FURUNO

OPERATOR'S MANUAL

ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM (ECDIS)

FMD-3005
FMD-3200
FMD-3200-BB

Model **FMD-3300**

For version 05.xx

FURUNO ELECTRIC CO., LTD.

www.furuno.com

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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 instructions in this manual. Wrong operation or maintenance can void 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 the 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 void the warranty.
- The following concern acts as our importer in Europe, as defined in DECISION No 768/2008/EC.
  - Name: FURUNO EUROPE B.V.
  - Address: Rotterdamseweg 30A, 2921 AP, Krimpen aan den IJssel, The Netherlands
- The following concern acts as our importer in UK, as defined in SI 2016/1025 as amended SI 2019/470.
  - Name: FURUNO (UK) LTD.
  - Address: West Building Penner Road Havant Hampshire PO9 1QY, U.K.
- The brand, product names, trademarks, registered trademarks, or service marks mentioned in this document belong to their respective holders.

How to dispose of this product

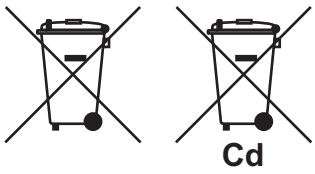
Dispose of this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.eiae.org/) for the correct method of disposal.

How to dispose of a used battery

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

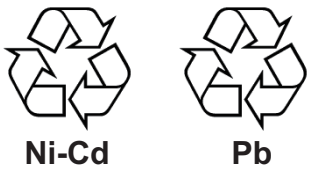
In the European Union

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

Follow the safety instructions listed below and throughout this manual to prevent damage to your equipment or vessel and to prevent harm to the operator or other personnel on-board. The results of failing to follow the instructions and guidelines outlined herein are listed below.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠ Warning, Caution Prohibitive Action Mandatory Action

⚠ WARNING

Do not open the equipment.

This equipment uses high voltage that can cause electrical shock.
Only qualified technician can work inside the equipment.

Turn off power at switchboard if the something is dropped inside the equipment.

Fire or electrical shock can result if the power remains on.

Turn off power at switchboard if the equipment is emitting smoke or fire.

Fire or electrical shock can result if the power remains on.

Do not place liquid filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Use the correct fuse.

Use of a wrong fuse can cause fire or damage the equipment.

⚠ WARNING

Do not disassemble or modify the equipment.

Fire, electrical shock or bodily injury can result.

Do not operate the equipment with wet hands.

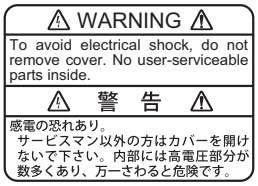
Fire or electrical shock can result.

Keep the equipment away from areas where contact with water is likely.

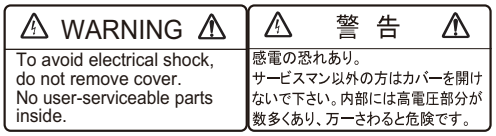
Fire or electrical shock can result if water gets into the equipment.

Warning Label

Warning labels are attached to the Processor Unit. Do not remove any label. If a label is missing or damaged, contact a FURUNO agent or dealer about replacement.



Name: Warning Label (1)
Type: 86-003-1011-3



Name: Warning Label (2)
Type: 03-129-1001-3

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FOREWORD

Congratulations on your choice of the FURUNO ECDIS (Electronic Chart Display and Information System) FMD-3005, FMD-3200, FMD-3200-BB, FMD-3300. 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.

This equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless installed, operated and maintained properly. Please carefully read and follow the recommended procedures for operation and maintenance.

Features

The FMD-3000 series ECDIS is the product of FURUNO's extensive experience in computer technology and marine electronics. The ECDIS displays electronic charts, nav lines, TT data, AIS objects and other navigation data on a high-resolution 19-inch (FMD-3005/3200), 23.1-inch display (FMD-3300), 27-inch display (FMD-3005/3300). The FMD-3200-BB is supplied without a monitor, permitting use of the commercial monitor of your choice.

The main features of this ECDIS series are

- Complies with the following standards: IMO A.694(17), IMO MSC.36(63), IMO MSC.97(73), IMO MSC.191(79), IMO MSC.232(82), IMO MSC.302(87), IMO MSC.1/Circ.1503, IEC 61174 Ed.4, IEC 61162-1 Ed.5, IEC 61162-2 Ed.1, IEC 61162-450 Ed.2, IEC 62288 Ed.3, IEC 60945 Ed.4, IEC 61996-1 Ed.2.0, IEC 62923-1 Ed.1, IEC 62923-2 Ed.1, IEC 62065 Ed.2.
- Continuous monitoring of ship's position through multi-sensor Kalman filter processing using GPS, DGPS, SDME.
- Route planning and route monitoring facilities.
- Radar image can be overlaid on electronic charts. (Requires FURUNO radar FAR-2xx7, FAR-2xx8, or FAR-3xxx.)
- Grounding warnings, safe depth contours.
- Chart database loaded and updated using DVD ROMs or CD ROMs.
- Target data from TT (Tracked Target) and AIS transponder to aid in collision avoidance.

Standards used in this manual

- The keys and controls of the ECDIS Control Unit RCU-024 are shown in bold face; for example, the **ENTER** key.
- The buttons on the InstantAccess bar™ and Status bar and menu items are shown in brackets; for example, the [PLAN] button.
- Context-sensitive menus are available with many buttons and boxes and objects within the display area. Right-click those items to display the related context-sensitive menu.
- Unless noted otherwise, "click" means to push the left button on a trackball module (in order to do a function).

- There are two types of Control Units: ECDIS Control Unit RCU-024 (alphabet keyboard, controls, trackball module) and Trackball Control Unit RCU-026 (trackball module only). Unless noted otherwise, "Control Unit" refers to the RCU-024.
- "Keyboard" refers to the alphabet keyboard of the ECDIS Control Unit RCU-024.
- The system can be operated with the controls of the ECDIS Control Unit or a trackball module. The descriptions in this manual use the trackball module.
- The colors mentioned in this manual are the default colors. Your colors may vary.
- “FMD-3xxx” refers to any of FMD-3005, FMD-3100, FMD-3200, FMD-3200-BB, FMD-3300.

Program no.

ECDIS: 2450074-05.xx, Conning: 2450079-05.xx
(xx is version no.)

Data protection scheme

Product	FMD-3005/3200/3200-BB/3300	
Software version	01.xx: FMD-3200/3300/ 3200-BB	03.xx: FMD-3200/3200-BB/ 3300/ 05.xx: FMD-3005/3200/3200-BB/3300
Testing Standard	IEC 61174 Ed. 3	IEC 61174 Ed. 4
Elec. Nav. Chart (ENC)	S-57 Ed. 3.1, S-57 Ed. 3.1.1, S-57 Maintenance Document (Cumulative) No.8	
Raster Nav. Chart (RNC)	S-61 Ed. 1.0	
ECDIS Presentation Library	S-52 PresLib Ed. 3.4	S-52 PresLib Ed. 4.0
ECDIS Color Scheme/Symbols	S-52 Ed. 6.0	S-52 Ed. 6.1
ENC Data Protection	S-63 Ed. 1.1.1	S-63 ed. 1.2.0
IHO CDS	S-64 Ed. 2.0.0	S-64 Ed. 3.0.1

The latest IHO standard can be found at http://www.iho.int

Virus prevention

The ECDIS is not equipped with a virus checker. The ECDIS operates in real time; therefore, having a virus checker that periodically checks the equipment for viruses would increase the processing load, which can affect operation. However, you can avoid viruses by following the instructions in this section.

Updating a chart: The PC and medium (USB flash memory, etc.) used to download and store an update for an existing chart or a new chart may be infected with a virus. Check the PC and the medium for viruses with a commercial virus checker - BEFORE you connect them to the ECDIS. Be sure the virus checker contains the latest virus definition files.

Network connection: The ECDIS receives and displays information from various navigation equipment and radar via a LAN. A PC and other equipment connected to a network can carry viruses. To prevent the introduction of a virus to the LAN, DO NOT connect the ECDIS or HUB to an external network, including other shipboard LAN.

3rd party software: Do not install any 3rd party software.

Open source software

This product includes software to be licensed under the GNU General Public License (GPL), GNU Lesser General Public License (LGPL), BSD, Apache, MIT 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 or LGPL as published by the Free Software Foundation. Please access to the following URL if you need source codes: https://www.furuno.co.jp/en/contact/cnt_oss_e01.html

This product uses the software module that was developed by the Independent JPEG Group.

Reverse engineering

Reverse engineering (disassemble, decompile) of the software of this equipment is strictly prohibited.
However, reverse engineering is permitted under the following conditions:

- The library used for the reverse engineering (GNU Library General Public License Version 2, GNU Lesser General Public License Version 2.1, or later editions) is clearly noted.
- The reverse engineered software is used only within the scope outlined under the appropriate license.

CE/UKCA declaration

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

Disclosure of Information about China RoHS

With regards to China RoHS information for our products, please refer to our website (www.furuno.com).

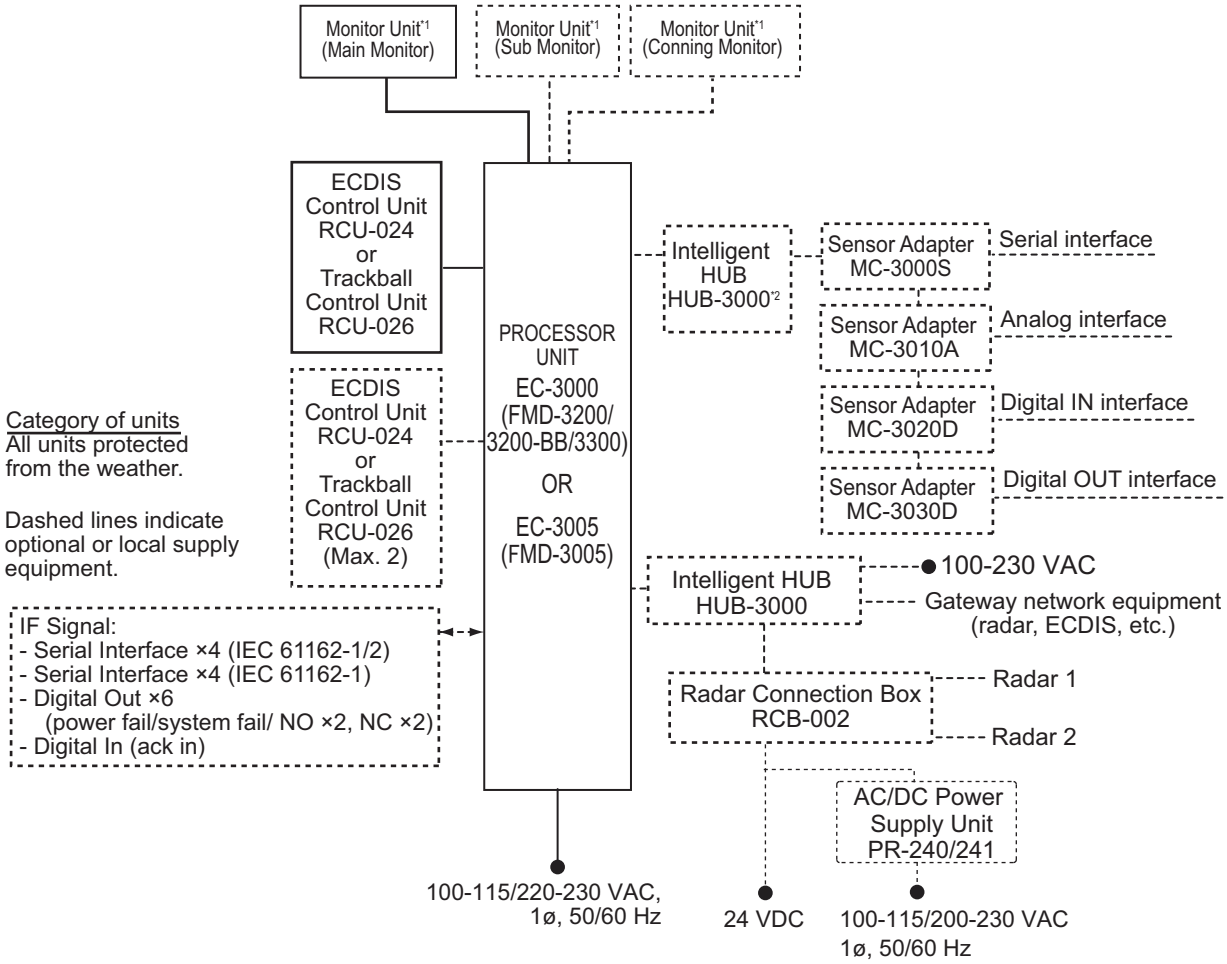
Importable file types

This ECDIS can import the following file types. It cannot import or execute other files. However, even if the file type is importable, it cannot be imported if the format is incorrect.

Route: .RTZ, .RTZP, .CSV, .TXT
User chart: .XML
User settings: .ZIP
ENC license file: .TXT
ENC data file: .ZIP
Radar map: .MRK

SYSTEM CONFIGURATION

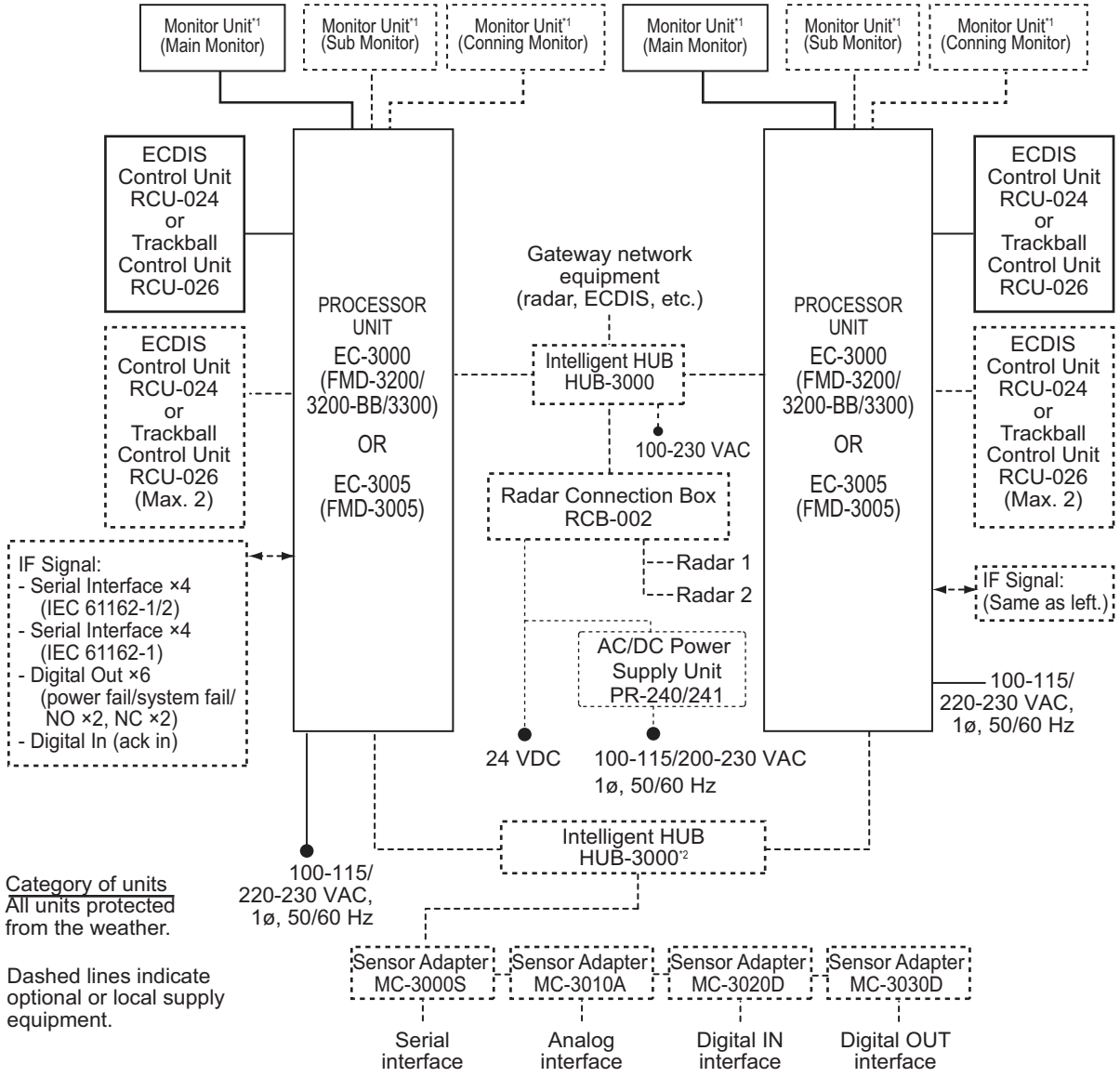
Single workstation



*1: See page xviii for the monitors available with the ECDIS.
*2: When the network complies with IEC 61162-450 Ed.1, the Switching Hub HUB-100 can also be used. (FMD-3200/3200-BB/3300 only)

Note: When using the EC-3000/3005 as an AMS device, connect an emergency power supply, in addition to the main power supply.

Multiple workstations



*1: See page xviii for the monitors available with the ECDIS.

*2: When the network complies with IEC 61162-450 Ed.1, the Switching Hub HUB-100 can also be used. (FMD-3200/3200-BB/3300 only)

Note: When using the EC-3000/3005 as an AMS device, connect an emergency power supply, in addition to the main power supply.

Monitors available with the ECDIS

The following monitors are available with the ECDIS:

Maker	Model	Viewing distance
FURUNO	MU-190*2	1.02 m
	MU-192*2	1.02 m
	MU-231*3	1.2 m
	MU-201CE	1.0759 m
	MU-231CE	1.0138 m
	MU-270W*5	1.02 m
Hatteland Technology	JH 19T14 FUD, JH 19T27 FUD	1.011 m
	JH 20T17 FUD	0.878 m
	JH 21T27 FUD	0.93m
	JH 23T12 FUD*6	1.011 m
	JH 23T14 FUD*4	1.011 m
	JH 26T11 MMD*6	0.985 m
	HD 19T21 MMD*6, HD 19T27 FUD	1.010 m
	HD 19T22 FUD*1	1.010 m
	HD 24T21 MMD*6	0.951 m
	HD 24T22 FUD, HD 24T27 FUD	0.951 m
	HD 26T21 MMD	0.985 m
	HD 26T22 MMD*6	0.985 m
	HD 26T22 FUD	0.985 m
	HD 27T22 FUD, HD 27T27 FUD	1.070 m
	HD 32T22 FUD*6, HD 32T40 FUD*6	1.268 m
	HD 55T22 FUD*6, HD 55T40 FUD*6	2.164 m
North Invent	WA270-01.MON.01	1.02 m
	WE270FU	1.07 m
	WA460-01.MON.01	1.82 m

*1: Standard supply for FMD-3200 (HK configuration only).

*2: Standard supply for FMD-3005/3200.

*3: Standard supply for FMD-3300.

*4: Standard supply for FMD-3300 (HK configuration only).

*5: Standard supply for FMD-3005/3300.

*6: Do not use for the monitor connected to the DVI1 port. These monitors are available for the port other than DVI1 port.

1. INTRODUCTION

1.1 System Configuration

This ECDIS series is comprised of the components shown in the illustration on the System Configuration page.

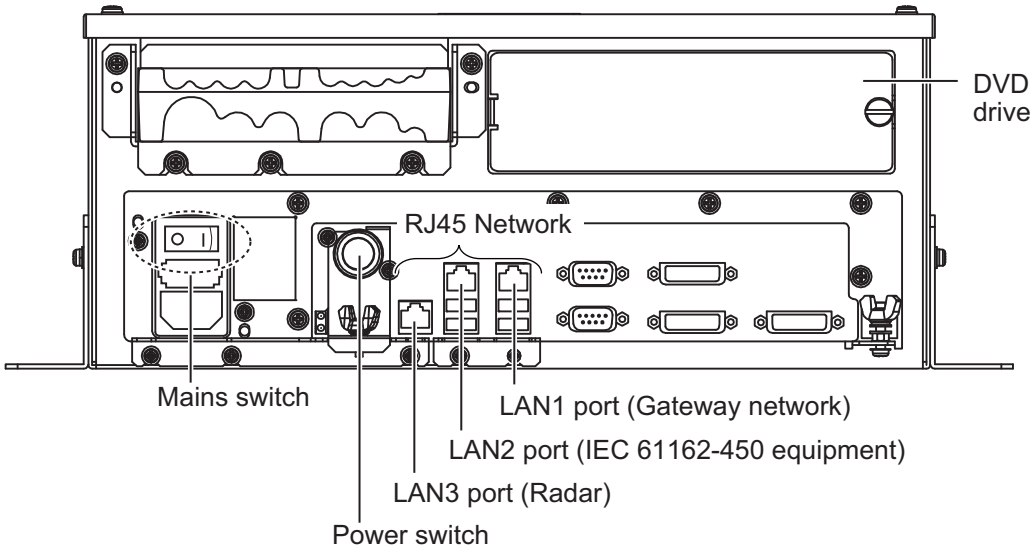
The Processor Unit is connected to various sensors, and performs navigation calculations, route planning and route monitoring. The Sensor Adapters interface between the Processor Unit and external equipment.

The operator controls the ECDIS with the ECDIS Control Unit RCU-024 or the Trackball Control Unit RCU-026. Both units are equipped with a trackball module (trackball, right and left mouse buttons and a scrollwheel). The RCU-024 is additionally equipped with an alphabet keyboard. All functions of the ECDIS can be accessed from the trackball module.

1.2 Processor Unit EC-3000/3005

The Processor Unit is the heart of the ECDIS system, and is mainly responsible for the chart management, route planning and route navigation.

The Processor Unit has two power switches. The Mains switch controls the power from the switchboard, and the Power switch controls the power to the ECDIS system.



Note 1: Do not operate the system with a medium inserted in the DVD drive when its use is not required, to prevent damage to the drive and medium. After use of a medium is completed, remove the medium from the drive and store it in its case.

Note 2: To keep the system stable, restart the unit at least once every two weeks.

Note 3: Close the lid of the DVD drive when the drive is not in use.

Note 4: The DVD ROM provided with this equipment contains the ECDIS program. Store the DVD in a place where the temperature and humidity are moderate. The recommended storage temperature is -10°C(14°F) to 40°C(104°F).

1.3 How to Turn the Power On/Off

Normally, leave the power switches at the front of the Processor Unit on and control the power with the power key on a Control Unit (RCU-024, RCU-026). The Monitor Unit is powered independently.

How to power the system

Push the Mains switch on the Processor Unit for the "I" position. Turn on the power switch on the Processor Unit or the power key on the Control Unit. The start-up display appears on the monitor.

Note: If the ambient temperature is less than 0°C(32°F) when the power is applied, nothing appears on the display. This is because the heater is warming the Processor Unit. The display appears after the Processor Unit becomes warm, in approx. two minutes.

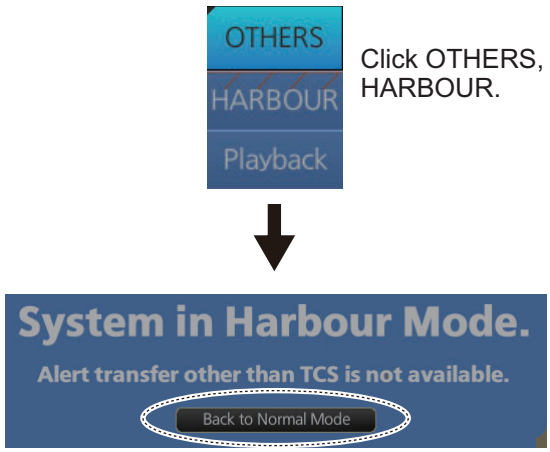
How to power off the system

Press the power switch on the Processor Unit or the power key on the Control Unit. Then, push the Mains switch for the "O" position.

1.4 The Harbour Mode

The Harbour mode is available to stop alert transfer from ECDIS to BNWAS for alerts other than a TCS alert. Use this mode when the ECDIS is not required, like in a harbour.

To activate the Harbour mode, first click the [OTHERS] button on the Status bar, then click [HARBOUR].



Click to return to normal operation.

To deactivate the Harbour mode and return to normal operation, click [Back to Normal Mode].

1.5 ECDIS Control Unit RCU-024

The RCU-024 consists of controls, keys, alphabet keyboard and trackball module (trackball, scrollwheel and left and right mouse buttons). The trackball module functions like a PC mouse. The operator rolls the trackball and operates the left and right mouse buttons and the scrollwheel to do various functions.



1.5.1 Control description

Key	Description
POWER key	Turns the system on or off. (Where the slide switch for a FURUNO monitor is ON, this key also turns the display unit on or off.)
Status LED	The color and state of the LED change according to system or alert status. **Green, lighting**: Normal operation status; no alerts generated. **Red, lighting**: Acknowledged alert (but not rectified) or SYSTEM FAIL. SYSTEM FAIL occurs when there is trouble in the Processor Unit or communication failure between the Processor Unit and an ECDIS Control Unit. Each Control Unit detects trouble and its lamp flashes in red and the buzzer sounds. If this condition occurs at the No. 1 ECDIS Control Unit, the SYSTEM FAIL signal is output. **Red, flashing rapidly**: Alert not acknowledged nor rectified. **Red, flashing slowly**: Alert not acknowledged but rectified. **OFF**: The heater on the CPU board is on, because the ambient temperature is not at least 0°C. The heater takes about two minutes to warm the equipment. The LED lights green after the heater goes off.
EBL rotary encoder	Adjusts active EBL.
[EBL 1]	Activates or deactivates EBL 1.
[EBL 2]	Activates or deactivates EBL 2.

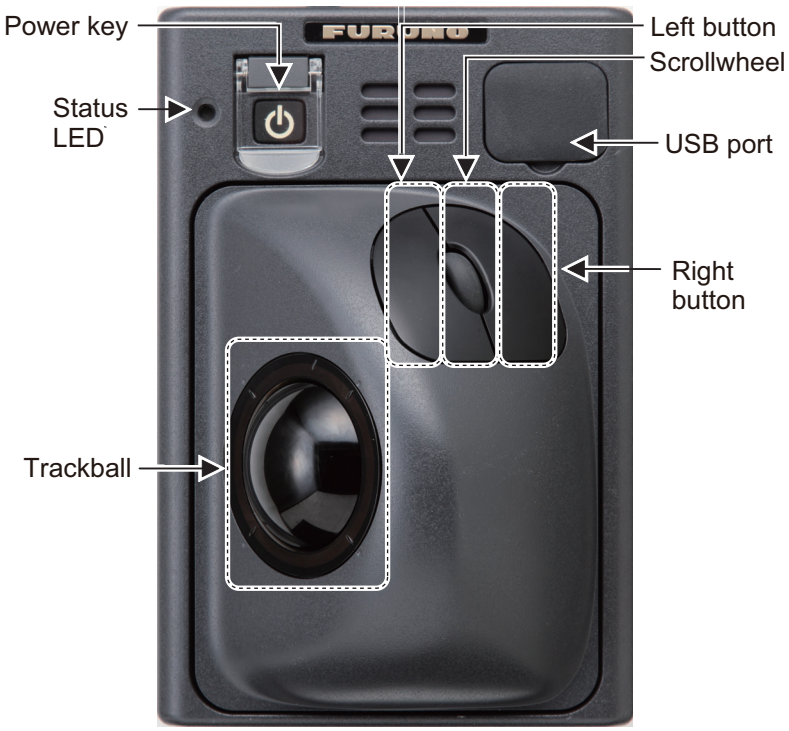
Key	Description
[ALARM ACK]	Alert acknowledgment for alerts generated by chart, navigation, etc.
InstantAccess knob ESC key	Selects and processes the functions on the InstantAccess bar™. **Rotate**: Selects item. **Push**: Confirms selection. **ESC** key: Goes back one step in the current operating sequence on the InstantAccess bar™.
[BRILL]	**Rotate**: Adjusts the brilliance of the monitor. **Push:** Selects a color palette.
[A/C RAIN]	No use.
[A/C SEA]	No use.
[GAIN]	**Push:** Takes a screenshot.
Alphabet keyboard	Enter alphanumeric data. The **CTRL** key has no function.
VRM rotary encoder	Adjusts active VRM.
[MFD]	Switches between the ECDIS, CONNING, and AMS* modes. *Optional specification
[VRM 1]	Activates or deactivates VRM1.
[VRM 2]	Activates or deactivates VRM2.
[UNDO]	Undo the last operation, when creating a route or user chart.
[VIEW/HIDE]	Shows or hides the Instant Access bar, [Route Information] box, VRMs, EBLs, [Overlay/NAV Tools] box.
[RANGE]	Selects the display scale.
[ACQ/ACT]	Activates cursor-selected sleeping AIS target.
[TARGET DATA]	Displays detailed data for selected TT, AIS object.
[TARGET CANCEL]	Sleeps cursor-selected activated AIS target.
USB port	Connects a USB flash memory (FAT16 or FAT32 format only) or DVD drive. Do not connect a USB HDD or PC keyboard. The DVD drive (Maker: TEAC, Type: PU-DVR10) is for chart updates.
Trackball module	See the description in section 1.6.
Speaker	Activates key beeps and alert sounds. **Note:** A thin waterproofing sheet is attached to the speaker on the control unit. Do not insert brushes or other objects into the speaker holes when cleaning them. If the sheet is torn, the speaker may be damaged if water leaks through the holes.

1.5.2 Operator fitness

The operator fitness signal is output whenever a key, the trackball, or the rotary encoder is operated.

1.6 Trackball Control Unit RCU-026

The RCU-026 has a power key, a trackball module (trackball, scrollwheel and left and right mouse buttons), a status LED, and a USB port. The trackball module functions like a PC mouse; the user rolls the trackball and operates the left and right buttons and the scrollwheel to do various functions.



Note: RCU-030 (optional unit) has a trackball module name the same as RCU-026.

1.6.1 Control description

Control	Description
Power key	Turns the system on or off. (While the slide switch for a FURUNO monitor is ON, this key also turns the display unit on or off.)
Status LED	The color and state of the LED change according to system or alert status. See the LED status description on page 1-3.
Left button	• Does the operation related to the object selected. • Confirms the operation done for the object selected.
Scrollwheel	• Select options. • Selects chart scale. • Sets numeric data. The scrollwheel does not have a "push" function.
Right button	• Displays context-sensitive menu when cursor is put in the display area. • Cancels operation done on the object selected.
Trackball	• Moves the cursor. • Selects an object.
USB port	Connects a USB flash memory (FAT16 or FAT32 format) or DVD drive. Do not connect a USB HDD or PC keyboard. The DVD drive (Maker: TEAC, Type: PU-DVR10) is for chart updates.

1.6.2 Operator fitness

The operator fitness signal is output whenever the trackball is operated.

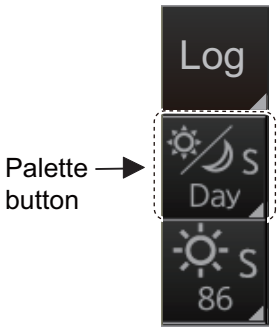
1.7 How to Select a Color Palette

The system provides three sets of color and brilliance sets (palette), day, dusk and night, to match any ambient lighting condition. The default specifications of each set are as shown in the table below. The panel dimmer setting is automatically changed, and the number of steps depends on the color palette selected.

Palette	Brilliance		Panel dimmer (step)	Text color	Background color
	19" display unit	23"/27" display unit			
Day-gray	110 cd/m^2	120 cd/m^2	9	White	Gray
Day-blue	110 cd/m^2	120 cd/m^2	9	White	Blue
Dusk-gray	50 cd/m^2	50 cd/m^2	8	Light gray	Dark gray
Dusk-blue	50 cd/m^2	50 cd/m^2	8	Light gray	Dark blue
Night-gray	5 cd/m^2	5 cd/m^2	5	Orange	Dark gray
Night-blue	5 cd/m^2	5 cd/m^2	5	Light gray	Dark blue

To select a palette, do the following:

1. Click the [ ] (Palette) button on the InstantAccess bar™.



2. Select [Day], [Dusk] or [Night] as appropriate. For example, select [Day] to show its options.



3. Click the palette desired.

Note 1: A palette can also be selected by pushing the **BRILL** control on the Control Unit.

Note 2: If the display cannot be seen when switching from a Night to Day palette, push and hold the right button (approx. 2 seconds) to switch to the dusk-gray mode.

Note 3: The color palette setting may not get synchronized among FMD-3xxx units selected for synchronization if a unit is being booted during the selection of the color palette. If this occurs, wait until all FMD-3xxx units selected for synchronization have booted, then reselect required color palette.

Note 4: The "S" or "L" at the right edge of the [ ] button indicates color palette adjustment method, S for System, L for Local. See section 23.7.

1.8 How to Adjust the Display Brilliance, Control Unit Backlighting

The monitor brilliance setting is defined according to the color palette setting. However, manual adjustment of the brilliance is also possible.

The backlighting for the Control Unit can be adjusted from the monitor brilliance adjustment window.

Note 1: To adjust the brilliance of the monitor from the Control Unit, use a brilliance control serial cable for the connection between the Processor Unit and the Control Unit.

Note 2: For how to adjust the display brilliance from your monitor, see its operator's manual.

Note 3: Improper brilliance may affect the visibility of information, especially on the night display.

Note 4: The "S" or "L" at the right edge of the [ ] button indicates brilliance adjustment method, S for System, L for Local. See section 23.7.

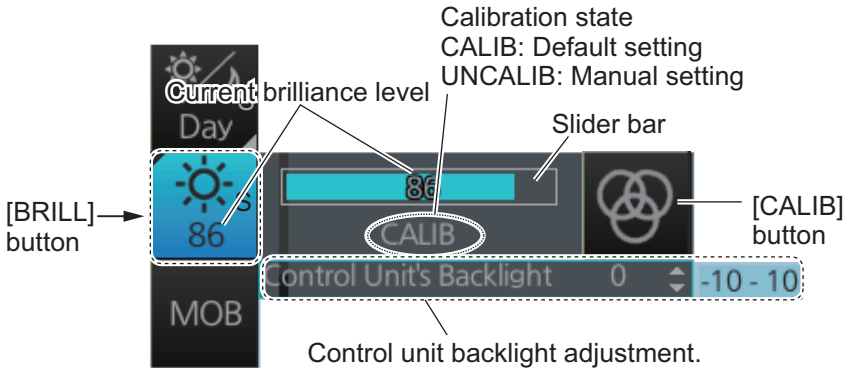
1.8.1 Manual brilliance adjustment

Manual brilliance adjustment with BRILL control on the ECDIS Control Unit

Operate the **BRILL** control to adjust brilliance. Turn it clockwise to increase the brilliance; counterclockwise to decrease the brilliance. Watch the brilliance level indication on the [ ] button (see the illustration below) to see the current brilliance level.

Manual brilliance adjustment from the InstantAccess bar™

1. Push the **InstantAccess** knob.
2. Rotate the knob to select the [ ] button, then push the knob to show the brilliance adjustment window.



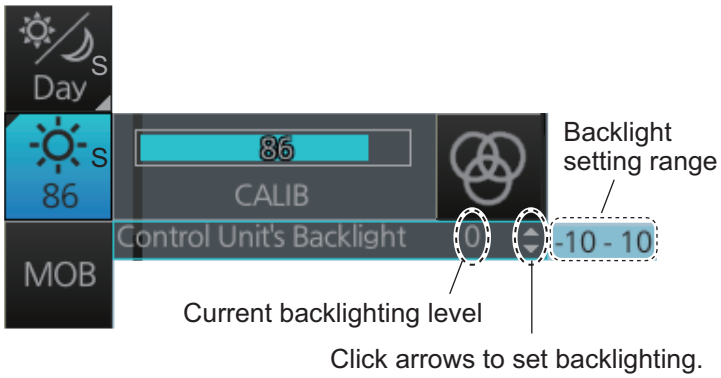
3. With the box ([CALIB]) in the center of the window selected, push the knob.
4. Rotate the knob to adjust the brilliance, the push the knob to set. The calibration state indication changes to "UNCALIB".
5. To restore the default brilliance, select the [ ] button, then push the knob. The calibration state indication changes to "CALIB".

Manual brilliance adjustment with the trackball module

1. Click the [ ] button on the InstantAccess bar™ to show the brilliance adjustment window.
2. **For coarse adjustment**, put the cursor on a location within the slider bar area, then push the left button. **For fine adjustment**, put the cursor on the end of the slider bar and roll the trackball while holding down the left button. The calibration state indication changes to "UNCALIB".
3. To restore the default brilliance, select the [ ] button, then push the knob. The calibration state indication changes to "CALIB".

1.8.2 Control unit backlighting

Put the cursor on the backlighting setting, and up and down arrows appear. Click the arrows to adjust the backlighting.

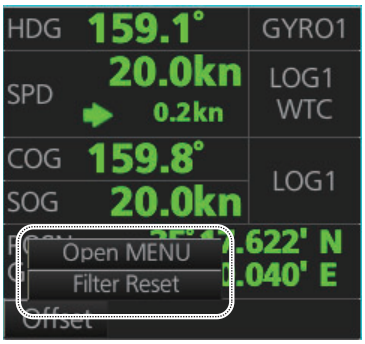


1.9 How to Enter Ship Speed

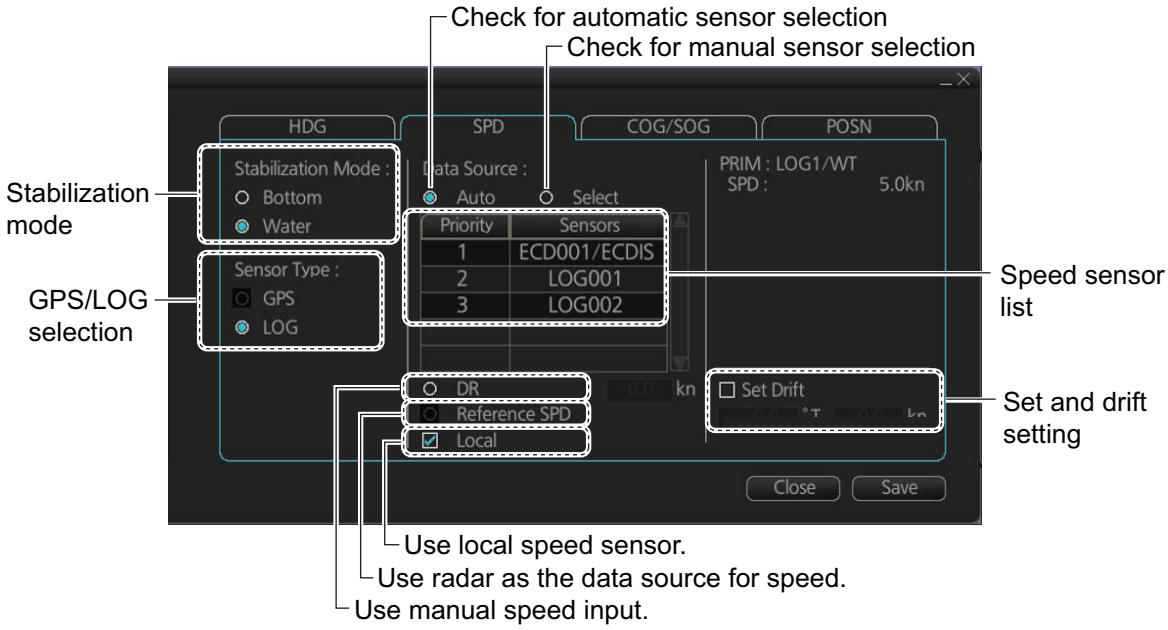
The speed can be entered automatically from a log (STW) or GPS (SOG), or manually on the menu.

Note: If [Local] is not checked, the following sensor settings are synchronized with all FMD-3xxx and FAR-3xxx units on the same network.

1. Right-click anywhere in the [Own ship information] box to show the context-sensitive menu.



2. Click [Open MENU] to show the [System Sensor Settings] menu.
3. Click the [SPD] tab.



SPD page

4. Do one of the following:
   <u>Automatic speed input</u>
   1) Check [Auto] at [Data Source].
   2) Check [LOG] or [GPS] at [Sensor Type] as appropriate.
   3) Select [Bottom] or [Water] at [Stabilization Mode]. Select [Bottom] if GPS is the source of speed data, or [Water] if a speed log is the source of speed data.
      Note: To switch between bottom tracking and water tracking speeds and vice versa, select [Bottom] or [Water] from the [Stabilization Mode] window. See section 2.5.2 for details.

Manual speed input

1) Confirm that AIS is disabled.
2) Select [Water] at [Stabilization Mode].
3) Select [DR].
4) Use the scrollwheel or keyboard to input speed.
   - **Scrollwheel**: Spin the wheel to set speed.
   - **Keyboard**: Enter speed with numeric keys.

Note: For set and drift, see page 18-3.

Local speed sensor input

Check [Local] to set the ship's speed independently from the system speed sensors. However, DR (Dead Reckoning) still uses system sensor speed.

5. Click the [Save] button to save settings.
   If the speed is entered manually and [Local] is not checked, you are asked "AIS Function of all units will be turned off. Do you wish to continue?" Click the [OK] button. The confirmation message appears the first time DR is selected on the [HDG], [POSN] or [SPD] page.
6. Click the [Close] button to close the menu.

Notes on speed input

- Be sure not to select a LOG option when a speed log is not connected. If the log signal is lost, the GPS sensor is used. In the event of GPS loss, the SPD is shown as "**.* kn".
- The SPD is shown as "**.* kn", and the label "LOG" is erased if no log signal is present for a certain amount of time. The timeout varies according to ship.
- If SOG is changed to STW, the label "LOG" (in orange) appears. If log signal is lost "LOG" is colored yellow.
- A single-axis water log cannot measure speed when the wind is coming from the leeway direction.
- Reference speed is not shared among units.
- To use [Reference SPD], turn off the AIS function and check [Bottom] and [Local] on the [SPD] page.

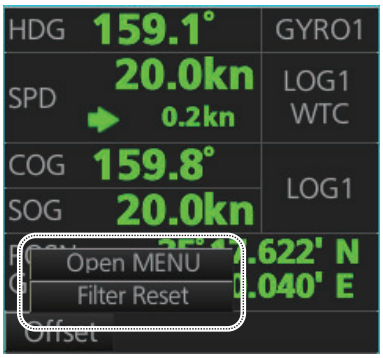
1.10 How to Enter Heading

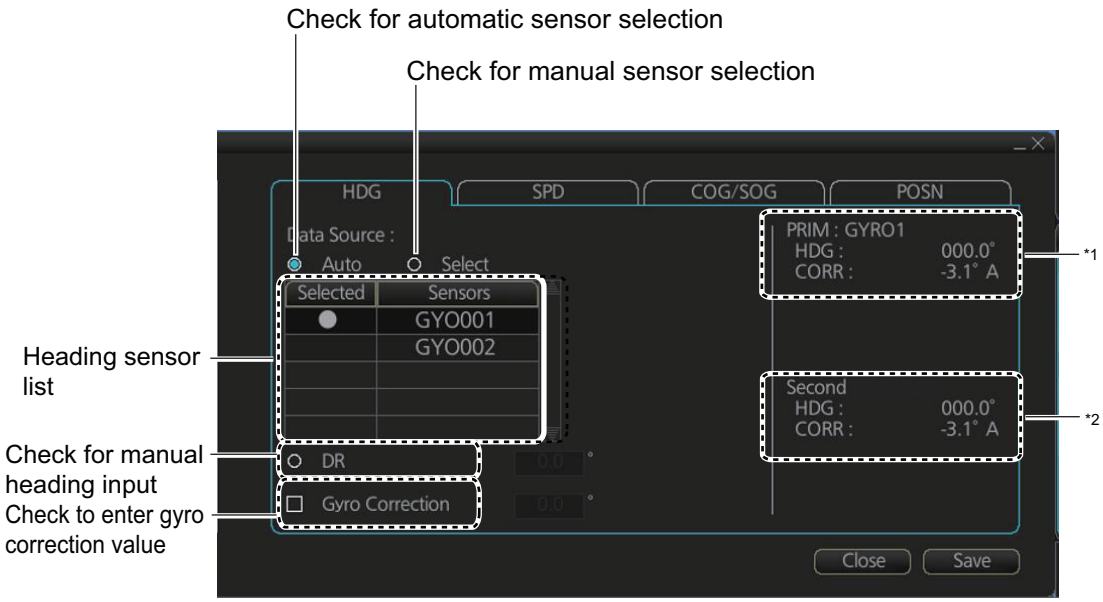
Heading can be entered automatically or manually.

Note 1: The following sensor settings are synchronized with all FMD-3xxx and FAR-3xxx units on the same network.

Note 2: When the vessel is in high latitudes (over 85°), data from the gyrocompass is not used. The internal filter data is used for heading calculation. In this case, the heading source in the sensor information box appears as "FILT".

1. Right-click anywhere in the [Own ship information] box to show the context-sensitive menu.
2. Click [Open MENU] to show the [System Sensor Settings] menu.
3. Click the [HDG] tab.





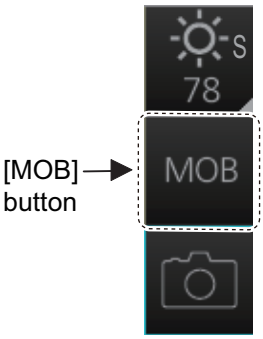
*1 Gyro correction display.
*2 [Second] is displayed even if only one gyrocompass is connected.

4. Do one of the following:
   Automatic heading input
   Check [Auto] at [Data Source].
   Note: To apply correction to the gyrocompass indication, check [Gyro Correction], then spin the scrollwheel to set the correction value.
   Manual heading input
   1) Confirm that AIS is disabled.
   2) Select [DR].
   3) Use the scrollwheel or keyboard to input heading.
      - **Scrollwheel**: Spin the wheel to set heading.
      - **Keyboard**: Enter heading with numeric keys.

5. Click the [Save] button to save settings.
   If the heading is entered manually, you are asked "AIS Function of all units will be turned off. Do you wish to continue?". Click the [OK] button. The confirmation message appears the first time DR is selected on the [HDG], [POSN] or [SPD] page.
6. Click the [Close] button to close the menu.

1.11 How to Mark MOB Position

Use the MOB (Man Overboard) feature to mark the position of man overboard on the display screen. Access the [MOB] button (in any mode) on the InstantAccess bar™.

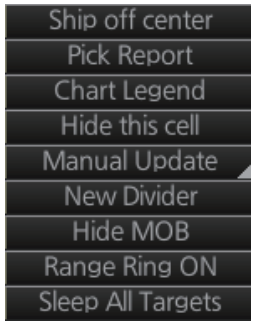


The MOB mark (orange) instantly appears at the system position when the button is operated.



Up to 100 MOB marks can be saved. When the capacity for MOB marks is reached, the oldest mark is automatically erased to make room for the latest.

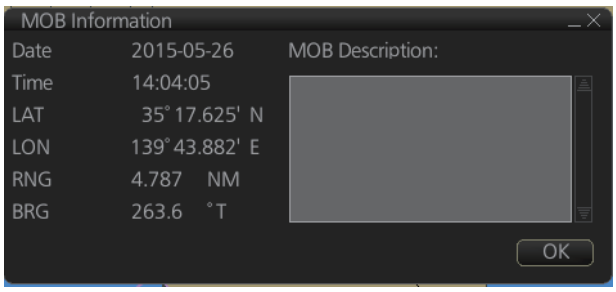
To hide an MOB mark, first click [NAVI] or [PLAN] on the Status bar. Right-click the mark to show the context-sensitive menu (shown right), then select [Hide MOB].



Exercise caution when using this feature in strong tide or current. The person will not be at the MOB position for a very long time. To show the range and bearing to the MOB considering the tidal current, right-click the MOB mark to show the context-sensitive menu, then select [Maneuver MOB]. To hide the range and bearing data, right-click the MOB mark, then select [Clear Maneuver].

How to find MOB information

In an ECDIS mode other than Chart maintenance, put the cursor on a MOB mark, then click to show the [MOB Information] window. Text can be entered in the [MOB Description] box. Click the [OK] button to save the text and close the window.

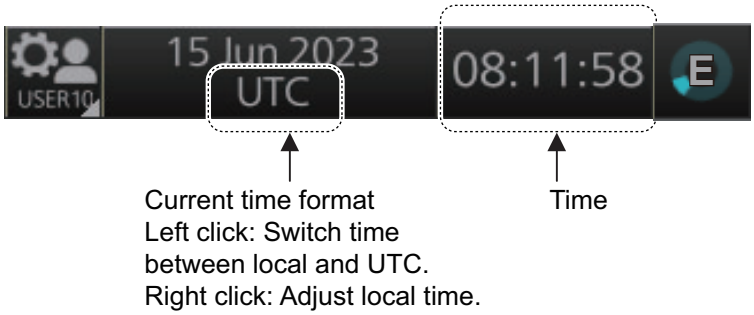


1.12 How to Select Time Format, Set Local Time

The time indication on the Status bar shows either UTC time and date, or on-board time and date, and cannot be adjusted. On-board time display requires synchronization with the on-board clock. For further details, consult your local dealer.

You can switch between the local time and the UTC time by left-clicking the Current time format indication (requires synchronization with local time, consult your local dealer for details).

Note: The date and time are yellow when the ZDA sentence is lost.



To set the local time, enter the time difference between the local time and the UTC time as shown below.

Note: Where the on-board time is synchronized, the local time setting is not available.

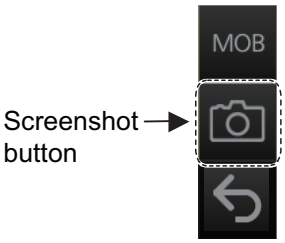
1. Right-click the Current time format indication to show the context-sensitive menu, then click [Adjust Local Time] to display the [Local Time Adjust] dialog box.



2. Enter the time difference between the local time and the UTC time, in hours and minutes. Use the button on the left to select the time offset direction. Select "+" if the local time is ahead of the UTC time, or "-" if it is behind the UTC time.

1.13 How to Take a Screenshot of the Display

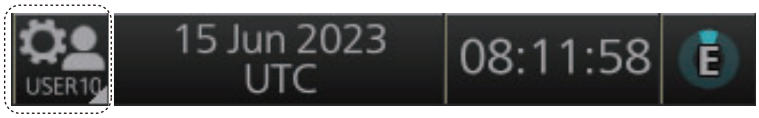
Click the Screenshot button (📷) on the InstantAccess bar™ to take a screenshot, and save it to the SSD (Solid State Drive). Alternatively, if your system has the ECDIS Control Unit RCU-024, you can push the [GAIN] control to take a screenshot. You can save a maximum of 100 screenshots. When the capacity for screenshots is reached, the oldest screenshot is automatically deleted to make room for the latest. In this case, delete unnecessary screenshots. You cannot take a screenshot when a menu or a dialog box is open. Screenshots can be copied to a USB flash memory. For how to process screenshots, see section 23.11.



1.14 The Settings Menu

The [Settings] button ( ) gives you access to the user profiles and the [Settings] menu. The [Settings] menu has facilities for screenshot management, file management, diagnostic tests and customizing. See chapter 23.

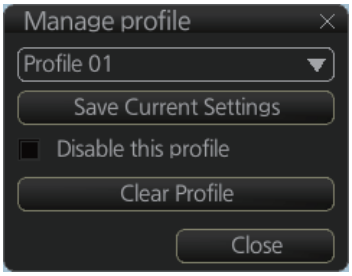
[Settings] button
The number on the button indicates the profile no. in use.



1.15 How to Manage User Profiles

Ten sets of [Chart Display], [Symbol Display] and [Chart Alert] menu settings can be stored in user profiles for later retrieval.

1.15.1 How to create a profile



1. Set the [Chart Display], [Symbol Display] and [Chart Alert] menus as desired.
2. Click [ ] on the Status bar, then click [Manage Profile].
3. Select a profile number from the "Profile" drop-down list.
   Note: Profiles 06-10 are disabled in the default setting. To enable a disabled profile, select the profile to enable from the "Profile" drop-down list, then remove the uncheck [Disable this profile].
4. Click [Save Current Settings].

1.15.2 How to disable a profile

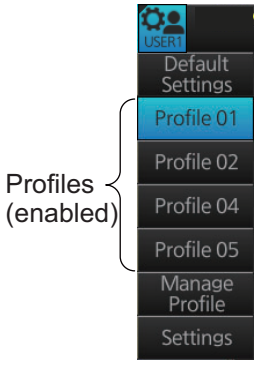
1. Click [ ] on the Status bar, then click [Manage Profile].
2. Select a profile number from the "Profile" drop-down list.
3. Check [Disable this profile].

The profile enabled at section 1.15.3 cannot be disabled.

1.15.3 How to activate a profile

1. Click [ ] on the Status bar.
2. Click the profile number you wish to activate.
   The confirmation message "Settings will be changed to Profile xx. Do you wish to continue?" appears.
3. Click [Yes] to activate the selected profile. Click [No] to cancel.

The button label shows the profile number selected at step 2.



1.15.4 How to erase a profile's default settings

1. Click [] on the Status bar, then click [Manage Profile].
2. Select a profile number from the "Profile" drop-down list.
3. Click [Clear Profile].
   The confirmation message "This profile will be cleared. Do you wish to continue?" appears.
4. Click [Yes] to clear all settings for the selected profile. Click [No] to cancel.

The settings for the profile number selected in step 2 change to those listed in the table in section 1.15.5.

1.15.5 How to restore default settings to a profile

1. Click [] on the Status bar, then click [Default Settings].
   The confirmation message "Settings will be changed to the default. Do you wish to continue?" appears.

   Note: This step can also be done by long-pressing the [] button.
2. Click [Yes] to restore default settings. The table below shows the items that are restored to default.

Note: If you try to restore default settings when there are unacknowledged alerts, you are informed the operation cannot be completed because there are unacknowledged alert(s). Acknowledge the alerts, then repeat the procedure.

Item		Settings
[**System Sensor Settings**] menu		
SPD page	Stabilization Mode	Bottom
[**Other Sensor Settings**] menu		
Other Sensor page	Wind	m/s
[**Basic Setting**] menu		
Basic Setting page	TM Reset	90%
[**Chart Display**] menu		
[General] page	Symbols	Paper Chart
	Boundaries	Plain
	Four Shades	Unchecked
	Full Light Lines	Unchecked
	Scale MIN	Unchecked
	Shallow Pattern	Unchecked
	Shallow Water Dangers	Checked
	Unknown	Checked
	Accuracy	Unchecked
	Highlight Date Dependent	Unchecked
	Highlight INFO	Unchecked
	Highlight Document	Unchecked
	Contour Labels	Unchecked
	LAT/LON Grid	Unchecked
[Text] page	Important Text	Checked
[NtoM] page	Temporary Notices	Unchecked
	Preliminary Notices	Unchecked
	No Information	Unchecked

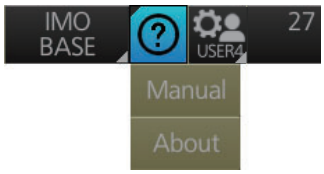
Item		Settings
[**Symbol Display**] menu		
[General] page	Ship Outlines	ON
	AIS Outlines	OFF (grayed out)
[Tracking] page	CCRP	Checked
	Primary	Checked
	Secondary	Checked
	Pivot	Checked
	Labels	0 min (OFF)
[Mariner] page	Labels	Checked
	Lines	Checked
	Clearing Lines	Checked
	Tidals	Checked
	Areas	Checked
	Circles	Checked
[**Chart Alert**] menu		
[Chart Alert] page	Safety Contour	Keeps previous setting
	Safety Depth	Keeps previous setting
	Safety Contour check box	Checked
	Dangerous or special areas	Checked
	Navigational Hazard check box	Checked
	Navigation Hazard Alert level	C (Caution)
[**TT/AIS**] - [**Setting**] menu		
[Setting.1] page ([AIS DISP Filter])	Base Station	OFF
	SAR Aircraft	OFF
	SART	OFF
	Synthetic Target	OFF
	Physical AtoN	OFF
	Virtual AtoN	OFF
[Setting.1] page ([Sleeping Target DISP Filter]	Synthetic AtoN	OFF
	Mobile Physical AtoN	OFF
	Mobile Virtual AtoN	OFF
[Setting.1] page ([Sleeping Target DISP Filter]	MAX Range	ON, 6 NM
	MIN Ship Speed	OFF (0.0 kn)
[Setting.1] page ([TT DISP Filter])	MAX Range	ON, 6 NM
[**Route Information**] menu		
[Route information] page	unit of “XTD”	m
Chart scale/presentation mode box		
Chart scale		3 NM
Presentation mode		North Up TM
[**Overlay/NAV Tools**] box		
[Look-ahead] page	Ahead	Time, 6 min
[Echo] page	Display	OFF
[TT/AIS] page	TT display	FILT OFF
	AIS display	DISP ALL
	Vector	6 min, TRUE
	PAST POSN	OFF

Item	Settings
Other functions	
Brilliance	CALIB
Viewing Date - Display Date	Auto: Today
Split Screen	Full Screen (no split)
Chart database mode	CUSTOM
TM Reset function	Enabled
Own track	Disabled
Log - NAV Log - Detail dialog	Show Track

*: Chart alert objects other than Safety Contour, No Vector Chart, Sounding UKC Limit, Not up-to-date, Navigational Hazard, UKC Limit, Non-official ENC, Permit Expired.

1.16 How to View System Information, Operator's Manual

You can show the system information and the operator's manual. Click the [?] button on the Status bar, then click the [Manual] or [About] button.

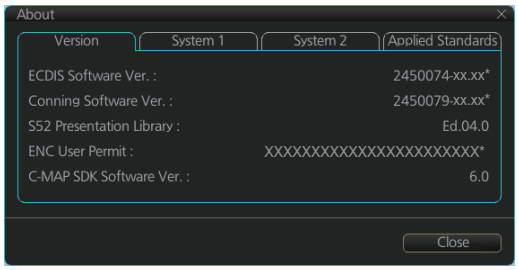


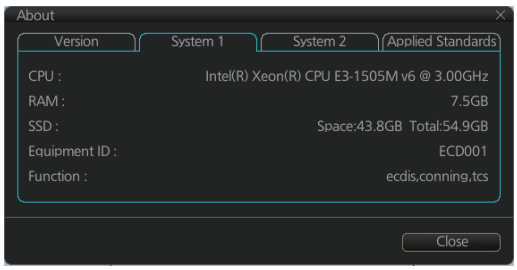
[**Manual**] shows the Operator's Manual

[**About**] shows the system information, prepared in the four tabs listed below.

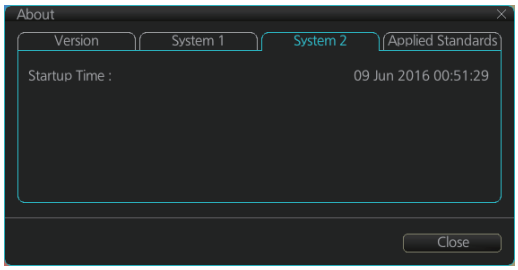
- [Version]: Shows the ECDIS software version no., conning software version no., S52 presentation library version, ENC user permit no., and C-MAP SDK software version no.
- [System 1]: Shows ECDIS system information: CPU type*, RAM capacity, SSD free/SSD capacity, Equipment ID and dongle information.
  *: The CPU board types are as shown below.
  ADP-555-03 (FMD-3xx0 only): [Intel(R) Core(TM) i5CPU E520 @ 2.40GHz]
  ADP-556-01 (FMD-3xx0 only): [Intel(R) Core(TM) i3-3120ME CPU @ 2.40GHz]
  ADP-219-01: [Intel(R) Xeon(R) CPU E3-1505M v6 @ 3.00GHz]
  [Function] shows the functions available with this system. In the example figure below, the functions are ecdis, conning, tcs.
- [System 2]: Shows the startup time of the current session.
- [Applied Standards]: Shows the IEC standards that the system conforms to.

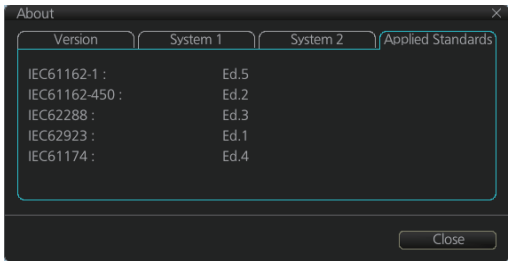
The information shown in this window may be different than what appears on your display.





*: Actual permit/version number appears here.



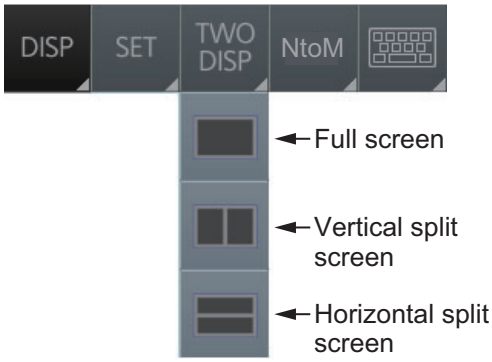


1.17 Split Screen

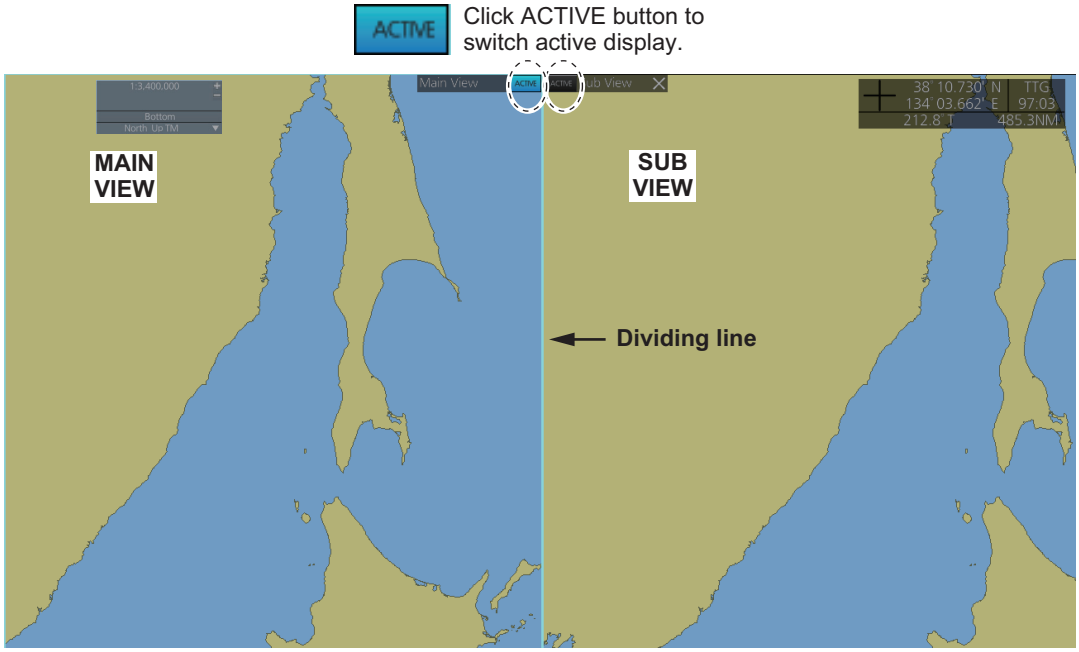
You can split the screen in two, horizontally or vertically, in the Voyage navigation mode.

1.17.1 How to activate, deactivate the split screen

To activate the split screen or return to the full screen, click the [DISP] and [TWO DISP] buttons on the InstantAccess bar™ to show the choices for screen division. Click the screen division desired.



The example below shows the vertical split screen. The active display can be switched by clicking an [ACTIVE] button at the top of the display. The dividing line between the main and sub views cannot be moved.



1.17.2 Function availability

Item	Viewable		Operable	
	Main	Sub	Main	Sub
AIS object	Yes	Yes	Yes	Yes
Anchor watch	Yes	Yes	Yes	No
Chart display	Yes	Yes	Yes	No
Danger highlight	Yes	Yes	Yes	No
Divider	Yes	Yes	Yes	No
EBL, VRM	Yes	Yes	Yes	Yes
Parallel index lines	Yes	Yes	Yes	Yes
Radar overlay	Yes	No	Yes	-
Range rings	Yes	Yes	Yes	No
TT	Yes	Yes	Yes	Yes
Weather overlay	Yes	No	Yes	-

1.17.3 Split screen usage characteristics

- If the sub view is not displayed correctly, restore the full screen display, then try to activate the split screen again.
- The display may not be updated when switching to the Voyage planning mode. If this occurs, switch to the Voyage navigation mode, restore the split screen display, then return to the Voyage planning mode.
- The own ship mark may not appear at the screen center when releasing the split screen display. If this occurs, click the indication "TM/CU Reset" at the top right position on the screen to show the own ship mark at the screen center.
- The TM reset feature only works on the active display. To return the own ship mark to the screen center, click the indication [TM/CU Reset] at the top right position on the screen.
- The sub view can use a location and chart scale different from the main view.
- The chart scale related messages (overscale, larger ENC available, etc.), which appear beneath the chart scale indication, show only on the main view.

1.18 Tips

This ECDIS provides operational tips for the display area and the InstantAccess bar™. To get a tip, simply put the cursor on an object. The tip appears to the right of the object. For example, put the cursor on the [BRILL] button on the InstantAccess bar™. The tip "Adjust brilliance" appears.



1.19 Printer Information

A Hewlett Packard (HP) printer may be connected to the system to print ENC Publisher's Notes, reports, logs, etc.

The available HP printers are Officejet Pro 8000, Officejet Pro 8100, Officejet Pro 8210, Officejet Pro 9110b, Officejet 100 Mobile, Officejet 200 Mobile, and HP Color LaserJet Pro M255dw. No other makes or models are permitted.

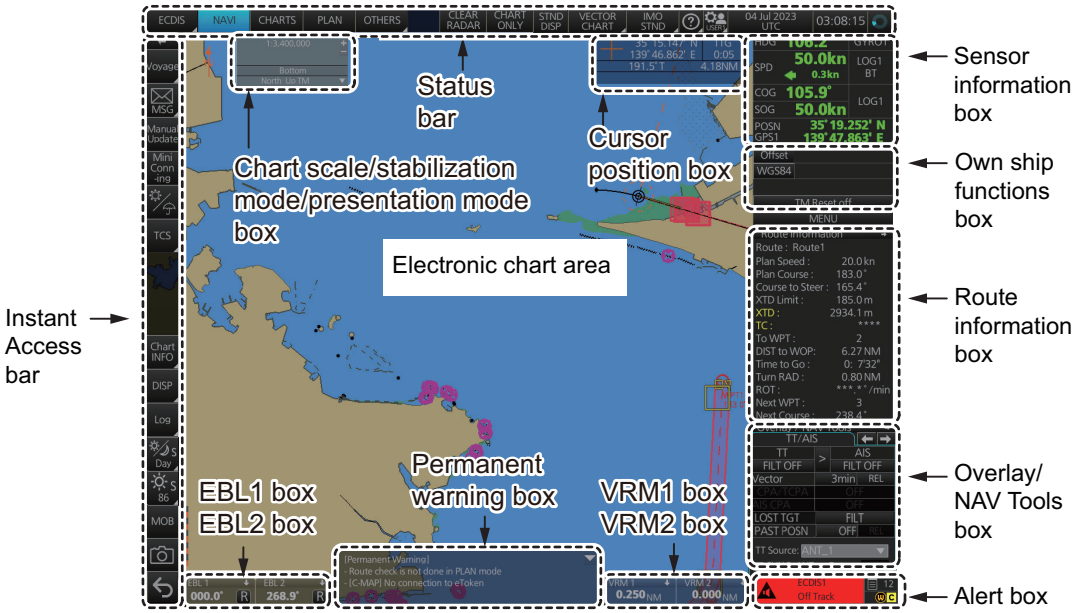
Note: If you are using the HP Color LaserJet Pro M255dw, the printer will not alert you if an error (out of paper, cover open, toner level, etc.) is detected at the printer side. Perform maintenance by referring to the printer's instruction manual.

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2. OPERATIONAL OVERVIEW

2.1 ECDIS Display

The ECDIS (Electronic Chart Display and Information Systems) screen is divided into several areas, as illustrated below. (The layout may be slightly different depending on your monitor's resolution.) The ECDIS operational area has no limitations. That is, high latitudes (85° and higher) are correctly displayed always. The ECDIS uses "orthographic" presentation for areas of high latitude and small chart scales. All other conditions use the "cylindrical equidistant" presentation.



- The **Status bar** provides for selection of display mode, chart format, etc.
- **The Sensor information box** displays ship's speed, course and position, and selects sensors.
- **The Own ship functions box** applies offset to the chart; changes geodetic data system, and provides true motion reset.
- The **Route information box** shows route and waypoint data, when a route is selected for navigation.
- The **Overlay/NAV Tools** box provides for setup of the radar overlay and navigation-related functions.
- The **Alert box** shows operational and system alert messages.
- The **VRM boxes** measure the range to an object.
- The **Permanent warning box** displays chart-related warning messages.
- The **EBL boxes** measure the bearing to an object.
- The **InstantAccess bar**™ provides quick access to functions such as brilliance adjustment, display palette and the menu. The contents change according to the ECDIS mode selected.
- The **Chart scale/stabilization mode/presentation mode box** selects the chart scale, stabilization mode, presentation mode, and displays chart scale error messages.
- The **Cursor position box** shows the latitude and longitude position of the cursor and the TTG to the cursor.
- The **Electronic chart area** shows the ECDIS chart.

Note: If the display indications freeze (because of ECDIS error, etc.), the buzzer sounds continuously. Restart the system to restore normal operation.

2.1.1 Electronic chart area

The ECDIS can use the following types of charts:

- S-57 (IHO)
- S-63 (IHO) (S-63 encrypted)
- ARCS (UKHO)
- C-MAP

The following information can also be displayed:

- Cursor (moved by trackball)
- Planned route
- EBL (Electronic Bearing Line) and VRM (Variable Range Marker)
- Radar image
- Own ship symbol with speed vector
- TT (Tracked Target, acquired from radar)
- AIS object

Electronic charts in ECDIS

The electronic navigational charts are displayed in the electronic chart area. There are two kinds of electronic navigational charts available for use in the ECDIS:

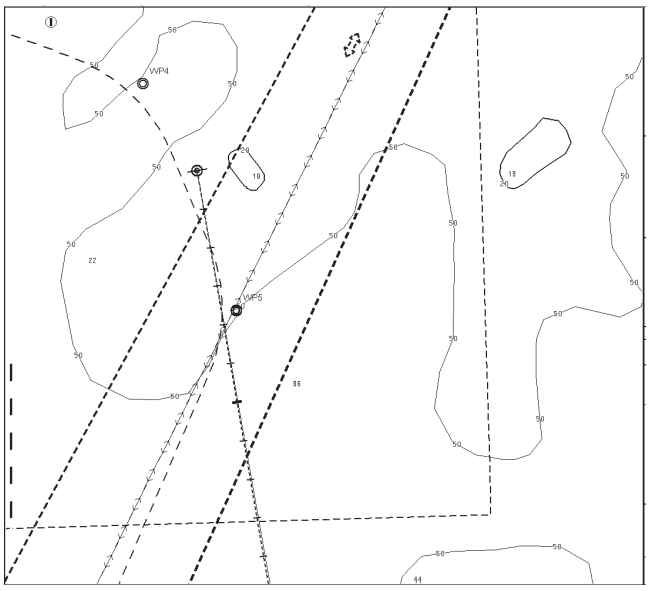
- Vector format (C-MAP or ENC)
- Raster format (ARCS)

The ECDIS combines chart and navigational information. It should be noted that modern navigation systems (e.g., differential GPS) may offer more accurate positioning than what was used to position some of the surveys from which the electronic navigational chart was derived.

ENC vector format

ECDIS is compatible with S57 Ed.3 ENC format charts. ENC charts are converted to SENC for use with ECDIS.

The details for the chart are displayed in the electronic chart area and these can be modified. You can change the chart scale with the ZOOM IN and ZOOM OUT functions, and the scale range is 1:1,000 - 1:70,000,000.



C-MAP vector format

The C-MAP charts require a contract with applicable provider. There are two types of C-MAP charts; C-MAP ENC SERVICE, which are officially recognized charts, and CMAP PROFESSIONAL, which are charts from a private source and cannot be used as a substitute for paper charts under any condition. To emphasize this point these charts are called "Non-ENC" charts in this manual.

Note: Some eToken dongles from the FEA-2xx7 can be used with this system. These are labeled "JeT FURUNO XXXXX". Contact your dealer for details.

This ECDIS accepts the following C-MAP chart types: ENC SERVICE, PROFESSIONAL+, ENC+ SERVICE and ADMIRALTY ENC SERVICE.

C-MAP ENC SERVICE charts comply with the IHO's (International Hydrographic Organization's) S-57 Edition 3 product specification. When used in the chart radar, the ENC data improves the safety of navigation at sea. When used in an ECDIS, the ENC data improves the safety of navigation at sea.

What is ENC delivery?

ENCs can be distributed as ENC delivery or SENC delivery. Both deliveries can be used in this system.

In ENC delivery, charts are distributed directly from source like PRIMAR, IC-ENC, JHA, etc. They are delivered onboard in ENC format (using S-57 and S-63), then the charts are installed into the system.

In SENC delivery, charts are already converted SENC before delivery and, then installed into the system. A C-MAP ENC delivery is SENC delivery.

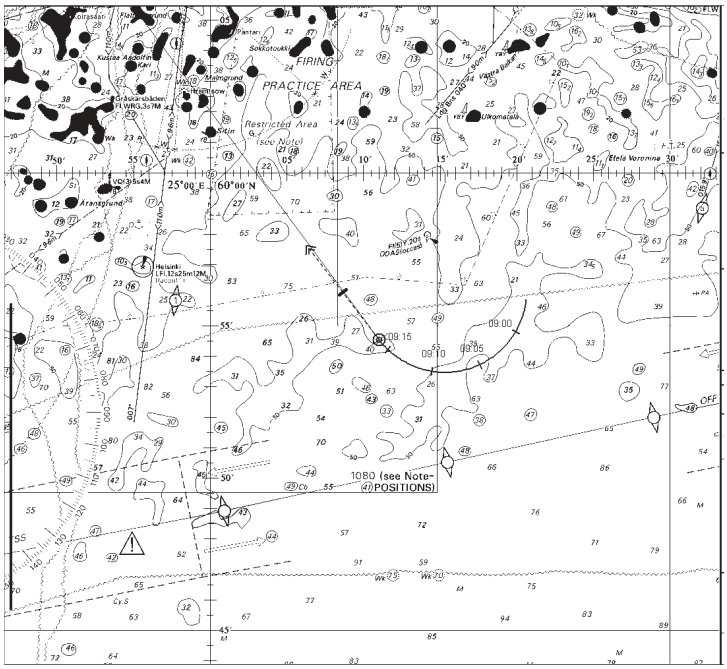
Important notices on ENC delivery

- If you are using both services (ENC and SENC deliveries) having the same chart name installed into the system through both deliveries, priority of displaying the chart is in ENC delivery.
- Chart updates for ENC delivery are only for charts of ENC delivery and chart updates for SENC delivery is only for charts of SENC delivery. You have to keep charts up-to-date separately.
- If you change from ENC delivery to SENC delivery, remove old charts from the system before installing charts from new delivery.

ARCS raster format

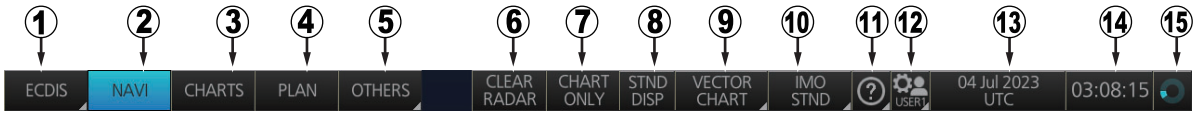
ARCS data is converted to SRNC format for use with the ECDIS. ARCS charts are digital reproductions of British Admiralty (BA) paper charts. They retain the same standards of accuracy, reliability and clarity as paper charts.

Zooming into the ARCS chart can be useful for magnifying a complex detail, however this decreases the density of the data displayed, and can give a false impression of the distance from danger.



2.1.2 Status bar

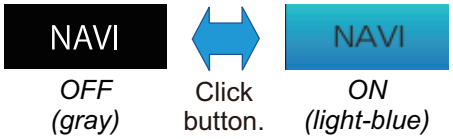
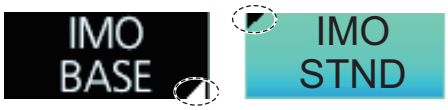
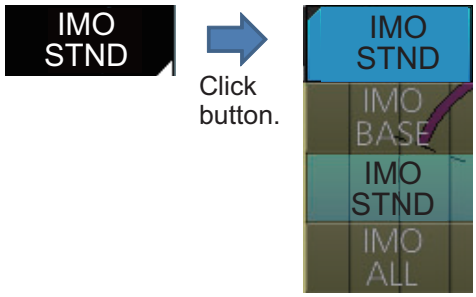
The Status bar runs across the top of the ECDIS display. The bar mainly provides for selection of display mode, ECDIS operating mode, chart type and chart display setting.



No.	Button or item	Description
1	Display mode	Selects the display mode, [ECDIS], [RADAR], [CONNING], or [AMS]*. (If the conning display is fed to a separate monitor, only ECDIS is available; the button is inoperative.) * Optional specification.
2	[NAVI]	Selects the Voyage navigation mode.
3	[CHARTS]	Goes to the Chart maintenance mode.
4	[PLAN]	Selects the Voyage planning mode.
5	[OTHERS]	• Sets system in the Harbour mode (standby). • Plays back log data (AMS connection must be off).
6	[CLEAR RADAR]	Hide the TT, AIS and radar displays. Shown only when one of the following conditions is met: • TT targets are shown on the display. • AIS objects are shown on the display. • Radar overlay is active.
7	[CHART ONLY]	Shows only the chart, when the left button is pressed and held down.
8	[STND DISP]	Restores the standard display for the display mode selected at Chart database.
9	Chart priority	Selects chart priority when both vector or raster are available.
10	Chart database	Selects the pre-defined presentations of ENC content: [IMO BASE], [IMO STND] or [IMO ALL]. [CUSTOM] appears when the symbols selected or deselected on the [Chart Display] menu do not match the preset conditions for [IMO BASE], [IMO STND] or [IMO ALL].
11		Displays the operator's manual, ECDIS program no. and system info.
12		• Manages user profiles. • opens the [Settings] menu. • The number on the button indicates the profile number in use.
13	Date	• Displays the date. • Selects the time to use, local or UTC. • Sets the time difference between local and UTC (to use local time).
14	Time	Shows the time, UTC or local.
15	Working indicator 	• Rotates clockwise if the system is working properly. If it is not spinning the system is not working. Shortly after the working indicator stops spinning the buzzer sounds and the status LED turns red. Reset the power to restore normal operation. • If the primary display mode is specified during the installation, the first letter of the mode name appears at the center of the working indicator as follows: A: AMS, C: Conning, E: ECDIS. The letter can be clicked to return to the primary display mode (the display mode shown when the system power is turned on).

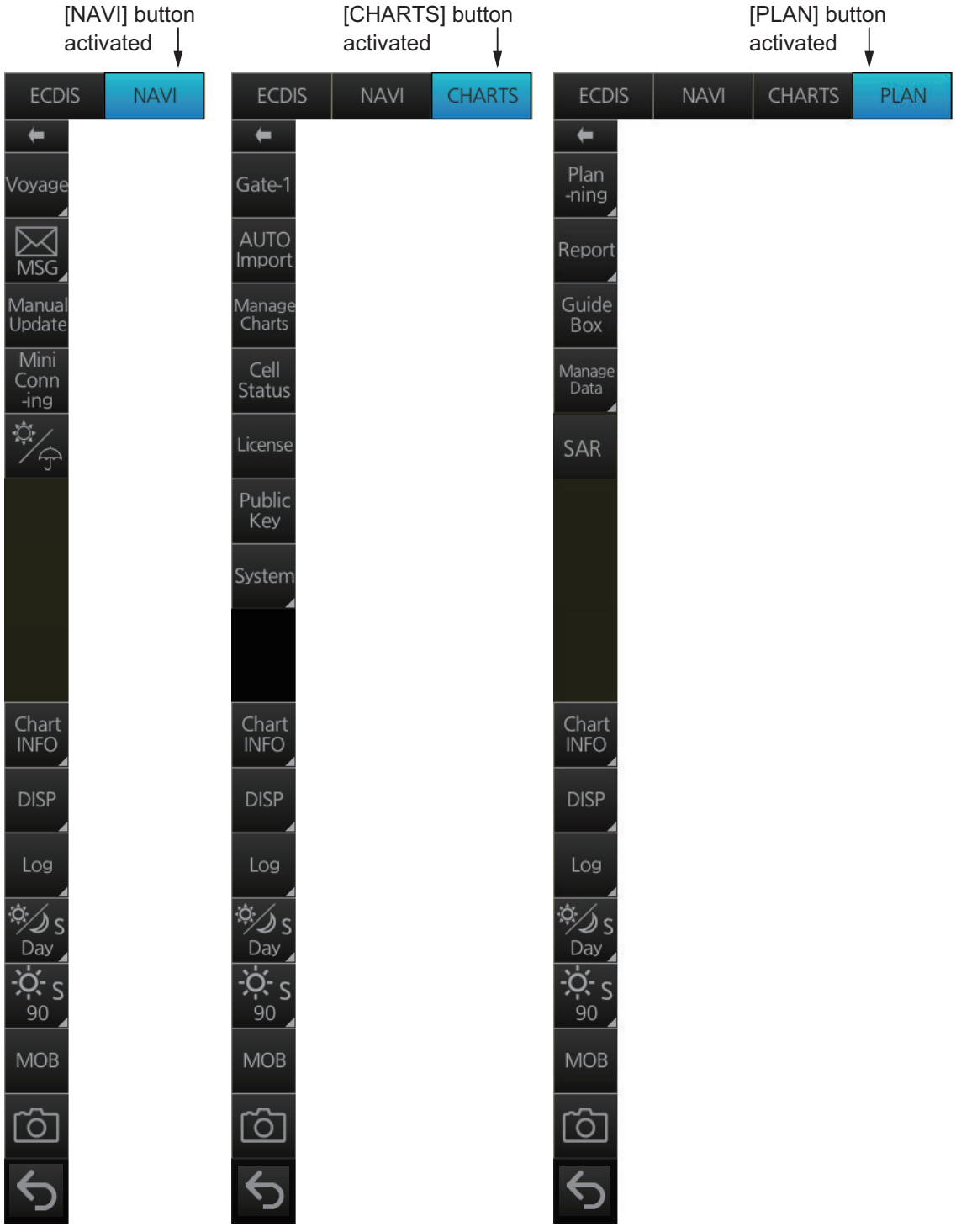
How to operate the buttons on the Status bar

There are two types of buttons on the Status bar: Toggle button and Drop-down list button. You operate the buttons with the trackball module.

Button type	Operating procedure
Toggle button	
A toggle button alternately selects one of two functions assigned to a button. The background color of a toggle button is light-blue when the button's function is enabled; gray (default color) when disabled. The [NAVI] button is an example of a toggle button.	 *OFF (gray)* Click button. *ON (light-blue)*
Drop-down list button	
A drop-down list button provides a drop-down list from which to select an option related to the label on the button. The [Chart Database] button is an example of a drop-down list button. See the right figure. A drop-down list button has a list status indicator whose position changes according to list status.  *List closed* *List opened*	

2.1.3 InstantAccess bar™

The InstantAccess bar™ runs vertically along the left edge of the screen. The bar contains all the operating functions related to the selected ECDIS operating mode (Voyage planning, Voyage navigation and Chart maintenance). The bar is divided into two sections, upper and lower. The buttons in the upper section change according to the ECDIS operating mode. The buttons in the lower section are common to all modes. A button with a triangle mark at its bottom right corner indicates a button with multiple functions.



Voyage navigation mode bar

Chart maintenance mode bar

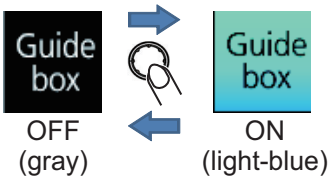
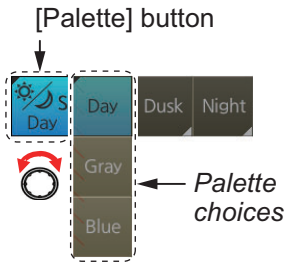
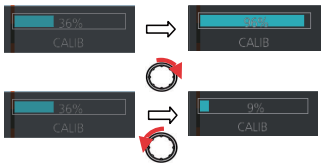
Voyage planning mode bar

Button	Description
Voyage navigation mode bar	
←	Minimizes the InstantAccess bar™ To restore the maximized bar, click anywhere on the minimized bar. 
[Voyage]	**Route** selects/deselects routes, and moves route to Voyage planning mode (for editing). **Instant Track** creates a temporary track to return to or make a temporary detour from the monitored course. **User Chart** selects/deselects user chart for monitoring. **Monitor INFO** shows the [Monitor Information] dialog box. **Stop Monitoring** stops monitoring of route, user chart.
	Processes AIS Safety and Navtex messages. If you have unread Navtex or Safety messages, the icon changes as shown right; "S" for unread Safety, "N" for unread Navtex, "S/N" for unread Safety and Navtex. 
[Manual Update]	Shows the menu for manual update of chart objects.
[Mini Conning]	Shows, hides the mini conning display.
	Activates or deactivates the weather overlay.
[TCS]	Controls for use with specific Autopilots. Optional specification. Requires presetting at installation. Does not appear unless the presetting is done. See chapter 26 for details.
Chart maintenance mode bar	
←	Minimizes the InstantAccess bar™
[Gate-1]	Automatically installs selected charts and their licenses. Requires presetting at installation. Does not appear unless the presetting is done.
[AUTO Import]	Automatically loads and installs ENC charts.
[Manage Charts]	Deletes charts; installs (imports) charts manually.
[Cell Status]	Finds cell status.
[License]	Enters license information.
[Public Key]	Shows the current public key. The public key changes each time a new one is installed.

Button	Description
[System]	Functions for chart synchronization and chart data management. **SYNC Config** selects the ECDIS units to synchronize. **SYNC Status** checks synchronization status. **Gate-1 Config.** manages Gate-1 charts. Does not appear unless the presetting mentioned at [Gate-1] above is done. **Reconvert** reconverts SENC charts. **Clear Charts** removes chart data.
Voyage planning mode bar	
←	Minimizes the InstantAccess bar™.
[Planning]	Creates routes and user charts.
[Report]	Displays route and user chart reports.
[Guide Box]	Shows or hides the guide box, which provides range and bearing measurement between waypoints when creating a route. **Note:** The distance between waypoints can be calculated by the [Rhumbline] or [Great Circle] method. Open the [NAV Tools] menu, select [Geometry], then select desired method.
[Manage Data]	Manages routes and user charts. **Route** imports, exports, deletes routes. **User Chart** deletes user charts. **Data Import** imports routes and user charts.
[SAR]	Shows the [Search and Rescue Settings] dialog box.
Common bar	
[Chart INFO]	Provides chart information. **Chart Legend** shows chart information for ship's position when own ship is at the screen center. **Viewing Dates** sets Display Date and Update Review dates. **Chart 1** displays an overview of the ECDIS chart symbols.
[DISP]	**SET** shows the [Basic Setting] dialog box, [Chart Display] menu, [Symbol Display] menu, [Chart Alert] dialog box. **TWO DISP** splits the screen in two, vertically or horizontally, in the Voyage navigation mode. **NtoM** shows, hides the NtoM overlay. **Keyboard** shows, hides the software keyboard.
[Log]	Displays Update log (ENC, ARCS, C-MAP), Event log (user event, POSN event)*, NAV log (Voyage, Details, Chart Usage), Target log (Danger Target), and Route Transfer log. *Voyage navigation and Voyage planning modes.
	Selects a color palette, day, dusk or night. The S or L at the right side of the label indicates how the color palette selection is shared, among the units of the system (S) or locally (L). The default setting is "S". See section 23.7 for details.
	• Adjusts the brilliance of the monitor. • Adjusts the backlighting of the Control Unit. The S or L at the right side of the label indicates how the brilliance/backlighting selection is shared, among the units of the system (S) or locally (L). The default setting is "S". See section 23.7 for details.
[MOB]	Inscribes the MOB (ManOverBoard) mark.
	Takes a screenshot.
	Restores the previous condition in route and user chart creation.

How to operate the buttons on the InstantAccess bar™

The InstantAccess bar™ has four types of buttons: toggle button, drop-down list button, slider bar button, and specialty button. (The MOB, , buttons are specialty buttons that provide a single-action function.) The buttons can be operated with the trackball module or the **InstantAccess** knob. This section shows you how to operate the buttons with the **InstantAccess** knob.

Toggle button	Drop-down list button	Slider bar button
		

1. Push the **InstantAccess** knob to enable its use with the InstantAccess bar™.
2. Rotate the **InstantAccess** knob to select a button. The background color of the button selected is light blue.
3. Do one of the following depending on button type.
   1) **Toggle button**: Push the knob to select setting.
   2) **Drop-down list button** or **slider bar**: Rotate the knob to select an item, or adjust the slider bar. Push the knob to confirm your selection or setting.
   Note 1: You can use the **ESC** key to go back one step in the current operating sequence.
   Note 2: The **InstantAccess** knob only adjusts the slider bar on the InstantAccess bar™.

2.1.4 Sensor information box

The sensor information box displays ship's heading, speed, course over the ground, speed over the ground and position. When the user-selected sensor fails, the system automatically selects another sensor. The color of the indications change according to sensor status. For details, see the table on the next page.

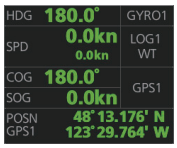
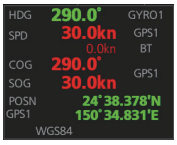
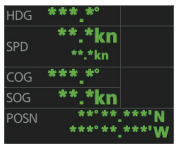
The digital indications and sensor names are colored according to sensor state. See the table below.
- [HDG]: Heading and its source.
- [SPD]: Longitudinal speed and its source. The direction of transverse speed is indicated with arrows, ▶, Starboard, ◀, Port.
- [COG]: Course over ground and its source.
- [SOG]: Speed over ground and its source.
- [POSN]: Latitude and longitude position of own ship and position source.

Note: The position source shall meet the requirements of IMO MSC.112(73).



Color of nav data indications and sensor name

The color of the nav data indications and sensor name change according to the state of the sensor data. The table shown below provides basic information. For detailed information, see Appendix 3. When no sensor data is received, the sensor source indication is blank. These indication methods comply with IEC62288 Ed.3.

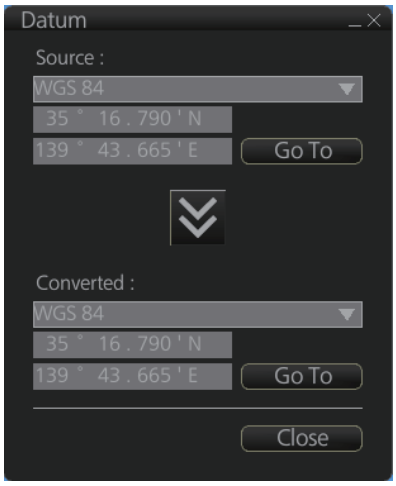
Sensor info box	Color of nav data indication	Color of sensor name	State
	Green	White	Sensor is normal.
	Yellow	White	Position correction applied.
	Red	White	Data is invalid.
	Green, data shown with asterisks (***.*)	No display	Data is not valid or not being received.
	Yellow	White, Yellow (DR)	Data is input manually (DR).

2.1.5 Own ship functions box

The own ship functions box shows information about own ship, enables offset, and does TM reset.



- [Offset] button: See section 18.7.1. This button is only operative in the Voyage navigation mode.
- [WGS84] button: Convert position data between datum; go to selected position on the current chart. Click the button to show the dialog box below. To convert a position from one datum to another, select the datum source at the [Source] pull-down list and enter position. Select the datum to convert to at the [Converted] pull-down list, then click the button. The position on the chart selected is shown below the [Converted] pull-down list. To go to a position, click a [Go To] button.

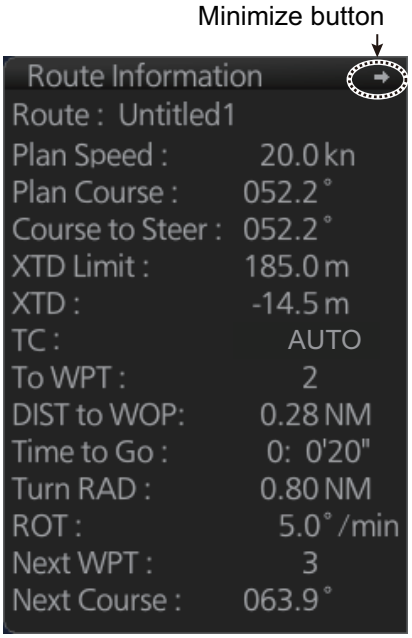


- **ENC info**: ENC chart info appears here.
  No indication: ENC chart is currently displayed.
  "ENC data available": Currently, RNC chart is shown, but ENC chart is available.
  "Non-ENC data": Non-official ENC material, in yellow characters. See section 3.19.
- **RNC info**: "RNC data" appears (in yellow) when raster chart is in use.
- **TM/CU status**:
  "TM/CU Reset": True motion reset is active. (Chart is stationary and own ship moves on the chart.)
  "TM Reset off": When dragging the chart; true motion is OFF. To restart true motion, click the indication,
  "Ship off screen": Ship is out of the display area.

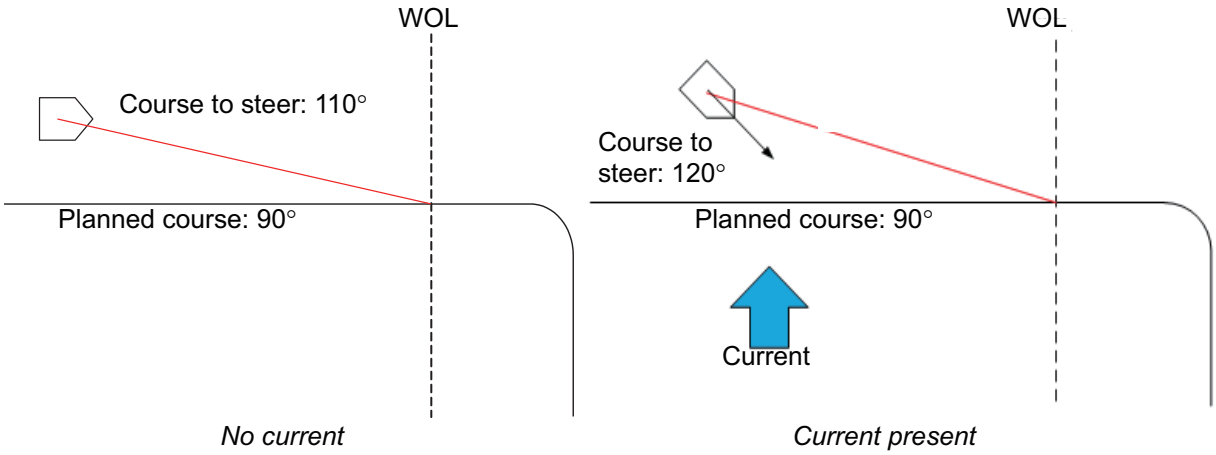
2.1.6 Route information box

Asterisks appear in data locations when no route is selected for navigation.

- [Route]: Name of monitored route
- [Plan Speed]: Planned speed to approach "To WPT".
- [Plan Course]: Planned course between previous WPT and "To WPT".
- [Course to Steer]: Calculated set course to follow the monitored route, including XTD, drift and gyro error compensations. See the figure below. If no tidal current information is entered, asterisks appear here.
- [XTD Limit]: Cross track distance, set when planning a route. The XTD limit figure can be shown in meters (m) or nautical miles (NM). Shown in white when the vessel is within the designated "off-track" limit. Shown in red when the vessel exceeds this threshold.
- [XTD]: Perpendicular distance the ship is from the intended track. The XTD figure can be shown in meters (m) or nautical miles (NM). To change the unit, right-click the [Route Information] to show the context menu. Click XTD, then select the desired unit. You can also change the unit from the menu: [Route], [Route Information], [unit of "XTD"].
- [TC]: Track Control System status. Requires optional TCS specification. No indication if TCS is disengaged from the ECDIS.
- [To WPT]: The waypoint that the ship is approaching.
- [Dist to WOP]: (wheel over point): Distance to the point where rudder order for course change at "To WPT" is given.
- [Time to Go]: Time to go to WOP.
- [Turn RAD]: Planned turning radius at "To WPT".
- [ROT]: Calculated rate of turn that is based on current speed and planned turning radius.
- [Next WPT]: The WPT following the "To WPT".
- [Next Course]: Next course (in degrees).



Course to steer



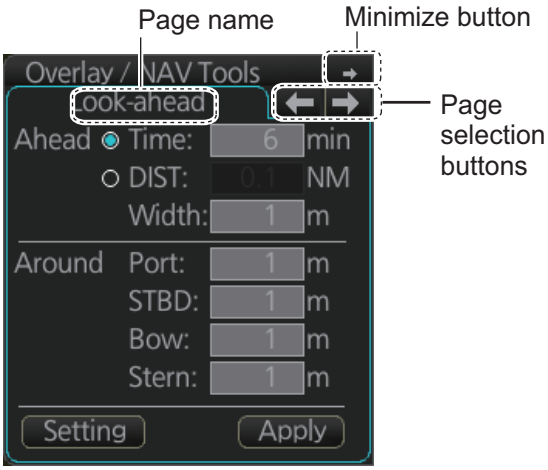
2.1.7 Overlay/NAV Tools box

The [Overlay/NAV Tools] box sets up the following objects and consists of the following pages.

- TT•AIS
- Echo
- Parallel index lines
- Range rings
- Predictor (predicts ship's future movements)
- Under the keel clearance
- Anchor watch
- Timer
- Look-ahead
- Curved EBL*

*Shown only when a EC-3000/3005 with the TCS functionality (optional specification) is connected to the network.

See chapters 13 and 14 for TT/AIS descriptions. Refer to section 16.2 for the radar overlay.



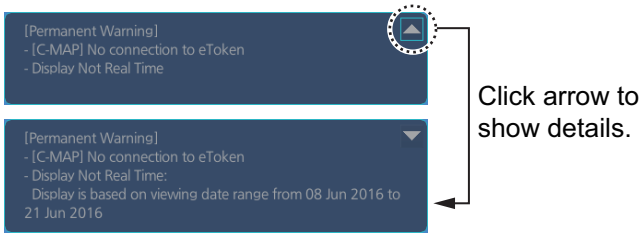
2.1.8 Alert box

The Alert box shows alert-related information. See chapter 20 for details.



2.1.9 Permanent warning box

The permanent warning box displays chart-related warning messages.
Click the arrow to show details.
Click the arrow again to minimize the box.

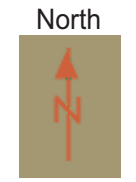


2.1.10 EBL, VRM boxes

The EBL measures the bearing to an object, and the VRM measures the range to an object. See section 2.9.

2.1.11 North mark

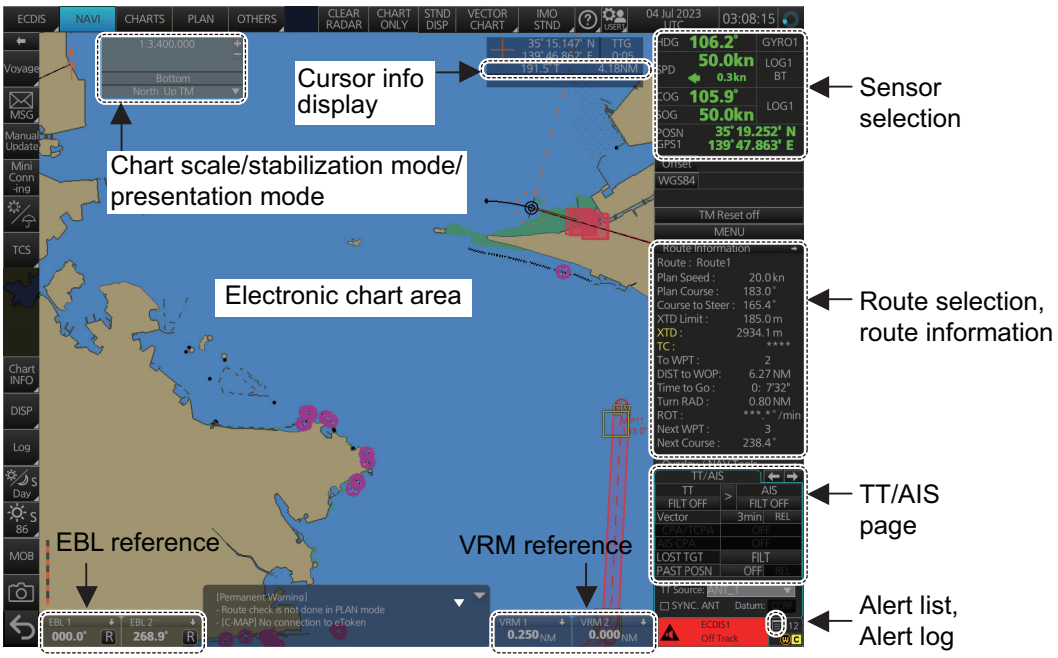
The north mark appears at the top left of the Chart for Radar display, is always visible, and points in the northerly direction. At high latitudes where north is not in a set direction, the north mark appears with the text "at own ship" or "at center" below the mark to show the reference point.



- "at own ship": Shown when your vessel is displayed on-screen. North is shown with your vessel as the reference point.
- "at center": Shown when your vessel is not displayed on-screen. North is shown with the center of the screen as the reference point.

2.1.12 Context-sensitive menus

Context-sensitive menus are available at the locations shown below. Right-click the applicable area, then select the appropriate item from the menu. The availability of the context-sensitive menu depends on the mode in use, as shown in the table below.



Item	Functions	Mode and availability		
		NAVI	CHART	PLAN
Chart scale/stabilization mode/ presentation mode	Drop-down list of chart scales.	Yes	Yes	Yes
Cursor info display	Switch cursor displays.	Yes	Yes	Yes
Sensor selection	Select sensors.	Yes	Yes	Yes
Route selection, route information	Select /unselect route for monitoring*; Move to plan*; Select user chart for monitoring*; Monitor INFO box*; XTD	Yes	Yes (XTD only)	Yes (XTD only)
TT, AIS page	Access TT, AIS functions.	Yes	Yes	Yes
Alert list, Alert log	Open alert list, alert log.	Yes	Yes	Yes
VRM reference	Select VRM reference; offset (heading or north).	Yes	Yes	Yes
EBL reference	Select EBL reference; offset (heading or north).	Yes	Yes	Yes
Electronic chart area	Own ship mark (or cursor position) to screen center; pick report; chart legend; chart cell show/ hide, manual update*; new divider, hide MOB, range ring ON/ OFF, sleep all targets, message dialog box, weather info**.	Yes	No	Yes

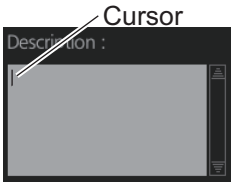
*NAVI mode only. **Available when weather overlay is active.

2.1.13 How to enter alphanumeric data

On some screens it is necessary to enter alphanumeric data. The data can be input three ways: keyboard of the Control Unit, software keyboard or trackball.

Alphanumeric data entry from the keyboard of the Control Unit

1. Click the input box.



Input box example

2. Press appropriate keys and press the **ENTER** key.

Key	Function	Keyboard
TAB	Move the selection cursor.	
CAPS LOCK	Switch between upper case and lower case alphabet.	
SHIFT	Turn caps lock on and off with the **CAPS LOCK** key.	
BS	Erase the character left of the cursor.	
ENTER	Terminate keyboard input; insert line feed.	
↑,↓,←,→	Move cursor in direction of arrow.	
Spacebar	Insert a space.	
CTRL	No use.	

Alphanumeric data entry from the software keyboard

A software keyboard is also available for entry of alphanumeric data. Do as follows to use the software keyboard. Display the keyboard before opening menus.

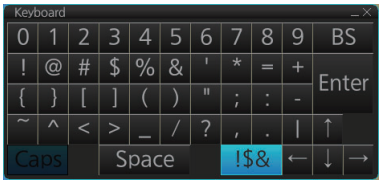
1. On the InstantAccess bar™, press the [DISP], [ ] and [ON] buttons to show the software keyboard. The [BS], [Enter], [↑],[↓],[←],[→] and [Spacebar] on the keyboard function the same as those keys on the keyboard of the Control Unit.



2. To switch between the alphabet keyboard and symbols keyboard, click [!$&].



Alphabet keyboard



Symbols keyboard

3. Click the input box.
4. Click appropriate keys and finally click the [Enter] key.

To hide the software keyboard, click the X button at the top right corner of the keyboard.

Alphanumeric data entry with the trackball module

The trackball module can also be used to enter alphanumeric data.

1. Put the cursor in the input box. Up and down arrows appear at the right side of the box.

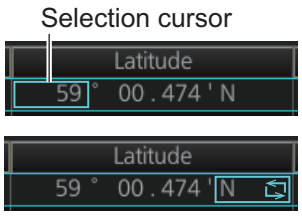


2. Enter data by one of the methods shown below.
   - Spin the scrollwheel to set data. Upward to decrease the value; downward to increase the value.
     Note: The incrementing direction can be changed with [Wheel rotation] in the [Customize] menu of the [Settings] menu.
   - Click ▲ to increase the value; ▼ to decrease the value.

How to enter latitude and longitude data with the trackball module

The trackball module can also be used to enter latitude and longitude data.

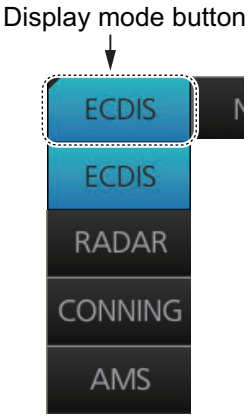
1. Put the cursor in the input box. A selection cursor (light-blue) appears.
2. Enter data by spinning the scrollwheel.
3. To switch coordinate between N and S and vice versa, put the cursor at the right edge of the input box. Dual arrows appear



4. Click to switch the coordinates. The method to switch E to W and vice versa is the same.

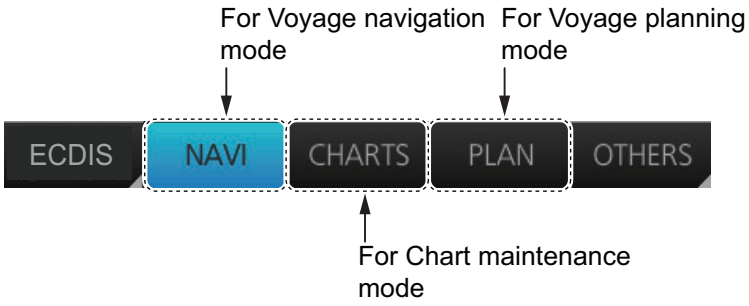
2.2 How to Select the Display Mode

Click the Display mode button at the far left side of the Status bar to select the display mode, among [ECDIS], [RADAR], [CONNING] and [AMS] (optional specification).
[**ECDIS**]: Displays electronic charts.
[**RADAR**]: Shows the radar display. (See the radar manual, issued separately.)
[**CONNING**]: Provides comprehensive navigation displays, like wind direction and rudder angle, in analog and digital formats. (Note that this button is inoperative if the conning display is fed to another monitor.) See section 22.1.
[**AMS**]: Opens the Alert Management System. See Chapter 25.



2.3 How to Select the ECDIS Operating Mode

The ECDIS has three operating modes: Voyage navigation, Chart maintenance, and Voyage planning. Select the mode from the Status bar with the [PLAN], [CHARTS] and [NAVI] buttons. The background of the button of the active mode is blue.



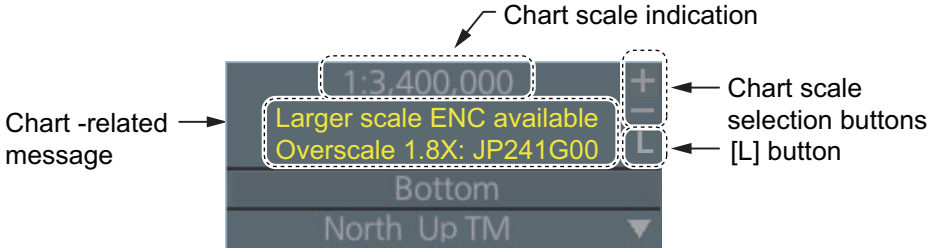
Note 1: When switching between the Voyage navigation and Chart maintenance modes it may take several minutes to read the chart database when using C-MAP charts or there are many charts installed.

Note 2: If the equipment accepts no key operation after switching to the Chart maintenance mode, reset the power.

2.4 How to Select the Chart Scale

When you open a chart it is displayed with the default scale, called the compilation scale. To change the chart scale, do one of the procedures shown below. The scale range is 1:1,000 to 1:70,000,000.

- Use the **RANGE** key on the Control Unit.
- Click the chart scale selection buttons in the Chart scale/stabilization/presentation mode presentation mode box.
- Right-click anywhere inside the Chart scale/stabilization/presentation mode to show a drop-down list of chart scales.
- Put the cursor anywhere on the chart and spin the scrollwheel.
- Use the [L] button in the Chart scale/stabilization/presentation mode box. Appears under certain conditions. See section 4.2.



Note: When the radar overlay is active the chart scale is shown in nautical miles (NM).

The table below lists the chart related messages and their meanings.

Message	Meaning	Remarks
Display Not Real Time*	Displayed date is not the current date.	
ENC data available	ENC data available for current area.	ARCS only
Larger RNC available	Larger RNC is available.	ARCS only
Larger scale ENC available	Larger scale available at current position (TM reset ON) or cursor location (TM reset OFF).	
MAG	Chart display magnification. In the example below the magnification is 1.98. 	Appears with monitor size 32 inch or higher.
Non-ENC data	ENC non-compatible chart in use.	
Overscale	Scale too large.	
RM(OFF)	Relative motion off.	
RNC data	RNC chart in use.	ARCS only
Underscale	Scale too small.	ARCS only
WGS shift undefined	WGS shift is not defined.	ARCS only

*: Shown as "Display Not Real Time: display is based on viewing date range from (start of date range) to (end of date range)" when the permanent warning dialog is maximized.

2.5 How to Select the Presentation Mode, Stabilization Mode

There are seven presentation modes available. However, depending on whether voyage navigation mode or voyage planning mode is active, some presentations modes are not available.

Presentation Mode	Voyage navigation mode	Voyage planning mode
North-up TM	Available	Available*2
North-up RM	Available	Not available
Course-up TM	Available	Available*2
Course-up RM	Available	Not available
Route-up TM*1	Not available	Available*2
Route-up RM*1	Available	Not available
Head-up RM	Available	Not available

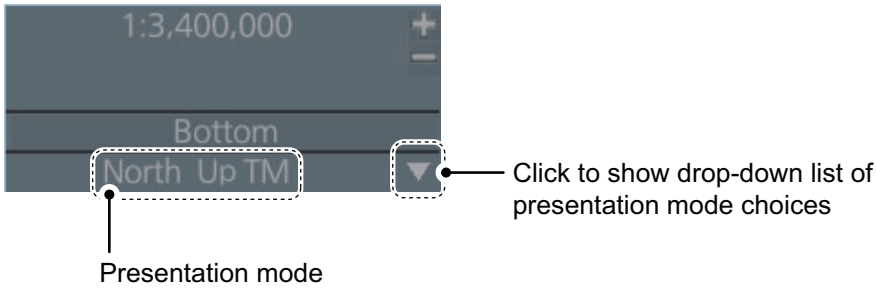
*1: Available only when a route is being monitored.

*2: "TM" not shown in the presentation mode indication.

2.5.1 How to select a presentation mode

There are two methods to select a presentation mode:

- Click the presentation mode indication to cycle through the presentation modes.
- Click the ▼ indication to show a drop-down list of presentation modes, then click the mode you want to use.



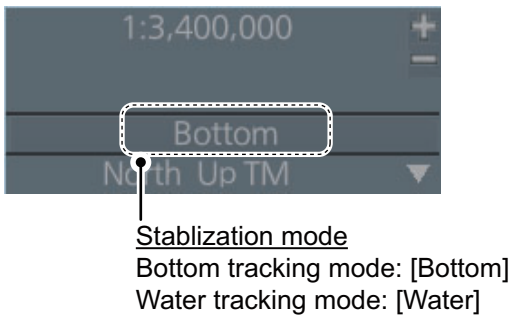
Description of presentation mode

Presentation mode	Description
North Up	North (0°) is the top-center of the screen.
Course up	Course is the top-center of the screen (at the time of selection)
Route Up	The planned course for a route being monitored is the top-center of the screen. If route monitoring is disabled, Route-up mode automatically changes to Course-up mode.
Head Up	Current heading is the top-center of the screen
TM (True Motion)	Own ship mark moves in relation to actual vessel movement, chart is displayed in a fixed orientation.
RM (Relative Motion)	Own ship mark is fixed at center of screen, chart moves in relation to vessel movement.

2.5.2 How to select a stabilization mode

Own ship and all targets can be [Water] (sea stabilized) or [Bottom] (ground stabilized), in any presentation mode.The stabilization mode is synchronized with all FMD-3xxx and FAR-3xxx on the bridge.

To select the stabilization mode, click the stabilization mode indication to select [Water] or [Bottom].

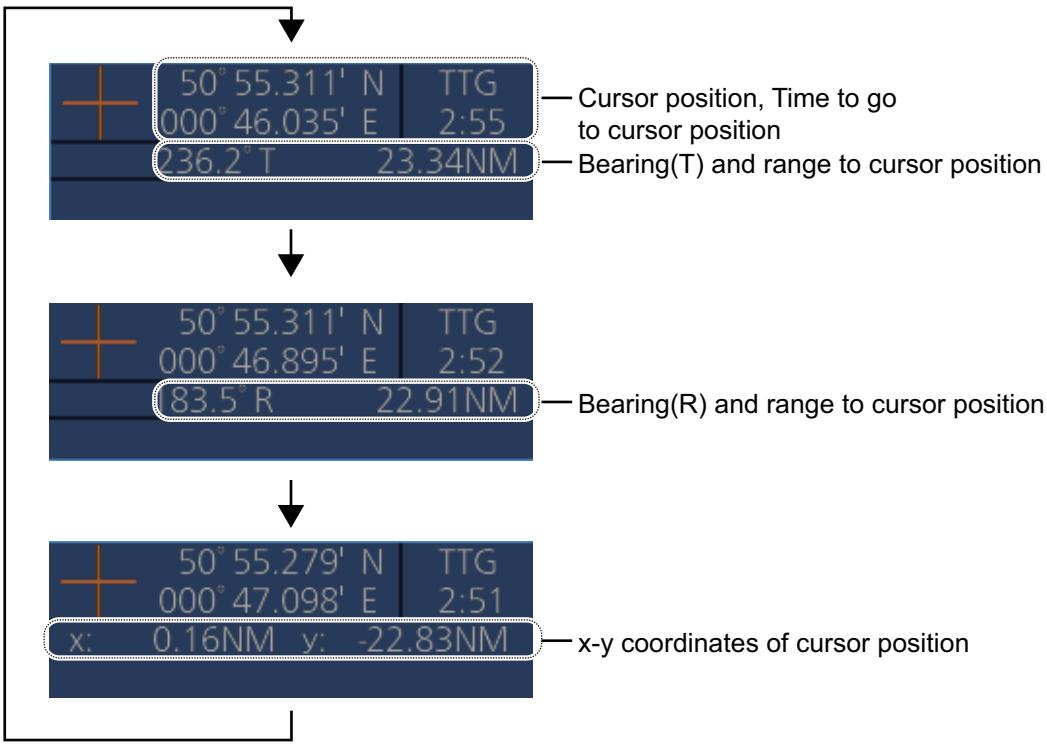


Note: The stabilization mode cannot be changed during data playback.

2.6 Cursor Position Box

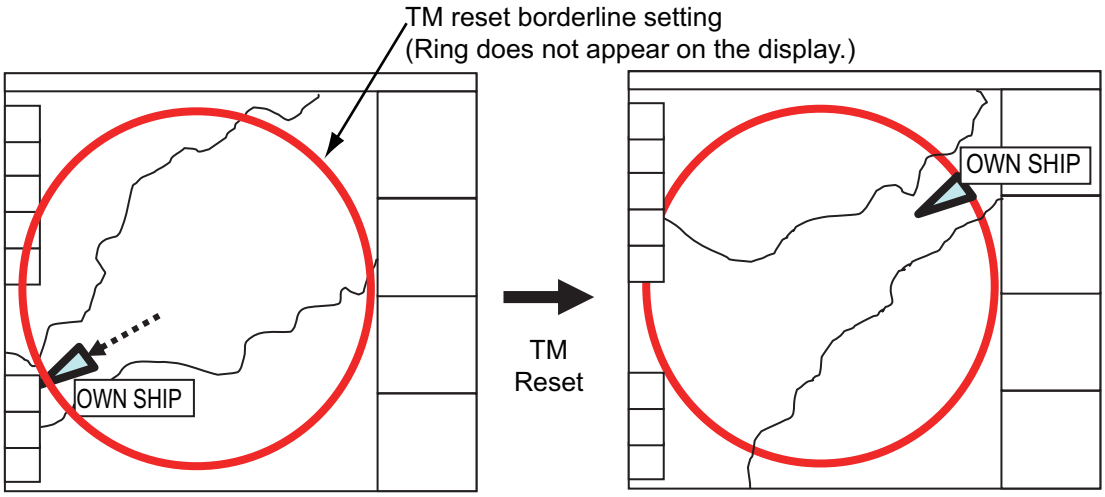
The Cursor position box shows

- Cursor position in latitude and longitude
- Time to go to the cursor position
- The bearing (True or Relative) and range to the cursor position, or x-y coordinates of cursor position. Click the bearing and range or x-y coordinates indication to switch the display, in the sequence shown below.



2.7 True Motion Reset

In the true motion mode, the chart is stationary and own ship moves on the screen. With TM reset active, own ship moves until it reaches the true motion reset borderline(s), then the chart is redrawn and own ship jumps back to an opposite position on screen based on its course. (This resetting can also be done manually by clicking the [TM/CU Reset] button.) When the TM reset function is active, "TM/CU Reset" appears at the right side of the display.



How to enable, disable automatic TM reset

To enable automatic TM reset, click the [TM Reset off] indication at the right side of the display to show [TM/CU Reset].

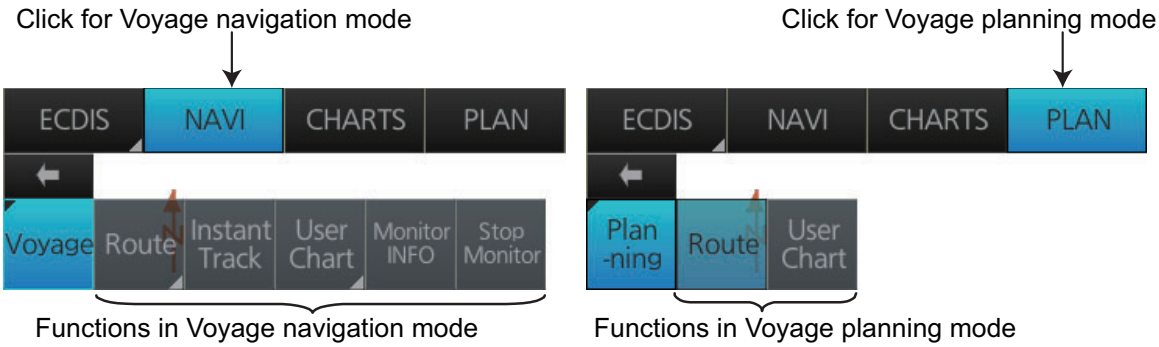


When the TM reset is disabled, change the chart scale with the scrollwheel and scroll the chart by drag and drop. The own ship information box shows the indication "TM Reset off". To restart true motion, click the indication. When own ship moves off the screen the box shows the indication "Ship off screen". To restart true motion, click the indication.

How to set the true motion reset borderline

You can set the limit for TM reset (in percentage) on the [Basic Setting] page. See section 4.3.2.

2.8 How to Control Route and User Charts in Voyage Navigation and Voyage Planning Modes

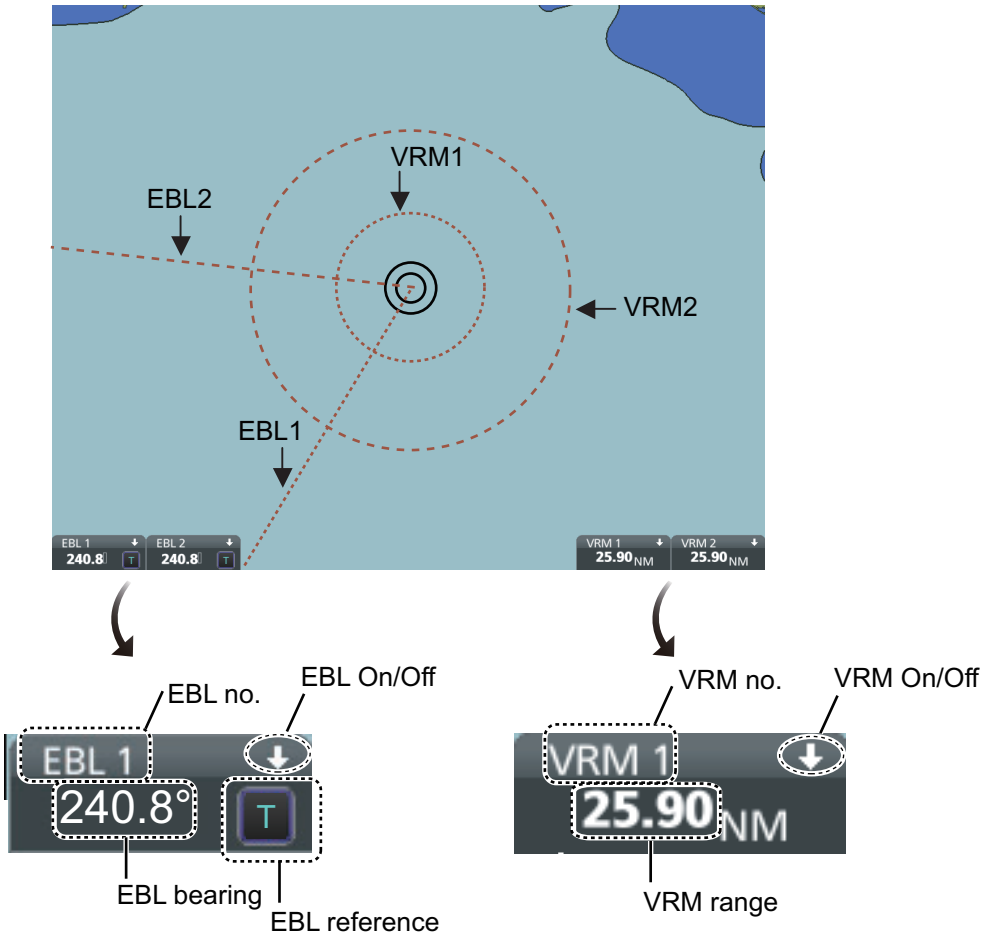


Click the appropriate chart mode button [PLAN] or [NAVI] at the top of the display to go to respective mode. For the Voyage navigation mode, click the [Voyage] button, then click the button corresponding to the action to take. For the Voyage planning mode, click the [Planning] button followed by the [Route] button to select a route, or [User Chart] button to select a user chart.

Voyage navigation mode functions
[Route]: This button has three functions: • [Select]: Selects the route to monitor. • [Unselect]: Deselects monitored route. • [Move to Plan]: Moves monitored route to Voyage planning mode (for editing).
[Instant Track]: Opens the [Instant Track] dialog box to create a temporary track to return to or make a temporary detour from the monitored course (see section 11.9).
[User Chart]: This button has one function. • [Select/Unselect]: Selects and unselects user charts from monitoring regardless of route being monitored
[Monitor INFO]: Opens the Monitor Information dialog box, to view monitored route, linked user chart, monitor user chart alerts and information.
[Stop Monitor]: Stops monitoring a route and user charts.
Voyage planning mode functions
[Route]: Shows the [Route Plan] dialog box to create or edit a route.
[User Chart]: Shows the [User Chart] dialog box to create or edit a user chart.

2.9 How to Use the VRM and EBL

The VRM measures the range to an object and the EBL measures the bearing to an object. There are two each of VRMs and EBLs. The lengths of the dashes on the EBL2 and VRM2 are longer than those of the EBL1 and VRM1 to distinguish them. The color of the VRMs and EBLs is orange.



2.9.1 How to hide/show an EBL, VRM

Control Unit: Push EBL or VRM key to hide or show respective marker.
Trackball: Click the arrow on an EBL or VRM box to hide the respective marker. To redisplay the marker, click the minimized box.

2.9.2 How to measure the range and bearing

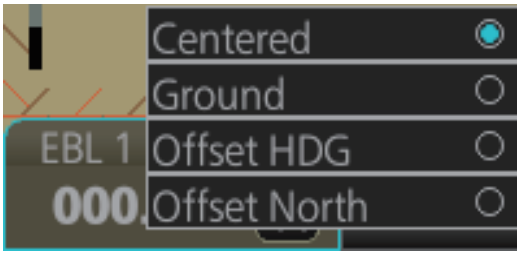
Range: Put the cursor on the VRM, then drag the cursor until the VRM is on the inner edge of the object.
Bearing: Put the cursor on the EBL, then drag the cursor until the EBL bisects the object.

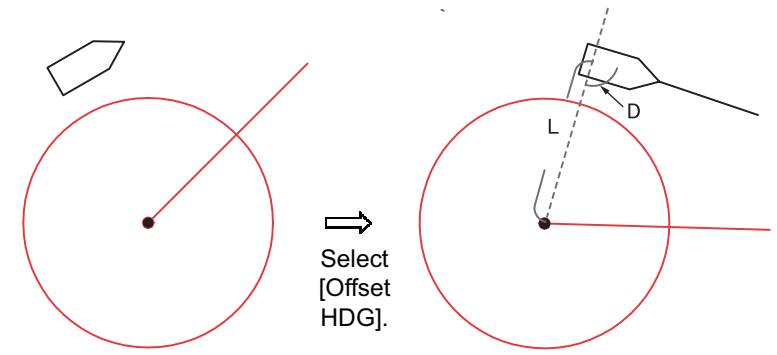
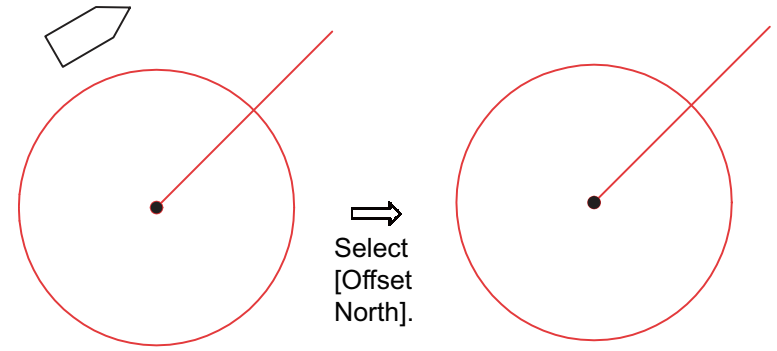
2.9.3 How to select bearing reference

The EBL bearing reference can be true or relative. Click the EBL reference indication to display T (True) or R (Relative).

2.9.4 EBL, VRM functions available with the context-sensitive menu

The EBLs and VRMs have additional functions that are accessed from the context-sensitive menu. Right-click any VRM or EBL box to show the context-sensitive menu.

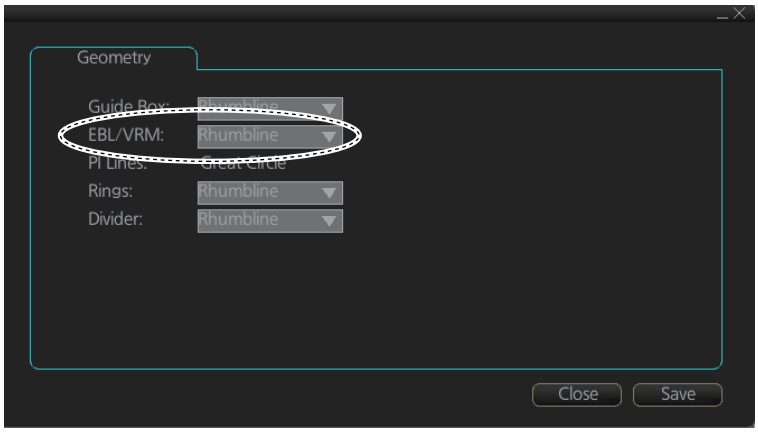


Function	Description
[Centered]	Centers the origin of the EBL and VRM on the current position.
[Ground]	Anchors the EBL and VRM to ground; neither the EBL or VRM move with ship's movement.
[Offset HDG]	 Drag and drop EBL, VRM on desired location. When vessel changes course, the EBL, VRM move so that the angle (D) to their centers stays fixed.
[Offset North]	 Drag and drop EBL, VRM on desired location. The EBL, VRM move to keep the angle from North to the center of the EBL, VRM, even if the vessel changes course. The distance to the center of the EBL, VRM is fixed.

2.9.5 How to select range calculation method

The range calculation method for the EBL and VRM can be selected to Rhumbline or Great Circle. Do as follows to select a calculation method.

1. Open the menu, then select [NAV Tools] and [Geometry] to show the [Geometry] page.



2. Select [Rhumbline] or [Great Circle] with the drop down list box for [EBL/VRM].
3. Click the [Save] button to save the setting, then click the close button to finish.

2.10 How to Show, Hide a Chart Cell

The currently displayed chart cell can be temporarily hidden.

1. Select the Voyage navigation mode or the Voyage planning mode, then right click the electronic chart display area.
2. Select [Hide this cell] from the pop-up menu. The corresponding cell disappears temporarily.
3. To redisplay the cell, right click the chart area, then select [Reset hidden cell] from the pop-up menu.



For NAVI mode

2.11 Datum

2.11.1 General

Datum is a mathematical model of the earth based on which a sea chart is produced. If the datum of a position sensor and that of a sea chart are different, a transformation has to be made somewhere in the system. Not doing so can result in errors of several sea miles. The difference between two datum is never constant, but depends on position. This means that the difference between WGS-84 and local datum, generally used in paper charts, is not generally valid with electronic sea charts.

2.11.2 Paper charts

Datum used in paper charts have been traditionally national datum for historical reasons. Many paper charts do not have a marked datum, therefore compatibility with electronic charts may be complicated. In some paper charts, the correction terms are

printed in lieu of datum, for correction of the WGS-84 system satellite locations. The correction terms are usable but only with the paper chart in question.

2.11.3 Electronic sea charts

- The ENC vector material has to be produced by a National Hydrographic Office in the WGS-84 datum.
- The ARCS (raster) material includes polynomials for each chart, making it possible for the ECS system to solve the difference between the WGS-84 datum and the local datum with an accuracy sufficient for authority responsibility. In some charts, the mentioned difference is not known with sufficient accuracy, resulting in displaying a message in the Cursor position box when displayed in ARCS compatible systems.

2.11.4 Positioning devices and datum

In early days of electronic positioning devices, datum received little attention because the commonly used systems utilized special charts (like Decca charts). Later on, data output was added to these systems, but still no attention was paid to datum and the position errors were considered as an inaccuracy of the system. With the spread of the GPS, however, datum has become better known. An accurate position is of no value if co-ordinates are in a wrong datum. GPS satellites utilize the WGS-84 datum.

2.11.5 ECDIS and datum

The ECDIS uses ENC material, produced to standards using WGS-84 datum. Positioning devices connected to the ECDIS must work in the WGS-84 datum. IMO requires that the ECDIS must give an alert if the datum of a positioning device is not the WGS-84.

2.12 Set up Before Departure

2.12.1 Updates before departure

Update chart material

Update your chart material before embarking on a new voyage. See section 3.20.

Viewing dates for charts and manual updates

Note: It is very important that you set the [Display Date] and [Update Review] dates for charts as the current date.

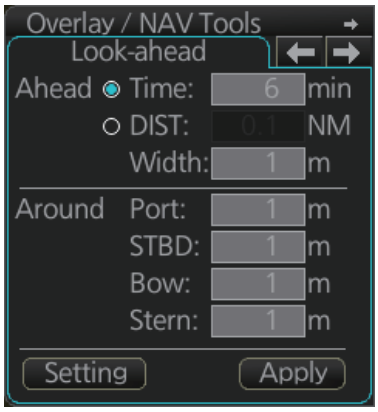
There may be features that require chart viewing dates or seasonal dates in charts. Accordingly, if you have not set Display and Update Review dates as the current date there is a possibility that you can get a wrong presentation or some feature may be absent. See section 5.2.2.

Create or update user chart, Notes

If necessary, create a new user chart and Notes or modify existing ones. See chapter 10.

Chart alert calculation

Set chart alert areas suitable for your coming voyage, on the [Look-ahead] page in the [Overlay/NAV Tools] box. See section 8.2.



2.12.2 Create or update a route

Create a new route or modify an existing one. See chapter 9.

Check your route against chart alerts

Before you sail your route, you should always check your route against chart alerts. This is important because your S57 charts and manual updates may contain chart viewing dates information. You can check chart alerts from the [Check Results] page on the [Route Plan] dialog box.

The following information is stored with the monitoring route plan:

- Conditions for chart alerts during route monitoring, which includes safety contour and other chart alerts, on the [Alert Parameters] page of the [Route Plan] dialog box.



- Name of the user chart to be used during route monitoring together with this planned route, on the [User Chart] page of the [Route Plan] dialog box.



- Name of the Notes to be used during route monitoring together with this planned route, on the [User Chart] dialog box.



Recalculate timetable and ETA values

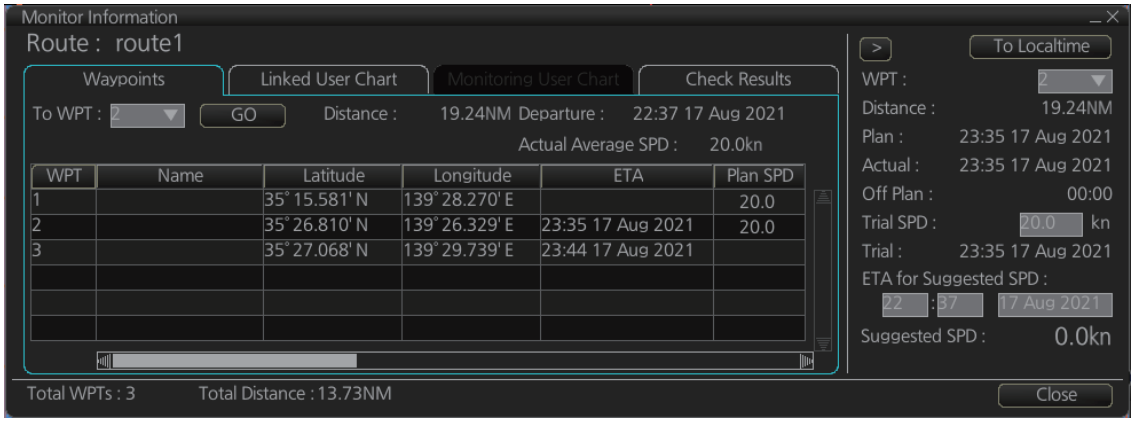
Timetable and ETA values can be recalculated from the [Optimize] page in the [Route Plan] dialog box. Minimally set ETD to equal departure time, and set optimization values.



2.12.3 How to check and prepare the route, user chart to monitor

Select the route to monitor, view linked user charts

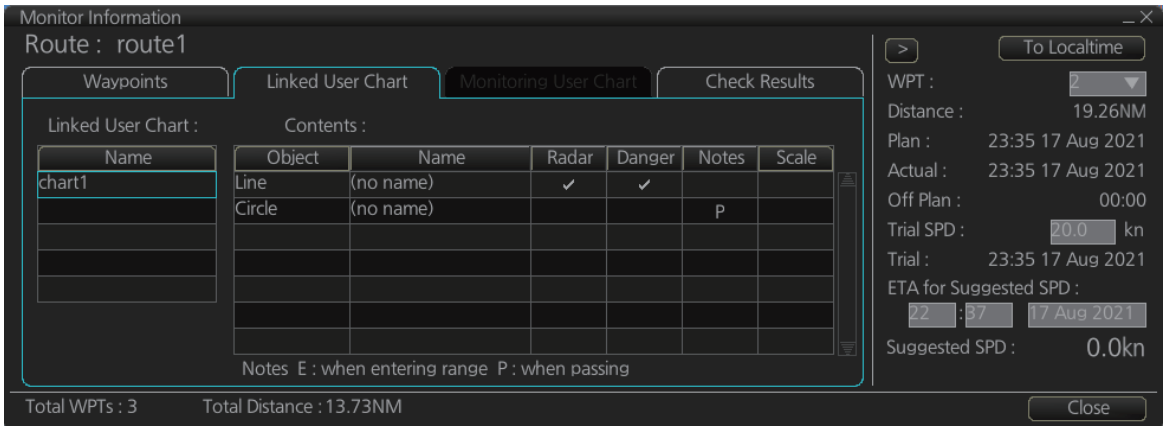
Select a route for the voyage: In the Voyage navigation mode, click the [Voyage], [Route] and [Select] buttons, or right-click the route indication in the [Route Information] box (right edge of screen), then select [Select Route]. See chapter 11. The [Monitor Information] dialog box appears, showing the [Waypoints] tab.



Note: A route cannot be opened if its planned settings are different from its navigation settings. The reason is given on the [Select Route] dialog box. In this case, open the route in the Voyage planning mode and click the [Check Route] button, on the [Alert Parameters] page. Adjust the route as necessary.

The To WPT can be selected, however WPT 01 cannot be selected.

To see all the user charts linked to the route, click the [Linked User Chart] tab to show the names of all the user charts linked to the route. Click a user chart to view its contents.



Select confirm conditions of the route plan

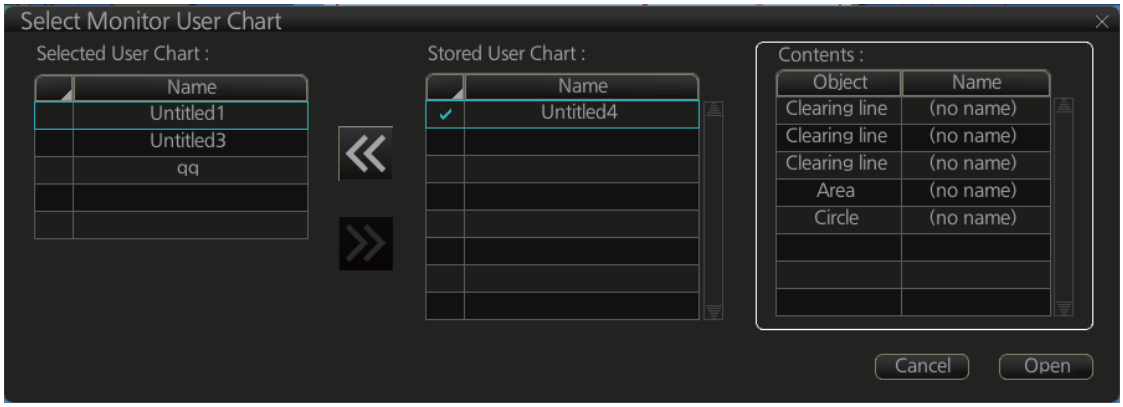
Check the setting on the [Chart Alert] dialog box; click the [DISP], [SET] and [Chart Alert] buttons to show that dialog box.



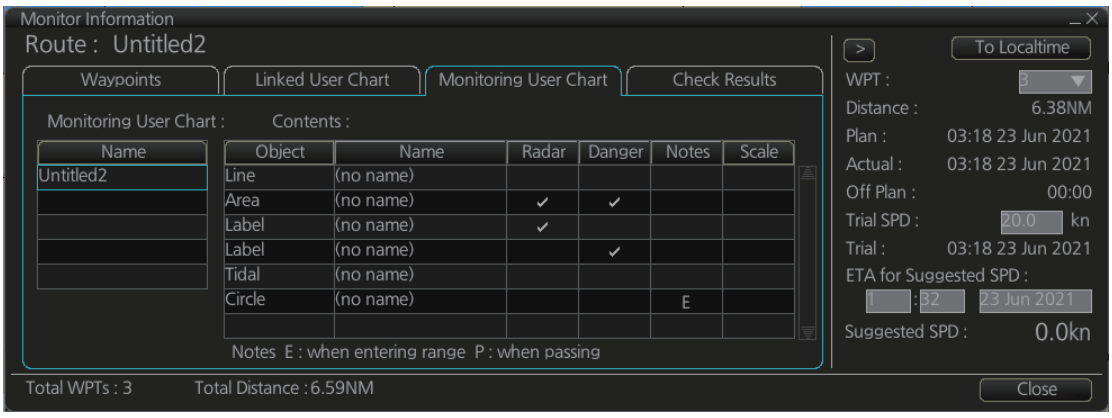
Select the user chart(s) to monitor

A user chart can be monitored without linking it to a route. You can select a user chart two ways.

- Click the [Voyage], [User Chart] and [Select/Unselect] buttons on the InstantAccess bar™ to open the [Select Monitor User Chart] dialog box.
- In the Voyage navigation mode, right click anywhere in the Route information box (right side of screen) to show the [Select Monitor User Chart] dialog box.



Check the chart(s) to use in the [Stored User Chart] window, then click the [<<] and [Open] buttons. The [Monitor Information] dialog box automatically appears and the user chart(s) selected are displayed in the [Monitoring User Chart] tab. Click a user chart to view its contents.

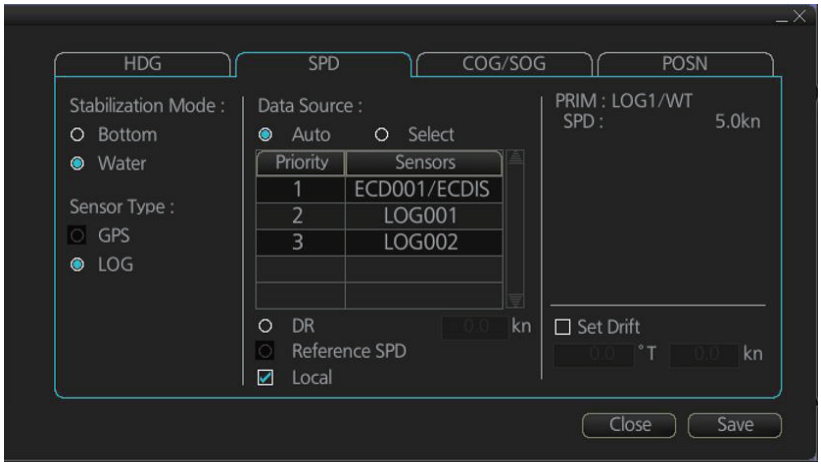


2.12.4 Check configuration of navigation sensors

You can check the configuration of your navigation sensors in the [System Sensor Settings] page in the [Sensor] menu.

Check speed settings ([SPD] page)

Open the menu and click the [SPD] tab. The user can select navigation sensors for use in navigation and view their current values.



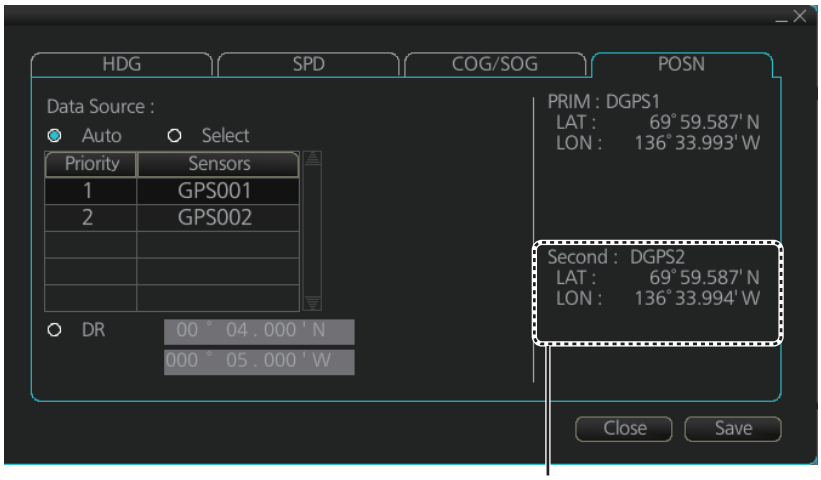
If there is no value shown for a sensor, this means that the sensor is not valid. Note that the content of these pages depends on the sensors that are in use on the ship.

The content of the display changes with sensor.

Note that manual speed should only be used in an emergency, when no other speed reference is available. Remember that position sensors are also available as speed sources.

Check position sensors (POSN page)

Open the menu and click the [POSN] tab. The [PRIM] and [Second] labels indicate the type of the position sensor. (In the figure below the [PRIM] label shows [DGPS1].) [PRIM] and [Second] indicate sensor status and priority.



The indication for the second sensor appears even when only one position-fixing equipment is connected.

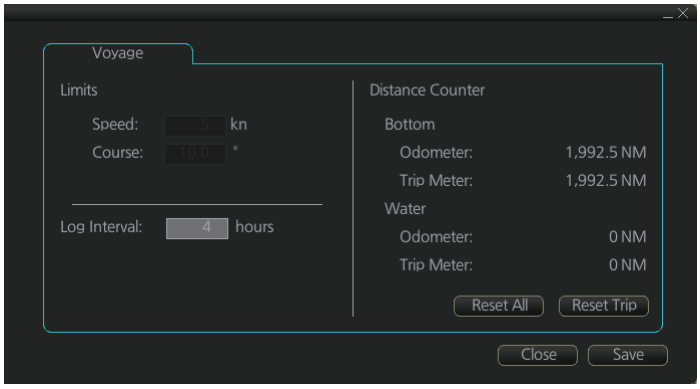
Only one sensor can be [PRIM] while the others are [Second] or off position. After a sensor is turned off, its status is changed to [Second] state. When a position sensor state is changed to [PRIM], the sensor formerly [PRIM] becomes [Second].

Select the [PRIM] navigation sensor as the sensor that is considered to be most accurate and reliable. Set all other navigation sensors as [Second].

2.12.5 How to reset odometer and trip meter

To reset the odometer and/or trip meter do as follows:

1. Open the menu, then select [Log], [NAV Log], then [Voyage] to show the [Voyage] menu.



2. Click one of the following buttons as appropriate.
   [Reset Trip]: Reset the trip distance (ground and water).
   [Reset All]: Reset both the odometer and the trip meter (ground and water).
3. Click the [Close] button to finish.

3. HOW TO MANAGE CHARTS

This chapter mainly shows you how to install the public keys, licenses and charts, manually update chart objects, and synchronize charts. All chart-related operations begin from the Chart maintenance mode, which you access by clicking the [CHARTS] button on the Status bar.

Note 1: Charts, routes, monitored routes, and user charts are shared with other FMD-3xxx, and FAR-3xxx units, via LAN. Data is shared automatically; no operation is required.

Note 2: Chart processing (installation, deletion, etc.) may take several minutes depending on the number of charts to be processed.

Note 3: If, when attempting to install charts, nothing appears on the display at the start of the procedure, reset the power and try again.

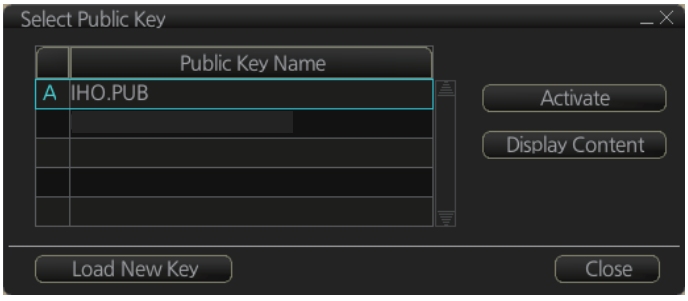
Note 4: If installation of AVCS charts stops, the message "Chart installation has stopped. Run the installation again. Installation will continue from the chart not yet installed." appears. This does not indicate completion of the installation. Restart the installation. The installation resumes from the chart not yet installed.
This message may also appear when installing C-MAP ENC SERVICE, C-MAP PROFESSIONAL+, C-MAP ENC+ SERVICE and C-MAP ADMIRALTY ENC SERVICE charts if the user does not confirm completion of the installation within approx. one hour. (Installation window remains on the screen.) However, this is not an indication of failed installation.

Note 5: When installing the AVCS LargeMedia, the message "No connection to dongle" may appear in the [Result] window at the completion of the installation. If this occurs, reinstall the media.

3.1 How to Install Public Keys for ENC Charts

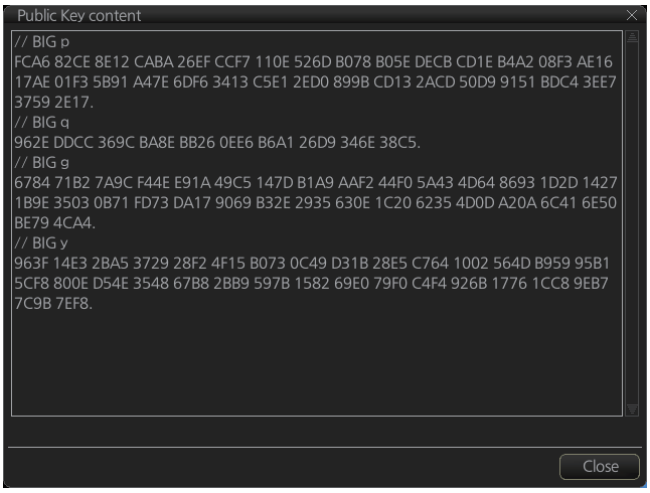
Public keys authenticate the source and integrity of the ENC chart materials used in this chart system. Before you install a new ENC chart, confirm that the corresponding public key is installed.

1. Set the medium (DVD, USB flash memory, etc.) that contains the public key. (The IHO public key is pre-installed.)
2. Get into the Chart maintenance mode, then click the [Public Key] button on the InstantAccess bar™.



3. Click the [Load New Key] button to show the [Open File] dialog box.

4. Find the .pub file, then click the [Open] button. The [Public Key] dialog box reappears.
5. Click the [Display Content] button on the [Public Key] dialog box to show the display contents.



6. Click the [Close] button to close the [Public Key] dialog box.
7. To accept the contents, click the [Activate] button on the [Public Key] dialog box.

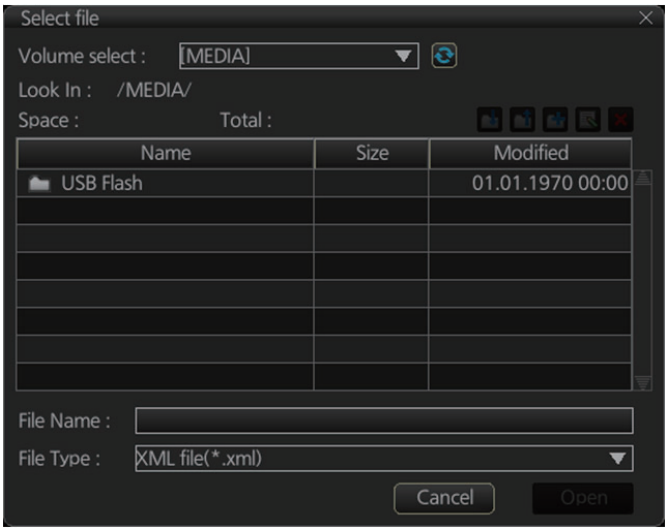
3.2 How to Install ENC Licenses, Charts

Install your ENC licenses and charts, in that order.

3.2.1 How to install an ENC license

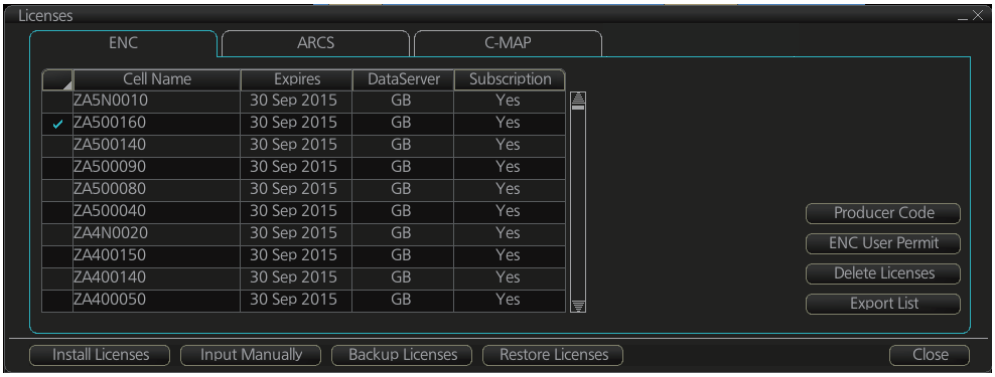
Automatic installation

1. Set the medium (DVD, USB flash memory, etc.) that contains the ENC license.
2. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™ to show the [Licenses] dialog box.
3. Click the [Import Licenses] button.



4. Select the medium, or folder, that contains the license, then click the [Open] button.

5. Find the license (permit.txt), then click the [OK] button to install the license. The [Licenses] dialog box, then shows cell name, date of expiration, data server name and subscription type of the license.

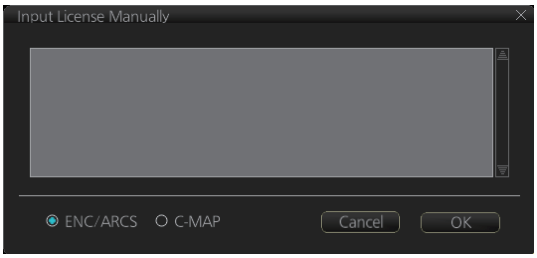


6. Click the [Close] button to finish.

Manual installation

If you do not have the medium which has your ENC license, you can enter the license number manually.

1. Click the [CHARTS] button on the Status bar to go the Chart maintenance mode, then click the [License] button on the InstantAccess bar™.
2. Click the [Input Manually] button to show the [Input License Manually] box.



3. Select the type [ENC/ARCS] at the bottom of the screen.
4. Enter the license number(s), then click the [OK] button.

3.2.2 How to install ENC charts

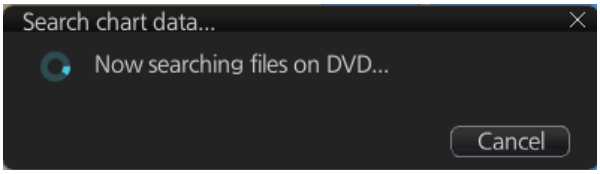
When you install charts from a medium, the system first loads a catalog, which stores certain information into your SSD such as cell IDs, their position, and edition number, from the install medium. Then, the system asks which charts you want to install from the chosen medium. After building the catalog, you can view the contents of it by clicking the [Cell Status] button.

Note 1: Do not cancel the installation (with the [Cancel] button) while it is in progress. Cancellation automatically resets the power, stopping the installation. If the power is reset, try to install the charts again. If the installation fails, reset the power and try again.

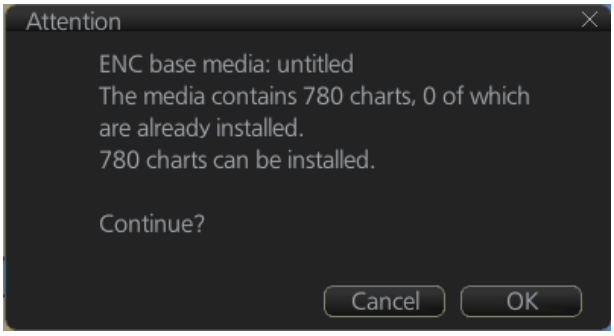
Note 2: When any chart is installed, all checked routes are reverted to unchecked status. Use the [Check Route] button on the [Alert Parameters] page to re-check routes before starting any voyage.

1. Set the medium that contains the ENC charts.

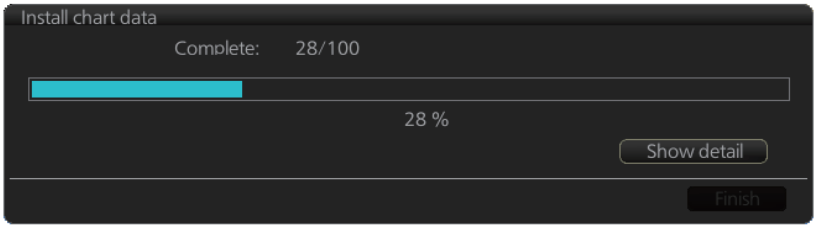
2. Get into the Chart maintenance mode, then click the [AUTO Import] button on the InstantAccess bar™. A prompt informs you that it may take a while to do the installation and are you sure to continue. Click the [OK] button to continue. A message informs you that the system is searching the medium (in the figure below the medium is a DVD) for chart data.



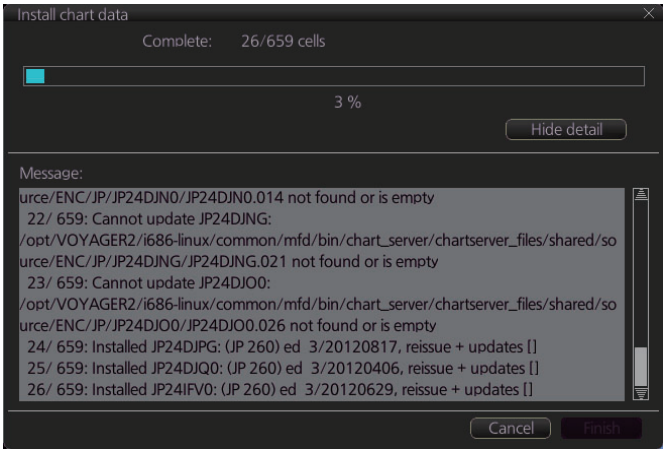
The results of the search are displayed, an example of which is shown below. To cancel the installation, click the [Cancel] button.



3. Click the [OK] button to install the charts. The [Install chart data] window appears and shows the percentage of completion, with digital and analog indications.

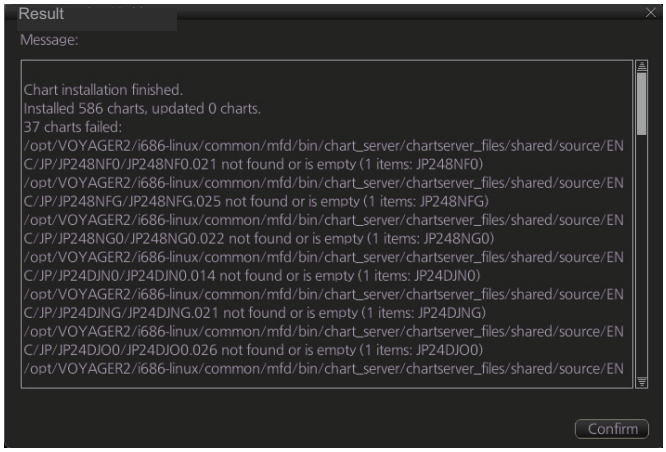


To show details during the installation, click the [Show detail] button.



To close the [Message] window, click the [Hide detail] button.

4. When the installation is completed, information about the installation appears in the [Result] window. Click the [Confirm] button to finish.
5. If applicable, set the next sequential medium and repeat steps 2-4 to install the next charts.
6. After all necessary charts are installed, reset the power.



Note 1: When many charts are installed, the ECDIS checks for error in the installed chart data at the next power up. This is not an indication of malfunction.

Note 2: Previous versions of charts cannot be displayed if installed after installing the latest versions.

3.3 How to Install ARCS Licenses, Charts

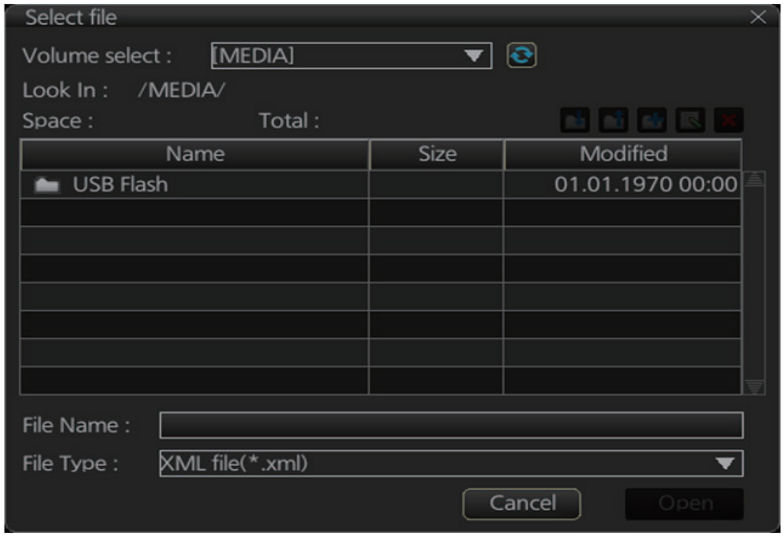
3.3.1 How to install an ARCS license

An ARCS license can be installed automatically or manually. The procedure which follows is for automatic installation. For manual installation, see "Manual installation" on page 3-3.

Note: Do not cancel the installation (with the [Cancel] button) while it is in progress. Cancellation automatically resets the power, stopping the installation. If the power is reset, try to install the charts again. If the installation fails, reset the power and try again.

1. Insert the medium (DVD, USB flash memory, etc.) that contains the ARCS license.
2. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™ to show the [Licenses] dialog box.

3. Click the [Import Licenses] button.



4. Find the medium that contains the license, then click the [Open] button.
5. Click the [OK] button to install the license.



6. Click the [Close] button to finish.

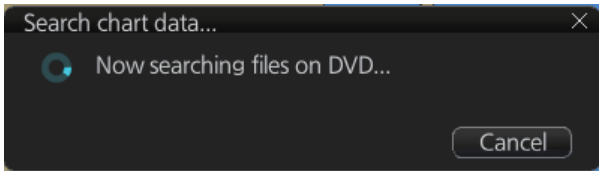
3.3.2 How to install ARCS charts

When you install charts from a medium, the system first loads a catalog, which stores certain information into your SSD such as cell IDs, their position, and edition number, from the install medium. Then, the system asks which charts you want to install from the chosen medium. After building the catalog, you can view the contents of it by clicking the [Cell Status] button.

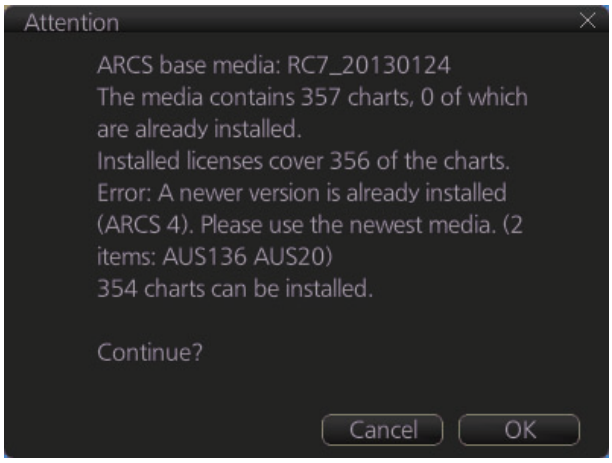
Note 1: Do not cancel the installation (with the [Cancel] button) of a chart while it is in progress. Cancellation will automatically reset the power, stopping the installation. If this occurs, try to install the chart again. If the installation fails, reset the power and try again.

Note 2: When any chart is installed, all checked routes are reverted to unchecked status. Use the [Check Route] button on the [Alert Parameters] page to re-check routes before starting any voyage.

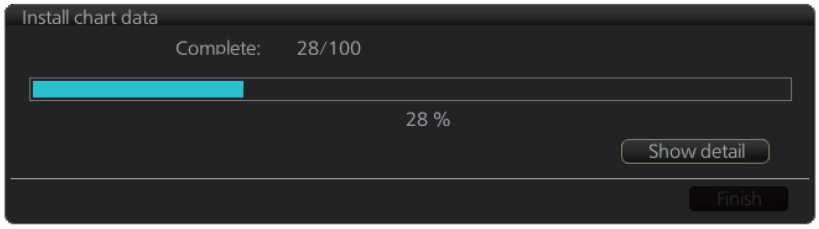
1. Set the medium that contains the ARCS charts.
2. Get into the Chart maintenance mode, then click the [AUTO Import] button on the InstantAccess bar™. A prompt informs you that it may take a while to do the installation and are you sure to continue. Click the [OK] button. A message informs you that the system is searching the medium (in the figure below the medium is a DVD) for chart data.



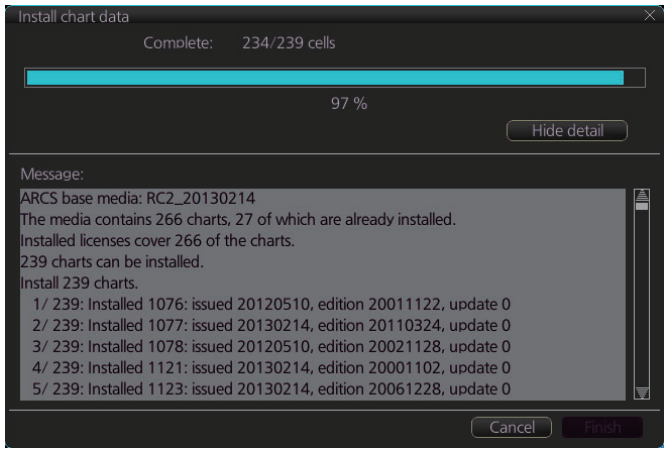
The results of the search are displayed, an example of which is shown below. To cancel the search, click the [Cancel] button.



3. Click the [OK] button to install the charts. The [Install chart data] window appears and shows the percentage of completion, with digital and analog indications.

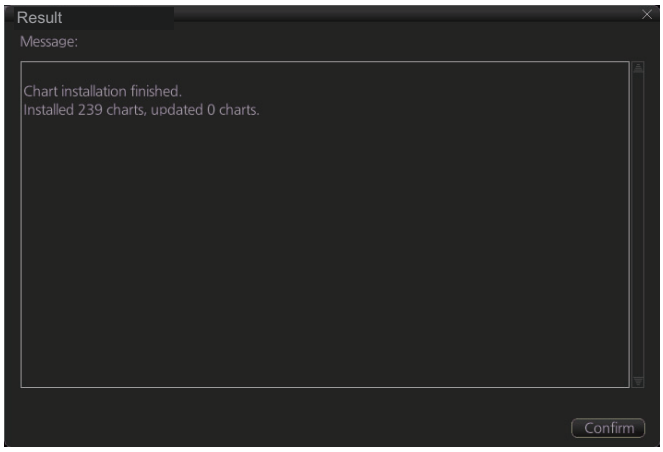


To show details during the installation, click the [Show detail] button.



To close the [Message] window, click the [Hide detail] button.

4. When the installation is completed, information about the installation appears in the [Result] window. Click the [Confirm] button to finish.



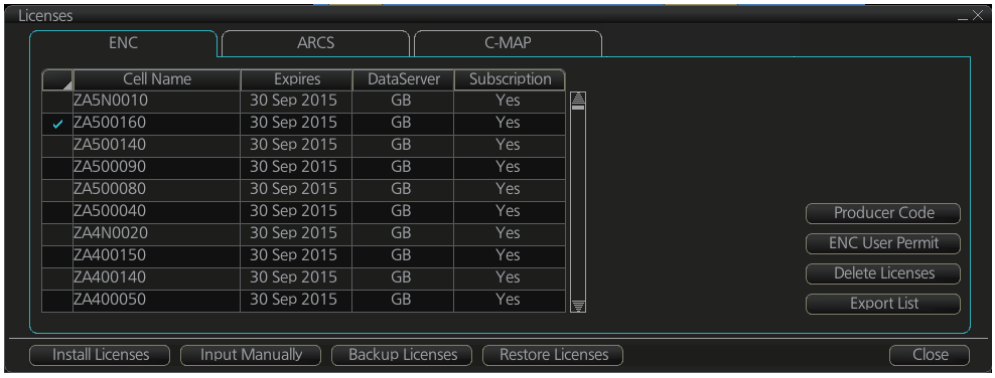
5. If applicable, set the next sequential medium, then repeat steps 2-4 to install the next charts.
6. After all necessary charts are installed, reset the power.

Note 1: When many charts are installed, the ECDIS checks for error in the installed data at the next power up. This is not an indication of malfunction.

Note 2: If, after installation, no ARCS chart appears, delete all ARCS charts and, then reinstall them.

3.4 How to Delete ENC, ARCS Licenses

1. Get into the Chart maintenance mode.
2. Click the [License] button on the InstantAccess bar™.
3. Click the [ENC] or [ARCS] tab as appropriate to show a list of licenses.



4. Put a checkmark next to the license(s) to delete.
5. Click the [Delete Licenses] button to delete the license(s) selected.

3.5 How to Update ENC Chart Manufacturer Info

An ENC chart has official or unofficial attributes. You can determine if an ENC chart is official or unofficial by viewing the chart manufacturer's information. Manufacturer's information has the following functions.



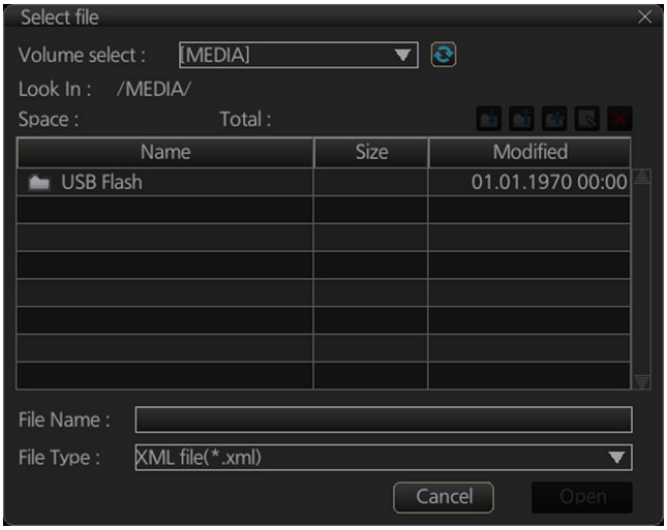
- [Filter] window (see section 3.14) can show or hide official or unofficial charts.
- Chart judgment with chart alert (see section 8.1.2). (Unofficial charts are subject to chart alert.)
- Unofficial charts are denoted on the [Check Results] of the [Route Plan] dialog box (see section 9.4.5) if the corresponding alert check is active.

The ENC manufacturer information can be updated as follows.

Note 1: ENC chart manufacturer information is built in the FMD beforehand, and it is not normally necessary to update the information.

Note 2: The ENC chart manufacturer information file has its own format. For details, contact a FURUNO dealer.

1. In the Chart maintenance mode, click the [License] button to show the [Licenses] dialog box.
2. Click the [ENC] tab.
3. Click the [Producer Code] button.



4. Select the ENC chart manufacturer information file, then click the [Open] button.
5. Reset the power.

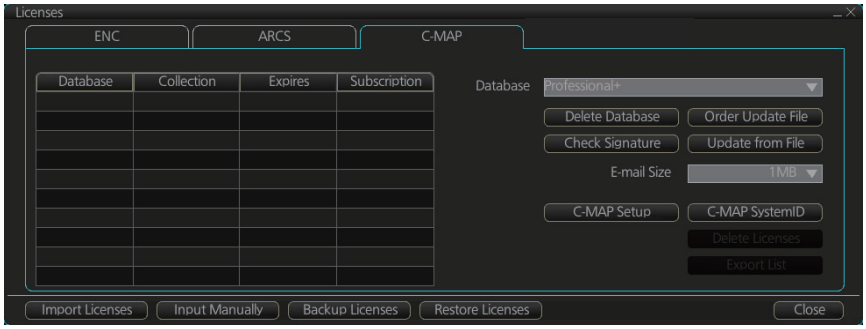
3.6 How to Install C-MAP Charts

Synchronize chart data before you install C-MAP charts, grouping the ECDIS units to synchronize, otherwise the chart data cannot be shared. See the procedure in section 3.21.1 for how to synchronize chart data. If C-MAP charts are not synchronized after installation, delete all C-MAP charts, and do the above procedure again.

3.6.1 How to register the eToken

The eToken is a hardware mechanism (installed inside the PCU) used for password authentication. Registration of the eToken is required only once, before you install the C-MAP database.

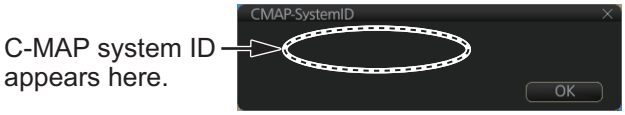
1. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™ to show the [Licenses] dialog box.
2. Click the [C-MAP] tab to the show the [Licenses] dialog box for C-MAP.



3. Click the [C-MAP Setup] button.
4. You are asked if you are sure to continue; click the [OK] button to continue and register the eToken.

Note 1: "C-MAP: No connection to eToken" disappears from the Permanent warning box after completion of the registration.

Note 2: You can show your C-MAP system ID by clicking the [C-MAP SystemID] button on the [Licenses] dialog box for C-MAP.



3.6.2 How to install the C-MAP database and licenses

When you install the C-MAP database from a medium, all data is saved to the SSD.

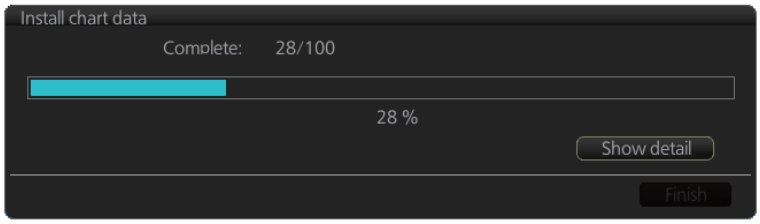
Note 1: To share C-MAP charts between FMD-3xxx, FAR-3xxx, group the units before you install the C-MAP charts. If the grouping is not done before chart installation, the charts are not shared. In this case, remove the C- MAP charts, group the ECDIS units, then re-install the C-MAP charts.

Note 2: The installation of a chart cannot be cancelled while it is in progress. If you get an error message, try to install the charts again.

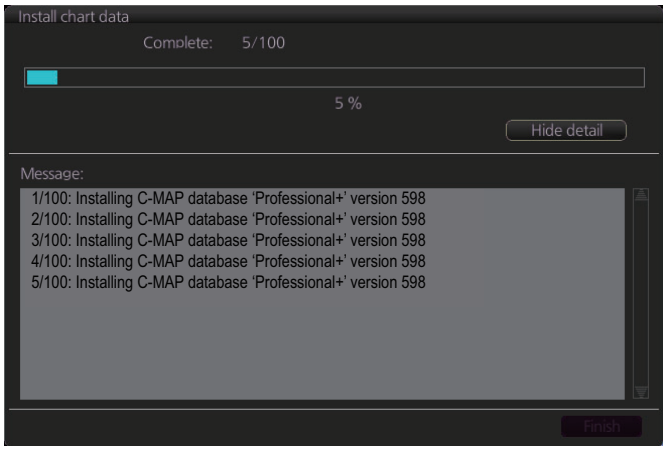
Note 3: The C-MAP database in the units selected for synchronization are synchronized upon the successful completion of the database installation.

How to install the C-MAP database

1. Insert the medium that contains the C-MAP database.
2. Get into the Chart maintenance mode, then click the [AUTO Import] button on the InstantAccess bar™.
   The [Install chart data] window appears and shows the percentage of completion, with digital and analog indication.

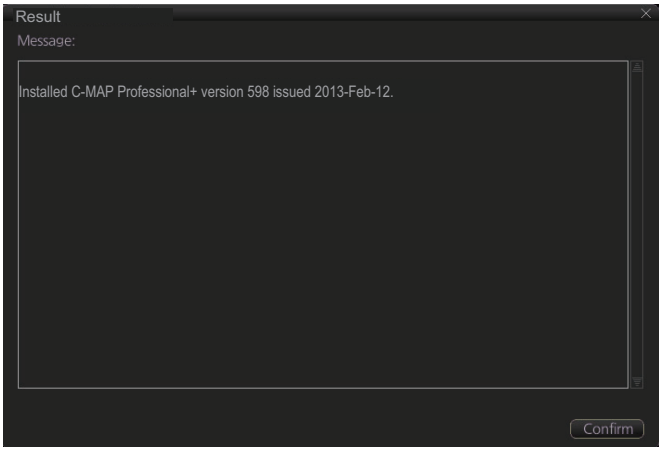


To show details during the installation, click the [Show detail] button.



To close the [Message] window, click the [Hide detail] button.

3. When the installation is completed, information about the chart database installed appears in the [Result] window. Click the [Confirm] button to finish.



4. If applicable, set the next sequential medium and repeat steps 2-3 to install the next databases.
5. After all databases are installed, reset the power.

Note 1: If, after installation, C-MAP charts do not appear, delete all corresponding charts and, then reinstall them.

Note 2: Synchronization is not done for charts which could not be installed successfully. Reinstall failed charts.

How to install C-MAP chart licenses

A C-MAP license file is normally installed automatically. Manual installation is also available.

Automatic installation:

1. Set the medium (DVD, USB flash memory, etc.) that contains the C-MAP license.
2. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™.
3. Click the [Import Licenses] button.
4. Select the medium that contains the license, then click the [Open] button.
5. Click the [OK] button to install the license.
6. Click the [Close] button to finish.
7. Reset the power.

Manual installation:

1. Click the [CHARTS] button on the Status bar to go the Chart maintenance mode, then click the [License] button on the InstantAccess bar™.
2. Click the [Input Manually] button to show the [Input License Manually] box.
3. Select the type [C-MAP] at the bottom of the window.
4. Enter the [Database name] and [Collection name] information as shown in the table below. Enter the names exactly as shown to ensure correct installation.

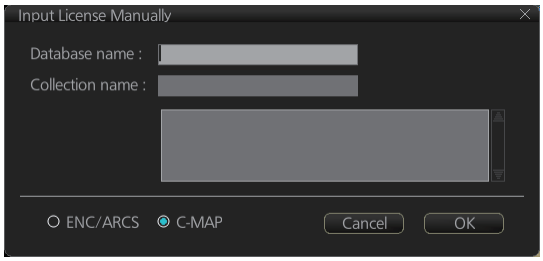


Chart type	Name to enter	
	Database name	Collection name
PROFESSIONAL+	Professional+	Enter "Zone *" (without quotations, *= contracted zone number) Ex. Zone 1
ENC SERVICE	ENC	Enter "Zone * ENC" (without quotations, *= contracted zone number) Ex. Zone 1 ENC
ENC+ SERVICE	ENC+	
ADMIRALTY ENC SERVICE	CAES	Enter the contracted collection name.

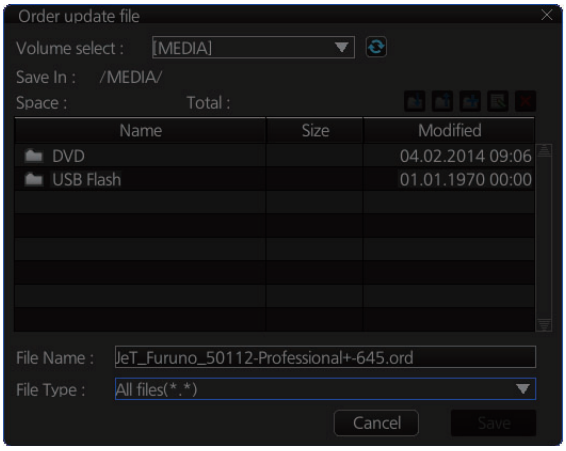
5. Enter the license (max. 16 characters) in the bottommost window.
6. Click the [OK] button to finish.
7. Reset the power.

3.6.3 How to generate, order and apply an update file

How to generate and order an update file

To update the C-MAP chart database, you have to generate an update file, and e-mail the file directly to C-MAP. The update file defines coverage of charts you can display on your chart radar.

1. Connect a USB flash memory to the USB port on the Control Unit.
2. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™.
3. Click the [C-MAP] tab to show the [Licenses] dialog box for C-MAP.
4. From the [E-mail Size] drop-down list, select the size of the update file. The choices are [100KB], [200KB], [300KB], [400KB], [500KB], [750KB], [1MB], [2MB], [3MB], [4MB], [10MB], [Unlimited]. This is the size of the data file in an e-mail. The file may be sent in pieces depending of the size selected.
5. Click the [Order Update File] button. A file name (C-MAP system ID and chart type) is automatically created, with the extension .ord.



6. Select the USB flash memory.
7. Click the [Save] button to save the order file to the USB flash memory.
8. Send the order file to updates@c-map.com.

Within a few minutes you will receive a file that includes the terms for using the chart service and the chart updates. Save the file to a USB flash memory and apply it as shown in the next section.

How to apply the update file

1. Insert the USB flash memory that contains the update file (.ans extension) into the USB port on the Control Unit.
2. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™.
3. Click the [C-MAP] tab to show the [Licenses] dialog box for C-MAP.
4. Click the [Update from File] button.
5. Find the update file on the USB flash memory, then click the [Open] button.

3.6.4 How to confirm license status

If you cannot display a C-MAP chart, follow the procedure below to check license status. Database and license should be installed beforehand.

1. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™.
2. Click the [C-MAP] tab to show the [Licenses] dialog box for C-MAP.
3. Click the [Check Signature] button. The results of the check appear in the [Result of Check Signature] window, as [ok] or [Not ok]. For [Not ok], contact your C-MAP dealer or C-MAP chart sales outlet for advice.
4. Click the [Ok] button to close the window.

3.7 How to Delete a C-MAP Chart Database

If you are going to delete all C-MAP chart databases, turn off chart synchronization and delete the databases from each Processor Unit.

1. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™.
2. Click the [C-MAP] tab to show the [Licenses] dialog box for C-MAP.
3. Select the database(s) to delete with the [Database] pull-down list.
4. Click the [Delete Database] button, then reset the power.

3.8 How to Export a List of Charts

Get into the Chart maintenance mode, click the [Manage Charts] button on the InstantAccess bar™ to show the [Manage Charts] dialog box. Check the charts to add to the list. Click the [Export List] button to export the checked charts to a USB flash memory, in .txt format.

3.9 How to Export a List of Specific Licenses

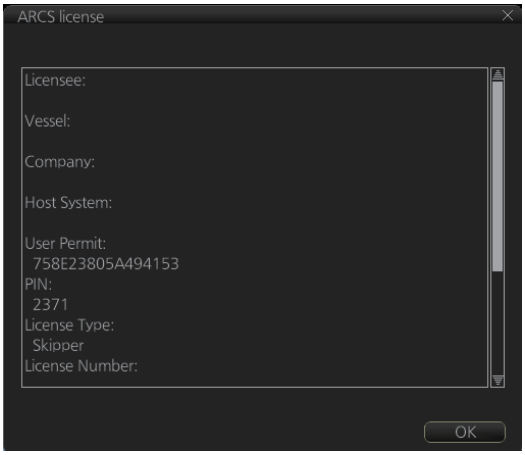
You can export a list of your ENC, ARCS or C-MAP licenses to a USB flash memory, in .txt format.

1. Set a USB flash memory in the USB port on the Control Unit.
2. Get into the Chart maintenance mode, then click the [License] button.
3. Click the [ENC], [ARCS] or [C-MAP] tab.
4. Click the [Export List] button.
5. Change the file name at [File Name] if desired.
6. Select the USB flash memory, then click the [Save] button.
7. Click the [OK] button to finish.

3.10 How to Show the ENC Permit, ARCS License

1. Get into the Chart maintenance mode, then click the [License] button.
2. Click the [ENC] or [ARCS] tab as applicable.
3. Click the [ENC User Permit] or [ARCS Licenses] button as applicable to show permit or license.





4. Click the [OK] button to finish.

3.11 How to Backup, Restore Licenses

You can make backup copies of your ENC, ARCS and AVCS (AIO) licenses and save them to a USB flash memory. If re-installation of the licenses becomes necessary, you can reinstall them from the USB flash memory. The backup and restore functions are not available with C-MAP charts.

To backup licenses:

1. Insert a USB flash memory into the USB port on the Control Unit.
2. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™ to show the [Licenses] dialog box.
3. Click the [Backup Licenses] button.
4. Select the USB flash memory, then select the folder in which to save the licenses, then click the [OK] button.
   The license files (ENCpermit.dat, ARCSpermit.dat) are saved in the selected folder.
5. Click the [OK] button.

To restore licenses:

1. Insert the USB flash memory that has the licenses into the USB port on the Control Unit.
2. Get into the Chart maintenance mode, then click the [License] button on the InstantAccess bar™ to show the [Licenses] dialog box.
3. Click the [Restore Licenses] button.
4. Select the USB flash memory, then select the folder in which licenses are saved, then click the [OK] button.
5. Click the [OK] button.

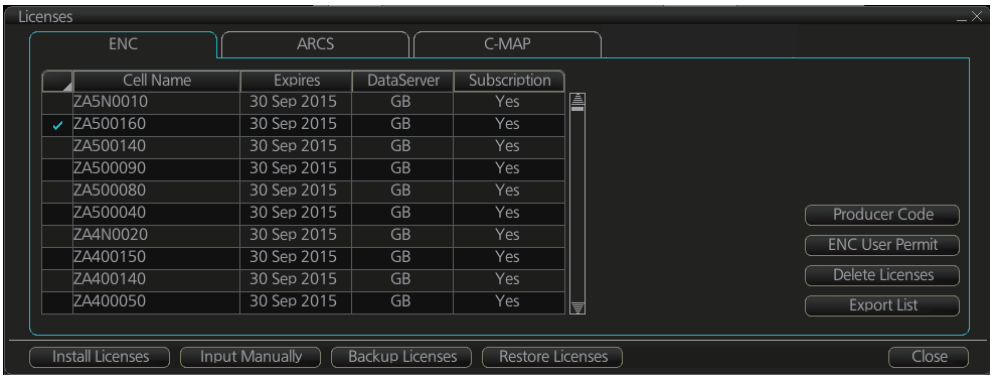
3.12 How to View Permit Expiration Date

Permits are used to control the right to use chart data in the ECDIS. A permit is connected to the edition of a chart. Permits are issued in two different types:

- **Subscription permit**: This type of permit includes updates for subsequent 3, 6, 9 or 12 months.
- **One-Off permit**: This type of permit includes only updates up to the issue date of the permit.

The expiry date of a permit controls the loading of Base charts and their updates to the chart. The system will warn you when you are installing charts or updates that are issued less than 30 days before the expiration date of a permit. If a permit has expired, it is impossible to install a chart or its update that was issued after the expiration date of the permit. The user has a right to view a chart forever, except C-MAP charts that have viewing periods which end two months after the expiry date of the license. If the charts are not updated regularly it will not complete the requirements for having up-to-date charts. To view the permit status of a chart, click the [License] button on the InstantAccess bar™ and, then click the applicable "chart" tab ([ENC], [ARCS], or [C-MAP]).

The example below shows the status of ENC charts. The expiration date of each cell appears in the [Expires] window.



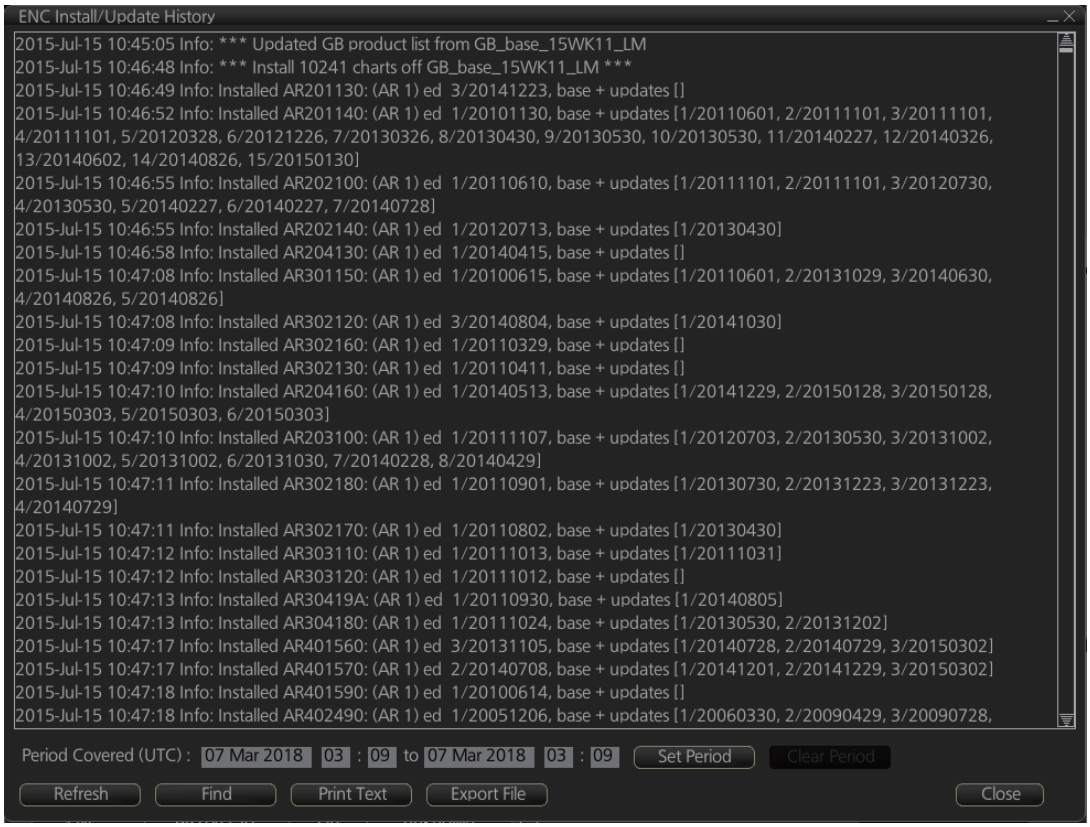
Subscription warnings for RENC

If you have at least one subscription-type permit, the system will automatically warn you about the expiration date of your subscription license, in the Permanent warning box.

Note: If you change service provider for some reason, it is recommended that you remove all the charts from the ECDIS before installing new charts of new service provider.

3.13 How to Display Install/Update History

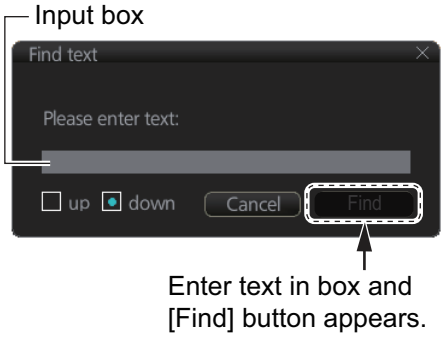
You can see a history of chart installations and updates. On the InstantAccess bar™, click the [Log] and [Update Log] buttons followed by the [ENC], [ARCS] or [C-MAP] button. The example below shows the install/update history for ENC charts.



You can filter the log with [Period Covered (UTC)]. Enter the period to display, then click the [Set Period] button. Click the [Clear Period] button to display all entries. The [Refresh] button updates the list. [Print Text] prints hard copy of the history. [Export File] exports the log file.The file name "UpdateLog_***YYYYMMDDhhmmss.txt" is automatically assigned. (***=ENC, ARCS, CMAP)

The [Find] button searches required text string as follows:

1) Click the [Find] button to show the [Find text] box.
2) Click the input box, then enter the text to search.
3) Select the search direction with the up or down radio button.
4) Click the [Find] button. The first matching text is highlighted in yellow at the top of the screen.



5) To continue the search click the [Find] button. To cancel the search, click the [Cancel] button.

3.14 Catalog of Chart Cells

A catalog is used to view graphical coverage of the charts stored in your SSD. Available charts are displayed showing their border limits. Note that sometimes the real coverage of the charts may be considerably less than the declared limits of it.

To display the catalog, get into the Chart maintenance mode, then click the [Manage Charts] button on the InstantAccess bar™. The [Filter] window lets you choose what to display. Check or uncheck items as appropriate.



1) Chart Type
   [ENC]: Display ENC charts.
   [ARCS]: Display ARCS charts.
   [C-MAP]: Display C-MAP charts.
2) Availability
   Display available or unavailable charts.
3) License
   [Valid]: Cell with valid license.
   [Missing/Expired]: Cell with missing or expired license.
   [Valid + Missing/Expired]: Display cell regardless of license.
   [Uncheck both]: Hide all cells.
4) C-MAP Collections
   A collection is a pre-defined dataset, the contents of which can be defined by zone, individual chart or any of those combinations. Applicable to C-MAP charts also.

5) Official
Display official or unofficial charts.

6) Up-to-date
Display charts which are or are not up to date.

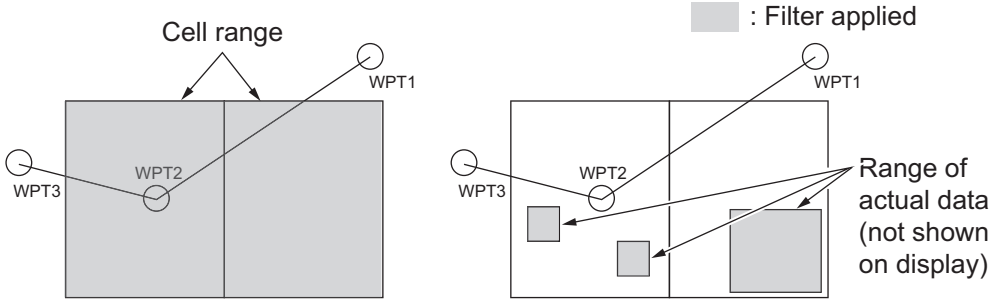
7) Purpose
Display chart according to its purpose - Overview, General, Coastal, NtoM, Approach, Harbour, Berthing.

8) Group
See the next section for how to group charts.

9) Route
The cells within a route and route waypoints (start and end points settable) are shown. When checked, the [Action] column of the [Manage Charts] dialog box shows the necessary action to be taken for each chart within the specified route in order to navigate the route.

Action	Description
[install]	License is installed, however the chart has not been installed. Install the chart.
[no action]	The latest chart is installed, and the license expiration date is 30 or more days away.
[order]	License not purchased. Order the license.
[reinstall]	The chart is corrupted. Reinstall the chart.
[remove]	Chart status is “withdrawn”. It is not necessary to purchase the license.
[renew]	The latest chart is installed, however the license expires within 30 days. Purchase the license.
[update]	Chart is not up-to-date. Install the latest chart.

Further, the range of the cell (square region) and the range in which the cell has actual data do not necessarily match. If the cell has not been purchased, the cell range is filtered, and if it has been purchased, the actual data range is filtered.



Cells have not been purchased
Two cells are displayed on the screen because the route is filtered.

Cells have been purchased
No cells are displayed on the screen because there is no filter on the route.

10) [Set Default] button
Restores all factory defaults for items in the window.

11) [Apply] button
Changes made to the filter window are applied to the chart. This button is only visible if changes are made to the filter window settings.

12) Chart boundary boxes
Defines the area covered by a chart and are color-coded according to license and permit status.

13) Line color legend

The line color legend provides information about license validity.

Color	Message	Color	Message
Internal charts		**External charts**	
Green	Chart is up-to-date	Green	Already installed and up-to-date
Dark Green	Permit will expire within 30 days	Yellow	Can be installed/updated but a warning
Yellow	Permit missing/expired	Orange	Already installed but not up-to-date
Orange	Chart is not up-to-date	Magenta	Can be installed/updated
Magenta	Permit available, chart not installed	Red	No valid permit
Red	Permit not available	Gray	Cannot be installed/updated
Blue	Chart's status is unknown		
Gray	Chart is withdrawn or corrupted		

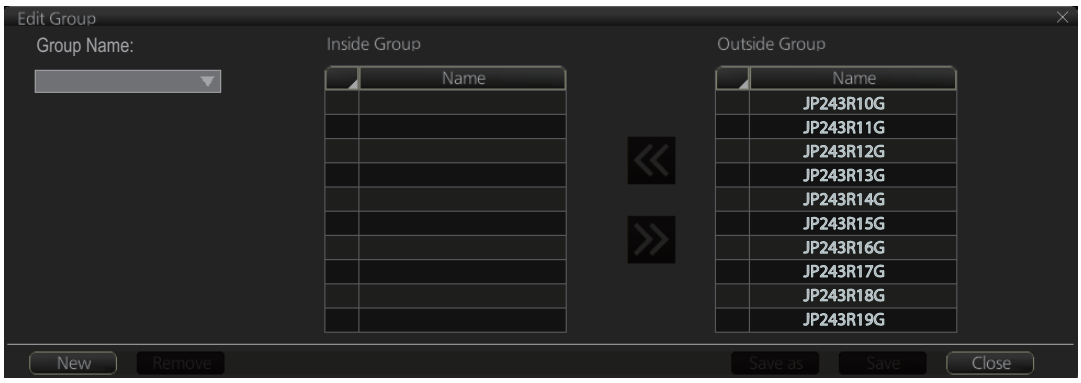
3.14.1 How to group chart cells

You can define groups of like-format chart cells. This means you can collect related charts, for example, all cells that cover a route from Liverpool to New York or all cells available from a National Hydrographic Office.

You can make a group and define charts from the [Edit Group] dialog box.

How to make a new group of chart cells

1. In the Chart maintenance mode, click the [Manage Charts] button on the InstantAccess bar™.
2. Click the [Edit] button in the [Filter] window to show the [Edit Group] dialog box.



3. Click the [New] button.
4. In the [Outside Group] window, click the box to the left of the chart cell you want to add to the group to show a checkmark. (A context-sensitive menu with "Select all" and "Deselect all" functions is available by right-clicking the box to the left of [Name], in either window.)
5. After you have selected the cells to add to the group, click the << button to move the names of the selected cells to the [Inside Group] window. If you want to remove a chart from the group, select it, then click the >> button.
6. Click the [Save] button.
7. Enter a name for the group, using the keyboard on the Control Unit or software keyboard, then click the [OK] button.
8. Click the [Close] button to finish.

How to edit a group of chart cells

You can edit a group of chart cells from a group as follows:

1. In the Chart maintenance mode, click the [Manage Charts] button on the InstantAccess bar™ to show the [Filter] window.
2. Click the [Edit] button.
3. At the item [Group Name], select the name of the group with the pull-down list.
4. In the [Inside Group] window, click the box to the left of the chart cell you want to remove from the group to show a checkmark. (A context-sensitive menu with "Select all" and "Deselect all" functions is available by right-clicking the box to the left of [Name].)
5. After you have selected the charts to remove to the group, click the >> button to remove the selected charts cells from the group.
6. Click [Save], then [Close] to finish.

How to delete a group of chart cells

You can delete group of chart cells as follows:

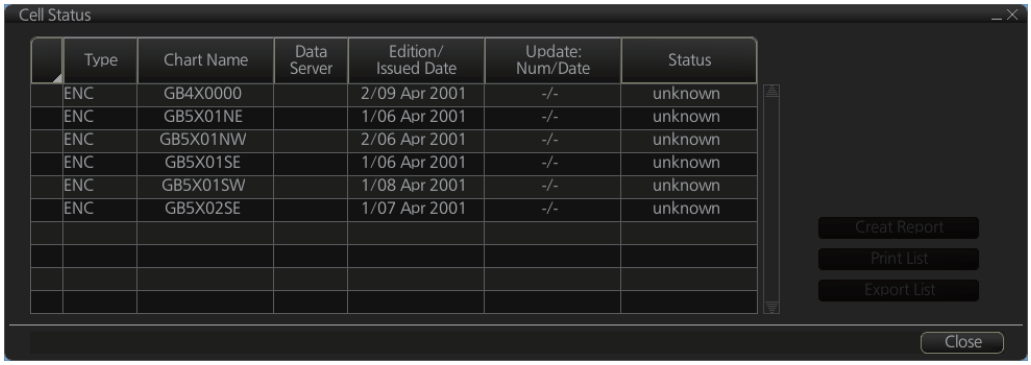
1. In the Chart maintenance mode, click the [Manage Charts] button on the InstantAccess bar™ to show the [Filter] window.
2. Click the [Edit] button.
3. Select the name of the group with the pull-down list at the item [Group Name].
4. Click the [Remove] button.
5. Click the [OK] button.
6. Click the [Close] button.

How to select the group to view

In the Chart maintenance mode, click the [Manage Charts] button on the InstantAccess bar™ to show the [Filter] window. Check [Group], then select the group to view from the pull-down list at [Group].

3.14.2 How to view status of chart cells

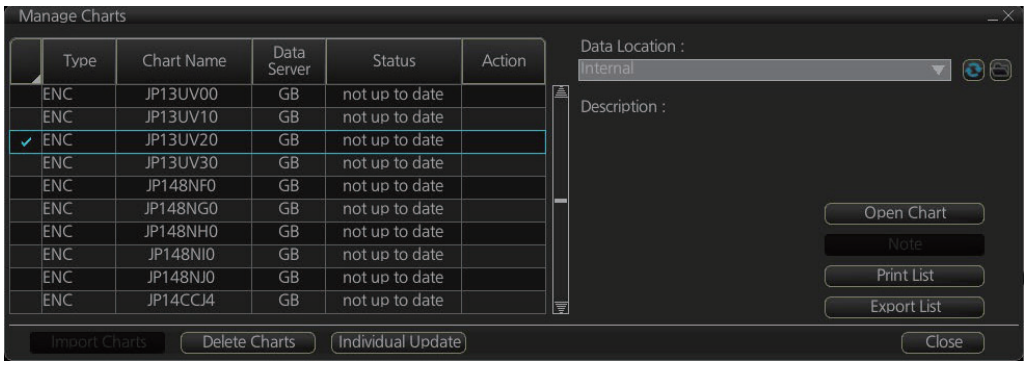
The [Cell Status] dialog box shows the status of the chart cells stored in the system. To show this dialog box, get into the Chart maintenance mode, then click the [Cell Status] button on the InstantAccess bar™.



- [Type]: Type of chart cell, ENC, C-MAP or ARCS.
- [Chart Name]: Chart name
- [Data Server]: The name of the data server where the chart was downloaded from.
- [Edition/Issue Date]: Edition no. and issued date of the chart cell.
- [Update: Num/Date]: No. and date of the update of the chart cell.
- [Status]:
  - [up to date]: Cell is up-to-date.
  - [not up to date]: Cell is not up-to-date.
  - [not installed]: Cell is not installed.
  - [withdrawn]: Cell has been withdrawn (cell will not be updated).
  - [unknown]: Cell is not delivered as part of a data server service (ex. unencrypted ENC).
  - [broken]: Cell is corrupted.

3.15 How to Open Charts

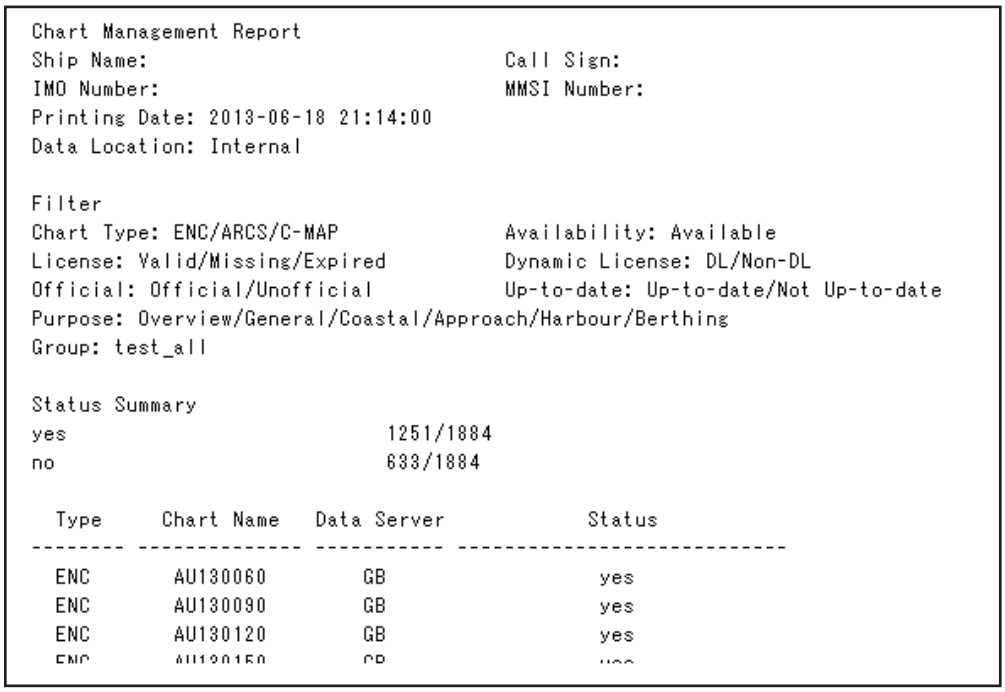
In the Chart maintenance mode, click the [Manage Charts] button on the InstantAccess bar™ to display the dialog box shown below. Select the chart to open, then click the [Open Chart] button.



3.16 How to Print Chart List, Cell Status List

3.16.1 How to print the chart list

1. In the Chart maintenance mode, click the [Manage Charts] button on the InstantAccess bar™ to show the [Manage Charts] dialog box.
2. Check the charts to print.
3. On the [Filter] window, check the information to print, then click the [Apply] button.
4. Click the [Print List] button to print. (If you have selected more than 30 charts, the message "The number of pages is 1. Do you want to continue?." appears. Click the [OK] button to continue, or the [Cancel] button to escape.)



```
Chart Management Report
Ship Name:                              Call Sign:
IMO Number:                             MMSI Number:
Printing Date: 2013-06-18 21:14:00
Data Location: Internal

Filter
Chart Type: ENC/ARCS/C-MAP              Availability: Available
License: Valid/Missing/Expired          Dynamic License: DL/Non-DL
Official: Official/Unofficial           Up-to-date: Up-to-date/Not Up-to-date
Purpose: Overview/General/Coastal/Approach/Harbour/Berthing
Group: test_all

Status Summary
yes                          1251/1884
no                           633/1884

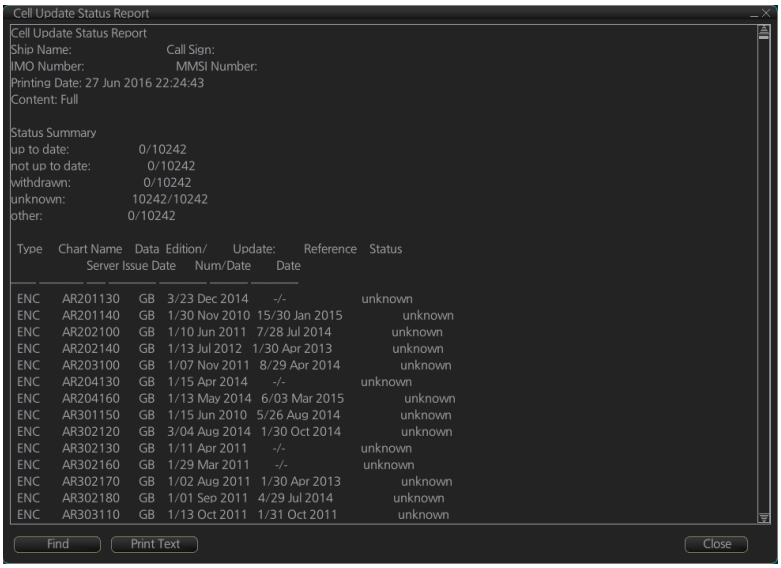
  Type     Chart Name   Data Server            Status
-------- -------------- ----------- ----------------------------
  ENC       AU130060        GB                  yes
  ENC       AU130090        GB                  yes
  ENC       AU130120        GB                  yes
  ENC       AU130150        GB                  yes
```

Description of chart list printout

Item	Description
[Ship Name]	Name of ship
[IMO Number]	Ship's IMO number
[Call Sign]	Ship's call sign
[MMSI]	Ship's MMSI number
[Printing Date]	Date list printed
[Data Location]	Location of charts; normally "Internal".
[Filter]	Settings of the items in the [Filter] window.
[Status Summary]	[yes]: charts with yes status/total number of charts [no]: charts with no status/total number of charts

3.16.2 How to print the cell status list

1. In the Chart maintenance mode, click the [Cell Status] button on the InstantAccess bar™ to show the [Cell Status] dialog box.
2. On the [Filter] window, check the information to print, then click the [Apply] button. The items selected here appear in the [Cell Status] dialog box.
3. Click the [Create Report] button to generate the report. A report for all cells shown in the [Cell Status] dialog appears.
   Note: If there are no cells shown in the [Cell Status] dialog box, the [Create Report] button is not available.



4. Click the [Print Text] button to print.

Description of cell status printout

Item	Description
[Ship Name]	Name of ship
[IMO Number]	Ship's IMO number
[Call Sign]	Ship's call sign
[MMSI]	Ship's MMSI number
[Printing Date]	Date list printed
[Content]	Full: The report shows the status for all cells listed in the [Cell Status] dialog box. Filtered for Route Plan: Appears when [Route] is selected at the [Filter] window. Only chart cells which are included in a route are shown.
[Status Summary]	up to date: number of up to date charts not up to date: number of charts that are not up to date withdrawn: number of withdrawn charts unknown: number of charts with unknown status other: number charts that are broken, etc.

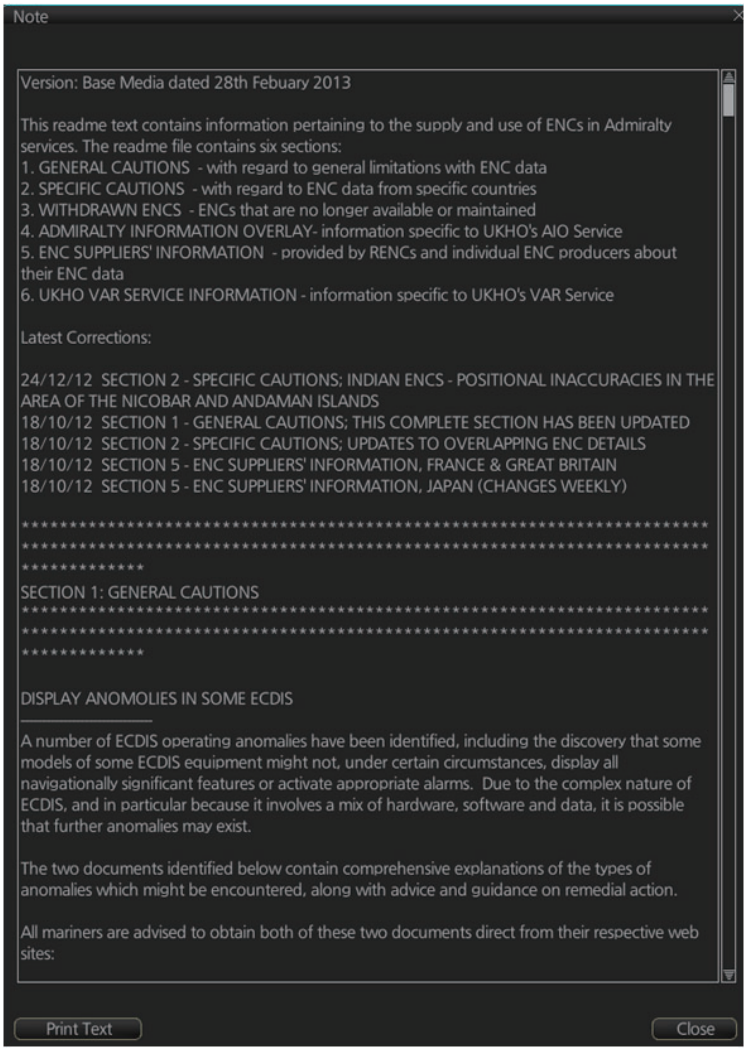
3.17 How to Delete Charts

If you are going to delete all charts, turn off chart synchronization and delete charts from each Processor Unit.

1. Click the [Manage Charts] button to show the [Manage Charts] dialog box.
2. Click the block to the left of a chart to show a checkmark. (A context-sensitive menu with "Select all" and "Deselect all" functions is available by right-clicking the block to the left of "Type".)
3. After selecting the chart(s) to delete, click the [Delete Charts] button.
4. Reset the power.

3.18 How to Show Publishers Notes for ENC Charts

You should read the text file associated with each catalog, which you can view when installing a chart from a medium. Click the [Note] button in the [Manage Charts] dialog box. You can print a hard copy with the [Print Text] button.



3.19 How to Find the Chart Type

The electronic chart system can display more than one ENC chart cell at a time. This feature is called multi-cell display. If one ENC chart cell does not cover the whole display, the system opens more ENC chart cells for display, if appropriate cells for the displayed area are available. The Own ship functions box shows information about ENC chart cells displayed on the electronic chart display area. When automatic TM reset is active, the information is displayed with reference to your ship's position. If TM reset is OFF, the information is displayed with reference to current cursor position.

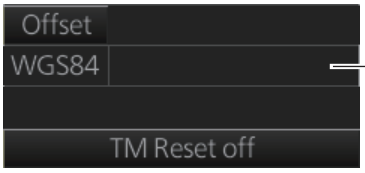


Chart type indication
No indication (Official ENC chart)
“Non-ENC data” (Unofficial ENC chart, indication in yellow)
“ENC data available” (Currently, RNC chart is in use, but ENC material is available. Indication shown in yellow.)

3.20 How to Update ENC, C-MAP Charts Manually

Manual update may include deleting an already existing object, modifying a position or other characteristics of an already existing object or inserting of a new object. In this system, manual updates are stored in a common database.

Mariners cannot permanently remove any of the official objects from the chart display. If a mariner needs to make obsolete any of the official objects he "deletes" them. Then, in practice, the deleted objects are still visible, but a diagonal line on the object indicates it is a deleted object.

However, a mariner can remove objects that he has inserted himself.

Note that the manual updates have no automatic connection to any automatic update received later for charts. If a manual update itself became obsolete, because the official chart has been updated to include the update defined as a manual update, the mariner must himself delete the obsolete manual update in question.

The system records complete usage of manual updates. All deletions, modifications and insertions are recorded and time stamped. If the mariner wishes to see what kind of manual updates he had in the past, for example, two weeks ago, he uses Update History to specify the relevant date range. For information on how to set Display Date and Update Review dates, see section 5.2.2.

Note 1: Do not manually update charts while charts are being synchronized. Wait until synchronization is completed.

Note 2: When any chart is updated, all checked routes are reverted to unchecked status. Use the [Check Route] button on the [Alert Parameters] page to re-check routes before starting any voyage.

Note 3: Updated areas in ARC charts are shown with a diagonal line.

3.20.1 How to insert update symbols

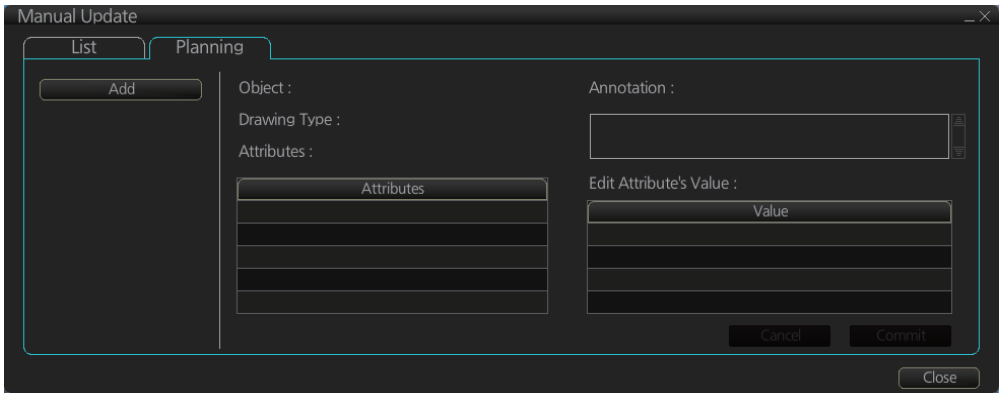
A manual update symbol can be added as shown in the procedure below.

Note 1: If the system freezes when updating the drawing type [area], reset the power.

Note 2: An update symbol that straddles the international date line cannot be edited. In this case, insert the same symbol on each side of the line.

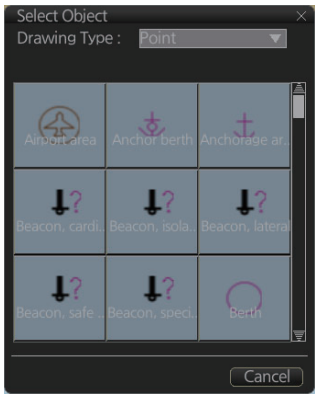
Note 3: Do not do manual updating during chart synchronizing. Do the updating after the completion of synchronizing or do the updating where the chart is installed.

1. Go to the Voyage navigation mode.
2. Click the [Manual Update] button on the InstantAccess bar™ to open the [Manual Update] dialog box.
3. Click the [Planning] tab.

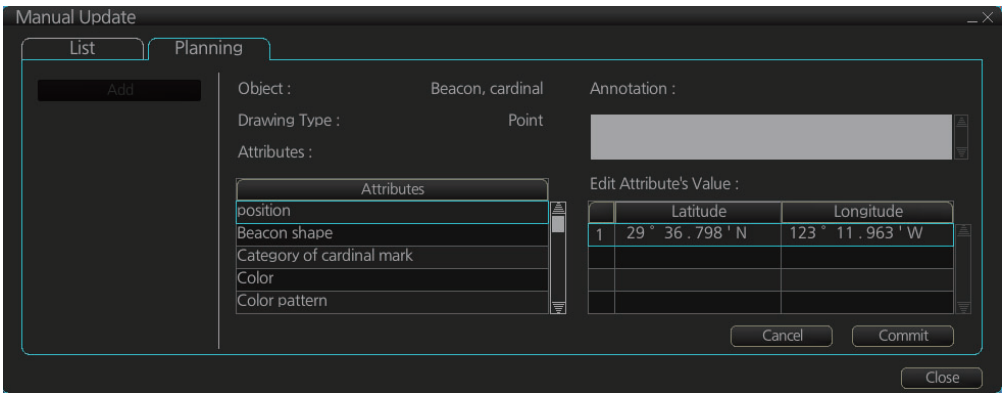


4. Click the [Add] button.

   Note: This window can also be shown from the context-sensitive menu. Right-click the display area, then select [Manual Update] and [Add New].



5. Use the [Drawing Type] pull-down list to select drawing type: point, line or area.
6. Click desired object.
7. Put the cursor on the location where to insert the symbol, then left click. The [Manual Update] dialog box shows:
   - Object
   - Drawing type



8. You can add a comment related to a manual update object in the [Description] box.

9. To add textual information to an attribute, select the attribute from the [Attributes] window, then add text in the [Edit Attribute's Value] window.
   The [Date end] factory default is set to three months from the date of insertion and applies to all chart items. You can adjust the dates here.
10. Click the [Commit] button to add all selected objects to the chart.

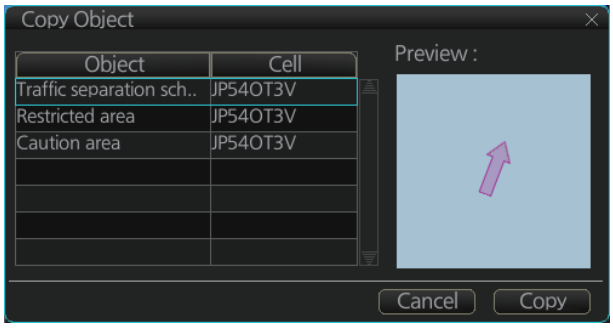
Note 1: If there is no textual information entered in the [Annotations] window, a confirmation message appears when you click the [Confirm] button. Check that the information is correct and click [Yes] or [No] as appropriate.

Note 2: A manual update object is displayed until the display until date entered for it has passed. If the object remains on the screen after the display until date, do some operation on the screen to refresh the screen to erase the object.

3.20.2 How to copy objects from an official chart and insert them

You can copy objects from an official chart and insert them as a manual update with the following procedure:

1. Right-click the object you wish to copy to show the context-sensitive menu, the click [Manual Update] and [Copy From Chart]. The Copy Chart dialog box appears.



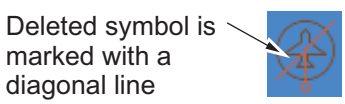
2. Click the object to copy, then click [Copy]. The object is copied to the [Manual Update] dialog box.
3. Referring to step 8 and step 9 in section 3.20.1, edit the object as required.
4. Click the [Commit] button to add the object to the chart.
   Note: If there is no textual information entered in the [Annotations] window, a confirmation message appears when you click the [Confirm] button. Check that the information is correct and click [Yes] or [No] as appropriate.

3.20.3 How to ignore chart objects

Manually entered update symbols cannot be deleted until the display until date arrives or is changed. However, you can mark the symbol to indicate that it can be ignored.

1. Put the cursor on the symbol, then right-click to show the context-sensitive menu.
2. Select [Manual Update] and [Delete].

The symbol is marked with a diagonal line.



3.20.4 How to delete (hide) a chart object

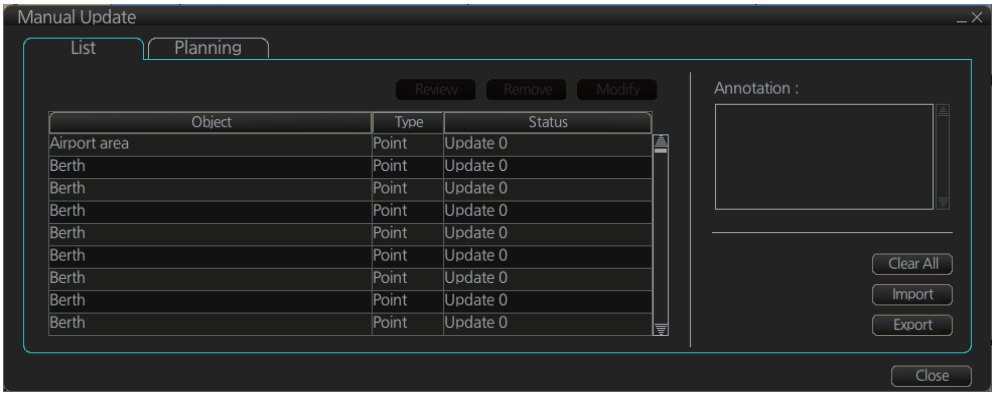
You can hide a manually inserted chart object by doing the following:

1. Referring to step 1 and step 2 of section 3.20.1, show the [Manual Update] dialog box.
2. Click the [List] tab.
3. Click the object to hide, then click the [Remove] button. The selected item is hidden from the chart display.

3.20.5 How to modify existing update symbols

The position, Display until date and description of an update symbol can be modified. A symbol that is marked as "deleted" or "removed" cannot be modified.

1. Follow steps 1-2 in section 3.20.1 to display the [Manual Update] dialog box.
2. Click the [List] tab.



3. Select the object to modify, then click the [Modify] button. The [Planning] dialog box appears.
4. Modify the object referring to steps 8 and 9 in section 3.20.1.
   Note: The annotation for all modified objects is reset to blank when the Modify button is clicked. Check and re-input the annotations as necessary.
5. Click the [Commit] button. A confirmation dialog appears. Click [Yes] or [No] as appropriate.

3.20.6 How to review a chart object

You can review a chart object in order to see the object before any changes were made. To review an object, do the following:

1. Follow steps 1-2 in subsection 3.20.1 to display the [Manual Update] dialog box.
2. Click the [List] tab.
3. Select the object to review, then click the [Review] button.
   Manually updated objects appear with a thick line, as shown in the figure to the right.
   Objects under review appear in the [Manual Update] dialog box with the status "Review x" (x indicates the state at which you are viewing the reviewed object). The object appears in a pre-modified state, and with each press of the [Review] button, one modification is "reverted".



3.20.7 How to remove all manual update data

You can remove all manual update data by doing the following:

1. Do steps 1-2 in subsection 3.20.1 to display the [Manual Update] dialog box.
2. Click the [List] tab.
3. Click the [Clear All] button.

3.21 How to Synchronize Chart Data

This section shows you how to synchronize chart data between FMD-3xxx, FAR-3xxx, so that all units share the same chart data. Synchronization can be done automatically or manually (see section 3.21.2), however all units selected for synchronization must be powered to complete the synchronization. Synchronization includes the following actions:

- Synchronize public keys
- Synchronize chart permits and licenses
- Synchronize chart data
- Synchronize manual updates

Note 1: Before synchronizing chart data, confirm that all units selected for synchronization are powered. (Do not turn off a unit during synchronizing.) If a unit is turned off during the synchronizing, do the following on the unit which contains the medium:

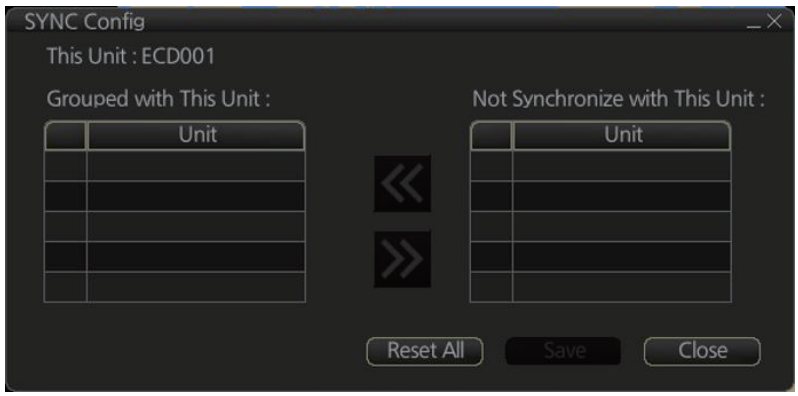
- Open the [SYNC Status] dialog box, then click the [Disable SYNC] button to disable synchronization. Power all units registered for synchronization, then click the [Urge SYNC] button on the [SYNC Status] dialog box on the unit containing the media to forcibly synchronize.
- Make a group of all the units currently powered, referring to section 3.21.1, and register the group with [Grouped with This Unit]. Reset the power on all units selected for synchronization.

Note 2: C-MAP charts are not automatically synchronized. C-MAP charts are only synchronized immediately after installing or updating the C-MAP database. If the system has several FMD-3xxx, FAR-3xxx, make a group of associated units before you install C-MAP charts.

3.21.1 How to select the units to synchronize

Do as follows to select the units to synchronize.

1. Get into the Chart maintenance mode. On the InstantAccess bar™, click [System] followed by [SYNC Config] to show the [SYNC Config] dialog box.

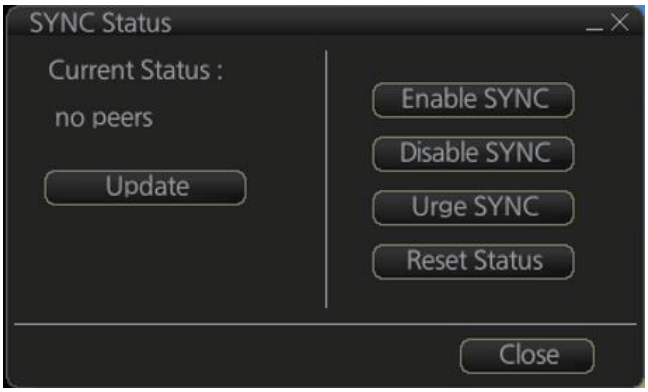


[Grouped with This Unit]: This window shows the units currently selected for synchronization.
[Not Synchronize with This Unit]: This windows shows the units not selected for synchronization.

2. **To select a unit for synchronization**: Put a checkmark next to the unit's name in the [Not Synchronize with This Unit] window, then click the << button. That unit's name is moved to the [Grouped with This Unit] window.
   To deselect a unit from synchronization: Put a checkmark next to the unit's name in the [Grouped with This Unit] window, then click the >> button. That unit's name is moved to the [Not Synchronize with This Unit] window.
   To deselect all units, click the [Reset All] button.
3. Click the [Save] button to finish.
4. Restart the power on applicable units to apply synchronization configuration changes.

3.21.2 How to check synchronization status

You can check chart synchronization status on the [SYNC Status] dialog box. Chart synchronization operations also are available from this dialog box. Normally, chart synchronization is done automatically, according to the sync settings on the [SYNC Config] dialog box. Use the [SYNC Status] dialog box to manually synchronize chart data when there is network failure, for example.



Get into the Chart maintenance mode. On the InstantAccess bar™, click [System] followed by [SYNC Status] to show the [SYNC Status] dialog box.

[Current Status]: Displays current synchronization status. The table below shows all the synchronization status messages.

Sync status	Meaning
[disabled]	Synchronization is disabled.
[must receive]	This ECDIS will receive chart data from another FMD-3xxx, FAR-3xxx.
[must send]	This ECDIS will send chart data to another FMD-3xxx, FAR-3xxx.
none	No synchronization task ready.

Note: Do not update charts manually when the sync status is “must receive”. Data may be corrupted. Wait until syncing is completed before updating charts manually.

[Update] button: Click this button to update [Current Status].

[Enable SYNC] button: Enables synchronization. You are asked, "Do you want to enable sync?" Click the [OK] button to enable synchronization. Synchronization is always enabled when ECDIS starts. A progress bar indicates progress in synchronization. The bar is erased within five minutes after completion of synchronization.

[Disable SYNC] button: Disables synchronization function temporarily. Use this feature to enable chart administration in case of network failure, for example. You are asked, "Do you want to disable sync?" Click the [OK] button to temporarily disable synchronization.
Note 1: In normal operation do not disable synchronization. If you accidentally disable synchronization, try to synchronize by clicking the [Enable SYNC] button. If that does not work, reset the power of all units selected for synchronization, then click the [Urge SYNC] button to synchronize.
Note 2: With synchronization disabled, the message "Synchronization disabled" may appear twice when installing a license. This does not affect installation of a license.

[Urge SYNC] button: Does immediate synchronization. You are asked, "Chart data in other units will be overwritten by this unit. Do you wish to continue?" Click the [OK] button to synchronize. If synchronization is not successful, restart applicable units and try again.

[Reset Status] button: Reset synchronization status to recover from synchronization status conflict. You are asked, "Do you want to reset sync status? This unit may be synchronized from the other unit." Click the [OK] button to reset.

3.21.3 Manual updates and synchronization

If you are synchronizing multiple FMD-3xxx, FAR-3xxx while manual updating is being done on one of the units, the message "File not found" may appear, meaning the manual update data was deleted. if this occurs, follow the procedure below to synchronize the units mentioned above. The procedure uses ECD001 and ECD002 as an example.

1. At the ECD001, get into the Chart maintenance mode, then click [System] and [SYNC Config] on the InstantAccess bar™.
2. Add ECD002 to [Grouped with This Unit], then click the [Save] button.
3. Reset the power on the ECD001 and ECD002.

4. At the ECD001, get into the Chart maintenance mode, then click the [System] and [SYNC Status] buttons on InstantAccess bar™ to show the [Enable SYNC] dialog box.
5. Click the [Urge SYNC] button to synchronize charts between ECD001 and ECD002.
6. To confirm synchronization, do as follows:
   1) At the ECD001, get into the Voyage navigation mode, then click the Manual Update button on the Instant Access bar.
   2) Click the [Planning] tab followed by the [Add] button.
   3) Insert an object at the ECD001.
   4) At the ECD002, move the cursor or change the chart scale. Confirm that the chart is updated.

3.22 How to Reconvert SENC Data

If you unintentionally installed outdated SENC data, you can reconvert the data to the latest corresponding SENC data. Get into the Chart maintenance mode, click the [System] and [Reconvert] buttons on the InstantAccess bar™ to reconvert all your SENC data.

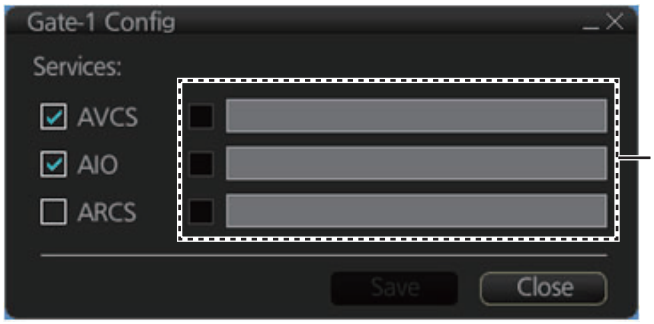
Note: All manual updates are removed in the reconversion.

3.23 How to Manage Gate-1 Charts

Gate-1 provides the ECDIS with the up-to-date UKHO chart data and permit file. To use Gate-1, the [Chart Service] setting must be set to [FURUNO], in the installation.

3.23.1 How to select the chart type(s) to install

1. Click the [CHARTS] button on the Status bar.
2. Click the [System] button on the InstantAccess bar™, then click [Gate-1 Config.] to show the [Gate-1 Config] window.



3. Check the chart type(s) that you want to install, then click the [Save] button.
4. You are asked if you are sure to save Gate-1 settings. Click the [OK] button to save settings. The message "Gate-1 services are saved. New services are applied after reboots." appears.
5. Click the [OK]button several times, then restart the unit.

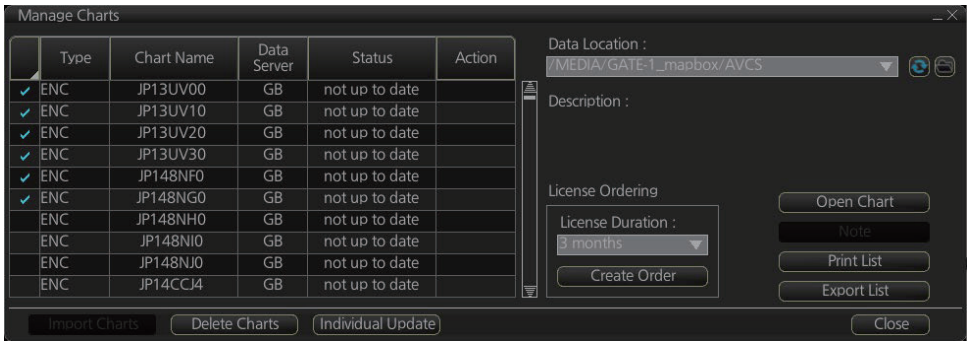
3.23.2 How to install charts and licenses

To install the chart selected at section 3.23.1 and its license, click the [CHARTS] button on the Status bar, then click the [Gate-1] button on the on the InstantAccess bar™. The message "This process takes time to complete, and the operation speed of this system will decline. Do you wish to continue?" appears. Click the [OK] button to continue and install your charts.

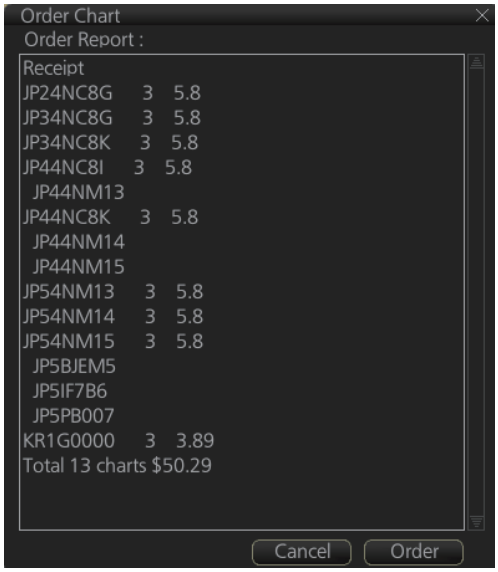
3.23.3 How to order licenses

Follow the procedure below to order licenses from Gate-1.

1. Click the [Manage Charts] button to show the [Manage Charts] dialog box.



2. At the [License Ordering] window, select the license duration from the pull-down list.
3. Click an appropriate block in the far-left hand column to select the chart to order. Repeat to select other charts.
4. After selecting the chart(s) to order, click the [Create Order] button. A window shows the charts ordered together with total cost.



5. Confirm the licenses and cost, then click the [Order] button.

After completing the purchase operation, the chart license purchase procedure is done via Gate-1. It takes several hours for a new license to arrive at Gate-1.

Note 1: Once a purchase is made you cannot cancel the purchase. Take care when making your order.

Note 2: Only UKHO AVCS and AIO licenses can be purchased.

Note 3: A network communication usage fee is assessed when purchasing a license.

Note 4: Unselected cells may appear in the order window because of the AVCS sales format.

Note 5: When navigating a route with the chart filter on, the filter is applied to the region of the cell where a cell has not been purchased. A region does not always have actual data in all ranges.

3.24 How to Delete Chart Data

Converted data (ENC: SENC, ARCS: SRNC), license, and product list data can be deleted collectively as follows:

How to clear all ENC data: Click the [CHARTS] button on the Status bar. On the InstantAccess bar™, click the [System], [Clear Charts] and [ENC] buttons.

How to clear ARCS data: Click the [CHARTS] button on the Status bar. On the InstantAccess bar™, click the [System], [Clear Charts] and [ARCS] buttons.

Note: For how to delete C-MAP data, see section 3.7.

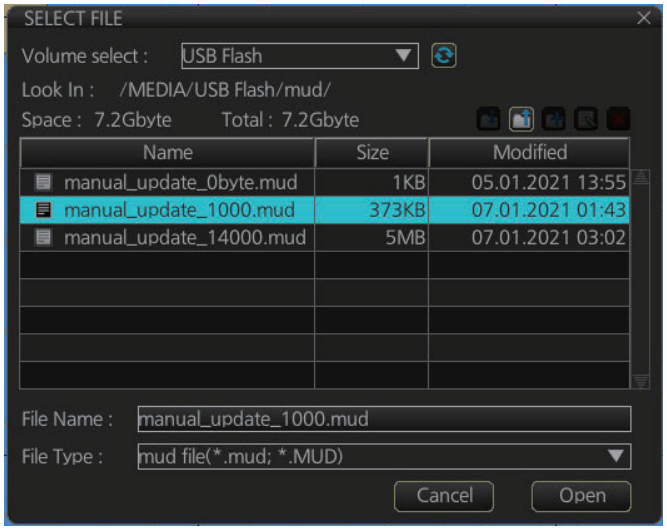
3.25 How to Import Chart Objects

You can import chart data to the ECDIS. **The maximum file size that can be imported is 5MB**.

1. On the Control Unit, insert the USB flash memory that contains the data to import into the USB port.
2. In the Voyage planing mode, click the [Manual Update] button on the InstantAccess bar™ to show the [Manual Update] dialog box.



3. Click the [List] tab.
4. Click the [Import] button to show the [Select File] dialog box.



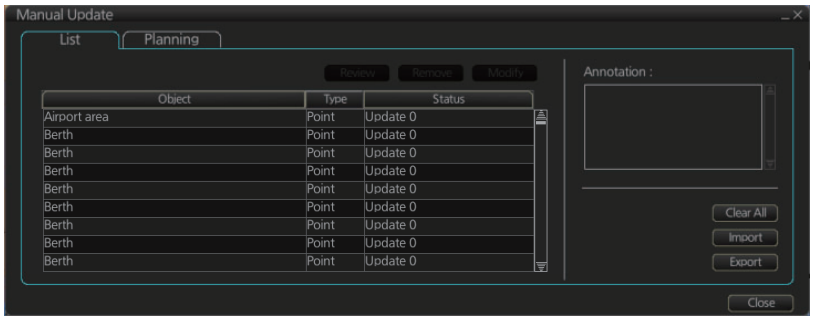
5. Click the data in the list that you want to import, then click the [Open] button.

Note: To erase all chart data, click the [All Delete] button.

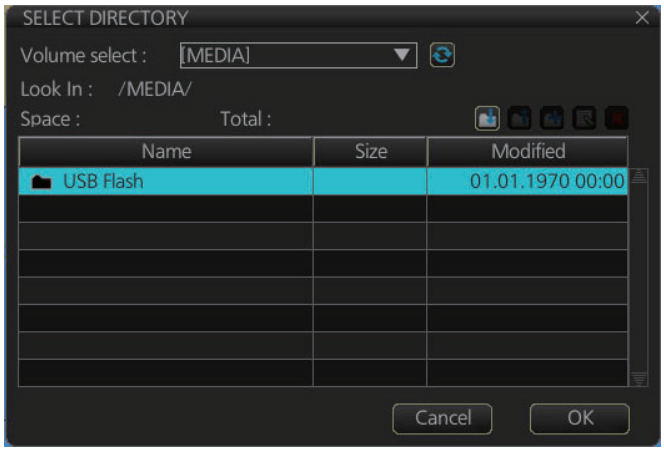
3.26 How to Export Chart Objects

You can export chart data to a USB flash memory.

1. On the Control Unit, insert a USB flash memory into a USB port.
2. In the Voyage planing mode, click the [Manual Update] button on the InstantAccess bar™ to show the [Manual Update] dialog box.



3. Click the [List] tab.
4. Click the [Export] button to export the data to the USB flash memory.



5. Select USB flash, then click the [OK] button.

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4. HOW TO CONTROL CHART OBJECTS

This chapter provides the information necessary for controlling chart features.

4.1 How to Browse Your Charts

You can view your charts using different positions and different scales. The basic tools for browsing charts are the **RANGE** key, chart offcenter, and scroll.

RANGE - and **RANGE +** change the chart scale. (The scrollwheel also can change the chart scale. Spin to change.) If true motion reset is active, ZOOM IN and ZOOM OUT keep the relative position of your ship with respect to the display. If true motion reset is off, ZOOM IN and ZOOM OUT keep the relative position pointed by the cursor with respect to the display. The system automatically chooses next larger or smaller scale. If a chart with larger compilation scale is available at your current viewing position, the message "Larger Scale ENC Available" appears.

The own ship position can be easily relocated to the screen center in the Navigation voyage and Navigation planning modes. Further, in the Navigation voyage mode, the own ship position can be put at the cursor position.

To move the own ship mark to the screen center, put the cursor in the chart area and right click [Ship on center]. **To move the own ship mark to a specific location**, right-click the position on the chart where to put the own ship mark, then right click [Ship off center].[Ship off center] is not available in the Voyage planning mode.

To scroll your chart, simply drag and drop.

4.2 How to Select the Chart Display Scale (maximum editing scale setting)

When the chart display scale becomes unsuitable, the Chart scale/stabilization mode/ presentation mode box shows the message "Larger scale ENC (or ARCS) available" together with a message detailing the reason why the chart is unsuitable; for example, "Underscale", "Overscale". If this occurs, adjust the chart scale manually (see section 2.4 for the methods), or automatically by clicking the [L] button ("L" is short for Largest) in the Chart scale/stabilization mode/presentation mode box. The [L] button automatically sets the compilation scale of the largest ENC (or ARCS) at the current position as the chart display scale.

The [L] button appears when the following three conditions are satisfied:

- The display mode is NAVI or PLAYBACK.
- The motion mode is true motion or relative motion, with no off centering.
- Own ship position data is valid.

When the cursor is placed on the [L] button, the tooltip "Set the largest compilation scale" appears.

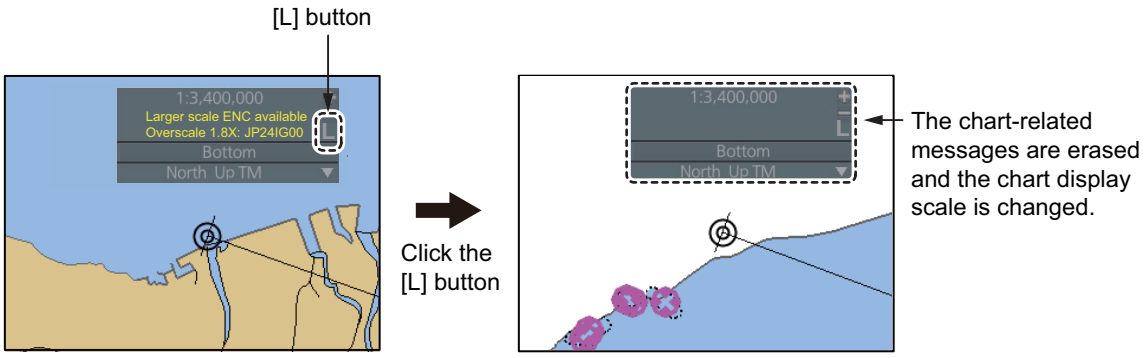


Chart priority and compilation scale selection

Vector chart priority: The largest compilation scale is extracted from the vector chart cell at own ship position. If there is no vector chart at own ship position, the largest compilation scale from the raster chart cell at own ship position is set as the display scale. If neither chart type exists at own ship position, nothing occurs. The background chart is ignored.

Raster chart priority: The largest compilation scale is extracted from the raster chart cell at own ship position. If there is no raster chart at own ship position, the largest compilation scale from the vector chart cell at own ship position is set as the display scale. If neither chart type exists at own ship position, nothing occurs. The background chart is ignored.

4.3 How to Control Visibility of Chart Objects

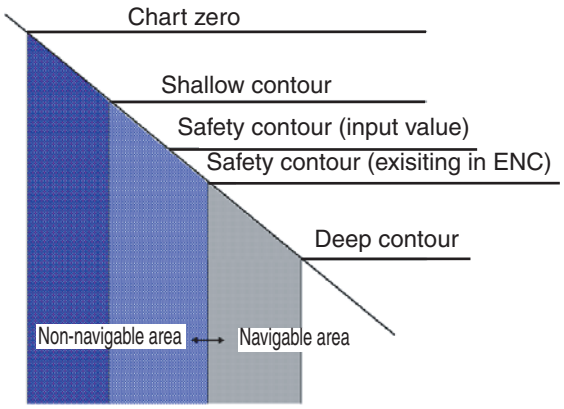
The [Chart Display] menu has several pages of chart features that you may show or hide as appropriate. To display this menu, click the [DISP], [SET] and [Chart DISP] menu on the InstantAccess bar™.

4.3.1 How to set value for shallow contour, safety depth, safety contour and deep contour

You can set values for Shallow Contour, Safety Depth, Safety Contour and Deep Contour, on the [Chart Alert] dialog box (sequence: [DISP], [SET], [Chart Alert]). Colors used for depth presentation on the electronic chart are controlled by setting values for Shallow Contour, Safety Depth, Safety Contour and Deep Contour. Soundings on the electronic chart, which are equal to or less than the value of Safety Depth, are highlighted. See the illustrations on the next page for multi-color presentation and two-color presentation. Selection of multi- or two-color presentation can be done with [Four Shades] on the [General] page of the [Chart Display] menu. Check the check box for multi-color; uncheck the box for two-color.

Note: The shallow contour cannot be set higher than the safety contour.

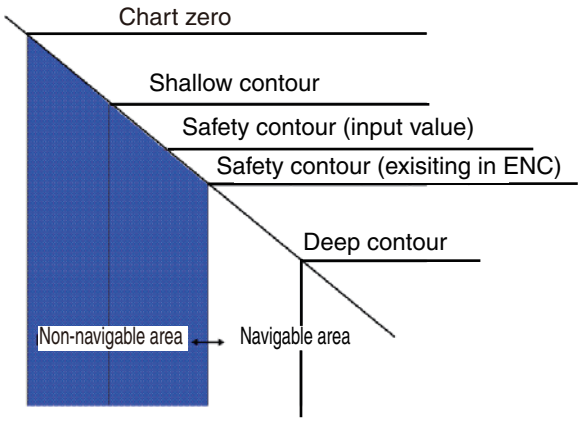
MULTI-COLOR presentation



In the multi-color presentation four colors are used for depths. If the value entered as the safety contour does not exist in the electronic chart, the system automatically selects the next available deeper depth contour as the safety contour. For example, the input value is 8 m, but there is no 8 m depth contour in the electronic chart. Then, the system automatically selects the next available deeper depth contour (10 m) as the safety contour. The depth contour value of 10 m is used as the safety contour in the electronic chart.

The shallow contour shows visual color change inside an unsafe water area. An unsafe water area is all areas shallower than the "safety contour". Set the value for the shallow contour less than the value of the safety contour.

TWO-COLOR presentation

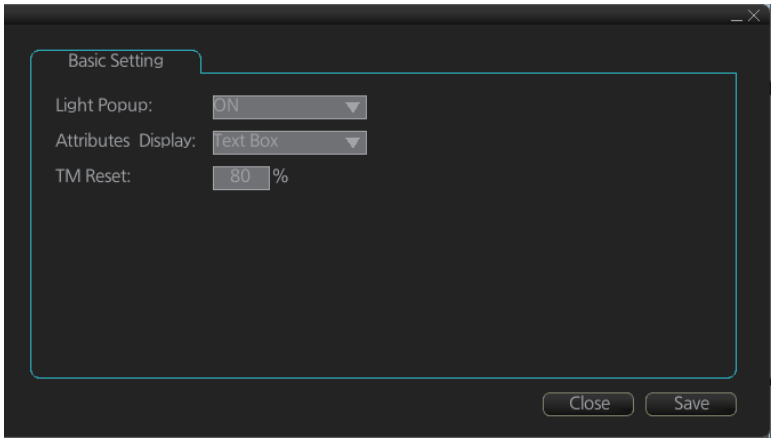


In the two-color presentation, unsafe water is shown in blue and safe water is shown in white. The safety contour is used to qualify unsafe water (depth shallower than safety contour) and safe water (depths deeper than safety contour).

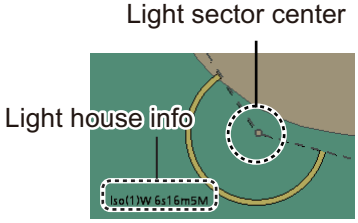
If the value entered as the safety contour does not exist in the electronic chart, the system automatically selects the next deeper available depth contour as the safety contour, the same as with the multi-color presentation.

4.3.2 Basic Setting menu

To display this menu, click [DISP], [SET] and [Basic Setting] on the InstantAccess bar™.



[Light Popup]: Show or hide light sectors information. [ON] provides light sector information (including length of arc of visibility) when the cursor is put on a light or light sector.

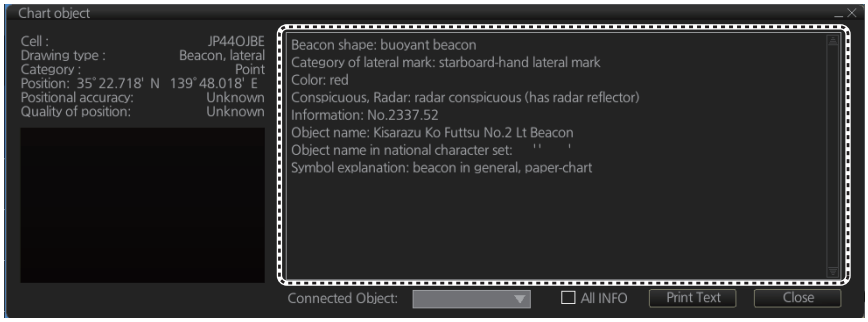


[Attributes Display]: Select how to show chart object information in the [Pick Report] dialog box, [Text Box] or [List].

List: Show the information in a list, like the one shown below.



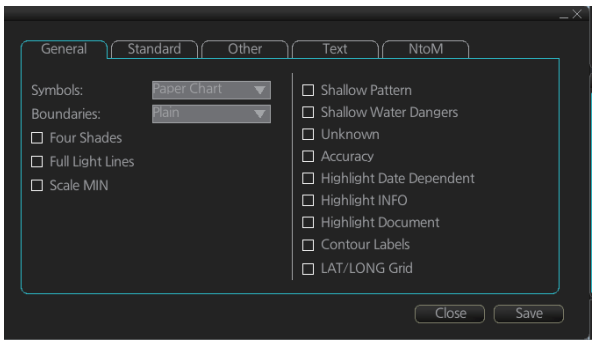
Text Box: Show the information in a text box, like the one shown below.

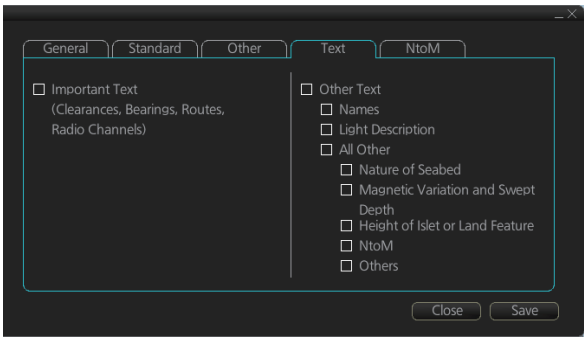


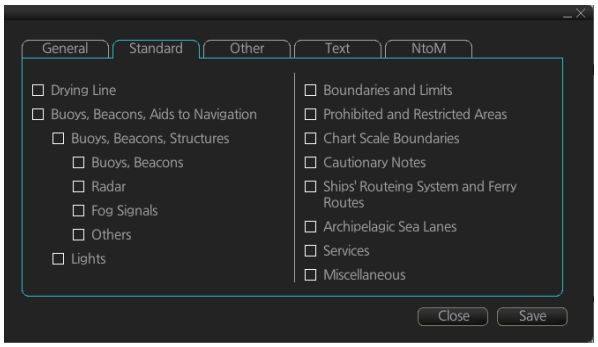
[TM Reset]: In the true motion mode, own ship moves until it reaches the true motion reset borderline (set here), and, then it jumps back to an opposite position on screen based on its course. Set the limit for TM reset (in percentage). For example, "80" resets the position when the own ship marker is at a location which is 80% of the range.

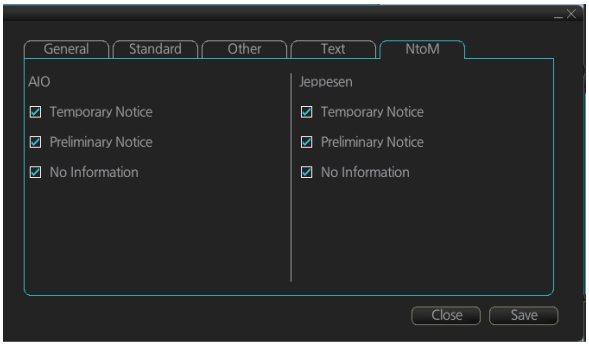
4.3.3 Chart Display menu

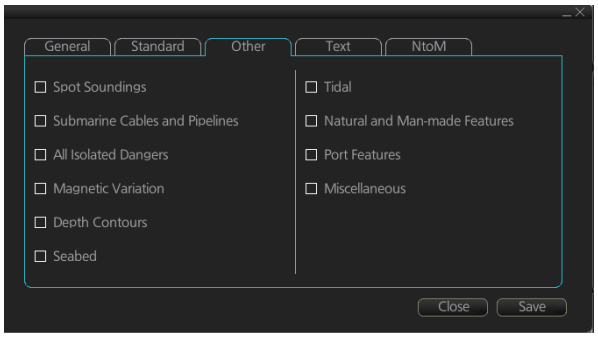
To access the [Chart Display] menu and its pages, click [DISP], [SET] and [Chart DISP] on the InstantAccess bar™, then select [General], [Standard], [Other], [Text], or [NtoM] page as appropriate.











General page

This page turns chart features on (checkbox checked) or off.

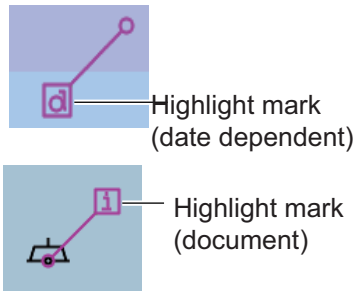
[Symbols]: Determines how to display chart symbols.
- [Paper Chart]: Symbols displayed the same as the conventional paper chart symbols
- [Simplified]: Symbols displayed in simplified style, and the sea is displayed in color.

[Boundaries]: Determines how to show boundary lines of chart objects.
- [Plain]: Boundary line shown with solid and dashed lines.
- [Symbolized]: Symbol is attached to the line according to the purpose of the line.

[Scale MIN]: Set the minimum chart scale to display chart objects. When the chart scale is lower than set here, the chart objects will not be displayed.

[Highlight Date Dependent]: Put a highlight mark on the chart object which carries a date dependent attribute.

[Highlight INFO], [Highlight Document]: Put a highlight mark on a chart object that has information or document attribute.



Standard page

The [Standard] page contains chart features defined by IMO that comprise a standard display.

Other page

The [Standard] page contains chart features not contained in IMO standard display.

Text page

Show or hide text information on the chart.

NtoM page

Show or hide the Notice to Mariners data.

Note: To use the "pick report" feature, which provides information for cursor-chosen chart feature, the associated chart feature must be turned on from the [General], [Standard], [Other], [Text], or [NtoM] page.

4.3.4 Display base

A subset of chart features is called the "display base". As required by IMO, these features cannot be made invisible. To get the display base, click [STND DISP] on the Status bar.

The display base consists of the following chart features:

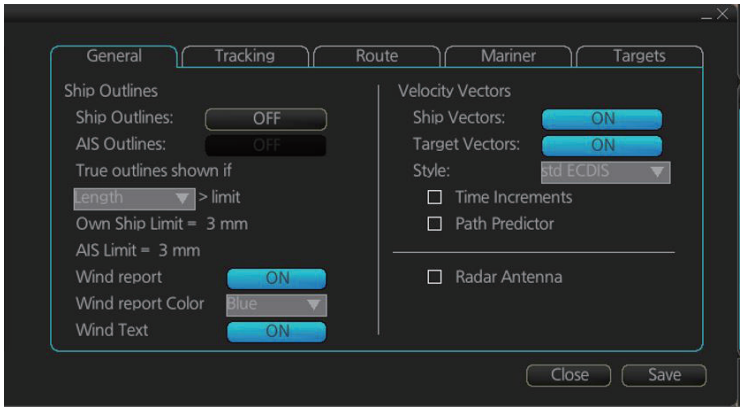
- Coastline (high water)
- Own ship's safety contour, which is chosen by the user
- Indication of isolated underwater dangers of depths less than the safety contour that lie within the safe waters defined by the safety contour
- Indication of isolated dangers that lie within the safe water defined by the safety contour such as bridges, overhead wires, etc., and including buoys and beacons whether or not these are being used as aids to navigation.
- Traffic routine systems
- Scale, range, orientation and display mode
- Units of depth and height

4.4 How to Control Visibility of Symbols, Features

Control of symbols and features is divided into five pages in the [Symbol Display] menu, which you can access by clicking the [DISP], [SET] and [Symbol DISP] buttons on the InstantAccess bar™.
[General] page: Controls own ship and target related items.
[Tracking] page: Controls past tracks and some other features.
[Route] page: Controls planned and monitored route.
[Mariner] page: Controls user charts.
[Targets] page: Controls TT, and AIS objects.

The user can define settings for chart details that are displayed over the chart area.

4.4.1 General page



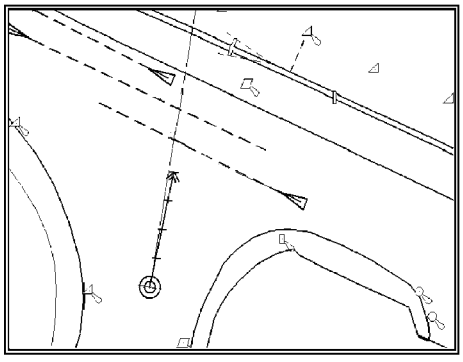
Ship, AIS Outlines

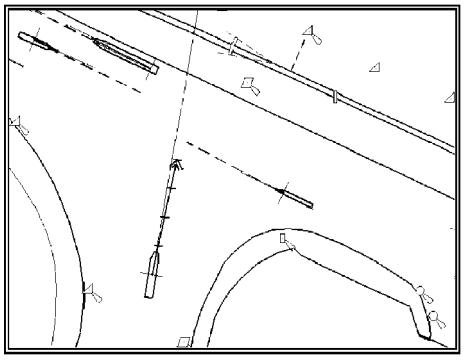
[Ship Outlines]: Select OFF or ON to show minimized or scaled symbol, respectively.

[AIS Outlines]: Select OFF or ON to show AIS objects in same size or scaled symbol, respectively.

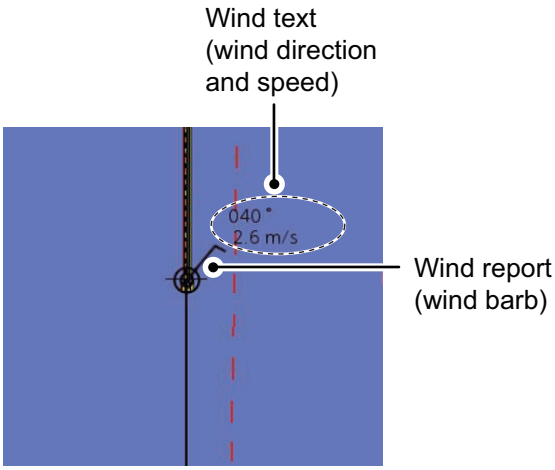
[True outlines shown if]: If the length or width of the own ship mark is greater than 3.0 mm, the own ship mark is shown with the true scale symbol. Select [Length] or [Beam width]

The right part of the figure below shows own ship mark and AIS objects with scaled symbols. The left illustrations shows own ship mark and AIS objects with point symbols. AIS objects are displayed as true scale symbol if the displayed chart scale is larger than set with "Outlines" limit (length>3.0 mm) on the [General] page in the [Symbol Display] menu and your own ship are displayed as true symbol scale if the size of the true scale symbol is larger than 3.0 mm on the chart display.





Wind Report



[Wind report]: Show or hide the wind barb, which represents the direction and speed of the wind. The wind barb points in the direction from which the wind is blowing. Lines and filled pennants on the wind barb indicate wind speed, based on the Beaufort wind scale.

[Wind report Color]: Select the color for the wind report.

[Wind Text]: Show or hide the wind report text.

Note: The wind report feature is not shown If there is no position or wind data.

Velocity Vectors

[Ship Vectors]: Show or hide own ship vector.

[Target Vectors]: Show or hide target vectors.

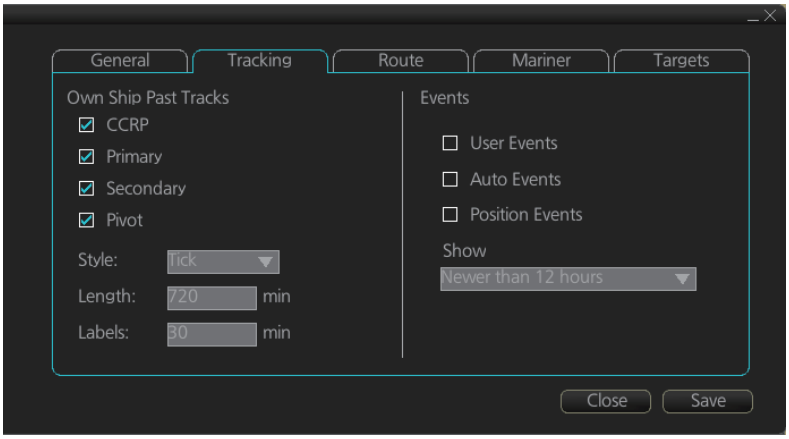
[Style]: Select the vector style. The [std ECDIS] vector is a speed-referenced vector symbol. [Conventional] is a simplified symbol.

[Time Increments]: Check to show ticks of velocity vector. This controls both own ship and targets ticks. If ticks are too tightly spaced, they will be automatically removed from the display, until spacing between ticks is sufficient to distinguish them separately. This depends on display scale and speed of vessel and target.

[Path Predictor]: Check to show the path predictor. The path predictor is a single dashed line originating at the CCRP and drawn at a length to represent the distance and path own ship will travel over the ground in the user-selected time interval for own ship speed vector.

[Radar Antenna]: Check to mark position of radar antenna (with "x").

4.4.2 Tracking page



Own ship past tracks

[CCRP]: Check to plot own ship's track with CCRP position as reference.

[Primary]: Check to plot own ship's track with position fed from sensor with highest priority.

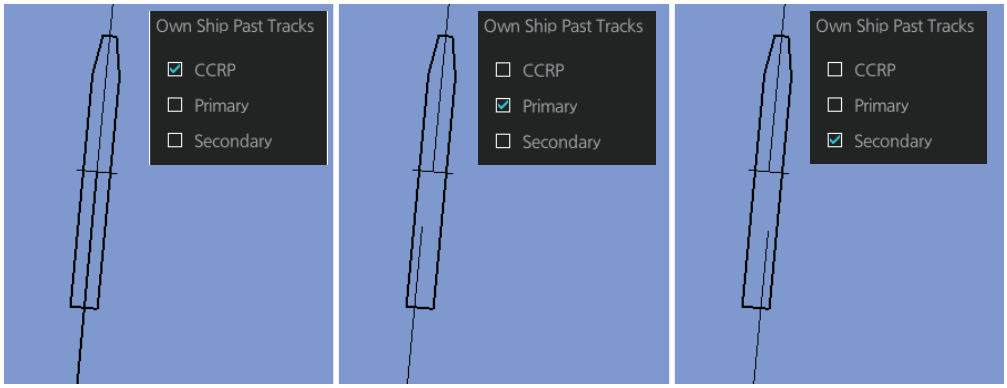
[Secondary]: Check to plot own ship's track with position fed from sensor with 2nd highest priority.

[Pivot]: Check to plot own ship's track with own ship's pivot position as reference.

[Style]: Select time stamp position for past track (indicated by Tick or Point).

[Length]: Select length of past track.

[Labels]: Select label interval.



Events

Events marks are based on the [Voyage] log records.

[User Events]: Display event symbols on the chart. User events are recorded by clicking [Log], [Event Log] and [User Event] on the InstantAccess bar™.

[Auto Events]: Display automatically entered event symbols, where the system has recorded an event based on conditions you have set. The available recording interval is 1 to 4 hours. See section 19.3.1.

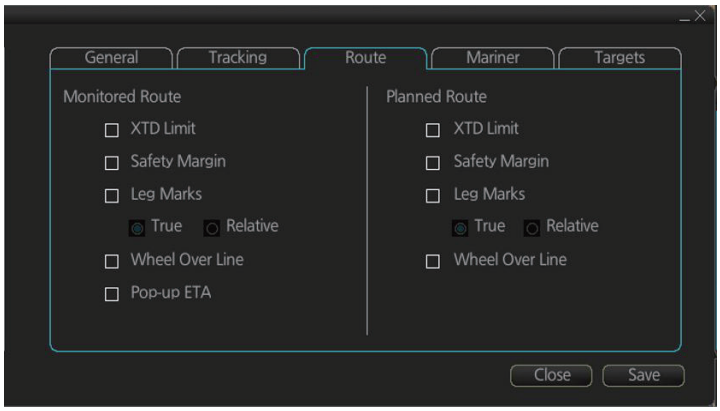
[Position Events]: Display the latitude and longitude of an event, recorded by clicking [Log], [Event Log] and [POSN Event] on the InstantAccess bar™.

Note 1: A MOB event is visible always.

Note 2: You can choose the period of time to display events, from the [Show] list box. [Newer than 12 hours], [Newer than 24 hours], [Newer than 1 week], [Newer than 2 weeks], [Newer than 1 month], [Newer than 3 months], or [All].

4.4.3 Route page

The [Route] page selects the route parts of the monitored and planned routes to show on the ECDIS.

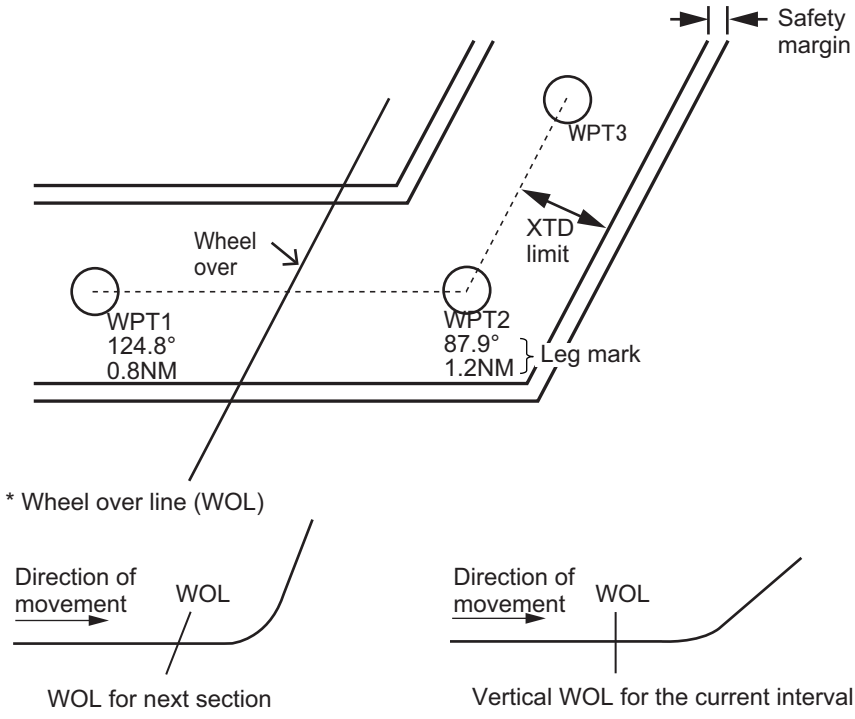


[XTD Limit]: The distance from the centerline to one side of the nav lane.

[Safety Margin]: The distance from one side of the channel limit to the safety margin distance.

[Leg Marks]: Indications of waypoint no. and range and bearing to next waypoint. (**True**: Reference to North; **Relative**: Reference to heading)

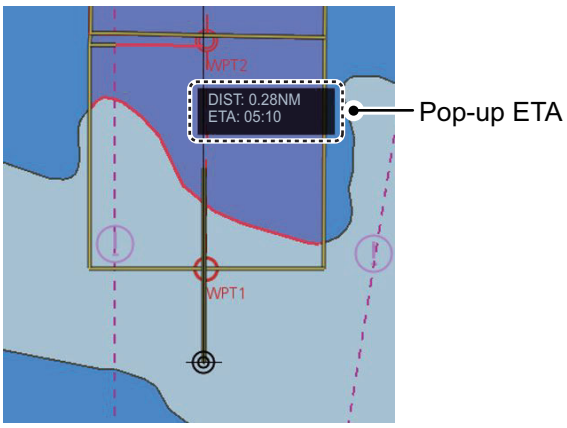
[Wheel Over Line]: The location where the ship turns toward new course. A parallel line appears at the next location.



Case 1: Normal

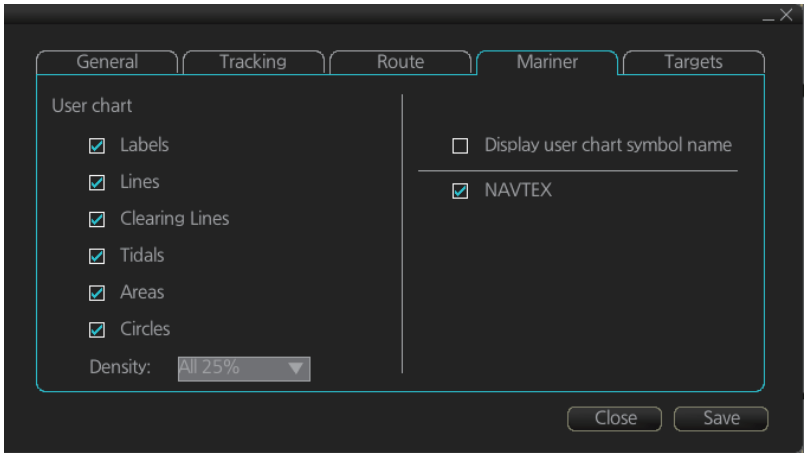
Case 2: Angle for next section is narrow (Not 20 deg)

[Pop-up ETA]: When set to [ON], moving the cursor over the monitored route displays the distance and estimated arrival time to the cursor position.



Note: ETA is displayed in UTC or local time depending on the system time setting.

4.4.4 Mariner page



Description

[Labels]: Check to show labels on user charts.

[Lines]: Check to show lines on user charts.

[Clearing Lines]: Check to show clearing lines (for marking dangerous areas) on user charts.

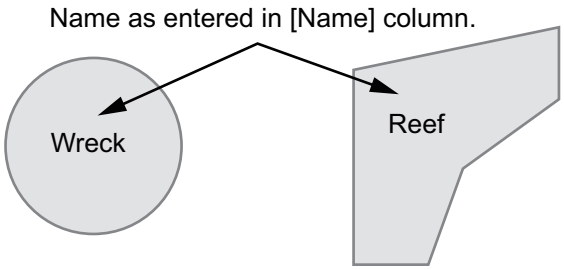
[Tidals]: Check to show tidal symbols and tidal data on user charts.

[Areas]: Check to show areas on the user charts.

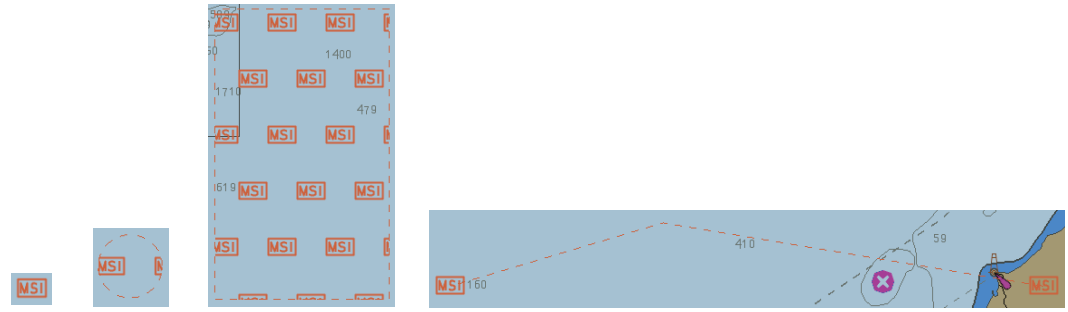
[Circles]: Check to show circles on user charts.

[Density]: Set the degree of transparency for the user chart objects. Color fill for the areas can be chosen as transparent from [All 0%], [All 25%], [All 50%], [All 75%], or [Each Object]. Select [All 0%] to show only boundary lines.

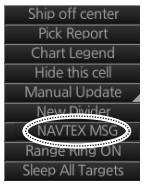
[Display user chart symbol name]: Check to display on the chart the name entered for a user chart symbol in the [Name] column of the [User Chart] dialog box. Effective for the circle and area symbols only. Names are shown in both the Voyage planning and Voyage navigation modes. See the figure below for examples.



[NAVTEX]: This item is valid when [Navtex Receiver] is made available in the installation. Check this item to show the MSI mark at the location of the position information contained in a Navtex message. See the illustration at the top of the next page for the information in a Navtex message.



The Navtex page can be opened from the context-sensitive menu. Right-click the MSI mark, then select [NAVTEX MSG]. See section 15.2.1.



4.4.5 Targets page



[Color]: Select color for TT and AIS objects from the list box.

[AtoN Symbol Color]: Select color of target (TT and AIS, common) from the list box.

[TT Size]: Select symbol size for tracked targets, Standard or Small.

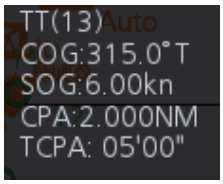
[AIS ROT TAG Limit]: Show target turning direction.

[TT Label]: Show or hide the TT label (target no.).

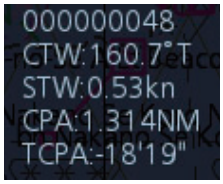
[AIS Label]: Show or hide the AIS label (ship's name).

[TT Pop-up Info]: Show or hide the TT pop-up, which is shown by placing the cursor on a TT.

[AIS Pop-up Info]: Show or hide the AIS pop-up, which is shown by placing the cursor on an AIS object.



TT pop-up info



AIS pop-up info

Note: CPA/TCPA information appears in the AIS pop-up info when the following two requirements are met. If the requirements are not met, CPA/TCPA appears as "*".

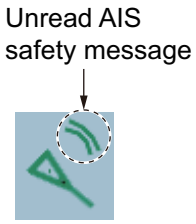
- AIS target is activated at the connected radar.
- The TTD sentence for the selected target is received from the connected radar.

Past position

[TT/AIS Points]: Select the number of TT and AIS past position points to display.

[Style]: Select style of presentation of target's past position.

[Unread AIS MSG]: When turned on, the unread AIS safety message symbol appears when there is an unread AIS safety message.



4.5 How to Control Predefined IMO Chart Display Settings

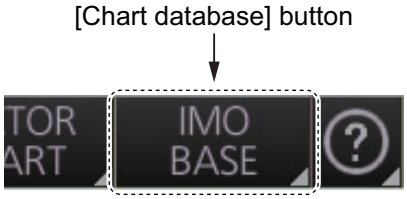
There are three sets of predefined chart display settings that can be used to display charts with certain chart features. The predefined chart display settings are:

- IMO BASE
- IMO STND(STANDARD)
- IMO ALL

When the chart settings are changed, the following settings changes are also applied to each page of the [Chart Display] menu.

	[Chart Display] menu		
	IMO Base	**IMO Standard**	**IMO All**
[Standard] page	Settings cannot be changed.	Settings cannot be changed.	Settings cannot be changed.
[General] page	All items are un-checked.	All items are un-checked.	All items are un-checked.
[Other] page	All items are un-checked.	All items are un-checked.	All items are checked.
[Text] page	Settings cannot be changed.	Settings cannot be changed.	Settings cannot be changed.
[NtoM] page	Settings cannot be changed.	Settings cannot be changed.	Settings cannot be changed.

You can change the chart display setting in use with the [Chart database] button on the Status bar.



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5. VECTOR (S57) CHARTS

Theoretically a chart can be coded for use on a computer as a vector chart. Vector-coded charts are coded using a variety of techniques. One technique is called S57ed3 and it has been chosen by IMO as the only alternative for SOLAS compliant electronic charts. If an S57ed3-coded chart is published by a government-authorized Hydrographic Office, then it is called "ENC". You can read more about ENC and related legal issues in this chapter. Hereafter, all references to vector chart material are referred to as "S57 charts" regardless of their source.

Sometimes you may wish to manually add Notices to Mariners or Navtex warnings into your S57 charts. This is called "manual updates". Also, manual updates are valid for all scales so that you don't need to repeat them for charts published in different scales from the same area.

5.1 Introduction to S57 Charts

An ENC chart is encrypted to prevent unauthorized use so the user needs a permit to view the ENC. This permit could be entered manually from the Control Unit, loaded from a USB flash memory.

Any new ENC must be loaded into the system. Some parts of the charts may be date dependent, i.e., they are visible after a set date or they are visible only for a limited period, etc. For all date-dependent objects set the Display Date and Update Review dates, referring to section 5.2.2. In the paper chart world, the Preliminary and Temporary Notices to Mariners represent the date dependency described above for S57 charts.

An important part of ENCs are the updates. Hydrographic Offices can issue two kinds of updates:

1. Incremental updates, which are small additions to original base cells.
2. Reissues and new editions, which are complete replacements of previous base cells and their updates.

All updates are date stamped and they may also contain date-dependent parts. You can set a date period and create an update report for that period (see section 5.4).

Chart material is stored in media such as DVD ROM, CD ROMs and USB flash memory or electronically through from LAN (Local Area Network) in which it could have arrived in DVD ROMs, CD ROMs or USB memories. Such material can contain only basic cells, cells and updates or only updates. The electronic chart system contains as standard the software required to access a medium.

Each S57 chart may contain additional links to textual descriptions or pictures, besides the chart itself. Typically additional textual descriptions and pictures contain important sailing directions, tidal tables and other traditional paper chart features that do not have any other method to be included into the S57 chart. This system copies these textual descriptions and pictures into its SSD so the user may cursor-pick them for viewing purposes.

5.1.1 Definitions of terms

Cell	A cell is a geographical area containing ENC data and it is the smallest division of ENC data. Each cell has a separate unique name. Hydrographic Offices divide their responsibility area by the cells that they publish.
S57 chart	A database, standardized as to content, structure and format, is issued for use with this system without any authority of government-authorized Hydrographic Office.
ENC	A database, standardized as to content, structure and format, is issued for use with this system on the authority of government-authorized Hydrographic Offices. The ENC contains all the chart information necessary for safe navigation and may contain supplementary information in addition to that contained in the paper chart (e.g., sailing directions) that may be considered necessary for safe navigation. The name of the coding standard for ENC is S57ed3.
SENC	A database resulting from the transformation of the ENC by the system for appropriate use, updates to the ENC by appropriate means, and other data added by the mariner. It is this database that is actually accessed by the system for display and other navigational functions. The SENC may also contain information from other sources.

5.1.2 Chart legend for S57 charts

The [Chart Legend] dialog box provides various information about the ENC chart currently displayed. The information can be displayed two ways:

- **Chart data for own ship position**: Right click the chart area, select [Ship on center] from the context menu, then click [Chart INFO] and [Chart Legend] on the Instant-Access bar™.
- **Chart data for cursor position**: Right click the chart area, select [Ship off center] from the context menu, then click [Chart INFO] and [Chart Legend] on the Instant-Access bar™.

To close the dialog box, click the [Close] button.

This system is capable of showing more than one S57 chart at a time. This feature is called the multi-chart display. If one S57 chart does not cover the whole display, the system will open more S57 chart cells for display, if appropriate cells for the displayed area are available. The chart legend shows information about S57 charts displayed on the electronic chart display area.



[**Name**]: Name of chart.
[**Type**]: Type of chart.

[Edition]: Edition number of the chart.
[Edition Date]: Date the edition was published.
[Update Number]: Update number
[Update Date]: Date of update
[Compilation Scale]: The scale of the original paper chart is shown here.
[Projection]: Projection of current chart.
[Horizontal Datum]: Horizontal datum used with current chart.
[Sounding Datum]: Datum used to create sounding data.
[Vertical Datum]: Vertical datum used with current chart.
[Units of Depth]: Unit of depth used with current chart.
[Units of Height]: Unit of measurement used to measure height of objects above sea level.
[Magnetic Variation]: Amount of magnetic variation. A positive value indicates a change in an easterly direction and a negative value indicates a change in a westerly direction.
[Quality Indication]: Quantitative estimate of the accuracy of chart features, given by the chart producer.

5.1.3 Permanent warnings for S57 charts

Permanent warnings help you keep the S57 charts up-to-date and these are shown at the bottom of the screen. Permanent warnings appear if the system detects a condition that may cause a chart to be not up-to-date.

Message	Meaning, Remedy
"Display Not Real Time"	Display Date is not the current date. Set Display Date and Update Review date to the current date (see section 5.2.2).
"No connection to dongle"	The dongle is not inserted or not recognized. Insert the dongle to erase the message.
"Not up to date (SSE 27): XXXXXXXX (Chart name appears at location of Xs.)"	At least one chart is not up to date. (Chart data has not been updated.) Load updated material.
"Permit expired (SSE 25): XXXXXXXX (Chart name appears at location of Xs.)"	You have an expired permit for a chart. Remove the chart or renew subscription for the permit.

Note: The system can assist in keeping RENC-received charts up-to-date. For charts that have been loaded from sources other than an RENC, the system is unable to know the exact up-to-date situation.

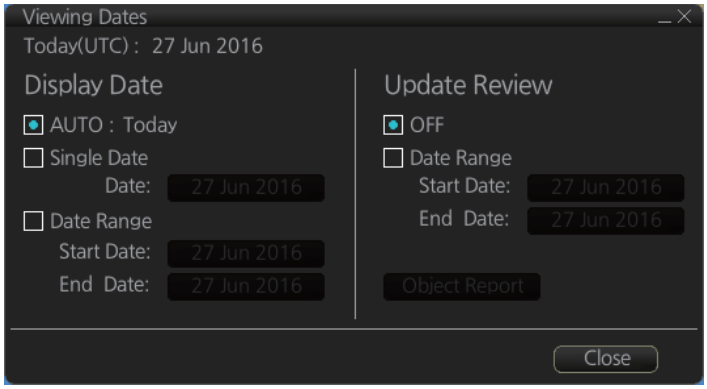
5.2 Chart Viewing Dates and Seasonal Features of the S57 Chart

5.2.1 Introduction

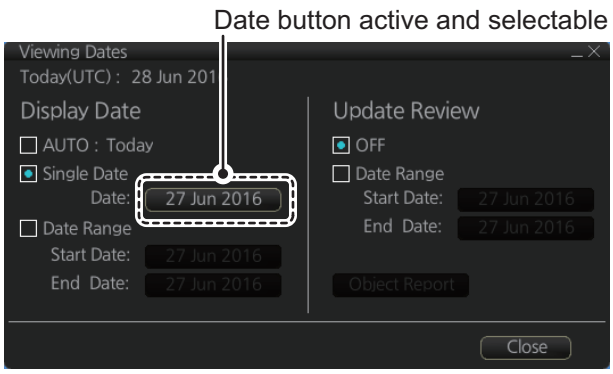
S57 charts contain date-dependent features. Updating in general, including reissues, new editions and updates, creates date dependency. In addition to the obvious date dependency, some features of the S57 charts create additional date dependency. These features include "Date Start", "Date End", "Seasonal date start" and "Seasonal date end". Hydrographic Offices use these features to publish Temporary and Preliminary Notices to Mariners, as their paper chart equivalent updates are called. "Seasonal date start" and "Seasonal date end" are used for seasonal chart features such as summer-only sea marks, seasonal yacht race areas, etc.
You can efficiently use chart viewing date dependency in order to use the valid data for any given date applicable for your navigation or planning purposes. For example, you can check for existence of changes and restrictions weeks before they became valid. Date dependency is a part of the new electronic method to keep your chart up-to-date and valid for your intended use. For voyages longer than one week, you should set Display Date and Update Review at least once during the voyage, to keep your chart up-to-date.

5.2.2 How to set Display Date and Update Review dates

1. On the InstantAccess bar™, click the [Chart INFO] and [Viewing Dates] button. The [Viewing Date] dialog box appears.

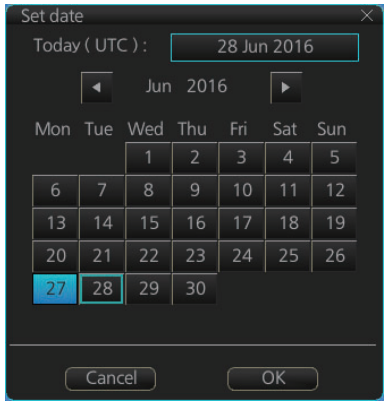


2. Select either [Single Date] or [Date Range] from the [Display Date] column, as appropriate. The date button becomes active and selectable, as shown in the example figure below.



- [Single Date]: Display only charts which have this date.
- [Date Range]: Display all charts within the set range.

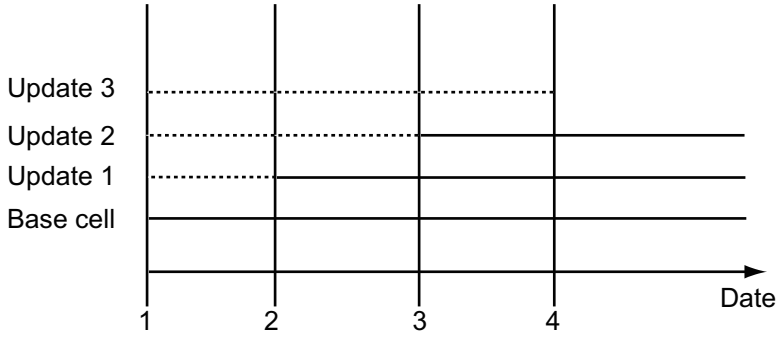
3. Click the date button to show the [Set date] dialog box.
4. Select the appropriate date from the calendar, then click [OK] to close the [Set date] dialog box and return to the [Viewing Dates] dialog box.
5. Click [Close].
6. Check the appropriate charts, then access the Viewing Dates dialog again (see step 1).
7. Select [AUTO - Today] to show the current date's chart.
8. Click [Close].



5.2.3 About chart viewing date dependency of S57 standard

How the issue date of updates changes the visibility of the changes

Study the example below to understand the behavior of updates relative to date.



The figure above shows how updates are dependent Chart viewing dates set in Display/Approved date settings by user. Actions 1 to 4 areas as follows:

1. Base cell including three updates is converted into SENC. Display Date is set as current date of the system.
2. The date in which update 1 was issued. [Display Date] must be set to correct date in order to see the chart with update 1.
3. The date in which update 2 was issued. [Display Date] must be set to correct date in order to see the chart with update 1 and update 2.
4. The date in which update 3 was issued. [Display Date] must be set to correct date in order to see the chart with update 1, update 2 and update 3.

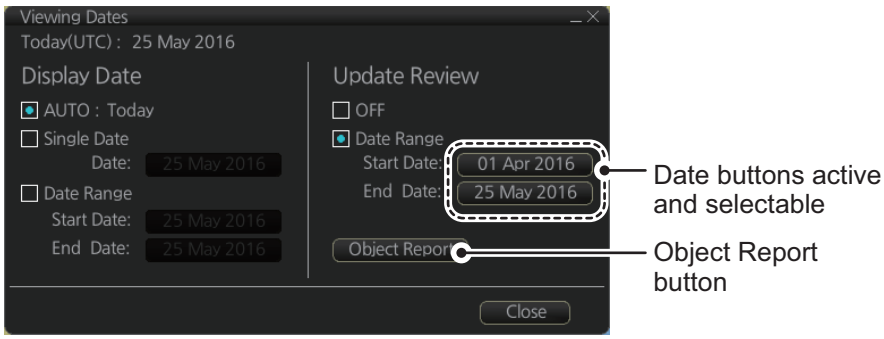
Note 1: In order to display charts with correct updated situation, always use current date during your voyage. If your voyage lasts more than one week, set current date at least once per week during your voyage.

Note 2: In order to display charts with correct updated situation during route planning, always use the planned date of each waypoint to check your plan.

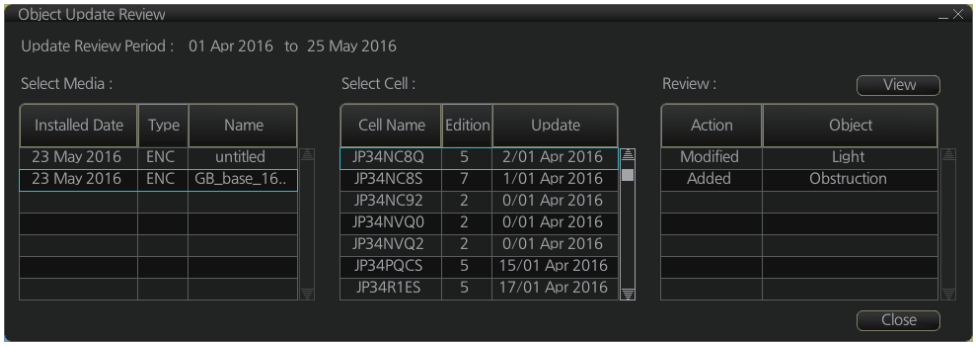
5.2.4 How to highlight updated data

You can highlight updated data by setting a date (or date period) and creating a report.

1. On the InstantAccess bar™, click the [Chart INFO] and [Viewing Dates] button. The [Viewing Date] dialog box appears.
2. In the [Update Review] column, check the [Date Range] box. The [Start Date] and [End Date] buttons become active and selectable.



3. Click the [Start Date] button to show the [Set date] dialog box.
4. Select the start date, then click [OK].
5. Click the [End Date] button to show the [Set date] dialog box.
6. Select the end date, then click [OK].
7. Click [Object Report]. The [Object Update Review] dialog appears.

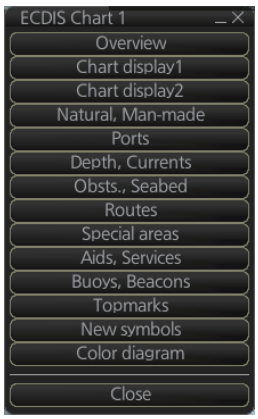


8. Select the items to highlight, then click the [View] button.
   Items selected here appear with an orange highlight mark.
9. To remove highlights, set the [Update Review] column of the [Viewing Dates] dialog box to [OFF].
10. Click the [Close] button on the [Viewing Dates] dialog box to close the dialog boxes.

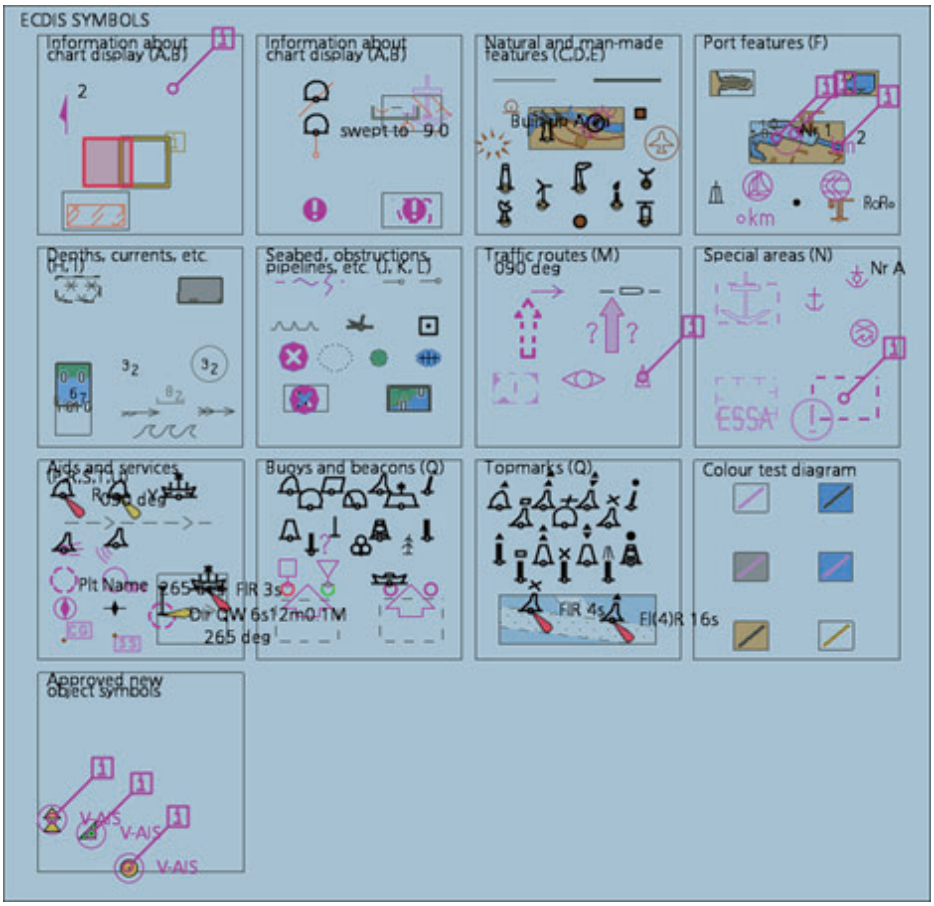
5.3 Symbology Used in S57 Charts

You can familiarize yourself with the symbology used by browsing IHO Chart 1, which is included in this system. Note that it behaves as any S57 chart and it follows your selections. See section 4.3.

1. Click the [Chart INFO] and [Chart 1] buttons on the InstantAccess bar™ to show to the [ECDIS Chart 1] menu, shown below.
2. Click a chart feature to show detailed information about the feature. Click [Overview] to show a compilation of all features, shown below.



ECDIS Chart 1 menu



5.3.1 Presentation library used for S57 chart features

The system uses the official IHO presentation library to draw S57 charts.

When this manual was published the official presentation library was "pslb04_0.dai", known as "Official IHO presentation library for system Ed 4.0, Edition: 3.4".

5.4 How to Find Information for S57 Chart Objects

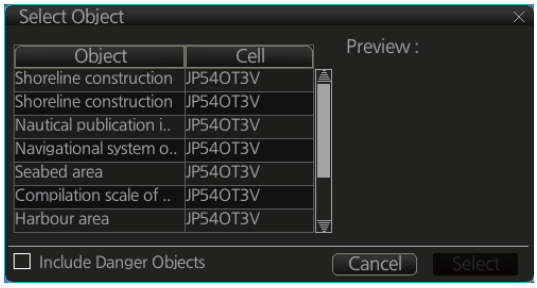
The ability to cursor-pick an object to find additional information about the object is an important function of the system. However, an unprocessed cursor pick, which does not discriminate or interpret and merely dumps on the interface panel all the information available at that point on the display, will normally result in pages of unsorted and barely intelligible attribute information.

Do the following to find information about a chart object.

1. Get into the Voyage navigation mode or Voyage planning mode, then right-click an object to show the context-sensitive menu. (The menu shown to the right appears in the Voyage navigation mode.)

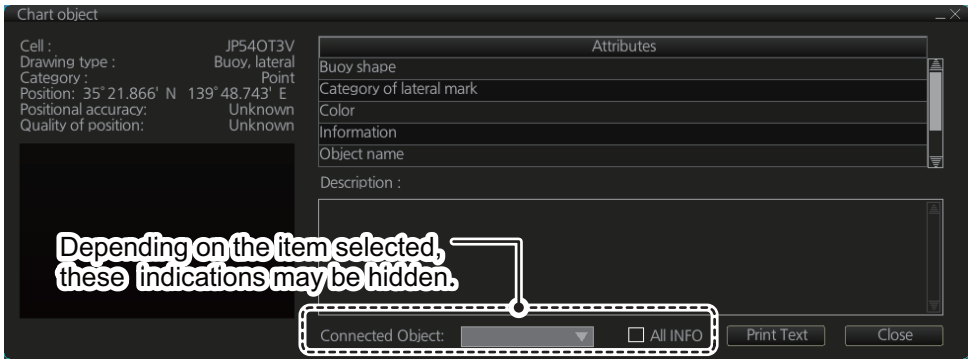


2. Click [Pick Report] to show the [Select Object] dialog box.



Note: The [Include Danger Objects] check box appears when there is at least one dangerous object. To show dangerous objects in the [Select Object] dialog box, check this box (after the box is check it becomes unselectable).

3. Click the object for which you want to know its details, then click the [Select] button.
Note: Objects selected from the Select Object dialog box are highlighted in orange color and are shown with a broken box( ).



- [Description] window: Click an attribute to view its description in this box.
- [All INFO]: Check the [All INFO] box to show all information in the [Attributes] window. (The [All INFO] box becomes unselectable when checked.)
- [Connected Object]: Objects which are connected to the selected object are shown in the drop-down list. Select an object from the list to show its details.

Note 1: If another window is active, the preview window may be partially obscured by that window. Move the window to display the entire preview.

Note 2: The [Attributes] window of the [Chart Object] dialog box changes according to the settings for [Attribute Display] in the [Basic Settings] menu.

5.5 Admiralty Information Overlay (AIO)

The Admiralty Information Overlay includes all Admiralty Temporary and Preliminary Notices to Mariners (T&P NMs) and provides additional navigationally significant information from UKHO's ENC validation programme. The AIO is displayed as a single layer on top of the basic ENC and is available free of charge as part of the Admiralty S57 Chart Service and within Admiralty Value Added Resellers' services.

The AIO has been developed to ensure mariners can simply view the information they need - in addition to the standard chart - to navigate safely and compliantly. By clearly showing where important Temporary or Preliminary changes may impact a voyage, the Admiralty Information Overlay will give seafarers the same consistent picture of the maritime environment on their charts as they have always had.

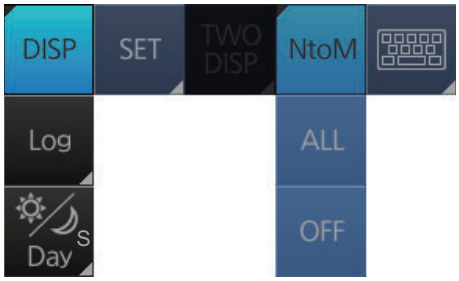
The AIO license is free of charge for AVCS license holders.

5.5.1 Installation

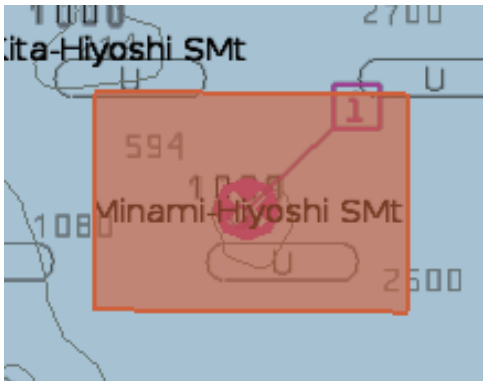
Installation is the same as that for the ENC chart. See section 3.2.

5.5.2 How to display the AIO

On the InstantAccess bar™, click the [DISP], [NtoM] and [ALL] buttons to show the AIO. To hide the AIO, click the [DISP], [NtoM] and [OFF] buttons.

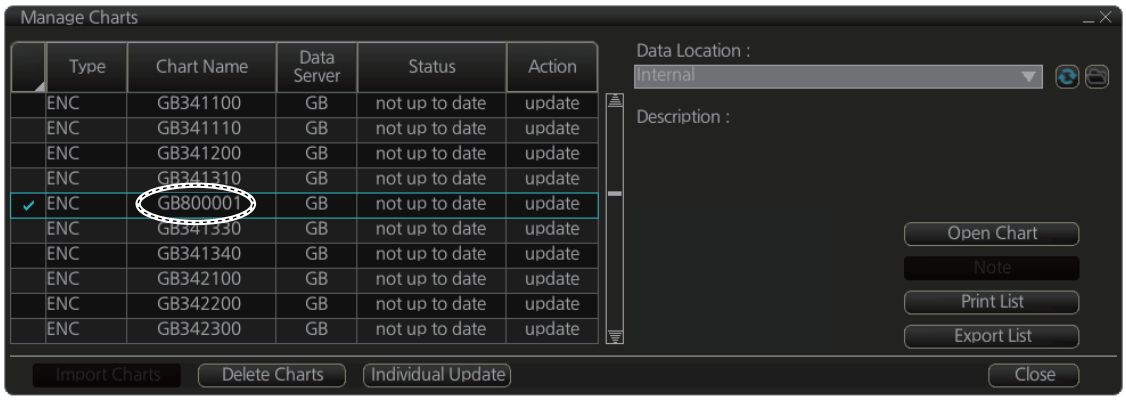


The area(s) that contain temporary or preliminary changes are marked as a hatched red area.



5.5.3 Catalog of AIO cells

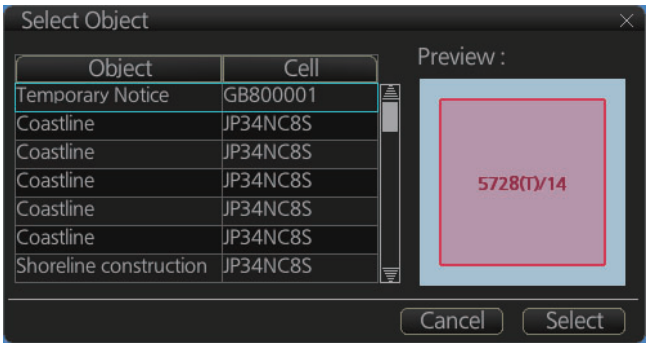
A catalog of AIO (NtoM) cells is maintained in the [Manage Charts] dialog box. To show this box, get into the Chart maintenance mode, then click the [Manage Charts] button on the InstantAccess bar™. The AIO cell is GB800001.



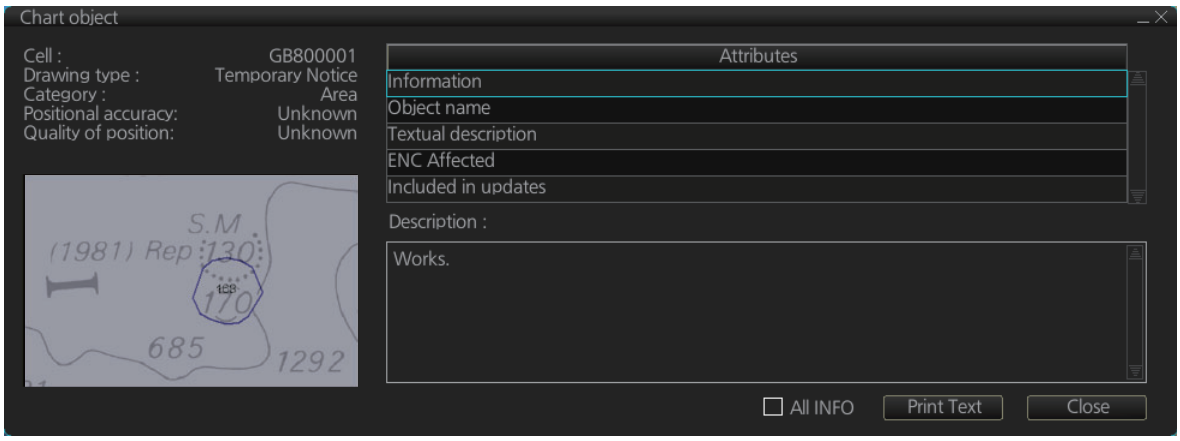
5.5.4 How to find AIO chart object information

Do the following to find chart object information contained in the AIO.

1. Right click a red hatched area in the chart area, then select [Pick Report] to show the [Select Object] dialog box.



2. Click [Preliminary Notice] in the dialog box to show the [Chart object] dialog box.



The [Chart object] dialog box shows the following information:

- Cell (name)
- Drawing type (Preliminary Notice, Temporary Notice)
- Category (AIO)

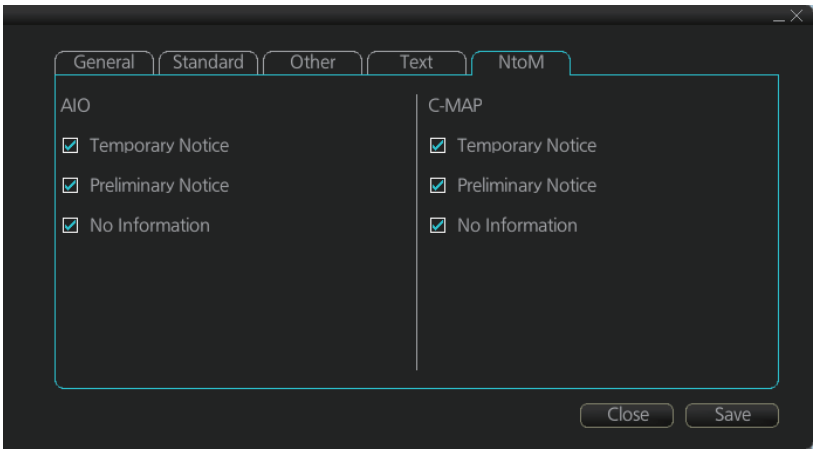
- Positional accuracy
- Quality of position
- The preview box provides a scaled-down image of the area selected. Click the image to enlarge it.
- The [Attribute] window shows the attributes for the AIO area selected. To find information about an attribute, click it to show its information in the [Description] box.
  [Information]: Description of area (for example, danger area).
  [Object Name]: Object name (number)
  [Textual description]: Full text of the Notice to Mariners (NtoM)
  [ENC affected]: ENC affected by the NtoM
  [Included in updates]: Date this item was updated ([Preliminary Notice] items only)
- [All INFO] checkbox: Check the box to show [Source indication] at the bottom of the [Attribute] window. (The [All INFO] box becomes unselectable when checked.)

Note: The [Attributes] window of the [Chart Object] dialog box changes according to the settings for [Attributes Display] in the [Basic Settings] menu.

5.5.5 How to select the information to display

Select what type of notices to display as follows:

1. Click the [DISP], [SET] and [Chart DISP] buttons on the InstantAccess bar™.
2. Click the [NtoM] tab.



3. In the [AIO] window, check the items to display.
4. Click the [Save] button to save settings, then click the [Close] button to close the menu.

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6. RASTER (ARCS) CHARTS

6.1 ARCS Charts

Approximately 2,700 ARCS charts are available on 11 chart CD-ROMs, covering the world's major trading routes and ports. Regionally based chart CD-ROMs RC1 to RC10 contain standard BA navigation charts. RC11 contains ocean charts at scales of 1:3,500,000 and smaller. ARCS charts are facsimile copies of BA paper charts, and as such share a common numbering system. They are supplied on each Weekly Update CD-ROM until incorporated into the chart CD-ROMs at the next issue.

Occasionally, it is necessary to issue new charts in advance of their intended date of validity, for example a change in regulations commencing on a future date. In such cases the current chart will co-exist with the new chart until the date of implementation, the earlier chart having the suffix "X" after the chart number. The system will allow access to both charts for the period of overlap by issue of new chart permits.

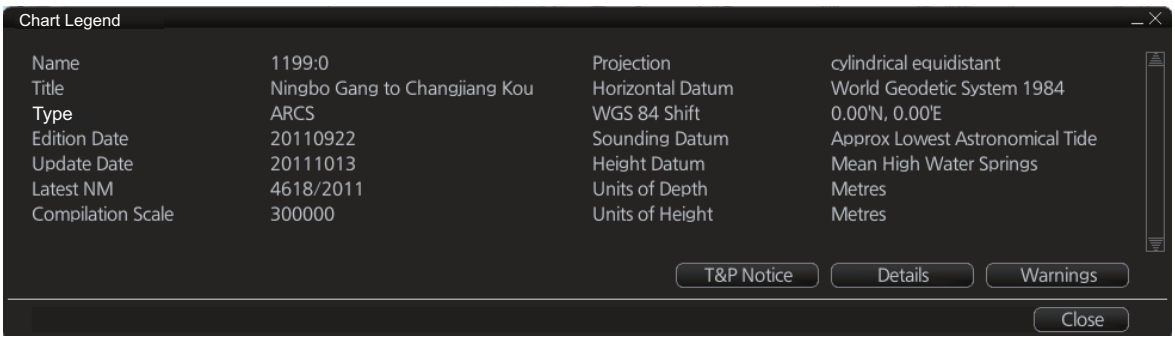
Sometimes you may wish to manually add Notices to Mariners or Navtex warnings into your ARCS charts. In this system this is called Manual Updates. Manual updates are valid for both ARCS and S57 charts so that you need to define them only once. Further, manual updates are valid for all scales so that you don't need to repeat them for charts published in different scales from the same area.

6.1.1 Chart legend of ARCS chart

The [Chart Legend] dialog box provides various information about the ARCS chart currently displayed. The information can be displayed two ways:

- **Chart data for own ship position**: Right click the chart area, select [Ship on center] from the context menu, then click [Chart INFO] and [Chart Legend] on the Instant-Access bar™.
- **Chart data for cursor position**: Right click the chart area, select [Ship off center] from the context menu, then click [Chart INFO] and [Chart Legend] on the Instant-Access bar™.

To close the dialog box, click the [Close] button.

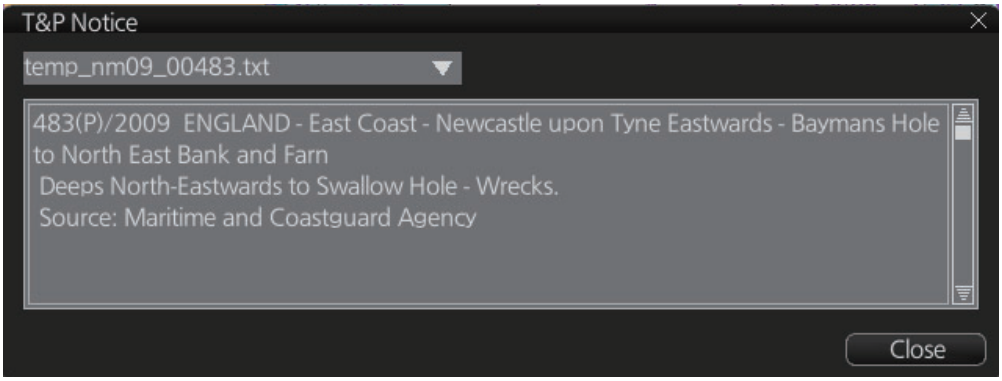


[**Name**]: Name of chart.
[**Title**]: Title of the chart.
[**Source**]**. Source of the chart.**
[Edition Date]: Date the edition was published.

[Update Date]: Date of update
[**Latest NM**]: Date of the latest Notice to Mariners included in the chart.
[Compilation Scale]: The scale of the original paper chart is shown here.
[Projection]: Projection of current chart.
[Horizontal Datum]: Horizontal datum used with current chart.
[WGS 84 Shift]: Datum shift between local datum and WGS-84 datum is known (=Defined), unknown, operator defined (=Undefined) or shift is known only some parts of chart (=Partially defined).
[Sounding Datum]: Datum used to create sounding data.
[Height Datum]: Vertical datum for objects located above sea.
[Units of Depth]: Unit of depth used with current chart.
[Units of Height]: Unit of measurement used to measure height of objects above sea level.
[T&P Notice], [**Details**], [**Warnings**] buttons: See the descriptions below.

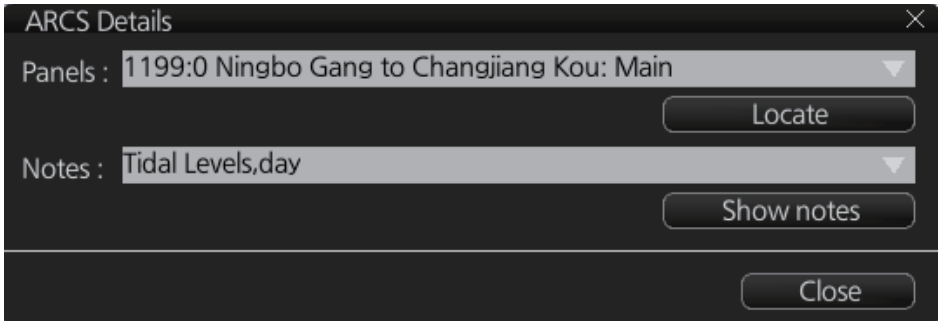
T&P notice

T&P Notices are also known as Temporary and Preliminary Notices to Mariners and they provide chart information that does not warrant permanent chart correction. To show the T&P Notices, click the [T&P Notice] button on the [Chart Legend] dialog box.



Details

Click the [Details] button on the [Chart Legend] dialog box to show detailed information about current chart.

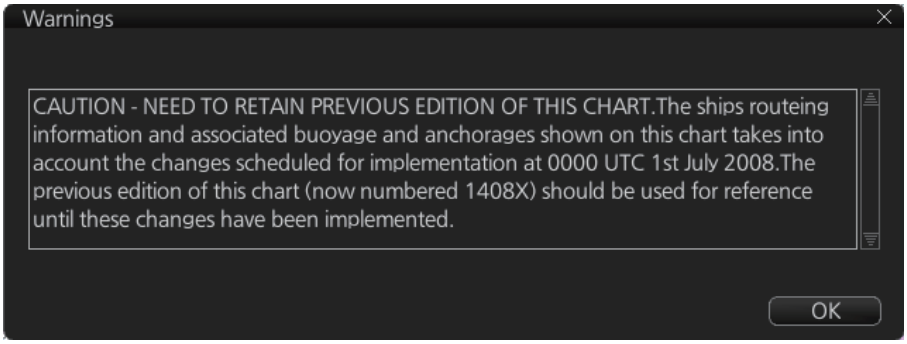


[**Panels**]: Selects desired inset (Panel) from the combo box. This works in conjunction with [Notes].

[**Notes**]: Select desired Notes from drop-down list, then click the [Show Notes] button to display the Notes.

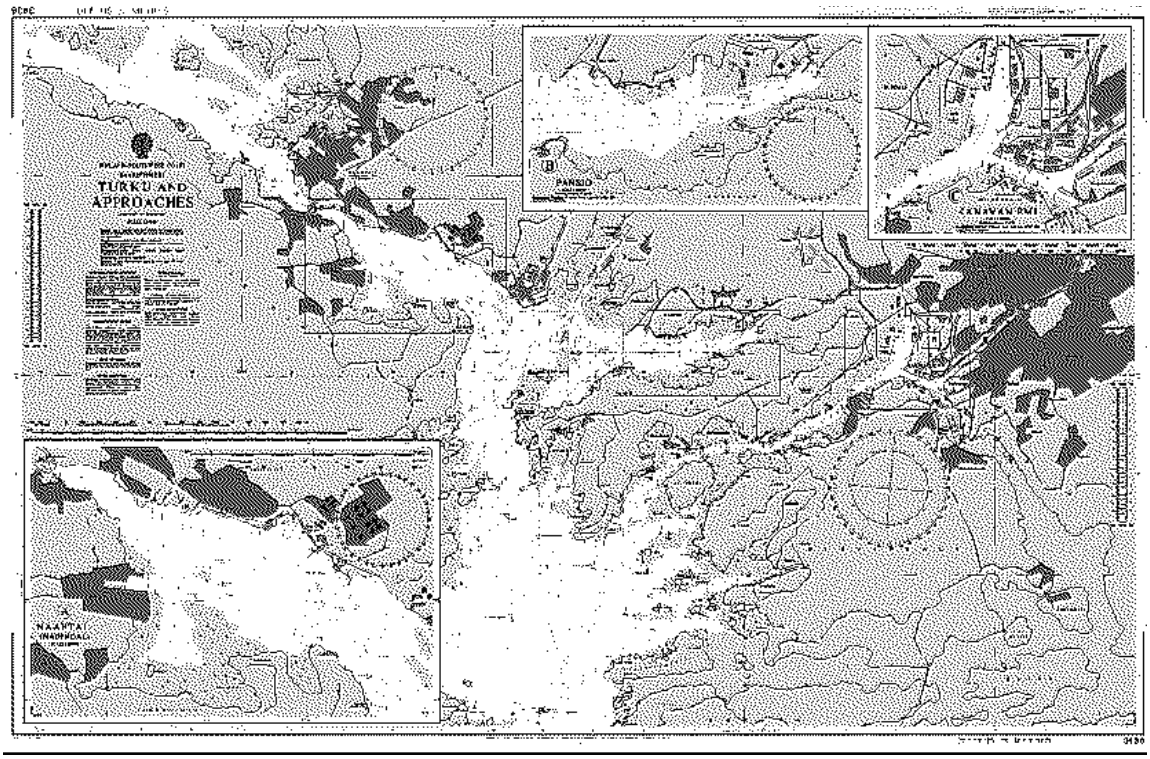
Warnings

There could be warnings not included in Notices to Mariners. British Admiralty may release textual warnings for any chart and they are available here. Click the [Warnings] button to display the [Warnings] window.

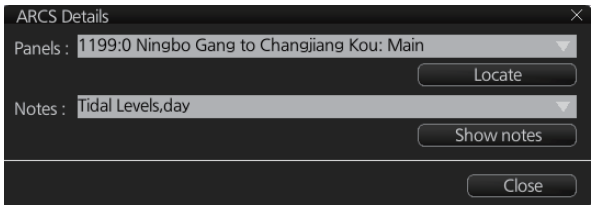


How to set preference for inset (panel)

If there are the different insets with the same position, the operator can select preferred inset, which displays your ship's position.



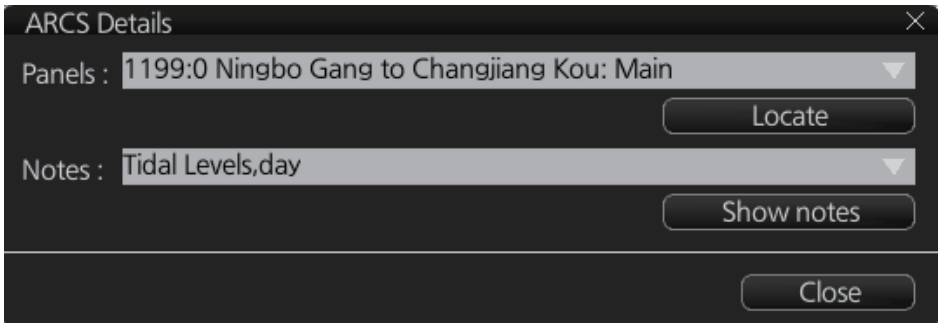
1. In the Voyage navigation mode or the Voyage planning mode, put the cursor at the desired location in the chart area, then right click to select [Chart Legend] to show the [Chart Legend] dialog box. If the own ship mark is at the screen center, the Chart Legend dialog box may be displayed by clicking [Chart INFO] and [Chart Legend] on the InstantAccess bar™.

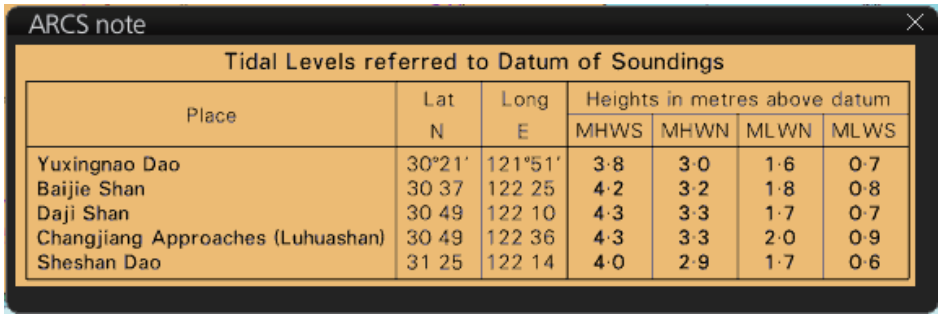


2. Click the [Details] button.
3. Select desired inset from the [Panels] drop-down list.

How to display notes of ARCS chart

The operator can select a desired item from the combo box in the [ARCS Details] dialog box in order to view notes for that item. Select an item on the [Notes] combo box, then click the [Show Notes] button to show the notes for the selected item.

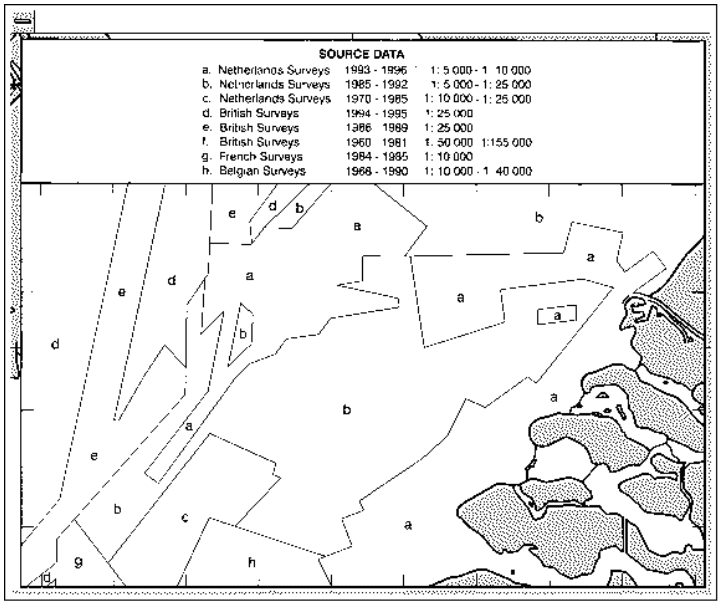




Place	Lat N	Long E	Heights in metres above datum MHWS	MHWN	MLWN	MLWS
Yuxingnao Dao	30°21′	121°51′	3·8	3·0	1·6	0·7
Baijie Shan	30 37	122 25	4·2	3·2	1·8	0·8
Daji Shan	30 49	122 10	4·3	3·3	1·7	0·7
Changjiang Approaches (Luhuashan)	30 49	122 36	4·3	3·3	2·0	0·9
Sheshan Dao	31 25	122 14	4·0	2·9	1·7	0·6

Source Data Diagram (SDD)

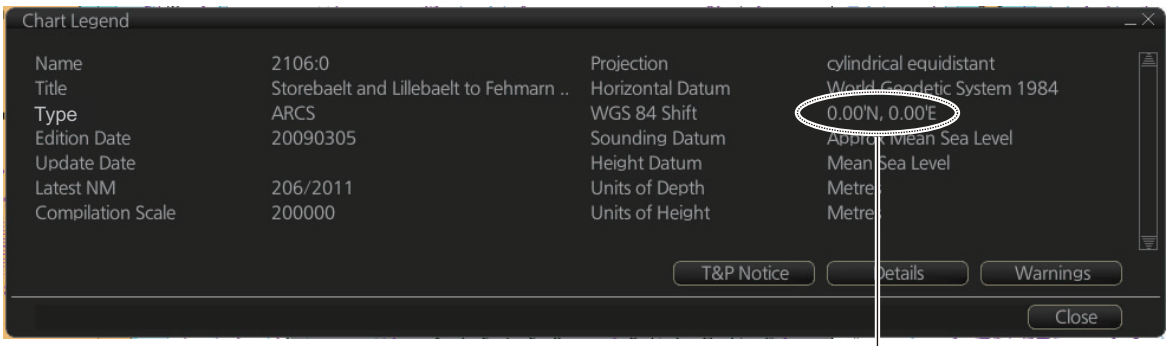
A Source Data Diagram (SDD) consists of two parts: a graphic showing the areas covered by each type of source material from which the chart was compiled, and a tabulation, keyed to a graphic, giving details of source dates and scales. The layout of the graphic corresponds to the layout of the chart, and the borders of the diagram equate to the limits of the chart panels. You can show the SDD by selecting [Source] from the [Notes] drop-down list and clicking the [Show Notes] button.



6.2 Datum and ARCS Charts

The difference between ARCS chart local datum and WGS 84 datum is known as WGS 84 shift. This difference is known and the system does the conversion automatically. If the WGS shift for a chart is defined, the amount of shift is indicated. If the WGS shift is not defined, "Undefined" is displayed. For no WGS shift, the indication 0.00'N, 0.00'E appears.

To find the WGS shift of the current chart, in the Voyage navigation or Voyage planning mode. right click the desired area on the chart to show the [Chart Legend] dialog box.



WGS 84 shift indication
(0.00'N, 0.00'E means no shift)

6.3 Permanent Warnings of ARCS

The system can help you to keep your ARCS charts up-to-date for the charts that you have received from ARCS. Producers of ARCS charts store up-to-date status on an ARCS Weekly Update CD-ROM (system files). This information is loaded into the ECDIS when you update, either by permits or by active group. Based on this information, ARCS permanent messages are displayed to help you keep your ARCS charts up-to-date.

Message	Meaning, Remedy
"[ARCS]: Permits have expired"	You have an expired permit for a chart. Remove the chart or renew subscription for the permit.
"No connection to dongle"	The dongle is not inserted or not recognized. Insert the dongle to erase the message.

6.4 ARCS Subscriptions

ARCS customers can subscribe to one of two service levels, ARCS Navigator or ARCS Skipper.

Note: If you receive an ARCS chart permit on a floppy disk, copy the contents of the disk to a USB flash memory and, then install the permit files.

6.4.1 ARCS Navigator

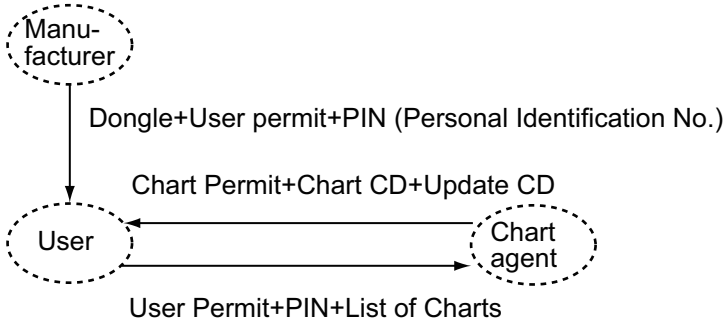
ARCS Navigator operators receive a comprehensive weekly updating service on a CD-ROM that mirrors the Admiralty Notices to Mariners (NMs) used to correct Admiralty paper charts. The update information is cumulative, ensuring that only the most recent Update CD-ROM is necessary. ARCS Navigator license is valid for 12 months. During this period, weekly updates will be delivered on Weekly Update CD-ROMs. ARCS Navigator is intended for SOLAS class operators who require that their charts are up-to-date.

Content of ARCS Navigator pack:

- One (1) or more Chart CD-ROMs (RC1-RC11) containing ARCS charts
- One (1) Update CD-ROM containing the latest ARCS chart corrections

6.4.2 ARCS license information

Licensee information, which is transferred between participants, is as shown below.



7. C-MAP CHARTS

Your chart system has the capability of using and displaying the latest C-MAP world-wide vector chart database. These charts are fully compliant with the latest IHO S-57 3.1 specifications.

In order to prepare the system for use with the C-MAP database, there are a number of things that must be done.

The descriptions in this chapter apply to C-MAP charts. (This system does not support CM-93/2 charts.)

7.1 How to Register the System at C-MAP

Your system has the capability to use the C-MAP chart database. To do so a eToken (supplied by C-MAP) must be connected to the system. The eToken provides the system with a unique System ID that enables C-MAP to issue correct licenses. The actual System ID can be found on the eToken itself, on the installation medium or on a sticker placed on the equipment. This ID must be provided on all chart orders, by e-mail (license.marine@c-map.com).

7.2 How to Order Charts

A chart order may be sent together with system registration as described above. It is essential that the required information be sent to C-MAP when ordering charts for a system. C-MAP issues order forms specifying the information that is required, and contains vital information that will allows C-MAP to monitor and maintain your licenses throughout the lifetime of the system.

For details on how to order charts see the C-MAP official website (http://www.c-map.com/).

7.3 How to Apply for Licenses

Once the order has been received at C-MAP, a license will be generated and transmitted back to the operator. This may be in the form of a single alphanumerical string (16 characters), or in the form of a file called PASSWORD.USR. Once this license has been received it should be input using the License Administrator software designed and supplied by the chart manufacturer. There are two types of licenses, purchase and subscription. Purchase licenses are valid indefinitely while subscription licenses need to be renewed every 12 months from the start of the subscription. Failure to renew a subscription will result in the charts becoming unavailable.

7.4 Troubleshooting

If you are having problems installing your software or charts please check the following before contacting C-MAP:

- Check that the charts are available, with the chart management function.
- Check that the license is correctly installed, with the license function

Contact Information: For information please call you're nearest C-MAP Office (details can be found on the reverse side of the C-MAP chart CO box) or contact C-MAP. E-mail: technical.marine@c-map.com

7.5 Chart Display

The two type of C-MAP charts can be displayed together. These charts have the priority order shown below.

1) C-MAP ENC
2) C-MAP PROFESSIONAL+

If the same navigational purpose charts are available over an area, priority is as shown above. Areas where ENC is not available C-MAP ENC charts are shown. Where C-MAP PROFESSIONAL+ are available, PROFESSIONAL+ charts are displayed.

The [Chart Legend] dialog box provides various information about the C-MAP chart currently displayed. The information can be displayed two ways:

- For current position: Click the [TM/CU Reset] button while in the Voyage navigation mode, then click the [Chart INFO] button on the InstantAccess bar™ followed by the [Chart Legend] button.
- For a specific location: Put the cursor on the location, then right-click and select [Chart Legend].

To close the dialog box, click the [Close] button.



[**Name**]: Name of chart.
[**Type**]: Type of chart.
[Edition]: Edition number of the chart.
[Edition Date]: Date the edition was published.
[Update Number]: Update number
[Update Date]: Date of update
[Compilation Scale]: The scale of the original paper chart is shown here.
[Projection]: Projection of current chart.
[Horizontal Datum]: Horizontal datum used with current chart.
[Sounding Datum]: Datum used to create sounding data.

[Vertical Datum]: Vertical datum used with current chart.
[Units of Depth]: Unit of depth used with current chart.
[Units of Height]: Unit of measurement used to measure height of objects above sea level.
[Magnetic Variation]: Amount of magnetic variation. A positive value indicates a change in an easterly direction and a negative value indicates a change in a westerly direction.
[Quality Indication]: Quantitative estimate of the accuracy of chart features, given by the chart producer.

7.6 Permanent Warnings

Permanent warnings help you keep the C-MAP up-to-date and these are shown at the bottom of the screen. Permanent warnings appear if the system detects a condition that may cause a chart to be not up-to-date.

Message	Meaning, Remedy
"[C-MAP]: Database not up to date"	Database is not up to date. Update the data base.
"[C-MAP]: No connection to eToken"	eToken dongle is not connected (inside the Processor Unit) or the eToken has not been initialized. If the dongle is connected, open the [License] dialog box, click the [C-MAP] tab, then click the [C-MAP Setup] and [OK] buttons to initialize the eToken.
"[C-MAP]: permits have expired"	You have an expired permit for a chart. Remove the chart or renew subscription for the permit.
"No connection to dongle"	The dongle is not inserted or not recognized. Insert the dongle to erase the message.
"Permit expired (SSE 25): XXXXXXXX (Chart name replaces Xs.)"	You have an expired permit for a chart. Remove the chart or renew subscription for the permit.

7.7 Notice to Mariners (NM)

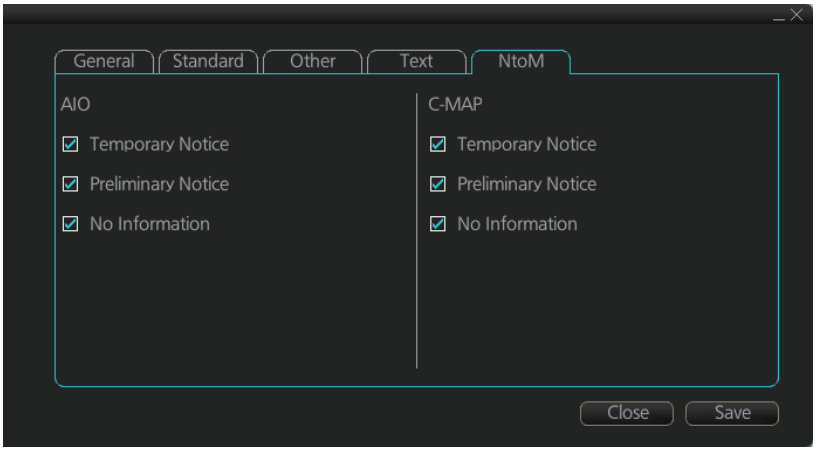
The NM has been developed to ensure mariners can simply view the information they need - in addition to the standard chart - to navigate safely and compliantly. By clearly showing where important Temporary or Preliminary changes may impact a voyage, the NM will give seafarers the same consistent picture of the maritime environment on their charts as they have always had.

The display and operation methods for NM is essentially the same as AIO. See section 5.5 for details.

How to select the NtoM information to display

Select what type of notices to display as follows:

1. Click the [DISP], [SET] and [Chart DISP] buttons on the InstantAccess bar™.
2. Click the [NtoM] tab.

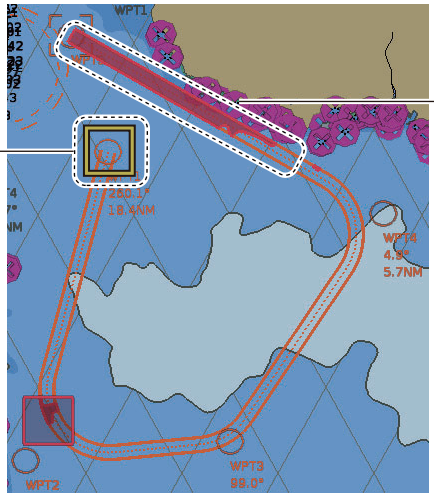


3. In the [C-MAP] window, check the items to display.
4. Click the [Save] button to save settings, then click the [Close] button to close the menu.

8. CHART ALERTS

The ECDIS can detect areas where the depth is less than the safety contour or detect an area where a specified condition exists. If prediction of own ship movement goes across a safety contour or an area where a specified condition exists, the system does the following:

- Chart objects set for Alarm category are highlighted in red on the chart (for checking planned route, navigation route).
- Chart objects set for Warning or Caution category are highlighted in yellow on the chart (for checking planned route, navigation route).
- An appropriate message appears in the Alert box for chart objects set for Alarm, Warning or Caution category.
- Chart objects set for Alarm or Warning category are given an aural alarm.



For this function, the ECDIS utilizes the chart database (S57 charts) stored on the SSD in SENC format. **Note that the ECDIS calculates dangerous areas using the largest scale chart available, which may not be the visualized chart.**

You can choose objects that are included for calculation of danger area (for example, restricted areas). A dialog box lists the various areas that activate danger warnings.

You can also define your own safe area by creating a user chart area. The system can utilize these areas when calculating chart alerts.

- The ECDIS can check the following for you:
  - Predicted movement area of own ship
  - Planned route with an easy to use locator function to find dangerous areas
- The ECDIS will highlight the following for you
  - Dangerous areas inside predicted movement area of the own ship
  - Dangerous areas inside your monitored route
  - Dangerous areas inside your planned route

8.1 Chart Alerts

Official S57 chart material contains depth contours that can be used for calculation of chart alerts. A chart database also includes different types of objects that the operator can use for chart alerts. The procedure for setting chart alerts is outlined below.

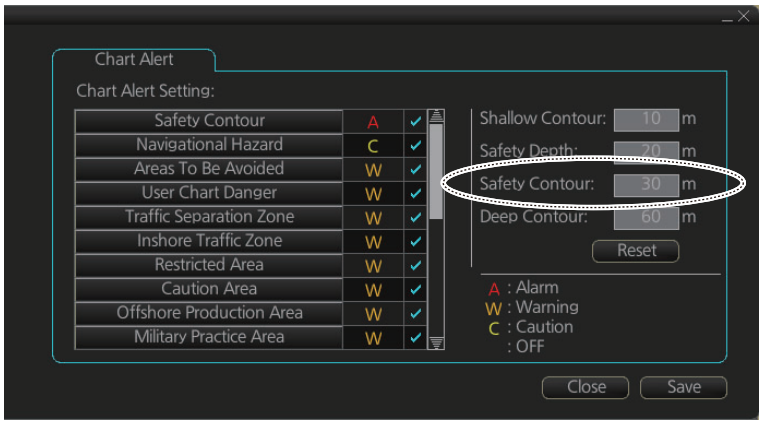
1. Choose suitable safety contour for your own ship. See section 8.1.1 for how to set the safety contour.
2. In the Voyage planning mode, define a new route or choose an existing one. Make a chart alert calculation of the route if there are indications of danger areas in the route. Modify your route if necessary and do the chart alert calculation again. To modify an existing route see section 9.5.
3. Choose route as monitored route.
4. Set a "look-ahead" for your own ship, referring to section 8.2.

The system is now ready for chart alert calculation of monitored route and estimated own ship position.

8.1.1 How to set safety contour

Select safety contour suitable for the own ship.

1. Click the [DISP], [SET] and [Chart Alert] buttons on the InstantAccess bar™ to show the [Chart Alert] page.



2. Enter desired depth at [Safety Contour], then click the [Save] button.

Any safety contours on the chart are highlighted with a thick gray line.

Note 1: The safety contour is not a new depth contour created by ECDIS - it is the highlight and activation of an existing contour line already present on the chart.

Note 2: If the chart does not contain chosen depth contour, the system will automatically choose next deeper contour.

8.1.2 How to select objects used in chart alerts

You can also include calculation areas that have to be noted when sailing (for example, restricted areas). To include these areas in chart alerts, do the following:

1. Click the [DISP], [SET] and [Chart Alert] buttons on the InstantAccess bar™ to show the [Chart Alert] page.



2. Click a letter indication to select the type of alert, warning or caution, to receive for the given chart object. [Safety Contours] is fixed to "A" (Alarm).
   - **W:** Warning, visual and aural alerts
   - **C**: Caution, visual alert only
   - **No display** (OFF): No alert notification. Available with objects other than [No Vector Chart].
3. Click the box to the right of the letter indication to show a check mark and show the alert. Click the box again to remove the check in the box and hide the alert. Checked alerts are highlighted according to priority:
   - **A** (Alarm): Red color highlight
   - **W** (Warning) and **C** (Caution): Yellow color highlight
4. Click the [Save] button to finish.

Note 1: C-MAP PROFESSIONAL+ charts may take several minutes to identify danger areas.

Note 2: The Type of Alert setting must be the same for all connected FMD-3xxx, FAR-3xxx.

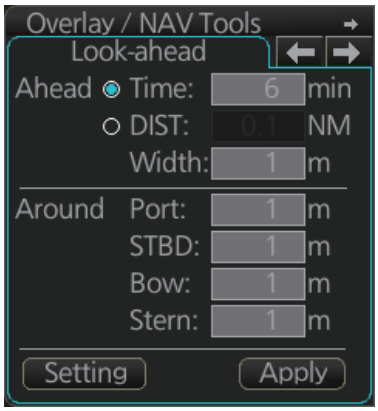
List of areas

There are the areas that the ECDIS detects and provides the audible alert and/or visual alert if estimated own ship position or planned or monitored route crosses the area defined on the [Chart Alert] page. You can choose from the following areas:

- Safety Contour
- Navigational Hazard
- Areas To Be Avoided
- User Chart Danger
- Traffic Separation Zone
- Inshore Traffic Zone
- Restricted Area
- Caution Area
- Offshore Production Area
- Military Practice Area
- Seaplane Landing Area
- Submarine Transit Lane
- Anchorage Area
- Marine Farm/Aqua Culture
- PSSA Area
- No Vector Chart
- Too Many Dangers
- UKC Limit
- Sounding UKC Limit
- Non-official ENC
- Not Up-to-date
- Permit Expired

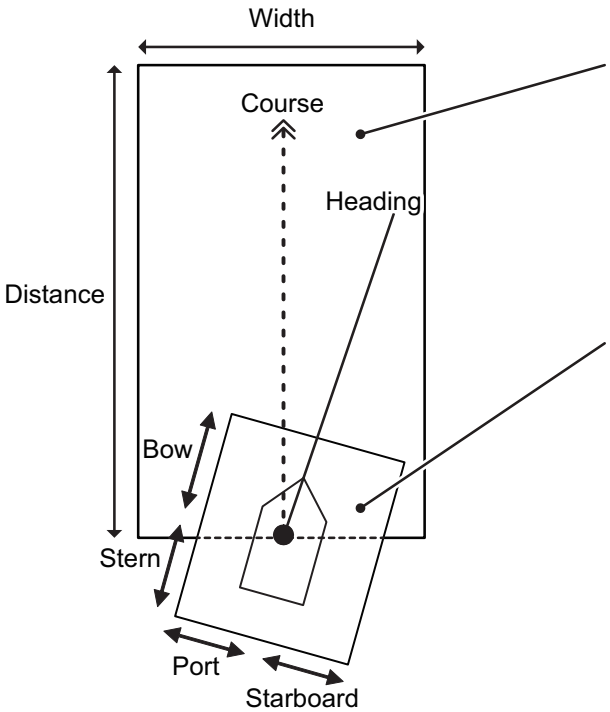
8.2 How to Activate Own Ship Check

Calculation of own ship predicted movement area is done using a check area ahead, or around, own ship position. Set the check area as follows:



1. Select the [Look-ahead] page from the [Overlay/ NAV Tools] box.
   Note: The [ON] button may not be shown depending on installation setting.

2. Set the ahead time or distance and ahead width, referring to the figure below. Also, set the "Around" figures: port, starboard, bow and stern check distance. The reference point is the conning position (CCRP).



Ahead: Sets an area with a length based on own speed (Time) or distance (DIST) ahead of your ship. The [Width] setting is applied to either [Time] or [DIST], depending on your selection. The area set here is always oriented based on your course (COG).

Around: Sets a fixed area around your ship. This area moves with your ship, in relation to your current heading (HDG).

3. To select the objects to use in chart alerts, click the [Setting] button and see section 8.1.2.
4. Click the [Apply] button to affect changes.

When an object set from the [Chart Alert] menu enters a set area, an alert is generated in the following manner:

- Alarm or Warning level alerts: Alert message and aural alert are generated.
- Caution level alerts: Alert message is generated (no aural alert).

Objects or areas that generate an alert are shown in the following manner. (Alarms: red highlight, Warnings/Cautions: yellow outline)

- Individual objects: The object is highlighted in red or outlined in yellow.
- Area objects: If the area object is larger than the look-ahead area, the look-ahead area is highlighted in red or outlined in yellow. If the area object is smaller than the look-ahead area, the area object is highlighted in red or outlined in yellow.

8.3 Route Planning

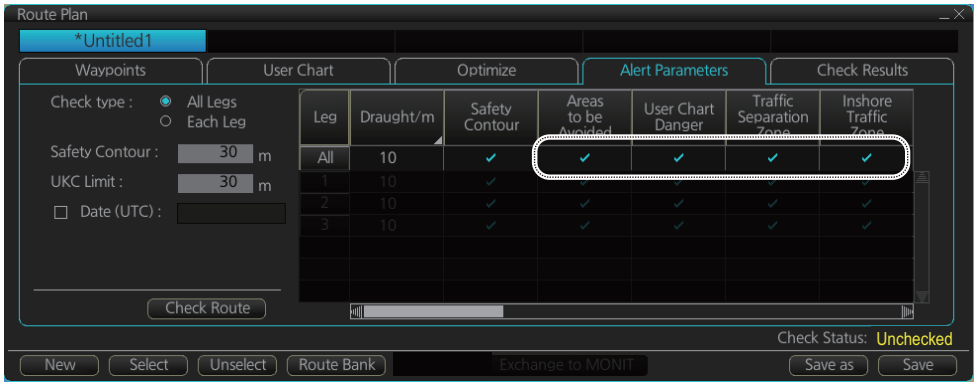
The system will calculate chart alerts using user-defined channel limit for routes. Danger areas are shown highlighted if safety contour or user-chosen chart alert areas are crossed by the planned route. For more information on route planning, see chapter 9.

Note: If your voyage is going to take a long time or you are planning it much earlier than it is to take place, use the Display Date and Update Review dates corresponding to the dates you are going to sail. See section 5.2.2 for how to set Display Date and Update Review dates.

8.3.1 Chart alerts for route planning

You can generate a list of chart alerts that cross by the planned route. This can be done as follows:

1. Enter safety contour you want to use.
2. Plan a route; define waypoints and other necessary information. See chapter 9 for route planning.
3. Select dangerous objects to be monitored during route monitoring, on the [Alert Parameters] page in the [Route Plan] dialog box, shown below. Click the box below each object to show or hide the check mark.
   When the route is checked, alert objects with a check mark which have their alert activated are highlighted on the chart display. Alert objects with no check mark are not highlighted.



4. Click the [Check Route] button to generate a list of chart alerts. The results appear on the [Check Results] page.



The figure above shows the alerts to be monitored. If there are alerts included in the planned route, check alerts leg by leg, or check alerts by using category of alert.

Note: When alerts are unchecked at step 3 in the above procedure, one or more of the following messages appear in the permanent warning box.

- [Safety Contour] unchecked: "Indication of crossing safety contour if Off. (in planning)"
- [Navigational Hazard] unchecked: "Indication of navigational hazards is Off. (in planning)"
- Other alerts unchecked: "Indication of some prohibited areas or areas with special conditions is Off. (in planning)"

9. ROUTES

9.1 Route Planning Overview

A route plan defines the navigation plan from starting point to the final destination. The plan includes:

- Route name
- Name, latitude and longitude of each waypoint
- Radius of turn circle at each waypoint
- Safe channel limits
- Chart alarm calculation based on channel limits against chart database and user chart danger
- UKC calculation
- Deadband width, nominal deadband width used for operating modes with moderate accuracy and economical sailing behavior
- Minimum and maximum speed for each leg
- The navigation method (rhumb line, great circle)
- Fuel saving
- ETD from each waypoint
- ETA to each waypoint
- Ship and environmental condition affecting the ship speed calculation
- Name of the user chart to use during route navigation together with the planned route
- Name of the Notes to use during route navigation together with this planned route, in the user chart dialog box.

Using the above-mentioned data, the system calculates speed, course and length for each leg, ETAs for each waypoint, fuel consumption and WOP. It also calculates safe water areas based on user-defined channel limits. The calculated data is displayed in tabular form, which can be printed as a documented route plan and also stored in a file for later use.

Main functions of route planning are:

- Define waypoints (maximum of 1,000 waypoints per route)
- Define turnings for each waypoint
- Define channel limits for each leg (a leg is the line connected between two waypoints). The channel limits are used to detect chart alerts when you are planning or monitoring your route.
- Define the speed for each leg
- Calculation for ETD and ETA
- Calculation for most economical sailing

Note 1: **Limitation of displayed route**

If you have small scale chart(s) on display having the whole eastern/western (0-180°E/0-180°W) hemisphere and a part of the other hemisphere on display, there is a limitation to display a route. To avoid this, set chart center so that the whole eastern/western hemisphere is not on the display. A maximum of five routes can be edited simultaneously.

Note 2: If a planned route's Safety Margin or Channel Limit contains excessive land masses, the ECDIS may freeze during a route check. When this happens, reset the ECDIS, then adjust the Channel Limit and Safety Margin settings in the Route Plan dialog box's Waypoints so that land mass is not included in the route.

9.2 Main Menu for Route Planning

The main parameters for the route planning are:

- Latitude and longitude of the waypoint
- Channel (XTD) limits to the waypoint
- Turning radius of the waypoint
- Maximum speed limit and planned speed for each leg

There are two phases for a route: Route Plan and Route Monitor. Route plan is used for planning the route and route monitor is used to control a route for monitoring.

To complete route planning, do the following.

1. Create a new route or choose an existing one. See section 9.4.
2. Modify your route if necessary. See section 9.5.
3. Make chart alert (safe water) calculation. See section 9.4.5.
4. Optimize your route. See section 9.8.

9.3 How Route Data is Synced

This unit can share route data between other units (FMD-3xxx, FAR-3xxx) via LAN. The route data created or changed in each unit is automatically distributed to other units via the unit that is the synchronization source.

The unit to be synchronized is determined by the following conditions from EC-3000/ 3005 (power is on) on the same network.

Two units in the network

The unit with the higher IP address is the synchronization source.

Three or more units in the network

The first booted unit or the second booted unit with the larger IP address is the synchronization source. When the power of the synchronization source unit is turned off, the unit with the larger IP address will be the synchronization source among the units that are powered on at that time.

The IP address increases in the following order.
ECD001 <ECD002 <… <ECD016 <CRA001 <CRA002 <… <CRA016 (maximum)

Note that if the power of some units is turned off, the route data created or changed will be lost in the following cases.

Example 1: ECD001, CRA001

How route data is synchronized when the system has ECD001, CRA001.

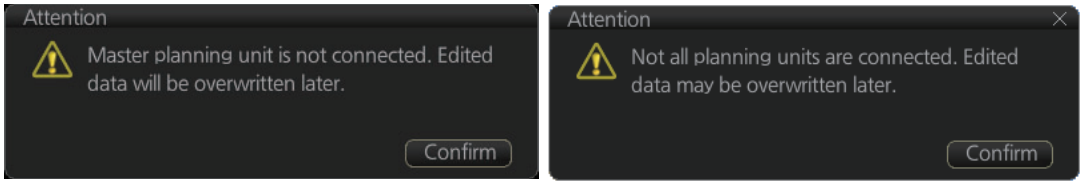
1) With the CRA001 turned off, turn on the ECD001 and create a route. The route data you created will not be delivered to CRA001 because CRA001 remains powered off.
2) The CRA001 is powered.
   CRA001 has a larger IP address than ECD001, so CRA001 is the source of synchronization. Therefore, the route data created in step 1 disappears from ECD001.

Example 2: ECD001, ECD002, CRA001

How route data is synchronized when the system has ECD001, ECD002, CRA001,

1) Power the CRA001, then create a route there. ECD001 and ECD002 are powered off. The route data created at CRA001 will not be delivered to ECD001 or ECD002 because they are still powered off.
2) Power off the CRA001.
3) Power on the ECD001 and ECD002, then power on the CRA001.
   Of the first two powered units, the one with the higher IP address, ECD002, is the synchronization source. Since ECD002 is the synchronization source, the route data created in step 1 disappears from CRA001.

If you click the [PLAN] button on the Status bar while some units are turned off, you may see a message similar to the ones shown below. In this case, turn on all the units in the network before creating or editing a route.



9.4 How to Create a New Route

To make a complete route for a voyage, do the following:

1. Click the [PLAN] button on the Status bar to activate the Voyage planning mode.
2. On the InstantAccess bar™, click the [Planning] button followed by the [Route] button to open the [Route Plan] dialog box.
3. Click the [New] button.



Note: If, after pressing the [New] button, the database cannot be accessed, the message "Database access failure occurred. You can make a route but cannot save it." appears. In this condition you can make a route and use it for navigation, but you cannot save it. Contact a FURUNO dealer for instruction.

4. Use the cursor to select a position for the first waypoint, then push the left mouse button. A waypoint mark appears on the position selected. The latitude and longitude of the position are entered into the [Route Plan] dialog box. The waypoint number appears in the [Waypoint] column. The latitude and longitude can be ed-

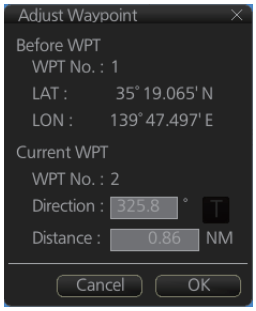
ited from the [Route Plan] dialog box. After entering the destination, you can edit the destination name, steering mode, turning radius*, route width limit, planned vessel speed, safety vessel speed, margin, parallel line 1/2, and time difference settings in the [Route Planning] dialog box. (*: Destination number 2 and later only). See section 2.1.13 for information on how to edit alphanumeric characters.

Note 1: A guide box that shows the range and bearing between waypoints is available. You can show or hide the box with the [Guide Box] button on the InstantAccess bar™. Click the button to show its background color in light-blue to display the guide box.



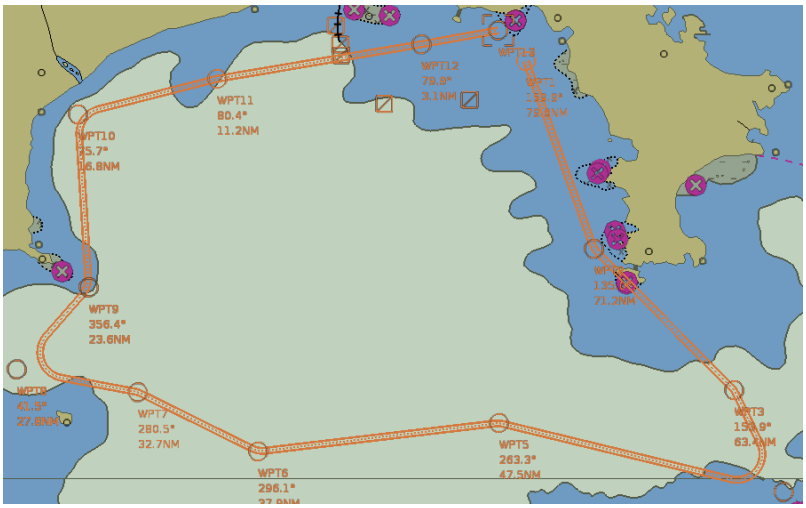
Note 2: The bearing and range of the waypoint can be adjusted as shown below.

1) In the Route Plan dialog box, right click the bearing or the distance of the waypoint to change.
2) Select [Adjust Position] to show the [Adjust Waypoint] context menu shown right.
3) Enter value at [Direction] or [Distance], then click the [OK] button.



5. Repeat step 4 to enter other waypoints.
6. After you enter the final waypoint, right-click the display to show the context-sensitive menu, then select [Finish].
7. Click the [Save] button.
8. Enter a name (max. 63 alphanumeric characters) for the route, using the keyboard on the Control Unit or software keyboard. Do NOT use the following symbols.
\, /, ?, “, *, <, >, :, |
9. After entering the route name, click the [OK] button.
10. Use the [Alert Parameters] page to define the safety contour and other specified conditions for checking the route. Click an item to place a check in the box, highlighting that type of chart alert area. Also, input value for [Draught/m]. A parameter for [Draught/m] can also be assigned globally to all legs from the context-sensitive menu. See section 9.4.4 for how to use the [Alert Parameters] page.
11. Use the [Check Route] button on the [Alert Parameters] page to detect areas where the depth is less than the safety contour or where specified conditions exist. The results appear on the [Check Results] page. This system can examine chart database against planned route to make a list of alerts where a route crosses a safety contour or specified areas used in chart alerts.
12. Use the [User Chart] page to link, de-link a user chart(s) with the route.See section 9.4.2.

13. Use the [Optimize] page to enter parameters for route optimization. See section 9.4.3.



14. Click [Save]. The [Save Route] dialog appears.
15. Input a name for the new route, then click [OK]. The route is now saved in the Route Bank.

How to use the Undo feature

The Undo feature, available when creating a route and a user chart, can be accessed from the ( ) button on the InstantAccess bar™. In route creation the feature is used with waypoint and text input.

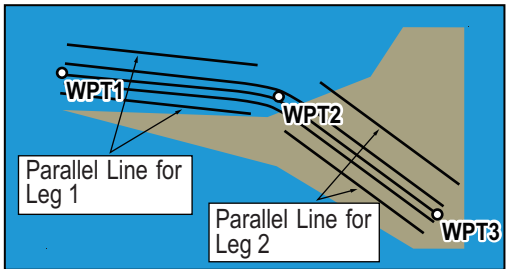
Waypoint input: Delete last-entered waypoint.
Text input: Erase last-entered character or character string.

9.4.1 How to use the Waypoints page

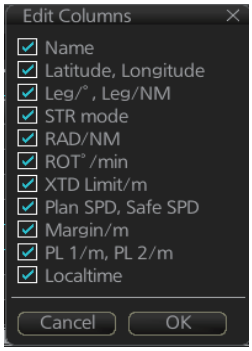


The following fields and boxes can be found in the [Waypoints] page. Scroll the list rightward to see hidden items.

[WPT]: Each waypoint has a number. [Name]: You can name each waypoint. [Latitude]: WPTs latitude coordinate is displayed in WGS-84 datum. [Longitude]: WPTs longitude coordinate is displayed in WGS-84 datum. [**Leg/**°]: Bearing of leg (True: reference to North). The bearing of legs can be changed. Right click a bearing to show the context sensitive menu. Select [Adjust Position], then set bearing in the pop-up window. [**Leg/NM**]: Length of leg (nm). The display method can changed by right clicking the column title to show the context sensitive menu. [Each] shows the distance of each leg. [Total] shows the total cumulative distance from leg to leg. [Remain] shows the distance remaining from leg to leg. Note that these settings are reflected to [Leg/NM] in the [Waypoints] page of the [Monitor Information] dialog box. [Str Mode]: Define steering mode for each leg - rhumb line or great circle. Click to select [Rhumbline] or [Greatcircle]. [RAD/NM]: Define turning radius for each waypoint. To change a radius, put the cursor in this column to show the up and down arrows. Click the arrows to set the radius. [**ROT°/min**]: [ROT°/min] changes with the [RAD/NM] setting. [ROT°/min] displays the rate of turn per minute according to the set value of the route information. If this value exceeds the maximum ROT (initial value: 60.0°/min), a dangerous turn will occur. This is denoted by showing the [ROT°/min] value in yellow and generating a warning. In this case, check the values for [RAD/NM], ship speed, etc. and make necessary adjustments to affect a safe turn.	[XTD LIM/m]: This value changes with the setting of [RAD/NM], and shows the turning range of the ship per minute according to the information set in route information. If the value exceeds the maximum turning rate (initial value 60.0°/minute) the turn is judged to be dangerous. To indicate this, the setting is shown in yellow. When this occurs, check the [RAD/NM] setting, ship's speed, etc. to prevent a dangerous turn. [**Plan SPD**]: Define planned speed to safely navigate a leg. [**Safe SPD**]: Define maximum speed to safely navigate a leg. [**Margin/m**]: Define extension for channel limits to be checked against chart alerts. [PL 1/m, PL 2/m]: One or two sets of parallel lines, colored orange, can be drawn on a route. Set the distance (in meters) to offset the lines from the route, from -99999 to 99999. Parallel lines allow the navigator to maintain a given distance away from hazards. See the illustration below. [XTD LIM] (radio button): Selects how to set channel limits - port and starboard channel limits are equal or not equal [Local Time]: Use local time for the time at which you plan to pass this waypoint. Enter the time difference between UTC and local time. The offset applied here appears in the "Check ETA" section of the route monitoring window. This setting does not affect your the time displayed in the status bar.



Note: You can select the route information data to display on the [Waypoints] page with the context-sensitive menu. Right click the "Edit Columns" to show the context-sensitive menu. Check or uncheck items as appropriate, then click the [OK] button.



9.4.2 How to use the User Chart page

The [User Chart] page lets you link user charts to routes. To link a user chart, click the box to the left of the user chart name in the [Stored User Chart] list to show a check-mark. Click the << button to copy that name to the [Linked User Chart] list. To de-link a user chart, click the box to the left of the user chart name in the [Linked User Chart] list, then click the >> button to erase the name. The contents of each user chart are shown in the [Contents] window.



[Linked User Chart]: List of user charts linked with selected route.
[Stored User Chart]: List of stored user charts.
<< button: Link a stored user chart. Check the chart in the [Stored user chart] list, then click this button. The user chart name is, then copied to the [Linked User Chart] list.
>> button: Click to remove selected (check-marked) user chart from the [Linked User Chart] list.
[Contents]: Lists the objects saved to the user chart selected.

9.4.3 How to use the Optimize page

After all waypoints are inserted and you have made safe water calculation, you can optimize your route, on the [Optimize] page. If not chosen, then optimization will be done automatically with max. speed. If you want do optimization with a specific strategy, see section 9.8 for how to optimize a route.

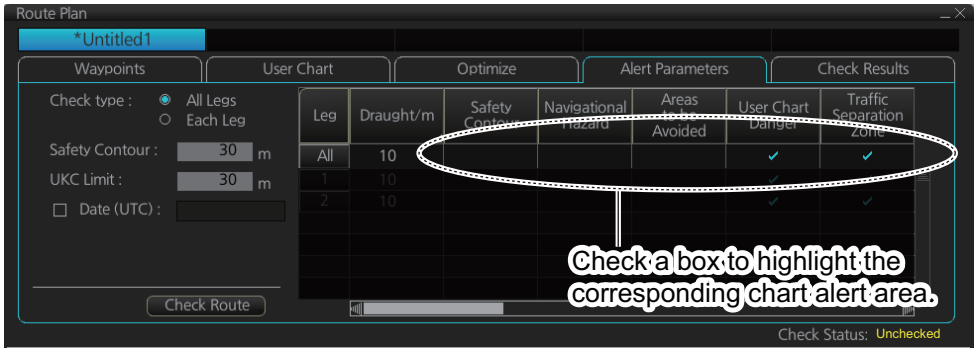


[Type]: Select optimization strategy: maximum speed, time table, maximum profit, or minimum cost.
[Set ETD]: Set date, time and waypoint to start from.
[Parameters]: Set the parameters for optimization, speed limit and income (max profit).
[Edit Cost Parameters]: button: Enter fuel consumption figures. See section 21.3.
[Set ETA]: For the type [Time table], set the date and time that you want to arrive at the waypoint selected.
[Optimized Speed/ETA]: The optimized speed for the date and time entered at [Set ETA] appears here, after clicking the [Calculate] button.
[Clear All]: Clear all ETD dates entered at [Set ETD].
[Calculate] button: Click to calculate optimization.
[Apply to Route] button: Apply the calculations on the [Optimize] page to the route.

9.4.4 How to use the Alert Parameters page

The [Alert Parameters] page sets the alert conditions to use when checking a route. Put a "W" for an item to highlight on the chart. ([Safety Contour] is fixed to "A" (Alarm). If you do not require the highlight display for an item, put a "C" for that object. The relevant alerts (Alarm, Warning, Caution) are shown in the [Check Results] page.

You can select the safety contour and chart alerts used to check the safety of the route. This allows you to check the safety with conditions different from those chosen for system use. This is useful when making a route for different loading or sailing conditions.



Item	Description	Item	Description
[Check type]	Check how to apply the alerts, to every leg or individual leg. (Only [Draught] can be applied to every leg.)	[Caution Area]	Caution area
[Safety Contour]	Set the safety contour (in meters).	[Offshore Production Area]	Offshore production area
[UKC Limit]	Set UKC limit.	[Military Practice Area]	Military practice area
[Date (UTC)]	A chart may have date-dependent features. Enter the actual data of embarkation to know date-dependent features.	[Seaplane Landing Area]	Seaplane landing area
[Check Route] button	Check route for safe navigation. The results are shown the [Check Results] page.	[Submarine Transit Lane]	Submarine transit lane
[Draught/m]	Ship's draught	[Anchorage Area]	Anchorage area
[Safety Contour]	Safety contour	[Marine Farm Aquaculture]	Marine farm aquaculture
[Navigational Hazard]	Navigational hazard.	[PSSA Area]	Particularly Sensitive Sea Area
[Areas to be Avoided]	Areas to be avoided	[No Vector Chart]	No vector chart for area
[User Chart Danger]	User chart danger area	[Too Many Dangers]	Too many dangers area
[Traffic Separation Zone]	Traffic separation zone	[UKC Limit]	Under keel clearance limit.
[Inshore Traffic Zone]	Inshore traffic zone	[Sounding UKC Limit]	Under keel clearance limit.

Item	Description	Item	Description
[Restricted Area]	Restricted area	[Non-official ENC]	No official ENC data
[Permit Expired]	Permit for chart has expired.	[Not Up-to-date]	Chart not up to date.

Context sensitive menus



A context-sensitive menu for setting the draught is available on the [Alert Parameters] page. Right-click [Draught] to show the menu. [Set "ALL" setting to all legs] applies the draught value of [Check type: All Legs] to all legs. [Clear setting] restores default settings for each leg.

9.4.5 How to use the Check Results page

The [Check Results] page allows you to make safe water calculation for your route. Click the [Check Route] button to do the check. After the button is operated, the alert type and latitude and longitude position of the alert appear for applicable legs on the route.



Note 1: In order to display charts with correct updated situation, always use current date during your voyage. If your voyage lasts more than one week, set current date at least once per week during your voyage.

Note 2: A route check can take longer with C-MAP charts. Wait until the completion of the check.

Note 3: After a chart update (including installing charts) is done, redo the route check (with [Check Route] button) on a route before using it for navigation, to confirm that the route is safe against updated charts. Also redo a route check whenever another unit in the network has updated charts while monitoring a route. When you attempt to use the instant track feature without doing a route check, the message "Not checked against ENC chart" appears in the permanent warning dialog box.

9.5 How to Modify an Existing Route

Note: If the route is protected, it cannot be overwritten even if the existing route is modified. You must unprotect the route (see page 9-26) before doing any modification.

9.5.1 How to change waypoint position

To change position of a waypoint you have the following choices:

- Enter latitude and longitude on the [Waypoints] page in the [Route Plan] dialog box.
- Drag and drop waypoint using the left button.

How to drag and drop waypoint to new position

1. Put the cursor on the route waypoint to move, then push the right button to show the context-sensitive menu.
2. Select [Edit].
3. Press and hold down the left button while rolling the trackball to move the cursor to a desired position. Release the button when the cursor is at the desired position. Right-click the display area to show the context-sensitive menu, then select [Finish].

How to change latitude and longitude from the Waypoints page

1. Show the [Waypoints] page.
2. Put the cursor on the digit to change in the Latitude or Longitude field.
3. Enter position from the Control Unit's keyboard, or spin the scrollwheel.

9.5.2 How to change other waypoint data

Other data of a waypoint, such as name, steering mode, turning radius, safe speed, planned speed, etc. can be edited from the [Waypoints] page. Select the route to edit and open the [Waypoints] page. Put the cursor on a desired field and spin the scrollwheel to change data. (Push the left button to change steering mode.)

9.5.3 How to add a new waypoint at the end of a route

How to add a new waypoint at the end of a route from the electronic chart area

1. Put the cursor on the current last waypoint of the route.
2. Right-click the display area to show the context-sensitive menu, then click [Edit].
3. Put the cursor on the new location for the last waypoint, then push the left button.
4. Right click, then click [Finish].

How to add a new waypoint at the end of a route from the Waypoints page

Open the [Waypoints] page, right-click [WPT], then select [Add WPT].
A waypoint is added at the end of the list. Edit the Latitude, Longitude, etc. as necessary.

9.5.4 How insert a waypoint

How to insert a waypoint between waypoints from the electronic chart area

1. Put the cursor anywhere on the route where you want to insert a waypoint.
2. Right-click to show the context-sensitive menu, then click [Edit].
3. Put the cursor on the leg where you want to insert a waypoint.
4. Right click, then click [Insert WPT].
5. Right click, then click [Finish].

How to insert a waypoint from the Waypoints page

Open the [Waypoints] page, then right-click the waypoint to process. Select [Insert after] or [Insert before] as appropriate. A waypoint is added after or before the waypoint selected. Edit the Latitude, Longitude, etc. as necessary.

9.5.5 How to delete a waypoint

How to delete a waypoint from the electronic chart area

Put the cursor on the waypoint to delete. Push the right button to show the context-sensitive menu, then select [Edit] followed by [Delete WPT].

How to delete a waypoint from the Waypoints page

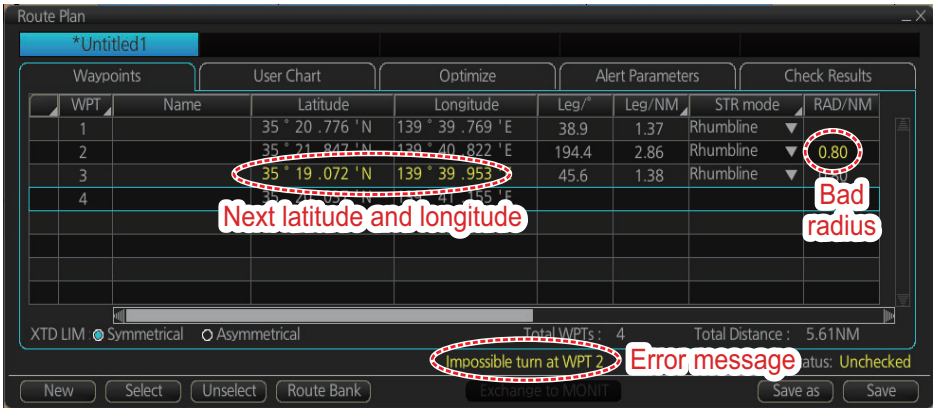
Right-click the waypoint you want to delete, then select [Delete WPT].

9.5.6 Geometry check of route

When you add a new waypoint, modify a waypoint or change other waypoint data, the geometry check may reveal problems with the route. The problem(s) are indicated in yellow and an appropriate message appear in yellow, on the [Waypoint] page. Refer to the descriptions in this section for the geometry check error messages and the remedies necessary to fix the route.

"Impossible turn at WPT XX" (XX=WPT no.)

The error message, next longitude and latitude and/or a turn radius appear in yellow.

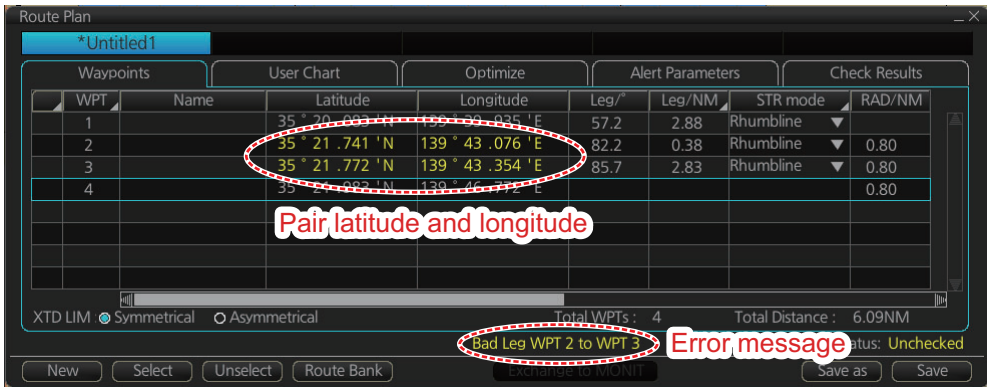


This means that the geometry of route makes it impossible for the ship to accomplish a turn. Typically, it is sufficient if you do the following, on the [Waypoints] page.

- Decrease the turn radius of the waypoint.
- Change latitude and longitude position of the waypoint or one of its neighbors.

"Bad Leg WPT XX to WPT XX" (XX=WPT no.)

The error message and a pair longitude and latitude appear in yellow.

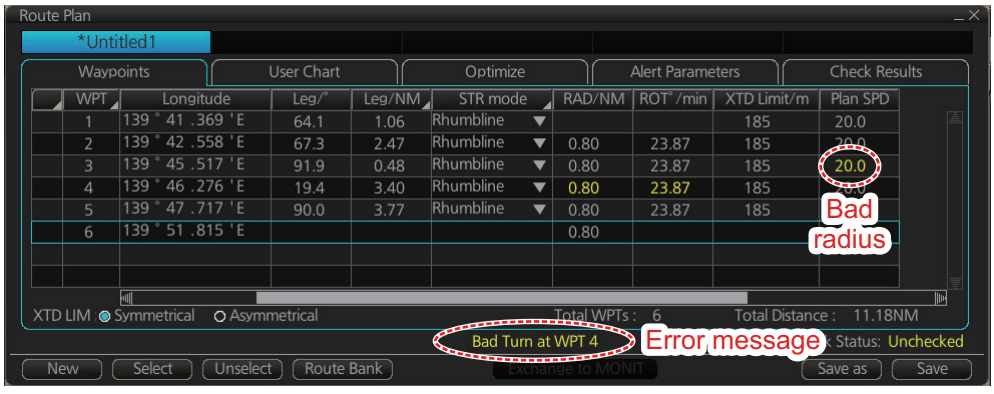


This means that the length of a leg is too short to accomplish a turn. Typically, it is sufficient if you do the following, on the [Waypoints] page.

- Change latitude and longitude position of the waypoint or one of its neighbors.

"Bad Turn at WPT XX" (XX=WPT no.)

The error message, turn radius and planned SPD indication (not shown in the figure below) appear in yellow.



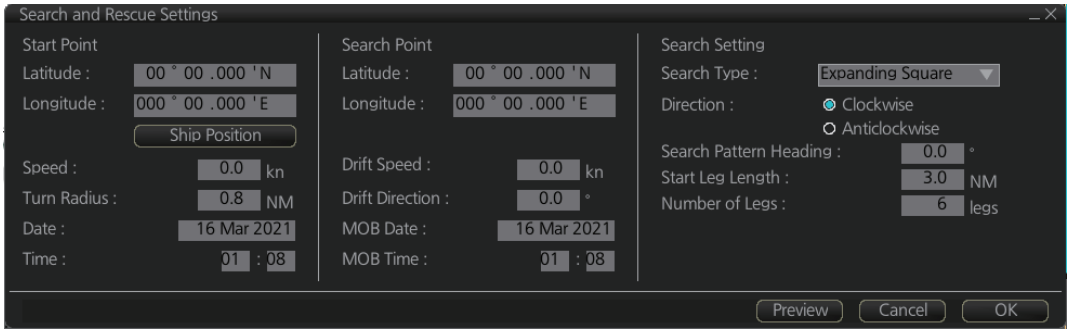
This means that the turn cannot be accomplished because the calculated ROT exceeds the MAX ROT. Typically, it is sufficient if you do the following, on the [Waypoints] page.

- Increase the turn radius of the waypoint.
- Decrease the planned SPD.

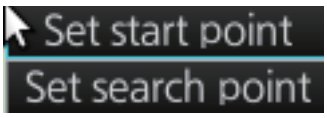
9.6 SAR Operations

The SAR feature facilitates search and rescue and MOB operations.

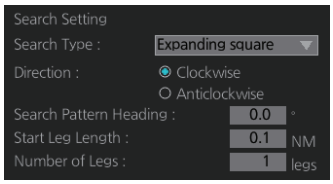
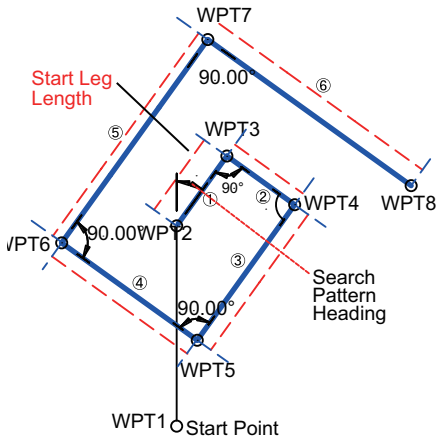
1. Click the [PLAN] button on the Status bar to get into the Voyage planing mode.
2. Click the [SAR] button on the InstantAccess bar™ to show the [Search and Rescue Settings] dialog box.

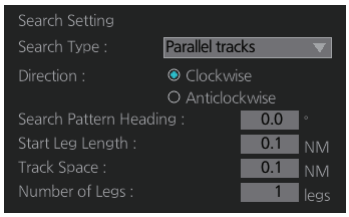
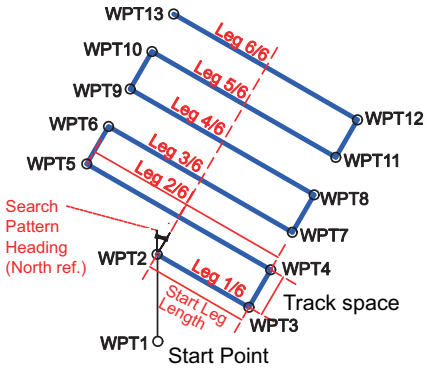
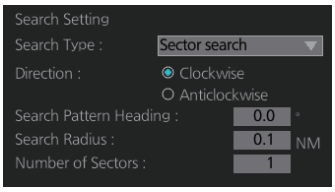
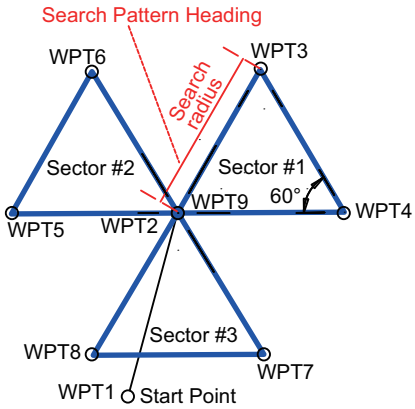


3. Enter your start point. To enter current position, click the [Ship Position] button. (The start point can also be entered directly on the screen. Put the cursor on the start point, right-click the chart to show the context-sensitive menu shown below, then click [Set start point].)



4. Enter your ship's speed and turn radius, current UTC date and time.
5. At [Search Point], enter the estimated position of the object to search. (The search point can also be entered directly on the screen. Put the cursor on the search point, right-click the chart to show the context-sensitive menu shown at step 2, then click [Set search point].
6. Enter drift speed, drift direction, and the MOB date.
7. At the [Search Setting] window, choose and set the search type, referring to the following table.

Search type	Options	Sample pattern
[Expanding square]	 [Direction]: Set the direction to start the search, Clockwise or Anticlockwise. [Search Pattern Heading]: See the right figure. [Start Leg Length]: Enter the start leg length. [Number of Legs]: Enter the number of legs to use. Starting at the probable location of the target, the search vessels expand outward in concentric squares.	

Search type	Options	Sample pattern
[Parallel tracks]	 [Direction]: Select the direction to start the search, Clockwise or Anti-clockwise. [Search Pattern Heading]: See the right figure. [Start Leg Length]: Enter the start leg length. [Track Space]: Enter the length of the short legs in the route. [Number of Legs]: Enter the number of legs to use. The parallel tracks pattern is usually the first pattern used in undertaking a search operation, since it assumes that the search object is in the vicinity of the track.	
[Sector search]	 [Direction]: Select the direction to start the search, Clockwise or Anti-clockwise. [Search Pattern Heading]: See the right figure. [Search Radius]: Enter the search radius (in NM). [Numbers of Sectors]: Enter the number of sectors to use. The sector search is used when the position of the body is known accurately and the search has to be done over a small area. It is normally carried out in the area, where the casualty or the object has been sighted.	

8. Click the [Preview] button. You can check the temporary search route in the display format specified by the current setting value and search type.
9. Click the [OK] button. The [Route Plan] dialog box appears and the system draws the search and rescue route on the screen according to the search and rescue settings.

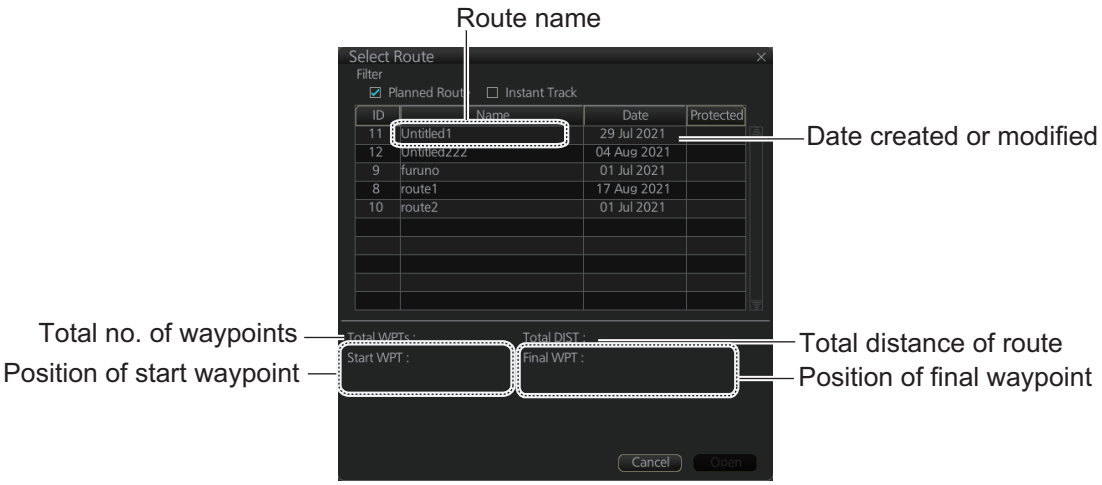
10. To follow the route, click the [Exchange to MONIT] button.
    Note: To monitor the route the following conditions must be met:
    - The route must have at least two waypoints.
    - The route must have no impossible turns.
    - The route must have no bad turns.
    - The route must have no bad legs.
    - The route must have been checked.
11. To save the route, click the [Save] button and enter a name for the route (max. 63 alphanumeric characters), using the keyboard on the Control Unit or the software keyboard. Do NOT use the following symbols.
    \, /, ?, “, *, <, >, :, |
12. After entering the route name, click the [OK] button.

If necessary you can drag waypoints to new position, like with an ordinary route.

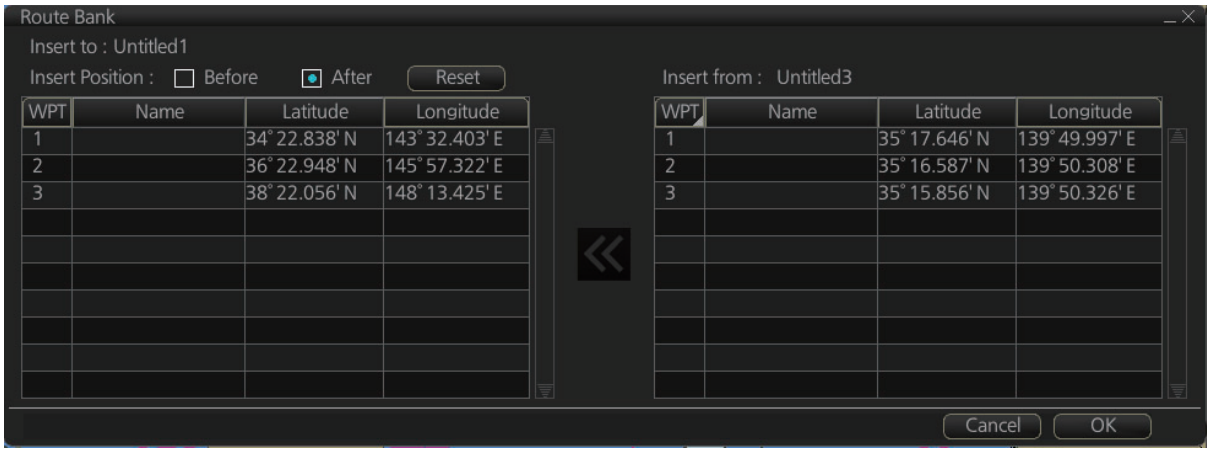
9.7 Route Bank

The route bank stores all the routes you have created. You can copy waypoints used in a route stored in the route bank to a non-active route. To show the route bank in the Voyage planning mode, select [Route], [Route Bank] in [Route Plan] dialog box:

1. Click the [PLAN] button on the Status bar to get into the Voyage planning mode.
2. On the InstantAccess bar™, click [Planning] and [Route].
3. Click the [Select] button to show the [Select Route] dialog box.

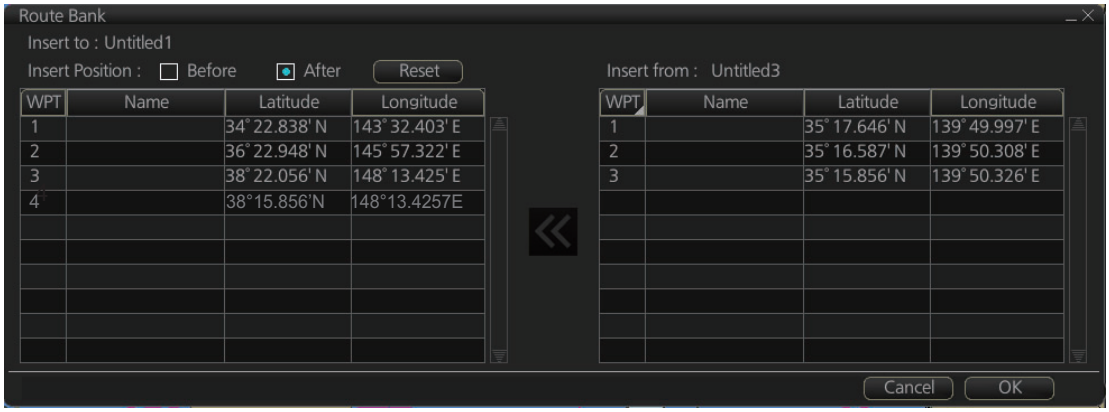


4. Select the route (active route) for which you want to copy its waypoint(s) in the active route. For example, select Route2. Click the [Open] button.
5. At the bottom of the [Route Plan] dialog box, click the [Route Bank] button.
6. Select the route that has the waypoint(s) you want to insert into the active route, then click the [Open] button. In the example below, some waypoints of Untitled 3 will be inserted into Untitled 1.



7. At [Insert Position], select where you want to insert waypoints into the active route, [Before] or [After] the waypoint selected in the next step. The [Reset] button restores the route to the original condition.
8. In the left-hand column set the cursor on the waypoint where to insert waypoints from the inactive route.
9. At the right-hand column, select the waypoint(s) to add to the active route. A context-sensitive menu is available by right-clicking [WPT] in the inactive route. The options available are [Select All], [Deselect All] and [Reverse] (reverse the order of the waypoints in the inactive route).

10. Click the << button to insert the waypoint(s) from the inactive route to the active route. In the example below, WPT3 of the inactive route is inserted at the end of the active route, becoming its waypoint 4.



11. Click the [OK] button to finish.

9.8 Route Optimization

9.8.1 Available route optimization strategies

After all waypoints are inserted, the route is optimized from the [Optimize] page in the [Route Plan] dialog box. If no optimization strategy is chosen, the optimization is done with "max. speed," defined in ship parameters. Optimization calculates all parameters for route steering (course and distance between two waypoints, maneuvering start point, WOP, etc.). There are four methods for optimization:

[Max speed]: This calculation uses the maximum speed defined in the ship parameters (see section 21.1) to generate ETA.

[Time table]: Calculates the speed required in order to arrive at destination at required ETA. Maximum speed is never exceeded. The user enters ETD and ETA to calculate speed to use. If, the user-entered ETA is earlier than that found with the Max. Speed calculation, the Max. speed-calculated ETA will be indicated below the Time Table ETA calculation figure. The calculated speed is shown on the [Route Information] box as [Plan Speed].

[Max. profit]: Based on ETD, this calculation takes in account the fuel cost and the fixed cost of the ship and calculates the most profitable speed (highest profit per time unit).

[Min. cost]: Based on ETD, this calculation takes in account the fuel cost and the fixed cost of the ship and calculates the speed that gives the minimum total cost. You need to set Cost parameters beforehand to use this feature.

9.8.2 How to optimize a route

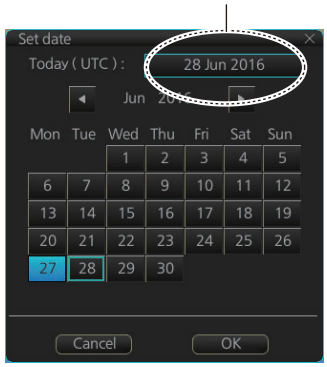
You can define Estimated Time of Departure (ETD), desired number of waypoints and Estimated Time of Arrival (ETA) on the [Optimize] page in the [Route Plan] dialog box to optimize your route.

1. Click the [Optimize] tab to open the [Optimize] page.



2. At [Type], click the drop-down list to select desired optimization strategy, referring to section 9.8.1 Available route optimization strategies.
3. Do the following:
   1) At the [Set ETD] window, enter starting WPT and date and time of departure. For entry of the date, the [Set date] dialog box, shown right, appears. Click the applicable date in the calendar if you are going to depart during the current month, or click the applicable arrow on the month/year button to select a different date. Click the [OK] button to save the ETD and close the window.

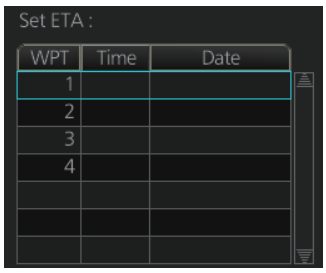
Click to use today's date.



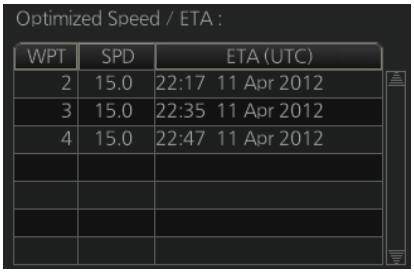
   2) At the [Waypoints] page in the [Route Plan] dialog box, enter the maximum speed to use. For the Type [MAX profit], enter [Income] value. If necessary, click the [Edit Cost Parameters] button to enter fuel consumption values.



3) For [Time table], the [Set ETA] window appears. Set the ETA to use for each waypoint. To enter the Time and Date, click the [Date] window to show the [Set date] dialog box. Click the appropriate date. The date entered appears in the [Set ETA] window.



4. Click the [Calculate] button to calculate optimal route. The [Optimized Speed/ETA] dialog box shows the results of the calculation.



5. To apply the ETA results to the route, click the [Apply to Route] button.
6. To save all optimization settings, click the [Save] button.

Note that the ETA used in route reports is the first-entered ETA.

9.8.3 How to plan a speed profile

A speed profile is defined by general max. speed and optimization types. These values are given while planning a route. You can define speed limit and optimize type in the [Optimize] page of the [Route Plan] dialog box and in the [Waypoints] page you can give planned and max. speed for each leg. The table below demonstrate how different optimize types and speed limits influence speed.

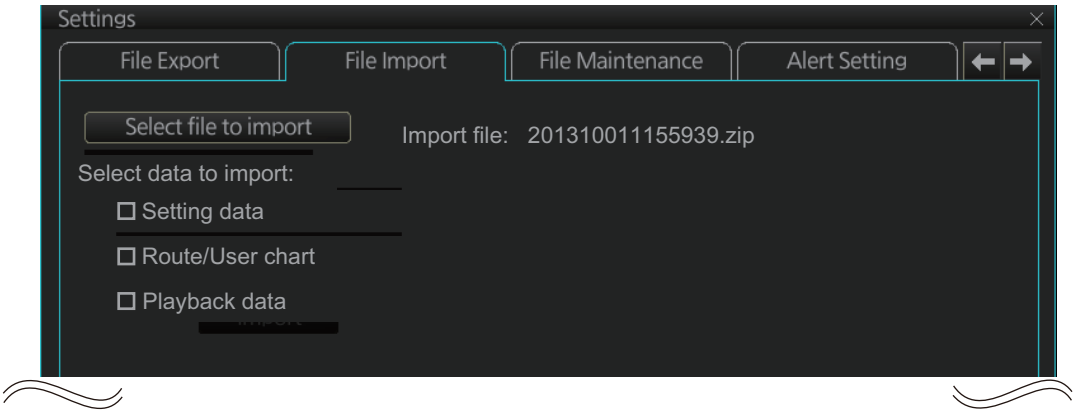
WPT	Min. cost	Max. profit	Timetable	Max. speed
1	4.8	10.9	10.0	10
2	4.8	12.9	15.0	15
3	4.8	12.9	16.2	20
4	4.8	12.9	16.2	20
5	6.0	12.9	15.0	15
6	6.0	12.9	16.2	20
7	4.8	12.9	16.2	20
8	4.8	12.9	16.2	20
9	6.0	12.9	16.2	17
10	4.8	8.0	8.0	8

9.9 How to Import Routes

9.9.1 How to import route data from FMD-3xxx, FAR-3xxx

You can import a route created on another FMD-3xxx, FAR-3xxx.

1. Set the USB flash memory that contains the route data to import into the USB port on the Control Unit.
2. Click the [ ] button on the Status bar and select [Settings].
3. Click the [OK] button, then select [Settings].
4. Click the [File Import] tab.
5. Click the [Select file to import] button to select the file to import. Click the [Open] button.

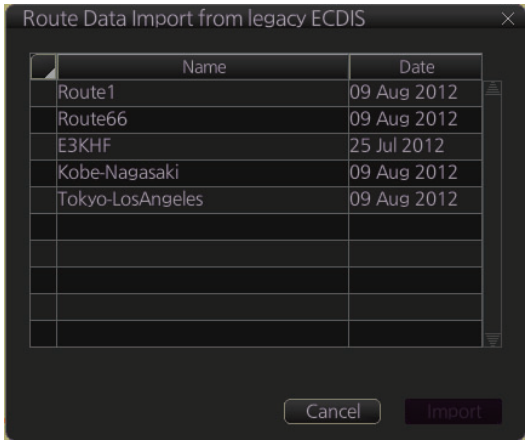


6. Check [Route/User chart].
7. Click the [Import] button.

9.9.2 How to import FEA-2x07 route data

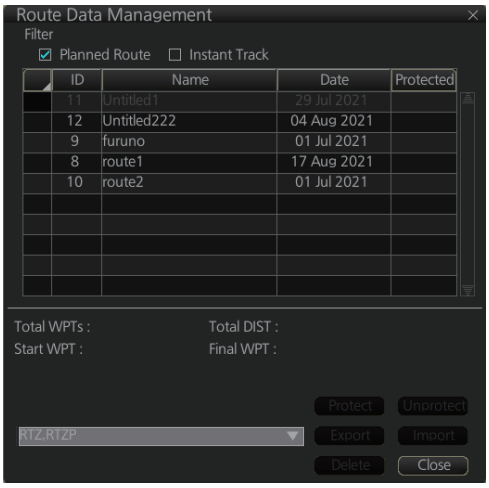
Routes created at an ECDIS FEA-2x07 can easily be imported to this ECDIS. Copy the routes to a folder in a USB flash memory, then follow this procedure. Note that FEA-2x05-created routes cannot be imported.

1. Set the USB flash memory to the USB port on the Control Unit.
2. Activate the Voyage planning mode.
3. Click the [Manage Data], [Data Import] and [Route] buttons to show the [SELECT DIRECTORY] dialog box.
4. Select the folder that contains the route(s) to be imported, then click the [OK] button.
5. Check the route(s) to import, then click the [Import] button.



9.9.3 How to import RTZ, CSV, ASCII format route data

1. Set the USB flash memory to the USB port on the Control Unit.
2. Activate the Voyage planning mode.
3. On the InstantAccess bar™, click the [Manage Data] and [Route] buttons to show the [Route Data Management] dialog box.



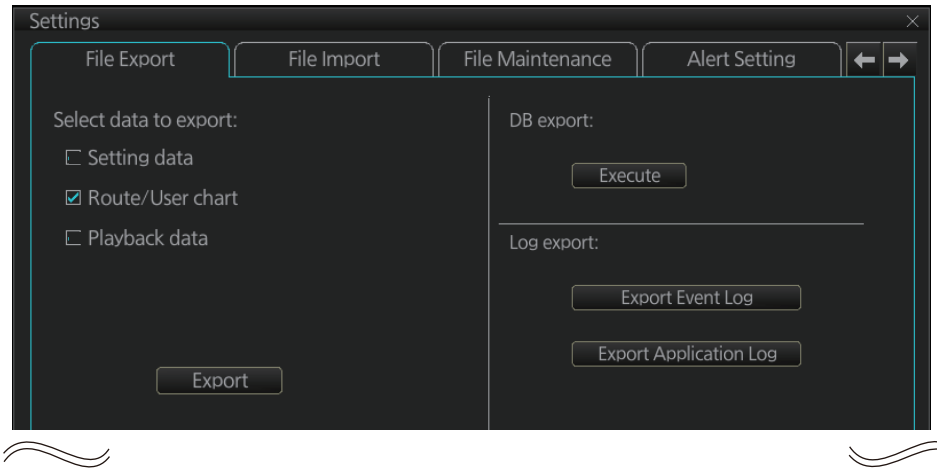
4. At the drop-down list, select the import format. The choices are
   [**RTZ**], [**RTZP**]: route data. RTZ is XML format; RTZP is compressed XML format.
   [**FEA-2x07**]: Route data, ECDIS FEA-2x07 format
   [**CSV Position**]: Waypoint position data, CSV format
   [**ASCII WPT Name Position**]: Waypoint name, position order, ASCII format
   [**ASCII Full**]: all route data, ASCII format
   [**ASCII Full (Support Asymmetrical XTD Limit**]: Asymmetrical channel limit support, ASCII format
   [**CSV Route Sheet**]: Route data, CSV format
   [**RTE Format**]: Route data, RTE format
   Note: Route Transfer (LAN) is shown as an option when the route transfer function is on. However, at this time, it is of no use.
5. Click the [Import] button.
6. Select the file to import, then click the [Open] button.
7. Click the [Close] button to finish.

9.10 How to Export Route Data

9.10.1 How to export FMD-3xxx route data

You can export route data to share the data with other FMD-3xxx, FAR-3xxx.

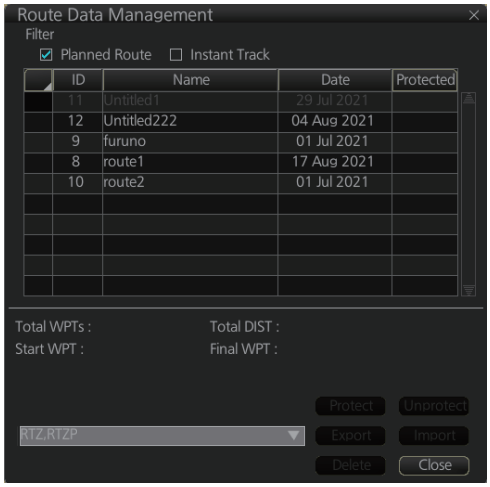
1. Set a USB flash memory in the USB port on the Control Unit.
2. Click the [USER] button on the Status bar and select [Settings]. Click the [OK] button, then select [Settings].
3. Click the [File Export] tab.



4. At [Select data to export], check only [Route/User chart].
5. Click the [Export] button to save the data to the USB flash memory.

9.10.2 How to export route data in FEA-2x07, RTZ, CSV, ASCII format

1. Activate the Voyage planning mode, then set a USB flash memory to the USB port on the Control Unit.
2. On the InstantAccess bar™, click the [Route], [Route] and [Route Data Management] buttons to show the [Route Data Management] dialog box.

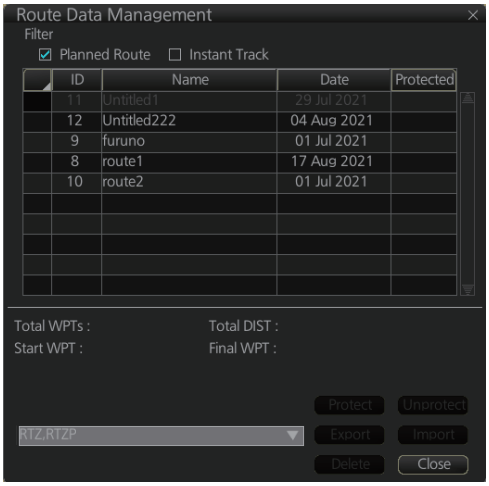


3. At the drop-down list, select the import format. The choices are
   [**RTZ**], [**RTZP**]: route data. RTZ is XML format; RTZP is compressed XML format.
   [**CSV Position**]: waypoint position data, CSV format
   [**ASCII WPT Name Positio**n]: waypoint name, position order, ASCII format
   [**ASCII Full**]: all route data, ASCII format
   [**ASCII Full (Support Asymmetrical XTD Limit**]: Asymmetrical channel limit support, ASCII format
   Note: Route Transfer (LAN) is shown an option when the route transfer function is on. However, at this time, it is of no use.
4. Check the route(s) to export, then click the [Export] button.
5. Click the [OK] button.

9.11 How to Delete Routes

Note: If the route is protected, it cannot be deleted. You must unprotect the route (see page 9-26) before deleting it.

1. Click the [PLAN] button on the Status bar to get into the Planning navigation mode.
2. Click the [Manage Data] button on the InstantAccess bar™ followed by the [Route] button.



3. Put a checkmark in the check box to the left of the route name.
4. Click the [Delete] button.
5. Click the [OK] button to delete the route(s) selected.

9.12 How to Protect Routes

You can protect your routes, preventing accidental deletion. To protect one or more routes, do the following:

1. Click the [PLAN] button on the Status bar to get into the Voyage planning mode.
2. Click the [Manage Data] button on the InstantAccess bar™, followed by the [Route] button to show the [Route Data Management] dialog box.
3. Click the column to the left of the route(s) you wants to protect, then click [Protect].
4. Click [Protect].
   The selected route(s) are now protected and the locked icon appears in the [Protected] column. The locked icon also appears in the [Select Route] dialog box, [Select User Chart] dialog box*, and the [User Chart Data Management] dialog box.
   * When user chart is linked to a route.



5. Click the [Close] button.

To remove protection:

Follow the above procedure and select [Unprotect] at step 4 to remove protection for the selected routes. The locked icon is, then erased.

9.13 Route Transfer Feature

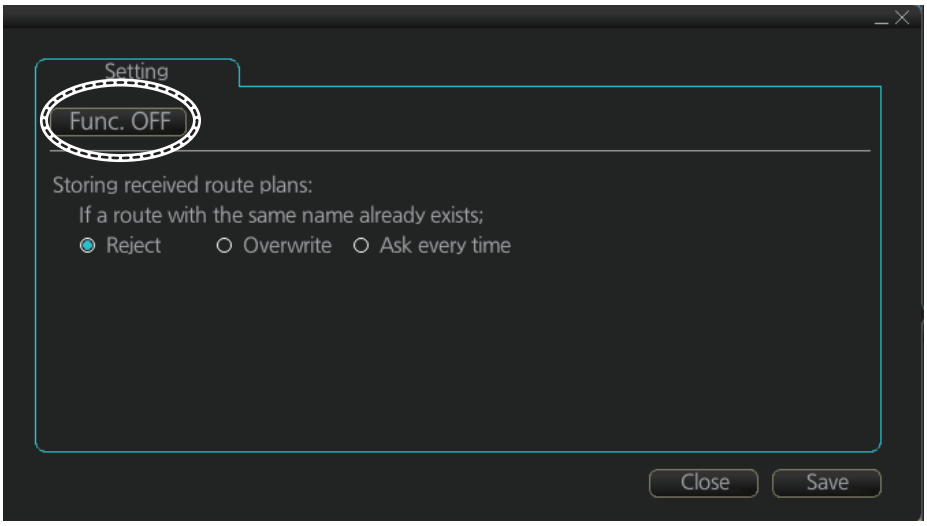
The route transfer feature lets you send and receive route data (RRT sentence) among the units connected in the LAN. Information about transmitted and received route data is stored in the route transfer log (see section 19.6).

Note: This feature is not available with our FAR-2xx7, FAR-2xx8 series radars. When you start monitoring a route, the route will be automatically sent to the radar connected in the network, regardless of the setting of this function.

9.13.1 How to turn route transfer on/off

To turn the route transfer feature on or off, do the following:

1. Open the menu, then click [Route] and [Route Transfer] to show the following dialog box.



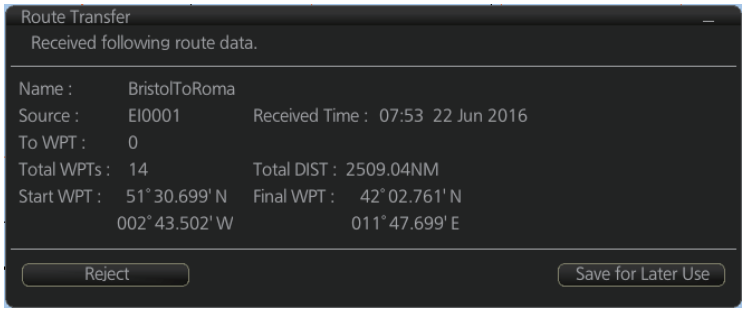
2. Click the function button (circled in the figure above) to change its label to read [Func. ON] (route transfer is enabled) or [Func. OFF] (route transfer is disabled) as required.
   When route transfer is enabled, the following functions are also enabled:

- Send/receive monitored routes
- Send/receive planned routes

   If you turned on route transfer, go to step 3. If you turned off route transfer, go to step 4.

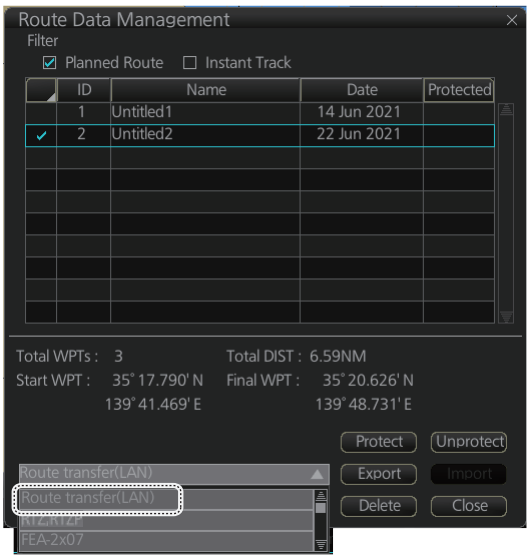
3. Use the radio buttons to select what to do when receiving route data having the same name as existing route data - [Reject], [Overwrite], [Ask every time].

- [**Reject**]: Don't save received route data. When route data is being received, a pop-up message informs you that the data will not be saved.
- [**Overwrite**]: Previously existing route data is written over. No notification of the over-writing is given.
- [**Ask every time**]: The [Route Transfer] dialog box appears. Click applicable button, referring to the description below.



- [**Reject**]: Route data is not saved.
- [**Save for Later Use**]: Route data is saved. (You can write over existing route data or save received route data under a new name.)

4. Click the [Save] button to save your settings, then click the [Close] button to finish and close the dialog box.
With route transfer selected to ON, the option [Route transfer (LAN)] is added to the drop down list box in the [Route Data Management] dialog box.



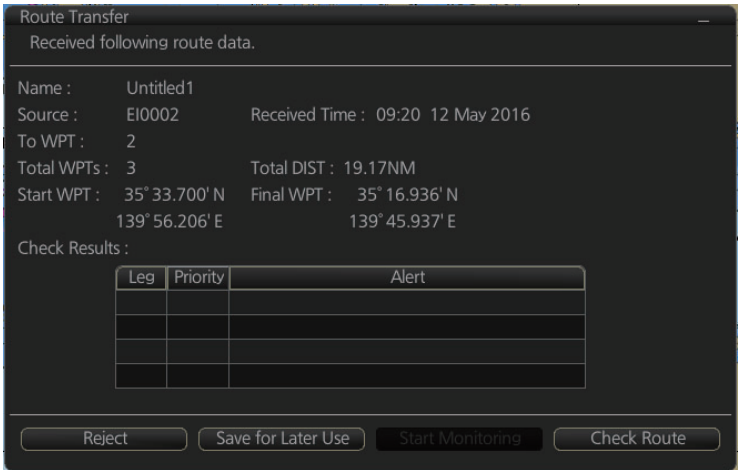
9.13.2 How to send and receive monitored routes

Sending monitored routes

The ECDIS sends the route data for a route which is selected for monitoring to other ECDIS connected to the same network. This is done automatically when route transfer is enabled and route monitoring is initiated.

Receiving monitored routes

When a route is received from another ECDIS on the same network, the [Route Transfer] window appears.



Select the appropriate handling for the received route from the buttons at the base of the [Route Transfer] window.

- [**Reject**]: Route data is not saved.
- [**Save for Later Use**]: Route data is saved. (You can write over existing route data or save received route data under a new name.)
- [**Start Monitoring**]: Moves the received route to the Route Monitor. This button is not selectable until the route is checked.
- [**Check Route**]: Check route for safe navigation. The results are shown the [Check Results] page. After the check is complete, the [Start Monitoring] button becomes selectable.

9.13.3 How to send and receive planned routes

Sending a planned route

You can send a planned route to other ECDIS in the same network.

1. Click the [PLAN] button on the Status bar to get into the Voyage planning mode.
2. On the InstantAccess bar™, click the [Manage Data] and [Route] buttons to show the [Route Data Management] dialog box.
3. Place a check in the box to left of the route(s) to transfer, then select Route transfer (LAN) from the drop-down box.
4. Select [Export].
   The selected route(s) are transfered to the ECDIS connected to the same network.

Note: If route transfer fails, the message "No response of route transfer. Please try again route transfer." appears. Check connections, then retry the above procedure.

Receiving a planned route

When a planned route is received with same name as an existing route, it is handled in the manner set at step 3 of section 9.13.1.

For all other received routes, the system automatically saves the route.

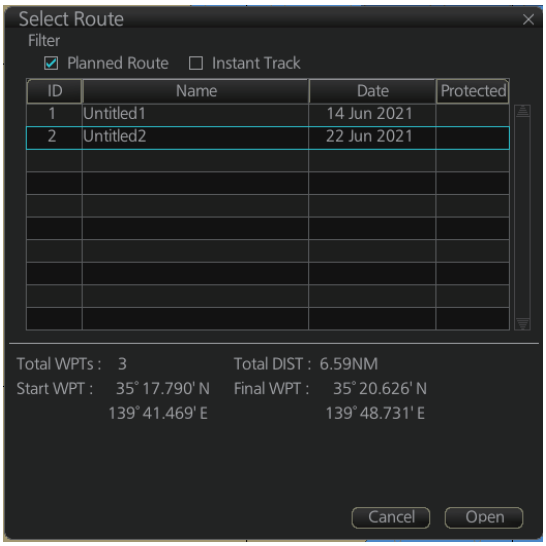
9.14 Reports

This ECDIS generates reports for waypoints in the selected route. If connected to a printer, reports can be printed by clicking the [Print Text] button. Text in reports can be searched with the [Find] button.

To generate a report, do the following:



1. Click the [PLAN] button on the Status bar to go to the Voyage planning mode.
2. Click the [Report] button followed by the [Route] button.
3. Click applicable "report" button - [WPT], [Full WPT] or [Passage] - to show the following dialog box.

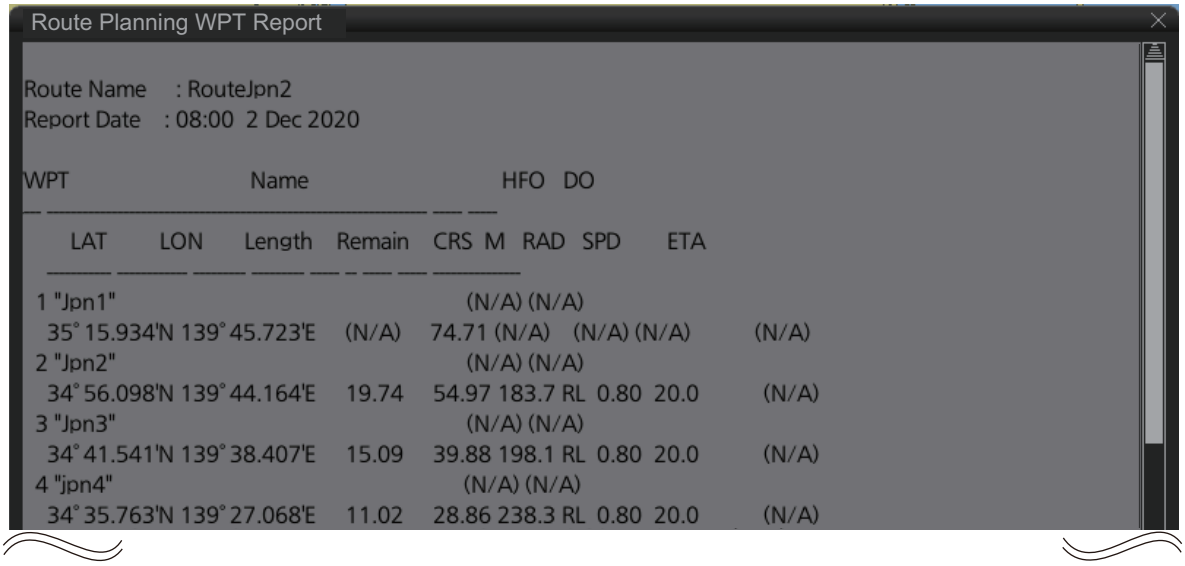


4. Select the appropriate route, then click the [Open] button to show the selected report. See the next several pages for examples.

WPT report

The WPT report contains the following information for each waypoint in the route selected.

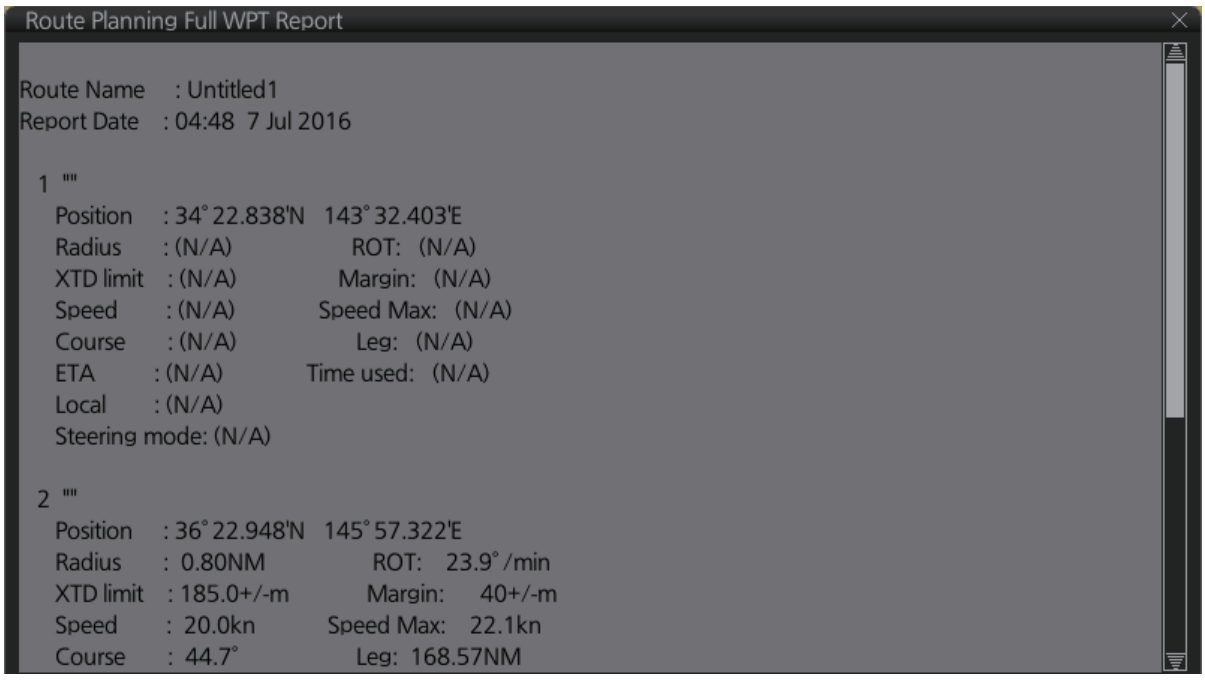
- Route name
- Date of report
- Waypoint no.
- Position in latitude and longitude
- Length of waypoint
- Distance remaining in route
- Planned courses and steering methods (RL (RhumbLine), GC (GreatCircle))
- Turning radius
- Planned speeds
- Estimated times of arrival (ETA)
- ETD from waypoint 1 (start point)
- ETA to waypoint "x" (final waypoint)
- Total length of route
- Estimated time required to run route using planned speeds and courses



Full WPT report

You can generate a full waypoint report for the route selected. The report includes the following for each waypoint

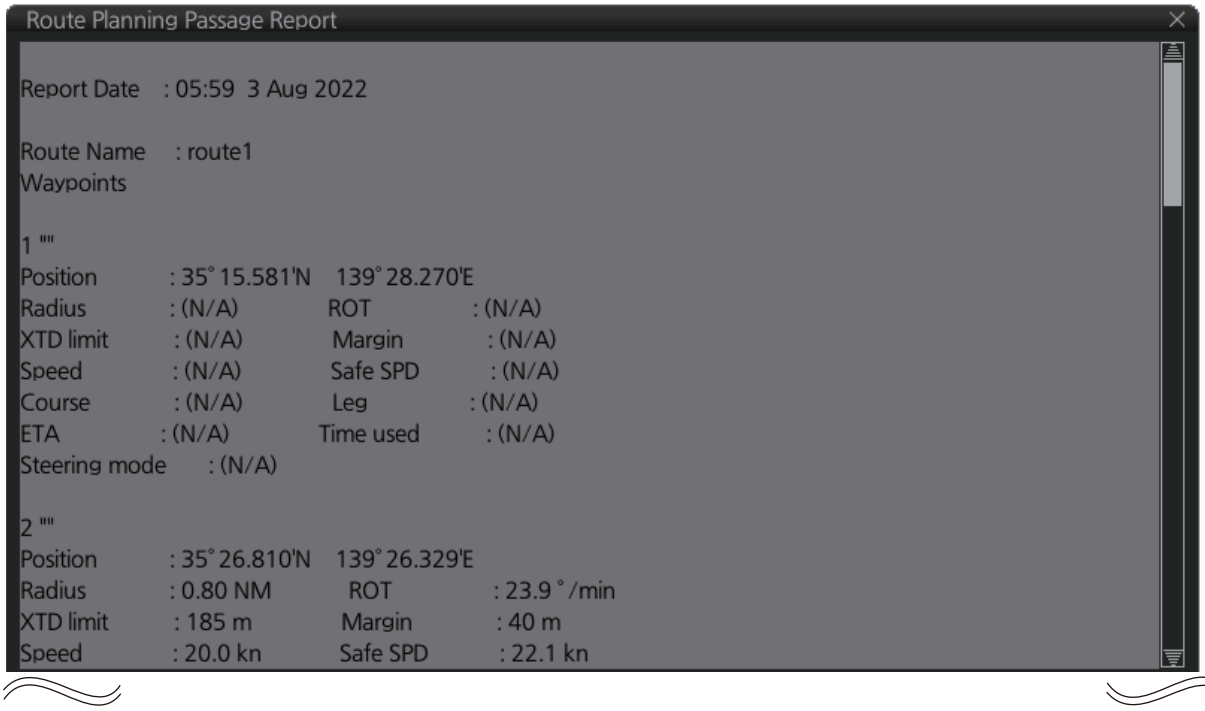
- Route name
- Date of report
- Waypoint no.
- Position in latitude and longitude
- Planned radius
- XTD limit (If set individually, port and starboard channel limits are separated with a diagonal.)
- Planned speed
- Planned course
- ETA
- Time difference from UTC
- Steering mode (rhumb line or great circle) to each waypoint
- ROT
- Margin for XTD limit
- Speed Max
- Leg length
- Time used



Passage report

The passage plan report generates waypoint information for each waypoint in the route selected.

- Route name
- Date of report
- Waypoint no.
- Position in latitude and longitude
- Length
- Cumulative length
- Planned course
- Steering method (RL or GC)
- Name of waypoint



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10. USER CHARTS

10.1 Introduction

User charts are overlays that the user creates to indicate safety-related objects and areas. They can be displayed on both the radar overlay and the electronic chart. These charts are intended for pointing out safety-related items like position of important navigation marks, safe area for the ship, etc. User charts areas can be used to activate alerts and indications based on user-defined danger symbols, lines and areas. When route or own ship estimated position is going to cross a user chart symbol, line or area that is defined as a dangerous one, an alert or indication is generated by the system. See the chapter on chart alerts.

A user chart consists of various objects (points, lines, text, symbols, etc.) danger points, and text. The table show number of points available for each chart item.

Item	Specifications (XML v1.1/v1.2/v1.3)
Amount of display objects	• 1-5 files. • A maximum of 100,000 points can be entered into five files. A circle counts as one point; a square is 4 points. (There is no limit to the number of input points for each file.)
Amount of danger points	• 1-5 files. • A maximum of 100,000 points can be entered into five files. However, if the number of points exceeds 10,000, the load on the system will increase, so a warning will be displayed when the file is read, which will slow down the process. (There is no limit to the number of input points for each file.)
Amount of text	• 1-5 files. • A maximum of 10,000 points can be entered into five files. (There is no limit to the number of input points for each file.)

The user chart is displayed on the radar overlay and its position and shape is based on the ship's actual position. When own ship is moving in the area covered by the user chart, the elements of the user chart are superimposed on the radar, with a maximum of 80 of the nearest elements displayed.

Note: If more than 200 user charts are linked to a route and the route data is transferred to a unit using software version is 3.02 or older, only the first 200 chart objects are displayed.

10.1.1 User chart objects

Below is a description of the objects used in a user chart.

- **Tidal**: There are two types of tidals, current and predicted.
- **Line**: You can define four different types of lines. Lines can be used in chart alert calculation and/or display on the radar:
  - **Navigation lines**: Displayed on both the radar overlay and the ECDIS display. Navigation lines are reference lines for coast line.
  - **Coast line**: Displayed on both the ECDIS and radar overlays. Coastal line is usually a well-defined (by chart digitizer) multi-segment line showing the coastline.

The user is able to create this type of line in case there is no suitable chart available over desired area in S57 format.

- **Depth contour**: Displayed on both the ECDIS and radar overlay. Depth line shows the chosen depth levels. The user is able to create this type of line in case there is no suitable chart available over desired area in S57 format.
- **Route line**: Displayed on both the radar overlay and the ECDIS display. Route lines are zones for anchoring, traffic separation lines, etc.

- **Clearing line**: A clearing line is used to define a line which a vessel can sail to avoid navigational hazards. A clearing line can be of the NMT (Not More Than) or NLT (Not Less Than) type. Displayed on the ECDIS display only.
- **Area**: The operator can define closed areas with a polygon. If route or estimated ship position is going to cross the area, the system generates a warning to the user. These areas can be used to specify safe areas as defined by the master or by the policy of the ship's owner. They are always available regardless of the type of chart material used.
- **Circle**: The operator can define an area with a circle, which can define a location to avoid. If route or estimated ship position is going to cross the area, the system generates a warning to the user. These areas can be used to specify safe areas as defined by the master or by the policy of the ship's owner. They are always available regardless of the type of chart material used.
- **Labels**: You can set six types of labels. Point (i) is primarily used to indicate the location of objects such as buoys, lighthouses, fixed markers, and wrecks. Points can be used to calculate chart alerts. Labels are used to display the characters entered by the user on the screen.

10.2 How User Charts are Synced

This unit can share user chart data between other units (FMD-3xxx, FAR-3xxx) via LAN. The user chart data created or changed in each unit is automatically distributed to other units via the unit that is the synchronization source.

The unit to be synchronized is determined by the following conditions from EC-3000/3005 (power is on) on the same network.

Two units in the network

The unit with the higher IP address is the synchronization source.

Three or more units in the network

The first booted unit or the second booted unit with the larger IP address is the synchronization source. When the power of the synchronization source unit is turned off, the unit with the larger IP address will be the synchronization source among the units that are powered on at that time.

The IP address increases in the following order.
ECD001 <ECD002 <… <ECD016 <CRA001 <CRA002 <… <CRA016 (maximum)

Note that if the power of some units is turned off, the user chart data created or changed will be lost in the following cases.

Example 1: ECD001, CRA001

How user chart data is synchronized when the system has ECD001, CRA001.

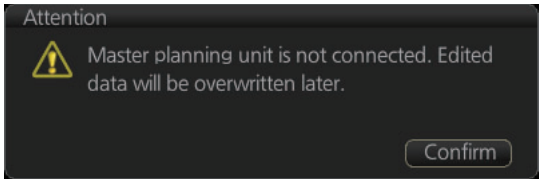
1) With the CRA001 turned off, turn on the ECD001 and create a user chart. The user chart data you created will not be delivered to CRA001 because CRA001 remains powered off.
2) The CRA001 is powered.
   CRA001 has a larger IP address than ECD001, so CRA001 is the source of synchronization. Therefore, the user chart data created in step 1 disappears from ECD001.

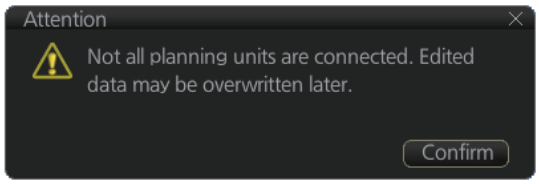
Example 2: ECD001, ECD002, CRA001

How user chart data is synchronized when the system has ECD001, ECD002, CRA001,

1) Power the CRA001, then create a user chart there. ECD001 and ECD002 are powered off. The user chart data created at CRA001 will not be delivered to ECD001 or ECD002 because they are still powered off.
2) Power off the CRA001.
3) Power on the ECD001 and ECD002, then power on the CRA001.
   Of the first two powered units, the one with the higher IP address, ECD002, is the synchronization source. Since ECD002 is the synchronization source, the user chart data created in step 1 disappears from CRA001.

If you click the [PLAN] button on the Status bar while some units are turned off, you may see a message similar to the ones shown below. In this case, turn on all the units in the network before creating or editing a user chart.





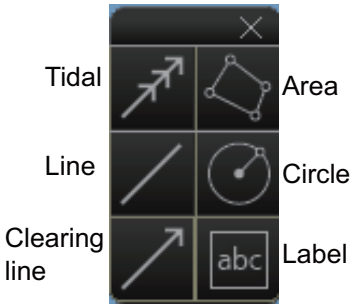
10.3 How to Create a User Chart

You can create and modify a user chart in the Voyage planning mode.

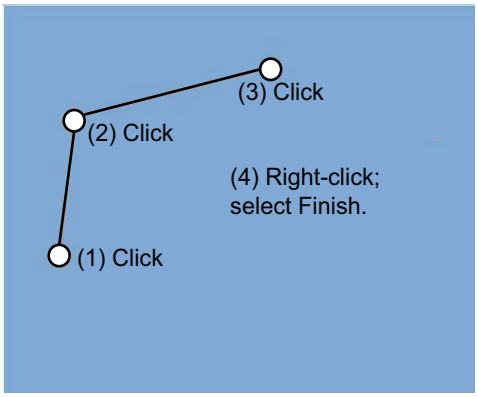
To make a complete user chart, do the following:

1. Click the [PLAN] button on the Status bar to go to the Voyage planning mode.
2. Click the [Planning] and [User Chart] buttons on the InstantAccess bar™ to show the user chart palette and the [User Chart] dialog box.
3. Click the [New] button on the [User Chart] dialog box to create a new chart.

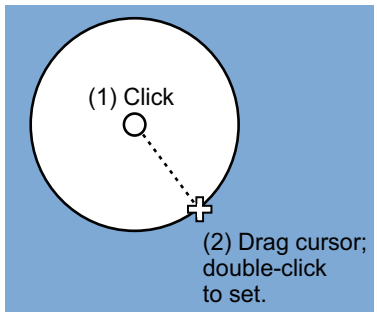




4. Click the desired object (button) on the palette.
5. Put the cursor on the location where to insert the object, then push the left button. See the figure below for how to construct lines, areas and circles.

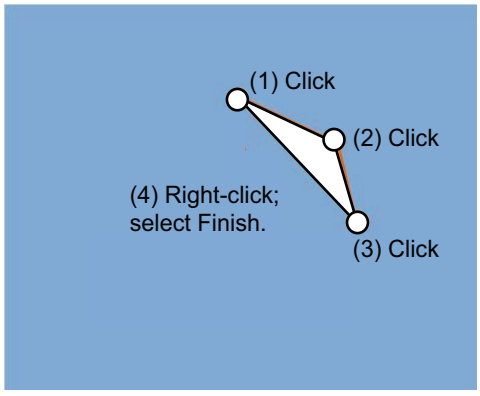


How to create a line



1) Put cursor where to locate center of circle then click.
2) Drag cursor to set radius; double-click to set.

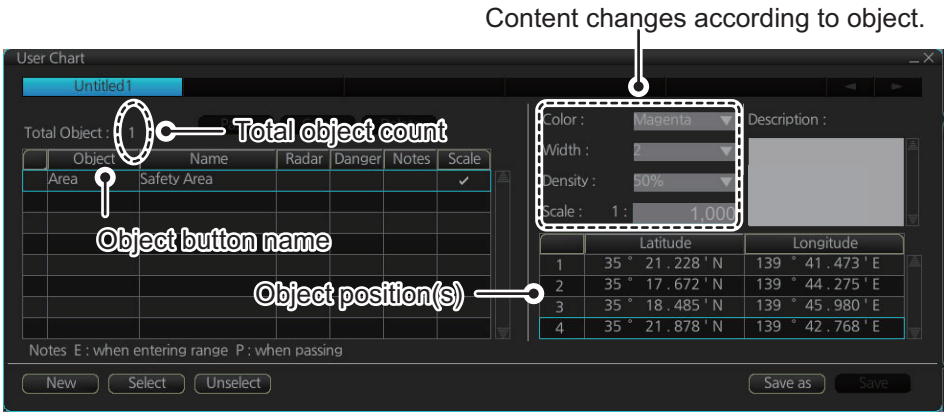
How to create a circle



How to create an area

When you insert an object, the following is done in the [User Chart] dialog box:
- Name of the object button appears in the [Object] window

- Latitude and longitude position of the object is displayed
- Total object count is updated



[User Chart] dialog box (Area)

Note: An object can be placed at the center of the screen. Do steps 1-4 in the procedure. In the User Chart dialog box, right click [Object] (left side of box), then select [Add Object].

6. To enter a name for the object, click the appropriate location in the [Name] window, then use the software keyboard or the Control Unit to enter a name.

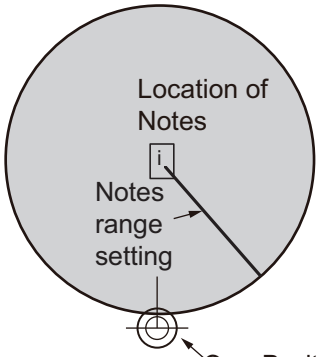
Object	Specifications
[Area]	[**Color**]: Red, green, blue, magenta, orange, brown, black, yellow [**Width**]: 1, 2, 3, 4, 5 [**Density**]: 0%, 25%, 50%, 75% [**Scale**] (Auto Zoom): 1:1,000 and 1:70,000,000
[Circle]	[**Color**]: Red, green, blue, magenta, orange, brown, black, yellow [**Width**]: 1, 2, 3, 4, 5 [**Density**]: 0%, 25%, 50%, 75% [**Size**]: 0.1 to 100.0 NM [**Scale**] (Auto Zoom): 1:1,000 and 1:70,000,000
[Label]	[**Color**]: Red, green, blue, magenta orange, brown, black, yellow [**Style**]: Label, point, circle, rhombus, pin [**Label**]: Enter text in input box. The text appears to the side of the object. The character string depends on the [Style] setting. **Note:** Character string location depends on the label type. Point: Character string is centered on the point of latitude/longitude. Others: Character string with the latitude/longitude points is left-justified.
[Tide]	[**Style**]: Measured value, predicted position [**Direction**]: 0°- 359.9° [**Time**]: 00:00-23:59 [**Speed**]: 0.0-10.0 kn
[Line]	[**Color**]: Red, green, blue, magenta, orange, brown, black, yellow [**Width**]: 1, 2, 3, 4, 5 [**Style**]: Coast (coastline), voyage (navigation line), route, water depth (contour) [**Scale**] (Auto Zoom): 1:1,000 and 1:70,000,000
[Clearing line]	[**Style**]: Avoidance line (below), Evacuation line (above), [**Direction**]: 0°- 359°

Object style can also be changed from the user chart palette. Right click object button, then select desired style from the context menu.

7. To enter the object name, click the appropriate location in the [Name] field. Then enter a name.
   Note: For circles and areas, you can display the object name on the object (see page 4-12).
8. **Label, line, clearing line, area, circle**: Click the corresponding box in the [Radar] column to hide or show the checkmark to display or don't display the object on the radar overlay. For other objects go step 9.
   Note: The clearing line setting is fixed to ON. (The checkmark is greyed out.)
9. **Label, line, clearing line, area, circle**: Click the corresponding box in the [Danger] window to hide or show the checkmark to use or don't use the object in chart alert calculation. For the tidal mark, go to step 12.
10. **Line, area, circle**: Do as shown below to add Notes data. For other objects go to step 12.
    1) Enter the text for the Notes in the [Description] box.
    2) Click the box in the [Notes] window of the [User Chart] dialog box to set the message display method.
       - E: Message appears when your ship approaches the user chart object. For a line, message appears when you are "x" miles from the line, which is set with [Range of notes].
       - P: Message appears when your ship is 10NM beyond the user chart object.
       - Blank: No message display.
    3) For a line, enter the distance from the line position in the [Range of notes] input box.
       Note: You cannot select both Danger and Notes for these symbols; select either Danger or Notes.

       What are Notes?

       "Notes" provide, in the Voyage navigation mode, messages for the operator relative to your vessel's position. When own ship is x miles from an area or circle chart object, a message appears in the [Monitor Note] dialog box. If alerting to the critical area is enabled, the [Critical Area] alert will be generated at the same time as the dialog box is displayed. The message appears for a line (set in [Range of notes]) when own ship is within x miles of the line or x miles after passing the line.



The pop-up window at right appears when own ship approaches a user chart object within the range set.
Example shown for “E” setting (approaching object).

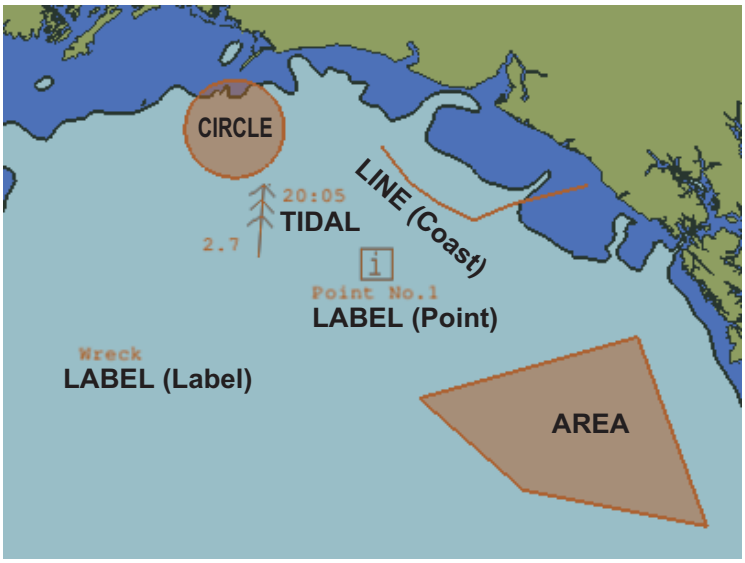


Note for Circle

11. **Line, Area, Circle**: Click the [Scale] drop down menu to set the scale to use in auto zoom; select whether to use Auto Zoom (section 10.13) or not. For other objects go to step 12.
12. To continue entering the same symbol, click a new location on the screen and do step 5. To enter a different symbol, do steps 4 and 5.
13. After you have entered all necessary objects, click the [Save] button.
    Note: If the [Save] button is not shown, update the user chart to show the button.
14. The [Save as user chart window] appears. Enter a name for the user chart, then click the [Save] button.

The figure on the next page shows a user chart and the corresponding entries in the [User Chart] dialog box.

- The Line with the name "Coast" is a coastline.
- The Notes for the Circle is "E". The message that was input in the [Description] box will appear in a pop-up window when your ship arrives inside the Circle.
- The Tidal marks line marks a tidal (current).
- The Area has Radar and Danger checked. This means the area is shown on the radar overlay and is used in chart alert calculation.
- The Label with the name "Point No. 1" is a point label and is also shown on the radar overlay.
- The Label with the name "Wreck" is a common label and has Danger checked; it is used in chart alert calculation.





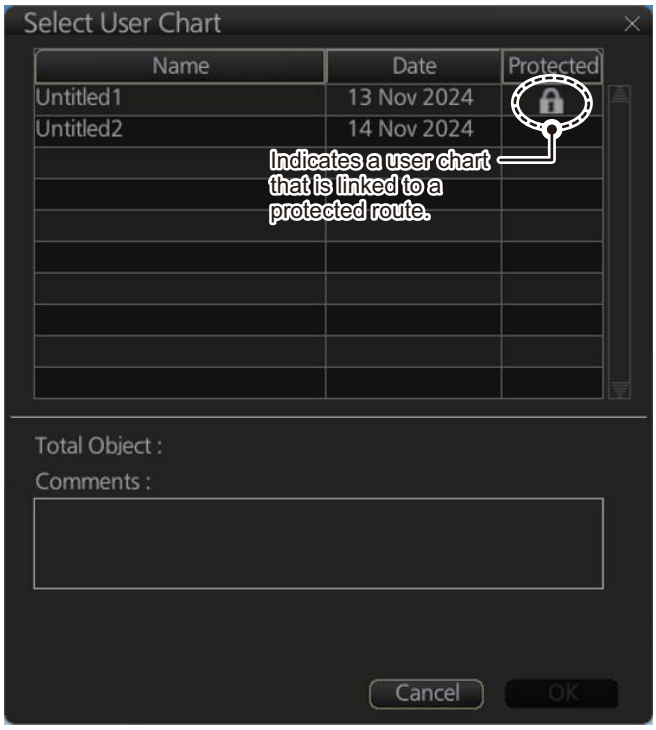
How to use the Undo feature

The Undo feature, available when creating a route and a user chart, can be accessed from the ( ) button on the InstantAccess bar™, use double-click, or the context-sensitive menu. In user chart creation the feature is used with object and text input as follows:

Tidal, Circle, Current, Label: Delete last-entered object.
Area, Line: Erase last-entered point. For [Area], the area must have at least four points. And for a [Line], there must be at least three points.
Text input: Erase last-entered character or character string.

10.4 How to Edit Objects on a User Chart

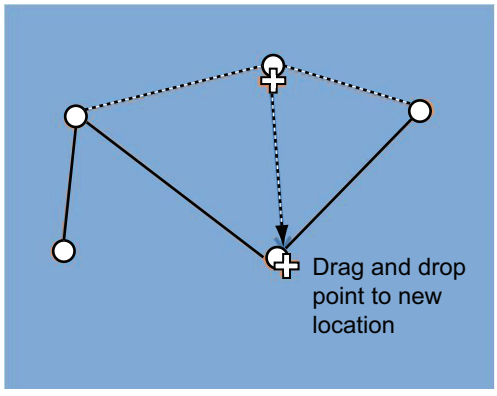
1. Do steps 1 and 2 in section 10.3 to show the [User Chart] dialog box.
2. Click the [Select] button to show the [Select User Chart] dialog box.



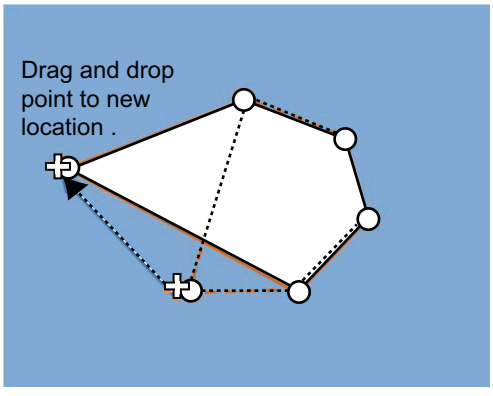
Note: If the route to which the user chart is linked is protected, a lock icon appears in the locations mentioned below. A user chart with a lock icon cannot be saved after editing. Before editing, release the route protection (see section 9.12).
- In the [Protected] column in the [Select User Chart] dialog box (see above).
- To the left of the user chart name in the [User Chart] dialog box.

3. Select the user chart to edit, then click the [OK] button.
4. Edit the name, latitude and longitude of objects as required. Objects can also be edited in the chart area.
   How to move objects
   Drag and drop the object.

   How to change corner points in lines and areas



How to change corner point on a line



How to change corner point in an area

How to erase a corner point in an area

Right click the point to erase to show the context-sensitive menu. Select [Delete Point]. The object is redrawn to reflect new shape.

How to insert a corner point on a line or area

Put the cursor on the location where to insert a corner point, right-click the display area to show the context-sensitive menu, then select [Insert].

Note: A point can also be inserted from the [User Chart] dialog box.

1) Open the [User Chart] dialog box and select a line or area.
2) At the position window at the right side, right click the location where to insert a point to show the context-sensitive menu.
3) Select [Insert Before] or [Insert After] to insert the point before or after the selected point.
4) Change latitude and longitude position of new point if necessary.

5. Click the [Save] button to save, then click the [Close] button to close the dialog box.

10.5 How to Delete Objects from a User Chart

1. Do steps 1 and 2 in section 10.3 to show the [User Chart] dialog box.
2. Click the [Select] button to open the [Select User Chart] dialog box.
3. Select the user chart that contains the object to delete, then click the [OK] button.
4. To the left of the [Object] column, put a check mark next to the item to delete.
5. Click the [Delete] button.
   Note: An object can also be deleted from the chart area. Right click the object to delete, select [Delete] from the context-sensitive menu.
6. Click the [Save] button to save your edits and close the dialog box.

10.6 How to Copy a User Chart Object

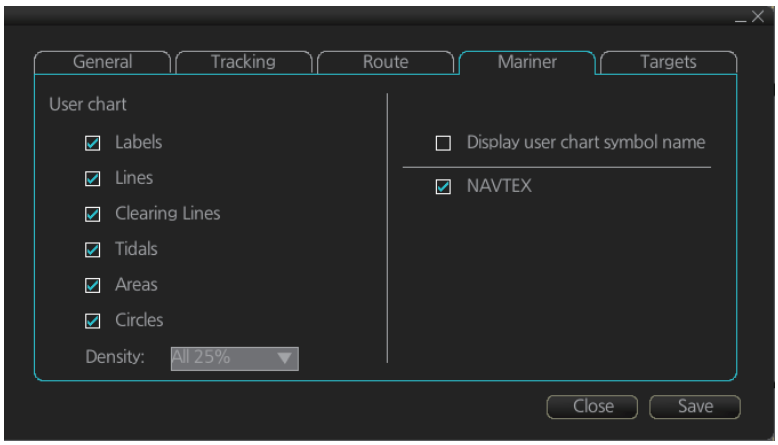
You can copy a user chart object and add it to another user chart.

1. Do steps 1 and 2 in section 10.3 to show the [User Chart] dialog box.
2. Click the [Select] button to open the [User Chart Selection] dialog box.
3. Select the user chart to use, then click the [OK] button.
4. Follow steps 1-3 to select the chart where to copy the object.
5. Click the tab of the source user chart.
6. To the left of the [Object] column, put a check mark next to the item to copy.
7. Click the [Copy] button.
8. Click the tab of the user chart where to copy the object.
9. Click the [Paste] button.
10. Click the [Save] button to finish and close the dialog box.

10.7 How to Select the User Chart Objects to Display

User charts can be displayed on the electronic chart. On the Instant Access bar, click [DISP], [SET], and [Symbol DISP]. Open the [Mariner] page and check the user chart items to display. Choose the degree of transparency for the objects with [Density].

Note: Alpha blending technology is used for transparency effects.

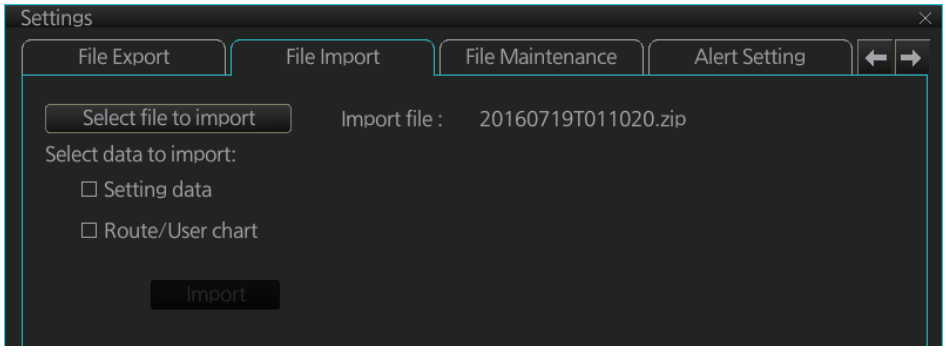


10.8 How to Import a User Chart

10.8.1 User chart created on other units (FMD-3xxx, FAR-3xxx)

Do as follows to import user charts created on other units (FMD-3xxx, FAR-3xxx):

1. Copy the user chart to a USB flash memory, then insert the flash memory in the USB port on the Control Unit.
2. Click [ ] on the Status bar, then click [Settings].
3. Click the [OK] button to open the [Settings] menu.
4. Click the [File Import] tab.
5. Click the [Select file to import button], select a file, then click the [Open] button.

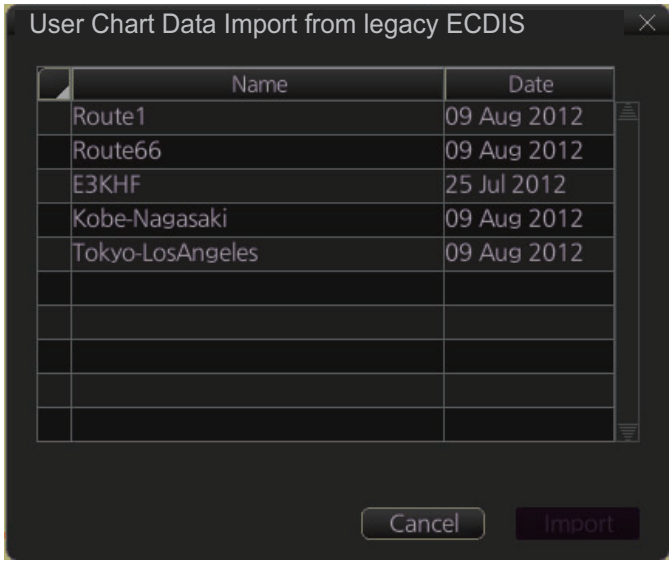


6. Put a checkmark at [Route/User chart], then click the [Import] button.

10.8.2 User chart created with ECDIS FEA-2x07

User charts created at the ECDIS FEA-2x07 can easily be imported to this ECDIS. Copy the user charts to a folder (see chapter 17 in the operator's manual of the FEA-2x07) in a USB flash memory, then do as follows. Note that FEA-2x05 created user charts cannot be imported.

1. Set the USB flash memory to the USB port on the Control Unit.
2. Activate the Voyage planning mode.
3. On the InstantAccess bar™, click the [Manage Data], [Data Import] and [User Chart] buttons to display the dialog box shown below.



4. Select the folder that contains the user chart(s) to be imported, then click the [OK] button.
5. Check the user chart(s) to import, then click the [Import] button.

10.8.3 XML format user chart

This equipment can read user chart v1.0 in XML format and v1.1/v1.2/v1.3 of extended specifications.

Note: For XML v1.3, an object can contain a maximum of 1000 lines. If more than 1000 line objects are detected during import, an error message appears. Decrease the amount of points to enable import.

1. Set the USB flash memory to the USB port on the Control Unit.
2. Activate the Voyage planning mode.
3. On the InstantAccess bar™, click the [Manage Data], [Data Import] and [User Chart] buttons to display the dialog box shown right.



4. Check the files to import.
5. Select XML input format from the drop-down list.
6. Click the [Import] button to import files. After the importing is completed, click the [Close] button.

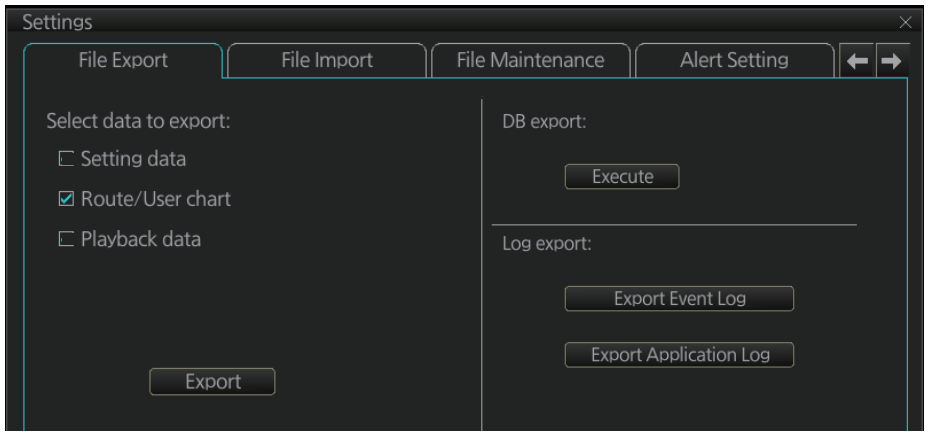
10.9 How to Export a User Chart

10.9.1 How to export a user chart

Do as follows to export user charts created here to other units (FMD-3xxx, FAR-3xxx).

1. Insert a USB flash memory in the USB port on the Control Unit.
2. Click [ ] on the Status bar, then click [Settings].
3. Click the [OK] button to open the [Settings] menu.
4. Click the [File Export] tab.

5. Put a checkmark at [Route/User chart].



6. Click the [Export] button to export the data to the USB flash memory.

10.9.2 XML format user chart

1. Set the USB flash memory to the USB port on the Control Unit.
2. Click the [PLAN] button on the Status bar to activate the Voyage planning mode.
3. Click the [Manage Data], [User Chart], and [User Chart] buttons on the InstantAccess bar™.



4. Put a checkmark on the chart(s) to export.

5. Select XML output format from the drop-down list, referring to the table below.

Format	No. of input points for Object	Pin/auto zoom support (Note 1)
XML v1.0	(Maximum 5 files x 300 maximum points per file)	No
XML v1.1 (DISP OPTs)	Up to 100,000 points (total of 5 files). See section 10.1 for details.	No
XML v1.2 (Scale OPTs)		Yes
XML v1.3 (Multi Line OPTs)		Yes

Note 1: If the user chart you want to export uses labels (style: pins) or the auto-zoom function, select [XML v1.3 (Multi Line OPTs)] for XML v1.3, or [XML v1.2 (scale / PS OPTs)] for XML v.1.2. If selected to [XML v1.0] or [XML v1.1 (DISP OPTs)], the output is as follows:

- [**Label**]: The style setting is converted to a label instead of a pin.
- [**Auto zoom**]: Auto zoom is disabled.

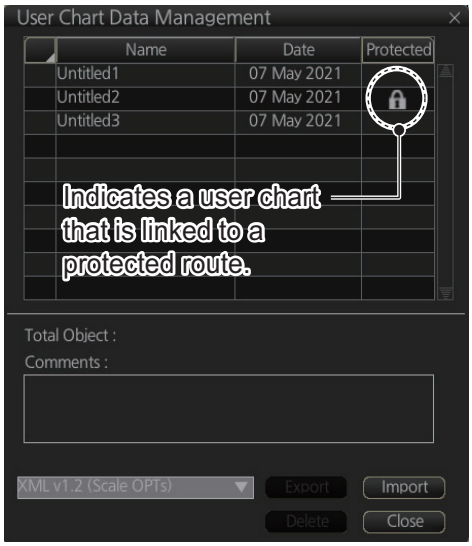
Note 2: Select [XML v1.3] when the user chart to export contains multi line objects*. (Only available selection when user chart contains multi line objects.)
*: Multi line object: A line object that contains more than one line in the object.

6. Click the [Export] button. The [Select User Chart] dialog box appears.
7. Select where to export the data, then click the [OK] button.

10.10 How to Delete User Charts

Note: A user chart cannot be deleted if it is linked to a protected route.

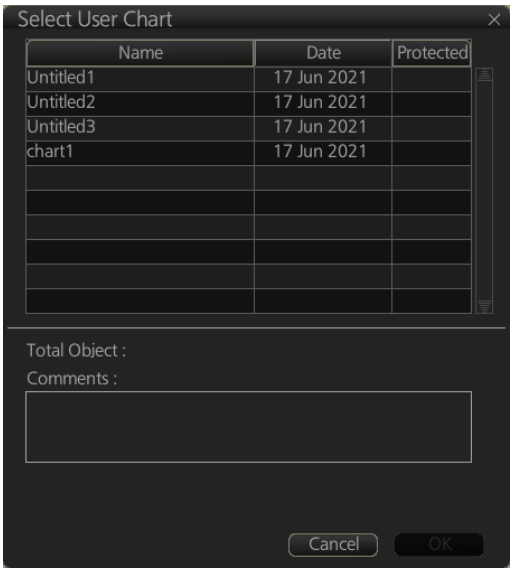
1. Click the [PLAN] button on the Status bar to get into the Planning navigation mode.
2. Click the [Manage Data] button on the InstantAccess bar™ followed by the [User Chart] button.



3. Check the user chart(s) to delete.
4. Click the [Delete] button, then click the [OK] button.

10.11 User Chart Reports

1. Click the [Plan] button to go to the Voyage planning mode.
2. Click the [Report] button followed by the [User Chart] button to show the [Select User Chart] dialog box.

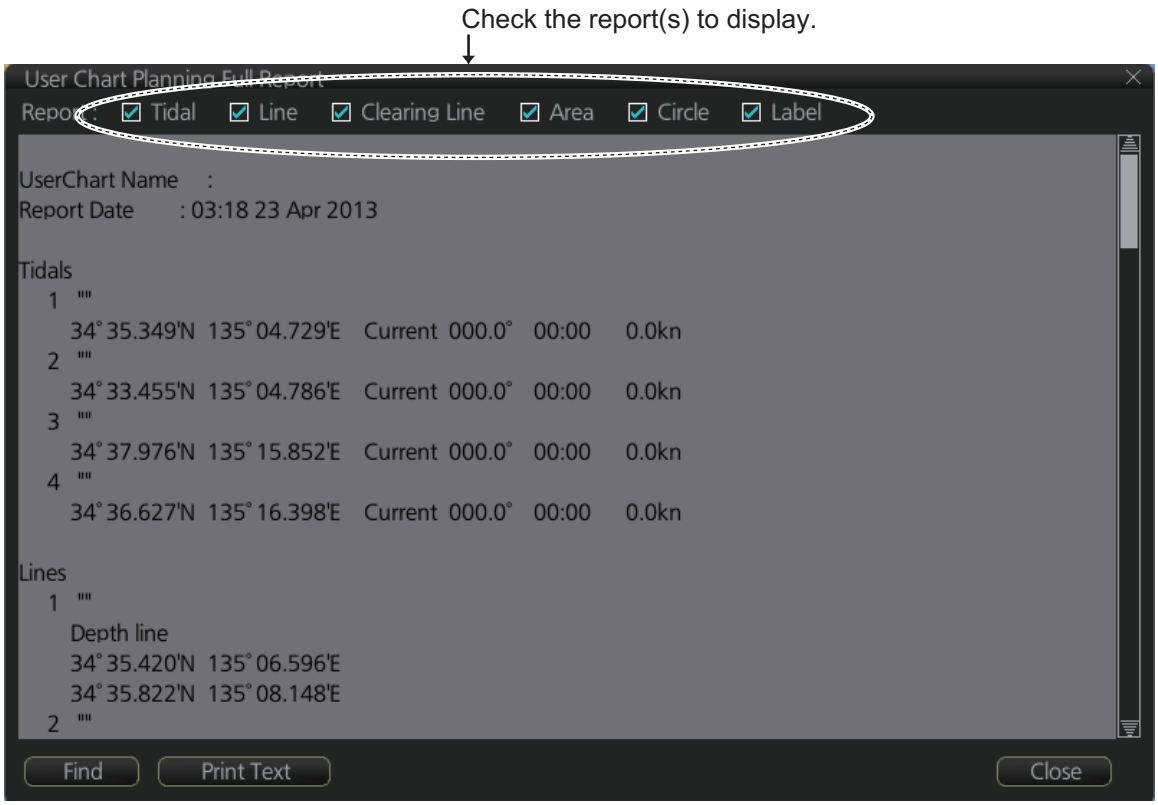


3. Select the appropriate user chart, then click the [OK] button to show the selected report. See the next several pages for examples of reports.

Full report

The full report contains information about each tidal, line, clearing line, label, area and circle in the user chart selected. Check or uncheck the boxes at the top of the display to select the report(s) to display.

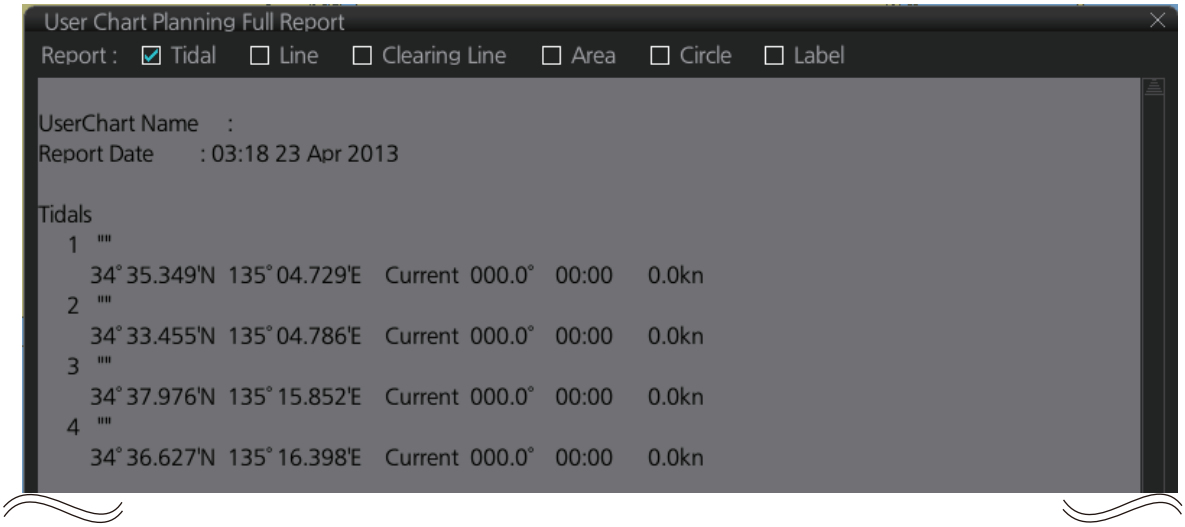
Color, line thickness, transparency are not output.



Tidal report

The tidal report provides

- Position of the tidal
- Type of tidal (current or predicted)
- Speed and direction of the tidal
- Time of the tidal

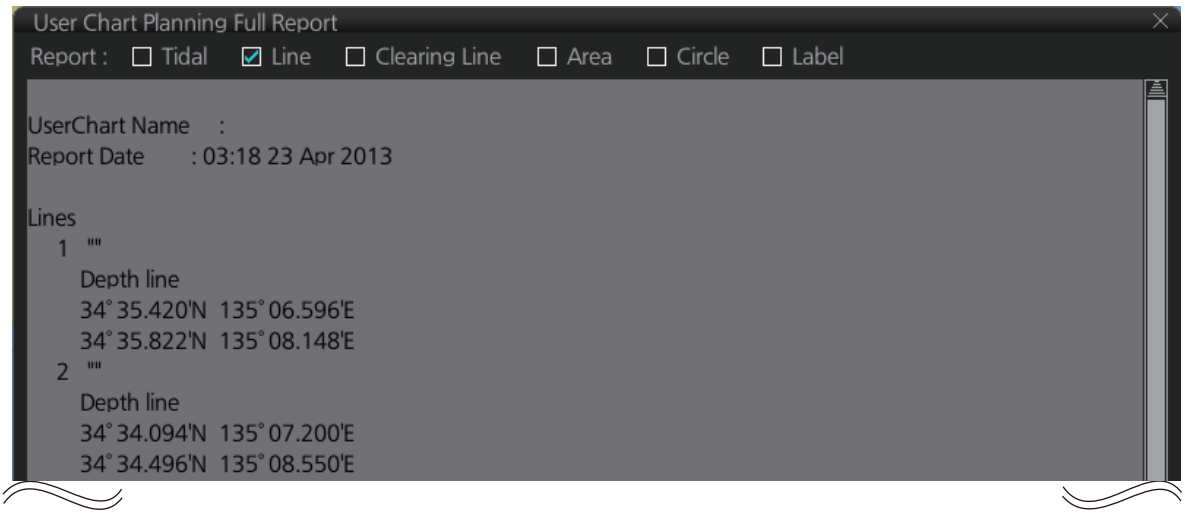


Line report

The Line report provides the following information.

- Name of line
- Latitude and longitude position of each point on a line
- [On Radar] appears with those lines selected to show on the radar overlay. (Check-mark in the [Radar] column of the [User Chart] dialog box. See section 10.3.)
- [Danger] appears with those lines selected to show on the radar overlay. (Check-mark in the [Danger] column of the [User Chart] dialog box. See section 10.3.)
- [Has Notes] appears with those lines selected to show on the radar overlay. (Check-mark in the [Has Notes] column of the [User Chart] dialog box. See section 10.3.)

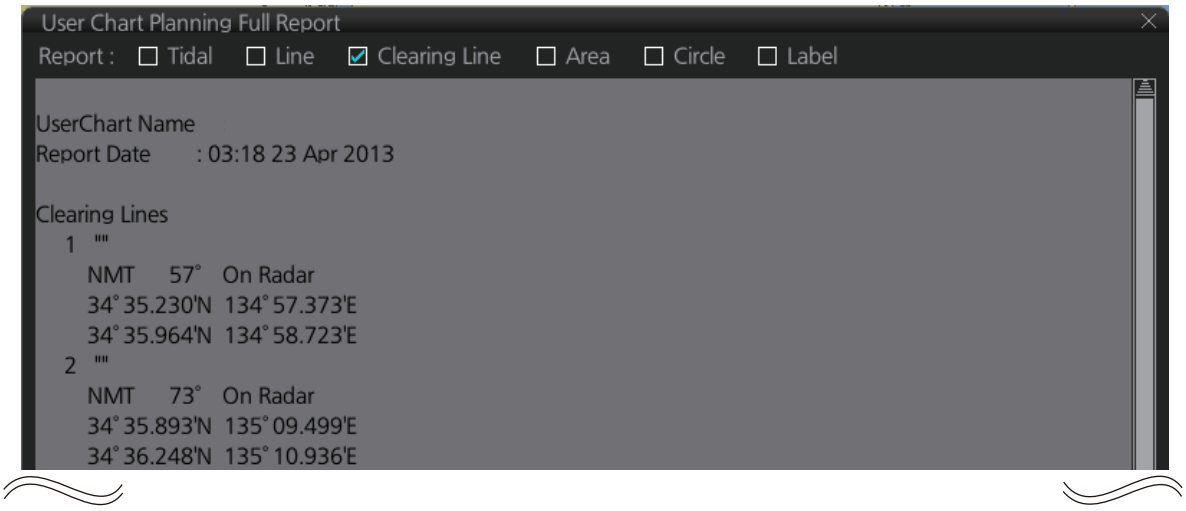
Color and line thickness are not output.



Clearing line

The Clearing line report shows the following information.

- Name of clearing line
- Latitude and longitude position of each point on a clearing line
- [On Radar] appears with those clearing lines selected to show on the radar overlay. (Checkmark in the [Radar] column of the [User Chart] dialog box. See section 10.3.)
- [Danger] appears with those clearing lines selected to show on the radar overlay. (Checkmark in the [Danger] column of the [User Chart] dialog box. See section 10.3.)

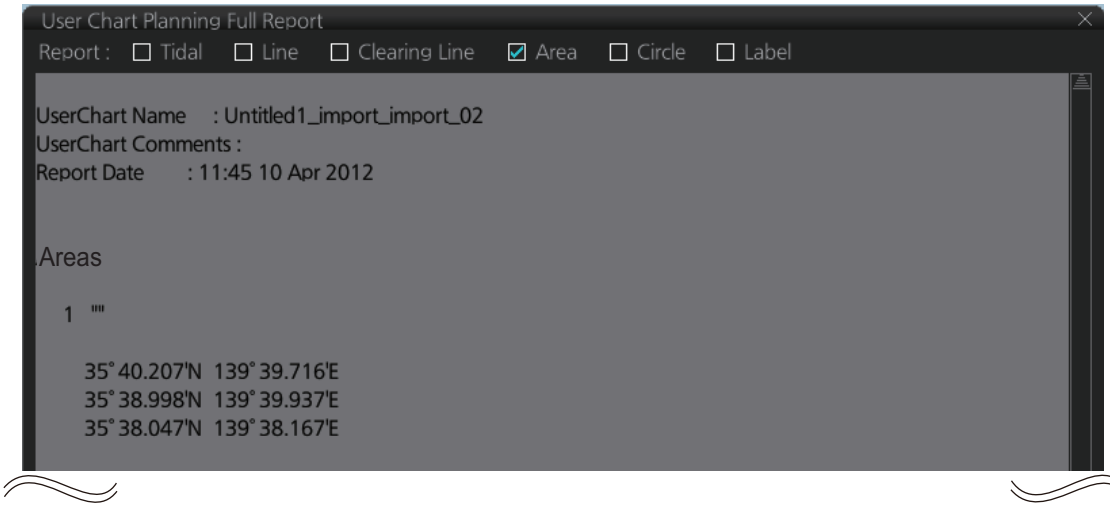


Area report

The area report provides the following information

- Name of area
- Latitude and longitude position of each point on the area
- [On Radar] appears with those areas selected to show on the radar overlay. (Checkmark in the [Radar] column of the [User Chart] dialog box. See section 10.3.)
- [Danger] appears with those areas selected to show on the radar overlay. (Checkmark in the [Danger] column of the [User Chart] dialog box. See section 10.3.)
- [Has Notes] appears with those areas selected to show on the radar overlay. (Checkmark in the [Has Notes] column of the [User Chart] dialog box. See section 10.3.)

Color, line thickness, transparency are not output.

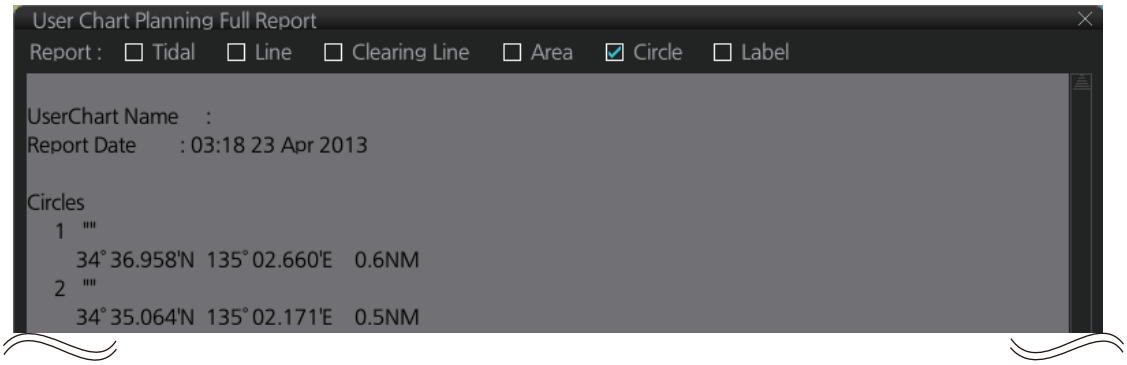


Circle report

The Circle report provides the following information.

- Name of circle
- Latitude and longitude position of circle and its radius
- [On Radar] appears with those circles selected to show on the radar overlay. (Checkmark in the [Radar] column of the [User Chart] dialog box. See section 10.3.)
- [Danger] appears with those circles selected to show on the radar overlay. (Checkmark in the [Danger] column of the [User Chart] dialog box. See section 10.3.)

Color, line thickness, transparency are not output.

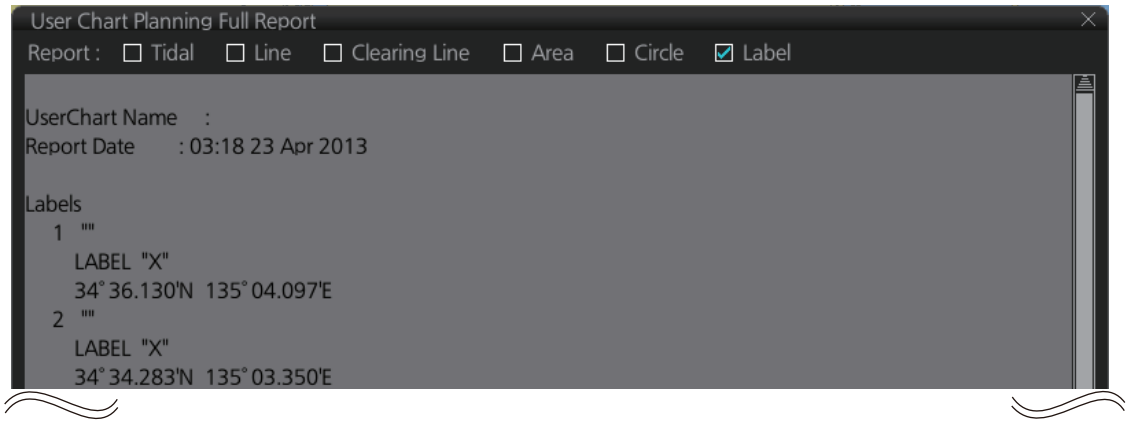


Label report

The Label report provides the following information.

- Name of label
- Latitude and longitude position of each label.
- [On Radar] appears with those labels selected to show on the radar overlay. (Checkmark in the [Radar] column of the [User Chart] dialog box. See section 10.3.)
- [Danger] appears with those labels selected to show on the radar overlay. (Check-mark in the [Danger] column of the [User Chart] dialog box. See section 10.3.)

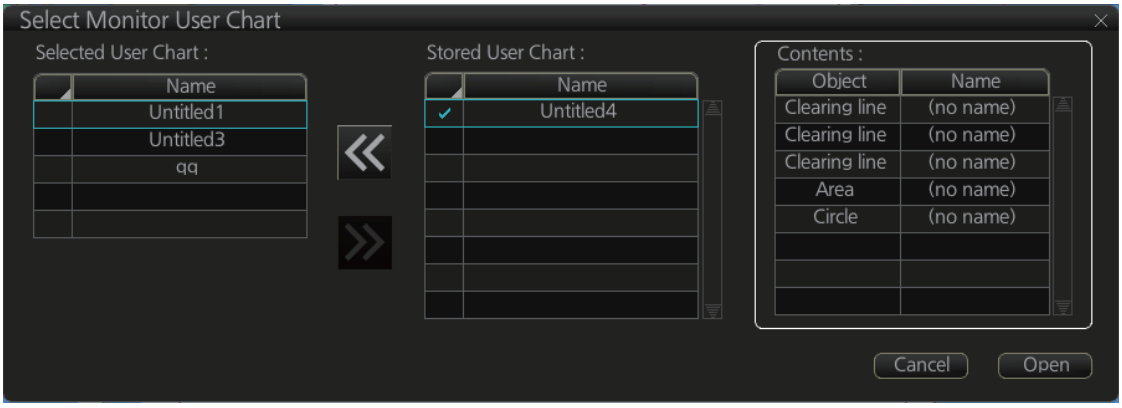
Color information is not output.



10.12 How to Select the User Chart(s) to Use in Route Monitoring

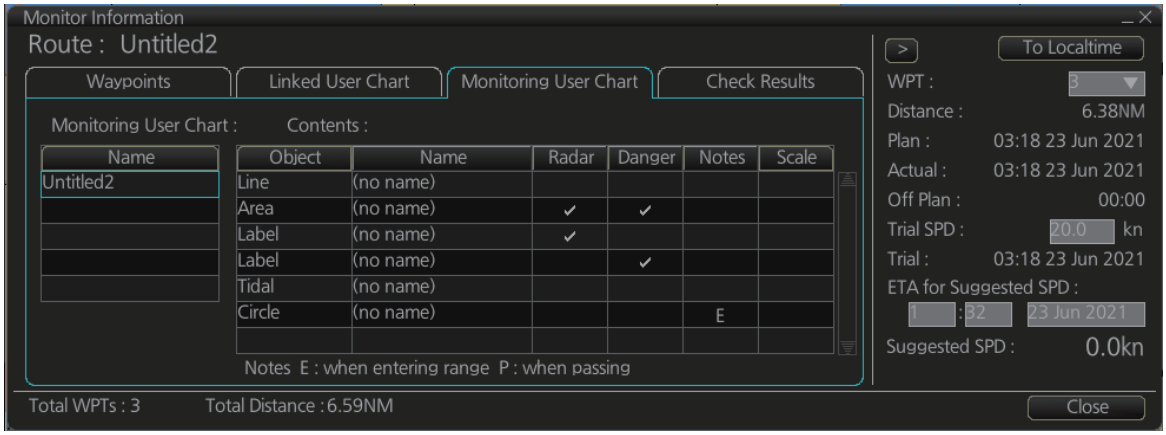
Click the [NAVI] button on the Status bar, then do as follows to select the user chart(s) to use in route monitoring.

1. Click the [Voyage], [User Chart] and [Select/Unselect] buttons on the InstantAccess bar™ to open the [Select Monitor User Chart] dialog box. The [Select Monitor User Chart] can also be selected by right clicking anywhere inside the [Route] information box (right side of screen) and, then clicking [Monitor User Chart].



2. Check the chart(s) to use in the [Stored User Chart] window, then click the [<<] and [Open] buttons. The [Monitor Information] dialog box automatically appears,

and shows the user charts selected for use in route monitoring. Click a user chart name to see details, in the [Contents] window.



How to cancel use of a user chart during route monitoring

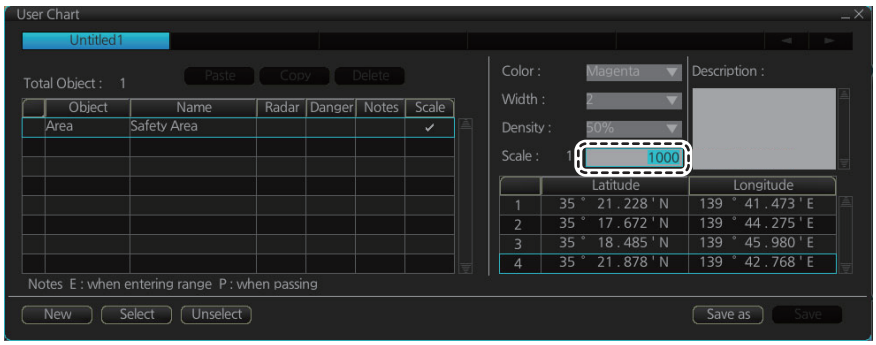
To cancel only a user chart during route monitoring, get into the Voyage navigation mode, then click the [Voyage], [User Chart], [Select/Unselect] buttons on the Instant-Access bar™ to show the [Select Monitor User Chart] dialog box. From the [Selected User Chart] list, select the user chart(s) to cancel, then click the [>>], and [Open] buttons.

To cancel both route and user chart in route monitoring, get into the Voyage navigation mode, then click the [Voyage] and [Stop Monitor] buttons on the InstantAccess bar™.

10.13 Auto Zoom

Auto zoom automatically switches the display scale to the specified scale when the ship nears a designated object (area, circle, line). The previous scale is restored once the ship passes the object. This feature is useful if you frequently use a specific scale along a route.

1. Click the [PLAN] button on the Status bar to go to the Voyage planning mode.
2. Click the [Planning] and the [User Chart] buttons on the InstantAccess bar™ to show the user chart palette and the [User Chart] dialog box.
3. If the user chart is not displayed, do the following:
   1) At the bottom of the [User Chart] dialog box, click the [Select] button to show the [Select User Chart] dialog box.
   2) Select desired user chart, then click the [OK] button.
4. Select the object to auto-zoom. Objects that can use auto zoom are areas, circles, and lines.
5. Put a checkmark in the [Scale] column. The scale input box (circled in the figure below) appears.



6. Select scale to use in auto zoom. The scale range is 1;1,000 to 1:70,000,000.
7. Click the [Save] button.

Monitor the user chart. When the ship nears the object selected here, the auto zoom feature is activated.

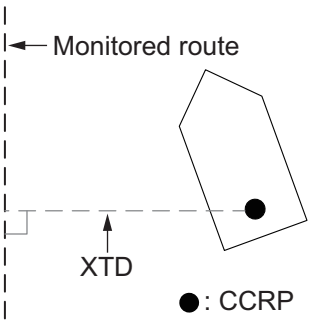
11. HOW TO MONITOR ROUTES

Route monitor is a means for permanent monitoring of the ship's behavior relative to the monitored route. The [Monitor Information] box displays the data on the ship's position relative to the monitored route. The monitored route consists of the following information, displayed in the electronic chart area:

- The route is displayed with red dots.
- The limits of channels of each leg are displayed with solid red lines. These limits are used to detect chart alerts when you are monitoring the route. See chapter 8 for how set those limits.
- Each leg has information about planned speed, shown in the [Monitor Information] box.
- Each leg has information about planned course to steer.

Note 1: In order to display charts with correctly updated situation, always use current date as Update Review and Display Date during your voyage. If your voyage lasts more than one week, set current date at least once per week during your voyage. See section 5.2.2 for how to set those dates.

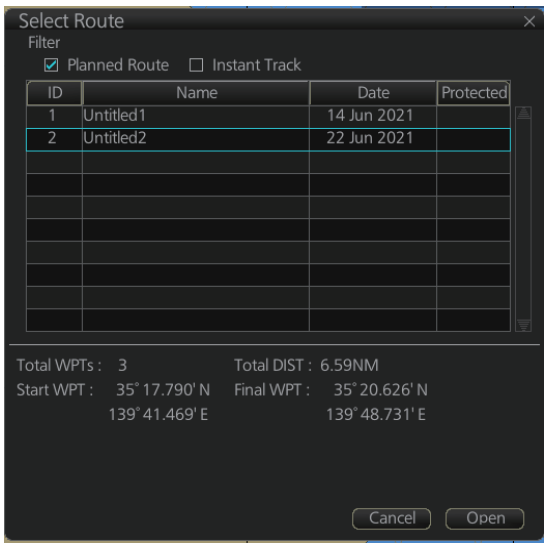
Note 2: XTD is the distance, in a straight line, from the monitored route to the CCRP. CCRP is set at installation. Where more than one CCRP is set, select the CCRP to use from the [CCRP] page of the [Settings] menu (see section 23.13).



11.1 How to Start Route Monitoring

Method 1: InstantAccess bar™

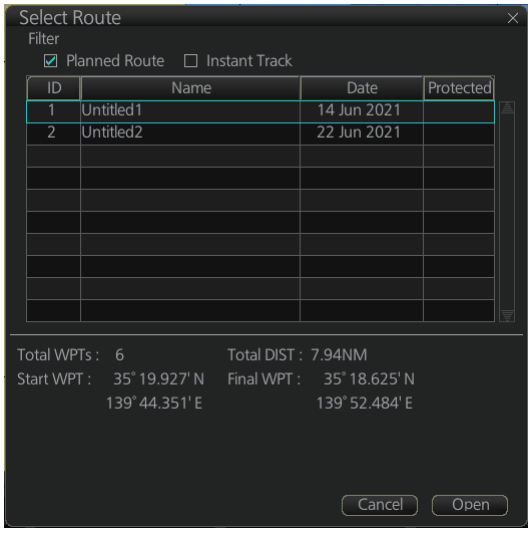
In the Voyage navigation mode, click the [Voyage], [Route] and [Select] buttons on the InstantAccess bar™. Click a route, then click the [Open] button.

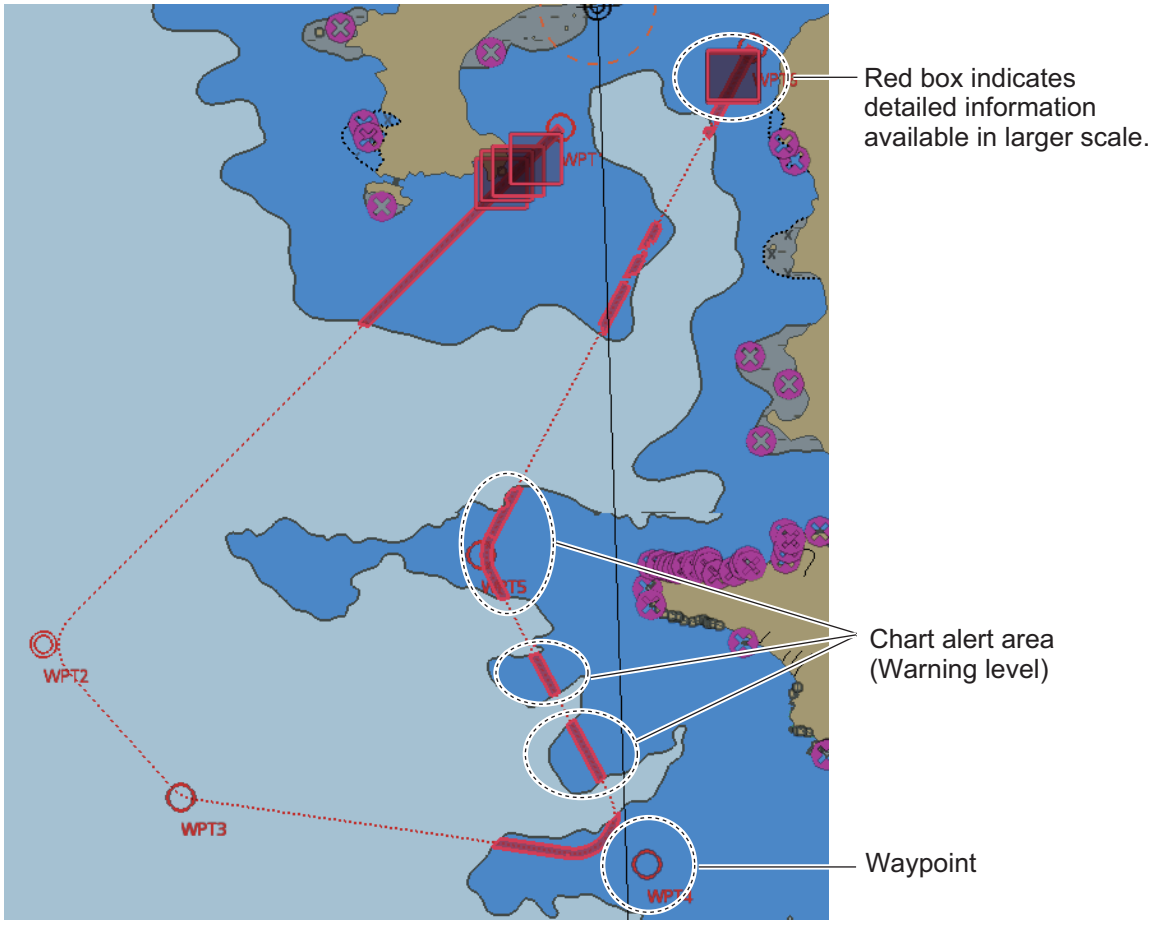


Method 2: Selection from the Route information box

Right-click the route name location in the [Route Information] box, then select [Select Route] to show the [Select Route] dialog box. Select a route, then click the [Open] button.







About monitoring routes

- When you choose a route for monitoring, the messages shown below appear, on the [Select Route] dialog box or in a message window, when a route cannot be opened for monitoring.
  - "Impossible turn at WPT XX" (XX=waypoint no.). Geometry of the route makes it impossible for the ship to accomplish a turn. Modify the route to make the turn possible.
  - "Bad Leg WPT XX to WPT XX" (XX=waypoint no.). A turn cannot be accomplished because the length of a leg is too short. Leng, then the leg.
  - "Bad Turn at WPT XX" (XX=waypoint no.). A turn cannot be accomplished because the calculated ROT exceeds the MAX ROT. Increase the turn radius, or decreased the planned speed.
  - "Unchecked / Check condition differs". The route has not been checked. Check the route, on the [Alert Parameters] page.
  - "Monitored in the NAVI mode". The route is currently being monitored.
  - "More than one WPT needed". The route has only one waypoint. Add more waypoints to the route.
  - "Route monitoring cannot be started. Please check ship's position and conditions." Click the [OK] button to close the message. Check ship's position and conditions of the route.
- The route check which occurs after selecting a route can take longer with C-MAP charts. Wait until the completion of the check.
- If you have small-scale chart(s) on display that have the whole eastern/western (0-180°E/0-180°W) hemisphere and a part of the other hemisphere on display, there is a limitation to display a route. To avoid this, set chart center so that the whole eastern/western hemisphere is not on the screen.
- Route monitoring is temporarily stopped (route is greyed out) and an alert appears when position, speed or heading is lost. To restore route monitoring, open the [System Sensor Settings] menu, manually enter speed, heading and position, check the checkbox for [Set Drift], then switch to the DR mode.
- Route data is sent to the radar (ex. FAR-2xx7 series) at the start of route monitoring or when the ship transits a waypoint. If a route is not displayed on the radar, stop, then restart monitoring at the ECDIS. A route is erased from the radar when route monitoring is stopped or the ECDIS is restarted. To redisplay the route, stop, then restart monitoring at the ECDIS.
- When chart alerts are unchecked while planning a route (see section 8.1.2) and route monitoring is activated, a message appears in the permanent warning box.
  - [Safety Contour] unchecked: "Indication of crossing safety contour if Off. (in monitoring)"
  - [Areas to be Avoided] unchecked: "Indication of navigational hazards is Off. (in monitoring)"
  - Other alerts unchecked: "Indication of some prohibited areas or areas with special conditions is Off. (in monitoring)"
- If this ECDIS is connected in the network to an FMD-3005/3200/3200-BB/3300 that is interfaced with an IEC 62065 Ed.2 compliant TCS (YDK Technologies PT-900, Tokyo Keiki PR-9000, EMRI FAP-3000, Raytheon Anschutz NP-5400), the alert "WOL Approach XX" (XX=waypoint no.) is generated at each waypoint if the TCS is not connected to the ECDIS in route monitoring.

11.2 How to Stop Monitoring a Route (Manual, Auto)

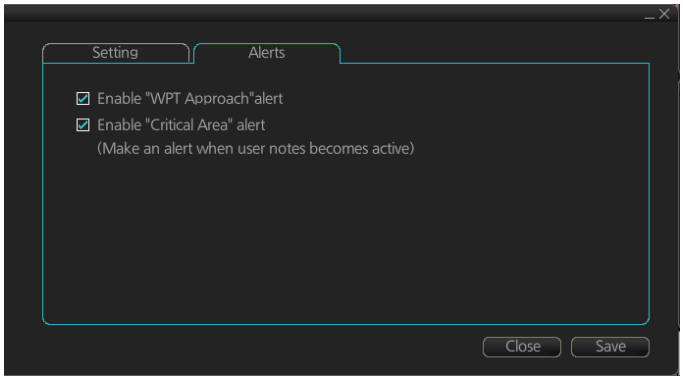
There are two methods to stop route monitoring: (1) Get into the Voyage navigation mode, then click the [Voyage] and [Stop Monitor] buttons on the InstantAccess bar™. (2) Get into the Voyage navigation mode, then click the [Voyage], [Route] and [Unselect] buttons on the InstantAccess bar™.

When Route Failure occurs, route monitoring is automatically stopped. See "route monitoring is stopped" in the Troubleshooting table in section 24.10 for details.

11.3 How to Enable Route Monitoring Alerts

You can enable or disable the route monitoring alerts: [WPT Approach] and [Critical Area].

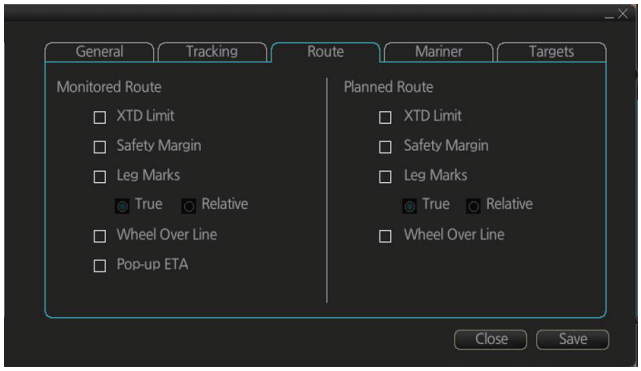
1. Open the menu, then select [Route], [Monitoring], [Settings], [Alerts].



2. Enable or disable the route monitoring alerts, referring to the description below.
   - [Enable “WPT Approach” alert]: Enable or disable the [WPT Approach] alert, which alerts you when the wheel over point has been approached.
   - [Enable “Critical Area alert”]: Enable or disable the [Critical Area] alert, which alerts you when you are entering a user chart notes area.
3. Click the [Save] button to save the settings.

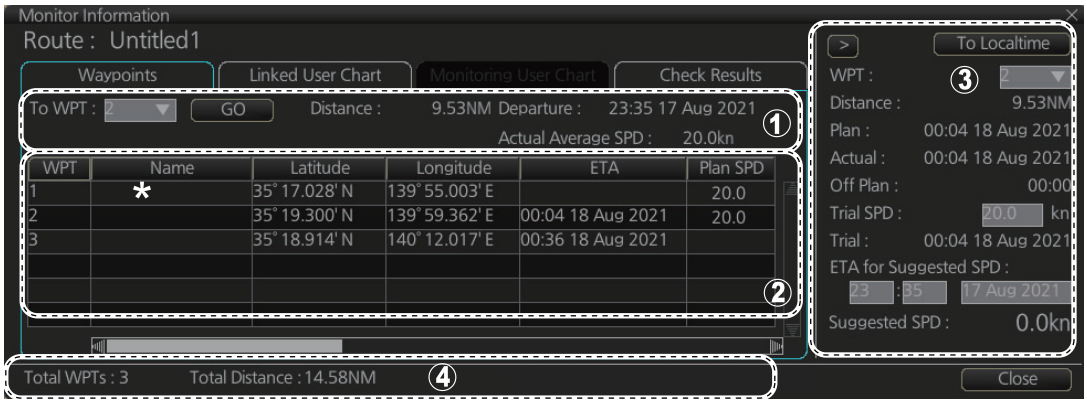
11.4 How to Select What Parts of a Route to Display

You can specify what parts of the monitored route to display. Click the [DISP], [SET] and [Symbol DISP] buttons on the InstantAccess bar™. Click the [Route] tab.



11.5 How to View Waypoint Information

Click the [Voyage] and [Monitor INFO] buttons on the InstantAccess bar™ to show the [Monitor Information] dialog box. Click the [Waypoints] tab to show waypoint info.



* Scroll list horizontally to view items shown in the figure below.

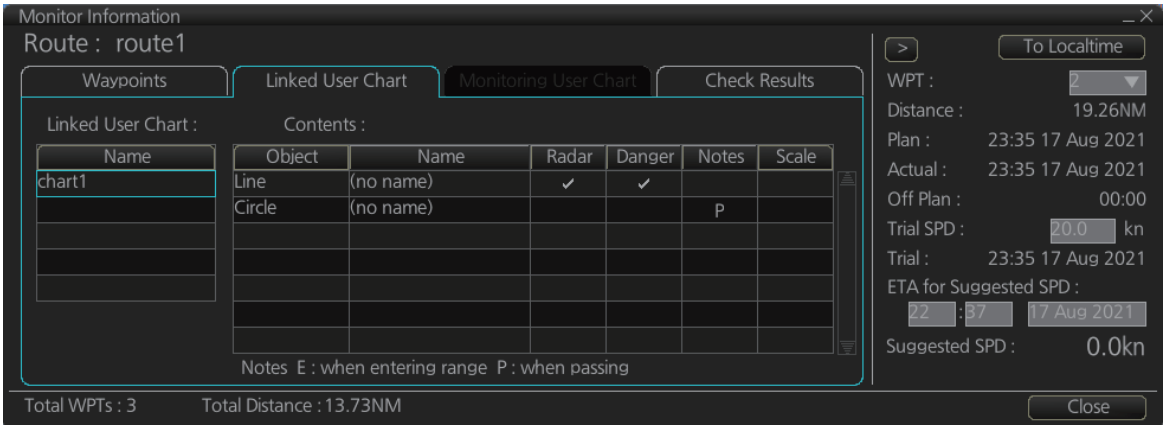
Leg/°	Leg/NM	STR mode	RAD/NM	ROT°/min	XTD Limit/m	Plan SPD	Safe SPD	Margin/m	Local Time
57.6	3.98	Rhumbline			185	20.0	22.1	40	+ 00 : 00
92.1	10.60	Rhumbline	0.80	23.87	185	20.0	22.1	40	+ 00 : 00
			0.80						+ 00 : 00

No.	Item	Description
1	[**To WPT**], [**GO**] button	The system chooses a next waypoint automatically. Check that the To waypoint is the desired one. The system will automatically advance to a next waypoint when you pass the To waypoint. The default To WPT is WPT2. If you desire a different one, select it here and the click the [GO] button.
	[**Distance**]	Distance from current position to selected waypoint.
	[**Departure**]	The time the route was selected for monitoring.
	[**Actual Average SPD**]	The average speed over the ground, measured every 30 seconds.
2	**Waypoint list**	The waypoint list provides for each waypoint WPT no., name, latitude and longitude position, ETA, plan speed, bearing to leg*, distance to leg*, ROT°/min, steering mode (rhumb line, great circle), turning radius/NM, XTD limit/m, plan speed, safe speed, margin, and local time. For details, see section 9.4.1. *The bearing to a leg and the display method for leg distance can be changed. See [Leg/NM] onpage 9-6.
3	**ETA check window**	Setting value for ETA confirmation. The arrow to the left of the [To Localtime] button allows you to show or hide the currently selected waypoint, (or [User Chart], [Check Results] page).
	[**To Localtime**] button	Switch between UTC and local time for ETA. For local time, the settings used in the creation of the route are used for the ETA calculation. See section 9.4.1.
	[WPT], [Distance]	Select a WPT to find the distance to that waypoint from current position.
	[**Plan**]	When planned speed is used in navigation, ETA to selected waypoint appears.
	[**Actual**]	When using current speed in navigation, ETA to selected waypoint is shown.
	[**Off Plan**]	The time difference between planned ETA and calculated ETA to final WPT, when different. The indication is prefixed with "-" if earlier than planned; "+" if later than planned.

	[**Trial SPD**]	The input range is a minimum of 0.1 to a maximum of 99.9 knots. It can be set in 0.1 knot units. The default value is the COG at the start of route monitoring.
	[**Trial**]	Displays the ETA to the specified target obtained by trial speed.
	[**Off Plan**]	The ETA for the trial speed entered.
	[**ETA for Suggested SPD**]	Estimated time of arrival using the speed set at [Suggested SPD].
	[**Suggested SPD**]	Displays the ETA obtained at the suggested ship speed.
	[**Start Calculate**]	Click to start calculation. The button label changes to [Stop Calculate].
4	[**Total WPTs**]	The total number of waypoints in the route.
	[**Total Distance**]	The total distance of the route.

11.6 How to View Linked User Chart Information

Click the [Voyage] and [Monitor INFO] buttons on the InstantAccess bar™, then click the [Linked User Chart] tab in the [Monitor Information] dialog box.



The [Linked User Chart] list shows all the user charts linked with the monitored route and their contents. Click a user chart name to show the contents of the chart in the [Contents] window.

11.7 How to View User Chart Object Information in Route Monitoring

In route monitoring, you can cursor pick user chart objects to show their information. Put the cursor on the user chart symbol to show the pop-up menu. Select [User Chart INFO] from the pop-up menu. Below are some examples of user chart info.



User chart INFO: Circle



User chart INFO: Line



User chart INFO: Area

11.8 How to Change Monitored Route to Planned Route

The monitored route can be transferred to the Voyage planning mode. This is useful when you don't need the route for monitoring but want to edit it. To transfer the monitored route, click the [Voyage], [Route] and [Move to Plan] buttons on the InstantAccess bar™.

Up to five planned routes can be shown on the display. If you try to display another route, the route list appears. Deselect a route in order to transfer the monitored route to the Voyage planning mode.

Note: When the monitored route is changed to a planned route, using the [Move to Plan] function, the operating mode changes from the Navigation voyage mode to the Voyage planning mode.

11.9 How to Use Instant Track to Return to or Deviate from Monitored Route

The instant track feature provides a temporary track, consisting of four waypoints, to return to or deviate from the monitored route. Correct data from navigation sensors is essential to this function.

There are two instant track modes: [Safe Off Track] and [Back to Track].

[**Save off Track**]: This mode provides a track from the monitored route to a safe location to avoid collision or the like.

[**Back to Track**]: This mode creates a track to follow to return to the monitored route when the vessel goes outside the channel limits.

The mode is automatically selected according to whether a monitored route is active or not and the amount of off course. Further, if a monitored route is active while following the instant track route, the instant track mode can be changed manually.

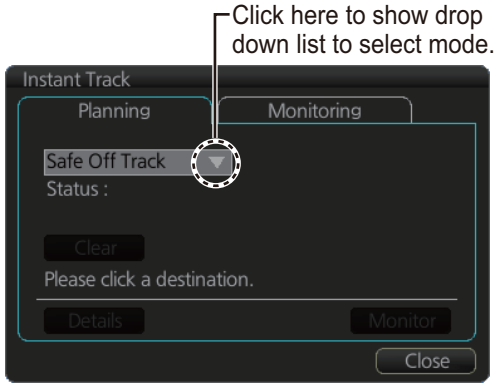
Condition	Mode	Manual mode switching
Neither monitored route nor instant track route active.*	Safe Off Track	No
• Both monitored route and instant track route are active.* • The absolute value of off track is within the XTD limit setting.	Safe Off Track	Yes
• Both monitored route and instant track route active.* • The absolute value of off track is outside the XTD limit setting.	Back to Track	Yes

* An additional instant track route can be joined to the instant track route related to a monitored route.

The parameters for the instant track (XTD limit, turn radius, etc.) can be set on the [Instant Track] page. See section 21.4.

11.9.1 Safe off track mode

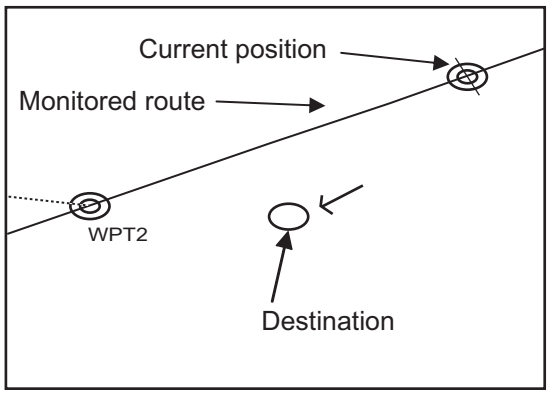
If it becomes necessary to deviate from the monitored route; for example, to avoid collision, use the [Safe Off Track] mode to create an instant track to a safe location.



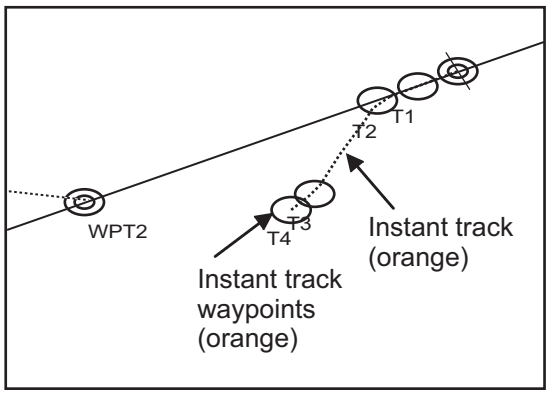
When monitored route is active

1. With a monitored route active, click the [Voyage] and [Instant Track] buttons on the InstantAccess bar™ to the show the [Instant Track] dialog box. The message "Please click a destination." appears on the [Planning] page.
   Note 1: If a monitored route is active, the [Back to Track] mode can also be selected.
   Note 2: If a monitored instant track route is already active, an instant track mode different from the currently active one can be selected.
2. Click a destination. The location is marked with an orange circle and arrow. The message "Please click a point to decide an angle." appears in the [Instant Track] dialog box. The location must be within 50 NM of current position.

3. Roll the trackball to select the angle of approach to the destination, then click.



① Click destination point. A circle and arrow appear.



② Click a location to set desired angle of approach. Instant track is drawn.

The system uses ship position, speed, angle of approach to create an instant track route. The track is also checked for hazardous objects and the like against the chart alerts.

During the calculation, the [Instant Track] dialog box window shows "Checking" in the [Status] field. If, after completion of the calculation, the track is suitable, the message "OK" replaces "Checking". The track and its waypoints, labeled [T1] - [T4], are colored orange. The track is saved to the database as "Instant Track_XXX" (XXX=001 - 400).

If there is a problem with the track, an error message appears and the track is erased from the screen. See section 11.9.3 for all the instant track messages and their meanings.

To return to the monitored route, click a waypoint on a leg of the route to create an instant track route to use to return to the monitored route.

11.9.2 Back to track mode

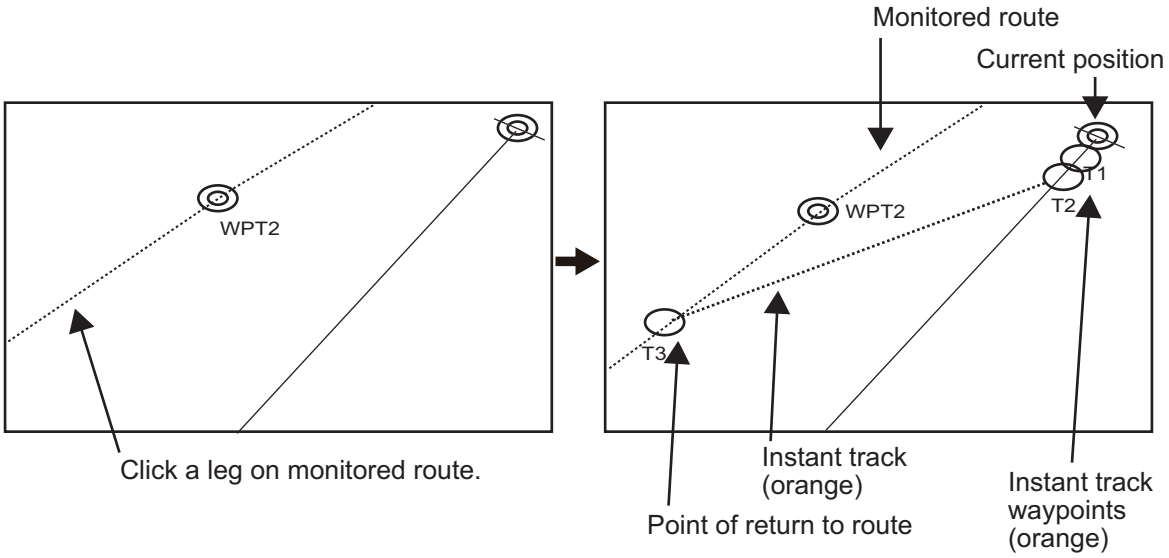
When the vessel goes off track, the Alert "Off Track" appears in the Alert box. To create an instant track to return to the monitored route, use the [Back to Track] mode as follows:



When monitored route is active

1. With a monitored route active, click the [Voyage] and [Instant Track] buttons on the InstantAccess bar™ to the show the [Instant Track] dialog box. The message "Please click a WPT on Leg." appears on the [Planning] page.
   Note 1: If a monitored route is active, the [Safe Off Track] mode can also be selected.
   Note 2: If a monitored instant track route is already active, an instant track mode different from the currently active one can be selected. Further, a completely new instant track route to the original monitored route can be created.

2. Click a leg or a waypoint on the monitored route. The location must be within 50 NM of current position.



The system uses ship position, speed and final waypoint to create a track. The track is also checked for hazardous objects and the like against the chart alerts.

During the calculation, the [Instant Track] dialog box shows "Checking" in the [Status] field. If, after completion of the calculation, the track is suitable, the message "OK" replaces "Checking". The track and its waypoints, labeled [T1] - [T3], are colored orange. The track is saved to the database as "Instant Track_XXX" (XXX=001 - 400).

If there is a problem with the track, an error message appears and the track is erased from the screen. See section 11.9.3 for all the instant track messages and their meanings.

11.9.3 Instant track messages

The table below shows all the instant track messages and their meanings.



Message	Meaning	Color
(1) Instant Track mode		
"Back to Track"	Back to track mode	White
"Safe Off Track"	Safe off track mode	White
(2) Check result, error message		
"Could not create the Track."	The track could not be created.	Yellow
"Too far destination from own ship."	Selected destination is 50 NM or more from current position.	Yellow
"ROT value not inputted correctly."	No ROT data input, or data is incorrect. Cannot create instant track.	Yellow
"Checking"	Checking route.	Red
"OK"	Instant track checked and is suitable to follow.	Green
"NG"	Route check failed.	Red
"Check error"	Route check error.	Red
"Instant track is expired."	Route monitor timeout.	Red
"Too many WPTs in monitoring route."	More than 190 waypoints are in the monitored route. (Instant track cannot be created.)	Red
(3) User operation message		
"Please click a destination."	Select a destination in the [Safe Off Track] mode.	White
"Please click a point to decide an angle."	Set the angle of approach in the [Safe Off Track] mode.	White
"Please click a WPT on leg."	Click a waypoint on a leg in the [Back to Track] mode.	White
(4) Name of instant track route		
InstantTrack_XXX (XXX: 001 - 400)	Name of monitored instant track route	White

11.9.4 Instant track details

You can see the location and alert type found in an instant track by clicking the [Details] button on the [Instant Track] dialog box.

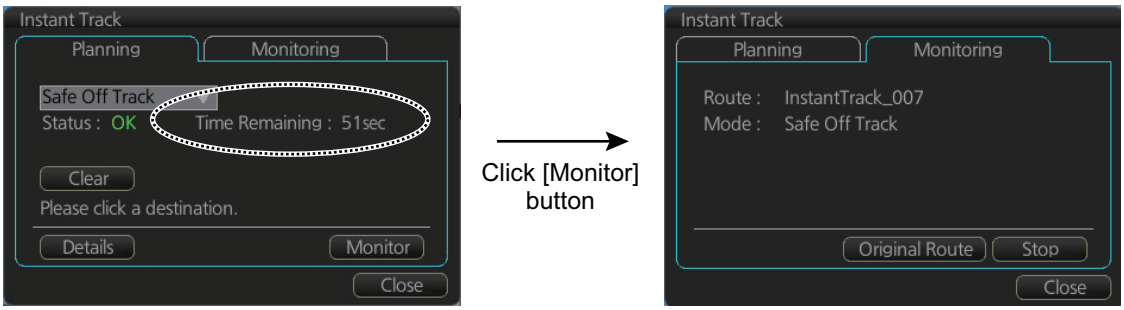
Note: If the Status is not [OK], an alert (alarm or warning priority, depending on setting) appears in the Alert box.



11.9.5 How to monitor, stop monitoring an instant track route

How to monitor an instant track route

If the route check results is "OK", click the [Monitor] button on the [Planning] page in the [Instant Track] dialog box to start monitoring the instant track route. Click the button before the time remaining counts to zero, otherwise the instant track will be cancelled, followed by the message "Instant track is expiration." After the [Monitor] button is clicked the [Monitoring] page is opened. The [Monitoring] page shows the name of the instant track and the instant track mode.



The vessel follows the instant track route in the same method as a monitored route, which is greyed out to indicate it is inactive. For the instant track route connected to a monitored route, the previous instant track route is also greyed out to show it is inactive. Any additional instant track routes are erased.

To close the [Instant Track] dialog box, click the [Close] button. (The system continues monitoring the instant track route.)

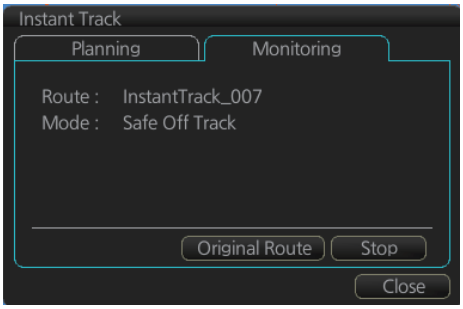
The following occurs when sensor data is lost while using the instant track function.

Monitoring condition	Result
Instant track route monitoring.	• An instant track route under creation is deleted. No route can be created. • The [Stop] button is pushed or the instant track route is followed until its completion. • After the instant track route is completed, an error message appears and the [Instant Track] dialog box closes.
No monitored route	An instant track route under creation is deleted.
Monitored route active	After the route is completed, an error message appears and the [Instant Track] dialog box closes.

Note: If there is no original route (safe off-track mode only) or the original route is not checked, the message "Not checked against ENC chart" appears in the permanent warning box.

How to stop monitoring an instant track route

Click the [Stop] button on the [Monitoring] page in the [Instant Track] dialog box to stop monitoring the instant track route. The system returns to monitoring the monitored route and the [Planning] page of the [Instant Track] dialog box opens.

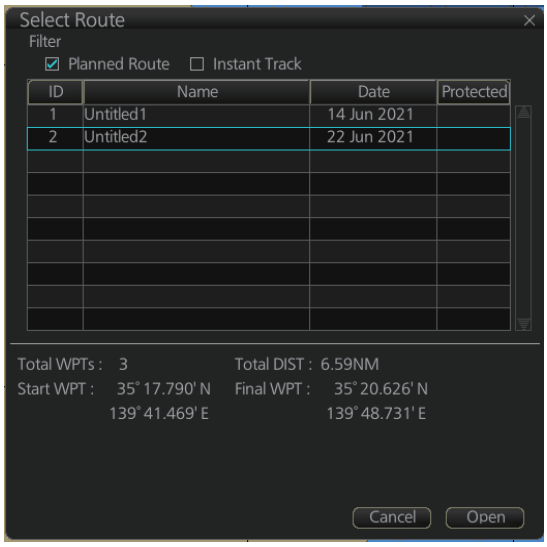


For the [Back to Track] mode, the instant track mode is canceled when the vessel returns to the monitored route. The instant track is greyed out to show that it is inactive.

11.9.6 How to return to a monitored route when following an instant track route (safe off track mode only)

Do the following to return to a monitored route while following an instant track route.

1. While monitoring an instant track route, click the [Original Route] dialog box and its [Monitoring] page in the [Instant Track] dialog box to show the [Select Route] dialog box. Check [Planned Route] to show a list of planned routes, or check [Instant Track] to show a list of instant track routes.

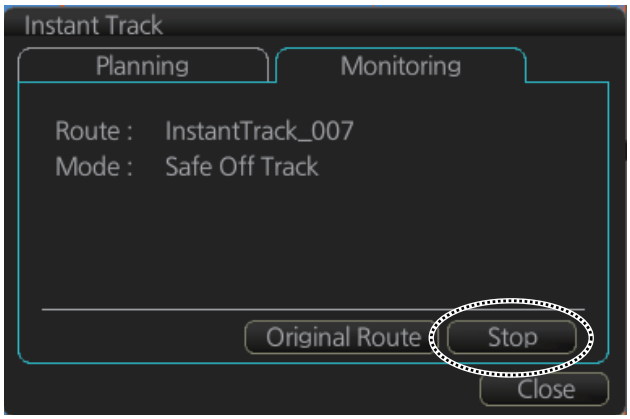


2. Select the route to use. The original route or the instant track route currently in use cannot be selected.
3. Click the [Open] button to close the dialog box. The vessel starts following the newly selected route.

When an instant track route is completed, the vessel starts following the route selected at step 2.

11.9.7 Button label and equipment state

The label on the button at the position circled in the figure below changes according to the state of the instant track.



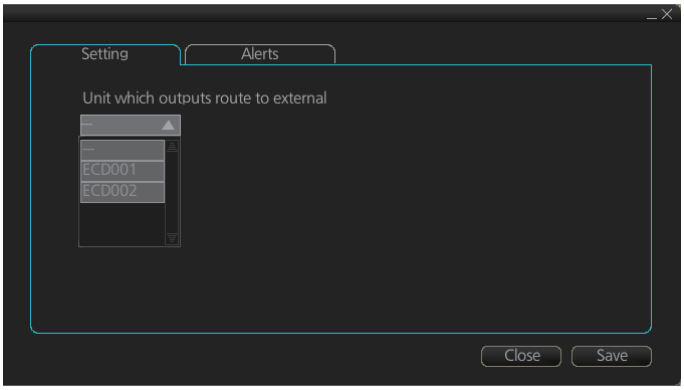
Instant track state	TCS state	Button label
Creating	OFF	Monitoring
	ON	Execute (same function as Monitoring)
Monitoring	OFF	Stop
	ON*	Stop
Return to original route after back to track mode	OFF	Reset (Instant track is deleted; another instant track maybe created)
	ON	Reset

* Button inoperative.

11.10 How to Output Route Data to External Equipment

A monitored route can be shared with other units (FMD-3xxx, FAR-3xxx) via LAN. Data is sharing is done automatically. Follow the procedure below to select the unit that is to output monitored route data to external devices.

1. Open the menu, then select [Route], [Monitoring] and [Setting] to show the [Setting] dialog box.
2. From the drop-down list, select the unit that outputs the route data to the external device. The list shows the unit names for which route data can be output. If there are no units that can output, nothing will be displayed in the list.



3. Click the [Save] button to save your settings and the Close button to close the menu.

12. NAVIGATION TOOLS

This chapter presents the various navigation tools available with the system. With the exception of the divider, the tools listed below are in the [Overlay/NAV Tools] Box.

- [TT/AIS] (see chapters 13 and 14)
- [Echo] (see chapter 16)
- [RCB Common]
- [PI]
- [Look-ahead]
- [Ring] (Range rings)
- [Predictor]
- [Anchor Watch]
- [UKC] (Under Keel Clearance)
- [Curved EBL]*
- [Divider]
- [Timer]

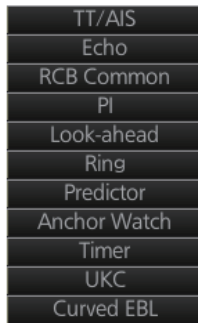
*: Shown only when a EC-3000/3005 with TCS functionality is connected to the network.

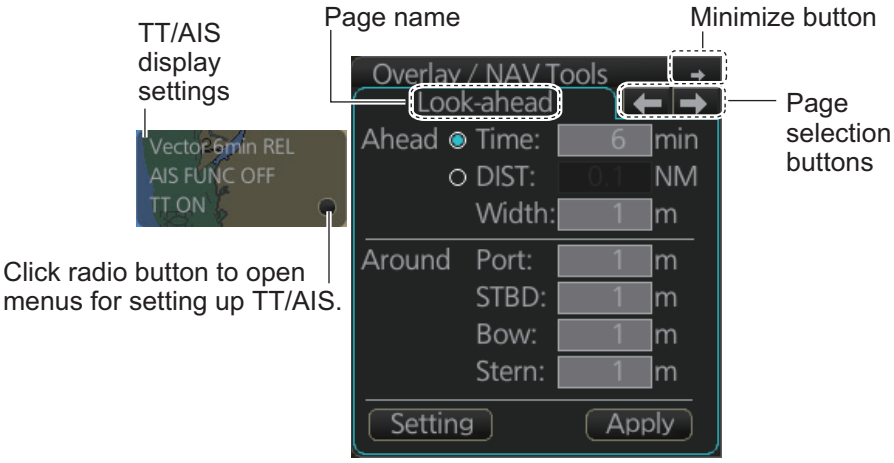
12.1 How to Access the Nav Tools in the Overlay/NAV Tools Box

The [Overlay/NAV Tools] box is located at bottom-right position on the screen, and contains various pages of functions for navigation. There are two methods to select pages.

- Click the page selection buttons on the [Overlay/NAV Tools] box.
- Right-click the page name on the [Overlay/NAV Tools] box to show a context menu of the available pages, as shown right.

The window that appears to the left of the [Overlay/NAV Tools] is shown except when the [TT/AIS] page is selected.

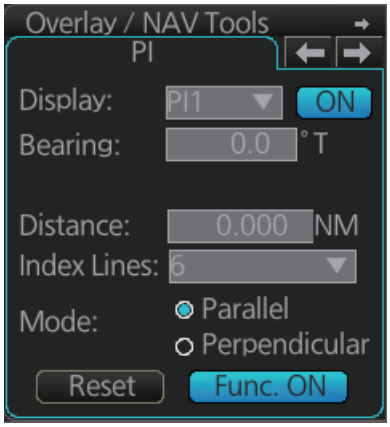




Overlay/NAV Tools box (Look-ahead page)

12.2 Parallel Index (PI) Lines

The parallel index lines are useful for keeping a constant distance between own ship and a coastline or a partner ship when navigating. There are 16 sets of PI lines (PI 1 to PI 16) on the [PI] page and you can turn them on or off individually. Select the PI line to process with the [Display] pull-down list, then click the [ON] or [OFF] button as appropriate. One, two, three or six lines can be shown. The [PI] page shows the data for one PI line.



The bearing can be set two ways: with the scrollwheel or dragging the PI line on the screen.

12.2.1 How to activate, deactivate PI lines

Select the PI line(s) set to activate or deactivate with the [Display] drop-down list. Activate or deactivate the set selected with the [ON], [OFF] button.

The [Func. ON], [Func. OFF] button globally activates, deactivates all PI lines selected to ON.

12.2.2 PI line bearing reference

PI line bearing reference may be relative to own ship's heading (Relative) or referenced to North (True). Select [True] or [REL] as applicable.

12.2.3 Number of PI lines to display

The maximum number of PI lines to display may be selected from 1, 2, 3 or 6 lines as below. The actual number of lines visible may be less depending on line interval. Select the number of lines to display at [Index Lines].

12.2.4 PI line mode

The PI line mode can be set for parallel (0-degrees) or perpendicular (90-degrees). Select [Parallel] or [Perpendicular] at [Mode].

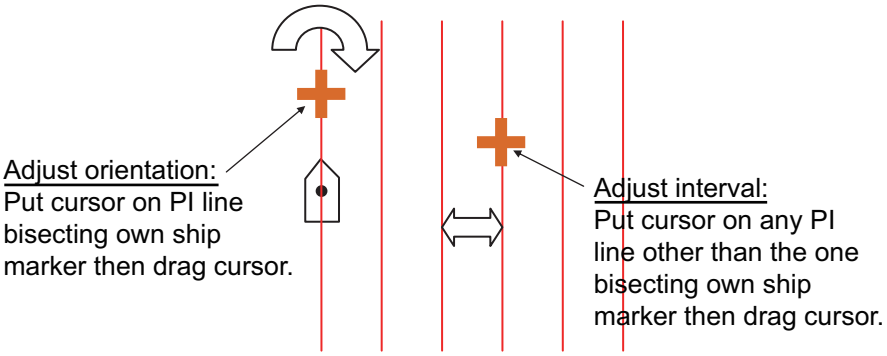
12.2.5 How to adjust PI line orientation, PI line interval

There are two ways to adjust PI line orientation and PI line interval: through the menu and on the screen.

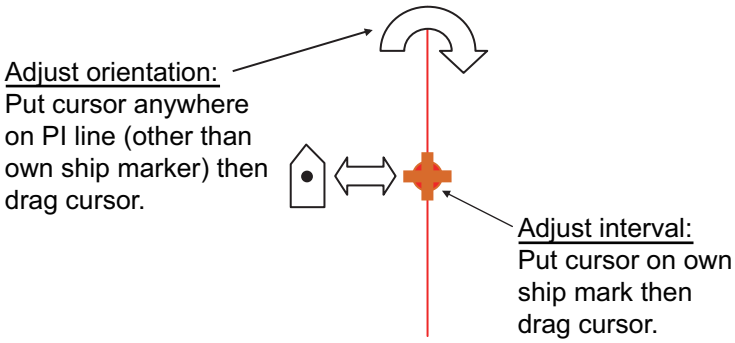
How to adjust PI line orientation, PI line interval from the menu

1. Set the orientation with [Bearing].
2. Set the line interval with [Distance].

How to adjust PI line orientation, PI line interval on the screen



How to adjust orientation and interval, multiple PI lines



How to adjust orientation and interval, single PI line

12.2.6 How to reset the PI lines

You can return PI lines to default orientation, 0-degrees for parallel orientation, 90-degrees for perpendicular orientation. This is faster than doing it manually. Click the [Reset] button to reset the parallel lines.

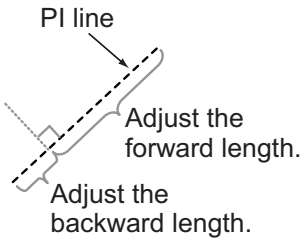
12.2.7 How to adjust PI line length

You can adjust the forward and backward lengths of a PI line when [Index Lines] is set to 1.

1. Open the main menu and select [NAV Tools], [PI Lines] and [Truncate].



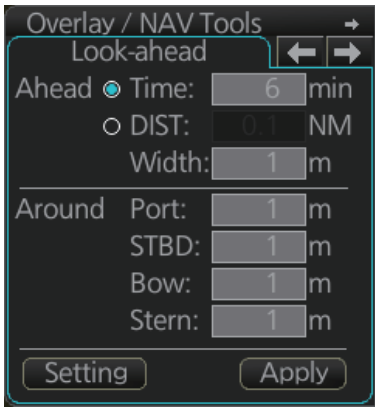
2. If not already displayed, click the ON/OFF button to display the PI line whose length you want to adjust.
3. Click the value in [Forward] and [Backward] columns to adjust their lengths, referring to the illustration below.



4. Click the [Save] button to finish.

12.3 Look-ahead

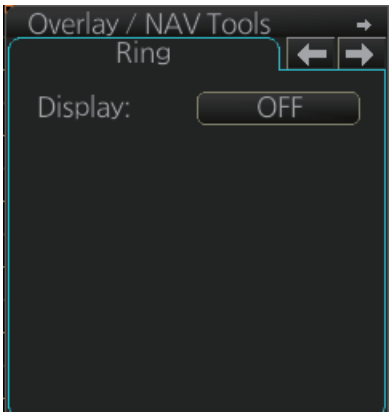
[Look-ahead] sets the area ahead and around own ship for which to check for safe navigation. See section 8.2 for how to activate own ship check.

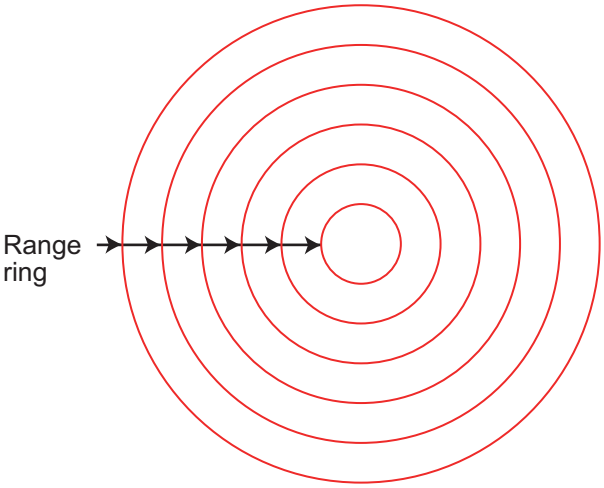


12.4 Ring

The range rings are the concentric set of rings on the ECDIS display. They provide an estimation of the range to an object. You can turn them on or off from the [Ring] page.

Note: The fixed range rings can also be shown/hidden from the pop-up menu. Right click the electronic chart display area, then select [Range Ring ON]/[Range Ring OFF]. Available in the Voyage navigation mode, Voyage planning mode.





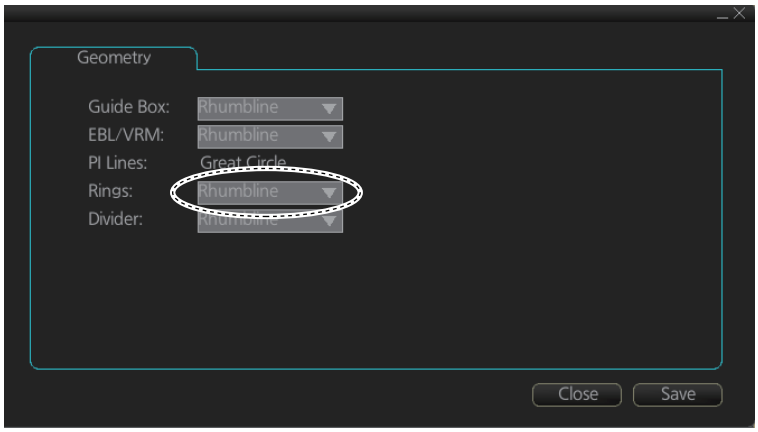
The interval between rings changes with the chart scale, as shown in the table below.

Chart scale	Ring interval (nm)	Chart scale	Ring interval (nm)
1:1,000	0.025	1:100,000	2.0
1:2,000	0.05	1:200,000	4.0
1:5,000	0.10	1:500,000	8.0
1:10,000	0.25	1:1,000,000	16.0
1:20,000	0.5	1:2,000,000	20.0
1:50,000	1.0		

How to select range calculation method

The range calculation method for the EBL and VRM can be selected to Rhumbline or Great Circle. Do as follows to select a calculation method.

1. Open the menu, then select [NAV Tools] and [Geometry] to show the [Geometry] page.

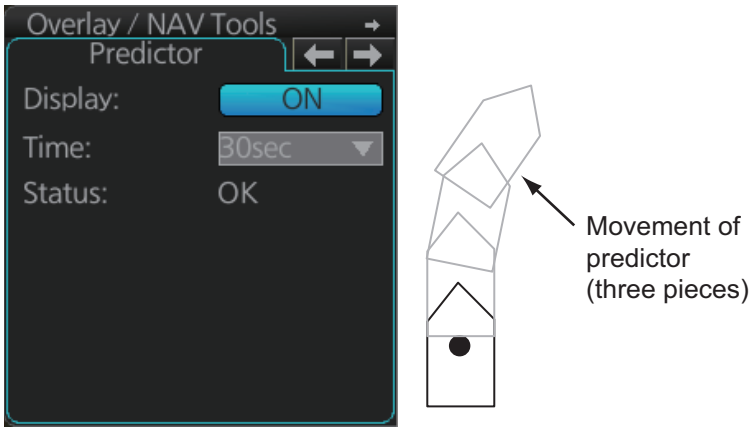


2. Select [Rhumbline] or [Great Circle] with the drop down list box for [Rings].
3. Click the [Save] button to save the setting, then click the close button to finish.

12.5 Predictor

The predictor is a tool for estimating your ship's future positions and behavior. The on-screen predictor graphic consists of three pieces of your ship, drawn in true scale to successive future positions. The position of the third symbol will be your approximate position at the end of the time interval selected. The predictor is calculated using current speed and rate of turn. Docking speed components (transversal bow speed, transversal stern speed, transversal center speed and rate of turn) are assumed to be stable during the prediction period. The predictor can be used in every steering-state, including manual steering.

To activate and set the Predictor, show the [Predictor] page. Turn the display on or off with [Display]. Set the time (30, 60, 90, 120, 150, 180 seconds), with [Time].



The Predictor is updated every three seconds internally and the status of the predictor is shown with [Status] as shown in the table below.

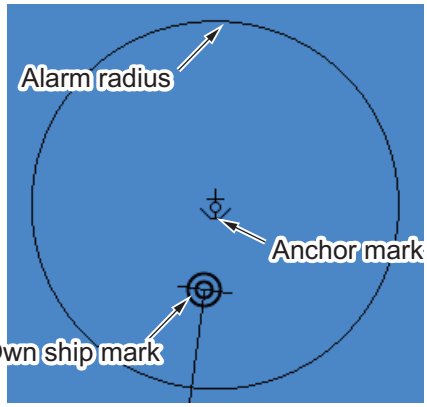
Indication	Meaning
"OK"	Speed is suitable, in accordance with estimation of ship's dynamics.
"Not Enough Speed"	Speed is too low, in accordance with estimation of ship's dynamics.
"Not Available. Reset Filter May Restore."	Calculation not possible, in accordance with estimation of ship's dynamics.

Note: The ship speed must be 0.5 kn or higher. The predictor may not be displayed or may not work properly if the speed is lower.

12.6 Anchor Watch

The anchor watch feature checks to see if your ship is drifting when it should be at rest. The anchor mark appears at the location of your ship's anchor. You can adjust the location for the anchor (see section 23.13).





To set the anchor watch:

1. Select the [Anchor Watch] page.
2. Set the alarm radius (in nautical miles) with [Drag Circle].
3. Drop the anchor, then click the [Drop Anchor] button.
   The anchor mark and alarm radius circle appear. You can adjust the location of the anchor mark and the alarm radius by drag and dropping them.
   Note: A latitude and longitude position can be set as the anchor watch position. Put a check mark in the box below the [Drop Anchor] button to show the latitude and longitude input boxes. Enter latitude and longitude, then click the [Drop Anchor] button.
4. Click the [Start Anchor Watch] button to start the anchor watch.

If your vessel travels more than the distance set here, the corresponding caution is generated.

If your ship drifts more than the anchor watch setting, the Alert "Anchor Watch" appears. The alert is escalated from warning level to alarm level if the alert is not acknowledged within two minutes. Also, if your vessel returns to within the tolerable radius, the alert is status is automatically changed to rectified.

To continue to use the anchor watch, click the [Clear Anchor] button to set the alarm about your current position. To stop the anchor watch, click the [Stop Anchor Watch] button. The caution is not generated even if your ship drifts more than the distance set with [Drag Circle]. Also, if the anchor watch alert is active and the [Stop Anchor Watch] button is clicked, the alert is also acknowledged and rectified.

12.7 UKC (Under Keel Clearance)

12.7.1 UKC overview

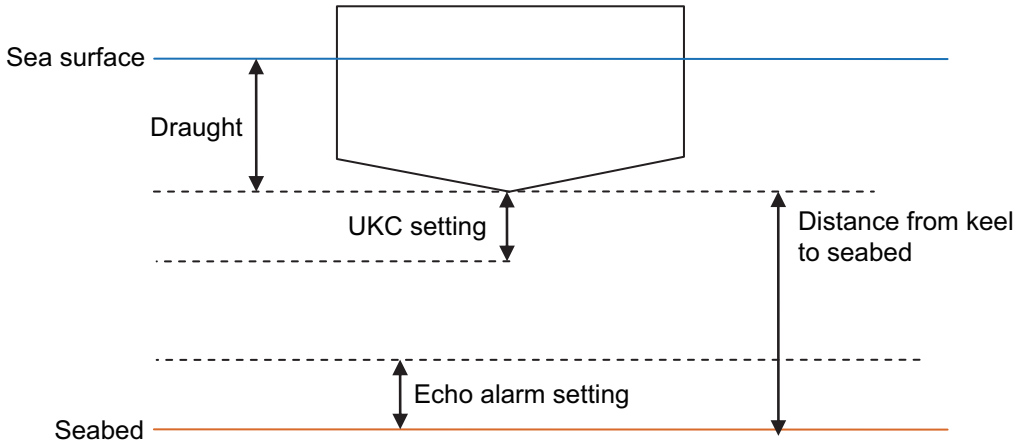
UKC is the distance between the deepest point of the vessel's hull and the seabed. The UKC feature continuously checks the ship's draught setting and actual speed.

When a look-ahead area is set and the depth within the set area gets shallower than the UKC, the Alert "UKC Limit" is generated.

UKC takes into account the amount of hull subsidence (Squat Effect). The evaluation criteria for the above alert is not based solely on the distance from the keel to the seabed, UKC or draught.

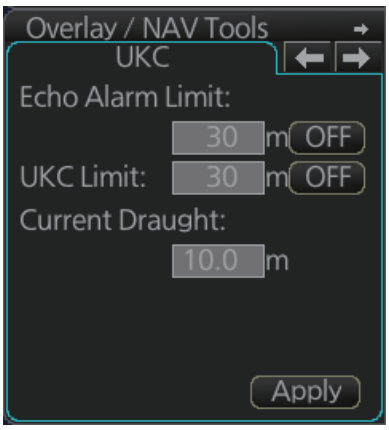
Note: When conducting a route check, UKC is calculated based on the planned speed for each leg.

The [Echo Alarm Limit] ([UKC] page in the [Overlay/NAV Tools] box) is compared with the depth (raw data) from the sensor. If the depth is shallower than the echo alarm limit, the Alert "Depth Limit" and the Alert "Actual UKC Limit" are generated.



12.7.2 How to set UKC

1. Select the [UKC] page from the [Overlay/NAV Tools] box.
2. Use [Echo Alarm Limit] to set the distance for the echo alarm. To activate the alarm, click the [ON/OFF] button to show [ON].
3. At [UKC Limit], set ship's UKC limit. To activate the UKC feature, click the [ON/OFF] button to show [ON].
4. Use [Current Draught] to set your ship's draught. Be sure to change the setting whenever the draught changes.
5. Click the [Apply] button to affect the changes.

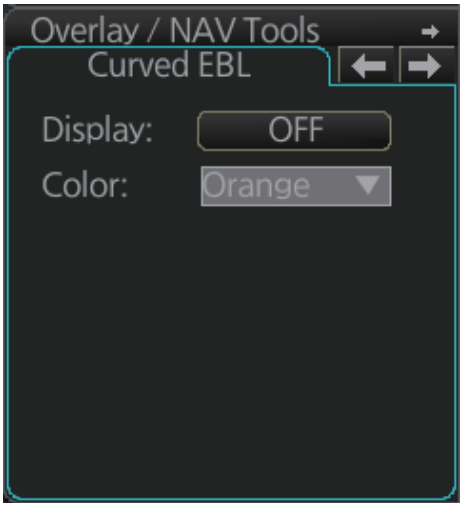


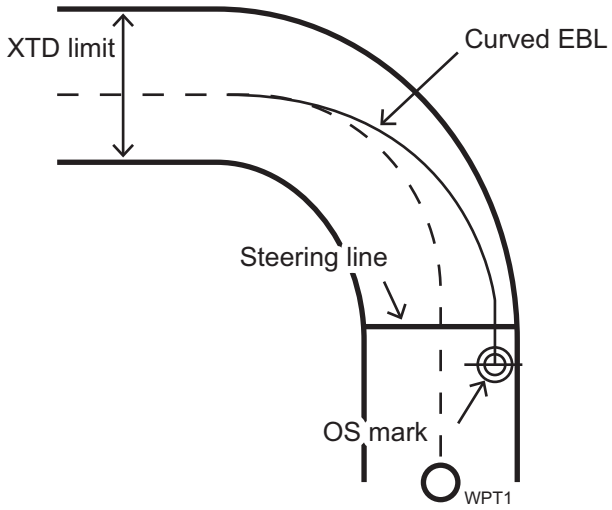
12.8 Curved EBL

The [Curved EBL] function shows the planned steering radius. You can use this function to determine the best location to begin a turn. You can also use the [Curved EBL] function to determine whether a turn is conducted as planned.

To show/hide the [Curved EBL], click the [ON]/[OFF] button on the [Curved EBL] page of the [Overlay/NAV Tools] box. The line color can be changed among red, green, blue, magenta, orange, brown, black, and yellow.

Note: This function is only available when a EC-3000/3005 with TCS functionality is connected to the network.





12.9 Divider

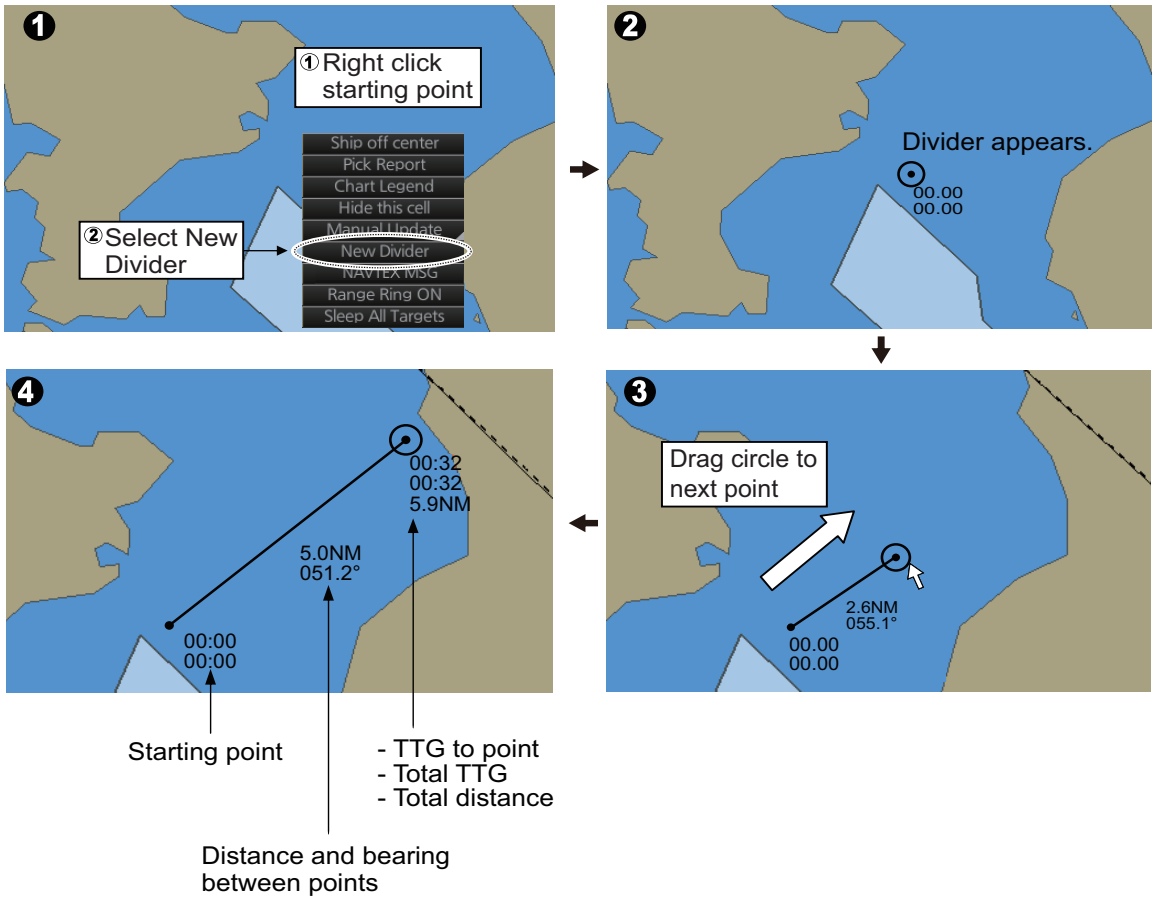
The divider performs the following calculations:

- Range and bearing between two points
- Total TTG from start to end
- TTG between two points
- Total distance from start to end

The divider is available in the Voyage navigation and Voyage planning modes. Only one divider can be displayed. The divider is neither saved nor shared among FMD-3xxx, FAR-3xxx.

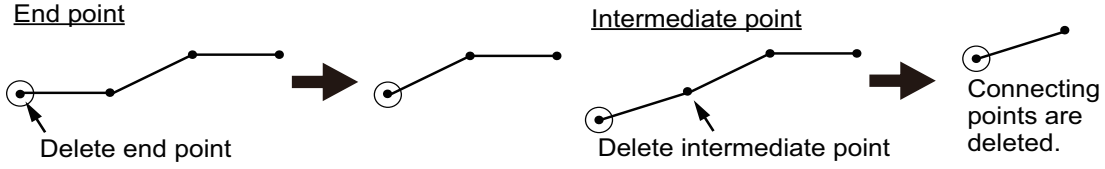
12.9.1 How to use the divider

Do as shown below to use the divider.

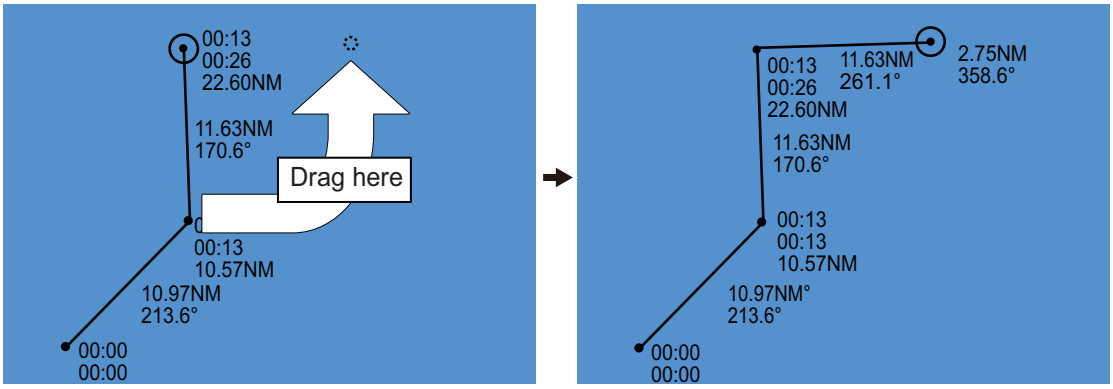


How to delete points

Point(s) can be deleted. Put the cursor on a point, right click, then select [Delete Points] from the pop-up menu. The point(s) deleted depends on the point selected.



You can also drag from an intermediate point to make another point.



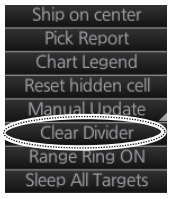
Note: If you drag a point to the edge of the displayed area, the chart scrolls in that direction.

12.9.2 Usage characteristics, limitations

- The distance between points is shown to the hundredths decimal place up to 100 NM and to the tenths decimal place thereafter.
- A maximum of 50 points can be inserted, and the maximum measurable distance between two points is 240.0 NM.
- The TTG value is rounded to the nearest decimal place. Therefore, the displayed total TTG may not equal the sum of all the TTGs.
- The TTG is measurable to 99:00. If the TTG is higher, the TTG indication is ">99:00".
- The ship's speed must be at least 0.5 kn to calculate TTG.
- The divider cannot be used in latitude higher than 85° when Rhumbline is in use.
- In the split screen display, the divider is viewable on both the main and sub views, but is operable only on the main view; that is, the view whose [ACTIVE] button is colored light blue).

12.9.3 How to deactivate and erase the divider

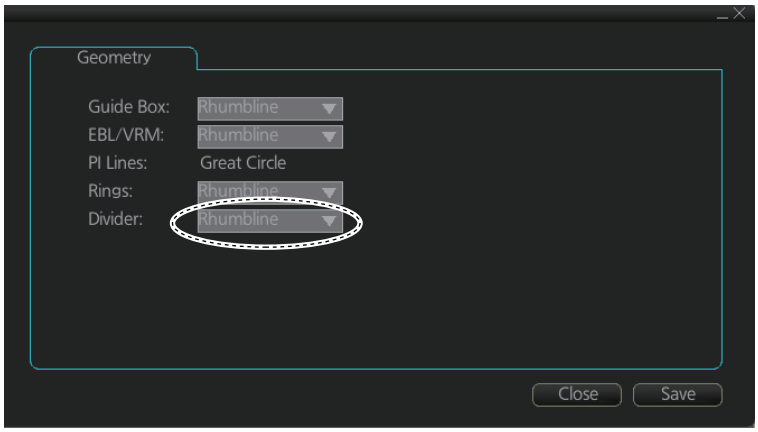
Get into the Voyage navigation or Voyage planning mode, then right-click the screen to show the context-sensitive menu. Select [Clear Divider].



12.9.4 How to select the range calculation method

The range calculation method for the EBL and VRM can be selected to Rhumbline or Great Circle. Do as follows to select a calculation method.

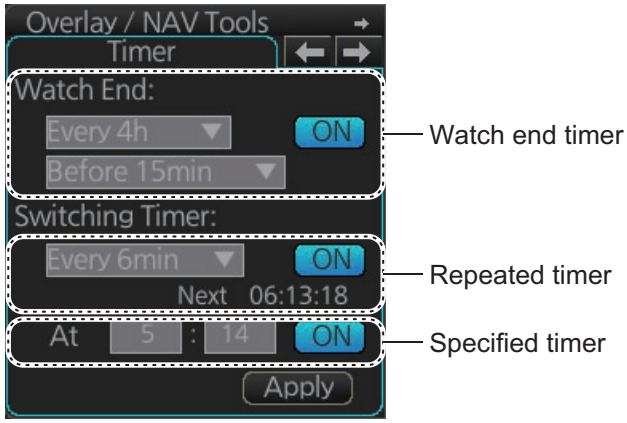
1. Open the menu, then select [NAV Tools] and [Geometry] to show the [Geometry] page.



2. Select [Rhumbline] or [Great Circle] with the drop down list box for [Divider].
3. Click the [Save] button to save the setting, then click the close button to finish.

12.10 Timer

The timer function provides three types of timers, watch end timer, repeated timer, and specified timer (alarm clock). An alert appears in the Alert box when the conditions of a timer are met.



12.10.1 Watch end timer

The watch end timer alerts you to end of a watch. This timer is useful for reminding the navigator to prepare to make a turn.

1. Display the [Timer] page.
2. Click the [OFF] button at the [Watch End] field. [OFF] changes to [ON] and the pull-down menu becomes available.
3. At the 1st pull-down menu at [Watch End], set how often to get an alert. The choices are [Every 1h], [Every 2h], [Every 3h], [Every 4h], [Every 6h], [Every 8h], [Every 12h], [Every 24h].

4. At the 2nd pull-down menu at [Watch End], set how many minutes before the specified time to get an alert. The choices are [Before 0min], [Before 5min], [Before 10min], [Before 15min], [Before 20min], [Before 25min], [Before 30min].
5. Click the [Apply] button.

For example, if the alert interval is 4 hours, and the time to generate the alert is 15 minutes before the alert time, the alert will be generated at 3:45, 7:45, 11:45, 15:45, 19:45, 23:45.

When the set time arrives, the message "Watch End" appears in the Alert box.

To disable the watch end timer, click the [ON] button in the [Watch End] section.

12.10.2 Repeated timer

The repeated timer provides repeat function of countdown alarm timing. When zero is reached, the timer repeats countdown from the programmed time. This timer is useful for reminding you of repeating tasks and routines, such as setting LOP.

1. Display the [Timer] page.
2. Click the [OFF] button at the [Switching Timer] field. [OFF] changes to [ON] and the pull-down menu becomes available.
3. At the pull-down menu at [Switching Timer], set the time to repeat the alert. The choices are [Every 1min], [Every 2min], [Every 3min], [Every 4min], [Every 5min], [Every 6min], [Every 10min], [Every 15min], [Every 20min], [Every 30min], [Every 60min].
4. Click the [Apply] button.

The [Next] field shows the next alert time.
For example, If the current time is 12:34:56 and the timer is set for 6 minutes, alerts will be generated at the intervals of 12:40:56, 12:46:56, 12:52:56.

After setting the alert, the message "Repeated Timer" appears in the Alert box. Depending on the current time setting (UTC or local time), the time when the next alert will occur will change.

To disable the repeated timer, click the [ON] button in the [Switching Timer] section.

12.10.3 Specified timer (alarm clock)

The specified timer alerts you at a specific time of the day.

1. Display the [Timer] page.
2. Click the [OFF] button. [OFF] changes to [ON] and the pull-down menu becomes available.
3. At the [At] field, set the hour (0 to 23) and minute (0 to 59) for the alarm clock
4. Click the [Apply] button.

When the specified time comes, the message "Specified Timer" appears in the Alert box.

To disable the specified timer, click the [ON] button in the [At] section.

13. TRACKED TARGET (TT) OPERATIONS

With connection to a radar, the movement of a maximum of 200 radar-tracked targets can be shown on the chart.

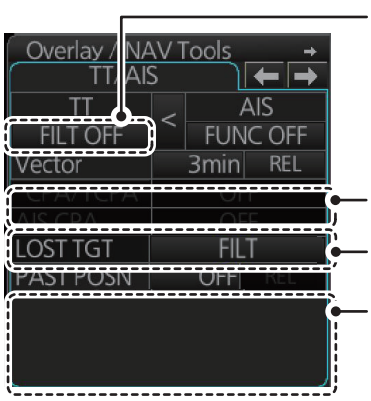
Note: To use the TT function on this device, the data from tracked targets must be ground referenced. If ground referenced data is not available, the following occurs.

- The vector is not shown.
- The COG, SOG indication is “missing”.

13.1 How to Show, Hide TT

Do the following to show or hide the TT.

1. Select the [TT/AIS] page from the [Overlay/NAV Tools] box.
2. Click the indication shown in the figure below to show [OFF], [FILT ON] or [FILT OFF] as appropriate.



Click to change the TT function’s behavior.
OFF: TT function is off.
FILT ON: TT target filter is in use.
FILT OFF: TT target filter is not used.

CPA/TCPA settings not available

LOST TGT (target) filter settings

For systems which have the optional RADAR function included, this section of the TT/AIS page appears blank.

Note: The TT symbols, AIS symbols and radar displays can be hidden. Click the [CLEAR RADAR] button on the Status bar to hide those displays.



13.2 TT Symbols and TT Attributes

13.2.1 TT symbols

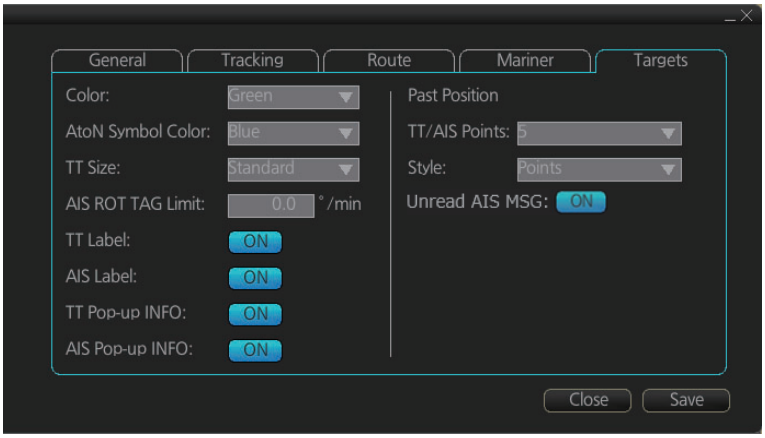
The symbols used in this equipment comply with IEC 62288 Ed.3.

Symbol	Default color	Name	Description
	Green	Past position point	Marks a past position of a TT.
	Green	Target under manual acquisition	A target acquired manually is initially indicated with a dashed circle.
	Green	Acquired target	Thick solid circle with vector indicating steady state tracking (within three minutes after acquisition).
	Red	Lost target	Lost TT shown with two red diagonal lines. There is no warning for lost TT on ECDIS. This symbol appears only when connected radar sends TTM/TTD whose status is “lost.”
R 01	Green	Reference target	Used to calculate own ship's over-the-ground speed (echo-referenced speed) for ground stabilization.
	Green	Association target	Association TT is shown in AIS symbol and TT data.
	Green	Target selected	TT selected to show its data.

13.2.2 TT symbol color and size

The color and size of the TT symbol can be changed to your liking. Note that the color of the AIS symbol is also changed.

1. Click the [DISP], [SET] and [Symbol DISP] buttons on the InstantAccess bar™ to show the [Symbol Display] menu.
2. Click the [Targets] tab.



3. Select the color among, green, blue, black, magenta and brown, with the [Color] pull-down list.
4. Select the size from standard or small, with the [TT Size] pull-down list.

13.3 How to Filter TT Targets

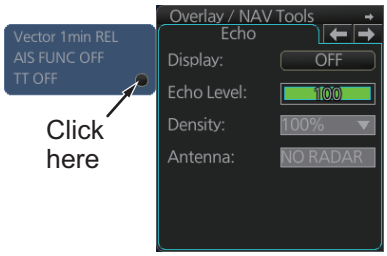
When there is a large number of TT targets tracked at one time, the screen can become crowded. You can limit the TT targets display on your screen, based on distance from your vessel.

1. Open the main menu and select [TT/AIS]→[Setting]→[Setting.1].



Note: You can also access the TT settings using the following methods:

- Select the [TT/AIS] page from the [Overlay/NAV Tools] box, right-click to show the context menu and select [Settings].
- From the TT/AIS window at the left-side of the [Overlay/NAV Tools] box, click the radio button. The TT/AIS window only appears when a page other than TT/AIS is displayed.



2. In the TT DISP Filter column, set the [MAX Range] as required.
   TT symbols beyond the range set here do not appear on the screen.
3. Click the [ON/OFF] button to show [ON].
4. Click [Save] to apply the settings, then click the [Close] button.
   The settings applied here affect the TT display when the TT display filter is set to [FILT ON].

Note: AIS and tracked target viewing limitations are as follows:

- AIS and tracked targets are displayed on top of chart 1:1,000,001 for S57 charts.
- AIS and tracked targets are displayed on top of chart 1:1,900,001 for ARCS charts. This allows display of AIS and tracked targets on top of the largest scale ocean charts (original scale 1:3,500,000) when they are zoomed to "overscale".

13.4 How to Set Vector Length and Vector Motion

Ground stabilization and sea stabilization

In the TM mode, the target vector can be displayed with reference to ground or water. To switch between ground or water, click the measurement mode box at the top left of the screen. You can also switch between [Ground] and [Water] on the [SPD] page ([MENU]→[System Sensor Settings]→[SPD]). Select [Bottom] for ground stabilization or [Water] for sea stabilization. The Vector mode indication in the true motion is [T GND] or [T WAT].

Water reference is a method of display using heading and speed over the water. Ground reference is a method of display using speed over the ground or current correction. If the accuracy is low, apply an offset to the current indication.

True vector

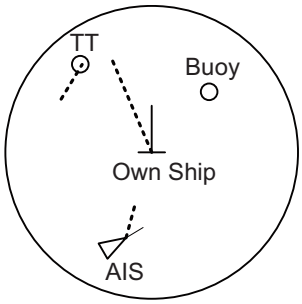
In the true motion mode, all fixed targets such as land, navigational marks and ships at anchor remain stationary on the radar overlay with vector length zero. But in the presence of wind and/or current, the vectors appear on fixed targets representing the reciprocal of set and drift affecting own ship unless set and drift values are properly entered.

In the true vector mode, there are two types of stabilization: ground stabilization (T GND) and sea stabilization (T WAT). The stabilization mode is automatically selected according to speed selection, as shown in the table below.

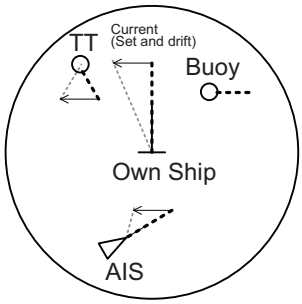
Speed selection	True vector mode
LOG(WT)	T WAT
LOG(BT)	T GND
POSN	T GND
REF	T GND
MAN	T GND
MAN w/set & drift	T GND

Relative vector

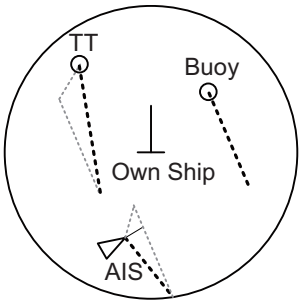
Relative vectors on targets that are not moving over the ground such as land, navigational marks and ships at anchor will represent the reciprocal of own ship's ground track. A target whose vector passes through own ship is on a collision course. (Dotted lines in the figure are for explanation only.)



True vectors in ground stabilization

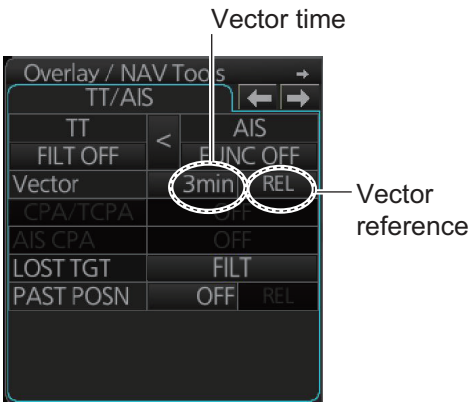


True vectors in sea stabilization



Relative vectors

To set the vector, click the vector time and vector reference indications in the [TT/AIS] page to set them.



13.5 How to Display TT Data

13.5.1 How to display target data for individual TT

By Control Unit

Put the cursor on a TT, then push the **TARGET DATA** key.

By trackball

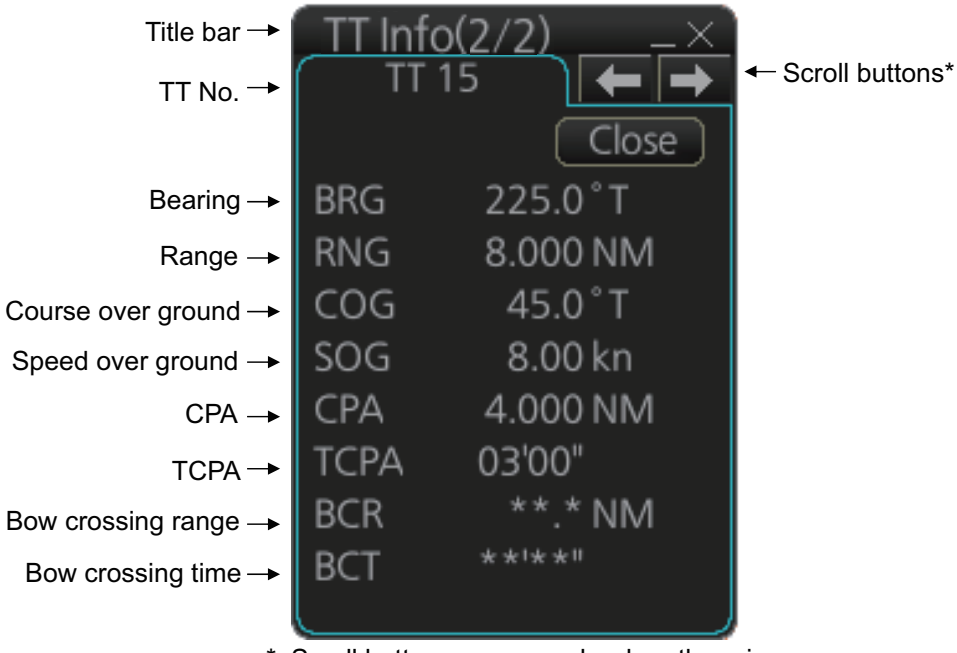
Click the target for which you want to show its data.

TT data

To erase TT data from a data box, click the appropriate close data button.

The basic TT data display shows the following information:

- Target's number. The same number as the matching target on the radar. When a target is erased the number will not be reused until the power is re-set or more than 200 targets are acquired.
- Bearing (BRG) and distance (RNG) of the target from own ship
- True speed (SOG) and true course (COG) of the target
- CPA and TCPA. A negative TCPA value means that you have already passed the closest point and the TT is going away from own ship. CPA and TCPA value display range is determined by the received sentence, as shown below.
  - **CPA**: For TTM, the range is 0.00 NM to 999.99 NM; for TTD, the range is 0.00 NM to 163.82 NM.
  - **TCPA**: For TTM, the time is -99’59” to 99’59”; for TTD, the time is -81’59” to 81’59”.
- The distance from your ship when a TT crosses your ship's bow (BCR), and the time until a TT crosses your ship's bow (BCT). The BCR and BCT values are always displayed with asterisks (*).



*: Scroll buttons appear only when there is more than one TT target’s data displayed.

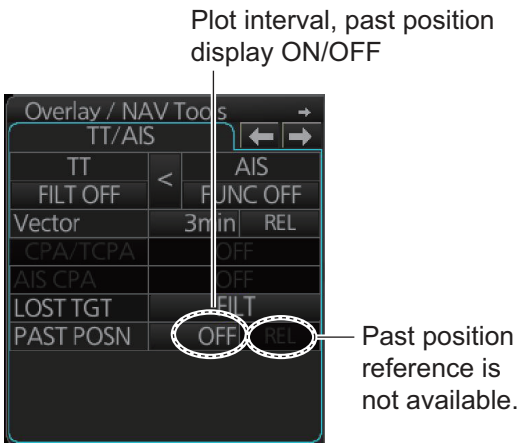
13.6 Displaying Past Positions of TT

The past position display shows equally time-spaced dots marking past positions of TT. A new dot is added at preset time intervals until the preset number is reached. If a TT changes its speed, the spacing will be uneven. If it changes course, its plotted course will not be a straight line.

You can set the plot interval on the [TT/AIS] page in the [Overlay/NAV Tools] box, at the locations circled in the illustration below.

13.6.1 How to enable, disable the past position display

Select the [TT/AIS] page from the [Overlay/NAV Tools] box. Click the indications circled in the figure below to set the plot interval (or disable the display).



13.6.2 Past position point attributes

You can define past position point attributes for TT by points and style.

1. Click the [DISP], [SET] and [Symbol DISP] buttons on the InstantAccess bar™ to show the [Symbol Display] menu.
2. Click the [Targets] tab.



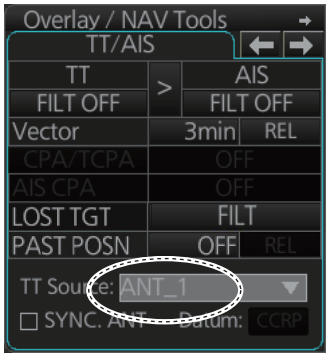
3. At [TT/AIS Points], select the number of points to show, [5] or [10].
4. At [Style], select the style for the past position points. The choices are [Points] and [Points and Dots].
5. Click [Save], then [Close] to apply the settings and close the menu.

13.7 How to Set the TT Source

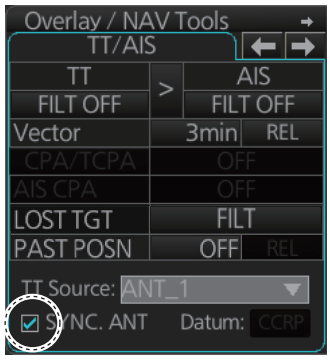
13.7.1 TT source for configurations compliant with the latest regulations

When the connected radar is compliant with the latest regulations, the TT source can be set as one of the antennas (ANT_1 etc.) from the [TT Source] drop-down box.

Normally, select the radar antenna which is selected to display radar echoes as the TT source.



To automatically select the radar currently displaying radar echoes as the TT source, check the [SYNC. ANT] box on the [TT/AIS] page in the [Overlay/NAV Tools] box.



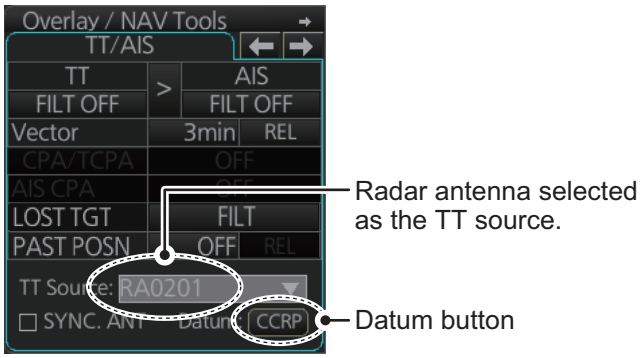
Notes on usage

- Antennas are displayed in numerical order, based on their SFID (Service Flow ID). For example, to use RAS001 select [ANT_1], to use RAS002 select [ANT_2].
- With [SYNC. ANT] checked, the antenna selected on the [Echo] page in the [Overlay/NAV Tools] box is marked with an asterisk.
- With [SYNC. ANT] checked, the checkmark is removed when a selection is made the drop-down box.
- [SYNC. ANT] is inoperative if no antenna is registered.
- The [Datum] button has no function when the connected radar is compliant with the latest regulations.

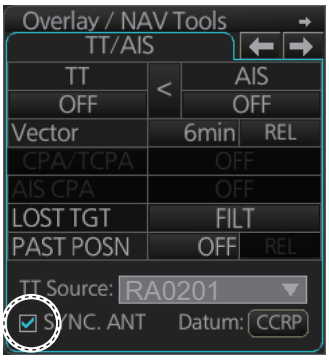
13.7.2 TT source for non-compliant configurations

For retro-fits and configurations where the connected radar does not comply with the latest regulations, you can select one of the antennas listed as "other antennas" (RA0201, etc.) as the TT source.

From the drop-down box, select the antenna SFID (set at installation) for the antenna to use as the TT source.



To automatically select the radar currently displaying radar echoes as the TT source, check the [SYNC. ANT] box on the [TT/AIS] page in the [Overlay/NAV Tools] box.



Notes on usage

- Radar antennas which are set as "other sensors at installation are displayed in numerical order, based on their SFID. For example RA0201, RA0202.
- When the radar selected is one of the "other sensors" antennas, the [Datum] button becomes active.
- The Datum button selects the reference position for use in the TTM sentence. Click the [Datum] button to select either [CCRP] or [ANT] (antenna).
- When [Datum] is set to [ANT], the indication appears in yellow color.
- With [SYNC. ANT] checked, the antenna selected on the [Echo] page in the [Overlay/NAV Tools] box is marked with an asterisk.
- With [SYNC. ANT] checked, the checkmark is removed when a selection is made the drop-down box.
- [SYNC. ANT] is inoperative if no antenna is registered.

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14. AIS FUNCTIONS

14.1 Introduction

An AIS transponder can be connected to this radar to overlay AIS objects on the radar display. The maximum number of AIS objects that can be stored in storage buffer of this radar is shown in the table below. When this buffer becomes full of AIS objects, an appropriate alert is generated to alert you to full storage buffer. The storage buffer contains automatic dead reckoning for AIS targets (class A and B AIS targets and SAR vessels) and AIS SAR aircrafts, which is based on reported Speed Over the Ground (SOG), Course Over the Ground (COG), Rate Of Turn (ROT) and heading. The storage buffer also contains calculation of range, bearing, CPA, TCPA, etc.

AIS object type	Processing capacity	Alert when reaching	
		95% of processing capacity	100% of processing capacity
AIS targets			
Class A target	1880	AIS CPTY 95%	AIS CPTY FULL
Class B target		AIS CPTY 95%	AIS CPTY FULL
AIS data report			
AIS base station	50	-	AIS DATREP FULL
AIS SAR aircraft		-	AIS DATREP FULL
Physical AIS AtoN		-	AIS DATREP FULL
Virtual AIS AtoN		-	AIS DATREP FULL
Mobile AIS AtoN		-	AIS DATREP FULL
Mobile Virtual AIS AtoN		-	AIS DATREP FULL
Synthetic AIS AtoN		-	AIS DATREP FULL
AIS locating device			
AIS-SART* (active)	20	-	AIS SART FULL
AIS-SART* (test)		-	AIS SART FULL
AIS synthetic target			
AIS synthetic target	50	-	AIS SYN TGT FULL

*: Includes AIS-SART, AIS MOB, and EPIRB-AIS.

The table below shows the display capacity for the AIS objects. When the number of displayed AIS objects reaches the display capacity, an appropriate alert is generated.

AIS object type	Display capacity	Alert when reaching	
		95% of processing capacity	100% of processing capacity
AIS targets			
Class A target	1000	AIS DISPLAY 95%	AIS DISPLAY FULL
Class B target		AIS DISPLAY 95%	AIS DISPLAY FULL
AIS data report			
AIS base station	50	-	-
AIS SAR aircraft		-	-
Physical AIS AtoN		-	-
Virtual AIS AtoN		-	-
Mobile AIS AtoN		-	-
Mobile Virtual AIS AtoN		-	-
Synthetic AIS AtoN		-	-
AIS locating device			
AIS-SART* (active)	20	-	-
AIS-SART* (test)		-	-
AIS synthetic target			
AIS synthetic target	50	-	-

*: Includes AIS-SART, AIS MOB, and EPIRB-AIS.

If a new AIS object is received while the maximum number of processing points or maximum display points has reached the upper limit, the ECDIS handles the new AIS object as follows.

- **AIS targets**: If the maximum number of processing points has reached the upper limit, a new AIS is discarded. If the maximum number of display points has reached the upper limit, symbols close to your own ship will be prioritized and displayed up to the maximum number of display points.
- **AIS data report/AIS transponder/AIS synthetic target**: If the maximum number of processing points or maximum display points has reached the upper limit, a new AIS is discarded.

The reporting interval for data sent from the AIS transponder depends on the speed and course of the AIS object being tracked. The table below shows the IMO standard AIS transponder reporting interval. Based on the table below, this unit determines which AIS object is being tracked.or has become lost. For a lost target, its AIS symbol disappears when the lost target alert is acknowledged.

Type of Ship	IMO nominal reporting interval	Lost object indication (reporting interval >)
Class A: Navigation status is “anchor” or “not under command” or “moored” or “aground”, and SOG ≦ 3kn	3 min	-
Class A: Navigation status is “anchor” or “not under command” or “moored” or “aground”, and SOG > 3kn	10 s	-
Class A: 0kn ≦ SOG < 14kn	10 s	-
Class A: 14kn ≦ SOG ≦ 23kn	6 s	-
Class A: SOG > 23kn	2 s	-
Class B: “CS” SOG < 2kn	3 min	-
Class B: “CS” SOG ≧ 2kn	30 s	-
Class B: “SO” 0 kn ≦ SOG < 2kn	3 min	-
Class B: “SO” 2 kn ≦ SOG < 14kn	30 s	-
Class B: “SO” 14 kn ≦ SOG ≦ 23kn	15 s	-
Class B: “SO” SOG > 23kn	5 s	-
Class A and Class B: no SOG available	N/A	-
AIS SAR aircraft	10 s	1 min
AIS AtoN	6 min	18 min
AIS base station	10 s	1 min
AIS-SART	N/A	6 min
AIS synthetic target	6 min	-

An AIS transponder "sees" all ships fitted with an AIS transponder belonging to either a Class A AIS or Class B AIS. Additionally the AIS transponder receives messages from ships and non-ships (AIS SART aircraft, AIS AtoN, AIS base station, and AIS search, and rescue transmitter).

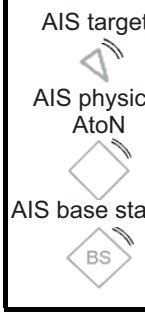
There can be several hundreds or several thousands of AIS objects, and of those only a few will be significant for your ship. To remove unnecessary class A or class B AIS targets from the ECDIS display, the feature "activated and sleeping AIS targets" is available. Initially any new AIS target received by an AIS transponder is not active (=sleeping). Such sleeping targets are shown with a small triangle. The operator can pick any AIS target and change it from sleeping to activated. Activated AIS targets are shown with a large triangle with speed vector, headline, ROT indicator, etc. Further, the operator can pick activated AIS targets and change their status to sleeping.

14.2 AIS Symbols

AIS objects are marked with an appropriate symbol as shown in the table below.

AIS object symbols

Symbol	Default color	Name	Description
	Green	AIS tracked target past position point	Mark past position.
	Green	Sleeping AIS target	Sleeping AIS symbol. (Lines are thinner than Active AIS symbol.)
	Green	Activated AIS target	Activated AIS target, with vector for course and speed. (Lines are thicker than sleeping AIS symbol.) Color can be changed with the menu.
	Green	Activated AIS target, true scale symbol	Activated AIS target with symbol shown in true scale. Association AIS symbol or activate AIS symbol is displayed within the ship's symbol when activated. This symbol disappears when the size of the true scale symbol is smaller than 3 mm on the display.
	Blue	AIS-SART	AIS-SART (search and rescue radar transponder), includes AIS MOB, EPIRB-AIS
	Blue	AIS-SART Test	AIS-SART (search and rescue radar transponder) test. Includes AIS-SART, AIS MOB and EPIRB-AIS.
	Green	Association AIS target	AIS and TT target declared as "association target". AIS symbol and AIS data are used.
	Green	Heading-turn indicator	Target's direction of turning.
	Green	SAR Aircraft - Fixed wing	SAR aircraft - fixed wing
	Green	SAR Aircraft - Helicopter	SAR aircraft.- helicopter
	Blue	AIS Base Station	AIS base station
	Green	AIS Synthetic Target	VTS generated synthetic target.
	Yellow	AIS Synthetic Target - Distress	Synthetic target in vessel distress situations.
	Green	AIS target selected symbol	Target selected to display its data.

Symbol	Default color	Name	Description
	Green	SAR Vessel	SAR (Search And Rescue) vessel
	Red (fixed)	AIS lost target	Intersecting diagonal lines are put on the AIS symbol and flash. The lost function applies only to AIS data reports and AIS position transponders.
	Green	Non HDG/COG sleeping AIS target	Sleeping AIS symbol without HDG and COG. Dashed line.
	Green	Non HDG/COG activated AIS target	Activated AIS symbol without HDG and COG. Dashed line.
	Green	Non HDG/COG synthetic target	Denotes VTS generated synthetic target without HDG and COG.
	Green	Unread AIS message (Note 5)	AIS symbol with unread or viewing AIS message.

Note 1: The equipment continues to process AIS objects when the AIS feature is switched off. When the AIS is again turned on, symbols are immediately displayed.

Note 2: AIS symbols are momentarily erased after the screen is redrawn when the heading is changed from the Head-up mode.

Note 3: The alert "AIS communication lost" occurs when no AIS data is received. Check the status of the AIS transponder. Alert priority depends on state of the AIS feature.
• AIS function ON: Warning
• AIS function OFF: Caution

Note 4: The color of the AIS symbol can be changed on the [Targets] page of the [Symbol Display] menu.

Note 5: [Unread AIS MSG] ([Targets] page) must be turned on to show the unread AIS message symbol.

Note 6: See the next page for AIS physical and virtual AtoN symbols.

AIS AtoN symbols

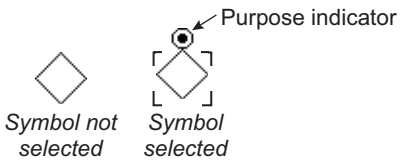
The table below shows all the AIS AtoN symbols.

Note: Synthetic AtoN is described as basic shape.

AIS Physical AtoN Symbol*1	AIS Virtual AtoN Symbol	Default Color	Meaning
		Blue	Basic shape
		Blue	RACON
		Blue	Emergency wreck mark
		Blue	North cardinal mark
		Blue	East cardinal mark
		Blue	South cardinal mark
		Blue	West cardinal mark
		Blue	Port hand mark
		Blue	Starboard hand mark
		Blue	Isolated danger
		Blue	Safe water
		Blue	Special mark

AIS Physical AtoN Symbol*1	AIS Virtual AtoN Symbol	Default Color	Meaning
	—	Line: Yellow*2 Char: Yellow*2	Off position*3
	—	Line: Blue Char: Yellow*2	Off or dimmed lighting installations
	—	Line: Blue Char: Yellow*2	RACON error
	—	Line: Blue Char: Yellow*2	Abnormal lighting installation, or AIS AtoN with abnormal lighting installation and racon installation
	—	Line: Yellow*2 Char: Yellow*2	Missing*3
		Blue	Mobile AtoN, basic shape
		Blue	Self-propelled, but direction not reported or unavailable mobile AtoN
		Blue	Tethered mobile AtoN
		Blue	Mobile AtoN with COG information. Arrow mark points in course direction of COG within ±22.5° sectors.

*1: The purpose indicator appears at the top a symbol (for example ⊙). The indicator is always displayed in the radar mode, and when a symbol of this type is selected in the chart mode or chart radar mode.



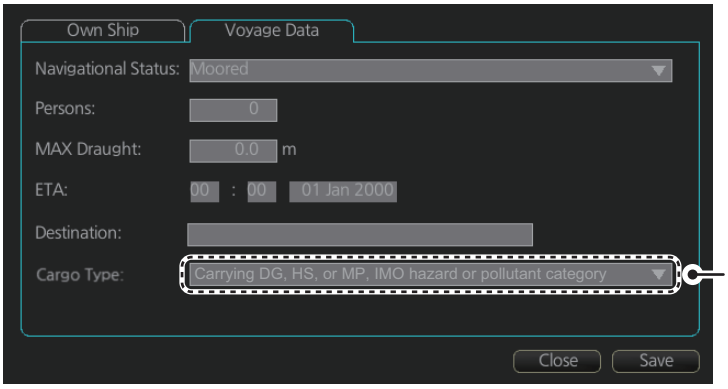
*2: Color not changeable.

*3: “Unlit”, “Racon err” and “Error” may be included.

14.3 Voyage Data

Before you embark on a voyage, set your navigation status, ETA, destination, draught and crew, on the [Voyage Data] page in the [NAV Status] menu. The data entered here is reflected to the AIS transponder.

1. Open the menu, then click both [NAV Status] in the [TT/AIS] menu and the [Voyage Data] tab.



Displayed according to connected AIS transponder

2. Click the [Navigational Status] drop-down list, then select your navigational status, from the list below.

- Underway using engine
- At anchor
- Not under command
- Restricted maneuverability
- Constrained by her draught
- Moored
- Aground
- Engaged in fishing
- Under way sailing
- Reserved for high speed craft
- Reserved for wing in ground
- Power driven vessel towing astern (regional use)
- Power driven vessel pushing ahead or towing alongside (regional use)
- Reserved for future use
- AIS-SART (active)
- Not defined

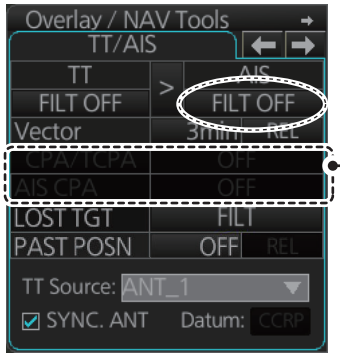
3. Enter the number of persons onboard (0 - 8191) at [Persons].
4. Enter ship's draught (0.0 - 25.5 (m)) at [MAX Draught].
5. Enter your ETA at [ETA], in UTC.
   Day: two digits
   Month: Three-character abbreviation
   Year: Four digits
6. Enter your destination at [Destination], using a maximum of 20 characters.
7. Use the [Cargo Type] pull-down menu to specify the type of cargo your vessel is carrying,

- All ships of this type
- Carrying DG, HS, or MP, IMO hazard or pollutant category X
- Carrying DG, HS, or MP, IMO hazard or pollutant category Y
- Carrying DG, HS, or MP, IMO hazard or pollutant category Z
- Carrying DG, HS, or MP, IMO hazard or pollutant category OS
- Reserved for future use (x4)
- No additional information

8. Click the [Save] button to register the settings. The settings are sent to the AIS transponder.

14.4 How to Show, Hide AIS Objects

Objects that are being tracked by an AIS transponder can also be displayed on the ECDIS display. To show or hide AIS object, select the [TT/AIS] page from the [Overlay/NAV Tools] box. Click the indication circled in the figure below to display [OFF], [FILT ON], [FILT OFF] or [FUNC OFF].



CPA/TCPA settings are not available from this system.

[**FILT OFF**]: Shows all AIS objects within the range set.
[**FILT ON**]: AIS objects are shown according to the AIS DISP filter settings, on the [TT/AIS] menu.
[**FUNC OFF**]: Deactivates the AIS function.

To deactivate the AIS function, click the location circled above to show [FUNC OFF]. Then, processing of AIS objects is stopped. To turn on the AIS function, click the area to show [FILT OFF], [FILT ON] or [OFF]. If the AIS function is activated while manually entering the heading, speed, or position, the manually entered information will be invalidated.

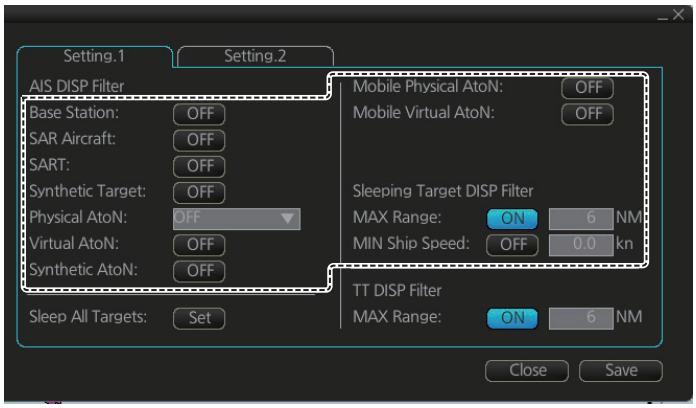
Note: The radar display, TT symbols and AIS symbols can be hidden from the Status bar Click the [CLEAR RADAR] button on the Status bar to hide those displays.



14.5 How to Filter AIS Objects

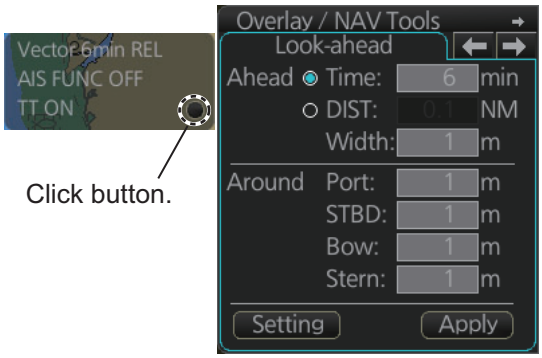
The display screen may become cluttered if too many AIS objects are shown. If this occurs, you can remove unwanted AIS objects by object type, distance from own ship, or ship speed. For example, you may want to remove slow moving objects if it is not necessary to display them.

1. Right-click [AIS] on the [TT/AIS] page in the [Overlay/NAV Tools box], select [Setting].



Note: The [Setting.1] page can also be opened as follows:

- MENU→[TT/AIS]→[Setting]→[Setting.1] tab
- Click the radio button on the window that appears to the right of the [Overlay/NAV Tools box], when a page other than the [TT/AIS] page is selected.



2. In the [AIS DISP Filter] window, set each item referring to the descriptions below.
   - [**Base Station**]: Show or hide the AIS base station symbol.
   - [SAR Aircraft]: Show or hide the AIS aircraft symbol.
   - [SART]: Show or hide the AIS-SART symbol.
   - [Synthetic Target]: Show or hide the AIS synthetic symbol.
   - [Physical AtoN]: Set to [ON] to hide the symbols of real AIS AtoN. If [UNHEALTHY] is selected, only real AIS aids with errors (“Off Posn”, “Unlit”, “Racon err”, “Error”, or “Missing”) are displayed.
   - [Virtual AtoN]: Show or hide the virtual AtoN symbol.
   - [Synthetic AtoN]: Show or hide the synthetic AtoN symbol.
   - [Mobile Physical AtoN]: Show or hide the mobile physical AtoN symbol.
   - [Mobile Virtual AtoN]: Show or hide the mobile virtual AtoN symbol.
   - [MAX Range]: Turn on button, then set maximum range. Any AIS object not within the range set is not shown on the display.
   - [MIN Ship Speed]: Turn on button, then set minimum speed. Any AIS object slower than set here is not shown on the display.

3. Click the [Save] button to save settings. Click the [Close] button to close the dialog box. These settings are effective when the AIS display setting is [FILT ON]. The AIS display setting [OFF] shows all AIS objects (same as [FILT OFF]).

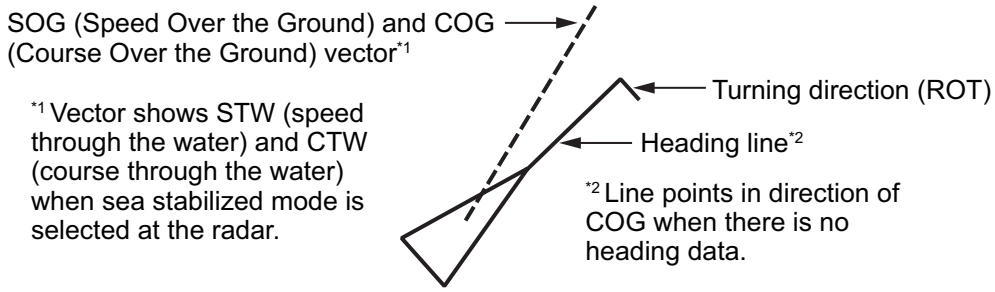
Note: AIS objects and TT viewing limitations are as follows:

- AIS objects and TT are displayed on top layer of chart 1:1,000,001 for S57 charts.
- AIS objects and TT are displayed on top layer of chart 1:1,900,001 for ARCS charts. This allows display of AIS objects and TT on top of the largest scale ocean charts (original scale 1:3,500,000) when they are zoomed to "overscale".

14.6 How to Activate AIS Targets

When you change a sleeping target to an activated target, the target's course and speed are indicated with a vector. The vector can be monitored to find vessel movement.

To activate a AIS target, select the target with the cursor, then press the **ACQ/ACT** key or left button.



Note: You can activate only AIS targets (class A and B AIS targets and SAR vessels).

14.7 How to Sleep Activated AIS Targets

A large number of active AIS targets on the screen can make it difficult to identify radar images and TT targets. In such cases, changing the active target to a sleeping target makes the radar image easier to see.

Note: You can "sleep" only AIS targets (class A and B AIS targets and SAR vessels).

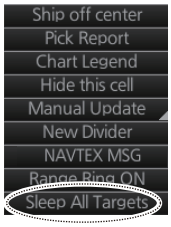
14.7.1 How to sleep an activated AIS target

To sleep an activated target, put the cursor on an activated target, then use the **TARGET/CANCEL** key.

14.7.2 How to sleep all activated AIS targets

You can sleep all activated targets by two methods, from the menu, and directly on the chart.

Sleep all activated targets from the pop-up menu



1. Select the Voyage navigation mode, or the Planning navigation mode, then right click the electronic chart display area.
2. Click [Sleep All Targets] to sleep all targets. All AIS targets now have the sleeping target symbol.

Sleep all activated targets from the menu

1. Open the [Overlay/NAV Tools] box, then right click [AIS].

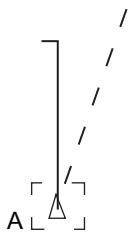


2. Click the [Set] button of [Sleep All Targets].
3. Click the [Save] button to save settings. Click the [Close] button to close the dialog box.

14.8 How to Display AIS Object Data

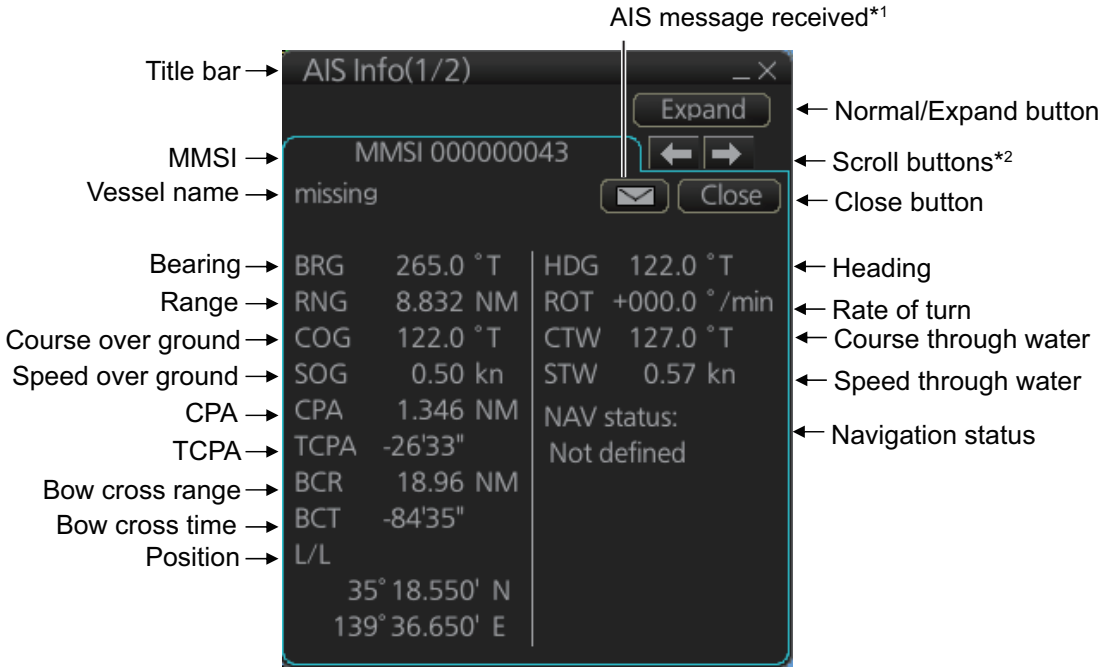
14.8.1 Basic AIS data

To display basic data, put the cursor on the desired target, then press the **TARGET DATA** key or left button. A broken square is put on the selected symbol and the AIS Information box shows the basic AIS object data. Below is an example of a Class A AIS target. The information displayed depends on the object selected. See section 14.8.3 for details.



Note: CPA/TCPA information appears in the AIS info when the following two requirements are met. If the requirements are not met, CPA/TCPA appears as "*".

- AIS target is activated at the connected radar.
- The TTD sentence for the selected target is received from the connected radar.



*1: The icon appears when an AIS message is received from an AIS object. Click the icon to show the AIS message(s). A maximum of the two latest messages is displayed.
*2: Scroll buttons appear only when there is more than one AIS object data displayed.

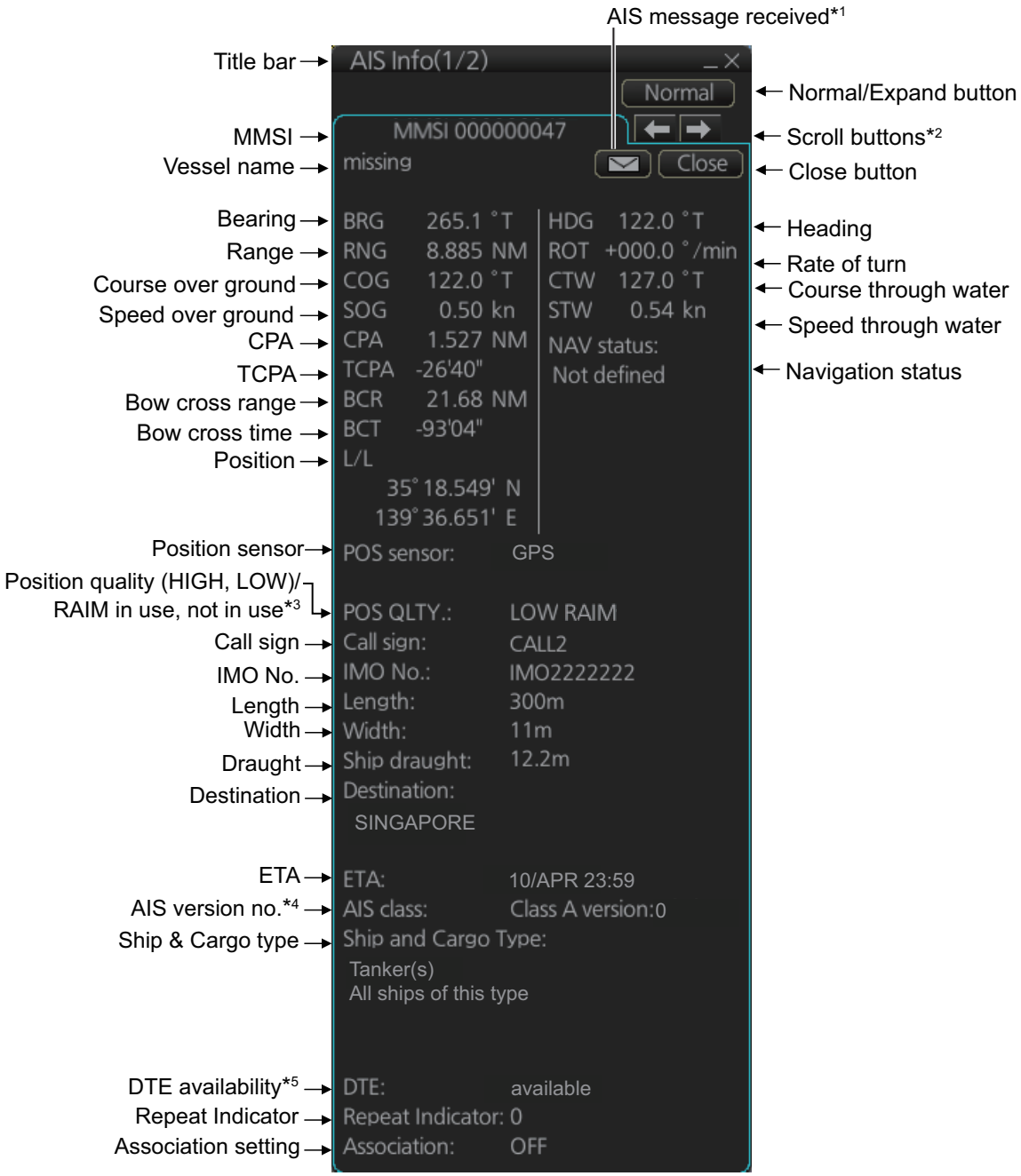
14.8.2 Expanded AIS data

The expanded AIS data display provides additional information about an AIS object. To display expanded AIS data, click the [Expand] button on the [AIS Info] box.

The illustration on the next page shows the expanded data from a class A AIS target. The information displayed depends on the AIS object selected. See section 14.8.3 for display type and data availability.

Note: CPA/TCPA information appears in the AIS info when the following two requirements are met. If the requirements are not met, CPA/TCPA appears as "*".

- AIS target is activated at the connected radar
- The TTD sentence for the selected target is received from the connected radar



*1: The icon appears when an AIS message is received from an AIS object. Click the icon to show the AIS message(s). A maximum of the two latest messages is displayed.
*2: Scroll buttons appear only when there is more than one AIS object data displayed.
*3: "RAIM" (Receiver Autonomous Integrity Monitoring) appears after position quality indication when RAIM is in use.
*4: Version of AIS transponder is shown only for the class A AIS targets.
*5: Message sent to AIS object when DTE (Data Terminal Equipment) cannot be used.

14.8.3 AIS object type and available AIS data

The AIS data available depends on the AIS object type. The table below shows the data available for each AIS object type.

Display item	Class A	Class B	Base station	SAR aircraft	AtoN	SART	Synthetic (DISTRESS)	Synthetic (VTS)
Name	✓	✓	✓	✓	✓	✓	✓	✓
Call	✓	✓	–	✓	–	–	–	✓*1
L/L	✓	✓	✓	✓	✓	✓	✓	✓
POS sensor	✓	✓	✓	✓	✓	–	–	–
POS QLTY.	✓	✓	✓	✓	✓	✓	–	–
POS indicator	–	–	–	–	✓	✓	–	–
COG	✓	✓	–	✓	–	✓	–	✓
SOG	✓	✓	–	✓	–	✓	–	✓
NAV status	✓	–	–	–*2	✓*3	✓	–	–
MMSI No.	✓	✓	✓	✓	✓	✓	–	✓*4
IMO No.	✓	–	–	–	–	–	–	✓*5
Length	✓	✓	–	✓	✓	–	–	✓
Width	✓	✓	–	✓	✓	–	–	–
Ship draught	✓	–	–	–	–	–	–	–
DEST.	✓	–	–	–	✓	–	–	–
ETA	✓	–	–	–	–	–	–	–
Start date	–	–	–	–	–	–	✓	–
End date	–	–	–	–	–	–	✓	–
AIS class	✓	✓	–	–	–	–	–	–
Association	✓	✓	–	–	–	–	–	–
Ship and Cargo Type	✓	✓	–	–	✓	–	–	–
Repeat Indicator	✓	✓	✓	✓	✓	✓	✓	✓
DTE	✓	✓	–	–	–	–	–	–

*1: Displayed when Call Sign is enabled during VTS.

*2: Where the selected AIS object is an aircraft, the aircraft's altitude appears.

*3: Mobile, RACON/Light (at AtoN) are used as AtoN status.

*4: Displayed when MMSI No. is enabled during VTS.

*5: Displayed when IMO No. is active during VTS.

14.9 Vector Length, Vector Stabilization in True Motion Mode

Ground stabilization and sea stabilization

In the TM mode, the target vector can be displayed with reference to ground or water. To switch between ground or water, click the measurement mode box at the top left of the screen. You can also switch between [Ground] and [Water] on the [SPD] page ([MENU]→[System Sensor Settings]→[SPD]). Select [Bottom] for ground stabilization or [Water] for sea stabilization. The Vector mode indication in the true motion is [T GND] or [T WAT].

Water reference is a method of display using heading and speed over the water. Ground reference is a method of display using speed over the ground or current correction. If the accuracy is low, apply an offset to the current indication.

True vector

In the true motion mode, all fixed targets such as land, navigational marks and ships at anchor remain stationary on the radar overlay with vector length zero. But in the presence of wind and/or current, the vectors appear on fixed targets representing the reciprocal of set and drift affecting own ship unless set and drift values are properly entered.

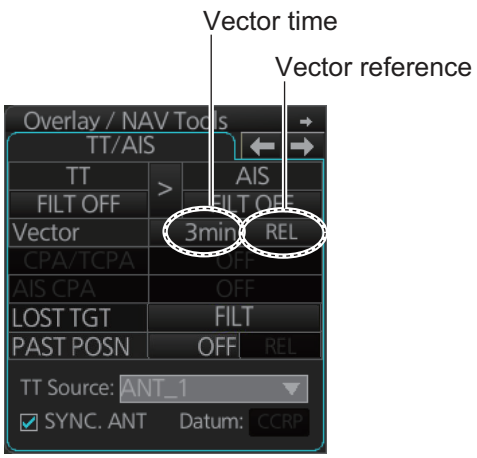
In the true vector mode, there are two types of stabilization: ground stabilization (T GND) and sea stabilization (T WAT). The stabilization mode is automatically selected according to speed selection, as shown in the table on the next page. Manual selection is available with [Stabilization Mode] in the [SPD] page: [Bottom], [T GND], [Water], [T WAT].

Speed selection	True vector mode
LOG (WT)	T WAT
LOG (BT)	T GND
POSN	T GND
REF	T GND
MAN	T WAT
MAN w/set & drift	T GND

Relative vector

Relative vectors on targets that are not moving over the ground such as land, navigational marks and ships at anchor will represent the reciprocal of own ship's ground track. A target whose vector passes through own ship is on a collision course.

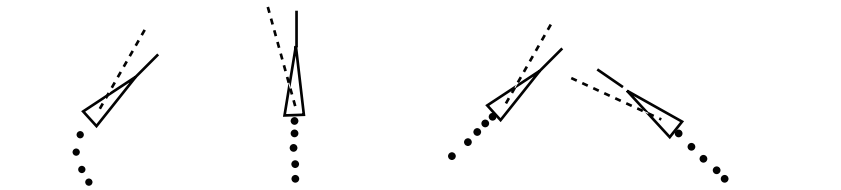
Vector time and vector reference can be set from the [TT/AIS] page in the [Overlay/NAV Tools] box. Click the vector length and vector reference indications to set them.



14.10 How to Display AIS Target Past Positions

The past position display shows the movement of all AIS active targets (Class A or B AIS targets and AIS search and rescue vessels). Tracks are displayed for the set number of position points at the set time interval. If the target changes its speed, the intervals between the trail dots changes. When the course is changed, the dotted display becomes a curved line.

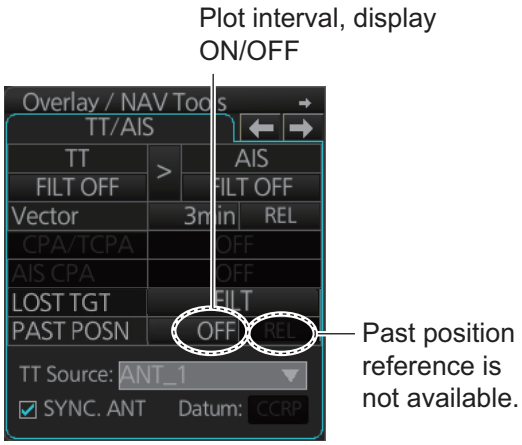
The figure below shows examples of past position displays.



a) Ship turning b) Ship running straight c) Ship reduced speed d) Ship increased speed

14.10.1 How to enable, disable the past position display

Select the [TT/AIS] page from the [Overlay/NAV Tools] box. Click the indication circled in the figure below to set the plot interval, turn the display ON or OFF.



14.10.2 Past position point attributes

You can set past position point attributes (no. of points, style) as follows.

1. Click the [DISP], [SET] and [Symbol DISP] buttons on the InstantAccess bar™ to show the [Symbol Display] menu.

2. Click the [Targets] tab.



3. At [TT/AIS Points], select the number of points to show, [5] or [10].
4. At [Style], select the style for the past position points. The choices are [Points] and [Points and Dots].
5. Click [Save], then [Close] to apply the settings and close the menu.

14.11 Lost Target Alert

If AIS data is not received for a certain period of time (see the table on page 14-2), an AIS object becomes a "lost object." When a lost target alert occurs, the aural alarm sounds and an alert is generated. The table below shows AIS object type and the corresponding lost target alert.

AIS object type		Lost alert
AIS data report	AIS base station	-
	AIS SAR aircraft	-
	Physical AIS AtoN	AIS AtoN Lost
	Virtual AIS AtoN	AIS AtoN Lost
	Mobile Physical AIS AtoN	AIS AtoN Lost
	Mobile Virtual AIS AtoN	AIS AtoN Lost
	Synthetic AIS AtoN	AIS AtoN Lost
AIS locating device	AIS-SART* (active)	AIS SART Lost
	AIS-SART* (test)	-
AIS synthetic target	AIS synthetic target	-

*: Includes AIS-SART, AIS MOB and EPRIB-AIS.

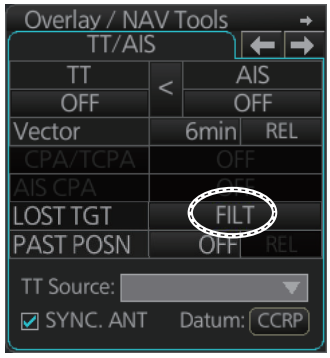
To acknowledge the alert, press the **ALARM ACK** key, or click the alert name in the Alert box.

Note: The AIS data transmission interval depends on object's speed. For details, see the owner's manual of the AIS transponder.

14.11.1 How to set the lost target alert

The lost target alert can be enabled or disabled as follows.

1. Select the [TT/AIS] page from the [Overlay/Nav Tools] box.
2. Click the indication (setting) circled in the figure at right, then select the appropriate setting referring to the description below.
   - [**ALL**]: Get the alert against all lost objects.
   - [**OFF**]: Disable the lost alert. [OFF] appears in yellow color.
   - [**FILT**]: Get the alert against the objects whose criteria meet the settings made in section 14.11.2. If there is an item turned ON in the Setting.2 page, [FILT] appears in yellow.



14.11.2 How to set the lost AIS filter

If you are in an area where AIS objects often become lost, the lost alert may activate frequently. In this case, you may want to specify which objects to classify as lost objects, to prevent frequent triggering of the lost alert.

1. Select the [TT/AIS] page from the [Overlay/Nav Tools] box. Click [OFF], [FILT], or [ALL] to select [Setting]. The [Setting.2] page can also be opened from the menu (Open menu→[TT/AIS]→[Setting]→[Setting.2] tab).



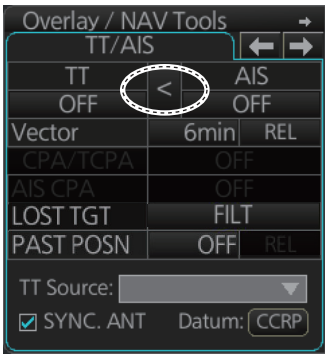
2. Set each menu item, referring to the description below.
   [**MAX RANGE**]: Set the maximum range to use. Any AIS object at a distance greater than set here will not trigger the lost alert.
   [**MIN SHIP SPEED**]: Set the minimum speed to use. Any AIS object whose speed is slower than set here will not trigger the lost alert.
   [**ATON**]: Select [ON] to exclude AIS AtoN from the lost alert.
   [**SART**]: Select [ON] to exclude AIS-SART from the lost alert.
   Note: If any item is set to [ON] in the above menu, the permanent alarm box will display the message "Some lost warning functions have been disabled" (if [LOST TGT] is set to [ALL]) in the [Overlay/NAV Tools] box,
3. Click the [Save] button, then click the close button to finish.

14.12 TT, AIS Target Association

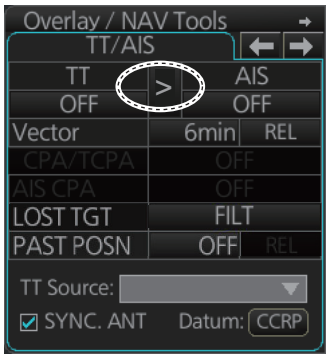
A vessel that carries an AIS transponder is marked on the display with both an AIS-symbol (based on GPS position) and a TT symbol (radar-detected target). To avoid the presentation of two target symbols for the same physical target, use the "association" function. If target data from both AIS and TT are available and if the association criteria are fulfilled, either the AIS or TT symbol is presented according to the association method selected. Association will not happen between AIS and TT if the AIS target is sleeping.

Note: Only AIS active targets (Class A or B AIS targets) are subject to the association function.

The target data to have priority is controlled from the [TT/AIS] page in the [Overlay/ NAV Tools] box. Click the arrow circled in the figure below to select target data priority. You cannot turn off the association function from this unit.



AIS data priority



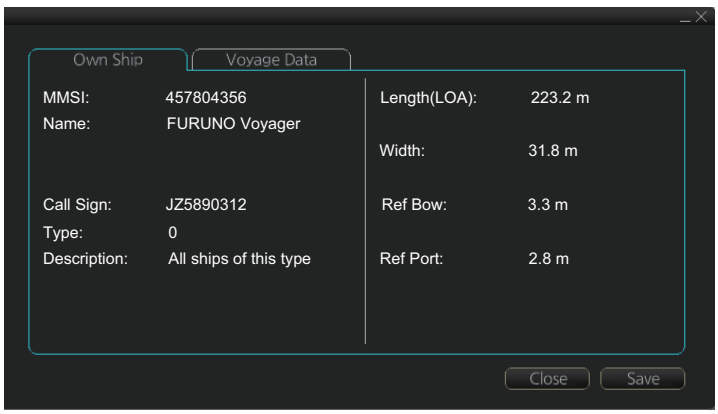
TT data priority

Note: The association data priority can also be selected from a context menu. Right-click the arrow on the TT/AIS page to display the window shown right.



14.13 How to Display Own Ship Data

You can see own ship's data on the [Own Ship] page in the [NAV Status] menu. Open the menu, then click both [NAV Status] in the [TT/AIS] menu and the [Own Ship] tab.



15. AIS SAFETY, NAVTEX MESSAGES

15.1 AIS Safety Messages

You can send and receive messages via the VHF link, to a specified destination (MMSI) or all AIS-equipped ships within communication range of your ship. Messages can be sent to warn of safety of navigation, for example, an iceberg sighted. Routine messages are also permitted. Short safety-related messages are only an additional means to broadcast safety information. They do not remove the requirements of the GMDSS. The maximum number of messages that can be stored is as follows.

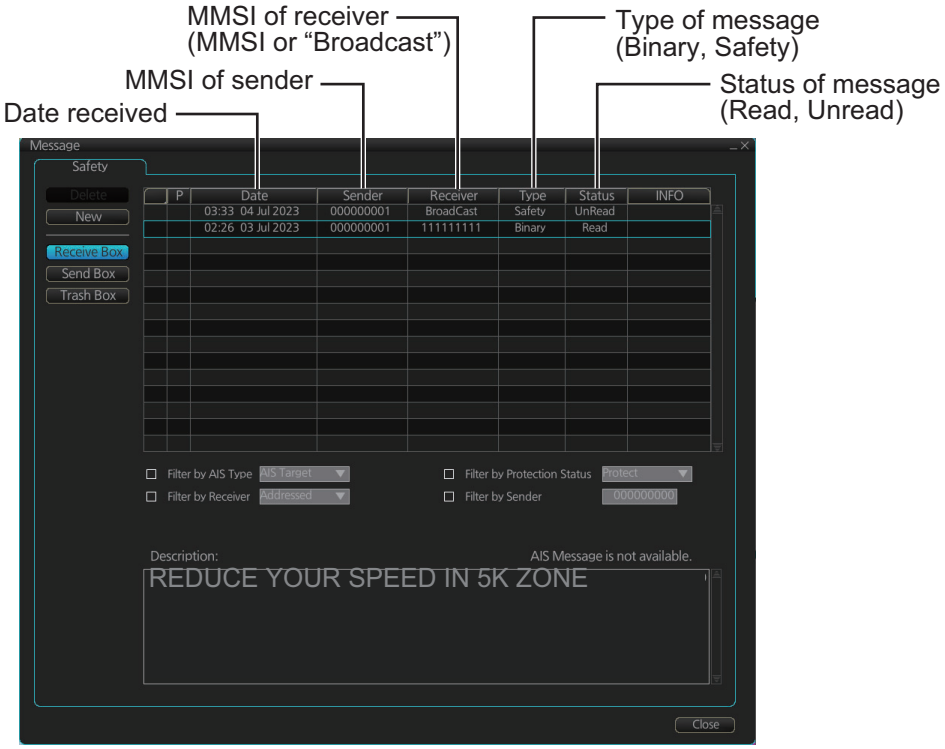
- **Addressed message**: Max.100 messages. (A maximum of 20 messages can be protected.)
- **Broadcast message**: Max. 100 messages. (A maximum of 20 messages can be protected.)
- **AtoN message**: Max. 25 messages. (Messages cannot be protected.)
- **SART message**: Max. 25 messages. (Messages cannot be protected.)

15.1.1 How to send an AIS safety message

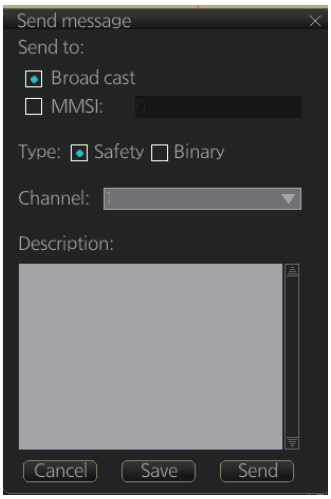


Note: If you are using the Trackball Control Unit RCU-026, display the software keyboard ([DISP] button, [ ], [ON] on the InstantAccess bar™) before starting this procedure.

1. In the Voyage navigation mode, click the [MSG] and [Safety MSG] buttons on the InstantAccess bar™ to show the [Message] dialog box.



2. Click the [New] button to show the [Send message] window.



3. At [Send to], select where to send the message. Select [Broadcast] to send the message to all AIS-equipped ships within communication range, or select [MMSI] and enter the MMSI of the ship where to send the message.
4. At [Type], select the type of message, [Safety] or [Binary] (routine).
5. At [Channel], select the channel to use to send the message.
6. At [Description], enter the text of your message. The no. of characters available depends on the type of message.
   Safety message broadcast: 90 characters
   Binary message broadcast: 86 characters
   Safety message addressed to MMSI: 85 characters
   Binary message addressed to MMSI: 80 characters
7. Click the [Send] button to send the message.

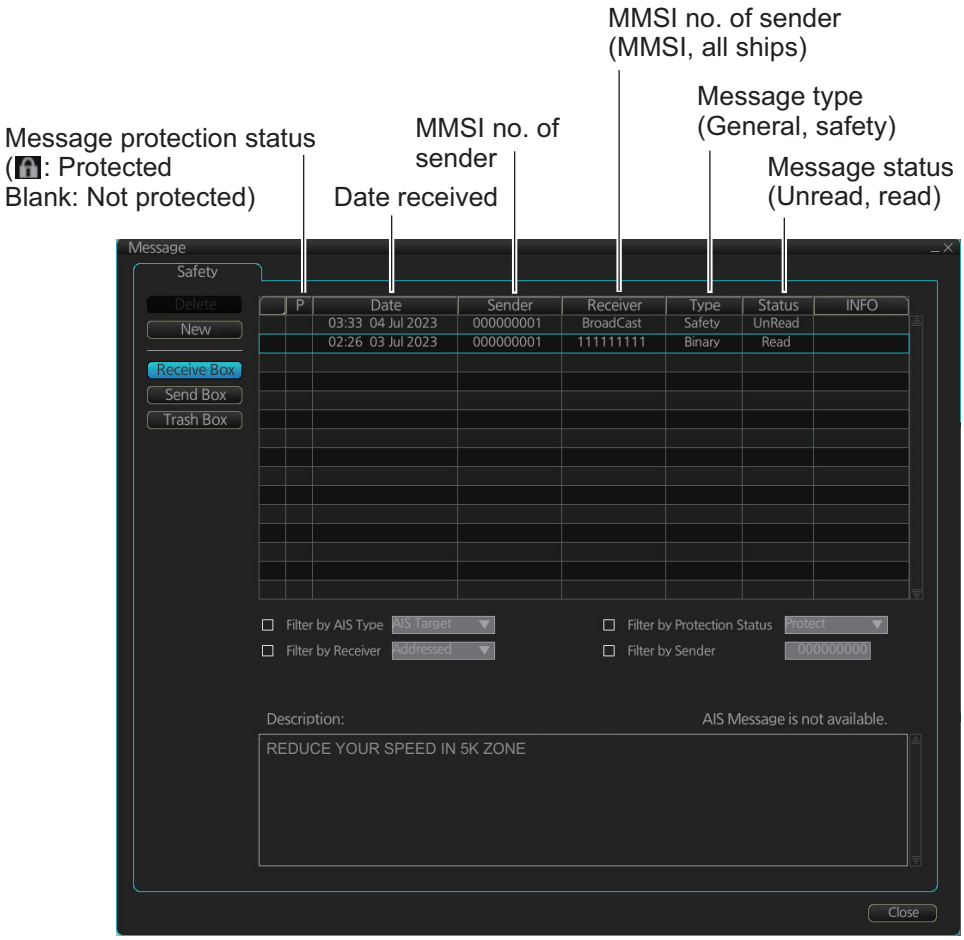
Note 1: If an AIS transponder is not connected when you attempt to send the message, the message "AIS MSG Send ERR" appears. Check the connection with the AIS transponder and try again.

Note 2: If the DTE specified an invalid AIS MMSI in step 3, an error message appears and the AIS message cannot be sent.

15.1.2 How to display received and sent AIS safety messages

Do the following the view the contents of a received AIS safety message.

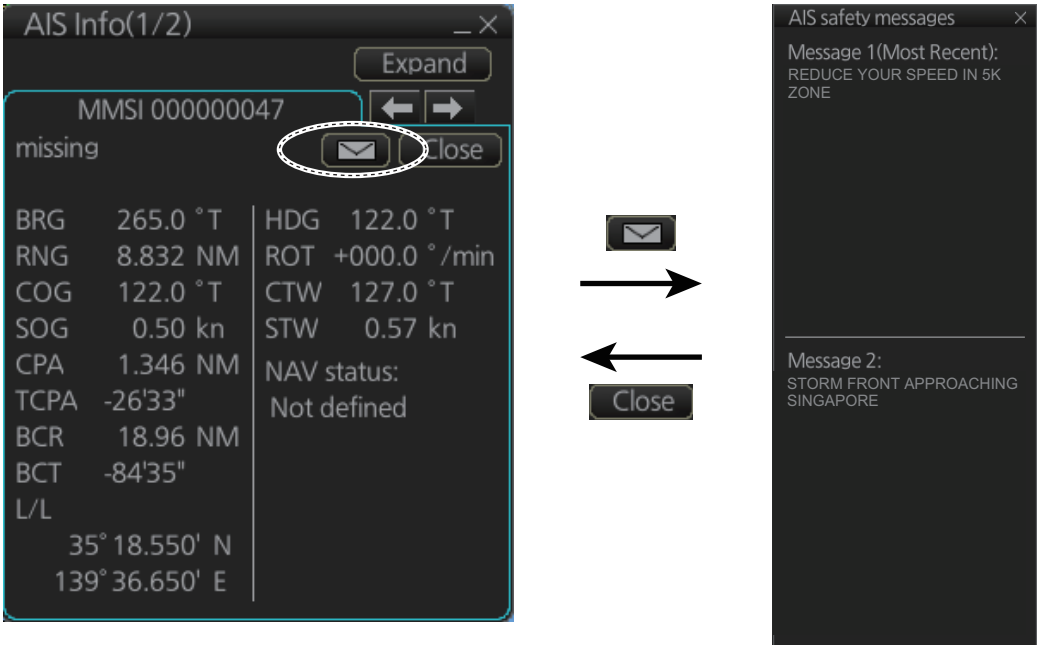
1. In Voyage navigation mode, click the [MSG] and [Safety MSG] buttons on the InstantAccess bar™.
2. Click the [Receive Box] or [Send Box] button as appropriate.
3. Click a message to view its contents.



Note: The date and time appear in yellow when there is no ZDA sentence input.

15.1.3 How to display a AIS safety message from the AIS info window

1. Open the [AIS Info] display, referring to "Expanded AIS data" on page 14-13.
2. Click the mail icon ( ) at the top of the window.



15.1.4 How to protect received AIS safety messages

You can protect important AIS safety messages received during your voyage from accidental deletion. Up to 20 each of addressed and broadcasted messages can be protected. Protected messages cannot be deleted until they are unprotected.

To protect a AIS safety message, do as shown below.

1. Put the cursor over the message you want to protect in the message list.
2. Right-click to display the context menu, then select the protection item.
3. If the protection is correctly applied, the padlock icon appears in the “P” column. Multiple selection is disabled when the lock icon is displayed.

Note: When 20 messages have already been protected and the type of AIS safety message is AtoN or SART, the protection item will be grayed out and cannot be selected.

15.1.5 How to unprotect received AIS safety messages

1. In the “P” column in the AIS safety message list, put the cursor on the padlock icon of the message you want to unprotect.
2. Right-click to display the context menu, then select [Unprotect].
3. If the unprotection is correctly applied, the padlock icon disappears.

15.1.6 How to filter received AIS safety messages

You can filter AIS safety messages four ways: AIS type, RX message category, message protection status, and MMSI number.

In the AIS safety message list, use the drop down list boxes to select the filter type and filtering method.



- [**Filter by AIS Type**]: Select [AIS AtoN], [AIS Target], [AIS SART], or [AIS AtoN] from the list to display the messages received from the type selected.
- [Filter by Receiver]: Select [Addressed] or [BroadCast] to display the corresponding AIS safety messages.
- [Filter by Protection Status]: Select [Protected] or [Unprotected] to display the corresponding AIS safety messages.
- [Filter by Sender]: Enter the MMSI number to show the messages received from that MMSI.

15.1.7 How to delete a received or sent message

How to delete a sent or received message

1. Click the [Receive Box] or [Send Box] as appropriate.
2. Click the box that is before the date to show a check mark. (All messages can be checked or unchecked with the context-sensitive menu. Right-click the box to the left of [Date], then select [Select All] or [Deselect All] as applicable.)
3. Click the [Delete] button.

How to delete received or sent messages permanently

1. Click the [Trash Box] button.
2. Click the box that is before the date to show a check mark. (All messages can be checked or unchecked with the context-sensitive menu. Right-click the box to the left of [Date], then select [Select All] or [Deselect All] as applicable.)
3. Click the [Delete] button.

Note: A large amount of messages may take some time to delete.

15.2 Navtex Messages

Navtex (Navigational Telex) is an international automated medium frequency direct-printing service for delivery of navigational and meteorological warnings and forecasts, as well as urgent marine safety information to ships.

Navtex messages can be received and read.

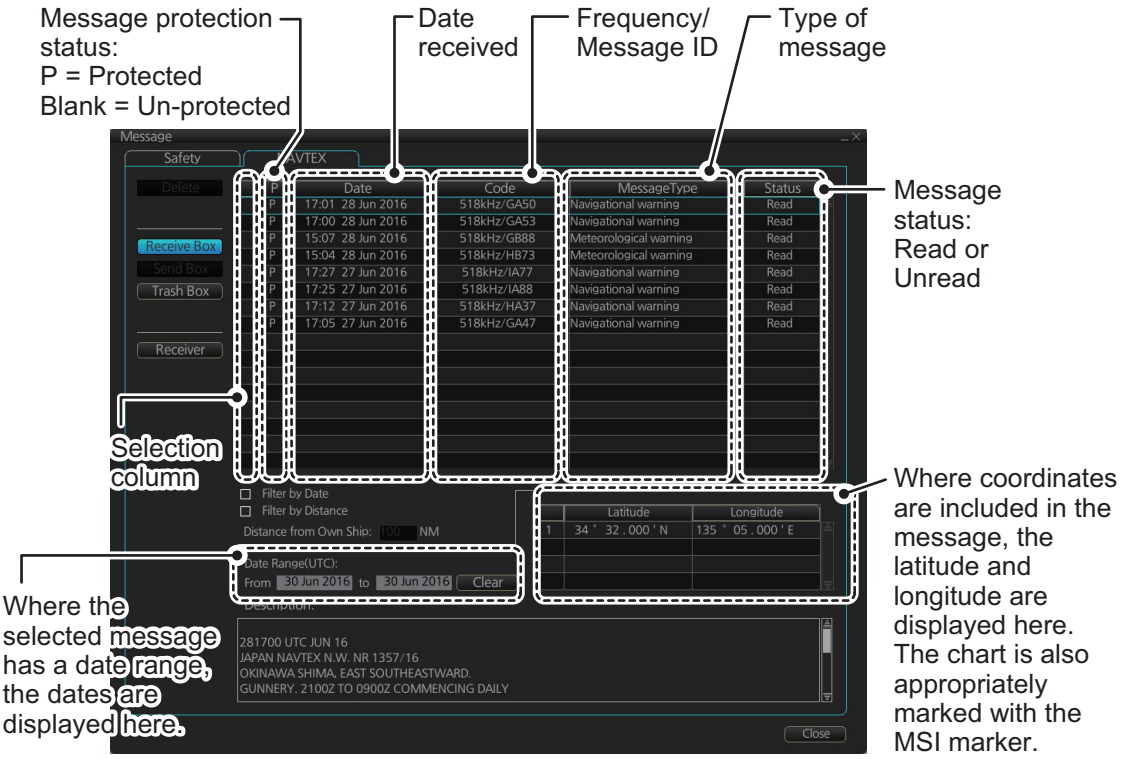
The [Receive Box] can store up to 500 messages. When the [Receive Box] is full and a new message is received, the system automatically deletes messages, in order, from the oldest message.

Note: If the message "Database access failure occurred. NAVTEX messages cannot be received." appears, your Navtex database may be corrupted. Consult your dealer for advice.

15.2.1 How to receive Navtex messages

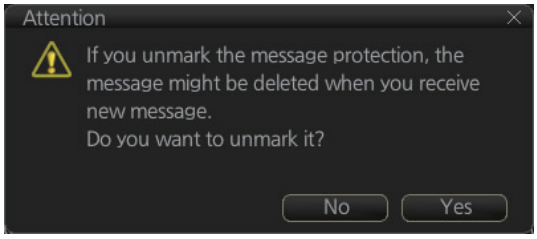
To display a received NAVTEX message, do the following:

1. In Voyage navigation mode, click the [MSG] and [NAVTEX MSG] buttons on the InstantAccess bar™.
2. Click the message to view. The text of the message appears in the [Description] box.

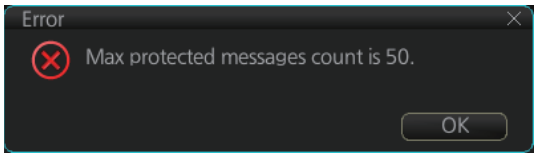


- You can filter the displayed messages as follows:
  Filter by date: Enter the date range for displayed messages in the [Date Range(UTC)] input area. To clear the filter, click the [Clear] button. Check the Filter by Date box to activate the filter.
  Filter by distance: Check the [Filter by Distance] box to activate the [Distance from Own Ship] input area. Enter the appropriate distance (setting range: 1 to 100 NM).

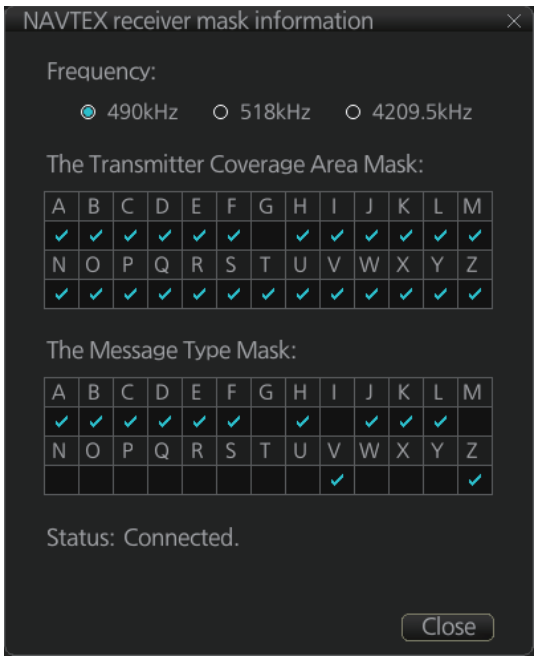
- To protect a message, or remove the protection, click the protection status column for the message. When removing protection, the confirmation window shown below appears. Select [Yes] or [No] as appropriate.



Note: You can protect up to 50 messages. When you try to protect more than 50 messages, the message shown below appears.



- You can check the settings for the Navtex receiver (if connected). Click the [Receiver] button to show the settings.



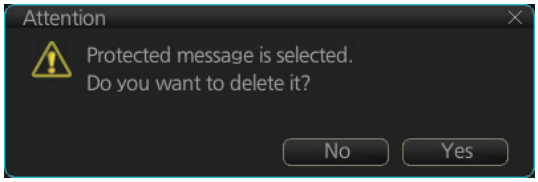
15.2.2 How to delete received Navtex messages

Note: A large amount of messages may take some time to delete.

How to delete received Navtex messages

1. Click the [MSG] and [NAVTEX MSG] buttons on the InstantAccess bar™.
2. Click the [Receive Box] button.
3. Click the selection column (indicated in the figure at section 15.2.1) to show a check mark in the box. (All messages can be checked or unchecked with the context-sensitive menu. Right-click the top box to the left of [P], then select [Select All] or [Deselect All] as applicable.)
4. Click the [Delete] button. The selected message is sent to the [Trash Box]. The [Trash Box] can hold up to 200 messages.

   Note: If a protected message is selected for deletion, the confirmation message shown to the right appears. Click [Yes] to delete the protected message or [No] to cancel deletion.



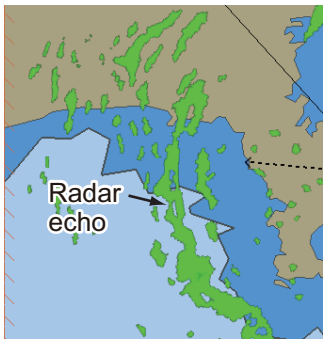
How to deleted received Navtex messages permanently

1. Click the [MSG] and [NAVTEX MSG] buttons on the InstantAccess bar™.
2. Click the [Trash Box] button.
3. Click the selection column (indicated in the figure at section 15.2.1) to show a check mark in the box. (All messages can be checked or unchecked with the context-sensitive menu. Right-click the box to the left of [Date], then select [Select All] or [Deselect All] as applicable.)
4. Click the [Delete] button.

16. RADAR OVERLAY

16.1 Introduction

The radar overlay has the radar echo image overlaid on the ECDIS chart display, in the Voyage navigation mode. The radar video signal can be fed from a FURUNO radar connected to the ECDIS via LAN, or via the optional Radar Connection Box (RCB-002) in the case of a FURUNO radar or a non-FURUNO radar.



This ECDIS has many features to support exact match in scale and orientation of the chart and radar echo image. Exact match of the radar echo image and chart is an essential security feature. If the radar echo image and the chart display match, then the mariner can rely on what he sees and the mariner also gets a very good confirmation that his navigation sensors (such as gyro and position receivers) operate properly and accurately. However, if the mariner is unable to achieve exact match, it is a very strong indication that something is wrong and he should not rely on what he sees.

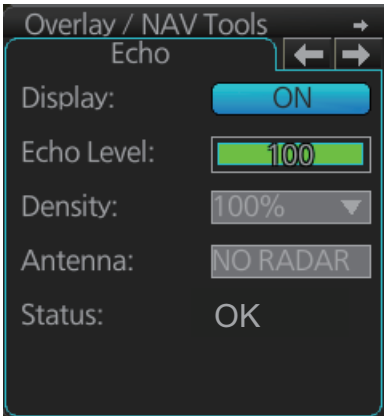
Selected scale of displayed chart also defines scale of radar overlay. When you change the chart scale, the scale of the radar overlay is automatically changed. The table below shows the standard scale and equivalent radar range.

Radar range (nm)	Standard scale	Radar range (nm)	Standard scale
0.25	1:4,000	6	1:90,000
0.5	1:8,000	12	1:180,000
0.75	1:12,000	24	1:350,000
1.5	1:22,000	48	1:700,000
3	1:45,000	96	1:1,500,000

16.2 How to Setup the Radar Overlay

Radar echoes can be output to the ECDIS and shown on its display. Like details on S57 charts, the radar overlay can be displayed or removed from the chart display. The transparency of the echo display can be set from the [Echo] page in the [Overlay/NAV Tools] box. To activate and setup the radar overlay, do the following:

1. Select the [Echo] page from the [Overlay/NAV Tools] box.



2. Click the [ON/OFF] button at [Display] to show [ON] (radar overlay ON) to activate the overlay.
   "Status: OK" appears under [Antenna] if the radar signal is being received.
   "Status: No Data" is displayed if there is no radar signal.
   Note: The radar display, TT symbols and AIS symbols can also be hidden by clicking [CLEAR RADAR] on the Status bar.

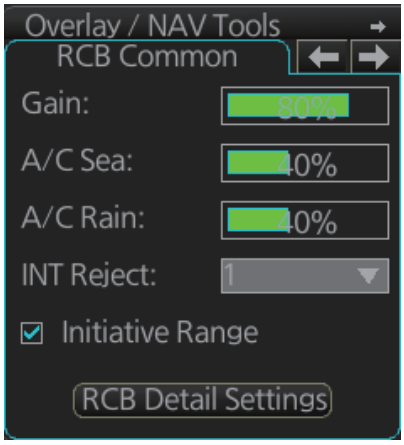


3. [Echo Level] adjusts the sensitivity of the radar picture. To adjust, put the cursor on the slider bar and roll the scrollwheel.
4. [Density] controls the "see through" behavior of the radar overlay. [100%] overlays the radar echo on the chart without modification. "75%" displays radar echoes faintly, and "25%" displays radar echoes somewhat faintly. It is recommended to use 25% or 50% when navigating narrow channels, so as not to conceal land-masses.
5. Click the [Antenna] drop-down list to select the radar that is to feed radar echoes.

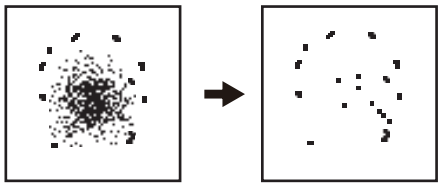
16.3 How to Adjust the Radar Signal Fed From the Radar Connection Box

Follow the procedure below to set up the radar overlay for the radar connected via the Radar Connection Box. These adjustments are not necessary for the radar which feeds the radar signal via LAN.

1. Select the [RCB Common] page from the [Overlay/NAV Tools] box.

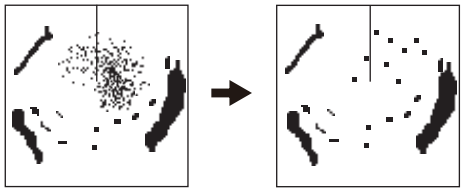


2. [Gain] adjusts the strength of the radar signal. Adjust the gain so that the background noise is just visible on the screen. If the gain level is too low, weak echoes may be missed. On the other hand, if the gain level is too high, the strong background noise can hide weak targets.
   Note: This setting does not affect the gain set on the radar.
3. [A/C Sea] reduces sea clutter, which is caused by strong reflections from the sea surface and occurs around own ship in high seas. Strong sea clutter can prevent identification of targets on the screen. Set the level so that weak sea clutter appears on the screen. Do not over-adjust the control - approaching targets can be missed. Set the level at 0 (OFF) if there is no sea clutter on the display, to prevent loss of small targets.



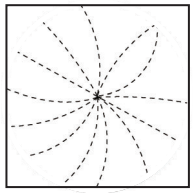
Sea clutter at the center of the screen. Sea clutter suppressed.

4. [A/C Rain] reduces rain clutter, which is caused by reflections from rain and snow. When the rain clutter hides targets, use the [A/C Rain] to reduce the rain clutter. The control operates like the sea clutter control and it is effective not only on near ranges but longer ranges as well. The higher the setting, the greater the rain clutter reduction.



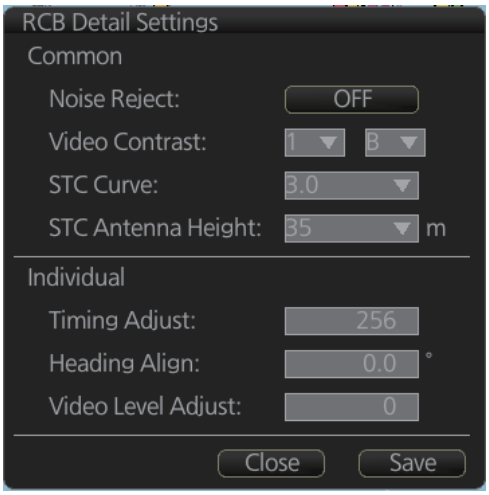
Rain clutter (starboard direction) A/C Rain adjusted; rain clutter suppressed.

5. [INT Reject] reduces radar interference. Radar interference can occur when your vessel is in the area of another radar that operates in the same frequency band (3 GHz) as own radar. The interference is seen on the screen as a number of bright spikes either in irregular pattern or as dotted lines that extend from the center of the edge of the picture. When this type of interference appears on the screen, use the interference rejector.

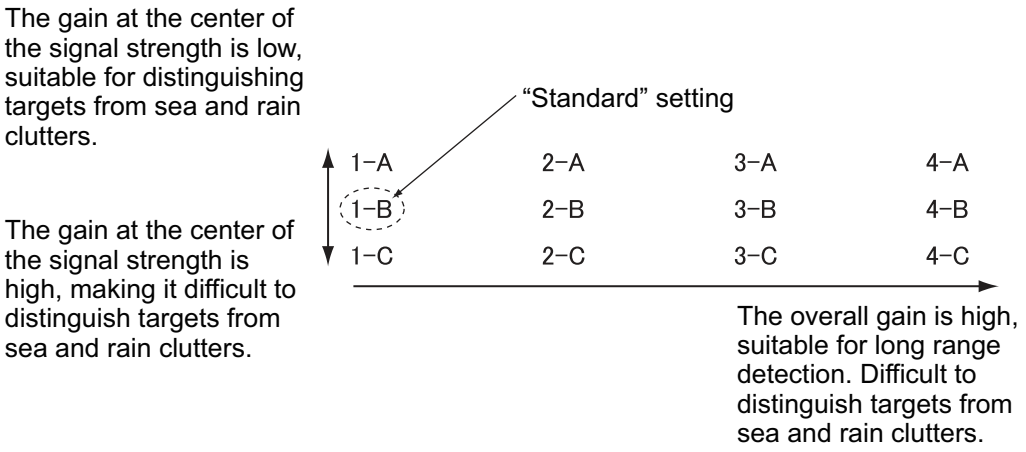


   Four settings are available, [1], [2], [3] and [OFF]. The higher the setting the greater the degree of interference rejection. Turn the rejector off when no interference is present, so as not to miss small targets.
6. [Initiative Range], when checked, sends the current ECDIS range to the RCB. For example, the current ECDIS range is 4 NM. Then, "4 NM" is sent to the RCB and the RCB sends echo data within that range to the ECDIS. If multiple ECDIS units are in the system, only one ECDIS can have [Initiative Range] checked, so all ECDIS displays are synced. If unchecked, the radar sends echo data corresponding to the previously set ECDIS range.
7. Click the [RCB Detail Settings] button to show the [RCB Detail Settings] dialog box. Set each item as shown on the next page. The dialog box has two divisions, [Common] and [Individual]. The [Common] settings apply to all the radars connected to the ECDIS via the Radar Connection Box. The [Individual] settings apply to the radar currently feeding echo data to the ECDIS via the Radar Connection Box.

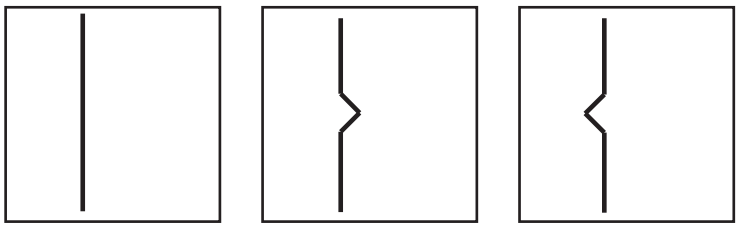
   Note: For FURUNO radars, it is recommended to use the settings set on the radar in order to match the radar overlay picture with the radar picture.



1) [Noise Reject] suppresses white noise.
2) [Video Contrast] adjusts the video dynamic range and curve. Refer to the figure below for settings and results.

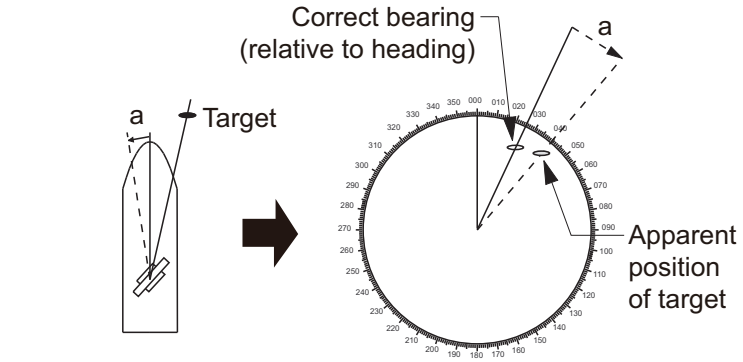


3) [STC Curve]: If sea clutter is not sufficiently suppressed with the [A/C Sea] control on the [RCB Common] page, try to adjust the STC curve. The choices are 2.5, 3.0, 3.5 and 4.2. The higher the number the greater the STC effect.
4) [STC Antenna Height] sets the antenna height (m) above sea level. The choices are 5, 7.5, 10, 15, 20, 25, 30, 35, 40, 45, and [more 45].
5) If a target appears pushed inward or pushed outward (when it should be straight), or targets displayed near the center of the screen are not at their correct distances, adjust [Timing Adjust] to straighten the target.
   Note: Improper adjustment causes echoes to be displayed weakly.



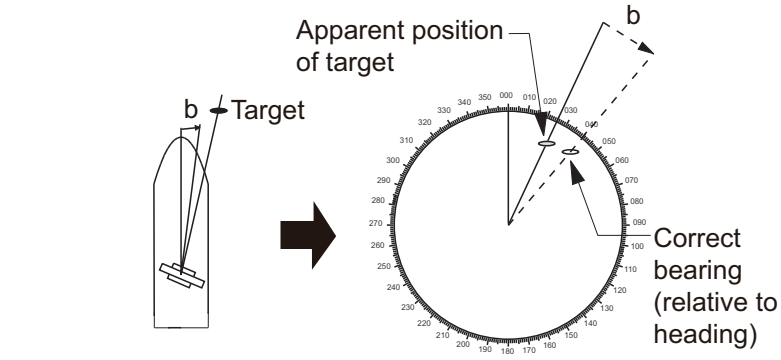
1) Transmit the radar and set the chart scale on the ECDIS to approximately 1:4,000.
2) Adjust the gain, sea clutter, etc. to display the radar image properly.
3) Find a target on the ECDIS that should be displayed straightly, like a pier or jetty.
4) While monitoring the target, enter a figure in [Timing Adjust] that straightens the target.

6) [Heading Align]: Some positioning error may occur when the antenna unit is installed. This error can be compensated from the ECDIS.



Antenna oriented to port

Picture appears
deviated clockwise.



Antenna oriented to starboard

Picture appears
deviated counterclockwise.

1) Set the chart scale on the ECDIS between 1:2,000 and 1:4000. Select a target echo which is near the radar heading line on the ECDIS.
2) Use the EBL control on the ECDIS to bisect the target echo.
3) Read the target bearing.
4) Measure bearing of the target on the chart to calculate the difference between the actual bearing and apparent bearing on the radar screen.
5) Enter the difference found in step 4) in the [Heading Align] box.

7) [Video Level Adjust]: When the signal cable is very long, the video amplifier input level decreases, shrinking target echoes. To prevent this, confirm (and adjust if necessary) video amplifier input level.
8) Click the [Save] button to save the settings.
9) Click the [Close] button to close the [RCB Detail Settings] dialog box.

16.4 Error Between Radar Echo Image and Chart

There are several reasons why the radar echo image and chart display do not match exactly. The mismatch is a combination of several reasons and removing one reason doesn't solve the mismatch perfectly. There is a fundamental difference between the radar echo image and corresponding chart feature. The radar echo is a reflection from the real life target and the actual position of the real life target is the front edge of the radar echo. Therefore, the radar echo should start from the chart feature and exist as far as the radar pulse length goes.

How to compensate for bearing error

Bearing error occurs in the following instances:

- Gyro error
- Inaccurate chart
- Improper installation parameters (radar overlay bearing offset)

How to compensate for position error

Position is caused by the following:

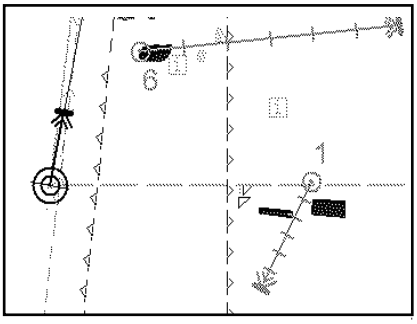
- Inaccurate position
- Position offset
- Inaccurate chart
- Improper installation parameters (conning position offset, position receiver antenna offset, radar overlay range offset)

16.5 Error Sources for Radar Echo Image and TT Mismatch

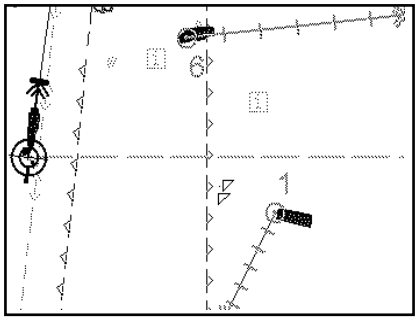
There are several reasons why the radar echo image and tracked target symbols do not match exactly.

1. Different gyro value at radar overlay and at ECDIS.
2. Improper installation parameters (radar overlay bearing offset, radar overlay range offset, conning position offset).

The example below shows how different gyro value set at radar overlay and at ECDIS affect the display of the ECDIS.



Different gyro value at radar and ECDIS



Equal gyro value at radar and ECDIS

17. WEATHER OVERLAY

17.1 What is the Weather Overlay?

The weather overlay, available in the Voyage navigation and Voyage planning modes, provides an animated display of weather information over time for the area selected. The information may include wave, ocean current, wind, temperature, cloud coverage, and precipitation rate. Spot weather information, which provides cursor-picked weather reports, is also provided.

The weather overlay is driven by GRIB (Gridded Information in Binary) data files. (This equipment supports GRIB1 (1st edition) files.) GRIB is the format used by the world's meteorological institutes to transport and process global weather data. (GRIB files are output direct from Numerical Weather Prediction programs, which is usually the US GFS (General Forecast System). Other models are used, however no one model is more reliable or accurate than another.

GRIB files are sent without review, thus there is no assurance that the data are accurate or correct. They are intended as an aid to weather forecasting - use them in conjunction with other weather data such as GMDSS forecasts and Navtex broadcasts.

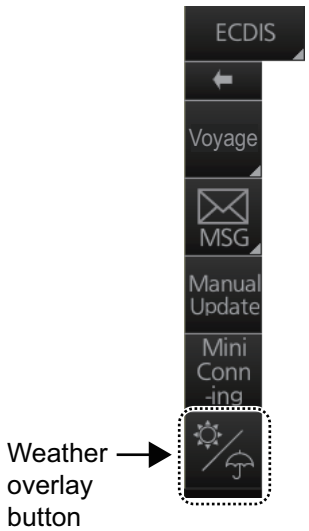
GRIB forecasts are useful for short term planning. The US GFS mathematical model, for example, is run four times a day, and produces forecasts for up to 16 days in advance, but with decreasing reliability over time. The model calculates on a 3-D grid with horizontal spacing of approx. 27 km on a 1/2 degree grid - namely approx. 30 mile spacing.

Global forecasts (GRIB files) are available through a wide variety of sources; for example, e-mail, FTP, and web browser, and most are free to the user.

17.2 How to Activate, Deactivate the Weather Overlay

To activate the weather overlay, get into the Voyage navigation mode, then click the Weather overlay button on the InstantAccess bar™. The overlay is active when the background color of the button is light blue.

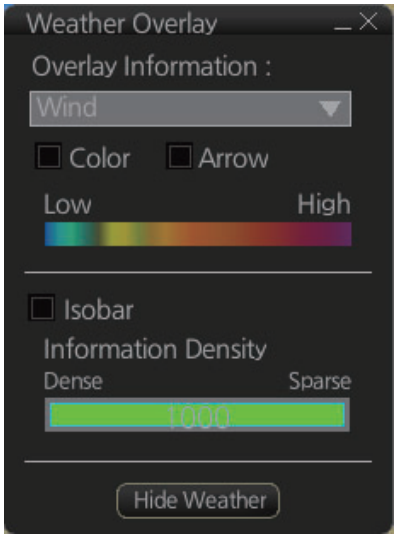
Note: The weather overlay and manual update mode (If active) are activated or deactivated reciprocally.



When the weather overlay is made active, two weather overlay dialog boxes appear, [Weather Overlay Control] and [Weather Overlay]. The [Weather Overlay Control] dialog box selects and plays back weather data files. The [Weather Overlay] dialog box controls what weather information to display and how to display it.



Weather Overlay Control dialog box

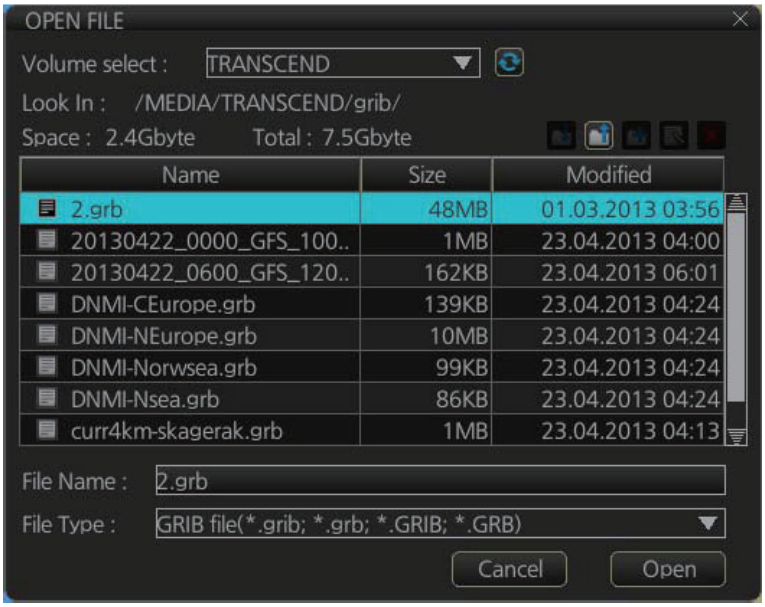


Weather Overlay dialog box

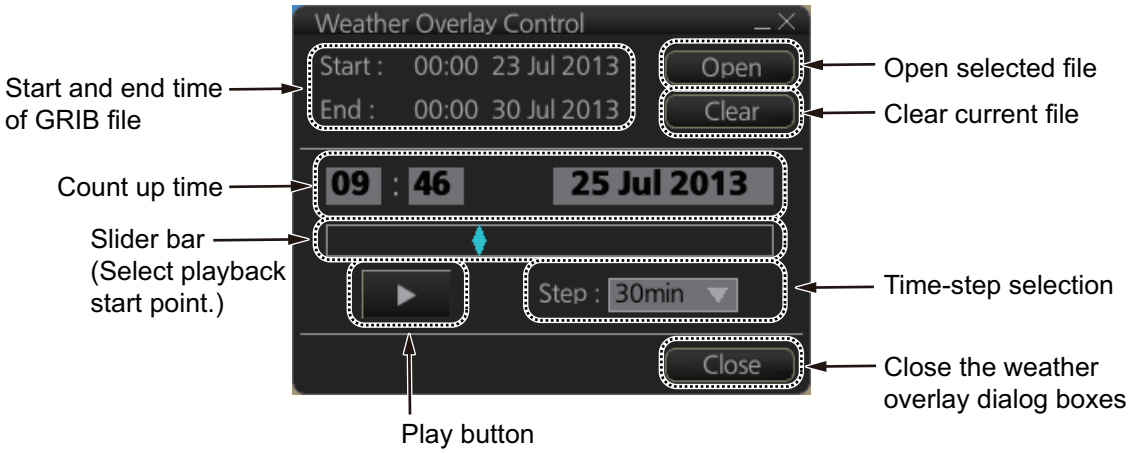
To deactivate the weather overlay, click the [Clear] button on the [Weather Overlay Control] dialog box to remove the weather overlay display, then click the Weather overlay button on the InstantAccess bar™.

17.3 How to Select, Playback a Weather Data File

1. Copy the weather data file (.grb extension) to a USB flash memory and insert the drive into a USB port on the PCU.
2. Activate the weather overlay, then click the [Open] button on the [Weather Overlay Control] dialog box to show the [OPEN FILE] window. Click the [Volume select] drop-down list to select the USB flash memory.



3. Select the weather data file, then click the [Open] button.
   The message "Now Preparing... "appears while the file is being read, and "Now unmounting the media" appears when the reading is completed. The [Weather Overlay Control] dialog box shows the start and end times of the file. If the file is too large, the message "An error occurred. The file size is too large." appears. Select a smaller file - the maximum file size is 100 MB. If there is a problem with the file, the message "An error occurred while reading weather data file." appears. Select another file.

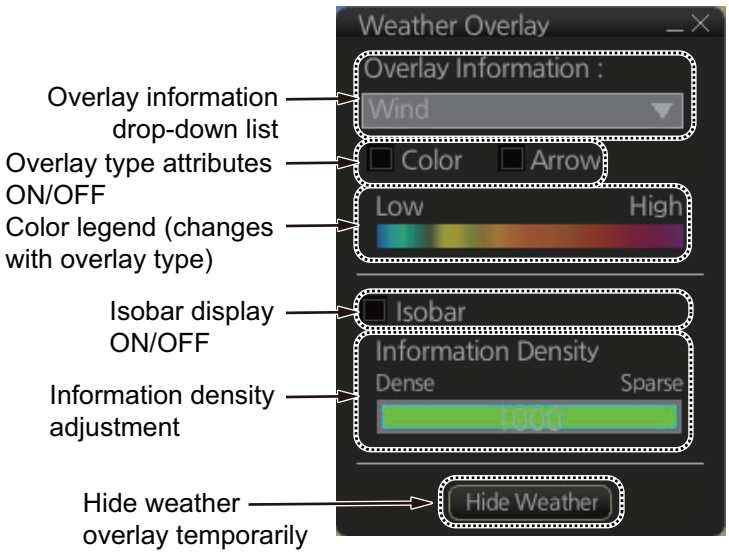


4. To select a specific start time, drag the slider bar to show that time on the Count up time indication. (The time and date can also be entered manually. Use the software keyboard to enter the time. Click the date to show the [Set date] dialog box to select the date.)
5. Use the [Step] drop-down list to select the time step interval, which defines how often to refresh (non-real time) the weather display. The choices are 30 minutes, 1 hour, 2 hours, 4 hours, and 6 hours.
6. To play or pause the playback, click the Play (▶) button.
7. To close both weather overlay dialog boxes, click the [Close] button. (The weather overlay remains active.) To redisplay them, click the Weather overlay button.

17.4 How to Set up the Weather Overlay

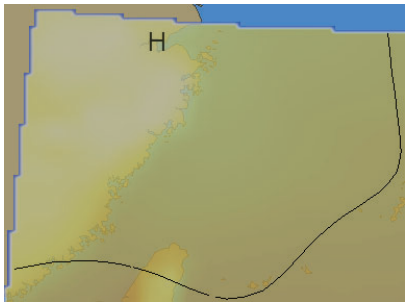
The weather overlay is set up from the [Weather Overlay] dialog box, in the Voyage planning mode or the Navigation planning mode (overlay must be active).

1. Select a display from the [Overlay Information] drop-down list. The choices are [Wind], [Temperature],

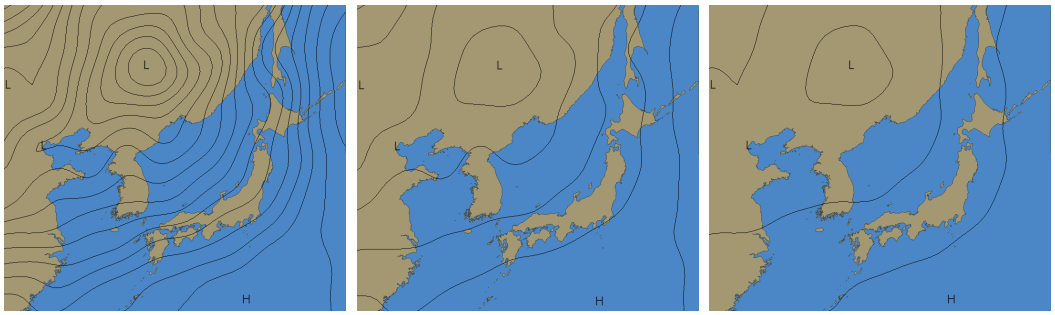


[Cloud Coverage], [Precipitation Rate], [Wave], and [Ocean Current].
(The weather data file must contain the data selected in order to display it.)

2. The [Color] checkbox, when checked, provides a color presentation of the weather item selected. (Unchecking the checkbox erases the color presentation.)
3. The [Wind], [Wave] and [Ocean Current] displays can show windbarbs (wind) or arrows (waves, ocean currents) to indicate the direction of respective item. Put a checkmark in the [Arrow] check box to show the windbarbs or arrows.



4. For any display, show or hide the isobar with [Isobar]. The isobar is the black curved line in the right figure and it connects points of equal atmospheric pressure. "H" appears in the case of high atmospheric pressure; "L" for low atmospheric pressure.
5. Set the information density with the [Information Density] bar. Drag the bar to required setting. The figure below shows several information density settings and the resulting displays.



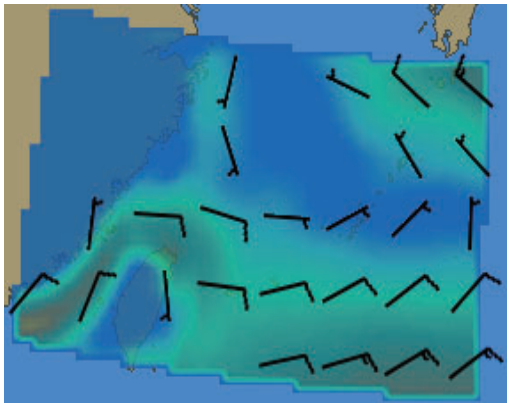
Full dense *Medium* *Full sparse*

6. To hide the weather overlay temporarily, click and hold down the [Hide Weather] button. Release the button to redisplay the overlay.

17.5 Weather Overlay Examples

17.5.1 Wind display

The wind display provides wind speed and direction. Windbarbs show both wind speed and direction. The relative wind speed is shown in colors, from blue (low) to magenta (high).



How to read the windbarbs

Windbarbs represent both wind speed and direction. The windbarbs point in the direction from which the wind is blowing. Lines and filled pennants on the windbarbs indicate speed.

- A half line represents speed from 1.49 to 4.08 m/s
- A full line represents speed from 4.09 to 6.68 m/s
- A filled pennant represents speed from 24.69 to 27.28 m/s



22.09 to 24.69 m/s wind at 100° east-east southeast

Wind from south at 24.69 to 27.28 m/s

Wind from southeast at 29.97 to 32.0 m/s

Example windbarbs

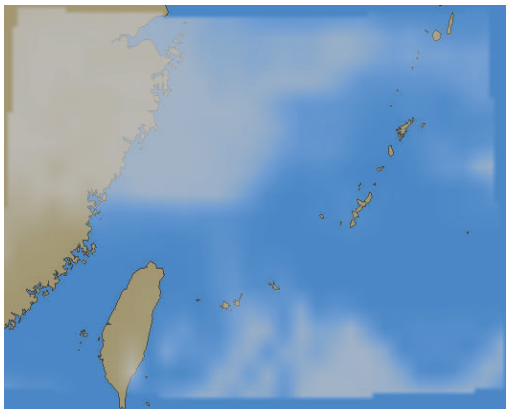
17.5.2 Temperature display

The temperature display provides air temperature information, in colors from blue (low) to red (high). The entire area in the figure below has moderately high temperatures.



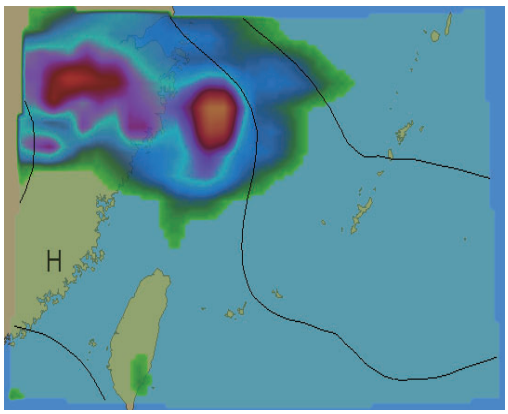
17.5.3 Cloud coverage display

The cloud coverage display shows areas obscured by clouds, in transparent (low) to light gray (high). In the figure below, clouds are covering the landmass and body of water at the top left corner.



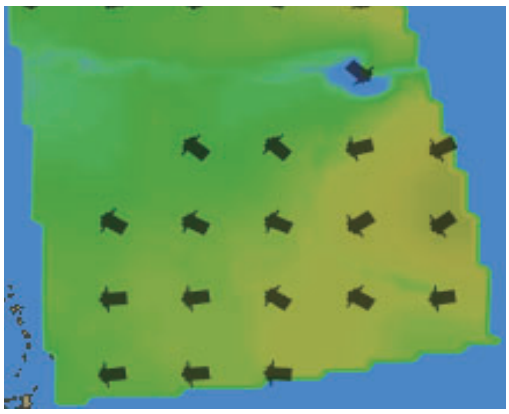
17.5.4 Precipitation rate display

The precipitation rate display shows accumulated precipitation over an hour, in colors from blue (low precipitation) to red (high precipitation). In the figure below light-to-heavy rain is present at the top left corner.



17.5.5 Waves display

The waves display shows the average height of the highest waves, in colors from green (low) to red (high). The length of an arrow indicates wave height. The arrow points in the direction of the main swell.

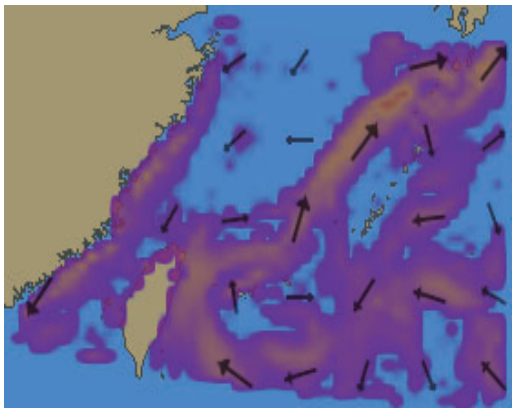


Arrow length and wave height (m)

Less than 1	Less than 3	Less than 5
(No arrow)		
Less than 7	Less than 9	Higher than 9
		

17.5.6 Ocean current display

The ocean current display provides ocean current direction and speed information. The arrows show both direction and speed. Speed is also shown with colors, from transparent (low) to red (high). The color of the currents in the figure below indicate that their speed is low.



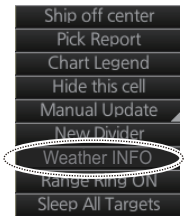
Arrow length and current speed (kn)

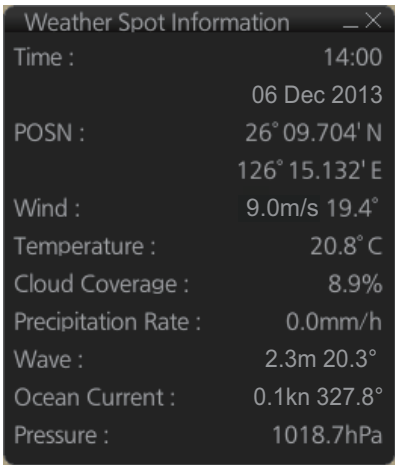
Less than 0.06	Less than 0.25	Less than 0.97	Less than 1.45
(No arrow)			
Less than 1.94	Less than 2.43	Less than 2.91	Less than 3.4
			
Less than 3.88	Less than 4.37	More than 4.37	
			

17.6 Weather Spot Information

You can get various weather information for any area with the weather spot information feature, in the Voyage navigation and Voyage planning modes. The weather overlay must be active and position data available.

1. Right-click the location for which you want to know its weather to show the context-sensitive menu.
2. Click [Weather INFO] to show the [Weather Spot Information] window. The window shows [N/A] where there is no data for the corresponding weather item.





Item	Description
[Time]	Time and date of weather forecast.
[POSN]	L/L position of weather forecast.
[Wind]	Wind speed (m/s) and direction (degree).
[Temperature]	Temperature, in °C.
[Cloud Coverage]	The fraction of the sky obscured by clouds, expressed in percentage.
[Precipitation Rate]	The amount of precipitation (rain, snow, etc.) in millimeters to fall in one hour.
[Wave]	Wave height (in meters) and wave direction (in degrees).
[Ocean Current]	Current velocity (kn) and direction (degree).
[Pressure]	Atmospheric pressure, expressed in hPa.

3. To erase the window, click the Close button at the top right corner of the window.

17.7 Summary of Weather Overlay Viewability, Operability and Operating Mode

The table below summarizes the operability and viewability of the weather overlay according to the operating mode.

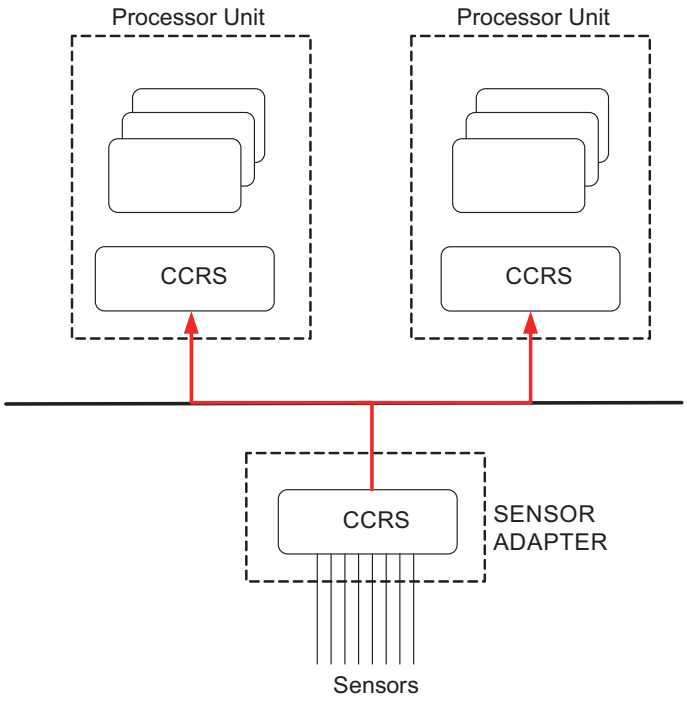
Item	Operating mode	
	NAVI	PLAN
Activate weather overlay	Yes	No
View weather overlay	Yes	Yes
Select weather data file	Yes	Yes*
Operate weather overlay related dialog boxes	Yes	Yes
Deactivate weather overlay	Yes	Yes
Restore weather overlay when switching from chart mode or playback mode	Yes*	Yes*
Weather spot information window	Yes	Yes

*Weather display previously active

18. NAVIGATION SENSORS

18.1 CCRS

This ECDIS employs a Consistent Common Reference System (CCRS) for the acquisition, processing, storage and distribution of sensor information. The CCRS ensures that all parts of the system uses the same source and values, e.g., speed through water, heading, etc. The illustration below shows the CCRS diagram.



The CCRS processes IEC 61162-1 and IEC 61162-2 data sentences. No other types of data (video signals, etc.) are processed.

Check for validity, legitimacy

The system checks received sentences for validity and legitimacy.

Validity check: A sentence's checksum, status (A/V), Mode indicator and setting values are checked. (If checksum error is found, the sentence is dis-affirmed.)
Legitimacy check: The range and accuracy of a sentence is checked.

If the check for both is OK a valid flag results. If either is invalid, the invalid flag is given.

Types of CCRS

There are two types of CCRS: System and Local. The System CCRS integrates all navigation devices. In the Local CCRS each navigation device operates independently.

Representative sensors

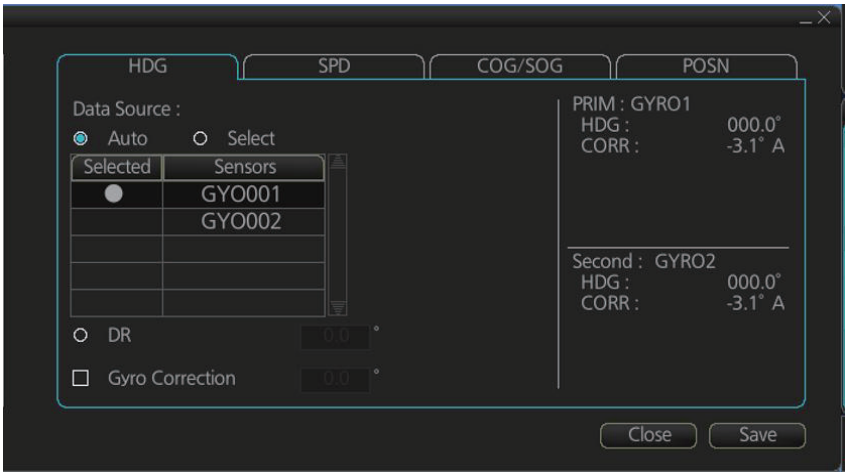
If the system has multiple like sensors, the CCRS selects the representative sensor. Generally, the system uses common representative sensors; however, independent representative sensors (local representative sensors) can also be used.

18.2 How to Select Navigation Sensors

The operator can choose navigation sensors to use for navigation and view their current values on the applicable page in the [System Sensor Settings] menu. Selected navigation sensors are synchronized with all FMD-3xxx and FAR-3xxx on the bridge. For the speed sensor, if [Local] is selected in the [SPD] page, the settings on the speed sensor settings are not synchronized.

18.2.1 Sensors menu description

HDG page



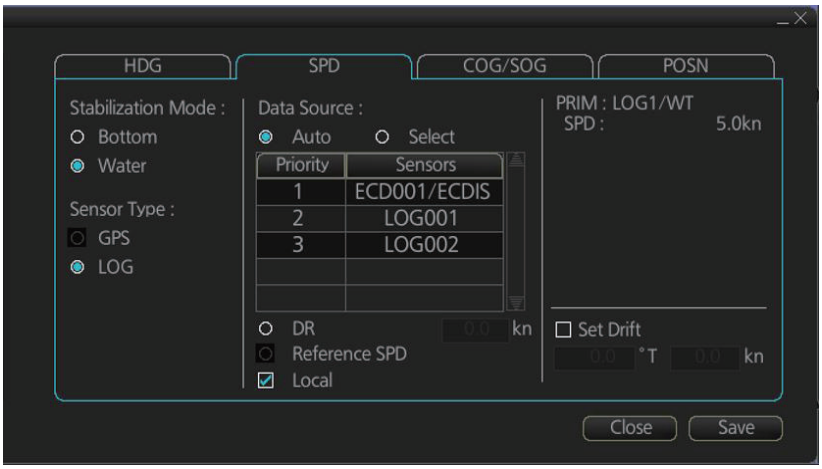
[**Data Source**]: If you want to use the sensors in the sensor list according to registration order, click [Auto]. Choose [Select] if you want to use any sensor regardless of registration order. Then, select the required sensor from the sensor list.

Note: [Select] is not shown when the No. 1 heading data source is set to [FILTER], at installation.

[**DR**]: Set heading manually when there is no heading sensor available. The AIS function must be disabled to use DR (see section 14.4). Click the button to affect manual heading input, then enter heading. The sensor list is greyed out. See section

[**Gyro Correction**]: Check to enable gyro correction. Enter correction value in the input box.

SPD page



[**Stabilization Mode**]: Select the water stabilization mode. Select [Bottom] for ground stabilization, or select [Water] for sea stabilization.

Note: The stabilization mode can also be selected by clicking the stabilization mode indication at the top of the screen.

[**Sensor Type**]: Select [GPS] in case of a GPS navigator, or [LOG] for speed log.

[**Data Source**]: To use the sensors in the sensor list according to priority order, select [Auto]. Choose [Select] to use any sensor regardless of priority. Then, select the required sensor from the sensor list.

[**DR**]: Sets the ship speed manually. The radio button is enabled only when the AIS function is off (see section 14.4) and when the [Stabilization Mode] is [Water]. Click the radio button to enable the input box and gray out the sensor list. [DR] is only available when there is no ship speed source.

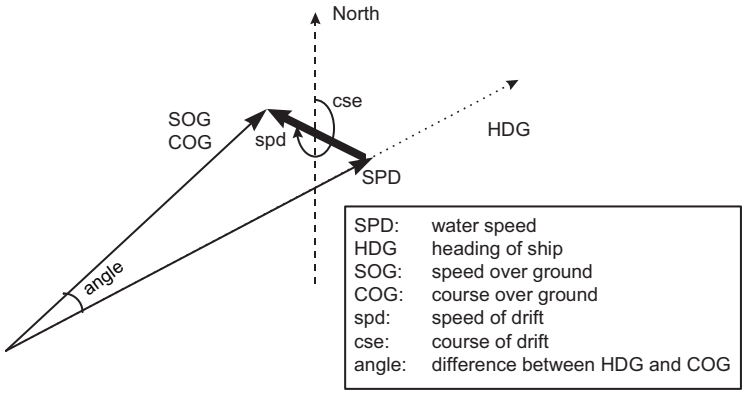
[**Reference SPD**]: Use radar as a source of ship speed and course information. Radio buttons are enabled only when the AIS function is off (see section 14.4), the [Stabilization Mode] is [Ground], and the speed source is [Local]. Click the radio button to gray out the sensor list. This reference speed applies only to the unit where this operation is done. Reference speed is not shared between units, so select reference speed at each unit.

[**Local**]: Use to avoid synchronizing speed sensor settings between units in order to set the ship's speed independently from the system speed sensors. However, DR (Dead Reckoning) still uses system sensor speed.

[**Set and drift**]: Check the box to manually set the speed and direction of the drift. The check box is enabled only when the AIS function is off (see section 14.4) and when the [Stabilization Mode] is [Water].

Angle = Difference between heading and COG
Spd = Speed component of the drift vector
Cse = Course component of the drift vector

Vector defined by (SOG and COG) is equal to vector sum of vectors defined by (SPD and HDG) and (set and drift).



COG/SOG page

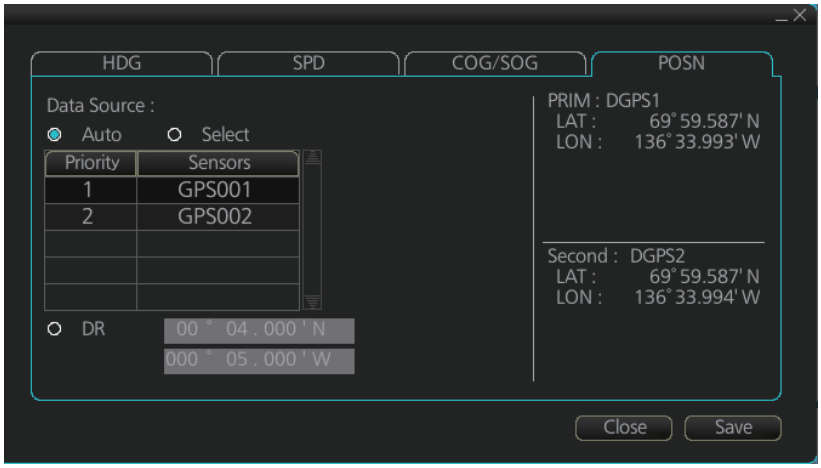
Select the source (GPS receiver) for speed over the ground and course over the ground.



[**Data Source**]: Select [Auto] to use the sensors in the sensor list according to the priority order. For manual selection, choose [Select] to use any sensor regardless of the priority order. For [Select], specify the required sensor from the sensor list.

[**GPS Smoothing**]: If smoothing is set at a sensor in the sensor list, change this setting to match the one set at the sensor. If smoothing is not set at a sensor, use the factory default (0). If you change the GPS smoothing setting, reset the power on all related units to reflect the change.

POSN (Position) page

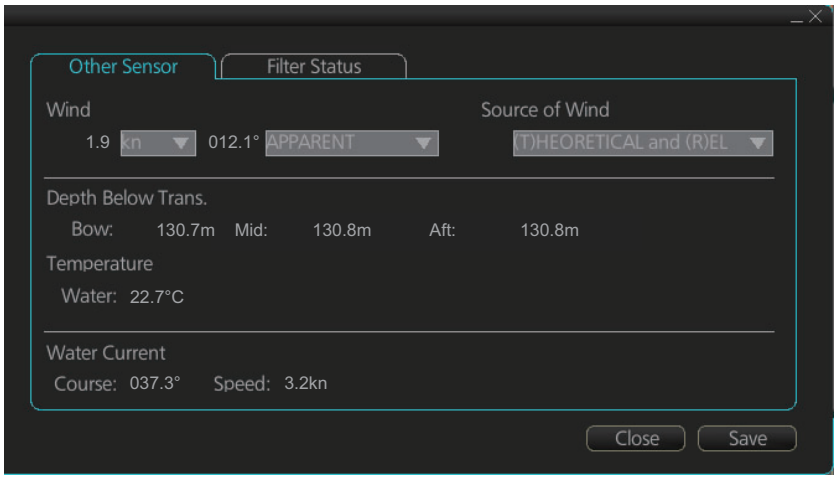


[**Data Source**]: Select [Auto] to use the sensors in the sensor list according to the priority order. For manual selection, choose [Select] to use any sensor regardless of the priority order. For [Select], specify the required sensor from the sensor list.

[**DR**]: When a sensor cannot be used, select [Manual], then enter position manually. The AIS function must be off (see section 14.4) and there must be valid heading and speed data to enter position manually. The sensor list is greyed out when DR is in effect.

Other sensors page

To show the [Other Sensors] page, open the menu and select [Other Sensor Settings].



[**Wind**]: Select wind unit, wind reference, and wind source. See section 18.8.

[**Depth Below Trans**]: Depth from hull at bow and aft to bottom. A depth alert value may be entered to alert you when the depth is within the value set.

[**Temperature**]: Water surface temperature.

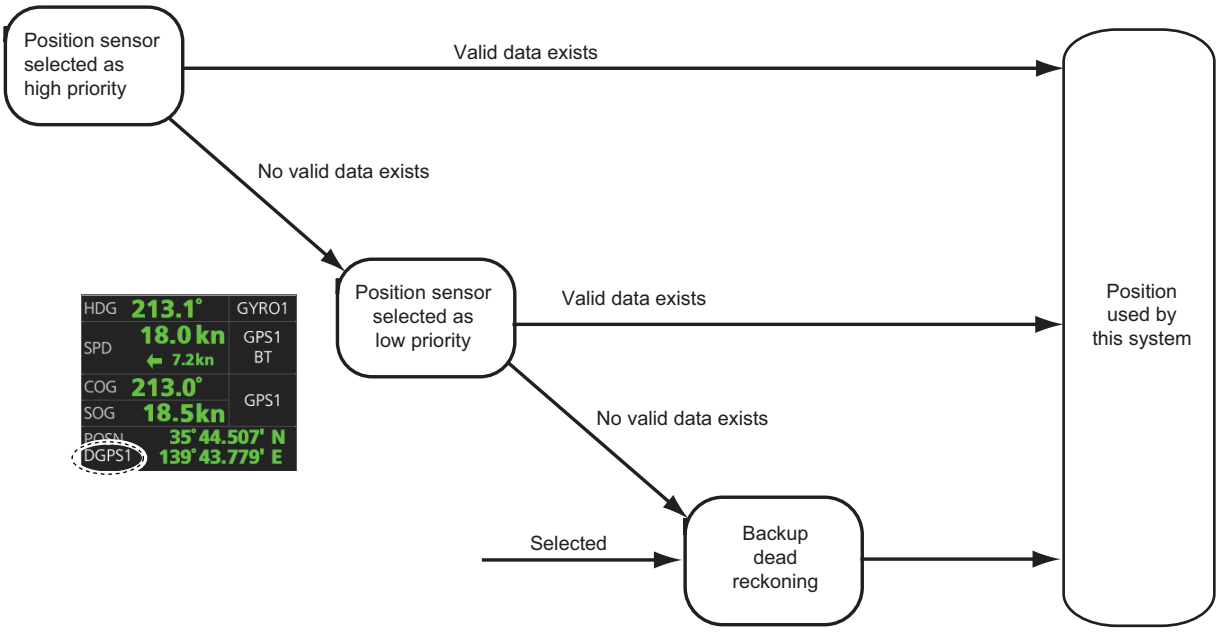
[**Water Current**]: Tide at own ship's position.

18.3 Source of Position

The figure below shows how source for position is chosen. The position sensors have either primary or secondary as input for their calculation. DGPS position sensors are considered more accurate than other position sensors.

The latitude and longitude position is shown at the top-right position on the chart display, and in the example below the position source is DGPS. Other indications that may be displayed in the position area are as follows:

- **DR**: Shown in yellow when position source is dead reckoning.
- **DGPS, GPS**: Name of position source.



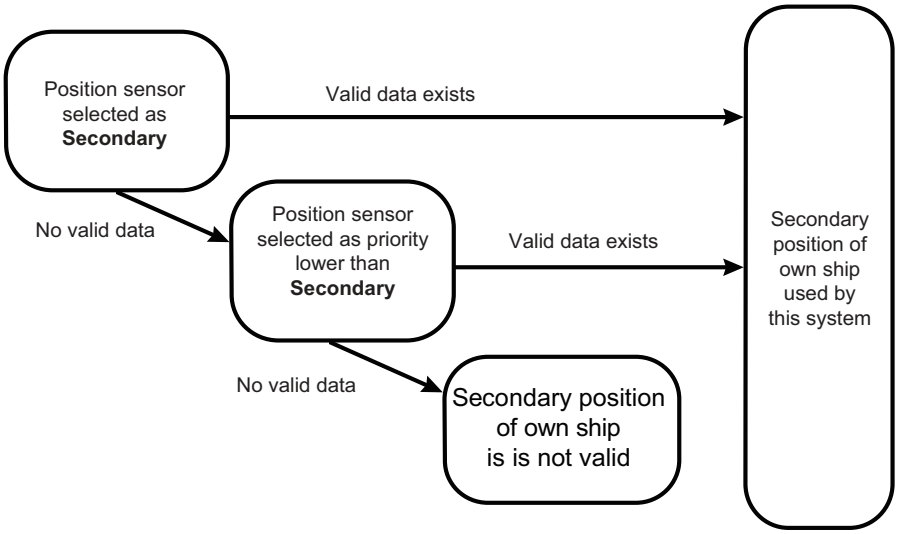
18.4 CCRP, Primary, Secondary and Pivot Positions of Own Ship

This system displays position in one of four methods:

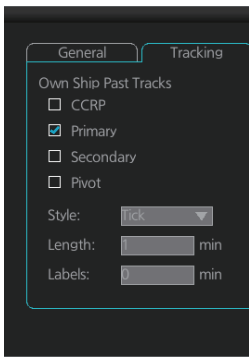
- **CCRP position**: CCRP
- **Primary position**: Position generated by position source chosen as highest priority.
- **Secondary position**: Position generated by position source chosen as 2nd highest priority.
- **Pivot position**: Ship's pivot point position.

The position source for primary position of own ship is chosen as Primary on the [POSN] page of the [System Sensor Settings] menu.

The position source for secondary position of own ship is chosen as Secondary on the [POSN] page of the [System Sensor Settings] menu. Secondary position of own ship is not available as latitude/longitude value for the user.



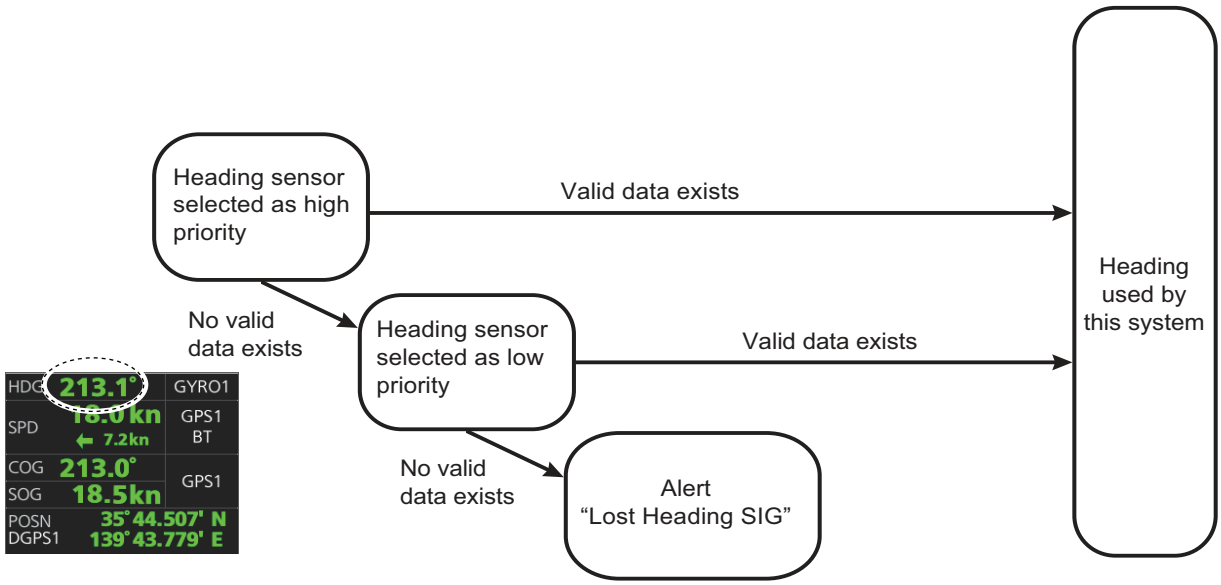
Past ship's track can be plotted on the chart with reference to CCRP, Primary, Secondary or Pivot position. You can control their visibility of the tracks, etc. from the [Tracking] page of the [Symbol Display] menu, shown in the right figure. In this example, past tracks are plotted using the primary position-fixing equipment.



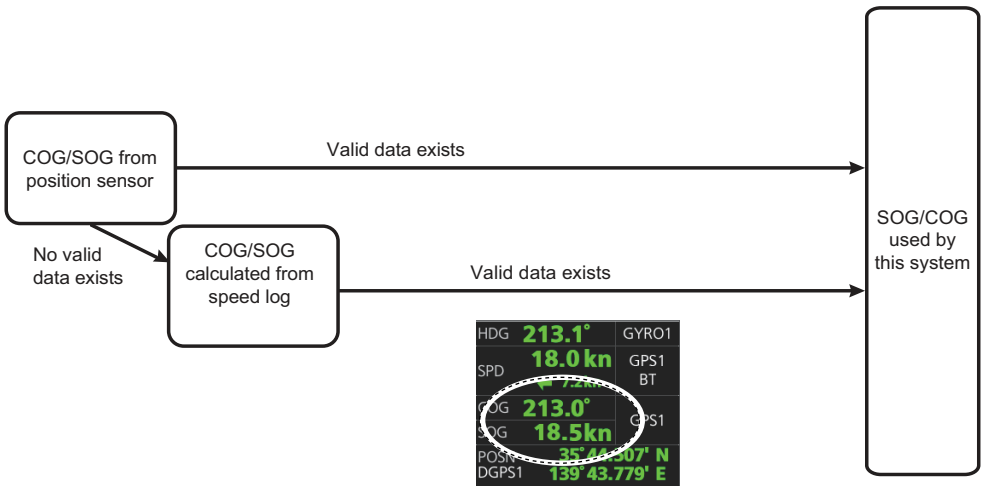
18.5 Source of Navigation Data

The figure below shows how various sources of navigation data are chosen. "SOG, COG" is speed over the ground and course over the ground, respectively. "SPD" is speed through the water. "Drift" is the difference between speed through the water and speed over ground.

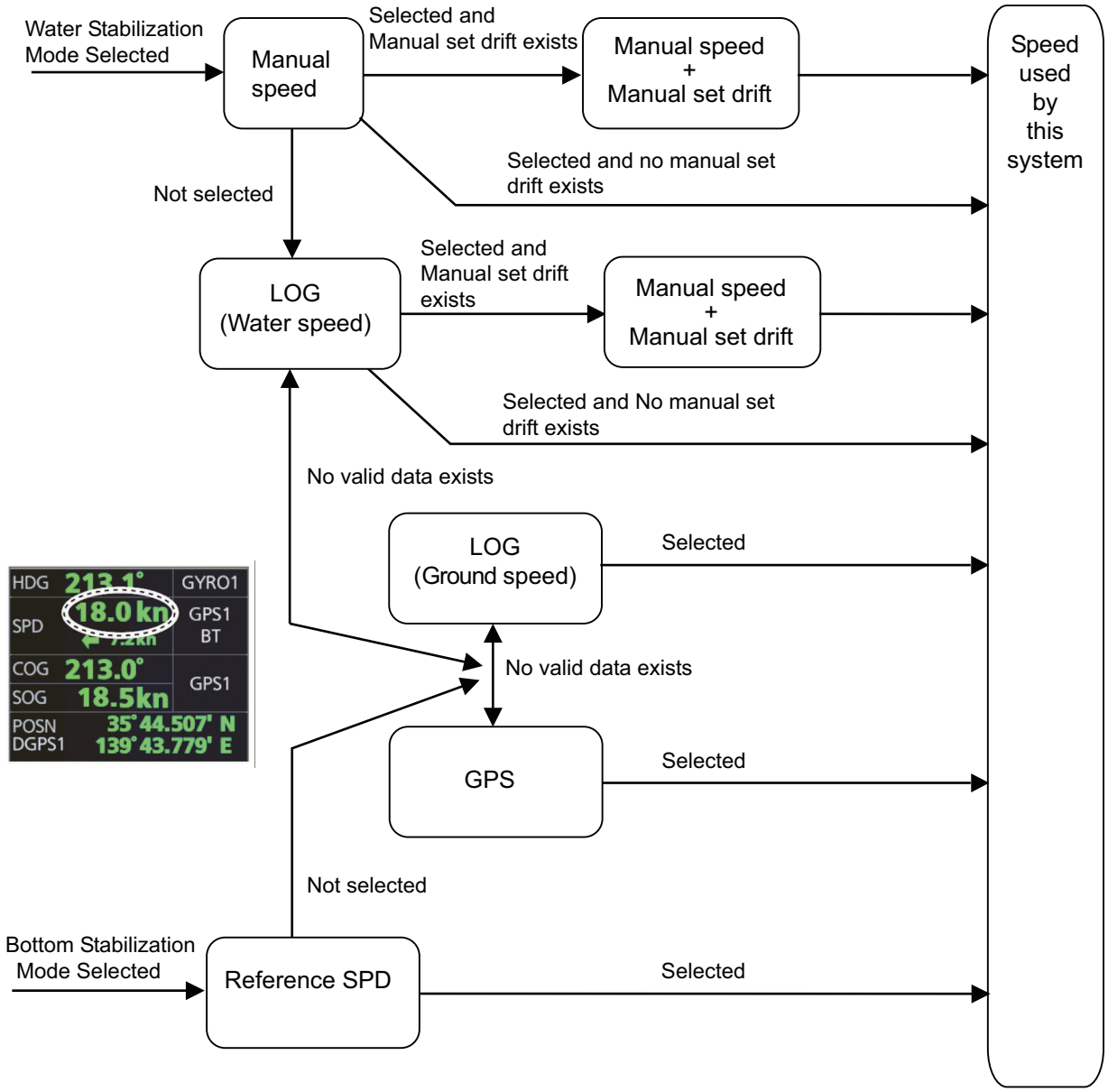
Heading used by the system is shown at the top-right position on the chart display. In the example shown below, heading is received from a gyrocompass and it is shown without additional text, meaning the value is referenced to true North. Additional gyro-related text that may appear is "(GYRO-A)" if the value is referenced to magnetic North.



SOG/COG used by the system is shown at the top-right position on the chart display. In the example below, COG and SOG are from chosen position sensors and this is indicated with the text "GPS*" or "LOG*" (* is the number of sensors).



Speed used by the system is shown at the top-right position on the chart display.The figure below shows the source of water speed is used for drift calculation.



Alerts related to SOG, COG, speed and heading components

You may not have selected a ship speed sensor or heading sensor, or the selected sensor may not be sending valid data. In those cases, even dead reckoning is not possible.

- If the heading information is lost, the alert "Lost Heading SIG" appears.
- If the speed information is lost, the alert "Lost SDME Signal" appears.
- If COG/SOG data is lost, the alert "Lost COG/SOG SIG" appears.
  Note: If the [Stabilization Mode] is [Bottom] and the sensor type is GPS, the alert priority will be Warning. For other settings, it is Caution.
- If ground tracking speed is lost, the alert "Lost LOG(BT) SIG" appears.
  Note: If the [Stabilization Mode] is [Bottom] and the sensor type is LOG, the alert priority will be Warning. For other settings, it is Caution.
- If water tracking speed is lost the alert "Lost LOG(WT) SIG" appears.
  Note: If the [Stabilization Mode] is [Water] and the sensor type is LOG, the alert priority will be Warning. For other settings, it is Caution.

18.6 Filter Status

The ECDIS incorporates a filter that receives raw sensor data, checks sensor integrity and processes multiple sensor data to produce a continuous estimate of ship's position and motion.

By default, the filtering uses data from all available sensors for filtering and integrity monitoring. The exception is heading data; only the selected heading device affects the filter output, but other heading sensors (including magnetic compasses) are used for integrity monitoring.

Sensors may be excluded manually or automatically. An excluded sensor participates in neither integrity monitoring or filtering. The filter automatically excludes a sensor from use if the sensor fails the first level of integrity check (for example, if a sudden jump is detected). If the actual integrity check fails for some reason and the filter is able to identify the faulty sensor, the faulty sensor is automatically excluded.

Sensor integrity is determined by:

(1) monitoring the statistical accuracy of each sensor independently and analyzing the input values and using the information of the type of sensor.

(2) monitoring the difference between pairs of sensors.

This equipment performs the consistency check required by the IEC-61924-2 (INS standards), for heading, turning rate, position, COG/SOG, and CTW/STW data. The result, shown on the [Filter Status] page of [Other Sensor Settings] menu, is either [Passed], [Low Accuracy], [Doubtful], [Failed], [Excluded], or [Not Available].

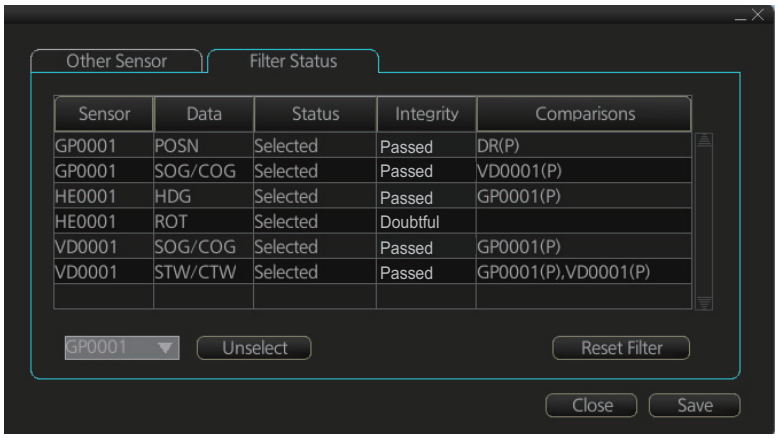
[**Passed**]: Data is available for comparison and data is normal.
[**Low Accuracy**]: Data signal strength is low, but data is normal.
[**Doubtful**]: Data is not available for comparison, but data is normal.
[**Failed**]: Data may or may not be available for comparison, and data is abnormal
[**Excluded**]: Data value changed significantly
[**Not Available**]: Sensor malfunction or data is improper.

Note: For heading data, if there is only one gyro connected, the judgment is "Doubtful" when the speed is 10 kn or less because heading cannot be checked against COG. If the speed is higher than 10 kn, COG can be checked against heading so the judgment is [Passed].

The methods of integrity monitoring are outlined in the table below.

Sensor	Comparison
Position	• Comparison with other position sensors. • Comparison with dead reckoning position.
Heading	• Comparison with other heading sensors. • Comparison with a COG sensor (used only if other heading sensors are not available and if COG is high enough).
Speed over the ground	• Comparison with other SOG sensors. • Comparison with water speed sensors is a secondary option (used only if other SOG sensors are not available).
Speed through the water	• Comparison with other STW sensors. • Comparison with SOG sensors is a secondary option (used only if other STW sensors are not available).
Rate of turn	• Comparison with other rate of turn sensors.

The status and integrity of all sensors can be monitored from the [Filter Status] page in the [Other Sensor Settings] menu. Sensors can also be unselected and the filter reset from this page.



The [Status] column indicates sensor status as follows:

- [Selected] (sensor selected for use in filter)
- [Unselected] (sensor not used in filter)
- [Not Available] (no sensor information)
- [Excluded] (automatically excluded sensor)

The [Integrity] column indicates sensor integrity as either [Passed] or [Failed]. The integrity evaluation is [Doubtful] when there are no other sensors to compare with.

The [Comparisons] column shows the sensors compared and the integrity evaluation of compared sensors in parentheses. Using the illustration above as an example, SOG/COG data fed from GP0002 is compared with the sensors GP0001 and VD0001. The integrity evaluation for the compared sensors is [Passed].

To unselect a sensor manually, select the sensor from the drop-down list at the bottom left corner of the page, click the [Unselect] button, then click the [Save] button. [Unselected] appears in the [Status] column. To reselect an unselected sensor, select the sensor from the drop-down list, click the [Select] button. [Selected] appears in the [Status] column.

The [Reset Filter] button functions to recover from sensor failure. When the button is operated:

- Automatically excluded sensors are re-included.
- All data history is erased.
- Output values are re-estimated using new data.
- Integrity monitoring is restarted using new data.

Note 1: The filter can also be reset from the context-sensitive menu. Right-click anywhere in the [Own ship information] box, then select [Filter Reset].

Note 2: The filter reset feature resets all units connected in the network.

18.7 Position Alignment

The position alignment feature functions to fine tune ship's position by using radar, radar echo target and ECDIS chart material.

18.7.1 How to align position

If the radar echo targets' symbols are not positioned correctly on the chart, there is either position error or gyro error or some combination of these errors.



Position may be aligned on the ECDIS display by moving own ship position or by moving radar target position. To align position, get into the Voyage navigation mode, then click the [Offset] button at the top-right position on the screen. (You are asked if you want to align position; click the [Yes] button to proceed.) Put the cursor on the correct position, then click. The amount of offset, in bearing and range, appears to the right the [Offset] button. The maximum offset in distance is 10.0 NM.

The latitude and longitude position indication is shown in yellow characters when the position align feature is active.

Note: The position offset value is synchronized with all FMD-3xxx and FAR-3xxx units on the same network.

18.7.2 How to cancel position alignment

Click the [Offset] button to cancel the position offset.

18.8 Wind Sensor

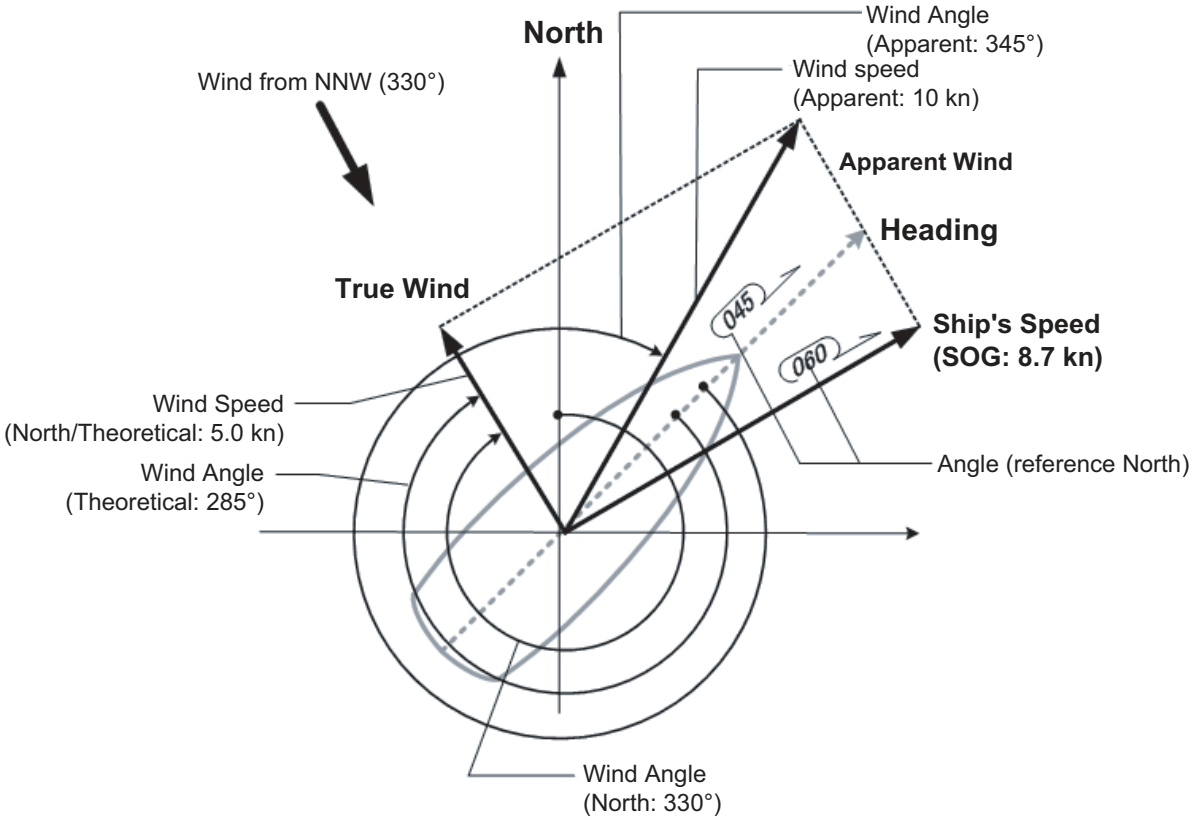
ECDIS can display and output wind data in the following three formats:
Apparent: Windmeter-measured wind speed and direction.
Wind angle reference: Heading
North: True wind angle, true wind speed, referenced to North
Wind angle reference: True North
Theoretical: True wind angle, true wind speed, referenced to heading
Wind angle reference: Heading

The illustration below shows wind speed and direction with given ship data.

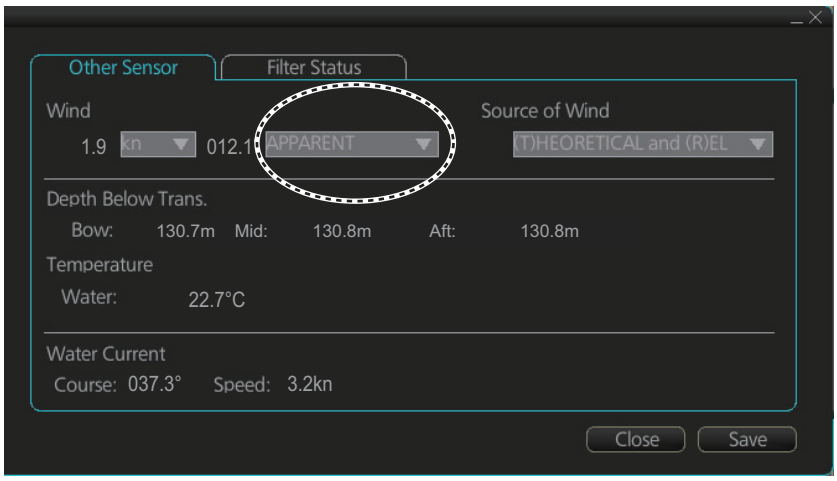
The wind values are as shown below.

Ship information:
COG: 60°
SOG: 8.7 kn
Heading: 45°

	Wind angle	Wind speed
Apparent	345°	10 kn
North (true wind, referenced to North)	330°	5 kn
Theoretical (true wind, referenced to heading)	285°	5 kn



Apparent, North (true wind referenced to North), Theoretical (true wind referenced to heading) may be selected from the [Other Sensor Settings] menu. If the wind indication is not accurate; for example, the wind is blowing from the North but the wind direction displays otherwise, check if the format is Theoretical. If it is, switch to another format.

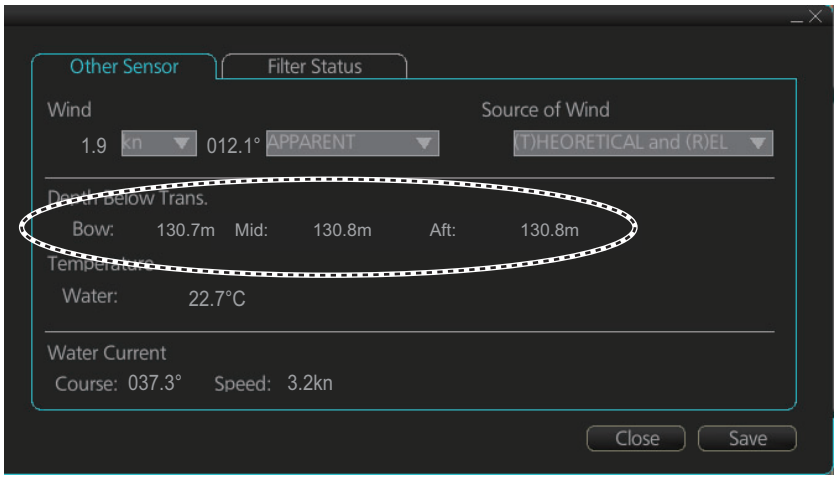


18.9 Depth Sensor

The depth output from a depth sensor (for example, echo sounder) is shown on the [Other Sensor] page in the [Other Sensor Settings] menu.

The content of the [Other Sensor] page depends on sensors connected.

In this example there are three transducers (bow, mid and aft) installed.



The system displays depth value as depth below the transducer. If required, you can get an alert when the measured depth is less than the [Echo Alarm Limit] setting ([UKC] page in the [Overlay/NAV Tools] box). The system generates the Alert "Depth Limit".

19. RECORDING, PLAYBACK FUNCTIONS

The ECDIS records various items during a voyage, like movement and position of your ship and dangerous radar targets (from the radar). These items are recorded in the following logs:

Update log:	Records the install and update history for the ENC, ARCS and C-MAP charts (see section 7.3).
Event log:	Records user events and position events.
NAV log:	Records entire voyage (i.e., a sailing of a route from first point to the last, also MOB data), details (position, speed and course every minute), chart usage (information on charts used for display).
Target log:	Records dangerous TT, AIS.
Alert log:	Records alerts generated by the system (see section 20.7).
Route transfer log:	Records sent and received route-related communications.

19.1 How to Record User, Position Events

This equipment can save/show a maximum of 2,000 events.

19.1.1 User events

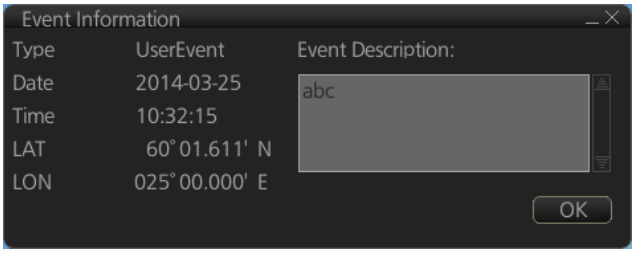
A user event is a comment about an event (weather, etc.). You can show user events on the chart area. Open the [Tracking] page of the [Symbol Display] menu show or hide the events.



To record a user event:

1. Get into the Voyage planning mode, then click the [Log], [Event Log] and [User Event] buttons on the InstantAccess bar™ to show the [Record User Event] window.
2. Enter a comment. Click the [OK] button to finish and close the text box.

An event marker (▭) (orange) appears at your position and the event is recorded to the [Voyage] log.



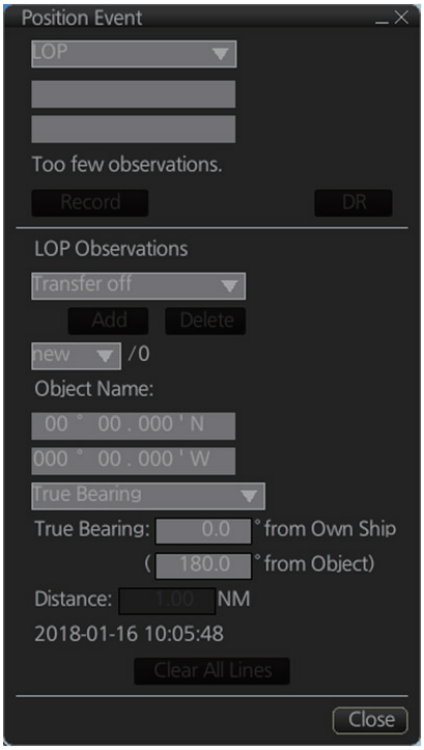
To view an event comment, get into an ECDIS mode other than Chart maintenance. Put the cursor on the event, then left click to show the [Event Information] window. The window shows the name of the event ([UserEvent]), time and date of entry, latitude and longitude position of the event and comment. Note that the comment can be edited from this window. Edit the comment, then click the [OK] button to save.

19.1.2 Position events

The purpose of a position event is to record current position data to the [Voyage] log. Position events can be shown in the chart area by checking [Positions] on the [Tracking] page of the [Symbol Display] menu. Do as shown below to record position events.

How to record position events

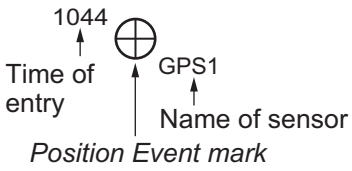
1. Get into the Voyage planning mode.
2. Click the [Log], [Event Log] and [POSN Event] buttons on the InstantAccess bar™ to show the [Position Event] dialog box.



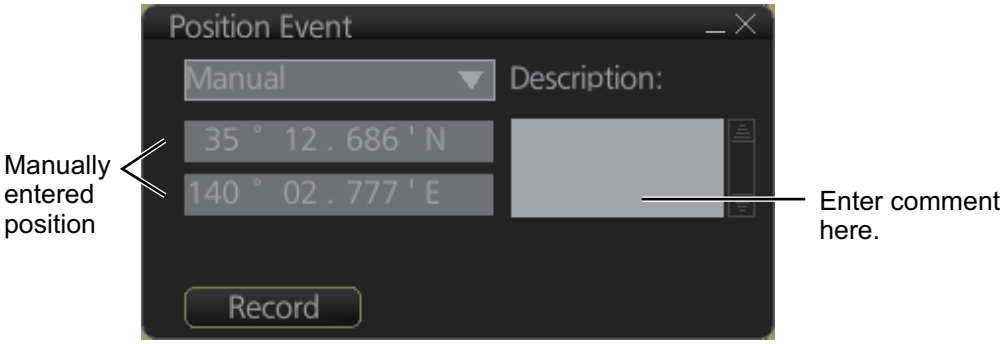
3. At the list box at the top of the dialog box, select position type.
   [LOP]: Latitude and longitude position of a fixed object at ship's position.
   [Position]: Ship's position fed from navigator selected.
   [Manual]: Manual entry of position.
4. If you selected [Position] at step 3, click the [Record] button.



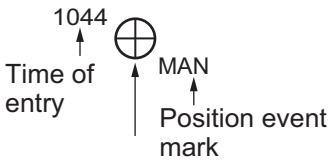
The [Position Event] window shows the position at the moment the [Record] button is clicked. The position is recorded to the [Voyage] log.



5. If you selected [Manual] at step 3, enter latitude and longitude position and comment (optional), then click the [Record] button.



The [Position Event] window shows the position at the moment the [Record] button is clicked. The position is recorded to the [Voyage] log.



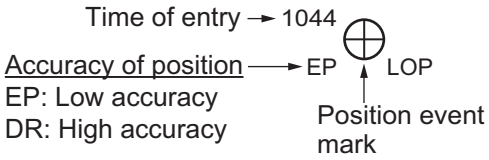
6. For [LOP], see the description below.
A plotted line on which a vessel is located, determined by observation or measurement of the range or bearing to an aid to navigation or other charted element. Two or more simultaneous observations can be combined to produce an estimate of the ship's current position. If the position is based on only two observations, it is an "estimated position" (EP); otherwise it is called a fix. A maximum of 6 observations can be entered to obtain a fix.
Basic operation: Coordinates of the aid to navigation can be entered into dialog boxes or they can be selected graphically on the chart:

- S57: Click on a charted object (beacon, light, buoy etc.) or any location. Description of the object appears above coordinate boxes.
- ARCS: Click anywhere in the chart.

Default values for bearing and range are approximated from ship's current position information. The time of observation is stopped when the object is selected (or when the [Add] button is clicked). Click the [Add] box to include the observation in the fix computation. The counter shows "new/1", at the input of the second observation. The word "new" indicates that the observation currently displayed is not yet included in the fix computation, and it appears as a dashed line or ring on the chart. The added observations can be edited or deleted after selecting them at the counter. When at least two measurements are entered, the EP or fix is computed and the coordinates are shown in the top part of the dialog. To show a position symbol on the chart, click the [Record] button. In the case of an EP, the letters EP are shown on the right side of the coordinates. If a valid position estimate cannot be obtained, a message is displayed under the coordinates. This may happen, for example, if the lines / circles have multiple crossings that are far apart, or if two lines are nearly parallel or don't intersect at all. The accuracy limit (estimated standard error) is 1.0 NM. If the estimate is valid, the [Record] box can be clicked to record the current position estimate in the [Voyage] log. Discrepancy between LOP result and ship position is also recorded in the log (this information may be

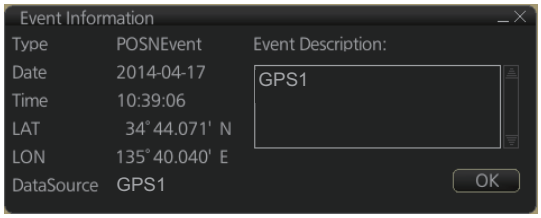
viewed by Info query on the position event symbol on the chart - which is displayed if position event display is on in chart display settings).
Time transfer: If the observations are not simultaneous, they should be transferred to a common time. Transferring is based on dead reckoning of ship movement. If a position line (or ring) is transferred, the letters TPL are shown beside its timestamp on the chart. The method of transfer may be selected in the bottom of the dialog. **Transfer to latest** transfers the measurements as if they were all made at the time of the newest measurement. **Continuous transfer** transfers all measurements to real time. **Transfer off** can be used to check where the measurement origins are. The position estimate and the record function follow the same logic, which means that Transfer off shows a position that has no relevance and Transfer to latest sends an old position to the [Voyage] log (timestamp in the log does not match the position).
If you are satisfied with the position shown in the latitude and longitude fields, then click the [Record] button to save the position observation to the Voyage log. If you wish you can also enter latitude and longitude values manually.
Timeouts: The observations cannot be used long after they were made because dead reckoning is inaccurate.

Click the [Record] button to put a position event at the LOP-calculated position. The position is recorded to the [Voyage] log.

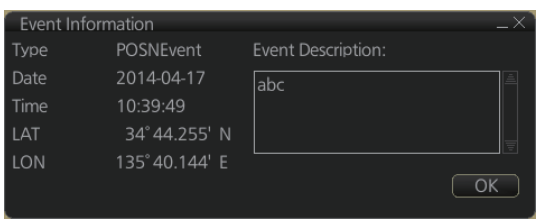


How to find position event information

You can find information about a position event in an ECDIS mode other than Chart maintenance. Put the cursor on the event mark, then left click to show the [Event Information] window. This window shows event type (position event), time of entry, event position, name of sensor ([Position] only), comment (automatic for [LOP] and [Position]; user-entered comment* for [Manual]), and position line data ([LOP] only).
*Comment cannot be changed from this window.



Position event: Position



Position event: Manual



Position event: LOP

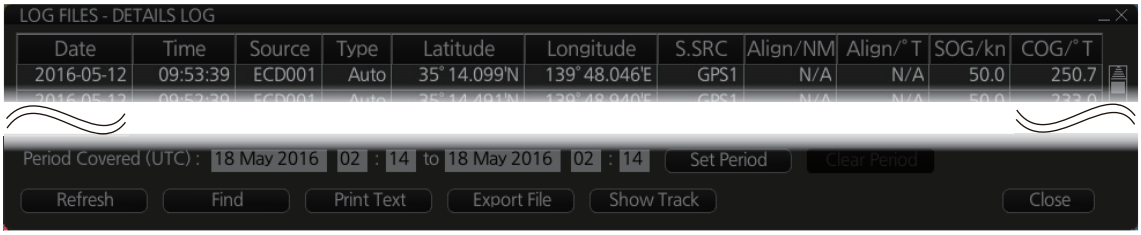
19.2 Details Log

The [Details] Log records the voyage information for the last 24 hours. Information is recorded every minute.

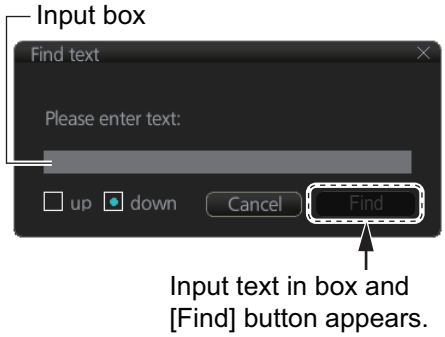
- Date of entry
- Time of entry
- Source: No. of unit which generated log
- Type: Type of position data
  - Auto: Automatic input of position
- Latitude, Longitude: Position as output by selected sensor and sensor used as the data source.
- Align/NM, Align/°T: Range, bearing offset, if used
- SOG/kn, COG/°T, S. SRC: Speed over the ground and its source
- HDG/°T, S. SRC: Heading data and its source
- CORR/°T, Gyro correction, if used.

How to view the Details log

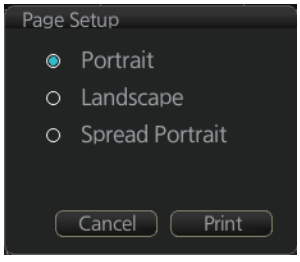
On the InstantAccess bar™, click the [Log], [NAV Log] and [Detail] buttons on the InstantAccess bar™.



- **To show the logs of a specific period**, enter the period to show with [Period Covered (UTC)], then click the [Set Period] button. Use the [Clear Period] button to display all logs. Log entries outside the set period become gray and the entries inside the set period remain visible. To show log entries which are not visible, spin the scrollwheel upward to scroll up the log, downward to scroll down the log.
- **To refresh the log**, click the [Refresh] button.
- **To search the log**, do as follows:
  1) Click the [Find] button to show the [Find text] box.
  2) Click the input box, then enter the text to search.
  3) Select the search direction with the up or down radio button.
  4) Click the [Find] button. The first matching text is highlighted in yellow at the top of the screen.
  5) To continue the search click the [Find] button. To cancel the search, click the [Cancel] button.



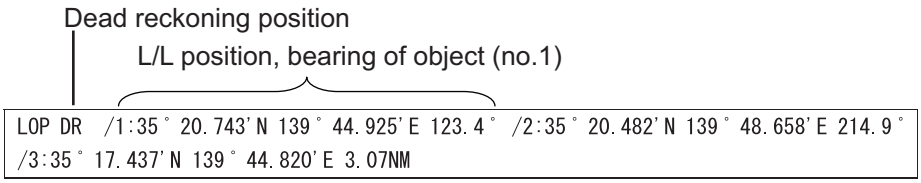
- **To print the log**, click the [Print Text] button. Select printing format, then click the [Print] button. [Spread Portrait] prints two pages of data on one page.
- **To show track for the period selected**, click the [Show Track] button. Use the [Hide Track] button to erase the track.
- **To export the log**, click the [Export File] button. The file is named DetailsLogYYYYMMDDhhmmss.csv.



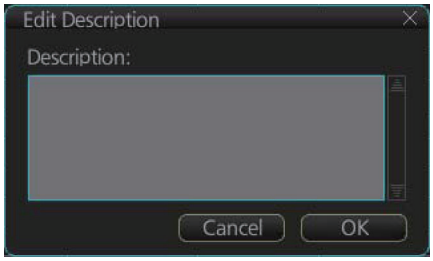
19.3 Voyage Log

The [Voyage] log records all voyage-related data of the past three months. Recorded events are:

- Date: Date of entry
- Time: Time of entry
- Type: Log entry types
  - Auto: Automatic entry of ship position, in 1 to 4 hr intervals, set by operator.
  - Ship: Logged if the amount of change in speed or course equals or is greater than the set values.
  - MOB: MOB position, entered with [MOB] button.
  - User: Operator-entered position. The information entered in the [Description] box is logged.
  - Posdev: Record user-entered position event. The[Description] window shows automatically entered data (Position, LOP) or manually entered comment (Manual).
    Automatically entered data (Position: data source, LOP: see below.
    The latitude and longitude position and bearing (or distance) of a maximum of three objects are automatically recorded to each log entry. An object whose position accuracy is low is not recorded. If an object has both a bearing and distance, separate entries are made.

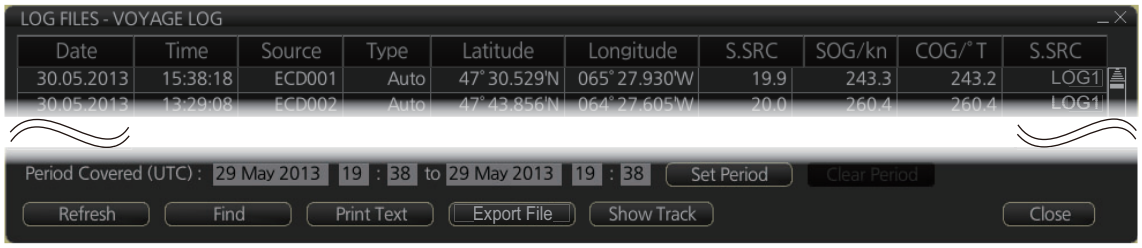


- Latitude, Longitude: Position as output by selected sensor and sensor used as the data source.
- SOG/kn, COG/°T, S.SRC: Speed over the ground, course over the ground. and their source
- HDG/°T, S.SRC: Heading and its source
- CORR/°T, Gyro correction, if used.
- Wind/kn Wind/°T: Wind speed and angle
- Dist/NM: Navigation distance
- Depth/m: Depth in meters
- Description: Show recorded contents, for [User], [PosDev] above.
  If desired items other than [Posdev] can be edited. Click an item to show the [Edit Description] box. Edit the description as required, then click the [OK] button.

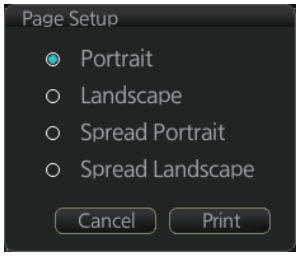


How to view the Voyage log

On the InstantAccess bar™, click the [Log], [NAV Log] and [Voyage] buttons on the InstantAccess bar™.



- **To show the logs of a specific period**, enter the period to show with [Period Covered (UTC)], then click the [Set Period] button. Use the [Clear Period] button to display all logs. Log entries outside the set period become gray and the entries inside the set period remain visible. To show log entries which are not visible, spin the scrollwheel upward to scroll up the log, downward to scroll down the log.
- **To refresh the log**, click the [Refresh] button.
- **To search the log**, do as follows:
  1) Click the [Find] button to show the [Find text] box.
  2) Click the input box, then enter the text to search.
  3) Select the search direction with the up or down radio button.
  4) Click the [Find] button. The first matching text is highlighted in yellow at the top of the screen.
  5) To continue the search click the [Find] button. To cancel the search, click the [Cancel] button.
- **To print the log**, click the [Print Text] button. Select printing format, then click the [Print] button.
- **To show track for the period selected**, click the [Show Track] button. Use the [Hide Track] button to erase the track.
- **To export the log**, click the [Export File] button. The file is named VoyageLogYYYYMMDDhhmmss.csv.



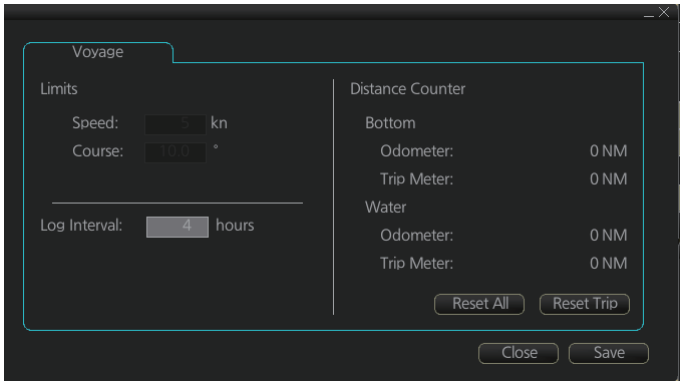
19.3.1 How to set conditions for voyage logging

The operator can set the conditions for automatic voyage logging (logging interval only). When the following conditions are met, data is stored into the Voyage log.

- Speed (or course) change is equal to the set value.
- The logging interval time has elapsed.

To set the conditions of logging, do as follows:

1. Open the menu and select [Log], [NAV Log] and [Voyage] to show the [Voyage] menu.
2. Set the logging interval (1 - 4 hr, 1 hr increment).
3. Click the [Save] button to save the settings, then click the [Close] button to finish.



19.4 Chart Usage Log

The [Chart Usage] log stores which charts were used on the ECDIS display. To open the log, click [Log], [NAV Log] and [Chart Usage] on the InstantAccess bar™. The following information is recorded in the chart usage log:

- Date and time chart was displayed
- Chart ID
- Center position of display (Lat, Lon)
- Chart source
- Chart edition
- Display scale
- Compilation scale
- The latest update included to chart
- Chart base



- **To show the logs of a specific period**, enter the period to show with [Period Covered (UTC)], then click the [Set Period] button. Use the [Clear Period] button to display all logs. Log entries outside the set period become gray and the entries inside the set period remain visible. To show log entries which are not visible, spin the scrollwheel upward to scroll up the log, downward to scroll down the log.
- **To refresh the log**, click the [Refresh] button.
- **To search the log**, do as follows:
  1) Click the [Find] button to show the [Find text] box.
  2) Click the input box, then enter the text to search.
  3) Select the search direction with the up or down radio button.
  4) Click the [Find] button. The first matching text is highlighted in yellow at the top of the screen.
  5) To continue the search click the [Find] button. To cancel the search, click the [Cancel] button.
- **To export the log**, click the [Export File] button. The file is named ChartUsageLogYYYYMMDDhhmmss.txt.
- **To print the log**, click the [Print Text] button.

19.5 Danger Targets Log

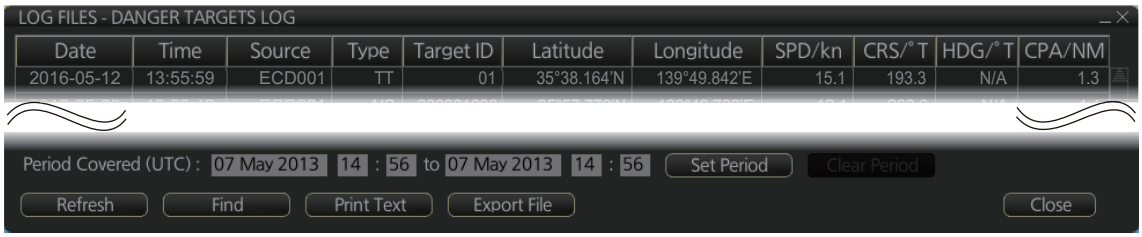
The [Danger Targets] log stores information about dangerous targets (CPA/TCPA alarm) that are received from a radar (TTs) and/or AIS targets received from an AIS transponder.

If a TT or AIS target is within the set CPA (Closest Point of Approach) and TCPA (Time to CPA), information of all TTs (including non-dangerous targets) are recorded into the danger target log. This data is as follows:

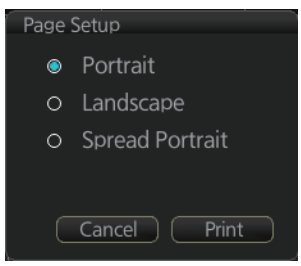
- Date: Date of entry
- Time: Time of entry
- Source: Unit which generated log
- Type: Type of dangerous target (TT or AIS)
- Target ID: When [Type] is [TT] - Dangerous target's number
  When [Type] is [AIS] - MMSI number
- Latitude and Longitude: Latitude and longitude position of dangerous AIS target or TT
- SPD/kn: Speed of dangerous AIS target or TT
- CRS/°T: Course of dangerous AIS target or TT
- HDG/°T: Heading of dangerous AIS target or TT
- CPA/NM, TCPA/min: CPA and TCPA of dangerous AIS target or TT

How to view the danger targets log

On the InstantAccess bar™, click the [Log], [Target Log] and [Danger Target] buttons.



- **To show the logs of a specific period**, enter the period to show with [Period Covered (UTC)], then click the [Set Period] button. Use the [Clear Period] button to display all logs. Log entries outside the set period become gray and the entries inside the set period remain visible. To show log entries which are not visible, spin upward to scroll up the log, downward to scroll down the log.
- **To refresh the log**, click the [Refresh] button.
- **To search the log**, do as follows:
  1) Click the [Find] button to show the [Find text] box.
  2) Click the input box, then enter the text to search.
  3) Select the search direction with the up or down radio button.
  4) Click the [Find] button. Matching text is highlighted in yellow at the top of the screen.
  5) To continue the search click the [Find] button. To cancel the search, click the [Cancel] button.
- **To print the log**, click the [Print Text] button. Select printing format, then click the [Print] button.
- **To export the log**, click the [Export File] button. The file is named DangerTargetLogYYYYMMDDhhmmss.csv.

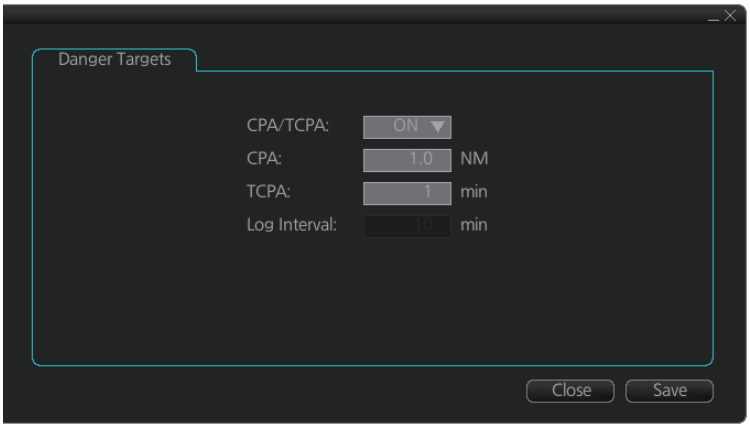


19.5.1 How to filter the danger targets log

You can filter the danger targets log by CPA or TCPA. When a TT or AIS target's CPA or TCPA is lower than the setting here, the target's details are automatically logged.

To set the filter, do the following:

1. Open the menu and select [Log], [Target Log] and [Danger Target] to show the [Danger Targets] menu.



2. At [CPA/TCPA], select [ON].
3. At [CPA], set the distance for the CPA.
4. At [TCPA], set the time for the TCPA.
   Note: [Log Interval] is fixed at 10 minutes.
5. Click [Save] to save the settings, then click [Close] to close the menu.

19.6 Route Transfer Log

The [Route Transfer] log keeps a tab of sent and received route-related communications. When one or more of the following conditions are met, an entry is made in the [Route Transfer] log.

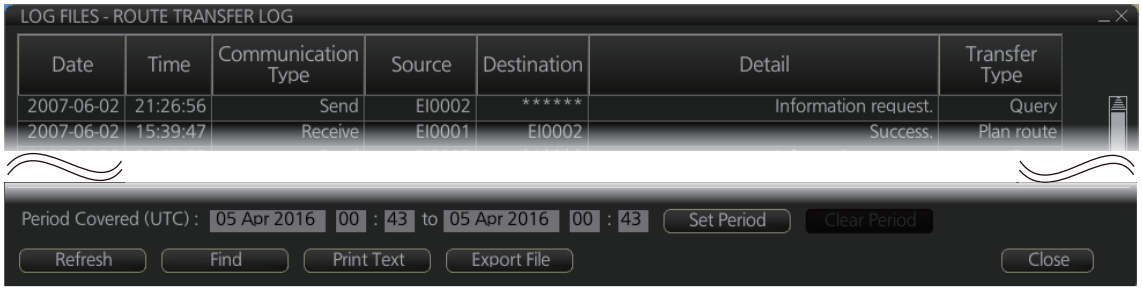
- RRT sentence is sent from this system.
- RRT sentence is received by this system.
- A sent RRT sentence is not acknowledged by an external device.

The log data includes the following:

- Date: Date of entry
- Time: Time of entry
- Communication Type: Send, Receive or No Response
- Source: UID of route related communication
- Destination: UID of destination of route related communication
- Detail: Content of transfer
- Transfer Type: Type of communication - Monitor route, Plan route, or Query
- Transfer Name: Name of transferred route
- Transfer Version: Transferred route's version
- Current WPT: Current waypoint
- Transfer Status: Current transfer status of the transferred route
- Application Status: Current status of the transfer application

How to view the route transfer log

On the InstantAccess bar™, click the [Log], [Target Log] and [Route TRANS Log] buttons



- **To show the logs of a specific period**, enter the period to show with [Period Covered (UTC)], then click the [Set Period] button. Use the [Clear Period] button to display all logs. Log entries outside the set period become gray and the entries inside the set period remain visible. To show log entries which are not visible, spin upward to scroll up the log, downward to scroll down the log.
- **To refresh the log**, click the [Refresh] button.
- **To search the log**, do as follows:
  1) Click the [Find] button to show the [Find text] box.
  2) Click the input box, then enter the text to search.
  3) Select the search direction with the up or down radio button.
  4) Click the [Find] button. Matching text is highlighted in yellow at the top of the screen.
  5) To continue the search click the [Find] button. To cancel the search, click the [Cancel] button.
- **To print the log**, click the [Print Text] button. Select printing format, then click the [Print] button.
- **To export the log**, click the [Export File] button. The file is namedRouteTransferLogYYYYMMDDhhmmss.csv.

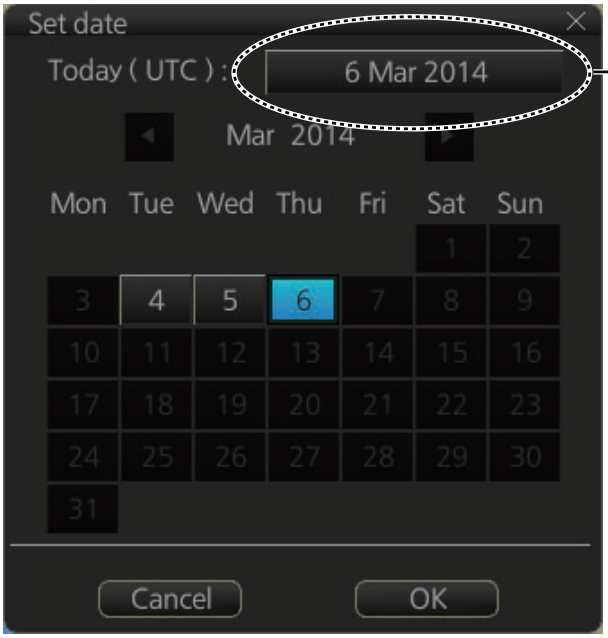
19.7 How to Playback the Log

The log can be played back to check ship's movements within a given time frame. If an AMS is connected, deactivate it to enable playback.

Cautions for data recording, playback

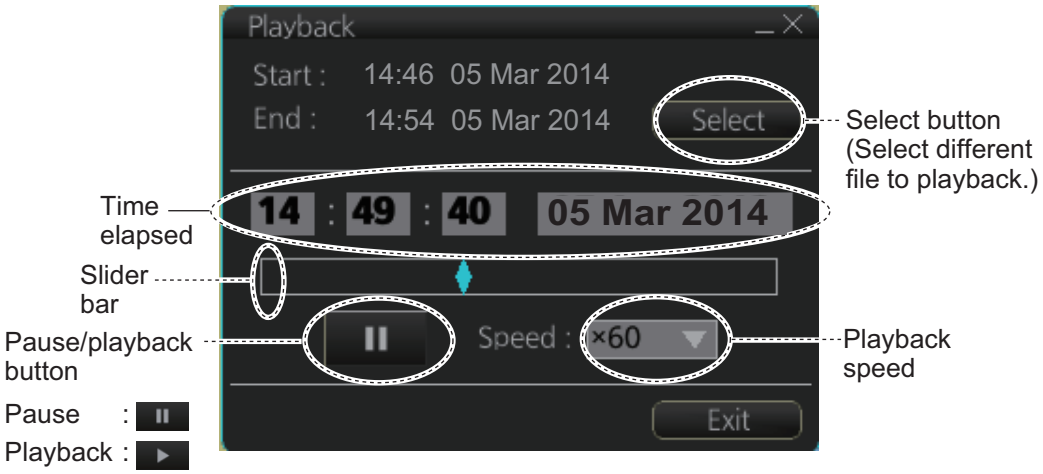
- In rare cases, data may be corrupted when recorded.
- The most recent playback data (max. last 10 minutes) is not saved in an unintentional power outage or a system restart. If the power was turned off with the power key on the Control Unit, the playback data which was present until the power was turned off is saved.
- Playback is not available when unacknowledged alerts exist.

1. On the Status bar, click the [OTHERS] and [Playback] buttons. A confirmation message appears to inform you that, during playback, the logging function and alert handling function are not available. Click the [OK] button to proceed. The window shown below appears.



2. Select the date to playback. Log data is stored by the day. To playback data in the current month, click a day in the calendar. For other dates, click the [◀] or [▶] button to select the month and, then click a day in the calendar. To playback the current day, click the button at the top of the screen.
3. Click the [OK] button, and the dialog box shown on the next page appears. This box has controls for
   - Start and End times
   - Time elapsed
   - Slider bar (drag the bar to change start time)
   - Playback speed list box (change the playback speed). The choices are x1, x2, x4, x10 and x60.

- The [Select] button selects a file. Playback is stopped and a message asks if you are sure to select a different file.



All your ship's movements and chart-related operations during the time period selected are plotted on the screen and the screen shows the message "PLAYBACK". To stop playback and return to the normal display, click the [Exit] button. The message "Please Restart ECDIS for using other functions without playback." appears. Click the [Restart] button to restart ECDIS.

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20. ALERTS

This chapter describes how the internal alert system works. For a complete list of alerts, See "ALERT LIST" on page AP-18.

Note 1: This equipment does not provide the functional alert group function.

Note 2: The reserved cluster identifier for this equipment, which is defined in IEC62923-2, is "Nav".

Note 3: Do not disconnect the LAN cable while the system is powered.

20.1 What is an Alert?

"Alert" is a generic name for a notice to any unusual or potentially dangerous situation generated within the system. Alerts are classified according to priority and category.

Alert priority

There are five alert priorities: emergency*, alarm, warning, caution, and indication.
* Generated when this ECDIS is connected to an AMS (Alert Management System, optional specification).

Emergency: Immediate danger to human life or to the ship and its machinery exists and that immediate action must be taken. The navigation equipment does not generated emergency alerts. **Emergency alerts are handled the same as an Alarm alert**.

Alarm: Situations or conditions which require immediate attention, decision and (if necessary) action by the bridge team to avoid any kind of hazardous situation and to maintain the safe navigation of the ship.

Warning: Conditions or situations which require immediate attention for precautionary reasons, to make the bridge team aware of conditions which are not immediately hazardous, but may become so.

Caution: Awareness of a condition which continues to require attention out of the ordinary consideration of the situation or of given information.

Indication: Display of regular information and conditions, not part of alert management. Indication alerts are handled the same as a Caution alert.

Alert category

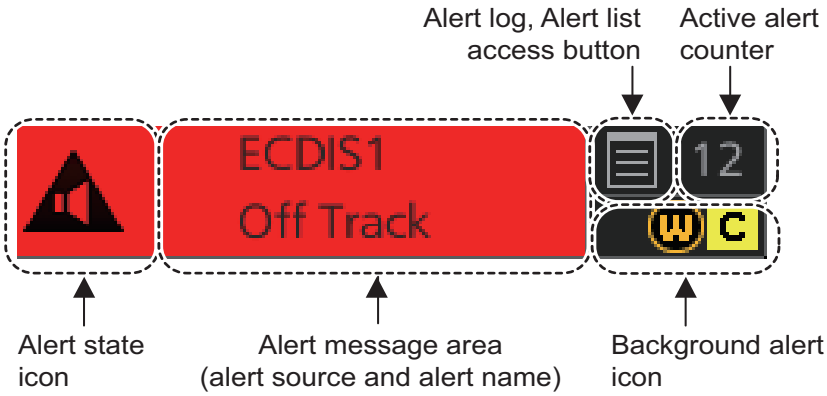
An alert is further classified by category, A, B or C, according to its degree of severity or source.

Category	Description
A	Category A alerts include the following, and must be confirmed from the equipment that generated the alert. • Danger of collision • Danger of grounding
B	Category B alerts are alerts where no additional information for decision support is necessary. Category B alerts are all alerts not falling under category A.
C	Alerts for other than navigation equipment (ex. engine-related alert)

20.2 Alert Box

When an alert is generated, the related alert message and alert state icon appear in the Alert box, which is at the bottom right corner on the screen. An audible alarm is additionally generated for alarms and warnings. When there is no active alert or indication, the message "No Active Alerts" appears in the Alert box.

In addition to the alert message and alert state icon, the Alert box provides access to the Alert list and Alert log.



Alert state icon: The state of an alert is shown with an icon. See page 20-4 for a complete list of the icons and their meanings.

Alert message area: The alert message area shows the name of the active alert with the highest priority, together with the alert source. The color of the text and background change according to the alert priority and alert status (see the table on the next page).
Unacknowledged alerts can be acknowledged from the Alert box and Alert list. Alerts are not removed from the Alert box and Alert list until they are acknowledged and the cause rectified (see section 20.5).

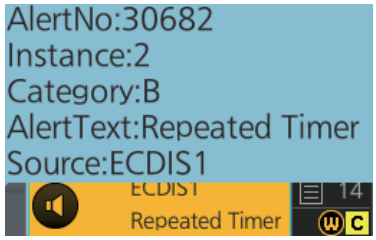
Alert Log, Alert list button: Right-click to select [Alert List Window] or [Alert Log Window]. The background color of the button is light blue when the list or log is open. See section 20.6 and section 20.7 for a description of the list and log.

Background alert icon(s): Shows the alert priority icon (A: alarm, W: warning, C: caution) of alerts, other than the alert currently displayed in the alert box. Background alert icons are shown only when two or more alerts are active. The icons disappear when alerts are acknowledged and rectified, and one or less alert is active.

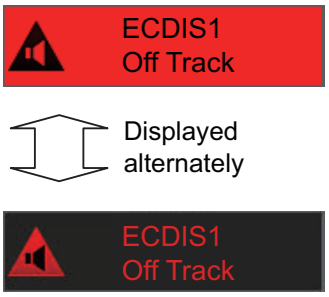
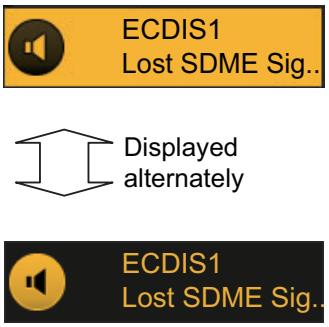
Active alert counter: Shows the number of active alerts, excluding the alert whose priority is Indication. This counter shows when two or more active alerts are generated.

How to find details about an alert

Place the cursor on the alert message area to show details about an alert.



Alert message display format

Alert indication	Priority of alert	Alert state	Display state
	Emergency, Alarm	- Not acknowledged, Not rectified. OR - Not acknowledged, Rectified.	Black characters on red background. (Flashing) Red characters on gray background.
	Alarm	Acknowledged, Not rectified.	Red characters on gray background.
	Warning	- Not acknowledged, Not rectified. OR - Not acknowledged, Rectified.	Black characters on yellow-orange back-ground. (Flashing) Yellow-orange characters on gray background.
	Warning	Acknowledged, Not rectified.	Black characters on yellow-orange background.
	Caution, Indication	Not rectified.	Yellow characters on gray background.
	Alarm, Warning	Acknowledged, Rectified.	No display.
	Emergency, Caution, Indication	Rectified.	No display.

Alert state icons

The table shows the alert state icons and their meanings. Flashing icons flash every other second.

No.	Icon	Alert state	Icon display	Audible alert
Alert priority: Emergency				
1		Cause not rectified	Red, flashing	Silent
Alert priority: Alarm				
2		Not acknowledged, not rectified	Red, flashing	3 short audible alerts repeated every 7 s.
3		Not acknowledged, not rectified, buzzer temporarily silenced	Red, flashing	Silent
4		Acknowledged, not rectified	Red, lit	Silent
5		Acknowledged, not rectified, acknowledged from external equipment	Red, lit	Silent
6		Not acknowledged, rectified	Red, flashing	Silent
Alert priority: Warning				
7		Not acknowledged, not rectified	Yellow-orange, flashing	2 short audible alerts repeated every 60 s.
8		Not acknowledged, not rectified, buzzer temporarily silenced	Yellow-orange, flashing	Silent
9		Acknowledged, not rectified	Yellow-orange, lit	Silent
10		Acknowledged, not rectified, acknowledged from external equipment	Yellow-orange, lit	Silent
11		Not acknowledged, rectified	Yellow-orange, flashing	Silent
Alert priority: Caution				
12		Caution	Yellow, lit	Silent
Alert priority: Indication				
13		Indication	Yellow, lit	Silent

No.	Icon	Alert state	Icon display	Audible alert
Other				
14		Acknowledge not allowed for alarm	Red, displayed with alarm icons (2, 3, 6)	Silent
15		Acknowledge not allowed for warning	Yellow-orange, displayed with warning icons (7, 8, 11)	Silent

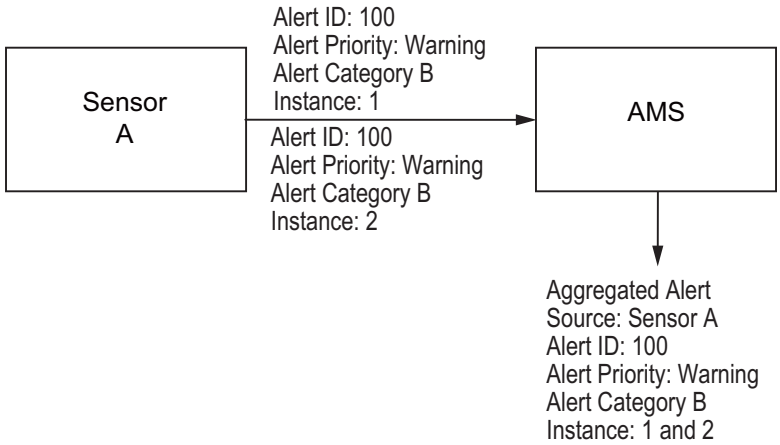
20.3 How to Temporarily Silence the Buzzer for an Alarm or Warning

The buzzer that sounds for an emergency, alarm or warning alert can be silenced from the Alert list, with the [Silence] button. The buzzer stops and the state of the alert icon changes. The alert message remains in the Alert box and Alert list until the cause for the alert is rectified.

20.4 Aggregated Alerts

MSC302(87) requires the use of the “aggregated alert,” which groups multiple similar alerts. ECDIS does not support aggregated alerts but transfers them to the AMS.

The illustration below shows the grouping possible with the FURUNO AMS. Grouped alerts can be collectively temporarily silenced at the AMS.



20.5 How to Acknowledge an Alarm or Warning

When an alarm or warning is generated, the buzzer sounds and the name of the alert appears and flashes in the Alert box and Alert list. To acknowledge the alert, do one of the following:

- Operate the **ALARM ACK** key on a Control Unit.
- In the Alert box, click the alert name.
- In the Alert list, click the alert name or click the [ACK] button.

When acknowledged, the buzzer stops and the flashing of the alert name stops. The state of the alert changes and the alert priority changes as shown below

Priority No.		Priority of Alert	Alert state
High	1	Emergency, Alarm	Not acknowledged, Not rectified
	2	Warning	Not acknowledged, Not rectified
	3	Alarm	Not acknowledged, Rectified
	4	Warning	Not acknowledged, Rectified
	5	Alarm	Acknowledged, Not rectified
	6	Warning	Acknowledged, Not rectified
Low	7	Caution, Indication	Not rectified

Category of alert and place of alert acknowledgment

The place of alert acknowledgment depends on the category of the alert.

Category	Where alert notification occurs	Place of alert acknowledgment
A	Equipment that generated the alert and AMS* (Alert Management System).	Equipment that generated the alert.
B	Equipment that generated the alert and AMS.	Equipment that generated the alert, or AMS.
C	IAS (Integrated Automation System) generated alert for other than navigation equipment (ex: engine-related alert).	–

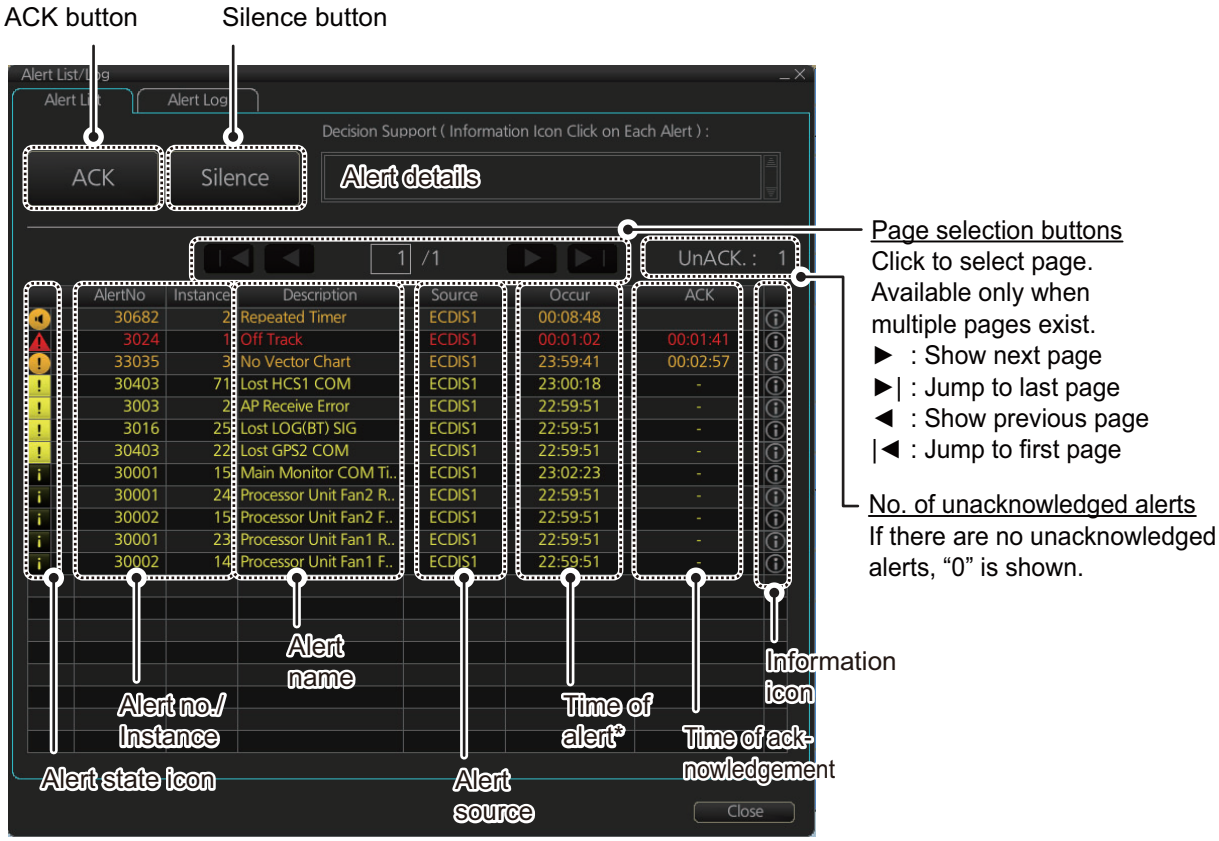
* A category A alert does not sound at the AMS.

20.6 Alert List

The Alert list displays all active alerts, with unacknowledged alerts at the top, in priority order. To display the list, right-click the [Alert List/Alert Log] button in the Alert box, then select [Alert List]. The ZDA sentence is required to display the time in the list.

The list shows

- Alert no., alert instance
- Alert name
- Source of alert
- Time (UTC) alert was generated
- Time (UTC), date alert was acknowledged
- Details about the alert selected
- Quantity of unacknowledged alerts



* The alert occurrence time is synchronized with UTC using the ZDA sentence. Occurrence time cannot be synchronized with UTC if ZDA sentence is interrupted.

The background color changes according alert state as follows.

Unacknowledged alert (flashing display): Emergency, Alarm, red; Warning, Yellow-orange
Acknowledged alert (steady display): Alarm, red; Warning, Yellow-orange; Caution, Indication yellow

The Alert state column shows the following:

- Left: Emergency, Alarm, Warning, Caution, Indication icons (numbers 1 to 13 in the table at "Alert state icons" on page 20-4).
- Right: Alert icon for Alarm, Warning is shown (numbers 14 to 15 in the table at "Alert state icons" on page 20-4.

To find detailed information about an alert, place the cursor on the [Description] or [Source] field of the applicable alert.

To check the remedy for the alert, click the information icon of the applicable alert, the [Decision Support] box at the top of the window shows how to handle the alert.

The [ACK] button acknowledges the alert at the top of the Alert list. Alarm and Warning categories can be acknowledged by clicking them in the list.

How the alert list is updated after acknowledgment, rectification

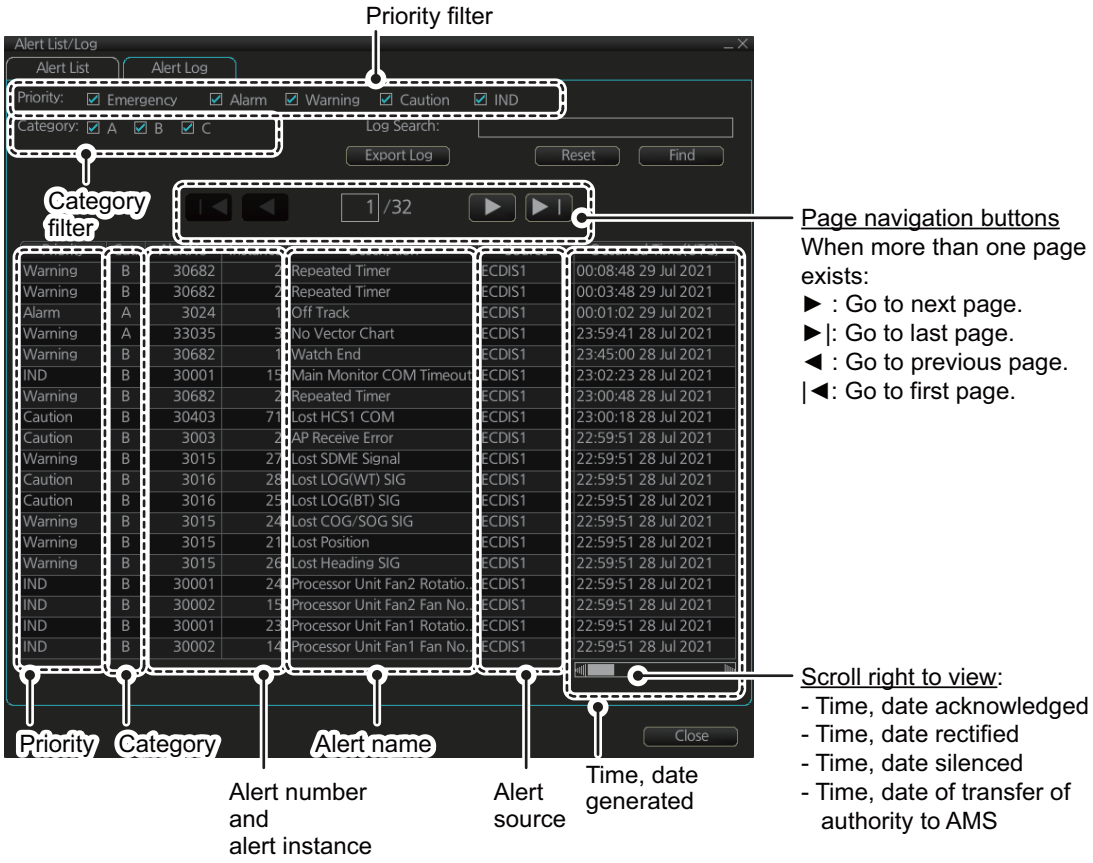
When you acknowledge an alert, its display method on the Alert list changes according to alert category and alert state. Acknowledged and rectified alerts are immediately removed from the list.

No.	Alert priority	Alert state	Display after acknowledgment	Display after rectification
1	Emergency, Alarm	Not acknowledged/Not rectified	5 (Alarm)	2 (Alarm) 8 (Emergency)
2		Not acknowledged/Rectified	9 (Warning)	–
3	Warning	Not acknowledged/Not rectified	6	4
4		Not acknowledged/Rectified	10	–
5	Alarm	Acknowledged/Not rectified	–	9
6	Warning	Acknowledged/Not rectified	–	10
7	Caution, Indication	Not rectified	–	11
8	Emergency	Rectified	–	–
9	Alarm	Acknowledged/Rectified	–	–
10	Warning	Acknowledged/Rectified	–	–
11	Caution, Indication	Rectified	–	–

20.7 Alert Log

The Alert log stores and displays the latest 10,000 alerts. To display the log, right-click the [Alert List/Log] button, then select [Alert Log Window]. The log shows the following information for each alert:

- Alert priority (emergency, alarm, warning, caution, indication)
- Alert category (A, B, C)
- Alert no., instance
- Alert name
- Time, date alert was generated (UTC)
- Time, date alert was acknowledged (UTC)
- Time, date alert was rectified (UTC)
- Time, date alert was silenced (UTC)
- Time, date of transfer of authority to AMS (UTC)



You can select what priority and category of alerts to display with the [Priority] and [Category] filters at the top of the list. The log can be sorted by [Priority], [Cat.], [Description] or [Occurred Time]. Click the corresponding column title to sort accordingly.

To find detailed information about an alert, place the cursor on the [Description] or [Source] field of the applicable alert.

To search the log, enter text in the [Log Search] box, then click the [Find] button. You can erase the contents of the [Log Search] box by clicking the [Reset] button.

You can save the contents of the log to a USB flash memory, in .dat format, by clicking the [Export Log] button.

20.8 Alert Reception from Connected Sensors

An "ALF receive and ACN transmit" communication is available for every serial line input. The ALF message from the sensor includes information about alerts from the sensor, and is presented though the normal alert system. When you acknowledge an alert, an ACN message is sent to the sensor to do remote acknowledge.

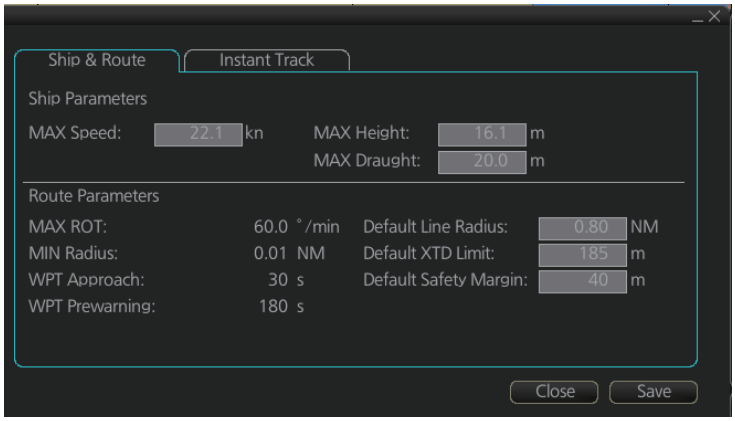
This interface is based on IEC 61162-1 and IEC 80/520/INF.

21. PARAMETERS

21.1 Ship and Route Parameters

The purpose of the ship and route parameters is set the basic parameters for the ship. These parameters are relative to ship steering and they are very important to get correct function of the integrated navigation system. They must be maintained carefully. Modification requires a good knowledge of the parameters' importance.

Open the menu and select [Ship & Route Parameters] from the [General] menu to show the [Ship & Route] page. Set each item referring to the description below.



Ship Parameters description

[**MAX Speed**]: Maximum speed the ship can do.
[**MAX Height**]: Maximum height of ship above sea level.
[**MAX Draught**]:Maximum draught of ship.

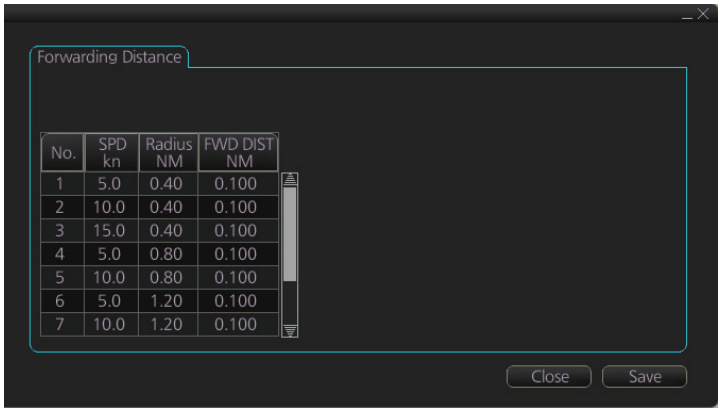
Route Parameters description

[**MAX ROT**]*: The maximum rate of turn of the ship. Set at installation.
[**MIN Radius**]*: The minimum turning radius of the ship. Set at installation.
[**WPT Approach**]*: The alert time before reaching the wheel over point.
[**WPT Prewarning**]*:The alert time before reaching the wheel over point.
[**Default Line Radius**]*: Define the default value of radius between waypoints during automatic route steering.
[**Default XTD Limit**]: Define the channel (XTD) limit.
[**Default Safety Margin**]: Define the default value of extension for channel limits to be checked against chart alerts.
* Set at installation and cannot be changed by the operator.

21.2 Forwarding Distances

The forwarding distances are the distances the ship travels straight after the steering command is given to the autopilot. These distances change according to the radius of turn.

The forwarding distances are entered at installation and cannot be changed by the operator. However, the operator can view the forwarding distances settings on the [Forwarding Distance] display ([MENU]→[General]→[Navigation Parameter]).



Note: These are the port side values. Starboard side values can also be shown. Contact a FURUNO dealer for details.

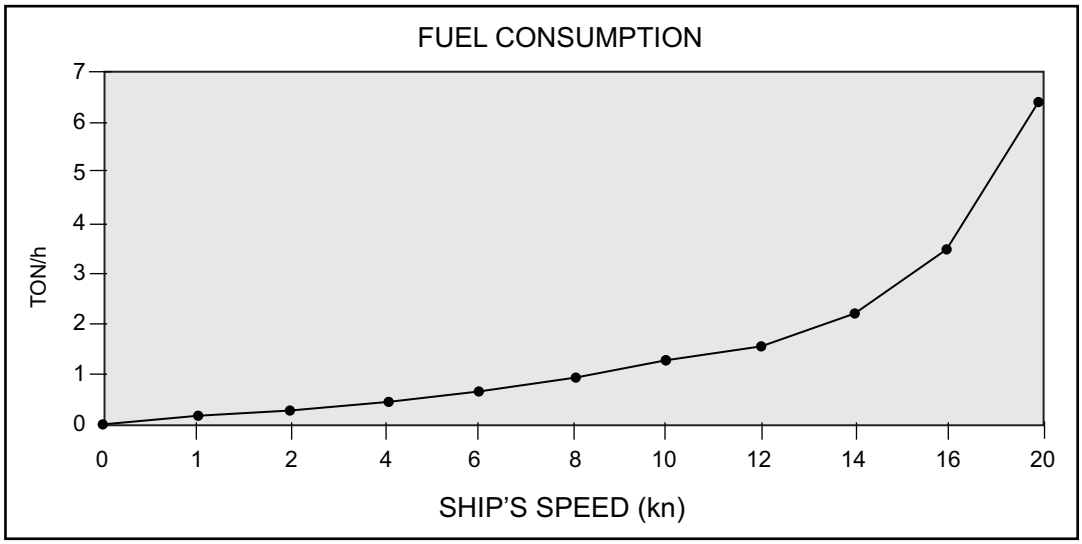
21.3 Cost Parameters

The cost parameters are used in the optimization calculation. Therefore define these parameters before doing the calculation.

Open the menu and select [Cost Parameters] from the [General] menu to show the [Cost Parameters] page. Set each item according to ship's plan, etc.



At the [Cost] window, enter the cost/hour and cost/ton for heavy fuel oil and diesel oil. At the [Fuel Consumption] window, define the fuel consumption figures for up to 12 different speeds. Before entering the data, plot the data on a graph, like the one shown below. Use a second graph if, for example, diesel oil consumption is different from that of heavy fuel oil. Reset the power to effect the settings.



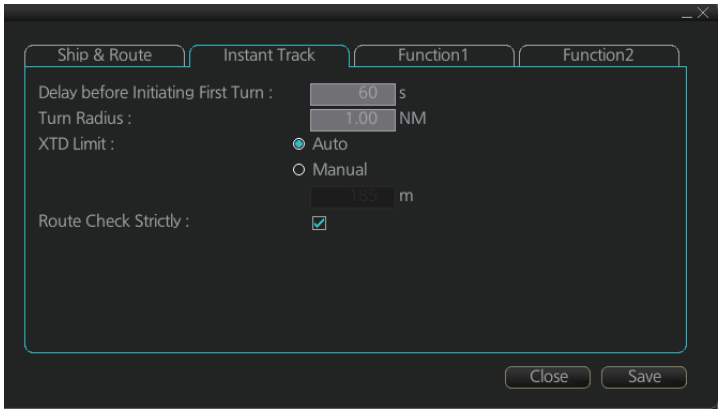
21.4 Instant Track Parameters

The instant track feature can create, in route monitoring, a simple route in the following situations:

- Return to the monitored route when the vessel goes outside the channel limits.
- Temporarily deviate from the monitored route (avoid collision, etc.).

How to set instant track parameters

Set the parameters for the instant track ([MENU]→[General]→[Ship & Route Parameters]→[Instant Track] tab).



[Delay before Initiating First Turn]: Set the number of seconds (30 - 600 seconds) to wait before initiating the first turn in the simple route.

[Turn Radius]: Set the turning radius (0.02 - 3.00 NM) to use between waypoints (four waypoints) in the simple route.

[XTD Limit]: Set the channel limit (10 - 3704 m) for the instant track, automatically or manually. The [Auto] setting uses the channel limit set for the monitored route.

[Route Check Strictly]: Check to prevent monitoring of instant track when a chart alert (alarm or warning) is found through the route check. Uncheck to monitor instant track in spite of chart alert found through the route check.

22. CONNING DISPLAYS

22.1 Main Conning Display

The main conning display provides relevant sensor information data (including engine data) from external equipment, on one display to facilitate safe and efficient monitoring. The ECDIS accepts sensor information data in analog, serial and contact signal formats.

Six sets of conning displays are available, and they are arranged at installation. Consult with the installer of the equipment to decide the content and layout of each display.

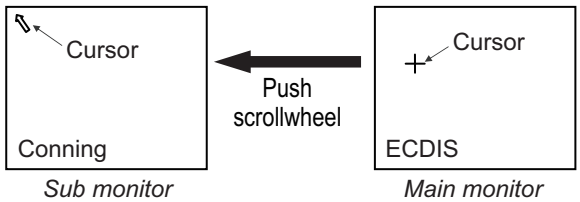
To show the conning display, click the Display mode button on the Status bar to select [CONNING].

Note: Analog data is shown in the lowest value of the setting range when the data is not input.

Conning display status bar (see next page)

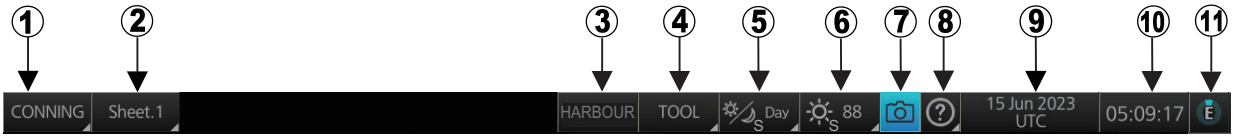


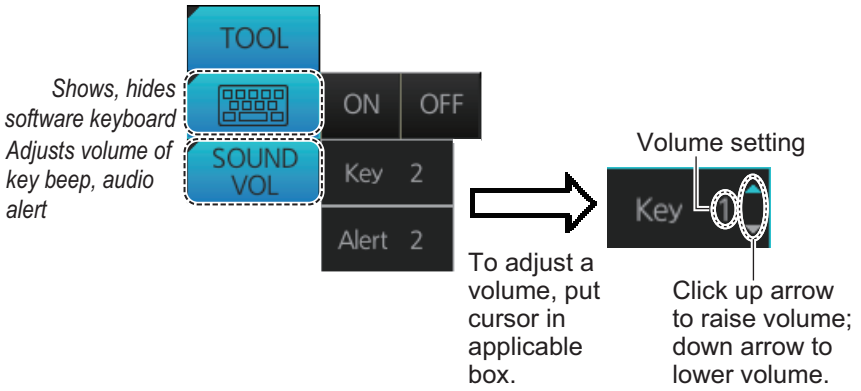
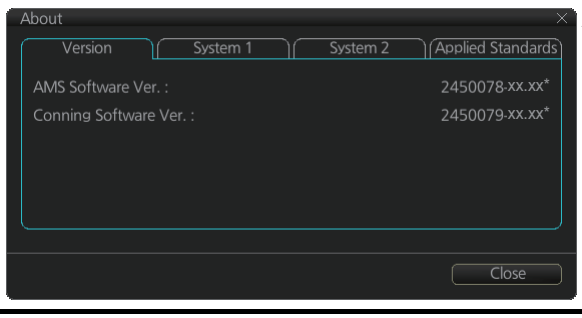
Note: The cursor can be moved between the main monitor and a sub monitor and vice versa if the sub monitor is configured to show the Conning display. Push the scrollwheel until the cursor moves to the other monitor.



Sub monitor *Main monitor*

Conning display Status bar



No.	Button	Description
1	Display mode	Selects the display mode. See section 2.2.
2	Conning display sheet	Select the sheet name* of the conning screen to be displayed.*: Settings can be changed from the equipment menu.
3	[HARBOUR]	Goes to the Harbour mode. See section 1.4.
4	[TOOL]	Shows, hides the software keyboard; adjusts the volume of the key beep and audio alert. 
5		Selects a display palette. See section 1.7. The indication on the button changes according to the [Data Sharing] page. The default setting is "S". See section 23.7.
6		Adjusts the brilliance of the monitor. See section 1.8. The indication on the button changes according to the [Data Sharing] page. The default setting is "S". See section 23.7.
7		Takes a screenshot. See section 1.13.
8		[Guide]: Shows the AMS Guide when the AMS display is active. Not used with the Conning Displays. [About]: Displays system information. Conning and AMS software versions appear in the Version tab (requires appropriate dongle information). See section 1.16 for information regarding the other tabs.  *: Version numbers subject to change.

No.	Button	Description
9	Date	See section 1.12.
10	Time	See section 1.12.
11		Rotates clockwise if the system is working properly. See section 2.1.2.

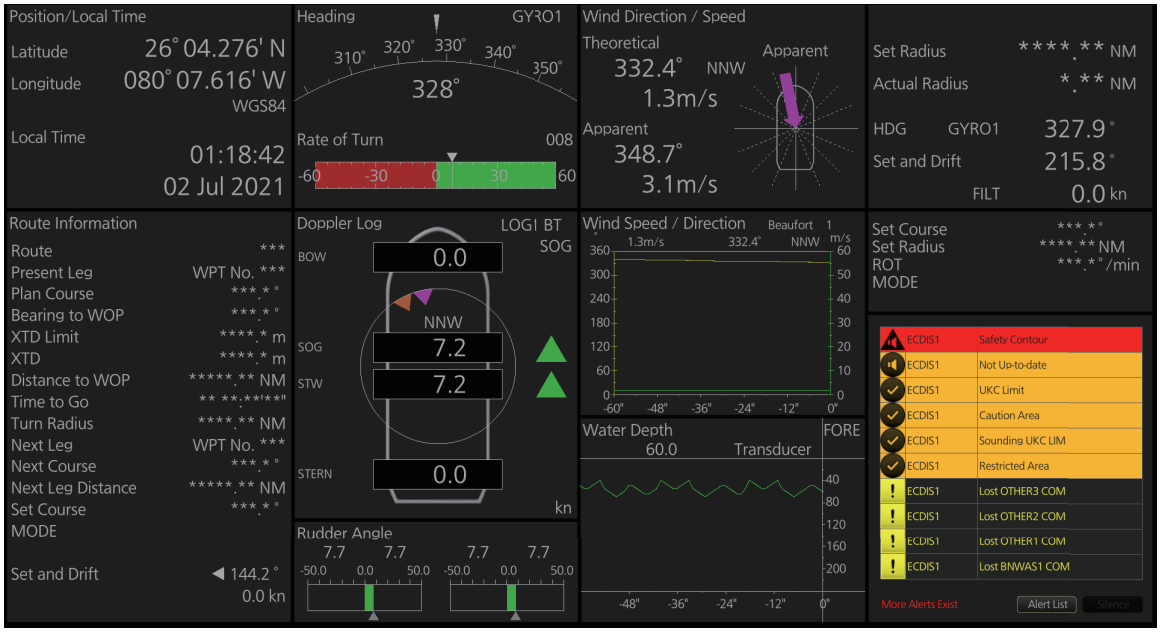
22.2 Conning Display Examples

Six conning display sheets are available, and the content, layout and name of each sheet can be customized, by the service technician. Below are some examples conning display sheets.

1) General navigation example



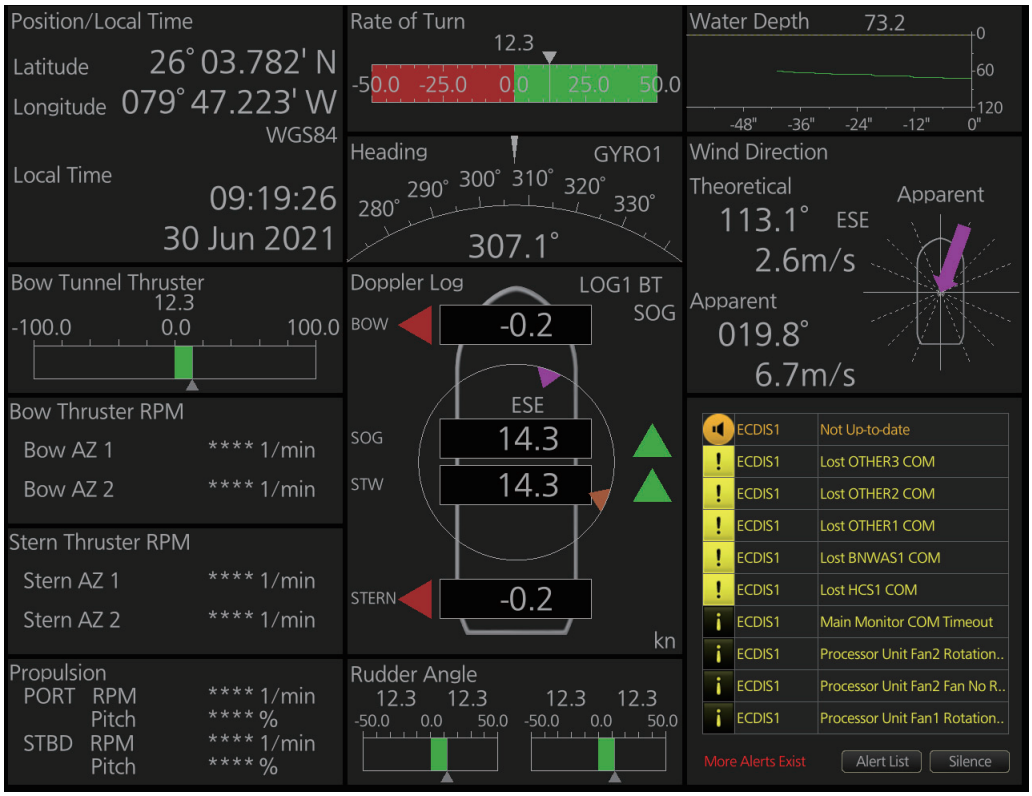
2) General navigation example



3) All waters, voyage example



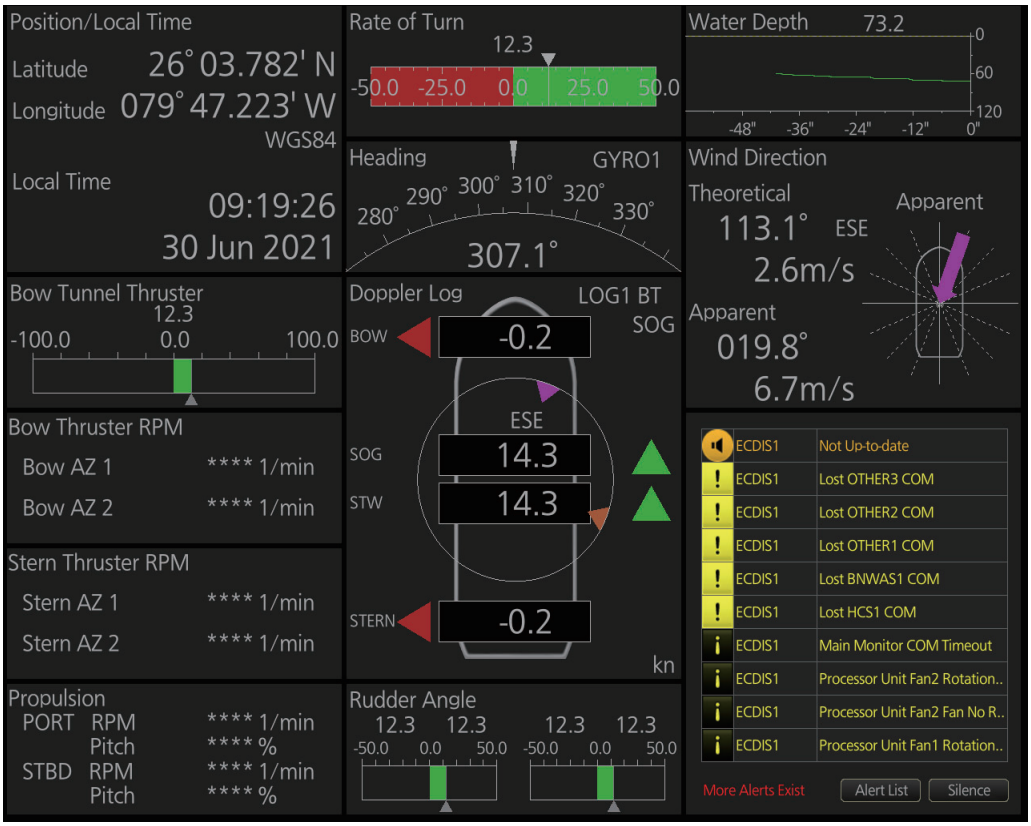
4) All waters, harbour example



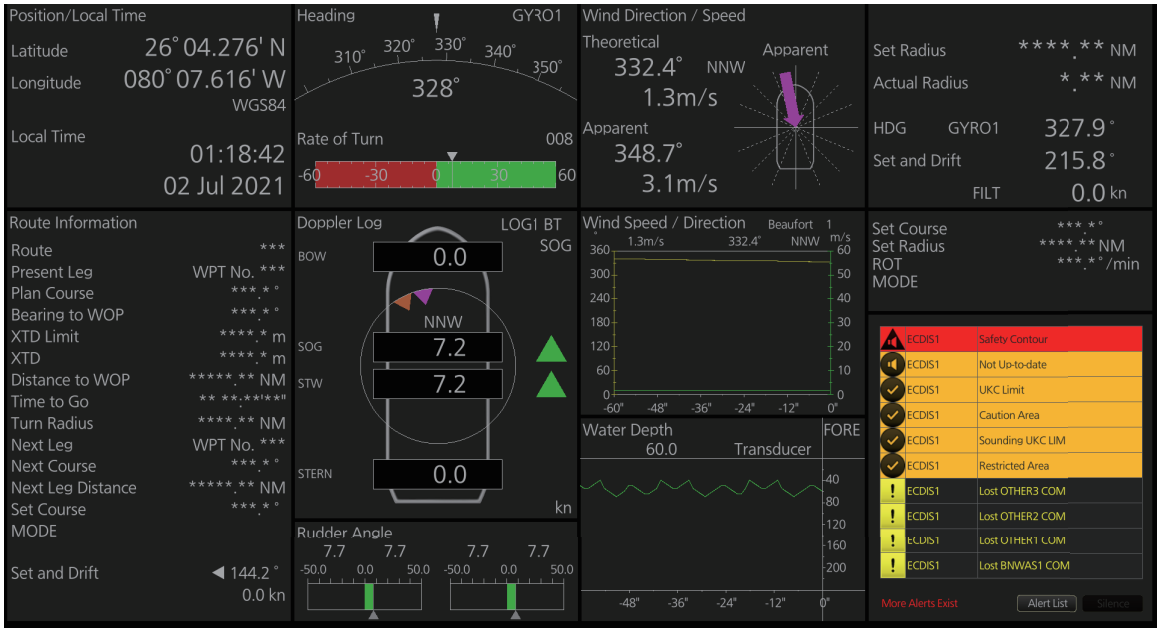
5) Ocean, voyage example



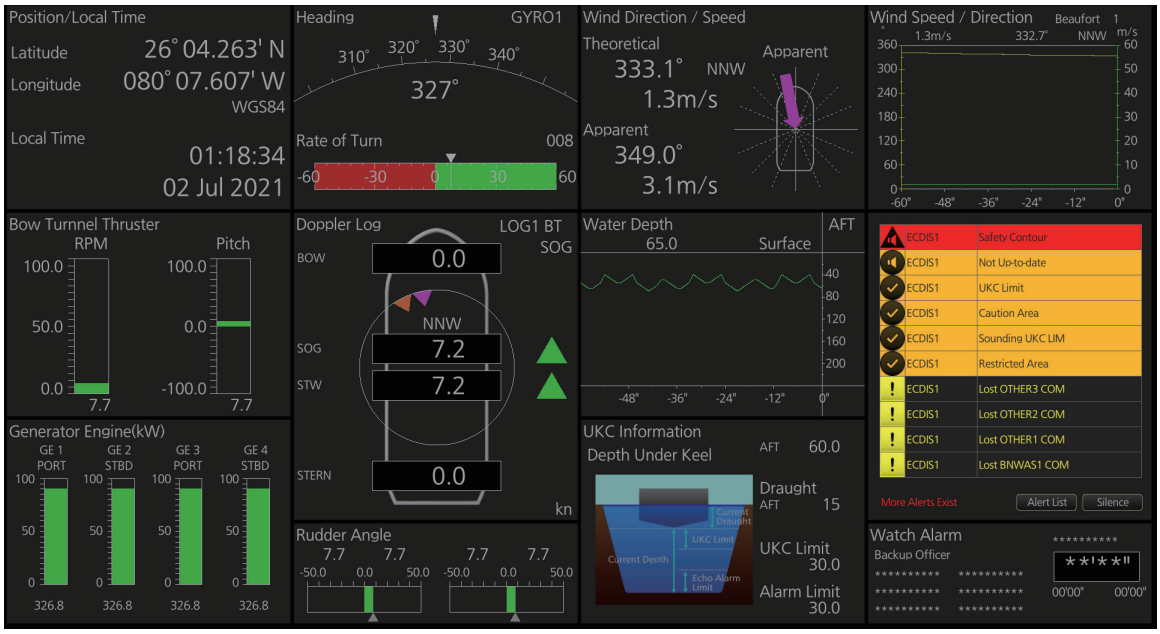
6) Ocean, harbour example



7) Ocean, navigation example



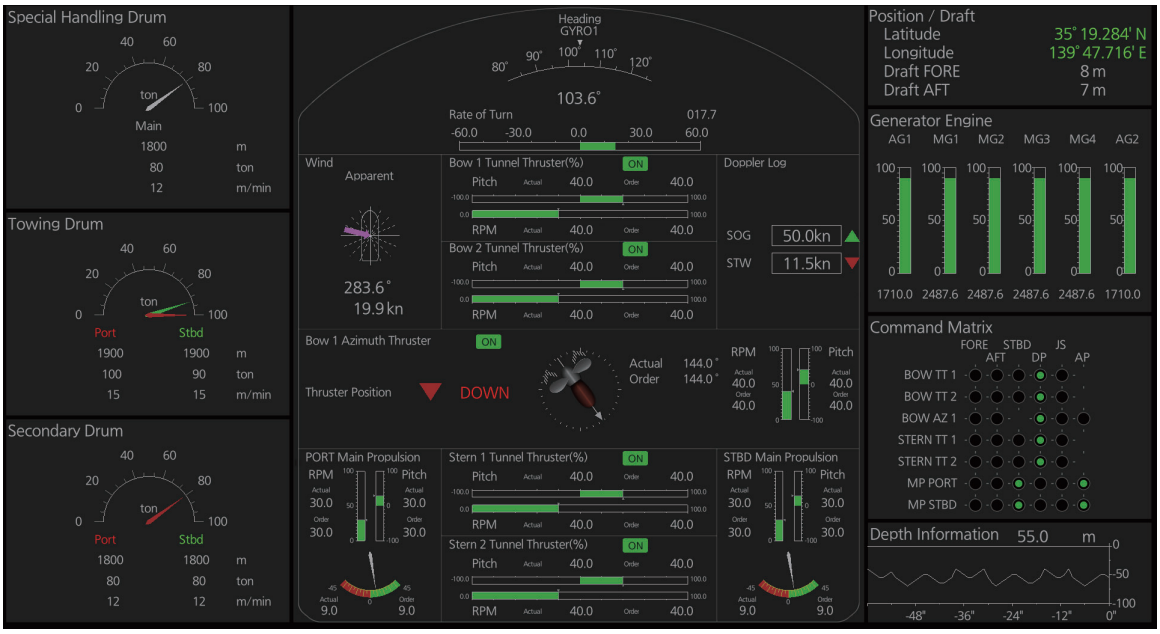
8) Ocean, harbour example



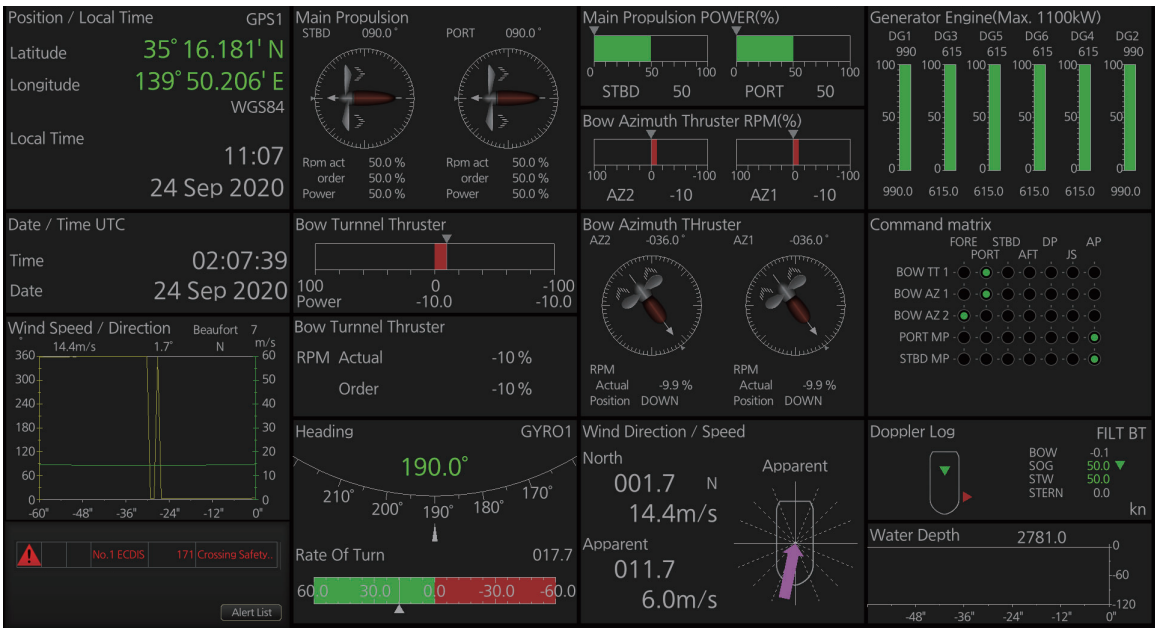
9) Offshore service vessel, fore 1 example



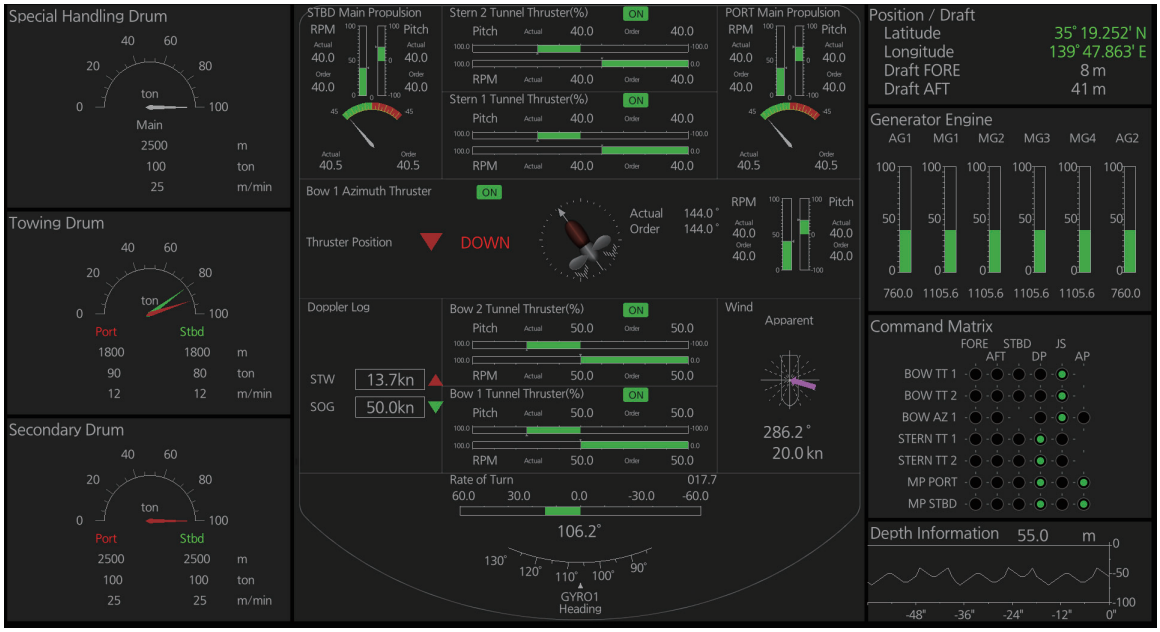
10) Offshore service vessel, fore 2 example



11) Offshore service vessel, aft 1 example

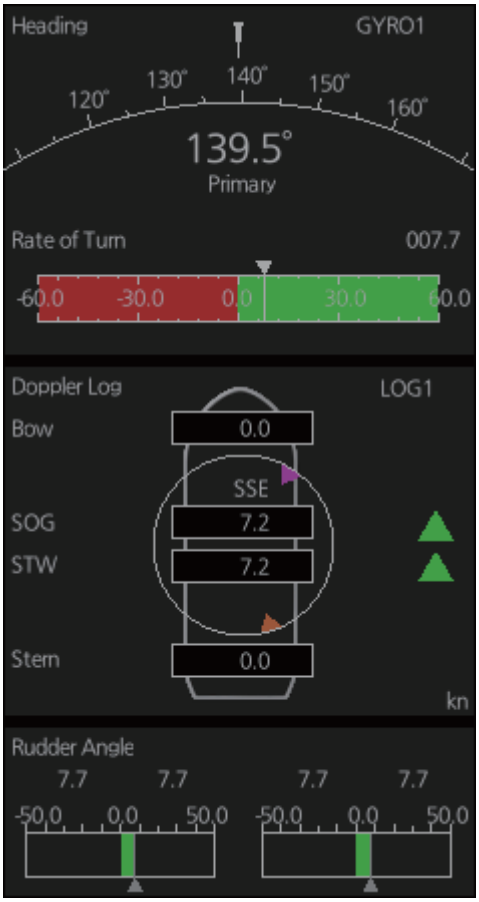


12) Offshore service vessel, aft 2 example



22.3 Mini Conning Display

The mini conning display, available in the Voyage navigation mode, provides various navigation information and is set during the installation. The display example below shows heading, Doppler log speed and rudder angle. To show or hide the mini conning display, click the [Mini Conning] button on the InstantAccess bar™.



The location of the display can be changed. Right click the mini-conning display to show the context-sensitive menu. Click the location desired: [Left Top], [Left Middle], [Left Bottom], [Right Top], [Right Middle] or [Right Bottom].

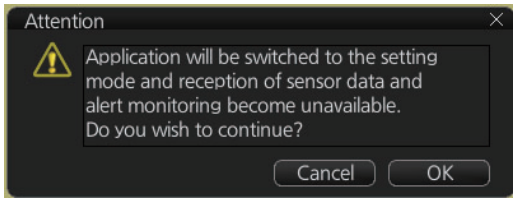
23. SETTINGS MENU

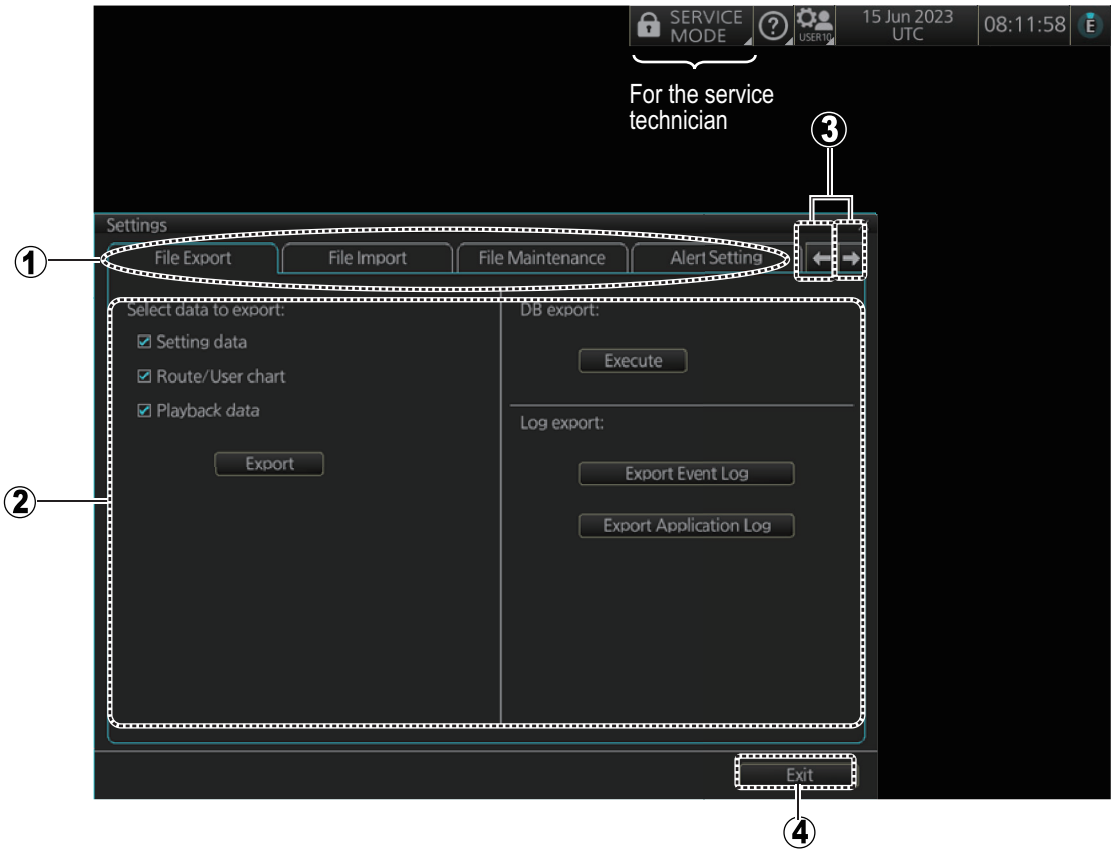
The [Settings] menu provides file import, export and maintenance, alert setting, testing facilities (display, keyboard, self test), data sharing, customizing, screenshot processing, user default restoration, CCRP selection, and remote access.

23.1 How to Access the Settings Menu

Click the [ ] button on the Status bar, then select [Settings]. The message shown right appears.

Click the [OK] button to show the [Settings] menu, then click the [OK] button.



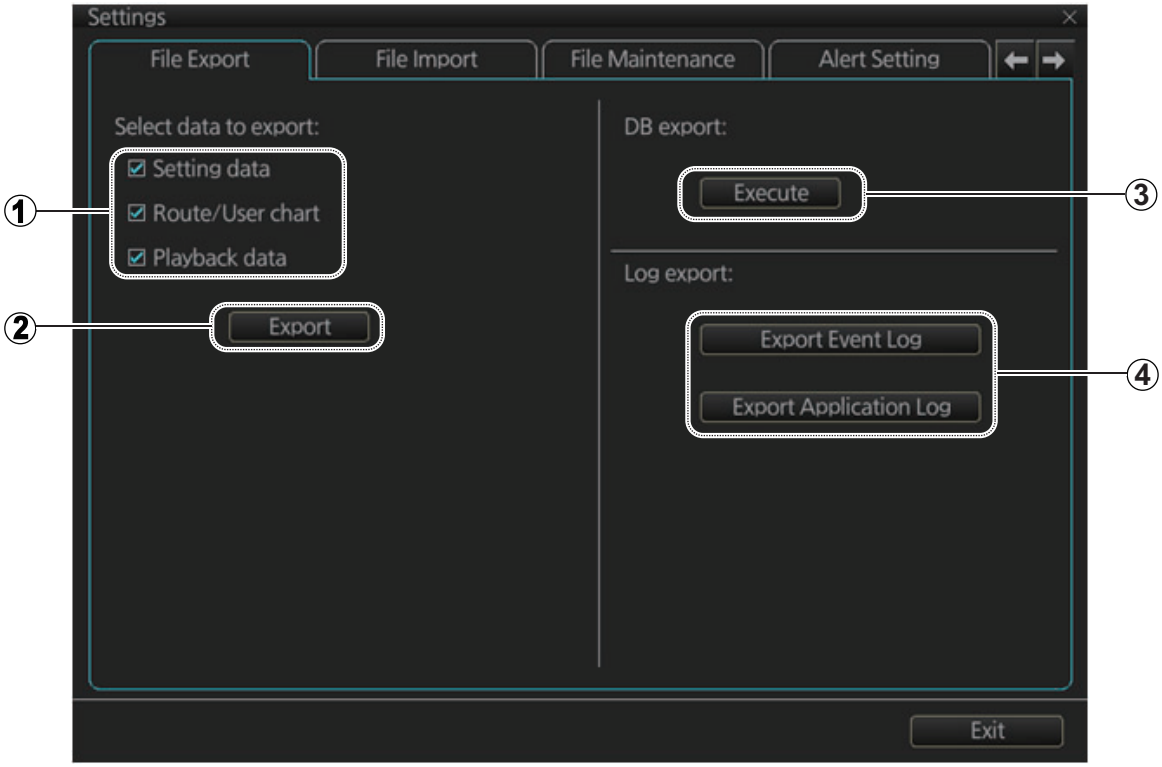


No.	Name	Description
1	Pages (menus)	A total of 13 menus. See the descriptions in this chapter.
2	Menu area	The menu for the selected page appears here.
3	Page selection buttons	Click to scroll the menus.
4	Exit button	Click to close the [Setting] menu.

To open a page, use the page selection buttons to select a page, then click the tab of the page required. The color of the border of the page selected is light blue.

23.2 File Export

The [File Export] page exports setting data, route/user charts, playback data*, and logs (event, application) to a USB flash memory, in .zip file format, to share with other like units.
*: Disable AMS to enable export.



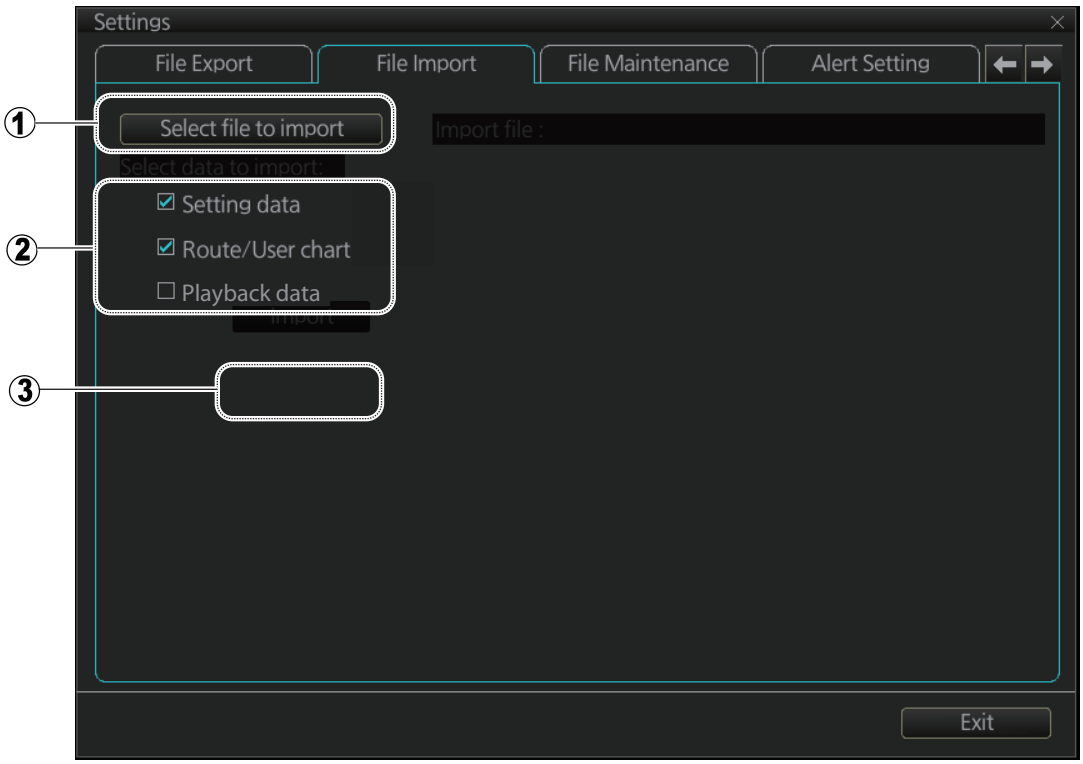
No.	Name	Description
1	Data selection	Check the data to export; setting data route/user chart, and playback data. (The size of the log data is large, thus some time may be required to export the data.)
2	[Export] button	Click to export all items selected on this menu. The [SAVE FILE] dialog box appears. Select where to save the data, then click the [Save] button.
3	[Execute] button	Saves test data to the SSD, for use by service technicians. Only service technicians can extract the data.
4	[Export Event Log] button, [Export Application Log] button	Export the (encoded) event log and application log, respectively. The exported file can be sent to an agent or dealer to assist in troubleshooting.

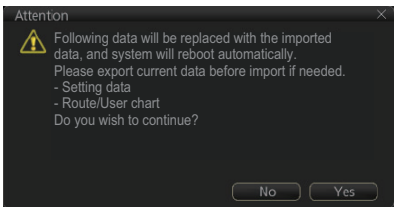
Note 1: The [Export] button does not appear unless an item is checked.

Note 2: The message "Now processing" appears during the exporting, and "File export succeeded." appears upon completion. Click the [OK] button to finish.

23.3 File Import

The [File Import] page lets you import FMD-3xx0 series created setting data, routes/user charts, and playback data*, from a USB flash memory.
.*Disable AMS to enable import.

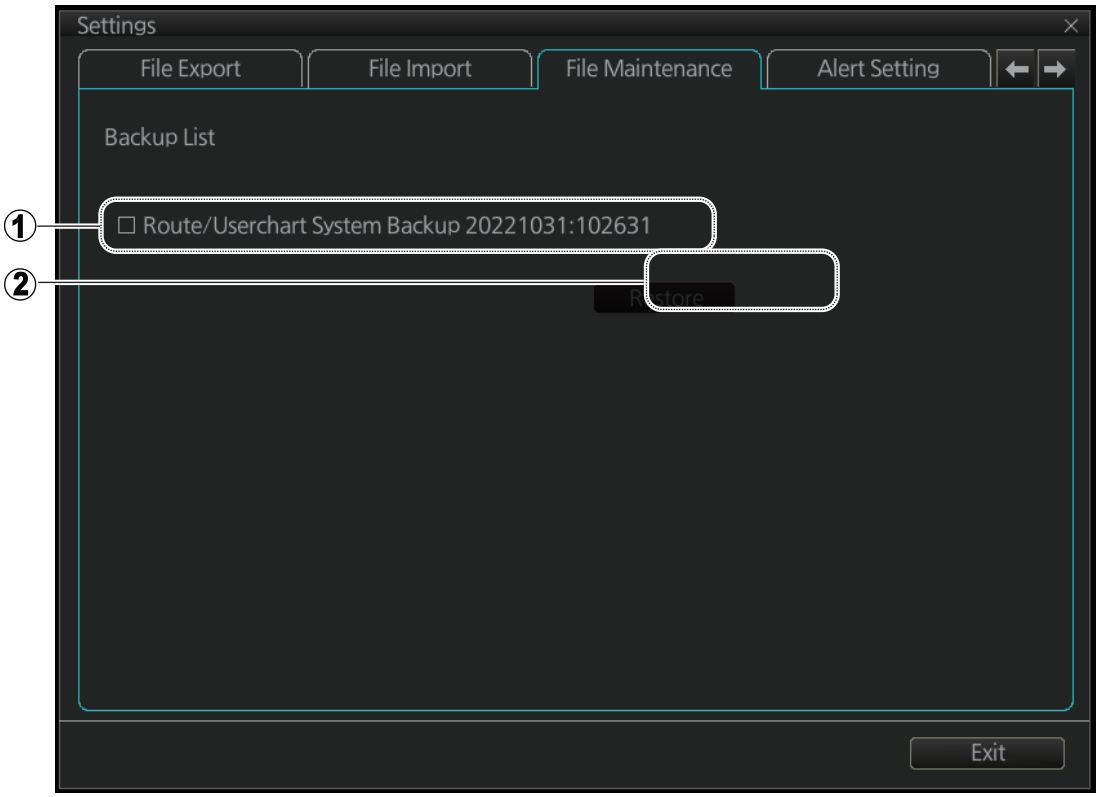


No.	Name	Description
1	[Select file to import] button	Click to show the [OPEN FILE] dialog box, where you can select the file to import.
2	Data selection	Check the data to import - setting data, route/user chart, and playback data.
3	[Import] button	Click to import the objects selected. The message shown right appears. 

Note 1: Item 2 does not appear until after a file is selected. Item 3 appears after the data to import is selected.
Note 2: The message "Now processing" appears during the importing, and the message "File import finished." appears upon completion. Click the [OK] button.
Note 3: The larger the log data the more the time required to import the data.
Note 4: The system automatically restarts after setting data is imported.
Note 5: If importing could not be completed, first check if the USB flash memory is properly inserted. If inserted properly, try importing again.
Note 6: Some setting data may be lost when importing that data from an FMD whose version is younger than 03.04. Confirm menu settings and re-set them as necessary.
Note 7: It may take more than 30 minutes to import the playback data that is output from an FMD whose software version is 03.31 or earlier. Do NOT import data during normal operation of the equipment.

23.4 File Maintenance

The [File Maintenance] page lets you restore the last-saved route/user chart system.

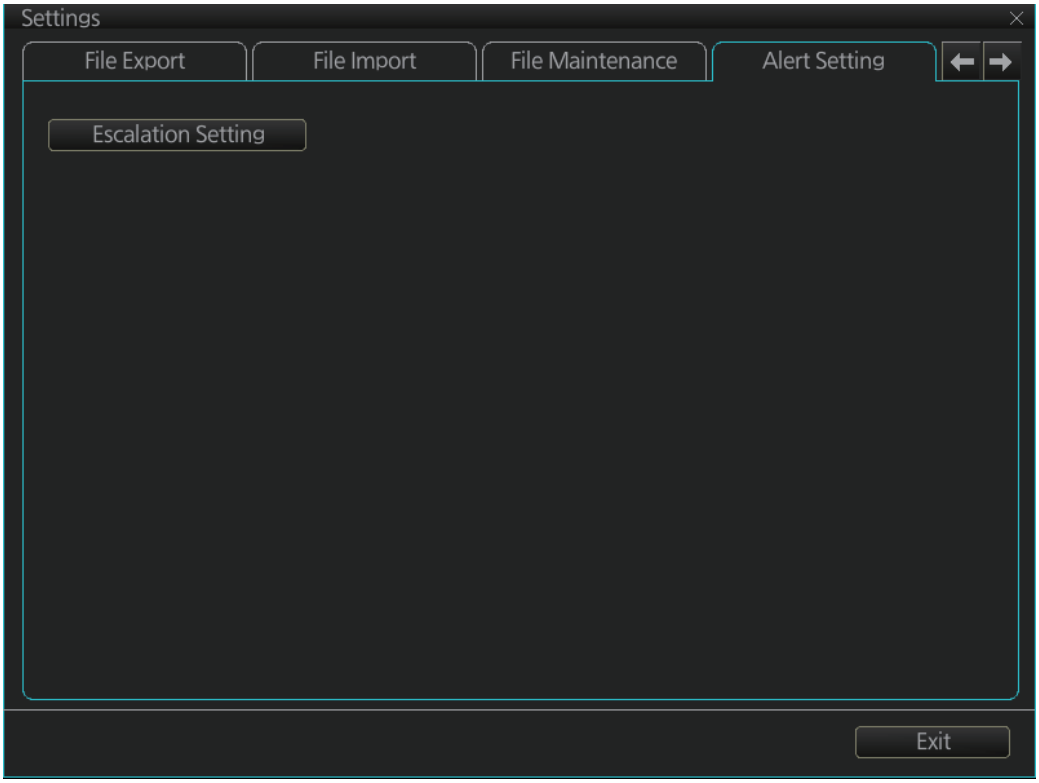


No.	Name	Description
1	[Route/User chart System Backup]	Check to revert the route/user chart system to the last saved state.
2	[Restore] button	Click the button to restore the checked items. The button appears when the item is checked.

Note: To restore the route data from the backup data, first check all route data, then do the restore from the latest data.

23.5 Alert Setting

The [Alert Setting] page sets how long to wait before the priority of an alert is raised to Warning or Alarm, when the alert goes unacknowledged. Click the [Escalation Setting] button to show the escalation settings. Alerts can be escalated to alarm level or repeated as a warning.



A grayed out [Escalation Mode] or [Escalation Time] value means that the value cannot be changed.



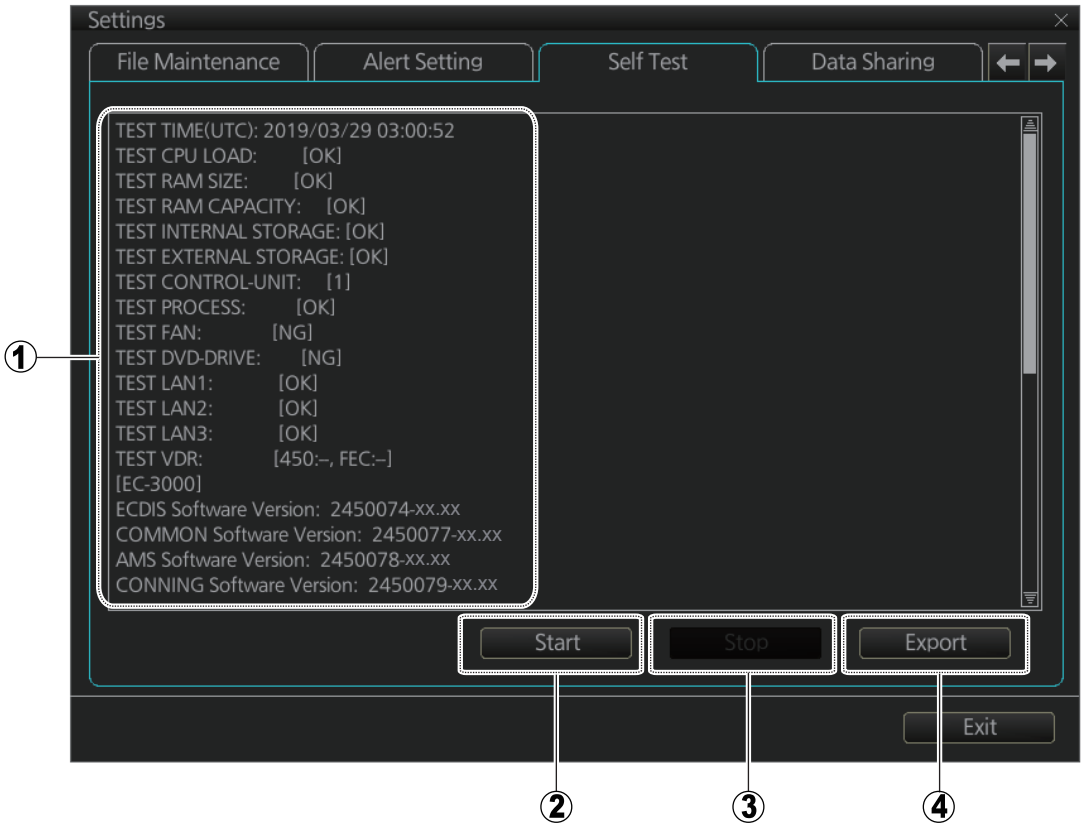
No.	Name	Description
1	Page selection buttons	Select alert page. ◀: Go to first page; ◀: Go to previous page ▶: Go to last page; ▶: Go to next page
2	[Save] button[*1]	Save settings.
3	[CANCEL] button *	Cancel settings and restore all previous settings.
4	[DEFAULT] button	Restore factory settings.
5	[Escalation Mode]	Current escalation modes are displayed.
6	[Escalation Time]	Set the escalation time, the time to wait before escalation occurs. The settings* are (in seconds) 30, 60, 90, 120, 150, 180, 240, 270, and 300. *The default value is 60 s. To globally assign escalation time on the displayed page, change the setting below the item. 

[*1]: These buttons appear when the setting of Escalation Mode or Escalation Time is changed.

Note: After changing the alert settings, some alerts will change to “not generated” state. Restart the equipment to return to the state before the change.

23.6 Self Test

The [Self Test] page is mainly used to check the equipment. The ECDIS function is inoperative during the test.

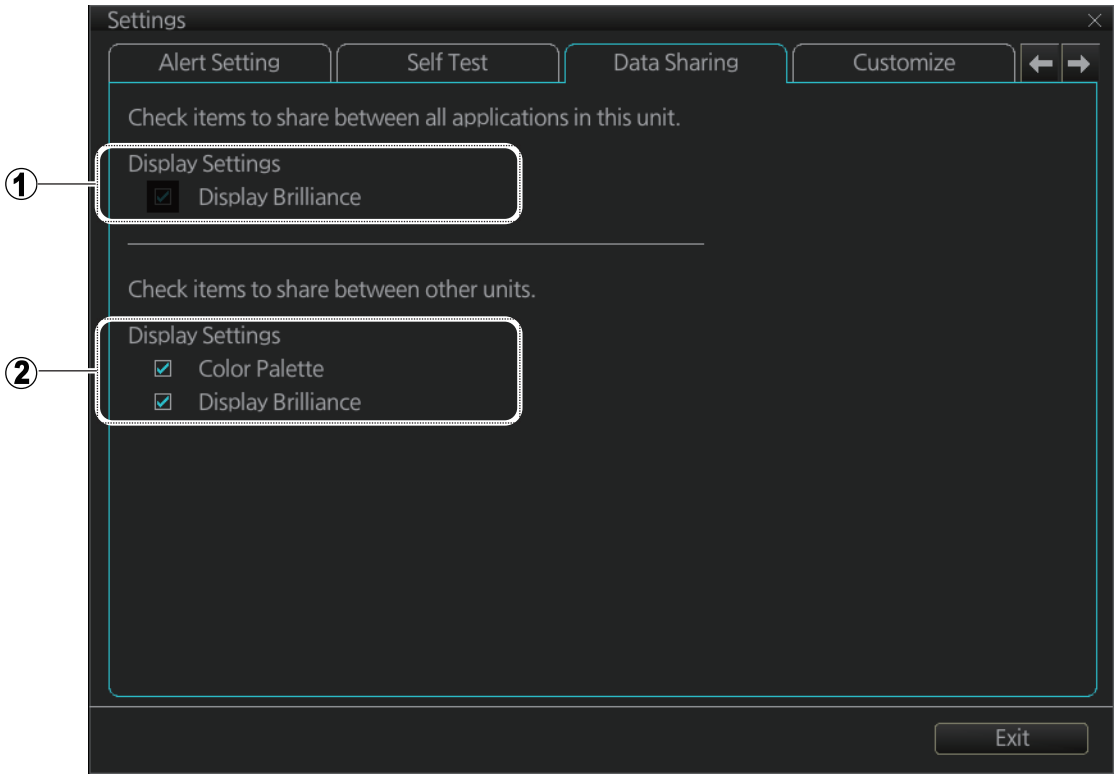


Example display: FMD-3200/3200-BB/3300

No.	Name	Description
1	Test results, program numbers, SSD info, Network status, IP conflict, dongle info	• Self test results • Program numbers for each software program • SSD's SMART information • Own equipment (EC-3000, EC-3005) network status • HUB-3000 network status • Sensor adapter network status • IP conflict check result • Dongle information **Note:** Program numbers and version numbers are subject to change.
2	[Start] button	Start the self test.
3	[Stop] button	Stop the self test. (Shown during test.)
4	[Export] button	Export the results of the self test to an external medium (ex. USB flash memory).

23.7 Data Sharing

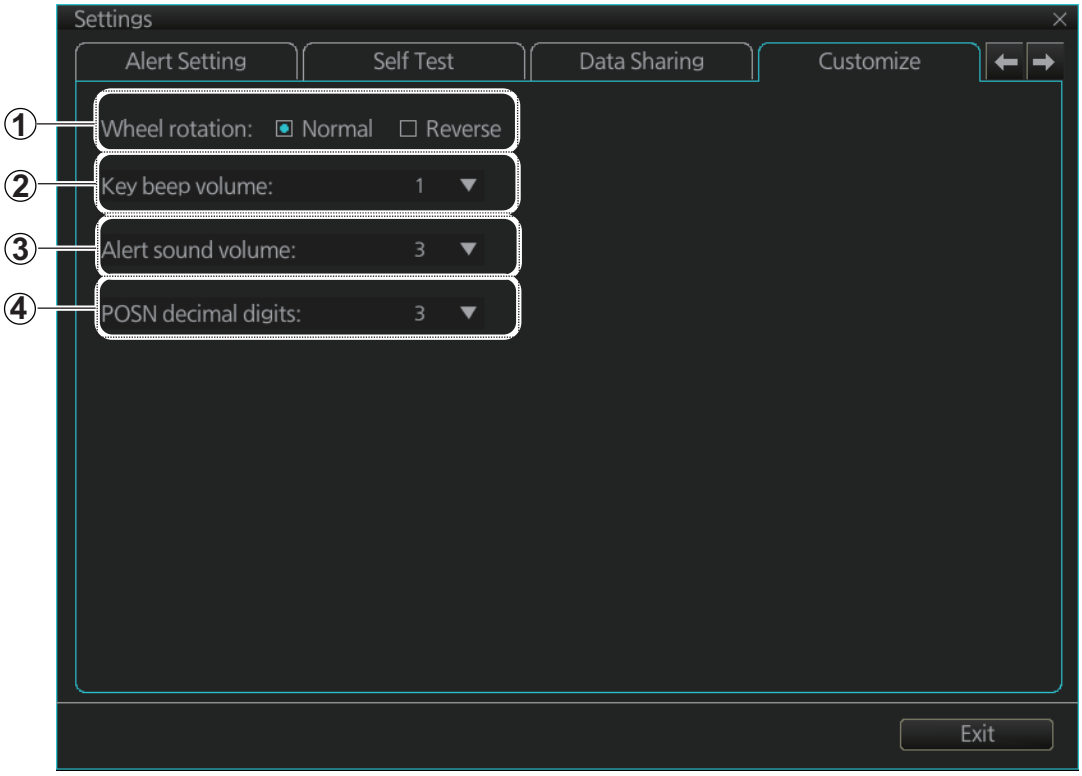
The [Data Sharing] page sets how to share data among applications and units.



No.	Name	Description
1	[Display Brilliance]	Set how to share the display brilliance setting between the applications in the unit (namely, ECDIS, conning). Check to share the setting among units, or uncheck to use local brilliance setting. Additionally, the brilliance setting is reflected to the applications of both the main and sub display units. **Note:** Uncheck [Display Brilliance] in (2) to activate this setting.
2	[Color Palette], [Display Brilliance]	Set how to share color palette and display brilliance among the units (other FMD-3xxx, FAR-3xxx) of the system. Check to share a setting among units, or uncheck to use local setting. After checking an item, a confirmation message appears. Click the [Yes] button to confirm selection. The chosen setting is reflected on the brilliance and color palette buttons on the Instant Access bar as follows: • Item checked: "S" appears on the corresponding button to indicate the item is shared among the units of the system. • Item not checked: "L" appears on the corresponding button to indicate the item is not shared among the units of the system.

23.8 Customize

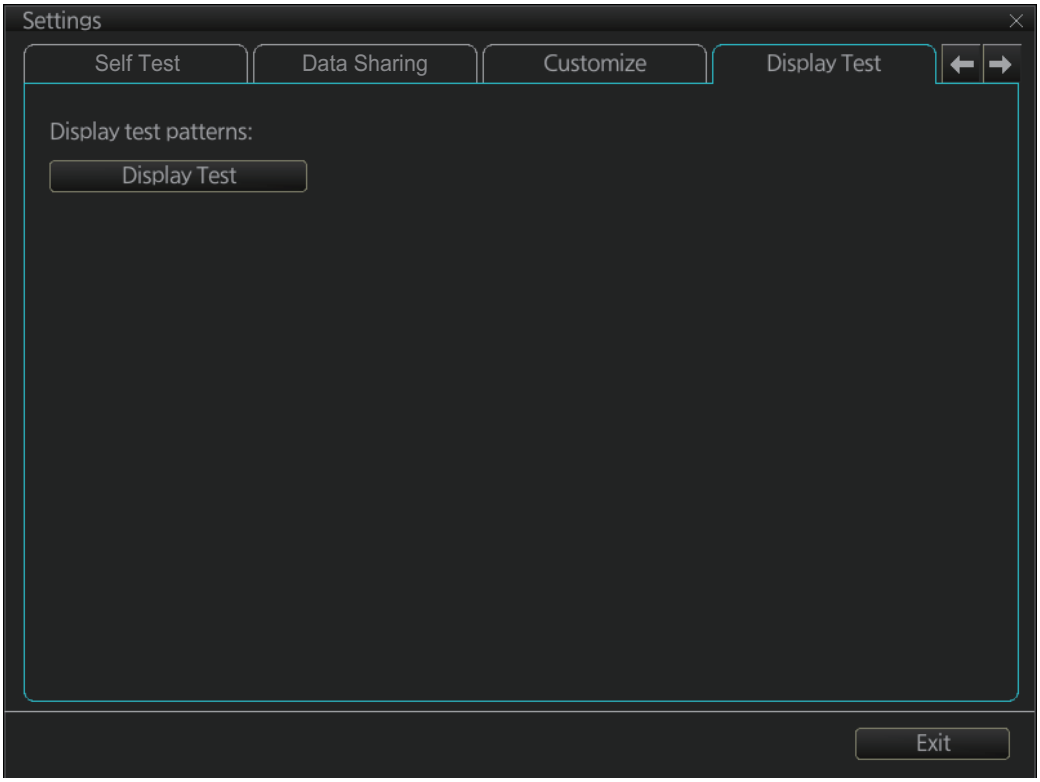
The [Customize] page lets you set buzzer volume, key beep volume, scrollwheel rotation direction, and the number of digits to display after the decimal point in position data.



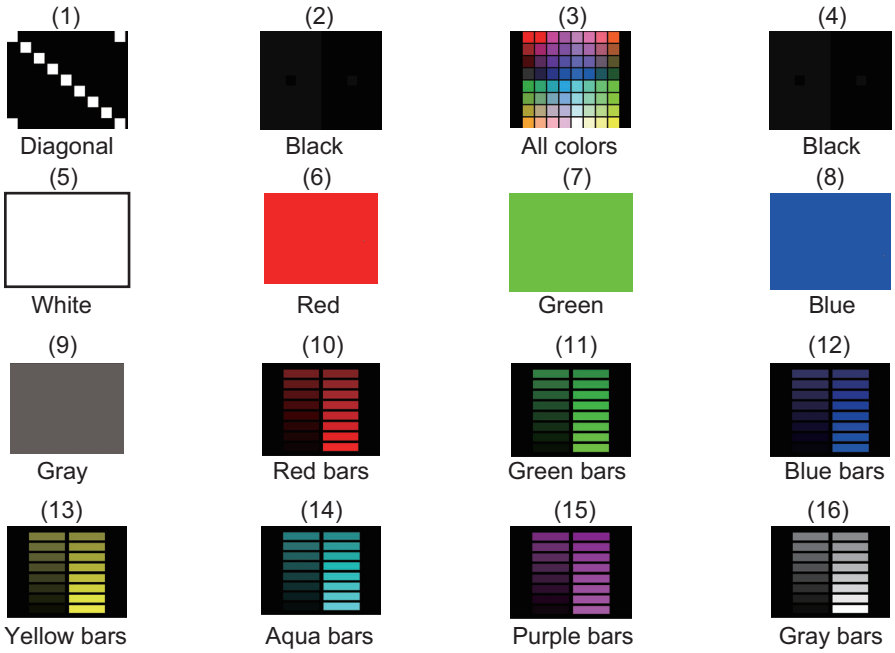
No.	Name	Description
1	[Wheel rotation]	Set the direction of scrollwheel rotation direction. **Normal**: Downward to increase value, upward to decrease value. **Reverse**: Reverse of "Normal".
2	[Key beep volume]	Set the volume of the key beep that sounds for correct key or mouse button operation. 0, no beep; 1, LOW; 2, MID; 3, HIGH
3	[Alert sound volume]	Set the loudness of the alert buzzer. 1, LOW; 2, MID; 3, HIGH
4	[POSN decimal digits]	Set the number of digits (3 or 4) to show after the decimal place in position data.

23.9 Display Test

The [Display Test] page displays various test patterns to check the monitor for proper display of colors. Click the [Display Test] button to start the test. The buzzer sounds at the start of the test.



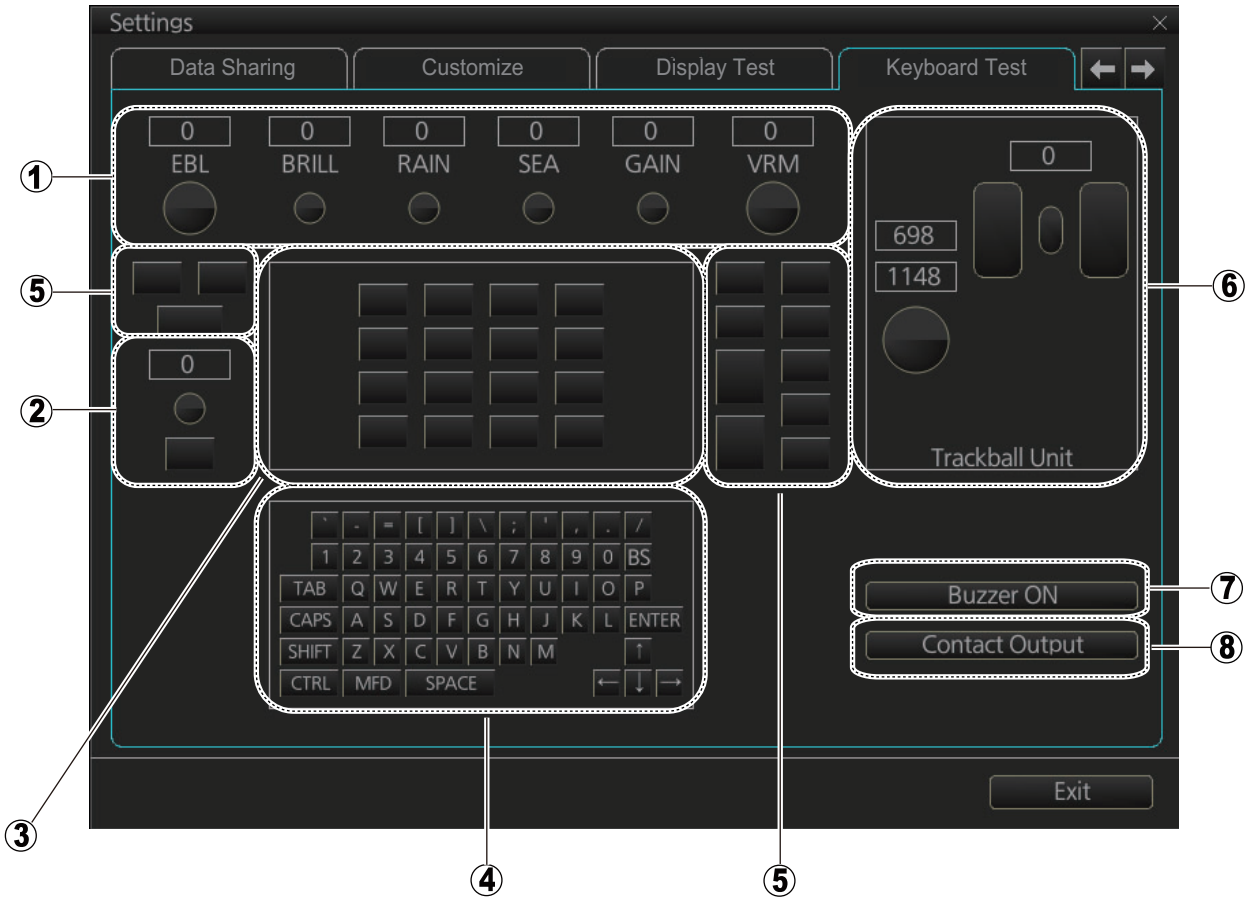
Left-click to proceed in the numerical order shown below; right click to proceed in reverse order.



To quit the display test and close the [Settings] menu, press the **ESC** key on the applicable Control Unit, or click the Exit button on the [Display Test] menu.

23.10 Keyboard Test

The [Keyboard Test] page checks the controls and keys on the ECDIS Control Unit and the trackball module on the ECDIS Control Unit and Trackball Control Unit.



No.	Name	Description
1	[EBL], [BRILL], [GAIN] and [VRM]	Operate the related controls on the ECDIS Control Unit. Rotate a control and the window above the control shows the setting value. Push a control and the equivalent location on screen lights in light blue. (The RAIN and SEA control have no function and the EBL and VRM controls do not have a push function.)
2	InstantAccess knob/key	Check the **InstantAccess** knob and key. 1) Rotate the knob and the setting value appears in the window. 2) Push the knob and the knob lights in light blue. 3) Push the key and the key lights in light blue.
3	No use	
4	Keyboard of the ECDIS Control Unit	Operate each key. The pressed key lights in light blue.
5	Keys of the ECDIS Control Unit	Operate each key. The pressed key lights in light-blue.

No.	Name	Description
6	[Trackball Unit]	Check the trackball module of a Control Unit: 1) Spin the scrollwheel and rotate the trackball. The indication above the operated control shows the setting value. 2) Push each button. The window above a pushed button lights in light blue. 3) Push the scrollwheel. The window above the wheel lights in light blue.
7	[Buzzer ON] button	Click the [Buzzer ON] button to sound the buzzer. The buzzer sounds and the button flashes (in red). Click the button again to cancel.
8	[Contact Output] button	Click the [Contact Output] button to output the alarm output signal from the Processor Unit. Click the button again to cancel.

23.11 Screenshots

The [Screenshot] page processes screenshots saved to the SSD.



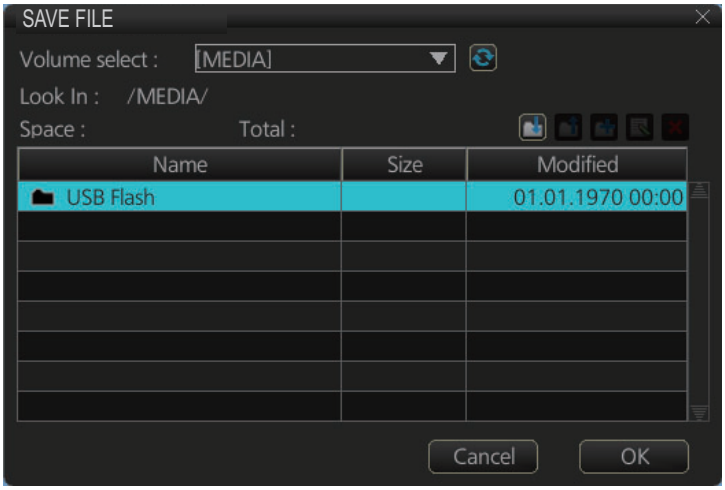
No.	Name	Description
1	List	List of screenshots taken. Screenshots are automatically assigned a file name consisting of the time and date the screenshot was taken.
2	Check boxes	Put a checkmark in the box of the screenshot to process.
3	[Preview]	Preview of the screenshot selected.
4	[Delete] button*	Delete the screenshot(s) selected.
5	[Export] button*	Export selected screenshot(s) to a USB flash memory.
6	[Print] button	Prints the selected (checked) screenshot.
7	[Apply] button*	Save comment.
8	Comment box	Enter comment for screenshot. Put a check in appropriate checkbox, then enter comment.

* Button does not appear until related action is completed.

23.11.1 How to export screenshots

You can export screenshots to a USB flash memory as follows:

1. Insert a USB flash memory in the USB port on the Control Unit.
2. Open the [Screenshot] page.
3. Put a checkmark in the checkbox of the screenshot(s) to export.
4. Click the [Export] button.



5. Select the USB flash memory.
6. Click the [OK] button to export the screenshots selected.
7. If the exporting was successful, a window showing the number of files exported appears. Click the [OK] button to finish.

23.11.2 How to delete screenshots

1. Select the [Screenshot] page.
2. Put a checkmark in the checkbox of the screenshot(s) to delete. To select all screenshots, right-click the box to the left of the [Date] column, then select [Select all]. To clear all check marks, select [Clear all].
3. Click the [Delete] button. You are asked "Selected files will be deleted. Do you wish to continue?"
4. Click the [Yes] button to delete the screenshots selected. The message "File deletion succeeded." appears.
5. Click the [OK] button to finish.

23.11.3 How to print screenshots

With connection of a printer you can print the screenshots stored in the SSD of the Processor Unit.

1. Select the [Screenshot] page.
2. Select the screenshot to print. Note that multiple screenshots cannot be printed at the same time.
3. Click the [Print] button.
4. Click the [OK] button to finish.

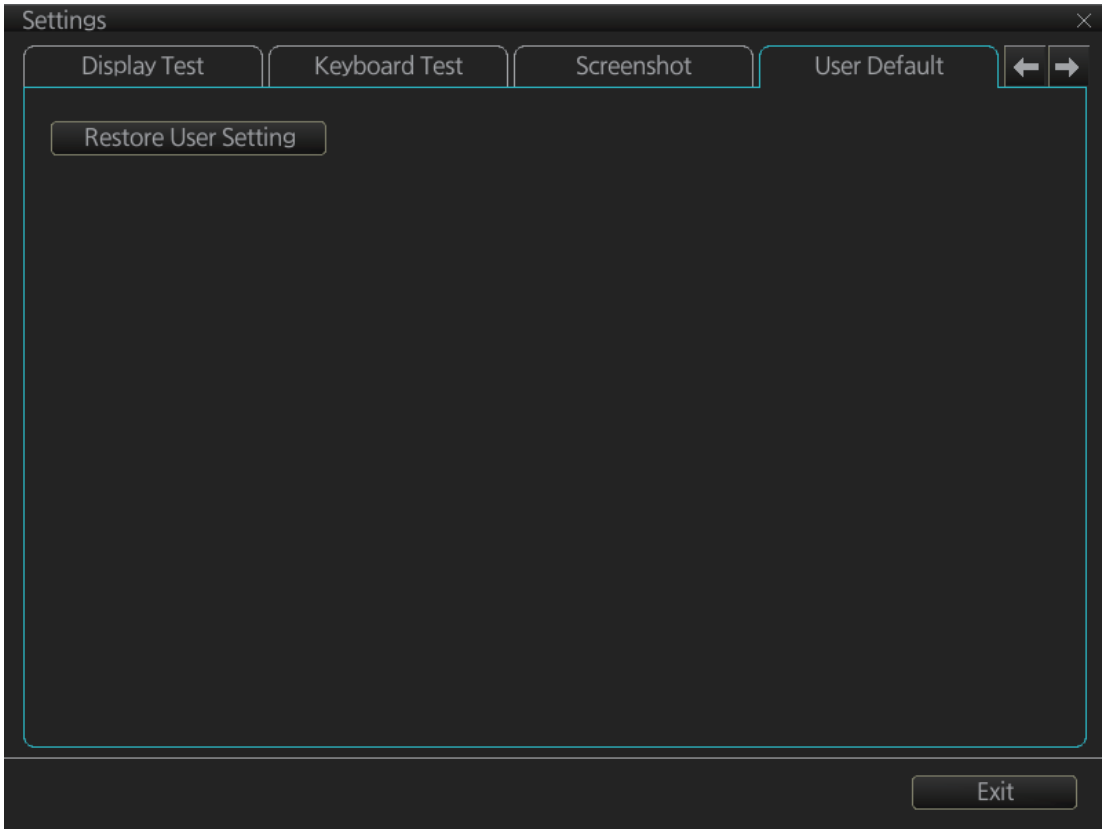
23.12 User Default

The [User Default] page restores all default settings for the [Chart Display] and [Symbol Display]. Click the [Restore User Setting] button. You are asked "All setting data will be restored to the default. Do you wish to continue?" appears. Click the [Yes] button to restore default settings and reset the power.

Note 1: If you require the settings shown below, copy them to a USB flash memory (using the file export feature), BEFORE restoring user defaults.

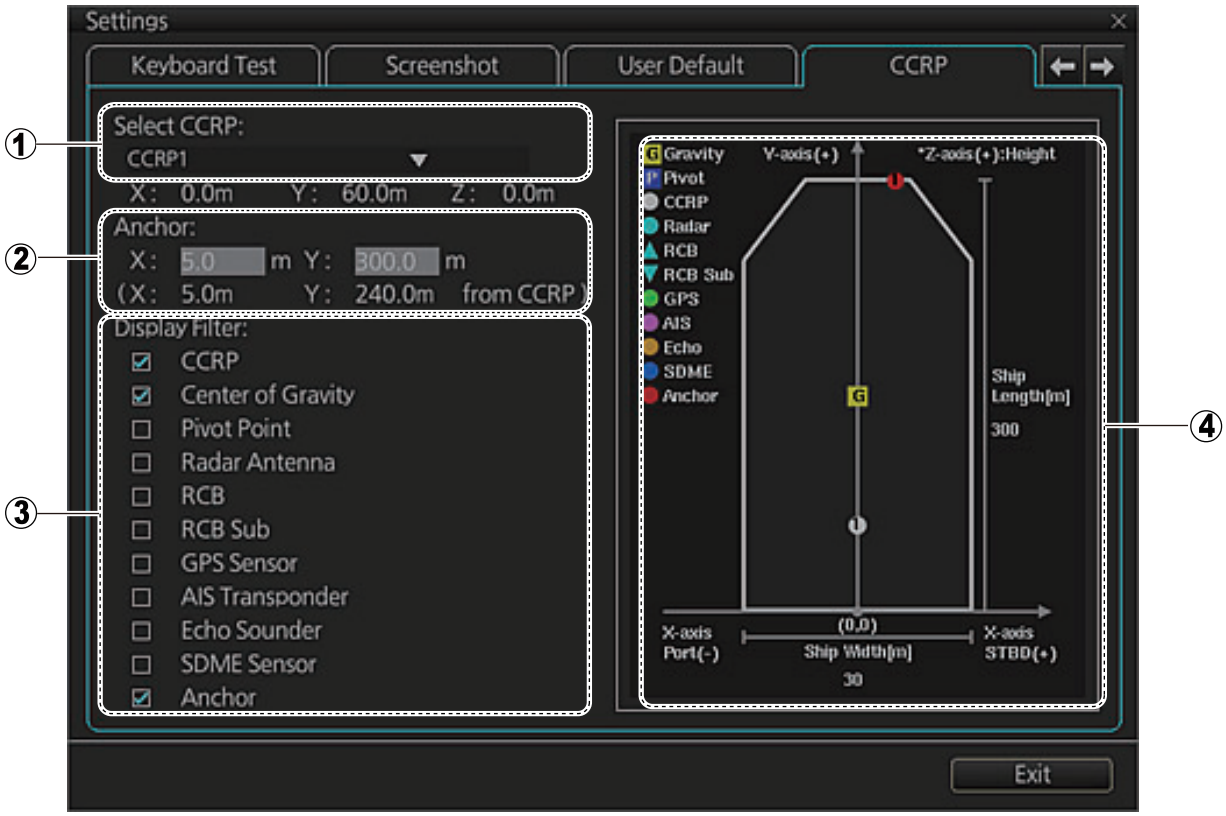
- Setting data
- Route/User chart

Note 2: Restart all units (FMD-3xxx, FAR-3xxx) in the same network after restoring user defaults.



23.13 CCRP

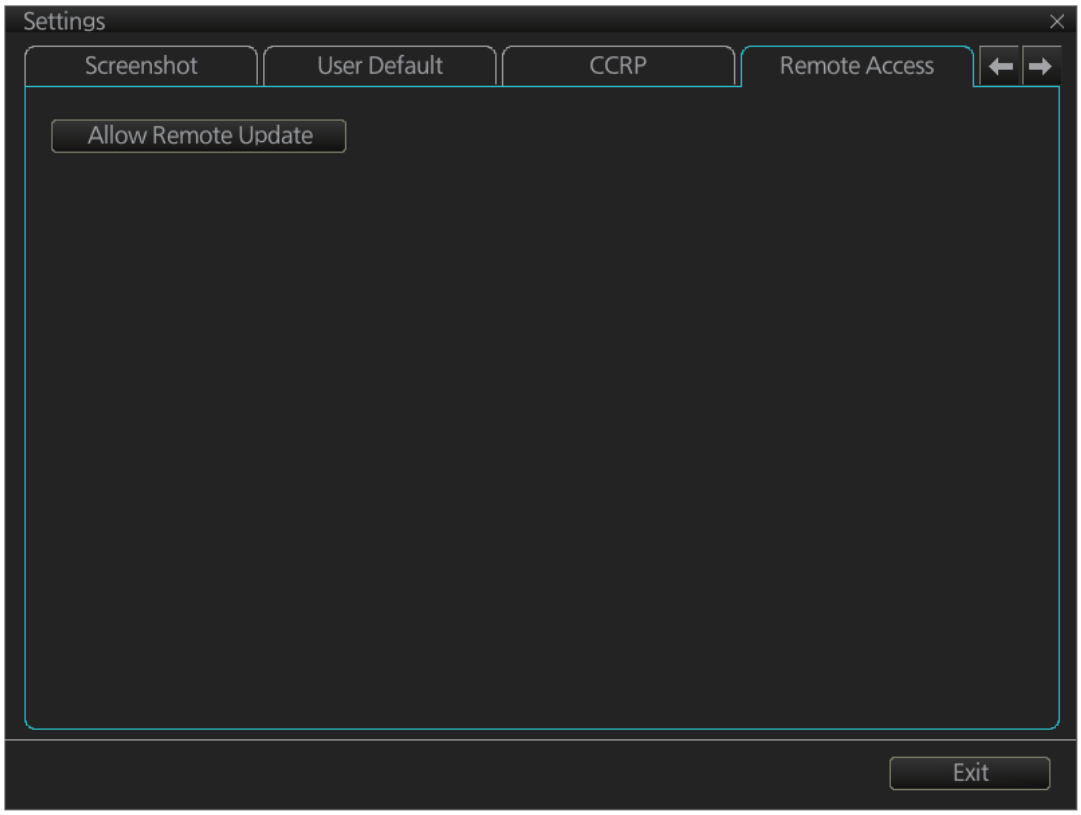
The [CCRP] page provides for selection of CCRP (Consistent Common Reference Point) and shows the location of various sensors.



No.	Name	Description
1	[Select CCRP]	Select the CCRP to use in the case of multiple CCRPs. **Note:** CCRP selections are not synchronized. Be sure to select the same CCRP for all units and, then restart all units.
2	[Anchor]	Enter anchor installation position (X and Y values from CCRP). The setting ranges are X, -15.0 to 15 m; Y, 0.0 to 300.0 m.
3	[Display Filter]	Check the items to show on the ship's graphic.
4	Ship's graphic	Shows the location of the sensors selected at the [Display Filter].

23.14 Remote Access

The [Remote Access] page lets you access and operate the equipment from a remote location. Use this page according to our instructions.



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24. MAINTENANCE AND TROUBLE-SHOOTING

Periodic checks and maintenance are important for proper operation of any electronic system. This chapter contains maintenance and troubleshooting instructions to keep optimum performance and the longest possible life of the equipment. Before attempting any maintenance or troubleshooting procedure please review the safety information below. If you cannot restore normal operation after following the troubleshooting procedures, do not attempt to check inside any unit; there are no operator-serviceable parts inside. Refer any repair work to a qualified technician.

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel can work inside the equipment.

IMPORTANT

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

24.1 Maintenance

Regular maintenance is essential to good performance. A regular maintenance program should be established and should at least include the items shown in the table below.

Interval	Check point	Check and measures	Remarks
When needed	Monitor unit and Processor Unit	Dust or dirt may be removed from a cabinet with a soft cloth. Water-diluted mild detergent may be used if desired. DO NOT use chemical cleaners to clean the display unit; they may remove paint and markings. To clean 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 a degreaser or an antifog solution, as they can strip the coating from the LCD.	Do not use chemical-based cleaners for cleaning. They can remove paint and markings.
	Filter inside Processor Unit	Have a technician clean the filter if it is dusty. See section 24.4.	
3 to 6 months	Cabling	Check that all cabling is firmly connected and is not damaged.	

24.2 How to Replace the Fuse

The fuse in the Processor Unit, Monitor Unit and Sensor Adapter protects those units from overvoltage (overcurrent) and internal fault. If a unit cannot be turned on, check if its fuse has blown. If a fuse has blown, find out the cause before replacing the fuse. If the fuse blows again after replacement, contact your dealer for advice.

⚠ WARNING

Use the proper fuse.

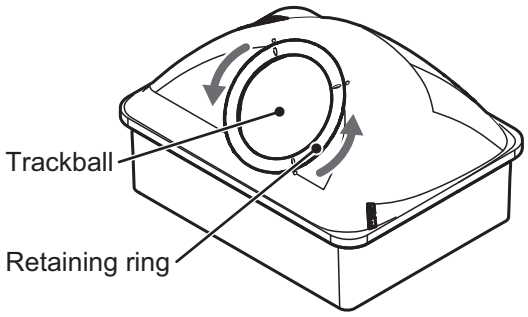
Use of a wrong fuse can damage the equipment or cause fire.

Unit	Power supply	Type
Processor Unit EC-3000/3005	100-115 VAC	FGMB-S 125V 10A PBF
	220-230 VAC	FGMB-A 250V 5A PBF
Monitor Unit	Refer to the Operator's Manual for the Monitor Unit.	
Sensor Adapter MC-3000S	24 VDC	FGMB-A 125V 3A PBF

24.3 Trackball Maintenance

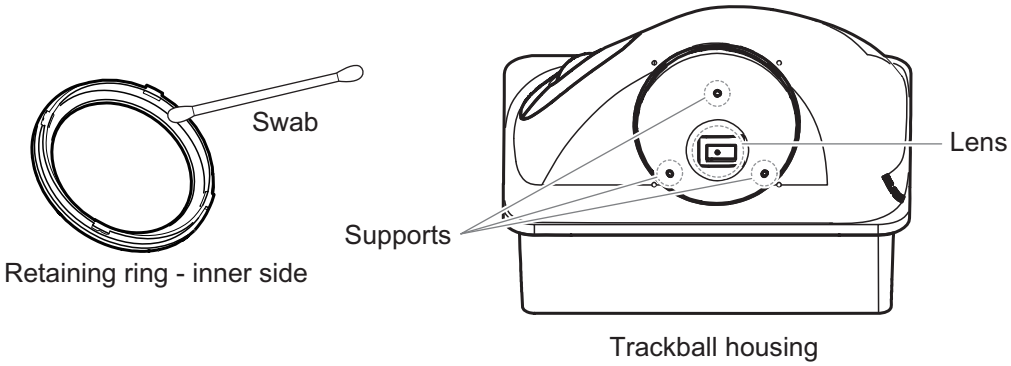
If the cursor moves abnormally, clean the trackball and inside the trackball housing (including the lens) as shown below:

1. Turn the retaining ring on the trackball module in the direction of the arrows (see figure below) to unlock it, then remove the retaining ring.



2. Use cellophane tape to remove the trackball from the trackball housing. Place the trackball and the retaining ring on a clean, soft cloth laid on a flat surface.
3. Clean the ball with a damp, soft cloth, then use a dry, lint-free cloth to carefully wipe the ball dry.

4. Use a swab, moistened with water, to carefully clean the inside of the retaining ring, the inside of the trackball housing, the supports and the lens. Change the swab regularly so that dirt and dust build-up is easily removed. Use a dry swab to wipe away moisture.



5. Re-set the ball and retaining ring. Be sure the retaining ring is not inserted reversely.

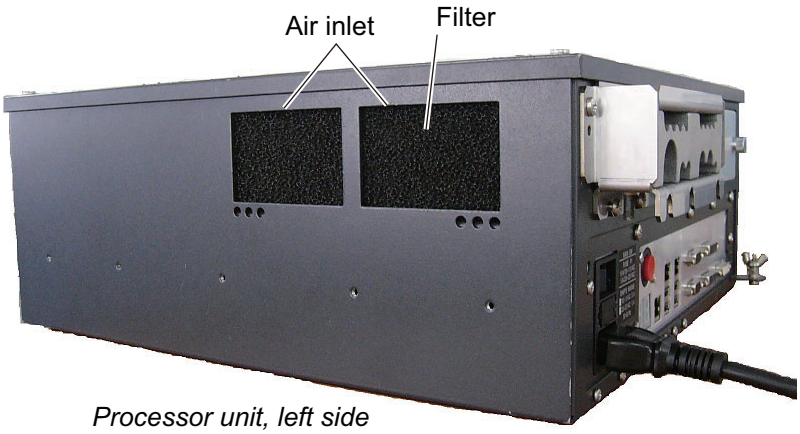
24.4 How to Clean and Replace the Air Inlet Filter

24.4.1 EC-3000/3005 Processor Unit

Clean the air inlet filter in the Processor Unit when it becomes dusty. Turn the Processor Unit off, then remove the filter and clean it with water and a mild detergent. Rinse the filter, allow the filter to dry, then return it to the Processor Unit.

Note 1: Be sure the air inlet is not blocked. A blocked inlet can cause the temperature to rise inside the cabinet, which can lead to malfunction.

Note 2: The right side of the Processor Unit has an exhaust vent. Remove dust from the vent as necessary.



Processor unit, left side

If the filter appears brittle and leaves residue on your hands when dry, replace the filter.

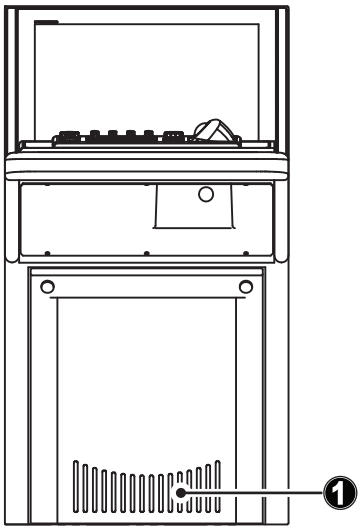
For filter replacement, consult your local dealer and quote the following details:

Part number: 24-014-0105

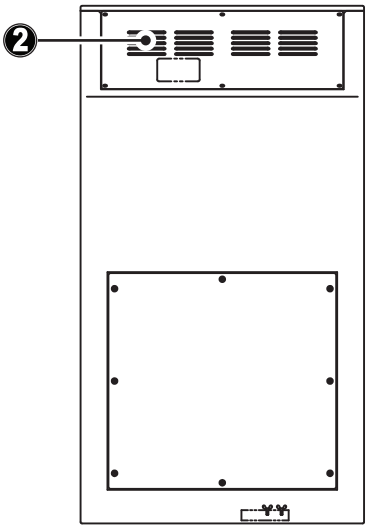
24.4.2 ECN-303/304/319/323/327 Console Units

The console unit air filters are fitted on the inside of the console units and are not accessible normally. The figures below show the locations of each air filter.

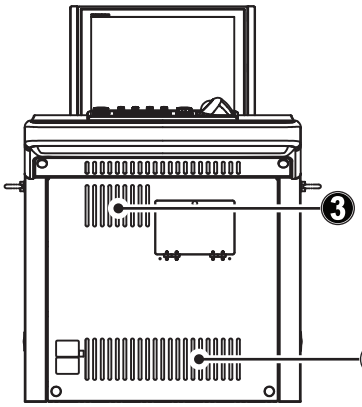
Note: The monitor size may differ, depending on the configuration purchased. The figures below are for reference only and are not to scale.



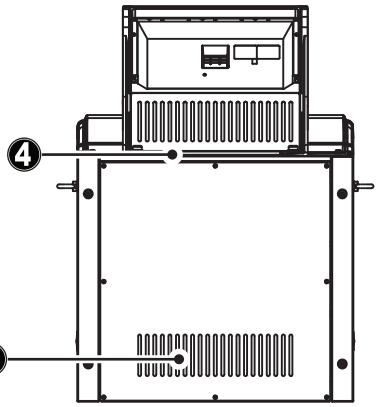
ECN-303/304 Front view



ECN-303/304 Rear view



ECN-319/323/327 Front view



ECN-319/323/327 Rear view

It is recommended to have a qualified technician clean and check the air filters when conducting routine service and maintenance. If the air filters require replacement, consult your dealer and quote the following details:

No.	Filter part no.	Remarks
1	03-163-7018	ECN-303/304: Front cover, lower section.
2	03-163-7219	ECN-303/304: Rear cover, upper section. ECN-319/323/327: Front & rear cover, lower section.
3	24-014-3251	ECN-319/323/327: Front cover, upper section
4	24-014-3252	ECN-319/323/327: Inside monitor cover, console top side.

24.5 Confirmation of Cyber Incident Occurrence

The only cyber incident that this unit considers to be a Denial of Service (DoS) event is an excessive load on the network. This can be confirmed by the “Network overload” alert.

24.6 Deterministic Output

Deterministic output refers to a predetermined output state when normal operation cannot be maintained (degraded operation) due to a cyber attack.

If the TCS function is used, the "TCS Stopped" alert is generated and the TCS is stopped in accordance with the requirements of IEC62065 Ed.2.

24.7 Forensics

Forensics is the collecting and analyzing evidence remaining on equipment after a cyber incident occurs. In the case of this unit, the audit log is the evidence. To preserve the audit log, follow section 23.2 [File Export] to obtain the event log and application log.

The above logs can only be viewed by service technician. The crew members must contact service technician in case of incident.

24.8 Backup and Recovery

Follow section 23.2 [File Export] and section 23.3 [File Import] to back up user data regularly and restore it as necessary.

If the Hermace Gateway is connected, the service settings are also backed up on the Hermace Gateway.

If operations do not function properly even after restoring user data, contact a service representative.

24.9 Checking the Operation of Security Functions

To check the security functions are working properly, do as follows.

Actions for the operator

Do the self test to check the following:

- The software version is the latest. For the latest software version, ask your dealer.
- The RX Flow for LANs 1 to 3 must be less than the RX Flow Threshold.
- The CPU Load of the HUB must be less than the CPU Load Threshold.
- If the “Watch” indication for each port of the HUB-3000 is “ON”, the “Link Status” indication is “UP”. If the “Watch” indication is “OFF”, the “Link Status” indication is “DOWN”.
- The RX Flow on each port of the HUB must be less than the RX Flow Threshold.
- Data on the RX Flow of the Sensor Adapter must be available.

Actions for the service technician

- Follow the Instruction Manual (AME-45220) to check that you can log in to the FMD-3005/3200/3300, MC-3000S and HUB-3000 equipment configuration screens.
- Confirm that the "Authentication successful" event occurs and that the event is recorded in the audit log.
- Check that the settings for the security data (see the following table) are compatible with the security policy of the ship's owner.

FMD-3005/3200/3300	
• IP Address • Chart Service Connection Settings • HUB-3000 Monitoring Settings	• Service Gateway Settings • Radar Connection Settings • Session Timeout
MC-3000S	
• IP Address	• Session Timeout
HUB-3000	
• IP Address • Default Gateway • Port Flow Config • Port Security • Port Mirror • Port Channel • Ring Protection • PDP • Static ARPs	• Mask Address • Port Config • Storm Control • QoS • VLAN • IGMP Snooping • STP • LLDP • SNMP

After checking these items, save the install data and setting data as necessary, referring to the Instruction Manual (AME-45220).

24.10 Troubleshooting

The troubleshooting table below provides common faults and the remedies with which to restore normal operation.

Troubleshooting

If...	, then...	Remedy
power cannot be turned on	• power connector may have loosened. • ship's mains is off. • fuse has blown.	• Check connector. • Check power supply. • Replace fuse.
power can be turned on but nothing appears on the display	• brilliance is too low. • the ambient temperature is less than 0°C (32°F).	• Adjust brilliance. • The heater is warming the Processor Unit. The display appears in approx. 2 minutes.
the picture freezes (display is not updated)	• ECDIS internal error	• Press the power key on a Control Unit to turn off the power. If the power does not go off, hold down the key. Turn on the power again to restore normal operation.

If...	, then...	Remedy
• the Control Unit buzzer is sounding continuously and the working indicator has stopped • the Control Unit buzzer is sounding continuously and the screen is blacked out	• suspect system error	• Press and hold down the power button on the Control Unit or the power switch on the Processor Unit until the power goes off. Then turn on the power again to restore normal operation.
message "There is no dongle or an error has occurred in the dongle. The system will automatically shut down." appears	• dongle is not connected. • data in the dongle is corrupted.	• Connect dongle. • Contact FURUNO for assistance.
monitored route is not displayed	• route has not been selected. • monitor route has not been selected to be visible above the chart.	• Select route to monitor. • Open the [Route] page of the [Symbol Display] menu and check the monitored route parts to show.
planned route is not displayed	• route has not been selected. • planned route has not been selected to be visible above the chart.	• Select route as "planned". • Open [Route] page of [Symbol Display] menu and check the planned route parts to show.
symbol of user chart cannot be erased	• two or more symbols may be superimposed on each other.	• Do the delete action several times.
position cannot be found	• position sensor(s) is not selected on the [POSN] page. • position sensor is turned off. • sensor cable has loosened.	• Check position sensor selections. • Turn on position sensor. • Check cable.
ARCS chart cannot be displayed	• no ARCS chart for area. • dongle is not connected. • license has expired.	• Open ARCS chart from the [Manage Charts] dialog box. • Connect dongle. • Renew ARCS license.
ENC chart cannot be displayed	• no ENC chart for area. • dongle is not connected.	• Open ENC chart from [Manage Charts] dialog box. • Connect dongle.
past track is not displayed	• past track is not selected to be visible.	• Open [Tracking] page of [Symbol Display] menu and select [Own Ship Past Tracks] to [CCRP], [Primary], [Secondary] or [Pivot] as appropriate.
monitored user chart is not displayed on ECDIS display	• user chart is not selected to be visible.	• Open [Mariner] page of [Symbol Display] menu and select parts to show.
route monitoring is stopped	• The Alert "Route Failure" appears.	• Resume route monitoring after your ship's position approaches the route. • Request service. • Check sensor connections.
user chart is not displayed on radar overlay	• user chart is not selected in Voyage navigation mode.	• Select user chart in Voyage navigation mode.

If...	, then...	Remedy
message "Nearing memory usage limit. Click the Restart button to restart the system to prevent trouble." appears	• the memory usage limit for software is close to capacity. Performance may be affected.	• If you need to save your work, click the [Later] button, then reset the power. If you don't need to save your work, click the [Restart] button. Note that the notice does not appear in the Conning mode.
message "Nearing memory usage limit. If you will start monitoring, click the Restart button to restart the system to prevent trouble during route monitoring."	• the memory usage limit for software is close to capacity. Performance may be affected.	• Click the [Restart] button.
message "Memory usage limit reached. Click the Restart button to restart the system to prevent trouble." appears.	• the memory usage limit for software is reached. Performance may be affected.	• Click the [Restart] button to reset the power. No other operations are available other than restart. Note that the notice does not appear in the Conning mode.
some Display mode buttons are yellow	• the memory usage limit for software is close to capacity. Performance may be affected.	• Stop all operations and reset the power.

24.11 Consumable Parts

The table below lists the consumable parts in the Processor Unit, Sensor Adapters and Monitor Units. Replace the parts before their expected expirations.

Note: The recommended replacement period varies depending on usage conditions.

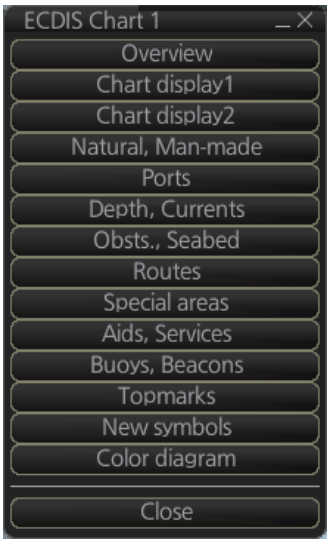
Part	Type	Replacement period
Processor Unit EC-3000/3005		
CPU Fan	KTA-555-01	8.5 years
Power Fan	109P0612H761	8.5 years
Chassis Fan	109P0612H761	8.5 years
Sensor Adapter MC-3000S		
MC-CS Board	24P0114	8.5 years
Sensor Adapter MC-3010A		
MC-ANLG Board*	24P0115(-00)	7.0 years
Monitor Unit		
Refer to the Operator's Manual for the Monitor Unit.		
Console		
Fan	9AD0901M1H	70,000 hours
	9AD0901H1H	

*: 24P0115(-11) and after do not require replacement.

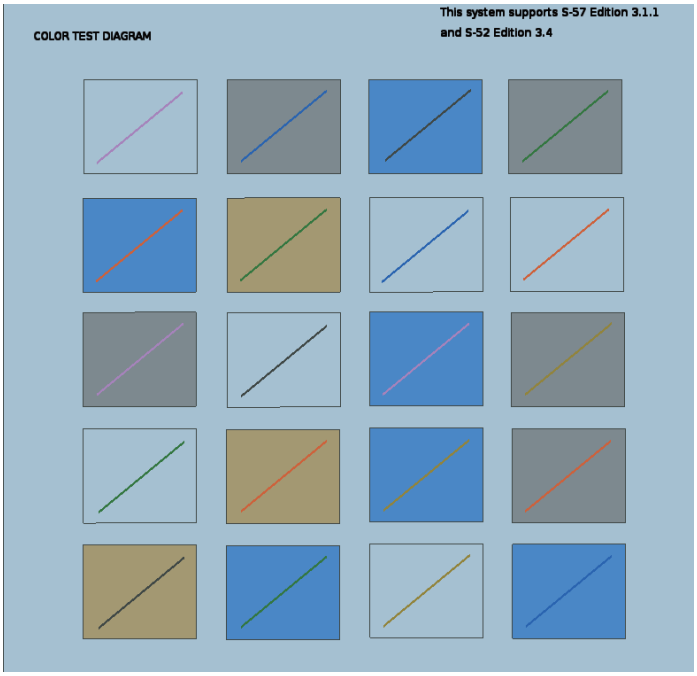
24.12 Color Differentiation Test for S57 Charts

The color differentiation checks if the ECDIS monitor can distinguish between the various color-coded areas, lines and symbols.

1. Click the [Chart INFO] and [Chart 1] buttons on the InstantAccess bar™ to show the [ECDIS Chart 1] menu.



2. Click [Color diagram] to show the color test diagram.



If the colors are correct, the diagonal line will be distinguishable from its surroundings, at any brilliance setting.

25. ALERT MANAGEMENT SYSTEM (optional specification)

25.1 What is an Alert Management System (AMS)?

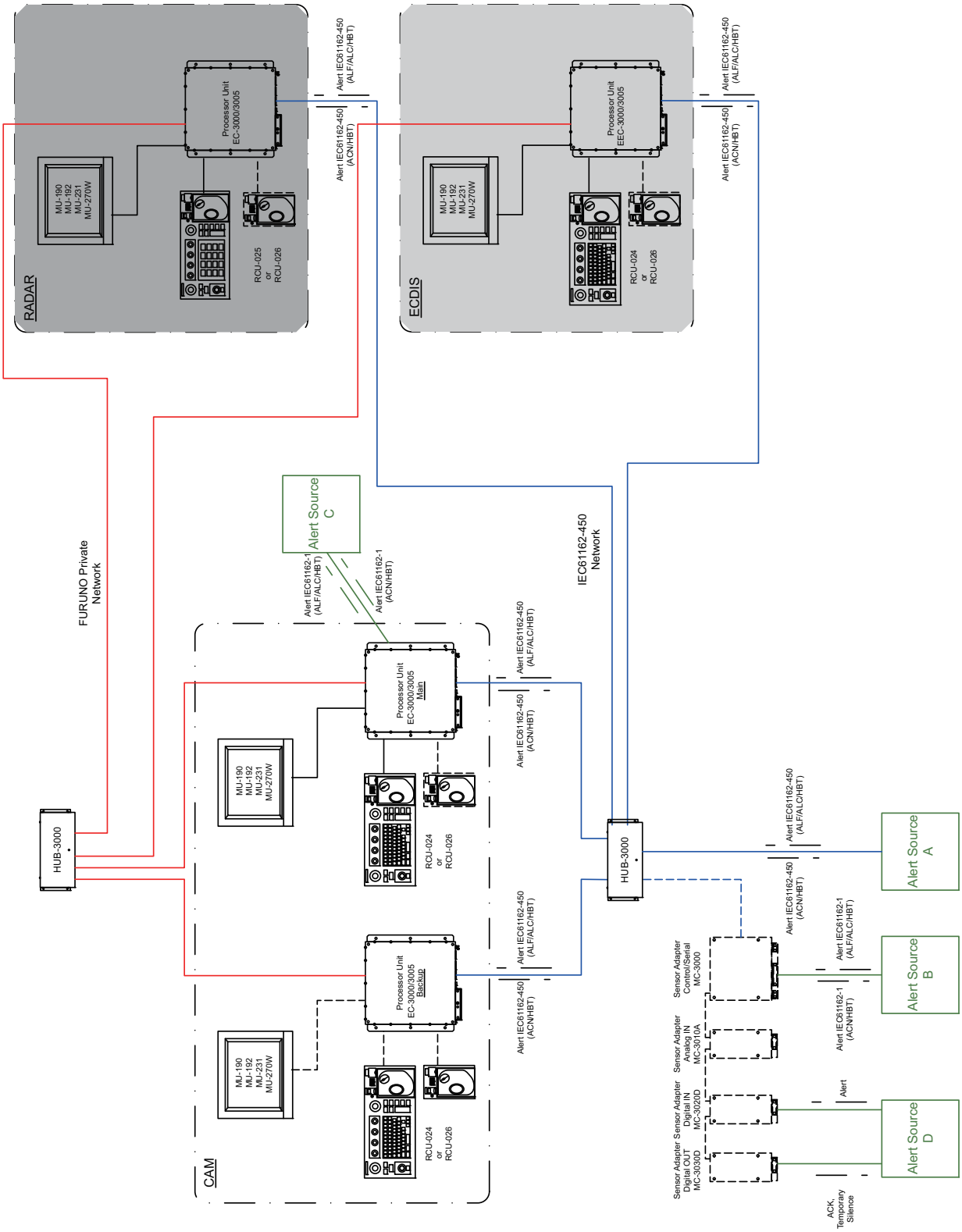
An AMS warns the navigator, with audio-visual indications, when safety parameters are violated or there is a failure of connected equipment. The AMS also transfers un-acknowledged alarm level alerts to the BNWAS.

The main functions of the AMS are

- Organize and track alerts that occur on the vessel. The AMS displays the alerts on its HMI system and sounds a buzzer when an alert condition occurs.
- Acknowledge alerts.
- Transfer alarm level alerts not acknowledged within 30 seconds to the BNWAS. (The BNWAS, then activates the Emergency Call to inform appropriate officers' quarters of unacknowledged alarms.)
- Temporarily silence alerts.
- Facilitate responsibility transfer for alerts.

25.2 System Configuration

An AMS system consists of ECDIS, radar, sensor adapters, and alert sources (GPS navigator, etc.).



25.3 Alert Priorities

There are five alert priorities: Emergency, Alarm, Warning, Caution, and Indication.

Emergency: Immediate danger to human life or to the ship and its machinery exists and that immediate action must be taken. The navigation equipment does not generate emergency alerts. **Emergency alerts are handled the same as an Alarm alert**.

Alarm: Alarms indicate situations or conditions which require immediate attention, decision and (if necessary) action by the bridge team to avoid any kind of hazardous situation and to maintain the safe navigation of the ship.

Warning: Conditions or situations which require immediate attention for precautionary reasons, to make the bridge team aware of conditions which are not immediately hazardous, but may become so.

Caution: Awareness of a condition which continues to require attention out of the ordinary consideration of the situation or of given information.

Indication: Display of regular information and conditions, not part of alert management. Indication alerts are handled the same as a Caution alert.

25.4 Alert Categories

Each alert is further classified into category A, category B, or category C, according to alert type and where the alert is acknowledged.

Category A: These alerts are acknowledged from both the alert source and the AMS and their buzzers are stopped.

Category B: These alerts are acknowledged from the alert source and the buzzer is temporarily silenced.

Category C: Category C alerts are specified as alerts that cannot be acknowledged on the bridge but for which information is required about the status and treatment of alerts; for example, certain alerts from the engine.

25.4.1 Cluster and category C alert

What is a cluster?

Cluster is a term that refers to a higher-level task groups. It is the performance of large tasks, such as navigation, the monitoring of engines, etc., and there is always an administrator for each cluster. Examples of clusters are voyages, engine rooms, hotels, and hospitals. (There are administrators such as officers for navigation clusters and engineers for engine clusters.)

Not all clusters are required, but at a minimum, navigation clusters are required. (Optional for other clusters.) If multiple clusters are configured, one CAM system must be installed for each cluster.

Clusters and category C alert

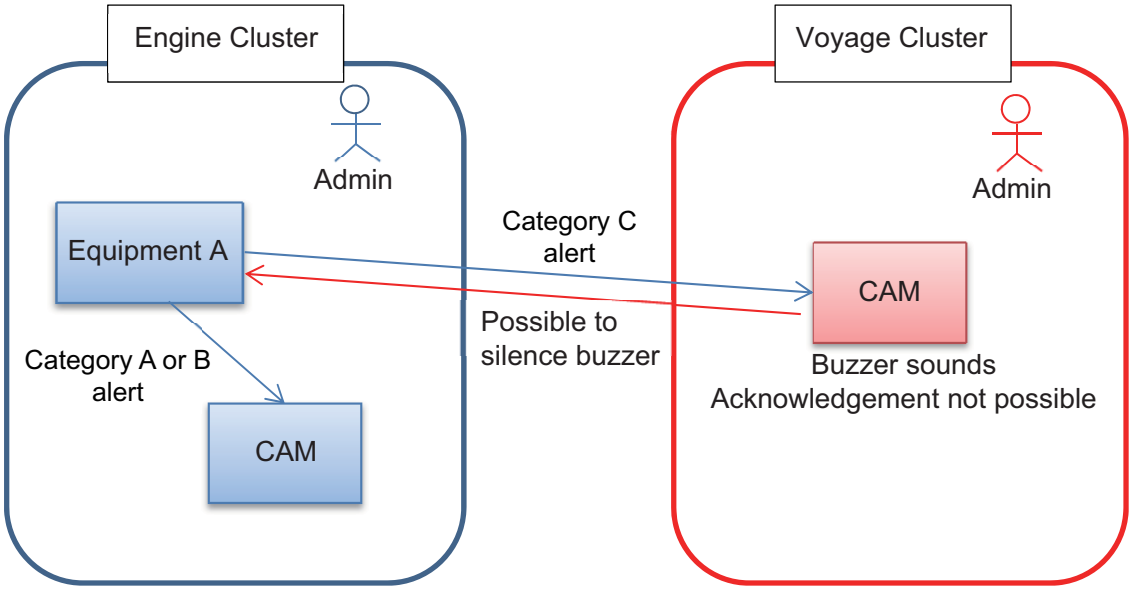
The category C alert is newly added to the BAM standard. An alert source belonging to a cluster displays an alert on its HMI and CAM (Category A/B alert) in the cluster to which it belongs, in order to give attention and convey necessary action to the operator

of that cluster. These alerts may only be acknowledged from their own HMI or CAM within that cluster. At the same time, an additional alert can be issued to another cluster if that cluster needs to be alerted.

For example, in order to notify the operator working in the voyage cluster of the alert generated in the engine cluster, an alert different from the alert of the own cluster can be generated. This alert is defined as Category C. In the case of category C, it is not possible to acknowledge the alert from the CAM of another cluster as in category A. However, the buzzer must sound in the CAM-HMI of another cluster as in category B.

This is to show that even though an operator who has an alert in another cluster but does not have the authority to acknowledge that alert can see what is happening at that cluster. Also, an alert source that receives a temporary silence command from another cluster's CAM must be able to silence the alert in category C. Temporary silence for category C alerts will last no more than five minutes.

Note that support for alert source category C is optional (not supported by FMD-3005/3200/3200-BB/3300). However, since AMS must be able to handle category C alerts, only AMS supports category C alert. (Alert display, buzzer ringing, temporary silence.)

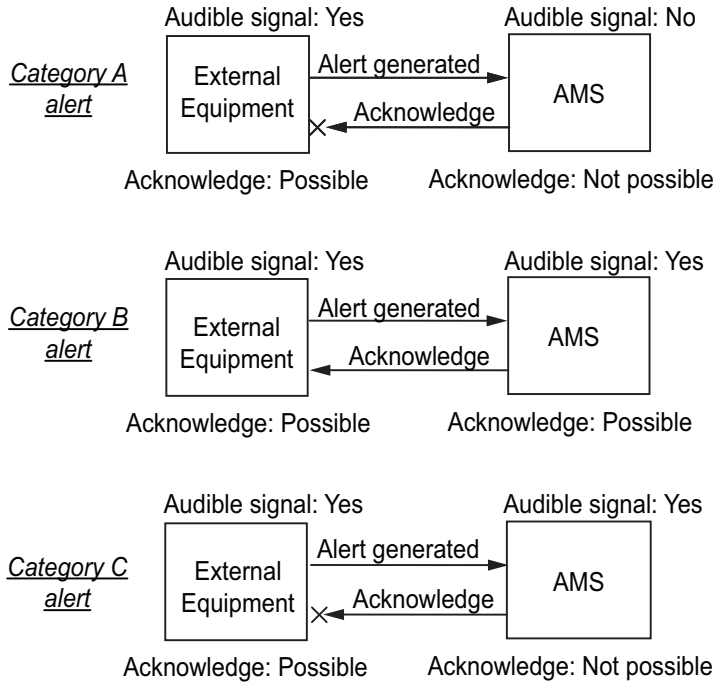


25.5 Alert Category and Place of Alert Acknowledgment

Category A: An alert is acknowledged from the equipment that generated the alert. The alert is acknowledged at the both the equipment and the AMS and their buzzers stop.

Category B: An alert is acknowledged from the equipment that generated the alert, or the AMS. The alert is acknowledged at the both the equipment and the AMS and their buzzers stop.

Category C: An alert is acknowledged from the equipment that generated the alert. The alert is acknowledged at the equipment that generated the alert.



25.6 How to Acknowledge an Alert From the AMS

There are two methods to acknowledge an alert from the AMS:

- **Trackball**: Click the alert name on any window in the AMS.
- **ALARM ACK** key: Push the key on the connected Control Unit.

Note: Alerts with an icon (or) that cannot be acknowledged at the AMS, can only acknowledged at the device that issued the alert.

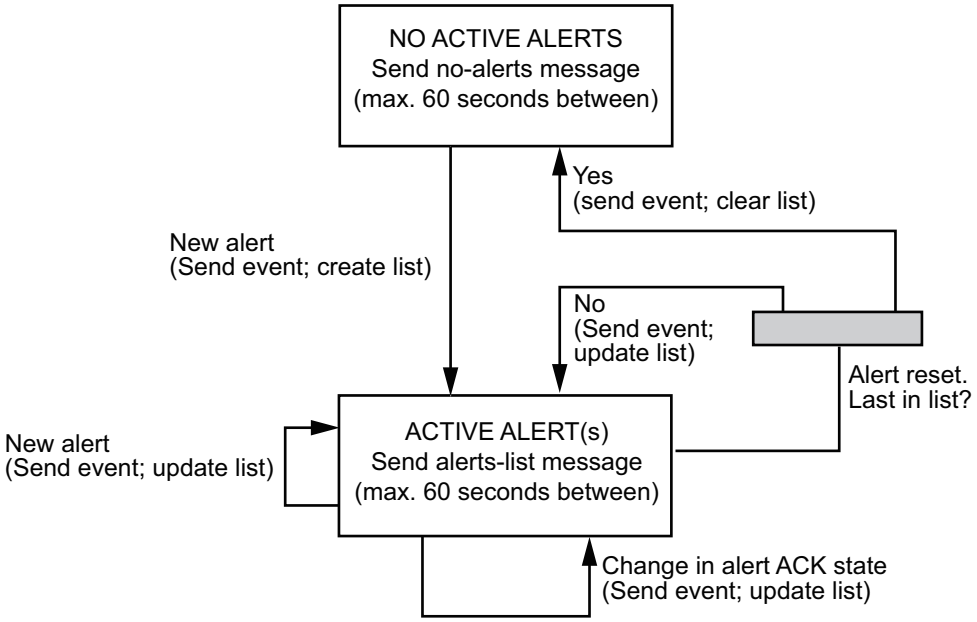
25.7 Alert-related Sentences

25.7.1 ACK/ALR sentences

Overview of alert acknowledgment flow

The function of the AMS is to coordinate exchange of alerts and acknowledgment of alerts between equipment connected to the AMS.

This AMS is designed according to the IEC's recommendations for Alert Handling (80/520/INF). The figure below shows the transition of the Alert status at the sensor.



Device states

A sensor has two main states, N and A.
State N: No active alerts. The device should send a "no-alerts" message with an interval of a maximum of 60 seconds. This message informs the AMS that the sensor has no active alerts.
State A: The device has one or more active alerts, of which zero or more may have been acknowledged and the rest (possibly zero) are unacknowledged. In this state, the device shall send all active alerts at an interval not greater than 60 seconds. When multiple alerts are active in the sensor, all active alerts are transmitted as a "list" of alerts (alert-list message). In response to the "list", applicable sensors output the ALR sentence, the content of which is defined in IEC 80/250/INF.

In addition to the periodic transmission mentioned, the sensor sends an Alert message (ALR) to the AMS when an alert is generated in the sensor in the following instances:

- A new alert is generated in the sensor.
- An existing alert is acknowledged in the sensor, either by the sensor itself or by remote acknowledgment by the AMS.
- An existing alert condition becomes non-active.

No-alerts message

The no-alerts message to informs the AMS that the sensor has no active alerts. It is sent at an interval not greater than 60 seconds, and may be used to clear the AMS alert list. This message is sent as an ALR message, without a time stamp and includes a "V" flag in the both the alert condition and acknowledgment field. The no-alerts message is as shown below.
$--ALR,,,V,V*hh

The alert-list message

The alerts-list message periodically refreshes the alert list in order for personnel to have up-to-the-minute list of active alerts. The alert / alert list message is sent with an interval not greater than 60 seconds. The alert / alert list message consists of the same message(s) sent when the corresponding event occurred, but all active alerts shall be reported. An example of two alert-list messages are shown below.
$--ALR,123456,123,A,A,Battery power in use*hh<CR><LF>
$--ALR,130507,456,A,V,Self test failure*hh<CR><LF>

ACK sentence

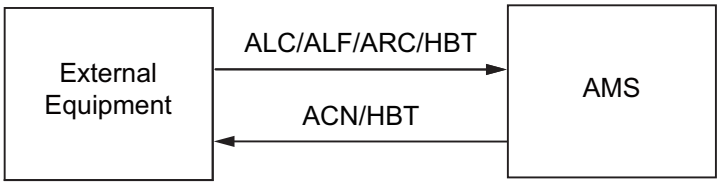
The AMS sends the ACK sentence to all sensors to acknowledge alerts. The sentence format is as shown below, where xxx is the Alert no. generated by each sensor.
$--ACK,xxx*hh<CR><LF>

This AMS supports only the single alert acknowledgment as defined by IEC 80/520/INF. In this case, it is necessary to send an alarm acknowledge message, the format which is shown below, from the external from the AMS to the sensor. The message is sent at an interval not greater than 60 seconds.
$--ACK*hh<CR><LF>

25.7.2 ACN/ALC/ALF/ARC/HBT sentences

Sentences output from external equipment and AMS

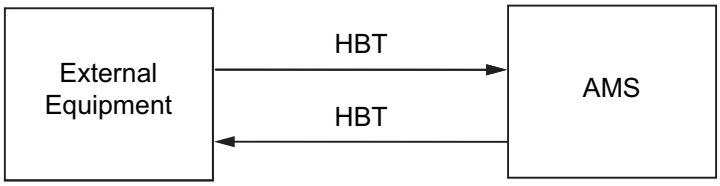
The sentences output by external equipment and the AMS are as shown in the illustration below.



Output sentence	
External equipment	**AMS**
• ALC (Alert cyclic list) • ALF (Alert sentence) • ARC (Alert command refused) • HBT (Heartbeat supervision sentence)	• ACN (Alert command) • HBT (Heartbeat supervision sentence)

HBT sentence

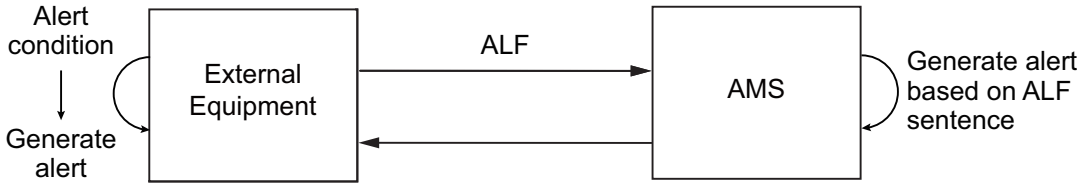
Both external equipment and the AMS output the HBT sentence periodically to confirm normal operation between each other. The sentence is output regardless of whether an alert is generated or not.



When an alert is generated...

When an alert condition is found at an external equipment, the equipment sends the ALF sentence to the AMS.

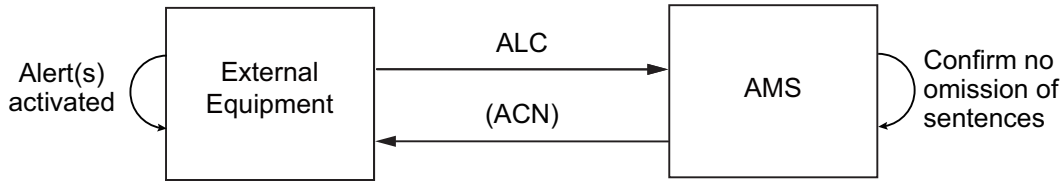
The ALF sentence contains Alert ID, Alert Priority, Alert Category, ACK/Silence, and other information. The AMS generates an alert based on the ALF sentence and sends it to the external equipment to acknowledge receipt of the alert.



Periodic transmission

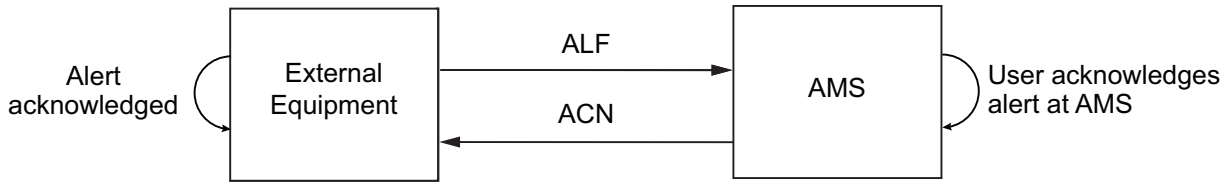
External equipment periodically (30 s or less) send alert status to the AMS using the ALC sentence.

If the ALC sentence contains an alert, the AMS sends the ACN sentence to the external equipment to request re-notification.



Alert ACK at the AMS (Category B)

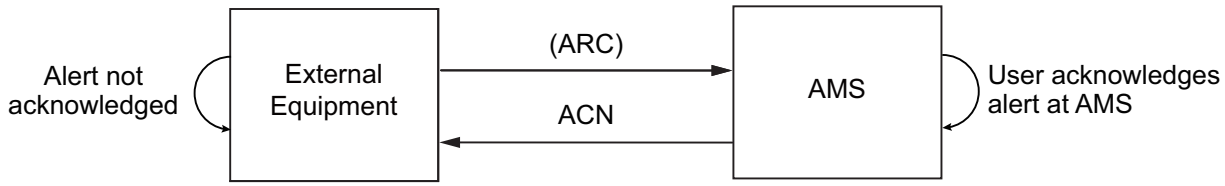
A category B alert generated by an external equipment can be acknowledged at the AMS. When this is done, the AMS sends the ACN sentence to the external equipment. Upon receiving the ACN sentence, the external equipment acknowledges receipt by sending the ALF sentence to the AMS.



Alert ACK at the AMS (Category A or Category C)

A category A or category C alert cannot be acknowledged by the AMS. When an external equipment requests the AMS to acknowledge a category A or category C alert the AMS sends the ACN sentence to the external equipment. Even though the external equipment receives acknowledgment by the ACN sentence, a category A or category C alert cannot be acknowledged at the external equipment.

The external equipment sends the ARC sentence. In some cases, acknowledgment is refused. (FURUNO devices output the ARC sentence.)



Repeat of Warning alert

For a Warning alert to become an Alarm alert, the alert priority must be changed. In most cases the Warning alert is simply repeated. In general, only the alerts specified by the IMO can become Alarm alerts.

When the external equipment generates a Warning alert, the Warning alert is repeated or the priority is changed to "Alarm." The latter case is known as "Alert Escalation".

The external equipment controls the interval at which a Warning alert is repeated. The external equipment sends the ALF sentence to AMS to notify the AMS of repeat of a Warning alert. The AMS also repeats the Warning alert.



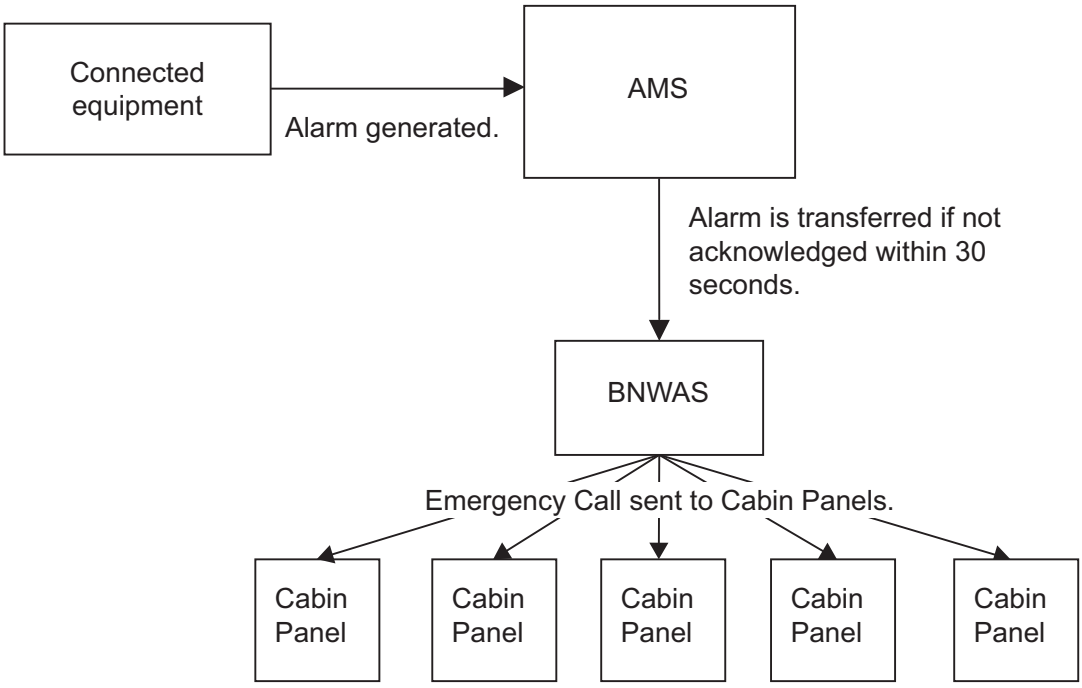
25.8 How an Alarm is Transferred to the BNWAS

Alarms are transferred to the BNWAS in the following sequence.

1) An Alarm generated by an equipment connected to the AMS is transferred to the BNWAS if it is not acknowledged within 30 seconds.
2) The BNWAS sends the Emergency Call to applicable Cabin Panels in living quarters and general quarters, to inform personnel of an unacknowledged Alarm.

To stop both the Emergency Call and the transfer of the Alarm, do as follows:

- **Category A, Category C Alarm**: Acknowledge the alert at the equipment that generated the Alarm.
- **Category B Alarm**: Acknowledge the alert at the equipment that generated the Alarm, or the AMS.



Note: The transfer of Alarms can be stopped (when in port, etc.) by setting the system in the Harbour mode. See section 1.4 for details.

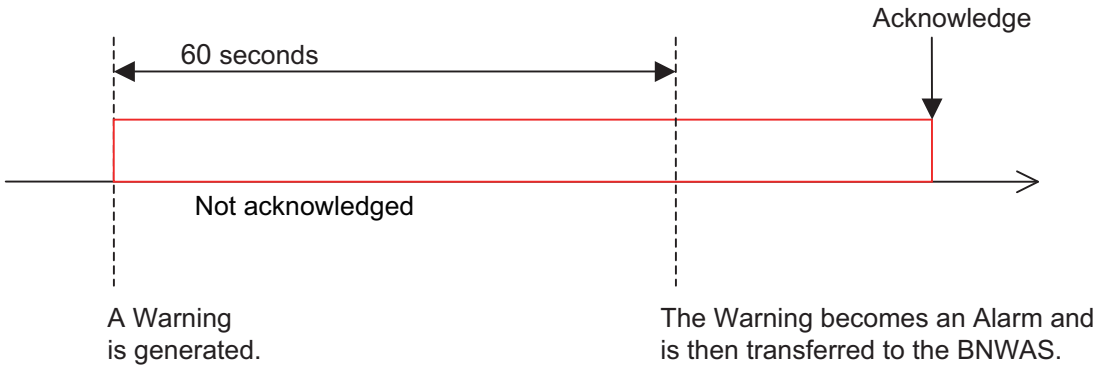
25.9 How to Temporarily Silence the Buzzer

The sensors and external equipment are compliant with MSC302(87), which has a provision to allow the temporary silencing of the buzzer for 30 seconds against any alert, from the equipment that generated the alert or from the AMS. The buzzer again sounds after 30 seconds if the alert is not acknowledged.

In this equipment, the [Silence] button, which is provided on the [ACTIVE ALERT] window, temporarily silences the buzzer. The [Silence] button also postpones the transfer of an alert to the BNWAS, but only once. All further operations of the [Silence] button will silence the alert, but will not postpone the transfer any further.

25.10 Alert Escalation

Alert escalation makes sure that if a warning priority alert is not acknowledged or resolved within a pre-determined amount of time, it will be repeated or its priority changed to Alarm.



There are two types of alert escalation.

Method 1: Warning alert is repeated

This is the standard method of escalation. This is done unless the IMO performance standards require that a Warning be changed to an Alarm. Warnings are repeated for a maximum of five minutes.

Method 2: Change to Alarm priority

If the warning is not acknowledged with a pre-determined time its priority is changed to Alarm. (Alert about track control, etc.)

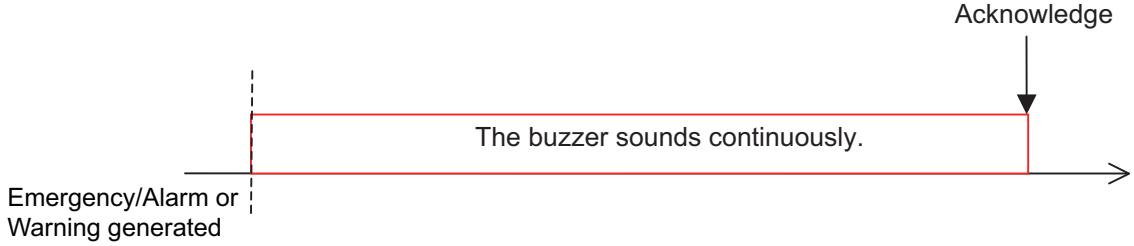
25.11 Buzzer Patterns

The AMS has two buzzer patterns, legacy and IEC 62288 Ed.3, and one is chosen at installation.

Note: IEC62923-1 / 2 stipulates that the audio and visual indications for a newly generated alert must be delayed for three to five seconds. This AMS has a delay of approximately five seconds. If the status of alert escalation, etc. changes, the audio and visual indications will be released without delay.

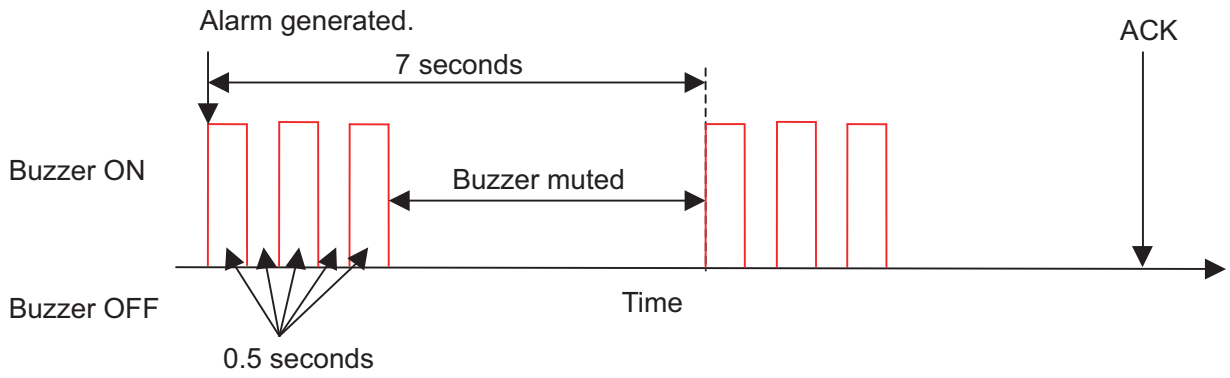
Legacy buzzer pattern

This buzzer sounds continuously until an emergency/alarm or warning is acknowledged.



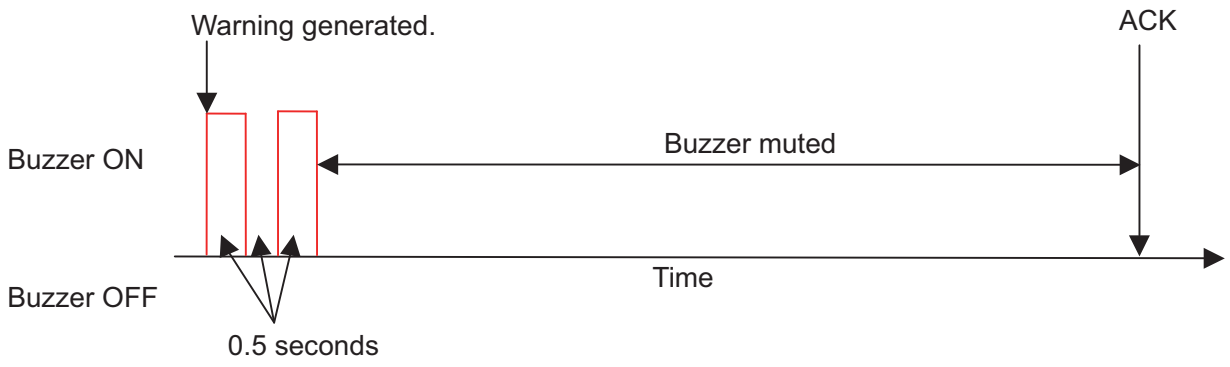
IEC 62288 Ed.3 buzzer pattern

This buzzer complies with INS regulations. There are two types of buzzer patterns, Alarm and Warning.
Alarm: The buzzer sounds three times in 7-second intervals.



IEC 62288 Ed.3 mode, alarm priority buzzer

Warning: The buzzer sounds twice and is, then muted.



IEC 62288 Ed.3 mode, warning priority buzzer

25.12 Alert Priority, Alert State

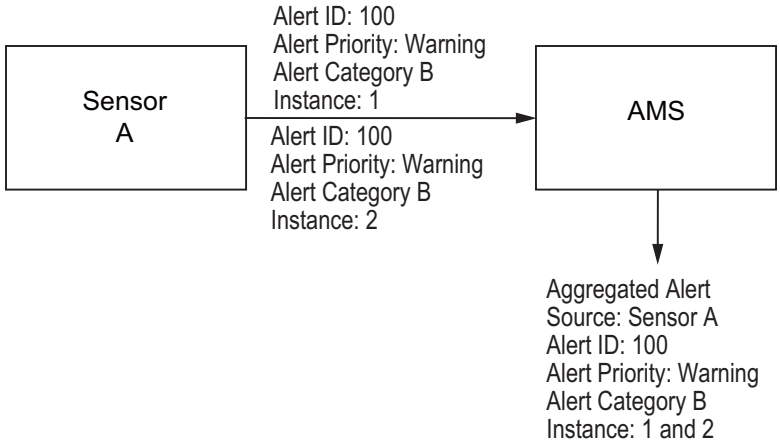
There are seven priority numbers according to the priority of the alert and alert state.

Priority No.		Priority of Alert	Alert state
High	1	Emergency, Alarm	Not acknowledged, Not rectified
	2	Warning	Not acknowledged, Not rectified
	3	Alarm	Not acknowledged, Rectified
	4	Warning	Not acknowledged, Rectified
	5	Alarm	Acknowledged, Not rectified
	6	Warning	Acknowledged, Not rectified
Low	7	Caution, Indication	Not rectified

25.13 Aggregated Alert

MSC302(87) requires the use of the "aggregated alert," which groups multiple similar alerts.

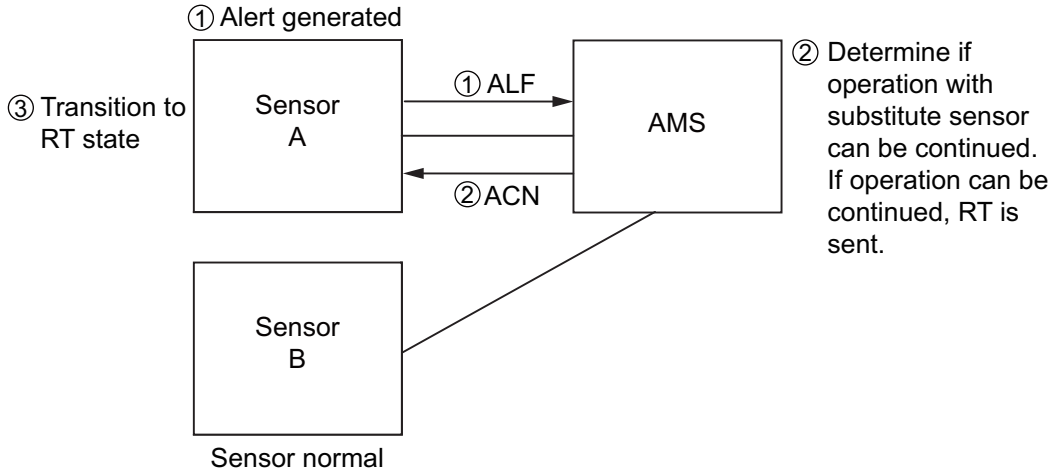
The illustration below shows how the FURUNO AMS groups similar alerts with a single sensor. Grouped alerts can be collectively temporarily silenced.



25.14 Responsibility Transfer Alert

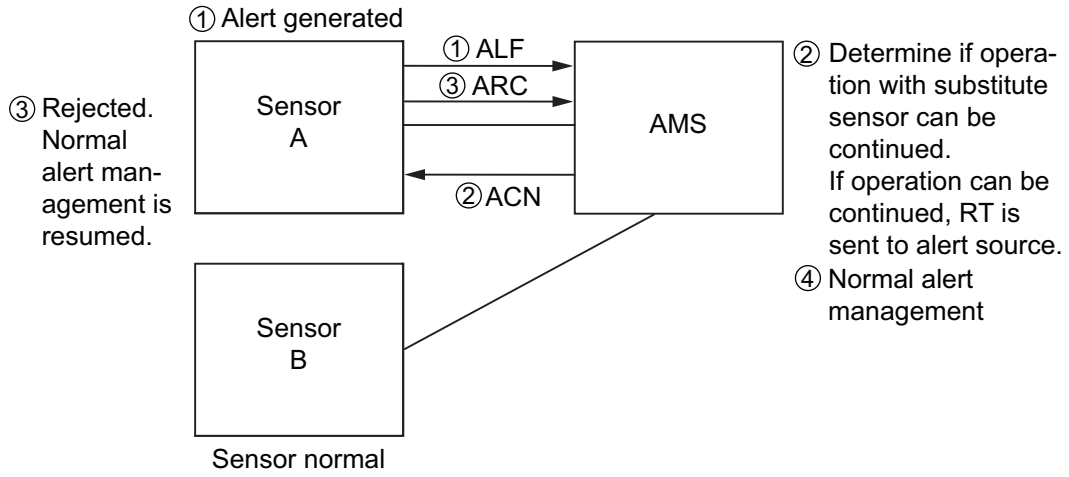
The AMS is responsible for managing alerts generated by alert sources. When the FURUNO AMS is connected to multiple like sensors and one of the sensors generates an alert, the AMS sends the Responsibility Transfer (abbreviated as “RT” in the illustrations below) to the alert source when another like sensor can be substituted for the alert source.

RT basic operation



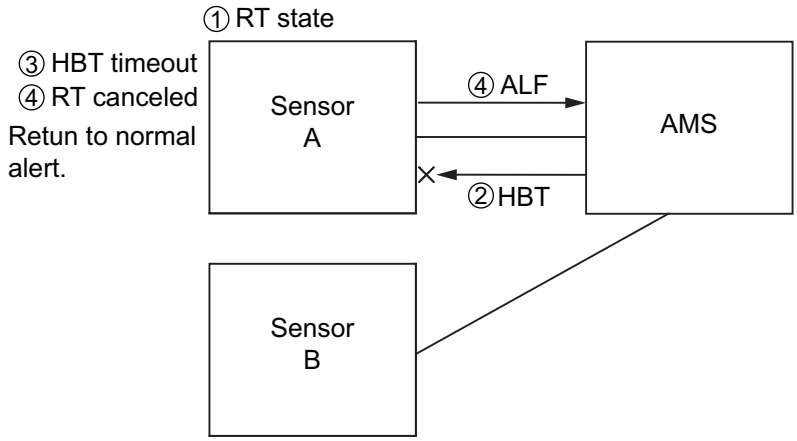
Alert source rejects RT

If RT is delayed from AMS, the alert source can reject RT (only for alerts whose IMO performance requirements allow rejection). If the alert source rejects RT, normal alert management is resumed.



Communication loss with AMS (after sending RT)

When the alert source goes into RT state, HBT sentences from the AMS are monitored. When the HBT sentence from the AMS cannot be received, the alert source rechanges the RT alert to the normal alert (active – unacknowledged) state.

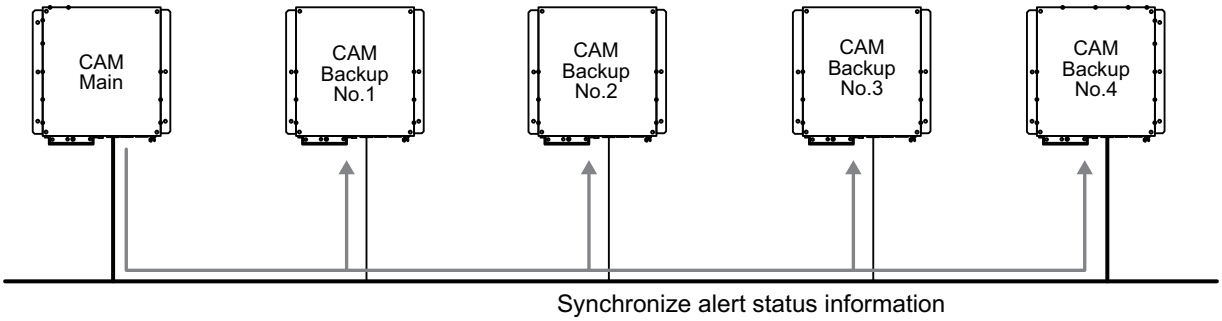


25.15 Backup Configuration

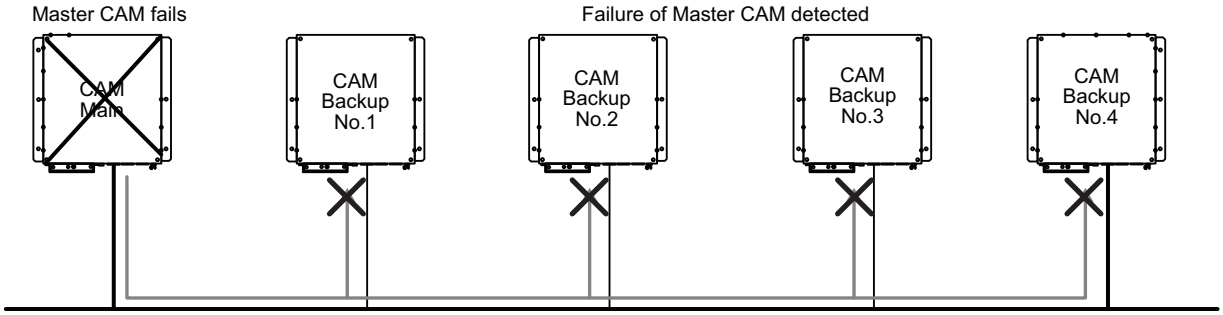
The FURUNO AMS supports backup configuration. The following configuration is possible.

Master AMS: 1 set Backup AMS: 4 sets

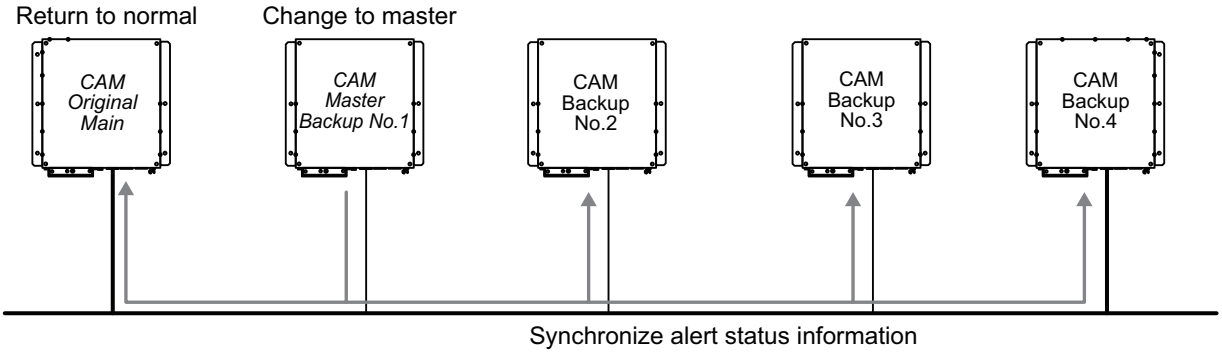
Alert information is controlled by the Master AMS. The Master AMS distributes alert information to Backup AMS via the network to share alerts among all AMS.

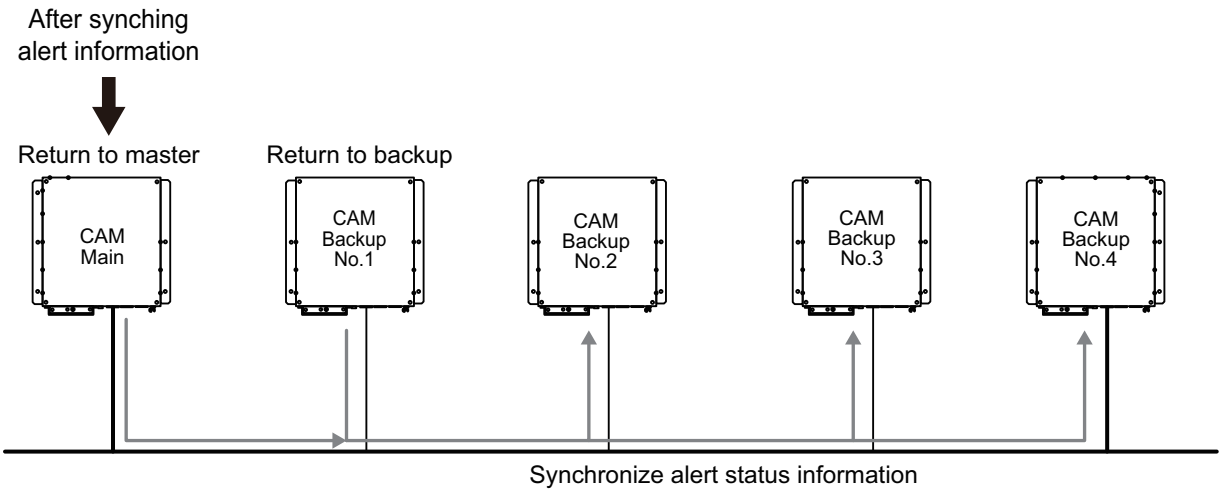


If the Master AMS fails, the Backup AMS having the highest priority (set at installation) among Backup AMS takes over as the Master AMS and distributes alert information to all Backup AMS.



After the Master AMS is restored to working order and all alert information is updated and synched, the original Master AMS again becomes the Master AMS.





25.16 Alert and Alert-related Icons

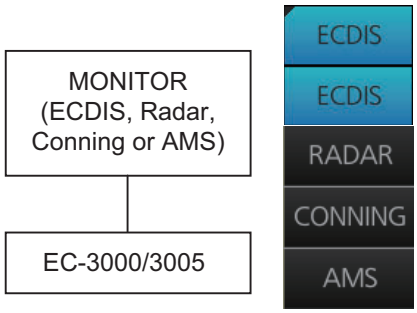
The table shows the icons that indicate various alert states in the AMS mode windows (see subsection 25.18.1), emergency (red), alarm (red), warning (yellow-orange), caution (yellow), and other. Flashing icons flash every other second.

No.	Icon	Alert state	Icon display	Audible alert
Alert priority: Emergency				
1		Cause not rectified	Red, flashing	Silent
Alert priority: Alarm				
2		Not acknowledged, not rectified	Red, flashing	3 short audible alerts repeated every 7 s.
3		Not acknowledged, not rectified, buzzer temporarily silenced	Red, flashing	Silent
4		Acknowledged, not rectified	Red, lit	Silent
5		Acknowledged, not rectified, acknowledged from external equipment	Red, lit	Silent
6		Not acknowledged, rectified	Red, flashing	Silent
Alert priority: Warning				
7		Not acknowledged, not rectified	Yellow-orange, flashing	2 short audible alerts repeated every 60 s.
8		Not acknowledged, not rectified, buzzer temporarily silenced	Yellow-orange, flashing	Silent

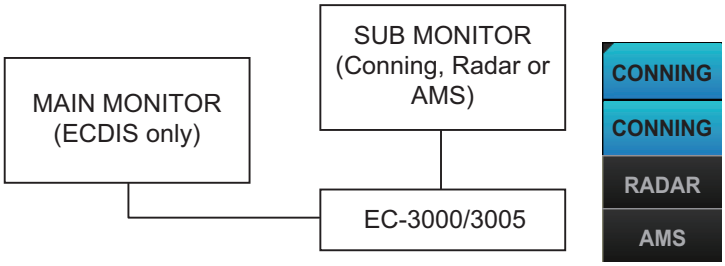
No.	Icon	Alert state	Icon display	Audible alert
9		Acknowledged, not rectified	Yellow-orange, lit	Silent
10		Acknowledged, not rectified, acknowledged from external equipment	Yellow-orange, lit	Silent
11		Not acknowledged, rectified	Yellow-orange, flashing	Silent
Alert priority: Caution				
12		Caution	Yellow, lit	Silent
Alert priority: Indication				
13		Indication	Yellow, lit	Silent
Other				
14		Aggregation	Red, Yellow-orange, or Yellow, displayed with emergency, alarm, warning, and caution icons (1 to 12)	Silent
15		Functional Alert Group	Red, Yellow-orange, or Yellow, displayed with emergency, alarm, warning, and caution icons (1 to 12)	Silent
16		Acknowledge not allowed for alarm	Red, displayed with alarm icons (2, 3, 6)	Silent
17		Acknowledge not allowed for warning	Yellow-orange, displayed with warning icons (7, 8, 11)	Silent

25.17 How to Select the AMS Mode

Select [AMS] with the Display mode button (the leftmost button on the Status bar) to activate the AMS mode. The configuration of the button depends on the monitor configuration.



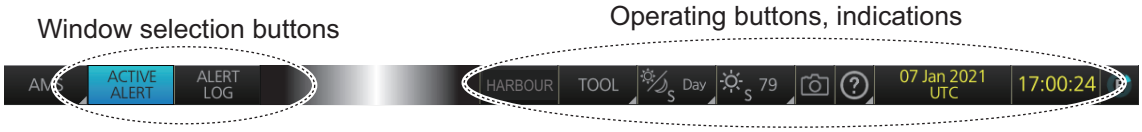
Single monitor configuration and Display mode button



Dual monitor configuration and Display mode button

25.18 AMS Mode Windows

The AMS mode shows alert information in two windows: [ACTIVE ALERT] and [ALERT LOG]. The windows can be selected with the corresponding buttons on the Status bar. Alerts can be acknowledged from the [ACTIVE ALERT] window, by clicking the alert.



25.18.1 Active alert window

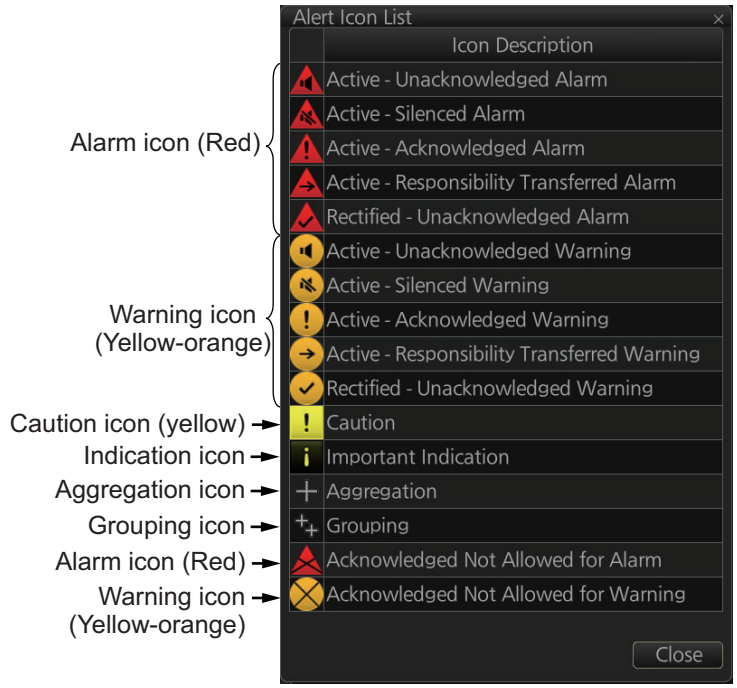
The [ACTIVE ALERT] window shows the status of all active alerts. If more than 20 alerts are active, the window can be scrolled to show the alerts which are off-screen.

The background color of an unacknowledged emergency or alarm flashes red and an unacknowledged warning flashes yellow-orange. The text of an acknowledged alarm is red and the text of an acknowledged warning is yellow-orange. The text of a caution or indication alert is yellow.

Category B alerts can be acknowledged by clicking the alert or the [ACK] button. Category A alerts must be acknowledged from the equipment that generated the alert.



See the next page for a description of the items in the list.

No.	Item name	Description
1	[ACK] button	Acknowledges the alert shown in the current alert box. **Note:** Only for alerts which can be acknowledged at the AMS
2	Current alert box	This box shows the highest priority alerts that are currently occurring.
3	[TEST] button	Releases a test alert. See section 25.19.
4	Alert Icon description button	Provides a description of the alert icons. 
5	Alert Aggregation display button	Shows or hides alert aggregation. Blue color when aggregation is shown, background color when alerts are shown separately.
6	Functional Alert Group display button	Shows or hides alert grouping. Blue color when grouping is shown, background color when alerts are shown separately. **Note:** To display Functional Alert Group alert, the feature to be enabled at the alert source. The alert source must be Functional Alert Group-compatible and connected to the same network as the ECDIS.
7	[SILENCE] button	Temporarily silences the alert buzzer.
8	Jump buttons	Jump to the top, or bottom, of the listed alerts.
9	Alert column	Shows the alert title and description.
10	Source column	Shows the alert source.

No.	Item name	Description
11	Last Update column	Shows the date and time that the alert was last updated. **Note:** The date and time an alert was last updated are synchronized with UTC, using the ZDA sentence. If the ZDA sentence is lost, the date and time cannot be synchronized with UTC.
12	Information button	Click to show detailed information for the selected alert in the Alert Info panel.
13	System Info	Shows the Alert Management System information (number of active alerts; Main or Backup AMS).
14	Alert Info	Shows detailed information for the selected alert. • [Last Update Time]:date and time at which the selected alert's status last changed. **Note:** The date and time an alert was last updated are synchronized with UTC, using the ZDA sentence. If the ZDA sentence is lost, the date and time cannot be synchronized with UTC. • [Cluster]: Equipment cluster to which the selected alert's source belongs. • [Source]: Name of the selected alert's source • [Alert Text]: the selected alert's title • [Priority]: the selected alert's priority • [Category]: the selected alert's category • [Mnemonic Code]: manufacturer's code • [Alert ID]: the selected alert's ID • [Instance]: the selected alert's instance number • [Decision Support]: Where available, shows possible solutions or remedies for the selected alert. • [Responsible]: Indicates where the alert can be acknowledged.

Aggregated alerts

Aggregated alerts have the following characteristics:

- Must originate from the same alert source
- Must have the same alert priority and category
- Must have the same alert ID
- Must have individual alert instances

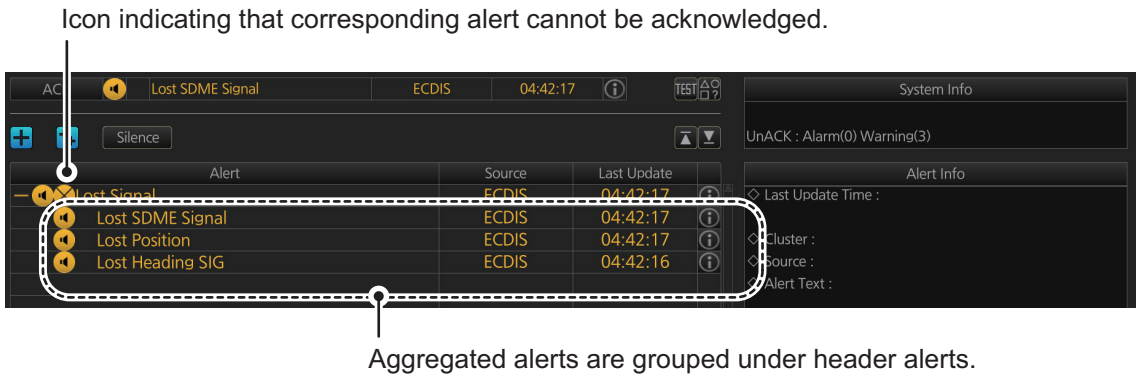
To show aggregated alerts, click the [Alert Aggregation display] button (). Aggregated alerts appear in a contracted list below their respective header alert.

Note: Header alerts are assigned the instance number "0".



To view the aggregated alerts, click the expand/contract button on the far left of the header alerts. Below the header alerts, all aggregated alerts are displayed in order of occurrence.

Aggregated alerts cannot be approved collectively. Therefore, on the left side of the header alert, you will see an icon indicating that it cannot be approved.



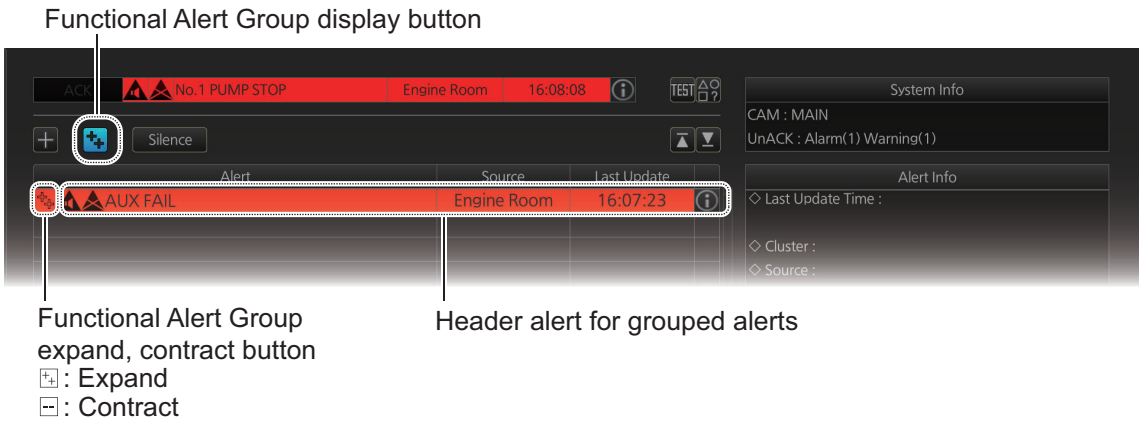
Functional Alert Group alerts

The functional alert group display method was implemented from IEC62923-1/2 and is supported by AMS.

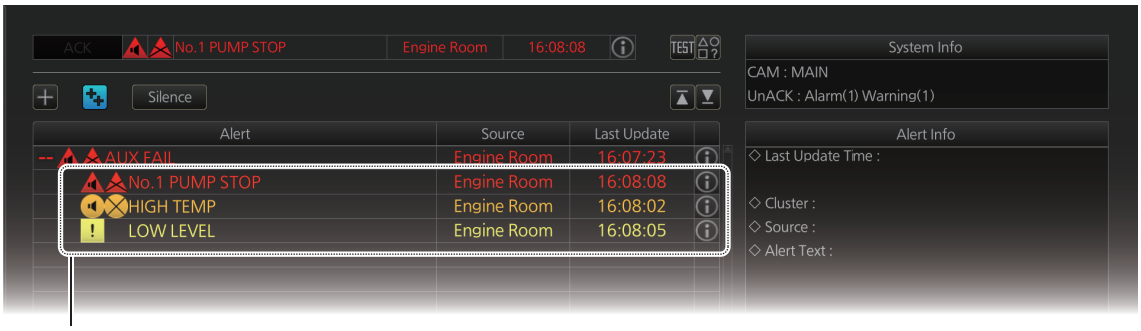
Functional alert group alerts have the following characteristics:

- Different alert sources may be mixed.
- Can have the same alert priorities and categories
- Can have multiple alert IDs
- Can have multiple alert instances

To show the functional alert groups, click the Functional Alert Group display button (). Grouped alerts appear in a contracted list below their respective header alert.



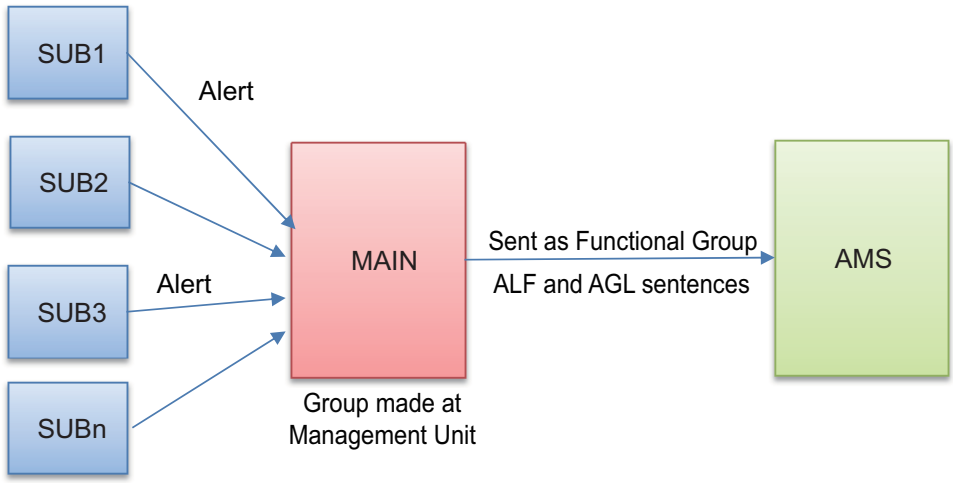
To view the grouped alerts, click the expand/contract button to the left of the header alert. All grouped alerts under the selected header are shown in order of occurrence.



Grouped alerts appear collectively below their header alert.

Note: Functional Alert Group settings are done only at the alert source. Settings cannot be changed from the FMD. To display functional alert groups on your AMS, at least one Functional Alert Group-capable device must be connected to the same network.

Functional Alert Group overview



For example, you have a system that manages multiple units

1) Alerts are raised on managed units
2) The unit under control notifies the management unit of an alert.
3) The Management Unit sends the AGL to the AMS, indicating that it is a Functional Alert Group.

Note: Functional alert groups can be displayed on the AMS only when the device that supports the Functional Alert Group function is connected to the AMS.

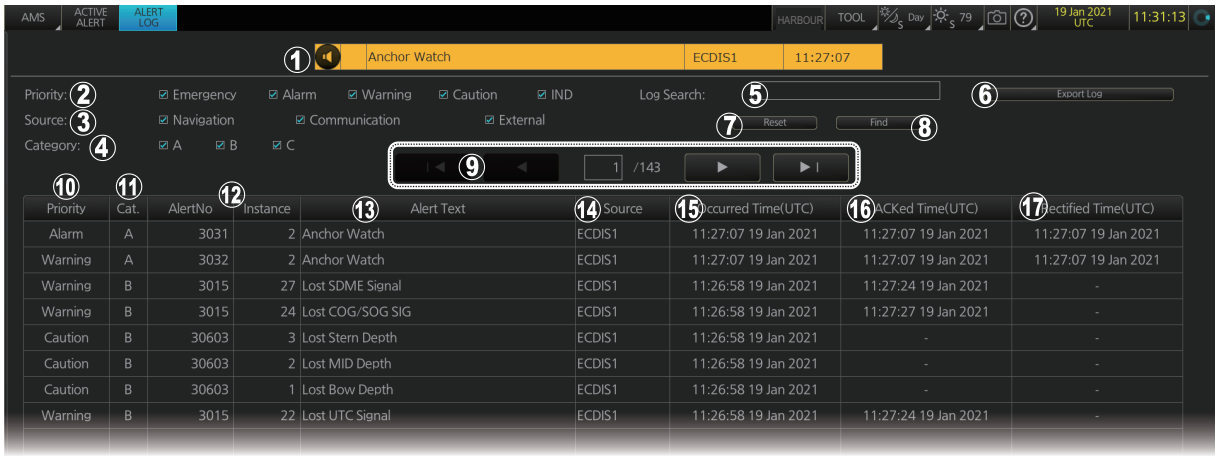
Differences between aggregate alerts and functional alert group

Aggregated alerts	Functional alert group
Alerts of the same priority.	May contain alarms, warnings and cautions within the same group. Emergency alarms are not permitted to be part of a group.
One individual alert can be presented in only one aggregation.	One individual alert may be presented in multiple groupings.
Flat structure: one presented alert and a flat list when opened.	A hierarchical structure is possible. A group may comprise other groups and also aggregations (nesting).
Based on having the same identifier and different instance.	Based on having information about the alerts that should be grouped (possibly received via AGL)

Aggregated alerts	Functional alert group
Alert aggregation information transmitted via ALFs (aggregated header alert and individual alerts).	Alert grouping information transmitted via ALF (functional alert group header alert) and AGL.
Alerts from the same source.	Alert groups may comprise alerts from the same source and/or multiple sources.
Alerts of category A, category B and category C can be aggregated, but only in separate aggregations.	Alert groups may comprise alerts of different categories.
Performed by the alert source.	Grouping can be performed by the alert source and by a grouping source (middleman) or CAM, distributing the AGL and functional alert group header alert (ALF).
Required function for a CAM (receiver/display), optional for all other BAM compliant equipment (source indicating aggregation by transmitting header alert), except when required by an individual equipment standard.	Optional functionality for all BAM compliant equipment.

25.18.2 ALERT LOG window

The [ALERT LOG] window provides a comprehensive list of generated alerts.



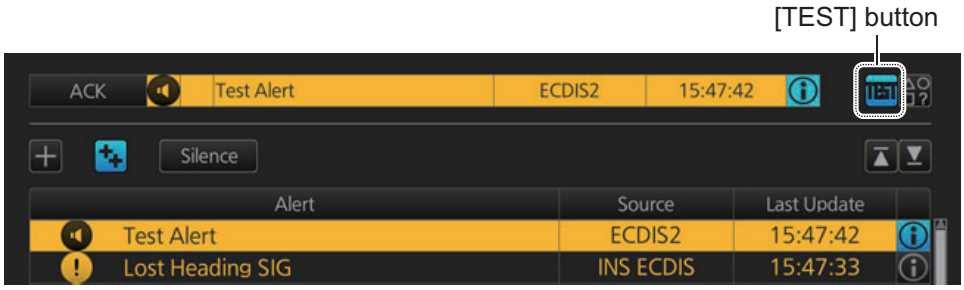
No.	Item name	Description
1	Current Alert box	This box shows the name of the active alert that has the highest priority.
2	[Priority]	Filter the list by the alert priority; [Emergency], [Alarm], [Warning], [Caution], [Indication].
3	[Source]	Filter the list by the source of alert; [Navigation], [Communication], [External].
4	[Category]	Filter the list by alert category; A, B or C.
5	[Log Search] box	Enter the text string to search.
6	[Export Log] button	Export the contents of the log to a USB flash memory, in ".txt" format.
7	[Reset] button	Stop the text search and restore the list to its pre-search state.
8	[Search] button	Search the string entered in the [Log Search] box.
9	[◀], [▶] (page selection buttons)	These buttons appear when there are more than 20 alerts. The buttons are greyed out if there is only one page of alerts. |◀: Go to first page; ◀: Go back one page ◀ |: Go to last page; ▶: Go forward one page

No.	Item name	Description
10	[Priority]	Priority of the alert.
11	[Cat.]	Category of the alert.
12	[Alert No.], [Instance]	Alert number and instance.
13	[Alert Text]	Name of alert.
14	[Source]	The name of the device that generated the alert.
15	[Occurred Time(UTC)]	The time (UTC), date the alert occurred.
16	[ACKed Time(UTC)]	The time (UTC), date the alert was acknowledged.
17	[Rectified Time(UTC)]	The time (UTC), date the alert was rectified.

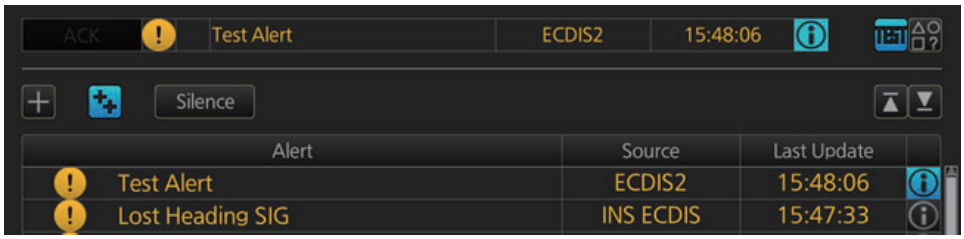
25.19 How to Test the AMS

The AMS test facility simulates the flow of an alert generation:
generate→acknowledge→rectify

1. Open the [ACTIVE ALERT] window, then click the [TEST] button. As shown in the figure below, a test alert (priority: warning, category: B) is generated.



2. Click the [ACK] button to acknowledge the test alert. Confirm that the alert is acknowledged (yellow highlight is removed).



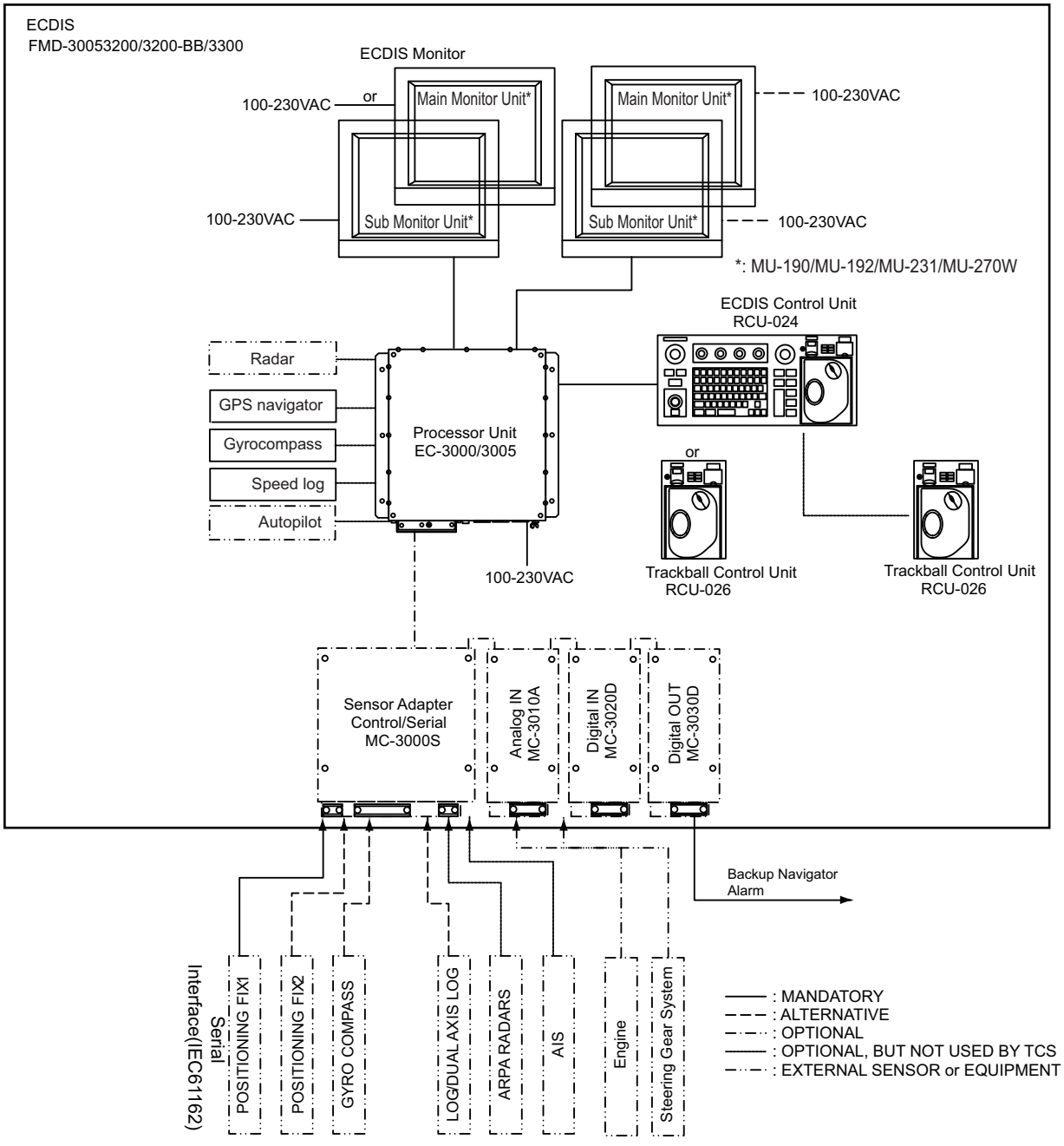
3. Click the [TEST] button again. Confirm that the status of the alert changes to normal, the cause is rectified, and the alert is removed from the alert list.

26. AUTOPILOT OPERATIONS (optional specification)

This chapter covers the type approval testing for the following autopilots:

- **Type Approval TC-3001 (IEC 62065 Ed. 2.)**: Raytheon Anschutz NP-5400, EMRI FAP-3000, TOKYO KEIKI PR-9000, YDK Technologies PT-900

26.1 Configuration



26.2 Controls

26.2.1 EMRI FAP-3000

Steering Control Unit



No.	Description
1	PROGRAM NEXT button: Shows next heading, next course, next radius, next rudder limit field.
2	CALL REMOTE CTRL button: Initiates integrated control with external navigation equipment (ECDIS, etc.)
3	CALL COURSE CTRL button: Heading-controlled course change using set radius
4	CALL HEADING CTRL button: Immediate heading-controlled course change using set rudder angle limit.
5	RADIUS button: Immediate radius-controlled course change using set radius.
6	Tiller • Set course and radius. • PORT and STBD lamps show when the tiller can set course. • INCREASE and DECREASE lamps show when the tiller can set radius or rudder angle limit.
7	EXECUTE button: Push to start course change.
8-10	SELECT buttons, arrow buttons: Select item to set (manual speed value, auto speed, rudder limit function, performance and conditions) with arrow buttons.
11	ALERT ACKN button: Lights when alert is generated; push to acknowledge alert.

Operating mode and rudder limit

Remote Control (TCS) Mode

The remote control mode corrects the bow direction and drift (difference due to wind, tidal current, etc.) to maintain the route set by ECDIS. Course line can be maintained by setting ship's width on the FAP-3000, which is useful in navigating narrow channels.

The user cannot set the "Radius" or the "Rudder Limit" in this mode. However, the rudder is controlled with the "Rudder Limit" value preset inside the FAP-3000. The preset "Rudder Limit" values are as shown in the table below. The standard specification (initial setting) is Rrudabs(=15). The rudder angle limit value is determined in inverse proportion to the vessel speed.

*Relative speed and corresponding rudder limit in the remote control mode [*u_norm (ex.:max. speed 20 knots)]*

Relative speed (kn)	Rudder limit (deg)
4	30
6	27
8	24.4
10	22
12	20
14	18.3
16	16.9
18	15.8
20	15

Course Control Mode

The course control mode automatically steers the vessel according to the course line set with COG (Course Over the Ground). Drift is calculated according to tidal current and wind to keep the ship on the course line.

The user can set the "Radius" and "Rudder Limit".

For rudder limit, the vessel is automatically steered according to the "Rudder Limit" set by the operator. Note that it is also possible to use the "Rudder Limit" value preset in the FAP-3000, even when "Rudder Limit/Auto by Speed" is selected from the menu. In this case, "By Speed" is shown in the Rudder Limit window. The preset "Rudder Limit" values are as shown in the table below. The standard specification (initial setting) is Grudabs(=10). The rudder angle limit value is determined in inverse proportion to the boat speed.

For radius, the user-set "Set Radius" works together with the "Rudder Limit" value preset inside the FAP-3000. The preset "Rudder Limit" values are as shown in the table below. The standard specification (initial setting) is Rrudabs(=15). The rudder angle limit value is determined in inverse proportion to the boat speed.

*Relative speed and corresponding rudder limit in the course control mode [*u_norm (ex.:max. speed 20 knots)]*

Grudabs(=10)		Rrudabs(=15)	
Relative speed (kn)	**Rudder limit (deg)**	**Relative speed (kn)**	**Rudder limit (deg)**
4	30	4	30
6	26	6	27
8	22.5	8	24.4
10	19.4	10	22
12	16.7	12	20
14	14.4	14	18.3
16	12.5	16	16.9
18	11	18	15.8
20	10	20	15

Heading Control Mode

This mode automatically maneuvers the vessel according to the set heading azimuth, and is influenced by the drift caused by tidal current and wind.

The user can set the radius and rudder limit.

For rudder limit, the vessel is automatically steered according to the "Rudder Limit" set by the operator. Note that it is also possible to use the "Rudder Limit" value preset in the FAP-3000, even when "Rudder Limit/Auto by Speed" is selected from the menu. In this case, "By Speed" is shown in the Rudder Limit window. The preset "Rudder Limit" values are as shown in the table below. The standard specification (initial setting) is Grudabs(=10). The rudder angle limit value is determined in inverse proportion to the boat speed.

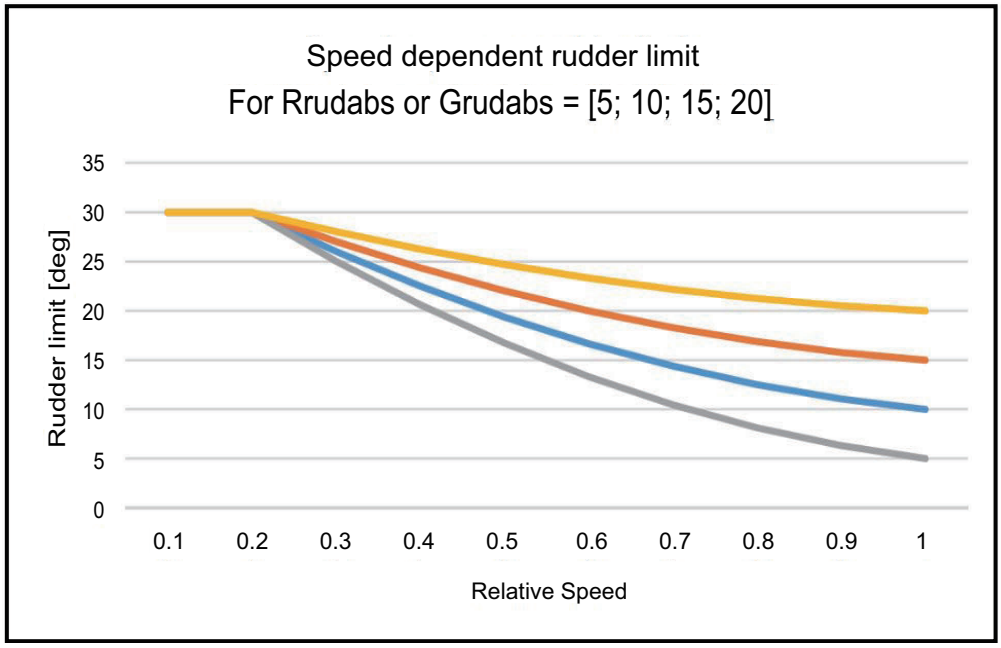
For radius, the user-set "Set Radius" works together with the "Rudder Limit" value preset inside the FAP-3000. The preset "Rudder Limit" values are as shown in the table below. The standard specification (initial setting) is Rrudabs(=15). The rudder angle limit value is determined in inverse proportion to the boat speed.

*Relative speed and corresponding rudder limit in the heading control mode [*u_norm (ex.:max. speed 20 kn)]*

Grudabs(=10)		Rrudabs(=15)	
Relative speed (kn)	**Rudder limit (deg)**	**Relative speed (kn)**	**Rudder limit (deg)**
4	30	4	30
6	26	6	27
8	22.5	8	24.4
10	19.4	10	22
12	16.7	12	20
14	14.4	14	18.3
16	12.5	16	16.9
18	11	18	15.8
20	10	20	15

Rrudabs, Grudabs setting values

"Rrudabs" or "Grudabs" can be selected from each setting value (=5/10/15/20). Relative curves of each set value are as shown below. **HOWEVER, THE VALUE CAN ONLY BE CHANGED BY THE SERVICE TECHNICIAN.**



Below are the base table values for "Rrudabs" and "Grudabs".

Rrudabs(=15) [u_norm (example: max. speed 20 knots)]*

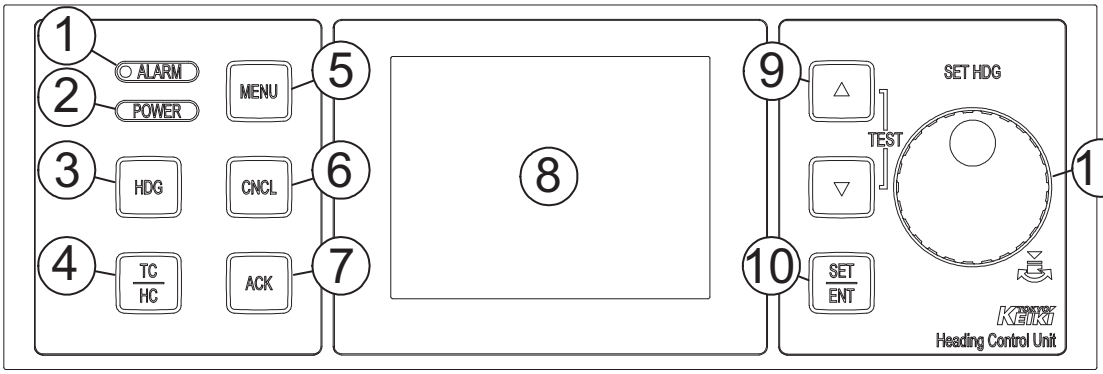
Relative speed (kn)	Rudder limit (deg)	Relative speed coefficient (ref.)
4	30	0.2
6	27	0.3
8	24.4	0.4
10	22	0.5
12	20	0.6
14	18.3	0.7
16	16.9	0.8
18	15.8	0.9
20	15	1.0

Grudabs (=10) [u_norm (example: max. speed 20 knots)]*

Relative speed (kn)	Rudder limit (deg)	Relative speed coefficient (ref.)
4	30	0.2
6	26	0.3
8	22.5	0.4
10	19.4	0.5
12	16.7	0.6
14	14.4	0.7
16	12.5	0.8
18	11	0.9
20	10	1.0

26.2.2 TOKYO KEIKI PR-9000

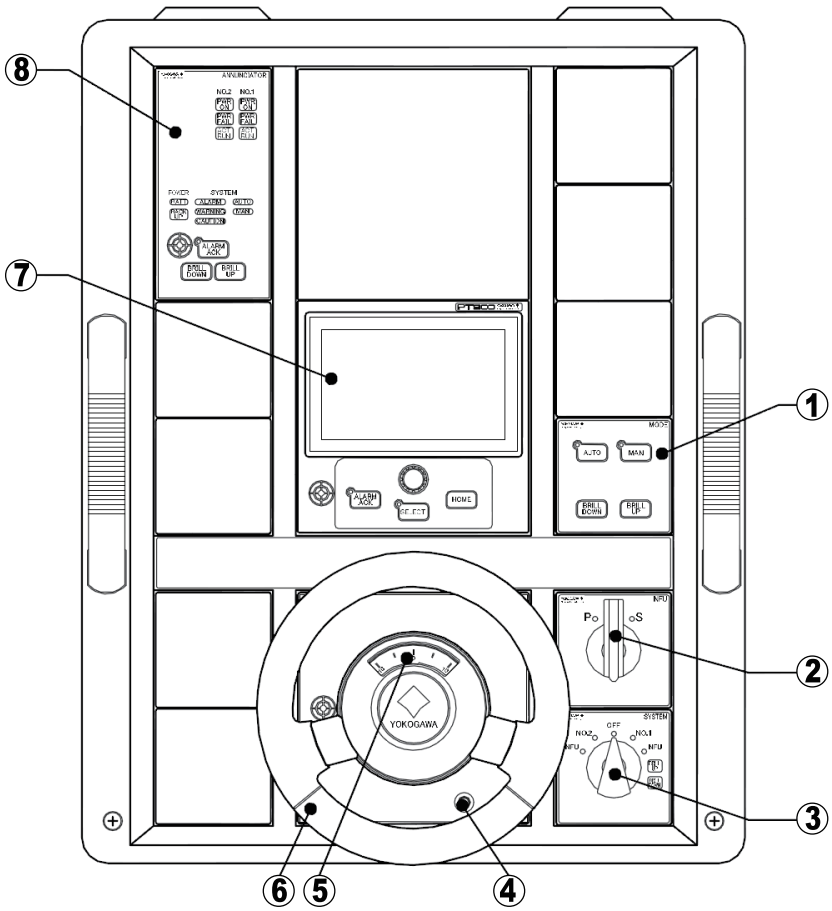
Heading Control Unit (HCU)



No.	Description
1	ALARM lamp: Flashes (red) or lights when the HCU receives an alarm.
2	POWER lamp: Lights (green) when the HCU starts.
3	HDG key: Select the heading sensor used for steering.
4	TC/HC key: Switch between the TC and HC modes, in automatic steering.
5	MENU key: Opens the menu.
6	CNCL (Cancel) key: Undo the last operation.
7	ACK key: Acknowledge alerts.
8	Display area: Displays system information.
9	Up, Down keys: • Adjust the screen brightness. • Select items on menus. • Change numeric values. • Press together to conduct the display test, which tests for proper display of colors.
10	SET/ENT key: Confirm selection or numeric value.
11	Heading knob: Change the setting in the HC mode. Also used a course memory setting (other than automatic steering).

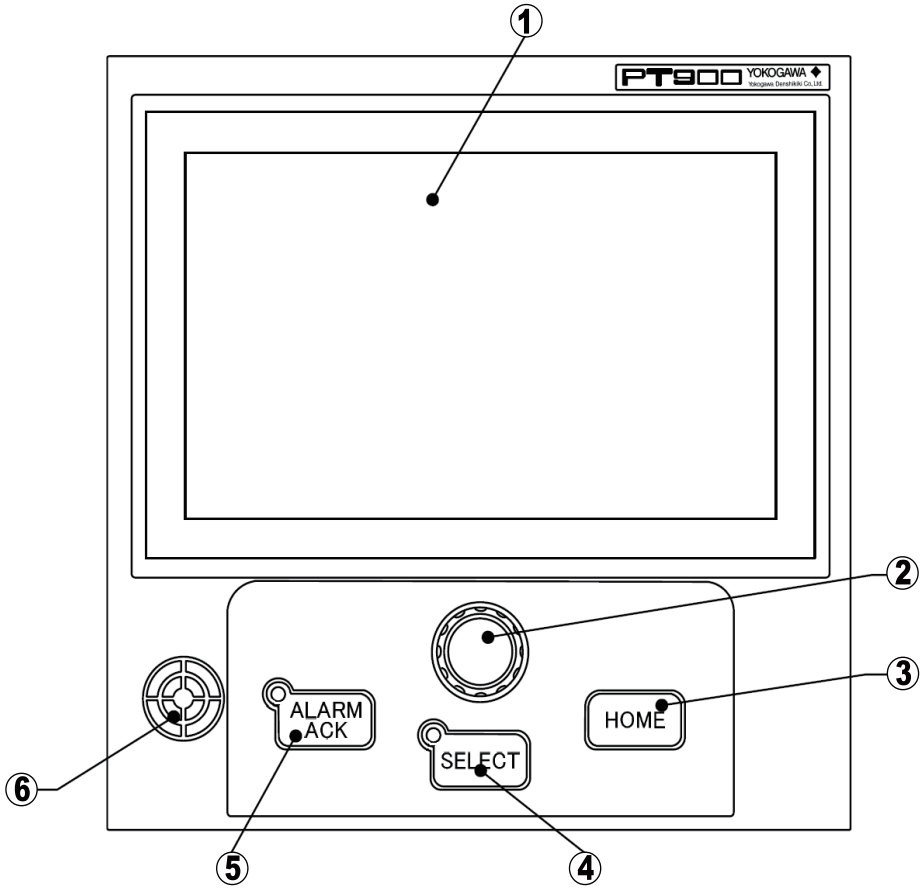
26.2.3 YDK Technologies PT-900

Upper Panel



No.	Control, item name	Description
1	Mode Selector	Select the mode, MAN(HAND) or AUTO. Select AUTO to start track control.
2	Non-Follow-Up Steering Lever	Steers the rudder in the direction selected, port or star-board.
3	System Selector Switch	Selects the system to use: OFF, FU-1 (No.1 operating system), FU-2 (No.2 operating system, NFU (Non-follow-up steering)
4	Dimmer	Adjusts the brightness of the steering angle indication.
5	Steering Angle Indicator	Shows steering angle.
6	Hand Steering Unit	Steers the vessel.
7	AP CDU (Control & Display Unit)	Provides controls for automatic steering functions. See the next page for description.
8	Annunciator Unit	Refer to the operator's manual of the autopilot

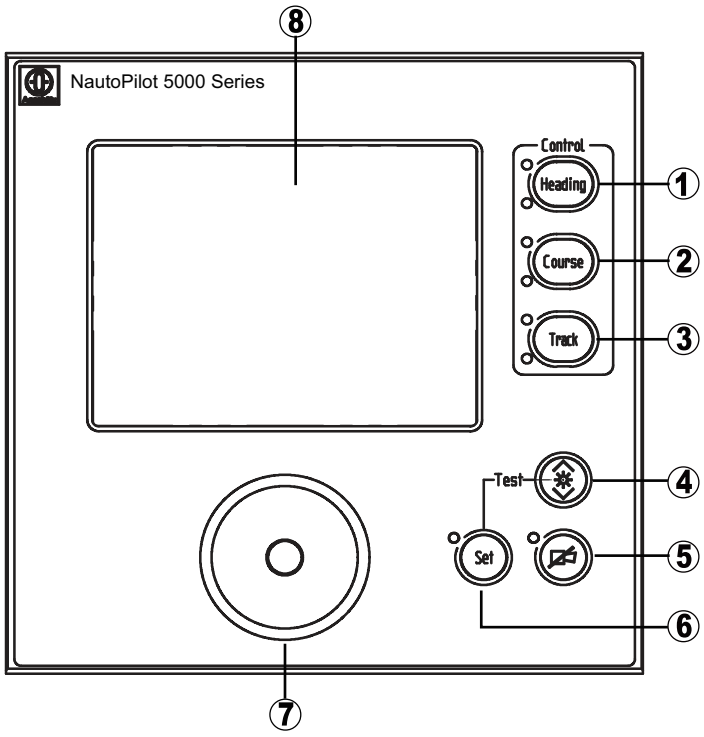
AP CDU



No.	Control, item name	Description
1	LCD & Touch Panel	Shows various autopilot data.
2	Course Setting Dial	Press and turn this control to set heading/course.
3	HOME key	Go to the home screen.
4	SELECT key	Selects, deselects this unit. The LED (green) lights when this unit is selected.
5	ALARM ACK key	Press the ALARM ACK key to acknowledge an alert and silence the buzzer. The LED blinks or lights (red) when there is an active alert.
6	Buzzer	The buzzer sounds for steering mode changeover and active alert.

26.2.4 Raytheon Anschutz NP-5400

The figure below shows functions of the controls of the operator unit.



No.	Control, item name	Description
1	Heading	Activates the heading control mode.
2	Course	Activates the course control mode.
3	Track	Activates the track control mode. (Available with connection to a track planning system.)
4	DIM	Adjusts brightness of illumination and display.
5	ACK	Acknowledges alarm or status messages. LED (red blinking) indicates the first occurrence of an alarm or status message (blinking) or that an acknowledged alarm or status message is still present (constant glow).
6	Set	• Sets changed parameters or adjusted values. The LED at the side of the button blinks after changing a parameter or value. Push the button to confirm change. • Press together with DIM to test equipment.
7	Rotary knob/button	Presets a heading and activates adjusted set heading value.
8	Touchscreen	For the display of data and operation of the Autopilot via the softkeys.

26.3 Steering Modes

26.3.1 EMRI FAP-3000

The FAP-3000 receives position, heading and speed data, compares them with the track section to be steered, and applies that information to calculate and command the necessary rudder angle.

Hand (manual) steering modes

The following hand steering modes are available without the autopilot: Steering wheel, Wing steering control, and Override tiller. While in a hand steering mode, the ECDIS indicates the rudder angle and the hand steering mode.

Autopilot steering modes

The autopilot steering modes are selected from the autopilot control panel.

Heading control mode
The autopilot steering modes are selected from the autopilot control panel. • Mode selection: CALL HEADING CTRL button • The CALL HEADING CTRL button lights. • Immediate course change when the tiller is used to set the heading. • Course change is defined as heading controlled by the set rudder angle limit.
Radius control mode
The Radius Control steering mode can be used always because it does not require position data. • Mode selection: RADIUS button • The lamp on the RADIUS button and CALL HEADING CTRL button lights. • Course change is radius controlled with the set radius. • If wind, current, etc. affect the ship, the ship will drift (inside or outside) from the planned turn. This is displayed on the radar screen.
Program heading change mode
The Program Heading Change steering mode can be used always because it does not require position data. • Mode selection: PPROGRAM NEXT button • The PROGRAM NEXT button lights. • The tiller is first used to set a new heading and radius, which are also displayed on the radar screen. • The EXECUTE button flashes if the newly set heading is different from the currently used heading. • Start course change by pushing the EXECUTE button. • After activation, control is returned to the RADIUS button. • If wind, current, etc. affect the ship, the ship will drift (inside or outside) from the planned turn. This is displayed on the radar screen.

26.3.2 YDK Technologies PT-900, Raytheon Anschutz NP-5400

Steering functions are available when the ECDIS system is connected to the Autopilot. To use a steering mode, set your Autopilot's system selection switch as shown below.
PT-900: FU-1, FU-2 (Follow Up) position
NP-5400: FU or NFU position (depending on system configuration)

Hand (manual) steering mode (Mode selector: HAND)

Set the Steering Mode Selector Switch to HAND. The ECDIS displays the rudder angle and indicates the steering mode in the [Route Information] box.

Autopilot steering mode (Mode selector: AUTO)

The operator sets the required heading of the ship with the Course Setting knob. Turns are controlled by the rudder limit or rate of turn and are started the operator.

Turn the Mode selection switch to the AUTO position, and the set course is shown in the SET. COURSE display. The initial value of the set course is the ship's heading at that time. To change the course, press the Course setting knob and release it when the required course appears. Now, the course deviation (CO.DEV: COURSE DEVIATION) is shown in the bar graph and AUTO is lit. AUTO goes off when the ship is following new course.

When the loading condition changes remarkably, yawing can large at the departure. Then, do auto course; change by 20° of port and starboard two or three times, and follow the state for approx. 15 minutes.

Turn controlled by the rudder angle: When a new course is set, turns are controlled by the rudder angle. You can set the required rudder angle limit with the Rudder limit knob.

Turn controlled by rate of turn: Press the AUTO unit <-SEL switch a number of times to light the data selection indicator R.O.T. and show the rate of turn (unit deg/min). Now, press the DATA CHANGE switch (located at the lower right) to show the turn rate order. The displayed value can be changed with - or + while pressing the DATA CHANGE switch. This value becomes the turn of rate order during automatic course change. The setting, however, cannot be changed during automatic course change.

26.3.3 TOKYO KEIKI PR-9000

The PR-9000 receives position, heading and speed data, compares them with the track section to be steered, and applies that information to calculate and command the necessary rudder angle.

Hand (manual) steering mode

Manual steering by UID (User Input Device). While in a hand steering mode, the ECDIS indicates the rudder angle and the hand steering mode.

Automatic steering modes (TC, HC)

The autopilot steering modes are selected from the HCU.

- **HC mode**: Automatic steering by heading control, heading set with the Heading knob.
- **TC mode**: Automatic steering by track control. Control the ship so that it follows a straight leg straightly or the curve in a curved leg.

26.3.4 YDK Technologies PT-900

- **Manual mode (Hand mode)**: Same as "H and (manual) steering mode" above.
- **Automatic steering mode (Auto mode)**: Same as "HC mode" above.
- **NAV steering mode (Auto mode)**: Same as "TC mode" above.

26.3.5 Raytheon Anschutz NP-5400

- **Hand mode**: Same as "Hand (manual) steering mode" above.
- **Automatic steering mode (Auto mode)**: Same as "HC mode" above.
- **Track control mode**: Same as "TC mode" above.

26.3.6 Summary of steering modes

Route steering modes (all autopilots)

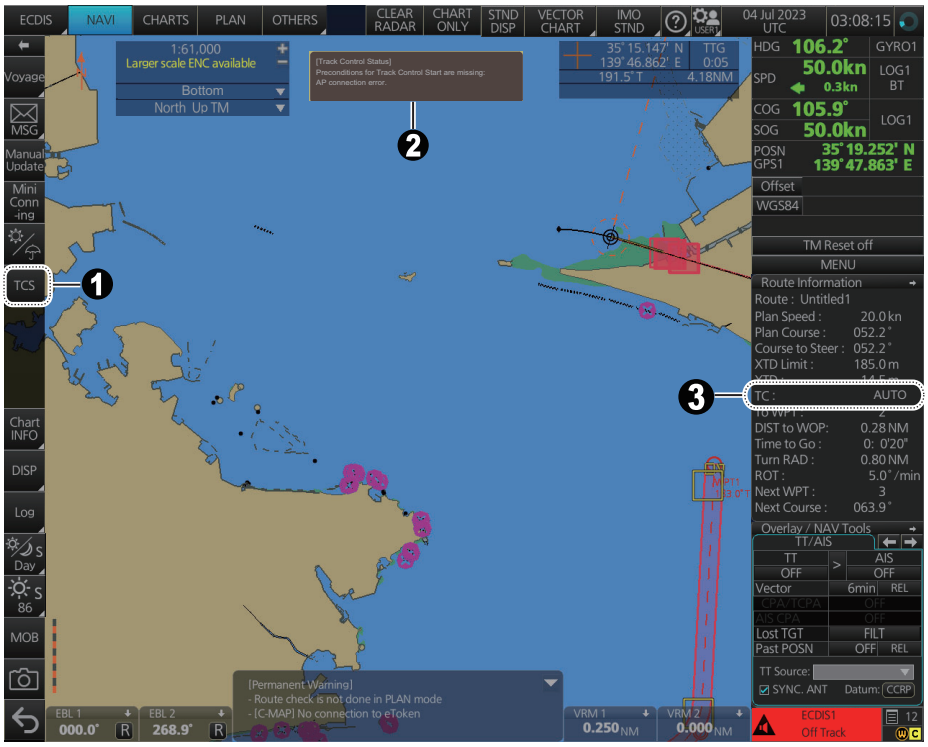
Item	Mode	
	GoSEA	GoAW
Set course	Automatic	Automatic
Set radius	Automatic	Automatic
Radius control	Yes	Yes
Design before execution	Yes	Yes
Wind, current, etc. compensation running straights between WPT	Low gain	High gain
Wind, current, etc. compensation in turns	Yes	Yes
Needs a gyrocompass	Yes	Yes
Needs a log	Yes	Yes
Precision of position-fixing equipment	Good(GPS)	High(GPS)
Needs direct SOG/COG sensor	No	No

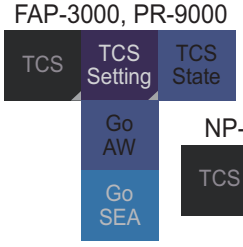
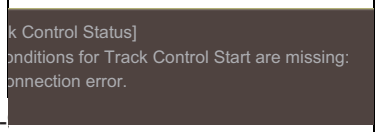
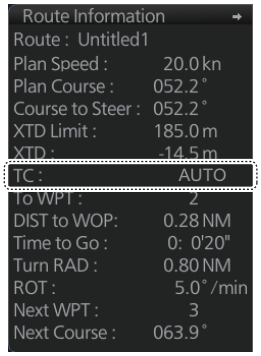
Summary of autopilot steering modes (FAP-3000)

Item	Heading Control	Radius Control	Program Heading Change	Program Track
Set heading	Yes	Yes	Yes	Yes
Set radius	No	Yes	Yes	Yes
Radius control	No	Yes	Yes	Yes
Design before execution	No	No	Yes	Yes
Wind, current, etc. compensation	No	No	No	Yes
Needs a gyrocompass	Yes	Yes	Yes	Yes
Needs a log	No	Yes	Yes	Yes
Needs precise position-fixing equipment	No	No	No	Yes
Needs direct SOG/COG sensor	No	No	No	Yes

26.4 Track Control Functions at the ECDIS

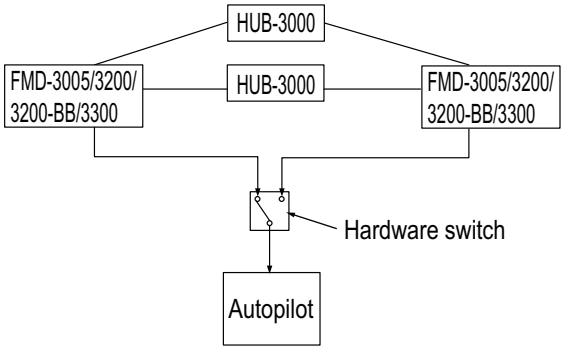
Track control functions are available in the Voyage navigation mode. Click the [NAVI] button to get into this mode.[Track Control Status]



(1) [**TCS**] button	(2) [**Track Control Status**] window	(3) [**Route Information**] box
FAP-3000, PR-9000  NP-5400, PT-  The buttons in the TCS button group do the following tasks. See section 26.6. [**TCS**]: Opens the TCS button group. [**TCS Setting**], [**OP**]: Selects a steering mode, [GoAW] or [GoSEA]. [**TCS State**]: Shows or hides the [Track Control Status] window. See "Messages" on page 26-20.	 The [Track Control Status] window displays a message when the route steering preconditions are not complete. See "Messages" on page 26-20.	 The route steering related indication(s) changes according to the autopilot connected. See section 26.7.1 for a description of the route steering related indications that appears in this box. The box shown above is applicable to autopilots PR-9000.

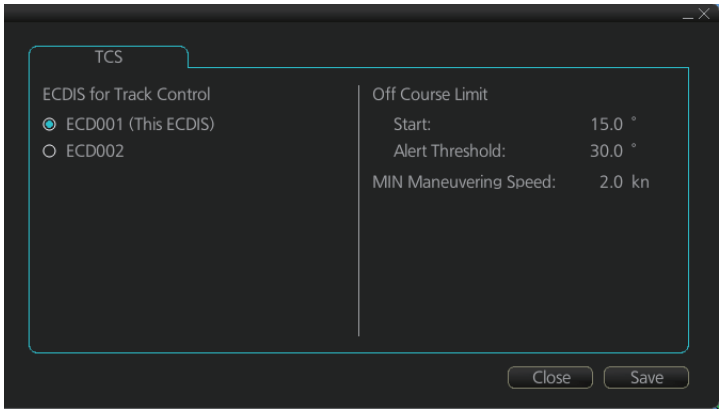
26.5 How to Select the ECDIS to Control the Autopilot

If the ship has more than one ECDIS, you can select the ECDIS to control the Autopilot. The ECDIS are connected to the Autopilot via a hardware switch to permit manual switching of the ECDIS.



For example, ECD0002 is currently the primary ECDIS and ECD003 is the secondary ECDIS. Then, to swap primary and secondary ECDIS units, do as follows.

1. **If the TCS is engaged to the ECDIS, stop the TCS**.
   CAUTION: DO NOT switch the ECDIS units while the TCS is engaged. Stop the TCS, then switch the units. Failure to disengage the TCS from the ECDIS can cause sudden and violent movement, creating a potentially dangerous situation.
2. Switch from ECD002 to ECD003 with the hardware switch.
3. Open the ECDIS menu.
4. From the [General] menu, open the [TCS] dialog box.



5. Click the radio button [ECD003].
6. Click the [Save] button to finish.

Then, the [TCS] button (InstantAccess bar™) at the ECDIS formerly selected as Primary becomes inoperative (greyed out) and the [TCS] button at the ECDIS now selected as Primary becomes operative.

Description of items in TCS dialog box

[Start]: The deviation threshold for the planned route and heading at the start of track control.
[Alert Threshold]: The deviation threshold for the planned route and heading in route monitoring and track control.
[Min Maneuvering Speed]: The minimum allowable maneuvering speed in track control. A speed lower than this triggers the low speed alarm.

26.6 How to Activate, Deactivate the Track Control System (TCS) from the ECDIS

26.6.1 How to activate the TCS

The TCS cannot be activated if the route steering preconditions have not been met. A related alert and status message appear on the ECDIS.
See section 26.7.2 for the status messages.

FAP-3000, PR-9000

1. Click the [TCS] button on the InstantAccess bar™ to show the TCS button group.



2. Click the [TCS Setting] button, then click [Go AW] or [Go SEA] to activate the route steering.
3. Do one of the following at the autopilot:
   FAP-3000: Push the CALL REMOTE button.
   PR-9000: Operate the TC/HC button.

NP-5400, PT-900

1. Create a route on the ECDIS.
2. Start route monitoring from the ECDIS.
3. On the autopilot, set the operation mode to AUTO.
4. On the InstantAccess bar™ of the ECDIS, click the [TCS] button, then click [OP], [GoAW] or [GoSEA].

26.6.2 How to deactivate the TCS

Models other than NP-5400, PT-900

Change the steering mode at the autopilot to hand to automatic.

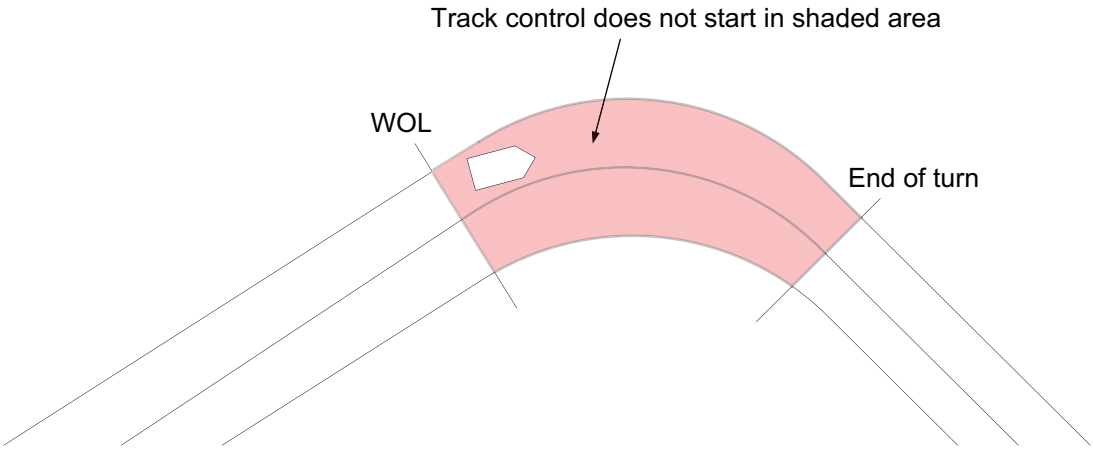
NP-5400, PT-900

Method 1: Change the steering mode at the autopilot to hand or automatic.
Method 2: On the InstantAccess bar™ of the ECDIS, click the [TCS] button, then click [Stop].

26.6.3 Track control limitations in Raytheon Anschutz NP-5400, Tokyo Keiki PR-9000, and the FMD

Limitations at the NP-5400, PR-9000

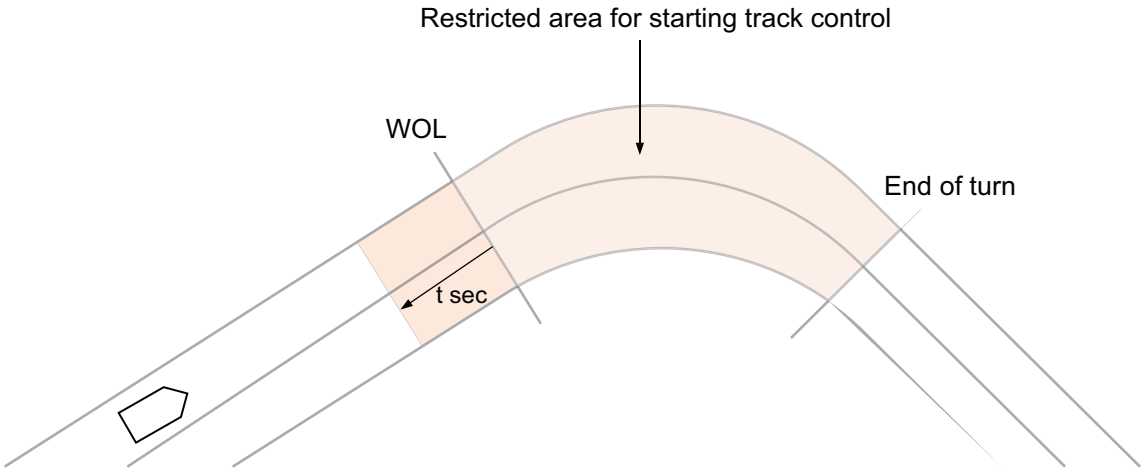
Track control does not start within the area between the WOL and end of turn.



Limitations at the FMD

Track control does not start between 0 to 180 seconds before the WOL position and the end of turn. Use manual or automatic steering to complete the turn, then use track control or the instant track feature to steer the vessel.

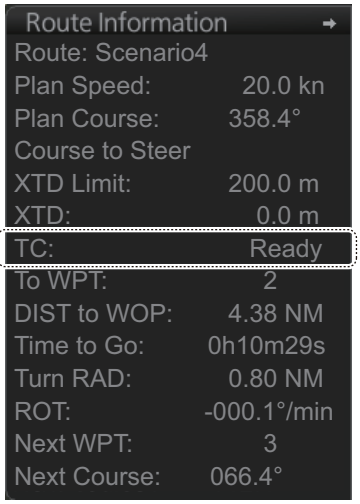
t sec range: -180 sec ≤ t ≤ 0 sec



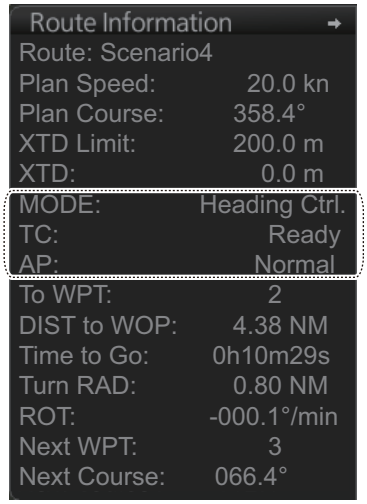
26.7 Route Steering Related Indications, Alerts and Messages Generated by ECDIS

26.7.1 Route steering related information in Route Information box

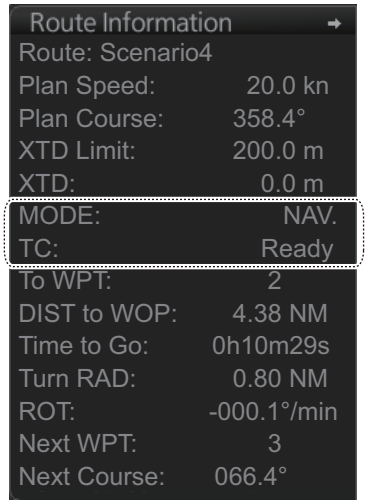
The route steering indications shown depends on the autopilot connected. See the figure and table below for the route steering indications.



Autopilot PR-9000
Route information box



Autopilot FAP-3000
Route information box



Autopilot NP-5400, PT-900
Route information box

Indication	Meaning	Comments
AP status indications (FAP-3000)		
[Failure]	FAP-3000 error (sensor data error, etc.).	
[Normal]	FAP-3000 working normally.	
MODE status indications (FAP-3000, NP-5400, PT-900)		
[Autopilot Off]	Autopilot function is off. Manual steering.	FAP-3000
[Course]	Course mode engaged.	NP-5400
[Course Ctrl]	Course Control engaged.	FAP-3000
[Heading]	Heading control engaged.	NP-5400
[Heading Ctrl].	Heading control engaged.	FAP-3000
[Program Track]	Program track engaged.	FAP-3000
[Track]	Track control engaged.	FAP-3000, NP-5400
[AUTO]	Automatic steering engaged.	PT-900
[HAND]	Manual steering engaged.	PT-900
[TRACK]	Track control engaged.	PT-900
TC status indications		
[GoAW]	GoAW mode activated.	
[GoAW Appr. Enabled]	Shown between the time of the WPT prewarning notice and its acknowledgment.	
[GoAW GC]	Great circle navigation in the GoAW mode.	
[GoAW Turn]	Turning in the GoAW mode.	
[GoAW Turn Enabled]	Shown between the time of the prewarning acknowledgment and the beginning of the turn.	
[GoSEA]	The GoSEA mode activated.	
[GoSEA Appr. Enabled]	Shown between the time of the WPT prewarning notice and its acknowledgment.	

Indication	Meaning	Comments
[GoSEA GC]	Great circle navigation in the GoSEA mode.	
[GoSEA Turn]	Turning in the GoSEA mode.	
[GoSEA Turn Enabled]	Shown between the time of the prewarning acknowledgment and the beginning of the turn.	
[NAV]	Mode is different from GoAW or GoSEA.	
[Not Ready]	TCS not ready; route monitoring not activated.	
[Ready]	Autopilot ready, route monitoring initiated. TCS engaged.	
[TC] is red	FMD error found.	The TCS cannot be started.
[TC] is yellow	Service state or FMD status is NA.	

26.7.2 Alerts and messages when precondition for route steering are not complete

When you select the GoAW mode and change the steering mode to NAVI[*1] at the Autopilot to activate the route steering, but route steering preconditions are not complete, an alert and a message are given.



Alert source and alert name

Alerts

Route steering precondition related alerts appear in the Alert box, which is at the bottom-right position on the screen. The alert flashes if it is an alarm or warning category.

The Alert "CRS Difference" informs you that there is a difference between the current heading of your ship and the required heading. The alert threshold is set during the installation.

The Alert "Off Track" appears if the ship is outside the channel limits of the route.

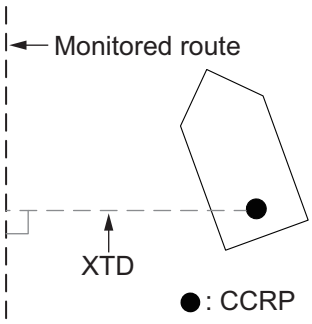
The Alert "AP Mode Conflict" informs you that neither the ECDIS nor the Autopilot can start the route steering mode. First change the steering mode from NAVI[*1] to AUTO[*2], then check that the preconditions for the route steering are complete.

The Alert "TCS Stopped" informs you that the 60-second timeout has passed before you changed the mode to NAVI*1. After you select the GoSEA or GoAW at the ECDIS, you have 60 seconds to change the mode to NAVI, otherwise this alert appears.

[*1] REMOTE CONTROL on FAP-3000, TC on PR-9000
*2 HEADING CONTROL on FAP-3000, HC on PR-9000

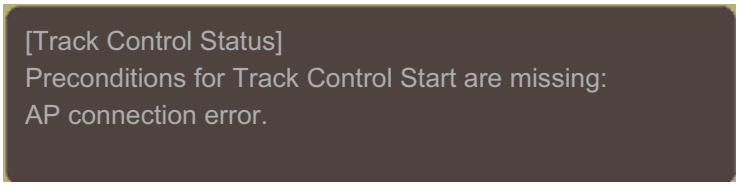
Note 1: For information about autopilot-generated alerts and autopilot failsafe, see the autopilot's operator's manual.

Note 2: XTD is the distance, in a straight line, from the monitored route to the CCRP. CCRP is set at installation. Where more than one CCRP is set, select the CCRP to use from the [CCRP] page of the [Settings] menu (see section 23.13).

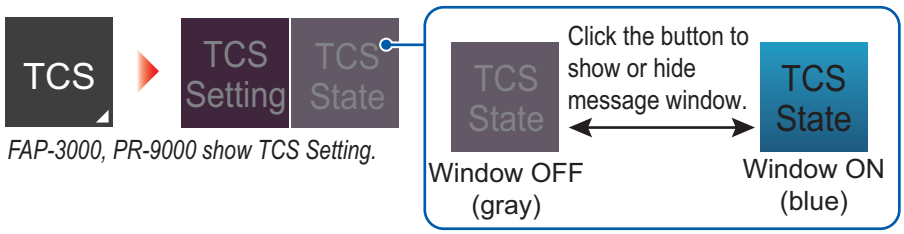


Messages

The message in the [Track Control Status] window (at the top of the display) states the reason why the preconditions for the start of track control are not complete.



This window can be shown or hidden with the [TCS State] button.



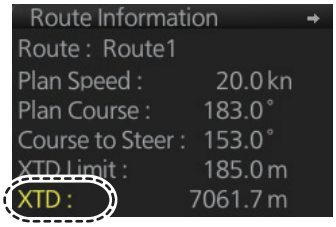
Messages in the Track Control Status window

Message	Reason	Action
"AP connection error"	Problem with connections at the Autopilot.	Check the Autopilot.
"AP heading error"	No HDG at Autopilot.	Check connections, heading source.
"AP not ready"	AP is in the NFU mode.	Select NAVI (REMOTE CONTROL on FAP-3000) mode.
"Off course"	Ship is off course.	Correct your course.
"Invalid HDG"	No HDG at ECDIS.	Check connections, heading source.
"Speed too low"	Current speed is lower than that set as the maneuvering speed.	Raise speed to match maneuvering speed set.
"Not using filter"	The filter is not being used.	
"Out of channel"	You tried to activate the route steering outside the channel limits.	Steer the ship inside the channel, then try to activate the route steering again.
"Unreliable POSN"	Position data is not reliable.	Check navigator.

26.7.3 Other route steering indications and alerts

Route steering indications in the Route Information box

Permanent alerts appear in the [Route Information] box in red in any the steering mode. In the example below the [XTD] value is shown in yellow when the vessel is outside the channel.



Route steering alerts

Alert "TCS Stopped" appears when the heading signal is lost.

Alert "Heading Failure" appears when there is no gyro data or the conditions of this alert have been valid for the last minute.

Alert "Speed Failure" appears when there is no speed data (both VBW and VTG).

Alert "Position Failure" appears when there is no position data.

Alert "CRS Difference" appears when there is a large difference between the planned course and the current course.

Alert "Off Track" appears when your vessel is off track.

Alert "End Of Track" appears when your vessel is near the last WPT in the route monitored.

Alert "AP Receive Error" appears when the ECDIS cannot communicate with the Autopilot. Change the steering mode to AUTO (HEADING CONTROL on FAP-3000, HC on PR-9000).

Alert "Use MAN Steering" is instruction for the user to change the steering mode to AUTO (HEADING CONTROL on FAP-3000, HC on PR-9000) or HAND. This alert is generated if there is not enough conditions to continue the TCS.

Alert "SPD Recovered" informs that the speed log or VTG input has been restored after its loss.

26.8 Alerts Given When Approaching a Waypoint

26.8.1 Track Control System (TCS) testing standard and Autopilot

There are two TCS testing standards, IEC 62065 Ed. 1.0 and IEC 62065 Ed. 2.0. The Autopilots that can be connected to this ECDIS conform to the following TCS standards:
IEC 62065 Ed. 2.0: FAP-3000, PR-9000, PT-900, NP-5400

26.8.2 Timing of alerts for change of course and alert generation order

(1) Timing for alert when course change command occurs

The timing at which the course change instruction alert is generated is as follows.

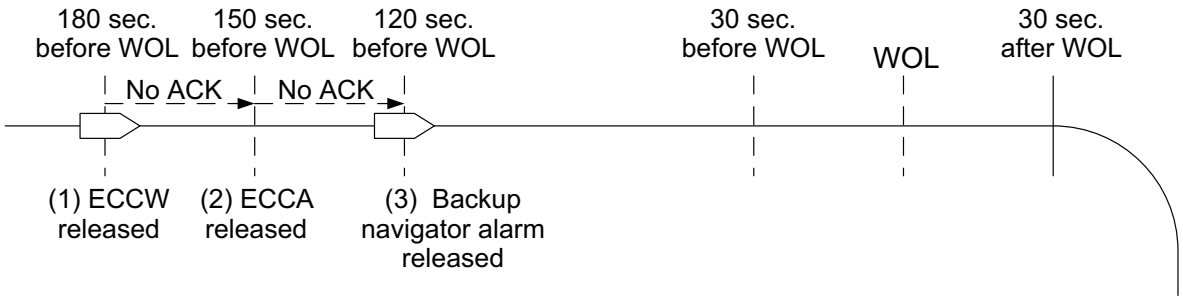
Alert	Timing for course change command generation	
	IEC 62065 reg.	FMD-3005/ 3200/3200-BB/ 3300
"WOL Approach XX" (XX=waypoint no.)	3 - 6 min. before WOL	180 sec. before WOL
"WOL XX" (XX=waypoint no.)	30 sec. before WOL	30 sec. before WOL

(2) Alert sequence

This section provides examples of how the FMD-3005/3200/3200-BB/3300 responds to unacknowledged alerts when approaching a waypoint.

Condition 1: No acknowledgments to alerts

1. The vessel's position is 180 seconds from the WOL.
   The FMD-3005/3200/3200-BB/3300 releases the "Early Course Change Warning" (ECCW), which is the Alert "WOL Approach XX" (XX=Waypoint no.).
2. The ECCW is not acknowledged.
3. 30 seconds later, the Warning is upgraded to Alarm, and the FMD-3005/3200/ 3200-BB/3300 releases the "Early Course Change Alarm" (ECCA), which is the Alert "WOL XX" (XX=Waypoint no.).
4. The ECCA is not acknowledged.
5. 30 seconds later, the FMD-3005/3200/3200-BB/3300 outputs the Backup Navigator Alarm to the BNWAS. The alarm is comprised of a contact signal (N/O or N/C) and the ALR sentence.
   $TCALR,,260,A,V,Emergency Call*0C<CR><LF>
6. The ECCA is acknowledged.
7. The FMD-3005/3200/3200-BB/3300 stops the Backup Navigator Alarm, resets the contact signal and outputs the ALR sentence to the BNWAS.
   $TCALR,,260,A,A,Emergency Call*1B<CR><LF>



Condition 2: The alert WOL Approach XX (XX=waypoint no.) is acknowledged, but the alert WOL XX (XX=waypoint no.) is not acknowledged,

1. The vessel's position is 180 seconds from the WOL.
   The FMD-3005/3200/3200-BB/3300 releases the "Early Course Change Warning" (ECCW), which is the "WOL Approach XX".
2. The ECCW is acknowledged.
3. The vessel's position is 30 seconds from the WOL.
   The FMD-3005/3200/3200-BB/3300 releases the "Actual Course Change Warning" (ACCW), which is the Alert "WOL XX".
4. The ACCW is not acknowledged.
5. 30 seconds after the vessel passes the WOL, the Warning is upgraded to Alarm and the FMD-3005/3200/3200-BB/3300 releases the "Actual Course Change Alarm" (ACCA), which is the Alert "Wheel Over Line".
6. The ACCA is not acknowledged.
7. 30 seconds later, the FMD-3005/3200/3200-BB/3300 outputs the Backup Navigator Alarm to the BNWAS. The output is comprised of a contact signal (N/O or N/C) and the ALR sentence.
   $TCALR,,260,A,V,Emergency Call*0C<CR><LF>
8. The ACCA is acknowledged.
9. The FMD-3005/3200/3200-BB/3300 stops the Backup Navigator Alarm, resets the contact signal and outputs the ALR sentence to the BNWAS.
   $TCALR,,260,A,A,Emergency Call*1B<CR><LF>

Note: The Backup Navigator Alarm is automatically stopped if the TCS is stopped before the Backup Navigator Alarm is acknowledged.

26.8.3 About the Backup Navigator Alarm

Autopilots other than Raytheon Anschutz NP-5400

The Backup Navigator Alarm alerts the bridge to an unacknowledged alarm by transferring the alarm within the TCS to the BNWAS.

For unacknowledged alarms that require output of the Backup Navigator Alarm, the TCS sends the Backup Navigator Alarm to the BNWAS. (Power failure of the TCS does not cause output of the Backup Navigator Alarm.)

The Backup Navigator Alarm is released in the following conditions in IEC 62605 Ed. 2 complying autopilots:

- If, within 30 seconds of the alarm's release, the alarm has not been acknowledged, has not been temporarily silenced and the alarm condition has not been rectified.
- If, within 30 seconds of the alarm's release, the alarm has not been acknowledged, has not been rectified but has been temporarily silenced, then the following applies. When the silencing has expired, the Backup Navigator Alarm acts as if the alarm condition has just occurred. Any further silencing does not result in further delay of the Backup Navigator Alarm. The silencing mentioned here is the temporary silence, reactivating the aural announcement, after 30 seconds.

After all the alarms associated with Backup Navigator Alarm activation have been acknowledged or rectified, the Backup Navigator Alarm is deactivated. Acknowledgment can occur locally, remotely, or by deactivating track control.

Raytheon Anschutz NP-5400

When a TCS-related alarm (early course change, actual course change, track control stop) is not acknowledged within a certain period, the transfer signal known as the Backup Navigator Alarm is sent to the BNWAS.

The TCS-related operations of autopilots of other manufacturers are handled at the FMD equipment. However, the NP-5400 outputs the Backup Navigator Alarm for some alarms.

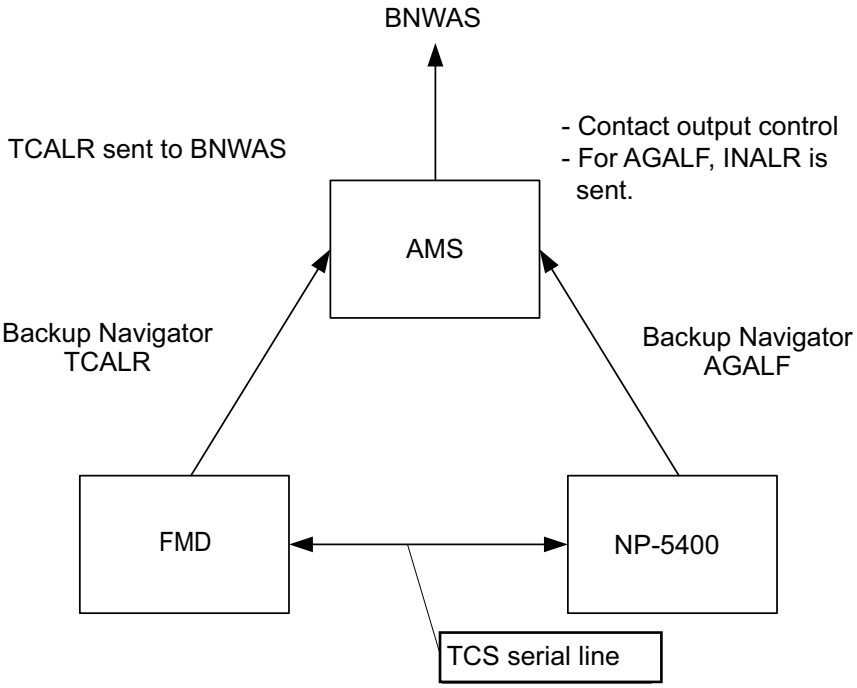
The Backup Navigator Alarm output from the NP-5400 is not the following sentence defined by the TCS standard.
$TCALR,,260,A,V,Emergency Call*0C<CR><LF>

The Backup Navigator Alarm is comprised of the ALF sentence plus a unique ID.

Because the NP-5400 does not use the signal defined in BNWAS, there is a possibility that the signal can not be received by a "standard" BNWAS. In this case it is necessary to transfer the Backup Navigator Alarm via an AMS.

From the above, the AMS receives the ALF sentence from the NP-5400, converts the ALF sentence to $INALR and, then outputs it to the BNWAS.

The TCALR output by ECDIS is output to the BNWAS via the AMS. (Sentence conforming to the standard.)

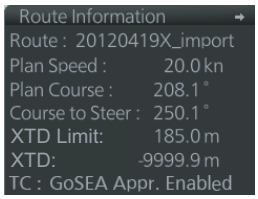


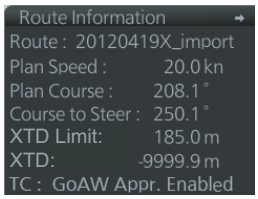
Notes

- The NP-5400 outputs the Backup Navigator Alarm signal as a contact signal or serial signal.
- If the BNWAS has a surplus of contact and serial ports, connection can be made at both the FMD and AMS. However, since most BNWAS do not have so many ports (for example, the FURUNO BR-500), the AMS temporarily receives the Backup Navigator Alarm from both the FMD and NP-5400 and, then sends them to the BNWAS.

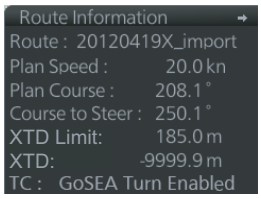
26.8.4 Waypoint-related indications in the Route Information box

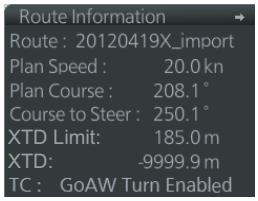
The text "GoSEA Appr. Enabled" or "GoAW Appr. Enabled" appears in the [Route Information] box until you acknowledge the Alert "WOL Approach XX" (XX=waypoint no.).



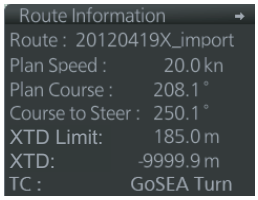


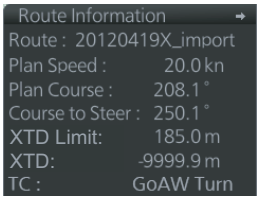
When you acknowledge the waypoint approach alert, the text "GoSEA Turn Enabled" or "GoAW Turn Enabled" appears in the [Route Information] box.





During a turn, the text "GoSEA Turn" or "GoAW Turn" appears in the [Route Information] box.





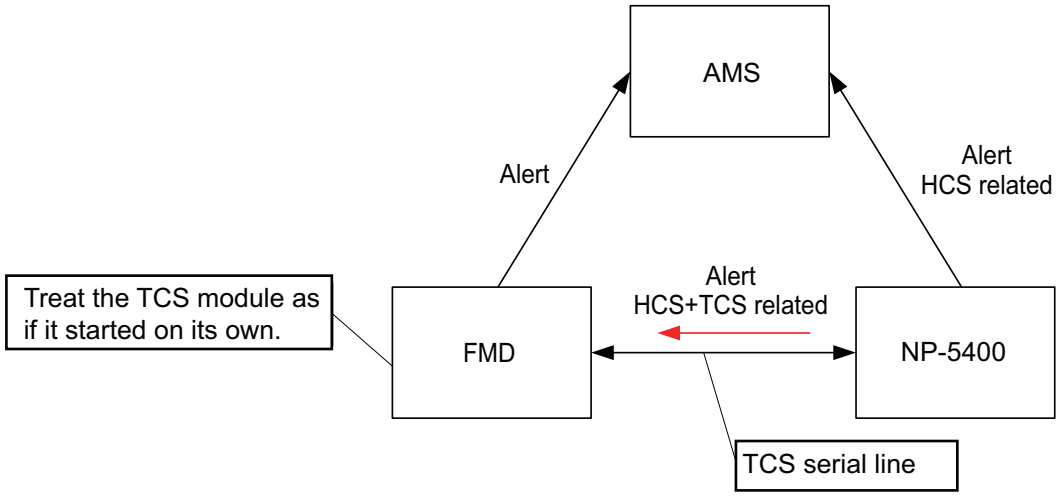
Note: When you approach the last waypoint, the Alert "End Of Track" appears. If you acknowledge this alert when the Autopilot is in the NAVI* mode, the route steering is automatically stopped and the system shows Alert "AP Mode Conflict". Route steering is deactivated until the NAVI* mode is selected again at the Autopilot. To return to the route steering, the ship's heading must be set toward the next waypoint and the ship must be inside the channel limits. Otherwise, an alert is given. *REMOTE CONTROL on FAP-3000, TC on PR-9000.

26.9 TCS-related Alerts from the Raytheon Anschutz NP-5400

The NP-5400 handles the following TCS-related alerts:

- Track control stop
- Course difference
- Low speed

When any of the above alerts occur, the NP-5400 displays the name of the offending alert, sounds the buzzer and informs the FMD of the alert, via the TCS serial line. The FMD receives the alert, generates its own alert, then outputs the alert to the Alert module. When the GUI or AMS acknowledges the alert, the FMD outputs the ACN sentence to the NP-5400 to complete the alert notification process.



Alert flow between NP-5400 and FMD

26.10 Route Steering Operations

26.10.1 How to stop or change a pre-enabled turn in route steering

There are two conditions where an automatic turn in a route must be stopped or changed:

- The turn cannot be done to the last value.
- The turn is outside of the planned turn (too fast or too slow).

How to stop a turn

FAP-3000: Change the steering mode from REMOTE CONTROL to HAND.
PR-9000: Change the steering mode from TC to HAND.
NP-5400, PT-900: Do one of the following:
Autopilot: Select automatic or manual steering mode.
FMD: On the InstantAccess bar™, click the [TCS] button followed by [Stop].

How to change a turn

What to do	How to execute the turn
Use different final value of set course	The problem is that radius control is only available in the NAVI[*1] steering mode. When you change the steering mode to a mode different from NAVI[*1], the ship stops following the radius. Below is what you can do: • Change the steering mode from NAVI[*1] to AUTO[*2]. This stops the turn completely and the current gyro heading is selected as the new set course for the Autopilot. Then, set a new final value for the set course and select an acceptable max. rudder angle to prevent too fast turning. • Turn the steering wheel to an acceptable angle to continue with a new radius (i.e. to equal previous rudder angle). Then, change the steering mode from NAVI[*1] to AUTO[*2]. Continue manual steering. • Change the steering mode from NAVI[*1] to NFU, then use the NFU steering lever. Manually steer the ship.
Compensate too fast turning	As soon as you change the steering mode to something other than NAVI[*1] the ship stops following the radius. Below is what you can do: • Change the steering mode from NAVI[*1] to AUTO[*2]. This stops the turn completely and the current gyro heading is selected as the new set course for the Autopilot. Then set a final value for the set course and select a suitable max. rudder angle to prevent too fast turning. • Set the steering wheel to a suitable angle to continue with a larger radius (i.e. smaller than previous rudder angle). Then change the steering mode from NAVI[*1] to HAND. Manually steer the ship. • Change the steering mode from NAVI[*1] to NFU. Manually steer the ship.
Compensate too slow turning	As soon as you change the steering mode to something other than NAVI[*1], the ship stops following the radius. Below is what you can do: • Set the steering wheel to a suitable angle to continue with a smaller radius (i.e. higher rudder angle than before). Then change the steering mode from NAVI[*1] to HAND. Continue manual steering. • Change the steering mode from NAVI[*1] to NFU. Manually steer the ship.

[*1] REMOTE CONTROL on FAP-3000, TC on PR-9000

[*2] HEADING CONTROL on FAP-3000, HC or PR-9000

26.10.2 Collision avoidance maneuver in route steering

Route steering is often interrupted by a collision avoidance maneuver, but there are also several other reasons to interrupt route steering. There are several possibilities to set the collision avoidance or any other maneuver:

- Use the Non-Follow-Up steering lever to directly control rudder pumps.
- Use the Override steering.
- Use the Follow-Up rudder control. (Change mode from NAVI[*1] to HAND.)
- Use the local Autopilot Heading control. (Change mode from NAVI[*1] to AUTO[*2])

[*1] REMOTE CONTROL on FAP-3000, TC on PR-9000

[*2] HEADING CONTROL on FAP-3000, HC on PR-9000

26.11 Steering Performance

The table below shows how environmental conditions affect steering performance.

26.11.1 Expected steering performance for going ahead

Environmental conditions	Heading control= AUTO	Mode	
		GoSea (FAP-3000) GoSea+TC (PR-9000) GoSea+NAV (NP-5400, PT-900)	GoAW (FAP-3000) GoAW+TC (PR-9000) GoAW+NAV (NP-5400, PT-900)
Calm sea, no wind, no current	COG is approx. the same as Set Course in Autopilot.	Ship follows monitored route.	Ship follows monitored route accurately.
Moderate wind and/or current	Ship has a tendency to drift.	Ship follows monitored route.	Ship follows monitored route accurately.
High wind and/or current	Ship is drifting.	1) Ship follows monitored route but may go outside channel limit area.* 2) Ship may have a problem following monitored route inside the channel limit, however.	1) Ship follows monitored route.* 2) Ship can have a problem following monitored route inside the channel limit.
Wind and/or current changes slowly.	There is no compensation for change.	Ship follows monitored route.	Ship follows monitored route accurately.
Sudden change of wind and/or current (For example sudden change from no current to 5 kn current perpendicular to track)	There is no compensation for change.	1) Ship may go outside channel limit but is "returned" to center of channel.* 2) Ship can have a problem following monitored route inside the channel limit.	1) Ship is kept within channel limit.* 2) Ship can have a problem following monitored route inside the channel limit.
Fast change of speed (ex: speed decreased from 20 to 7 kn)	There is no compensation for change.	Ship follows monitored route, but may need full channel limit area.	Ship follows monitored route, but may need full channel limit area.

*: The Track Control System can compensate drift up to 45 degrees. If the drift is larger, your ship may go outside the channel limit.

26.11.2 Expected steering performance for turns

Environmental conditions	Heading control= AUTO	Mode	
		GoSea (FAP-3000) GoSea+TC (PR-9000) GoSea+NAV (NP-5400, PT-900)	GoAW (FAP-3000) GoAW+TC (PR-9000) GoAW+NAV (NP-5400, PT-900)
Calm sea, no wind, no current	Ship does normal Autopilot turn under this condition.	Ship follows monitored route.	Ship follows monitored route accurately.
Moderate wind and/or current	Ship does normal Autopilot turn under this condition.	Ship follows monitored route.	Ship follows monitored route accurately.
High wind and/or current	Ship does normal Autopilot turn under this condition.	1) Ship follows monitored route, but may go outside channel limit area.* 2) Ship can have a problem following monitored route inside the channel limit.	1) Ship follows monitored route.* 2) Ship can have a problem following monitored route inside the channel limit.
Wind and/or current changes slowly.	Ship does normal Autopilot turn under this condition.	Ship follows monitored route.	Ship follows monitored route accurately.
Sudden change of wind and/or current (For example sudden change from no current to 5 kn current perpendicular to track)	Ship does normal Autopilot turn under this condition.	1) Ship may go outside channel limit but is "returned" to center of channel.* 2) Ship can have a problem following monitored route inside the channel limit.	1) Ship is kept within channel limit.* 2) Ship can have a problem following monitored route inside the channel limit.
Slow change of speed	Ship does normal Autopilot turn under this condition.	Ship follows monitored route, but may need full channel limit area.	Ship follows monitored route.
Fast change of speed (For example, speed decreased from 20 to 7 kn)	Ship does normal Autopilot turn under this condition.	Ship follows monitored route, but may need full channel limit area.	Ship follows monitored route, but may need full channel limit area.

*: The Track Control System can compensate drift up to 45 degrees. If the drift is larger, your ship may go outside the channel limit.

26.11.3 Expected steering performance under critical failure

Below is a summary of the system behavior in different failures in the GoSEA or GoAW steering mode.

Lost heading to Autopilot

	Related alerts	Expected system performance	Operator action
Immediately	• These alerts and warnings may be generated at the ECDIS: 1) Alert "Lost Heading SIG". 2) Alert "No SOG for FILT". 3) Alert "No HDG for FILT". • The lamp[*1] on the Autopilot's Steering Control Unit (or Control Panel) lights.		• Acknowledge alerts. • Monitor situation.
Within a few seconds	• Alert "TCS Stopped". *Transferred to BNWAS if not acknowledged within 30 seconds. • Alert "Heading Failure". • Alert "AP Mode Conflict".	TCS stops and • If the ship is running straight, the rudder order is frozen at the last value to approximately continue ahead. • If the ship is turning, the rudder order is frozen at the last value to approximately continue the rate of turn.	• Acknowledge alerts. • Monitor situation.

[*1]: FAP-3000, PR-9000: ALARM

Lost speed (PR-9000)

	Associated alerts	Expected system performance	Operator action
	• Speed log data, VTG sentence lost. Alerts "No SOG for FILT", and "No STW for FILT" **are given**.		• Acknowledge alerts. • Monitor situation.
Within 30 seconds	• Alert "Speed Failure".		• Acknowledge alerts. • Monitor situation.
Within 10 minutes	• Alert "AP Mode Conflict", is generated at the ECDIS. The ALARM lamp on the Autopilot's Steering Control Unit (or Control Panel) lights. • When the speed log or VTG data is restored, the Alert "SPD Recovered" appears.	TCS stops and • If the ship is running straight, actual heading is used as set course. • If the ship is turning, last-set course and radius are used to complete the turn.	• Acknowledge alerts. • Monitor situation. • Change the steering mode to AUTO.

Low speed

	Associated alerts	Expected system performance	Operator action
	• Alert "Speed Too Low" appears.		• Acknowledge alerts. • Monitor situation.

Lost communication between Autopilot and ECDIS and vice versa

	Associated alerts	Expected system performance	Operator action
Within 15 seconds	• Alert "AP Receive Error" is generated at the ECDIS.	Guidance for the navigator	• Acknowledge alerts. • Monitor situation.
After Alert "AP Receive Error"	• Alert "TCS Stopped" is generated at the ECDIS. Track control is stopped and the lamp[*1] on the Autopilot's Steering Control Unit lights. *Transferred to BNWAS if not acknowledged within 30 seconds.	TCS stops and • If the ship is running straight, actual heading is used as set course. • If the ship is turning, last set course and radius are used to complete the turn.	• Acknowledge alerts. • Monitor situation. • Change the steering mode to AUTO.

[*1]: FAP-3000, PR-9000: ALARM

Position discrepancy (position from only one GPS navigator is reliable)

	Associated alerts	Expected system performance	Operator action
Pre-condition	• If sensors in Filter calculation are NOT inside operator selected position discrepancy limit, Alert "GPSx* Banned" appears.[*1] *x=sensor no.		• Monitor situation.

[*1]: For IEC 62065 Ed. 2 complying autopilots (PR-9000), the sequence is different. For example, two GPS navigators are onboard and one exceeds the discrepancy limit. Then, the alerts "GPSx Banned" and "POSN Discrepancy" appear

Total lost position (position from ALL GPS navigators is unreliable

	Associated alerts	Expected system performance	Operator action
	• Alert "Lost GPSx*" COM (*x=sensor no.) OR • The Kalman filter detects position jump, etc.		• Acknowledge alerts. • Monitor situation.
Within 30 seconds	• Alert "Heading Failure". • Alert "Lost Position".[*2] • Alert "No POSN for FILT". • Alert "No SOG for FILT".	• The Kalman filter is turned OFF and the system uses dead reckoning for positioning. • If you have a log or dual-axis log, then dead reckoning is based on them and the gyro. • If you have a log or dual-axis log, then dead reckoning is based on last valid speed from position sensors.	• Acknowledge alerts. • Monitor situation.
Repeated every two minutes	• Alert "Use MAN Steering".	Guidance for navigator	• Change immediately to local Autopilot control. • Acknowledge alerts.
Within 10 minutes	• Alert "TCS Stopped"*2 is generated at the ECDIS. The lamp[*1] on the Autopilot's Steering Control Unit (or Control Panel) lights. *Transferred to BNWAS if not acknowledged within 30 seconds.	TCS stops and • If the ship is running straight, actual heading is used as set course. • If the ship is turning, last-set course and radius are used to complete the turn.	• Acknowledge alerts. • Monitor situation. • Change the steering mode to AUTO (HEADING CONTROL on FAP-3000).

[*1]: FAP-3000, PR-9000: ALARM

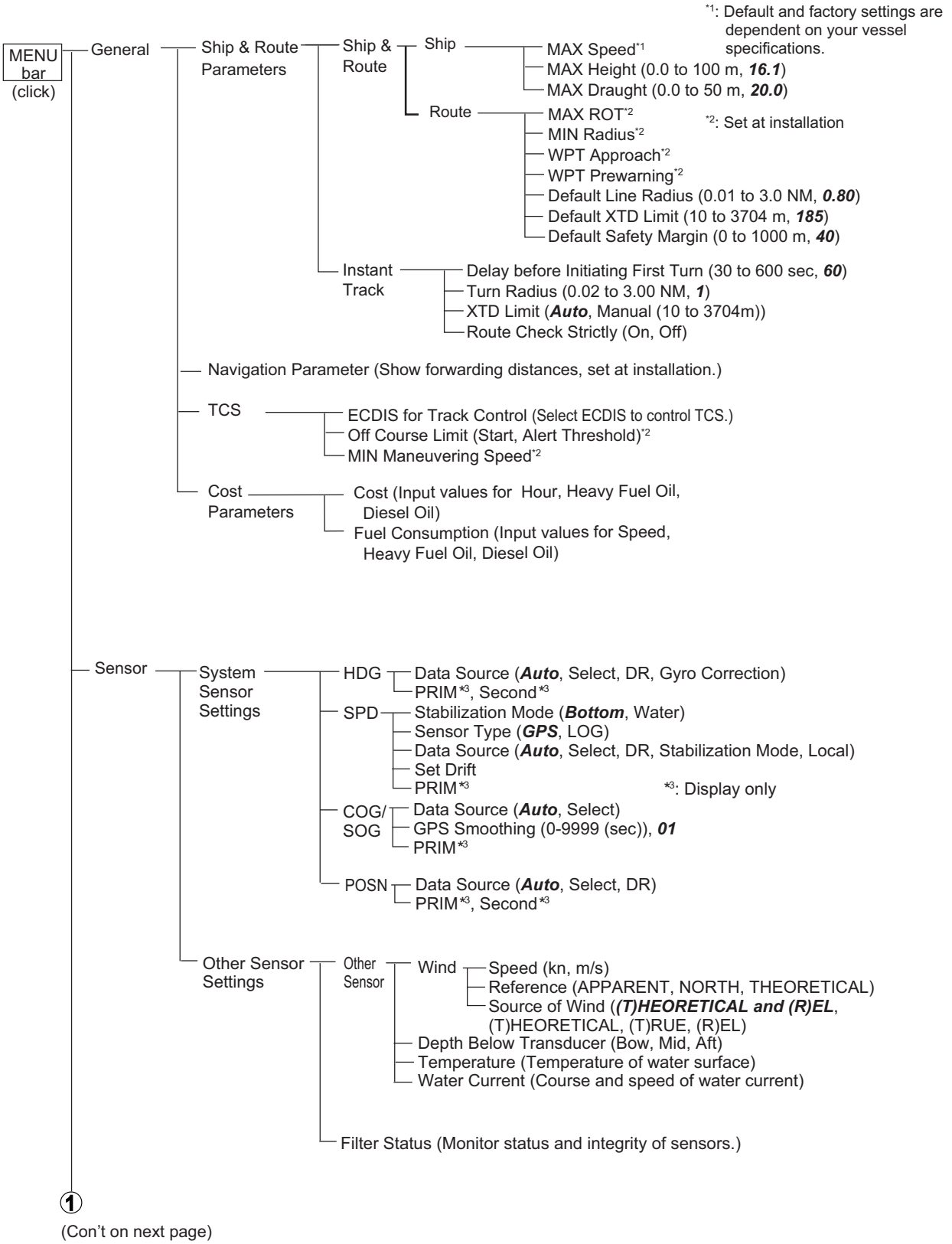
[*2]: Shown as "Position Failure" on IEC 60265 Ed. 2 complying autopilots (PR-9000).

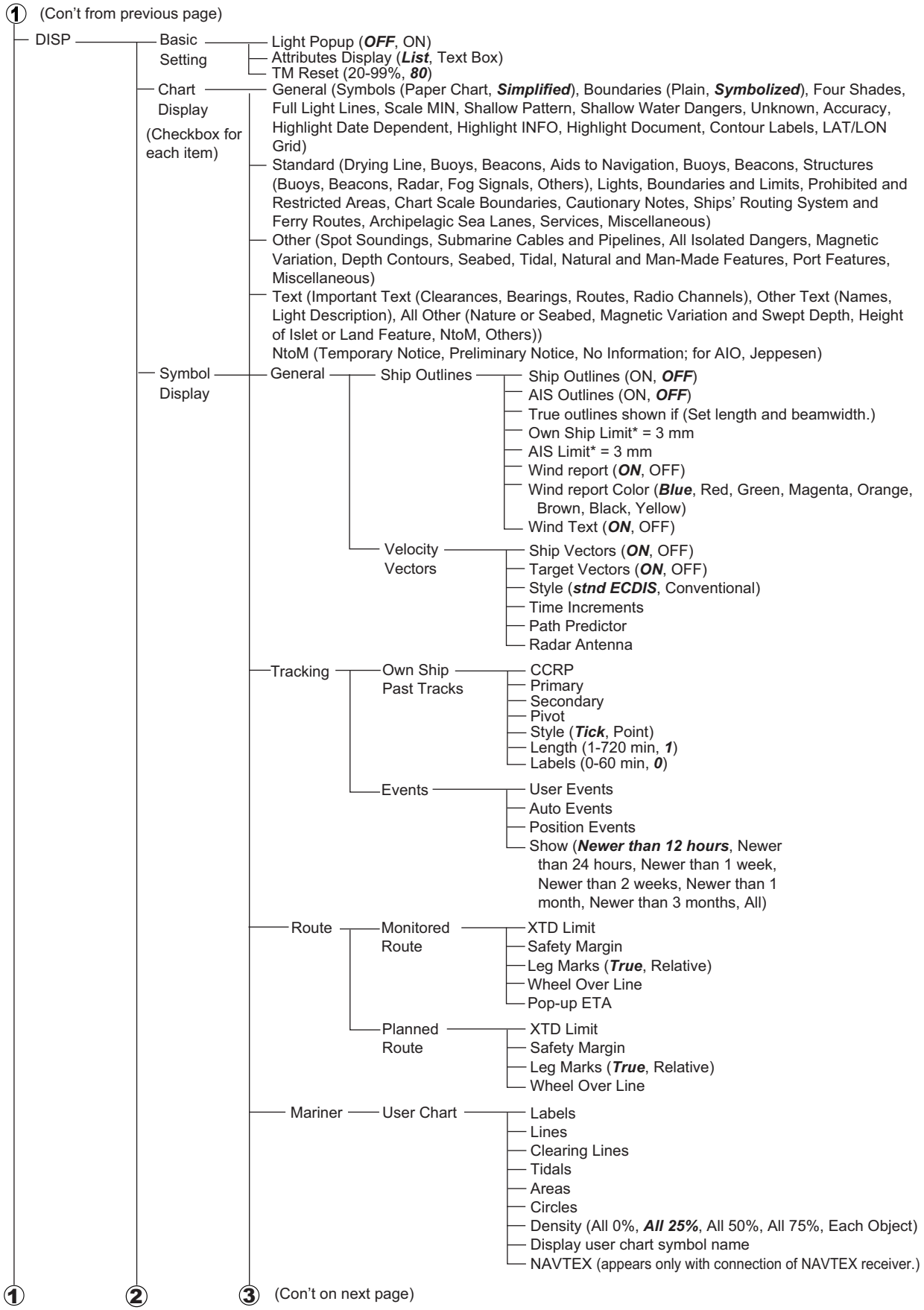
26.11.4 When track control is stopped...

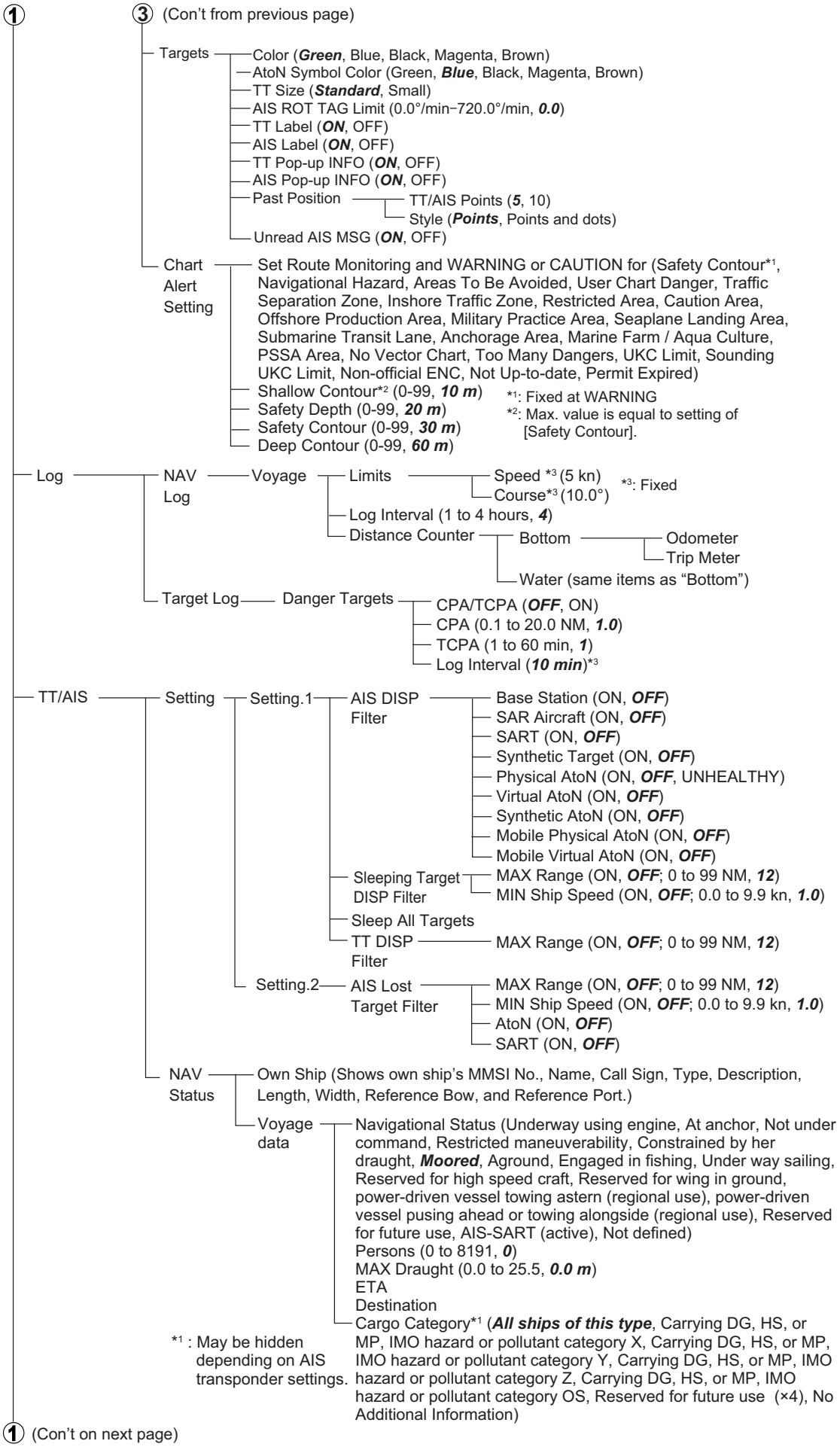
- **Track control is stopped on a straight leg**: The autopilot goes into the heading keeping mode and the heading at the time the track control was stopped becomes the set course.
- **Track control is stopped on a curved leg**: The autopilot goes into the heading changing mode and the bearing of the straight leg TO waypoint becomes the set course.

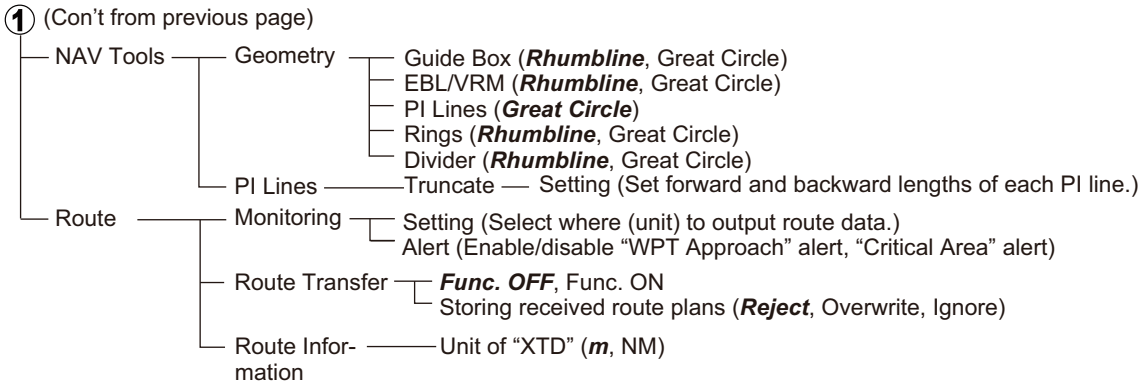
APPX. 1 MENU TREE

Main Menu

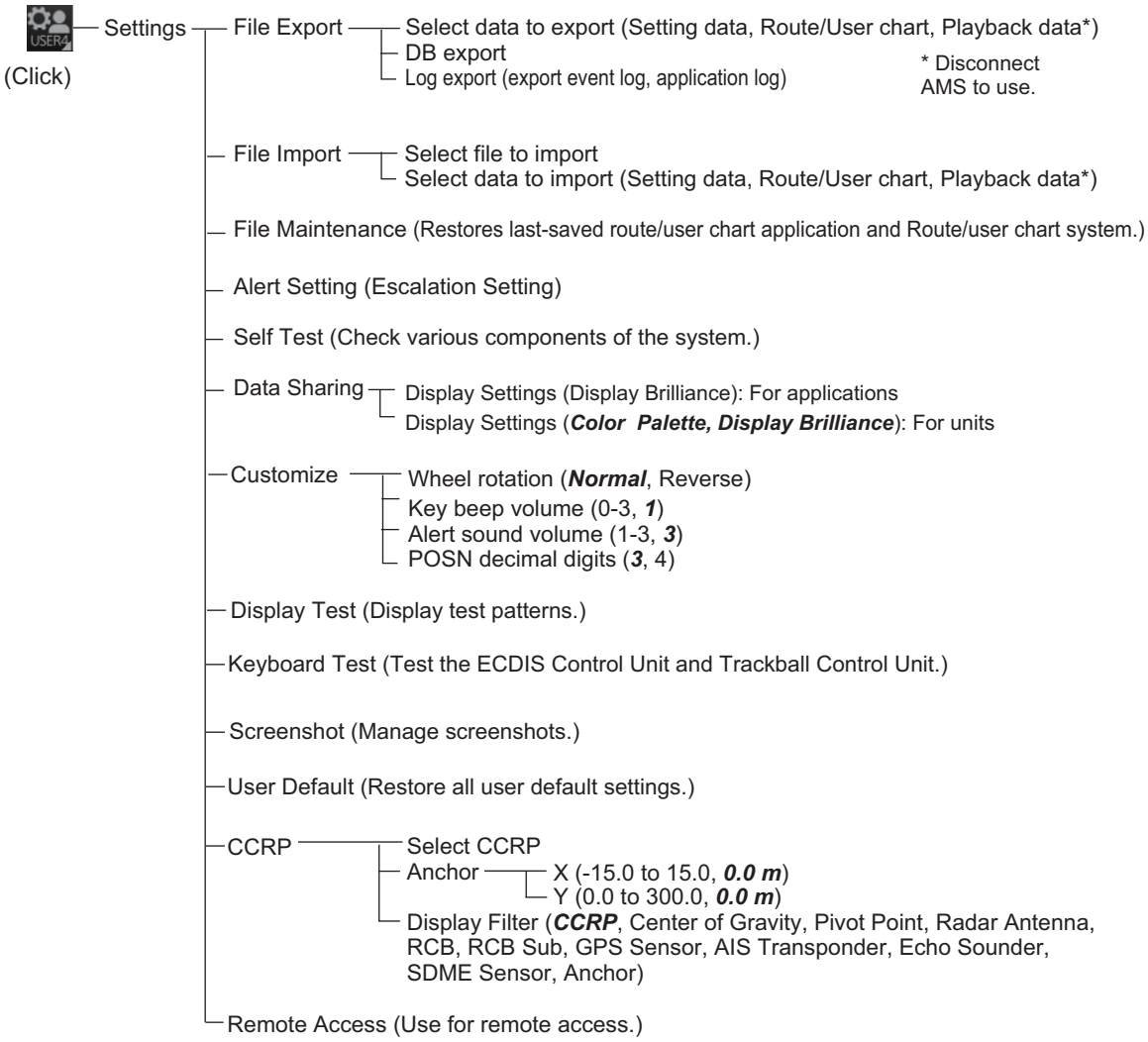



① (Con't from previous page)
DISP
Basic Setting
Light Popup (OFF, ON)
Attributes Display (List, Text Box)
TM Reset (20-99%, 80)
Chart Display
(Checkbox for each item)
General (Symbols (Paper Chart, Simplified), Boundaries (Plain, Symbolized), Four Shades, Full Light Lines, Scale MIN, Shallow Pattern, Shallow Water Dangers, Unknown, Accuracy, Highlight Date Dependent, Highlight INFO, Highlight Document, Contour Labels, LAT/LON Grid)
Standard (Drying Line, Buoys, Beacons, Aids to Navigation, Buoys, Beacons, Structures (Buoys, Beacons, Radar, Fog Signals, Others), Lights, Boundaries and Limits, Prohibited and Restricted Areas, Chart Scale Boundaries, Cautionary Notes, Ships' Routing System and Ferry Routes, Archipelagic Sea Lanes, Services, Miscellaneous)
Other (Spot Soundings, Submarine Cables and Pipelines, All Isolated Dangers, Magnetic Variation, Depth Contours, Seabed, Tidal, Natural and Man-Made Features, Port Features, Miscellaneous)
Text (Important Text (Clearances, Bearings, Routes, Radio Channels), Other Text (Names, Light Description), All Other (Nature or Seabed, Magnetic Variation and Swept Depth, Height of Islet or Land Feature, NtoM, Others))
NtoM (Temporary Notice, Preliminary Notice, No Information; for AIO, Jeppesen)
Symbol Display
General
Ship Outlines
Ship Outlines (ON, OFF)
AIS Outlines (ON, OFF)
True outlines shown if (Set length and beamwidth.)
Own Ship Limit* = 3 mm
AIS Limit* = 3 mm
Wind report (ON, OFF)
Wind report Color (Blue, Red, Green, Magenta, Orange, Brown, Black, Yellow)
Wind Text (ON, OFF)
Velocity Vectors
Ship Vectors (ON, OFF)
Target Vectors (ON, OFF)
Style (stnd ECDIS, Conventional)
Time Increments
Path Predictor
Radar Antenna
Tracking
Own Ship Past Tracks
CCRP
Primary
Secondary
Pivot
Style (Tick, Point)
Length (1-720 min, 1)
Labels (0-60 min, 0)
Events
User Events
Auto Events
Position Events
Show (Newer than 12 hours, Newer than 24 hours, Newer than 1 week, Newer than 2 weeks, Newer than 1 month, Newer than 3 months, All)
Route
Monitored Route
XTD Limit
Safety Margin
Leg Marks (True, Relative)
Wheel Over Line
Pop-up ETA
Planned Route
XTD Limit
Safety Margin
Leg Marks (True, Relative)
Wheel Over Line
Mariner
User Chart
Labels
Lines
Clearing Lines
Tidals
Areas
Circles
Density (All 0%, All 25%, All 50%, All 75%, Each Object)
Display user chart symbol name
NAVTEX (appears only with connection of NAVTEX receiver.)
① ② ③ (Con't on next page)


① (Con't on next page)
③ (Con't from previous page)
Targets
Color (Green, Blue, Black, Magenta, Brown)
AtoN Symbol Color (Green, Blue, Black, Magenta, Brown)
TT Size (Standard, Small)
AIS ROT TAG Limit (0.0°/min–720.0°/min, 0.0)
TT Label (ON, OFF)
AIS Label (ON, OFF)
TT Pop-up INFO (ON, OFF)
AIS Pop-up INFO (ON, OFF)
Past Position
TT/AIS Points (5, 10)
Style (Points, Points and dots)
Unread AIS MSG (ON, OFF)
Chart Alert Setting
Set Route Monitoring and WARNING or CAUTION for (Safety Contour*1, Navigational Hazard, Areas To Be Avoided, User Chart Danger, Traffic Separation Zone, Inshore Traffic Zone, Restricted Area, Caution Area, Offshore Production Area, Military Practice Area, Seaplane Landing Area, Submarine Transit Lane, Anchorage Area, Marine Farm / Aqua Culture, PSSA Area, No Vector Chart, Too Many Dangers, UKC Limit, Sounding UKC Limit, Non-official ENC, Not Up-to-date, Permit Expired)
Shallow Contour*2 (0-99, 10 m)
Safety Depth (0-99, 20 m)
Safety Contour (0-99, 30 m)
Deep Contour (0-99, 60 m)
*1: Fixed at WARNING
*2: Max. value is equal to setting of [Safety Contour].
Log
NAV Log
Voyage
Limits
Speed *3 (5 kn)
Course*3 (10.0°)
*3: Fixed
Log Interval (1 to 4 hours, 4)
Distance Counter
Bottom
Odometer
Trip Meter
Water (same items as "Bottom")
Target Log
Danger Targets
CPA/TCPA (OFF, ON)
CPA (0.1 to 20.0 NM, 1.0)
TCPA (1 to 60 min, 1)
Log Interval (10 min)*3
TT/AIS
Setting
Setting.1
AIS DISP Filter
Base Station (ON, OFF)
SAR Aircraft (ON, OFF)
SART (ON, OFF)
Synthetic Target (ON, OFF)
Physical AtoN (ON, OFF, UNHEALTHY)
Virtual AtoN (ON, OFF)
Synthetic AtoN (ON, OFF)
Mobile Physical AtoN (ON, OFF)
Mobile Virtual AtoN (ON, OFF)
Sleeping Target DISP Filter
MAX Range (ON, OFF; 0 to 99 NM, 12)
MIN Ship Speed (ON, OFF; 0.0 to 9.9 kn, 1.0)
Sleep All Targets
TT DISP Filter
MAX Range (ON, OFF; 0 to 99 NM, 12)
Setting.2
AIS Lost Target Filter
MAX Range (ON, OFF; 0 to 99 NM, 12)
MIN Ship Speed (ON, OFF; 0.0 to 9.9 kn, 1.0)
AtoN (ON, OFF)
SART (ON, OFF)
NAV Status
Own Ship (Shows own ship's MMSI No., Name, Call Sign, Type, Description, Length, Width, Reference Bow, and Reference Port.)
Voyage data
Navigational Status (Underway using engine, At anchor, Not under command, Restricted maneuverability, Constrained by her draught, Moored, Aground, Engaged in fishing, Under way sailing, Reserved for high speed craft, Reserved for wing in ground, power-driven vessel towing astern (regional use), power-driven vessel pusing ahead or towing alongside (regional use), Reserved for future use, AIS-SART (active), Not defined)
Persons (0 to 8191, 0)
MAX Draught (0.0 to 25.5, 0.0 m)
ETA
Destination
Cargo Category*1 (All ships of this type, Carrying DG, HS, or MP, IMO hazard or pollutant category X, Carrying DG, HS, or MP, IMO hazard or pollutant category Y, Carrying DG, HS, or MP, IMO hazard or pollutant category Z, Carrying DG, HS, or MP, IMO hazard or pollutant category OS, Reserved for future use (×4), No Additional Information)
*1 : May be hidden depending on AIS transponder settings.



Settings Menu



APPX. 2 ABBREVIATIONS, SYMBOLS

Abbreviations

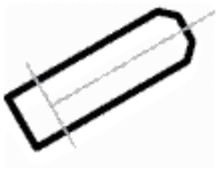
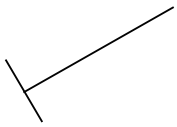
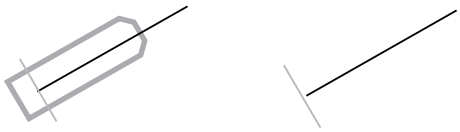
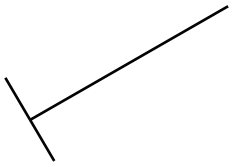
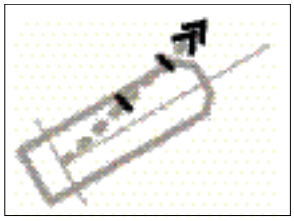
Abbreviation	Meaning
ACK	Acknowledge
ACQ	Acquire
ACT	Activate
ADJ	Adjustment
AIO	Admiralty Information Overlay
AIS	Automatic Identification System
ANT	Antenna
Apr	April
ATON	Aid To Navigation
Aug	August
AUTO	Automatic
BB	Blackbox
BCR	Bow Cross Range
BCT	Bow Cross Time
BLU	Blue
BNWAS	Bridge Navigational Watch Alarm System
BRG	Bearing
BT	Bottom Tracking
Caps	Capital (letters)
CAT	Category
CCRP	Common Consistent Reference Point
CH	Channel
COG	Course over the Ground
COM	Communication
CONFIG	Configuration
CORR	Correction
CORRE	Correlation
CPA	Closest Point of Approach
CPU	Central Processing Unit
CSE	Course
CYA	CYAN
DATREP	Data Report
Dec	December
DEMO	Demonstration
DISP	Display
DR	Dead Reckoning
DTE	Data Terminal Equipment
E	English
E	East
EBL	Electronic Bearing Line
EPFS	Electronic Position Fixing System

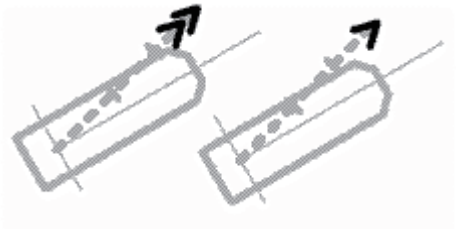
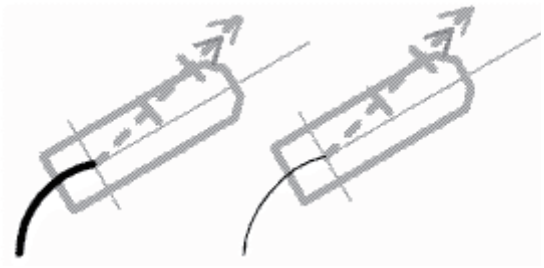
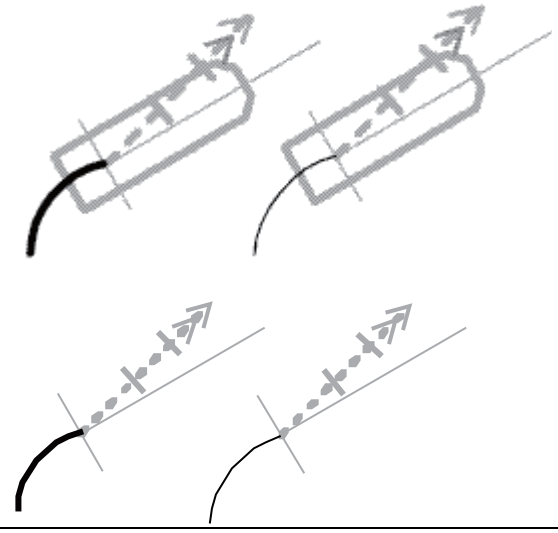
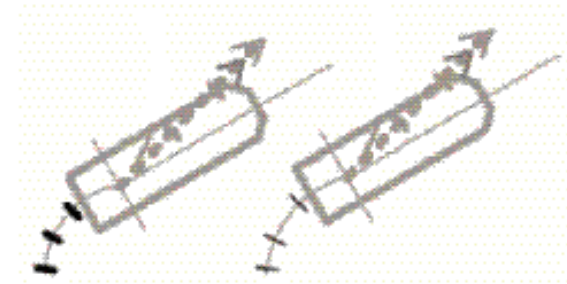
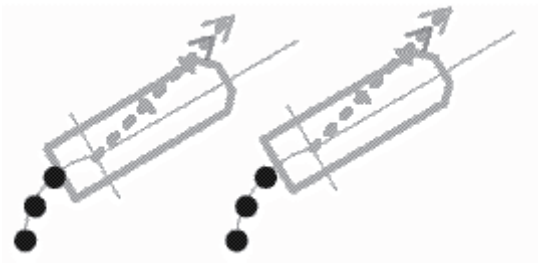
Abbreviation	Meaning
ETA	Estimated Time of Arrival
EXT	External
Feb	February
FILT	Filter
GPS	Global Positioning System
GRN	Green
GRY	Gray
Gyro	Gyrocompass
HDG	Heading
hr	hour
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IND	Indication
INS	Integrated Navigation System
J	Japanese
Jan	January
Jul	July
Jun	June
kyd	kiloyard
L	Largest, Long (pulse length), or Local
L/L	Latitude/Longitude
LAN	Local Area Network
LL	Latitude, Longitude
LO	Low
MAG	Magnetic, Magenta, or Magnify
MAN	Manual
Mar	March
MAX	Maximum
MID	Middle
min	minute
MIN	Minimum
MMSI	Maritime Mobile Service Identity
MOB	Man Overboard
MON	Monitor
MSG	Message
N	North
NAV	Navigation, Navigator
Navtex	Navigational Telex
NM	Nautical miles
NO.	Number
Nov	November
NtoM	Notice to Mariners
Oct	October
OP	Operation
OS	Own Ship
PC	Personal Computer
PERPENDIC	Perpendicular
PI	Parallel Index (lines)
POSN	Position

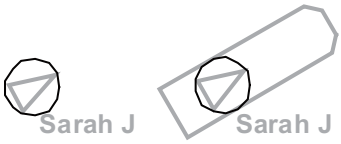
Abbreviation	Meaning
PRIM	Primary
PSSA	Particularly Sensitive Sea Area
QLTY	Quality
R	Relative
RAIM	Receiver Autonomous Integrity Monitoring
REF	Reference
Rel	Relative
RM	Relative Motion
RNG	Range
ROT	Rate of Turn
S	South, or System
s	Second
S1 (2)	Short1(2) (pulse length)
SAR	Search And Rescue
SART	Search And Rescue Transponder
SDME	Speed and Distance Measuring Equipment
SEL	Select
Sep	September
SM	Statute Miles
SOG	Speed Over the Ground
SPD	Speed
SPEC	Specification
SSD	Solid State Drive, Solid State Device
S.SRC	Sensor Source
STAB	Stabilization
STBY	Stand-by
STND	Standard
SW	Switch
SYNC	Synchronization
SYN TGT	Synthetic Target
T	True
TB	True Bearing
TC	Track Control
TCPA	Time to Closest Point of Approach
TCS	Track Control System
TGT, TGTS	Target, Targets
TM	True Motion
TM/CU	True Motion/Course-up
T.GND	True-ground
T.WAT	True-sea
TT	Tracked Target or Target Tracking
TTD	Tracked Target Data
TTG	Time to go
TTM	Tracked Target Information
TX	Transmit
UKC	Under Keel Clearance
UTC	Universal Time, Coordinated
VECT	Vector
VRM	Variable Range Marker

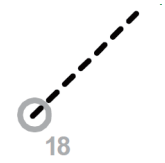
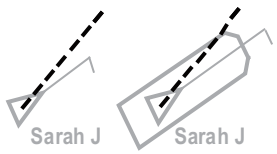
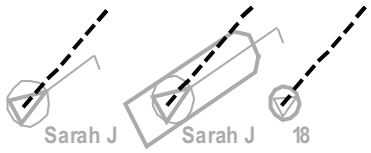
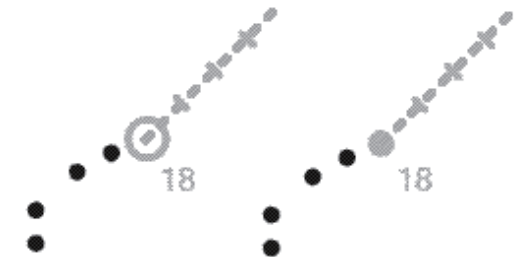
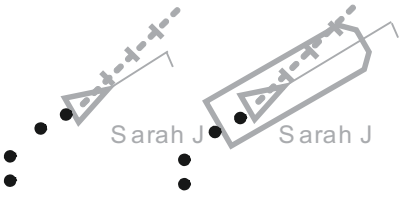
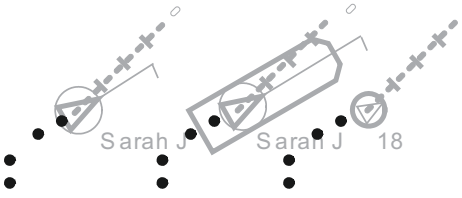
Abbreviation	Meaning
W	West
W/O	Without
WHT	White
WOL	Wheel Over Line
WOP	Wheel Over Point
WPT	Waypoint
WT	Water Tracking
XTD	Cross Track Distance
YEL	Yellow

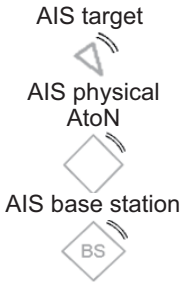
ECDIS Symbols

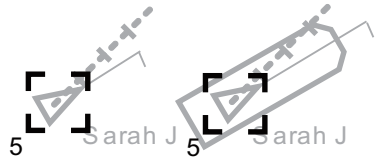
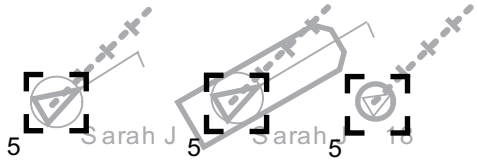
Symbol name and description	Symbol graphic(s)
Own ship - true scaled outline This can be displayed when based on user selection either beam width or length is more than 3 mm.	
Own ship - simplified symbol	
Own ship - minimized symbol	
Radar antenna position This symbol indicates location of the radar antenna. Select if position of radar antenna is displayed with symbol X by Symbol Display menu.	
Own ship heading line This line originates from CCRP or Radar antenna position. CCRP: Consistent Common Reference Point	
Beam line This line passes through the CCRP or radar antenna position.	
Velocity vector - time increments	

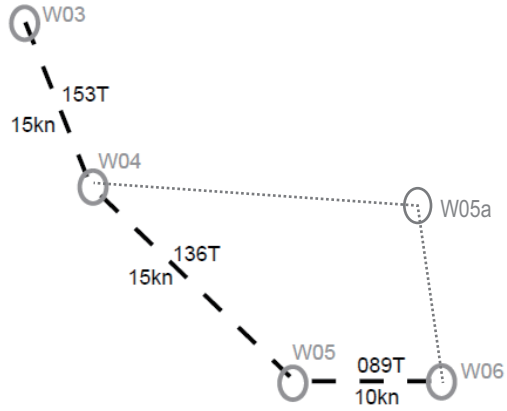
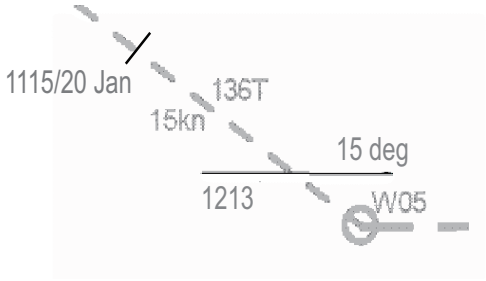
Symbol name and description	Symbol graphic(s)
Velocity vector - stabilization indicator Ground stabilization is indicated by double arrowhead and water stabilization is indicated as single arrowhead.	
Past track System past track is indicated by thick line. Raw sensor primary past track is indicated by thin line. Raw sensor secondary past track is indicated by grey thin line.	
Past track - time increments Time increments are presented as single lines perpendicular to the past track.	
Past track - past positions Past positions are drawn as bold lines.	
Past track - past positions Past positions are drawn as small filled circular symbols.	

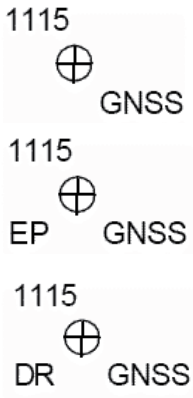
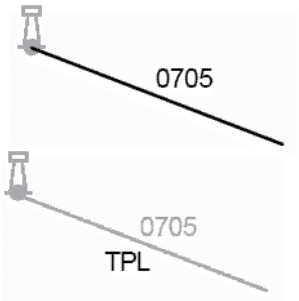
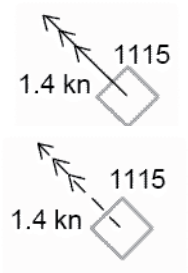
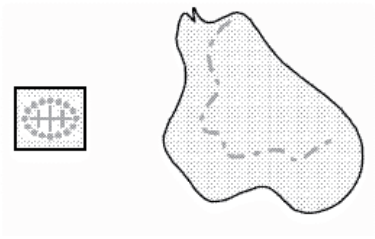
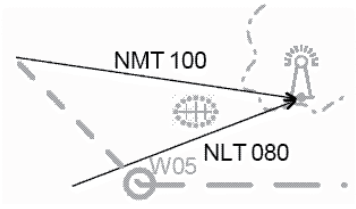
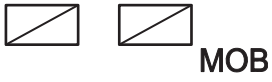
Symbol name and description	Symbol graphic(s)
Radar targets in acquisition state	 5 mm in diameter
Tracked radar targets TT: Std or small user selection by Symbol Display	 3 mm in diameter
Tracked radar targets - alternative TT: Std or small user selection by Symbol Display	 1 mm in diameter
Sleeping AIS targets Orientation is towards heading (or COG if heading unknown). If both heading and COG are unknown the orientation is toward top of display.	 Sleeping AIS target  Non HDG/COG sleeping AIS target
Activated AIS targets Orientation is towards heading (or COG if heading unknown). If both heading and COG are unknown the orientation is toward top of display.	 Activated AIS target  Non HDG/COG activated AIS target
Activated AIS targets - true scaled outline • This can be displayed when based on user selection either beam width or length is more than 3 mm. • AIS outline: ON/OFF	
Activated AIS targets - associated target	Associated targets represented by AIS target symbols  Associated objects represented by radar target symbols 

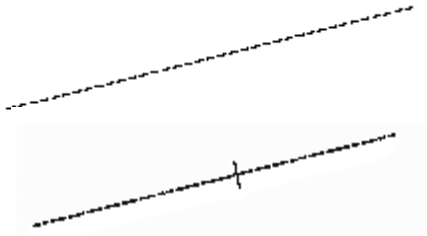
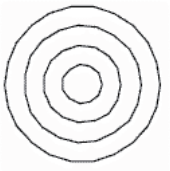
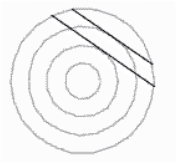
Symbol name and description	Symbol graphic(s)
Activated AIS targets - heading lines - turn indicators	
Velocity vectors	Radar target velocity vectors  AIS target velocity vectors  Associated target velocity vectors 
Target past positions	Radar target past positions  AIS target past positions  Associated target past positions 

Symbol name and description	Symbol graphic(s)
AIS aid to navigation (AtoN) Physical AtoN is in solid line; virtual AtoN in dashed line. See the table on page 14-5 for details.	
AIS - SART (active)	
AIS - SART (Test)	
AIS base station	
AIS SAR vessel	
SAR aircraft - Fixed wing	
SAR aircraft - Helicopter	
AIS Synthetic target	
AIS Synthetic target - Distress	
With unread/viewing AIS message symbol	

Symbol name and description	Symbol graphic(s)
Selected targets	Selected radar targets  Selected AIS targets  Selected association targets  Selected AIS ATON  Selected AIS SART 
Danger target • The lost target symbol is red, and flashes until the lost target is acknowledged on the radar. • Shown only when the TTD sentence (status = CPA/TCPA alarm) is received from the radar. • CPA/TCPA alert is not occurred. • “Danger Target” log is not recorded.	TT danger target  Associated TT danger target  AIS danger target  Associated AIS danger target 

Symbol name and description	Symbol graphic(s)
Lost target The lost target symbol is red, and flashes until the lost target is acknowledged.	TT lost target  Lost AIS AtoN  Lost AIS-SART 
Waypoint	
Next waypoint	
Routes - Monitor Monitored route leg lines are dashed. Leg lines may indicate planned speed and bearing.	
Wheel over position	

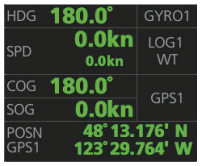
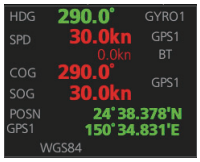
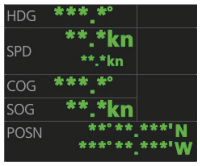
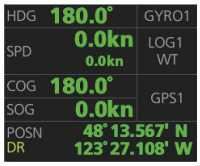
Symbol name and description	Symbol graphic(s)
Plotted positions Plotted position includes some labels. Type is DR, EP or Fix (Fix is without label). Examples of source labels are GNSS: G GPS: G DGPS: dG Loran: L etc.	
Line of position Abbreviation is LOP. Label TPL is used to indicate measurement transferred by dead reckoning.	
Tidal stream User defined tidal stream symbols are available as part of User Chart. Actual tidal stream use solid vector and predicted tidal stream use dashed vector.	
Danger highlight Route Plan, Route Monitor and own ship Chart Alarm search area use danger highlight to indicate violation against user selected dangers.	
Danger bearing Also called by traditional name clearing line. User defined clearing line symbols are available as part of User Chart.	
Event marker Event markers indicate events recorded into the Voyage record. The Man overboard event marker has the label "MOB".	
User cursor	

Symbol name and description	Symbol graphic(s)
Electronic bearing line (EBL) Second example show with range marker.	
Variable range marker (VRM)	
Range rings	
Parallel index lines	

Symbols on operating buttons

Symbol	Meaning	Symbol	Meaning
	Minimize button (on InstantAccess bar™)		Screenshot capture
	Access AIS, Navtex message processing		Monitor brilliance; Control Unit backlighting. The sharing method is shown as "S" (System) or "L" (Local).
	Access user profile, common settings, Number indicates the profile number in use.		Color palette selection. The sharing method is shown as "S" (System) or "L" (Local).
	Information (show program no., operator's manual, AMS guide (option)).		Activate weather display
	Undo, redo		Restores the calibration to the default settings.

APPX. 3 DATA COLOR AND MEANING

	Ind. color	Sensor name color	HDG	L/L	SPD	COG/SOG	Sensor info box
SYSTEM	GRN	WHT	THS-A HDT	GNS-A, D, F, P, R GGA-1, 2, 3, 4, 5 GLL-A, D and (status: A) RMC-A, D, F, P, R and (status: A) *1	VBW-A VHW	VTG-A, D, P RMC-A, D, F, P, R and (status: A)	
	RED	WHT		DGPS update interval in GGA, GNS sentence is higher than 10 seconds. GNS-A, D, F, P, R RMC-A, D, F, P, R and (status: A) *2			
	GRN (***.*)	WHT	THS-E, M, S: invalid HDT: invalid No sentence input	GNS-E, M, S, N and (status: V: invalid GGA-6, 7, 8, 0: invalid GLL-E, M, S, N and (status: V): invalid RMC-E, M, S, N and (status: V): invalid No sentence input	VBW-V: Invalid VHW: Invalid No sentences	VTG-E, M, S, N: Invalid RMC-E, M, S, N and (status: V): Invalid No sentence input	
	GRN	YEL (DR)		Interval value at time sensor was lost (DR)			
MANUAL	YEL (MAN*3) GRN (DR)	WHT (MAN*3) YEL (DR)	Offset	Manual setting (DR)	Manual setting value		

*1: Navigational status in RMC, GNS sentence shown in “S”, “V” only (IEC 61162-1 Ed. 4 or later).
For IEC 61162-1 Ed.3 navigation status is not included in sentence.
*2: Navigational status in RMC, GNS sentence shown in “C”, “U”, “null” only (IEC 61162-1 Ed. 4 or later).
*3: “CORR1” replaces “MAN” in case of heading offset.

APPX. 4 ALERT LIST

The table starting from the bottom of the page lists the possible alerts for this equipment. Each alert is listed with alert IDs (ALF and ALR), alert description, and priority/category. This equipment can output alerts in ALF or ALR format. The alert number depends on the output format and may differ between formats.

This unit supports the aggregate alert function. Aggregate alerts are a grouping of similar alerts. When an aggregated alert occurs, the aggregated alert name (header alert) is displayed on the AMS connected to this unit. The following table lists the ALF alert numbers and aggregate alert names that are subject to aggregate alerts.

Aggregated Alert Name	Alert Priority	ALF No.
Critical Point*	Alarm	3037, x
Critical Point	Warning	3038, x
HUB Link ERR	Caution	30433, x
HUB Flow ERR	Caution	30436, x
HUB Overload	Caution	30439, x
WOL XX (XX=WPT no.)*	Warning	3028, x
Wheel Over Line*	Alarm	3027, x
Target Capacity	Warning	3042, x
Target Capacity	Caution	3043, x

X: instance number
*: TCS dedicated alert

If the warning alert on the left side of the table below is not acknowledged within the set time (escalation time), the alarm will sound again and you will be re-notified (the warning status will be repeated). For the warning alerts on the right side of the table below, if you do not acknowledge within 120 seconds (TCS dedicated alert: 30 seconds) after the alert occurs, the priority will change from "warning" to "alarm".

Warning repeated		Change to Alarm	
Applicable warning alert	Escalation time (default setting)	Applicable warning alert	Escalation time (default setting)
IEC 62923-2 alert	270 s (fixed)	Anchor watch*1	120 s (fixed)
Other than IEC 62923-2 alert	60 s (changeable)	WOL Approach XX (XX=WPT no.)*2	30 s (fixed)
		WOL XX (XX=WPT no.)*2	30 s (fixed)
		TCS Stopped*2	30 s (fixed)
		Track End*2	30 s (fixed)
		CRS Difference*2	30 s (fixed)
		Bad Track POSN*2	30 s (fixed)
		Speed Too Low*2	30 s (fixed)
		Drift Comp Fail*2	30 s (fixed)
		TCS Test Mode*2	30 s (fixed)
		POSN Recovered*2	30 s (fixed)
		SPD Recovered*2	30 s (fixed)

*1: The escalation time for the [Anchor Watch] alert is the time specified in IEC61174. You cannot change the setting.

*2: TCS dedicated alert.

Note 1: You can change the priority of some alerts, from the [Chart Alerts] page. See section 8.1.2.

Note 2: This equipment does not support the responsibility transfer alert function.

Note 3: "TCS" in the Priority/Category indicates TCS dedicated alert.

Priority: Alarm, Warning, Caution

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3005,-	465	**Name**: Invalid Datum **Meaning**: Primary position sensor uses non-WGS-84 datum or missing datum information. **Remedy**: Check status of GPS sensor.	Warning/B
3038,1 to 3038,199	-	**Name**: WPT Approach XX (XX is WPT No.) **Meaning**: The wheel over point has been approached. **Remedy**: Take helm if needed.	Warning/A
3038, 100000	-	**Name**: Critical Area **Meaning**: Entering user chart notes area. **Remedy**: Confirm description of notes.	Warning/A
3037,1001 to 3037,1199	-	**Name**: WOL Approach XX (XX is WPT No.) **Meaning**: The wheel over line has been approached in track control. **Remedy**: Watch and acknowledge alert.	Alarm/A, TCS
3038,1001 to 3038,1199	-	**Name**: WOL Approach XX (XX is WPT No.) **Meaning**: The wheel over line has been approached in track control. **Remedy**: Watch and acknowledge alert.	Warning/A, TCS
3028,1001 to 3028,1199	-	**Name**: WOL XX (XX is WPT No.) **Meaning**: The wheel over line has been passed in track control. **Remedy**: Watch and acknowledge alert.	Warning/A, TCS
3027,1001 to 3027,1199	-	**Name**: Wheel Over Line **Meaning**: The wheel over line has been approached in track control. **Remedy**: Watch and acknowledge alert.	Alarm/A, TCS
3064,-	657	**Name**: Speed Too Low **Meaning**: Speed is too low during track control. **Remedy**: Increase speed or stop track control.	Alarm/B, TCS
3065,-	159	**Name**: Speed Too Low **Meaning**: Speed is too low during track control. **Remedy**: Increase speed or stop track control.	Warning/B, TCS
3003,-	985	**Name**: Lost Interface **Meaning**: Data from external equipment is lost. **Remedy**: Check connection of external equipment	Caution/B
3003,1	541	**Name**: AIS MSG Send ERR **Meaning**: AIS message transmission failed. **Remedy**: Check the connection with AIS.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3003,2	667	**Name**: AP Receive Error **Meaning**: Communication between AP and ECDIS is discontinued. **Remedy**: Check the connection in the Autopilot.	Caution/B
3011,8	654	**Name**: POSN Discrepancy **Meaning**: POSN is much different from others in POSN sensors. **Remedy**: Monitor situation carefully, or stop track control.	Alarm/A, TCS
3012,8	154	**Name**: POSN Discrepancy **Meaning**: There is a difference between position sensors during track control. **Remedy**: Monitor situation carefully, or stop track control.	Warning/A, TCS
3011,7	655	**Name**: HDG Discrepancy **Meaning**: HDG value is much different from others in HDG sensors. **Remedy**: Monitor situation carefully, or stop track control.	Alarm/A, TCS
3012,7	155	**Name**: HDG Discrepancy Meaning: There is a difference between heading sensors during track control. **Remedy**: Monitor situation carefully, or stop track control.	Warning/A, TCS
80746,2	698	**Name**: No POSN Monitor **Meaning**: Position monitor function cannot be used because several position sensors are not available. **Remedy**: Check the position monitor status.	Caution/B, TCS
80746,1	697	**Name**: No HDG Monitor **Meaning**: Heading monitor function cannot be used because several heading sensors are not available. **Remedy**: Check the heading monitor status.	Caution/B, TCS
3014,1	156	**Name**: Heading Failure **Meaning: Lost speed during track control.** **Remedy**: Monitor situation carefully, or stop track control.	Alarm/B, TCS
3014,2	161	**Name**: Position Failure **Meaning: Lost speed during track control.** **Remedy**: Monitor situation carefully, or stop track control.	Alarm/B, TCS
3014,3	162	**Name**: Speed Failure **Meaning: Lost speed during track control.** **Remedy**: Monitor situation carefully, or stop track control.	Alarm/B, TCS
3024,1	172	**Name**: Off Track **Meaning**: While monitoring route, ship position deviates more than XTD limit **Remedy**: Make XTD smaller.	Alarm/A
3031,1	171	**Name**: Safety Contour **Meaning**: When a check area is set, the vessel entered a shallower area than the threshold set in [Safety Contour]. **Remedy**: Reconfirm Safety Contour setting or change the course.	Alarm/A
3031,2	496	**Name**: Anchor Watch **Meaning**: While anchor watch alert function is enabled, ship's position has been outside of alarm area centering certain position for more than 3 seconds. **Remedy**: Be careful of dragging anchor.	Alarm/A

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30312,-	510	**Name**: Lost MODBUS COM **Meaning**: Connection to the MODBUS is lost or interrupted. **Remedy**: Check connection.	Warning/B
3032,2	495	**Name**: Anchor Watch **Meaning**: While anchor watch alert function is enabled, ship's position has been outside of alarm area centering certain position for more than 3 seconds. **Remedy**: Be careful of dragging anchor.	Warning/A
30332,-	331	**Name**: Lost SEL Gyro **Meaning**: When connected with Double Gyro System, instrument produced by YDK Technologies, "Double Gyro" status cannot be acquired. **Remedy**: If the error frequently occurs, contact FURUNO and inform frequency of occurrence.	Warning/B, TCS
3035,1	620	**Name**: USR CHT Danger **Meaning**: A User Chart Danger Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,2	621	**Name**: Separation Zone **Meaning**: A Traffic Separation Zone that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,3	622	**Name**: ITZ **Meaning**: An Inshore Traffic Zone that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,4	623	**Name**: Restricted Area **Meaning**: A Restricted Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,5	624	**Name**: Caution Area **Meaning**: A Caution Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,6	625	**Name**: OFS PROD Area **Meaning**: An Offshore Production Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,7	626	**Name**: MIL PRAC Area **Meaning**: A Military Protection Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3035,8	627	**Name**: SPL Landing Area **Meaning**: A Seaplane Landing Area that is set to Warning/ Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,9	628	**Name**: SM Transit Lane **Meaning**: A Submarine Transit Lane that is set to Warning/ Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,10	629	**Name**: Anchorage Area **Meaning**: An Anchorage Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,11	630	**Name**: Marine Farm **Meaning**: A Marine Farm/Aquaculture that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,12	631	**Name**: PSSA Area **Meaning**: A PSSA Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,13	632	**Name**: ATBA **Meaning**: An Areas to be Avoided that is set to Alarm in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Warning/A
3035,14	645	**Name**: NAV Hazard **Meaning**: One or more navigational hazards detected by the Look-ahead function. **Remedy**: Adjust course as necessary.	Warning/A
3036,1	594	**Name**: USR CHT Danger **Meaning**: A User Chart Danger Area that is set to Warning/ Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,2	595	**Name**: Separation Zone **Meaning**: A Traffic Separation Zone that is set to Warning/ Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,3	596	**Name**: ITZ **Meaning**: An Inshore Traffic Zone that is set to Warning/ Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,4	597	**Name**: Restricted Area **Meaning**: A Restricted Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3036,5	598	**Name**: Caution Area **Meaning**: A Caution Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,6	599	**Name**: OFS PROD Area **Meaning**: An Offshore Production Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,7	600	**Name**: MIL PRAC Area **Meaning**: A Military Protection Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,8	601	**Name**: SPL Landing Area **Meaning**: A Seaplane Landing Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,9	602	**Name**: SM Transit Lane **Meaning**: A Submarine Transit Lane that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,10	603	**Name**: Anchorage Area **Meaning**: An Anchorage Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,11	604	**Name**: Marine Farm **Meaning**: A Marine Farm/Aquaculture that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,12	605	**Name**: PSSA Area **Meaning**: A PSSA Area that is set to Warning/Caution in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,13	606	**Name**: ATBA **Meaning**: An Areas to be Avoided that is set to Alarm in chart alert is detected inside the check area. **Remedy**: Be careful of the object mentioned here, on ship's direction.	Caution/B
3036,14	607	**Name**: NAV Hazard **Meaning**: One or more navigational hazards detected by the Look-ahead function. **Remedy**: Adjust course as necessary.	Caution/B
3043,3	530	**Name**: AIS Display 95% **Meaning**: 95% of maximum number of AIS targets which can be displayed is used. **Remedy**: Adjust [AIS DISP FILTER] settings.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3042,3	531	**Name**: AIS Display Full **Meaning**: Maximum number of AIS targets which can be displayed is used. **Remedy**: Adjust [AIS DISP FILTER] settings.	Warning/A
3043,4	532	**Name**: AIS Capacity 95% **Meaning**: 95% of maximum number of AIS targets which can be displayed is used. **Remedy**: Adjust [AIS DISP FILTER] settings.	Caution/B
3042,4	533	**Name**: AIS CPTY Full **Meaning**: Maximum number of AIS targets which can be displayed is used. **Remedy**: Adjust [AIS DISP FILTER] settings.	Warning/A
3042,5	535	**Name**: Active AIS Full **Meaning**: 100% of capacity for active AIS is used. **Remedy**: The number of active AIS target became 100% of its limit. Change the unnecessary targets to sleep mode.	Warning/A
3043,5	534	**Name**: Active AIS 95% **Meaning**: 95% of capacity for active AIS is used. **Remedy**: The number of active AIS target became 95% of its limit. Change the unnecessary targets to sleep mode.	Caution/B
3043,7	547	**Name**: AIS DATREP Full **Meaning**: 100% of memory capacity for AIS data report is filled. **Remedy**: Adjust [AIS DISP FILTER] settings.	Caution/B
3043,8	548	**Name**: AIS SART Full **Meaning**: 100% of memory capacity for AIS locating device is filled. **Remedy**: Adjust [AIS DISP FILTER] settings.	Caution/B
3043,9	549	**Name**: AIS SYN TGT Full **Meaning**: 100% of memory capacity for AIS synthetic target is filled. **Remedy**: Adjust [AIS DISP FILTER] settings.	Caution/B
3052,5	552	**Name**: AIS AtoN Lost **Meaning**: The system lost an AIS AtoN. **Remedy**: Confirm that the AIS AtoN is lost, then acknowledge the alert.	Warning/A
3052,6	553	**Name**: AIS SART Lost **Meaning**: The system lost an AIS SART. **Remedy**: Confirm that the AIS SART is lost, then acknowledge the alert.	Warning/A
30432,-	431	**Name**: HUB-3000 Error **Meaning**: A network error has occurred between the HUB-3000 and one or more connected units. **Remedy**: Check network connections between the EC-3000/3005 and networked units.	Warning/B
30433,1 to 30433,128	-	**Name**: HUB link ERR **Meaning**: An illegal Link down or Link up was detected at HUB-3000. **Remedy**: Check connection of HUBXX port Y.	Caution/B
30436,1 to 30436,128	-	**Name**: HUB Flow ERR **Meaning**: The HUB-3000 port is overloaded. **Remedy**: Check the device on HUBXX port Y.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30439,1 to 30439,16	-	**Name**: HUB overload **Meaning**: The HUB-3000 CPU is overloaded. **Remedy**: Check devices connected to HUBXX.	Caution/B
30452,-	330	**Name**: Conflict Gyro **Meaning**: When connected with Double Gyro System, instrument produced by YDK Technologies, two gyro has been displayed "Selected" status for 3 seconds. **Remedy**: If the error frequently occurs, contact FURUNO and inform frequency of occurrence.	Warning/B, TCS
30645,-	644	**Name**: Actual UKC Limit **Meaning**: Actual depth is outside the preset UKC limit. **Remedy**: Check depth, adjust heading accordingly.	Warning/A
30703,-	700	**Name**: RT Version > 1 **Meaning**: Received route transfer sentence (RTZ) is a higher version than this system. **Remedy**: Check route details. Some route details may not be displayed correctly.	Caution/B
30801,-	485	**Name**: Depth Limit **Meaning**: Seabed has been less than set depth for more than 3 seconds. **Remedy**: Be careful of risk of grounding.	Alarm/A
30903,-	905	**Name**: Audit log fail **Meaning**: An event could not be saved to the audit log. **Remedy**: Check the audit log.	Caution/B
30906,-	906	**Name**: Network overload **Meaning**: The LAN interface is overloaded. **Remedy**: Check other devices in the network.	Caution/B
80716,-	665	**Name**: AP Mode Conflict **Meaning**: Failure to start TCS. **Remedy**: Check the TCS mode in the Autopilot.	Caution/B, TCS
80721,-	659	**Name**: Drift Comp Fail **Meaning**: Cannot perform drift compensation. **Remedy**: Drift is inaccurate. Monitor drift carefully.	Alarm/B, TCS
80722,-	689	**Name**: Drift Comp Fail **Meaning**: Cannot perform drift compensation. **Remedy**: Drift is inaccurate. Monitor drift carefully.	Warning/B, TCS
80726,-	696	**Name**: Drift Inaccurate **Meaning**: Drift estimation is not reliable. **Remedy**: Monitor the drift value and compensate for error accordingly.	Caution/B, TCS
80731,2	661	**Name**: POSN Recovered **Meaning**: Failed position sensor becomes available before TCS stops. **Remedy**: Monitor ship’s position.	Alarm/B, TCS
80732,2	693	**Name**: POSN Recovered **Meaning**: Failed position sensor becomes available before TCS stops. **Remedy**: Monitor ship’s position.	Warning/B, TCS
80731,3	662	**Name**: SPD Recovered **Meaning**: Failed speed sensor becomes available before TCS stops. **Remedy**: Monitor ship’s speed.	Alarm/B, TCS

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
80732,3	694	**Name**: SPD Recovered. **Meaning**: Failed speed sensor becomes available before TCS stops. **Remedy**: Monitor ship's speed.	Warning/B, TCS
80727,-	660	**Name**: TCS Test Mode **Meaning**: TCS is in test mode. Checks disabled. **Remedy**: Wait until complete of tests to conduct checks.	Alarm/B, TCS
80728,-	690	**Name**: TCS Test Mode **Meaning**: TCS is in test mode. Checks disabled. **Remedy**: Wait until completion of tests to conduct checks.	Warning/B, TCS
80735,-	675	**Name**: Use MAN Steering **Meaning**: All GPS signals are lost during track control, and track control has been continued for 10 minutes in DR. Alarm generates every 2 minutes. **Remedy**: Switch autopilot mode to manual or auto.	Warning/B, TCS
3061,-	658	**Name**: Bad Track POSN **Meaning**: Self route check failed during track control. **Remedy**: Stop track control.	Alarm/A, TCS
3062,-	163	**Name**: Bad Track POSN **Meaning**: Self route check failed during track control. **Remedy**: Stop track control.	Warning/A TCS
3015,21	170	**Name**: Lost Position **Meaning**: All position data has been lost for more than 30 seconds. **Remedy**: Check the connection with all GPS.	Warning/B
3015,22	272	**Name**: Lost UTC Signal **Meaning**: Time data of all available GPS sensor has been not available for more than 3 seconds. **Remedy**: Check position sensor, sensor status.	Warning/B
3015,23	277	**Name**: Lost Wind Signal **Meaning**: Wind speed/direction data of all available WIND sensors has been not available for more than 3 seconds. **Remedy**: Check the connection with all wind sensors. Also, check sensor status.	Warning/B
3015,24	279	**Name**: Lost COG/SOG SIG **Meaning**: COG/SOG data input stopped for three seconds. **Remedy**: Check the connection with all GPS sensors. Also, check sensor status.	Warning/B
3015,25	284	**Name**: Lost LOG(BT) SIG **Meaning**: SOG data of all available LOG (ground speed) sensors has been not available for more than 3 seconds. **Remedy**: Check the connection with all LOG sensors. Also, check sensor status.	Warning/B
3015,26	450	**Name**: Lost Heading SIG **Meaning**: Heading data of all available gyro has been not available for more than 2 seconds. **Remedy**: Check the connection with all gyro. Also, check sensor status.	Warning/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
3015,27	453	**Name**: Lost SDME Signal **Meaning**: Speed data from all available SDME has been not available for more than 3 seconds. **Remedy**: Check the connection with all SDME. Also, check sensor status.	Warning/B
3015,28	278	**Name**: Lost LOG(WT) SIG **Meaning**: STW data of all available SDME sensors has been not available for more than 3 seconds. **Remedy**: Check the connection with all SDME. Also, check sensor status.	Warning/B
3015,30	380	**Name**: Lost AIS COM **Meaning**: Data from AIS has been discontinued for more than set time. (Set at installation) Default: 60 seconds AIS is turned off, or there is a problem with network. **Remedy**: Check the connection with AIS and network.	Warning/B
3016,24	382	**Name**: Lost COG/SOG SIG **Meaning**: COG/SOG data input stopped for three seconds. **Remedy**: Check the connection with all GPS sensors. Also, check sensor status.	Caution/B
3016,25	383	**Name**: Lost LOG(BT) SIG **Meaning**: SOG data of all available LOG (ground speed) sensors has been not available for more than 3 seconds. **Remedy**: Check that connection with all LOG sensors. Also, check sensor status.	Caution/B
3016,28	384	**Name**: Lost LOG(WT) SIG **Meaning**: Speed data from all available SDME has been not available for more than 3 seconds. **Remedy**: Check the connection with all SDME. Also, check sensor status.	Caution/B
3016,30	381	**Name**: Lost AIS COM Meaning: Data from AIS has been discontinued for more than set time. (Set at installation) Default: 60 seconds AIS is turned off, or there is a problem with network. **Remedy**: Check the connection with AIS and network.	Caution/B
30403,1	255	**Name**: Lost Gyro1 COM **Meaning**: Data from No.1 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.1 gyro is turned off, or there is a problem with network.	Caution/B
30403,2	256	**Name**: Lost Gyro2 COM **Meaning**: Data from No.2 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.2 gyro is turned off, or there is a problem with network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,3	257	**Name**: Lost Gyro3 COM **Meaning**: Data from No.3 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.3 gyro is turned off, or there is a problem with network.	Caution/B
30403,4	258	**Name**: Lost Gyro4 COM **Meaning**: Data from No.4 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.4 gyro is turned off, or there is a problem with network.	Caution/B
30403,5	259	**Name**: Lost Gyro5 COM **Meaning**: Data from No.5 gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.5 gyro is turned off, or there is a problem with network.	Caution/B
30512,1	900	**Name**: No POSN for FILT **Meaning**: No valid position sensor is available for filter. (Banned or connection error). **Remedy**: Check the connection with all GPS sensors.	Warning/B, TCS
30512,2	901	**Name**: No SOG for FILT **Meaning**: No valid COG/SOG is available for filter. (Banned or connection error) **Remedy**: Check the connection with all GPS sensors.	Warning/B, TCS
30512,3	902	**Name**: No STW for FILT **Meaning**: No valid CTW/STW sensor is available for filter. (Banned or connection error) **Remedy**: Check the connection with all GPS sensors.	Warning/B, TCS
30512,4	903	**Name**: No HDG for FILT **Meaning**: No valid heading sensor is available for filter. (Banned or connection error) **Remedy**: Check the connection with all GPS sensors.	Warning/B, TCS
30603,1	273	**Name**: Lost Bow Depth **Meaning**: Depth data of all available depth sensor(Bow) has been not available for more than 3 seconds. **Remedy**: Check the connection with all echo sounders.	Caution/B
30603,2	274	**Name**: Lost MID Depth **Meaning**: Depth data of all available depth sensor(Mid) has been not available for more than 3 seconds. **Remedy**: Check the connection with all echo sounders.	Caution/B
30603,3	275	**Name**: Lost Stern Depth **Meaning**: Depth data of all available depth sensor(Stern) has been not available for more than 3 seconds. **Remedy**: Check the connection with all echo sounders.	Caution/B
30603,5	285	**Name**: Lost HDG MAG **Meaning**: Heading data of all available magnetic gyro has been not available for more than 3 seconds. **Remedy**: Check the connection with all magnetic gyro.	Caution/B
30603,6	276	**Name**: Lost Depth **Meaning**: Depth data of all available depth sensors has been not available for more than 3 seconds. **Remedy**: Check the connection with all echo sounders.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30682,1	680	**Name**: Watch End **Meaning**: Watch is ending. **Remedy**: Prepare to make turn(s).	Warning/B
30682,2	681	**Name**: Repeated Timer **Meaning**: The action set with repeated timer is approaching. **Remedy**: Take the actions scheduled in advance.	Warning/B
30682,3	682	**Name**: Specified Timer **Meaning**: The action set with specified timer is approaching. **Remedy**: Take the actions scheduled in advance.	Warning/B
33035,1	634	**Name**: UKC Limit **Meaning**: Measured depth from echo sounder is less than set UKC limit value. **Remedy**: Be careful that measured depth is less than UKC limit.	Warning/A
33035,2	635	**Name**: Non-official ENC **Meaning**: A non-official ENC with warning and caution settings was detected in the fore monitoring check area. **Remedy**: Install official ENC.	Warning/A
33035,3	636	**Name**: No Vector Chart **Meaning**: A vector chart without warning and caution was detected in the fore monitoring check area, **Remedy**: Install latest vector chart.	Warning/A
33035,4	637	**Name**: Not Up-to-date **Meaning**: When Not Up to Date is set to Warning/Caution in chart alert, a chart area that is not up-to-date is detected inside the check area. **Remedy**: Install latest chart.	Warning/A
33035,5	638	**Name**: Permit Expired **Meaning**: When Permit Expired is set to Warning/Caution in chart alert, a chart area that has an expired permit is detected inside the check area. **Remedy**: Update chart permits.	Warning/A
33035,6	646	**Name**: Sounding UKC LIM **Meaning**: Chart depth for one or more legs is outside of UKC threshold. **Remedy**: Adjust course as necessary.	Warning/A
33035,7	647	**Name**: Too Many Dangers **Meaning**: Selected route and look-ahead area have too many dangerous objects. **Remedy**: The check area may not be completely checked for dangerous objects. Make the route or look-ahead area smaller.	Warning/A
33036,1	608	**Name**: UKC Limit **Meaning**: **Measured depth from echo sounder is less than UKC limit value.** **Remedy**: Be careful that measured depth is less than UKC limit.	Caution/B
33036,2	609	**Name**: Non-official ENC **Meaning**: When Non-official ENC is set to Warning/Caution in chart alert, the non-official chart area is detected inside the check area. Remedy: Install latest official ENC.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
33036,3	611	**Name**: No Vector Chart **Meaning**: When No Vector Chart is set to Warning/Caution in chart alert, the No Vector Chart area is detected inside the check area. **Remedy**: Install vector charts.	Caution/B
33036,4	612	**Name**: Not Up-to-date **Meaning**: When Not Up to Date is set to Warning/Caution in chart alert, a chart area that is not up-to-date is detected inside the check area. **Remedy**: Install latest chart.	Caution/B
33036,5	613	**Name**: Permit Expired **Meaning**: When Permit Expired is set to Caution in chart alert, a chart area the has an expired permit is detected inside the check area. **Remedy**: Update chart permits.	Caution/B
33036,6	614	**Name**: Sounding UKC LIM **Meaning**: Chart depth for one or more legs is outside the UKC threshold. **Remedy**: Adjust course accordingly.	Caution/B
33036,7	615	**Name**: Too Many Dangers **Meaning**: Selected route and look-ahead area have too many dangerous objects. **Remedy**: The check area may not be completely checked for dangerous objects. Make the route or look-ahead area smaller.	Caution/B
3007,200	160	**Name**: TCS Stopped **Meaning**: Track control is discontinued because sensors such as GYRO, GPS, LOG and Autopilot stop input during Track Control. **Remedy**: Check the sensors and autopilot.	Alarm/B, TCS
3008,200	153	**Name**: TCS Stopped **Meaning**: Track control is discontinued because sensors such as GYRO, GPS, LOG and Autopilot stop input during track control. **Remedy**: Check the sensors and autopilot.	Warning/B, TCS
3022,-	165	**Name**: TCS Power Fail **Meaning**: Some units running TCS have experienced a power failure. **Remedy**: Check the TCS.	Warning/B, TCS
3024,2	653	**Name**: End of Track **Meaning**: Vessel is 30 seconds away from last waypoint. **Remedy**: Track control reaches last waypoint. Take necessary action.	Alarm/A, TCS
3025,2	652	**Name**: End of Track **Meaning**: Vessel is 30 seconds away from last waypoint. **Remedy**: Track control reaches last waypoint. Take necessary action.	Warning/A, TCS
3008,100	691	**Name**: Route Failure **Meaning**: Route monitoring is stopped due to internal error. **Remedy**: Check own ship position.	Warning/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30303,1	030	**Name**: Lost SA1 COM **Meaning**: Communication error with No.1 sensor adapter is detected. 30 seconds timeout. No.1 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.1 sensor adapter and network.	Caution/B
30303,2	031	**Name**: Lost SA2 COM **Meaning**: Communication error with No.2 sensor adapter is detected. 30 seconds timeout. No.2 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.2 sensor adapter and network.	Caution/B
30303,3	032	**Name**: Lost SA3 COM **Meaning**: Communication error with No.3 sensor adapter is detected. 30 seconds timeout. No.3 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.3 sensor adapter and network.	Caution/B
30303,4	033	**Name**: Lost SA4 COM **Meaning**: Communication error with No.4 sensor adapter is detected. 30 seconds timeout. No.4 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.4 sensor adapter and network.	Caution/B
30303,5	034	**Name**: Lost SA5 COM **Meaning**: Communication error with No.5 sensor adapter is detected. 30 seconds timeout. No.5 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.5 sensor adapter and network.	Caution/B
30303,6	035	**Name**: Lost SA6 COM **Meaning**: Communication error with No.6 sensor adapter is detected. 30 seconds timeout. No.6 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.6 sensor adapter and network.	Caution/B
30303,7	036	**Name**: Lost SA7 COM **Meaning**: Communication error with No.7 sensor adapter is detected. 30 seconds timeout. No.7 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.7 sensor adapter and network.	Caution/B
30303,8	037	**Name**: Lost SA8 COM **Meaning**: Communication error with No.8 sensor adapter is detected. 30 seconds timeout. No.8 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.8 sensor adapter and network.	Caution/B
30303,9	038	**Name**: Lost SA9 COM **Meaning**: Communication error with No.9 sensor adapter is detected. 30 seconds timeout. No.9 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.9 sensor adapter and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30303,10	039	**Name**: Lost SA10 COM **Meaning**: Communication error with No.10 sensor adapter is detected. 30 seconds timeout. No.10 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.10 sensor adapter and network.	Caution/B
30303,11	094	**Name**: Lost SA11 COM **Meaning**: Communication error with No.11 sensor adapter is detected. 30 seconds timeout. No.11 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.11 sensor adapter and network.	Caution/B
30303,12	095	**Name**: Lost SA12 COM **Meaning**: Communication error with No.12 sensor adapter is detected. 30 seconds timeout. No.12 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.12 sensor adapter and network.	Caution/B
30303,13	096	**Name**: Lost SA13 COM **Meaning**: Communication error with No.13 sensor adapter is detected. 30 seconds timeout. No.13 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.13 sensor adapter and network.	Caution/B
30303,14	097	**Name**: Lost SA14 COM **Meaning**: Communication error with No.14 sensor adapter is detected. 30 seconds timeout. No.14 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.14 sensor adapter and network.	Caution/B
30303,15	098	**Name**: Lost SA15 COM **Meaning**: Communication error with No.15 sensor adapter is detected. 30 seconds timeout. No.15 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.15 sensor adapter and network.	Caution/B
30303,16	099	**Name**: Lost SA16 COM **Meaning**: Communication error with No.16 sensor adapter is detected. 30 seconds timeout. No.16 sensor adapter is turned off, or there is a problem with network. **Remedy**: Check the connection with No.16 sensor adapter and network.	Caution/B
3031,101	656	**Name**: CRS Difference **Meaning**: Actual heading of the ship deviates from the track course beyond a preset value (default 30 degrees). **Remedy**: Monitor closely or stop track control.	Alarm/A, TCS
3032,101	158	**Name**: CRS Difference **Meaning**: Actual heading of the ship deviates from the track course beyond a preset value (default 30 degrees). **Remedy**: Monitor closely or stop track control.	Warning/A, TCS

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,11	391	**Name**: Lost ROT Gyro1 **Meaning**: Data from No.1 ROT gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: Check the connection with No.1 ROT gyro.	Caution/B
30403,12	392	**Name**: Lost ROT Gyro2 **Meaning**: Data from No.2 ROT gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: Check the connection with No.2 ROT gyro.	Caution/B
30403,13	393	**Name**: Lost ROT Gyro3 **Meaning**: Data from No.3 ROT gyro has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: Check the connection with No.3 ROT gyro.	Caution/B
30403,21	290	**Name**: Lost GPS1 COM **Meaning**: Ship position data from No.1 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.1 GPS is turned off, or there is a problem with network.	Caution/B
30403,22	291	**Name**: Lost GPS2 COM **Meaning**: Ship position data from No.2 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.2 GPS is turned off, or there is a problem with network.	Caution/B
30403,23	292	**Name**: Lost GPS3 COM **Meaning**: Ship position data from No.3 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.3 GPS is turned off, or there is a problem with network.	Caution/B
30403,24	293	**Name**: Lost GPS4 COM **Meaning**: Ship position data from No.4 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.4 GPS is turned off, or there is a problem with network.	Caution/B
30403,25	294	**Name**: Lost GPS5 COM **Meaning**: Ship position data from No.5 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.5 GPS is turned off, or there is a problem with network.	Caution/B
30403,26	295	**Name**: Lost GPS6 COM **Meaning**: Ship position data from No.6 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.6 GPS is turned off, or there is a problem with network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,27	296	**Name**: Lost GPS7 COM **Meaning**: Ship position data from No.7 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.7 GPS is turned off, or there is a problem with network.	Caution/B
30403,28	297	**Name**: Lost GPS8 COM **Meaning**: Ship position data from No.8 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.8 GPS is turned off, or there is a problem with network.	Caution/B
30403,29	298	**Name**: Lost GPS9 COM **Meaning**: Ship position data from No.9 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.9 GPS is turned off, or there is a problem with network.	Caution/B
30403,30	299	**Name**: Lost GPS10 COM **Meaning**: Ship position data from No.10 GPS has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.10 GPS is turned off, or there is a problem with network.	Caution/B
30403,41	280	**Name**: Lost SDME 1 COM **Meaning**: Speed data from No.1 SDME has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.1 SDME is turned off, or there is a problem with network. **Remedy**: Check the connection with No.1 SDME and network.	Caution/B
30403,42	281	**Name**: Lost SDME 2 COM **Meaning**: Speed data from No.2 SDME has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.2 SDME is turned off, or there is a problem with network. **Remedy**: Check the connection with No.2 SDME and network.	Caution/B
30403,43	282	**Name**: Lost SDME 3 COM **Meaning**: Speed data from No.3 SDME has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.3 SDME is turned off, or there is a problem with network. **Remedy**: Check the connection with No.3 SDME and network.	Caution/B
30403,51	235	**Name**: Lost Depth1 COM **Meaning**: Input of depth data from No.1 echo sounder has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.1 echo sounder is turned off, or there is a problem with network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,52	236	**Name**: Lost Depth2 COM **Meaning**: Input of depth data from No.2 echo sounder has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.2 echo sounder is turned off, or there is a problem with network.	Caution/B
30403,53	237	**Name**: Lost Depth3 COM **Meaning**: Input of depth data from No.3 echo sounder has been discontinued for more than set time. (Set at installation) Default: 60 seconds **Remedy**: No.3 echo sounder is turned off, or there is a problem with network.	Caution/B
30403,61	300	**Name**: Lost Rudder1 COM **Meaning**: Rudder data from No.1 rudder sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.1 Rudder is turned off, or there is a problem with network. **Remedy**: Check the connection with No.1 rudder sensor and network.	Caution/B
30403,62	301	**Name**: Lost Rudder2 COM **Meaning**: Rudder data from No.2 rudder sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.2 Rudder is turned off, or there is a problem with network. **Remedy**: Check the connection with No.2 rudder sensor and network.	Caution/B
30403,63	302	**Name**: Lost Rudder3 COM **Meaning**: Rudder data from No.3 rudder sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.3 Rudder is turned off, or there is a problem with network. **Remedy**: Check the connection with No.3 rudder sensor and network.	Caution/B
30403,71	303	**Name**: Lost HCS1 COM **Meaning**: Data from No.1 HCS has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.1 HCS is turned off, or there is a problem with network. **Remedy**: Check the connection with No.1 HCS and network.	Caution/B
30403,72	304	**Name**: Lost HCS2 COM **Meaning**: Data from No.2 HCS has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.2 HCS is turned off, or there is a problem with network. **Remedy**: Check the connection with No.2 HCS and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403,81	305	**Name**: Lost VDR COM **Meaning**: Sentence from VDR has been discontinued for more than set time. (Set at installation) Default: 180 seconds VDR is turned off, or there is a problem with network. **Remedy**: Check the connection with VDR and network.	Caution/B
30403,91	306	**Name**: Lost BNWAS1 COM **Meaning**: Caution Sentence from BNWAS1 has been discontinued for more than set time. (Set at installation) Default: 180 seconds BNWAS1 is turned off, or there is a problem with network. **Remedy**: Check the connection with BNWAS1 and network.	Caution/B
30403,92	307	**Name**: Lost BNWAS2 COM **Meaning**: Caution Sentence from BNWAS2 has been discontinued for more than set time. (Set at installation) Default: 180 seconds BNWAS2 is turned off, or there is a problem with network. **Remedy**: Check the connection with BNWAS2 and network.	Caution/B
30403,93	308	**Name**: Lost BNWAS3 COM **Meaning**: Caution Sentence from BNWAS3 has been discontinued for more than set time. (Set at installation) Default: 180 seconds BNWAS3 is turned off, or there is a problem with network. **Remedy**: Check the connection with BNWAS3 and network.	Caution/B
30503,1	851	**Name**: GPS1 Banned **Meaning**: Own ship position data from No.1 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,2	852	**Name**: GPS2 Banned **Meaning**: Own ship position data from No.2 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,3	853	**Name**: GPS3 Banned **Meaning**: Own ship position data from No.3 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30503,4	854	**Name**: GPS4 Banned **Meaning**: Own ship position data from No.4 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,5	855	**Name**: GPS5 Banned **Meaning**: Own ship position data from No.5 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,6	856	**Name**: GPS6 Banned **Meaning**: Own ship position data from No.6 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,7	857	**Name**: GPS7 Banned **Meaning**: Own ship position data from No.7 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,8	858	**Name**: GPS8 Banned **Meaning**: Own ship position data from No.8 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,9	859	**Name**: GPS9 Banned **Meaning**: Own ship position data from No.9 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30503,10	860	**Name**: GPS10 Banned **Meaning**: Own ship position data from No.10 GPS is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,11	871	**Name**: Gyro1 Banned **Meaning**: Heading data from No.1 Gyro is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,12	872	**Name**: Gyro2 Banned **Meaning**: Heading data from No.2 Gyro is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,13	873	**Name**: Gyro3 Banned **Meaning**: Heading data from No.3 Gyro is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,14	874	**Name**: Gyro4 Banned **Meaning**: Heading data from No.4 Gyro is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,15	875	**Name**: Gyro5 Banned **Meaning**: Heading data from No.5 Gyro is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30503,21	861	**Name**: SDME1 Banned **Meaning**: Own ship speed data from No.1 SDME is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,22	862	**Name**: SDME2 Banned **Meaning**: Own ship speed data from No.2 SDME is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,23	863	**Name**: SDME3 Banned **Meaning**: Own ship speed data from No.3 SDME is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,31	881	**Name**: ROT Gyro1 Banned **Meaning**: Heading data from No.1 ROT Gyro is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,32	882	**Name**: ROT Gyro2 Banned **Meaning**: Heading data from No.2 ROT Gyro is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS
30503,33	883	**Name**: ROT Gyro 3 Banned **Meaning**: Heading data from No.3 ROT Gyro is determined abnormal by integrity check. **Remedy**: Reset the filter to confirm that it isn't a temporal error value. If the data is normal, it is reusable. However, if it's continually removed, there is a possibility that correct data is not received from sensor. In this case, contact FURUNO.	Caution/B, TCS

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 101	360	**Name**: Lost WIND1 COM **Meaning**: Data from No.1 wind sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.1 wind sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.1 wind sensor.	Caution/B
30403, 102	361	**Name**: Lost WIND2 COM **Meaning**: Data from No.2 wind sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.2 wind sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.2 wind sensor.	Caution/B
30403, 103	362	**Name**: Lost WIND3 COM **Meaning**: Data from No.3 wind sensor has been discontinued for more than set time. (Set at installation) Default: 60 seconds No.3 wind sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.3 wind sensor.	Caution/B
30403, 111	370	**Name**: Lost CURRENT COM **Meaning**: Data from water current has been discontinued for more than set time. (Set at installation) Default: 60 seconds Water current sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with water current and network.	Caution/B
30403, 121	371	**Name**: Lost TEMP COM **Meaning**: Data from water temp. has been discontinued for more than set time. (Set at installation) Default: 60 seconds Water temp sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with water temp and network.	Caution/B
30403, 141	390	**Name**: Lost NAVTEX COM **Meaning**: Data from NAVTEX has been discontinued for more than set time. (Set at installation) Default: 180 seconds NAVTEX is turned off, or there is a problem with network. **Remedy**: Check the connection with NAVTEX and network.	Caution/B
30403, 151	310	**Name**: Lost OTHER1 COM **Meaning**: Data from No.1 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.1 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.1 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 152	311	**Name**: Lost OTHER2 COM **Meaning**: Data from No.2 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.2 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.2 other sensor and network.	Caution/B
30403, 153	312	**Name**: Lost OTHER3 COM **Meaning**: Data from No.3 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.3 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.3 other sensor and network.	Caution/B
30403, 154	313	**Name**: Lost OTHER4 COM **Meaning**: Data from No.4 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.4 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.4 other sensor and network.	Caution/B
30403, 155	314	**Name**: Lost OTHER5 COM **Meaning**: Data from No.5 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.5 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.5 other sensor and network.	Caution/B
30403, 156	315	**Name**: Lost OTHER6 COM **Meaning**: Data from No.6 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.6 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.6 other sensor and network.	Caution/B
30403, 157	316	**Name**: Lost OTHER7 COM **Meaning**: Data from No.7 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.7 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.7 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 158	317	**Name**: Lost OTHER8 COM **Meaning**: Data from No.8 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.8 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.8 other sensor and network.	Caution/B
30403, 159	318	**Name**: Lost OTHER9 COM **Meaning**: Data from No.9 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.9 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.9 other sensor and network.	Caution/B
30403, 160	319	**Name**: Lost OTHER10 COM **Meaning**: Data from No.10 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.10 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.10 other sensor and network.	Caution/B
30403, 161	411	**Name**: Lost OTHER11 COM **Meaning**: Data from No.11 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.11 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.11 other sensor and network.	Caution/B
30403, 162	412	**Name**: Lost OTHER12 COM **Meaning**: Data from No.12 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.12 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.12 other sensor and network.	Caution/B
30403, 163	413	**Name**: Lost OTHER13 COM **Meaning**: Data from No.13 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.13 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.13 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 164	414	**Name**: Lost OTHER14 COM **Meaning**: Data from No.14 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.14 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.14 other sensor and network.	Caution/B
30403, 165	415	**Name**: Lost OTHER15 COM **Meaning**: Data from No.15 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.15 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.15 other sensor and network.	Caution/B
30403, 166	416	**Name**: Lost OTHER16 COM **Meaning**: Data from No.16 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.16 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.16 other sensor and network.	Caution/B
30403, 167	417	**Name**: Lost OTHER17 COM **Meaning**: Data from No.17 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.17 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.17 other sensor and network.	Caution/B
30403, 168	418	**Name**: Lost OTHER18 COM **Meaning**: Data from No.18 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.18 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.18 other sensor and network.	Caution/B
30403, 169	419	**Name**: Lost OTHER19 COM **Meaning**: Data from No.19 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.19 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.19 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 170	420	**Name**: Lost OTHER20 COM **Meaning**: Data from No.20 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.20 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.20 other sensor and network.	Caution/B
30403, 171	421	**Name**: Lost OTHER21 COM **Meaning**: Data from No.21 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.21 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.21 other sensor and network.	Caution/B
30403, 172	422	**Name**: Lost OTHER22 COM **Meaning**: Data from No.22 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.22 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.22 other sensor and network.	Caution/B
30403, 173	423	**Name**: Lost OTHER23 COM **Meaning**: Data from No.23 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.23 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.23 other sensor and network.	Caution/B
30403, 174	424	**Name**: Lost OTHER24 COM **Meaning**: Data from No.24 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.24 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.24 other sensor and network.	Caution/B
30403, 175	425	**Name**: Lost OTHER25 COM **Meaning**: Data from No.25 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.25 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.25 other sensor and network.	Caution/B

Alert No.		Alert Name, Meaning and Remedy	Priority/ Category
ALF ID	ALR ID		
30403, 176	426	**Name**: Lost OTHER26 COM **Meaning**: Data from No.26 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.26 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.26 other sensor and network.	Caution/B
30403, 177	427	**Name**: Lost OTHER27 COM **Meaning**: Data from No.27 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.27 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.27 other sensor and network.	Caution/B
30403, 178	428	**Name**: Lost OTHER28 COM **Meaning**: Data from No.28 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.28 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.28 other sensor and network.	Caution/B
30403, 179	429	**Name**: Lost OTHER29 COM **Meaning**: Data from No.29 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.29 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.29 other sensor and network.	Caution/B
30403, 180	430	**Name**: Lost OTHER30 COM **Meaning**: Data from No.30 other sensor has been discontinued for more than set time. (Set at installation) Default: 180 seconds No.30 other sensor is turned off, or there is a problem with network. **Remedy**: Check the connection with No.30 other sensor and network.	Caution/B

Priority: Indication

All indication alerts are in category "B". Note that the ALF sentence is not output.

Note: Indication alerts appears in both the Alert box and the Alert list, just like any other alert.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30001,1	001	**Name**: Main Monitor Fan1 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 1 fan in the main monitor (FURUNO make) connected to COM1 is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30001,2	002	**Name**: Main Monitor Fan2 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 2 fan in the main monitor (FURUNO make) connected to COM1 is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,3	003	**Name**: Main Monitor Fan3 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 3 fan in the main monitor (FURUNO make) connected to COM1 is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,4	004	**Name**: Main Monitor Fan4 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 4 fan in the main monitor (FURUNO make) connected to COM1 is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,5	014	**Name**: Sub Monitor Fan1 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 1 fan in the sub monitor (FURUNO make) connected to COM2 is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,6	015	**Name**: Sub Monitor Fan2 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 2 fan in the sub monitor (FURUNO make) connected to COM2 is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,7	016	**Name**: Sub Monitor Fan3 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 3 fan in the sub monitor (FURUNO make) connected to COM2 is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,8	017	**Name**: Sub Monitor Fan4 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 4 fan in the sub monitor (FURUNO make) connected to COM2 is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,9	011	**Name**: Main Monitor RS485 Communication Timeout **Meaning**: RS485 communication error between the display (main monitor) connected to COM1 and EC-3000/3005 has occurred for 180 seconds or more (sentence error or checksum error). **Remedy**: Check the brilliance control cable. If the cable is damaged, replace it.
30001,10	024	**Name**: Sub Monitor RS485 Communication Timeout **Meaning**: RS485 communication error between the display (sub monitor) connected to COM2 and EC-3000/3005 has occurred for 180 seconds or more (sentence error or checksum error). **Remedy**: Check the brilliance control cable. If the cable is damaged, replace it.
30001,11	012	**Name**: Main Monitor No Signal **Meaning**: No video signal has been input for 60 seconds or more from the display (main monitor) connected to COM1. **Remedy**: Check the video signal cable. If the cable is damaged, replace it.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30001,12	025	**Name**: Sub Monitor No Signal **Meaning**: No video signal has been input for 60 seconds or more from the display (sub monitor) connected to COM2. **Remedy**: Check the video signal cable. If the cable is damaged, replace it.
30001,13	013	**Name**: Main Monitor Sentence Syntax Error **Meaning**: There is a syntax error in the sentence input from the display (main monitor) connected to COM1. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer to request service.
30001,14	026	**Name**: Sub Monitor Sentence Syntax Error **Meaning**: There is a syntax error in the sentence input from the display (sub monitor) connected to COM2. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer to request service.
30001,15	027	**Name**: Main Monitor COM Timeout **Meaning**: The connection with the display (main monitor) connected to COM1 has been lost for 60 seconds or more. **Remedy**: Check the connection with the display unit.
30001,16	028	**Name**: Sub Monitor COM Timeout **Meaning**: The connection with the display (sub monitor) connected to COM2 has been lost for 60 seconds or more. **Remedy**: Check the connection with the display unit.
30001,17	073	**Name**: Processor Unit CPU Temp High **Meaning**: The temperature of the CPU in the processor unit is rising. **Remedy**: Turn off the processor unit. Wait several minutes, then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,18	074	**Name**: Processor Unit GPU Temp High **Meaning**: The temperature of the GPU in the processor unit is rising. **Remedy**: Turn off the processor unit. Wait several minutes, then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,19	075	**Name**: Processor Unit CPU Board Temp High **Meaning**: The temperature of the CPU board in the processor unit is rising. **Remedy**: Turn off the processor unit. Wait several minutes, then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,20	076	**Name**: Processor Unit Remote1 Temp High **Meaning**: The temperature of the CPU in the processor unit is rising. **Remedy**: Turn off the processor unit. Wait several minutes, then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,21	077	**Name**: Processor Unit Remote2 Temp High **Meaning**: The temperature of the CPU in the processor unit is rising. **Remedy**: Turn off the processor unit. Wait several minutes, then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,22	078	**Name**: Processor Unit CPU Fan Rotation Speed Lowering **Meaning**: The rotation speed of the CPU fan in the processor unit is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30001,23	079	**Name**: Processor Unit Fan1 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 1 fan in the processor unit is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,24	080	**Name**: Processor Unit Fan2 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 2 fan in the processor unit is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,25	081	**Name**: Processor Unit Fan3 Rotation Speed Lowering **Meaning**: The rotation speed of the No. 3 fan in the processor unit is lowering. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30001,26	089	**Name**: Processor Unit CPU board Battery Power Error **Meaning**: CPU board battery voltage in processor unit is out of threshold. **Remedy**: Turn off the processor unit. Wait several minutes, then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,27	090	**Name**: Processor Unit CPU board Core Power Error **Meaning**: CPU board core voltage error has occurred. **Remedy**: Turn off the processor unit. Wait several minutes, then turn on the power. If the message appears, contact a FURUNO agent or dealer to request service.
30001,28	070	**Name**: RCU 1 COM Timeout **Meaning**: Communication error with No. 1 control unit has occurred for 40 seconds or more. **Remedy**: Check the connection with the control unit.
30001,29	071	**Name**: RCU 2 COM Timeout **Meaning**: Communication error with No. 2 control unit has occurred for 40 seconds or more. **Remedy**: Check the connection with the control unit.
30001,30	072	**Name**: RCU 3 COM Timeout **Meaning**: Communication error with No. 3 control unit has occurred for 40 seconds or more. **Remedy**: Check the connection with the control unit.
30001,31	400	**Name**: Network Printer Not Available **Meaning**: The network printer cannot be detected. There may be a connection error or an error (out of paper, jam, out of ink, etc.) on the printer side. **Remedy**: Make sure the printer is connected to the network. Make sure that no errors (out of paper, jam, out of ink, etc.) have occurred on the printer side.
30001,32	401	**Name**: Local Printer Not Available **Meaning**: The local printer cannot be detected. There may be a connection error or an error (out of paper, jam, out of ink, etc.) on the printer side. **Remedy**: Make sure the printer is connected to the network. Make sure that no errors (out of paper, jam, out of ink, etc.) have occurred on the printer side.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30002,3	006	**Name**: Main Monitor High Temperature Inside Monitor **Meaning**: The internal temperature of the display (main monitor) connected to COM1 is rising. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer and report the frequency of occurrence.
30002,4	019	**Name**: Sub Monitor High Temperature Inside Monitor **Meaning**: The internal temperature of the display (sub monitor) connected to COM2 is rising. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer and report the frequency of occurrence.
30002,5	007	**Name**: Main Monitor Fan1 No Rotation **Meaning**: The No. 1 fan of the main monitor (FURUNO make) connected to COM1 has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,6	008	**Name**: Main Monitor Fan2 No Rotation **Meaning**: The No. 2 fan of the main monitor (FURUNO make) connected to COM1 has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,7	009	**Name**: Main Monitor Fan3 No Rotation **Meaning**: The No. 3 fan of the main monitor (FURUNO make) connected to COM1 has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,8	010	**Name**: Main Monitor Fan4 No Rotation **Meaning**: The No. 4 fan of the main monitor (FURUNO make) connected to COM1 has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,9	020	**Name**: Sub Monitor Fan1 No Rotation **Meaning**: The No. 1 fan of the sub monitor (FURUNO make) connected to COM2 has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,10	021	**Name**: Sub Monitor Fan2 No Rotation **Meaning**: The No. 2 fan of the sub monitor (FURUNO make) connected to COM2 has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,11	022	**Name**: Sub Monitor Fan3 No Rotation **Meaning**: The No. 3 fan of the sub monitor (FURUNO make) connected to COM2 has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,12	023	**Name**: Sub Monitor Fan4 No Rotation **Meaning**: The No. 4 fan of the sub monitor (FURUNO make) connected to COM2 has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,13	082	**Name**: Processor Unit CPU Fan No Rotation **Meaning**: The CPU fan in the processor unit has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30002,14	083	**Name**: Processor Unit Fan1 No Rotation **Meaning**: The No. 1 fan in the processor unit has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,15	084	**Name**: Processor Unit Fan2 No Rotation **Meaning**: The No. 2 fan in the processor unit has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,16	085	**Name**: Processor Unit Fan3 No Rotation **Meaning**: The No. 3 fan in the processor unit has stopped rotating. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer about replacement of the fan.
30002,17	086	**Name**: Processor Unit CPU board 5V Power Error **Meaning**: Voltage error (5V) on the CPU board. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer and report the frequency of occurrence.
30002,18	087	**Name**: Processor Unit CPU board 3.3V Power Error **Meaning**: Voltage error (3.3V) on the CPU board. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer and report the frequency of occurrence.
30002,19	088	**Name**: Processor Unit CPU board 12V Power Error **Meaning**: Voltage error (12V) on the CPU board. **Remedy**: If this occurs frequently, contact a FURUNO agent or dealer and report the frequency of occurrence.
30050,1	320	**Name**: Lost CH1 COM **Meaning**: Communication with the EC-3000/3005 serial port CH1 has been interrupted for more than the time set at installation (default setting: no timeout). **Remedy**: Check the serial port.
30050,2	321	**Name**: Lost CH2 COM **Meaning**: Communication with the EC-3000/3005 serial port CH2 has been interrupted for more than the time set at installation (default setting: no timeout). **Remedy**: Check the serial port.
30050,3	322	**Name**: Lost CH3 COM **Meaning**: Communication with the EC-3000/3005 serial port CH3 has been interrupted for more than the time set at installation (default setting: no timeout). **Remedy**: Check the serial port.
30050,4	323	**Name**: Lost CH4 COM **Meaning**: Communication with the EC-3000/3005 serial port CH4 has been interrupted for more than the time set at installation (default setting: no timeout). **Remedy**: Check the serial port.
30050,5	324	**Name**: Lost CH5 COM **Meaning**: Communication with the EC-3000/3005 serial port CH5 has been interrupted for more than the time set at installation (default setting: no timeout). **Remedy**: Check the serial port.
30050,6	325	**Name**: Lost CH6 COM **Meaning**: Communication with the EC-3000/3005 serial port CH6 has been interrupted for more than the time set at installation (default setting: no timeout). **Remedy**: Check the serial port.

Alert No.		Alert Name, Meaning and Remedy
ALF ID	ALR ID	
30050,7	326	**Name**: Lost CH7 COM **Meaning**: Communication with the EC-3000/3005 serial port CH7 has been interrupted for more than the time set at installation (default setting: no timeout). **Remedy**: Check the serial port.
30050,8	327	**Name**: Lost CH8 COM **Meaning**: Communication with the EC-3000/3005 serial port CH8 has been interrupted for more than the time set at installation (default setting: no timeout). **Remedy**: Check the serial port.
30807,-	820	**Name**: NAVTEX Message Received **Meaning**: Navtex message has been received. **Remedy**: Check the content of the message.

SPECIFICATIONS OF
Electronic Chart Display and Information System (ECDIS)
FMD-3005

1 MONITOR UNIT

1.1	Display type	
	MU-190/192	19-inch color LCD, 1280 x 1024 pixel (SXGA)
	MU-270W	27-inch color LCD, 1920 x 1200 pixel (WUXGA)
1.2	Brilliance	
	MU-190	450 cd/m^2 typical
	MU-192/270W	400 cd/m^2 typical
1.3	Visible distance	1.02 m nominal
1.4	Video interface	DVI-D: DVI-standard, VESA-DDC2B
1.5	Brilliance control	RS-485, serial data control (DDC sentence)

2. PROCESSOR UNIT

2.1	Display mode	HU/NU/CU/RU (True/Relative motion)
2.2	Chart materials	IMO/IHO S57-3 ENC or C-MAP vectorized material BA ARCS rasterized material
2.3	Own ship's indication	Own ship's mark/track and numeral position in lat/lon, speed, course and heading
2.4	Target tracking (TT)	Range, bearing, speed, course, CPA/TCPA Target information from AIS
2.5	Other information	Waypoint, Route monitoring and several alarms
2.6	Display features	Chart zoom-in/out, Cursor (EBL, VRM, parallel index lines), Scroll, Symbol select, Palette select, One touch activation, Electronic chart information auto-update
2.7	Position calculation	Navigation by result of positioning found with external sensor Dead reckoning with gyro and log Highly accurate position, speed and heading from Kalman filter
2.8	Route planning	Planning by rhumb line, great circle, Chart alarm, SAR composition, Optimize
2.9	Route monitoring	Off-track display, Waypoint arrival alarm, Shallow depth alarm Route creation; route data is transferred to radar
2.10	User chart creation	100,000 points max. (amount of 5 files max.)
2.11	Notes	Create and display notes data; transferred to radar
2.12	AIS safety message	Receive, create and transmit safety messages View and modify own ship information stored in AIS transponder
2.13	NAVTEX message	Receive and display NAVTEX messages (position, etc.)
2.14	MOB (Man Overboard)	Position and other data at time of man overboard are recorded MOB mark is displayed on the screen
2.15	Manual update	User enters, deletes and edits chart objects
2.16	Other functions	Radar overlay, Playback voyage data

3 INTELLIGENT HUB (OPTION)

3.1	Number of ports	8 ports (10/100/1000BASE-T)
3.2	Swiching method	Store and forward, non-blocking L2 switching
3.3	Capacitance of switching	16 Gbps

3.4	Flow Control	Full-Duplex (IEEE802.3x flow-controlled at automatic mode)
3.5	Ring aggregation	8 group max.
3.6	Spanning tree	STP(IEEE802.1D), RSTP(IEEE802.1w), MST(IEEE802.1s)
3.7	IGMP snooping	IGMP v1, v2, v3
3.8	Operation control	PING, SNMP v1, v2c, v3
3.9	VLAN	Port-base VLAN, IEEE802.1Q Tag VLAN supported, VLAN ID : 1 to 4094, VLAN registration : 128 group
3.10	Multiple VLAN	Communication between isolated ports is disabled
3.11	Cast control	Broadcast, Multicast suppression

4 RADAR OVERLAY (OPTION)

4.1	Picture color	Radar picture: 256 colors
4.2	Range	0.125 to 96 NM
4.3	Display mode	Heading-up, North-up (heading data required)

5 INTERFACE

5.1	Processor unit (EC-3005)	
	Number of port	
	Serial	8 ports (IEC61162-1/2: 4 ports, IEC61162-1: 4 ports)
	Alarm output	6 ports: contact signal, load current 250 mA Normal close: 2, Normal open: 2, System fail: 1 (n/c), Power fail: 1 (n/c)
	DVI output	3 ports: DVI-D (2), DVI-I or RGB picture data (1 port for VDR)
	USB	4 ports (3 ports for control units)
	LAN	2 ports: Ethernet 1000Base-T for local communication
	Digital input	1 port: contact signal, 100 ohm max. or 24 VDC input
	Data sentences	
	Input	ABK, ACN, ALC, ALF, ALR, ARC, CUR, DBT, DPT, DTM, ETL, EVE, GGA, GLL, GNS, HBT, HCR, HDT, HTD, MTW, MWV, NRM, NRX, NSR, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, THS, TLB, TRC, TRD, TTD, TTM, VBW, VDM, VDO, VDR, VHW, VLW, VSD, VTG, XDR, ZDA
	Output	ABM, ACK, ACN, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, HTC, OSD, RRT, RTE, VBW, VDR, VSD, WPL, XTE
5.2	Sensor adapter (option)	
	MC-3000S (serial)	8 ports: I/O, IEC61162-1/2: 4 ports, IEC61162-1: 4 ports
	MC-3010A (analog)	3 ports: Input, -10 to +10 V, 0 to 10 V or 4 to 20 mA
	MC-3020D (digital-in)	8 ports: relay contact, logics set from program
	MC-3030D (digital-out)	8 ports: relay contact, normal open and normal close available
5.3	Ethernet interface for IEC61162-450 (EC-3005)	
	Port (LAN2)	1000Base-T, IPv4, 8P8C connector
	Data sentences	
	Input	ABK, ACN, ALC, ALF, ALR, ARC, CUR, DBT, DPT, DTM, ETL, EVE, GGA, GLL, GNS, HBT, HCR, HDT, HTD, MTW, MWV, NRM, NRX, NSR, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, THS, TLB, TRC, TRD, TTD, TTM, VBW, VDM, VDO, VDR, VHW, VLW, VSD, VTG, XDR, ZDA
	Output	ABM, ACK, ACN, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT,

		HTC, OSD, RRT, RTE, VBW, VDR, VSD, WPL, XTE
	IEC61162-450 transmission group	
	Input	MISC, TGTD, SATD, NAVD, VDRD, RCOM, TIME, PROP, USR1 to USR8, BAM1, BAM2, CAM1, CAM2, NETA, PGP1 to PGP4, PGB1 to PGB4
	Output	Arbitrary (default: NAVD)
	Multicast address	239.192.0.1 to 239.192.0.20, 239.192.0.56 to 239.192.0.64
	Destination port	60001 to 60020, 60056 to 60064
	Datagram header	UdPbC
	Non Re-transmittable binary image transfer	
	Multicast address	239.192.0.21 to 239.192.0.25
	Destination port	60021 to 60025
	Datagram header	RaUdP
	Maximum output rate	Adjustable from 0.8 to 16 Mbps (0.8 Mbps steps), default: 4.8 Mbps
	Re-transmittable binary image transfer	
	Multicast address	239.192.0.26 to 239.192.0.30
	Destination port	60026 to 60030
	Datagram header	RrUdP
	Maximum output rate	Adjustable from 0.8 to 16 Mbps (0.8 Mbps steps), default: 4.8 Mbps
	IGMP	Version 1
	Other Network function excepted IEC61162-450	
		HTTP: *.*.*.*:80, Syslog: 239.192.0.254:514
	Note: These functions have little effect (total band-width is less than 100 kbps).	
5.4	Ethernet interface for IEC61162-450 (MC-3000S)	
	Port	100Base-TX, IPv4, 8P8C connector
	Maximum data rate	800 sps
	Data sentence	Output: XDR
	IEC61162-450 transmission group	
	Input	MISC, TGTD, SATD, NAVD, VDRD, RCOM, TIME, PROP, USR1 to USR8, BAM1, BAM2, CAM1, CAM2, NETA, PGP1 to PGP4, PGB1 to PGB4
	Output	Arbitrary (default: MISC)
	Multicast address	239.192.0.1 to 239.192.0.20, 239.192.0.56 to 239.192.0.64
	Destination port	60001 to 60020, 60056 to 60064
	Datagram header	UdPbC
	IGMP	Version 1
	Other Network function excepted IEC61162-450	
		HTTP: *.*.*.*:80, Syslog: 239.192.0.254:514
	Note: These functions have little effect (total band-width is less than 100 kbps).	

6 POWER SUPPLY

6.1	Monitor unit	
	MU-190	100-230 VAC: 0.5-0.4 A, 1 phase, 50/60 Hz
	MU-192	100-230 VAC: 0.4-0.3 A, 1 phase, 50/60 Hz
	MU-270W	100-230 VAC: 0.6-0.4 A, 1 phase, 50/60 Hz
6.2	Processor unit	100-115/220-230 VAC: 2.3/1.1 A, 1 phase, 50/60 Hz
6.3	Sensor adapter (option)	24 VDC: 1.4 A (for 11 units), Input to MC-3000S, the sources of other sensor adapters are fed from MC-3000S

6.4	Radar connection box (option)	24 VDC: 0.6 A
6.5	HUB (option)	100-230 VAC: 0.1 A, 1 phase, 50/60 Hz

7 ENVIRONMENTAL CONDITION

7.1	Ambient temperature	-15°C to +55°C
7.2	Relative humidity	95% or less at 40°C
7.3	Degree of protection	
	Monitor unit	IP22
	HUB	IP22
	Radar connection box	IP22
	Others	IP20 (IP22 by specified mounting method, option)
7.4	Vibration	IEC 60945 Ed.4

8 UNIT COLOR

8.1	Monitor unit	N2.5 (MU-190/270W), N1.0 (MU-192)
8.2	Processor/control unit	N2.5 (fixed)
8.3	Sensor adapter	N2.5
8.4	Radar connection box	N2.5
8.5	HUB	N2.5
8.6	Console	2.5GY5/1.5 (standard), 7.5BG7/2, 2.5G7/2, N7.5

SPECIFICATIONS OF
Electronic Chart Display and Information System (ECDIS)
FMD-3200/3300/3200-BB

1 MONITOR UNIT

1.1	Display type	
	MU-190/192, HD19T22	19-inch color LCD, 1280 x 1024 pixel (SXGA)
	MU-231, JH23T14	23.1-inch color LCD, 1600 x 1200 pixel (UXGA)
	MU-270W	27-inch color LCD, 1920 x 1200 pixel (WUXGA)
	HD26T22	25.54-inch color LCD, 1920 x 1200 pixel (WUXGA)
	- Applicable model	FMD-3200: MU-190/192, HD19T22, HD26T22 FMD-3300: MU-231/270W, JH23T14, HD26T22 FMD-3200-BB: Commercial monitor (user supply)
1.2	Brilliance	
	MU-190	450 cd/m^2 typical
	MU-192/231/270W	400 cd/m^2 typical
	JH23T14	500 cd/m^2 typical
	HD19T22/HD26T22	350 cd/m^2 typical
1.3	Visible distance	
	MU-190/192/270W	1.02 m nominal
	MU-231	1.2 m nominal
	HD19T22/JH23T14	1.01 m nominal
	HD26T22	0.99 m nominal
1.4	Video interface	DVI-D: DVI-standard, VESA-DDC2B
1.5	Brilliance control	RS-485, serial data control (DDC sentence)

2. PROCESSOR UNIT

2.1	Display mode	HU/NU/CU/RU (True/Relative motion)
2.2	Chart materials	IMO/IHO S57-3 ENC or C-MAP vectorized material BA ARCS rasterized material
2.3	Own ship's indication	Own ship's mark/track and numeral position in lat/lon, speed, course and heading
2.4	Target tracking (TT)	Range, bearing, speed, course, CPA/TCPA Target information from AIS
2.5	Other information	Waypoint, Route monitoring and several alarms
2.6	Display features	Chart zoom-in/out, Cursor (EBL, VRM, parallel index lines), Scroll, Symbol select, Palette select, One touch activation, Electronic chart information auto-update
2.7	Position calculation	Navigation by result of positioning found with external sensor Dead reckoning with gyro and log Highly accurate position, speed and heading from Kalman filter
2.8	Route planning	Planning by rhumb line, great circle, Chart alarm, SAR composition, Optimize
2.9	Route monitoring	Off-track display, Waypoint arrival alarm, Shallow depth alarm Route creation; route data is transferred to radar
2.10	User chart creation	100,000 points max. (amount of 5 files max.)
2.11	Notes	Create and display notes data; transferred to radar

2.12	AIS safety message	Receive, create and transmit safety messages View and modify own ship information stored in AIS transponder
2.13	NAVTEX message	Receive and display NAVTEX messages (position, etc.)
2.14	MOB (Man Overboard)	Position and other data at time of man overboard are recorded MOB mark is displayed on the screen
2.15	Manual update	User enters, deletes and edits chart objects
2.16	Other functions	Radar overlay, Playback voyage data

3 INTELLIGENT HUB (OPTION)

3.1	Number of ports	8 ports (10/100/1000BASE-T)
3.2	Swiching method	Store and forward, non-blocking L2 switching
3.3	Capacitance of switching	16 Gbps
3.4	Flow Control	Full-Duplex (IEEE802.3x flow-controlled at automatic mode)
3.5	Ring aggregation	8 group max.
3.6	Spanning tree	STP(IEEE802.1D), RSTP(IEEE802.1w), MST(IEEE802.1s)
3.7	IGMP snooping	IGMP v1, v2, v3
3.8	Operation control	PING, SNMP v1, v2c, v3
3.9	VLAN	Port-base VLAN, IEEE802.1Q Tag VLAN supported, VLAN ID : 1 to 4094, VLAN registration : 128 group
3.10	Multiple VLAN	Communication between isolated ports is disabled
3.11	Cast control	Broadcast, Multicast suppression

4 RADAR OVERLAY (OPTION)

4.1	Picture color	Radar picture: 256 colors
4.2	Range	0.125 to 96 NM
4.3	Display mode	Heading-up, North-up (heading data required)

5 INTERFACE

5.1	Processor unit (EC-3000)	
	Number of port	
	Serial	8 ports (IEC61162-1/2: 4 ports, IEC61162-1: 4 ports)
	Alarm output	6 ports: contact signal, load current 250 mA Normal close: 2, Normal open: 2, System fail: 1 (n/c), Power fail: 1 (n/c)
	DVI output	3 ports: DVI-D (2), DVI-I or RGB picture data (1 port for VDR)
	USB	4 ports (3 ports for control units)
	LAN	2 ports: Ethernet 1000Base-T for local communication
	Digital input	1 port: contact signal, 100 ohm max. or 24 VDC input
	Data sentences	
	Input	ABK, ACN, ALC, ALF, ALR, ARC, CUR, DBT, DPT, DTM, ETL, EVE, GGA, GLL, GNS, HBT, HCR, HDT, HTD, MTW, MWV, NRM, NRX, NSR, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, THS, TLB, TRC, TRD, TTD, TTM, VBW, VDM, VDO, VDR, VHW, VLW, VSD, VTG, XDR, ZDA
	Output	ABM, ACK, ACN, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, HTC, OSD, RRT, RTE, VBW, VDR, VSD, WPL, XTE
5.2	Sensor adapter (option)	
	MC-3000S (serial)	8 ports: I/O, IEC61162-1/2: 4 ports, IEC61162-1: 4 ports

MC-3010A (analog)	3 ports: Input, -10 to +10 V, 0 to 10 V or 4 to 20 mA
MC-3020D (digital-in)	8 ports: relay contact, logics set from program
MC-3030D (digital-out)	8 ports: relay contact, normal open and normal close available

5.3 Ethernet interface for IEC61162-450 (EC-3000)

Port (LAN2)	1000Base-T, IPv4, 8P8C connector
Data sentences	
Input	ABK, ACN, ALC, ALF, ALR, ARC, CUR, DBT, DPT, DTM, ETL, EVE, GGA, GLL, GNS, HBT, HCR, HDT, HTD, MTW, MWV, NRM, NRX, NSR, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, THS, TLB, TRC, TRD, TTD, TTM, VBW, VDM, VDO, VDR, VHW, VLW, VSD, VTG, XDR, ZDA
Output	ABM, ACK, ACN, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, HTC, OSD, RRT, RTE, VBW, VDR, VSD, WPL, XTE
IEC61162-450 transmission group	
Input	MISC, TGTD, SATD, NAVD, VDRD, RCOM, TIME, PROP, USR1 to USR8, BAM1, BAM2, CAM1, CAM2, NETA, PGP1 to PGP4, PGB1 to PGB4
Output	Arbitrary (default: NAVD)
Multicast address	239.192.0.1 to 239.192.0.20, 239.192.0.56 to 239.192.0.64
Destination port	60001 to 60020, 60056 to 60064
Datagram header	UdPbC
Non Re-transmittable binary image transfer	
Multicast address	239.192.0.21 to 239.192.0.25
Destination port	60021 to 60025
Datagram header	RaUdP
Maximum output rate	Adjustable from 0.8 to 16 Mbps (0.8 Mbps steps), default: 4.8 Mbps
Re-transmittable binary image transfer	
Multicast address	239.192.0.26 to 239.192.0.30
Destination port	60026 to 60030
Datagram header	RrUdP
Maximum output rate	Adjustable from 0.8 to 16 Mbps (0.8 Mbps steps), default: 4.8 Mbps
IGMP	Version 1
Other Network function excepted IEC61162-450	
	HTTP: *.*.*.*:80, Syslog: 239.192.0.254:514

Note: These functions have little effect (total band-width is less than 100 kbps).

5.4 Ethernet interface for IEC61162-450 (MC-3000S)

Port	100Base-TX, IPv4, 8P8C connector
Maximum data rate	800 sps
Data sentence	Output: XDR
IEC61162-450 transmission group	
Input	MISC, TGTD, SATD, NAVD, VDRD, RCOM, TIME, PROP, USR1 to USR8, BAM1, BAM2, CAM1, CAM2, NETA, PGP1 to PGP4, PGB1 to PGB4
Output	Arbitrary (default: MISC)
Multicast address	239.192.0.1 to 239.192.0.20, 239.192.0.56 to 239.192.0.64
Destination port	60001 to 60020, 60056 to 60064
Datagram header	UdPbC
IGMP	Version 1

Other Network function excepted IEC61162-450
HTTP: *.*.*.*:80, Syslog: 239.192.0.254:514
Note: These functions have little effect (total band-width is less than 100 kbps).

6 POWER SUPPLY

6.1	Monitor unit	
	MU-190	100-230 VAC: 0.5-0.4 A, 1 phase, 50/60 Hz
	MU-192	100-230 VAC: 0.4-0.3 A, 1 phase, 50/60 Hz
	MU-231	100-230 VAC: 0.7-0.4 A, 1 phase, 50/60 Hz
	MU-270W	100-230 VAC: 0.6-0.4 A, 1 phase, 50/60 Hz
	HD19T22- FUD-MA4-FAGA (option, standard supply for FMD-3200 HK configuration)	100-240 VAC: 0.8-0.3 A, 1 phase, 50/60 Hz or 24 VDC: 3.1 A
	JH23T14-FUD-MR4-AOAA (standard supply for FMD-3300 HK configuration)	100-240 VAC: 1.6-0.7 A, 1 phase, 50/60 Hz or 24 VDC: 6.5 A
	HD26T22-FUD-MA4-FAGA (option)	115/230 VAC: 1.1/0.5 A, 1 phase, 50/60 Hz or 24 VDC: 5.2 A
6.2	Processor unit (values change depending on the CPU board type)	
	ADP-556	100-115/220-230 VAC: 3.0/1.5 A, 1 phase, 50/60 Hz
	ADP-219	100-115/220-230 VAC: 2.3/1.1 A, 1 phase, 50/60 Hz
6.3	Sensor adapter (option)	24 VDC: 1.4 A (for 11 units), Input to MC-3000S, the sources of other sensor adapters are fed from MC-3000S
6.4	Radar connection box (option)	24 VDC: 0.6 A
6.5	HUB (HUB-3000/ HUB-100, option)	100-230 VAC: 0.1 A, 1 phase, 50/60 Hz

7 ENVIRONMENTAL CONDITIONS

7.1	Ambient temperature	-15°C to +55°C
7.2	Relative humidity	95% or less at 40°C
7.3	Degree of protection	
	Monitor unit	IP22 (MU-190/192/231/270W), IP66 (front) or IP22 (rear) (HD19/26T22), IP66 (front) or IP20 (rear) (JH23T14)
	HUB	IP22 (HUB-3000), IPX0 (HUB-100)
	Radar connection box	IP22
	Others	IP20 (IP22 by specified mounting method, option)
7.4	Vibration	IEC 60945 Ed.4

8 UNIT COLOR

8.1	Monitor unit	N2.5 (MU-190/231/270W), N1.0 (MU-192), RAL9011 (HD19/26T22, JH23T14)
8.2	Processor/control unit	N2.5 (fixed)
8.3	Sensor adapter	N2.5
8.4	Radar connection box	N2.5
8.5	HUB	N2.5 (HUB-3000), N3.0 (HUB-100)
8.6	Console	2.5GY5/1.5 (standard), 7.5BG7/2, 2.5G7/2, N7.5

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Publication No. DOCQA1978

Declaration of Conformity

0575 0097

We FURUNO ELECTRIC CO., LTD.
(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan
(Address)

declare under our sole responsibility that the product

ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM
FMD-3005
(Serial No. 1001-62xx-xxxx)
(Model name, type number)

to which this declaration relates conforms to the following standard(s) or other normative document(s)

EU
Directive 2014/90/EU on Marine Equipment (MED) as amended the Implementing Regulation (EU) 2025/1533

SOLAS 74 Reg. V/18, V/19, V27 & X/3
IMO Res. A.694(17)
IMO Res. MSC.36(63)
IMO Res. MSC.97(73)
IMO Res. MSC.191(79)
IMO Res. MSC.232(82)
IMO Res. MSC.302(87)
IMO MSC.1/Circ.1503 Rev.1 or 2

For assessment, see
- EC-type examination certificate (Module B)
  MEDB00008HE Rev.4: DNV AS (0575)
- Product Quality System certificate (Module D)
  MEDD00002CD Rev.9 DNV AS (0575)

UK
UK MCA Merchant Shipping (Marine Equipment) Regulations 2016 (MER) as amended MSN 1874 Amendment 10

SOLAS 74 Reg. V/18, V/19, V27 & X/3
IMO Res. A.694(17)
IMO Res. MSC.36(63)
IMO Res. MSC.97(73)
IMO Res. MSC.191(79)
IMO Res. MSC.232(82)
IMO Res. MSC.302(87)
IMO MSC.1/Circ.1503 Rev.1

For assessment, see
- UK-type examination certificate (Module B)
  MERB00008HE Rev.3: DNV UK Ltd. (0097)
- Product Quality System certificate (Module D)
  MERD00002CD Rev.7: DNV UK Ltd. (0097)

(title and number of the requirements)

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
23 September 2025
(Place and date of issue)

Akihiko Kanechika
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Publication No. DOCQA1980

Declaration of Conformity

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declare under our sole responsibility that the product

ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM
FMD-3200, FMD-3200-BB and FMD-3300
(Serial No.4395/6313/6317/6318-xxxx)
(Model name, type number)

to which this declaration relates conforms to the following standard(s) or other normative document(s)

EU
Directive 2014/90/EU on Marine Equipment (MED) as amended the Implementing Regulation (EU) 2025/1533

SOLAS 74 Reg. V/18, V/19, V27 & X/3
IMO Res. A.694(17)
IMO Res. MSC.36(63)
IMO Res. MSC.97(73)
IMO Res. MSC.191(79)
IMO Res. MSC.232(82)
IMO Res. MSC.302(87)
IMO MSC.1/Circ.1503 Rev.1 or 2

For assessment, see
- EC-type examination certificate (Module B)
  MEDB00001AV Rev.13: DNV AS (0575)
- Product Quality System certificate (Module D)
  MEDD00002CD Rev.9: DNV AS (0575)

UK
UK MCA Merchant Shipping (Marine Equipment) Regulations 2016 (MER) as amended MSN 1874 Amendment 10

SOLAS 74 Reg. V/18, V/19, V27 & X/3
IMO Res. A.694(17)
IMO Res. MSC.36(63)
IMO Res. MSC.97(73)
IMO Res. MSC.191(79)
IMO Res. MSC.232(82)
IMO Res. MSC.302(87)
IMO MSC.1/Circ.1503 Rev.1 or 2

For assessment, see
- UK-type examination certificate (Module B)
  MERB00001AV Rev.3: DNV UK Ltd. (0097)
- Product Quality System certificate (Module D)
  MERD00002CD Rev.7: DNV UK Ltd. (0097)

(title and number of the requirements)

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
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TRACK CONTROL SYSTEM TC-3001 R-A
(Serial No. 4395/6313/6317/6318-xxxx, 1001-62xx-xxxx)
(Model name, type number)

to which this declaration relates conforms to the following standard(s) or other normative document(s)

EU
Directive 2014/90/EU on Marine Equipment (MED) as amended the Implementing Regulation (EU) 2025/1533

SOLAS 74 Reg. V/18 & V/19
IMO Res. A.694(17)
IMO Res. MSC.74(69)
IMO Res. MSC.191(79)
IMO Res. MSC.302(87)

UK
UK MCA Merchant Shipping (Marine Equipment) Regulations 2016 (MER) as amended MSN 1874 Amendment 10

SOLAS 74 Reg. V/18 & V/19
IMO Res. A.694(17)
IMO Res. MSC.74(69)
IMO Res. MSC.191(79)
IMO Res. MSC.302(87)

(title and number of the requirements)

For assessment, see
- EC-type examination certificate (Module B) MEDB00003HC Rev.3: DNV AS (0575)
- Product Quality System certificate (Module D) MEDD00002CD Rev.9: DNV AS (0575)

For assessment, see
- UK-type examination certificate (Module B) MERB00003HC Rev.1: DNV UK Ltd. (0097)
- Product Quality System certificate (Module D) MERD00002CD Rev.7: DNV UK Ltd. (0097)

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
23 September 2025
(Place and date of issue)

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TRACK CONTROL SYSTEM TC-3001 EMRI
(Serial No. 4395/6313/6317/6318-xxxx, 1001-62xx-xxxx)
(Model name, type number)

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EU
Directive 2014/90/EU on Marine Equipment (MED) as amended the Implementing Regulation (EU) 2025/1533

SOLAS 74 Reg. V/18 & V/19
IMO Res. A.694(17)
IMO Res. MSC.74(69)
IMO Res. MSC.191(79)
IMO Res. MSC.302(87)

UK
UK MCA Merchant Shipping (Marine Equipment) Regulations 2016 (MER) as amended MSN 1874 Amendment 10

SOLAS 74 Reg. V/18 & V/19
IMO Res. A.694(17)
IMO Res. MSC.74(69)
IMO Res. MSC.191(79)
IMO Res. MSC.302(87)

(title and number of the requirements)

For assessment, see
- EC-type examination certificate (Module B) MEDB00000AJ Rev.5: DNV AS (0575)
- Product Quality System certificate (Module D) MEDD00002CD Rev.9: DNV AS (0575)

For assessment, see
- UK-type examination certificate (Module B) MERB00000AJ Rev.1: DNV UK Ltd. (0097)
- Product Quality System certificate (Module D) MERD00002CD Rev.7: DNV UK Ltd. (0097)

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
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TRACK CONTROL SYSTEM TC-3001 TKC
(Serial No. 4395/6313/6317/6318-xxxx, 1001-62xx-xxxx)
(Model name, type number)

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EU
Directive 2014/90/EU on Marine Equipment (MED) as amended the Implementing Regulation (EU) 2025/1533

SOLAS 74 Reg. V/18 & V/19
IMO Res. A.694(17)
IMO Res. MSC.74(69)
IMO Res. MSC.191(79)
IMO Res. MSC.302(87)

UK
UK MCA Merchant Shipping (Marine Equipment) Regulations 2016 (MER) as amended MSN 1874 Amendment 10

SOLAS 74 Reg. V/18 & V/19
IMO Res. A.694(17)
IMO Res. MSC.74(69)
IMO Res. MSC.191(79)
IMO Res. MSC.302(87)

(title and number of the requirements)

For assessment, see
- EC-type examination certificate (Module B) MEDB000045U Rev.2: DNV AS (0575)
- Product Quality System certificate (Module D) MEDD00002CD Rev.9: DNV AS (0575)

For assessment, see
- UK-type examination certificate (Module B) MERB000045U Rev.1: DNV UK Ltd. (0097)
- Product Quality System certificate (Module D) MERD00002CD Rev.7: DNV UK Ltd. (0097)

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
23 September 2025
(Place and date of issue)

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TRACK CONTROL SYSTEM TC-3001 YDK
(Serial No. 4395/6313/6317/6318-xxxx, 1001-62xx-xxxx)
(Model name, type number)

to which this declaration relates conforms to the following standard(s) or other normative document(s)

EU
Directive 2014/90/EU on Marine Equipment (MED) as amended the Implementing Regulation (EU) 2025/1533

SOLAS 74 Reg. V/18 & V/19
IMO Res. A.694(17)
IMO Res. MSC.74(69)
IMO Res. MSC.191(79)
IMO Res. MSC.302(87)

UK
UK MCA Merchant Shipping (Marine Equipment) Regulations 2016 (MER) as amended MSN 1874 Amendment 10

SOLAS 74 Reg. V/18 & V/19
IMO Res. A.694(17)
IMO Res. MSC.74(69)
IMO Res. MSC.191(79)
IMO Res. MSC.302(87)

(title and number of the requirements)

For assessment, see
- EC-type examination certificate (Module B) MEDB00000S4 Rev.5: DNV AS (0575)
- Product Quality System certificate (Module D) MEDD00002CD Rev.9: DNV AS (0575)

For assessment, see
- UK-type examination certificate (Module B) MERB00000S4 Rev.1: DNV UK Ltd. (0097)
- Product Quality System certificate (Module D) MERD00002CD Rev.7: DNV UK Ltd. (0097)

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
23 September 2025
(Place and date of issue)

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Publication No. SOCQA0040

PSTI Statement of Compliance

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9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan
(Address of manufacturer of the product)

declare under our sole responsibility that the product

ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM
FMD-3005
(Product type, batch)

August / 31 / 2033
(Support period for the product)

https://www.furuno.co.jp/en/csr/sociality/customer/product_security.html
(Weblink for latest information and contact to report to the manufacturer security issues)

to which this declaration relates conforms to the following standard(s) or other normative document(s)

Product Security and Telecommunications Infrastructure Act 2022
Product Security and Telecommunications Infrastructure (Security Requirements for Relevant Connectable Products) Regulations 2023 Schedule 1

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
29 August 2024
(Place and date of issue)

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Publication No. SOCQA0073

PSTI Statement of Compliance

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(Address of manufacturer of the product)

declare under our sole responsibility that the product

ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM
FMD-3200, FMD-3200-BB, FMD-3300
(Product type, batch)

December / 31 / 2028
(Support period for the product)

https://www.furuno.co.jp/en/csr/sociality/customer/product_security.html
(Weblink for latest information and contact to report to the manufacturer security issues)

to which this declaration relates conforms to the following standard(s) or other normative document(s)

Product Security and Telecommunications Infrastructure Act 2022
Product Security and Telecommunications Infrastructure (Security Requirements for Relevant Connectable Products) Regulations 2023 Schedule 1

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
10 July 2025
(Place and date of issue)

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