FURUNO

OPERATOR'S MANUAL

NAVIGATIONAL ECHO SOUNDER

Model **FE-800**

FURUNO ELECTRIC CO., LTD.

www.furuno.com

IMPORTANT NOTICES

General

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

How to discard this product

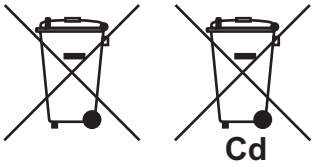
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.eiae.org/) for the correct method of disposal.

How to discard a used battery

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

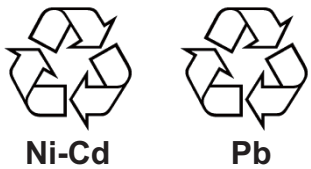
In the European Union

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



In the USA

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



In the other countries

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

SAFETY INSTRUCTIONS

The operator must read the safety instructions before attempting to operate the 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, could result in minor or moderate injury.

Warning, Caution | Prohibitive Action | Mandatory Action

WARNING

Do not open the equipment.

The equipment uses high voltage that can cause electrical shock. Refer any repair work to a qualified technician.

If water leaks into the equipment or something is dropped into the equipment, immediately turn off the power at the switchboard.

Fire or electrical shock can result.

If the equipment is giving off smoke or fire, immediately turn off the power at the switchboard.

Fire or electrical shock can result.

If you feel the equipment is acting abnormally or giving off strange noises, immediately turn off the power at the switchboard and contact a FURUNO service technician.

WARNING

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

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

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

Do not place liquid-filled containers on or near the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Do not operate the equipment with wet hands.

Electrical shock can result.

Use the proper fuse.

Use of the wrong fuse can cause fire or electrical shock.

⚠ CAUTION

Handle the LCD carefully.

The LCD is made of glass, which can cause injury if broken.

Do not transmit with the transducer out of water.

Damage to the transducer can result.

Properly adjust the gain.

Too little gain gives no picture. Too much gain shows excessive noise on the picture. Using the depth data for navigation when the gain is incorrectly set can lead to a dangerous situation.

Too high Correct Too low

The data presented by this equipment is intended as a source of navigation information.

The prudent navigator never relies exclusively on any one source of navigation information, for safety of vessel and crew.

The use of two transceivers with the same frequency will result in interference.

When fitting more than one transceiver, ensure the frequencies are different.

⚠ CAUTION

Observe the following compass safe distances to prevent magentic compass deviation:

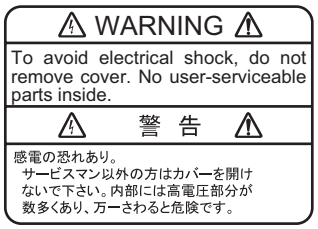
	Standard Compass	Steering Compass
Display Unit FE-8010	0.75 m	0.50 m
Transceiver Unit FE-8020	1.50 m	0.95 m
Matching Box MB-502	0.80 m	0.50 m
Matching Box MB-504	0.65 m	0.40 m

About the TFT LCD

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

Warning Label(s)

Warning label(s) is(are) attached to the equipment. Do not remove the label(s). If a label is missing or damaged, contact a FURUNO agent or dealer about replacement.



Name: Warning Label 1
Type: 86-003-1011-3
Code No.: 100-236-233

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FOREWORD

A Word to FE-800 Owners

Thank you for purchasing this navigational echo sounder. We are confident you will discover why FURUNO has become synonymous with quality and reliability.

Since 1948, FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment.
This dedication to excellence is furthered by our extensive global network of agents and dealers.

Please carefully read and follow the safety information and operating and maintenance instructions set forth in this manual before attempting to operate the equipment and conduct any maintenance. Your navigational echo sounder will perform to the utmost of its ability only if it is operated and maintained in accordance with the correct procedures.

This equipment is designed, produced and documented by FURUNO ELECTRIC CO., LTD., complying with ISO 9001 standards as certified by the Lloyd's Register of Quality Assurance System.

Features

The FE-800 is a color navigation echo sounder which operates with 50 or 200 kHz frequency. The FE-800 is comprised of a control unit, transceiver, matching box and transducer. Echoes are output on an 8.4-inch LCD screen.

The main features of the FE-800 are:

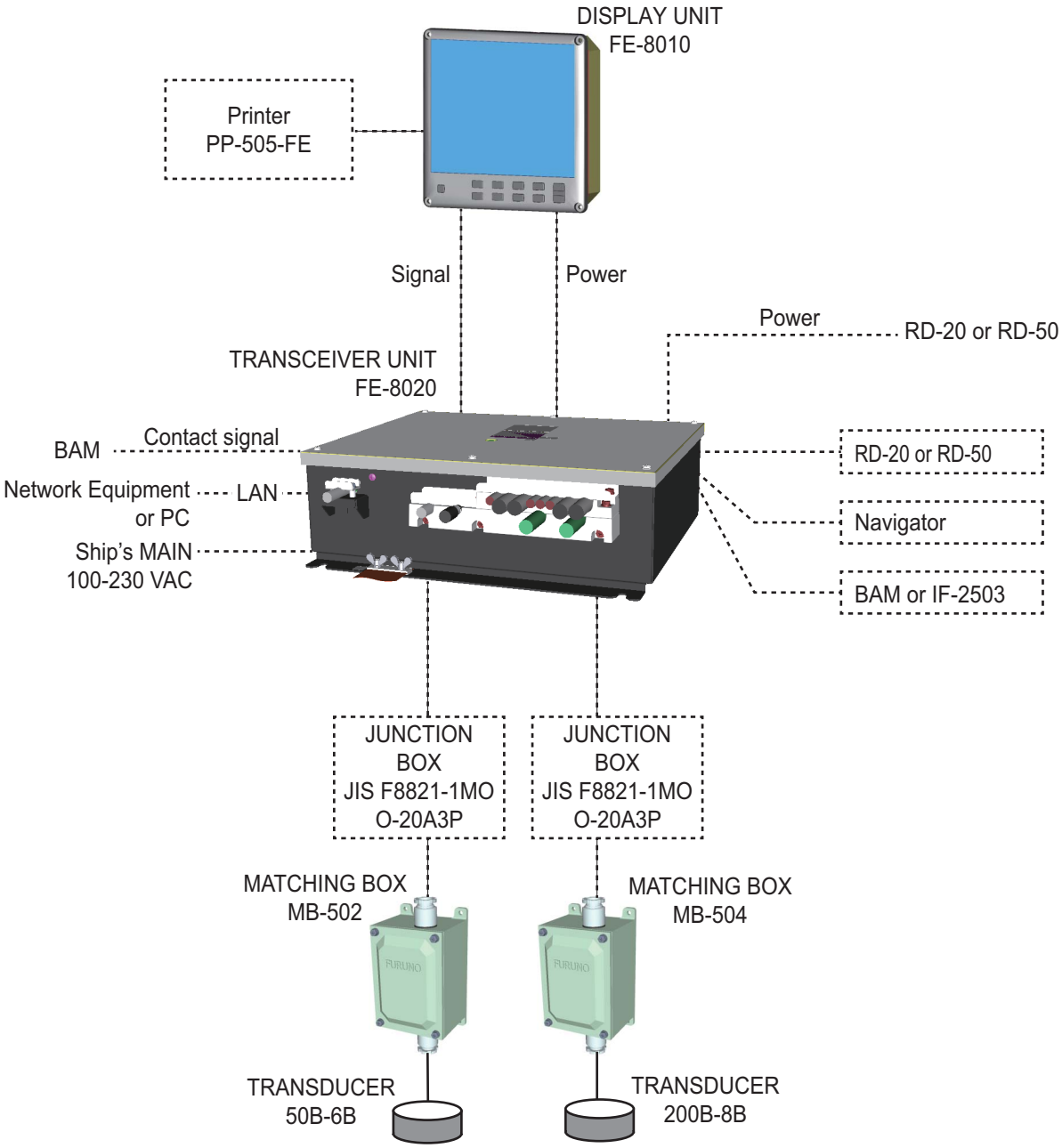
- Complies with the following regulations:
  ISO9875:2000, IEC60945 Ed.4, IEC61162-1 Ed.4, IEC61162-1 450, IEC62288 Ed.2.
- Can display dual frequency (50 kHz/200 Khz) depth reading on one screen.
- Three display modes available:
  - NAV mode: Standard display showing depth readings.
  - OS DATA mode: Shows own ship location, time, COG/SOG alongside current depth readings.
  - HISTORY mode: Shows past readings in graph form alongside current depth readings.
- Can be connected to an external monitor (RD-20/RD-50) for remote display of readings.
- Compatible with Bridge Alert Management systems - IMO MSC.302(87)
- Can connect up to two transceivers, allowing dual on-screen display of echoes.
- Connecting the optional printer allows printing of echo data.
- Can save/replay up to 24 hours of depth reading history.
- Connecting a PC with the optional data recording software allows recording of echo data.

Program numbers

Unit	Program Number
FE-8010	1251002-01.xx
FE-8020	1251003-01.xx

"xx" indicates minor version numbers.

SYSTEM CONFIGURATION

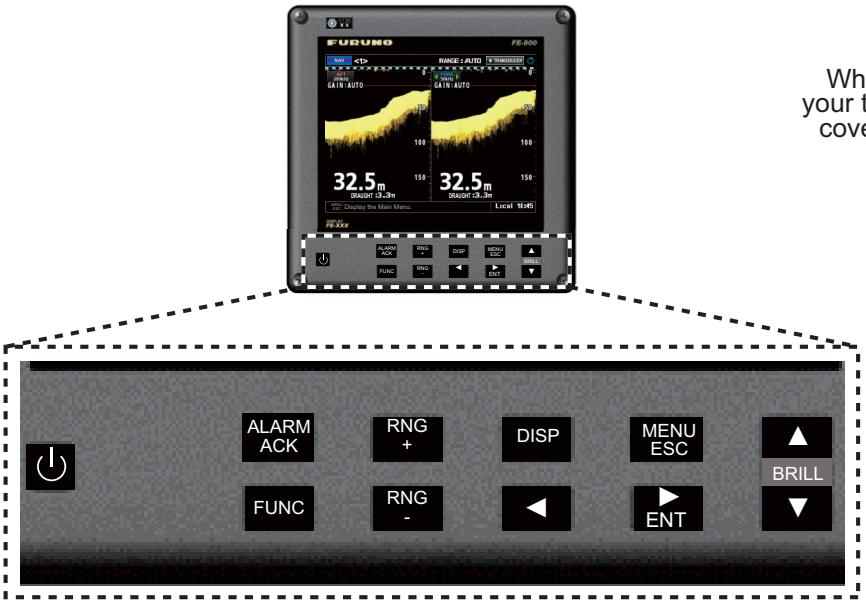


Equipment category	
Display unit	Protected from the weather
Transceiver unit	Protected from the weather

1. OPERATION

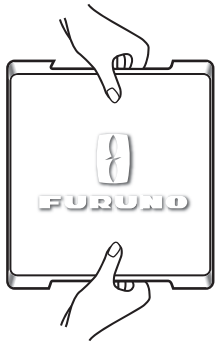
1.1 Controls

All operations of the FE-800 are carried out with the controls on the front panel of the display unit. Some functions require a long key press, while others require a short key press.



Removing the cover

While pressing the center with your thumbs as illustrated, pull the cover towards you to remove it.



Key	Function
⏻	Press to turn the FE-800 on/off.
ALARM/ ACK	Turns off alert buzzer.
FUNC	Long press to memorize menu functions. Short press to recall memorized functions.
RNG +	Increases depth range.
RNG -	Decreases depth range.
DISP	• Cycles through display modes in the following order: (Nav → History → OS Data → Nav) • Returns to Main display from any location in the menus.
MENU/ ESC	• Displays/closes the menu. • Returns one level in the menu tree (unless on first level).
◀ and ▶ **ENT**	• Adjusts key brilliance. • Menu screens - Moves up/down levels in the menu tree. • History - Moves the cursor location in the history mini-window. • Logbook - Changes the displayed page. • Mini-windows (GAIN, etc.) - Switches settings (EG: FORE/AFT settings).
▲ **BRILL** ▼	• Opens [Brilliance Setting] pop-up window/Adjust panel brilliance. • Select menu items in menu window. • Change settings in current pop-up window.

1.2 How to Turn the Power On/Off

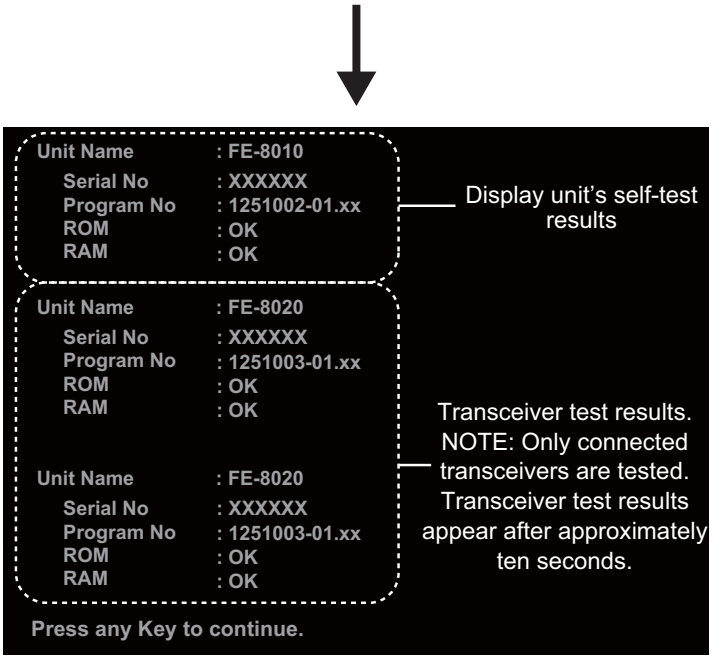
Note 1: Make sure the unit is connected correctly to each transceiver.

Note 2: After turning the unit off, wait at least 5 seconds before you turn the power on again.

Press the ⏻ button to turn the unit on. With the power on, press the ⏻ button again to turn the unit off.

On startup, the unit displays a splash screen for approximately ten seconds, then begins a self-test. The self-test checks the logic circuits, battery status and displays the program version currently in use.

Splash screen



Self-test results

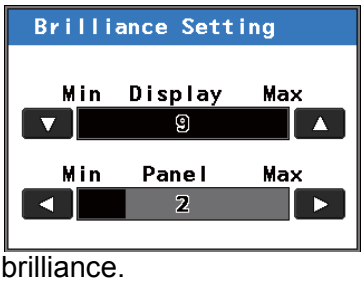
After the self-test completes, the mode used before the FE-800 was turned off is activated. You can now change modes freely (See section 1.4.)

Note: If any errors occur during the self-test process, the self-test stops the startup procedure. Contact your local Furuno dealer for service.

1.3 Panel and Key Brilliance

Both panel and key brilliance can be adjusted from the main screen using the following procedure:

1. Press ▲ or ▼ on the **BRILL** pad to open the Brilliance pop-up window.



2. Press ▲ or ▼ to adjust panel brilliance.
3. Press ◀ or ▶ to adjust key brilliance.
4. Press the **MENU/ESC** key to close the pop-up window.

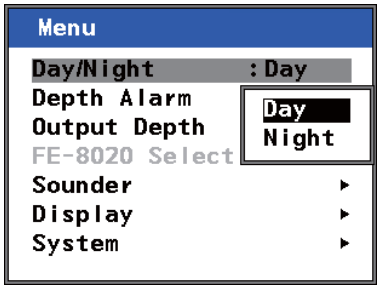
Brilliance settings for Day or Night mode are stored separately.

When changing modes, the last-used setting is restored.

1.3.1 Day/Night Mode

The FE-800 has Day and Night display settings to allow better screen visibility. To switch between modes, do the following:

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



3. Select [Day] or [Night] as appropriate, then press the **ENT** key.
4. Press the **MENU/ESC** key once to close the menu.

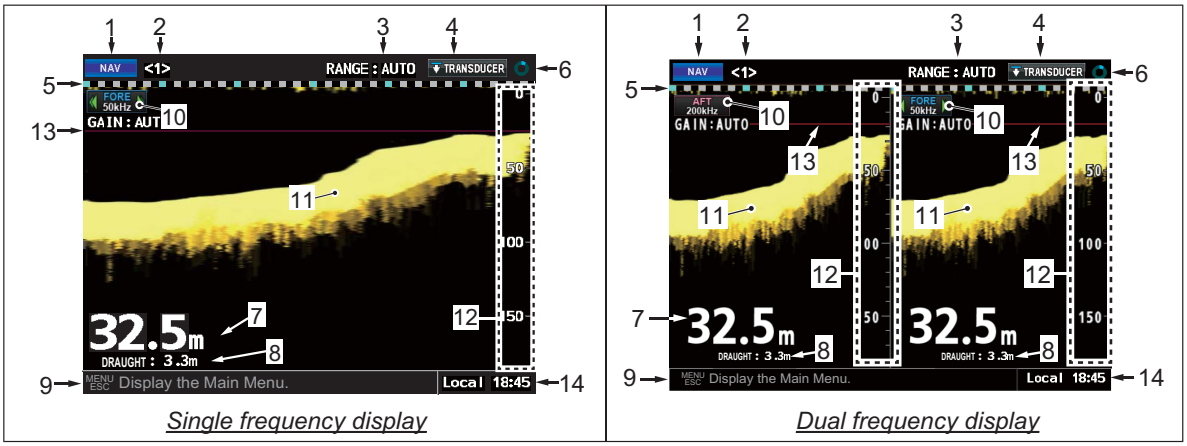
The default settings for Day and Night modes are shown in the table below.

Mode	Panel Brilliance	Key Brilliance
Day	9	2
Night	2	2

1.4 Display Modes and Screen Indications

The FE-800 has 3 main display modes: NAV, HISTORY, OS DATA.
The display modes are set in a cycle pattern, and each press of the **DISP** key changes the selected mode, in the sequence shown below.

Note 1: OS DATA mode requires external EPFS data (EG:GPS). If [Time Adjust] in the [Service] menu is set to [Internal] when initial settings are made, the OS DATA screen is unavailable. To change the [Time Adjust] settings, consult a FURUNO technician.
Note 2: The main display shows output from both transducers if two are connected. If only one is connected, the display shows only the output from the connected transducer. The menu display may change slightly for single transducer configurations.
For brevity, this manual uses a two transducer output display for all explanations.
An example of the difference between single and dual frequency displays and their respective marks and indications is shown below.



Single frequency display

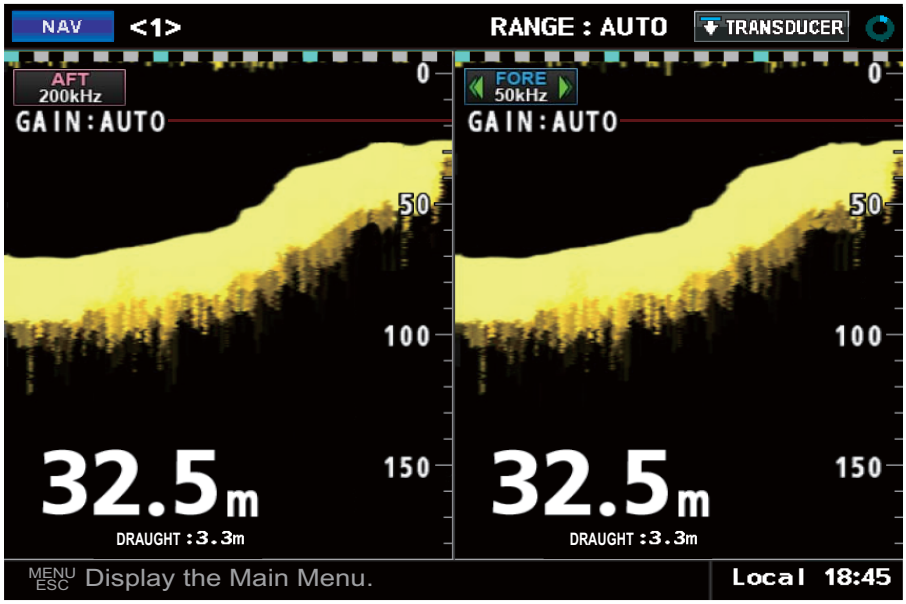
Dual frequency display

No.	Name	Description
1	Mode indicator	Shows current display mode (NAV, NAV + HISTORY or NAV + OS DATA).
2	Transceiver no.	Shows the currently selected transceiver.
3	Range setting	Shows the currently selected range setting.
4	Reading indicator	Shows the currently selected reference point for depth readings. (TRANSDUCER, KEEL OR SURFACE.)
5	Time scale	Shows the time scale for displayed readings. One square is equal to 1 minute of readings. The distance from one blue square to the next is equal to ten minutes of readings.
6	System status indicator 	Shows unit is functioning normally. Stops moving when unit is malfunctioning.
7	Depth	Shows current depth and selected depth unit.
8	Draught setting	Shows the draught setting for respective transducer.
9	Alarm message or menu description	Shows active alarms or a brief description of the selected menu item. **Note:** Alarm messages take priority over menu descriptions.
10	Transducer	Shows the location of the transducer and output signal.
11	Sounding echo	Shows the reflected echo.
12	Range indicator	Shows depth range. Changes with range scale.
13	Depth Alarm line	Indicates the depth setting for the depth alarm.
14	Time	Indicates time and time setting (UTC, Local, etc.)

1.4.1 NAV Mode

This is the default mode for the FE-800. The screen shows depth and echo from FORE and AFT positions.

The default display order of the echo readings is AFT - FORE.

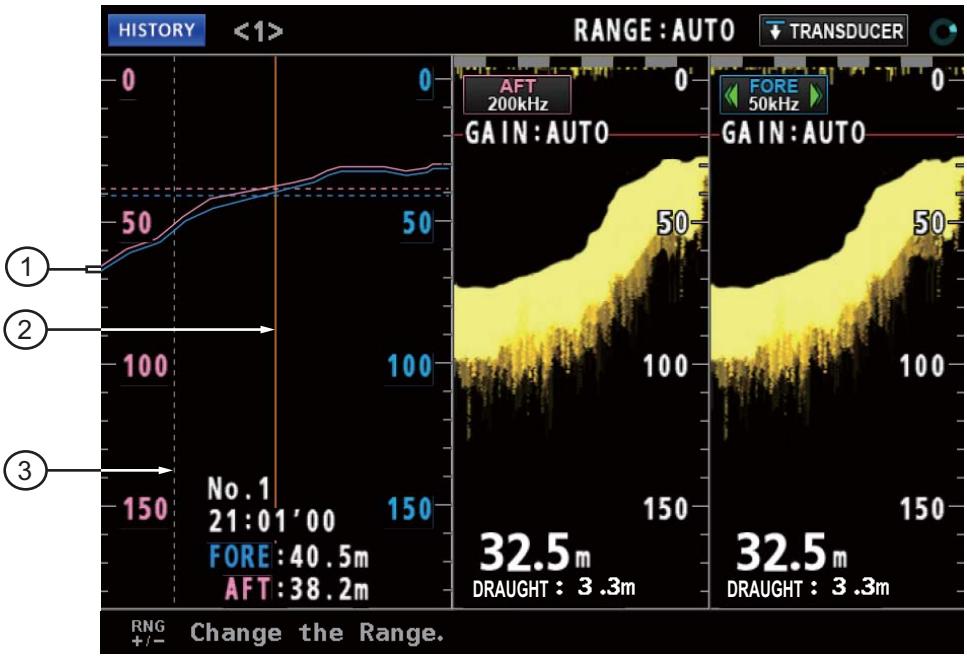


1.4.2 HISTORY Mode

This mode provides a mix of Contour and Strata echo readings taken. The amount of data stored in the HISTORY log depends on the interval setting. The table below shows the differences in amount of data that can be stored.

Interval setting	Amount of data stored
2 min	24 hours
1 min	12 hours
5 sec	1 hour

Previous echo readings can be accessed by using ◀ or ▶ to move the cursor.

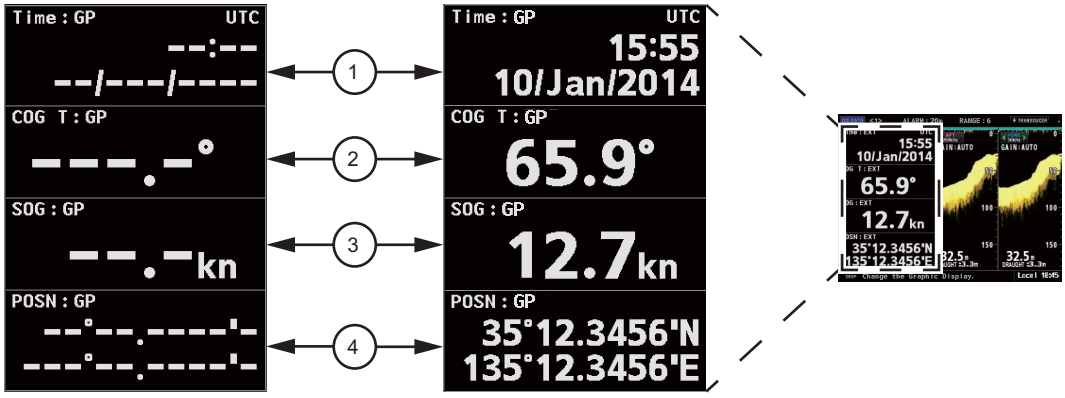


Number	Description
1	FORE/AFT depth history.
2	Time (location) in sounding depth history. Move this indicator using ◀ or ▶. FORE/AFT history readings are displayed at the bottom of this screen.
3	Change indicator. This line appears in the case of any de-synchronization between the FE-800 and connected sensors or units.

1.4.3 OS DATA Mode

This mode shows Own Ship Data (OS DATA), and is only available if the [Time Adjust] setting in the [Service Menu] is set to [External].

To change the [Time Adjust] settings in the [Service Menu], consult a FURUNO technician.



The OS DATA mode requires a connected EPFS device, such as GPS. If there is no device connected, or connection is interrupted, the OS DATA is displayed as shown in the above left figure. The left side of the display shows the OS DATA, the right side of the display shows the current echo readings.

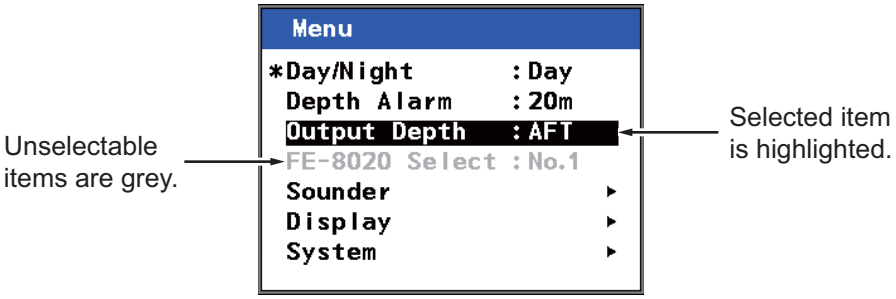
Number	Description
1	Date and Time as received by the EPFS device.
2	COG (Course Over the Ground) as calculated by the EPFS device.
3	SOG (Speed Over the Ground) as calculated by the EPFS device.
4	POSN (Position) as calculated by the EPFS device.

EPFS devices are often referred to as “talkers”. Below is a list of talker types, and their respective display names, which can be used with the FE-800.

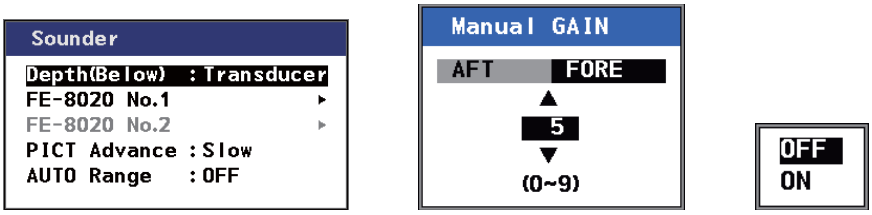
Displayed talker name	Description
DE	Decca Navigator
GA	Galileo positioning system
GL	GLONASS positioning system
GN	Global navigation satellite system (GNSS)
GP	Global positioning system (GPS)
II	Integrated instrumentation
IN	Integrated navigation
LA	Loran A
LC	Loran C

1.5 Menu Overview

1. Press the **MENU/ESC** key to open the Main menu.



2. Use the ▲ or ▼ key to navigate the menu. The item currently selected is highlighted.
3. To choose a menu item, press the ▶ **ENT** key.
   Depending on which item is selected, a new menu, a setting window or a setting box is displayed.



Newly opened menu *Settings window* *Settings box*

4. Use the ▲ or ▼ key to navigate the menu or adjust settings as required.
5. Press the ▶ **ENT** key to open the selected item, or to apply the setting changes.
   To return to the previous menu, or to abandon changes, press ◀ or the **MENU/ESC** key.
6. Press the **DISP** key once, or press the **MENU/ESC** key several times to close the menus.

Note 1: If [FE-8020 No.2] is not enabled in the [Service Menu], the following menu items are grey and not selectable:

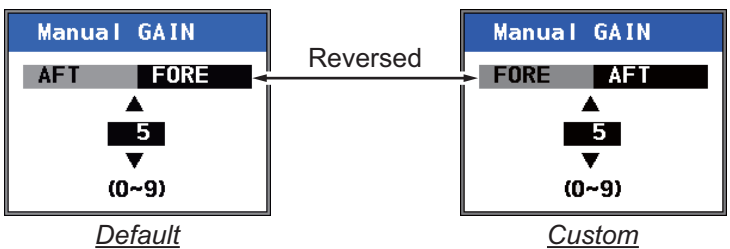
- Main menu → [FE-8020 Select]
- [Sounder] menu → [FE-8020 No.2]
- [System] menu → [Parameters] → [FE-8020 No.2]
- [System] menu → [Information] → [FE-8020 No.2]

To enable [FE-8020 No.2], consult a FURUNO technician.

Note 2: For brevity, all further references to the ▶ **ENT** key are written as "**ENT** key".

If the display settings are set to FORE - AFT at installation, some pop-up menu layouts will change according to the FORE - AFT or AFT - FORE display order.

The example below shows both the default, AFT - FORE, and the custom display order of FORE - AFT.



Default *Custom*

For the sake of brevity, all explanations and images in this manual use the default.

1.6 How to Select a Range

The range can be set either manually or automatically. In the auto mode, the range will self-adjust to provide as clear as possible an image. The auto mode is cancelled when the range is manually adjusted.

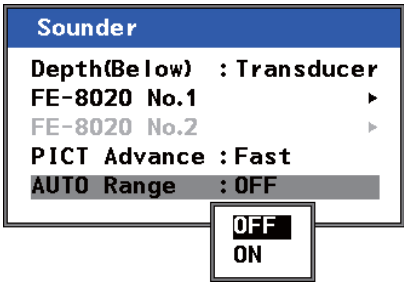
There are eight basic ranges available.

Press **RNG+** or **RNG-** to change the range.

In cases where the depth goes outside the display area, adjust the range scale until the seabed appears near the center of the screen. (See section 3.1.)

1.6.1 How to enable/disable auto range

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, then press the **ENT** key.
3. Select [Auto Range] using ▲ or ▼, then press the **ENT** key.
4. Select [ON] or [OFF] as appropriate, then press the **ENT** key to apply the setting.
5. Press the **MENU/ESC** key twice to close the menu.



1.7 Gain

Note: To manually adjust the gain, you must first turn [AUTO GAIN] off. The figures shown in this section are of a dual transducer configuration. Single transducer configuration pop-up menus will change slightly.

⚠ CAUTION

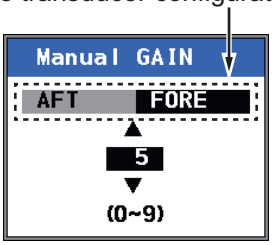
Properly adjust the gain.

Too little gain gives no picture. Too much gain shows excessive noise on the picture. Using the depth data for navigation when the gain is incorrectly set can lead to a dangerous situation.

1.7.1 How to adjust the gain

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, then press the **ENT** key.
3. Select the appropriate transceiver ([FE-8020 No.1] or [FE-8020 No.2]) using ▲ or ▼, then press the **ENT** key.
4. Select [Manual GAIN] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
5. If using a single transducer configuration, skip to step 7. For dual transducer configuration go to the next step.
6. Select [AFT] using ◀ or ▶.
   The available settings are [0] to [9].
7. Adjust the gain using ▲ or ▼, then press the **ENT** key to select [FORE].
8. Adjust the gain for [FORE] using ▲ or ▼. The available settings are [0] to [9].
9. Press the **MENU/ESC** key three times to close the menu.

The FORE/AFT bar is absent in single transducer configurations.

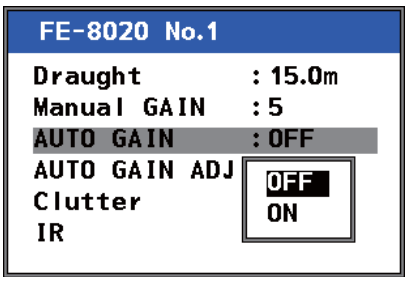


1.7.2 Automatic Operation

The gain and clutter (low level noise) adjustments can be done automatically.

How to turn automatic operation on or off

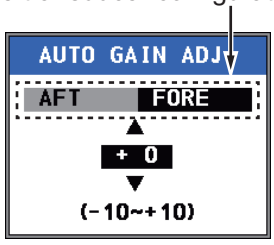
1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, then press the **ENT** key.
3. Select the appropriate transceiver ([FE-8020 No.1] or [FE-8020 No.2]) using ▲ or ▼, then press the **ENT** key.
4. Select [AUTO GAIN] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
5. Select [ON] or [OFF] as appropriate, using ▲ or ▼, then press the **ENT** key to apply the setting.
6. Press the **MENU/ESC** key three times to close the menu.



1.7.3 How to offset the auto gain

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, then press the **ENT** key.
3. Select the transceiver ([FE-8020 No.1] or [FE-8020 No.2]) as appropriate using ▲ or ▼, then press the **ENT** key.
4. Select [AUTO GAIN ADJ], then press the **ENT** key.This will open a pop-up window.
5. If using a single transducer configuration, skip to step 7. For dual transducer configuration go to the next step.
6. Select [AFT] using ◀ or ▶. The available range is [-10] to [+10].

The FORE/AFT bar is absent in single transducer configurations.



7. Select the desired setting using ▲ or ▼, then press the **ENT** key to select [FORE].
8. Adjust the setting for [FORE] using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. The available range is [-10] to [+10].
9. Press the **MENU/ESC** key three times to close the menu.

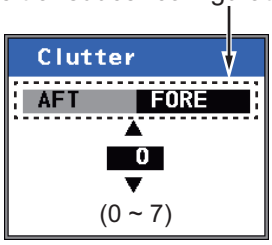
1.8 Clutter

Low level noise can cause your display to look “cluttered” with unnecessary dots. These are caused mainly by dirty water or noise. This kind of noise can be suppressed by adjusting the clutter.

Note: To manually adjust the clutter, you must first turn [AUTO GAIN] off.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, then press the **ENT** key.
3. Select the transceiver ([FE-8020 No.1] or [FE-8020 No.2]) as appropriate using ▲ or ▼, then press the **ENT** key.
4. Select [Clutter] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
5. If using a single transducer configuration, skip to step 7. For dual transducer configuration go to the next step.
6. Select [AFT] using ◀ or ▶. The available settings are [0] to [7].

The FORE/AFT bar is absent in single transducer configurations.

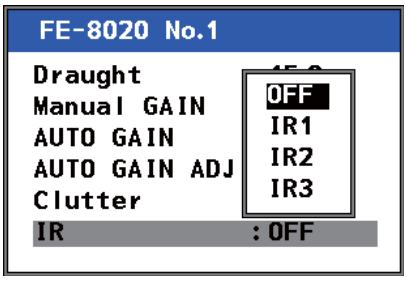


7. Adjust the Clutter as desired, using ▲ or ▼, then press the **ENT** to select [FORE].
8. Adjust [FORE] clutter using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. The available settings are [0] to [7].
9. Press the **MENU/ESC** key three times to close the menu.

1.9 Interference

Interference from other acoustic equipment operating nearby or other electronic equipment on your vessel may show on your display. There are three levels of interference suppression, [IR1], [IR2] and [IR3]. The higher the number, the greater the degree of suppression. The default setting is [OFF].

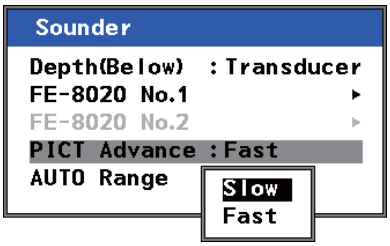
1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, then press the **ENT** key.
3. Select the transceiver ([FE-8020 No.1] or [FE-8020 No.2]) as appropriate using ▲ or ▼, then press the **ENT** key.
4. Select [IR] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
5. Adjust the interference suppression as desired, using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. The available settings are [IR1], [IR2], [IR3] and [OFF].
6. Press the **MENU/ESC** key three times to close the menu.



1.10 PICT Advance

The picture advance menu allows you determine the speed at which the vertical scan lines run across the screen.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, then press the **ENT** key.
3. Select [PICT Advance] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.



4. Select [FAST] or [SLOW] as appropriate, using ▲ or ▼, then press the **ENT** key.
   [FAST] picture advance expands the echo sideways across the screen. This is useful when studying a rough bottom closely.
   [SLOW] picture advance compresses the echo allowing for close inspection when the bottom is smooth.
5. Press the **MENU/ESC** key twice to close the menu.

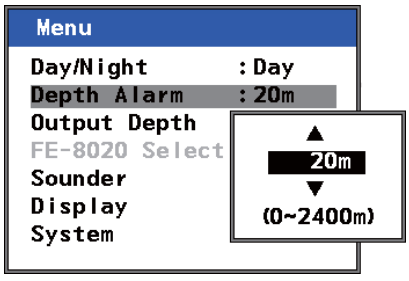
1.11 How to Set the Depth Alarm

The depth alarm sounds when the seabed is shallower than the depth setting. The default setting is 2 meters.

Note: The depth setting distance is measured from the face of the transducer.

The depth can be adjusted by following the procedure below:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Depth Alarm] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
3. Choose the depth at which you wish the alarm to activate, using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window.
   The available range is 0 to 2400m.
4. Press the **MENU/ESC** key once to close the menu.



How to acknowledge the alarm and silence the alarm buzzer

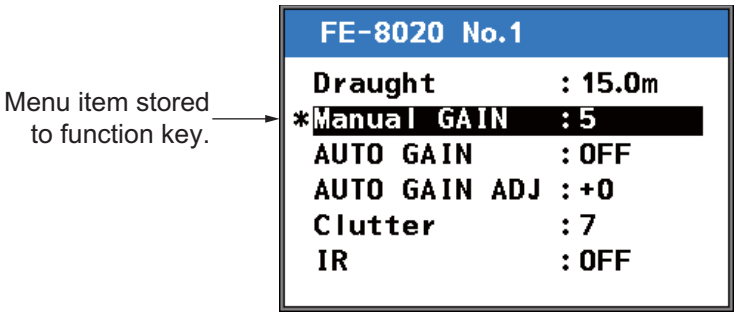
You can acknowledge the alarm, and silence the buzzer, by pressing the **ALARM/ACK** (Alarm Acknowledge) key.

1.12 How to Use the Function Key

The function key can store and recall a preset location in the menu. You can recall the function by pressing the **FUNC** key.

To store a function

1. Navigate the menu to the function you wish to store.
2. Press and hold the **FUNC** key to store the menu function. A small asterisk "*" will appear next to the menu item when it is stored.
   In the example below, [Manual GAIN] is stored to the **FUNC** key.

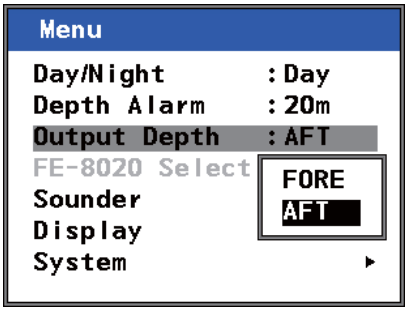


3. Release the **FUNC** key after the asterisk "*" appears.
4. Press the **DISP** key to return to the main display.

1.13 How to Output to External Equipment

The FE-800 can output depth information from one transceiver to external equipment, such as ECDIS. To select the transceiver which will output to the external equipment, do the following:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Output Depth] using ▲ or ▼, then press the **ENT** key.
3. Select [FORE] or [AFT] as appropriate, then press the **ENT** key.



The selected transceiver is highlighted as shown in the figure below.

Transceiver selected for external output is highlighted with green arrows.

4. Press the **MENU/ESC** key once to close the menu.

1.14 How to Choose a Transceiver

If your FE-800 is connected to two transceivers, you can switch between the transceivers using the procedure below.

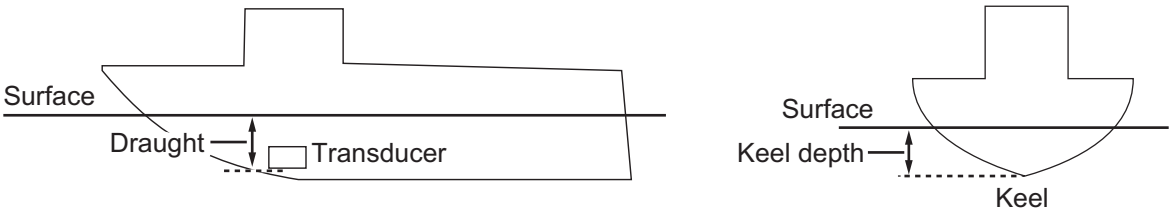
Note: If [FE-8020 No.2] is not enabled in the [Service Menu], this menu is not selectable. To enable [FE-8020 No.2], consult a FURUNO technician.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [FE-8020 Select] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
3. Select the appropriate transceiver using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. The available options are [No.1] or [No.2].
4. Press the **MENU/ESC** key once to close the menu.

1.15 How to Set the Depth Below Surface (DBS)

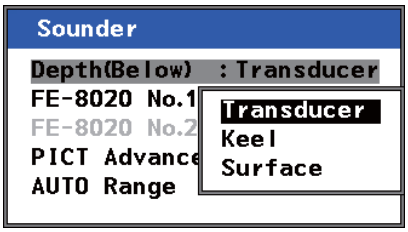
The depth reading can be referenced from one of three points.

- Transducer — Depth from transducer to seabed (requires transducer “below waterline” measurement.)
- Surface — Depth from surface to seabed (requires Draught input, see section 1.16.)
- Keel — Depth from keel to seabed (requires keel depth setting. Consult your local FURUNO dealer.)



To choose which setting to use, do the following:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, then press the **ENT** key.
3. Select [DEPTH(BELOW)] using ▲ or ▼, then press the **ENT** key. This will open a pop-up.



4. Select the location to take the depth reading from, then press **ENT** to apply the settings and close the pop-up window. The available options are [Transducer], [Surface] and [Keel].
5. Press the **MENU/ESC** key twice to close the menu.

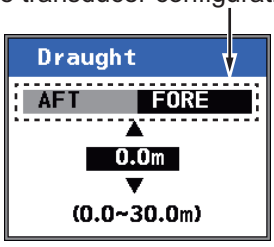
1.16 How to Set Draught

Draught can be set in two locations, [FORE] and [AFT], if your vessel has transducers at both of these locations. If your vessel only has one transducer, the draught is set at the transducer location only.

To set the draught for your vessel, do the following:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Sounder] using ▲ or ▼, the press the **ENT** key.
3. Select the appropriate transceiver to set ([FE-8020 No.1] or [FE-8020 No.2]), then press the **ENT** key.
4. Select [Draught], then press the **ENT** key. This will open a pop-up window.
5. If using a single transducer configuration, skip to step 8. For dual transducer configuration go to the next step.
6. Select [AFT] using ◀ or ▶.
7. Choose the draught depth using ▲ or ▼, then press the **ENT** to select [FORE].

The FORE/AFT bar is absent in single transducer configurations.



8. Adjust [FORE] draught using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. The available range is 0.0 m to 30.0 m.
9. Press the **MENU/ESC** key three times to close the menu.

1.17 Logbook

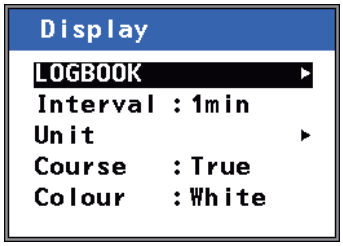
The logbook stores time, depth and own ship position in the form of a table. The logbook is capable of storing data for up to 24 hours or up to 720 log entries, across 72 pages.

Once the maximum number of entries is reached, the oldest entry is deleted to make room for the youngest entry.

How to display the logbook

To display the logbook, do the following:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [DISPLAY] using ▲ or ▼, then press the **ENT** key.
3. Select [LOGBOOK] using ▲ or ▼, then press the **ENT** key.
4. Press ▶ or ◀ to change the page currently displayed.
5. Press the **DISP** key to close the logbook.

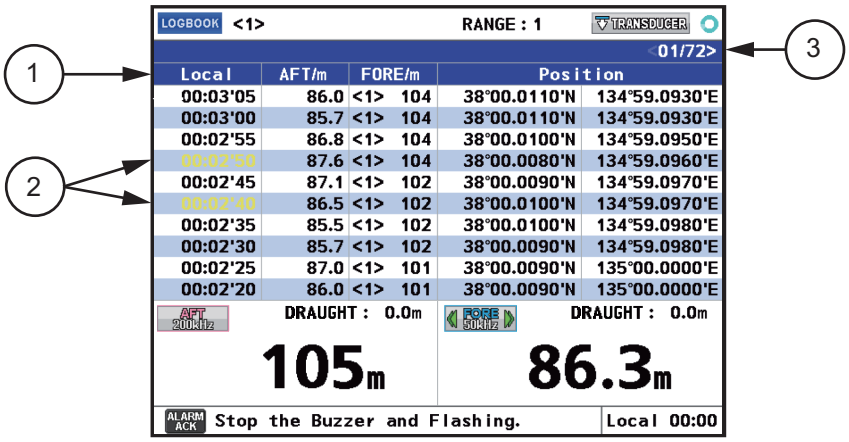


How to change the logging interval

The logging interval for each entry can be adjusted in the menu by doing the following:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Display] using ▲ or ▼, then press the **ENT** key.
3. Select [Interval] using ▲ or ▼ then press the **ENT** key. The Interval settings pop-up window will open.
4. Choose the appropriate interval (5 s - 1 hour max., 1 min - 12 hours max., 2 min - 24 hours max.) using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window.
5. Press the **MENU/ESC** key twice to close the menu.

Note: Changing the interval will change the data available to be displayed in the LOGBOOK.

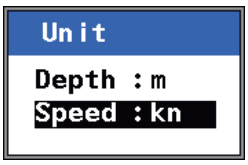


Number	Description
1	Currently displayed time setting. **[UTC]:** Coordinated Universal Time. **[Local]:** Time with UTC difference calculated. **[Time]:** Unit's internal clock time.
2	Changes color from black to yellow when **[Time Adjust]** is set to **[External]** and there is a switch from External to Internal clock.
3	Currently viewed page. Data is listed in order from newest to oldest.

1.18 How to Change the Unit of Measurement

You can change the displayed unit of measurement for depth and speed using the following procedure.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Display] using ▲ or ▼, then press the **ENT** key.
3. Select [Unit] using ▲ or ▼, then press the **ENT** key. This will open the [Unit] pop-up window.
4. Select the [Depth] or [Speed] using ▲ or ▼, then press **ENT** to open the settings pop-up window. The available options are shown in the table below.
5. Press the **MENU/ESC** key three times to close the menu.



Item	Unit
Depth	m (meters)
	ft (feet)
Speed	kn (knots)
	MPH (Miles Per Hour)
	km/h (Kilometers Per Hour)

1.19 How to Select the Displayed Course

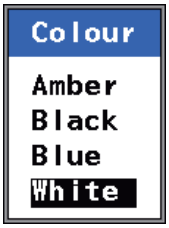
You can select a course reference, true or magnetic.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Display] using ▲ or ▼, then press the **ENT** key.
3. Select [Course] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
4. Select the course display using ▲ or ▼, then press **ENT** to apply the setting. The available options are [True] and [Magnetic].
5. Press the **MENU/ESC** key twice to close the menu.

1.20 How to Change the Colour Scheme

You can change the colour scheme of the display as follows:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [Display] using ▲ or ▼, then press the **ENT** key.
3. Select [Colour] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
4. Select the colour scheme using ▲ or ▼, then press **ENT** to apply the setting and close the pop-up window. The available options are shown in the figure to the right.
5. Press the **MENU/ESC** key twice to close the menu.

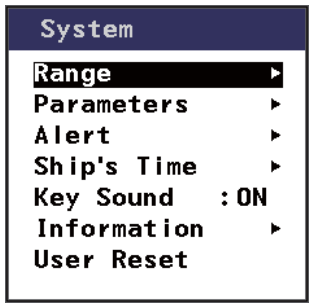


Color scheme	Background Color	Text Color
Amber	Black	White
Black	Black	White
Blue	White	Black
White	White	Black

2. SYSTEM MENU

The [System Menu] should be preset at installation. Normally, there is no need to access this menu.

Note: The echo display will be cleared when the [System Menu] is opened.

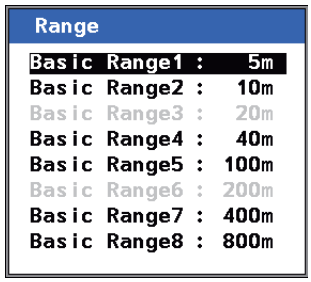


2.1 How to Set the Basic Range Scale

Use the table below for reference when changing the range scale settings. Depending on your configuration, some options may not be available.

Range scale setting	Range	Default
BASIC RANGE1	5 to (BR2-1)	5 m
BASIC RANGE2	(BR1+1) to 19	10 m
BASIC RANGE3	20	20 m
BASIC RANGE4	21 to (BR5-1)	40 m
BASIC RANGE5	(BR4+1) to 199	100 m
BASIC RANGE6	200	200 m
BASIC RANGE7	201 to (BR8-1)	400 m
BASIC RANGE8	(BR7+1) to 2400	800 m

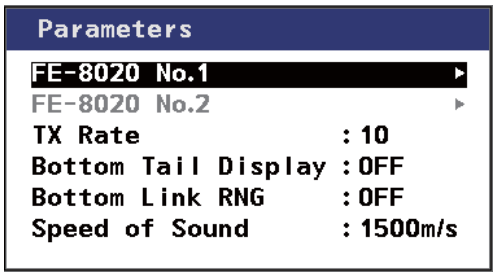
1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Range] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.



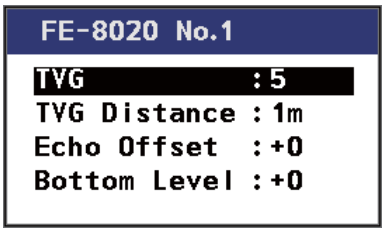
4. Select the basic range scale using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
5. Adjust the range, if required, using ▲ or ▼, then press the ENT key to apply the setting and close the pop-up window.
   To keep the default setting, press the **MENU/ESC** key or ◀.
6. Press the **MENU/ESC** key three times to close the menu.

2.2 How to Set Transducer Parameters

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Parameters] using ▲ or ▼, then press the **ENT** key.



4. Select [FE-8020 No. 1] or [FE-8020 No. 2] as appropriate using ▲ or ▼, then press the **ENT** key.



5. Select the parameter you wish to set using ▲ or ▼, then press the **ENT** key. This will open a pop-up window. The table below shows the available menu items and their available settings.

Menu item	Available setting range	Default
TVG	0 to 9	5
TVG Distance	1 m to 100 m	1 m
Echo Offset	-20 to +20	0
Bottom Level	-10 to +10	0

6. Adjust the parameter using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window.
   To keep the default setting, press ◀ or the **MENU/ESC** key.
7. Press the **MENU/ESC** key four times to close the menu.

2.2.1 Bottom level

If the depth indication is unstable or the seabed cannot be displayed steadily notwithstanding the adjustment of the control panel, you may adjust the bottom echo level.

To adjust the bottom level setting, see section 2.2.

Note: Do not switch transducer (frequency) at the Junction Box when setting the bottom level. If it is necessary to set bottom level for a different frequency, turn off the FE-800, switch transducer at Junction Box and then turn on the FE-800 again.

⚠ CAUTION

If the level is set too low, the FE-800 may not be able to distinguish the bottom from fish echo and the depth indication may be unstable.
If set too high, the depth indication does not appear.

2.2.2 TVG level

TVG (Time Varied Gain) compensates for propagation attenuation of the ultrasonic waves, reducing surface noise to provide a smooth display. The TVG lowers receiver sensitivity at the time of pulse emission and gradually increases it with time, thereby making objects of same reflectivity at different depths appear at the same intensity or colors on the display.

The TVG working depth is down to approximately 150 m on the 200 kHz system and 350 m on the 50 kHz system. Outside this range the echoes from the seabed and fish schools are received in full level. There is no perceivable deterioration in performance.

To adjust the TVG level or the TVG distance, see section 2.2.

Note: Do not switch transducers (frequency) at the Junction Box when setting the TVG level. If it is necessary to set TVG level for a different frequency, turn off the FE-800, switch transducers at the Junction Box and then turn on the FE-800 again.

2.2.3 Echo offset

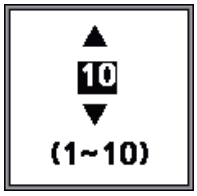
The echo offset feature functions to compensate for too weak or too strong echo level.

If the on-screen echo level appears to be too weak or too strong and the level cannot be adjusted satisfactorily with the GAIN control, see section 2.2 to adjust the TVG level.

2.3 How to Set TX Rate

TX rate adjusts the rate at which the FE-800 transmits a signal. The TX rate can be adjusted to compensate for noise created by other sounders.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Parameters] using ▲ or ▼, then press the **ENT** key.
4. Select [TX Rate] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.



5. Adjust the [TX Rate] using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. The higher the setting, the higher the rate at which the FE-800 outputs a signal. To keep the default setting (10), press ◀ or the **MENU/ESC** key.
6. Press the **MENU/ESC** key three times to close the menu.

2.4 How to Set Bottom Tail Display

You can change the color of the stronger echoes on the seabed by using the [Bottom Tail Display] function.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Parameters] using ▲ or ▼, then press the **ENT** key.
4. Select [Bottom Tail Display] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
5. Select [OFF] or [ON] as appropriate, then press the **ENT** key to apply the settings and close the pop-up window.
   To keep the default setting, press ◀ or the **MENU/ESC** key.
6. Press the **MENU/ESC** key three times to close the menu.

2.5 How to Set Bottom Link RNG

The pulsewidth can be changed in conjunction with either the seabed depth or the display range.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Parameters] using ▲ or ▼, then press the **ENT** key.
4. Select [Bottom Link RNG] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.
5. Select [OFF] or [ON] as appropriate, then press the **ENT** key to apply the settings and close the pop-up window. To keep the default setting, press ◀ or the **MENU/ESC** key.
6. Press the **MENU/ESC** key three times to close the menu.

2.6 How to Set the Speed of Sound

You can manually set the speed of sound to compensate for changes in temperature and salinity.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Parameters] using ▲ or ▼, then press the **ENT** key.
4. Select [Speed of Sound] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.

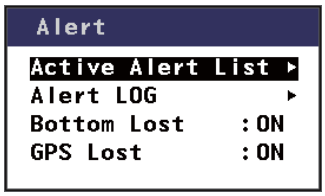
5. Adjust the parameter using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. To keep the default setting, press ◀ or the **MENU/ESC** key.
6. Press the **MENU/ESC** key three times to close the menu.

2.7 Alert Menu

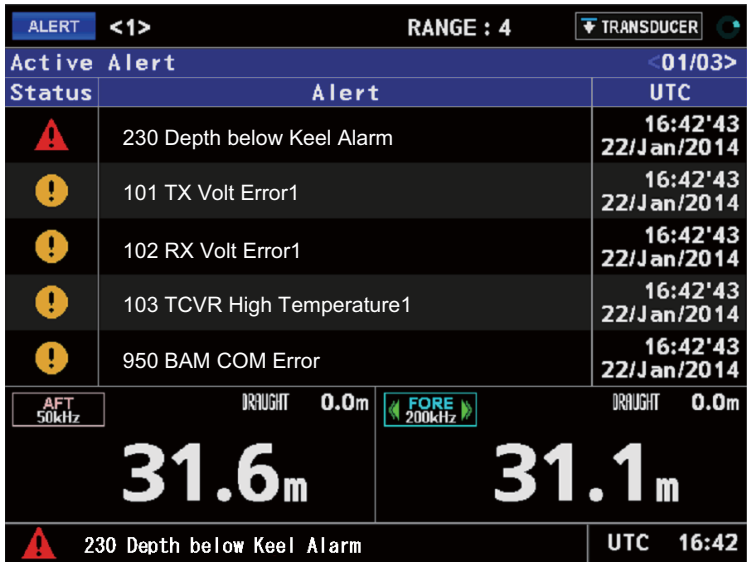
2.7.1 Active alert list

The [Active Alert] list shows the currently active alerts.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Alert] using ▲ or ▼, then press the **ENT** key.



4. Select [Active Alert] list using ▲ or ▼, then press the **ENT** key.

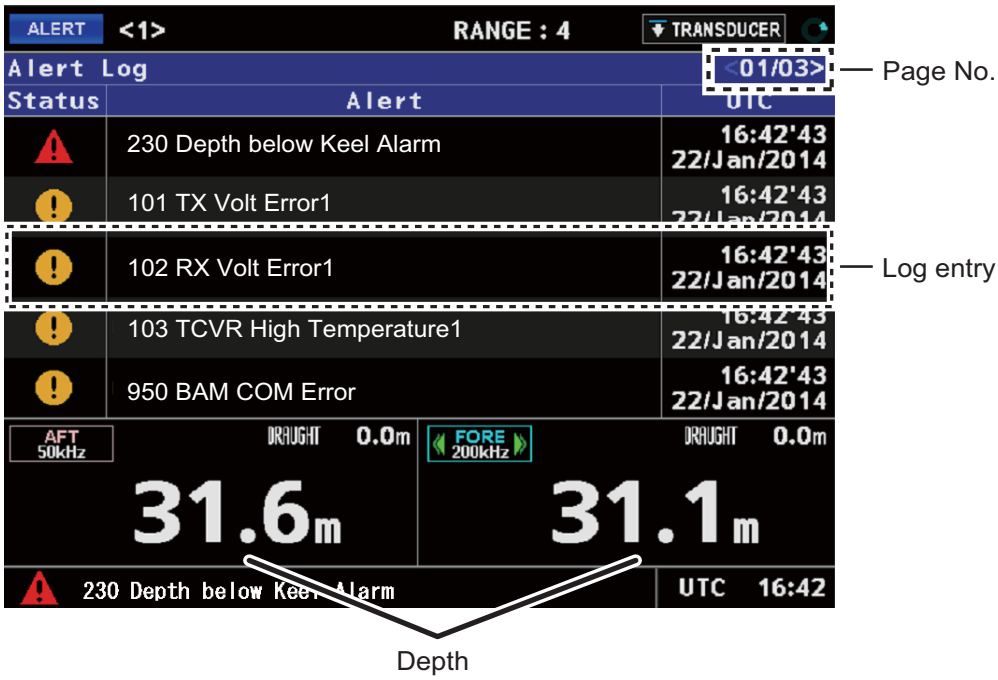


5. To change pages, use ◀ or ▶.
6. Press the **DISP** key to close the open menus.

2.7.2 How to display the alert log

The [Alert Log] tracks all alerts.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Alert] using ▲ or ▼, then press the **ENT** key.
4. Select [Alert Log] using ▲ or ▼, then press the **ENT** key.



Note: The above example shows alerts which are output under Alert I/F1 or Legacy settings. When the unit is using Alert I/F2 settings the alerts are output with the prefix “210”. For example “210301 DISP COM Error”.
For more information about alert codes and meanings, see section 2.8.
Alert I/F1, Alert I/F2 and Legacy settings are set during the initial installation. Consult a FURUNO technician to change these settings.

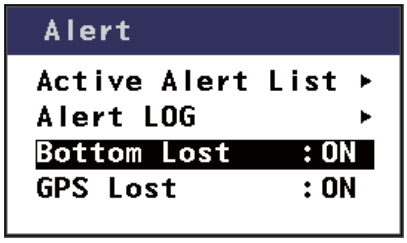
5. To change pages, use ◀ or ▶.
6. Press the **DISP** key to close the open menus.

2.7.3 Bottom lost

The FE-800 can output an alert when the seabed echo is lost.

To adjust the alert settings, do the following:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Alert] using ▲ or ▼, then press the **ENT** key.
4. Select [Bottom Lost] using ▲ or ▼, then press the **ENT** key.



5. Select [ON] to output an alert, select [OFF] to stop alert output.
6. Press the **DISP** key to close the open menus.

2.7.4 GPS lost

The FE-800 can output an alert when the GPS signal is lost.

To adjust the alert settings, do the following:

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Alert] using ▲ or ▼, then press the **ENT** key.
4. Select [GPS Lost] using ▲ or ▼, then press the **ENT** key.

5. Select [ON] to output an alert, select [OFF] to stop alert output.
6. Press the **DISP** key to close the open menus.

2.8 Alarms, Warnings and Cautions

When an error occurs, the system will attempt to notify the user with an audible alarm and a pop-up message window, similar to the one shown below.

Press the **ALARM ACK** key to acknowledge the alert and stop the audible alarm.

There are three priority-based levels to which the alert notification can be assigned. The table below lists the possible Alarms, Warnings and Cautions in order of priority from most urgent (Alarms) to least urgent (Cautions).

Note: All notifications are stored in the Alert LOG.

Alert ID	Alert text	Priority	Possible Cause
230	Depth below Keel Alarm	Alarm	Current depth is less than preset.
201101	TX Volt Error1	Warning	Voltage not within safe guidelines on transceiver 1.
201111	TX Volt Error2	Warning	Voltage not within safe guidelines on transceiver 2.
201102	RX Volt Error1	Warning	Voltage not within safe guidelines on transceiver 1.
201112	RX Volt Error2	Warning	Voltage not within safe guidelines on transceiver 2.
201103	TCVR High Temperature1	Warning	Temperature exceeds safe guidelines on transceiver 1.
201113	TCVR High Temperature2	Warning	Temperature exceeds safe guidelines on transceiver 2.
201301	DISP COM Error	Warning	Communication error between display unit and transceiver 1.
201302	TCVR COM Error	Warning	Communication error between transceiver 1 and transceiver 2.
201001	Bottom Lost	Warning	Seabed is not detected by equipment
201303	UTC Timeout	Caution	Connection with EPFS device (GPS) lost.
201104	Fan0 Speed Error1	Caution	Fan No.0's speed lower than minimum speed on transceiver 1.
201114	Fan0 Speed Error2	Caution	Fan No 0's speed lower than minimum speed on transceiver 2.
201950	BAM COM Error	Caution	Communication error with BAM.

Depending on your Alert mode, Alert ID can be output in two formats, 3-digit or 6 digit. Alert I/F1 and Legacy alert modes will output alert IDs in 3-digit format. Alert I/F2 will output alerts in 6-digit format.

Note: "Alert 230: Depth below keel alarm" will only output in 3-digit format.

The 6-digit format has the prefix "201" added to the normal 3-digit format.

For example: Alert ID "201101" is in Alert I/F2 format, the equivalent in Alert I/F1 and Legacy format is "101".

Note: Alert I/F1, Alert I/F2 and Legacy settings are set during the initial installation. Consult a FURUNO technician to change these settings.

2.8.1 Alert icons and their meanings

Icon	Description	Priority	Icon color
	Active-unacknowledged notification, icon is flashing. The cause of the notification is still present. Flashing: One second interval, 0.5 second ON time. Buzzer: Three short audible beeps, followed by seven seconds silence, then repeats.	Alarm	Red
	Active-silenced notification, icon is flashing. The buzzer has been silenced, the cause of the notification is still present. Flashing: One second interval, 0.5 second ON time. Buzzer: Silent.	Alarm	Red
	Rectified-unacknowledged notification, icon is flashing. Flashing: Four second interval, three second ON time. Buzzer: Silent.	Alarm	Red
	Active-acknowledged, icon is displayed steadily.	Alarm	Red
	Active-responsibility transferred, icon is displayed steadily.	Alarm	Red
	Active-unacknowledged notification, icon is flashing. Flashing: One second interval, 0.5 second ON time. Buzzer: Two short audible beeps, followed by one minute silence, then repeats.	Warning	Orange
	Active-silenced notification, icon is flashing. Flashing: One second interval, 0.5 second ON time. Buzzer: Silent.	Warning	Orange
	Rectified-unacknowledged notification, icon is flashing. Flashing: Four second interval, three second ON time. Buzzer: Silent.	Warning	Orange
	Active-responsibility transferred, icon is displayed steadily.	Warning	Orange
	Active-acknowledged, icon is displayed steadily.	Warning	Orange
	Active, icon is displayed steadily.	Caution	Yellow

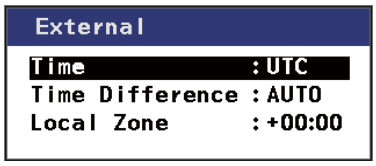
2.9 How to Set or Adjust the Time

The unit can display the time from an external EPFS device (such as GPS), or the unit's internal clock. The time source is selected during the initial installation and requires a FURUNO technician to adjust the setting. The source which has not been selected at installation will be displayed as a grey, unselectable menu item in the [Ship's Time] menu. The example below shows [External] as the selected source, with [Internal] as unselectable (grey).

In configurations where the time source is set to [External] and the source signal is lost (for example, the GPS fails), the unit reverts to the internal clock and the time is displayed in yellow.

2.9.1 External time

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Ship's Time] using ▲ or ▼, then press the **ENT** key.
4. Select [External] using ▲ or ▼, then press the **ENT** key.



5. Select [Time] or [Local Difference] as appropriate, using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.

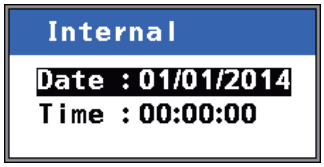
Menu item	Setting range	Default
Time	UTC (UTC Time difference) Local (Ship's local time)	**UTC**
Time Difference	Auto or Manual	**AUTO**
Local Zone	-13:45 to +13:45 (at 15 minute intervals)	**0:00**

6. Adjust the parameter using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. To keep the default setting, press the **DISP** key or the **MENU/ESC** key.
7. Press the **MENU/ESC** key four times to close the menu.

2.9.2 Internal time

The internal clock can be set to show the day, month, year, hour, minute and second. By default, this is set to "**00:00:00 1/Jan/2014**". You can adjust the time as follows.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Ships's Time] using ▲ or ▼, then press the **ENT** key.
4. Select [Internal] using ▲ or ▼, then press the **ENT** key. This will open a pop-up window.



5. Select [Date] or [Time] as appropriate, using ▲ or ▼, then press the **ENT** key.

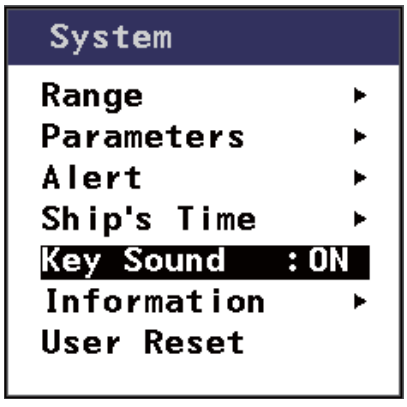
Setting	Format
Date	Day/Month/Year
Time	Hours:minutes:seconds

6. Adjust the parameter using ▲ or ▼, then press the **ENT** key to apply the settings and close the pop-up window. To keep the default setting, press the **DISP** key or the **MENU/ESC** key.
7. Press the **MENU/ESC** key four times to close the menu.

2.10 Key Beeps

Each key press on the FE-800 can produce a beep sound. You can turn the key beep off by doing the following.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Key Sound] using ▲ or ▼, then press the **ENT** key.

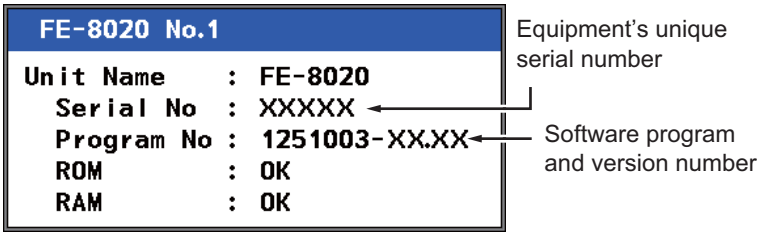


4. Select [ON] to output a sound, select [OFF] to stop sound output.
5. Press the **DISP** key to close the menu.

2.11 System Information

The system information display shows information about your FE-800 unit and the transceiver(s) connected to it. The figure below is an example of the information screen.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [Information] using ▲ or ▼, then press the **ENT** key. A confirmation pop-up window will appear.
4. Select [FE-8010], [FE-8010 No.1] or [FE-8020 No.2] as appropriate using ▲ or ▼, then press the **ENT** key.



5. Press the **DISP** key to close the open menus.

2.12 User Reset

You can restore the factory default settings using this menu.

1. Press the **MENU/ESC** key to open the Main menu.
2. Select [System] using ▲ or ▼, then press the **ENT** key.
3. Select [User Reset] using ▲ or ▼, then press the **ENT** key. A confirmation pop-up window will appear.

4. Select [YES] or [NO] as appropriate using ▲ or ▼, then press the **ENT** key.
5. Press the **MENU/ESC** key twice to close the menu.

3. MAINTENANCE AND TROUBLESHOOTING

⚠ WARNING

Do not open the cover.

There are no user-serviceable parts inside.

Refer any repair work to a qualified technician.

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 Checklist

Regular maintenance is essential for good performance. Checking the items listed below on a regular basis will keep the equipment in good shape for years to come.

Item	Action
Cable run	If conductors are exposed, replace cable.
Display unit ground	If corroded, clean.
Ship's main voltage	If out of rating, correct the problem.

3.2 Cleaning the Display Unit

Dust or dirt on the cabinet can be removed with a soft cloth. If desired, a water-moistened cloth may be used. Do not use chemical cleaners, they may remove paint and markings.

To clean the LCD, wipe the LCD 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. Also, do not use a degreaser or an antifog solution, as they can strip the coating from the LCD.

3.3 Transducer Maintenance

Marine life on the transducer face will result in a gradual decrease in sensitivity.

Check the transducer face for cleanliness each time the ship is dry-docked. Carefully remove any marine life with a piece of wood or fine-grade sandpaper.

3.4 Replacing the Fuse/Battery

If a fuse blows, find the cause before replacing it. Use only designated fuses. Using the wrong fuse will damage the unit and void the warranty. Consult your dealer for replacement of the fuse.

A battery installed on a circuit board inside the transceiver unit preserves data when the power is turned off. The life of the battery is about ten years. When the battery voltage is low, a warning message "Displayed time may be incorrect. Please re-set the clock." appears after the self-test. When this happens, contact your dealer to request a replacement of the battery. Press any key to proceed to the main display screen.

Note: The message "Displayed time may be incorrect. Please re-set the clock." appears when the FE-800 is turned on for the first time. In this case, the battery does not need replacement, however the clock must be set.

Item	Type	Code Number
Lithium Battery	BR-1225-A/BK	000-178-989-10
Glass Tube Fuse (for AC input, 2 pcs)	FGMB 250V 2A PBF	000-157-497-10

3.5 Troubleshooting

The table below provides simple troubleshooting procedures which you may follow to restore normal operation. If you cannot restore normal operation, contact your dealer.

SYMPTOM	PROBABLE CAUSE	REMEDY
No picture, no reading measure	Low voltage	Check the supply voltage.
	Fuse blown	Refer to section 3.4.
	Power cable damaged	Repair the cable.
No echo sounding picture	Transducer cable damaged	Repair the cable.
	Transducer cable connection loosened	Tighten the connections.
Irregular display	Low sensitivity	Increase the gain (refer to section 1.7).
	Low reflectivity from seabed.	Suspect muddy seabed.
	Marine life on transducer	Remove marine life from the transducer when dry-docked.
Loss of seabed display	Out of range	Check the range scale setting.
	Air bubbles caused by going astern or running over other ships' wake	This is normal. It is not a sign of equipment trouble.
Heavy noise	Wrong installation at the transducer	Find cause of noise. Relocate the transducer if noise persists.
	Other echo sounders nearby	If more than one echo sounder is working on the ship, there is no ideal measure to cure the problem.
Surface noise	Aeration in near surface water	Not an equipment problem.
	Rough weather	Not an equipment problem.

3.6 Fan and LCD Backlight Life Expectancy

Item	Life Expectancy
Fan	60,000 hours at 60°C
LCD backlight	60,000 hours at 35°C

APPENDIX 1 MENU TREE

All default settings are in bold italic

MAIN MENU
- 1 Day/Night
- 2 Depth Alarm
- 3 Output Depth
- 4 FE-8020 Select
- 5 Sounder
- 6 Display
- 7 System

1 Day/Night (***Day*** /Night)

2 Depth Alarm (0 to 2400m) ***Default=20m***

3 Output Depth (AFT/FORE)

4 FE-8020 Select (***No. 1*** , No. 2)

5 Sounder
- DEPTH (BELOW) (Transducer, ***Keel*** , Surface)
- FE-8020 No. 1
  - Draught (***0.0m*** to 30.0m)
  - Manual GAIN (0 to 9) ***Default=5***
  - AUTO GAIN (***OFF*** , ON)
  - AUTO GAIN ADJ (-10 to +10) ***Default=0***
  - Clutter (0 to 7) ***Default=7***
  - IR (***OFF*** , IR1, IR2, IR3)
- FE-8020 No. 2
  - Draught (***0.0m*** to 30.0m)
  - Manual GAIN (0 to 9) ***Default=5***
  - AUTO GAIN (***OFF*** , ON)
  - AUTO GAIN ADJ (-10 to +10) ***Default=0***
  - Clutter (0 to 7) ***Default=7***
  - IR (***OFF*** , IR1, IR2, IR3)
- PICT Advance (***SLOW*** , FAST)
- Auto Range (***OFF*** , ON)

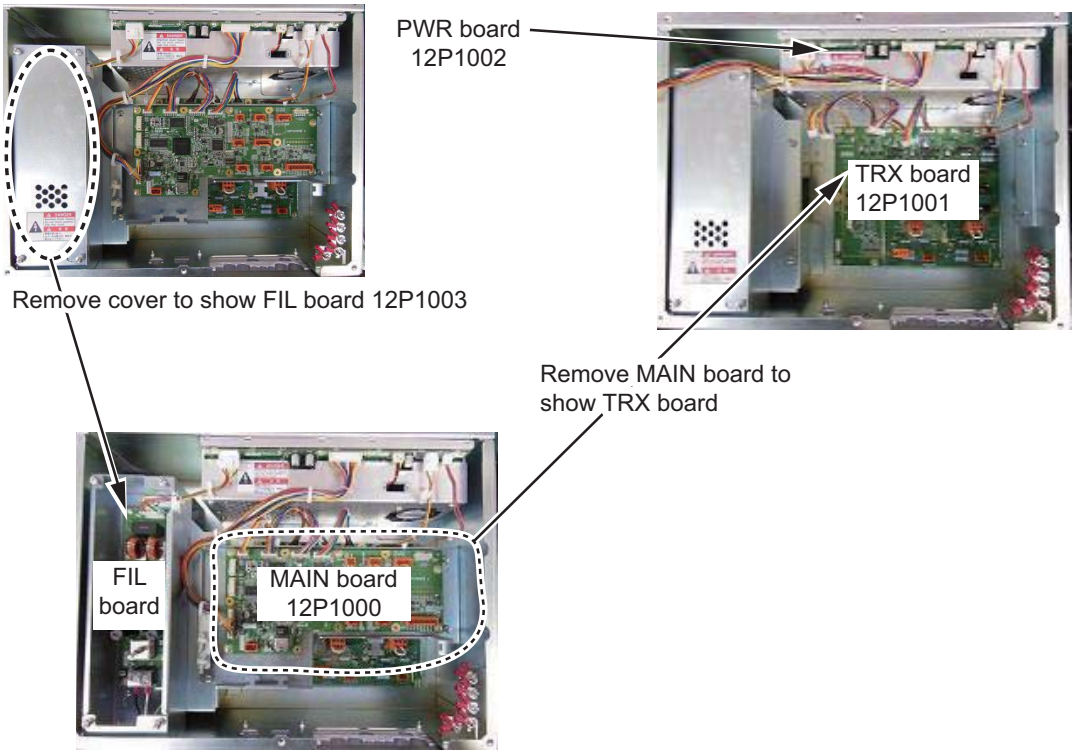
6 Display
- LOGBOOK
- Interval (5s, ***1 min*** , 2 min)
- Unit
  - Depth (***m*** , ft)
  - Speed (***kn*** , MPH, km/h)
- Course (***True*** , Magnetic)
- Color (***Amber*** , Black, Blue, White)

7 System

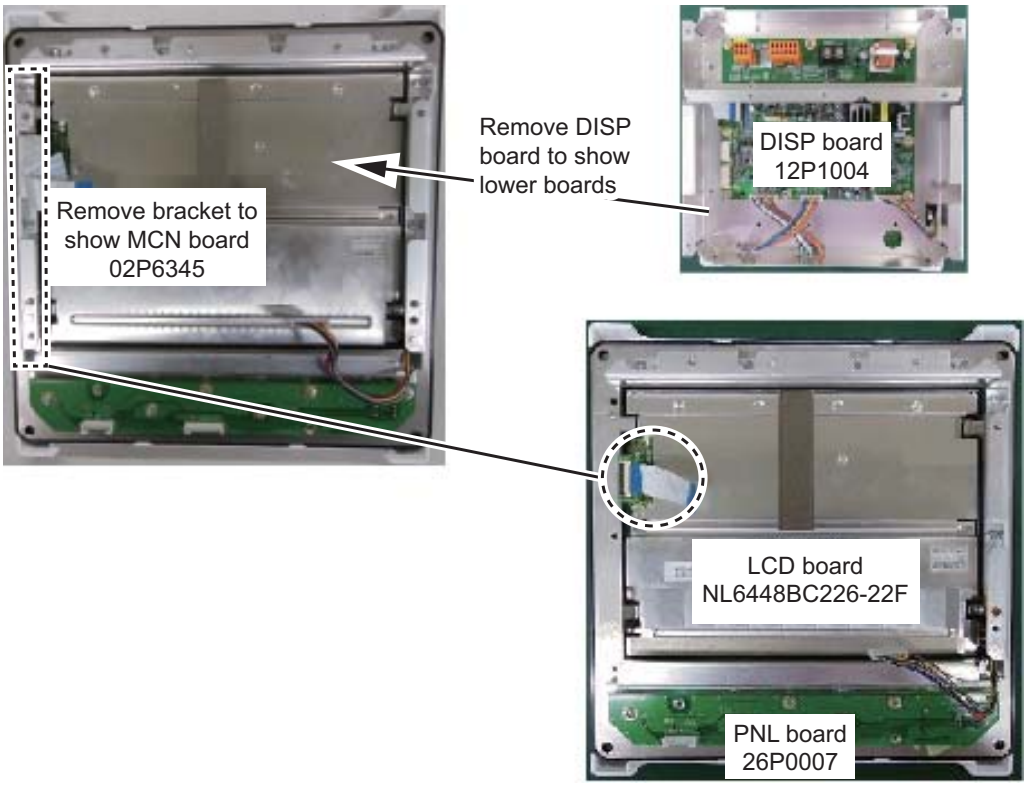
- Range
  - Basic Range1 (2 to 18) ***Default=5m***
  - Basic Range2 ((BR1+1) to (BR3-1)) ***Default=10m***
  - Basic Range3 (20) ***Default=20m***
  - Basic Range4 (21 to (BR5-1)) ***Default=40m***
  - Basic Range5 ((BR4+1) to 199) ***Default=100m***
  - Basic Range6 (200) ***Default=200m***
  - Basic Range7 (201 to (BR8-1)) ***Default=400m***
  - Basic Range8 ((BR7+1) to 2400) ***Default=800m***
- System Parameters
  - No. 1 Parameters
    - TVG (0 to 9) ***Default=5***
    - TVG Distance (***1m*** to 100m)
    - Echo Offset (-20 to +20) ***Default=0***
    - Bottom Level (-10 to +10) ***Default=0***
  - No. 2 Parameters
    - TVG (0 to 9) ***Default=5***
    - TVG Distance (***1m*** to 100m)
    - Echo Offset (-20 to +20) ***Default=0***
    - Bottom Level (-10 to +10) ***Default=0***
  - TX Rate (1 to 10) ***Default=10***
  - Bottom Tail Display (***OFF*** , ON)
  - Bottom Link RNG (***OFF*** , ON)
  - Speed of Sound (1480 to 1520) ***Default=1500m/s***
- Alert
  - Active Alert List
  - Alert Log
  - Bottom Lost (OFF***, ON***)
  - GPS Lost (OFF, ***ON***)
- Ship's Time
  - External
    - Time (***UTC*** , Local)
    - Time Difference (***AUTO*** , Manual)
    - Local Zone (-13;45 to +13:45) ***Default=0:00***
  - Internal
    - Date (***01/01/2014*** to 31/12/2099)
    - Time (***00:00:00*** to 23:59:59)
- Key Sound (OFF, **ON**)
- Information
  - FE-8010
  - FE-8020 No. 1
  - FE-8020 No. 2
- User Reset (YES, NO)

APPENDIX 2 PARTS LOCATIONS

Transceiver unit FE8020



Display unit FE-8010



APPENDIX 3 LIST OF TERMS AND ABBREVIATIONS

Term	Meaning	Term	Meaning
ADD	Address	IR	Interference Rejector
ACK	Acknowledge	I/F	Interface
ADJ	Adjust	I/O	Input/Output
AFT	Aft	IP	Internet Protocol
ALARM	Alarm	Jan	January
ALERT	Alert	Jul	July
Apr	April	Jun	June
Aug	August	KEEL	Keel
AUTO	Automatic	kn	Knots
BAM	Bridge Alert Management	km/h	Kilometers per hour
BRILL	Brilliance	KP	Keying Pulse
COG	Course Over the Ground	LA	Loran A
COM	Communication	LC	Loran C
CONFIG	Configuration	LCD	Liquid Crystal Display
DATA	Data	LOG	Log
DBS	Depth Below Surface	LOGBOOK	Logbook
DE	Decca Navigator	m	Meters
Dec	December	Mar	March
DEMO	Demonstration	May	May
DEST	Destination	MENU	Menu
DISP	Display	MPH	Miles Per Hour
DRAUGHT	Draught	NMEA	National Marine Electronics Association
ENT	Enter	OFF	Off
EPFS	Electronic Position Fixing System	ON	On
ESC	Escape	NAV	Navigation
EQUIP	Equipment	Nov	November
EXT	External	Oct	October
ft	Feet	OS	Own Ship
FAN	Fan	PICT	Picture
Feb	February	POSN	Position
FORE	Fore	RAM	Random Access Memory
FUNC	Function	RNG, RANGE	Range
GA	Galileo positioning system	ROM	Read Only Memory
GAIN	Gain	SEL	Select
GL	GLONASS positioning system	Sep	September
GN	Global navigation satellite system	SFI	System Function ID
GP, GPS	Global Positioning System	SOG	Speed Over the Ground
HISTORY	History	SURFACE	Surface
IEC	International Electrotechnical Commission	T	True
II	Integrated Instrumentation	TEST	Test
IN	Integrated Navigation	TCVR	Transceiver

Term	Meaning
TRANSDUCER, XDR	Transducer
TVG	Time Varied Gain
TX	Transmit
UTC	Universal Time, Coordinated

SPECIFICATIONS OF NAVIGATIONAL ECHO SOUNDER FE-800

1 TRANSCEIVER UNIT

1.1 Transmit frequency: 50 kHz, 200 kHz or alternating transmit among these frequencies

1.2 Output power: 1 kWrms

1.3 Measuring range: 2 to 200 m on 50 kHz, 1 to 200 m on 200 kHz

1.4 Accuracy: 0.5 m at 20 m range, 5 m at 200 m range, or 2.5% of depth range

1.5 Basic display range

Unit	Range							
	1	2	3	4	5	6	7	8
Meter	5	10	20	40	100	200	400	800
Feet	15	30	60	120	300	600	1500	2500

1.6 Roll/pitch tolerance: Rolling: ±10°, Pitching: ±5°

1.7 Data recording period

Recording period (hrs)	24	12	1
Interval (min.)	2	1	0.5

1.8 Display mode: "NAV": Basic echo presentation with the depth below transducer, keel or sea surface
"HISTORY": Historical presentation with the depth
"OS data": Echo presentation with the pop-up table of present navigational data; L/L, course, speed, time, depth
Dual-frequency display

1.9 Auto-mode: Range, Gain

1.10 Picture advance speed: 15 minutes (200 m range) or more

1.11 Alarm: Shallow depth

2 DISPLAY UNIT

2.1 Display: 8.4-inch color LCD, 640x480 (VGA) , 0.267 mm/dot

2.2 Picture color: Echo: 8 colors, Character and ground: 3 colors

2.3 Interface: RS-232C: 1 port (for printer)

2.4 Visible distance

Depth: 3.8 m

Others: 0.9 m nominal

3 INTERFACE

3.1 Number of ports

IEC61162-1: Input: 2, Output: 4

IEC61162-450: I/O: 1 (Ethernet 100base-TX, RJ45 connector),
Transmission group
IN: MISC, NAVD, OUT: Arbitrary (default: NAVD)
IEEE802.3 data link

Contact closure: Output: 1

3.2 Data sentences (IEC61162)

Input: ACK, ACM/ACN, GGA, GLL, HBT, RMA, RMC, VTG, ZDA

	Output	ALC, ALF, ALR, ARC, DBK*[1], DBS*[1], DBT*[2], DPT, HBT

*[1]: Not SOLAS compliant. *[2]: Available when the transducer face is same level as keel.

3.3	Output proprietary sentence	
	PFEC	msi (mandatory, for multiple transducer installation)
3.4	Alarm output	Dry contact, Normal open/close (24 VDC/ 2 A)

4 POWER SUPPLY

4.1	Transceiver unit	100-230 VAC: 0.7-0.4 A, 1 phase, 50-60 Hz
4.2	Display unit	24 VDC, 0.4 A (supplied from transceiver unit)
4.3	Printer (option)	12-24 VDC: 1.3 A max. (for printing)

5 ENVIRONMENTAL CONDITIONS

5.1	Ambient temperature	-15°C to +55°C
5.2	Relative humidity	93% or less at +40°C
5.3	Degree of protection	
	Transceiver unit	IP22: Bulkhead mount, IP20: Tabletop mount
	Display unit	IP22
	Matching box	IP45
5.4	Vibration	IEC 60945 Ed.4

6 UNIT COLOR

6.1	Transceiver unit	N2.5
6.2	Display unit	N2.5

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Publication No. DOCQA0593

Declaration of Conformity

0735

We FURUNO ELECTRIC CO., LTD.

(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan

(Address)

declare under our sole responsibility that the product

NAVIGATIONAL ECHO SOUNDER FE-800

(Model name, type number)

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

IMO Resolution A.224(VII)	IEC 60945 Ed.4.0: 2002
IMO Resolution A.694(17)	IEC 61162-1 Ed.4.0: 2010
IMO Resolution MSC.74(69) Annex 4	IEC 61162-450 Ed.1.0: 2011
IMO Resolution MSC.191(79)	IEC 62288 Ed.2.0: 2014
IMO Resolution MSC.302(87)	IEC61924-2 Ed.1.0: 2012 Annex K and M
2000 HSC Code 13	ISO 9875 Ed.3.0: 2000

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

For assessment, see

- EC Type Examination (Module B) Certificate No.MED-B-9054 issued by Det Norske Veritas Germanischer Lloyd (DNV GL), Norway.
- EC Quality System (Module D) Certificate No. BSH/4613/02208/2345/12 issued by Federal Maritime and Hydrographic Agency (BSH), The Federal Republic of Germany.

This declaration is issued according to the provisions of European Council Directive 96/98/EC on marine equipment modified by Commission Directive 2012/32/EU and 2013/52/EU.

On behalf of Furuno Electric Co., Ltd.

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(Elemental Chlorine Free)

The paper used in this manual
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