IMPORTANT NOTICES

General

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

How to discard this product

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

How to discard a used battery

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

In the European Union

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

In the USA

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

In the other countries

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

**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 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.

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

**WARNING**

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.
FOREWORD

A Word to the Owner of the FA-150

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

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

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

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

Thank you for considering and purchasing FURUNO.

Features

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

The FA-150 consists of VHF and GPS antennas, a transponder unit, a monitor unit, and several associated units. The transponder contains a VHF transmitter, two TDMA receivers on two parallel VHF channels, a DSC channel 70 receiver, interface, communication processor, and internal GPS receiver. The internal GPS is a 12-channel all-in-view receiver with a differential capability, and provides UTC reference for system synchronization to eliminate clash among multiple users. It also gives position, COG and SOG when the external GPS fails.
The main features are

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

GPS antenna
GSC-001
GPA-017S

VHF antenna

GPS/VHF combined antenna
GVA-100

Distributor unit
DB-1

 Either

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

12-24 VDC

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

---

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Weather Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSC-001</td>
<td>Exposed to the weather</td>
</tr>
<tr>
<td>GVA-100</td>
<td>Exposed to the weather</td>
</tr>
<tr>
<td>FA-1501</td>
<td>Protected from the weather</td>
</tr>
<tr>
<td>FA-1502</td>
<td>Protected from the weather</td>
</tr>
<tr>
<td>DB-1</td>
<td>Protected from the weather</td>
</tr>
<tr>
<td>PR-240</td>
<td>Protected from the weather</td>
</tr>
</tbody>
</table>
## PROGRAM NUMBER

<table>
<thead>
<tr>
<th>PCB</th>
<th>Location</th>
<th>Program No.</th>
<th>Version No.</th>
<th>Date of Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU (24P0062)</td>
<td>Monitor Unit</td>
<td>2450021 (Prog)</td>
<td>01.**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2450020 (Boot)</td>
<td>01.**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>02.**</td>
<td>September 2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>02.**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2450021 (Prog)</td>
<td>03.**</td>
<td>May 2012</td>
</tr>
<tr>
<td>MAIN (24P0035)</td>
<td>Transponder Unit</td>
<td>2450018</td>
<td>01.**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>485026</td>
<td>40**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>GPS Receiver</td>
<td></td>
<td>02.**</td>
<td>September 2009</td>
</tr>
<tr>
<td></td>
<td>Transponder Unit</td>
<td></td>
<td>03.**</td>
<td>May 2012</td>
</tr>
</tbody>
</table>

**: 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.

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

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.
This page intentionally left blank.
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.

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:

<table>
<thead>
<tr>
<th>Ship’s navigation status</th>
<th>Nominal reporting interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship at anchor and not moving faster than 3 kn</td>
<td>3 minutes</td>
</tr>
<tr>
<td>Ship at anchor and moving faster than 3 kn</td>
<td>10 seconds</td>
</tr>
<tr>
<td>Ship speed 0-14 kn</td>
<td>10 seconds</td>
</tr>
<tr>
<td>Ship speed 0-14 kn and changing course</td>
<td>3 1/3 seconds</td>
</tr>
<tr>
<td>Ship speed 14-23 kn</td>
<td>6 seconds</td>
</tr>
<tr>
<td>Ship speed 14-23 kn and changing course</td>
<td>2 seconds</td>
</tr>
<tr>
<td>Ship speed faster than 23 kn</td>
<td>2 seconds</td>
</tr>
<tr>
<td>Ship speed faster than 23 kn and changing course</td>
<td>2 seconds</td>
</tr>
</tbody>
</table>
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)
   - **CONTRAST** (0 ~ 63)
   - **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.

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.

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.

NOTE: For INLAND AIS mode, the USER SETTINGS menu has two pages. See section 2.9 to 2.11 for your reference.
1. OPERATION

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.

![Options window]

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

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.

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.

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

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

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

3. Press ► to show the DESTINATION sub-menu.
4. NEW is 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
***************(0/3)
[NEW?]
COTE D'IVOIRE
SAN FRANCISCO
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.
### 1. OPERATION

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

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

14. Press ► to display the DRAUGHT&PERSONS sub-menu.  
15. DRAUGHT is 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.
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

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.)
- **DANGEROUS (TARGET) LIST** (See section 1.7.3.)
  - When a dangerous target exists, the dangerous target list has priority.
- **OWN STATIC DATA 1**
- **OWN STATIC DATA 2**
- **OWN STATIC DATA 3**
- **OWN STATIC DATA 4**
- **OWN STATIC DATA 5**
- **OWN DYNAMIC DATA**
- **OWN SHIP'S DYNAMIC DATA** (See section 1.7.4.)
- **ALARM STATUS**
- **ALARM STATUS DISPLAY** (See section 3.5.)

Switch between these displays with ▲▼◄►.
### 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.

<table>
<thead>
<tr>
<th>Ship’s navigation status</th>
<th>Target declared as lost target after;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class A</strong></td>
<td></td>
</tr>
<tr>
<td>Ship at anchor or moored and not moving faster than 3 kn</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Ship at anchor or moored and moving at more than 3 kn</td>
<td>50 seconds</td>
</tr>
<tr>
<td>0-14 kn speed</td>
<td>50 seconds</td>
</tr>
<tr>
<td>0-14 kn speed with course change</td>
<td>50 seconds</td>
</tr>
<tr>
<td>14-23 kn speed</td>
<td>30 seconds</td>
</tr>
<tr>
<td>14-23 kn speed with course change</td>
<td>30 seconds</td>
</tr>
<tr>
<td>Speed higher than 23 kn</td>
<td>10 seconds</td>
</tr>
<tr>
<td>Speed higher than 23 kn with course change</td>
<td>10 seconds</td>
</tr>
</tbody>
</table>

| **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.

<table>
<thead>
<tr>
<th>TARGET LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>FURUNO</td>
</tr>
<tr>
<td>&quot;BASE&quot;</td>
</tr>
<tr>
<td>&quot;SAR*&quot;</td>
</tr>
<tr>
<td>INTREP</td>
</tr>
</tbody>
</table>

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.
1. OPERATION

Ship info display, mobile class A

- **MMSI**: 431099806
- **NAME**: FURUNO
- **CALLSIGN**: ZL6DEF1
- **IMO NO.**: 12345678
- **CPA**: 0.02 NM
- **TCPA**: 0'17"

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

- **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**:

- **Type of ship**:
- **Status description**:

- **Draught**: 6.0m
- **NAV STATUS**: 0

- **Destination**: TOKYO
- **ETA**: 26/JUN 15:30 UTC

**DNGR** appears when CPA/TCPA of target is less than CPA/TCPA setting. If no signal is received from target, **LOST** appears. 640 later the target’s data is erased.
1. OPERATION

Ship info display, mobile class B

[SHIP INFO] 1/4
MMSI [B]: 431099806
NAME: FURUNO
CALL SIGN: ZLBDEF
VENDOR ID: FEC001
CPA: 0.02 NM
TCPA: 0.17°

MMSI No.
Name
Call sign
AIS mfg. ID code
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.

[SHIP INFO] 2/4
LAT: 34°00.5442’N
LON: 134°30.3883’E
SOG: 17.8 kn
COG: 213.5°
HDG: 278° PA: H
R/B: 25.12 NM/351.5°

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

[SHIP INFO] 3/4

A: 100 m
B: 23 m
C: 6 m
D: 6 m
LENGTH: 123 m
BEAM: 12 m

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

[SHIP INFO] 4/4
TYPE OF SHIP: 25

****TYPE DETAIL****
CARGO SHIPS
ALL SHIPS OF THIS TYPE

Type No.
Type description
1. OPERATION

**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]**
- 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°

**SAR (Search and Rescue) 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.

**[SAR INFO]**
- MMSI: 431099806
- CPA: 0.02 NM
- TCPA: 0°17′

**[SAR INFO]**
- 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°
**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.
1. OPERATION

AtoN (Aid to Navigation) info display

[AtoN INFO] 1/4
MMSI: 431099808
NAME: FURUNO
CPA: 0.02 NM
TCPA: 0°17'

[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.

[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

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

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

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

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

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

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

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.

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.
<table>
<thead>
<tr>
<th>OWN STATIC DATA</th>
<th>1/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSI</td>
<td>123456789</td>
</tr>
<tr>
<td>NAME</td>
<td>FURUNO VOYAGER</td>
</tr>
<tr>
<td>CALL SIGN</td>
<td>CAL0001</td>
</tr>
<tr>
<td>IMO NO.</td>
<td>623498071</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OWN STATIC DATA</th>
<th>2/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESTINATION</td>
<td>TOKYO</td>
</tr>
<tr>
<td>ETA</td>
<td>15/JUL 11:22 UTC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OWN STATIC DATA</th>
<th>3/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRAUGHT</td>
<td>12.1 m</td>
</tr>
<tr>
<td>NAV STATUS</td>
<td>0</td>
</tr>
<tr>
<td><strong>STATUS DETAIL</strong></td>
<td>UNDER WAY USING ENGINE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OWN STATIC DATA</th>
<th>4/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH</td>
<td>95 m</td>
</tr>
<tr>
<td>BEAM</td>
<td>30 m</td>
</tr>
<tr>
<td>ANT POSN INT</td>
<td>EXT</td>
</tr>
<tr>
<td>LENGTH A</td>
<td>75 m 77 m</td>
</tr>
<tr>
<td>LENGTH B</td>
<td>20 m 18 m</td>
</tr>
<tr>
<td>LENGTH C</td>
<td>15 m 18 m</td>
</tr>
<tr>
<td>LENGTH D</td>
<td>15 m 12 m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OWN STATIC DATA</th>
<th>5/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. OF PERSONS</td>
<td>12</td>
</tr>
<tr>
<td>TYPE OF SHIP</td>
<td>36</td>
</tr>
<tr>
<td>CLASS</td>
<td>A</td>
</tr>
<tr>
<td><strong><strong>TYPE DETAIL</strong></strong></td>
<td>SAILING</td>
</tr>
</tbody>
</table>

MMSI no. Name of ship

Call sign

IMO no.

Destination

Estimated date of arrival, estimated time of arrival

Draught

Navigation status no.

Navigation status description

Length of convoy

Beam of convoy

INT: Internal GPS, EXT: External GPS

Distance from bow to GPS antenna position

Distance from stern to GPS antenna position

Distance from port to GPS antenna position

Distance from starboard to GPS antenna position

Number of persons

Ship type

Ship class

Type detail
1.7.5 Dynamic data display

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

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

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

1.7.6 Alarm status display

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

1.8 Messages

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

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

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

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

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

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

5. ADRS TYPE is selected; press the ENT key.

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

7. For BROAD CAST, go to step 8. For ADRS CAST, “MMSI” is selected; press the ENT key, enter MMSI number of the vessel that you want to receive your message, then press the ENT key.

8. MSG TYPE is selected; press the ENT key.

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

10. CHANNEL is selected; press the ENT key.

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

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

16. Use the CursorPad to enter your message.
17. Press the ENT key to return to the CREATE MSG sub-menu.
18. Select SEND MSG then press the ENT key.

   The prompt shown right appears.

   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**

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOW SENDING.</td>
<td>Message is being sent.</td>
</tr>
<tr>
<td>SEND MESSAGE COMPLETE. PRESS ANY KEY</td>
<td>Transmission of message completed. (MMSI is additionally shown in case of addressed message.)</td>
</tr>
<tr>
<td>SEND MESSAGE UNSUCCESSFUL. PRESS ANY KEY</td>
<td>Message could not be sent.</td>
</tr>
<tr>
<td>SEND MESSAGE UNSUCCESSFUL. MMSI: XXXXXXXXX</td>
<td>Message sent successfully, however there is no reply from receiver of message.</td>
</tr>
<tr>
<td>NOW WAITING RESPONSE. PRESS ANY KEY</td>
<td>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.</td>
</tr>
</tbody>
</table>

1.8.2 Receiving messages

How to view a received message

When a message is received, the window shown right appears on the display. To view the contents of the message follow the procedure below.
1. Press any key to erase the message.
2. Press the MENU key to show the main menu.
3. Select MSG then press the ENT key.
4. Select RX LOG then press the ENT key.

**RX LOG**

03/MAY 13:25 NEW
* [UTC] FROM: 4310199111
28/MAR 03:43 [UTC] FROM: 431099111
22/MAR 18:00 [UTC] FROM: 431099111
1/3[▼] MSG[ENT] QUIT[MENU]

- Date and time message received ("NEW" displayed for unread message)
- MMSI of sender

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

**RX 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
LONG RANGE RECEIVED MSG CPA/TCPA ALARM

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

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: 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.

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.

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.
3. Select VIEW CHANNEL then press the **ENT** key.
4. Press the **DISP** key to close the display.
1. OPERATION

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.

SELECT NO.: File number, 0-9. In order of distance from own ship, from closest to furthest.
TIME: Data and time equipment controlled by external source.
MMSI: MMSI displayed for control by DSC or shore-based AIS. Dashes or “EMPTY” (no data) otherwise.
TYPE: How channel is controlled: AIS, AIS message; HIGH SEA (for reference setting), PI, ECDIS or PC; DSC, DSC; MANUAL, manual control

Note: MMSI and TYPE must be set to other than “HIGH SEA” to edit.
4. Select desired file number from SELECT NO.
5. Press the ENT key to show details.

6. POWER is selected; press the ENT key to show the channel power options.
7. Select power desired then press the **ENT** key.
8. CH NO. CH-A is 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.

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

<table>
<thead>
<tr>
<th>Mode</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH-A</td>
<td>TX/RX</td>
<td>TX/RX</td>
<td>RX</td>
<td>RX</td>
<td>RX</td>
<td>UNUSED</td>
</tr>
<tr>
<td>CH-B</td>
<td>TX/RX</td>
<td>RX</td>
<td>TX/RX</td>
<td>RX</td>
<td>RX</td>
<td>RX</td>
</tr>
</tbody>
</table>

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.

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 (southwest point) of the AIS operating area then press the **ENT** key.

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

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

24. Press **◄** to select YES then press the **ENT** key.

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

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

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

1.10 **Enabling/Disabling Alarm Buzzer, Key Beep**

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

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

   ![USER SETTINGS Menu]

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

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

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

1.11 **Long Range**

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

1.11.1 **LR MODE (Long Range Mode)**

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

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

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

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

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

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

**Manual reply**

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

**Automatic reply**

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

---

**Codes used in long range messages**

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

---

1.11.2 **MSG27 TX**

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

1. Press the **MENU** key to open the menu.
2. Select **USER SETTINGS** then press the **ENT** key.
3. Select **LONG RANGE** then press the **ENT** key.
4. Select **MSG27 TX** then press the **ENT** key.

![Message settings menu]

5. MSG27 TX is selected; press the **ENT** key.

6. Select **ON** or **OFF** as appropriate then press the **ENT** key.
   
   **ON** sends your ship's position to a satellite via the AIS VHF communication link.

7. Press the **DISP** key to close the menu.
1.12 Pilot Plug (Option)

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

Baudrate: 38400 bps

**Note:** The following setting is required for the FA-150. If the pilot does not function, check these settings.

<table>
<thead>
<tr>
<th>Menu</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>[INITIAL SETTINGS]-</td>
<td>[MODE]: [EXT DISPLAY]</td>
</tr>
<tr>
<td>[VIEW I/O PORT]-</td>
<td></td>
</tr>
<tr>
<td>[VIEW COM PORT]-</td>
<td></td>
</tr>
<tr>
<td>[VIEW COM4]</td>
<td></td>
</tr>
</tbody>
</table>

Type: AMP 206486-1, 206486-2 (9-pin, male)

Signal connection:
- TX-A ------ Pin 1
- TX-B ------ Pin 4
- RX-A ------ Pin 5
- RX-B ------ Pin 6
- SHIELD ------ Pin 9

Examples of connectors
1. OPERATION

1.13 Viewing Initial Settings

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

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

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

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

   ![Activation Screen]

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. INLAND AIS

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 Menu]

   NAV STATUS:
   AIS MODE:       SOLAS
   ***STATUS DETAIL***
   AT ANCHOR

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

   ![AIS Mode Selection]

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

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

   ![NAV STATUS Menu]

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

   ![DESTINATION Menu]

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

   ![DESTINATION Menu - Enter New Destination]
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.

! $ * \n
**Note 2:** Destinations can be selected, edited and deleted from the DESTINATION sub-menu. See section 1.5.

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

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

11. SOLAS DRAUGHT is selected; press the **ENT** key.
12. Enter SOLAS draught (tenths place resolution) then press the **ENT** key.
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.

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.

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.

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](image)

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](image)

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.

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
NAME : FURUNO VOYAGER
CALL SIGN: ZL6DEF1
IMO NO. : 9241062*
ENI : 1654321
AIS MODE : SOLAS

[STATIC DATA] 2/9 |
SOLAS DESTINATION: *
* * * * * * * * * * * * *
MAINZ

ETA: 15/JUL 11:22 UTC*

[STATIC DATA] 3/9 |
INLAND DESTINATION
COUNTRY CODE : DE
LOCATION CODE : MAI
FAIRWAY NO. : 03901
TERMINAL CODE : 00FRB
FAIRWAY HECT : 00000
ETA: 15/JUL 11:22 UTC*

[STATIC DATA] 4/9 |
NAV STATUS: 01
UN/LOADED: UNLOADED
***STATUS DETAIL***
AT ANCHOR

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

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

(Continued on next page)
2. INLAND AIS

(Continued from previous page)

[STATIC DATA] 5/9
HAZARDOUS CARGO
NUMBER OF CONES 3
ANT POSN INT EXT
LENGTH A : 75 m 77 m
LENGTH B : 20 m 18 m
LENGTH C : 15 m 18 m
LENGTH D : 15 m 12 m

- Hazardous cargo
- No. of cones (0-3), B-FLAG, or UNKNOWN
- INT: Internal GPS, EXT: External GPS
- Distance from bow to GPS antenna position
- Distance from stem to GPS antenna position
- Distance from port to GPS antenna position
- Distance from starboard to GPS antenna position

[STATIC DATA] 6/9
LEN[SHIP]: 95,0m
BEAM[SHIP]: 30,0m
LEN[CONVOY]: 95m
BEAM[CONVOY]: 30m
SOLAS DRAUGHT: 25,5m
INLAND DRAUGHT: 25,50m

- Length of ship
- Beam of ship
- Length of convoy (INT ANT POSN OR EXT ANT POSN, total of A+B)
- Beam of convoy (INT ANT POSN OR EXT ANT POSN, total of C+D)
- SOLAS draught
- Inland draught

[STATIC DATA] 7/9
AIR DRAUGHT: 40,00m
CREW: 30
PASSENGER: 500
SHIPBOARD PERSONNEL: 75
NO. OF PERSONS: 605

- Air draught
- No. of crew
- No. of passengers
- No. of shipboard personnel
- Total no. of persons

[STATIC DATA] 8/9
TYPE OF SHIP: 71
NUMBER OF TUGBOATS: 1

- Type of ship
- Number of assisting tugboats

****TYPE DETAIL****
CARGO SHIPS
CARRYING
DG, HS, OR MP(X)

[STATIC DATA] 9/9
ERI CODE: 8000

- ERI code no.
- ERI code no, description

****CODE DETAIL****
VESSEL
TYPE UNKNOWN
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.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Speed over ground</th>
<th>Course over ground, Heading</th>
<th>Rate of turn</th>
</tr>
</thead>
</table>

* 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

Update rate of dynamic ship information

*Ship’s dynamic conditions and nominal reporting interval*

<table>
<thead>
<tr>
<th>Ship’s dynamic conditions</th>
<th>Nominal reporting interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship at anchor and not moving faster than 3 kn</td>
<td>3 minutes</td>
</tr>
<tr>
<td>Ship at anchor and moving faster than 3 kn</td>
<td>10 seconds</td>
</tr>
<tr>
<td>Ship operating in SOLAS mode, moving 0-14 kn</td>
<td>10 seconds</td>
</tr>
<tr>
<td>Ship operating in SOLAS mode, moving 0-14 kn speed and changing course</td>
<td>3 1/3 seconds</td>
</tr>
<tr>
<td>Ship operating in SOLAS mode, moving 14-23 kn</td>
<td>6 seconds</td>
</tr>
<tr>
<td>Ship operating in SOLAS mode, moving 14-23 kn and changing course</td>
<td>2 seconds</td>
</tr>
<tr>
<td>Ship operating in SOLAS mode, moving faster than 23 kn</td>
<td>2 seconds</td>
</tr>
<tr>
<td>Ship operating in SOLAS mode, moving faster than 23 kn and changing course</td>
<td>2 seconds</td>
</tr>
<tr>
<td>Ship operating in inland waterway mode</td>
<td>Assigned between 2 seconds and 10 minutes</td>
</tr>
</tbody>
</table>
2. INLAND AIS

2.6 Details Ship Display (Mobile Class A)

See section 1.7.2 for how to show this display.

<table>
<thead>
<tr>
<th>[SHIP INFO]</th>
<th>1/9</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSI [A]</td>
<td>431099806</td>
</tr>
<tr>
<td>NAME</td>
<td>FURUNO*</td>
</tr>
<tr>
<td>CALL SIGN</td>
<td>ZL6DEF1**1</td>
</tr>
<tr>
<td>IMO NO.</td>
<td>9241062</td>
</tr>
<tr>
<td>ENI</td>
<td>1654321**1, **2</td>
</tr>
<tr>
<td>BLUE SIGN</td>
<td>YES</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>[SHIP INFO]</th>
<th>2/9</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAT</td>
<td>51°55.0213’N</td>
</tr>
<tr>
<td>LON</td>
<td>4°30.0012’E</td>
</tr>
<tr>
<td>SOG</td>
<td>17.8kn</td>
</tr>
<tr>
<td>COG</td>
<td>213.5°</td>
</tr>
<tr>
<td>HDG</td>
<td>278° PA: H</td>
</tr>
<tr>
<td>R/B</td>
<td>25.12 NM/351.5°</td>
</tr>
<tr>
<td>ROT</td>
<td>0.1°/min</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>[SHIP INFO]</th>
<th>3/9</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPA</td>
<td>0.12NM</td>
</tr>
<tr>
<td>TCPA</td>
<td>0’23”</td>
</tr>
<tr>
<td>NAV STATUS</td>
<td>10</td>
</tr>
<tr>
<td><em><strong>STATUS DETAIL</strong></em></td>
<td>RESERVED FOR WING IN GROUND (WING)</td>
</tr>
</tbody>
</table>

CPA TCPA Navigation status Navigation status details

<table>
<thead>
<tr>
<th>[SHIP INFO]</th>
<th>4/9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOLAS DRAUGHT:</td>
<td>10.0m</td>
</tr>
<tr>
<td>INLAND DRAUGHT:</td>
<td>10.00m</td>
</tr>
<tr>
<td>ANT LENGTH A</td>
<td>75m</td>
</tr>
<tr>
<td>ANT LENGTH B</td>
<td>20m</td>
</tr>
<tr>
<td>ANT LENGTH C</td>
<td>15m</td>
</tr>
<tr>
<td>ANT LENGTH D</td>
<td>15m</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>[SHIP INFO]</th>
<th>5/9</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEN[SHIP]:</td>
<td>95.0m</td>
</tr>
<tr>
<td>BEAM[SHIP]:</td>
<td>30.0m</td>
</tr>
<tr>
<td>LEN[CONVOY]:</td>
<td>95m</td>
</tr>
<tr>
<td>BEAM[CONVOY]:</td>
<td>30m</td>
</tr>
<tr>
<td>HAZARDOUS CARGO</td>
<td>NUMBER OF CONES 1</td>
</tr>
<tr>
<td>UN/LOADED:</td>
<td>UNLOADED</td>
</tr>
</tbody>
</table>

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)
2. INLAND AIS

(Continued from previous page)

[SHIP INFO] 6/9
TYPE OF SHIP: 71

***TYPE DETAIL***
FUTURE USE
CARGO SHIP
CARRYING
DG, HS, OR MP(X)

[SHIP INFO] 7/9
ERI CODE: 8080

**CODE DETAIL***
MOTOR FREIGHTER
WITH TANKER

[SHIP INFO] 8/9
SENSOR QUALITY
SPEED: HIGH
COURSE: LOW
HEADING: HIGH
DESTINATION
ROTTERDAM
ETA: 15/JUL 17:21 UTC

[SHIP INFO] 9/9
CREW: 10
PASSENGER: 100
SHIPBOARD PERSONNEL: 20
NO. OF PERSONS: 130

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.
2.7 Inland AIS Specific Messaging

2.7.1 Text message

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

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

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

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

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

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

```
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 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**

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOW SENDING</td>
<td>Message is being sent.</td>
</tr>
<tr>
<td>SEND MESSAGE COMPLETE. PRESS ANY KEY.</td>
<td>Transmission of message completed. (MMSI is additionally shown in case of addressed message.)</td>
</tr>
<tr>
<td>SEND MESSAGE UNSUCCESSFUL. PRESS ANY KEY</td>
<td>Message could not be sent.</td>
</tr>
<tr>
<td>SEND MESSAGE UNSUCCESSFUL. MMSI: XXXXXXXXXX</td>
<td>Message sent successfully, however there is no reply from receiver of message.</td>
</tr>
<tr>
<td>NOW WAITING RESPONSE. PRESS ANY KEY.</td>
<td>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.</td>
</tr>
</tbody>
</table>
2.7.2 ETA and RTA messages

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

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

Sending an ETA message

1. Press the [MENU] key to open the menu.
2. Select MSG then press the [ENT] key.
3. Select ETA/RTA then press the [ENT] key.
4. CREATE MSG is selected; press the [ENT] key.
5. SET MSG TYPE is selected; press the [ENT] key.
2. INLAND AIS

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.

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.

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.

16. COUNTRY CODE is selected; press the ENT key. Enter the UN country code of your destination, referring to ISO 3166, then press the ENT key.
17. Enter location code, fairway no., terminal code, and fairway hectometre, referring to the ERI (Electronic Reporting International) Guide Part IV Annex 2 for examples.
   Note: To see the results of an entry, show the SET DESTINATION screen.
18. Press the **MENU** key twice to return to the CREATE MSG menu.
19. Select SET ETA then press the **ENT** key.

The date and time format are shown as UTC (Coordinated Universal Time) or LT (Local Time).

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.

When the time difference is 00:00, [UTC] is shown near the time indication. Otherwise, [LT] is shown.
5. Select the message then press the **ENT** key.

### 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.

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

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

### 2.7.3 No. of persons message

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

1. Press the **MENU** key to open the menu.
2. Select MSG then press the **ENT** key.
3. Select NO. OF PERSONS then press the **ENT** key.
4. CREATE MSG is selected; press the **ENT** key.
5. SET MSG TYPE is selected; press the **ENT** key.
6. ADRS TYPE is selected; press the ENT key.

7. Select ADRS CAST to send a message to a specific AIS-equipped ship or authority, or BROAD CAST to send a message to all AIS-equipped ships within broadcasting range. Press the ENT key.

8. For BROAD CAST, go to step 9. For ADRS CAST, select MMSI then press the ENT key. Enter the MMSI of the vessel which you want to receive your message then press the ENT key.

9. Select TYPE then press the ENT key.

10. Select SOLAS(IFM16) or INLAND(RFM55) as applicable then press the ENT key.

   SOLAS(IFM16): Send no. of persons.
   INLAND(RFM55): Send no. of crew, passengers and shipboard personnel.

11. CHANNEL is selected; press the ENT key.

12. Select the channel to use to send the message then press the ENT key.

13. RETRY TIMES is selected; press the ENT key.

14. Enter the number of times to re-send the message (if the first transmission is unsuccessful) then press the ENT key.

15. Press the MENU key to return to the CREATE MSG menu.

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

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

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

The information includes the following:

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

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

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

The EMMA warning message has three pages and the 1st page looks something like the left-hand screen on the next page. To view the other screens, press ►.
### Item Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>Fi: Fire in the Forests</td>
</tr>
<tr>
<td></td>
<td>FO: Fog</td>
</tr>
<tr>
<td></td>
<td>FL: Flood</td>
</tr>
<tr>
<td></td>
<td>HT: High Temperature</td>
</tr>
<tr>
<td></td>
<td>LT: Low Temperature</td>
</tr>
<tr>
<td></td>
<td>RA: Rain</td>
</tr>
<tr>
<td></td>
<td>SN: Snow and Ice</td>
</tr>
<tr>
<td></td>
<td>TH: Thunderstorm</td>
</tr>
<tr>
<td></td>
<td>WI: Wind</td>
</tr>
</tbody>
</table>

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] 1/2
COUNTRY CODE: DE
GAUGE ID: 1001
WATER LEVEL: 65.43m
GAUGE ID: 1002
WATER LEVEL: 55.43m
GAUGE ID: 1003
WATER LEVEL: -45.43m
```

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.

```
[TX LOG]
31/APR 13:25 OK
27/MAR 03:43 OK
19/MAR 18:00 OK
```

**NOTE**: Time format is shown as UTC (Coordinated Universal Time) or LT (Local Time).
5. Select a message then press the ENT key. Below are sample TX log messages.

![TX addressed message]

![TX broadcast message]

![ETA message (page 1)]

![ETA message (page 2)]

![SOLAS IFM16 no. of persons message]

![INLAND RFM55 no. of persons message]

6. Press the MENU key to close the message.

**RX logs**

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

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

![RX log for text messages]
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.

\[
\begin{array}{|c|}
\hline
[RTA LOG] 2/2 \\
STATUS \\
LIMITED OPERATION \\
RTA: 05/JUN 12:32 UTC \\
\hline
\end{array}
\quad
\begin{array}{|c|}
\hline
[RTA LOG] 2/2 \\
COUNTRY CODE: DE \\
LOCATION CODE: TRI \\
FAIRWAY NO.: 01234 \\
TERMINAL CODE: 11111 \\
FAIRWAY HECTOMETRE 01000 \\
\hline
\end{array}
\]

**RTA message (page 1)**

\[
\begin{array}{|c|}
\hline
[RTA LOG] 2/2 \\
WILL CHANGE COURSE TO 352 DEGREES AT 13:10 APR 10. \\
\hline
\end{array}
\quad
\begin{array}{|c|}
\hline
[RTA LOG] 2/2 \\
STORM WARNING FOR SAN FRANCISCO AREA. \\
\hline
\end{array}
\]

**RX addressed message**

**RX broadcast message**

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

2.8 **Viewing Initial Settings**

The INITIAL SETTNGS 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.
2.9 Selecting Menu Language

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

1. Press the MENU key to open the menu.
2. Select USER SETTINGS then press the ENT key.
3. Select LANGUAGE (on page 2) then press the ENT key.
4. Select the desired language then press the ENT key.
5. Press the DISP key to close the menu.
2.10 Selecting Units of Measurement

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

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

   - [RANGE CPA UNITS] [SOG UNITS] [LENGTH UNITS]
     - NM km
     - km km/h
     - m dm

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

2.11 Setting for Time Difference

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

1. Press the MENU key to open the menu.
2. Select USER SETTINGS then press the ENT key.
3. Select TIME DIFF (on page 2) then press the ENT key.

4. Select the desired time difference then press the ENT key. You can change the value with ▲ or ▼, the digit with ► or ◄. The setting range is -14:00 to +14:00. If you set the value outside the range, the error message appears shown below. Press any key to close the message.

   Error Message

5. Press the DISP key to close the menu.

NOTE: When there is no time data from GPS, days in a leap year may be shifted.
3. MAINTENANCE, TROUBLESHOOTING

### WARNING

**ELECTRICAL SHOCK HAZARD**

Do not open the equipment.

Only qualified personnel should work inside the equipment.

### NOTICE

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

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

3.1 Maintenance

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

**Maintenance items**

<table>
<thead>
<tr>
<th>Item</th>
<th>Check point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectors</td>
<td>Check that all connectors on the rear panel of the transponder unit and monitor unit are firmly connected.</td>
</tr>
<tr>
<td>Cabling</td>
<td>Check cabling for damage. Replace if damaged.</td>
</tr>
<tr>
<td>Ground terminal</td>
<td>Check the ground terminal on the monitor unit and transponder unit for rust. Clean if necessary.</td>
</tr>
<tr>
<td>Ground wire</td>
<td>Check that the ground wire on the monitor unit and transponder unit is firmly fastened.</td>
</tr>
<tr>
<td>Monitor unit, Transponder unit</td>
<td>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.</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Part</th>
<th>Type</th>
<th>Code No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuse</td>
<td>FGBO-A 3A AC125V</td>
<td>000-549-063</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td></td>
</tr>
<tr>
<td>Cannot turn on the power.</td>
<td>• Check that the power connector is firmly fastened.</td>
</tr>
<tr>
<td></td>
<td>• Check the power supply.</td>
</tr>
<tr>
<td>Transmitting, receiving messages</td>
<td></td>
</tr>
<tr>
<td>Cannot transmit or receive.</td>
<td>• Check that the VHF antenna cable is firmly fastened.</td>
</tr>
<tr>
<td></td>
<td>• Check the VHF antenna for damage.</td>
</tr>
<tr>
<td></td>
<td>• For TX message, try different TX channel.</td>
</tr>
<tr>
<td></td>
<td>(operating sequence: <strong>MENU</strong>, <strong>MSG</strong>, CREATE <strong>MSG</strong>, SET MSG TYPE, CHANNEL)</td>
</tr>
<tr>
<td>Can transmit but message is sent to wrong party.</td>
<td>• 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: <strong>MENU</strong>, <strong>MSG</strong>, CREATE <strong>MSG</strong>, SET MSG TYPE, ADRS TYPE and MMSI)</td>
</tr>
<tr>
<td>Position data</td>
<td></td>
</tr>
<tr>
<td>No position data</td>
<td>• Check the GPS antenna for damage.</td>
</tr>
<tr>
<td></td>
<td>• Check the GPS antenna cable and its connectors.</td>
</tr>
</tbody>
</table>

3.4 Diagnostics

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

3.4.1 Monitor unit test

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

1. Press the **MENU** key to open the main menu.
2. Select DIAGNOSTICS then press the **ENT** key.
3. MONITOR TEST is selected; press the ENT key. The test program automatically proceeds in the sequence shown below.

XX.XX = Program version no.

(a) The first screen in the test shows boot no. and program no. The message “PUSH KEY” prompts you to test the keys. Press each key (except the PWR key) and arrows on the CursorPad one by one. The name of the pressed key or arrow appears next to “KEY” if the control is functioning normally.

(b) The ROM, SDRAM and (I/O)PORT (special test connector required, otherwise “NG” appears) are checked. The results of the ROM/SDRAM check are shown as OK or NG (No Good). If NG appears, try the test again. If NG still appears, contact your dealer for advice. The contrast and dimmer settings are automatically changed. Check that their setting indications are reasonable.

(c) The screen announces the start of the LCD check.

(d) The screen turns black.

(e) The screen turns white.

4. The test is repeated. To escape from the test and return to the DIAGNOSTICS menu, press the MENU key three times when PUSH KEY is displayed.
3.4.2 Transponder test

The transponder test consists of 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.
3. MAINTENANCE, TROUBLESHOOTING

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. MAINTENANCE, TROUBLESHOOTING

### 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.

```
[POWER ON/OFF HISTORY]
PWR-ON 17/MAY/2009 05:35:54
PWR-OFF 17/MAY/2009 04:56:57
PWR-ON 17/MAY/2009 04:06:34
QUIT[MENU]
```

- Power turned on 17 May 2009 at 05:35:54

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 05:35:54
TX-OFF 17/MAY/2009 04:34:57
TX-ON 17/MAY/2009 04:33:57
PAGE (1/2) :[▲] QUIT[MENU]
```

- Tx at 17 May 2009 at 05:35:54

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 STATUS]

<table>
<thead>
<tr>
<th>Alarm name, date and time of alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPFS 7/MAY 4:32:16</td>
</tr>
<tr>
<td>L/L 7/MAY 4:02:01</td>
</tr>
<tr>
<td>SOG 7/MAY 2:34:54</td>
</tr>
<tr>
<td>COG 6/MAY 7:09:32</td>
</tr>
<tr>
<td>HDG 3/MAY 8:00:21</td>
</tr>
<tr>
<td>ROT 19/APR 9:05:22</td>
</tr>
</tbody>
</table>

2. Use ▼ or ▲ to scroll the log.

   *Alarm statuses and their meanings*

<table>
<thead>
<tr>
<th>Alarm Status Indication</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANT</td>
<td>Antenna VSWR trouble. Continued operation possible.</td>
</tr>
<tr>
<td>CH1</td>
<td>TDMA RX1 Board trouble. TX stopped on corresponding TX channel.</td>
</tr>
<tr>
<td>CH2</td>
<td>TDMA RX2 Board trouble. TX stopped on corresponding TX channel.</td>
</tr>
<tr>
<td>CH70</td>
<td>DSC RX Board trouble, transmission stopped on CH70.</td>
</tr>
<tr>
<td>COG</td>
<td>Invalid COG data</td>
</tr>
<tr>
<td>EPFS</td>
<td>No data from external navigator. Continued operation possible.</td>
</tr>
<tr>
<td>FAIL</td>
<td>General system failure</td>
</tr>
<tr>
<td>HDG</td>
<td>Invalid/nonexistent HDG data</td>
</tr>
<tr>
<td>L/L</td>
<td>No L/L data</td>
</tr>
<tr>
<td>MKD</td>
<td>Minimum input device failure</td>
</tr>
<tr>
<td>ROT</td>
<td>Invalid ROT data</td>
</tr>
<tr>
<td>SOG</td>
<td>Invalid SOG data</td>
</tr>
<tr>
<td>TX</td>
<td>TX malfunction</td>
</tr>
</tbody>
</table>
### 3.6 Error and System Messages

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

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN’T DISPLAY INVALID DATA</td>
<td>No position data.</td>
</tr>
<tr>
<td>CAN’T DISPLAY OVER LAT85°</td>
<td>Own ship’s latitude is higher than 85°.</td>
</tr>
<tr>
<td>COLLISION ALARM</td>
<td>AIS target within set CPA/TCPA range.</td>
</tr>
<tr>
<td>COMMUNICATION ERROR</td>
<td>No communication with transponder.</td>
</tr>
<tr>
<td>DIFFERENT FROM ANT POS VALUE</td>
<td>For Inland AIS. Total sum of internal and external antenna distances are more than 3 meters greater than LENGTH (BEAM) OF SHIP.</td>
</tr>
<tr>
<td>ERROR REGIST</td>
<td>1) You entered MSG22 or DSC data whose sea areas overlap one another, or wrong NAV STATUS</td>
</tr>
<tr>
<td></td>
<td>2) You entered NAV STATUS as 14 on page 1 of NAV STATUS menu.</td>
</tr>
<tr>
<td>GPS COMMUNICATION ERROR</td>
<td>Communication error with internal GPS, shown at internal GPS self test.</td>
</tr>
<tr>
<td>ILLEGAL COMBINATION OF PRIORITY</td>
<td>Duplication in priority setting.</td>
</tr>
<tr>
<td>ILLEGAL MODE WAS SELECTED. PRESS ANY KEY.</td>
<td>Invalid combination of channels is selected for editing.</td>
</tr>
<tr>
<td>INCORRECT NUMBER! PRESS ANY KEY.</td>
<td>Incorrect ERI code entered.</td>
</tr>
<tr>
<td>INPUT THE UTC TIME!</td>
<td>Input the UTC time when there is no time data from GPS.</td>
</tr>
<tr>
<td>MESSAGE!</td>
<td>Class A AIS text message received.</td>
</tr>
<tr>
<td>MESSAGE! EMMA WARNING</td>
<td>Inland AIS EMMA warning message received.</td>
</tr>
<tr>
<td>MESSAGE! RTA</td>
<td>Inland AIS RTA message received.</td>
</tr>
<tr>
<td>MESSAGE! TEXT</td>
<td>Inland AIS text message received.</td>
</tr>
<tr>
<td>MESSAGE! WATER LEVEL</td>
<td>Inland AIS water level message received</td>
</tr>
<tr>
<td>NO CREW</td>
<td>Number of crew not entered in no. of persons message.</td>
</tr>
<tr>
<td>NO ETA, DESTINATION</td>
<td>You attempted to send a message that does not have ETA or destination.</td>
</tr>
<tr>
<td>NO MESSAGE</td>
<td>No TX message to send when you attempted to send a message.</td>
</tr>
<tr>
<td>NO NUMBER OF PERSONS</td>
<td>Number of persons not entered in no. of persons message.</td>
</tr>
<tr>
<td>NO OWN SHIP POSITION AVAILABLE</td>
<td>Invalid own ship position.</td>
</tr>
<tr>
<td>NO PASSENGER</td>
<td>Number of passengers not entered in no. of persons message.</td>
</tr>
<tr>
<td>NO SEL</td>
<td>Attempted to see detailed data for a target which has no data.</td>
</tr>
<tr>
<td>NO SHIPBOARD PERSONNEL</td>
<td>Number of shipboard personnel not entered in no. of persons message.</td>
</tr>
<tr>
<td>OUT OF RANGE! 0-255</td>
<td>Wrong IP, sub net mask or gateway address.</td>
</tr>
</tbody>
</table>
3. MAINTENANCE, TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Error Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT OF RANGE! 0-65535</td>
<td>Invalid port number entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! 10-30</td>
<td>Invalid NavNet port number entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! BEAM:0-100</td>
<td>Invalid beam of ship entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! CH-A(CH-B) DOESN'T EXIST</td>
<td>Invalid channel entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! CPA:0-6.00</td>
<td>Invalid CPA range entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! CREW:0-254</td>
<td>Invalid crew no. entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! DAY</td>
<td>Invalid day entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! DRAUGHT:0-20.0</td>
<td>Invalid inland draught entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! DRAUGHT:0-25.5</td>
<td>Invalid SOLAS draught entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! HOUR:0-23*</td>
<td>Invalid hour entered.</td>
</tr>
<tr>
<td>OUT OF RANGE!: INVALID CHANNEL</td>
<td>Invalid CH-NO. A or CH-NO. B entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! LENGTH:0-800</td>
<td>Invalid ship's length entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! MINUTE:0-59*</td>
<td>Invalid minute entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! NAV STATUS:0-15</td>
<td>Invalid nav status entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! PASSENGER:0-8190</td>
<td>Invalid no. of passengers entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! PERSONNEL:0-254</td>
<td>Invalid no. of personnel entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! RETRY TIMES:0-3. PRESS ANY KEY.</td>
<td>Invalid no. of retry times entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! TCPA:0-60</td>
<td>Invalid TCPA entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! TUGBOAT:0-6</td>
<td>Invalid tugboat quantity entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! TYPE NO.:10-99</td>
<td>Invalid cargo type entered.</td>
</tr>
<tr>
<td>OUT OF RANGE! ZONE:1-8</td>
<td>Invalid zone entered.</td>
</tr>
<tr>
<td>SEND MESSAGE UNSUCCESSFUL</td>
<td>Message could not be sent.</td>
</tr>
<tr>
<td>TRANSPONDER WAS REBOOTED</td>
<td>Transponder was rebooted.</td>
</tr>
</tbody>
</table>

* 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.

3. Press the **DISP** key to close the display.
3.8 Displaying Sensor Status

The SENSOR STATUS screen shows sensor status.

1. Press the MENU key.
2. Select SENSOR STATUS then press the ENT key.
3. Press the DISP key to close the display.

(sensor status messages and their meanings)

<table>
<thead>
<tr>
<th>Sensor Status Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH MANAGEMENT</td>
<td>Channel changed (displayed about 30 s)</td>
</tr>
<tr>
<td>EXT DGNSS</td>
<td>Using external DGNSS</td>
</tr>
<tr>
<td>EXT GNSS</td>
<td>Using external GNSS</td>
</tr>
<tr>
<td>EXT SOG/COG</td>
<td>Using external SOG/COG</td>
</tr>
<tr>
<td>HDG VALID</td>
<td>Heading data normal</td>
</tr>
<tr>
<td>INT DGNSS BEACON</td>
<td>Using internal DGNSS beacon</td>
</tr>
<tr>
<td>INT DGNSS MSG 17</td>
<td>MSG 17 corrects internal GNSS with differential correction</td>
</tr>
<tr>
<td>INT GNSS</td>
<td>Using internal GNSS</td>
</tr>
<tr>
<td>INT SOG/COG</td>
<td>Using internal SOG/COG</td>
</tr>
<tr>
<td>OTHER ROT</td>
<td>Value calculated from HDT, or ROT device used and talker is other than T1</td>
</tr>
<tr>
<td>ROT VALID</td>
<td>ROT data normal</td>
</tr>
<tr>
<td>UTC CLOCK LOST</td>
<td>Internal position fix lost</td>
</tr>
</tbody>
</table>
3. MAINTENANCE, TROUBLESHOOTING

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
ARE YOU SURE?
YES  NO

SET USER DEFAULT
ARE YOU SURE?
YES  NO

GPS COLD START
ARE YOU SURE?
YES  NO
```

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]
   
<table>
<thead>
<tr>
<th>Setting</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEY BEEP</td>
<td>ON</td>
</tr>
<tr>
<td>ALARM BUZZER</td>
<td>ON</td>
</tr>
<tr>
<td>AUTO SORT</td>
<td>ON</td>
</tr>
<tr>
<td>DISP SART TEST</td>
<td>ON</td>
</tr>
<tr>
<td>LONG RANGE</td>
<td></td>
</tr>
<tr>
<td>RECEIVED MSG</td>
<td></td>
</tr>
<tr>
<td>CPA/TCPA ALARM</td>
<td></td>
</tr>
</tbody>
</table>

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

3. Select **DISP SART TEST** then press the **ENT** key.
4. Select **ON** then press the **ENT** key.
5. Press the **DISP** key to close the menu.
6. At the plotter display, press the **DISP** key.
7. Select **SART** then press the **ENT** key to show detailed information for the AIS-SART.
8. Confirm that the STATUS field is showing “SART TEST”. (See page 1-19.)
APPENDIX

Menu Tree - Class A AIS

[MAIN] key

MSG
CREATE 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)
LONG RANGE
RECEIVED MSG
CPA/TCPA ALARM

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))

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 PC PORT

SET LAN PORT
* Shown when optional LAN kit is installed.

SET LR CH
CH-A
CH-B

(Continued on next page)

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.

Note: For PC Network

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

(Continued from previous page)

<table>
<thead>
<tr>
<th>CHANNEL SETTINGS</th>
<th>VIEW CHANNEL (View power and channel settings of channel in use.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EDIT CHANNEL</td>
</tr>
<tr>
<td></td>
<td>SELECT NO. (0-9)</td>
</tr>
<tr>
<td></td>
<td>TIME (UTC)</td>
</tr>
<tr>
<td></td>
<td>FROM MMSI (HIGH SEA, MMSI, EMPTY)</td>
</tr>
<tr>
<td></td>
<td>TYPE (HIGH SEA, AIS, PI, DSC, MANUAL, EMPTY)</td>
</tr>
<tr>
<td></td>
<td>FROM MMSI</td>
</tr>
<tr>
<td></td>
<td>POWER (1W, 12.5W)</td>
</tr>
<tr>
<td></td>
<td>CH NO. CH-A, CH-B</td>
</tr>
<tr>
<td></td>
<td>MODE CH-A, CH-B</td>
</tr>
<tr>
<td></td>
<td>ZONE (1-8 (NM)</td>
</tr>
<tr>
<td></td>
<td>CH AREA</td>
</tr>
<tr>
<td></td>
<td>RIGHT TOP</td>
</tr>
<tr>
<td></td>
<td>LEFT BOTTOM</td>
</tr>
<tr>
<td></td>
<td>LAT</td>
</tr>
<tr>
<td></td>
<td>LON</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIAGNOSTICS</th>
<th>MONITOR TEST (Displays PROG NO. and BOOT NO.; checks ROM, SDRAM, LCD, controls.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TRANSPONDER TEST</td>
</tr>
<tr>
<td></td>
<td>MEMORY TEST (Displays PROGRAM NO.; checks ROM, RAM, and MOT HW.)</td>
</tr>
<tr>
<td></td>
<td>GPS TEST (Display PROGRAM NO. and checks internal GPS receiver.)</td>
</tr>
<tr>
<td></td>
<td>PWR ON/OFF HISTORY (Log for time of equipment power on and off.)</td>
</tr>
<tr>
<td></td>
<td>TX ON/OFF HISTORY (Log for time of equipment transmission on and off.)</td>
</tr>
<tr>
<td></td>
<td>MEMORY CLEAR</td>
</tr>
<tr>
<td></td>
<td>MONITOR CLEAR (YES, NO)</td>
</tr>
<tr>
<td></td>
<td>SET USER DEFAULT (YES, NO)</td>
</tr>
<tr>
<td></td>
<td>GPS COLD START (YES, NO)</td>
</tr>
<tr>
<td></td>
<td>ACTIVATE KEY (DEVICE ID, KEY[ACTIVATED])</td>
</tr>
<tr>
<td></td>
<td>FOR SERVICE (For service technician. Not accessible by user.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAV STATUS key</th>
<th>NAV STATUS (00-15)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DESTINATION</td>
</tr>
<tr>
<td></td>
<td>SELECT</td>
</tr>
<tr>
<td></td>
<td>EDIT</td>
</tr>
<tr>
<td></td>
<td>DELETE</td>
</tr>
<tr>
<td></td>
<td>ARRIVAL TIME</td>
</tr>
<tr>
<td></td>
<td>DATE</td>
</tr>
<tr>
<td></td>
<td>TIME</td>
</tr>
<tr>
<td></td>
<td>CARGO TYPE (10-99)</td>
</tr>
<tr>
<td></td>
<td>DRAUGHT&amp;PERSONS</td>
</tr>
<tr>
<td></td>
<td>DRAUGHT (0-25.5(m))</td>
</tr>
<tr>
<td></td>
<td>NO. OF PERSONS (0-8191)</td>
</tr>
</tbody>
</table>
Menu Tree - Inland AIS

[MENU] key

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

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)
LONG RANGE
LR MODE (AUTO, MANUAL)
MSG27 TX (ON, OFF)
RECEIVED MSG
BUZZER (ON, OFF)
CPA/TCPA ALARM
CPA (0.0-6.00 (NM))
TCPA (0-60 (min))
ALARMS (ON, OFF)
ALARM BUZZER (ON, OFF)
LANGUAGE (ENGLISH, FRENCH, DUTCH, GERMAN)
TIME DIFF (-14:00 to +14:00)
RANGE CPA UNITS (NM, km)
SOG UNITS (kn, km/h)
LENGTH UNITS (m, dm)

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 (IEC61162-1, IEC61162-2, AD-10)
SET PC PORT
  MODE (STANDARD, MONITOR, SERVICE, BEACON, DISABLE)
  SPEED (4800BPS, 9600BPS, 19.2KBPS, 38.4KBPS, 57.6KBPS)

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.
APPENDIX

(Continued from previous page)

* Shown when optional LAN kit is installed.

- SET LAN PORT
- VIEW CHANNEL
  - SELECT NO. (0-9)
  - TIME
  - FROM
  - MMSI (HIGH SEA, MMSI, EMPTY)
  - TYPE (HIGH SEA, AIS, PI, DSC, MANUAL, EMPTY)

- EDIT CHANNEL
  - FROM MMSI
  - POWER (1W, 12.5W)
  - CH NO. CH-A, CH-B
  - MODE CH-A, CH-B
  - ZONE (1-8 (NM)
  - CH AREA

- VIEW PRIORITY
- VIEW QUALITY
- SET BLUE SIGN SW (AVAILABLE, NOT AVAILABLE)

- CHANNEL SETTINGS
- VIEW CHANNEL (View power and channel settings of channel in use.)
- SELECT NO. (0-9)
- TIME
- FROM
- MMSI (HIGH SEA, MMSI, EMPTY)
- TYPE (HIGH SEA, AIS, PI, DSC, MANUAL, EMPTY)

- EDIT CHANNEL
  - FROM MMSI
  - POWER (1W, 12.5W)
  - CH NO. CH-A, CH-B
  - MODE CH-A, CH-B
  - ZONE (1-8 (NM)
  - CH AREA

- VIEW PRIORITY
- VIEW QUALITY
- SET BLUE SIGN SW (AVAILABLE, NOT AVAILABLE)

- DIAGNOSTICS
- TRANSPOUNDER
- MEMORY TEST
- 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)
- AIS MODE (SOLAS, INLAND)
- 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)

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

* Shown when optional LAN kit is installed.
## 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.

<table>
<thead>
<tr>
<th>Blk.No.</th>
<th>TYPE, NAME</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>24P0062</td>
<td>CPU MONITOR UNIT</td>
<td>MONITOR UNIT</td>
</tr>
<tr>
<td>24P0034</td>
<td>DSC TRANSPONDER UNIT</td>
<td></td>
</tr>
<tr>
<td>24P0043</td>
<td>GPSTB TRANSPONDER UNIT</td>
<td></td>
</tr>
<tr>
<td>24P0035</td>
<td>MAIN TRANSPONDER UNIT</td>
<td></td>
</tr>
<tr>
<td>24P0036</td>
<td>MOT TRANSPONDER UNIT</td>
<td></td>
</tr>
<tr>
<td>24P0037</td>
<td>PWR TRANSPONDER UNIT</td>
<td></td>
</tr>
<tr>
<td>24P0033A</td>
<td>RX1 TRANSPONDER UNIT</td>
<td></td>
</tr>
<tr>
<td>24P0033B</td>
<td>RX2 TRANSPONDER UNIT</td>
<td></td>
</tr>
<tr>
<td>24P0032</td>
<td>TX TRANSPONDER UNIT</td>
<td></td>
</tr>
<tr>
<td>GN-8093</td>
<td>GPS RECEIVER</td>
<td>TRANSPONDER UNIT</td>
</tr>
</tbody>
</table>
APPENDIX

Parts Location

Monitor unit

![Monitor unit, rear cover opened](image1)

- CPU Board
  - 24P0062

Transponder unit

![Transponder unit, top cover removed](image2)

- TX Board
  - 24P0032
- PWR Board
  - 24P0037
- MOT Board
  - 24P0036

Monitor unit, rear cover opened

Transponder unit, top cover removed
APPENDIX

Transponder unit, bottom cover removed

RX2 Board
24P0033

RX1 Board
24P0033

DSC Board
24P0033

GPS Receiver
GN-8093

MAIN Board
24P0035

GPSTB Board
24P0043
Digital Interface (IEC 61162-1 Edition 4, 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, THS, 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, 1 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
Serial interface I/O circuit

COM1, 2, 3 port
Baud rate selectable from 4800 and 38400 (bps).

COM4, 5 port
Baud rate selectable from 4800 and 38400 (bps).

COM6 port
Baud rate selectable from 4800 and 38400 (bps).
**APPENDIX**

**DISP port**

Baud rate selectable from 4800 and 38400 (bps).

**Blue Sign port**

**Sentence description**

**Input sentences**

**ABM - Addressed binary and safety related message**

$$**ABM, x, x, x, xxxxxxxx, x, x.x, s--s, x, *hh<CR><LF>$$

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

**ACA - AIS regional channel assignment message**

$$**ACA,x,IIII.lI, a,yyyy.yy,a,IIII.II,a,yyyy.yy,a,x,xxxx,x,x.x,x.x,x.x,x.x,x.x,x.x,x.a.x,hhmmsss.ss,*hh<CR><LF>$$

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. Information source
14. In-use flag
15. Time of “in-use” change

*AP-10*
ACK - Acknowledge alarm

$**ACK,xxx,*hh<CR><LF>
1
1. Local alarm number (identifier) (000 - 999)

AIR - AIS interrogation request

$**AIR,xxxxxxxxx,x,x,x,x,x,xxxxxxxxx,x,x,x, a, x,x, x.x,x.x *hh<CR><LF>
1 2 3 4 5 6 7 8 9 10 11 12
1. MMSI of interrogated station 1
2. ITU-R M.1371 message requested from station 1
3. Message sub-section
4. ITU-R M.1371 second message requested from station 1
5. Message sub-section
6. MMSI of interrogated station 2
7. ITU-R M.1371 message requested from station 2
8. Message sub-section
9. Channel used on request
10. No use. Response slot for Message ID 1.1 of Message 15
11. No use. Response slot for Message ID 1.2 of Message 15
12. No use. Response slot for Message ID 2.1 of Message 15

BBM - UAIS broadcast binary message.

$**BBM,x,x,x,x,xx,s--s,x,*hh<CR><LF>
1 2 3 4 5 6 7
1. Total number of sentences needed to transfer the message (1 - 9)
2. Sentence number (1 - 9)
3. Sequential Message identifier (0 - 9)
4. AIS channel for broadcast of the radio message
5. VDL message no. (8 or 14)
6. Encapsulated data
7. Number of fill-bits, 0 to 5

DTM - Datum reference

$**DTM,ccc,a,x,x,a,x,x,a,x,x,ccc,*hh<CR><LF>
1 2 3 4 5 6 7 8
1. Local datum (W84=WGS84  W72=WGS72  S85=SGS85,  P90=PE90
    User defined=999, IHO datum code
2. Local datum subdivision code (NULL or one character)
3. Lat offset, min (-59.99999 - 59.599999)
4. N/S
5. Lon offset, min
6. E/W
7. Altitude offset, meters (no use)
8. Reference datum (W84=WGS84  W72=WGS72  S85=SGS85,  P90=PE90)
APPENDIX

GBS - GNSS satellite fault detection

$**GBS, hhmmss.ss, x,x, x,x, xx, x.x, x,x, x.h, h, *hh<CR><LF>

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

GGA - Global positioning system (GPS) fix data

$**GGA, hhmmss.ss, llll.ll, a, yyyy.yy, a, x, xx, x,x, x,x, M, x.x, M, x.x, xxxx,*hh<CR><LF>

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

GLL - Geographic position - latitude/longitude

$**GLL, llll,III, a, yyyy.yy, a, hhmmss.ss, a,x,*hh<CR><LF>

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

$**GNS,hhmmss.ss,llll.ll,a,IIIII.II,a,c--c,xx,x,x,x,x,x,x,x,a*hh<CR><LF>

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

**HDT - Heading - true**

$**HDT,xxx,x,T*hh<CR><LF>

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

**LRF - Long-range function**

$**LRF,x,xxxxxxxxx,c--c,c--c,c--c*hh<CR><LF>

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

**LRI - Long-range interrogation**

$**LRI,x,a,xxxxxxxxx,xxxxxxxxx,lliill.lli,a,yyyy.yy,a,lliill.lli,a,yyyy.yy,a*hh<CR><LF>

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

OSD - Own ship data

$**OSD, x.x, A, x.x, a, x.x, a, x.x, x.x, a *hh<CR><LF>

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

RMC - Recommended minimum specific GPS/TRANSIT data

$GPRMC, hhmmss.ss, A, llll.ll, a, yyyyy.yy, a, x.x, x.x, ddmmyy, x.x, a, a *hh<CR><LF>

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

ROT - Rate of turn

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

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

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

THS - True heading and status

```
$--THS, x.x, a *hh<CR><LF>
   1   2
1. Heading, degrees true (0.00-360.00)
2. Mode indicator
   (A=Autonomous   E=Estimated (dead reckoning)   M=Manual input   S=Simulator mode
   V=Data not valid (including standby)
```

VBW - Dual ground/water speed

```
$**VBW,x.x,x.x,x.x,x.x,x.x,x.x,x.x,xx,xx,x.x,x.x,*hh<CR><LF>
   1   2   3   4   5   6   7   8   9   10
1. (No use) Longitudinal water speed, knots (-9999.99 - 9999.99)
2. (No use) Transverse water speed, knots (-9999.99 - 9999.99)
3. (No use) Status: water speed, A=data valid V=data invalid
4. Longitudinal ground speed, knots (-9999.99 - 9999.99)
5. Transverse ground speed, knots (-9999.99 - 9999.99)
6. Status: ground speed, A=data valid V=data invalid
7. (No use) Stern transverse water speed, knots (-9999.99 - 9999.99)
8. (No use) Status: stern water speed, A=data valid V=data invalid
9. (No use) Stern transverse ground speed, knots (-9999.99 - 9999.99)
10. (No use) Status: stern ground speed, A=data valid V=data invalid
```

VSD - UAIS voyage static data

```
$--VSD,x.x,x.x,x.x,x.x,c--c, hhmss.ss,xx,xx,x.x,x.x,x.x*hh<CR><LF>
   1  2  3  4  5  6  7  8  9
1. Type of ship and cargo category (0 - 255)
2. Maximum present static draught (0 to 25.5 Meters)
3. Persons on-board (0 - 8191)
4. Destination (1 - 20 characters)
5. Estimated UTC of arrival at destination
6. Estimated day of arrival at destination (00 to 31(UTC))
7. Estimated month of arrival at destination (00 to 12(UTC))
8. Navigational status (0 - 15)
9. Regional application flags (0 - 15)
```
APPENDIX

VTG - Course over ground and ground speed

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

Output sentences

ABK - UAIS addressed and binary broadcast acknowledgement

$**ABK,xxxxxxxxx,x,x.x,x,x,*hh<CR><LF>
     1    2   3   4   5
1. MMSI of the addressed AIS unit
2. AIS channel of reception
3. Message ID
4. Message sequence number
5. Type of acknowledgement

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

ACS - Channel management information source

$**ACS,x,xxxxxxxxx,hhmmss.ss,xx,xx,xxxx,*hh<CR><LF>
     1  2   3   4   5   6
1. Sequence number (0 - 9)
2. MMSI of originator
3. UTC at receipt of channel management information
4. UTC day (01 - 31)
5. UTC month (01 - 12)
6. UTC year

ALR - Set alarm state

$**ALR,hhmmss.ss,xxx,A,A,c—c,*hh<CR><LF>
     1  2    3   4   5
1. Time of alarm condition change, UTC
2. Unique alarm number (identifier) at alarm source (000 - 999)
3. Alarm condition (A=threshold exceeded, V=not exceeded)
4. Alarm acknowledge state (A=acknowledged, V=not acknowledged)
5. Alarm description text (alphanumeric)

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

AP-16
LR1 - Long-range reply with destination for function request "A"

```
$**LR1,x,xxxxxxxx,xxxxxxx,c--c,c--c,xxxxxxxxx*hh<CR><LF>
    1  2  3  4  5  6
1. Sequence number
2. MMSI of responder
3. MMSI of requester (reply destination)
4. Ship's name (1 - 20 characters)
5. Call sign (1 - 7 characters)
6. IMO number, (9-digit number)
```

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

```
$**LR2,x,xxxxxxxx,xxxxxxx,hmmss,illl,il,a,yyyyy.yy,a,x.x,T,x,x,N*hh<CR><LF>
    1  2            3              4            5            6           7       8
1. Sequence number
2. MMSI of responder
3. Date (ddmmyy)
4. UTC of Position
5. Latitude - N/S
6. Longitude - E/W
7. Course over ground, degrees True
8. Speed over ground, Knots
```

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

```
$**LR3,x,xxxxxxxx,xxxxxxx,hmmss,xxxxx,x.x,cc,x.x,x.x,cc,x.x*hh<CR><LF>
    1  2           3       4            5             6   7   8    9  10 11
1. Sequence number
2. MMSI of responder
3. Voyage destination (1 - 20 characters)
4. ETA date (ddmmyy)
5. ETA time
6. Draught
7. Ship/cargo
8. Ship length
9. Ship breadth
10. Ship type
11. Persons (0 to 8191)
```

TXT - Text transmission

```
$--TXT,xx,xx,xx,c--c*hh<CR><LF>
    1  2  3  4
1. Total number of sentences (01 - 99)
2. Sentence number (01 - 99)
3. Text identifier
4. Text message
```
VDM - VHF data-link message

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

VDO - UAIS VHF data-link own-vessel report

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

Inland AIS specific sentences

Input sentences

PIWWIVD - Inland waterway voyage data

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

PIWWSPW - Inland AIS security password

$PIWWSPW a, x, c, c, c, x, hh<CR><LF>
1 2 3 4
1. Mode (E: Password input, C: Password change)
2. Password level (1: Maintenance password, 2: User password)
3. Password (At least 6 characters)
4. Valid time (0 and 1-60 (s))
PIWWSSD - Inland waterway static ship data

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

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, xx.xx, xx.xx, x, xxxx, xxxx, xxx, hh<CR><LF>

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

Output sentences

PIWWSPR - Inland AIS security password response

$PIWWSPR a, x, x, xx.xx, 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)
## VHF Channel List

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1 W power on CH13 and CH67.
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## Terminology, Units, Symbols

### Terminology

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<td>Two Dimensional Positioning</td>
<td>DTL</td>
<td>Detail</td>
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<tr>
<td>3D</td>
<td>Three Dimensional Positioning</td>
<td>E</td>
<td>East</td>
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<tr>
<td>ABM</td>
<td>Addressed Binary Message</td>
<td>E, G</td>
<td>for example</td>
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<tr>
<td>ADRS</td>
<td>Address</td>
<td>EMMA</td>
<td>European Multiservice Meteorological Awareness system</td>
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<td>AIS</td>
<td>Automatic Identification System</td>
<td>ENI</td>
<td>Unique European Vessel Identification Number</td>
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<td>Alarm</td>
<td>ENT</td>
<td>Enter</td>
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<td>Altitude</td>
<td>EPFS</td>
<td>Electronic Position Fixing System</td>
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<td>Antenna</td>
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<td>Electronic Reporting International</td>
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<td>April</td>
<td>ERR</td>
<td>Error</td>
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<td>Change</td>
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<td>Global Navigation Satellite System</td>
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<td>GPS</td>
<td>Global Positioning System</td>
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<td>Cancel</td>
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<td>Course Over the Ground</td>
<td>HDG</td>
<td>Heading</td>
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<td>Contrast</td>
<td>HECT</td>
<td>Hectometer</td>
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<tr>
<td>CPA</td>
<td>Closest Point of Approach</td>
<td>HI</td>
<td>High</td>
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<td>CPU</td>
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<td>HW</td>
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<td>Input/Output</td>
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<td>International Function Message</td>
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<td>International Maritime Organization</td>
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<td>Intrude</td>
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<td>JUN</td>
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<tr>
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<td>Dimmer</td>
<td>L</td>
<td>Low, left</td>
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<td>Latitude/Longitude</td>
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<td>LAT</td>
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<td>Depth</td>
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<td>Digital Selective Calling</td>
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## Abbreviations and Meanings

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<td>ROM</td>
<td>Read Only Memory</td>
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<tr>
<td>MAR</td>
<td>March</td>
<td>ROT</td>
<td>Rate Of Turn</td>
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<tr>
<td>MAX</td>
<td>Maximum</td>
<td>RTA</td>
<td>Requested Time of Arrival</td>
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<td>MAY</td>
<td>May</td>
<td>RX</td>
<td>Receive</td>
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<tr>
<td>MENU</td>
<td>Menu</td>
<td>S</td>
<td>South</td>
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<tr>
<td>MIN</td>
<td>Minimum</td>
<td>S/C</td>
<td>SOG/COG</td>
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<td>MKD</td>
<td>Minimum Keyboard Display</td>
<td>SAR</td>
<td>Search And Rescue</td>
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<td>MMSI</td>
<td>Maritime Mobile Services Identity</td>
<td>SDRAM</td>
<td>Synchronous Dynamic RAM</td>
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<td>MOT</td>
<td>Mother Board</td>
<td>SEL</td>
<td>Select</td>
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<td>Maritime Pollutant (applies to AIS)</td>
<td>SEP</td>
<td>September</td>
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<td>MSG</td>
<td>Message</td>
<td>SET</td>
<td>Set (i.e., set and drift, or setting a value)</td>
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<td>North</td>
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<td>Simulation</td>
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<td>Symbol(s)</td>
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<td>TIME</td>
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<td>R</td>
<td>Right</td>
<td>TOW</td>
<td>Vessel Engaged in Towing Operations</td>
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<td>R/B</td>
<td>Range / Bearing</td>
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<td>Receiver Autonomous Integrity Monitoring</td>
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<td>LOADED or UNLOADED</td>
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<td>Rain</td>
<td>UTC</td>
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<td>Reference</td>
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<td>Water</td>
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### Units

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<td>degree(s)</td>
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</tr>
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<tr>
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<td>decimeter</td>
<td>min</td>
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<td>kilometer</td>
<td>NM</td>
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<td>km/h</td>
<td>kilometer per hour</td>
<td>s</td>
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<td>Selected AIS targets</td>
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<td>AIS-SART (Search and Rescue Transmitter)</td>
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<tr>
<td><img src="image" alt="Symbol" /></td>
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## Icons

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<td><img src="image" alt="Icon" /></td>
<td>SAR (Search and Rescue)</td>
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<tr>
<td><img src="image" alt="Icon" /></td>
<td>Aid to Navigation</td>
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<tr>
<td><img src="image" alt="Icon" /></td>
<td>AIS-SART</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /> in turn</td>
<td>Normal Operation</td>
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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 Ed.4 (Nov-10) or 61162-2 (Sep-98)
   Input VSD, SSD, ABM, BBM, ACA, ACK, AIR, DTM, GBS, GGA, GLL,
   GNS, HDT, LRF, LRI, OSD, RMC, ROT, THS, VBW, VTG
   Output VDM, VDO, ABK, ACA, ALR, TXT, LR1, LR2, LR3, LRF, LRI
4.2 Sensor input IEC 61162-1 Ed.4 (Nov-10): 3 ports and 61162-2(Sep-98): 3 ports
   DTM, GBS, GGA, GLL, GNS, HDT, OSD, RMC, ROT, THS, VBW, VTG
4.3 External beacon or PC RS-232C
4.4 Heading sensor AD-10 format
4.5 Alarm output Contact closure
4.6 Bluesign input Contact closure
5 POWER SUPPLY

5.1 Transponder unit 12-24 VDC: 7-3.5 A
5.2 Monitor unit 12-24 VDC: 0.3-0.15 A
5.3 AC/DC power supply unit (PR-240, option) 100-115/200-230 VAC, 1 phase, 50/60 Hz

6 ENVIRONMENTAL CONDITION

6.1 Ambient temperature
   GPS/VHF antenna -25°C to +55°C (storage: -25°C to +70°C)
   Other units -15°C to +55°C
6.2 Relative humidity 95% at 40°C
6.3 Degree of protection
   GPS/VHF antenna IPX6
   Transponder unit IP20
   Monitor unit IP22
6.4 Vibration IEC 60945 ed.4

7 COATING COLOR

7.1 GPS antenna N9.5
7.2 Transponder unit N3.0
7.3 Monitor unit Panel: N3.0, Chassis: 2.5GY5/1.5
<table>
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<tr>
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<th>AIS-SART test indication ........................................ 3-14</th>
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<td>Alarm status display ................................................ 1-24</td>
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Declaration of Conformity

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/4613/02206/1602/10 issued by Federal Maritime and Hydrographic Agency, The Federal Republic of Germany.

This declaration is issued according to the provisions of European Council Directive 96/98/EC on marine equipment modified by Commission Directive 2009/26/EC.

On behalf of Furuno Electric Co., Ltd.

Takahiko Kusuda
Manager, QMS Secretariat
Quality Assurance Department

Nishinomiya City, Japan
November 8, 2010

(Place and date of issue)

(name and signature or equivalent marking of authorized person)