FA-150 OPERATOR'S MANUAL

FURUNO

U-AIS TRANSPONDER

Model FA-150

FURUNO ELECTRIC CO., LTD.

www.furuno.com

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.

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

FURUNO Authorized Distributor/Dealer

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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

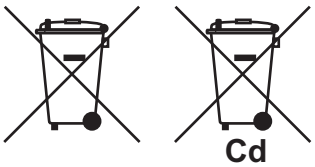
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.eiae.org/) for the correct method of disposal.

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.

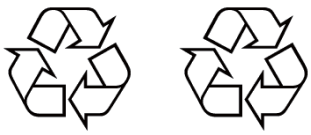
In the European Union

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/m² are present are given below.

100 W/m²: Nil
10 W/m²: 0.1 m
2 W/m²: 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.

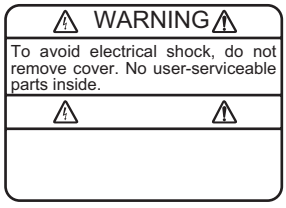
Fire or electrical shock can result if water leaks in the equipment.

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.



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) 2450020 (Boot)	01.** 01.**	
			02.** 02.**	September 2009
		2450021 (Prog)	04.**	August 2013
MAIN (24P0035)	Transponder Unit GPS Receiver	2450018 485026	01.** 40.**	
	Transponder Unit		02.**	September 2009
			04.**	August 2013

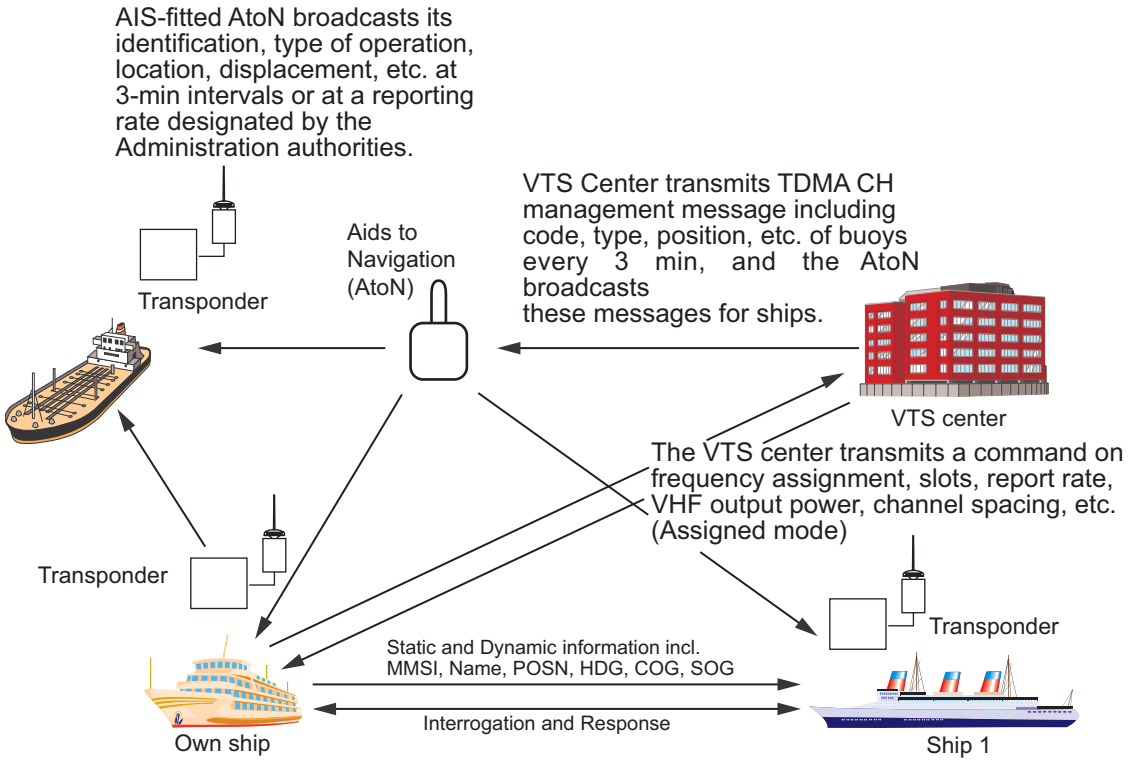
** : Minor Modifications

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.



All ships broadcast Static and Dynamic information (autonomous and continuous mode). If OS wants to know information about ship 1, OS shall send an interrogation in polling mode; then ship 1 will transmit her response on the same VHF channel without operator intervention.

AIS system

Not all ships carry AIS

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

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

Use of AIS in collision avoidance

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

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

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

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

Erroneous information

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

TABLE OF CONTENTS

FOREWORD

A Word to the Owner of the FA-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

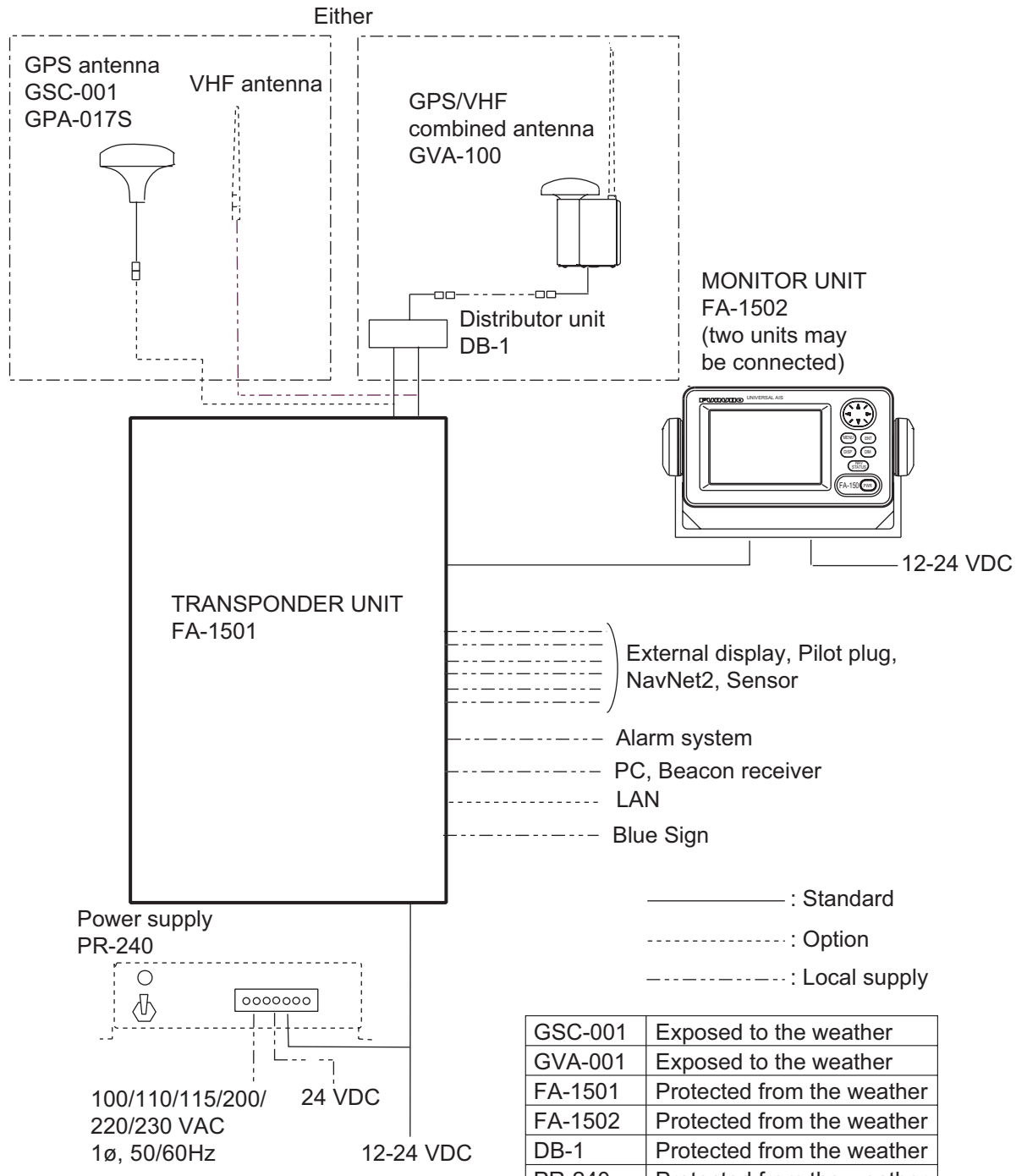
The FA-150 is a universal AIS (Automatic Identification System) for open sea and inland waterways, capable of exchanging navigation and ship data between own ship and other ships or coastal stations. It complies with IMO MSC.74(69) Annex 3, A.694, ITU-R M.1371-4 and DSC ITU-R M.825. It also complies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

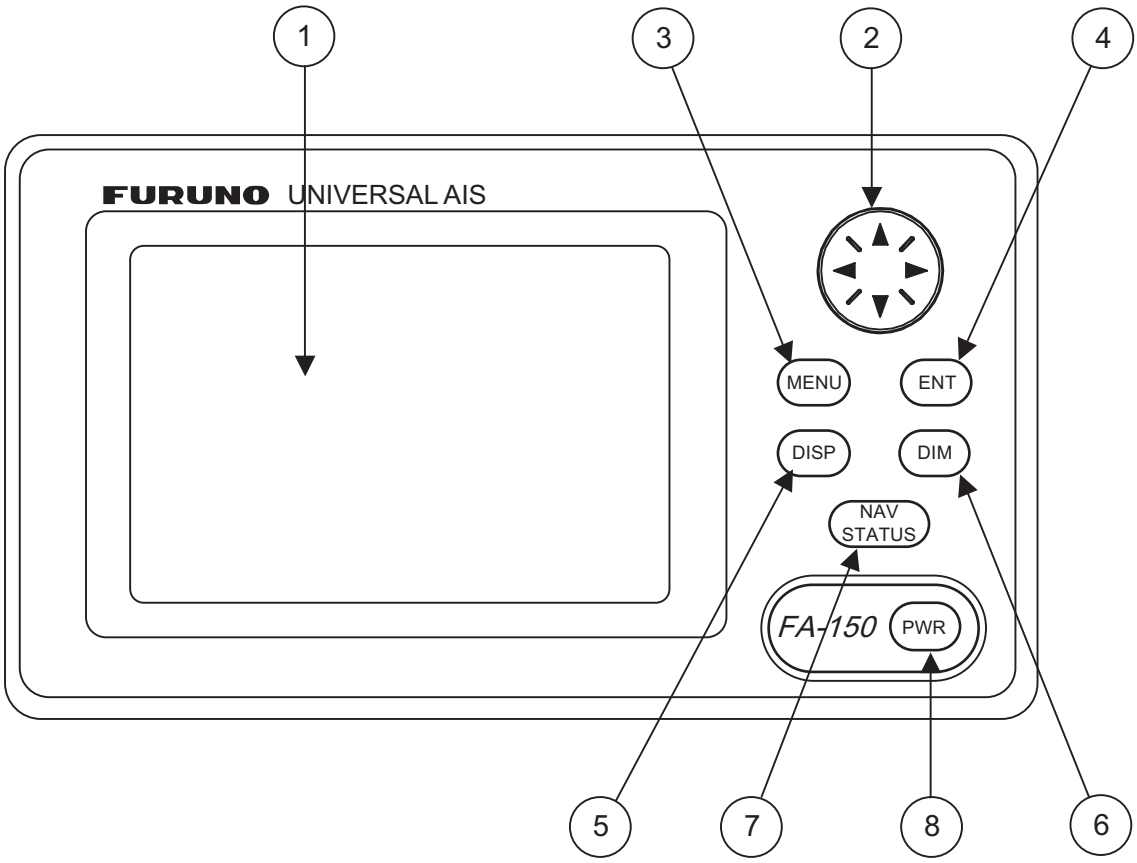
SYSTEM CONFIGURATION



GSC-001	Exposed to the weather
GVA-001	Exposed to the weather
FA-1501	Protected from the weather
FA-1502	Protected from the weather
DB-1	Protected from the weather
PR-240	Protected from the weather

1. OPERATION

1.1 Description of Controls

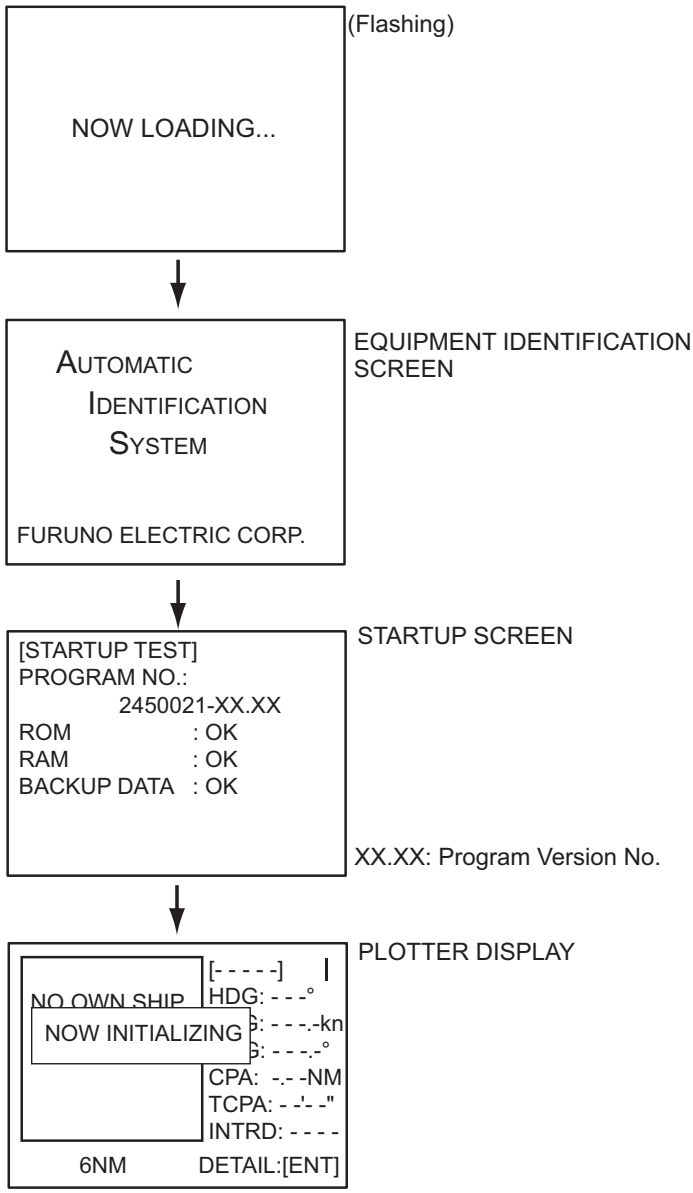


(1)	LCD Screen:	Displays various data.
(2)	CursorPad:	Shifts cursor; chooses menu items and options; selects alphanumeric data.
(3)	MENU key:	Opens the menu.
(4)	ENT key:	Terminates keyboard input; changes screen.
(5)	DISP key:	Chooses a display screen; closes menu.
(6)	DIM key:	Adjusts panel dimmer 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:

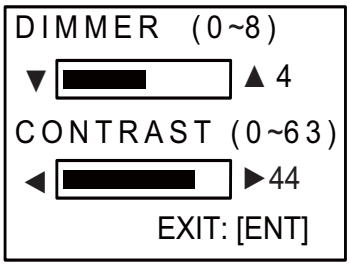
Ship's dynamic conditions and nominal reporting interval

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.

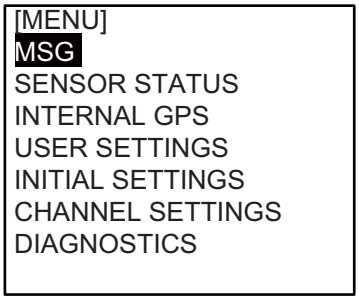
Note: If the equipment is turned off with the contrast setting of 35 or lower, the equipment will start up with the contrast setting 36 when the power is again turned on.

1.4 Menu Overview

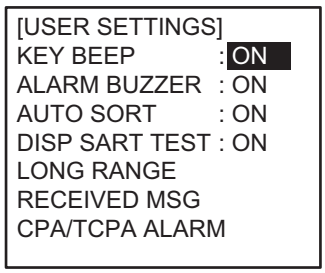
You can select the functionality of the equipment through the menu. If you get lost in operation, press the **MENU** key until you return to the main menu. The complete menu tree is provided in the Appendix.

1.4.1 Menu operating procedure

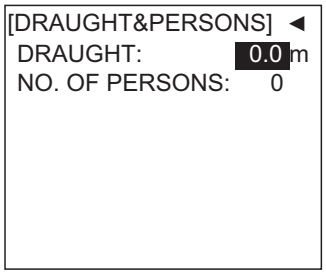
1. Press the **MENU** key to display the main menu.



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)



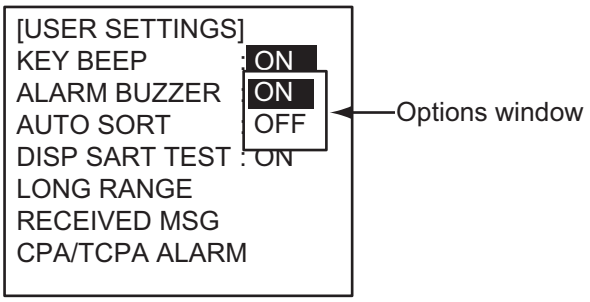
DRAUGHT&PERSONS input screen
(Data input)

   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.

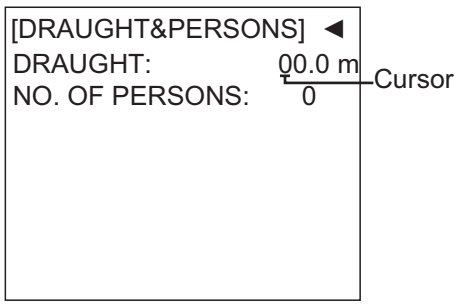


Note: For INLAND AIS mode, the USER SETTINGS menu has two pages. See section 2.9 to section 2.11.

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.

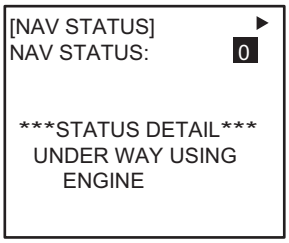
6. Press the **DISP** key to close the menu.

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.

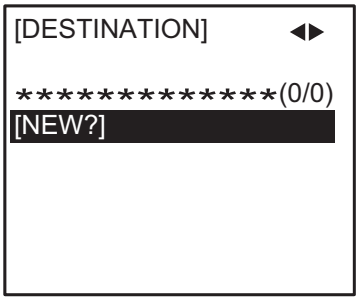


2. If your navigation status is different from that shown, follow the procedure below. If it is the same as shown, go to step 3.
   1) Press the **ENT** key.
   2) Press ▲ or ▼ to select appropriate status then press the **ENT** key. Refer to the data below to select appropriate nav status.

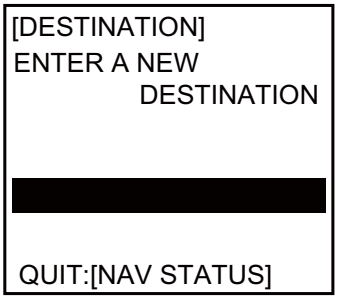
00: UNDER WAY USING ENGINE
01: AT ANCHOR
02: NOT UNDER COMMAND
03: RESTRICTED MANEUVERABILITY
04: CONSTRAINED BY HER DRAUGHT
05: MOORED
06: AGROUND
07: ENGAGED IN FISHING
08: UNDER WAY SAILING
09: RESERVED FOR HIGH SPEED CRAFT (HSC)*1
10: RESERVED FOR WING IN GROUND (WIG)*2
11: RESERVED FOR FUTURE USE
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.



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

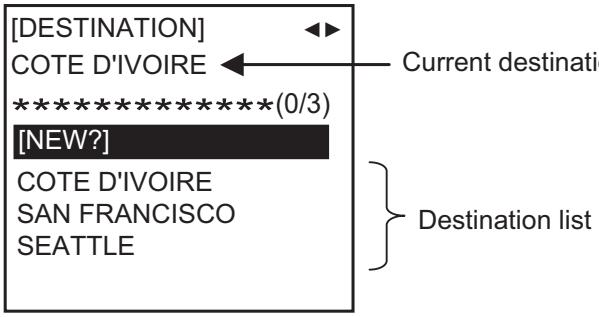


[NAV STATUS] menu, [DESTINATION] sub-menu, destination input

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

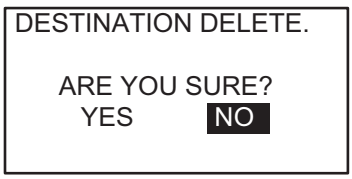
If you have already registered some destinations, the DESTINATION sub-menu looks something like the one below. From this screen you can select, edit or delete destinations.



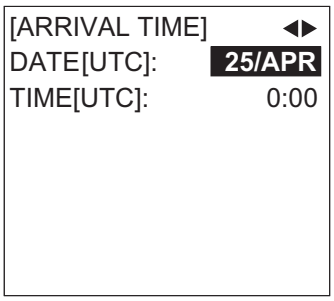
1) Select appropriate destination then press the **ENT** key to show the options window below.

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

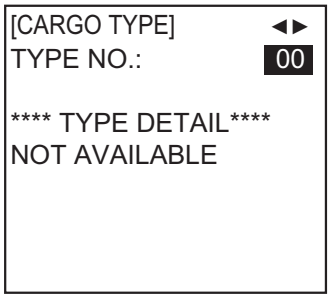
SELECT: Select a destination.
EDIT: Press the **ENT** key twice then edit the destination.
DELETE: The prompt below appears. Press ◄ to select **YES**; press the **ENT** key



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



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.



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.

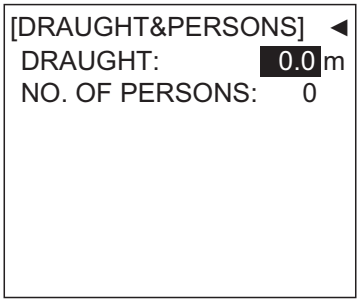
    Note 1: Only the second digit for the type of vessel is entered here; the first digit is entered on the [INITIAL SETTINGS] menu, during installation.

    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.

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

WIG: Wing in ground
HSC: High speed craft
DG: Dangerous goods
HS: Harmful substances
MP: Marine pollutants
0-9: Undefined

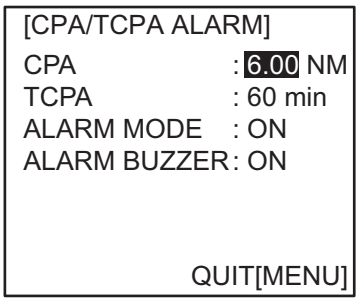
14. Press ▶ to display the [DRAUGHT&PERSONS] sub-menu.
15. [DRAUGHT] is already selected; press the **ENT** key.
16. Enter ship's draught (setting range: 0-25.5(m)) then press the **ENT** key.
17. [NO. OF PERSONS] is now selected; press the **ENT** key.
18. Enter total number of persons onboard (setting range: 0-8191) then press the **ENT** key. Enter 8191 for total greater than 8190.
19. Press the **DISP** key to close the menu.



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.

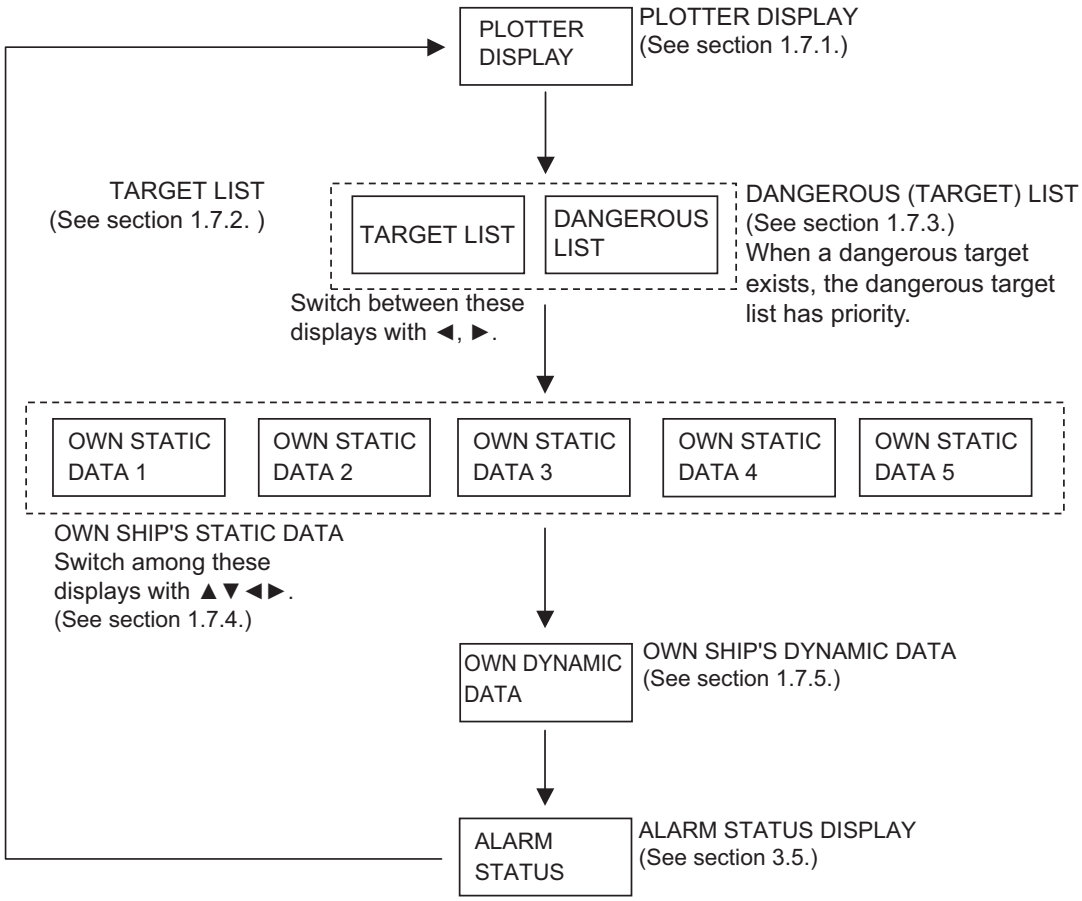
1. Press the **MENU** key to open the main menu.
2. Select [USER SETTINGS] then press the **ENT** key.
3. Select [CPA/TCPA ALARM] then press the **ENT** key.



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.

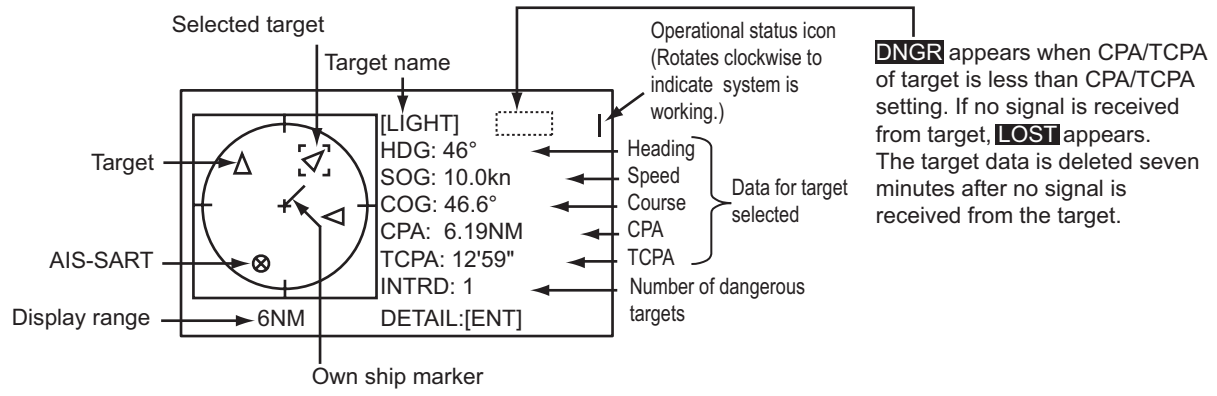


1.7.1 Plotter display

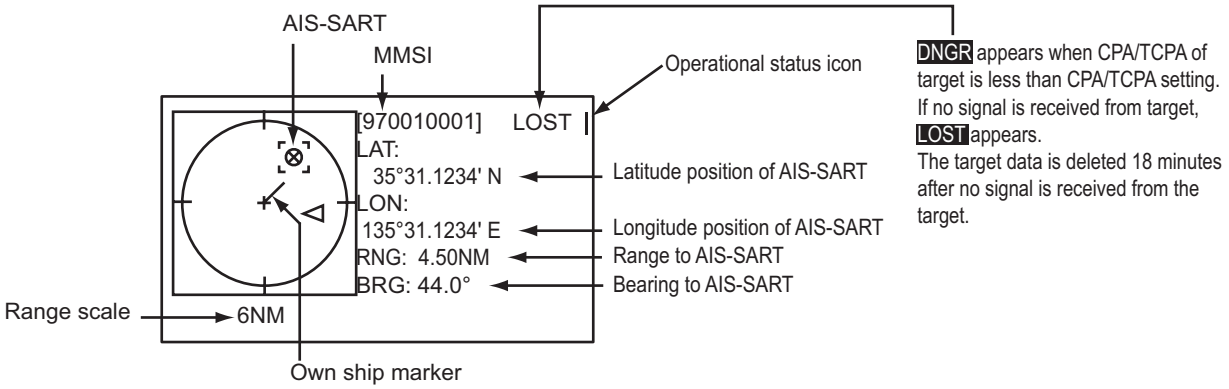
The plotter display, which automatically appears after the power-on sequence, shows the name, heading, SOG, COG, CPA and TCPA of AIS-equipped ships, AIS-SARTs, etc. within the range selected. The number of dangerous targets is also indicated.

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



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.

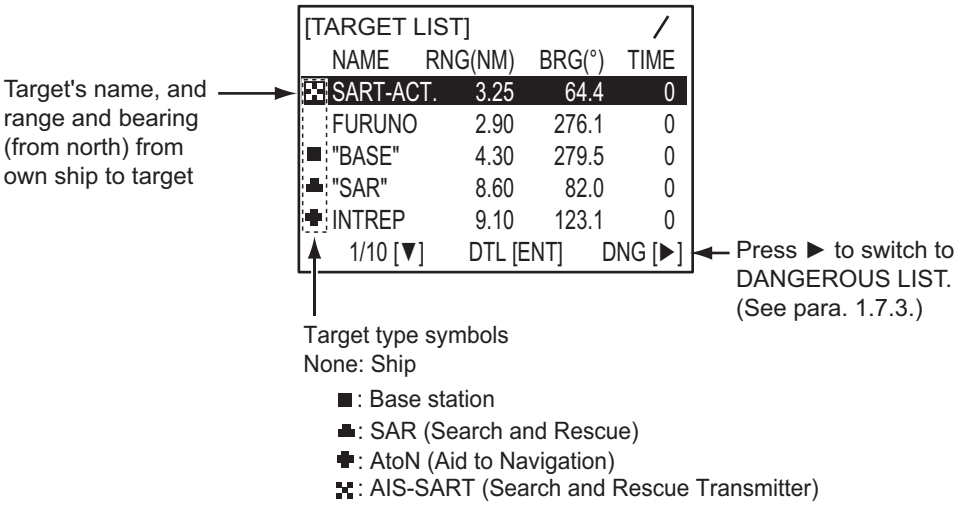
Ship's navigation status	Target declared as lost target after;
Class A	
Ship at anchor or moored or aground or not under command and not moving faster than 3 kn	7 minutes
Ship at anchor or moored or aground or not under command and moving at more than 3 kn	50 seconds
0-14 kn speed	50 seconds
0-14 kn 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)

1. 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.



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.

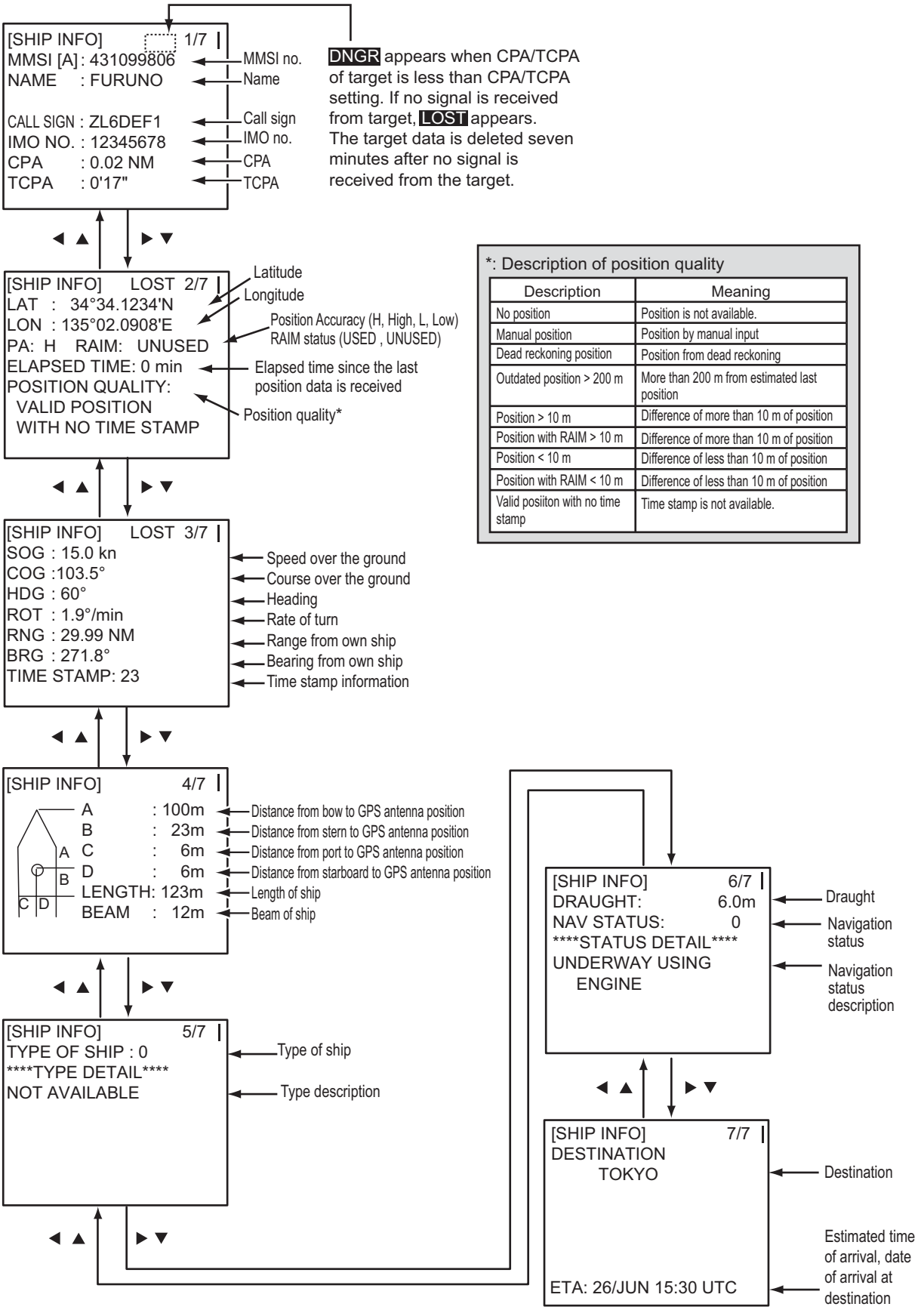
Note 4: When [AUTO SORT] on the [USER SETTINGS] menu is [OFF], the range and bearing to a target are updated. However, target order is not updated. To do this, press ◀, and targets are sorted in range order. "NOW SORTING" is shown while sorting.

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.

2. 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.
3. Use ▲ or ▼ to scroll the display to see other data.

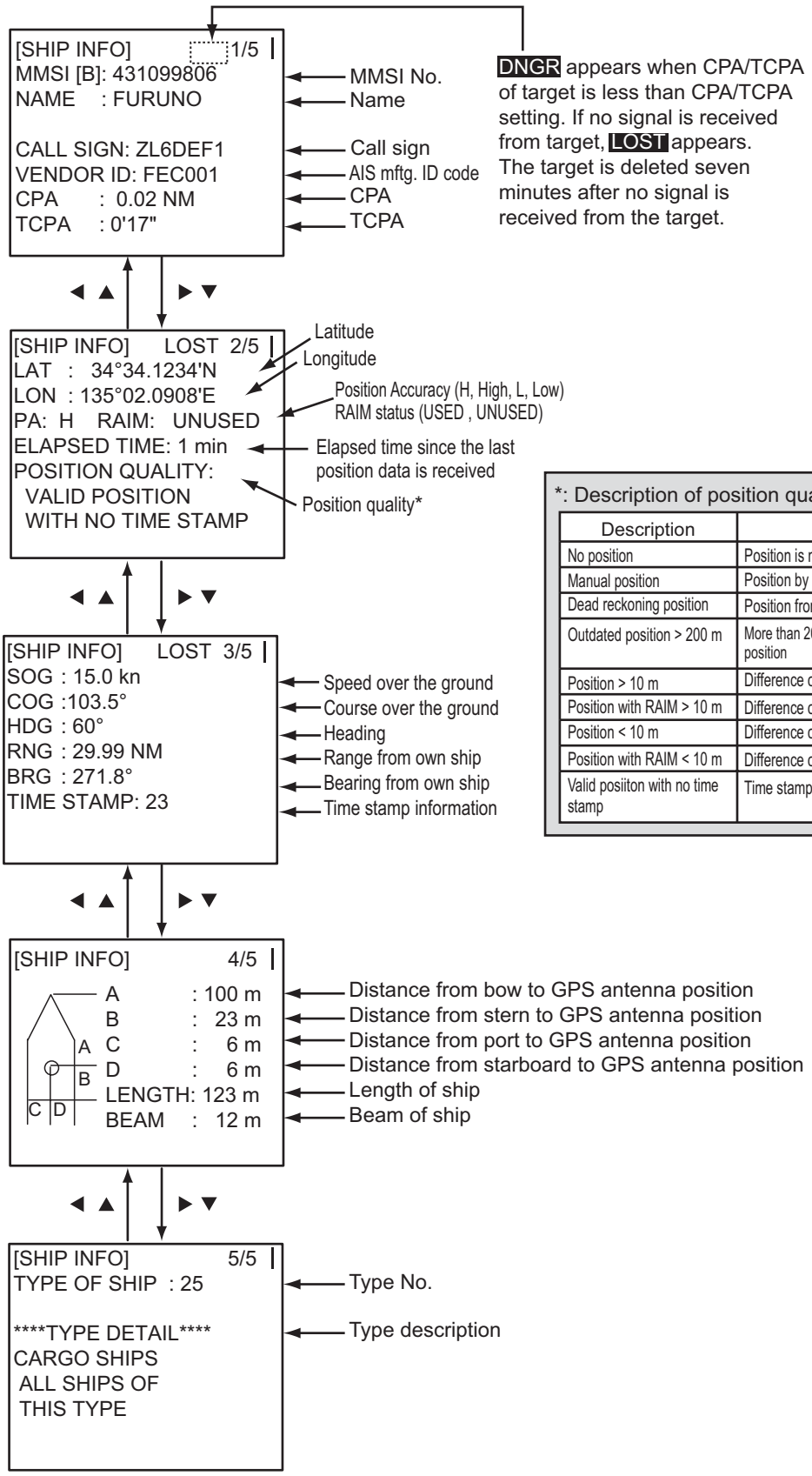
Ship info display, mobile class A



*: 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 posiiton with no time stamp	Time stamp is not available.

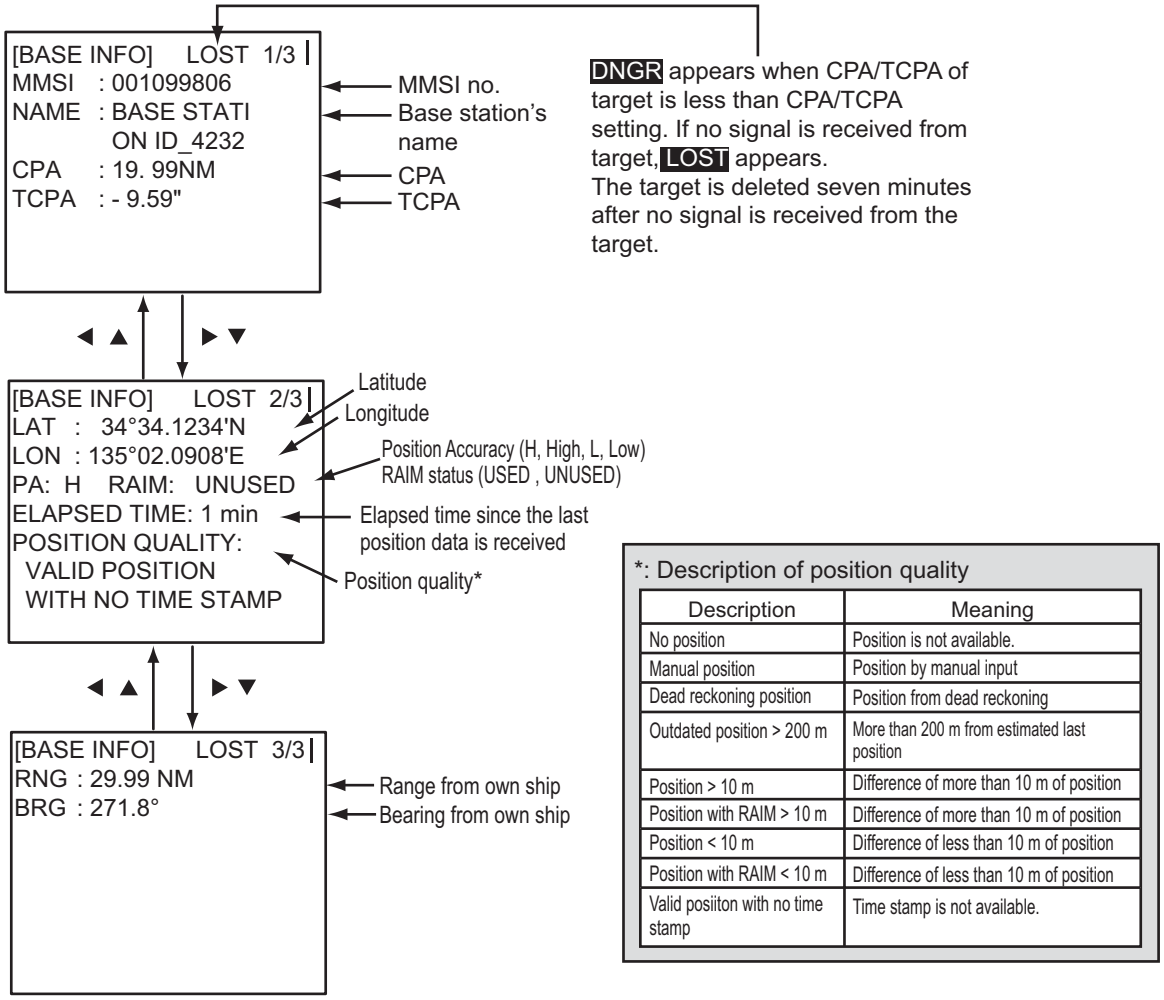
Ship info display, mobile class B



*: 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 posiiton with no time stamp	Time stamp is not available.

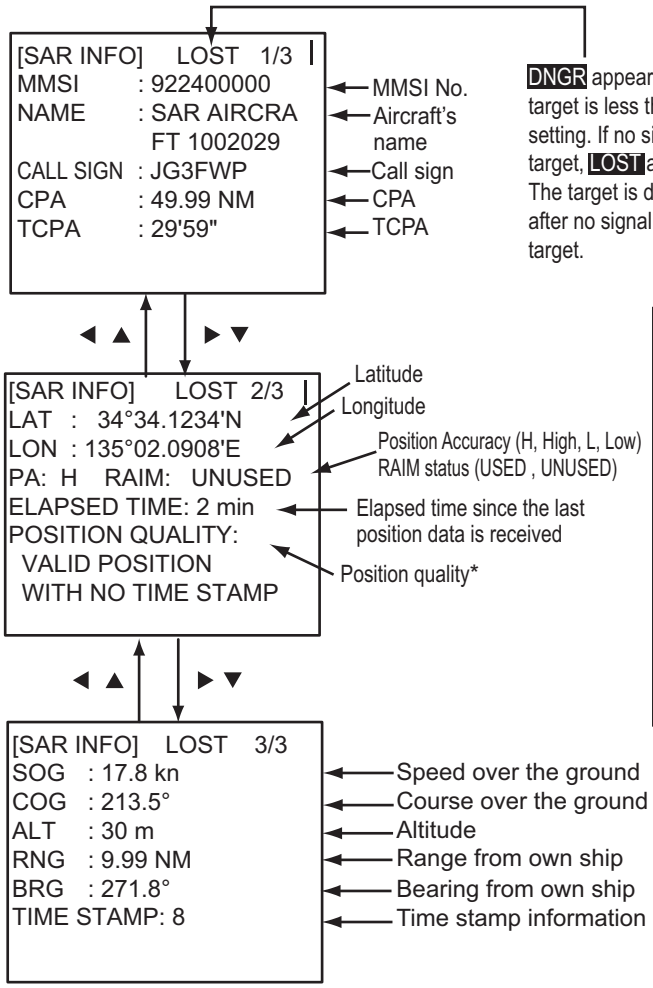
Base station display



*: 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 posiiton with no time stamp	Time stamp is not available.

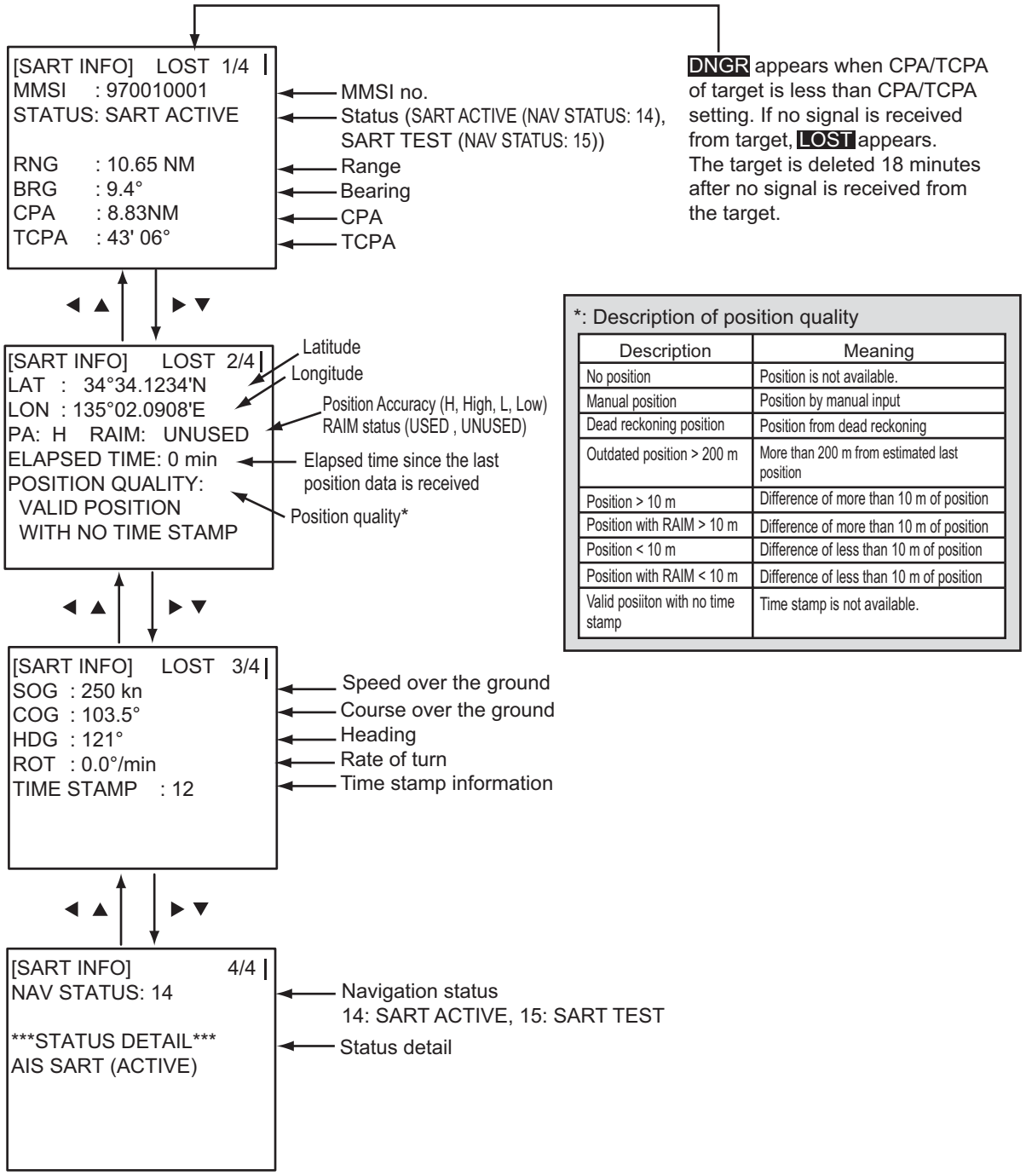
SAR (Search and Rescue) info display



*: 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 posiiton with no time stamp	Time stamp is not available.

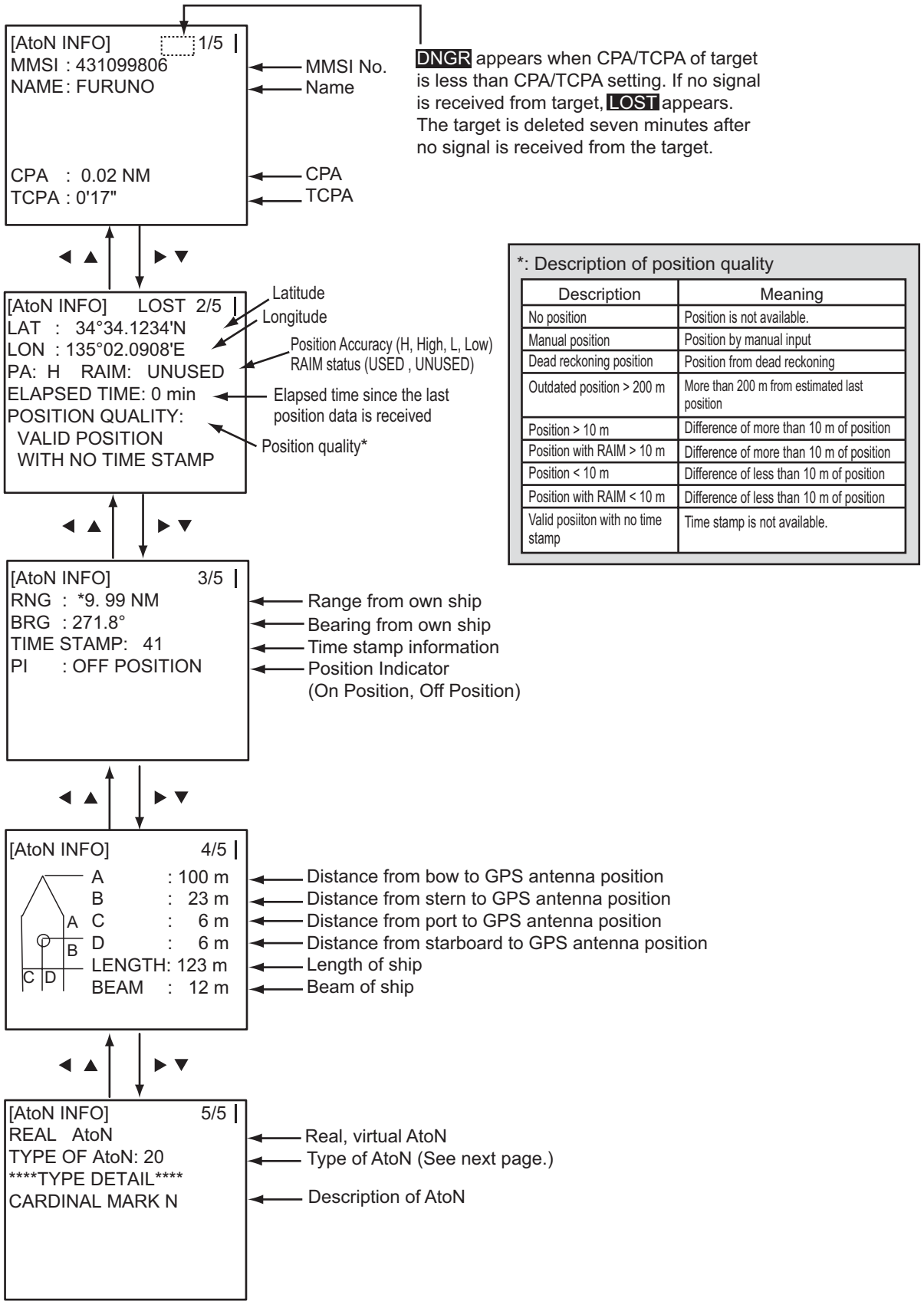
AIS-SART info display



*: 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 posiiton with no time stamp	Time stamp is not available.

AtoN (Aid to Navigation) 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 posiiton with no time stamp	Time stamp is not available.

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

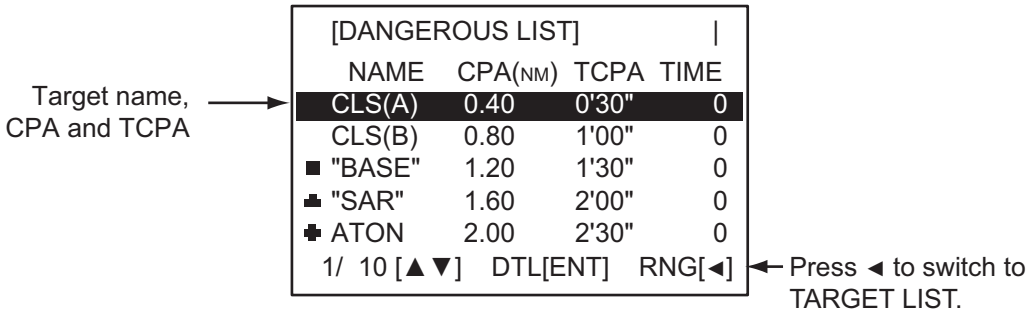
A to N type and name

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.

1. 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.
2. Press ▶ to show the [DANGEROUS LIST].



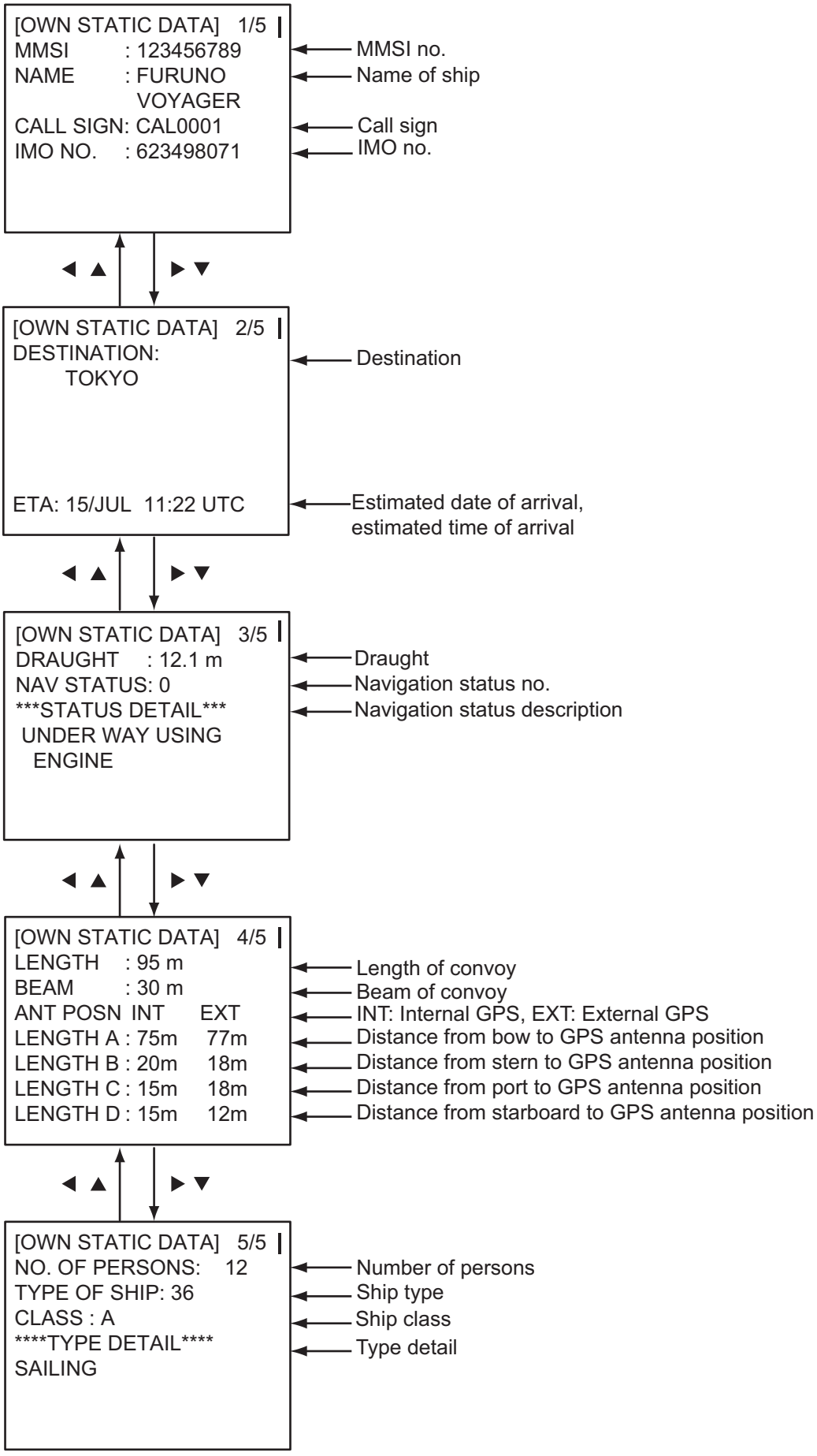
3. To find detailed information about a dangerous target, use ▲ or ▼ to select the target then press the **ENT** key.
4. To change page: ▼ or ▶ to go forward; ▲ or ◀ to go back.

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.

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

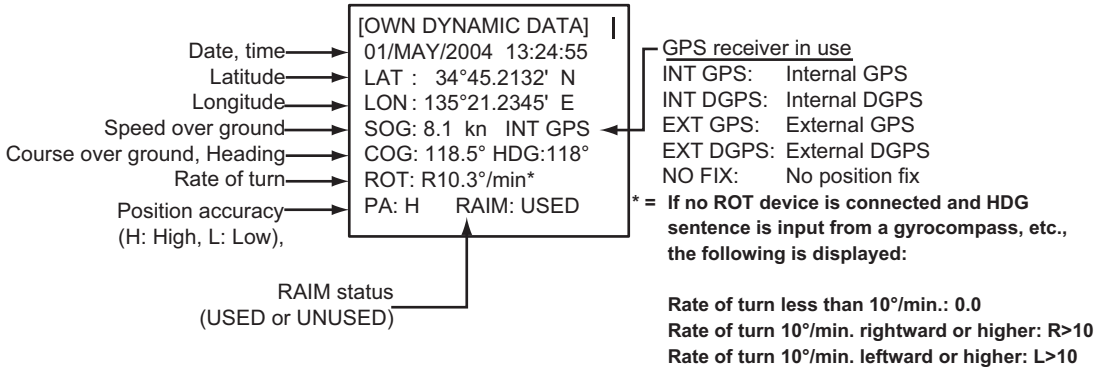

[OWN STATIC DATA] 1/5
MMSI : 123456789
NAME : FURUNO
VOYAGER
CALL SIGN: CAL0001
IMO NO. : 623498071
MMSI no.
Name of ship
Call sign
IMO no.
[OWN STATIC DATA] 2/5
DESTINATION:
TOKYO
ETA: 15/JUL 11:22 UTC
Destination
Estimated date of arrival,
estimated time of arrival
[OWN STATIC DATA] 3/5
DRAUGHT : 12.1 m
NAV STATUS: 0
STATUS DETAIL
UNDER WAY USING
ENGINE
Draught
Navigation status no.
Navigation status description
[OWN STATIC DATA] 4/5
LENGTH : 95 m
BEAM : 30 m
ANT POSN INT EXT
LENGTH A : 75m 77m
LENGTH B : 20m 18m
LENGTH C : 15m 18m
LENGTH D : 15m 12m
Length of convoy
Beam of convoy
INT: Internal GPS, EXT: External GPS
Distance from bow to GPS antenna position
Distance from stern to GPS antenna position
Distance from port to GPS antenna position
Distance from starboard to GPS antenna position
[OWN STATIC DATA] 5/5
NO. OF PERSONS: 12
TYPE OF SHIP: 36
CLASS : A
****TYPE DETAIL****
SAILING
Number of persons
Ship type
Ship class
Type detail

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

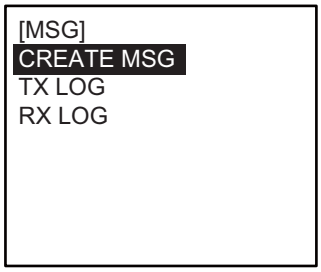
You may send and receive messages via VHF channels, to a specified MMSI or all AIS-equipped ships in the area. Messages can be sent to warn of safety of navigation; for example, an iceberg sighted. Routine messages are also permitted.

Short safety-related messages are only an additional means to broadcast safety information. They do not remove the requirements of the GMDSS.

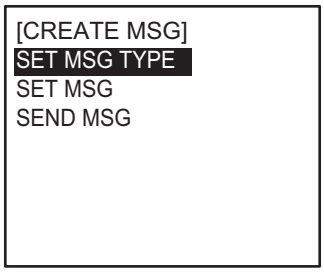
When a message is received, the equipment beeps and the indication "MESSAGE" appears. The contents of the message may be viewed on the RX log.

1.8.1 Sending a message

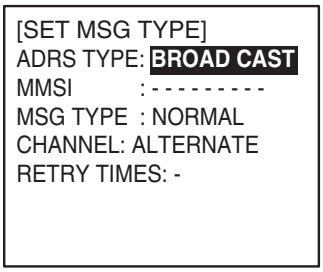
1. Press the **MENU** key to open the main menu.
2. Use ▲ or ▼ to select [MSG] then press the **ENT** key.



3. [CREATE MSG] is selected; press the **ENT** key. (For Inland AIS, additionally select [CREATE MSG] then press the **ENT** key.)



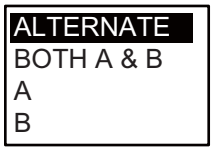
4. [SET MSG TYPE] is already selected; press the **ENT** key.



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

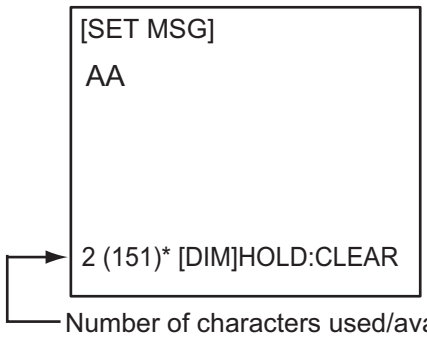
6. Select [ADRS CAST] to send a message to a specific AIS-equipped ship, or [BROAD CAST] to send a message to all AIS-equipped ships within broadcasting range. Press the **ENT** key.
7. For [BROAD CAST], go to step 8. For [ADRS CAST], [MMSI] is selected; press the **ENT** key, enter the MMSI number of the vessel that you want to receive your message, then press the **ENT** key.
8. [MSG TYPE] is selected; press the **ENT** key.

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.



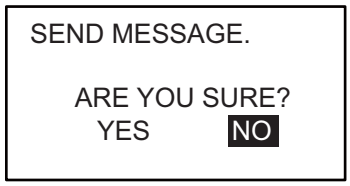
11. Select which channel to transmit your message over then press the **ENT** key.
12. [RETRY TIMES] is now selected; press the **ENT** key. If the [ADRS TYPE] is [BROADCAST] go to step 14.
13. For [ADRS CAST], enter the number of times to re-transmit a message (0-3) then press the **ENT** key.
14. Press 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 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

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:

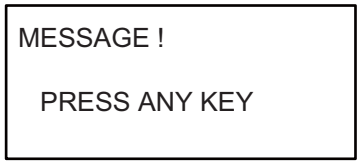
AIS message status messages and their meanings

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

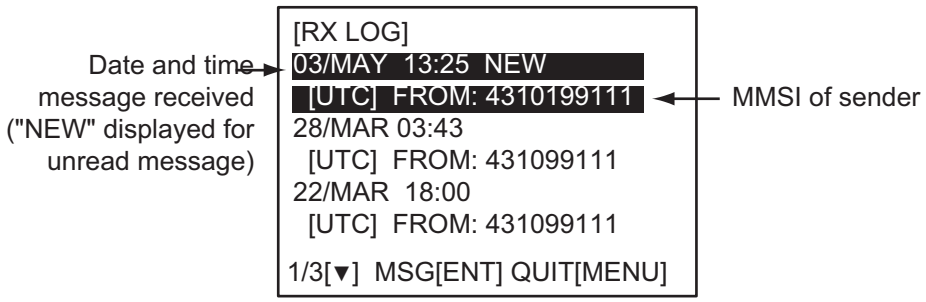
How to view a received message

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

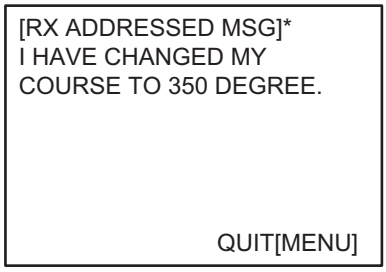


1. Press any key to erase the message.
2. Press the **MENU** key to show the main menu.
3. Select [MSG] then press the **ENT** key.

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.



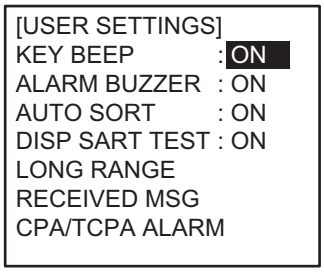
*RX BROADCAST MSG for received broadcast message

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

Automatically displaying incoming messages

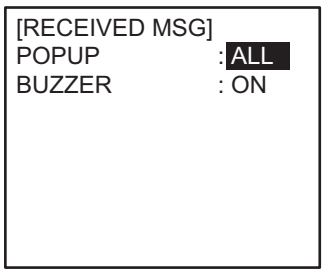
You can display incoming messages automatically as follows:

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 which category of receive message to display automatically then press the **ENT** key.
   [ALL]: Display any message upon receipt.
   [ABM]: Display only addressed binary messages, upon their receipt.
   [OFF]: Disable automatic displaying of incoming messages.

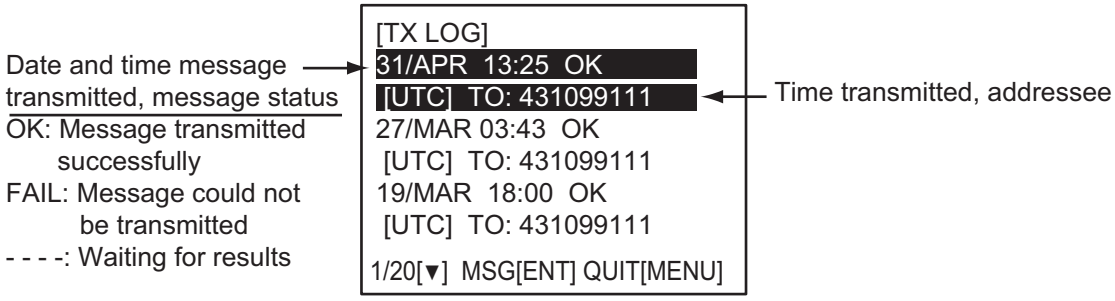
6. To get an audio alert when the message type selected at step 5 is received, set [BUZZER] to [ON].
7. Press the **DISP** key to close the menu.

1.8.3 TX and RX message logs

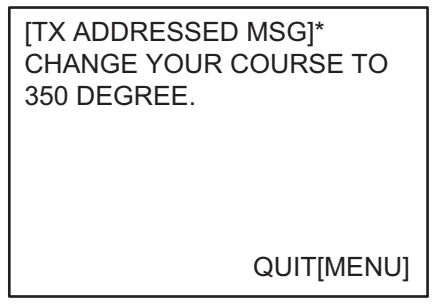
The FA-150 stores the latest 20 each of transmitted and received messages in respective message logs. When a log becomes full, the oldest message in the log is automatically deleted to make room for the latest.

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.



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. A
- Automatic setting by AIS message from shore-based AIS.
- Setting by shipboard system such as ECDIS.
- Manual setting

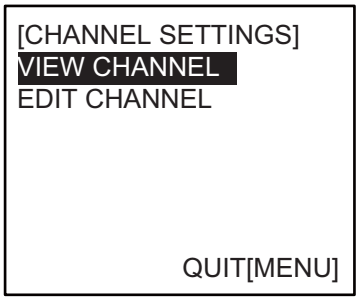
The default area is as follows:

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

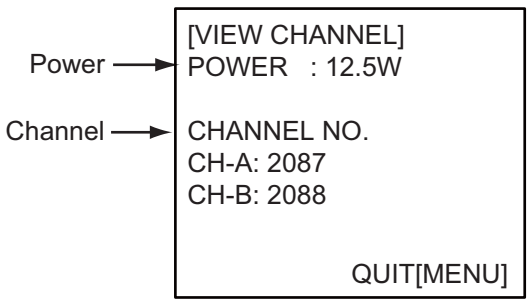
1.9.1 Viewing channels, Tx power

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.

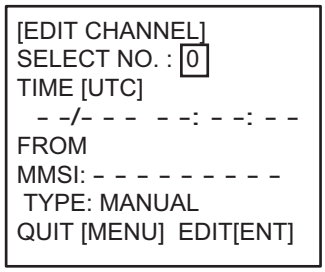
1.9.2 Displaying, editing regional operating area status

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].

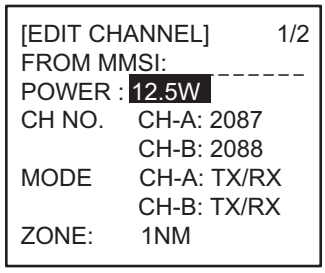
About registering areas

- AIS and DSC messages registered within last two hours cannot be edited.
- An item labeled [HIGH SEA] cannot be registered. ([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.

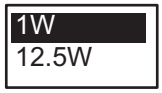
1. Press the **MENU** key to open the menu.
2. Select [CHANNEL SETTINGS] then press the **ENT** key.
3. Select [EDIT CHANNEL] then press the **ENT** key.
   [SELECT NO].: File number, 0-9. In order of distance from own ship, from closest to furthest.
   [TIME]: Data and time equipment controlled by external 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.



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



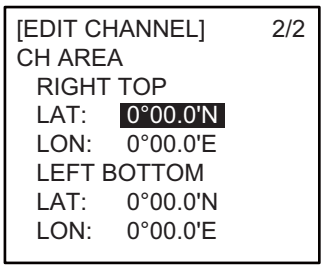
7. Select power desired then press the **ENT** key.
8. [CH NO. CH-A] is now selected; press the **ENT** key.
9. Select channel number for CH-A then press the **ENT** key.
10. [CH NO. CH-B] is now selected; press the **ENT** key.
11. Select channel number for CH-B then press the **ENT** key.

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

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

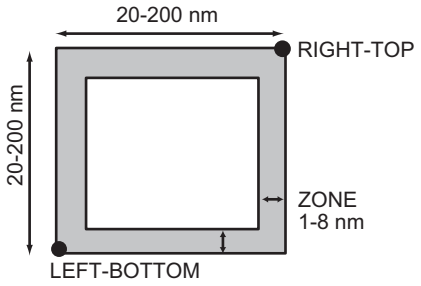
Mode	1	2	3	4	5	6
CH-A	TX/RX	TX/RX	RX	RX	RX	UNUSED
CH-B	TX/RX	RX	TX/RX	RX	UNUSED	RX

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 ▲ or ▼ to show page 2 of the [EDIT CHANNEL] sub-menu.

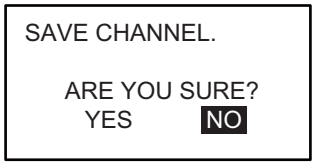


19. [LAT] of [RIGHT TOP] is already selected; press the **ENT** key. Enter latitude for the right-top position (northeast point) of the AIS operating area then press the **ENT** key.
20. [LON] of [RIGHT TOP] is now selected; press the **ENT** key. Enter longitude for the right-top position (northeast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

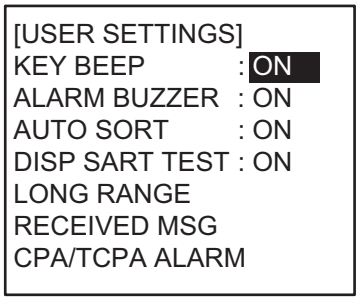


24. Press ◀ to select [YES] then press the **ENT** key.
    Note: If a combination other than that shown in the table at step 13 is selected, the message "ILLEGAL MODE WAS SELECTED PRESS ANY KEY." appears.
25. Press the **DISP** key to close the menu.
    Note: If you enter invalid data, the message "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.



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

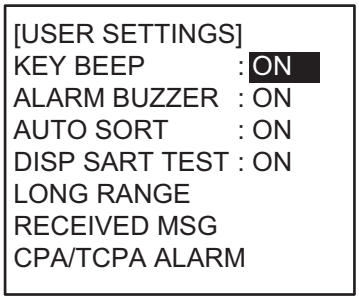
The long range function sets how to reply to a request for own ship data from a distant station (for example, an Inmarsat C station) and whether to transmit your ship's position to a satellite via the AIS VHF communication link or not.

1.11.1 LR MODE (Long Range Mode)

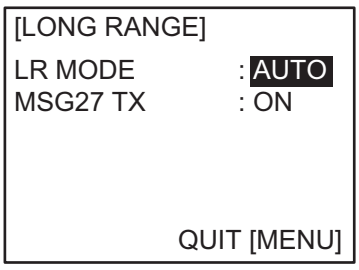
The long range mode sets how to reply to a request for own ship data from a distant station, for example, Inmarsat C station. You may reply automatically or manually.

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.



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

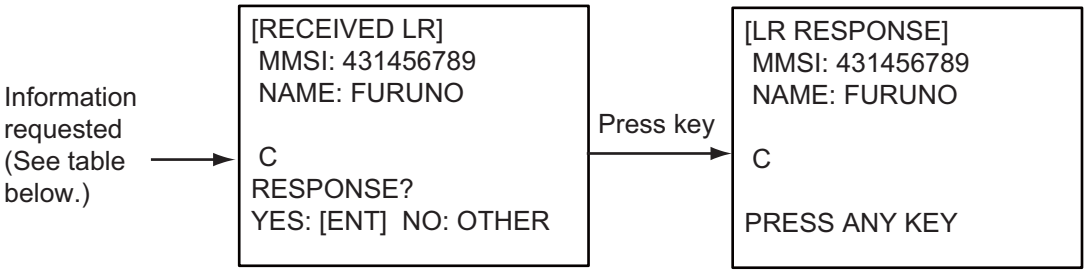


4. Select [LR MODE] then press the **ENT** key.

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.

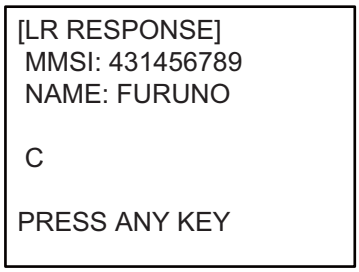
Manual reply

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.



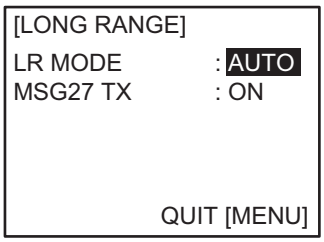
Codes used in long range messages

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. [MSG27 TX] is now selected; press the **ENT** key.
6. 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.

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

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.

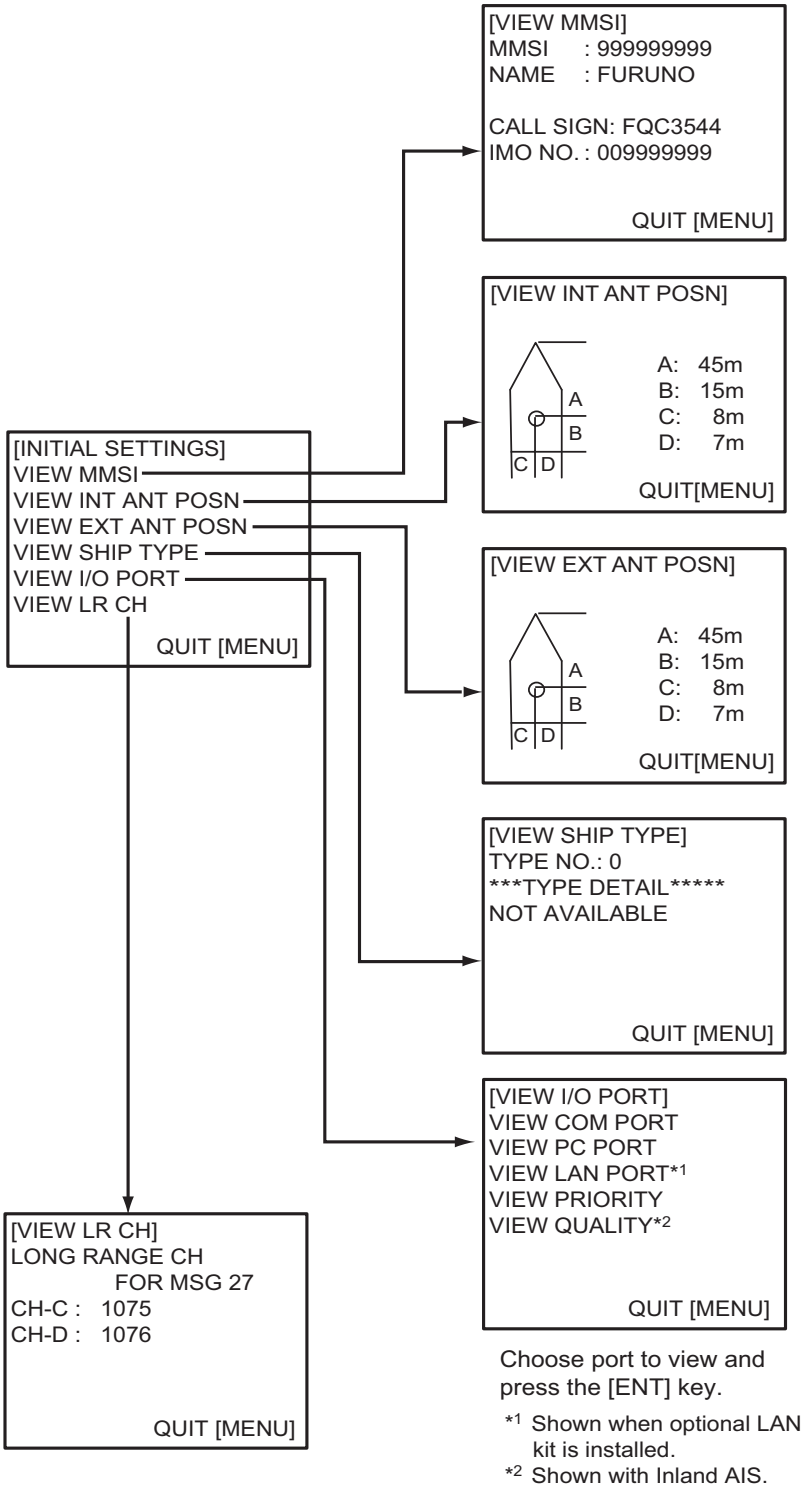
Item	Specifications
Baudrate	38400 bps **Note:** The following setting is required for the FA-150. If the pilot does not function, check these settings. Menu: [INITIAL SETTINGS] - [VIEW I/O PORT] - [VIEW COM PORT] - [VIEW COM4] Setting: [MODE]: [EXT DISPLAY]
Type	AMP 206486-1, 206486-2 (9-pin, male)
Signal connection	TX-A: Pin 1 TX-B: Pin 2 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.



*1 Shown when optional LAN kit is installed.
*2 Shown with Inland AIS.

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.

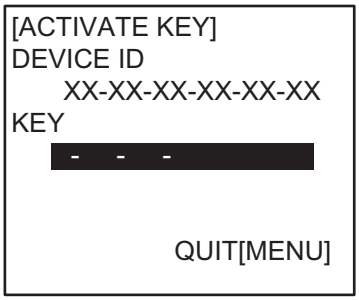
Ships with Inland AIS transponders on board autonomously determine their actual position using the Global Positioning System (GPS), which is part of the AIS transponder. Furthermore they broadcast their ID and position to other ships over a distance of 10 to 30 kilometers (depending on the geographical 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.



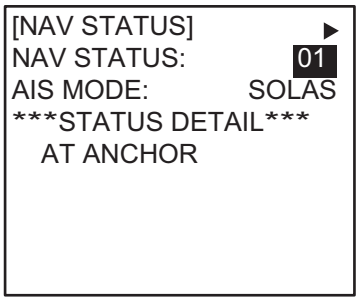
4. Press the **ENT** key, enter your activation key then press the **ENT** key.
5. Press the **MENU** key to quit.

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

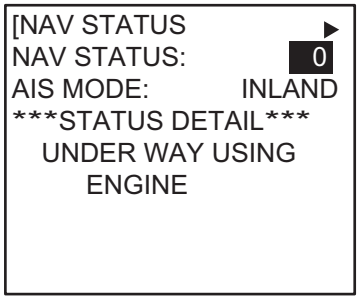
- IMO NO. is transmitted with all zeroes.
- The draught used in Inland AIS is "Inland draught".
- The number of characters for a text message is as follows
  NORMAL MSG with BROAD-CAST: Solas, 156, Inland, 86
  NORMAL MSG with ADDRESS-CAST: Solas, 151, Inland, 80
  SAFETY MSG with BROAD-CAST: Solas,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

2.3 Entering Voyage-Related Data

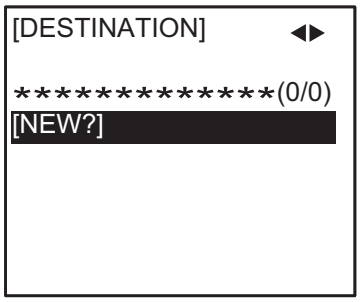
Before you embark on a voyage using Inland AIS, set the various related data (see the list below) on the [NAV STATUS] menu.

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

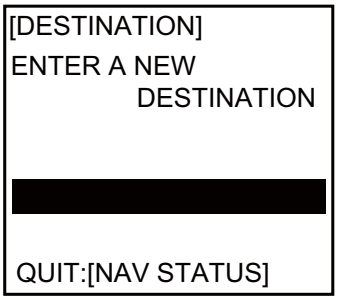
1. Press the **NAV STATUS** key.



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



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



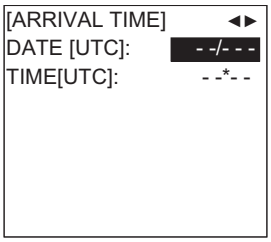
4. Press the ENT key. Enter destination then press the ENT key. You can use up to 20 alphanumeric characters, and enter 20 destinations. (For how to enter alphanumeric characters, see "Entering alphanumeric data" on page 1-6.)

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

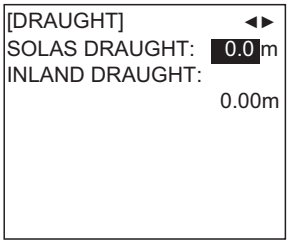
   **$! * , **

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

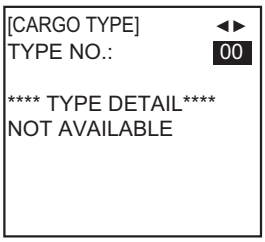
5. Press ▶ to show the [ARRIVAL TIME] sub-menu.



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.

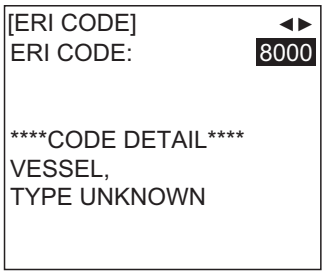


11. [SOLAS DRAUGHT] is now selected; press the **ENT** key.
12. Enter SOLAS draught (tenths place resolution) then press the **ENT** key.
13. [INLAND DRAUGHT] is now selected; press the **ENT** key.
14. Enter inland draught (hundredths place resolution) then press the **ENT** key.
15. Press ▶ to show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

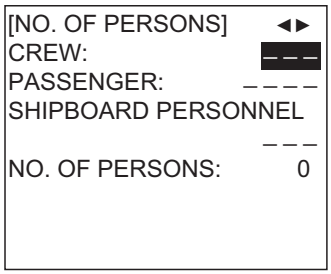


16. [TYPE NO.] is now selected; press the **ENT** key.
17. Select type of vessel/cargo, referring to the table on page 1-10, then press the **ENT** key.
    Note 1: Only the second digit for the type of vessel is entered here; the first digit is entered on the initial settings menu, during installation.
    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.

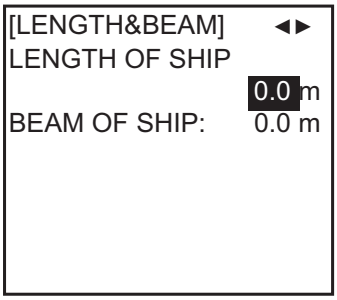
18. Press ▶ to go to the [ERI CODE] sub-menu.



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.

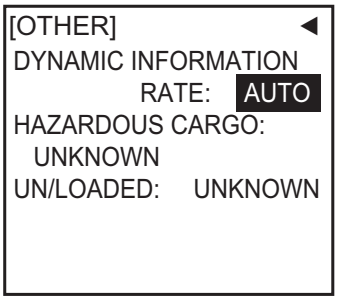


22. [CREW] is now selected; press the **ENT** key.
23. Enter number of crew (0-254) then press the **ENT** key.
24. [PASSENGER] is now selected; press the **ENT** key.
25. Enter number of passengers (0-8190) then press the **ENT** key.
26. [SHIPBOARD PERSONNEL] is now selected; press the **ENT** key.
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.

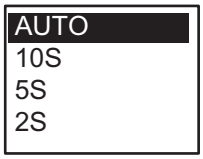


31. Enter the length and beam of your ship, pressing the **ENT** key after entering each item. (If [LENGTH OF SHIP] is more than three meters greater than the LENGTH OF CONVOY (A+B total for INT ANT POSN or EXT ANT POSN), the message "DIFFERENT FROM ANT POSN VALUE" appears. The same message also appears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

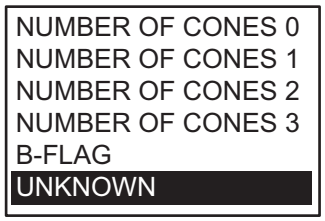
32. Press ▶ to go to the [OTHER] sub-menu.



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.

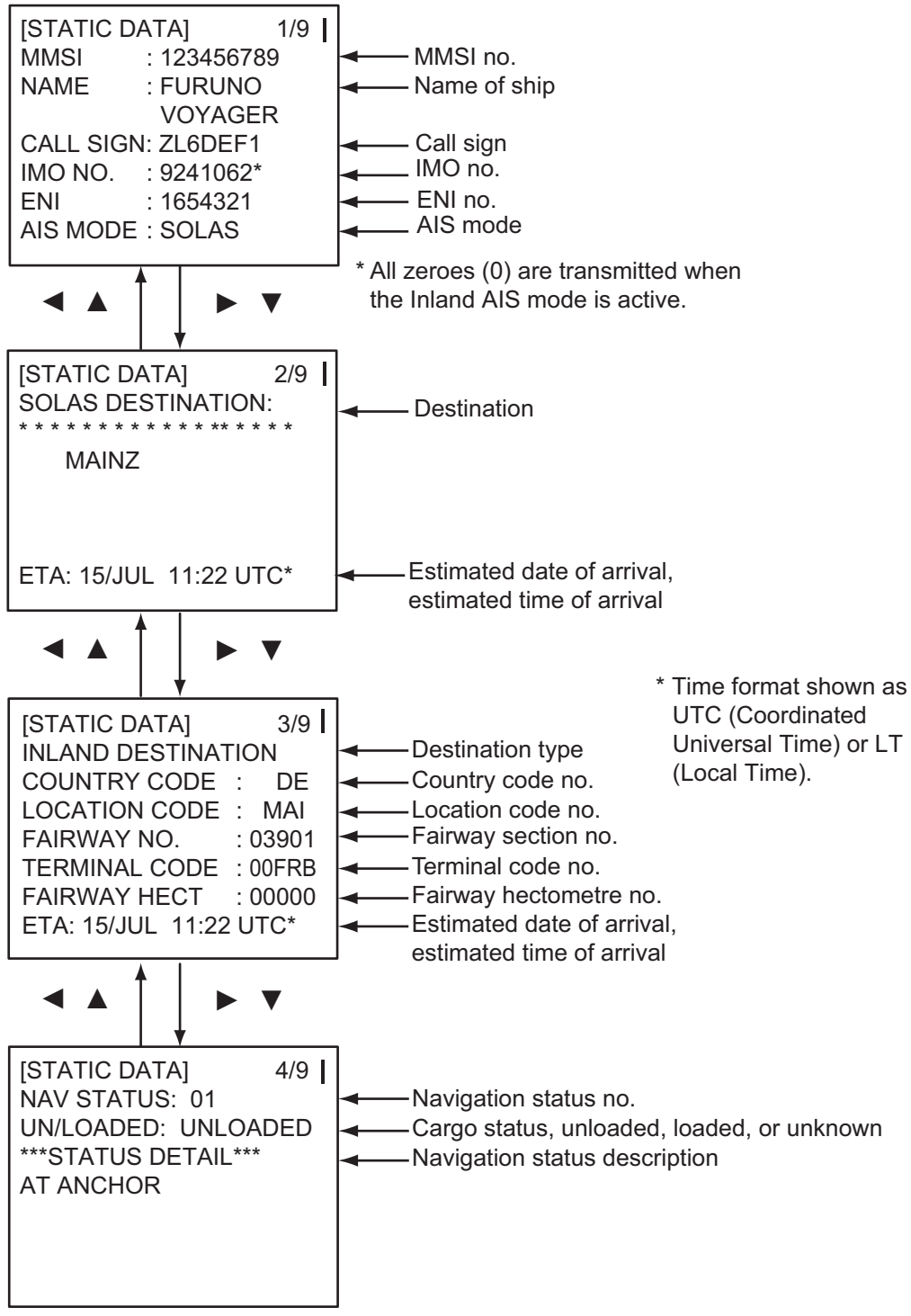


36. If your ship is carrying hazardous cargo, "cones" (max. 3) have to be shown on the mast, in daylight with cones and nighttime with blue lights. The greater the number of the cones the more hazardous the cargo. Select [NUMBER OF CONES 0] if your ship is not carrying hazardous cargo. Select [B-FLAG] 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.



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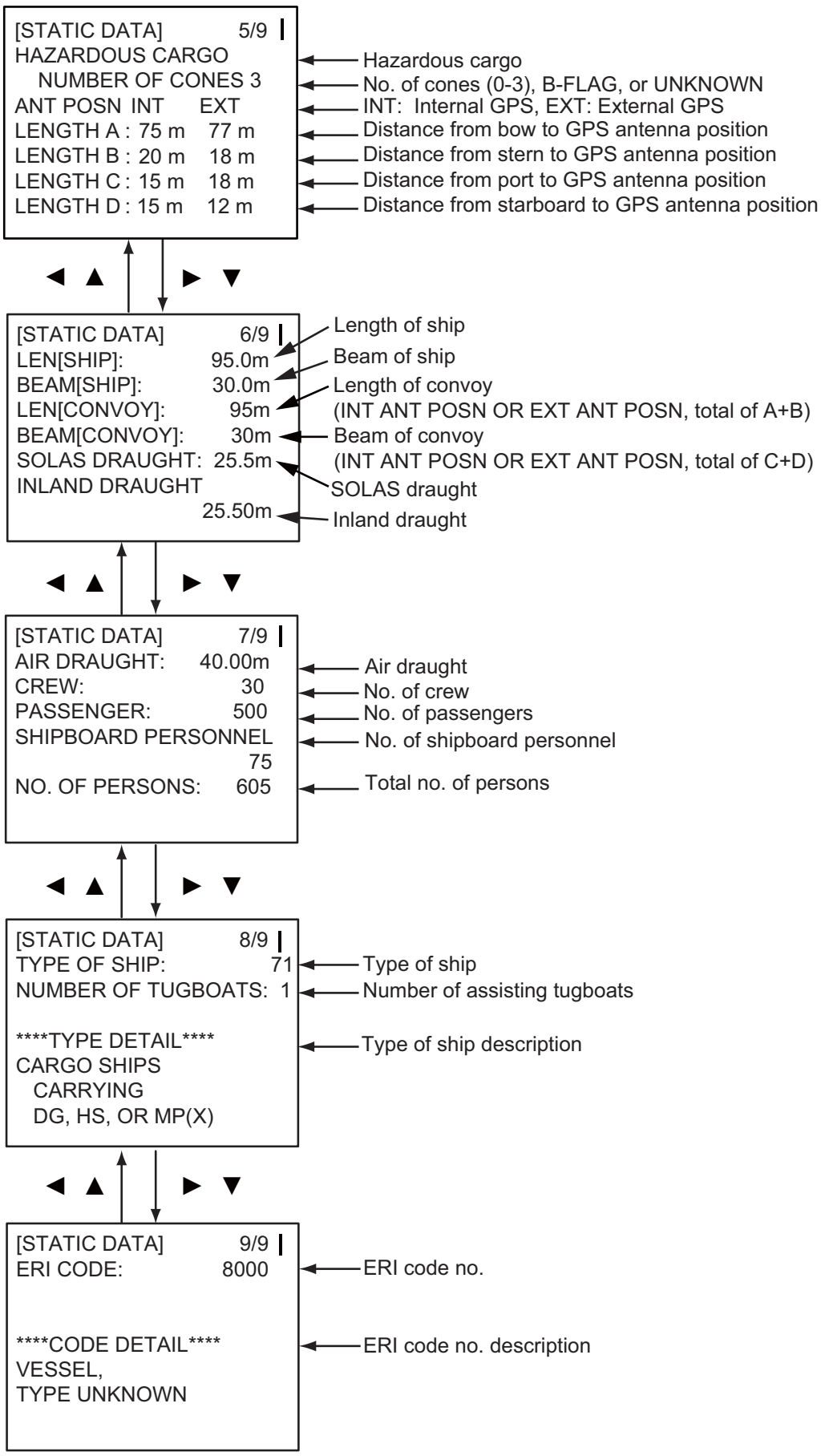
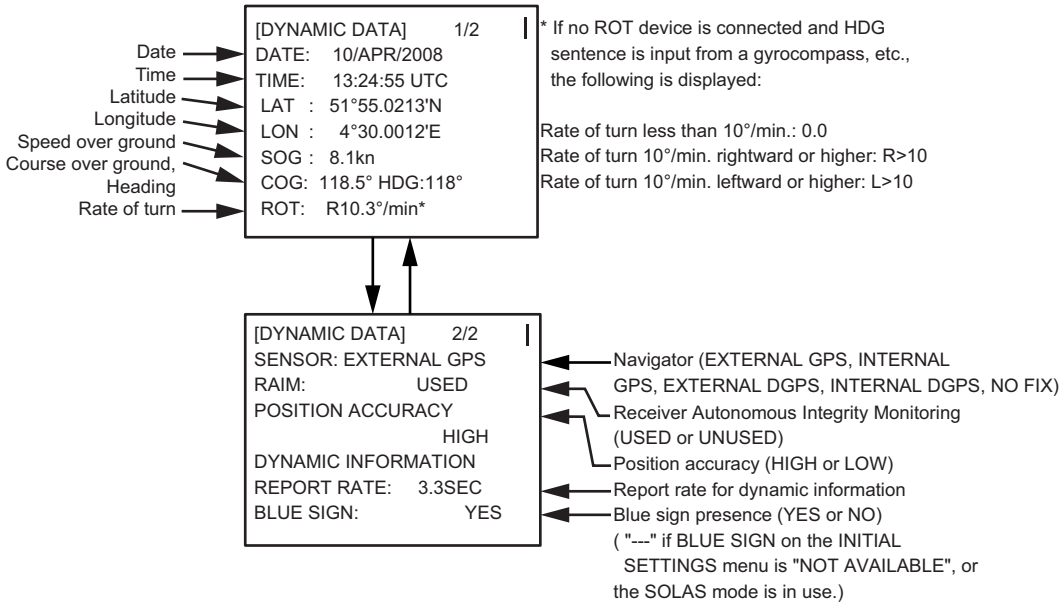


2.5 Dynamic Data

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.



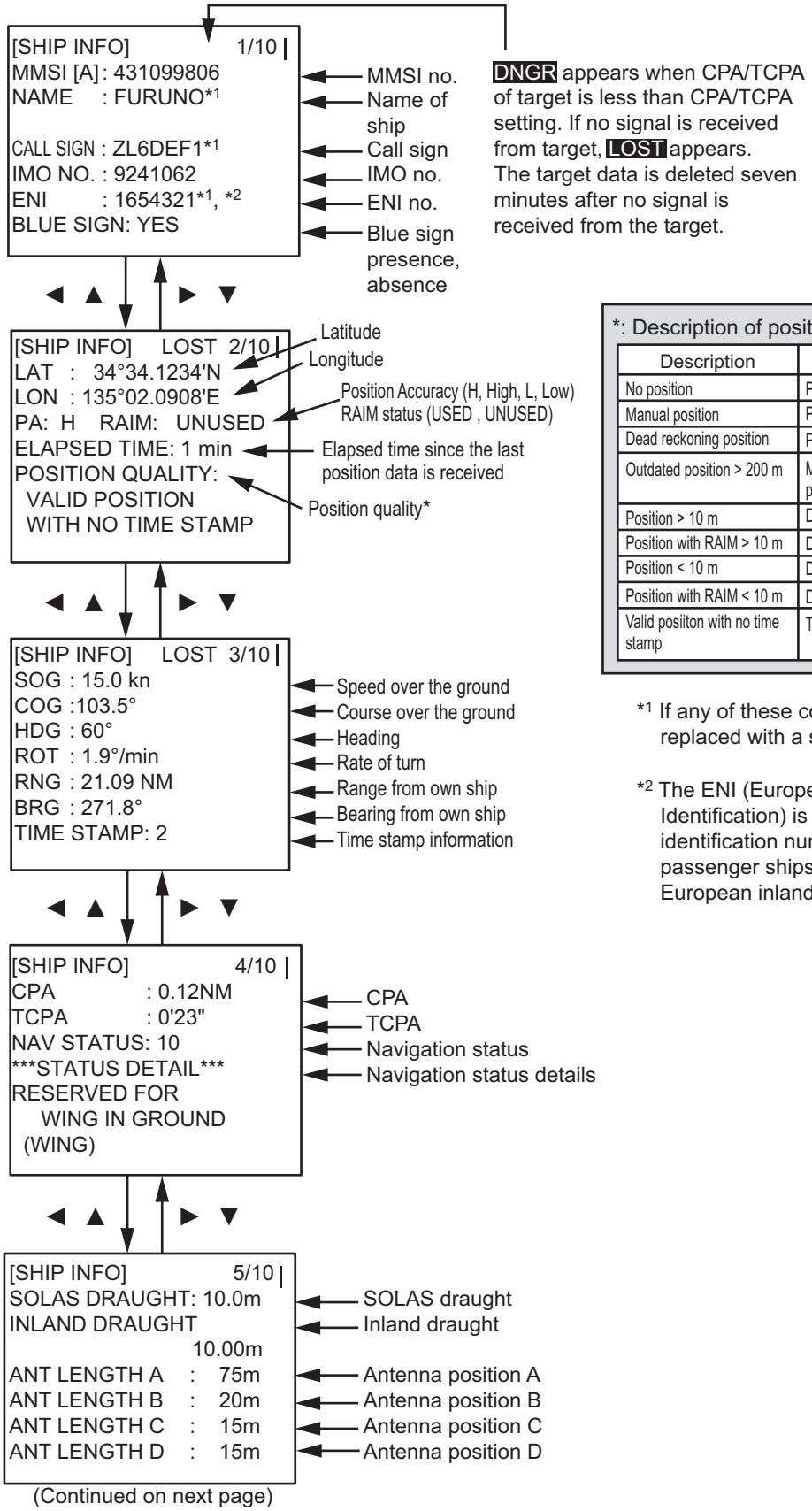
Update rate of dynamic ship information

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.



(Continued on next page)

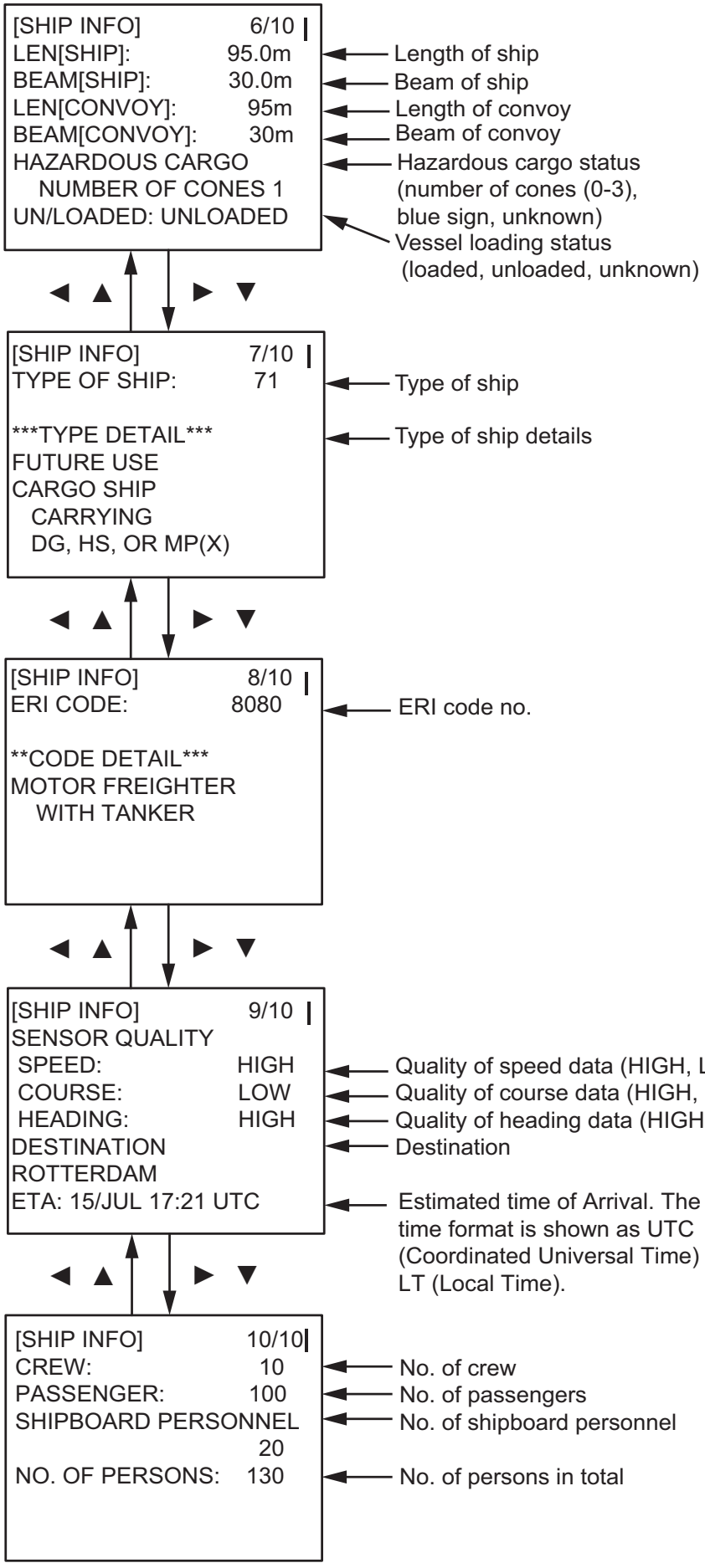
*: Description of position quality

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 posiiton 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 from previous page)



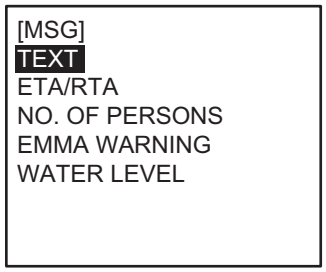
Note 1: [BLUE SIGN] information (contained in message type 1) is displayed when the FA-150 receives an RFM10* message type 6 (inland ship and voyage related data) or type 8 (safety-related message). When this happens, "BLUE SIGN" appears on page 1/10 of the [DETAILS SHIP] displays. If the target becomes 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.

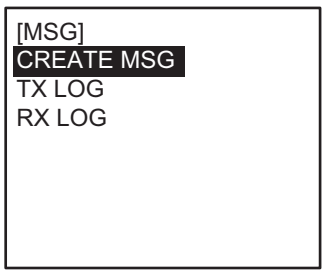
2.7 Inland AIS Specific Messaging

2.7.1 Text message

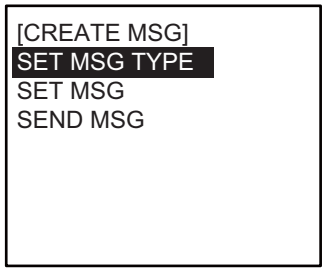
1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.



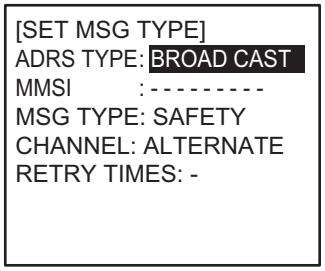
3. [TEXT] is already selected; press the **ENT** key.



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



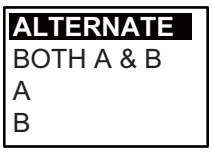
5. [SET MSG TYPE] is now selected; press the **ENT** key.



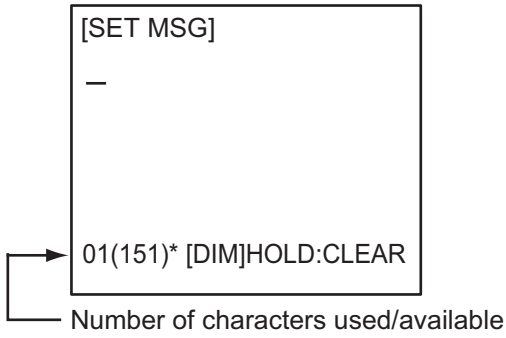
6. [ADRS TYPE] line is now selected; press the **ENT** key.

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.

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.



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.



*: 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 **MENU** key to return to the [CREATE MSG] sub-menu.
17. Select [SEND MSG] then press the **ENT** key. The prompt shown below appears.

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.

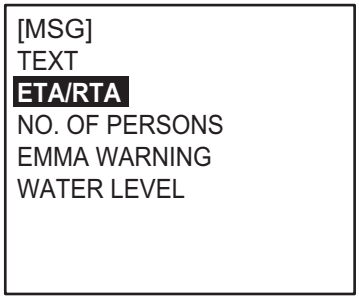
2.7.2 ETA and RTA messages

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.).

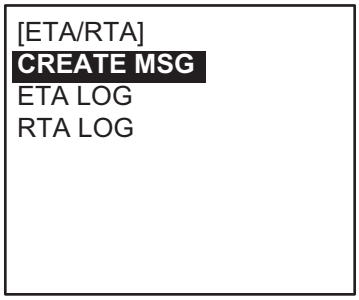
Upon receipt of your ETA message, the lock authority responds with an RTA (Requested Time of Arrival) message, usually within 15 minutes of receipt of the ETA message. The RTA message contains lock operational status, requested time of arrival and the particulars of the lock (country code, location code,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

Sending an ETA message

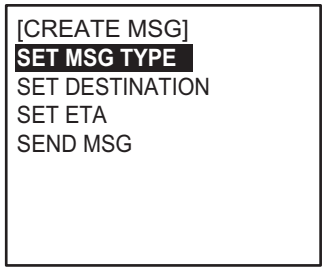
1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.



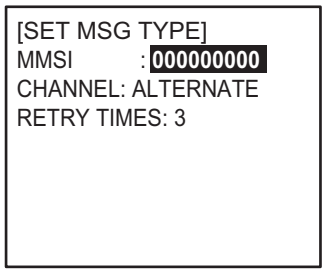
3. Select [ETA/RTA] then press the **ENT** key.



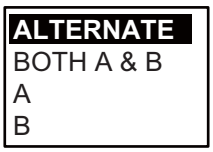
4. [CREATE MSG] is now selected; press the **ENT** key.



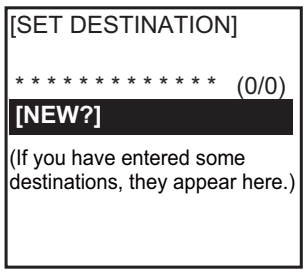
5. [SET MSG TYPE] is now selected; press the **ENT** key.



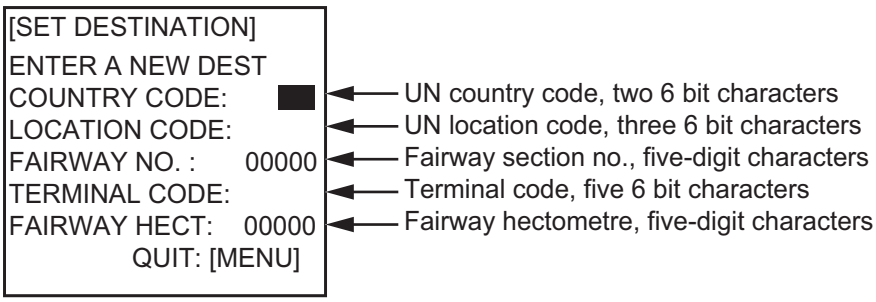
6. [MMSI] is now selected; press the **ENT** key.
7. Enter the MMSI of the lock/bridge/terminal you want to pass through then press the **ENT** key.
8. [CHANNEL] is now selected; press the **ENT** key.



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 un-successful) 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.

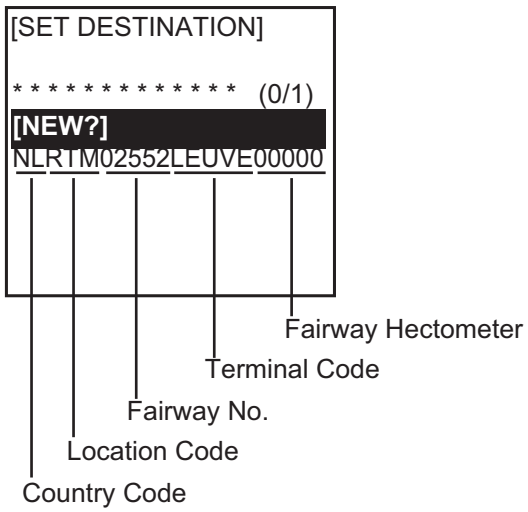


14. [NEW] is now selected. If your destination is shown on screen, select it, press the **ENT** key then go to step 18. To enter a new destination, go to step 15.
15. With [NEW] selected, press the **ENT** key.

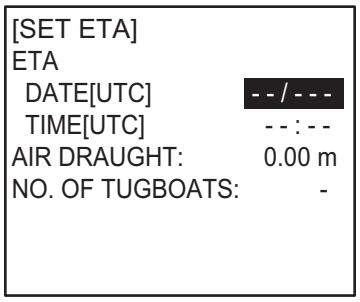


16. [COUNTRY CODE] is selected; press the **ENT** key. Enter the UN country code of your destination, referring to ISO 3166, then press the **ENT** key.
17. Enter location code, fairway no., terminal code, and fairway hectometre, referring to the ERI (Electronic Reporting International) Guide Part IV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



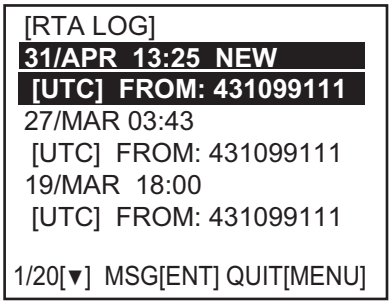
20. [DATE[UTC]] is now selected; press the **ENT** key.
21. Enter the day (1-2 digits) and month (three-character abbreviation) of ETA then press the **ENT** key.
22. [TIME[UTC]] is now selected; press the **ENT** key.
23. Enter your ETA, in 24-hour notation, then press the **ENT** key.
24. [AIR DRAUGHT] 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.

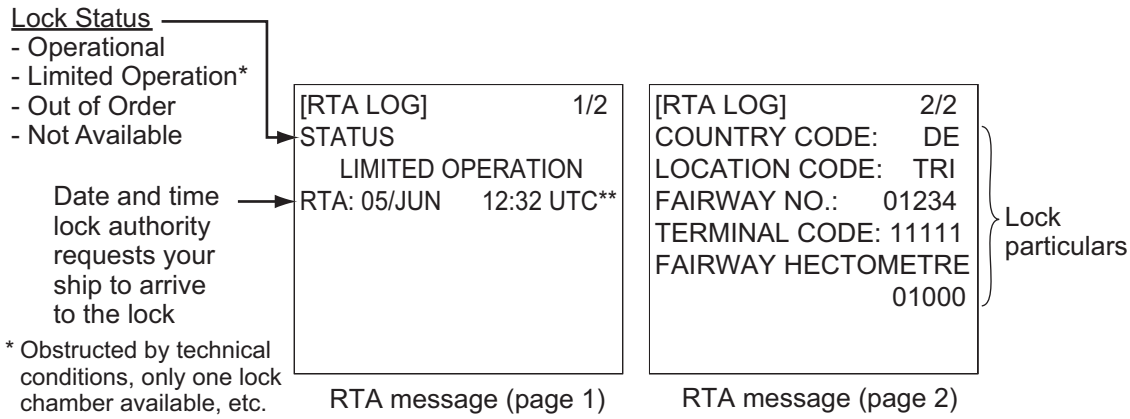
Receiving an RTA message

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.





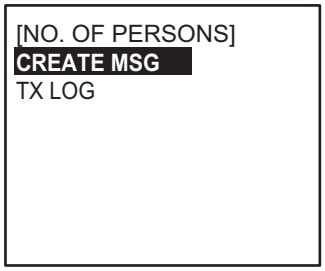
**: Time format shown as UTC (Coordinated Universal Time) or LT (Local Time).

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

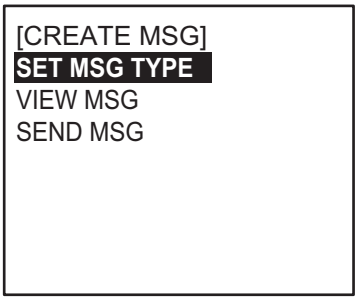
2.7.3 No. of persons message

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.

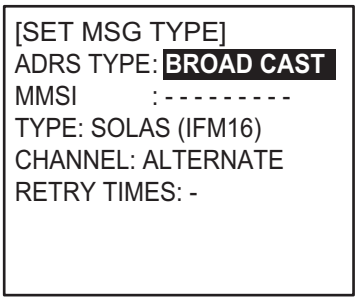
1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.
3. Select [NO. OF PERSONS] then press the **ENT** key.



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



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

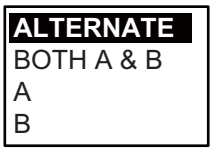


6. [ADRS TYPE] is selected; press the **ENT** key.

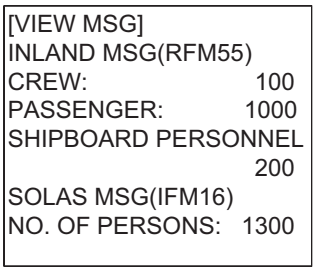
7. Select [ADRS CAST] to send a message to a specific AIS-equipped ship or authority, or [BROAD CAST] to send a message to all AIS-equipped ships within broadcasting range. Press the **ENT** key.
8. For [BROAD CAST], go to step 9. For [ADRS CAST], select [MMSI] then press the **ENT** key. Enter the MMSI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



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.



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

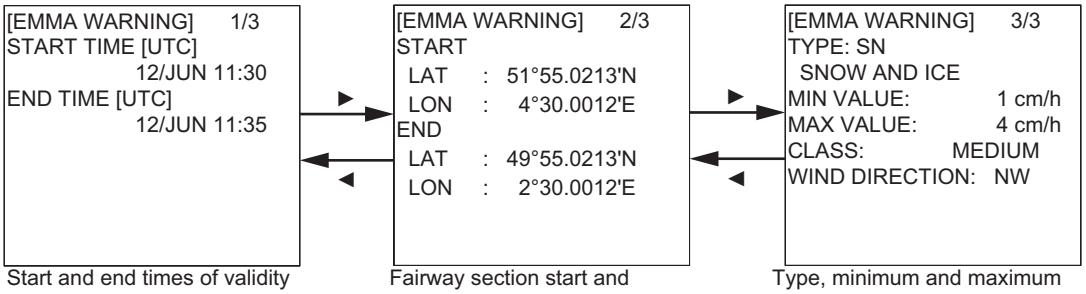
EMMA (European Multiservice Meteorological Awareness) warnings are sent by base stations to skippers to inform them of special meteorological situations. EMMA does not provide continuous weather information, but only warnings of wind, rain, snow and ice, thunderstorm, fog, extreme temperatures (low and 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.

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 ▶.



Start and end times of validity of warning

Fairway section start and end co-ordinates of warning

Type, minimum and maximum values, class and wind direction (See next page for description.)

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: • km/h (wind) • °C (temperature) • cm/h (snow) • l/m^{2}h (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

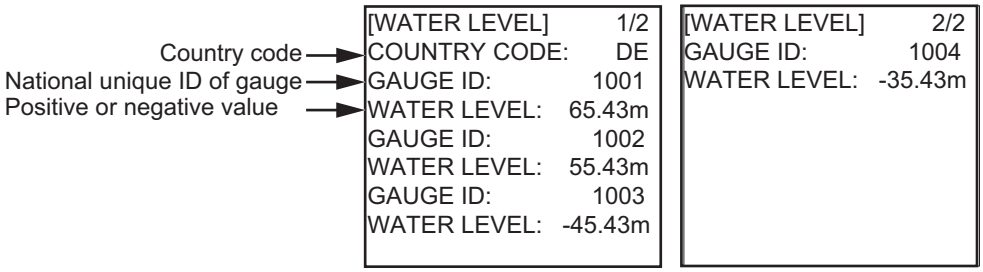
5. Press the **MENU** key to close the message.

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.



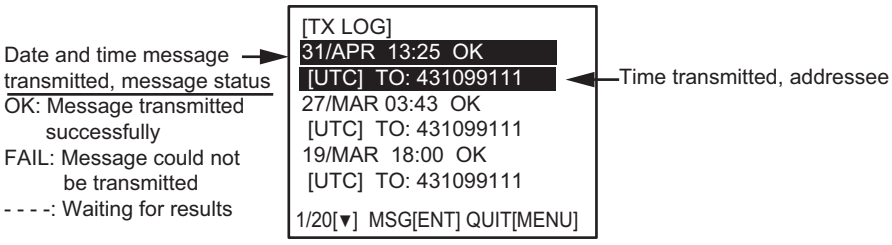
5. Press the **MENU** key to close the message.

2.7.6 Message logs

TX logs

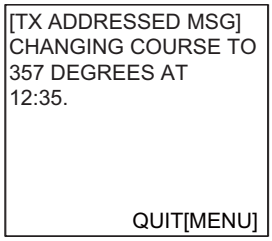
The TX logs store transmitted text messages, ETA, and no. of persons messages, in respective logs. To see a TX message, do the following:

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.

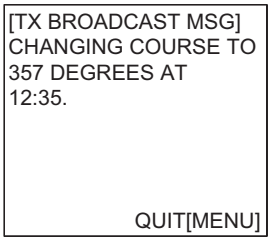


Note: Time format is shown as [UTC] (Coordinated Universal Time) or [LT] (Local Time).

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

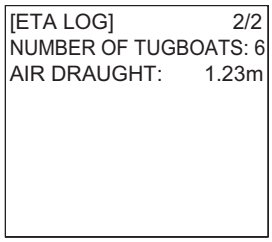


TX addressed message

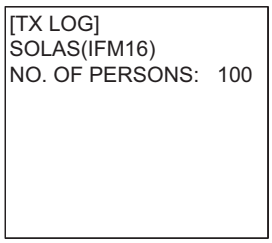


TX broadcast message

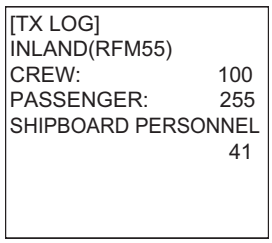
ETA message (page 1)



ETA message (page 2)



SOLAS IFM16 no. of persons message



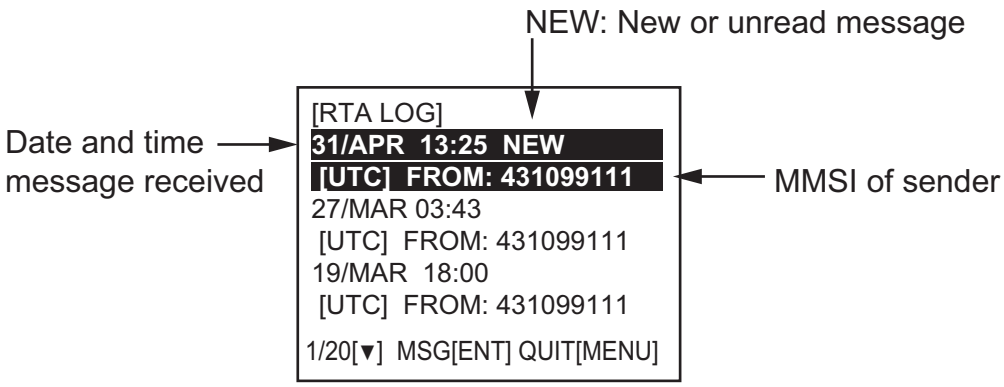
INLAND RFM55 no. of persons message

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

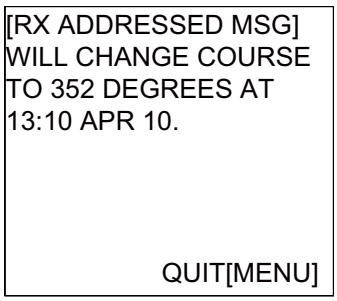
RX logs

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:

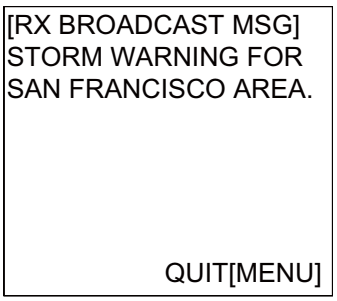
1. Press the **MENU** key to open the menu.
2. Select [MSG] then press the **ENT** key.
3. Select [RX LOG] (Text), [ETA LOG] (ETA), [RTA LOG] (RTA), [EMMA WARNING] or [WATER LEVEL] as appropriate then press the **ENT** key. Below is the RX log for text messages. (The RX log for other message types is similar.)



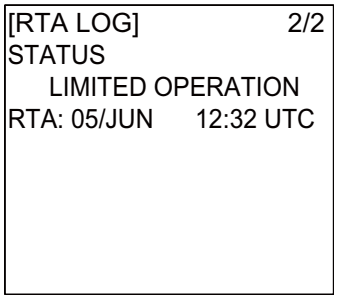
4. Select the message to view then press the **ENT** key. Below are examples of text and RTA messages. For EMMA warning and water level messages, see paragraph 2.7.4 and paragraph 2.7.5, respectively.



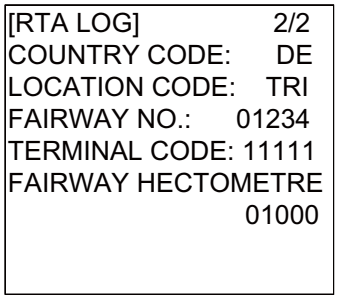
RX addressed message



RX broadcast message



RTA message (page 1)



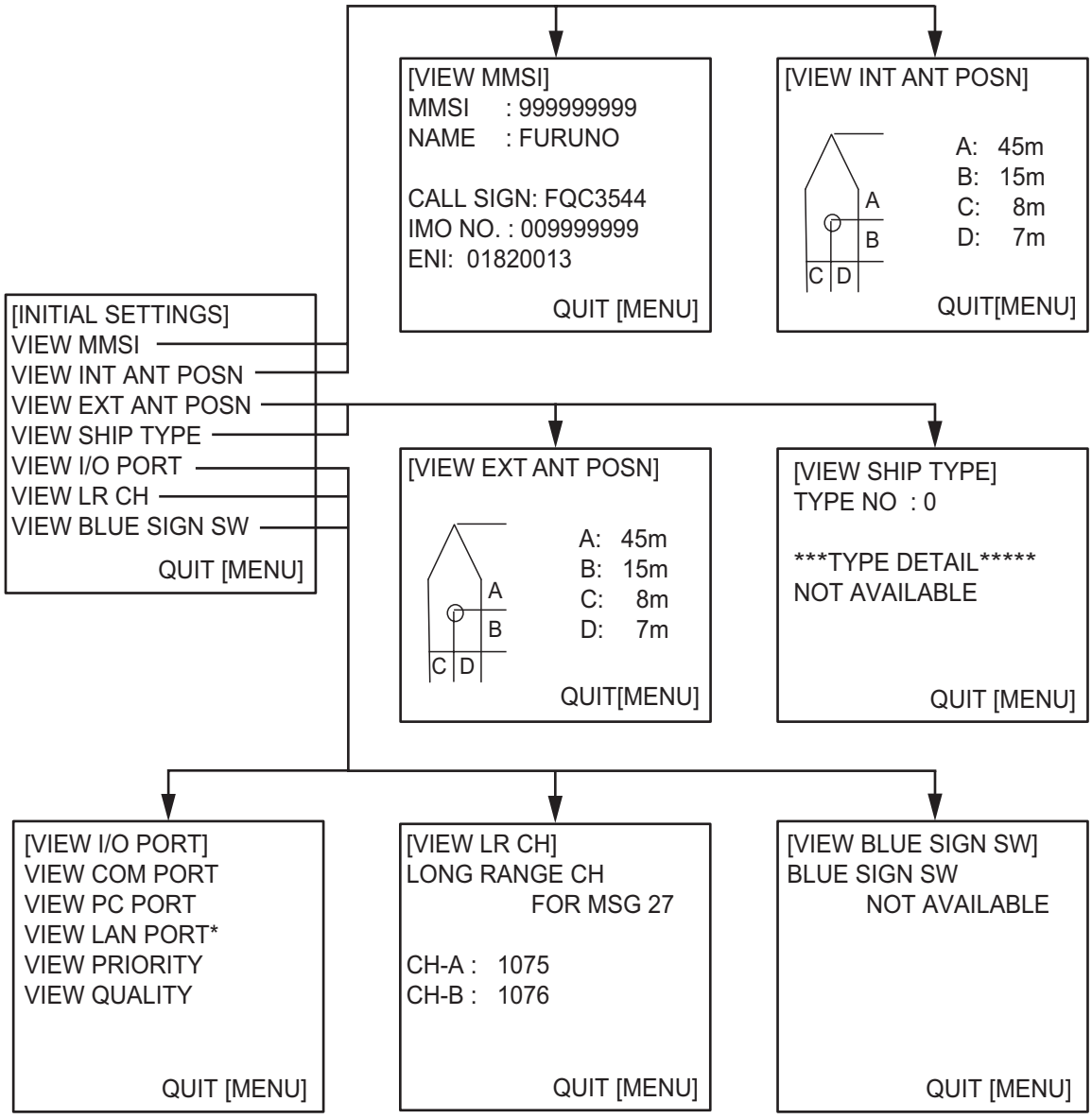
RTA message (page 2)

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.



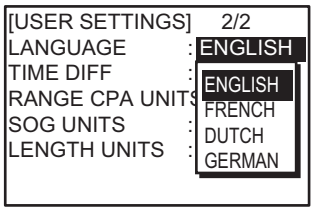
Choose port to view and press the **ENT** key.

* Shown when optional LAN kit is installed.

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.

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

ELECTRICAL SHOCK HAZARD
Do not open the equipment.

Only qualified personnel should work inside the equipment.

NOTICE

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

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

3.1 Maintenance

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

Item	Check point
Connectors	Check that all connectors on the rear panel of the transponder unit and monitor unit are firmly connected.
Cabling	Check cabling for damage. Replace if damaged.
Ground terminal	Check the ground terminal on the monitor unit and transponder unit for rust. Clean if necessary.
Ground wire	Check that the ground wire on the monitor unit and transponder unit is firmly fastened.
Monitor unit, Transponder unit.	Dirt and dust should be removed from units with a soft, dry cloth. For the LCD, wipe it carefully to prevent scratching, using tissue paper and an LCD cleaner. To remove dirt or salt deposits, use an LCD cleaner, wiping slowly with tissue paper so as to dissolve the dirt or salt. Change paper frequently so the salt or dirt will not scratch the LCD. Do not use solvents such as thinner, acetone or benzene for cleaning any unit; they can remove paint and marks and deform the equipment.

3.2 Replacement of Fuse, 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

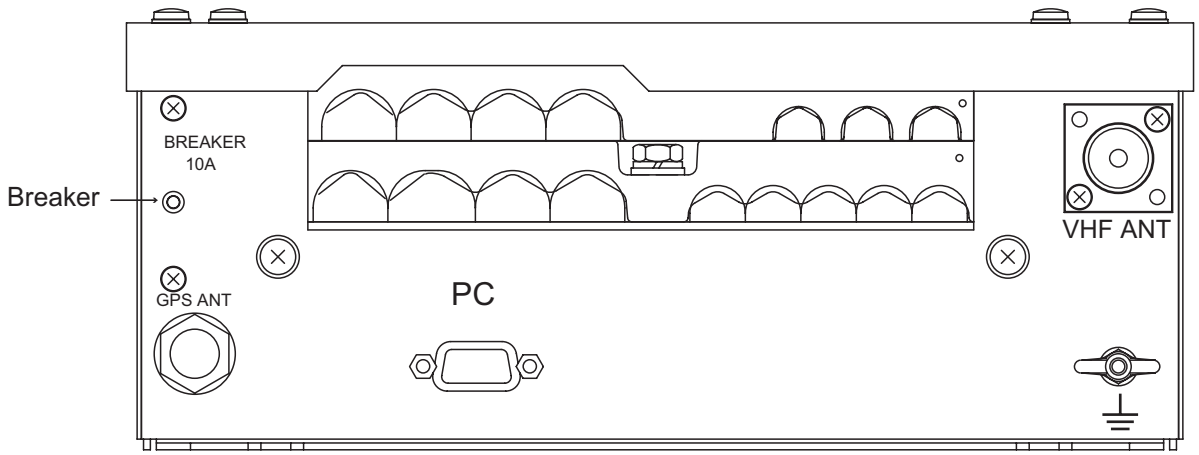
⚠ WARNING

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.	• Check that the power connector is firmly fastened • Check the power supply.
Transmitting, receiving messages	
Cannot transmit or receiver.	• Check that the VHF antenna cable is firmly fastened. • Check the VHF antenna for damage. • For TX 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.	• 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.	• Check the GPS antenna for damage. • Check the GPS antenna cable and its connectors.

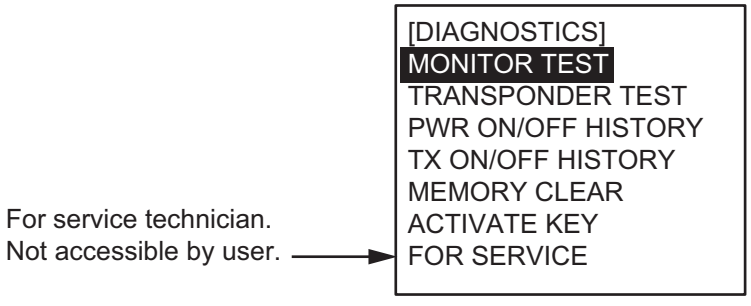
3.4 Diagnostics

The FA-150 provides diagnostic tests to check the monitor unit and transponder unit for proper operation.

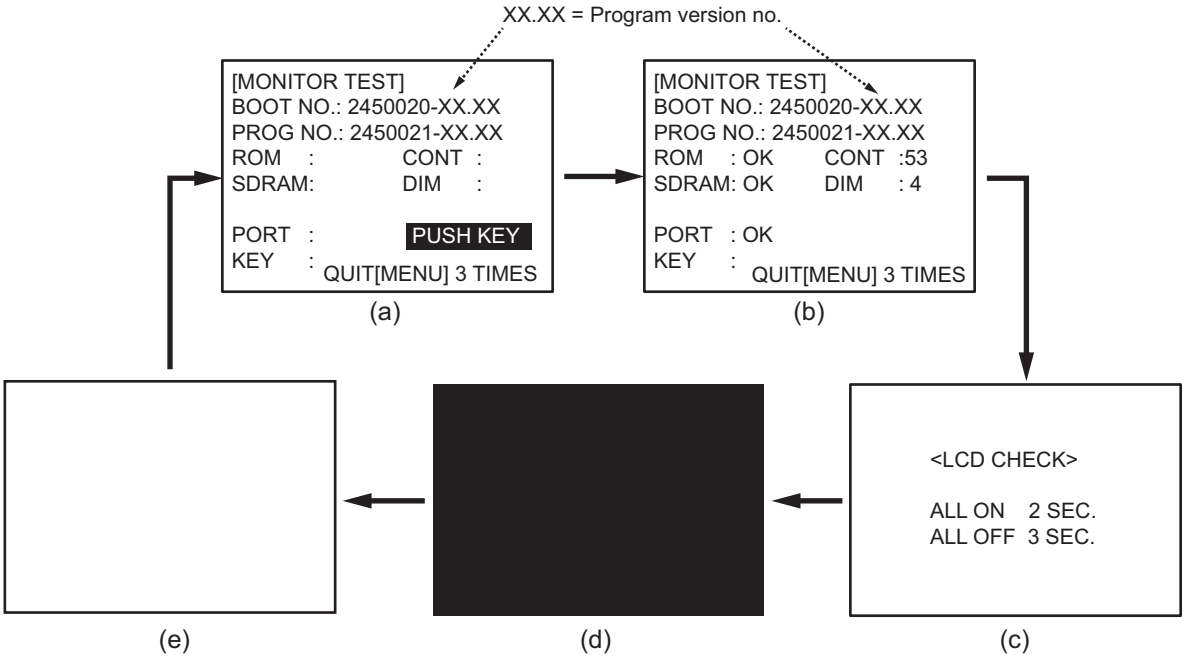
3.4.1 Monitor unit test

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.



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 version of the Mother Board is also show.
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
MOT HW    : x
TX HW     : y
```

xx.xx: Program Version No.
x: 0, Non-Inland AIS, other than 0: Inland AIS
y: 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.

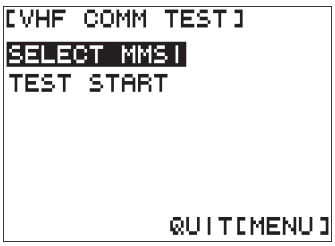
OK: Normal
NG: No Good - Appears along with reason for NG.
- DATA BACKUP ERR: Data backup problem
- GPS COMMUNICATION ERROR: Communication error with internal receiver
- PARAMETER BACKUP ERR: Parameter backup problem
- ROM ERROR
- RAM ERROR
- ANTENNA ERROR

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

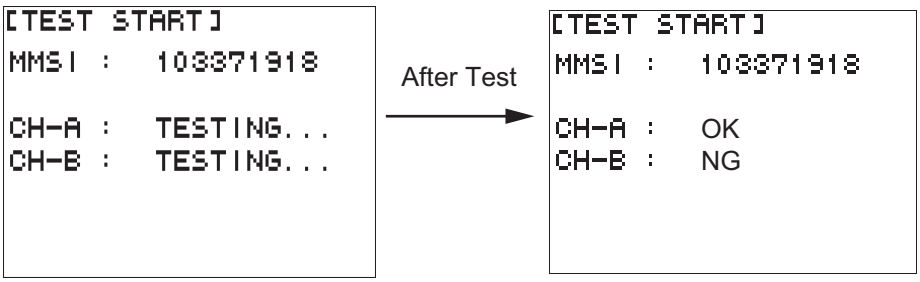
VHF communication test

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] on the [SELECT MMSI] window then press the **ENT** key.
6. Select required MMSI.
   - MMSI selected automatically
     Two MMSI numbers are shown. Select either one.
   - MMSI input manually
     To input MMSI manually, select [MANUAL] then input the MMSI using the cursor pad (▲▼: select number, ◀▶: select digit). 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 then the result of test, "OK" or "NG", appears.
   "OK": Normal
   "NG": No Good. You can not communicate with specified MMSI channel.

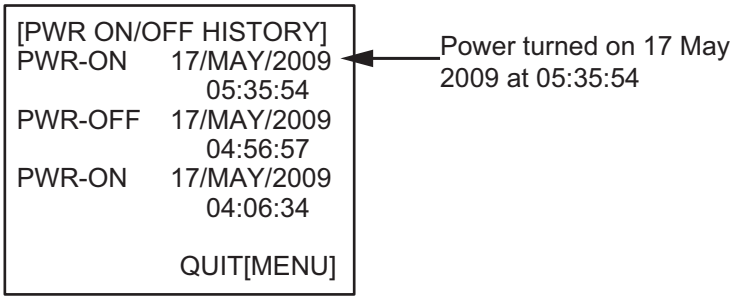


   The result "NG" may appear under the following conditions:
   - Within one minute after the power is turned on.
   - The error "TX malfunction" occurs.
   - You are in the limited area for transmission of CH-A and/or CH-B.
9. Press the **MENU** key to return to the [DIAGNOSTICS] sub-menu.

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.

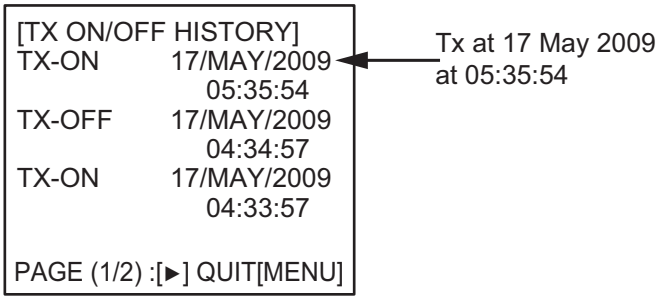


4. Use ▼ or ▶ to change page in the forward direction; ▲ or ◀ to change page in the reverse direction.
5. Press the **MENU** key to return to the [DIAGNOSTICS] sub-menu.

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.

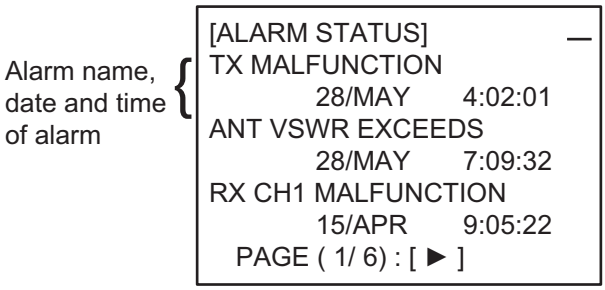


4. Use ▼ or ▶ to change page in the forward direction; ▲ or ◀ to change page in the reverse direction.
5. Press the **MENU** key to return to the [DIAGNOSTICS] sub-menu.

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.

Alarm log in the [ALARM STATUS] and Popup indication

Alarm ID	Alarm log (ALARM STATUS)	Alarm Popup indication	Meaning
001	TX MALFUNCTION	TX	AIS Transmit failure – Transmission stopped.
002	ANT VSWR EXCEEDS	ANT	AIS antenna high VSWR has been detected. Check antenna.
003	RX CH1 MALFUNCTION	CH1	RX1 Failure – Transmission stopped for corresponding transmission channel.
004	RX CH2 MALFUNCTION	CH2	RX2 Failure – Transmission stopped for corresponding transmission channel.
005	RX CH70 MALFUNCTION	CH70	DSC Receive failure.
007	UTC SYNC INVALID	UTC	No synchronization with UTC
008	MKD CONNECTION LOST	MKD	AIS – Communication failure between transponder unit and monitor unit (MKD).
009	INT/EXT POS MISMATCH	POSN	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.)
010	NAVSTATUS INCORRECT	NAV	Mismatch between the ship's speed and [NAVSTATUS] information.
011	HDG SENSOR OFFSET	HDG-OFS	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.)
014	ACTIVE AIS-SART	SART-ACTIVE	Received the AIS-SART message.
025	EXTERNAL EPFS LOST	EPFS	External navigation data not received – Check external GNSS.
026	NO POS SENSOR IN USE	L/L	No position data available.
029	NO VALID SOG INFO	SOG	SOG information is invalid.
030	NO VALID COG INFO	COG	COG information is invalid.
032	NO VALID HDG INFO	HDG	HDG information data is lost/invalid.
035	NO VALID ROT INFO	ROT	Rate of turn (ROT) data not available.

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

3.6 Error and System Messages

The FA-150 displays the following error and system messages to alert you to errors and events.

Message	Meaning
CAN'T DISPLAY INVALID DATA	No position data.
CAN'T DISPLAY OVER LAT85°	Own ship's latitude is higher than 85°.
COLLISION ALARM	AIS target within set CPA/TCPA range.
COMMUNICATION ERROR	No communication with transponder.
DIFFERENT FROM ANT POS VALUE	For Inland AIS. Total sum of internal and external antenna distances are more than 3 meters greater than LENGTH (BEAM) OF SHIP.
ENTER MMSI	No MMSI. Set MMSI properly.
ERROR REGIST	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.
GPS COMMUNICATION ERROR	Communication error with internal GPS, shown at internal GPS self test.
ILLEGAL COMBINATION OF PRIORITY	Duplication in priority setting.
ILLEGAL MODE WAS SELECTED. PRESS ANY KEY.	Invalid combination of channels is selected for editing.
INCORRECT NUMBER! PRESS ANY KEY	Incorrect ERI code entered.
INPUT THE UTC TIME!	Input the UTC time when there is no time data from GPS.
INVALID MMSI	Invalid MMSI.
MESSAGE!	Class A AIS text message received.

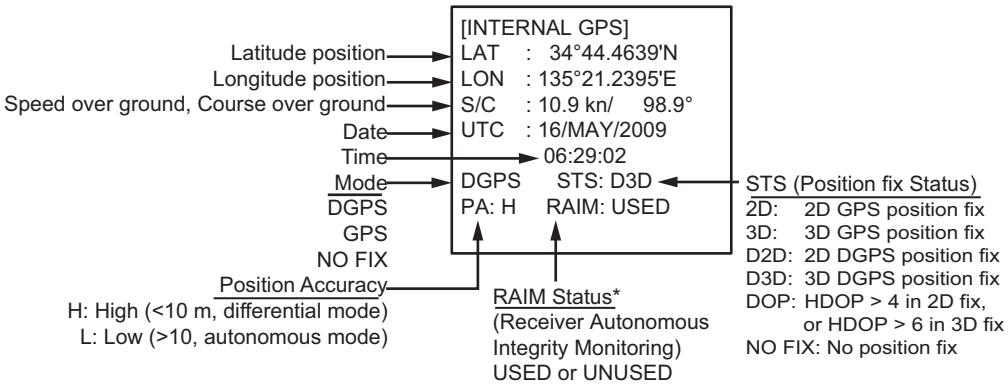
Message	Meaning
MESSAGE! EMMA WARNING	Inland AIS EMMA warning message received.
MESSAGE! RTA	Inland AIS RTA message received.
MESSAGE! TEXT	Inland AIS text message received.
MESSAGE! WATER LEVEL	Inland AIS water level message received.
NO CREW	Number of crew not entered in no. of persons message.
NO 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 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.
NO SEL	Attempted to see detailed data for a target which has no data.
NO SHIPBOARD PERSONNEL	Number of shipboard personnel not entered in no. of persons message.
OUT OF RANGE! 0-255	Wrong IP, sub net mask or gateway address.
OUT OF RANGE! 0-65535	Invalid port number entered.
OUT OF RANGE! 10-30	Invalid NavNet port number entered.
OUT OF RANGE! BEAM:0-100	Invalid beam of ship entered.
OUT OF RANGE! CH-A(CH-B) DOESN'T EXIST	Invalid channel entered.
OUT OF RANGE! CPA:0-6.00	Invalid CPA range entered.
OUT OF RANGE! CREW:0-254	Invalid crew no. entered.
OUT OF RANGE! DAY	Invalid day entered.
OUT OF RANGE! DRAUGHT:0-20.0 OUT OF RANGE! DRAUGHT:0-25.5	Invalid inland draught entered. Invalid SOLAS draught entered.
OUT OF RANGE! HOUR:0-23*	Invalid hour entered.
OUT OF RANGE!: INVALID CHANNEL	Invalid CH-NO. A or CH-NO. B entered.
OUT OF RANGE! LENGTH:0-800	Invalid ship's length entered.
OUT OF RANGE! MINUTE:0-59*	Invalid minute entered.
OUT OF RANGE! NAV STATUS:0-15	Invalid nav status entered.
OUT OF RANGE! PASSENGER:0-8190	Invalid no. of passengers entered.
OUT OF RANGE! PERSONNEL:0-254	Invalid no. of personnel entered.
OUT OF RANGE! RETRY TIMES:0-3. PRESS ANY KEY.	Invalid no. of retry times entered.
OUT OF RANGE! TCPA:0-60	Invalid TCPA entered.
OUT OF RANGE! TUGBOAT:0-6	Invalid tugboat quantity entered.
OUT OF RANGE! TYPE NO.:10-99	Invalid cargo type entered.
OUT OF RANGE! ZONE:1-8	Invalid zone entered.
SEND MESSAGE UNSUCCESSFUL	Message could not be sent.
TRANSPONDER WAS REBOOTED	Transponder was rebooted.
TX NOT AVAILABLE	Not available test due to invalid transmission

* Error message displayed for both even if only one is out of range.

3.7 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.



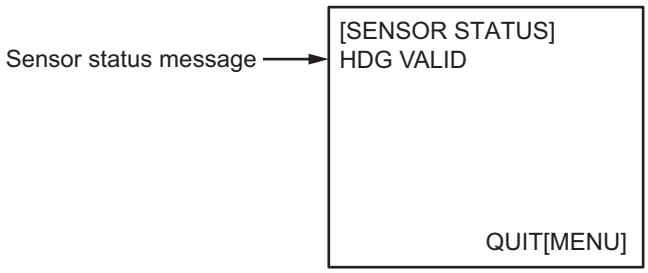
*RAIM: Technique whereby the GPS receiver verifies the integrity of the signals received from the GPS constellation.

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

3.8 Displaying Sensor Status

The [SENSOR STATUS] screen shows sensor status.

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



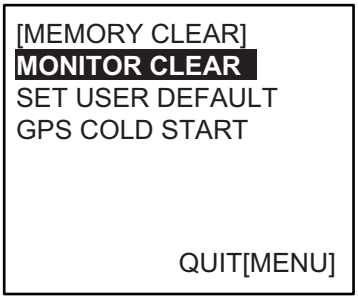
3. Press the **DISP** key to close the display.

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

3.9 Restoring Default Settings

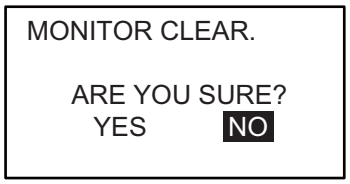
You may clear all or specific settings to start afresh with default settings. When all data is cleared, the default settings for all items in the [INIT SETTING] and [SYSTEM SETTINGS] sub-menus are restored. GPS data is also cleared; however, MMSI and IMO numbers, ship's name and call sign are not cleared.

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.

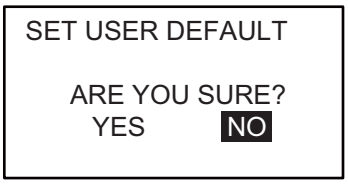


4. Select [MONITOR CLEAR], [SET USER DEFAULT] or [GPS COLD START] as appropriate then press the **ENT** key.

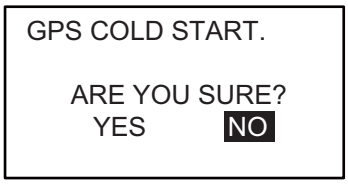
MONITOR CLEAR	Restore default settings for dimmer, contrast, CPA/TCPA, key beep, audio alarm and received message alarm.
USER DEFAULT	Restores all settings to default, except items in the [INITIAL SETTINGS] menu (MMSI No., IMO No., ship's name and call sign, etc.)
GPS COLD START	Clears GPS Almanac to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



MONITOR CLEAR



USER DEFAULT



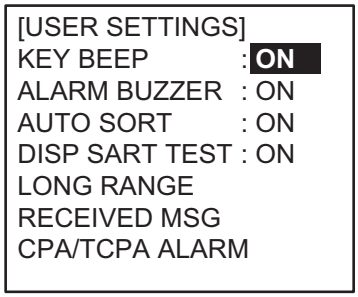
GPS COLD START

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

3.10 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.



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.)

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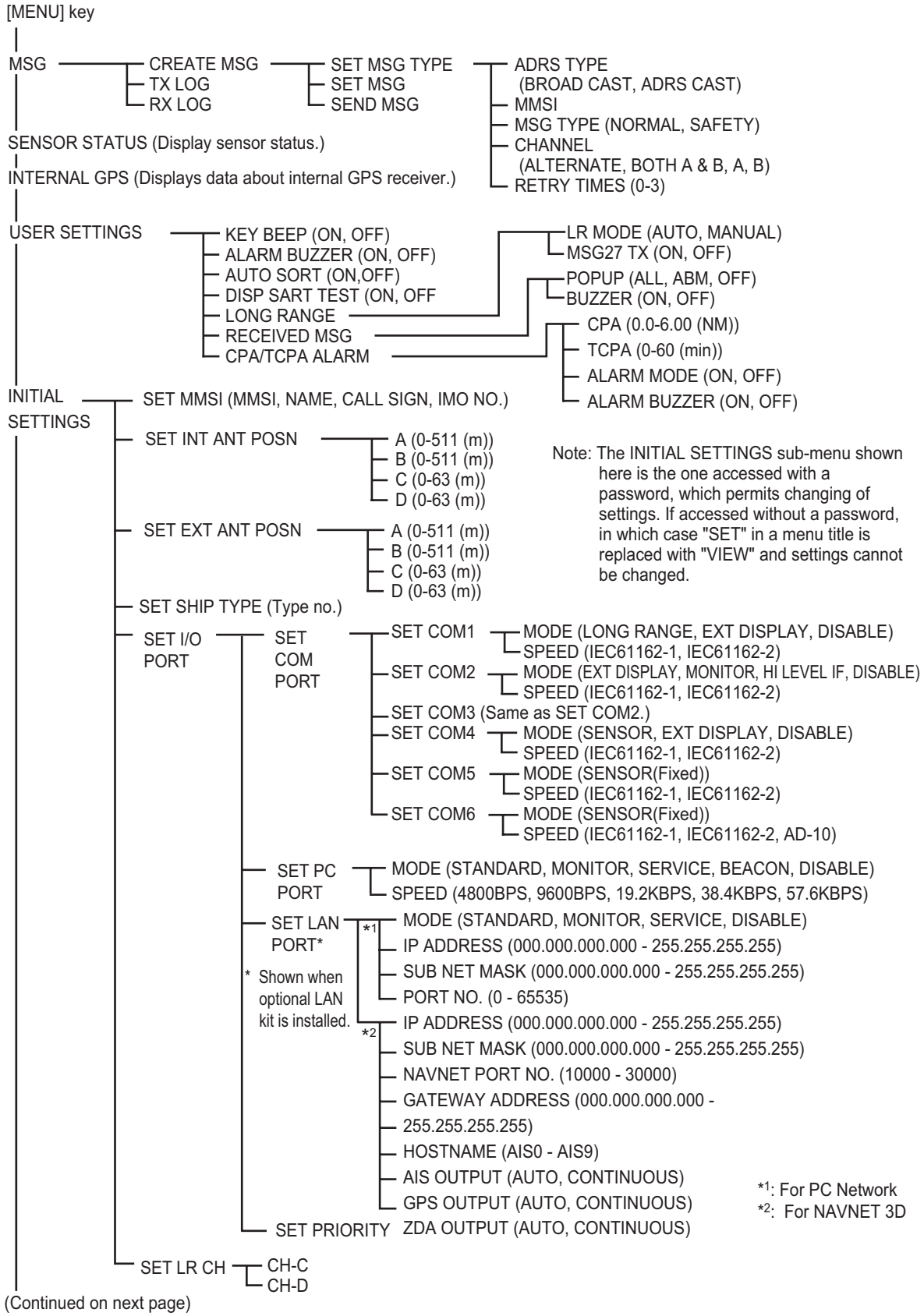
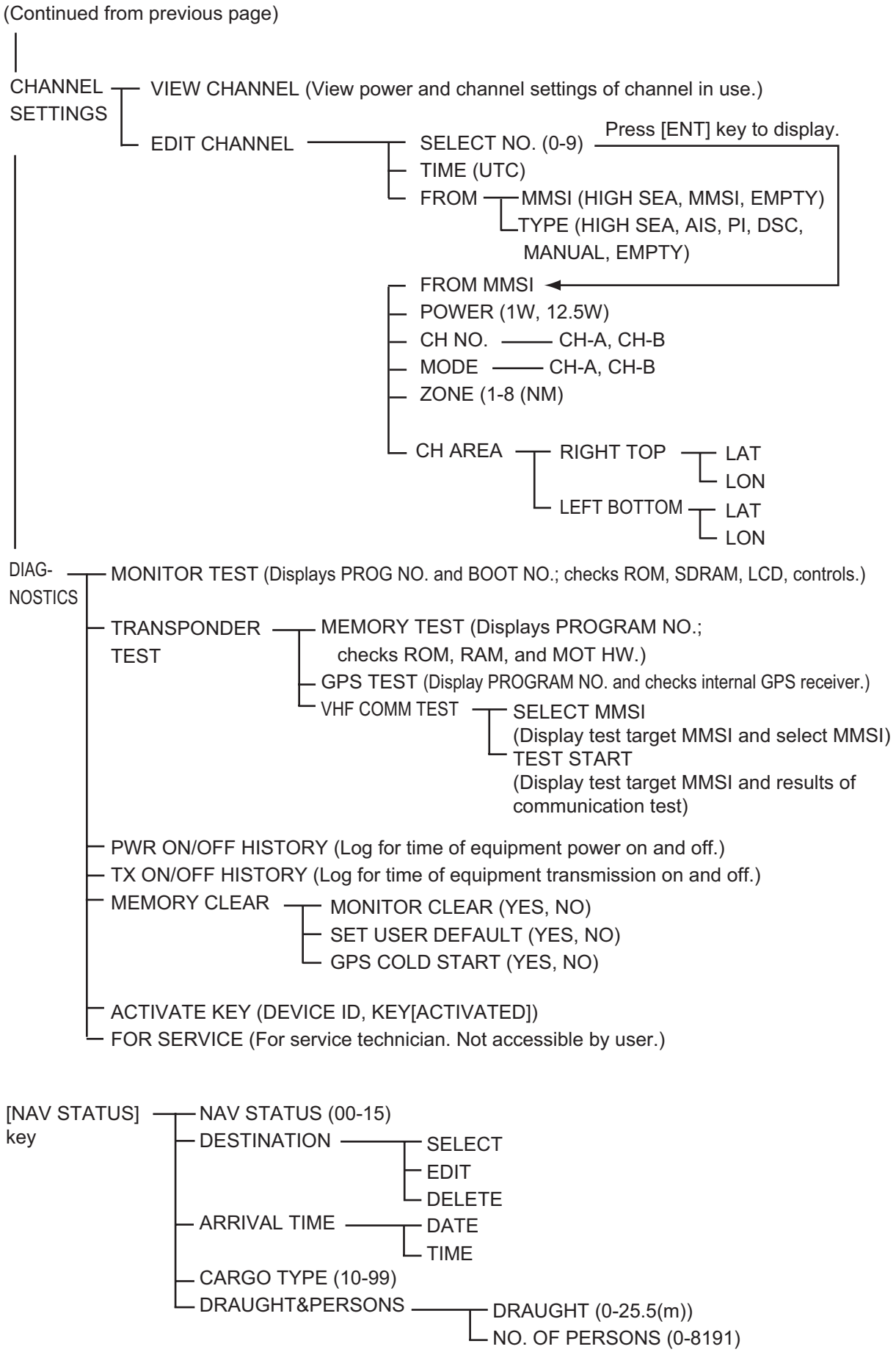
APPENDIX 1 MENU TREE

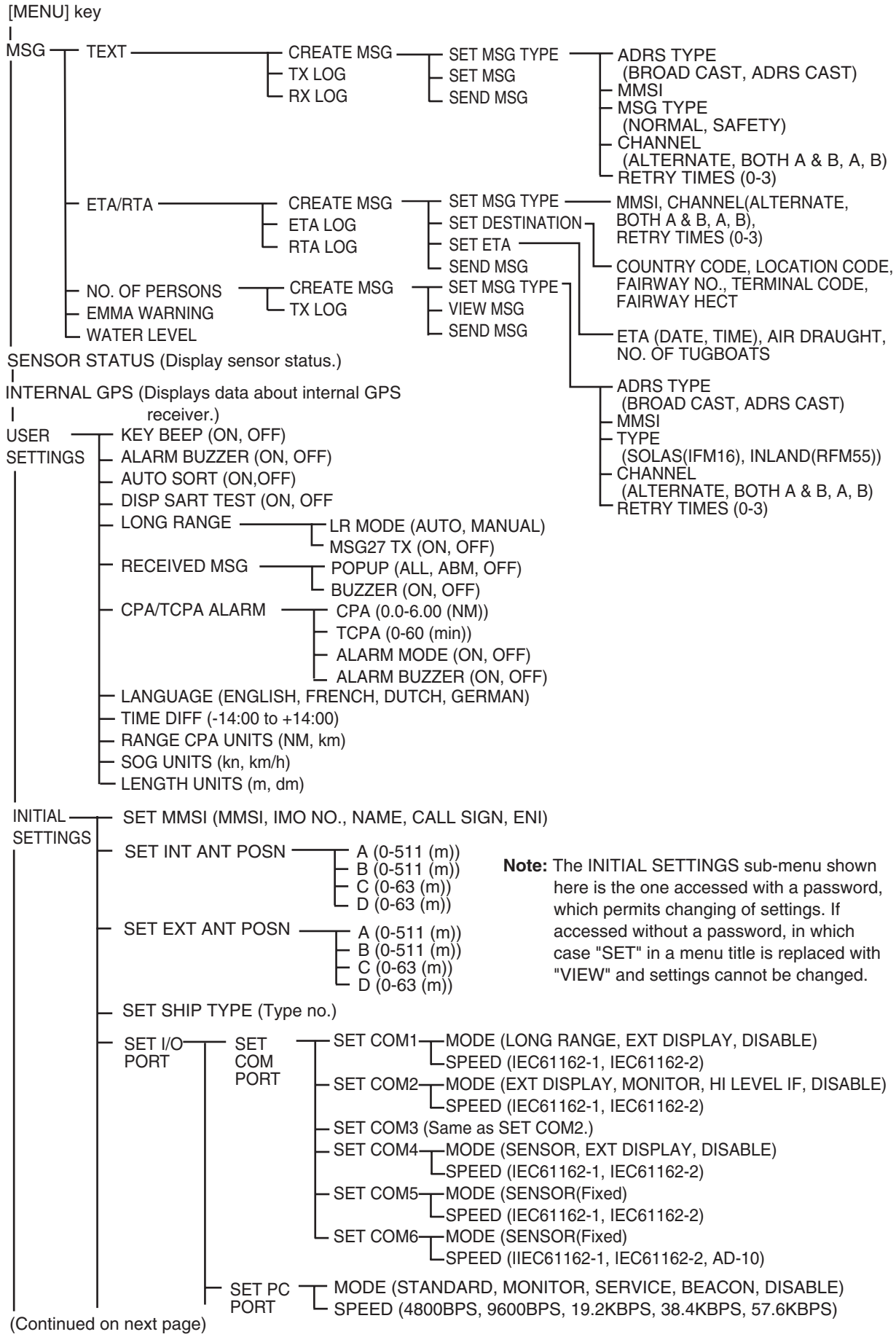
Class A AIS



(Continued on next page)

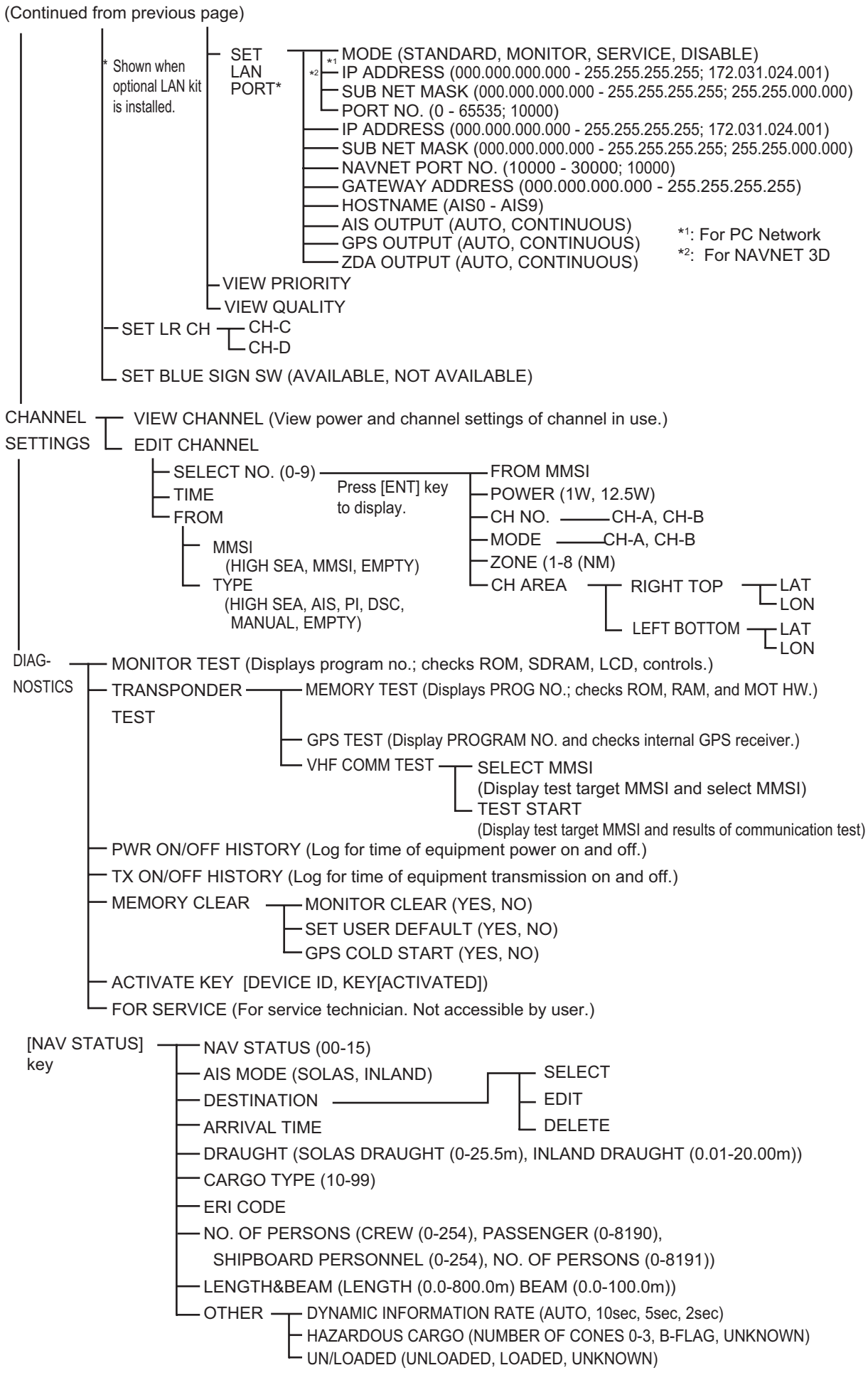

(Continued from previous page)
CHANNEL SETTINGS
VIEW CHANNEL (View power and channel settings of channel in use.)
EDIT CHANNEL
SELECT NO. (0-9)
Press [ENT] key to display.
TIME (UTC)
FROM
MMSI (HIGH SEA, MMSI, EMPTY)
TYPE (HIGH SEA, AIS, PI, DSC, MANUAL, EMPTY)
FROM MMSI
POWER (1W, 12.5W)
CH NO.
CH-A, CH-B
MODE
CH-A, CH-B
ZONE (1-8 (NM)
CH AREA
RIGHT TOP
LAT
LON
LEFT BOTTOM
LAT
LON
DIAG-NOSTICS
MONITOR TEST (Displays PROG NO. and BOOT NO.; checks ROM, SDRAM, LCD, controls.)
TRANSPONDER TEST
MEMORY TEST (Displays PROGRAM NO.; checks ROM, RAM, and MOT HW.)
GPS TEST (Display PROGRAM NO. and checks internal GPS receiver.)
VHF COMM TEST
SELECT MMSI
(Display test target MMSI and select MMSI)
TEST START
(Display test target MMSI and results of communication test)
PWR ON/OFF HISTORY (Log for time of equipment power on and off.)
TX ON/OFF HISTORY (Log for time of equipment transmission on and off.)
MEMORY CLEAR
MONITOR CLEAR (YES, NO)
SET USER DEFAULT (YES, NO)
GPS COLD START (YES, NO)
ACTIVATE KEY (DEVICE ID, KEY[ACTIVATED])
FOR SERVICE (For service technician. Not accessible by user.)
[NAV STATUS] key
NAV STATUS (00-15)
DESTINATION
SELECT
EDIT
DELETE
ARRIVAL TIME
DATE
TIME
CARGO TYPE (10-99)
DRAUGHT&PERSONS
DRAUGHT (0-25.5(m))
NO. OF PERSONS (0-8191)

Inland AIS



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)


(Continued from previous page)
* Shown when optional LAN kit is installed.
SET LAN PORT*
*1 MODE (STANDARD, MONITOR, SERVICE, DISABLE)
*2 IP ADDRESS (000.000.000.000 - 255.255.255.255; 172.031.024.001)
SUB NET MASK (000.000.000.000 - 255.255.255.255; 255.255.000.000)
PORT NO. (0 - 65535; 10000)
IP ADDRESS (000.000.000.000 - 255.255.255.255; 172.031.024.001)
SUB NET MASK (000.000.000.000 - 255.255.255.255; 255.255.000.000)
NAVNET PORT NO. (10000 - 30000; 10000)
GATEWAY ADDRESS (000.000.000.000 - 255.255.255.255)
HOSTNAME (AIS0 - AIS9)
AIS OUTPUT (AUTO, CONTINUOUS)
GPS OUTPUT (AUTO, CONTINUOUS)
ZDA OUTPUT (AUTO, CONTINUOUS)
*1: For PC Network
*2: For NAVNET 3D
VIEW PRIORITY
VIEW QUALITY
SET LR CH
CH-C
CH-D
SET BLUE SIGN SW (AVAILABLE, NOT AVAILABLE)
CHANNEL SETTINGS
VIEW CHANNEL (View power and channel settings of channel in use.)
EDIT CHANNEL
SELECT NO. (0-9)
TIME
FROM
MMSI (HIGH SEA, MMSI, EMPTY)
TYPE (HIGH SEA, AIS, PI, DSC, MANUAL, EMPTY)
Press [ENT] key to display.
FROM MMSI
POWER (1W, 12.5W)
CH NO. CH-A, CH-B
MODE CH-A, CH-B
ZONE (1-8 (NM)
CH AREA
RIGHT TOP
LAT
LON
LEFT BOTTOM
LAT
LON
DIAG-NOSTICS
MONITOR TEST (Displays program no.; checks ROM, SDRAM, LCD, controls.)
TRANSPONDER TEST
MEMORY TEST (Displays PROG NO.; checks ROM, RAM, and MOT HW.)
GPS TEST (Display PROGRAM NO. and checks internal GPS receiver.)
VHF COMM TEST
SELECT MMSI (Display test target MMSI and select MMSI)
TEST START (Display test target MMSI and results of communication test)
PWR ON/OFF HISTORY (Log for time of equipment power on and off.)
TX ON/OFF HISTORY (Log for time of equipment transmission on and off.)
MEMORY CLEAR
MONITOR CLEAR (YES, NO)
SET USER DEFAULT (YES, NO)
GPS COLD START (YES, NO)
ACTIVATE KEY [DEVICE ID, KEY[ACTIVATED])
FOR SERVICE (For service technician. Not accessible by user.)
[NAV STATUS] key
NAV STATUS (00-15)
AIS MODE (SOLAS, INLAND)
DESTINATION
SELECT
EDIT
DELETE
ARRIVAL TIME
DRAUGHT (SOLAS DRAUGHT (0-25.5m), INLAND DRAUGHT (0.01-20.00m))
CARGO TYPE (10-99)
ERI CODE
NO. OF PERSONS (CREW (0-254), PASSENGER (0-8190), SHIPBOARD PERSONNEL (0-254), NO. OF PERSONS (0-8191))
LENGTH&BEAM (LENGTH (0.0-800.0m) BEAM (0.0-100.0m))
OTHER
DYNAMIC INFORMATION RATE (AUTO, 10sec, 5sec, 2sec)
HAZARDOUS CARGO (NUMBER OF CONES 0-3, B-FLAG, UNKNOWN)
UN/LOADED (UNLOADED, LOADED, UNKNOWN)

APPENDIX 2 OTHER INFORMATION

Parts List

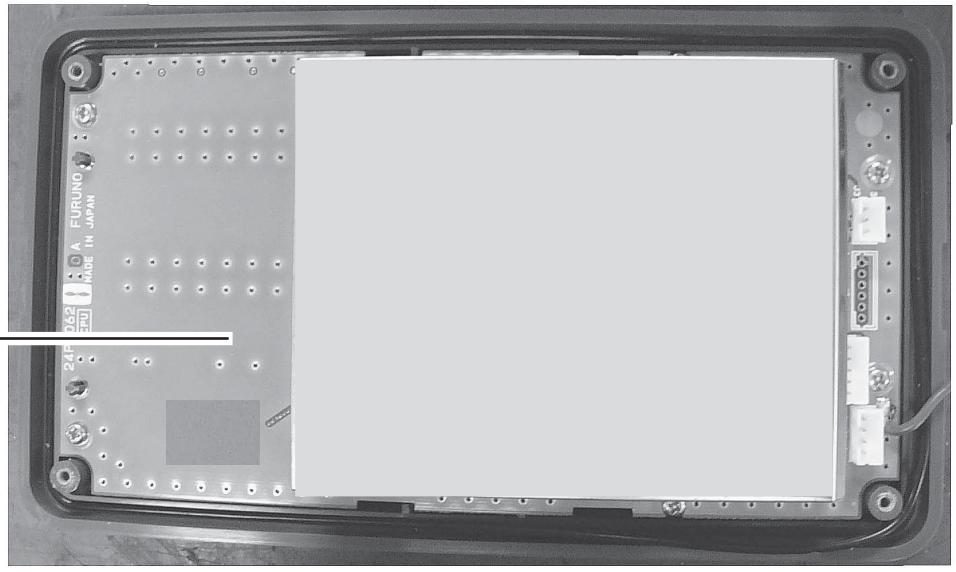
This equipment contains complex modules in which fault diagnosis and repair down to component level are not practical (IMO A.694(17)/8.3.1). Only some discrete components are used. FURUNO Electric Co., Ltd. believes identifying these components is of no value for shipboard maintenance; therefore, they are not listed in the manual. Major modules can be located on the parts location photo on page AP-6 and AP-7.

F U R U N O 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

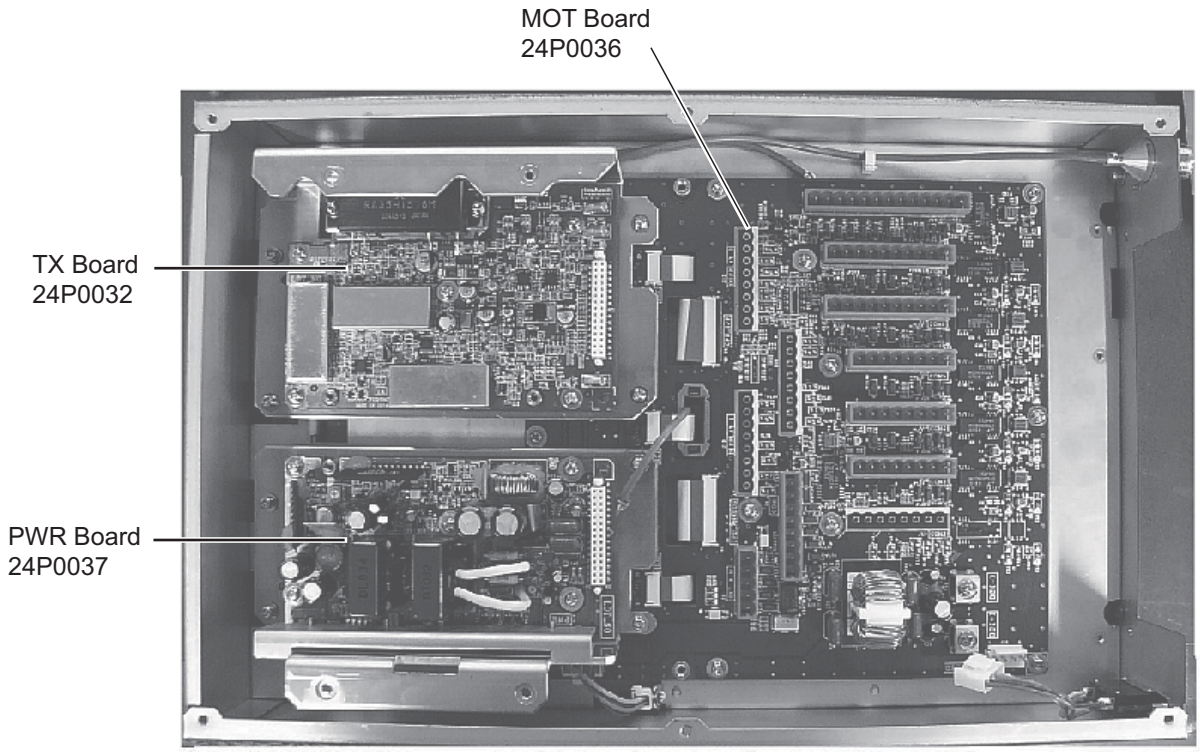
Parts Location

Monitor Unit

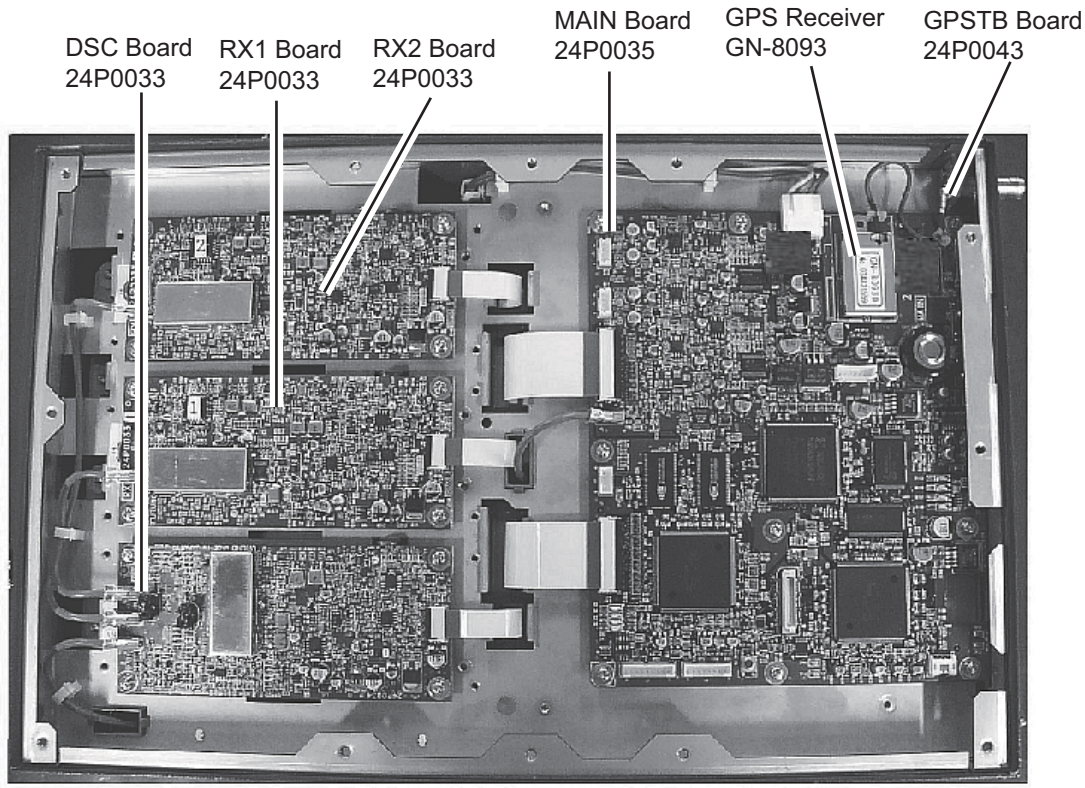


Monitor unit, rear cover opened

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, 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, ALR, LRF, LR1, LR2, LR3, TXT, PIWWSPR, VDM, VDO, VER

Transmission interval

ABK: With each event
ACA, ACS: At RX
ALR: 30 s
LRF, LR1, LR2, LR3: At RX
TXT: Each update
VDM: At RX
VDO: 1 s
VER: When requested, or powered on

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

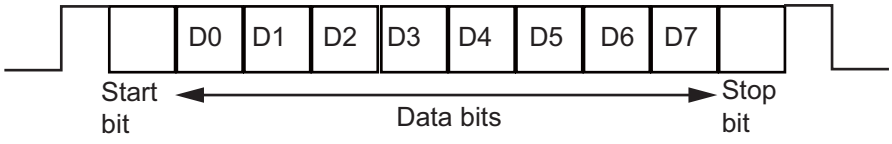
Differential driver output
R=50 ohm 2 v min.
R=27 ohm 1.5 V min.

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.

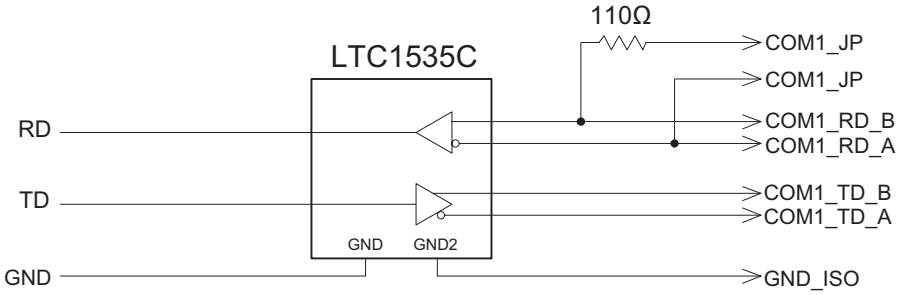
The following parameters are used:
Baud rate: 38.4 Kbps /4800 bps
Data bits: 8 (D7 = 0), parity none
Stop bits: 1



Serial interface I/O circuit

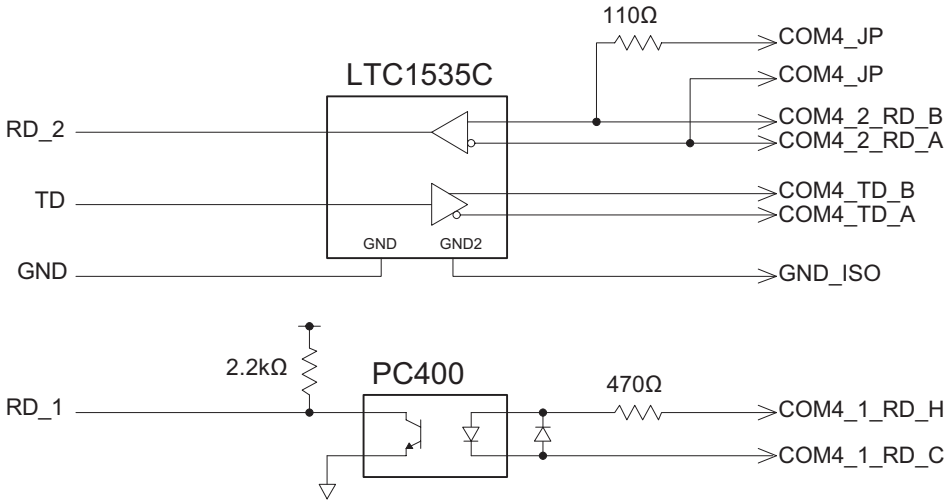
COM1, 2, 3 port

Baud rate selectable from 4800 and 38400 (bps).



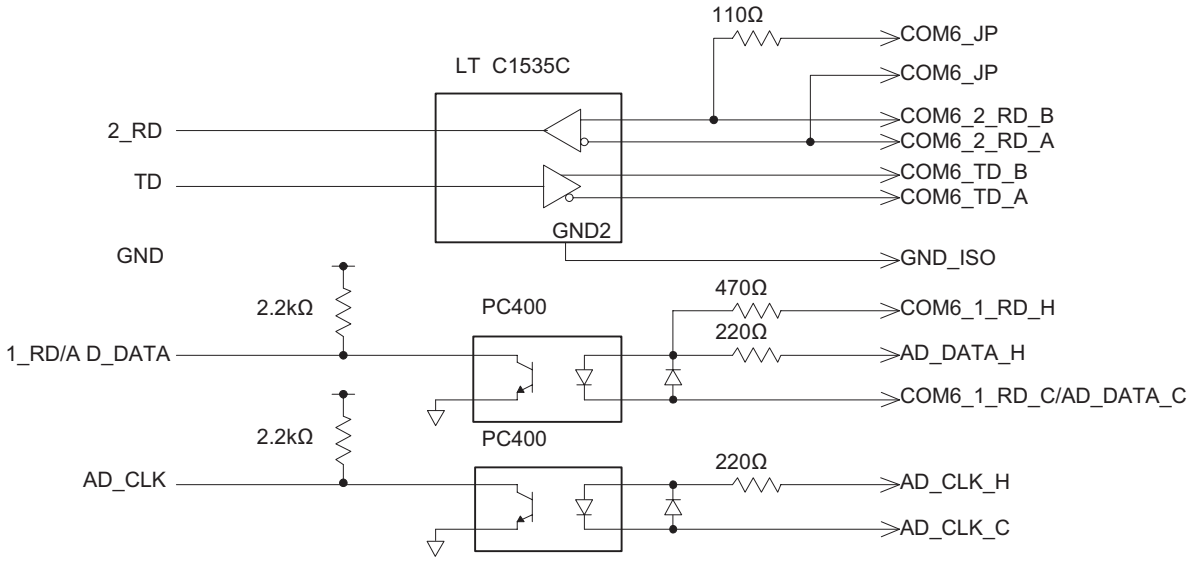
COM4,5 port

Baud rate selectable from 4800 and 38400 (bps).



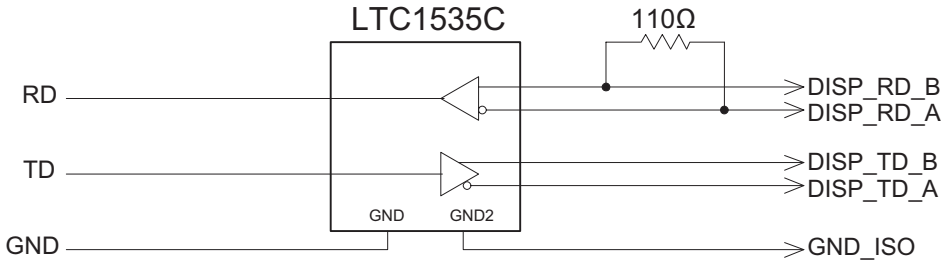
COM6 port

Baud rate selectable from 4800 and 38400 (bps).

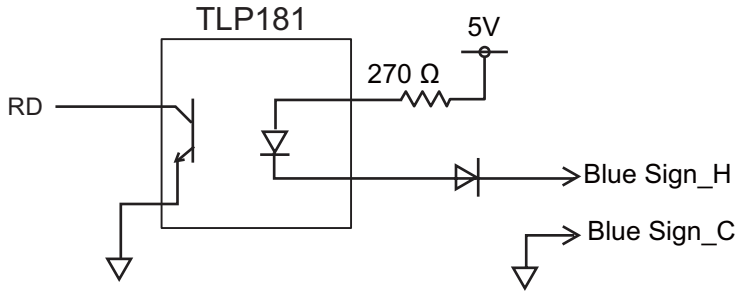


DISP port

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

ACK - Acknowledge alarm

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

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

AIR - AIS interrogation request

$**AIR,xxxxxxxxx,x.x,x,x.x,x,xxxxxxxxx,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 - 59.59999)
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)

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,IIIII.II,a,c--c,xx,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 600, 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,xxxxxxxxx,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,xxxxxxxxx,xxxxxxxxx,llll.ll,a,yyyyy.yy,a,llll.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)

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 refereence, 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, hhmmss.ss, A, llll.ll, a, yyyyy.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,*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,xxxxxxxxx,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-9.

ACS - Channel management information source

$**ACS,x,xxxxxxxxx,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

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)

LRF - See "LRF - Long-range function" on page AP-12

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

$**LR1,x,xxxxxxxxx,xxxxxxxxx,c--c,c--c,xxxxxxxxx*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,xxxxxxxxx,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,xxxxxxxxx,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)

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,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)

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))

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. (00007000-9999 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		

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
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1021	157.05	210	156.5125	1287	157.3875	2201	160.6625
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1024	157.2	213	156.6625	2003	160.75	2204	160.8125
1025	157.25	214	156.7125	2004	160.8	2205	160.8625
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1027	157.35	216	156.8125	2007	160.95	2207	160.9625
1028	157.4	217	156.8625	8	156.4	2218	161.5125
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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
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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		

Note: 1 W power on CH13 and CH67.

ERI Codes

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

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
BRG	Bearing	FULL	Full
CH	Channel	GND	Ground
CHG	Change	GNSS	Global Navigation Satellite System
CLR	Clear	GPS	Global Positioning System
CNCL	Cancel	H	High
COG	Course Over the Ground	HDG	Heading
CONT	Contrast	HECT	Hectometer
CPA	Closest Point of Approach	HI	High
CPU	Central Processing Unit	HS	Harmful Substances (applies to AIS)
CRS	Course	HW	Hardware
D2D	Differential and 2D	I/O	Input/Output
D3D	Differential and 3D	ID	Identification
DATE	Date	IF	Interface
DAY	Day	IFM	International Function Message
DECR	Decrease	IMO	International Maritime Organization
DEL	Delete	INFO	Information
DEST	Destination	INT	Internal
DG	Dangerous Goods	INTRD	Intrude
DGNSS	Differential GNSS	JAN	January
DGPS	Differential GPS	JUN	July
DIM	Dimmer	L	Low, left
DISP	Display	L/L	Latitude/Longitude
DNG	Danger	LAT	Latitude
DNGR	Danger	LEN	Length
DOP	Dilution Of Precision	LOG	Log
DPTH	Depth	LON	Longitude
DSC	Digital Selective Calling	LR	Long Range

Abbreviation	Meaning	Abbreviation	Meaning
LT	Local Time	ROM	Read Only Memory
MAR	March	ROT	Rate Of Turn
MAX	Maximum	RTA	Requested Time of Arrival
MAY	May	RX	Receive
MENU	Menu	S	South
MIN	Minimum	S/C	SOG/COG
MKD	Minimum Keyboard Display	SAR	Search And Rescue
MMSI	Maritime Mobile Services Identity number	SDRAM	Synchronous Dynamic RAM
MOT	Mother Board	SEL	Select
MP	Maritime Pollutant (applies to AIS)	SEP	September
MSG	Message	SET	Set (i.e., set and drift, or setting a value)
N	North	SIM	Simulation
NAV	Navigation	SOG	Speed Over the Ground
NO.	Number	SOLAS	Safety Of Life At Sea
NOV	November	SPD	Speed
OCT	October	STS	Status
OFF	Off	STW	Speed Through the Water
ON	On	SW	Switch
PA	Position Accuracy	SYM	Symbol(s)
PI	Presentation Interface, Position Indicator	TCPA	Time to CPA
PORT	Port	TEST	Test
POSN	Position	TGT	Target
PWR	Power	TIME	Time
R	Right	TOW	Vessel Engaged in Towing Operations
R/B	Range / Bearing	TX	Transmit
RAIM	Receiver Autonomous Integrity Monitoring	UN/ LOADED	LOADED or UNLOADED
RAIN	Rain	UTC	Universal Coordinated Time
RAM	Random Access Memory	WARNING	Warning
REF	Reference	WAT	Water
RFM	Regional Function Message	WIG	Wing In Ground
RNG	Range		

Units

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

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 ≤ 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, AIR, BBM, DTM, GBS, GGA, GLL, GNS, HBT, HDT, LRF, LRI, OSD, RMC, ROT, SSD, THS, VBW, VSD, VTG
	Output	ABK, ACA, ALR, LR1, LR2, LR3, LRF, LRI, TXT, VER, VDM, VDO
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

INDEX

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Publication No. DOCQA0379

Declaration of Conformity

0735

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)	IEC 61993-2 Ed.2.0: 2012
IMO Resolution MSC.74 (69) Annex 3	IEC 61108-1 Ed.2.0: 2003
IMO Resolution MSC.191 (79)	IEC 60945 Ed.4.0: 2002 incl. Corr. 1, 2008
ITU-R M.1371-4 (Class A)	IEC 61162-1 Ed.4.0: 2010
ITU-R M.825-3	IEC 61162-2 Ed.1.0: 1998
ITU-R M.1084-5	IEC 62288 Ed.1.0: 2008

(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. BSH/46122/4322310/13 issued by Federal Maritime and Hydrographic Agency (BSH), The Federal Republic of Germany.
- EC quality system (Module D) certificate No. BSH/4613/02208/2345/12 issued by Federal Maritime and Hydrographic Agency (BSH), The Federal Republic of Germany.

This declaration is issued according to the provisions of European Council Directive 96/98/EC on marine equipment modified by Commission Directive 2011/75/EU and 2012/32/EU.

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan
March 1, 2013

(Place and date of issue)

Yoshitaka Shogaki
Department General Manager
Quality Assurance Department

(name and signature or equivalent marking of authorized person)