# iCOM

## INSTRUCTION MANUAL

MARINE PLOTTER/SOUNDER
# FP−561
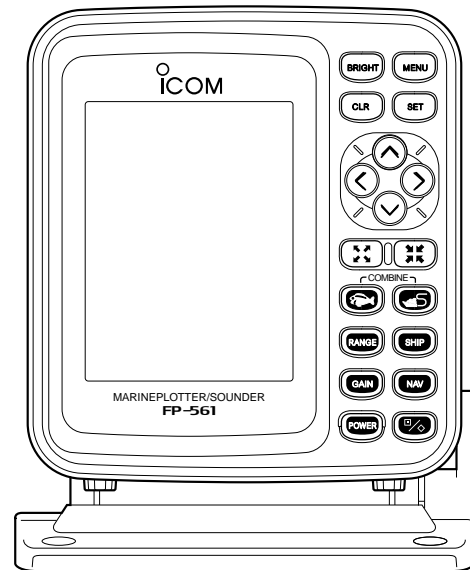
MARINEPLOTTER/SOUNDER
**FP−561**

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

## Icom Inc.

# INTRODUCTION

**Thank you very much for purchasing the FP-561.**
**The FP-561 is an advanced navigation and fishfind-ing 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 en-sure correct and efficient use of the product.**

## Cartgraphy supplied by

**NAVIONICS**
*THE LEADER IN ELECTRONIC CHARTS*

**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 |
| 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 |

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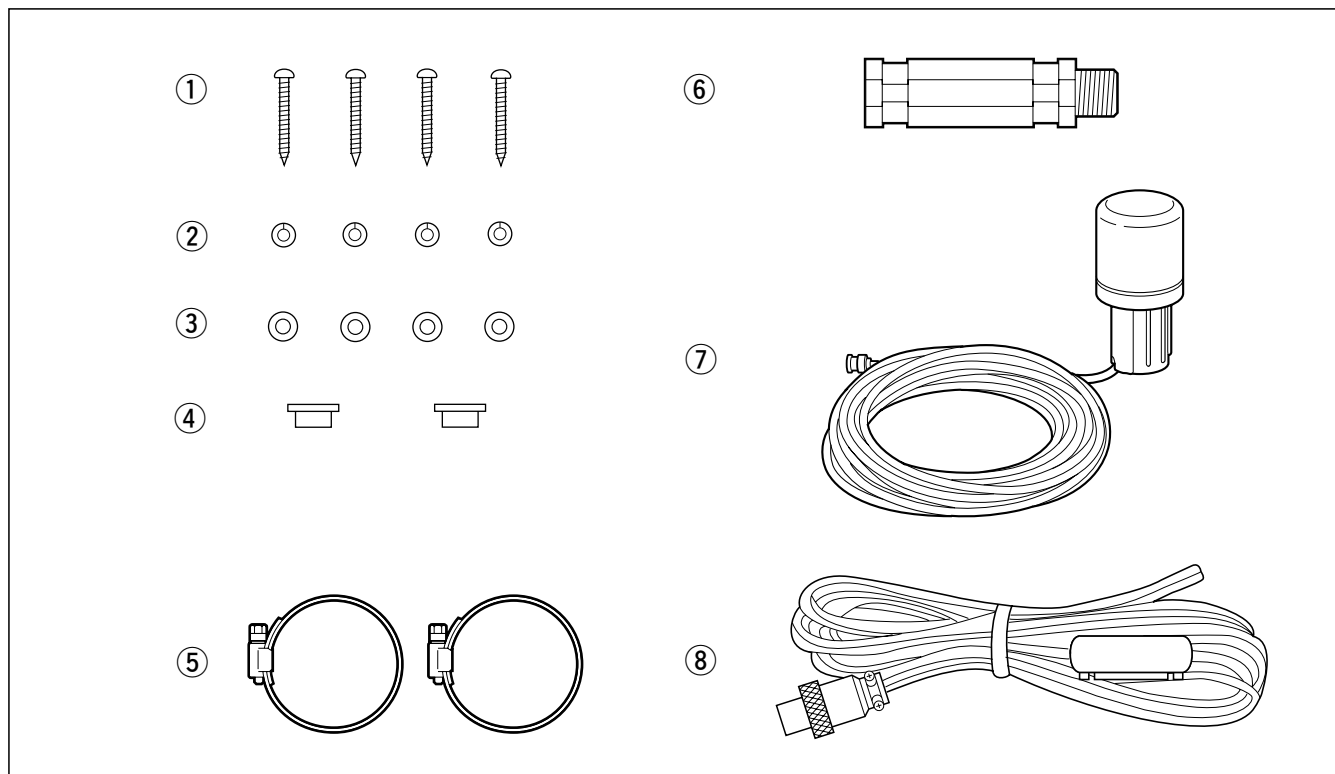
Versions of the FP-561 which display "CE" on the serial number seal, comply with the essential requirements of the 89/336/EEC directive for Electromagnetic Compati-bility.

i

# TABLE OF CONTENTS

# 1 SAFETY NOTICES

> ### 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.

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## ⚠ 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.

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<table>
<tr><td colspan="2">⚠ **CAUTION** | Each of the following caution notices indicates that neglecting the suggested procedure or practice may result in personal injury or property damage.</td></tr>
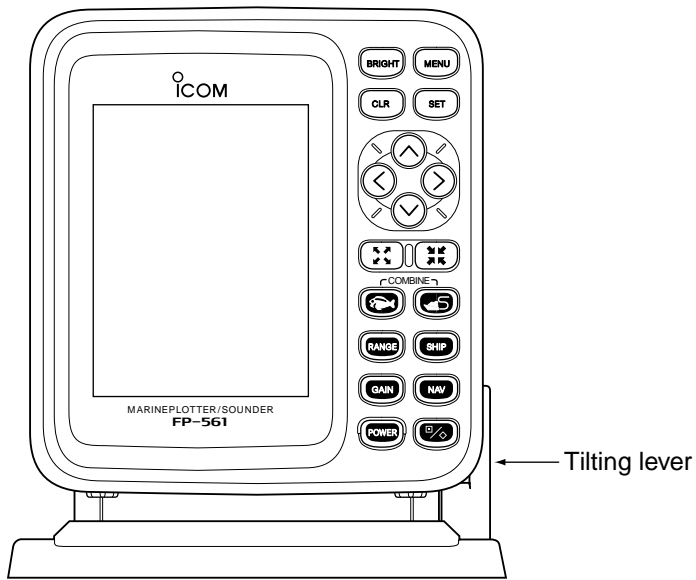</table>

**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
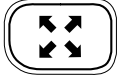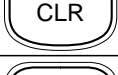
- Do not install the product close to speakers, power transformers or other equipment that produces a magnetic field.
- When starting the engine of the ship involves a rapid fall in supply voltage to the product, be sure to start the engine before powering on the product.
- Avoid using organic solvents such as thinner or benzene to clean the product.
  These solvents will cause damage to the product surface.
  To clan the product or antenna, wipe it using a soft cloth damped 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.

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# 2 PARTS AND FUNCTIONS

■ **Main unit**                                                           ■ **Operation panel**

Tilting lever

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

### 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



MARINEPLOTTER
/SOUNDER

**FP-561**

WARNING:
This electronic chart is an aid to navigation designed to facilitate the use of authorized government charts, not to replace them. Only official government charts and notices to mariners contain all of the current information needed for the safety of navigation, and the captain is responsible for their prudent use.

After approx. 10 seconds
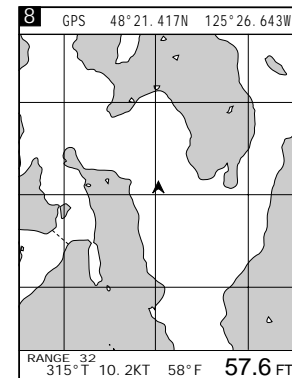


### 3-2 Adjusting the LCD brightness and contrast



**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.
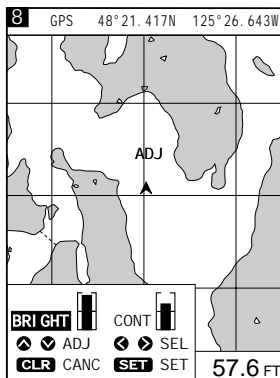
### 3-3 Alarm sound

**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**

**Coastline screen**



**Navigation monitor screen**
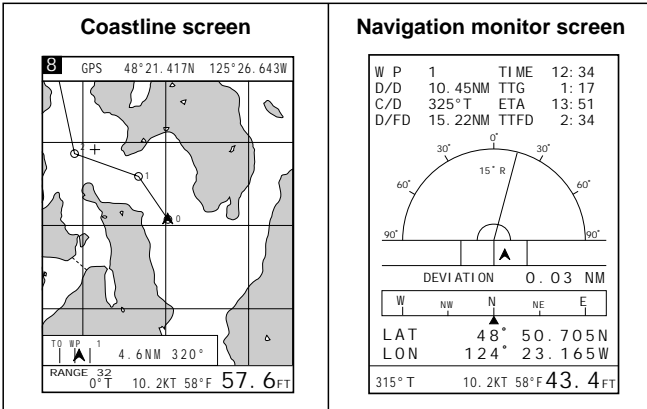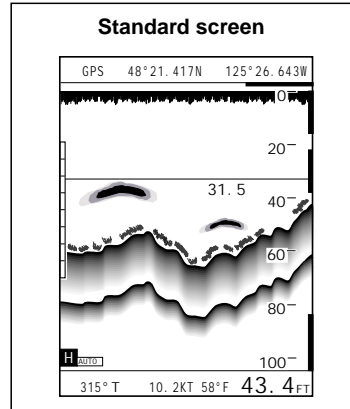


**Standard screen**



**Standard + A scope screen**
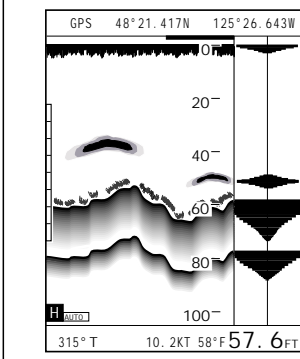


**Dual screen**
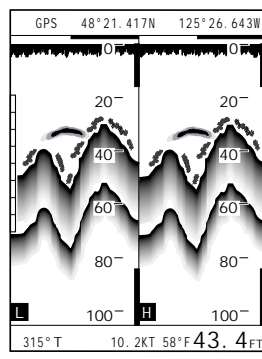


**Standard + Bottom lock screen**
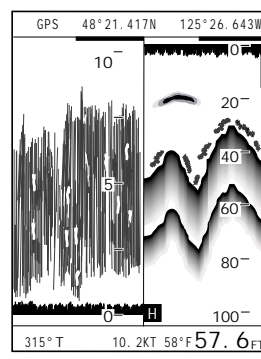


**Standard + Marker zoom-in screen**
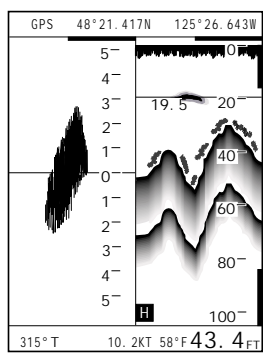


● **Combination**

**Combination mode**
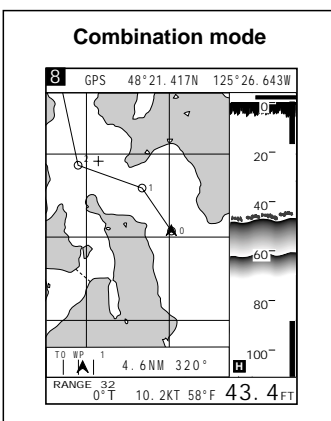


**To change the operation mode, proceed as follows.**

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.

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## 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**
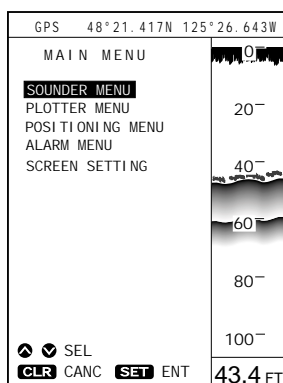


| SEL | Press to select a submenu. |
| ENT | Press to open the submenu. |
| CANC | Press to return to the previous screen. |

● **Plotter Menu screen**
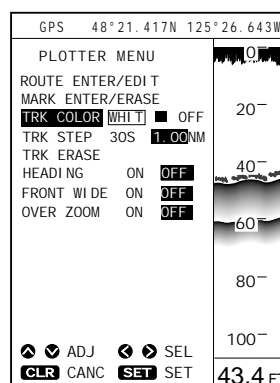


| SEL | Use to select a setting option or digit. |
| ADJ | Use to change the value of the digit. |
| SET | Press to confirm and save the setting. |
| CANC | Press to clear or cancel the setting and return to the item selection step. When pressing this key during the item selection step, you will returns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

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## 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.

FP-561

Card slot

Card cover

NAVIONICS® Electronic Chart (Microcharts™)
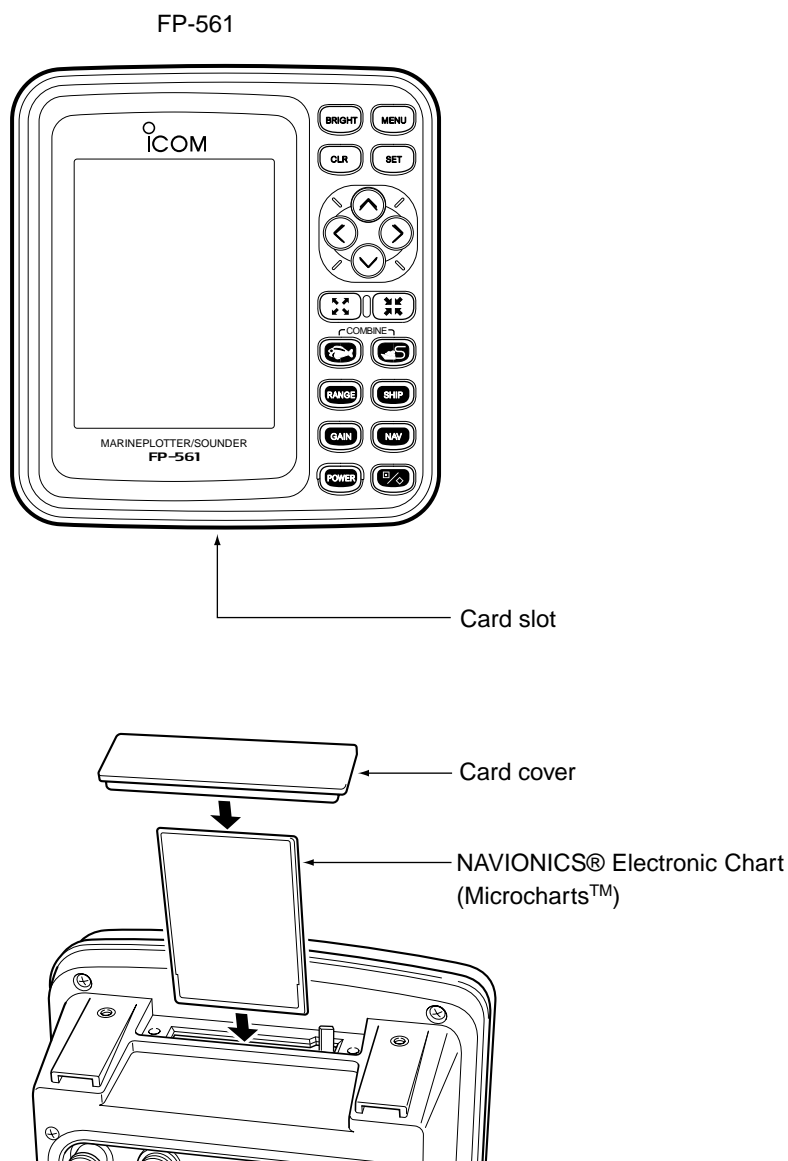
**Card slot located at the bottom**

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# 4 AVAILABLE OPERATION MODES AND SCREENS

**•Menu operation flow**

```
SOUNDER MENU

FREQUENCY    L    H
STC          1
DSP SPEED    5    STOP
I.R          ON   OFF
N.R          1    OFF
```

MENU

Press the
[MENU] key.

```
GPS    48°21.417N  125°26.643W

MAIN MENU                    0

SOUNDER MENU
PLOTTER MENU                20
POSITIONING MENU
ALARM MENU
SCREEN MENU                 40

                            60

                            80

                            100
  SEL
CLR CANC  SET ENT          43.4 FT
```

```
PLOTTER MENU

ROUTE ENTER/EDIT
MARK ENTER/ERASE
TRK COLOR    WHIT■  OFF
TRK STEP     30S   1.00 NM
TRK ERASE
HEADING      ON    OFF
FRONT WIDE   ON    OFF
OVER ZOOM    ON    OFF
```

| ROUTE ENTER/EDIT |
| MARK ENTER/ERASE |

```
POSITIONING MENU

POS EQUIP   GPS   NMEA
POS CORR    GOTOCURSUR
            LAT NO.000
            LON E0.000

AVERAGING   1     OFF
DGPS
POSITIONING INFO
```

| DGPS |
| POSITIONING INFO |

```
ALARM MENU

DEPTH             1m    OFF
SHALLOW           1m    OFF
FISH DEPTH        1m    OFF
     WIDTH        1m
ALARM ZONE 0.01NM       OFF
```

```
SCREEN SETTING

DISP MODE   1        2
BKG COLOR   BLUE ■
LAND        YELL ■   CSLN
SEA         BLUE ■
NAME        WHIT ■   OFF
D CON ≦5m   LBLU ■   OFF
D CON =10m  LBLU ■   OFF
D CON ≧20m  LBLU ■   OFF
LIGHT       RED  ■   OFF
GRID        BLUE ■   OFF
DISP MAPS   WHIT ■   OFF
```

9

# PLOTTER MODE

**(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 |
|---|---|
| **Coastline screen**<br> | This screen indicates various navigational data including coastlines, track and marks. |
| **Navigation monitor screen**<br> | This screen indicates easy-to-understand graphical and text information helpful for navigation. |

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

| | |
|---|---|
| **Positioning Information screen**<br> | This screen shows GPS/DGPS information. |

## (1)-2  Coastline screen

**8** DGPS  34 18.000N 135 01.000E

FISH
ALRM
ARRV
ALRM

34°21.362N    28°
135°06.950E    18.05
                         NM
                       1:32
TO WP  1
23.00NM   30°
RANGE 32
0°T   12KT   54.3°F   80.0 FT
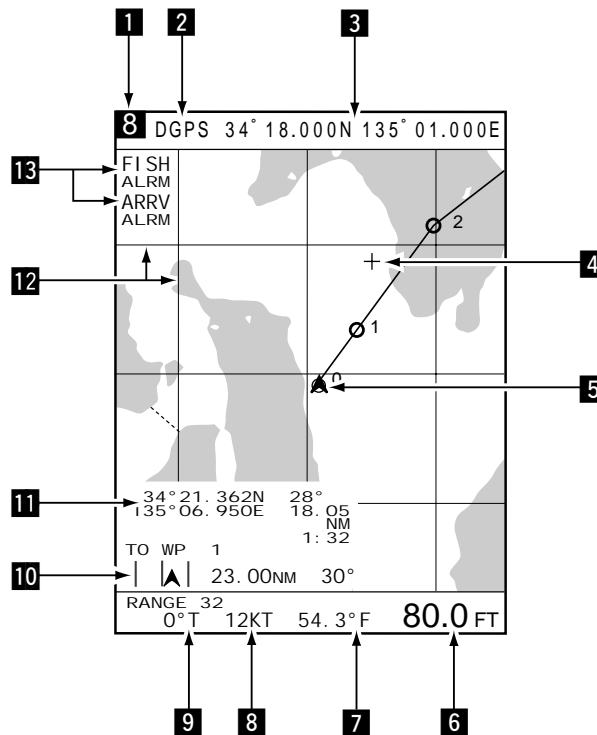
| **1** Reduced scale | This field shows the current scale to which the coast line image is displayed. The coastline image can be zoomed in or out to a total of 16 scales (☞ P. 17). |
|---|---|

**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 Ml/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 ture 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/longitude) 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)-3  Navigation monitor screen

```
┌─────────────────────────────────┐
│ 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│
│ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─│
│ FISH                            │
│ ALRM            0               │
│ ARRV     30          30         │
│ ALRM         15 R               │
│   60                     60     │
│                                 │
│  90                       90    │
│ ─ ─ ─ ─ ─ ┌──┬───┬──┐─ ─ ─ ─ ─ │
│           │   │ ▲ │   │         │
│    DEVIATION    0.03NM          │
│ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ │
│  W   NW    N    NE    E          │
│              ▲                  │
│ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ │
│ LAT        34°18.000N           │
│ LON       134°01.000E           │
│ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ │
│  0°T  12KT  54.3°F    80.0 FT   │
└─────────────────────────────────┘
```
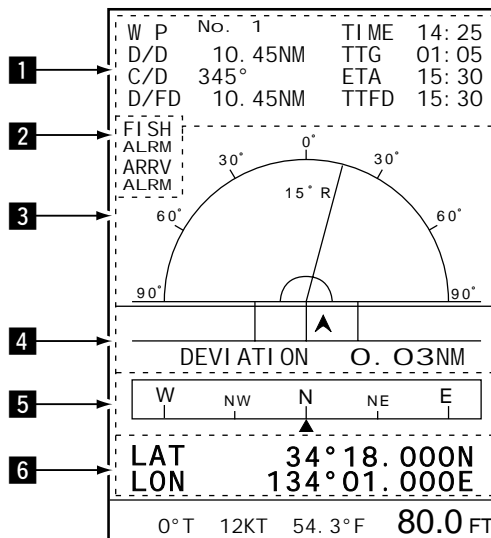
**1 Monitor**

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.

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**(1)-4  Positioning Information screen**

```
┌─────────────────────────────────────┐
│ DGPS  34 18.000N 135 01.000E         │
├─────────────────────────────┬────────┤
│     POSITIONING INFO        │▄▄▄▄ 0─ │
│ ┌─────────────────────────┐ │        │
│ │ SAT#  S/N  BRG   ELV     │ │        │
│ │  12   50    0    81      │ │        │
│ │  15   45   90    79      │ │        │
│ │   2   40  180    56      │ │  10─   │
│ │  16   52  270    63      │ │        │
│ │  20   60   45    30      │ │        │
│ │  22   30  135    10      │ │        │
│ │  10   56  225    25      │ │        │
│ │   9   63  315    44      │ │  20─   │
│ └─────────────────────────┘ │        │
│ ┌─────────────────────────┐ │        │
│ │ DOP        1.50          │ │        │
│ └─────────────────────────┘ │  30─   │
│ ┌─────────────────────────┐ │        │
│ │ DGPS INFOMATION         │ │        │
│ │   RD-200                │ │        │
│ │   Rev. 1.1              │ │        │
│ │   FREQUENCY 283.5kHz    │ │        │
│ │   BAUD RATE   200       │ │  40─   │
│ │   S/N          00       │ │        │
│ └─────────────────────────┘ │        │
│ CLR BACK                    │ 80.0FT │
└─────────────────────────────┴────────┘
```

**1** at Satellite row, **2** at DOP row, **3** at DGPS INFOMATION row.
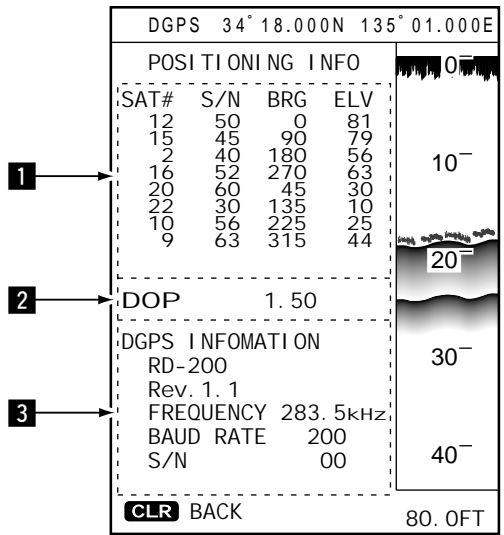
| | | |
|---|---|---|
| **1 Satellite** | | This field shows and locates the navigational satellites that the system is being tracked. |
| **2 DOP** | | This field shows the geometrical arrangement of the navigational satellites and the ship in the form of DOP (Dilution Of Precision) ranging from 0.00 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. |

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### (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 (0 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.

The cross hair cursor is not displayed.

Press the [ZOOM-IN] key to zoom in the image in ship-centering mode.

Press the [ZOOM-OUT] key to zoom out the image in ship-centering mode.

| | | |
|---|---|---|
| 10 DGPS 34 18.000N 135 01.000E | 8 DGPS 34 18.000N 135 01.000E | 10 DGPS 34 18.000N 135 01.000E |
| RANGE 128  0°T 12KT 54.3°F 80.0 FT | RANGE 32  0°T 12KT 54.3°F 80.0 FT | RANGE 128  0°T 12KT 54.3°F 80.0 FT |
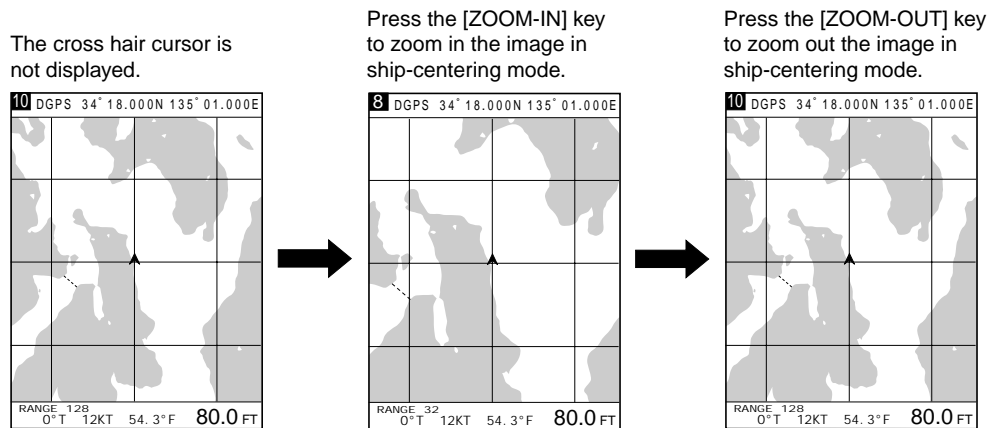
**C Cursor-centering mode**

**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 of 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.

The cross hair cursor is activated.

Press the [ZOOM-IN] key to zoom in the image in cursor-centering mode.

Press the [ZOOM-OUT] key to zoom out the image in cursor-centering mode.

| | | |
|---|---|---|
| 10 DGPS 34 18.000N 135 01.000E | 8 DGPS 34 18.000N 135 01.000E | 10 DGPS 34 18.000N 135 01.000E |
| RANGE 128  0°T 12KT 54.3°F 80.0 FT | RANGE 32  0°T 12KT 54.3°F 80.0 FT | RANGE 128  0°T 12KT 54.3°F 80.0 FT |

17
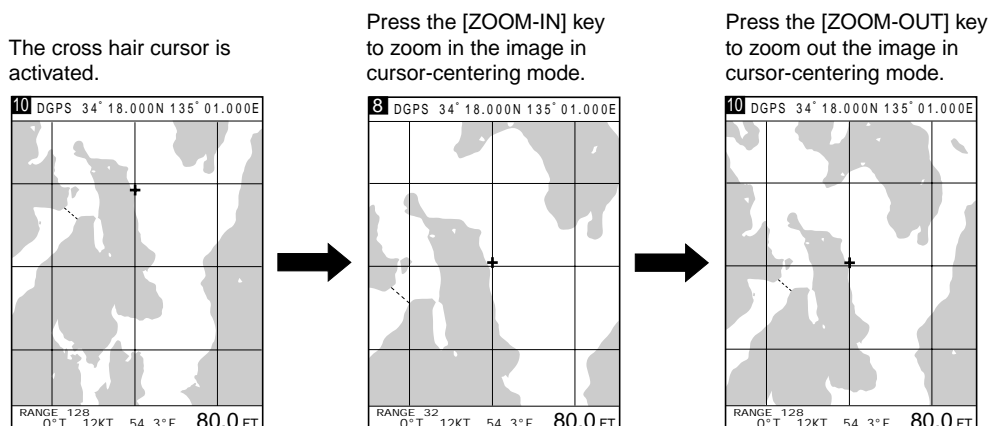
**(2)-2 Ship-centering mode**

**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 coast-line data is displayed.

**(2)-3 Displaying the latitude and longitude lines**

**The loxodromic latitude and longitude lines can be displayed on the coast-line 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

```
5  GPS  34 18.000N 135 01.000E

      MAIN MENU

SOUNDER MENU
PLOTTER MENU
POSITIONING MENU
ALARM MENU
SCREEN SETTING




⌃ ⌄ SEL
CLR CANC  SET ENT     80. 0FT
```

● Screen Setting screen

```
5  GPS  34 18.000N 135 01.000E

     SCREEN SETTING

DISP MODE    1    2
BKG COLOR    BLUE□
LAND         YELL□ CSLN
SEA          BLUE□
NAME         WHIT□ OFF
D CON   5m   LBLU□ OFF
D CON  10m   LBLU□ OFF
D CON  20m   LBLU□ OFF
LIGHT        RED □ OFF
GRID         BLUE□ OFF
DISP MAPS    WHIT□ OFF

⌃ ⌄ SEL
CLR BACK  SET ENT     80. 0FT
```

18
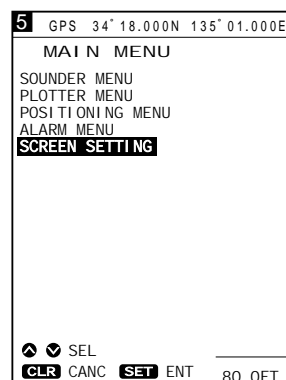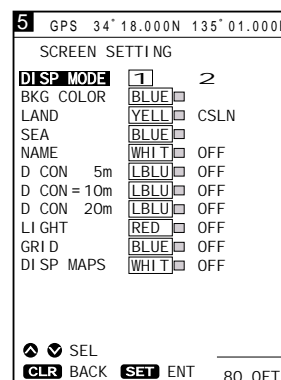
**(2)-4 Measuring the distance and azimuth between two points**

**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.

**A Measurement between the ship mark and the cursor position**

```
6  GPS  34 18.000N  135 01.000E




              +

           ʌ


  34°20. 000N   27°
  135°02. 500E  2. 35
                 NM
                O: 15
  RANGE  8
  0°T   12KT  54. 3°F   80.0 FT
```
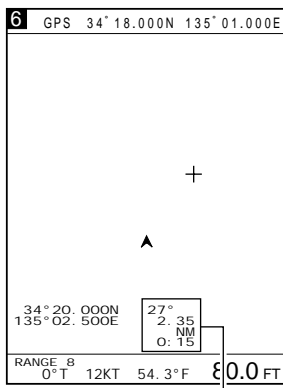
Cursor position field where the distance and azimuth between the ship and the cursor position are displayed

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 of 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**

```
6  GPS  34 18.000N  135 01.000E



   Subcursor
         \
          \   +
           +

          ʌ


  34°21. 000N   60°
  135°04. 400E  1. 93
                 NM
                O: 12
  RANGE  8
  0°T   12KT  54. 3°F   80.0 FT
```
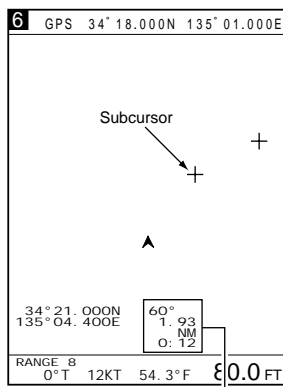
Cursor position field where the distance and azimuth between two points are displayed

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.

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## (3)-1  Registering and editing navigation routes

**A  Registering navigation routes**

● Route Enter/Edit screen

```
5  GPS  34 18.000N 135 01.000E
     ROUTE ENTER/EDIT
 NO.
    1
    2
    3
    4
    5
    6
    7
    8
    9
   10

ENTER/EDIT ERS ERSALL

◀ ▶ SEL
CLR BACK  SET ENT      80.0FT
```
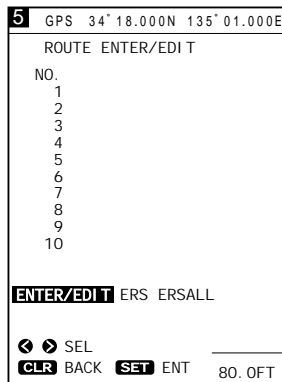
Select Route Enter/Edit and press the [SET] key.

● Comment Entry screen

```
5  GPS  34 18.000N 135 01.000E
     ROUTE ENTER/EDIT
 NO.
   1 ROUTE 1
    2
    3
    4
    5
    6
    7
    8
    9
   10
ABCDEFGHI JKLMNOPQRS
TUVWXYZ  0123456789
abcdefghi jklmnopqrs
tuvwxyz .,!#$%&--()
         ← →      END
▲ ▼ ◀ ▶ SEL
CLR CANC  SET SET     80.0FT
```
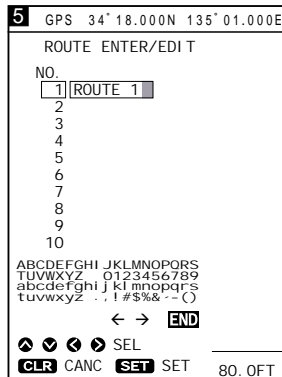
Enter a comment and select END; then press the [SET] key.

● Route Registration screen

```
5  GPS  34 18.000N 135 01.000E




                        4



                  3

            2


     1

        ↖


  34°23.752N    27°
  135°01.792E    2.89
  ○                NM
                 0:25
           MENU EXIT
CLR CANC  SET SET     80.0FT
```
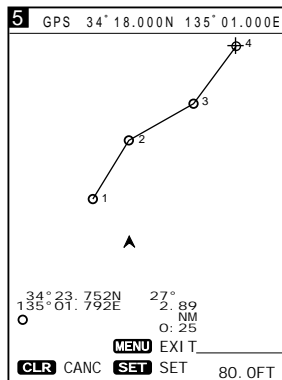
Move the cross hair cursor to a turning point and press the [SET] key. Repeat this operation to set a route.

**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.

**B 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

```
5  GPS  34 18.000N 135 01.000E

                            4
                         3    5
                    2

               1

               ⋀

  34°23.752N    37°
  135°01.792E   3.54
  ○              NM
               O: 25
            MENU EXIT
  CLR CANC  SET SET    80.0FT
```
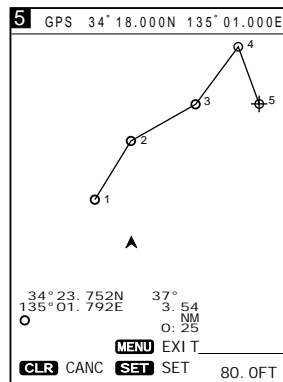
Move the cross hair cursor to the desired point and press the [SET] key. The route is extended to the point.

● Clearing turning points

```
5  GPS  34 18.000N 135 01.000E

                         ○

                    3   ⊕
                2

           1

           ⋀

  34°23.752N    37°
  135°01.792E   3.54
  ○              NM
               O: 25
            MENU EXIT
  CLR CANC  SET SET    80.0FT
```
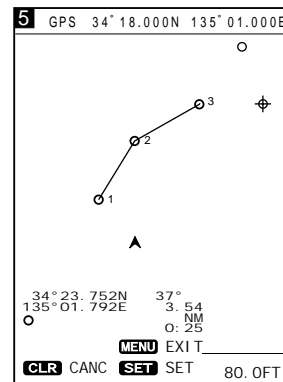
Each time the [CLR] key is pressed, a turning points is cleared in descending order of its No.

## (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

```
5  GPS  34 18.000N 135 01.000E
    ROUTE  ENTER/EDIT
  NO.
    1  ROUTE 1
    2
    3
    4
    5
    6
    7
    8
    9
   10

  ENTER/EDIT  ERS  ERSALL

  ◀ ▶ SEL
  CLR BACK  SET ENT    80. 0FT
```
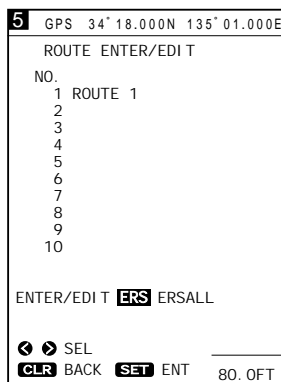
Select ERS and press the [SET] key.

● Selecting a route No.

```
5  GPS  34 18.000N 135 01.000E
    ROUTE  ENTER/EDIT
  NO.
    1  ROUTE 1
    2
    3
    4
    5
    6
    7
    8
    9
   10

  ENTER/EDIT  ERS  ERSALL

  ◀ ▶ SEL   ◀ ▶ PAGE
  CLR CANC  SET SET    80. 0FT
```

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

● Clearing the route

```
5  GPS  34 18.000N 135 01.000E
    ROUTE  ENTER/EDIT
  NO.
    1  ROUTE 1
    2
    3
    4
    5
    6
    7
    8
    9
   10

  ERASE ROUTE 1  ?


  CLR CANC  SET OK    80. 0FT
```
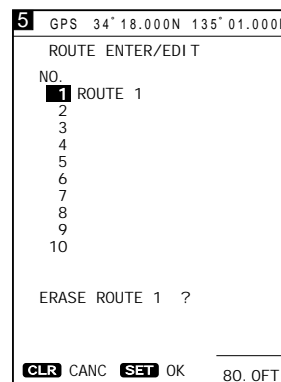
Press the [SET] key, and the selected route is cleared.

● Selecting all routes

```
  ENTER/EDIT ERS  ERSALL

  ◀ ▶ SEL
  CLR BACK  SET ENT    80. 0FT
```
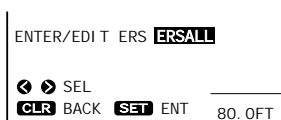
Select ERSALL and press the [SET] key.

● Clearing all routes

```
   ERASE ALL ROUTES ?


  CLR CANC  SET OK    80. 0FT
```
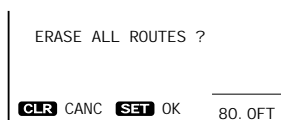
Press the [SET] key, and all the routes are cleared.

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**(3)-3  Character list**

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

```
ABCDEFGHIJKLMNOPQRS
TUVWXYZ□□0123456789
abcdefghijklmnopqrs
tuvwxyz.,!#$%&´-()
        ←  →     END
```
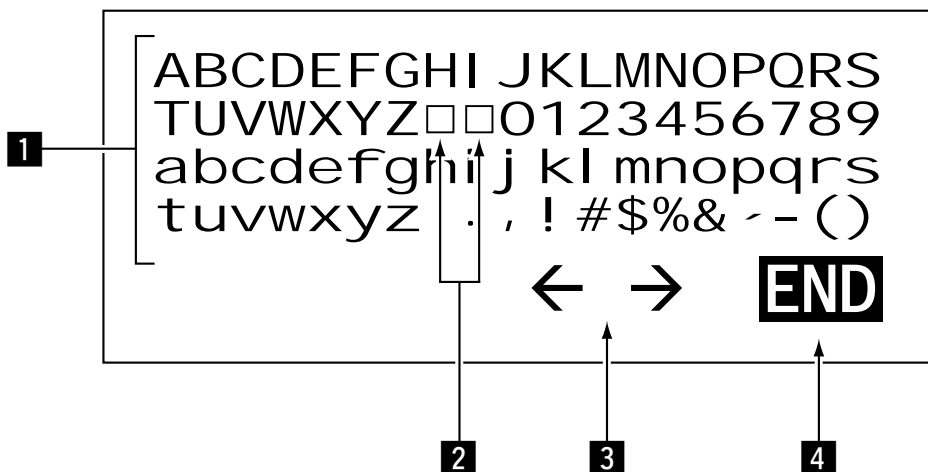
**1 Character list**

**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 over-write 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.

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## (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 coastline screen.

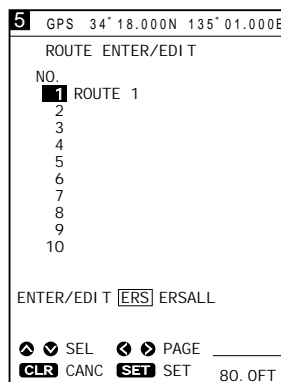**Ⓐ Registration of marks from the Plotter Menu screen**

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

```
⑤  GPS  34 18.000N  135 01.000E
      MARK  ENTER/ERASE
   ENTER
     LAT    34°25.123N
     LON   135°10.456E

   ERASE ALL




   ⊼ ⊻ ADJ   ⧭ ⧐ SEL
   CLR CANC  SET SET      80.0FT
```
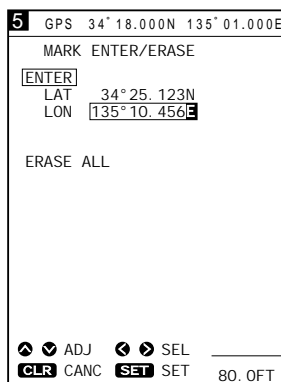
Enter the latitude and longitude and press the [SET] key.

● Selecting the mark to be used

```
⑤  GPS  34 18.000N  135 01.000E
      MARK  ENTER/ERASE
   ENTER
     LAT    34°25.123N
     LON   135°10.456E
          ○
   ERASE ALL




   ○○○○○◎○
   ⊼ ⊻ TYPE  ⧭ ⧐ COL
   CLR CANC  SET SET      80.0FT
```
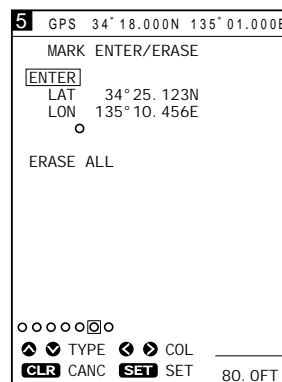
Select the desired mark and press the [SET] key.

● Entering the user-defined mark name

```
⑤  GPS  34 18.000N  135 01.000E
      MARK  ENTER/ERASE
   ENTER
     LAT    34°25.123N
     LON   135°10.456E
          ○ Point1▮

   ERASE ALL



   ABCDEFGHIJKLMNOPQRS
   TUVWXYZ  0123456789
   abcdefghijklmnopqrs
   tuvwxyz .,!#$%&`-()
        ← →        END
   ⊼ ⊻ ⧭ ⧐ SEL
   CLR CANC  SET SET      80.0FT
```
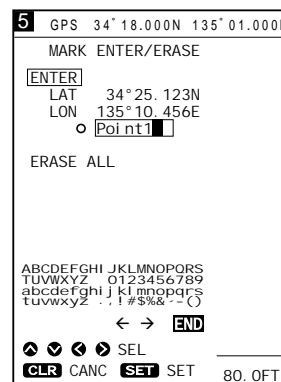
Enter the mark name and press the [SET] key.

**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
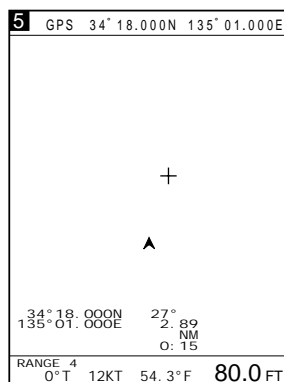


Move the cross hair cursor to the desired position.

● Selecting the desired mark and color
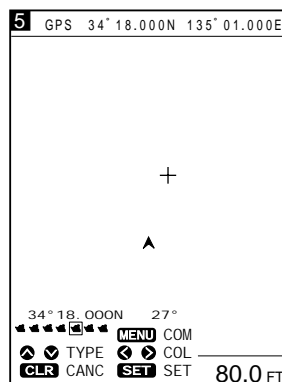


Select the desired mark and its color.

● Entering a comment



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

25
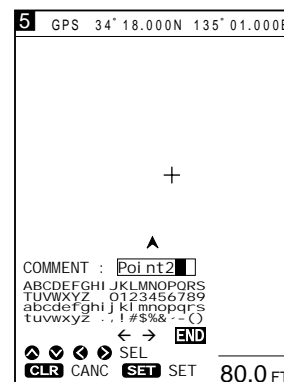
### (4)-2  Clearing marks

> **Marks cannot be cleared during destination or route navigation.**

**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).

#### A Clearing marks on the coastline screen

● Clearing marks on the coastline screen

```
⑤ GPS  34 18.000N 135 01.000E




        ✛


        ⋏


  34°18.000N    27°
  135°01.000E   2.89   ⎤ Mark position
 ◂ Point2       NM    ⎦ data
               0:15
 ERASE THE MARK ?
 CLR CANC  SET OK      80.0 FT
```
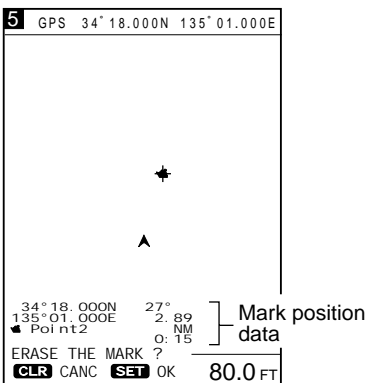
Move the cross hair cursor until it coincides with the mark you want to clear, and press the [CLR] key.

**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.**

#### B Clearing marks from the Plotter Menu screen

● Clearing marks from the Plotter Menu screen

```
⑤ GPS  34 18.000N 135 01.000E
    MARK ENTER/ERASE

  ENTER
    LAT      °   .    N
    LON      °   .    E


  ┌─────────┐
  │ERASE ALL│
  └─────────┘




    ERASE ALL MARKS ?


 CLR CANC SET OK       80.0FT
```
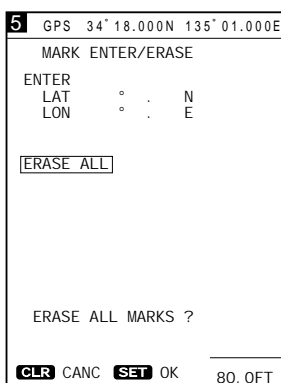
Select "ERASE ALL" and press the [SET] key.

**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.

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## (5)-1 Setting route navigation

● Navigation screen

```
NAV    DESTINATN
       ROUTE
🔼 🔽 SEL
CLR CANC  SET SET    80.0FT
```

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

● Selecting a route No.

```
ROUTE  1  GO
       ROUTE 1
🔼 🔽 SEL ◀ ▶ GO/RTN
CLR CANC  SET SET    80.0FT
```
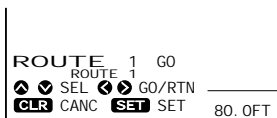
Select route No. and "GO" or
"RTN" voyage and press the
[SET] key.

● Route navigation screen

```
5 DGPS 34 18.000N 135 01.000E




                     ⊘3

             ⊘2



       ⊘1

         ▲ 0




TO WP  1
   | ▲ | 0.19NM 315°
RANGE 4
    0°T 5.5KT  54.3°F  80.0 FT
```
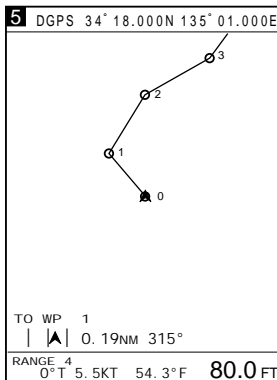
**Route navigation means that the ship is navigated via a number of registered marks to the destination.**

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 fist 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

```
EXIT
  THE NAVIGATION ?
CLR CANC  SET OK    80.0FT
```

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.

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**(6)-1  Setting destination navigation**

**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.

**A Setting destination navigation using existing registered marks**

● Navigation screen

```
NAV   DESTINATN
            ROUTE
 ⊘ ⊘ SEL
 CLR CANC  SET SET   80. 0FT
```

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

● Destination navigation screen

```
  34°18. 0OON    27°
 135°01. 0OOE    2. 89
  ◀ Point2         NM
                 O: 15
 ⊘ ⊘ ◀ ▶ DESTINATN
 CLR CANC  SET SET   80. 0FT
```

Select a mark 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 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

```
 5 DGPS 34 18.000N 135 01.000E

                    ○
           ○
                      ⊕-1
        ○
     ⊿ ○

  34  19. 0OON    50°
 135  O2. 3OOE    1. 40
 ○                  NM
 TO  WP   1        O: 15
 |⬧|
 | |    1. 40NM   50°
 RANGE_4
   0°T 5. 5KT   54. 3°F  80.0 FT
```
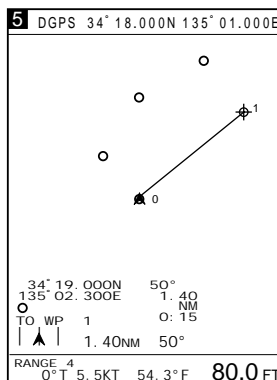
Move the cursor to the desired position and press the [SET] key.

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 "○") 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

```
 EXIT
   THE NAVIGATION ?
 CLR CANC  SET OK   80. 0FT
```
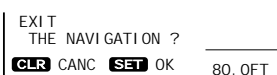
Press the [SET] key to cancel the current navigation.

**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

```
5  GPS  34 18.000N 135 01.000E

   PLOTTER MENU
 ROUTE ENTER/EDIT→
 MARK ENTER/ERASE→
 TRK COLOR   WHIT□  OFF
 TRK STEP    30S  1.00NM
 TRK ERASE
 HEADING       ON   OFF
 FRONT WIDE    ON   OFF
 OVER ZOOM     ON   OFF




 ◈ ◈ ADJ    ◈ ◈ SEL
 CLR CANC  SET SET    80.0FT
```
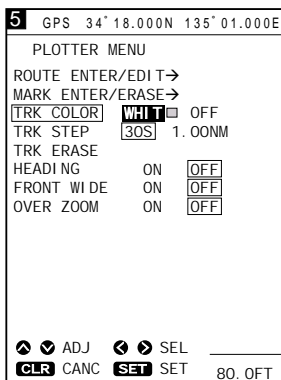
**There are seven user-selectable colors of the track.**
Set the track color as follows.
① Press the [MENU] key.
   The Main Menu screen will appear.
② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
   The Plotter Menu screen will appear.
③ Select "TRK COLOR" (track color) 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

```
5  GPS  34 18.000N 135 01.000E

   PLOTTER MENU
 ROUTE ENTER/EDIT→
 MARK ENTER/ERASE→
 TRK COLOR   WHIT□  OFF
 TRK STEP    30S  1.00NM
 TRK ERASE
 HEADING       ON   OFF
 FRONT WIDE    ON   OFF
 OVER ZOOM     ON   OFF




 ◈ ◈ ADJ    ◈ ◈ SEL
 CLR CANC  SET SET    80.0FT
```
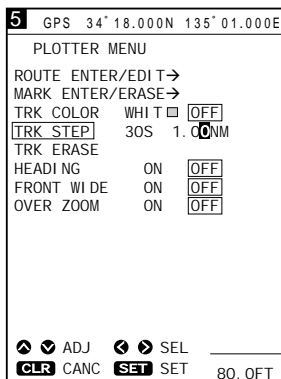
**The system stores and plots the track consisting of up to 5,000 points through which the ship passed.**
If the number of the points exceeds 5,000, excess track data is deleted in chronological order.
The track data is updated at specified tracking intervals.
Note that longer tracking (track update) 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

```
5  GPS  34 18.000N 135 01.000E

  PLOTTER MENU
ROUTE ENTER/EDIT→
MARK ENTER/ERASE→
TRK COLOR   WHIT□ OFF
TRK STEP    30S  1.00NM
TRK ERASE

HEADING     ON   OFF
FRONT WIDE  ON   OFF
OVER ZOOM   ON   OFF




  ERASE THE TRACK ?


CLR CANC SET OK    80.0FT
```
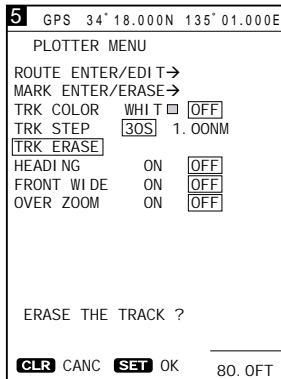
**To clear the track on the screen after navigation, proceed as follows.**
Note the following procedure loses any track data in the system. Make sure that deletion of track data will cause no problem before commencing the procedure.

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

```
5  GPS  34 18.000N 135 01.000E

  PLOTTER MENU
ROUTE ENTER/EDIT→
MARK ENTER/ERASE→
TRK COLOR   WHIT□ OFF
TRK STEP    30S  1.00NM
TRK ERASE
HEADING     ON   OFF
FRONT WIDE  ON   OFF
OVER ZOOM   ON   OFF




◀ ▶ SEL
CLR CANC SET SET    80.0FT
```

**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

```
5  GPS  34 18.000N 135 01.000E

  PLOTTER MENU
ROUTE ENTER/EDIT→
MARK ENTER/ERASE→
TRK COLOR   WHIT□ OFF
TRK STEP    30S  1.00NM
TRK ERASE
HEADING     ON   OFF
FRONT WIDE  ON   OFF
OVER ZOOM   ON   OFF
```
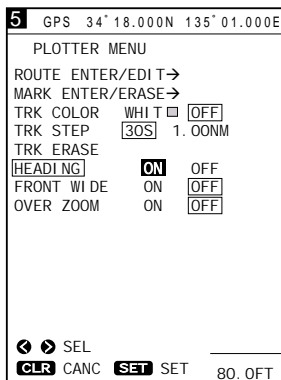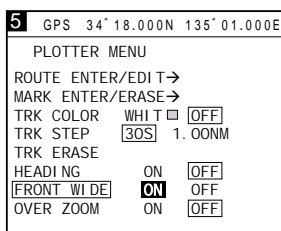
**To set the front wide function, proceed as follows.**
① Press the [MENU] key.
  The Main Menu screen will appear.
② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
  The Plotter Menu screen will appear.
③ Select "FRONT WIDE" using the [UP] or [DOWN] key and press the [SET] 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

```
5  GPS  34 18.000N 135 01.000E

  PLOTTER MENU
ROUTE ENTER/EDIT→
MARK ENTER/ERASE→
TRK COLOR   WHIT□ OFF
TRK STEP    30S  1.00NM
TRK ERASE
HEADING     ON   OFF
FRONT WIDE  ON   OFF
OVER ZOOM   ON   OFF
```
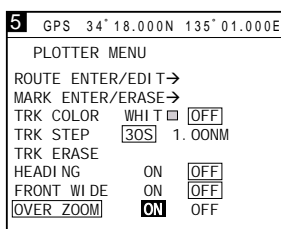
**To set the over zoom function, proceed as follows.**
① Press the [MENU] key.
  The Main Menu screen will appear.
② Select "Plotter Menu" using the [UP] or [DOWN] key and press the [SET] key.
  The Plotter Menu screen will appear.
③ Select "OVER ZOOM" using the [UP] or [DOWN] key and press the [SET] 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.

### ◢ Specifying the color of land

```
5  GPS  34 18.000N 135 01.000E

   SCREEN SETTING

DISP MODE     1    2
BKG COLOR    BLUE▫
LAND         YELL▫  CSLN
SEA          BLUE▫
NAME         WHIT▫  OFF
D CON   5m   LBLU▫  OFF
D CON  10m   LBLU▫  OFF
D CON  20m   LBLU▫  OFF
LIGHT        RED▫   OFF
GRID         BLUE▫  OFF
DISP MAPS    WHIT▫  OFF



 ⊙ ⊙ ADJ   ⊙ ⊙ SEL
 CLR CANC  SET SET    80.0FT
```

**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.

### ◢ Specifying the color of sea

```
5  GPS  34 18.000N 135 01.000E

   SCREEN SETTING

DISP MODE     1    2
BKG COLOR    BLUE▫
LAND         YELL▫  CSLN
SEA          BLUE▫
NAME         WHIT▫  OFF
D CON   5m   LBLU▫  OFF
D CON  10m   LBLU▫  OFF
D CON  20m   LBLU▫  OFF
LIGHT        RED▫   OFF
GRID         BLUE▫  OFF
DISP MAPS    WHIT▫  OFF



 ⊙ ⊙ SEL
 CLR CANC  SET SET    80.0FT
```

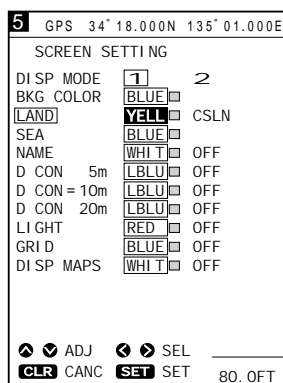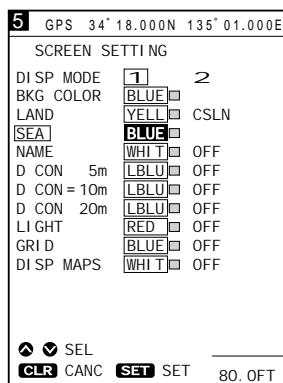**The color of sea can be selected from among two available colors.**

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**

```
5  GPS  34 18.000N 135 01.000E

   SCREEN SETTING

DISP MODE    1    2
BKG COLOR    BLUE□
LAND         YELL□  CSLN
SEA          BLUE□
NAME         WHIT□  OFF
D CON   5m   LBLU□  OFF
D CON  10m   LBLU□  OFF
D CON  20m   LBLU□  OFF
LIGHT        RED □  OFF
GRID         BLUE□  OFF
DISP MAPS    WHIT□  OFF


  ⊗ ⊗ ADJ    ◐ ◑ SEL
  CLR CANC  SET SET    80.0FT
```

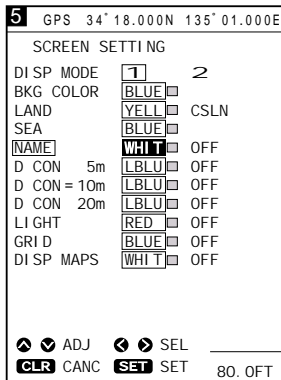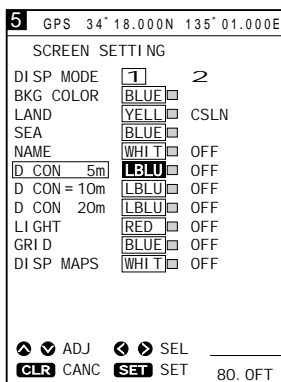**The color of place-names can be selected from among seven available colors.**

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.
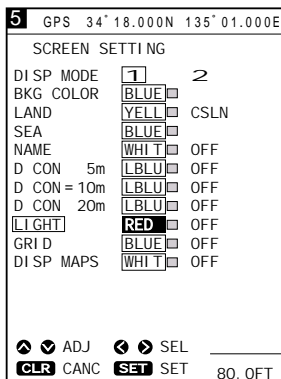
You will return to the previous screen.

**D** **Specifying the color of depth contours**

```
5  GPS  34 18.000N 135 01.000E

   SCREEN SETTING

DISP MODE    1    2
BKG COLOR    BLUE□
LAND         YELL□  CSLN
SEA          BLUE□
NAME         WHIT□  OFF
D CON   5m   LBLU□  OFF
D CON  10m   LBLU□  OFF
D CON  20m   LBLU□  OFF
LIGHT        RED □  OFF
GRID         BLUE□  OFF
DISP MAPS    WHIT□  OFF


  ⊗ ⊗ ADJ    ◐ ◑ SEL
  CLR CANC  SET SET    80.0FT
```

**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**

```
5  GPS  34 18.000N 135 01.000E

   SCREEN SETTING

DISP MODE    1    2
BKG COLOR    BLUE□
LAND         YELL□  CSLN
SEA          BLUE□
NAME         WHIT□  OFF
D CON   5m   LBLU□  OFF
D CON  10m   LBLU□  OFF
D CON  20m   LBLU□  OFF
LIGHT        RED □  OFF
GRID         BLUE□  OFF
DISP MAPS    WHIT□  OFF


  ⊗ ⊗ ADJ    ◐ ◑ SEL
  CLR CANC  SET SET    80.0FT
```

**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.

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**F Specifying the color of map border**

```
5  GPS  34 18.000N 135 01.000E
   SCREEN SETTING
DISP MODE    1     2
BKG COLOR   BLUE □
LAND        YELL □ CSLN
SEA         BLUE □
NAME        WHIT □ OFF
D CON   5m  LBLU □ OFF
D CON  10m  LBLU □ OFF
D CON  20m  LBLU □ OFF
LIGHT       RED  □ OFF
GRID        BLUE □ OFF
DISP MAPS   WHIT □ OFF


 ◎ ◎ ADJ   ◎ ◎ SEL
 CLR CANC  SET SET    80.0FT
```

**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.
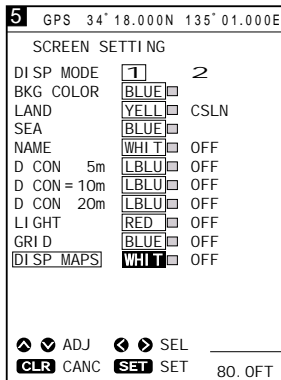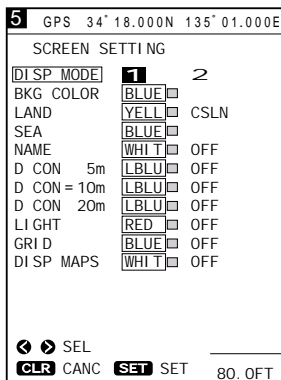
You will return to the previous screen.

**G Specifying the display mode**

```
5  GPS  34 18.000N 135 01.000E
   SCREEN SETTING
DISP MODE    1     2
BKG COLOR   BLUE □
LAND        YELL □ CSLN
SEA         BLUE □
NAME        WHIT □ OFF
D CON   5m  LBLU □ OFF
D CON  10m  LBLU □ OFF
D CON  20m  LBLU □ OFF
LIGHT       RED  □ OFF
GRID        BLUE □ OFF
DISP MAPS   WHIT □ OFF


 ◎ ◎ SEL
 CLR CANC  SET SET    80.0FT
```

**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.

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**(9)  Selection of positioning device**

```
5  GPS  34 18.000N 135 01.000E
    POSITIONING MENU          0
 POS EQUIP  GPS   NMEA
 POS CORR   GOTOCURSOR
         LAT  NO.OOO        10
         LON  EO.OOO
 AVERAGING  1     OFF
 DGPS→                      20
 POSITIONING INFO→

                            30


                            40
  ◑ ◐ SEL                    H
 CLR CANC  SET SET        80. OFT
```
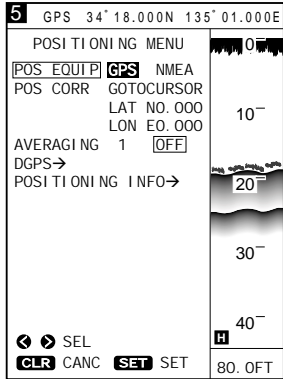
**There are two options in receiving the latitude and longitude data of the current ship position.**

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**

```
5  GPS  34 18.000N 135 01.000E
    POSITIONING MENU              0
POS EQUIP GPS  NMEA
POS CORR  GOTOCURSOR
          LAT NO. OOO          10
          LON EO. OOO
AVERAGING  1   OFF
DGPS→
POSITIONING INFO→              20

                              30

                              40
  ⬆⬇ ADJ   ⬅➡ SEL     H
  CLR CANC  SET SET     80. OFT
```

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.
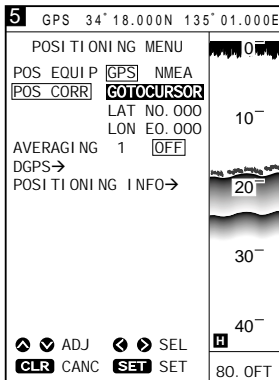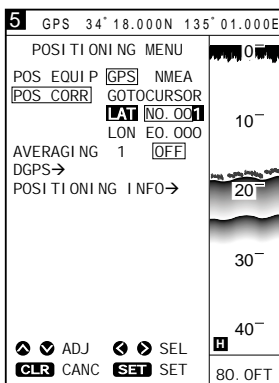
③ Press the [MENU] key.
The Main Menu screen will appear.

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**

```
5  GPS  34 18.000N 135 01.000E
    POSITIONING MENU              0
POS EQUIP GPS  NMEA
POS CORR  GOTOCURSOR
          LAT NO. OO1          10
          LON EO. OOO
AVERAGING  1   OFF
DGPS→
POSITIONING INFO→              20

                              30

                              40
  ⬆⬇ ADJ   ⬅➡ SEL     H
  CLR CANC  SET SET     80. OFT
```
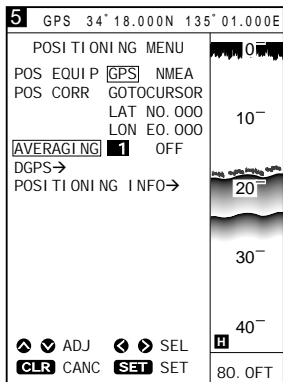
**In this way of correction, the latitude/longitude of the current ship position can be corrected by up to 9.999 minutes in 0.001-minute increments.**

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**

```
5  GPS  34 18.000N 135 01.000E
      POSITIONING MENU              0
   POS EQUIP GPS  NMEA
   POS CORR  GOTOCURSOR
             LAT NO.000          10
             LON EO.000
   AVERAGING  1   OFF
   DGPS→                         20
   POSITIONING INFO→

                                 30


                                 40
   ⊙ ⊙ ADJ   ⊙ ⊙ SEL         H
   CLR CANC  SET SET            80.0FT
```

**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.

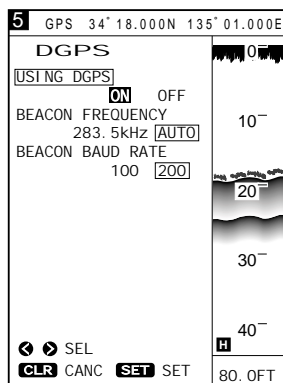To activate the averaging function, proceed as follows.

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.

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## (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.
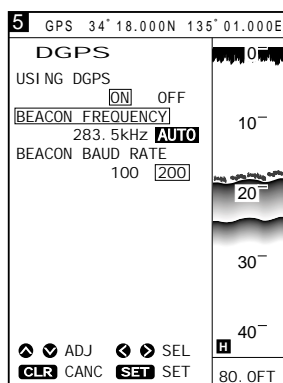
## (12)-2 Using the DGPS

```
5  GPS 34 18.000N 135 01.000E
   DGPS                        0
USING DGPS
              ON   OFF        10
BEACON FREQUENCY
       283.5kHz AUTO
BEACON BAUD RATE              20
       100   200
                              30
                              40
  ◀ ▶ SEL        H
  CLR CANC SET SET   80.0FT
```

**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.
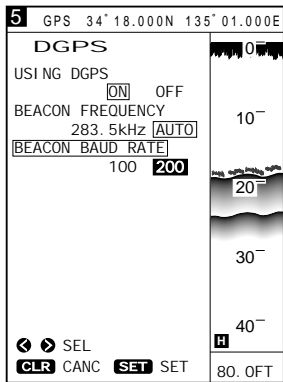
You will return to the previous screen.

## (12)-3 Setting the beacon station

```
5  GPS 34 18.000N 135 01.000E
   DGPS                        0
USING DGPS
              ON   OFF        10
BEACON FREQUENCY
       283.5kHz AUTO
BEACON BAUD RATE              20
       100   200
                              30
                              40
  ▲ ▼ ADJ  ◀ ▶ SEL    H
  CLR CANC SET SET   80.0FT
```

**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.
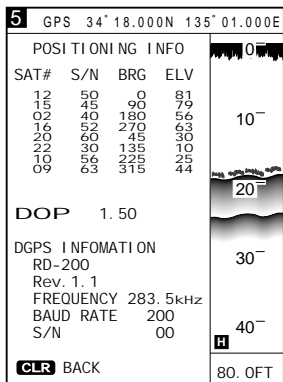
You will return to the previous screen.

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

```
5  GPS  34 18.000N 135 01.000E
        DGPS                    0⎺
   USING DGPS
          ON  OFF
   BEACON FREQUENCY            10⎺
        283.5kHz AUTO
   BEACON BAUD RATE
              100  200
                            20⎺

                            30⎺

                            40⎺
   ◀ ▶ SEL                   H
   CLR CANC  SET SET       80.0FT
```

**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

```
5  GPS  34 18.000N 135 01.000E
   POSITIONING INFO           0⎺
   SAT#  S/N  BRG  ELV
    12   50    0   81
    15   45   90   79
    02   40  180   56       10⎺
    16   52  270   63
    20   60   45   30
    22   30  135   10
    10   56  225   25
    09   63  315   44

   DOP    1.50              20⎺

   DGPS INFOMATION
   RD-200                   30⎺
   Rev.1.1
   FREQUENCY 283.5kHz
   BAUD RATE   200          40⎺
   S/N         00            H
   CLR BACK               80.0FT
```

**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.
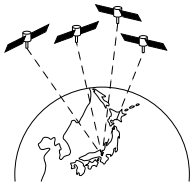


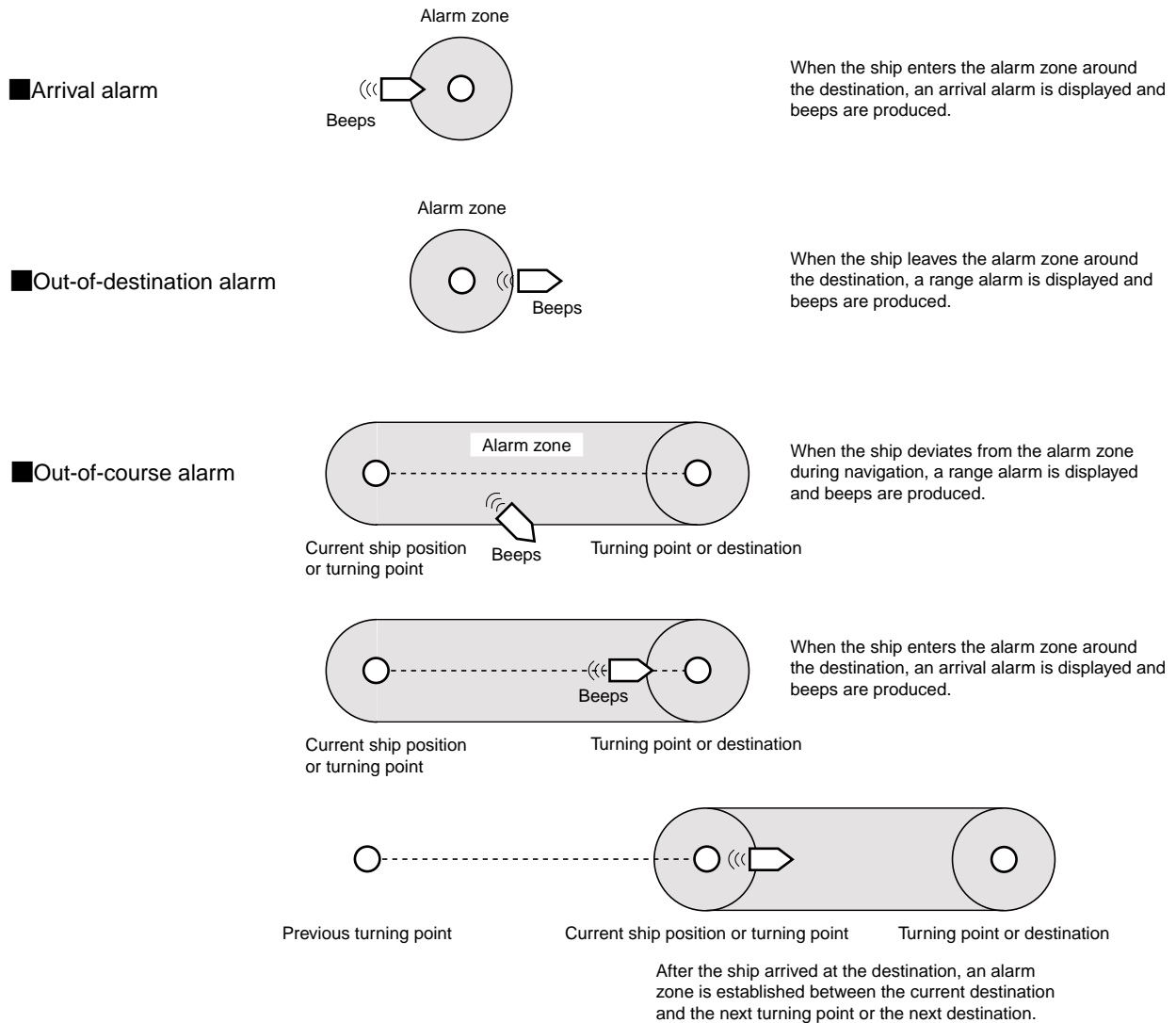Good geometrical arrangement: DOP is small.
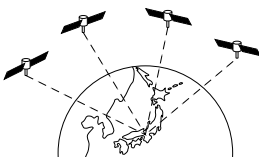


**The DOP (Dilution Of Precision) is a positioning precision indicator which represents the geometrical arrangement of the navigational satellites and the ship.**

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.
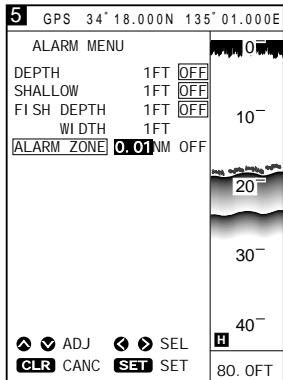
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## (15)-1 Available alarms

**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 Ml) around the ship position in increments of 0.01 NM (or 0.01 km or 0.01 Ml).
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 ARRV 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. |

■Arrival alarm

Alarm zone

Beeps

When the ship enters the alarm zone around the destination, an arrival alarm is displayed and beeps are produced.

■Out-of-destination alarm

Alarm zone

Beeps

When the ship leaves the alarm zone around the destination, a range alarm is displayed and beeps are produced.

■Out-of-course alarm

Alarm zone

Beeps

Current ship position or turning point    Turning point or destination

When the ship deviates from the alarm zone during navigation, a range alarm is displayed and beeps are produced.

Beeps

Current ship position or turning point    Turning point or destination

When the ship enters the alarm zone around the destination, an arrival alarm is displayed and beeps are produced.

Previous turning point    Current ship position or turning point    Turning point or destination

After the ship arrived at the destination, an alarm zone is established between the current destination and the next turning point or the next destination.

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## (15)-2  Setting the alarm zone

```
5  GPS  34 18.000N 135 01.000E
                                      0
   ALARM MENU

   DEPTH         1FT  OFF
   SHALLOW       1FT  OFF
   FISH DEPTH    1FT  OFF      10
        WIDTH    1FT
   ALARM ZONE  0.01 NM OFF

                               20

                               30

                               40
   ⊙ ⊙ ADJ   ⊙ ⊙ SEL    H
   CLR CANC  SET SET         80. OFT
```

**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.

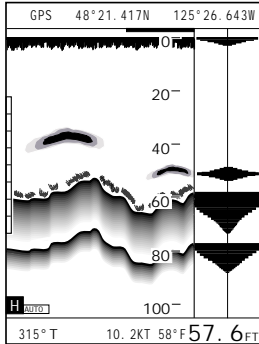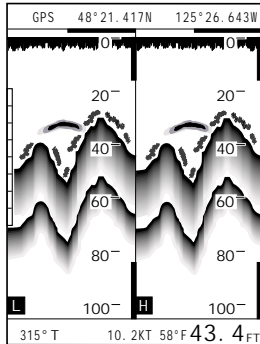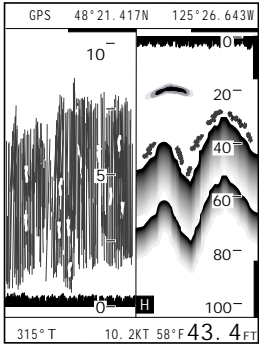 * To stop beep sounds temporarily, press the [CLR] key.

# SOUNDER MODE

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

## (1)-1  Standard screen
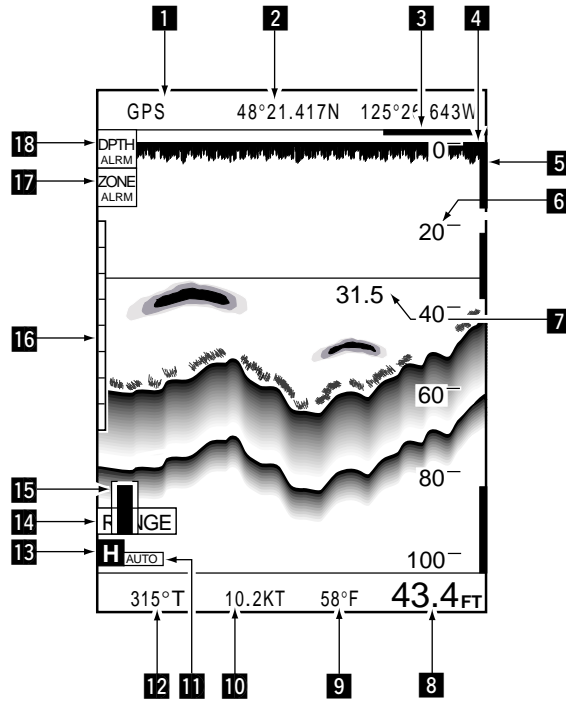


**1 Positioning device**

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 (☞ 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.

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| 🔟 **Ship speed** | This field shows the current ship speed. |
| --- | --- |

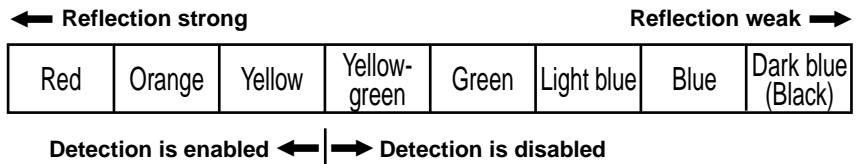**⓫ Operation mode** — When the system operates in auto mode (☞ P.53), "AUTO" is indicated in this field.

**⓬ 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)

**⓭ Frequency** — This field shows the frequency in use (◧: high frequency, ◧: low frequency).
In the dual screen, the frequency specified on the Fishfinder Menu screen is displayed on the right.

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

**⓯ 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.

**⓰ 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.

**◄─ Reflection strong**                              **Reflection weak ─►**

| Red | Orange | Yellow | Yellow-green | Green | Light blue | Blue | Dark blue (Black) |
| --- | --- | --- | --- | --- | --- | --- | --- |

**Detection is enabled ◄──│──► Detection is disabled**

**⓱ Plotter alarm indication** — Alarms indicated in this field include range alarm and arrival alarm.

**⓲ Fishfinder alarm** — Alarms indicated in this field include depth alarm, fish alarm and shoal alarm.

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## (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".
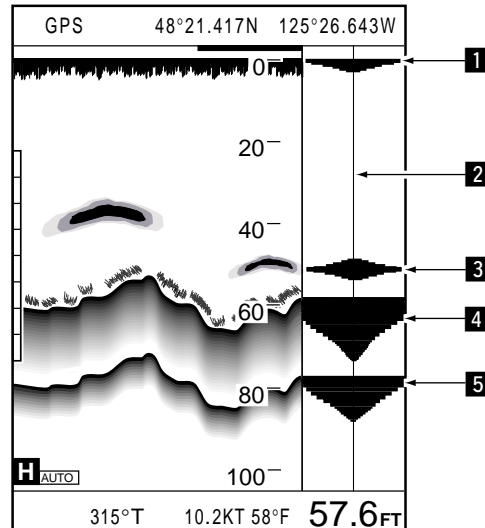


**1** **Strong reflection (oscillation line)**       Indicated in red due to large amplitude

**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".



**Low frequency image** →

← **High frequency image** (frequency specified on the Sounder Menu screen)
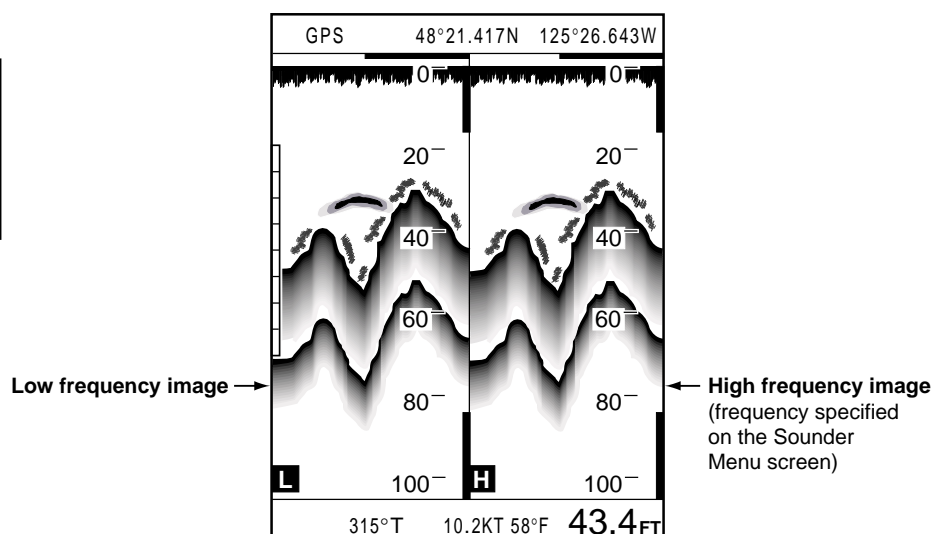
## (1)-5 Standard + Bottom lock screen

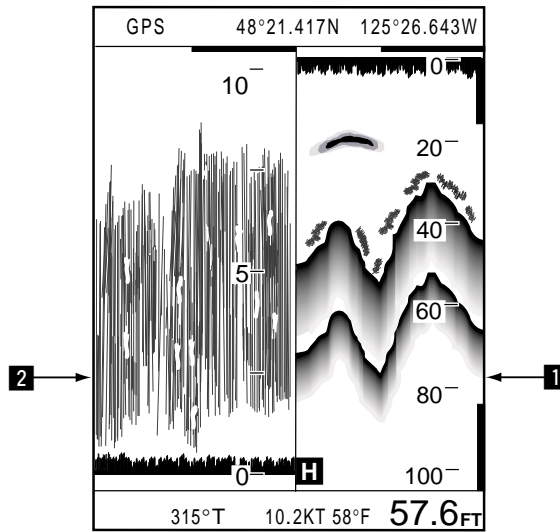For common indications on different screens, such as alarm range marker, time mark and sensitivity level, see section (1)-2 "Standard screen".

GPS    48°21.417N   125°26.643W

10

5

0

**2**

**1**

100

315°T    10.2KT 58°F   57.6FT
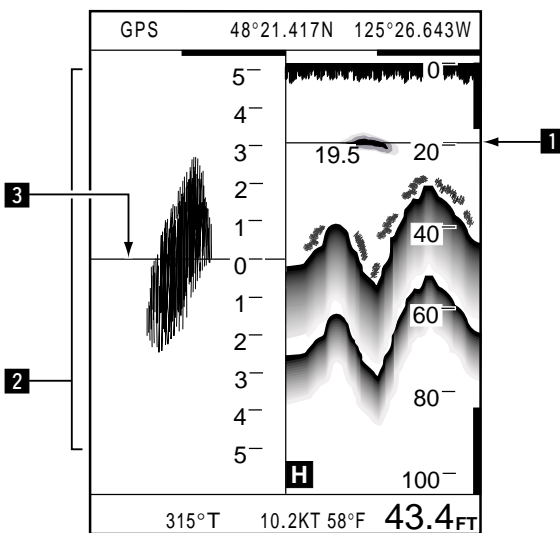
**1 Standard image**      This image is the same as that on the standard screen.

**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".

GPS    48°21.417N   125°26.643W

5
4
3
2
1
0
1
2
3
4
5

**3**

**2**

0

19.5   20

**1**

40

60

80

100

315°T    10.2KT 58°F   43.4FT

**1 Depth marker**      Underwater area around this marker is zoomed in.
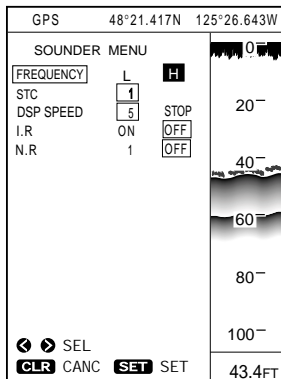
**2 Maker zoom-in image**      This image covers the specified underwater area (☞ P. 55).

**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.

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## (2) Selection of Frequency

```
GPS        48°21.417N  125°26.643W
  SOUNDER MENU                        0
 FREQUENCY    L      H
 STC                 1             20
 DSP SPEED    5    STOP
 I.R         ON    OFF
 N.R          1    OFF            40

                                  60

                                  80

                                 100
 ◀ ▶ SEL
 CLR CANC  SET SET               43.4 FT
```
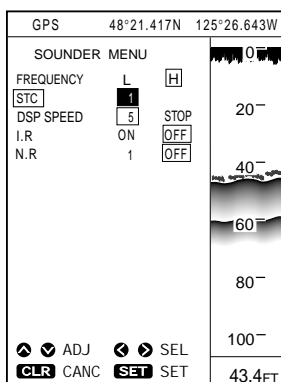
**To select the Sounder frequency between "High (H)" and "Low (L)", proceed as follows. (Default; H)**

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.

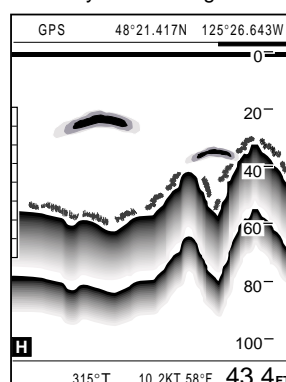| Frequency | Low (L) | High (H) |
|---|---|---|
| **Directivity** (directional angle) | High (large) | Low (small) |
| **Depth coverage** | Deep | Shallow |
| **Resolution** (detection of fish density) | Low | High |
| **Immunity to bubbles and underwater noises** | Low | High |
| **Main application**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

## (3) STC; Setting of Immunity to Air Bubbles

```
GPS        48°21.417N  125°26.643W
  SOUNDER MENU                        0
 FREQUENCY    L      H
 STC                 1             20
 DSP SPEED    5    STOP
 I.R         ON    OFF
 N.R          1    OFF            40

                                  60

                                  80

                                 100
 ◀ ▶ ADJ   ◀ ▶ SEL
 CLR CANC  SET SET               43.4 FT
```
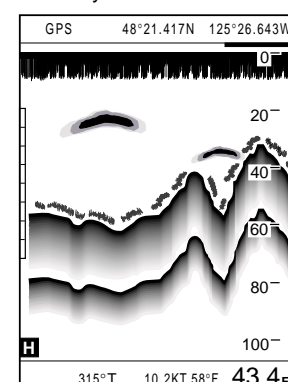
**To set the immunity to air bubbles in the sea surfaces so as to improve the image legibility, proceed as follows. (Default; 1)**

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.

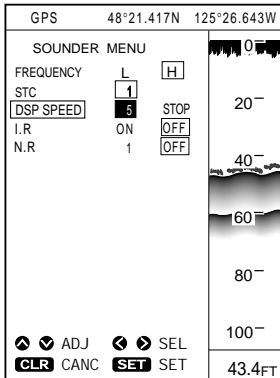⑤ When you finish setting the immunity level, press the [MENU] key to close the Main Menu screen.

Immunity level too high

```
GPS    48°21.417N  125°26.643W
                             0
                            20
                            40
                            60
                            80
 H                         100
 315°T  10.2KT 58°F  43.4 FT
```

Immunity level too low

```
GPS    48°21.417N  125°26.643W
                             0
                            20
                            40
                            60
                            80
 H                         100
 315°T  10.2KT 58°F  43.4 FT
```

**(4) Setting of Display speed**

```
GPS    48°21.417N  125°26.643W

SOUNDER  MENU
FREQUENCY      L    H
STC            1
DSP SPEED      5    STOP
I.R           ON    OFF
N.R            1    OFF

                    0
                   20
                   40
                   60
                   80
                  100
◇ ◇ ADJ  ◇ ◇ SEL
CLR CANC  SET SET   43.4FT
```

**The display speed can be adjusted to "1" thru "5" or "STOP". (Default; 5)**
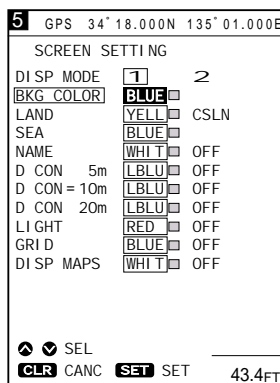Selecting a high display speed enlarges the image horizontally and will thus be helpful for analyzing the image.
If you want to do detection for a long time, you should select a low display speed.
To set the display speed, proceed as follows.
① Press the [MENU] key.
   The Main Menu screen will appear.
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**

```
5 GPS  34 18.000N 135 01.000E

SCREEN SETTING
DISP MODE    1     2
BKG COLOR   BLUE
LAND        YELL   CSLN
SEA         BLUE
NAME        WHIT   OFF
D CON  5m   LBLU   OFF
D CON  10m  LBLU   OFF
D CON  20m  LBLU   OFF
LIGHT       RED    OFF
GRID        BLUE   OFF
DISP MAPS   WHIT   OFF

◇ ◇ SEL
CLR CANC  SET SET   43.4FT
```
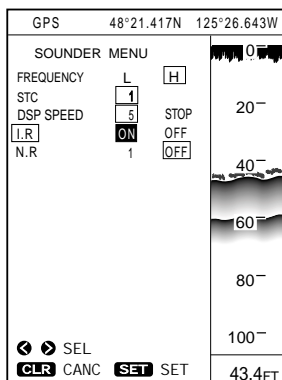
**The background color can be set to "Blue" or "Black". (Default; BLUE)**
Select a background color according to the ambient working conditions as follows.
① Press the [MENU] key.
   The Main Menu screen will appear.
② Select "Screen Setting" using the [UP] or [DOWN] key and press the [SET] key.
   The 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.

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## (6) Setting of Interference Rejection

```
GPS        48°21.417N  125°26.643W
   SOUNDER  MENU
FREQUENCY      L    H        0
STC            1
DSP SPEED      5    STOP     20
I.R            ON   OFF
N.R            1    OFF      40
                             60
                             80
                             100
   ❰ ❱ SEL
   CLR CANC  SET SET         43.4FT
```

**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)**
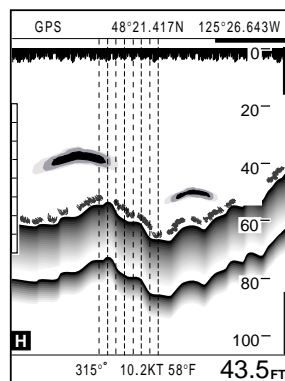
To activate the interference rejection function, proceed as follow.

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.
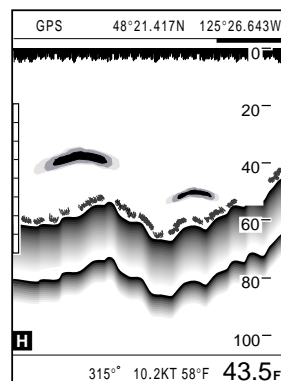⑤ When you finish setting, press the [MENU] key to close the Main Menu screen.
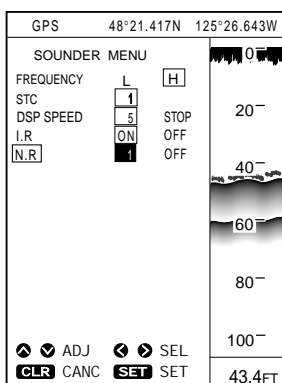
Noise disturbance caused by other fishfinder
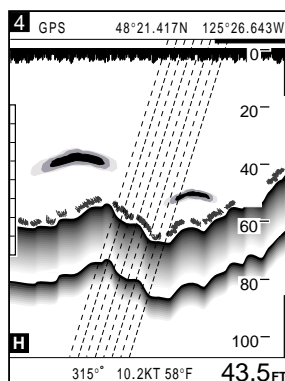
Inductive interference caused by a generator on the ship

Anti-interference ON

## (7) Setting of Noise Reduction

```
GPS        48°21.417N  125°26.643W
   SOUNDER  MENU
FREQUENCY      L    H        0
STC            1
DSP SPEED      5    STOP     20
I.R            ON   OFF
N.R            1    OFF      40
                             60
                             80
                             100
   ❰ ❱ ADJ   ❰ ❱ SEL
   CLR CANC  SET SET         43.4FT
```

**The system has an 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

GPS   48°21.417N  125°26.643W
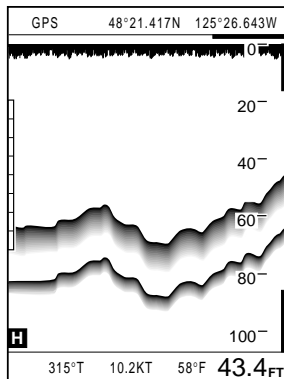
— Sensitivity level bar
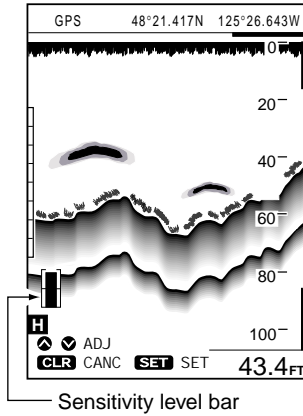
**The sensitivity setting is critical to ensure optimal fishfinder performance. Be sure to set the sensitivity properly when using the system in manual mode.**

**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.
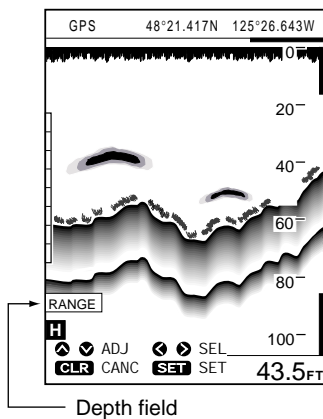
③ Press the [GAIN] or [SET] key to save the setting.

Sensitivity level too low

Sensitivity level too high
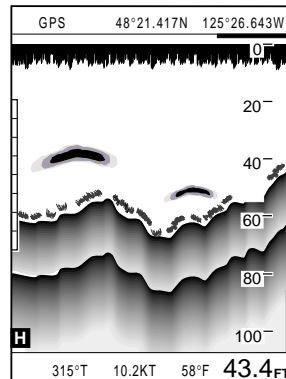
## (9) Manual Setting of Depth Range

GPS   48°21.417N  125°26.643W

— Depth field

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

Available units of the depth range include m (metes), 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**

SHIFT

H
△ ▽ ADJ   ◁ ▷ SEL
**CLR** CANC  **SET** SET   43.4FT
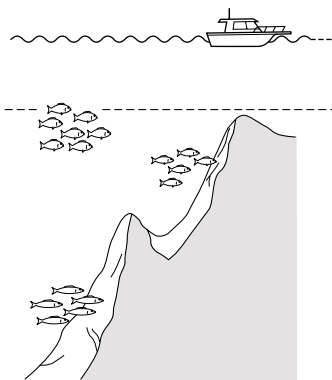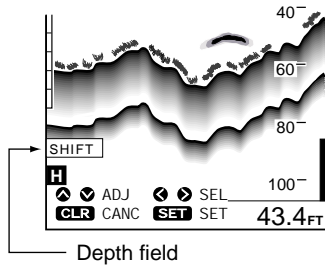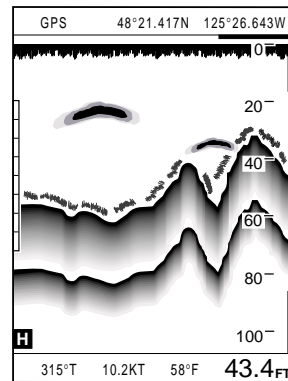
—— Depth field

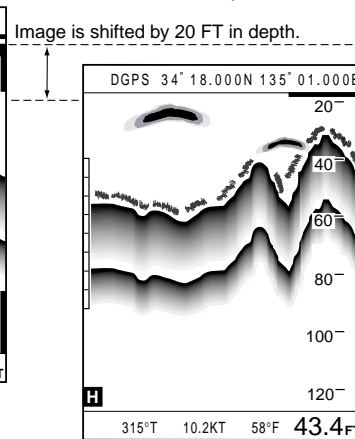**Setting the depth shift allows you to specify a depth at which the upper edge of the screen image stands.**

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.

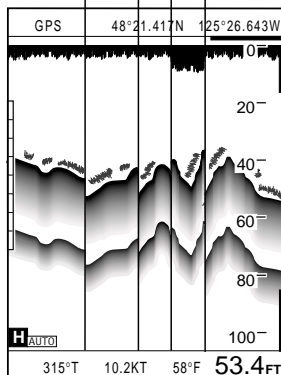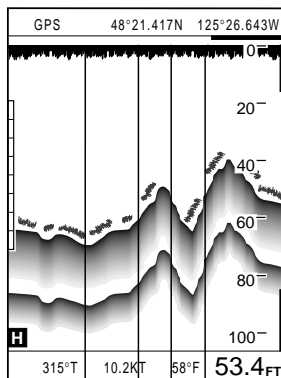④ Press the [RANGE] or [SET] key to save the setting.

When no depth shift is set

GPS   48°21.417N  125°26.643W

0
20
40
60
80
100
H
315°T   10.2KT   58°F   43.4FT

When a 20 FT depth shift is set

Image is shifted by 20 FT in depth.

DGPS 34 18.000N 135 01.000E

20
40
60
80
100
120
H
315°T   10.2KT   58°F   43.4FT

**(11) Selection of Auto Operation**

Manual operation

GPS   48°21.417N  125°26.643W

0
20
40
60
80
100
H
315°T   10.2KT   58°F   53.4FT

GPS   48°21.417N  125°26.643W

0
20
40
60
80
100
H AUTO
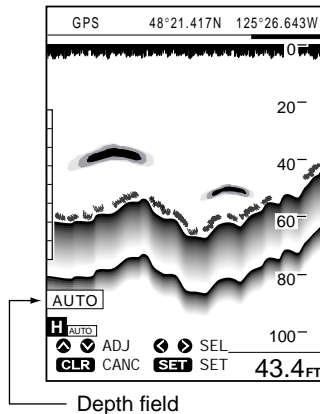315°T   10.2KT   58°F   53.4FT

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.

GPS   48°21.417N  125°26.643W

0
20
40
60
80
AUTO
H AUTO
△ ▽ ADJ   ◁ ▷ SEL
**CLR** CANC  **SET** SET   100   43.4FT

—— Depth field

53

**(12) Depth Measurement**
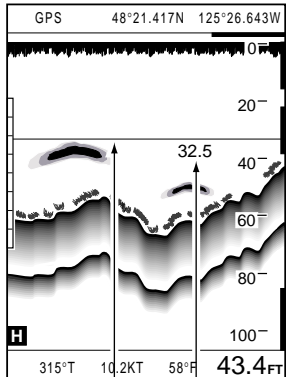


Depth marker    Depth value

**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 rock 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 |

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**(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.

GPS    48°21.417N  125°26.643W

5 4 3 2 1 0 1 2 3 4 5

0 19.7 20 40 60 80 100

H

315°T    10.2KT    58°F    43.4FT

← Depth marker

55
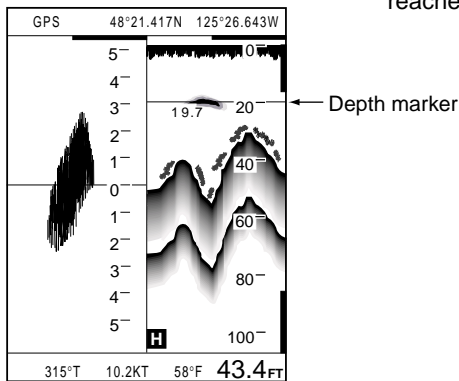
## (15) Setting of Sounder Alarm Ranges

```
GPS        48°21.417N  125°26.643W
ALARM MENU                        0
DEPTH          85 FT   OFF
SHALLOW        15 FT   OFF       20
FISH  DEPTH    18 FT   OFF
        WIDTH  15 FT              40
ALARM ZONE  0.4NM     OFF
                                 60

                                 80

⊙ ⊙ ADJ   ⊙ ⊙ SEL             H 100
CLR CANC  SET SET              43.4 FT
```
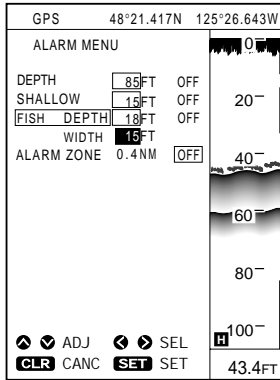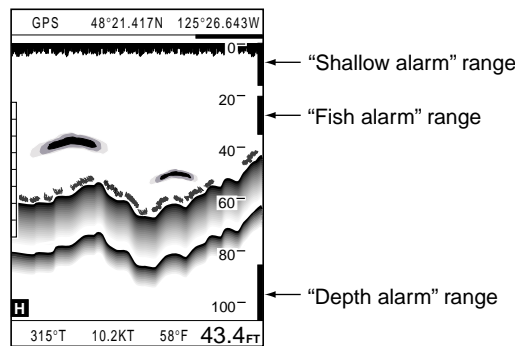
**Three types of Sounder alarms are available as shown in the table below.**

| 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.

```
GPS     48°21.417N  125°26.643W
                               0        ← "Shallow alarm" range

                              20        ← "Fish alarm" range

                              40

                              60

                              80

                                        ← "Depth alarm" range
H                            100
315°T   10.2KT   58°F  43.4 FT
```

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## (16)-1 Reflections from 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.
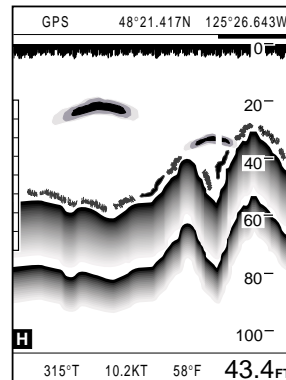
### A Reading topographical features of the sea bottom

**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:**

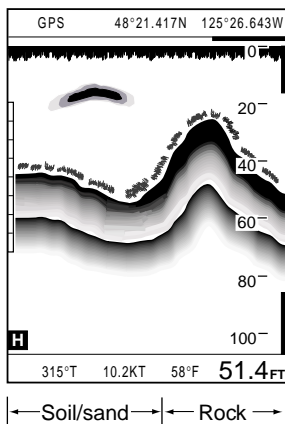| Topographical feature | Screen image |
|---|---|
| **Flat** | Assuming that its geological features are constant, the displayed contour of a flat terrain has a uniform width. |
| **Hilly** | The displayed contour of a hilly terrain has a long tailing[1]. This is because the ultrasonic sent from the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

Flat terrain
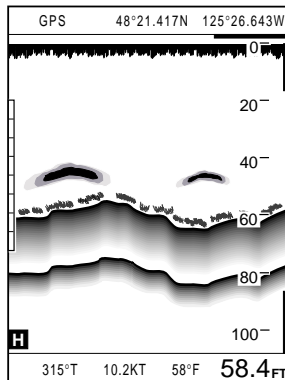


Hilly terrain



### B Reading geological features of the sea bottom



|←—Soil/sand—→|←— Rock —→|

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

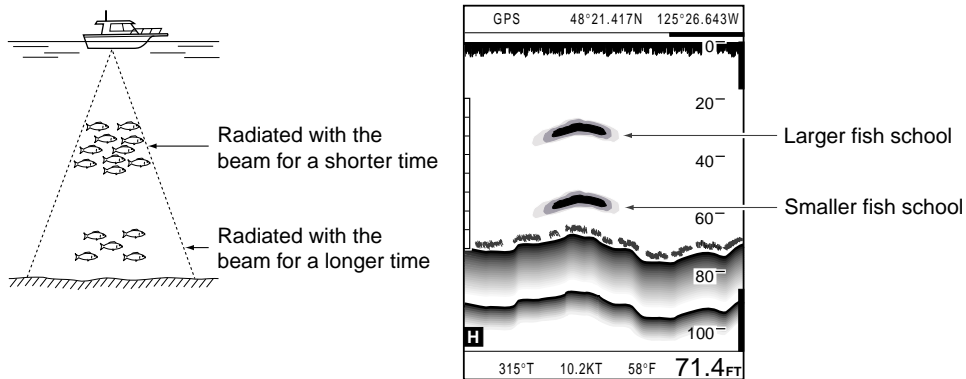| Geological feature | Screen image |
|---|---|
| **Hard**<br>**(e.g., rock, coral reef)** | Assuming that its geological features are constant, the displayed contour of a hard terrain has a uniform width. |
| **Soft**<br>**(e.g., soil, sand,**<br>**seeweed)** | The contour of a soft terrain is display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

## (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**

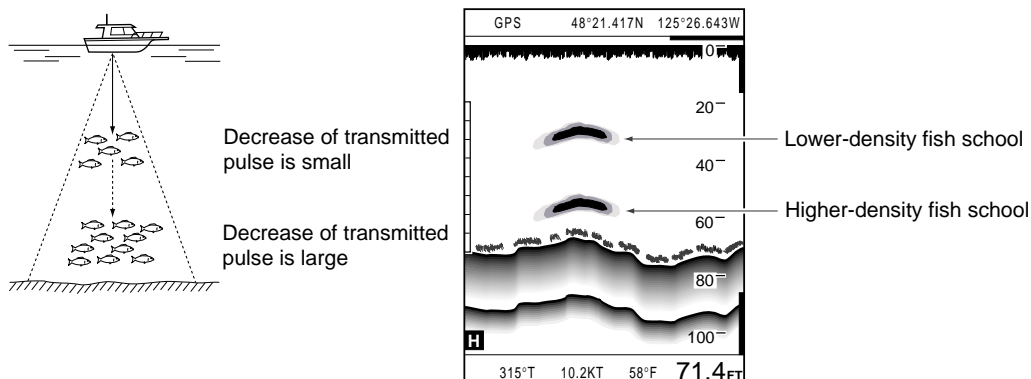**The image size of s a fish school is in proportion to the actual size.**
When the system detects two same-sized fish school at different depths, however, the fish school located at a deeper position will be displayed as a smaller-sized image on the screen. This is because the ultrasonic radiates at 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.

Radiated with the beam for a shorter time

Radiated with the beam for a longer time

Larger fish school

Smaller fish school

GPS  48°21.417N  125°26.643W
0
20
40
60
80
100
H
315°T  10.2KT  58°F  71.4 FT

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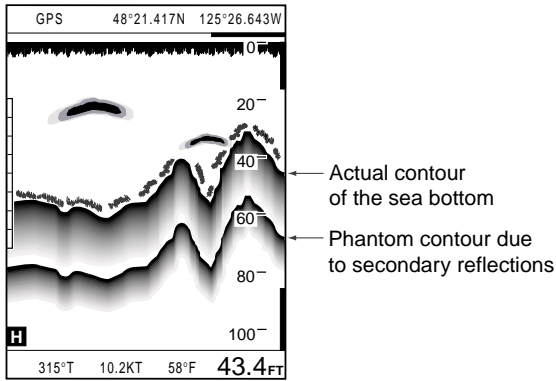When two images having the same density (same signal strength) are displayed at different depths on the same screen, however, the density of the two fish schools are different; the deeper one is actually denser than the shallower one. This is because the deeper the object position is, the more the pulses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

Decrease of transmitted pulse is small

Decrease of transmitted pulse is large

Lower-density fish school

Higher-density fish school

GPS  48°21.417N  125°26.643W
0
20
40
60
80
100
H
315°T  10.2KT  58°F  71.4 FT

## (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.

GPS    48°21.417N  125°26.643W

← Actual contour of the sea bottom

← Phantom contour due to secondary reflections

315°T   10.2KT   58°F   43.4 FT

## (16)-4 Plankton layers or tidal current layer

**A Plankton layers**

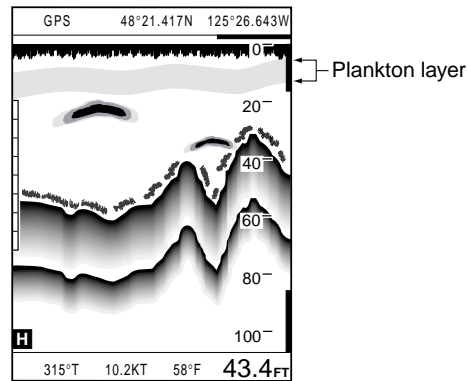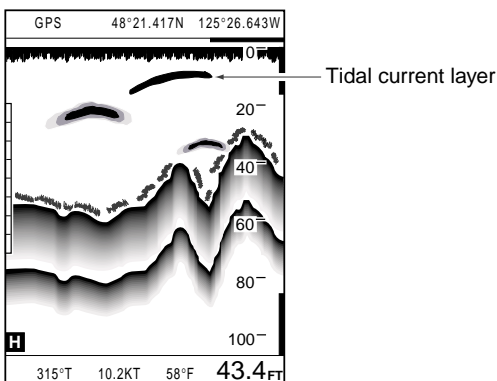**Plankton may sometimes gather and form a layer.**

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:

GPS    48°21.417N  125°26.643W

Tidal current layer

315°T   10.2KT   58°F   43.4 FT

GPS    48°21.417N  125°26.643W

Plankton layer
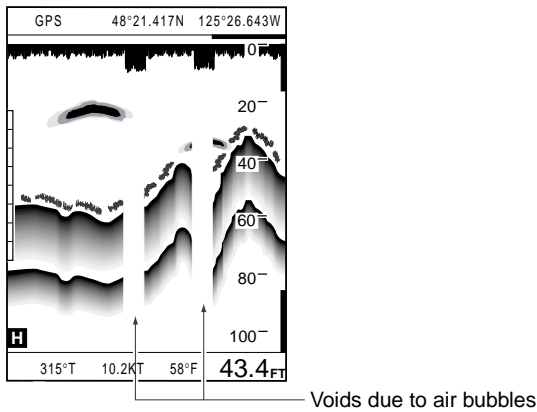
315°T   10.2KT   58°F   43.4 FT

## (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.

GPS    48°21.417N  125°26.643W

0
20
40
60
80
100

H

315°T    10.2KT    58°F    43.4FT

— Thermocline
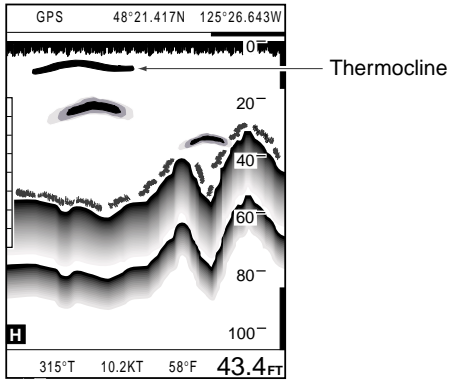
## (16)-6  Influence of air bubbles

**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.**
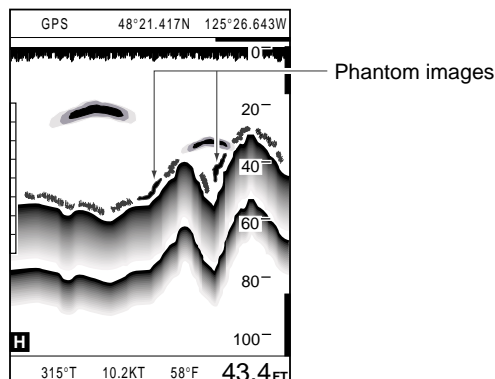This symptom is apt to occur when a low frequency is used, the ship turns and passes through its own track, or the sea is rough. Voids on the screen mean that the ultrasonic energy is dissipated or absorbed by air bubbles.

GPS    48°21.417N  125°26.643W

0
20
40
60
80
100

H

315°T    10.2KT    58°F    43.4FT

— Voids due to 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.

Main lobe
Side lobe

GPS    48°21.417N  125°26.643W

0
20
40
60
80
100

H

315°T    10.2KT    58°F    43.4FT

Phantom images

60
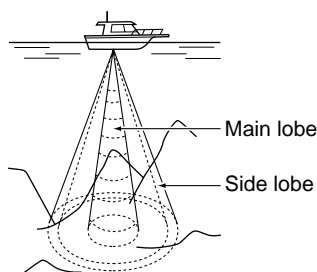
# COMBINATION MODE

**(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.
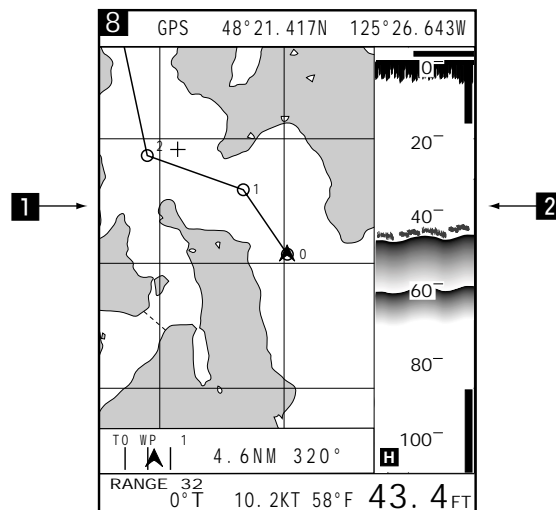


**1 Coastline screen**

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.**

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## 5-1 Initial setting on the SET MODE screen
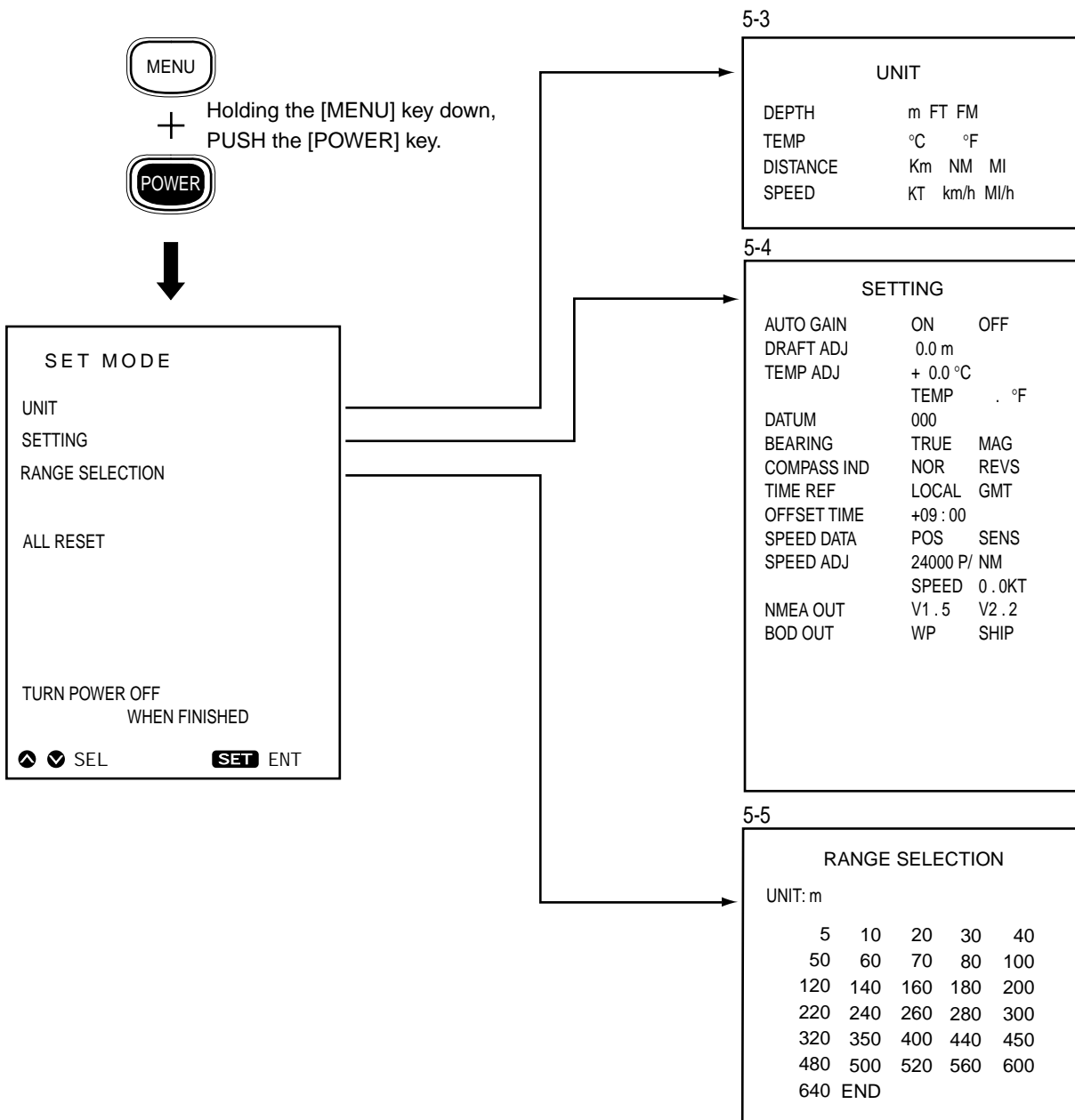
**The SET MODE screen allows you to set such items that, once set after installation, will not require to be changed in normal use.**
To enter the SET MODE screen, proceed as follows.

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.

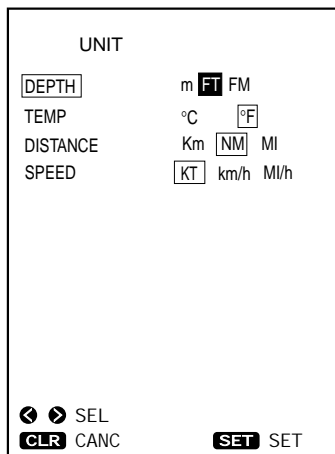## 5-2 Initial setting on each submenu screen

■ **Operation flow on the SET MODE screen**



MENU

＋ Holding the [MENU] key down,
PUSH the [POWER] key.

POWER

```
    SET MODE

UNIT
SETTING
RANGE SELECTION

ALL RESET

TURN POWER OFF
          WHEN FINISHED
 ⊗ ⊗ SEL        SET  ENT
```

5-3
```
            UNIT

DEPTH            m  FT  FM
TEMP             ℃      ℉
DISTANCE         Km  NM  MI
SPEED            KT  km/h  MI/h
```

5-4
```
            SETTING

AUTO GAIN        ON       OFF
DRAFT ADJ        0.0 m
TEMP ADJ         + 0.0 ℃
                 TEMP      . ℉
DATUM            000
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
```

5-5
```
        RANGE SELECTION

UNIT: m

       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  END
```

## 5-3 UNIT

**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.

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

```
        UNIT

DEPTH       m  FT  FM
TEMP        °C      °F
DISTANCE    Km  NM  MI
SPEED       KT  km/h  MI/h




  ◄ ► SEL
  CLR CANC      SET SET
```

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.

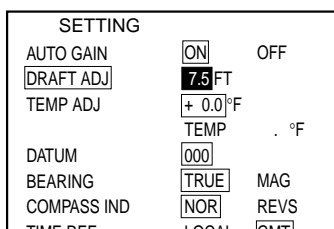| Setting item | Selectable units |
|---|---|
| **DEPTH** | m (default) $\Longleftrightarrow$ FT $\Longleftrightarrow$ FM |
| **TEMP (temperature)** | °C (default) $\Longleftrightarrow$ °F |
| **DISTANCE** | km $\Longleftrightarrow$ NM (default) $\Longleftrightarrow$ MI |
| **SPEED** | KT (default) $\Longleftrightarrow$ km/h $\Longleftrightarrow$ MI/h |

## 5-4 SETTING

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

Select such units that are convenient for you to use.

■ **AUTO GAIN**

```
      SETTING
AUTO GAIN    ON      OFF
DRAFT ADJ    0.0 FT
TEMP ADJ     + 0.0 °F
             TEMP    . °F
```

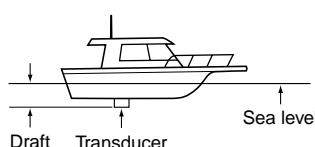**This item allows you to make a selection between two automatic control options;**
•ON:　　　　The image sensitivity and depth range are automatically controlled. (default)
•OFF:　　　 Only the depth range is automatically controlled.

■ **DRAFT ADJ**

```
      SETTING
AUTO GAIN    ON      OFF
DRAFT ADJ    7.5 FT
TEMP ADJ     + 0.0 °F
             TEMP    . °F
DATUM        000
BEARING      TRUE    MAG
COMPASS IND  NOR     REVS
TIME REF     LOCAL   GMT
```



Draft　Transducer　　　Sea level

**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      ON      OFF
DRAFT ADJ      7.5 FT
TEMP ADJ       + 2.4 °F
               TEMP        . °F
DATUM          000
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
 CLR CANC         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      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
```

**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      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    − 8:30
SPEED DATA     POS     SENS
SPEED ADJ      22000 P/ NM
               SPEED   0.0KT
NMEA OUT       V1.5    V2.2
BOD OUT        WP      SHIP
 ◀ ▶ SEL
 CLR CANC         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.

■ **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**

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

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**

```
        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
  CLR CANC            SET SET
```

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

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    [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
◀ ▶ SEL
CLR CANC          SET SET
```

**This item allows you to make a selection between two versions of external NMEA0183 supported by the system:**
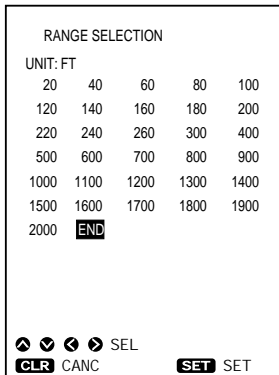- V1.5: Version 1.5
- V2.2: Version 2.2

■ **BOD OUT**

```
        SETTING
AUTO GAIN    [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
◀ ▶ SEL
CLR CANC          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.

## 5-5 RANGE SELECTION

```
RANGE SELECTION
UNIT: FT
   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  END

 ◇ ◇ ◇ ◇ SEL
 CLR CANC        SET SET
```
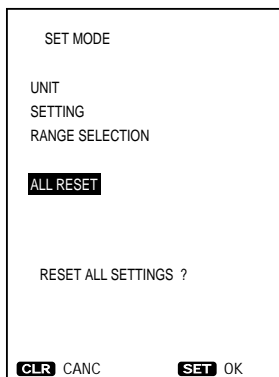
Ranges you have selected: White
Ranges you have not selected: Red

**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)** | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 |
| **(default)** | 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

```
SET MODE

UNIT
SETTING
RANGE SELECTION

ALL RESET


RESET ALL SETTINGS ?


CLR CANC       SET OK
```

**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.
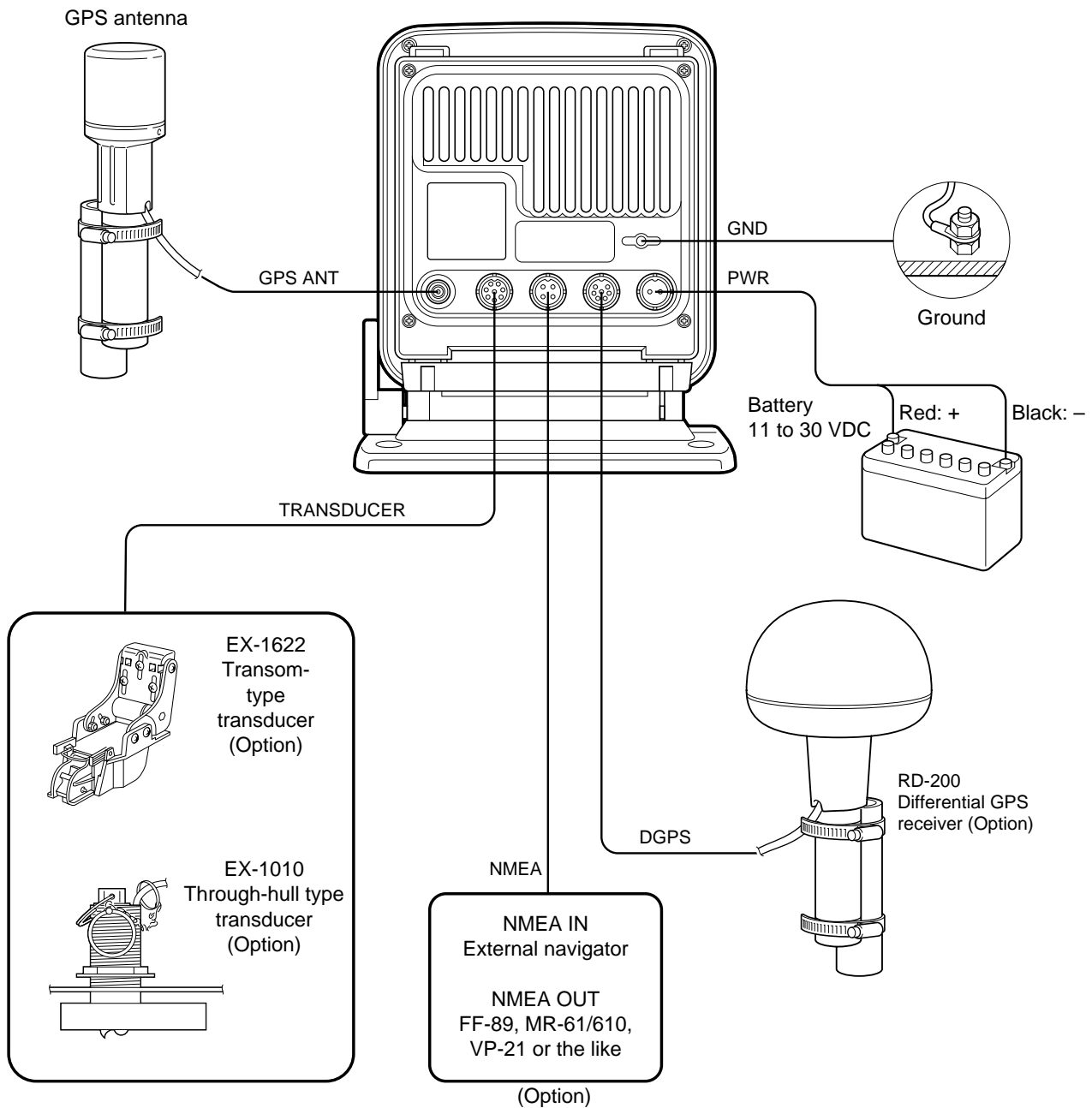
• Press [CLR] to cancel the function.

**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.

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## 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.

GPS antenna

GPS ANT

GND

Ground

PWR

Battery
11 to 30 VDC

Red: +

Black: –

TRANSDUCER

EX-1622
Transom-
type
transducer
(Option)

EX-1010
Through-hull type
transducer
(Option)

NMEA

NMEA IN
External navigator

NMEA OUT
FF-89, MR-61/610,
VP-21 or the like

(Option)

DGPS

RD-200
Differential GPS
receiver (Option)

## 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 a magnetic compass and magnetic tape; and

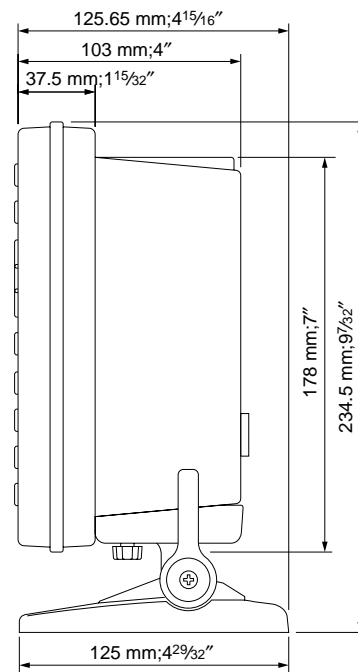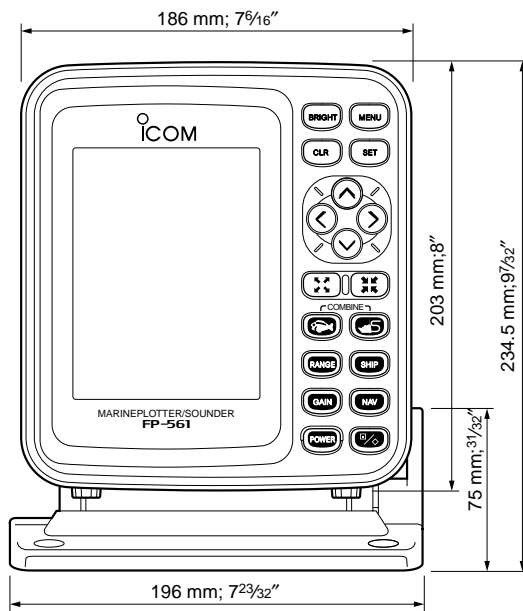③ Is not exposed to rainwater, spray of water or direct sunlight.

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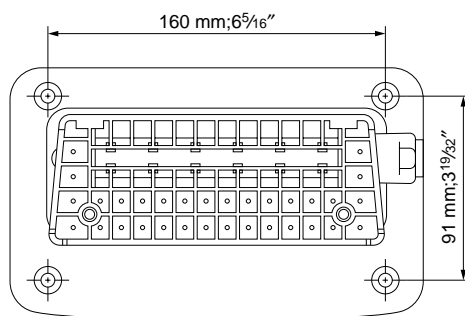# 6 INSTALLATION PROCEDURE

**B 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

186 mm; 7⁶⁄₁₆″

203 mm;8″

234.5 mm;9⁷⁄₃₂″

75 mm;3¹⁄₃₂″

196 mm; 7²³⁄₃₂″

iCOM

MARINEPLOTTER/SOUNDER
FP-561

125.65 mm;4¹⁵⁄₁₆″

103 mm;4″

37.5 mm;1¹⁵⁄₃₂″

178 mm;7″

234.5 mm;9⁷⁄₃₂″

125 mm;4²⁹⁄₃₂″

160 mm;6⁵⁄₁₆″

91 mm;3¹⁹⁄₃₂″

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

iCOM

MARINEPLOTTER/SOUNDER
FP-561

Tilting

Tilting lever
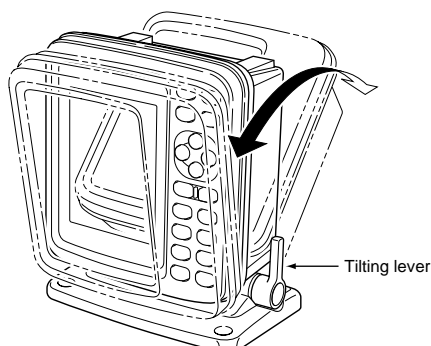
Removing the unit from the stand

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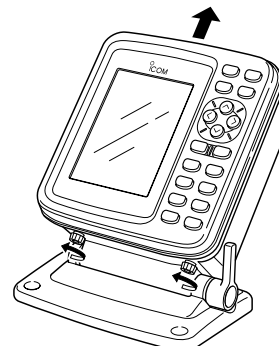
**C Connecting the power cable**

**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 over-all 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
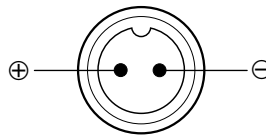
**D Connecting a ground cable**

**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.

Film capacitor

Silicon rubber

Must be within 10 cm each

Electrolytic capacitor

| 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.
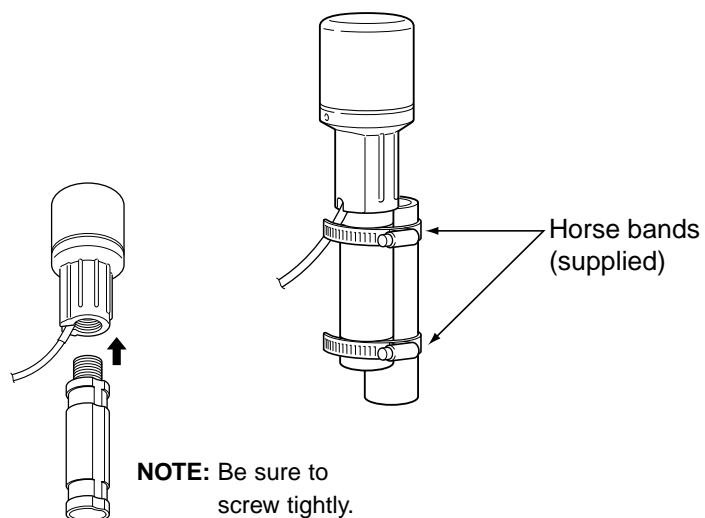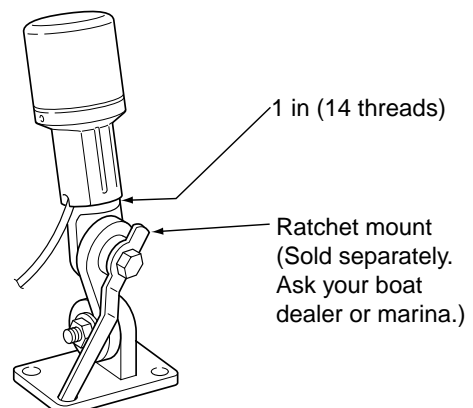
70
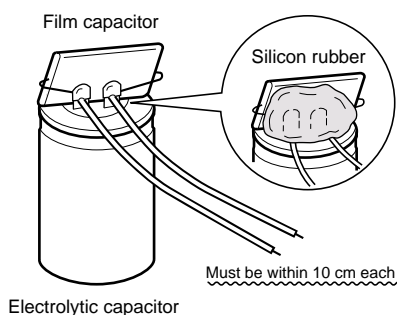
## 6-4 Installing the GPS antenna

**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 extention 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 must**



Horse bands
(supplied)

**NOTE:** Be sure to screw tightly.

**•Install on a deck or roof**



1 in (14 threads)

Ratchet mount
(Sold separately.
Ask your boat
dealer or marina.)

## 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



To the TRANSDUCER terminal on the real panel of FP-561

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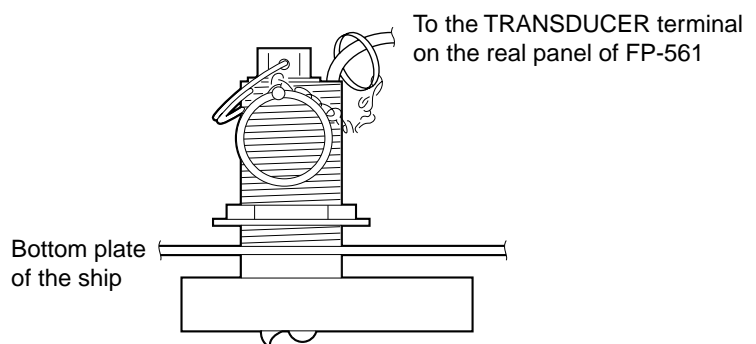
● **Do not plug or unplug a cable into of from the TRANSDUCER connector. Doing so may cause damage to the ship speed sensor.**
● **A transducer must be installed by a shipbuilder or an expert installer.**

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# 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

NMEA  IN  ⊕ —— 1 ●  ● 4 —— NMEA  OUT  ⊖
NMEA  IN  ⊖ —— 2 ●  ● 3 —— NMEA  OUT  ⊕
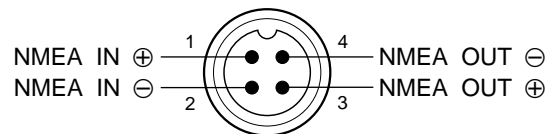
### 6-7 DGPS

**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 to the system to be kept in a 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.**

# 8 SPECIFICATIONS
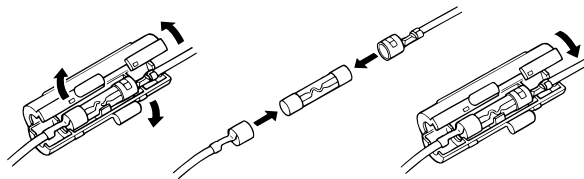
## GENERAL

- **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, Acceleraration: 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

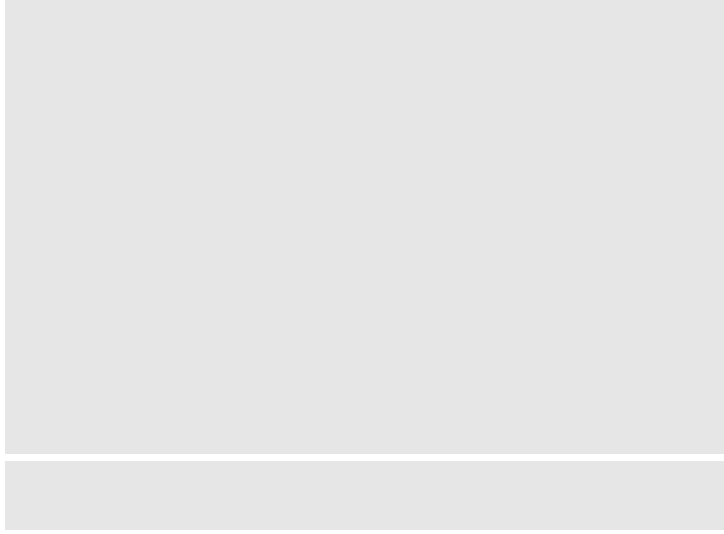| | | |
|---|---|---|
| ● **Units of ship speed** | : | KT, km/h, MI/h |
| ● **Units of distance** | : | km, NM, MI |
| ● **LCD brightness** | : | 16 stages |
| ● **External data input** | : | (1) NMEA0183 |
| | | (2) Water temperature/ship speed data |
| | | (3) Input from DGPS |
| ● **Data output** | : | 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.

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# 9 DATUM (GEODETIC REFERENCE) CODE

## ■ Datum (Geodetic reference) table

0 : WGS 84—Default
1 : Ethiopia, Sudan
2 : Burkina Faso
3 : Cameroon
4 : Ethiopia
5 : Mali
6 : Senegal
7 : Sudan
8 : Somalia
9 : Bahrain
10 : Saudi Arabia
11 : Cocas Islands
12 : Antigua
13 : Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe
14 : Botswana
15 : Burundi
16 : Lesotho
17 : Malawi
18 : Swaziland
19 : Zaire
20 : Zambia
21 : Zimbabwe
22 : Kenya, Tanzania
23 : Ascension Island
24 : Iwo Jima
25 : St Helena Island
26 : Tern Island
27 : Marcus Island
28 : Australia & Tasmania
29 : Australia & Tasmania
30 : Djibouti
31 : Efate & Erromango Island
32 : Bermuda
33 : Guinea–Bissau
34 : Colombia
35 : Indonesia
36 : Camp Area Astro Antarctica (McMurdo Camp Area)
37 : Argentina
38 : Phoenix Islands
39 : South Africa
40 : Bahamas, Florida
41 : Tunisia
42 : New Zealand
43 : Paraguay
44 : Brazil
45 : Guinea
46 : Indonesia (Sumatra)
47 : Gizo Island
48 : Easter Island
49 : Austria, Belgium, Denmark, Finland, France, Italy, West Germany, Gibraltar, Greece, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland
50 : Austria, France, West Germany, Netherlands, Denmark, Switzerland,
51 : Iraq, Israel, Jordan, Lebanon, Kuwait, Saudi Arabia, Syria
52 : Cyprus
53 : Egypt

54 : England, Channel Islands, Ireland, Scotland, Shetland Islands
55 : Finland, Norway
56 : Greece
57 : Iran
58 : Italy (Sardinia)
59 : Italy (Sicily)
60 : Malta
61 : Portugal, Spain
62 : Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland
63 : Leeward Islands
64 : Republic of Maldives
65 : New Zealand
66 : Graciosa Base SW 1948 Azores
67 : Guam
68 : Indonesia
69 : Guadalcanal Island
70 : Afghanistan
71 : Iceland
72 : Hong Kong
73 : Taiwan
74 : Bangladesh
75 : India, Nepal
76 : Thailand, Vietnam
77 : Thailand
78 : Ireland
79 : South Georgia Islands
80 : Diego Garcia
81 : Johnston Island
82 : Sri Lanka
83 : Kerguelen Island
84 : West Malaysia & Singapore
85 : Caroline Islands
86 : Cayman Brac Island
87 : Ghana
88 : Liberia
89 : Luzon Philippines (Excluding Mindanao)
90 : Luzon Philippines (Mindanao)
91 : Mahe Island
92 : Ethiopia (Eritrea)
93 : Morocco
94 : Midway Islands
95 : Cameroon
96 : Nigeria
97 : Montserrat (Leeward Islands)
98 : Gabon
99 : Oman (Masirah Island)
100 : Saudi Arabia
101 : United Arab Emirates
102 : Trinidad & Tobago
103 : Antigua, Barbados, Barbuda, Cuba, Caicos Islands, Dominican Republic, Grand Cayman, Jamaica, Turks Islands
104 : Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua
105 : Canada
106 : CONUS
107 : CONUS (East of Mississippi River) including Louisiana, Missouri, Minnesota
108 : CONUS (West of Mississippi River)

109 : Alaska
110 : Bahamas (Except San Salvador Island)
111 : Bahamas (San Salvador Island)
112 : Canada (Alberta, British, Columbia)
113 : Canada (Manitoba, Ontario)
114 : Canada
     (New Brunswick, Newfoundland, Nova Scotia, Quebec)
115 : Canada (Northwest Territories, Saskatchewan)
116 : Canada (Yukon)
117 : Canal Zone
118 : Cuba
119 : Greenland (Hayes Peninsula)
120 : Mexico
121 : Alaska, Canada, CONUS
122 : Central America, Mexico
123 : Azores (Corvo & Flores Islands)
124 : Egypt
125 : Hawaii, Kauai, Maui, Oahu
126 : Hawaii
127 : Kauai
128 : Maui
129 : Oahu
130 : Oman
131 : England, Isle of Man, Scotland, Shetland Islands,
     Wales
132 : England
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

165 : Brazil
166 : Chile
167 : Colombia
168 : Ecuador
169 : Ecuador (Baltra, Galapagos)
170 : Guyana
171 : Paraguay
172 : Peru
173 : Trinidad & Tobago
174 : Venezuela
175 : Singapore
176 : Madagascar
177 : Brunei, East Malaysia (Sabah, Sarawak)
178 : Tokyo–MEAN FOR Japan, Korea, Okinawa
179 : Tokyo–Japan
180 : Tokyo–Korea
181 : Tokyo–Okinawa
182 : Tristan da Cunha
183 : Viti Levu Island
184 : Marshall Islands
185 : Wake Atoll
186 : WGS 1972–Global Definition
187 : Yacare–Uruguay
188 : Zanderij–Suriname

**Count on us!**

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