FURUNO

OPERATOR'S MANUAL

CLASS A AIS

Model **FA-170**

PRODUCT NAME: U-AIS TRANSPONDER

Multi-Language Operator's Guide
Download Link

Multi-Language Operator's Guide gives you the basic information on the operation of this model. Please visit our website from the following two-dimensional code and download.

Operator's Guide is available in the following languages.
English, French and German.

FURUNO ELECTRIC CO., LTD.

www.furuno.com

(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

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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 descriptions 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: Siriusstraat 86, 5015 BT, Tilburg, The Netherlands
- The following concern acts as our importer in UK, as defined in SI 2016/1025 as amended SI2019/470.
  - Name: FURUNO (UK) LTD.
  - Address: West Building Penner Road Havant Hampshire PO9 1QY, U.K.
- All brand, product names, trademarks, registered trademarks, and service marks belong to their respective holders.

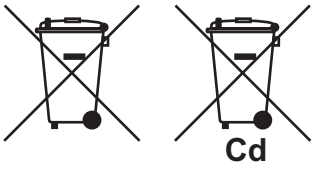
How to discard this product

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

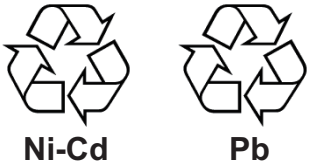
How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery, see the chapter on Maintenance. If a battery is used, 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

The operator must read the safety instructions before attempting to operate this equipment.

⚠ 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, can result in minor or moderate injury.

⚠ Warning, Caution Prohibitive Action Mandatory Action

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel should work inside the equipment.

Do not approach the antenna closer than listed below when it is transmitting.

The antenna emits radio waves that can be harmful to the human body.

RF power density on antenna aperture	Distance
100 W/m^2	N/A
10 W/m^2	0.04 m
2 W/m^2	0.09 m

Immediately turn off the power at the switchboard if water leaks into the equipment or something is dropped in the equipment.

Continued use of the equipment can cause fire or electrical shock. Contact a FURUNO agent for service.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

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 proper fuse.

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

⚠ WARNING

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

Continued use of the equipment can cause fire or electrical shock. Contact a FURUNO agent for service.

Make sure no rain or water splash leaks into the equipment.

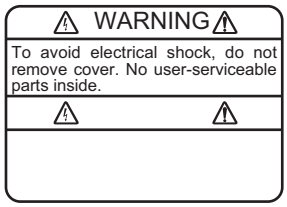
Fire or electrical shock can result if water leaks in the equipment.

Do not operate the equipment with wet hands.

Electrical shock can result.

WARNING LABEL

A warning label is attached to the AC-DC power supply. Do not remove the label.
If the label is missing or damaged, contact a FURUNO agent or dealer about replacement.



Unit: PR-241 Power Supply
PR-240 Power Supply
Name: Warning Label (1)
Type: 86-003-1011-3
CodeNo.: 100-263-233-10

About the TFT LCD

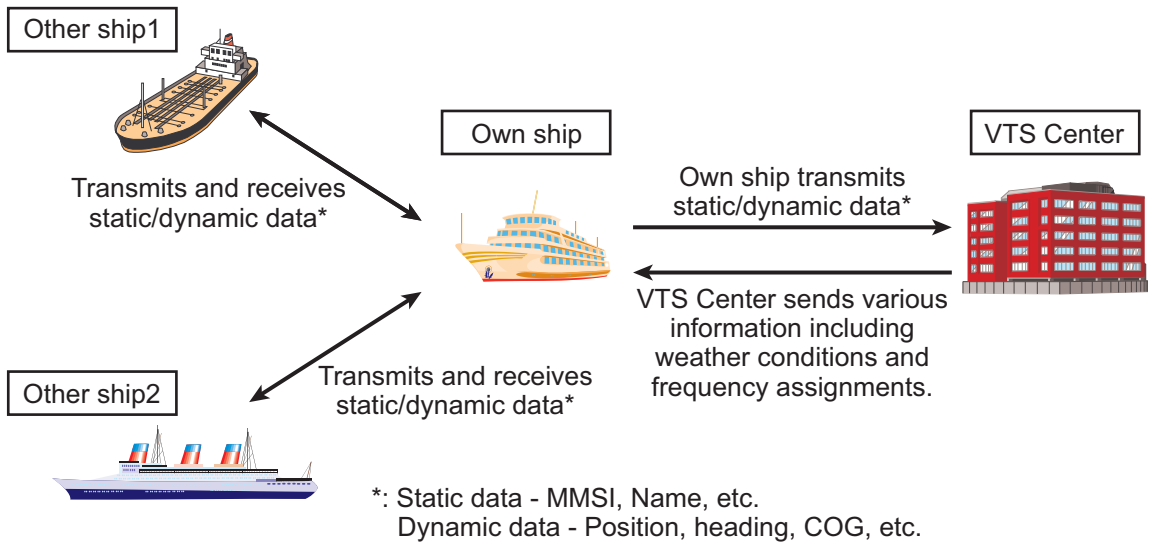
The TFT LCD is constructed using the latest LCD techniques, and displays 99.99% of its pixels. The remaining 0.01% of the pixels may drop out or blink, however this is not an indication of malfunction.

SYSTEM OVERVIEW

System overview

The Automatic Identification System (AIS) was originally developed to aid the Vessel Traffic Services (VTS) by use of a VHF transponder working on Digital Selective Call (DSC) at VHF CH70, and is still in use along the UK coastal areas and others. Some time later the IMO developed a Universal AIS using the new sophisticated technology called Self-Organized Time Division Multiple Access (SOTDMA) based on a VHF Data Link (VDL).

The system operates in three modes – autonomous (continuous operation in all areas), assigned (data transmission interval remotely controlled by authority in traffic monitoring service) and polled (in response to interrogation from a ship or authority). It is synchronized with GNSS time to avoid conflict among multiple users (IMO minimum 2000 reports per minute and IEC requires 4500 reports on two channels). The VHF channels 87B and 88B are commonly used and in addition there are local AIS frequencies. Shipborne AIS transponders exchange various data as specified by the IMO and ITU on either frequency automatically set up by the frequency management telecommand received by the DSC receiver on ship.



AIS system

Not all ships carry AIS

The Officer of the Watch (OOW) should always be aware that other ships, and in particular leisure craft, fishing boats and warships, and some coastal shore stations (including Vessel Traffic Service centers) might not be fitted with AIS.

The OOW should also be aware that AIS fitted on other ships as a mandatory carriage requirement might be switched off by the master if its use might compromise the security of the vessel. Thus, users are therefore cautioned to always bear in mind that information provided by AIS may not be giving a complete or correct “picture” of shipping traffic in their vicinity.

Use of AIS in collision avoidance

As an anti-collision aid, the AIS has the following advantages over radar:

- Information provided in near real-time
- Capable of instant presentation of target course alterations
- Not subject to target swap
- Not subject to target loss in clutter
- Not subject to target loss due to abrupt maneuvers
- Able to “detect” ships within VHF/FM coverage, including in some circumstances, around bends and behind islands.

When using the AIS for anti-collision purposes it is important to remember that the AIS is an additional source of navigation information. It does not replace other navigational systems. The AIS may not be giving a complete or correct “picture” of shipping traffic in its vicinity.

The use of the AIS does not negate the responsibility of the OOW to comply with all collision regulation requirements, especially the maintaining of a proper look-out. The prudent navigator uses all aids available to navigate the ship.

Erroneous information

Erroneous information implies a risk to other ships as well as your own. Poorly configured or improperly calibrated sensors might lead to incorrect information being transmitted. It is the user’s responsibility to ensure that all information entered into the system is correct and up to date.

TABLE OF CONTENTS

FOREWORD

A Word to the Owner of the FA-170

FURUNO Electric Company thanks you for purchasing the FA-170 AIS Transponder. We are confident you will discover why the FURUNO name has become synonymous with quality and reliability.

Since 1948, FURUNO Electric Company has enjoyed an enviable reputation for quality and reliability throughout the world. This dedication to excellence is furthered by our extensive global network of agents and dealers.

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

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

Thank you for considering and purchasing FURUNO.

Features

The FA-170 is a universal AIS (Automatic Identification System) for open sea and inland waterways, capable of exchanging navigation and ship data between own ship and other ships or coastal stations.

It complies with IMO MSC.74(69) Annex 3, IMO MSC.302(87), A.694, ITU-R M.1371-5 and DSC ITU-R M.825. It also complies with IEC 61924-2, IEC 61993-2 (Type testing standard) and IEC 60945 Ed. 4 (EMC and environmental conditions).

The FA-170 consists of VHF and GNSS antennas, a transponder unit, a monitor unit, and several associated units. The transponder contains a VHF transmitter, two TDMA receivers on two parallel VHF channels, a DSC channel 70 receiver, interface, communication processor, and internal GNSS receiver. The internal GNSS is a 12-channel all-in-view receiver with a differential capability, and provides UTC reference for system synchronization to eliminate clash among multiple users. It also gives position, COG and SOG when the external GNSS fails.

The main features are:

- Safety of navigation by automatically exchanging navigational data between ships and between ship and coast
- Static data:
  - MMSI (Maritime Mobile Service Identity)
  - IMO number (where available)
  - Call sign & name
  - Length and beam
  - Type of ship
  - Location of position-fixing antenna on the ship

- Dynamic data:
  - Ship's position with accuracy indication and integrity status
  - Universal Time Coordinated (UTC)
  - Course over ground (COG)
  - Speed over ground (SOG)
  - Heading
  - Rate of turn (ROT) where available
- Voyage-related data
  - Ship's draught
  - Navigational status (manual input)
  - Hazardous cargo (type)
  - Destination and ETA (at master's discretion)
- Short safety-related messages, free messages
- LCD panel satisfies the IMO minimum requirements plus simple plotting modes
- Interfaces for radar, ECDIS, PC for future networking expansion
- GNSS/VHF combined antenna for easy installation available
- Built-in GNSS receiver for UTC synchronization and backup position-fixing device
- The Inland AIS feature is based on CCNR (Vessel Tracking and Tracing Standard for Inland Navigation). Inland AIS receives and sends SOLAS AIS information, and interfaces automatic data input such as blue sign, draught (in centimeters), air draught (height from waterline), hazardous cargo blue cone indication, euro ship identifier and inland ship type. Further, the inland AIS sends ETA (Estimated Time of Arrival) to lock, bridge, terminal, etc. and displays response as RTA (Requested Time of Arrival) from the lock, bridge or terminal. Information receivable from land stations include EMMA warning, water level data, etc.

Program Numbers

Unit & PC board	Program No.	Version No.
Monitor Unit (MAIN: 20P8200D)	0550256	02.××
Transponder Unit (R-MOD: 05P0892)	0550255	02.××
Transponder Unit (GPS: 20P8211)	48504650	××

××: Minor modification

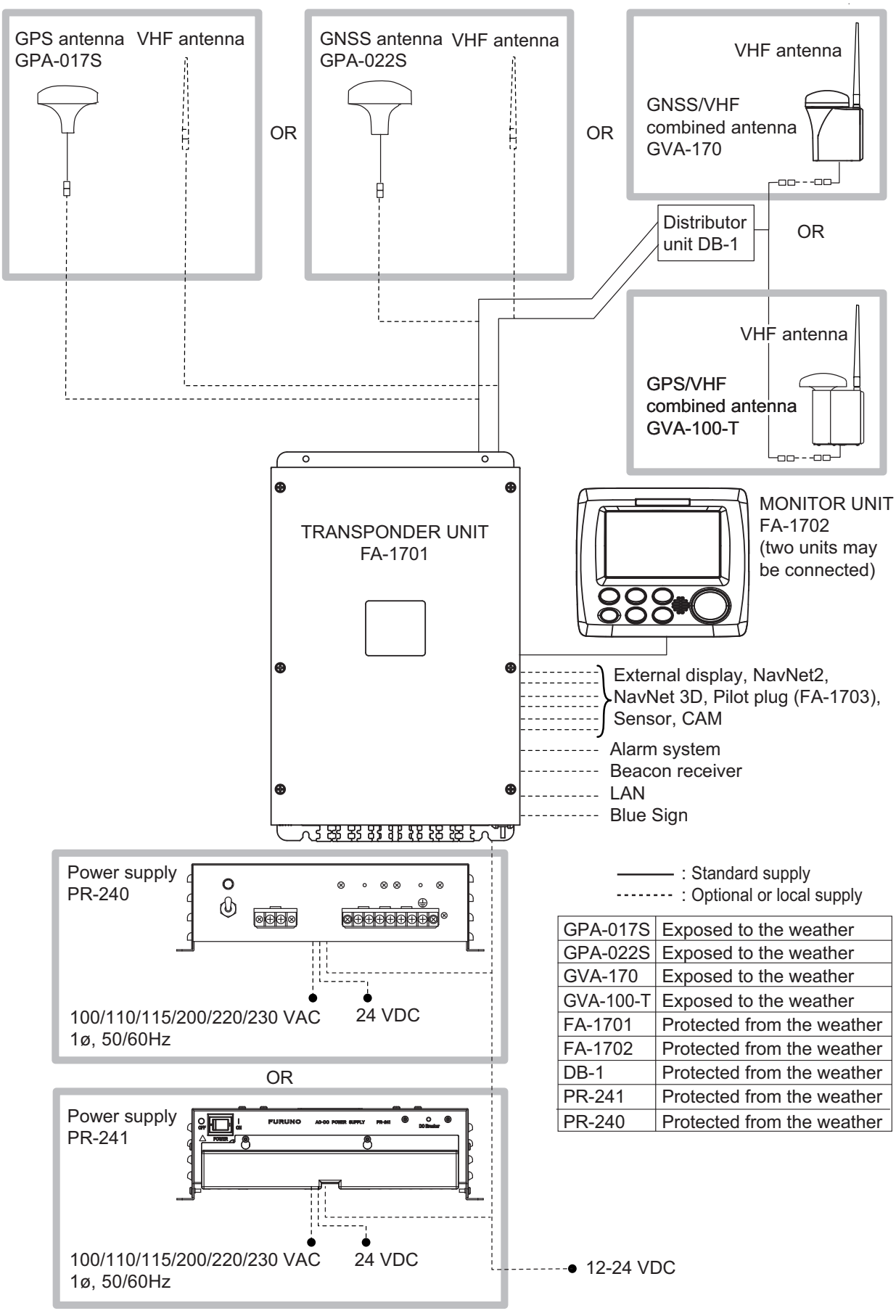
CE/UKCA Declarations

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).

SYSTEM CONFIGURATION



: Standard supply
: Optional or local supply

GPA-017S	Exposed to the weather
GPA-022S	Exposed to the weather
GVA-170	Exposed to the weather
GVA-100-T	Exposed to the weather
FA-1701	Protected from the weather
FA-1702	Protected from the weather
DB-1	Protected from the weather
PR-241	Protected from the weather
PR-240	Protected from the weather

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1. OPERATION

1.1 Description of Controls

No.	Key name	Function(s) when pressed
1	**BRILL** key	• Displays brilliance setting pop-up window. • Switches between Day and Night display modes.
2	**DISP** key	• Cycles through display screens. • Switches between Day and Night display modes when brilliance pop-up window is active. • Closes all active menu windows and returns to the last used display screen.
3	**MENU/ESC** key	Short press • To open the menu. • To go back one layer in the menu. • To close the settings screen, when displayed, and return to the menu. Long press to open ALERT display.
4	Power key ⏻	• Short press to turn the unit on. • Long press to turn the unit off.
5	**NAV STATUS** key	Opens the [NAV STATUS] settings window.
6	**ENT/ACK** key	• Confirms the currently selected item on the menu. • Confirms adjusted settings. • Acknowledge alerts.
7	Cursorpad	• Move the selection cursor. • Plotter display: ◀ or ▶ changes display range. • TARGET LIST display: ◀ or ▶ changes pages. • OWN INFORMATION display: ◀ or ▶ switches between information tabs. • ALERT display: ◀ or ▶ switches between the alert list and the alert log. ▲ or ▼ selects an alert.

Note: The nominal viewing distance is 70 cm.

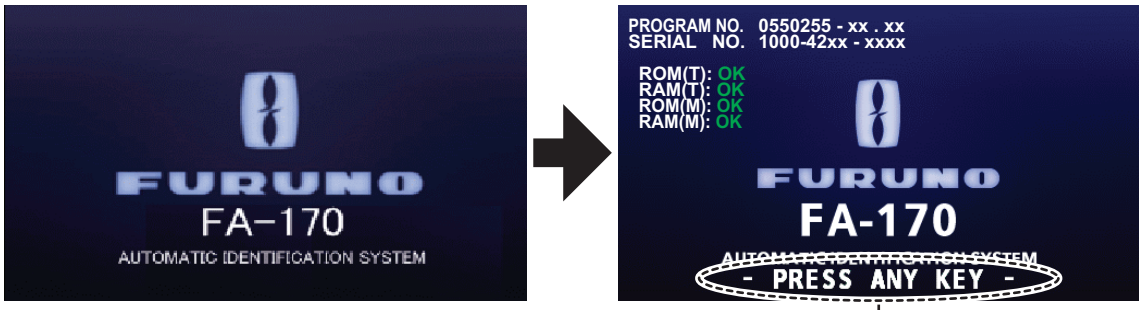
This manual uses the following terminology for the sake of brevity:

Terminology	Example	Meaning
Select	Select [MSG].	Use the Cursorpad to select [MSG].
◀, ▲, ▶, ▼	Press ▶.	Press the corresponding arrow on the Cursorpad.

1.2 How to Turn the Power On and Off

Press the power key to turn the equipment on. When powered, the equipment sounds a beep then proceeds in the sequence shown below.

To turn the power off, press and hold the power key .



This indication flashes to show the unit is ready for use. The automatic startup test results are displayed when tests are completed.

Indication	Description
PROGRAM NUMBER	Displays the program number for this FA-170. The indication "XX.XX" is replaced with the version number.
SERIAL NUMBER	Displays the serial number for this FA-170.
ROM(T) / RAM(T)	Displays the ROM/RAM test results for the connected FA-1701.
ROM(M) / RAM(M)	Displays the ROM/RAM test results for the FA-1702.

The startup screen displays the program version number, serial number and the results of the ROM and RAM data test, showing "OK" or "NG" (No Good) as the result. The message "- PRESS ANY KEY -" flashes to indicate that the test is complete. Press any key to close the test results. If "NG" appears for any of the check results after the startup test is completed, contact your dealer for advice.

When no errors occur at startup, the plotter display is shown after the test is completed.

If there is no response from the transponder unit or AIS symbols do not appear, the message “COMMUNICATION ERROR” appears on the screen. Press any key to erase the message. Check the connection between the monitor unit and the transponder unit.

The FA-170 should be powered while underway or at anchor. The master may switch off the AIS if he believes that the continual operation of the AIS might compromise the safety or security of his ship. The AIS should be restarted when it is safe to do so.

The equipment transmits own ship static data within two minutes of start-up and it is transmitted at six-minute intervals thereafter. Static data includes MMSI number, IMO number, call sign, ship name, ship length and width, ship type and GNSS antenna position.

In addition to static data, ship’s dynamic data is also transmitted. This data includes position with quality indication, SOG, COG, rate of turn, heading, etc. Dynamic data is transmitted every 2 seconds to 3 minutes depending on ship’s speed and course change. Voyage-related data, such as ship’s draught, hazardous cargo, destination and estimated time of arrival, are also transmitted at six-minute intervals.

The FA-170 starts receiving data from AIS-equipped ships as soon as it is turned on, and those ships' locations are shown on the plotter display with the AIS symbol. (To learn more about the plotter display, see section 1.8.) With connection of a radar or ECDIS, the AIS target symbols may be overlaid on the radar or ECDIS.

Note 1: If no navigation sensor is installed or a sensor such as a gyrocompass has failed, the AIS automatically transmits "not available data" to AIS-equipped ships.

Note 2: The reporting intervals are as follows:

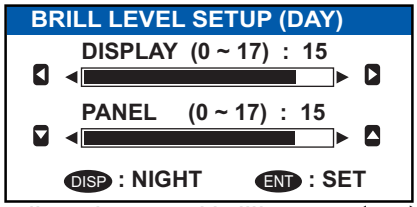
Ship's navigational status	Nominal reporting interval
Ship at anchor or moored and not moving faster than 3 kn	3 minutes
Ship at anchor or moored and moving faster than 3 kn	10 seconds
Ship speed 0-14 kn	10 seconds
Ship speed 0-14 kn and changing course	3 1/3 seconds
Ship speed 14-23 kn	6 seconds
Ship speed 14-23 kn and changing course	2 seconds
Ship speed faster than 23 kn	2 seconds
Ship speed faster than 23 kn and changing course	2 seconds

Note 3: The screen refreshes slower in low ambient temperature. (See the specifications at the back of this manual for detailed information on recommended ambient temperatures.)

1.3 How to Adjust the Panel and Display Brilliance

The panel and display brilliance may be adjusted as follows:

1. Press the **BRILL** key to show the [BRILL LEVEL SETUP] pop up window. If there is no operation within five seconds, the pop up window automatically closes.



2. Press ▲ or ▼ to adjust the panel brilliance; ◀ or ▶ to adjust the display brilliance. The default panel and display brilliance settings are 15 and 15, respectively. To restore default settings see section 3.8.)
   Note: The display brilliance can also be adjusted by pressing the **BRILL** key several times to cycle through brilliance levels.
3. Press the **ENT/ACK** key to close the setting screen and apply the settings.

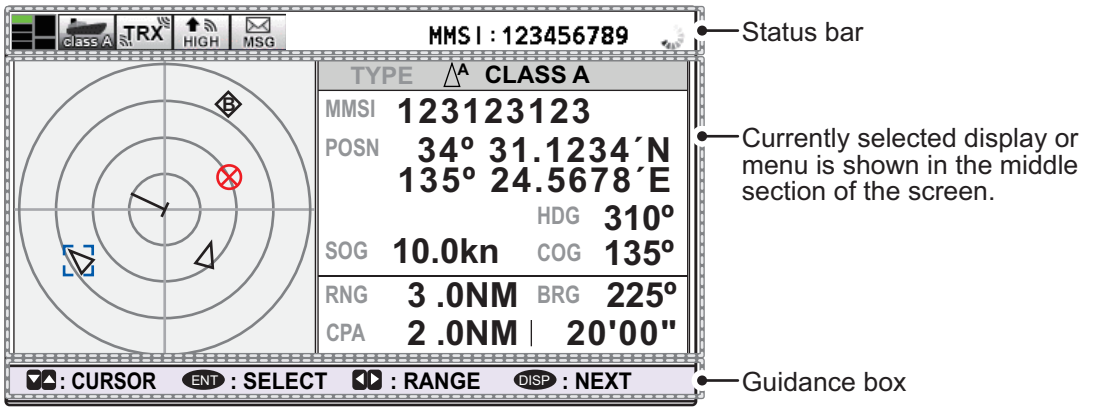
How to switch between day and night displays

You can change the background and text color to suit the time of day.

1. Press the **BRILL** key to show the [BRILL LEVEL SETUP] pop up window.
2. Press the **DISP** key while the pop up window is shown. The pop up window closes and the display settings change.
3. Repeat the procedure to reverse the settings.

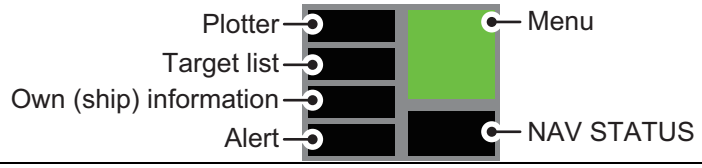
1.4 Display Overview

The FA-170 display is made up of three major areas, as indicated in the Plotter display example figure below.



The guidance box contents change according to the currently selected display or menu.

The status bar shows various icons indicating the status of the equipment and shows the vessel's own MMSI. The icons which can be displayed in the status bar are listed in the table below, along with a brief description.

Icon	Icon name	Description
	Operational status	The dotted line rotates in a clockwise motion to indicate that the equipment is working normally.
	Contents mini-map	Shows the location of the currently selected menu/display, indicated as a green box in the mini-map. The figure below shows the "locations", as displayed in the mini-map. 
class A	Class A AIS mode	Displayed when the equipment is using the Class A AIS mode.
SOLAS	SOLAS AIS mode	Displayed when the equipment is using the SOLAS AIS mode.
INLAND	INLAND AIS mode	Displayed when the equipment is using the INLAND AIS mode.
RX	RX (Receive)	Displayed when both A and B channels are set to receive mode (includes OFF). Shown only with CLASS A and INLAND AIS modes.
TRX	TRX (Transmit)	Displayed when either channel A or B are set to transmit mode.
HIGH	HIGH (power)	Displayed when the transmit power level is set to [HIGH].

Icon	Icon name	Description
	LOW (power)	Displayed when the transmit power level is set to [LOW].
	SEND	Displayed during message transmission for all messages, except routine messages.
	MSG	Displayed when there are unread messages.
	ANTENNA POSITION	Displayed when antenna position is not set. Set the [ANTENNA POSITION] from the [INITIAL SET] menu.
	MMSI	Own ship MMSI.

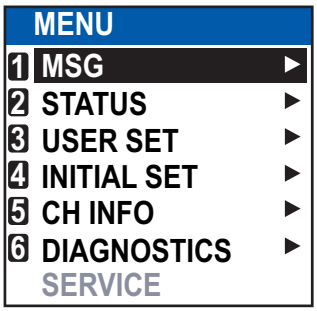
1.5 Menu Overview

You can access the various functions of your FA-170 from the menu. If you get lost in operation, press the **MENU/ESC** key until you return to the main menu. A complete menu tree is provided in "MENU TREE" on page AP-1.

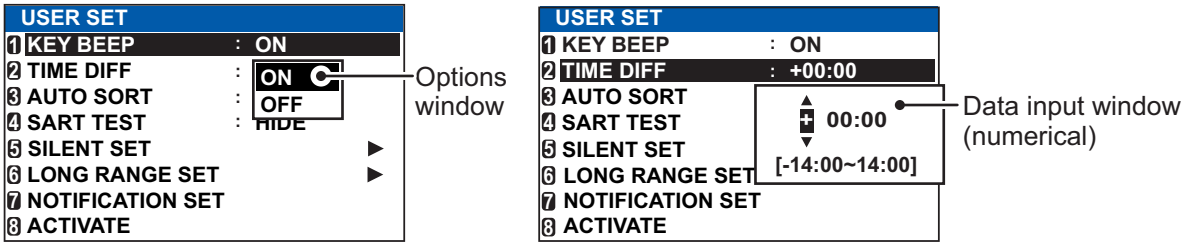
Note: Inland AIS mode menus may differ from the menus shown in this chapter. For INLAND AIS mode, see "INLAND AIS OPERATION" on page 2-1.

1.5.1 Menu operating procedure

1. Press the **MENU/ESC** key to display the main menu.



2. Select a main menu item, then press the **ENT/ACK** key.
3. Select a sub-menu then press the **ENT/ACK** key.
   There are two types of sub-menus: option selection and data input. (Some sub-menus combine both.) Below are examples of each type of sub-menu.

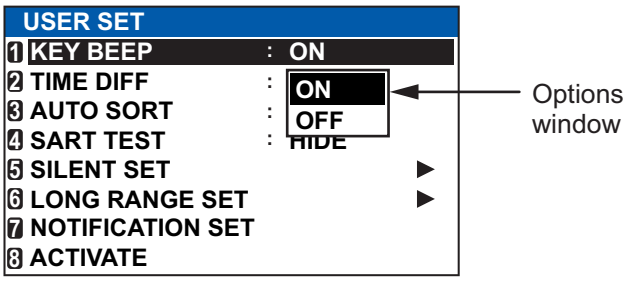


4. Select a menu item then press the **ENT/ACK** key.
5. Depending on the menu selected, select an option or input alphanumeric data, then press the **ENT/ACK** key.
6. Press the **DISP** key to close the menu.

1.5.2 How to select a menu option

The procedure below shows how to select an option from a menu.

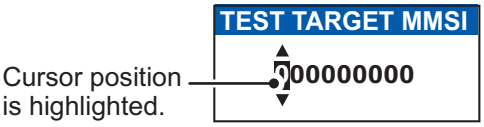
1) A window showing the options for the item selected is overlaid on the sub-menu. For example, the options for [KEY BEEP] are as shown below.



2) Press ▲ or ▼ to select option desired, then press the **ENT/ACK** key.

1.5.3 How to enter numeric data

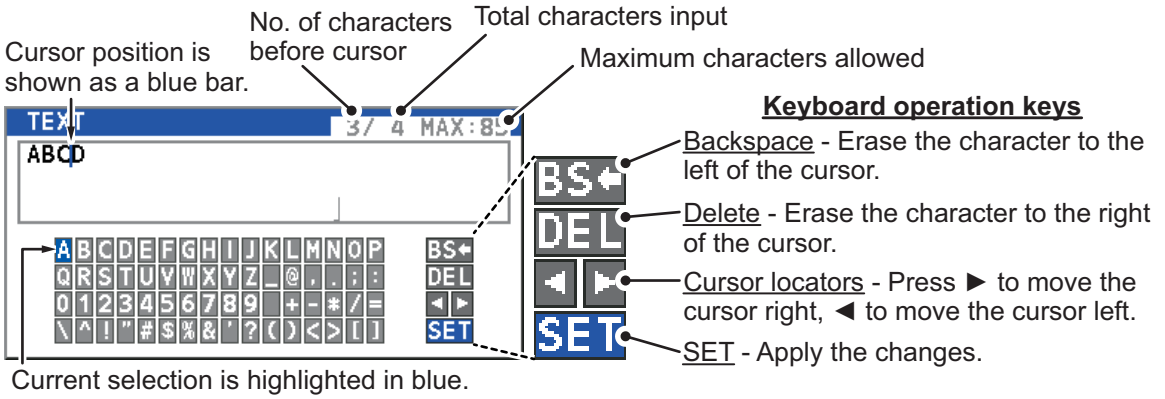
The procedure below shows how to enter numeric data.



1) Select the appropriate numeric character. Press ▲ to display numeric characters cyclically in ascending order. Press ▼ to display numeric characters cyclically in descending order.
2) Press ◀ or ▶ to shift the cursor.
3) Repeat steps 1) and 2) to finish entering data.
4) After entering all data, press the **ENT/ACK** key to register input.

1.5.4 How to use the software keyboard for alphanumeric input

The software keyboard appears when alphanumeric input is possible. Software keyboard operation requires the use of the Cursorpad and the **ENT/ACK** key.



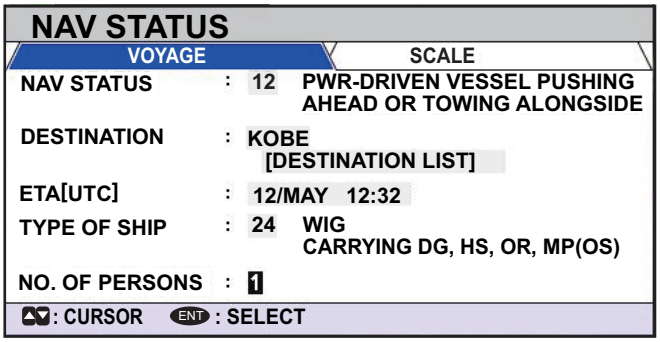
1. Referring to the figure above, press the arrow keys to select a character or keyboard operation.
2. Press the **ENT/ACK** key to confirm your selection.
3. Repeat steps 1 and 2 to complete the alphanumeric input.
4. Select [SET], then press the **ENT/ACK** key.

1.6 How to Enter Voyage-Related Data

There are seven items on the [NAV STATUS] menu that you will need to enter at the start of a voyage.

- Navigational status
- Type of ship
- ETA(LT/UTC) (Arrival time)
- Destination
- No. of persons
- Extended dimensions
- Draught

1. Press the **NAV STATUS** key to open the [NAV STATUS] menu.
   The [NAV STATUS] setting is selected by default



2. If your navigational status is different from that shown, follow the procedure below. If it is the same as shown, go to step 3.
   1) Press the **ENT/ACK** key. The [NAV STATUS] options pop up window appears.
   2) Input the appropriate status, then press the **ENT/ACK** key. Refer to the data below to select appropriate navigational status.
      Note: When the [NAV STATUS] is set to [12: PWR-DRIVEN VESSEL PUSHING AHEAD OR TOWING ALONGSIDE], refer to steps 10 to 12 and set the [EXTENDED DIMENSIONS].

00: UNDERWAY USING ENGINE
01: AT ANCHOR
02: NOT UNDER COMMAND
03: RESTRICTED MANEUVERABILITY
04: CONSTRAINED BY HER DRAUGHT
05: MOORED
06: AGROUND
07: ENGAGED IN FISHING
08: UNDERWAY SAILING
09: RESERVED FOR HIGH SPEED CRAFT (HSC)*1
10: RESERVED FOR WING IN GROUND (WIG)*2
11: PWR-DRIVEN VESSEL TOWING ASTERN
12: PWR-DRIVEN VESSEL PUSHING AHEAD OR TOWING ALONGSIDE
13: RESERVED FOR FUTURE USE
14: AIS-SART (ACTIVE), MOB-AIS, EPIRB-AIS*3
15: DEFAULT (ALSO USED BY SART, MOB, EPIRB UNDER TEST)

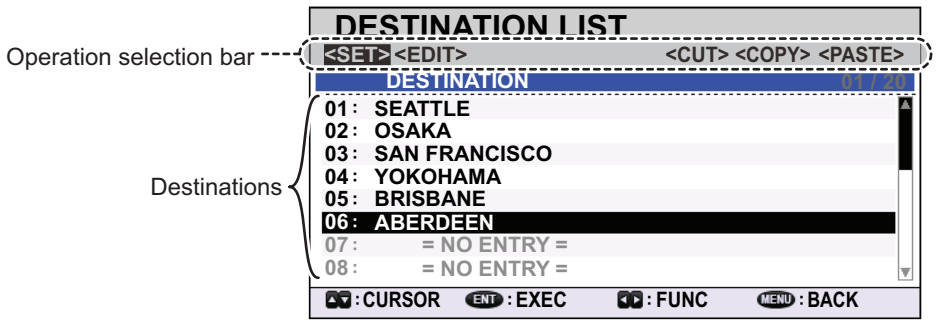
*1: RESERVED FOR FUTURE AMENDMENT OF NAVIGATIONAL STATUS FOR SHIPS CARRYING DG, HS, OR MP, OR IMO HAZARD OR POLLUTANT CATEGORY C, HIGH SPEED CRAFT (HSC)

*2: RESERVED FOR FUTURE AMENDMENT OF NAVIGATIONAL STATUS FOR SHIPS CARRYING DANGEROUS GOODS (DG), HARMFUL SUBSTANCES (HS) OR MARINE POLLUTANTS (MP), OR IMO HAZARD OR POLLUTANT CATEGORY A, WING IN GROUND (WIG)

*3: Not selectable for this type of equipment.

3. Select [DESTINATION], then press the **ENT/ACK** key. The software keyboard appears for direct input.
   Enter the desired destination then press the **ENT/ACK** key. You can use up to 20 alphanumeric characters and enter up to 20 destinations.

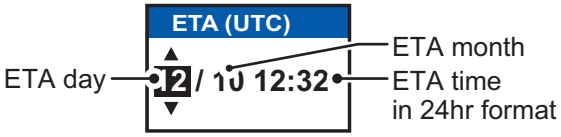
A list of destinations can also be accessed by selecting [DESTINATION LIST].



Referring to operation descriptions in the table below, press ◀ or ▶ to select an operation, press ▲ or ▼ to select an entry in the list, then press the **ENT/ACK** key to confirm the selection.

Operation	Description
<SET>	Set the current selection as the destination.
<EDIT>	Rename the selected destination.
<CUT>	Cut the current selection to temporary memory, leaving the entry empty. The destination can now be pasted as a different entry.
<COPY>	Copy the current selection to temporary memory. The destination can now be pasted as a different entry.
<PASTE>	Paste the entry in temporary memory. **Note 1:** Only one entry can be stored in temporary memory at a time. If you <CUT> two entries successively, the first is deleted. **Note 2:** Entries over-written with <PASTE> cannot be restored.

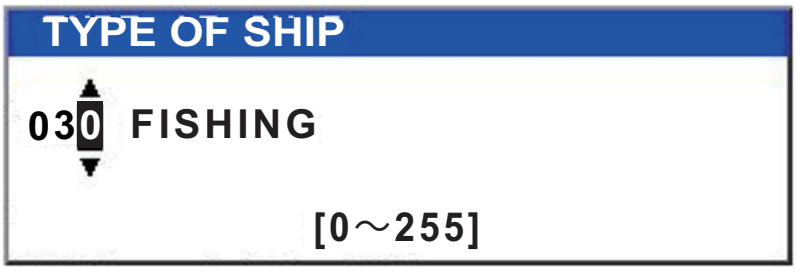
4. Select [ETA (LT/UTC)], then press the **ENT/ACK** key. The settings pop up window shown below appears.



Note 1: The ETA indication appears as "ETA [LT]" when a time offset is set from [TIME DIFF] in the [USER SET] menu. When the setting for [TIME DIFF] is not changed from the default (+00:00) setting, the ETA indication appears as "ETA [UTC]".

Note 2: Where a GNSS is not connected, or the signal is lost/interrupted, the ETA indication appears as ETA [UTC]. Further, the settings pop up window displays "NOTE: INPUT THE UTC" at the bottom of the pop up window.

5. Set the ETA date and time, referring to the figure above, then press the **ENT/ACK** key.
6. Select [TYPE OF SHIP], then press the **ENT/ACK** key. The settings pop up window shown below appears.

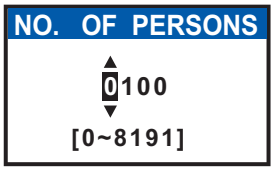


7. Select type of vessel/cargo, referring to the table on the following page, then press the **ENT/ACK** key.
   Note: When [Tanker] is selected and the Nav status is [Moored], output power is automatically switched to 1 W when SOG is less than 3 knots. Further, in the above condition, when SOG becomes higher than 3 knots, a beep sounds. (The pop-up message "TX POWER CHANGED" also appears to notify you that the TX power has changed). To erase the pop-up message, press the **ENT/ACK** key or reduce SOG to below 3 knots.

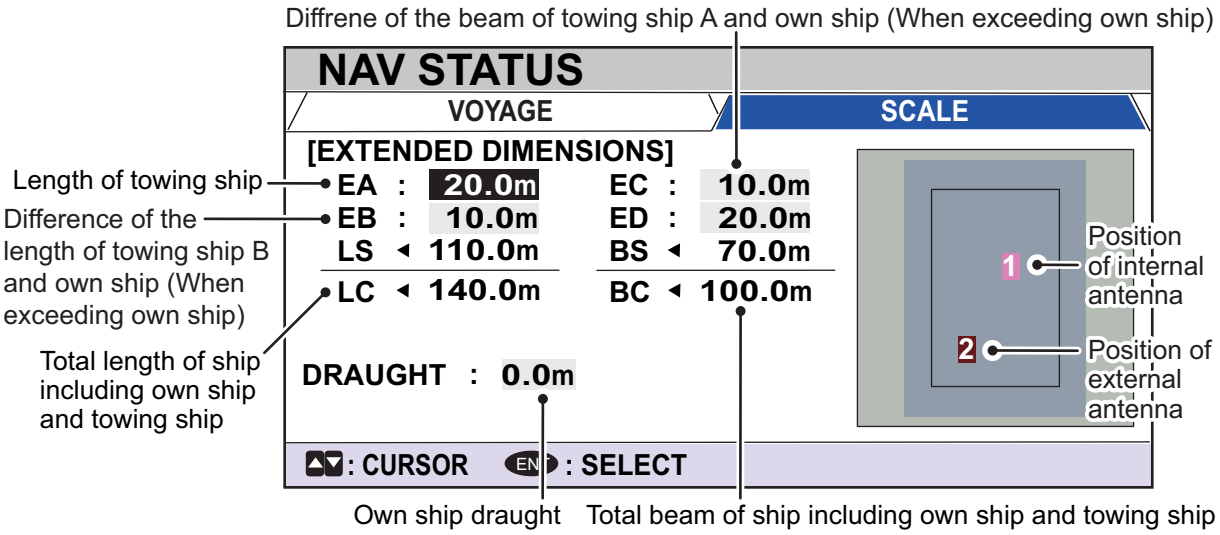
10	FUTURE USE	ALL SHIPS OF THIS TYPE
11	FUTURE USE	CARRYING DG, HS, OR MP(X)
12	FUTURE USE	CARRYING DG, HS, OR MP(Y)
13	FUTURE USE	CARRYING DG, HS, OR MP(Z)
14	FUTURE USE	CARRYING DG, HS, OR MP(OS)
15	FUTURE USE	
16	FUTURE USE	
17	FUTURE USE	
18	FUTURE USE	
19	FUTURE USE	NO ADDITIONAL INFORMATION
20	WIG	ALL SHIPS OF THIS TYPE
21	WIG	CARRYING DG, HS, OR MP(X)
22	WIG	CARRYING DG, HS, OR MP(Y)
23	WIG	CARRYING DG, HS, OR MP(Z)
24	WIG	CARRYING DG, HS, OR MP(OS)
25	WIG	FUTURE USE
26	WIG	FUTURE USE
27	WIG	FUTURE USE
28	WIG	FUTURE USE
29	WIG	NO ADDITIONAL INFORMATION
30	FISHING	
31	TOWING	
32	LENGTH OF THE TOW EXCEEDS 200M OR BREADTH EXCEEDS 25M	
33	ENGAGED IN DREDGING OR UNDERWATER OPERATIONS	
34	ENGAGED IN DIVING OPERATIONS	
35	ENGAGED IN MILITARY OPERATIONS	
36	SAILING	
37	PLEASURE CRAFT	
38	FUTURE USE	
39	FUTURE USE	
40	HSC	ALL SHIPS OF THIS TYPE
41	HSC	CARRYING DG, HS, OR MP(X)
42	HSC	CARRYING DG, HS, OR MP(Y)
43	HSC	CARRYING DG, HS, OR MP(Z)
44	HSC	CARRYING DG, HS, OR MP(OS)
45	HSC	FUTURE USE
46	HSC	FUTURE USE
47	HSC	FUTURE USE
48	HSC	FUTURE USE
49	HSC	NO ADDITIONAL INFORMATION
50	PILOT VESSEL	
51	SEARCH AND RESCUE VESSELS	
52	TUGS	
53	PORT TENDERS	
54	VESSELS WITH ANTI-POLLUTION FACILITIES OR EQUIPMENT	
55	LAW ENFORCEMENT VESSELS	
56	SPARE-FOR ASSIGNMENTS TO LOCAL VESSELS	
57	SPARE-FOR ASSIGNMENTS TO LOCAL VESSELS	
58	MEDICAL TRANSPORTS	
59	SHIPS & AIRCRAFT OF STATES NOT PARTIES TO AN ARMED CONFLICT	
60	PASSENGER SHIPS	ALL SHIPS OF THIS TYPE
61	PASSENGER SHIPS	CARRYING DG, HS, OR MP(X)
62	PASSENGER SHIPS	CARRYING DG, HS, OR MP(Y)
63	PASSENGER SHIPS	CARRYING DG, HS, OR MP(Z)
64	PASSENGER SHIPS	CARRYING DG, HS, OR MP(OS)
65	PASSENGER SHIPS	FUTURE USE
66	PASSENGER SHIPS	FUTURE USE
67	PASSENGER SHIPS	FUTURE USE
68	PASSENGER SHIPS	FUTURE USE
69	PASSENGER SHIPS	NO ADDITIONAL INFORMATION
70	CARGO SHIPS	ALL SHIPS OF THIS TYPE
71	CARGO SHIPS	CARRYING DG, HS, OR MP(X)
72	CARGO SHIPS	CARRYING DG, HS, OR MP(Y)
73	CARGO SHIPS	CARRYING DG, HS, OR MP(Z)
74	CARGO SHIPS	CARRYING DG, HS, OR MP(OS)
75	CARGO SHIPS	FUTURE USE
76	CARGO SHIPS	FUTURE USE
77	CARGO SHIPS	FUTURE USE
78	CARGO SHIPS	FUTURE USE
79	CARGO SHIPS	NO ADDITIONAL INFORMATION
80	TANKER(S)	ALL SHIPS OF THIS TYPE
81	TANKER(S)	CARRYING DG, HS, OR MP(X)
82	TANKER(S)	CARRYING DG, HS, OR MP(Y)
83	TANKER(S)	CARRYING DG, HS, OR MP(Z)
84	TANKER(S)	CARRYING DG, HS, OR MP(OS)
85	TANKER(S)	FUTURE USE
86	TANKER(S)	FUTURE USE
87	TANKER(S)	FUTURE USE
88	TANKER(S)	FUTURE USE
89	TANKER(S)	NO ADDITIONAL INFORMATION
90	OTHER TYPE OF SHIP	ALL SHIPS OF THIS TYPE
91	OTHER TYPE OF SHIP	CARRYING DG, HS, OR MP(X)
92	OTHER TYPE OF SHIP	CARRYING DG, HS, OR MP(Y)
93	OTHER TYPE OF SHIP	CARRYING DG, HS, OR MP(Z)
94	OTHER TYPE OF SHIP	CARRYING DG, HS, OR MP(OS)
95	OTHER TYPE OF SHIP	FUTURE USE
96	OTHER TYPE OF SHIP	FUTURE USE
97	OTHER TYPE OF SHIP	FUTURE USE
98	OTHER TYPE OF SHIP	FUTURE USE
99	OTHER TYPE OF SHIP	NO ADDITIONAL INFORMATION

WIG: Wing in ground
HSC: High speed craft
DG: Dangerous goods
HS: Harmful substances
MP: Marine pollutants
0-9: Undefined
100-199: Reserved, for regional use
200-255: Reserved, for future use

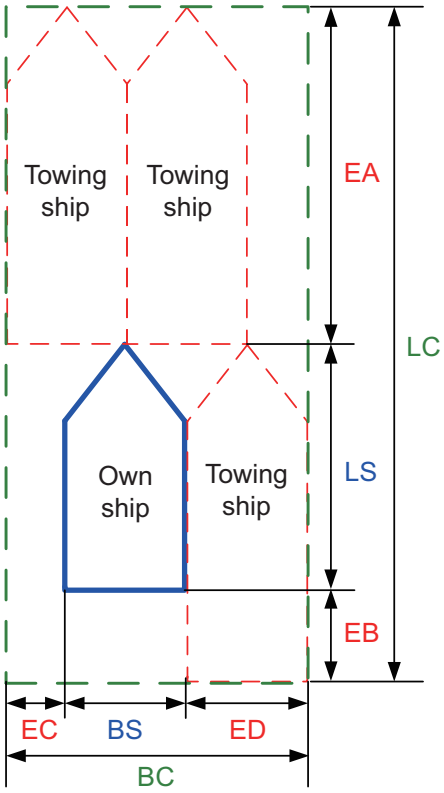
8. Select [NO. OF PERSONS], then press the **ENT/ACK** key.
9. Input total number of persons aboard the ship (setting range: 0-8191) then press the **ENT/ACK** key. If the total number of person aboard the ship is more than [8191], the indication is fixed at [8191].



10. Press ▶ to display [SCALE] tab.



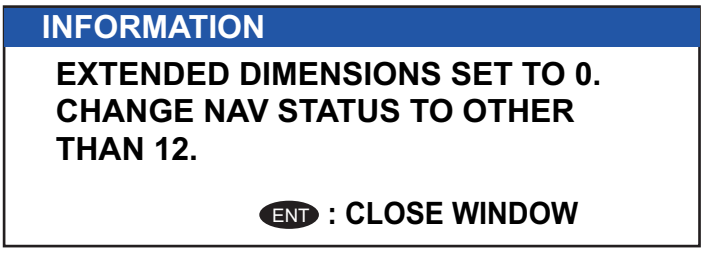
11. Referring to the table below, input the length and beam of own ship and the towing ship. The values are displayed as meters.



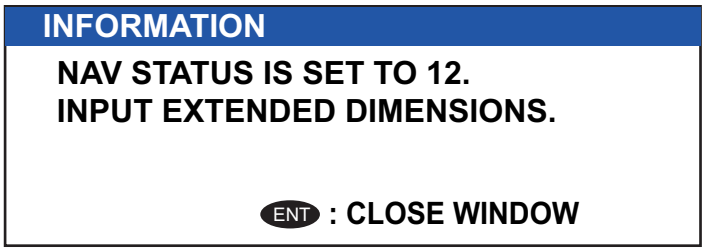
Menu item	Description
[EA]	Length of towing ship
[EB]	Difference of the length of towing ship and own ship
[EC]	Difference of the beam of towing ship and own ship
[ED]	Beam of towing ship
[LS]	Length of own ship
[BS]	Beam of own ship
[LC]	Shows the total length including own ship and towing ship
[BC]	Shows the total beam including own ship and towing ship

[LS], [BS], [LC], [BC] are calculated results, not for input.

12. Press the **ENT/ACK** key after entering each dimension.
The length and beam of own ship and towing ship will be notified to other ships when selecting [12: PWR-DRIVEN VESSEL PUSHING AHEAD OR TOWING ALONGSIDE] in the [NAV STATUS] menu.
Note 1: When [12: PWR-DRIVEN VESSEL PUSHING AHEAD OR TOWING ALONGSIDE] is selected on [NAV STATUS] and the [EA], [EB], [EC] and [ED] are set to “0 m”, the following pop-up message will appear. Set [NAV STATUS] to other than [12: PWR-DRIVEN VESSEL PUSHING AHEAD OR TOWING ALONGSIDE] or set the value of [EA], [EB], [EC] and [ED] to appropriate values.



Note 2: When [EA], [EB], [EC] and [ED] are set to “0 m” and selected [12: PWR-DRIVEN VESSEL PUSHING AHEAD OR TOWING ALONGSIDE] in [NAV STATUS], the following pop-up message appears. Set [EA], [EB], [EC] and [ED] to appropriate values or select other than [12: PWR-DRIVEN VESSEL PUSHING AHEAD OR TOWING ALONGSIDE] in [NAV STATUS] menu.



13. Select [DRAUGHT], then press the **ENT/ACK** key.
14. Input the ship’s draught (setting range: 0 m to 25.5 m), then press the **ENT/ACK** key.
15. Press the **DISP** key to close the menu.

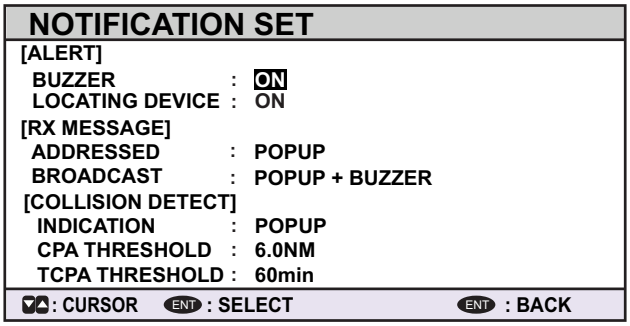
1.7 How to Set the Notification

The [NOTIFICATION SET] menu is used to set the following items:

- Enable or disable the alert buzzer and locating devices (SART, MOB, EPIRB) alerts.
- Notifications for received [ADDRESSED] and [BROADCAST] messages.
- Notifications for collision detection.

To change the settings in the [NOTIFICATION SET] menu, do the following:

1. Press the **MENU/ESC** key to open the main menu.
2. Select [USER SET], then press the **ENT/ACK** key.
3. Select [NOTIFICATION SET], then press the **ENT/ACK** key. The [NOTIFICATION SET] screen appears.
4. Select the [BUZZER] item below [ALERT], then press the **ENT/ACK** key. The settings pop up window appears.



5. Select [ON] to enable the alert buzzer, or select [OFF] to disable the alert buzzer, then press the **ENT/ACK** to confirm the setting.

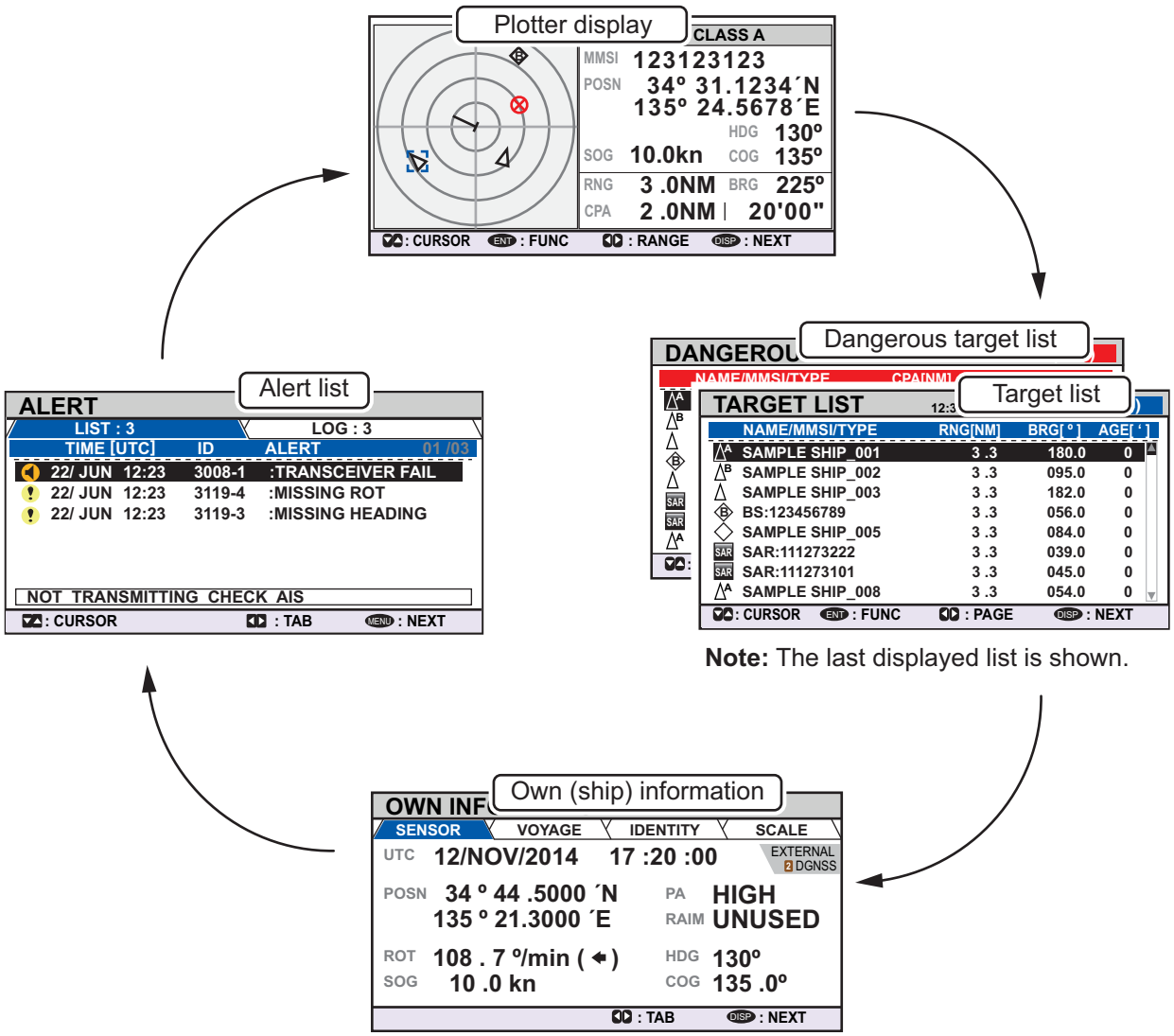
6. Select the [LOCATING DEVICE], then press the **ENT/ACK** key. The settings pop up window appears.
7. Select [ON] to enable the alert when received message from SART Active, MOB Active and EPIRB Active. Select [OFF] to disable the alert.
8. Select the [ADDRESSED] item below [RX MESSAGE], then press the **ENT/ACK** key. The settings pop up window appears.
9. Select the appropriate setting, referring to the table below, then press the **ENT/ACK** key.

Setting	Description
POPUP + BUZZER	Enable both the pop up indication and the buzzer.
POPUP	Enable only the pop up indication. (No buzzer.)
OFF	Disable notifications.

10. Set the notifications for [BROADCAST] RX messages and [COLLISION DETECT] in the same manner.
11. Select the [CPA THREHOLD] item in [COLLISION DETECT], then press the **ENT/ACK** key to show the setting window for [CPA THREHOLD] is as shown.
12. Press ▲ or ▼ to set a range, then press the **ENT/ACK** key. The available ranges are 0.0 NM to 6.0 NM.
13. Select the [TCPA THREHOLD] item in [COLLISION DETECT], then press the **ENT/ACK** key to show the setting window for [TCPA THREHOLD] is as shown.
    Note: When both CPA and TCPA are below the [CPA THREHOLD] and [TCPA THREHOLD] setting values, the collision alarms is available.
14. Press ▲ or ▼ to set a time, then press the **ENT/ACK** key. The available time is 0 min to 60 min.
15. Press the **DISP** key to close the menu.

1.8 How to Select a Display

Use the **DISP** key to select a display. Each time the key is pressed, the display changes in the sequence shown below.



Note: The last displayed list is shown.

The [DANGEROUS LIST] and [TARGET LIST] are displayed dependent on which list was last displayed. For example, if the [DANGEROUS LIST] is viewed at any time, the [TARGET LIST] is hidden in the above cycle and can only be viewed by sorting the [DANGEROUS LIST]. See section 1.8.2 for details.

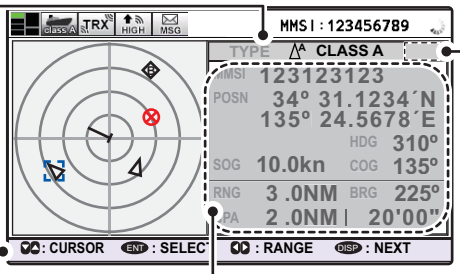
1.8.1 Plotter display

The plotter display, which automatically appears after the power-on sequence, shows various information for AIS-equipped ships, locating devices, etc. within the range selected. The display is fixed at a north-up orientation.

Data for ship target

A target marker (hollow triangle) indicates the presence of a vessel equipped with AIS in a certain location and course. To view detailed information about a vessel, see subsection 1.8.2.

If two or more targets occupy a similar position, the display priority order is: selected target (surrounded by a broken box, as shown in the example below) > non-selected target.



Target type (CLASS A, CLASS B, BS, AtoN, SAR, Locating Device, INLAND)

Key guidance bar

DANGER is displayed here when a target is calculated to be on a collision course with your vessel. If no signal is received from target, **LOST** is displayed. The target data is deleted seven minutes after the loss of signal from the target.

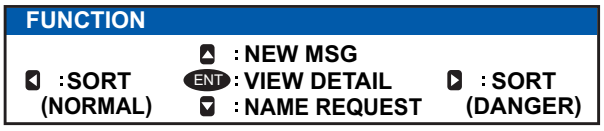
	Own ship symbol
	Selected target
	Locating device
	Target (black)
	Base station

For a full list of AIS icons, and their meanings, see Appendix 5, at the back of this manual.

MMSI: Target's MMSI
NAME: Target vessel's name (if available)
POSN: Target's last known position
HDG: Target's heading
SOG: Target's Speed Over Ground
COG: Target's Course Over Ground
RNG: Range to target from own ship
BRG: Bearing to target
CPA: Range and time to approach to the target from own ship

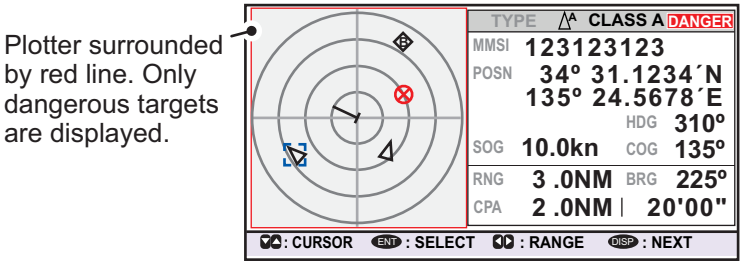
How to operate the plotter display

1. Press the **DISP** key to show the plotter display.
2. Press ◀ or ▶ to select a range. The available ranges are (in nm): 0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, and 24.
3. Press ▲ or ▼ to select a target. The selected target is highlighted in a blue colored broken box. Further, the selected target's basic data are displayed on the right-side of the screen.
4. To view a target's detailed data, or to sort the target list, select the desired target, then press the **ENT/ACK** key. The [FUNCTION] pop up window appears.



- [SORT (NORMAL)]: Press ◀ to display and sort the [TARGET LIST] into range order.

- [SORT (DANGER)]: Press ▶ to display and sort the [DANGEROUS TARGET LIST] in range order.
  Note: When [SORT (DANGER)] is selected, all non-dangerous targets are hidden on the plotter display and the plotter screen is surrounded by a red box, as shown in the figure below.



  To show any targets which were hidden by this option, select [SORT (NORMAL)] from the [FUNCTION] pop up window.
- [VIEW DETAIL]: Press the **ENT/ACK** key to open the [TARGET DETAIL] screen.
- [NEW MSG]: Press ▲ to open the text input window to create an AIS message to send to the selected target.
- [NAME REQUEST]: Press ▼ to send a name request to the target vessel's AIS.
  Note: Name requests cannot be sent to the same target within a short period, regardless of target. If you have requested the name of a target too soon after the last request, the pop up message "CANNOT REQUEST NAME" appears. Wait a short while before requesting the name again.

Note 1: A target is declared a lost target under the conditions shown in the table below. A target is erased from the screen seven minutes (For locating device, 18 minutes) after no signal is received from the target.

Ship's navigational status	Target declared as lost target after:
Class A	
Ship at anchor or moored and not moving faster than 3 kn.	7 minutes
Ship at anchor or moored and moving at more than 3 kn.	50 seconds
0 to 14 kn speed	50 seconds
0 to 14 kn speed with course change	50 seconds
14 to 23 kn speed	30 seconds
14 to 23 kn speed with course change	30 seconds
Speed higher than 23 kn	10 seconds
Speed higher than 23 kn with course change	10 seconds
Class B	
Speed over ground less than 2 kn	7 minutes
Speed over ground 2 kn or higher	150 seconds

Note 2: When a target is considered to be on a collision course, the audible alert sounds (if active). Take suitable measures to avoid collision.

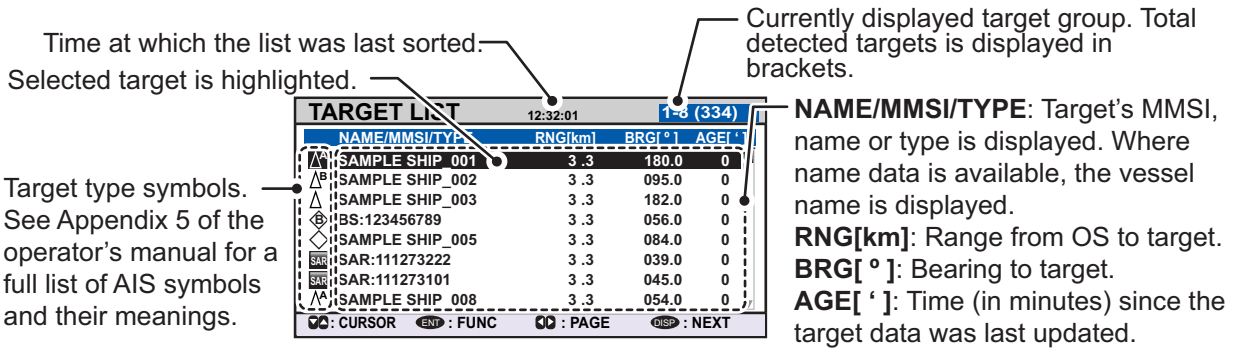
Note 3: "DANGER" appears next to the target type when a target is considered to be on a collision course. Further, when a target becomes a lost target, "LOST" appears next to the target type.

1.8.2 Target list

The [TARGET LIST] can store up to 2048 AIS targets and locating devices being detected by the FA-170. Targets are displayed across several pages, in the order which they are detected. The list can be sorted in range order, from closest to farthest.

Note: The last viewed list is displayed when the **DISP** key is pressed to show either the [TARGET LIST] or the [DANGEROUS LIST]. To view the [TARGET LIST] when the [DANGEROUS LIST] is displayed, follow the procedure outlined in step 3 on the following page.

1. Press the **DISP** key until the [TARGET LIST] is displayed.



The [NAME/MMSI/TYPE] column of the [TARGET LIST] displays the target vessel's type in the following formats:

Where the target type is CLASS A/CLASS B/AtoN

The name of the vessel is displayed when the name data is available. Where the name data is not available, the vessel's MMSI is displayed.

Where the target type is SAR(VESSEL/AIRCRAFT)/LOCATING DEVICE

The format in which data is displayed is listed in the table below.

TYPE	Display format	TYPE	Display format
SAR vessel	SAR:(stations' MMSI/name)	MOB Active	MOB AIS:(station's MMSI)
SAR aircraft	SAR:(stations' MMSI/name)	MOB Test	MOB TEST:(station's MMSI)
SART Active	AIS SART:(station's MMSI)	EPIRB Active	EPRIB AIS:(station's MMSI)
SART Test	SART TEST:(station's MMSI)	EPIRB Test	EPRIB TEST:(station's MMSI)

Where the target type is BASE STATION

"BS:(Base station's MMSI)" is displayed.

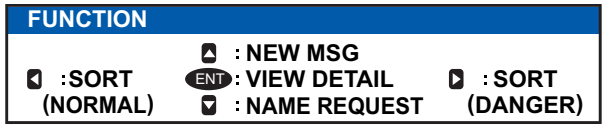
Note 1: If there is no data for the target selected, the fields are displayed as "=NO TARGET=".

Note 2: Targets are automatically sorted in range order (closest to farthest) when no key is operated for 30 seconds. Target order is then updated every five seconds.
Active locating devices take priority and are displayed at the top of the list.

Note 3: When [AUTO SORT] on the [USER SET] menu is [OFF], the range and bearing to a target are updated. However, target order is not updated. To manually sort targets, see step 2.

Note 4: To select a target on the plotter display, press ▲ or ▼ to select the target then press the **ENT/ACK** key. Press ▲ to cycle through targets from nearest to furthest; ▼ to cycle through targets from farthest to nearest.

2. Press ▼ or ▲ to scroll through the first 100 targets, press ◀ or ▶ to scroll through the targets in groups of 8 (next/previous 8 targets).
   The indication "NEXT 100 TARGETS" appears at the bottom of the list if more targets are available. Select the indication, then press the **ENT/ACK** key to show the next 100 targets.
   The indication "PREVIOUS 100 TARGETS" appears at the top of the list if there is one or more pages of targets before the one currently displayed. Select the indication, then press the **ENT/ACK** key to show the previous 100 targets.
3. To view target data, or to sort the target list, select the desired target, then press the **ENT/ACK** key. The target list options pop up window is displayed.



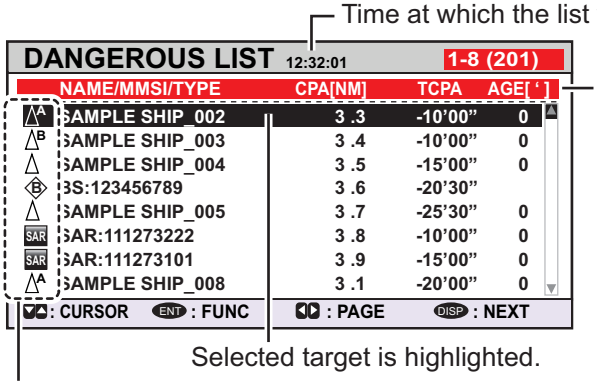
- [SORT (NORMAL)]: Press ◀ to sort the [TARGET LIST] into range order. The closest target is displayed at the top of the list.
- [SORT (DANGER)]: Press ▶ to display and sort the [DANGEROUS TARGET]LIST in range order. The closest target is displayed at the top of the list.
- [VIEW DETAIL]: Press the **ENT/ACK** key to open the [TARGET DETAIL] screen.
- [NEW MSG]: Press ▲ to open the text input window to create an AIS message to send to the selected target.
- [NAME REQUEST]: Press ▼ to send a name request to the target vessel's AIS.
  Name requests cannot be sent to the same target within a short period, regardless of target. If you have requested the name of a target too soon after the last request, or the target is out of range, or the target has set their AIS to RX only mode, the pop up message "CANNOT REQUEST NAME" is displayed. Wait a short while before requesting the name again.

4. Press the **DISP** key to close the menu.

1.8.3 Dangerous (target) list

Dangerous targets are targets which are calculated to be on a collision course with your vessel. When a dangerous target is detected, the target and its available details can be viewed in the [DANGEROUS TARGET LIST].

Note: The operations available from the [DANGEOUS TARGET LIST] are the same as the [TARGET LIST] operations. To view the [DANGEROUS LIST] when the [TARGET LIST] is displayed, follow the procedure outlined in step 3 of section 1.8.2.



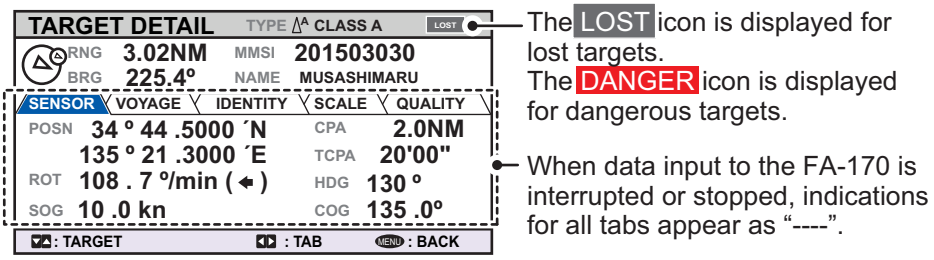
NAME/MMSI/TYPE: Target's MMSI, name or type is displayed. Where name data is available, the vessel name is displayed.
CPA[NM]: Range to approach to the target from own ship.
TCPA: Time to approach to the target from own ship.
AGE[']: Time (in minutes) since the target data was last updated.

Note: If there are no dangerous targets detected, list shows the message "=NO TARGET=".

1.8.4 How to interpret the [TARGET DETAIL] screen

The [TARGET DETAIL] screen shows available detailed information about the selected target.

Lost and dangerous targets have the appropriate icon displayed at the top right, as indicated in the lost target example below.



The LOST icon is displayed for lost targets.
The DANGER icon is displayed for dangerous targets.

When data input to the FA-170 is interrupted or stopped, indications for all tabs appear as "----".

There are five tabs available for viewing; [SENSOR], [VOYAGE], [IDENTITY], [SCALE] and [QUALITY]. Press ◀ or ▶ to select a tab and show its information.

The selected target's bearing ([BRG]), range ([RNG]), [MMSI] and [NAME] are displayed at the top of the screen regardless of the selected tab. For lost or dangerous targets, the appropriate icon is displayed at the top right of the screen.

The information displayed on each tab varies, depending on the type of target selected.

The tables on the following pages list each tab's contents, along with a brief description.

SENSOR tab

Contents	Description
POSN	Target's last known position. Displayed for all target types.
ROT	Target's Rate Of Turn. Displayed only for CLASS A and Locating device target types.
ALT	Altitude. Displayed only for SAR VESSEL and SAR AIRCRAFT target types.
SOG	Target's Speed Over Ground. Displayed only for CLASS A, CLASS B, SAR VESSEL, SAR AIRCRAFT and Locating device target types.
COG	Target's Course Over Ground. Displayed only for CLASS A, CLASS B, SAR VESSEL, SAR AIRCRAFT and Locating device target types.
HDG	Target's last known heading. Displayed only for CLASS A, CLASS B and Locating device target types.
CPA	Range to target. Displayed for all target types.
TCPA	Time to approach to target. Displayed for all target types.

VOYAGE tab

The VOYAGE tab is only displayed for CLASS A target types.

Contents	Description
NAV STATUS	Target's navigational status (see section 1.6 for details).
DESTINATION	Target's destination.
ETA	Target's Estimated Time of Arrival at the above destination.

IDENTITY tab

The IDENTITY tab is only displayed for CLASS A, CLASS B, SAR VESSEL, SAR AIRCAFT and AtoN target types.

Contents	Description
CALL SIGN	Target's call sign. Not displayed for AtoN target types.
IMO NO.	Target's International Maritime Organization registration number.
TYPE OF SHIP	Target's ship type. Displayed only for CLASS A and CLASS B target types.
REAL AtoN	Displayed as "YES" for physical aids to navigation, "NO" for virtual aids to navigation. Displayed only for AtoN target types.
TYPE OF AtoN	The type of aids to navigation. Displayed only for AtoN target types.
VENDER ID	Target's AIS maker's ID. Displayed only for CLASS A and CLASS B target types.

SCALE tab

The SCALE tab is only displayed for SAR VESSEL, SAR AIRCRAFT and AtoN target types.

Contents	Description
SHIP SIZE(LENGTH, BEAM)	Target's ship size (length, beam). Displayed for all above target types.
ANT POSN(X,Y)	Position of target's antenna. Displayed for all above target types.
DRAUGHT	Target ship's draught. Displayed only for CLASS A target types.
PI	Off-position indicator. Displayed only for AtoN target types.

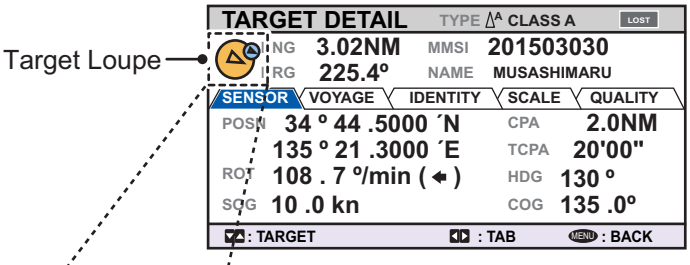
QUALITY tab

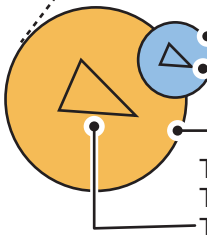
The QUALITY tab is displayed for all target types.

Contents	Description	
PA	Position Accuracy for target ship. (HIGH: High accuracy, LOW: Low accuracy.)	
RAIM	Target's RAIM status. (USED: Using RAIM, UNUSED: Not using RAIM.).	
TIME STAMP	Time at which the target was last detected. Not displayed for AIS base stations.	
POSN QUALITY	Target's position quality. Possible position qualities are shown in the list below:	
	Quality indication	**Meaning**
	[NO POSITION]	Position data not available.
	[MANUAL POSITION]	Position data is input manually.
	[DEAD RECKONING POSITION]	Position calculated by dead reckoning.
	[OUTDATED POSITION > 200 M]	More than 200 m from last estimated position.
	[POSITION > 10 M]	Difference of more than 10 m from last estimated position.
	[POSITION WITH RAIM > 10 M]	Difference of more than 10 m from last estimated position.
	[POSITION < 10 M]	Difference of less than 10 m from last estimated position.
	[POSITION WITH RAIM < 10 M]	Difference of less than 10 m from last estimated position.
	[VALID POSN WITH NO TIME STAMP]	No time stamp available.

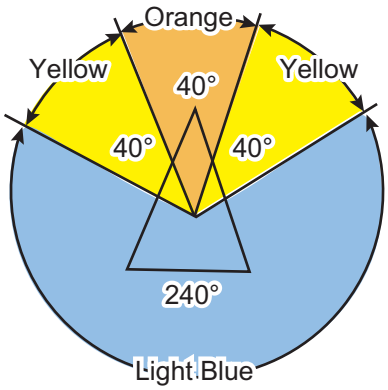
Target Loupe

Target loupe is on the top left side of [TARGET DETAIL] screen.
The target loupe shows the positions and directions of own ship and other ship.





Small circle
The icon in small circle shows the direction of own ship.
The icon's direction changes according to the HDG value.
Large circle
The icon in large circle shows the direction of other ship.
The shape of icon changes according to the type of target.
The direction changes according to the HDG value.



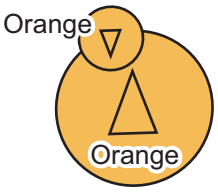
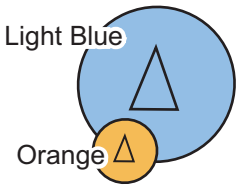
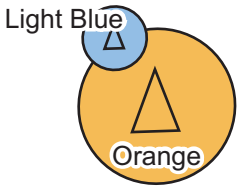
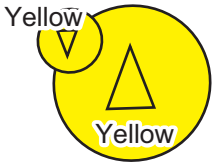
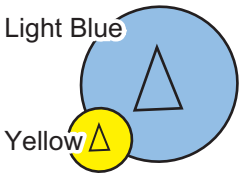
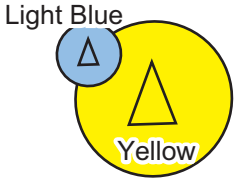
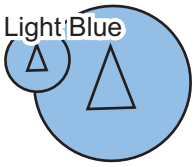
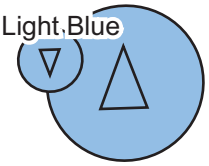
Color of large circle and small circle changes according to the position of each other to show the possibility of collision.

For example, the color of small circle becomes orange when the other ship is in 40° area from the center of own ship. The change of color to orange indicates the high possiblity of becoming the cause of collision for own ship. Also, when the position of own ship is within 40° area of other ship, the color of large circle becomes orange.

Also, the color of small circle becomes yellow when the other ship is in 20° to 60° area from the center of own ship. The change of color to yellow indicates the lower possiblity of becoming the cause of collision for own ship. Also, when the position of own ship is within 20° to 60° area of other ship, the color of large circle becomes yellow.

On the contrary, when the position of other ship is in 240° area, the color of large circle and small circle become light blue to indicate low possibility of collision.

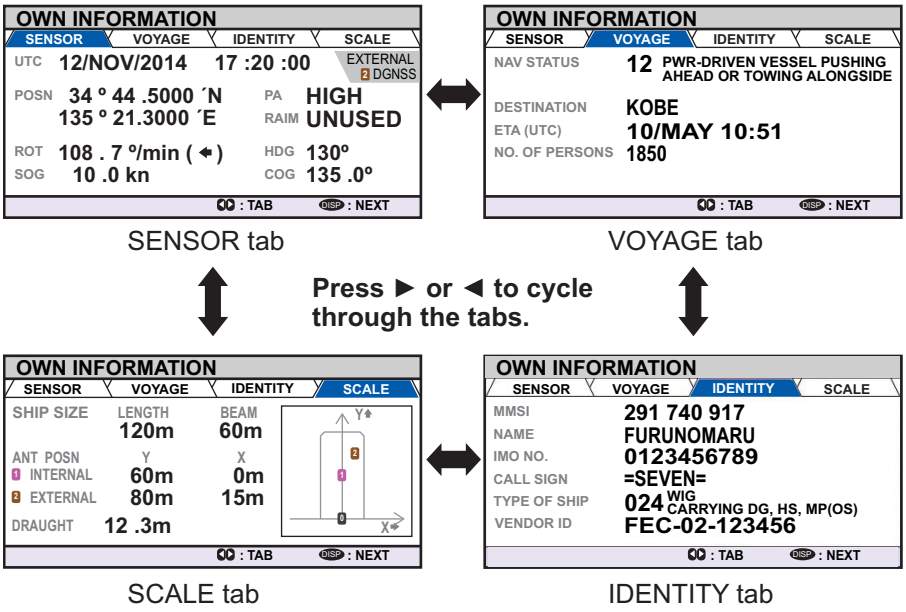
Indications of target loupe - Indicated colors are the colors of each circle

	Both ships	Small circle (Own ship)	Large circle (Other ship)
Orange			
Yellow			
Light Blue			

1.8.5 Own ship data

The [OWN INFORMATION] display shows your ship's data across four tabs. The information displayed is shown in the figure below. This data should be checked once per voyage or once per month, whichever is shorter. Data may be changed only on the authority of the master.

The Officer of the Watch should periodically check position, SOG and sensor information for quality.



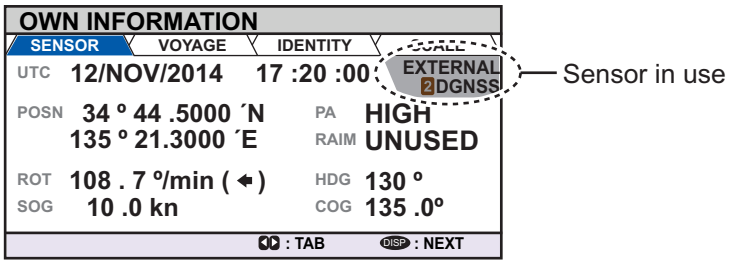
The table below list each tab's contents along with a brief description.

Tab	Item	Description
[SENSOR]	[UTC], [LT]	Date and time. [UTC]: Universal Time, Coordinated. [LT]: Local time. **Note:** For more information on these indications, see section 1.15.
	[POSN]	OS (Own Ship) position.
	[ROT]	Rate of Turn.
	[SOG]	Speed Over Ground.
	[PA]	Positioning accuracy.
	[RAIM]	RAIM status. [USED]: RAIM is currently in use. [UNUSED]: RAIM is not currently in use.
	[HDG]	Heading.
	[COG]	Course Over Ground.
	GNSS status	GNSS currently in use.
[VOYAGE]	[NAV STATUS]	Current navigational status.
	[DESTINATION]	Current destination.
	[ETA [UTC]], [ETA [LT]]	Estimate Time of Arrival (ETA) at the destination.
	[NO. OF PERSONS]	Number of people aboard your vessel.

Tab	Item	Description
[IDENTITY]	[MMSI]	Own ship's MMSI.
	[NAME]	Own ship's name.
	[IMO NO.]	Own ship's IMO number.
	[CALL SIGN]	Own ship's call sign.
	[TYPE OF SHIP]	Own ship's vessel type. See section 1.6, step 7 for details.
	[VENDOR ID]	Own ship's vendor ID.
[SCALE]	[SHIP SIZE]	Own ship's length and beam.
	[ANT POSN]	Antenna position. [INTERNAL]: position of internal antenna. [EXTERNAL]: position of external antenna.
	[DRAUGHT]	Own ship's draught.

Sensor priority

When the signal is not received from the sensor, if the multiple sensors are connected, the sensor in use is switched according to the priority shown as the table below.



Priority		Sensor in use	Indication on [SENSOR] tab
High	1	External DGNSS in use (corrected)	EXTERNAL DGNSS
	2	Internal DGNSS in use (corrected; Message 17)	INTERNAL DGNSS
	3	Internal DGNSS in use (corrected; beacon)	
	4	External EPFS in use (uncorrected)	EXTERNAL GNSS
	5	Internal GNSS in use (uncorrected)	INTERNAL GNSS
Low	6	No position	NO FIX

1.8.6 Alert display

The alert display shows the date and time alerts were generated. For further details, see section 3.5.

1.9 Messages

You may send and receive messages via VHF channels, to a specified MMSI or all AIS-equipped ships in the area. 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.

When a message is received, the equipment beeps and pop up appears, indicating the type of message received.

Sent messages are stored in the [MSG BOX] (message box) under the [OUTBOX] tab.

Received messages are stored in the [MSG BOX] under the [INBOX] tab.

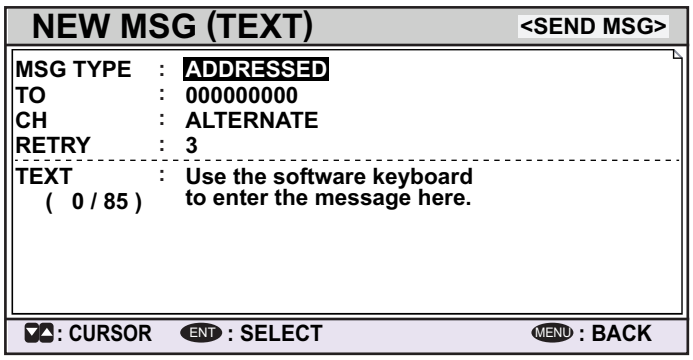
The FA-170 can store up to 20 transmitted messages and up to 20 addressed received messages and 20 broadcast received messages. When the [INBOX] or [OUTBOX] becomes full, the oldest message in the box is automatically deleted to make room for the latest.

1.9.1 How to send a message

This procedure applies to Class A AIS, for Inland AIS, see section 2.6.1.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [MSG], then press the **ENT/ACK** key.

3. [NEW MSG] is selected. Press the **ENT/ACK** key. The [NEW MSG] screen appears.

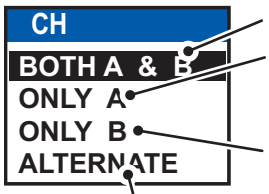


4. [MSG TYPE] is selected, press the **ENT/ACK** key to change the type of message you wish to send. The options pop up shown below appears.

BROADCAST — Message to all vessels.
ADDRESSED — Message to specified vessel only.

5. Select the appropriate message type, then press the **ENT/ACK** key.
   For broadcast messages, skip to step 8.
6. Select [TO], then press the **ENT/ACK** key. A numerical settings pop up appears.

7. Input the MMSI of the ship you wish to send this message to, then press the **ENT/ACK** key to close the pop up. See section 1.5 for how to input data.
   Note: When sending an addressed message and it is known that the recipient cannot display the message, [NO MKD] will appear on the right side of MSG TYPE.
8. Select [CH] (Channel), then press the **ENT/ACK** key. The channel select options pop up appears.



Sends the same message to both channel A and channel B.

Sends the message to channel A. If channel A is set to RX only and channel B is set to TXRX, the message is sent to channel B.

Sends the message to channel B. If channel B is set to RX only and channel A is set to TXRX, the message is sent to channel A.

Sends messages on alternating channels. In other words, if the last message sent on channel A, the next message is sent on channel B.

9. Select the appropriate option, then press the **ENT/ACK** key.
   For broadcast messages, skip to step 12.
10. Select [RETRY], then press the **ENT/ACK** key. The retry attempts setting pop up appears.
11. Press ▲ to increase the retry attempts, ▼ to decrease the retry attempts. The maximum setting for retries is 3. Press the **ENT/ACK** key to apply the setting and close the pop up.
12. Press ▼ to highlight the message text, then press the **ENT/ACK** to display the software keyboard.
13. Input the new message text, referring to section 1.5.4. The maximum number of characters allowed is as follows:
    - BROADCAST: 90 characters.
    - ADDRESSED: 85 characters.
14. Press ▲ or ▼ to highlight [<SEND MSG>] at the top right of the screen, then press the **ENT/ACK** key. A confirmation pop up appears.
15. Select [YES] to send the message or [NO] to cancel the message, then press the **ENT/ACK** key.

Note: The following pop up messages may be displayed during sending or after the message has been sent.

Pop up message	Description
MESSAGE SENT SUCCESSFULLY.	Displayed after a message is sent successfully.
NO TEXT IN MESSAGE	Displayed when the message body is blank and <SEND MSG> is selected.
FAILED TO SEND MESSAGE. (CODE:X)	The message failed to send. The code (indicated as "X" in the example to the left) indicates the reason for the failure. "CODE:1" indicates that the message was not acknowledged by the recipient. "CODE:2" indicates that the message failed to send.

1.9.2 How to receive messages

When a message is received, the equipment beeps and a pop up message appears on the screen. The table below lists the possible messages with a brief description. To enable/disable these pop ups, see section 1.7.

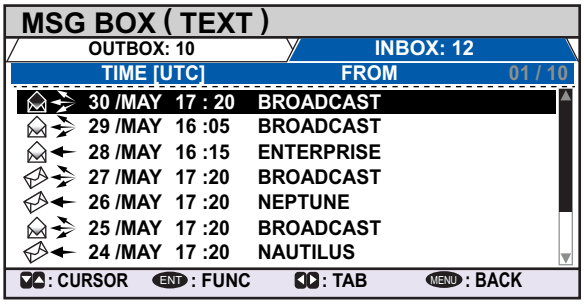
Pop up message	Description
TEXT MESSAGE RECEIVED.	Displayed when a broadcast message is received.
TEXT MESSAGE RECEIVED. MMSI/NAME.	Displayed when an addressed message is received. MMSI appears by default, however, where name data is available, the vessel name is also displayed.

1.9.3 How to use the message box (MSG BOX)

How to view a received message

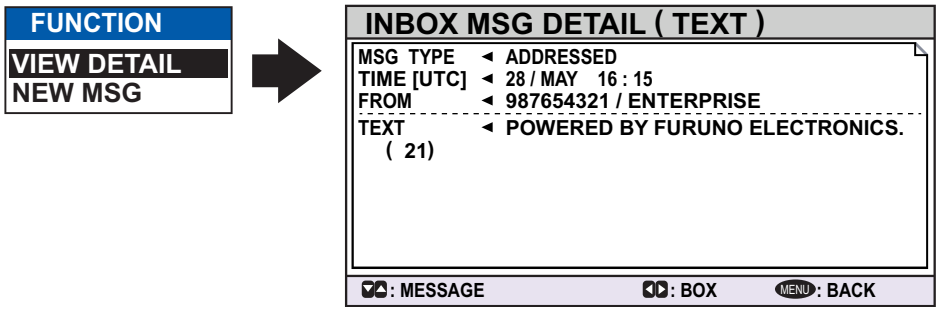
To view message contents, follow the procedure below.

1. Press the **ENT/ACK** to close the pop up window.
2. Press the **MENU/ESC** key to show the main menu.
3. Select [MSG], then press the **ENT/ACK** key.
4. Select [MSG BOX], then press the **ENT/ACK** key. The [OUTBOX] tab is displayed by default. Press ▶ to display the [INBOX] tab.



Indication	Meaning
	This message has been viewed.
	This message is unviewed.
	Broadcast message
	Addressed message

5. Select the message you wish to view, then press the **ENT/ACK** key. The message options pop up window shown below appears.

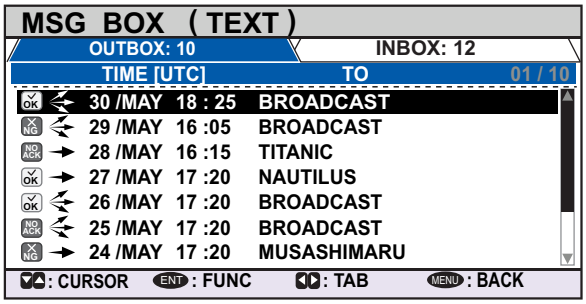


Select [VIEW DETAIL], then press the **ENT/ACK** key to display the received message's contents. The figure above shows an example of a received message. Select [NEW MSG], then press the **ENT/ACK** key to send a message back to this message's sender.

6. Press ▲ or ▼ to view other messages, press ◀ or ▶ to switch between viewing an [INBOX] message and an [OUTBOX] message.
7. Press the **DISP** key to close the menu.

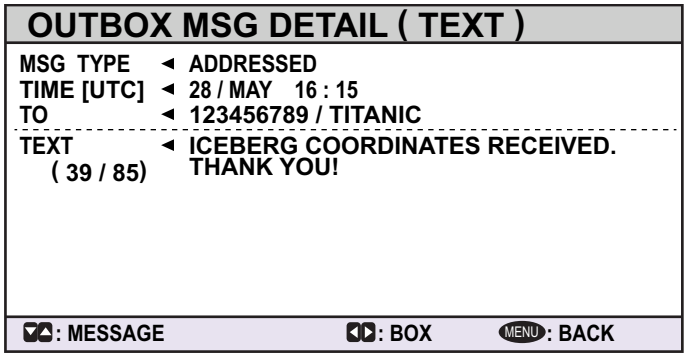
How to view sent messages

1. Press the **ENT/ACK** to close the pop up window.
2. Press the **MENU/ESC** key to show the main menu.
3. Select [MSG], then press the **ENT/ACK** key.
4. Select [MSG BOX], then press the **ENT/ACK** key. The [OUTBOX] tab is displayed by default.



Indication	Meaning
OK	This message was sent successfully.
NG	This message was not sent.
NO ACK	Waiting for recipient to acknowledged this message.
	Broadcast message
	Addressed message

5. To view the contents of a message, highlight the message then press the **ENT/ACK** key. The message options pop up window appears.
   Select [VIEW DETAIL] to display the received message's contents. The figure below shows an example of a received message.
   Select [NEW MSG] to send another message to the recipient.



6. Press ▲ or ▼ to view other messages, press ◀ or ▶ to switch between viewing an [INBOX] message and an [OUTBOX] message.
7. Press the **DISP** key to close the menu.

1.10 Regional Operating Channels

AIS operates primarily on two dedicated VHF channels, CH 2087 and CH2088. Where these channels are not available regionally, the AIS is capable of being automatically switched to designated alternate channels by means of a message from a shore facility. Where no shore based AIS or GMDSS sea area A1 station is in place, the AIS should be switched manually as in subsection 1.10.2.

A regional operating area is set with the procedure shown below. The most recent eight areas are memorized.

- Automatic setting of VHF DSC (channel 70) from shore-based AIS.
- Automatic setting by AIS message from shore-based AIS.
- Setting by shipboard system such as ECDIS.
- Manual setting

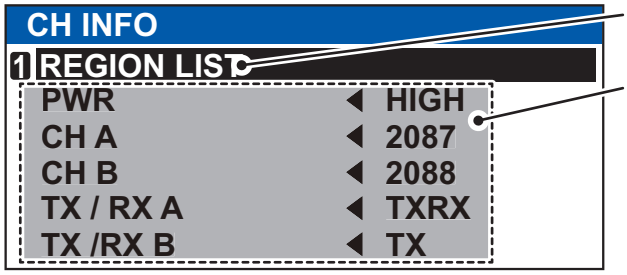
The default area is as follows:

- Tx power: 12.5 W
- Channel no. 2087, 2088
- Tx/Rx mode: Tx/Rx

1.10.1 How to view channel information

Do the following to view current channel information. To edit channel information, see subsection 1.10.2.

1. Press the **MENU/ESC** key to open the menu.
2. Select [CH INFO]. The [CH INFO] pop up window appears.



Select to display the regional channel list.

Current channel's details.
PWR: Power.
CH A: Channel used for channel A.
CH B: Channel used for channel B.
TX / RX A: Channel A TX/RX settings.
TX / RX B: Channel B TX/RX settings.

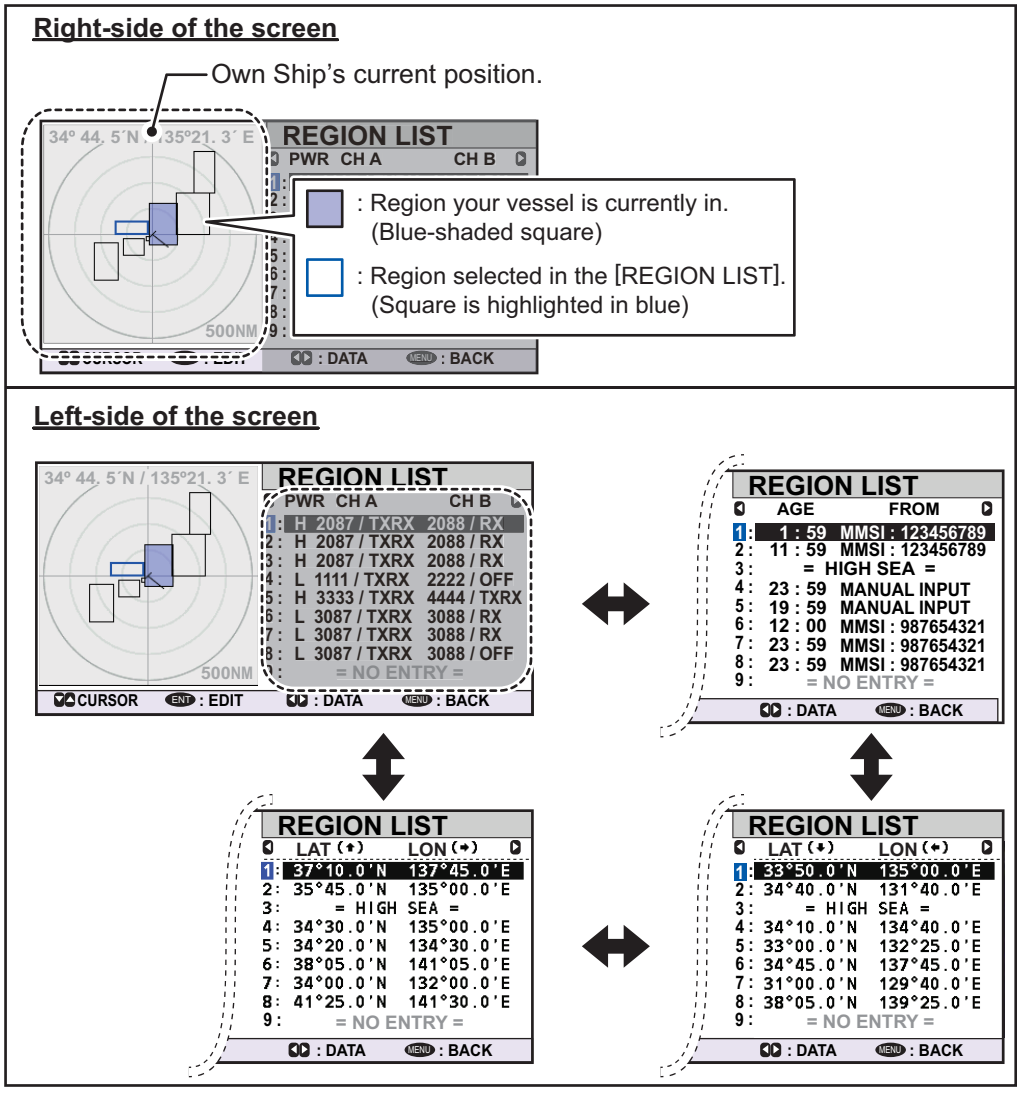
3. Press the **DISP** key to close the display.

1.10.2 How to edit/view regional channels

You may display the status of regional operating areas currently memorized in the equipment. Nine of any combination of AIS message from shore-based AIS, DSC message, manual settings and commands from ECDIS or a PC may be registered and one will be [HIGH SEA].

- AIS and DSC messages registered within last two hours cannot be edited.
- An item labeled [HIGH SEA] cannot be edited. ([HIGH SEA] are data used for international waters not controlled by shore-based AIS.)
- If two areas overlap one another the older data is deleted.
- Data older than 24 hours is deleted.
- Area data is deleted when it is more than 500 miles from the area for which it was registered.

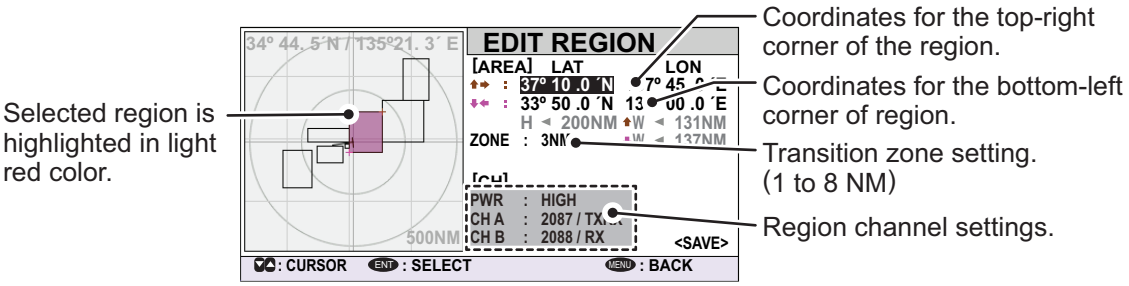
1. Press the **MENU/ESC** key to open the menu.
2. Select [CH INFO], then press the **ENT/ACK** key.
3. Select [REGION LIST] then press the **ENT/ACK** key. The REGION LIST has four pages of data related to each region, displayed on the left-side of the screen as shown in the figure below. The right side of the screen displays your current position, current region and the selected region.
   Press ◀ or ▶ to change pages.



The data displayed on each page of the [REGION LIST] is described in the table below.

Data	Description
Region number	Up to eight regions can be assigned and set up. The ninth region is reserved for open seas and is displayed as "= HIGH SEA =". The region you are currently in is highlighted in blue (no. 1 in the example on the previous page).
PWR	• H: High power TX setting. • L: Low power TX setting.
CH A/CH B	Channel A/B's frequency and TX/RX settings.
AGE	Time since the channel was registered.
FROM	Cause/origin of the last change.
LAT/LON	Latitude and Longitude of the region's corners.

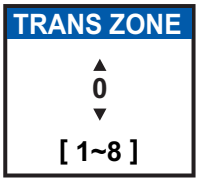
4. Select the desired region number. You can select a region to edit from any page in the [REGION LIST]. The selected region is highlighted in blue on the plotter screen.
5. Press the **ENT/ACK** key to show the selected region's details. The region is highlighted in light red on the plotter screen, as shown in the figure below.



6. The [LAT] setting for the top-right corner of the region is already selected; press the **ENT/ACK** key. Input the latitude for the top-right position (northeast point) of the AIS operating area then press the **ENT/ACK** key.
7. Press ▶ to select the [LON] setting for the top-right corner, then press the **ENT/ACK** key. Input the longitude for the right-top position (northeast point) of the AIS operating area then press the **ENT/ACK** key.
8. Press ▶ to select the [LAT] setting for the bottom-left corner, then press the **ENT/ACK** key. Enter latitude for the bottom-left position (southwest point) of the AIS operating area then press the **ENT/ACK** key.
9. Press ▶ to select the [LON] setting for the bottom-left corner, then press the **ENT/ACK** key. Enter longitude for the bottom-left position (southwest point) of the AIS operating area then press the **ENT/ACK** key.

   Note: The overall area for the selected region in displayed in height (H) and width (H) values, in gray text. If the set region is less than 20 nautical miles or more than 200 nautical miles long/wide, the height and width values are displayed in red text. Adjust the dimensions so the length/width of the region is more than 20 nautical miles and less than 200 nautical miles.

10. Press ▶ to select the setting for [ZONE], then press the **ENT/ACK** key. A numerical input pop up window appears. The transition zone works as a buffer between your current region and the regions immediately adjacent to your current region. When any vessel enters the transition zone, messages sent from the adjacent region channel A are received via your region's channel B. This helps to locate vessels in adjacent regions.

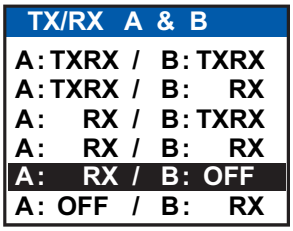


11. Input the size of the transition zone for this region, then press the **ENT/ACK** key.

12. Press ▶ to select [PWR], then press the **ENT/ACK** key to show the channel power options.
13. Select [HIGH] or [LOW] power desired then press the **ENT/ACK** key.

14. Select the channel indication for [CH A], then press the **ENT/ACK** key. A numerical input pop up window appears.
15. Input the channel number for [CH A] then press the **ENT/ACK** key.

16. Press ▶ to select the transmit/receive settings, then press the **ENT/ACK** key. An options pop up window appears.
17. Select the appropriate setting, then press the **ENT/ACK** key.
    [TXRX]: Transmit and receive.
    [RX]: Receive only.
    [OFF]: Disable the channel.



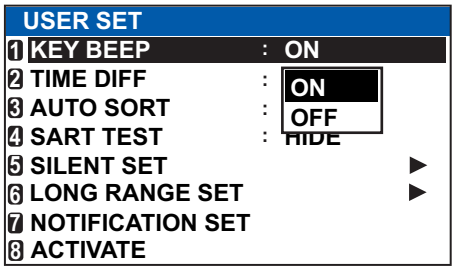
18. Press ▶ to select [<SAVE>], then press the **ENT/ACK** key. A confirmation pop up window appears.
    Select [YES] to apply the new settings and return to the [REGION LIST], [NO] to cancel the new settings and return to editing the region.
    Note: If you enter invalid data, a pop up message stating the reason for the error appears. The table on the following page lists the pop up messages for these errors and the recommended action for each error.

Pop up error message	Recommended action
INVALID CHANNEL	Check the channel setting, re-input the settings.
INVALID REGION SIZE.	Check the region size is less than 200 NM and more than 20 NM. Adjust your region size.
INVALID REGION. ADJUST SIZE OR LOCATION.	Check your region size and location, there is at least one other region overlapping. Resize or relocate your region.
INVALID OPERATION: REGION CANNOT BE OVERWRITTEN.	Check the overlapping regions. Adjust your region size or location.

1.11 How to Enable/Disable the Key Beep

You can turn off the beep, which sounds for valid key input.

1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET], then press the **ENT/ACK** key.



3. [KEY BEEP] is already selected, press the **ENT/ACK** key.
4. Select [ON] or [OFF] as appropriate then press the **ENT/ACK** key.
5. Press the **DISP** key to close the menu.

1.12 Long Range

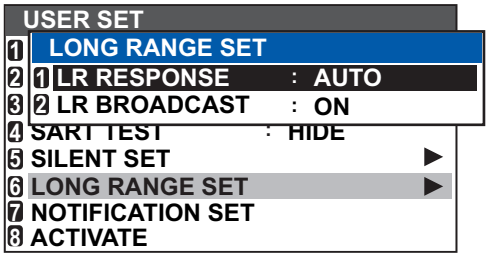
The long range function sets the following:

- How to reply to a request for own ship data from a distant station (for example, an Inmarsat C station).
- Whether to transmit your ship's position to a satellite via the AIS VHF communication link or not.

1.12.1 How to set up long range response

Select how to reply to a request for own ship data from a distant station, for example, an Inmarsat C station. The available options are [AUTO] (automatically) or [MANUAL] (manually).

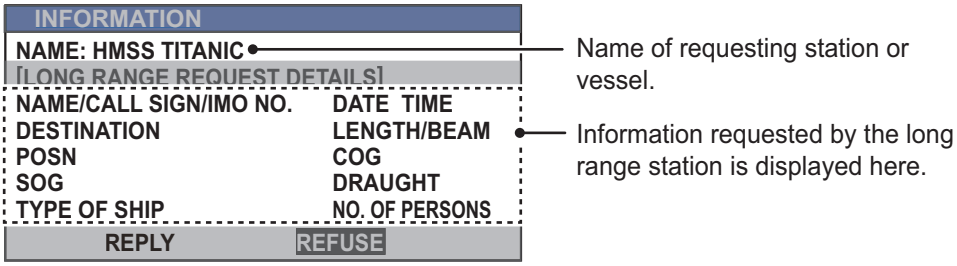
1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET], then press the **ENT/ACK** key.
3. Select [LONG RANGE SET], then press the **ENT/ACK** key.



4. Select [LR RESPONSE] then press the **ENT/ACK** key.
5. Select [AUTO] (auto reply) or [MANUAL] (manual reply) as appropriate then press the **ENT/ACK** key.
6. Press the **DISP** key to close the menu.

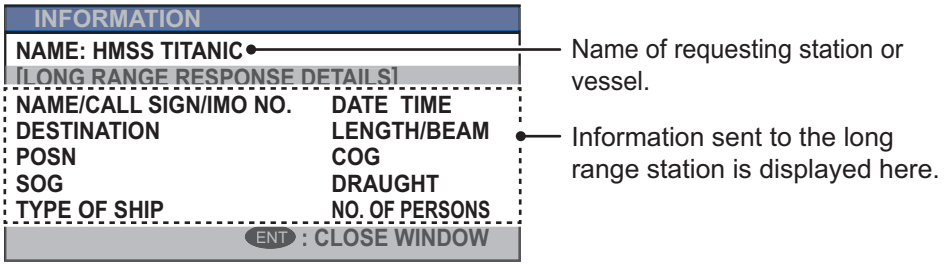
Manual reply

For manual reply, the requesting ship's MMSI, name and information requested appear. Select [REFUSE], then press the **ENT/ACK** key to send no data, or select [REPLY], then press the **ENT/ACK** to send data. The screen then changes according to your selection.



Automatic reply

For automatic reply, the pop up message shown below appears when an automatic reply is sent. Requested data is automatically transmitted. Press the **ENT/ACK** key to close the message.



1.12.2 How to broadcast own ship data

You can broadcast own ship data to a satellite via the AIS VHF communication link.

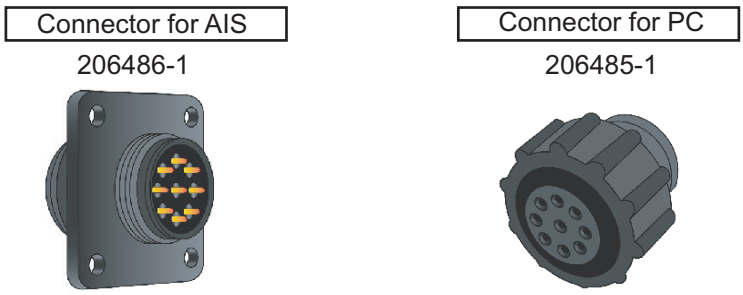
1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET] then press the **ENT/ACK** key.
3. Select [LONG RANGE SET] then press the **ENT/ACK** key.
4. Select [LR BROADCAST] then press the **ENT/ACK** key.
5. Select [ON] or [OFF] as appropriate then press the **ENT/ACK** key.
   [ON] sends your ship's position, and other data to a satellite via the AIS VHF communication link.
6. Press the **DISP** key to close the menu.

Note: The availability of this function depends of equipment specifications. The menu is not shown unless so equipped.

1.13 Pilot Plug (FA-1703, option)

A pilot plug, which is connected between the AIS and a PC, is required to feed AIS information to a PC. The plug is required for the ships passing through the Panama Canal and the Saint Lawrence Seaway. The specifications for the pilot plug are as shown below.

Item	Specifications
Baud rate	38400 bps **Note:** The following setting is required for the FA-170. If the pilot does not function, check these the following items. • COM port settings: [INITIAL SET] menu → [I/O PORT]. The selected port for the pilot plug must be set to [EXT DISPLAY]. • Check the pilot plug connection at both the FA-170 and the connected PC.
Type	AMP 206486-1 (9-pin, male)
Signal connection	TX-A: Pin 1 TX-B: Pin 4 RX-A: Pin 5 RX-B: Pin 6 SHIELD: Pin 9



Pilot Plug connectors for FA-1703

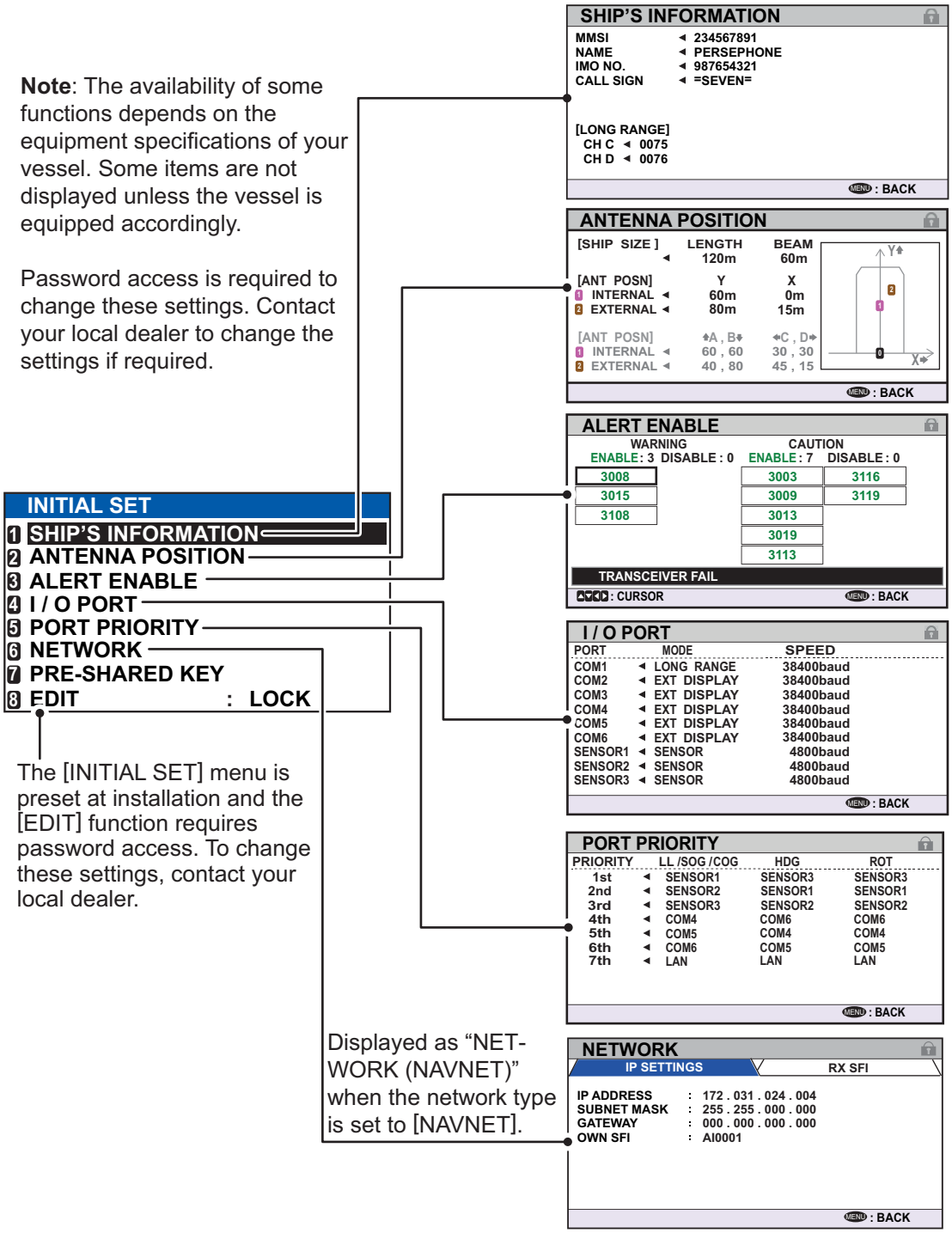
1.14 Viewing Initial Settings

The [INITIAL SET] menu, which is locked with a password to prevent accidental changes to the ship's details, is where the installer enters ship's MMSI, internal and external antenna positions, ship type, I/O port settings, network settings and pre-shared key. You can view the settings on this menu as follows.

1. Press the **MENU/ESC** to open the menu.
2. Select [INITIAL SET], then Press the **ENT/ACK** key.
3. Select item to view then press the **ENT/ACK** key.

Note: The availability of some functions depends on the equipment specifications of your vessel. Some items are not displayed unless the vessel is equipped accordingly.

Password access is required to change these settings. Contact your local dealer to change the settings if required.



The [INITIAL SET] menu is preset at installation and the [EDIT] function requires password access. To change these settings, contact your local dealer.

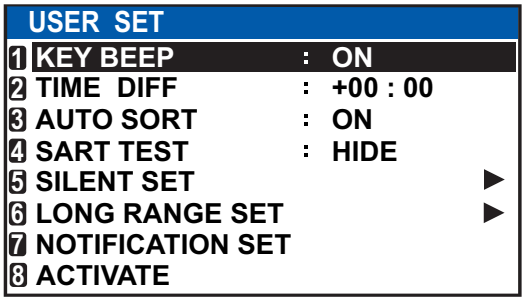
Displayed as "NETWORK (NAVNET)" when the network type is set to [NAVNET].

4. Press the **DISP** key to close the menu.

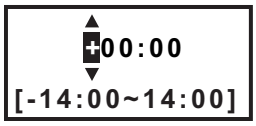
1.15 Setting for Time Difference

You can set the time difference from UTC (Coordinated Universal Time) to show the local time.

1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET] then press the **ENT/ACK** key.



3. Select [TIME DIFF], then press the **ENT/ACK** key. The settings pop up window is displayed.



4. Select the desired time difference then press the **ENT/ACK** key. You can change the value with ▲ or ▼, the digit with ▶ or ◀. The setting range is -14:00 to +14:00.
5. Press the **DISP** key to close the menu.

Note: When a UTC time offset is set, the time display indication for messages and NAV STATUS screen is indicated as "LT" (Local Time). When there is no offset, the time display indication for messages and the NAV STATUS screen is indicated as "UTC" (Coordinated Universal Time).

1.16 Setting for Silent Function

Transmission can be stopped from this menu. Receiving continues after stopping the transmission with this menu.

The following settings are required for using the silent function.

- Setting of interface for controlling the silent function.
- Setting of TX mode.

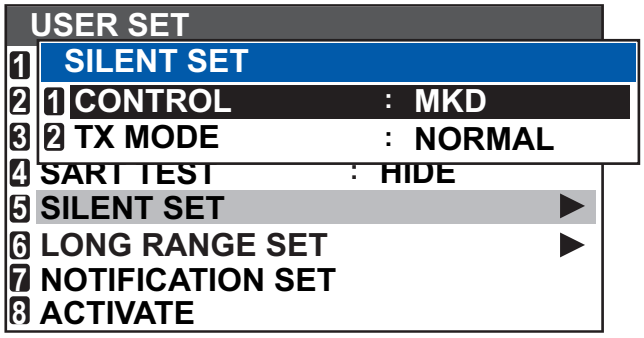
There are three TX modes in the silent function. The TX mode can be changed from menu or external switch.

- [NORMAL]: Transmissions and receiving function normally.
- [RESTRICT]*: Transmissions are restricted for the messages other than the particular messages. Receiving functions normally.
  *: The TX mode cannot be set to [RESTRICT] from the external switch.
- [SILENT]: Only receiving functions.

1.16.1 How to set the controlling interface of the silent function

The interface of silent function can be selected from the menu or the external switch. Regarding the connections of external switch, refer to “2.3.2 How to connect the FA-1701 transponder unit” of Installation Manual or the interconnection diagram located at its end.

1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET], then press the **ENT/ACK** key.
3. Select [SILENT SET], then press the **ENT/ACK** key.
4. Select [CONTROL], then press the **ENT/ACK** key.



5. Select [MKD] or [SWITCH] as appropriate then press the **ENT/ACK** key.
   Select [MKD] to switch the [TX MODE] (refer to 1.16.2 about the [TX MODE]) from the menu.
   Select [SWITCH] to switch the [TX MODE] from the external switch.
6. Press the **DISP** key to close the menu.

1.16.2 How to switch the TX mode

When selecting [MKD] in [CONTROL] menu, the TX mode can be switched from the [TX MODE] menu.

1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET], then press the **ENT/ACK** key.
3. Select [SILENT SET], then press the **ENT/ACK** key.
4. Select [TX MODE], then press the **ENT/ACK** key.
5. Select [NORMAL], [RESTRICT] or [SILENT] as appropriate, then press the **ENT/ACK** key.
   Each mode functions as follows.
   - [NORMAL]: Transmissions and receiving function normally.
   - [RESTRICT]: Transmissions are restricted for the messages other than the particular messages*. Receiving functions normally.
   - [SILENT]: Only receiving functions.

   *: Binary messages are sent only when ABM/BBM sentences are entered.
6. Press the **DISP** key to close the menu.

2. INLAND AIS OPERATION

This section provides the operating procedures for the Inland AIS feature, which allows use of the AIS transponder on inland waterways or the open sea. Only those procedures that are different from the Class A AIS transponder are presented.

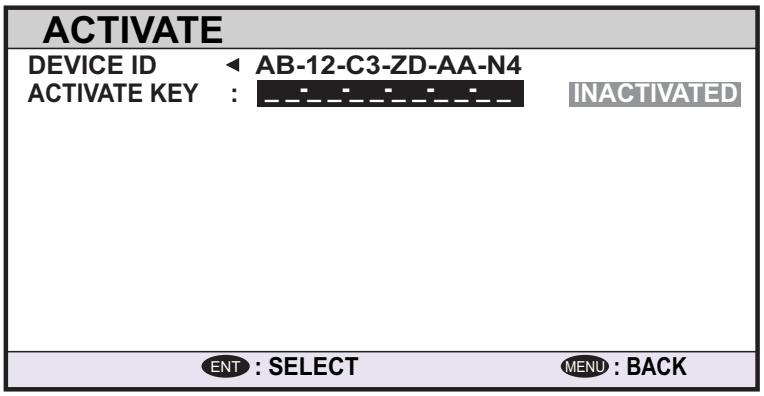
Ships with Inland AIS transponders on board autonomously determine their actual position using the Global Navigation Satellite System (GNSS), which is part of the AIS transponder. Furthermore they broadcast their ID and position to other ships over a distance of 10 to 30 kilometers (depending on the geographical environment). Other ships in the area receive this information and are able to display their own position and that of other ships. Inland AIS helps the skipper in his direct nautical decisions, especially in critical situations, like the approach of a bend or a constriction.

Further, authorities have the possibility to allow electronic submission of cargo lists, for example, for transports of dangerous cargo. The standard for “Electronic Reporting” (ERI) allows the digital, language independent submission of cargo or passenger reports from ships or agencies to authorities. In combination with electronic data exchange between the authorities of different countries this results in less reporting for the skippers. On the other hand all cargo information is available to authorities in case of an accident.

2.1 How to Activate the Inland AIS

Input your key number (received from dealer) to activate the Inland AIS. (If the key was input during the installation, activation key input is not necessary.)

1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET] then press the **ENT/ACK** key.
3. Select [ACTIVATE] then press the **ENT/ACK** key.



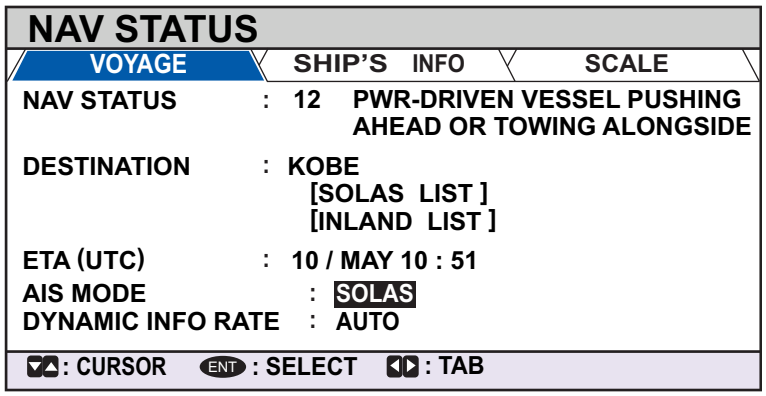
4. Press the **ENT/ACK** key to display the alphanumeric pop up window.The selected digit cycles through digits in the following order when ▲ is pressed: 1, 2 ... 9, 0, A, B, C ... X, Y, Z, 1, 2... press ▼ to cycle through digits in the opposite direction. Press ▶ or ◀ to move the selection cursor.
5. Input the activation key, then press the **ENT/ACK** key.

If you entered the activation key correctly, the indication "ACTIVATED!" appears then the system is automatically restarted. The FA-170 starts up with the SOLAS mode active.

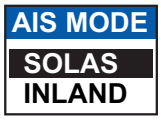
2.2 Selecting AIS Mode

The Inland AIS has two operating modes: Inland (inland waterways) and SOLAS (SOLAS compliant class A AIS transponder). Select desired mode as follows:

1. Press the **NAV STATUS** key to open the [NAV STATUS] menu.



2. Press ▼ to select [AIS MODE] then press the **ENT/ACK** key. The mode selection pop up window appears.



3. Select [SOLAS] or [INLAND] as appropriate then press the **ENT/ACK** key. The AIS mode icon at the top of the screen changes to display the selected mode.

Inland mode active

SOLAS mode active

You are asked if you are sure to reboot the system. Select [YES] then press the **ENT/ACK** key to reboot the unit.

Notes on Inland AIS operation

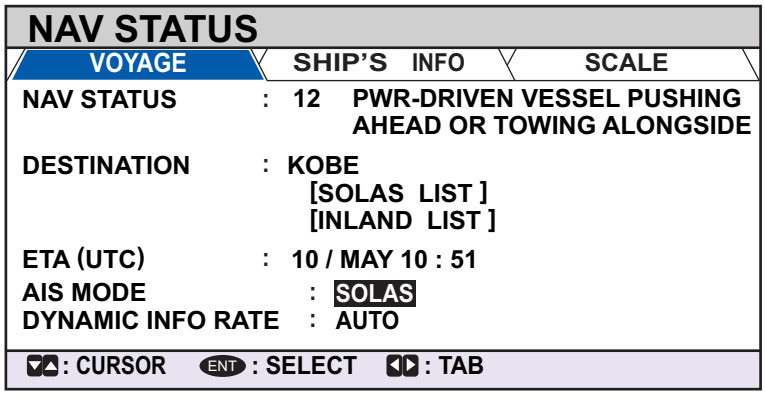
- IMO No. is transmitted with all zeros.
- The draught used in Inland AIS is “Inland draught”.

2.3 How to Enter Voyage-Related Data

Before you embark on a voyage using Inland AIS, set the various related data (see the list below) on the [NAV STATUS] menu.

- Navigational status
- Destination
- Arrival time
- AIS mode currently in use
- Rate at which your vessel's dynamic information is transmitted
- ERI code
- No. of blue cones (for hazardous cargo)
- Cargo status
- No. of persons
- Length and beam of ship
- Draught

1. Press the **NAV STATUS** key.
   The [NAV STATUS] setting is selected by default.



2. If your navigational status is different from that shown, follow the procedure below. If it is the same as shown, go to step 3.
   1) Press the **ENT/ACK** key. The [NAV STATUS] options pop up window appears.
   2) Input the appropriate status, then press the **ENT/ACK** key. Refer to the data below to select appropriate navigational status.

00: UNDERWAY USING ENGINE
01: AT ANCHOR
02: NOT UNDER COMMAND
03: RESTRICTED MANEUVERABILITY
04: CONSTRAINED BY HER DRAUGHT
05: MOORED
06: AGROUND
07: ENGAGED IN FISHING
08: UNDERWAY SAILING
09: RESERVED FOR HIGH SPEED CRAFT (HSC)*1
10: RESERVED FOR WING IN GROUND (WIG)*2
11: PWR-DRIVEN VESSEL TOWING ASTERN
12: PWR-DRIVEN VESSEL PUSHING AHEAD OR TOWING ALONGSIDE
13: RESERVED FOR FUTURE USE
14: AIS-SART (ACTIVE), MOB-AIS, EPIRB-AIS*3
15: DEFAULT (ALSO USED BY SART, MOB, EPIRB UNDER TEST)

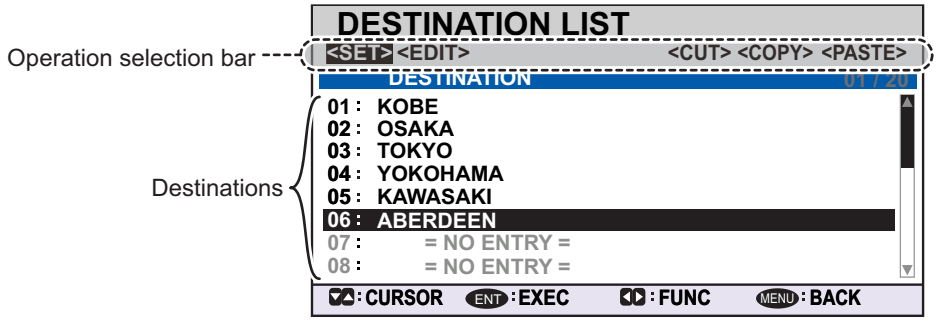
*1: RESERVED FOR FUTURE AMENDMENT OF NAVIGATIONAL STATUS FOR SHIPS CARRYING DG, HS, OR MP, OR IMO HAZARD OR POLLUTANT CATEGORY C, HIGH SPEED CRAFT (HSC)

*2: RESERVED FOR FUTURE AMENDMENT OF NAVIGATIONAL STATUS FOR SHIPS CARRYING DANGEROUS GOODS (DG), HARMFUL SUBSTANCES (HS) OR MARINE POLLUTANTS (MP), OR IMO HAZARD OR POLLUTANT CATEGORY A, WING IN GROUND (WIG)

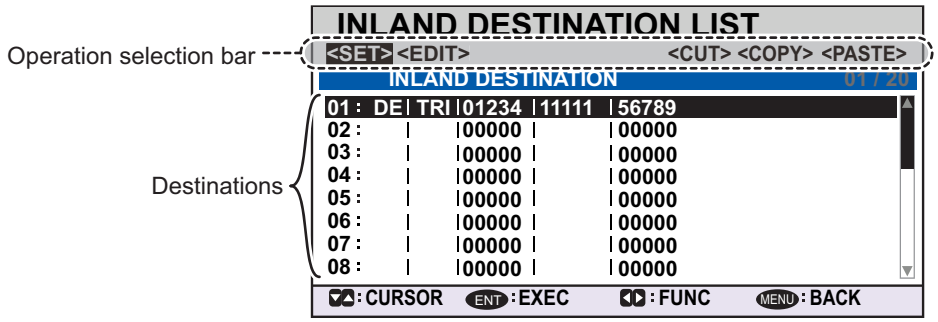
*3: Not selectable for this type of equipment.

3. Select [DESTINATION], then press the **ENT/ACK** key. The software keyboard appears for direct input. See section 1.5.4 for how to use the software keyboard. Enter the desired destination then press the **ENT/ACK** key. You can use up to 20 alphanumeric characters and enter up to 20 destinations.

A list of destinations can also be accessed by selecting [SOLAS LIST] (displayed as DESTINATION LIST once accessed, as shown in the figure below) or [INLAND LIST] as appropriate for your AIS mode.



SOLAS destinations list

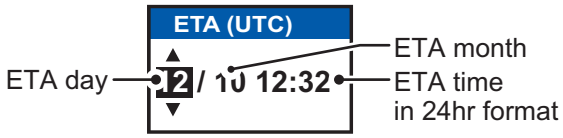


INLAND destinations list

Referring to operation descriptions in the table below, press ◀ or ▶ to select an operation, press ▲ or ▼ to select an entry in the list, then press the **ENT/ACK** key to confirm the selection.

Operation	Description
<SET>	Set the currently selection as the destination.
<EDIT>	Rename the selected destination. The software keyboard appears when <EDIT> is selected. See section 1.5.4 for how to use the software keyboard.
<CUT>	Cut the current selection to temporary memory, leaving the entry empty. The destination can now be pasted as a different entry. **Note:** Only one entry can be stored in temporary memory at a time. If you <CUT> two entries successively, the first is deleted.
<COPY>	Copy the current selection to temporary memory. The destination can now be pasted as a different entry.
<PASTE>	Paste the entry stored in temporary memory to the selected destination number. **Note:** Entries over-written with <PASTE> cannot be restored.

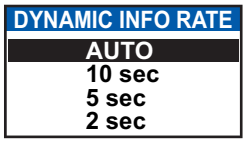
4. Select [ETA (LT/UTC)], then press the **ENT/ACK** key. The settings pop up window shown below appears.



Note 1: The ETA indication appears as "ETA [LT]" when there a time offset is set from [TIME DIFF] in the [USER SET] menu. When the setting for [TIME DIFF] is not changed from the default (+00:00) setting, the ETA indication appears as "ETA [UTC]".

Note 2: Where a GNSS is not connected, or the signal is lost/interrupted, the ETA indication appears as ETA [UTC]. Further, the settings pop up window displays "NOTE: INPUT THE UTC" at the bottom of the pop up window.

5. Set the ETA date and time, referring to the figure on the previous page, then press the **ENT/ACK** key.
6. Confirm that the AIS mode selected is correct for this voyage. If a mode change is necessary, change the mode (See section 2.2), then repeat this procedure after the system restarts. If no change is required, go to step 7.
7. Select [DYNAMIC INFO RATE], then press the **ENT/ACK** key. The settings pop up window shown to the right appears.



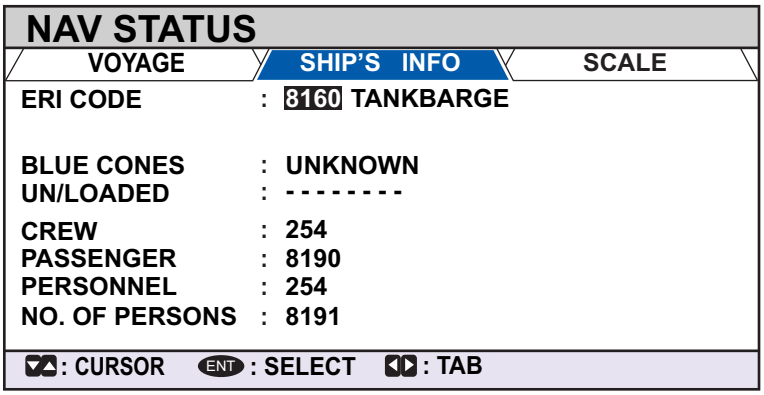
If the report rate from a base station is used, this setting is ignored. For that reason, this setting is not always the same as the actual report rate.

8. Select the appropriate interval to send dynamic information, then press the **ENT/ACK** key.

Note 1: This setting is fixed to [AUTO] when [AIS MODE] is set to [SOLAS].

Note 2: The new settings take effect after approximately 8 minutes. In the meantime, the [AUTO] setting is used, regardless of the on-screen indication.

9. Press ▶ to display the [SHIP'S INFO] tab.

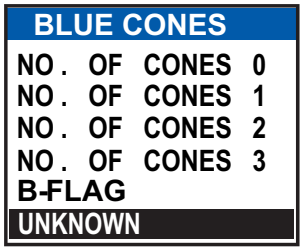


10. [ERI CODE] is selected. Press the **ENT/ACK** key to edit the ERI code type for this voyage.
For [SOLAS] mode, the [ERI CODE] item is replaced with [CARGO TYPE].
11. Input the ERI code, referring to "ERI Codes" on page AP-15, then press the **ENT/ACK** key.

Note: When [Tanker] is selected and the Nav status is [Moored], output power is automatically switched to 1 W when SOG is less than 3 knots. Further, in the above condition, when SOG becomes higher than 3 knots, a beep sounds. (The

pop-up message "TX POWER CHANGED" also appears to notify you that the Tx power has changed). To erase the pop-up message, press the **ENT/ACK** key or reduce SOG to below 3 knots.
For SOLAS mode, input the cargo type, referring to step 7 of section 1.6.

12. Select [BLUE CONES], then press the **ENT/ACK** key. The pop up window shown below appears.



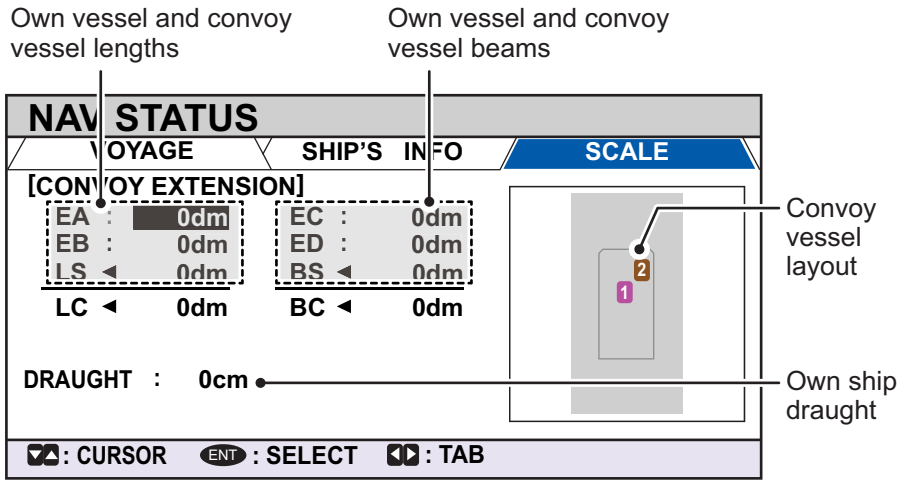
Depending on the cargo, up to four “cones” have to be shown on the mast, in daylight with cones and nighttime with blue lights. The greater the number of the cones the more hazardous the cargo.

- Select [NO. OF CONES 0] if your ship is not carrying hazardous cargo.
- Select [B-FLAG] if your ship carries explosives or hazardous cargo that exceeds the hazard level expressed with cones.
- Select [UNKNOWN] if you are unsure of cargo type.

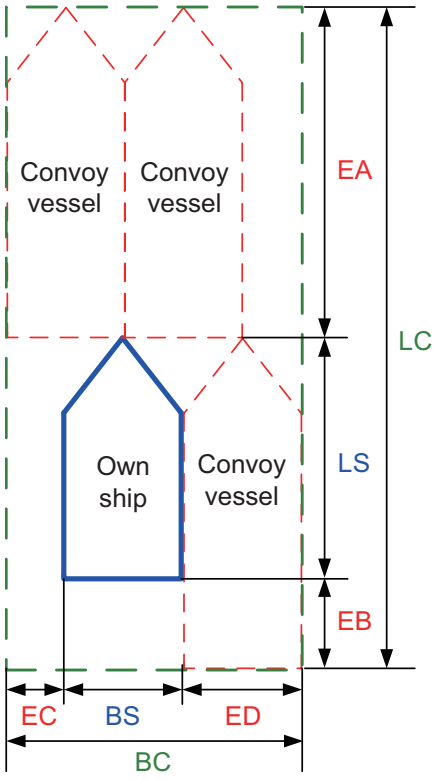
13. Set [BLUE CONES] as necessary, then press the **ENT/ACK** key.
14. Select [UN/LOADED], then press the **ENT/ACK** key. The pop up window shown to the right appears.

15. Select [LOADED] for vessel loaded with cargo, [UNLOADED] for vessel with no cargo, or [- - -] if you are unsure of the loading status.
16. Select [CREW] is now selected, then press the **ENT/ACK** key.
17. Enter number of crew (0-254) then press the **ENT/ACK** key.
18. Select [PASSENGER], then press the **ENT/ACK** key.
19. Enter number of passengers (0-8190) then press the **ENT/ACK** key.
20. Select [PERSONNEL], then press the **ENT/ACK** key.
21. Enter number of shipboard personnel (persons other than passengers and crew, 0-254) then press the **ENT/ACK** key.
    Note: The number of crew, passengers and shipboard personnel are sent in RFM55 messages.
22. [NO. OF PERSONS] is selected; press the **ENT/ACK** key.
23. Enter the total number of persons (sum of crew, passengers and shipboard personnel) on-board then press the **ENT/ACK** key.
    Note: If the value entered for [CREW], [PASSENGER], [PERSONNEL] or [NO. OF PERSONS] exceeds the maximum setting listed in the steps above, the value appears as maximum for that item.

24. Press ▶ to display the [SCALE] tab.



25. Referring to the table below, input the length and beam of your vessel and the convoy vessel. The values are displayed as decimeters.

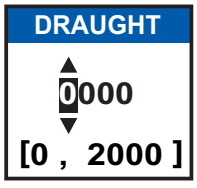


Menu item	Description
[EA]	Length of convoy vessel
[EB]	Difference of the length of convoy vessel and own ship
[EC]	Difference of the beam of convoy vessel and own ship
[ED]	Beam of convoy vessel
[LS]	Length of own ship
[BS]	Beam of own ship
[LC]	Shows the total length including own ship and convoy vessel
[BC]	Shows the total beam including own ship and convoy vessel

[LS], [BS], [LC], [BC] are calculated results, not for input.

Press the arrow keys to move the selection cursor and highlight the item you wish to edit, then press the **ENT/ACK** key. A numerical input pop up window appears for the selected item.

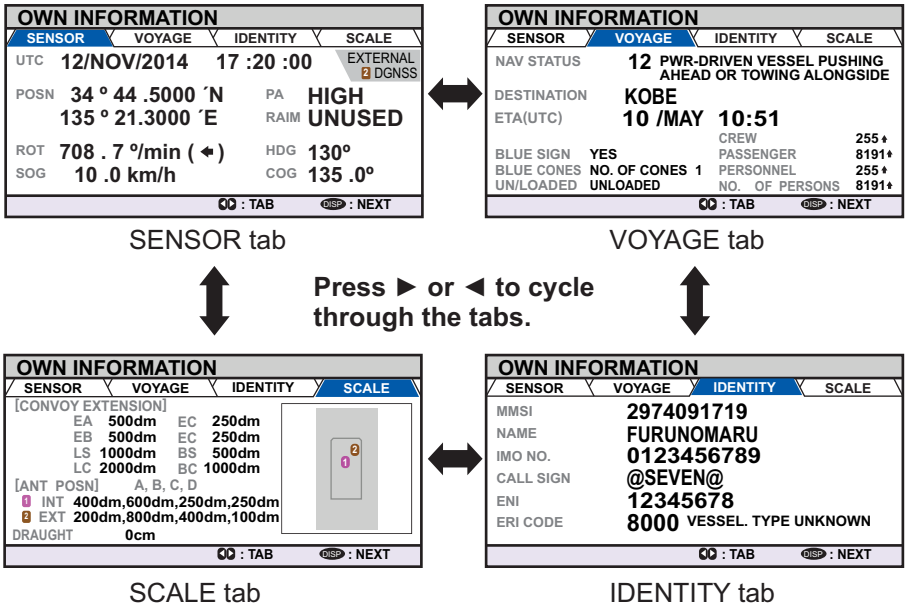
26. Select [DRAUGHT], then press the **ENT/ACK** key to display the [DRAUGHT] setting pop up window. The setting range is [0] cm to [2000] cm.
27. Input the draught, then press the **ENT/ACK** key.
28. Press the **DISP** key to close the menu.



2.4 Static Data

The [OWN INFORMATION] display shows your ship's data across four tabs. The information displayed is shown in the figure below. This data should be checked once per voyage or once per month, whichever is shorter. Data may be changed only on the authority of the master.

The Officer of the Watch should periodically check position, SOG and sensor information for quality.



Note 1: The above displays are when INLAND mode is active. When SOLAS mode is active, they are same as in CLASS A AIS.

Note 2: The [TYPE OF SHIP] indication on the [IDENTITY] tab changes to display the ERI code when INLAND mode is active.

Update rate of dynamic ship information

Ship's dynamic conditions and nominal reporting interval

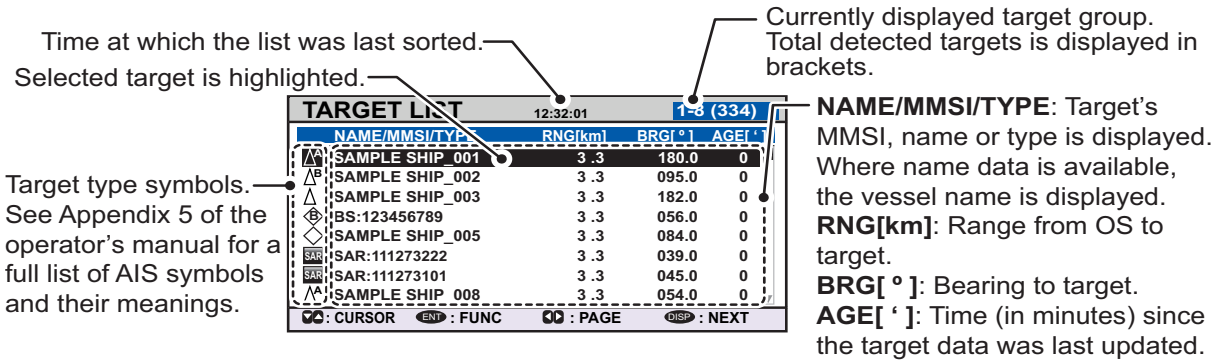
Ship's dynamic conditions	Nominal reporting interval
Ship at anchor or moored and not moving faster than 3 kn	3 minutes
Ship at anchor or moored and moving faster than 3 kn	10 seconds
Ship operating in SOLAS mode, moving 0-14 kn	10 seconds
Ship operating in SOLAS mode, moving 0-14 kn speed and changing course	3 1/3 seconds
Ship operating in SOLAS mode, moving 14-23 kn	6 seconds
Ship operating in SOLAS mode, moving 14-23 kn and changing course	2 seconds
Ship operating in SOLAS mode, moving faster than 23 kn	2 seconds
Ship operating in SOLAS mode, moving faster than 23 kn and changing course	2 seconds
Ship operating in inland waterway mode	Assigned between 2 seconds and 10 minutes

2.5 Target List and Dangerous Target List

2.5.1 Target list

The [TARGET LIST] can store up to 2048 AIS targets and locating devices being detected by the FA-170, in the order which they are detected. The list can be sorted in range order, from closest to farthest.

1. Press the **DISP** key until the [TARGET LIST] or [DANGEROUS LIST] appears.



Note: The last views list ([DANGEROUS LIST] or [TARGET LIST]) is displayed.

Targets are displayed in groups of 100, however only eight targets are displayed on the screen at any time. The following operations are used in the TARGET LIST.

Operation	Description
Press ▲ or ▼.	Scroll up or down the list of targets. The selected target is highlighted.
Press ◀ or ▶.	Move to the next group of targets (next 8 targets).
Select [NEXT 100 TARGETS], then press the **ENT/ACK** key.	Move to the next page of the target list (next 100 targets). **Note:** Displayed only if more than 100 targets are detected.
Select [PREVIOUS 100 TARGETS], then press the **ENT/ACK** key.	Move to the previous page of the target list (last 100 targets). **Note:** Displayed only if more than 100 targets are detected.
Select a target, then press the **ENT/ACK** key.	Display the selected target's details. See section 1.8.4 for details.

The [NAME/MMSI/TYPE] column of the [TARGET LIST] displays the target vessel's type in the following formats:

For CLASS A/CLASS B/AtoN type targets

Where the vessel name is available, the name is displayed. Where no name data is available, the MMSI is displayed.

For SAR(VESSEL/AIRCRAFT)/Locating device type targets

TYPE	Display format
SAR Vessel	SAR:(stations' MMSI/name)
SAR Aircraft	SAR:(stations' MMSI/name)
SART Active	AIS SART:(station's MMSI)
SART Test	SART TEST:(station's MMSI)
MOB Active	MOB AIS:(station's MMSI)
MOB Test	MOB TEST:(station's MMSI)
EPIRB Active	EPRIB AIS:(station's MMSI)
EPIRB Test	EPRIB TEST:(station's MMSI)
AIS Base Station	BS:(stations' MMSI/name)

Note 1: If there is no data for the target selected, the fields are displayed as "=NO TARGET=".

Note 2: Targets are automatically sorted in range order (closest to farthest) when no key is operated for 30 seconds. Target order is then updated every five seconds.
Active locating devices take priority and are displayed at the top of the list.

Note 3: When [AUTO SORT] on the [USER SET] menu is [OFF], the range and bearing to a target are updated. However, target order is not updated. To manually sort targets, see step 2.

Note 4: To select a target on the plotter display, press ▲ or ▼ to select the target then press the **ENT/ACK** key. Press ▲ to cycle through targets from nearest to furthest; ▼ to cycle through targets from farthest to nearest.

2. To view target data, or to sort the target list, select the desired target, then press the **ENT/ACK** key. The target list options pop up window appears.

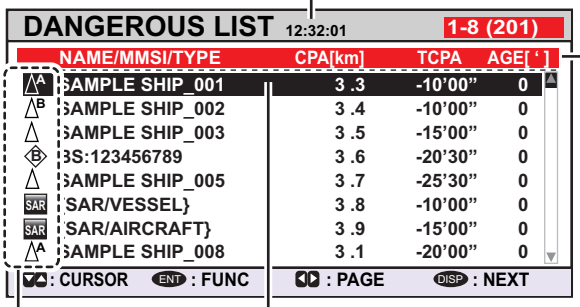
- [SORT (NORMAL)]: Press ◀ to display and sort the [TARGET LIST] into range order. The closest target is displayed at the top of the list.
- [SORT (DANGER)]: Press ▶ to display and sort the [DANGEROUS TARGET LIST] in range order. The closest target is displayed at the top of the list.
- [VIEW DETAIL]: Press the **ENT/ACK** key to open the [TARGET DETAIL] screen.
- [NEW MSG]: Press ▲ to open the text input window to create an AIS message to the selected target.
- [NAME REQUEST]: Press ▼ to send a name request to the target vessel's AIS.
  Note: Name requests cannot be sent to the same target within a short period, regardless of target. If you have requested the name of a target too soon after the last request, or the target is out of range, or the target has set their AIS to RX only mode, the pop up message "CANNOT REQUEST NAME" is displayed. Wait a short while before requesting the name again.

3. Press the **DISP** key to close the menu.

2.5.2 Dangerous (target) list

Dangerous targets are targets which are calculated to be on a collision course with your vessel. When a dangerous target is detected, the target and its available details can be viewed in the [DANGEROUS TARGET LIST].

The operations available from the [DANGEROUS TARGET LIST] are the same as the [TARGET LIST] operations. See section 2.5.1 and section 2.5.3 for details.



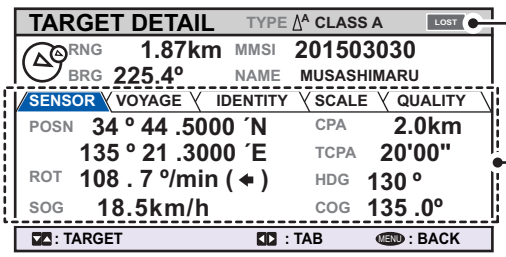
NAME/MMSI/TYPE: Target's MMSI, name or type is displayed. Where name data is available, the vessel name is displayed.
CPA[km]: Range to approach to the target from own ship.
TCPA: Time to approach to the target from own ship.
AGE[']: Time (in minutes) since the target data was last updated.

Note: When no dangerous targets are detected, the list shows the message "= NO TARGET =".

2.5.3 How to interpret the [TARGET DETAIL] screen

The [TARGET DETAIL] screen shows available detailed information about the selected target.

Lost and dangerous targets have the appropriate icon displayed at the top right, as indicated in the lost target example below.



The LOST icon is displayed for lost targets.
The DANGER icon is displayed for dangerous targets.

When data input to the FA-170 is interrupted or stopped, indications for all tabs appear as "----".

There are five tabs available for viewing; [SENSOR], [VOYAGE], [IDENTITY], [SCALE] and [QUALITY]. Press ◀ or ▶ to change the tab currently displayed.

The selected target's bearing ([BRG]), range ([RNG]), [MMSI] and [NAME] are displayed at the top of the screen regardless of the selected tab. For lost or dangerous targets, the appropriate icon is displayed at the top right of the screen.

The information displayed on each tab varies, depending on the type of target selected.

The tables on the following pages list each tab's contents, along with a brief description.

SENSOR tab

Contents	Description
POSN	Target's last known position. Displayed for all target types.
ROT	Target's Rate Of Turn. Displayed only for CLASS A and Locating device target types.
ALT	Altitude. Displayed only for SAR VESSEL and SAR AIRCRAFT target types.
SOG	Target's Speed Over Ground. Displayed only for CLASS A, CLASS B, SAR VESSEL, SAR AIRCRAFT and Locating device target types.
COG	Target's Course Over Ground. Displayed only for CLASS A, CLASS B, SAR VESSEL, SAR AIRCRAFT and Locating device target types.
HDG	Target's last known heading. Displayed only for CLASS A, CLASS B and Locating device target types.
CPA	Range to target. Displayed for all target types.
TCPA	Time to approach to target. Displayed for all target types.

VOYAGE tab

The VOYAGE tab is only displayed for CLASS A target types and has two pages.

Contents	Description
NAV STATUS	Target's navigational status (see section 1.6 for details).
DESTINATION	Target's destination.
ETA	Target's Estimated Time of Arrival at the above destination.
BLUE SIGN	Indicates if the target is carrying hazardous cargo.
BLUE CONES	Indicates the number of blue cones (type of hazardous cargo) carried by the target.
UN/LOADED	Indicates if the target is loaded or unloaded.
CREW	Indicates the number of crew aboard the vessel/aircraft.
PASSENGERS	Indicates the number of passengers aboard the vessel/aircraft.
PERSONNEL	Indicates the number of personnel aboard the vessel/aircraft.
NO. OF PERSONS	Indicates the total number of people aboard the vessel/aircraft.

IDENTITY tab

The IDENTITY tab is only displayed for CLASS A, CLASS B, SAR VESSEL, SAR AIRCAFT and AtoN target types.

Contents	Description
CALL SIGN	Target's call sign. Not displayed for AtoN target types.
IMO NO.	Target's International Maritime Organization registration number.
TYPE OF SHIP	Target's ship type. Displayed only for CLASS A and CLASS B target types.
REAL AtoN	Displayed as "YES" for physical aids to navigation, "NO" for virtual aids to navigation. Displayed only for AtoN target types.
TYPE OF AtoN	The type of aids to navigation. Displayed only for AtoN target types.
VENDER ID	Target's AIS maker's ID. Displayed only for CLASS B target types.
ENI	Target's ENI (Unique European Vessel Identification Number).
ERI CODE	Target's ERI (Electronic Reporting International ship type) code.

SCALE tab

The SCALE tab is only displayed for SAR VESSEL, SAR AIRCRAFT and AtoN target types.

Contents	Description
SHIP SIZE(LENGTH, BEAM)	Target's ship size (length, beam). Displayed for all above target types.
ANT POSN(X,Y)	Position of target's antenna. Displayed for all above target types.
DRAUGHT	Target ship's draught. Displayed only for CLASS A target types.
PI	Target's position. Displayed only for AtoN target types.
CONVOY	Target's convoy length and beam.

QUALITY tab

The QUALITY tab is displayed for all target types.

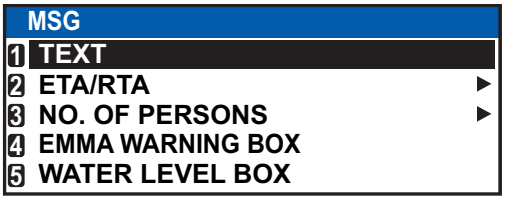
Contents	Description	
PA	Position Accuracy for target ship. (H: High accuracy, L: Low accuracy.)	
RAIM	Target's RAIM status. (USED: Using RAIM, UNUSED: Not using RAIM.).	
TIME STAMP	Time at which the target was last detected. Not displayed for AIS base stations.	
POSN QUALITY	Target's position quality. Possible position qualities are shown in the list below:	
	Quality indication	**Meaning**
	No position	Position data not available.
	Manual position	Position data is input manually.
	Dead reckoning position	Position calculated by dead reckoning.
	Outdated position > 200 m	More than 200 m from last estimated position.
	Position > 10 m	Difference of more than 10 m from last estimated position.
	Position with RAIM > 10 m	Difference of more than 10 m from last estimated position.
	Position < 10 m	Difference of less than 10 m from last estimated position.
	Position with RAIM < 10 m	Difference of less than 10 m from last estimated position.
	Valid position with no time stamp	No time stamp available.
HDG/SOG/ COG QUALITY	Target's gyro/speed sensor quality. Possible sensor qualities are shown in the list below:	
	Quality indication	**Meaning**
	HIGH	Target is equipped with sensors which meet the requirements of the VTT Standard for Inland Navigation.
	LOW	Target is not equipped with sensors which meet the requirements of the VTT Standard for Inland Navigation.

2.6 Inland AIS Specific Messaging

All sent and received messages are stored in their respective message box. Refer to the appropriate section below for how to view messages once they are sent or received.

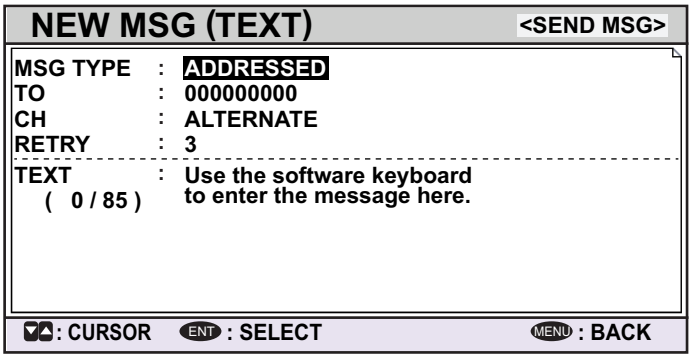
2.6.1 How to send a text message

1. Press the **MENU/ESC** key to open the menu.
2. Select [MSG], then press the **ENT/ACK** key.

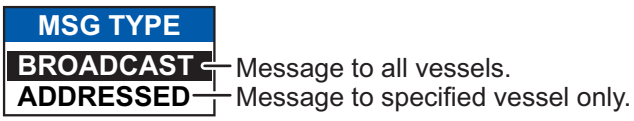


3. [TEXT] is selected, press the **ENT/ACK** key.

4. Select [NEW MSG], then press the **ENT/ACK** key.



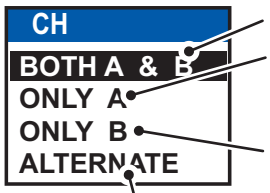
5. [MSG TYPE] is selected, press the **ENT/ACK** key to change the type of message you wish to send. The options pop up shown below appears.
6. Select the appropriate message type, then press the **ENT/ACK** key.



For broadcast messages, skip to step 9.

7. Select [TO], then press the **ENT/ACK** key. A numerical settings pop up appears.
8. Input the MMSI of the ship you wish to send this message to, then press the **ENT/ACK** key to close the pop up. See section 1.5 for how to input data.
   Note: When sending an addressed message and it is known that the recipient cannot display the message, [NO MKD] will appear on the right side of MSG TYPE.

9. Select [CH] (Channel), then press the **ENT/ACK** key. The channel select options pop up appears.



Sends the same message to both channel A and channel B.

Sends the message to channel A. If channel A is set to RX only and channel B is set to TXRX, the message is sent to channel B.

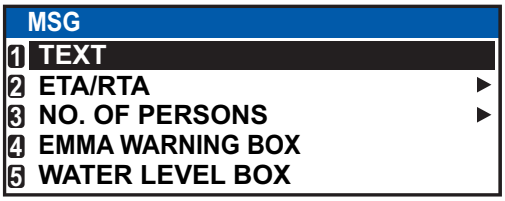
Sends the message to channel B. If channel B is set to RX only and channel A is set to TXRX, the message is sent to channel A.

Sends messages on alternating channels. In other words, if the last message sent on channel A, the next message is sent on channel B.

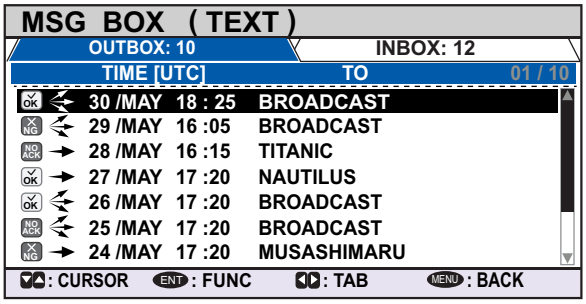
10. Select the appropriate option, then press the **ENT/ACK** key.
    For broadcast messages, skip to step 13.
11. Select [RETRY], then press the **ENT/ACK** key. The retry attempts setting pop up appears.
12. Press ▲ to increase the retry attempts, ▼ to decrease the retry attempts. The maximum setting for retries is 3. Press the **ENT/ACK** key to apply the setting and close the pop up.
13. Press ▼ to highlight the message text, then press the **ENT/ACK** to display the software keyboard.
14. Input the new message text, referring to section 1.5.4. The maximum number of characters allowed is as follows:
    - BROADCAST: 90 characters.
    - ADDRESSED: 85 characters.
15. Press ▲or ▼ to highlight [<SEND MSG>] at the top right of the screen, then press the **ENT/ACK** key. A confirmation pop up appears.
16. Select [YES] to send the message or [NO] to cancel the message, then press the **ENT/ACK** key.

2.6.2 How to view a sent text message

1. Press the **MENU/ESC** key to open the menu.
2. Select [MSG], then press the **ENT/ACK** key.

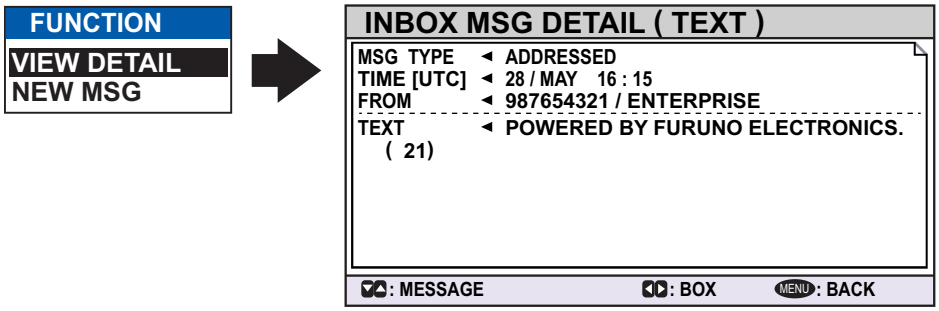


3. Select [TEXT], then press the **ENT/ACK** key.
4. Select [MSG BOX], then press the **ENT/ACK** key. The message box appears.



Indication	Meaning
OK	This message was sent successfully.
NG	This message was not sent.
NO ACK	Waiting for recipient to acknowledged this message.
	Broadcast message
→	Addressed message

5. Select the message you wish to view, then press the **ENT/ACK** key. The message options pop up window shown below appears.



Select [VIEW DETAIL], then press the **ENT/ACK** key to display the received message's contents. The figure above shows an example of a received message. Select [NEW MSG], then press the **ENT/ACK** key to send a message back to this message's sender.

6. Press ▲ or ▼ to view other messages, press ◀ or ▶ to switch between viewing an [INBOX] message and an [OUTBOX] message.
7. Press the **DISP** key to close the menu.

2.6.3 ETA and RTA messages

The purpose of an ETA message is to apply for a time slot at a lock, bridge or terminal. (Hereafter "lock" refers to lock, bridge or terminal.) The message contains your ship's ETA at the lock, air draught, the number of assisting tugboats required and the particulars of the lock (country code, location code, etc.).

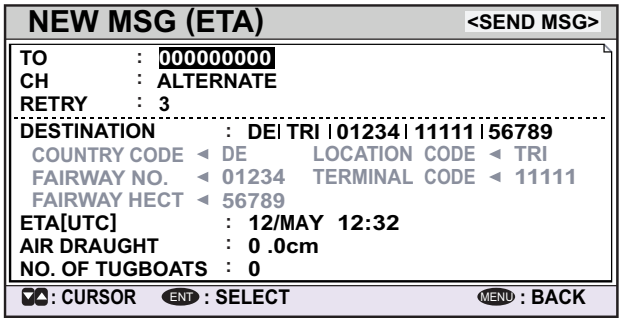
Upon receipt of your ETA message, the lock authority responds with an RTA (Requested Time of Arrival) message, usually within 15 minutes of receipt of the ETA message. The RTA message contains lock operational status, requested time of arrival and the particulars of the lock (country code, location code, etc.).

How to send an ETA message

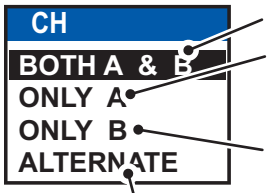
1. Press the **MENU/ESC** key to open the menu.
2. Select [MSG], then press the **ENT/ACK** key.
3. Select [ETA/RTA], then press the **ENT/ACK** key.

The [NEW MSG] option in the [ETA/RTA] pop up window is not available for selection in [SOLAS] mode.

4. Select [NEW MSG], then press the **ENT/ACK** key.



5. [TO] is selected. Press the **ENT/ACK** key. to display the MMSI settings pop up window.
6. Enter the MMSI of the lock/bridge/terminal you want to pass through then press the **ENT/ACK** key.
7. Select [CH], then press the **ENT/ACK** key.



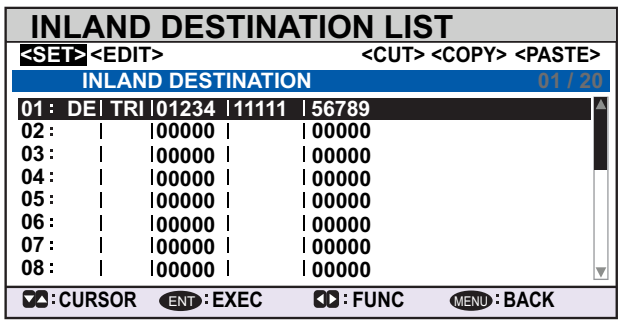
Sends the same message to both channel A and channel B.

Sends the message to channel A. If channel A is set to RX only and channel B is set to TXRX, the message is sent to channel B.

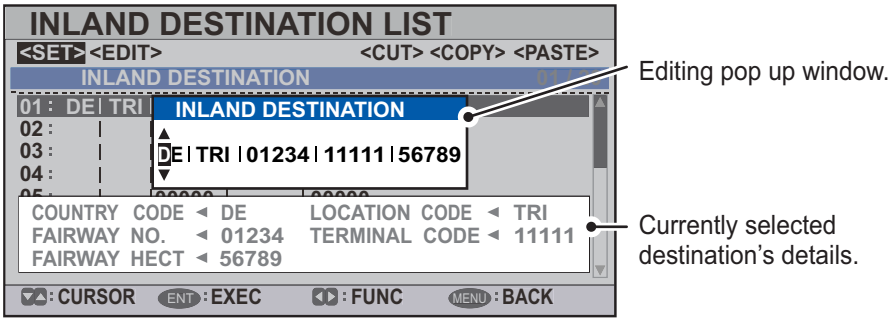
Sends the message to channel B. If channel B is set to RX only and channel A is set to TXRX, the message is sent to channel A.

Sends messages on alternating channels. In other words, if the last message sent on channel A, the next message is sent on channel B.

8. Select the channel over which to send the message then press the **ENT/ACK** key.
9. Select [RETRY], then press the **ENT/ACK** key. The retry attempts setting pop up appears.
10. Press ▲ to increase the retry attempts, ▼ to decrease the retry attempts. The maximum setting for retries is 3. Press the **ENT/ACK** key to apply the setting and close the pop up.
11. Select [DESTINATION] then press the **ENT/ACK** key. The [INLAND DESTINATION LIST] appears.



12. Referring to section 2.3, select or edit an existing destination or create a new destination. The figure below shows an example destination and the edit pop up windows.

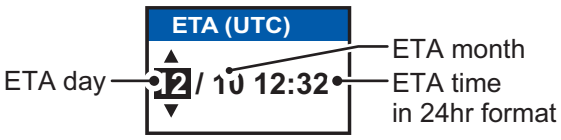


When setting an destination for the [INLAND DESTINATION LIST] the following details are required.

- Country code: The UN country code of your destination. (Referring to ISO 3166.)
- Three letter location code.
- Fairway number and hectometer.
- Terminal code.

Note: For location codes, fairway numbers (and hectometers) and terminal codes, refer to the ERI (Electronic Reporting International) Guide Part IV Annex 2 for examples.

13. Input or edit the destination as appropriate, then press the **ENT/ACK** key. Press ▲ to increase the value (or the next character, in alphabetical order), press ▼ decrease the value (or the previous character, in alphabetical order). Press ▶ to move the selection cursor to the right, ◀ to move the cursor to the left.
14. Select [<SET>], then press the **ENT/ACK** key.
15. Select [ETA (UTC)], then press the **ENT/ACK** key. The settings pop up window shown below appears.



16. Select [AIR DRAUGHT], then press the **ENT/ACK** key.
17. Enter your ship's air draught then press the **ENT/ACK** key. (Air draught is the vertical distance measured from the ship's waterline to the highest point on the ship.)
18. Select [NO. OF TUGBOATS], then press the **ENT/ACK** key.
19. Enter the no. of assisting tugboats (0-6) your ship requires then press the **ENT/ACK** key. Enter [0] for none.
20. Press ▲or ▼ to highlight [<SEND MSG>] at the top right of the screen, then press the **ENT/ACK** key. The system will now attempt to send the message.

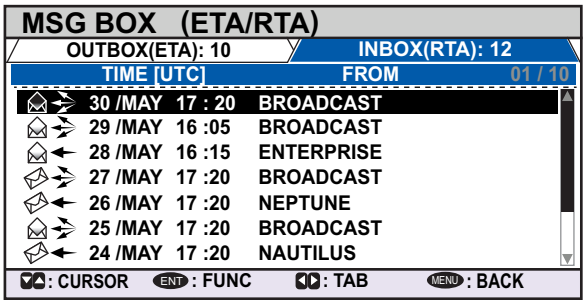
How to view sent ETA messages and received RTA messages

A lock authority responds to an ETA message with an RTA message. An RTA message contains the date and time the lock authority requests that your ship arrive to the lock, lock status and the particulars of the lock (country code, location code, etc.)

When an RTA message is received, a pop up showing the message "RTA MESSAGE RECEIVED." appears. The pop up also shows the sender's MMSI ID, or the sender's name it if is included in the message.

To view past messages, do the following:

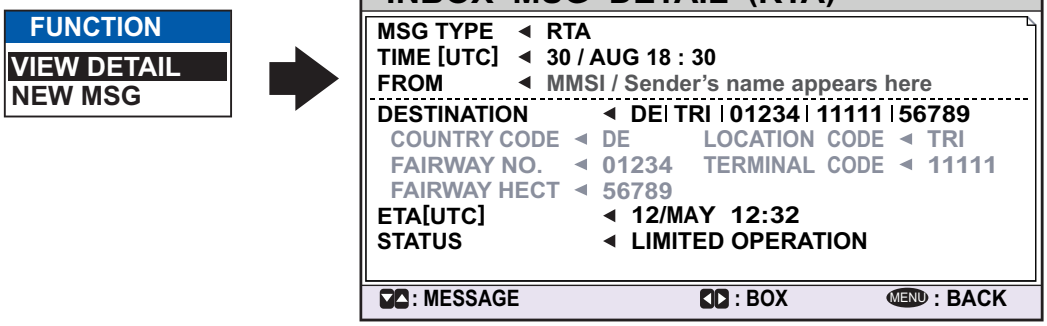
1. Press the **MENU/ESC** key to open the menu.
2. Select [MSG], then press the **ENT/ACK** key.
3. Select [ETA/RTA], then press the **ENT/ACK** key.
4. Select [MSG BOX], then press the **ENT/ACK** key. The message box appears.



Indication	Meaning
	This message has been viewed.
	This message is unviewed.
	Broadcast message
	Addressed message

Press ◀ or ▶ to switch between the [OUTBOX(ETA)] and [INBOX(RTA)] tabs.

5. Select the message you wish to view, then press the **ENT/ACK** key. The message options pop up window shown below appears.



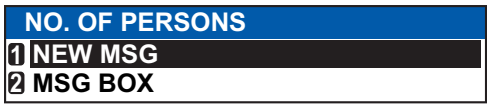
Select [VIEW DETAIL], then press the **ENT/ACK** key to display the received message's contents. The figure above shows an example of a received message. Select [NEW MSG], then press the **ENT/ACK** key to send a message back to this message's sender.

6. Press ▲ or ▼ to view other messages, press ◀ or ▶ to switch between viewing an [INBOX] message and an [OUTBOX] message.
7. Press the **DISP** key to close the menu.

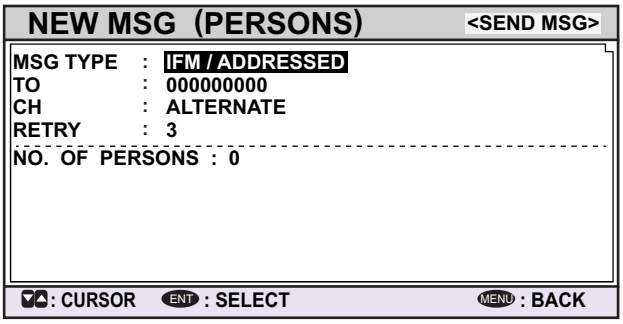
2.6.4 No. of persons message

A number of persons message informs authorities or ships how many persons (passengers, crew, shipboard personnel) you have on board your ship. Send this message on request or in case of an accident or other event.

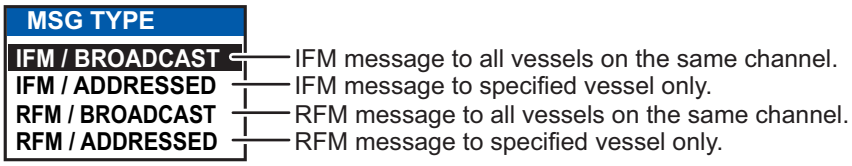
1. Press the **MENU/ESC** key to open the menu.
2. Select [MSG] then press the **ENT/ACK** key.
3. Select [NO. OF PERSONS] then press the **ENT/ACK** key.



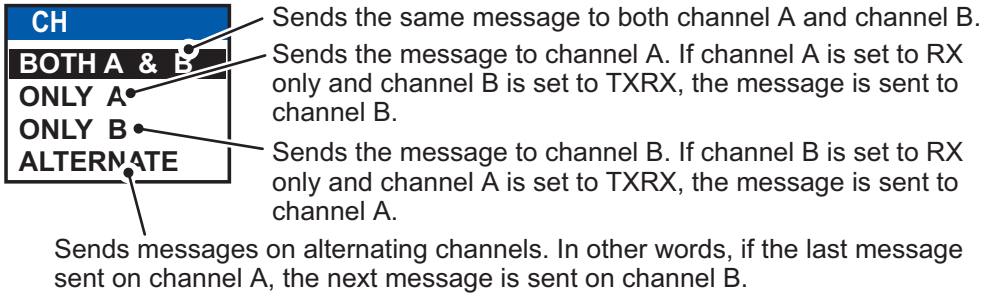
4. Select [NEW MSG], then press the **ENT/ACK** key.



5. [MSG TYPE] is selected; press the **ENT/ACK** key.



6. Select the appropriate message type, then press the **ENT/ACK** key.
   IFM messages require the total number of people on board.
   RFM messages require a breakdown of the total people on board (No. of crew, passengers and personnel).
7. Select [CH], then press the **ENT/ACK** key.



8. Select the channel to use to send the message then press the **ENT/ACK** key.
9. Select [RETRY], then press the **ENT/ACK** key. The retry attempts setting pop up appears.
10. Press ▲ to increase the retry attempts, ▼ to decrease the retry attempts. The maximum setting for retries is 3. Press the **ENT/ACK** key to apply the setting and close the pop up.
11. Select and enter the total number for [NO. OF PERSONS] (IFM message) or [CREW], [PASSENGER] and [PERSONNEL] (RFM message), then press the **ENT/ACK** key.

12. Press ▲or ▼ to highlight [<SEND MSG>] at the top right of the screen, then press the **ENT/ACK** key. The system will now attempt to send the message.

2.6.5 EMMA warning message

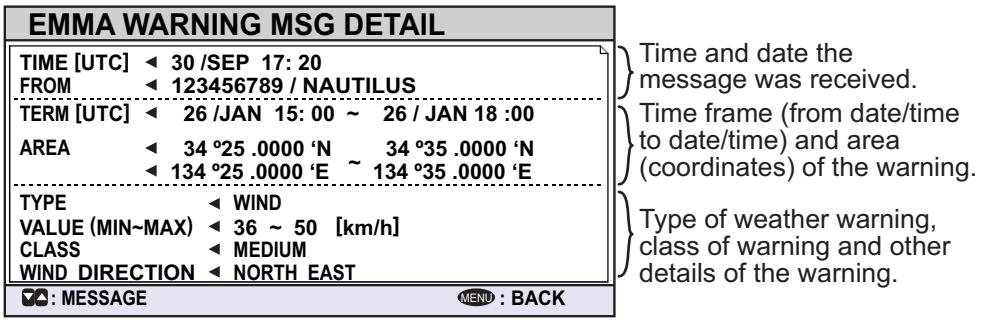
EMMA (European Multiservice Meteorological Awareness) warnings are sent by base stations to skippers to inform them of special meteorological situations. EMMA does not provide continuous weather information, but only warnings of wind, rain, snow and ice, thunderstorm, fog, extreme temperatures (low and high), flood, fire in the forest. These messages are additional to the Notices to Skippers warnings.

The information includes the following:

- Start time of validity
- End time of validity
- Fairway section start and end co-ordinates
- Type of weather warning
- Minimum value
- Maximum value
- Classification of warning
- Wind direction

When you receive an EMMA warning, the "EMMA WARNING RECEIVED" pop up window appears and shows the MMSI or name of the sending agency. To see the contents of the message, do the following:

1. Press the **MENU/ESC** key to open the menu.
2. Select [MSG] then press the **ENT/ACK** key.
3. Select [EMMA WARNING BOX] then press the **ENT/ACK** key.
4. Select a message then press the **ENT/ACK** key.
   The EMMA warning message looks something like example below. To view the other messages, press ▲ or ▼.



Item	Description	
TYPE	[FIRE IN THE FORESTS], [FOG], [FLOOD], [HIGH TEMPERATURE], [LOW TEMPERATURE], [RAIN], [SNOW AND ICE], [THUNDER-STORM], [WIND]	Units of measurement are as follows: • km/h (wind) • °C (temperature) • cm/h (snow) • l/m^2h (rain) • m (visibility distance in fog)
MIN, MAX VALUE	The minimum and maximum value of respective item over one hour. For example, if the minimum and maximum values for snow and ice are 1 and 4 respectively, this means that 1-4 cm of snow or ice has fallen in one hour. The indication range is -254 to +254, or "- - - -" in case where a value is not reported, for example, fire in the forests and flood.	
CLASS	Weather classification: [SLIGHT], [MEDIUM], [STRONG/HEAVY] or "- - - - - - - -" (unknown)	

Item	Description
WIND DIRECTION	[NORTH], [NORTH EAST], [EAST], [SOUTH EAST], [SOUTH], [SOUTH WEST], [WEST], [NORTH WEST] or "- - - -" (Where no wind data is available.)

5. Press the **MENU/ESC** key to close the message.

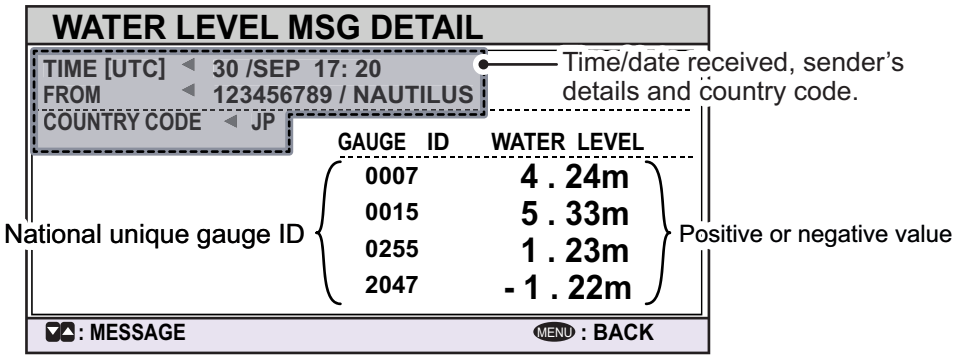
2.6.6 Water level message

The water level message is sent by base stations to inform skippers about actual water levels in their area. It is additional short-term information to the water levels distributed via Notices to Skippers. The message contains the country code (location), gauge ID and water level.

When you receive a water level message, a pop up displays "WATER LEVEL MESSAGE RECEIVED.".

To see the contents of the message, do the following:

1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT/ACK** key.
3. Select [WATER LEVEL BOX] then press the **ENT/ACK** key.
4. Select a message then press the **ENT/ACK** key.



5. Press the **MENU/ESC** key to close the message.

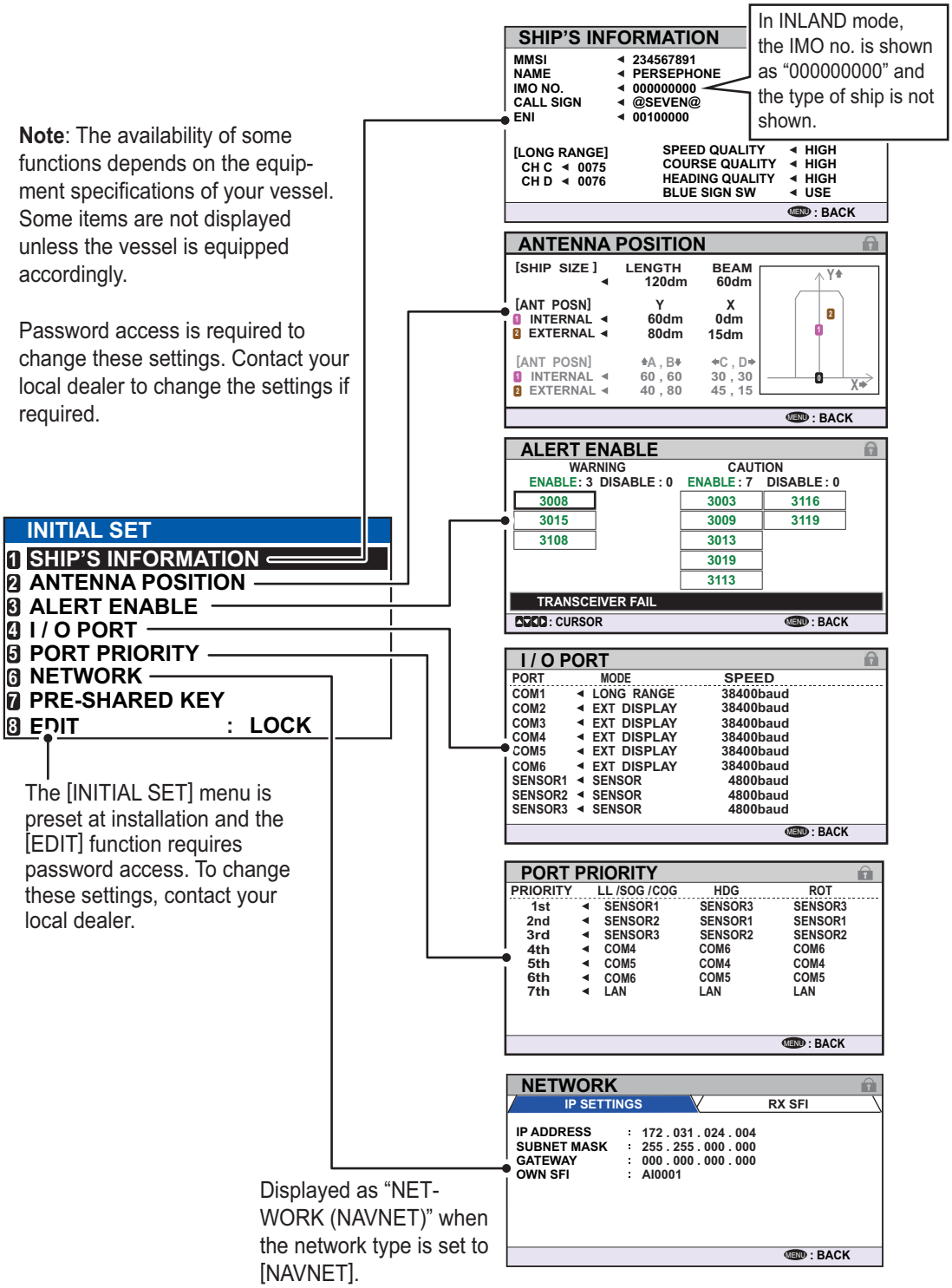
2.7 Viewing Initial Settings

The [INITIAL SET] menu, which is locked with a password to prevent accidental changes to the ship's details, is where the installer enters ship's MMSI, internal and external antenna positions, ship type, I/O port settings and network settings. You can view the settings on this menu as follows.

1. Press the **MENU/ESC** to open the menu.
2. Press the **ENT/ACK** key twice.
3. Select item to view then press the **ENT/ACK** key.

Note: The availability of some functions depends on the equipment specifications of your vessel. Some items are not displayed unless the vessel is equipped accordingly.

Password access is required to change these settings. Contact your local dealer to change the settings if required.

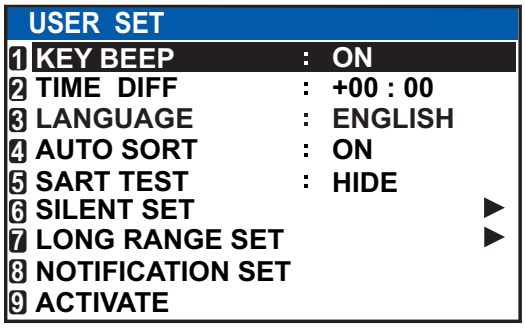


4. Press the **DISP** key to close the menu.

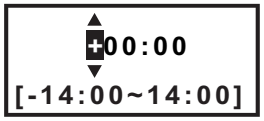
2.8 Setting for Time Difference

You can set the time difference from UTC (Coordinated Universal Time) to show the local time.

1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET] then press the **ENT/ACK** key.



3. Select [TIME DIFF], then press the **ENT/ACK** key. The settings pop up window is displayed.



4. Select the desired time difference then press the **ENT/ACK** key. You can change the value with ▲ or ▼, the digit with ▶ or ◀ The setting range is -14:00 to +14:00.
5. Press the **DISP** key to close the menu.

Note: When a UTC time offset is set, the time display indication for messages and NAV STATUS screen is indicated as "LT" (Local Time). When there is no offset, the time display indication for messages and the NAV STATUS screen is indicated as "UTC" (Coordinated Universal Time).

2.9 How to Select Menu Language

You can select the language for menu window among ENGLISH, FRENCH, DUTCH and GERMAN. The default language is ENGLISH.

1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET] then press the **ENT/ACK** key.
3. Select [LANGUAGE], then press the **ENT/ACK** key. The settings pop up window is displayed.

4. Select the desired language then press the **ENT/ACK** key.
5. Press the **DISP** key to close the menu.

3. MAINTENANCE, TROUBLE-SHOOTING

⚠ WARNING

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel should work inside the equipment.

NOTICE

Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

3.1 Maintenance

Regular maintenance is necessary to maintain performance. A monthly maintenance program should be established and should at least include the items listed in the table below.

Item	Check point
Connectors	Check that all connectors on the rear panel of the transponder unit and monitor unit are firmly connected.
Cabling	Check cabling for damage. Replace if damaged.
Ground terminal	Check the ground terminal on the monitor unit and transponder unit for rust. Clean if necessary.
Ground wire	Check that the ground wire on the monitor unit and transponder unit is firmly fastened.
Monitor unit, Transponder unit.	Dirt and dust should be removed from units with a soft, dry cloth. For the LCD, wipe it 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 any unit; they can remove paint and marks and deform the equipment.

3.2 Replacement of Fuse

The transponder unit contains a 8A fuse which protects the equipment from overvoltage, reverse polarity and equipment fault. If the power cannot be turned on, the fuse may be blown. Contact your local dealer for advice.

Unit	Fuse type	Specification	Code No.
Transponder unit FA-1701	FGMB-S 125V 8A PBF	12 to 24 VDC	000-191-004-10

⚠ WARNING

Use the proper fuse.

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

3.3 Troubleshooting

The troubleshooting table below provides common symptoms of trouble and the means to rectify them. If you cannot restore normal operation, do not attempt to check inside the equipment. Refer any repair work to a qualified technician.

Symptom	Remedy
Power	
Cannot turn on the power.	• Check that the power cable between the transponder and monitor units for damage. • Check the power supply.
Transmitting, receiving messages	
Cannot transmit or receiver.	• Check that the VHF antenna cable is firmly fastened. • Check the VHF antenna for damage. • For TX messages, try a different TX channel. CLASS A: See section 1.9.1. INLAND: See section 2.6.1.
Can transmit but message is sent to wrong party.	Check that the[MSG TYPE] is set to [ADDRESSED] and the MMSI entered at [TO] is correct. For CLASS-A, see section 1.9.1. For INLAND: See section 2.6.1.
Position data	
No position data.	• Check the GNSS antenna for damage. • Check the GNSS antenna cable and its connectors.

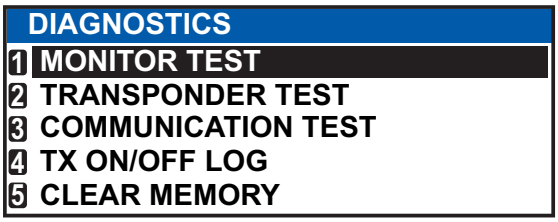
3.4 Diagnostics

The FA-170 provides diagnostic tests to check the monitor unit and transponder unit for proper operation.

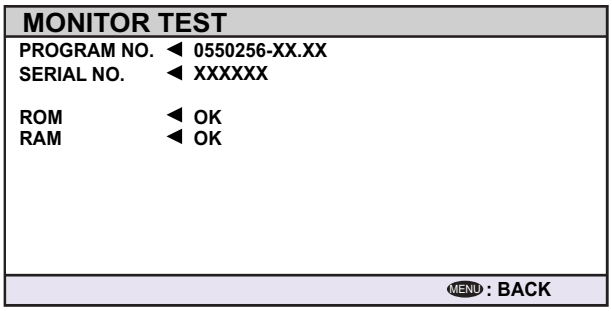
3.4.1 Monitor unit test

The monitor unit test shows program no., and checks the ROM, RAM, LCD and controls.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT/ACK** key.



3. [MONITOR TEST] is already selected; press the **ENT/ACK** key.



"XX.XX" indicates software version number.

a) The screen in the test displays the monitor unit's program number and serial number.

b) The ROM and RAM are checked. The results of the ROM/RAM check are shown as "OK" or "NG" (No Good). If "NG" appears, try the test again. If "NG" still appears, contact your dealer for advice.

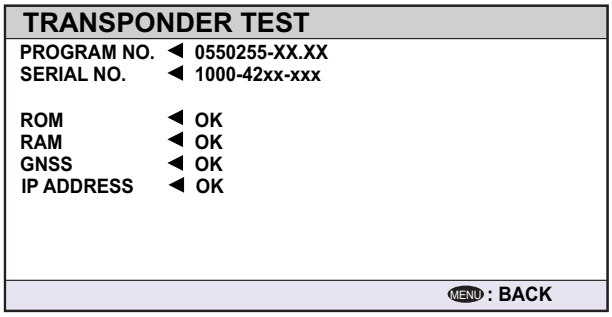
3.4.2 Transponder test

The transponder tests two aspects of the transponder: transponder memory and internal GNSS receiver.

The [IP ADDRESS] checks if the LAN connection has duplicate IP addresses in the same network. When there are duplicate IP addresses, the [IP ADDRESS] is “NG”. When there is no LAN connection to the FA-170, “--” will be shown as a result.

To run this test, do the following:

1. Press the **MENU/ESC** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT/ACK** key.
3. Select [TRANSPONDER TEST] then press the **ENT/ACK** key.
4. The transponder program number and serial number are displayed and the ROM and RAM are checked. The results of the ROM and RAM check are displayed as "OK" or "NG" (No Good). The result of [IP ADDRESS] is displayed as “OK”, “NG” or “--”. For any "NG", contact your dealer for advice.



The GNSS test results are displayed the format shown below.

OK: Normal

NG: No Good - Appears along with reason for NG.

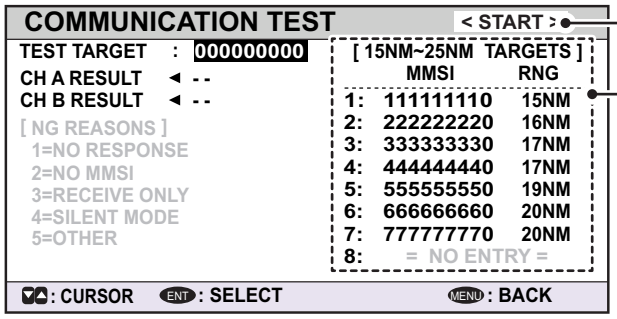
- ROM ERROR
- RAM ERROR
- MEMORY ERROR
- ANTENNA ERROR
- COM ERROR

5. Press the **MENU/ESC** key to return to the [DIAGNOSTICS] sub-menu.

3.4.3 VHF communication test

The VHF communication test checks for proper transmission and reception over the VHF channel.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT/ACK** key.
3. Select [COMMUNICATION TEST] then press the **ENT/ACK** key.



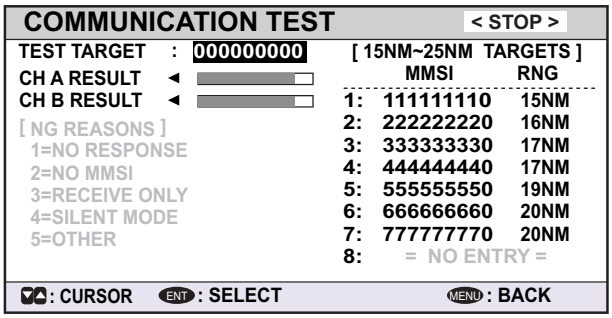
Select [START], then press the **ENT/ACK** key to begin the communications test.

Available test targets list showing the MMSI of each target and range to target.

The FA-170 automatically selects targets with a range of 15 NM to 25 NM for this list with CLASS A type targets listed above other types.

4. Input the required MMSI, referring to the list at the right of the screen. You can also select the test target from the list at the right of the screen using the arrow keys, then press the **ENT/ACK** key.
5. Select [START] then press the **ENT/ACK** key.

When the test is complete, the results are displayed for both channel A and B, along with a reason for test failure where applicable.
"OK": Normal
"NG": No Good. Unable to communicate with specified vessel's (MMSI) channel.
The result "NG" appears with a number explaining the failure. The number and meanings are listed in the table below.



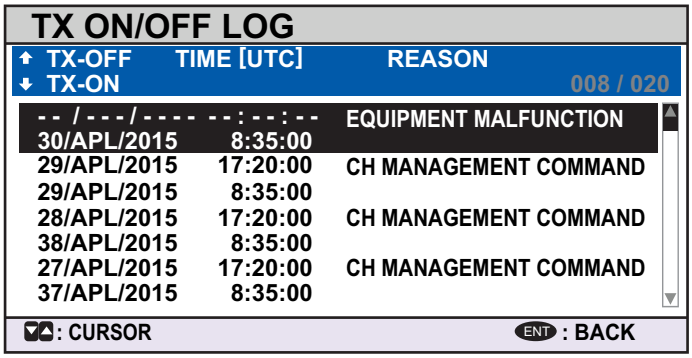
Number	Reason	Measures
1	No response. The message was not acknowledged by the test target.	Change targets, then repeat the test.
2	Own ship MMSI is not set.	Refer to the installation manual for this equipment and input the MMSI.
3	The FA-170 is set to "receive only" and cannot send a test message.	Change the setting for [CH INFO] to [TX/RX AorB] from the [REGION LIST]. See section 1.10.2. **Note:** The system automatically transmits when the setting is changed to [TX/RX AorB].
4	The FA-170 is in silent mode and cannot send a test message.	Disable silent mode.
5	Less than one minute interval between messages sent.	Wait for more than one minute, then repeat the test.
6	Failed for an unknown reason. (Other than those above.)	There may be an obstacle (land mass, etc.) between your vessel and the test vessel. Manually input a different test target MMSI then repeat the test.

6. Press the **MENU/ESC** key to return to the [DIAGNOSTICS] sub-menu.

3.4.4 TX on/off log

The [TX ON/OFF LOG] shows the date and time at which transmissions were started or stopped. The time and date at which unit was turned off is also displayed.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT/ACK** key.
3. Select [TX ON/OFF LOG] then press the **ENT/ACK** key.



The reasons which may be displayed are listed in the table below, along with their meaning.

Reason	Meaning
POWER OFF	Transmission disabled due to unit power off.
SILENT MODE	Transmission disabled due to unit operating in SILENT mode.
CH MANAGEMENT COMMAND	Transmission disabled due to CH INFO receive mode.
EQUIPMENT MALFUNCTION	Transmission disabled due to equipment malfunction.
INVALID CONFIGURATION	Transmission disabled due to invalid settings.

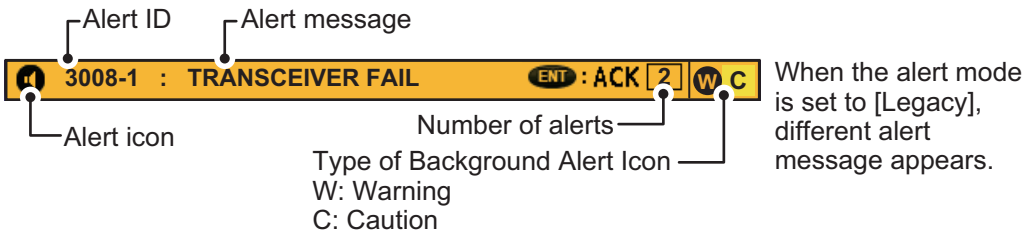
4. Press ▲ or ▼ to move the cursor and display other log entries.
   The cursor selects two lines, as shown in reverse video in the figure above. The contents of each log entry are:
   - Top line: Date and time at which transmission was turned off and reason transmission was turned off.
     Note: If transmission is turned off for more than 15 minutes, one of the reasons listed below is displayed.

Reason	Meaning
"POWER OFF"	Transmission ceased as the power was turned off.
"SILENT MODE"	Transmission ceased due to activation of [SILENT] mode.
"CH MANAGEMENT COMMAND"	Transmission ceased due to current channel settings.
"EQUIPMENT MALFUNCTION"	Transmission ceased due to equipment fault.
"INVALID CONFIGURATION"	Transmission ceased due to invalid settings.

   - Bottom line: Date and time at which transmission was turned on.
5. Press the **MENU/ESC** key to return to the [DIAGNOSTICS] sub-menu.

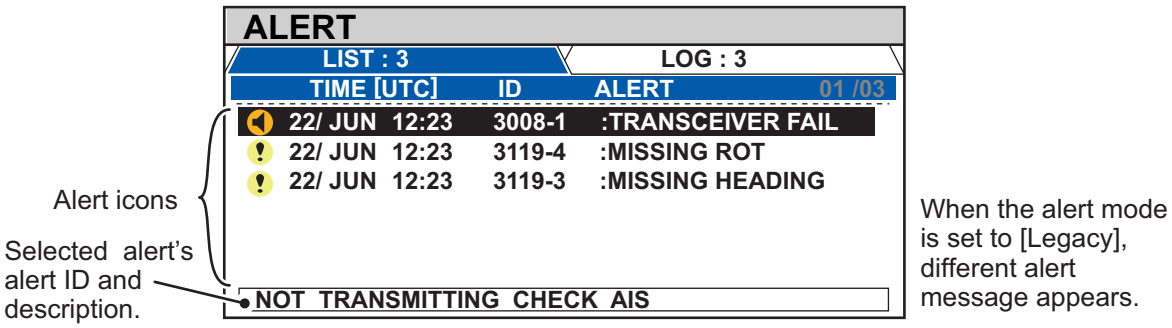
3.5 Alerts

The buzzer sounds for equipment errors and is accompanied by a flashing indication at the bottom of the screen. Press the **ENT/ACK** key to silence the buzzer and acknowledge the alert. If there are multiple alerts, each alert must be acknowledged individually. The indication at the bottom of the screen remains until the alert cause is removed or rectified. Alert ID and alert messages differ according to the alert mode set during the installation. Refer to "ALERTS, IDS, MEANINGS AND MEASURES" on page AP-7 about the alerts shown in each alert mode.



To see which alert(s) has been violated, display the [ALERT] list as shown in the procedure below.

1. Press the **DISP** key or long press **MENU/ESC** key to show the [ALERT] log.



2. Use ▲ or ▼ to select an alert. Each alert is displayed with the date and time at which it was generated. Where there is no date/time data available, the date/time indication appears as "- -/- - - - -:- -".
   Select an alert to display brief description in the box at the bottom of the screen, as shown in the example above.
3. Press ◀ or ▶ to change the displayed tab.
   The [LIST] tab shows active alerts only.
   The [LOG] tab shows the latest 20 alerts which have been acknowledged and rectified.

Each active alert entry is accompanied by an alert icon, indicating the state of the alert. The alert icons displayed on the FA-170 are listed in the table below with a brief description.

Icon	Priority	Meaning	Icon	Priority	Meaning
	Warning	Active-unacknowledged notification, icon is flashing.*		Warning	Active-responsibility transferred notification, icon is lit steadily.
	Warning	Active-silenced notification, icon is flashing.*		Warning	Active-acknowledged notification, icon is lit steadily.
	Warning	Rectified-unacknowledged notification, icon is flashing.*		Caution	Active, icon is lit steadily.

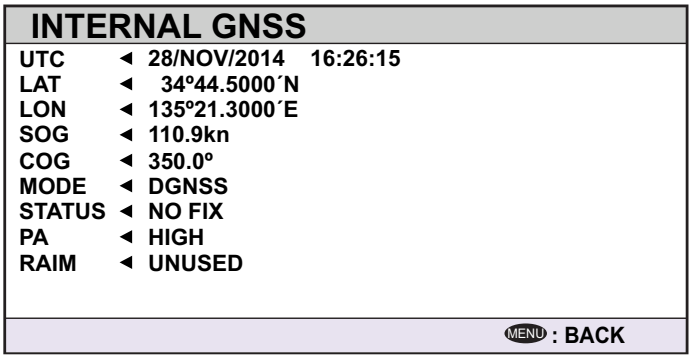
*: Flashing at 0.5 second intervals.

See "ALERTS, IDS, MEANINGS AND MEASURES" on page AP-7 for a full list of alerts, alert IDs, their meanings and possible countermeasures.

3.6 GNSS Monitor

The GNSS monitor display shows information about the built-in GNSS receiver, including position, speed over ground, course over ground, date, time, mode position accuracy, position-fixing status and RAIM status.

1. Press the **MENU/ESC** key to open the menu.
2. Select [STATUS], then press the **ENT/ACK** key.
3. Select [INTERNAL GNSS], then press the **ENT/ACK** key.



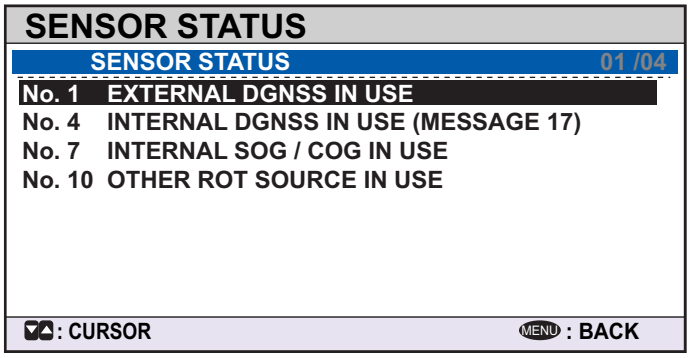
Indication	Description	Indication	Description
UTC	Date and time	MODE	Selected GNSS mode • [GNSS]: GNSS is used for position fix. • [DGNSS]: DGNSS is used for position fix. • [NO FIX]: The system is unable to calculate a position fix.
LAT	Latitude of current position	STATUS	GNSS status • [2D]: Two dimensional GNSS fix. • [3D]: Three dimensional GNSS fix. • [D2D]: Two dimensional DGNSS fix. • [D3D]: Three dimensional DGNSS fix. • [DOP]: Dilution of precision fix. • [NO FIX]: The system is unable to calculate a position fix.
LON	Longitude of current position	PA	Position accuracy (HIGH = Less than 10 m, LOW = more than 10 m)
SOG	Speed Over Ground	RAIM	Current RAIM status (USED or UNUSED)
COG	Course Over Ground		

4. Press the **DISP** key to close the display.

3.7 Displaying Sensor Status

The [SENSOR STATUS] screen shows currently connected sensors' status.

1. Press the **MENU/ESC** key.
2. Select [STATUS], then press the **ENT/ACK** key.
3. Select [SENSOR STATUS] then press the **ENT/ACK** key.



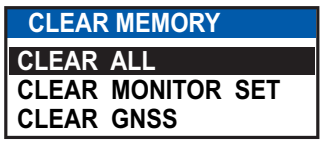
4. Press the **DISP** key to close the display. The table below lists the possible sensor status messages and their meanings.

Sensor Status Message	Meaning
EXTERNAL DGNSS IN USE	Using external DGNSS
EXTERNAL GNSS IN USE	Using external GNSS
INTERNAL DGNSS IN USE (BEACON)	Using internal DGNSS beacon
INTERNAL DGNSS IN USE (MESSAGE 17)	MSG 17 corrects internal GNSS with differential correction
INTERNAL GNSS IN USE	Using internal GNSS
EXTERNAL SOG/COG IN USE	Using external SOG/COG
INTERNAL SOG/COG IN USE	Using internal SOG/COG
HEADING VALID	Heading data normal
RATE OF TURN INDICATOR IN USE	ROT data normal
OTHER ROT SOURCE IN USE	Value calculated from HDT, or ROT device used and talker is other than TI.
CHANNEL MANAGEMENT PARAMETERS CHANGED	Channel changed (displayed about 30 s)
LOW POWER TANKER MODE ACTIVE	Low power because of tanker mode.
LOW POWER TANKER MODE INACTIVE	Tanker mode set to inactive, but currently low power. (displayed about 30 s)
OPERATING IN ASSIGNED MODE BY MESSAGE 16 FROM BASE STATION 00MIDXXXX	Operating with assinged mode by the direction of base station (MMSI=00MIDXXXX).
OPERATING IN DATA LINK MANAGEMENT MODE BY MESSAGE 20 FROM BASE STATIONS 00MIDXXXX[...]	Operating with data link management mode by the direction of base station (MMSI=00MIDXXXX, ...).
OPERATING IN CHANNEL MANAGEMENT MODE BY MESSAGE 22 FROM BASE STATION 00MIDXXXX ON CHANNELS YYYY AND ZZZZ	Operating with channel management mode (on channels YYYY and ZZZZ) by the direction of base station (MMSI=00MIDXXXX).
OPERATING IN GROUP ASSIGNMENT MODE BY MESSAGE 23 FROM BASE STATION 00MIDXXXX	Operating with group assignment mode by the direction of base station (MMSI=00MIDXXXX).
RETURNED TO DEFAULT OPERATIONS	Operations are returned from the direction of base station. (displayed about 30 s)

3.8 How to Restore Default Settings

You may clear all or specific settings to start afresh with default settings. When all data is cleared, the default settings for all items in the [USER SET] menu are restored. Additionally all messages and the alert history are cleared. GNSS data is also cleared; however, MMSI and IMO numbers, ship's name and call sign are not cleared.

1. Press the **MENU/ESC** key to open the menu.
2. Select [DIAGNOSTICS] then press the **ENT/ACK** key.
3. Select [CLEAR MEMORY] then press the **ENT/ACK** key.
4. Select [CLEAR ALL], [CLEAR MONITOR SET] or [CLEAR GNSS] as appropriate then press the **ENT/ACK** key. A confirmation pop up window appears.



CLEAR ALL	Restores all settings to default, except items in the [INITIAL SET] menu (MMSI No., IMO No., ship's name and call sign, etc.)
CLEAR MONITOR SET	Restore default settings for dimmer, contrast, key beep and notifications.
CLEAR GNSS	Clears GNSS Almanac to receive latest Almanac.

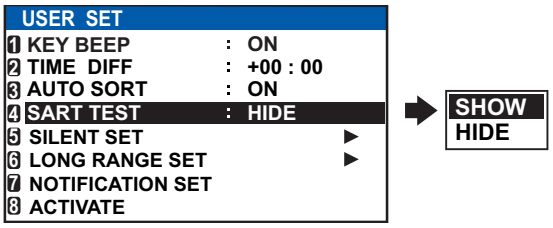
5. Select [YES] then press the **ENT/ACK** key.
   For [CLEAR ALL] and [CLEAR MONITOR SET], a beep sounds then the equipment restarts.

3.9 AIS-SART Test Indication in Target List

The FA-170 can confirm if an AIS-SART station is functioning correctly. This test requires SART TEST message data. Note that this setting is deactivated when the power is turned off. MOB-AIS and EPIRB-AIS test are also the subject of this test.

Note: This function tests if a locating device is functioning correctly. It is not a SART diagnostic tool for FA-170.

1. Press the **MENU/ESC** key to open the menu.
2. Select [USER SET], then press the **ENT/ACK** key.



3. Select [SART TEST], then press the **ENT/ACK** key.
4. Select [SHOW], then press the **ENT/ACK** key.
5. Press the **DISP** key to close the menu.
6. Press the DISP to show the [TARGET LIST]. If the [DANGEROUS TARGET] is displayed, switch to the [TARGET LIST], referring to step 3 of section 1.8.2.
7. Select [SART] then press the **ENT/ACK** key to show detailed information for the AIS-SART station.
8. Confirm that the [STATUS] field is showing "SART TEST", "MOB TEST" or "EPIRB TEST".

APPENDIX 1 MENU TREE

Class-A Menu Tree

Bold Italic : Default

MAIN MENU
- 1 MSG
- 2 STATUS
- 3 USER SET
- 4 INITIAL SET
- 5 CH INFO
- 6 DIAGNOSTICS
- 7 SERVICE (For service personnel only)

1 MSG
- NEW MSG
- MSG BOX
  - INBOX
  - OUTBOX

2 STATUS
- INTERNAL GNSS
- SENSOR STATUS

3 USER SET
- KEY BEEP (***ON***, OFF)
- TIME DIFF (-14:00 to +14:00, default: ***+00:00***)
- AUTO SORT (***ON***, OFF)
- SART TEST (SHOW, ***HIDE***)
- SILENT MODE
  - CONTROL (***MKD***, SWITCH)
  - TX MODE (MKD) (***NORMAL***, RESTRICT, SILENT)
- LONG RANGE SET
  - LR RESPONSE (***AUTO***, MANUAL)
  - LR BROADCAST (***ON***, OFF)
- NOTIFICATION SET
  - ALERT
    - BUZZER (***ON***, OFF)
    - LOCATING DEVICE (***ON***, OFF)
  - RX MESSAGE
    - ADDRESSED (***POPUP+BUZZER***, POPUP, OFF)
    - BROADCAST (***POPUP+BUZZER***, POPUP, OFF)
  - COLLISION DETECT
    - INDICATION (***POPUP+BUZZER***, POPUP, OFF)
    - CPA THREHOLD (0.0 NM to 6.0 NM, ***6.0 NM***)
    - TCPA THREHOLD (0 min to 60 min, ***60 min***)
- ACTIVATE

4 INITIAL SET
- SHIP'S INFORMATION
  - MMSI (000000000 to 999999999,default: ***---------***)
  - NAME (Maximum 20 characters, default: ***BLANK***)
  - IMO NO. (***0000000000*** to 1073741823)
  - CALL SIGN (Maximum 7 characters, default: ***BLANK***)
  - LONG RANGE
    - CH C (***0075***, 0076)
    - CH D (0075, ***0076***)
- ANTENNA POSITION
  - SHIP SIZE
    - LENGTH (***0m*** to 800m)
    - BEAM (***0m*** to 100m)
  - ANT POSN*
    - INTERNAL Y (***0 m***)
    - INTERNAL X (***0 m***)
    - EXTERNAL Y (***0 m***)
    - EXTERNAL X (***0 m***)
- ALERT ENABLE
  - WARNING*[2] (3008, 3015, 3108) (***ON***, OFF)
  - CAUTION*[2] (3003, 3009, 3013, 3019, 3113, 3116, 3119) (***ON***, OFF)
  - WARNING1*[3] (001,002,003,004,014,026,029,030) (***ON***, OFF)*[3]
  - WARNING2*[3] (005,007,008,009,010,011,025,032,035,BAM**) (***ON***, OFF)*[3]

*[1]: The setting ranges depend on the length/beam of ship size.

*[2]: Displayed for Alert IF2.
*[3]: Displayed for Legacy.

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- I/O PORT
  - COM1 — MODE (***EXT DISPLAY***, PILOT PLUG, LONG RANGE, BEACON, MONITOR, SERVICE, DISABLE)
    - SPEED (57600baud, ***38400baud***, 4800baud)
  - COM2 (SAME AS COM 1)
  - COM3 (SAME AS COM 1)
  - COM4 — MODE (***EXT DISPLAY***, PILOT PLUG, LONG RANGE, SENSOR, BEACON, MONITOR, SERVICE, DISABLE)
    - SPEED (57600baud, ***38400baud***, 4800baud)
  - COM5 (SAME AS COM 4)
  - COM6 (SAME AS COM 4)
  - SENSOR1 — MODE (***SENSOR***, DISABLE)
    - SPEED (Fixed at 4800baud)
  - SENSOR2 (SAME AS SENSOR 1)
  - SENSOR3 (SAME AS SENSOR 1)
- PORT PRIORITY
  - 1st — LL/SOG/COG (***SENSOR1***, SENSOR2, SENSOR3, COM4, COM5, COM6, LAN)
    - HDG (SENSOR1, SENSOR2, ***SENSOR3***, COM4, COM5, COM6, LAN)
    - ROT (SENSOR1, SENSOR2, ***SENSOR3***, COM4, COM5, COM6, LAN)
  - 2nd — LL/SOG/COG (SENSOR1, ***SENSOR2***, SENSOR3, COM4, COM5, COM6, LAN)
    - HDG (***SENSOR1***, SENSOR2, SENSOR3, COM4, COM5, COM6, LAN)
    - ROT (***SENSOR1***, SENSOR2, SENSOR3, COM4, COM5, COM6, LAN)
  - 3rd — LL/SOG/COG (SENSOR1, SENSOR2, ***SENSOR3***, COM4, COM5, COM6, LAN)
    - HDG (SENSOR1, ***SENSOR2***, SENSOR3, COM4, COM5, COM6, LAN)
    - ROT (SENSOR1, ***SENSOR2***, SENSOR3, COM4, COM5, COM6, LAN)
  - 4th — LL/SOG/COG (SENSOR1, SENSOR2, SENSOR3, ***COM4***, COM5, COM6, LAN)
    - HDG (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, ***COM6***, LAN)
    - ROT (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, ***COM6***, LAN)
  - 5th — LL/SOG/COG (SENSOR1, SENSOR2, SENSOR3, COM4, ***COM5***, COM6, LAN)
    - HDG (SENSOR1, SENSOR2, SENSOR3, ***COM4***, COM5, COM6, LAN)
    - ROT (SENSOR1, SENSOR2, SENSOR3, ***COM4***, COM5, COM6, LAN)
  - 6th — LL/SOG/COG (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, ***COM6***, LAN)
    - HDG (SENSOR1, SENSOR2, SENSOR3, COM4, ***COM5***, COM6, LAN)
    - ROT (SENSOR1, SENSOR2, SENSOR3, COM4, ***COM5***, COM6, LAN)
  - 7th — LL/SOG/COG (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, COM6, ***LAN***)
    - HDG (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, COM6, ***LAN***)
    - ROT (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, COM6, ***LAN***)
- NETWORK
  - IP SETTINGS — IP ADDRESS (000.000.000.000 to 255.255.255.255, default: ***172.031.024.004***)
    - SUBNET MASK (000.000.000.000 to 255.255.255.255, default: ***255.255.000.000***)
    - GATEWAY (***000.000.000.000*** to 255.255.255.255)
    - OWN SFI (***AI0001*** to AI9998)
  - RX SFI — POSN (PRIMARY: ***NONE***, SFI*[4] SECONDARY: ***NONE***, SFI*[4])
    - SOG/COG (PRIMARY: ***NONE***, SFI*[4] SECONDARY: ***NONE***, SFI*[4])
    - HDG (PRIMARY: ***NONE***, SFI*[4] SECONDARY: ***NONE***, SFI*[4])
    - ROT (PRIMARY: ***NONE***, SFI*[4] SECONDARY: ***NONE***, SFI*[4])
    - AIS CTL (PRIMARY: ***ANY***, SFI*[4] SECONDARY: ***NONE***, SFI*[4])
    - ALERT (PRIMARY: ***ANY***, SFI*[4] SECONDARY: ***NONE***, SFI*[4])

*[4]: Setting range of SFI XXYYYY (X: A to Z, YYYY: 0000 to 9999)

- NETWORK (NAVNET)
  - IP ADDRESS (000.000.000.000 to 255.255.255.255, default: ***172.031.024.004***)
  - SUBNET MASK (000.000.000.000 to 255.255.255.255, default: ***255.255.000.000***)
  - GATEWAY (***000.000.000.000*** to 255.255.255.255)
  - NAVNET PORT (***10000*** to 30000)
  - HOST NAME (***AIS0*** to AIS9)
  - AIS INFO (***ON***, OFF)
  - ZDA INFO (ON, ***OFF***)
  - GNSS INFO (ON, ***OFF***)
- PRE-SHARED KEY
- EDIT

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5 CH INFO
- REGION LIST
  - AREA (top right corner coordinates)
    - LAT; default: ***--º --.-' - (current coordinates)***
    - LON; default: ***--º --.-' - (current coordinates)***
  - AREA (bottom left corner cordinates), same as top right coordinates.
  - ZONE (1 to 8, default: ***5***)
  - CH
    - PWR (***HIGH***, LOW)
    - CH A (Channel no./TXRX, RX, OFF); default: ***2087/TXRX***.
    - CH B (Channel no./TXRX, RX, OFF); default: ***2088/TXRX***.

6 DIAGNOSTICS
- MONITOR TEST
- TRANSPONDER TEST
- COMMUNICATION TEST
- TX ON/OFF LOG
- CLEAR MEMORY (***CLEAR ALL***, CLEAR MONITOR SET, CLEAR GNSS)

7 SERVICE (Requires password access. For service personnel only)

Inland Menu Tree

Bold Italic : Default

MAIN MENU
- 1 MSG
- 2 STATUS
- 3 USER SET
- 4 INITIAL SET
- 5 CH INFO
- 6 DIAGNOSTICS
- 7 SERVICE (For service personnel only)

1 MSG
- TEXT
  - NEW MSG
  - MSG BOX
- ETA/RTA
  - NEW MSG*
  - MSG BOX

*: Not available in SOLAS mode.

- NO. OF PERSONS
  - NEW MSG
  - MSG BOX
- EMMA WARNING BOX
- WATER LEVEL BOX

2 STATUS
- INTERNAL GNSS
- SENSOR STATUS

3 USER SET
- KEY BEEP (***ON***, OFF)
- TIME DIFF (-14:00 to +14:00), default: ***+00:00***
- LANGUAGE (***ENGLISH***, FRENCH, DUTCH, GERMAN)
- AUTO SORT (***ON***, OFF)
- SART TEST (SHOW, ***HIDE***)
- SILENT MODE
  - CONTROL (***MKD***, SWITCH)
  - TX MODE (MKD) (***NORMAL***, RESTRICT, SILENT)
- LONG RANGE SET
  - LR RESPONSE (***AUTO***, MANUAL)
  - LR BROADCAST (***ON***, OFF)
- NOTIFICATION SET
  - ALERT
    - BUZZER (***ON***, OFF)
    - LOCATING DEVICE (***ON***, OFF)
  - RX MESSAGE
    - ADDRESSED (***POPUP+BUZZER***, POPUP, OFF)
    - BROADCAST (***POPUP+BUZZER***, POPUP, OFF)
  - COLLISION DETECT
    - INDICATION (***POPUP+BUZZER***, POPUP, OFF)
    - CPA THREHOLD (0.0 NM to 6.0 NM, ***6.0 NM***)
    - TCPA THREHOLD (0 min to 60 min, ***60 min***)
- ACTIVATE

4 INITIAL SET
- SHIP'S INFORMATION
  - MMSI (000000000, 200000000 to 799999999 or 982000000 to 987999999, default: ---------)
  - NAME (Maximum 20 characters, default: ***BLANK***)
  - IMO NO. (Fixed at ***0000000000***)
  - CALL SIGN (Maximum 7 characters, default: ***BLANK***)
  - ENI (Maximum 8 numbers, default: ***BLANK***)
  - LONG RANGE
    - CH C (***0075***, 0076)
    - CH D (0075, ***0076***)
  - SPEED QUALITY (HIGH, ***LOW***)
  - COURSE QUALITY (HIGH, ***LOW***)
  - HEADING QUALITY (HIGH, ***LOW***)
  - BLUE SIGN (***USE***, UNUSE)

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- ANTENNA POSITION
  - SHIP SIZE
    - LENGTH (***0dm*** to 8000dm)
    - BEAM (***0dm*** to 1000dm)
  - ANT POSN*5
    - INTERNAL Y (***0dm***)
    - INTERNAL X (***0dm***)
    - EXTERNAL Y (***0dm***)
    - EXTERNAL X (***0dm***)

*5: The setting ranges depend on the length/beam of ship size.

- ALERT ENABLE
  - WARNING*6 (3008, 3015, 3108) (***ON***, OFF)
  - CAUTION*6 (3003, 3009, 3013, 3019, 3113, 3116, 3119) (***ON***, OFF)
  - WARNING1*7 (001,002,003,004,014,026,029,030) (***ON***, OFF)*7
  - WARNING2*7 (005,007,008,009,010,011,025,032,035,BAM**) (***ON***, OFF)*7

*6: Displayed for ALERT
*7: Displayed for Legacy.

- I/O PORT
  - COM1
    - MODE (***EXT DISPLAY***, PILOT PLUG, LONG RANGE, BEACON, MONITOR, SERVICE, DISABLE)
    - SPEED (57600baud, ***38400baud***, 4800baud)
  - COM2 (SAME AS COM 1)
  - COM3 (SAME AS COM 1)
  - COM4
    - MODE (***EXT DISPLAY***, PILOT PLUG, LONG RANGE, SENSOR, BEACON, MONITOR, SERVICE, DISABLE)
    - SPEED (57600baud, ***38400baud***, 4800baud)
  - COM5 (SAME AS COM 4)
  - COM6 (SAME AS COM 4)
  - SENSOR1
    - MODE (***SENSOR***, DISABLE)
    - SPEED (Fixed at 4800baud)
  - SENSOR2 (SAME AS SENSOR 1)
  - SENSOR3 (SAME AS SENSOR 1)

- PORT PRIORITY
  - 1st
    - LL/SOG/COG (***SENSOR1***, SENSOR2, SENSOR3, COM4, COM5, COM6, LAN)
    - HDG (SENSOR1, SENSOR2, ***SENSOR3***, COM4, COM5, COM6, LAN)
    - ROT (SENSOR1, SENSOR2, ***SENSOR3***, COM4, COM5, COM6, LAN)
  - 2nd
    - LL/SOG/COG (SENSOR1, ***SENSOR2***, SENSOR3, COM4, COM5, COM6, LAN)
    - HDG (***SENSOR1***, SENSOR2, SENSOR3, COM4, COM5, COM6, LAN)
    - ROT (***SENSOR1***, SENSOR2, SENSOR3, COM4, COM5, COM6, LAN)
  - 3rd
    - LL/SOG/COG (SENSOR1, SENSOR2, ***SENSOR3***, COM4, COM5, COM6, LAN)
    - HDG (SENSOR1, ***SENSOR2***, SENSOR3, COM4, COM5, COM6, LAN)
    - ROT (SENSOR1, ***SENSOR2***, SENSOR3, COM4, COM5, COM6, LAN)
  - 4th
    - LL/SOG/COG (SENSOR1, SENSOR2, SENSOR3, ***COM4***, COM5, COM6, LAN)
    - HDG (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, ***COM6***, LAN)
    - ROT (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, ***COM6***, LAN)
  - 5th
    - LL/SOG/COG (SENSOR1, SENSOR2, SENSOR3, COM4, ***COM5***, COM6, LAN)
    - HDG (SENSOR1, SENSOR2, SENSOR3, ***COM4***, COM5, COM6, LAN)
    - ROT (SENSOR1, SENSOR2, SENSOR3, ***COM4***, COM5, COM6, LAN)
  - 6th
    - LL/SOG/COG (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, ***COM6,*** LAN)
    - HDG (SENSOR1, SENSOR2, SENSOR3, COM4, ***COM5***, COM6, LAN)
    - ROT (SENSOR1, SENSOR2, SENSOR3, COM4, ***COM5***, COM6, LAN)
  - 7th
    - LL/SOG/COG (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, COM6, ***LAN***)
    - HDG (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, COM6, ***LAN***)
    - ROT (SENSOR1, SENSOR2, SENSOR3, COM4, COM5, COM6, ***LAN***)

- NETWORK
  - IP SETTINGS
    - IP ADDRESS (000.000.000.000 to 255.255.255.255, default: ***172.031.024.004***)
    - SUBNET MASK (000.000.000.000 to 255.255.255.255, default: ***255.255.000.000***)
    - GATEWAY (***000.000.000.000*** to 255.255.255.255)
    - OWN SFI (AI0001 to AI9998)
  - RX SFI
    - POSN (PRIMARY: ***NONE***, SFI*4 SECONDARY: ***NONE***, SFI*4)
    - SOG/COG (PRIMARY: ***NONE***, SFI*4 SECONDARY: ***NONE***, SFI*4)
    - HDG (PRIMARY: ***NONE***, SFI*4 SECONDARY: ***NONE***, SFI*4)
    - ROT (PRIMARY: ***NONE***, SFI*4 SECONDARY: ***NONE***, SFI*4)
    - AIS CTL (PRIMARY: ***ANY***, SFI*4 SECONDARY: ***NONE***, SFI*4)
    - ALERT (PRIMARY: ***ANY***, SFI*4 SECONDARY: ***NONE***, SFI*4)

*4: Setting range of SFI XXYYYY (X: A to Z, YYYY: 0000 to 9999)

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- NETWORK (NAVNET)
  - IP ADDRESS (000.000.000.000 to 255.255.255.255, default: ***172.031.024.004***)
  - SUBNET MASK (000.000.000.000 to 255.255.255.255, default: ***255.255.000.000***)
  - GATEWAY (***000.000.000.000*** to 255.255.255.255)
  - NAVNET PORT (***10000*** to 30000)
  - HOST NAME (***AIS0*** to AIS9)
  - AIS INFO (***ON***, OFF)
  - ZDA INFO (ON, ***OFF***)
  - GNSS INFO (ON, ***OFF***)
- EDIT

5 CH INFO

- REGION LIST
  - AREA (top right corner coordinates)
    - LAT; default: ***--º --.-' - (current coordinates)***
    - LON; default: ***--º --.-' - (current coordinates)***
  - AREA (bottom left corner cordinates), same as top right coordinates.
  - ZONE (1 to 8, default: ***5***)
  - CH
    - PWR (***HIGH***, LOW)
    - CH A (Channel no./TXRX, RX, OFF); default: ***2087/TXRX***.
    - CH B (Channel no./TXRX, RX, OFF); default: ***2088/TXRX***.

6 DIAGNOSTICS

- MONITOR TEST
- TRANSPONDER TEST
- COMMUNICATION TEST
- TX ON/OFF LOG
- CLEAR MEMORY (***CLEAR ALL***, CLEAR MONITOR SET, CLEAR GNSS)

7 SERVICE (Requires password access. For service personnel only)

APPENDIX 2 ALERTS, IDS, MEANINGS AND MEASURES

The FA-170 displays alerts at the bottom of the screen, as they occur. You can see all alerts, current and past, from the [ALERT LIST] screen. The contents of Alert List differs when selecting Alert IF2 and Legacy. To use BAM (Bridge Alert Management), set the Alert Mode to Alert IF2. Alert mode is password protected. Contact FURUNO for password details.

The table on the following page shows the alert ID, displayed message, meaning and measures for each alert.

Note 1: Alert priority and alert category

"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 three priorities: alarm, warning and caution.

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.

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 are not shown on this equipment.
B	Alert where no additional information for decision support is necessary.
C	Category C alerts are not shown on this equipment.

Note 2: The BAM function type for the FA-170 is "P".

Note 3: Connection with the Central Alert Management (CAM) is available on COM1 to 6 or with LAN.

Note 1: Detection of RX malfunction

1) **Detection of TDMA RX malfunction**
   Frequency error
   PLL chip on TRX-PWR board generates lock or unlock signal for synthesizer.
   MPU watches and sets status flag which reflects data of ALF/ALR sentence.
   When selecting Alert IF2, ID 3008 and ID 3116.
   When selecting Legacy, ID 003 for RX1 or ID 004 for RX2.
2) **Detection of DSC RX malfunction**
   General error
   A DSC error will occur when the FA-170 cannot detect a correct signal strength from the DSC receive circuit 120 seconds.

Note 2: Detection of TX malfunction
MPU detects TX malfunction in the following cases:

1) The signal indicated "LOCK" is not received from the PLL chip on the TRX-PWR board.
2) The voltage of monitoring signal on the TRX-PWR board is abnormal. The reason for TRX-PWR board malfunction can be a hardware problem or software problem causing a continuous transmission that exceeds 250 msec.
   Note: The hardware stops automatically because of the continuous transmission.
3) Invalid MMSI
4) An excessively high VSWR (Voltage Standing Wave Ratio) for the AIS antenna detected.
   When selecting Alert IF2, ID 3008.
   When selecting Legacy, ID 001.

Each active alert entry is accompanied by an alert icon, indicating the state of the alert. The alert icons displayed on the FA-170 are listed in the table below with a brief description.

Icon	Priority	Meaning	Icon	Priority	Meaning
	Warning	Active-unacknowledged notification, icon is flashing.*		Warning	Active-responsibility transferred notification, icon is lit steadily.
	Warning	Active-silenced notification, icon is flashing.*		Warning	Active-acknowledged notification, icon is lit steadily.
	Warning	Rectified-unacknowledged notification, icon is flashing.*		Caution	Active, icon is lit steadily.

*: Flashing at 0.5 second intervals.

When selecting Alert IF2

Alert ID	Displayed message	Sub message	Priority/ Alert instance *3	Category	Meaning	Measures
3003	LOST EXT EPFS	CHECK EXTERNAL POSITION SENSOR	Caution	B	Signal from external navigational aids lost or interrupted.	Check connection to EPFS devices.

Alert ID	Displayed message	Sub message	Priority/ Alert instance *3	Category	Meaning	Measures
3008*1*2	TRANS-CEIVER FAIL	NOT TRANS-MITTING, CHECK AIS	Warning (1)*3	B	Transmission stopped due to a failure.	Check antenna and FA-170 connections. Check that the own ship MMSI is set. Consult your dealer if the problem is not rectified.
		NOT RECEIV-ING, CHECK AIS	Warning (2 or 3)*3	B	RX1 or RX2 failure.	Circuit board may be damaged. Contact your dealer.
3009	LOST MKD	CANNOT DIS-PLAY SAFE-TY RELATED MESSAGES	Caution	B	Communication failure between the transponder and the monitor unit.	Check connection between units. Consult your dealer if the problem is not rectified.
3013	DOUBT-FUL GNSS	INT/EXT GNSS POSI-TION MIS-MATCH	Caution (1)*3	B	Mismatch of position data between internal GNSS and external GNSS. After taking into account the antenna position, there is a difference of over 100 m.	Check calibration and location setting for both GNSS antennas.
	DOUBT-FUL HEADING	DIFFER-ENCE WITH COG EX-CEEDS LIMIT	Caution (2)*3	B	Mismatch between COG and HDT. There is a difference of over 45°for more than five minutes at a speed of over five knots.	Check connection to sensor.
3015*1*2	LOST PO-SITION	OWN SHIP POSITION NOT TRANS-MITTED	Warning	B	No position data available.	Check connection to sensor.
3019	WRONG NAVSTA-TUS	CHECK NAVSTATUS SETTING	Caution	B	Mismatch between ship's speed and [NAV STATUS] information.	Check [NAV STATUS] menu settings. Adjust settings appropriately.

Alert ID	Displayed message	Sub message	Priority/ Alert instance *3	Cate gory	Meaning	Measures
3108*1*2	LOCAT-ING DE-VICE	CHECK AIS TARGETS	Warning	B	AIS-SART, AIS-MOB, EPRIB-AIS message received.	Check the message.
3113	SYNC IN FALLBACK	CHECK AIS FOR UTC TIME SYN-CHRONISA-TION	Caution	B	No synchronization with UTC.	Internal GNSS has no fix. Check weather and surroundings for obstacles. If the error appears frequently, contact your dealer.
3116	IMPAIRED RADIO	REDUCED COVERAGE (ANTENNA VSWR)	Caution (1)*3	B	High VSWR for the AIS antenna detected.	Check the antenna. Consult your dealer if the problem is not rectified.
		CH1 INOPER-ATIVE, CHECK AIS	Caution (2)*3	B	RX1 failure.	Circuit board may be damaged. Contact your dealer.
		CH2 INOPER-ATIVE, CHECK AIS	Caution (3)*3	B	RX2 failure.	Circuit board may be damaged. Contact your dealer.
		DSC INOPER-ATIVE	Caution (4)*3	B	Failed to receive DSC message.	Circuit board may be damaged. Contact your dealer.
3119	MISSING SOG	NOT TRANS-MITTING COG	Caution	B	COG information is invalid.	Check connection to sensor.
	MISSING SOG	NOT TRANS-MITTING SOG	Caution	B	SOG information is invalid.	Check connection to sensor.
	MISSING HEADING	NOT TRANS-MITTING HEADING	Caution	B	HDG information is lost or invalid.	Check connection to sensor.

*1: The transfer of responsibility is allowed. See the next page regarding the Responsibility Transfer Alert.

*2: The temporary silence is allowed by inputting ACN sentence.

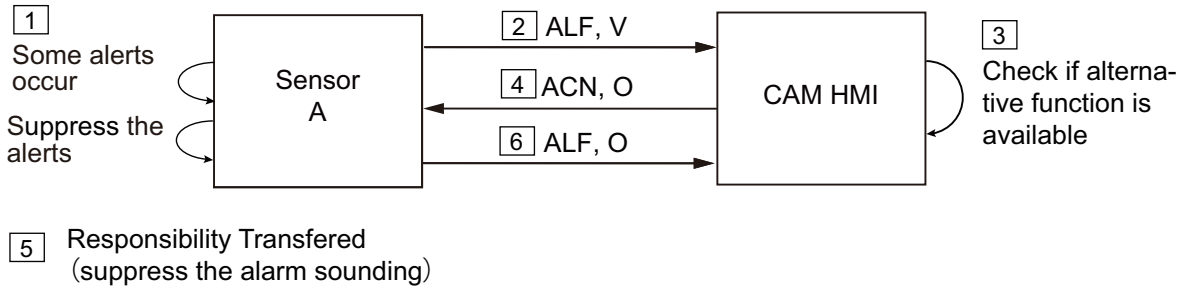
*3: The number in the brackets shows the alert instance.

Responsibility Transfer

IEC62923 requires the use of the “responsibility transfer” function to reduce unnecessary alerts when some alternative function is available.

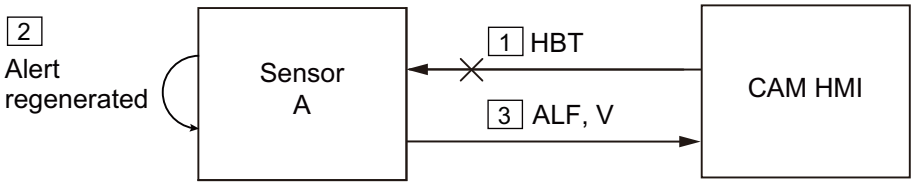
Below is the responsibility transfer flow in text and figure.

1. Warning is generated.
2. This equipment sends ALF with a state of “V” (active unacknowledged) to CAM.
3. CAM Checks if any alternative function is available.
4. CAM HMI sends “responsibility transfer command” ACN,O.
5. Alarm sound is suppressed and alert changes to responsibility transferred state.
6. ALF with a state of “O” (active responsibility transferred) is sent to CAM.



Cancel Responsibility Transfer

1. CAM HMI does not send HBT sentence to Sensor A in specified time-out period.
2. Sensor A regenerates the warning.
3. It sends ALF with a state of “V” (active unacknowledged) to CAM HMI.
   Note the following concerning Responsibility Transfer:
   - When a Responsibility Transferred alert is acknowledged, the alert state becomes “Acknowledged.”
   - When the cause of a Responsibility Transferred alert is resolved, the alert state becomes “Normal.”
   - Category A alerts reject Responsibility Transfer. (ARC sentence is sent.)



When selecting Legacy ED.1/Legacy ED.2

Alert ID	Displayed message	Priority	Meaning	Measures
1	TX MALFUNCTION	Warning	Transmission stopped due to a failure.	Check antenna and FA-170 connections. Check that the own ship MMSI is set. Consult your dealer if the problem is not rectified.

Alert ID	Displayed message	Priority	Meaning	Measures
2	ANTENNA VSWR EXCEEDS LIMIT	Warning	High VSWR for the AIS antenna detected.	Check the antenna. Consult your dealer if the problem is not rectified.
3	RX CHANNEL 1 MALFUNCTION	Warning	RX1 failure.	Circuit board may be damaged. Contact your dealer.
4	RX CHANNEL 2 MALFUNCTION	Warning	RX2 failure.	
5	RX CHANNEL 70 MALFUNCTION	Warning	Failed to receive DSC message.	
7	UTC SYNC INVALID	Warning	No synchronization with UTC.	Internal GNSS has no fix. Check weather and surroundings for obstacles. If the error appears frequently, contact your dealer.
8	MKD CONNECTION LOST	Warning	Communication failure between the transponder and the monitor unit.	Check connection between units. Consult your dealer if the problem is not rectified.
9	INT/EXT GNSS POSITION MISMATCH	Warning	Mismatch of position data between internal GNSS and external GNSS. After taking into account the antenna position, there is a difference of over 100 m.	Check calibration and location setting for both GNSS antennas.
10	NAV STATUS INCORRECT	Warning	Mismatch between ship's speed and [NAVSTATUS] information.	Check [NAV STATUS] menu settings. Adjust settings appropriately.
11	HEADING SENSOR OFFSET	Warning	Mismatch between COG and HDT. There is a difference of over 45° for more than five minutes at a speed of over five knots.	Check connection to sensor.
14	ACTIVE LOCATING DEVICE	Warning	AIS-SART, AIS-MOB, EPRIB-AIS message received.	Check the message.
25	EXTERNAL EPFS LOST	Warning	Signal from external navigational aids lost or interrupted.	Check connection to EPFS devices.
26	NO POSITION SENSOR IN USE	Warning	No position data available.	Check connection to sensor.
29	NO VALID SOG INFORMATION	Warning	SOG information is invalid.	
30	NO VALID COG INFORMATION	Warning	COG information is invalid.	
32	HEADING LOST / INVALID	Warning	HDG information is lost or invalid.	
35	NO VALID ROT INFORMATION	Warning	No ROT information available.	

APPENDIX 3 PARTS LIST/LOCATION

Parts List

This equipment contains complex modules in which fault diagnosis and repair down to component level are not practical (IMO A.694(17)/8.3.1). Only some discrete components are used. FURUNO Electric Co., Ltd. believes identifying these components is of no value for shipboard maintenance; therefore, they are not listed in the manual. Major modules can be located on the parts location photo on the following pages.

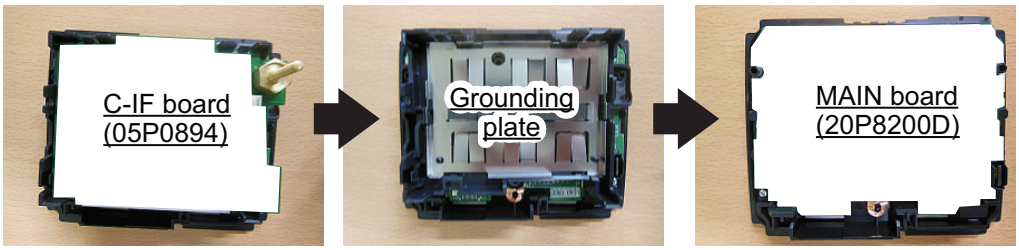
F U R U N O ELECTRICAL PARTS LIST	Model	FA-170
	Unit	MONITOR UNIT, TRANSPONDER UNIT
	Blk.No.	

TYPE, NAME	LOCATION
PRINTED CIRCUIT BOARD	
20P8200D, MAIN	MONITOR UNIT FA-1702
05P0894, C-IF	MONITOR UNIT FA-1702
05P0893, TRX-PWR	TRANSPONDER UNIT FA-1701
05P0891, T-IF	TRANSPONDER UNIT FA-1701
20P8211, GPS	TRANSPONDER UNIT FA-1701
05P0892, R-MOD	TRANSPONDER UNIT FA-1701

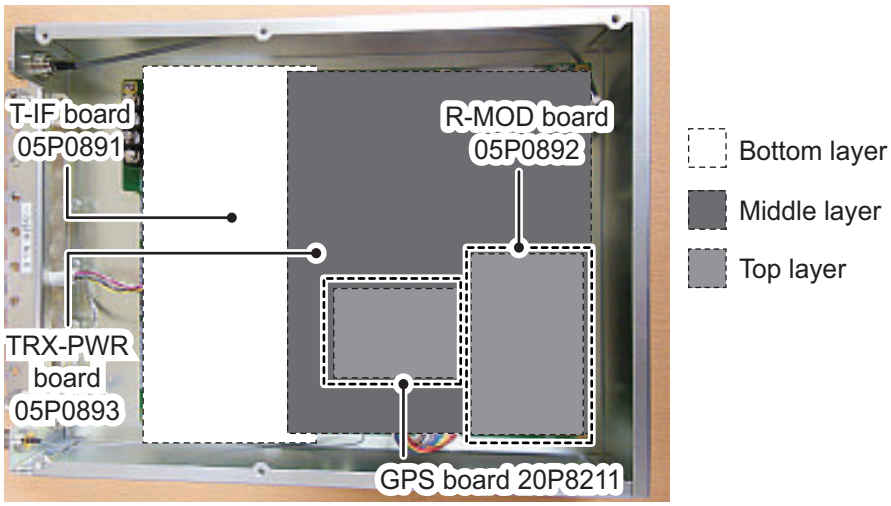
Parts Location

Monitor Unit

Remove the C-IF board, then remove the grounding plate to expose the main board.



Transponder unit



APPENDIX 4 CHANNEL LISTS AND ERI CODES

International mode VHF channel list

Ch No.	Freq.	Ch No.	Freq.	Ch No.	Freq.	Ch No.	Freq.
1001	156.05	1065	156.275	1088	157.425	2024	161.8
1002	156.1	1066	156.325	2001	160.65	2025	161.85
1003	156.15	67	156.375	2002	160.7	2026	161.9
1004	156.2	68	156.425	2003	160.75	2027	161.95
1005	156.25	69	156.475	2004	160.8	2028	162
6	156.3	70	156.525	2005	160.85	2060	160.625
1007	156.35	71	156.575	2007	160.95	2061	160.675
1018	156.9	72	156.625	8	156.4	2062	160.725
1019	156.95	73	156.675	9	156.45	2063	160.775
1020	157	74	156.725	10	156.5	2064	160.825
1021	157.05	75	156.775	11	156.55	2065	160.875
1022	157.1	76	156.825	12	156.6	2066	160.925
1023	157.15	77	156.875	13	156.65	2078	161.525
1024	157.2	1078	156.925	14	156.7	2079	161.575
1025	157.25	1079	156.975	15	156.75	2080	161.625
1026	157.3	1080	157.025	16	156.8	2081	161.675
1027	157.35	1081	157.075	17	156.85	2082	161.725
1028	157.4	1082	157.125	2018	161.5	2083	161.775
1060	156.025	1083	157.175	2019	161.55	2084	161.825
1061	156.075	1084	157.225	2020	161.6	2085	161.875
1062	156.125	1085	157.275	2021	161.65	2086	161.925
1063	156.175	1086	157.325	2022	161.7	2087	161.975
1064	156.225	1087	157.375	2023	161.75	2088	162.025

USA mode VHF channel list

Ch No.	Freq.	Ch No.	Freq.	Ch No.	Freq.	Ch No.	Freq.
1001	156.05	1065	156.275	1088	157.425	2024	161.8
		1066	156.325	2001	160.65	2025	161.85
1003	156.15	67	156.375	2002	160.7	2026	161.9
		68	156.425	2003	160.75	2027	161.95
1005	156.25	69	156.475	2004	160.8	2028	162
6	156.3	70	156.525	2005	160.85	2060	160.625
1007	156.35	71	156.575	2007	160.95	2061	160.675
1018	156.9	72	156.625	8	156.4	2062	160.725
1019	156.95	73	156.675	9	156.45	2063	160.775
1020	157	74	156.725	10	156.5	2064	160.825
1021	157.05	75	156.775	11	156.55	2065	160.875
1022	157.1	76	156.825	12	156.6	2066	160.925
1023	157.15	77	156.875	13	156.65	2078	161.525
1024	157.2	1078	156.925	14	156.7	2079	161.575
1025	157.25	1079	156.975	15	156.75	2080	161.625
1026	157.3	1080	157.025	16	156.8	2081	161.675
1027	157.35	1081	157.075	17	156.85	2082	161.725
1028	157.4	1082	157.125	2018	161.5	2083	161.775
		1083	157.175	2019	161.55	2084	161.825
1061	156.075	1084	157.225	2020	161.6	2085	161.875
		1085	157.275	2021	161.65	2086	161.925
1063	156.175	1086	157.325	2022	161.7	2087	161.975
1064	156.225	1087	157.375	2023	161.75	2088	162.025

Note: 1 W power on CH13 and CH67.

ERI Codes

ERI code			AIS code	
Full code	U	Ship name (EN)	First digit	Second digit
8000	No	VESSEL., TYPE UNKNOWN	9	9
8010	V	MOTOR FREIGHTER	7	9
8020	V	MOTOR TANKER	8	9
8021	V	MOTOR TANKER, LIQUID CARGO, TYPE N	8	0
8022	V	MOTOR TANKER, LIQUID CARGO, TYPE C	8	0
8023	V	MOTOR TANKER, DRY CARGO AS IF LIQUID (E.G. CEMENT)	8	9
8030	V	CONTAINER VESSEL	7	9
8040	V	GAS TANKER	8	0
8050	C	MOTOR FREIGHTER, TUG	7	9
8060	C	MOTOR TANKER, TUG	8	9
8070	C	MOTOR FREIGHTER WITH ONE OR MORE SHIPS ALONGSIDE	7	9
8080	C	MOTOR FREIGHTER WITH TANKER	8	9
8090	C	MOTOR FREIGHTER PUSHING ONE OR MORE FREIGHTERS	7	9
8100	C	MOTOR FREIGHTER PUSHING AT LEAST ONE TANK-SHIP	8	9
8110	No	TUG, FREIGHTER	7	9
8120	No	TUG, TANKER	8	9
8130	C	TUG, FREIGHTER, COUPLED	3	1
8140	C	TUG, FREIGHTER/TANKER, COUPLED	3	1
8150	V	FREIGHTBARGE	9	9
8160	V	TANKBARGE	9	9
8161	V	TANKBARGE, LIQUID CARGO, TYPE N	9	0
8162	V	TANKBARGE, LIQUID CARGO, TYPE C	9	0
8163	V	TANKBARGE, DRY CARGO AS IF LIQUID (E.G. CEMENT)	9	9
8170	V	FREIGHTBARGE WITH CONTAINERS	8	9
8180	V	TANKBARGE, GAS	9	0
8210	C	PUSHTOW, ONE CARGO BARGE	7	9
8220	C	PUSHTOW, TWO CARGO BARGES	7	9
8230	C	PUSHTOW, THREE CARGO BARGES	7	9
8240	C	PUSHTOW, FOUR CARGO BARGES	7	9
8250	C	PUSHTOW, FIVE CARGO BARGES	7	9
8260	C	PUSHTOW, SIX CARGO BARGES	7	9
8270	C	PUSHTOW, SEVEN CARGO BARGES	7	9
8280	C	PUSHTOW, EIGHT CARGO BARGES	7	9
8290	C	PUSHTOW, NINE CARGO BARGES	7	9
8310	C	PUSHTOW, ONE TANK/GAS BARGE	8	0
8320	C	PUSHTOW, 2 BARGES AT LEAST ONE TANKER/GAS BARGE	8	0
8330	C	PUSHTOW, 3 BARGES AT LEAST ONE TANKER/GAS BARGE	8	0
8340	C	PUSHTOW, 4 BARGES AT LEAST ONE TANKER/GAS BARGE	8	0
8350	C	PUSHTOW, 5 BARGES AT LEAST ONE TANKER/GAS BARGE	8	0
8360	C	PUSHTOW, 6 BARGES AT LEAST ONE TANKER/GAS BARGE	8	0
8370	C	PUSHTOW, 7 BARGES AT LEAST ONE TANKER/GAS BARGE	8	0
8380	C	PUSHTOW, 8 BARGES AT LEAST ONE TANKER/GAS BARGE	8	0
8390	C	PUSHTOW, 9 OR MORE BARGES AT LEAST ONE TANKER/GAS BARGE	8	0
8400	V	TUG, SINGLE	5	2
8410	No	TUG, ONE OR MORE TOWS	3	1
8420	C	TUG, ASSISTING A VESSEL OR LINKED COMBINATION	3	1
8430	V	PUSHBOAT, SINGLE	9	9
8440	V	PASSENGER SHIP, FERRY, CRUISE SHIP, RED CROSS SHIP	6	9
8441	V	FERRY	6	9
8442	V	RED CROSS SHIP	5	8
8443	V	CRUISE SHIP	6	9
8444	V	PASSENGER SHIP WITHOUT ACCOMMODATION	6	9
8450	V	SERVICE VESSEL, POLICE PATROL, PORT SERVICE	9	9
8460	V	VESSEL, WORK MAINTENANCE CRAFT, FLOATING DERRICK, CABLE SHIP, BUOY SHIP, DREDGE	3	3
8470	C	OBJECT, TOWED, NOT OTHERWISE SPECIFIED	9	9
8480	V	FISHING BOAT	3	0
8490	V	BUNKERSHIP	9	9
8500	V	BARGE, TANKER, CHEMICAL	8	0
8510	C	OBJECT, NOT OTHERWISE SPECIFIED	9	9
1500	V	GENERAL CARGO VESSEL MARITIME	7	9
1510	V	UNIT CARRIER MARITIME	7	9
1520	V	BULK CARRIER MARITIME	7	9
1530	V	TANKER	8	0
1540	V	LIQUIFIED GAS TANKER	8	0
1850	V	PLEASURE CRAFT, LONGER THAN 20 METRES	3	7
1900	V	FAST SHIP	4	9
1910	V	HYDROFOIL	4	9

Note: ERI codes 8070, 8440 and 8460 are displayed in abbreviated format.

APPENDIX 5 ABBREVIATIONS, UNITS AND SYMBOLS

Numerical abbreviations

Abbreviation	Meaning	Abbreviation	Meaning
2D	Two Dimensional Positioning	3rd	Third
3D	Three Dimensional Positioning	4th	Fourth
1st	First	5th	Fifth
2nd	Second	6th	Sixth

A:

Abbreviation	Meaning	Abbreviation	Meaning
ACK	Acknowledge	ANT	Antenna
AGE	Time elapsed from acquisition.	APR	April
AIS	Automatic Identification System	AtoN	Aids to Navigation
		AUG	August
ALARM	Alarm	AUTO	Automatic
ALT	Altitude		

B:

Abbreviation	Meaning	Abbreviation	Meaning
BAM	Bridge Alert Management	BRG	Bearing
BASE	Base Station	BRILL	Brilliance
baud	Baud rate	BS	Beam of ship, Back Space, Base Station
BC	Beam of convoy		

C:

Abbreviation	Meaning	Abbreviation	Meaning
CAM	Central Alert Management	CH	Channel
CONT	Contrast	COG	Course Over the Ground
CPA	Closest Point of Approach	COM, COMM	Communication
CPU	Central Processing Unit		

D:

Abbreviation	Meaning	Abbreviation	Meaning
D2D	Differential and 2D	DGNSS	Differential GNSS
D3D	Differential and 3D	DGPS	Differential GPS
DATE	Date	DIFF	Difference
DAY	Day	DISP	Display
DEC	December	DNGR	Danger
DEL	Delete	DOP	Dilution Of Precision
DEST	Destination	DPTH	Depth
DG	Dangerous Goods	DSC	Digital Selective Calling

E:

Abbreviation	Meaning	Abbreviation	Meaning
E	East	ENI	Unique European Vessel Identification Number
EA	Extension A	ENT	Enter
EB	Extension B	EPIRB	Emergency Position Indicating Radio Beacon
EC	Extension C	EPFS	Electronic Position Fixing System
ECDIS	Electronic Chart Display Information System		
EMMA	European Multiservice Meteorological Awareness system	ERI	Electronic Reporting International (ship type) code
		ESC	Escape
		ETA	Estimated Time of Arrival
		EXT	External

F:

Abbreviation	Meaning	Abbreviation	Meaning
FEB	February	FL	Flood
FI	Fire in the forests	FO	Fog
FIX	Fix	FUNC	FUNCTION

G:

Abbreviation	Meaning	Abbreviation	Meaning
GNSS	Global Navigation Satellite System	GPS	Global Positioning System

H:

Abbreviation	Meaning	Abbreviation	Meaning
H	Height	HMI	Human machine interface
HDG	Heading	HS	Harmful Substances (applies to AIS)
HDT	Data sentence (Heading-true)		
HECT	Hectometer	HSC	High Speed Craft
HI	High		

I:

Abbreviation	Meaning	Abbreviation	Meaning
ID	Identification	INFO	Information
IEC	International Electrotechnical Commission	INT	Internal
IF	Interface	I/O	Input/Output
IFM	International Function Message	IP	Internet Protocol (Address)
IMO	International Maritime Organization	ISO	International Standards Organization

J:

Abbreviation	Meaning	Abbreviation	Meaning
JAN	January	JUN	June
JUL	July		

L:

Abbreviation	Meaning	Abbreviation	Meaning
L	Low, left	LO	Low
LAN	Local Area Network	LOG	Log
LAT	Latitude	LON	Longitude
LC	Length of convoy	LR	Long Range
LCD	Liquid Crystal Display	LS	Length of ship
L/L	Latitude/Longitude	LT	Local Time
LL	Latitude/Longitude		

M:

Abbreviation	Meaning	Abbreviation	Meaning
MAR	March	MMSI	Maritime Mobile Services Identity number
MAX	Maximum	MP	Maritime Pollutant (applies to AIS)
MAY	May		
MENU	Menu	MPU	Micro processing Unit
MIN	Minimum	MSG	Message
MKD	Minimum Keyboard Display	MOB	Man Overboard

N:

Abbreviation	Meaning	Abbreviation	Meaning
N	North	NIGHT	Night
NAME	Name	NG	No Good
NAV	Navigation	NO.	Number
NAV STATUS	Navigational status	NOV	November
NE	Northeast	NW	Northwest

O:

Abbreviation	Meaning	Abbreviation	Meaning
OCT	October	ON	On
OFF	Off	OS	Other Substances, Own Ship
OK	O.K.		

P:

Abbreviation	Meaning	Abbreviation	Meaning
PA	Position Accuracy	PORT	Port
PI	Position Indicator	POSN	Position
PLL	Phase Locked Loop	PWR	Power

R:

Abbreviation	Meaning	Abbreviation	Meaning
RA	Rain	ROM	Read Only Memory
RAIM	Receiver Autonomous Integrity Monitoring	ROM(M)	ROM (Monitor Unit)
		ROM(T)	ROM (Transponder Unit)
RAIN	Rain	ROT	Rate Of Turn
RAM	Random Access Memory	RSSI	Received Signal Strength Indication
RAM(M)	RAM (Monitor Unit)		
RAM(T)	RAM (Transponder Unit)	RTA	Requested Time of Arrival
RFM	Regional Function Message	RX	Receive
RNG	Range		

S:

Abbreviation	Meaning	Abbreviation	Meaning
S	South	SFI	System Function ID
SAR	Search And Rescue	SIM	Simulation
SART	Search And Rescue Transponder	SN	Snow and Ice
SART ACT.	SART active	SOG	Speed Over the Ground
SE	Southeast	SOLAS	Safety Of Life At Sea
SEP	September	STW	Speed Through the Water
SET	Set (i.e., set and drift, or setting a value)	SW	Southwest, Switch
		SYNC	Synchronization

T:

Abbreviation	Meaning	Abbreviation	Meaning
TCPA	Time to Closest Point of Approach	TOW	Vessel engaged in towing operations
TEST	Test	TRANS	Transition
TH	Thunderstorm	TRX	Transceiver
TI	Turn rate Indicator	TX	Transmit
TIME	Time		

U:

Abbreviation	Meaning	Abbreviation	Meaning
UN/ LOADED	LOADED or UNLOADED	UTC	Universal Coordinated Time

V:

Abbreviation	Meaning	Abbreviation	Meaning
VHF	Very High Frequency	VSWR	Voltage Standing Wave Ratio

W:

Abbreviation	Meaning	Abbreviation	Meaning
W	West, Wide	WI	Wind
WARNING	Warning	WIG	Wing In Ground

Units

Abbreviation	Unit	Abbreviation	Unit
°	degree(s)	kn	knot(s)
°C	degree(s)	kbps	kilo bit per second
bps	bit per second	l/m^2h	liter per square meter hour
cm	centimeter	m	meter
cm/h	centimeter per hour	min	minute(s)
dm	decimeter	msec	millisecond
hr	Hour(s)	NM	nautical mile(s)
km	kilometer	s	second(s)
km/h	kilometer per hour		

Symbols

Symbol	Description	Symbol	Description
	Own ship symbol		AIS AtoN (physical)
	Selected target		AIS AtoN (virtual)
	Unselected target		Locating device (AIS-SART, AIS-MOB, EPIRB-AIS)
	AIS Base Station		SAR vessel
	SAR aircraft		

APPENDIX 6 RADIO REGULATORY INFORMATION

USA-Federal Communications Commission (FCC)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Caution: Exposure to Radio Frequency Radiation
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65.
- This equipment should be installed and operated keeping the radiator at least 9 cm or more away from person's body.
- This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Canada-Industry Canada (IC)

Caution: Exposure to Radio Frequency Radiation
This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment should be installed and operated keeping the radiator at least 9 cm or more away from person's body.

Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contr êolé et respecte les règles d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement doit etre installé et utilise en gardant une distance de 9 cm ou plus entre le dispositif rayonnant et le corps.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

SPECIFICATIONS OF U-AIS TRANSPONDER
FA-170

1 TRANSPONDER UNIT

1.1	TX/RX frequency	156.025 MHz to 162.025 MHz
1.2	Class of emission	F1B
1.3	Output power	1 W or 12.5 W selectable
1.4	Impedance	50 ohms
1.5	DSC receiver	CH70 fixed, 156.525 MHz
1.6	Bandwidth	25 kHz

2 MONITOR UNIT

2.1	Screen	4.3-inch color LCD, 480 x 272 dots (WQVGA)
2.2	Brilliance control	18 steps
2.3	Visible distance	0.7 m nominal
2.4	Buzzer volume	75 to 85 dB (A)

3 GNSS RECEIVER

3.1	Receiving frequency	1575.42 MHz (GPS), 1602.5625 MHz (GLONASS)
3.2	Tracking code	C/A code (GPS), L1OF (GLONASS)
3.3	Number of channel	GPS: 12 channels parallel, 12 satellites
		GLONASS: 10 channels parallel, 10 satellites
3.4	Accuracy (dependent on ionospheric activity and multipath)	
	GPS	13 m max. (2drms、HDOP < 4)
	DGPS	5 m max. (2drms、HDOP < 4)
3.5	Tracking speed	1000 kn
3.6	Position fixing time	Cold start: 90 s approx.
3.7	Position update interval	1 second typical
3.8	DGPS data receiving	RTCM SC-104 ver-2.1

4 INTERFACE

4.1	Number of ports	
	Serial	6 ports, IEC61162-1 Ed.5 or IEC61162-2 Ed.1
	Sensor input	3 port, IEC61162-1 Ed.5, 4800 bps
	Alarm I/O	1 port, Contact closure (normal close or open),
		Output level: 50 V, 80 mA max.
	LAN	1 port, Ethernet, 100Base-TX, RJ45 connector, Auto MDI/MDIX,
		for IEC61162-450 Ed.2
	BLUESIGN input	1 port, Relay contact
4.2	Data sentences	IEC61162-1/2/450
	Input	ABM, ACA, ACK, ACM, ACN, AIQ, AIR, BBM, DTM, EPV, GBS, GGA, GLL, GNS, HBT, HDT, LRF, LRI, OSD, PIWWIVD, PIWWSPW, PIWWSSD, PIWWVSD, RMC, ROT, SPW, SRP, SSA, SSD, THS, VBW, VSD, VTG

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	Output	ABK, ACA, ACS, ALC, ALF, ALR, ARC, EPV, HBT, HDT, LR1, LR2, LR3, LRF, LRI, NAK, PIWWIVD, PIWWSRP, PIWWSSD, PIWWVSD, ROT, SRP, SSD, THS, TRL, TXT, VER, VDM, VDO, VSD Note 1: SPW is input only from serial ports. Note 2: HDT, ROT and THS are output only from serial ports. Note 3: SRP is output from NETA in transmission group
4.3	Proprietary sentences (output only)	
	PFEC	LBK, AIcmd, idatr, ident, idfnc, pidat, pireq
4.4	IEC61162-450 transmission group	
	Input	MISC, TGTD, SATD, NAVD, BAM1, BAM2, CAM1, CAM2, NETA, PROP
	Output	Arbitrary (default: TGTD)
4.5	Network function (except IEC61162-450)	
	Data format	SNMP, HTTP, Syslog, Furuno Management Protocol (FMP)
	Data sentences	same as 4.2 sentences (FMP)

5 POWER SUPPLY

5.1	Transponder unit	12-24 VDC: 6-3 A
5.2	Monitor unit	12 VDC: 0.3 A max. (supplied from transponder unit)
5.3	AC/DC power supply unit (option)	
	PR-240	100-115/200-230 VAC, 1 phase, 50/60 Hz
	PR-241	100-230 VAC, 1 phase, 50-60 Hz

6 ENVIRONMENTAL CONDITIONS

6.1	Ambient temperature	
	Combined antenna (VHF antenna excluded)	-25°C to +70°C
	GNSS antenna unit	-25°C to +70°C
	Other units	-15°C to +55°C
6.2	Relative humidity	93% or less at +40°C
6.3	Degree of protection	
	Combined antenna	IP56
	Transponder unit	IP20, IP22 (bulkhead mount)
	Monitor unit	IP22 (standard, cable protection kit), IP35 (waterproof kit) Cable protection kit/ waterproof kit: option
	Pilot plug unit	IP22 (front panel), IPX0 (chassis)
6.4	Vibration	IEC 60945 Ed.4

7 UNIT COLOR

7.1	Combined antenna	N9.5
7.2	Transponder/ Monitor unit	N2.5
7.3	Pilot plug unit	N2.5

INDEX

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Declaration of Conformity

0560

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

U-AIS TRANSPONDER FA-170
(Serial No.1000-42xx/60xx-xxxx)

(Model name, type number)

to which this declaration relates conforms to the following standard(s) or normative document(s)

IMO Resolution A.694 (17)	IEC 61993-2 Ed.3.0: 2018
IMO Resolution MSC.36 (63)	IEC 61108-1 Ed.2.0: 2003, IEC 61108-2 Ed.1.0: 1998
IMO Resolution MSC.97 (73)	IEC 61162-1 Ed.5.0: 2016, IEC 61162-2 Ed.1.0: 1998
IMO Resolution MSC.191 (79)	IEC 61162-450 Ed.2.0: 2018
IMO Resolution MSC.302(87)	IEC 62288 Ed.2.0: 2014
IMO Resolution MSC.74(69)	IEC 60945 Ed.4.0: 2002 incl. Corr. 1, 2008
ITU-R M.1371-5	IEC 62923-1/2 Ed.1.0: 2018
	CCNR Test standard Inland AIS Ed.2.0: 2012

(title and/or number and date of issue of the standard(s) or other normative document(s))

For assessment, see

- EC type examination (Module B) certificate No. MEDB00000EV Rev.2 issued by DNV GL AS (0575), Norway.
- Product Quality System (Module D) certificate No. P 112 (Issue 62) issued by Telefication, The Netherlands.

This declaration is issued according to the Directive 2014/90/EU of the European Parliament and of the Council on marine equipment, and the Implementing Regulation (EU) 2021/1158.

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
23 December 2021

(Place and date of issue)

Akihiko Kanechika
Department General Manager
Quality Assurance Department

(name and signature or equivalent marking of authorized person)