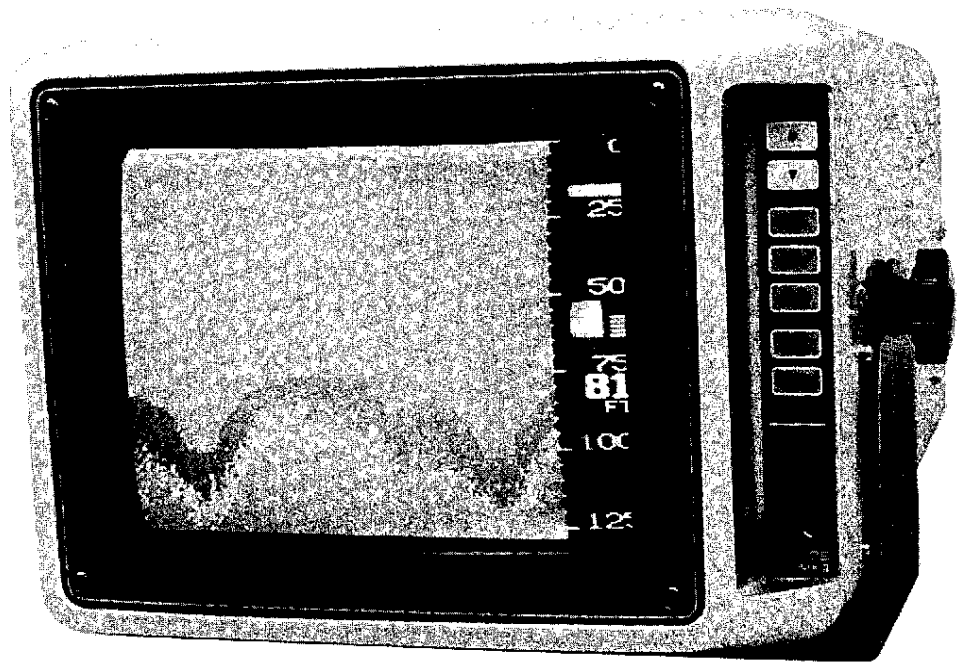


HE-705^{MK II}

OPERATIONS MANUAL



SITEX

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SECTION 1 GENERAL INFORMATION

1.1 Principle of Operation

HE-705 MK2 Fish Finder detects the distance to a school of fish or the sea bottom by transmitting ultrasonic pulses into the water, receiving the ultrasonic waves reflected by the school of fish or the sea bottom and by displaying the time delay on a C.R.T. screen.

The composition of the Fish Finder is shown in Fig. 1. At the instant the unit operates, transmitter power is sent to the transducer from the oscillator unit. The transmitter power is converted into an ultrasonic signal by the transducer and transmitted into the water.

The ultrasonic signal reflected from the school of fish or the sea bottom is received by the transducer and converted into an electric signal, amplified in the receiving section and displayed in the displaying section.

Since the speed at which the ultrasonic wave propagates in water is approximately 1,500M (800 fa.) per second, an interval of one second (between the time the ultrasonic wave is transmitted and the time the reflected wave is received) is equivalent to a round trip of 1,500M (800 fa.) or a distance to the sea bottom of 750M (400 fa.)

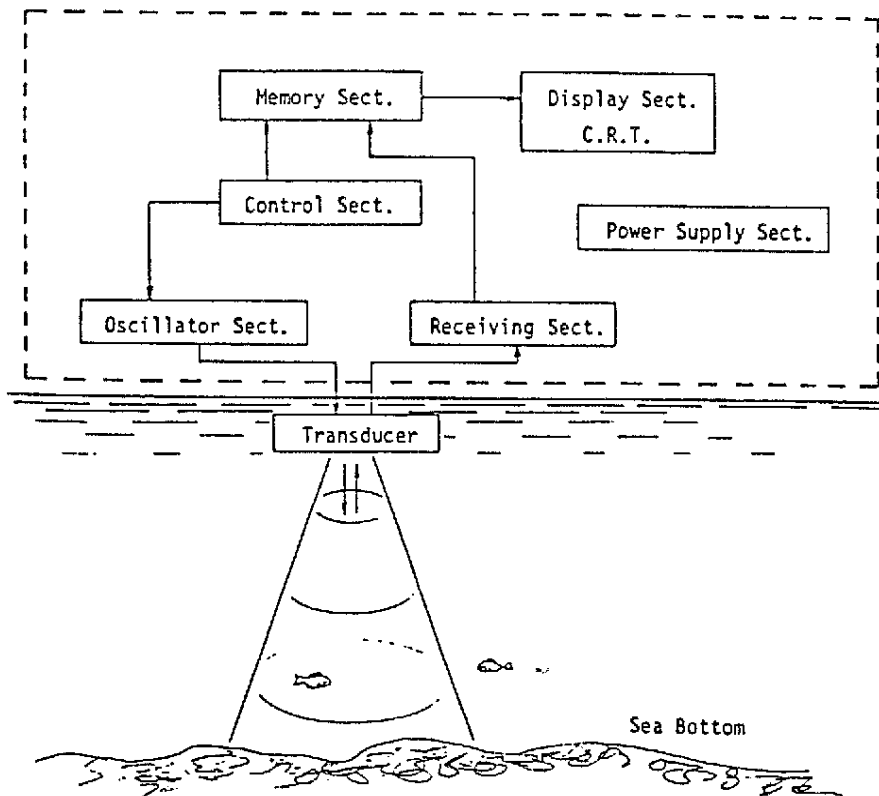


Fig.1 Basic Composition

1.2. Specifications

Depth Range

feet	fathoms	meter
0-30	0-5	0-8
0-40	0-8	0-10
0-60	0-10	0-15
0-80	0-15	0-20
0-125	0-20	0-30
0-150	0-30	0-40
0-250	0-40	0-60
0-300	0-60	0-80
0-500	0-80	0-125
0-600	0-125	0-150
0-1000	0-150	0-250
0-1200	0-250	0-300
0-2000	0-300	0-500
* 0-2400	* 0-500	* 0-600
* 0-4000	* 0-600	* 0-1,000

* : 50KHz only

Frequency	50 or 200KHz
Power Output	500 watts
Display	8 colors
Sweep Speed	6 steps
Function	Normal/Shift/Normal or Shift /Normal or Shift + Expansion /Normal or Shift + Bottom Lock
CRT Type	10" color
Voltage	11-40VDC
Power Consumption	40W
Dimension (mm)	219 (H) x 301 (W) x 297 (D)
Weight	6.5Kg

Auto Range, Auto Shift, Clean Echo (ON/OFF), Bottom Depth Indicator, Surface
Water Temperature Indication (32°F - 99.9°F), Thermo Graph (ON/OFF),
Alarm (1,2,OFF), Expansion, Bottom Lock,
Color Configuration changeable,

* Specifications are subject to change without notice.

SECTION 2 INSTALLATION

2.1 Control Unit

It is recommended to install the equipment in a place protected from humidity, vibrations and direct sun rays as much as the arrangement of the ship's structure may permit. Direct contact with sea spray must be avoided. To install the control unit refer to Fig. 2.

There should be at least 4" (100mm) between body and surrounding walls.

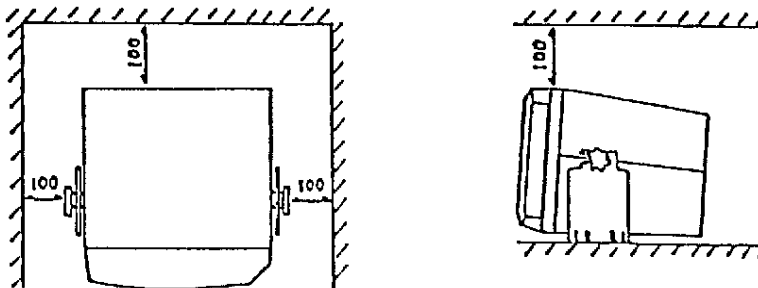
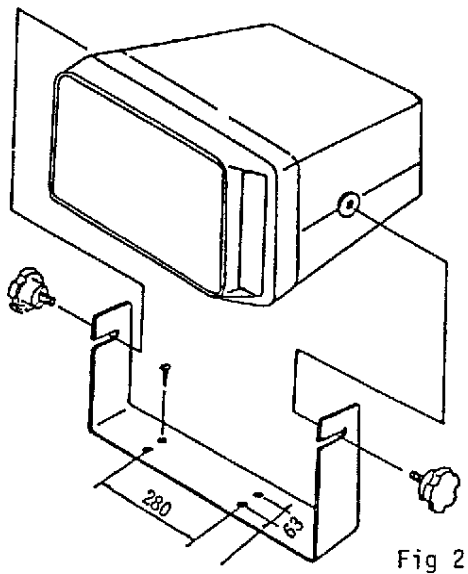


Fig 3

2.2 Transducer

The transducer can be mounted in several different ways.

In all cases, the mounting site should be as far away from air bubble streams as possible, since air bubbles will greatly decrease the efficiency of the transducer and sensitivity of the receiver.

In the case of through-hull mounting, appropriate levelling blocks should be used, if necessary, to point the transducer face straight down. This type of mounting will provide optimum performance in all cases.

Internal mounting may be suitable for fiberglass or steel vessels, use a small tank and fill it with water. On double-layer bottom vessels, this mounting can not be used. Internal mounting is not as acceptable from a performance stand point as thru hull mounting.

2.3 Fitting Connector to Transducer Cable

The transducer cable is a three-core (black or red, white & gray (semitransparent colored - shielded)) shielded cable. Using a proper stripping tool, prepare the cable's end as shown in Fig. 3.

Unscrew the cable clamping screws and plug - body securing screw of the connector, and slide the shell and coupling ring on the cable. Then solder the shield in gray wire to terminal No. 1, the black or red lead to terminal No.2, the shield to terminal No. 3, the white lead to terminal No. 4 and the semitransparent-colored lead in gray wire to terminal No. 5.

The terminal identification numbers are indicated on the plug-body face. Be sure no wire hairs touch another pin and that the soldered wires do not contact another wire.

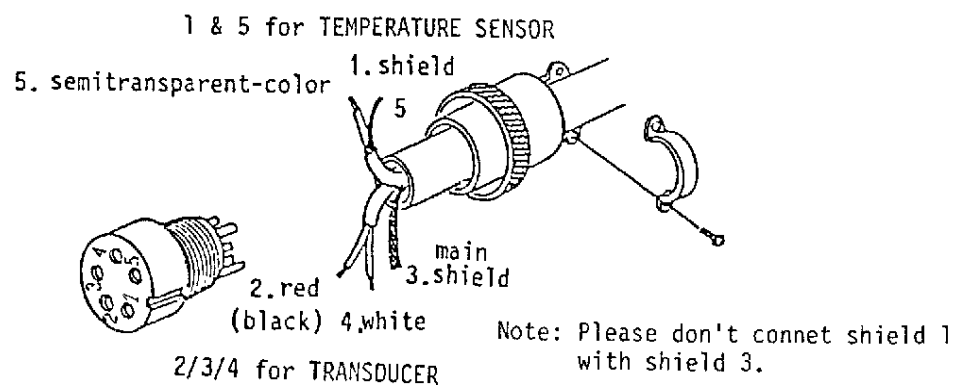


Fig. 3

2.4 External Connections

2.4.1 Normal Connection

To connect the external power supply cable and the transducer cable to the unit, proceed as follows;

- (1) Connect the power supply cable to the socket located at the rear side of the unit.
- (2) Connect the power supply cable to the external battery. Connect the white wire to the positive (+) and the black wire to the negative (-) terminal. Connector pin 1 is (+), pin 2 is (-).
- (3) Connect the plug of the transducer cable to the socket located at the rear side of the unit.

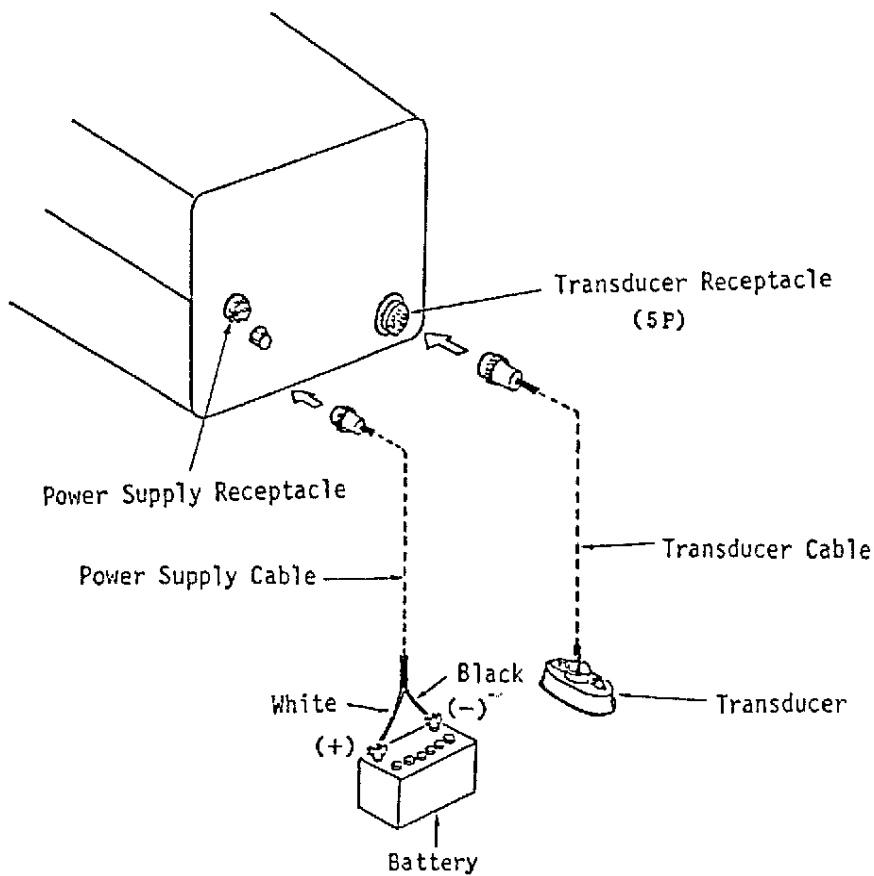


Fig. 4

SECTION 3 OPERATION

3.1 External Operation Controls and Functions

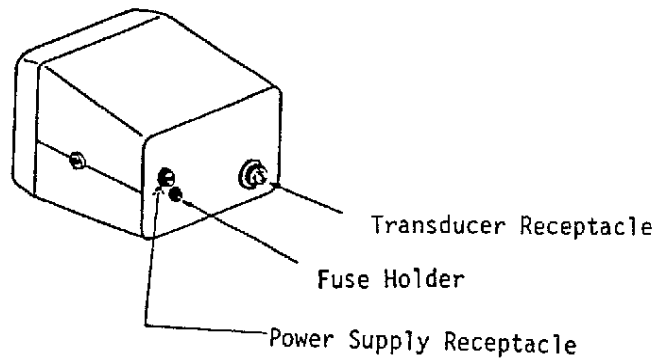
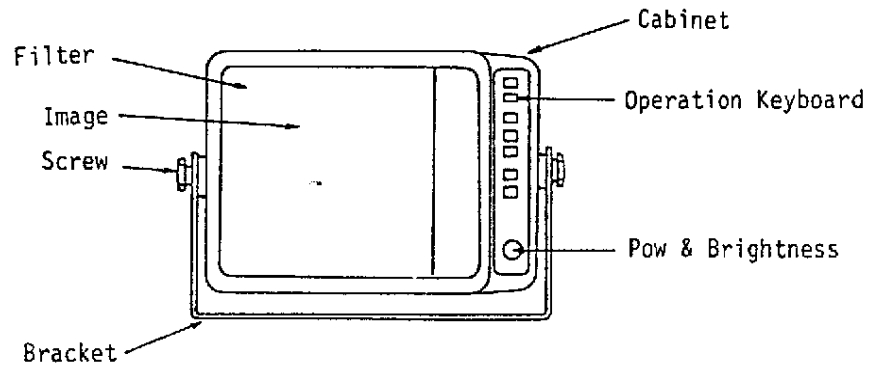


Fig. 5

3.2 Operation

Check the voltage and polarity of the battery before connecting the sounder. This unit operates by rotating the Pow. & Brightness control clockwise.

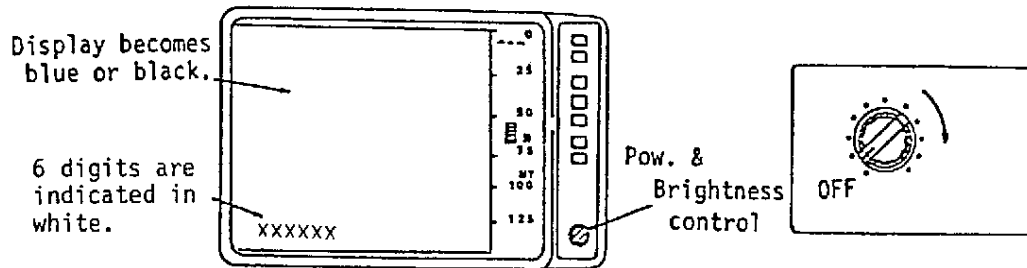


Fig. 6

At first, alarm comes on once, and then above image appears. If image moves towards the left, operation is normal.

note: In case that no image appears even if you rotates the Pow. & Brightness control clockwise fully, please check the fuse located at the rear side of main unit is blown. If the fuse is blown, check the connection of power supply cable and replace the fuse.

Internal battery check: The screen image appears as shown in Fig. 7 and "REPLACE INTERNAL BATTERY" is shown on the lower left of screen. In this case, internal battery is run down. In this event the internal battery must be replaced by your servicing technician.

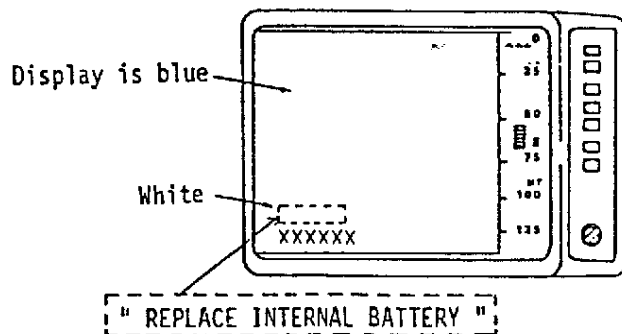
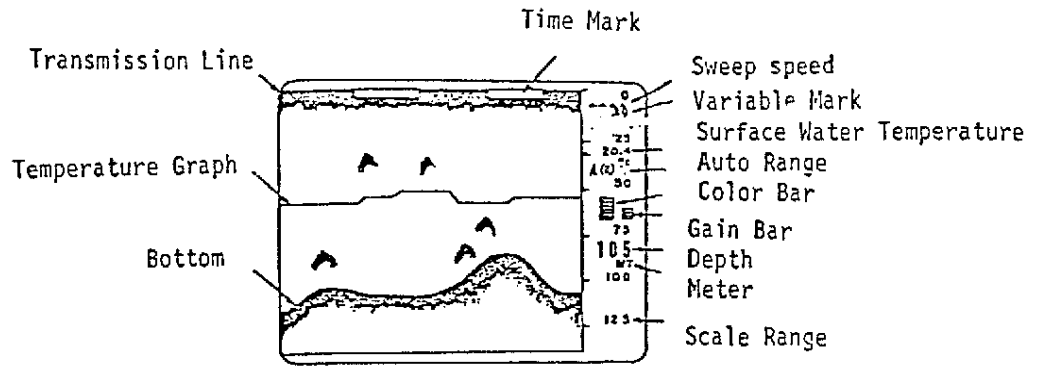


Fig. 7

3.3 Description of Image Picture



- Dual Mode -

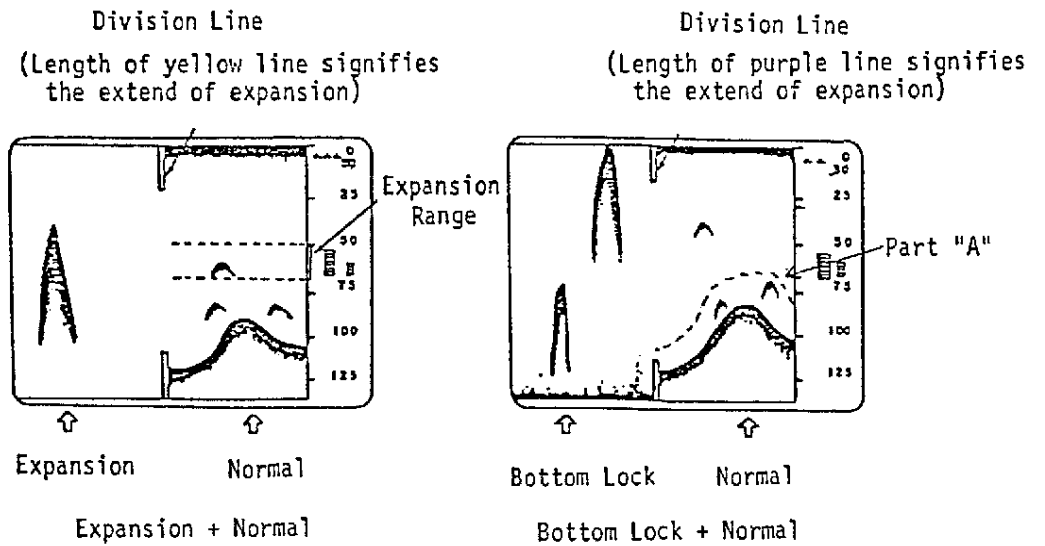


Fig. 8

NOTES: This product has a memory that will retain all control settings when power is turned off, except shift mode.

Part "A" indicates area of bottom lock expansion.

3.4. Range

Select the required range by the RANGE switch.

feet	fathoms	meter
0-30	0-5	0-8
0-40	0-8	0-10
0-60	0-10	0-15
0-80	0-15	0-20
0-125	0-20	0-30
0-150	0-30	0-40
0-250	0-40	0-60
0-300	0-60	0-80
0-500	0-80	0-125
0-600	0-125	0-150
0-1000	0-150	0-250
0-1200	0-250	0-300
0-2000	0-300	0-500
* 0-2400	* 0-500	* 0-600
* 0-4000	* 0-600	* 0-1,000

* : 50KHz only

3 keys **RANGE**, **A** and **Y** are used in order to change the range. Press **A** key within 2 seconds after pressing **RANGE** key, the depth range will decrease. At the shallowest range, even if **A** key is pressed, the depth range will not increase. Press **Y** key within 2 seconds after pressing **RANGE** key, the depth range will increase. At the deepest range, even if **Y** key is pressed, the depth range will not increase.

The actual depth capability of sounders depends on the transducer, the quality of the installation, type of bottom, salinity of water and other considerations.

Actual bottom depth is displayed in white numbers in the middle right-hand corner of the CRT.

3.5 Shift

The shift provides a means to expand any selected depth scale. By shifting a shallow depth scale to a deeper depth, the depth images are enlarged.

Shift can be either an automatic or manual function. Choice of shift type is provided by the MENU.

Manual shift allows increase of a selected range for closer inspection of markings.

3 keys **SHIFT**, **▲** and **▼** are used for this function. Press **▲** key within 2 seconds after pressing **SHIFT** key, both the top and bottom readings on the display will shift to shallower depth by an equal amount. **▲** is not possible when the top reading on the screen is zero.

Press **▼** key within 2 seconds after pressing **SHIFT** key, both the top and bottom readings on the display will shift to deeper depth by an equal amount. **▼** is not possible when the maximum shift is obtained at the respective depth range.

It is possible to expand a portion of a depth range. For example, Range setting is 0-125 feet, but a closer inspection of the 30-60 feet portion is desired. To expand, first decrease range to 0-30 feet. Next press **SHIFT** key, then press and hold **▼** key until the bottom readout of 60 feet is attained.

3.6 Gain

The picture is displayed in seven colors (order of priority: RED, YELLOW, GREEN, WHITE, PURPLE, LIGHT BLUE and BLUE or BLACK) on the color CRT.

BLUE or BLACK means that the echo level is not enough to display.

Gain is adjusted at eight steps. Gain bar indicates extent of gain. As the number of gain bar increases, the internal amplifier gain is increased.

Higher gain setting will produce a picture of weaker reflected echo signals (small fish, plancton, small debris, etc.).

At the same time, the normal picture displayed will be shown in colors indicating stronger levels.

Too much gain will produce the picture with excess red, and will make it difficult to discriminate fish from seabed.

The optimum setting of the gain control is a matter of experience, as the results obtained will vary from ship to ship and are largely dependent upon depth of the fish schools being detected vertical distances to the seabed and oceanographic and other local conditions, it is recommended that the user should set the gain control to show both the first and the second echo when the instrument is being used for fish detection.



Poor Gain

Excessive Gain

Optimum Gain

Fig. 9

3 keys **GAIN**, **▲** and **▼** are used for this function. Press **GAIN** key, gain bar flashes. Press **▲** key during flashing, the number of gain bars are increased by one and gain is increased to the next step. **▲** is not possible when the number of gain bar is eight (max. gain).

Press **▼** key during flashing, the gain is decreased by one step. and gain is decreased by one step.

▼ is not possible when the number of gain bar is one (min. gain).

3.7 Sweep Speed

Sweep speed is indicated in red arrow.
Following 5 sweep speeds are selectable.

w/o Mark	▲	▲▲	▲▲▲	▲▲▲▲	▲▲▲▲▲
stop	slow ←————→ fast				

3 keys **SWEEP SET**, **▲**, **▼** are used for this function. Press **▲** key within 2 seconds after pressing **SWEEP SET** key, the number of red arrow is increased by one and sweep speed is increased by one step. **▲** is not possible when five arrows are shown (max. sweep speed).

Press **▼** key within 2 seconds after pressing **SWEEP SET** key, the number of red arrow is decreased by one and sweep speed is decreased by one step. Eliminating all arrows will "freeze" the display.

3.8 Variable Marker

Variable marker is indicated by the yellow digit and yellow arrow as shown in Fig.10. When you desire to know the depth of reflected echoes from fish schools, you can read the depth by moving the variable maker to the position of reflected signal.

This marker is also used for both "expansion" and "alarm" function.

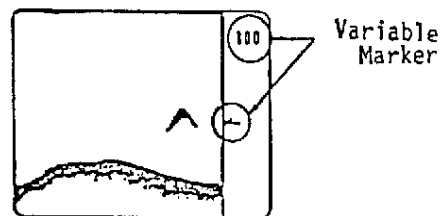


Fig. 10

Two keys **▲** and **▼** are used in order to move this marker. Press **▲** key, digit of variable marker is decreased by one and the arrow moves upward. Press **▲** continuously, digit of variable marker is decreased by ten and this arrow and digit disappear when digit turns to "0". Press **▼** key, digit of variable marker is increased by one and the arrow moves downward.

Note: When digit of variable marker is out of displayed depth range, yellow arrow is not indicated.

3.9 Normal, Expansion, Bottom Lock

It is able to display bottom lock or expansion image on the left side of normal image.

Expansion mode indicates enlarged looks of selected area on the normal image.

For example, in case of deep range, there is seeing difficulty on small indication fish schools on the normal image.

In this case, only selected area is enlarged when expansion mode is selected.

In bottom lock mode, bottom contour is indicated as a straight line and expansion view of certain area from bottom contour is shown.

For example, there is seeing difficulty of fish schools adjacent to the bottom in normal mode.

It is convenient to discriminate fish schools adjacent to the bottom lock mode.

On a table Fig. 11, 12, expansion area at respective depth range in expansion or bottom lock image is indicated.

Bottom Lock		
Depth Range (m)	Depth Area 1 (x16, m)	Depth Area 11 (x8, m)
0-8	4	(8)
0-10	5	(10)
0-15	4	8
0-20	5	10
0-30	4	8
0-40	5	10
0-60	4	8
0-80	5	10
0-125	8	16
0-150	10	20
0-250	16	32
0-300	20	40
0-500	32	64
0-600	40	80
0-1000	64	128

Fig. 11

Bottom Lock

Depth Range (FA)	Depth Area 1 (x16, FA)	Depth Area 11 (x8, FA)	Depth Range (FT)	Depth Area 1 (x16, FT)	Depth Area 11 (x8, m)
0-5	2.5	(5)	0-30	15	(30)
0-8	4	(8)	0-40	20	(40)
0-10	2.5	5	0-60	15	30
0-15	4	8	0-80	20	40
0-20	2.5	5	0-125	15	30
0-30	4	8	0-150	20	40
0-40	2.5	5	0-250	15	30
0-60	4	8	0-300	20	40
0-80	5	10	0-500	30	60
0-125	8	16	0-600	40	80
0-150	10	20	0-1000	60	125
0-250	16	32	0-1200	80	160
0-300	20	40	0-2000	125	250
0-500	32	64	0-2400	160	320
0-600	40	80	0-4000	250	500

Expansion

Depth Range (m)	Depth Area 1 (x8, m)	Depth Area 11 (x4, m)
0-8	(8)	(8)
0-10	(10)	(10)
0-15	8	(16)
1-20	10	(20)
0-30	8	16
0-40	10	20
0-60	8	16
0-80	10	20
0-125	16	32
0-150	20	40
0-250	32	64
0-300	40	80
0-500	64	128
0-600	80	160
0-1000	128	256

Depth Range (FA)	Depth Area 1 (x8, FA)	Depth Area 11 (x4, FA)	Depth Range (FT)	Depth Area 1 (x8, FT)	Depth Area 11 (x4, FT)
0-5	(5)	(5)	0-30	(30)	(30)
0-8	(8)	(8)	0-40	(40)	(40)
0-10	5	(10)	0-60	30	(60)
0-15	8	(16)	0-80	40	(80)
0-20	5	10	0-125	30	60
0-30	8	16	0-150	40	80
0-40	5	10	0-250	30	60
0-60	8	16	0-300	40	80
0-80	10	20	0-500	60	125
0-125	16	32	0-600	80	160
0-150	20	40	0-1000	125	250
0-250	32	64	0-1200	160	320
0-300	40	80	0-2000	250	500
0-500	64	128	0-2400	320	640
0-600	80	160	0-4000	500	1000

Fig. 12

Each time you press key, the display changes from normal to expansion, to bottom lock and back to normal.

The display changes to menu display when is pressed continuously for over 2 seconds.

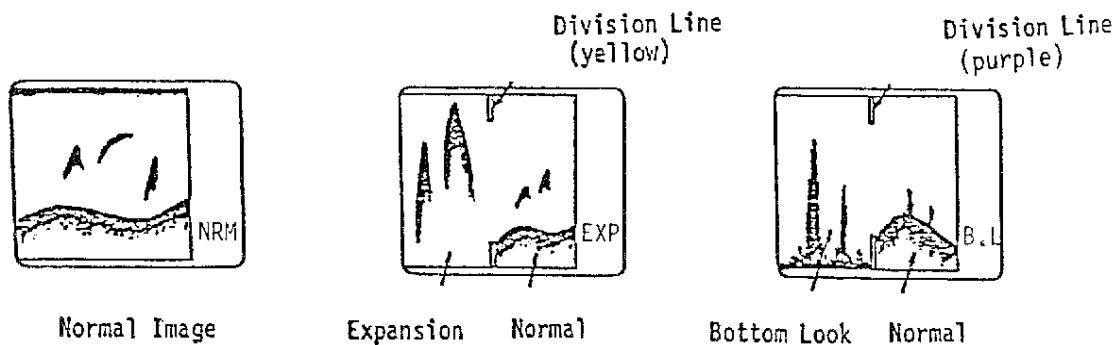


Fig. 20

If you select "Exp"

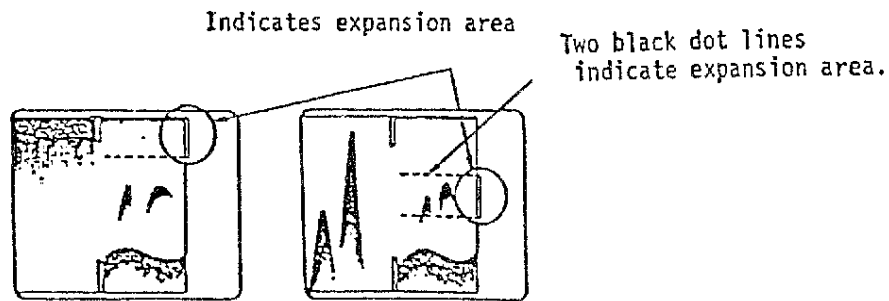
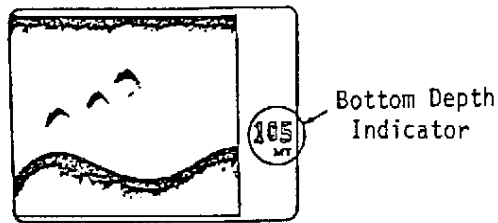


Fig. 21

Select expansion and lines which show expansion area appear. Press or key, adjust the variable marker to the desired position. The expanded area enlarged is shown on the left side of screen.

Note: When the expansion area is out of the depth range, the expansion image is not shown.

3. 10 Bottom Depth Indicator



When a strong echo is reflected from the bottom and it is shown in a red color, the depth to the bottom is indicated as a white large digit as shown in Fig. 11.

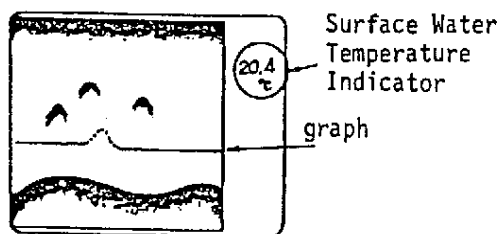
Fig. 11

The digital readout will be to the tenth unless the bottom depth is in excess of 100 feet or the range selected is in excess of 0-300 ft.

A flashing light blue digital reading indicates a temporary loss of the bottom and care should be taken not to rely on this information until the steady white numerals reappear.

When the echo reflected from the bottom is not shown on the display or it is impossible to receive echo from the bottom due to air bubble streams, there will be no digital readout.

3. 11 Surface Water Temperature Indicator







In Fig. 12, this unit indicates surface water temperature and a temperature graph. The temperature graph illustrates the variation of surface water temperature graphically on the screen.


Fig. 12

When the temperature graph is not required, it can be cancelled in the menu.


4. OPERATION


4.1 Description of MENU


4 keys , ,  and  are used in order to use menu function.

 : Touch this key quickly and the display is changed from normal, expansion to bottom lock mode.

Hold this key for over 2 seconds at a time and it becomes the function key to change to the Menu display.

 : To enter a selected item, press the set key, When this key is pressed on the menu readout, the cursor shown as a red asterisk covered by green indicated the item to be used.







 : Press this key, the green cursor moves upward.

 : Press this key, the green cursor moves downward.

Please use the following procedure to make changes in the menu setting for menu 1 and menu 2.



Menu 1, it is able to set up most functions.



Menu 2, it is able to select color configuration.

1. Menu 1 display is shown when  key is pressed over 2 seconds.
2. Press  or  key to move the cursor flashing in green color up or down.
3. Press  key, the red asterisk moves and a new selection can be made.
4. When you want to change other items, please operate as shown in steps 2 and 3 above.
5. Press  key after setting menu 1 and the display changes to menu 2.
6. Selections in menu 2 are made by the same operations as step 2 and 3 above.
7. Press  key after making your selections in menu 2 and you return to the working display.

Note : Standard factory settings are shown on page 18.

MENU 1

M T
 F A
 * F T
 * R N G |
 R N G |
 *  
 * H . F

))
))
 * O F F
 * G R A P H
 O F F
 * C . E
 O F F
 * M
 A . R
 A . S
 C
 * F
 * 


METER
 FATHOMS
 FEET
 EXPANSION : EXPAND TO 4 TIMES
 BOTTOM LOCK: EXPAND TO 8 TIMES
 EXPANSION : EXPAND TO 8 TIMES
 EXPANSION : EXPAND TO 16 TIMES
 DIVISION RATIO 1 OF RIGHT/
 LEFT PARALELL IMAGE

 DIVISION RATIO 2 OF RIGHT/
 LEFT PARALELL IMAGE

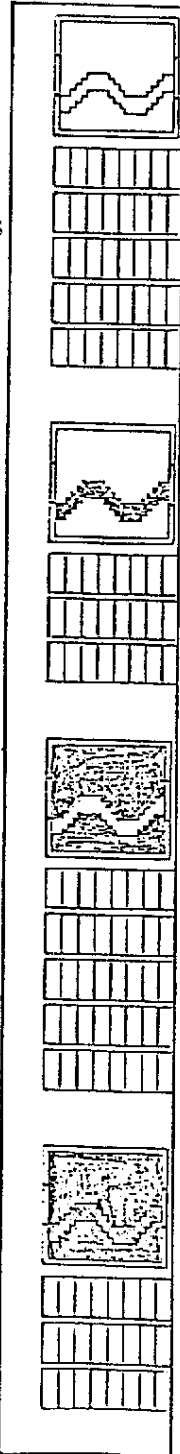
ALARM 1
 ALARM 2

 ALARM OFF
 TEMP GRAPH ON
 TEMP GRAPH OFF
 CLEAN-ECHO ON
 CLEAN-ECHO OFF
 MANUAL

 AUTO RANGE
 AUTO SHIFT
 CELSIUS
 FAHRENHEIT
 TRANSMITTING OUTPUT HIGH

MIDDLE
 LOW

MENU 2



COLOR CONFIGURATION

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

4.3 Expansion Range

Two expansion ranges are selectable.

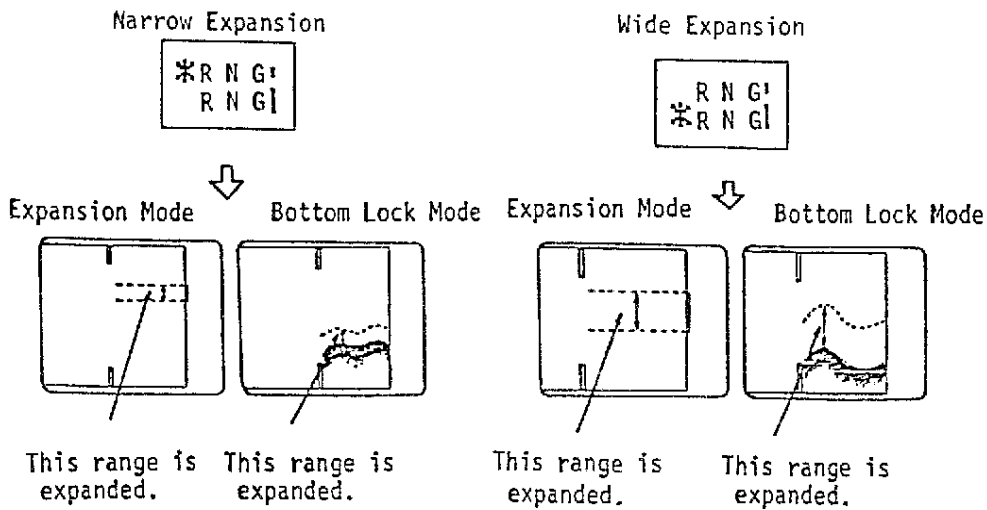


Fig. 22

4.10 Division Ratio of Parallel Image

Two ratios are selectable.

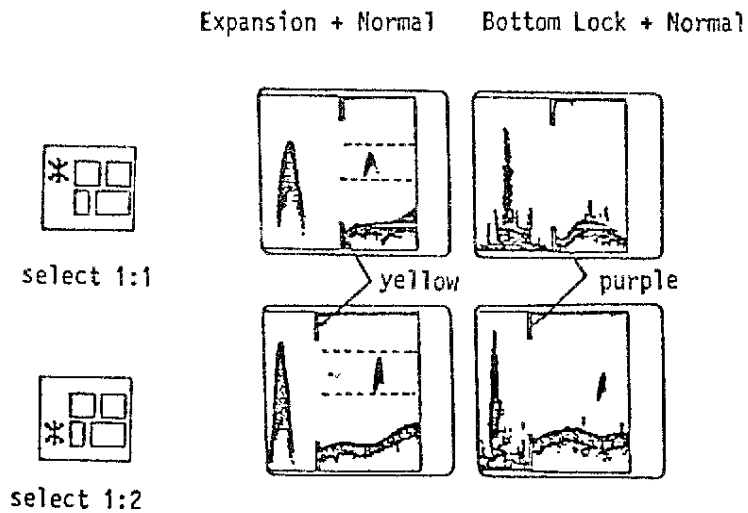


Fig. 23

4.4 Alarm Selection

Two fish zones are available. The blue alarm will cause the unit to sound on any echos stronger than light blue. The yellow alarm will sound only on echos with yellow returns or stronger (larger fish). For the example:

Reflected Echo	Strong ←————→ Weak	Back Color
Color Arrangement	red, red, yellow, green, purple, white, light blue	BLUE



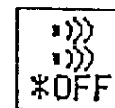
By alarm 1 () or alarm 2 () is setted, alarm comes on when stronger reflected signal than basic signal (correspond to alarm 1 or alarm 2) appears on the alarm area.



Alarm 1



Alarm 2



Alarm off

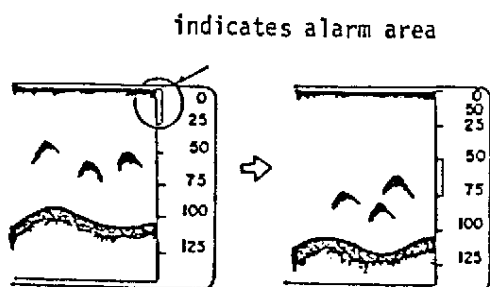


Fig. 17

The alarm comes on when stronger echos than the alarm selected appear on the display.

Note: Alarm does not come on when the variable marker is located at "0". When alarm area is beyond the depth range, alarm area line is not shown. In this case, alarm does not come on.

When the alarm is chosen, a yellow or blue line indicating the alarm area appears. Press or key, move the variable marker to the desired position .

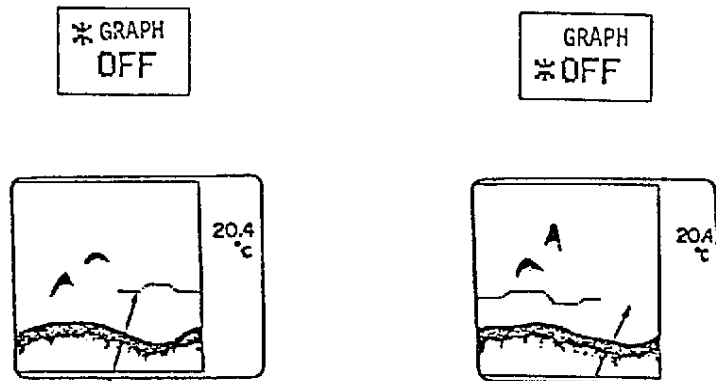
4.5 Selection of scale

Operator can select the scale.

MT Meter
FA Fathoms
FT Feet

4.6 Temperature Graph

Operator can see the variation of surface water temperature as a line in addition to the temperature readout. Select :OFF" and the operator can turn off the temperature graph.



Temperature graph is shown. Fig. 1 Temperature graph is not shown.

4.7 Clean Echo (Noise elimination)

There are several sources of noise including interference from other sounders, air bubbles, electrical noises, mechanical noises, etc. By setting to :C.E.", most of these noises are eliminated and the clean display is produced.

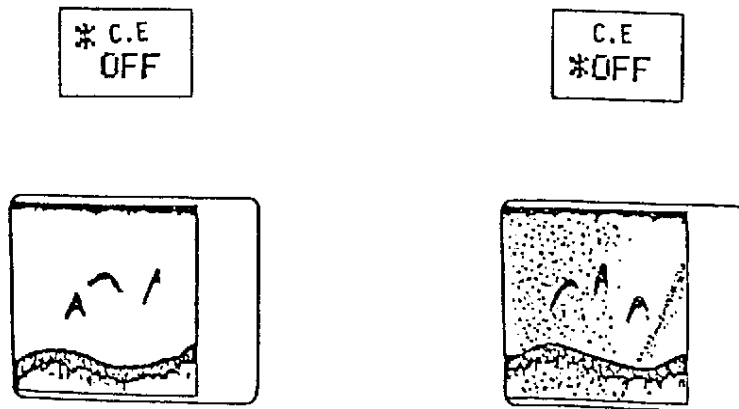


Fig. 19

4.8 MANUAL, AUTO RANGE AUTO SHIFT

```

#M
A(R)
A(S)
    
```

Changes the range when operator presses **RANGE** key, then either **A** or **Y** key.
Shifts the range when operator presses **SHIFT** key, then either **A** or **Y** key.

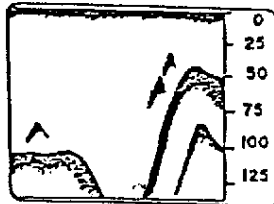
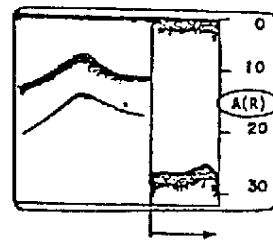
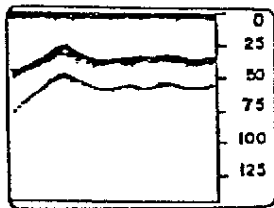


Fig. 14

```

M
*A(R)
A(S)
    
```

Changes the range automatically. Range is changed automatically so that the bottom is kept on the display (lower half).



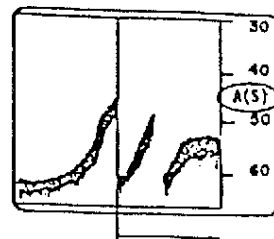
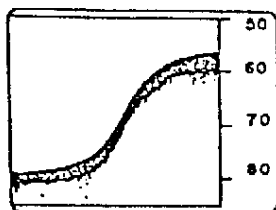
"A(R)" is shown in yellow.

Fig. 15

```

M
A(R)
*A(S)
    
```

Shifts the range automatically. Range is shifted automatically so that the bottom is kept on the display.

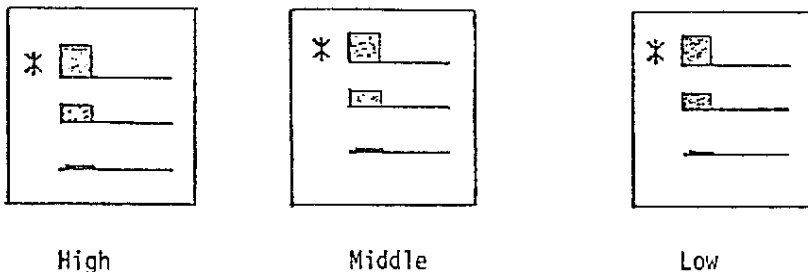


"A(S)" is shown in yellow

Fig. 16

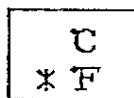
4.9 Transmitting Output

In case of over sensitivity on the shallow ranges, if the sensitivity cursor is at 1, please decrease transmitting switch as follows:



Surface Temperature

Select temperature indication of conversion Fahrenheit or Celsius.



Fahrenheit
Indication



Celsius
Indication

Color Configurations

One of following 16 color configurations is selectable according to the strength of reflected signal you require.

strength of reflection	Strong Weak	back color
color 1. configuration	red, red yellow, green, purple, white, light blue	BLUE
2.	red, red, yellow, green, white, white, light blue	
3.	red, red, yellow, green, purple, light blue, blue	
4.	red, red, yellow, green, white, light blue, blue	
5.	red, red, red, yellow, green, white, blue	
6.	black, red, yellow, green, purple, white, light blue	
7.	black, black, red, yellow, green, purple, light blue	
8.	black, black, red, yellow, green, white, light blue	
9.	red, red, yellow, green, purple, white, light blue	
10.	red, red, yellow, green, white, white, light blue	
11.	red, red, yellow, green, purple, white, black	
12.	red, red, yellow, green, white, light blue, black	
13.	red, red, red, yellow, green, white, black	
14.	blue, red, yellow, green, purple, white, light blue	
15.	blue, blue, red, yellow, green, purple, light blue	
16.	blue, blue, red, yellow, green, white, light blue	