NAVIGATION SOUNDER

ES-633

OPERATION MANUAL

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NOTES TO USERS

Thank you very much for purchasing the ES-633.

Before operating this unit, please read this manual thoroughly and understand the operation enoughly to prevent any trouble and injury in advance.

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INTRODUCTION

NOTATION

The following notations are used in this manual. Before using this unit, make sure to understand the meaning of the followings.

- **DANGER**: indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

- **WARNINGS**: indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

- **CAUTIONS**: indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

- **NOTICE**: indicates the contents for the user's reference.

NOTES FOR THE OPERATION MANUAL

- Keep this operation manual in a place where it is easy to take. When you give this unit, ES-633, to someone else, make sure to give this manual, too.

- The safety for the using way which is not mentioned in this manual is not guaranteed.

- The contents in this manual are subject to change without notice or obligation.
HOW TO TURN ON THE POWER

To turn on the power, press the ON key.

To turn off the power, keep pressing the OFF key until the unit’s operation stops.

It is impossible to turn the power off by only pressing the OFF key.

KEY OPERATION EXPLANATION

For key operating procedure, refer to "OPERATION PROCEDURE". The followings show how to explain the "OPERATION PROCEDURE".

- One short beep sounds when the correct operation is achieved.
  Three short beeps sound when the wrong operation is achieved.

- While displaying the menu mode, pressing the NAV key returns the display to the previous one.

Press this key once.

Shows the applicable display when a key is pressed.

SHOWS

Shows the function name selected.

Setting

Use these keys to set the setting.

Use keys to shift the yellow indicator to the desired function.

Shows the applicable display when a key is pressed.

Shows the function name selected.

ENTER NUMERAL

exhibits the key operation.

Shows the applicable display when a key is pressed.

How to set is explained below.

MODE

Press this key to complete the setting and return to the previous display.
PRECAUTIONS

PLOTTER DATA

⚠️ DANGER ⚠️ Plotter data, ie coastlines and lighthouse positions, should not be relied on totally for navigation. For safe navigation please use marine charts as issued by the authorities.

INSTALLATION POSITION

⚠️ WARNINGS ⚠️ Do not use in the place there is flammable gas. It could cause fire.

⚠️ CAUTIONS ⚠️ Bad environment may cause fire, get hurt and cause electric shock.
This equipment should be installed in a place away from the followings.
- High temperatures. Eg direct sunlight.
- Moisture. Eg rain, sea spray or heavy condensation.
- Heavy vibration.

POWER SUPPLY

⚠️ WARNINGS ⚠️ The power requirement of this unit is DC10.5V ~30V. Please use correct voltage, otherwise, it could cause fire/electric shock.

⚠️ CAUTIONS ⚠️ Make sure to turn off the power by the power "ON/OFF" key on the control panel. Turning on/off the power by the switch on the switchboard may cause a serious problem or wrong operation.

When starting the engine, make sure the power of this unit is turned off.
INSTALLATION

⚠️ Warnings ⚠️

Do not install in a slant/unstable place.
Make sure to fix this unit and the GPS antenna.
Do not use the unit while tentatively installed.

For wiring, pay attention to the followings. Wrong wiring could cause fire/get hurt.
- Do not to disturb steering and walking.
- Do not touch the revolving thing.
- Do not bend, twist and stretch by force.
- Do not put heavy thing on cable.

⚠️ Cautions ⚠️

When taking out/putting in cable, make sure to turn the power off and hold the plug. Otherwise, cable may be damaged and fire and electric shock may cause.

HANDLING

⚠️ Cautions ⚠️

Do not control this unit while steering.
It may cause wrecks.

Never open the main unit case.
There is a high voltage component inside, and it will result in death or serious injury.
For inspection/adjustment/parts installation/repairment, please ask to your dealer.

When installing the transducer through an opening in the hull bottom, pay attention to intensity and waterproofing.

⚠️ Warnings ⚠️

Please use correct fuse.
If not, it could result in serious trouble or fire.

Please use the specified power supply cable.
If not, it could result in fire.
## COMPOSITION

<table>
<thead>
<tr>
<th>CODE</th>
<th>MAIN UNIT</th>
<th>PIPE</th>
<th>MOUNT BRACE</th>
<th>HOOD</th>
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<tbody>
<tr>
<td>ITEM</td>
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<td><strong>EX130</strong></td>
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<table>
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<th><strong>EX120</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
<td>FUSE</td>
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<td>PARTS#</td>
<td>—</td>
</tr>
<tr>
<td>QTY</td>
<td>3</td>
</tr>
</tbody>
</table>

**NOTE**, the code number is shown on the packaging. However, ** indicates the lot management number.
MAIN UNIT MOUNTING

After fixing the mounting brace in place with the tapping screws, fix the knob bolts and the rubber plates. And, after inserting the main unit from front, fasten the knob bolts.

**WARNINGS**

- Do not install in a slant/unstable place. And, make sure to fix this unit. Using under the tentative installation could result in injury.
- When suspending from the ceiling, make sure that the main unit should not fall to the gland. Never to install in a place where there are some possibilities to hit your head. It could result in injury.

The mount brace of the main unit revolves 40° from side to side. The adjustment is available in 4 steps (every 10°). After fixing the mount brace, adjust it at your convenient degree.
CAUTIONS

This equipment should be installed in a place away from the following.

- Equipment which transmits or is effected by magnetic field.
- High temperatures. Eg direct sunlight.
- Moisture. Eg rain, sea spray or heavy condensation.
- Heavy vibration.

DIMENSIONS

[Diagram showing dimensions and weight]

WEIGHT: 2.5kg (MOUNT BRACE IS INCLUDED.)
GPS ANTENNA MOUNTING

Take care to install the antenna in an area free from obstacles and avoid the following:

① Radar beam (vertical beam width is 30 ~ 40 degrees)
   If the antenna is installed in the path of a radar beam the internal GPS receiver may be destroyed.

② 1 meter or more away from wireless antennas: See below.

③ At least 3 meters away from a DF loop antenna: See below.

④ Away from obstacles that will block satellite signals

⚠️ DANGER ⚠️

Pay attention to the GPS antenna installation/maintenance.
And, make sure to fix the GPS antenna.

1. MOUNTING POSITION
2. ANTENNA MOUNTING

After plugging the cable into the antenna socket, connect the cable to the antenna by tightening the lock ring clockwise.

To ensure the cable does not vibrate, use vinyl tape to bind it to the mast.

To mount the antenna on or beside the bridge, optional adjustable GPS antenna brace (OP-111) is useful.

⚠️ CAUTIONS

- After connecting the antenna cable, wind adhesive tape around the plug, then wrap with vinyl tape to ensure waterproofing.
1. INSTALLATION PRECAUTIONS

As the transducer serves the same function for an echo sounder as an antenna does for a radio, it needs to be installed with great care for optimum performance of the equipment. Please install the transducer with great care for the following conditions.

1. BUBBLE INTERFERENCE

The transducer transmits a sound wave and receives an echo. When bubbles pass over the transducer face they reflect the sound wave and appear as echoes on the screen. The more bubbles the less sensitivity.

Install the transducer as follows:
1. where bubbles will not pass over the transducer face.
2. where there is no protrusion in the way of the transducer beam.

2. NOISE

To avoid noise interference, install the transducer and its cables as far away from the engine and propeller as possible. And, pay attention that the transducer cables should not be run parallel to other cables.

3. SHOCK

If the transducer is subjected to excessive shock, performance may be effected. Where possible avoid subjecting the transducer to shock.

4. INSTALLATION DEPTH

Be sure to install the transducer in such a position that the transducer is immersed in water as deep as possible and that the transducer face is parallel to the water surface.

5. PAINT AND DIRT

To avoid reduction in the equipments performance be sure to keep the transducer face free from paint and dirt.
2. THROUGH HULL INSTALLATION

This is the way to install the transducer through a hole in the hull bottom. The installation way differs depending on the vessel’s type, wooden, FRP, steel etc.

- Please install the transducer in accordance with the following conditions.
  1. To be installed 1/3 to 1/2 of the length of the vessel back from the bow, and 30cm away from the keel.
  2. To be protruded between 20cm and 30cm from the hull bottom.
  3. Use the levelling block (fairing block) so that the transducer may be installed vertically and the sound beam will not tilt off.

- Through hull installation can also be applied inside the fish tank or a partitioned space as the picture left.

The further the transducer protrudes from the hull bottom the more stable the performance that will result. However, in the case of a high speed boat, the transducer should protrude as little as possible to reduce drag and excessive force.

⚠️ CAUTIONS

- Thorough consideration and attention should be given before making a hole in the hull bottom.
- When the transducer is installed to protrude from the hull bottom, arrange a transducer housing with FRP etc. to protect the transducer.
3. HULL–SIDE INSTALLATION

This is the way to install the transducer with a pipe to the port or starboard of the hull. This way is suitable comparatively for the small vessel.

- Please install in accordance with the following conditions.
  1. Transducer should be installed 1/4 to 1/2 of the length of the vessel back from the bow.
  2. Transducer should be protruded between 1m and 1.5m from the draft.
  3. Install the pipe in order to make the transducer face parallel to the sea surface. The pipe should be tightly installed so that the pipe does not vibrate while the vessel is running.
  4. Pass the thin and strong rope to the portion, where the transducer and the pipe are jointed, and stretch it toward the bow and the stern.

- It is possible to install the pipe double as the picture left.

The pipe can be easily mounted (or dismounted) to the hull side with the metal fitting or sucking disk, and, this method allows stable performance avoiding bubbles to the transducer. However, as the pipe is an obstacle during ship's navigation and fishing operation, it can be dismounted from the hull side when the sounder is not in use.

⚠️ CAUTIONS

When the transducer face rises toward the stern, it tends to catch the noise from the screw and to occur bubbles.
4. TRANSON INSTALLATION

This is the way to install the transducer at the stern.

Fit the transducer to the metal fitting and fix it with the screws so that the transducer face is in alignment with the hull bottom.

Install the transducer face horizontally.

Cover the screw with sealant.

Use the metal fitting bolt to adjust the transducer face to be in alignment with the hull bottom.

To avoid occurrence of bubbles, fill the space between hull bottom and transducer with silicone type glue and make it flat.

5. HOUSING BOX INSTALLATION

This is the way to install the transducer in the bottom board using a optional in-hull kit.

Fix the housing box on the bottom board and pour in ample water or castor oil so as the transducer face is not left exposed.

This method can easily be done without professional skills nor damaging the hull body.

For further details, refer to optional in-hull kit manual.
6. INSTALLATION TO THE BOTTOM BOARD

This is the way to install the transducer directly to the bottom board.
Grind the place where the transducer is installed, to remove oil.
Fix the transducer face directly to the bottom board with glue.
Stick carefully so as not to remain bubbles between the transducer face and the bottom board.

ENSURE NO BUBBLES ARE LEFT BETWEEN HULL & TRANSDUCER FACE.

7. INSIDE TANK INSTALLATION

This is the way to install the transducer using a fish tank.
Before fixing the transducer inside the tank, fill the tank with water and find out the best recording position by holding the transducer by hand.

WARNING

The above installation methods 5, 6 and 7 are applicable to FRP(single ply) or aluminum hull boats only.
Install the transducer where the FRP thickness is below 10mm. and avoid the keel and ballast fin vicinity.
The sound waves are transmitted through the hull board, the sensitivity will be inferior to those external installation methods. and also the thicker the hull board the less the sensitivity.
**TERMINALS FOR CONNECTING OPTIONAL EQUIPMENT**

8P TERMINAL

- No.1: GND
- No.2: SPEED INPUT
- No.3: 5V OUTPUT
- No.4: W. TEMP. INPUT
- No.5: NC
- No.6: NC
- No.7: NMEA OUTPUT +
- No.8: NMEA OUTPUT -

7P TERMINAL

- No.1: RTCM INPUT +
- No.2: RTCM INPUT -
- No.3: NC
- No.4: NMEA INPUT +
- No.5: NMEA INPUT -
- No.6: NC
- No.7: NC

---

**GPS SIGNAL INPUT**

- FUSE 3A
  - Please use correct one.

---

**POWER SUPPLY INPUT**

- No.1: BLACK
- No.2: RED

---

**GPS ANTENNA (GP-3A)**

**TRANSUDER (3P)**

- No.1: WHITE
- No.2: SHIELD
- No.3: BLACK

---

**NOTICE**

1. RTCM means the Differential GPS.
2. Do not connect anything to the NC pins.

---

**WARNINGS**

- The power requirement of this unit is DC10.5V～30V.
  - Please use correct voltage. Otherwise, it could cause fire/electric shock.
- Please use the specified power supply cable.
  - If not, it could result in fire.
- When taking out/putting in cable, make sure to turn the power off and hold the plug. Otherwise, cable may be damaged and fire and electric shock may cause.
- When wiring, do not disturb steering and walking. Do not bend, twist and stretch by force. And, do not put a heavy thing on cable. Wrong wiring could result in fire and injury.
7 PIN TERMINAL FOR OPTIONAL EQUIPMENT
To connect GPS antenna (GP-3A)

8 PIN TERMINAL FOR OPTIONAL EQUIPMENT
PG 17

3 PIN TRANSUDER TERMINAL

EARTH TERMINAL
To connect the power source: 10.5 ~ 30V
When changing the fuse please use the correct one. PG 17

2 PIN POWER SUPPLY TERMINAL
CONTROL PANEL KEYS

PLOTTER MENU KEY: PG 38
To display the menu for Plotter functions.

SHIFT KEYS: PG 27
To shift the display/cursor up/down/left/right (four kinds).

CLEAR KEY: PG 96/100/104/105
To erase Wake/Marks.

NAVIGATION KEY: PG 55/115
To display course/route.

MARK KEY: PG 98/103/110
To enter Mark and Waypoint Mark.

FUNCTION KEY: PG 99
To display color/shape in reverse order.
To cancel the course up function.

ECHO SOUNDER MENU KEY: PG 82
To display the menu for Echo sounder.

GAIN CONTROL DIAL: PG 142
To control the level of gain.

POWER SUPPLY KEY: PG 4
To turn the power supply on/off.

MODE KEY: PG 25/131
To change the modes. Plotter, Navigation, Sounder, Plotter/Sounder.

CURSOR KEY: PG 28
To display/not to display the cursor.

ZOOM UP/DOWN KEYS: PG 26
To enlarge/reduce the display.

WAKE KEY: PG 49/95
To change wake color.

SHAPE KEY: PG 98
To change mark shape.

COLOR KEY: PG 98
To change mark color.

PHASED RANGE KEYS: PG 135
To change the phased range (upper range limit)

RANGE KEYS: PG 135
To change the basic range.

BRIGHTNESS CONTROL KNOB: PG 142
Turning the knob clockwise increases the brightness.

⚠️ CAUTIONS ⚠️

To turn the power supply off, be sure to use the "ON/OFF" keys on the main unit's control panel. Turning the power supply off by the key on the switchboard may cause trouble.
MODE EXAMPLE

PLOTTER MODE

From own ship to cursor crossing:
DISTANCE 8.86 NM
BEARING 111.5° T
TIME 01H32 M

①: Own ship on display. OWN SHIP’S LAT/LON or COURSE
←: Own ship is off display in this direction.

NOTE 1) The display marked * indicates when the external sounder or optional equipment is connected.

NOTE 2) The above display is shown when "FULL" is specified for "DISPLAY INFO. (Display Information)".

☆ Danger

Plotter data, i.e. coastlines and lighthouse positions, should not be relied on totally for navigation. For safe navigation, please use marine charts as issued by the authorities.
OWN SHIP: Shown as a white circle (●). Positional data (Lat/Lon) is displayed in the lower left of the screen. A short line projecting from the own ship position is the direction of travel. Three kinds of this line can be selected. The mark flashes at intervals of one second under normal conditions. However, if signals from the receiver should become irregular it will flash at quarter second intervals and the the color will change from white to green.

WAKE: The Wake is shown as a line on the screen (as indicated in previous page). However, some wake lines are shown as a zigzag depending on the plot interval setting. The Wake can be shown on the display in any one of seven colors, or erased completely.

GRID (LATITUDE/LONGITUDE LINES): The spacing of latitude/longitude lines depends on the scale of the display. Latitude and longitude lines are displayed in any one of seven colors, or erased completely.

CURSORS: Cross cursor, which can be selected in one of two sizes, and Ring Cursor are displayed in order. When cursor is displayed it's positional data are displayed in the screens upper left, and the distance, the bearing and the time from own ship's position to cursor crossing are displayed in the screens lower left.

COAST LINES: The coast lines you specified are memorized in the main unit. Will be indicated in any one of seven colors, or will also be erased from the display. The display which the land in filled color will also be available.

DEPTH LINES: 100m, 200m and 500m depth lines are shown on the screen. Will be displayed in any one of seven colors, or will be erased from the display.

MARKS: Can be used to memorize fishing reef and net positions. Eight kinds of Mark (□ • ◇ • △ • × • + • ■ • ← • →), any one of seven colors and up to 10,000 points are displayed. The mark color/mark shape, which are selected, and the quantity of mark remaining are displayed in the screens upper.

MARK REMAINING: Shows the quantity of available Mark.
CHART MARK: Available in one of seven colors. 10,000 points are used to draw chart lines freely on the screen. The current chart mark color is indicated in the screen's upper.

WAYPOINT MARK: Uses the same shapes as the Marks, however, can be displayed with some comments, and can be edited in the Waypoint List display. Can be used to mark ports, net positions etc. The distance and bearing and time from own ship position to a waypoint are displayed. Eight kinds of Mark(□・◇・△・×・+・□・●・++) , any one of seven colors and up to 10,000 points are displayed. The waypoint may be used in setting routes and setting Alarm.

MARK SHAPE/COLOR: Shows the mark shape/color when Mark→Chart Mark→Waypoint Mark are entered.

WAKE COLOR: Shows the wake color.

CURRENT TIME: Local time according to GPS data is displayed. (User setting) This time can be adjusted under "TIME DIFF(Time Difference)." for "CORRECTION" display. PG 61.

WATER TEMPERATURE: Display the water temperature only when the optional water temperature sensor is connected.

ALARM: "AL" indicates when the alarm function is set.

DISPLAY BEARING: Shows the bearing on display with this mark.

⚠️ DANGER ⚠️

Plotter data, ie coast lines and lighthouse positions, should not be relied on totally for navigation. For safe navigation please use marine charts as issued by the authorities.
NOTE: The water temperature and the water temperature graph are displayed when the optional water temperature sensor (OP-41) is connected.

© ECHO SOUNDER MODE EXPLANATION

TIME MARKER: 30 second elapsed time mark.
SURFACE LINE: Indicates the position of the transducer face.
DEPTH SCALE: For measuring the depth of the echo.
EXPANSION SCALE: For measuring the expansion range.
EXPANSION RANGE LINE: Indicates the depth from which the range is expanded under expansion mode.
DEPTH: Indicates the water depth.
WATER TEMPERATURE: Indicates when the optional water temperature sensor (OP-41) is connected.
WATER TEMPERATURE GRAPH: Indicates the water temperature with a line.
WATER TEMPERATURE SCALE: For measuring the water temperature that the water temperature graph shows.
COLOR SCALE: Indicates the level of an echoes strength.
PLOTTER/ECHO SOUNDER MODE

The Plotter mode is displayed in the left side of the screen and the Echo Sounder mode is displayed in the right side.

- To enlarge/reduce the width of the Echo Sounder mode, press the following keys within 5 seconds after pressing the [FUNC] key.

The Echo Sounder display can be enlarged up to 3/4 area of the display.

- : enlarges the Sounder area.
  - : reduces the Sounder area.

The method of operation is the same for the Plotter and Sounder modes.

NAVIGATION MODE

<table>
<thead>
<tr>
<th>NAVIGATION MODE</th>
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<tbody>
<tr>
<td>LAT.</td>
<td>34°34.880′N</td>
</tr>
<tr>
<td>LONG.</td>
<td>137°02.620′E</td>
</tr>
<tr>
<td>SPEED</td>
<td>13.2 KT</td>
</tr>
<tr>
<td>COURSE</td>
<td>76°T→</td>
</tr>
<tr>
<td>DEPTH</td>
<td>28.4 MT</td>
</tr>
<tr>
<td>TEMP.</td>
<td>18.5°C*</td>
</tr>
</tbody>
</table>

The own ship’s latitude/longitude, ship speed, course, depth, water temperature are displayed in large characters. PG 131.

NOTE) The water temperature is displayed when the optional water temperature sensor (OP-41) is connected.
**BASIC OPERATION**

**MODE SELECTION**

This unit includes Plotter and Echo Sounder functions.

The display mode may be selected in the following manner.

Pressing the **MODE** key changes the mode from "PLOTTER MODE → NAVIGATION MODE → ECHO SOUNDER MODE → PLOTTER/ECHO SOUNDER MODE".

For Plotter/Echo Sounder mode, the width of the Sounder display may be adjusted by pressing the **←** or **→** key within 5 seconds after pressing the **FUNC** key.

To widen the area of the Sounder mode, press the **←** key.

To shorten the area of the Sounder mode, press the **→** key.
SETTING OWN SHIP POSITION

When the unit is first switched on it will display Own Ship's position at 00°00'.000'N, 00°00'.000'E.

- When the unit first receives own ship's, normal Lat/Lon data, the display numerals will change to show it's correct Lat/Lon, and it's position will be shifted to the center of display.

- When normal signal receives, the own ship's mark will be displayed in white (●), when the irregular signal receives, it will be displayed in green.

ZOOM UP • DOWN

To enlarge/reduce the picture use the following keys:

- When cursor is not displayed, the display will be enlarged centering around the own ship's position.

- When cursor is displayed, the display will be enlarged centering around the cursor crossing.

- The scale varies with latitude, and the center width of the display is displayed in miles (NM). A scale rate for display size may be selected as an alternative.

- To continuously enlarge/reduce the picture, press the required key continuously.

KEY --- To Zoom up/Enlarge the picture.

KEY --- To Zoom down/Reduce the picture.
SHIFTING DISPLAY

To shift the display up/down/left/right, use the keys.

If cursor is on the display, press key to clear it.

- A single press of keys shifts the display one eights (1/8) to the direction of the arrow of the key.
- Continuous pressing of keys shift the display continuously.

To shift the display diagonally, press the two keys which bracket the diagonal of movement desired. See example below.

Shifts display to upper right.

Shifts display to lower right.

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CURSOR USE

Each press of the key changes the cursor display as follows.

- When cursor is on the display pressing the keys shifts it.
  
  keys shifts the cursor up and down.
  keys shifts the cursor left and right.

- Pressing a key/keys continuously will cause the cursor to shift continuously. When the cursor reaches the edge of the display, the display shifts automatically.

When the Cross Cursor is displayed, the cursor crossing's Lat/Lon is indicated in the upper left, and the distance, bearing and the time from own ship's position to the cursor crossing are indicated in the lower left.

To enlarge the ring of Ring Cursor, use key. To reduce it, use key.

The cursor crossing's Lat/Lon is indicated in the upper left. The radius of ring, and the bearing and the time from own ship to cursor crossing are displayed in the screen's lower.
AUTOMATIC SHIFTING

When the own ship position reaches the edge of the display the display will automatically shift to show the own ship position in the center of the screen.

However, the display will not shift automatically if the cursor are on the display or if own ship is out of the display because of the operation of "shifting display".

CENTERING OWN SHIP

Ensure the cursor is cleared from the display by pressing + key.

Press either one of [ ] keys.

The display will shift to show the own ship position in the center of the screen.

CENTERING CURSOR CROSSING

Ensure the cursor is on the display by pressing + key.

Shift the cursor crossing to the desired point.

Press either one of [ ] keys.

The specified point will be shifted to the center of the screen.
Chapter 2

USER SETTING

This chapter provides you the explanation for the user setting.

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FACTORY SETTING ........................................................... 32
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USER SETTING ................................................................. 36
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WHEN FIRST STARTING UP THE UNIT

When the equipment is connected to the standard GPS sensor (GP-3), it is only necessary to turn the power supply on by pressing the ON key. However, for operation of the unit at optimum performance we recommend pre-setting of all functions listed.

To assist your setting, refer to "FACTORY SETTING" in the following page.
USER SETTING

FACTORY SETTING

This equipment is shipped from the factory with the functions under the settings listed below.
Before using the equipment please change the functions to the desired settings.

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>FACTORY SETTING</th>
<th>SETTING MENU</th>
</tr>
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<td>INTERNAL • EXTERNAL&lt;br&gt;0183N • 0183P • CIF&lt;br&gt;NAVIGATOR • SENSOR&lt;br&gt;LAT/LON • LORAN C</td>
<td>&quot;5 NAVIGATOR&quot;&lt;br&gt;PG 39&lt;br&gt;[NAV]+△5</td>
</tr>
<tr>
<td>SERIAL OUTPUT</td>
<td>16000#1 • 8000#2 • 4000#4 • 2000#8&lt;br&gt;1/1 • 1/2 • 1/4 • 1/8&lt;br&gt;1/1 • 1/2 • 1/4 • 1/8</td>
<td>&quot;WAKE ALLOT&quot;&lt;br&gt;PG 44&lt;br&gt;[NAV]+△6+△2</td>
</tr>
<tr>
<td>SPEED INPUT</td>
<td>WAYPOINT 3000&lt;br&gt;MARK 3000&lt;br&gt;CHART 1000</td>
<td>&quot;MARK ALLOT&quot;&lt;br&gt;PG 47&lt;br&gt;[NAV]+△6+[COL]+61</td>
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<tr>
<td>POSITION DISPLAY FORM</td>
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<td>&quot;8 WAKE MEMORY&quot;&lt;br&gt;PG 48&lt;br&gt;[NAV]+COL8</td>
</tr>
<tr>
<td>PAGE DIVISION</td>
<td>BLUERED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF&lt;br&gt;BLUE • ON • OFF&lt;br&gt;RED • ON • OFF&lt;br&gt;MAGENTA • ON • OFF&lt;br&gt;GREEN • ON • OFF&lt;br&gt;CYAN • ON • OFF&lt;br&gt;YELLOW • ON • OFF&lt;br&gt;WHITE • ON • OFF&lt;br&gt;BLUE • 0.0 • 0.5 • 10.0&lt;br&gt;RED • 0.5 • 10.0 • 15.0&lt;br&gt;MAGENTA • 10.0 • 15.0 • 20.0&lt;br&gt;GREEN • 15.0 • 20.0 • 25.0&lt;br&gt;CYAN • 20.0 • 25.0 • 30.0&lt;br&gt;YELLOW • 25.0 • 30.0 • 35.0&lt;br&gt;WHITE • 30.0 • 35.0 • 100.0&lt;br&gt;BLUE • 1000 • 0.0 • 0.0&lt;br&gt;RED • 0.0 • 0.0 • 0.0&lt;br&gt;MAGENTA • 0.0 • 0.0 • 0.0&lt;br&gt;GREEN • 0.0 • 0.0 • 0.0&lt;br&gt;CYAN • 0.0 • 0.0 • 0.0&lt;br&gt;YELLOW • 0.0 • 0.0 • 0.0&lt;br&gt;WHITE • 0.0 • 0.0 • 0.0</td>
<td>&quot;8 WAKE MEMORY&quot;&lt;br&gt;PG 48&lt;br&gt;[NAV]+COL8</td>
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<td>Factory Setting</td>
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<td>Navigation</td>
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<td>&quot;NAVIGATION&quot;</td>
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<tr>
<td>Time Display</td>
<td>TIME REQUIRED • ARRIVAL TIME • FIXED • RENEWAL • OFF</td>
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<td>Cursor Size</td>
<td>SMALL • LARGE</td>
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<td>Course Vector</td>
<td>SHORT • LONG • SHIP SPEED</td>
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<tr>
<td>Display Information</td>
<td>FULL • LIMITED</td>
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<tr>
<td>Time Difference</td>
<td>+00:00 • NOTHING(0.000' N 0.000'E) • NOTHING(0.000' N 0.000'E) • 0 • 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 00-00-00</td>
<td>&quot;CORRECTION&quot;</td>
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<td></td>
<td>PG 60</td>
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<td>Chart Shift</td>
<td></td>
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<tr>
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</tr>
<tr>
<td>Datum</td>
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<td>Smoothing</td>
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</tr>
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<td>OFF • AUTO • MANUAL</td>
<td>&quot;UNIT-KEY&quot;</td>
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<td>Distance Unit</td>
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<tr>
<td>Key Setting</td>
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<tr>
<td>Grid Color</td>
<td>BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF • PUT • NOT PUT</td>
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<td>Forshore</td>
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<tr>
<td>Depth Line</td>
<td>10 • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF • PUT • NOT PUT</td>
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<tr>
<td></td>
<td>20 • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF</td>
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<tr>
<td></td>
<td>50 • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF</td>
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<td></td>
<td>100 • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF</td>
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<td></td>
<td>200 • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF</td>
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<tr>
<td></td>
<td>500 • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF</td>
<td></td>
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<tr>
<td></td>
<td>1000 • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2000 • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF</td>
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<td>WRECK • BLUE • RED • MAGENTA • GREEN • CYAN • YELLOW • WHITE • OFF</td>
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</tr>
<tr>
<td>Place Name</td>
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<tr>
<td>Display Bearing</td>
<td>EAST • SOUTH • WEST • NORTH • WAYPOINT • COURSE</td>
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<td></td>
<td>WIDTH • SCALE</td>
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<td>FACTORY SETTING</td>
<td>SETTING MENU</td>
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<td>----------------------------------</td>
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<tr>
<td>MARK DISPLAY</td>
<td>□ - ON - OFF BLUE - • - •</td>
<td>&quot;3 WAYPOINT • MARK DISPLAY&quot; PG 102</td>
</tr>
<tr>
<td></td>
<td>◇ - ON - OFF RED - • - •</td>
<td>NAV + 3</td>
</tr>
<tr>
<td></td>
<td>+ - ON - OFF MAGENTA - • - •</td>
<td></td>
</tr>
<tr>
<td></td>
<td>× - ON - OFF GREEN - • - •</td>
<td></td>
</tr>
<tr>
<td></td>
<td>△ - ON - OFF CYAN - • - •</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● - ON - OFF YELLOW - • - •</td>
<td></td>
</tr>
<tr>
<td></td>
<td>← - ON - OFF WHITE - • - •</td>
<td></td>
</tr>
<tr>
<td></td>
<td>↔ - ON - OFF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WPT NO. - ON - OFF</td>
<td></td>
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<tr>
<td>ALARM</td>
<td>ARRIVAL - ON - OFF 0.00NM</td>
<td>&quot;4 ALARM&quot; PG 119/137</td>
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<td></td>
<td>ANCHOR WATCH - ON - OFF 0.00NM</td>
<td>NAV + 4</td>
</tr>
<tr>
<td></td>
<td>TRACK ERROR - ON - OFF 0.00NM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BORDER - ON - OFF 0.00NM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHALLOW - ON - OFF 0000MT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DEEP - ON - OFF 0000MT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>THRESHOLD LEVEL - ON - OFF 1·2·3·4·5·6·7</td>
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</tr>
<tr>
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<td>TX OUTPUT - OFF</td>
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<td>PICTURE FEED</td>
<td>OFF - AUTO RANGE - AUTO SHIFT</td>
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<td>THRESHOLD</td>
<td>OFF - ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OFF - 1·2·5·10·20·50·100</td>
<td></td>
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<tr>
<td></td>
<td>• 250 MT. • FT. BR.</td>
<td></td>
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<tr>
<td></td>
<td>OFF - 5·10·20·50·100·250</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 500·1000 FT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/1·1/2·1/4·1/8·STOP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7COL●6COL●5COL●4COL●3COL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OFF - LOW - MID - HIGH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OFF - LOW - MIDI - MID2 - HIGH</td>
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<td>DEPTH UNIT</td>
<td>MT - PT - BR - FM</td>
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<td>SPLIT IMAGE</td>
<td>HORIZONTAL - VERTICAL</td>
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<td>OFF - LOW - MID - HIGH</td>
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<td>TEMPERATURE GRAPH</td>
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<td>COLOR SELECT</td>
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<td>REDUCED DISPLAY</td>
<td>CONTROL PANEL</td>
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<tr>
<td>MARK SHAPE</td>
<td>□ - ◇ - + - × - △ - ◆ - ● - ↔</td>
<td></td>
</tr>
<tr>
<td>MARK COLOR</td>
<td>BLUE - RED - MAGENTA - GREEN</td>
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</tr>
<tr>
<td></td>
<td>CYAN - YELLOW - WHITE - OFF</td>
<td></td>
</tr>
<tr>
<td>WAKE COLOR</td>
<td>BLUE - RED - MAGENTA - GREEN</td>
<td></td>
</tr>
<tr>
<td>RANGE</td>
<td>CYAN - YELLOW - WHITE - OFF</td>
<td></td>
</tr>
<tr>
<td>PHASED RANGE</td>
<td>0 - 5(MT. BR, FM) OR 0 - 15(FT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
RETURN TO FACTORY SETTING

1. TO "KEEP" THE DATA ENTERED

Ensure the power supply switch is turned off. Then while pressing the key press the key. Keep pressing them until the beep stops (about 1 sec.).

This operation will return the functions to factory setting as outlined in the previous page, however, entered data such as marks, wake, routes etc will remain.

2. TO "CLEAR" ALL THE DATA ENTERED

Ensure the power supply switch is turned off. Then while pressing the key and the key together, press the key. Keep pressing them until the beep stops (about 1 sec.).

This operation will return the functions to factory setting as outlined in the previous page, and all the entered data such as marks, wake, routes etc will be initialized and cleared.

⚠️ CAUTIONS

- No.2 operation will clear the data permanently.
- If the keys are released before the beep stops, the return to factory setting function may not operate.
USER SETTING

For maximum efficiency and convenient operation by the user, functions may be set by the user and memorized under User Setting.

This function is particularly useful when erroneous data is entered and the keyboard becomes inoperable as all functions may be quickly returned to the User Setting.

Please remember to set all functions under User Setting when first operating the unit.

1. MEMORIZE USER SETTING

After setting each function to the desired setting, turn the power supply off by pressing the OFF key.

And, while pressing the ON key, press the OFF key.

Keep pressing the ON key until the beep stops.

All function settings will be memorized under user setting.

2. RETURN TO USER SETTING

Make sure the power supply is turned off.

While pressing the ON key, press the ON key.

Keep pressing the ON key until the beep stops.

All functions will return to user setting.

3. REVISE USER SETTING

To revise user setting first return to factory setting using the return to factory setting as outlined on the previous page. Reset the functions as desired and memorize using the memorize user setting procedure outlined above.
PLOTTER FUNCTION SETTING

This chapter provides you the explanation for setting each Plotter function.
For making good use of this model, please set each function before using.
MENU DISPLAY

Pressing NAV key will display the main menu shown below. Function setting/selecting/entering displays may be selected from this menu.

- Use the numeral keys (MENU1~MENU9) to display the desired function's display.

SET DISPLAY NUMBER

<p>| | |</p>
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<th></th>
<th></th>
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</table>

SELECT THE NUMBER.

* For more detailed explanation, refer to the above mentioned pages.
NAVIGATOR MENU

To set the functions which are related to Navigator.

1. NAVIGATOR SELECT ———— To select the navigation source.
2. SERIAL OUTPUT ———— To select the output format.
3. SPEED INPUT ———— To select the speed input from either Speed sensor or Navigator.
4. POSITION DISPLAY FORM ———— To select the type of own ship's positional data which is displayed on the screen's lower.

NAVIGATOR SELECT

To select the navigation source from either internal or external navigator.

- To use the internal GPS navigator(GP-3) select "INTERNAL", to use the external navigator select "EXTERNAL".

OPERATION PROCEDURE

![Diagram showing navigation selection process]

Operation procedure:

1. NAV MENU
2. 5 NAVIGATOR
3. SPECIFY
4. NAV. SELECT
5. MODE

Shift the yellow indicator to the line 1st.

5 NAVIGATOR

NAV. SELECT  INTERNAL

Each press of  or  key changes the setting, "INTERNAL  EXTERNAL."

INTERNAL: INTERNAL GPS NAVIGATOR
EXTERNAL: EXTERNAL NAVIGATION RECEIVER
SERIAL OUTPUT

To select the output format for the 8 pin optional equipment terminal in the rear panel.

OPERATION PROCEDURE

1. NAV MENU
2. 5 N AVIGATOR
3. 5 NAVIGATOR
4. SERIAL OUTPUT
5. MODE

Shift the yellow indicator to the line 2nd.

5 NAVIGATOR

NAV. SELECT
SERIAL OUTPUT 0183N
SPEED INPUT
POS. DSP. FORM

Each press of or key changes the setting. "0183N - 0183P - CIF".

0183N: DBT, HTW, GGA, GLL, VTG, APA, XTE, BOD are output by dividing into three blocks.
1. DBT, HTW
2. GGA, GLL, VTG
3. APA, XTE, BOD
Output period: approximately 5 seconds.

0183P: GGA, GLL, VTG, APB, BOD, ZDA, BWC, GSS are output by dividing into three blocks.
1. GGA, GLL, VTG
2. APB, BOD, ZDA
3. BWC, GSS
Output period: approximately 5 seconds.

CIF(PURUNO CIF): No.11(Date, Time), No.24(Lat, Lon), No.41(Ship speed, Bearing) are output.
Output period: approximately 5 sec.
SPEED INPUT

To select the ship's speed input from either Speed sensor or Navigator.

OPERATION PROCEDURE

NAV MENU \[ \rightarrow \]

5 NAVIGATOR \[ \rightarrow \]

SPECIFY \[ \rightarrow \]

SHIFT \[ \rightarrow \]

SELECT \[ \rightarrow \]

SPEED INPUT \[ \rightarrow \]

MODE

Shift the yellow indicator to the line 3rd.

5 NAVIGATOR

NAV. SELECT
SERIAL OUTPUT
SPEED INPUT
POS. DSP. FORM

Each press of \[ \] or \[ \] key changes the setting, "NAVIGATOR - SENSOR - ".

NAVIGATOR: To show the ship speed using the signal from the external navigator.
SENSOR: To show the ship speed using the signal from Speed sensor.

NOTICE

This setting is not needed when the speed sensor is not used.
POSITION DISPLAY FORM

To specify the positional data to be displayed in either Lat/Lon or Loran C Time Difference data.

To specify Chain or Slave when the data from Loran C is displayed.

LAT/LON: To display the Lat/Lon data.
(EX) 34°42.972' 187°01.655'

LORAN C: To display the Loran C Time Difference data.
(EX) S1 18705.6 S2 34251.2

1. DISPLAY IN LAT/LON DATA

To display the own ship's positional data in Lat/Lon in the screen's lower left.

OPERATION PROCEDURE

NAV MENU → 5 NAVIGATOR → 5 NAVIGATOR

SPECIFY

△ 5

POS. DSP. FORM → MODE

SELECT "LAT/LON".

Shift the yellow indicator to the line 4th.

Each press of or key changes the setting. "LAT/LON - LORAN C."

To shift the yellow indicator, use or key.
2. DISPLAY IN LORAN C TIME DIFFERENCE DATA

To display the own ship's positional data in Loran C Time Difference data in the screen's lower left.

**OPERATION PROCEDURE**

- NAV MENU
- 1 2 3
- 4
- 5 NAVIGATOR
- SELECT SPECIFY
- 5
- POS. DSP. FORM
- SELECT "LORAN C"
- SHIFT
- CHAIN
- SELECT
- SLAVE 1
- SELECT
- SLAVE 2
- SELECT
- MODE

**5 NAVIGATOR**

NAV. SELECT
SERIAL OUTPUT
SPEED INPUT
POS. DSP. FORM LORAN C
CHAIN 9970
SLAVE 1 1
SLAVE 2 3

Each press of ➕ or ➖ key changes the setting, "LAT/LON - LORAN C."

To shift the yellow indicator, use ➕ or ➖ key.

**NOTICE**

This setting is not needed when Loran C Time Difference data is not used.
**ALLOT SETTING**

To set "WAKE ALLOT" and "MARK ALLOT" before using the Plotter function.

⚠️ **CAUTIONS**

Changing the setting for "WAKE ALLOT" or "MARK ALLOT" erases the data memorized (Wake data and Waypoint/Mark/Chart which were entered by the user.).

**WAKE ALLOT MENU**

Once the available set points have been used each new point memorized will mean the automatic erasure of the oldest point. Up to 16,000 points can be memorized in this unit.

1. PAGE DIVISION ............. To divide the wake points.
2. DISPLAY/MEMORY PAGE --- To select the page the wake is displayed/memorized.

**OPERATION PROCEDURE**

```
NAV MENU → [ ] → 6 DATA STORAGE SPECIFY
            △ 6

2 WAKE ALLOT A WAKE ALLOT Setting MODE
SPECIFY ▼ 2
```

**WAKE ALLOT**

- PAGE DIVISION 4000x4
- DISPLAY PAGE 1/4
- MEMORY PAGE 1/4

Use keys to select the setting.

Use ▲▼ keys to shift the yellow indicator.

* For more detailed explanation, refer to the following pages. The operation procedure starts from the above mentioned point "A".
1. PAGE DIVISION

Up to 16,000 wake points can be memorized in this unit. This function is for dividing these points into the pages (can be chosen from 1, 2, 4 and 8 pages).

**OPERATION PROCEDURE**

1. Press the "WAKE ALLOT" button and select the number of wake points you wish to divide.
2. Press the "PAGE DIVISION" button to set the page division.
3. Use the "SHIFT" button to shift the yellow indicator to the line list.

**WAKE ALLOT**

**PAGE DIVISION** 4000×4

- Each press of the "" or "" key changes the setting "16000×1 - 8000×2 - 4000×4 - 2000×8"

- **16000×1**: Wake points are not divided. --------- 1 page
- **8000×2**: Wake points are divided into two. ------- 2 pages
- **4000×4**: Wake points are divided into four. ------ 4 pages
- **2000×8**: Wake points are divided into eight. ---- 8 pages

When the display page and the memory page is set on the same page, once the available points have been used each new point memorized will mean the automatic erasure of the oldest point.

It is possible to use different pages for memory and display. This means it is possible not to erase the wake data desired by setting it on the display page. (Refer to next page for details.)

In this case, the wake will be displayed on the display, however, it will not be displayed by shifting the display because it is not memorized on that page.

**CAUTIONS**

Changing the setting for "PAGE DIVISION" erases the wake data memorized. If the memorized data is needed, make sure to preserve it before changing.
2. DISPLAY PAGE/MEMORY PAGE

To set the display page and the memory page for wake.

**OPERATION PROCEDURE**

A

RAW

MENU

△△△

2

WAKE ALLOT

Display page

MEMORY PAGE

Mode

Shift the yellow indicator to the line 2nd (3rd).

**WAKE ALLOT**

- **DISPLAY PAGE** 1/4
- **MEMORY PAGE** 1/4

When "4000*4" is selected for "PAGE DIVISION"
Each press of key changes the setting "1/4 - 2/4 - 3/4 - 4/4 - ".

<table>
<thead>
<tr>
<th>DISPLAY PAGE</th>
<th>MEMORY PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>Page 1 will be displayed. The wake data will be memorized in Page 1.</td>
</tr>
<tr>
<td>2/4</td>
<td>Page 2 will be displayed. The wake data will be memorized in Page 2.</td>
</tr>
<tr>
<td>3/4</td>
<td>Page 3 will be displayed. The wake data will be memorized in Page 3.</td>
</tr>
<tr>
<td>4/4</td>
<td>Page 4 will be displayed. The wake data will be memorized in Page 4.</td>
</tr>
</tbody>
</table>

The settings displayed for "DISPLAY PAGE" and for "MEMORY PAGE" differs depending on the setting for "PAGE DIVISION" on the previous page.
When "16000*1" is selected, the display page and the memory page should be the same.

- 16000*1 is selected: 1/1 is displayed.
- 8000*2 is selected: 1/2 and 2/2 are displayed.
- 4000*4 is selected: 1/4, 2/4, 3/4 and 4/4 are displayed.
- 2000*8 is selected: 1/8, 2/8, 3/8, 4/8, 5/8, 6/8, 7/8 and 8/8 are displayed.

*When the same display and memorize pages are selected*

**DISPLAY PAGE** 1/4

**MEMORIZE PAGE** 1/4

- The wake will be memorized on the page it is displayed on. Each page has 4000 points of memory once these have been used every new point memorized will mean the erasure of the oldest point.

*When different display/memorize pages are selected*

**DISPLAY PAGE** 1/4

**MEMORIZE PAGE** 3/4

The wake will be memorized on one page and displayed on another.
MARK ALLOT MENU

There are three kinds of marks (Waypoint mark/Mark/Chart mark), a total 10,000 points, available.

⚠️ CAUTIONS

Changing the setting for "MARK ALLOT" erases all the mark data memorized. If the memorized data is needed, make sure to preserve it before changing.

FACTORY SETTING

Waypoint mark: 3000 points
Mark : 3000 points
Chart mark : 1000 points

Waypoint mark's allotting is prior to mark's, and mark's allotting is prior to chart mark's.
A total 10,000 points is available with this unit. However, please keep in mind a waypoint mark needs two points. In other words, if 3000 points are allotted for waypoint mark, a total 6,000 points are spent.

OPERATION PROCEDURE

NAV MENU → 1 MARK ALLOT → MARK ALLOT SPECIFY → MARK ALLOT SETTING → MODE

MARK ALLOT

WAYPOINT 3000
MARK 3000
CHART 1000

Each press of 🔛 or 🔜 key changes the setting per 250 points.
Each press of 🔛 or 🔜 key changes the setting per 500 points.

Use 🔙 keys to shift the yellow indicator. However, it is not shifted to "CHART".

HOW TO SELECT

① Select the Waypoint mark points, and the available Mark/Chart mark points will be displayed.
② Select the Mark points, and the available Chart mark points will be re-displayed.
**WAKE MEMORY**

The ship's wake is received from the navigator in a series of points. These points are displayed as a line according to the set wake memory interval and set wake color.

**WAKE MEMORY MENU**

To set the settings related to Wake.
1. **WAKE MEMORY**  
   To select the wake data memory On/Off.
2. **WAKE COLOR**  
   To select the wake color setting method.
3. **DEVOID NAV DSP/MEM**  
   To display/memorize or not display/not memorize wake when error data is received.
4. **MEMORY INTERVAL**  
   To set the Memory interval for Wake.

**OPERATION PROCEDURE**

```
NAV MENU → 3 9 → 8 WAKE MEMORY → A 8 WAKE MEMORY
```

- **Setting**
- **SHIFT SELECT**
- **MODE**

**8 WAKE MEMORY**

- **WAKE MEMORY**
- **WAKE COLOR**
- **DEVOID NAV DSP**
- **DEVOID NAV MEM**
- **MEMORY INTERVAL**
- **MEMORIZED POINT**
- **TIME REMAINING**

Use the yellow indicator keys to select the setting.

- **NUMBER OF POINTS**
- **TIME REMAINING**

For more detailed explanation, refer to the following pages.

The operation procedure starts from the above mentioned point "A".
1. WAKE MEMORY

To select the wake data memory On/Off.

**OPERATION PROCEDURE**

![Diagram showing the operation procedure]

Each press of the key changes the setting, "blue - red - magenta - green - cyan - yellow - white - OFF - ".

- **BLUE**
- **RED**
- **MAAGENTA**
- **GREEN**
- **CYAN**
- **YELLOW**
- **WHITE**
- **OFF**

Will be displayed with the color selected from these. (will be indicated in upper.)

**WAKE COLOR**

Shows the color specified above.

**WAKE KEY**

Doing the following key operation provides the same effect as the one available from the setting method for the "8 WAKE MEMORY".

- Each press of the key changes the wake color. "blue - red - magenta - green - cyan - yellow - white - OFF - ".
- Each press of the key within 5 seconds after pressing the key changes the wake data memory On/Off.
2. WAKE COLOR

To select the wake color setting method. There are three kinds of methods as follows. The wake color can be changed automatically according to water temperature or depth.

① WAKE COLOR SET BY "COLOR"

To display/memorize the wake with the color selected. And, to select its display On or Off.

Each press of or key changes the setting. "COLOR - TEMP. - DEPTH - ".

After selecting "COLOR", press or key to go into the following menu. "COLOR".

Each press of or key changes the setting. "ON - OFF - ".

ON: displays the wake with this color.
OFF: not display the wake with this color.
WAKE COLOR SET BY "WATER TEMPERATURE"

The wake color will change when the water temperature reaches the set limit.

**OPERATION PROCEDURE**

A

8 WAKE MEMORY

TEMP. (°C)

WAKE COLOR

- Each press of ▲ or ▼ key changes the setting. "COLOR - TEMP. - DEPTH - ".
- After selecting "TEMP.", press ◄ or ► key to go into the following menu. "TEM(°C)".

<table>
<thead>
<tr>
<th>TEM(°C)</th>
<th>(EXAMPLE) FACTORY SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>■(blue) 00.0 - 05.0</td>
<td>0°C ~ 5°C : BLUE WAKE</td>
</tr>
<tr>
<td>■(red) 05.0 - 10.0</td>
<td>5°C ~ 10°C : RED WAKE</td>
</tr>
<tr>
<td>■(magenta) 10.0 - 15.0</td>
<td>10°C ~ 15°C : MAGENTA WAKE</td>
</tr>
<tr>
<td>■(green) 15.0 - 20.0</td>
<td>15°C ~ 20°C : GREEN WAKE</td>
</tr>
<tr>
<td>■(cyan) 20.0 - 25.0</td>
<td>20°C ~ 25°C : CYAN WAKE</td>
</tr>
<tr>
<td>■(yellow) 25.0 - 30.0</td>
<td>25°C ~ 30°C : YELLOW WAKE</td>
</tr>
<tr>
<td>■(white) 30.0 - 35.0</td>
<td>30°C ~ 35°C : WHITE WAKE</td>
</tr>
</tbody>
</table>

WAKE COLOR

Use ▲▼◄► keys to shift the yellow indicator.

Use ◄↑▼ keys to enter the temperature data.

**NOTICE**

Available when the optional water temperature sensor (OP-41) is connected.
The wake color will change when the water depth reaches the set limit.

**OPERATION PROCEDURE**

1. NAV ➔ COL ➔ 8 WAKE MEMORY ➔ SHIFT ➔ WAKE COLOR

2. Specify "DEPTH" ➔ "DEPTH (MT)" ➔ SHIFT ENTER DEPTH RANGE ➔ MODE

**8 WAKE MEMORY**

Each press of or key changes the setting. "COLOR - TEMP. - DEPTH - ".

After selecting "TEMP.", press or key to go into the following menu, "DEP (MT)".

**DEP (MT)**

<table>
<thead>
<tr>
<th></th>
<th>0000 - 0010</th>
<th>0010 - 0020</th>
<th>0020 - 0030</th>
<th>0030 - 0040</th>
<th>0040 - 0050</th>
<th>0050 - 0060</th>
<th>0060 - 0070</th>
</tr>
</thead>
<tbody>
<tr>
<td>(blue)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(red)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(magenta)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(green)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(cyan)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(yellow)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(white)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EXAMPLE FACTORY SETTING**

- 0m ~ 10m: BLUE WAKE
- 10m ~ 20m: RED WAKE
- 20m ~ 30m: MAGENTA WAKE
- 30m ~ 40m: GREEN WAKE
- 40m ~ 50m: CYAN WAKE
- 50m ~ 60m: YELLOW WAKE
- 60m ~ 70m: WHITE WAKE

**WAKE COLOR**

Use keys to shift the yellow indicator.

Use keys to enter the depth data.
3. DEVOID NAVIGATION DISPLAY/MEMORY

© To display/memorize or not display/not memorize wake when error data is received from the GPS receiver/external navigator.

**OPERATION PROCEDURE**

A\(\) NAV MENU \(\rightarrow\) NAV R\(\) WAKE MEMORY \(\rightarrow\) NAV DEVOID DSP \(\rightarrow\) NAV DEVOID NAV MEM \(\rightarrow\) MODE

- **NAV R WAKE MEMORY**
  - Shift the yellow indicator to the line 3rd (4th).

8 WAKE MEMORY

- **DEVOID NAV DSP**
  - ON
- **DEVOID NAV MEM**
  - OFF

Each press of ★ or ★★ key changes the setting, "ON - OFF - ".

**DEVOID NAVIGATION DISPLAY**

- **ON** : Displays the wake even when the error data is received.
- **OFF** : Not display the wake when the error data is received.

**DEVOID NAVIGATION MEMORY**

- **ON** : Memorizes the wake even when the error data is received.
- **OFF** : Not memorize the wake when the error data is received.

**NOTICE**

Own ship mark flashes at intervals of one second under normal conditions.

However, if signals from the receiver should become irregular it will flash at quarter second intervals and the color will change from white to green.

The white mark flashes under normal conditions.
4. MEMORY INTERVAL

To set the Memory interval for Wake.

**OPERATION PROCEDURE**

A [NAV MENU] → WAKE MEMORY → MEMORY INTERVAL → MODE

**8 WAKE MEMORY**
- **MEMORY INTERVAL**: 00'05"
- **MEMORIZED POINT**: 237
- **TIME REMAINING**: 513NM

Shift the yellow indicator to the line 5th.

Each press of ▼ or ▲ key changes the setting. "00'05" - 0.01NM - ".

Use keys to enter the memory interval (time or distance).

NUMBER OF POINTS BEING MEMORIZED
TIME REMAINING STILL AVAILABLE AT PRESENT MEMORY INTERVAL. (Not available when the memory interval is set with the distance.)

00'05": Memorizes the wake at the specified time interval.
Available from 5 seconds to 60 minutes.

0.01NM: Memorizes the wake at the specified distance interval.
Available from 0.01 to 9.99NM.

**NOTICE**

If the set memory interval is long the wake will be displayed more unevenly but time of wake display will be longer.
If the memory interval is short the wake will be displayed more evenly however the time of wake display will be shorter because the wake is limited to up to 16,000 points (when one page is selected.)

<table>
<thead>
<tr>
<th>MEMORY INTERVAL</th>
<th>1 PAGE</th>
<th>2 PAGES</th>
<th>3 PAGES</th>
<th>4 PAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 sec.</td>
<td>16,000 points</td>
<td>8,000 x 2</td>
<td>4,000 x 4</td>
<td>2,000 x 8</td>
</tr>
<tr>
<td>30 sec.</td>
<td>22hrs. 13mins.</td>
<td>11hrs. 6 mins.</td>
<td>5hrs. 33mins.</td>
<td>2hrs. 46mins.</td>
</tr>
<tr>
<td>1 min.</td>
<td>5days 13hrs.</td>
<td>2days 18hrs.</td>
<td>1day 9hrs.</td>
<td>1day 9hrs.</td>
</tr>
<tr>
<td>10 min.</td>
<td>11days 2hrs.</td>
<td>5days 13hrs.</td>
<td>27days 18hrs.</td>
<td>13days 21hrs.</td>
</tr>
<tr>
<td>30 min.</td>
<td>333days 8hrs.</td>
<td>166days 16hrs.</td>
<td>83days 8hrs.</td>
<td>41days 16hrs.</td>
</tr>
</tbody>
</table>
NAVIGATION KEY

To set the settings related to Navigation.

1. NAVIGATION .......................... To display the course.
2. TIME DISPLAY ......................... To select the display way of the time from own ship position to cursor crossing or waypoint.
3. LINE DISPLAY .......................... To specify the course line display On/Off.
4. CURSOR SIZE .......................... To select the cursor size.
5. COURSE VECTOR ....................... To select the displaying way of the course vector.
6. DISPLAY INFORMATION ............... To select the data to be displayed.

OPERATION PROCEDURE

NAVIGATION

Use keys to select the setting.

NAVIGATION OFF
TIME DISPLAY TIME REQUIRED
LINE DISPLAY FIXED
CURSOR SIZE SMALL
COURSE VECTOR SHORT
DISPLAY INFO. FULL

Use keys to shift the yellow indicator.

* For more detailed explanation, refer to the following pages.
NAVIGATION

The course from own ship position to a specified waypoint or the cursor crossing will be displayed in a dotted purple line. The distance, bearing and time to this point will also be displayed in the lower left of the screen.

It is possible to erase the dotted course line but still have the information displayed.

For more details, refer to PG 115.

TIME DISPLAY

To select the display way of the time from own ship position to cursor crossing or waypoint.

OPERATION PROCEDURE

NAVIGATION → TIME DISPLAY → MODE

Shift the yellow indicator to the line 2nd.

Each press of or key changes the setting, "TIME REQUIRED - ARRIVAL TIME - ".

TIME REQUIRED: displays the time to the specified point.
EX. 01H32M : 1 hour and 32 minutes

ARRIVAL TIME: displays the arrival time at the specified point.
EX. 11:15
LINE DISPLAY

To specify the course line (a dotted purple line) display On or Off. PG 115.

OPERATION PROCEDURE

NAVIGATION
LINE DISPLAY
MODE

Shift the yellow indicator to the line 3rd.

NAVIGATION

LINE DISPLAY
FIXED

Each press of  or  key changes the setting, "FIXED - RENEWAL - OFF - ".

FIXED : displays the line.
RENEWAL : displays the line. When the own ship shifts, the line also shifts.
OFF : not display the line, however, displays the data.

DATA

-12 LINE

The line will not be shifted even when the own ship is shifted.

The line will be shifted when the own ship is shifted.

The line will not be displayed however, the data will be displayed.
CURSOR SIZE

To select the cursor size (large・small).

OPERATION PROCEDURE

NAVIGATION -> CURSOR SIZE -> MODE

Shift the yellow indicator to the line 4th.

NAVIGATION
CURSOR SIZE SMALL

Each press of \(\□\) or \(\◆\) key changes the setting, "SMALL - LARGE - ".

LARGE: displays the cursor on the full screen.
SMALL: displays the cursor in "|" shape.

COURSE VECTOR

To select the displaying way of the course vector.

OPERATION PROCEDURE

NAVIGATION -> COURSE VECTOR -> MODE

Shift the yellow indicator to the line 5th.

NAVIGATION
COURSE VECTOR SHORT

Each press of \(\□\) or \(\◆\) key changes the setting, "SHORT - LONG - SHIP SPEED - ".

SHORT: displays the short route vector.
LONG: displays the route vector on the full screen.
SHIP SPEED: varies the route vector depending on the ship speed.
DISPLAY INFORMATION

◎ To select the data to be displayed.

**OPERATION PROCEDURE**

NAVIGATION ➔ DISPLAY INFO. ➔ MODE

Shift the yellow indicator to the line 6th.

**NAVIGATION**

DISPLAY INFO.  FULL

Each press of or  key changes the setting. "FULL - LIMITED - ".

FULL : displays the distance, bearing and the time from own ship position to the specified point, and displays the specified point's positional data in addition.

LIMITED : displays the distance, bearing and the time from own ship position to the specified point.

**FULL**

**LIMITED**

No display

LAT/LON OF THE POSITION SPECIFIED

DISTANCE/BEARING/TIME FROM OWN SHIP POSITION TO THE SPECIFIED POSITION
CORRECTION MENU

To correct the following settings.

1. TIME DIFFERENCE: To correct the time displayed in the screen.
2. SHIP SHIFT: To correct the own ship position.
3. CHART SHIFT: To correct the chart position.
4. POSITION SHIFT (CORRECT): To correct the positional data.
5. DATUM: To correct (set) to the most suitable surveying system.
6. SMOOTHING: To correct the errors in the navigational data of the wake, the own ship position, the ship speed and the course, by averaging them.
7. MAGNET CORRECT: To correct (select) the way of course.

OPERATION PROCEDURE

NAV MENU → A → 9 SPECIAL FUNCTION → 9 SPECIAL FUNCTION

3 CORRECTION → CORRECTION → Correction setting → MODE

SELECT ↘ 3

SHIFT : SET

(to enter numerals)

(to select)

(For Own ship/Chart shift)

CORRECTION

TIME DIFF. +00:00
SHIP SHIFT 0.000' N 0.000' E
CHART SHIFT 0.000' N 0.000' E
POSITION SHIFT 0.000' N 0.000' E
DATUM 2 TOKYO
SMOOTHING 00 - 00 - 00
MAGNET CORRECT OFF

Use keys to enter the numeral/to select the setting.

Use keys to shift the yellow indicator.

* For more detailed explanation, refer to the following pages.
The operation procedure starts from the above mentioned point "A".
TIME DIFFERENCE

To correct the time displayed in the upper right of the screen to your local time. Enter the time difference between your local time and the standard time as follows.

**OPERATION PROCEDURE**

1. **CORRECTION**
   - TIME DIFF. +09:00
   - Each press of or key changes the setting. 

2. **SHIFT**
   - Set the yellow indicator to the time 1st.

3. **TIME DIFF.**

4. **MODE**

   Use or key to shift the yellow indicator, and keys to enter the time difference.

SHIP SHIFT/ CHART SHIFT

To correct Own Ship or Chart(Coast line) position.

**SHIP SHIFT**

When the Own Ship position is incorrect.
Display the Cursor Lines on the screen and move the Cursor Crossing to the correct Own Ship position.
Do the SHIP SHIFT operation to shift the own ship position and the own ship positional data will be corrected. (The data before operating will not be corrected.)
CHART SHIFT

When the Chart(Coast Line) position is incorrect.
Display the Cursor Lines on the screen and move the Cursor Crossing to the correct Own Ship position.
Do the CHART SHIFT operation to shift the chart.
The own ship positional data is as same as the data before operation.

OPERATION PROCEDURE

Press this key and shift the cursor crossing to the actual own ship's position on the display.
(Zoom the display up for accuracy.)

Press key to display the shift data, and the own ship position/chart will be shifted.
To cancel this operation, press key.

NOTICE

To reset SHIP SHIFT/CHART SHIFT first press key to cancel the shift operation and set again.
SHIP SHIFT/CHART SHIFT should not only be done when the GPS receiver is in a normal, stable condition.

CORRECTION

SHIP SHIFT 0.000' N 0.000' E
CHART SHIFT 0.000' N 0.000' E
POSITION SHIFT (CORRECT)

To correct the positional data of this unit and to display the same data of the external navigation when each data is different.
Only the own ship positional data on the lower left of the screen will be corrected by this operation.

OPERATION PROCEDURE

When "LAT/LON" is selected for "POS. DSP. FORM (position display form)" (PG42)

Use ← or → key to shift the yellow indicator and use keys to enter the data to be corrected.
To cancel, press CLR key.

When "LORAN C" is selected for "POS. DSP. FORM (position display form)" (PG43)

Use ← or → key to shift the yellow indicator and use keys to enter the data to be corrected.
To cancel, press CLR key.
To select the most suitable surveying (Lat/Lon) system from the following:

0: OFF
1: WGS-72 (LORANC•NNSS)
2: TOKYO
3: NORTH AMERICA
4: ALASKA/CANADA
5: EUROPE
6: AUSTRALIA
7: SOUTH ASIA
8: SOUTH AMERICA

2: TOKYO is as the same datum as that on the display.

**OPERATION PROCEDURE**

A

MENU 0 3

CORRECTION

SHIFT

DATUM

SELECT

MOD

CORRECTION

DATUM

2 TOKYO

Each press of ▲ or ▼ key changes the setting. "0 - 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - ".

Or use 0 3 1 8 keys for direct setting.

**NOTICE**

This function will operate only when this unit is operated by internal GPS.
SMOOTHING

Errors in the navigational data will cause errors in own ship position and wake display.
- By averaging (smoothing) wake, own ship position, speed and course, these errors may be reduced.
- Smoothing may be set from 0 (no smoothing) ~ 9 (the highest level of smoothing)
- First set to 0 and increase the level gradually in relation to the errors.

OPERATION PROCEDURE

A
NAV MENU 9 ▼ 3
CORRECTION
SHIFT
""""""
Shift the yellow indicator to the line 6th.
SHIFT ENTER NUMERALS
""""""
""""""
0

SMOOTHING RATE FOR WAKE/OWN SHIP POSITION
SMOOTHING RATE FOR SHIP SPEED
SMOOTHING RATE FOR COURSE

CORRECTION
SMOOTHING QU - UU - UU

Use ▼ 1 ~ 9 keys to enter the smoothing rate (0 ~ 99).

Use ◄ or ► key to shift the yellow indicator.

NOTICE

When this unit is operated by the external navigation use the smoothing function of the external navigation.
To correct (select) the display way of course.

**OPERATION PROCEDURE**

A  
RAV  MENU  9  ◀  S

**CORRECTION**

MAGNET CORRECT  OFF

Each press of or key changes the setting. "OFF - AUTO - MANUAL".

- **OFF**: displays the true direction. ("T" will be displayed in the lower right.)
- **AUTO**: displays the magnet direction automatically corrected. ("W" will be displayed in the lower right.)
- **MANUAL**: displays the magnet direction manually corrected.

To enter the correct rate, press key and use the keys or keys.

"T(OFF)" or "W(AUTO)"
UNIT • KEY MENU

① To set the unit for each setting.

① TEMPERATURE UNIT  ① TEMPERATURE DISPLAY
   To select the temperature unit when the temperature is displayed.
   To select the temperature display ON/OFF.
② SPEED UNIT
   To select the speed unit when the ship speed is displayed.
③ DISTANCE UNIT
   To select the distance unit when the distance is displayed.
④ KEY SETTING
   To select the kind of mark which is displayed when key is pressed.

OPERATION PROCEDURE

NAV MENU  →  ⑤  →  ⑩ SPECIAL FUNCTION  →  ⑩ SPECIAL FUNCTION

UNIT • KEY  →  UNIT • KEY
   Select  →  Setting  →  MODE

UNIT • KEY

TEMP. UNIT  °C
TEMP. DISPLAY OFF
SPEED UNIT  KT
DISTANCE UNIT  KM
KEY SETTING  WAYPOINT

Use  keys to select the setting.

Use  keys to shift the yellow indicator.

* For more detailed explanation, refer to the following pages.
The operation procedure starts from the above mentioned point "A".
TEMPERATURE UNIT/TEMPERATURE DISPLAY

To select the temperature unit to be displayed in the screen's upper right and to select the temperature unit display ON/OFF.

OPERATION PROCEDURE

A ➔ UNIT-KEY ➔ SHIFT ➔ TEMP. UNIT ➔ TEMP. DISPLAY ➔ SELECT ➔ MODE

Shift the yellow indicator to the line 1st (2nd).

UNIT-KEY

TEMP. UNIT  °C
TEMP. DISPLAY OFF

Each press of ☑️ or ☐️ key changes the setting. "°C - °F - ".

Each press of ☑️ or ☐️ key changes the setting. "ON - OFF - ".

ON: Displays the water temperature.
OFF: No display.

NOTICE

The optional Temperature Sensor OP-41 must be connected to the rear panel for temperature display. PG 17.
SPEED UNIT

To select the speed unit to be displayed, screens lower right.

OPERATION PROCEDURE

UNIT-KEY    SPEED UNIT

Shift the yellow indicator to the line 3rd.

Each press of or key changes the setting, "KT - KM/H - ".

KT: Knots
KM/H: Kilometer(s) per hour

DISTANCE UNIT

To select the distance unit to be displayed, screens upper left.

OPERATION PROCEDURE

UNIT-KEY    DISTANCE

Shift the yellow indicator to the line 4th.

Each press of or key changes the setting, "NM - KM - ".

NM: Nautical mile. (1NM=1.8Km)
KM: Kilometer(s)
KEY SETTING

To select the kind of mark which is displayed when ◯ key is pressed.

**OPERATION PROCEDURE**

![Diagram showing the operation procedure]

- **UNIT-KEY**
- **KEY SETTING**
- **WAYPOINT**
- **MODE**

Shift the yellow indicator to the line 5th.

Each press of ◆ or ◆ key changes the setting, "WAYPOINT - MARK - ".

WAYPOINT: Waypoint mark will be displayed when ◯ key is pressed.
MARK: Mark will be displayed when ◯ key is pressed.

**HOW TO USE**

By pressing ◯ key within 5 seconds after pressing FUNC key will display the other mark which is not selected for the above "KEY SETTING".
When "WAYPOINT" is selected for "KEY SETTING", Mark will be displayed.
When "MARK" is selected, Waypoint will be displayed.
"7 PLOTTER SETTING" menu is for setting the following functions.

1. GRID COLOR  To select the color of the grid to be displayed, or to select the grid display Off.
2. LAND COLOR  To select the color of the land to be displayed, or to select the land display Off.
3. FORSHORE  To select the color of the forshore to be displayed, or to select the forshore display Off.
4. DEPTH LINE  To select the color of the depth line to be displayed, or to select the depth line display Off.
5. OTHER INFORMATION  To select the color of the wreck/fishing reef to be displayed, or to select the wreck/fishing reef display Off.
6. LIGHTHOUSE  To select the lighthouse display On (in blinking) or Off.
7. PLACE NAME  To select the place name display On or Off.
8. DISPLAY BEARING  To change the display bearing.
9. SCALE DISPLAY  To select the scale display type.

**OPERATION PROCEDURE**

1. NAV MENU
2. PLOTTER SETTING
3. SELECT
4. 7 PLOTTER SETTING
5. Setting
6. MODE

**7 PLOTTER SETTING**

GRID COLOR  PUT
LAND COLOR  PUT
FORSHORE  ID
DEPTH LINE  WRECK
OTHER INFO.  BLINK
LIGHTHOUSE  ON
PLACE NAME  NORTH
DSP. BEARING  WIDTH
SCALE DISPLAY

Use keys to select the setting.
Use keys to shift the yellow indicator.

* For more detailed explanation, refer to the following pages.
The operation procedure starts from the above mentioned point "A".
GRID COLOR

To select the color of the grid (latitude/longitude lines) to be displayed, or to select the grid display "OFF".

OPERATION PROCEDURE

A
NAV MENU 7 ➔ 7 PLOTTER SETTING ➔ SHIFT ➔ GRID COLOR ➔ SELECT ➔ MODE

Shift the yellow indicator to the line 1st.

7 PLOTTER SETTING
GRID COLOR  ■ (blue)

Each press of  ◄ or  ► key changes the setting, ■ (blue) - ■ (red) - ■ (magenta) - ■ (green) - ■ (cyan) - ■ (yellow) - ■ (white) - □ (No grid display) -  " , and it will be displayed with the color selected.

NOTICE

The color explanation besides ■ is not actually displayed on the menu.
LAND COLOR

To select the color of the land to be displayed, or to select the land (chart) display "OFF".
To select either the land to be displayed in filled color or the map to be displayed using coast lines (without color).

OPERATION PROCEDURE

A ➔ 7 ➔ 7 PLOTTER SETTING ➔ SHIFT ➔ LAND COLOR ➔ SELECT ➔ SELECT ➔ MODE

Shift the yellow indicator to the line 2nd.
(Color select) (Function select)

7 PLOTTER SETTING

LAND COLOR ➔ PUT

Each press of ✅ or ✖️ key changes the setting. "PUT - NOT PUT - ".

PUT : displays the land in filled color.

NOT PUT : displays the land using coast lines (chart).

Each press of ◀️ or ▶️ key changes the setting. " ➔ (blue) - ➔ (red) - ➔ (magenta) - ➔ (green) - ➔ (cyan) - ➔ (yellow) - ➔ (white) - ➔ (No land display) - " , and it will be displayed with color selected.

Changes this color.

PUT

Land is displayed with color.

NOT PUT

Land is displayed with chart lines.
TO SELECT THE COLOR OF THE FORSHORE TO BE DISPLAYED, OR TO SELECT THE FORSHORE DISPLAY "OFF".

To select either the forshore to be displayed in filled color or to be displayed using a line (without color).

**OPERATION PROCEDURE**

A

[Image: Diagram showing the operation procedure]

**7 PLOTTER SETTING**

FORSHORE

**PUT**

Each press of [ ] or [ ] key changes the setting. "■ (blue) - ■ (red) - ■ (magenta) - ■ (green) - ■ (cyan) - ■ (yellow) - ■ (white) - □ (No forshore display) - ". And it will be displayed with the color selected.

Each press of [ ] or [ ] key changes the setting. "PUT - NOT PUT - ".

PUT: displays the forshore in filled color.

NOT PUT: displays the forshore using a line.

**CAUTIONS**

Forshore data is optional.
DEPTH LINE

To select the color of the depth line to be displayed, or to select the depth line display "OFF".
This function is available when the depth line data is included in this unit.

OPERATION PROCEDURE

A

[NAV MENU] 7

[SHIFT]

7 PLOTTER SETTING

DEPTH LINE

[SELECT]

SHIFT the yellow indicator to the line 4th.

(Color select) (Function select)

Each press of [ ] or [ ] key changes the setting, "10 - 20 - 50 - 100 - 200 - 500 - 1000 - 2000 - ".

Each press of [ ← ] or [ → ] key changes the setting. ■(blue) - ■(red) - ■(magenta) - ■(green) - ■(cyan) - ■(yellow) - ■(white) - ■ (No depth line display) - ".

On the above menu, select the depth line to be displayed using [ ] or [ ] key first, and select its color using [ ← ] or [ → ] key.
The color can be differed depending on the depth line.
When the depth line is not displayed, select "■".

CAUTIONS

The 100/200/500m depth line data are available as standard however, the others are optional.
OTHER INFORMATION

To select the color of the wreck/fishing reef to be displayed, or to select the wreck/fishing reef "OFF". This function is available when the wreck/fishing reef data are included in this unit.

OPERATION PROCEDURE

A ➔ 7 PLOTTER SETTING ➔ OTHER INFO ➔ MODE

Shift the yellow indicator to the line 5th.

(Color select) (Function select)

7 PLOTTER SETTING

OTHER INFO. ➔ WRECK

Each press of ▼ or ▲ key changes the setting, "WRECK - FISH REEF - ".

Each press of ◀ or ▶ key changes the setting, "■ (blue) - ■ (red) - ■ (magenta) - ■ (green) - ■ (cyan) - ■ (yellow) - ■ (white) - □ (No wreck/fishing reef display) - ", and they will be displayed with the color selected.

On the above menu, select the wreck/fishing reef to be displayed using ▼ or ▲ key first, and select it's color using ◀ or ▶ key.

When the wreck/fishing reef is not displayed, select "□".

NOTICE

The wreck/fishing reef data is optional.
To select the lighthouse display On, On (in blinking) or Off.
This function is available when the lighthouse data are included in this unit.

**OPERATION PROCEDURE**

A

[Diagram: Menu → 7 Plotter Setting → Shift → Lighthouse → Select → Mode]

Shift the yellow indicator to the line 6th.

---

**7 PLOTTER SETTING**

**Lighthouse**

**BLINK**

Each press of or key changes the setting, "ON - BLINK - OFF - ".

- **ON**: displays the lighthouse.
- **BLINK**: displays the lighthouse in blinking.
- **OFF**: not display the lighthouse.

---

**NOTICE**

The lighthouse will automatically disappear from the screen when the screen width becomes more than 40NM.
PLACE NAME

To select the place name (port/island/peninsular etc.) display On or Off.

OPERATION PROCEDURE

A ➔ 7 (PILOT SETTING) ➔ SHIFT ➔ PLACE NAME ➔ SELECT ➔ MODE

Shift the yellow indicator to the line 7th.

7 PLOTTER SETTING

PLACE NAME: ON

Each press of or key changes the setting, "ON - OFF - ".
ON : displays the place name.
OFF : not display the place name.

NOTICE

The place name will be displayed only when the screen width is less than about 8NW even though "ON" is selected.
DISPLAY BEARING

To change the display bearing. The chart revolves in sectors of 90° (4 settings).

**OPERATION PROCEDURE**

A [NAV MENU] 7 [7 PLOTTER SETTING] [SHIFT] [DSP. BEARING] [SELECT] [MODE]

Shift the yellow indicator to the line 8th.

**7 PLOTTER SETTING**

**DSP. BEARING NORTH**

Each press of [ ] or [ ] key changes the setting, "NORTH – WEST – SOUTH – EAST – WAYPOINT – COURSE – “.

**NORTH**
The chart is displayed with the compass point selected toward the top of the screen.

**WEST**
The chart is displayed setting the bearing, from Own Ship to the waypoint, toward the top of the screen.

**SOUTH**
The chart is displayed setting Own Ship's course toward the top of the screen.

**EAST**

**WAYPOINT**
Chart revolves to set the waypoint direction toward the top of the screen. See PG.116.

**COURSE**

**BOW DIRECTION**
Chart revolves to set the bow direction toward the top of the screen.
To select the scale display in the upper left corner as being Scale (the scale of reduction of the displayed chart) or Width (the width of the center of the displayed chart in nautical miles.)

Operation Procedure:

A ➔ 7 PLOTTER SETTING ➔ SHIFT ➔ SCALE DISPLAY ➔ SELECT ➔ MODE

Shift the yellow indicator to the line 9th.

7 PLOTTER SETTING

SCALE DISPLAY ➔ WIDTH

Each press of [ ] or [ ] key changes the setting, "WIDTH - SCALE - ".

WIDTH : displays the width of the center of the displayed chart in nautical miles (NM).

SCALE : displays the scale of reduction of the displayed chart.
Chapter 4

ECHO SOUNDER FUNCTION SETTING

This chapter provides you the explanation for setting each Echo Sounder function.

For making good use of this model, please set each function before using.

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- COLOR SELECT ........................................ 93
Pressing key displays the "SOUNDER MENU" for setting the following Echo Sounder functions.

1. AUTO MODE: To change the basic range/phased range automatically in order to always show the sea bottom in lower half area of the display.
2. TX OUTPUT: To select the transmit output of echo sounder should be carried out ("ON") or not ("OFF").
3. BOTTOM-LOCK EXPANSION: To display the normal mode in the screens upper 2/3 area (or right half) and the bottom-lock expansion mode in the screens lower 1/3 (or left half).
4. PICTURE FEED: To change the picture feed rate.
5. THRESHOLD: To erase and recall weaker echoes from the color scale.
6. NOISE REJECT: To reject the noise interference from nearby fishing vessels.
7. CLUTTER: To suppress mild interference covering the whole screen.
8. SOUNDER SET: To display the following "SOUNDER SET" menu.

**OPERATION PROCEDURE**

*Press the keys to select the setting*

- AUTO MODE: OFF
- TX OUTPUT: ON
- BOTTOM EXPANSION: OFF
- PICTURE FEED: 1/1
- THRESHOLD: 7COL
- NOISE REJECT: OFF
- CLUTTER: OFF
- SOUNDER SET: NEXT MENU

Use keys to shift the yellow indicator.

* For more detailed explanation, refer to the following pages.
AUTO MODE

To change the basic range/phased range automatically in order to always show the sea bottom in lower half area of the display.

OPERATION PROCEDURE

ECHO S

MENU

SOUNDER MENU

Shift indicator to the line 1st.

AUTO MODE

MODE

SOUNDER MENU

AUTO MODE OFF

Each press of  or  key changes the setting, "OFF - AUTO RANGE - AUTO SHIFT - ".

OFF : Even though the depth of the sea bottom changes, the range will not change.

AUTO RANGE : The basic range will change automatically to always show the full depth from the transducer face to the sea bottom in the lower half of the display regardless of changes in depth.

AUTO SHIFT : The phased range will change automatically to always track the bottom in the specified range and to display it in the lower half of the display.

AUTO RANGE

Changes this range (Basic Range) automatically.

"AR" will be indicated here while this function is activated.

AUTO SHIFT

Changes this range (Phased Range) automatically.

"AS" will be indicated here while this function is activated.
NOTICE

- For Auto Range, and Auto Shift to function successfully, the sea bottom echo must be in red or orange. The two strongest scale colors.

- Even when the sea bottom echo is in red or orange, if there is interference due to bubbles etc. the function may not be able to track the bottom. In this case, if the bottom is not located after 16 transmissions, the depth scale will return to 0 and start searching again. If the function is unable to locate the bottom the scale still continue to fluctuate.

TX OUTPUT

©To select the transmit output of echo sounder should be carried out ("ON") or not ("OFF") when the plotter mode is displayed.

OPERATION PROCEDURE

ECHO S MENU ➔ SOUNDER MENU ➔ TX OUTPUT ➔ MODE

.shift the yellow indicator to the line 2nd.

SOUNDER MENU

TX OUTPUT ON

Each press of or key changes the setting, "OFF - ON - ".

ON: Displays the depth on the plotter mode because the transmit output of echo sounder is carried out.

OFF: Not display the depth on the plotter mode because the transmit output of echo sounder is not carried out.
BOTTOM-LOCK EXPANSION

To display the normal mode in the screen's upper 2/3 area (or right half) and the bottom-lock expansion mode in the screen's lower 1/3 (or left half). And to select the range for the bottom-lock expansion mode. PG 91.

OPERATION PROCEDURE

Echo Sounder Menu -> Sounder Menu -> Shift bottom expansion -> Select mode

Shift the yellow indicator to the line 3rd.

Sounder Menu

Bottom Expansion OFF

Each press of or key changes the setting. "OFF - 1 - 2.5 - 5 - 10 - 20 - 50 - 100 - 250 - OFF - "(MT, BR, FM) or "OFF - 5 - 10 - 20 - 50 - 100 - 250 - 500 - 1000 - OFF - "(FT).

OFF : Displays Normal mode.
1~250 MT, BR, FM or 5~1000 FT : Displays Normal/Bottom-lock Expansion mode

When "HORIZONTAL" is selected for "SPLIT IMAGE".

Expansion Range Line: This range is specified by the Range Keys.

The range between the sea bottom and the expansion range line is displayed.

HOW TO USE + , 2, 5 KEYS

While Sounder mode is displayed, doing the following key operation provides the same effect as the one available from the setting method for the above mentioned "BOTTOM-LOCK EXPANSION".

Pressing key within 5 seconds after pressing key displays the Normal/Bottom-lock Expansion mode.

Each press of key changes the setting. "1 - 2.5 - 5 - 10 - 20 - 50 - 100 - 250 - (MT, BR, FM)" or "5 - 10 - 20 - 50 - 100 - 250 - 500 - 1000 (FT)".

On the contrary, each press of key changes the setting in reverse order. PG 136.
To change the picture feed rate.

**Operation Procedure**

- **Echo Sounder Menu**
  - Shift the yellow indicator to the line 4th.

**Sounder Menu**

- **Picture Feed**
  - 1/1
  - Each press of or key changes the setting, "1/1 - 1/2 - 1/4 - 1/8 - STOP - ".

- 1/1
- 1/2
- 1/4
- 1/8
- **Stop**: Stops the picture shifting.

**What Is "Picture Feed"?**

Picture feed rate refers to the speed the picture travels from right to left on the screen. 1/1 refers to 1 vertical line of picture per 1 sound transmission, 1/2 refers to 1 line of picture per 2 sound transmissions etc. There is no relation to ship speed.
THRESHOLD

To erase and recall weaker echoes from the color scale.

**OPERATION PROCEDURE**

```
ECHO S
MENU   →   SOUNDER MENU
         ↓
SHIFT
         ↓
  SELECT
           →
THRESHOLD
           →
MODE
```

- Shift the yellow indicator to the line 5th.

**SOUNDER MENU**

```
THRESHOLD
      OFF
```

- Each press of key changes the setting. "7COL. - 6COL. - 5COL. - 4COL. - 3COL. - ".

- Unwanted echoes, such as noise and plankton, may be erased for clearer definition of the target echoes.

- Each time or key is pressed the weakest color will be erased. On the fifth press all colors will be recalled.

**HOW TO USE FUNC + 3 KEYS**

While the Sounder mode is displayed, doing the following key operation provides the same effect as the one available from the setting method for the above mentioned "THRESHOLD".

Pressing key within 5 seconds after pressing key changes the setting, "7COL. - 6COL. - 5COL. - 4COL. - 3COL. - ".

**WHAT IS "THRESHOLD"?**

The equipment will pick up and display unwanted echoes from small objects in the water. With the threshold function it is possible to eliminate these unwanted echoes.
NOISE REJECT

To reject the noise interference from nearby fishing vessels.

OPERATION PROCEDURE

Echo Sounder Menu → Sounder Menu → Noise Reject → Mode

Shift the yellow indicator to the line 6th.

[Diagram showing sounder menu options]

SONDER MENU
NOISE REJECT OFF

Each press of \large{\text{△}} or \large{\text{◼}} key changes the setting. "OFF - LOW - MID - HIGH - ".

[Diagram showing noise levels]

OFF LOW MID HIGH

WHAT IS "NOISE"?

Noise appears like rain on the screen, as shown above, when the sounder receives sound waves from a neighboring ship's equipment.

⚠️ CAUTIONS

Some types of noise interference may not be rejected.
CLUTTER

To suppress mild interference covering the whole screen.

OPERATION PROCEDURE

Echo sounder menu → Sounder menu → Clutter → Mode

Shift the yellow indicator to the line 7th.

Each press of  or  key changes the setting. "OFF - LOW - MID1 - MID2 - HIGH - ".

OFF

No clutter.

LOW

As the level of the setting increases, the noise is erased by turns from the weakest.

MID1

MID2

HIGH

Too much clutter reduction may erase fish school and the sea bottom.

SOUNDER SET

To display the "SOUNDER SET" menu.
Refer to the following pages for the details.
Press key to display the "SOUNDER MENU".

Use or key to shift the yellow indicator to the line 8th, "SOUNDER SET", and press or key to display the "SOUNDER SET" menu.

To set the following functions, use or key to shift the yellow indicator to the desired one, and press or key.

① DEPTH UNIT To select the depth unit for the depth scale and the depth display.
② SPLIT IMAGE To select the division way, vertically or horizontally, for the Normal/Bottom-lock Expansion mode.
③ TVG To select the level of the TVG function.
④ WHITE LINE To display the sea bottom in a line.
⑤ TEMPERATURE GRAPH To display the water temperature with a graph.
⑥ COLOR SELECT To select the background color of the display.

OPERATION PROCEDURE

ECHO S MENU SOUNDER MENU SOUNDER SET SELECT (To display "SOUNDER SET" menu.) SOUNDER SET MODE

SOUNDER SET

DEPTH UNIT M T
SPLIT IMAGE HORIZONTAL
TVG OFF
WHITE LINE OFF
TEMP. GRAPH OFF
COLOR SELECT A-1

Use keys to select the setting

Use keys to shift the yellow indicator.

* For more detailed explanation, refer to the following pages.
The operation procedure starts from the above mentioned point "A".
DEPTH UNIT

To select the depth unit for the depth scale and the depth display.

OPERATION PROCEDURE

A   SOUNDER SET   DEPTH UNIT   SHIFT   DEPTH UNIT   SELECT   MODE

Shift the yellow indicator to the line 1st.

SOUNDER SET

DEPTH UNIT  WT

Each press of  or  key changes the setting. "WT - FM - BR - FT - ".

SPLIT IMAGE

To select the division way of echo sounder display, vertically or horizontally, for the Normal/Bottom-lock Expansion mode.

OPERATION PROCEDURE

A   SOUNDER SET   SPLIT IMAGE   SHIFT   SPLIT IMAGE   SELECT   MODE

Shift the yellow indicator to the line 2nd.

SOUNDER SET

SPLIT IMAGE  HORIZONTAL

Each press of  or  key changes the setting. "HORIZONTAL - VERTICAL - ".

HORIZONTAL: Displays the Normal mode in the upper half and the Bottom-lock Expansion mode in the lower half.

VERTICAL: Displays the Normal mode in the right half and the Bottom-lock Expansion mode in the left half.
TVG

To suppress unnecessary echoes near the water surface such as bubbles and floating matter, select the level of this function.

**OPERATION PROCEDURE**

A ➔ SOUNDER SET ➔ TVG ➔ SELECT ➔ MODE

**SOUNDER SET**

TVG ➔ OFF

Each press of or key changes the setting, "OFF - LOW - MID - HIGH - ".

OFF ➔ LOW ➔ MID ➔ HIGH

Not using TVG function. Increasing the level suppresses bubbles/others. Too high level may suppress the fish school and sea bottom.

WHITE LINE

To display the sea bottom highlighted against the display background making it easier to see fish on, or just above, the bottom.

**OPERATION PROCEDURE**

A ➔ SOUNDER SET ➔ WHITE LINE ➔ MODE

**SOUNDER SET**

WHITE LINE ➔ OFF

Each press of or key changes the setting, "OFF - ON - ".

OFF ➔ ON

OFF : Displays the bottom with a belt.
ON : Displays the bottom with a line.
TEMPERATURE GRAPH

To select the water temperature scale/water temperature graph display's On/Off.

OPERATION PROCEDURE

A

SOUNDER SET

TEMP. GRAPH

MODE

SHIFT

SELECT

Shift the yellow indicator to the line 5th.

SOUNDER SET

TEMP. GRAPH OFF

Each press of or key changes the setting. "OFF - ON - ".

CAUTIONS

- The water temperature graph is displayed only when the optional water temperature sensor (OP-41) is connected. PG 17.
- When the water temperature sensor is not connected, select "OFF" for "TEMP. GRAPH". PG 68.

COLOR SELECT

To select the background color of the display, black or blue.

OPERATION PROCEDURE

A

SOUNDER SET

COLOR SELECT

MODE

SHIFT

SELECT

Shift the yellow indicator to the line 6th.

SOUNDER SET

COLOR SELECT A-1

Each press of or key changes the setting. "A-1 - A-2 - ".

A-1 : Background color is blue.
A-2 : Background color is black.
Chapter 5

HOW TO USE PLOTTER FUNCTION

This chapter provides you how to enter/clear Waypoint/Marks/Course/Route.

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WAKE

WAKE DISPLAY/MEMORY

While using the plotter function, the following key operations are useful for quick wake color changing/wake memory On/Off selection.

1. WAKE COLOR CHANGE

Pressing the key changes the wake color. Each press of this key changes the setting "Blue - Red - Magenta - Green - Cyan - Yellow - White -." The selected color will be indicated in the screen's upper right, and the wake will be displayed/memorized in it.

2. WAKE DATA MEMORY

Pressing the key within 5 seconds after pressing the Func key changes the wake memory setting On/Off. When the wake has been memorized, the wake will not be memorized. On the contrary, when the wake has not been memorized, the wake will be memorized.

Each press of the key changes the memory setting, on - off.

When the wake has been memorized, its color has also been indicated in the screen's upper. On the contrary, when it has not been memorized, its color has not been indicated.

NOTICE

"WAKE MEMORY" setting in the "8 WAKE MEMORY" menu provides the same effect as the above operation. (Refer to PG 49).
CLEAR WAKE

It is possible to clear wake from the display and the memory or it may be cleared from the display only and stored in the memory.

- The two methods of clearing wake are as follows....
  1. Clear wake only of a specified color or clear all wake
  2. Not displayed on the screen (but memorized)

⚠️ CAUTIONS

Clearing by the above functions 1 and 2 will mean the mark is permanently erased and may not be re-displayed.

1. CLEAR WAKE BY COLOR OR CLEAR ALL WAKE

To clear wake only of a specified color.

OPERATION PROCEDURE

CLR ➔ CLEAR ➔ WAKE COLOR ➔ CLR ➔ ▲ OR ▼

Shift the yellow indicator to the line 1st.

To cancel clearing ➔ ← OR →

CLEAR
WAKE COLOR
MARK SHAPE
MARK COLOR
MARK S/C
ALL MARK
CHART COLOR
ALL WAYPOINT

Each press of ▼ or ▲ key changes the setting, "■ (blue) - ■ (red) - ■ (magenta) - ■ (green) - ■ (cyan) - ■ (yellow) - ■ (white) - ALL COL. - ".

- When the color is specified, "WAKE COLOR" will be indicated in red by pressing CLR key. Then, press either one of ▲ or ▼ key to erase the wake of a specified color.

- When "ALL COL" is selected, "WAKE COLOR" will be indicated in red by pressing CLR key. Then, press either one of ▲ or ▼ key to erase all the wakes.

NOTICE

- When the wake color is changed automatically according to water temperature or depth, the wake will not be cleared by this method.

- Before pressing CLR key to display "CLEAR" menu be sure to clear the cursor from the display.
2. NOT DISPLAYED ON THE SCREEN (BUT MEMORIZED)

OPERATION PROCEDURE

NAV MENU → 8 WAKE MEMORY → 8 WAKE MEMORY

SELECT

COL B

SHIFT → WAKE COLOR → COLOR → MODE

SELECT "COLOR": GO ON TO NEXT PAGE.

Each press of or key changes the setting, "ON - OFF - ".

ON : displays the wake.
OFF : not display the wake.

COLOR

■ (blue) ON
■ (red) ON
■ (magenta) ON
■ (green) ON
■ (cyan) ON
■ (yellow) ON
■ (white) ON

NOTICE

When the wake color is changed automatically according to water temperature or depth, the wake display can not be erased.
INPUT MARK

Mark is useful to memorize fishing reefs, sunken rocks, etc.
* Up to 10,000 points marks are available in eight shapes (□・◇・＋・×・△・△・◆・＋) and seven colors.
* Mark may be set in the following two ways.
  ① Set at cursor crossing position
  ② Set at own ship position

1. SET AT CURSOR CROSSING POSITION

  * Ensure the cursor is displayed with the + key.
  Shift the cursor crossing to the desired position.
  Press the ◇ key.
  The mark will be entered in the shape/color indicated above.
  (When "MARK" is selected for "KEY SETTING". PG 70)

  * Before entering,
    Specify the shape with the ◇ key. Each press of it changes the setting, "□ - ◇ - + - × - △ - △ - ◆ - ◆ - △ - × - + - ◇ - ".
    Specify the color with the COL key. Each press of it changes the setting, "Blue - Red - Magenta - Green - Cyan - Yellow - White".

  * Pressing the FUNC key before specifying the shape/color reverses the setting order as follows.
    ◇ key : "□ - - - ◆ - ◆ - ◆ - △ - × - + - ◇ - "
    COL key : "Blue - White - Yellow - Cyan - Green - Magenta - Red - "

    The quantity of the available marks will be indicated on the display.

NOTICE

The mark, specified "OFF" on the "3 WAYPOINT·MARK DISPLAY", will display when entering, however, will not be displayed when the display shifts. PG 102

The shape, "◆" and "－", should be used for chart mark. PG 103
2. SET AT OWN SHIP POSITION

- When the cursor is displayed, ensure it is cleared by pressing the + key.

Press the ◊ key.

The mark will be entered in the shape/color indicated above. (When "MARK" is selected for "KEY SETTING". PG 70)

- Before entering.
  Specify the shape with the ◊ key. Each press of it changes the setting. "□ - ◊ - + - △ - ♦ - ◊ - ♦ - ◊ - - - - ".

  Specify the color with the COL key; Each press of it changes the setting. "Blue - Red - Magenta - Green - Cyan - Yellow - White".

- Pressing the FUNC key before specifying the shape/color reverses the setting order as follows.

  ◊ key : "□ - - - ◊ - ♦ - ◊ - △ - × - + - ◊ - "

  COL key : "Blue - White - Yellow - Cyan - Green - Magenta - Red - "

The quantity of the available marks will be indicated on the display.

---

**FUNCTION KEY**

For five seconds after pressing the FUNC key, the indication of screen width (or scale) in the screen’s upper left will be in red.

Pressing the following keys while showing the indication in red will activate as follows.

- ◊ key : displays the other mark which was not selected for "KEY SETTING". PG 98.
- ◊ key : reverses the setting order of mark shape. PG 98.
- COL key : reverses the setting order of mark color. PG 98.
- \+ key : changes the wake memory setting. On or Off. PG 95.
- \- \+ \( \triangleleft \) : widens/shortens the range for Bottom-lock Expansion Mode. PG 136.
- \+ key : sets the phased range to "0". PG 135.
- \- key : erases the display color for Echo Sounder Mode from the weakest. PG 137.
CLEAR MARK

It is possible to clear the mark from display and memory, or the mark can be cleared from the display only and retained in the memory.

The three methods of clearing simple mark are as follows.
① Clear only one mark
② Clear marks by shape/color or clear all marks.
③ Clear marks from the display only (retains in the memory).

⚠️ CAUTIONS

Clearing by the above functions ① and ② will mean the mark is permanently erased and may not be re-displayed.

1. CLEAR ONLY ONE MARK

• Press ± key to display the cursor.

Shift the cursor crossing with the ↑↓←→ keys to the mark to be erased.
Press the CLR key.

2. CLEAR MARKS BY SHAPE/COLOR OR CLEAR ALL MARKS

Before displaying "CLEAR" menu, be sure to clear the cursor from the display.

To specify the mark shape to be erased.

Each press of the ☐ or ☐ key changes the setting. "□ - ◇ - + - × - △ - ◤ - ◤ - ◤ - □ - "

To specify the mark color to be erased.

Each press of the ◀ or ▶ key changes the setting. "Blue - Red - Magenta - Green - Cyan - Yellow - White - ALL COL. - "

To specify the mark shape/color.

To erase all marks.
1. **MARK SHAPE**  
   To clear all the marks of that shape.

   **OPERATION PROCEDURE**
   
   - CLR → CLEAR
   - ▲▼ → MARK SHAPE
   - ←→ → SPECIFY SHAPE.
   - "MARK SHAPE" will be shown in red.
   - To cancel clearing.
   - ▲▼ OR ←→

   Shift the yellow indicator to the line 2nd.

2. **MARK COLOR**  
   To clear all the marks of that color.

   **OPERATION PROCEDURE**
   
   - CLR → CLEAR
   - ▲▼ → MARK COLOR
   - ←→ → SPECIFY COLOR.
   - "MARK COLOR" will be shown in red.
   - To cancel clearing.
   - ▲▼ OR ←→

   Shift the yellow indicator to the line 3rd.

3. **MARK SHAPE/COLOR**  
   To clear all the marks of that shape and color.

   **OPERATION PROCEDURE**
   
   - CLR → CLEAR
   - ▲▼ → MARK S/C
   - ←→ → SPECIFY SHAPE & COLOR.
   - "MARK S/C" will be shown in red.
   - To cancel clearing.
   - ▲▼ OR ←→

   Shift the yellow indicator to the line 4th.

4. **ALL MARK**  
   To clear all the marks.

   **OPERATION PROCEDURE**
   
   - CLR → CLEAR
   - ▲▼ → ALL MARK
   - "ALL MARK" will be shown in red.
   - To cancel clearing.
   - ▲▼ OR ←→

   Shift the yellow indicator to the line 5th.

---

**NOTICE**

- Before pressing CLR key to display "CLEAR" menu be sure to clear the cursor from the display.
3. CLEAR MARKS FROM THE DISPLAY ONLY
(RETAINS IN THE MEMORY)

Mark can be set to be displayed or not to be displayed according to shape and color.
Displaying/not displaying the number of the waypoint mark can also be selected.

Each press of or key changes the setting: "ON - OFF - ".

To select ON(display)/OFF(no display) for the mark indicated in the shape left.

To select the waypoint mark number display ON/OFF.

To select (display)/() (no display) for the mark with the color indicated.

OPERATION PROCEDURE

NAV MENU → 3 WAYPOINT·MARK DISPLAY → 5 WAYPOINT·MARK DISPLAY

① MARK SHAPE ⋅⋅⋅⋅ To select "ON(display)/OFF(no display)" for the mark specified by shape.

SHIFT
Shift the yellow indicator to the line 1st ~ 8th.

② WAYPOINT NUMBER ⋅⋅⋅⋅ To select "ON(display)/OFF(no display)" for the waypoint mark number.

SHIFT
Shift the yellow indicator to the line 9th.

③ MARK COLOR ⋅⋅⋅⋅ To select "ON(display)/OFF(no display)" for the mark specified by color.

SHIFT
Shift the yellow indicator to the line 10th.
CHART MARK

INPUT CHART MARK

① Chart mark is useful to draw boundary and coast lines by yourself.
   - Chart mark may be selected from seven colors and there are up to 10,000 chart marks available. PG 47.
   ① Keep pressing the key till the mark on the screen's upper center will be indicated in "●".
   Each press of the key changes the setting. "□ - ◊ - + - x - △ - □ - ● - ◊ - ● - - - ".

② Specify the desired color of chart mark by pressing the key.
③ Press the key to display the cursor on the screen and shift the cursor crossing to the desired position, then press the key to set the chart mark. (When "MARK" is selected for "KEY SETTING". PG 70)
④ Repeating the procedure of shifting the cursor crossing and pressing the key draws a line(chart line) linking each mark. From the second chart mark, they will be changed(indicated) automatically.
⑤ To make a break in the chart line, press the key to change the mark to "●" and press the key.
⑥ If the cursor is erased and the key is pressed, a chart mark will be indicated at the own ship's position.

Shift the cursor crossing to the desired position.
Press key.
Shift the cursor crossing to the next position and press key and repeat.
CLEAR CHART MARK

It is possible to clear chart mark from display.

- The two methods of clearing chart marks are as follows....
  ① Clear a portion of the chart mark
  ② Clear chart mark by color

⚠️ CAUTIONS

Clearing by the above methods will mean that chart mark is permanently erased and may not be re-displayed.

1. CLEAR A PORTION OF CHART MARK

- Press key to display the cursor and move the cursor rossing to the portion of the mark to be erased with keys.
- Press key to erase that portion.

2. CLEAR CHART MARK BY COLOR

<table>
<thead>
<tr>
<th>CLEAR</th>
<th>WAKE COLOR</th>
<th>MARK SHAPE</th>
<th>MARK COLOR</th>
<th>MARK S/C</th>
<th>ALL MARK</th>
<th>CHART COLOR</th>
<th>ALL WAYPOINT</th>
</tr>
</thead>
</table>

Each press of or key changes the setting, "■(blue) - ■(red) - ■(magenta) - ■(green) - ■(cyan) - ■(yellow) - ■(white) - ALL COL. - ".

OPERATION PROCEDURE

CLR ➔ CLEAR ➔ CHART COLOR ➔ CLR ➔ OR ➔

SHIFT SELECT COLOR. ➔ "CHART COLOR" will be shown in red.

Shift the yellow indicator to the line 6th.

To cancel clearing ➔ OR ➔

NOTICE

- The marks that "OFF" are set on the mark setting display will be displayed when entering, however, they will be erased by doing the Shifting Display operation etc. PG 102.
- Before pressing key to display "CLEAR" menu be sure to clear the cursor from the display.
WAYPOINT MARK

INPUT WAYPOINT MARK

① Waypoint mark is useful to indicate the position of ports, net positions etc.
• The distance, bearing and time from own ship's position to a waypoint may be displayed and alarms and routes may be set with the waypoint mark.
• Up to 5,000 point marks are available in eight shapes (□・◇・×・△・◻・●・●+●) and seven colors. PG 47.
The number(1〜) and the comment(8 characters) can be added to the waypoint mark.
• To set waypoint mark the following methods are available.
① Set by positional(Lat/Lon) data
② Set by positional(LORAN C) data
③ Set by the waypoint key
④ Set with the "WAYPOINT ENTRY LIST" (entering, correcting, erasing etc.)

HOW TO CHANGE THE "WAYPOINT ENTRY" DISPLAY

① Use ▲▼ keys to shift the yellow indicator to "WAYPOINT ENTRY".
② Press ▲ key to change the display as follows.
③ Keep pressing ▲▼ key to display the desired display.
Pressing ▼ key changes the display order in the opposite direction.
1. SET BY POSITIONAL (LAT/LON) DATA

OPERATION PROCEDURE

NAV MENU → 1 WAYPOINT ENTRY → SPECIFY → SHIFT: SELECT "LAT/LON". → WAYPOINT ENTRY LAT/LON

1. Shift the yellow indicator to "WAYPOINT ENTRY".

SHIFT NO MARK

Shift the yellow indicator to the line 2nd. or When the number is OK.

Shift the yellow indicator to the line 3rd.

1. SET BY POSITIONAL (LAT/LON) DATA

LATITUDE

LETTER NUMERAL SHIFT

"N" will be shown at the end of the data. For south latitude, press to change it to "S".

1. SET AT OWN SHIP POSITION

The own ship's positional data will be displayed.

2. SET AT CURSOR CROSSING POSITION

The cursor crossing's positional data will be displayed.

3. SET AT CURSOR CROSSING POSITION

DISPLAY NOTE MODE

When "NOTE" is selected.

Shift the yellow indicator to the line 6th.

Shift the yellow indicator to the line 7th.

Up to 8 characters can be entered.

<To be continued on the next page.>
Use the \(\uparrow\downarrow\) keys to shift the yellow indicator.

### WAYPOINT ENTRY LAT/LON

<table>
<thead>
<tr>
<th>NO</th>
<th>0001</th>
<th>(\odot)</th>
<th>&quot;(\uparrow) (\downarrow)&quot; N</th>
<th>(\uparrow) (\downarrow)&quot; E</th>
<th>DISPLAY</th>
<th>NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LATITUDE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LONGITUDE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOTE</td>
<td>[-----]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1.** Each press of the \(\uparrow\downarrow\) or \(\uparrow\downarrow\) key changes the setting, "LIST - LORANC - LAT/LON - ".
   - Select "LAT/LON".
   - LIST : uses the list to enter by Lat/Lon data.
   - LORANC : enters by LORANC data.
   - LAT/LON : enters by Lat/Lon data.

**2.** Enter the number with the numeral keys (0~9).

**3.** Select the shape/color with the \(\uparrow\downarrow\) keys.

**4.** For South Latitude data, use the \(\uparrow\downarrow\) keys to change to "S".

**5.** For West Longitude data, use the \(\uparrow\downarrow\) keys to change to "W".

**6.** Enter the positional data with the \(\uparrow\downarrow\) \(\uparrow\) \(\downarrow\) \(\odot\) keys.
   - Pressing the \(\uparrow\) key will display the own ship's positional data.
   - Pressing the \(\downarrow\) key will display the cursor crossing's data.

**7.** Each press of the \(\uparrow\downarrow\) or \(\uparrow\downarrow\) key changes the setting, "NUMBER - NOTE - OFF"
   - NUMBER : attaches the mark's number
   - NOTE : attaches the comment.
   - OFF : not display the mark.

**8.** Each press of the \(\uparrow\downarrow\) or \(\uparrow\downarrow\) key enters a character.
   - After entering a character, press the \(\uparrow\) key to shift the yellow indicator to the next.
   - Enter characters from the left without a space.

---

**NOTICE**

- To correct any mistaken entry shift the yellow indicator to the mistake with \(\uparrow\downarrow\) \(\leftarrow\rightarrow\) keys and enter the correct information.
- When entering the waypoint mark at the cursor crossing, shift the cursor crossing to the desired position first.
- When setting mark by Lat/Lon data, specify the compass with the \(\uparrow\downarrow\) \(\right\) \(\downarrow\) keys.
2. SET BY LORAN C DATA

OPERATION PROCEDURE

NAV MENU → 3 → 1 WAYPOINT ENTRY → SPECIFY

1 Shift the yellow indicator to "WAYPOINT ENTRY".

SHIFT SELECT "LORANC" → WAYPOINT ENTRY LORANC

NO → ENTER NUMERAL

Shift the yellow indicator to the line 2nd.

or

When the number is OK.

SHIFT → MARK

SHAPE & COLOR

Shift the yellow indicator to the line 4th.

CHAIN

SHIFT SELECT

TD1 → ENTER NUMERAL

Shift the yellow indicator to the line 5th.

SHIFT → TD2

: ENTER NUMERAL

Shift the yellow indicator to the line 6th.

DISPLAY

When "NOTE" is selected.

NOTE

SHIFT ENTER SHIFT

Shift the yellow indicator to the line 8th.

Up to 8 characters can be entered.

To be continued on the next page.

NOTICE

It is impossible to enter mark at the own ship position or at the cursor crossing with this menu, "WAYPOINT ENTRY LORANC".

When entering at the own ship position or the cursor crossing, use the key. PG 110.
Use the ▲▼ keys to shift the yellow indicator.

WAYPOINT ENTRY LORANC

<table>
<thead>
<tr>
<th>NO</th>
<th>0001</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARK</td>
<td>◇</td>
</tr>
<tr>
<td>CHAIN</td>
<td>990</td>
</tr>
<tr>
<td>TD1</td>
<td>----</td>
</tr>
<tr>
<td>TD2</td>
<td>----</td>
</tr>
<tr>
<td>DISPLAY</td>
<td>NUMBER</td>
</tr>
<tr>
<td>NOTE</td>
<td>[-----]</td>
</tr>
</tbody>
</table>

1. Each press of the ▲ or ▼ key changes the setting, "LIST - LORANC - LAT/LON - ".
   Select "LORANC".
   - LIST : uses the list to enter by Lat/Lon data.
   - LORANC : enters by LORANC data.
   - LAT/LON : enters by Lat/Lon data.

2. Enter the number with the numeral keys (1～0).

3. Select the shape/color with the ▲/▼ keys.

4. Select the chain with the ▲/▼ keys.

5. Enter the positional data with the ▲/▼ keys.

6. Each press of the ▲ or ▼ key changes the setting, "NUMBER - NOTE - OFF"
   - NUMBER : attaches the mark's number
   - NOTE : attaches the comment.
   - OFF : not display the mark.

7. Each press of the ▲ or ▼ key enters a character.
   - After entering a character, press the → key to shift the yellow indicator to the next.
   - Enter characters from the left without a space.

NOTICE

- When pressing the ▲ key, the characters will be displayed in alphabetical order. When pressing the ▼ key, they will be displayed in the opposite order.
- When entering the numerals, use ▲/▼ keys.
3. SET WITH MARK KEY

Pressing the ◇ key enters the waypoint mark at the own ship position or the cursor crossing.

WHEN "WAYPOINT" IS SELECTED FOR "KEY SETTING"

- To set waypoint mark at own ship's position when you want to set, press the ◇ key.
- To set waypoint mark at cursor crossing position when you want to set, press the + key to display the cursor on the screen and shift the cursor crossing to the desired point, then press the ◇ key.
- That waypoint mark will be displayed with the shape/color indicated above. PG70.
- The smallest mark number which has not been used will automatically be attached.

WHEN "MARK" IS SELECTED FOR "KEY SETTING"

- To set waypoint mark at own ship's position when you want to set, press the ◇ key within 5 seconds after pressing the FUNC key.
- To set waypoint mark at cursor crossing position when you want to set, press the + key to display the cursor on the screen and shift the cursor crossing to the desired point, then press the ◇ key within 5 seconds after pressing the FUNC key.
- That waypoint mark will be displayed with the shape/color indicated above. PG70.
- The smallest mark number which has not been used will automatically be attached.

4. WAYPOINT ENTRY LIST

Under this function, "WAYPOINT ENTRY LIST", it is possible to confirm the data entered for the waypoint marks, and is also possible to list, edit, erase and enter waypoint mark data.

- Up to 5,000 waypoint marks are available.
- The data of up to 20 marks may be displayed on one screen (page).
- To shift from page to page the following three methods are available.

①Shift the yellow indicator with ◄ ► keys to a number entry point and enter the desired mark number with ◄ ► keys. That number's page will be displayed.

②Press ◄ ► key and the mark list will change to the next page.

③Press ◄ ► key and the mark list will change to the previous page.
1. CHANGE DATA

- Shift the yellow indicator with \( \uparrow \downarrow \leftarrow \rightarrow \) keys to the data to be changed. Enter the new data with \( \text{ECHO-S} \sim \) keys and press \( \text{MODE} \) key to complete the setting.
2. INPUT NEW DATA

- To change to the page for the desired mark number, use the \[\text{\textarrowup}, \text{\textarrowdown}\] keys to shift the yellow indicator to the line of the desired mark number or. use the \[\text{\textarrowleft}, \text{\textarrowright}\] keys to shift the yellow indicator to the mark number to be changed then use the \[\text{\textnum{1} to \textnum{0}}\] keys to enter the number of the mark to be changed. That numbers page will automatically be displayed.

- Enter the data by changing the shape by the \[\text{\textarrowup}, \text{\textarrowdown}\] key and changing the color by the \[\text{\textarrowleft}, \text{\textarrowright}\] key and entering the number by the \[\text{\textnum{1} to \textnum{0}}\] keys.

Press the \[\text{\textmode}\] key to complete the setting.

- Instead of entering positional (Lat/Lon) data.

  if the \[\text{\textarrowup}\] key is pressed after displaying the cursor on the screen the data of the cursor crossing will be entered.

  If the \[\text{\textarrowdown}\] is pressed the data of the own ship's position will be entered.

3. CLEAR DATA

- Shift the yellow indicator to the data to be cleared and press \[\text{\textclr}\] key.

  The red color will cover the whole line of the data, then press \[\text{\textarrowup}, \text{\textarrowdown}\] key to clear the line.

  To cancel the clear operation, press \[\text{\textarrowleft}, \text{\textarrowright}\] key.

4. CLEAR FROM DISPLAY

- Shift the yellow indicator to desired line's mark display style (right end character) and press \[\text{\textarrowleft}, \text{\textarrowright}\] key one or two times to change it to "X". and its waypoint mark will be erased from the display.

- On the contrary, if \[\text{\textarrowleft}, \text{\textarrowright}\] key is pressed when "X" is displayed, it will change to "N" or "C" and its waypoint mark will be displayed.

  \[\text{\textnum{N}}: \text{displays the waypoint mark with the number.}\]
  \[\text{\textnum{C}}: \text{displays the waypoint mark with the comment.}\]
  \[\text{\textnum{X}}: \text{not display the waypoint mark.}\]

5. CONTINUE DATA EDIT

- After any entry, change, clear of the data, pressing \[\text{\textmode}\] key will return to the plotter mode. However, if \[\text{\textarrowup}, \text{\textarrowdown}\] key is pressed instead of \[\text{\textmode}\] key it is possible to continue editing data.

NOTICE

In the "WAYPOINT ENTRY LIST", the data which was entered by Time Difference will be displayed in the Lat/Lon data.
CLEAR WAYPOINT MARK

It is possible to clear the waypoint mark from the display and the memory, or waypoint mark may be cleared from the display only and retained in the memory.

The three methods of clearing waypoint mark are as follows.
1. Clear from "WAYPOINT ENTRY LAT/LON" menu
2. Clear from "WAYPOINT ENTRY LIST" menu
3. Clear mark from the display only (retained in the memory)

⚠️ CAUTIONS

Clearing by the above method 1 or 2 will mean the mark is permanently erased and may not be re displayed.

1. CLEAR FROM "WAYPOINT ENTRY LAT/LON" MENU

OPERATION PROCEDURE

NAV MENU → WAYPOINT ENTRY → SPECIFY

Shift the yellow indicator to "WAYPOINT ENTRY".

It's mark and positional data will be displayed.
The number will be shown in red.

CLEAR OR

To cancel clearing.

NAV MENU → WAYPOINT ENTRY LIST

Enter the mark number to be erased.

Entering the mark number to be erased with 1 ~ 0 keys will display its data.

Press CLR key, and the mark number specified will be displayed in red.

Press or key to clear it.

The specified number's data.

NOTICE

In the case of "WAYPOINT ENTRY LORANC" menu, display is not same as above but clearing method is the same.
2. CLEAR FROM "WAYPOINT ENTRY LIST" MENU OR CLEAR FROM DISPLAY

Using "WAYPOINT ENTRY LIST" menu makes it possible to confirm the data to be cleared. (Refer to PG 112)
And it is possible to set not to display the waypoint on the screen.

OPERATION PROCEDURE

To clear data

SHIFT CLR

The red color will cover the whole line of the data.

To clear only one data

To cancel clearing

Not to display on the screen.

SHIFT

Select "X".

Shift the yellow indicator to the mark's display style (right end) of the data to be cleared.

WAYPOINT ENTRY LIST

<table>
<thead>
<tr>
<th>MARK NUMBER</th>
<th>LATITUDE DATA</th>
<th>LONGITUDE DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MARK SHAPE/COLOR</td>
<td>WAYPOINT MARK DISPLAY STYLE</td>
</tr>
<tr>
<td>0001</td>
<td>34° 39'.633' N</td>
<td>N: displays with the number.</td>
</tr>
<tr>
<td>0002</td>
<td>34° 35'.187' N</td>
<td>C: displays with the comment.</td>
</tr>
<tr>
<td>0019</td>
<td>34° 40'.108' N</td>
<td>X: not display the waypoint mark</td>
</tr>
<tr>
<td>0020</td>
<td>34° 42'.873' N</td>
<td></td>
</tr>
</tbody>
</table>

- 114 -
COURSE DISPLAY

COURSE NAVIGATION

The course from own ship position to a specified waypoint or the cursor crossing may be displayed in a dotted purple line. The distance, bearing and time to this point are displayed in the lower left of the screen. It is possible to clear the dotted course line but still have the information displayed. PG 57.

The course between two specified waypoints may also be displayed.

• The following four course displays are available.
(1) Course display from own ship to waypoint
(2) Course display from own ship to cursor crossing
(3) Course display between two waypoints
(4) Route display (Refer to PG 130)

• This is useful to set the alarm range. Refer to PG 119.

NAVIGATION KEY

Pressing this key will display the navigation menu which is for setting the desired course.

To display the desired course, after pressing \( \sim \) key to display the navigation menu.

1. Shift the yellow indicator by \( \uparrow \) or \( \downarrow \) key to the line first. "NAVIGATION".

2. Keep pressing \( \rightarrow \) key to the desired course display. See below for display order.
   Pressing \( \leftarrow \) key instead of \( \rightarrow \) key will reverse the order.
1. COURSE FROM OWN SHIP TO WAYPOINT

The course from own ship position to a specified waypoint will be displayed in a dotted purple line.

The specified waypoint number and its positional data will be displayed in the screen's upper left, and the distance, bearing and time from own ship to it will also be displayed in the screen's lower left.

**OPERATION PROCEDURE**

1. **NAVIGATION**
   - Shift the yellow indicator to the line 1st.
   - SELECT "WPT 0001".

2. **NAVIGATION**
   - **WPT 0001**
   - ENTER NUMERAL
   - Enter the waypoint number to be displayed.

**NAVIGATION**

- **WPT 0012**
- **TIME DISPLAY**
- **LINE DISPLAY**
- **CURSOR SIZE**
- **COURSE VECTOR**
- **DISPLAY INFO.**

To enter the waypoint number, use the \( \text{CHG / MENU} \) keys. Make sure to enter it in four digits. EX No.16-0016

**CLEAR A COURSE**

**OPERATION PROCEDURE**

1. **NAVIGATION**
   - Shift the yellow indicator to the line 1st.
   - SELECT "OFF".

2. **OFF**
   - **MODE**

**Desired WAYPOINT MARK's**
- NUMBER
- LATITUDE DATA
- LONGITUDE DATA

*Available when "FULL" is selected for "DISPLAY INFO.", PG59

**DISTANCE BEARING**
TIME REQUIRED or ARRIVAL TIME
From OWN SHIP POSITION to WAYPOINT
2. OWN SHIP TO CURSOR CROSSING

The course from own ship position to cursor crossing will be displayed in a dotted purple line.
The specified cursor crossing's positional data will be displayed in the screen's upper left, and the distance, bearing and time required (or arrival time) from own ship to it will also be displayed in the screen's lower left.

OPERATION PROCEDURE

Shift the cursor crossing to the position to be displayed.

NAVIGATION

NAVIGATION CURSOR POS.

CURSOR POS.

MODE

NAVIGATION

NAVIGATION CURSOR POS.

Desired CURSOR CROSSING's LATITUDE DATA, LONGITUDE DATA
Available when "FULL" is selected for "DISPLAY INFO." pg. 59.

CLEAR A COURSE

OPERATION PROCEDURE

Shift the yellow indicator to the line 1st.

NAVIGATION

NAVIGATION OFF

OFF

MODE

DISTANCE BEARING TIME REQUIRED or ARRIVAL TIME From OWN SHIP to CURSOR CROSSING.
3. COURSE BETWEEN TWO WAYPOINTS

The course from waypoint to waypoint will be displayed in a dotted purple line. The number of that two waypoints, the distance and the bearing from the first waypoint to the second waypoint are displayed in the upper left of the screen.

**OPERATION PROCEDURE**

**NAVIGATION**

Shift the yellow indicator to the line 1st.

**SELECT "WPT-WPT 0001-0002".**

**NAVIGATION**

**WPT-WPT 0001-0002**

**ENTER NUMERAL**

Enter the waypoint number to be displayed.

To enter the waypoint number, use the $[$ and $]$ keys. Make sure to enter it in four digits. EX No.16→0016

**WAYPOINT MARK's NUMBER**

Available when "FULL" is selected for "DISPLAY INFO.". PG 59.

**CLEAR A COURSE**

**OPERATION PROCEDURE**

**NAVIGATION**

Shift the yellow indicator to the line 1st.

**SELECT "OFF".**

**NAVIGATION OFF**

**OFF**

**MODE**
ALARM

ALARM SETTING

The alarm function may be set for when own ship enters or departs a specified area or for when own ship departs from a specified course.

The four alarm settings are as follows.
1. Own ship arrives at a specified distance from a waypoint
2. Own ship moves a specified distance away from a waypoint
3. Own ship moves a specified distance from a set course
4. Own ship crosses a specified border

COURSE DISPLAY OPERATION

Before setting the alarm function, be sure to display the course using the following procedure.

- Before setting the above ①, ② and ③

  - Set the mark's color on the display to be white.

  - Set the mark's shape on the display to be ◆ (Starting point mark).

  - Shift the cursor crossing, and press the ◆ key.

  - Repeat this procedure to draw the sea area.

- Before setting the above ④

  - Enter the waypoint number the alarm function be set.

HOW TO STOP ALARM

When the alarm sounds, set the alarm function "OFF" by referring to "CANCEL THE ALARM FUNCTION" on the following pages.
1. ARRIVAL ALARM
(OWN SHIP ARRIVES AT A SPECIFIED DISTANCE FROM WAYPOINT)

Alarm sounds when own ship arrives at a specified distance from waypoint.
- Before setting alarm, ensure to display the course from own ship to the desired waypoint as follows.

OPERATION PROCEDURE
Before doing the following procedure, ensure to display the course from own ship to the desired waypoint. Refer to P6 116 for details.

NAV MENU → 3 → 4 ALARM SPECIFY 4 → 4 ALARM

SHIFT  → ARRIVAL SELECT "ON" ENTER NUMERAL

Shift the yellow indicator to the line 1st.

4 ALARM
ARRIVAL 0.20NM OFF
ANCHOR WATCH
TRACK ERROR
BORDER

Enter the alarm range with keys
The range is set 0.2NM from waypoint No.12.

Each press of key changes the setting. "ON - OFF - ".
ON: sets the alarm.
OFF: cancels the alarm.

© CANCEL THE ALARM FUNCTION
OPERATION PROCEDURE

NAV MENU → 3 → 4 ALARM SPECIFY 4 → 4 ALARM

SHIFT  → ARRIVAL SELECT "OFF"

Shift the yellow indicator to the line 1st.
2. ANCHOR WATCH ALARM
(OWN SHIP MOVES A SPECIFIED DISTANCE AWAY FROM A WAYPOINT)

Alarm sounds when own ship moves a specified distance away from a waypoint.
- Before setting alarm, ensure to display the course from own ship to the desired waypoint as follows.

**OPERATION PROCEDURE**

Before doing the following procedure, ensure to display the course from own ship to the desired waypoint. Refer to PG 116 for details.

```
NAV MENU  ➔  1  ➔  2  ➔  3  ➔  4 ALARM ➔  4 ALARM

SHIFT ➔  ANCHOR WATCH ➔  MODE
```

Shift the yellow indicator to the line 2nd.

4 ALARM

Enter the alarm range with keys

- ARRIVAL
- ANCHOR WATCH 0.10NM OFF
- TRACK ERROR
- BORDER

Each press of or key changes the setting, "ON - OFF - ".
ON : sets the alarm.
OFF: cancels the alarm.

**CANCEL THE ALARM FUNCTION**

**OPERATION PROCEDURE**

```
NAV MENU  ➔  1  ➔  2  ➔  3  ➔  4 ALARM ➔  4 ALARM

SHIFT ➔  ANCHOR WATCH ➔  MODE
```

Shift the yellow indicator to the line 2nd.

The range is set 0.1NM from waypoint No.23.
3. CROSS TRACK ALARM
(OWN SHIP MOVES A SPECIFIED DISTANCE FROM A SET COURSE)

Alarm sounds when own ship moves a specified distance from a set course.
- Before setting alarm, ensure to display the course from own ship to the
desired waypoint as follows.

OPERATION PROCEDURE

Before doing the following procedure, ensure to display the course from own ship to the
desired waypoint. Refer to PG 116 for details.

4 ALARM
ARRIVAL
ANCHOR WATCH
TRACK ERROR 0.1NM OFF
BORDER

Enter the alarm range with [CHOS] keys

The range is set 0.1NM each side of the course to
waypoint.

Each press of or key changes the setting. "ON - OFF - ".
ON : sets the alarm.
OFF: cancels the alarm.

CANCEL THE ALARM FUNCTION

OPERATION PROCEDURE

Shift the yellow indicator to the line 3rd.

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4. BORDER ALARM (OWN SHIP CROSSES A SPECIFIED BORDER)

Alarm sounds when own ship crosses a specified border.

OPERATION PROCEDURE

Before doing the following procedure, ensure to draw the chart where the alarm function should be activated. Refer to PG 103 for details.

NAV MENU ➔ ➔ ➔ 4 ALARM ➔ ➔ ➔ 4 ALARM

SHIFT ➔ ➔ ➔ BORDER ➔ ➔ ➔ MODE

Select "ON" ➔ ➔ ➔ ENTER NUMERAL

Shift the yellow indicator to the line 4th.

Enter the alarm range with keys

The range is set 0.1NM from the white chart mark line.

Each press of or key changes the setting. "ON - OFF - ".

ON: sets the alarm.
OFF: cancels the alarm.

CANCEL THE ALARM FUNCTION

OPERATION PROCEDURE

NAV MENU ➔ ➔ ➔ 4 ALARM ➔ ➔ ➔ 4 ALARM

SHIFT ➔ ➔ ➔ BORDER ➔ ➔ ➔ MODE

Select "OFF"

Shift the yellow indicator to the line 4th.

CAUTIONS

Ensure the chart mark color is white, or this function will not be available.
ROUTE NAVIGATION

© "COURSE" means the straight line from own ship position to a specified waypoint or to the cursor crossing.
"ROUTE" means a serial line which starts from the own ship position to connect a number of waypoint marks.

- This route is displayed as a dotted purple line and the distance, the time required and the bearing will be displayed in the screens lower.
The route may also be cleared from the screen. Refer to "LINE DISPLAY" on PG 57.

- A route can contain up to 20 waypoint marks and up to a total of 50 routes will be set. Up to 5 routes can be displayed at one time.

ROUTE SET

1. ROUTE INPUT

© To set waypoint marks to display a route.
- After entering the desired route number(1~50) for a route, enter the waypoints in the desired order for the route.
- The route set will be displayed as follows. (After selecting under ROUTE SELECT function and setting the route display.)

OPERATION PROCEDURE

NAV MENU → 2 ROUTE → 2 ROUTE

SHIFT → ROUTE SET → ROUTE SET → NO

 이것을 노란색 표시로 화면 5 번째로 이동시킵니다.

SHIFT → ROUTE COMPONENT NO 01 → 02

Enter WPT NO → Shift the yellow indicator to "02".

SHIFT → ROUTE COMPONENT NO 03

Enter WPT NO → Shift the yellow indicator to "03".

Repeat entering Enter the waypoint numbers in the desired order.

To be continued on the next page.
Use the \[ \leftarrow \] or \[ \rightarrow \] key to go into the next menu, "ROUTE SET".

Use the \[ \uparrow \downarrow \] keys to shift the yellow indicator.

Use the \[ \leftarrow \] \[ \rightarrow \] keys to enter the route number (01~50).
To change to the next number, press the \[ \uparrow \] key.
To change to the previous number, press the \[ \downarrow \] key.

Use the \[ \leftarrow \] \[ \rightarrow \] keys to enter the waypoint number (01~50) in the desired order.

ROUTE COMPONENT NUMBER

As each waypoint number is entered its Lat/Lon data will be displayed.

Use the \[ \uparrow \downarrow \] keys to shift the yellow indicator.

HOW TO USE ROUTE NAVIGATION

1. Enter the waypoint marks which compose a route. PG 105.
2. Enter the route number and enter the waypoint mark numbers which compose a route. (Route set)
3. Select the route number to be displayed, and specify the route display method. (Route selection)
4. Display the route. (Route display)
2. CHANGE DATA IN "ROUTE SET" MENU

①To change from one route list to another, shift the yellow indicator with 

direction keys to "NO" and enter the route number with 

keys. The list will automatically be changed to the list on which the specified 

route is set.

To change to the next list, press key.
To change to the previous list, press key.

②Shift the yellow indicator with keys to the waypoint data to 

be changed and enter the new data. However, latitude/longitude data may not be 

changed.

③To erase the data of a waypoint mark, shift the yellow indicator to the 

desired route component number and press key, and the waypoint mark 

number will be shown in red.

Press or key to erase the data.

④To insert/clear a line for entering/erasing a waypoint mark, shift the yellow 

indicator to the desired route component number and operate as explained below.

To insert a line, press key.
To erase the desired line, press key to show the number in red and 

press or key.

⑤To erase a page of data from the route list, shift the yellow indicator to the 

desired route number and press key, and the route number will be shown 

in red.

Press or key to erase a page of data.
To cancel erasing, press either or :

NOTICE

Under "ROUTE SET" function, if the waypoint number is not entered or if the 

waypoint number is entered but the latitude/longitude information is not 

entered, the data of a route component number will not be displayed.
ROUTE SELECTION

© To display a route and to select the route point order.

OPERATION PROCEDURE

NAV MENU → 2 ROUTE → 2 ROUTE

SHIFT → ROUTE NO → WPT. ORDER

Shift the yellow indicator to the line 1st.

Enter ROUTE NO

Shift the yellow indicator to the line 2nd.

Enter WPT. ORDER

Shift the yellow indicator to the line 3rd.

Enter START POINT

Shift the yellow indicator to the line 4th.

Enter WPT. CHANGE

Enter MODE

Use the keys to shift the yellow indicator.

2 ROUTE

ROUTE NO 01 00 00 00 00 Enter the route number to be displayed.
WPT. ORDER FORWARD Select the display order of route.
START POINT 01 Enter the start route component number
WPT. CHANGE 0.10NM (not waypoint number). PG 129.
ROUTE SET NEXT MENU Enter the range (distance) that changes to show the waypoint.

* For more detailed explanation, refer to the following pages.
1. ROUTE NO.

- Enter the desired route number to be displayed from the route numbers entered in "ROUTE SET" (PG 124).

- Up to 5 routes may be displayed at once. Set from left to right.

- When one route is selected.
  (EX) 1: ROUTE NO. 01 00 00 00 00

- When continuous routes are selected.
  (EX) 1: ROUTE NO. 01 05 07 00 00

Set from left to right.

2. WAYPOINT ORDER

- To select the display order of set waypoints which are set on the above.

  FORE

  Displays the route with component No's 01→02→03 in numerical order.

  BACK

  Displays the route with component No's 20→19→18 in reverse numerical order.

When the waypoint numbers are set as 012→020→021→...

---→050. See left picture.

<table>
<thead>
<tr>
<th>ROUTE SET NO 01</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 0012 34°38.644N 137°</td>
</tr>
<tr>
<td>02 0020 34°33.866N 136°</td>
</tr>
<tr>
<td>03 0024 34°32.145N 136°</td>
</tr>
<tr>
<td>04 ---</td>
</tr>
<tr>
<td>05 ---</td>
</tr>
<tr>
<td>19 ---</td>
</tr>
<tr>
<td>20 0050 34°28.100N 137°</td>
</tr>
</tbody>
</table>

ROUTE COMPONENT NUMBER
3. START POINT

To select the route component number from which the route display will start.

WHEN "01" IS SPECIFIED.

<table>
<thead>
<tr>
<th>ROUTE SET</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO 01</td>
</tr>
<tr>
<td>01 0012</td>
</tr>
<tr>
<td>02 0020</td>
</tr>
<tr>
<td>03 0021</td>
</tr>
<tr>
<td>04 0050</td>
</tr>
</tbody>
</table>

Displays from this line.

WHEN "02" IS SPECIFIED.

<table>
<thead>
<tr>
<th>ROUTE SET</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO 01</td>
</tr>
<tr>
<td>01 0012</td>
</tr>
<tr>
<td>02 0020</td>
</tr>
<tr>
<td>03 0021</td>
</tr>
<tr>
<td>04 0050</td>
</tr>
</tbody>
</table>

Displays from this line.

4. WAYPOINT CHANGE

When the route is displayed the distance from own ship to the next waypoint will be displayed in the lower part of the screen. When the own ship nears this waypoint the display will change to show the distance from own ship to the following waypoint.

The range from the waypoint to own ship that the display will change is selected in the following manner.

When own ship enters the specified range the data in the lower left of the screen indicating next waypoint will change to indicate the data of the waypoint specified. However, the route line may not be changed.
ROUTE DISPLAY

To display the route, specified under "2 ROUTE" function on the menu mode, in a purple dotted line.

**OPERATION PROCEDURE**

1. **NAVIGATION**
2. **NAVIGATION**
3. **NAVIGATION ROUTE NAV**
4. **ROUTE NAV.**
5. **MODE**

**NAVIGATION**

- ROUTE NAV.

Select "ROUTE NAV."

- The set route will be displayed as the picture right.

However, it is the one when "FULL" is selected for the display information. When "LIMITED" is selected, the data displayed in the screens upper will not be displayed. PG 59.

From OWN SHIP to WAYPOINT
- NUMBER: 0012
- LATITUDE DATA: 34° 38.644'N
- LONGITUDE DATA: 137° 01.523'E

From OWN SHIP to LAST WAYPOINT of ROUTE
- DISTANCE: 25.33NM
- TIME REQUIRED: 001H12M

From OWN SHIP to DESIRED WAYPOINT
- DISTANCE: 10.55NM
- BEARING: 221°.4'T
- TIME REQUIRED: 00H15M

**CLEAR A COURSE**

**OPERATION PROCEDURE**

1. **NAVIGATION**
2. **NAVIGATION**
3. **NAVIGATION OFF**
4. **OFF**
5. **MODE**

Shift the yellow indicator to the line 1st.
INFORMATION MODES

NAVIGATION MODE

The own ship's latitude/longitude (time difference), ship speed, bearing, water temperature will be displayed in large characters. This makes it easier to see from a distance.

OPERATION PROCEDURE

To return to the plotter mode, press the NAV MENU key.
SELF CHECK MODE

This mode is for checking and displaying the condition of the following internal units.

OPERATION PROCEDURE

SELF CHECK

ROM VER3.4E MAIN ROM VERSION
MAP VER10.0 MAP ROM VERSION
RAM OK RAM CHECK
VRAM OK Y-RAM CHECK
NAVIGATOR INTERNAL EXTERNAL NAVIGATOR CHECK
RECEIVING STATUS MODE

This mode is for checking the receiving status of the navigator connected to the unit.

OPERATION PROCEDURE

NAV MENU ➔ 9 SPECIAL FUNCTION ➔ 9 SPECIAL FUNCTION

SPECIFY ➔ 2 RECEIVING STATUS ➔ RECEIVING STATUS ➔ MODE

RECEIVING STATUS

<table>
<thead>
<tr>
<th>DOP</th>
<th>01.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS</td>
<td>OK</td>
</tr>
<tr>
<td>TR. SAT.</td>
<td>08</td>
</tr>
<tr>
<td>SAT. NO.</td>
<td>01 20 21 05 23</td>
</tr>
<tr>
<td>S/N</td>
<td>51 50 51 51 45</td>
</tr>
<tr>
<td>ELEV.</td>
<td>71 78 38 38 17</td>
</tr>
<tr>
<td>AZIMUTH</td>
<td>330 062 216 045 182</td>
</tr>
<tr>
<td>SAT. NO.</td>
<td>25 09 12 -- --</td>
</tr>
<tr>
<td>S/N</td>
<td>45 -- -- -- --</td>
</tr>
<tr>
<td>ELEV.</td>
<td>32 -- -- -- --</td>
</tr>
<tr>
<td>AZIMUTH</td>
<td>286 -- -- -- --</td>
</tr>
</tbody>
</table>

RECEIVING STATUS

- **DOP** .... DOP rate
  The smaller the rate is the higher the accuracy is. alternately, the larger the rate is the lower the accuracy is.
  00.0: Not yet tracking

- **STATUS** .... Receiving status
  OK: Now tracking
  NG: (No good) Not yet tracking

- **TR. SAT.** .... The number of the satellites now being tracked
- **SAT. NO.** .... The satellite numbers
- **S/N** .... The S/N rate for each satellite
- **ELEV.** .... The elevation of each satellite in use
- **AZIMUTH** .... The azimuth of each satellite in use
Chapter 6

HOW TO USE ECHO SOUNDER FUNCTION

This chapter provides you how to use Echo Sounder function.

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PHASED RANGE KEYS ................................. 135
NORMAL/BOTTOM-LOCK EXPANSION MODE ........ 136
THRESHOLD FUNCTION ................................. 137
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GAIN CONTROL DIAL .................................. 142

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MAIN UNIT KEYS AND DIALS

RANGE KEYS

To select the basic range for the Normal mode.

A total 17 basic range is available as follows:
0～5 10～15 20～30 40～50 60～80 100～150 200～300 500～1000 Meters,
Fathoms, Braccia.
0～15 20～30 40～50 60～80 100～150 200～300 500～1000 2000～3000 Feet

Changes this range.
△ 5 Press this key to shorten the range.
▽ 2 Press this key to widen the range.

PHASED RANGE KEYS

To change the depth at the top of the display to show the range therefrom on the screen.

△ 6 Press this key to make the phased range shallower.
▽ 3 Press this key to deepen the phased range.

Changes the depth here.

Changes this depth.

This range is selected by the range keys.

• The phased range is shifted in 11 steps. Each step is 2/5 of the basic range (full range of the screen) selected by the basic range keys.

However, the available phased range are from 0 to 1999 in steps of meters, fathoms, braccia or feet.

• By shifting the phased range, the desired area expanded in the specific range can be seen.

• Pressing FUNC key within 5 seconds after pressing △ 6 key sets the phased range to "0".
NORMAL/BOTTOM-LOCK EXPANSION MODE

To display the Normal mode in the upper 2/3 area of the screen (or right half) and the Bottom-lock Expansion mode in the lower 1/3 area (or left half). PG 91

And to select the range for the Bottom-lock Expansion mode.

- Pressing ▼2 key within 5 seconds after pressing FUNC key displays the Normal Bottom-lock Expansion mode.

Each press of ▼2 key changes the setting, "1 - 2.5 - 5 - 10 - 20 - 50 - 100 - 250 (MT, BR, PN)" or "5 - 10 - 20 - 50 - 100 - 250 - 500 - 1000 (FT)".

On the contrary, each press of △5 key changes the setting in reverse order.

WHEN "VERTICAL" IS SELECTED FOR "SPLIT IMAGE".

EXPANSION RANGE LINE

NORMAL MODE
This range is selected by the range keys.

SEA BOTTOM

This is the range, selected by the above mentioned operation, between the sea bottom and the expansion range line.

OFF - 1 - 2.5 - 5 - 10 - 20 - 50 - 100 - 250 Meters/Fathoms/Braccia
OFF - 5 - 10 - 20 - 100 - 100 - 250 - 500 - 1000 - 2000 Feet

NORMAL MODE   NORMAL/BOTTOM-LOCK EXPANSION MODE

WHEN "HORIZONTAL" IS SELECTED FOR "SPLIT IMAGE".

EXPANSION RANGE LINE

NORMAL MODE
This range is selected by the above mentioned operation, between the sea bottom and the expansion range line.

Changes this range.

FUNC

▼2 Press this key to shorten the expansion range.

△5 Press this key to widen the expansion range.

NOTICE

The above mentioned key operation provides the same effect as the one available from the setting for the "BOTTOM EXPANSION" on the "SOUNDER MENU". PG 85.
THRESHOLD FUNCTION

To erase and recall weaker echoes from the color scale.

- Pressing \( \triangle 3 \) key within 5 seconds after pressing \( \text{FUNC} \) key changes the setting. "7COL. - 6COL. - 5COL. - 4COL. - 3COL. - ".

- Unwanted echoes, such as noise and plankton, may be erased for clearer definition of the target echoes.

- Each time \( \triangle 3 \) key is pressed the weakest color will be erased.

NOTICE

The above mentioned key operation provides the same effect as the one available from the setting for the "THRESHOLD" on the "SOUNDER MENU". PG 87.

ALARM SETTING

The alarm sounds when the water becomes shallower/deeper than the set depth as well as when the echoes are recorded within the set area.

1. SHALLOW ALARM
   It starts buzzing when the sea bottom becomes shallower than the set depth.

2. DEEP ALARM
   It starts buzzing when the sea bottom becomes deeper than the set depth.

3. THRESHOLD LEVEL
   It starts buzzing when the echoes are recorded within the set area (between the depth set for "SHALLOW ALARM" and the depth set for "DEEP ALARM").

And, it is able to start buzzing when the echoes corresponding with the color scale are recorded with this function.

"AL" will be indicated here while the alarm is set.

HOW TO STOP ALARM

When the alarm sounds, set the alarm function "OFF" by referring to "CANCEL THE ALARM FUNCTION" on the following pages.
1. SHALLOW ALARM
(WHEN THE SEA BOTTOM BECOMES SHALLOWER THAN THE SET DEPTH)

It starts buzzing when the sea bottom becomes shallower than the set depth.

OPERATION PROCEDURE

NAV MENU → 4 → 4

A

SHIFT

SELECT "ON": ENTER NUMERAL (DEPTH)

SHALLOW

MODE

0020 MT OFF

DEEP

THRESHOLD LEV.

4 ALARM

Use [0] keys to enter the set depth.

Indicates when "ON" is selected.

Alarm sounds in this area.

When the sea bottom becomes shallower than the set depth, the alarm will sound.

¢ CANCEL THE ALARM FUNCTION

OPERATION PROCEDURE

NAV MENU → 4 → 4

A

SHIFT

SELECT "OFF".

MODE

- 138 -
2. DEEP ALARM

WHEN THE SEA BOTTOM BECOMES DEEPER THAN THE SET DEPTH

It starts buzzing when the sea bottom becomes deeper than the set depth.

OPERATION PROCEDURE

NAV MENU ➔ SHIFT ➔ DEEP ➔ MODE

Select "ON" and enter numeral (depth).

Each press of ◄ or ► key changes the setting. "ON - OFF - ".

ON : Sets the alarm function.
OFF : Cancels the alarm function.

Use ◄~► keys to enter the set depth.

Indicates when "ON" is selected.

Alarm sounds in this area.

When the sea bottom becomes deeper than the set depth, the alarm will sound.

50 MT
(The depth set for "DEEP")

CANCEL THE ALARM FUNCTION

OPERATION PROCEDURE

NAV MENU ➔ FUNC 4 ➔ SHIFT ➔ DEEP ➔ MODE

Select "OFF".

Shift the yellow indicator to the line 6th.
3. THRESHOLD LEVEL ALARM
(WHEN THE ECHOES ARE RECORDED BETWEEN THE SET AREA)

It starts buzzing when the echoes are recorded within the set area (between the depth set for "SHALLOW ALARM" and the depth set for "DEEP ALARM").
And it is able to start buzzing when the echoes corresponding with the color scale are recorded under this function.

OPERATION PROCEDURE

NAV MENU ➔ 1-1 ➔ 4 ALARM ➔ Specify ➔ 4 ALARM

<table>
<thead>
<tr>
<th>MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Use [INC] 1~0 keys to set the upper limit depth to make the alarm sound.
Use [DEC] 1~0 keys to set the lower limit depth to make the alarm sound.

### 4 ALARM

<table>
<thead>
<tr>
<th>Shallow</th>
<th>Deep</th>
<th>Threshold Lev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0020 MT OFF</td>
<td>0050 MT OFF</td>
<td>3 OFF</td>
</tr>
</tbody>
</table>

Each press of [INC] or [DEC] key changes the setting, "ON - OFF - ".
ON : Sets the alarm function.
OFF : Cancels the alarm function.

Use [INC] 1~7 keys to set the echo threshold level.
There are seven selections (1~7).

1 : 1~7
2 : 2~7
3 : 3~7
4 : 4~7
5 : 5~7
6 : 6 and 7
7 : 7

The alarm sounds when the echoes corresponding with the color number mentioned left of the color scale are recorded.
Refer to the picture on the next page for the color number.

To be continued on the next page.
NOTICE

When "ON" is selected for the "THRESHOLD LEV.", the "ON" settings for "SHALLOW" and "DEEP" alarm functions will not be effective.

CANCEL THE ALARM FUNCTION

OPERATION PROCEDURE

A

SHIFT

Thresholds level

SELECT "OFF".

Shift the yellow indicator to the line 7th.
BRIGHTNESS CONTROL DIAL

Turning the dial clockwise increases the brightness of the screen.

GAIN CONTROL DIAL

Adjust the gain to show the picture at the correct receiving level. Turning the dial clockwise increases the level.

- The strongest echo appears in red, and the next strongest echo is in Orange → Yellow → Green → Yellow-green → Cyan → Light blue.

- In the case of detecting the sea bottom only, as the sea bottom is very reflective, it can be seen at a low gain level.

- For detecting fish schools, the gain level has to be slightly increased. However, increasing the gain will pick up other floating matter in the water too.

- When it is difficult to get the bottom echo due to the bad sea bottom condition, for example, sludge and too much seaweed, increase the gain level.

- When passing over the transducer face, bubbles may reflect the sound wave and appear as echoes on the screen.
SPECIFICATIONS

1. GPS SENSOR (GP-3)
   1. RECEIVING FREQUENCY: 1575.42 MHz (C/A code) L1
   2. RECEIVING CHANNEL: 8 channel simultaneous view format
   3. ACCURACY: Position 30m RMS (HDOP<3) (Without selective availability), Differential-ready *

2. PLOTTER
   1. PROJECTION: Mercators projection
   2. CHART RANGE: Below 85° Latitude
   3. SCALE: 1/3,400 to 1/12,000,000.
      Display width: 0.2 to 737 miles at 35° Latitude.
   4. WAKE FUNCTION:
      (1) Memory interval: 5 seconds to 60 minutes
      Navigating distance set: 0.01 to 9.99 miles
      (2) Total points: 16,000
      (3) Colors: Blue•Red•Magenta•Green•Cyan•Yellow•White
      (4) Wake color set (7 colors) by water temperature*
      (5) Wake color set (7 colors) by water depth*
   5. MARK FUNCTION:
      (1) Types: Waypoint•Mark•Chart (3 types)
      (2) Shapes: 8 types (□•◊•×•••△•□•●•++
      (3) Comment: Up to 8 characters can be entered.
      (4) Routes: 50 routes (20 Waypoints per route)
      (5) Total points: Max 10,000
      (6) Colors: Blue•Red•Magenta•Green•Cyan•Yellow•White
   6. DATA DISPLAY:
      (1) Own Ship position (Lat/Lon or Time Difference (LORAN C))
      (2) Lat/Lon at Cursor Crossing
      (3) Distance, Bearing & Time to Cursor Crossing or Waypoint
      (4) Waypoint mark list
      (5) Coast line (displaying land in filled color) • Place name • Fishing reef • *
      (6) Current date or Lunar calendar
      (7) Display center width or scale
      (8) Wake color • Mark color • Quantity of remaining marks
      (9) Ship speed • Course • Water temperature*
   7. DISPLAY SELECT:
      (1) Course vector (short•long•ship speed)
      (2) Bearing (true direction or magnet direction)
      (3) Cursor shape (cross cursor (large or small) • Ring cursor)
   8. ALARM FUNCTION:
      (1) Arrival (2) Anchor Watch (3) Cross Track Error (4) Border
   9. OTHER FUNCTIONS:
      (1) Depth line* (2) Lighthouse* (3) Differential GPS*
ECHO SOUNDER

1. PHASED RANGE  The upper range limit may be set in 11 steps per 2.5 of the basic range between 0〜1999.

2. BASIC RANGE  0〜5・10・15・20・30・40・50・60・80・100・150・200・300・500・1000 meters, fathoms, braccia.
                0〜15・20・30・40・50・60・80・100・150・200・300・500・1000・2000・3000 feet.

3. PARTIAL EXPANSION  Available as a combination of the above 1 & 2.

4. BOTTOM-LOCK EXPANSION  0〜1・2.5・5・10・20・50・100・250 meters, fathoms, braccia.
                             0〜5・10・20・100・250・500・1000・2000 feet.

5. FREQUENCY  50KHz or 200KHz

6. DISPLAY MODES
   (1)Normal             (2)Partial expansion
   (3)Normal/Bottom-lock expansion

7. DISPLAY DATA
   (1)Digital Depth Scale  (2)Water depth
   (3)Water Temperature Scale* (4)Water temperature*

8. FUNCTION DISPLAY  Auto Range ON/OFF•Auto Shift ON/OFF•Alarm

9. ADDITIONAL DISPLAY  Color Scale•30 Seconds Time Marker•
                        Water Temperature Graph•

10. ADDITIONAL FUNCTIONS  TVG•Clutter•Threshold•White line•Noise reject•
                            Color select(2 options)•Auto range•Auto shift•
                            Shallow alarm•Deep alarm•Fish alarm•
                            Picture speed adjust(stop + 4 speeds)

OTHERS

1. INPUT DATA  DGPS data(RTCM SC104 format)•NMEA-0183 format•
                Water Temperature Sensor•

2. OUTPUT DATA  NMEA-0183 format

3. SCREEN  6 inch high resolution colour screen.
            240×300 pixels

4. POWER REQUIREMENT  DC10.5〜30V•Power consumption 20W

NOTE. An asterisk * requires the optional equipment.