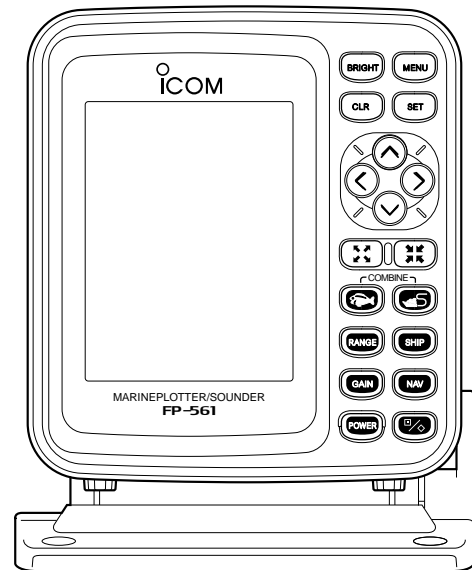




INSTRUCTION MANUAL

MARINE PLOTTER/SOUNDER
FP-561



Electronic charts are not legal replacements for paper charts. Always carry and consult current official charts frequently.

INTRODUCTION

Thank you very much for purchasing the FP-561. The FP-561 is an advanced navigation and fishfinding system of compact design into which a marine navigator with a built-in GPS receiver and a fishfinder are integrated.

Connecting the PD-200, a DGPS beacon receiver, to this system will permit the GPS to pinpoint the ship location more accurately.

Please read this instruction manual carefully to ensure correct and efficient use of the product.

Cartography supplied by

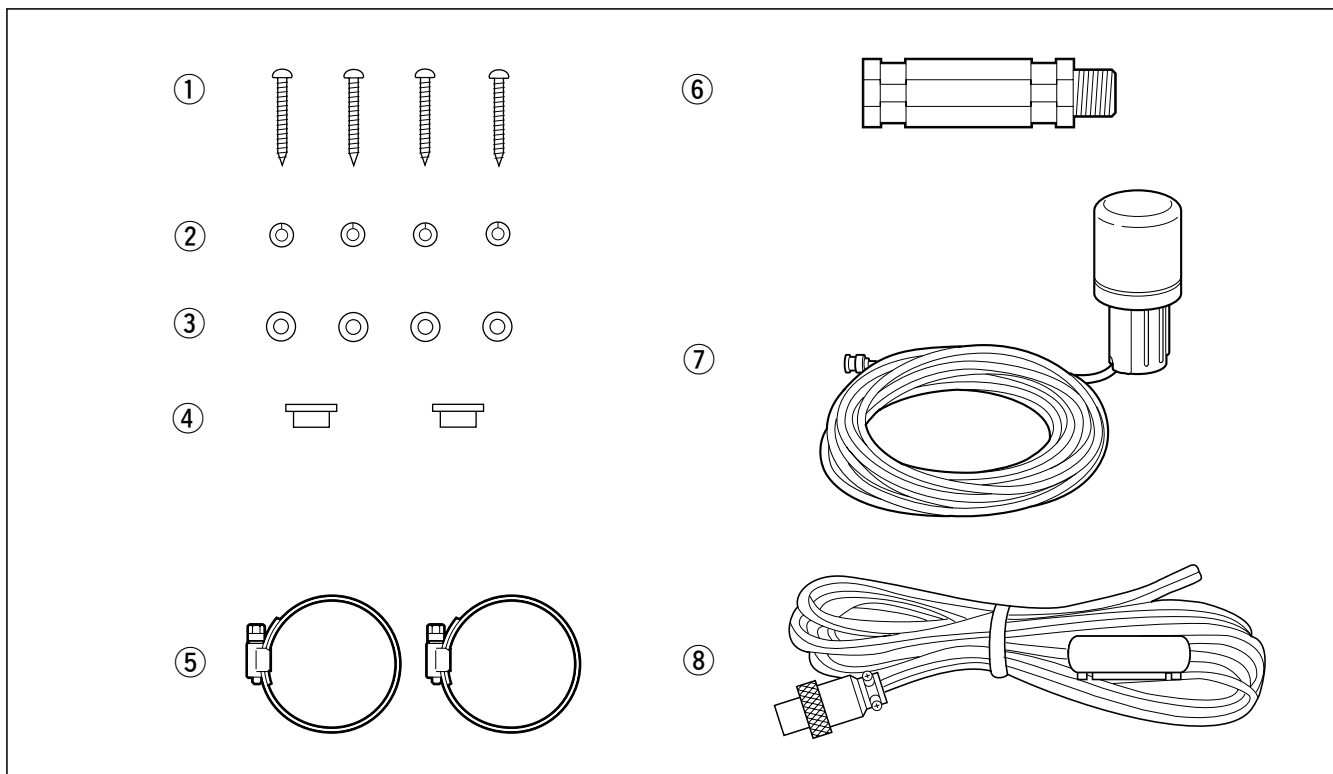


NAVIONICS Seamless chart start from \$99 and span the globe with high detail and 16 zoom levels.

Ask your nearest NAVIONICS dealer for more details.

SUPPLIED ACCESSORIES

	Qty.	
① Self-tapping screws (M 6 × 30).....	4	● Instruction manual
② Spring washers (M 6)	4	
③ Flat washers (M 6).....	4	
④ Connector covers.....	2	
⑤ Horse band (HAS-40).....	2	
⑥ Extention pipe (2273 PIPE).....	1	
⑦ GPS antenna	1	
⑧ Power cable (OPC-786).....	1	



Versions of the FP-561 which display "CE" on the serial number seal, comply with the essential requirements of the 89/336/EEC directive for Electromagnetic Compatibility.

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Be sure to read the following safety notices to ensure safe use of the product.

- The safety notices are for preventing personal injury and property damage.
- Observe the following safety notices to ensure safe and proper used of the product.
- After you finish reading this manual, store it in a safe place for future reference.

⚠ WARNING

Each of the following warning notices indicates that neglecting the suggested procedure or practice may result in death or serious personal injury.

- **Be sure turn off the power by pressing the power key or disconnect the power cable from the battery immediately when the product produces smoke or smells of something burning.**
Failure to do so may cause a fire or electric shock.
After making sure that smoking ceases, contact your dealer or our service personnel for inspection.
- **Do not install the product in areas where it is exposed to flammable gases.**
Doing so may cause a fire or an explosion.
- **Supply the product with the specified voltage or use the specified power supply.**
Otherwise, a malfunction or fire may result.
- **Use the specified fuse.**
Otherwise, a malfunction or fire may result.
- **Do not remove the cover and touch internal parts of the product.**
Doing so may cause death due to a high voltage inside the product.
Servicing and adjustment of the product must be performed by competent persons.
- **Be sure to electrically ground the product to the hull.**
Failure to do so may cause electric shock or leak.
- **Be careful to prevent foreign objects from entering the product.**
Foreign objects including metal chips, wire scraps and liquids inside the product may cause a shortcircuit, fire or malfunction.
- **A through-the-hull type echo sounding transducer must be installed by a shipbuilder or an expert installer.**
Otherwise, the ship could be waterlogged.

⚠ CAUTION

Each of the following caution notices indicates that neglecting the suggested procedure or practice may result in personal injury or property damage.

- **Navigation-aid data among other information provided by the product is not intended for navigational use by itself.**
For detailed and latest information for navigation, consult nautical charts and Notices to Mariners.
- **Always hold the plug when removing the power cable from the power supply.**
Pulling the power cable may cause damage to the power cable and a fire or electric shock.
- **Do not install the product, antenna and transducer in areas other than specified.**
Doing so may cause an accident or a malfunction.
- **Do not expose the product to water.**
Doing so may cause a malfunction or fire.
- **Never modify or attempt to repair the product by yourself.**
Doing so could cause a malfunction or fire.
Only competent persons are allowed to modify or repair the product.
- **Do not scrape, tailor, strain, twist, or put a heavy object on, the power cable.**
Doing so may damage the cable, resulting in a fire or electric shock.
- **Do not touch the power cable with wet hands.**
Doing so may cause electric shock.
- **Observe the polarity when plugging the product to the power supply.**
Reverse connection will cause a malfunction or fire.

⚠ CAUTION

Each of the following caution notices indicates that neglecting the suggested procedure or practice may result in personal injury or property damage.

Data card handling precautions:

- Do not put data cards into such a pocket or poly bag that is electrically charged.
- Do not leave data cards in an area exposed to direct sunlight or seawater.
- Be careful to prevent dust or dirt from entering the connector of data cards (keep the card slot free of dirt).
- Do not bend data cards or put a heavy object on them.
- Do not throw or drop data cards.
- Be sure to power off the product before inserting or removing a data card to or from the card slot.

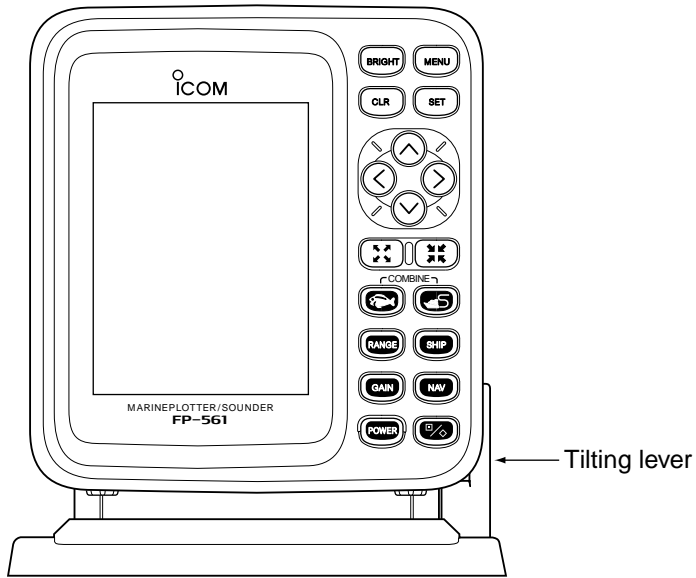
Other precautions

- Do not install the product close to speakers, power transformers or other equipment that produces a magnetic field.
 - When starting the engine of the ship involves a rapid fall in supply voltage to the product, be sure to start the engine before powering on the product.
 - Avoid using organic solvents such as thinner or benzene to clean the product.
These solvents will cause damage to the product surface.
To clean the product or antenna, wipe it using a soft cloth dampened with a water-diluted detergent.
 - The product contains a lithium battery (having a life of approx. five years) which retains GPS positioning data. If this backup battery is completely dead, the GPS almanac data is lost and it will take a long time to acquire navigational satellites. Registered navigational marks and routes are also lost.
- If these symptoms appear, contact your dealer or our local sales office.**
- The LCD is of high-density type having an effective pixel percentage of at least 99.99%; it may have an ineffective pixel or "always active" pixel percentage of max. 0.01% under normal conditions.
 - The LCD is a consumable component and has a life expectancy of approx. 10,000 operation hours. When the service life expires, the LCD screen will darken, flicker or provide no display.
At the first sign of these symptoms, the LCD should be replaced. Consult your dealer or our service personnel.

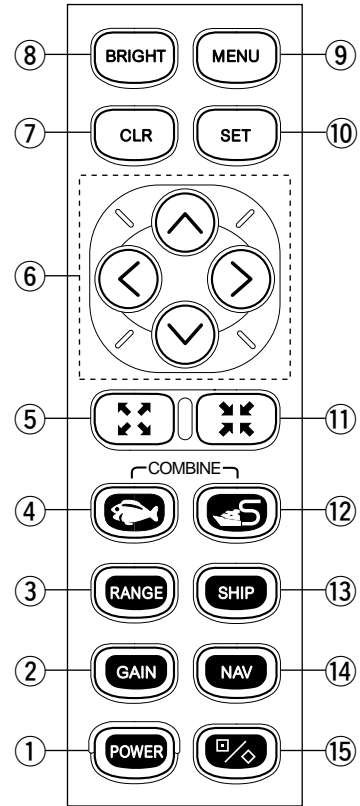
2



















PARTS AND FUNCTIONS

■ Main unit



■ Operation panel



KEY		FUNCTION
①	 [POWER] key	Press to power on or off the product (☞ P. 5). Each time this key is pressed, the power is turned on and off alternately.
②	 [GAIN] key	Use to set the image sensitivity (☞ P. 52) on the fishfinder screen.
③	 [RANGE] key	Use to set the depth range (☞ P. 52) or depth shift (☞ P. 53), or to enter auto operation (☞ P. 53).
④	 [SOUNDER] key	Use to select the fishfinder mode (☞ Pgs. 6 & 44). Using the [SOUNDER]-[PLOTTER] key combination causes the system to enter the Combination mode.
⑤	 [ZOOM-IN] key	Use to zoom in the coastline screen image (☞ P. 18). This key can be used to zoom in the bottom rock screen image and the marker zoom-in screen image.
⑥	 [UP] key  [DOWN] key  [LEFT] key  [RIGHT] key	Use to activate and move the cross hair cursor (☞ P. 18) and fishfinder markers. These keys can also be used to select a menu item or change settings. * To move the cross hair cursor: Using the [UP]-[LEFT] or [UP]-[RIGHT] key combination allows you to move the cross hair cursor to the upper left or right. Using the [DOWN]-[LEFT] or [DOWN]-[RIGHT] key combination allows you to move the cross hair cursor to the lower left or right.
⑦	 [CLR] key	Use to delete marks or abort setting on various screens.
⑧	 [BRIGHT] key	Use to adjust the brightness and contrast (☞ P. 5) of screen display.
⑨	 [MENU] key	Use to select the menu screen (☞ P. 7).
⑩	 [SET] key	Use to execute operations or save settings.
⑪	 [ZOOM-OUT] key	Use to zoom out the coastline screen image (☞ P. 18). This key can also be used to zoom out the bottom rock screen image and the marker zoom-in screen image.
⑫	 [PLOTTER] key	Use to select the plotter mode (☞ Pgs. 6 & 12). Using the [PLOTTER]-[SOUNDER] key combination causes the system to enter the Combination mode.
⑬	 [SHIP] key	Use to center the current ship position on a screen (☞ P. 19). Pressing this key causes the cross hair cursor to disappear from the screen.
⑭	 [NAV] key	Use to select either of the destination navigation or the route navigation (☞ Pgs. 28 & 29).
⑮	 [MARK] key	Use to edit or register marks (☞ P. 26).

3-1 Powering on or off the system

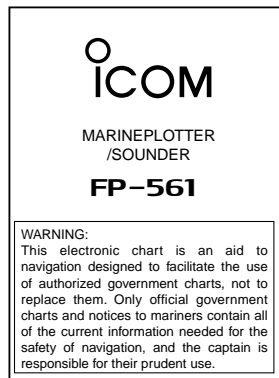
After installing the system, be sure to perform initial setting according to the instructions in Chapter 5 “Initial Setting after Installation” (P. 62 ff.).

- ① Press the [POWER] key.

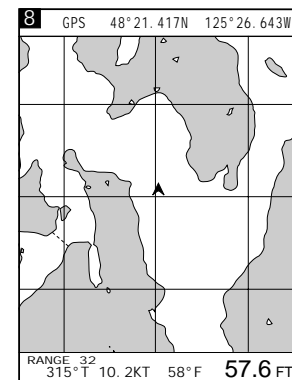
The system will sound an electronic beep, display the opening screen for approx. ten seconds and then enter the screen where you left off.

- ② To power off the system, press the [POWER] key again.

Opening screen



After approx. 10 seconds



3-2 Adjusting the LCD brightness and contrast

The LCD can be adjusted in brightness and contrast according to the environment of the installation site.

- ① Press the [BRIGHT] key.

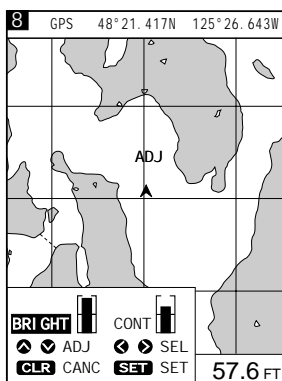
A level bar indicating the LCD brightness and contrast will appear at the lower left of the screen.

- ② Press the [LEFT] or [RIGHT] key to select setting item “Brightness” or “Contrast”.

The selected item is highlighted in blue.

- ③ Press [UP] or [DOWN] key to set the selected item.

- ④ Press the [SET] key to save the setting.



3-3 Alarm sound

The system produces an alarm sound when key operation is erroneous or invalid.

You will hear an alarm sound when

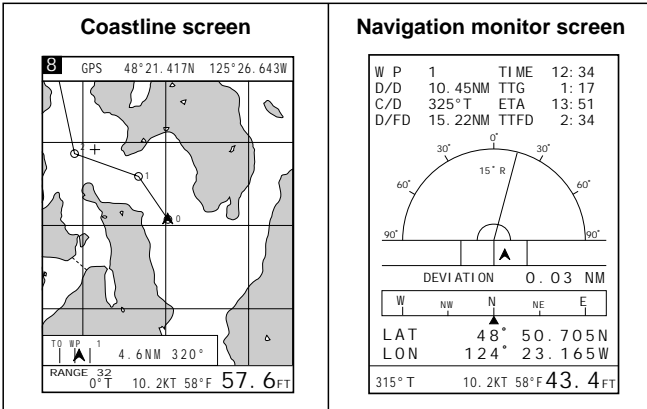
- pressing an inoperative key,
- performing erroneous key operation,
- pressing an invalid key in plotter mode,
- pressing an invalid key in sounder mode,
- pressing an invalid key in combination mode, or
- pressing an invalid key on a menu screen.

Note that an electronic beep sound is heard when the power is turned on or correct key operation is done.

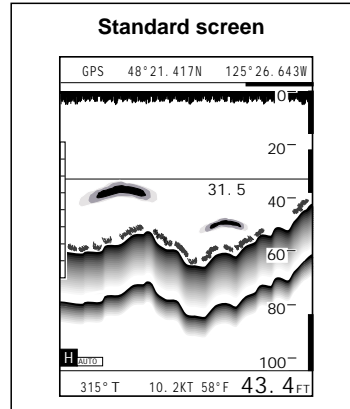
4-1 How to change operation modes

Three operation modes are available for this system: the plotter mode, sounder mode and combination mode.

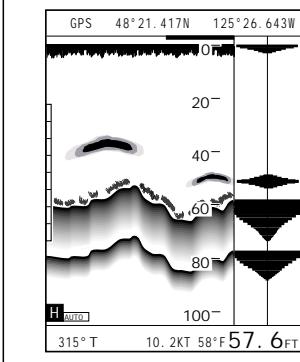
• Plotter mode



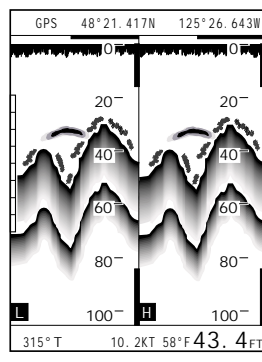
• Sounder mode



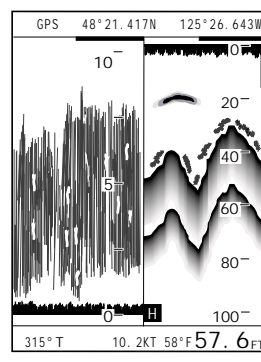
Standard + A scope screen



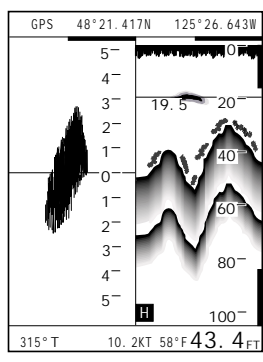
Dual screen



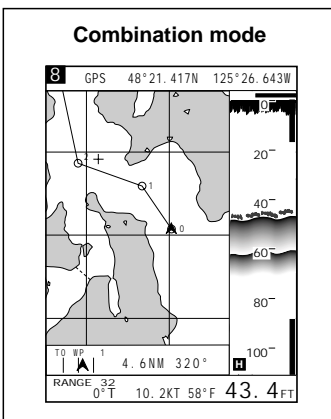
Standard + Bottom lock screen



Standard + Marker zoom-in screen



• Combination



To change the operation mode, proceed as follows.

- ① When the system is in plotter mode:
Press the [SOUNDER] key. The system will enter the fishfinder mode.
- ② When the system is in fishfinder mode:
Press the [PLOTTER] key. The system will enter the plotter mode.
- ③ When the system in plotter or fishfinder mode:
Press the [SOUNDER] and [PLOTTER] keys simultaneously. The system will enter the combination mode.
- ④ When the system is in combination mode:
Press the [SOUNDER] or [PLOTTER] key. The system will enter the mode corresponding to the key pressed.

In combination mode, only the combination screen is available. This screen consists of the following two screens.

- Standard screen of fishfinder mode
- Coastline screen of plotter mode

When the combination mode is canceled, the display will move to the standard screen of the fishfinder mode or the coastline screen of the plotter mode.

4 AVAILABLE OPERATION MODES AND SCREENS

4-2 Menu operation

Menu screens allows you to select and execute various functions of the system or to change various settings.

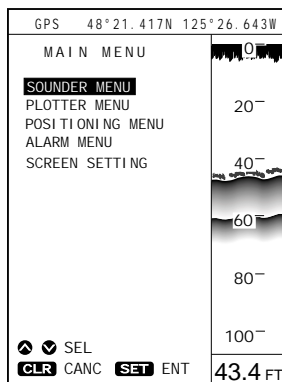
For available menu screens and the menu structure, see page 9.

The following summarizes the menu operation flow.

- ① Press the [MENU] key.
The Main Menu screen will appear.
The currently selected menu item (a submenu) is highlighted in yellow.
- ② Select the desired submenu (e.g., Plotter Menu) using the [UP] or [DOWN] key and press the [SET] key.
The selected submenu (e.g., Plotter Menu) screen will appear.
On the submenu screen, the currently selected menu item (setting item) is highlighted in yellow.
- ③ Select the desired setting item using the [UP] or [DOWN] key and press the [SET] key.
The selected setting item turns blue and the corresponding setting field is highlighted in yellow.
* While any setting item is highlighted in blue, you cannot move to other submenu screens.
- ④ Select the desired setting option in the setting field using the [LEFT] or [RIGHT] key and press the [SET] key.
Alternatively, select the desired digit using the [LEFT] or [RIGHT] key and enter or change the value using the [UP] or [DOWN] key; then press the [SET] key.
- ⑤ Repeat step ④ above for each setting item.
- ⑥ Repeat steps ③ to ⑤ above for each submenu.
- ⑦ When you finish setting, press the [CLR] momentarily to close the Main Menu screen.

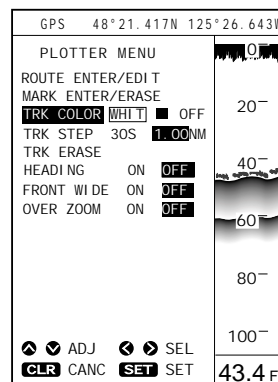
For detailed description of setting on each submenu screen, see the appropriate section.

• Main Menu screen



- SEL Press to select a submenu.
- ENT Press to open the submenu.
- CANC Press to return to the previous screen.

• Plotter Menu screen



- SEL Use to select a setting option or digit.
- ADJ Use to change the value of the digit.
- SET Press to confirm and save the setting.
- CANC Press to clear or cancel the setting and return to the item selection step.
When pressing this key during the item selection step, you will returns to the previous screen.

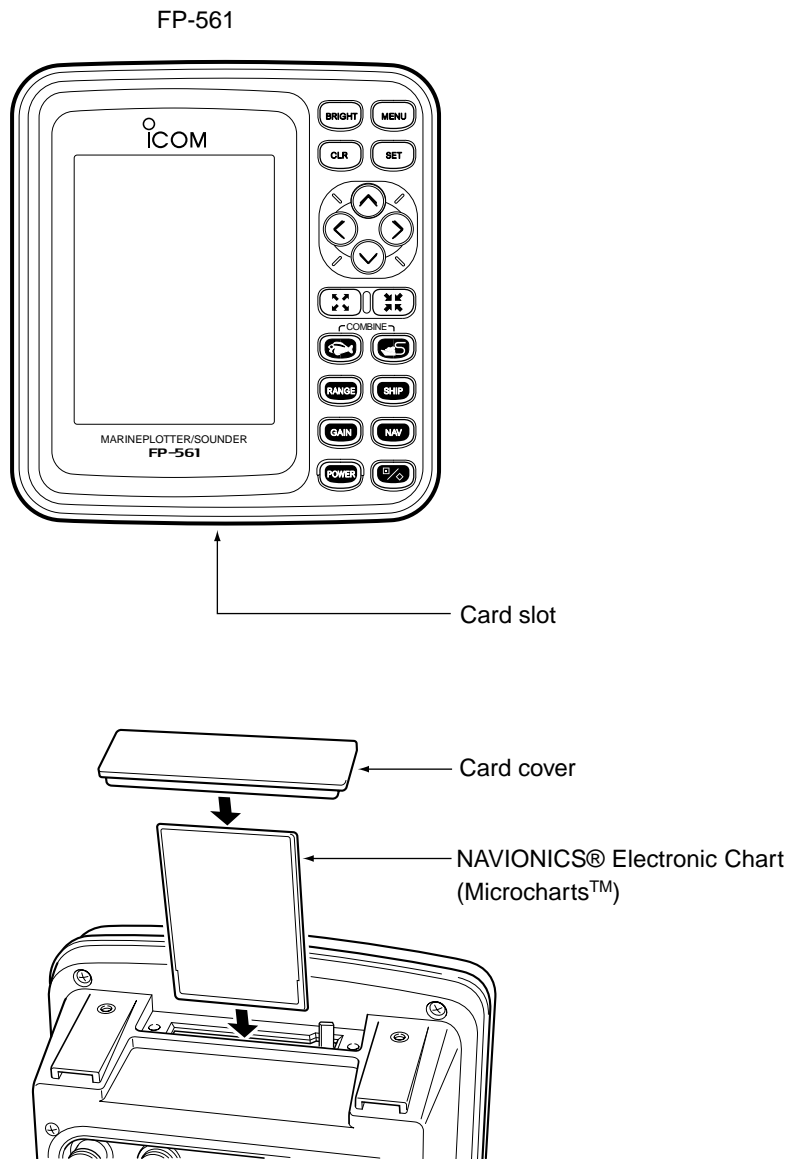
4-3 Electronic Chart card

■ How to insert a Electronic Chart card

Be sure to power off the system before inserting or removing a Electronic Chart card into or from the card slot.

Insert a NAVIONICS® Electronic Chart card carefully into the card slot with the card face (on which “↑” is marked) directed to the same direction as the display. Forcing a Electronic Chart card into the slot will cause damage to the card socket in the slot.

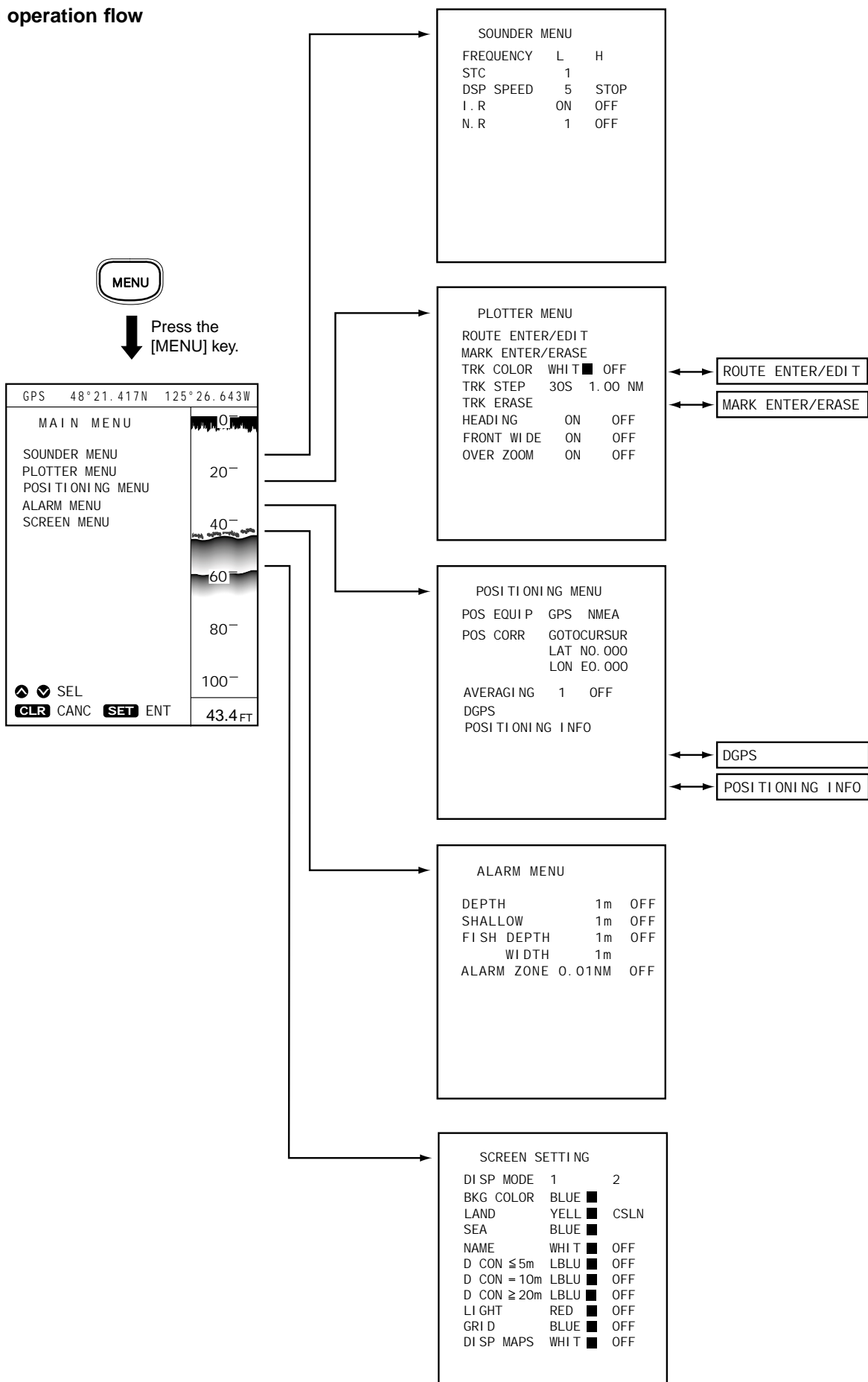
If the system fails to operate normally even through an Electronic Chart card has been inserted, remove the card once and then reinsert it.



Card slot located at the bottom

4 AVAILABLE OPERATION MODES AND SCREENS

• Menu operation flow





PLOTTER MODE



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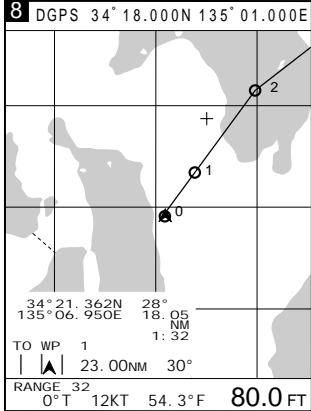
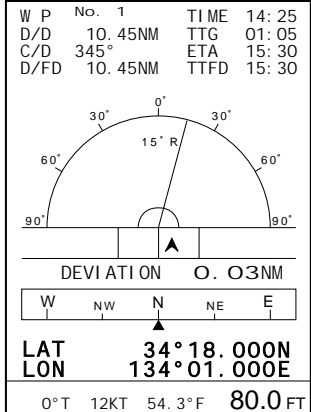
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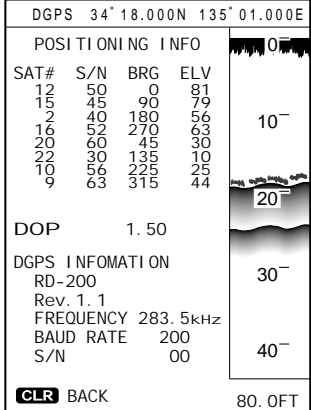
(1)-1 How to access screens

In plotter mode, the following two screens are available.

Pressing the [PLOTTER] key in plotter mode allows selection between the coastline screen and the navigation monitor screen.

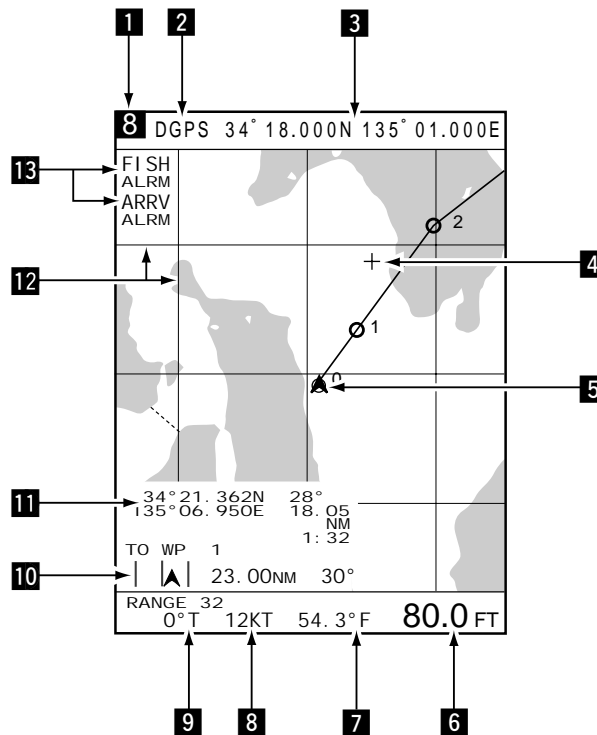
Screen No. and name	Description
<p style="text-align: center;">Coastline screen</p>  <p>DGPS 34° 18.000N 135° 01.000E</p> <p>34° 21.362N 28° 18.05 NM 135° 06.950E 1: 32</p> <p>TO WP 1 23.00NM 30°</p> <p>RANGE 32 0° T 12KT 54.3°F 80.0 FT</p>	<p>This screen indicates various navigational data including coastlines, track and marks.</p>
<p style="text-align: center;">Navigation monitor screen</p>  <p>W P No. 1 TIME 14: 25 D/D 10.45NM TTG 01: 05 C/D 345° ETA 15: 30 D/FD 10.45NM TTFD 15: 30</p> <p>DEVIATION 0.03NM</p> <p>LAT 34° 18.000N LON 134° 01.000E</p> <p>0° T 12KT 54.3°F 80.0 FT</p>	<p>This screen indicates easy-to-understand graphical and text information helpful for navigation.</p>

The Positioning Information screen can be accessed from the Positioning Menu screen. (P. 38)

<p style="text-align: center;">Positioning Information screen</p>  <p>DGPS 34° 18.000N 135° 01.000E</p> <p>POSITIONING INFO</p> <table border="1"> <thead> <tr> <th>SAT#</th> <th>S/N</th> <th>BRG</th> <th>ELV</th> </tr> </thead> <tbody> <tr><td>12</td><td>50</td><td>0</td><td>81</td></tr> <tr><td>15</td><td>45</td><td>90</td><td>79</td></tr> <tr><td>2</td><td>40</td><td>180</td><td>56</td></tr> <tr><td>16</td><td>52</td><td>270</td><td>63</td></tr> <tr><td>20</td><td>60</td><td>45</td><td>30</td></tr> <tr><td>22</td><td>30</td><td>135</td><td>10</td></tr> <tr><td>10</td><td>56</td><td>225</td><td>25</td></tr> <tr><td>9</td><td>63</td><td>315</td><td>44</td></tr> </tbody> </table> <p>DOP 1.50</p> <p>DGPS INFORMATION RD-200 Rev. 1.1 FREQUENCY 283.5kHz BAUD RATE 200 S/N 00</p> <p>CLR BACK 80.0 FT</p>	SAT#	S/N	BRG	ELV	12	50	0	81	15	45	90	79	2	40	180	56	16	52	270	63	20	60	45	30	22	30	135	10	10	56	225	25	9	63	315	44	<p>This screen shows GPS/DGPS information.</p>
SAT#	S/N	BRG	ELV																																		
12	50	0	81																																		
15	45	90	79																																		
2	40	180	56																																		
16	52	270	63																																		
20	60	45	30																																		
22	30	135	10																																		
10	56	225	25																																		
9	63	315	44																																		

1 ◀ PLOTTER MODE ▶ AVAILABLE SCREENS AND INDICATIONS

(1)-2 Coastline screen



1 Reduced scale

This field shows the current scale to which the coast line image is displayed. The coastline image can be zoomed in or out to a total of 16 scales (☞ P. 17).

2 Positioning device

This field shows the positioning device in use.

Indication	DGPS	GPS	EXT
Positioning device in use	DGPS+GPS	GPS	External NMEA

3 Ship position

This field shows the current ship position in latitude/longitude. White characters in the field mean that the positioning is done normally. Red characters in the field suggest that the system fails to pinpoint the current ship position due to a positioning error or the like. The field is blank if no data is received for 10 seconds or more due to a connection error.

4 Cross hair cursor

The cross hair cursor appears on the screen when the [UP]/[DOWN] or [LEFT]/[RIGHT] key is pressed.

5 Ship position mark

This mark shows the current ship position. The ship is currently located at the center of this mark. This mark changes to “●” when the ship slows down to 3 knots (or equivalent in km/h or MI/h) or less.

6 Depth

This field shows the current depth of water.

- 7 Water temperature** This field shows the current water temperature.
If no water temperature sensor is installed, the field is blank.

- 8 Speed** This field shows the current ship speed.
If no speed data is found, the field is blank.

- 9 Azimuth** This field shows the current azimuth of the bow (at which the ship is navigated).
"T" or "M" indicates true or magnetic bearing, respectively. See p. 64 for settings.

- 10 Monitor** This field shows the destination No., the destination azimuth relative to the current
ship position, the distance from the ship to the destination, and the deviation out of
course. The deviation out of course is indicated graphically.

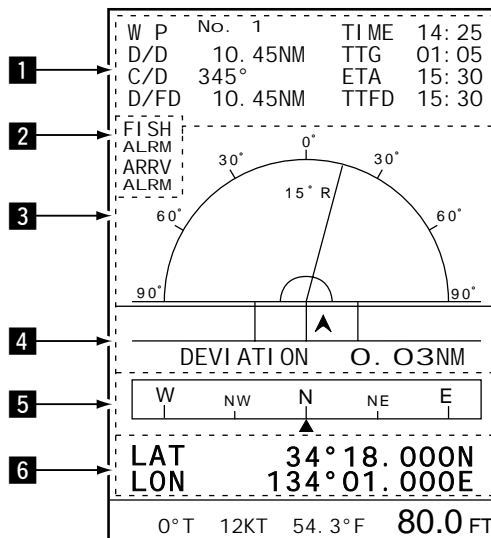
- 11 Cursor position** This field shows the intersection position of the cross hair cursor (in latitude/longi-
tude) and the azimuth and distance of the intersection relative to the current ship
position. Aligning the intersection of the cross hair cursor with the mark yields the
position data of the mark.

- 12 Latitude/longitude lines** The latitude and longitude lines can be displayed by operation on the Screen
Setting screen (→ P. 18).

- 13 Alarm indication** Alarms that can be displayed in this field include shoal alarm, depth alarm or fish
alarm for the fishfinder mode, and arrival alarm or range alarm for the plotter mode.

1 ◀ PLOTTER MODE ▶ AVAILABLE SCREENS AND INDICATIONS

(1)-3 Navigation monitor screen



1 Monitor

This field shows navigation data including the destination No., the destination azimuth, the distance to the destination, and the time to arrive the destination.

2 Alarm indication

Alarms that can be displayed in this field include shoal alarm, depth alarm or fish alarm for the fishfinder mode, and arrival alarm or range alarm for the plotter mode.

3 Azimuth deviation

This field shows the current ship azimuth graphically (with a green line) and numerically on the assumption that the destination azimuth is zero degree.

Note that, although the deviation of the ship azimuth from the destination azimuth exceeds 90 degrees, the reading remains 90 degrees.

4 Distance deviation

This field shows the deviation out of course in distance graphically and numerically.

When alarm limits are set with the alarm function, they are displayed with red lines on the screen.

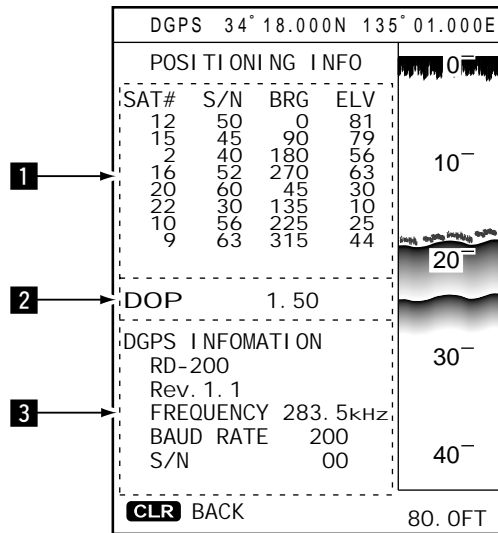
5 Compass

This field shows the direction to which the ship is being navigated.

6 Ship position

This field shows the current ship position in latitude/longitude.

(1)-4 Positioning Information screen



1 Satellite

This field shows and locates the navigational satellites that the system is being tracked.

2 DOP

This field shows the geometrical arrangement of the navigational satellites and the ship in the form of DOP (Dilution Of Precision) ranging from 0.00 to 99.99 (→ P. 38). The lower this value is, the better the geometrical arrangement is for the system to receive signals from the satellites.

3 DGPS information

This field shows DGPS positioning information.

(2)-1 Zooming in or out coastline images

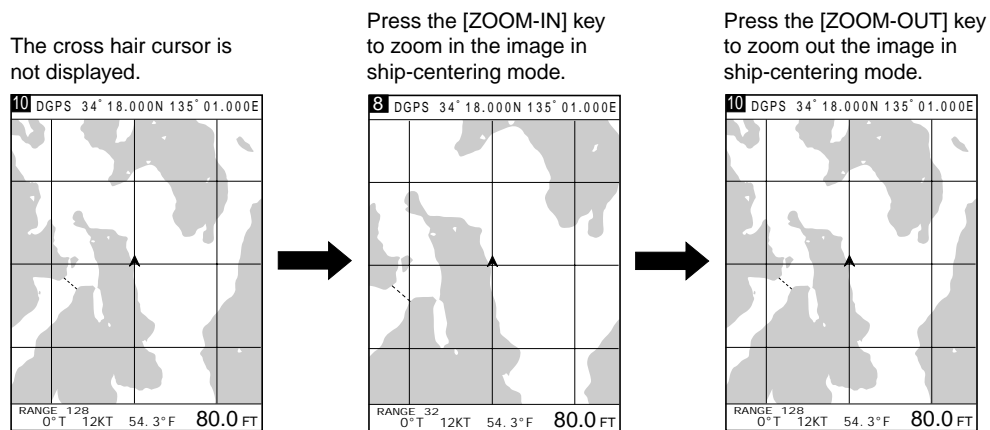
A 16 reduced scales

The coastline image on the screen can be zoomed in or out to 0.125/256 NM per dot to 4096/256 NM per dot (10 to 15). See p. 30 for over zoom function. The zooming center may be the ship position or the cross hair cursor position.

B Ship-centering mode

In this mode, the coastline image is zoomed in or out while the current ship mark is centered on the screen.

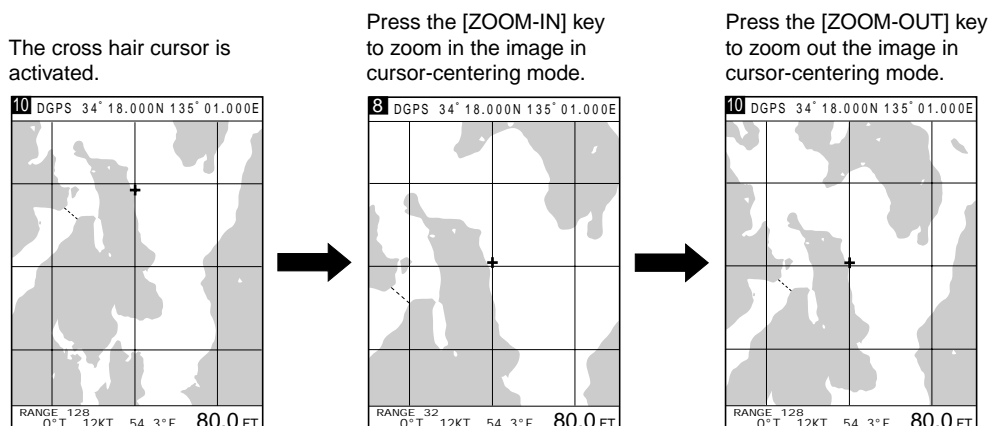
When the cross hair cursor is not active, pressing the [ZOOM-IN] or [ZOOM-OUT] key causes zooming operation to be done in this mode.



C Cursor-centering mode

In this mode, the coastline image is zoomed in or out while the cross hair cursor position is centered on the screen.

- ① Press [UP]/[DOWN] or [LEFT]/[RIGHT] key to activate the cross hair cursor on the screen.
- ② Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor to the desired position on the screen.
Using the [UP]-[LEFT] or [UP]-[RIGHT] key combination allows you to move the cross hair cursor to the upper left or right.
Using the [DOWN]-[LEFT] or [DOWN]-[RIGHT] key combination allows you to move the cross hair cursor to the lower left or right.
* When the cross hair cursor reaches a screen edge, the coastline image is scrolled.
- ③ Use the [ZOOM-IN] or [ZOOM-OUT] key to enlarge or reduce the image to the desired scale in cursor-centering mode.
* When you press the [SHIP] key in cursor-centering mode, the cross hair cursor disappears and the system goes to the ship-centering mode.



(2)-2 Ship-centering mode

In ship-centering mode, the coastline image is automatically adjusted so that the ship is always at the center of the screen.

The system defaults to the ship-centering mode.

■ Manual operation (when the cross hair cursor is active)

If the ship mark is missing from the screen on which the cross hair cursor is active, pressing the [SHIP] key allows the system to go to the ship-centering mode, where the cross hair cursor disappears and the ship mark is centered on the screen.

A ROM card contains coastline data consisting of at least two screens. If a ROM card (a NAVIONICS® Electronic Chart) is not inserted into the card slot, no coastline data is displayed.

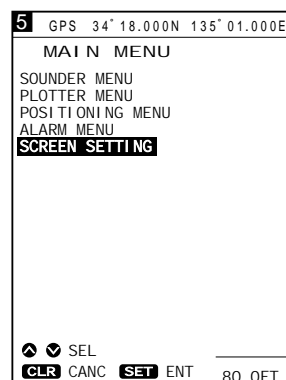
(2)-3 Displaying the latitude and longitude lines

The loxodromic latitude and longitude lines can be displayed on the coastline screen.

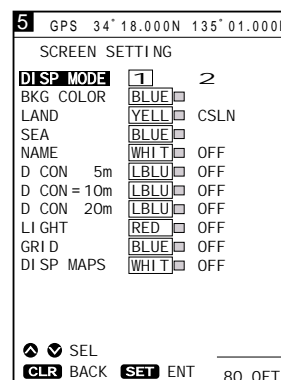
The color of these lines can be selected from seven options.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Screen Setting" using the [UP] or [DOWN] key and press the [SET] key.
The Screen Setting screen will appear.
- ③ Select "GRID" using the [UP] or [DOWN] key and press the [SET] key.
The selected menu item turns blue.
- ⑤ Move to the color field using the [LEFT] key.
The color field is highlighted in yellow.
- ⑥ Select the desired color from among available colors (White (WHIT), Yellow (YELL), Light blue (LBLU), Purple (PURP), Red, Green (GREE), Blue) and press the [SET] key.
The color of the latitude/longitude lines changes to the selected option.
* If you do not want to display the latitude/longitude lines on the screen, select "OFF" and press the [SET] key.
- ⑦ When you finish setting, press the [MENU] key.
The previous screen appears.

● Main Menu screen

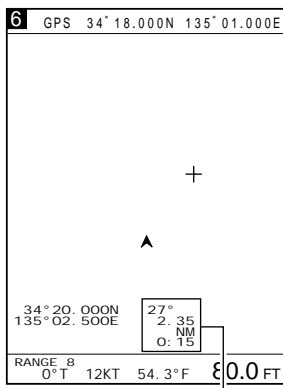


● Screen Setting screen



(2)-4 Measuring the distance and azimuth between two points

A Measurement between the ship mark and the cursor position



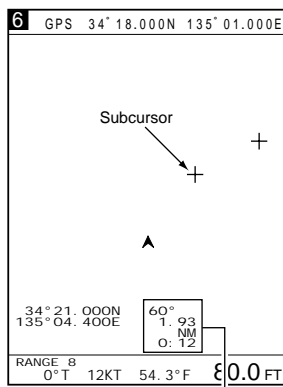
Cursor position field where the distance and azimuth between the ship and the cursor position are displayed

Using the cross hair cursor permits you to measure the distance and azimuth between two points easily.

The distance and azimuth that can be measured are between the ship mark and the cursor position or between two points specified with the cursor.

- ① Press the [UP]/[DOWN] or [LEFT]/[RIGHT] key to activate the cross hair cursor (in light blue).
The cursor position is indicated at the lower left of the screen.
* When the cross hair cursor is activated, the auto ship-centering mode is canceled.
- ② Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor to the desired position.
Using the [UP]-[LEFT] or [UP]-[RIGHT] key combination allows you to move the cross hair cursor to the upper left or right.
Using the [DOWN]-[LEFT] or [DOWN]-[RIGHT] key combination allows you to move the cross hair cursor to the lower left or right.
* When the cross hair cursor reaches a screen edge, the coastline image is scrolled.
- ③ The distance between the ship mark and the cursor position and the azimuth of the cursor position relative to the ship mark are displayed in the cursor position field. When the ship mark coincides with the cursor position, a message indicating the ship reaches the cursor position is displayed in this field.

B Measurement between two points specified with the cursor



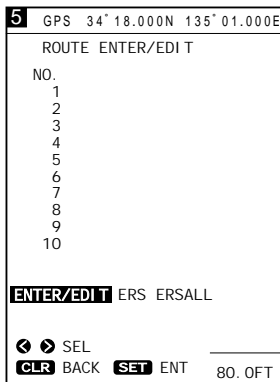
Cursor position field where the distance and azimuth between two points are displayed

- ① Press the [UP]/[DOWN] or [LEFT]/[RIGHT] key to activate the cross hair cursor (in light blue).
- ② Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor to the desired first point.
- ③ Press the [SET] key.
The first point (subcursor position) turns red.
The distance and azimuth readings in the cursor position field will also turn red.
- ④ Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor (light blue) to the desired second point.
* Pressing the [SET] key causes the subcursor to turn light blue, allowing you to change the subcursor position.
- ⑤ The distance between the two points and the azimuth of the light blue cursor relative to the red subcursor are displayed in the cursor position field.
- ⑥ When you finish measurement, press the [CLR] key.
The subcursor will go off.

(3)-1 Registering and editing navigation routes

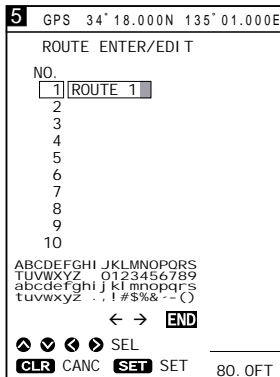
A Registering navigation routes

● Route Enter/Edit screen



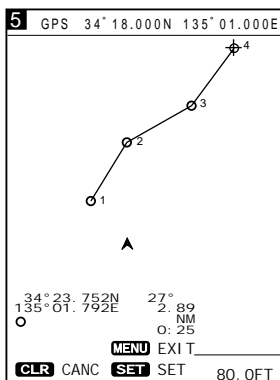
Select Route Enter/Edit and press the [SET] key.

● Comment Entry screen



Enter a comment and select END; then press the [SET] key.

● Route Registration screen



Move the cross hair cursor to a turning point and press the [SET] key. Repeat this operation to set a route.

You can register up to 20 navigation routes, each of which consists of up to 50 points.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "Route Enter/Edit" using the [UP] or [DOWN] key and press the [SET] key.
The Route Enter/Edit screen will appear.
- ④ Select "ENTER/EDIT" using the [LEFT] or [RIGHT] key and press the [SET] key.
This will allow you to select a route, and route No. 1 will currently be highlighted in yellow.
- ⑤ Using the [UP] or [DOWN] key, select the route No. you want to register.
* Pressing the [RIGHT] key permits you to go to the next page (route Nos. 11–20) of the Route Enter/Edit screen. To return to the previous page (route Nos. 1–10), press the [LEFT] key.
- ⑥ Press the [SET] key.
The character list will be displayed at the bottom of the screen and END be highlighted in yellow.
* The selected route No. will be displayed in the corresponding comment field. The contents in the comment field can be overwritten and changed.
- ⑦ Select a character from the character list using the [UP]/[DOWN] or [LEFT]/[RIGHT] key and press the [SET] key.
Each time the [SET] key is pressed, the selected character is entered in the comment field.
* A comment such as a user-defined route name of up to eight characters can be entered in each comment field.
- ⑧ Select "END" and press the [SET] key.
The coastline screen will appear.
- ⑨ Move the cross hair cursor to the beginning point of the route using the [UP]/[DOWN] or [LEFT]/[RIGHT] key and press the [SET] key.
Move the cross hair cursor to the next turning point and press the [SET] key.
* Up to 50 turning points can be registered per route.
* Sections between registered turning points are indicated as blue solid lines.
- ⑩ When you finish route registration, press the [MENU] key.
The routes are registered, and you will return to the coastline screen.

■ Editing navigation routes

■ Extending a navigation route

The procedure of editing a registered route (extending a route or clearing turning points of the route) is as follows.

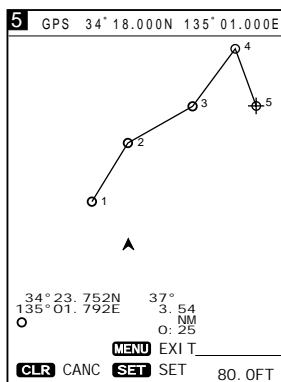
- ① Select the route you want to extend according to the instruction in “A Registering navigation routes” on the previous page.
 - * The selected route is highlighted in blue.
- ② Move the cross hair cursor to the point to which you want to extend the route using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, and press the [SET] key.
 - * Up to 50 turning points can be registered per route.
- ③ The route extension is highlighted in blue.
- ④ When you finish extending the route, press the [MENU] key.
 - The route extension is registered, and you will return to the coastline screen.

■ Clearing turning points

Pressing the [CLR] key during extending a route clears the last turning point registered (the mark is not cleared).

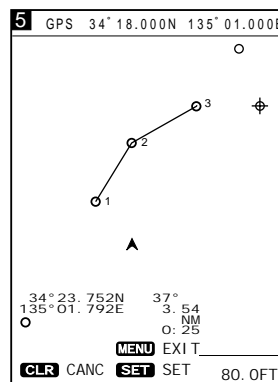
Repeat this operation until all the turning points you want to clear are cleared. Clearing all the turning points of a route results in the route itself being cleared.

● Extending a route



Move the cross hair cursor to the desired point and press the [SET] key. The route is extended to the point.

● Clearing turning points



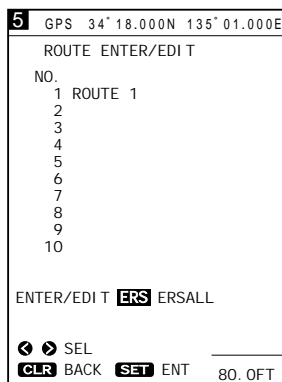
Each time the [CLR] key is pressed, a turning point is cleared in descending order of its No.

(3)-2 Clearing a route

The procedure of clearing a route is as follows.

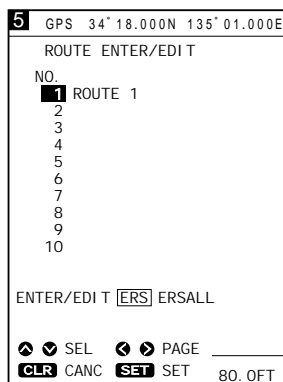
- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "Route Enter/Edit" using the [UP] or [DOWN] key and press the [SET] key.
The Route Enter/Edit screen will appear.
- ④ Select "ERS" (erase) or "ERSALL" (erase all) using the [LEFT] or [RIGHT] key and press the [SET] key.
When you select "ERS", route No. 1 will be highlighted in yellow.
* When you select "ERSALL", proceed with step ⑧ below.
- ⑤ Using the [UP] or [DOWN] key, select the route No. you want to clear.
* Pressing the [RIGHT] key permits you to go to the next page (route Nos. 11–20) of the Route Enter/Edit screen. To return to the previous page (route Nos. 1–10), press the [LEFT] key.
- ⑥ Press the [SET] key.
A message will appear at the bottom of the screen, indicating the route No. you selected is going to be cleared.
- ⑦ Press the [SET] key again to clear the route.
- ⑧ When you select "ERSALL" in step ④ above:
Press the [SET] key.
A message will appear at the bottom of the screen, indicating all the registered routes are going to be cleared.
- ⑨ Press the [SET] key again to clear all the routes.

● Route Enter/Edit screen



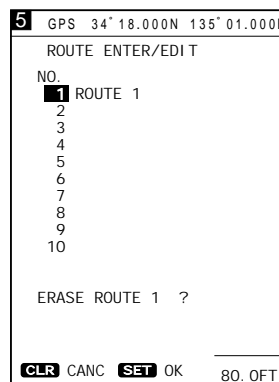
Select ERS and press the [SET] key.

● Selecting a route No.



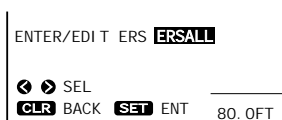
Select the route No. you want to clear and press the [SET] key.

● Clearing the route



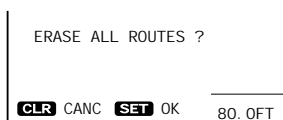
Press the [SET] key, and the selected route is cleared.

● Selecting all routes



Select ERSALL and press the [SET] key.

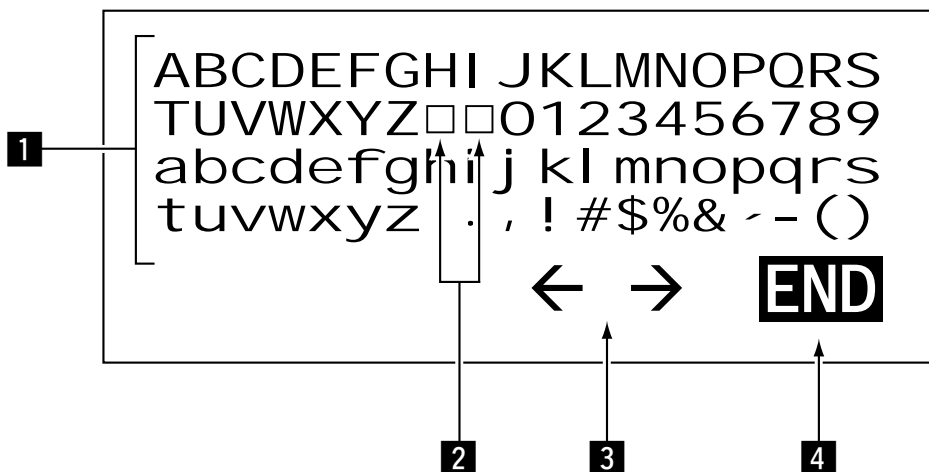
● Clearing all routes



Press the [SET] key, and all the routes are cleared.

(3)-3 Character list

The character list appears on the Route Enter/Edit screen during route No. selection, and is used for comment entry.



1 Character list

The character list is a list of characters used for comment entry.

Select a character from the character list using the [UP]/[DOWN] or [LEFT]/[RIGHT] key and press the [SET] key. The selected character is entered in the comment field of the selected route No.

2 Spaces

When a space is selected and the [SET] key is pressed, a space is entered in overwrite mode in the comment field of the selected route No.

3 Cursor movement directions

The cursor moves to the arrow direction you specified here.

Select the direction in which you want to move the cursor using the [UP]/[DOWN] or [LEFT]/[RIGHT] key and press the [SET] key.

4 END

Use this command when you finish or abort comment entry.

Select "END" using the [UP]/[DOWN] or [LEFT]/[RIGHT] key and press the [SET] key. You will exit from the character list screen.

* Pressing the [CLR] key also allows you to exit from the character list screen, irrespective of what is highlighted in yellow.

(4)-1 Registering marks

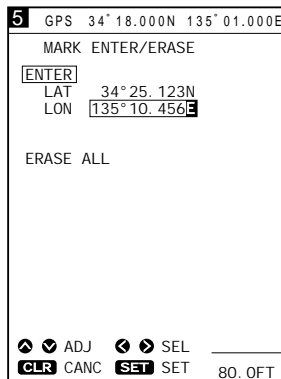
Navigational reference points, such as the destination point and turning points, can be indicated with marks. These marks will be helpful for destination navigation and route navigation.

They can be registered in two ways: from the Plotter Menu screen or on the coast-line screen.

A Registration of marks from the Plotter Menu screen

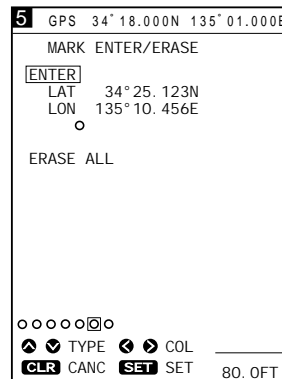
- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "Mark Enter/Erase" using the [UP] or [DOWN] key and press the [SET] key.
The Mark Enter/Erase screen will appear.
- ④ Select "ENTER" using the [UP] or [DOWN] key and press the [SET] key.
The system is ready for mark registration and the first digit of the latitude setting field is highlighted in yellow.
- ⑤ Select digits in the latitude setting field using the [LEFT] or [RIGHT] key, enter a numerical value and specify the latitude direction, N (North) or S (South), using the [UP] or [DOWN] key, and then press the [SET] key.
The first digit of the longitude setting field is highlighted in yellow.
- ⑥ Select digits in the longitude setting field using the [LEFT] or [RIGHT] key, enter a numerical value and specify the longitude direction, E (East) or W (West), using the [UP] or [DOWN] key, and then press the [SET] key.
One of 12 marks will appear at the bottom of the screen.
- ⑦ Select the desired mark using the [UP] or [DOWN] key and the desired color of the mark (seven colors selectable) using the [LEFT] or [RIGHT] key, and then press the [SET] key.
The character list will appear at the bottom of the screen and END is highlighted in yellow.
- ⑧ Select a character from the character list to name the mark, and then press the [SET] key.
Each time the [SET] key is pressed, the selected character is entered in the comment field.
* A comment such as a user-defined mark name of up to eight characters can be entered in each comment field.
- ⑨ Select "END" and press the [SET] key.
The mark is now registered.
* Repeat steps ⑤ to ⑨ as required.

● Mark Enter/Erase screen



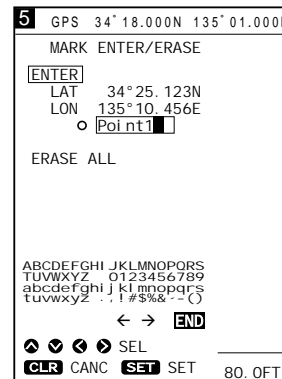
Enter the latitude and longitude and press the [SET] key.

● Selecting the mark to be used



Select the desired mark and press the [SET] key.

● Entering the user-defined mark name



Enter the mark name and press the [SET] key.

4 ◀ PLOTTER MODE ▶ MARK MANIPULATION

B Registration of the current ship position mark on the coastline screen

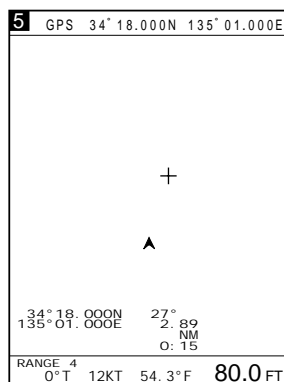
To indicate the current ship position with a mark, proceed as follows.

- ① Press the [MARK] key.
One of 12 marks will appear at the bottom of the screen.
- ② Select the desired mark using the [UP] or [DOWN] key and the desired color of the mark (seven colors selectable) using the [LEFT] or [RIGHT] key.
* If no comment is required, press the [SET] key. This brings the mark registration operation to an end.
- ③ Press the [MENU] key.
The character list will appear at the bottom of the screen, on which "END" is highlighted in yellow.
- ④ Select a character from the character list using the [UP]/[DOWN] or [LEFT]/[RIGHT] key and press the [SET] key.
Each time the [SET] key is pressed, the selected character is entered in the comment field.
* A comment of up to eight characters can be entered in each comment field.
- ⑤ Select "END" and press the [SET] key.
The selected mark and entered comment are placed at the current ship position.

C Registration of marks located at any position on the coastline screen

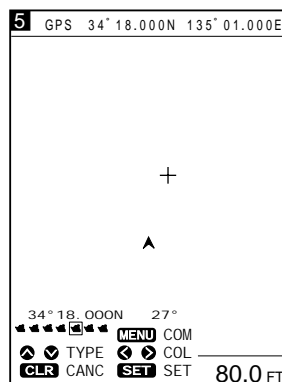
- ① On the coastline screen, press the [UP]/[DOWN] or [LEFT]/[RIGHT] key to activate the cross hair cursor.
- ② Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor to any desired position on the screen.
- ③ Press the [MARK] key.
One of 12 marks will appear at the bottom of the screen.
- ④ Select the desired mark using the [UP] or [DOWN] key and the desired color of the mark (seven colors selectable) using the [LEFT] or [RIGHT] key.
* If no comment is required, press the [SET] key. This brings the mark registration operation to an end.
- ⑤ Press the [MENU] key.
The character list will appear at the bottom of the screen, on which "END" is highlighted in yellow.
- ⑥ Select a character using the [UP]/[DOWN] or [LEFT]/[RIGHT] key and press the [SET] key.
Each time the [SET] key is pressed, the selected character is entered in the comment field.
* A comment of up to eight characters can be entered in each comment field.
- ⑦ Select "END" and press the [SET] key.
The selected mark and entered comment are placed at the cross hair cursor position on the screen.

● Activating the cross hair cursor



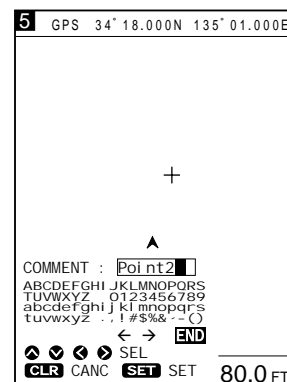
Move the cross hair cursor to the desired position.

● Selecting the desired mark and color



Select the desired mark and its color.

● Entering a comment



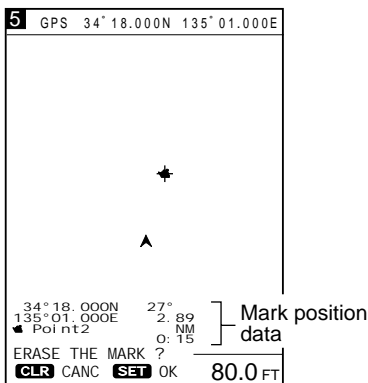
Enter a comment and select "END"; then press the [SET] key.

(4)-2 Clearing marks

Marks cannot be cleared during destination or route navigation.

A Clearing marks on the coastline screen

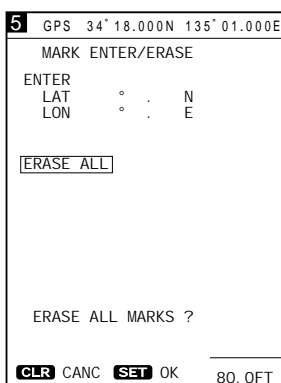
- Clearing marks on the coastline screen



Move the cross hair cursor until it coincides with the mark you want to clear, and press the [CLR] key.

B Clearing marks from the Plotter Menu screen

- Clearing marks from the Plotter Menu screen



Select "ERASE ALL" and press the [SET] key.

To clear registered marks separately, you must enter the coastline screen. To clear all registered mark at a time, you must enter the Plotter Menu screen.

Note that marks placed along a navigation route, such as turning point marks, cannot be cleared unless turning points of the route are canceled (☞ P. 21) or the route is canceled (☞ P. 22).

To clear registered marks separately, proceed as follows

- ① On the coastline screen, press the [UP]/[DOWN] or [LEFT]/[RIGHT] key to activate the cross hair cursor.
- ② Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor to the mark you want to clear.
The comment of the mark will be also displayed.
* If the mark appears to coincide with the cross hair cursor because of the scale to which the coastline image is displayed, zoom in the image before clearing the mark.
- ③ Press the [CLR] key.
A message indicating the mark is going to be cleared will appear at the bottom of the screen.
* If you do not want to clear the mark, press the [CLR] key again.
- ④ Press the [SET] key.
The mark will be cleared.

Note that, while the cross hair cursor is not active on the screen, the current ship position mark is not cleared.

To clear all registered marks at a time, proceed as follows.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "Mark Enter/Erase" using the [UP] or [DOWN] key and press the [SET] key.
The Mark Enter/Erase screen will appear.
- ④ Select "Erase All" using the [UP] or [DOWN] key.
- ⑤ Press the [SET] key.
A message will appear indicating all marks are going to be cleared.
- ⑥ Press the [SET] key.
All marks will be cleared.
* To clear such marks that are placed along a route, cancel the route in advance.

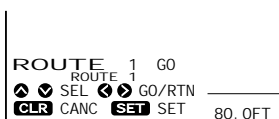
(5)-1 Setting route navigation

- Navigation screen



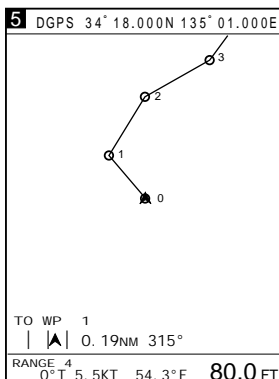
Select "ROUTE" and press the [SET] key.

- Selecting a route No.



Select route No. and "GO" or "RTN" voyage and press the [SET] key.

- Route navigation screen



Route navigation means that the ship is navigated via a number of registered marks to the destination.

- ① Make sure that the navigation route has already been registered (☞ P. 20) before commencing route navigation.
Failure to register the navigation route disables route navigation.
* Registration of a new navigation route needs an existing route or destination, if any, to be canceled in advance (see section (5)-2).
- ② Press the [NAV] key.
The navigation selection screen will appear.
- ③ Select "Route" using the [UP] or [DOWN] key and press the [SET] key.
The Route No. field, Outward/Homeward selection field, and comment field will appear at the bottom of the screen.
- ④ Select "Route No." using the [UP] or [DOWN] key, select "GO" (Outward) or "RTN" (Return; Homeward) voyage using the [LEFT] or [RIGHT] key, and then press the [SET] key.
The route navigation screen will appear, at the bottom of which are displayed the first destination No., the azimuth and distance to the destination, and the deviation out of course.
* On the coastline screen, the section between the current ship mark and the first destination No. is depicted by a green solid line. A purple solid line is used to show each section thereafter.

■ Changing the monitor range

The solid line indicating the first section of route navigation defaults to green. If you want to expand the monitor range to the second section between the first and second destination Nos. (if you want to change the color of the solid line for the second section from purple to green), proceed as follows.

- ① On the coastline screen, press the [UP] or [DOWN] key to activate the cross hair cursor.
- ② Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor until its intersection coincides with the mark of the second destination No.
- ③ Press the [NAV] key.
The purple solid line for the second section will turn green.

(5)-2 Canceling route navigation

- Navigation cancel screen



Press the [SET] key to cancel the current navigation.

To cancel route navigation, proceed as follows.

- ① On the coastline or combination screen, press the [NAV] key during route navigation.
* Make sure that a mark along the route does not coincide with the cross hair cursor.
- ② A message indicating the current navigation is going to be canceled is displayed. Press the [SET] key.
The current navigation will be canceled.

(6)-1 Setting destination navigation

A Setting destination navigation using existing registered marks

• Navigation screen



Select "DESTINATN" and press the [SET] key.

• Destination navigation screen



Select a mark and press the [SET] key.

Destination navigation means that the ship is navigated from the current ship position to the specified destination (within one section only).

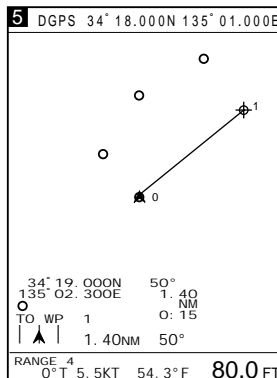
Destination navigation is set on the coastline screen.

Registration of a new navigation section needs an existing route or destination, if any, to be canceled in advance.

- ① On the coastline or combination screen, press the [NAV] key.
The navigation selection screen will appear.
- ② Select "DESTINATN" (destination) using the [UP] or [DOWN] key and press the [SET] key.
- ③ The cross hair cursor will appear at the center of the screen.
Position data of the cross hair cursor is displayed at the bottom of the screen.
- ④ Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor until its intersection coincides with the desired one of existing registered marks.
Information on the mark, such as a comment, is displayed at the bottom of the screen.
- ⑤ Press the [SET] key.
The destination navigation screen will appear, on which the section between the current ship position and the destination mark is depicted by a green solid line.
At the bottom of the screen are displayed the destination No., the azimuth and distance to the destination, and the deviation out of course.

B Setting destination navigation using a newly registered mark

• Destination navigation screen

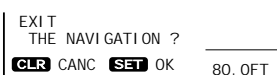


Move the cursor to the desired position and press the [SET] key.

- ① On the coastline or combination screen, press the [NAV] key.
The navigation selection screen will appear.
- ② Select "DESTINATN" (destination) using the [UP] or [DOWN] key and press the [SET] key.
- ③ The cross hair cursor will appear at the center of the screen.
Position data of the cross hair cursor is displayed at the bottom of the screen.
- ④ Using the [UP]/[DOWN] or [LEFT]/[RIGHT] key, move the cross hair cursor so that its intersection reaches the desired position.
- ⑤ Press the [SET] key.
A new mark (purple "O") is automatically registered.
The destination navigation screen will appear, on which the section between the current ship mark and the specified destination mark is depicted by a green solid line.
At the bottom of the screen are displayed the destination No., the azimuth and distance to the destination, and the deviation out of course.

(6)-2 Canceling destination navigation

• Navigation cancel screen

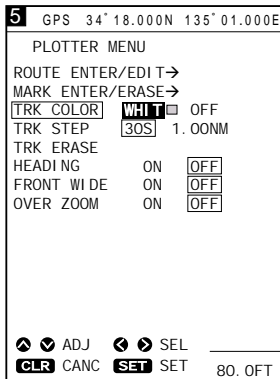


Press the [SET] key to cancel the current navigation.

To cancel destination navigation, proceed as follows.

- ① On the coastline or combination screen, press the [NAV] key during destination navigation.
- ② A message indicating the current navigation is going to be canceled is displayed.
Press the [SET] key.
The current navigation will be canceled.

(7)-1 Setting the track color

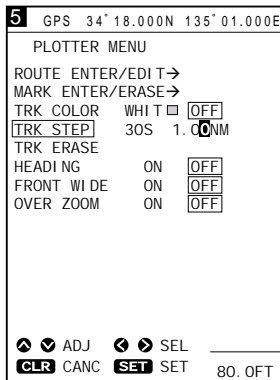


There are seven user-selectable colors of the track.

Set the track color as follows.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "TRK COLOR" (track color) using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Move to the color setting field using the [LEFT] or [RIGHT] key.
The color field is highlighted in yellow.
- ⑤ Select the desired color from among seven colors (White (WHIT), Yellow (YELL), Light blue (LBLU), Purple (PURP), Red, Green (GREE), Blue) using the [UP] or [DOWN] key and press the [SET] key.
The track color is set as you selected.
- ⑥ When you finish setting the track color, press the [MENU] key.
You will return to the previous screen.

(7)-2 Changing the tracking interval



The system stores and plots the track consisting of up to 5,000 points through which the ship passed.

If the number of the points exceeds 5,000, excess track data is deleted in chronological order.

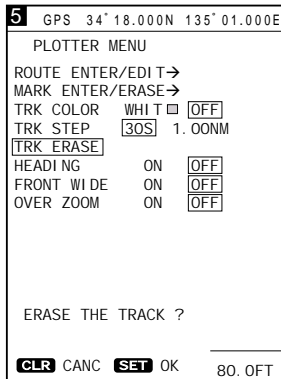
The track data is updated at specified tracking intervals.

Note that longer tracking (track update) intervals allow the system to cover a longer track, but may cause a lower resolution of the track image when zoomed in.

To change the tracking intervals, proceed as follows.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "TRK STEP" (track step) using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Move to the setting field using the [LEFT] or [RIGHT] key.
The setting field is highlighted in yellow.
This field contains three setting items; the time interval, the unit of time, and the distance interval.
* The unit of distance depends on the setting on the Setting Menu screen.
- ⑤ Enter the desired time interval and unit of time, or the distance interval into the setting field, and then press the [SET] key.
The change in tracking interval is saved.
- ⑥ When you finish changing, press the [MENU] key.
You will return to the previous screen.

(7)-3 Clearing the track

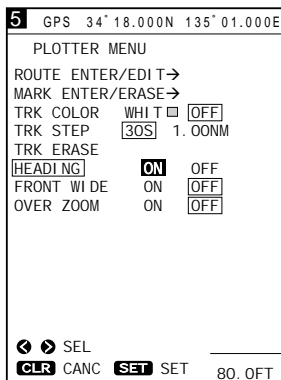


To clear the track on the screen after navigation, proceed as follows.

Note the following procedure loses any track data in the system. Make sure that deletion of track data will cause no problem before commencing the procedure.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "TRK ERASE" (track erase) using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ A message will appear at the bottom of the screen, indicating the track data is going to be cleared.
Press the [SET] key to clear the track data.
Press the [CLR] key to abort "clear" operation. You will return to the Plotter Menu screen.
- ⑤ Press the [MENU] key to return to the previous screen.

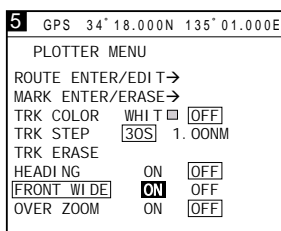
(7)-4 Setting the heading vector



To set the heading vector, proceed as follows.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "HEADING" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Select "ON" or "OFF" using the [LEFT] or [RIGHT] key and press the [SET] key.
The heading vector will appear when ON is selected.
- ⑤ Press the [MENU] key to return to the previous screen.

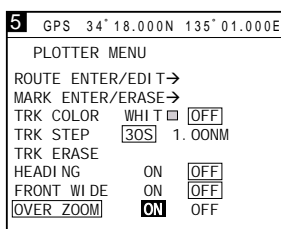
(7)-5 Setting the front wide function



To set the front wide function, proceed as follows.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "FRONT WIDE" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Select "ON" or "OFF" using the [LEFT] or [RIGHT] key and press the [SET] key.
The heading area will displayed widely when ON is selected.
- ⑤ Press the [MENU] key to return to the previous screen.

(7)-6 Setting the over zoom function



To set the over zoom function, proceed as follows.

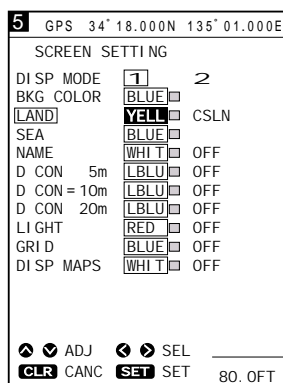
- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "OVER ZOOM" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Select "ON" or "OFF" using the [LEFT] or [RIGHT] key and press the [SET] key.
The all zoom ranges will become selectable when ON is selected.

(8)-1 Setting colors of data on screen

Data stored on a NAVIONICS® Electronic Chart, including lights positions and depth contours, can be displayed selectively.

The following explains how to specify colors of land, sea, place-names, depth contours, lights, and latitude/longitude lines.

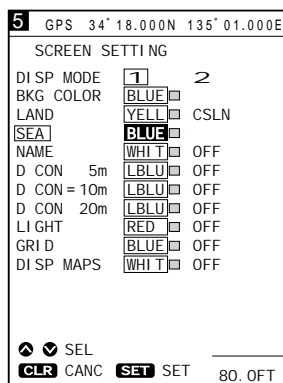
A Specifying the color of land



The color of land can be selected from among seven available colors.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Screen Setting" using the [UP] or [DOWN] key and press the [SET] key.
The Screen Setting screen will appear.
- ③ Select "LAND" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Move to the color field or "CSLN" (coastline) field using the [LEFT] or [RIGHT] key.
The field is highlighted in yellow.
* When moving to the color field, proceed with step ⑤.
* When moving to "CSLN", press the [SET] key.
Land will be contoured in the selected color. The inside of land remains the same as sea in color.
- ⑤ Select the desired color from among available colors (White (WHIT), Yellow (YELL), Light blue (LBLU), Purple (PURP), Red, Green (GREE), Blue) using the [UP] or [DOWN] key and press the [SET] key.
Land will be displayed in the selected color.
- ⑥ When you finish setting the color of land, press the [MENU] key.
You will return to the previous screen.

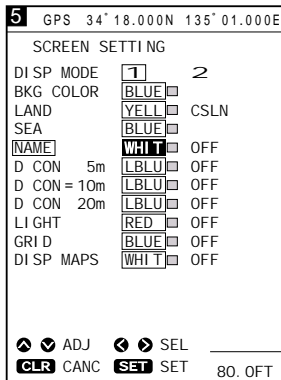
B Specifying the color of sea



The color of sea can be selected from among two available colors.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Screen Setting" using the [UP] or [DOWN] key and press the [SET] key.
The Screen Setting screen will appear.
- ③ Select "SEA" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Select "BLUE" or "BLK" (Black) using the [UP] or [DOWN] key and press the [SET] key.
Sea is displayed in the selected color.
- ⑤ When you finish setting the color of sea, press the [MENU] key.
You will return to the previous screen.

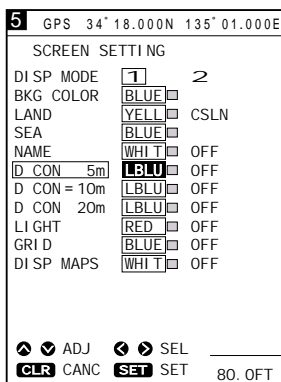
C Specifying the color of place-names



The color of place-names can be selected from among seven available colors.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Screen Setting" using the [UP] or [DOWN] key and press the [SET] key.
The Screen Setting screen will appear.
- ③ Select "NAME" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Move to the color field using the [LEFT] or [RIGHT] key.
The color field will be highlighted in yellow.
- ⑤ Select the desired color from among available colors (White (WHIT), Yellow (YELL), Light blue (LBLU), Purple (PURP), Red, Green (GREE), Blue) using the [UP] or [DOWN] key and press the [SET] key.
Place-names will be displayed in the selected color.
* When you select "OFF" and press the [SET] key, place-names are not displayed.
- ⑥ When you finish setting the color of place-names, press the [MENU] key.
You will return to the previous screen.

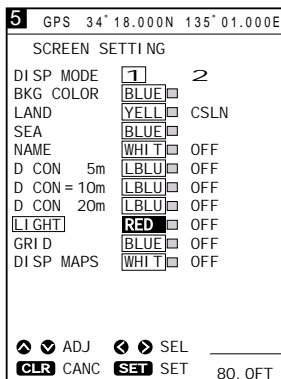
D Specifying the color of depth contours



The color of depth contour can be selected from among seven available colors.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Screen Setting" using the [UP] or [DOWN] key and press the [SET] key.
The Screen Setting screen will appear.
- ③ Select "D CON 5m," "D CON=10m" or "D CON 20m" using the [UP] or [DOWN] key and press the [SET] key. (D CON=Depth Contour)
The selected item turns blue.
- ④ Move to the color field using the [LEFT] or [RIGHT] key.
The color field will be highlighted in yellow.
- ⑤ Select the desired color from among available colors (White (WHIT), Yellow (YELL), Light blue (LBLU), Purple (PURP), Red, Green (GREE), Blue) using the [UP] or [DOWN] key and press the [SET] key.
Depth contour will be displayed in the selected color.
* When you select "OFF" and press the [SET] key, depth contour are not displayed.
- ⑥ When you finish setting the color of depth contour, press the [MENU] key.
You will return to the previous screen.

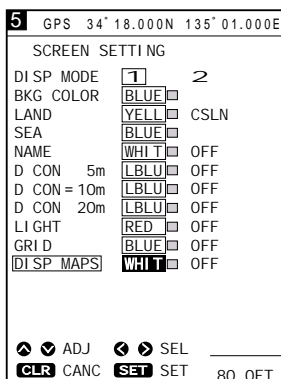
E Specifying the color of lights



The color of lights can be selected from among seven available colors.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "LIGHT" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Move to the color field using the [LEFT] or [RIGHT] key.
The color field will be highlighted in yellow.
- ⑤ Select the desired color from among available colors (White (WHIT), Yellow (YELL), Light blue (LBLU), Purple (PURP), Red, Green (GREE), Blue) using the [UP] or [DOWN] key and press the [SET] key.
Lights will be displayed in the selected color.
* When you select "OFF" and press the [SET] key, lights are not displayed.
- ⑥ When you finish setting the color of lights, press the [MENU] key.
You will return to the previous screen.

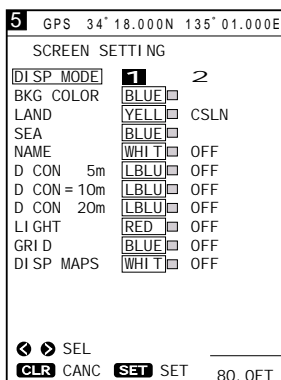
F Specifying the color of map border



The color of map border can be selected from among seven available colors.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Screen Setting" using the [UP] or [DOWN] key and press the [SET] key.
The Screen Setting screen will appear.
- ③ Select "DISP MAPS" (display maps) using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Move to the color field using the [LEFT] or [RIGHT] key.
The color field will be highlighted in yellow.
- ⑤ Select the desired color from among available colors (White (WHIT), Yellow (YELL), Light blue (LBLU), Purple (PURP), Red, Green (GREE), Blue) using the [UP] or [DOWN] key and press the [SET] key.
Map border will be displayed in the selected color.
* When you select "OFF" and press the [SET] key, map border are not displayed.
- ⑥ When you finish setting the color of map border, press the [MENU] key.
You will return to the previous screen.

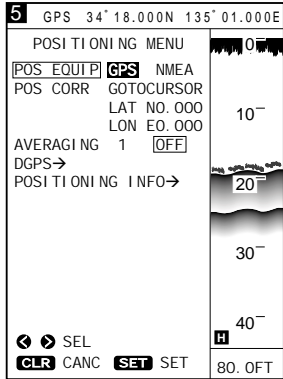
G Specifying the display mode



These color settings can be memorized and selected from two display modes.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Plotter Menu screen will appear.
- ③ Select "DISP MODE" (display mode) using the [LEFT] or [RIGHT] key and press the [SET] key.
Color settings will be displayed in the memorized colors.
- ④ When you finish selection, press the [MENU] key.
You will return to the previous screen.

(9) Selection of positioning device



There are two options in receiving the latitude and longitude data of the current ship position.

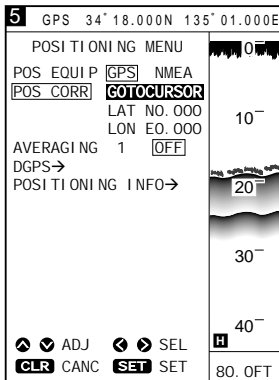
- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Positioning Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Positioning Menu screen will appear.
- ③ Select "POS EQUIP" (positioning equipment) using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Select "GPS" or "NMEA" using the [LEFT] or [RIGHT] key.
The selected option is highlighted in yellow.
 - When you select "GPS", positioning data received by the supplied GPS receiver is used to pinpoint the current ship position.
 - When you select "NMEA", positioning data received via the external NMEA input port is used to pinpoint the current ship position.
- * Selecting "NMEA" disables "DGPS" and "Positioning Information" to be selected.
- ⑤ When you finish selecting the positioning device, press the [MENU] key.
You will return to the previous screen.

(10)-1 Correcting a ship positioning error

If the current ship position on screen differs from that on the nautical chart in latitude and/or longitude, you can correct such a ship positioning error with ease.

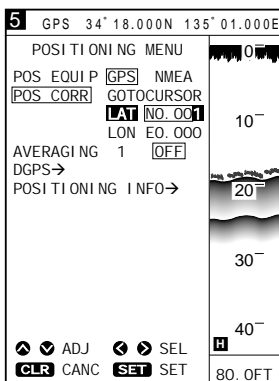
There are two ways for positioning error correction: one using the cross hair cursor and the other with latitude/longitude entry.

(10)-2 Correction using the cross hair cursor



- ① On the coastline screen, press the [UP]/[DOWN] or [LEFT]/[RIGHT] key to activate the cross hair cursor.
- ② On the coastline screen, use the [UP]/[DOWN] or [LEFT]/[RIGHT] key to move the cross hair cursor until its centerline coincides with the correct ship position.
- ③ Press the [MENU] key.
The Main Menu screen will appear.
- ④ Select "Positioning Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Positioning Menu screen will appear.
- ⑤ Select "POS CORR" (Position Correction) using the [UP] or [DOWN] key and press the [SET] key.
"GOTOCURSOR" (Goto Cursor Position) is highlighted in yellow.
- ⑥ Press the [SET] key.
The latitude/longitude readings of the system will be corrected so that they correspond to the current cursor position.
- ⑦ When you finish correction, press the [MENU] key.
You will return to the previous screen.

(10)-3 Correction with latitude/longitude entry

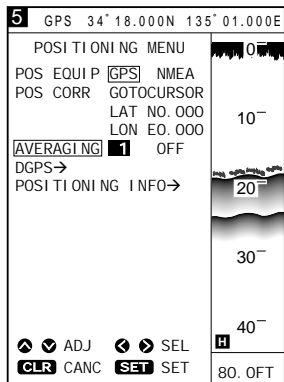


In this way of correction, the latitude/longitude of the current ship position can be corrected by up to 9.999 minutes in 0.001-minute increments.

Orientation in latitude or longitude can also be changed from N (North) to S (South) or E (East) to W (West), and vice versa.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Positioning Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Positioning Menu will appear.
- ③ Select "POS CORR" (Position Correction) using the [UP] or [DOWN] key and press the [SET] key.
"GOTOCURSOR" (Goto Cursor Position) is highlighted in yellow.
* When you want to change the longitude, proceed with step ⑦.
- ④ Select "LAT" (Latitude) using the [UP] or [DOWN] key and press the [SET] key.
- ⑤ Move to the latitude setting field using the [LEFT] or [RIGHT] key.
This field will be highlighted in yellow.
- ⑥ Set orientation to N or S and enter the desired correction value in the field using the [UP] or [DOWN] key; then press the [SET] key.
- ⑦ Select "LON" (Longitude) using the [UP] or [DOWN] key and press the [SET] key.
- ⑧ Move to the longitude setting field using the [LEFT] or [RIGHT] key.
This field will be highlighted in yellow.
- ⑨ Set orientation to E or W and enter the desired correction value in the field using the [UP] or [DOWN] key; then press the [SET] key.
The current ship position will be corrected.
- ⑩ When you finish correction, press the [MENU] key.
You will return to the previous screen.

(11) Averaging



Averaging is the process of averaging positioning data received by the supplied GPS receiver for past several seconds so as to minimize meandering of the plotted track.

This process makes the track smoother, but deteriorates the response of the screen image to changes in ship speed and azimuth.

To activate the averaging function, proceed as follows.

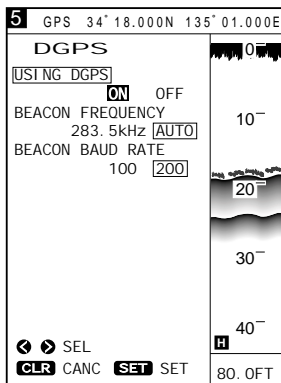
- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Positioning Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Positioning Menu screen will appear.
- ③ Select "Averaging" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Move to the averaging level field.
This field will be highlighted in yellow.
- ⑤ Enter a value into the averaging level field using the [UP] or [DOWN] key and press the [SET] key.
* A higher averaging level results in smaller meandering of the track.
- ⑥ When you finish setting an averaging level, press the [MENU] key.
You will return to the previous screen.

(12)-1 DGPS

The DGPS is a newly established system intended to improve the positioning precision of the GPS. (Optional RD-200 is needed to use the DGPS).

This chapter describes how to correct the positioning data using DGPS data, select the beacon station, and set the baud rate.

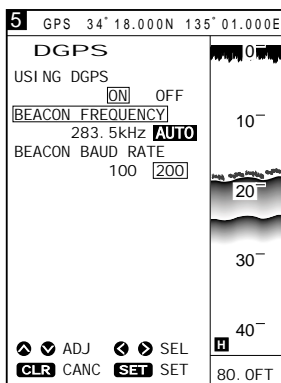
(12)-2 Using the DGPS



Using the DGPS data allows correction of the positioning data received by the supplied GPS receiver.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Positioning Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Positioning Menu screen will appear.
- ③ Select "DGPS" using the [UP] or [DOWN] key and press the [SET] key.
The DGPS screen will appear.
- ④ Select "Using DGPS" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ⑤ Select "ON" using the [LEFT] or [RIGHT] key and press the [SET] key.
The selection is now saved.
- ⑥ When you finish setting, press the [MENU] key.
You will return to the previous screen.

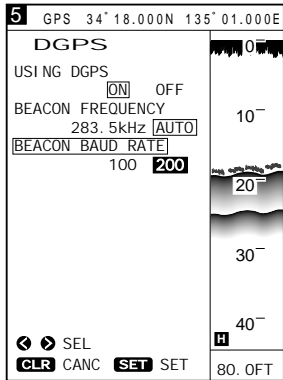
(12)-3 Setting the beacon station



To set the beacon station, proceed as follows.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Positioning Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Positioning Menu screen will appear.
- ③ Select "DGPS" using the [UP] or [DOWN] key and press the [SET] key.
The DGPS screen will appear.
- ④ Select "Beacon Frequency" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ⑤ Select the frequency field or "Auto".
When you select the frequency field, proceed with step ⑥.
When you select "Auto", press the [SET] key.
When "Auto" is selected, a beacon station having the highest signal intensity is automatically selected. If the system fails to synchronize with this beacon station for one minute, it automatically selects a beacon station having the second highest signal intensity.
- ⑥ Set the frequency using the [UP] or [DOWN] key and press the [SET] key.
* Set the frequency of the beacon station nearest to the current ship position.
- ⑦ When you finish setting the beacon station, press the [MENU] key.
You will return to the previous screen.

(12)-4 Setting the baud rate of the beacon station

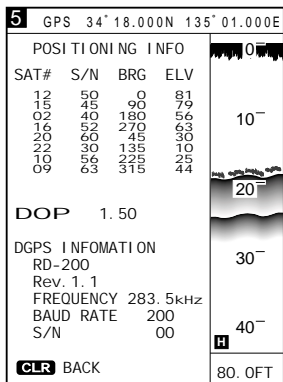


To set the baud rate (transmission speed) of the beacon station, proceed as follows.

- ① Press the [MENU] key.
 - The Main Menu screen will appear.
- ② Select "Positioning Menu" using the [UP] or [DOWN] key and press the [SET] key.
 - The Positioning Menu screen will appear.
- ③ Select "DGPS" using the [UP] or [DOWN] key and press the [SET] key.
 - The DGPS screen will appear.
- ④ Select "Beacon Baud Rate" using the [UP] or [DOWN] key and press the [SET] key.
 - The selected item turns blue.
- ⑤ Select "100" or "200" using the [LEFT] or [RIGHT] key and press the [SET] key.
 - The baud rate of the beacon station will be set as you selected.
- ⑥ When you finish setting the baud rate, press the [MENU] key.
 - You will return to the previous screen.

* If the frequency of the beacon station has been set to "Auto" in section (12)-3, the baud rate of the beacon station is also set automatically. In this case, manual baud rate setting is ignored.

(13) Access to Positioning Information screen

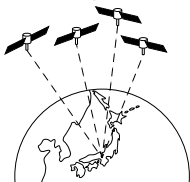


To access the Positioning Information screen where information on the DGPS/GPS in use is displayed, proceed as follows.

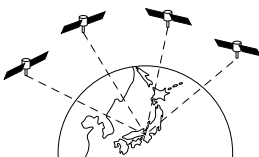
- ① Press the [MENU] key.
 - The Main Menu screen will appear.
- ② Select "Positioning Menu" using the [UP] or [DOWN] key and press the [SET] key.
 - The Positioning Menu screen will appear.
- ③ Select "Positioning Info" using the [UP] or [DOWN] key and press the [SET] key.
 - The Positioning Information screen will appear.
- ④ Press the [MENU] key to return to the previous screen.

(14) DOP as a Positioning Precision Indicator

Bad geometrical arrangement: DOP is large.



Good geometrical arrangement: DOP is small.



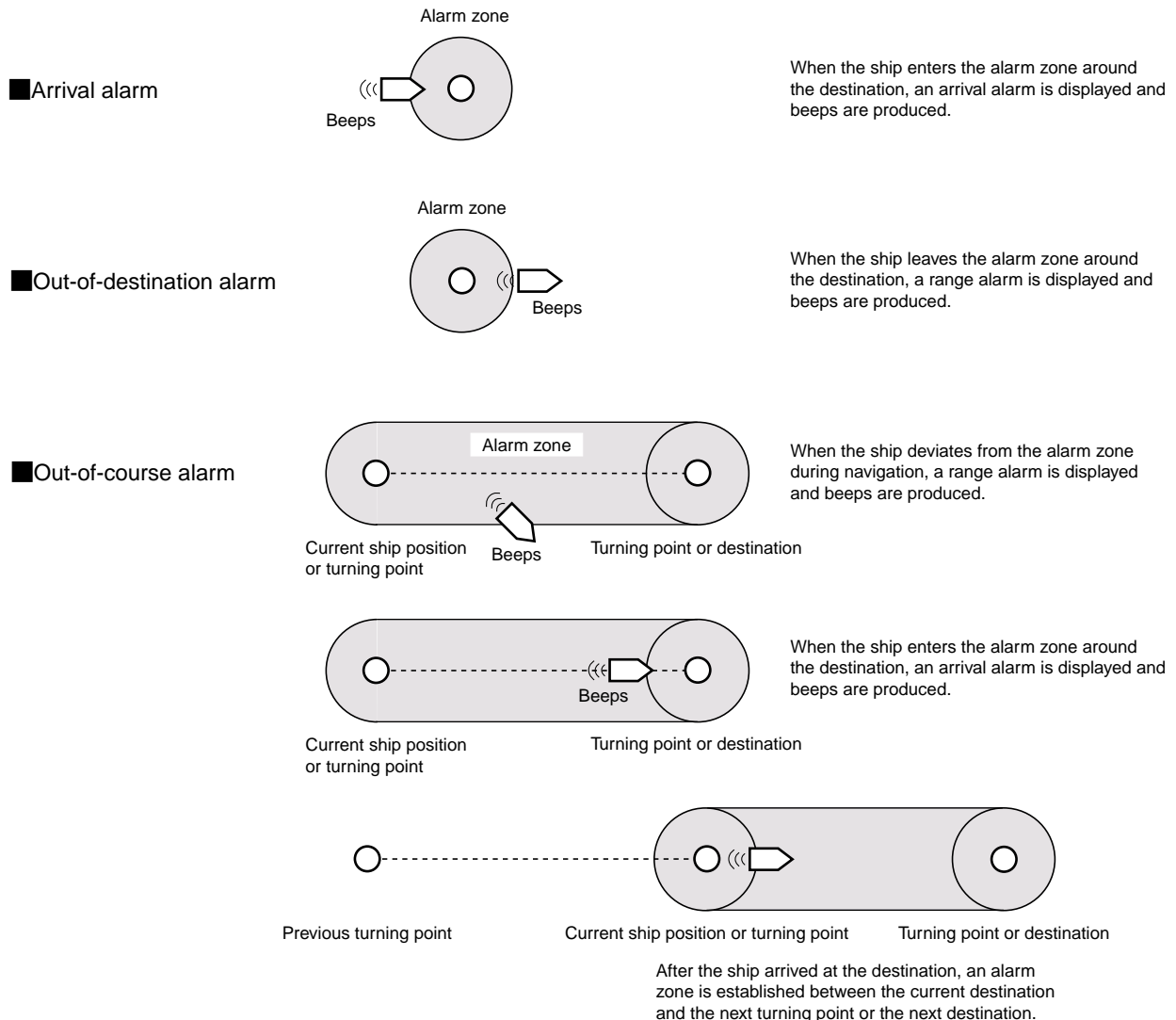
The DOP (Dilution Of Precision) is a positioning precision indicator which represents the geometrical arrangement of the navigational satellites and the ship.

The DOP ranges from "0.00" (best arrangement) to "99.99" (worst arrangement). Note that the positioning error of the GPS may increase depending on policies of the U.S. Department of Defense.

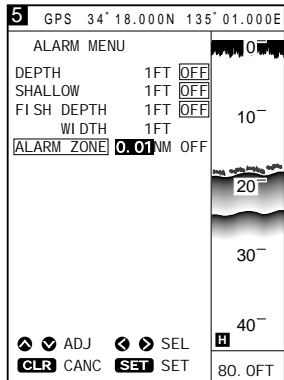
(15)-1 Available alarms

As shown in the table below, there are three types of plotter-related alarms. The alarm zone can be set to a maximum of 9.99 NM (or 9.99 km or 9.99 MI) around the ship position in increments of 0.01 NM (or 0.01 km or 0.01 MI). The alarm zone are displayed in the unit specified on the Unit setting screen (P. 63).

Alarm type	Description
Arrival alarm	When the ship enters the alarm zone around the destination, beeps are produced and an ARRIV alarm is displayed on the screen.
Out-of-destination alarm	When the ship leaves the alarm zone around the destination, beeps are produced and a ZONE alarm is displayed on the screen.
Out-of-course alarm	When the ship deviates from the alarm zone during navigation, beeps are produced and a ZONE alarm is displayed on the screen. When the ship returns within the alarm zone, beeps stop. When the ship deviates from the alarm zone again, beeps are produced.



(15)-2 Setting the alarm zone



To set the alarm zone, proceed as follows.

Perform steps ① to ③ when simply turning on or off the alarm function.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Alarm Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Alarm Menu screen will appear.
- ③ Select "Alarm Zone" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
* To cancel the alarm function, select "OFF" and press the [SET] key.
- ④ Move to the alarm zone setting field using the [LEFT] or [RIGHT] key.
This field will be highlighted in yellow.
- ⑤ Set a value into the alarm zone setting field using the [UP] or [DOWN] key and press the [SET] key.
The setting will be saved.
- ⑥ When you finish setting the alarm zone, press the [MENU] key.
You will return to the previous screen.
* To stop beep sounds temporarily, press the [CLR] key.

SOUNDER MODE

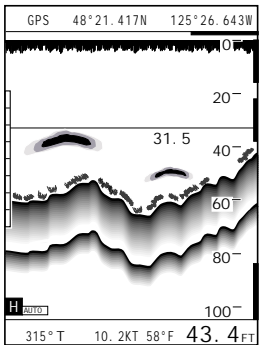
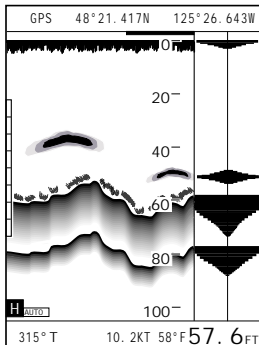
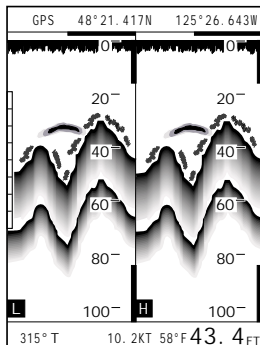
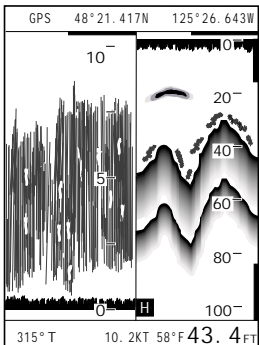
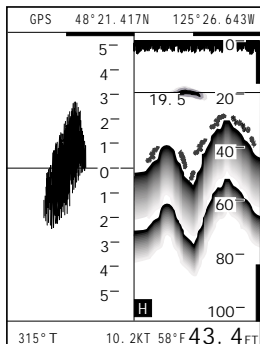
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(1)-1 How to access screens

In fishfinder mode, the following five screens are available.

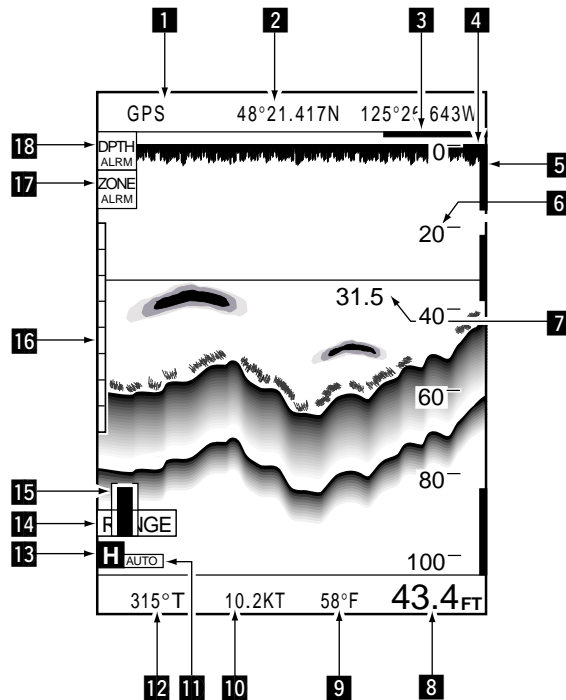
Pressing the [SOUNDER] key once in plotter mode allows you to select from among the standard screen, standard + A scope screen, dual screen, standard + bottom lock screen, and standard + Marker zoom-in screen in this order.

* If no water temperature sensor is installed, the water temperature field is blank.

Screen name	Indication	Screen name	Indication
<p>Standard screen</p> 	<p>This screen shows an image of underwater that is detected at either of a high (H) or low (L) frequency.</p>	<p>Standard + A scope screen</p> 	<p>This screen consists of the standard screen and its zoom-in screen.</p>
<p>Dual screen</p> 	<p>This screen shows two images of underwater that are detected at both of a high (H) and low (L) frequencies. * Frequencies set on the Fishfinder Menu screen are displayed on the right.</p>	<p>Standard + Bottom lock screen</p> 	<p>This screen consists of the standard screen and the bottom lock screen.</p>
<p>Standard + Marker zoom-in screen</p> 	<p>This function provides zoom-in display around the variable range marker for detailed observation of underwater activity such as fish schools.</p>		

1 ≡ SOUNDER MODE ≡ AVAILABLE SCREENS AND INDICATIONS

(1)-1 Standard screen



1 Positioning device

This field shows the positioning device in use.

Indication	DGPS	GPS	EXT
Positioning device in use	DGPS+GPS	GPS	External NMEA

2 Ship position

This field shows the current ship position in latitude/longitude or time difference.

3 Time mark

In this field, a moving 30-second time mark is always indicated in yellow.

4 Ship position

The current ship position is located at the upper right corner in fishfinder mode.

5 Alarm range marker

Alarm range markers are monitor range indicators. The shoal alarm range is indicated in red, the depth alarm range in yellow, and the fish alarm range in green.

6 Depth scale

This screen has FT scales in 20 FT (default; m) increments (see P. 52).

7 Depth marker

The depth marker (green) and depth value are indicated during depth measurement.

8 Depth

This field shows the current depth of water. If the level of reflections from the bottom is low, this may not be displayed.

9 Water temperature

This field shows the current water temperature ranging from 0.0 to +40.0 in °C or +32.0 to +104 in °F. If the water temperature is out of this range, “**.*” is displayed. If no water temperature sensor is installed, the field is blank.

- 10 Ship speed** This field shows the current ship speed.

- 11 Operation mode** When the system operates in auto mode (☞ P.53), "AUTO" is indicated in this field.

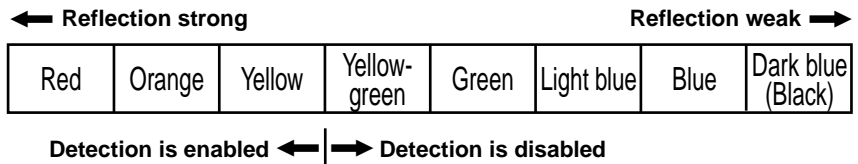
- 12 Bearing** This field shows the current bearing of the bow (at which the ship is navigated).
• T (TRUE); True bearing, M (MAG); Magnetic bearing (p. 66)

- 13 Frequency** This field shows the frequency in use (H: high frequency, L: low frequency).
In the dual screen, the frequency specified on the Fishfinder Menu screen is displayed on the right.

- 14 [RANGE] key** This field shows the current setting (Range/Shift/Auto) of the range key.

- 15 Sensitivity level bar** The level bar indicates the sensitivity in 32 levels.
When the Sensitivity key is pressed to adjust the sensitivity level, the level bar appears on the screen while highlighted in yellow.

- 16 Color pattern** The color pattern consists of eight colors arranged in descending order of reflection level. If the noise reduction function (☞ P. 51) is ON, however, colors having a lower reflection level may not be displayed.
The background color can be set to "Blue" or "Black" (☞ P. 50). The image sensitivity should be adjusted so that the portion close to the sea bottom is indicated in red. If this portion has a yellow-green color, the depth or the shape of sea bottom may not be detected due to weak reflection from the sea bottom.

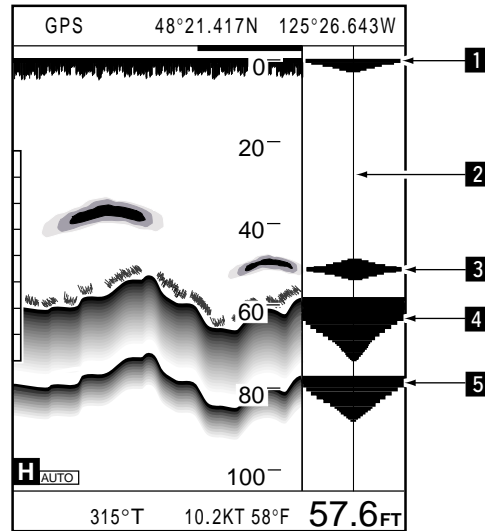


1 **◀ SOUNDER MODE ▶** AVAILABLE SCREENS AND INDICATIONS

(1)-3 Standard + A scope screen

The A scope image represents reflections from the sea bottom or a shoal of fish in amplitude and color.

For common indications on different screens, such as alarm range marker, time mark and sensitivity level, see section (1)-2 "Standard screen".



1 Strong reflection (oscillation line)

Indicated in red due to large amplitude

2 No reflection

No change in color (background color) due to nothing detected

3 Weak reflection (from fish)

Small amplitude

4 Strong reflection (from sea bottom)

Indicated in red due to large amplitude

5 Strong reflection (secondary reflection)

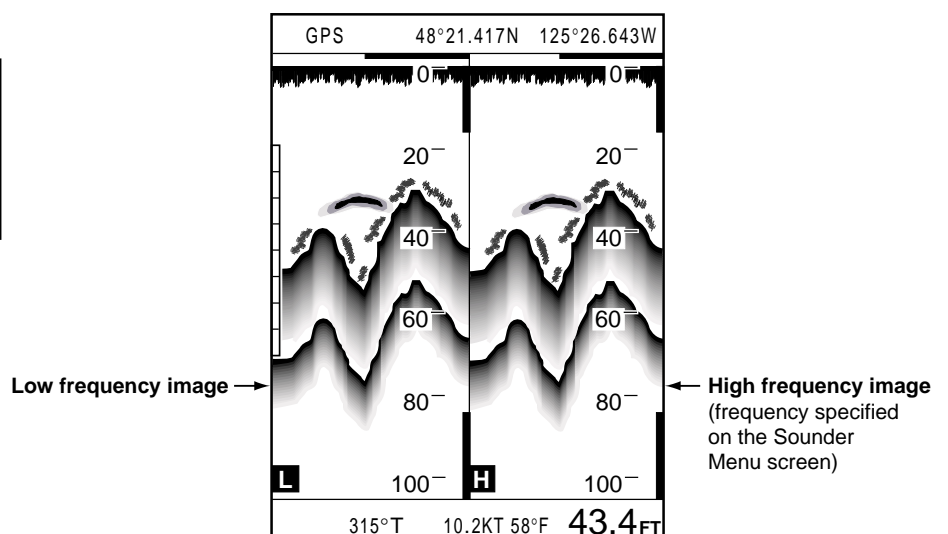
Indicated in red due to large amplitude

(1)-4 Dual screen

The dual screen consists of high and low frequency images of the same contents as the standard screen.

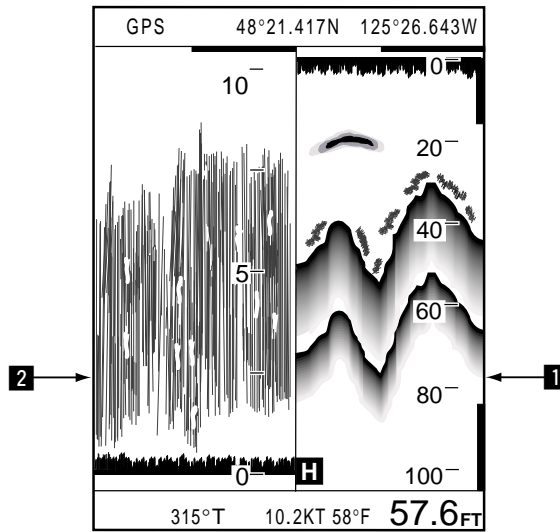
The frequency specified on the Sounder Menu screen is indicated on the right.

For common indications on different screens, such as alarm range marker, time mark and sensitivity level, see section (1)-2 "Standard screen".



(1)-5 Standard + Bottom lock screen

For common indications on different screens, such as alarm range marker, time mark and sensitivity level, see section (1)-2 “Standard screen”.



1 Standard image

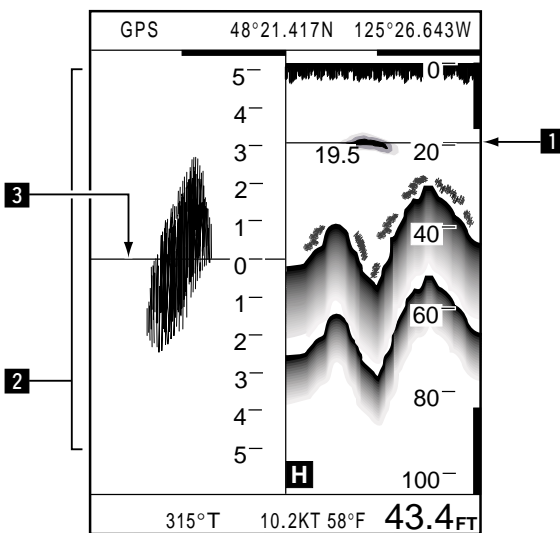
This image is the same as that on the standard screen.

2 Bottom lock image

This image covers the specified bottom area (☞ P. 54).

(1)-6 Standard + Marker zoom-in screen

For common indications on different screens, such as alarm range marker, time mark and sensitivity level, see section (1)-2 “Standard screen”.



1 Depth marker

Underwater area around this marker is zoomed in.

2 Marker zoom-in image

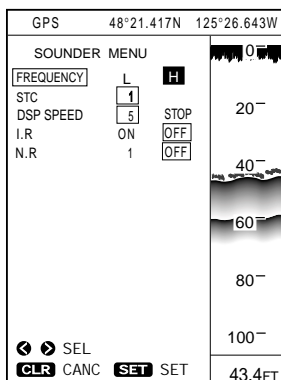
This image covers the specified underwater area (☞ P. 55).

3 Zoom-in centerline

This line represents the center of the marker zoom-in image and corresponds to the depth marker on the standard image.

2 ≪ SOUNDER MODE ≫ SELECTION OF FREQUENCY

(2) Selection of Frequency



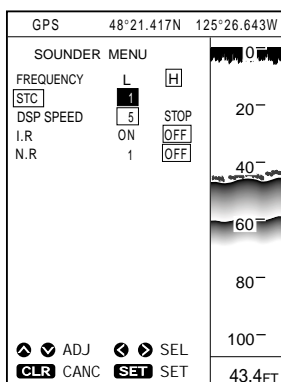
To select the Sounder frequency between “High (H)” and “Low (L)”, proceed as follows. (Default; H)

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select “Sounder Menu” using the [UP] or [DOWN] key and press the [SET] key.
The Sounder Menu screen will appear.
- ③ Select “Frequency” using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Select “**L**” (50 kHz) or “**H**” (200 kHz) using the [LEFT] or [RIGHT] key and press the [SET] key.
The selected frequency will be indicated in the frequency field on fishfinder screens.
- ⑤ When you finish selecting the frequency, press the [MENU] key to close the Main Menu screen.

The following table summarizes characteristics and main applications of the low and high frequencies.

Frequency	Low (L)	High (H)
Directivity (directional angle)	High (large)	Low (small)
Depth coverage	Deep	Shallow
Resolution (detection of fish density)	Low	High
Immunity to bubbles and underwater noises	Low	High
Main application	Search of board area, underwater geological survey	Diagnosis of fish density or fish size

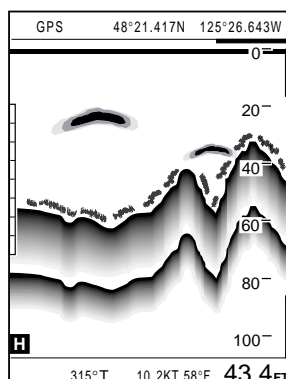
(3) STC; Setting of Immunity to Air Bubbles



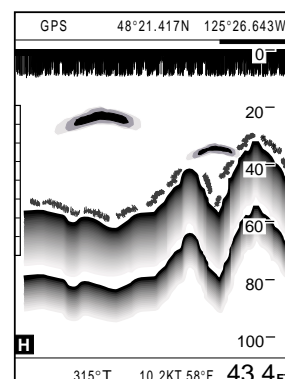
To set the immunity to air bubbles in the sea surfaces so as to improve the image legibility, proceed as follows. (Default; 1)

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select “Sounder Menu” using the [UP] or [DOWN] key and press the [SET] key.
The Sounder Menu screen will appear.
- ③ Select STC using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Enter the desired immunity level from among 15 levels using the [UP] or [DOWN] key and press the [SET] key.
The setting is now saved.
- ⑤ When you finish setting the immunity level, press the [MENU] key to close the Main Menu screen.

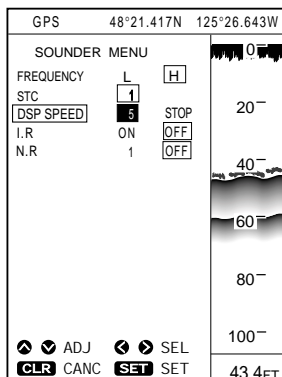
Immunity level too high



Immunity level too low



(4) Setting of Display speed



The display speed can be adjusted to “1” thru “5” or “STOP”. (Default; 5)
 Selecting a high display speed enlarges the image horizontally and will thus be helpful for analyzing the image.

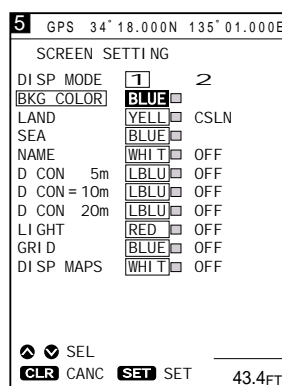
If you want to do detection for a long time, you should select a low display speed. To set the display speed, proceed as follows.

- ① Press the [MENU] key.
 The Main Menu screen will appear.
- ② Select “Sounder Menu” using the [UP] or [DOWN] key and press the [SET] key.
 The Sounder Menu screen will appear.
- ③ Select “DSP speed” using the [UP] or [DOWN] key and press the [SET] key.
 The selected item turns blue.
- ④ Move to the display speed setting field or “STOP” using the [LEFT] or [RIGHT] key.
 * When moving to the speed setting field, proceed with step ⑤.
 * When selecting “STOP”, press the [SET] key.
 The DSP speed is STOP.
- ⑤ Select the desired value (“1” to “5”) using [UP] or [DOWN] key and press the [SET] key.
 The selection is now saved

Rate indication	STOP	1 ~ 5
Rate	—	Low ↔ High

- ⑥ When you finish setting the display speed, press the [MENU] key to close the Main Menu screen.

(5) Selection of background color

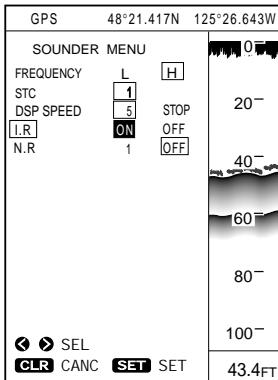


The background color can be set to “Blue” or “Black”. (Default; BLUE)
 Select a background color according to the ambient working conditions as follows.

- ① Press the [MENU] key.
 The Main Menu screen will appear.
- ② Select “Screen Setting” using the [UP] or [DOWN] key and press the [SET] key.
 The Screen Setting screen will appear.
- ③ Select “BKG COLOR” (Background color) using the [UP] or [DOWN] key and press the [SET] key.
 The selected item turns blue.
- ④ Select “BLUE” or “BLK” (Black) using the [UP] or [DOWN] key and press the [SET] key.
 Background is displayed in the selected color.
- ⑤ When you finish setting the color of background, press the [MENU] key to close the Main Menu screen.

6 SOUNDER MODE SETTING OF INTERFERENCE REJECTION

(6) Setting of Interference Rejection

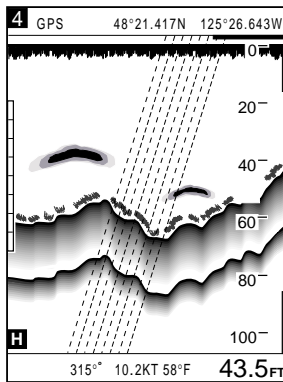


The system has an interference rejection function that removes inductive interference derived by a generator on the ship or noise disturbance caused by a fishfinder of other ships. (Default; ON)

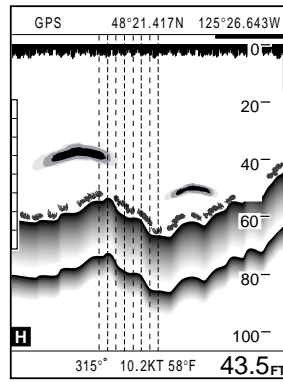
To activate the interference rejection function, proceed as follow.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Sounder Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Sounder Menu screen will appear.
- ③ Select "I.R" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Select "ON" using the [LEFT] or [RIGHT] key and press the [SET] key.
The setting is now saved.
- ⑤ When you finish setting, press the [MENU] key to close the Main Menu screen.

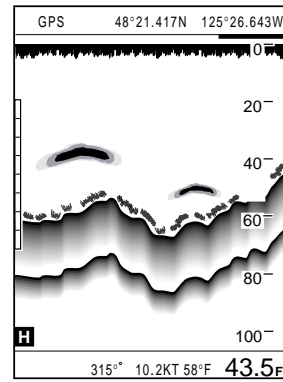
Noise disturbance caused by other fishfinder



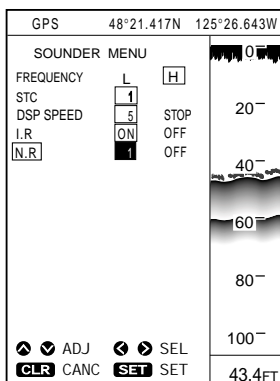
Inductive interference caused by a generator on the ship



Anti-interference ON



(7) Setting of Noise Reduction

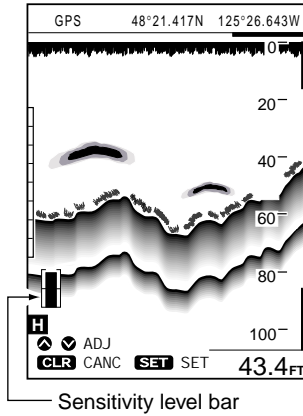


The system has a noise reduction function that suppresses noises caused by contamination of seawater or other sources. These noises may appear as blue or green dots on fishfinder screens. (Default; OFF)

To suppress the noises and make the image legible, proceed as follows.

- ① Press the [MENU] key.
The Main Menu screen will appear.
 - ② Select "Sounder Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Sounder Menu screen will appear.
 - ③ Select "N.R" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
 - ④ Move to the noise reduction level by using the [LEFT] or [RIGHT] key.
 - ⑤ Select the desired level ("1" to "4") using the [UP] or [DOWN] key and press the [SET] key.
The selection is now saved.
- * Level "1" minimizes noise suppression and Level "4" maximizes it.
* If you select "OFF", the noise reduction function is not used.
- ⑥ When you finish setting, press the [MENU] key to close the Main Menu screen.

(8) Manual Setting of Sensitivity

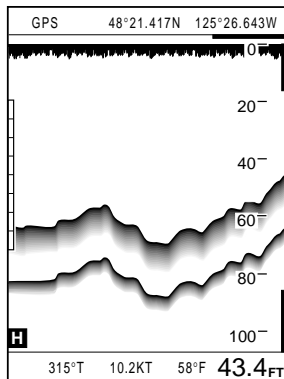


The sensitivity setting is critical to ensure optimal fishfinder performance. Be sure to set the sensitivity properly when using the system in manual mode.

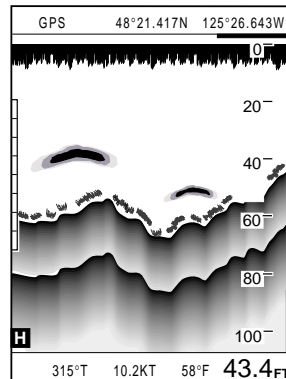
To set the sensitivity to ultrasonic reflected from the sea bottom, proceed as follows.

- ① Press the [GAIN] key.
The level bar will appear on the screen and is indicating the current level.
* The level bar is inoperative when the system is in auto sensitivity mode or auto operation mode.
- ② Using the [UP] or [DOWN] key, set the sensitivity level so that the portion close to the sea bottom is displayed in red (color shown at the top of the color pattern) and noises (blue) are not found in the water.
Each time you press the [UP] or [DOWN] key, the level bar changes in height in increments of one step.
- ③ Press the [GAIN] or [SET] key to save the setting.

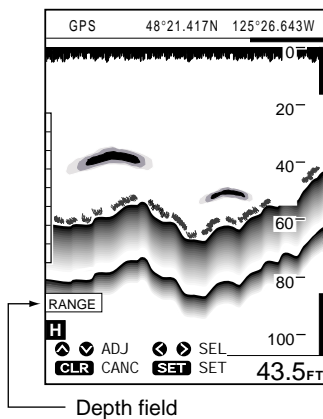
Sensitivity level too low



Sensitivity level too high



(9) Manual Setting of Depth Range



The depth range is an underwater range in depth that contained in the screen image.

Available units of the depth range include m (metres), FT (feet) and FM (fathoms) (☞ P. 63).

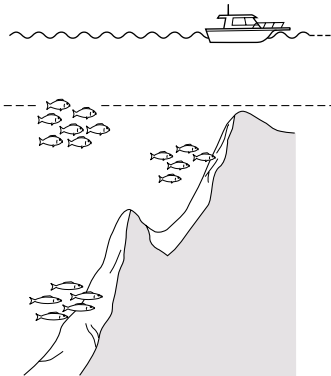
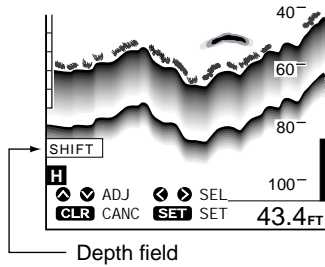
To set the depth range manually, proceed as follows.

- ① Press the [RANGE] key.
"RANGE" ("SHIFT" or "AUTO") will be indicated in the depth field on the screen.
* If auto operation is active, it is canceled.
- ② Select "RANGE" using the [LEFT] or [RIGHT] key.
- ③ Select the desired depth range using the [UP] or [DOWN] key.
Each time you press the [UP] or [DOWN] key, the depth range changes in increments of one step.
* On the Depth Range Selection screen (☞ P. 67), you can preset up to 31 depth ranges suited to the sea bottom.
- ④ Press the [RANGE] or [SET] key to save the setting.

Units of depth	Depth range (default)									
m (meters)	0 ~ 5	0 ~ 10	0 ~ 20	0 ~ 40	0 ~ 80	0 ~ 160	0 ~ 240	0 ~ 320	0 ~ 480	0 ~ 640
FT (feet)	0 ~ 20	0 ~ 40	0 ~ 60	0 ~ 100	0 ~ 180	0 ~ 260	0 ~ 600	0 ~ 1000	0 ~ 1500	0 ~ 2000
FM (fathoms)	0 ~ 3	0 ~ 5	0 ~ 10	0 ~ 20	0 ~ 40	0 ~ 80	0 ~ 120	0 ~ 160	0 ~ 260	0 ~ 350

* The depth ranges default to (are factory set to) those shown in the table above.

(10) Setting of Depth Shift

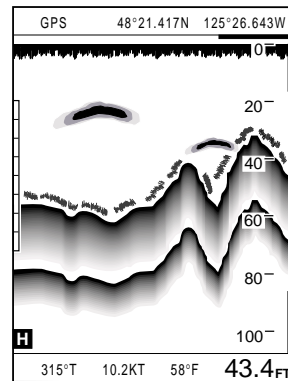


Setting the depth shift allows you to specify a depth at which the upper edge of the screen image stands.

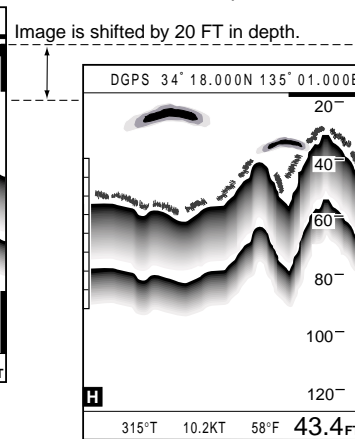
To set the depth shift, proceed as follows.

- ① Press the [RANGE] key.
"RANGE" ("SHIFT" or "AUTO") will be indicated in the depth field on the screen.
- ② Select "Shift" using the [LEFT] or [RIGHT] key.
- ③ Select the desired depth shift using the [UP] or [DOWN] key.
Each time you press the [UP] or [DOWN] key, the depth shift changes in increments of one step.
- ④ Press the [RANGE] or [SET] key to save the setting.

When no depth shift is set

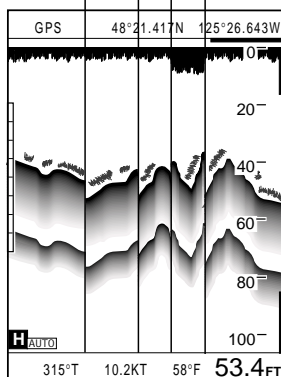
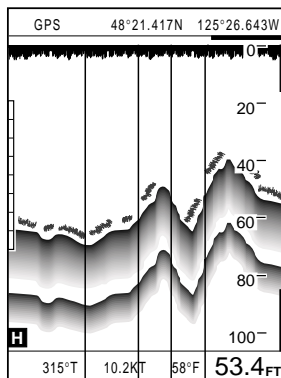


When a 20 FT depth shift is set



(11) Selection of Auto Operation

Manual operation



Auto operation

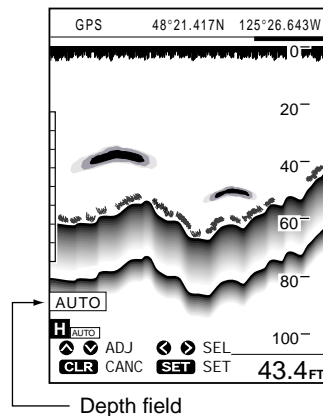
Auto operation is suitable for beginners to use the fishfinder.

Detection of the sea bottom needs subtle adjustment of the depth range according to the shape of the sea bottom.

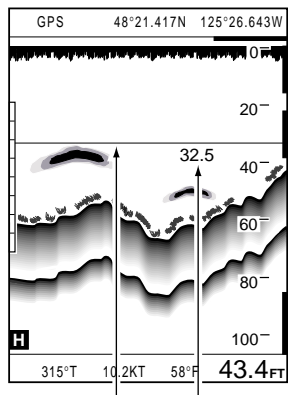
The use of the auto operation function of the system, however, permits the bottom image to be always displayed on the screen.

To use auto operation, proceed as follows.

- ① Press the [RANGE] key.
"RANGE" ("SHIFT" or "AUTO") will be indicated in the depth field on the screen.
- ② Select "AUTO" using the [LEFT] or [RIGHT] key.
- ③ Press the [RANGE] or [SET] key to save the setting.



(12) Depth Measurement



Depth marker Depth value

The depth of the sea bottom or a shoal of fish can be measured precisely.

The depth is indicated by a green line called the depth marker and a numerical value.

To measure the depth, proceed as follows.

- ① Press the [UP]/[DOWN] or [LEFT]/[RIGHT] key.
The depth marker and a depth value will appear at the top of the screen.
- ② Press the [UP] or [DOWN] key until the depth marker moves to the desired position.
The depth of the position will be numerically indicated underneath the depth marker.
* Pressing the [UP] or [DOWN] key for 0.5 second or more causes the depth marker to move continuously.
* In Combination mode, the depth marker cannot be used.
- ③ To exit from the depth measurement mode, select other fishfinder screens or press the [CLR].

(13) Setting of Zoom-in range on Bottom lock Screen

The zoom-in range displayed on the standard + bottom lock screen can be selected from among four options.

On the bottom lock screen, a certain depth range measured from the sea bottom is zoomed in.

To set the zoom-in range, proceed as follows.

- ① Press the Sounder key to select "Standard + Bottom lock Screen".
- ② Press the [ZOOM-IN] or [ZOOM-OUT] key until the desired depth range is reached.
- ③ Release the [ZOOM-IN] or [ZOOM-OUT] key.
The setting is saved.

Units of depth	Bottom zoom-in range			
m (meters)	0 ~ 5	0 ~ 10	0 ~ 20	0 ~ 40
FT (feet)	0 ~ 15	0 ~ 30	0 ~ 60	0 ~ 120
FM (fathoms)	0 ~ 3	0 ~ 5	0 ~ 10	0 ~ 20

14 ◀ SOUNDER MODE ▶ SETTING OF MARKER ZOOM-IN RANGE

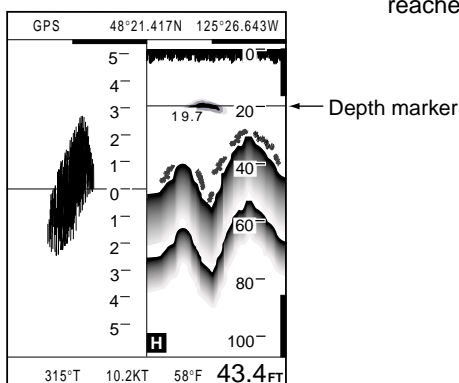
(14) Setting of Marker Zoom-in Range

The zoom-in range displayed on the standard + marker zoom-in screen can be selected from among four options.

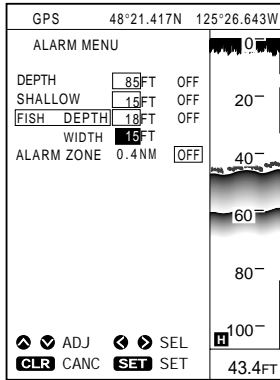
The zoom-in function provides zoom-in display around the variable range marker for detailed observation of underwater activity such as fish schools.

To set the zoom-in range, proceed as follows.

- ① Press the Sounder key to select "Standard + Marker zoom-in Screen".
 - * The depth marker will appear on the screen automatically.
- ② Pressing the [UP] or [DOWN] key, move the depth marker to the desired position.
- * In Combination mode, the maker zoom-in screen cannot be used.
- ③ Press the [ZOOM-IN] or [ZOOM-OUT] key until the desired zoom-in range is reached.



(15) Setting of Sounder Alarm Ranges

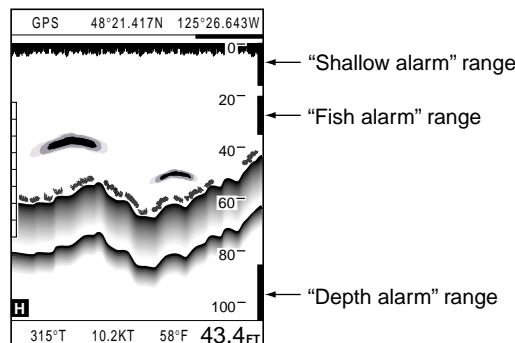


Three types of Sounder alarms are available as shown in the table below.

Alarm type	Description
Depth alarm	When the ship enters an area where the depth of water exceeds the specified limit, an alarm sound is produced and a "DEPTH alarm" is displayed on the screen. When the ship leaves the area, an alarm sound stops.
Shallow alarm	When the ship enters an area where the depth of water is shallower than the specified limit, an alarm sound is produced and a "SHALLOW alarm" is displayed on the screen. When the ship leaves the area, an alarm sound stops.
Fish alarm	When a fish school is detected within the specified bounds, an alarm sound is produced and a "FISH alarm" is displayed on the screen. When a fish school is undetectable within the specified bounds, an alarm sound stops.

To set the sounder alarm ranges, proceed as follows.

- ① Press the [MENU] key.
The Main Menu screen will appear.
- ② Select "Alarm Menu" using the [UP] or [DOWN] key and press the [SET] key.
The Alarm Menu screen will appear.
- ③ Select "Depth (Limit)", "Shallow (Limit)" or "Fish (Depth/Width)" using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue.
- ④ Using the [LEFT] or [RIGHT] key, move to the depth setting field of the selected item.
The depth setting item will be highlighted in yellow.
- ⑤ Enter a depth value into the depth setting field using the [UP] or [DOWN] key and press the [SET] key.
* When "Fish" is selected, entering a depth value into the depth setting field followed by pressing the [SET] key will cause the width setting field to be highlighted in yellow.
- ⑥ Each time you enter a value into each setting field, press the [SET] key.
The setting is saved.
- ⑦ When you finish setting all the sounder alarm ranges, press the [MENU] key to close the Main Menu screen.
* To stop an alarm sound temporarily, press the [CLR] key.



(16)-1 Reflections from the sea bottom

A Reading topographical features of the sea bottom

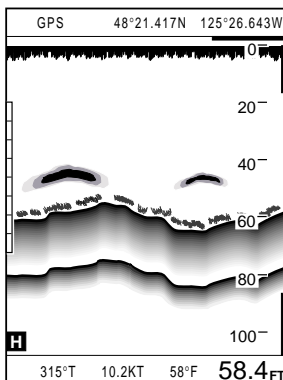
Reflections from the sea bottom are displayed in red provided that the sensitivity is properly set (☞ P. 52).

Screen images of the sea bottom provide you with information on the topographical and geological features of the sea bottom. Such information will help you search for good fishing banks.

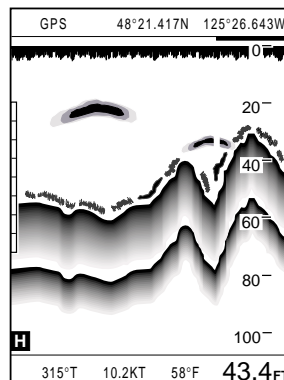
Submarine terrains may be flat or hilly, just as is the case with land. On screen images, topographical features of the sea bottom are displayed, as in:

Topographical feature	Screen image
Flat	Assuming that its geological features are constant, the displayed contour of a flat terrain has a uniform width.
Hilly	The displayed contour of a hilly terrain has a long tailing* ¹ . This is because the ultrasonic sent from the transducer has a certain beam angle and hence reflections from a bank vary in time of their returning to the transducer* ² . * ¹ The depth of water immediately underneath the ship looks shallower than the actual depth. * ² The displayed contour of a bank tends to be narrow.

Flat terrain



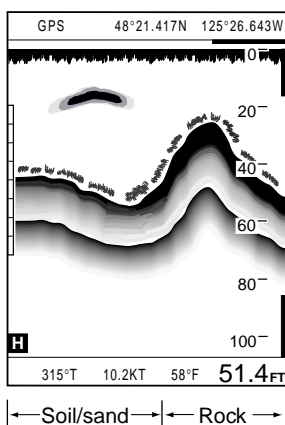
Hilly terrain



B Reading geological features of the sea bottom

On screen images, geological features of the sea bottom are displayed, as in:

Geological feature	Screen image
Hard (e.g., rock, coral reef)	Assuming that its geological features are constant, the displayed contour of a hard terrain has a uniform width.
Soft (e.g., soil, sand, seaweed)	The contour of a soft terrain is display loses redness in color and has a short railing* ¹ . This is because soil or sand absorbs much of the ultrasonic. * ¹ When slim constitutes the sea bottom, the low frequency screen shows a long tailing.



← Soil/sand → ← Rock →

(16)-2 Reflection from a fish school

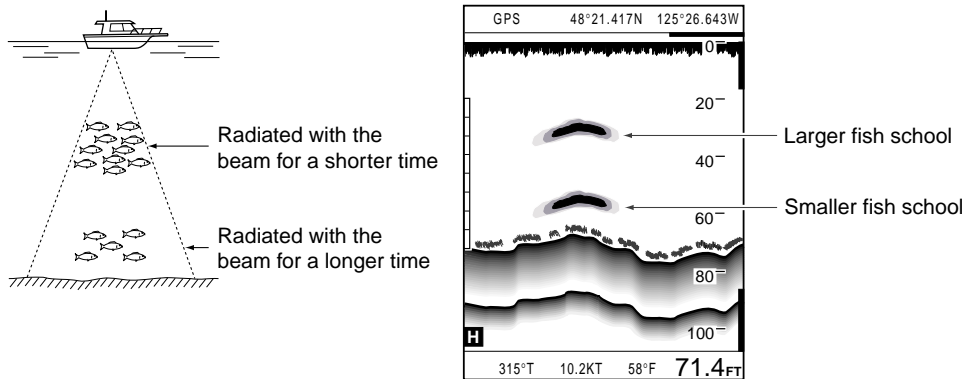
In general, reflections from a fish school form a light-colored downturn between the sea level and bottom on the screen.

Information provided by the screen image of a fish school includes the size and density of the shoal. Comparison, as a routine matter, between the screen image and the actual fishery will permit you to read the image exactly.

A Reading the size of a fish school

The image size of a fish school is in proportion to the actual size.

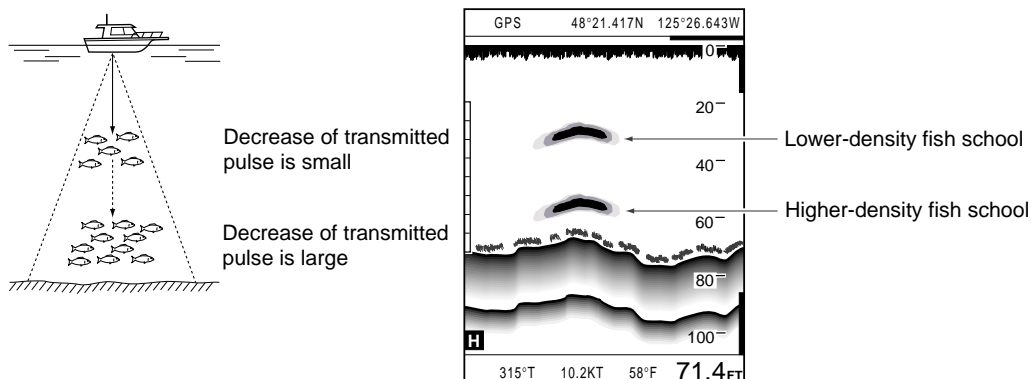
When the system detects two same-sized fish school at different depths, however, the fish school located at a deeper position will be displayed as a smaller-sized image on the screen. This is because the ultrasonic radiates at a cone-shaped beam angle from the transducer and therefore the deeper the object position is, the longer the time for which it is radiated with the beam. The relationship between the image size and the depth of an object depends on the image feed rate and the ship speed.



B Reading the density of a fish school

The higher the density of a fish school is, the closer to red the color of the image is (i.e., the higher the strength of signals reflected from the object is).

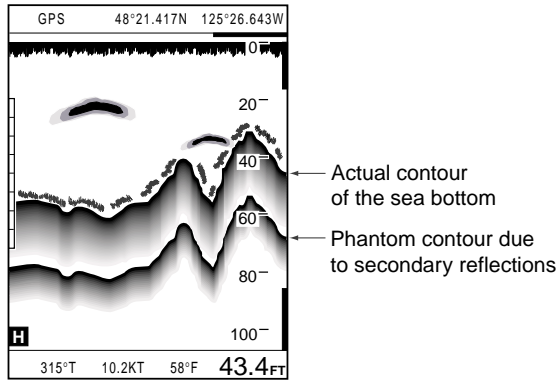
When two images having the same density (same signal strength) are displayed at different depths on the same screen, however, the density of the two fish schools are different; the deeper one is actually denser than the shallower one. This is because the deeper the object position is, the more the pulses reflected from the object delay.



(16)-3 Secondary reflections from the sea bottom

In shallow-depth areas, phantom contours of the sea bottom may often occur under the actual contour.

These phantom contours of the sea bottom are caused by secondary reflections from the sea bottom (bounce of the ultrasonic wave between the sea bottom and the water surface or the ship). This symptom tends to occur in particular when the ship bottom is rocky or a low frequency is used. The secondary contours will appear at depths of integral multiples of the actual depth of water.



(16)-4 Plankton layers or tidal current layer

A Plankton layers

Plankton may sometimes gather and form a layer.

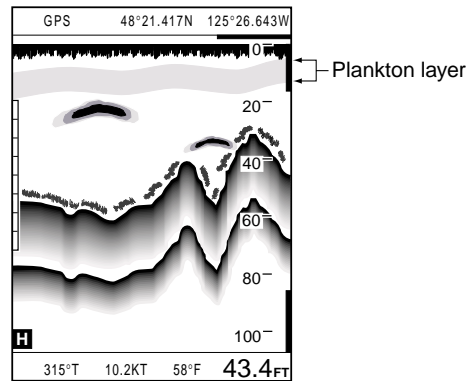
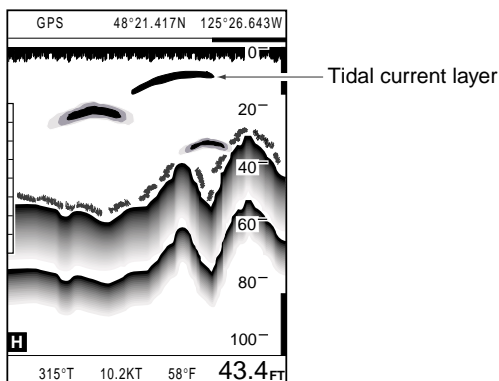
Such a layer looks like a cloud on the screen and may expand to the depths. Since plankton forms the food of many fish, detection of plankton layers will lead to an increase in fishery.

Plankton are light-sensitive, and live in the depth in the daytime and emerge to a shallow depth at night.

B Tidal current layers

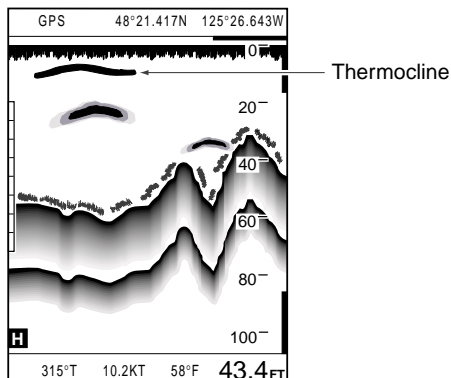
Tidal current layers may occur depending on the speed or route of tidal currents.

In areas where different tidal currents encounter, air bubbles or plankton form a layer, which is displayed on the screen, as in:



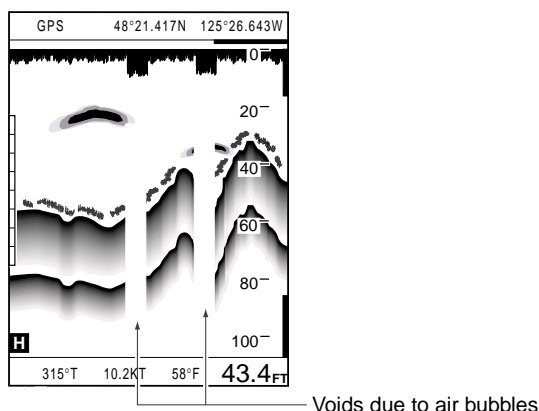
(16)-5 Thermoclines

Thermocline is a lay of a body of water at which the rate of temperature decreases with depth is at a maximum, and is displayed as a screen image.
As a thermocline reflects ultrasonic waves, it appears as a very thin line between the sea level and bottom on the screen.



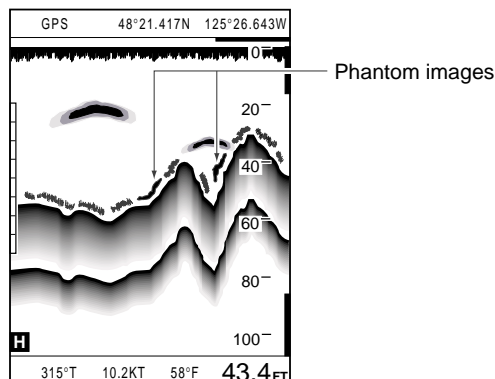
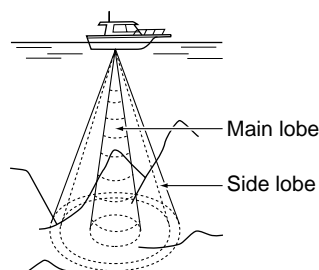
(16)-6 Influence of air bubbles

If the ultrasonic beam passes through air bubbles, reflections from a shoal of fish or the sea bottom may deteriorate or be interrupted, resulting in voids occurring on the screen image.
This symptom is apt to occur when a low frequency is used, the ship turns and passes through its own track, or the sea is rough. Voids on the screen mean that the ultrasonic energy is dissipated or absorbed by air bubbles.



(16)-7 Phantom images

The side lobe from the transducer may cause phantom images.
These images tend to appear above the contour of the sea bottom in a hilly terrain, or under the contour in a flat terrain.



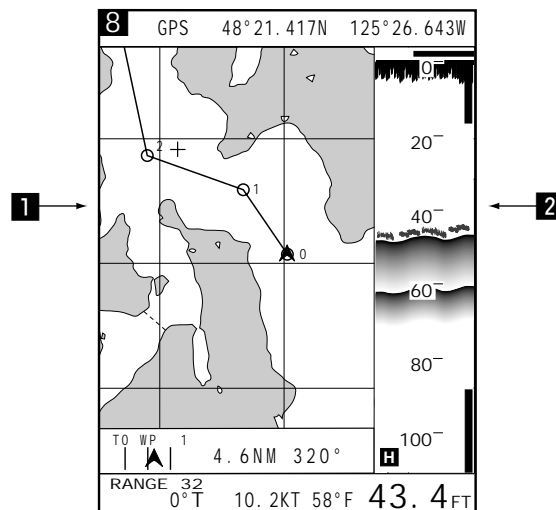
(1) ◀ COMBINATION MODE ▶ AVAILABLE SCREENS AND INDICATIONS

COMBINATION MODE

(1) Available Screens and Indications

The coastline screen and the fishfinder screen are displayed simultaneously in combination mode.

Screen indications and operation procedures in this mode are the same as those in other modes, except described below on this page.



1 Coastline screen

In combination mode, the coastline screen is always displayed here.

2 Sounder screen

In combination mode, the standard screen is always displayed here.

In combination mode, you cannot select other screens than shown above nor use the depth marker.

5-1 Initial setting on the SET MODE screen

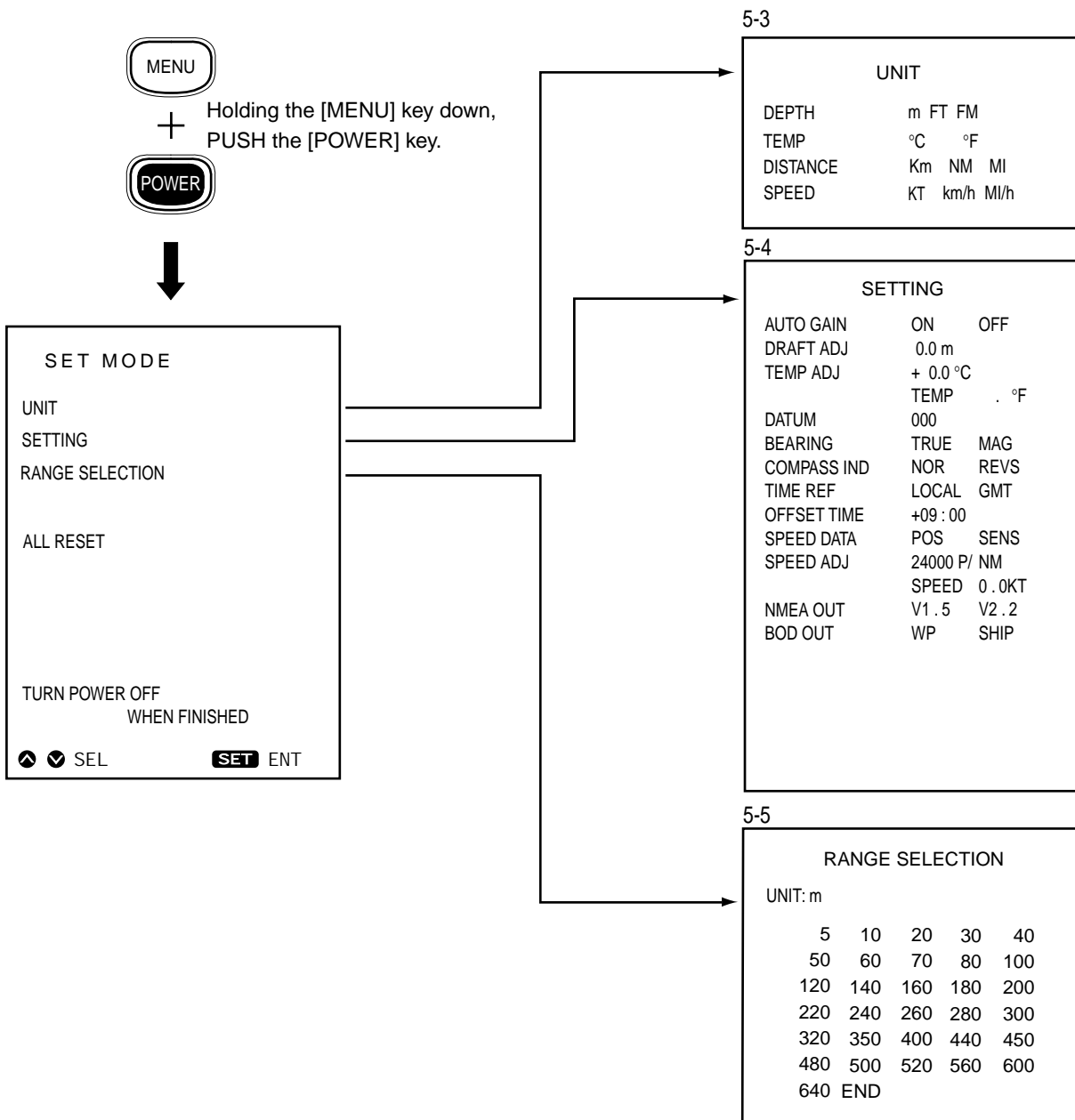
The SET MODE screen allows you to set such items that, once set after installation, will not require to be changed in normal use.

To enter the SET MODE screen, proceed as follows.

- ① Press the [POWER] key to turn off the system.
- ② While holding the [MENU] key down, press the [POWER] key.
The SET MODE screen will appear.
- ③ After you finish initial setting, press the [POWER] key to turn off the system.
When powering on the system, you can start normal operation.

5-2 Initial setting on each submenu screen

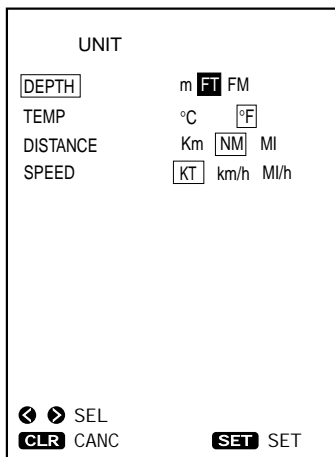
■ Operation flow on the SET MODE screen



5 INITIAL SETTING AFTER INSTALLATION

5-3 UNIT

Setting the units of depth, water temperature, distance and ship speed



This section describes how to set the units of depth, water temperature, distance and ship speed.

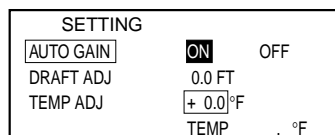
Select such units that are convenient for you to use.

- ① Select "UNIT" on the SET MODE menu screen using the [UP] or [DOWN] key and press the [SET] key.
The UNIT screen will appear.
- ② Select "DEPTH", "TEMP (water temperature)", "DISTANCE" or "SPEED" using the [UP] or [DOWN] key and press the [SET] key.
- ③ Move to the desired unit using the [LEFT] or [RIGHT] key.
The selected item is highlighted in yellow.
- ④ Press the [SET] key.
The setting is saved.
- ⑤ When you finish setting the units, press the [MENU] key.
You will return to the SET MODE screen.

Setting item	Selectable units
DEPTH	m (default) ↔ FT ↔ FM
TEMP (temperature)	°C (default) ↔ °F
DISTANCE	km ↔ NM (default) ↔ MI
SPEED	KT (default) ↔ km/h ↔ MI/h

5-4 SETTING

AUTO GAIN



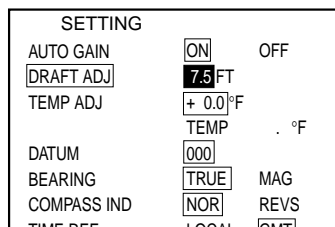
This section describes how to set the various parameters for plotter and sounder functions.

Select such units that are convenient for you to use.

This item allows you to make a selection between two automatic control options;

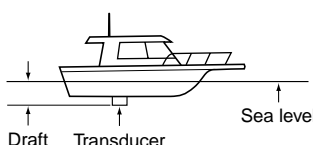
- ON: The image sensitivity and depth range are automatically controlled. (default)
- OFF: Only the depth range is automatically controlled.

DRAFT ADJ



The following describes how to correct for draft (difference in height between the sea level and the transducer installation position) to ensure proper images.

- ① Select "SETTING" on the SET MODE screen using the [UP] or [DOWN] key and press the [SET] key.
The DRAFT ADJ screen will appear.
- ② Select "DRAFT ADJ" using the [UP] or [DOWN] key and press the [SET] key.
- ③ Enter the draft value into the setting field using the [UP] or [DOWN] key and press the [SET] key.
The setting is saved.
* The permissible draft value ranges "0" to "30.0".
- ④ When you finish correction for draft, press the [MEMU] key.
You will return to the SET MODE screen.



■ TEMP ADJ

SETTING		
AUTO GAIN	<input type="checkbox"/> ON	OFF
DRAFT ADJ	<input type="text" value="7.5"/>	FT
TEMP ADJ	<input type="text" value="+ 2.4"/>	°F
	TEMP	. °F
DATUM	<input type="text" value="000"/>	
BEARING	<input type="checkbox"/> TRUE	MAG
COMPASS IND	<input type="checkbox"/> NOR	REVS
TIME REF	LOCAL	<input type="checkbox"/> GMT
OFFSET TIME	<input type="text" value="+ 9:00"/>	
SPEED DATA	<input type="checkbox"/> POS	SENS
SPEED ADJ	<input type="text" value="24000"/>	P/ NM
	SPEED	0.0KT
NMEA OUT	V1.5	<input type="checkbox"/> V2.2
BOD OUT	<input type="checkbox"/> WP	SHIP
<input type="checkbox"/> ADJ		
<input type="checkbox"/> CLR	CANC	<input type="checkbox"/> SET SET

The following describes how to correct the water temperature detected by the temperature sensor.

- ① Select "SETTING" on the Setting SET MODE using the [UP] or [DOWN] key and press the [SET] key.
The SETTING screen will appear.
- ② Select "TEMP ADJ" using the [UP] or [DOWN] key and press the [SET] key.
The current water temperature is indicated in the temperature setting field on the SETTING screen.
- ③ Enter the desired value into the temperature setting field using the [UP] or [DOWN] key and press the [SET] key.
The setting is saved.
* The permissible correction range is "-20 to +20".
- ④ When you finish correcting the water temperature, press the [MENU] key.
You will return to the SET MODE screen.

■ DATUM

SETTING		
AUTO GAIN	<input type="checkbox"/> ON	OFF
DRAFT ADJ	<input type="text" value="7.5"/>	FT
TEMP ADJ	<input type="text" value="+ 2.4"/>	°F
	TEMP	. °F
DATUM	<input type="text" value="123"/>	
BEARING	<input type="checkbox"/> TRUE	MAG
COMPASS IND	<input type="checkbox"/> NOR	REVS
TIME REF	LOCAL	<input type="checkbox"/> GMT
OFFSET TIME	<input type="text" value="+ 9:00"/>	
SPEED DATA	<input type="checkbox"/> POS	SENS
SPEED ADJ	<input type="text" value="24000"/>	P/ NM
	SPEED	0.0KT
NMEA OUT	V1.5	<input type="checkbox"/> V2.2
BOD OUT	<input type="checkbox"/> WP	SHIP
<input type="checkbox"/> ADJ		
<input type="checkbox"/> CLR	CANC	<input type="checkbox"/> SEL SET

The build-in GSP receiver of the system receives signals from the GPS, and the GPS uses the WGS-84 geodetic reference system, a global geodetic reference system.

The following describes how to select the geodetic reference system of nautical charts you currently use, in order to avoid positioning errors due to differences between the nautical charts and the WGS-84. (see pgs. 77, 78; DATUM TABLE)

- ① Select "SETTING" on the SET MODE screen using the [UP] or [DOWN] key and press the [SET] key.
The SETTING screen will appear.
- ② Select "DATUM" using the [UP] or [DOWN] key and press the [SET] key.
- ③ Move the geodetic system setting filed using the [LEFT] or [RIGHT] key.
The selected digit in the field is highlighted in yellow.
- ④ Enter the value corresponding to the nautical charts you currently use using the [UP] or [DOWN] key and press the [SET] key.
The setting is saved.
- ⑤ When you finish setting geodetic data, press the [MENU] key.
You will return to the SET MODE screen.

■ BEARING

SETTING		
AUTO GAIN	<input type="checkbox"/> ON	OFF
DRAFT ADJ	<input type="text" value="7.5"/>	FT
TEMP ADJ	<input type="text" value="+ 2.4"/>	°F
	TEMP	. °F
DATUM	<input type="text" value="123"/>	
BEARING	<input type="checkbox"/> TRUE	MAG
COMPASS IND	<input type="checkbox"/> NOR	REVS
TIME REF	LOCAL	<input type="checkbox"/> GMT
OFFSET TIME	<input type="text" value="- 8:30"/>	
SPEED DATA	<input type="checkbox"/> POS	SENS
SPEED ADJ	<input type="text" value="22000"/>	P/ NM
	SPEED	0.0KT
NMEA OUT	V1.5	<input type="checkbox"/> V2.2
BOD OUT	<input type="checkbox"/> WP	SHIP
<input type="checkbox"/> SEL		
<input type="checkbox"/> CLR	CANC	<input type="checkbox"/> SET SET

The following describes how to correct the ship or destination bearing that will be displayed on the coastline screen or other screens.

• TRUE; True bearing, MAG; Magnetic bearing

- ① Select "SETTING" on the SET MODE screen using the [UP] or [DOWN] key and press the [SET] key.
The SETTING screen will appear.
- ② Select "BEARING" using the [UP] or [DOWN] key and press the [SET] key.
- ③ Select "True" or "Magnetic" using the [LEFT] or [RIGHT] key and press [SET] key.
The setting is saved.
- ④ When you finish setting the azimuth, press the [MENU] key.
You will return to the SET MODE screen.

5 INITIAL SETTING AFTER INSTALLATION

COMPASS IND

DATUM	123	
BEARING	TRUE	MAG
COMPASS IND	NOR	REVS
TIME REF	LOCAL	GMT
OFFSET TIME	+ 9 : 00	

This item allows you to make a selection between two options on graphic indication on the navigation monitor screen:

- NOR: Normal indication
- REVS: Reverse indication

TIME REF

BEARING	TRUE	MAG
COMPASS IND	NOR	REVS
TIME REF	LOCAL	GMT
OFFSET TIME	+ 9 : 00	
SPEED DATA	POS	SENS
SPEED ADJ	24000 P/ NM	

This item allows you to make a selection between two options on Time indication on the navigation monitor screen:

- LOCAL: Local standard time
- GMT: Greenwich Mean Time (UTC)

OFFSET TIME

The following describes how to set the offset time between UTC (Universal Time Coordinated) and the standard time of a time zone.

SETTING		
AUTO GAIN	ON	OFF
DRAFT ADJ	7.5 FT	
TEMP ADJ	+ 2.4 °F	
	TEMP	°F
DATUM	123	
BEARING	TRUE	MAG
COMPASS IND	NOR	REVS
TIME REF	LOCAL	GMT
OFFSET TIME	+09 : 00	
SPEED DATA	POS	SENS
SPEED ADJ	24000 P/ NM	
	SPEED	0.0KT
NMEA OUT	V1.5	V2.2
BOD OUT	WP	SHIP
▲ ▼ ADJ	◀ ▶ SEL	
CLR CANC	SET SET	

The offset time of the system defaults to "+9".

- ① Select "SETTING" on the Setting Menu screen using the [UP] or [DOWN] key and press the [SET] key.
The SETTING screen will appear.
- ② Select "OFFSET TIME" using the [UP] or [DOWN] key and press the [SET] key.
- ③ Move to the time difference setting field using the [LEFT] or [RIGHT] key.
The selected item is highlighted in yellow.
- ④ Enter the desired value into the time difference setting field using the [UP] or [DOWN] key and press the [SET] key.
The setting is saved.
- ⑤ When you finish setting the offset time, press the [MENU] key.
You will return to the SET MODE screen.

SPEED DATA

TIME REF	LOCAL	GMT
OFFSET TIME	+ 9 : 00	
SPEED DATA	POS	SENS
SPEED ADJ	24000 P/ NM	
	SPEED	0.0KT
NMEA OUT	V1.5	V2.2

This item allows you to make a selection between two ship speed signal sensing options.

- POS: Signals received by the GPS receiver are used to read the ship speed.
- SENS: Signals detected by the sensor are used to read the ship speed.

SPEED ADJ

The following describes how to correct the ship speed for difference between the actual speed and the speed sensor reading.

SETTING		
AUTO GAIN	ON	OFF
DRAFT ADJ	7.5 FT	
TEMP ADJ	+ 2.4 °F	
	TEMP	°F
DATUM	123	
BEARING	TRUE	MAG
COMPASS IND	NOR	REVS
TIME REF	LOCAL	GMT
OFFSET TIME	+ 9 : 00	
SPEED DATA	POS	SENS
SPEED ADJ	24000 P/ NM	
	SPEED	0.0KT
NMEA OUT	V1.5	V2.2
BOD OUT	WP	SHIP
▲ ▼ ADJ	◀ ▶ SEL	
CLR CANC	SET SET	

- ① Select "SETTING" on the SET MODE screen using the [UP] or [DOWN] key and press the [SET] key.
The SETTING screen will appear.
- ② Select "SPEED ADJ" using the [UP] or [DOWN] key and press the [SET] key.
- ③ Enter the pulse rate of the speed sensor into the pulse rate setting field using [UP] or [DOWN] key and press the [SET] key.
* When using an optional sensor, EX-1622 (transom type speed/temperature sensor), set the pulse rate to "24000 P/NM".
When using an optional transducer, EX-1010 (through-the-hull type transducer with speed/water temperature sensor), set the pulse rate to "22000 P/NM".
* If the above setting causes an error to occur, adjust the pulse rate while referring to the speed reading displayed on the screen.
- ④ When you finish correcting the ship speed, press the [MENU] key.
You will return to the SET MODE screen.

■ NMEA OUT

SETTING		
AUTO GAIN	<input type="checkbox"/> ON	OFF
DRAFT ADJ	<input type="text" value="7.5"/>	FT
TEMP ADJ	<input type="text" value="+ 2.4"/>	°F
	TEMP	. °F
DATUM	<input type="text" value="123"/>	
BEARING	<input type="checkbox"/> TRUE	MAG
COMPASS IND	<input type="checkbox"/> NOR	REVS
TIME REF	<input type="checkbox"/> LOCAL	<input type="checkbox"/> GMT
OFFSET TIME	<input type="text" value="+ 9:00"/>	
SPEED DATA	<input type="checkbox"/> POS	SENS
SPEED ADJ	<input type="text" value="24000"/>	P/ NM
	SPEED	0.0KT
NMEA OUT	<input type="checkbox"/> V1.5	<input checked="" type="checkbox"/> V2.2
BOD OUT	<input type="checkbox"/> WP	SHIP
<input type="button" value="←"/> <input type="button" value="→"/>	SEL	
<input type="button" value="CLR"/>	CANC	
<input type="button" value="SET"/>	SET	

This item allows you to make a selection between two versions of external NMEA0183 supported by the system:

- V1.5: Version 1.5
- V2.2: Version 2.2

■ BOD OUT

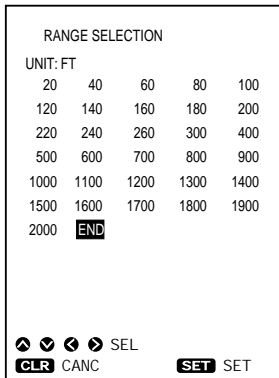
SETTING		
AUTO GAIN	<input type="checkbox"/> ON	OFF
DRAFT ADJ	<input type="text" value="7.5"/>	FT
TEMP ADJ	<input type="text" value="+ 2.4"/>	°F
	TEMP	. °F
DATUM	<input type="text" value="123"/>	
BEARING	<input type="checkbox"/> TRUE	MAG
COMPASS IND	<input type="checkbox"/> NOR	REVS
TIME REF	<input type="checkbox"/> LOCAL	<input type="checkbox"/> GMT
OFFSET TIME	<input type="text" value="+ 9:00"/>	
SPEED DATA	<input type="checkbox"/> POS	SENS
SPEED ADJ	<input type="text" value="24000"/>	P/ NM
	SPEED	0.0KT
NMEA OUT	<input type="checkbox"/> V1.5	<input checked="" type="checkbox"/> V2.2
BOD OUT	<input checked="" type="checkbox"/> WP	SHIP
<input type="button" value="←"/> <input type="button" value="→"/>	SEL	
<input type="button" value="CLR"/>	CANC	
<input type="button" value="SET"/>	SET	

This item allows you to make a selection between two reference points of the azimuth to the destination or next turning point:

- WP: The azimuth from the starting point to the next turning point is applied on NMEA OUT. (default)
- SHIP: The azimuth from the current ship position to the destination is applied on NMEA OUT.

5 INITIAL SETTING AFTER INSTALLATION

5-5 RANGE SELECTION



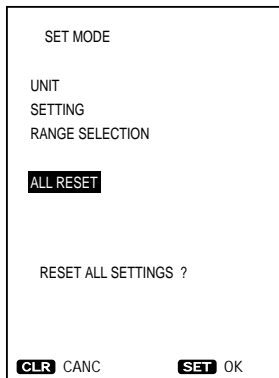
Ranges you have selected: White
Ranges you have not selected: Red

This section describes how to register your most-used depth ranges among 31 depth ranges.

- ① Select "Range Selection" on the SET MODE screen using the [UP] or [DOWN] key and press the [SET] key.
The Depth Range Selection screen will appear.
- ② Select a desired range using the [UP]/[DOWN] or [LEFT]/[RIGHT] key and press the [SET] key.
The selected range turns white.
- ③ Repeat step ② until all of your desired ranges turn white.
Ranges you have not selected are show in red.
To undo your selection, press the [CLR] key.
- ④ When you finish range selection, move the cursor to "END" and press the [SET] or press the [MENU] key.
The selections are saved, and you will return to the SET MODE screen.

Units of Depth range	Standard depth ranges															
m (meters) (default)	5	10	20	30	40	50	60	70	80	100	120	140	160	180	200	220
	240	260	280	300	320	350	400	440	450	480	500	520	560	600	640	
FT (feet)	20	40	60	80	100	120	140	160	180	200	220	240	260	300	400	500
	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	
FM (fathoms)	3	5	10	15	20	25	30	35	40	50	60	70	80	90	100	110
	120	130	140	150	160	180	200	220	240	260	280	300	320	340	350	

5-6 ALL RESET



Any changes you made to the system parameters can be restored to the original settings (defaults).

To do this, proceed as follows.

- ① Select "ALL RESET" on the SET MODE screen using the [UP] or [DOWN] key and press the [SET] key.
The selected item turns blue and a message will appear, indicating that you are going to reset all the setting items.
- ② Press the [SET] key.
All the setting items default to their original state.
 - Press [CLR] to cancel the function.

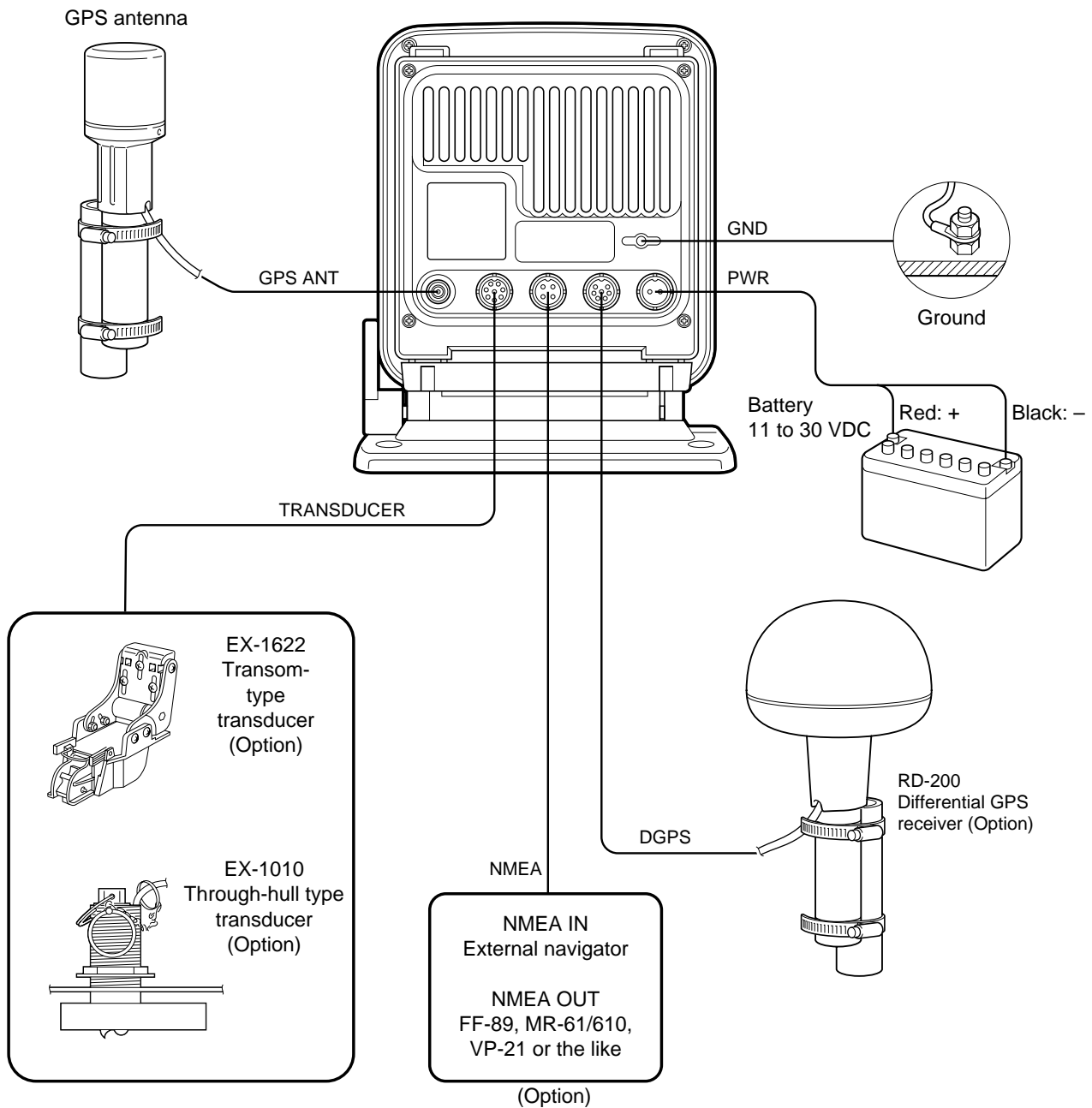
WARNING:

When "All Reset" is selected and the [SET] key is pressed, all of your settings, including registered routes and marks, are lost and cannot be restored.

6-1 Overall connection diagram

Install the system properly according to the instruction of this manual to ensure optimum performance and stable operation of the system

Prior to commencing installation work, make sure that the system package comes complete with the accessories listed in the "Standard accessories" section on the first page of the manual.



6-2 Installation procedure

A Installation place of the main unit

Install the main unit of the system in such an area that

- ① Is situated forward of the steering wheel and is easy for the steersman to observe the display of the unit;
- ② Is distant as far as possible from devices forming a magnetic field, such as a loudspeaker and power transformer, or devices sensitive to a magnetic field, such as a magnetic compass and magnetic tape; and
- ③ Is not exposed to rainwater, spray of water or direct sunlight.

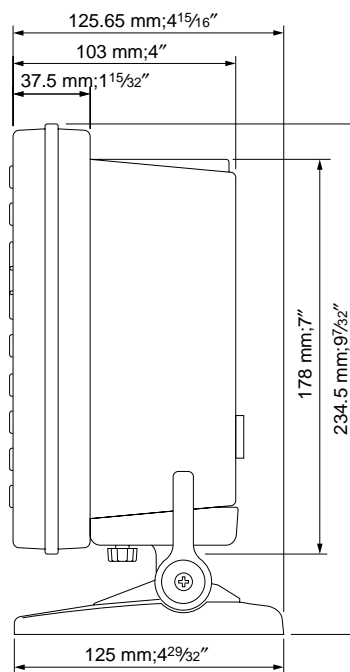
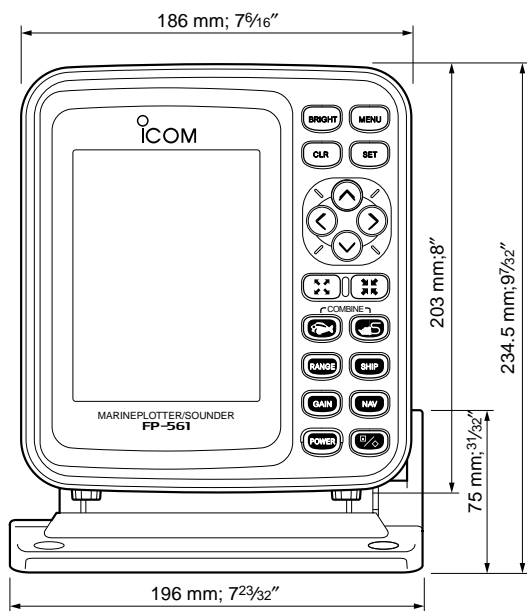
6 INSTALLATION PROCEDURE

■ Installing the main unit

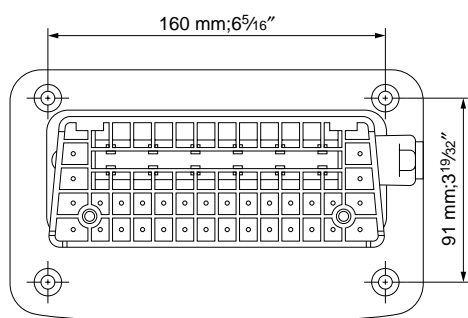
Install the main unit as follows.

- ① Choose the installation position of the stand of the main unit.
- ② Mark center points through the four mounting holes of the stand and then drill a hole of 5 mm in diameter at each of the marked points.
- ③ Secure the stand with the self-tapping screws, flat washers and spring washers.
- ④ Mount the main unit onto the stand and secure it with two mounting screws.
- ⑤ Push the tilting lever down and adjust the angle of the unit as appropriate; then return the lever to the original position.

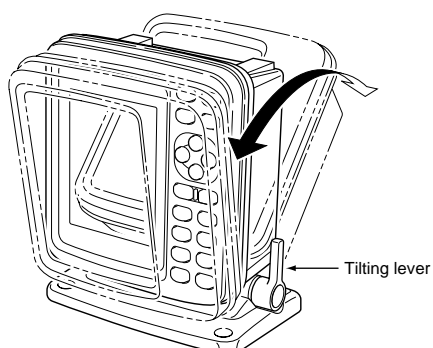
*Protrusions not included



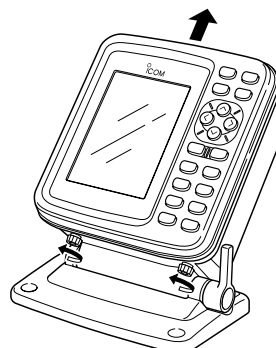
The stand can also be attached to the top of the unit.



Tilting



Removing the unit from the stand



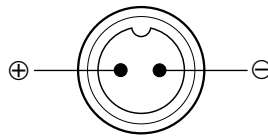
Connecting the power cable

This system operates from an 11 to 30 VDC power source.

Connect the power cable as follows.

- ① Connect the connectorless end of the cable to the battery as shown in the overall connection diagram (P. 68).
* Exercise care to avoid reverse connection in polarity. Reverse connection may cause a blowout of the fuse or damage to the system.
- ② Connect the connector end of the cable to the PWR connector located on the rear panel of the system.

PWR connector on the rear panel



Connecting a ground cable

Be sure to ground the system properly.

Failure to do so may cause a malfunction or fault of the system.

To establish a ground for the system, use a ground cable of adequate size to connect between the GND terminal and the engine block or hull in the shortest distance.

Never connect ground cables for other electronic devices to the grounding mass that is used to ground the system.

6-3 Measures against noises from the generator

Since GPS signals reaches the system from a distance of several hundred miles, noise sources near the system may result in failure to take full advantage of the system.

Noise sources include generator, fishfinder, radar, computer and fluorescent lamp. The system should be placed apart from these noise sources as far as possible or the noise sources except the generator should not be used during the use of the system.

Take the following measures against noises due to the generator among others.

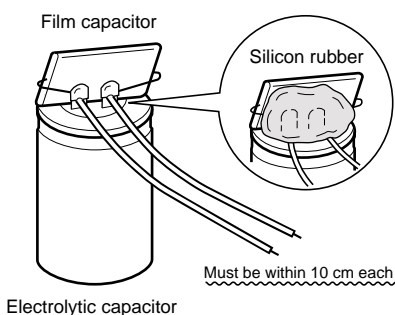
- ① Prepare an electrolytic capacitor and a film capacitor having the following ratings depending on the system's power source voltage.

Power source voltage	Electrolytic capacitor	Film capacitor
12V	2,200μF 35WV	4.7μF 400WV
24V	2,200μF 50WV	4.7μF 400WV

- ② Solder the electrolytic capacitor and film capacitor in parallel with each other. And as shown in the figure on the left, connect lead wires to the capacitor combination and cover the lead connections with silicon rubber to avoid current leakage.

* **The lead wires must not exceed 4 in (10 cm) in length.**

- ③ Connect the positive end of the capacitor combination to the generator output terminal and the negative end to the grounding mass such as the engine block.



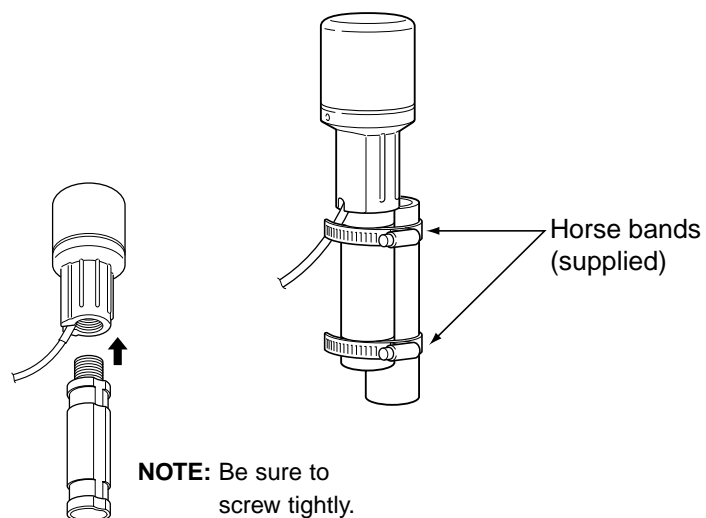
6 INSTALLATION PROCEDURE

6-4 Installing the GPS antenna

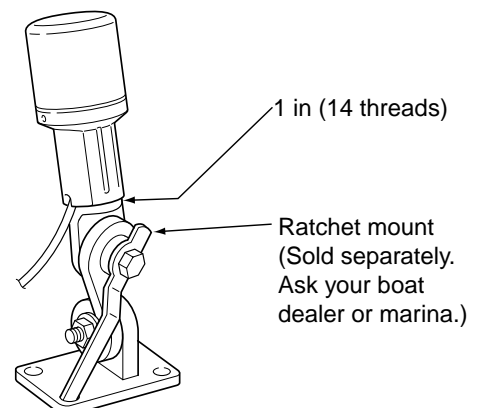
When installing the GPS antenna, observe the following.

- ① Install the antenna at the top of the highest and obstacle-free position of the ship.
- ② Install the antenna in a horizontal position.
Install the antenna with a extension pipe and the horse bands as follows.
- ③ Install the antenna at a position at least 1 m away from the main unit or other electronic devices.
- ④ Do not paint the antenna.
Doing so will deteriorate the sensitivity of the antenna due to metal components of a paint.
- ⑤ Install the antenna and route the antenna cable at some distance from other antennas or antenna cables (such as a TV antenna and radio), metal objects, and the main unit.
It is recommended not to use a TV during the use of the system.

•Install on mast



•Install on a deck or roof



6-5 Installing an optional transducer

A Optional transducers and accessories

Various types of transducers and ship speed/water temperature sensors are available as options to suit your application.

EX-1010	Through-the-hull type transducer (600W, 2 frequencies, metal enclosure, built-in sensor)
EX-1622	Transom type transducer (600W, 2 frequencies, plastic enclosure, built-in sensor)
RD-200	DGPS beacon receiver

B Installation position

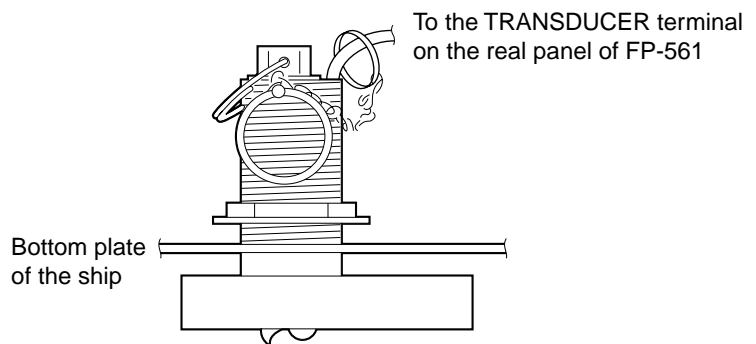
The performance of the fishfinder greatly depends on the installation position of the transducer.

Transducers are mainly divided into two types: the through-the-hull type and the transom type.

Install the transducer in the following area.

- ① Area where the possibility of on-screen voids due to air bubbles or water turbulence is minimized;
- ② Area that resists being exposed to noises from the engine;
- ③ Area where the transducer is kept horizontal even if the ship runs at high speed; (The optimum installation position of the transducer is said to be at a distance of a half or one-third of the ship length from the stern for low-speed small ships, and to be located close to the stern for high-speed ships.)
- ④ Area where the bottom plate is the thinnest in the vicinity of the stern (for inner-hull type transducer; the ultrasonic decays when it passes through the bottom plate).

Installation example of EX-1010



- Do not plug or unplug a cable into of from the TRANSDUCER connector. Doing so may cause damage to the ship speed sensor.
- A transducer must be installed by a shipbuilder or an expert installer.

6 INSTALLATION PROCEDURE

6-6 Connecting an external navigator

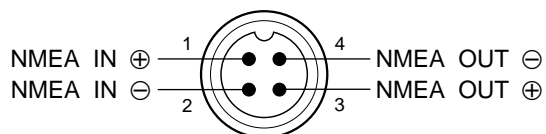
An external navigation equipments can be connected to the NMEA connector on the rear panel of the system.

Connect a 4-pin microphone connector to the NMEA connector and plug the data line in the 1-pin connector and the data return line in the 2-pin connector.

When using an external navigator, set "Positioning Equipment" to "NMEA" on the Positioning Menu screen (☞ P. 34).

When sending positioning data obtained from the build-in GPS navigator to optional radar MR-61/610, Marine plotter VP-21 or other devices, plug these devices to the NMEA connector (3-pin/4-pin) on the rear panel of the system while referring to the overall connection diagram on page 70.

NMEA connector on the rear panel



6-7 DGPS

The DGPS is a newly established system intended to improve the positioning precision of the GSP.

Connecting RD-200, a DGPS beacon receiver, allows the system to receive correction data from a land DGPS reference station, thereby enabling the positioning precision to be further improved.

The nominal positioning precision is 100 m when only the GPS is used, but using the DGPS leads to the nominal precision of 10 m.

* For details, see the RD-200 Instruction Manual.

7-1 Maintenance and inspection

This system is designed to be easy to maintain for the operator. Proper maintenance allows the system to be kept in an optimum state and prevents the possibility of malfunctions.

As a high voltage is used in the system, be sure to read the Safety Notice on page 1 before commencing maintenance work.

- ① To remove dirt from the cover or key panel, wipe it using a soft cloth damped with a water-diluted detergent.
- ② To clean the TFT display, wipe it using a soft cloth damped with an anti-static agent or water.
- ③ Check cable connections and the GND terminal for contamination and looseness.

Also check cables for wear.

- ④ Check the transducer surface, cables and connectors for rust or adhesion of marine organisms such as algae.

To clean the transducer surface, wipe it using a soft brush damped with a detergent.

- ⑤ The main unit of the system contains a lithium battery that retains data in RAM. This backup battery has a life of approx. five (5) years.

If the battery is completely dead, registered navigational marks and routes are lost.

If these symptoms appear, contact your dealer or our local sales office.

7-2 Replacing the fuse

All the circuits of the system are fuse-protected.

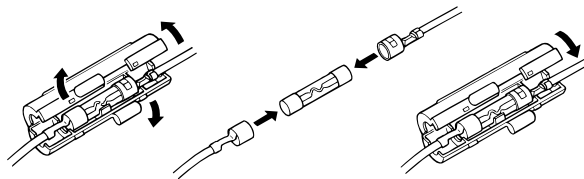
If the [POWER] key is inoperative, proceed as follows.

- ① Open the fuse holder of the power cable, remove the burnt fuse.
- ② Locate and remove the cause of a fuse blowout, install a new fuse.

Use the replacement fuse rated at 3 A.

*** Fuses are contained in the main unit.**

If replacing the fuse of the power cable fails to remove the symptom, contact your dealer or our service personnel for inspection.



GENERAL

- **Display** : 5.6" TFT color LCD (320 × 234 dots)
- **Power supply** : 11 to 33 VDC
- **Power consumption** : Less than 22 W (Less than 1.8 A at 12 VDC)
- **Weight** : Approx. 2.2 kg; 4 lb 14 oz
- **Operating ambient temperature** : 0 °C to +50°C, +32°F to +122°F

PLOTTER

- **Track indication** : (1) Number of available reduced scales : 16
(2) Tracking intervals : 5 sec. to 60 min.
/ in increments of 0.01 to 9.99 (common for all units)
(3) Track plotting points : 5,000 max. (7 colors selectable)
- **Data indication** : Coastlines, place-names (stored in ROM card)
- **Navigation calculation** : (1) Latitude and longitude of current ship position
(2) Distance, required time, deviation out of course
(3) Latitude and longitude of cursor position, azimuth, distance
(4) Time
- **Number of registered marks** : 500 max.
- **Alarms** : Range alarm, arrival alarm
- **Available screens** : (1) Coastline screen
(2) Navigation monitor screen
(3) Positioning information screen

GPS RECEIVER

- **Receive system** : 12 channels, all-in-one view
- **Receive Frequency** : 1575.42 MHz
- **Following efficiency** : Speed: Less than 500 m/S, Acceleration: Less than 4 G
- **Measuring accuracy** : 15 m RMS (DOP≤6)
The precision may deteriorate to 100 m max. depending on the policies of the U.S. Department of Defense.

SOUNDER

- **Transmission frequency** : 50/200 kHz
- **Output power** : 500 W (RMS)
- **Available screens** : (1) Standard screen
(2) Standard + A scope screen
(3) Two-frequency screen
(4) Standard + bottom rock screen
(5) Standard + marker zoom-in screen
- **Image feed** : 6 stages including Halt
- **Alarms** : (1) Shallow alarm
(2) Depth alarm
(3) Fish alarm
- **Units of depth of water** : m (meter), FT (feet), FM (fathom)
- **Units of water temperature** : 0 to +40°C, +32 to 104°F
- **Ultrasonic reflection levels** : 8 colors used
- **Depth ranges** : m : 5, 10, 20, 30, 40, 50, 60, 70, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 350, 400, 450, 480, 500, 520, 560, 600, 640
FT : 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 300, 400, 500, 600, 700, 800, 900, 1000, 110, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000
FM : 3, 5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 350
- **Phase shift variable range** : 0 to 640 m (0 to 2000 FT, 0 to 3200 FM) in increments of one step
- **Zoom-in ranges** : m : 5, 10, 20, 40
FT : 15, 30, 60, 120
FM : 3, 5, 10, 20

OTHER

- **Units of ship speed** : KT, km/h, MI/h
- **Units of distance** : km, NM, MI
- **LCD brightness** : 16 stages
- **External data input** : (1) NMEA0183
(2) Water temperature/ship speed data
(3) Input from DGPS
- **Data output** : NMEA0183 (GGA, GLL, XTE, AAM, VGT, BOD, WPL, BWC)
Synchronous serial transfer at 4800 bps
Ver 1.5/2.2

*Appearance and specifications of the system may be subject to change without notice.

■ Datum (Geodetic reference) table

0	: WGS 84—Default	54	: England, Channel Islands, Ireland, Scotland, Shetland Islands
1	: Ethiopia, Sudan	55	: Finland, Norway
2	: Burkina Faso	56	: Greece
3	: Cameroon	57	: Iran
4	: Ethiopia	58	: Italy (Sardinia)
5	: Mali	59	: Italy (Sicily)
6	: Senegal	60	: Malta
7	: Sudan	61	: Portugal, Spain
8	: Somalia	62	: Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland
9	: Bahrain	63	: Leeward Islands
10	: Saudi Arabia	64	: Republic of Maldives
11	: Cocos Islands	65	: New Zealand
12	: Antigua	66	: Graciosa Base SW 1948 Azores
13	: Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe	67	: Guam
14	: Botswana	68	: Indonesia
15	: Burundi	69	: Guadalcanal Island
16	: Lesotho	70	: Afghanistan
17	: Malawi	71	: Iceland
18	: Swaziland	72	: Hong Kong
19	: Zaire	73	: Taiwan
20	: Zambia	74	: Bangladesh
21	: Zimbabwe	75	: India, Nepal
22	: Kenya, Tanzania	76	: Thailand, Vietnam
23	: Ascension Island	77	: Thailand
24	: Iwo Jima	78	: Ireland
25	: St Helena Island	79	: South Georgia Islands
26	: Tern Island	80	: Diego Garcia
27	: Marcus Island	81	: Johnston Island
28	: Australia & Tasmania	82	: Sri Lanka
29	: Australia & Tasmania	83	: Kerguelen Island
30	: Djibouti	84	: West Malaysia & Singapore
31	: Efate & Erromango Island	85	: Caroline Islands
32	: Bermuda	86	: Cayman Brac Island
33	: Guinea-Bissau	87	: Ghana
34	: Colombia	88	: Liberia
35	: Indonesia	89	: Luzon Philippines (Excluding Mindanao)
36	: Camp Area Astro Antarctica (McMurdo Camp Area)	90	: Luzon Philippines (Mindanao)
37	: Argentina	91	: Mahe Island
38	: Phoenix Islands	92	: Ethiopia (Eritrea)
39	: South Africa	93	: Morocco
40	: Bahamas, Florida	94	: Midway Islands
41	: Tunisia	95	: Cameroon
42	: New Zealand	96	: Nigeria
43	: Paraguay	97	: Montserrat (Leeward Islands)
44	: Brazil	98	: Gabon
45	: Guinea	99	: Oman (Masirah Island)
46	: Indonesia (Sumatra)	100	: Saudi Arabia
47	: Gizo Island	101	: United Arab Emirates
48	: Easter Island	102	: Trinidad & Tobago
49	: Austria, Belgium, Denmark, Finland, France, Italy, West Germany, Gibraltar, Greece, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland	103	: Antigua, Barbados, Barbuda, Cuba, Caicos Islands, Dominican Republic, Grand Cayman, Jamaica, Turks Islands
50	: Austria, France, West Germany, Netherlands, Denmark, Switzerland,	104	: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua
51	: Iraq, Israel, Jordan, Lebanon, Kuwait, Saudi Arabia, Syria	105	: Canada
52	: Cyprus	106	: CONUS
53	: Egypt	107	: CONUS (East of Mississippi River) including Louisiana, Missouri, Minnesota
		108	: CONUS (West of Mississippi River)

109 : Alaska	165 : Brazil
110 : Bahamas (Except San Salvador Island)	166 : Chile
111 : Bahamas (San Salvador Island)	167 : Colombia
112 : Canada (Alberta, British, Columbia)	168 : Ecuador
113 : Canada (Manitoba, Ontario)	169 : Ecuador (Baltra, Galapagos)
114 : Canada (New Brunswick, Newfoundland, Nova Scotia, Quebec)	170 : Guyana
115 : Canada (Northwest Territories, Saskatchewan)	171 : Paraguay
116 : Canada (Yukon)	172 : Peru
117 : Canal Zone	173 : Trinidad & Tobago
118 : Cuba	174 : Venezuela
119 : Greenland (Hayes Peninsula)	175 : Singapore
120 : Mexico	176 : Madagascar
121 : Alaska, Canada, CONUS	177 : Brunei, East Malaysia (Sabah, Sarawak)
122 : Central America, Mexico	178 : Tokyo–MEAN FOR Japan, Korea, Okinawa
123 : Azores (Corvo & Flores Islands)	179 : Tokyo–Japan
124 : Egypt	180 : Tokyo–Korea
125 : Hawaii, Kauai, Maui, Oahu	181 : Tokyo–Okinawa
126 : Hawaii	182 : Tristan da Cunha
127 : Kauai	183 : Viti Levu Island
128 : Maui	184 : Marshall Islands
129 : Oahu	185 : Wake Atoll
130 : Oman	186 : WGS 1972–Global Definition
131 : England, Isle of Man, Scotland, Shetland Islands, Wales	187 : Yacare–Uruguay
132 : England	188 : Zanderij–Suriname
133 : England, Isle of Man, Wales	
134 : Scotland, Shetland Islands	
135 : Wales	
136 : Canary Islands	
137 : Pitcairn Island	
138 : Burkina Faso & Niger	
139 : Congo	
140 : Porto Santo, Madeira Islands	
141 : Bolivia, Chile, Colombia, Ecuador, Guyana, Peru, Venezuela	
142 : Bolivia	
143 : Chile (Northern, Near 19° S)	
144 : Chile (Southern, Near 19° S)	
145 : Colombia	
146 : Ecuador	
147 : Guyana	
148 : Peru	
149 : Venezuela	
150 : Chile (Southern, Near 53° S) (Hito XVIII)	
151 : Puerto Rico, Virgin Islands	
152 : Qatar	
153 : Greenland (South)	
154 : Mascarene Islands	
155 : Italy (Sardinia)	
156 : Espirito Sano Island	
157 : Azores (Sao Miguel, Santa Maria Islands)	
158 : East Falkland Island	
159 : Namibia	
160 : Salvage Islands	
161 : SGS 85	
162 : Argentina, Bolivia, Brazil, Chile, Peru, Colombia, Ecuador, Guyana, Paraguay, Trinidad & Tabago, Venezuela	
163 : Argentina	
164 : Bolivia	

Count on us!

