

FURUNO

OPERATOR'S MANUAL

COLOR VIDEO SOUNDER

MODEL FCV-1000

This manual contains operating instructions only. Installation instructions and servicing information are issued in separate manuals.



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SAFETY INSTRUCTIONS

"**DANGER**", "**WARNING**" and "**CAUTION**" notices appear throughout this manual. It is the responsibility of the operator of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.



DANGER

This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.



SAFETY INFORMATION FOR THE OPERATOR



WARNING



Do not open the cover of the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause death. Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Immediately turn off the power at the ship's mains switchboard if water or foreign object falls into the equipment or the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire, electrical shock or serious injury.



CAUTION

Do not place liquid-filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Do not place heater near the equipment.

Heat can melt the power cord, which can result in fire or electrical shock.

Do not operate the unit with wet hands.

Electrical shock can result.

Use the correct fuse.

Use of the wrong fuse can cause fire or equipment damage.

(Continued on next page)

NOTICE

Do not use the equipment for other than its intended purpose.

Use of the equipment as a chair or a shelf, for example, can cause equipment damage.

Immediately turn off the power whenever you feel the equipment is abnormal.

Continued use can cause equipment damage.

The useable temperature range is 0°C to 50°C.

Use out of the range can cause equipment damage.

Keep magnets and magnetic fields (speaker, transformer, etc.) away from the equipment.

Magnets and magnetic fields can cause equipment malfunction.

Do not place objects near the equipment.

Objects near the equipment can cause overheating.

Handle the equipment carefully.

Rough handling can cause corrosion.

Do not use chemical cleaners to clean the equipment.

Chemical cleaners can remove paint and markings.

FOREWORD

FURUNO Electric Company thanks you for considering and purchasing the FURUNO FCV-1000 Color Video Sounder. We are confident you will discover why FURUNO has become synonymous with quality and reliability.

For over 40 years FURUNO Electric Company has enjoyed an enviable reputation for efficient and dependable marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

Your unit is designed and manufactured to meet the rigorous demands of the marine environment. However, no machine can perform to the utmost of its ability unless properly operated and maintained. Please carefully read and follow the recommended procedures for operation and maintenance.

We would appreciate hearing from you, the end-user, about whether we are achieving our purposes.

Thank you for considering and purchasing FURUNO.

FEATURES

The FCV-1000 is a dual frequency color video sounder which has a large variety of functions, all contained in a rugged splashproof cabinet.

The principal features of the FCV-1000 are

- User-friendly design for simplified operations.
- A wide variety of display modes (incl. bottom-lock expansion, manual zoom, bottom zoom and bottom discrimination displays), using potent 1kW transceiver.
- Ship's track plotted in plotter mode (position-fixing equipment required)
- Five sets of user settings for customized operation according to fishing ground, fish species, etc.
- Any range scale between 5 m and 4000 m.
- AUTO function for automatic adjustment of range and gain.
- A-scope display gives excellent bottom fish discrimination, vital for bottom trawler and lobster/crab boats
- Bottom, water temperature and fish alarms for safety of navigation and unattended fish detection.
- Memory card (option) for saving echo sounder display, fishing ground data (water temperature and depth) and customized settings.
- Universal 11- 40VDC power supply drawing 80W or less power.

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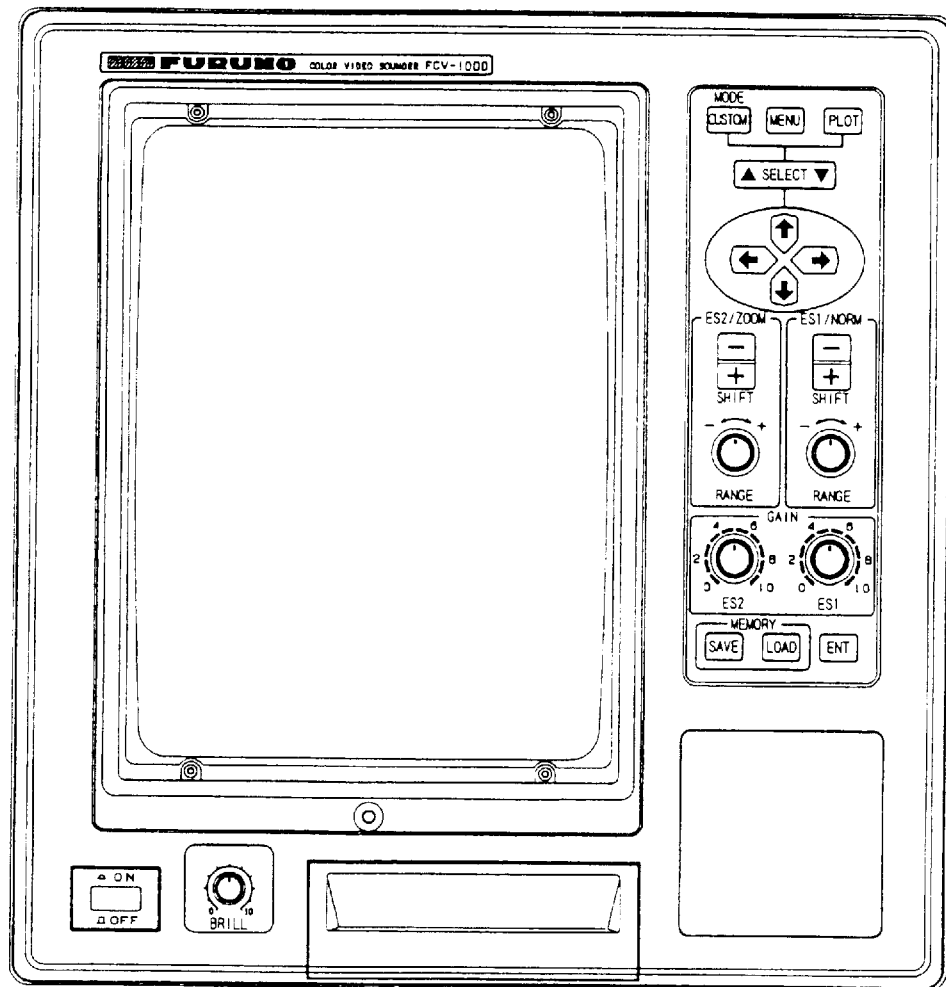
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1. OPERATING CONTROLS

The equipment is so designed that even a first time user can quickly become familiar with the operating procedure. Any time you change a control setting, the unit displays an alphanumeric message to confirm that it has received your command.



Function of Controls and Keys

CONTROL/KEY	FUNCTION
ON/OFF	Turn on/off the unit.
BRILL	Adjust brightness of the screen.
CUSTOM	Turn on/off the custom mode operation.
MENU	Turn on/off the menu display.
PLOT	Turn on/off the plotter display.

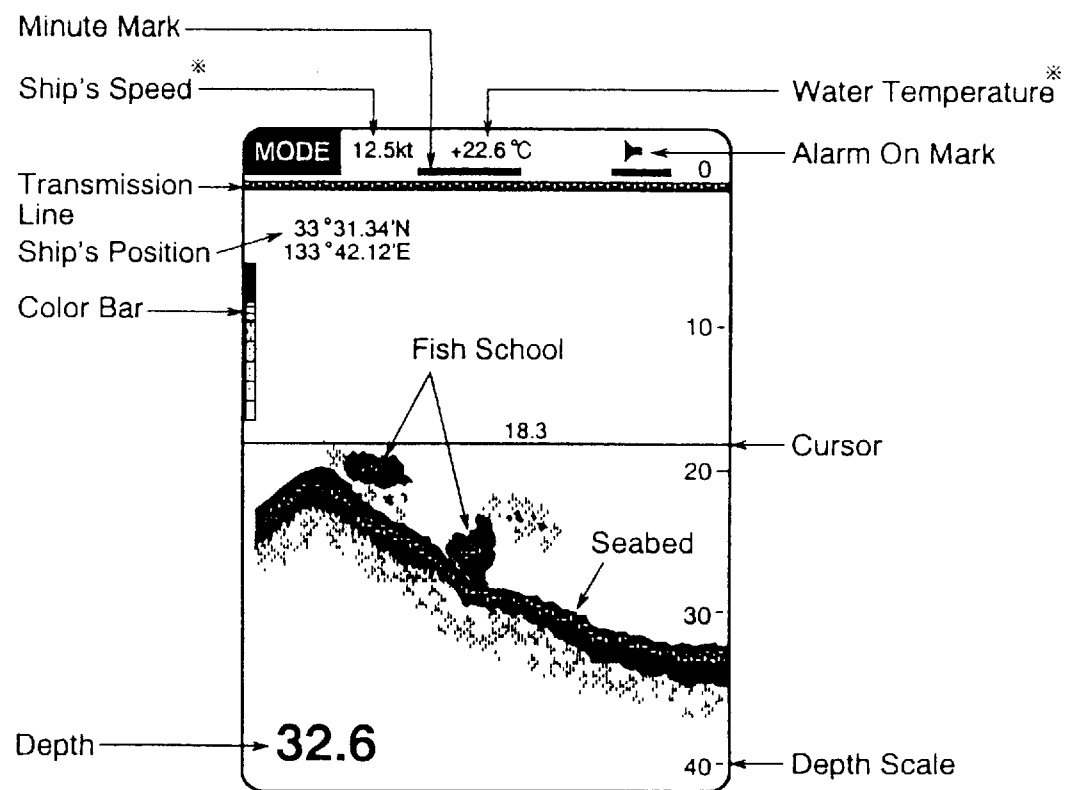
CONTROL/KEY	FUNCTION
SELECT	1) Select a display mode. 2) Select a custom setting. 3) Select a menu. 4) Scroll echo sounder display recalled from internal memory or memory card.
ARROWS	1) Move the cursors. 2) Select items and set options on menus.
SHIFT	Set start depth for normal and marker zoom displays.
RANGE	Set ranges for normal and zoom displays.
GAIN	Adjust sensitivity of the receivers.
SAVE	Save echo sounder display to internal memory or memory card.
LOAD	Recall echo sounder display saved to internal memory or memory card.
ENT	1) Register custom settings to the CUSTOM key. 2) Plot an event mark on the plotter display. 3) Designate fishing ground for fishing ground data display.

2. TYPES OF DISPLAYS

2.1 ECHO SOUNDER

Single Frequency Display

This is a basic display for observing fish schools and seabed. It shows either the high or low frequency display over the entire screen.



**: Requires connection to position fixing equipment and/or speed/temperature sensor.*

Minute Mark

One minute is shown by a 30 second horizontal bar and 30 second space.

Transmission Line

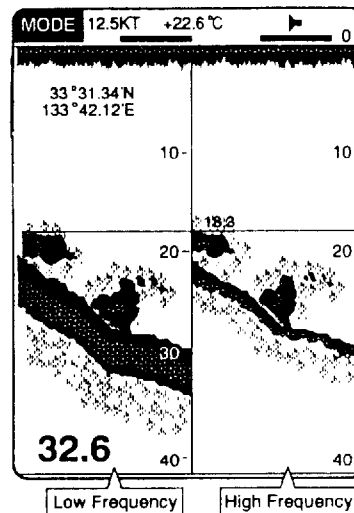
This shows the transducer's position on the ship's hull. Depth is measured with respect to this line.

Color Bar

The color bar shows 7 or 6 colors used to display echoes: colors in upper location are used for strong echoes and those in lower location for weak echoes.

Dual Frequency Display

This shows the normal display for one frequency on the left half and that for the other frequency on the right half of the screen. It is useful for detecting fish schools which have different reflection characteristics with frequency. For example, a school of tiny fish like the minnow makes stronger echoes on a high frequency than on a low frequency.

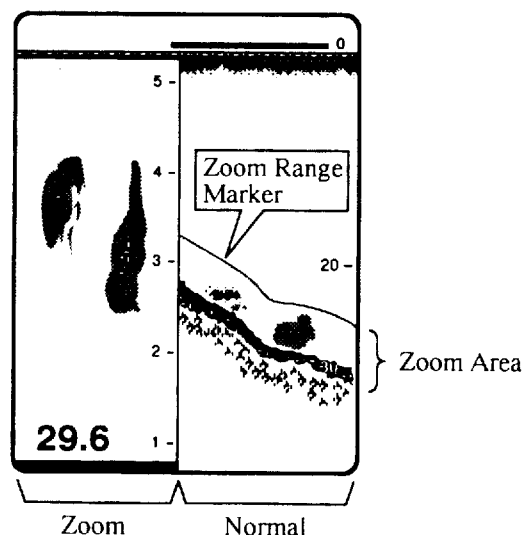


Normal/Zoom Combination Display

This shows normal display on the right half of the screen and zoom-in display on the left half. Three types of zoom-in displays are available.

Bottom-lock expansion

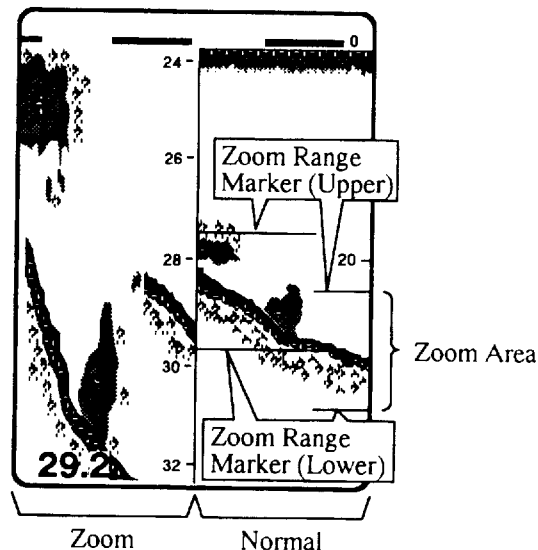
The bottom-lock expansion display provides a normal display on the right half of the screen and a narrow layer in contact with the seabed on the rest of the screen with the seabed contour shown by a straight line at the screen bottom. The range of expansion is shown by a yellow marker. This display offers excellent bottom fish discrimination, which is vital for bottom trawling.



Bottom zoom

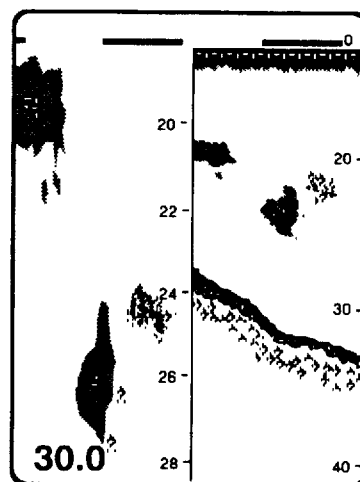
The bottom zoom expands bottom and bottom fish echoes to full vertical size of the screen. The zone expanded is shown by the zoom range marker on the normal display.

This mode may be useful for observing hardness of the bottom closely together with bottom fish. Many fishermen find a place where bottom fish are likely to be by the shape of bottom profile and length of bottom echoes. The length of the bottom echo is an indication of bottom hardness; the longer the echo, the harder the bottom.



Manual zoom

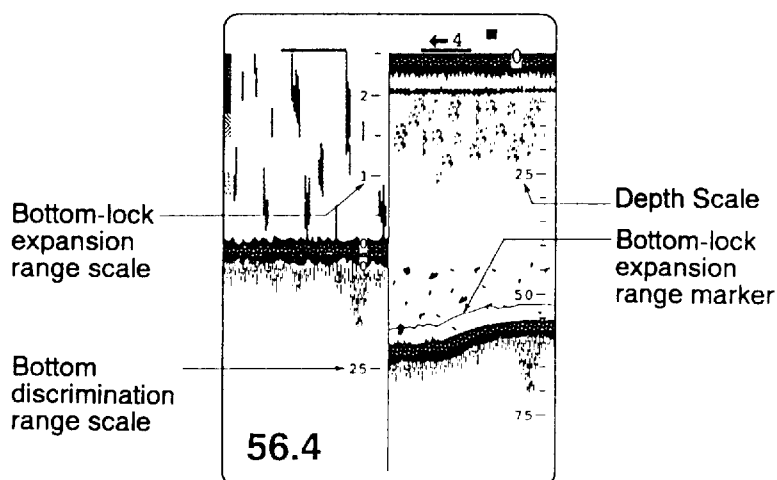
This display expands any location on the normal display to full vertical size of the screen on the left half of the screen. You may specify the portion to expand with the RANGE control and SHIFT [+] [-] keys. The segment between the zoom range markers are expanded.



BOTTOM DISCRIMINATION

In this picture, a bottom contour appears in a straight line at the screen center. The upper part of the screen displays fish echoes expanded like a bottom-lock picture and the lower part, bottom reflections below a bottom contour with a normal range scale.

This picture will enable you to readily find bottom fish and bottom nature on the same screen.

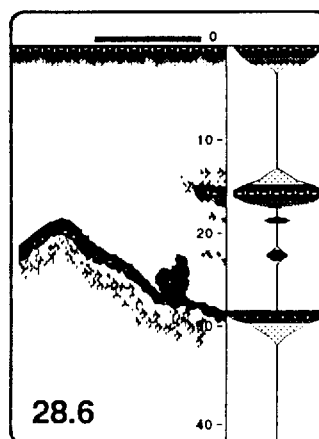


Zoom Display

This display shows the bottom-lock expansion, bottom zoom, marker zoom or bottom discrimination display over the entire screen.

A-Scope Display

The A-scope display appears on the right 1/4 of the screen and the normal display on the rest of the screen. The A-scope display shows echoes in each transmission with amplitudes and colors proportional to their intensities. This lets you see small fish and fish near the bottom at a glance.



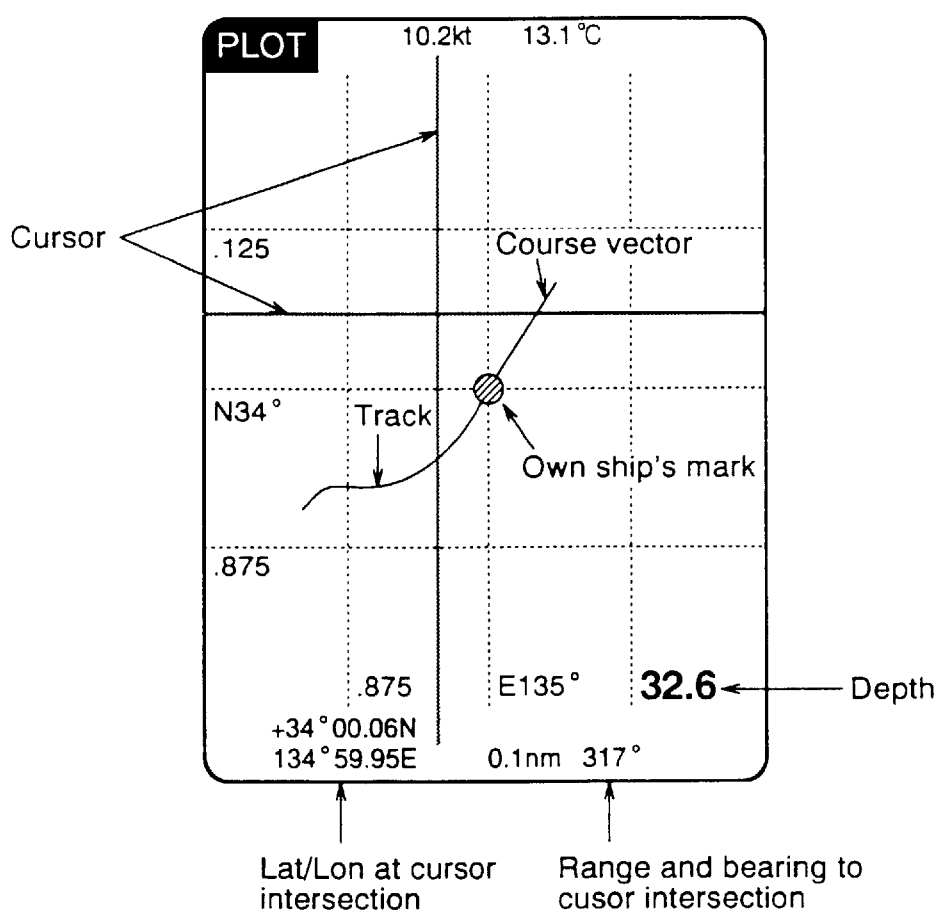
2.2 PLOTTER

You may use this display when the FCV-1000 is interfaced to a position fixing equipment.

Plotter only Display

Own ship's movement is plotted on the screen by using navigation data fed from position fixing equipment. Latitude/longitude grid lines provide position reference.

Since the display size is only 0.5 to 10 nautical miles square, the plotter display functions to monitor ship's movement in a fishing ground rather than for navigation purposes.



Course vector

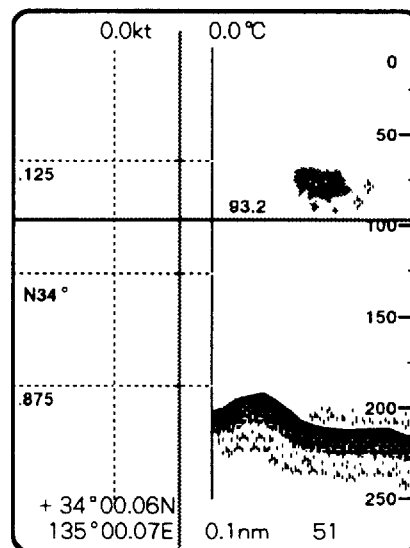
Show ship's speed by length of the vector and ship's course by direction of the vector.

Track

Track is shown by series of lines connecting ship's positions saved at specified time intervals. Up to 1000 positions can be saved.

Plotter/Echo Sounder Combination Display

Normal echo sounder display is shown on the right half of the screen and the plotter display on the left half.

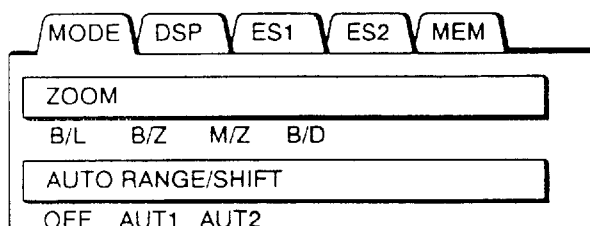


2.3 MENU

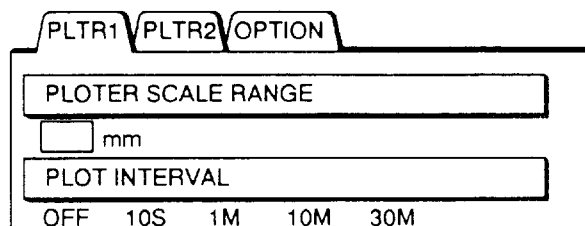
Menu Composition

The menus contain less-often used functions which once preset do not require frequent adjustment.

The unit has two different menu sets (one for echo sounder and the other for plotter) and each set contains several menus as shown below.



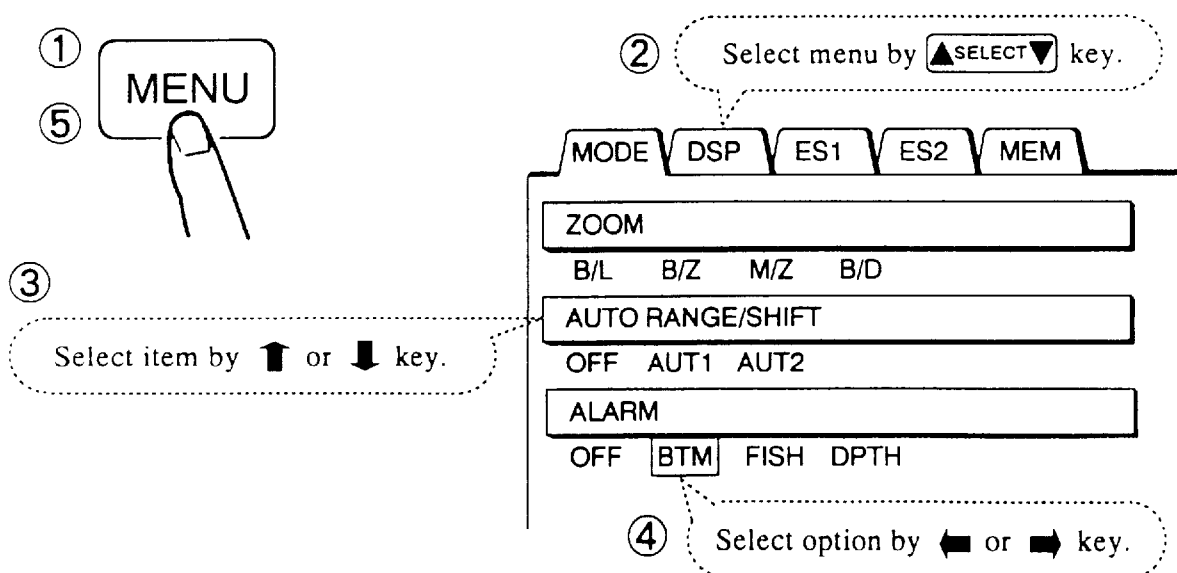
Echo Sounder Menu



Plotter Menu

Operation on Menu

1. Press the MENU key to display menus.
If an echo sounder display is on the screen when the MENU key is pressed, echo sounder menus are displayed and if plotter display plotter menus.
2. Use the SELECT keys to select a menu.
3. Use the up and down ARROW keys to select an item on the menu card.
4. Use the right and left ARROW keys to set parameter of the item.



5. Press MENU, CUSTOM or PLOT key to exit the menu.

■ **NOTE**

To change from the echo sounder menu to the plotter menu or vice versa, press the SELECT up arrow key a few times.

3. TURNING THE UNIT ON/OFF

Turning the Unit On/Off

Turning on

Press the ON/OFF key.

In a few seconds, you will see either the echo sounder display or plotter display. The display shown depends on which one was in use when the unit was turned off last time.

Turning off

Press the ON/OFF key.

Adjusting Picture Brilliance

The picture brilliance is adjusted with the BRILL control. Keeping a moderate brilliance not only lessens eye fatigue but also extends the life of the display screen (CRT).

4. ECHO SOUNDER OPERATION

(by using CUSTOM setting function)

Overview

The settings of controls and menus of the echo sounder may change with fishing ground, fishing method and fish species. The FCV-1000's CUSTOM setting function allows you to quickly tune up the unit for appropriate settings when your fishing condition changes.

When the CUSTOM settings have been registered to the unit (five sets of settings at maximum), you may use the FCV-1000 for normal fish finding purpose by the following two operations only.

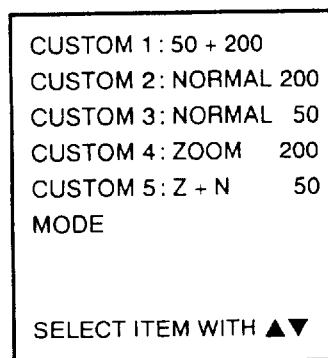
■ NOTE

For registration of custom settings and items which can be registered, refer to chapter 10 "REGISTERING CUSTOM SETTING."

Recalling Custom Setting

Do the following to operate the unit by custom settings.

1. Press the CUSTOM key
The display will show a pop-up menu which should look like the figure below.



2. Use the SELECT or CUSTOM key to select a custom setting.

Adjusting Sensitivity

The GAIN control adjusts the sensitivity of the receiver. Normally, it is set to the point where a slight amount of noise appears on the display. Too high a setting causes excessive noise on the screen and makes discrimination of echoes difficult.

Changing Custom Setting Temporarily

While the unit operates by a custom setting you may sometimes wish to temporarily change a part of setting. In such case, change the setting as you wish, and the unit operates by the changed setting.

Note that since the custom setting saved in the internal memory remains unaffected, you may operate the unit by the custom setting by recalling it again.

5. ECHO SOUNDER OPERATION

(without using CUSTOM setting function)

5.1 BASIC OPERATION

Showing Echo Sounder Display

Press the CUSTOM key, and the echo sounder display is shown on the screen.

Selecting Display Mode

Overview

Eight display modes are available and you may select one of them with the CUSTOM and SELECT keys.

Procedure

1. Press CUSTOM key

A selection window as shown below appears on the screen.

CUSTOM 1 : 50 + 200
CUSTOM 2 : NORMAL 200
CUSTOM 3 : NORMAL 50
CUSTOM 4 : ZOOM 200
CUSTOM 5 : Z + N 50
MODE

SELECT ITEM WITH ▲▼

1. Choose "MODE" by the SELECT key.

The display mode selection window as shown below appears.

ES1 ZOOM
ES1 ZOOM + NORMAL
ES1 NORMAL (50kHz)
ES2 + ES1
ES2 NORMAL (200kHz)
ES2 ZOOM + NORMAL
ES2 ZOOM

SELECT MODE WITH ▲▼

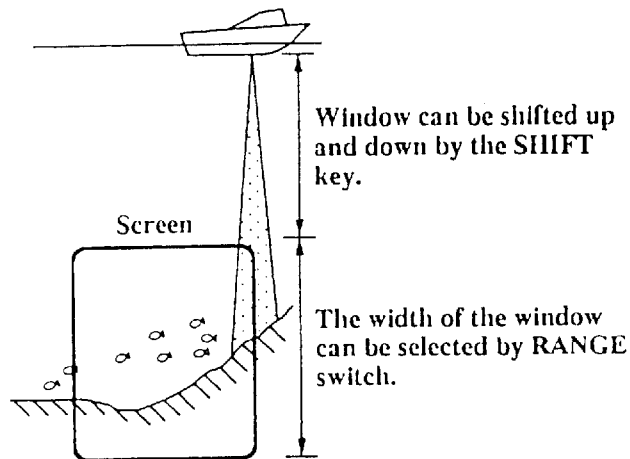
2. Press the SELECT key to choose mode.

Your selection is highlighted in white and the display shows the selected mode.

Setting Normal Display Range

Introduction

The RANGE controls and SHIFT keys used together give you the means to select the depth zone you can see on the screen. RANGE can be thought of as providing a “window” into the water column and SHIFT as moving the “window” to the desired depth.



Range setting

There are two pairs of RANGE and SHIFT controls. The pair you use depends on the display mode:

Normal and ES1 + ES2 modes

You may use either pair of controls. In the ES1 + ES2 mode, both low and high frequency displays are set to the same range and shift.

Normal + zoom mode

Use the right hand pair of controls.

How range changes

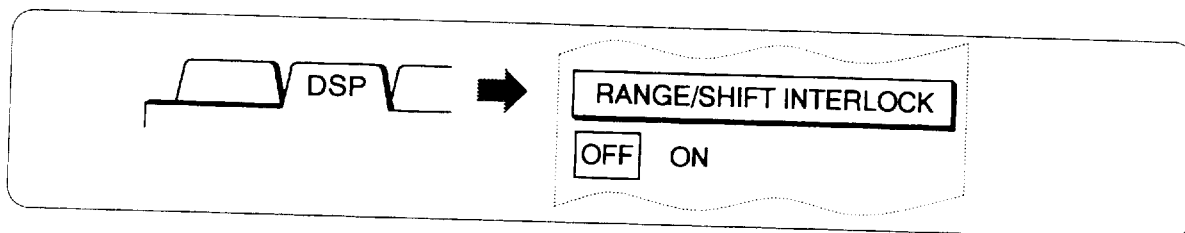
The range changes in 1 meter steps up to 20 meters, 10 meter steps between 20 meters and 1000 meters and 100 meters steps between 1000 meters and 4000 meters. The minimum and maximum ranges available are 5 meters and 4000 meters, respectively. If you try to set a range below 5 meters or above 4000 meters, a beep sounds to inform you.

How shift changes

Steps of change are different with ranges and the maximum shift is 4000 meters.

Setting different ranges/shifts for low and high frequency displays

If you prefer to have different range and shift settings on low and high frequency displays, set the RANGE/SHIFT INTERLOCK item to OFF on the DSP menu.



Controls to use

On the ES1 + ES2 mode, use the controls on the right hand to set the range/shift for the right hand display and those on the left hand for the left hand display.

Adjusting Sensitivity

Guideline

The GAIN control adjusts the sensitivity of the receiver. Normally, it is set to the point where a slight amount of noise appears on the display. Too high a setting causes excessive noise on the screen and makes discrimination of fish echoes difficult.



High



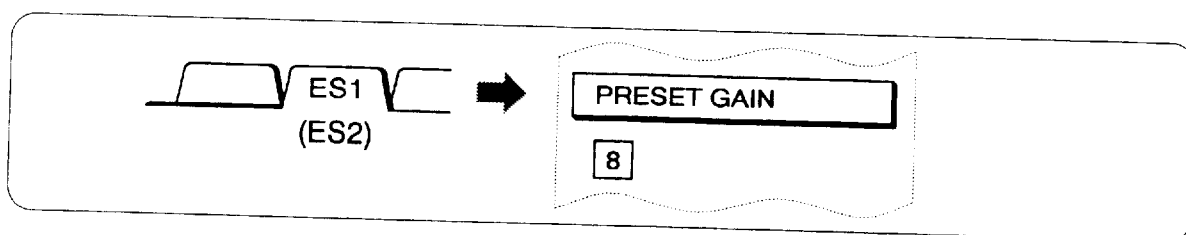
Proper



Low

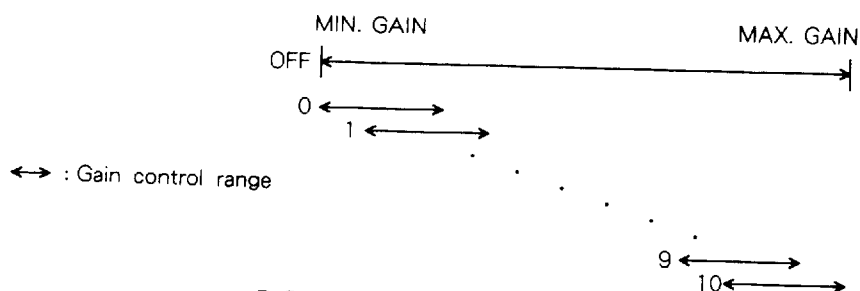
Gain presetting

You normally adjust minimum through maximum sensitivity by the GAIN controls on the front panel. If you wish to use the GAIN controls to adjust sensitivity in a specific range, set the "preset gain" on the ES1/ES2 menus.



How preset gain works

Look at the illustration shown below. If, for example, the gain preset is set to 1, the GAIN control adjusts the sensitivity in a range marked by "1".



Using Auto Gain/Auto Range

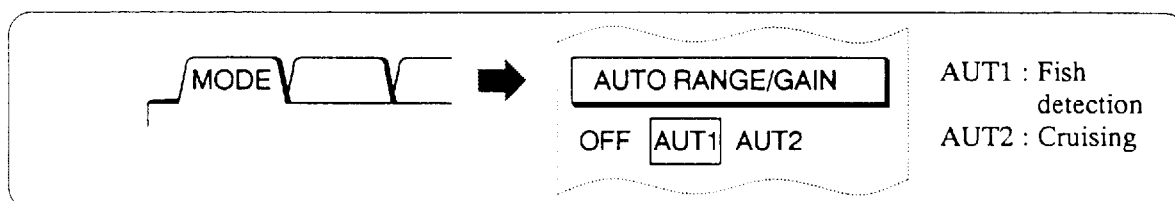
Overview

The AUTO function automatically selects the gain and the range scale. You may use this function virtually all the time, if you do not mind the gain and the range scale to change from time to time.

Some fishermen prefer to maintain a constant gain so that they can judge fish species from intensity of echoes on the screen. In that case, use the manual gain and range settings.

Selecting AUTO

You may turn on/off the AUTO function on the MODE menu.



AUTO 1 and AUTO 2

The AUTO 1 is fish mode for searching fish schools and AUTO 2 cruising mode for tracking the seabed. The AUTO 2 uses a higher clutter setting than AUTO 1, thus its use should be avoided when the objective is searching fish schools: weak fish echoes may be deleted by the clutter function.

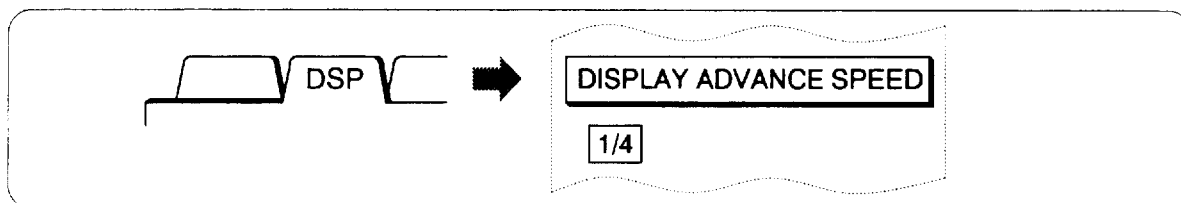
How AUTO works

- 1) The range changes automatically to locate the bottom on the lower half of the screen.
- 2) The gain changes automatically to show the bottom echo in reddish brown.

5.2 DISPLAY ADVANCE SPEED AND COLORS

Selecting Display Advance Speed

The echoes on the screen moves from right to left at a constant speed you set on the DSP menu.



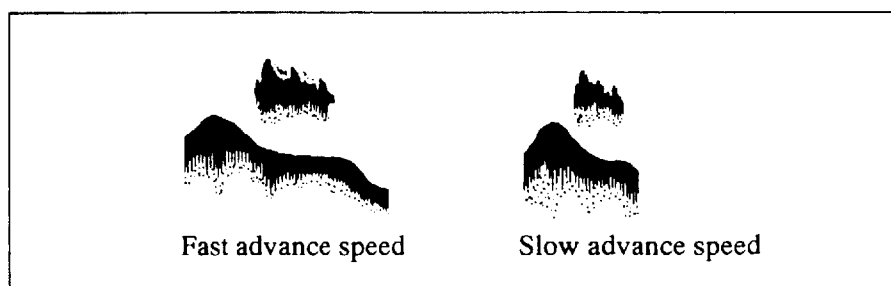
Display advancement

Seven different speeds are available. The following table shows how many transmissions are necessary for an echo to move by one scan line.

Speed	Slow ← → Fast						
Scan line/ transmission	Stop	1/8	1/6	1/4	1/2	1/1	2/1

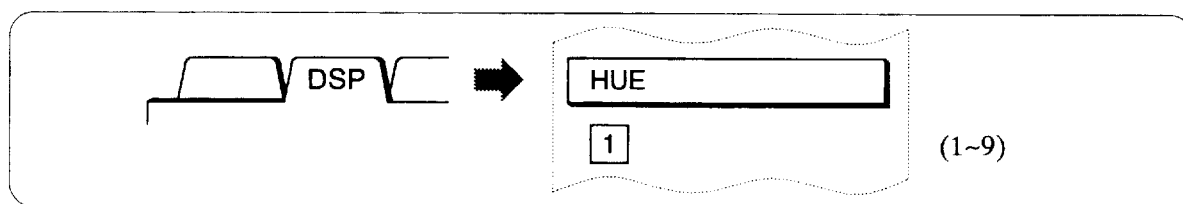
Remarks for selecting speed

When selecting advance speed, keep in mind that a fast advance speed will expand the size of fish schools and seabed horizontally on the screen and a slow advance speed will contract them.



Selecting Background Color and Echo Color

You may select a background color and echo colors on the DSP menu.



Colors available

Nine sets of background and echo colors are available as shown in the table below.

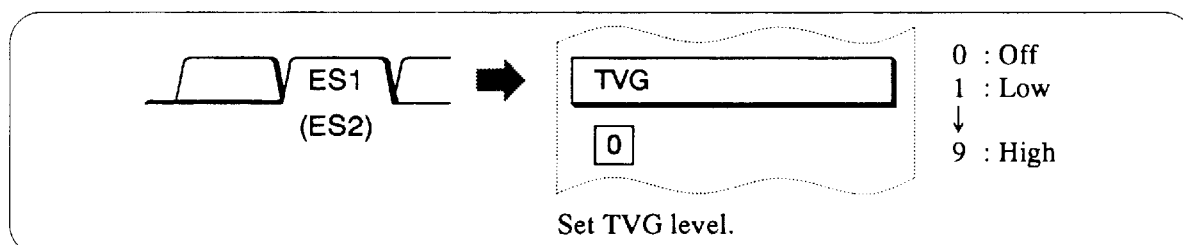
Menu Setting	Background Color	Echo Color
COLOR 1	Blue	Seven
COLOR 2	Light blue	Seven
COLOR 3	Light blue	Seven
COLOR 4	Black	Seven
COLOR 5	Black	Seven
COLOR 6	Black	Monochrome
COLOR 7	Light blue	Seven
COLOR 8	Light blue	Seven
COLOR 9	Light blue	Seven

The monochrome presentation displays echoes in amber with seven intensities.

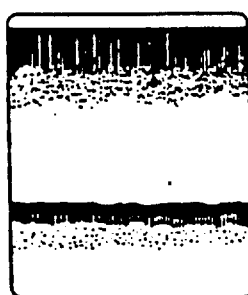
5.3 ELIMINATING NOISE AND INTERFERENCE

Eliminating Surface Noise

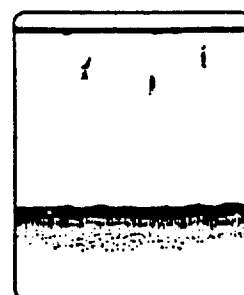
When surface noise masks a shallow target, adjust the TVG (Time Varied Gain) setting on the ES1/ES2 menus.



Setting guideline Set it between “2” and “4” for normal fishing. Too high a setting eliminates small echoes.



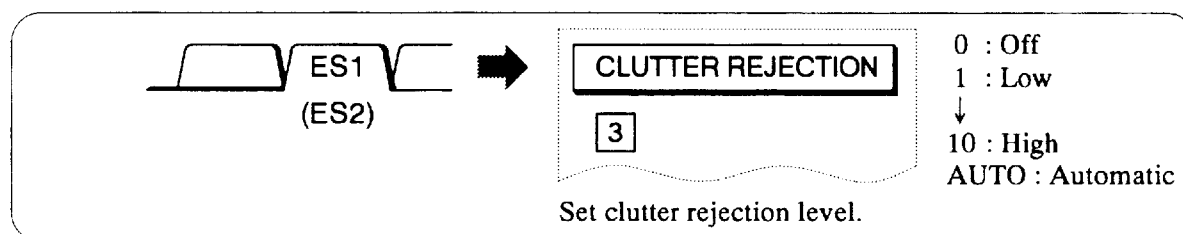
TVG “off”



TVG “on”

Eliminating Low Level Noise

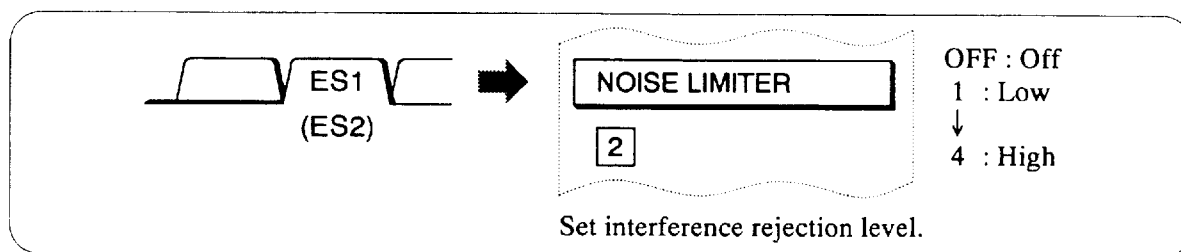
Blue dots may cover a large part of the screen. They are due to water contamination. When they mask targets, adjust the CLUTTER REJECTION function on the ES1/ES2 menus.



Setting guideline Do not use too high a setting, otherwise weak echoes may also be eliminated.

Eliminating Interference

When interference from other acoustic equipment operating nearby or electric equipment on board appears on the screen, adjust the NOISE LIMITER function on the ES1/ES2 menus to reduce it.

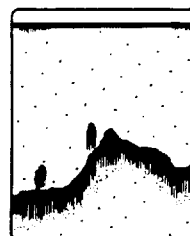


How interference looks like

Acoustic and electric interferences appear as shown in the figure below.



Interference by other electric device



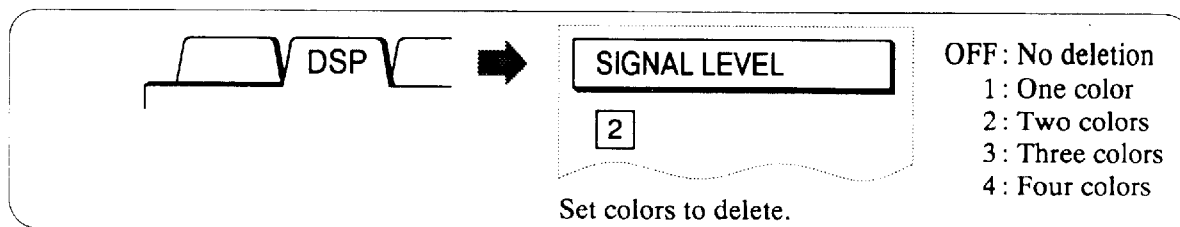
Interference by nearby echo sounder

■ NOTE:

If the noise limiter is left in "3" (highest degree of noise rejection) when no interference exists, weak echoes may be missed or eliminated.

Displaying Strong Echoes Only

When you wish to display fish schools above a certain level of strength, or wish to eliminate noise displayed on a large part of the screen, adjust the SIGNAL LEVEL function on the DSP menu.



How it works

If, for example, you set the SIGNAL LEVEL to "2", echoes displayed in up to second weakest echo color are deleted.

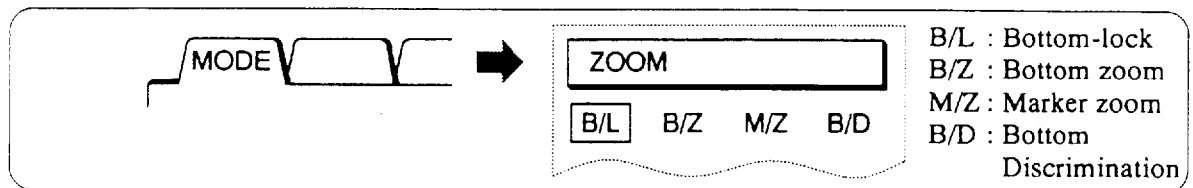
How you know deleted colors

You may identify the deleted colors on the color bar at the left edge of the screen. Deleted colors are missing from the color bar.

5.4 ZOOM DISPLAY

Selecting Zoom Type

As mentioned earlier, the FCV-1000 provides three types of zoom: bottom-lock expansion, bottom zoom and manual zoom. You pre-set which one to use on the MODE menu, and display it by pressing the SELECT key.



Setting Range

Range control to use

Use the RANGE control on the left in the normal + zoom display and any RANGE control in the zoom only display.

How range changes

The range changes in 1 meter steps. The minimum and maximum ranges are 1 meters and 300 meters for manual and bottom zooms and 3 meters and 300 meters for bottom-lock zoom, respectively. If you try to set a range beyond the limits, a beep sounds to inform you.

Setting Zoom Start Depth (For Manual Zoom)

In the manual zoom display, specify the zoom start depth with the SHIFT keys.

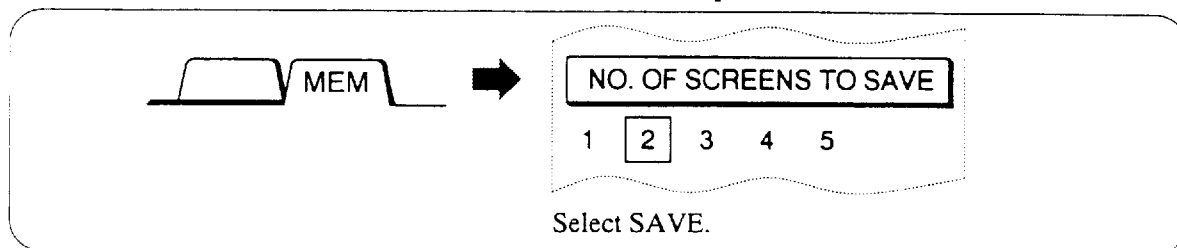
5.5 SAVING/RECALLING ECHO SOUNDER DISPLAY

This section describes saving/recalling of a echo sounder display to the internal memory.

Saving

Procedure

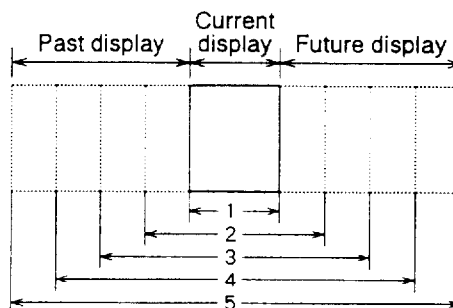
1. Open the MEM menu and set the NO. OF SCREENS TO SAVE. The unit can save up to 5 full screens.



2. Press the SAVE key.
The mark "○" appears at the top right-hand side of the screen while the unit is saving the display to the internal memory.

How display is saved

Present, past and future displays can be saved. Look at the illustration shown below. If, for example, you set "No. of screens to save" to 2, a half each screen of past and future display and a full screen of present display are saved.

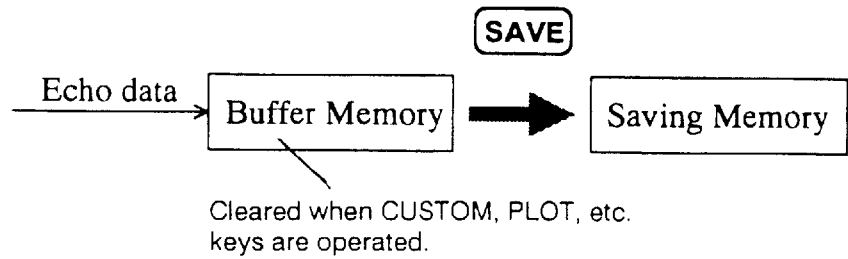


The displays saved are erased when another display is newly saved. Use the memory card (option) to store displays at several different places.

Remarks for saving

Do not operate CUSTOM, PLOT, MENU, SELECT and LOAD keys for several minutes prior to pressing the SAVE key. Otherwise the past echoes cannot be completely saved. Only the echoes obtained after operating these keys are saved. The reason for this is as follows.

The buffer memory continuously accumulates echo data in the past transmissions so that they can be transferred to the saving memory at any time the SAVE key is pressed. However, operating the above mentioned keys clears the buffer memory, causing past echo data to be saved are not available in the memory.



Recalling

Saved displays can be recalled on the left half of the screen.

Recalling

1. Press the LOAD key. Last saved display is recalled.
The mark "▷" appears at the top right-hand side of the screen while the unit is recalling the display.
3. To scroll the recalled display manually, press the SELECT key:
[◀] key for forward and [▶] key for reverse.

Stop recalling

Press the LOAD key to stop recalling and return to the normal display.

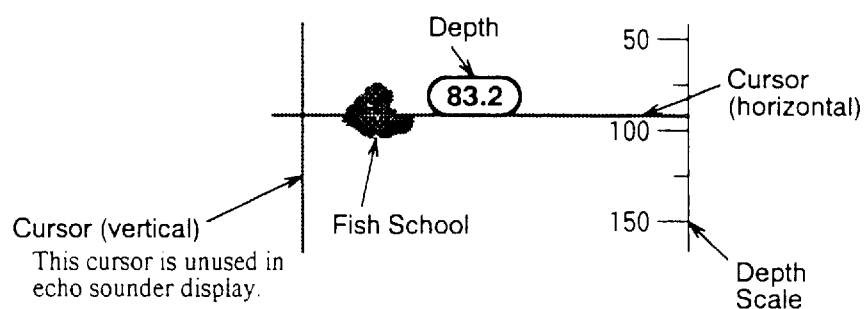
5.6 MISCELLANEOUS

Cursor

The horizontal cursor measures the depth of a fish school.

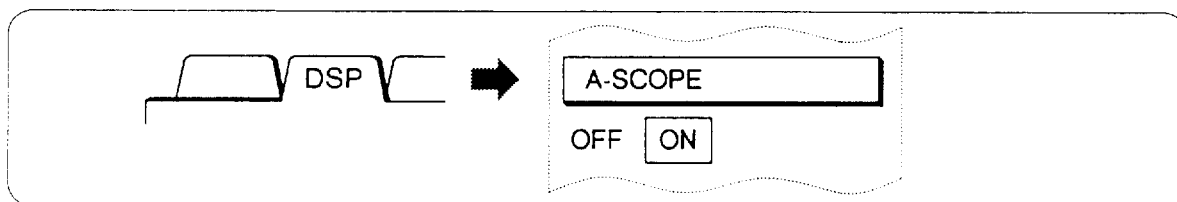
Procedure

Move the cursor onto a fish school with the ARROW keys. The depth of the fish school appears above the cursor.



Turning on the A-scope Display

You can turn on the A-scope display on the DSP menu.



6. PLOTTER OPERATION

This chapter describes operation on the plotter display, which you can display by pressing the PLOT key.

■ **NOTE:**

The plotter function requires position data input by position fixing equipment to function.

6.1 PLOTTER DISPLAY

Turning On

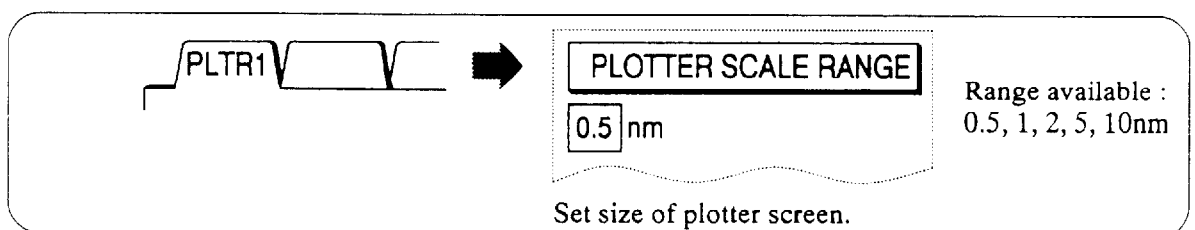
Press the PLOT key to turn the plotter display on.

Selecting Display Mode

A plotter only display and a plotter/echo sounder combination display are available. You may select one by pressing the PLOT key and SELECT key. Every pressing the SELECT key alternates the plotter only display and the plotter/fish finder combination display.

Changing Plotter Scale

The scale of the plotter display is set at the factory to 0.5 nm. You may change it on the PLTR1 menu.

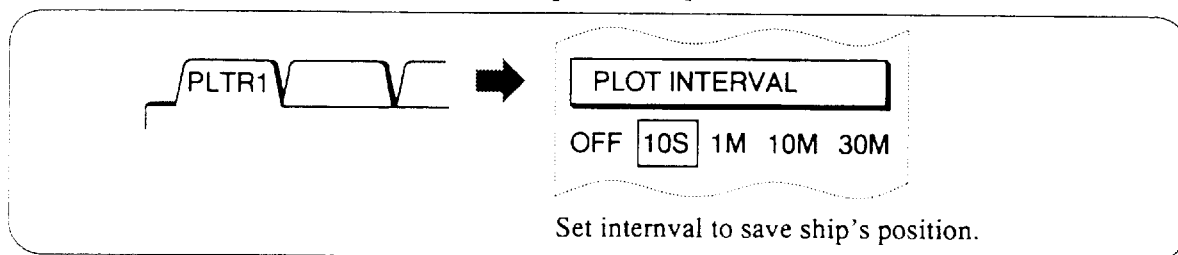


What the plotter scale shows

The plotter scale shows the distance from the top to the bottom and also from the left to right edges of the plotter display.

Selecting Plot Interval

The FCV-1000 receives position data every 2 to 3 seconds from the position fixing equipment and plots them on the screen. It also saves position data to internal memory at the interval set on the PLTR1 menu. Up to 1000 positions can be saved.



Data update on internal memory

The internal memory can store 1,000 positions. When the memory becomes full, oldest position is overwritten to make room for latest position.

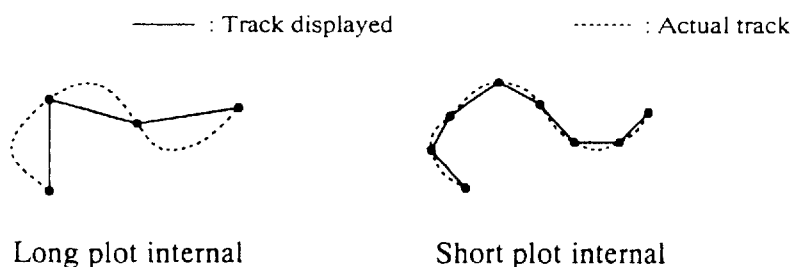
How stored data is used

The FCV-1000 uses position data stored in the internal memory to reconstruct track when the display is shifted: when own ship mark reaches an edge of the display, the display automatically shifts to locate the own ship mark in the center of the plotter display. When the display is shifted, the track plotted on the screen is erased and then it is reconstructed by using the data in the memory.

Guideline for selecting plot interval

There are advantages and disadvantages of short and long plot intervals as shown in the following table.

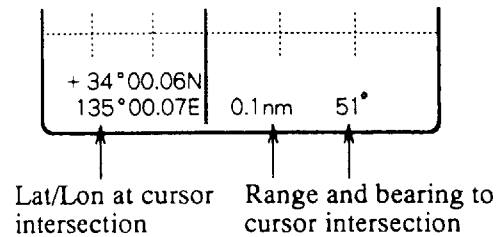
Plot Interval	Advantage	Disadvantage
Long	Total storage time of track is long.	Track is reconstructed with less accuracy.
Short	Track is reconstructed with better accuracy.	Total storage time of track is short.



Select a plot interval, considering plotter scale and ship's speed.

Using the Cursors

The horizontal and vertical cursors are used to find the latitude/longitude of the intersecting point and also range and bearing to it. Use the ARROW keys to move the cursors.



Displaying Latitude/Longitude of Ship's Position

Move the cursor to the right edge of the screen to display the latitude/longitude of ship's position instead of those at the cursor intersection.

In the echo sounder/plotter combination display, the latitude/longitude of ship's position are displayed when the cursors intersect on the echo sounder display.

Entering /Deleting Event Mark

You can electrically inscribe event marks on the display to denote important locations. Up to 100 event marks can be entered: 50 marks through FCV-1000's keyboard and 50 marks from the navaid connected to the FCV-1000.

Entering

The event mark (square, \square) can be entered at own ship's present position pressing the ENT key.

Deleting

Move the cursor intersection onto the mark to be deleted and press the ENT key.

External event mark

The external event mark (triangle, \triangle) is plotted at own ship's present position when the EVENT key is pressed on the navaid connected to the FCV-1000.

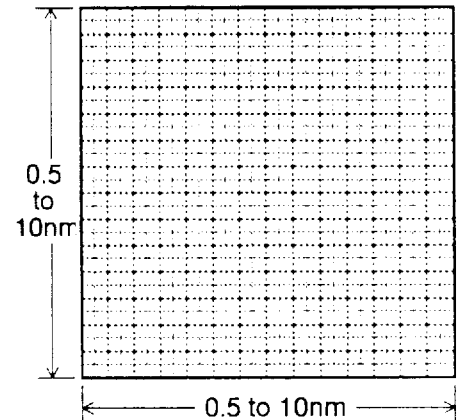
■ NOTE

The event marks entered on the FCV-1000 are automatically saved to the memory card (option) but those entered from the navaid are not.

6.2 FISHING GROUND DATA DISPLAY

What is Fishing Ground Data

The fishing ground data are sets of water temperature and depth data in the user-designated fishing ground. When you designate the fishing ground (0.5 to 10 nautical mile square size), the unit automatically divides the area into thousands of small divisions and collects water temperature and depth data in divisions which the ship passes through.



The collected data change the color of the ship's track accordingly. This allows you to observe distribution of water temperature and undulations of seabed in the whole fishing ground (if the ship moves through all divisions).

■ CAUTION

Do not use the fishing ground data display as a navigational aid to avoid shoals and reefs. Data displayed are not absolutely accurate: accuracy limitations inherent to the nav-sensor and air bubbles beneath the ship may cause depth error.

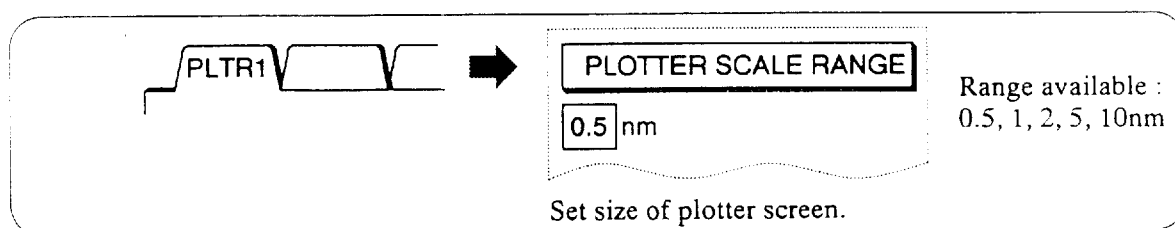
Designating Fishing Ground and Collecting Data

Procedure

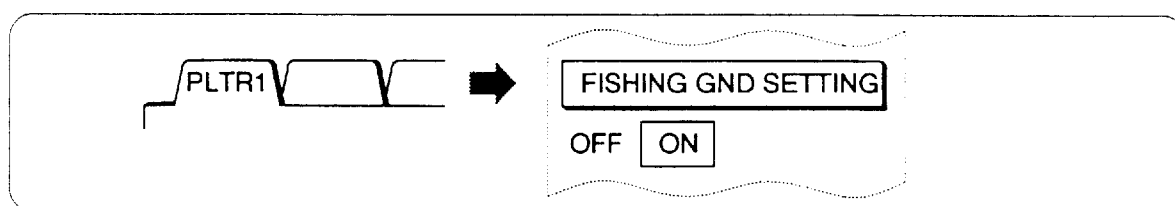
1. Insert a formatted memory card (option) into the card slot.

You can collect data even if you do not use the memory card: data are stored on internal memory of the unit. However, those data are erased when the unit is turned off.

2. Move the ship to the center of the fishing ground.
3. Press the MENU key
4. Set size of fishing ground at PLOTTER SCALE RANGE item on PLTR1 menu.



5. Set FISHING GND SETTING to ON on PLTR1 menu.



6. Press the MENU key to exit the menu.
7. Press the ENT key.

The unit encircles the designated fishing ground by a white frame and shows it on the full plotter screen.

Afterward, as the ship moves within the fishing ground, the unit automatically saves water temperature and depth data to the memory card and internal memory, and changes the color of the ship's track on the screen.

How to collect data

You do not have to collect data in a single trip. You can collect it through multiple trips by using the memory card (option). Once you designate the fishing ground area, the unit automatically collects data whenever the ship enters the area. Further the unit continues to collect data regardless of the display mode in use.

Data updating

Data is updated when the ship makes a subsequent pass through a division.

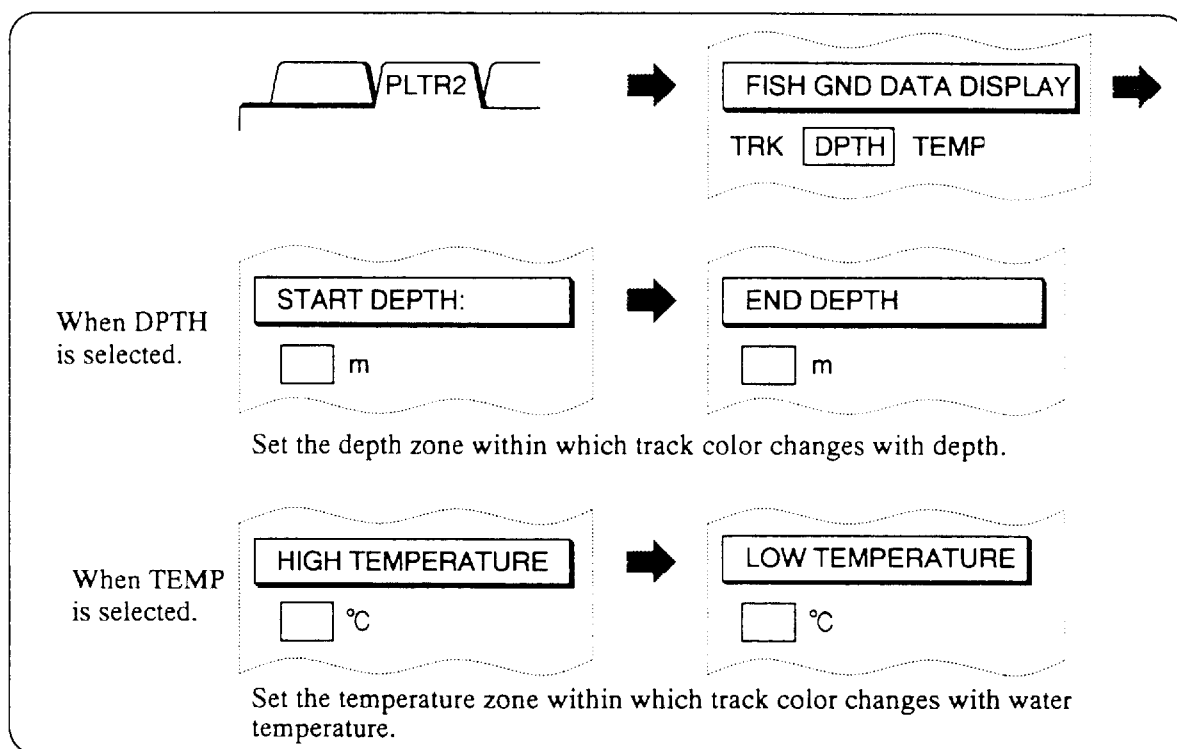
How display changes

The display changes automatically depending on whether the ship is within or outside the designated fishing ground area. If it is

outside the area, the unit shows normal plotter display and if it is within the area, the designated fishing ground area on full plotter screen.

Changing Track Color with Depth or Water Temperature

The track color may be set to change by depth or water temperature variation. You can select which condition to use on the PLTR2 menu.



The "TRK" does not change the track color. The track is always plotted in white.

■ NOTE:

You can select TEMP only when the FCV-1000 receives water temperature data from a nav sensor is connected to the temperature/speed sensor (option).

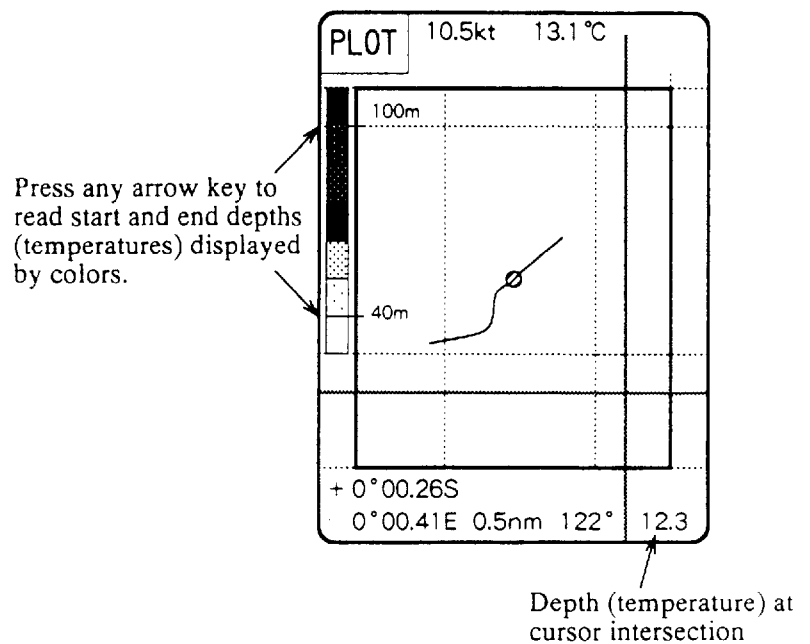
How color changes

The unit divides the region between the upper and lower limit temperatures or depths into 6 equal parts and displays each part in a specific color. It also displays above and below the region in different colors.

Identifying upper/lower limit temperature (depth)

On the fishing ground data display, the colors of the ship's track show water temperature or depth as described above. If you wish to identify upper/lower limit temperatures (depths) while observing the fishing ground data display, press one of the four ARROW keys.

The upper and lower limit temperatures (depths) are shown beside the color bar displayed at the left edge of the screen.

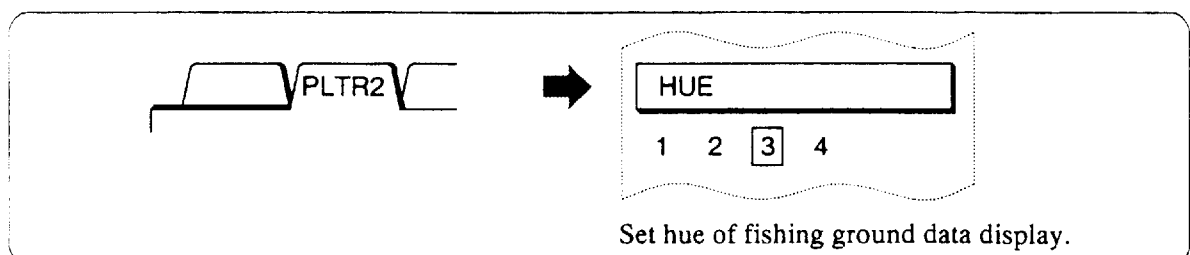


Reading Depth (Temperature) for Specific Location

To read the depth (water temperature) data for specific location within the designated fishing ground, move the intersecting point of the cursors to the location for which the depth (water temperature) is read out. The depth (water temperature) is digitally displayed at right bottom of the screen. See the illustration shown above.

Selecting Track Color Pattern

When the track color is set to change by depth or water temperature variation, its color pattern can be selected on the PLTR2 menu.



7. ALARM OPERATION

General

Types of alarm

The following three alarms are available and you may use one of them at a time.

- Bottom alarm
- Fish alarm
- Water temperature alarm

The alarm works while the unit is operating in any of the echo sounder, plotter and custom mode displays.

Alarm enabled indication

When you activate an alarm, the alarm mark "▶" appears at the top right-hand side of the screen.

Silencing aural alarm

Press any key. This silences the alarm for the existing alarm condition; the alarm will be released when the alarm condition is breached the next time.

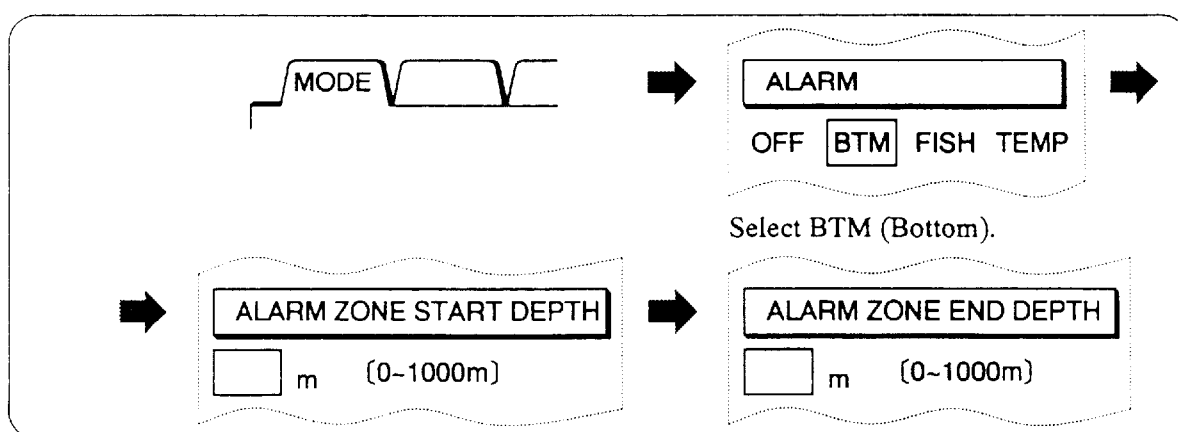
Bottom Alarm

Overview

The bottom alarm alerts you when the seabed enters into the alarm zone.

Setting the alarm

You may set the bottom alarm on the MODE menu.



How to use bottom alarm

You may use the bottom alarm as an anchor watch alarm or an under-keel clearance alarm.

Anchor watch alarm

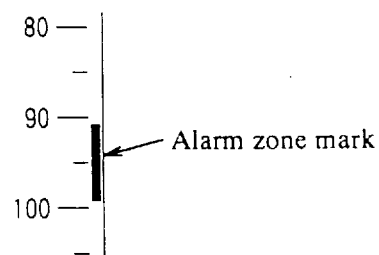
The anchor watch alarm warns you when the anchored boat is drifting when it should be at rest. Set the upper limit depth to the length of anchor chain of your boat.

Under-keel clearance alarm

The under-keel clearance alarm is useful for preventing running aground in waters where the bottom is known to dramatically and suddenly rise. Set the upper limit depth to zero and the lower limit depth to a desired under-keel clearance.

Alarm zone indication

The alarm zone is shown by a white bar at the right edge of the fish finder display.

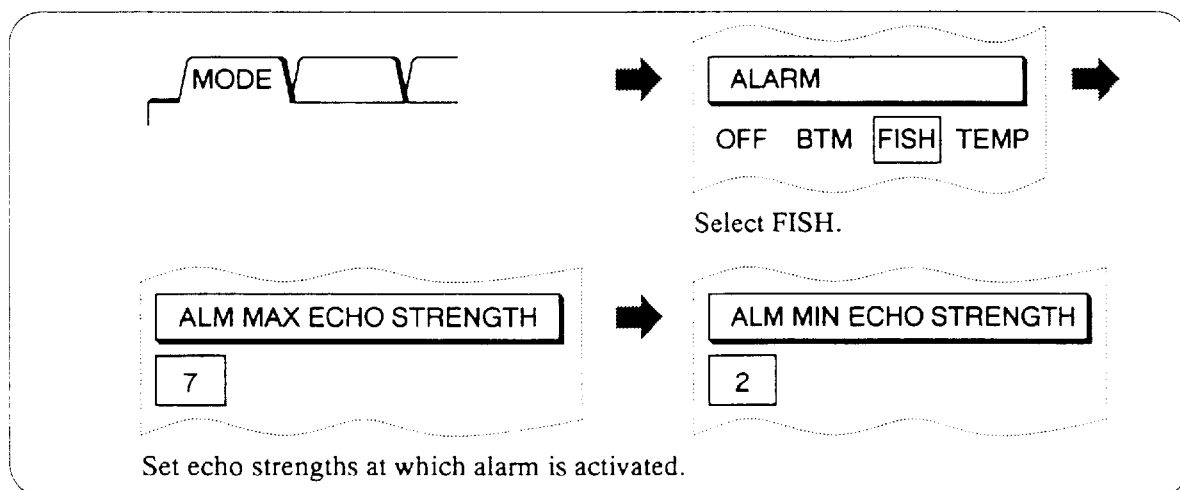


Fish Alarm

Overview

Occasionally you will be preoccupied with other work and unable to concentrate on watching echo sounder display. When that is the case, you can use the fish alarm to alert you to the presence of fish.

Setting the alarm You may set the fish alarm on the MODE menu.



What number means?

The numbers 0 through 15 indicate the eight colors on the color bar shown at the left edge of the screen; 0/1 for background color and 15/16 for reddish brown.

Water Temperature Alarm

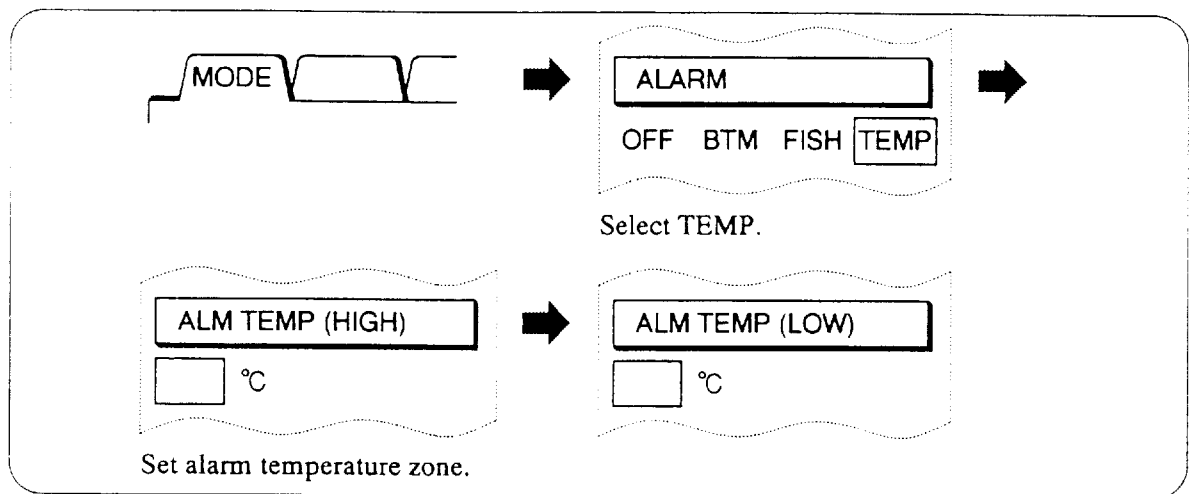
Overview

All fish species have their respective habitable water temperature ranges. By using the water temperature alarm, the buzzer can alert when the water temperature suits the fish you are aiming for.

■ Note

You can use this function only when the unit is connected to temperature speed sensor (option) or when it has temperature data input from a nav equipment.

Setting the alarm You may set the water temperature alarm on the MODE menu.



8. OPERATION WITH MEMORY CARD

General

The memory cards function to store data for later replay.

What memory cards can store

The memory card can store the following data.

- 1) Echo sounder displays (five full screens)
- 2) Fishing ground data (one area)
- 3) Custom mode (five modes)
- 4) Ship's track (1,000 points)

When data is saved/recalled

Fishing ground data and ship's track are automatically saved to and recalled from the memory card.

Echo sounder display is saved to and recalled from the memory card by the operation "5.5 Saving/recalling Echo Sounder Display" described on page 5-10.

■ NOTE


Five full screens of echo sounder display can be saved at maximum. If, for example, each saving saves one screen, fives screens can be saved and if it saves two screens, four screens can be saved.

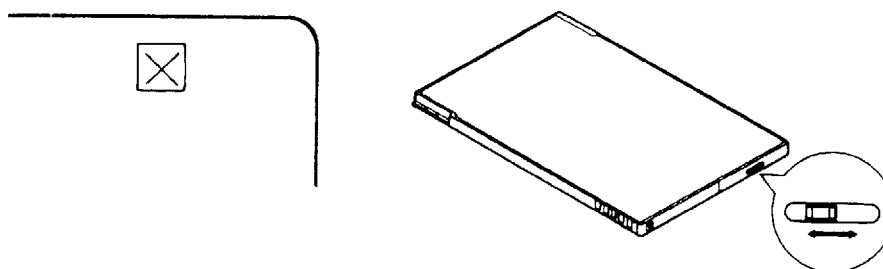
Custom settings are saved by the procedure described in later part of this chapter.

Handling Precaution

- Do not bend or drop cards.
- Keep cards dry.
- Keep connector edge free from dust and dirt.
- Keep cards out of direct sunlight and high temperature.

Write-protection tab

The memory cards have a write-protection tab which prevents writing of data to them. Set it rightward if you want to prevent writing. When the card is write-protected, the icon "  " appears on the top right hand side of the screen.

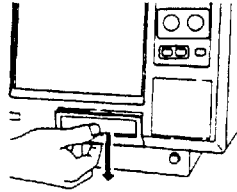


Right position: write-protected

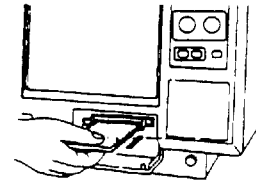
Inserting/Removing Memory Cards

Inserting

The door at the bottom of the display hides two card drives. Open the door and insert the memory card label side up in the drive selected on the MEM menu.



① Open door.



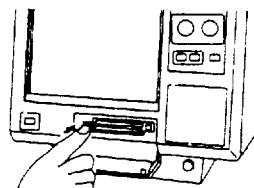
② Insert memory card label side up.

NOTE : New memory card needs formatting.

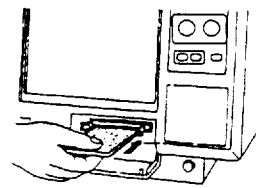


Removing

1. Press an eject button; left side button when the card is in the lower drive and right side button when it is in the upper drive.
2. Pull the card toward you.



① Press black button.



② Pull card toward you.

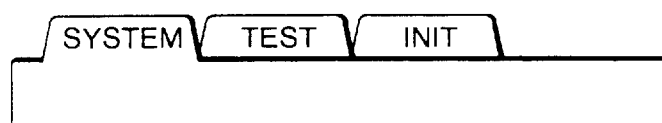
Formatting Memory Cards

Overview

Before you save information to a memory card you must format it. Formatting is a routine procedure you must perform on new cards before you can use them with this unit. You have to format them only once. You can format cards you have used before, however, in which case all information on them is erased.

Procedure

1. Insert the memory card in the card drive.
2. While pressing and holding any key, turn on the unit.
3. Release hold when SYSTEM/TEST/INIT menus appear.



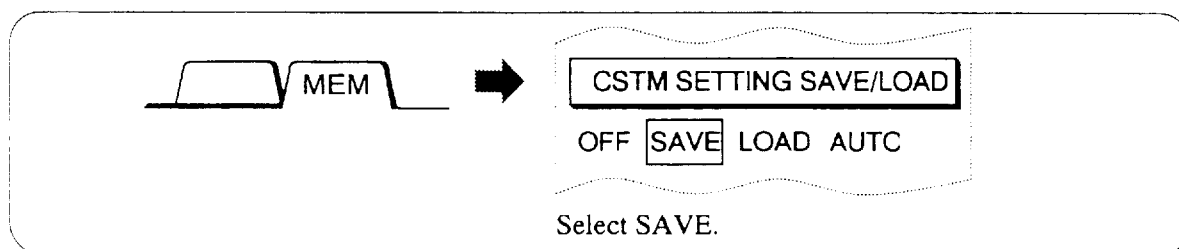
4. Select INIT menu with the SELECT key.
5. Select FORMAT MEMORY CARD.
6. Press the ENT key to start formatting.
7. After the formatting is completed, turn the unit off and then on to return to normal operation.

Saving/Recalling Custom Mode Settings

Overview

The custom mode settings stored in the unit's internal memory can be saved to memory cards and recalled them later. This lets you set up multiple FCV-1000's to the same settings and provides a backup copy of settings if they are lost or erased.

Saving/Recalling Use the MEM menu to save and recall.




What is AUTO

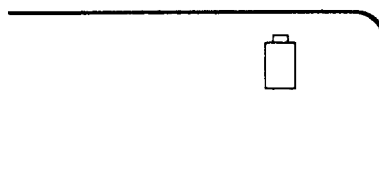
The AUTO automatically saves the custom mode settings to the memory card when they are registered or when the registered settings are changed.

■ NOTE

Be aware that custom mode settings in the internal memory are deleted when those of a memory card are loaded.

Replacement of Battery

The memory card uses a battery to store information. The life of the battery is about three years. When the voltage of the battery is low, the icon "  " appears on the display. The battery should be replaced at your earliest convenience, so that important information will not be lost.



Battery type and code number

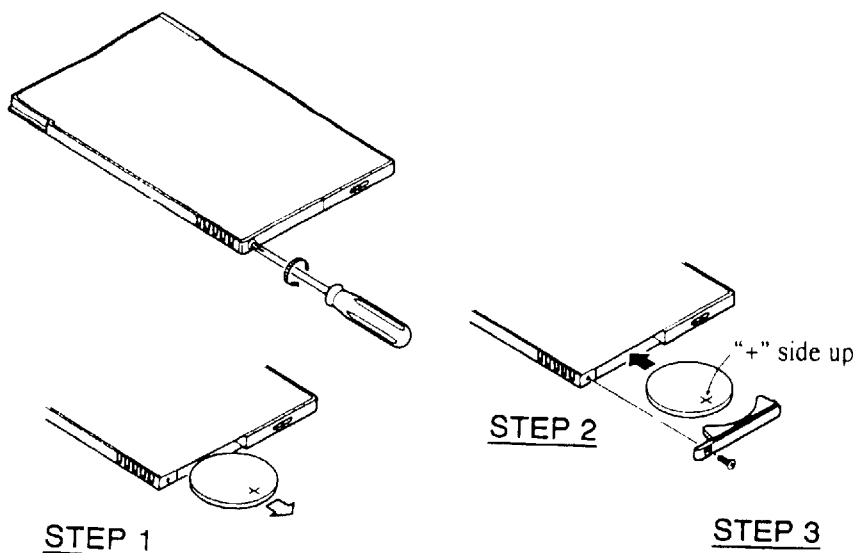
Type	Code No.
Lithium Battery BR-2325	000-126-680

Procedure

1. Open the battery lid with a small Phillips head screwdriver. Remove battery.
2. Insert new battery plus terminal facing upward and outward.
3. Close battery lid.

■ NOTE

Insert new battery within 10 minutes after removing expired battery. Otherwise, the information stored on the card will be lost.



9. CORRECTION

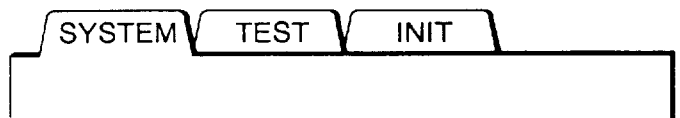
Correcting Ship's Speed /Water Temperature Readout

Overview

You may correct ship's speed readout error up to $\pm 50\%$ in 1% steps and water temperature readout up to $\pm 20^\circ$ in 1° steps on the system menu.

Procedure

1. While pressing and holding down any key, turn the unit on.
The following display appears.



2. Press the ENT key to display the SYSTEM menu
3. Press the SELECT key to choose the CORRection menu.
4. Select "SPEED CORRECTION" or "TEMP CORRECTION" item and set correction by left and right ARROW keys.
5. Press the MENU key to escape.

■ NOTE

You can correct the ship's speed and water temperature measured with the speed/temperature sensor (option) but not that fed by position fixing equipment.

10. REGISTERING CUSTOM SETTING

Overview

The custom setting function is similar to the quick dialing function on a telephone. It stores the user-set control panel and menu settings and allow to recall them by only a few key strokes. Five sets of custom settings can be registered.

Registering

What you can registered

The following items on the control panel and echo sounder menus can be registered as customs settings.

Control panel

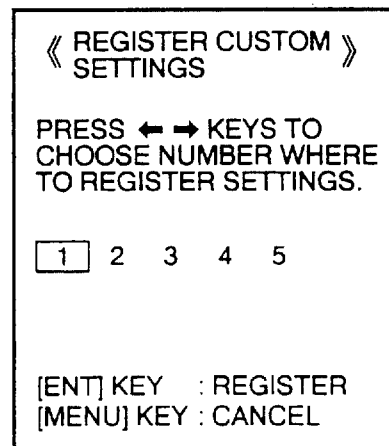
Display mode, Range, Shift

Echo sounder menu

All items (except MEM menu)

Procedure

1. Set display mode, range and shift.
2. Open the echo sounder menu and set all items (except MEM menu).
3. Set the CUSTOM SETTING REGISTER item to ON on the MEM menu. The display should now look something like the figure below.



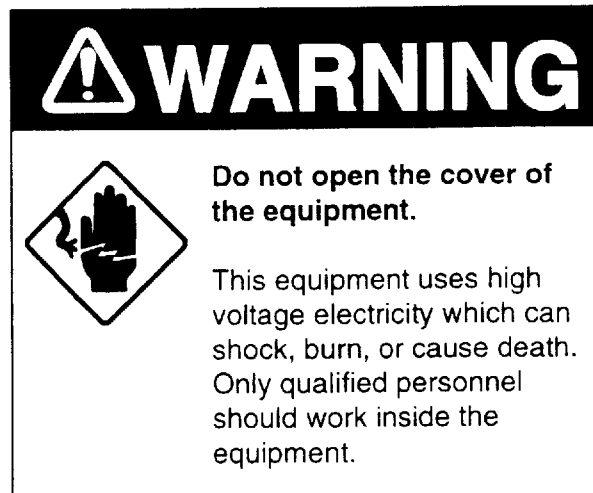
4. Press the left and right ARROW keys to choose a number under which to register the settings.
5. Press the ENT key to register settings. To cancel registration, press the MENU key instead of the ENT key.

11. MAINTENANCE

Periodic Check

The equipment will maintain optimum performance for a long period. However, continued performance cannot be expected without periodic inspection and maintenance. Important points to check from time to time are tabulated below.

Check Item	Action
Cable run	If conductors are exposed, replace cable.
Power cable plug/transducer cable plug	If loosened, secure firmly.
Display unit ground	If corroded, clean.
Ship's mains voltage (11 to 40VDC)	If out of ratings, correct problem.



Cleaning

Keep the equipment clean and dry at all times. Dust or loose dirt should be wiped off with a soft, dry cloth. To remove heavy dirt, use mild detergent and water on a cotton tipped swab or soft cloth.

■ CAUTION

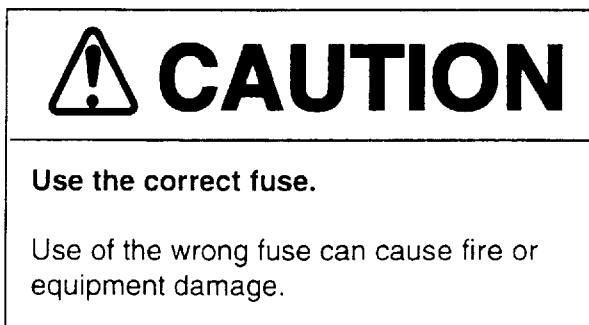
The only recommended cleaning agent is mild detergent. The use of chemical solvents may remove paint coating/markings on the front panel.

Maintenance of the Transducer

Marine life on the transducer face will result in a gradual decrease in the sensitivity. Check the transducer face for cleanliness each time the boat is dry-docked. Carefully remove any marine life with a piece of wood or sandpaper.

Fuse Replacement

A fuse on the rear panel of the display unit protects the equipment against overvoltage/reverse polarity of the ship's mains or internal fault of the equipment. If the fuse blows, first find the cause of the problem before replacing it. A fuse rated for more than 10A should not be used, since it may cause serious damage to the equipment.



12. IF SOMETHING SHOULD GO WRONG WITH YOUR UNIT

If the unit is not operating properly, perform the following operation check to determine whether it is really defective. If there is a problem, proceed to the system diagnosis section to identify the cause of the problem. If you can not restore normal operation, do not attempt to check inside the unit. Any repair work is best left to a qualified technician.

12.1 OPERATION CHECK

No Echo Presentation, But Scale appears

- Is the combined echo sounder properly operating (when the FCV-1000 is used as a monitor)?
- Is the transducer connector tightened?

No Zero Line/Zero Line not in Position

- Is the range shift reading "0"? If the range is shifted several meters or more, the zero line does not appear.
- Is the ship's draft set on the SYSTEM menu?
If the ship's draft has been set, the zero line appears at the draft depth.

Low Sensitivity

- Are the GAIN controls properly set?
- Is the POWER REDUCTION set to "D" on the SYSTEM menu?

Zigzagged Seabed Trace/Occasional Loss of Echo

- Is the sea rough?
Zigzagged seabed trace is plotted when the boat pitches and rolls.
- When the boat passes through aerated water, propagation of sound wave is blocked, causing loss of echo plotting. This often occurs when crossing a wake.

No Depth Readout/Bottom-Lock Inoperative

- Is the seabed echo present within the normal picture range?
- Is the seabed echo strong enough; namely, red or reddish brown?

Automatic Function Inoperative

- Is the seabed return strong enough; reddish brown or red?

Picture is Distorted

- Are equipment which generate a magnetic field nearby (heavy duty transformer rectifier, etc.)?

Color Impurity in a Particular Area

- Are equipment which generate a magnetic field near the screen?

Occasional Disturbance and Random Noise

- Are the connection cables laid near pulse generating equipment or their cables? If so, separate them.

Heavy Noise and Interference

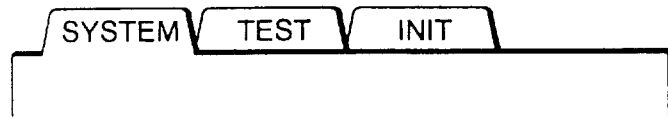
- Is the GAIN and CLUTTER (menu) set properly?
- Is the NL (Noise Limiter) on the menu set properly?
- Is the equipment properly grounded (with a copper strap)?

12.2 SYSTEM DIAGNOSIS (SELF-CHECK)

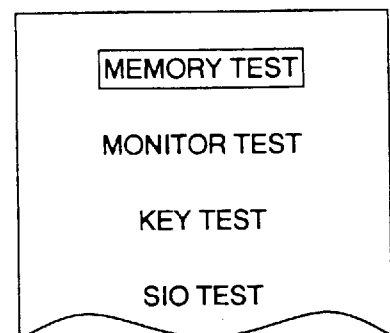
Your unit provides several self-check facilities which check it for proper operation.

Procedure

1. While pressing and holding down any key, turn the unit on.
2. Release hold when the following display appears.

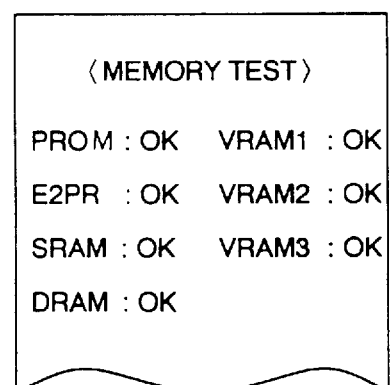


3. Select the TEST menu with the SELECT key.
4. Use up down ARROW keys to select a test item.
5. Press the ENT key to execute the test.
6. Repeat steps 1 to 5 to execute another test.



Memory Test

ROMs and RAMs are checked for normal operation. If the device checked is normal, "OK" appears and if it is abnormal, "NG" appears.

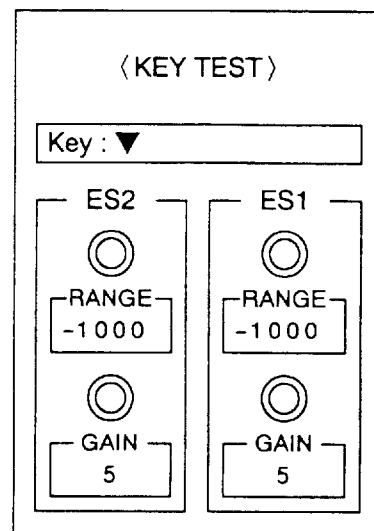


Monitor Test

This checks the color monitor display. 16 color pattern and white horizontal/vertical grid lines are displayed. Use the grid lines for checking the linearity of the display and the color pattern for checking colors.

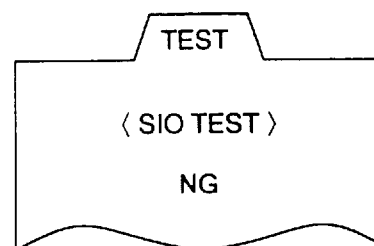
Keyboard Test

Operate each key and control one by one. The key name or key symbol appears if the key is normally functioning. As for RANGE and GAIN controls, numbers changes as they are turned; RANGE: -1000 to +999, GAIN: 0 to 255.



SIO Test

This checks the input/output circuit. Connect the test plug to the "NMEA/CIF" connector on the rear panel, otherwise the test result will be "NG". Run jumper wires between pins #1 and #3 and pins #2 and #4 on the test plug.



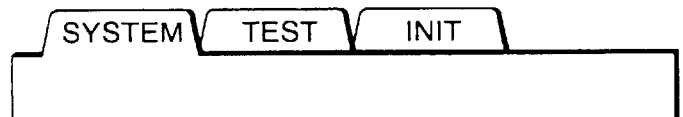
13. SYSTEM MENU

Overview

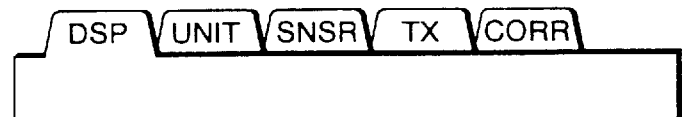
The SYSTEM menu allows custom tailoring of the unit to specific uses, such as fishing method, user's preference, navigation equipment connected, etc. It consists of five menu cards.

Operation Procedure

1. While pressing and holding any key, turn the unit on.
2. Release hold when the following display appears.



3. Press the ENT key to display the SYSTEM menu.



4. Use the SELECT keys to select a menu card.
5. Use the left and right ARROW keys to select an item on the menu card.
6. Use the up and down ARROW keys to set option.
7. Press the MENU key to return to normal operation.

System Menu Description

Asterisk-marked options are factory settings.

DSP menu

ITEM	OPTION	FUNCTION
DEPTH SCALE	OFF LEFT CNTR RGHT*	Select whether to display depth scale of echo sounder on left, center or right of the screen.
SPLIT SCREEN	VERT* HOR	Select whether to split the screen into vertical halves or horizontal halves for dual frequency and zoom combination displays.
DISPLAY ADVANCE DIR	LEFT* L/R RGHT	Select direction to which echo sounder display advances. In L/R, the display on the right half of the screen advances to the left and that on the left half to the right.
SAVE ES DATA	PIC* ECHO	Select PIC to save echo sounder display on the screen to internal memory or memory card. To select ECHO, optionally available ROM card (program card) is required.
ZOOM RANGE MARKER	OFF ON*	Turn on or off the zoom range marker drawn on the normal echo sounder display.

UNIT menu

ITEM	OPTION	FUNCTION
DEPTH	m* FT FA P/B	Select unit of depth readout. m: Meter FT: Foot FA: Fathom P/B: Passi/Braza
SPEED	kt* sm/h km/h	Select unit of speed readout. kt: Knot sm/h: Statute mile per hour km/h: Kilo-meter per hour
RANGE	nm* m	Select unit of distance readout. nm: Nautical mile m: Meter
TEMPERATURE	°C* °F	Select unit of temperature readout.

SNSR menu

ITEM	OPTION	FUNCTION
SIO DATA FORMAT	NMEA* CIF	Select format of data fed from position fixing equipment. CIF is the standard data format of FURUNO equipment.
NAV SENSOR	GPS* LC DR ALL	Set source of nav data fed to the FCV-1000 in NMEA or CIF format. GRS: GPS navigator LC: Loran-C navigator DR: Sat-nav ALL: Any nav-sensor (any talker accepted in NMEA format)
SPEED DATA SOURCE	OFF* SNSR SIO LOG	Select source of speed data. OFF: No data SNSR: Speed sensor (option) SIO: Position fixing equipment LOG: Speed log
TEMP DATA SOURCE	OFF* SNSR SIO FNZ	Select source of water temperature data. OFF: No data SNSR: Temperature sensor (option) SIO: Position fixing equipment FNZ: FURUNO FNZ-18 Net Sonde
NET SONDE DATA	OFF* PLSE CIF0 CIF9 CIFA CIFF	Select type of Net Sonde data. OFF: No data PLSE: Pulse signal, i.e., when fed to J4 CIF: Digital signal in CIF data format Numbers 0 to 9 and alphakets A to F are Sonde Nos. which are set on the display unit of the Net Sonde FNZ-18. Refer to the installation manual of the FCV-1000 for further details.

TX menu

ITEM	OPTION	FUNCTION
SPEED LOG PULSE	200PPM* 300PPM 400PPM	Select rate of log pulse when the FCV-1000 is connected to a speed log.
OUTPUT POWER	A B C D*	Select transmission output power. D: Full power A: Minimum power Normal setting is "D".

ITEM	OPTION	FUNCTION
TX PULSE REP RATE	HIGH* LOW	Select transmission repetition rate. Normal setting is "HIGH".
TX PULSE LENGTH	SHRT LONG*	Select transmission pulse length. Normal setting is "LONG". In addition to this setting, the pulse length changes with range in use.
TX SYNCHRONIZATION	OFF 1 2 1/2	Select whether to synchronize transmission with other equipment. If two or more echo sounders/sonars are operated simultaneously, mutual interference may result due to asynchronous transmission. This item is used to turn on/off synchronization. Refer to the installation manual for connection to other equipment and for details of settings of this item.

CORR menu

ITEM	OPTION	FUNCTION
SPEED CORRECTION	0%* (-50 to +50)	Compensate speed sensor error here. Note that speed data fed by the position fixing equipment can not be corrected.
TEMP CORRECTION	0°* (-20 to +20°)	Compensate speed sensor error here. Note that temperature data fed by the position fixing equipment cannot be corrected.
DRAFT SETTING	0*m	If you want to display depth from sea surface instead of transducer face, set ship's draft here.

14. SPECIFICATIONS

1. Display

- | | |
|--------------------------------|--|
| 1) Screen Size | 10" diagonal CRT |
| 2) Echo Color | Seven colors according to echo intensity. Nine sets of back ground and echo colors are available. Monochrome presentation is also available. |
| 3) Echo Sounder Display | <ul style="list-style-type: none">1) Single frequency2) Dual frequency3) Zoom/normal combination4) Zoom5) A-scope/normal combination <p>Zoom: Manual zoom, bottom zoom, bottom-lock zoom and bottom discrimination available</p> |
| 4) Plotter Display | <ul style="list-style-type: none">1) Plotter only2) Plotter/echo sounder combination3) Fishing ground data (displays water temperature or depth in colors for one nautical mile square size fishing ground) |

2. Echo Sounder

- | | |
|---------------------------------|---|
| 1) Frequency | 28/50/88/200 kHz (two frequencies selected) |
| 2) Output Power | 1 kW (can be changed to 2 or 3 kW) |
| 3) TX Pulselength | 0.1 to 3.6 ms (interlocked with range scale) |
| 4) TX Repetition Rate | 5 to 600 ppm (interlocked with range scale) |
| 5) Basic Range | 5 to 4000 m (FT, FA, P/B) |
| 6) Range Shift | 0 to 4000 m (FT, FA, P/B) |
| 7) Zoom Range | 1 to 300 m for manual and bottom zooms
3 to 300 m for bottom-lock expansion zoom |
| 8) Auto Mode | Automatically changes range and sensitivity according to depth and echo intensity. |
| 9) Display Advance Speed | Selectable in 7 steps |

3. Plotter

- 1) **Display Area** 0.5, 1, 2, 5 or 10 nautical mile square
- 2) **Track Color** Fixed, or varied by water temperature or depth
- 3) **Track Saving Interval** Off, 10 sec, 1 min., 10 min. and 30 min., selectable

4. Other Functions

- 1) **Custom Settings** Five sets of custom settings can be saved to the internal memory for operation simplicity.
- 2) **Alarms** Bottom, fish and water temperature alarms
- 3) **Display Saving** Fives screens of echo sounder display

5. Input/Output Data

- 1) **NMEA #0183 Format (Ver. 1.5)**

Input	RMB, BWC, RMC, RMA, GLL, VTG, VHW, MTW
Output	SDDBT (depth), SDDBS (depth), YCYMTW* (water temperature), VWVHW* (ship's speed)

- 2) **CIF Format**

Input	L/L, Ship's Speed, Course, Waypoint ID, Range to Waypoint, Waypoint Bearing, Water Temperature, Cross-track Error
Output	Depth, Water Temperature*, Ship's Speed

* Requires speed/temperature sensor.

6. Environmental Condition & Power Supply

- 1) **Environmental Condition** Temperature: 0 - 50°C
Relative Humidity: Less than 85%
- 2) **Power Supply** 11V to 40Vdc, approx. 80W

APPENDIX 1. LIST OF MENUS

ECHO SOUNDER MENU		
M O D E	ZOOM	B/L, B/Z, M/Z
	AUTO RANGE/GAIN	OFF, AUT1, AUT2
	ALARM	OFF, BTM, FISH, TEMP
D I S P	SIGNAL LEVEL	OFF, 1 to 3
	HUE	1 to 9
	SHIFT/RANGE INTERLOCK	OFF, ON
	A-SCOPE	OFF, ON
	DISPLAY ADVANCE SPEED	1/8, 1/6, 1/4, 1/2, 1/1, 2/1
E S 1 / E S 2	CLUTTER REJECTION	0 to 10, AUTO
	NOISE LIMITER	OFF, 1 to 4
	PRESET GAIN	OFF, 1 to 10
	TVG	0 to 9
M E M	NO. OF SCREENS TO SAVE	1, 2, 3, 4, 5
	CSTM SETTING SAVE/LOAD	OFF, SAVE, LOAD, AUTO
	CUSTOM SETTING REGISTER	OFF, ON

PLOTTER MENU		
P L T R 1	PLOTTER SCALE RANGE	0.5, 1, 2, 5, 10
	PLOT INTERVAL	OFF, 10S, 1M, 10M, 30M
	POSITION DISPLAY	OFF, L/L, TD
P L T R 2	HUE	1, 2, 3, 4
	FISHING GROUND SETTING	OFF, ON
	FISH GND DATA DISPLAY	TRK, DPTH, TEMP
O P T I O N	INTERPOLATE F-GND DATA	NO, YES

SYSTEM MENU		
D I S P	DEPTH SCALE	OFF, LEFT, CNTR, RGT
	SPLIT SCREEN	VER, HOR
	DISPLAY ADVANCE DIR	LEFT, L/R, RGT
	SAVE ES DATA	PIC, ECHO
	ZOOM RANGE MARKER	OFF, ON
U N I T	DEPTH	m, FT, FA, P/B
	SPEED	kt, sm/h, km/h
	RANGE	nm, m
	TEMPERATURE	°C, °F
S N S R	SIO DATA FORMAT	NMEA, CIF
	NAV SENSOR	GPS, LC, DR, ALL
	SPEED DATA SOURCE	OFF, SNSR, SIO, LOG
	TEMP DATA SOURCE	OFF, SNSR, SIO, FNZ
	NET SONDE DATA	OFF, PLSE, CIF
T X	SPEED LOG PULSE	200/300/400
	OUTPUT POWER	A, B, C, D
	TX PULSE REP RATE	HIGH, LOW
	TX PULSE LENGTH	SHRT, LONG
	TX SYNCHRONIZATION	OFF, 1, 2, 1/2
C O R R	SPEED CORRECTION	- 50 to +50%
	TEMP CORRECTION	- 20.0 to +20.0 °
	DRAFT SETTING	- 50.0 to +50.0m

TEST MENU	
MEMORY TEST	
MONITOR TEST	
KEY TEST	
SIO TEST	

INITIALIZATION MENU	
FORMAT MEMORY CARD	
RESTORE DEFAULTS	