

SI-TEX[®] CVS-833/833C

Echo Sounder

OPERATION MAUNAL

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AMENDMENT HISTORY

CVS-833/833C OPERATION MANUAL
Doc No: 0093132902

No.	Document No & Rev No.	Date	Amendments
0	93132904-00	05/02/24	First issue
1	0093132904-01	06/06/26	Chapter 5
2	0093132904-02	06/08/16	Chapter 2
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Amendment policy

When any change is applied in the document, only the document number of the relevant sheet(s) and cover sheet are modified and the rest of the sheets are not changed. The document number is shown in the footer area, right or left bottom of each sheet.

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Safety Precautions

- **High Voltage**

High voltages are used in the transmitter section which could be life threatening. A protection cover with the words **Danger High Voltage** is provided in this section but wait 10 minutes before inspecting inside.

Even if the power switch is turned off, residual voltages may remain in the capacitors inside the unit. Before inspection or replacement of parts, discharge this residual voltage in a safe and correct manner.

- **Disconnect Main Power**

It is still possible to receive an electric shock caused by unintentionally switching on the power during repair work. To prevent this from happening, make sure to completely disconnect the unit from the ship's main supply before attempting any inspection.

- **Dust**

Dust can accumulate inside after long periods of use. Allergies can result from the inhalation of this dust, therefore during inspection and cleaning it is advisable to use a mask.

- **Static Electricity**

Static sensitive semiconductor devices are used in this unit. Before changing the printed boards be careful not to damage any of these devices due to electrostatic build up from carpet, clothes, seats, etc.

Symbols used in this manual

The following symbols are used in this manual. You are requested to be fully aware of the meaning of each symbol before carrying out inspection and maintenance of this equipment.

Alarm mark



Alarm

To handle the equipment ignoring this sign may lead to injury to the human body or damage to the equipment.

Caution mark



Caution

To handle the equipment ignoring this sign may lead to a malfunction of the equipment.

Warning High Voltage mark



To handle the equipment ignoring this sign may lead to electrical shock to the human body.

Prohibition mark



This sign indicates that a specified action is prohibited. The prohibited action will be shown in the vicinity of the mark.

How to use this manual

Scope of this manual

This manual contains information about installation, operation and maintenance of the CVS-833/833C sounder.

Structure of this manual

This manual is divided into sections according to the contents as described below. This arrangement will help you overview the whole of the contents as well as refer to detailed information for your specific requirement.

Chapter 1: General information

- General
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- Type name of component units
- Software type used
- System configuration

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- Installation material list
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- Data input serial line

Chapter 1

General information

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Chapter 1 General information

1.1 General

The CVS-833/833C series of sounder is composed of two main units, a display unit and a transducer unit. Transmitting power level can be selected from 600 W (CVS-833) and 1 KW (CVS-833C), using the same dual-frequency transducer type for 50 KHz and 200 KHz.

The display unit uses a high brightness, 8" TFT (Thin Film Transistor) display to allow an easy viewing even in daytime operation. The operation is simple and straightforward, using dedicated rotary controls and user-friendly menus.

By pressing the AUTO key the unit is set to hands-free operation, in which the gain and depth range are automatically selected to an optimized level by an internal micro-controller chip.

1.2 Applicable standard

The CVS-833/833C is designed and tested to comply with the international standard of IEC-60945 3rd edition that defines the general requirements of electronic maritime equipment.

1.3 Type name of component units

Type name	Output	Display type	Transducer type
CVS-833	600W	CVS-833	TD-500T-2 or TD-500T-3
CVS-833C	1kW	CVS-833C	TD-501T-3 or TD-501C

1.4 Software type used

Software type name	Application
KM-E05	CVS-833
KM-E06	CVS-833C

1.5 System configuration

The CVS-833/833C system is configured as follows: (Refer to Figure 1.1 for the system configuration diagram)

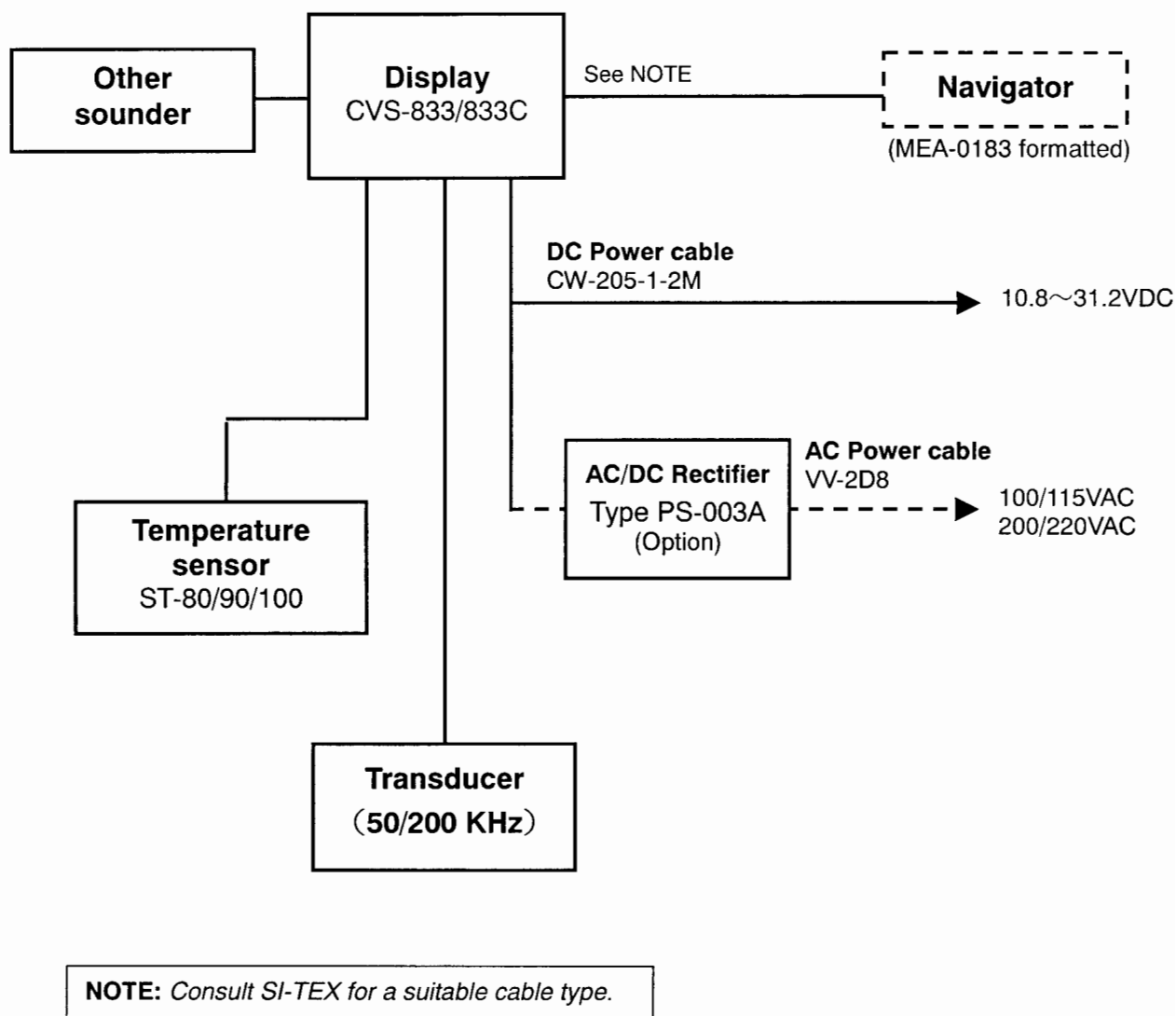


Figure 1.1 System configuration of CVS-833/833C

Chapter 2

Equipment composition

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Chapter 2 Equipment Composition

2.1 Standard equipment list

No	Item name	Type name	Remarks	Weight/length	Q'ty
1	Display unit	CVS-833/833C	CVS-833: 600W CVS-833C: 1kW With hard cover, hood, mounting bracket and fixing knobs	3.5 kg	1
2	DC Power cable	CW-205-1-2M	With 2-pin connector on one end and crimping terminals on the other	2m	1
3	Operation manual	93132904	English		1

2.2 Essential option

No	Item name	Ratings	Application	Weight/length
1	Transducer For CVS-833 (600W)	TD-500T-2	600W: 50kHz/200kHz Material: plastic For inner-hull	0.7kg / 9m
2		TD-500T-3	600W: 50kHz/200kHz Material: zinc bronze For through-hull	1.5kg / 9m
3		Or equivalent	600W: 50kHz/200kHz The connector (3-pin or 8-pin) must be prepared.	-
3	Transducer For CVS-833C (1kW)	TD-501T-3	1kW: 50kHz/200kHz Material: zinc bronze With temperature sensor	3.4kg / 9m
4		TD-501C	1kW: 50kHz/200kHz Material: rubber molded For Inner-hull, Bottom-hull or Broadside The connector (3-pin) must be prepared.	4.2kg / 9m
5		Or equivalent	1kW: 50kHz/200kHz The connector (3-pin or 8-pin) must be prepared.	-

2.3 Spare parts list

No	Item name	Ratings	Specification	Shape/Dimensions)	Q'ty	Application
1	Fuse	F-7161-5A	Normal blow	Tubular (f 6.3 x 32)	2	Mains supply protection

2.4 Installation material list

No	Item name	Ratings	Application	Q'ty
1	Truss tapping screw	TPT5 x 20U	For the display installation	4

Equipment composition

2.5 Optional items list

No	Item name	Ratings	Application	Weight/length
1	Speed and Temperature sensor	ST-80	For the transom installation. Material: Plastic. A connecting cable attached.	0.3kg
		ST-90	For the through-hull installation. Material: plastic. A connecting cable attached.	0.5kg
		ST-100	For the through-hull installation. Material: zinc bronze. A connecting cable attached.	1kg
2	Connecting cable	CW-60-10M	A BNC connector on one end, crimp terminals on the other	10m
		CW-153A-5M	6-pin connectors on both ends	5m
		CW-154A-5M	6-pin connector on one end and fly-leads on the other	5m
		CW-155-5M	A BNC connector on one end, 6-pin connector on the other	5m
		CW-351-5M CW-327-5M CW-374-5M	A 6-pin waterproof connector on one end and a 6-pin connector on the other	5m
		CW-352-5M CW-328-5M	A 6-pin waterproof connector on one end, crimp terminals on the other	5m
		CW-376-5M	A 6-pin waterproof connector on one end and fly-leads on the other	5m
		CW-506-5M	5-pin connector on one end and fly-leads on the other	5m
		CW-371-5M	A 5-pin waterproof connector on one end and a 5-pin connector on the other	5m
3	Inner hull kit	MFB-04	Material: Resin. For the transducer fitting.	1.3kg
4	Junction box	JB-12	1 input 3 outputs / 3 inputs 1 output. For the navigator connection	0.42kg
5	Rectifier	PS-003A	With 2 pieces of fuse (5A)	2.8kg
6	Power cable	VV-2D8-3M	Both ends dressed and tinned	3m

Chapter 3

Specification

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Chapter 3 Specification

3.1 Functional Specification

Type	CVS-833/833C
Display	8 inch color TFT LCD
Display Colors	16 colors (red, orange, yellow, green, light green, white, light blue, blue and medium blue)/background (blue, dark blue, black, white) OR 8 colors (red, orange, yellow, green, light green, white, light blue, blue) / background (blue, dark blue, black, white)
TX Frequency(kHz)	50/200kHz
Sounding Range	<p>【CVS-833】 5-80 (5 step), 80-100(10 step), 100-200(20 step), 200-600(50 step) / meter, Japanese fathom, fathom or Italian fathom</p> <p>【CVS-833C】 5-80 (5 step), 80-100(10 step), 100-200(20 step), 200-900(50 step), 900-1200(100 step) / meter, Japanese fathom, fathom or Italian fathom</p> <p>【CVS-833】 10-20(10 step), 20-200(20 step), 200-600(40 step), 600-2000(200step) / feet</p> <p>【CVS-833C】 10-20(10 step), 20-200(20 step), 200-600(40 step), 600-4000(200step) / feet</p>
Zoom/Bottom Range	<p>2.5, 5,10,20,40,80 / meter, Japanese fathom, fathom or Italian fathom, one range selected</p> <p>10,20,40,80,160,320 / feet, one range selected</p>
Shift	<p>Automatic/Manual</p> <p>【CVS-833】 deepest displayed depth is 2000/feet (5 step space) deepest displayed depth is 600/meter, Japanese fathom, fathom, Italian fathom(1 step space)</p> <p>【CVS-833C】 deepest displayed depth is 4000/feet (5 step space) deepest displayed depth is 1200/meter, Japanese fathom, fathom, Italian fathom(1 step space)</p>
Picture Mode H: high frequency normal L: low frequency normal M:Mix	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <div style="border: 1px solid black; padding: 5px; text-align: center; width: 40px; height: 40px;">H</div> <div style="border: 1px solid black; padding: 5px; text-align: center; width: 40px; height: 40px;"> <div style="border-bottom: 1px solid black; padding: 2px 5px;">L</div> <div style="padding: 2px 5px;">H</div> </div> <div style="border: 1px solid black; padding: 5px; text-align: center; width: 40px; height: 40px;">L H</div> <div style="border: 1px solid black; padding: 5px; text-align: center; width: 40px; height: 40px;">M H</div> <div style="border: 1px solid black; padding: 5px; text-align: center; width: 40px; height: 40px;">M L</div> </div> <div> <p>Side by side display is available with normal display plus area zoom, fixed bottom zoom, bottom quality zoom OR bottom partial zoom, vertical/horizontal split display, 25 picture modes in total.</p> <p>The above side by side display can be changed to vertical split or horizontal split screen. The above picture modes are applicable to Menu picture, A-scope picture and Navigation except Initial Menu. Initial Menu is used for setting initial settings and various functions.</p> </div> </div>
Display Area	Up/down split (up:down ratio=1:1), left/right split (left:right ratio=1:1), menu (right side 50%) A-scope (right side 13%)
Alarm	Fish school / bottom alarm and water temperature alarm (upper and lower limits)
Picture update rate	7 fixed positions (2/1, 1/1, 1/2, 1/4, 1/8, 1/16, 1/32) and freeze
Interference Reduction	3 stage (off, 1, 2)
Color Rejection	14 stage

Output reduction	10 stage
Marker	Depth marker (VRM), scale, zoom range marker, scaling marker, time marker, rainbow pattern
Controls	Gain, brilliance, sounding range and picture mode
Auto functions	Gain, sounding range OR shift
Other Functions	Illumination, draught adjust, ext/int synch. Select, temperature correction, PRR, picture update direction, external fish finder connection, ship's speed log, white line and background color
Ship's Course Data	Ship's position (lat/long 0.0001minutes accuracy, loranC LOP), water temperature (°C/ °F /graph display), ship's speed (kmh/mph/kt), and ship's direction

3.2 Serial data

Input data

Type: NMEA0183 Ver. 2.0/1.5

Sentence: GGA, GLL, GNS, GTD, VTG, MTW

Output data

Type: NMEA0183 Ver. 2.0

Sentence: DBS, DBT, DPT, MTW, VHW, GGA

3.3 Power supply requirements

Input voltage: 10.8 ~ 31.2 VDC

Input power: CVS-833: 25W, CVS-833C: 30W (measured at 24 VDC)

AC operation The AC/DC rectifier type PS-003A is required.

Input voltage range: 115 VAC or 230 VAC

Input power requirement: 220 W

3.4 Environmental condition

(1) Temperature, humidity

Operating temperature: -15°C to +55°C

Storage temperature: +70°C

Humidity 93±3% (at +40°C)

(2) Vibration

No mechanical and electrical damages or faulty conditions are observed under the following vibration and acceleration are applied.

2 to 5 H up to 13.2 Hz: Amplitude +/-1mm+/-10% (Maximum acceleration 7 m/s² at 13.2 Hz)

13.2 Hz to 60 Hz: Constant acceleration of 7 m/s²

(3) Water proofing grade

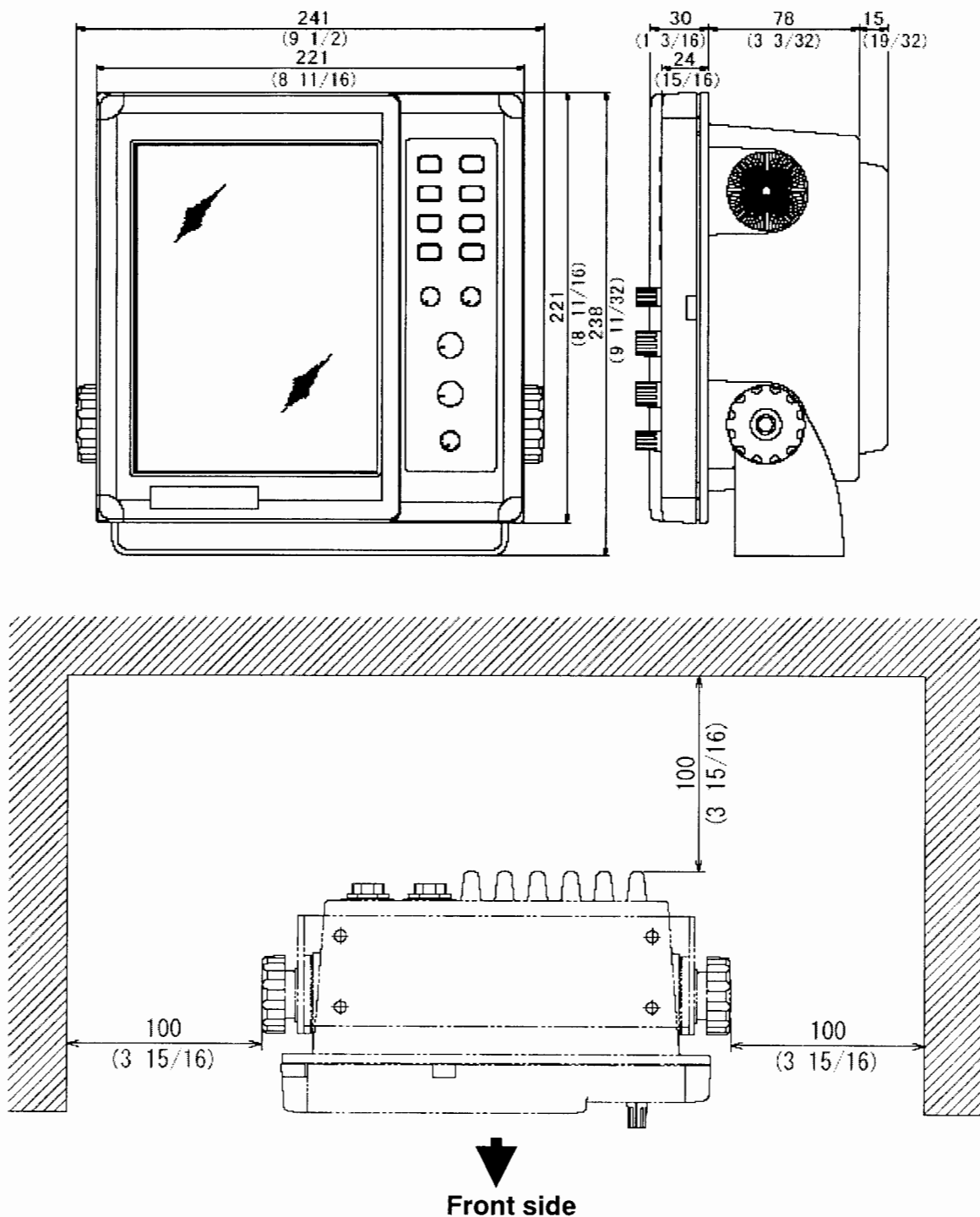
IPX2

3.5 External dimensions and weight

External dimensions: Width x Height x Depth

External dimensions: 220mm x 237mm x 117mm

Weight: 3.5 Kg (7.7lb)

External dimensions of the Receiver-indicator unit**Figure 3.1 External dimensions of the Receiver-Indicator unit**

Chapter 4

Installation

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Chapter 4 Installation

4.1 Installation consideration

General

Qualified service technicians should perform the installation of CVS-833/833C series that comprises the following operations.

- (1) Unpacking each component of the system.
- (2) Inspection of the exterior of each component unit and accessory.
- (3) Checking the ship's mains voltage and current capacity.
- (4) Determining the installation site
- (5) Installing the Display unit
- (6) Planning the cable routing and connections
- (7) Adjustment and setups

4.2 Unpacking each component of the system

Unpack your package and check if all of the items stated in the packing list are contained in the package. If not, report this to an insurance agent for tracing missing goods or refund.

4.3 Inspection of each component unit and accessories

Carefully check the exterior of each component unit for dents, damage, etc. Also check the inside of component units for electrical and mechanical damages.

4.4 Positioning the units

To achieve best operational performance, the following factors must be considered.

- (1) The display unit should be positioned in the location where the external situation can be viewed.
- (2) Locate the display so that it provides easy viewing from all likely operator's positions.
- (3) Select a position safe and free from dampness, water spray, rain and direct sunlight.
- (4) Provide enough space for servicing. Consider access to the rear panel for connecting various cables.
- (5) Position the display unit as possible away from other radio equipment.

4.5 Cable routing and connections

- (1) The transducer cable should be run separately away from other cables such as, radio antenna feeders, power cables, etc. Under no circumstances should it be in parallel arrangement with other cables. These precautions are essential to avoid radio interference to/from other equipment installed on the ship. If this arrangement is not possible, either cable set should be screened with metal conduit or another form of shielding.
- (2) The display unit should be grounded to the hull as short as possible using a thick braided harness lead connected to the grounding stud at the rear of the display unit.
- (3) The power supply cable should be connected directly to the ship's battery to avoid the conducted RF noise from other equipment on board.

4.6 Display installation

The display unit is designed for table mount and flush mount. For detail, refer to the following paragraphs.

4.6.1 Table mounting

- (1) Remove the two fixing knobs that fix the display unit to the mounting bracket.
- (2) Remove the display unit from the bracket and place it on a flat and safe area.
- (3) Place the mounting bracket to the place where the display unit is to be installed, and fix the bracket with four (4) tapping screws.
- (4) Reset the display unit on to the bracket and fix it using the two screws that were removed in step (1).

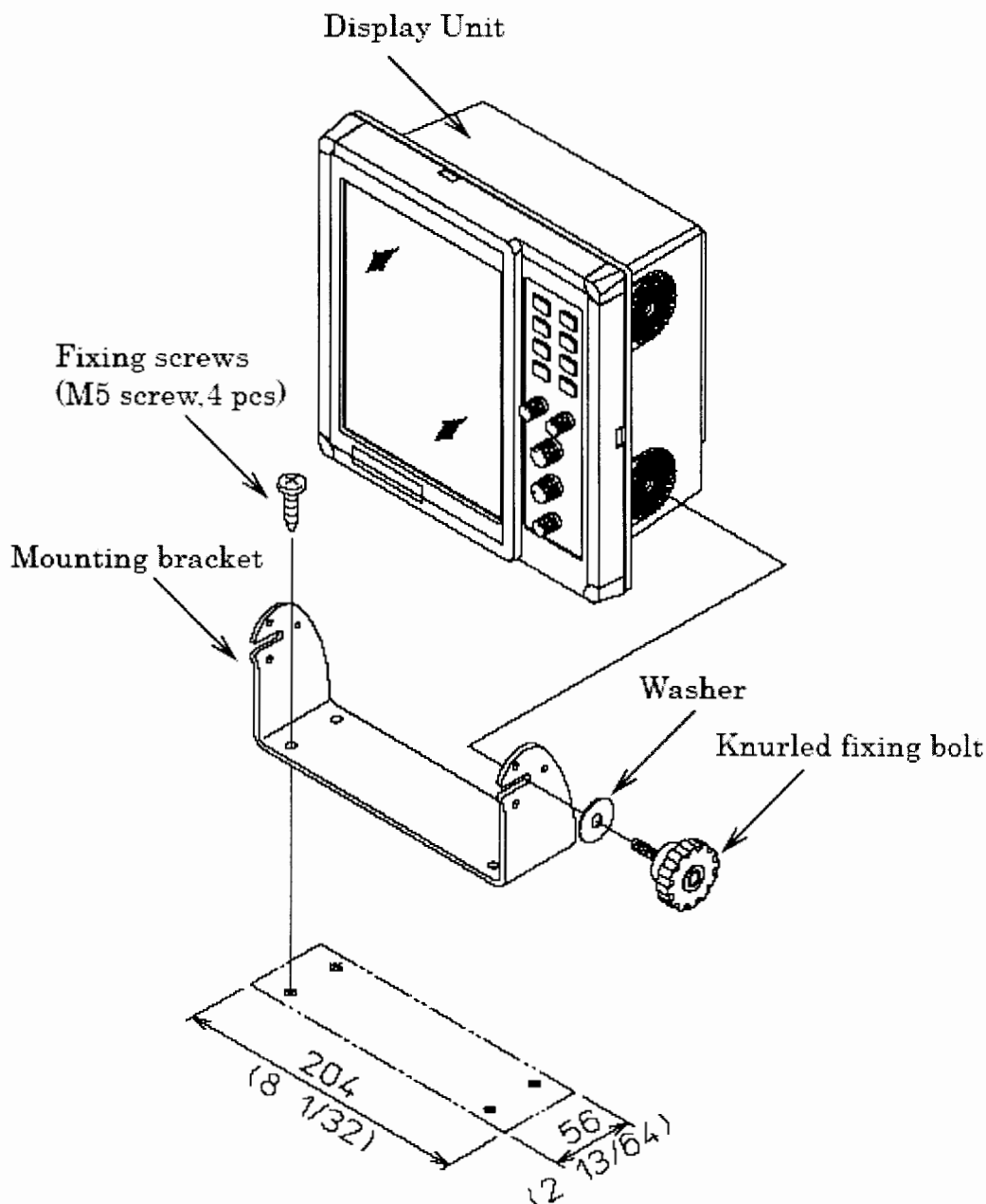


Figure 4.2 Fitting the display unit in the table mounting mode

4.6.2 Flush mounting

- (1) Cut a rectangle opening that measures 190 mm x 194 mm.
- (2) Loosen two (2) fixing knobs that fasten the display unit onto the fixing bracket.
- (3) Remove four (4) plastic screw covers, which are fitted on each corner of the display front face.
- (4) Put the display on the opening and fix with four (4) tapping screws. In case you use M4 screws to fix the display, select an appropriate screw length that best suits fixing the unit to the panel thickness.
- (5) Refit the coverings removed in step (3).

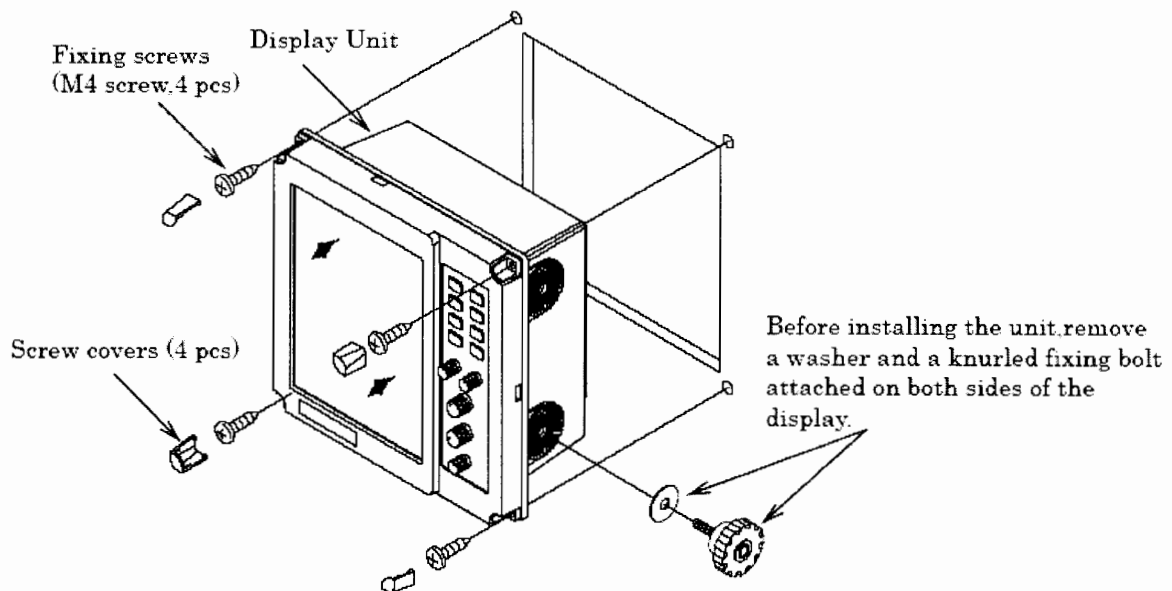


Figure 4.2 Flush mounting arrangement

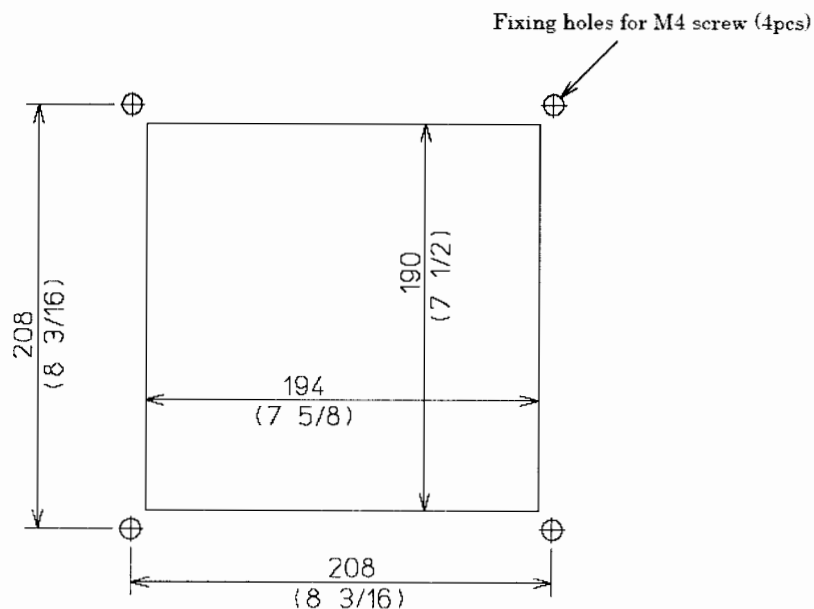


Figure 4.3 Flush mounting arrangement

4.6.3 Connections to CVS-833/833C

Connect the transducer cable, power cable and the data cable to each mating connector at the rear panel. (Refer to the following figures for the connection details.)

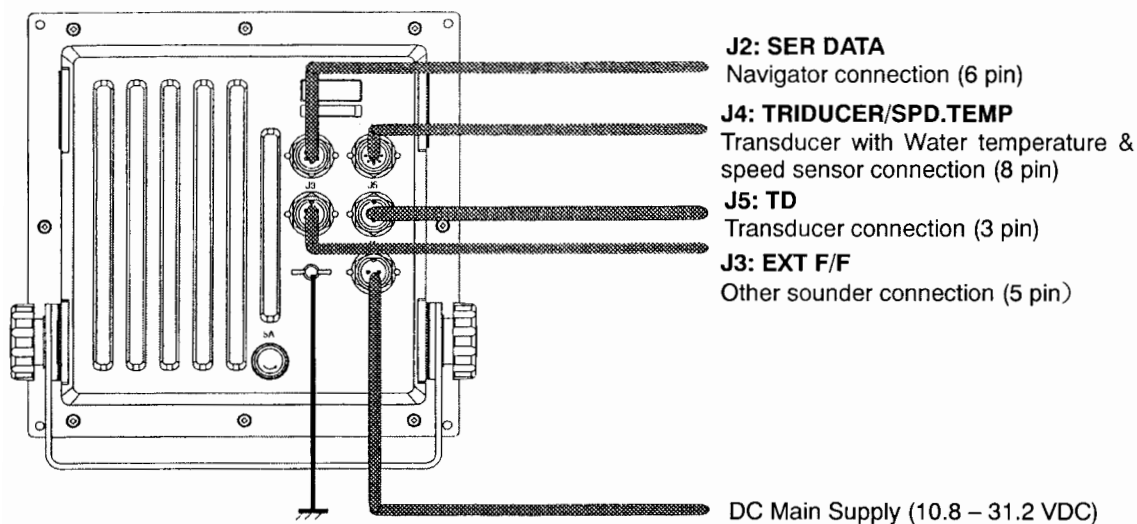


Figure 4.4 Sounder connections

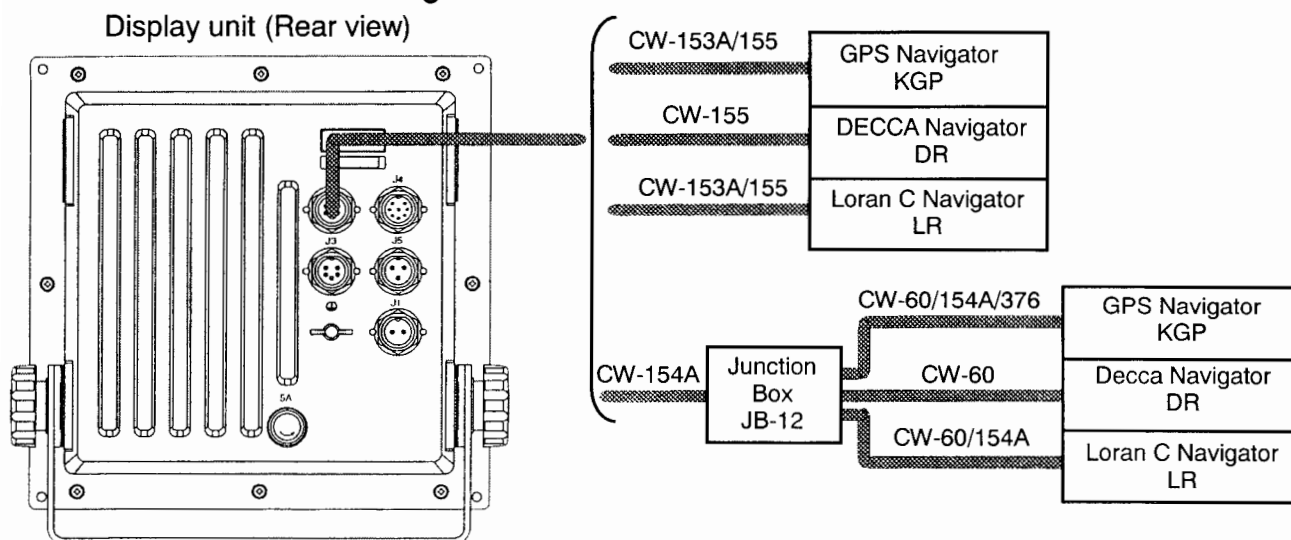
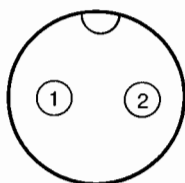


Figure 4.5 Connecting a navigator unit

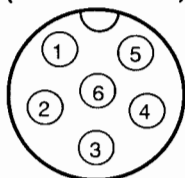
The pinouts of each connector are shown in the following figures, which is viewed from the top side.

J1
(10.8 – 31.2 VDC)



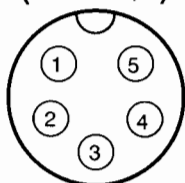
Pinout	Signal name
1	DC Mains (+)
2	DC Mains (-)

J2
(SER DATA)



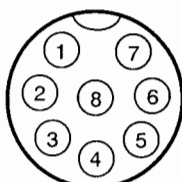
Pinout	Signal name	Remarks
1	GND	
2	SER OUT(SIG)	Serial signal out (+OP)
3	SER OUT(RTN)	Serial signal out (-OP)
4	SER IN(SIG)	Serial signal in (+IP)
5	SER IN(RTN)	Serial signal in (-IP)
6	NC	

J3
(EXT F/F)



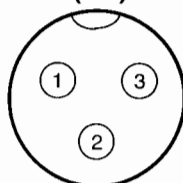
Pinout	Signal name	Remarks
1	EXT.TRIG	Sync trigger input from external sounder
2	GND	Ground
3	Zero TRIG OUT	Zero trigger output
4	AF SIG OUT	AF signal output
5	EXT.SIG	Sounder video input from external sounder

J4
(TRIDUCER /SPD&TEMP)



Pinout	Signal name	Remarks
1	SPD (Pulse)	Speed pulse input
2	SPD (+B))	+ DC supply for speed sensor
3	TD	Transducer signal IN/OUT
4	SH	Transducer signal (Shield)
5	TD	Transducer signal IN/OUT
6	TEMP	Temperature signal in
7	TEMP	Temperature signal in
8	SPD (GND)	Ground

J5
(TD)



Pinout	Signal name	Remarks
1	TD1	Transducer signal IN/OUT
2	TD SH	Transducer signal (Shield)
3	TD0	Transducer signal IN/OUT

4.7 Check after installation

Before you turn the unit on, check the following points to make sure the CVS-833/833C operates properly.

- (1) Is the ship's supply voltage and current within the rated range?
- (2) Is the transducer wiring normal? No wrong connections, no short circuits, etc?

Chapter 5

Basic Operation

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Chapter 5 Basic Operation

5.1 Introduction

In this chapter, all necessary operating instructions are given from getting started to turning off the system. The following panel layout illustration will give you an idea what sort of key switches and controls are available as well as their brief functional descriptions.

5.2 Theory of fish finder operation

The color fish finder CVS-833/833C is composed of a display unit with a transmitter/receiver and a transducer unit. Various transducer types are available according to the frequency, with or without temperature and speed sensors, etc.

The transmitter/receiver section produces a driving pulse, which is sent to the transducer to transmit ultrasonic sound energy to the ocean. The transmitted energy hits the school of fish or sea bottom and bounces back following the same path to the transducer. The received signals are converted to electrical signals and subject to signal processing to allow a color presentation on the Liquid Crystal Display (LCD). When the ship moves from Point A to Point B, the ultrasonic sound energy scans past the ocean as shown in Figure 5.2. Figure 5.3 shows a sectional view of the sea bottom. Figure 5.1 shows an example of the image presentation on the screen, where the latest echoes are supplied from the furthest right side of the screen and move to the left.

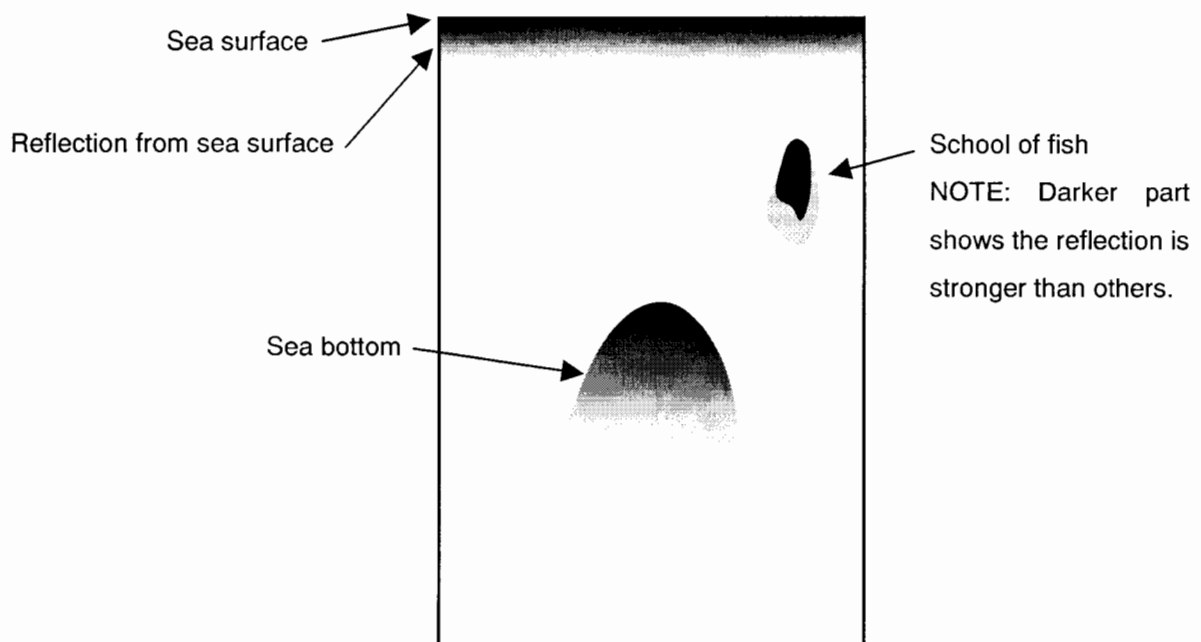


Figure 5.1 Typical echo presentations on the screen

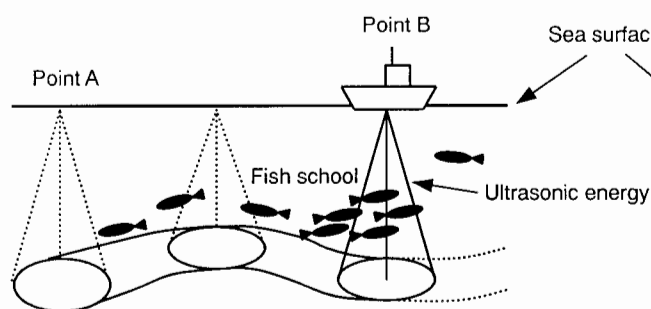


Figure 5.2 Ultrasonic sound scans past the objects

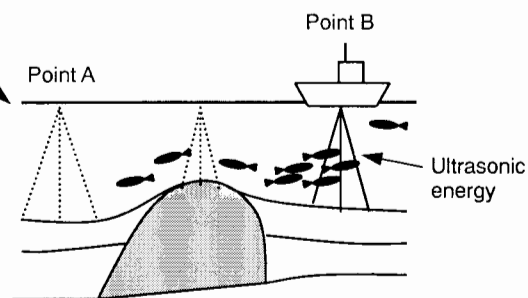


Figure 5.3 Profile of Sea bottom

5.2.1 Screen presentation

In addition to the sounder image, various data including own ship's position, speed, temperature, distance traveled and the sea bottom depth are shown on the screen. These data can be deleted, if required.

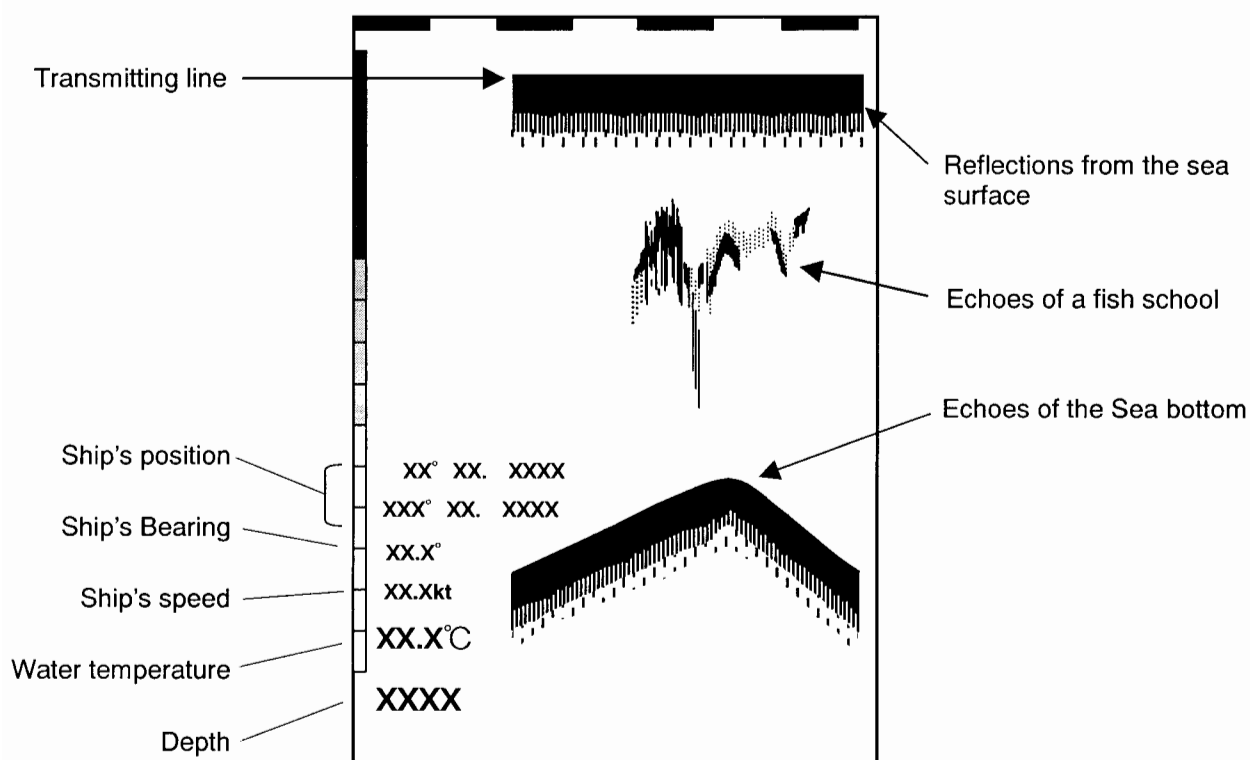


Figure 5.4 Typical sounder screen with data shown

5.3 Operation panel layout

The operation panel layout is shown in the following figure.

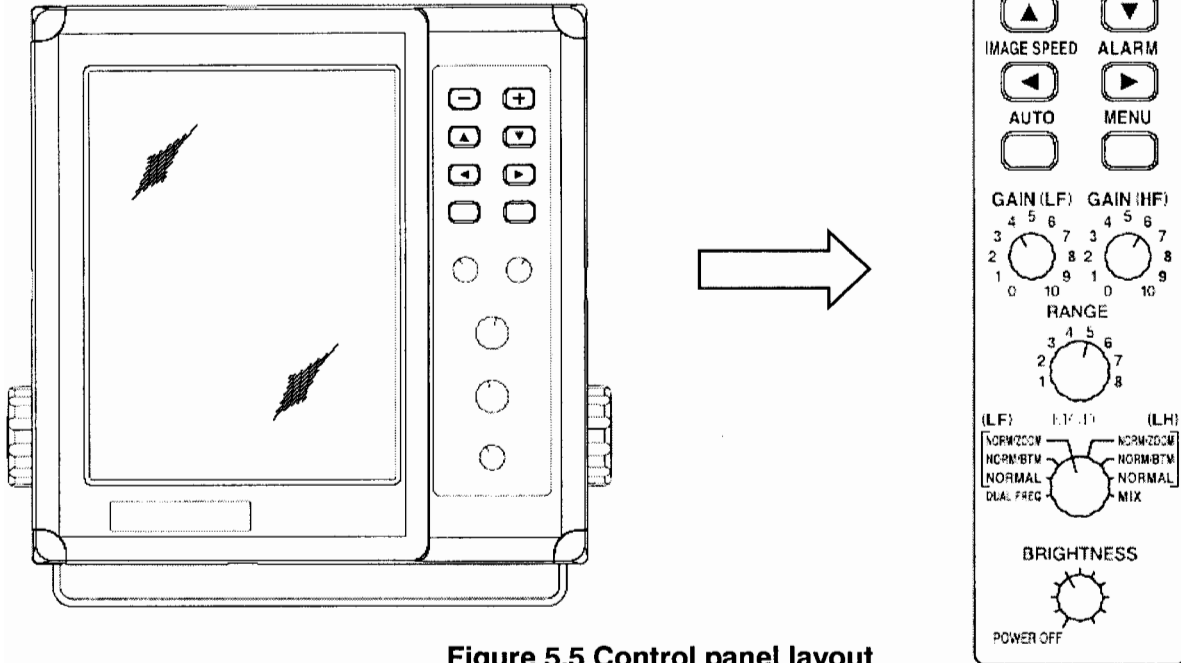


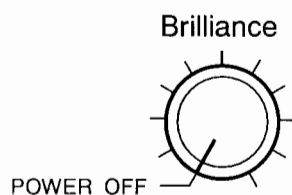
Figure 5.5 Control panel layout

5.3.1 Operating controls and key switches

All necessary controls and functional settings can be done on the display control panel. Dedicated rotary controls are provided for frequent sounder operations; these include Power ON/OFF, Depth Range setting, Gain Control and Image Mode change, allowing quick and effective operations. Tactile keypads are provided for additional settings and operations.

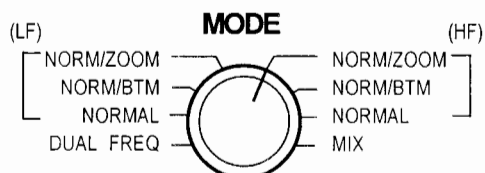
5.3.1.1 The functions of various key switches and controls

Power / Brilliance controls



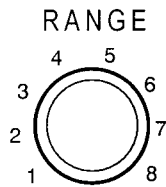
Turns the power on and off and also controls screen brilliance. The brilliance increases when the control is turned clockwise and decreases when turned counter clockwise.

Image mode switch



Selects the image mode. For detail, refer to Para 5.5 "Selecting image mode".

Depth range setting (Range) control



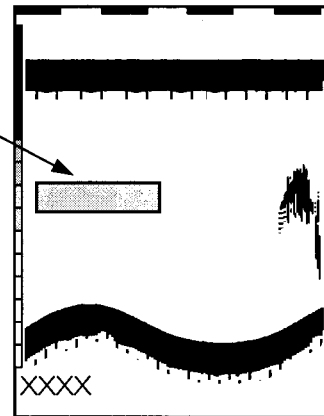
Selects the depth range in 8 steps. Each depth scale number has its own depth range registered.

NOTE: To change the depth range scale, select the sub menu "2 DEPTH RANGE PRESET" in the initial menu and register the depth and unit.

Default depth ranges are as follows:

	CVS-833	CVS-833C
Depth range 1:	10 ft	10 ft
Depth range 2:	20 ft	20 ft
Depth range 3:	40 ft	40 ft
Depth range 4:	60 ft	100 ft
Depth range 5:	100 ft	200 ft
Depth range 6:	200 ft	600 ft
Depth range 7:	400 ft	1000 ft
Depth range 8:	600 ft	2000 ft

Selected depth range

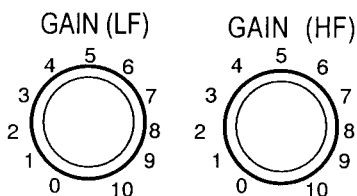


Setting auto range

Always displays the entire sonar image from the sea surface to the bottom. To select this mode:

- (1) Select Auto Range in Menu 6.
- (2) Press the AUTO key repeatedly until AUTO appears.

Gain controls



GAIN (HF):

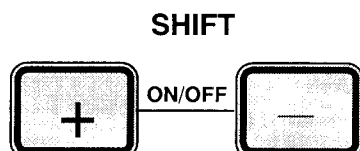
Controls the high frequency receiver gain.

GAIN (LF):

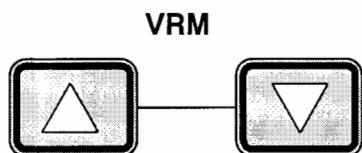
Controls the low frequency receiver gain.

NOTE: To use the gain control, set Auto Gain to OFF.

SHIFT keys



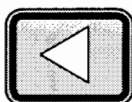
Each press of both the + and – keys toggles the image shift ON and OFF. Pressing the + or – key sets the shift position. Refer to Para 5.5 "Image shift ON/OFF and shift position selection" for detail.

VRM UP/DOWN keys

Displays Variable Range Marker as a green line, allowing the operator to precisely measure the depth of fish school and sea bottom. To use VRM:

- (1) Press the UP or DOWN arrow key to display VRM.
- (2) To move VRM, press UP or DOWN arrow key. Digital depth display will be shown in the left bottom corner of the screen.

NOTE: In dual display mode, VRM moves one display to the other as long as either the UP or DOWN arrow key is pressed.

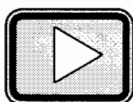
Image scroll key / Left arrow key**IMAGE SPEED**

This key selects the image scroll speed. This key also doubles as a left arrow key, used in sub menus to select the items. To select the scroll speed:

- (1) Press the key to stop the sounder image.
- (2) Press the key again to display the image scroll speed set up screen.
- (3) Press the VRM up arrow or down arrow key to set up the speed.

Default: 1/1

Scroll speed: (Slow) 1/32 1/16 1/8 1/4 1/2 1/1 2/1 (Fast)

Alarm key / Right arrow key**ALARM**

Each press of this key toggles the alarm ON and OFF. This key also doubles as a right arrow key, used in sub menus to select the items.

To set up the alarm, refer to Para. 6.5 (Menu 2)

Default: OFF

Alarm setting: OFF or ON

Auto key**AUTO**

Turns ON and OFF the auto functions that include AUTO range, AUTO shift and AUTO gain.

To set up the AUTO, refer to Para. 6.9 (Menu 6)

Default: OFF

AUTO setting: OFF or ON

Menu key

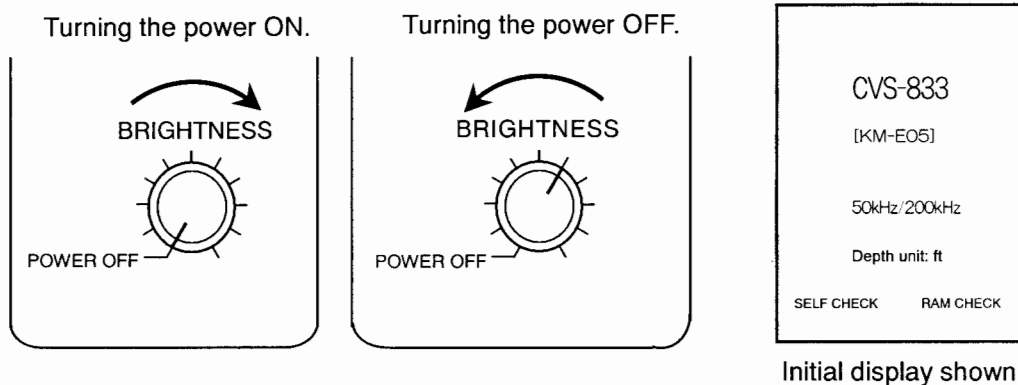
MENU



Displays Initial Menu. Also, this key is used to exit a sub menu.

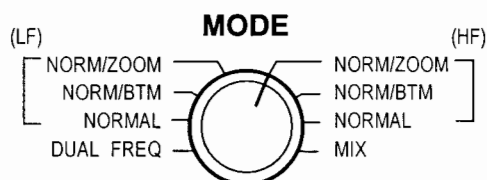
5.4 Getting started

Turn the POWER/BRILL control clockwise to turn on the equipment. Further turning the control clockwise increases the image brilliance and counter clockwise decreases the brilliance. When turned on, an initial display will appear on the screen, showing the frequencies in use, depth unit and the result of self-tests.



5.5 Selecting image mode

Use the image mode switch to select the image mode. The following modes are available:



- (1) DUAL FREQ: Dual frequency display in normal screen
- (2) NORMAL: Normal single screen with High frequency or Low frequency display
- (3) NORM/BTM: Split screen with Normal and Bottom Zoom display
- (4) NORM/ZOOM: Split screen with Normal and Partially Zoomed display
- (5) MIX: Mixed High and Low frequencies image and normal High frequency image

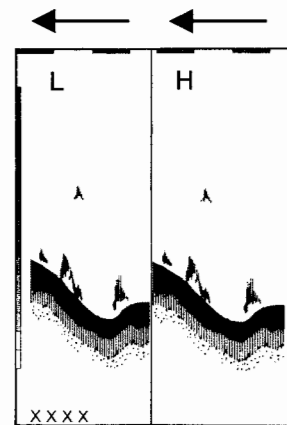
5.5.1 Default display

The following figures illustrate the default displays, which are selected by the image mode switch. To change the display, refer to Para 6.11.3 "Setting display mode".

5.5.1.1 DUAL FREQ

Displays a dual frequency images in normal mode, 50 KHz at the left side and 200 KHz at the right side.

Picture scrolls from right to left

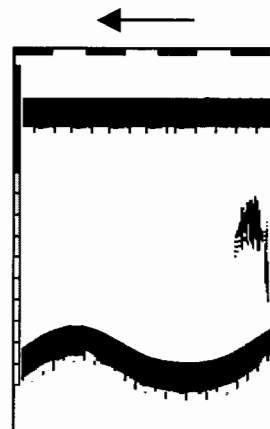


Normal Dual frequency

5.5.1.2 NORMAL (HF/LF)

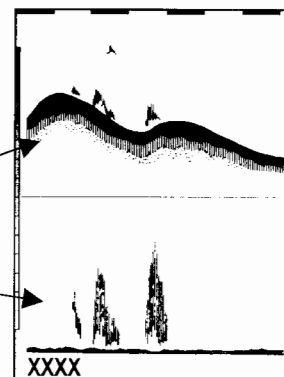
A single screen of High Frequency (200 KHz) or Low Frequency (50 KHz) image.

Picture scrolls from right to left.

**5.5.1.3 NORMAL/BTM (HF/LF)**

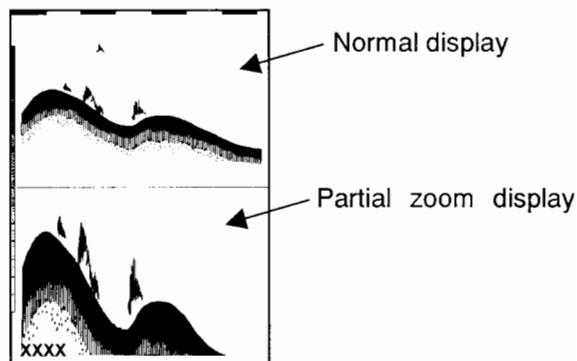
Displays normal display (High or Low, selected by the Image Mode switch) on the upper half and bottom zoom display on the lower half side of the screen.

Normal display
Bottom zoom display



5.5.1.4 NORM/ZOOM (HF/LF)

Displays normal (High or Low, selected by the Image Mode switch) and partial zoom images. The normal image is shown in the upper half and the partial zoom in the lower half part of the screen.



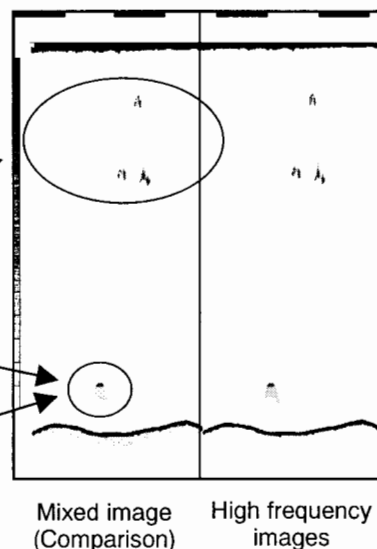
5.5.1.5 MIX

Displays normal (High frequency) and mixed image with High and Low frequencies. The normal image is shown on the right and the mixed image on the left side of the screen.

The fish echoes only appear in high frequency are displayed in their original color.

The fish images shown in red in both high and low frequencies are displayed in red.

In the mixed mode picture, the high and low frequency images appear in the same position are mixed and displayed in a mixed color.



5.5.2 Image scroll directions

The following figures show all available displays in each mode. Arrow marks show the image scroll direction. The item with an asterisk indicates default picture mode.

5.5.2.1 DUAL FREQ

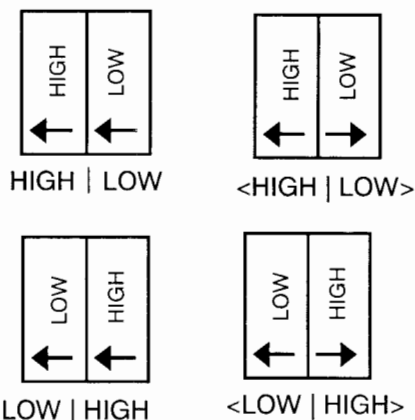
In dual frequency mode, the screen is vertically split and image scroll direction can be changed as follows:

* HIGH | LOW: Vertically split, one way scroll.

<HIGH | LOW>: Vertically split, center scroll

LOW | HIGH: Vertically split, one way scroll.

<LOW | HIGH>: Vertically split, center scroll



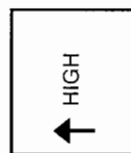
HIGH: High frequency Normal image

LOW: Low frequency Normal image

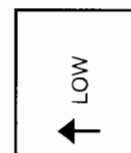
5.5.2.2 NORMAL (HF/LF)

NORMAL (HF): A single High frequency image

NORMAL (LF): A single Low frequency image



High freq normal



Low freq normal

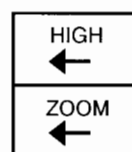
5.5.2.3 NORM/BTM (HF)

NORM / ZOOM: Horizontally split, one way scroll

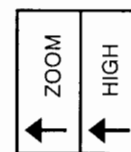
ZOOM | NORM: Vertically split, one way scroll

ZOOM / NORM: Horizontally split, one way scroll

NORM | ZOOM: Vertically split, one way scroll



NORM / ZOOM

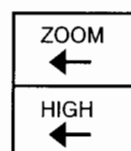


ZOOM | NORM

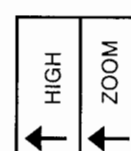
NORM: High frequency Normal Image.

ZOOM: Sea bottom fixed zoomed or

Sea bottom sediment zoom.



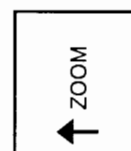
ZOOM / NORM



NORM | ZOOM

Open Menu7 and select the BTM Zoom image.

The Bottom Zoom image is shown in a single display.



Bottom Zoom

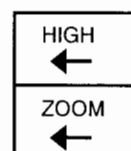
5.5.2.4 NORM/ZOOM (HF)

NORM / ZOOM: Horizontally split, one way scroll

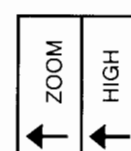
ZOOM | NORM: Vertically split, one way scroll

ZOOM / NORM: Horizontally split, one way scroll

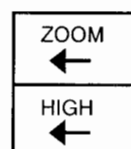
NORM | ZOOM: Vertically split, one way scroll



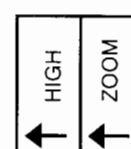
NORM / ZOOM



ZOOM | NORM



ZOOM / NORM



NORM | ZOOM

NORM: High frequency Normal image

ZOOM: Partial zoom image

Basic Operation

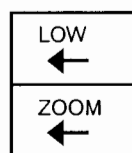
5.5.2.5 NORM/ZOOM (LF)

NORM / ZOOM: Horizontally split, one way scroll

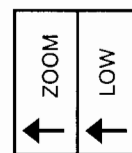
ZOOM | NORM: Vertically split, one way scroll

ZOOM / NORM: Horizontally split, one way scroll

NORM | ZOOM: Vertically split, one way scroll



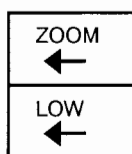
NORM / ZOOM



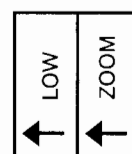
ZOOM | NORM

NORM: Low freq Normal image

ZOOM: Partial zoom image



ZOOM / NORM



NORM | ZOOM

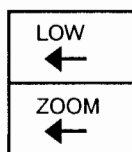
5.5.2.6 NORM/BTM (LF)

NORM / ZOOM: Horizontally split, one way scroll

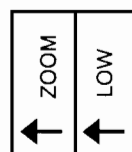
ZOOM | NORM: Vertically split, one way scroll

ZOOM / NORM: Horizontally split, one way scroll

NORM | ZOOM: Vertically split, one way scroll



NORM / ZOOM

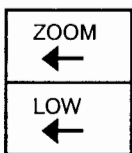


ZOOM | NORM

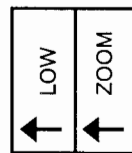
NORM: Low frequency Normal image

ZOOM: Bottom Lock image or

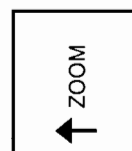
Bottom Sediment Zoom image



ZOOM / NORM



NORM | ZOOM



Bottom Zoom

Open Menu7 and select the BTM Zoom image.

The Bottom Zoom image is shown in a single display.

5.5.2.7 MIX

MIX | H: Vertically split, one way scroll

<MIX | H>: Vertically split, center scroll

H | MIX: Vertically split, one way scroll

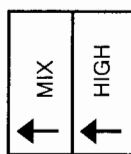
<H | MIX>: Vertically split, center scroll

MIX | L: Vertically split, one way scroll

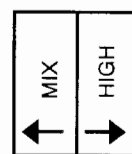
<MIX | L>: Vertically split, center scroll

L | MIX: Vertically split, one way scroll

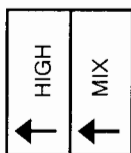
<L | MIX>: Vertically split, center scroll



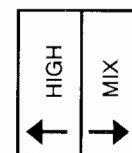
MIX | H



<MIX | H>

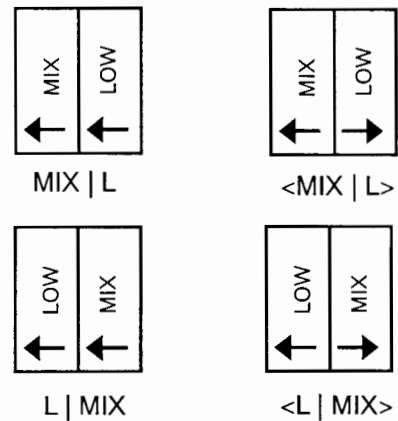


H | MIX



<H | MIX>

H: High freq Normal image
 L: Low frequency Normal image
 MIX: Compared Mix image or
 Subtract Mix image



5.5.3 Displaying Dual Frequency image

The CVS-833/833C sounder has a dual frequency image screen function. The screen is split to give high frequency image on the right and low frequency image on the left. Before you display the dual screen, you need to register an image mode. To register:

1. Open the INITIAL menu and select "3 Image mode registration". For setting detail, refer to Para 6.11.3 "Image mode selection".
2. Turn the MODE selection switch to select the DUAL FREQ mode. Dual screen display will be shown.

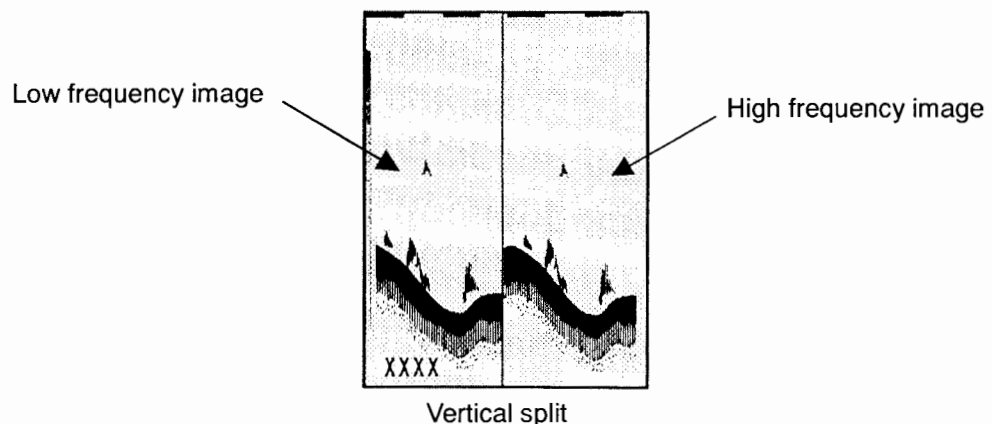


Figure 5.6 Dual Frequency image display

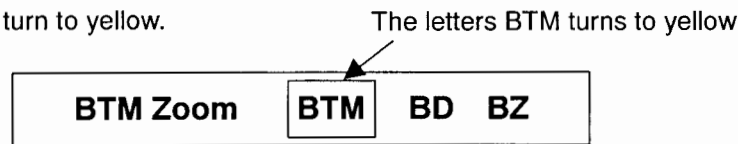
5.5.4 Displaying Zoomed Sea Bottom

The bottom-zoomed screens are available in three kinds: Sea Bottom-Fixed Zoom, Sea Bottom-Sediment Zoom and Bottom Lock Zoom.

5.5.4.1 Displaying Bottom Lock (BTM) image

When you select the NORMAL/ZOOM mode, the sea bottom is always shown flat with a normal display shown above. This allows easy finding of the fish school near the sea bottom, while observing the entire sounder image. To set this mode:

1. Open Sub Menu 1 and select "Zoom range" (Para. 6.4.1) to set up a zooming range.
2. Open Sub Menu 7 and select "BTM Zoom". Refer to Para 6.10.1 "BTM Zoom". The color of the letter BTM will turn to yellow.



3. In the INITIAL MENU, select "3. Image Mode Registration" and select the image mode, "Vertical split" or "Horizontal split". Refer to Para. 6.11.3 "Resetting the image mode selection".
4. Turn the MODE selection switch to NORM/BTM of either Low or High frequency.

The Bottom Lock display range is displayed by an orange colored bar.

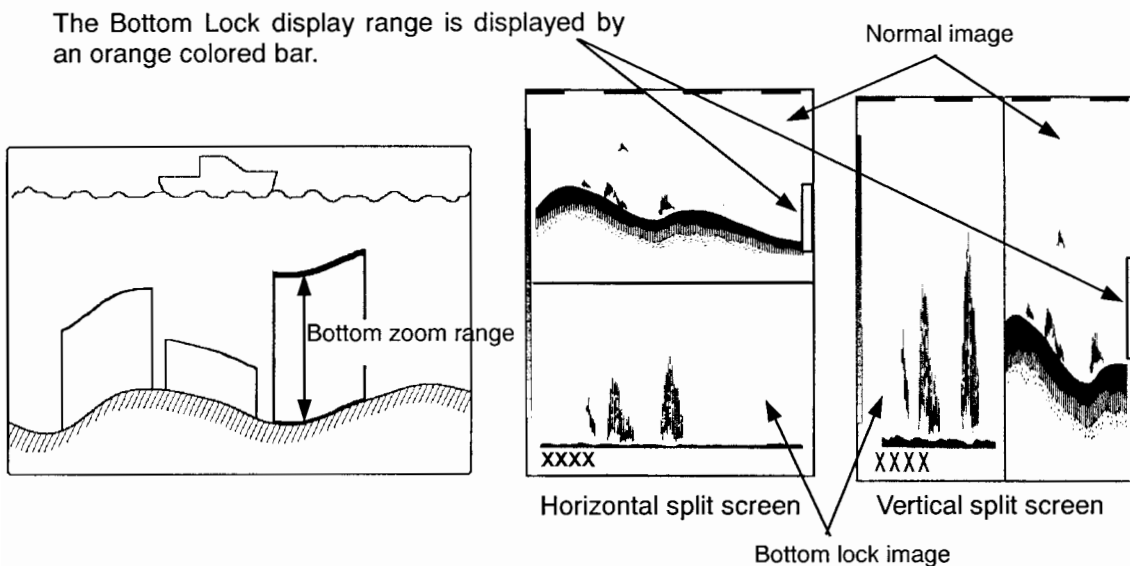
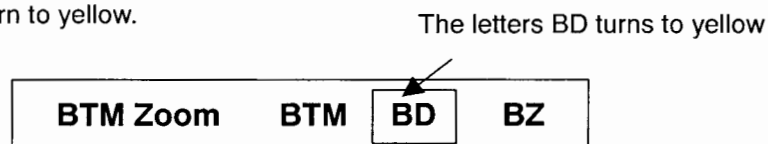


Figure 5.7 Bottom Lock (BTM) image display

5.5.4.2 Displaying Bottom Discrimination (B.D.) image

Similar to the NORMAL/ZOOM mode, the sea bottom is always shown flat with normal image (shown in the upper half of the screen). This allows easy viewing of fish schools near the sea bottom. This feature also allows analysis of the sea bottom, in addition to the type of fish school. Refer to the following figure for detail. To use this mode:

1. Open Sub Menu 1 and select "Zoom range" (Para. 6.4.1) to set up a zooming range.
2. Open Sub Menu 7 and select "BTM Zoom". Refer to Para 6.10.1 "BTM Zoom". The color of the letter BD will turn to yellow.



3. In the INITIAL MENU, select "3. Image Mode Registration" and select the image mode, "Vertical split" or "Horizontal split". Refer to Para. 6.11.3 "Resetting the image mode selection".
4. Turn the MODE selection switch to NORM/BTM of either Low or High frequency.

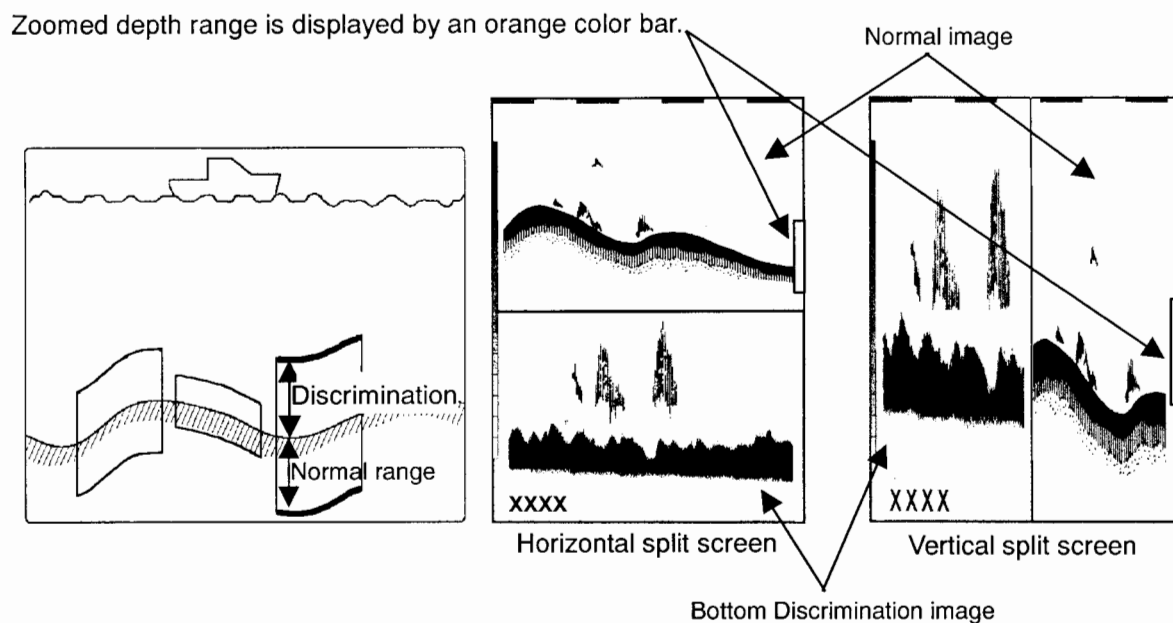
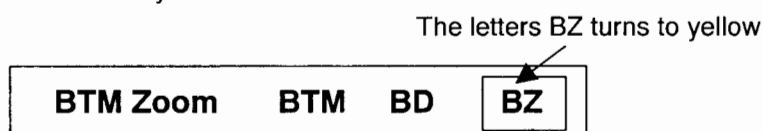


Figure 5.8 Bottom Discrimination (B.D.) image display

5.5.4.3 Displaying Bottom Zoom (BZ) image

This feature allows viewing at a zoomed depth range with the sea bottom fixed at the bottom of the screen. Using the bottom line as reference, this function zooms up the areas above the bottom. This function indicates height from the bottom in solid scale lines while the bottom depth is indicated by the original depth scale, so you can closely observe schools of fish near the bottom. To use this function:

1. Open Sub Menu 1 and select "Zoom range" (Para. 6.4.1) to set up a zooming range.
2. Open Sub Menu 7 and select "BTM Zoom". Refer to Para 6.10.1 "BTM Zoom". The color of the letters BZ will turn to yellow.



3. Turn the MODE selection switch to NORM/BTM of either Low or High frequency.

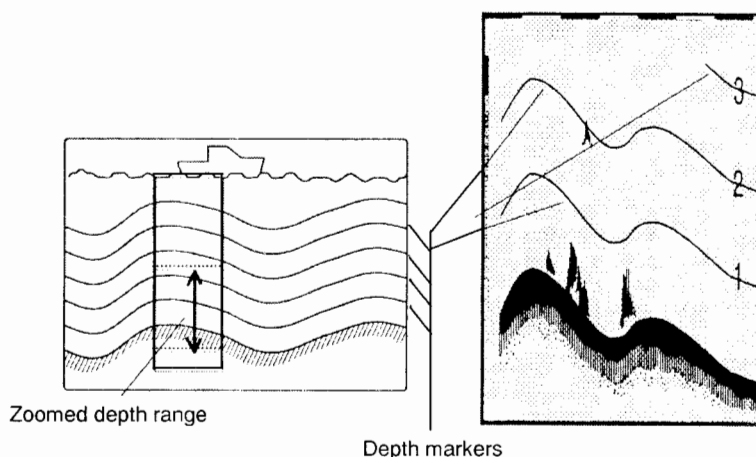


Figure 5.9 Bottom Zoom (BZ) image display

NOTE: *The normal image is not available in this mode.*

5.5.5 Displaying partially zoomed depth display

This mode allows showing a partially zoomed display, referenced to a specified depth from which the zooming range starts.

1. Set up a zooming range in Sub Menu 1. Refer to Para. 6.4.1 “Zooming range” for detail.
2. Set up a reference point from which the zooming range starts. To do so, open Sub Menu 1 “Zooming starting depth” and specify the depth.
3. Turn the MODE switch to NORM/ZOOM either in HIGH or LOW frequency.

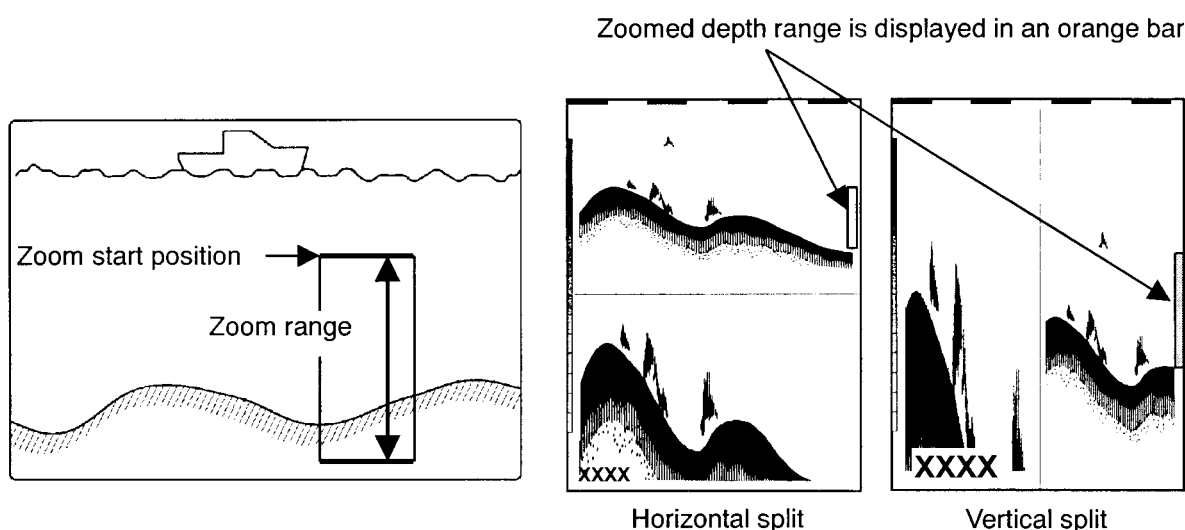


Figure 5.10 Partially zoomed depth display

5.5.6 Displaying mix images

Reflection from a school of fish is sensitive to the ultrasonic frequency i.e. the higher the frequency, the stronger the reflection, and vice versa. Utilizing this characteristic, detection of small fish like anchovy/sardines can be made possible by combining and processing signals of high and low frequencies reflected from the same object. The MIXED image can be selected from COMPARISON or SUBTRACTION. To use this function;

1. Select COMPARISON or SUBTRACTION from Sub Menu 4. (Refer to Para 6.7.5 for detail)
2. Set the MODE control to MIX.

5.6 Registering the depth to the range numbers

If you need to change the default depth range as assigned to range scale number (1 to 8), use the following procedure:

1. Press the MENU key.
2. Press the UP or DOWN arrow key to select Initial Menu 2 DEPTH RANGE PRESET.
3. Press the RIGHT arrow key to select Sub Menu 2 DEPTH RANGE PRESET.

4. Press the UP or DOWN key to select the range number.
5. Press the LEFT or RIGHT arrow key to select a desired range scale out of the table.
6. Repeat the procedure from step 4 for further range settings.
7. When finished with the settings, press the MENU key. The screen returns to the Initial Menu display and a further press of the MENU key displays the normal screen as shown in the figure below.

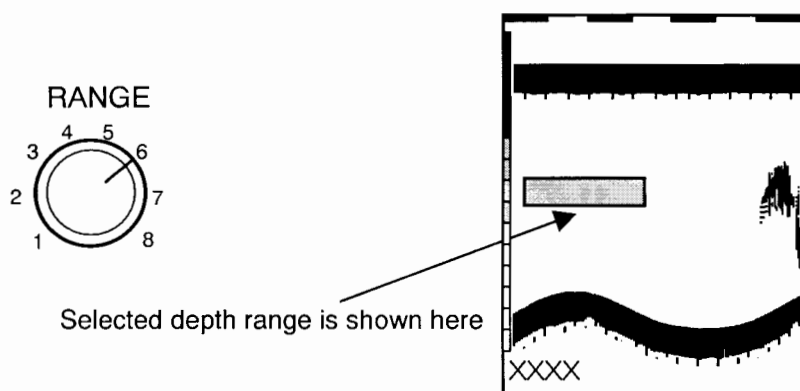


Figure 5.11 Depth range display on the screen

5.6.1 Displaying Auto Range

This function provides the entire sounder screen display from the sea bottom to the sea surface, even if the sea bottom depth changes. To use this function:

1. Press the AUTO key repeatedly until the letters AUTO appears.

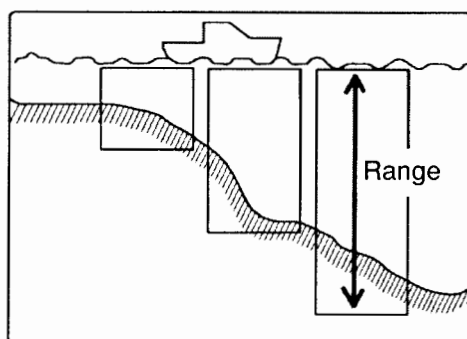
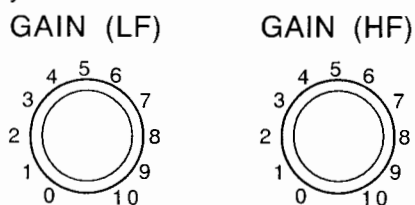


Figure 5.12 Auto Range function

5.7 Setting the receiver gain

Turn the HIGH or LOW frequency gain control to make the sea bottom display turn red. This setting gives good fish detection capability.



5.7.1 Setting AUTO GAIN function

Using this function the receiver gain is automatically controlled to an appropriate level even if the sea bottom depth changes, eliminating the need of manual gain control. To use this function:

1. Press the AUTO key repeatedly until the word "AUTO" appears on the screen.

5.8 Shifting the image

NORMAL image mode has two shift modes, Fixed Shift and Auto Shift.

5.8.1 Setting Fix Shift mode (Selecting depth range and Fix Shift position)

In this mode, sounding range can be determined by setting an upper depth line and the depth range.

The image starts from the upper depth line. To use this function:

1. Register the depth range. Refer to 6.11.2 "Registering depth range" for detail.
2. Select the depth range by the RANGE switch.
3. Press the + and – key at the same time to set up shift positioning status.
4. Press the + or – key to set the upper depth value.

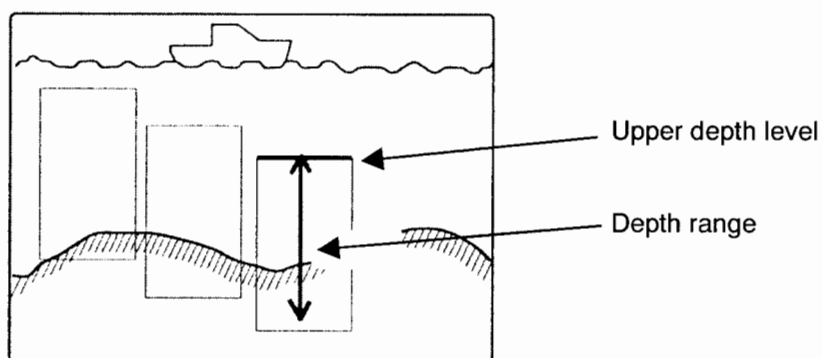


Figure 5.13 Setting Upper depth and depth range

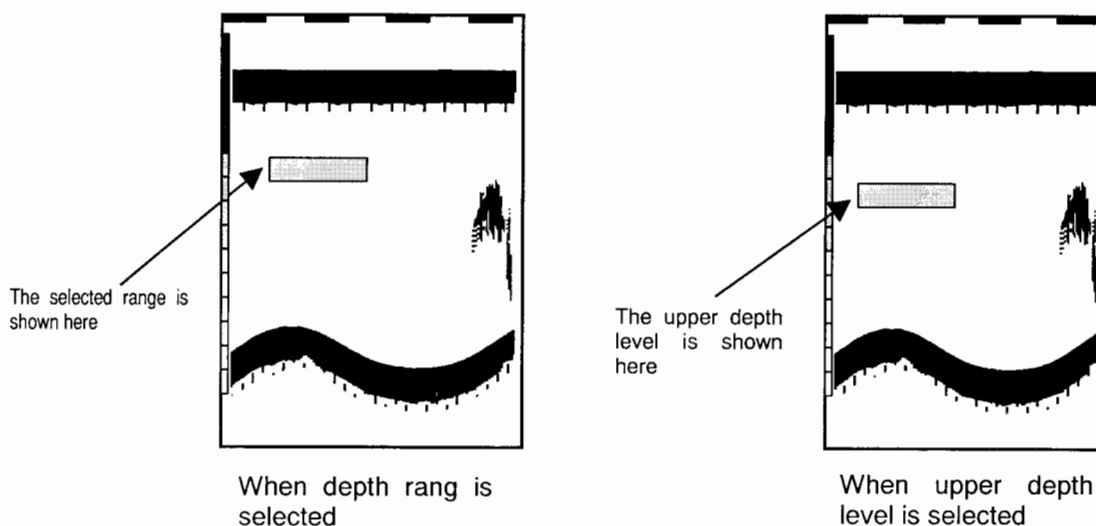
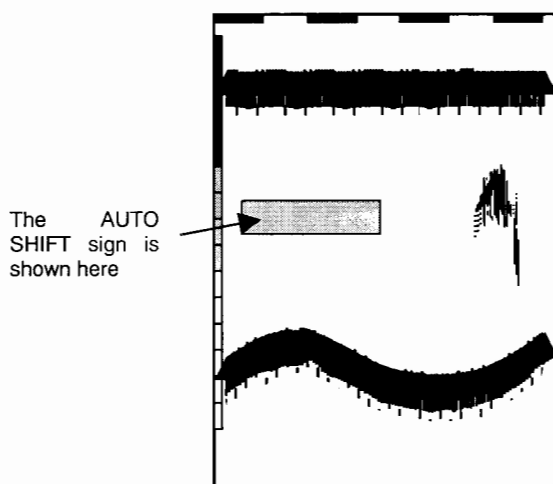


Figure 5.14 Fix Shift mode display

5.8.2 Displaying Auto Shift image

In this mode, the sea bottom is always shown at the bottom of the screen. To select this mode:

1. Open Sub Menu 6 and select SHIFT. The color of the letters SHIFT turns to yellow. Refer to Para 6.9.1 for detail.
2. Press the + and – key at the same time to display AUTO SHIFT on the screen.



The AUTO SHIFT image

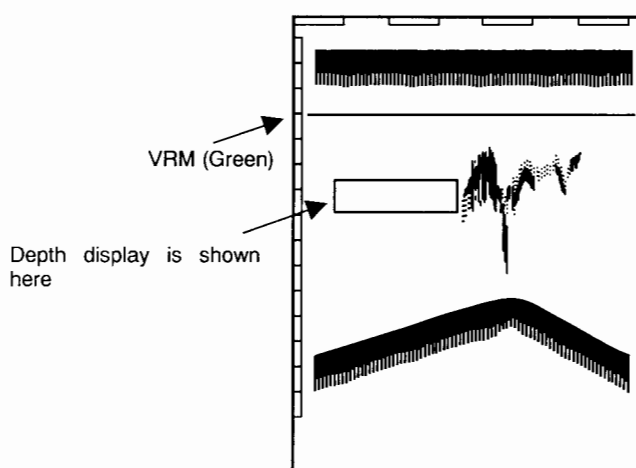
NOTE: When AUTO RANGE is selected, you cannot switch to AUTO SHIFT mode. To use AUTO SHIFT, press the MENU key to turn off the AUTO RANGE function before activating the AUTO SHIFT image.

Figure 5.15 Auto Shift image display

5.9 Measuring the depth by VRM

Using VRM, you can measure accurate depth of objects under water. To use this function:

1. Press the UP and DOWN keys at the same time to show VRM on the screen. The VRM will be displayed in a green line and the depth display in the left side of the screen.



VRM display

Figure 5.16 VRM display on the screen

NOTE: When VRM is shown within normal display, its depth indication refers to the starting depth of partial zoom display.

5.10 Changing image scroll speed

Scroll speed is correlated with the number of transmission. To change the speed:

1. Press the IMAGE SPEED key to show the speed selecting menu.
2. Press the UP or DOWN key to select the speed. The image speed display changes as follows: 1/32, 1/16, 1/8, 1/4, 1/2, 1/1, 2/1

NOTE: Meaning of the scroll speed indication is as follows:

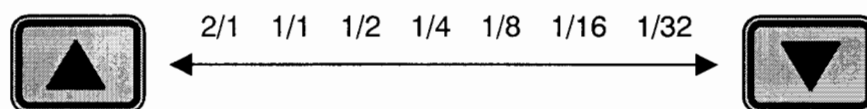
1/32: Sounder display is drawn every 32 transmissions.

1/16: Sounder display is drawn every 16 transmissions

1/8: Sounder display is drawn every 8 transmissions

....

2/1: Sounder display is drawn twice every transmission



5.11 Setting up the alarm

This function is used to detect the sea bottom or a school of fish that touches or enters a preset alarm bar. To use this function:

1. Open Sub Menu 2 and set up Alarm Range. Refer to Para. 6.5.1 for setting detail.
2. Press the ALARM key to activate the alarm function.
3. Press the VRM UP or DOWN key to select Upper Alarm Depth.

As a result of this setting, an audio depth alarm sounds when the sea bottom or a school of fish enters the alarm area. Take the following notes in setting each alarm function.

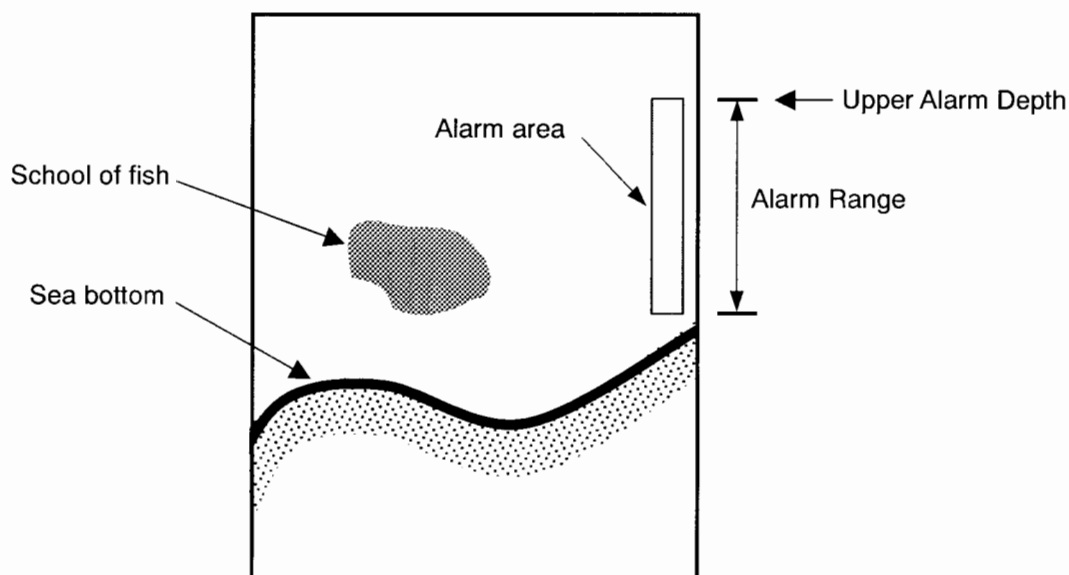


Figure 5.17 Alarm range display

When used as a Bottom Alarm:

An audio alarm sounds when the sea bottom touches or falls within the alarm bar. The following points should be considered:

- (1) The minimum alarm length is 3 % of the depth range in use.
- (2) Alarm bar length should be determined according to the profile of the sea bottom.

When used as a Fish Alarm:

An audio alarm sounds when a school of fish enters the alarm bar. The alarming condition is determined according to the length and color of a school of fish. The following points should be considered:

- (1) The length of the alarm bar should be decided according to the thickness of a school of fish.
- (2) The color that activates the alarm should be decided according to a predominant color of a school of fish.

CAUTION: *The audio alarm will automatically stop in the following conditions:*

1. *When an object leaves the alarm.*
2. *When the alarm bar is removed from the display.*
3. *When the alarm bar disappears due to the alarm depth range changing.*
4. *When the upper depth is set to the same depth as the lower depth of the alarm bar.*

Chapter 6

Using the Menu

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Chapter 6 Using the Menu

6.1 Available menus

The Main Menu and Initial Menu are provided in the CVS-833/833C series of sounders. The Main Menu contains frequently used settings such as changing display mode, image processing method, etc. The Initial Menu is used to set up technical items in such a case when the equipment is installed or relocated.

6.1.1 Opening Main Menu .

MENU



Press the MENU key to display Main Menu.

6.1.2 Opening Initial Menu

MENU



Press and hold the MENU key and turn the power switch on.

NOTE: To open Initial Menu, turn the equipment off and then turn on again.

6.2 How to use the Menu

6.2.1 Selecting the Main Menu item

The following common key sequence can be used for all menu selections.

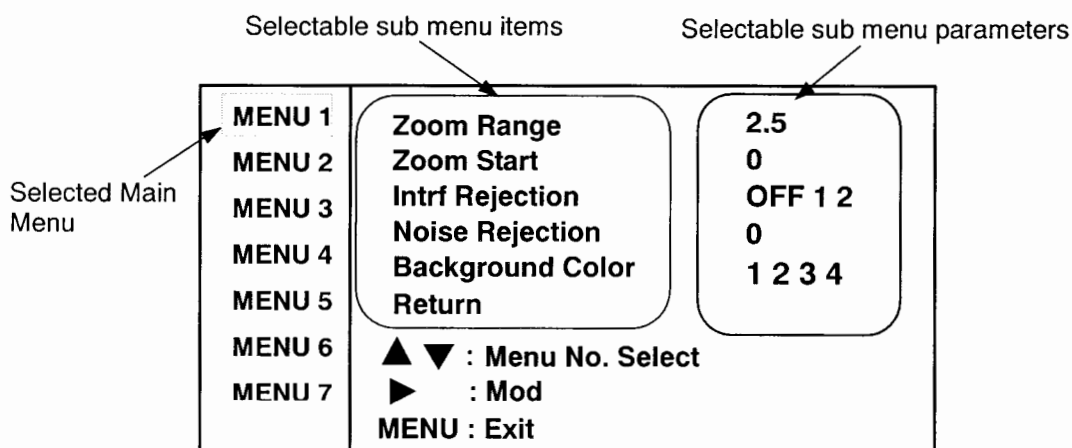
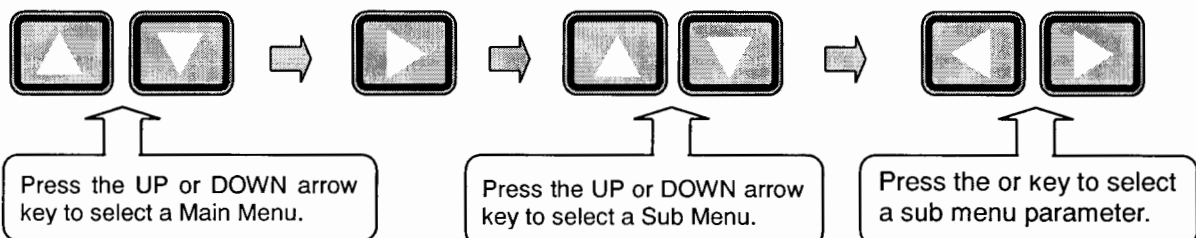


Figure 6.1 Main Menu display

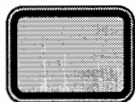
6.2.2 Selecting Initial Menu

Operating procedure of the Initial Menu is the same as Main Menu.

6.3 Exiting from the Menu

6.3.1 Exiting from Main Menu

MENU



Press the MAIN menu key repeatedly until the menu display disappears.

6.3.2 Exiting from Initial Menu

Open Initial Menu and select "9. EXIT". For detail, refer to Para. 6.11.9 "Exiting Initial Menu".

6.4 MENU 1

Using MENU 1, the following functions can be used:

1. Selecting a zooming range for the bottom lock image, bottom discrimination image, bottom zoom image and zoom image
2. Setting a zooming start position for the zoom range
3. Selecting the intensity of interference rejection
4. Selecting the intensity of noise rejection
5. Selecting the background color

6.4.1 Zoom Range

Using this sub menu, you can select a zooming range of the following image modes; Bottom Lock image, Bottom Discrimination image and Zoom image. To select:

1. Move the cursor to the left using the RIGHT arrow key and select Zoom Range using the UP or DOWN key.
2. Move the cursor to the left or right using the LEFT or RIGHT key to select your desired zoom range.
3. Initial and selectable zoom ranges are as follows:

Initial setting: 10ft, 2.5 m/J.fm/fm/l.fm

Selective range :

10, 20, 40, 80, 160, 320ft

2.5, 5, 10, 20, 40, 80 m/J.fm/fm/l.fm

MENU 1	Zoom Range	2.5
MENU 2	Zoom Start	0
MENU 3	Intrf Rejection	OFF 1 2
MENU 4	Noise Rejection	0
MENU 5	Background Color	1 2 3 4
MENU 6	Return	
MENU 7	▲▼ : MENU No. Select	
	▶ : Mod	
	MENU : Exit	

Figure 6.2 Setting up Zoom Range in Menu 1

6.4.2 Zoom Start

Using this sub menu, you can select the zoom starting depth of a zoomed image. To select:

1. Move the cursor to the right using the RIGHT arrow key and select Zoom Start depth using the UP or DOWN key.
2. Move the cursor to the left or right using the LEFT or RIGHT key to select your desired zoom depth.

The initial setting and selectable depths are as follows:

Initial setting: 0 ft / m / J.fm / fm / I.fm

Selective depth :

CVS-833: 0~2000ft or 0~ 600 m / J.fm / fm / I.fm

CVS-833C: 0~4000ft or 0~1200 m / J.fm / fm / I.fm

6.4.3 Infr Rejection (Interference Rejection)

When other fishing vessel is working near your ship, your sounder image may be covered with noise like image. This is caused by interference from other sounder units that operate on the same frequency and rate of transmission. To reduce such an interference:

1. Move the cursor to the right using the RIGHT arrow and select Noise Rejection using the UP or DOWN key.
2. Move the cursor to the left or right using the LEFT or RIGHT key to select your desired intensity.

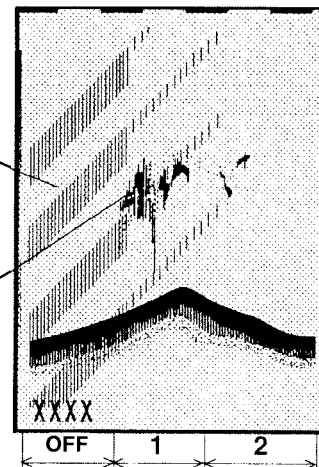
The initial setting and selectable intensity of rejection are as follows:

Initial setting: OFF

Selective intensity: OFF, 1, 2

Interference from
other ship

School of fish



6.4.4 Noise Rejection

This sub menu is used to reject low level boat noise.

To set:

1. Move the cursor to the right using the RIGHT arrow and select Noise Rejection using the UP or DOWN key.
2. Move the cursor to the left or right using the LEFT or RIGHT key to select your desired zoom depth.

The initial setting and selectable rejection intensity are as follows:

Initial setting: 0

Settable range: 0 - 9

6.4.5 Background Color

The background color can be changed in 4 steps according to the lighting condition. To set:

1. Move the cursor to the right using the RIGHT arrow key and select Background Color using the UP or DOWN key.
2. Move the cursor to the left or right using the LEFT or RIGHT key to select your desired color.

The initial setting and selectable colors are as follows:

Initial setting: 1

Selective colors: 4 steps

1: Blue 2: Dark Blue 3: Black 4: White

6.5 MENU 2

Using MENU 2, the following functions can be used:

1. Setting the alarm range for Fish Alarm or Bottom Alarm.
2. Setting the color by which the alarm is activated.
3. Setting the length of an echo signal by which the fish alarm is activated.
4. Selecting the upper limit temperature by which the temperature alarm will be activated.
5. Selecting the lower limit temperature by which the temperature alarm will be activated.

Refer to Para. 6.2.1 for setting detail.





MENU 1	Alarm Range	5
MENU 2	Alarm Level	
MENU 3	Alarm Length	S M L
MENU 4	U Temp Alarm	16.0 °C
MENU 5	L Temp Alarm	15.0 °C
MENU 6	Return	
MENU 7	  : Menu No. Select	
	 : Mod	
	MENU : Exit	

Figure 6.3 Menu 2 display

6.5.1 Alarm Range

This function sets up the alarm range, which is shown in an orange bar on the right side of the screen. When the sea bottom or a school of fish touches the bar, an audio alarm will be activated. To set the alarm range:

1. Press the ALARM key to activate the alarm function.
2. Press the VRM UP or DOWN arrow key to set up the upper limit of the alarm range.
3. In the Sub Menu 2, move the cursor to the right with the RIGHT arrow key and select "Alarm range" using the UP or DOWN key.
4. Use the LEFT or RIGHT key to select the alarm range value, which starts from the upper limit depth.

Initial setting: 5 ft / m / J.fm / fm / I.fm

Selective range:

CVS-833: 0 – 2000 ft or 0 – 600 m / J.fm / fm / I.fm

CVS-833C: 0 – 4000 ft or 0 – 1200 m / J.fm / fm / I.fm

NOTE: To select the depth unit, refer to Para. 6.11.1 "DEPTH UNIT SELECT".

6.5.2 Alarm Level

Using this function you can select the image color that activates the alarm.



CAUTION: A weaker color than that specified does not activate the alarm

Initial setting: Red

Selective colors: 14 colors

6.5.3 Alarm Length

This sub menu determines a vertical length of sounder image that activates the alarm.

Initial setting: Short

Selectable video length: 3 steps (Short, Medium and Long)

Short: 2 dots and more

Medium: 6 dots and more

Long: 10 dots and more

6.5.4 U Temp Alarm (Upper Temperature Alarm)

Temperature alarm: When temperature information from the SI-TEX temperature sensor (ST-80, 90 or ST-100) or external temperature sensor falls within a preset temperature range, the audio alarm will be activated.

The U Temp Alarm function sets up the upper limit of the temperature alarm range.

Initial setting: 0.0 °C / °F

Selective range: 0.0 – 99.9 °C / °F in 0.1 °C / °F

6.5.5 L Temp Alarm (Lower Temperature Alarm)

The L Temp Alarm function sets up the lower limit of the temperature alarm range.

Initial setting: 0.0 °C / °F

Selective range: 0.0 – 99.9 °C / °F in 0.1 °C / °F step

6.6 MENU 3 (STC adjustment)

Using MENU 3, the following items can be adjusted.

1. STC Depth for High Frequency picture.
2. STC Amplitude for High Frequency picture.
3. STC Depth for Low Frequency picture.
4. STC Amplitude for Low Frequency picture.

MENU 1	STC Depth (H)	0
MENU 2	STC Amp (H)	0
MENU 3	STC Depth (L)	0
MENU 4	STC Amp (L)	0
MENU 5	Return	
MENU 6	▲ ▼ : MENU No. Select	
MENU 7	▶ : Mod	
	MENU : Exit	

Figure 6.4 Menu 3 display

Initial setting: 0

Control range: 0 - 20

STC is an abbreviation of Sensitivity Time Control, which is used to reduce weak echoes such as plankton, floating marine plants, etc. near the sea surface in order to view a school of fish in good clarity. The rate of sensitivity reduction is in log law, which can be adjusted in depth and in amplitude. Relation between the STC law and resultant image display is shown in Figure 6.5 and 6.6.

6.6.1 Adjusting STC amplitude

In this mode, you are reducing receiver sensitivity in time proportional law with STC depth fixed. This mode is useful in shallow water fishing to gain a better view of a school of fish near the sea surface.

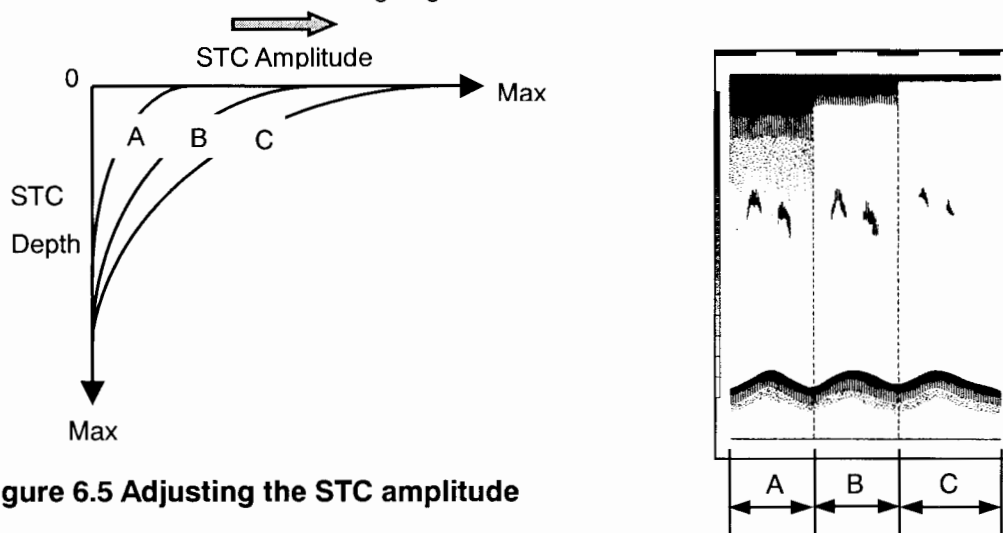


Figure 6.5 Adjusting the STC amplitude

Operational notes for STC amplitude adjustment

- (1) STC law A: STC is not enough, causing noise and unwanted residual weak echoes near the sea surface are still shown.
- (2) STC law B: STC is appropriate, causing unwanted echoes are perfectly reduced while schools of fish are shown without degradation.
- (3) STC law C: STC is too much, causing the echoes of fish school are reduced too much.

6.6.2 Adjusting STC depth

In this mode, you are reducing receiver sensitivity to depth in time proportional law with STC amplitude fixed. This mode is useful in deep sea fishing to locate school of fish and the species.

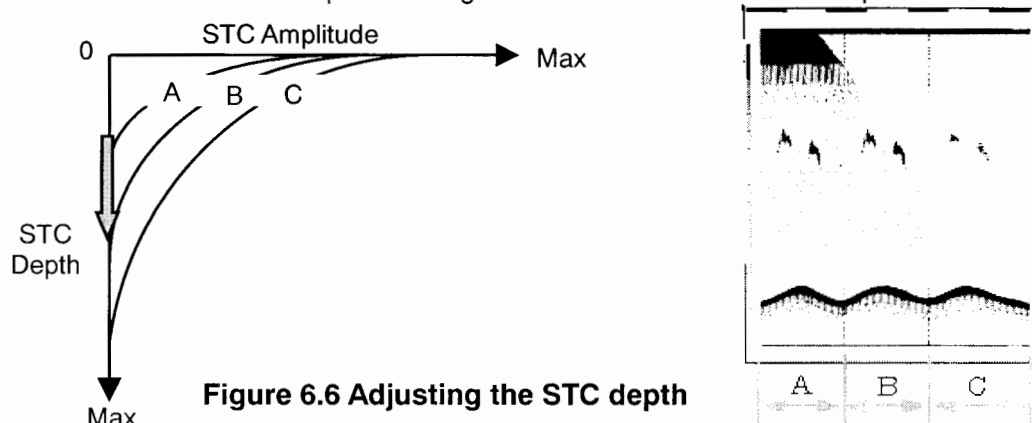


Figure 6.6 Adjusting the STC depth

Operational notes for STC amplitude adjustment

- (1) STC law A: STC is not enough, causing noise and unwanted residual weak echoes in shallow and mid depth zone to be shown.
- (2) STC law B: STC is appropriate, causing unwanted echoes to be perfectly reduced while schools of fish are shown without degradation.
- (3) STC law C: STC is too much, causing the echoes from fish school to be reduced too much.

6.7 MENU 4

Using MENU 4, the following functions can be used:

1. Changing transmission output (High / Low frequency)
2. Setting a depth for bottom detection.
3. Matching to the ship's draft
4. Adjusting the operation panel illumination
5. Changing the composite image processing

MENU 1	Output	10
MENU 2	Bottom Start	1
MENU 3	Draft	00.0
MENU 4	Panel Illum	1/3
MENU 5	Mix Type	CMP SUB
MENU 6	Return	
MENU 7	▲▼ : MENU No. Select	
	▶ : Mod	
	MENU : Exit	

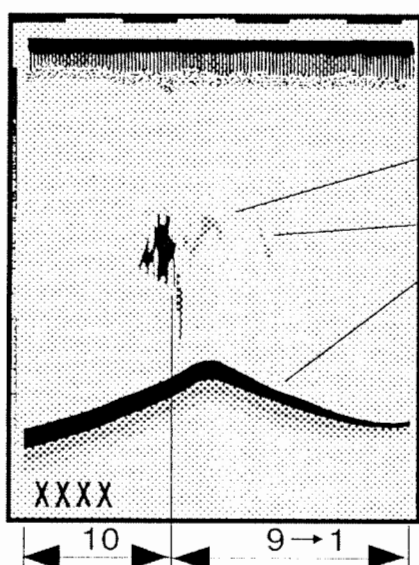
Figure 6.7 Menu 4 display**6.7.1 Output (Adjusting output power)**

This function allows reducing acoustic power for the following applications:

- To decrease noise and interference from other boat's sounders, reduce the power. This is effective in minimizing the interference.
- To better display school of fish near the bottom, reduce the power. This allows reducing signal return from the bottom, thereby the fish echoes can be better discriminated.

Initial setting: 10

Setting range: 1 (weak) to 10 (strong)



Fish image

Bottom and fish echoes are reduced in sensitivity, thus both images are easy to discriminate.

Figure 6.8 The effect by reducing power

6.7.2 Bottom Start (Specifying a depth for Bottom Detection)

This function avoids mistaken bottom detection from large school of fish by setting the inhibit depth for bottom detection.

Initial setting: 1ft / m / J.fm / fm / l.fm

Setting range: 1~400 ft or 1~100m / J.fm / fm / l.fm

6.7.3 Draft (Matching to the boat's draft)

This function is used for matching the depth of the emission line to the draft of your boat.

Initial setting: 0.0 ft / m / J.fm / fm / l.fm

Setting range: 0.0~25.5 ft or 0.0~10.0 m / J.fm / fm / l.fm

6.7.4 Panel Illum (Adjusting the operation panel illumination)

This function allows adjusting illumination of the operation panel when required.

Initial setting: 1/3

Setting range: 1/3 (darkest) - 3/3 (brightest), 3 steps

6.7.5 Mix Type (Selecting image-mixing mode)

Initial setting: Compare

Selectable mode: Compare and Subtraction

The image-mixing mode is an image processing function that enables weak fish like young sardines to be better defined by comparing or subtracting the images from both the HIGH and LOW frequencies. When echoes are detected by the HIGH frequency component, the sounder displays these echoes in a preselected color to indicate small fish targets. This method utilizes the characteristic of ultrasonic wave that small and weak fish echoes are sensitive to high frequency waves but are weak with a low frequency waves. The MIX feature has two modes COMPARISON and SUBTRACTION.

COMPARISON mode:

This mode displays the result of the comparison between HIGH and LOW frequency echoes. If those echoes are overlapped at the same depth, the resultant colors are displayed in mixed colors. However, if the HIGH frequency echo is painted red (strongest color), the mixed color will also be red to show the echoes are from small fish. If the mixed fish school is partly displayed with mixed colors among red color, it suggests the possibility of a larger fish school among the small fish school.

SUBTRACTION mode:

This mode displays the resultant image by subtracting the HIGH frequency echoes from those of LOW frequency. Using this method, you can discern a fish school by size. For instance, if the resultant echoes are displayed in similar colors as the HIGH frequency echoes, this result suggests the majority

of the fish species is sensitive to the HIGH frequency transmission, i.e. the detected fish school could be small fish like young sardine. If the resultant echoes are shown in different colors from the HIGH frequency transmission, it indicates the fish school is sensitive to LOW frequency, therefore a larger size of fish species.

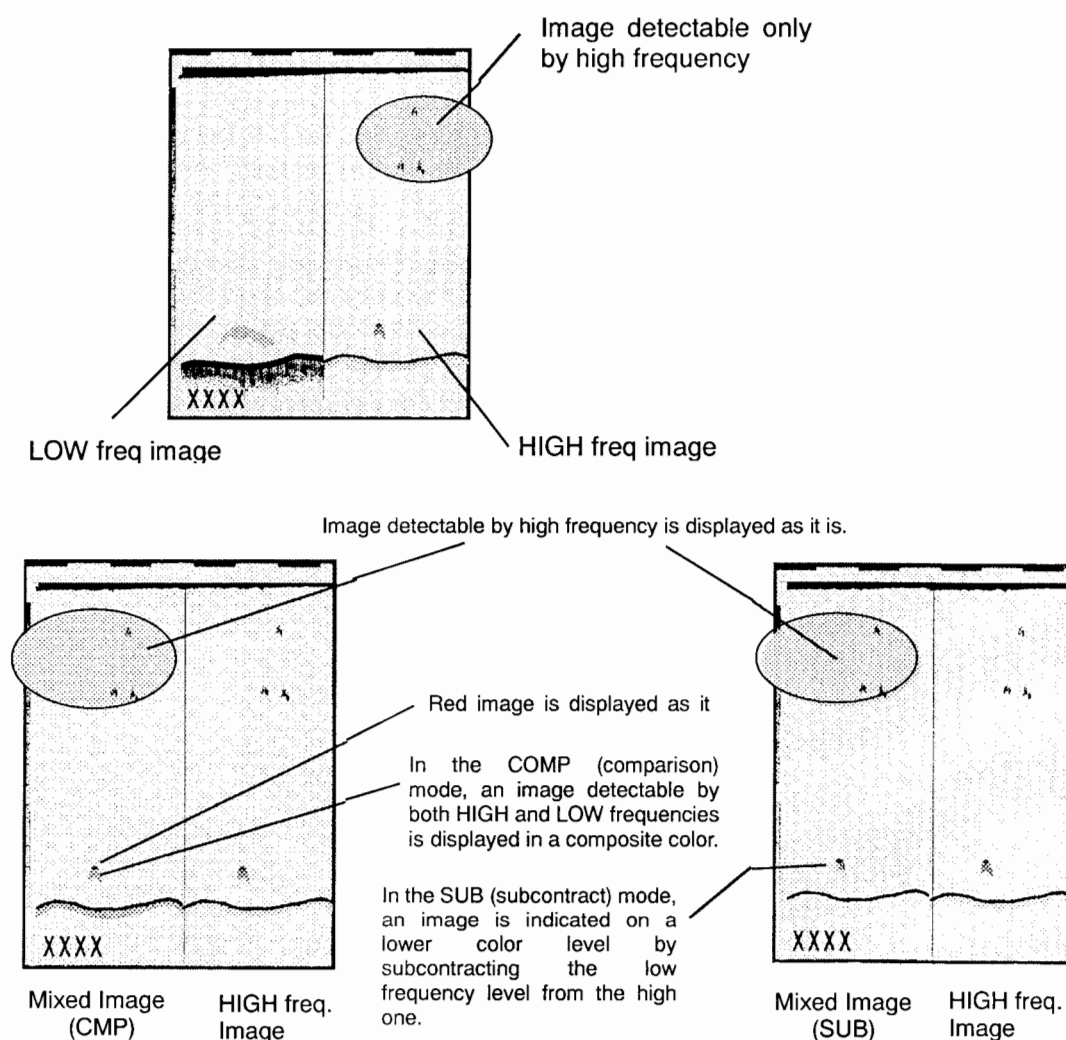


Figure 6.9 Mixed image display

6.8 MENU 5

MENU 5 includes the following functions.

1. Correcting a displayed boat speed.
2. Correcting a displayed water temperature.
3. Turning on or off display of the water temperature Graph.
4. Changing the number of transmission in order to reduce images from other sounder, which is synchronized with your sounder.

MENU 1	Speed Corr	0%
MENU 2	Temp Corr	0.0℃
MENU 3	Temp Graph	OFF ON
MENU 4	PRR	1
MENU 5	Return	
MENU 6	▲ ▼ : MENU No. Select	
MENU 7	▶ : Mod	
	MENU : Exit	

Figure 6.10 Menu 5 display

6.8.1 Speed Corr (Correcting a displayed boat speed)

This function allows you to correct the displayed speed data supplied from the SI-TEX speed/temperature sensor ST-80/90/100.

Initial setting: 0.0 %

Setting range: -50 to +50 %

6.8.2 Temp Corr (Correcting a displayed water temperature)

This function allows you to correct the displayed temperature data supplied from the SI-TEX speed/temperature sensor ST-80/90/100.

Initial setting: 0.0 °C / °F

Setting range: -9.9 to +9.9°C / °F

6.8.3 Temp Graph (Turning on or off the water temperature graph)

Using the water temperature data supplied from the ST-80/90/100 speed/temperature sensor, a water temperature graph can be displayed.

Initial setting: OFF

Available settings: OFF and ON

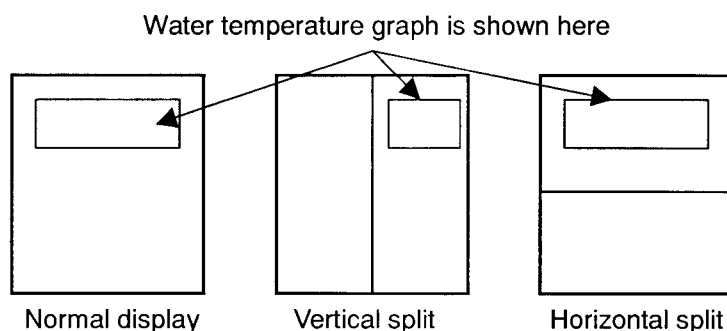


Figure 6.11 Temp graph display position

6.8.4 PRR (Pulse Repetition Rate)

This function allows you to reduce false echoes caused by other sounder's transmission by changing own sounder's transmitter pulse transmission rate or PRR.

Initial setting: 1

Setting range: 1 (fast) to 10 (slow)

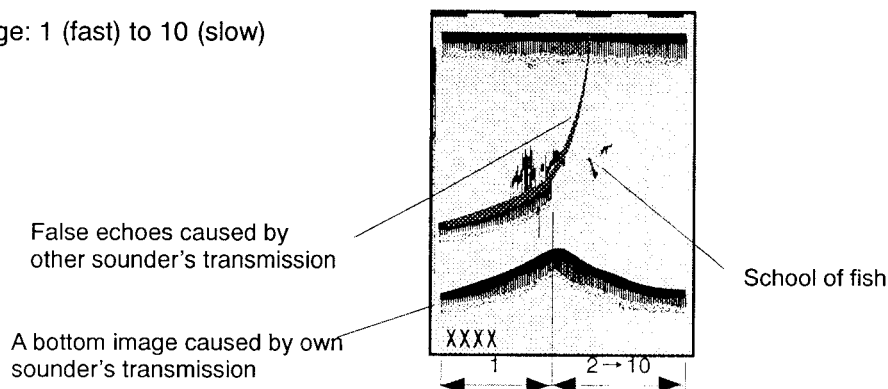


Figure 6.12 Changing PRR from 1 to 10

6.9 MENU 6

MENU 6 is used for the following settings.

1. Switching to Auto Range (RANGE) or Auto Shift (SHIFT).
2. Turning on or off Auto Gain function.
3. Setting the bottom color in auto mode for High frequency.
4. Setting the bottom color in auto mode for Low frequency.

MENU 1	Auto Sel	OFF RANGE SHIFT
MENU 2	Gain Sel	MANU AUTO
MENU 3	Auto Gain Adj (H)	0
MENU 4	Auto Gain Adj (L)	0
MENU 5		
MENU 6	Return	
MENU 7	▲ ▼ : MENU No. Select	
	▶ : Mod	
	MENU : Exit	

Figure 6.13 Menu 6 display

6.9.1 Auto Sel (Switching to Auto Range or Auto Shift)

This sub menu allows you to select auto range, auto shift or auto off mode.

Initial setting: OFF

Available settings: OFF, RANGE and SHIFT

6.9.2 Gain Sel (Turning on or off the Auto Gain function)

This sub menu selects the Auto Gain function on or off. By selecting AUTO GAIN, receiver gain is automatically controlled according to the sea bottom depth.

Initial setting: MANU

Available setting: MANU (Manual) or AUTO

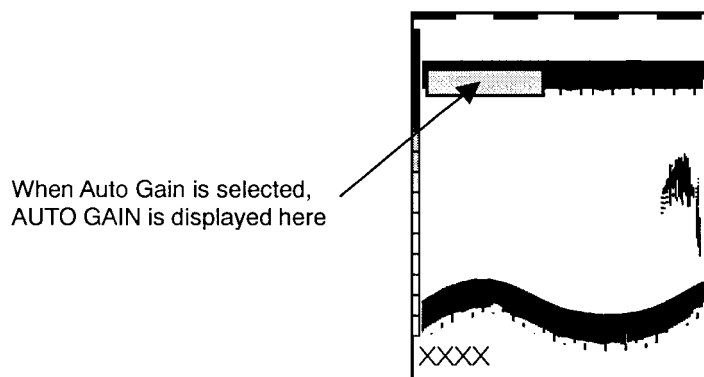


Figure 6.14 AUTO GAIN mode display

6.9.3 Auto Gain Adj (H) / Auto Gain Adj (L) (Setting the bottom color in auto mode)

The bottom color should always be set to red, whether the gain mode is auto or manual. In case the bottom color in auto mode is not red, use this function to reset.

Initial setting: 0

Setting range: -20~+20

6.10 MENU 7

This menu provides the following functional set ups.

Selecting the bottom zoom image.

Turning the display of the A-Scope display
on or off.

Reducing the image display color.

Displaying the white line on the bottom surface.

Changing the output pulse length.

MENU 1	BTM Zoom	BTM BD BZ
MENU 2	A Scope	OFF ON
MENU 3	Color Rejection	14/14
MENU 4	White Line	OFF ON
MENU 5	Pulse Width	S M L
MENU 6	Return	
MENU 7	▲▼ : MENU No. Select	
	▶ : Mod	
	MENU : Exit	

Figure 6.15 Menu 7 display

6.10.1 BTM Zoom (Selecting the Bottom Zoom image)

NOTE: The operation select switch must be set to NORM/BTM (H/L) prior to this setting.

Using this function, you can select the bottom zoom image.

BTM (Bottom Lock): The bottom image is always locked in the lower part of the screen even though the depth changes.

BD (Bottom Discrimination): Variation of the bottom hardness can be shown in different colors

BZ (Bottom Zoom): Bottom image can be zoomed.

Initial setting: BTM

6.10.2 A Scope (Showing A-Scope)

The A-Scope feature allows you to observe the wave shape of a fish echo, which may assist in discerning the characteristics type of the school of fish.

Initial setting: OFF

Available settings: OFF, ON

NOTE: The A-Scope is not available when the mid screen scroll speed is selected.

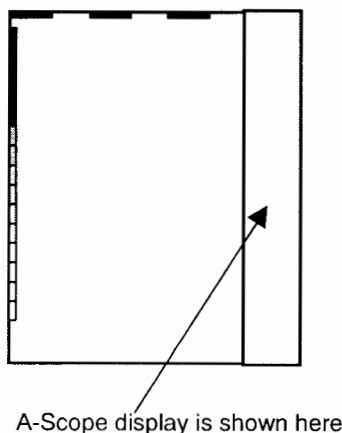


Figure 6.16 A-Scope display

6.10.3 Color Rejection (Reducing the image color)

Acoustic noise caused by the bubbles or other oceanic factors may be displayed on the screen in a weaker color like white, pale green, etc. Certain types of fish school such as squid and baby anchovy may also be displayed in similar colors. In such a case, reduce the number of colors on the color palette to better discern the school of fish and noise.

Initial setting: 14/14 (all colors used)

Setting range: 1/14 to 1/14 (14 steps)

NOTE: *An alarm beeps when attempting to erase the last remaining color.*

6.10.4 White Line (Displaying the white line on the bottom surface)

The white line feature allows you to discern between the bottom and a school of fish, i.e. the bottom profile is drawn in black and white line and the school of fish is displayed in a variety of colors without any effect.

Initial setting: OFF

Available setting: OFF and ON

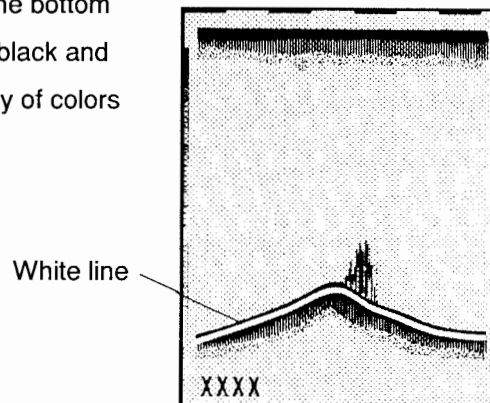


Figure 6.17 White line display

6.10.5 Pulse Width (Changing the output pulse width)

According to your requirement, you can change the transmission pulse width in 3 steps.

S (Short): The definition of fish echoes improves, however, the detection capability lessens.

M (Medium): The fish echo detection capability improves; yet the image definition is maintained.

L (Long): The fish echo detection capability increases, however, the image definition will lessen.

Initial setting: M

Available settings: S, M and L

6.11 Initial Menu

This menu is used to set up the following items.

Selecting a depth unit.

Selecting a depth range.

Selecting an image mode.

Changing a depth, depth scale, color bar and a time mark.

Changing a depth range, turning on or off the NAV data display.

Selecting a language used on the display.

OTHER SETTING 1 - Setting up external sync signal, water temperature data, ship's speed and the gain characteristic.

OTHER SETTING 2 – Sonic correction, selecting color characteristic and color tone.

Exiting INITIAL menu

To select Initial Menu, press and hold the MENU key and turn the power on.

A rectangular box representing the Initial Menu display. It contains a list of nine items, each preceded by a number from 1 to 9. The items are: 1 DEPTH UNIT SELECT, 2 DEPTH RANGE PRESET, 3 IMAGE MODE SETTING, 4 DISPLAY SETTING, 5 NAV DISPLAY SETTING, 6 言語 (LANGUAGE), 7 OTHER SETTING 1, 8 OTHER SETTING 2, and 9 EXIT.

1 DEPTH UNIT SELECT
2 DEPTH RANGE PRESET
3 IMAGE MODE SETTING
4 DISPLAY SETTING
5 NAV DISPLAY SETTING
6 言語 (LANGUAGE)
7 OTHER SETTING 1
8 OTHER SETTING 2
9 EXIT

Figure 6.18 Initial Menu display

6.11.1 DEPTH UNIT SELECT

Selects a depth unit used in the sounder display.

Initial setting: ft

Selectable depth unit: m (meters), J.fm (Japanese fathom), fm (fathom), I.fm (Italian Fathom) and ft (feet)

1 DEPTH UNIT SELECT

A rectangular box representing the DEPTH UNIT SELECT sub menu. It contains a list of five depth units: m, J.fm, fm, I. fm, and ft. The 'ft' option is highlighted with a dashed rectangular border.

m
J.fm
fm
I. fm
ft

Figure 6.19 DEPTH UNIT SELECT sub menu

6.11.2 DEPTH RANGE PRESET

Registers the depth ranges to be allocated to the depth numbers, which is selected by the rotary range switch. The selectable range tables are shown below depending on the sounder type number and the depth unit.

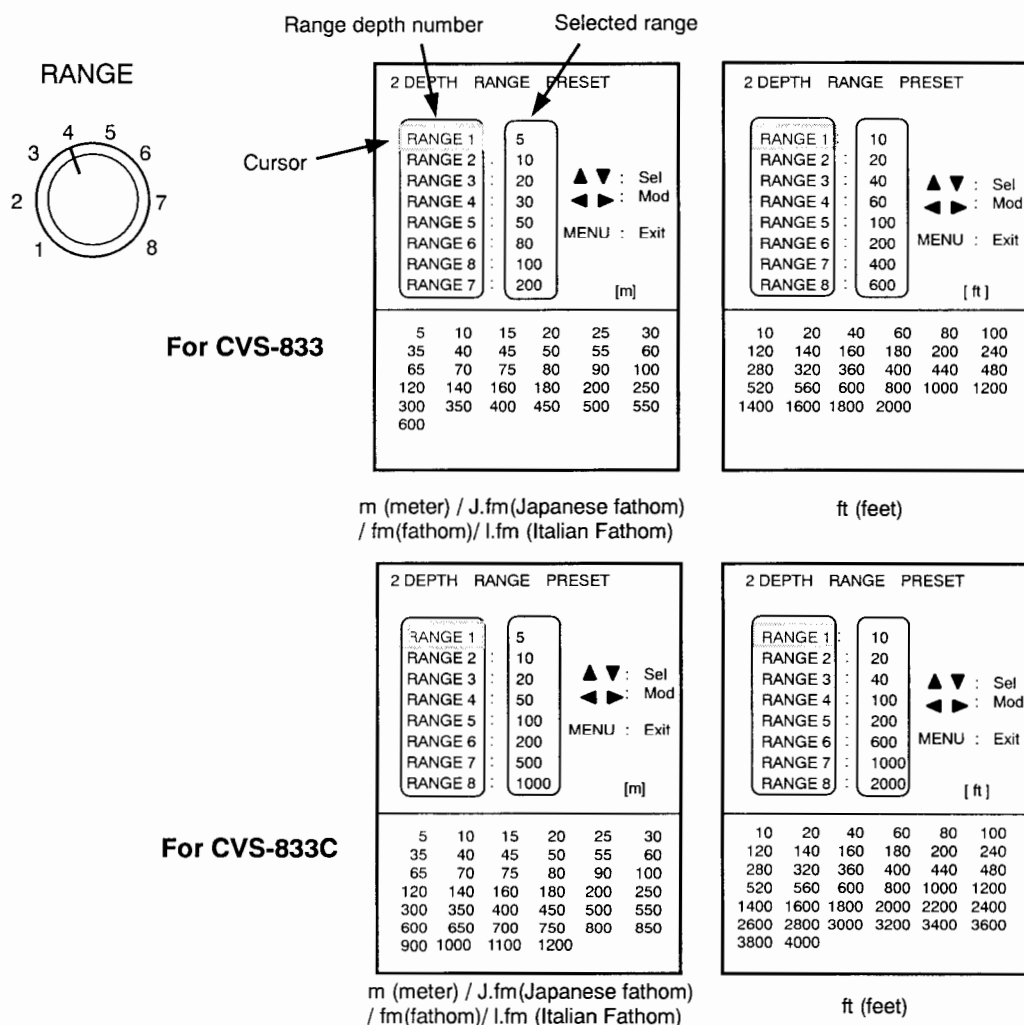


Figure 6.20 DEPTH RANGE PRESET menu

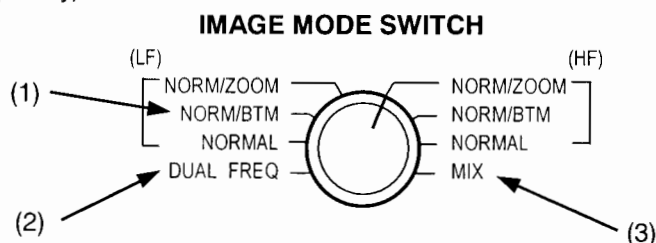
6.11.3 IMAGE MODE SETTING

Changes various split screen displays, which can be selected by the rotary control switch.

NORM/BTM (Normal / Bottom)

DUAL FREQ (Dual Frequency)

MIX



6.11.3.1 NORM/BOTTOM (Selecting split screen type)

This function selects a split screen type in Normal / Bottom mode. The available types are as follows:

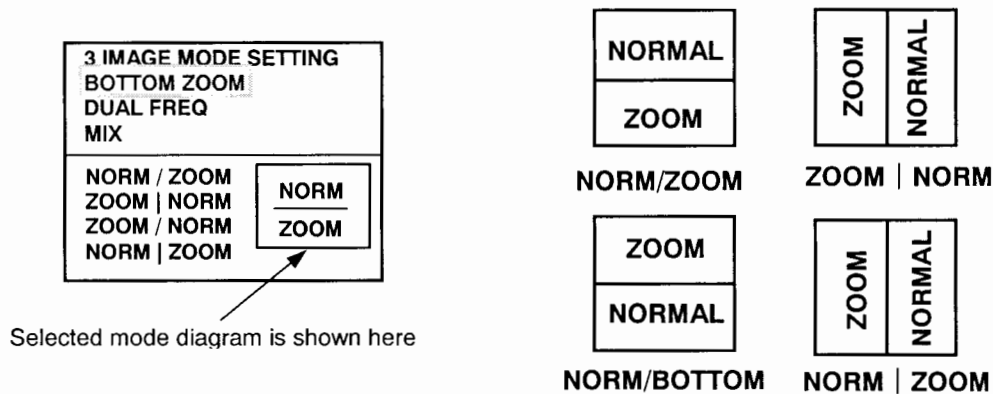


Figure 6.21 NORM/BOTTOM menu and available display mode

6.11.3.2 DUAL FREQ (Selecting image feed type in Dual Frequency mode)

In the DUAL FREQ mode, you can select a best-suited split screen (High/Low Frequencies) type and screen feed direction among the selection in the sub menu.

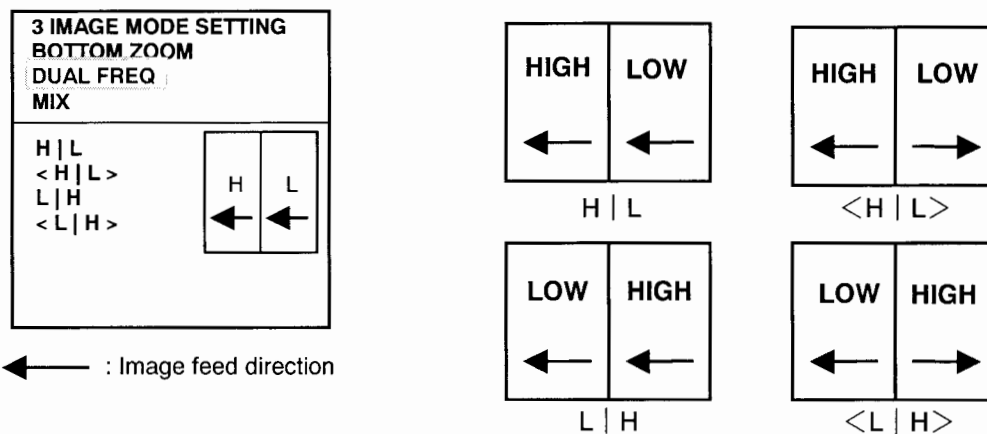


Figure 6.22 DUAL FREQ menu and available display mode

6.11.3.3 MIX (Selecting image feed type in Image Mix)

In MIX mode, you can select a mix mode split screen type with various combinations of the transmission frequencies, as well as the screen feed direction among the selections in the sub menu.

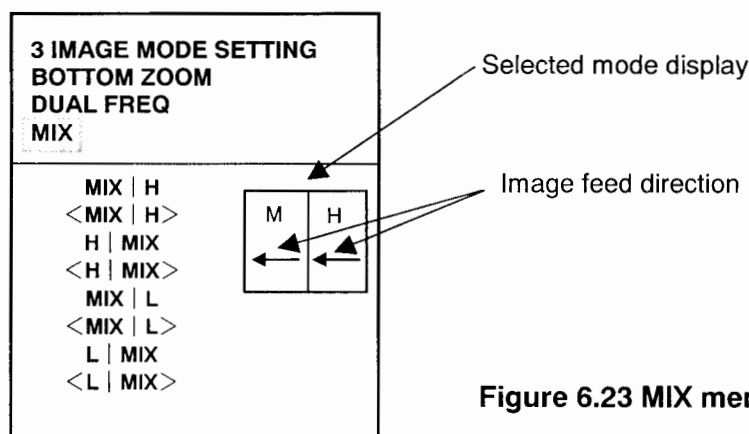


Figure 6.23 MIX menu display

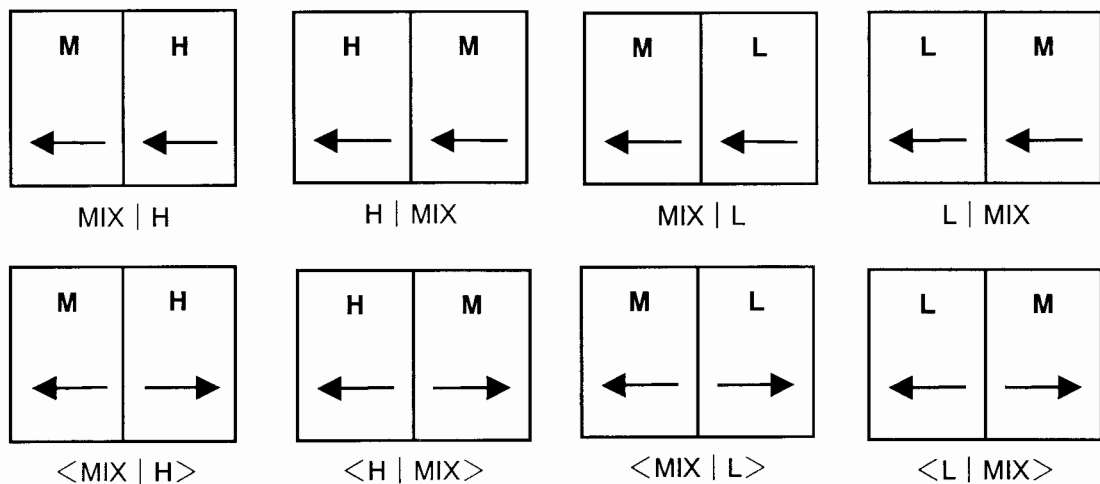


Figure 6.24 Available MIX mode display

6.11.4 DISPLAY SETTING (Turning on or off various marks and video processing)

In this mode, you can turn on or off the depth scale, and various marks and shown on the display.

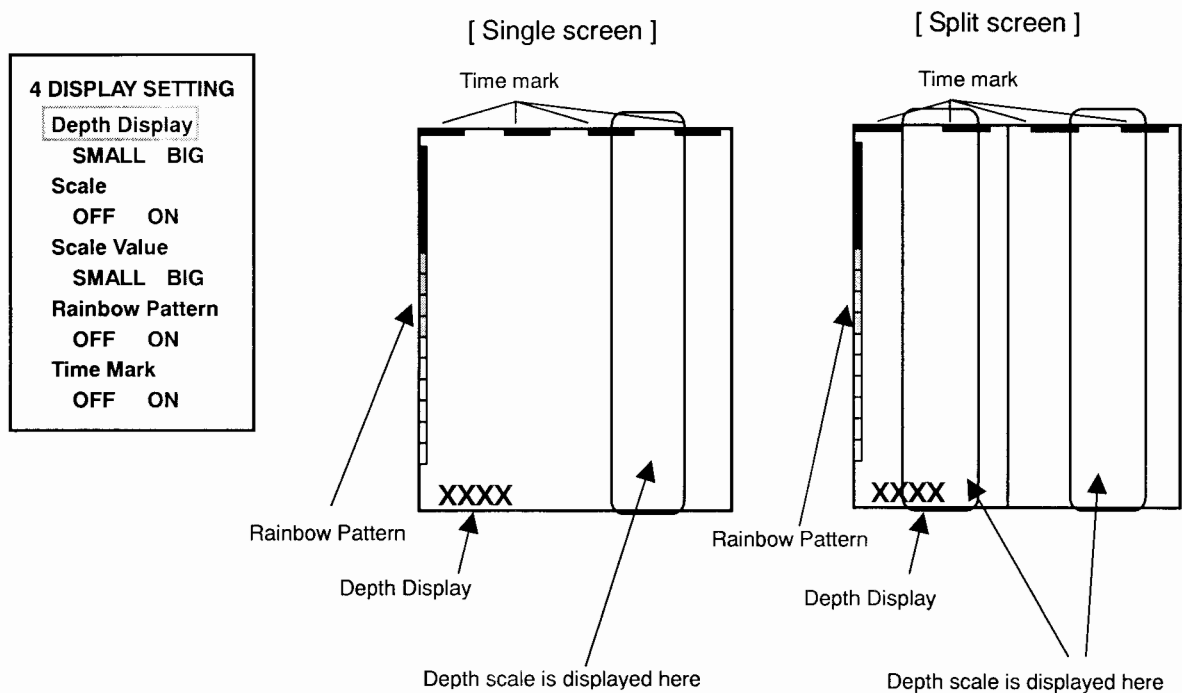


Figure 6.25 DISPLAY SETTING menu and screen presentation

6.11.5 NAV DISPLAY SETTING

In this mode, you can select the kinds of NAV display item shown on the sounder display. These items include; position display type (OFF, L/L, LOP), bearing display (ON or OFF), temperature display (OFF, °C, °F) and the digital speed display (OFF, kmph, mph, kt).

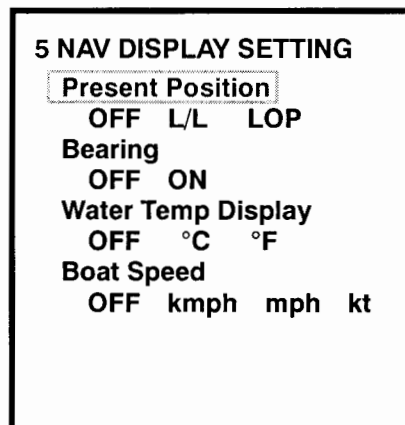


Figure 6.26 NAV DISPLAY SETTING menu display

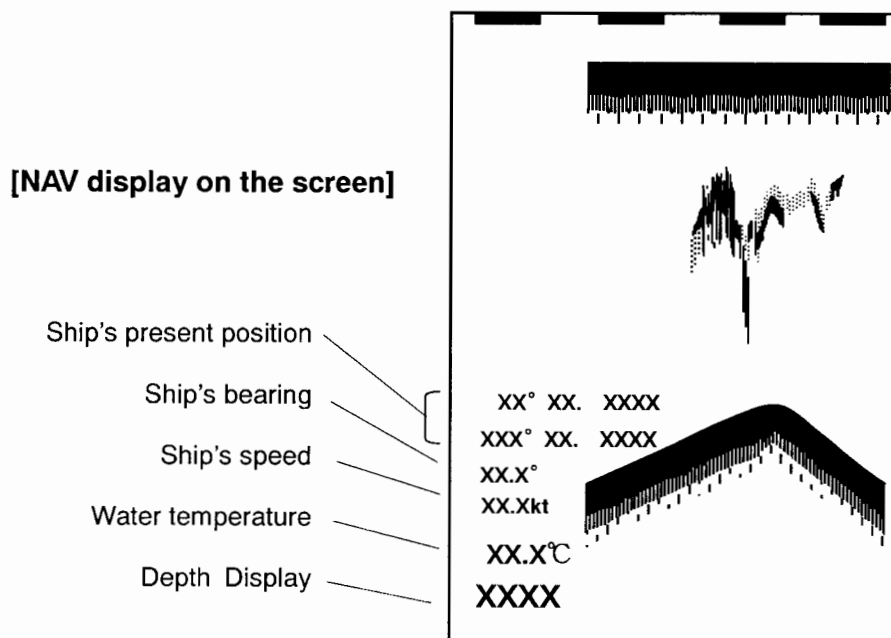


Figure 6.27 NAV DISPLAY SETTING display and available presentations

6.11.6 LANGUAGE

You can select either Japanese or English for the display language.

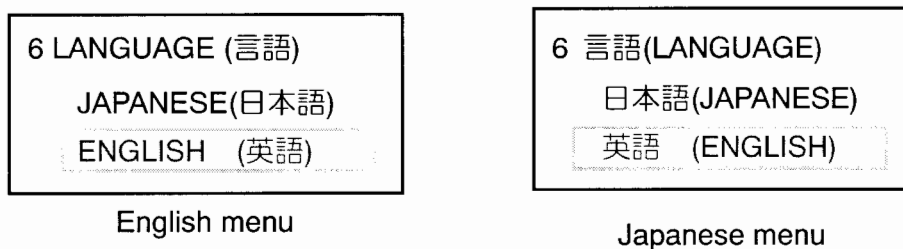


Figure 6.28 LANGUAGE menu display

6.11.7 OTHER SETTING 1

Using this sub menu, you can select the following technical settings.

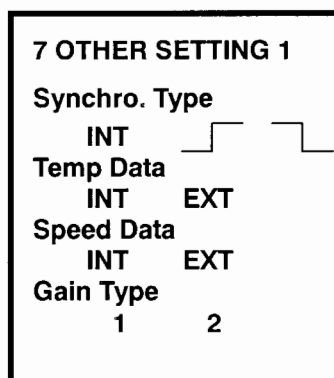




Figure 6.29 OTHER SETTING 1 menu display

6.11.7.1 Synchro Type (Selecting Int or Ext Sync trigger)



When two fish finders are operated at the same time, an acoustic interference may be observed on each display. To eliminate the interference, you need to synchronize the transmission timing of both sounders by using the same trigger pulse. To do so, connect a sync trigger from an external sounder to the connector J3 (EXT F/F) on the rear panel.

INT (Internal): No synchronization with external sounder.

: Your sounder is synchronized with an external sounder triggered by a positive going pulse supplied from J3 (EXT F/F).

: Your sounder is synchronized with an external sounder triggered by a negative going pulse supplied from J3 (EXT F/F).

Initial setting: INT (Internal)

Available settings: INT  

NOTE: Before proceeding to settings, you need to have an external synchro trigger applied via the J3 connector on the rear panel. For detail, refer to Para 4.6.3.

6.11.7.2 Temp Data (Selecting temperature data source)

Using this sub menu, you can select the temperature data source, INT (internal) or EXT (external). These data sources are supplied from the rear panel connectors, J2 and J4. Details are as follows:

INT: The water temperature data is supplied from the SI-TEX temperature/speed sensor ST-80/90/100, which is connected to J4 (TRIDUCER/SPD.TEMP) on the rear panel. If the temperature data is absent, "0.0" will be displayed on the screen.

EXT: The water temperature data is supplied from NMEA0183 serial data, which is connected to J2 (SER DATA) on the rear panel. If the temperature data is absent, XX.X will be displayed on the screen.

Initial setting: INT (internal)

Available settings: INT (J4) and EXT (J2)

6.11.7.3 Speed data (Selecting speed data source)

Using this sub menu, you can select the speed data source, INT (internal) or EXT (external). These data sources are supplied from the rear panel connectors, J2 (SER DATA) and J4 (TRIDUCER/SPD.TEMP). Details are as follows:

INT: The speed data is supplied from the SI-TEX temperature/speed sensor ST-80/90/100, which is connected to J4 (TRIDUCER/SPD.TEMP) on the rear panel. If the speed data is absent, "0.0" will be displayed on the screen.

EXT: The speed data is supplied from NMEA0183 serial data, which is connected to J2 (SER DATA) on the rear panel. If the speed data is absent, XX.X will be displayed on the screen.

Initial setting: EXT (External)

Available settings: INT (J4) and EXT (J2)

6.11.7.4 Gain Type (Selecting the gain control law)

Using this sub menu, you can select the gain control characteristic type according to the type of fishing and fish species. The selectable characteristics are Linear and Log. Available settings are "1" and "2".

1: Gain changes in log law. This characteristic is suited to deep sea fishing.

2: Gain changes in linear law. This characteristic is suitable for finding fish schools in shallow water or weak sounding fish school detection.

Initial setting: 1 (Log)

6.11.8 OTHER SETTING 2

This setting includes the following set up items.

6.11.8.1 Sonic Corr (Correcting depth indication)

Corrects a depth indicator value to a known true value. A depth indication may deviate from a true value because of the water temperature difference or salt concentration in the water. This setting compensates such deviation.

Initial setting: 0 %

Setting range: -7 % to +2 %

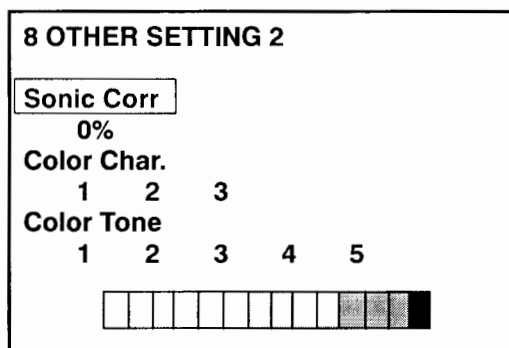


Figure 6.30 OTHER SETTING 2 menu display

6.11.8.2 Color Char (Selecting color gradation law)

Selects the characteristics of the display color gradation. The following three sets of color gradation are available.

- 1: The entire color gradation is evenly divided.
- 2: Color gradation of stronger echo group is finely divided.
- 3: Color gradation of weaker echo group is finely divided.

Initial setting: 1

Selecting range: 1, 2, 3 (3 steps)

6.11.8.3 Color Tone (Selecting color tone law)

Selects the number of image colors and the background color on the screen. The following five sets of color tones are available.

- 1: 16 colors (SI-TEX standard color)
- 2: 16 colors (Color varies from blue to white to red)
- 3: 16 colors (Color varies from light green to white to red)
- 4: 8 colors (SI-TEX standard color)
- 5: Monochrome display with 16 shades of gray.

Initial setting: 1

Selecting range: 1,2,3,4,5 (5 steps)

6.11.9 EXIT (Exiting from Initial Menu)

Open the “9 Exit” menu to exit from the menu by selecting one of the following exit mode menus.

6.11.9.1 EXIT with current settings

Exiting the menu without affecting the current settings in the menu. In an ordinary operation this mode is used.

6.11.9.2 EXIT with SIMULATOR MODE

When you use this EXIT mode, the simulated picture will be displayed after exiting this menu. To finish the simulated picture, simply turn off the sounder and then turn on again for further use.

Note: In simulated picture, the STC, Gain and the draft setting are not available.

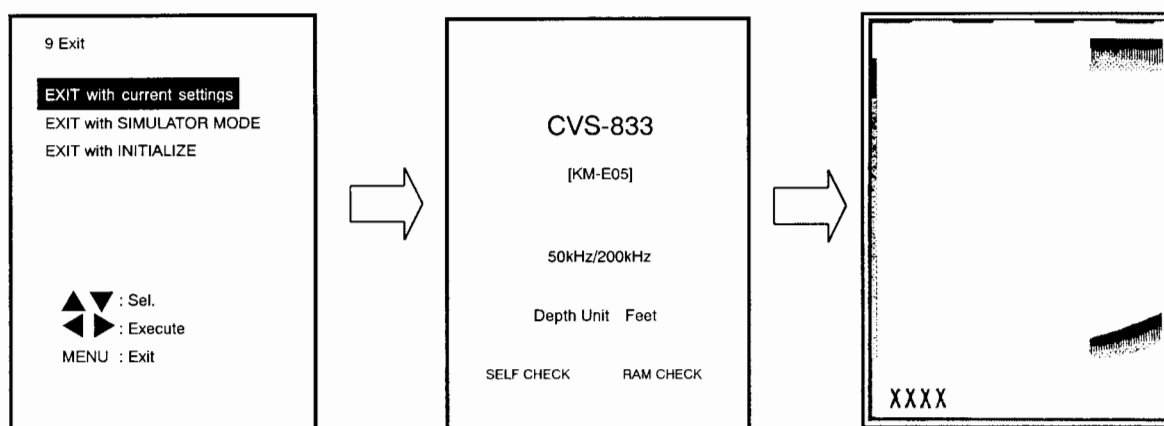


Figure 6.31 EXIT menu display

6.11.9.3 EXIT with INITIALIZE

When you exit from the menu using this mode, the sounder settings will be defaulted.

To return to normal display, press the MENU key.

CAUTION: Record all settings, if required, before using this mode.

CAUTION: Whenever the internal battery is replaced, use the “EXIT with INITIALIZE”

Chapter 7

Trouble shooting

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Chapter 7 Trouble Shooting

This chapter covers simplified fault locating procedures to assist the ship's crew to locate a faulty module as well as to replace a fuse.

7.1 Information required for service

Please advise the following details:

- (1) Name of vessel, Satcom number if available.
- (2) Equipment type name
- (3) Equipment serial number
- (4) Software type name, shown on the standby screen and stated in this manual.
- (5) Next port of call, ETA and ship's agent
- (6) Faulty conditions and the result of on board check

7.2 Self check function

When the CVS-833/833C is first turned on, a memory check program runs to diagnose a possible memory cell failure. If the result is normal, the message "SELF CHECK RAM CHECK" will appear on the screen indicating that the memory check is complete without any failures detected. If this sign does not appear, a memory cell may be faulty. Call for service to repair the CVS-833/833C unit.

7.3 Trouble shooting

The following table provides information about first line check schedules to locate a faulty area and gives remedial measure(s), where applicable.

Table 7.1 Fault finding chart for CVS-833/833C

Faults detected	Possible cause of the failure	Remedial action against negative result
Equipment does not turn on	<ol style="list-style-type: none"> 1. Is the 5A fuse blown? 2. Is the power supply voltage lies within the rated range (10.8 – 31.2 VDC)? 3. Is the power cable firmly connected to a ship's battery? 4. Is the cable connection between the transducer and TX/RX unit firm and secured? 	<ol style="list-style-type: none"> 1. Replace the blown fuse with new one. CAUTION: Make sure to turn off the main supply before attempting to replace the fuse. 2. Use a proper rated main supply. 3. Reconnect the cable firmly to the battery. 4. Check the cable for cut, short, etc. and repair the cable if necessary and reconnect.
Equipment turns on with beep but nothing shown on the display.	<ol style="list-style-type: none"> 1. LCD unit may be faulty. 2. Logic PCB may be faulty. 	<ol style="list-style-type: none"> 1. Call for service. 2. Call for service.

Faults detected	Possible cause of the failure	Remedial action against negative result
No depth indication but — — — — shown.	<ol style="list-style-type: none"> 1. Is the bottom echo displayed within the display? 2. If YES, then, is the bottom painted in red? 	<ol style="list-style-type: none"> 1. Select an appropriate depth range in which the bottom is displayed. 2. Adjust the GAIN control to obtain the red sea bottom. If the above actions are not the answer, call for service.
No water temperature display shown.	<ol style="list-style-type: none"> 1. Is the water temperature unit (°C or °F) selected? If NO, go to Initial Menu to select "5 NAV DISPLAY SETTING" and select the unit. 2. Is the temperature/speed sensor type T-80/90/100 connected to the receptacle J4 (TEMP) located at the rear panel? 	<ol style="list-style-type: none"> 1. Select a desired temperature unit. 2. Connect an appropriate sensor type to CVS-833/833C.
No present position is shown	<ol style="list-style-type: none"> 1. Is the L/L or LOP coordinate selected in the Initial Menu "5 NAV DISPLAY SETTING"? 2. Is the necessary NMEA-0183 Nav data (GGA, GLL, GNS) supplied via the receptacle J2 (SER DATA) at the rear panel? 	<ol style="list-style-type: none"> 1. Select a necessary coordinate in the Initial Menu "5 NAV DISPLAY SETTING". 2. Connect a Navigator unit to CVS-833/833C and select "7 OTHER SETTING 1" to select a desired format.
No ship's speed data shown	<ol style="list-style-type: none"> 1. Is the speed unit (kpmh, mph, kt) selected in the Initial Menu "5 NAV DISPLAY SETTING"? 2. Is the necessary NMEA-0183 Nav data (VTG) supplied via the receptacle J2 (SER DATA) at the rear panel? 	<ol style="list-style-type: none"> 1. Select a desired speed unit in the menu. 2. Connect a Navigator unit to CVS-833/833C and select "7 OTHER SETTING 1" to select a suitable format that contains the VTG sentence.
No own ship's bearing display shown	<ol style="list-style-type: none"> 1. Is the "Bearing ON" selected in the Initial Menu "5 NAV DISPLAY SETTING"? 2. Is the necessary NMEA-0183 Nav Data (VTG) supplied via the receptacle J2 (SER DATA) at the rear panel? 	<ol style="list-style-type: none"> 1. Select "Bearing ON" in the menu. 2. Connect a Navigator unit that supplies NMEA 0183 format with VTG sentence to J2.

Chapter 8

Maintenance

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Chapter 8 Maintenance

8.1 Periodic inspection and cleaning

To prolong the equipment life, the following maintenance should be performed on a routine basis. Also, from time to time, check plug connections and cables.

8.1.1 Monthly check

If the display screen is dirty, clean the screen with a soft cloth dampened with anti-static agent or pure water. Do not use a dry cloth as it causes static build up, which accumulates dust.

8.1.2 Semiyearly check

Inspect the surface of the transducer for any marine growth. If so, remove the growth using an appropriate tool taking care not to scratch the surface. Harsh scratching of the transducer surface may cause the transducer performance to be severely degraded.

Chapter 9

Technical References

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Chapter 9 Technical References

9.1 Serial input data

Data format: IEC 1162-1 (NMEA-0183 Ver. 1.5 and 2.0)

9.2 Details of input sentences

NOTE: Checksum is a total sum of EX-ORed data that are put between the \$ and asterisk (*) signs.

Name & Version	Data name
GGA Ver. 1.5/2.0	GPS Position data <div> <p>\$ - - GGA, , xxxx.xxx, N/S, xxxxx.xxx, E/W, x, , , , , , , , *hh <CR><LF></p> </div>
GLL Ver. 1.5/2.0	Geographic position <div> <p>\$ - - GLL, xxxx.xxx, N/S, xxxxx.xxx, E/W, , A, a *hh <CR><LF></p> </div>
GNS Ver.1.5	Depth data <div> <p>\$ - - GNS, xxxx.x, f, xxxx.x, M, xxx.x, F *hh <CR><LF></p> </div>

Name & Version	Data name
GTD	Depth data
Ver.1.5	<p>\$ - - GTD, xxxx.x, f, xxxx.x, M, xxx.x, F *hh <CR><LF></p> <p>The diagram shows the sentence structure for GTD. It starts with a '\$' character, followed by a hyphen, another hyphen, and a space. Then, the sentence is: 'GTD, xxxx.x, f, xxxx.x, M, xxx.x, F *hh <CR><LF>'. The fields are: 'GTD' (Sentence name), 'xxxx.x' (Depth in feet), 'f' (Depth in meters), 'xxxx.x' (Depth in fathoms), 'M' (Talker device code), 'xxx.x' (Checksum), and 'F *hh' (Mode identifier). The 'Start of sentence' is indicated at the beginning of the sentence.</p>
VTG	Course and water speed
Ver.1.5	<p>\$ - - VTG, xxx.x, T, , , xx.x, N, , a *hh <CR><LF></p> <p>The diagram shows the sentence structure for VTG. It starts with a '\$' character, followed by a hyphen, another hyphen, and a space. Then, the sentence is: 'VTG, xxx.x, T, , , xx.x, N, , a *hh <CR><LF>'. The fields are: 'VTG' (Sentence name), 'xxx.x' (Ship's bearing (True)), 'T' (Ground speed (KNT)), ', , , ' (These fields are not used), 'xx.x' (Mode identifier), 'N' (Checksum), and 'a *hh' (Mode identifier). The 'Start of sentence' is indicated at the beginning of the sentence.</p>
MTW	Water temperature
Ver.1.5	<p>\$ - - MTW, xx, C *hh <CR><LF></p> <p>The diagram shows the sentence structure for MTW. It starts with a '\$' character, followed by a hyphen, another hyphen, and a space. Then, the sentence is: 'MTW, xx, C *hh <CR><LF>'. The fields are: 'MTW' (Sentence name), 'xx' (Temperature (°C)), 'C' (Checksum), and '*hh' (Mode identifier). The 'Start of sentence' is indicated at the beginning of the sentence.</p>

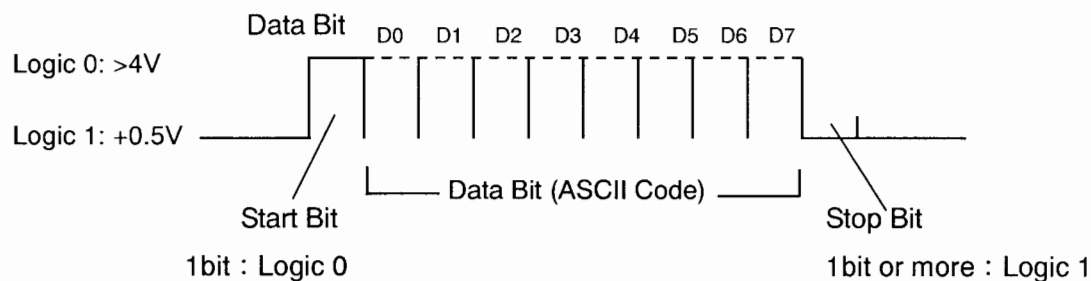
9.3 Serial output data

Data format: IEC 1162-1 (NMEA-0183 Ver. 2.0)

9.3.1 Details of output data sentences

NOTE: Checksum is a total sum of EX-ORed data that are put between the \$ and asterisk (*) signs.

Data structure



NOTE: A parity bit is not provided.

9.3.2 Output Signal specification

Data rate: 4800 baud

Output signal level: TTL

Output current: 5 mA Maximum

Data refreshing rate: 1 second

Name & Version	Sentence name
DBS Ver.1.5	Depth data (From the sea surface to the seabed)
	<p>\$ SD DBS, xxxx.x, f, xxxx.x, M, xxx.x, F *hh <CR><LF></p> <p>The diagram shows the structure of the sentence: \$ SD DBS, xxxx.x, f, xxxx.x, M, xxx.x, F *hh <CR><LF>. The fields are: Sentence name (SD DBS), Depth (meters) (xxxx.x), Depth (feet) (f), and Checksum (*hh). The Start of sentence is indicated by the \$ character.</p>

DBT Ver.1.5	<p>Depth (From the transducer surface to the seabed)</p> <p>\$ SD DBT, xxxx.x, f, xxxx.x, M, xxx.x, F *hh <CR><LF></p>
DPT Ver.2.0	<p>Depth (From the transducer surface to the ocean down below)</p> <p>\$ SD DPT, xxxx.x, xxxx.x, *hh <CR><LF></p>
MTW Ver.1.5	<p>Water temperature</p> <p>\$ SD MTW, xx, C *hh <CR><LF></p>
VHW Ver.1.5	<p>Water speed and ship's bearing</p> <p>\$ SD VHW, xxx.x, T, xxx.x, M, xxx.x, N, xxx.x, K *hh <CR><LF></p>

GGA	GPS Position data
Ver. 1.5/2.0	<p>\$ - - GGA, , xxxx.xxx, N/S, xxxxx.xxx, E/W, x, , , , , , , , *hh <CR><LF></p> <p>Sentence name</p> <p>Latitude</p> <p>N: North S: South</p> <p>Longitude</p> <p>E: East W: West</p> <p>x</p> <p>This field is not used</p> <p>Checksum</p> <p>Start of sentence</p> <p>GPS signal quality 0: Positioning unable 1: GPS positioning 2: DGPS positioning 3 - 8: Not acceptable</p>

9.4 Data input/output serial line

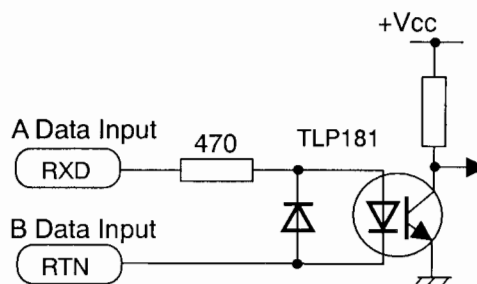
Port name: J2

The connector used:

Serial Data input (listener side):

The IEC 61162-1 standard signal can be received.

Input load: 470 ohms

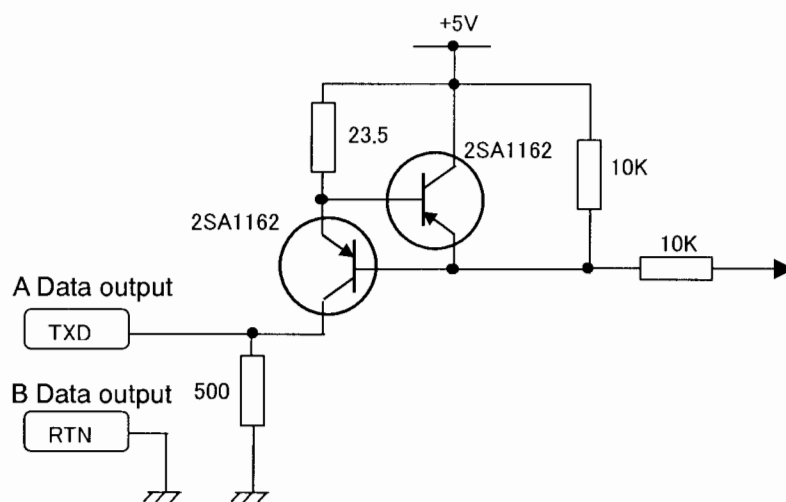
Device: Opto-coupler
Type TLP181 (Toshiba)

Serial data input circuit

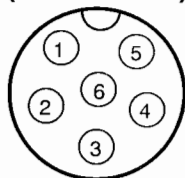
Serial Data output (talker side):

Output Type: RS232C

Device: 2SA1162



Serial data output circuit

(SER DATA)

Pinout	Signal name	Remarks
1	GND	
2	SER OUT(SIG)	Serial signal out (+OP)
3	SER OUT(RTN)	Serial signal out (-OP)
4	SER IN(SIG)	Serial signal in (+IP)
5	SER IN(RTN)	Serial signal in (-IP)
6	NC	

CERTIFICATE OF LIMITED WARRANTY

Providing you present a valid proof of purchase, SI-TEX Marine Electronics Inc. warrants all parts of each new product against defects in material and workmanship under normal use and will repair or exchange any parts proven to be defective at no charge for a period of two years for parts and one year for labor from the date of purchase, except as provided below under Limited Warranty Exceptions.

Defects will be corrected during normal working hours by an authorized SI-TEX Marine Electronics Inc. dealer, service center, or at the SI-TEX office in St. Petersburg, Florida. There will be no charge for labor for a period of one year from the date of purchase, except as provided below under Limited Warranty Exceptions.

This Warranty and Proof of Purchase must be made available to the authorized SI-TEX Marine Electronics Inc. service location or dealer at the time of service.

LIMITED WARRANTY EXCEPTIONS

SI-TEX Marine Electronics Inc. will not be responsible for equipment which has been subjected to water or lightning damage, accident, abuse, or misuse, nor any equipment on which the serial number label has been removed, altered or mutilated.

SI-TEX Marine Electronics Inc. assumes no responsibility for damage incurred during installation.

This Limited Warranty is effective only with respect to the original purchaser.

Any cost associated with transducer replacement, other than the cost of the transducer itself, is specifically excluded from this Limited Warranty.

Travel costs incurred will not be accepted for SI-TEX Marine Electronics Inc. products.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF.

SPECIFIC EXCLUSIONS

Charges for overtime, stand-by, holiday, and per diem are specifically excluded from the Limited Warranty.

Chart paper, stylus, stylus belt, lamps, and fuses are consumable items and are not covered by this Limited Warranty.

Installation workmanship or materials except as provided directly by SI-TEX Marine Electronics Inc. are not covered by this Limited Warranty. SI-TEX Marine Electronics Inc. equipment or parts thereof, which have been repaired or altered except by an authorized SI-TEX Marine Electronics Inc. dealer or service center, are not warranted in any respect.

Transducer, software update, battery, microphone, magnetron, and microwave components and water damage on water resistant VHF radio are items excluded from the two-year warranty and are covered by warranty for a period of one year for both parts and labor.

SI-TEX Marine Electronics Inc. will not, at any time, assume any costs or labor charges for checkout or external line fuse replacement or problems not found to be at fault in equipment itself.

THERE ARE NO WARRANTIES OR GUARANTEES EXPRESSED OR IMPLIED WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY. SI-TEX MARINE ELECTRONICS INC. HAS NO OTHER LIABILITY TO PURCHASE FOR DIRECT OR CONSEQUENTIAL DAMAGE OR ANY THEORY INCLUDING ABSOLUTE LIABILITY, TORT, OR CONTRACT. THIS LIMITED WARRANTY CANNOT BE ALTERED OR MODIFIED IN ANY WAY AND SHALL BE INTERPRETED IN ACCORDANCE WITH THE LAWS OF THE STATE OF FLORIDA. THIS WARRANTY IS LIMITED TO THE CONTINENTAL U.S.A., ALASKA, HAWAII, AND CANADA.

HOW TO OBTAIN SERVICE UNDER THIS WARRANTY

To provide better flexibility, SI-TEX Marine Electronics Inc. gives you the option of obtaining service under this warranty by either:

a) Contacting an authorized SI-TEX Marine Electronics Inc. service station (The closest service station may be found by contacting your dealer of purchase.)

Or

b) Shipping your equipment prepaid via UPS or truck with insurance prepaid to SI-TEX Marine Electronics Inc. at the address provided below. SI-TEX Marine Electronics Inc. will, whenever possible, make all repairs covered by Limited Warranty within two weeks of receiving the equipment in Florida and return same to you, freight prepaid.

c) You must present a copy of your Purchase Sales Slip at the time you request warranty service.

Shipping/Mailing Address:

SI-TEX Marine Electronics Inc.
11001 Roosevelt Blvd., Suite 800
St. Petersburg, FL 33716
727-576-5734

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