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PRECAUTIONS

[1] INSTALLATION POSITION

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.

[2] HIGH VOLTAGE

Do not open the case cover.
There are high voltage components inside.

[3] TRANSDUCER MAINTENANCE

The transducer must be kept free at all times from barnacles and dirt. Failure to ensure this will result in reduced performance of the equipment. Periodic inspections should be carried out if possible.

Under no circumstances should the transducer face be painted.

DIMENSIONS

![Dimensions Diagram]
## COMPOSITION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CODE</th>
<th>PARTS NUMBER</th>
<th>QTY</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAIN UNIT</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>OPERATION MANUAL</td>
<td>**DM121</td>
<td></td>
<td>1</td>
<td></td>
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<tr>
<td>MAIN UNIT COVER</td>
<td></td>
<td></td>
<td>1</td>
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</tr>
<tr>
<td>POWER CABLE SET</td>
<td>**DM010</td>
<td>(31524D,**DM001,**DM002, METAL CONNECTOR FOR TRANSDUCER)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POWER CABLE</td>
<td></td>
<td>31524D</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ACCESSORIES</td>
<td>**DM001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fuse: 15A</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5P METAL CONNECTOR</td>
<td>FM14-5P</td>
<td></td>
<td>1</td>
<td>EXTERNAL NAV. INPUT</td>
</tr>
<tr>
<td>6P METAL CONNECTOR</td>
<td>FM14-6P</td>
<td></td>
<td>1</td>
<td>NMEA OUTPUT</td>
</tr>
<tr>
<td>7P METAL CONNECTOR</td>
<td>FM14-7P</td>
<td></td>
<td>1</td>
<td>NAVIGATOR OUTPUT</td>
</tr>
<tr>
<td>8P METAL CONNECTOR</td>
<td>FM14-8P</td>
<td></td>
<td>1</td>
<td>EXTERNAL SIG. IN/OUT</td>
</tr>
<tr>
<td>HEXAGONAL BOLT</td>
<td>30054D</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>SPRING WASHER</td>
<td>φ 8</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>FLAT WASHER</td>
<td>φ 8×18×1.6</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>BOLT SET</td>
<td>**DM002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOLT</td>
<td>8×80</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>NUT</td>
<td>M8</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>WASHER</td>
<td>30588D</td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>*SINGLE FREQUENCY</td>
<td>HS21P-3</td>
<td></td>
<td>1*</td>
<td></td>
</tr>
<tr>
<td>3P METAL CONNECTOR</td>
<td></td>
<td></td>
<td></td>
<td>SINGLE FREQUENCY × 2</td>
</tr>
<tr>
<td>*DUAL FREQUENCY</td>
<td>HS21P-3</td>
<td></td>
<td>2*</td>
<td></td>
</tr>
<tr>
<td>3P METAL CONNECTOR OR</td>
<td></td>
<td></td>
<td></td>
<td>DUAL FREQ. IN A BOX</td>
</tr>
<tr>
<td>5P METAL CONNECTOR</td>
<td>HS21P-5</td>
<td></td>
<td>1*</td>
<td></td>
</tr>
<tr>
<td>MOUNTING BRACKET</td>
<td>**DM110</td>
<td>32762B</td>
<td>1</td>
<td>W/RUBBER PLATE</td>
</tr>
<tr>
<td>*TRANSCEIVER UNIT</td>
<td></td>
<td></td>
<td>1*</td>
<td>UNIT SPECIFIED BY USER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(SINGLE FREQ.:1 UNIT)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2*</td>
<td>(DUAL FREQ.:2 UNITS)</td>
</tr>
</tbody>
</table>

NOTE, the code number is shown on the packaging. However, two asterisks ** indicate the lot management number. One asterisk * indicates difference depending on the frequency (single or dual).
[1] TRANSCEIVER UNIT INSTALLATION

Before installing the main unit, install the transceiver unit in the main unit. The transceiver unit is enclosed in the accessories box.
(Single frequency: 1 unit. Dual frequency: 2 units)

Remove the cover plate from the unit installation aperture. (Picture 1)
When only one frequency is used remove one cover plate of the installation apertures as per the picture below.
Leave the bolts removed until the transceiver unit has been installed.

---

HIGH FREQ. TRANSCEIVER UNIT INSTALLATION APERTURE

LOW FREQ. TRANSCEIVER UNIT INSTALLATION APERTURE

PICTURE 1

---

TRANSCEIVER UNIT INSTALLATION SITE

- SINGLE FREQUENCY
  In the case of a 200KHz transceiver unit, connect the HIGH cable and install the unit in the high frequency transceiver unit installation aperture (upper side). In the case of a transceiver other than 200KHz, connect the LOW cable and install the unit in the low frequency transceiver unit installation aperture (lower side).

- DUAL FREQUENCY
  After comparing the two frequencies units, connect the LOW cable to the lower frequency transceiver unit and install the unit in the lower frequency transceiver unit installation aperture (lower side), and connect the HIGH cable to the high frequency transceiver unit and install the unit in the high frequency transceiver unit installation aperture (upper side).
② Take the transceiver unit out of the accessories box.

③ Pull the two connection cables (LOW and HIGH) out from the installation aperture.

④ Connect the cables to the plugs on the transceiver unit. Ensure they are connected properly. (Picture 2)

Low Cable → for Low Frequency
High Cable → for High Frequency

⑤ Insert the rails (on top and bottom of the unit) to the rail guides of the main unit, and push the transceiver unit into the main unit. If the unit is hard to insert because the connection cables are twisted, pull the transceiver unit out and insert it again.

⑥ After completing transceiver unit installation, fix it in place with the bolts which fastened the cover plate. (Picture 3)
This equipment should be installed in a place away from direct sunlight, sea spray and heavy vibration.

- Fix the mounting bracket in place.
- Insert the main unit into the mounting bracket and tighten it with the bolts (36054D).

- When installing the mounting bracket to the main unit, tilt adjustment is available in three steps.

- After locating the tilt adjustment level for easiest viewing, insert a screwdriver through the center hole of the bracket to hold the unit in place and tighten the bolts. (See picture left.)
[3] CONNECTION

- In the case of pin No.1 and No.3, contrary connecting is O.K. (No.1: WHITE No.3: BLACK)
- In some cases, the colour of the wires in the transducer cable differs according to the type of transducer.
- Each cable consists of two lead wires and shield wire.
- The colour of the two lead wires may differ. However, either lead wire may be connected to pin No.1 or No.3.

3P-5P CONNECTION BOX OP-112 (OPTIONAL)

When a dual frequency transducer is used, a connection box is required.

DUAL FREQUENCY TRANSDUCER

HIGH FREQUENCY TRANSDUCER

LOW FREQUENCY TRANSDUCER

TRANSUDER (5P) CONNECTION

<table>
<thead>
<tr>
<th>PIN</th>
<th>50/200kHz</th>
<th>TRANSDUCER</th>
<th>OTHER COMBINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1</td>
<td>GREEN</td>
<td>200kHz</td>
<td>GREEN</td>
</tr>
<tr>
<td>No.2</td>
<td>RED</td>
<td>SHIELD</td>
<td>SHIELD</td>
</tr>
<tr>
<td>No.3</td>
<td>SHIELD</td>
<td>WHITE</td>
<td>BLACK</td>
</tr>
<tr>
<td>No.4</td>
<td>BLACK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.5</td>
<td>WHITE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Temperature Sensor (4P)

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1</td>
<td>WHITE</td>
</tr>
<tr>
<td>No.2</td>
<td>SHIELD</td>
</tr>
<tr>
<td>No.3</td>
<td>SHIELD</td>
</tr>
<tr>
<td>No.4</td>
<td>BLACK</td>
</tr>
</tbody>
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### Navigator Input (5P)

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1</td>
<td>SIGNAL INPUT +</td>
</tr>
<tr>
<td>No.2</td>
<td>SIGNAL INPUT -</td>
</tr>
<tr>
<td>No.3</td>
<td>SHIELD</td>
</tr>
<tr>
<td>No.4</td>
<td>SIGNAL OUTPUT +</td>
</tr>
<tr>
<td>No.5</td>
<td>SIGNAL OUTPUT -</td>
</tr>
</tbody>
</table>

### Navigator Output (7P)

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1</td>
<td></td>
</tr>
<tr>
<td>No.2</td>
<td></td>
</tr>
<tr>
<td>No.3</td>
<td>SHIELD</td>
</tr>
<tr>
<td>No.4</td>
<td>OUTPUT +</td>
</tr>
<tr>
<td>No.5</td>
<td>OUTPUT -</td>
</tr>
<tr>
<td>No.6</td>
<td></td>
</tr>
<tr>
<td>No.7</td>
<td></td>
</tr>
</tbody>
</table>

---

### GPS Input (8P)

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1</td>
<td></td>
</tr>
<tr>
<td>No.2</td>
<td>SIGNAL INPUT</td>
</tr>
<tr>
<td>No.3</td>
<td></td>
</tr>
<tr>
<td>No.4</td>
<td>SIGNAL OUTPUT</td>
</tr>
<tr>
<td>No.5</td>
<td>GND</td>
</tr>
<tr>
<td>No.6</td>
<td></td>
</tr>
<tr>
<td>No.7</td>
<td>12V OUTPUT</td>
</tr>
<tr>
<td>No.8</td>
<td>SHIELD</td>
</tr>
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</table>

### External Input/Output (8P)

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
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<tbody>
<tr>
<td>No.1</td>
<td>TRIGGER INPUT</td>
</tr>
<tr>
<td>No.2</td>
<td>TRIGGER OUTPUT</td>
</tr>
<tr>
<td>No.3</td>
<td>HIGH FREQ. SIG. INPUT</td>
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<td>No.4</td>
<td>HIGH FREQ. SIG. OUTPUT</td>
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<tr>
<td>No.5</td>
<td>GND</td>
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<tr>
<td>No.6</td>
<td>LOW FREQ. SIG. INPUT</td>
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<tr>
<td>No.7</td>
<td>LOW FREQ. SIG. OUTPUT</td>
</tr>
<tr>
<td>No.8</td>
<td>SHIELD</td>
</tr>
</tbody>
</table>

### NMEA Output (6P)

<table>
<thead>
<tr>
<th>PIN</th>
<th>SIGNAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.1</td>
<td></td>
</tr>
<tr>
<td>No.2</td>
<td></td>
</tr>
<tr>
<td>No.3</td>
<td>SHIELD</td>
</tr>
<tr>
<td>No.4</td>
<td>OUTPUT +</td>
</tr>
<tr>
<td>No.5</td>
<td>OUTPUT -</td>
</tr>
<tr>
<td>No.6</td>
<td></td>
</tr>
</tbody>
</table>

---

**NOTE:** Do not connect anything to NC or blank pins.

**NOTE:** When an external navigator is used, ensure to change the connecting. (Refer to Page 49)
FUNCTION EXPLANATION

[1] SOUNDER MODE EXAMPLE

This display example is for Normal mode. Bottom expansion mode and Middle expansion mode are different from this display.

**FREQUENCY**
- INDICATOR: indicates frequency.
- EXPANSION START POINT: indicates the expansion start depth.

**THE DEPTH START POINT (PHASED RANGE) AT THE TOP OF THE SCREEN**

**TIME MARKER:**
- 30 second elapsed time.

**DISPLAY START POINT:**
- indicates the position of the transducer face.

**WATER TEMPERATURE SCALE:**
- the scale for the water temperature graph.

**WATER TEMPERATURE GRAPH:**
- indicates water temperature on the temperature scale.

**DEPTH SCALE:**
- to measure the depth of sea bottom and echo.

**EXPANSION START MARK:**
- indicates the depth from where the range is expanded under expansion mode.

**When Auto range/Auto shift function is used, R-A/S-A will be displayed here.**

**PICTURE SPEED-NOISE REDUCTION-DYNAMIC RANGE INDICATOR:**
- indicates the level set.
- Indicates own ship's speed/course bearing/latitude & longitude/water temperature.

**COLOUR SCALE:**
- indicates the level of the echo’s strength.

**DEPTH DISPLAY:**
- indicates current bottom depth selected under "DEPTH UNIT (depth unit)" function on the menu mode.

**NOTE:** To display the functions marked with an asterisk *, optional equipment is required.
NAVIGATION DATA MODE EXAMPLE

When the normal echo sounder mode is displayed, pressing NAV key on the control panel displays the navigation data display in the lower left 1/4 of the screen. (Only while pressing this key.)

· To keep displaying the navigation data mode, specify "ON" for "NAV MODE" on the menu mode. (Refer to [20] NAVIGATION DATA MODE on PG 29.)

· While displaying the navigation data display in the lower left 1/4 of the screen the sounder mode of that area is not displayed.

COLOUR SCALE

CROSS TRACK INDICATION displays cross track using the number (distance) and the length of the colour bar when own ship moves a specified distance from a set course.
Unit: NM (nautical mile) is not displayed.

NUMBER/LAT. LONG OF WAYPOINT displays the number and lat/long of the waypoint selected.

BEARING/DISTANCE/TIME REQUIRED displays the bearing/distance/time required from own ship to waypoint.
Unit of Time required: H(hour)•M(minute)

SHIP SPEED/COURSE BEARING displays the ship speed and course bearing using a compass diagram.
Unit of Ship speed: KT (knott) or KM/H (kilometer per hour)
OWN SHIP'S LAT/LONG displays the own ship's lat/long.

WATER TEMPERATURE
Unit: °C or °F

WATER DEPTH
Unit: MT (meter) or FT (feet) or FM (fathom) or BR (braccia)

CAUTION

The unit of the cross track "NM (nautical mile)" display is unchangeable.

The unit of time required "H (hour)•M (minute)" display is automatically changed.

The unit of ship speed "KT (knott)•KM/H (kilometer per hour)" display can be selected on the menu mode. (Refer to PG 23.)

The size and the unit of water depth "MT (meter)•FT (feet)•FM (fathom)•BR (braccia)" display can be selected on the menu mode. (Refer to PG 22•24.)
[3] CONTROL PANEL

© Refer to PG 32 ~ for details.

NORMAL MODE KEYS
To select high/low frequency normal modes.

MEMORY WRITE KEY
To memorize the right half of the screen.

MEMORY READ KEY
To display the memorized data in the left side of the screen.

HIGH FREQUENCY KEY
To change the setting only for high frequency. (Red lights while the setting can be changed.)

LOW FREQUENCY KEY
To change the setting only for low frequency. (Red lights while the setting can be changed.)

MAIN RANGE KEYS (NORMAL DISPLAY)
To select the main range (full range of the screen) for normal display.

THRESHOLD KEYS
To display and erase colours from the colour threshold.

VRM (Variable Range Marker) KEYS
To display VRM at the desired depth.

TVG DIALS
To adjust the sensitivity for deep depth.

WHITE LINE DIALS
To display the sea bottom using a line.

KEY LOCK KEY
To lock the keyboard operation. (Red lights while this function is activating.)

NAVIGATION MODE KEY
To display the navigation data mode only while pressing this key.
PHASED RANGE KEYS
To select the depth that the display starts from at the top of the screen.

MENU KEY
To display the menu mode.

INPUT KEY
To return the menu mode to the normal sounder mode.

BOTTOM EXPANSION KEYS
To display the high/low frequency bottom expansion modes.

MIDDLE EXPANSION KEYS
To display the high/low frequency middle expansion modes.

EXPANSION RANGE KEYS (EXPANSION MODES)
To select the expansion range for the bottom expansion/middle expansion modes.

EXPANSION START KEYS
To select the upper expansion start point for the middle expansion mode.

NOISE REDUCTION KEY
To reduce noise interference from nearby fishing vessels.

PICTURE SPEED KEY
To select the picture speed rate.

MARK KEY
To enter a vertical line to mark echoes on the display.

ALARM KEY
To set alarm.

GAIN DIALS
To control the level of sensitivity of the received echo signal.

ON/OFF BRIGHTNESS DIAL
To turn the power on/off and to select the level of brightness.

CAUTION
Ensure to use the on/off brightness dial on the control panel to turn the power supply on/off. Turning the power supply on/off using a switchboard may cause some trouble.
1. **HIGH/LOW FREQUENCY (3P) TERMINALS**
   - To connect transducers.
   - Upper side: For high frequency
   - Lower side: For low frequency

2. **COOLING FAN**
   - Do not put anything around this equipment.

3. **POWER REDUCTION DIALS**
   - To avoid interference to other echo sounders. Reduce the power in a crowded fishery.
   - 4 steps levels are available.
   - (D: maximum, A: minimum)

4. **NAVIGATOR INPUT (5P) TERMINAL**
   - To connect an external navigator
   - Refer to PG 49 for details.

5. **FUSE**
   - 15A fuse.
   - Please use correct fuse.

6. **POWER SUPPLY (2P) TERMINAL**
   - To connect a power source.
   - (18V ~ 40V)

7. **NAVIGATION OUTPUT (7P) TERMINAL**
   - To output the signal for external navigator.

8. **TEMPERATURE SENSOR (4P) TERMINAL**
   - To connect an optional temperature sensor (OP-102).

9. **EARTH TERMINAL**

10. **GPS INPUT (8P) TERMINAL**
    - To connect an optional GPS receiver (ESG-130G).

11. **EXTERNAL INPUT/OUTPUT (8P) TERMINAL**
    - To use as a monitor of external sounder or to connect a data recorder.

12. **NMEA OUTPUT (5P) TERMINAL**
    - To output the format signal of NMEA-0183.
# INITIAL FUNCTION SETTINGS

## [1] FACTORY SETTING

This equipment is shipped from the factory with the functions under the following settings. The user is able to re-set these functions to the most convenient settings with the user setting operation.

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>FACTORY SETTING</th>
<th>SETTING MENU</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICTURE SPEED</td>
<td>1/1(PF1)</td>
<td>CONTROL PANEL KEYS or DIALS ON THE REAR PANEL</td>
</tr>
<tr>
<td>NOISE REDUCTION</td>
<td>OFF(NRO)</td>
<td></td>
</tr>
<tr>
<td>MAIN RANGE(NORMAL MODE)</td>
<td>0~5</td>
<td></td>
</tr>
<tr>
<td>EXPANSION RANGE(EXPANSION MODES)</td>
<td>0~1</td>
<td></td>
</tr>
<tr>
<td>PHASED RANGE</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>THRESHOLD</td>
<td>7 COLOURS DISPLAY</td>
<td></td>
</tr>
<tr>
<td>ALARM</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AUTO RANGE</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AUTO SHIFT</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>POWER REDUCTION</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>DYNAMIC RANGE</td>
<td>6dB(DR6)</td>
<td></td>
</tr>
<tr>
<td>SCREEN DIVISION</td>
<td>VERTICAL</td>
<td></td>
</tr>
<tr>
<td>DUAL FREQUENCY MODE</td>
<td>L/H</td>
<td></td>
</tr>
<tr>
<td>HIGH/LOW FREQ. GAIN</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>HIGH/LOW FREQ. TVG</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TRANSMIT RATE</td>
<td>666 TIMES/_MINUTE</td>
<td></td>
</tr>
<tr>
<td>DEPTH UNIT</td>
<td>WT</td>
<td></td>
</tr>
<tr>
<td>WATER TEMPERATURE UNIT</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>SHIP SPEED UNIT</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>SCALE POSITION</td>
<td>RIGHT</td>
<td></td>
</tr>
<tr>
<td>DEPTH DISPLAY</td>
<td>MEDIUM</td>
<td></td>
</tr>
<tr>
<td>DRAFT</td>
<td>00</td>
<td></td>
</tr>
<tr>
<td>RANGE SETTING</td>
<td>LINKED</td>
<td>MENU MODE</td>
</tr>
<tr>
<td>TRANSMIT SYNCHRO</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>ECHO SIGNAL SELECT</td>
<td>INTERNAL</td>
<td></td>
</tr>
<tr>
<td>TRIGGER SELECT</td>
<td>INTERNAL</td>
<td></td>
</tr>
<tr>
<td>A SCPE</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>BOTTOM EXPANSION DISPLAY POSITION</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>COLOUR SELECTION</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>C1 COLOUR SETTING</td>
<td>A1</td>
<td></td>
</tr>
<tr>
<td>C2 COLOUR SETTING</td>
<td>B1</td>
<td></td>
</tr>
<tr>
<td>LATITUDE/LONGITUDE DISPLAY</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>NAVIGATION MODE</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>NAVIGATION INPUT</td>
<td>NMEA0183</td>
<td></td>
</tr>
<tr>
<td>WAYPOINT</td>
<td>00</td>
<td></td>
</tr>
<tr>
<td>COLOUR SCALE DISPLAY</td>
<td>DISPLAY</td>
<td>When turning on the power supply.</td>
</tr>
<tr>
<td>WATER TEMPERATURE GRAPH</td>
<td>NO DISPLAY</td>
<td></td>
</tr>
<tr>
<td>OUT OF THE DEPTH DISPLAY</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>USER SETTING</td>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

## [2] RETURN TO FACTORY SETTING

To return to factory setting, first turn the on/off brightness dial "OFF" then turn it back "ON" while pressing key. Keep pressing this key until the "beep" noise stops.

All functions will return to the above settings.
[ 3 ] USER SETTING

In addition to the factory setting function this model may also be set to functions selected by the user. This function is called USER SETTING.

The user may easily set the desired function settings, display numerals etc. by operating as explained below.

- With this function the user may return to the desired function settings if the unit should become inoperable due to mistaken use of the controls. Please be sure to memorize USER SETTING at the time the unit is first operated.

1) MEMORIZE USER SETTING

- Set all functions and display units to the desired setting.
- Once all functions have been changed, turn the on/off brightness dial "OFF".
  Then, while pressing [MENU] key, turn the power back "ON" again.
  Keep pressing [MENU] key until the "beep" noise stops.
- After this operation all functions will be memorized under the user setting.

2) RETURN TO USER SETTING

- When the unit becomes inoperable turn the on/off brightness dial "OFF".
  Then, while pressing [MENU] key, turn the power back "ON" again.
  Keep pressing [MENU] key until the "beep" noise stops.
- After this operation all functions will be returned to the user setting.

3) REVISE USER SETTING

- To change user setting which has been set, first operate the return to factory setting function as outlined [2] in the previous page.
  Reset all functions as required, then memorize the setting using (1) MEMORIZE USER SETTING procedure as outlined above.

CAUTION

- If [ ] key or [MENU] key is released before the "beep" noise stops, the settings will not be returned to "FACTORY SETTING" or "USER SETTING".
- After setting "USER SETTING", following the procedure of "RETURN TO FACTORY SETTING" in the previous page will cancel the "USER SETTING".
DISPLAY MODES

The different kinds of display modes, which can be selected depending on the combination of the setting on the menu mode (SCREEN DIVISION or DUAL FREQUENCY MODE) and the setting by the control panel keys, may be shown as follows.

- All explanations of "MENU MODE FUNCTION (PG 18)" and "CONTROL PANEL KEYS (PG 32)" are under normal single frequency mode. In dual frequency mode case, refer to the following pictures.

### DISPLAY MODE LIST

<table>
<thead>
<tr>
<th>CONTROL PANEL KEYS</th>
<th>NORMAL MODE</th>
<th>NORMAL/ BOTTOM EXP. MODE</th>
<th>NORMAL/ MIDDLE EXP. MODE</th>
<th>NORMAL/ NAVIGATION DATA MODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGLE FREQ.</td>
<td></td>
<td></td>
<td></td>
<td>LO PER HIG FRE.</td>
</tr>
<tr>
<td>VERTICAL</td>
<td>LOW OR HIG FRE.</td>
<td>NORMAL DISPLAY</td>
<td>BOTTOM EXP. DISPLAY</td>
<td>MIDDLE EXP. DISPLAY</td>
</tr>
<tr>
<td>HORIZONTAL</td>
<td>NORMAL DISPLAY</td>
<td>BOTTOM EXP. DISPLAY</td>
<td>MIDDLE EXP. DISPLAY</td>
<td>NAVI- NORMAL DISPLAY</td>
</tr>
<tr>
<td>DUAL FREQ.</td>
<td></td>
<td></td>
<td></td>
<td>NAVI- NORMAL DISPLAY</td>
</tr>
<tr>
<td>L/H</td>
<td>LOW</td>
<td>LOW</td>
<td>HIGH</td>
<td>NORMAL</td>
</tr>
<tr>
<td>VERTICAL</td>
<td>NORMAL DISPLAY</td>
<td>NORMAL</td>
<td>HIGH</td>
<td>BOTTOM EXP.</td>
</tr>
<tr>
<td>H/L</td>
<td>HIGH</td>
<td>HIGH</td>
<td>LOW</td>
<td>BOTTOM EXP.</td>
</tr>
<tr>
<td>DUAL FREQ.</td>
<td></td>
<td>HIGH</td>
<td>HIGH</td>
<td>NORMAL</td>
</tr>
<tr>
<td>L/H</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
<td>NORMAL</td>
</tr>
<tr>
<td>HORIZONTAL</td>
<td>NORMAL DISPLAY</td>
<td>NORMAL</td>
<td>BOTTOM EXP.</td>
<td>MIDDLE EXP.</td>
</tr>
<tr>
<td>H/L</td>
<td>HIGH</td>
<td>HIGH</td>
<td>HIGH</td>
<td>NORMAL</td>
</tr>
</tbody>
</table>

LOW: LOW FREQUENCY   HIGH: HIGH FREQUENCY
MENU MODE DISPLAY

Before first using the equipment, set each function on the "MENU MODE".

Press [MENU] key to show the "MENU MODE" below.

While operating keyboards a short "beep" sounds for correct operation and three short "beep" sound for incorrect operation.

Use [▲] [▼] keys to shift the menu cursor [ ] to the function to be set and use [▲] [▼] keys to specify the setting.

(▲key: up, ▼key: down, ▲key: right, ▼key: left)

: shows the function being selected.

<table>
<thead>
<tr>
<th>DYN_RANGE</th>
<th>3 dB</th>
<th>4 dB</th>
<th>5 dB</th>
<th>6 dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCRN_DIV</td>
<td>VERT</td>
<td>HORIZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DUAL FREQ</td>
<td>L</td>
<td>H</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>GAIN_UP_H</td>
<td>0</td>
<td>+10</td>
<td>+20</td>
<td>+30</td>
</tr>
<tr>
<td>GAIN_UP_L</td>
<td>0</td>
<td>+10</td>
<td>+20</td>
<td>+30</td>
</tr>
<tr>
<td>TVG_H</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>TVG_L</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>TRAN_RATE</td>
<td>1000</td>
<td>6.66</td>
<td>333</td>
<td></td>
</tr>
<tr>
<td>DPX UNIT</td>
<td>OFF</td>
<td>MT</td>
<td>FM</td>
<td>BR</td>
</tr>
<tr>
<td>TEMP_UNIT</td>
<td>'C</td>
<td>'C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPD UNIT</td>
<td>OFF</td>
<td>KT</td>
<td>KM/H</td>
<td></td>
</tr>
<tr>
<td>SCALE POS</td>
<td>OFF</td>
<td>CENTER</td>
<td>RIGHT</td>
<td></td>
</tr>
<tr>
<td>DPX DISP</td>
<td>OFF</td>
<td>SML</td>
<td>MED</td>
<td>LRG</td>
</tr>
<tr>
<td>DRAFT</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RANGE SET</td>
<td>LINKED</td>
<td>SINGLE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAN SYNC</td>
<td>OFF</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECHO SIG</td>
<td>INTERNAL</td>
<td>EXTERNAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRIGGER</td>
<td>INTERNAL</td>
<td>EXTERNAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A SCOPE</td>
<td>OFF</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTM EXPN</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>COL SET</td>
<td>A1</td>
<td>A2</td>
<td>B1</td>
<td>B2</td>
</tr>
<tr>
<td>LAT/LON</td>
<td>OFF</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAV MODE</td>
<td>OFF</td>
<td>ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAV INPUT</td>
<td>NMEA0182</td>
<td>NMEA0183</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WPT</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WPT SET</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After setting the function, press [退出] key to return to the sounder mode.

For details, refer to the following pages.
[1] DYNAMIC RANGE

By shifting the dynamic range from 6dB, 5dB, 4dB, 3dB, the operator is able to discriminate more precisely the size, depth and density of the fish school. Selecting 6dB makes it easier to compare with the equipment you used before. Experimenting with this function will teach the user the best setting for various fishing operations.

Display the setting being selected, here.

When the dynamic range is changed from 6dB to 5dB this range will be displayed in 7 colours.

This diagram shows the comparative signal threshold levels for the dynamic ranges.
[2] SCREEN DIVISION

To select the screen division either VERTICAL or HORIZONTAL for Bottom expansion mode, Middle expansion mode and Dual frequency mode.

**VERTICAL:**
- displays the picture which is divided into vertically (left/right).

**HORIZONTAL:**
- displays the picture which is divided into horizontally (upper/lower).

[3] DUAL FREQUENCY DISPLAY LOCATION

To select the frequency display location when Dual frequency mode is selected.

When "VERT(vertica)" is selected in the above [2] SCREEN DIVISION, "L | H H | L" will be displayed.
When "HORIZ(horiz)" is selected, "H / L L / H" will be displayed.

**L | H:** Left side: Low freq. Right side: High freq.
**H | L:** Left side: High freq. Right side: Low freq.

**H / L:** Upper half: High freq. Lower half: Low freq.
**L / H:** Upper half: Low freq. Lower half: High freq.

To finely adjust sensitivity in order to display a clearer picture of the full range, from transducer face to sea bottom.

| GAIN UP H | 0  | +10 | +20 | +30 | +40 |
| GAIN UP L | 0  | +10 | +20 | +30 | +40 |

GAIN UP H: High frequency gain up  GAIN UP L: Low frequency gain up

The relationship between the control panel gain dial and the menu gain up setting is explained below.

- When the menu gain up setting is changed from "GAIN UP 0" to "GAIN UP +10" the control panel gain dial volume increases 3 points on the scale.

- When the menu gain up setting is "0" and the control panel gain dial volume is on "3", it has the same result as when the menu gain up setting is on "+10" and the control panel gain dial volume is on "0".

**CAUTION**

Even if the higher menu gain up level is selected without increasing the control panel gain dial, the strong echoes may be displayed in some case.
[5] HIGH FREQUENCY/LOW FREQUENCY TVG ADJUST

The TVG function may be adjusted according to the strength of the target echo.

- Because the sound wave loses power the deeper it goes, echoes from deep fish schools will be weaker than echoes from schools of the same size which are at a shallower depth.
- As a general rule, without TVG, shallower targets show a stronger echo signal, deeper targets show a weaker echo signal.
- The TVG function allows adjustment of the echo signal to show deep echoes at a more accurate size and density.

<table>
<thead>
<tr>
<th>TVG H</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVG L</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

TVG H: High frequency TVG  TVG L: Low frequency TVG

*TVG function will operate according to the following settings.

- **STANDARD ADJUSTMENT (WHEN DYNAMIC RANGE IS SET AT 6dB)**
  1: Lowest level of TVG: if the echo is at twice the depth sensitivity will be increased a half a step on the threshold colour scale.
  2: When the target is sea bottom or large fish schools: if the echo is at twice the depth sensitivity will be increased one full step on the threshold colour scale.
  3: When the target is small fish schools: if the echo is at twice the depth sensitivity will be increased one and a half(1.5) steps on the threshold colour scale. This setting is half way in sensitivity between settings "2" and "4".
  The equipment is shipped from the factory with TVG under this setting.
  4: When the target is single fish: if the echo is at twice the depth sensitivity will be increased two full steps on the threshold colour scale. TVG effect is increased abruptly as depth increases.

**IN SUMMARY:** At a deep range, when sensitivity is low select setting "4" to increase sensitivity. When sensitivity is high select setting "1" to decrease sensitivity.

---

***CAUTION***

The TVG function setting influences the control panel TVG dial and the control panel GAIN dial.
[6] TRANSMIT RATE

To select the echo transmit rate (times per minute).

```
TRANSMIT RATE  1000  666  333
```

[7] DEPTH UNIT

To select the unit for depth scale and depth measurement from MT (meters), FM (fathoms), BR (braccia) and FT (feet).

```
DEPTH UNIT  MT  FM  BR  FT
```

[MT]

DEPTH SCALE
20.0 MT
METERS

[FM]

1FM: 1.82m

[BR]

1BR: 1.65m

[FT]

1FT: 0.3m

[8] WATER TEMPERATURE UNIT

To select the water temperature measurement unit from °C (Celsius) or °F (Fahrenheit) or OFF (no display).

```
TEMP UNIT  OFF  °C  °F
```

[OFF]

20.0 MT

[°C]

WATER TEMPERATURE DISPLAY

[°F]

20.0 MT

C A T U I O N

Water temperature will be displayed when the optional temperature sensor (OP-102) is connected.
[9] SPEED UNIT

To select the ship's speed measurement unit from KT (nautical miles) or KM/H (kilometers per hour) or OFF (no display).

SPD UNIT OFF KT KM/H

[OFF] [KT] [KM/H]

displays the course bearing.

C AUION

Ship speed will be displayed when the external navigator or optional SUZUKI GPS (ESG-130G) is connected.

[10] SCALE POSITION

To select the depth scale position from CENTER or RIGHT or OFF (no display).

SCALE POS OFF CENTER RIGHT

[OFF] [CENTER] [RIGHT]
【11】DEPTH DISPLAY

○To select the size of the depth display from SML(small), MED(medium), LRG(large) or OFF(no display).

<table>
<thead>
<tr>
<th>DEPTH DISP</th>
<th>OFF</th>
<th>SML</th>
<th>MED</th>
<th>LRG</th>
</tr>
</thead>
<tbody>
<tr>
<td>[OFF]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[SML]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[MED]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[LRG]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

【12】DRAFT

○Because the echo sounder measures the depth from the transducer face down, the draft (the range from the sea surface to the transducer face) is not measured.

Use ▲ key to shift the cursor to the first digit of the number.

Use ▲ or ▼ key to set the draft range in one unit steps from 0~99 meters, fathoms, braccia, feet.

To decrease the number: ▲ key  To increase the number: ▼ key

DRAFT  01

- For example, if the transducer is installed 1 meter below the sea surface (at hull bottom) and the true depth of the sea bottom is 5 meters then, before draft adjustment, the depth will be displayed as 4 meters (giving a one meter error). See diagram.

- After setting the desired draft range return to sounder mode and be sure to press the phased range keys to adjust the echo start depth as indicated.

(Refer to 【1】PHASED RANGE KEYS on PG 32.)
[13] RANGE SETTING

©To set functions for high and low frequency displays together or separately.

- When "LINKED" is specified, the following function settings for both high and low frequency displays on the dual frequency mode will be the same.

PHASED RANGE (THE DEPTH START POINT) · MAIN RANGE (NORMAL MODE) · EXPANSION RANGE (EXPANSION MODE) · NOISE REDUCTION · EXPANSION START POINT · PICTURE SPEED · ALARM · MARKER

In this case both [ ] and [ ] keys on the control panel will be indicated by the red lights.

- When "SINGLE" is specified, the above functions for high and low frequency displays on the dual frequency mode can be set separately.

In this case either one of [ ] or [ ] keys on the control panel will be indicated by the red light.

When the RANGE SET function is "LINKED" both high and low frequencies will be indicated by the red light.

CONTROL PANEL

- When only [ ] key is indicated by red light, pressing [ ] key will indicate the high frequency key by red light and the function settings for only high frequency display can be changed. The function settings for low frequency display can not be changed.

- When only [ ] key is indicated by red light, the function settings for only low frequency display can be changed.

The left picture is the example of the dual frequency mode when the main range for high frequency display is set to 50m and the one for low frequency display is set to 30m.

Separate main range setting applies to the ES-5300.
[14] TRANSMIT SYNCHRO

To set the high/low frequency sound wave transmitting together or separately.

- Normally, the transmit cycle for shallow range is faster than the one for deep range in the single frequency mode case.
  In the case of the dual frequency mode picture example on the previous page, when "ON" is specified for TRANSMIT SYNCHRO the transmit cycle for shallow range display (right side: 30m) is slower than the one in the single frequency mode case because it synchronizes the transmit cycle for deep range (left side: 50m).
- When "OFF" is specified the transmit cycles for each frequency is as same as the ones in the single frequency mode cases because the transmit cycle for shallow range and the one for deep range are set separately.

[15] ECHO SIGNAL/TRIGGER SIGNAL

To select where the echo signal/trigger signal is taken from either INTERNAL or EXTERNAL.

- Select when using only the signal of the ES-5300.
- Select when using the signal from external unit.

[16] A SCOPE

To select A SCOPE display on the screens right side either "ON" or "OFF".

- [OFF]
  
  20.0 MT

- [ON]
  
  20.0 MT
[17] BOTTOM EXPANSION DISPLAY POSITION

To display the bottom using a line or the range fixed as follows. Displaying the bottom with the range fixed makes it easier to judge the bottom's nature (ex. rock or sand).

[1] EXPANSION DISPLAY
The bottom is displayed with a line.

[2] EXPANSION DISPLAY
The bottom is displayed in the lower 1/5 of the expansion range.

[3] EXPANSION DISPLAY
The bottom is displayed in the lower 2/5 of the expansion range.

[18] COLOUR SELECT (COLOUR PALETTE SET)

The following settings are available on colour select function.

A1•A2•B1•B2 Pre-set colour options
C1•C2 Colours may be freely set (colour tone select function).
The factory adjusted colour tone of C1 is the same as A1,
and C2 is the same as A2.

SET COLOUR OPTIONS
A 8 steps colour tone may be freely set.

To freely set the colours for C1 and C2.

- Use ▲ or ▼ key to move the cursor to C1 or C2 and press key to display the "COLOUR PALETTE SET" display.

- Use ▲ or ▼ key to move the cursor to "SET" and press key to display "COLOUR PALETTE SET" display on the next page.
Moving the cursor to "RESET" and pressing key return the colour tone to the user setting.
Use ▲ or ▼ key to select the range (0~15).

**COLOUR PALETTE SET**

RED 08
GREEN 02
BLUE 10

Use ▲ or ▼ key to move the cursor.

Use ×100 ▲ or ×100 ▼ key to move the frame to the colour to be changed on the colour scale. Each numeral colour intensity (red, green, blue) will be displayed with the numerals and the graph on the colour palette set display.

Use ▲ or ▼ key to move the cursor to the colour to be changed and use ▲ or ▼ key to select its colour intensity (1: weakest ~ 15: strongest) on the colour palette set display.

Once the colour palette has been set, press ◀ key to memorize the setting under C1 and C2 and return to the "MENU MODE".

**WHAT IS "COLOUR PALETTE"?**

- There are three basic colours (red, green and blue). Each colour has 15 intensity levels. By mixing the different colours and intensity levels the desired colour tones may be created for the display.
[19] LATITUDE/LONGITUDE DISPLAY

To select the own ship's latitude/longitude display either "ON" or "OFF".

![Latitude/Longitude Display](image)

**CAUTION**
Latitude/longitude display is available only when the external navigator or SUZUKI GPS is connected.

[20] NAVIGATION DATA MODE

To select the navigation mode display either "ON" or "OFF".
Refer to [2] NAVIGATION DATA MODE EXAMPLE on PG 10 for details.

![Navigation Mode Display](image)

**CAUTION**
Navigation mode display is available only when the external navigator or SUZUKI GPS is connected.
[21] NAVIGATION INPUT

- To select the input signal style either "NMEA0182" or "NMEA0183".

| NAVINPUT | NMEA0182 | NMEA0183 |

- Specify either one of these in accordance with the output signal of the external navigator connected.

[22] WAYPOINT

- To select the waypoint number when the navigation data mode is displayed. Refer to [22] NAVIGATION DATA MODE EXAMPLE on PG 10 for details.

| WP   | 013 |

- Select the waypoint number to be displayed on the navigation data mode from the numbers (01~20) that the latitude/longitude datas are entered (refer to [23] WAYPOINT SET on the next page).

Press \( \text{△} \) key to move the cursor to the numeral's first digit.

Use \( \text{△} \) or \( \text{▽} \) key to enter the waypoint number (01~20) and press \( \text{⑦} \) key to set the waypoint number to be displayed on the navigation data mode.

(To decrease the number: \( \text{△} \) key. To increase the number: \( \text{▽} \) key.)

- When the waypoint number which is not set under [23] WAYPOINT SET on the next page, three short "beep" sound and it can not be displayed on the navigation data mode. First enter the latitude/longitude data refer to the next page.
WAYPOINT SET

To enter the latitude/longitude data at the waypoint's numbers 01~20.

- Press 🔄 key to display the following "WPT SET" menu.

- Use ▲ or ▼ key to move the cursor to the desired waypoint number to enter the latitude/longitude data.

And use ▲ key to move the cursor to the -- position and use ▼ key and ▼ key to move the latitude/longitude data.

( ▼ key: To decrease North-East  ▲ key: To increase South-West)

- To enter the current own ship's latitude/longitude data, press ▼ key.

- To enter the latitude/longitude data at the time when the ▼ or ▲ key is pressed (refer to PG 33) press each one of ▲ or ▼ key( ▲ or ▼)

- To erase the data entered, move the cursor to the desired waypoint number and press ▼ key. The cursor will cover the whole line of that data. Then, press ▲ or ▼ key to erase all that data.

To cancel erasing the data, press ▼ key instead of pressing ▲ or ▼ key.

- To return to the "MENU MODE", press 🔄 key.

<table>
<thead>
<tr>
<th>WAYPOINT NUMBER</th>
<th>LATITUDE DATA</th>
<th>LONGITUDE DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>01  34° 36. 25 N</td>
<td>137° 33. 41 E</td>
<td></td>
</tr>
<tr>
<td>02  34° 40. 35 N</td>
<td>137° 24. 25 E</td>
<td></td>
</tr>
<tr>
<td>03  -- - - - -  -</td>
<td>- - - - - -  -</td>
<td></td>
</tr>
<tr>
<td>18  -- - - - -  -</td>
<td>- - - - - -  -</td>
<td></td>
</tr>
<tr>
<td>19  34° 30. 45 N</td>
<td>137° 15. 05 E</td>
<td></td>
</tr>
<tr>
<td>20  34° 42. 81 N</td>
<td>137° 07. 22 E</td>
<td></td>
</tr>
</tbody>
</table>
CONTROL PANEL KEYS

[1] PHASED RANGE KEYS

- For the selection of the depth start point at the top of the screen.
  - Phased range may be set in one unit steps (0 to 999).
  - \( \times 100 \) : to change a number of third figure.
  - \( \times 10 \) : to change a number of second figure.
  - \( \times 1 \) : to change a number of first figure.
- This function may be used to show the desired area expanded on the screen.
- Pressing \( \times 100 \) key and \( \times 1 \) key together sets the depth start point to 0.
- Refer to PG 46 for AUTO SHIFT function.

[2] MENU MENU KEY

- To display the "MENU MODE", press \( \text{MENU} \) key.
- "MENU MODE" is the display to set functions of the ES-5300. (Refer to PG 17.)

[3] INPUT KEY

- To return to the sounder display from the menu mode, press \( \rightarrow \) key.
MEMORY WRITE/READ KEYS

©To memorize the right half (up to three pictures) of the screen.

- Within 10 seconds after pressing \( \text{\textup{a}} \) key press one of the three keys (\( \text{\textup{A弯}}, \text{\textup{B弯}}, \text{\textup{C弯}} \)) to memorize the picture at the time of pressing the key, under that key.

©The memorized picture will be erased when the power supply is turned off.

©When the picture is newly memorized under the key which has been memorized other picture, the old one will be erased and the new one will be memorized.

Displays the picture, being memorized under the specified key, on the left half of the screen.

©To recall and display the memorized picture on the left half of the screen.

- Within 10 seconds after pressing \( \text{\textup{b}} \) key press one of the three keys (\( \text{\textup{A弯}}, \text{\textup{B弯}}, \text{\textup{C弯}} \)) which corresponds to the high frequency mode key A·B·C under which the display is memorized.

©By pressing \( \text{\textup{b}} \) key the display will be returned to the normal mode, however, the data will be stored in the memory and the memorized picture will be redisplayed as long as the power supply is not turned off.

NORMAL MODE KEYS

©To display Normal mode.
Refer to "DISPLAY MODE LIST" on PG 16 for details.

- To display high frequency Normal mode on the full screen, press \( \text{\textup{A弯}} \) key.
- To display low frequency Normal mode on the full screen, press \( \text{\textup{A弯}} \) key.
- To display dual frequency Normal mode on the full screen, press \( \text{\textup{A弯}} \) key and \( \text{\textup{A弯}} \) key together.

NORMAL MODE

This range is selected by main range keys.
To display Normal/Bottom expansion mode. Refer to "DISPLAY MODE LIST" on PG 16 for details.

- To display high frequency Normal/Bottom expansion mode, press $\text{B} \downarrow \text{N}$ key.
- To display low frequency Normal/Bottom expansion mode, press $\text{B} \uparrow \text{N}$ key.
- To display dual frequency Normal/Bottom expansion mode, press $\text{B} \downarrow \text{N}$ and $\text{B} \uparrow \text{N}$ key together.

**SCREEN DIVISION: HORIZONTAL**

- **NORMAL DISPLAY**
  This range is selected by the main range keys.

- **BOTTOM EXPANSION DISPLAY**
  This range is selected by the expansion range keys.

- **Under screen division**
  HORIZONTAL setting Normal display is displayed on the upper half of the screen. Bottom expansion display, which displays from bottom in a range selected by the expansion range keys, is displayed on the lower half.

**SCREEN DIVISION: VERTICAL**

- **Right hand side range**
  (Normal display) is selected by the main range keys.

- **Left hand side range**
  (Bottom expansion display) is selected by the expansion range keys.

- **Under screen division**
  VERTICAL setting Normal display is displayed on the right side of the screen. Bottom expansion display is displayed on the left side.

- The expansion range is indicated by a yellow line on Normal display.

- The expansion range line is automatically indicated by the range selected by the expansion range keys. The expansion display consists of the range between bottom and expansion range line. Refer to [10] EXPANSION RANGE KEYS on PG 37.
MIDDLE EXPANSION MODE KEYS

To display Normal/Middle expansion mode.
Refer to "DISPLAY MODE LIST" on PG 16 for details.

- To display high frequency Normal/Middle expansion mode, press \[\text{key}\].
- To display low frequency Normal/Middle expansion mode, press \[\text{key}\].
- To display dual frequency Normal/Middle expansion mode, press \[\text{key}\] and \[\text{key}\] together.

SCREEN DIVISION: HORIZONTAL

EXPANSION RANGE LINES

This range will be expanded

派遣版

NORMAL DISPLAY

This range is selected by the main range keys.

MIDDLE EXPANSION DISPLAY

This range is selected by the expansion range keys.

SCREEN DIVISION: VERTICAL

Right hand side range

(Normal display) is selected by the main range keys.

Left hand side range

(Middle expansion display) is selected by the expansion range keys.

Under screen division

HORIZONTAL setting Normal mode is displayed on the upper half of the screen. Middle expansion mode, which displays from phased range (expansion start point) in a range selected by the expansion range keys, is displayed on the lower half.

Under screen division

VERTICAL setting Normal display is displayed on the right side of the screen. Middle expansion display is displayed on the left side.

The expansion range is indicated by two yellow lines on Normal display.

The upper expansion range line can be set by the expansion start mark which is same as the phased range depth on the Middle expansion display. The expansion display consists of the expansion range which starts from the phased range. Refer to [10] EXPANSION RANGE KEYS on PG 37.
HIGH FREQUENCY/LOW FREQUENCY KEYS

To adjust high and low frequency functions separately on the dual frequency mode. Refer to [13] RANGE SETTING on PG 25 for details.

- To set functions only for high frequency, press key and the red light above the high frequency key will be indicated.
- To set functions only for low frequency, press key and the red light above the low frequency key will be indicated.

CAUTION

This function is useful only when "SINGLE" is specified for "RANGE SETTING" on the menu mode. (Refer to PG 25.)
In the case when both the red lights above these keys are indicated, "LINKED" is specified for "RANGE SETTING". Change the setting to "SINGLE".

MAIN RANGE KEYS (NORMAL DISPLAY)

To select the main range for Normal display.

18 steps selections are available with key and key.

- 5~10 ~ 15 ~ 20 ~ 25 ~ 30 ~ 40 ~ 50 ~ 60 ~ 80 ~ 100 ~ 120 ~ 150 ~ 200 ~ 300 ~ 500 ~ 1000 ~ 2000 meters, fathoms, braccia
- 15 ~ 20 ~ 25 ~ 30 ~ 40 ~ 50 ~ 60 ~ 80 ~ 100 ~ 120 ~ 150 ~ 200 ~ 300 ~ 500 ~ 1000 ~ 2000 ~ 3000 ~ 6000 feet

This range is selected by the main range keys.

For AUTO RANGE function, refer to PG 45.
EXPANSION RANGE KEYS (EXPANSION DISPLAY)

Select the expansion range for middle expansion display and bottom expansion display.

8 steps selections are available with ▲ ▼ key and ▲ ▼ key.

- 1~2.5~5~10~20~50~100~250 meters, fathoms, braccia.
- 5~10~20~50~100~250~500~1000 feet.

NORMAL/BOTTOM EXPANSION MODE

NORMAL/MIDDLE EXPANSION MODE

This range is selected by the expansion range keys.

EXPANSION START KEYS

EXPANSION RANGE LINE

EXPANSION START DEPTH

When this key is pressed, the expansion start mark goes up.

EXP
▲

When this key is pressed, the expansion start mark goes down.

▼

START

To set the expansion start point (at the top) for middle expansion display.

- The numeral expansion start depth will be indicated on the upper of the screen.
[12] \[ \int \text{THRESHOLD KEYS} \]

To erase and replace weaker echoes from the colour scale.
- Unwanted echoes, such as noise and plankton, may be erased for clearer definition of the target echoes.
- Each time \[ \int \wedge \] key is pressed the weakest colour on the colour scale will be erased.
- Each time \[ \int \triangle \] key is pressed the colour previously erased will be replaced.

Each press of this key replaces colours as shown right.

\[ \triangle \]

\[ \wedge \]

THRESHOLD

Each press of this key erases colours as shown right.

\[ \text{COLOUR SCALE} \]

7 COLOURS

6 COLOURS

5 COLOURS

4 COLOURS

3 COLOURS

WHAT IS "THRESHOLD"?
The equipment may pick up and display unwanted echoes from small objects in the water. With the threshold function it is possible to eliminate these unwanted echoes.

[13] \[ \int \text{VRM(VARIABLE RANGE MARKER) KEY} \]

To display/shift the VRM(variable range marker) to the desired depth and to read its depth in digital correctly.

\[ \int \text{VRM} \]

Press this key to shift the VRM shallower.

\[ \int \triangle \]

Press this key to shift the VRM deeper.

\[ \int \wedge \]

CAUTION

When the VRM is displayed, it may be cleared by pressing \[ \int \triangle \] key and \[ \int \wedge \] key together, however, its positional data(depth) will be stored in the memory.
PICTURE SPEED KEY

To change the picture speed rate.

- Each press of the key changes the setting.

The picture speed rates are as follows.

(PF1) (PF2) (PF3) (PF4) (PF5) (PF6) (PF7) (PF8) (PF0)
1/1 1/2 1/4 1/8 1/4+1/1 1/8+1/2 1/16+1/4 1/32+1/8 STOP

The full screen is shifted at these rates.
(Refer to picture 1~3.)

The right half display is shifted at normal picture feed rate and
the left half display is shifted at slower feed rate.
(Refer to picture 4.)

- In the picture 1 the ship sails from point A to point B.
When the faster feed rate is selected the picture shows
as picture 2, when the slower feed rate is selected the
picture shows as 3.
(When one of PF1~PF4(1/1~1/8) is selected.)

- The combination display consists of the normal feed rate
picture (right half) and the slower feed rate picture
(left half) is available as picture 4.
(When one of PF5~PF8(1/4+1/1~1/32+1/8) is selected.)

WHAT IS "PICTURE SPEED"?
Picture speed 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.
[15] NOISE REDUCTION KEY

To reduce noise interference from nearby fishing vessels.

Each press of the key changes the reduction level.

Noise reduction levels: (NRO) OFF (NR1) LOW (NR2) MEDIUM (NR3) HIGH

Display the level being selected here.

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.

CAUTION
Do not select higher level than the level to be needed because the weak echoes will be erased.
Some types of noise interference may not be reduced.

[16] ALARM KEY

To make the alarm sound when the bottom becomes shallower than the set alarm depth.

Before setting the alarm, shift the VRM (refer to PG 38) to the desired depth.

And press [ key.

When the alarm function is set the letter "A" will appear at the right side of the VRM numerals.

To clear the alarm function, press [ key again.

The VRM may be cleared by pressing [ and [ key together, however, its positional data (depth) will be stored in the memory. (Refer to [13] VRM KEY on PG 38.)
[17] MARK KEY

To mark a line on the display for use as a echo mark.

- Press key to set a yellow vertical line on the right hand edge of the screen.

Press this key to display a yellow vertical line on the right hand edge of the screen.

[18] KEY LOCK KEYBOARD LOCK KEY

To lock the keyboard functions so as not to make the changes or additions by the erroneous operations.

Press key to lock the keyboard functions other than keys.

- When the keyboard functions are locked the red light above key will be indicated.

Press key and key together to clear the keyboard lock function.

The red light will be indicated while keyboard lock function is activated.
[19] NAVIGATION DATA MODE KEY

To display the navigation data mode:

- Press NAV key to display the navigation data mode as left.
- The navigation data mode is displayed only while pressing NAV key.
- Refer to [2] NAVIGATION DATA MODE EXAMPLE on PG 10 for details.

[20] ON/OFF BRIGHTNESS DIAL

Turn the power on by turning the dial clockwise. Further turning in a clockwise direction increases screen brightness.

CAUTION

Turn the power supply on/off only by using on/off brightness dial. Turning the power supply on/off directly from the vessel's power supply board will cause serious problems.
[21] TVG DIAL

To control the level of the sensitivity of the received deep echo signal.

- Turning the dial clockwise does not increase the gain level close to the transducer but increases the gain level as the depth increases.
- For further true display, using the TVG dial corrects the displaying differences between the shallow echo and the deep echo.
- The sensitivity achieved using the TVG dial influences the sensitivity achieved using the GAIN dial and H/L frequency TVG adjust function on the menu mode. Refer to PG 44 and 21.

WHAT IS “TVG”?
The power of the sound wave is absorbed at a certain rate when travelling through the water.
The higher the frequency, the higher the rate of absorption. For example after travelling 1 kilometer the power of a 50KHz sound wave will decrease to 1/8 of it’s orginal strength. The power of a 200KHz sound wave will decrease to 1/300 of it’s original strength.
Use this TVG dial to counteract the absorption effect by increasing the received echo signal of deep echoes.

[22] WHITE LINE DIAL

To display the sea bottom highlighted against the display background making it easier to see fish on, or just above, the bottom.
To adjust the level of sensitivity of the received echo signal.

- Turning the dial clockwise increases the gain level. Keep turning the dial until the sea bottom is shown in red.

The gain is too low.  This picture shows the correct gain level.  This picture is at the correct gain level but the water is full of unwanted echoes (dirt).  The level of gain is too high.

- The strongest echoes are displayed in red and as the received echoes get weaker they are indicated as follows: red→orange→yellow→green→light green→blue→light blue (when colour scale A1 or A2 is selected).

- When the target is the sea bottom the gain level setting can be low because the echo from the sea bottom is very strong. However, when the target is fish the level of gain must be increased to pick up the weaker echo. Increasing the gain too much will display unwanted echoes from bubbles and plankton etc.

- If the sea bottom echo is weak due to seaweed, mud etc. adjust the gain level to pick up the weaker echo.

- When passing over the transducer face, bubbles reflect the sound wave and appear as echoes on the screen. In this case, no echoes (fish school) may be displayed even though at a maximum gain level.

**CAUTION**

Combining the use of the gain control dial and the GAIN UP H/L function on the menu mode gives variable gain ranges. (Refer to [4] HIGH FREQUENCY/LOW FREQUENCY GAIN UP on PG 20.)
AUTO RANGE/AUTO SHIFT FUNCTION

[1] AUTO RANGE FUNCTION

The main range will change automatically to always show the full depth from transducer face to sea bottom on the lower 1/2 area of the screen regardless of changes in depth.

- Press \( \triangle \) key and \( \triangledown \) key together to "activate" the auto range function.

- For variable ranges, refer to [9] MAIN RANGE KEYS(NORMAL DISPLAY) on PG 36.

- To "cancel" auto range function, press \( \triangle \) key or \( \triangledown \) key.

CAUTION

1. For auto range function to work successfully, the sea bottom echo must be in "red or orange". The two strongest scale colours.

2. 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 the minimum range and start searching again. If the function is unable to locate the bottom the scale will continue to fluctuate.
[2] AUTO SHIFT FUNCTION

The phased range will change automatically to always track the bottom, to be shown on the lower 1/2 of the screen, in the specified range.

- Press $\uparrow \downarrow$ key and $\uparrow$ key together to "activate" the auto shift function.

Press these keys together.

This range changes automatically.

To "cancel" the auto shift function, press $\uparrow$ key or $\downarrow$ key.

CAUTION

1. For auto shift function to work successfully, the sea bottom echo must be in "red or orange". The two strongest scale colours.

2. 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 meter (fathom, braccia, feet) and start searching again. If the function is unable to locate the bottom the scale will continue to fluctuate.
PARTICULAR FUNCTIONS
(SET WHEN TURNING ON THE POWER)

[1] WATER TEMPERATURE GRAPH
©To select the water temperature graph display either "ON" or "OFF".
- To display the water temperature graph, ensure to turn the power supply "off", and turn the power supply back "on" again while pressing key.
- To erase the water temperature graph, ensure to turn the power supply "off", and turn the power supply back "on" again while pressing key.

![Water Temperature Graph]

The water temperature scale/graph will be displayed on the upper half of the screen.

CAUTION
The water temperature graph will be displayed only when the optional water temperature sensor(OP-102) is connected.

[2] COLOUR SCALE DISPLAY
©To select the colour scale display either "ON" or "OFF".
- To display the colour scale, ensure to turn the power supply "off", and turn the power supply back "on" again while pressing key.
- To erase the colour scale, ensure to turn the power supply "off", and turn the power supply back "on" again while pressing key.

![Colour Scale Display]

Displays the colour scale

Not display the colour scale
OUT OF RANGE DEPTH DISPLAY ON/OFF

To display the water depth numerals even though the sea bottom is out of the screen i.e. the sea bottom becomes deeper than the main range selected using the procedure of [9] MAIN RANGE KEYS(NORMAL DISPLAY) on PG 36.
(The water depth numerals will not normally be displayed when the sea bottom is out of the screen.)

- To display the out of range display, ensure to turn the power supply "off", and turn the power supply back "on" again while pressing key.
- To erase the out of range display, ensure to turn the power supply "off", and turn the power supply back "on" again while pressing key.

CAUTION

- To complete the settings for the particular functions, ensure to keep pressing the specified key until the "beep" sound stops.
- When TRIGGER SIGNAL setting is EXTERNAL(refer to [15] ECHO SIGNAL/TRIGGER SIGNAL on PG 26), the out of range depth display is not available.
EXTERNAL NAVIGATOR CONNECTION

1. Be sure to ask your dealer for the connecting operation because there is high voltage portion inside.
2. When connecting to the external navigator, refer to the following to change the inside wiring of the main unit.
   When connecting to SUZUKI brand GPS, changing the inside wiring is not needed.
3. It is impossible to use the external navigator and the SUZUKI brand GPS together.
4. Before start connecting operation, be sure to turn the power supply off and remove the power supply cable from the main unit.

---

**PICTURE 1**

4. Remove the 4 bolts (A~D), which fix the sash to the main unit, to see the main PCB. (Picture 3)
5. Remove the 5P connector (white) which inserts into the main PCB. And insert the 5P connector (blue) which is fixed to the rear panel with tape. (Picture 3)
6. Replace the sash, the case cover and the transceiver unit.

---

**PICTURE 2**

7. To remove the transceiver unit from the main unit, refer to [1] TRANSCEIVER UNIT INSTALLATION on PG 4.
8. After undoing the 9 bolts (1~9), remove the case cover in the big arrow direction. (Picture 1)
9. After removing the case cover, see the main unit from right side and you will find the sash with rail guide for transceiver unit. (Picture 2)

---

**PICTURE 3**

(For EXTERNAL NAVIGATOR)
Attach the blue connector.

(For SUZUKI GPS)
Remove the white connector.
SPECIFICATIONS

1: PHASED RANGE
May be set 0~999 MT, FM, BR, FT in one unit steps.
(Same range setting and separate range setting for high/
low frequency displays are available.)

2: MAIN RANGE
0~5·10·15·20·25·30·40·50·60·80·100·120·150·200·300·500·
1000·2000 MT, FM, BR.
0~15·20·25·30·40·50·60·80·100·120·150·200·300·500·1000·
2000·3000·6000 FT*

3: EXPANSION RANGE
(BOTTOM EXPANSION)
0~1·2·5·10·20·50·100·250 MT, FM, BR.
(MIDDLE EXPANSION)
0~5·10·20·50·100·250·500·1000 FT.

4: FREQUENCIES
28.38–50 or 200KHz. Single or Dual frequency.

5: DISPLAY MODES
1) Low frequency only 2) High frequency only
3) Dual frequency (Vertical or Horizontal split)
4) Normal/Bottom expansion (Vertical or Horizontal split)
5) Normal/Partial expansion (Vertical or Horizontal)
6) Dual Normal/Bottom expansion (Vertical or Horizontal)
7) Dual Normal/Middle expansion (Vertical or Horizontal)
8) Navigation data (lower left 1/4)/Sounder
9) A scope/Sounder

6: DATA DISPLAY
1) Depth scale 2) Water depth 3) Lat/Long* 4) Ship speed*
5) Course (shows the direction in a arrow)*
6) Water temperature* 7) Waypoint numerals (20 points)
8) Lat/Long at waypoint*
9) Distance, bearing, time to waypoint* 10) Cross track*

7: FUNCTION SET DISPLAY
Picture speed·Noise reduction·Dynamic range

8: ADDITIONAL DISPLAY
30 sec. time marker·Colour scale (ON or OFF)*
Expansion range lines·Expansion start mark·Auto range·
Auto shift·Low/High frequency display·VRM·Marker line

9: ADDITIONAL FUNCTION
Dynamic range selection·TYG·Threshold·
Output power reduction·Noise reduction·White line·
Draft adjust·Auto degaussing·Colour tone selection
(6 types)·Memorizing display (3 displays)·Depth alarm·
Scale position selection·Auto lighting·User setting·
Picture speed selection (stop and 8 kinds)·
Water depth display size selection (large, medium, small
and OFF)·Transmit cycle selection·Keyboard lock·
Out of range depth display·
Bottom expansion display position selection (3 steps)·
Keyboard backup

© OTHERS

1: INPUT DATA
External sounder·Water temperature sensor·
External navigator (NMEA-0182, 0183)·

2: OUTPUT DATA
Receiving output·Transmit trigger·Water depth (NMEA-0183)·
Water temperature (NMEA-0183)·Lat/Long*

3: SCREEN
15 inch high resolution CRT (512×512 pixels)

4: POWER REQUIREMENT
DC18V~40V·Power consumption 120W

5: OPTIONAL EQUIPMENTS
Water temperature sensor

NOTE: functions marked with an asterisk * require optional equipment.