CONTENTS

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

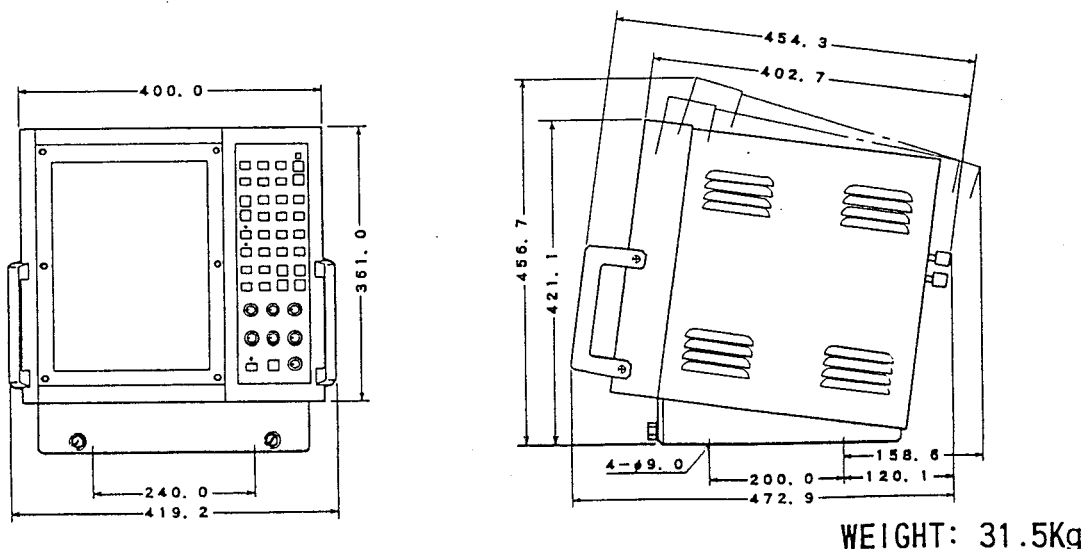Do not open the case cover.
There are high voltage components inside.

[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

WEIGHT: 31.5Kg

COMPOSITION

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

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).
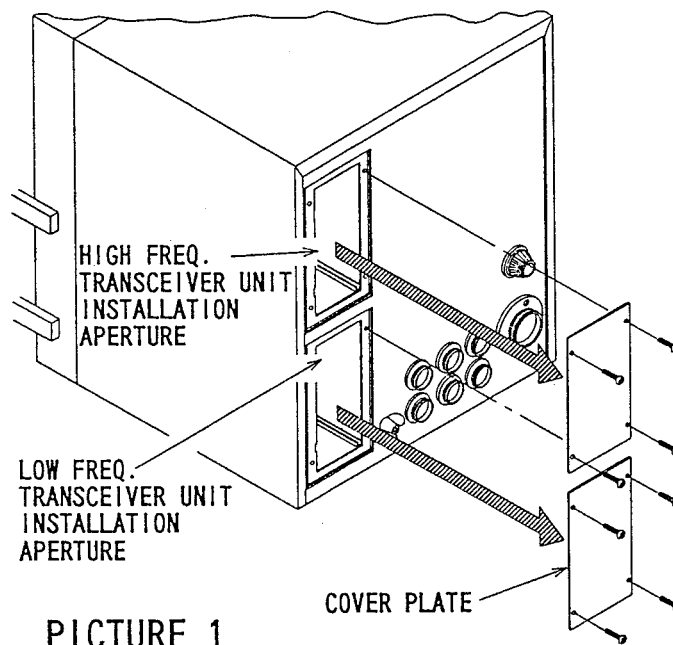
INSTALLATION

【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)

①Remove 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

COVER PLATE

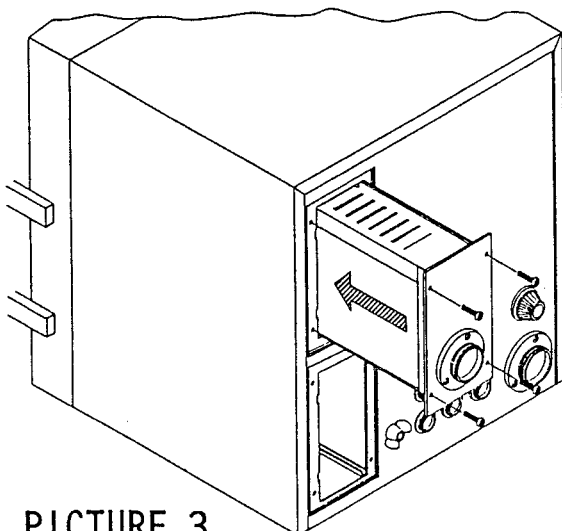### PICTURE 1

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 compairing 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).

②Take the transceiver unit out of the accessories box.

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

④Connect 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
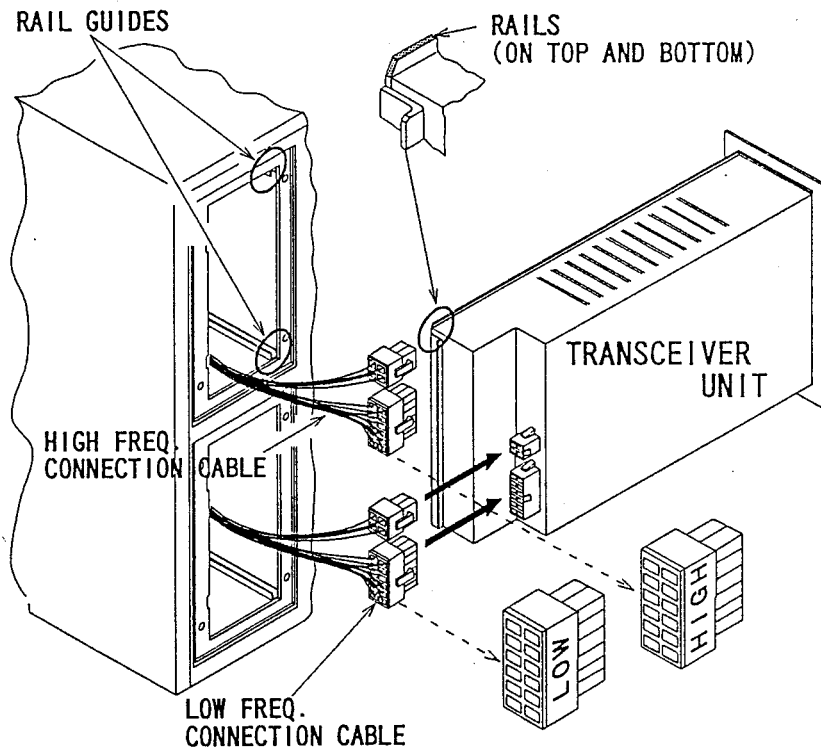
PICTURE 2

PICTURE 3

⑤Insert 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.

⑥After completing transceiver unit installation, fix it in place with the bolts which fastened the cover plate. (Picture 3)

【2】 MAIN UNIT MOUNTING

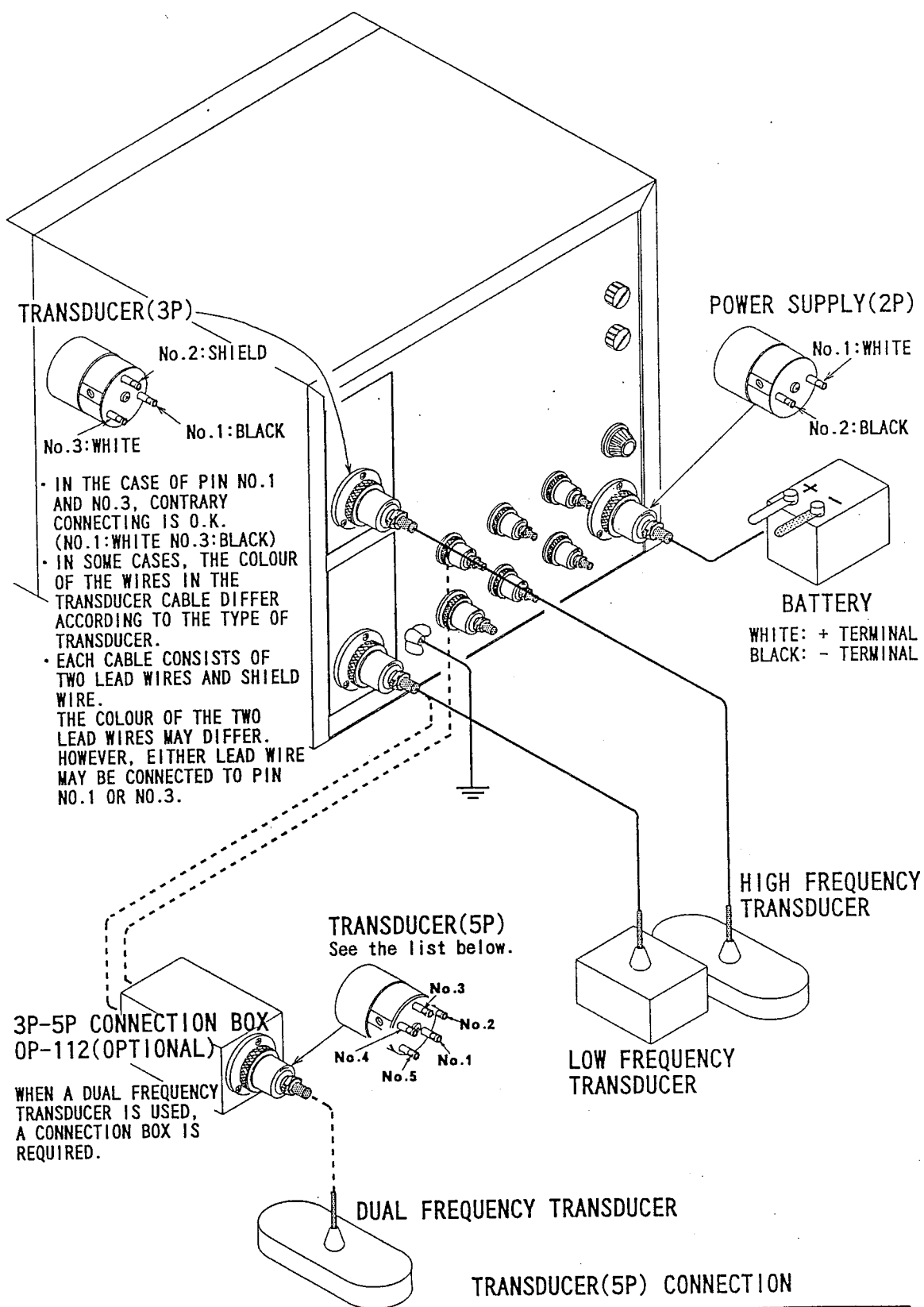◎This equipment should be installed in a place away from direct sunlight, sea spray and heavy vibration.
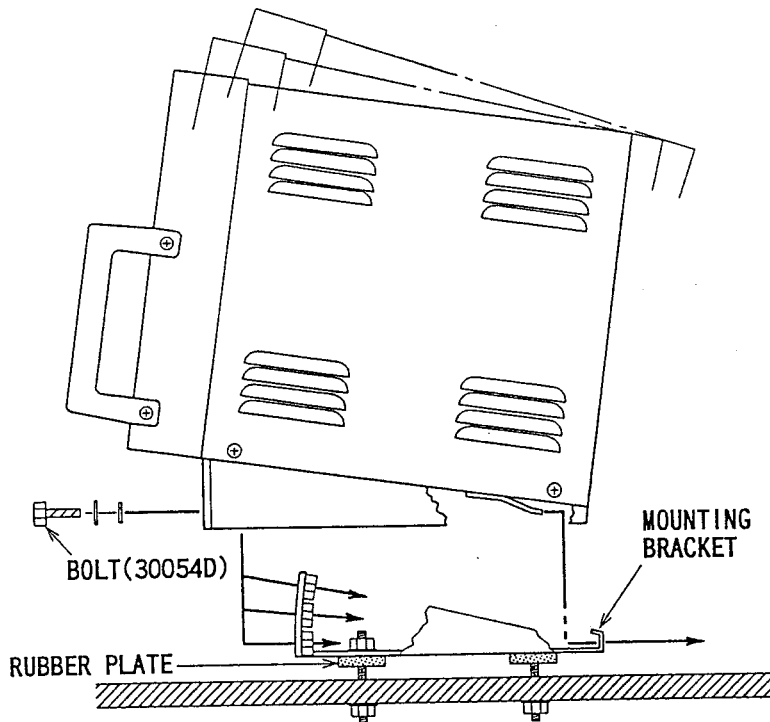
· Fix the mounting bracket in place.
Insert the main unit into the mounting bracket and tighten it with the bolts (36054D).

BOLT(30054D)

MOUNTING BRACKET

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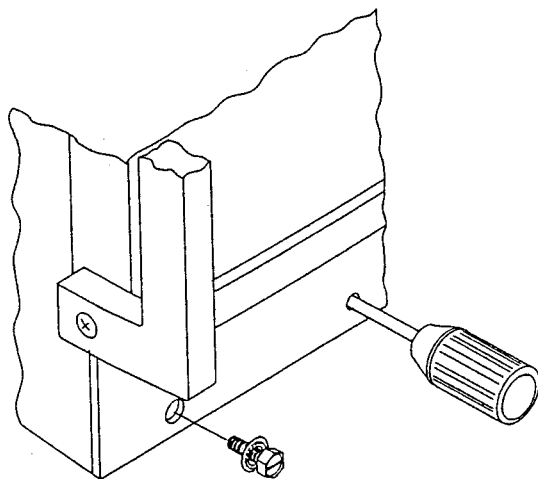
· When installing the mounting bracket to the main unit, tilt adjustment is available in three steps.

· After locating the tilt adjustment level for easiest viewing, insert a screw driver through the center hole of the bracket to hold the unit in place and tighten the bolts. (See picture left.)

【3】 CONNECTION

TRANSDUCER(3P)

No.2:SHIELD

No.3:WHITE No.1:BLACK

- 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 DIFFER 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.

POWER SUPPLY(2P)

No.1:WHITE

No.2:BLACK

BATTERY

WHITE: + TERMINAL
BLACK: - TERMINAL

HIGH FREQUENCY TRANSDUCER

TRANSDUCER(5P)
See the list below.

No.3
No.2
No.4 No.1
No.5

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

WHEN A DUAL FREQUENCY TRANSDUCER IS USED, A CONNECTION BOX IS REQUIRED.

LOW FREQUENCY TRANSDUCER

DUAL FREQUENCY TRANSDUCER

TRANSDUCER(5P) CONNECTION

PIN	50/200KHz TRANSDUCER		OTHER COMBINATION	
No.1	GREEN	200KHz	WHITE	HIGH FREQ.
No.2	RED		GREEN	
No.3	SHIELD		SHIELD	
No.4	BLACK	50KHz	RED	LOW FREQ.
No.5	WHITE		BLACK	

TEMPERATURE SENSOR(4P)

PIN	SIGNAL
No.1	WHITE
No.2	SHIELD
No.3	SHIELD
No.4	BLACK

NAVIGATOR INPUT(5P)

PIN	SIGNAL
No.1	SIGNAL INPUT +
No.2	SIGNAL INPUT -
No.3	SHIELD
No.4	SIGNAL OUTPUT +
No.5	SIGNAL OUTPUT -

NAVIGATOR OUTPUT(7P)

PIN	SIGNAL
No.1	
No.2	
No.3	SHIELD
No.4	OUTPUT +
No.5	OUTPUT -
No.6	
No.7	

(REFER TO PG 49
   FOR CONNECTING.)

EXTERNAL NAVIGATOR

TEMPERATURE
SENSOR OP-102
(OPTIONAL)
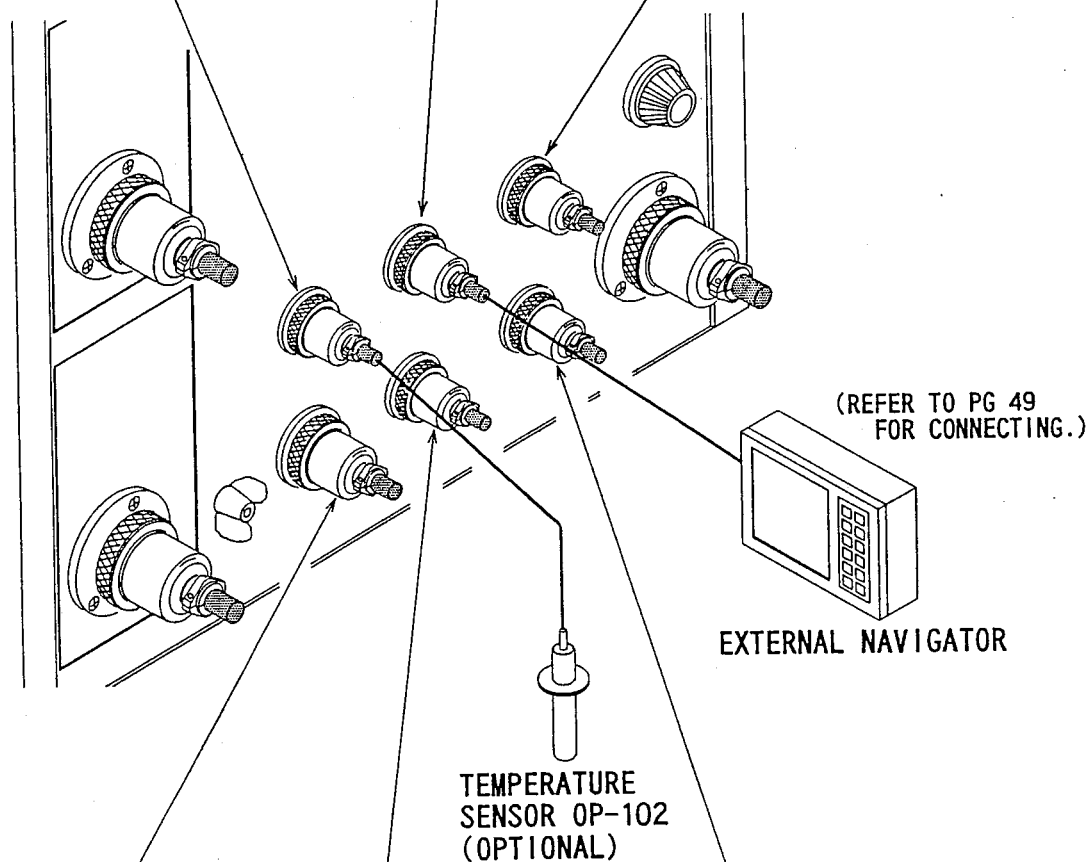
GPS INPUT(8P)

PIN	SIGNAL
No.1	
No.2	SIGNAL INPUT
No.3	
No.4	SIGNAL OUTPUT
No.5	GND
No.6	
No.7	12V OUTPUT
No.8	SHIELD

EXTERNAL INPUT/OUTPUT(8P)

PIN	SIGNAL
No.1	TRIGGER INPUT
No.2	TRIGGER OUTPUT
No.3	HIGH FREQ. SIG. INPUT
No.4	HIGH FREQ. SIG. OUTPUT
No.5	GND
No.6	LOW FREQ. SIG. INPUT
No.7	LOW FREQ. SIG. OUTPUT
No.8	SHIELD

NMEA OUTPUT(6P)

PIN	SIGNAL
No.1	
No.2	
No.3	SHIELD
No.4	OUTPUT +
No.5	OUTPUT -
No.6	

NOTE) DO NOT CONNECT ANYTHING TO NC OR BLANK PINS.
NOTE) WHEN A 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: EXPANSION START POINT:
indicates   indicates the expansion   THE DEPTH START POINT(PHASED RANGE)
frequency.   start depth.   AT THE TOP OF THE SCREEN

TIME MARKER:
30 second elapsed time.

HIGH 49. 2 0   LOW   49. 2 0

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

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

FISH SCHOOL

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

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

SEA BOTTOM

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

HIGH FREQ. DISPLAY   LOW FREQ. DISPLAY

1. 6KT219° T⁄
34° 43, 130′N
137° 05, 790′E
10, 7 C

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

3 5.2MT

S—A   S—A
P F 1   P F 1
N R 1   N R 1
D R 6   D R 6

PICTURE SPEED・NOISE REDUCTION・
 DYNAMIC RANGE INDICATOR:
indicates the level set.
Indicates own ship's speed*/
course bearing*・latitude &
longitude*・water temperature*.
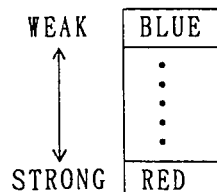
COLOUR SCALE: DEPTH DISPLAY:
indicates the   indicates current bottom
level of the   depth selected under
echo's strength.   "DEPTH UNIT(depth unit)"
                     function on the menu mode.

WEAK	BLUE
↑	·
		·
		·
↓	·
STRONG	RED
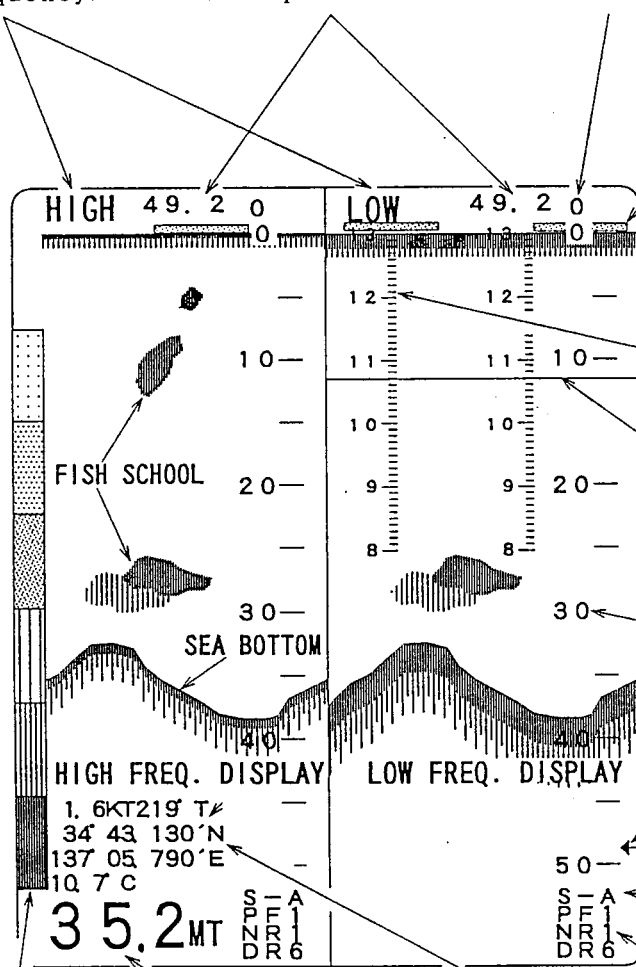
NOTE: To display the functions marked with an
      asterisk *, optional equipment is required.

【2】 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.

```
 | | | | |  ▦▦  | | |
              0. 04
0 1
  34° 43. 900´N
137° 06. 400´E
230°   3. 2NM  1. 8H

    219° T

  1. 6KT219° T
  34° 43. 130´N
137° 05. 790´E
10. 7° C
35.2 MT
```

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

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:℃ 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.

【4】 REAR PANEL CONNECTORS

①HIGH/LOW FREQUENCY (3P) TERMINALS
   To connect transducers.
   Upper side: For high frequency
   Lower side: For low frequency

②COOLING FAN
   Do not put anything around this
   equipment.

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

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

⑤FUSE
   15A fuse.
   Please use correct fuse.

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

⑦NAVIGATION OUTPUT (7P) TERMINAL
   To output the signal for
   external navigator.
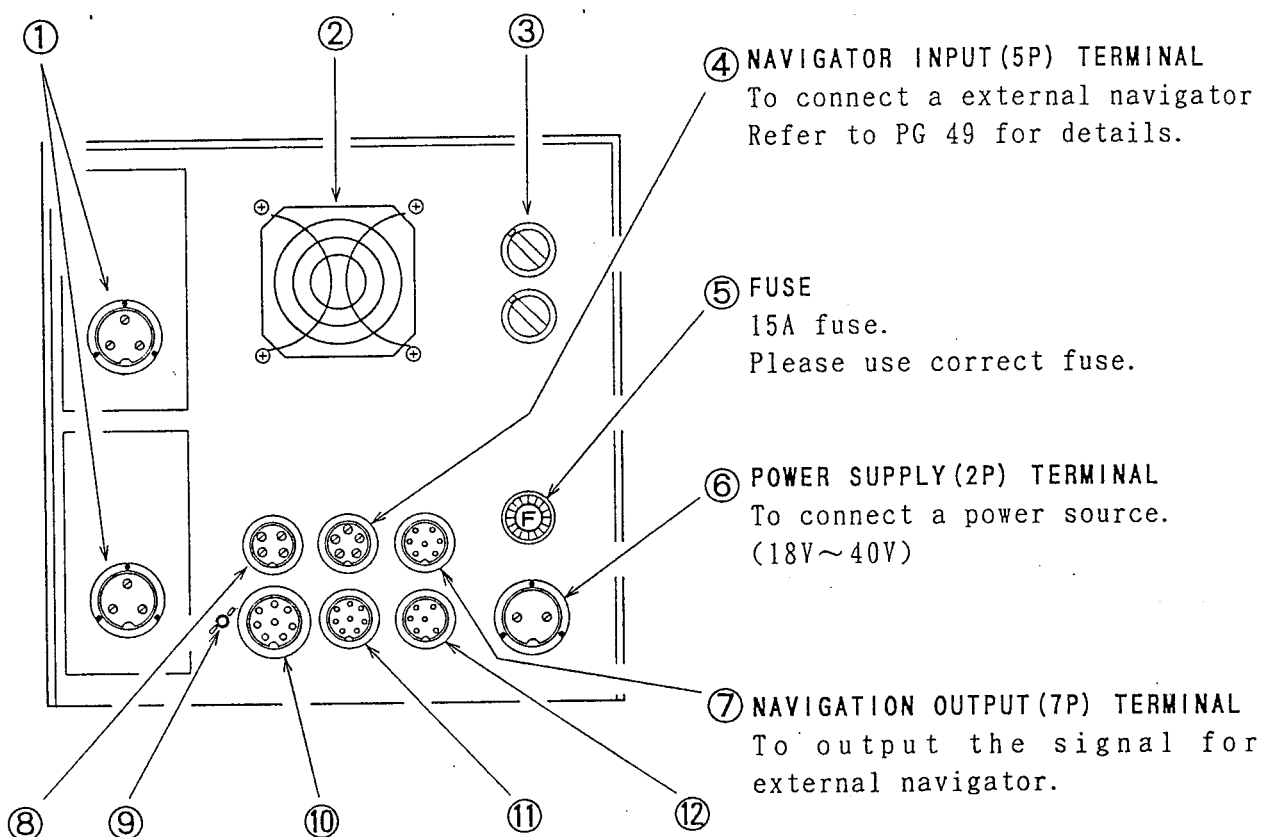
⑧TEMPERATURE SENSOR (4P) TERMINAL
   To connect a optional temperature
   sensor(OP-102).

⑨EARTH TERMINAL

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

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

⑫NMEA OUTPUT (6P) TERMINAL
   To output the format signal of
   NMEA-0183.

- 13 -

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.

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

【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
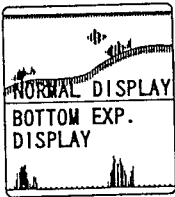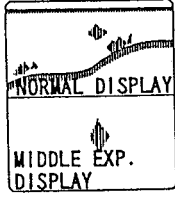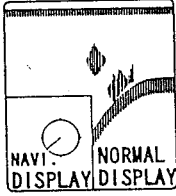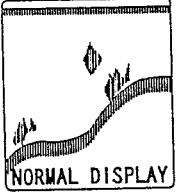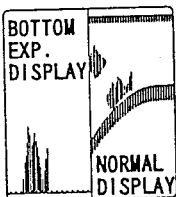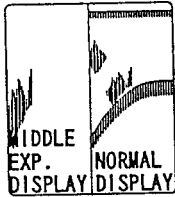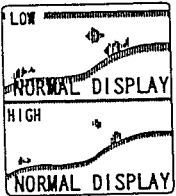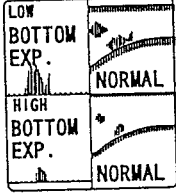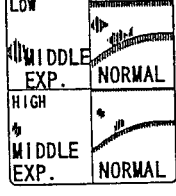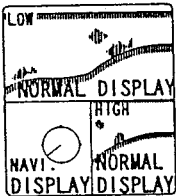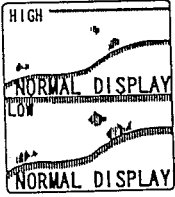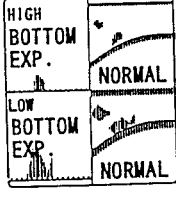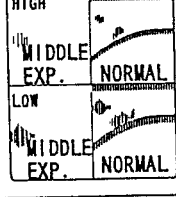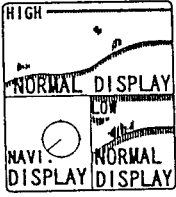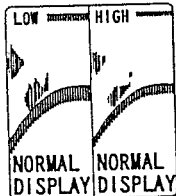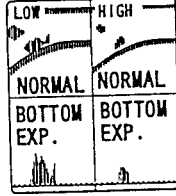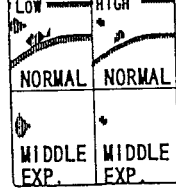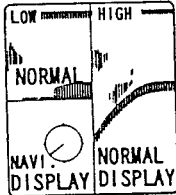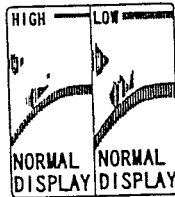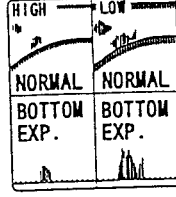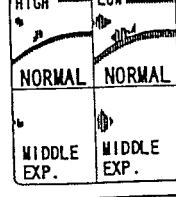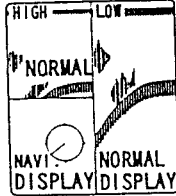
· If [↵] key or [MENU] key is released before the "beep" noise stops, the settings will not be returned to "FACTORY SETTING" or "USER SETTING".

· 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

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.

DYN RANGE	3 d B	4 d B	5 d B	6 d B	
SCRN DIV	VERT	HORIZ			
DUAL FERQ	L I H	H I L			
GAIN UP H	0	+ 1 0	+ 2 0	+ 3 0	+ 4 0
GAIN UP L	0	+ 1 0	+ 2 0	+ 3 0	+ 4 0
TVG H	1	2	3	4	
TVG L	1	2	3	4	
TRAN RATE	1 0 0 0	6 6 6	3 3 3		
DPTH UNIT	MT	FM	BR	FT	
TEMP UNIT	OFF	˙C	˙F		
SPD UNIT	OFF	KT	KM／H		
SCALE POS	OFF	CENTER	RIGHT		
DPTH DISP	OFF	SML	MED	LRG	
DRAFT	0 0				
RANGE SET	LINKED	SINGLE			
TRAN SYNC	OFF	ON			
ECHO SIG	INTERNAL	EXTERNAL			
TRIGGER	INTERNAL	EXTERNAL			
A SCOPE	OFF	ON			
BTM EXPN	1	2	3		
COL SET	A 1	A 2	B 1	B 2	C 1	C 2
LAT／LON	OFF	ON			
NAV MODE	OFF	ON			
NAV INPUT	NMEA0182	NMEA0183			
WPT	0 0				
WPT SET					

◎After setting the function, press 「↵」 key to return to the sounder mode.

◎For details, refer to the following pages.

- 17 -

MENU MODE FUNCTION

【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.

```
DYN RANGE      3 d B    4 d B    5 d B    6 d B
              (D R 3)  (D R 4)  (D R 5)  (D R 6)
```
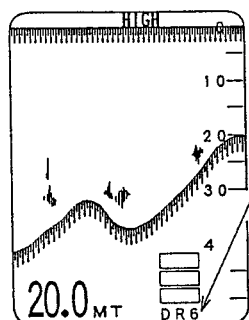
display the setting being selected, here.

COLOUR SCALE
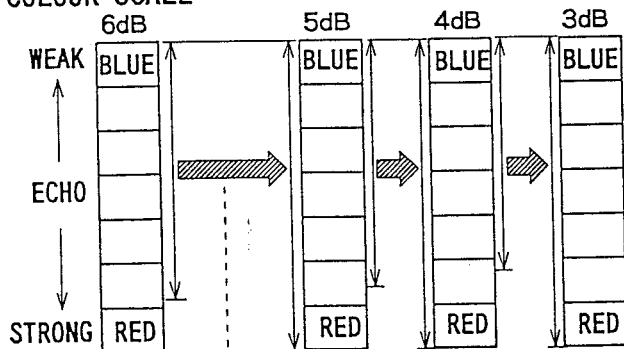
When the dynamic range is changed from 6dB to 5dB this range will be displayed in 7 colours.
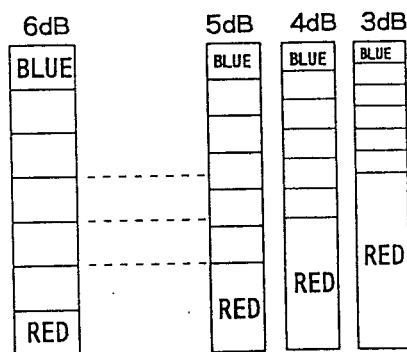
This diagram shows the comparative signal threshold levels for the dynamic ranges.

【2】 SCREEN DIVISION

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

```
┌─────────────────────────────────────────────────────┐
│                                                       │
│   S C R N   D I V        V E R T      H O R I Z       │
│                                                       │
└─────────────────────────────────────────────────────┘
```
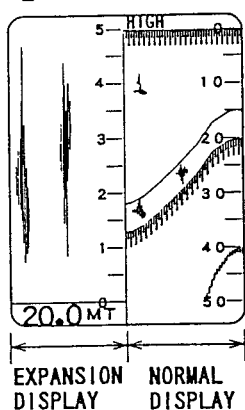
[VERTICAL]   [HORIZONTAL]
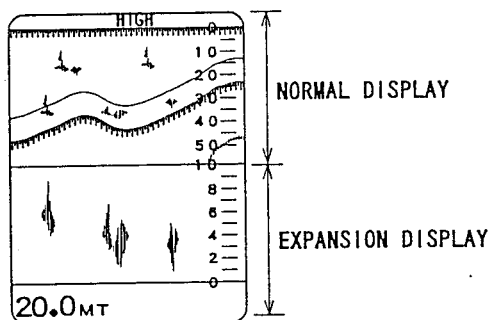
VERTICAL:
displays the picture which
is divided into vertically
(left/right).

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

EXPANSION NORMAL
DISPLAY   DISPLAY

NORMAL DISPLAY

EXPANSION DISPLAY

【3】 DUAL FREQUENCY DISPLAY LOCATION

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

```
┌─────────────────────────────────────────────────────┐
│                                                       │
│   D U A L   F R E Q          L I H      H I L         │
│                                                       │
└─────────────────────────────────────────────────────┘
```

When "VERT(vertical)" is selected in the above
【2】 SCREEN DIVISION, "L I H H I L" will be displayed.
When "HORIZ(horizontal)" is selected, "H／L L／H"
will be displayed.

[L I H]   [H／L]

L I H: Left side; Low freq.
       Right side; High freq.
H I L: Left side; High freq.
       Right side; Low freq.
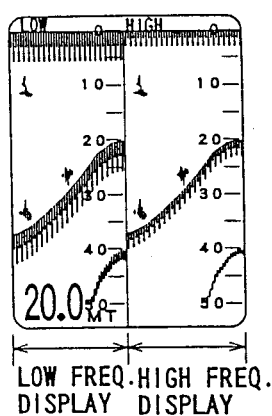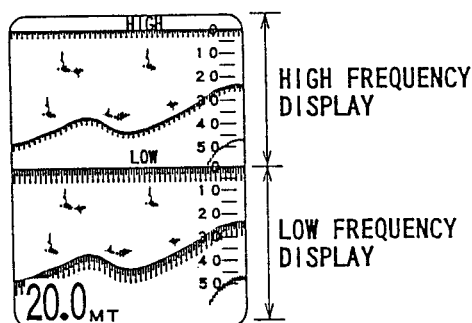
HIGH FREQUENCY
DISPLAY

LOW FREQUENCY
DISPLAY

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

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

LOW FREQ. HIGH FREQ.
DISPLAY   DISPLAY

SCREEN DIVISION: SCREEN DIVISION:
    VERTICAL   HORIZONTAL

【4】 HIGH FREQUENCY/LOW FREQUENCY GAIN UP

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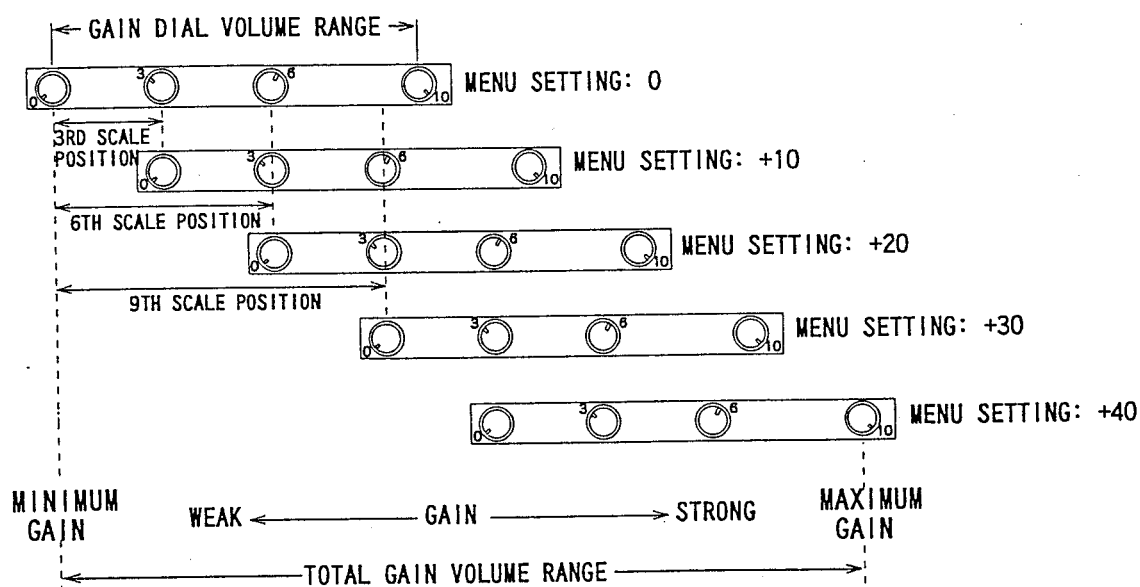
· When the menu gain up setting is changed from "GAIN UP 0" to "GAIN UP +10" the control panel gain dial volume increases 3 points on the scale.

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.

T V G H	1	2	3	4
T V G L	1	2	3	4

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.

NO TVG

TVG: 2 or 3

50m ---- ALMOST SAME SIZE FISH SCHOOL

100m ----

Shows in red.

Shows in yellow.

Deep echoes will be displayed larger.

Shows in red.

Shows in red.

Echoes from deep fish schools will be weaker than from the schools at a same size shallower depth.

Select TVG adjust level "2" or "3" to show deep echoes at a more accurate size and density

DYNAMIC RANGE LEVEL: 6dB
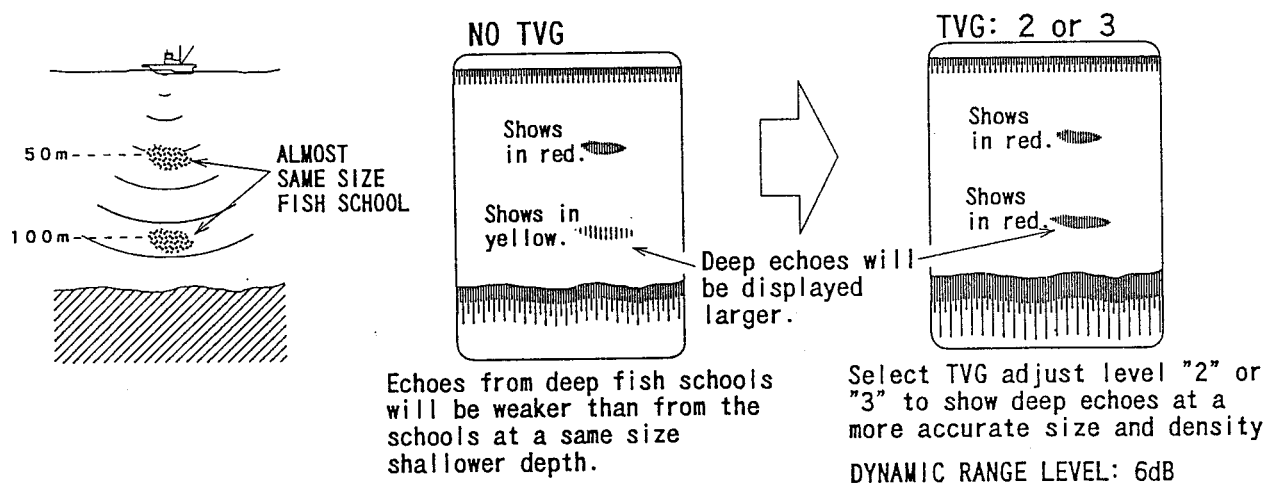
CAUTION

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).

| TRAN 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).

| DPTH UNIT | MT | FM | BR | FT |

[MT]

DEPTH SCALE→

20.0MT

WATER DEPTH

METERS

[FM]

20.0 FM

FATHOM
1FM:1.82m

[BR]

20.0 BR

BRACCIA
1BR:1.65m

[FT]

20.0 FT

FEET
1FT:0.3m
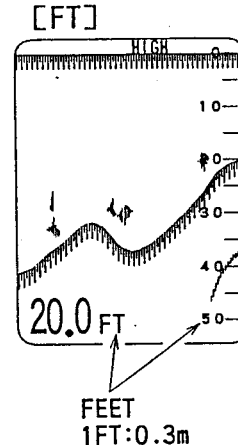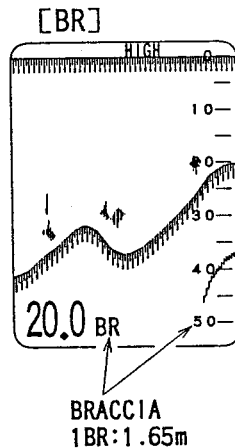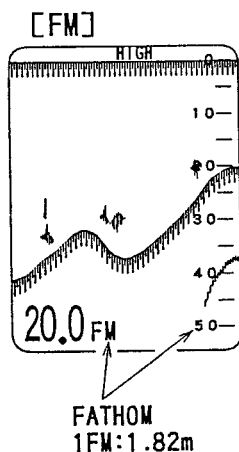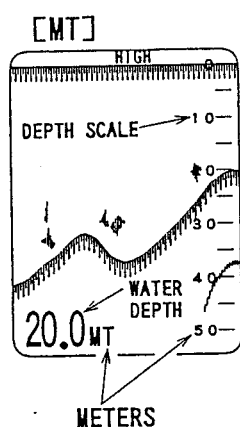
【8】 WATER TEMPERATURE UNIT

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

| TEMP UNIT | OFF | °C | °F |

[OFF]

20.0MT

[°C]

WATER TEMPERATURE
DISPLAY

10.7 C

20.0MT

[°F]

10.7 F

20.0MT
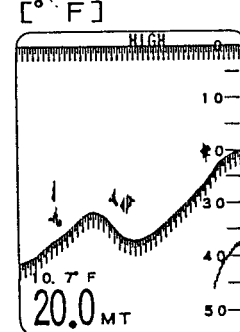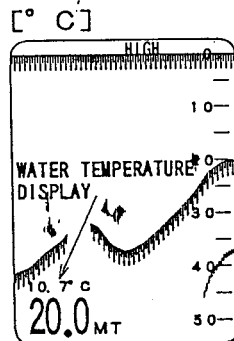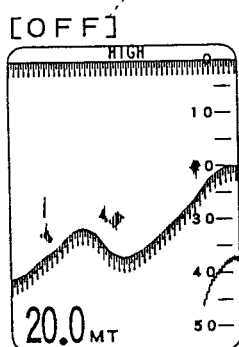
CATUION

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).

```
S P D   U N I T        O F F        K T        K M / H
```

[OFF]   [KT]   [KM/H]

SHIP SPEED

displays the
course bearing.
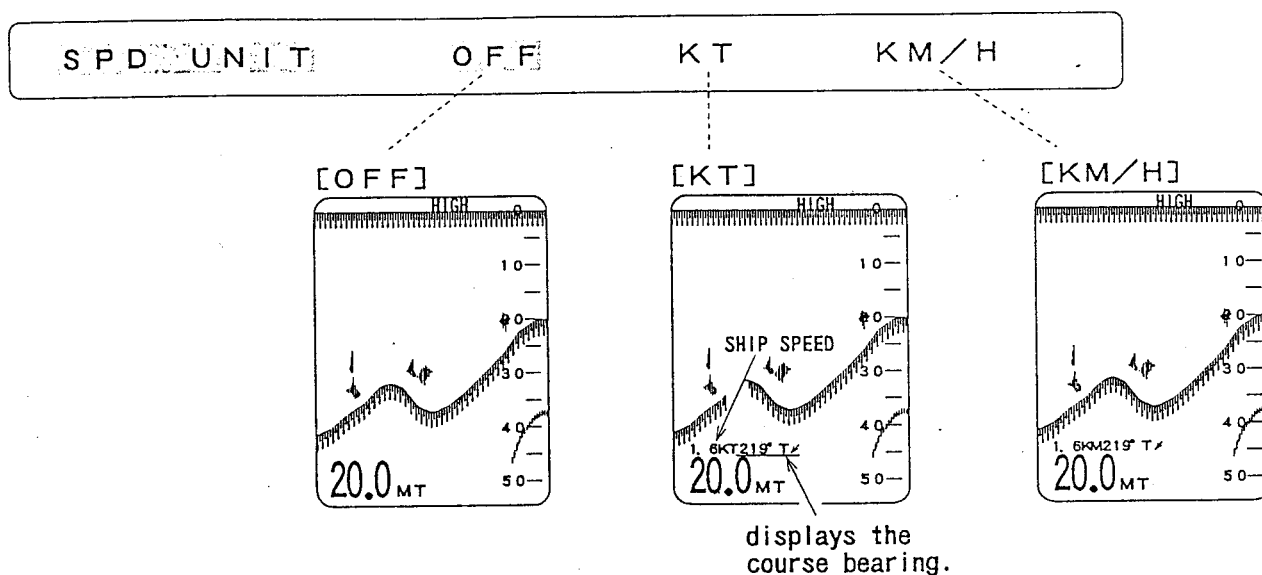
CATUION

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).

```
S C A L E   P O S        O F F        C E N T E R        R I G H T
```

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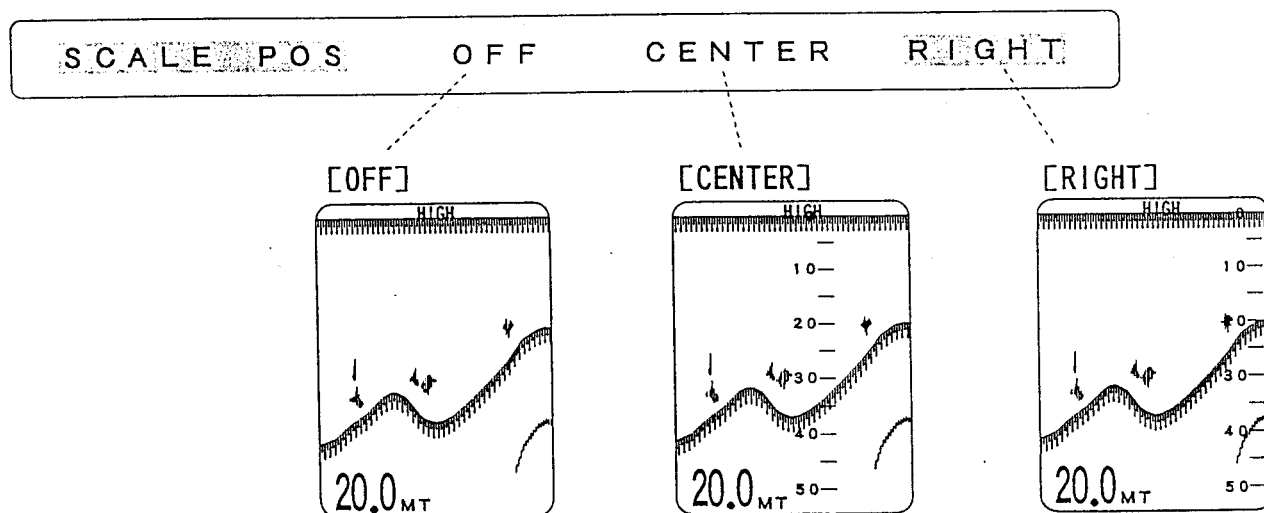
【 11 】 DEPTH DISPLAY

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

```
DPTH DISP      OFF      SML      MED      LRG
```

[OFF]	[SML]	[MED]	[LRG]
HIGH	HIGH	HIGH	HIGH

20. 0MT   2Q 0MT   20.0MT
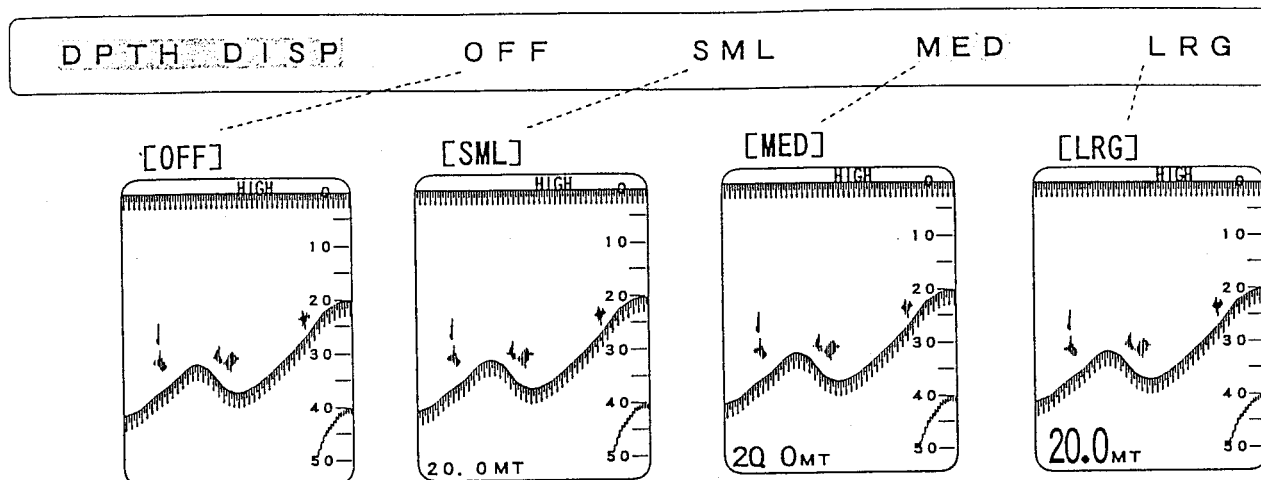
【 12 】 DRAFT

◎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 ×100△ or ×100▽ key to set the draft range in one unit steps from 0～99
meters, fathoms, braccia, feet.

To decrease the number: ×100△ key   To increase the number: ×100▽ key

```
DRAFT          0 1
```

· 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.

DRAFT RANGE   Before draft adjustment   After setting the draft 1.0 and returning to sounder normal mode.   Adjust the echo start depth to 1.0 with the phased range keys.

1 m

5 m
TRANSDUCER   4 m
FACE

4.0MT   5.0MT   5.0MT
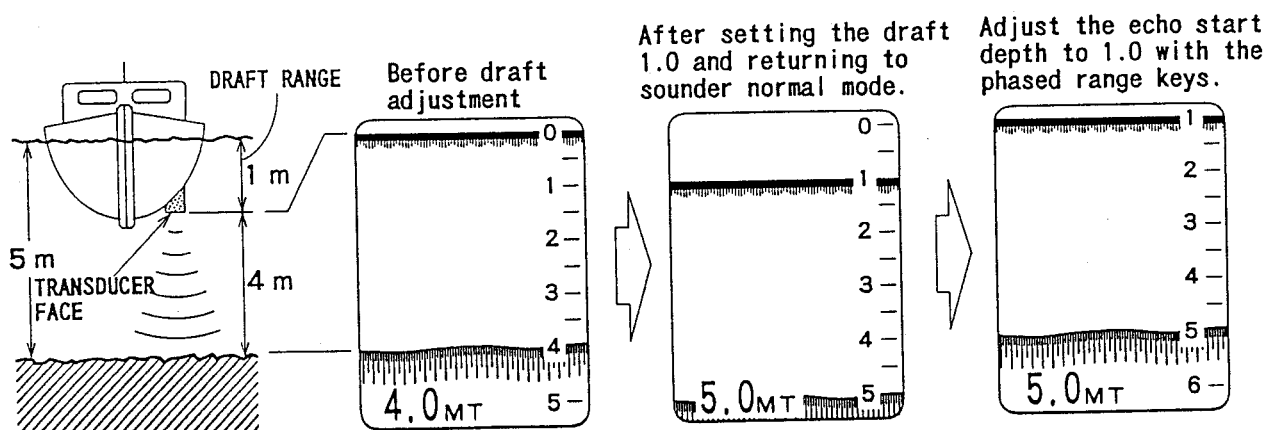
· After setting the desired draft range return to sounder mode and be sure to
press the phased range keys to adjust the echo start depth as indicated.

(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 〔ᶹᶹ〕 and 〔∿〕 keys on the control panel will be indicated by the red lights.

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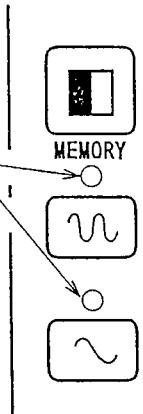
CONTROL PANEL

· 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 〔ᶹᶹ〕 or 〔∿〕 keys on the control panel will be indicated by the red light.

RANGE SET   LINKED   SINGLE

· When only 〔∿〕 key is indicated by red light, pressing 〔ᶹᶹ〕 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.

[L | H]

Sets the main range (full length of the screen) to 50m.

Sets the main range (full length of the screen) to 30m.

20.0

LOW FREQ. HIGH FREQ.
DISPLAY   DISPLAY
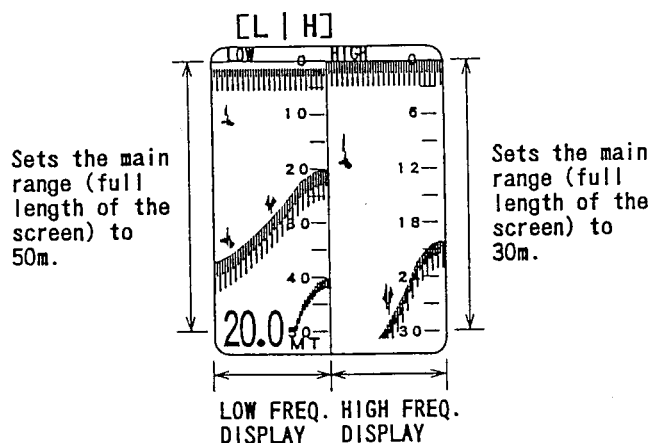
SCREEN DIVISION: VERTICAL

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.

```
TRAN SYNC          OFF          ON
```

Transmits the high/low frequency
sound wave **separate speeds**.

Transmits the high/low frequency
sound wave **same speeds**.

· 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.

```
ECHO SIG        INTERNAL      EXTERNAL
TRIGGER         INTERNAL      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".

```
A SCOPE          OFF          ON
```

[OFF]

[ON]
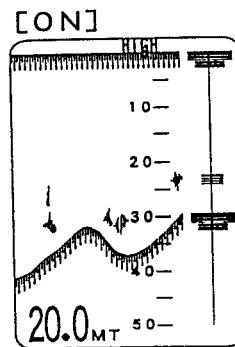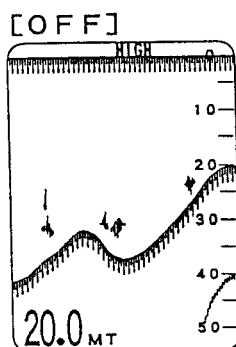
【 17 】 BOTTOM EXPANSION DISPLAY POSITION

◎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).

```
B T M   E X P N          1          2          3
```

[1]

EXPANSION NORMAL
DISPLAY   DISPLY
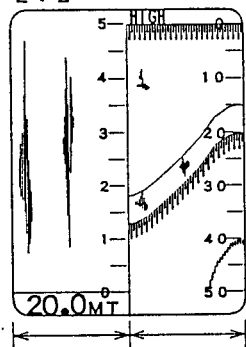
The bottom is displayed
with a line.

[2]

EXPANSION NORMAL
DISPLAY   DISPLY
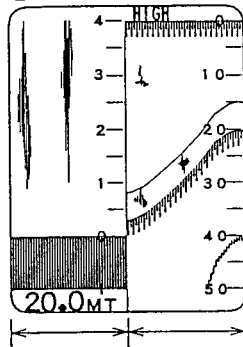
The bottom is displayed
in the lower 1/5 of the
expansion range.

[3]

EXPANSION NORMAL
DISPLAY   DISPLY
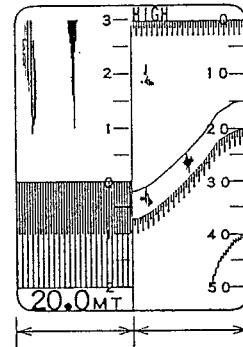
The bottom is displayed
in the lower 2/5 of the
expansion range.

【 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

```
C O L   S E T     A 1     A 2     B 1     B 2     C 1     C 2
```

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.
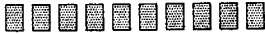
```
COLOUR PALETTE SET

  SET
  PRESET
```

· Use ⬆△ or ⬇▽ key to move the cursor to "SET" and
press ↵ key to display "COLOUR PALETTE SET"
display on the next page.
Moving the curosor to "RESET" and pressing ↵ key
return the colour tone to the user setting.
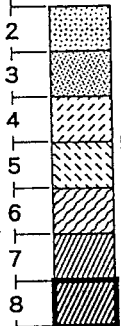
Use ⟦▸△⟧ or ⟦◂▽⟧ key to select
the range (0~15).

COLOUR PALETTE SET

RED   08   ⬚⬚⬚⬚⬚⬚⬚⬚

GREEN   02   ⬚⬚

BLUE   10   ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

Use ⟦▴△⟧ or ⟦▾▽⟧ key to move the
cursor.

1 ◁─── BACK COLOUR
2
3
4   COLOUR SCALE
5
6
7
8

Change the frame position
with ⟦×∞ △⟧ or ⟦×∞ ▽⟧ key.

· 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 it's 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.

RED
WHITE
GREEN   BLUE
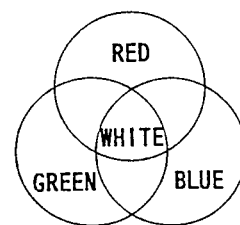
【 19 】 LATITUDE/LONGITUDE DISPLAY

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

```
L A T / L O N          O F F          O N
```

[OFF]   [ON]

LATITUDE/
LONGITUDE
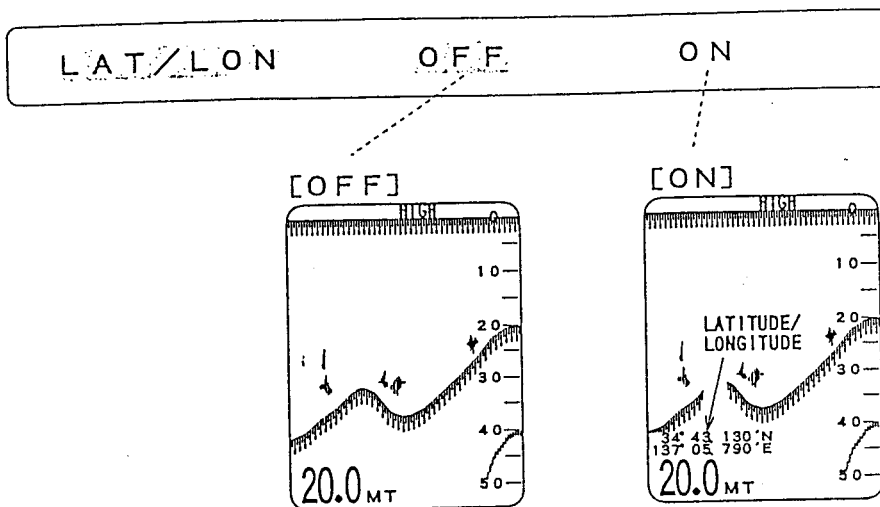
CAUTION

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.

```
N A V   M O D E          O F F          O N
```

[OFF]   [ON]
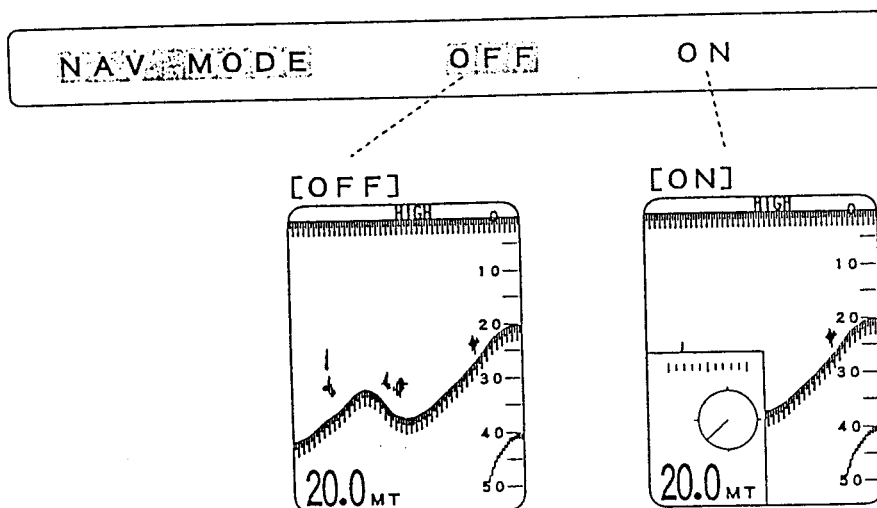
CAUTION

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".

```
NAV INPUT        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 〔2〕 NAVIGATION DATA MODE EXAMPLE on PG 10 for details.

```
WPT                     0 1
```

· 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 [▸△] key to move the cursor to the numeral's first digit.

Use [×100△] or [×100▽] key to enter the waypoint number (01~20) and press
[↵] key to set the waypoint number to be displayed on the navigation data
mode.
(To decrease the number : [×100△] key. To increase the number : [×100▽] 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.

【 23 】 WAYPOINT SET

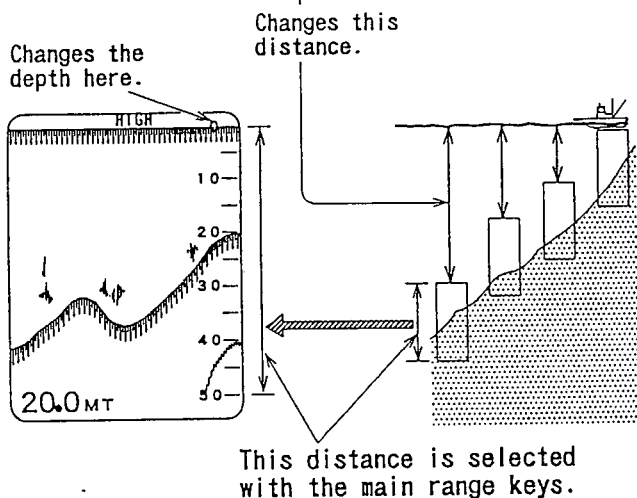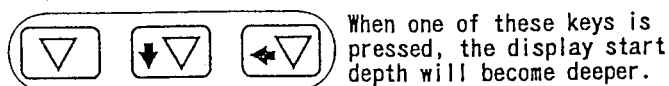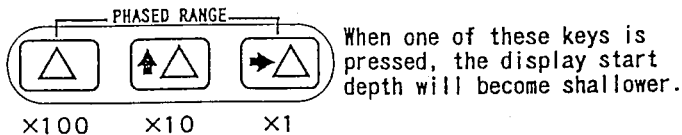◎To enter the latitude/longitude data at the waypoint's numbers 01~20.

> W P T   S E T

- 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 [×100△] key and [×100▽] key to enter the latitude/longitude data.

  ([×100△] key: To decrease·North·East   [×100▽] 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 [A⩘] or [A∿] key([B⩘] or [B∿] · [C⩘] or [C∿]).

- 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.

```
    W P T   S E T
  0 1    3 4° 3 6. 2 5′N    1 3 7° 3 3. 4 1′E
  0 2    3 4° 4 0. 3 5′N    1 3 7° 2 4. 2 5′E
  0 3    ──° ──. ──′─       ───° ──. ──′─

       {           {                {

  1 8    ──° ──. ──′─       ───° ──. ──′─
  1 9    3 4° 3 0. 4 5′N    1 3 7° 1 5. 0 5′E
  2 0    3 4° 4 2. 8 1′N    1 3 7° 0 7. 2 2′E
```

WAYPOINT NUMBER   LATITUDE DATA   LONGITUDE DATA

CONTROL PANEL KEYS

【1】 PHASED RANGE KEYS

When one of these keys is pressed, the display start depth will become shallower.

×100 ×10 ×1

When one of these keys is pressed, the display start depth will become deeper.

Changes the depth here.

Changes this distance.

HIGH

10—
20—
30—
40—
50—

20.0 MT

This distance is selected with the main 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).

×100 : to change a number of third figure.

×10 : to change a number of second figure.

×1 : to change a number of first figure.

・This function may be used to show the desired area expanded on the screen.

・Pressing ×100△ key and ▲△ key together sets the depth start point to 0.

・Refer to P.G 46 for AUTO SHIFT function.

【2】 MENU MENU KEY

◎ To display the "MENU MODE", press MENU key.

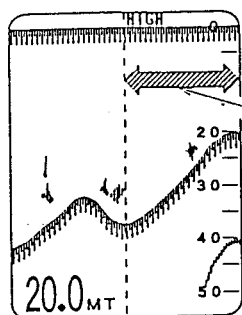◎ "MENU MODE" is the display to set functions of the ES-5300. (Refer to PG 17.)

【3】 INPUT KEY

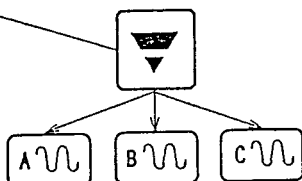◎ To return to the sounder display from the menu mode, press key.

【4】 ▽ ▮ MEMORY WRITE/READ KEYS

Memorizes the right half of the screen at the time when pressing these keys.

▽ → A⟋⟍ B⟋⟍ C⟋⟍

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

· Within 10 seconds after pressing ▽ key press one of the three keys (A⟋⟍ · B⟋⟍ · C⟋⟍) 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.
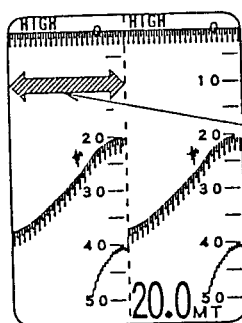
Displays the picture, being memorized under the specified key, on the left half of the screen.

▮ → A⟋ B⟋ C⟋
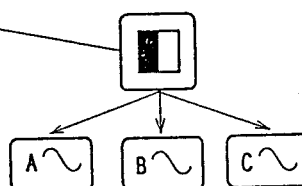
◎To recall and display the memorized picture on the left half of the screen.

· Within 10 seconds after pressing ▮ key press one of the three keys (A⟋ · B⟋ · C⟋)which corresponds to the high frequency mode key A·B·C under which the display is memorized.

◎By pressing ▮ 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.
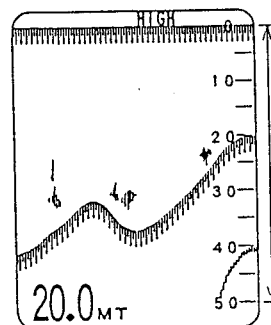
【5】 ▯ NORMAL MODE KEYS

◎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 A⟋⟍ key.

· To display low frequency Normal mode on the full screen, press A⟋ key.

NORMAL MODE

This range is selected by main range keys.

· To display dual frequency Normal mode on the full screen, press A⟋⟍ key and A⟋ key together.

〔6〕 ↓ BOTTOM EXPANSION MODE KEYS

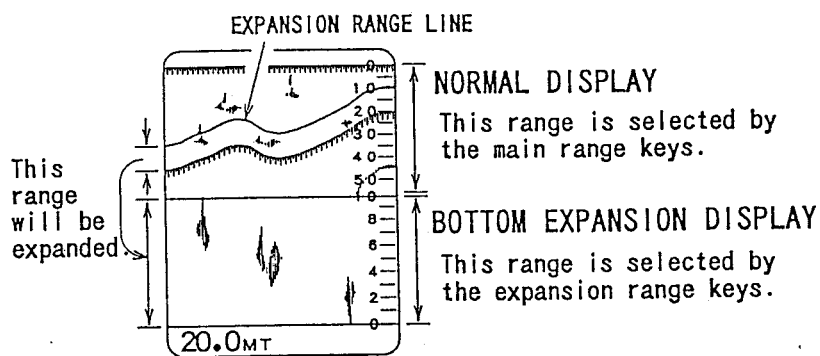◎To display Normal/Bottom expansion mode.
　Refer to "DISPLAY MODE LIST" on PG 16 for details.

・To display high frequency Normal/Bottom expansion mode, press [B∿] key.

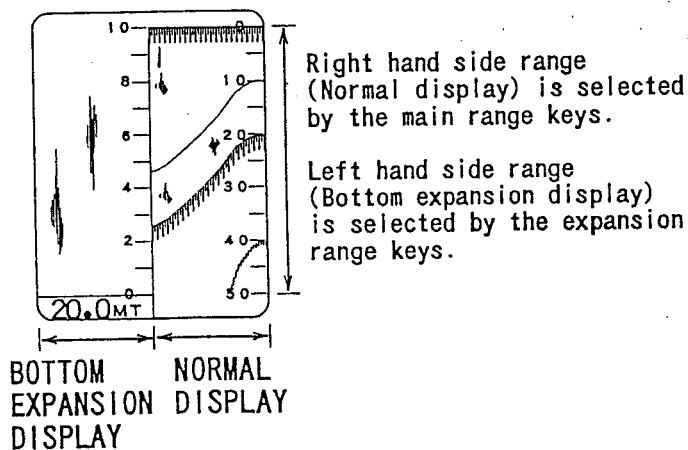・To display low frequency Normal/Bottom expansion mode, press [B∿] key.

・To display dual frequency Normal/Bottom expansion mode, press [B∿] and [B∿] key together.

SCREEN DIVISION: HORIZONTAL

EXPANSION RANGE LINE

This range will be expanded

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

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

20.0MT

◎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.

BOTTOM   NORMAL
EXPANSION   DISPLAY
DISPLAY

20.0MT

・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.
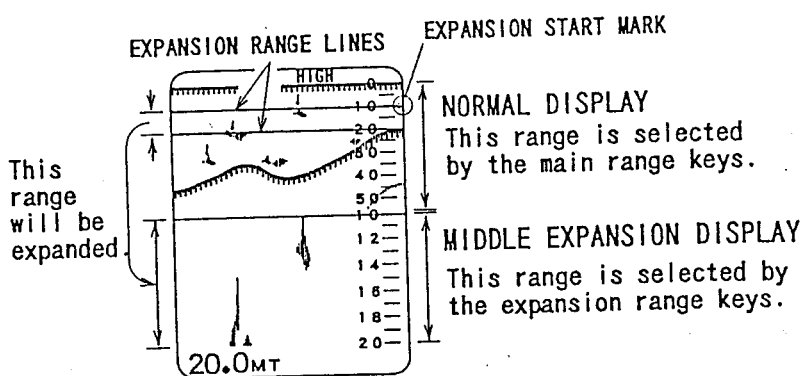
〔7〕 ↕ MIDDLE EXPANSION MODE KEYS
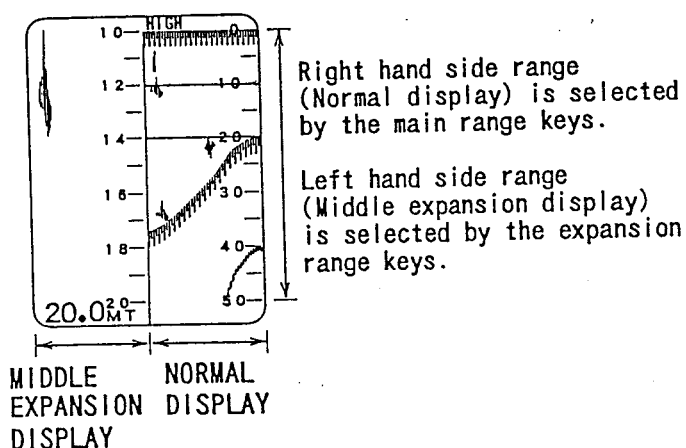
◎To display Normal/Middle expansion mode.
  Refer to "DISPLAY MODE LIST" on PG 16 for details.

· To display high frequency Normal/Middle expansion mode, press [cɅ] key.

· To display low frequency Normal/Middle expansion mode, press [cↄ] key.

· To display dual frequency Normal/Middle expansion mode, press [cɅ] key and
  [cↄ] key together.

| SCREEN DIVISION: HORIZONTAL |

EXPANSION RANGE LINES   EXPANSION START MARK

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

MIDDLE EXPANSION DISPLAY
This range is selected by
the expansion range keys.

This range will be expanded

20.0MT

| 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.

20.0MT

MIDDLE   NORMAL
EXPANSION   DISPLAY
DISPLAY

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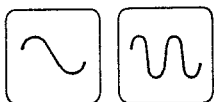
· The expansion range is indicated by two yellow lines on Normal display.

· The upper expansion range line can be set by the expansion start mark which is as 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.

[8] ⬚⬚ 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".
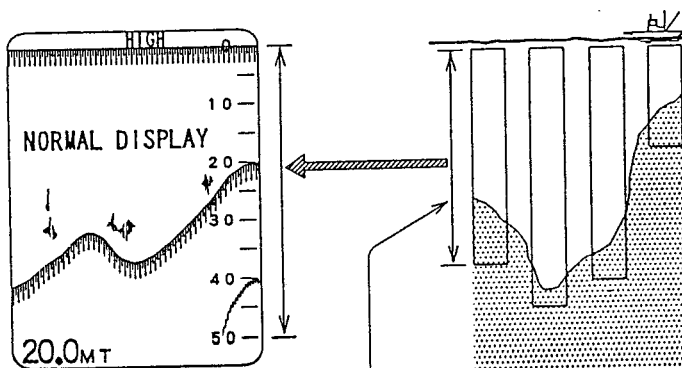
[9] ▪▌ MAIN RANGE KEYS (NORMAL DISPLAY)

◎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.
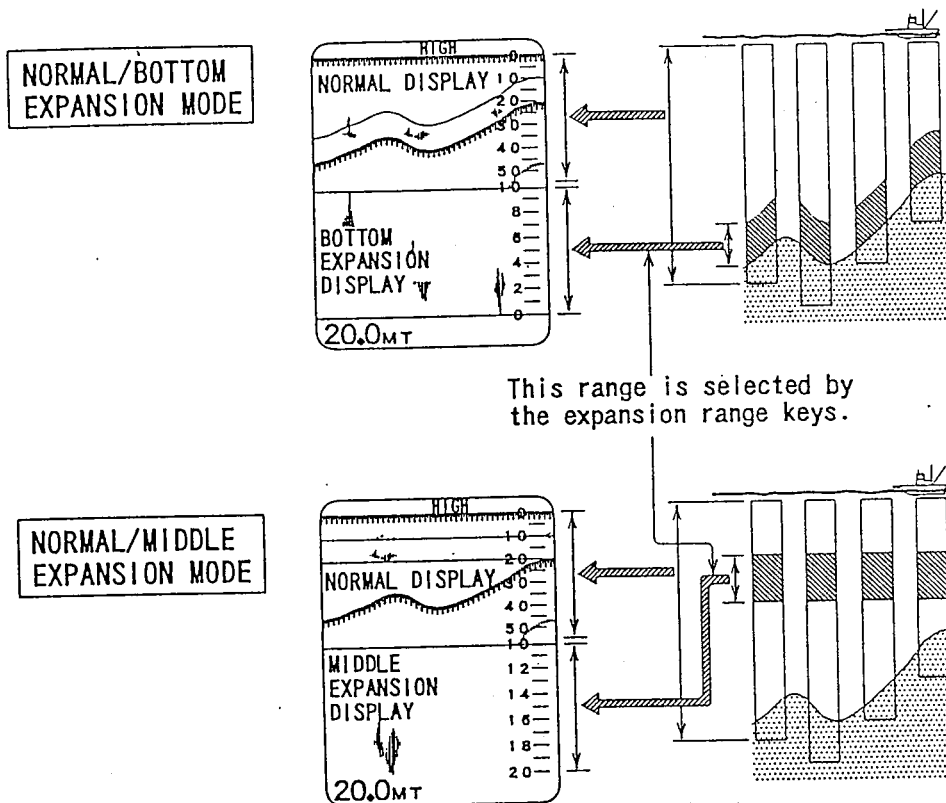
· For AUTO RANGE function, refer to PG 45.

〔10〕 □▯ EXPANSION RANGE KEYS (EXPANSION DISPLAY)

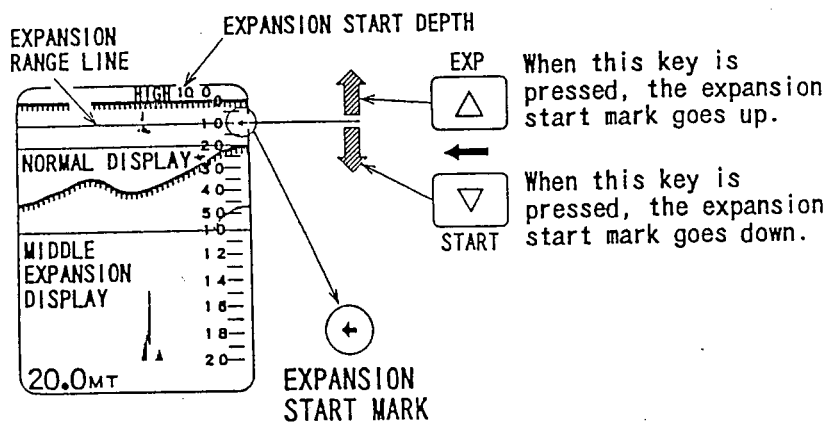◎To select the expansion range for Middle expansion display and Bottom expansion display.

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 DISPLAY

BOTTOM EXPANSION DISPLAY

20.0MT

This range is selected by the expansion range keys.

NORMAL/MIDDLE EXPANSION MODE

NORMAL DISPLAY

MIDDLE EXPANSION DISPLAY

20.0MT

〔11〕 ← EXPANSION START KEYS

EXPANSION RANGE LINE

EXPANSION START DEPTH

NORMAL DISPLAY

MIDDLE EXPANSION DISPLAY

20.0MT

EXPANSION START MARK

EXP

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

←

▽ 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 〗 ∫ 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.
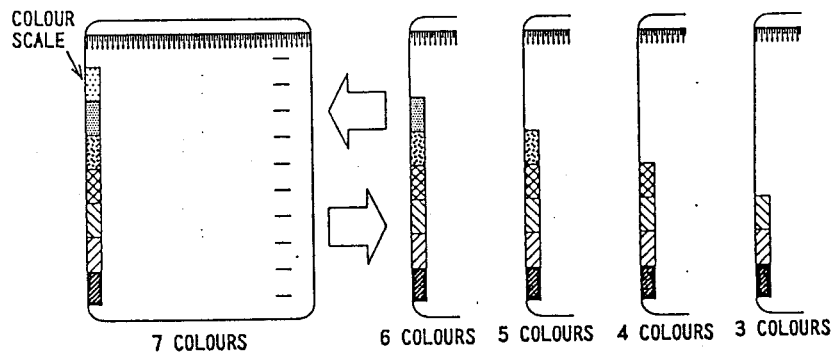
- Each time 〔∫▽〕 key is pressed the weakest colour on the colour scale will be erased.

- Each time 〔∫△〕 key is pressed the colour previously erased will be replaced.

Each press of this key replaces colours as shown right.
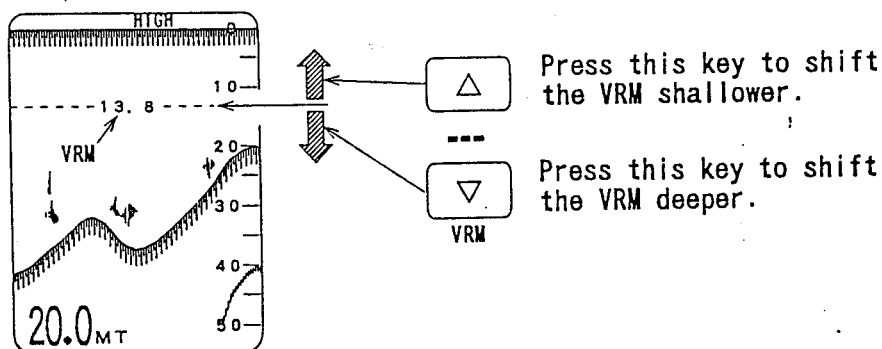
△
∫
▽
THRESHOLD
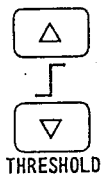
Each press of this key erases colours as shown right.

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 〗 --- 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.

HIGH

13.8

VRM

20.0 MT

△　Press this key to shift the VRM shallower.

▽　Press this key to shift the VRM deeper.
VRM

CAUTION

When the VRM is displayed, it may be cleared by pressing 〔---△〕 key and 〔---▽〕 key together, however, its positional data(depth) will be stored in the memory.

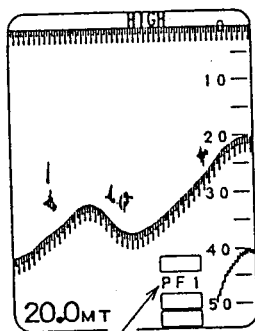# 【 14 】 |ⅢⅢ| PICTURE SPEED KEY

◎To change the picture speed rate.

・Each press of |ⅢⅢ| 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.
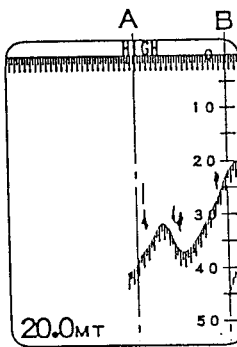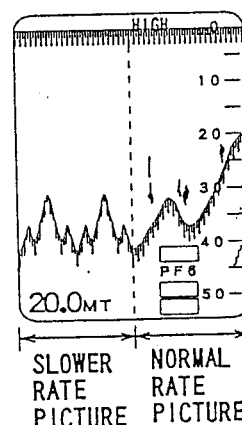・(When one of PF5~PF8(1/4+1/1~1/32+1/8) is selected.)

Displays the rate being selected, here.
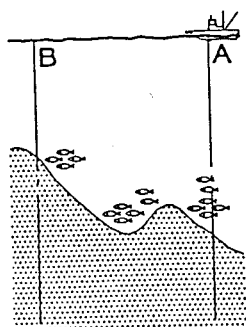
PICTURE 1   PICTURE 2   PICTURE 3   PICTURE 4
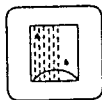
SLOWER RATE PICTURE   NORMAL RATE PICTURE
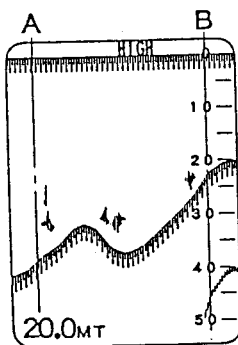
WHAT IS "PICTURE SPEED" ?
Picture speed rate refers to the speed the picture travels from right to left on the screen. 1/1 refers to 1 vertical line of picture per 1 sound transmission, 1/2 refers to 1 line of picture per 2 sound transmissions etc. There is no relation to ship speed.
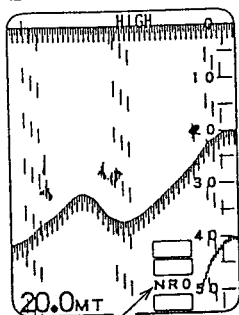
【 15 】 ▦ NOISE REDUCTION KEY

◎To reduce noise interference from nearby fishing vessels.

Each press of ▦ key changes the reduction level.
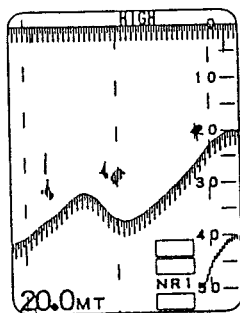
Noise reduction levels: (NR0)   (NR1)   (NR2)   (NR3)
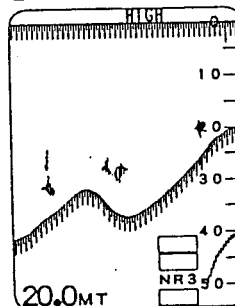   OFF   LOW   MEDIUM   HIGH

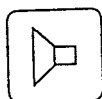[NR0]   [NR1]   [NR2]   [NR3]

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.
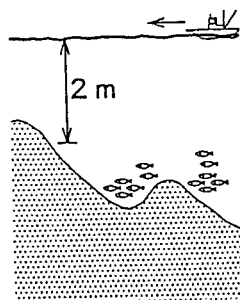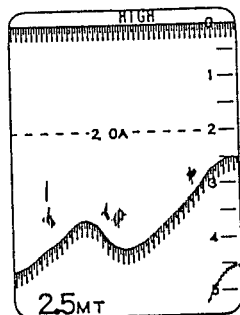
CAUTION

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.
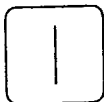
And press ◁| key.

- 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.)
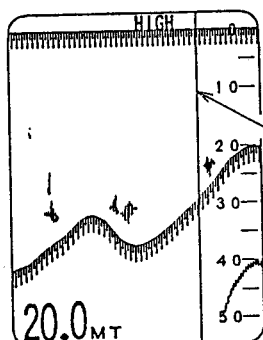
【 17 】 | MARK KEY

◎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 LOCK key to lock the keyboard functions other than ▷ · | · NAV keys

・When the keyboard functions are locked the red light above KEY LOCK key will be indicated.

◎Press KEY LOCK key and NAV key together to clear the keyboard lock function.

The red light will be indicated while keyboard lock function is activated.
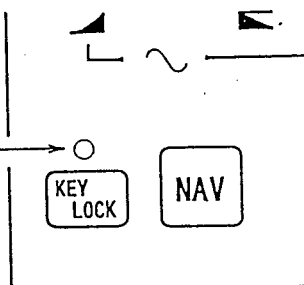
〖 19 〗 NAV NAVIGATION DATA MODE KEY
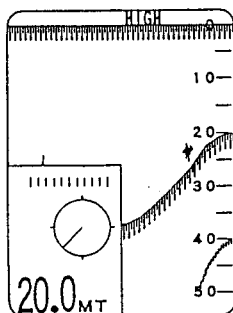
NAV

Displays the navigation
data mode only while
pressing this 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
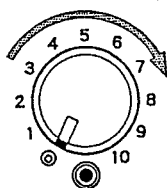
ON/OFF BRIGHTNESS

◎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.

TVG: OFF

TVG: MEDIUM
Turning the TVG dial clockwise increases the gain for deep echoes.

TVG: HIGH

WHAT IS "TVG"?
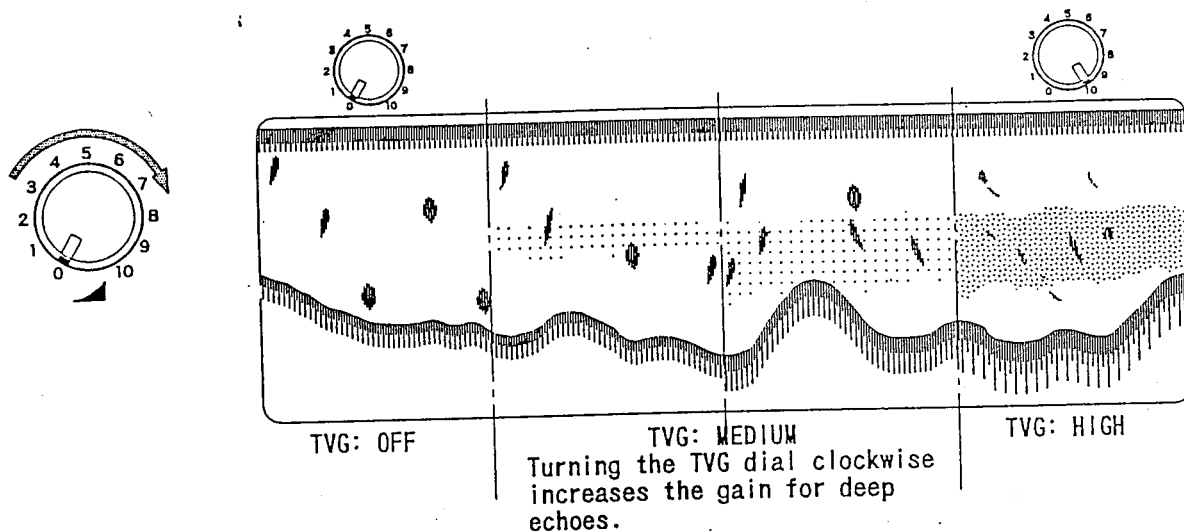The power of the sound wave is absorbed at a certain rate when travelling through the water.
The higher the frequency, the higher the rate of absorption. For example after travelling 1 kilometer the power of a 50KHz sound wave will decrease to 1/8 of it's orginal strength. The power of a 200KHz sound 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

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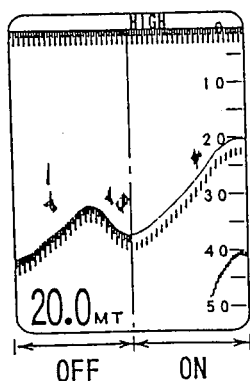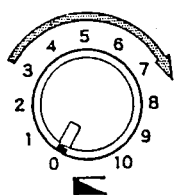
◎To display the sea bottom highlighted against the display background making it easier to see fish on, or just above, the bottom.

【 23 】 GAIN DIAL

◎ 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).
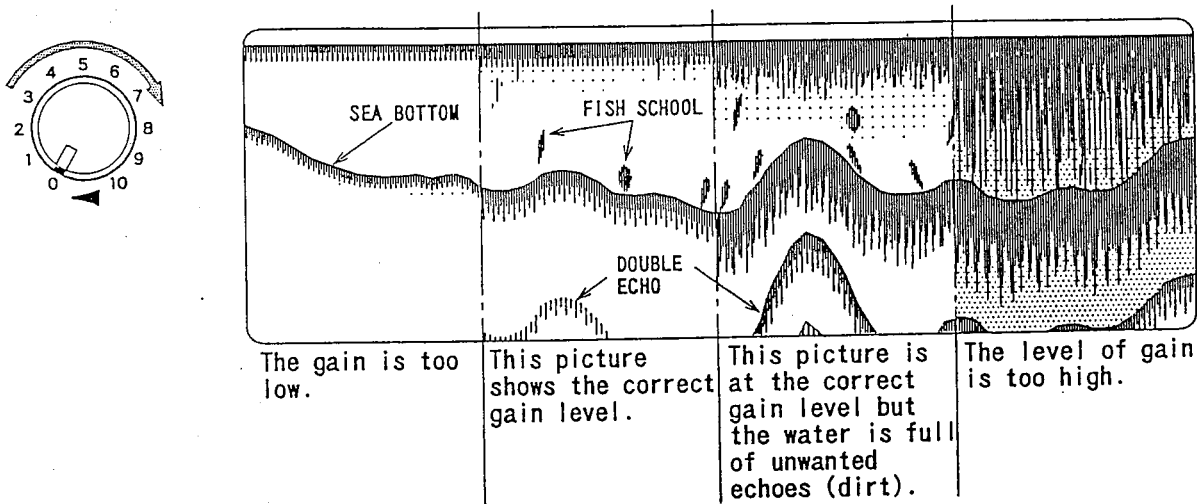
· When the target is the sea bottom the gain level setting can be low because the echo from the sea bottom is very strong. However, when the target is fish the level of gain must be increased to pick up the weaker echo.
Increasing the gain too much will display unwanted echoes from bubbles and plankton 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.
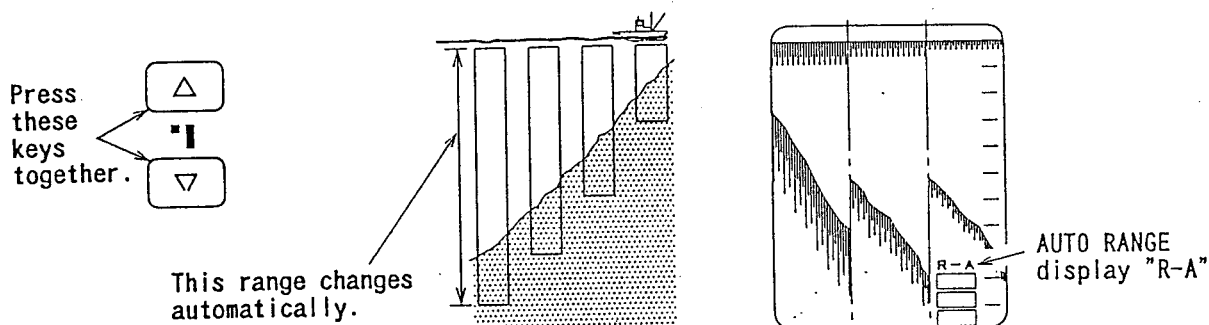
CAUTION
Combining the use of the gain control dial and the GAIN UP H/L function on the menu mode gives variable gain ranges. (Refer to 【4】 HIGH FREQUENCY/LOW FREQUENCY GAIN UP on PG 20.)

AUTO RANGE/AUTO SHIFT FUNCITON

〖 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 ｜▪|△| key and ｜▪|▽| key together to "activate" the auto range function

Press these keys together.

This range changes automatically.

AUTO RANGE display "R-A"

・For variable ranges, refer to 〖 9 〗 MAIN RANGE KEYS(NORMAL DISPLAY) on PG 36.

・To "cancel" auto range function, press ｜▪|△| key or ｜▪|▽| 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 returen 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 ▶△ key and ◀▽ key together to "activate" the auto shift function.

Press these keys together. ▶△ ×1 ◀▽

This range changes automatically.

AUTO SHIFT display "S-A"

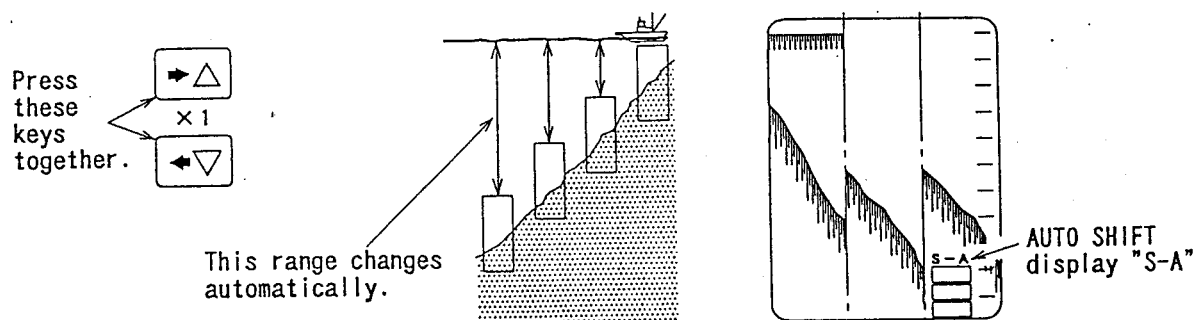◎To "cancel" the auto shift function, press ▶△ key or ◀▽ key.

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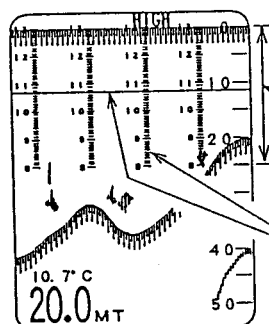
The water temperature scale /graph will be displayed on the upper half of the screen.

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.

[ON]

Displays the colour scale

[OFF]

Not display the colour scale

【 3 】 OUT OF RANGE DEPTH DISPLAY ON/OFF

◎To display the water depth numerals even though the sea bottom is out of
   the screen ie· 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
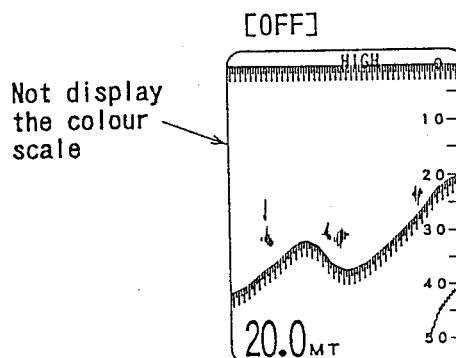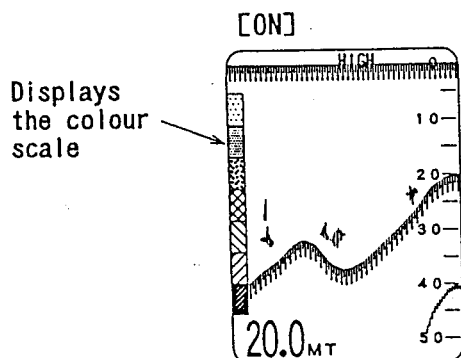
   turn the power supply back "on" again while pressing ⌷---△⌷ key.

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

◎ Be sure to ask your dealer for the connecting operation because there is high voltage portion inside.
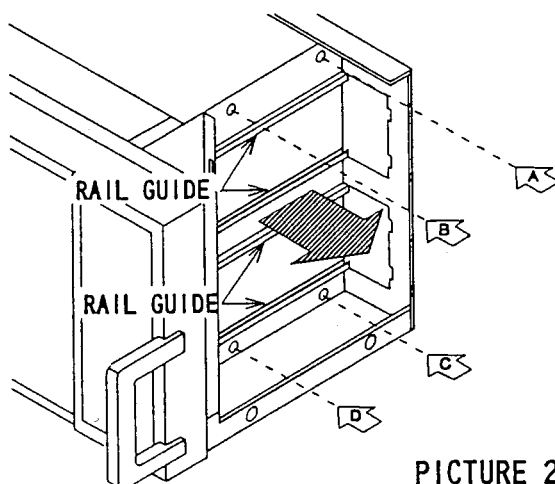
◎ When connecting to the external navigator, refer to the following to change the inside wireing of the main unit.

   When connecting to SUZUKI brand GPS, changing the inside wiring is not needed.

◎ It is impossible to use the external navigator and the SUZUKI brand GPS together.

◎ Before start connecting operation, be sure to turn the power supply off and remove the power supply cable from the main unit.
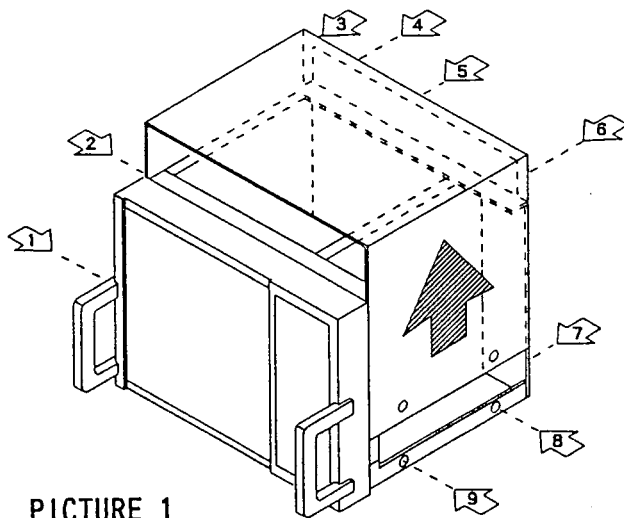
① To remove the transceiver unit from the main unit, refer to [1] TRANSCEIVER UNIT INSTALLATION on PG 4.

② After undoing the 9 bolts (1~9), remove the case cover in the big arrow direction. (Picture 1)

③ 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 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.

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RAIL GUIDE

PICTURE 2

MAIN PCB

(For EXTERNAL NAVIGATOR)
Attach the blue connector.

(For SUZUKI GPS)
Remove the white connector.

PICTURE 3

SPECIFICATIONS

◎SPECIFICATION

1:PHASED RANGE	May be set 0~999 MT, FM, BR, FT in one unit steps. (Same range setting and seperate 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) (MIDDLE EXPANSION)	0~1·2.5·5·10·20·50·100·250 MT, FM, BR. 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 wayoint*
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·TVG·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, midium, 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.