FURUNO

OPERATOR'S MANUAL

UAIS Transponder

FA-150

UNIVERSAL AIS

FURUNO

MENU   ENT
DISP   DIM
NAV STATUS
FA-150 PWR

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

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(TOMA) FA-150

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www.furuno.co.jp

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(ies), see the chapter on Maintenance. Follow the instructions below if a battery(ies) is used.

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.
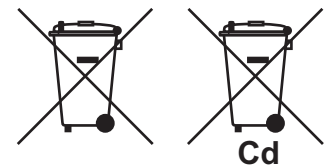
In the USA

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.
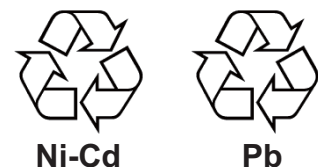
In the other countries

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

⚠ WARNING ⚠
To avoid electrical shock, do not remove cover. No user-serviceable parts inside.
⚠   ⚠

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

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FOREWORD

A Word to the Owner of the FA-150

FURUNO Electric Company thanks you for purchasing the FA-150 UAIS Transponder. We are confident you will discover why the FURUNO name has become synonymous with quality and reliability.

For over 60 years 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.137-3 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

Either

GPS antenna
GSC-001
GPA-017S

VHF antenna

GPS/VHF
combined antenna
GVA-100

Distributor unit
DB-1

MONITOR UNIT
FA-1502
(two units may
be connected)

12-24 VDC

TRANSPONDER UNIT
FA-1501

External display, Pilot plug,
NavNet2, Sensor

Alarm system

PC, Beacon receiver

LAN

Blue Sign

──────────── : Standard

------------- : Option

─·─·─·─·─·─· : Local supply

Power supply
PR-240

100/110/115/200/
220/230 VAC
1φ, 50/60Hz

24 VDC

12-24 VDC

GSC-001	Exposed to the weather
GVA-100	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

PROGRAM NUMBER

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

**: Minor Modification

SYSTEM OVERVIEW

System overview

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

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

AIS-fitted AtoN broadcasts its identification, type of operation, location, displacement, etc. at 3-min intervals or at a reporting rate designated by the Administration authorities.

VTS Center transmits TDMA CH management message including code, type, position, etc. of buoys every 3 min, and the AtoN broadcasts these messages for ships.

Aids to Navigation (AtoN)

Transponder

VTS center

The VTS center transmits a command on frequency assignment, slots, report rate, VHF output power, channel spacing, etc. (Assigned mode)

Transponder

Trans-ponder

Static and Dynamic information incl. MMSI, Name, POSN, HDG, COG, SOG

Interrogation and Response

Own ship

Ship 1

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.

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x

1. OPERATION

1.1 Description of Controls
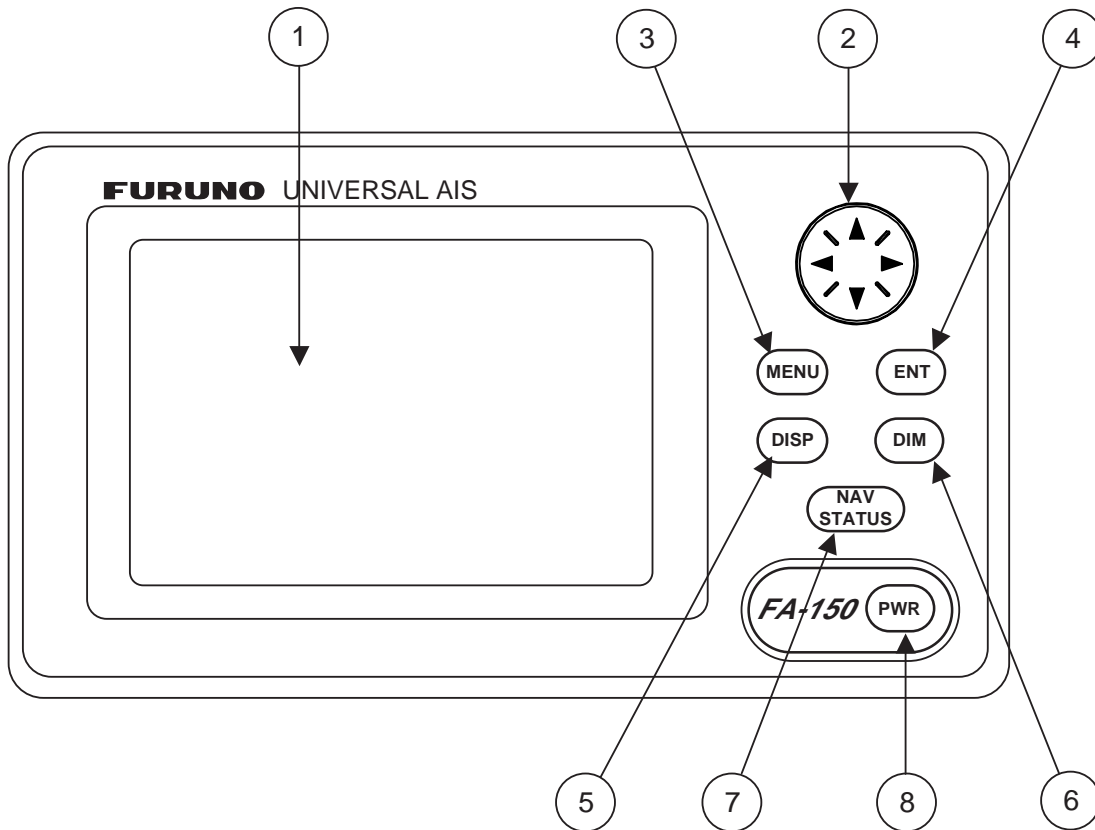
① LCD Screen: Displays various data.

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.

Notice: 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.

```
                              (Flashing)
┌─────────────────────┐
│                     │
│                     │
│   NOW LOADING...     │
│                     │
│                     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐   EQUIPMENT IDENTIFICATION
│   AUTOMATIC          │   SCREEN
│     IDENTIFICATION   │
│       SYSTEM         │
│                     │
│ FURUNO ELECTRIC CORP.│
└─────────────────────┘
           │
           ▼
┌─────────────────────┐   STARTUP SCREEN
│ [STARTUP TEST]      │
│ PROGRAM NO.:        │
│       2450021-XX.XX │
│ ROM        : OK     │
│ RAM        : OK     │
│ BACKUP DATA  : OK   │
│                     │
│                     │   **.**: Program Version No.
└─────────────────────┘
           │
           ▼
┌─────────────────────┐   PLOTTER DISPLAY
│        [- - - - -]  I│
│ NO OWN SHIP HDG:- - -°│
│ NOW INITIALIZING:- - -.-kn│
│             :- - -.-°│
│        CPA: -.- -NM │
│        TCPA: - -:- -"│
│        INTRD: - - - -│
│  6NM      DETAIL:[ENT]│
└─────────────────────┘
```
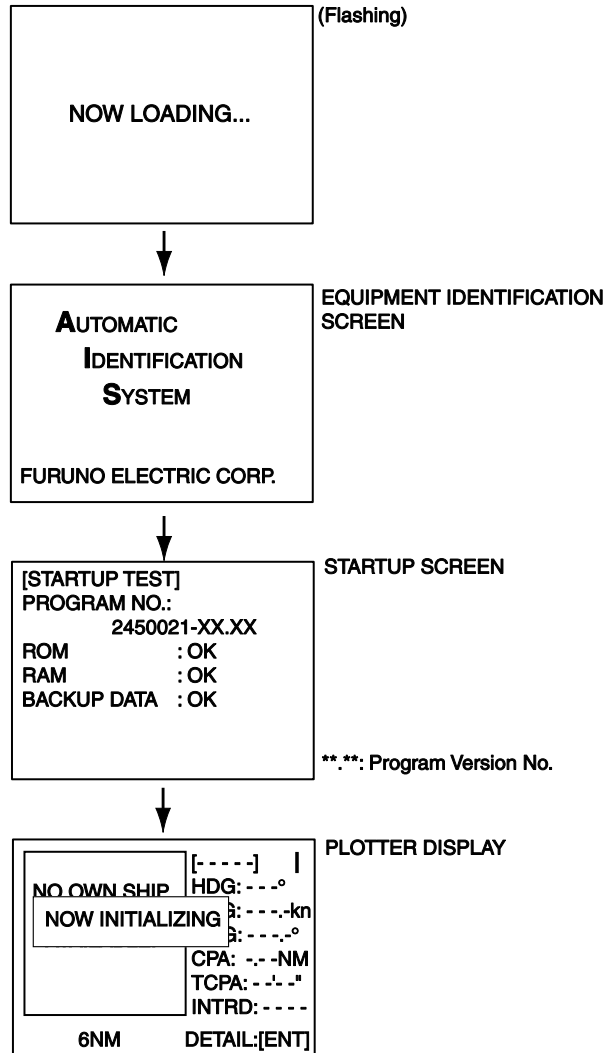
The startup screen displays the program version number and the results of the ROM, RAM and backup data test, showing OK or "NG" (No Good) as the result. If "NG" appears for any of the check result, try resetting the power to restore normal operation. If that does not work, contact your dealer for advice. 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' location 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 and not moving faster than 3 kn	3 minutes
Ship at anchor 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.

```
┌─────────────────────────┐
│ DIMMER  (0~8)           │
│ ▼ ▮▮▮▮▮▮     ▲ 4        │
│ CONTRAST (0~63)         │
│ ◄ ▮▮▮▮▮▮▮   ►44        │
│           EXIT: [ENT]   │
└─────────────────────────┘
```
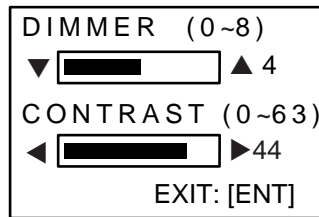
2. Use ▲ or ▼ to adjust the panel dimmer; ◄ or ► to adjust the contrast. (The default dimmer and contrast settings are 4 and 45, respectively. To restore default settings see section 3.9 Restoring Default Settings.)
3. Press the **ENT** key to close the setting screen.

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.

```
[MENU]
MSG
SENSOR STATUS
INTERNAL GPS
USER SETTINGS
INITIAL SETTINGS
CHANNEL SETTINGS
DIAGNOSTICS
```
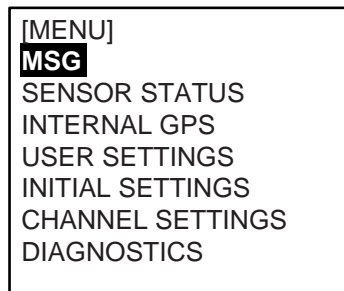
2. Press ▲ or ▼ on the **CursorPad** to select a menu then press the **ENT** key.
3. Press ▲ or ▼ to select a sub-menu then press the **ENT** key.

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]
KEY BEEP        : ON
ALARM BUZZER  : ON
AUTO SORT      : ON
DISP SART TEST : ON
LR MODE         : AUTO
RECEIVED MSG
CPA/TCPA ALARM
```

```
[DRAUGHT&PERSONS]  ◄
 DRAUGHT:          0.0 m
 NO. OF PERSONS:   0
```
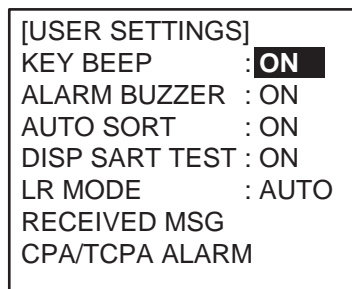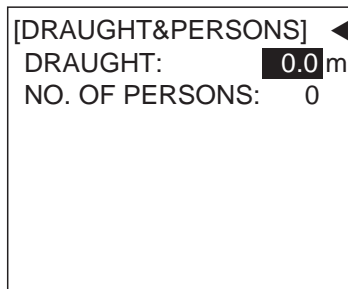
USER SETTINGS sub-menu   DRAUGHT&PERSONS input screen
(Option selection)   (Data input)

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.

a) 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.

```
[USER SETTINGS]
KEY BEEP        : ON
ALARM BUZZER    : ON
AUTO SORT       : OFF
DISP SART TEST  : ON
LR MODE         : AUTO
RECEIVED MSG
CPA/TCPA ALARM
```
Options window
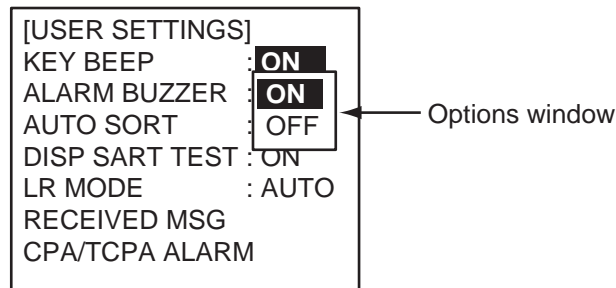
b) Press ▲ or ▼ to select option desired then press the **ENT** key.

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.

```
[DRAUGHT&PERSONS]  ◄
DRAUGHT:            00.0 m
NO. OF PERSONS:       0
```
Cursor
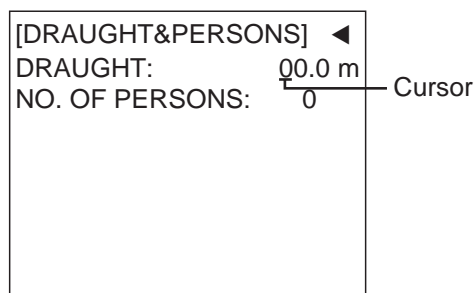
a) Select DRAUGHT and press the **ENT** key.

b) Press ▲ or ▼ to select appropriate numeric. Pressing ▲ displays alphanumeric characters cyclically in order of blank space, alphabet, numerals, and symbols.

c) Press ► to shift the cursor to the adjacent place, then use ▲ or ▼ to select alphanumeric character.

d) Repeat steps b) and c) to finish entering data. To erase a character, insert a space.

e) 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
- Cargo type
- Arrival time
- Destination
- No. of persons
- Draught

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

```
[NAV STATUS]          ▶
NAV STATUS:        0


***STATUS DETAIL***
 UNDER WAY USING
     ENGINE
```
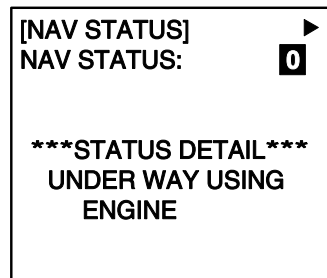
2. If your navigation status is different from that shown, follow the procedure below. If it is the same as shown, go to step 3.

   a) Press the **ENT** key.

   b) 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-TRAWLING
      08:   UNDER WAY SAILING
      09:   ENGAGED IN FISHING OTHER THAN TRAWLING
      10:   AIR-CUSHION VESSEL IN NON-DISPLACEMENT MODE OR WIG
            CRAFT TAKING OFF, LANDING OR IN FLIGHT
      11:   POWER-DRIVEN VESSEL TOWING ASTERN
      12:   POWER-DRIVEN VESSEL PUSHING AHEAD OR TOWING
            ALONGSIDE
      13:   IN DISTRESS OR REQUIRING ASSISTANCE
      14:   AIS-SART (ACTIVE), SEEKING TO ATTRACT ATTENTION*
            * Input not possible. "ERROR REGIST PRESS ANY KEY" appears.
      15:   NOT DEFINED (DEFAULT), AIS-SART (TEST)

3. Press ► to show the DESTINATION sub-menu.

```
[DESTINATION]       ◄►

*************(0/0)
[NEW?]
```

4. NEW is selected; press the **ENT** key.

```
[DESTINATION]
ENTER A NEW
            DESTINATION



████████████████████


QUIT:[NAV STATUS]
```
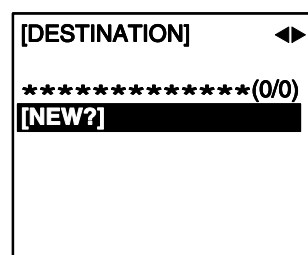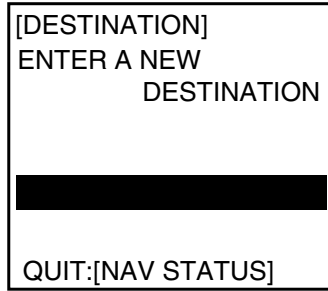
NAV STATUS menu, DESTINATION sub-menu, destination input

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.

```
[DESTINATION]        ◄►
COTE D'IVOIRE  ◄──────── Current destination
* * * * * * * * * * * * *(0/3)
[NEW?]
COTE D'IVOIRE  ⎫
SAN FRANCISCO  ⎬ Destination list
SEATTLE        ⎭
```
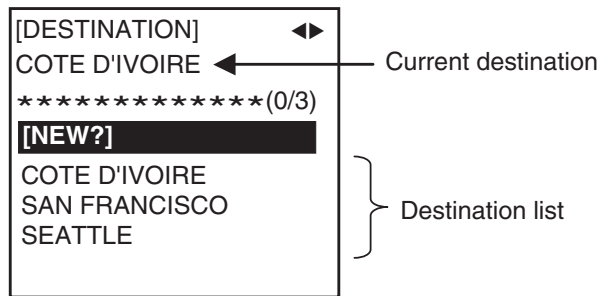
1) Select appropriate destination then press the **ENT** key to show the options window below.

```
SELECT
EDIT
DELETE
```

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.

```
DESTINATION DELETE.

   ARE YOU SURE?
   YES      NO
```
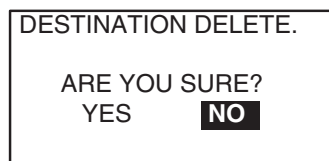
6. Press ► to show the ARRIVAL TIME sub-menu.

```
[ARRIVAL TIME]      ◄►
DATE[UTC]:       25/APR
TIME[UTC]:         0:00
```

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

```
[CARGO TYPE]        ◄►
TYPE NO.:            00

**** TYPE DETAIL****
NOT AVAILABLE
```

12. TYPE NO. is 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		60	PASSENGER SHIPS ALL SHIPS OF THIS TYPE
11	FUTURE USE CARRYING DG, HS, OR MP(X)		61	PASSENGER SHIPS CARRYING DG, HS, OR MP(X)
12	FUTURE USE CARRYING DG, HS, OR MP(Y)		62	PASSENGER SHIPS CARRYING DG, HS, OR MP(Y)
13	FUTURE USE CARRYING DG, HS, OR MP(Z)		63	PASSENGER SHIPS CARRYING DG, HS, OR MP(Z)
14	FUTURE USE CARRYING DG, HS, OR MP(OS)		64	PASSENGER SHIPS CARRYING DG, HS, OR MP(OS)
15	FUTURE USE FUTURE USE		65	PASSENGER SHIPS FUTURE USE
16	FUTURE USE FUTURE USE		66	PASSENGER SHIPS FUTURE USE
17	FUTURE USE FUTURE USE		67	PASSENGER SHIPS FUTURE USE
18	FUTURE USE FUTURE USE		68	PASSENGER SHIPS FUTURE USE
19	FUTURE USE NONE		69	PASSENGER SHIPS NONE
20	WIG ALL SHIPS OF THIS TYPE		70	CARGO SHIPS ALL SHIPS OF THIS TYPE
21	WIG CARRYING DG, HS, OR MP(X)		71	CARGO SHIPS CARRYING DG, HS, OR MP(X)
22	WIG CARRYING DG, HS, OR MP(Y)		72	CARGO SHIPS CARRYING DG, HS, OR MP(Y)
23	WIG CARRYING DG, HS, OR MP(Z)		73	CARGO SHIPS CARRYING DG, HS, OR MP(Z)
24	WIG CARRYING DG, HS, OR MP(OS)		74	CARGO SHIPS CARRYING DG, HS, OR MP(OS)
25	WIG FUTURE USE		75	CARGO SHIPS FUTURE USE
26	WIG FUTURE USE		76	CARGO SHIPS FUTURE USE
27	WIG FUTURE USE		77	CARGO SHIPS FUTURE USE
28	WIG FUTURE USE		78	CARGO SHIPS FUTURE USE
29	WIG NONE		79	CARGO SHIPS NONE
30	FISHING		80	TANKER ALL SHIPS OF THIS TYPE
31	TOWING		81	TANKER CARRYING DG, HS, OR MP(X)
32	LENGTH OF THE TOW EXCEEDS 200M OR BREADTH EXCEEDS 25M		82	TANKER CARRYING DG, HS, OR MP(Y)
33	ENGAGED IN DREDGING OR UNDERWATER OPERATIONS		83	TANKER CARRYING DG, HS, OR MP(Z)
34	ENGAGED IN DIVING OPERATIONS		84	TANKER CARRYING DG, HS, OR MP(OS)
35	ENGAGED IN MILITARY OPERATIONS		85	TANKER FUTURE USE
36	SAILING		86	TANKER FUTURE USE
37	PLEASURE CRAFT		87	TANKER FUTURE USE
38	FUTURE USE		88	TANKER FUTURE USE
39	FUTURE USE		89	TANKER NONE
40	HSC ALL SHIPS OF THIS TYPE		90	OTHER TYPE OF SHIP ALL SHIPS OF THIS TYPE
41	HSC CARRYING DG, HS, OR MP(X)		91	OTHER TYPE OF SHIP CARRYING DG, HS, OR MP(X)
42	HSC CARRYING DG, HS, OR MP(Y)		92	OTHER TYPE OF SHIP CARRYING DG, HS, OR MP(Y)
43	HSC CARRYING DG, HS, OR MP(Z)		93	OTHER TYPE OF SHIP CARRYING DG, HS, OR MP(Z)
44	HSC CARRYING DG, HS, OR MP(OS)		94	OTHER TYPE OF SHIP CARRYING DG, HS, OR MP(OS)
45	HSC FUTURE USE		95	OTHER TYPE OF SHIP FUTURE USE
46	HSC FUTURE USE		96	OTHER TYPE OF SHIP FUTURE USE
47	HSC FUTURE USE		97	OTHER TYPE OF SHIP FUTURE USE
48	HSC FUTURE USE		98	OTHER TYPE OF SHIP FUTURE USE
49	HSC NONE		99	OTHER TYPE OF SHIP NONE
50	PILOT			
51	SEARCH AND RESCUE VESSELS			WIG: Wing in ground
52	TUGS			HSC: High speed craft
53	PORT TENDERS			DG: Dangerous goods
54	VESSELS WITH ANTI-POLLUTION FACILITIES OR EQUIPMENT			HS: Harmful substances
55	LAW ENFORCEMENT VESSELS			MP: Marine pollutants
56	SPARE-FOR ASSIGNMENTS TO LOCAL VESSELS			0-9: Undefined
57	SPARE-FOR ASSIGNMENTS TO LOCAL VESSELS			
58	MEDICAL TRANSPORTS			
59	SHIPS ACCORDING TO RESOLUTION NO 18			

14. Press ► to display the DRAUGHT&PERSONS sub-menu.
15. DRAUGHT is 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 selected; press the **ENT** key.
18. Enter total number of persons onboard (setting range: 0-8191) then press the **ENT** key. Enter 8191 for total greater than 8190.
19. Press the **DISP** key to close the menu.

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

1.6   Setting CPA/TCPA

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

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

```
[CPA/TCPA ALARM]

CPA          : 6.00 NM
TCPA         : 60 min
ALARM MODE   : ON
ALARM BUZZER : ON



               QUIT[MENU]
```

4. CPA is selected; press the **ENT** key.
5. Enter CPA (setting range: 0-6.00 NM) then press the **ENT** key.
6. TCPA is selected; press the **ENT** key.
7. Enter TCPA (setting range: 0-60 min) then press the **ENT** key.
8. ALARM MODE is 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 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.

PLOTTER DISPLAY
(See section 1.7.1.)

TARGET LIST
(See section 1.7.2.)

Switch between these displays with ◄, ►.

DANGEROUS (TARGET) LIST
(See section 1.7.3.)
When a dangerous target exists, the dangerous target list has priority.

OWN SHIP'S STATIC DATA
Switch among these displays with ▲▼◄►.
(See section 1.7.4.)

OWN SHIP'S DYNAMIC DATA
(See section 1.7.5.)

ALARM STATUS DISPLAY
(See section 3.5.)

PLOTTER DISPLAY

TARGET LIST

DANGEROUS LIST

OWN STATIC DATA 1

OWN STATIC DATA 2

OWN STATIC DATA 3

OWN STATIC DATA 4

OWN STATIC DATA 5

OWN DYNAMIC DATA

ALARM STATUS

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 section 1.7.2.

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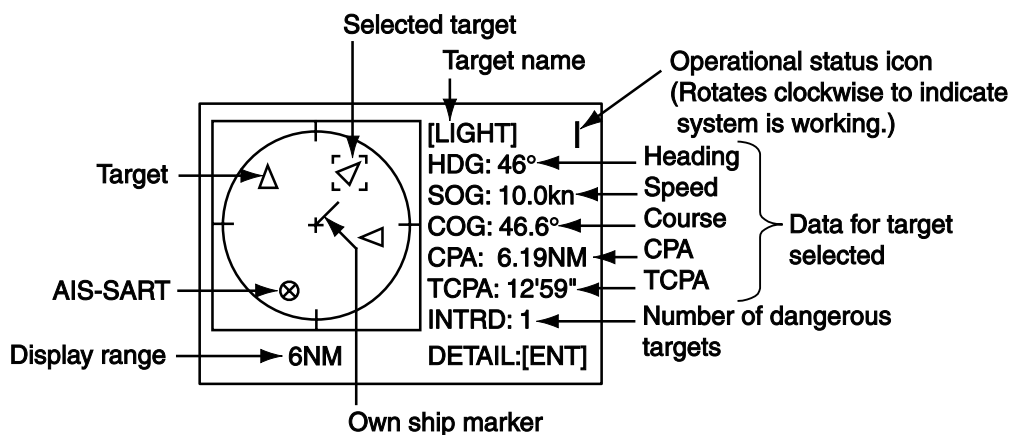
Data for AIS-SART
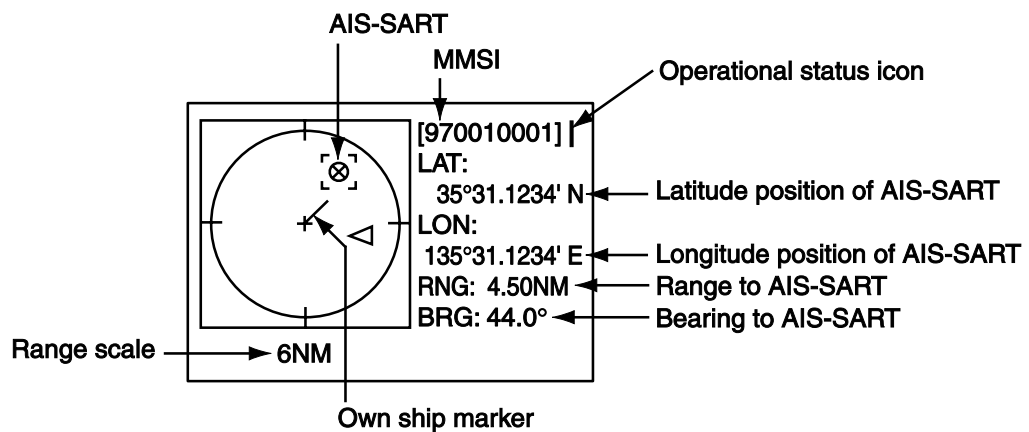
Operations on the plotter display

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 section 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 6 minutes and 40 seconds after it is declared a lost target.

Ship's navigation status	Target declared as lost target after;
Class A	
Ship at anchor or moored and not moving faster than 3 kn	10 minutes
Ship at anchor or moored 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	10 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.

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

```
[TARGET LIST]                 |
   NAME  RNG(NM)  BRG(°)
 FURUNO    2.90    276.1
�властSART    3.25    264.4
■"BASE"    4.30    279.5
♣"SAR"    8.60     82.0
✦INTREP    9.10    123.1
1/ 10 [▼] DTL[ENT] DNG[▶]
```

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

Target type symbols
None: Ship
■ : Base station
♣ : SAR (Search and Rescue)
✦ : AtoN (Aid to Navigation)
✖ : AIS-SART (Search and Rescue Transmitter)

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

[SHIP INFO]   1/6
MMSI [A]: 431099806   ← MMSI no.
NAME   : FURUNO   ← Name

CALL SIGN : ZL6DEF1   ← Call sign
IMO NO. : 12345678   ← IMO no.
CPA   : 0.02 NM   ← CPA
TCPA   : 0'17"   ← TCPA

DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. 6:40 later the target's data is erased.

◀ ▲   ▶ ▼

[SHIP INFO]   2/6
LAT : 34⁰03.5442'N   ← Latitude
LON : 134⁰30.3883'E   ← Longitude
SOG : 17.8 kn   ← Speed over the ground
COG : 213.5⁰   ← Course over the ground
HDG : 278⁰ PA: H   ← Heading, Position Accuracy (H, High, L, Low)
R/B : 25.12 NM/351.5⁰ ← Range and bearing from own ship
ROT : R0.1⁰/min   ← Rate of turn

◀ ▲   ▶ ▼

[SHIP INFO]   3/6
          A   : 100m ← Distance from bow to GPS antenna position
          B   : 23m ← Distance from stern to GPS antenna position
      A   C   :   6m ← Distance from port to GPS antenna position
      B   D   :   6m ← Distance from starboard to GPS antenna position
          LENGTH: 123m   ← Length of ship
   C D   BEAM   : 12m   ← Beam of ship

◀ ▲   ▶ ▼

[SHIP INFO]   4/6
TYPE OF SHIP : 0   ← Type of ship.
****TYPE DETAIL****
UNDERWAY USING   ← Status description
   ENGINE

◀ ▲   ▶ ▼

[SHIP INFO]   5/6
DRAUGHT: 6.0m ← Draught
NAV STATUS: 0 ← Navigation status
****STATUS DETAIL****
UNDERWAY USING   ← Navigation status description
   ENGINE

◀ ▲   ▶ ▼

[SHIP INFO]   6/6
DESTINATION
    TOKYO   ← Destination

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

Ship info display, mobile class B

[SHIP INFO]   1/4
MMSI [B]: 431099806   ← MMSI No.
NAME   : FURUNO   ← Name

CALL SIGN: ZL6DEF1   ← Call sign
VENDOR ID: FEC001   ← AIS mftg. ID code
CPA   : 0.02 NM   ← CPA
TCPA   : 0'17"   ← TCPA

DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. 6:40 later the target's data is erased.

◄ ▲   ► ▼

[SHIP INFO]   2/4
LAT : 34⁰03.5442'N   ← Latitude
LON : 134⁰30.3883'E   ← Longitude
SOG : 17.8 kn   ← Speed over the ground
COG : 213.5⁰   ← Course over the ground
HDG : 278⁰ PA: H   ← Heading, Position Accuracy (H, High, L, Low)
R/B : 25.12 NM/351.5⁰   ← Range and bearing from own ship

◄ ▲   ► ▼

[SHIP INFO]   3/4
          A   : 100 m   ← Distance from bow to GPS antenna position
          B   : 23 m   ← Distance from stern to GPS antenna position
          C   :   6 m   ← Distance from port to GPS antenna position
          D   :   6 m   ← Distance from starboard to GPS antenna position
          LENGTH: 123 m   ← Length of ship
          BEAM   : 12 m   ← Beam of ship

◄ ▲   ► ▼

[SHIP INFO]   4/4
TYPE OF SHIP : 25   ← Type No.

****TYPE DETAIL****   ← Type description
CARGO SHIPS
 ALL SHIPS OF
 THIS TYPE

Base station display

DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. 6:40 later the target's data is erased.

```
[BASE INFO]          1/1
MMSI    : 001099806
CPA     : 0.02 NM
TCPA    : 0'17"
LAT :   34°03.5442'N
LON: 134°30.3883'E
PA  : H
R/B : 25.12 NM/351.5°
```

← MMSI no.
← CPA
← TCPA
← Latitude
← Longitude
← Position Accuracy (H, High, L, Low)
← Range and bearing from own ship

SAR (Search and Rescue) info display

```
[SAR INFO]        1/2
MMSI    : 431099806
CPA     : 0.02 NM
TCPA    : 0'17"
```

← MMSI No.
← CPA
← TCPA

DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. 6:40 later the target's data is erased.

◄ ▲   ► ▼
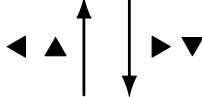
```
[SAR INFO]        2/2
LAT:   34°03.5442'N
LON: 134°30.3883'E
ALT:  30 m
SOG: 17.8 kn
COG: 213.5°
PA: H
R/B: 25.12 NM/351.5°
```

← Latitude
← Longitude
← Altitude
← Speed over the ground
← Course over the ground
← Position Accuracy (H, High, L, Low)
← Range and bearing from own ship

AIS-SART info display

DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. 6:40 later the target's data is erased.

[SART INFO]   1/3
MMSI   : 970010001
STATUS: SART ACTIVE

RNG   : 10.65 NM
BRG   : 9.4°
CPA   : 8.83NM
TCPA   : 43' 06°

◄ ▲   ► ▼

[SART INFO]   2/3
LAT   :   34°03.5442'N
LON   : 134°30.3883'E
SOG : 17.8kn
COG : 213.5°
HDG : 213°
ROT : R 0.1°/min
PA   : H

◄ ▲   ► ▼

[SART INFO]   3/3
NAV STATUS: 14

STATUS DETAIL
AIS SART (ACTIVE),
SEEKING TO ATTRACT
ATTENTION

— MMSI no.
— Status (SART ACTIVE (NAV STATUS: 14), SART TEST (NAV STATUS: 15))
— Range
— Bearing
— CPA
— TCPA

— Latitude
— Longitude
— Speed over the ground
— Course over the ground
— Heading
— Rate of turn
— Position Accuracy (H, High, L, Low)

— Navigation status 14: SART ACTIVE, 15: SART TEST
— Status detail

AtoN (Aid to Navigation) info display

```
[AtoN INFO]        [    ]  1/4 |
MMSI : 431099806
NAME : FURUNO



CPA  : 0.02 NM
TCPA : 0'17"
```

◀ ▲   ▶ ▼

```
[AtoN INFO]             2/4 |
LAT  :  34°03.5442'N
LON  : 134°30.3883'E
PA   : H
RNG  : 25.12 NM
BRG  : 351.5°
PI   : ON POSITION
```

◀ ▲   ▶ ▼

```
[AtoN INFO]             3/4 |
        A      : 100 m
        B      :  23 m
     A  C      :   6 m
     B  D      :   6 m
        LENGTH : 123 m
  C  D  BEAM   :  12 m
```

◀ ▲   ▶ ▼

```
[AtoN INFO]             4/4 |
REAL  AtoN
TYPE OF AtoN: 20
****TYPE DETAIL****
CARDINAL MARK N
```

— MMSI No.
— Name

— CPA
— TCPA

DNGR appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. 6:40 later the target's data is erased.

— Latitude
— Longitude
— Position Accuracy (H, High, L, Low)
— Range from own ship
— Bearing from own ship
— Position Indicator (On Position, Off Position)

— 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
— Length of ship
— Beam of ship

— Real, virtual AtoN
— Type of AtoN (See next page.)
— Description of AtoN

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 section 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.

Target name, CPA and TCPA →

```
[DANGEROUS LIST]         |
  NAME   CPA(NM)  TCPA
 FURUNO   0.50    3'20"
 EXPLOR   1.20    3'35"
 INTREP   1.80    3'50"
 VOYAGE   1.90    3'55"
 SEADOG   2.00    4'00"
 1/ 10 [▼] DTL[ENT] RNG[◄]
```
← Press ◄ to switch to TARGET 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 1: The message "LOST" appears at the top of the Dangerous List when no AIS signal is received from the target selected.

Note 2: 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.

See the illustration on the next page for own ship's static data examples.

[OWN STATIC DATA] 1/5
MMSI   : 123456789 ← MMSI no.
NAME   : FURUNO   ← Name of ship
              VOYAGER
CALL SIGN: CAL0001   ← Call sign
IMO NO.   : 623498071 ← IMO no.

◀ ▲   ▶ ▼

[OWN STATIC DATA] 2/5
DESTINATION:
      TOKYO   ← Destination

ETA: 15/JUL 11:22 UTC ← Estimated date of arrival,
                         estimated time of arrival

◀ ▲   ▶ ▼

[OWN STATIC DATA] 3/5
DRAUGHT   : 12.1 m   ← Draught
NAV STATUS: 0   ← Navigation status no.
STATUS DETAIL   ← Navigation status description
 UNDER WAY USING
   ENGINE

◀ ▲   ▶ ▼

[OWN STATIC DATA] 4/5
LENGTH   : 95 m   ← Length of convoy
BEAM   : 30 m   ← Beam of convoy
ANT POSN INT   EXT   ← INT: Internal GPS, EXT: External GPS
LENGTH A : 75m   77m ← Distance from bow to GPS antenna position
LENGTH B : 20m   18m ← Distance from stern to GPS antenna position
LENGTH C : 15m   18m ← Distance from port to GPS antenna position
LENGTH D : 15m   12m ← Distance from starboard to GPS antenna position

◀ ▲   ▶ ▼

[OWN STATIC DATA] 5/5
NO. OF PERSONS: 12   ← Number of persons
TYPE OF SHIP: 36   ← Ship type
CLASS : A   ← Ship class
****TYPE DETAIL****   ← Type detail
SAILING

1-23

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.

Date, time ⟶	[OWN DYNAMIC DATA] ▎
	01/MAY/2004 13:24:55
Latitude ⟶	LAT : 34°45.2132' N
Longitude ⟶	LON : 135°21.2345' E
Speed over ground ⟶	SOG: 8.1 kn INT GPS ←
Course over ground, Heading ⟶	COG: 118.5° HDG:118°
Rate of turn ⟶	ROT: R10.3°/min*
Position accuracy ⟶	PA: H RAIM: USED
(H: High, L: Low),	
RAIM status	
(USED or UNUSED)	

GPS receiver in use
INT GPS: Internal GPS
INT DGPS: Internal DGPS
EXT GPS: External GPS
EXT DGPS: External DGPS
NO FIX: No position fix

* = If no ROT device is connected and HDG
     sentence is input from a gyrocompass, etc.,
     the following is displayed:

Rate of turn less than 10°/min.: 0.0
Rate of turn 10°/min. rightward or higher: R>10
Rate of turn 10°/min. leftward or higher: L>10

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.

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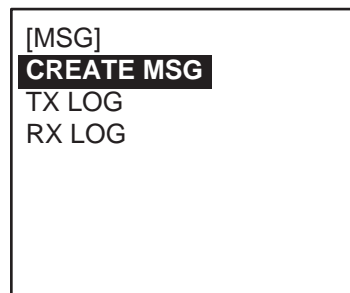
3. CREATE MSG is selected; press the **ENT** key. (For Inland AIS, additionally select CREATE MSG then press the **ENT** key.)

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

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

```
[SET MSG TYPE]
ADRS TYPE: BROAD CAST
MMSI      : - - - - - - - - -
MSG TYPE  : NORMAL
CHANNEL: ALTERNATE
RETRY TIMES: -
```
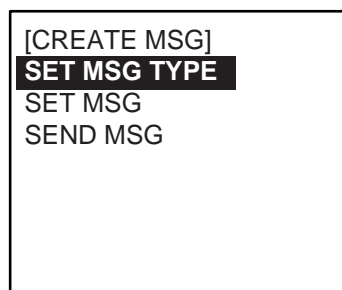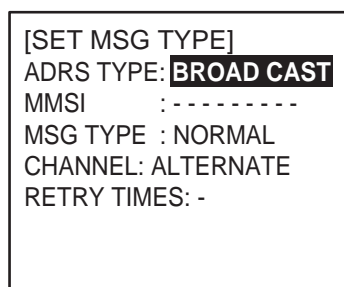
5. ADRS TYPE is selected; press the **ENT** key.

> **BROAD CAST**
> ADRS CAST

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 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.

> **SAFETY**
> NORMAL

9. Select message type: NORMAL (message other than safety) or SAFETY (important navigational or meteorological warning). Press the **ENT** key.
10. CHANNEL is selected; press the **ENT** key.

> **ALTERNATE**
> BOTH A & B
> A
> B

11. Select which channel to transmit your message over then press the **ENT** key.
12. RETRY TIMES is selected; press the **ENT** key. If the ADRS TYPE is 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.

> [SET MSG]
>
> ‒
>
>
>
> 01(151)* [DIM]HOLD:CLEAR

└─ Number of characters used/available

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

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 below appears.

> SEND MESSAGE.
>
> ARE YOU SURE?
> YES   **NO**

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 below appears on the display. To view the contents of the message follow the procedure below.

```
MESSAGE !

  PRESS ANY KEY
```

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.

Date and time message received ("NEW" displayed for unread message) → [RX LOG] / 03/MAY 13:25 NEW / [UTC] FROM: 4310199111 ← MMSI of sender / 28/MAR 03:43 / [UTC] FROM: 431099111 / 22/MAR 18:00 / [UTC] FROM: 431099111 / 1/3[▼] MSG[ENT] QUIT[MENU]

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

```
[RX ADDRESSED MSG]*
I HAVE CHANGED MY
COURSE TO 350 DEGREE.




                        QUIT[MENU]
```
*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.

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

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

```
[RECEIVED MSG]
POPUP           : ALL
BUZZER          : ON




```

4. Select POPUP, then press the **ENT** key
5. Select which category of receive message to display automatically then press the **ENT** key.

```
ALL
ABM
OFF
```

    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 section 1.8.2.

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

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

Time transmitted, addressee

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

```
[TX ADDRESSED MSG]*
CHANGE YOUR COURSE TO
350 DEGREE.




               QUIT[MENU]
```

*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 section 1.9.2.

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

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

The default area is as follows:

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

1.9.1 Viewing channels, Tx power

Do the following to view current channels.

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

```
[CHANNEL SETTINGS]
VIEW CHANNEL
EDIT CHANNEL




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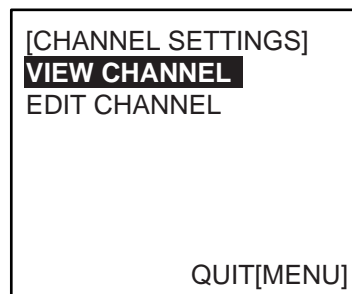
3. Select VIEW CHANNEL then press the **ENT** key.

```
            [VIEW CHANNEL]
Power  →    POWER   : 12.5W

Channel →   CHANNEL NO.
            CH-A: 2087
            CH-B: 2088

                    QUIT[MENU]
```
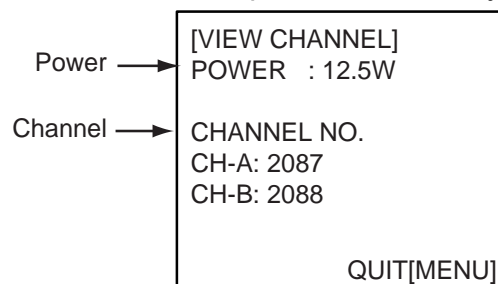
4. Press the **DISP** key to close the display.

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 five weeks 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.

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

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

TIME: Data and time equipment controlled by external source.

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

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

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

4. Select desired file number from SELECT NO.

5. Press the **ENT** key to show details.

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

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

```
1W
12.5W
```

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

```
TX/RX
RX
UNUSED
```

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 selected; press the **ENT** key.
15. Select desired mode for CH-B then press the **ENT** key.
16. ZONE is 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.

```
[EDIT CHANNEL]         2/2
CH AREA
  RIGHT TOP
  LAT:    0°00.0'N
  LON:    0°00.0'E
  LEFT BOTTOM
  LAT:    0°00.0'N
  LON:    0°00.0'E
```

19. LAT of RIGHT TOP is 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 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 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 (southeast 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.
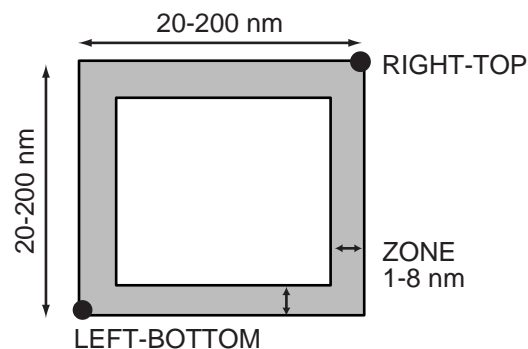
23. Press the **MENU** key. The prompt shown below appears.


```
SAVE CHANNEL.

ARE YOU SURE?
YES      NO
```
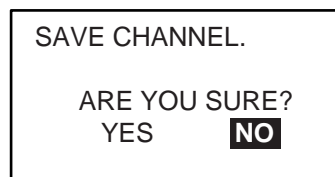
24. Press ◄ to select YES then press the **ENT** key.

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.

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

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

1.11　Long Range 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.

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

3. Select LR MODE then press the **ENT** key.

```
AUTO
MANUAL
```

4. Select AUTO (auto reply) or MANUAL (manual reply) as appropriate then press the **ENT** key.
5. 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.

```
[RECEIVED LR]
 MMSI: 431456789
 NAME: FURUNO

 C
 RESPONSE?
 YES: [ENT]  NO: OTHER
```

Information requested (See table on next page.)

Press key

```
[LR RESPONSE]
 MMSI: 431456789
 NAME: FURUNO

 C

 PRESS ANY KEY
```
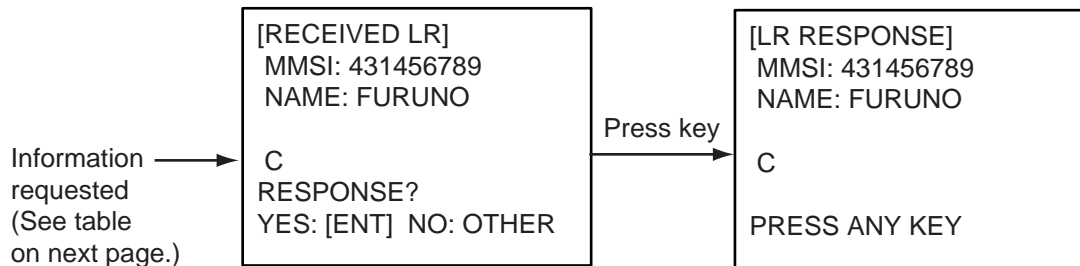
Automatic reply

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.

```
[LR RESPONSE]
 MMSI: 431456789
 NAME: FURUNO

 C

PRESS ANY KEY
```

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

1.12 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.

[VIEW MMSI]
MMSI   : 999999999
NAME   : FURUNO

CALL SIGN: FQC3544
IMO NO. : 009999999

QUIT [MENU]

[INITIAL SETTINGS]
VIEW MMSI
VIEW INT ANT POSN
VIEW EXT ANT POSN
VIEW SHIP TYPE
VIEW I/O PORT

QUIT [MENU]

[VIEW INT ANT POSN]

A: 45m
B: 15m
C: 8m
D: 7m

QUIT[MENU]

[VIEW EXT ANT POSN]

A: 45m
B: 15m
C: 8m
D: 7m

QUIT[MENU]

[VIEW SHIP TYPE]
TYPE NO.: 0
TYPE DETAIL**
NOT AVAILABLE

QUIT [MENU]

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

[VIEW I/O PORT]
VIEW COM PORT
VIEW PC PORT
VIEW LAN PORT[1]
VIEW PRIORITY
VIEW QUALITY[2]

QUIT [MENU]

[1] Shown when optional LAN kit is installed.
[2] Shown with Inland AIS.
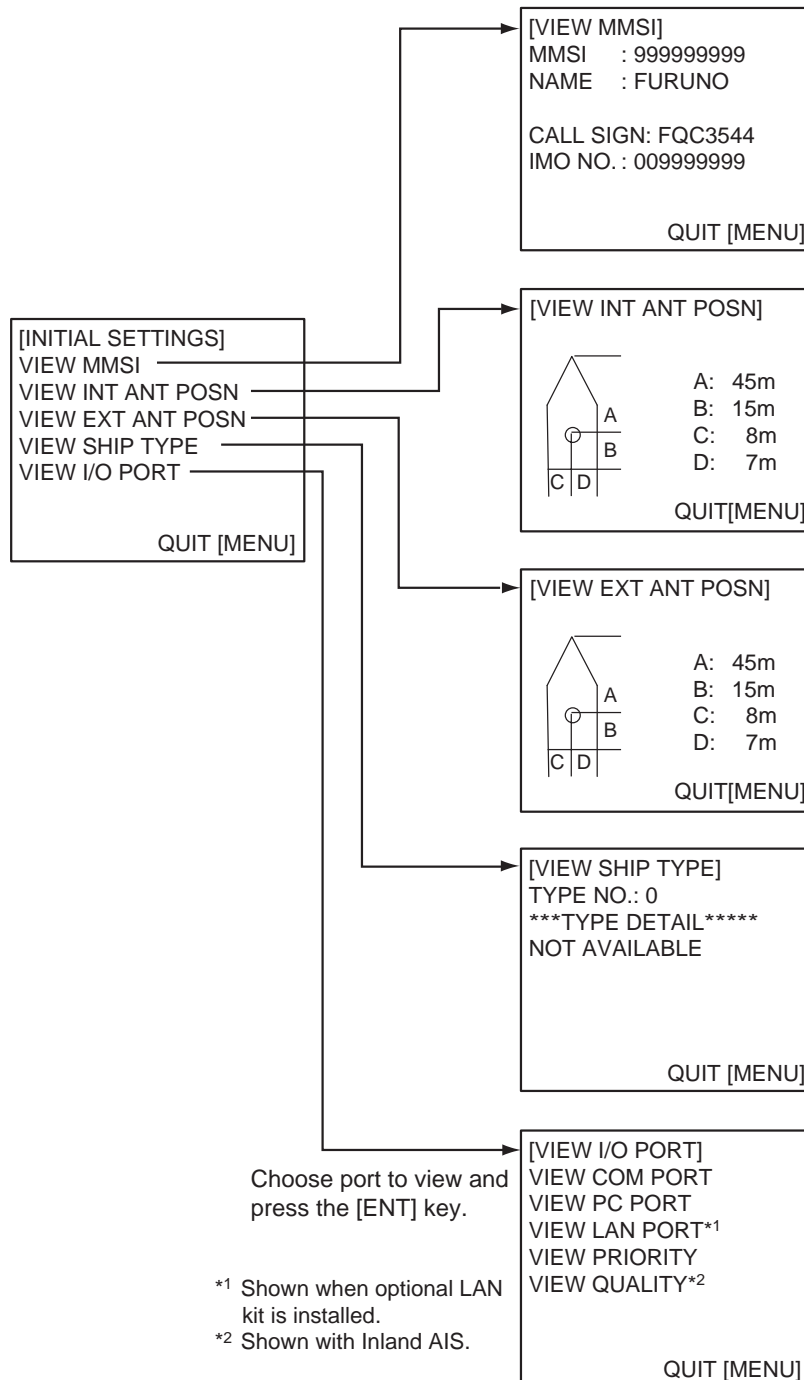
This page intentionally left blank.

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2. INLAND AIS OPERATION

This section provides the operating procedures for the Inland AIS feature, which allows use of the AIS transponder on inland waterways or the open sea. Only those procedures that are different from the Class A AIS transponder are presented.
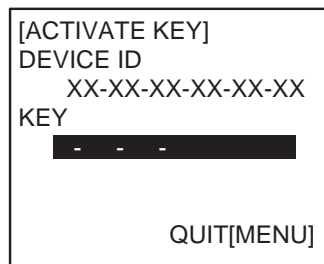
Ships with Inland AIS transponders on board autonomously determine their actual position using the Global Positioning System (GPS), which is part of the AIS transponder. Furthermore they broadcast their ID and position to other ships over a distance of 10 to 30 kilometers (depending on the geographical environment). Other ships in the area receive this information and are able to display their own position and that of other ships. Inland AIS helps the skipper in his direct nautical decisions, especially in critical situations, like the approach of a bend or a constriction.

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

2.1 Activating the Inland AIS

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

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

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



              QUIT[MENU]
```

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

```
[NAV STATUS]              ▶
NAV STATUS:           15
AIS MODE:          SOLAS
***STATUS DETAIL***
   NOT DEFINED
      (DEFAULT)


```
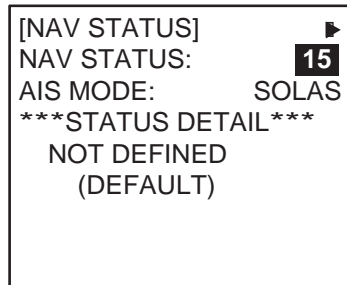
2. Push ▼ to select AIS MODE then press the **ENT** key.

```
SOLAS
INLAND
```

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 voyage 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.
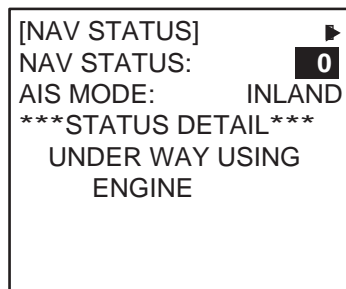
```
[NAV STATUS]              ►
NAV STATUS:           0
AIS MODE:        INLAND
***STATUS DETAIL***
   UNDER WAY USING
         ENGINE
```

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

```
[DESTINATION}          ◄►

* * * * * * * * * * * * *(0/0)
[NEW?]
```

3. NEW is selected; press the **ENT** key.
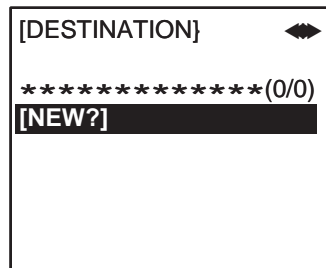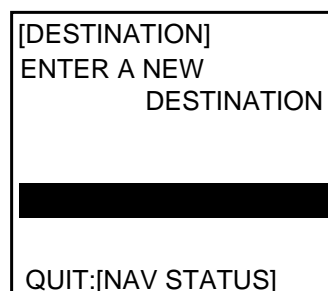
```
[DESTINATION]
ENTER A NEW
           DESTINATION




QUIT:[NAV STATUS]
```

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.

```
[ARRIVAL TIME]        ◄►
DATE[UTC]:      --/---
TIME[UTC]:         --*--
```

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

```
[DRAUGHT]             ◄►
SOLAS DRAUGHT:  0.0 m
INLAND DRAUGHT:
                 0.00m
```

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

```
[CARGO TYPE]         ◄►
TYPE NO.:            00

**** TYPE DETAIL****
NOT AVAILABLE
```

16. TYPE NO. is selected; press the **ENT** key.

17. Select type of vessel/cargo, referring to the table on page 1-10, then press the **ENT** key.

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

    Note 2: When "Tanker" is selected and the Nav status is "Moored", output power is automatically switched to 1 W when the SOG is less than 3 knots. Further, in the above condition, when the SOG becomes higher than 3 knots, the pop-up message "CHANGE NAV STATUS?" appears and a beep sounds. (The pop-up message "TX POWER CHANGED" also appears to notify you that the Tx power has changed). To erase the pop-up message, press any key or lower the SOG below 3 knots.

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

```
[ERI CODE]              ◄►
ERI CODE:             8000



****CODE DETAIL****
VESSEL,
TYPE UNKNOWN


```

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

```
[NO. OF PERSONS]        ◄►
CREW:                 – – –
PASSENGER:          – – – –
SHIPBOARD PERSONNEL

                     – – –
NO. OF PERSONS:         0


```

22. CREW is selected; press the **ENT** key.
23. Enter number of crew (0-254) then press the **ENT** key.
24. PASSENGER is selected; press the **ENT** key.
25. Enter number of passengers (0-8191) then press the **ENT** key. Enter "8191" if the total number of passengers is more than 8190.
26. SHIPBOARD PERSONNEL is 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.
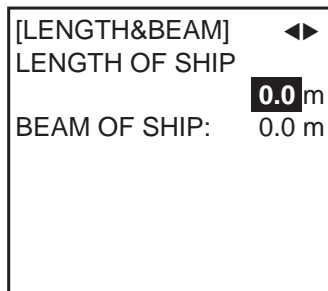
28. NO. OF PERSONS is selected; press the **ENT** key.

29. Enter the total number of persons (sum of crew, passengers and shipboard personnel) onboard then press the **ENT** key.

    Note: NO. OF PERSONS is sent in IFM16 messages.
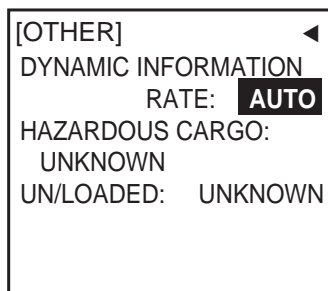
30. Press ► to go to the LENGTH&BEAM sub-menu.

```
[LENGTH&BEAM]      ◄►
LENGTH OF SHIP
                  0.0 m
BEAM OF SHIP:     0.0 m
```
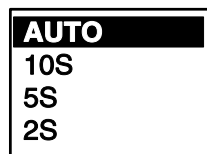
31. Enter the length and beam of your ship, pressing the **ENT** key after entering each item. (If LENGTH OF SHIP is more than three meters greater than the LENGTH OF CONVOY (A+B total for INT ANT POSN or EXT ANT POSN), the message "DIFFERENT FROM ANT POSN VALUE" appears. The same message also appears when the value for BEAM OF SHIP is more than three meters greater than the total for the BEAM OF CONVOY (C+D ANT POSN.)

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

```
[OTHER]              ◄
DYNAMIC INFORMATION
        RATE:    AUTO
HAZARDOUS CARGO:
  UNKNOWN
UN/LOADED:    UNKNOWN
```

33. DYNAMIC INFORMATION RATE is 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.

```
AUTO
10S
5S
2S
```

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 selected; press the **ENT** key.

```
NUMBER OF CONES 0
NUMBER OF CONES 1
NUMBER OF CONES 2
NUMBER OF CONES 3
B-FLAG
UNKNOWN
```

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 selected; press the **ENT** key.

```
UNKNOWN
LOADED
UNLOADED
```

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.

```
[STATIC DATA]        1/9
MMSI      : 123456789          ←——— MMSI no.
NAME      : FURUNO             ←——— Name of ship
            VOYAGER
CALL SIGN: ZL6DEF1             ←——— Call sign
IMO NO.   : 9241062*           ←——— IMO no.
ENI       : 1654321            ←——— ENI no.
AIS MODE : SOLAS               ←——— AIS mode
```

◄ ▲   ► ▼

* All zeroes (0) are transmitted when
  the Inland AIS mode is active.

```
[STATIC DATA]        2/9
SOLAS DESTINATION:             ←——— Destination
* * * * * * * * * * ** * * * *

    MAINZ



ETA: 15/JUL  11:22 UTC         ←——— Estimated date of arrival,
                                    estimated time of arrival
```

◄ ▲   ► ▼

```
[STATIC DATA]        3/9
INLAND DESTINATION             ←——— Destination type
COUNTRY CODE  :    DE          ←——— Country code no.
LOCATION CODE  :   MAI         ←——— Location code no.
FAIRWAY NO.     : 03901        ←——— Fairway section no.
TERMINAL CODE  : 00FRB         ←——— Terminal code no.
FAIRWAY HECT    : 00000        ←——— Fairway hectometre no.
ETA: 15/JUL  11:22 UTC         ←——— Estimated date of arrival,
                                    estimated time of arrival
```

◄ ▲   ► ▼

```
[STATIC DATA]        4/9
NAV STATUS: 15                 ←——— Navigation status no.
UN/LOADED:  UNLOADED           ←——— Cargo status, unloaded, loaded, or unknown
***STATUS DETAIL***            ←——— Navigation status description
NOT DEFINED
  (DEFAULT)
```

(Continued on next page)

(Continued from previous page)

```
[STATIC DATA]        5/9 |
HAZARDOUS CARGO                  ◄─── Hazardous cargo
   NUMBER OF CONES 3             ◄─── No. of cones (0-3), B-FLAG, or UNKNOWN
ANT POSN  INT     EXT            ◄─── INT: Internal GPS, EXT: External GPS
LENGTH A : 75 m   77 m           ◄─── Distance from bow to GPS antenna position
LENGTH B : 20 m   18 m           ◄─── Distance from stern to GPS antenna position
LENGTH C : 15 m   18 m           ◄─── Distance from port to GPS antenna position
LENGTH D : 15 m   12 m           ◄─── Distance from starboard to GPS antenna position
```

◄ ▲   ► ▼

```
[STATIC DATA]        6/9 |
LEN[SHIP]:          95.0m        ◄─── Length of ship
BEAM[SHIP]:         30.0m        ◄─── Beam of ship
LEN[CONVOY]:         95m         ◄─── Length of convoy (INT ANT POSN OR EXT ANT POSN, total of A+B)
BEAM[CONVOY]:        30m         ◄─── Beam of convoy  (INT ANT POSN OR EXT ANT POSN, total of C+D)
SOLAS DRAUGHT:  25.5m            ◄─── SOLAS draught
INLAND DRAUGHT                   ◄─── Inland draught
                    25.50m
```

◄ ▲   ► ▼

```
[STATIC DATA]        7/9 |
AIR DRAUGHT:     40.00m          ◄─── Air draught
CREW:               30           ◄─── No. of crew
PASSENGER:         500           ◄─── No. of passengers
SHIPBOARD PERSONNEL              ◄─── No. of shipboard personnel
                    75
NO. OF PERSONS:    605           ◄─── Total no. of persons
```

◄ ▲   ► ▼

```
[STATIC DATA]        8/9 |
TYPE OF SHIP:        71          ◄─── Type of ship
NUMBER OF TUGBOATS: 1            ◄─── Number of assisting tugboats

****TYPE DETAIL****
CARGO SHIPS                      ◄─── Type of ship description
  CARRYING
  DG, HS, OR MP(X)
```

◄ ▲   ► ▼

```
[STATIC DATA]        9/9 |
ERI CODE:          8000          ◄─── ERI code no.


****CODE DETAIL****              ◄─── ERI code no. description
VESSEL,
TYPE UNKNOWN
```

2-9

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.

```
                        [DYNAMIC DATA]      1/2
Date         ────────▶  DATE:  10/APR/2008
Time         ────────▶  TIME:  13:24:55 UTC
Latitude     ────────▶  LAT :  51°55.0213'N
Longitude    ────────▶  LON :   4°30.0012'E
Speed over ground ───▶  SOG:   8.1kn
Course over ground, Heading ▶ COG: 118.5° HDG:118°
Rate of turn ────────▶  ROT:   R10.3°/min*
```

* If no ROT device is connected and HDG sentence is input from a gyrocompass, etc., the following is displayed:

Rate of turn less than 10°/min.: 0.0
Rate of turn 10°/min. rightward or higher: R>10
Rate of turn 10°/min. leftward or higher: L>10

```
[DYNAMIC DATA]      2/2
SENSOR: EXTERNAL GPS   ◀─── Navigator (EXTERNAL GPS, INTERNAL
RAIM:            USED  ◀───  GPS, EXTERNAL DGPS, INTERNAL DGPS, NO FIX)
POSITION ACCURACY      ◀─── Receiver Autonomous Integrity Monitoring
              HIGH          (USED or UNUSED)
DYNAMIC INFORMATION         Position accuracy (HIGH or LOW)
REPORT RATE:   3.3SEC  ◀─── Report rate for dynamic information
BLUE SIGN:        YES  ◀─── Blue sign presence (YES or NO)
                            ( "---" if BLUE SIGN on the INITIAL
                              SETTINGS menu is "NOT AVAILABLE", or
                            the SOLAS mode is in use.)
```

Update rate of dynamic ship information

Ship's dynamic conditions and nominal reporting interval

Ship's dynamic conditions	Nominal reporting interval
Ship at anchor and not moving faster than 3 kn	3 minutes
Ship at anchor 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 section 1.7.2 for how to show this display.

```
[SHIP INFO]              1/9
MMSI [A] : 431099806
NAME    : FURUNO*

CALL SIGN : ZL6DEF1*1
IMO NO. : 9241062
ENI     : 1654321*1, *2
BLUE SIGN: YES
```

◀ ▲   ▶ ▼

← MMSI no.
← Name of ship
← Call sign
← IMO no.
← ENI no.
← Blue sign presence, absence

"DNGR" (DANGER) appears (in reverse video) when a target's CPA and TCPA are lower than the CPA/TCPA setting.
"LOST" appears (in reverse video) when signal from a target is lost. Six minutes and 40 seconds after loss of signal the target's data is erased.
*1 If any of these contain an "@" it is replaced with a space.

```
[SHIP INFO]              2/9
LAT : 51°55.0213'N
LON :  4°30.0012'E
SOG : 17.8kn
COG : 213.5°
HDG : 278° PA: H
R/B : 25.12 NM/351.5°
ROT : 0.1°/min
```

◀ ▲   ▶ ▼

← Latitude
← Longitude
← Speed over ground
← Course over ground
← Heading, Position Accuracy (H, High, L, Low)
← Range and bearing from own ship
← Rate of turn

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

```
[SHIP INFO]              3/9
CPA         : 0.12NM
TCPA        : 0'23"
NAV STATUS: 10
***STATUS DETAIL***
RESERVED FOR
   WING IN GROUND
 (WING)
```

◀ ▲   ▶ ▼

← CPA
← TCPA
← Navigation status
← Navigation status details

```
[SHIP INFO]              4/9
SOLAS DRAUGHT: 10.0m
INLAND DRAUGHT
                10.00m
ANT LENGTH A  :  75m
ANT LENGTH B  :  20m
ANT LENGTH C  :  15m
ANT LENGTH D  :  15m
```

◀ ▲   ▶ ▼

← SOLAS draught
← Inland draught
← Antenna position A
← Antenna position B
← Antenna position C
← Antenna position D

```
[SHIP INFO]              5/9
LEN[SHIP]:       95.0m
BEAM[SHIP]:      30.0m
LEN[CONVOY]:       95m
BEAM[CONVOY]:      30m
HAZARDOUS CARGO
   NUMBER OF CONES 1
UN/LOADED: UNLOADED
```

← Length of ship
← Beam of ship
← Length of convoy
← Beam of convoy
← Hazardous cargo status (number of cones (0-3), blue sign, unknown)
← Vessel loading status (loaded, unloaded, unknown)

(Continued on next page)

(Continued from previous page)

```
[SHIP INFO]          6/9  |
TYPE OF SHIP:         71      ◄──── Type of ship

***TYPE DETAIL***             ◄──── Type of ship details
FUTURE USE
CARGO SHIP
   CARRYING
   DG, HS, OR MP(X)
```

◄ ▲   ► ▼

```
[SHIP INFO]          7/9  |
ERI CODE:          8080       ◄──── ERI code no.

**CODE DETAIL***
MOTOR FREIGHTER
    WITH TANKER
```

◄ ▲   ► ▼

```
[SHIP INFO]          8/9  |
SENSOR QUALITY
  SPEED:           HIGH       ◄──── Quality of speed data (HIGH, LOW)
  COURSE:           LOW       ◄──── Quality of course data (HIGH, LOW)
  HEADING:         HIGH       ◄──── Quality of heading data (HIGH, LOW)
DESTINATION                   ◄──── Destination
ROTTERDAM
ETA: 15/JUL 17:21 UTC
```

◄ ▲   ► ▼

```
[SHIP INFO]          9/9  |
CREW:               10        ◄──── No. of crew
PASSENGER:         100        ◄──── No. of passengers
SHIPBOARD PERSONNEL           ◄──── No. of shipboard personnel
                    20
NO. OF PERSONS:    130        ◄──── No. of persons in total
```

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 1/9 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.

Note 3: If a ship changes its mode from CLASS B SO Inland AIS to CLASS B SO, the Inland AIS information is erased and replaced with CLASS B SO information.

2.7   Inland AIS Specific Messaging

2.7.1   Text message

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

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

3. TEXT is selected; press the **ENT** key.

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

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

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

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

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

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

```
BROAD CAST
ADRS CAST
```

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

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

```
 SAFETY 
 NORMAL
```

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

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

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

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

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

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

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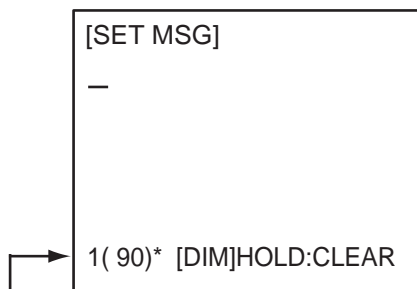
```
[SET MSG]

–




1( 90)*  [DIM]HOLD:CLEAR
```
Number of characters used/available

*: Number of characters available with each message type for Inland AIS is as follows:
 NORMAL message with BROAD-CAST : 86 characters
 NORMAL message with ADDRESS-CAST: 80 characters
 SAFETY message with BROAD-CAST : 90 characters
 SAFETY message with ADDRESS-CAST : 85 characters

SET MSG screen

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.

```
SEND MESSAGE.

ARE YOU SURE?
YES        NO 
```

18. Press ◄ to select YES then press the **ENT** key to send your message.

Message status is shown as follows:

AIS message status messages and their meanings

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

2.7.2 ETA and RTA messages

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

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

Sending an ETA message

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

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

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

```
[ETA/RTA]
CREATE MSG
ETA LOG
RTA LOG
```

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

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

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

```
[SET MSG TYPE]
MMSI        : 000000000
CHANNEL: ALTERNATE
RETRY TIMES: 3
```

6. MMSI is 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 selected; press the **ENT** key.

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

9. Select the channel over which to send the message then press the **ENT** key.
10. RETRY TIMES is selected; press the **ENT** key.
11. Enter the number of times to re-send the message (if the first transmission is unsuccessful) then press the **ENT** key. An ETA message can be resent a maximum of three times.
12. Press the **MENU** key to return to the CREATE MSG menu.

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

```
[SET DESTINATION]

* * * * * * * * * * * *   (0/0)
[NEW?]

(If you have entered some
destinations, they appear here.)
```

14. NEW is 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.

```
[SET DESTINATION]
ENTER A NEW DEST
COUNTRY CODE:      ◄───── UN country code, two 6 bit characters
LOCATION CODE:     ◄───── UN location code, three 6 bit characters
FAIRWAY NO. :   00000 ◄── Fairway section no., five 6 bit characters
TERMINAL CODE:     ◄───── Terminal code, five 6 bit characters
FAIRWAY HECT:   00000 ◄── Fairway hectometre, five 6 bit characters
         QUIT: [MENU]
```

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.

```
[SET DESTINATION]

* * * * * * * * * * * *   (0/1)
[NEW?]
NLRTM02552LEUVE00000
                            Fairway Hectometer
                         Terminal Code
                      Fairway No.
                Location Code
          Country Code
```
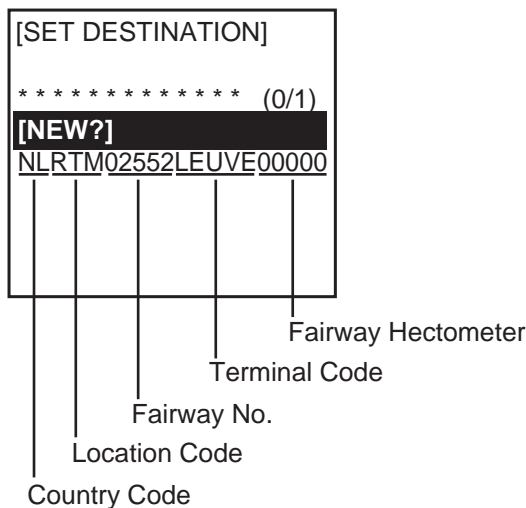
18. Press the **MENU** key twice to return to the CREATE MSG menu.

19. Select SET ETA then press the **ENT** key.

```
[SET ETA]
ETA
  DATE[UTC]          --/---
  TIME[UTC]          --:--
AIR DRAUGHT:         0.00 m
NO. OF TUGBOATS:        -
```

20. DATE[UTC] is 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 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.

```
[RTA LOG]
31/APR  13:25  NEW
 [UTC]  FROM: 431099111
27/MAR 03:43
 [UTC]  FROM: 431099111
19/MAR  18:00
 [UTC]  FROM: 431099111

1/20[▼]  MSG[ENT] QUIT[MENU]
```

5. Select the message then press the **ENT** key.

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

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

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

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

RTA message (page 1)

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

Lock
particulars

RTA message (page 2)

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.

```
[NO. OF PERSONS]
CREATE MSG
TX LOG
```

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

```
[CREATE MSG]
SET MSG TYPE
VIEW MSG
SEND MSG
```
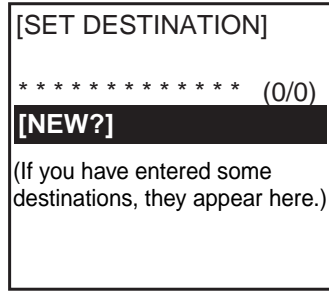
5. SET MSG TYPE is selected; press the **ENT** key.

```
[SET MSG TYPE]
ADRS TYPE: BROAD CAST
MMSI      : - - - - - - - - -
TYPE: SOLAS (IFM16)
CHANNEL: ALTERNATE
RETRY TIMES: -
```

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

```
BROAD CAST
ADRS CAST
```

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.

```
SOLAS(IFM16)
INLAND(RFM55)
```

9. 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.

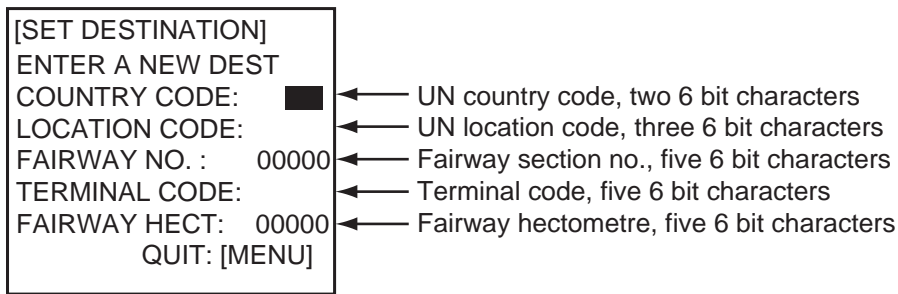10. CHANNEL is selected; press the **ENT** key.

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

11. Select the channel to use to send the message then press the **ENT** key.
12. RETRY TIMES is selected; press the **ENT** key.
13. Enter the number of times to re-send the message (if the first transmission is unsuccessful) then press the **ENT** key.

14. Press the **MENU** key to return to the CREATE MSG menu.

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

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

15. 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 on the next page. To view the other screens, press ►.

```
[EMMA WARNING]      1/3          [EMMA WARNING]      2/3          [EMMA WARNING]      3/3
START TIME [UTC]                 START                           TYPE: SN
        12/JUN 11:30             LAT  :  51°55.0213'N              SNOW AND ICE
END TIME [UTC]                   LON  :   4°30.0012'E            MIN VALUE:          1
        12/JUN 11:35             END                             MAX VALUE:          4
                                 LAT  :  49°55.0213'N            CLASS:       MEDIUM
                                 LON  :   2°30.0012'E            WIND DIRECTION:  NW
```

Start and end times of validity   Fairway section start and   Type, minimum and maximum
of warning   end co-ordinates of warning   values, class and wind direction
                                                                    (See below 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 fixed as follows: • km/h (wind) • °C (temperature) • cm/h (snow) • l/m²h (rain) • m (visibility distance in fog)
MIN, MAX VALUE	The minimum and maximum value of respective item over one hour. For example, if the minimum and maximum values for snow and ice are 1 and 4 respectively, this means that 1-4 cm of snow or ice has fallen in one hour. The indication range is -254 to +254, or "----" in case where a value is not reported, for example, fire in the forests and flood.
CLASS	Weather classification: SLIGHT, MEDIUM, STRONG/HEAVY, "- - - - - - - -" (unknown)
WIND DIRECTION	N, NE, E, SE, S, SW, W, NW

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

2.7.5   Water level message

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

When you receive a water level message, a popup displays "MESSAGE! WATER LEVEL". To see the contents of the message, do the following:

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

```
                                    [WATER LEVEL]        1/1
        Country code ─────►         COUNTRY CODE:         DE
National unique ID of gauge ─────►  GAUGE ID:           2047
Positive or negative value ─────►   WATER LEVEL:  -83.82m
                                    GAUGE ID:           2123
                                    WATER LEVEL:  -12.32m
                                    GAUGE ID:           3234
                                    WATER LEVEL:   83.82m
```

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.

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

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

Time transmitted, addressee

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

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




            QUIT[MENU]
```
TX addressed message

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




            QUIT[MENU]
```
TX broadcast message

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

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

```
[TX LOG]
SOLAS(IFM16)
NO. OF PERSONS:   100
```
SOLAS IFM16 no. of persons message

```
[TX LOG]
INLAND(RFM55)
CREW:              100
PASSENGER:        255
SHIPBOARD PERSONNEL
                   41
```
INLAND RFM55 no. of persons message

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

RX logs

The RX logs store received text messages, RTA, EMMA warning and water level messages, in respective logs. When you receive one of those messages, a popup shows "MESSAGE! XXX (XXX=message type)". To see the contents of the message, do the following:

1. Press the **MENU** key to open the menu.
2. Select MSG then press the **ENT** key.
3. Select RX LOG (Text), 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.)

NEW: New or unread message

```
[RX LOG]
31/APR  13:25  NEW
 [UTC]  FROM: 431099111
27/MAR 03:43
 [UTC]  FROM: 431099111
19/MAR  18:00
 [UTC]  FROM: 431099111

1/20[▼]  MSG[ENT] QUIT[MENU]
```

Date and time → message received

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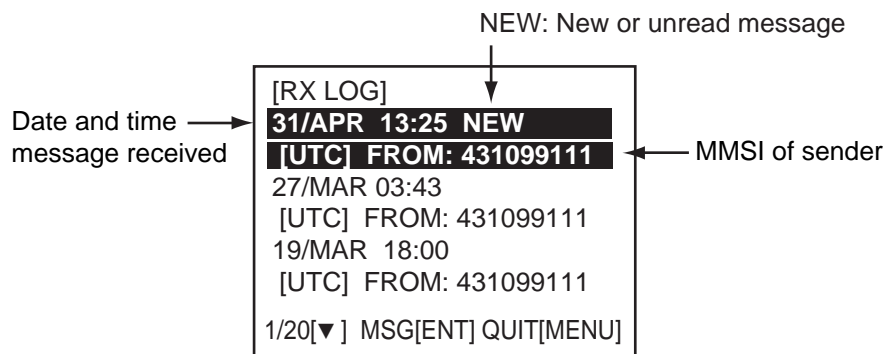
4. Select the message to view then press the **ENT** key. Below are examples of text and RTA messages. For EMMA warning and water level messages, see section 2.7.4 and 2.7.5, respectively.

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




            QUIT[MENU]
```
RX addressed message

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




            QUIT[MENU]
```
RX broadcast message

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



```
RTA message (page 1)

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

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

2.8 Viewing Initial Settings

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

1. Press the **MENU** 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.

```
[VIEW MMSI]
MMSI    : 999999999
NAME    : FURUNO

CALL SIGN: FQC3544
IMO NO. : 009999999
ENI:  01820013
                    QUIT [MENU]
```

```
[VIEW INT ANT POSN]

              A:  45m
              B:  15m
              C:   8m
              D:   7m
                    QUIT[MENU]
```

```
[INITIAL SETTINGS]
VIEW MMSI
VIEW INT ANT POSN
VIEW EXT ANT POSN
VIEW SHIP TYPE
VIEW I/O PORT
VIEW BLUE SIGN SW
          QUIT [MENU]
```

```
[VIEW EXT ANT POSN]

              A:  45m
              B:  15m
              C:   8m
              D:   7m
                    QUIT[MENU]
```

```
[VIEW SHIP TYPE]
TYPE NO  : 0

***TYPE DETAIL*****
NOT AVAILABLE

                    QUIT [MENU]
```

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

* Shown when optional LAN kit is installed.

```
[VIEW I/O PORT]
VIEW COM PORT
VIEW PC PORT
VIEW LAN PORT*
VIEW PRIORITY
VIEW QUALITY

          QUIT [MENU]
```

```
[VIEW BLUE SIGN SW]
BLUE SIGN SW
          NOT AVAILABLE

                    QUIT [MENU]
```

3. MAINTENANCE, TROUBLESHOOTING

⚠ WARNING	NOTICE
ELECTRICAL SHOCK HAZARD **Do not open the equipment.** Only qualified personnel should work inside the equipment.	**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.

Maintenance items

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.
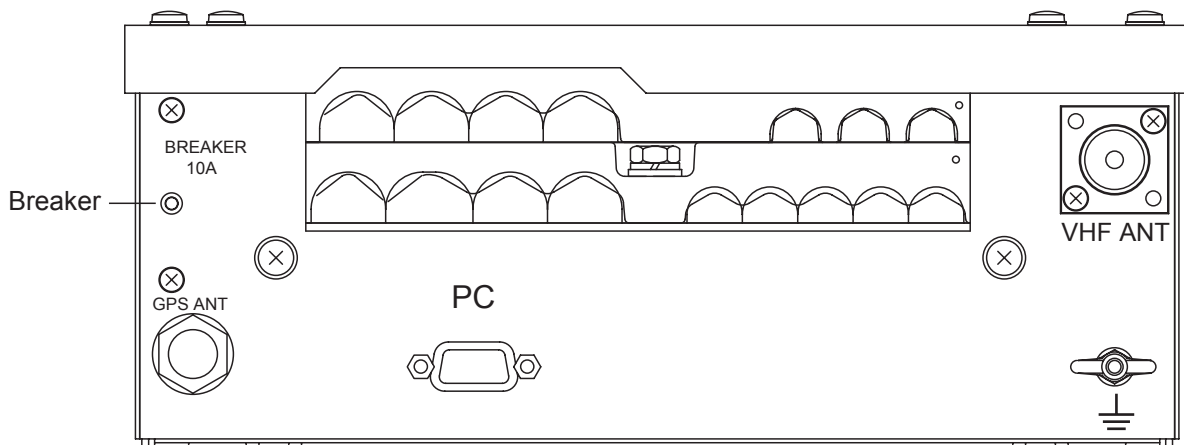
3.3 Troubleshooting

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.

Troubleshooting

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 receive.	• Check that the VHF antenna cable is firmly fastened. • Check the VHF antenna for damage. • For TX message, try different TX channel. (operating sequence: **MENU**, 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 a message. (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.

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

For service technician. ⟶ FOR SERVICE
Not accessible by user.

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

XX.XX = Program version no.

```
[MONITOR TEST]
BOOT NO.: 2450020-XX.XX
PROG NO.: 2450021-XX.XX
ROM   :         CONT  :
SDRAM:          DIM    :
PORT  :
KEY    :        PUSH KEY
              QUIT[MENU] 3 TIMES
```
(a)

```
[MONITOR TEST]
BOOT NO.: 2450020-XX.XX
PROG NO.: 2450021-XX.XX
ROM    : OK      CONT  :53
SDRAM: OK        DIM    : 4
PORT   : OK
KEY     :
              QUIT[MENU] 3 TIMES
```
(b)

(e)

(d)

```
<LCD CHECK>

ALL ON   2 SEC.
ALL OFF  3 SEC.
```
(c)
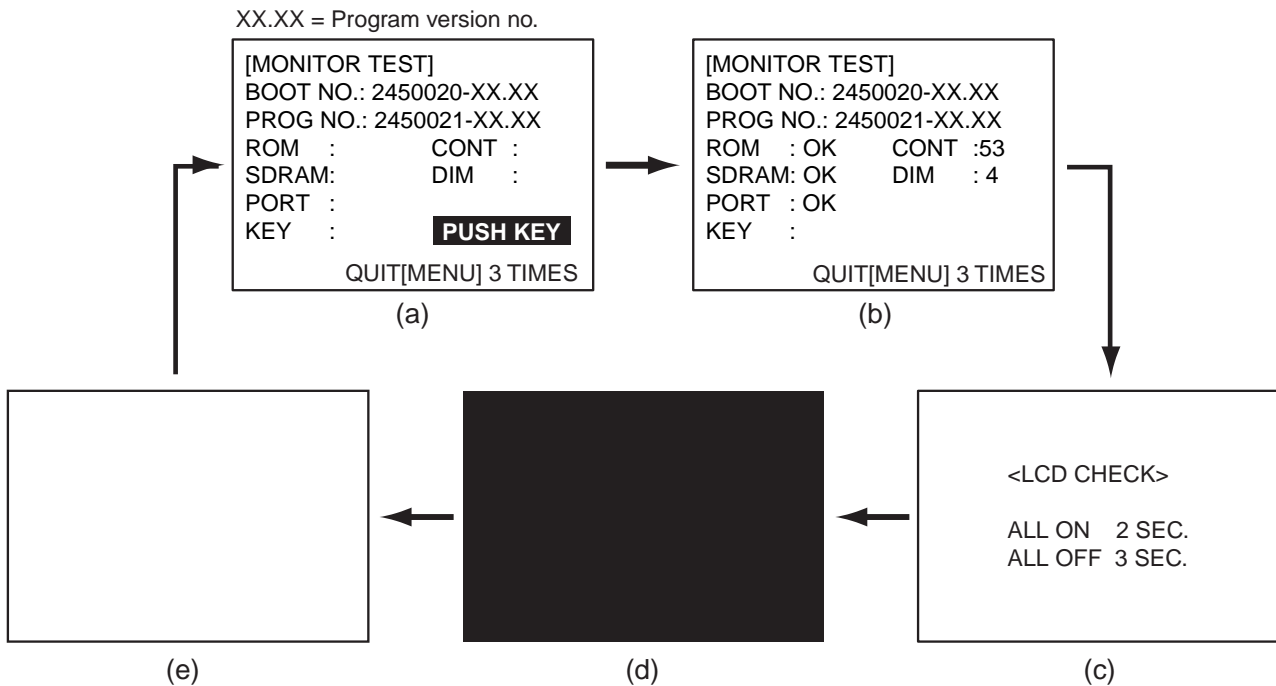
a) The first screen in the test shows boot no. and program no. The message "PUSH KEY" prompts you to test the keys. Press each key (except the **PWR** key) and arrows on the **CursorPad** one by one. The name of the pressed key or arrow appears next to "KEY" if the control is functioning normally.

b) The ROM, RAM, SDRAM and (I/O)PORT (special test connector required, otherwise "NG" appears) are checked. The results of the ROM/RAM/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 two tests: memory test and internal GPS receiver 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 shown.

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

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

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

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

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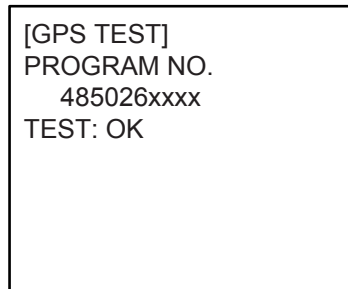
xxxx: Program Version No.

5. 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-ons and power-offs. If the interval between power-off and power-on is less than 15 minutes those times are not shown.

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

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

           QUIT[MENU]
```

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

3.4.4 Tx on/off history

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

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

```
[TX ON/OFF HISTORY]
TX-ON      17/MAY/2009  ◄───── Tx at 17 May 2009
           05:35:54              at 05:35:54
TX-OFF     17/MAY/2009
           04:34:57
TX-ON      17/MAY/2009
           04:33:57

PAGE (1/2) :[►] QUIT[MENU]
```

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

3.5　Alarm Status

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

1. At the plotter display, press the **DISP** key four times to show the ALARM STATUS display.

Alarm name, date and time of alarm →

```
[ALARM STATUS]
EPFS    7/MAY    4:32:16
L/L     7/MAY    4:02:01
SOG     7/MAY    2:34:54
COG     6/MAY    7:09:32
HDG     3/MAY    8:00:21
ROT     19/APR   9:05:22
```

2. Use ▼ or ▲ to scroll the log.

Alarm statuses and their meanings

Alarm Status Indication	Meaning
ANT	Antenna VSWR trouble. Continued operation possible.
CH1	TDMA RX1 Board trouble. TX stopped on corresponding TX channel.
CH2	TDMA RX2 Board trouble. TX stopped on corresponding TX channel.
CH70	DSC RX Board trouble, transmission stopped on CH70.
COG	Invalid COG data
EPFS	No data from external navigator. Continued operation possible.
FAIL	General system failure
HDG	Invalid/nonexistent HDG data
L/L	No L/L data
MKD	Minimum input device failure
ROT	Invalid ROT data
SOG	Invalid SOG data
TX	TX malfunction

3.6 Error and System Messages

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

Error and system messages and their meanings

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.
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.
MESSAGE!	Class A AIS text message received.
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.

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

Note: 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.

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.

Latitude position ────────►
Longitude position ────────►
Speed over ground, Course over ground ────────►
Date ────────►
Time ────────►
Mode ────────►
DGPS
GPS
NO FIX
Position Accuracy ────────
H: High (<10 m, differential mode)
L: Low (>10, autonomous mode)

```
[INTERNAL GPS]
LAT   :  34°44.4639'N
LON   : 135°21.2395'E
S/C   : 10.9 kn/    98.9°
UTC   : 16/MAY/2009
          06:29:02
DGPS    STS: D3D  ◄────
PA: H   RAIM: USED
```

RAIM Status*
(Receiver Autonomous
Integrity Monitoring)
USED or UNUSED

STS (Position fix Status)
2D: 2D GPS position fix
3D: 3D GPS position fix
D2D: 2D DGPS position fix
D3D: 3D DGPS position fix
DOP: HDOP > 4 in 2D fix,
          or HDOP > 6 in 3D fix
NO FIX: No position fix

*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.

Sensor status message ⟶

```
[SENSOR STATUS]

UTC CLOCK LOST




                      QUIT[MENU]
```
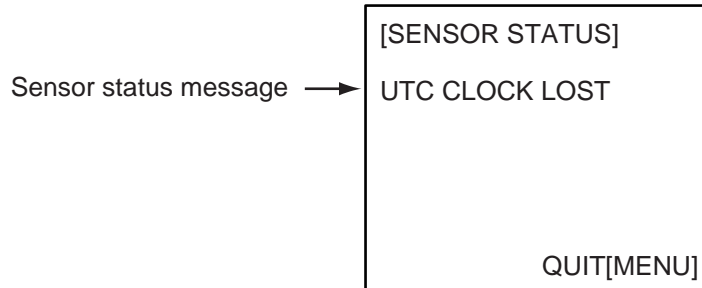
3. Press the **DISP** key to close the display.

Sensor status messages and their meanings

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 T1
ROT VALID	ROT data normal
UTC CLOCK LOST	Internal position fix lost

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.

```
[MEMORY CLEAR]
MONITOR CLEAR
SET USER DEFAULT
GPS COLD START




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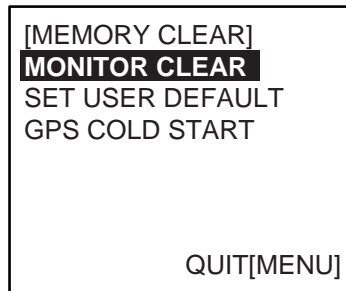
4. Select MONITOR CLEAR, SET USER DEFAULT or GPS COLD START as appropriate then press the **ENT** key.

   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.
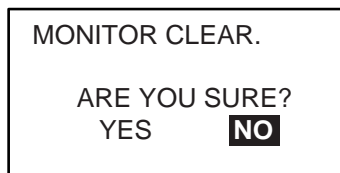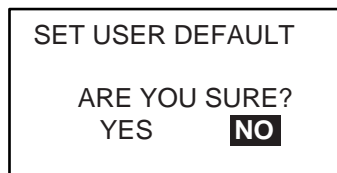
```
MONITOR CLEAR.          SET USER DEFAULT          GPS COLD START.

ARE YOU SURE?            ARE YOU SURE?             ARE YOU SURE?
YES      NO             YES      NO               YES      NO
```
      MONITOR CLEAR   USER DEFAULT   GPS COLD START
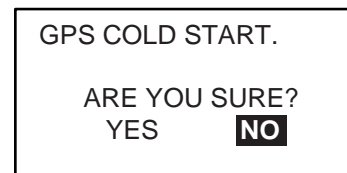
5. Press ◄ to select YES then press the **ENT** key.

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). Note that this setting is turned off when the power is turned off.

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

```
[USER SETTINGS]
KEY BEEP        :‎ON
ALARM BUZZER  : ON
AUTO SORT       : ON
DISP SART TEST : ON
LR MODE          : AUTO
RECEIVED MSG
CPA/TCPA ALARM
```
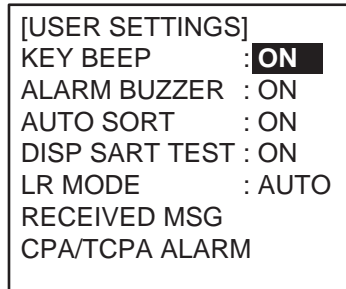
3.   Select DISP SART TEST then press the **ENT** key.
4.   Select ON then press the **ENT** key.
5.   Press the **DISP** key to close the menu.
6.   At the plotter display, press the **DISP** key.
7.   Select SART then press the **ENT** key to show detailed information for the AIS-SART.
8.   Confirm that the STATUS field is showing "SART TEST". (See page 1-28.)

APPENDIX

Menu Tree - Class A AIS

[MENU] key

MSG
- CREATE MSG
  - SET MSG TYPE
    - ADRS TYPE
      (BROAD CAST, ADRS CAST)
    - MMSI
    - MSG TYPE
      (NORMAL, SAFETY)
    - CHANNEL
      (ALTERNATE, BOTH A & B, A, B)
    - RETRY TIMES (0-3)
  - SET MSG
  - SEND MSG
- TX LOG
- RX LOG

SENSOR STATUS (Display sensor status.)

INTERNAL GPS (Displays data about internal GPS receiver.)

USER SETTINGS
- KEY BEEP (ON, OFF)
- ALARM BUZZER (ON, OFF)
- AUTO SORT (ON,OFF)
- DISP SART TEST (ON, OFF
- LR MODE (AUTO, MANUAL)
- RECEIVED MSG
  - POPUP (ALL, ABM, OFF)
  - BUZZER (ON, OFF)
- CPA/TCPA ALARM
  - CPA (0.0-6.00 (NM))
  - TCPA (0-60 (min))
  - ALARM MODE (ON, OFF)
  - ALARM BUZZER (ON, OFF)

INITIAL SETTINGS
- SET MMSI (MMSI, IMO NO., NAME, CALL SIGN)
- SET INT ANT POSN
  - A (0-511 (m))
  - B (0-511 (m))
  - C (0-63 (m))
  - D (0-63 (m))

  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.

- SET EXT ANT POSN
  - A (0-511 (m))
  - B (0-511 (m))
  - C (0-63 (m))
  - D (0-63 (m))
- SET SHIP TYPE (Type no.)
- SET I/O PORT
  - SET COM PORT
    - SET COM1
      - MODE (LONG RANGE, EXT DISPLAY, DISABLE)
      - SPEED (IEC61162-1, IEC61162-2)
    - SET COM2
      - MODE (EXT DISPLAY, MONITOR, HI LEVEL IF, DISABLE)
      - SPEED (IEC61162-1, IEC61162-2)
    - SET COM3 (Same as SET COM2.)
    - SET COM4
      - MODE (SENSOR, EXT DISPLAY, DISABLE)
      - SPEED (IEC61162-1, IEC61162-2)
    - SET COM5
      - MODE (SENSOR(Fixed)
      - SPEED (IEC61162-1, IEC61162-2)
    - SET COM6
      - MODE (SENSOR(Fixed)
      - SPEED (IIEC61162-1, IEC61162-2, AD-10)
  - SET PC PORT
    - MODE (STANDARD, MONITOR, SERVICE, BEACON, DISABLE)
    - SPEED (4800BPS, 9600BPS, 19.2KBPS, 38.4KBPS, 57.6KBPS)
  - SET LAN PORT*
    - *1
      - MODE (STANDARD, MONITOR, SERVICE, DISABLE)
    - *2
      - IP ADDRESS (000.000.000.000 - 255.255.255.255)
      - SUB NET MASK (000.000.000.000 - 255.255.255.255)
      - PORT NO. (0 - 65535)
    - IP ADDRESS (000.000.000.000 - 255.255.255.255)
    - SUB NET MASK (000.000.000.000 - 255.255.255.255)
    - NAVNET PORT NO. (10000 - 30000)
    - 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)

    *Shown when optional LAN kit is installed.

    *1: For PC Network
    *2: For NAVNET 3D

  - SET PRIORITY

(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

DIAGNOSTICS
- MONITOR TEST (Displays PROG NO. and BOOT NO.; checks ROM, RAM, 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.)
- 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)

AP-2

Menu Tree - Inland AIS

[MENU] key

MSG
- TEXT
  - CREATE MSG
    - SET MSG TYPE
      - ADRS TYPE (BROAD CAST, ADRS CAST)
      - MMSI
      - MSG TYPE (NORMAL, SAFETY)
      - CHANNEL (ALTERNATE, BOTH A & B, A, B)
      - RETRY TIMES (0-3)
    - SET MSG
    - SEND MSG
  - TX LOG
  - RX LOG
- ETA/RTA
  - CREATE MSG
    - SET MSG TYPE
    - SET DESTINATION
      - COUNTRY CODE, LOCATION CODE, FAIRWAY NO., TERMINAL CODE, FAIRWAY HECT
    - SET ETA
      - ETA (DATE, TIME), AIR DRAUGHT, NO. OF TUGBOATS
    - SEND MSG
  - ETA LOG
  - RTA LOG
- NO. OF PERSONS
- EMMA WARNING
- WATER LEVEL
  - CREATE MSG
    - SET MSG TYPE
      - ADRS TYPE (BROAD CAST, ADRS CAST)
      - MMSI
      - TYPE (SOLAS(IFM16), INLAND(RFM55))
      - CHANNEL (ALTERNATE, BOTH A & B, A, B)
      - RETRY TIMES (0-3)
    - VIEW MSG
    - SEND MSG
  - TX LOG

SENSOR STATUS (Display sensor status.)

INTERNAL GPS (Displays data about internal GPS receiver.)

USER SETTINGS
- KEY BEEP (ON, OFF)
- ALARM BUZZER (ON, OFF)
- AUTO SORT (ON,OFF)
- DISP SART TEST (ON, OFF
- LR MODE (AUTO, MANUAL)
- RECEIVED MSG
  - POPUP (ALL, ABM, OFF)
  - BUZZER (ON, OFF)
- CPA/TCPA ALARM
  - CPA (0.0-6.00 (NM))
  - TCPA (0-60 (min))
  - ALARM MODE (ON, OFF)
  - ALARM BUZZER (ON, OFF)

INITIAL SETTINGS
- SET MMSI (MMSI, IMO NO., NAME, CALL SIGN, ENI)
- SET INT ANT POSN
  - A (0-511 (m))
  - B (0-511 (m))
  - C (0-63 (m))
  - D (0-63 (m))
- SET EXT ANT POSN
  - A (0-511 (m))
  - B (0-511 (m))
  - C (0-63 (m))
  - D (0-63 (m))
- SET SHIP TYPE (Type no.)
- SET I/O PORT
  - SET COM PORT
    - SET COM1
      - MODE (LONG RANGE, EXT DISPLAY, DISABLE)
      - SPEED (IEC61162-1, IEC61162-2)
    - SET COM2
      - MODE (EXT DISPLAY, MONITOR, HI LEVEL IF, DISABLE)
      - SPEED (IEC61162-1, IEC61162-2)
    - SET COM3 (Same as SET COM2.)
    - SET COM4
      - MODE (SENSOR, EXT DISPLAY, DISABLE)
      - SPEED (IEC61162-1, IEC61162-2)
    - SET COM5
      - MODE (SENSOR(Fixed)
      - SPEED (IEC61162-1, IEC61162-2)
    - SET COM6
      - MODE (SENSOR(Fixed)
      - SPEED (IIEC61162-1, IEC61162-2, AD-10)
  - SET PC PORT
    - MODE (STANDARD, MONITOR, SERVICE, BEACON, DISABLE)
    - SPEED (4800BPS, 9600BPS, 19.2KBPS, 38.4KBPS, 57.6KBPS)
  - 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)
  - VIEW PRIORITY
  - VIEW QUALITY
- SET BLUE SIGN SW (AVAILABLE, NOT AVAILABLE)

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.

* Shown when optional LAN kit is installed.

*1: For PC Network
*2: For NAVNET 3D

(Continued on next page)

APPENDIX

```
│
CHANNEL ─┬─ VIEW CHANNEL (View power and channel settings of channel in use.)
SETTINGS │
         │                                      Press [ENT] key to display.
         └─ EDIT CHANNEL ─┬─ SELECT NO. (0-9) ──────────────────────────┐
                          ├─ TIME                                       │
                          ├─ 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- ─┬─ MONITOR TEST (Displays program no.; checks ROM, RAM, LCD, controls.)
NOSTICS │
        ├─ TRANSPONDER ─┬─ MEMORY TEST (Displays PROG NO.;
        │   TEST        │    checks ROM, RAM, and MOT HW.)
        │               └─ GPS TEST (Display PROGRAM NO. and checks internal GPS receiver.)
        │
        ├─ 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] ─┬─ NAV STATUS (00-15)              ┌─ SELECT
key           ├─ AIS MODE (SOLAS, INLAND)        ├─ EDIT
              ├─ DESTINATION ───────────────────── 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)
```
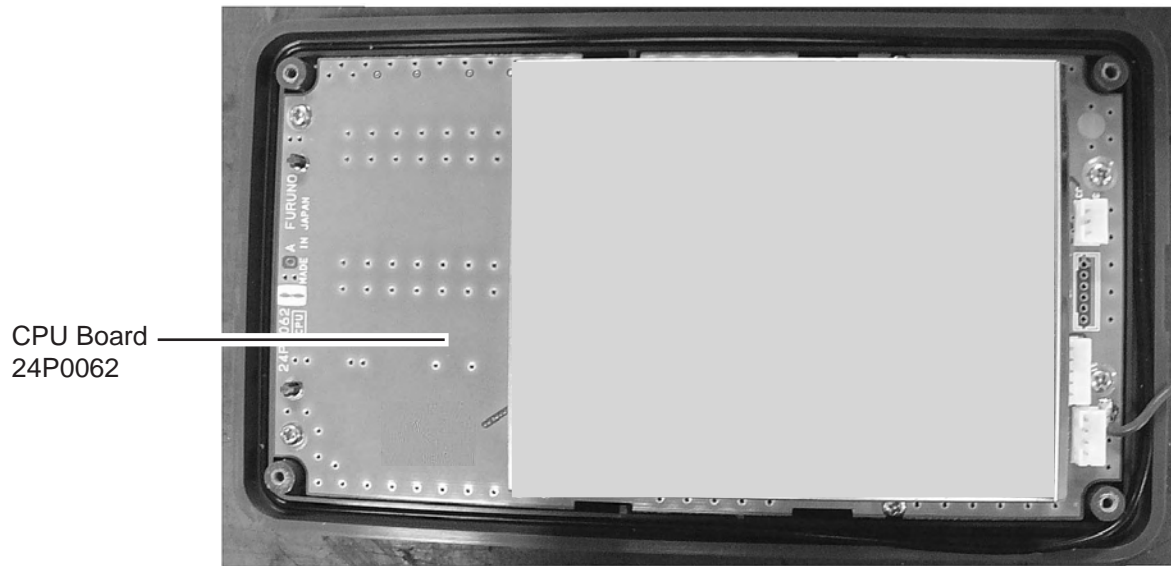
AP-4

Parts List

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

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

Parts Location

Monitor unit

CPU Board
24P0062

Monitor unit, rear cover opened

Transponder unit

MOT Board
24P0036

TX Board
24P0032

PWR Board
24P0037
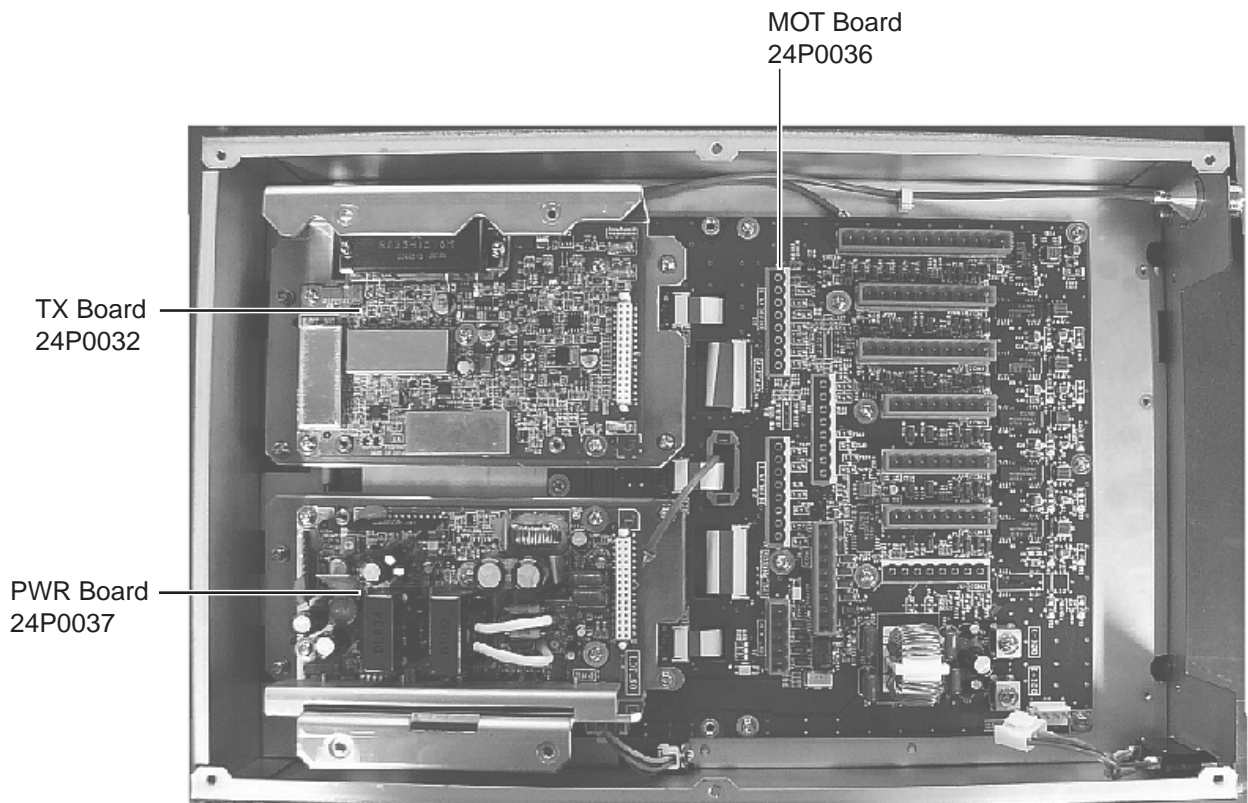
Transponder unit, top cover removed

GPS Receiver
GN-8093

MAIN Board
24P0035

GPSTB Board
24P0043

RX2 Board
24P0033

RX1 Board
24P0033

DSC Board
24P0033
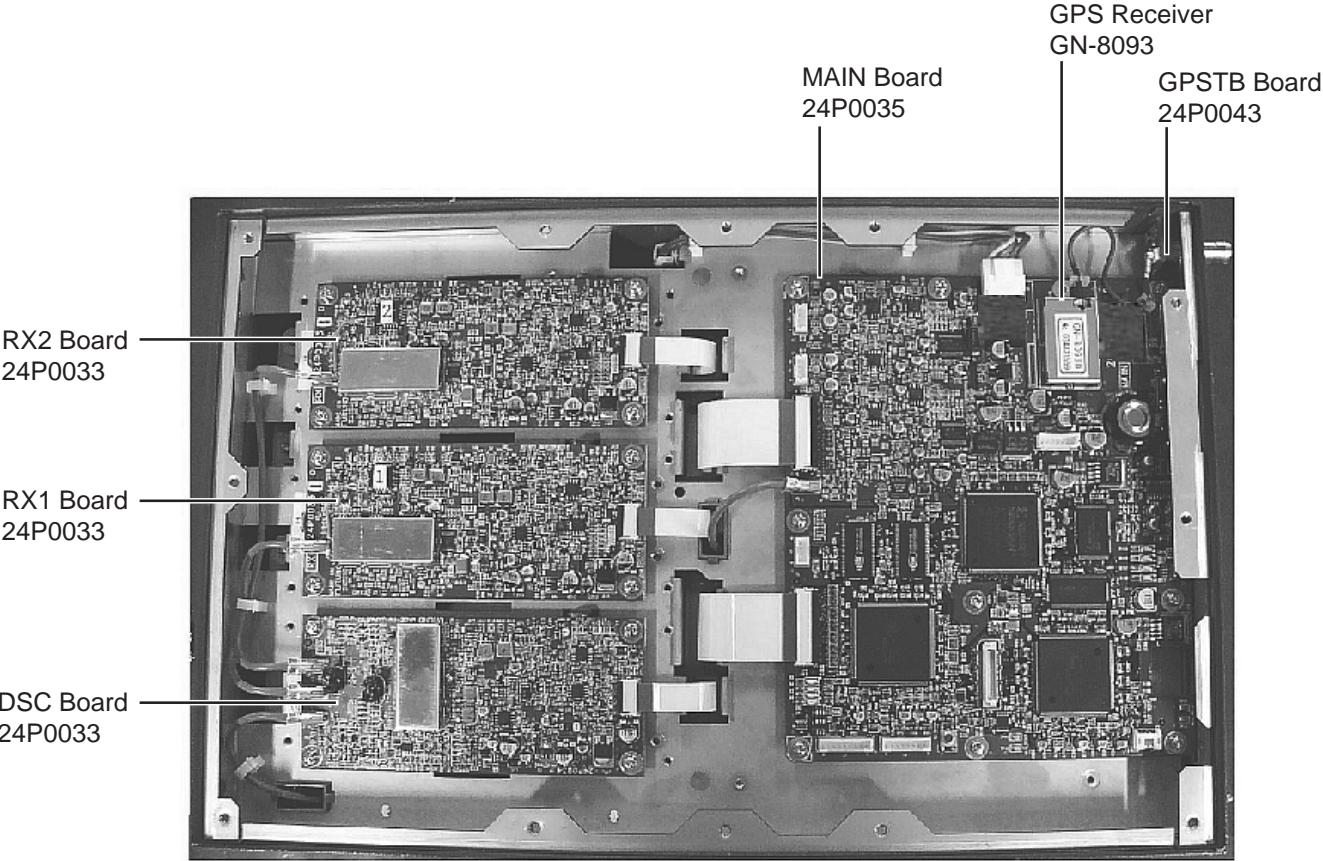
Transponder unit, bottom cover removed

AP-7

Digital Interface (IEC 61162-1 Edition 2, IEC 61162-2)

Sentence data

Input sentences

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

Output sentences

ABK, ACA, ACS, ALR, LRF, LR1, LR2, LR3, TXT, PIWWSPR, VDM, VDO

Transmission interval

ABK: With each event
ACA, ACS: At RX
ALR: 30 s during alarm, 2 min normally no alarm
LRF, LR1, LR2, LR3: At RX
TXT: Each update
VDM: At RX
VDO: 1 s

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
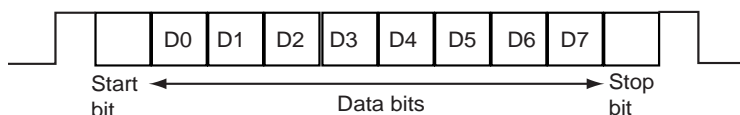60 mA min. 150 mA max.

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
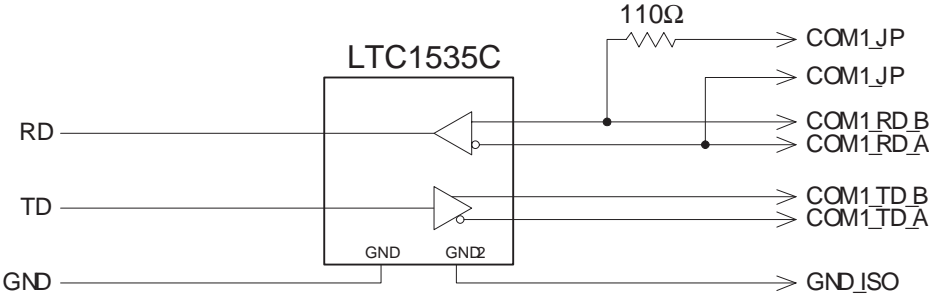Data bits: 8 (D7 = 0), parity none
Stop bits: 1

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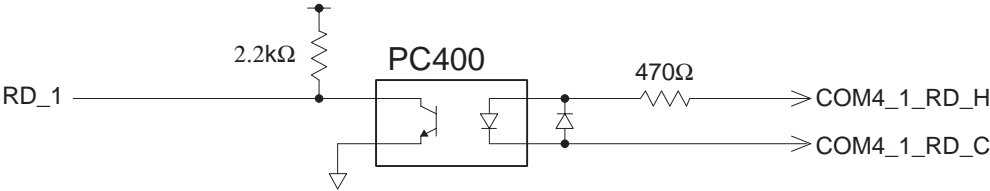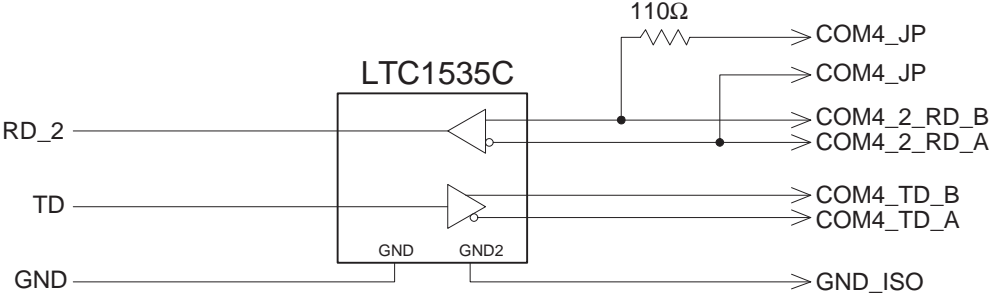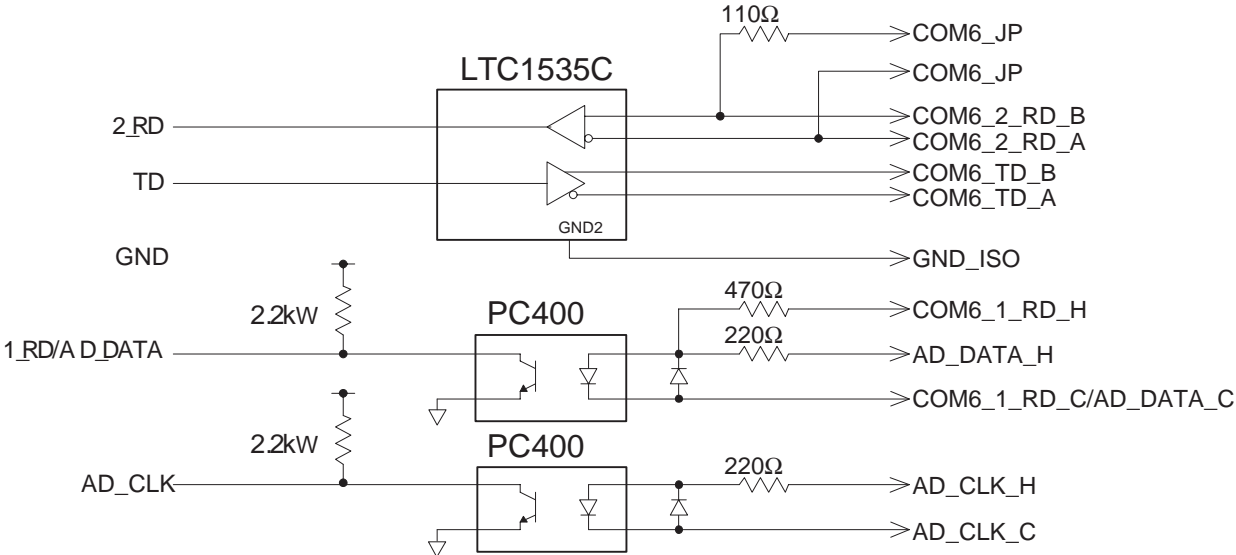
Serial interface I/O circuit

COM1, 2, 3 port

Baud rate selectable from 4800 and 38400 (bps).

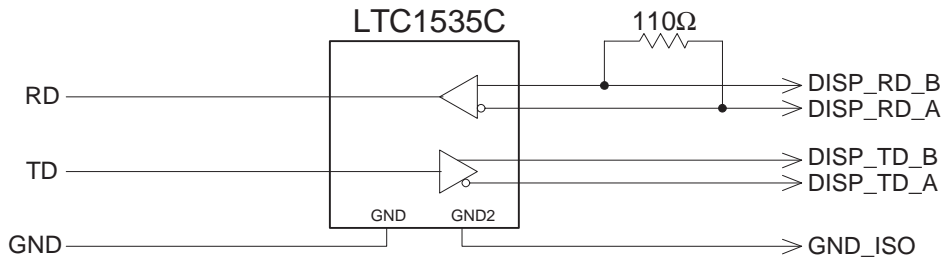## COM 4, 5 port

Baud rate selectable from 4800 and 38400 (bps).

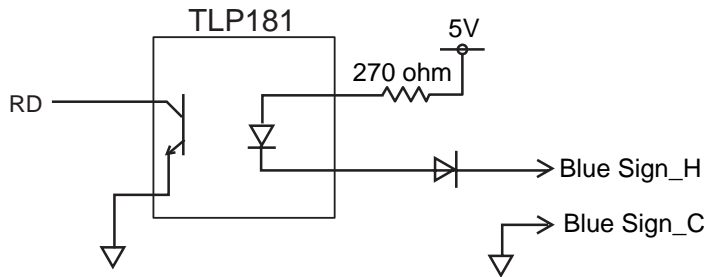## COM6 port

Baud rate selectable from 4800 and 38400 (bps).

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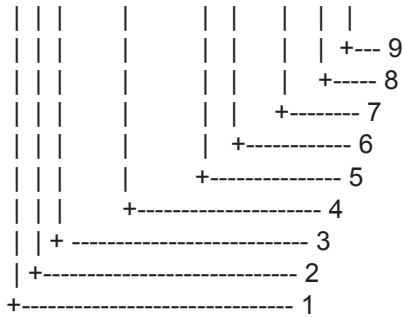
1. Total number of sentences needed to transfer the message, 1 to 9
2. Message sentence number, 1 to 9
3. Message sequence identifier, 0 to 3
4. The MMSI of destination AIS unit for the ITU-R M.1371 message 6 or 12
5. AIS channel for broadcast of the radio message
6. VDL message number(6 or 12), see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

ACA - AIS regional channel assignment message

$--ACA,x,llll.l, a,yyyyy.y,a,llll.l,a,yyyyy.y,a,x,xxxx,x,xxxx,x,x,x,a,x,hhmmss.s*hh<CR><LF>

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
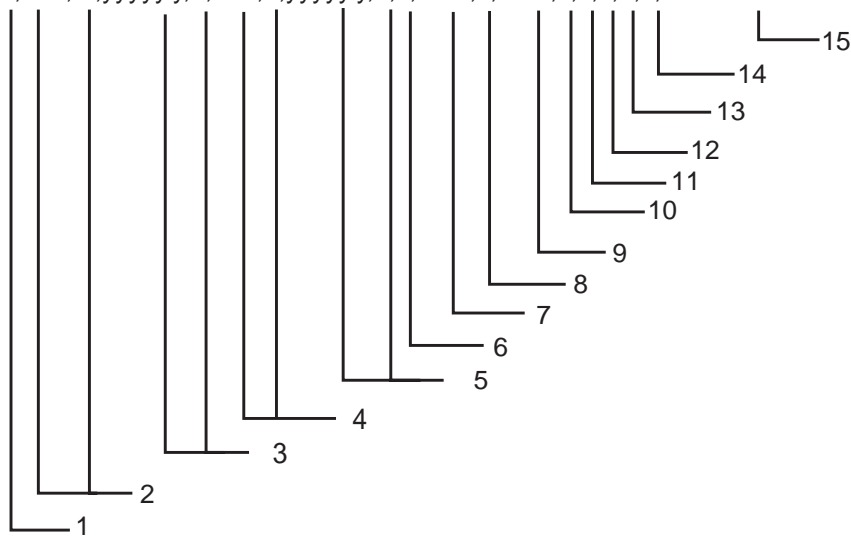5. Region Southwest corner longitude - E/W
6. Transition Zone Size
7. Channel A
8. Channel A bandwidth
9. Channel B
10. Channel B bandwidth
11. Tx/Rx mode control
12. Power level control
13. Not used
14. In-use flag
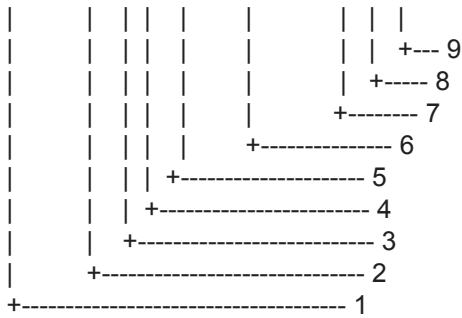15. Time of in-used change

ACK - Acknowledge alarm

$--ACK,xxx*hh<CR><LF>
      | +--------------------- 2
      +----------------------- 1

1. Local alarm number(identifier)
2. Checksum

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AIR - AIS interrogation request

```
$--AIR,xxxxxxxxx,x.x,x,x.x,x,xxxxxxxxx,x.x,x*hh<CR><LF>
               |      |  | |  |      |        | | |
               |      |  | |  |      |        | | +--- 9
               |      |  | |  |      |        | +----- 8
               |      |  | |  |      |        +------- 7
               |      |  | |  |      +-------------- 6
               |      |  | | +------------------ 5
               |      |  | +--------------------- 4
               |      |  +------------------------ 3
               |      +--------------------------- 2
               +--------------------------------- 1
```

1. MMSI of interrogated station 1
2. ITU-R M.1371 message requested from station 1
3. Message sub-section
4. Number of second message requested from station 1
5. Message sub-section
6. MMSI of interrogated station 2
7. Number of message requested from station 2
8. Message data sub-section
9. Checksum

BBM - UAIS broadcast binary message.

```
!--BBM,x,x,x,x,x.x,s--s,x*hh<CR><LF>
        || | | |    |  | |
        || | | |    |  | +--- 8
        || | | |    |  +------ 7
        || | | |    +--------- 6
        || | | +------------ 5
        || | +--------------- 4
        || +----------------- 3
        | +------------------- 2
        +--------------------- 1
```
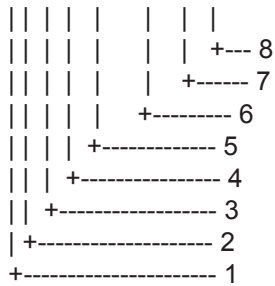
1. Total number of sentences needed to transfer the message, 1 to 9
2. Message sentence number, 1 to 9
3. Sequential Message identifier, 0 to 9
4. AIS channel for broadcast of the radio message
5. VDL message number(8 or 14), see ITU-R M.1371
6. Binary data
7. Number of fill-bits, 0 to 5
8. Checksum

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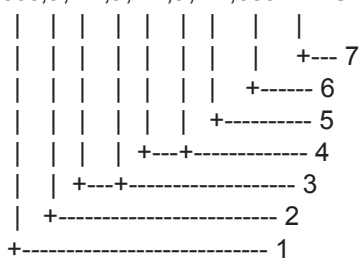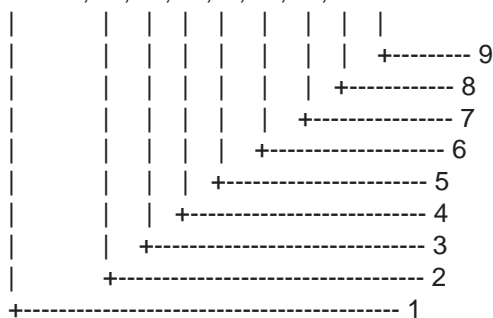## DTM - Datum reference

```
$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>
          |  |  |  |  |  |  |  |   |    |
          |  |  |  |  |  |  |  |   |    +--- 7
          |  |  |  |  |  |  |  |   +------ 6
          |  |  |  |  |  |  |  +--------- 5
          |  |  |  |  +---+------------ 4
          |  |  +---+------------------ 3
          |  +----------------------- 2
          +-------------------------- 1
```

1. Local datum W84 - WGS84
           W72 - WGS72
           S85 - SGS85
           P90 - PE90
           999 - User defined
           IHO datum code
2. Not used
3. Lat offset, min, N/S
4. Lon offset, min, E/W
5. Not used
6. Reference dattum W84 - WGS84
            W72 - WGS72
            S85 - SGS85
            P90 - PE90
7. Checksum

GBS - GNSS satellite fault detection

```
$--GBS,hhmmss.ss,x.x,x.x,x.x,xx,x.x,x.x,x.x*hh<CR><LF>
                |      |   |   |   |   |   |   |   |
                |      |   |   |   |   |   |   |   +--------- 9
                |      |   |   |   |   |   |   +----------- 8
                |      |   |   |   |   |   +--------------- 7
                |      |   |   |   |   +------------------ 6
                |      |   |   |   +---------------------- 5
                |      |   |   +------------------------- 4
                |      |   +---------------------------- 3
                |      +------------------------------- 2
                +-------------------------------------- 1
```

1. Not used
2. Expected error in latitude
3. Expected error in longitude
4. Not used
5. Not used
6. Not used
7. Not used
8. Not used
9. Checksum

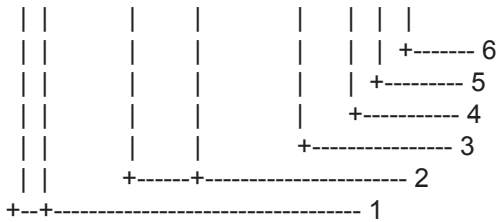**AP-13**

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>
        |          |   |      |     | || | |   |   |   |   |   |  |    |
        |          |   |      |     | || | |   |   |   |   |   |  | +-- 11
        |          |   |      |     | || | |   |   |   |   |   | +---- 10
        |          |   |      |     | || | |   |   |   |   | +--------- 9
        |          |   |      |     | || | |   |   | +---+----------- 8
        |          |   |      |     | || | |   +---+----------------- 7
        |          |   |      |     | || | +----------------------- 6
        |          |   |      |     | || +------------------------ 5
        |          |   |      |     | | +------------------------- 4
        |          |   |      |     +---+-------------------------- 3
        |        +---+--------------------------------------------- 2
        +-------------------------------------------------------- 1
```
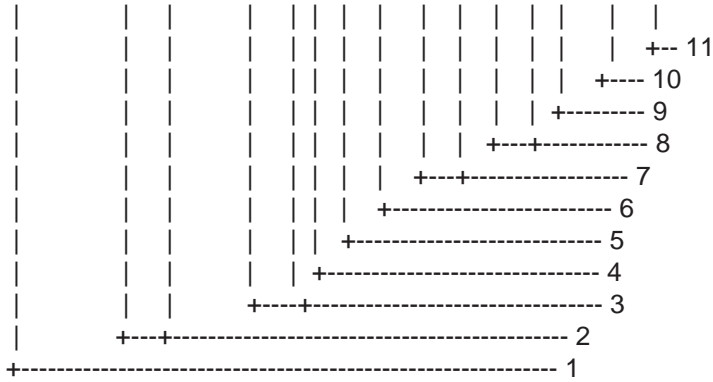
1. Not used
2. Latitude, N/S
3. Longitude, E/W
4. GPS quality indicator
5. Not used
6. Not used
7. Not used
8. Not used
9. Not used
10. Not used
11. Checksum

GLL - Geographic position - latitude/longitude

```
$--GLL,llll.ll,a,yyyyy.yy,a,hhmmss.ss,A,a*hh<CR><LF>
        | |       |       |           |  | | |
        | |       |       |           |  | | +------- 6
        | |       |       |           |  | +--------- 5
        | |       |       |           | +----------- 4
        | |       |       |           +--------------- 3
        | |          +------+---------------------- 2
        +--+--------------------------------- 1
```

1. Latitude, N/S
2. Longitude, E/W
3. Not used
4. Status: A=data valid, V=data invalid
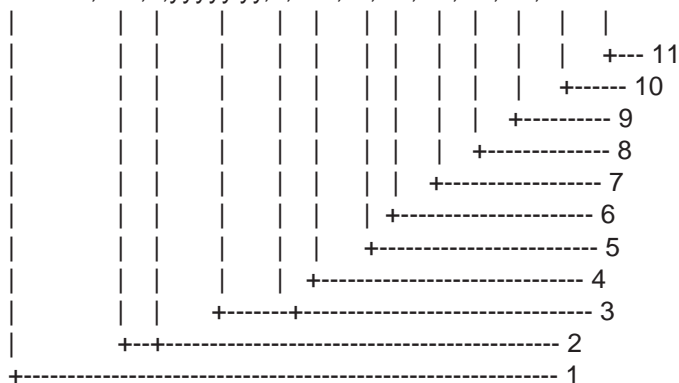5. Mode indicator(see note)
6. Checksum

NOTE Positioning system Mode indicator:
    A = Autonomous
    D = Differential
    E = estimated(dead reckoning)
    M = Manual input
    S = Simulator
    N = Data not valid

The Mode indicator field supplements the Status field. The Status field shall be set to V=invalid for all values of Operating Mode except for A=Autonomous and D=Differential. The positioning system Mode indicator and Status field shall not be null fields.
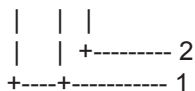
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GNS - GNSS fixed data

```
$--GNS,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c,xx,x.x,x.x,x.x,x.x,x.x*hh<CR><LF>
            |        |  |     |   |   |   |  |   |   |   |   |   |  |
            |        |  |     |   |   |   |  |   |   |   |   |   |  +--- 11
            |        |  |     |   |   |   |  |   |   |   |   |   +------ 10
            |        |  |     |   |   |   |  |   |   |   |   +---------- 9
            |        |  |     |   |   |   |  |   |   |   +------------- 8
            |        |  |     |   |   |   |  |   |   +---------------- 7
            |        |  |     |   |   |   |  | +-------------------- 6
            |        |  |     |   |   |   | +----------------------- 5
            |        |  |     |   |   | +------------------------- 4
            |        |  |     | +--+---------------------------- 3
            |      +--+---------------------------------------- 2
          +--------------------------------------------------- 1
```

1. Not used
2. Latitude, N/S
3. Longitude, E/W
4. Mode indicator
5. Not used
6. Not used
7. Not used
8. Not used
9. Not used
10. Not used
11. Checksum

HDT - Heading - true

```
$--HDT,x.x,T*hh<CR><LF>
         |   | |
         |   | +--------- 2
       +----+----------- 1
```
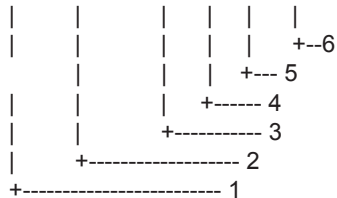
1. Heading, degrees true
2. Checksum

LRF - Long-range function

```
$--LRF,x,xxxxxxxxx,c--c,c--c,c--c*hh<CR><LF>
        |     |      |    |    |   |
        |     |      |    |    |   +--6
        |     |      |    |    +--- 5
        |     |      |    +------ 4
        |     |      +---------- 3
        |     +------------------ 2
      +----------------------- 1
```
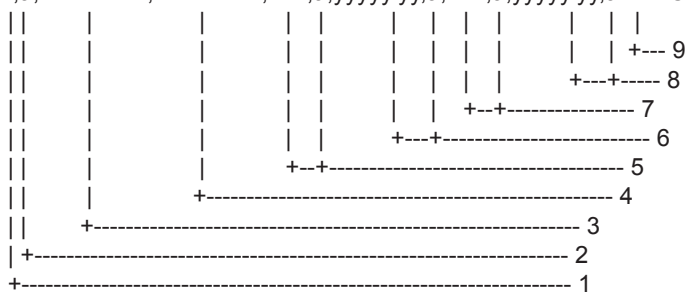
1. Sequence number, 0 to 9
2. MMSI of requestor
3. Name of requestor, 1 to 20 characters
4. Function request, 1 to 26 characters
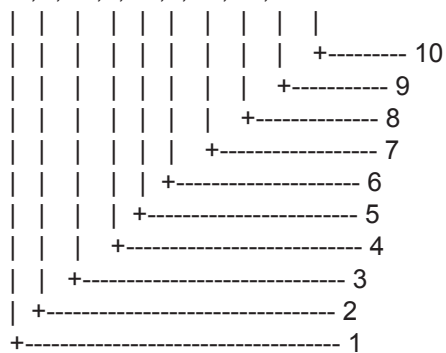5. Function reply status
6. Checksum

LRI - Long-range interrogation

```
$--LRI,x,a,xxxxxxxxx,xxxxxxxxx,llll.ll,a,yyyyy.yy,a,llll.ll,a,yyyyy.yy,a*hh<CR><LF>
       ||   |        |        |  |     |   |   |  |       |   |  |
       ||   |        |        |  |     |   |   |  |       |   | +--- 9
       ||   |        |        |  |     |   |   |  |     +---+----- 8
       ||   |        |        |  |     |   | +--+--------------- 7
       ||   |        |        |  |   +---+------------------------ 6
       ||   |        |      +--+------------------------------------- 5
       ||   |      +-------------------------------------------------- 4
       ||  +---------------------------------------------------------- 3
       | +------------------------------------------------------------ 2
       +------------------------------------------------------------- 1
```

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)
9. Checksum

OSD - Own ship data

```
$--OSD,x.x,A,x.x,a,x.x,a,x.x,x.x,a*hh<CR><LF>
       |   | |   | |   | |   |   |  |
       |   | |   | |   | |   |   | +--------- 10
       |   | |   | |   | |   | +----------- 9
       |   | |   | |   | +-------------- 8
       |   | |   | |   +------------------ 7
       |   | |   | +-------------------- 6
       |   | |   +------------------------ 5
       |   | +-------------------------- 4
       |   +---------------------------- 3
       | +------------------------------ 2
       +--------------------------------- 1
```
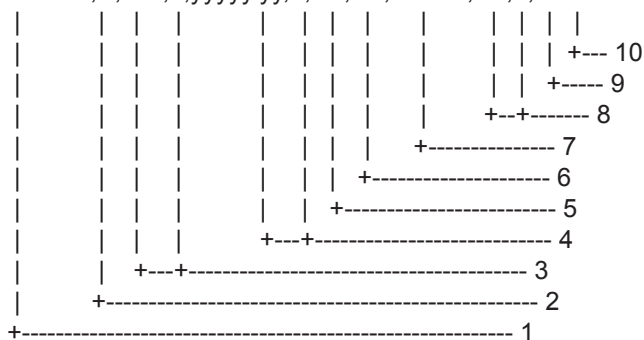
1. Heading, degrees true
2. Heading status: A=data valid, V=data invalid
3. Vessel course, degrees true
4. Course reference, B/M/W/R/P(see note)
5. Vessel speed
6. Speed reference, B/M/W/R/P(see note)
7. Not used
8. Not used
9. Speed units, K(km/h) / N(Knots) / S(statute miles/h)
10. Checksum

NOTES - Reference systems(speed/course):
    B = bottom tracking log
    M = manually entered
    W = water referenced
    R = radar tracking(of fixed target)
    P = positioning system ground reference

RMC - Recommended minimum specific GPS/TRANSIT data

```
$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a*hh<CR><LF>
                |        | |    |       | | | | |    |      | | | |
                |        | |    |       | | | | |    |      | | | +--- 10
                |        | |    |       | | | | |    |      | | +----- 9
                |        | |    |       | | | | |    |      +--+------- 8
                |        | |    |       | | | | |    +--------------- 7
                |        | |    |       | | | +-------------------- 6
                |        | |    |       | | +----------------------- 5
                |        | |    |       +---+------------------------ 4
                |        | +---+------------------------------------ 3
                |        +---------------------------------------- 2
                +----------------------------------------------------- 1
```

1. UTC of position fix
2. Status: A=data valid, V=navigation receiver warning
3. Latitude, N/S
4. Longitude, E/W
5. Speed over ground, knots
6. Course over ground, degrees true
7. Date: dd/mm/yy
8. Not used
9. Not used
10. Checksum

NOTE Positioning system Mode indicator:
    A = Autonomous
    D = Differential
    E = estimated(dead reckoning)
    M = Manual input
    S = Simulator
    N = Data not valid

The Mode indicator field supplements the Status field. The Status field
shall be set to V=invalid for all values of Operating Mode except for
A=Autonomous and D=Differential. The positioning system Mode indicator
and Status field shall not be null fields.
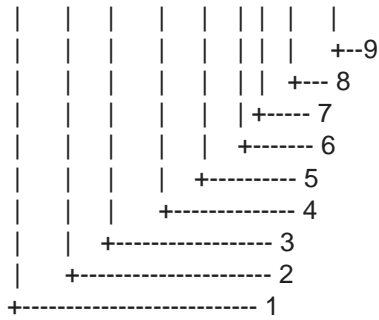
ROT - Rate of turn

```
$--ROT,x.x,A*hh<CR><LF>
        |   | |
        |   | +--- 3
        |   +----- 2
        +-------- 1
```
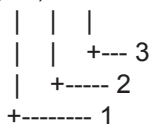
1. Rate of turn, deg/min, "-"=bow turns to port
2. Status: A=data valid, V=data invalid
3. Checksum

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SSD - UAIS ship static data

```
$--SSD,c--c,c--c,xxx,xxx,xx,xx,c, aa*hh<CR><LF>
           |   |   |   |   |   |  | | |  |   |
           |   |   |   |   |   |  | | |  |   +--9
           |   |   |   |   |   |  | | |  +--- 8
           |   |   |   |   |   |  | +----- 7
           |   |   |   |   |   |  +------- 6
           |   |   |   |   +---------- 5
           |   |   |   +------------- 4
           |   |   +----------------- 3
           |   +-------------------- 2
           +------------------------- 1
```
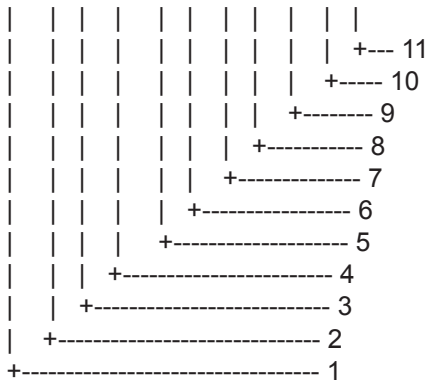
1. Ship's Call Sign, 1 to 7 characters
2. Ship's Name, 1 to 20 characters
3. Pos. ref. point distance, "A," from bow, 0 to 511 Meters
4. Pos. ref. point distance, "B," from stern, 0 to 511 Meters
5. Pos. ref. point distance, "C," from port beam, 0 to 63 Meters
6. Pos. ref. point distance, "D," from starboard beam, 0 to 63 Meters
7. DTE indicator flag
8. Source identifier
9. Checksum

VBW - Dual ground/water speed

```
$--VBW,x.x,x.x,A,x.x,x.x,A,x.x,A,x.x,A*hh<CR><LF>
         |   |   |  |   |   |  |   |  |   |   |   |
         |   |   |  |   |   |  |   |  |   |   +--- 11
         |   |   |  |   |   |  |   |  |   +----- 10
         |   |   |  |   |   |  |   |  +-------- 9
         |   |   |  |   |   |  +----------- 8
         |   |   |  |   |   +------------- 7
         |   |   |  |   +---------------- 6
         |   |   |  +------------------ 5
         |   |   +---------------------- 4
         |   +------------------------- 3
         |   +---------------------------- 2
         +------------------------------- 1
```

1. Not used
2. Not used
3. Not used
4. Longitudinal ground speed, knots
5. Transverse ground speed, knots
6. Status: ground speed, A=data valid V=data invalid
7. Not used
8. Not used
9. Not used
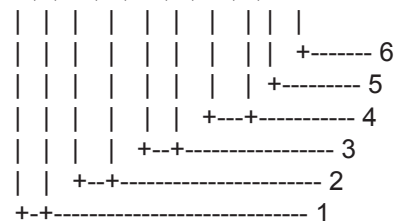10. Not used
11. Checksum

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>
            |  |  |  |          |       |  |  |  |   |
            |  |  |  |          |       |  |  |  |   +--- 10
            |  |  |  |          |       |  |  |  +------ 9
            |  |  |  |          |       |  |  +--------- 8
            |  |  |  |          |       |  +------------ 7
            |  |  |  |          |       +--------------- 6
            |  |  |  |          +---------------------- 5
            |  |  |  +--------------------------- 4
            |  |  +---------------------------------- 3
            |  +------------------------------------- 2
            +---------------------------------------- 1
```
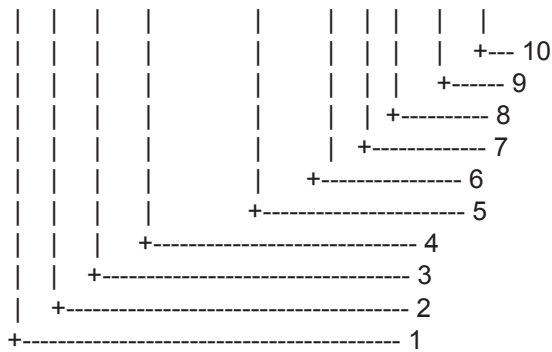
1. Type of ship and cargo category, 0 to 255
2. Maximum present static draught (Solas Draught), 0 to 25.5 Meters
3. Persons on-board, 0 to 8191
4. Destination, 1-20 characters
5. Estimated UTC of arrival at destination
6. Estimated day of arrival at destination, 00 to 31(UTC)
7. Estimated month of arrival at destination, 00 to 12(UTC)
8. Navigational status, 0 to 15
9. Regional application flags, 0 to 15
10. Checksum

VTG - Course over ground and ground speed

```
$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>
        |  |  |  |  |  |  |  |  | |  |
        |  |  |  |  |  |  |  |  | |  +------- 6
        |  |  |  |  |  |  |  |  | +--------- 5
        |  |  |  |  |  |  +---+----------- 4
        |  |  |  |  +--+---------------- 3
        |  |  +--+--------------------- 2
        +-+------------------------- 1
```

1. Course over ground, degrees true
2. Not used
3. Speed over ground, knots
4. Speed over ground, km/h
5. Mode indicator(see note)
6. Checksum

NOTE Positioning system Mode indicator:
    A = Autonomous
    D = Differential
    E = estimated(dead reckoning)
    M = Manual input
    S = Simulator
    N = Data not valid
  The positioning system Mode indicator field shall not be a null field.

Output sentences

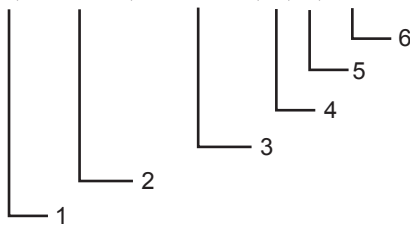## ABK - UAIS addressed and binary broadcast acknowledgement

```
$--ABK,xxxxxxxxx,a,x.x,x,x*hh<CR><LF>
              |      |  |  | | |  |
              |      |  |  | | |  +--- 6
              |      |  |  | +----- 5
              |      |  |  +------- 4
              |      |  +--------- 3
              |      +------------ 2
              +------------------ 1
```
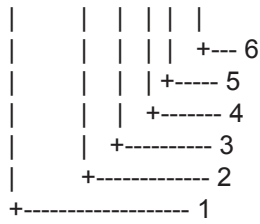
1. MMSI of the addressed AIS unit
2. AIS channel of reception
3. Message type
4. Message sequence number
5. Type of acknowledgement
6. Checksum

ACA - See "Input sentences."

ACS - Channel management information source

```
$--ACS,x,xxxxxxxxx,hhmmss.ss,xx,xx,xxxx*hh<CR><LF>
```

1. Sequence number, 0 to 9
2. MMSI of originator
3. UTC at receipt of regional operating settings
4. UTC day, 01- to 31
5. UTC month, 01 to 12
6. UTC year

ALR - Set alarm state

```
$--ALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF>
              |         |  | | | |   |
              |         |  | | | |   +------------ 6
              |         |  | | | +---------------- 5
              |         |  | | +------------------ 4
              |         |  | +-------------------- 3
              |         |  +----------------------- 2
              |         +------------------------- 1
```
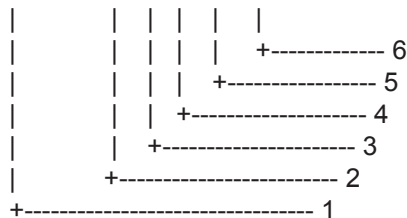
1. Time of alarm condition change, UTC
2. Local alarm number(identifier)
3. Alarm condition(A=threshold exceeded, V=not exceeded)
4. Alarm's acknowledge state, A=acknowledged V=unacknowledged
5. Alarm's description text
6. Checksum

AP-20

LRF - See "Input sentences."

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

```
$--LR1,x,xxxxxxxxx,xxxxxxxxx,c--c,c--c,xxxxxxxxx*hh<CR><LF>
         |    |        |      |    |      |        |
         |    |        |      |    |      |      +---- 7
         |    |        |      |    |      +---------- 6
         |    |        |      |    +---------------- 5
         |    |        |      +-------------------- 4
         |    |        +-------------------------- 3
         |    +------------------------------------ 2
         +------------------------------------------ 1
```
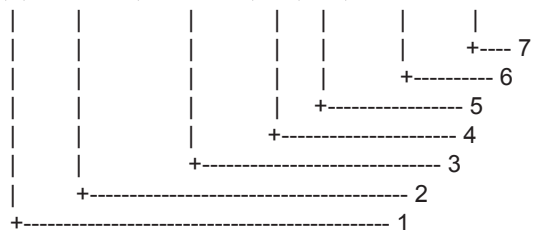
    1. Sequence Number
    2. MMSI of responder
    3. MMSI of requestor(reply destination)
    4. Ship's name, 1 to 20 characters
    5. Call Sign, 1 to 7 characters
    6. IMO Number, 9-digit number
    7. Checksum

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

```
$--LR2,x,xxxxxxxxx,xxxxxxxx,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x.x,T,x.x,N*hh<CR><LF>
         |    |        |         |         |    |    |     |  |  | |  | |  |
         |    |        |         |         |    |    |     |  |  | |  | +--- 9
         |    |        |         |         |    |    |     |  |  | +---+----- 8
         |    |        |         |         |    |    |     |  +--+---------- 7
         |    |        |         |         |    |    +----+---------------- 6
         |    |        |         |         +---+------------------------ 5
         |    |        |         +------------------------------------ 4
         |    |        +---------------------------------------------- 3
         |    +------------------------------------------------------ 2
         +-------------------------------------------------------- 1
```
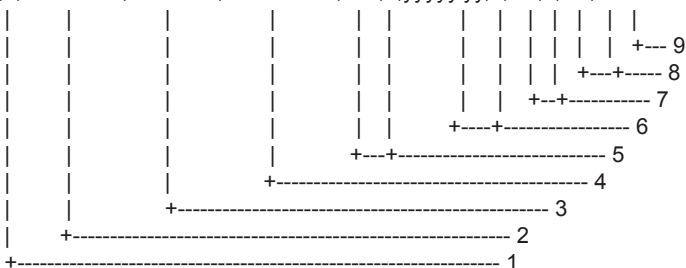
    1. Sequence Number
    2. MMSI of responder
    3. Date: ddmmyyyy
    4. UTC of Position
    5. Latitude - N/S
    6. Longitude - E/W
    7. Course over ground, degrees True
    8. Speed over ground, Knots
    9. Checksum

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

```
$--LR3,x,xxxxxxxxx,c--c,xxxxxx,hhmmss.ss,x.x,x.x,x.x,x.x,x.x,x.x*hh<CR><LF>
        |    |       |     |          |      | | |   | | |  |
        |    |       |     |          |      | | |   | | |  +---- 12
        |    |       |     |          |      | | |   | | +------- 11
        |    |       |     |          |      | | |   | +--------- 10
        |    |       |     |          |      | | |   +------------- 9
        |    |       |     |          |      | | +---------------- 8
        |    |       |     |          |      | +------------------ 7
        |    |       |     |          |      +--------------------- 6
        |    |       |     |          +---------------------------- 5
        |    |       |     +--------------------------------------- 4
        |    |       +--------------------------------------------- 3
        |    +-------------------------------------------------- 2
        +------------------------------------------------------- 1
```
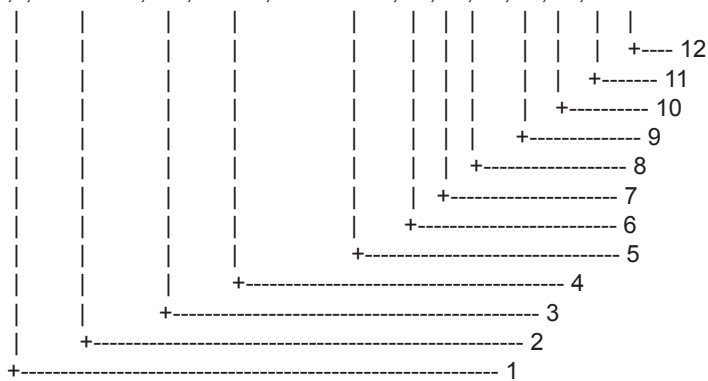
1. Sequence Number
2. MMSI of responder
3. Voyage destination, 1 to 20 characters
4. ETA Date: ddmmyy
5. ETA Time
6. Draught
7. Ship/cargo(ITU-R M.1371, Table 18)
8. Ship length
9. Ship breadth
10. Ship type(ITUR-R M.1371, Table 18)
11. Persons, 0 to 8191
12. Checksum

TXT - Text transmission

```
$--TXT,xx,xx,xx,c--c*hh<CR><LF>
        |  |  |  |    |
        |  |  |  |    |  +--- 5
        |  |  |  +--+----- 4
        |  |  +---------- 3
        |  +------------ 2
        +--------------- 1
```
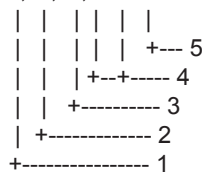
1. Total number of message, 01 to 99
2. Message number, 01 to 99
3. Text identifier
4. Text Message
5. Checksum

VDM - VHF data-link message

```
!--VDM,x,x,x,a,s--s,x*hh<CR><LF>
         | ||  |   |   |  | |
         | ||  |   |   |  | +--- 7
         | ||  |   |   | +----- 6
         | ||  |   +-------- 5
         | || +----------- 4
         | | +------------- 3
         | +--------------- 2
         +----------------- 1
```

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
4. AIS channel
5. Encapsulated ITU-R M.1371 radio message
6. Number of fill-bits, 0 to 5
7. Checksum

VDO - UAIS VHF data-link own-vessel report

```
!--VDO,x,x,x,a,s--s,x*hh<CR><LF>
         | | ||   |  |  |
         | | ||   |  | +--- 7
         | | ||   | +----- 6
         | | ||   +-------- 5
         | | | +----------- 4
         | | +------------- 3
         | +--------------- 2
         +----------------- 1
```

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
4. AIS channel
5. Encapsulated ITU-R M.1371 radio message
6. Number of fill-bits, 0 to 5
7. Checksum

AP-23

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>
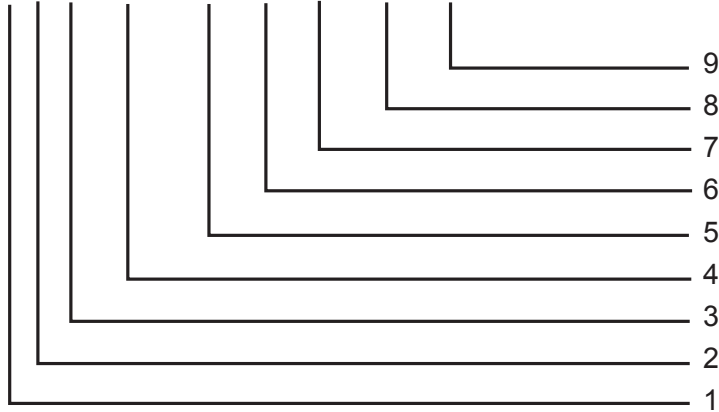
1. Reporting rate, 0-15 1 to 9
2. No. of blue cones, 0-3, 4=B-Flag, 5=unknown (default)
3. Loaded/unloaded, 1=loaded, 2=unloaded, 0=not available (default)
4. Inland draught, 0.01-20.00(m), 0=unknown (default)
5. Air draught, 0.01-40.00(m), 0=unknown (default)
6. No. of tugboats, 0-6,7=unknown (default)
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>
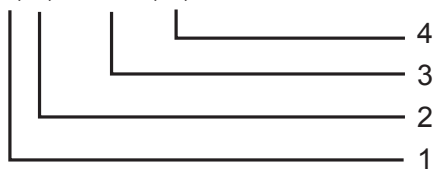
1. Mode (E: Password input, C: Password change)
2. Password level (1: Maintenance password, 2: User password
3. Password (At least 6 characters)
4. Valid time (0 and 1-60 (s))

AP-24

PIWWSSD - Inland waterway static ship data

$PIWWSSD CCCCCCCC, xxxx, xxxx, xxxx, x, x, x, hh\<CR>\<LF>

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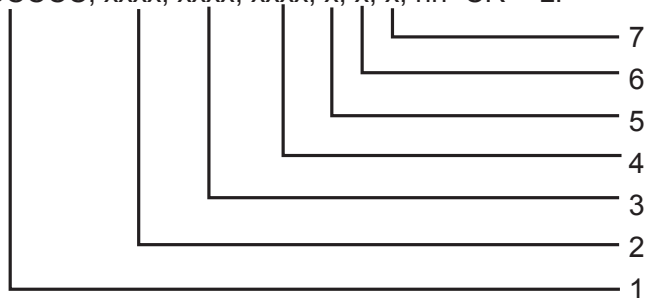
1. ENI no. (00000000-9999 9999)
2. ERI ship type (0-9999)
3. Length of ship (0.0-800.0(m))
4. Beam of ship (0.0-100.0(m))
5. Quality of speed information (1: High, 0: Low)
6. Quality of course information (1: High, 0: Low)
7. Quality of heading information (1: High, 0: Low)

PIWWVSD - Inland waterway voyage data

$PIWWVSD x, x, x, x, xx.xx, xx.xx, x, xxx, xxxx, xxx, hh\<CR>\<LF>

```
                                                  10
                                                9
                                              8
                                            7
                                          6
                                        5
                                      4
                                    3
                                  2
                                1
```
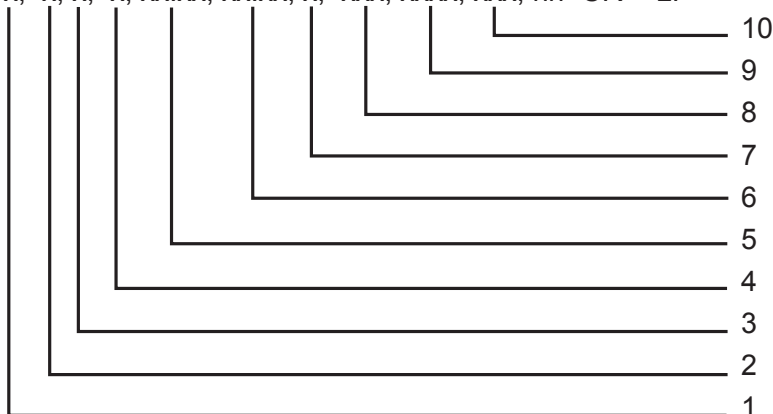
1. Reporting rate. 1: SOLAS reporting rate, 2: 2s, 0:not available (default)
2. Blue sign, 1: Not set, 2: Set, 0: Not available (default)
3. Hazardous cargo 0-3, 4=B-Flag, 5=unknown (default)
4. Loaded/unloaded, 1=loaded, 2=unloaded, 0=not available (default)
5. Static draught, 0.01-20.00(m), 0=unknown (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)

<u>Output sentences</u>

PIWWSPR - Inland AIS security password response

$PIWWSPR a, x, x, x, hh<CR><LF>
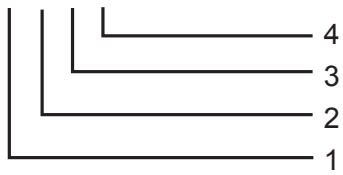
1. Mode (E: Password input, C: Password change)
2. Password level (1: Maintenance password, 2: User password
3. Valid time (0-60 (s))
4. Status (0: Pass, 1: Fail)

AP-26

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	1571375	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
1019	156.95	208	156.4125	1285	157.2875	2087	161.975
1020	157	209	156.4625	1286	157.3375	2088	162.025
1021	157.05	210	156.5125	1287	157.3875	2201	160.6625
1022	157.1	211	156.5625	2001	160.65	2202	160.7125
1023	157.15	212	156.6125	2002	160.7	2203	160.7625
1024	157.2	213	156.6625	2003	160.75	2204	160.8125
1025	157.25	214	156.7125	2004	160.8	2205	160.8625
1026	157.3	215	156.7625	2005	160.85	2206	160.9125
1027	157.35	216	156.8125	2007	160.95	2207	160.9625
1028	157.4	217	156.8625	8	156.4	2218	161.5125
		1218	156.9125	9	156.45	2219	161.5625
1061	156.075	1219	156.9625	10	156.5	2220	161.6125
		1220	157.0125	11	156.55	2221	161.6625
1063	156.175	1221	157.0625	12	156.6	2222	161.7125
1064	156.225	1222	157.1125	13	156.65	2223	161.7625
1065	156.275	1223	157.1625	14	156.7	2224	161.8125
1066	156.325	1224	157.2125	15	156.75	2225	161.8625
67	156.375	1225	157.2625	16	156.8	2226	161.9125
68	156.425	1226	157.3125	17	156.85	2227	161.9625
69	156.475	1227	157.3625	2018	161.5	2228	162.0125
70	156.525	1228	157.4125	2019	161.55	2260	160.6375
71	156.575	1260	156.0375	2020	161.6	2261	160.6875
72	156.625	1261	156.0875	2021	161.65	2262	160.7375
73	156.675	1262	156.1375	2022	161.7	2263	160.7875
74	156.725	1263	156.1875	2023	161.75	2264	160.8375
75	156.775	1264	156.2375	2024	161.8	2265	160.8875
76	156.825	1265	156.2875	2025	161.85	2266	160.9375
77	156.875	1266	156.3375	2026	161.9	2278	161.5375
1078	156.925	267	156.3875	2027	161.95	2279	161.5875
1079	156.975	268	156.4375	2028	162	2280	161.6375
1080	157.025	269	156.4875	2060	160.625	2281	161.6875
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		

1 W power on CH13 and CH67.

AP-28

ERI Codes

Full code	U	Ship name (EN)	AIS code 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
2D	Two Dimensional Positioning
3D	Three Dimensional Positioning
ABM	Addressed Binary Message
ADRS	Address
AIS	Automatic Identification System
ALARM	Alarm
ALT	Altitude
ANT	Antenna
APR	April
AtoN	Aids To Navigation
AUG	August
AUTO	Automatic
AVAIL	Available
BRG	Bearing
CH	Channel
CHG	Change
CLR	Clear
CNCL	Cancel
COG	Course Over the Ground
CONT	Contrast
CPA	Closest Point of Approach
CPU	Central Processing Unit
CRS	Course
D2D	Differential and 2D
D3D	Differential and 3D
DATE	Date
DAY	Day
DECR	Decrease
DEL	Delete
DEST	Destination
DG	Dangerous Goods
DGNSS	Differential GNSS
DGPS	Differential GPS
DIM	Dimmer
DISP	Display
DNG	Danger
DNGR	Danger
DOP	Dilution Of Precision
DPTH	Depth
DSC	Digital Selective Calling
DTL	Detail
E	East
E.G	for example
EMMA	European Multiservice Meteorological Awareness system
ENI	Unique European Vessel Identification Number
ENT	Enter
EPFS	Electronic Position Fixing System

ERI	Electronic Reporting International
ERR	Error
ETA	Estimated Time of Arrival
EXT	External
FEB	February
FIX	Fix
FULL	Full
GND	Ground
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
H	High
HDG	Heading
HECT	Hectometer
HI	High
HS	Harmful Substances (applies to AIS)
HW	Hardware
I/O	Input/Output
ID	Identification
IF	Interface
IFM	International Function Message
IMO	International Maritime Organization
INFO	Information
INT	Internal
INTRD	Intrude
JAN	January
JUL	July
JUN	June
L	Low, left
L/L	Latitude/Longitude
LAT	Latitude
LEN	Length
LOG	Log
LON	Longitude
LR	Long Range
MAR	March
MAX	Maximum
MAY	May
MENU	Menu
MIN	Minimum
MKD	Minimum Keyboard Display
MMSI	Maritime Mobile Services Identity number
MOT	Mother Board
MP	Maritime Pollutant (applies to AIS)
MSG	Message
N	North
NAV	Navigation
NO.	Number
NOV	November
OCT	October
OFF	Off
ON	On
PA	Position Accuracy

AP-31

PI	Presentation Interface, Position Indicator
PORT	Port
POSN	Position
PWR	Power
R	Right
R/B	Range / Bearing
RAIM	Receiver Autonomous Integrity Monitoring
RAIN	Rain
RAM	Random Access Memory
REF	Reference
RFM	Regional Function Message
RNG	Range
ROM	Read Only Memory
ROT	Rate Of Turn
RTA	Requested Time of Arrival
RX	Receive
S	South
S/C	SOG/COG
SAR	Search And Rescue
SDRAM	Synchronous Dynamic RAM
SEL	Select
SEP	September
SET	Set (i.e., set and drift, or setting a value)
SIM	Simulation
SOG	Speed Over the Ground
SOLAS	Safety Of Life At Sea
SPD	Speed
STS	Status
STW	Speed Through the Water
SW	Switch
SYM	Symbol(s)
TCPA	Time to CPA
TEST	Test
TGT	Target
TIME	Time
TOW	Vessel Engaged in Towing Operations
TX	Transmit
UN/LOADED	LOADED or UNLOADED
UTC	Universal Coordinated Time
WARNING	Warning
WAT	Water
WIG	Wing In Ground
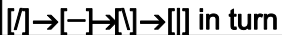
Units

Abbreviation	Unit
°	degree(s)
cm	centimeter
km	kilometer
kn	knot(s)
m	meter
min	minute(s)
NM	Nautical Mile(s)
s	second(s)

Symbols

Symbol	Meaning
◁	Sleeping AIS targets
◁	Selected AIS targets
⊗	AIS-SART (Search and Rescue Transmitter)
⊗	Selected AIS-SART

Icons

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

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FURUNO

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	Position fixing method	All in view, 8-state Kalman filter
3.5	Accuracy	
	GPS	10 m approx, 95% of the time, (HDOP ≤ 4)
	DGPS	5 m approx, 95% of the time
3.6	Tracking velocity	900 kt
3.7	Position-fixing time	Warm start: 36 s, Cold start: 43 s
3.8	Position update interval	1 second typical
3.9	DGPS data receiving	RTCM SC-104 ver-2.1

4   INTERFACE

4.1	Navigation I/O	4 ports, IEC 61162-1(Jul-00) or 61162-2(Sep-98)
	Input	VSD, SSD, ABM, BBM, ACA, ACK, AIR, DTM, GBS, GGA, GLL, GNS, HDT, LRF, LRI, OSD, RMC, ROT, VBW, VTG
	Output	VDM, VDO, ABK, ACA, ALR, TXT, LR1, LR2, LR3, LRF, LRI
4.2	Sensor input	IEC 61162-1(Jul-00): 3 ports and 61162-2(Sep-98): 3 ports DTM, GNS, GLL, GGA, RMC, VBW, VTG, OSD, HDT, GBS, ROT
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

FURUNO

5   POWER SUPPLY

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

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

5.3   AC/DC power supply unit (PR-240, option)

                                 100-115/200-230 VAC, 1 phase, 50/60 Hz

6   ENVIRONMENTAL CONDITION

6.1   Ambient temperature

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

       Other units   -15°C to +55°C

6.2   Relative humidity   95% at 40°C

6.3   Degree of protection

       GPS/VHF antenna   IPX6

       Transponder unit   IP20

       Monitor unit   IP22

6.4   Vibration   IEC 60945 ed.4

7   COATING COLOR

7.1   GPS antenna   N9.5

7.2   Transponder unit   N3.0

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

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FURUNO

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Publication No. DOCQA0143

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.74(69) Annex 3
IMO Resolution MSC.191(79)
ITU-R Recommendations M.1371-3 (Class A), M.825-3, M.1084-3
IALA Technical Clarification of Recommendation ITU-R M.1371-3 (Ed. 2.0)
IEC 61993-2 Ed.1.0: 2001, IEC 61162-1 Ed.3.0: 2007, IEC 61162-2 Ed.1.0: 1998,
IEC 60945 Ed.4.0: 2002, IEC 61108-1 Ed.2.0: 2003, 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/4612/4321548/10 issued by Federal Maritime and Hydrographic Agency(BSH-Cert), The Federal Republic of Germany.

- EC quality system (Module D) certificate No. BSH/4613/02205/1413/09 issued by Federal Maritime and Hydrographic Agency, The Federal Republic of Germany.

This declaration is issued according to the provisions of European Council Directive 2008/67/EC on marine equipment modified by Commission Directive 2009/26/EC.

On behalf of Furuno Electric Co., Ltd.

Takahiko Kusuda
Manager, QMS Secretariat
Quality Assurance Department

Nishinomiya City, Japan
April 9, 2010

(Place and date of issue)

(name and signature or equivalent marking of authorized person)