

FURUNO

U-AIS TRANSPONDER

Model **FA-150**



FA-150 OPERATOR'S MANUAL

FURUNO ELECTRIC CO., LTD.

ECF

(Elemental Chlorine Free)

The paper used in this manual is elemental chlorine free.

FURUNO ELECTRIC CO., LTD.

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FURUNO Authorized Distributor/Dealer

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 **FURUNO ELECTRIC CO., LTD.**

www.furuno.com

IMPORTANT NOTICES

General

- The operator of this equipment must read and follow the descriptions in this manual. Wrong operation or maintenance can cancel the warranty or cause injury.
- Do not copy any part of this manual without written permission from FURUNO.
- If this manual is lost or worn, contact your dealer about replacement.
- The contents of this manual and equipment specifications can change without notice.
- The example screens (or illustrations) shown in this manual can be different from the screens you see on your display. The screens you see depend on your system configuration and equipment settings.
- Save this manual for future reference.
- Any modification of the equipment (including software) by persons not authorized by FURUNO will cancel the warranty.
- All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

How to discard this product

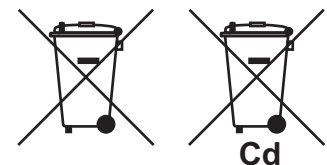
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (<http://www.eiae.org/>) for the correct method of disposal.

How to discard a used battery

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

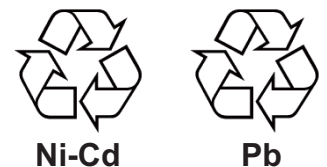
In the European Union

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



In the USA

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





In the other countries

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














SAFETY INSTRUCTIONS

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.
	The antenna emits electromagnetic radio frequency (RF) energy, which can be harmful. Distances at which RF radiation level of 100, 10 and 2 W/m ² are present are given below. 100 W/m ² : Nil 10 W/m ² : 0.1 m 2 W/m ² : 1.0 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.

 WARNING 	
<small>To avoid electrical shock, do not remove cover. No user-serviceable parts inside.</small>	
	

Name: Warning Label (1)
Type: 86-003-1011-1
Code No.: 100-236-231

PROGRAM NUMBER

PCB	Location	Program No.	Version No.	Date of Modification
CPU (24P0062)	Monitor Unit	2450024 (Prog)	01.**	
		2450020 (Boot)	01.**	
			02.**	September 2009
			02.**	
		2450021 (Prog)	04.**	August 2013
MAIN (24P0035)	Transponder Unit	2450018	01.**	
	GPS Receiver	485026	40.**	
	Transponder Unit		02.**	September 2009
			04.**	August 2013

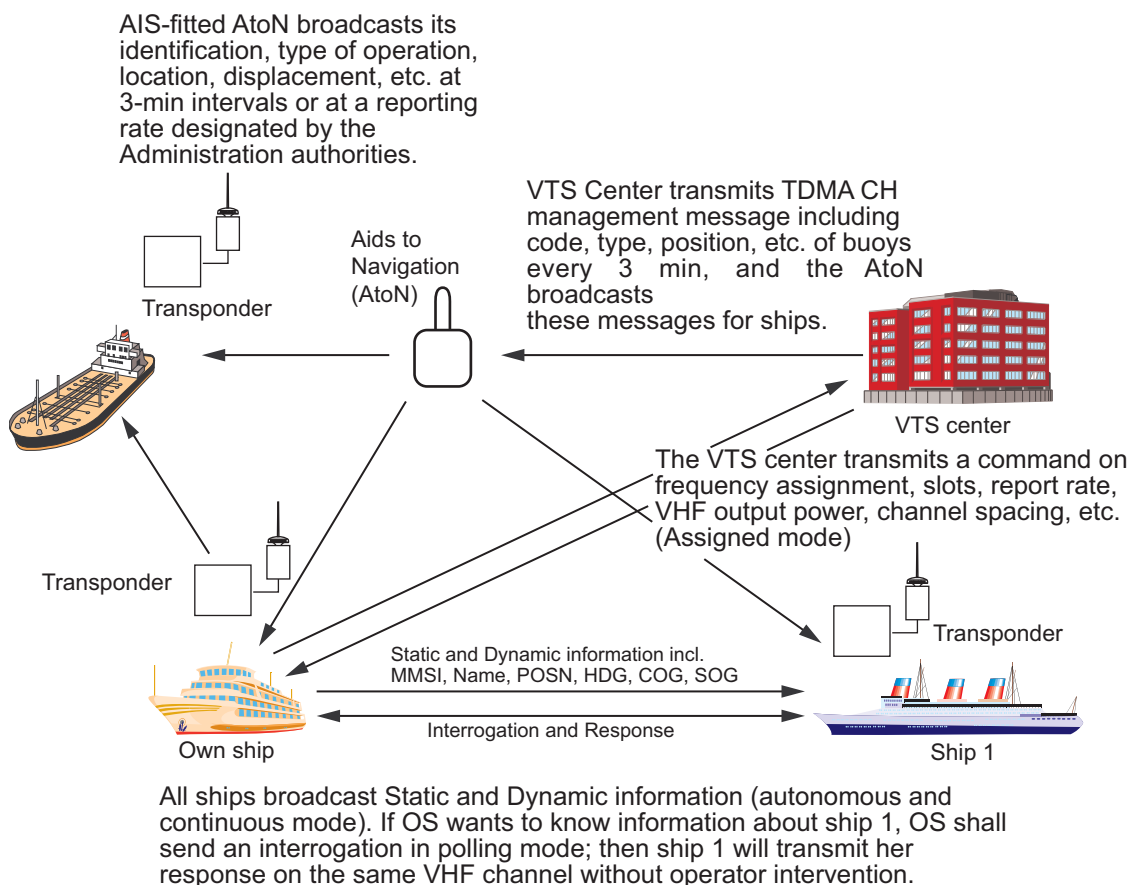
** : Minor Modifications

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 GPS 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.

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FOREWORD

A Word to the Owner of the FA-150

FURUNO Electric Company thanks you for purchasing the FA-150 UAIS 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

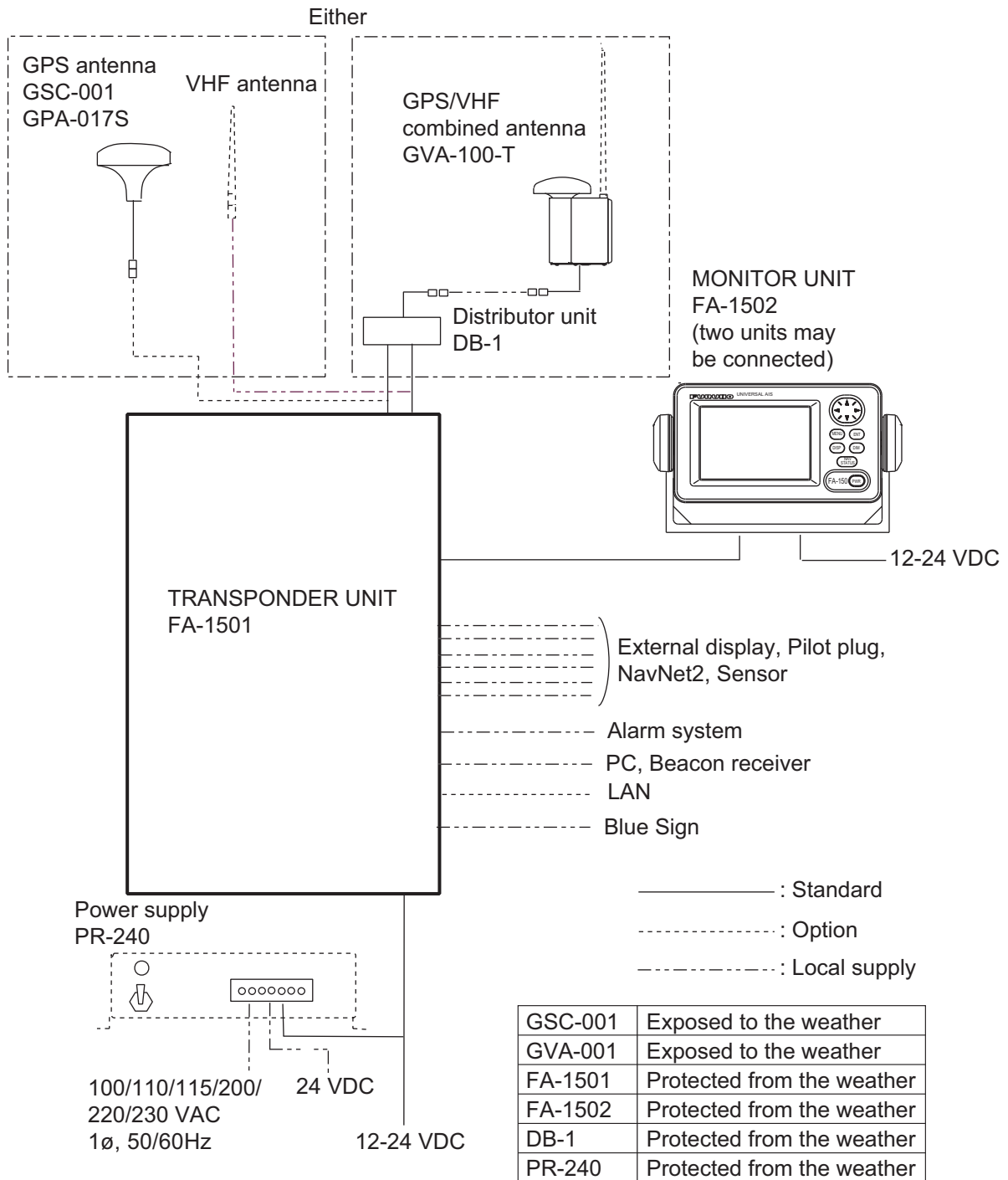
The FA-150 is a universal AIS (Automatic Identification System) for open sea and inland waterways, capable of exchanging navigation and ship data between own ship and other ships or coastal stations. It complies with IMO MSC.74(69) Annex 3, IMO MSC.302(87), A.694, ITU-R M.1371-4 and DSC ITU-R M.825. It also complies with IEC 61993-2 (Type testing standard) and IEC 60945 (EMC and environmental conditions).

The FA-150 consists of VHF and GPS 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 GPS receiver. The internal GPS 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 GPS fails.

The main features are:

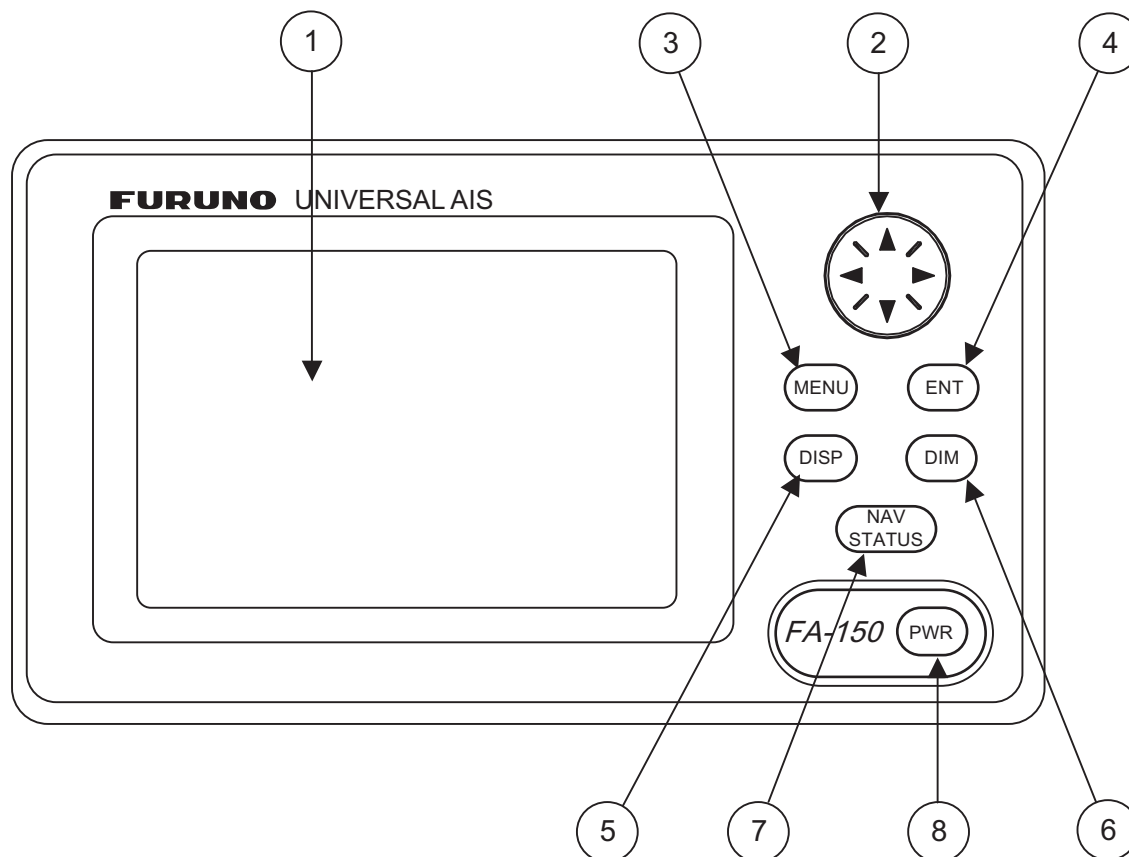
- Safety of navigation by automatically exchanging navigational data between ships and between ship and coast
- Static data:
 - MMSI (Maritime Mobile Service Identity)
 - IMO number (where available)
 - Call sign & name
 - Length and beam
 - Type of ship
 - Location of position-fixing antenna on the 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
 - Navigation 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
- GPS/VHF combined antenna for easy installation available
- CPA/TCPA alarm
- Built-in GPS 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.

SYSTEM CONFIGURATION



1. OPERATION

1.1 Description of Controls

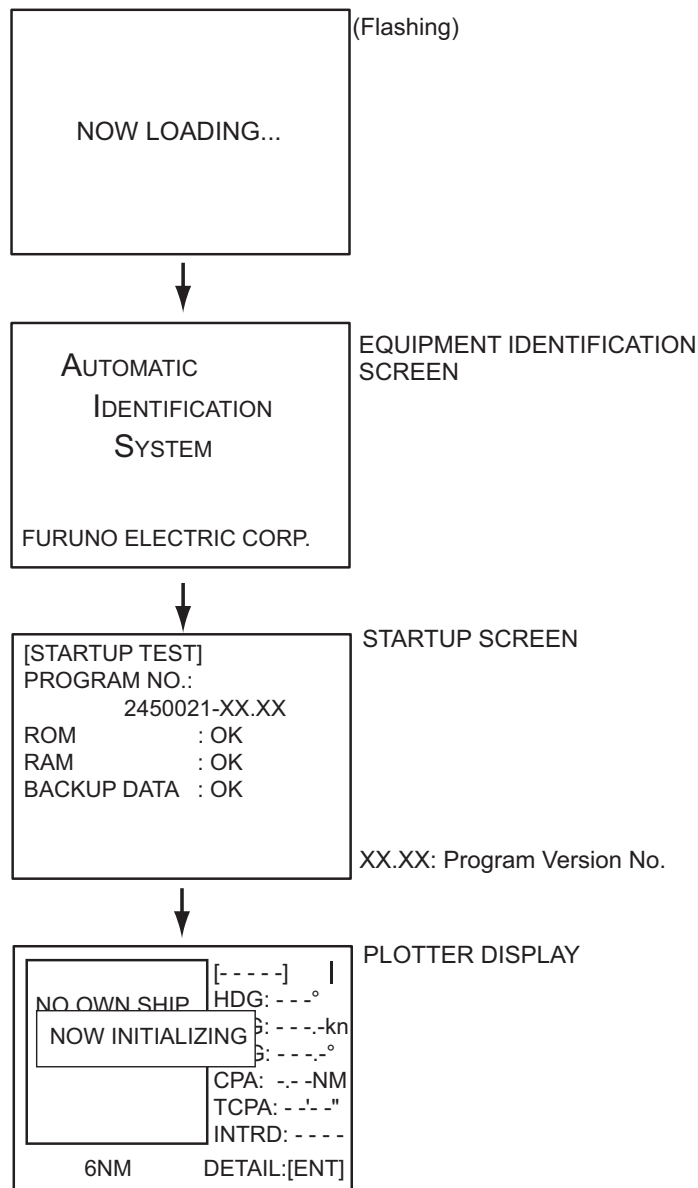


- ① LCD Screen: Displays various data.
- ② CursorPad: Shifts cursor; chooses menu items and options; selects alphanumeric data.
- ③ MENU key: Opens the menu.
- ④ ENT key: Terminates keyboard input; changes screen.
- ⑤ DISP key: Chooses a display screen; closes menu.
- ⑥ DIM key: Adjusts panel dimmer and LCD contrast.
- ⑦ NAV STATUS key: Displays NAV STATUS menu, which contains voyage-related data.
- ⑧ PWR key: Turns the power on and off.

Note: The nominal viewing distance is 50 cm.

1.2 Turning the Power On and Off

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



The startup screen displays the program version number and the results of the ROM, RAM and backup data test, showing "OK" or "NG" (No Good) as the result. If "NG" appears for any of the check result, try resetting the power to restore normal operation. If that does not work, contact your dealer for advice. After the startup test is completed the plotter display appears, showing the messages "NO OWN SHIP POSITION AVAILABLE." and "NOW INITIALIZING." These messages mean that position data has not yet arrived and the transponder is initializing itself, respectively. When both messages disappear, the equipment is ready for use. If the message "ENTER MMSI!" appears, the vessel's MMSI has not been registered in the equipment. Enter MMSI.

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 if the transponder unit is powered. Also check the connection between the monitor unit and the transponder unit.

The FA-150 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 once the source of danger has gone.

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 GPS 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 s to 3 min depending on ship's speed and course change. Voyage-related data, such as ship's draft, hazardous cargo, destination and estimated time of arrival, are transmitted at six-minute intervals.

The FA-150 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 1.7.) 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:

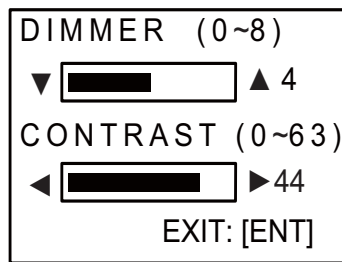
Ship's dynamic conditions and nominal reporting interval

Ship's navigation status	Nominal reporting interval
Ship at anchor or moored or aground or not under command and not moving faster than 3 kn	3 minutes
Ship at anchor or moored or aground or not under command 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

1.3 Adjusting Panel Dimmer and Contrast

The panel dimmer and display contrast may be adjusted as follows:

1. Press the **DIM** key to show the dimmer and contrast setting screen.



2. Use ▲ or ▼ to adjust the panel dimmer; ◀ or ▶ to adjust the contrast. (The default dimmer and contrast settings are 4 and 45, respectively. To restore default settings see section 3.9 Restoring Default Settings.)
3. Press the **ENT** key to close the setting screen.

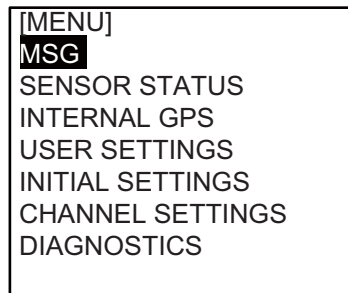
Note: If the equipment is turned off with the contrast setting of 35 or lower, the equipment will start up with the contrast setting 36 when the power is again turned on.

1.4 Menu Overview

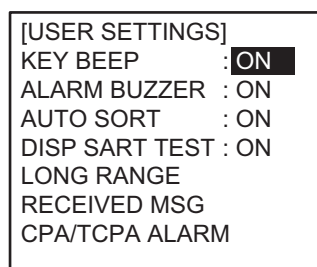
You can select the functionality of the equipment through the menu. If you get lost in operation, press the **MENU** key until you return to the main menu. The complete menu tree is provided in the Appendix.

1.4.1 Menu operating procedure

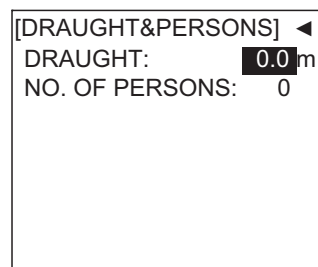
1. Press the **MENU** key to display the main menu.



2. Press **▲** or **▼** to select a menu then press the **ENT** key.
3. Press **▲** or **▼** to select a sub-menu then press the **ENT** 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.



USER SETTINGS sub-menu
(Option selection)



DRAUGHT&PERSONS input screen
(Data input)

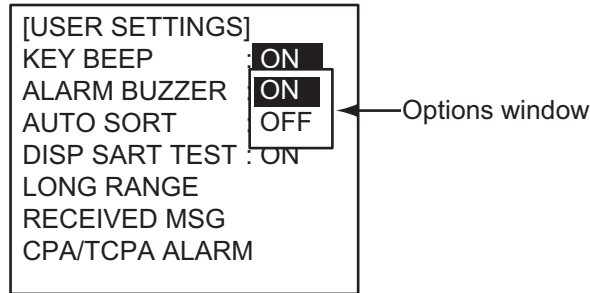
Note: For INLAND AIS mode, the [USER SETTINGS] menu has two pages. See section 2.9 to section 2.11 for your reference.

4. Press **▲** or **▼** to select a menu item then press the **ENT** key.
5. Depending on the sub-menu selected, select an option or enter alphanumeric data.

Selecting an option

The example below shows how to select an option from the [USER SETTINGS] 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.

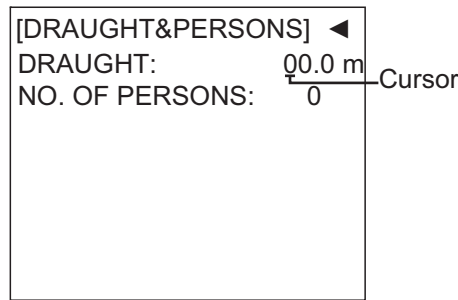


Note: For INLAND AIS mode, the USER SETTINGS menu has two pages. See section 2.9 to section 2.11.

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

Entering alphanumeric data

The example below shows how to enter numeric data on the [DRAUGHT&PERSONS] sub-menu, which is on the [NAV STATUS] menu.



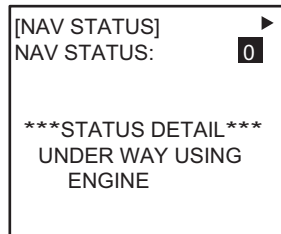
- 1) Select [DRAUGHT] and press the **ENT** key.
- 2) Press ▲ or ▼ to select appropriate numeric. Pressing ▲ displays alphanumeric characters cyclically in order of blank space, alphabet, numerals, and symbols.
- 3) Press ► to shift the cursor to the adjacent place, then use ▲ or ▼ to select alphanumeric character.
- 4) Repeat steps 2) and 3) to finish entering data. To erase a character, insert a space.
- 5) After entering all data, press the **ENT** key to register input.
6. Press the **DISP** key to close the menu.

1.5 Entering Voyage-Related Data

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

- Navigation Status
- Destination
- Cargo type
- No. of persons
- Arrival time
- Draught

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



2. If your navigation 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** key.

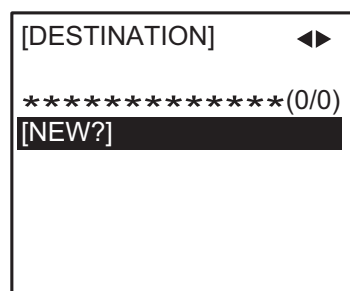
- 2) Press **▲** or **▼** to select appropriate status then press the **ENT** key. Refer to the data below to select appropriate nav status.

- 00: UNDER WAY 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: UNDER WAY SAILING
- 09: RESERVED FOR HIGH SPEED CRAFT (HSC)*¹
- 10: RESERVED FOR WING IN GROUND (WIG)*²
- 11: RESERVED FOR FUTURE USE
- 12: RESERVED FOR FUTURE USE
- 13: RESERVED FOR FUTURE USE
- 14: AIS-SART (ACTIVE)
- 15: NOT DEFINED = DEFAULT (ALSO USED BY AIS-SART 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)

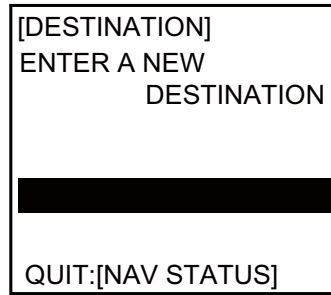
*2: RESERVED FOR FUTURE AMENDMENT OF NAVIGATIONAL STATUS FOR SHIPS CARRYING DANGEROUS GOODS (DG), HARMFUL SUBSTANCES (HS) OR MARINE POLLUTANTS (MP), OR IMO HAZARD OR POLLUTANT CATEGORY A, WING IN GRAND (WIG)

3. Press **▶** to show the [DESTINATION] sub-menu.



1. OPERATION

4. [NEW] is already selected; press the **ENT** key.

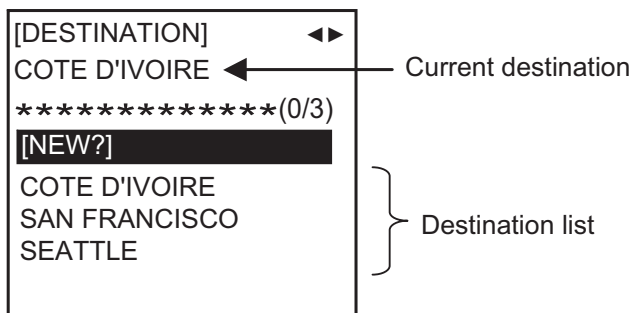


[NAV STATUS] menu, [DESTINATION] sub-menu, destination input

5. Press the **ENT** key. Enter destination then press the **ENT** key. You can use up to 20 alphanumeric characters (“\”, “^”, “!”, “,”, “\$”, and “*” count as three characters), and enter 20 destinations. (For how to enter alphanumeric characters, see "Entering alphanumeric data" on page 1-6.)

PROCESSING DESTINATIONS

If you have already registered some destinations, the DESTINATION sub-menu looks something like the one below. From this screen you can select, edit or delete destinations.



- 1) Select appropriate destination then press the **ENT** key to show the options window below.

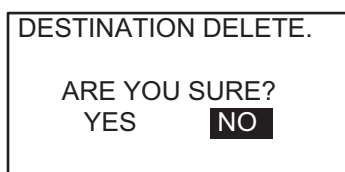


- 2) Select SELECT, EDIT or DELETE as appropriate then press the **ENT** key. Do one of the following according to your objective.

SELECT: Select a destination.

EDIT: Press the **ENT** key twice then edit the destination.

DELETE: The prompt below appears. Press ◀ to select **YES**; press the **ENT** key



6. Press ► to show the [ARRIVAL TIME] sub-menu.

[ARRIVAL TIME]	◀▶
DATE[UTC]:	25/APR
TIME[UTC]:	0:00

7. [DATE[UTC]] is already selected; press the **ENT** key.
 8. Enter the date of arrival then press the **ENT** key.
 9. [TIME[UTC]] is now selected; press the **ENT** key.
 10. Enter the estimated time of arrival, in 24-hour notation, then press the **ENT** key.
 11. Press ► to show the [CARGO TYPE] sub-menu.

[CARGO TYPE]	◀▶
TYPE NO.:	00
**** TYPE DETAIL ****	
NOT AVAILABLE	

12. [TYPE NO.] is already selected; press the **ENT** key.
 13. Select type of vessel/cargo, referring to the table on the next page, then press the **ENT** key.

Note 1: Only the second digit for the type of vessel is entered here; the first digit is entered on the [INITIAL SETTINGS] menu, during installation.

Note 2: 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, the pop-up message "CHANGE NAV STATUS?" appears and 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 any key or lower SOG below 3 knots.

1. OPERATION

10	FUTURE USE ALL SHIPS OF THIS TYPE	60	PASSENGER SHIPS ALL SHIPS OF THIS TYPE
11	FUTURE USE CARRYING DG, HS, OR MP(X)	61	PASSENGER SHIPS CARRYING DG, HS, OR MP(X)
12	FUTURE USE CARRYING DG, HS, OR MP(Y)	62	PASSENGER SHIPS CARRYING DG, HS, OR MP(Y)
13	FUTURE USE CARRYING DG, HS, OR MP(Z)	63	PASSENGER SHIPS CARRYING DG, HS, OR MP(Z)
14	FUTURE USE CARRYING DG, HS, OR MP(OS)	64	PASSENGER SHIPS CARRYING DG, HS, OR MP(OS)
15	FUTURE USE FUTURE USE	65	PASSENGER SHIPS FUTURE USE
16	FUTURE USE FUTURE USE	66	PASSENGER SHIPS FUTURE USE
17	FUTURE USE FUTURE USE	67	PASSENGER SHIPS FUTURE USE
18	FUTURE USE FUTURE USE	68	PASSENGER SHIPS FUTURE USE
19	FUTURE USE NONE	69	PASSENGER SHIPS NONE
20	WIG ALL SHIPS OF THIS TYPE	70	CARGO SHIPS ALL SHIPS OF THIS TYPE
21	WIG CARRYING DG, HS, OR MP(X)	71	CARGO SHIPS CARRYING DG, HS, OR MP(X)
22	WIG CARRYING DG, HS, OR MP(Y)	72	CARGO SHIPS CARRYING DG, HS, OR MP(Y)
23	WIG CARRYING DG, HS, OR MP(Z)	73	CARGO SHIPS CARRYING DG, HS, OR MP(Z)
24	WIG CARRYING DG, HS, OR MP(OS)	74	CARGO SHIPS CARRYING DG, HS, OR MP(OS)
25	WIG FUTURE USE	75	CARGO SHIPS FUTURE USE
26	WIG FUTURE USE	76	CARGO SHIPS FUTURE USE
27	WIG FUTURE USE	77	CARGO SHIPS FUTURE USE
28	WIG FUTURE USE	78	CARGO SHIPS FUTURE USE
29	WIG NONE	79	CARGO SHIPS NONE
30	FISHING	80	TANKER ALL SHIPS OF THIS TYPE
31	TOWING	81	TANKER CARRYING DG, HS, OR MP(X)
32	LENGTH OF THE TOW EXCEEDS 200M OR BREADTH EXCEEDS 25M	82	TANKER CARRYING DG, HS, OR MP(Y)
33	ENGAGED IN DREDGING OR UNDERWATER OPERATIONS	83	TANKER CARRYING DG, HS, OR MP(Z)
34	ENGAGED IN DIVING OPERATIONS	84	TANKER CARRYING DG, HS, OR MP(OS)
35	ENGAGED IN MILITARY OPERATIONS	85	TANKER FUTURE USE
36	SAILING	86	TANKER FUTURE USE
37	PLEASURE CRAFT	87	TANKER FUTURE USE
38	FUTURE USE	88	TANKER FUTURE USE
39	FUTURE USE	89	TANKER NONE
40	HSC ALL SHIPS OF THIS TYPE	90	OTHER TYPE OF SHIP ALL SHIPS OF THIS TYPE
41	HSC CARRYING DG, HS, OR MP(X)	91	OTHER TYPE OF SHIP CARRYING DG, HS, OR MP(X)
42	HSC CARRYING DG, HS, OR MP(Y)	92	OTHER TYPE OF SHIP CARRYING DG, HS, OR MP(Y)
43	HSC CARRYING DG, HS, OR MP(Z)	93	OTHER TYPE OF SHIP CARRYING DG, HS, OR MP(Z)
44	HSC CARRYING DG, HS, OR MP(OS)	94	OTHER TYPE OF SHIP CARRYING DG, HS, OR MP(OS)
45	HSC FUTURE USE	95	OTHER TYPE OF SHIP FUTURE USE
46	HSC FUTURE USE	96	OTHER TYPE OF SHIP FUTURE USE
47	HSC FUTURE USE	97	OTHER TYPE OF SHIP FUTURE USE
48	HSC FUTURE USE	98	OTHER TYPE OF SHIP FUTURE USE
49	HSC NONE	99	OTHER TYPE OF SHIP NONE
50	PILOT		
51	SEARCH AND RESCUE VESSELS		WIG: Wing in ground
52	TUGS		HSC: High speed craft
53	PORT TENDERS		DG: Dangerous goods
54	VESSELS WITH ANTI-POLLUTION FACILITIES OR EQUIPMENT		HS: Harmful substances
55	LAW ENFORCEMENT VESSELS		MP: Marine pollutants
56	SPARE-FOR ASSIGNMENTS TO LOCAL VESSELS		0-9: Undefined
57	SPARE-FOR ASSIGNMENTS TO LOCAL VESSELS		
58	MEDICAL TRANSPORTS		
59	SHIPS & AIRCRAFT OF STATES NOT PARTIES TO AN ARMED CONFLICT		

14. Press ► to display the [DRAUGHT&PERSONS] sub-menu.

15. [DRAUGHT] is already selected; press the **ENT** key.

16. Enter ship's draught (setting range: 0-25.5(m)) then press the **ENT** key.

17. [NO. OF PERSONS] is now selected; press the **ENT** key.

18. Enter total number of persons onboard (setting range: 0-8191) then press the **ENT** key. Enter 8191 for total greater than 8190.

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

[DRAUGHT&PERSONS] ◀
DRAUGHT: 0.0m
NO. OF PERSONS: 0

1.6 Setting CPA/TCPA

Set the CPA (Closest Point of Approach) and TCPA (Time to Closest Point of Approach) range for which you want to be alerted to AIS targets which can be on a collision course. When a ship's CPA and TCPA are lower than that set here, the buzzer sounds (if active) and the message "COLLISION ALARM" appears.

1. Press the **MENU** key to open the main menu.
2. Select [USER SETTINGS] then press the **ENT** key.
3. Select [CPA/TCPA ALARM] then press the **ENT** key.

[CPA/TCPA ALARM]

CPA : **6.00** NM

TCPA : 60 min

ALARM MODE : ON

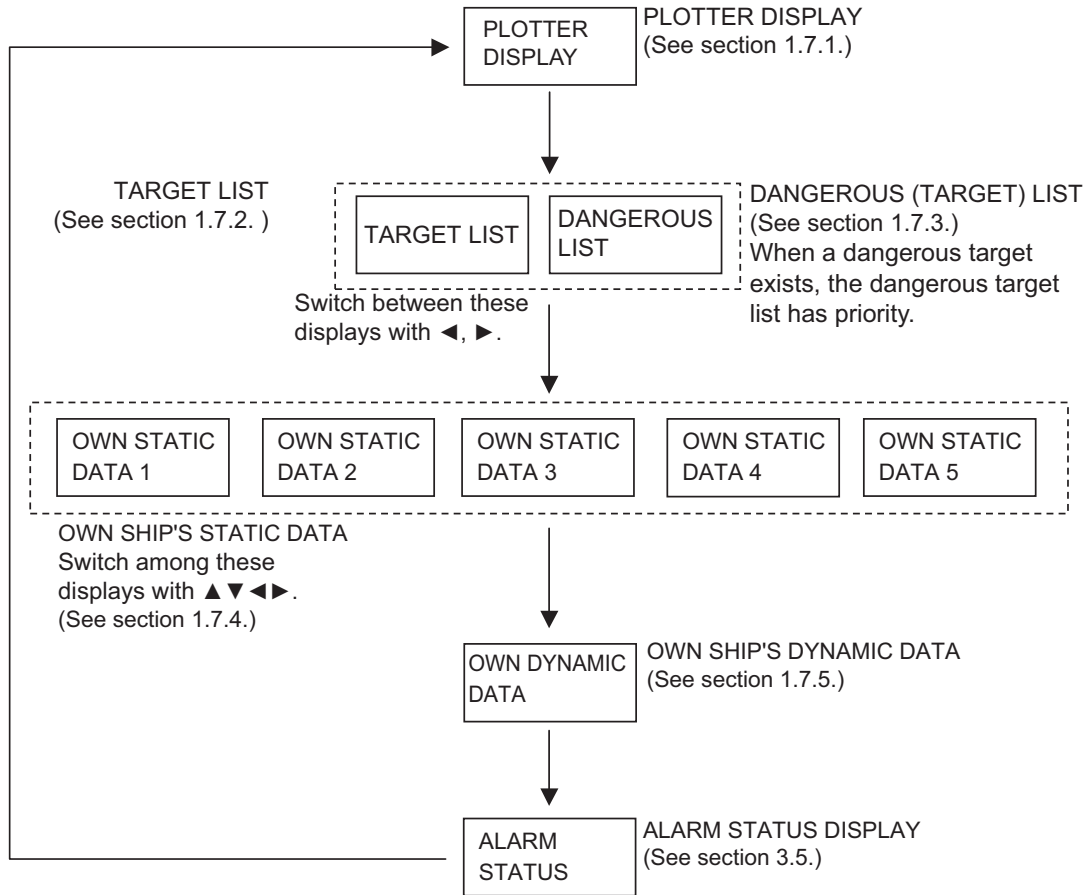
ALARM BUZZER : ON

QUIT[MENU]

4. [CPA] is already selected; press the **ENT** key.
5. Enter [CPA] (setting range: 0-6.00 NM) then press the **ENT** key.
6. [TCPA] is now selected; press the **ENT** key.
7. Enter [TCPA] (setting range: 0-60 min) then press the **ENT** key.
8. [ALARM MODE] is now selected; press the **ENT** key.
9. Select [ON] to activate the [CPA/TCPA]alarm; [OFF] to deactivate it. Press the **ENT** key.
10. [ALARM BUZZER] is now selected; press the **ENT** key.
11. Select [ON] to enable the [CPA/TCPA] audio alarm, or [OFF] to disable it. Press the **ENT** key.
12. Press the **DISP** key to close the menu.

1.7 Selecting a Display

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



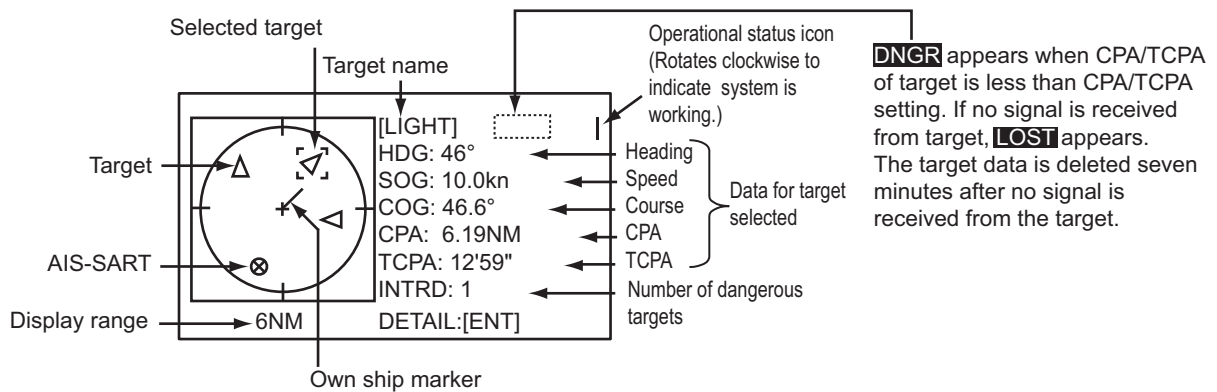
1.7.1 Plotter display

The plotter display, which automatically appears after the power-on sequence, shows the name, heading, SOG, COG, CPA and TCPA of AIS-equipped ships, AIS-SARTs, etc. within the range selected. The number of dangerous targets is also indicated.

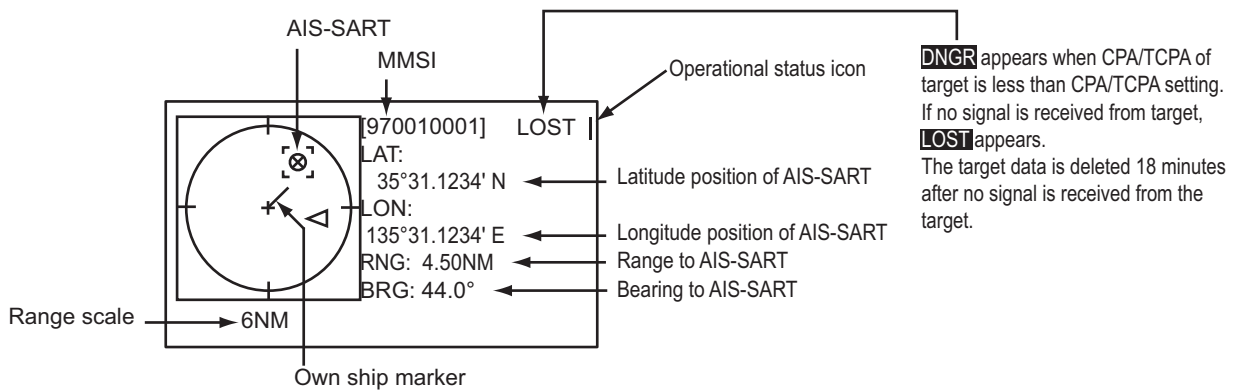
Data for ship target

A target marker (hollow triangle) indicates the presence of a vessel equipped with AIS in a certain location and course. To find detailed information about a vessel, see paragraph 1.7.2.

If two or more targets occupy a similar position, the display priority order is selected target, AIS-SART and ship target.



Data for AIS-SART



1. OPERATION

Operations on the plotter display

1. Press the **DISP** key to show the plotter display.
2. Use ▲ or ▼ to select the range. The available ranges are (in nm) 0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, and 24.
3. To find a target's data, see paragraph 1.7.2.

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 AIS-SART, 18 minutes) after no signal is received from the target.

Ship's navigation status	Target declared as lost target after;
Class A	
Ship at anchor or moored or aground or not under command and not moving faster than 3 kn	7 minutes
Ship at anchor or moored or aground or not under command and moving at more than 3 kn	50 seconds
0-14 kn speed	50 seconds
0-14 kn speed with course change	50 seconds
14-23 kn speed	30 seconds
14-23 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's CPA and TCPA are lower than set in section 1.6, the audio alarm sounds (if active). Press any key to silence the audio alarm. Take suitable measures to avoid collision.

Note 3: "DNGR" (DANGER) appears at the end of the [HDG] line when a target's CPA and TCPA are lower than the [CPA] and [TCPA] alarm settings. Further, when a target becomes a lost target, "LOST" appears at the end of the [HDG] line.

1.7.2 Target list (displaying target data)

- At the plotter display, press the **DISP** key to show the [TARGET LIST], which lists all AIS targets and AIS-SARTs being detected by the FA-150.

[TARGET LIST]				
NAME	RNG(NM)	BRG(°)	/ TIME	
☒ SART-ACT.	3.25	64.4	0	
FURUNO	2.90	276.1	0	
■ "BASE"	4.30	279.5	0	
▣ "SAR"	8.60	82.0	0	
⊕ INTREP	9.10	123.1	0	
▲ 1/10 [▼]	DTL [ENT]	DNG [▶]		

Target's name, and range and bearing (from north) from own ship to target

Target type symbols
None: Ship

- : Base station
- ▣ : SAR (Search and Rescue)
- ⊕ : AtoN (Aid to Navigation)
- ☒ : AIS-SART (Search and Rescue Transmitter)

Press ▶ to switch to DANGEROUS LIST. (See para. 1.7.3.)

Note 1: The dangerous target list appears when there are dangerous targets. You can switch to the target list by pressing ◀.

Note 2: If there is no data for the target selected, the message "NO SEL" appears. Hit any key to escape.

Note 3: Targets are automatically sorted in range order (closest to furthest) when no key is operated for 30 seconds. Target order is then updated every five seconds.

Note 4: When [AUTO SORT] on the [USER SETTINGS] menu is [OFF], the range and bearing to a target are updated. However, target order is not updated. To do this, press ◀, and targets are sorted in range order. "NOW SORTING" is shown while sorting.

Note 5: To select a target on the plotter display, press ◀ or ▶ to select the target then press the **ENT** key. Press ▶ to select from nearest to furthest; ◀ to select from furthest to nearest. The display then looks something like the one shown at the top of the next page. If you wish to see other target data, go to step 3 below.

Note 6: The information source is specified from obtained MMSI and ship's name of an AIS target.

- Use ▲ or ▼ to select the target whose data you wish to view then press the **ENT** key. The display then looks something like one of the displays shown on the next several pages, according to type of target.
- Use ▲ or ▼ to scroll the display to see other data.

1. OPERATION

Ship info display, mobile class A

[SHIP INFO] 1/7 |

MMSI [A]: 431099806 ← MMSI no.

NAME : FURUNO ← Name

CALL SIGN : ZL6DEF1 ← Call sign

IMO NO. : 12345678 ← IMO no.

CPA : 0.02 NM ← CPA

TCPA : 0'17" ← TCPA

DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. The target data is deleted seven minutes after no signal is received from the target.

[SHIP INFO] LOST 2/7 |

LAT : 34°34.1234'N ← Latitude

LON : 135°02.0908'E ← Longitude

PA: H RAIM: UNUSED ← Position Accuracy (H, High, L, Low) RAIM status (USED, UNUSED)

ELAPSED TIME: 0 min ← Elapsed time since the last position data is received

POSITION QUALITY: ← Position quality*

WITH NO TIME STAMP

*: Description of position quality

Description	Meaning
No position	Position is not available.
Manual position	Position by manual input
Dead reckoning position	Position from dead reckoning
Outdated position > 200 m	More than 200 m from estimated last position
Position > 10 m	Difference of more than 10 m of position
Position with RAIM > 10 m	Difference of more than 10 m of position
Position < 10 m	Difference of less than 10 m of position
Position with RAIM < 10 m	Difference of less than 10 m of position
Valid position with no time stamp	Time stamp is not available.

[SHIP INFO] LOST 3/7 |

SOG : 15.0 kn ← Speed over the ground

COG : 103.5° ← Course over the ground

HDG : 60° ← Heading

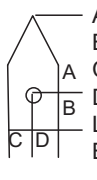
ROT : 1.9°/min ← Rate of turn

RNG : 29.99 NM ← Range from own ship

BRG : 271.8° ← Bearing from own ship

TIME STAMP: 23 ← Time stamp information

[SHIP INFO] 4/7 |



A : 100m ← Distance from bow to GPS antenna position

B : 23m ← Distance from stern to GPS antenna position

C : 6m ← Distance from port to GPS antenna position

D : 6m ← Distance from starboard to GPS antenna position

LENGTH: 123m ← Length of ship

BEAM : 12m ← Beam of ship

[SHIP INFO] 5/7 |

TYPE OF SHIP : 0 ← Type of ship

****TYPE DETAIL**** ← Type description

NOT AVAILABLE

[SHIP INFO] 6/7 |

DRAUGHT: 6.0m ← Draught

NAV STATUS: 0 ← Navigation status

****STATUS DETAIL**** ← Navigation status description

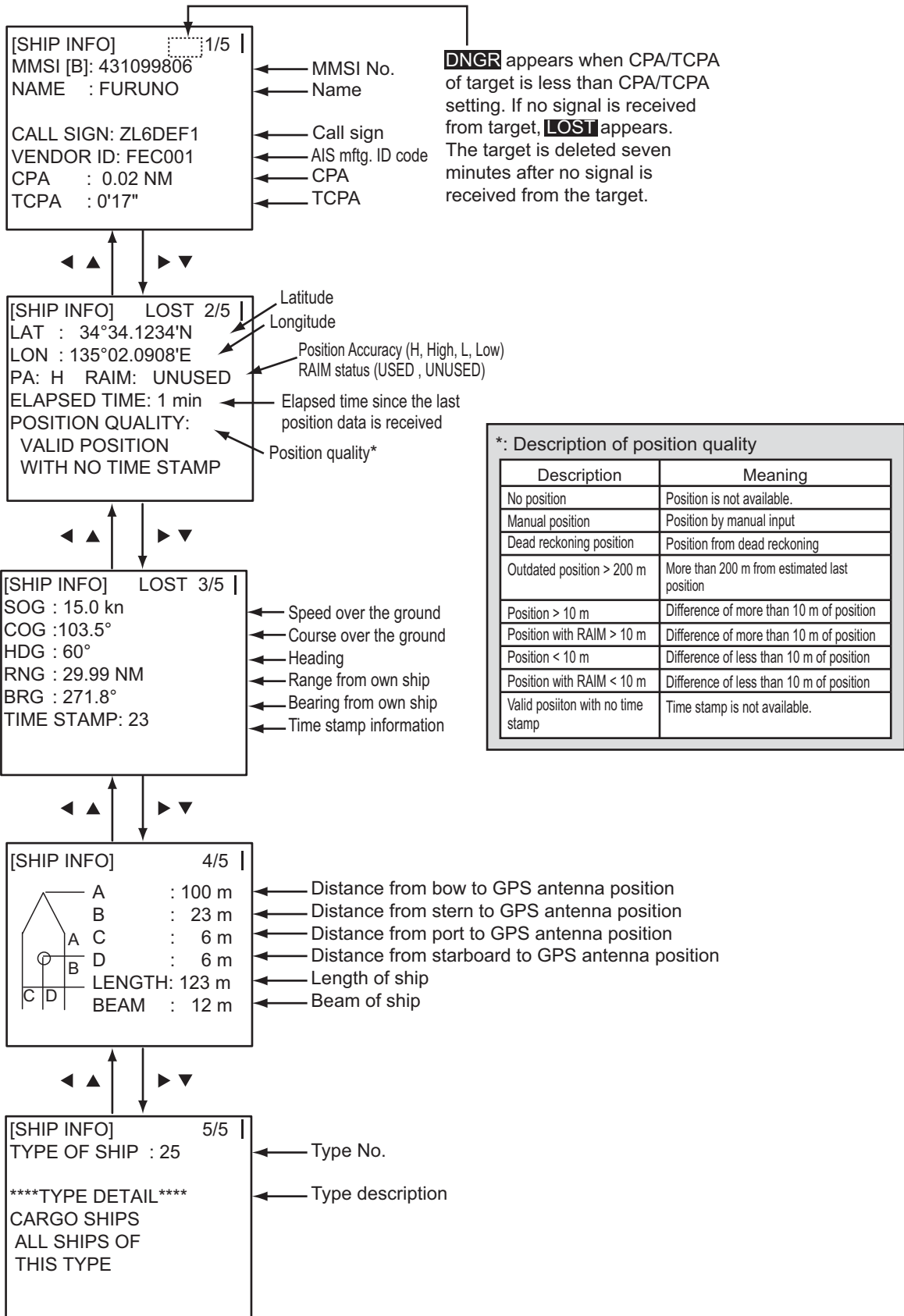
UNDERWAY USING ENGINE

[SHIP INFO] 7/7 |

DESTINATION TOKYO ← Destination

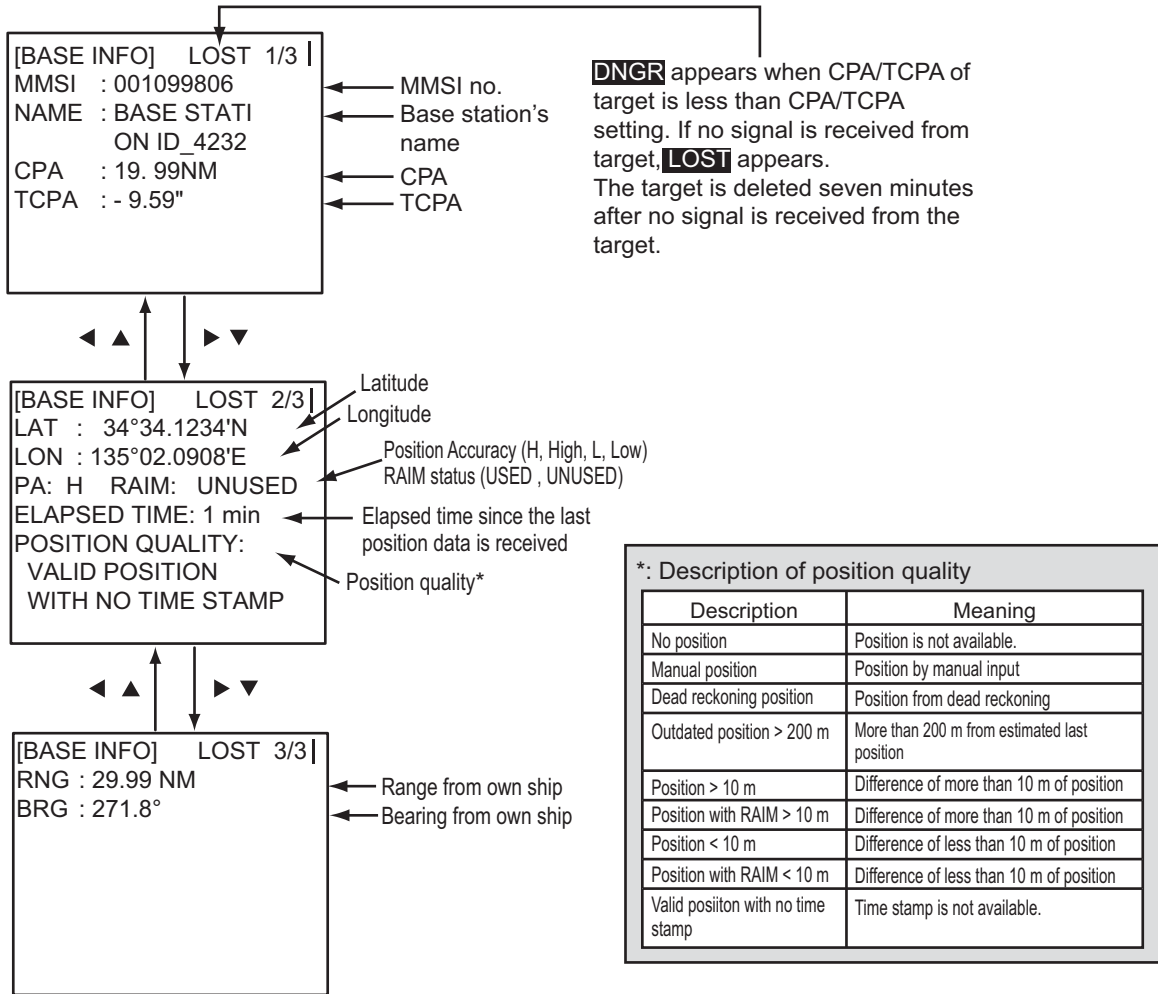
ETA: 26/JUN 15:30 UTC ← Estimated time of arrival, date of arrival at destination

Ship info display, mobile class B

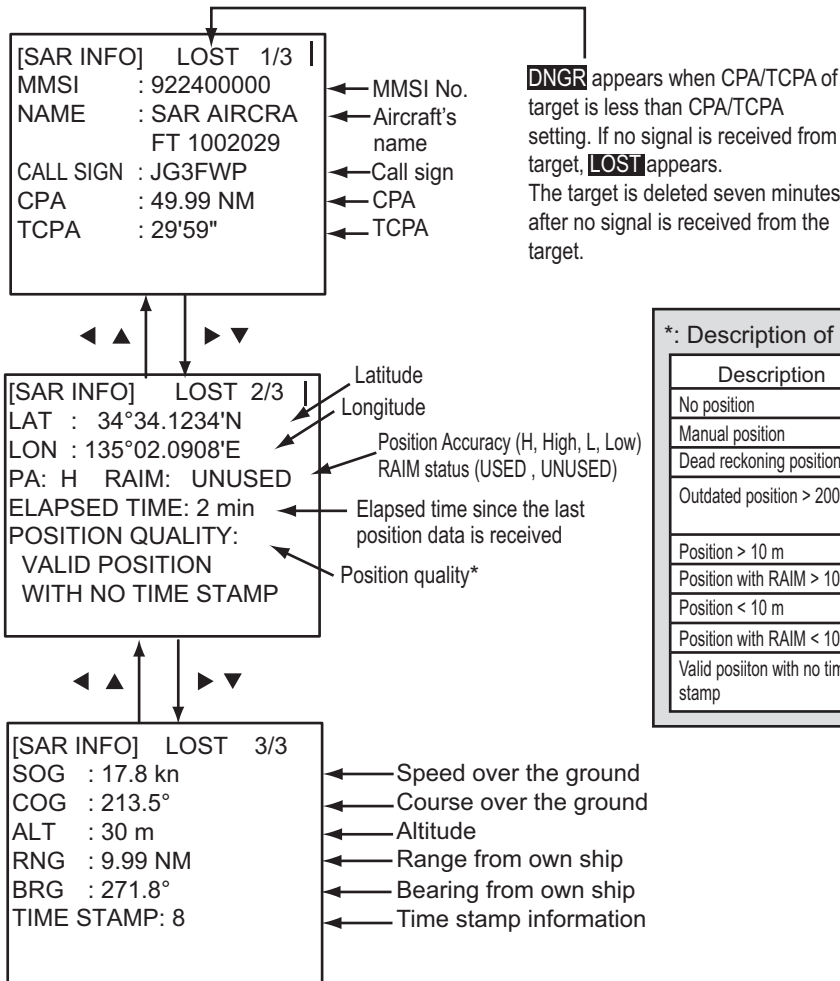


1. OPERATION

Base station display



SAR (Search and Rescue) info display

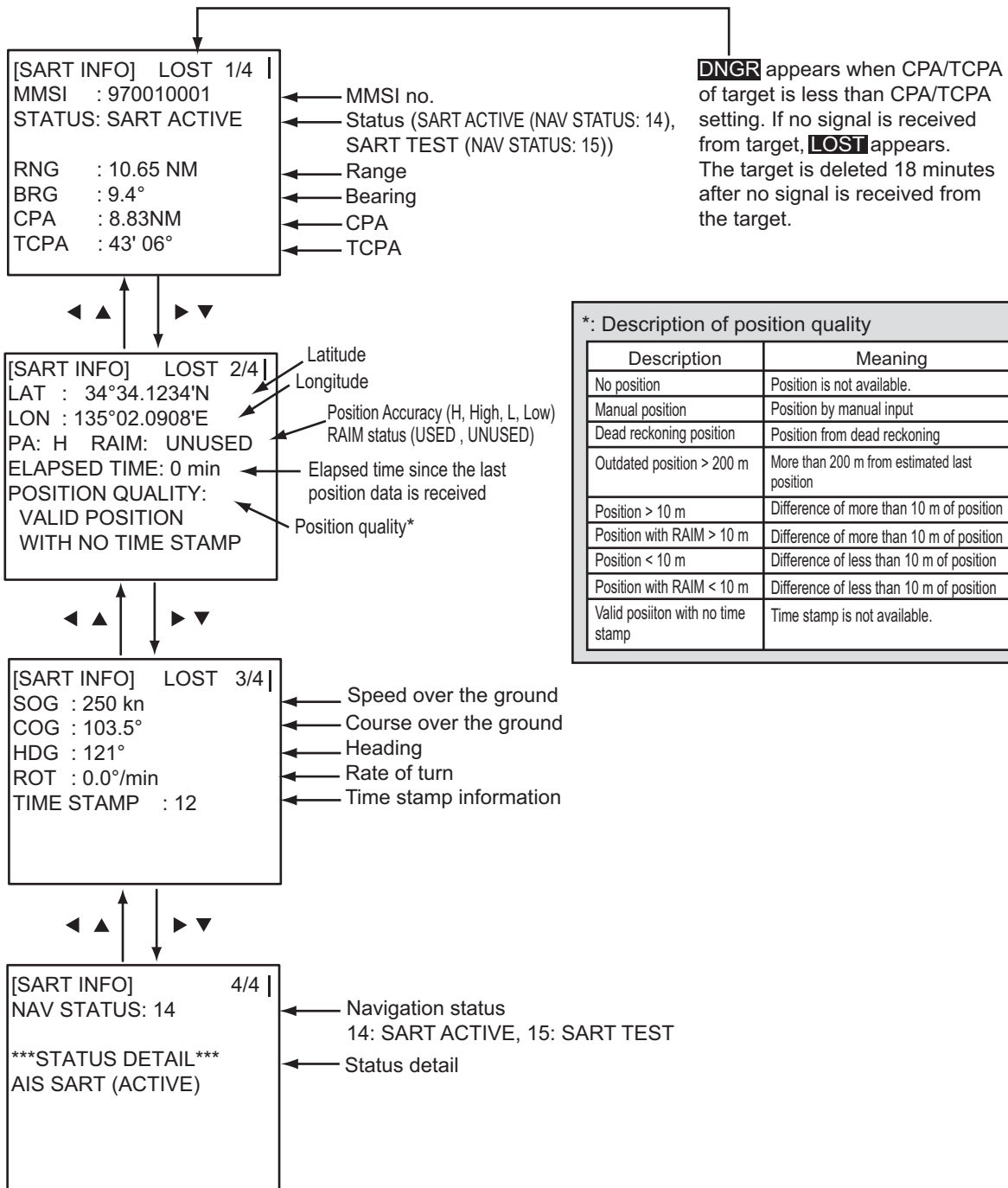


*: Description of position quality

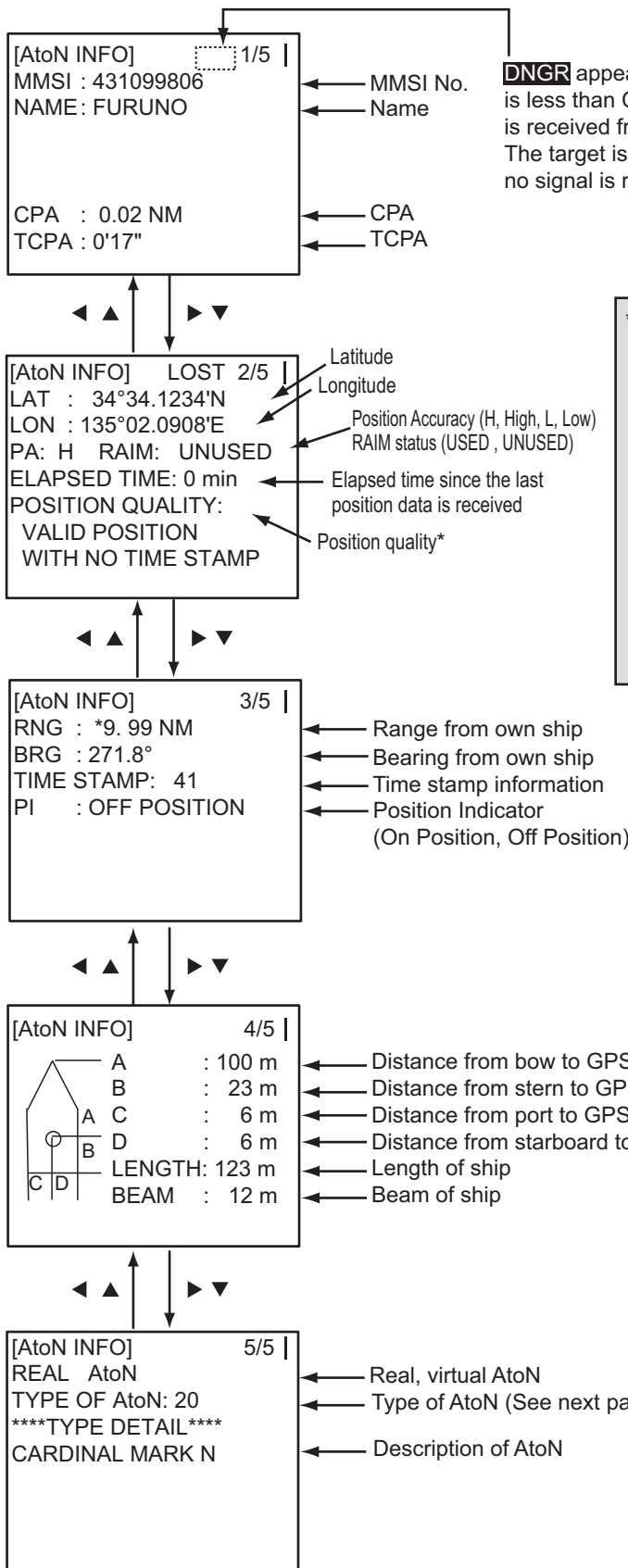
Description	Meaning
No position	Position is not available.
Manual position	Position by manual input
Dead reckoning position	Position from dead reckoning
Outdated position > 200 m	More than 200 m from estimated last position
Position > 10 m	Difference of more than 10 m of position
Position with RAIM > 10 m	Difference of more than 10 m of position
Position < 10 m	Difference of less than 10 m of position
Position with RAIM < 10 m	Difference of less than 10 m of position
Valid position with no time stamp	Time stamp is not available.

1. OPERATION

AIS-SART info display



AtoN (Aid to Navigation) info display



DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. The target is deleted seven minutes after no signal is received from the target.

*: Description of position quality

Description	Meaning
No position	Position is not available.
Manual position	Position by manual input
Dead reckoning position	Position from dead reckoning
Outdated position > 200 m	More than 200 m from estimated last position
Position > 10 m	Difference of more than 10 m of position
Position with RAIM > 10 m	Difference of more than 10 m of position
Position < 10 m	Difference of less than 10 m of position
Position with RAIM < 10 m	Difference of less than 10 m of position
Valid position with no time stamp	Time stamp is not available.

1. OPERATION

The table below shows all the AtoN types and names that may appear on the AtoN INFO display.

A to N type and name

Type	Name of AtoN
0	DEFAULT, TYPE OF A TO N NOT SPECIFIED
1	REFERENCE POINT
2	RACON
3	OFF SHORE STRUCTURE
4	SPARE
5	LIGHT, WITHOUT SECTORS
6	LIGHT, WITH SECTORS
7	LEADING LIGHT FRONT
8	LEADING LIGHT REAR
9	BEACON, CARDINAL N
10	BEACON, CARDINAL E
11	BEACON, CARDINAL S
12	BEACON, CARDINAL W
13	BEACON, PORT HAND
14	BEACON, STARBOARD HAND
15	BEACON, PREFERRED CHANNEL PORT HAND
16	BEACON, PREFERRED CHANNEL STARBOARD HAND
17	BEACON, ISOLATED DANGER
18	BEACON, SAFE WATER
19	BEACON, SPECIAL MARK
20	CARDINAL MARK N
21	CARDINAL MARK E
22	CARDINAL MARK S
23	CARDINAL MARK W
24	PORT HAND MARK
25	STARBOARD HAND MARK
26	PREFERRED CHANNEL PORT HAND
27	PREFERRED CHANNEL STARBOARD HAND
28	ISOLATED DANGER
29	SAFE WATER
30	SPECIAL MARK
31	LIGHT VESSEL / LANBY / RIGS

1.7.3 Dangerous (target) list

You can easily find dangerous ships whose CPA and TCPA are lower than the CPA and TCPA alarm settings.

- At the plotter display, press the **DISP** key to show the [TARGET LIST] (see paragraph 1.7.2).

Note 1: If the target list appears, press ► to show the dangerous list.

Note 2: Targets are automatically sorted by TCPA when no key is operated for 30 seconds. Target order is then updated every five seconds.

- Press ► to show the [DANGEROUS LIST].

[DANGEROUS LIST]				
NAME	CPA(NM)	TCPA	TIME	
CLS(A)	0.40	0'30"	0	
CLS(B)	0.80	1'00"	0	
■ "BASE"	1.20	1'30"	0	
▲ "SAR"	1.60	2'00"	0	
⊕ ATON	2.00	2'30"	0	
1/ 10 [▲ ▼] DTL[ENT] RNG[◀]				← Press ◀ to switch to TARGET LIST.

Target name, CPA and TCPA →

- To find detailed information about a dangerous target, use ▲ or ▼ to select the target then press the **ENT** key.
- To change page: ▼ or ► to go forward; ▲ or ◀ to go back.

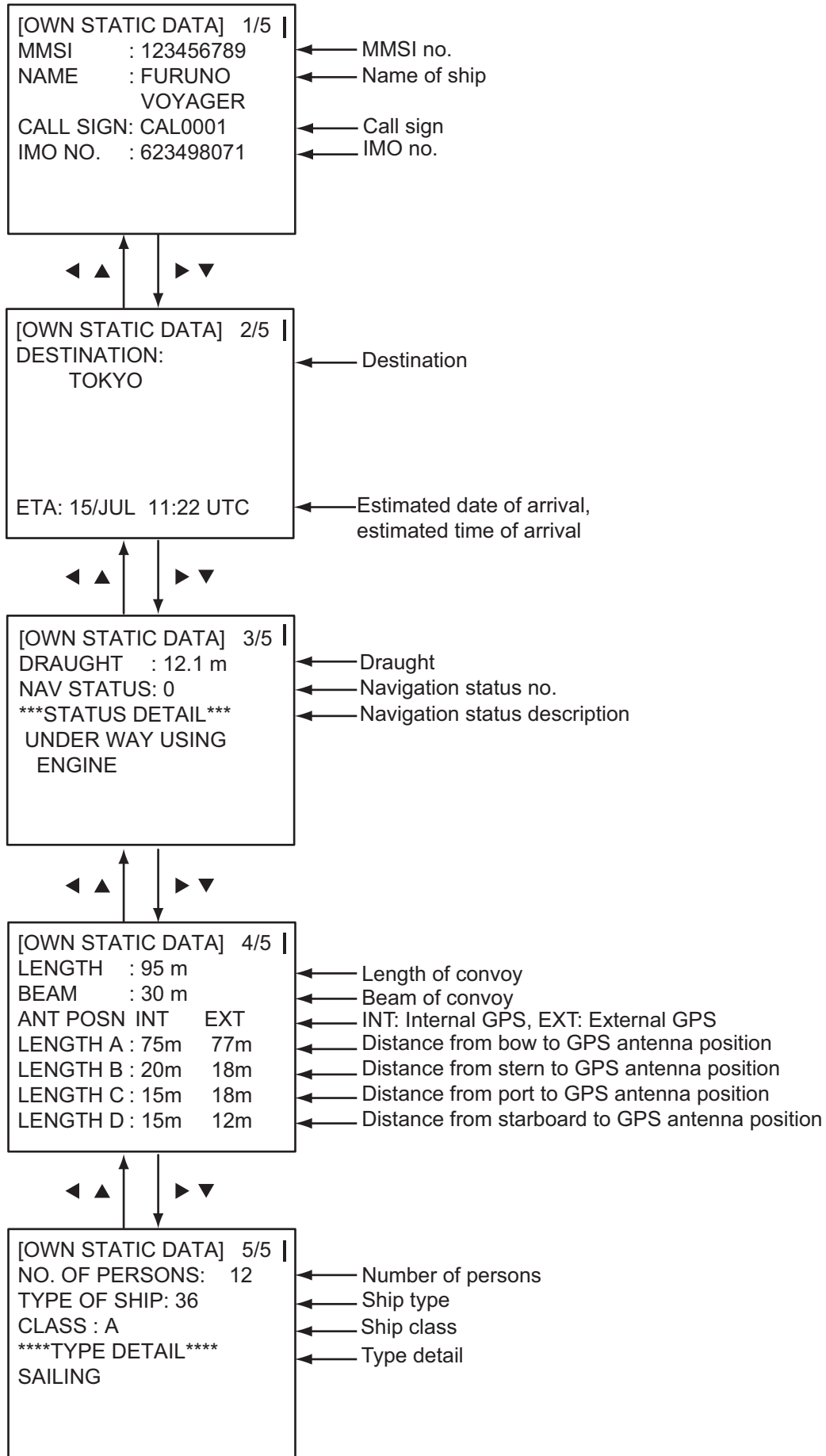
Note: CPA and TCPA are automatically updated when [AUTO SORT] on the [USER SETTINGS] menu is [OFF], however target order is not updated. To do this, press ►, and the targets are sorted in TCPA order. "NOW SORTING" is shown while sorting.

1.7.4 Static data display

The [OWN STATIC DATA] display shows, on five pages, your ship's static data, which includes MMSI, call sign and name, IMO number, type of ship and location of position-fixing antenna. 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.

- At the plotter display, press the **DISP** key twice to show [OWN STATIC DATA]. See the next page.
- To view other own static data: ▼ or ► to go forward, ▲ or ◀ to go back.

1. OPERATION

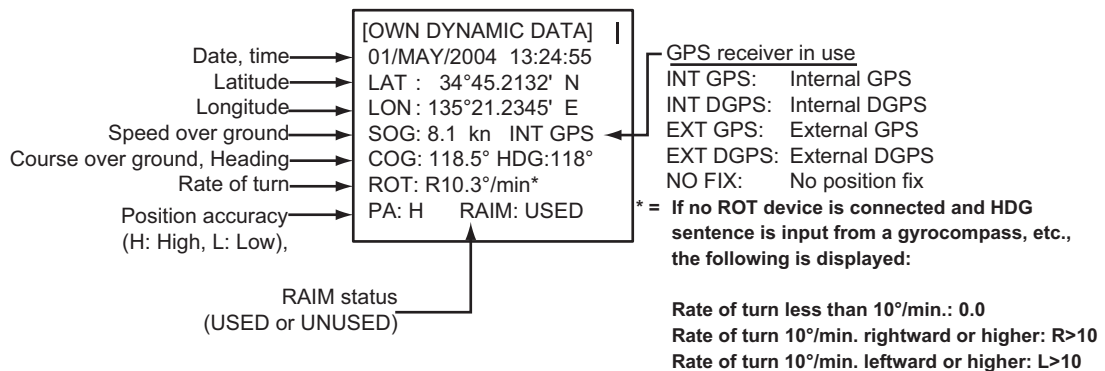


1.7.5 Dynamic data display

The [OWN DYNAMIC DATA] display shows your ship's dynamic data, which includes time, date, ship's position, SOG, COG, heading, ROT, position accuracy, and RAIM use.

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

At the plotter display, press the **DISP** key three times to show the [OWN DYNAMIC DATA] display.



1.7.6 Alarm status display

The alarm status display shows the date and time alarms were violated. For further details, see section 3.5.

1.8 Messages

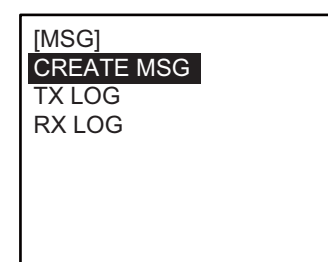
You may send and receive messages via VHF channels, to a specified MMSI or all AIS-equipped ships in the area. Messages can be sent to warn of safety of navigation; for example, an iceberg sighted. Routine messages are also permitted.

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 the indication "MESSAGE" appears. The contents of the message may be viewed on the RX log.

1.8.1 Sending a message

1. Press the **MENU** key to open the main menu.
2. Use **▲** or **▼** to select [MSG] then press the **ENT** key.



1. OPERATION

3. [CREATE MSG] is selected; press the **ENT** key. (For Inland AIS, see paragraph 2.7.1.)

```
[CREATE MSG]
SET MSG TYPE
SET MSG
SEND MSG
```

4. [SET MSG TYPE] is already selected; press the **ENT** key.

```
[SET MSG TYPE]
ADRS TYPE: BROADCAST
MMSI      :-----
MSG TYPE  : NORMAL
CHANNEL   : ALTERNATE
RETRY TIMES: -
```

5. [ADRS TYPE] is selected; press the **ENT** key.

```
BROADCAST
ADRS CAST
```

6. Select [ADRS CAST] to send a message to a specific AIS-equipped ship, or [BROADCAST] to send a message to all AIS-equipped ships within broadcasting range. Press the **ENT** key.

7. For [BROADCAST], go to step 8. For [ADRS CAST], [MMSI] is selected; press the **ENT** key, enter the MMSI number of the vessel that you want to send your message, then press the **ENT** key.

8. [MSG TYPE] is selected; press the **ENT** key.

```
SAFETY
NORMAL
```

9. Select message type: [NORMAL] (message other than safety) or [SAFETY] (important navigational or meteorological warning). Press the **ENT** key.

10. [CHANNEL] is selected; press the **ENT** key.

```
ALTERNATE
BOTH A & B
A
B
```

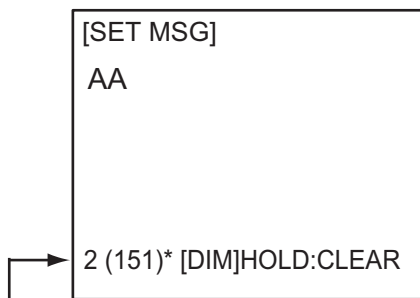
11. Select which channel to transmit your message over then press the **ENT** key.

12. [RETRY TIMES] is now selected; press the **ENT** key. If the [ADRS TYPE] is [BROADCAST] go to step 14.

13. For [ADRS CAST], enter the number of times to re-transmit a message (0-3) then press the **ENT** key.

14. Press the **MENU** key to return to the [CREATE MSG] sub-menu.

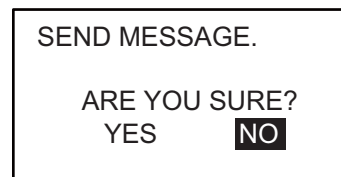
15. Select [SET MSG] then press the **ENT** key.



*: Number of characters available with each message type for Class A, SOLAS is as follows:
 NORMAL message with BROADCAST : 156 characters
 NORMAL message with ADDRESS-CAST : 151 characters
 SAFETY message with BROADCAST : 161 characters
 SAFETY message with ADDRESS-CAST : 156 characters

Number of characters used/available

- 16. Use the **CursorPad** to enter your message.
- 17. Press the **ENT** key to return to the [CREATE MSG] sub-menu.
- 18. Select [SEND MSG]then press the **ENT** key. The prompt shown right appears.



- 19. Press **◀** to select [YES] then press the **ENT** key to send your message.
 Message status is shown as follows:

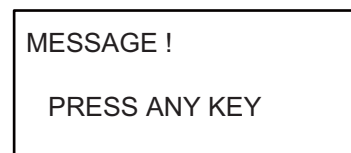
AIS message status messages and their meanings

Message	Meaning
NOW SENDING.	Message is being sent.
SEND MESSAGE COMPLETE. PRESS ANY KEY	Transmission of message completed. (MMSI is additionally shown in case of addressed message.)
SEND MESSAGE UNSUCCESSFUL. PRESS ANY KEY	Message could not be sent.
SEND MESSAGE UNSUCCESSFUL. MMSI: XXXXXXXXX PRESS ANY KEY	Message sent successfully, however there is no reply from receiver of message.
NOW WAITING RESPONSE. PRESS ANY KEY	You tried to send a message while the transponder is awaiting receive confirmation (successful or unsuccessful) for the first-sent message. After confirmation is received, the next sequential message will be sent.

1.8.2 Receiving messages

How to view a received message

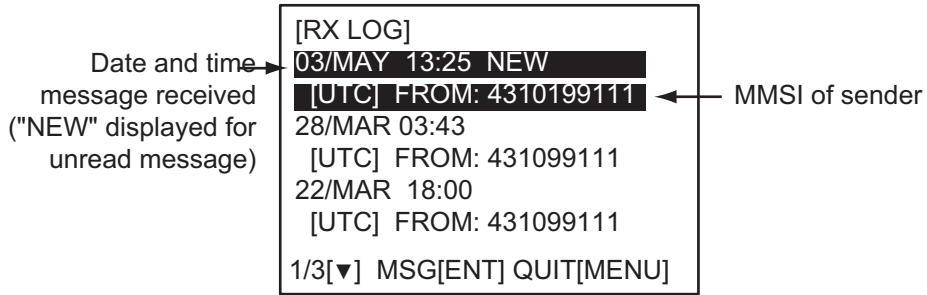
When a message is received, the window shown right appears on the display. To view the contents of the message follow the procedure below.



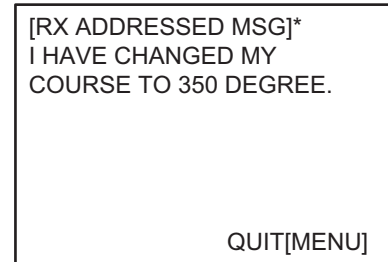
- 1. Press any key to erase the message.
- 2. Press the **MENU** key to show the main menu.
- 3. Select [MSG] then press the **ENT** key.

1. OPERATION

4. Select [RX LOG] then press the **ENT** key.



5. To view the contents of a message, select the message then press the **ENT** key. The figure shown right is an example of a received message.



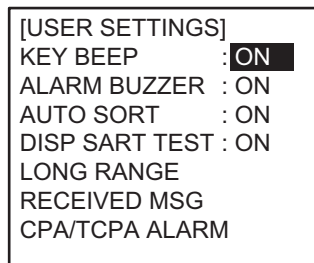
*RX BROADCAST MSG for received broadcast message

6. Press the **DISP** key to close the log.

How to view a popup of incoming messages

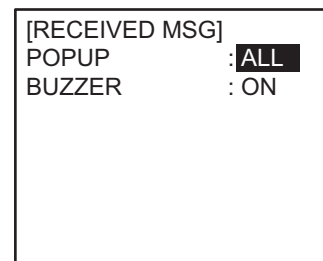
You can display incoming messages automatically as follows:

1. Press the **MENU** key to open the menu.
2. Select [USER SETTINGS] then press the **ENT** key.



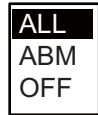
Note: For [INLAND AIS] mode, the [USER SETTINGS] menu has two pages. See section 2.9 to section 2.11.

3. Select [RECEIVED MSG], then press the **ENT** key.



4. Select [POPUP], then press the **ENT** key

5. Select how to view the popup then press the **ENT** key.
 [ALL]: Display any message upon receipt.
 [ABM]: Display only addressed binary messages, upon their receipt.
 [OFF]: Disable display of incoming messages.



6. To get an audio alert when the message type selected at step 5 is received, set [BUZZER] to [ON].
7. Press the **DISP** key to close the menu.

1.8.3 TX and RX message logs

The FA-150 stores the latest 20 each of transmitted and received messages in respective message logs. When a log becomes full, the oldest message in the log is automatically deleted to make room for the latest.

When you receive a message, a popup shows "MESSAGE!" To display a message log, do the following:

1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.
3. Select [TX LOG] or [RX LOG] as appropriate then press the **ENT** key. Below is an example of the TX log. For the appearance of the RX log, see paragraph 1.8.2.

- Date and time message transmitted →
- Message status
- OK: Message transmitted successfully
- FAIL: Message could not be transmitted
- -: Waiting for results

[TX LOG]

31/APR 13:25 OK

[UTC] TO: 431099111

27/MAR 03:43 OK

[UTC] TO: 431099111

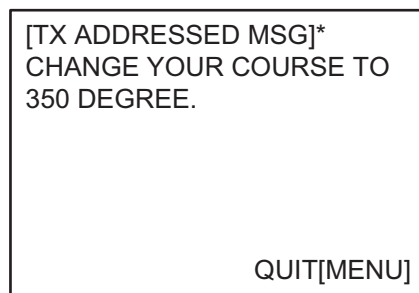
19/MAR 18:00 OK

[UTC] TO: 431099111

1/20[▼] MSG[ENT] QUIT[MENU]

} ← Time format, addressee

4. To view the contents of a message, select it with ▲ or ▼ then press the **ENT** key. Below is an example of a transmitted message. For an example of a received message, see paragraph 1.8.2.



*TX BROADCAST MSG for transmitted broadcast message

5. Press the **DISP** key to close the log.

1.9 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 paragraph 1.9.2.

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

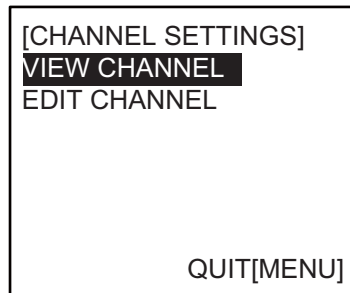
The default area is as follows:

- Tx power: 12.5 W
- Channel no. 2087, 2088
- Frequency Bandwidth: 25 kHz
- Tx/Rx mode: Tx/Rx

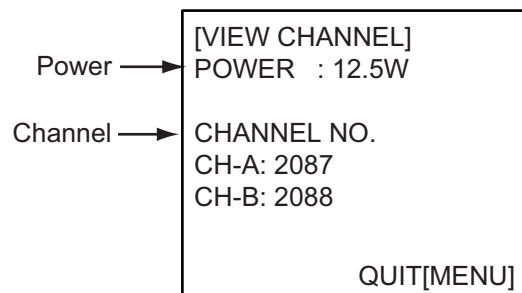
1.9.1 Viewing channels, Tx power

Do the following to view current channels.

1. Press the **MENU** key to open the menu.
2. Select [CHANNEL SETTINGS] then press the **ENT** key.



3. Select [VIEW CHANNEL] then press the **ENT** key.



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

1.9.2 Displaying, editing regional operating area status

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].

About registering areas

- 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** key to open the menu.
2. Select [CHANNEL SETTINGS] then press the **ENT** key.
3. Select [EDIT CHANNEL] then press the **ENT** key.

[SELECT NO.]: File number, 0-9. In order of distance from own ship, from closest to furthest.

[TIME]: Data and time equipment controlled by external source.

[MMSI]: MMSI displayed for control by DSC or shore-based AIS. Dashes or "EMPTY" (no data) otherwise.

[TYPE]: How channel is controlled: AIS, AIS message; HIGH SEA (for reference setting), PI, ECDIS or PC; DSC, DSC; MANUAL, manual control

Note: [MMSI] and [TYPE] must be set to other than [HIGH SEA] to edit.

4. Select desired file number from [SELECT NO.]
5. Press the **ENT** key to show details.

```
[EDIT CHANNEL]
SELECT NO. : 0
TIME [UTC]
  - - / - - - - : - - : - -
FROM
MMSI: - - - - -
TYPE: MANUAL
QUIT [MENU] EDIT[ENT]
```

```
[EDIT CHANNEL]      1/2
FROM MMSI:
POWER : 12.5W
CH NO.  CH-A: 2087
        CH-B: 2088
MODE    CH-A: TX/RX
        CH-B: TX/RX
ZONE:   1NM
```

6. [POWER] is already selected; press the **ENT** key to show the channel power options.

```
1W
12.5W
```

7. Select power desired then press the **ENT** key.
8. [CH NO. CH-A] is now selected; press the **ENT** key.
9. Select channel number for CH-A then press the **ENT** key.
10. [CH NO. CH-B] is now selected; press the **ENT** key.
11. Select channel number for CH-B then press the **ENT** key.

1. OPERATION

12. [MODE CH-A] is now selected; press the **ENT** key.



13. Select desired mode for [CH-A] then press the **ENT** key.

Mode	1	2	3	4	5	6
CH-A	TX/RX	TX/RX	RX	RX	RX	UNUSED
CH-B	TX/RX	RX	TX/RX	RX	UNUSED	RX

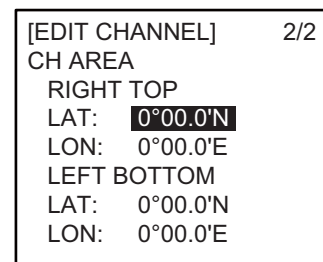
14. [MODE CH-B] is now selected; press the **ENT** key.

15. Select desired mode for [CH-B] then press the **ENT** key.

16. [ZONE] is now selected; press the **ENT** key.

17. Key in the zone distance then press the **ENT** key. (The setting range is 1 to 8 (nm)).

18. Use ▼ to show page 2 of the [EDIT CHANNEL] sub-menu.



19. [LAT] of [RIGHT TOP] is already selected; press the

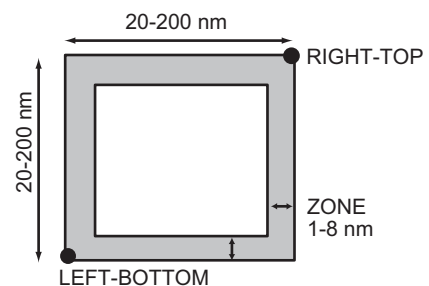
ENT key. Enter latitude for the right-top position (northeast point) of the AIS operating area then press the **ENT** key.

20. [LON] of [RIGHT TOP] is now selected; press the **ENT** key. Enter longitude for the right-top position (northeast point) of the AIS operating area then press the **ENT** key.

21. [LAT] of [LEFT BOTTOM] is now selected; press the **ENT** key. Enter latitude for the left-bottom position (southwest point) of the AIS operating area then press the **ENT** key.

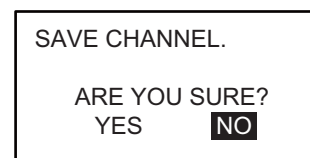
22. [LON] of [LEFT BOTTOM] is selected; press the **ENT** key. Enter longitude for the left-bottom position (southwest point) of the AIS operating area then press the **ENT** key.

Note: The available range is 20-200 nm. If the area contains overlapping data the older data will be erased.



23. Press the **MENU** key. The prompt shown right appears.

24. Press ◀ to select [YES] then press the **ENT** key.



Note: If a combination other than that shown in the table at step 13 is selected, the message "ILLEGAL MODE WAS SELECTED PRESS ANY KEY." appears.

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

Note: If you enter invalid data, the message "OUT OF RANGE!: OO" appears. Press any key to escape. Reenter data.

1.10 Enabling/Disabling Alarm Buzzer, Key Beep

You may turn on or off the buzzers that sound for alarms or incoming messages. Further, you may turn off the beep, which sounds for valid key input. Note that the alarm buzzer is not related to a radar or ECDIS alarm.

1. Press the **MENU** key to open the menu.
2. Select [USER SETTINGS] then press the **ENT** key.

Note: For INLAND AIS mode, the [USER SETTINGS] menu has two pages. See section 2.9 to section 2.11.

```
[USER SETTINGS]
KEY BEEP       : ON
ALARM BUZZER  : ON
AUTO SORT     : ON
DISP SART TEST : ON
LONG RANGE
RECEIVED MSG
CPA/TCPA ALARM
```

3. Select [KEY BEEP] or [ALARM BUZZER] as appropriate then press the **ENT** key.
4. Select [ON] or [OFF] as appropriate then press the **ENT** key.
5. Press the **DISP** key to close the menu.

1.11 Long Range

The long range function sets how to reply to a request for own ship data from a distant station (for example, an Inmarsat C station) and whether to transmit your ship's position to a satellite via the AIS VHF communication link or not.

1.11.1 LR MODE (Long Range Mode)

The long range mode sets how to reply to a request for own ship data from a distant station, for example, Inmarsat C station. You may reply automatically or manually.

1. Press the **MENU** key to open the menu.
2. Select [USER SETTINGS] then press the **ENT** key.

Note: For INLAND AIS mode, the [USER SETTINGS] menu has two pages. See section 2.9 to section 2.11.

```
[USER SETTINGS]
KEY BEEP       : ON
ALARM BUZZER  : ON
AUTO SORT     : ON
DISP SART TEST : ON
LONG RANGE
RECEIVED MSG
CPA/TCPA ALARM
```

3. Select [LONG RANGE] then press the **ENT** key.

```
[LONG RANGE]
LR MODE       : AUTO
MSG27 TX     : ON

QUIT [MENU]
```

1. OPERATION

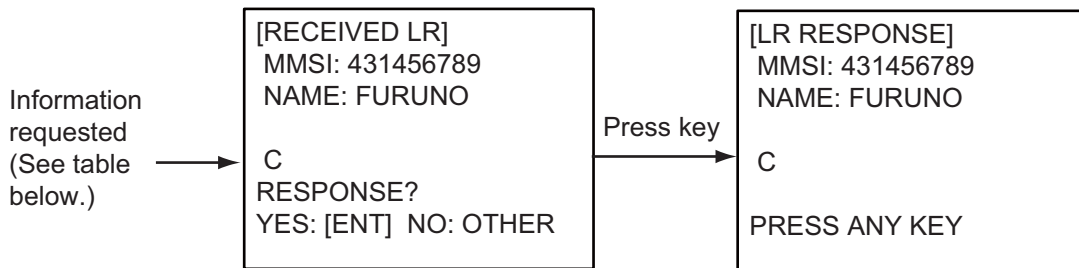
4. Select [LR MODE] then press the **ENT** key.



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

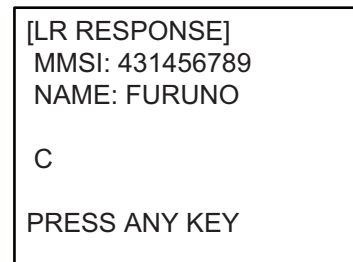
Manual reply

For manual reply, the requesting ship's MMSI, name and information requested (code, see next page) appear. Press the **ENT** key to send the data, or press any key other than **ENT** to send no data. The screen then changes according to your selection.



Automatic reply

For automatic reply, the message below appears when a request for own ship data arrives from a distant station. Requested data is automatically transmitted. Press the **ENT** key to erase the message.



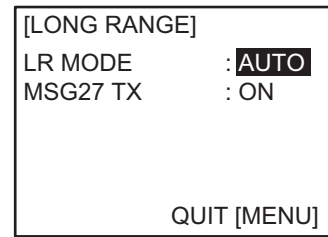
Codes used in long range messages

Code	Meaning
A	Ship name, call sign, IMO number
B	Date message created
C	Position
E	Course over ground
F	Speed over ground
I	Waypoint, ETA
O	Draft
P	Ship type, Load
U	Ship length, width, type
W	Number of crew

1.11.2 MSG27 TX

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

1. Press the **MENU** key to open the menu.
2. Select [USER SETTINGS] then press the **ENT** key.
3. Select [LONG RANGE] then press the **ENT** key.
4. Select [MSG27 TX] then press the **ENT** key.
5. Select [ON] or [OFF] as appropriate then press the **ENT** key.
[ON] sends your ship's position to a satellite via the AIS VHF communication link.
6. Press the **DISP** key to close the menu.

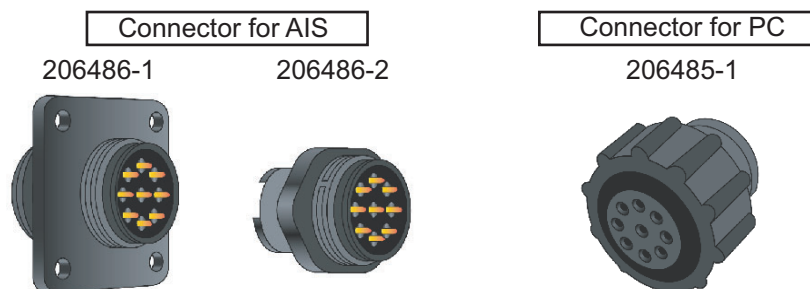


Note: The availability of this function depends of equipment specifications. The menu is not shown unless so equipped.

1.12 Pilot Plug (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				
Baudrate	38400 bps Note: The following setting is required for the FA-150. If the pilot does not function, check these settings.				
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Menu</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>[INITIAL SETTINGS] - [VIEW I/O PORT] - [VIEW COM PORT] - [VIEW COM4]</td> <td>[MODE]: [EXT DISPLAY]</td> </tr> </tbody> </table>	Menu	Setting	[INITIAL SETTINGS] - [VIEW I/O PORT] - [VIEW COM PORT] - [VIEW COM4]	[MODE]: [EXT DISPLAY]
Menu	Setting				
[INITIAL SETTINGS] - [VIEW I/O PORT] - [VIEW COM PORT] - [VIEW COM4]	[MODE]: [EXT DISPLAY]				
Type	AMP 206486-1, 206486-2 (9-pin, male)				
Signal connection	TX-A: Pin 1 TX-B: Pin 4 RX-A: Pin 5 RX-B: Pin 6 SHIELD: Pin 9				

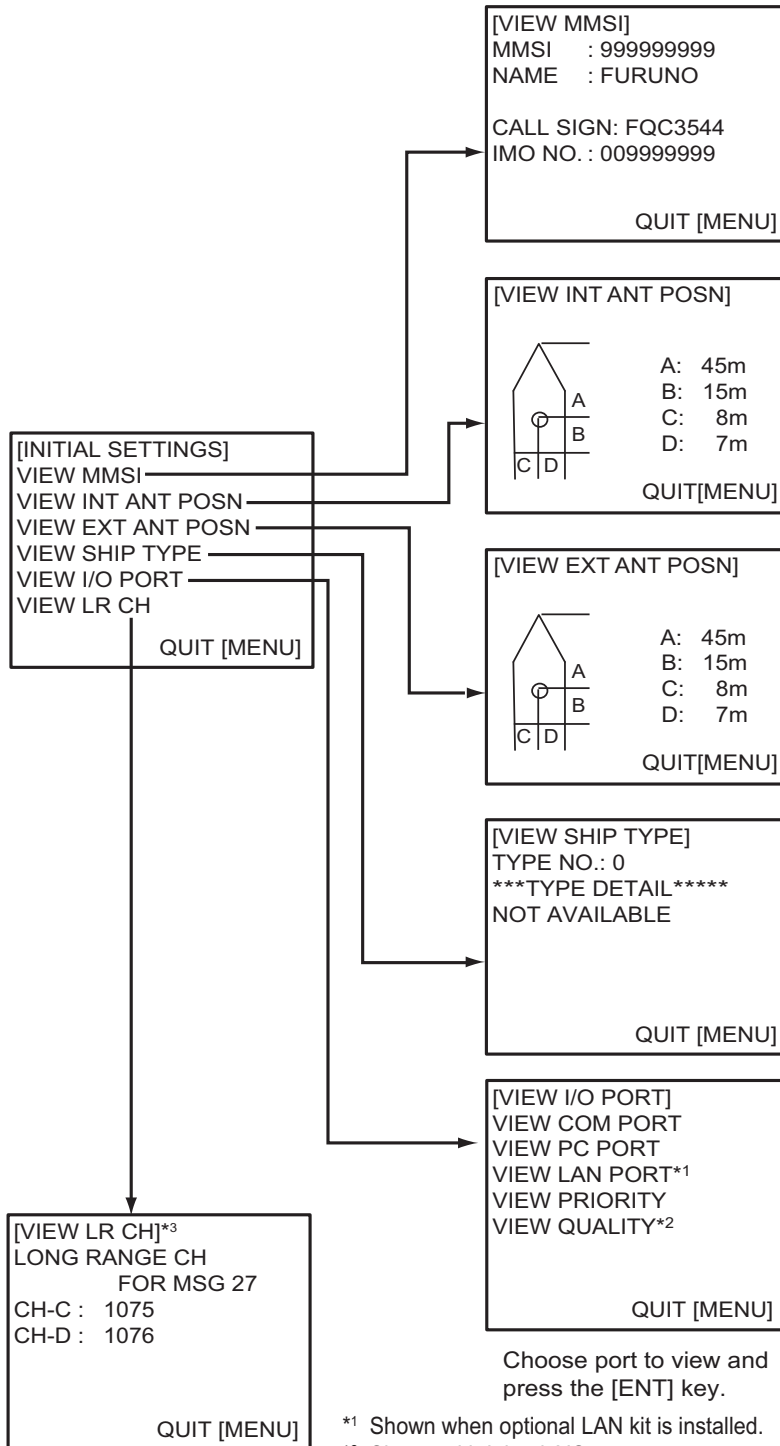


Examples of connectors

1.13 Viewing Initial Settings

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

1. Press the **MENU** to open the menu.
2. Select [INITIAL SETTINGS] then press the **ENT** key.
3. Press the **ENT** key twice.
4. Select item to view then press the **ENT** key.



Choose port to view and press the [ENT] key.

*1 Shown when optional LAN kit is installed.

*2 Shown with Inland AIS.

*3 Shown depending on equipment specifications.

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 Positioning System (GPS), 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 e.g. 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 Activating the Inland AIS

Enter your key number (received from dealer) to activate the Inland AIS. (If the key was entered during the installation, entry is not necessary.)

1. Press the **MENU** key to open the menu.
2. Select [DIAGNOSTICS] then press the **ENT** key.
3. Select [ACTIVATE KEY] then press the **ENT** key.

[ACTIVATE KEY]
DEVICE ID
 XX-XX-XX-XX-XX-XX
KEY
 - - -

QUIT[MENU]

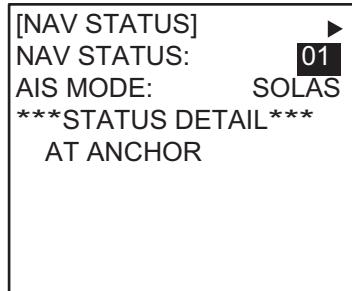
4. Press the **ENT** key, enter your activation key then press the **ENT** key.

If you entered the activation key correctly, the indication "ACTIVATED!" appears then the system is automatically restarted. Start 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. Push ▼ to select [AIS MODE] then press the **ENT** key.



3. Select [SOLAS] or [INLAND] as appropriate then press the **ENT** key.

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

Notes on Inland AIS operation

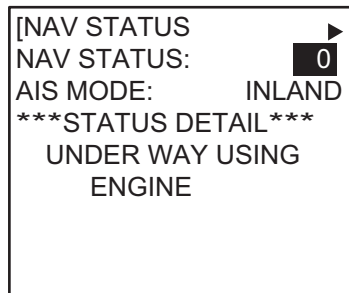
- IMO NO. is transmitted with all zeroes.
- The draught used in Inland AIS is "Inland draught".
- The number of characters for a text message is as follows
NORMAL MSG with BROADCAST: Solas, 156, Inland, 86
NORMAL MSG with ADDRESS-CAST: Solas, 151, Inland, 80
SAFETY MSG with BROADCAST: Solas, 161, Inland, 90
SAFETY MSG with ADDRESS-CAST: Solas, 156, Inland, 85

2.3 Entering Voyage-Related Data

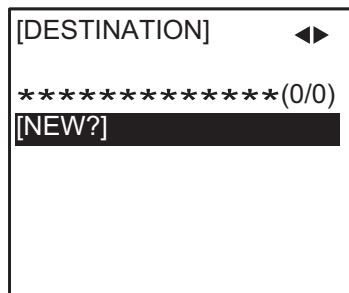
Before you embark on a voyage using Inland AIS, set the various related data (see the list below) on the [NAV STATUS] menu.

- Destination
- Arrival time
- Draught
- Cargo type
- ERI code
- No. of persons
- Length and beam of ship
- Dynamic information rate
- Hazardous cargo
- Ship loading status

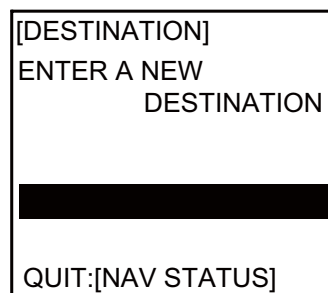
1. Press the **NAV STATUS** key.



2. Press ► to show the [DESTINATION] sub-menu.



3. [NEW] is now selected; press the **ENT** key.



4. Press the **ENT** key. Enter destination then press the ENT key. You can use up to 20 alphanumeric characters, and enter 20 destinations. (For how to enter alphanumeric characters, see "Entering alphanumeric data" on page 1-6.)

Note 1: Each of the characters shown below counts as three characters.

\$! * , \ ^

Note 2: Destinations can be selected, edited and deleted from the [DESTINATION] sub-menu. See section 1.5.

2. INLAND AIS OPERATION

5. Press ► to show the [ARRIVAL TIME] sub-menu.

```
[ARRIVAL TIME] ◀▶
DATE [UTC]:  - / - - -
TIME[UTC]:  - * - -
```

6. [DATE[UTC]] is now selected; press the **ENT** key.
7. Enter the date of arrival then press the **ENT** key.
8. [TIME[UTC]] is selected; press the **ENT** key.
9. Enter the estimated time of arrival then press the **ENT** key. Use 24-hour notation.
10. Press ► to show the [DRAUGHT] sub-menu.

```
[DRAUGHT] ◀▶
SOLAS DRAUGHT:  0.0m
INLAND DRAUGHT:  0.00m
```

11. [SOLAS DRAUGHT] is now selected; press the **ENT** key.
12. Enter SOLAS draught (tenths place resolution) then press the **ENT** key.
13. [INLAND DRAUGHT] is now selected; press the **ENT** key.
14. Enter inland draught (hundredths place resolution) then press the **ENT** key.
15. Press ► to show the [CARGO TYPE] sub-menu.

```
[CARGO TYPE] ◀▶
TYPE NO.:  00
**** TYPE DETAIL****
NOT AVAILABLE
```

16. [TYPE NO.] is now selected; press the **ENT** key.
17. Select type of vessel/cargo, referring to the table on page 1-10, then press the **ENT** key.

Note 1: Only the second digit for the type of vessel is entered here; the first digit is entered on the initial settings menu, during installation.

Note 2: When [Tanker] is selected and the Nav status is [Moored], output power is automatically switched to 1 W when the SOG is less than 3 knots. Further, in the above condition, when the SOG becomes higher than 3 knots, the pop-up message "CHANGE NAV STATUS?" appears and 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 any key or lower the SOG below 3 knots.

18. Press ► to go to the [ERI CODE] sub-menu.

[ERI CODE]	◀▶
ERI CODE:	8000
****CODE DETAIL****	
VESSEL, TYPE UNKNOWN	

19. [ERI CODE] is now selected; press the **ENT** key.
20. Enter four-digit ERI code (type of ship), referring to the ERI code table in the Appendix, then press the **ENT** key.
21. Press ► to go to the [NO. OF PERSONS] sub-menu.

[NO. OF PERSONS]	◀▶
CREW:	---
PASSENGER:	----
SHIPBOARD PERSONNEL	----
NO. OF PERSONS:	0

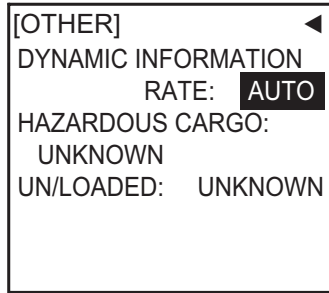
22. [CREW] is now selected; press the **ENT** key.
23. Enter number of crew (0-254) then press the **ENT** key.
24. [PASSENGER] is now selected; press the **ENT** key.
25. Enter number of passengers (0-8190) then press the **ENT** key.
26. [SHIPBOARD PERSONNEL] is now selected; press the **ENT** key.
27. Enter number of shipboard personnel (persons other than passengers and crew, 0-254) then press the **ENT** key.
- Note:** Crew, passenger and shipboard personnel are sent in RFM55 messages.
28. [NO. OF PERSONS] is selected; press the **ENT** key.
29. Enter the total number of persons (sum of crew, passengers and shipboard personnel) onboard then press the **ENT** key.
30. Press ► to go to the [LENGTH&BEAM] sub-menu.

[LENGTH&BEAM]	◀▶
LENGTH OF SHIP	
BEAM OF SHIP:	0.0 m
	0.0 m

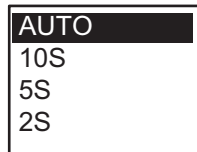
31. Enter the length and beam of your ship, pressing the **ENT** key after entering each item. (If [LENGTH OF SHIP] is more than three meters greater than the LENGTH OF CONVOY (A+B total for INT ANT POSN or EXT ANT POSN), the message "DIFFERENT FROM ANT POSN VALUE" appears. The same message also appears when the value for [BEAM OF SHIP] is more than three meters greater than the total for the BEAM OF CONVOY (C+D ANT POSN).)

2. INLAND AIS OPERATION

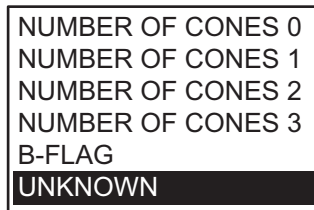
32. Press ► to go to the [OTHER] sub-menu.



33. [DYNAMIC INFORMATION RATE] is now selected; press the **ENT** key. 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, which appears on page 2/2 of the [DYNAMIC DATA] screens.



34. Select [AUTO], [10S], [5S] or [2S] as appropriate then press the **ENT** key.
Note 1: This setting is fixed to [AUTO] in the SOLAS mode.
Note 2: The new rate takes effect in 4-8 minutes. In the meantime the rate is [AUTO], regardless of the indication.
35. [HAZARDOUS CARGO] is now selected; press the **ENT** key.



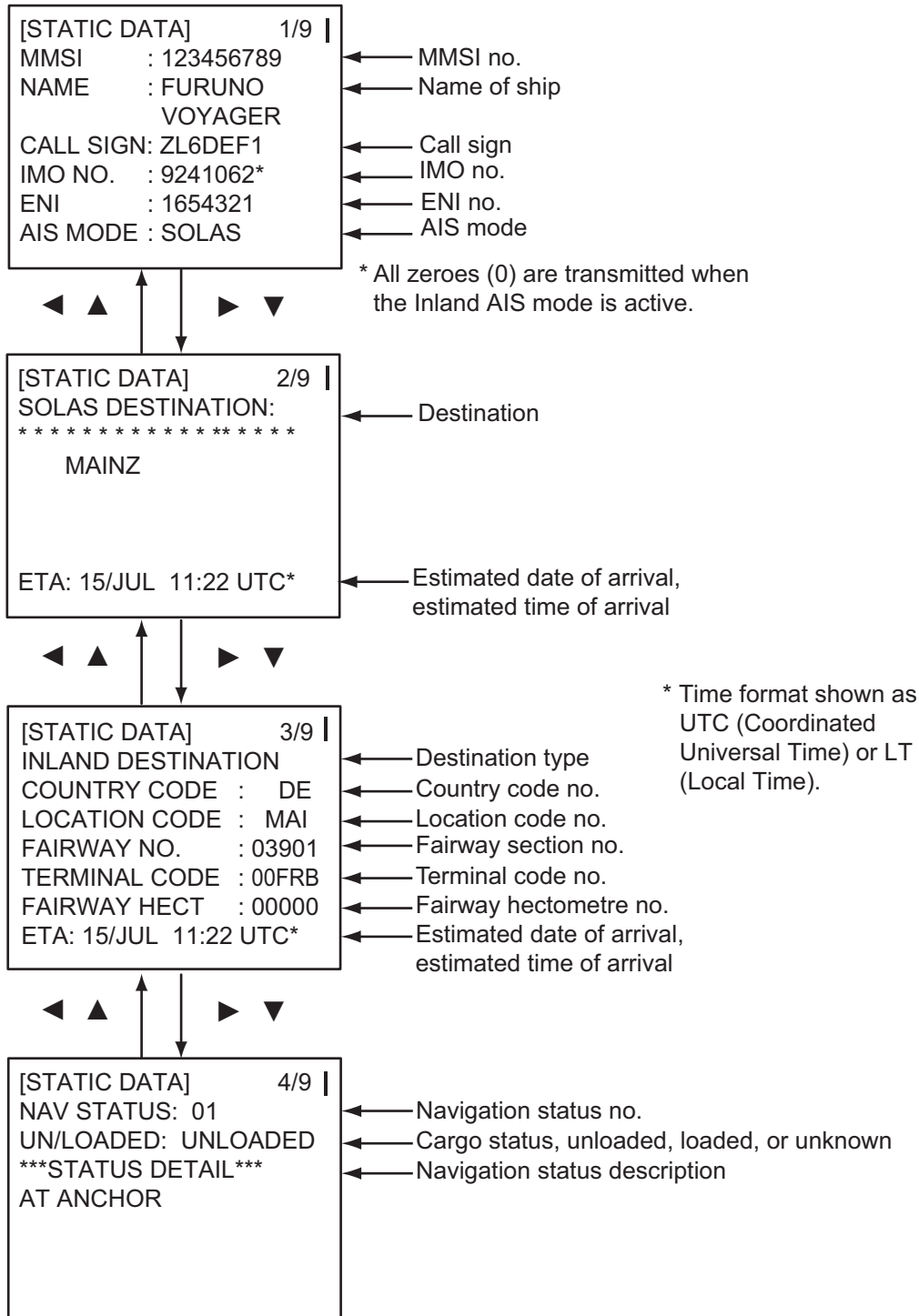
36. If your ship is carrying hazardous cargo, "cones" (max. 3) have to be shown on the mast, in daylight with cones and nighttime with blue lights. The greater the number of the cones the more hazardous the cargo. Select [NUMBER OF CONES 0] if your ship is not carrying hazardous cargo. Select [B-FLAG] 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.
37. Press the **ENT** key.
38. [UN/LOADED] is now selected; press the **ENT** key.



39. Select [LOADED] for vessel loaded with cargo, [UNLOADED] for vessel with no cargo, or [UNKNOWN] if you are unsure of the loading status.
40. Press the **ENT** key.
41. Press the **DISP** key to close the menu.

2.4 Static Data

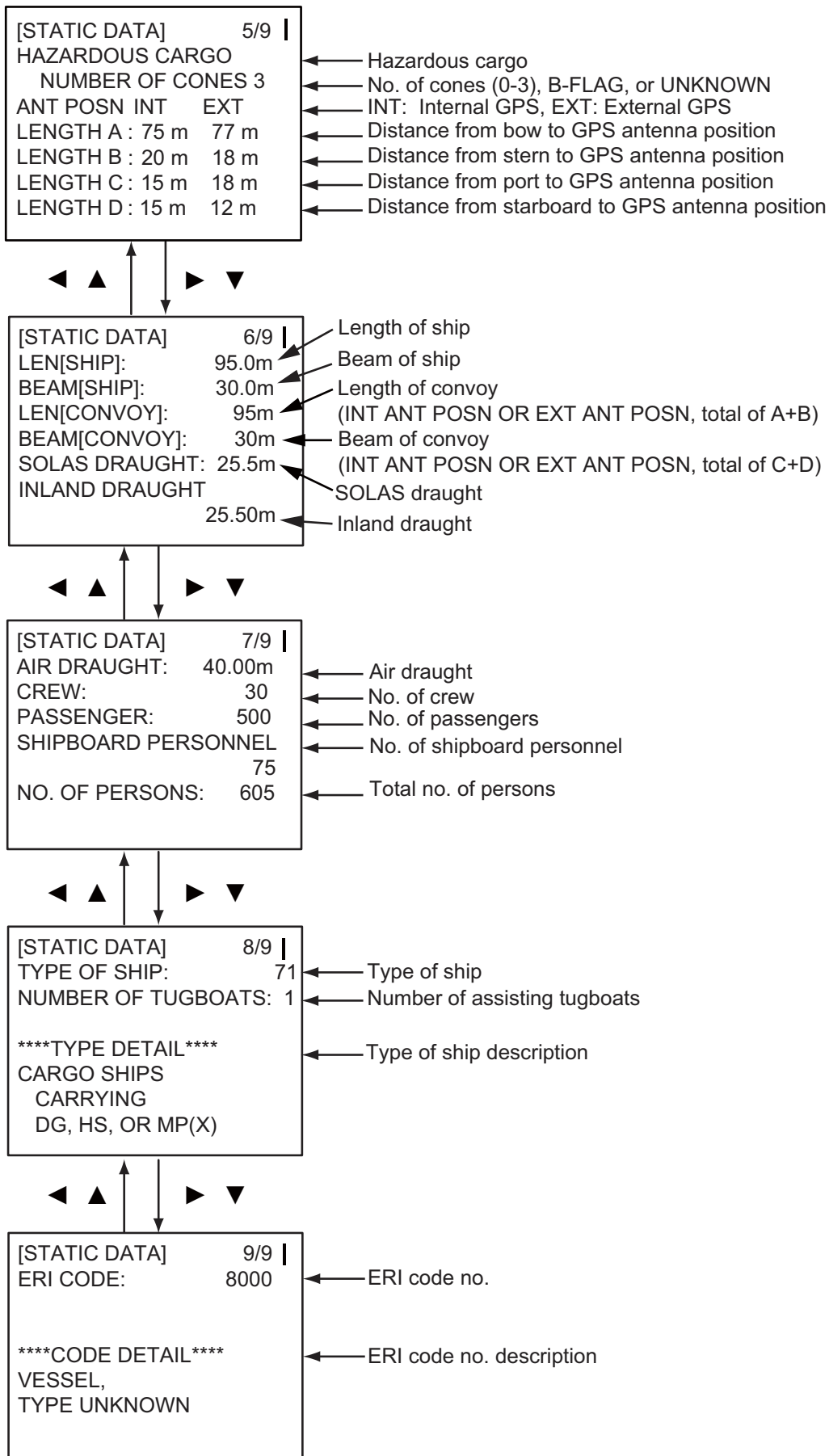
The STATIC DATA display shows various navigation data such as your MMSI no., ship name, etc. This data should be checked once per voyage or once per month whichever is shorter. Data may be changed only on the authority of the master. To show your static data, press the **DISP** key twice at the plotter display to show [OWN STATIC DATA]. Use ▼ or ► to go forward, ▲ or ◀ to go back.



(Continued on next page)

2. INLAND AIS OPERATION

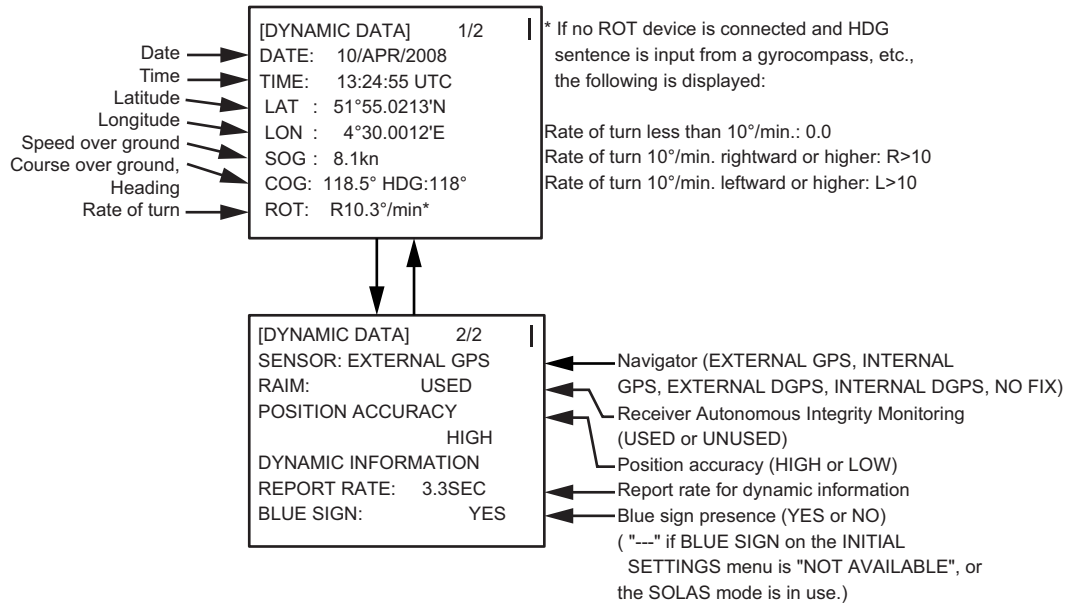
(Continued from previous page)



2.5 Dynamic Data

The [DYNAMIC DATA] display shows your ship's dynamic data, which includes date, time, ship's position, etc. To show these displays, press the **DISP** key three times at the plotter display.

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



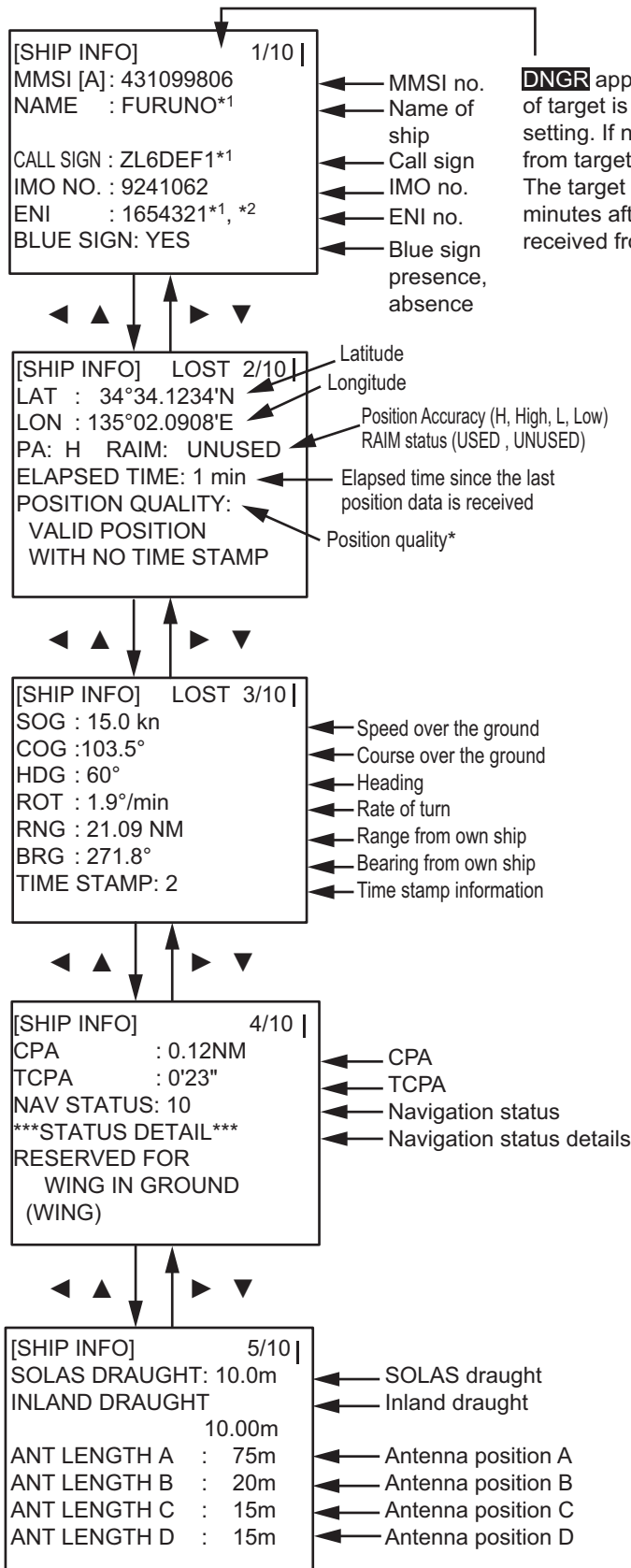
Update rate of dynamic ship information

Ship's dynamic conditions and nominal reporting interval

Ship's dynamic conditions	Nominal reporting interval
Ship at anchor or moored or aground or not under command and not moving faster than 3 kn	3 minutes
Ship at anchor or moored or aground or not under command 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

2.6 Details Ship Display (Mobile Class A)

See paragraph 1.7.2 for how to show this display.



DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. The target data is deleted seven minutes after no signal is received from the target.

*: Description of position quality

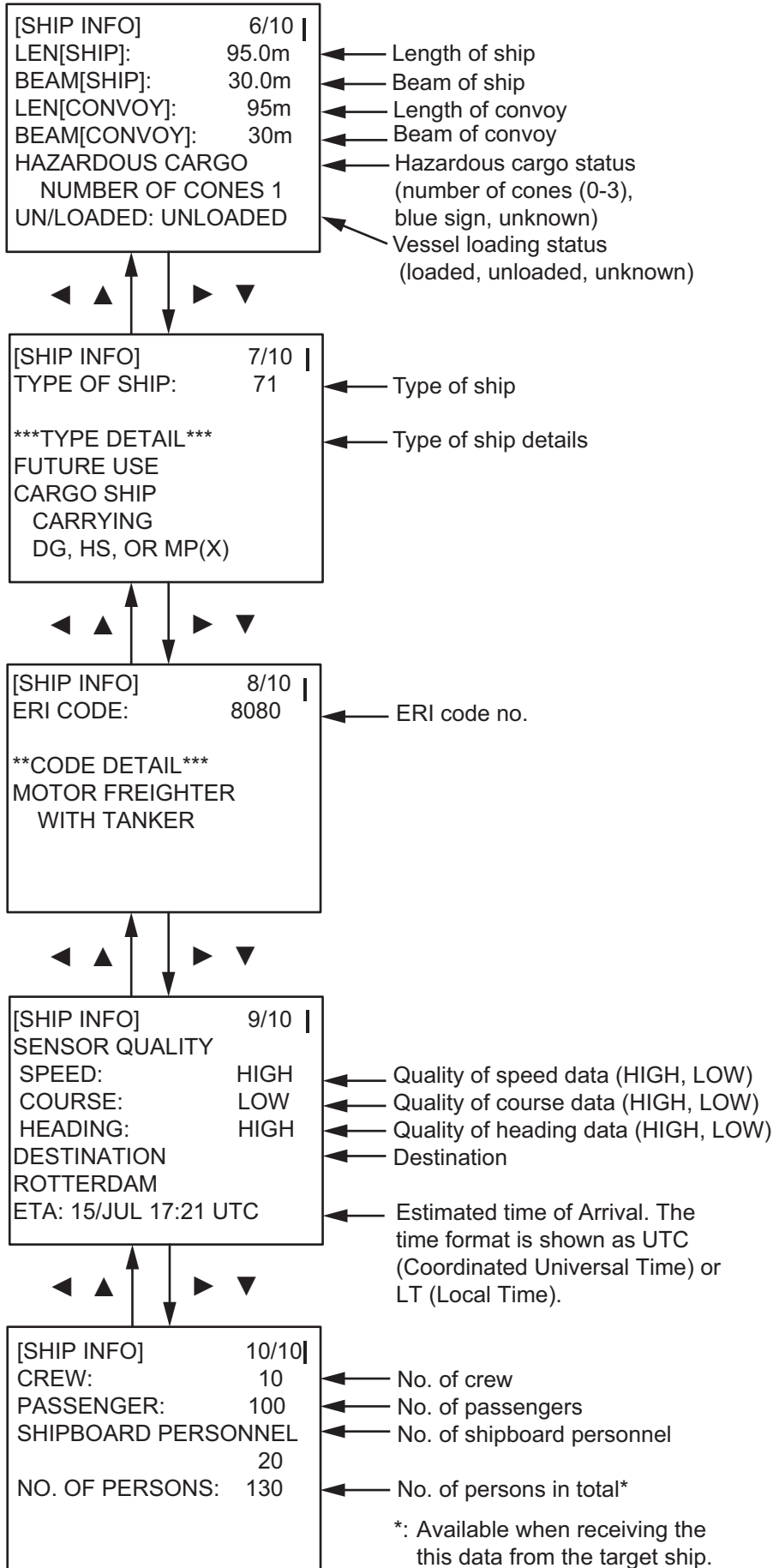
Description	Meaning
No position	Position is not available.
Manual position	Position by manual input
Dead reckoning position	Position from dead reckoning
Outdated position > 200 m	More than 200 m from estimated last position
Position > 10 m	Difference of more than 10 m of position
Position with RAIM > 10 m	Difference of more than 10 m of position
Position < 10 m	Difference of less than 10 m of position
Position with RAIM < 10 m	Difference of less than 10 m of position
Valid position with no time stamp	Time stamp is not available.

*1 If any of these contain an "@" it is replaced with a space.

*2 The ENI (European Number of Identification) is an unique vessel identification number of barges, passenger ships and tugboats on European inland waters.

(Continued on next page)

(Continued from previous page)



2. INLAND AIS OPERATION

Note 1: [BLUE SIGN] information (contained in message type 1) is displayed when the FA-150 receives an RFM10* message type 6 (inland ship and voyage related data) or type 8 (safety-related message). When this happens, "BLUE SIGN" appears on page 1/10 of the [DETAILS SHIP] displays. If the target becomes lost but later is re-detected, the target is treated as a mobile station class A AIS target until [BLUE SIGN] information is again received.

* RFM=Regional Function Message

Note 2: A target detected as Inland AIS remains as such once information from the target is received, regardless of any subsequent AIS mode changes.

2.7 Inland AIS Specific Messaging

2.7.1 Text message

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

```
[MSG]
TEXT
ETA/RTA
NO. OF PERSONS
EMMA WARNING
WATER LEVEL
```

3. [TEXT] is already selected; press the **ENT** key.

```
[MSG]
CREATE MSG
TX LOG
RX LOG
```

4. [CREATE MSG] is now selected; press the **ENT** key.

```
[CREATE MSG]
SET MSG TYPE
SET MSG
SEND MSG
```

5. [SET MSG TYPE] is now selected; press the **ENT** key.

```
[SET MSG TYPE]
ADRS TYPE: BROADCAST
MMSI      :-----
MSG TYPE: SAFETY
CHANNEL: ALTERNATE
RETRY TIMES: -
```

6. [ADRS TYPE] line is now selected; press the **ENT** key.

BROAD CAST
ADRS CAST

7. Select [ADRS CAST] to send a message to a specific AIS-equipped ship, or [BROAD CAST] to send a message to all AIS-equipped ships within broadcasting range of your ship. Press the **ENT** key. For [ADRS CAST], select MMSI then enter MMSI no.

8. Select [MSG TYPE] then press the **ENT** key.

SAFETY
NORMAL

9. Select message type: [NORMAL] (message other than safety) or [SAFETY] (important navigational or meteorological warning). Press the **ENT** key.

10. [CHANNEL] is selected; press the **ENT** key.

ALTERNATE
BOTH A & B
A
B

11. Select which channel to transmit your message over then press the **ENT** key.

12. [RETRY TIMES] is selected; press the **ENT** key. If the [ADRS TYPE] is [BROAD CAST] go to step 13. For [ADRS CAST], enter the number of times to re-transmit a message (0-3) then press the **ENT** key.

13. Press the **MENU** key to return to the [CREATE MSG] sub-menu.

14. Select [SET MSG] then press the **ENT** key.

[SET MSG]
—
01(151)* [DIM]HOLD:CLEAR

Number of characters used/available

*: Number of characters available with each message type for Class A, SOLAS is as follows:

NORMAL message with BROAD-CAST	: 156 characters
NORMAL message with ADDRESS-CAST	: 151 characters
SAFETY message with BROAD-CAST	: 161 characters
SAFETY message with ADDRESS-CAST	: 156 characters

15. Use the **CursorPad** to enter your message.

16. Press the **ENT** key to return to the [CREATE MSG] sub-menu.

17. Select [SEND MSG] then press the **ENT** key. The prompt shown below appears.

SEND MESSAGE.
ARE YOU SURE?
YES NO

18. Press **◀** to select [YES] then press the **ENT** key to send your message. Message status is shown as follows:

AIS message status messages and their meanings

Message	Meaning
"NOW SENDING."	Message is being sent.
"SEND MESSAGE COMPLETE. PRESS ANY KEY."	Transmission of message completed. (MMSI is additionally shown in case of addressed message.)
"SEND MESSAGE UNSUCCESSFUL. PRESS ANY KEY."	Message could not be sent.
"SEND MESSAGE UNSUCCESSFUL. MMSI: XXXXXXXXX PRESS ANY KEY."	Message sent successfully, however there is no reply from receiver of message.
"NOW WAITING RESPONSE. PRESS ANY KEY."	You tried to send a message while the transponder is awaiting receive confirmation (successful or unsuccessful) for the first-sent message. After confirmation is received, the next sequential message will be sent.

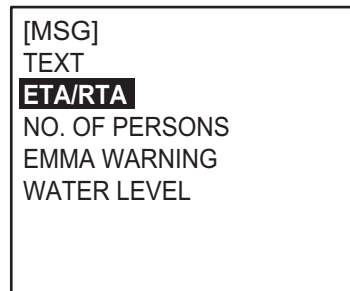
2.7.2 ETA and RTA messages

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.).

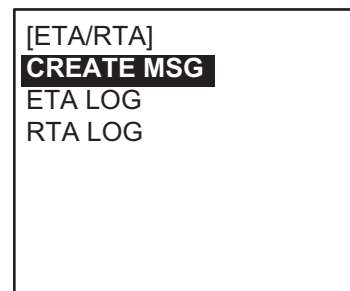
Upon receipt of your ETA message, the lock authority responds with an RTA (Requested Time of Arrival) message, usually within 15 minutes of receipt of the ETA message. The RTA message contains lock operational status, requested time of arrival and the particulars of the lock (country code, location code,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

Sending an ETA message

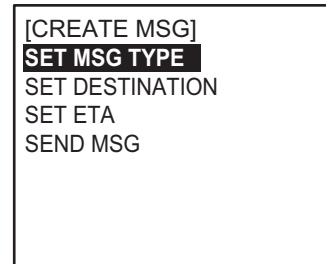
1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.



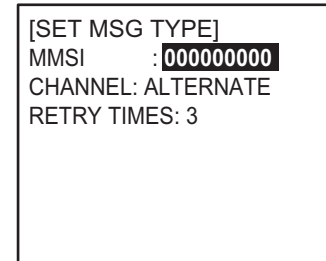
3. Select [ETA/RTA] then press the **ENT** key.



4. [CREATE MSG] is now selected; press the **ENT** key.



5. [SET MSG TYPE] is now selected; press the **ENT** key.



6. [MMSI] is now selected; press the **ENT** key.

7. Enter the MMSI of the lock/bridge/terminal you want to pass through then press the **ENT** key.

8. [CHANNEL] is now selected; press the **ENT** key.



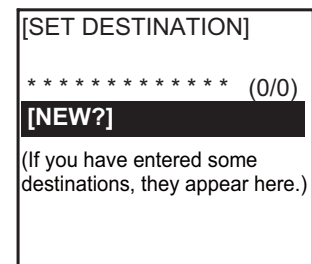
9. Select the channel over which to send the message then press the **ENT** key.

10. [RETRY TIMES] is now selected; press the **ENT** key.

11. Enter the number of times to re-send the message (if the first transmission is unsuccessful) then press the **ENT** key. An ETA message can be resent a maximum of three times.

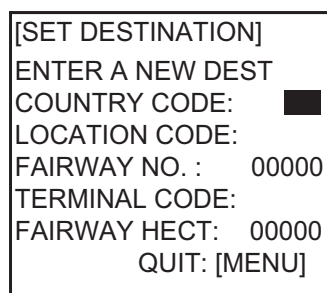
12. Press the **MENU** key to return to the [CREATE MSG] menu.

13. Select [SET DESTINATION] then press the **ENT** key.



14. [NEW] is now selected. If your destination is shown on screen, select it, press the **ENT** key then go to step 18. To enter a new destination, go to step 15.

15. With [NEW] selected, press the **ENT** key.

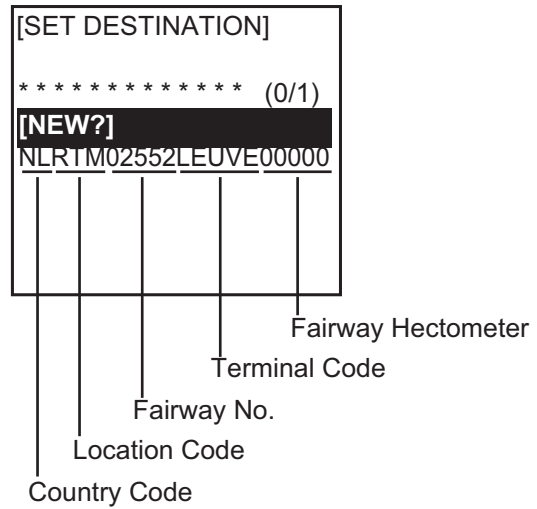


- ← UN country code, two 6 bit characters
- ← UN location code, three 6 bit characters
- ← Fairway section no., five-digit characters
- ← Terminal code, five 6 bit characters
- ← Fairway hectometre, five-digit characters

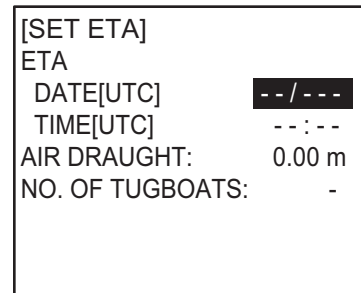
2. INLAND AIS OPERATION

16. [COUNTRY CODE] is selected; press the **ENT** key. Enter the UN country code of your destination, referring to ISO 3166, then press the **ENT** key.
17. Enter location code, fairway no., terminal code, and fairway hectometre, referring to the ERI (Electronic Reporting International) Guide Part IV Annex 2 for examples.

Note: To see the results of an entry, show the [SET DESTINATION] screen.



18. Press the **MENU** key twice to return to the [CREATE MSG] menu.
19. Select [SET ETA] then press the **ENT** key. The date and time format are shown as UTC (Co-ordinated Universal Time) or LT (LocalTime).



20. [DATE[UTC]] is now selected; press the **ENT** key.
21. Enter the day (1-2 digits) and month (three-character abbreviation) of ETA then press the **ENT** key.
22. [TIME[UTC]] is now selected; press the **ENT** key.
23. Enter your ETA, in 24-hour notation, then press the **ENT** key.
24. [AIR DRAUGHT] is selected; press the **ENT** key.
25. Enter your ship's air draught then press the **ENT** key. (Air draught is the vertical distance measured from the ship's waterline to the highest point on the ship.)
26. [NO. OF TUGBOATS] is selected; press the **ENT** key.
27. Enter the no. of assisting tugboats (0-6) your ship requires then press the **ENT** key. Enter "0" for none.
28. Press the **MENU** key to return to the [CREATE MSG] menu.
29. Select [SEND MSG] then press the **ENT** key. You are asked if you are sure to send the message. Select [YES] then press the **ENT** key to send the message.

Receiving an RTA message

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 popup shows "MESSAGE! RTA". To view the message, do the following:

1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.
3. Select [ETA/RTA] then press the **ENT** key.
4. Select [RTA LOG] then press the **ENT** key to show the RTA log. A sample log is shown at the top of the next page. New or unread messages show "NEW" on the date and time line. When the time difference is 00:00, [UTC] is shown near the time indication. Otherwise, [LT] is shown.
5. Select the message then press the **ENT** key.

```
[RTA LOG]
31/APR 13:25 NEW
[UTC] FROM: 431099111
27/MAR 03:43
[UTC] FROM: 431099111
19/MAR 18:00
[UTC] FROM: 431099111
1/20[▼] MSG[ENT] QUIT[MENU]
```

Lock Status

- Operational
- Limited Operation*
- Out of Order
- Not Available

Date and time lock authority requests your ship to arrive to the lock

* Obstructed by technical conditions, only one lock chamber available, etc.

```
[RTA LOG] 1/2
STATUS
LIMITED OPERATION
RTA: 05/JUN 12:32 UTC**
```

RTA message (page 1)

```
[RTA LOG] 2/2
COUNTRY CODE: DE
LOCATION CODE: TRI
FAIRWAY NO.: 01234
TERMINAL CODE: 11111
FAIRWAY HECTOMETRE
01000
```

RTA message (page 2)

} Lock particulars

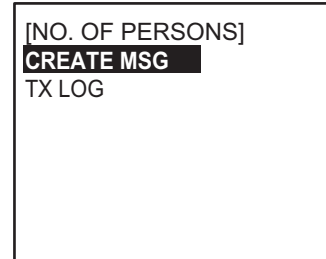
** : Time format shown as UTC (Coordinated Universal Time) or LT (Local Time).

6. Press the **MENU** key to close the message.

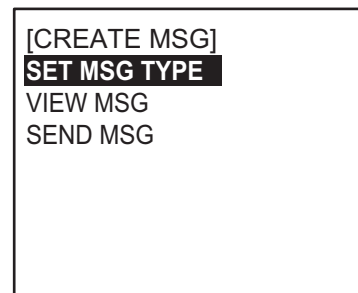
2.7.3 No. of persons message

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 event.

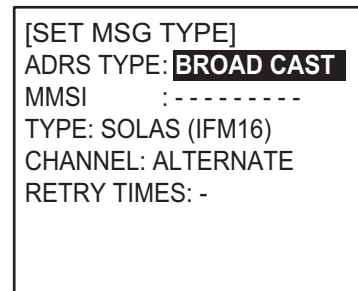
1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.
3. Select [NO. OF PERSONS] then press the **ENT** key.



4. [CREATE MSG] is now selected; press the **ENT** key.



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



6. [ADRS TYPE] is selected; press the **ENT** key.



7. Select [ADRS CAST] to send a message to a specific AIS-equipped ship or authority, or [BROADCAST] to send a message to all AIS-equipped ships within broadcasting range. Press the **ENT** key.
8. For [BROADCAST], go to step 9. For [ADRS CAST], select [MMSI] then press the **ENT** key. Enter the MMSI of the vessel which you want to send your message then press the **ENT** key.
9. Select [TYPE] then press the **ENT** key.



10. Select [SOLAS(IFM16)] or [INLAND(RFM55)] as applicable then press the **ENT** key.
 [SOLAS(IFM16)]: Send no. of persons.
 [INLAND(RFM55)]: Send no. of crew, passengers and shipboard personnel.

11. [CHANNEL] is selected; press the **ENT** key.

ALTERNATE
BOTH A & B
A
B

12. Select the channel to use to send the message then press the **ENT** key.
13. [RETRY TIMES] is now selected; press the **ENT** key.
14. Enter the number of times to re-send the message (if the first transmission is unsuccessful) then press the **ENT** key.
15. Press the **MENU** key to return to the [CREATE MSG] menu.

Note: To view your message before sending it, return to the [CREATE MSG] screen, select [VIEW MSG] then press the **ENT** key.

[VIEW MSG]
INLAND MSG(RFM55)
CREW: 100
PASSENGER: 1000
SHIPBOARD PERSONNEL 200
SOLAS MSG(IFM16)
NO. OF PERSONS: 1300

16. Select [SEND MSG] then press the **ENT** key. You are asked if you are sure to send the message. Select [YES] then press the **ENT** key to send the message.

2.7.4 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

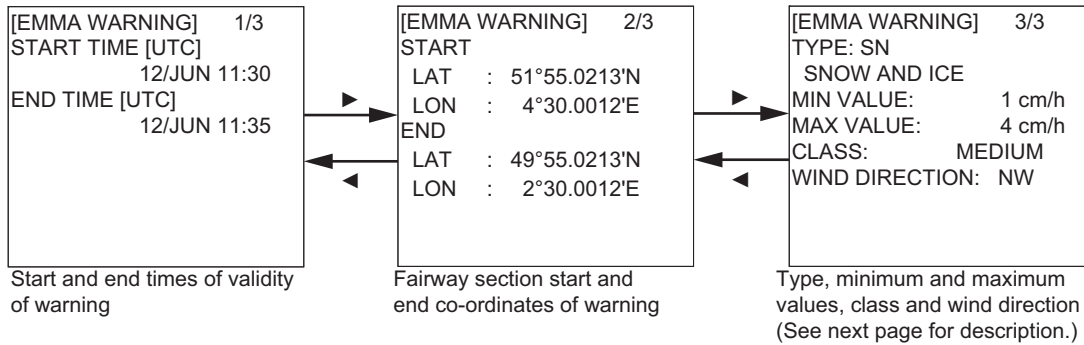
When you receive an EMMA warning, a popup displays "MESSAGE! EMMA WARNING". To see the contents of the message, do the following:

1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.
3. Select [EMMA WARNING] then press the **ENT** key.

2. INLAND AIS OPERATION

4. Select a message then press the **ENT** key.

The EMMA warning message has three pages and the 1st page looks something like the left-hand screen below. To view the other screens, press **▶**.



Item	Description
TYPE	FI: Fire in the Forests FO: Fog FL: Flood HT: High Temperature LT: Low Temperature RA: Rain SN: Snow and Ice TH: Thunderstorm WI: Wind Units of measurement are as follows: <ul style="list-style-type: none"> • km/h (wind) • °C (temperature) • cm/h (snow) • l/m²h (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, "- - - - -" (unknown)
WIND DIRECTION	N, NE, E, SE, S, SW, W, NW

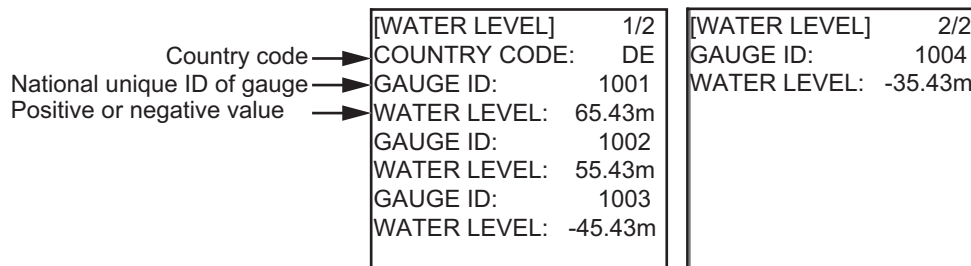
5. Press the **MENU** key to close the message.

2.7.5 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 popup displays "MESSAGE! WATER LEVEL". 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** key.
3. Select [WATER LEVEL] then press the **ENT** key.
4. Select a message then press the **ENT** key.



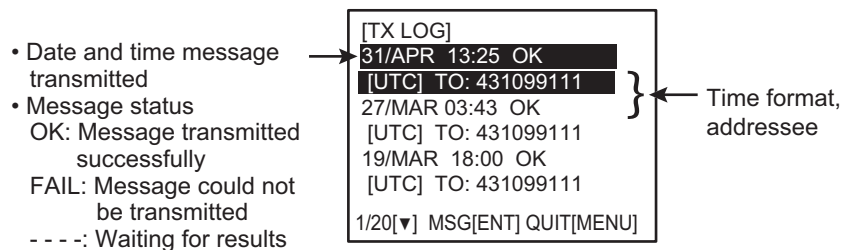
5. Press the **MENU** key to close the message.

2.7.6 Message logs

TX logs

The TX logs store transmitted text messages, ETA, and no. of persons messages, in respective logs. To see a TX message, do the following:

1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.
3. Select [TEXT], [ETA/RTA] or [NO. OF PERSONS] as appropriate then press the **ENT** key.
4. Select [TX LOG] (for [TEXT], [NO. OF PERSONS]) or [ETA LOG] as appropriate then press the **ENT** key.



Note: Time format is shown as [UTC] (Coordinated Universal Time) or [LT] (Local Time).

2. INLAND AIS OPERATION

5. Select a message then press the **ENT** key. Below are sample TX log messages.

```
[TX ADDRESSED MSG]
CHANGING COURSE TO
357 DEGREES AT
12:35.

QUIT[MENU]
```

TX addressed message

```
[TX BROADCAST MSG]
CHANGING COURSE TO
357 DEGREES AT
12:35.

QUIT[MENU]
```

TX broadcast message

```
[ETA LOG] 1/2
ETA: 05/JUN 12:32 UTC
COUNTRY CODE: DE
LOCATION CODE: TRI
FAIRWAY NO.: 01234
TERMINAL CODE: 11111
FAIRWAY HECTOMETRE
01000
```

ETA message (page 1)

```
[ETA LOG] 2/2
NUMBER OF TUGBOATS: 6
AIR DRAUGHT: 1.23m
```

ETA message (page 2)

```
[TX LOG]
SOLAS(IFM16)
NO. OF PERSONS: 100
```

*SOLAS IFM16 no. of
persons message*

```
[TX LOG]
INLAND(RFM55)
CREW: 100
PASSENGER: 255
SHIPBOARD PERSONNEL
41
```

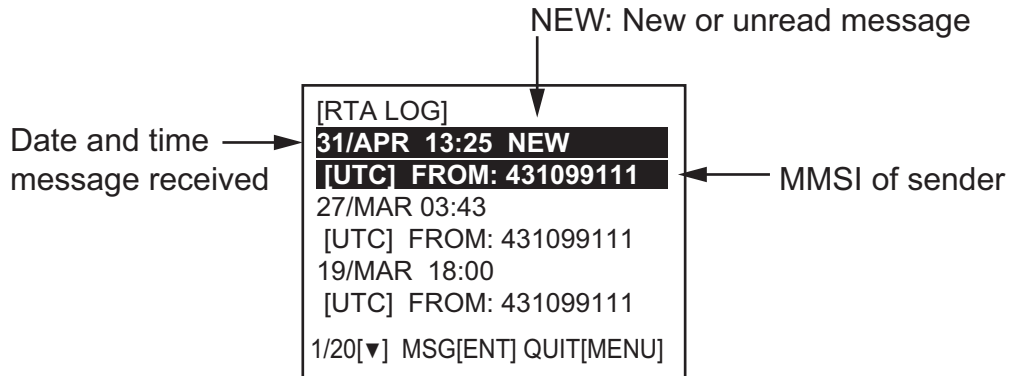
*INLAND RFM55 no. of
persons message*

6. Press the **MENU** key to close the message.

RX logs

The RX logs store received text messages, RTA, EMMA warning and water level messages, in respective logs. When you receive one of those messages, a popup shows "MESSAGE! XXX" (XXX=message type). 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** key.
3. Select [RX LOG] (Text), [RTA LOG] (RTA), [EMMA WARNING] or [WATER LEVEL] as appropriate then press the **ENT** key. Below is the [RTA LOG]. (The RX log for other message types is similar.)



4. Select the message to view then press the **ENT** key. Below are examples of text and RTA messages. For EMMA warning and water level messages, see paragraph 2.7.4 and paragraph 2.7.5, respectively.

```
[RX ADDRESSED MSG]
WILL CHANGE COURSE
TO 352 DEGREES AT
13:10 APR 10.

QUIT[MENU]
```

RX addressed message

```
[RX BROADCAST MSG]
STORM WARNING FOR
SAN FRANCISCO AREA.

QUIT[MENU]
```

RX broadcast message

```
[RTA LOG] 1/2
STATUS
LIMITED OPERATION
RTA: 05/JUN 12:32 UTC
```

RTA message (page 1)

```
[RTA LOG] 2/2
COUNTRY CODE: DE
LOCATION CODE: TRI
FAIRWAY NO.: 01234
TERMINAL CODE: 11111
FAIRWAY HECTOMETRE
01000
```

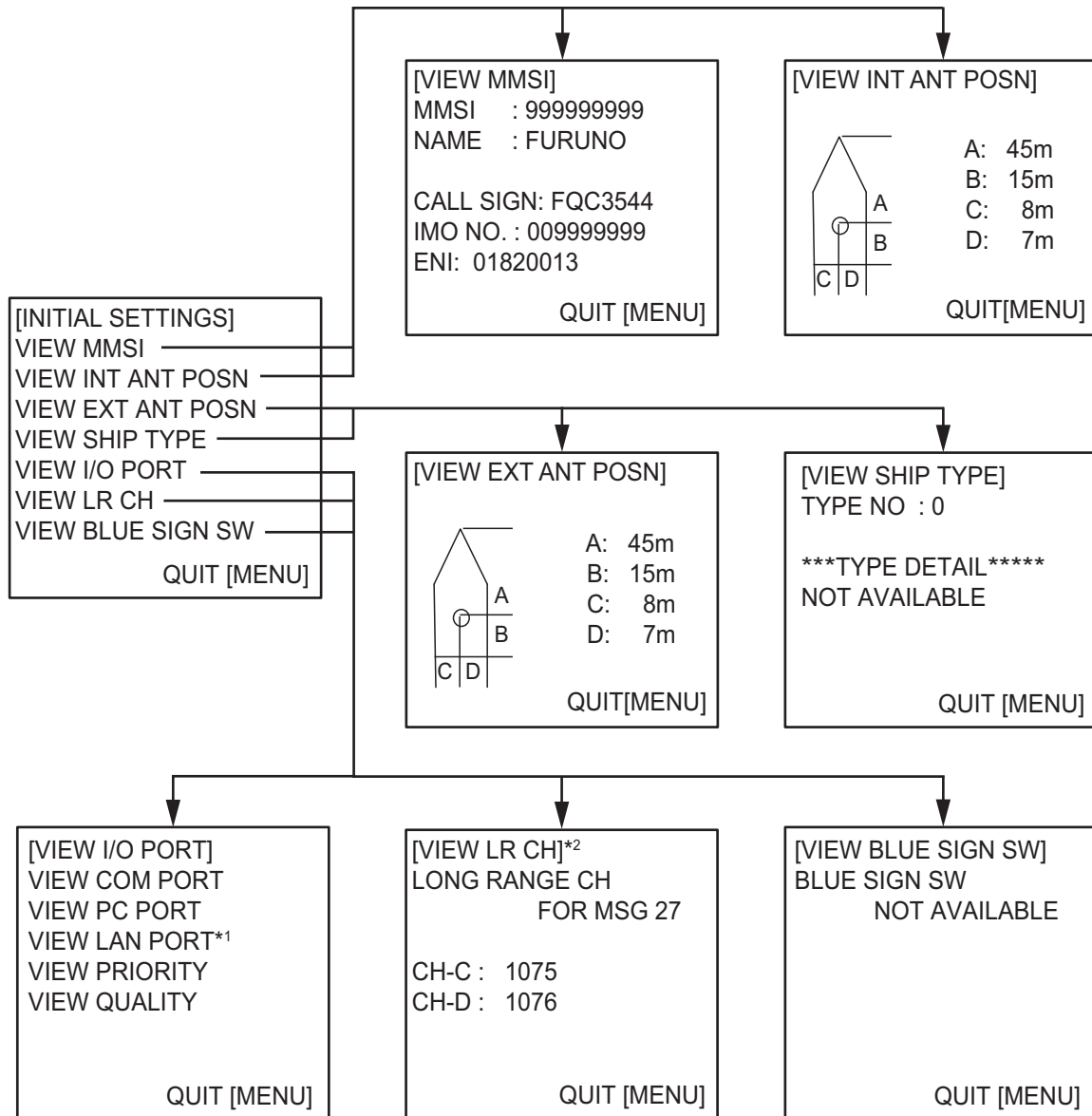
RTA message (page 2)

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

2.8 Viewing Initial Settings

The [INITIAL SETTINGS] menu, which is locked with a password, is where the installer enters ship's MMSI, internal and external antenna positions, ship type, I/O port settings and blue sign status. You can view the settings on this menu as follows.

1. Press the **MENU** key to open the menu.
2. Select [INITIAL SETTINGS] then press the **ENT** key.
3. Press the **ENT** key twice.
4. Select item to view then press the **ENT** key.



Choose port to view and press the **ENT** key.

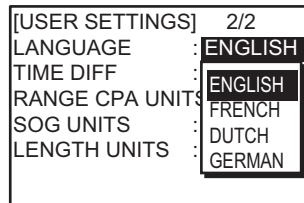
*1 Shown when optional LAN kit is installed.

*2 Shown depending on equipment specifications.

2.9 Selecting Menu Language

You can select the language for menu window among English, French, Dutch or German.

1. Press the **MENU** key to open the menu.
2. Select [USER SETTINGS] then press the **ENT** key.
3. Select [LANGUAGE] (on page 2) then press the **ENT** key.



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

2.10 Selecting Units of Measurement

You can select the units of measurement for distance, length and speed.

1. Press the **MENU** key to open the menu.
2. Select [USER SETTINGS] then press the **ENT** key.
3. Select [RANGE CPA UNITS], [SOG UNITS] or [LENGTH UNITS] (on page 2) as appropriate then press the **ENT** key. The options for each item are as follows.



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

2.11 Setting for Time Difference

You can set the time differences from UTC (Universal Time Coordinated) to show the local time. When you select UTC for the time display, "[UTC]" is shown near the time indication. For local time, "[LT]" is shown.

1. Press the **MENU** key to open the menu.
2. Select [USER SETTINGS] then press the **ENT** key.
3. Select [TIME DIFF] (on page 2) then press the **ENT** key. ±00:00
4. Select the desired time difference then press the **ENT** key. You can change the value with ▲ or ▼, the digit with ► or ◀. The setting range is -14:00 to +14:00. If you set the value outside the range, the error message appears shown below. Press any key to close the message.

OUT OF RANGE!
TIME DIFF:
-14:00 - +14:00
PRESS ANY KEY.

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

Note: When there is no time data from GPS, days in a leap year may be shifted.

3. MAINTENANCE, TROUBLESHOOTING

 WARNING	
	<p>ELECTRICAL SHOCK HAZARD Do not open the equipment.</p> <p>Only qualified personnel should work inside the equipment.</p>

<h2>NOTICE</h2>
<p>Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.</p> <p>Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.</p>

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, Resetting the Breaker

3.2.1 Replacement of fuse

The power cable for the monitor unit contains a 3A fuse which protects the equipment from overvoltage, reverse polarity and equipment fault. If the power cannot be turned on, check if the fuse has blown. If the fuse has blown, find the cause before replacing the fuse. If the fuse blows again after replacement, contact your dealer for advice.

Part	Type	Code No.
Fuse	FGBO-A 3A AC125V	000-549-063

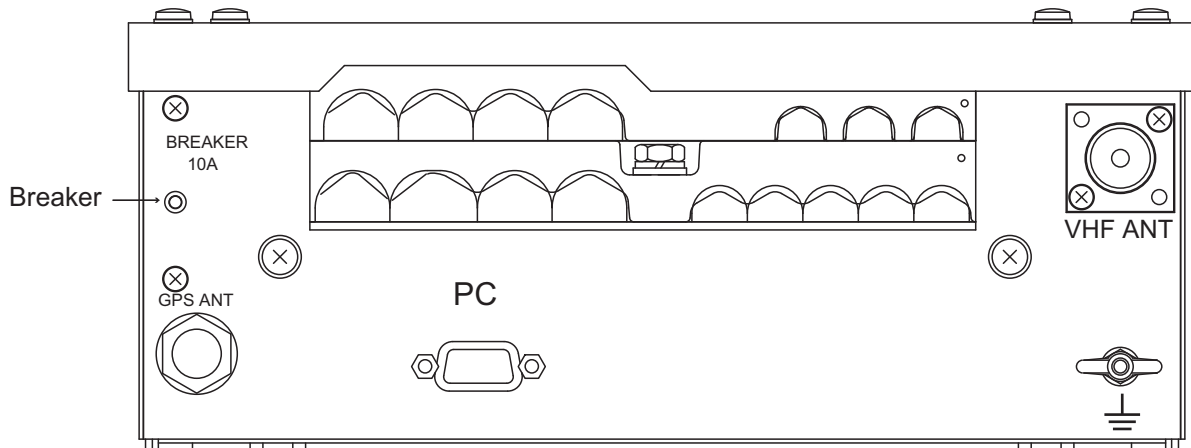
⚠ WARNING

Use the proper fuse.

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

3.2.2 Resetting the breaker

If the power cannot be turned on, the **BREAKER** button on the rear panel of the transponder unit may have activated. The **BREAKER** button pops out when overvoltage, reverse polarity or equipment fault is detected, to protect the system from damage. If the button pops out, find the reason before pushing it in to restore normal operation.



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.	<ul style="list-style-type: none"> • Check that the power connector is firmly fastened • Check the power supply.
Transmitting, receiving messages	
Cannot transmit or receiver.	<ul style="list-style-type: none"> • Check that the VHF antenna cable is firmly fastened. • Check the VHF antenna for damage. • For TX message, try a different TX channel. (Menu operating sequence: [MENU] key→[MSG]→[CREATE MSG]→[SET MSG TYPE]→[CHANNEL])
Can transmit but message is sent to wrong party.	<ul style="list-style-type: none"> • On the SET MSG TYPE sub-menu, check that ADRS TYPE is selected to ADRS-CAST and MMSI is correct, before sending the message. (Menu operating sequence: [MENU]→[MSG]→[CREATE MSG]→[SET MSG TYPE]→[ADRS TYPE] and [MMSI])
Position data	
No position data.	<ul style="list-style-type: none"> • Check the GPS antenna for damage. • Check the GPS antenna cable and its connectors.

3.4 Diagnostics

The FA-150 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.

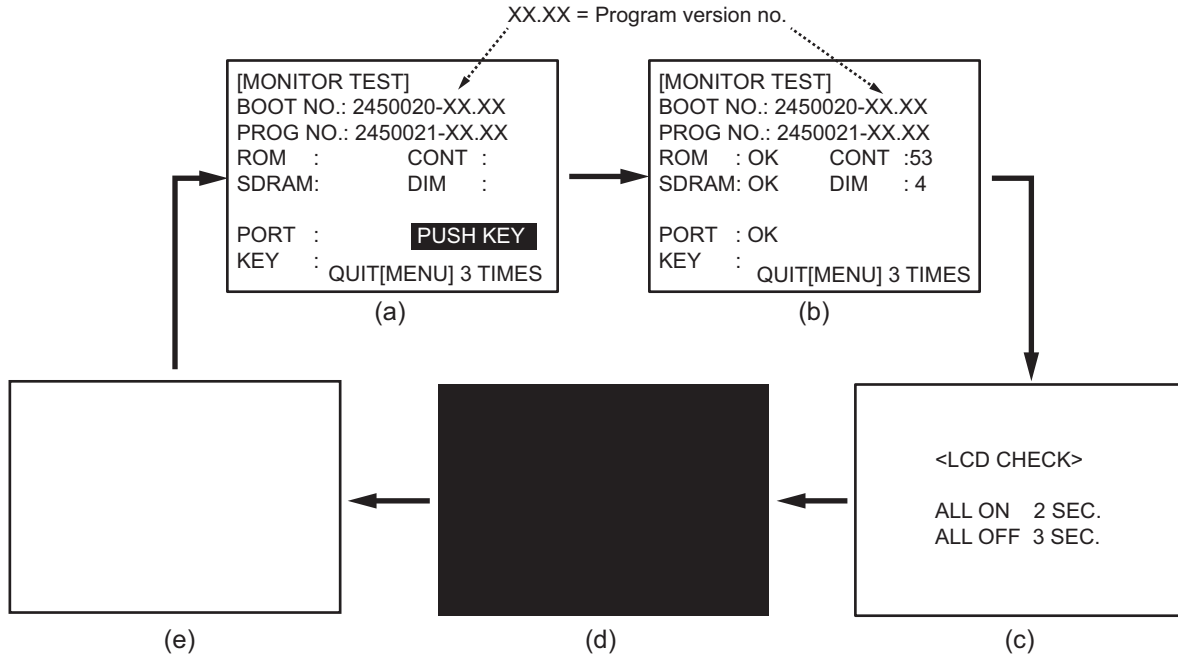
1. Press the **MENU** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT** key.

For service technician.
Not accessible by user. →

[DIAGNOSTICS]
MONITOR TEST
TRANSPONDER TEST
PWR ON/OFF HISTORY
TX ON/OFF HISTORY
MEMORY CLEAR
ACTIVATE KEY
FOR SERVICE

3. MAINTENANCE, TROUBLESHOOTING

3. [MONITOR TEST] is already selected; press the **ENT** key. The test program automatically proceeds in the sequence shown below.



- a) The first screen in the test shows boot no. and program no. The message "PUSH KEY" prompts you to test the keys. Press each key (except the **PWR** key) and arrows on the **CursorPad** one by one. The name of the pressed key or arrow appears next to [KEY] if the control is functioning normally.
 - b) The ROM, SDRAM and (I/O)PORT (special test connector required, otherwise "NG" appears) are checked. The results of the ROM/ SDRAM 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.
The contrast and dimmer settings are automatically changed. Check that their setting indications are reasonable.
 - c) The screen announces the start of the LCD check.
 - d) The screen turns black.
 - e) The screen turns white.
4. The test is repeated. To escape from the test and return to the [DIAGNOSTICS] menu, press the **MENU** key three times when "PUSH KEY" is displayed.

3.4.2 Transponder test

The transponder test consists of three tests: memory test, internal GPS receiver test and VHF communication test.

Memory test

The memory can be checked for proper operation and the program number displayed as follows:

1. Press the **MENU** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT** key.
3. Select [TRANSPONDER TEST] then press the **ENT** key.
4. Select [MEMORY TEST] then press the **ENT** key. The program no. is displayed and the ROM and RAM are checked. The results of the ROM and RAM check are shown as "OK" or "NG" (No Good). For any "NG", contact your dealer for advice. The versions of the MAIN Board, Mother Board and TX Board are also shown.
5. Press the **MENU** key to return to the [DIAGNOSTICS] sub-menu.

```
[MEMORY TEST]
PROGRAM NO.
  2450018-xx.xx
MAIN ROM   : OK
MAIN RAM   : OK
SUB RAM    : OK
HW VERSION
  MAIN: x  MOT: y  TX: z
```

xx.xx: Program Version No.
 x: MAIN Hardware Version No.
 y: 0 (for Non-Inland AIS),
 other than 0 (for Inland AIS)
 z: TX Hardware Version No.

Internal GPS test

The internal GPS receiver can be checked for proper operation as follows:

1. Press the **MENU** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT** key.
3. Select [TRANSPONDER TEST] then press the **ENT** key.
4. Select [GPS TEST] then press the **ENT** key to start the test. The program no. and the test results appear as shown below.

```
[GPS TEST]
PROGRAM NO.
  485026xxxx
TEST: OK
```

xxxx: Program Version No.

OK: Normal

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

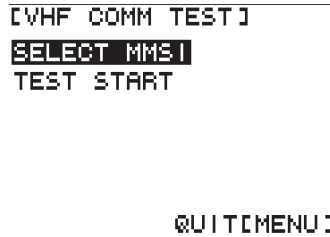
- DATA BACKUP ERR: Data backup problem
- GPS COMMUNICATION ERROR: Communication error with internal receiver
- PARAMETER BACKUP ERR: Parameter backup problem
- ROM ERROR
- RAM ERROR
- ANTENNA ERROR

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

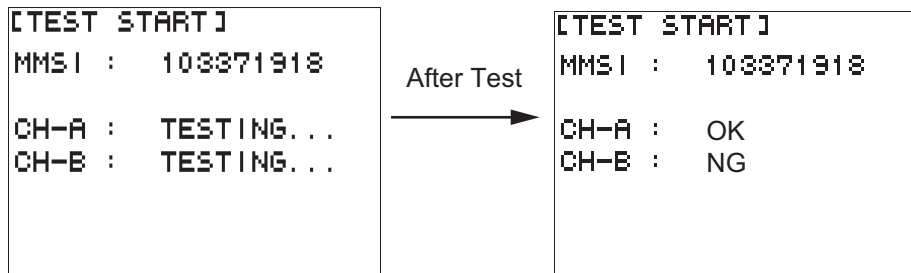
VHF communication test

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

1. Press the **MENU** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT** key.
3. Select [TRANSPONDER TEST] then press the **ENT** key.
4. Select [VHF COMM TEST] then press the **ENT** key.



5. Select [SELECT MMSI] window then press the **ENT** key.
6. Select a suitable MMSI to do the test, automatically or manually.
 - **Automatic MMSI selection:** Two MMSI numbers, within 15 - 25 NM of your vessel, are automatically selected. Select one.
 - **Manual MMSI input:** Select [MANUAL] then press the **ENT** key. Enter the MMSI using the cursor pad (▲▼: select number, ◀▶: select digit) then press the **ENT** key.
7. Press the **MENU** key to open the [VHF COMM TEST] window.
8. Select [TEST START] then press the **ENT** key. The message "TESTING..." appears during the test. The result of the test is shown as "OK" or "NG".
 - "OK": Normal
 - "NG": No Good. You can not communicate over the specified MMSI channel.



The result "NG" may appear under the following conditions:

- An object (island, etc.) between your vessel and the MMSI specified may be blocking transmission. If you suspect that this may be the problem, manually select a different MMSI, on the [SELECT MMSI] screen.
 - The error "TX MALFUNCTION" occurs. See "TX MALFUNCTION" in the table on page AP-27 for details.
 - The test was conducted within one minute after starting the equipment.
 - You are in an area where transmission is not possible. Check the mode set on [SELECT NO] on the [EDIT CHANNEL] screen. This test cannot be conducted when you cannot transmit and receive.
9. Press the **MENU** key to return to the [DIAGNOSTICS] sub-menu.

3.4.3 Power on/off history

The [PWR ON/OFF HISTORY] log shows the date and time of the latest 30 power-on and power-off. If the interval between power-off and power-on is less than 15 minutes those times are not shown.

1. Press the **MENU** key to open the main menu.
2. Select [DIAGNOSTICS] then press the **ENT** key.
3. Select [PWR ON/OFF HISTORY] then press the **ENT** key.

[PWR ON/OFF HISTORY]		
PWR-ON	17/MAY/2009	← Power turned on 17 May 2009 at 05:35:54
	05:35:54	
PWR-OFF	17/MAY/2009	
	04:56:57	
PWR-ON	17/MAY/2009	
	04:06:34	
QUIT[MENU]		

4. Use ▼ or ► to change page in the forward direction; ▲ or ◀ to change page in the reverse direction.
5. Press the **MENU** key to return to the [DIAGNOSTICS] sub-menu.

3.4.4 TX on/off history

The [TX ON/OFF HISTORY] log shows the date and time of the latest 30 transmissions.

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

[TX ON/OFF HISTORY]		
TX-ON	17/MAY/2009	← Tx at 17 May 2009 at 05:35:54
	05:35:54	
TX-OFF	17/MAY/2009	
	04:34:57	
TX-ON	17/MAY/2009	
	04:33:57	
PAGE (1/2) :[▶] QUIT[MENU]		

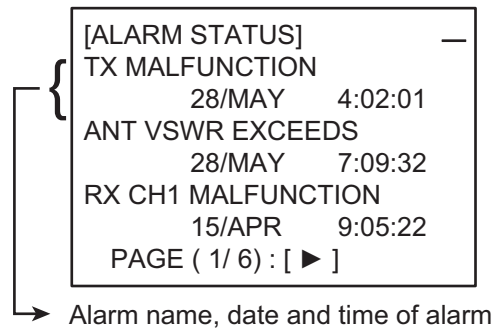
4. Use ▼ or ► to change page in the forward direction; ▲ or ◀ to change page in the reverse direction.
5. Press the **MENU** key to return to the [DIAGNOSTICS] sub-menu.

3.5 Alarm Status

The alarm sounds for equipment error and is accompanied by a flashing popup indication. Press any key to silence the alarm and erase the popup. To see which alarm(s) has been violated, display the [ALARM STATUS] log as shown below.

1. At the plotter display, press the **DISP** key four times to show the [ALARM STATUS] display.
2. Use ▲ or ▼ to scroll the log.

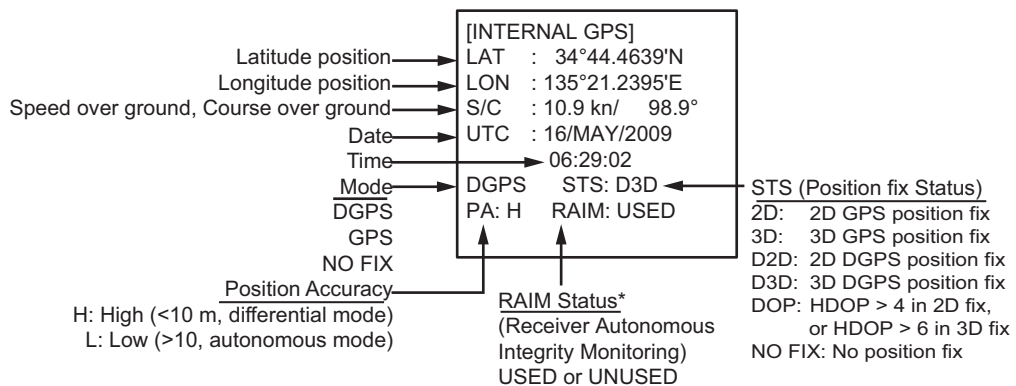
For alarm messages and their meanings, see Appendix 3.



3.6 GPS Monitor

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

1. Press the **MENU** key to open the menu.
2. Select [INTERNAL GPS] then press the **ENT** key.



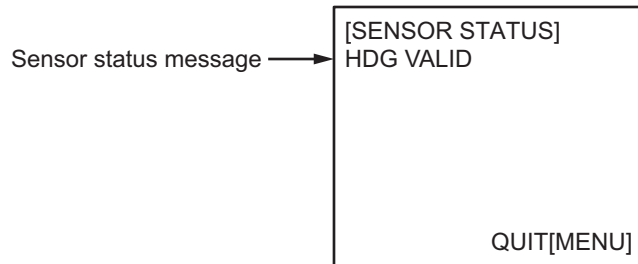
*RAIM: Technique whereby the GPS receiver verifies the integrity of the signals received from the GPS constellation.

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

3.7 Displaying Sensor Status

The [SENSOR STATUS] screen shows sensor status.

1. Press the **MENU** key.
2. Select [SENSOR STATUS] then press the **ENT** key.



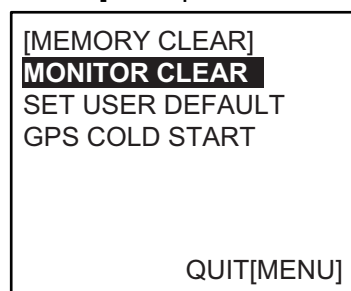
3. Press the **DISP** key to close the display.

Sensor Status Message	Meaning
CH MANAGEMENT	Channel changed (displayed about 30 s)
EXT DGNSS	Using external DGNSS
EXT GNSS	Using external GNSS
EXT SOG/COG	Using external SOG/COG
HDG VALID	Heading data normal
INT DGNSS BEACON	Using internal DGNSS beacon
INT DGNSS MSG 17	MSG 17 corrects internal GNSS with differential correction
INT GNSS	Using internal GNSS
INT SOG/COG	Using internal SOG/COG
OTHER ROT	Value calculated from HDT, or ROT device used and talker is other than TI.
ROT VALID	ROT data normal

3.8 Restoring 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 [INIT SETTING] and [SYSTEM SETTINGS] sub-menus are restored. GPS data is also cleared; however, MMSI and IMO numbers, ship's name and call sign are not cleared.

1. Press the **MENU** key to open the menu.
2. Select [DIAGNOSTICS] then press the **ENT** key.
3. Select [MEMORY CLEAR] then press the **ENT** key.



3. MAINTENANCE, TROUBLESHOOTING

4. Select [MONITOR CLEAR], [SET USER DEFAULT] or [GPS COLD START] as appropriate then press the **ENT** key.

MONITOR CLEAR	Restore default settings for dimmer, contrast, CPA/TCPA, key beep, audio alarm and received message alarm.
USER DEFAULT	Restores all settings to default, except items in the [INITIAL SETTINGS] menu (MMSI No., IMO No., ship's name and call sign, etc.)
GPS COLD START	Clears GPS Almanac to receive latest Almanac.

MONITOR CLEAR. ARE YOU SURE? YES NO
--

MONITOR CLEAR

SET USER DEFAULT ARE YOU SURE? YES NO
--

USER DEFAULT

GPS COLD START. ARE YOU SURE? YES NO

GPS COLD START

5. Press **◀** to select [YES] then press the **ENT** key.
For [MONITOR CLEAR] and [USER DEFAULT], a beep sounds then the equipment restarts.

3.9 AIS-SART Test Indication in Target List

The FA-150 can confirm if an AIS-SART is working properly. This test requires message 1 data (MMSI No. 97 XXXXXXX, NAV STATUS: 15) or Message 14 data (MMSI No. 97 XXXXXXX, TEXT: "SART TEST"). Note that this setting is turned off when the power is turned off.

1. Press the **MENU** key to open the menu.
2. Select [USER SETTINGS] then press the **ENT** key.

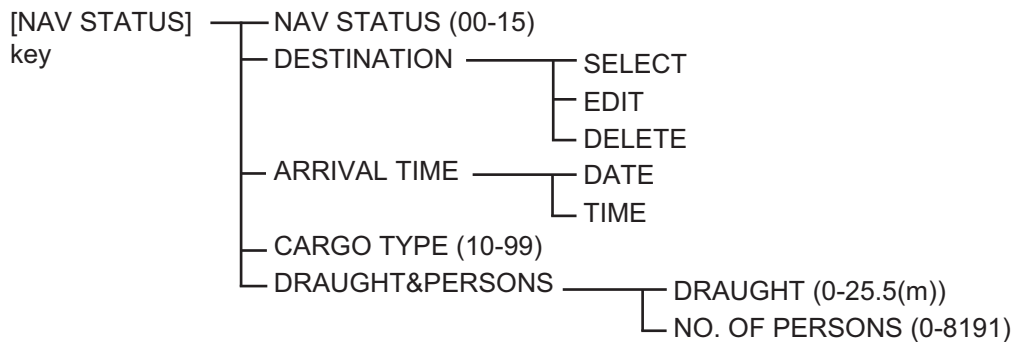
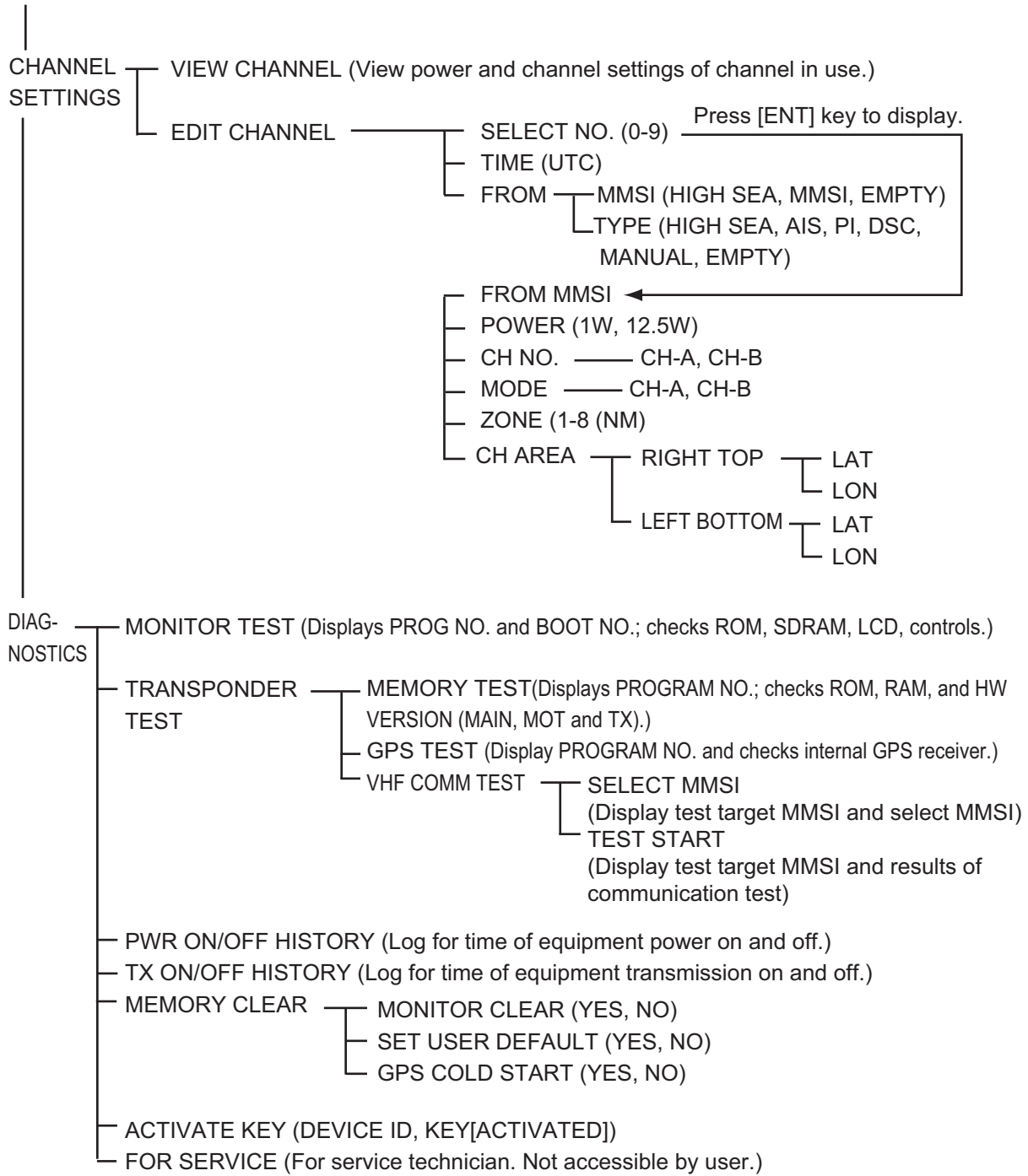
[USER SETTINGS] KEY BEEP : ON ALARM BUZZER : ON AUTO SORT : ON DISP SART TEST : ON LONG RANGE RECEIVED MSG CPA/TCPA ALARM

Note: For INLAND AIS mode, the [USER SETTINGS] menu has two pages. See section 2.9 to section 2.11.

3. Select [DISP SART TEST] then press the **ENT** key.
4. Select [ON] then press the **ENT** key.
5. Press the **DISP** key to close the menu.
6. At the plotter display, press the **DISP** key.
7. Select [SART] then press the **ENT** key to show detailed information for the AIS-SART.
8. Confirm that the [STATUS] field is showing "SART TEST". (See page 1-20.)

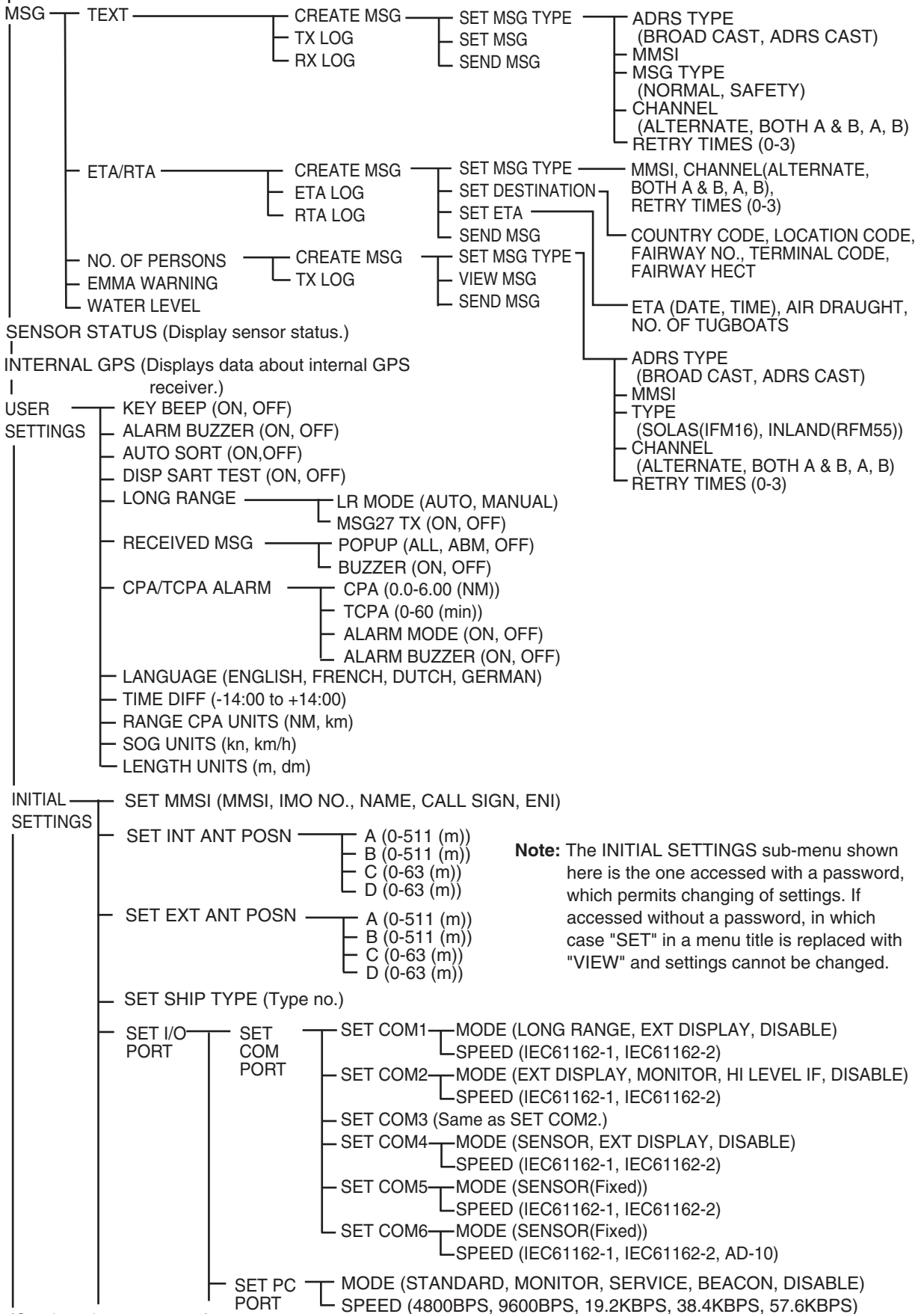
APPENDIX 1 MENU TREE

(Continued from previous page)



Inland AIS

[MENU] key

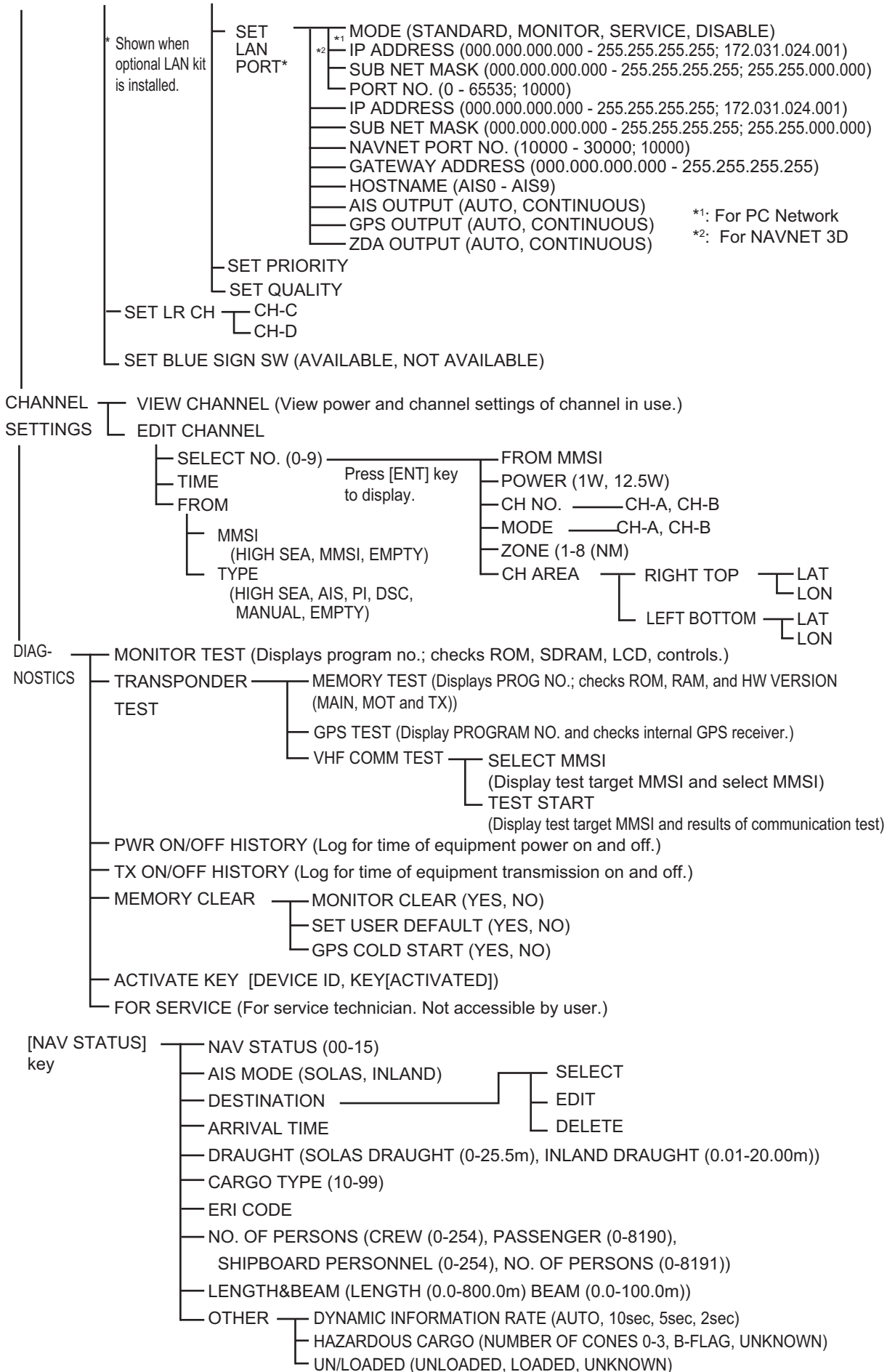


Note: The INITIAL SETTINGS sub-menu shown here is the one accessed with a password, which permits changing of settings. If accessed without a password, in which case "SET" in a menu title is replaced with "VIEW" and settings cannot be changed.

(Continued on next page)

APPENDIX 1 MENU TREE

(Continued from previous page)



APPENDIX 2 OTHER INFORMATION

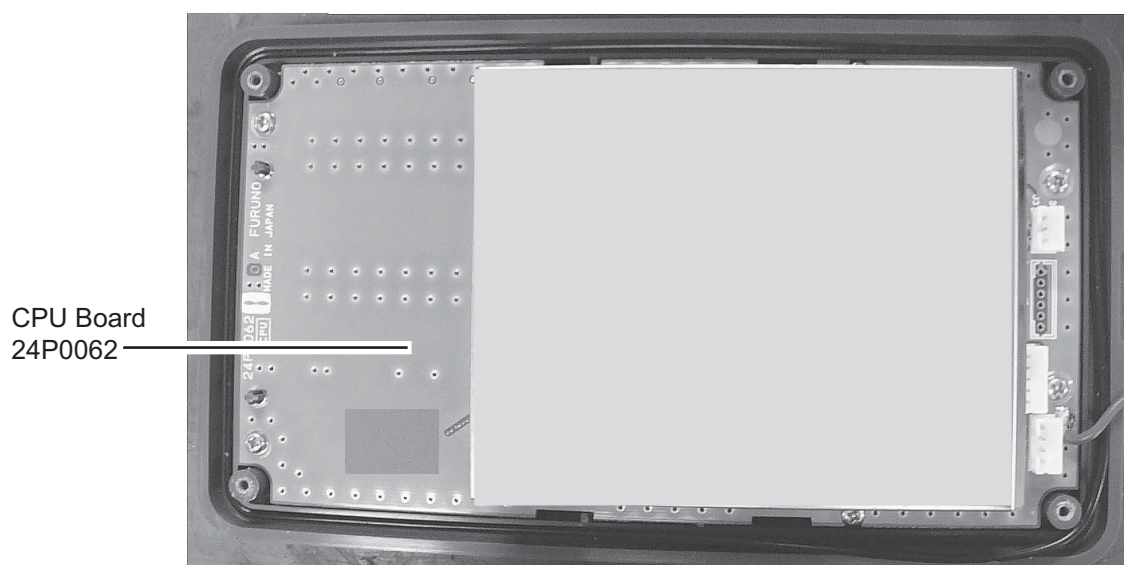
Parts List

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 page AP-6 and AP-7.

FURUNO ELECTRICAL PARTS LIST	Model	FA-150	
	Unit	MONITOR UNIT, TRANSPONDER UNIT	
	Blk.No.		
TYPE, NAME		LOCATION	
PRINTED CIRCUIT BOARD			
24P0062, CPU		MONITOR UNIT	
24P0034, DSC		TRANSPONDER UNIT	
24P0043, GPSTB		TRANSPONDER UNIT	
24P0035, MAIN		TRANSPONDER UNIT	
24P0036, MOT		TRANSPONDER UNIT	
24P0037, PWR		TRANSPONDER UNIT	
24P0033A, RX1		TRANSPONDER UNIT	
24P0033B, RX2		TRANSPONDER UNIT	
24P0032, TX		TRANSPONDER UNIT	
GN-8093, GPS RECEIVER		TRANSPONDER UNIT	

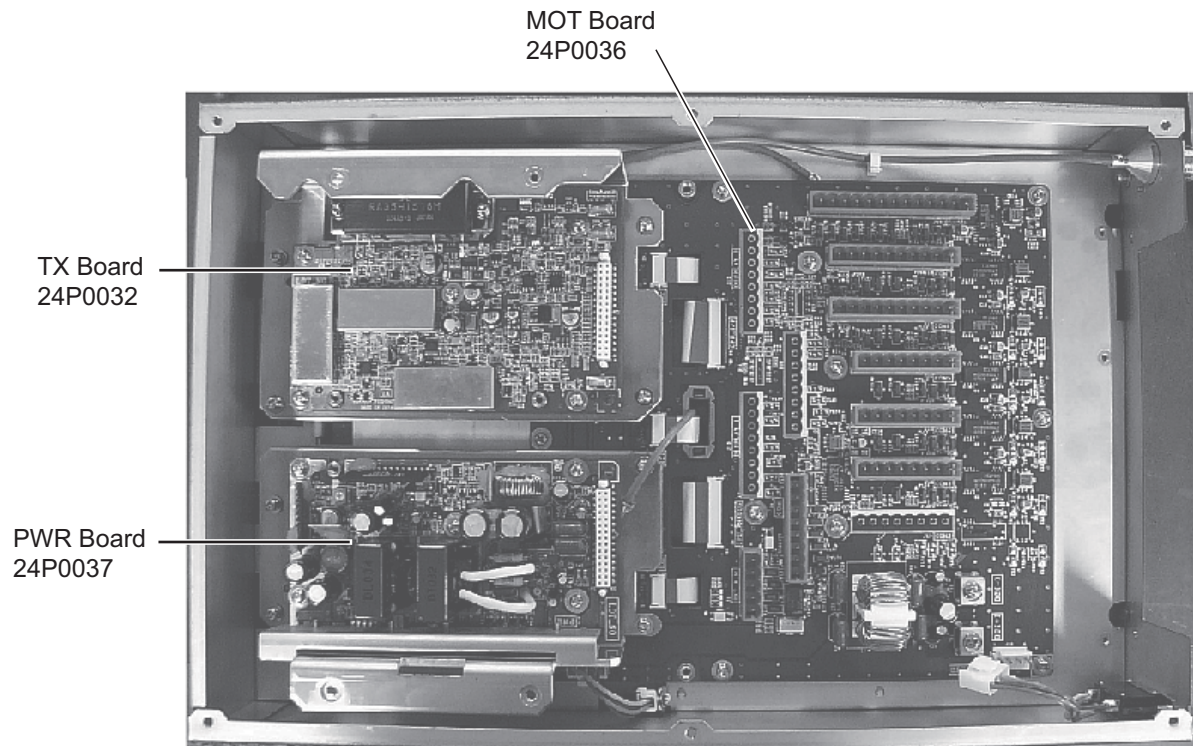
Parts Location

Monitor Unit

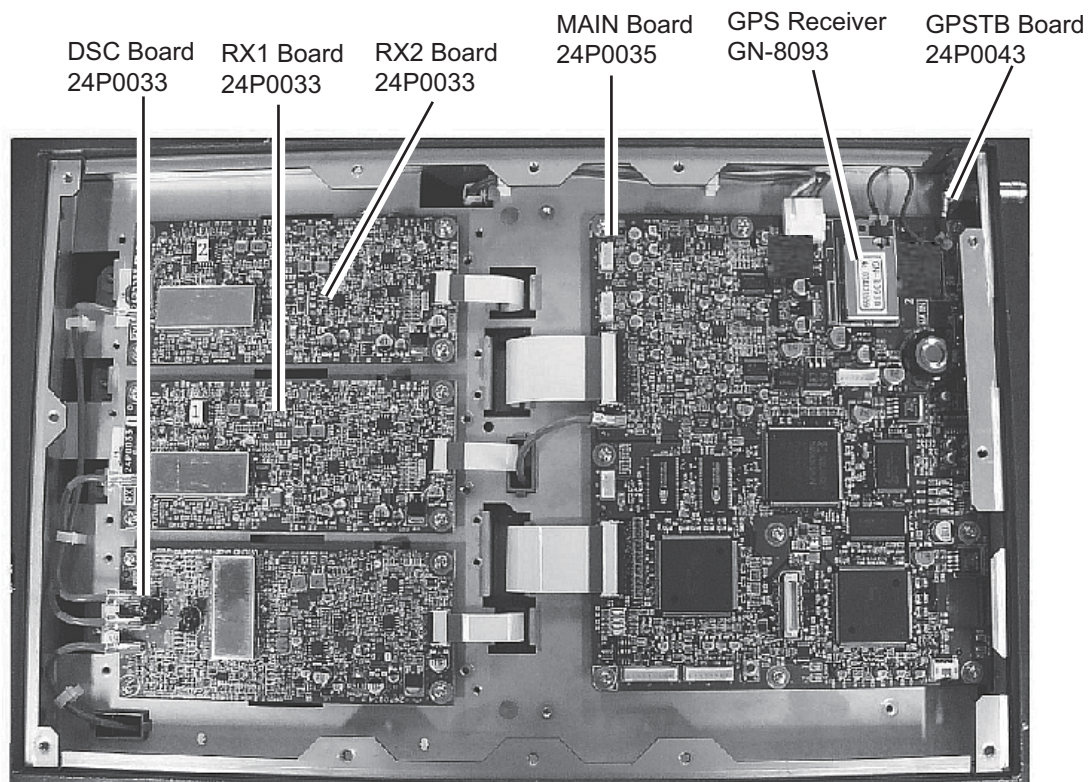


Monitor unit, rear cover opened

Transponder unit



Transponder unit, top cover removed



Transponder unit, bottom cover removed

Digital Interface (IEC 61162-1 Edition 4, IEC 61162-2)**Sentence data**Input sentences

ABM, ACA, ACK, ACN, AIR, BBM, DTM, GBS, GGA, GLL, GNS, HBT, HDT, LRF, LRI, OSD, PIWWIVD, PIWWSPW, PIWWSSD, PIWWVSD, RMC, ROT, SSD, THS, VBW, VSD, VTG

Output sentences

ABK, ACA, ACS, ALC, ALF, ALR, ARC, HBT, LRF, LR1, LR2, LR3, SSD, TXT, PIWWSPR, VDM, VDO, VER, VSD

Transmission interval

ABK, ALF: With each event

ACA: When requested, or at RX

ACS: At RX

ALC, ALR: 30 s

ARC: When refused ACN

LRF, LR1, LR2, LR3: At RX

HBT: 50 s

SSD: When requested

TXT: When requested, or each update

VDM: At RX

VDO: 1 s

VER: When requested, or powered on

VSD: When requested

Load requirements as listener

Isolation: Provided

Input Impedance: Input Impedance: 110 ohms (130K ohms without jumper plug)

Max. Voltage: ± 14 V to GNDiso

Threshold: ± 0.2 V (A-B)

Output drive capability*Differential driver output*

R=50 ohm 2 v min.

R=27 ohm 1.5 V min.

Driver short-circuit current

60 mA min. 150 mA max.

Data transmission

Data is transmitted in serial asynchronous form in accordance with the standard referenced in 2.1 of IEC 61162-1/2. The first bit is a start bit and is followed by data bits, least-significant-bit as illustrated below.

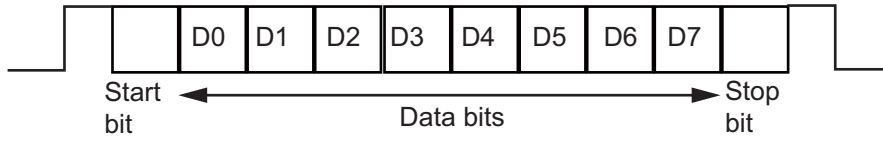
The following parameters are used:

Baud rate: 38.4 Kbps /4800 bps

APPENDIX 2 OTHER INFORMATION

Data bits: 8 (D7 = 0), parity none

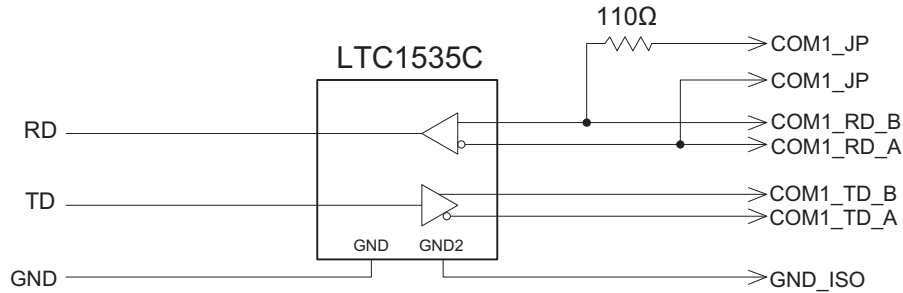
Stop bits: 1



Serial interface I/O circuit

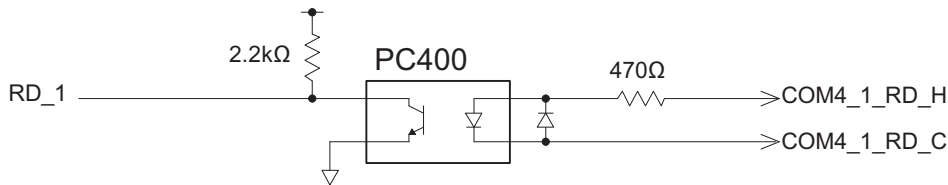
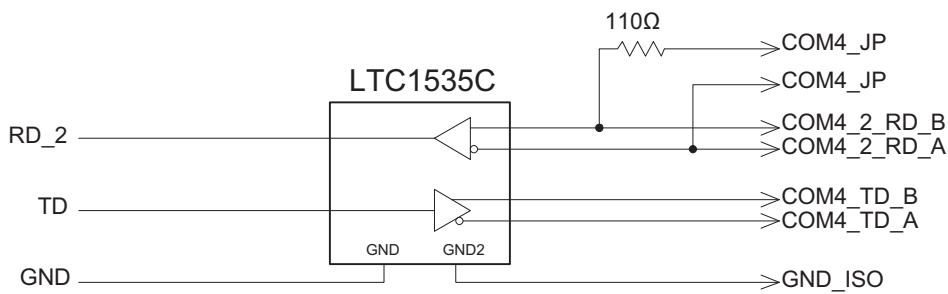
COM1, 2, 3 port

Baud rate selectable from 4800 and 38400 (bps).



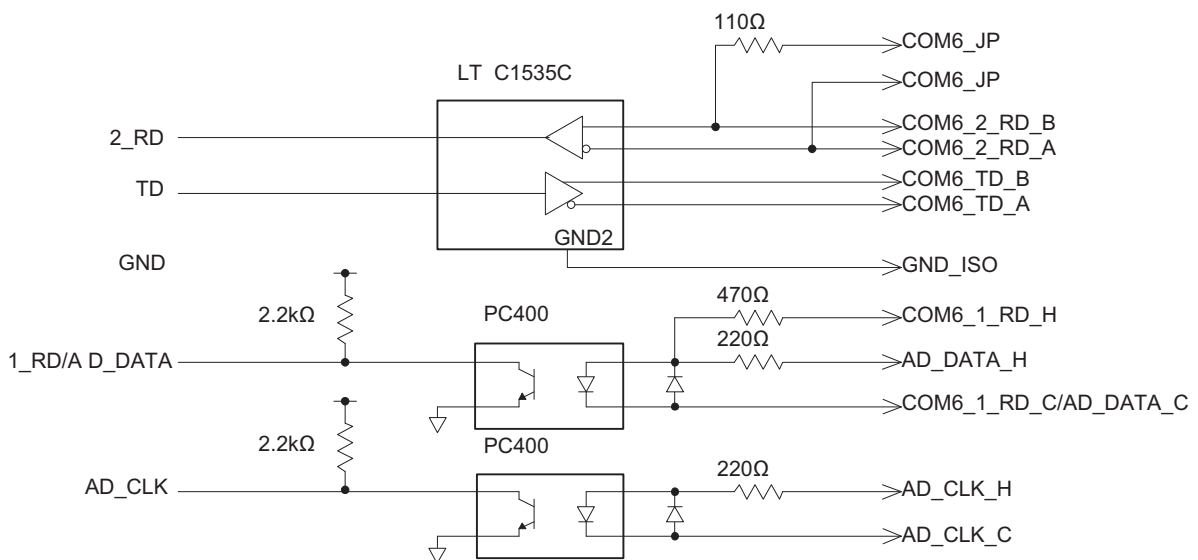
COM4,5 port

Baud rate selectable from 4800 and 38400 (bps).



COM6 port

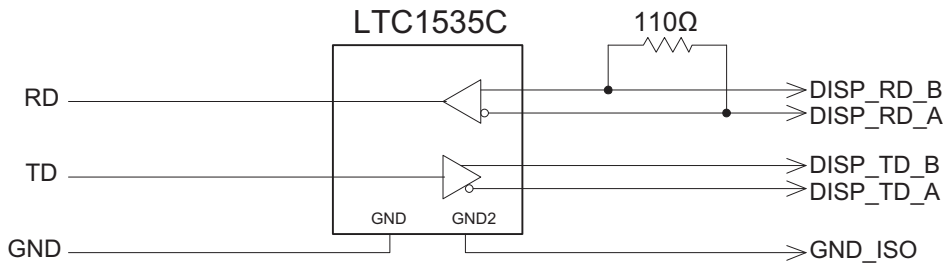
Baud rate selectable from 4800 and 38400 (bps).



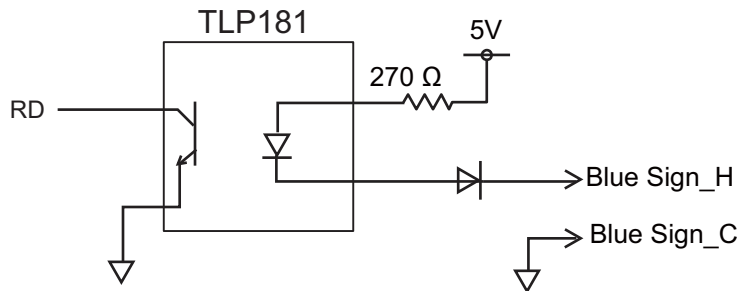
APPENDIX 2 OTHER INFORMATION

DISP port

Baud rate selectable from 4800 and 38400 (bps).



Blue Sign port



Sentence description

Input sentences

ABM - Addressed binary and safety related message

! **ABM, x, x, x, xxxxxxxx, x, x.x, s--s, x, *hh<CR><LF>
 1 2 3 4 5 6 7 8

1. Total number of sentences needed to transfer the message (1 - 9)
2. Message sentence number (1 - 9)
3. Message sequence identifier (0 - 3)
4. The MMSI of destination AIS unit for the ITU-R M.1371 message (9 digits)
5. AIS channel for broadcast of the radio message (0 - 3)
6. VDL message number (6, 12, 25, 26, 70 or 71), see ITU-R M.1371
7. Encapsulated data (1 - 63 bytes)
8. Number of fill-bits (0 - 5)

ACA - AIS regional channel assignment message

\$ **ACA, x, llll.ll, a, yyyyy.yy, a, llll.ll, a, yyyyy.yy, a, x, xxxx, x, xxxx, x, x, x, a, x, hhmmss.ss, *hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

- | | |
|--|-----------------------------|
| 1. Sequence number, 0 to 9 | 9. Channel B |
| 2. Region Northeast corner latitude - N/S | 10. Channel B bandwidth |
| 3. Region Northeast corner longitude - E/W | 11. Tx/Rx mode control |
| 4. Region Southwest corner latitude - N/S | 12. Power level control |
| 5. Region Southwest corner longitude - E/W | 13. Information source |
| 6. Transition Zone Size | 14. In-use flag |
| 7. Channel A | 15. Time of "in-use" change |
| 8. Channel A bandwidth | |

ACK - Acknowledge alarm

\$**ACK,xxx,*hh<CR><LF>
1

1. Local alarm number (identifier) (000 - 999)

ACN - Alert command

\$**ACN,hhmmss.ss,aaa,x.x,x.x,c,a*hh<CR><LF>
1 2 3 4 5 6

1. Time
2. Manufacturer mnemonic code
3. Alert Identifier
4. Alert Instance (1 - 999999)
5. Alert command
(A=acknowledge, Q=request/repeat information, O=responsibility transfer S=silence)
6. Sentence status flag

AIR - AIS interrogation request

\$**AIR,xxxxxxxx,x.x,x.x,x,xxxxxxxx,x.x,x, a, x.x, x.x, x.x *hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12

1. MMSI of interrogated station 1
2. ITU-R M.1371 message requested from station 1
3. Message sub-section
4. ITU-R M.1371 second message requested from station 1
5. Message sub-section
6. MMSI of interrogated station 2
7. ITU-R M.1371 message requested from station 2
8. Message sub-section
9. Channel used on request
10. No use. Response slot for Message ID 1.1 of Message 15
11. No use. Response slot for Message ID 1.2 of Message 15
12. No use. Response slot for Message ID 2.1 of Message 15

BBM - UAIS broadcast binary message.

\$**BBM,x,x,x,x,xx,s--s,x,*hh<CR><LF>
12 3 4 5 6 7

1. Total number of sentences needed to transfer the message (1 - 9)
2. Sentence number (1 - 9)
3. Sequential Message identifier (0 - 9)
4. AIS channel for broadcast of the radio message
5. VDL message no. (8, 14, 25, 26, 70 or 71)
6. Encapsulated data
7. Number of fill-bits, 0 to 5

DTM - Datum reference

\$**DTM,ccc,a,x.x,a,x.x,a,x.x,ccc,*hh<CR><LF>
1 2 3 4 5 6 7 8

1. Local datum (W84=WGS84 W72=WGS72 S85=SGS85, P90=PE90
User defined=999, IHO datum code)
2. Local datum subdivision code (NULL or one character)
3. Lat offset, min (-59.99999 - 59.99999)
4. N/S
5. Lon offset, min
6. E/W
7. Altitude offset, meters (no use)
8. Reference datum (W84=WGS84 W72=WGS72 S85=SGS85, P90=PE90)

APPENDIX 2 OTHER INFORMATION

GBS - GNSS satellite fault detection

\$**GBS, hhmmss.ss, x.x, x.x, x.x, xx, x.x, x.x, x.x h, h, *hh<CR><LF>
1 2 3 4 5 6 7 8 9 10

1. UTC time of GGA or GNS fix associated with this sentence
2. Expected error in latitude (0.0 - 999.9)
3. Expected error in longitude (0.0 - 999.9)
4. Expected error in altitude (no use)
5. ID number of most likely failed satellite (no use)
6. Probability of missed detection for most likely failed satellite (no use)
7. Estimate of bias in meters on most likely failed satellite (no use)
8. Standard deviation of bias estimate (no use)
9. GNSS system ID
10. GNSS signal ID

GGA - Global positioning system (GPS) fix data

\$**GGA, hhmmss.ss, llll.ll, a, yyyyy.yy, a, x, xx, x.x, x.x, M, x.x, M, x.x, xxxx, *hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13 14

1. UTC of position (no use)
2. Latitude (0.00000 - 9000.00000)
3. N/S
4. Longitude (0.00000 - 18000.00000)
5. E/W
6. GPS quality indicator
7. Number of satellites in use, 00-12, may be different from the number in view (no use)
8. Horizontal dilution of precision (no use)
9. Antenna altitude above/below mean sea level (geoid) (no use)
10. Units of antenna altitude, m (no use)
11. Geoidal separation (no use)
12. Units of geoidal separation, m (no use)
13. Age of differential GPS data (no use)
14. Differential reference station ID, 0000-1023 (no use)

GLL - Geographic position - latitude/longitude

\$**GLL, llll.lll, a, yyyyy.yy, a, hhmmss.ss, a, x, *hh<CR><LF>
1 2 3 4 5 6 7

1. Latitude (0.00000 - 9000.00000)
2. N/S
3. Longitude (0.00000 - 18000.00000)
4. E/W
5. UTC of position (no use)
6. Status (A=data valid V=data invalid)
7. Mode indicator (A=Autonomous D=Differential E=Estimated (dead reckoning)
M=Manual input S=Simulator N=Data not valid)

GNS - GNSS fix data

\$**GNS,hhmmss.ss,llll.ll,a,lllll.ll,a,c--c,xx,x.x,x.x,x.x,x.x,x.x,x.x,a*hh<CR><LF>
 1 2 3 4 5 6 7 8 9 10 11 12 13

1. UTC of position (no use)
2. Latitude (0.00000 - 9000.00000)
3. N/S
4. Longitude (0.00000 - 18000.00000)
5. E/W
6. Mode indicator
 A=Autonomous D=Differential E=Estimated Mode F=Float RTK M=Manual Input Mode
 N=No fix P=Precise R=Real Time Kinematic S=Simulator Mode
7. Total number of satellites in use (00 - 99)
8. HDOP (0.0 - 999.99)
9. Antenna altitude, meters (-999.99 - 9999.99)
10. Geoidal separation (-999.99 - 9999.99)
11. Age of differential data (0 - 999)
12. Differential reference station ID (0000 - 1023)
13. Navigational status indicator (S=Safe C=Caution U=Unsafe V=Navigational status not valid, equipment is not providing navigational status indication)

HBT - Heart beat supervision

\$--HBT,x.x,A,x*hh<CR><LF>
 1 2 3

1. Configured repeat interval (1 to 999, NULL)
2. Equipment status (A/V)
3. Sequential sentence identifier (0 to 9)

HDT - Heading - true

**HDT,xxx.x,T*hh<CR><LF>
 1 2

1. Heading, degrees (0.00 to 360.00)
2. True (T)

LRF - Long-range function

**LRF,x,xxxxxxxx,c--c,c--c,c--c*hh<CR><LF>
 1 2 3 4 5

1. Sequence number (0 - 9)
2. MMSI of requester
3. Name of requester (1 - 20 characters)
4. Function (1 - 26 characters)
5. Function reply status

LRI - Long-range interrogation

**LRI,x,a,xxxxxxxx,xxxxxxxx,lll.ll,a,yyyyy.yy,a,lll.ll,a,yyyyy.yy,a*hh<CR><LF>
 1 2 3 4 5 6 7 8

1. Sequence number (0 to 9)
2. Control flag
3. MMSI of requestor
4. MMSI of destination
5. Latitude - N/S (north-east coordinate)
6. Longitude - E/W (north-east coordinate)
7. Latitude - N/S (south-west coordinate)
8. Longitude - E/W (south-west coordinate)

APPENDIX 2 OTHER INFORMATION

OSD - Own ship data

\$**OSD,x.x,A,x.x,a,x.x,a,x.x,x.x,a*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. Heading, degrees true (0.00 - 360.00)
2. Heading status (A=data valid, V=data invalid)
3. Vessel course, degrees true (0.00 - 359.99)
4. Course reference
B=Bottom tracking log
M=Manually entered
W=Water referenced
R=Radar tracking (of fixed target)
P=Positioning system ground reference
5. Vessel speed (0.00 - 999.999)
6. Speed reference, B/M/W/R/P (See 4.)
7. Vessel set, degrees true, manually entered (0.00 - 360.00)
8. Vessel drift (speed), manually entered (0.00 - 999.999)
9. Speed units (K=km/h N=Knots S=statute miles/h)

RMC - Recommended minimum specific GPS/TRANSIT data

\$GPRMC, hhmss.ss, A, llll.ll, a, yyyy.yy, a, x.x, x.x, ddmmyy, x.x, a, a, a*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12 13

1. UTC of position fix (000000 - 235959)
2. Status (A=data valid, V=navigation receiver warning)
3. Latitude (0.0000 - 9000.0000)
4. N/S
5. Longitude (0.0000 - 18000.0000)
6. E/W
7. Speed over ground, knots (0.0 - 9999.9)
8. Course over ground, degrees true (0.0 - 359.0)
9. Date (010100 - 311299)
10. Magnetic variation, degrees E/W (0.0 - 180.0/NULL)
11. E/W
12. Mode indicator
(A=Autonomous D=Differential E=Estimated (dead reckoning) mode
F=Float RTK M=Manual input mode N=No fix P=Precise R=Real time kinematic
S=Simulator mode)
13. Navigational status indication
(S=Safe C=Caution U=Unsafe V=Navigational status not valid, equipment is not providing
navigational status indication)

ROT - Rate of turn

\$--ROT,x.x,A*hh<CR><LF>
1 2

1. Rate of turn, deg/min, "-"=bow turns to port (-9999.9 - 9999.9)
2. Status: A=data valid, V=data invalid

SSD - UAIS ship static data

\$**SSD,c--c,c--c,xxx,xxx,xx,xx,c, aa*hh<CR><LF>
1 2 3 4 5 6 7 8

1. Ship's call sign (1 - 7 characters)
2. Ship's name (1 - 20 characters)
3. Pos. ref. point distance, "A," from bow (0 - 511 Meters)
4. Pos. ref. point distance, "B," from stern (0 - 511 Meters)
5. Pos. ref. point distance, "C," from port beam (0 - 63 Meters)
6. Pos. ref. point distance, "D," from starboard beam (0 - 63 Meters)
7. DTE indicator flag
8. Source identifier

THS - True heading and status

\$--THS, x.x, a *hh<CR><LF>
1 2

1. Heading, degrees true (0.00-360.00)
2. Mode indicator
(A=Autonomous E=Estimated (dead reckoning) M=Manual input S=Simulator mode
V=Data not valid (including standby))

VBW - Dual ground/water speed

\$**VBW,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,x.x,*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10

1. (No use) Longitudinal water speed, knots (-9999.99 - 9999.99)
2. (No use) Transverse water speed, knots (-9999.99 - 9999.99)
3. (No use) Status: water speed, A=data valid V=data invalid
4. Longitudinal ground speed, knots (-9999.99 - 9999.99)
5. Transverse ground speed, knots (-9999.99 - 9999.99)
6. Status: ground speed, A=data valid V=data invalid
7. (No use) Stern transverse water speed, knots (-9999.99 - 9999.99)
8. (No use) Status: stern water speed, A=data valid V=data invalid
9. (No use) Stern transverse ground speed, knots (-9999.99 - 9999.99)
10. (No use) Status: stern ground speed, A=data valid V=data invalid

VSD - UAIS voyage static data

\$--VSD,x.x,x.x,x.x,c--c,hhmmss.ss,xx,xx,x.x,x.x,*hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. Type of ship and cargo category (0 - 255)
2. Maximum present static draught (0 to 25.5 Meters)
3. Persons on-board (0 - 8191)
4. Destination (1 - 20 characters)
5. Estimated UTC of arrival at destination
6. Estimated day of arrival at destination (00 to 31(UTC))
7. Estimated month of arrival at destination (00 to 12(UTC))
8. Navigational status (0 - 15)
9. Regional application flags (0 - 15)

VTG - Course over ground and ground speed

\$--VTG, x.x, T, x.x, M, x.x, N, x.x, K, a,*hh <CR><LF>
1 2 3 4 5 6 7 8 9

1. Course over ground, degrees (0.0 - 359.9)
2. T=True (fixed)
3. (No use) Course over ground, degrees (0.0 - 359.9)
4. (No use) M=Magnetic (fixed)
5. Speed over ground, knots (0.00-9999.9)
6. N=Knots (fixed)
7. Speed over ground (0.00 - 9999.9)
8. K=km/h (fixed)
9. Mode indicator
(A=Autonomous mode, D=Differential mode, E= Estimated (dead reckoning) mode
M=Manual input mode, P=Precise, S=Simulator mode, N=Data not valid)

Output sentences

ABK - UAIS addressed and binary broadcast acknowledgement

\$**ABK,xxxxxxxx,x,x,x,x,x,*hh<CR><LF>
 1 2 3 4 5

- 1. MMSI of the addressed AIS unit
- 2. AIS channel of reception
- 3. Message ID
- 4. Message sequence number
- 5. Type of acknowledgement

ACA - See "ACA - AIS regional channel assignment message" on page AP-10.

ACS - Channel management information source

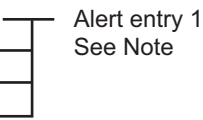
\$**ACS,x,xxxxxxxx,hhmmss.ss,xx,xx,xxxx,*hh<CR><LF>
 1 2 3 4 5 6

- 1. Sequence number (0 - 9)
- 2. MMSI of originator
- 3. UTC at receipt of channel management information
- 4. UTC day (01 - 31)
- 5. UTC month (01 - 12)
- 6. UTC year

ALC - Cyclic alert list

\$**ALC,xx,xx,xx,x.x,aaa,x.x,x.x,x.x,.....,*hh<CR><LF>
 1 2 3 4 5 6 7 8 9

- 1. Total number of sentences for this message (01 to 99)
- 2. Sentence number (01 to 99)
- 3. Sequential message identifier (00 to 99)
- 4. Number of alert entries
- 5. Manufacturer mnemonic code
- 6. Alert identifier
- 7. Alert instance
- 8. Revision counter
- 9. Additional Alert entries (see Note)



Note: Alert entry 0 - n: Each alert entry consists of

- Manufacturer Identifier (see ALF Manufacturer Identifier)
- Alert Identifier (see ALF Alert identifier)
- Alert instance (see ALF instance)
- Revision counter (see ALF revision counter)

ALF - Alert sentence

```
$**ALF,x,x,x,hhmmss.ss,a,a,a,aaa,x,x,x,x,x,x,c--c,*hh<CR><LF>
  1 2 3    4    5 6 7 8 9 10 11 12 13
```

1. Total number of ALF sentences for this message (1, 2)
2. Sentence number (1, 2)
3. Sequential message identifier (0 to 9)
4. Time of last change
5. Alert category (A=Category A, B=Category B, C=Category C, NULL)
6. Alert priority (E=Emergency Alarm, A=Alarm, W=Warning, C=Caution, NULL)
7. Alert state
 - V=active - unacknowledged,
 - S=active - silenced,
 - A=active - acknowledged or active,
 - O=active - responsibility transferred,
 - U=rectified - unacknowledged,
 - N=normal,
 - NULL
8. Manufacturer mnemonic code
9. Alert identifier
10. Alert instance (1 to 999999)
11. Revision counter (1 to 99)
12. Escalation counter (0 to 9)
13. Alert text

ALR - Set alarm state

```
$**ALR,hhmmss.ss,xxx,A,A,c--c,*hh<CR><LF>
  1    2 3 4 5
```

1. Time of alarm condition change, UTC
2. Unique alarm number (identifier) at alarm source (000 - 999)
3. Alarm condition (A=threshold exceeded, V=not exceeded)
4. Alarm acknowledge state (A=acknowledged, V=not acknowledged)
5. Alarm description text (alphanumeric)

ARC - Alert command refused

```
$**ARC,hhmmss.ss,aaa,x,x,x,x,c*hh<CR><LF>
  1    2 3 4 5
```

1. Time
2. Manufacturer mnemonic code
3. Alert identifier
4. Alert instance (1-999999)
5. Refused alert command
 - A=acknowledge
 - Q=request/repeat information
 - O=responsibility transfer
 - S=silence

HBT - Heart beat supervision

```
$--HBT, x. x, A, x*hh<CR><LF>
  1 2 3
```

1. Configured repeat interval (1 to 999, NULL)
2. Equipment status (A/V)
3. Sequential sentence identifier (0 to 9)

LRF - See "LRF - Long-range function" on page AP-13

APPENDIX 2 OTHER INFORMATION

LR1 - Long-range reply with destination for function request "A"

\$**LR1,x,xxxxxxxx,xxxxxxxx,c--c,c--c,xxxxxxxx*hh<CR><LF>
1 2 3 4 5 6

1. Sequence number
2. MMSI of responder
3. MMSI of requester (reply destination)
4. Ship's name (1 - 20 characters)
5. Call sign (1 - 7 characters)
6. IMO number, (9-digit number)

LR2 - Long-range reply for function requests "B, C, E, and F"

\$**LR2,x,xxxxxxxx,xxxxxx,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x.x,T,x.x,N*hh<CR><LF>
1 2 3 4 5 6 7 8

1. Sequence number
2. MMSI of responder
3. Date (ddmmyy)
4. UTC of Position
5. Latitude - N/S
6. Longitude - E/W
7. Course over ground, degrees True
8. Speed over ground, Knots

LR3 - Long-range reply for function requests "I, O, P, U and W"

\$**LR3,x,xxxxxxxx,c--c,xxxxxx,hhmmss.ss,x.x,cc,x.x,x.x,cc,x.x*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11

1. Sequence number
2. MMSI of responder
3. Voyage destination (1 - 20 characters)
4. ETA date (ddmmyy)
5. ETA time
6. Draught
7. Ship/cargo
8. Ship length
9. Ship breadth
10. Ship type
11. Persons (0 to 8191)

SSD - "SSD - UAIS ship static data" on page AP-14.

TXT - Text transmission

\$--TXT,xx,xx,xx,c--c*hh<CR><LF>
1 2 3 4

1. Total number of sentences (01 - 99)
2. Sentence number (01 - 99)
3. Text identifier
4. Text message

VDM - VHF data-link message

\$**VDM,x,x,x,x,s--s,x,*hh<CR><LF>
1 2 3 4 5 6

1. Total number of sentences needed to transfer the message (1 to 9)
2. Message sentence number (1 to 9)
3. Sequential message identifier (0 to 9, NULL)
4. AIS channel Number
5. Encapsulated ITU-R M.1371 radio message (1 - 63 bytes)
6. Number of fill-bits (0 to 5)

VDO - UAIS VHF data-link own-vessel report

!AIVDO,x,x,x,x,s--s,x,*hh<CR><LF>
1 2 3 4 5 6

1. Total number of sentences needed to transfer the message (1 to 9)
2. Message sentence number (1 to 9)
3. Sequential message identifier (0 to 9, NULL)
4. AIS channel Number (A or B)
5. Encapsulated ITU-R M.1371 radio message (1 - 63 bytes)
6. Number of fill-bits (0 to 5)

VER - Version

\$AIVER,x,x,aa,c-c,c-c,c-c,c-c,c-c,x,*hh<CR><LF>
1 2 3 4 5 6 7 8 9 10

1. Total number of sentences needed (1 to 9)
2. Sentence number (1 to 9)
3. Device type (AI)
4. Vendor ID
5. Unique Identifier
6. Manufacturer serial number
7. Model code (product code)
8. Software revision
9. Hardware revision
10. Sequential message identifier (0 to 9)

VSD - See "VSD - UAIS voyage static data" on page AP-15.

Inland AIS specific sentences**Input sentences**PIWWIVD - Inland waterway voyage data

\$PIWWIVD x, x, x, xx.xx, xx.xx, x, xxx, xxxx, xxx, hh<CR><LF>
1 2 3 4 5 6 7 8 9

1. Reporting rate, 0-15 1 to 9
2. No. of blue cones, 0-3, 4=B-Flag, 5=unknown (default)
3. Loaded/unloaded, 1=loaded, 2=unloaded, 0=not available (default)
4. Inland draught, 0.01-20.00(m), 0=unknown (default)
5. Air draught, 0.01-40.00(m), 0=unknown (default)
6. No. of tugboats, 0-6,7=unknown (default)
7. No. of crew members, 0-254, 255=unknown (default)
8. No. of passengers, 0-8190, 8191=unknown (default)
9. No. of shipboard personnel, 0-254, 255=unknown (default)

PIWWSPW - Inland AIS security password

\$PIWWSPW a, x, c - - - c, x, hh<CR><LF>
1 2 3 4

1. Mode (E: Password input, C: Password change)
2. Password level (1: Maintenance password, 2: User password)
3. Password (At least 6 characters)
4. Valid time (0 and 1-60 (s))

APPENDIX 2 OTHER INFORMATION

PIWWSSD - Inland waterway static ship data

\$PIWWSSD CCCCCCCC, xxxx, xxxx, xxxx, x, x, x, hh<CR><LF>
1 2 3 4 5 6

1. ENI no. (00000000-9999 9999)
2. ERI ship type (0-9999)
3. Length of ship (0.0-800.0(m))
4. Beam of ship (0.0-100.0(m))
5. Quality of speed information (1: High, 0: Low)
6. Quality of course information (1: High, 0: Low)
7. Quality of heading information (1: High, 0: Low)

PIWWVSD - Inland waterway voyage data

\$PIWWVSD x, x, x, x, xx.xx, xx.xx, x, xxx, xxxx, xxx, hh<CR><LF>
1 2 3 4 5 6 7 8
9 10

1. Reporting rate. 1: SOLAS reporting rate, 2: 2s, 0: not available (default)
2. Blue sign, 1: Not set, 2: Set, 0: Not available (default)
3. Hazardous cargo 0-3, 4=B-Flag, 5=unknown (default)
4. Loaded/unloaded, 1=loaded, 2=unloaded, 0=not available (default)
5. Static draught, 0.01-20.00(m), 0=unknown (default)
6. Air draught, 0.01-40.00(m), 0=unknown (default)
7. No. of tugboats, 0-6, 7=unknown (default)
8. No. of crew members, 0-254, 255=unknown (default)
9. No. of passengers, 0-8190, 8191=unknown (default)
10. No. of shipboard personnel, 0-254, 255=unknown (default)

Output sentences

PIWWSPR - Inland AIS security password response

\$PIWWSPR a, x, x, x, hh<CR><LF>
1 2 3 4

1. Mode (E: Password input, C: Password change)
2. Password level (1: Maintenance password, 2: User password)
3. Valid time (0-60 (s))
4. Status (0: Pass, 1: Fail)

VHF Channel List**International mode**

Ch No.	Freq.	Ch No.	Freq.	Ch No.	Freq.	Ch No.	Freq.
1001	156.05	1088	157.425	277	156.8875	2079	161.575
1002	156.1	1201	156.0625	1278	156.9375	2080	161.625
1003	156.15	1202	156.1125	1279	156.9875	2081	161.675
1004	156.2	1203	156.1625	1280	157.0375	2082	161.725
1005	156.25	1204	156.2125	1281	157.0875	2083	161.775
6	156.3	1205	156.2625	1282	157.1375	2084	161.825
1007	156.35	1206	156.3125	1283	157.1875	2085	161.875
1018	156.9	1207	156.3625	1284	157.2375	2086	161.925
1019	156.95	208	156.4125	1285	157.2875	2087	161.975
1020	157	209	156.4625	1286	157.3375	2088	162.025
1021	157.05	210	156.5125	1287	157.3875	2201	160.6625
1022	157.1	211	156.5625	2001	160.65	2202	160.7125
1023	157.15	212	156.6125	2002	160.7	2203	160.7625
1024	157.2	213	156.6625	2003	160.75	2204	160.8125
1025	157.25	214	156.7125	2004	160.8	2205	160.8625
1026	157.3	215	156.7625	2005	160.85	2206	160.9125
1027	157.35	216	156.8125	2007	160.95	2207	160.9625
1028	157.4	217	156.8625	8	156.4	2218	161.5125
1060	156.025	1218	156.9125	9	156.45	2219	161.5625
1061	156.075	1219	156.9625	10	156.5	2220	161.6125
1062	156.125	1220	157.0125	11	156.55	2221	161.6625
1063	156.175	1221	157.0625	12	156.6	2222	161.7125
1064	156.225	1222	157.1125	13	156.65	2223	161.7625
1065	156.275	1223	157.1625	14	156.7	2224	161.8125
1066	156.325	1224	157.2125	15	156.75	2225	161.8625
67	156.375	1225	157.2625	16	156.8	2226	161.9125
68	156.425	1226	157.3125	17	156.85	2227	161.9625
69	156.475	1227	157.3625	2018	161.5	2228	162.0125
70	156.525	1228	157.4125	2019	161.55	2260	160.6375
71	156.575	1260	156.0375	2020	161.6	2261	160.6875
72	156.625	1261	156.0875	2021	161.65	2262	160.7375
73	156.675	1262	156.1375	2022	161.7	2263	160.7875
74	156.725	1263	156.1875	2023	161.75	2264	160.8375
75	156.775	1264	156.2375	2024	161.8	2265	160.8875
76	156.825	1265	156.2875	2025	161.85	2266	160.9375
77	156.875	1266	156.3375	2026	161.9	2278	161.5375
1078	156.925	267	156.3875	2027	161.95	2279	161.5875
1079	156.975	268	156.4375	2028	162	2280	161.6375
1080	157.025	269	156.4875	2060	160.625	2281	161.6875
1081	157.075	270	156.5375	2061	160.675	2282	161.7375
1082	157.125	271	156.5875	2062	160.725	2283	161.7875
1083	157.175	272	156.6375	2063	160.775	2284	161.8375
1084	157.225	273	156.6875	2064	160.825	2285	161.8875
1085	157.275	274	156.7375	2065	160.875	2286	161.9375
1086	157.325	275	156.7875	2066	160.925	2287	161.9875
1087	157.375	276	156.8375	2078	161.525		

APPENDIX 2 OTHER INFORMATION

USA mode

Ch No.	Freq.	Ch No.	Freq.	Ch No.	Freq.	Ch No.	Freq.
1001	156.05	1088	157.425	277	156.8875	2079	161.575
		1201	156.0625	1278	156.9375	2080	161.625
1003	156.15	1202	156.1125	1279	156.9875	2081	161.675
		1203	156.1625	1280	157.0375	2082	161.725
1005	156.25	1204	156.2125	1281	157.0875	2083	161.775
6	156.3	1205	156.2625	1282	157.1375	2084	161.825
1007	156.35	1206	156.3125	1283	157.1875	2085	161.875
1018	156.9	1207	156.3625	1284	157.2375	2086	161.925
1019	156.95	208	156.4125	1285	157.2875	2087	161.975
1020	157	209	156.4625	1286	157.3375	2088	162.025
1021	157.05	210	156.5125	1287	157.3875	2201	160.6625
1022	157.1	211	156.5625	2001	160.65	2202	160.7125
1023	157.15	212	156.6125	2002	160.7	2203	160.7625
1024	157.2	213	156.6625	2003	160.75	2204	160.8125
1025	157.25	214	156.7125	2004	160.8	2205	160.8625
1026	157.3	215	156.7625	2005	160.85	2206	160.9125
1027	157.35	216	156.8125	2007	160.95	2207	160.9625
1028	157.4	217	156.8625	8	156.4	2218	161.5125
		1218	156.9125	9	156.45	2219	161.5625
1061	156.075	1219	156.9625	10	156.5	2220	161.6125
		1220	157.0125	11	156.55	2221	161.6625
1063	156.175	1221	157.0625	12	156.6	2222	161.7125
1064	156.225	1222	157.1125	13	156.65	2223	161.7625
1065	156.275	1223	157.1625	14	156.7	2224	161.8125
1066	156.325	1224	157.2125	15	156.75	2225	161.8625
67	156.375	1225	157.2625	16	156.8	2226	161.9125
68	156.425	1226	157.3125	17	156.85	2227	161.9625
69	156.475	1227	157.3625	2018	161.5	2228	162.0125
70	156.525	1228	157.4125	2019	161.55	2260	160.6375
71	156.575	1260	156.0375	2020	161.6	2261	160.6875
72	156.625	1261	156.0875	2021	161.65	2262	160.7375
73	156.675	1262	156.1375	2022	161.7	2263	160.7875
74	156.725	1263	156.1875	2023	161.75	2264	160.8375
75	156.775	1264	156.2375	2024	161.8	2265	160.8875
76	156.825	1265	156.2875	2025	161.85	2266	160.9375
77	156.875	1266	156.3375	2026	161.9	2278	161.5375
1078	156.925	267	156.3875	2027	161.95	2279	161.5875
1079	156.975	268	156.4375	2028	162	2280	161.6375
1080	157.025	269	156.4875	2060	160.625	2281	161.6875
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1084	157.225	273	156.6875	2064	160.825	2285	161.8875
1085	157.275	274	156.7375	2065	160.875	2286	161.9375
1086	157.325	275	156.7875	2066	160.925	2287	161.9875
1087	157.375	276	156.8375	2078	161.525		

Note: 1 W power on CH13 and CH67.

ERI Codes

Full code	ERI code		AIS code	
	U	Ship name (EN)	First digit	Second digit
8000	No	VESSEL., TYPE UNKNOWN		99
8010	V	MOTOR FREIGHTER		79
8020	V	MOTOR TANKER		89
8021	V	MOTOR TANKER, LIQUID CARGO, TYPE N		80
8022	V	MOTOR TANKER, LIQUID CARGO, TYPE C		80
8023	V	MOTOR TANKER, DRY CARGO AS IF LIQUID (E.G.CEMENT)		89
8030	V	CONTAINER VESSEL		79
8040	V	GAS TANKER		80
8050	C	MOTOR FREIGHTER, TUG		79
8060	C	MOTOR TANKER, TUG		89
8070	C	MOTOR FREIGHTER WITH ONE OR MORE SHIPS ALONGSIDE		79
8080	C	MOTOR FREIGHTER WITH TANKER		89
8090	C	MOTOR FREIGHTER PUSHING ONE OR MORE FREIGHTERS		79
8100	C	MOTOR FREIGHTER PUSHING AT LEAST ONE TANK-SHIP		89
8110	No	TUG, FREIGHTER		79
8120	No	TUG, TANKER		89
8130	C	TUG, FREIGHTER, COUPLED		31
8140	C	TUG, FREIGHTER/TANKER, COUPLED		31
8150	V	FREIGHTBARGE		99
8160	V	TANKBARGE		99
8161	V	TANKBARGE, LIQUID CARGO , TYPE N		90
8162	V	TANKBARGE, LIQUID CARGO , TYPE C		90
8163	V	TANKBARGE, DRY CARGO AS IF LIQUID (E.G.CEMENT)		99
8170	V	FREIGHTBARGE WITH CONTAINERS		89
8180	V	TANKBARGE, GAS		90
8210	C	PUSHTOW, ONE CARGO BARGE		79
8220	C	PUSHTOW, TWO CARGO BARGES		79
8230	C	PUSHTOW, THREE CARGO BARGES		79
8240	C	PUSHTOW, FOUR CARGO BARGES		79
8250	C	PUSHTOW, FIVE CARGO BARGES		79
8260	C	PUSHTOW, SIX CARGO BARGES		79
8270	C	PUSHTOW, SEVEN CARGO BARGES		79
8280	C	PUSHTOW, EIGHT CARGO BARGES		79
8290	C	PUSHTOW, NINE OR MORE BARGES		79
8310	C	PUSHTOW, ONE TANK / GAS BARGE		80
8320	C	PUSHTOW, 2 BARGES AT LEAST ONE TANKER/GAS BARGE		80
8330	C	PUSHTOW, 3 BARGES AT LEAST ONE TANKER/GAS BARGE		80
8340	C	PUSHTOW, 4 BARGES AT LEAST ONE TANKER/GAS BARGE		80
8350	C	PUSHTOW, 5 BARGES AT LEAST ONE TANKER/GAS BARGE		80
8360	C	PUSHTOW, 6 BARGES AT LEAST ONE TANKER/GAS BARGE		80
8370	C	PUSHTOW, 7 BARGES AT LEAST ONE TANKER/GAS BARGE		80
8380	C	PUSHTOW, 8 BARGES AT LEAST ONE TANKER/GAS BARGE		80
8390	C	PUSHTOW, 9 OR MORE BARGES AT LEAST ONE TANKER/GAS BARGE		80
8400	V	TUG, SINGLE		52
8410	No	TUG, ONE OR MORE TOWS		31
8420	C	TUG, ASSISTING A VESSEL OR LINKED COMBINATION		31
8430	V	PUSHBOAT, SINGLE		99
8440	V	PASSENGER SHIP, FERRY, CRUISE SHIP, RED CROSS SHIP		69
8441	V	FERRY		69
8442	V	RED CROSS SHIP		58
8443	V	CRUISE SHIP		69
8444	V	PASSENGER SHIP WITHOUT ACCOMODATION		69
8450	V	SERVICE VESSEL, POLICE PATROL, PORT SERVICE		99
8460	V	VESSEL, WORK MAINTAINANCE CRAFT, FLOATING DERRICK, CABLE SHIP, BUOY SHIP, DREDGE		33
8470	C	OBJECT, TOWED, NOT OTHERWISE SPECIFIED		99
8480	V	FISHING BOAT		30
8490	V	BUNKERSHIP		99
8500	V	BARGE, TANKER, CHEMICAL		80
8510	C	OBJECT, NOT OTHERWISE SPECIFIED		99
1500	V	GENERAL CARGO VESSEL MARITIME		79
1510	V	UNIT CARRIER MARITIME		79
1520	V	BULK CARRIER MARITIME		79
1530	V	TANKER		80
1540	V	LIQUIFIED GAS TANKER		80
1850	V	PLEASURE CRAFT, LONGER THAN 20 METRES		37
1900	V	FAST SHIP		49
1910	V	HYDROFOIL		49

Terminology, Units, Symbols

Terminology








Abbreviation	Meaning	Abbreviation	Meaning
2D	Two Dimensional Positioning	DTL	Detail
3D	Three Dimensional Positioning	E	East
ABM	Addressed Binary Message	E. G	for example
ADRS	Address	EMMA	European Multiservice Meteorological Awareness system
AIS	Automatic Identification System	ENI	Unique European Vessel Identification Number
ALARM	Alarm	ENT	Enter
ALT	Altitude	EPFS	Electronic Position Fixing System
ANT	Antenna	ERI	Electronic Reporting International
APR	April	ERR	Error
AtoN	Aids to Navigation	ETA	Estimated Time of Arrival
AUG	August	EXT	External
AUTO	Automatic	FEB	February
AVAIL	Available	FIX	Fix
BAM	Bridge Alert Management	FULL	Full
BASE	Base Station	GND	Ground
BRG	Bearing	GNSS	Global Navigation Satellite System
CH	Channel	GPS	Global Positioning System
CHG	Change	H	High
CLR	Clear	HDG	Heading
CNCL	Cancel	HECT	Hectometer
COG	Course Over the Ground	HI	High
COM, COMM	Communication	HS	Harmful Substances (applies to AIS)
CONT	Contrast	HSC	High Speed Craft
CPA	Closest Point of Approach	HW	Hardware
CPU	Central Processing Unit	I/O	Input/Output
CRS	Course	ID	Identification
D2D	Differential and 2D	IEC	International Electrotechnical Communication
D3D	Differential and 3D	IF	Interface
DATE	Date	IFM	International Function Message
DAY	Day	IMO	International Maritime Organization
DEC	December	INFO	Information
DECR	Decrease	INT	Internal
DEL	Delete	INTRD	Intruding Ships
DEST	Destination	IP	Internet Protocol (Address)
DG	Dangerous Goods	JAN	January
DGNSS	Differential GNSS	JUN	June
DGPS	Differential GPS	L	Low, left
DIFF	Difference	L/L	Latitude/Longitude
DIM	Dimmer		
DISP	Display		
DNG	Danger		
DNGR	Danger		
DOP	Dilution Of Precision		
DPTH	Depth		
DSC	Digital Selective Calling		

Abbreviat ion	Meaning	Abbreviation	Meaning
LAN	Local Area Network	RNG	Range
LAT	Latitude	ROM	Read Only Memory
LEN	Length	ROT	Rate Of Turn
LOG	Log	RTA	Requested Time of Arrival
LON	Longitude	RX	Receive
LR	Long Range	S	South
LT	Local Time	S/C	SOG/COG
MAR	March	SAR	Search And Rescue
MAX	Maximum	SART	Search And Rescue Transponder
MAY	May	SART ACT.	SART active
MENU	Menu	SDRAM	Synchronous Dynamic RAM
MIN	Minimum	SE	Southeast
MKD	Minimum Keyboard Display	SEL	Select
MMSI	Maritime Mobile Services Identity number	SEP	September
MOT	Mother Board	SET	Set (i.e., set and drift, or setting a value)
MP	Maritime Pollutant (applies to AIS)	SIM	Simulation
MSG	Message	SOG	Speed Over the Ground
N	North	SOLAS	Safety Of Life At Sea
NAV	Navigation	SPD	Speed
NE	Northeast	STS	Status
NO.	Number	STW	Speed Through the Water
NOV	November	SW	Southwest, Software, Switch
NW	Northwest	SYM	Symbol(s)
OCT	October	SYNC	Synchronization
OFF	Off	TCPA	Time to CPA
OFS	Offset	TEST	Test
ON	On	TGT	Target
PA	Position Accuracy	TIME	Time
PI	Presentation Interface, Position Indicator	TOW	Vessel Engaged in Towing Operations
PORT	Port	TX	Transmit
POSN	Position	UN/ LOADED	LOADED or UNLOADED
PROG	Program	UTC	Universal Coordinated Time
PWR	Power	VHF	Very High Frequency
R	Right	VHF COMM TEST	VHF Communication Test
R/B	Range / Bearing	VSWR	Voltage Standing Wave Ratio
RAIM	Receiver Autonomous Integrity Monitoring	W	West
RAIN	Rain	WARNING	Warning
RAM	Random Access Memory	WAT	Water
REF	Reference	WIG	Wing In Ground
RFM	Regional Function Message		—





Units

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

Symbols

Symbol	Meaning
	Sleeping AIS targets
	Selected AIS targets
	AIS-SART (Search and Rescue Transmitter)
	Selected AIS-SART
	Aid to Navigation
	Sleeping Base Station
	Selected Base Station

Icons

Icon	Meaning
	Base station
	SAR(Search and Rescue)
	Aid to Navigation
	AIS-SART
[/]→[-]→[∨]→[] in turn	Normal Operation

APPENDIX 3 MESSAGES

Alarm messages

Alarm log (ALARM STATUS)	Alarm Popup indication	Priority	Meaning	Remedy
TX MALFUNCTION	TX	Warning	AIS Transmit failure – Transmission stopped.	Change to initial setting is required. Contact FURUNO.
ANT VSWR EXCEEDS	ANT	Warning	AIS antenna high VSWR has been detected. Check antenna.	Check the antenna for damage. Contact FURUNO.
RX CH1 MALFUNCTION	CH1	Warning	RX1 Failure – Transmission stopped for corresponding transmission channel.	Circuit board may be damaged. Contact FURUNO.
RX CH2 MALFUNCTION	CH2	Warning	RX2 Failure – Transmission stopped for corresponding transmission channel.	Circuit board may be damaged. Contact FURUNO.
RX CH70 MALFUNCTION	CH70	Warning	DSC Receive failure.	Circuit board may be damaged. Contact FURUNO.
UTC SYNC INVALID	UTC	Warning	No synchronization with UTC	
MKD CONNECTION LOST	MKD	Warning	AIS – Communication failure between transponder unit and monitor unit (MKD).	
INT/EXT POS MISMATCH	POSN	Warning	Mismatch of position data between internal GNSS and external GNSS. (After taking into account the antenna position, there is the difference of over 100 m.)	
NAVSTATUS INCORRECT	NAV	Warning	Mismatch between the ship's speed and [NAVSTATUS] information.	

Alarm log (ALARM STATUS)	Alarm Popup indication	Priority	Meaning	Remedy
HDG SENSOR OFFSET	HDG-OFS	Warning	Mismatch between COG and HDT. (There is a difference of over 45 degrees for more than 5 minutes at a speed of more than 5 knots.)	
ACTIVE AIS-SART	SART-ACTIVE	Warning	Received the AIS-SART message.	
EXTERNAL EPFS LOST	EPFS	Warning	External navigation data not received – Check external GNSS.	
NO POS SENSOR IN USE	L/L	Warning	No position data available.	
NO VALID SOG INFO	SOG	Warning	SOG information is invalid.	
NO VALID COG INFO	COG	Warning	COG information is invalid.	
NO VALID HDG INFO	HDG	Warning	HDG information data is lost/invalid.	
NO VALID ROT INFO	ROT	Warning	Rate of turn (ROT) data not available.	
BAM COM ERROR	BAM	Caution	Communication failure between transponder unit and bridge alert management (BAM) system. Note: This error does not sound the aural alarm. Further, the alarm pop indication does not flash.	

Note 1: Detection of RX malfunction

1) **Detection of TDMA RX malfunction**

Frequency error

PLL chip on receiver board generates lock or unlock signal for synthesizer.

MPU watches and sets status flag which reflects data of ALR sentence.

ID 003 for RX1, ID 004 for RX2

2) **Detection of DSC RX malfunction**

General error

DSC Error (ID: 005) will happen in case of DSC MPU could not receive format specifier of the data from DSC amplifier unless RSSI exists more than 90 seconds.

Note 2: Detection of TX malfunction

MPU detects TX malfunction (ID:001) in the following cases:

- 1) The signal indicated "LOCK" is not received from the PLL chip on the TX board.
- 2) The voltage of monitoring signal on the TX board is abnormal. The reason for TX 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

Error messages

Message	Meaning	Remedy
COMMUNICATION ERROR		Warning
PARAMETER ERROR SENTENCE NO. XXXX* KIND: XXXXXX XXXXXXXXXX	Error in communication between transponder unit and monitor unit.	Contact an authorized FURUNO agent or dealer.

Warning messages

Message	Meaning	Remedy
COLLISION ALARM	You are on a collision course with another vessel.	Take appropriate evasive action to avoid collision.

Information messages (conventional AIS, inland AIS)

Message	Meaning	Remedy
CAN'T DISPLAY INVALID DATA	No position data.	
CAN'T DISPLAY OVER LAT85°	Own ship's latitude is higher than 85°.	
CHANGE NAV STATUS?	Mismatch between the ship's speed and [NAVSTATUS] information.	There is mismatch between the ship's speed and NAV STATUS setting value. Check the NAV STATUS setting (at anchor, moored, aground, underway using engine) and ship's speed.
DESTINATION FULL	Destination list is full.	If it is necessary to add a destination delete an unnecessary one.
ENTER MMSI	No MMSI. Set MMSI properly.	
ERROR REGIST	<ol style="list-style-type: none"> 1) You entered [MSG22] or [DSC] data whose sea areas overlap one another, or wrong [NAV STATUS] 2) You entered [NAV STATUS] as 14 on page 1 of [NAV STATUS] menu. 	
ILLEGAL MODE WAS SELECTED.	Invalid combination of channels is selected for editing.	

APPENDIX 3 MESSAGES

Message	Meaning	Remedy
INVALID CHANNEL	Invalid channel entered in the [EDIT CHANNEL] display.	See paragraph 1.9.2 for how to enter the data.
INVALID L/L	Invalid L/L entered in the [EDIT CHANNEL] display	See paragraph 1.9.2 for how to enter the data.
L/L SIZE ERROR	Invalid L/L size entered in the [EDIT CHANNEL] display.	See paragraph 1.9.2 for how to enter the data.
NO ETA, DESTINATION	You attempted to send a message that does not have ETA or destination.	
NO MESSAGE	No TX message to send when you attempted to send a message.	
NO SEL	Attempted to see detailed data for a target which has no data.	
NOW INITIALIZING	System is initializing.	Wait until the message is gone.
NOW SENDING	Your message is being sent.	
NOW WAITING RESPONSE	Waiting for message from receiver in response to your message	Wait for reply.
OUT OF RANGE! XXXXXX	Entered value is out of possible range.	Correctly enter the data.
PRIORITY ERROR	Invalid priority entered in the [EDIT CHANNEL] display.	See paragraph 1.9.2 for how to enter the data.
SEND MESSAGE COMPLETE	Message successfully transmitted.	
SEND MESSAGE UNSUCCESSFUL	Message could not be sent.	
SIZE ERROR	Invalid size entered in the [EDIT CHANNEL] display	See paragraph 1.9.2 for how to enter the data.
TRANSPONDER WAS REBOOTED	Transponder was rebooted.	
TX NOT AVAILABLE	Not available test due to invalid transmission	
TX POWER CHANGED.(XXX W)	TX power was changed. XXX=power value	

Information messages (inland AIS only)

Message	Meaning	Remedy
DIFFERENT FROM ANT POS VALUE	[LENGTH OF SHIP] is more than three meters greater than the [LENGTH OF CONVOY] (A+B total for [INT ANT POSN] or [EXT ANT POSN]). The same message also appears when the value for [BEAM OF SHIP] is more than three meters greater than the total for the [BEAM OF CONVOY] (C+D ANT POS.).	Correctly enter length or beam as applicable.
INCORRECT NUMBER!	Incorrect ERI code entered.	
INPUT THE UTC TIME!	Input the UTC time when there is no time data from GPS.	
MESSAGE! EMMA WARNING	EMMA message received.	Check contents of message on the [EMMA WARNING] display.
MESSAGE! RTA	RTA message received.	Check contents of message on the RTA log.
MESSAGE! TEXT	Text message received.	Check contents of message on the RX log.
MESSAGE! WATER LEVEL	Water level message received.	Check contents of message on the [WATER LEVEL] display.
NO CREW	Number of crew not entered in no. of persons message.	
NO NUMBER OF PERSONS	Number of persons not entered in no. of persons message.	
NO OWN SHIP POSITION AVAILABLE	Invalid own ship position.	
NO PASSENGER	Number of passengers not entered in no. of persons message.	
NOT AVAILABLE!	You attempted to send an ETA messages when the AIS mode is SOLAS.	ETA message cannot be sent when the AIS mode is SOLAS. Set the AIS mode to INLAND to send the message.

SPECIFICATIONS OF U-AIS TRANSPONDER FA-150

1 TRANSPONDER UNIT

1.1	TX/RX frequency	156.025 MHz to 162.025 MHz
1.2	Output power	1W or 12.5 W selectable
1.3	Impedance	50 ohms
1.4	DSC receiver	CH70 fixed, 156.525 MHz, G2B, 1200 bps
1.5	Bandwidth	25 kHz/ 12.5 kHz

2 MONITOR UNIT

2.1	Display	4.5-inch, monochrome LCD
2.2	Display size	60 (H) x 95 (W) mm, 120 x 64 dots

3 GPS RECEIVER

3.1	Receiving frequency	1575.42 MHz
3.2	Tracking code	C/A code
3.3	Number of channel	12 channels parallel, 12 satellites
3.4	Accuracy	
	GPS	10 m approx, 95% of the time, (HDOP \leq 4)
	DGPS	5 m approx, 95% of the time
3.5	Tracking velocity	900 kt
3.6	Position-fixing time	Warm start: 36 s, Cold start: 43 s
3.7	Position update interval	1 second typical
3.8	DGPS data receiving	RTCM SC-104 ver-2.1

4 INTERFACE

4.1	Navigation I/O	4 ports, IEC 61162-1 Ed.4 (2010-11) or 61162-2 (1998-9)
	Input	ABM, ACA, ACK, ACN, AIR, BBM, DTM, GBS, GGA, GLL, GNS, HBT, HDT, LRF, LRI, OSD, RMC, ROT, SSD, THS, VBW, VSD, VTG
	Output	ABK, ACA, ACS, ALC, ALF, ALR, ARC, HBT, LR1, LR2, LR3, LRF, LRI, SSD, TXT, VER, VDM, VDO, VSD
4.2	Sensor input	IEC 61162-1 Ed.4 (2010-11): 3 ports and 61162-2(1998-9): 3 ports DTM, GBS, GGA, GLL, GNS, HDT, OSD, RMC, ROT, THS, VBW, VTG
4.3	External beacon or PC	RS-232C
4.4	Heading sensor	AD-10 format
4.5	Alarm output	Contact closure

4.6 Bluesign input Contact closure

5 POWER SUPPLY

5.1 Transponder unit 12-24 VDC: 7-3.5 A

5.2 Monitor unit 12-24 VDC: 0.3-0.15 A

5.3 AC/DC power supply unit (PR-240, option)
100-115/200-230 VAC, 1 phase, 50/60 Hz

6 ENVIRONMENTAL CONDITION

6.1 Ambient temperature

GPS/VHF antenna -25°C to +55°C (storage: -25°C to +70°C)

Other units -15°C to +55°C

6.2 Relative humidity 95% at 40°C

6.3 Degree of protection

GPS/VHF antenna IPX6

Transponder unit IP20

Monitor unit IP22

6.4 Vibration IEC 60945 ed.4

7 COATING COLOR

7.1 GPS antenna N9.5

7.2 Transponder unit N3.0

7.3 Monitor unit Panel: N3.0, Chassis: 2.5GY5/1.5

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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-150

(Model name, type number)

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

IMO Resolution MSC.694 (17)	EN 61993-2: 2013
IMO Resolution MSC.74 (69)	EN 61108-1: 2003
IMO Resolution MSC.191 (79)	EN 61162-1: 2011
IMO Resolution MSC.302(87)	EN 61162-2: 1998
ITU-R M.1371-4	EN 62288: 2008
2000 HSC Code 13	EN 60945: 2002
	IEC 61924-2 Ed.1.0: 2012 Annex K and M

(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. MED-B-9781 issued by Det Norske Veritas Germanischer Lloyd (DNV GL), Norway.
- Product Quality System (Module D) certificate No. P 112 issued by Telefication, The Netherlands.

This declaration is issued according to the provisions of European Council Directive 96/98/EC on marine equipment modified by Commission Directive MED 2013/52/EU and 2014/93/EU.

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
March 25, 2015

(Place and date of issue)

Yoshitaka Shogaki
Department General Manager
Quality Assurance Department

(name and signature or equivalent marking of authorized person)