CE

KODEN

BASIC OPERATION MANUAL

COLOR ECHO SOUNDER

Broadband

CVS-FX2
CVS-FX2BB

This product is specifically designed to be installed on boats and other means of maritime transport. If your country forms part to the EU, please contact your dealer for advice before attempting to install elsewhere.

CVS-FX2/BB.BM.E 0093102002-01

Declaration of Conformity

(As referred to in Annex IV 2. of Directive 2004/108/EC)

Declares under his sole responsibility that the produced Echo Sounder manufactured by

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Identified by the type number CVS-FX2 to which this declaration refers conforms to the relevant essential requirements of Directive 2004/108/EC and is in conformity with the EMC requirements of EU harmonised standard

EN 60945: 2002 (Clauses 9,10 & 12)

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Dated : 19 Jul. 2012 **Document No. 72-2731U-X004**

N.B. As this product is for Maritime use compliance with Directive 72/23/EEC is not required.

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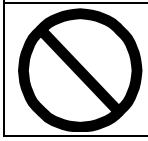
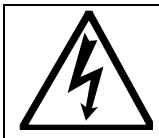
For Your Safe Operation

Symbol used in this Operation Manual

The following pictograms are used in this manual. The meaning of each symbols shall be well understood and the maintenance and inspection shall be carried out.

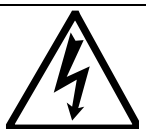
Symbol	Meaning
Warning	**Mark for warning** This mark denotes that there is a risk of death or serious injury when dealt with incorrectly.
	Mark for danger of high voltage This mark denotes that there is a risk of death or serious injury due to electric shock when dealt with incorrectly.
Caution	**Mark for caution** This mark denotes that there is a risk of slight injury or damages of devices when dealt with incorrectly.
	**Mark for prohibition** This mark denotes prohibition of specified conducts. Description of the prohibition is displayed near the mark.

Caution items on equipment

	**Be careful of high voltage inside** High voltage, which may risk your life, is used. This high voltage may remain in the circuit even after the power is switched off. To prevent contact with the high voltage circuits accidentally, a protective cover or the label with this mark is provided on the high voltage circuit. When the inside is to be checked, ensure to switch off the power and to discharge the residual voltage for safety. An engineer authorized by Koden shall carry out the inspection and maintenance works.
Warning	**Power off in the boat** An accidental power-on during works may result in worker's electrification. To prevent such accident in advance, ensure that power in the boat and on the equipment are switched off. Furthermore, it is safer to hang a caution tag saying "Under work" near the power switch of equipment.
Warning	**Be careful of dust** Inhaled dust may cause respiratory affection. At the time of cleaning the inside of equipment, be careful not to inhale dust. Wearing a safety mask is recommended.

Caution	**Caution on location of installment** The equipment shall not be installed at locations which are excessively damp and suffers from water drops. Otherwise, dew condensation may occur inside the display screen, and corrosion may occur inside the unit box.
Caution	**Measures against static electricity** Static electricity may be generated from the carpet on the floor in the cabin or clothes made of synthetic fiber, and it may destroy the electronic components on circuit boards. The circuit boards shall be handled with appropriate measures against static electricity.
Caution	**Caution at installation of transducer** Transducer shall be installed at locations where there is no effect by bubble and noise. Bubble and noise may seriously degrade the performance of this equipment.

Cautions on handling

Warning	No disassembly or modification of this equipment is allowed. It may lead to failure, firing, smoking or electric shock. In case of failure, please contact Koden's dealers or Koden.
Warning	In case of smoking or firing, switch off the power in the boat and of this equipment. It may lead to firing, electric shock or damages.
	**Be careful of residual high voltage** High voltage may remain in capacitors for several minutes after switching off the power. Before inspection of the inside, please wait at least 5 minutes after switching off or discharge the residual electricity in an appropriate manner. Then, start the work.
Caution	The information displayed on this equipment is not intended to use for your navigation. For your navigation, be sure to see the specified materials.
Caution	Please use the specified fuses. If un-specified fuses are used, they may cause firing, smoking or damages.
Caution	Be sure to submerge the transducer in water before transmission. If not, it may be damaged.

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Introduction

CVS-FX2 is the 15inch LCD color echo sounder that can display images in 4 optional frequencies.

CVS-FX2BB is the Black Box type without the display unit of CVS-FX2, for which customer can select the display monitor of preference. The external monitor and connecting cable are user supply.

This unit equipped with the latest digital process can accurately display circumstances in the water under all conditions.

The main features of this unit are as follows:

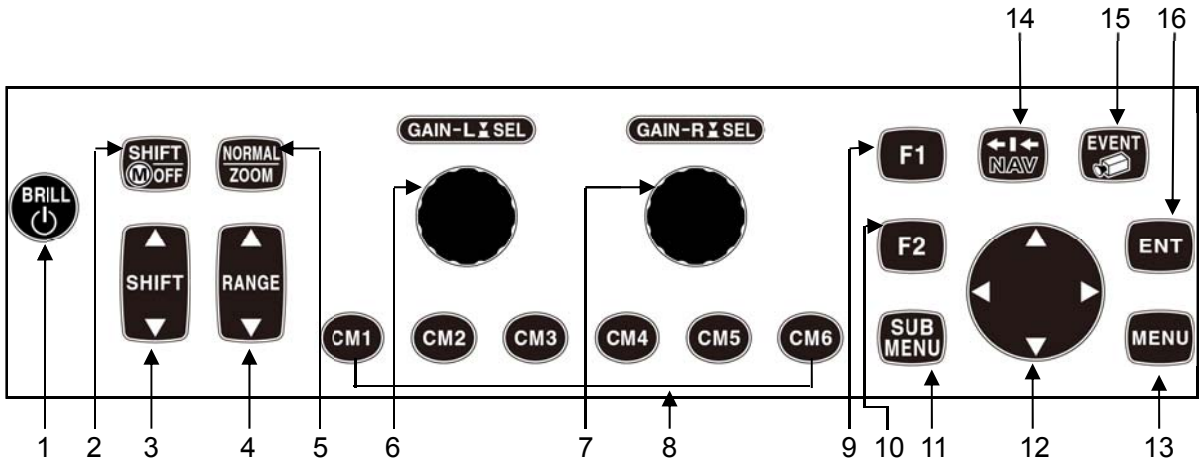
- This unit is a multi-frequency echo sounder with broadband transducers.
- With a simple operation on a menu, frequencies up to 4 can be optionally set within a wide range.
- With digital reception processing, the high resolution in shallow depth and the noise reduction capability in deep depth are both attainable. In addition, optimum images can be displayed by the auto mode function.
- The high-performance LCD maintains high visibility under any conditions. (Only CVS-FX2)
- With adoption of a special filter (AR coated), images can be seen clearly even under the direct sunlight. Well protected against reflection on the LCD screen and dew condensation. (Only CVS-FX2)
- This unit has high waterproof level and can be installed in an open bridge. (Only CVS-FX2)
- Sona-Tone™ (Sonar sound) function provides fish school status by sound..
- Up to 500 graphic images can be stored. Homing function is available by pushing event key while recalling the stored images, to provide navigation guidance to the designated position (optional GPS is required).
- Various alarm functions are available (Bottom, school of fish, water temperature*, vessel speed*, arrival*, XTE*, power source).

  (Note: The mark * denotes that the connection of optional sensors is required)
- The display and the operation units can be easility installed from the front side by flush mounting. (Flush mounting of monitor is only for CVS-FX2).
- RGB analog output to an external monitor is provided as standard. The use of external monitor enables to observe the echo sounder images from the place distant from the main unit (External monitor is owner supply).
- The data for image, waypoint, and setting can be backed up in the USB memory and the SD card, to be recalled later.
- As the operation unit is separated, operation away from the processor and the display units is possible.

Chapter 1 Preparation

1.1 To use keys

Key board of CVS-FX2/CVS-FX2BB



NO.	Key Name	Description
1	[BRILL ⏻]	Press: Power on. Adjusts brilliance of the screen and panel. Long-press: Power off.
2	[SHIFT/Ⓜ OFF]	Press: Switches ON/OFF of Shift Long-press: Changes of range mode (Auto range/Manual/Auto Shift)
3	[▲SHIFT▼]	Changes the shift position setting.
4	[▲RANGE▼]	Changes the range setting.
5	[NORMAL/ZOOM]	Press: Switches NORMAL/ZOOM assignment of [RANGE] [SHIFT] keys. Long-press: Short-cut to the range setting menu.
6	[GAIN-L/SEL] (Gain knob)	Rotate: Gain adjustment at low frequency side Press: Switches of operation screen at low frequency side
7	[GAIN-R/SEL] (Gain knob)	Rotate: Gain adjustment at high frequency side Press: Switches of operation screen at high frequency side
8	[CM1] • • • [CM6]	Press: Recalls CM (CM: Condition Memory. See P2-1) Switches screen modes Long-press: Starts copy of CM
9	[F1] (Function key 1)	Press: Recalls directly the item registered. Long-press: Selects and saves the item to register
10	[F2] (Function key 2)	Press: Recalls directly the item registered. Long-press: Selects and saves the item to register.
11	[SUB MENU]	Opens/Closes the Submenu. Return to the Menu of the previous operation
12	[CURSOR]▲ ▼ ◄ ►	Selects item of Menu/Submenu Changes the setting values for the Menu/Submenu. Moves the markers (VRM, event). Changes the Shift.
13	[MENU]	Press: Opens/Closes the Menu. Closes submenu and control boxes. Long-press: Activates function to move Menu/Submenu position on the screen.

14	[←|←/NAV]	Press: Changes the image scroll speed. Long-press: Displays the navigation screen.
15	[EVENT]	Press: Outputs the present position or the event cursor position in TLL sentences. Store image. Starts homing. Long-press: Displays the images of CCD camera.
16	[ENT]	Ends input of setting value digits for Menu/submenu. Temporary erasing of displayed items on screen.

There are two types of pressing of keys, which are Press and Long-press.

1. Press: Press the key with a finger and release immediately.
2. Long-press: Keep pressed until the screen display responds.

Normal operation is done with [Press].

When the relevant key is long-pressed, the control box of the function defined for the key is displayed. Release the finger from the key, once the control box is displayed.

[GAIN-L/SEL] knob

and [GAIN-R/SEL] knob

are the knobs for gain control.

Operation of the gain knobs are in two ways, [Rotate] and [Press].

1. Rotate: Turn the knob clockwise or anticlockwise
2. Press: Press the top of the knobs.

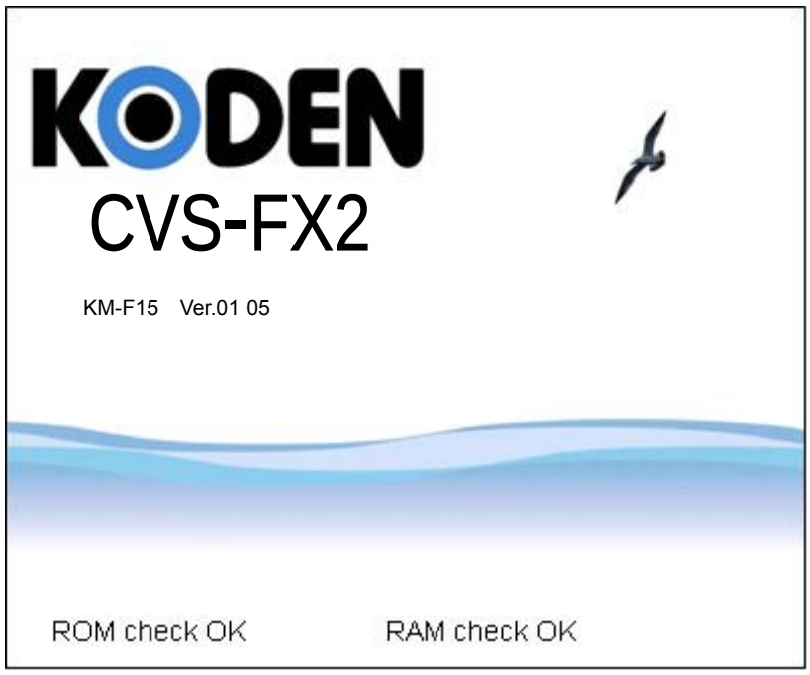
1.2 Power On/Off

1.2.1 Power On

Press the [BRILL⏻] key

to power on.

The start-up screen is displayed. On start-up, the internal memory (ROM and RAM) is automatically checked. If the checking completes normally, the message is displayed as below.



⚠ **Caution: If an error occurs during the memory check, LEDs on the operation panel blink to indicate possible failure of the unit. In this case, please contact a dealer of Koden or Koden.**

⚠ **Caution: Please wait until the fish finder screen is displayed after the power is turned on. It takes about 30 seconds.**

⚠ **Caution: You may not be able to operate keys when the onboard power supply is momentarily lost or interrupted. Please wait for recovery which takes approximately one minute.**
Please turn on the power again, in case you do not see recovery after one minute.
Please take the following steps to recover power supply:

1) Please turn off the power supply in accordance with 1.2.2 Power Off.

2) Please turn on the power supply in accordance with 1.2.1 Power On.

1.2.2 Power Off

Keep pressing the [BRILL⏻] key

for 3 seconds to power off. After countdown for power shut down, when the indication below is displayed, release the finger off from the key. After 15 seconds, power is switched off automatically.

Please wait for a while. Power shutdown process in progress.

1.2.3 Power Voltage Alarm

When nonstandard power voltage is detected, the icon starts blinking and generates alarm.

> ⚠ **Caution:** The power will be automatically switched off when the voltage is low (8.5 V or lower) or high (34 V or higher). The accuracy of power voltage indication is ± 0.5 V.

1.3 Selection of language to be displayed

When the power is switched on for the first time after installation, the following [Language] screen is displayed.

Select a language using [▲] key or [▼] key of .

To decide the language, press [MENU] key

.

> ⚠ **Caution:** There are the other languages than English and Japanese for selection..

1.4 To use Menu

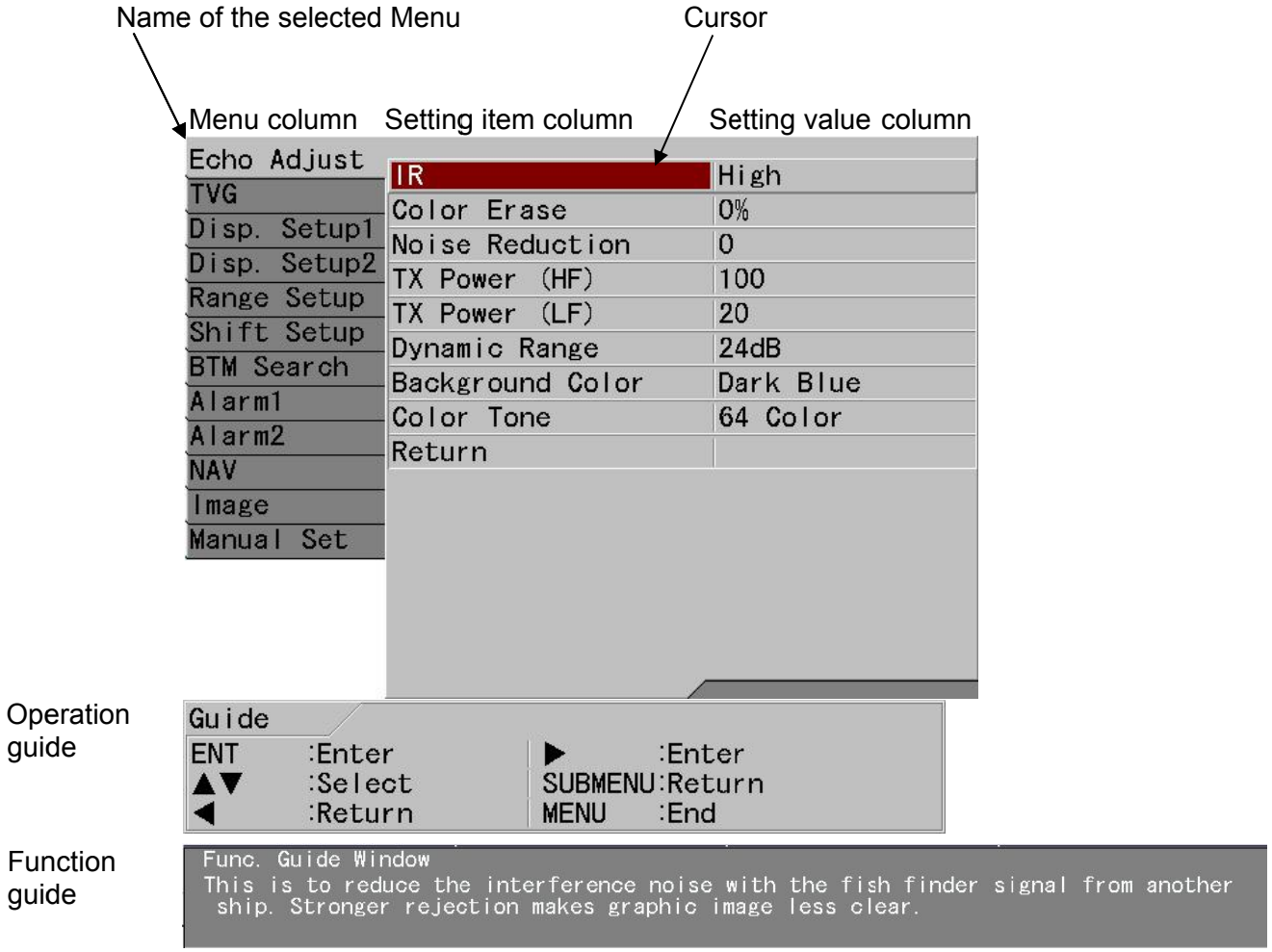
CVS-FX2 and CVS-FX2BB have two kinds of menu, [MENU] and [SUBMENU].
The operation of the both menus is basically the same.

1.4.1 Open/Close the Menu

To display the menu, press the [MENU] key

.

List of menu items, message boxes of operation guide and function guide are displayed as shown below:



The operation guide is displayed when [SUBMENU], [System] and [Guide Window] are all on. (See the Full Menu Reference “5.2.1 Display/No display of Guide Window”)
The function guide is displayed when [SUBMENU], [System] and [Func. Guide Window] are all on. (See the Full Menu Reference “5.2.2 Display/No display of Func. Guide Window”)

To close the menu, press [MENU] key

.

The [MENU], [Guide Window] and [Func. Guide Window] on the screen disappear.

1.4.2 Operation of the Menu

Press [▲] key or [▼] key of to select a menu item while Menu is displayed.

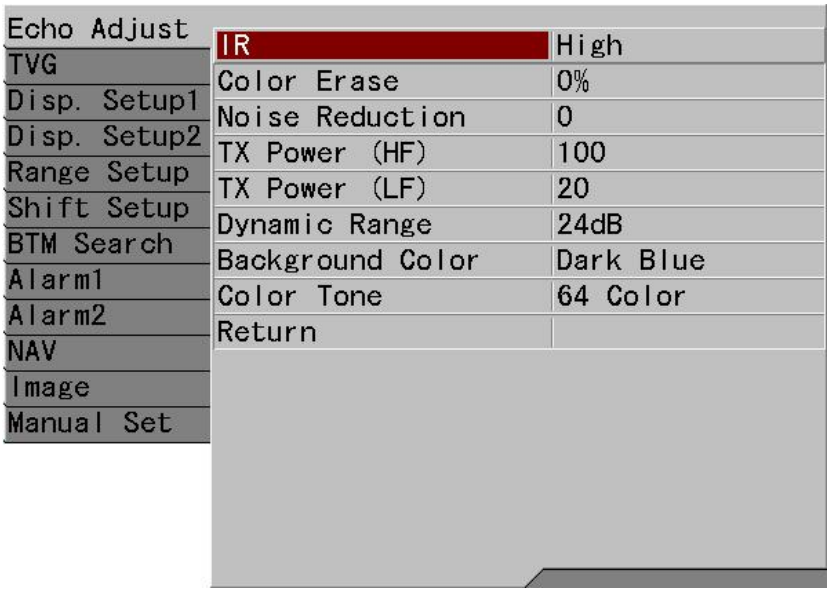
List of the setting items changes to the corresponding contents with the selected menu item.

Menu column Setting item column Setting value column

Press [▶] key of .

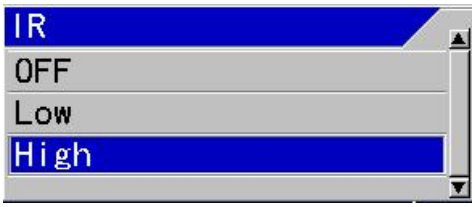
Then, a cursor appears in the Setting item column.

Menu column Setting item column Setting value column



Press [▲] key or [▼] key of to select the item to change.

Press [▶] key of , and the setting box appears with the corresponding selection items.



Press [▲] key or [▼] key of , to change the setting.

Press [◀] key of or [SUBMENU] key . Then, the cursor returns to the setting item column.

To return to the menu column, press [◀] key of or [SUBMENU] key .

Then, the cursor returns to the menu column.

Press [MENU] key to close the menu.

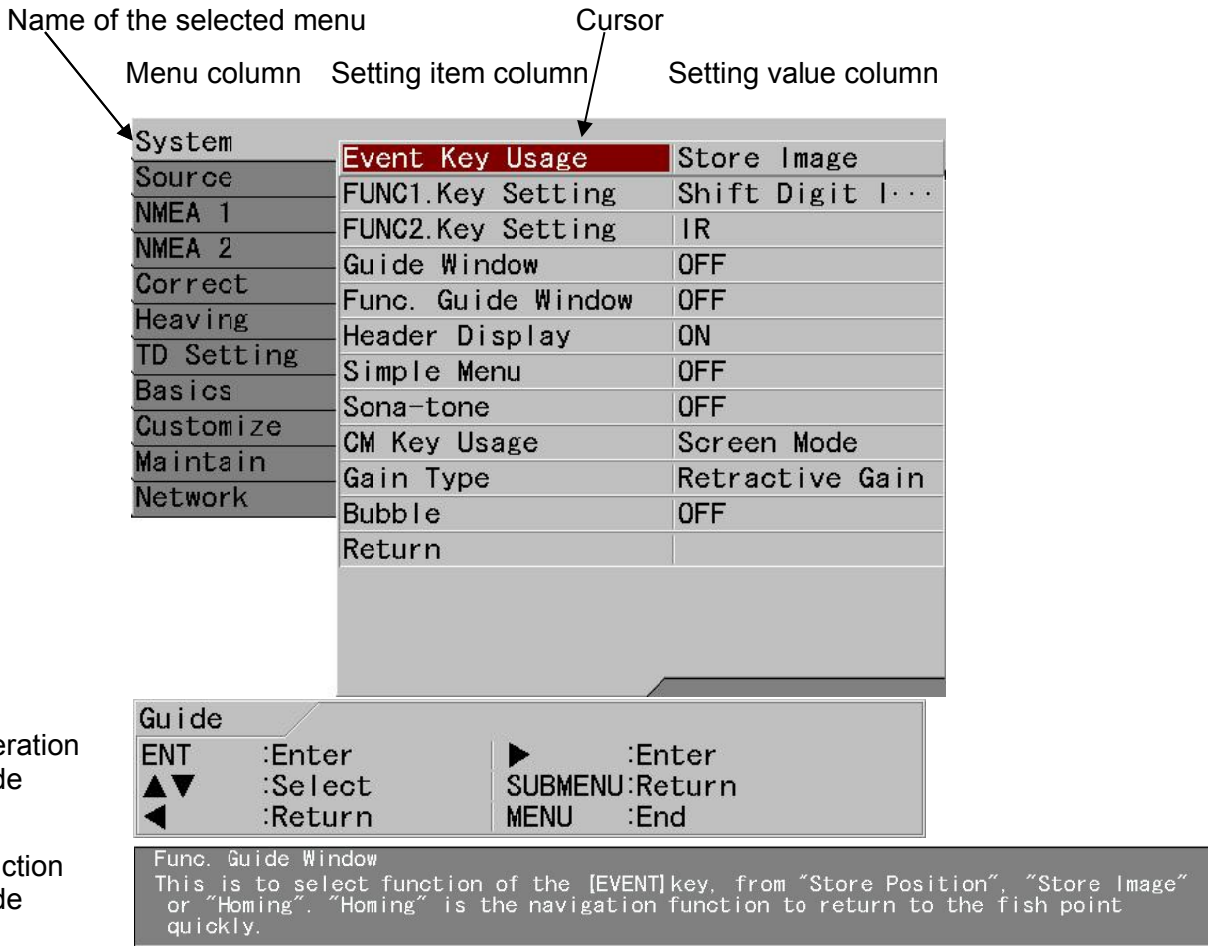
Caution: Menu disappears when [MENU] key is pressed during menu operation.

1.4.3 Open/Close of Submenu

To display the Submenu, press the [SUBMENU] key

.

List of Submenu items, operation guide box and function guide box are displayed as shown below:



The operation guide is displayed when [SUBMENU], [System] and [Guide Window] are all on. (See the Full Menu Reference “5.2.1 Display/No display of Guide Window”)
The function guide is displayed when [SUBMENU], [System] and [Func. Guide Window] are all on. (See the Full Menu Reference “5.2.2 Display/No display of Func. Guide Window”)

To close the Submenu, press [SUBMENU] key

or [MENU] key

.

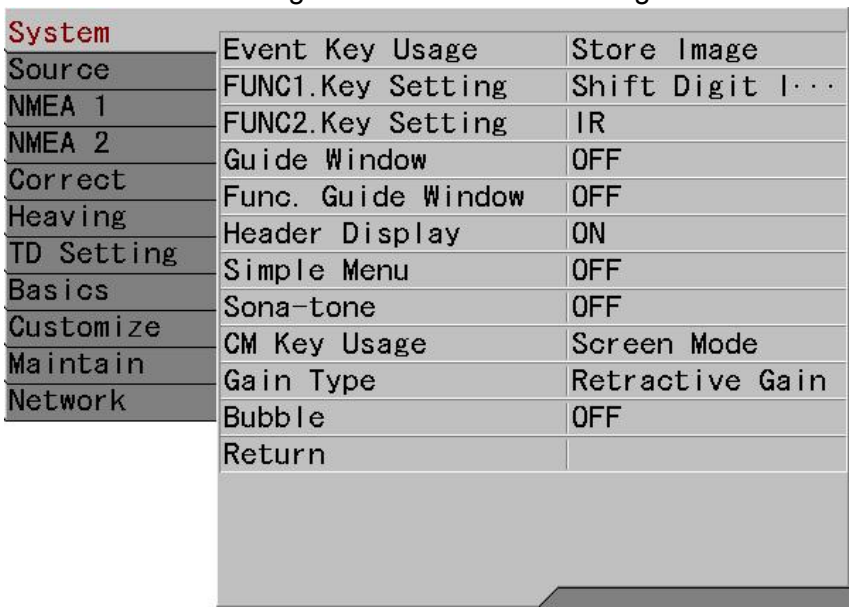
[SUBMENU], [Guide Window] and [Func. Guide Window] disappear.

1.4.4 Operation of SUBMENU

Press [▲] key or [▼] key of to select a menu item during SUBMENU is displayed.

List of the setting items changes to the corresponding contents with the selected Submenu item.

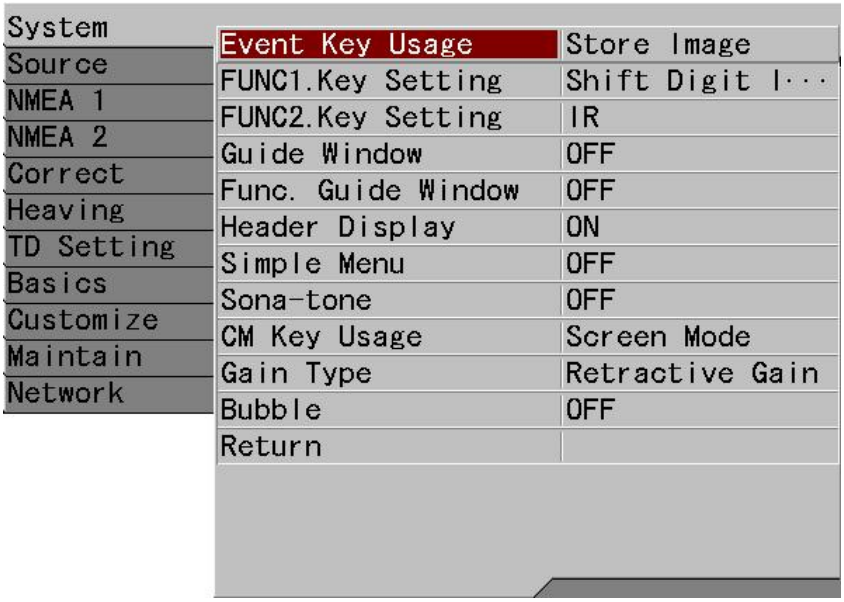
Menu column Setting item column Setting value column



Press [►] key of .

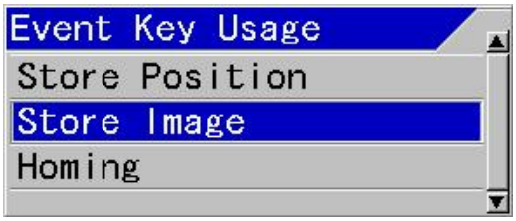
Cursor appears in the setting item column.

Menu column Setting item column Setting value column



Press [▲] key or [▼] key of to select the item to change.

Then, press [▶] key of , and the setting box appears with the corresponding selection items.



Press [▲] key or [▼] key of to change the setting.

To return the cursor to the set item column, press [◀] key of or [SUBMENU] key of SUB MENU. Then, the cursor returns to the set item column.

To return to the menu column, press [◀] key of or [SUBMENU] key of SUB MENU.

Then, the cursor returns to the menu column.

To close the menu, press [SUBMENU] key SUB MENU or [MENU] key MENU.

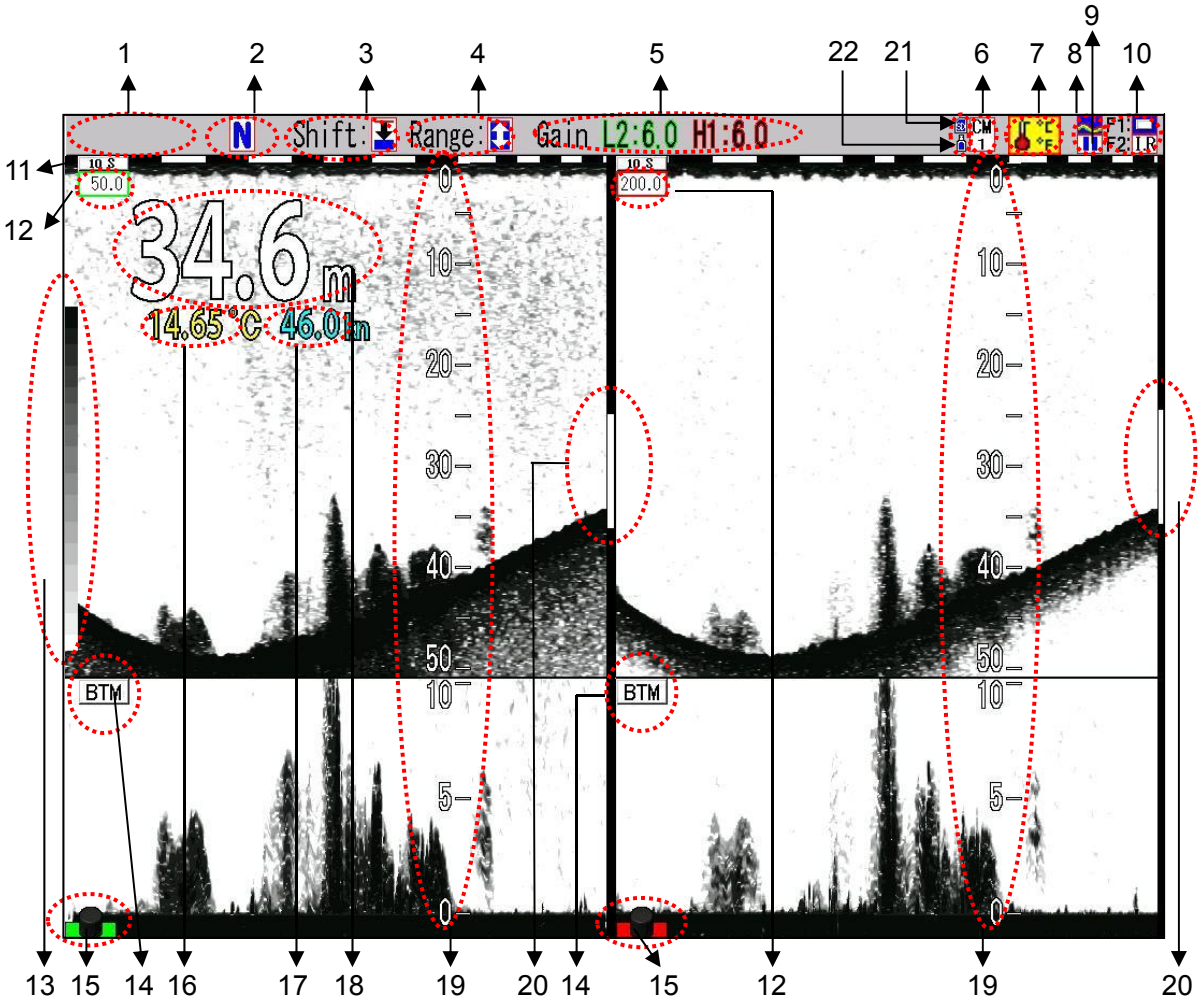
⚠ **Caution:** When [MENU] key MENU is pressed during operation of the Submenu, the display of the Submenu will disappear.

1.5 To read echo sounder's screen

A screen of echo sounder consists of the header display in a gray color stripe at upper portion and the image display part of the echo sounder.

The header display indicates setting status of various functions by icons for easier understanding.

The echo sounder image display part overlays the necessary information for fish school finding.

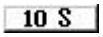


Header display

No.	Name	Description
1	Range Mode	[Auto Range] for Auto Range No display for Manual [Auto Shift] for Auto Shift
2	[SHIFT] and [RANGE] status icon	N Shift/Range on normal screen Shift on partial zoom/Range zoom screen
3	Shift mode icon	Shift: All screens same Shift: Scr. Individual SHIFT OFF Shift off
4	Range mode icon	All screens same Scr. Individual

5	Gain (TD)	L2: Gain value of low frequency 2 L1: Gain value of low frequency 1 H2: Gain value of high frequency 2 H1: Gain value of high frequency 1
6	CM icons	CM1 on display CM2 on display CM3 on display CM4 on display CM5 on display CM6 on display
7	Alarm setting status	: Bottom Alarm ON : Fish Alarm ON : Speed Alarm ON : Arrival Alarm ON : XTE Alarm ON : Water Temp Alarm ON No display: No Alarm activated
8	[EVENT] key status (indicates the settings)	: Position storage and TLL output : Image storage : Start Homing
9	Image scroll speed	: High speed : Stop : Normal (1/1) : Low speed
10	F1]/[F2] key status icon (indicates the settings)	: Shift Digit Input : IR (Interference rejection) : Color Erase : Noise Reduction : Background color : TVG Adjust : White Line : A Scope : Image Swap : Image Title : VRM Interval : Sona-tone : Nav Start : Image Recall

Display portion of echo sounder images

No.	Name	Description
11	Time marker	indicates the image scroll speed. White/Black and Green/Black switch at every 5 minutes.  : White/Black indicates 10 seconds. : Green/Black indicates 10 seconds. : White/Black indicates 1 minute. : Green/Black indicates 1 minute.
12	Image title	: High frequency 1 : High frequency 2 : Low frequency 1 : Low frequency 2 : Mix A : Mix B : Mix C : Mix D : Fish school size Numerical value: Frequency
13	Color Bar Scale	Scale for color representation of images by echo sounder
14	Zoom image title	: Sea bottom-fixed zoom : Sea bottom discrimination zoom : Zoom : Bottom follow zoom : Bottom follow zoom with high frequency 1 : Bottom follow zoom with high frequency 2 : Bottom follow zoom with low frequency 1 : Bottom follow zoom with low frequency 2
15	Gain knob icon	: Individual gain, individual range, individual shift and VRM operation are available. : Individual gain operation is available : Individual range, shift and VRM operation are available. None : Operation unavailable
16	Water temperature	Value of water temperature (˚C or ˚F)
17	Vessel speed	Vale of vessel speed (kn, km/h or mph)
18	Water depth	Depth of sea bottom (m, J.fm, fm, I.fm, ft)
19	Scale	Depth scale of normal images and zoom images
20	Zoom range bar Alarm range bar	Bar to indicate the display range of zoom images against normal images Bar to indicate the alarm range against normal images
21	SD card icon	: SD card connected None : SD card not connected
22	USB memory icon	: USB memory connected None : USB memory not connected

1.6 Adjustment of brilliance for comfortable viewing

1.6.1 Adjustment of LCD brilliance

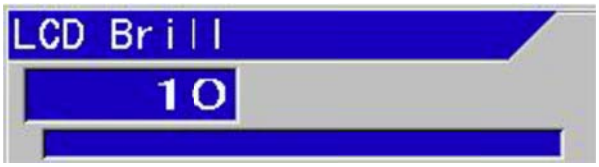
The brilliance of screen can be adjusted with [LCD Brill]. (Only CVS-FX2)

Each time [BRILL ⏻] key

is pressed, [LCD Brill] and [Panel Brill] are switched over.

When [BRILL ⏻] key

is pressed, the [LCD Brill] box is displayed



When [▲] key of is pressed, the screen turns brighter and when [▼] key is pressed, the screen turns darker.
1 is for the darkest and 10 is for the brightest.

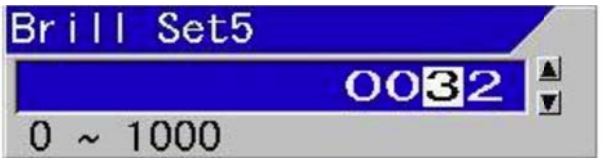
To close the menu, press [MENU] key

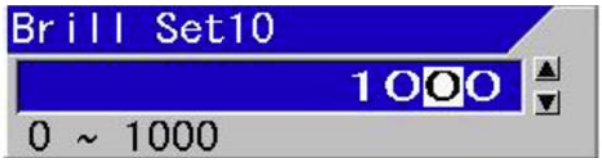
.

For finer adjustment at 1 to 10 individually, point the cursor to the desired number of [Brill Set] by [▲] or [▼] keys of while the [LCD Brill] box is on display.

Press [ENT] key

, and the box for [Brill Set] appears.





Point the cursor to the digit to be changed with [◄] or [►] keys of and:

Numeric value increases with [▲] key.
Numeric value decreases with [▼] key.

Press [ENT] key

, and the value is set and returns to the [LCD Brill] box.

To close the menu after setup of the value, press [MENU] key

.

⚠ **Caution: For CVS-FX2BB the screen brilliance cannot be adjusted by pressing the

key. Please adjust brilliance by the LCD monitor's operation. Please refer to the operation manual of the LCD monitor.**

1.6.2 Adjustment of panel brilliance

The brilliance of display panel can be adjusted at [Panel Brill]

For CVS-FX2

Each time [BRILL ⏻] key

is pressed, [LCD Brill] and [Panel Brill] are switched over.

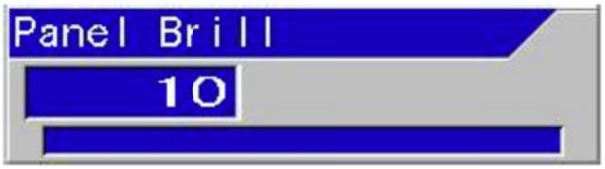
When [BRILL ⏻] key

is pressed, the [Panel Brill] box is displayed.

For CVS-FX2BB

When [BRILL ⏻] key

is pressed, the [Panel Brill] box is displayed.



When [▲] key of
is pressed, the panel brilliance turns brighter and when [▼] key is pressed, the panel brilliance will turn darker.

1 is for the darkest and 10 is for the brightest.

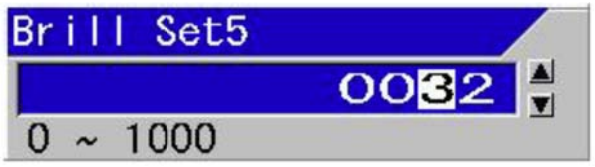
To close the menu, press [MENU] key

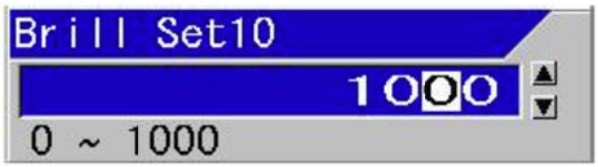
.

For finer adjustment at 1 to 10 individually, point the cursor to the desired number of [Brill Set] by [▲] or [▼] keys of
while the [Panel Brill] box is on display.

Press [ENT] key

, and the box for [Brill Set] appears.





Point the cursor to the digit to be changed with [◄] or [►] keys of
and:

The numeric value increases with [▲] key.
The numeric value decreases with [▼] key.

Press [ENT] key

, and the value is set and returns to the [Panel Brill] box.

To close the menu after setup of the value, press [MENU] key

.

Chapter 2 Basic operation

2.1 Switch screen images (Setting up of CM menu)

At setup of CM*[1] Menu, images on screen can be switched over.
If the setup of CM Menu is registered in [CM] keys, there is no need to operate CM Menu at every time of change of images. As for the details of [CM keys and the storing method into the [CM] keys, please see “Chapter 3 To make the best of [CM] keys”, p 3 - 1.

The main setup items in this chapter at this point are as follows:

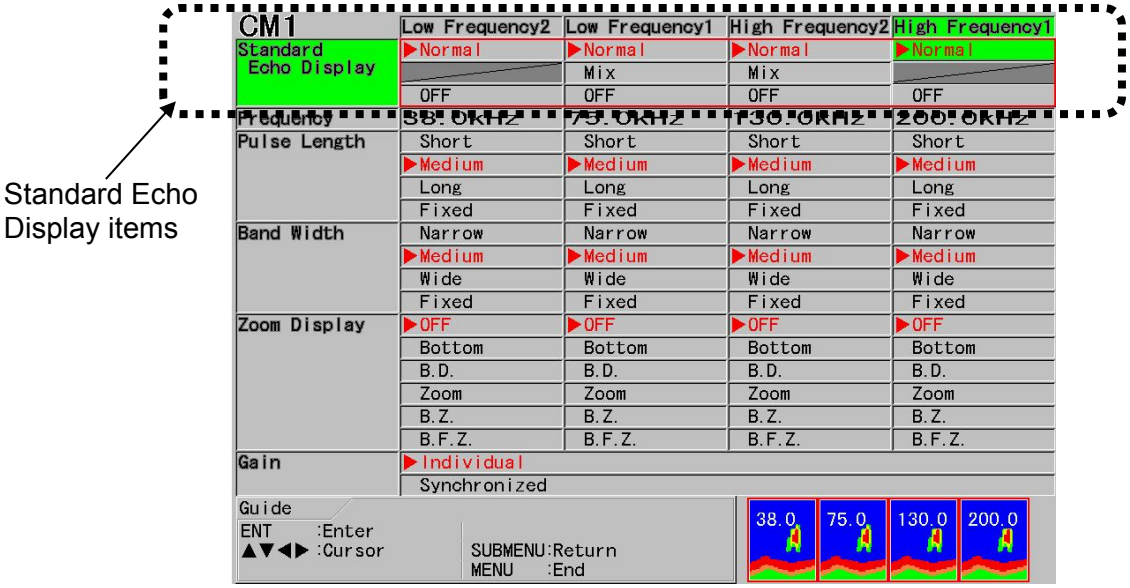
- Display of normal images
- Change of frequency
- Display of zoom images
- Display of mixed images
- Selection of pulse length
- Selection of frequency bandwidth
- Selection of changing method of gain

2.1.1 Display of 1-frequency/displays of 2-frequency and more

CVS-FX2/FX2BB can switch ON/OFF the display of 4-frequency images individually.
To select Standard Echo Display:

1. Press [CM] key used ([CM] key lit red)
   When CM1 is lit red, press [CM1] key

   .
2. CM Menu is displayed.
3. Moving the cursor with key, select [Normal] or [OFF] of high frequency 1 in Standard Echo Display items.



When [Normal] is selected, normal images are displayed on high frequency 1 screen.
When [OFF] is selected, high frequency 1 screen is not displayed.

*[1] CM (Condition Memory) : CM is the key to store the setting conditions of the echo sounder and to recall them by one touch. There are 6 keys, CM1 to CM6, to store 6 types of setups.

4. Press [ENT] key

.

5. Moving the cursor with , select [Normal], [Mix] or [OFF] in the Standard Echo Display items of high frequency 2, and press [ENT] key

.

   When [Normal] is selected, normal images are displayed on high frequency 2 screen.

   When [Mix] is selected, mixed images are displayed on high frequency 2 screen. (As for details, please see “2.1.4 Display of mixed images”, p 2-15)

   When [OFF] is selected, no high frequency 2 screen is not displayed.

6. Moving the cursor with , select [Normal], [Mix] or [OFF] in the Standard Echo Display items of low frequency 1 and press [ENT]

key.

   When [Normal] is selected, normal images are displayed on low frequency 1 screen.

   When [Mix] is selected, mixed images are displayed on low frequency 1 screen. (As for details, please see “2.1.4 Display of mixed images”, p 2-15)

   When [OFF] is selected, no low frequency 1 screen is not displayed.

7. Moving the cursor with , select [Normal], or [OFF] in the Standard Echo Display items of low frequency 2 and press [ENT] key

.

   When [Normal] is selected, normal images are displayed on low frequency 2 screen.

   When [OFF] is selected, no low frequency 2 screen is not displayed.

2.1.2 Setting frequency to match the transducer to be used

On CVS-FX2/FX2BB, the frequencies used for 4 screens can be set in a range of 24 to 240 kHz. The range of selectable frequency depends on the transducers connected.

At the time of the initial usage

In the case the other transducer than TDM-052 is used with CVS-FX2/FX2BB for the first time after purchase, it is necessary to adjust setting of the transducer.

Factory default setting of CVS-FX2/FX2BB is as follows: the type of transducer is TDM-052, high frequency 1 is 200 kHz, high frequency 2 is 130 kHz, low frequency 1 is 75 kHz and low frequency 2 is 38 kHz.

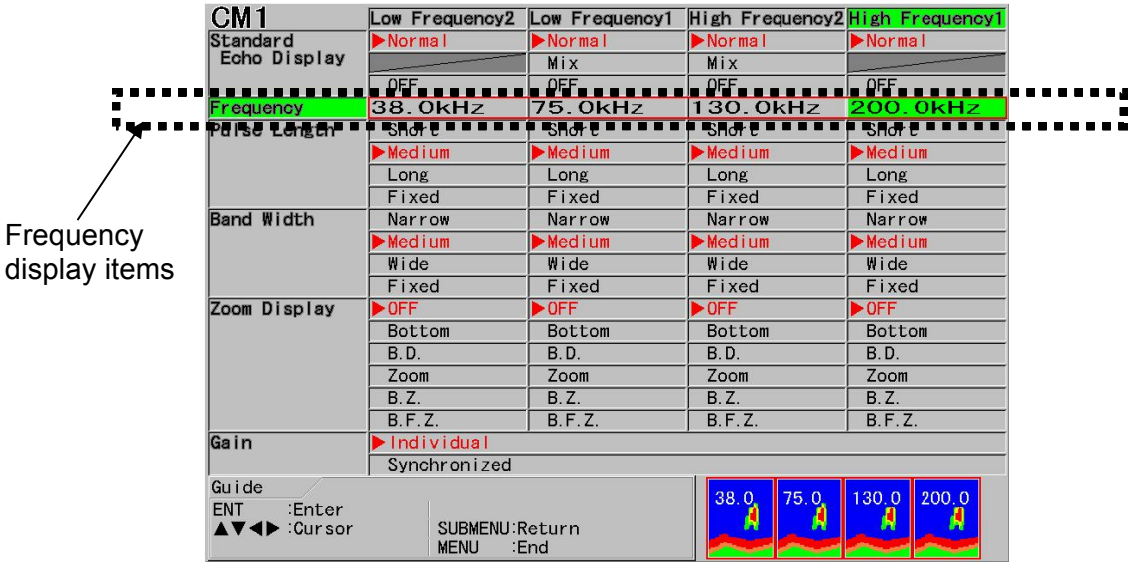
If the connected transducer is different from the factory default, the setting shall be performed at first.

As for the setting of transducer, please see the Installation Manual “2.1 Setup of transducer” of “Chapter 2 Adjustment”.

To change frequency:

1. Press [CM] key used (lights red).
   When CM1 is lit red, press [CM1] key

   .
2. CM menu will be displayed.
3. Move the cursor to the position that indicates the frequency of high frequency 1 in frequency display items using
   .



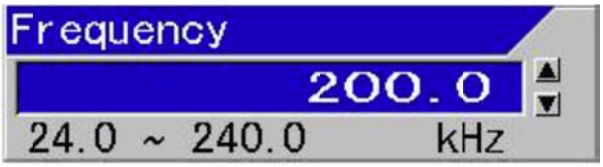
4. Press [ENT] key

   .
5. [Frequency] box is displayed.

6. Increase or decrease the value with [▲] and [▼] key of to set frequency.

   [▲] key: The numeric value increases.
   [▼] key: The numeric value decreases.

   When the key is kept pressed, the value automatically shifts to the upper digit.



7. Press [ENT] key

.

8. Repeat the procedures 3 to 7 for frequencies on other screens.

> ⚠ **Caution:** When the other transducer than broadband type (TDM-052, TDM-062) is connected, the transducer cannot perform the designated specification if frequency setting exceeds the fixed range of the transducer.

Setting up of frequency:

1. Relation between a transceiver and display screen
For CVS-FX2/FX2BB, there are two types of transceiver for high frequency and low frequency, and each transceiver has two channels of channel 1 and channel 2.
High frequency 1 is the channel 1 for high frequency.
High frequency 2 is the channel 2 for high frequency.
Low frequency 1 is the channel 1 for low frequency.
Low frequency 2 is the channel 2 for low frequency.

2. Limitation in setting of high and low frequencies:
In the case of a broadband transducer, the cable at high frequency side of the transducer shall be connected to the high frequency terminal and the cable at low frequency side of transducer shall be connected to low frequency terminal.
The frequency range to be set has the following limitations per transducer.

Name of transducer	Frequency range of low frequency	Frequency range of high frequency
TDM-052	38 to 75 kHz	130 to 210 kHz
TDM-062	38 to 75 kHz	85 to 135 kHz

⚠ **Caution:** If the frequency setting exceeds the ranges above, gain will not be enough to let the transducer perform to the designated specification.

When the other transducer than broadband type is connected, please connect the cable for low frequency of the transducer to the low frequency terminal and the cable for high frequency of the transducer to the high frequency terminal, and set the designated frequency of the transducer.

3. Simultaneous transmission and reception*1 and alternate transmission and reception*2
Two transceivers for high frequency and low frequency transmit and receive simultaneously, and the channel 1 and channel 2 of each transceiver operate in alternate transmission and reception.

4. When the same frequency is set for high frequencies 1 and 2 or low frequencies 1 and 2, alternate transmission and reception do not operate. Transmission and reception are performed by only channel 1 and the image is displayed using the channel 1 data by the channel 2 gain setting.

5. The conditions when alternate transmission and reception can operate even when the same frequency is set for channels 1 and 2:
- If pulse width is different
- If frequency bandwidth is different
- If range is different.
- If shift is different.
- If the types of display zoom is different.

*1 Simultaneous transmission and reception: Each transmitter and receiver for high frequency and low frequency operates simultaneously.
*2 Alternate transmission and reception: Channels 1 and 2 of high frequency and channels 1 and 2 of low frequency transmit and receive alternately by each channel. The image scroll speed will drop to a half of that of simultaneous transmission and reception

2.1.3 Displaying of zoom images

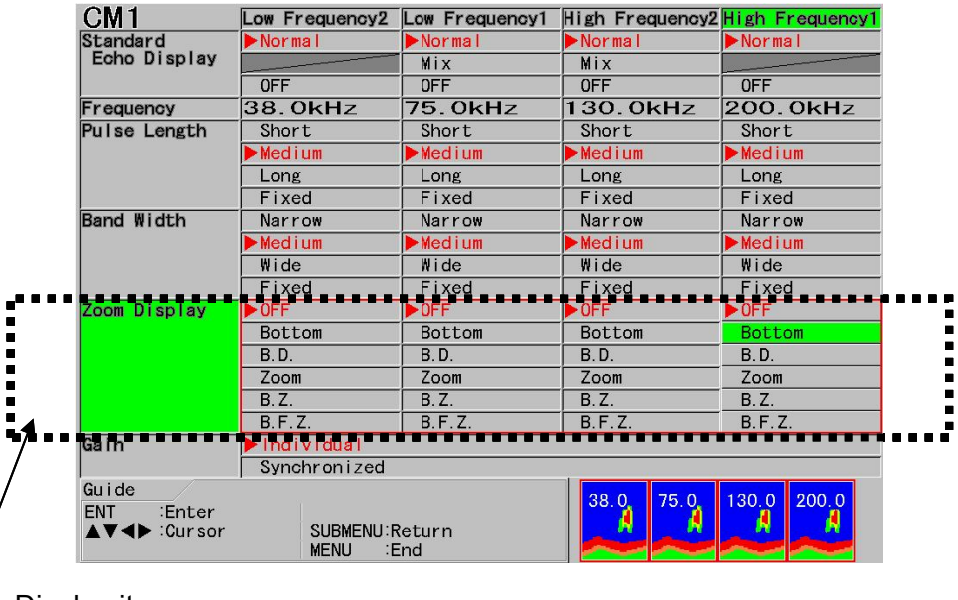
To display zoom images:

1. Press the [CM] key used (Lights red [CM] key).
   When CM1 is lit red, press the [CM1] key

.

2. The CM menu is displayed.

3. Moving the cursor with , select [OFF], [Bottom], [B.D.(Bottom Discrimination)], [Zoom], [B.Z. (Bottom Zoom)] and [B.F.Z. (Bottom Follow Zoom)] for high frequency 1 of Zoom Display items.



Zoom Display items

4. Press [ENT] key

.

5. Repeat the procedures 3 and 4 for zoomed display of high frequency 2, low frequency1 and low frequency 2.

6. Press [CM1] key

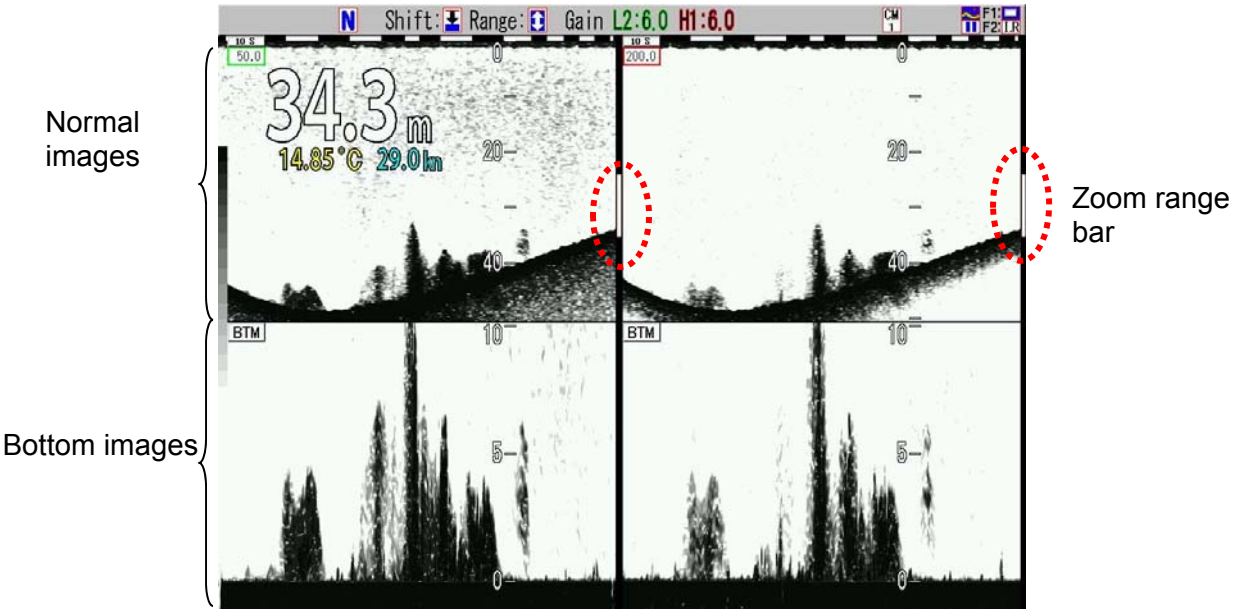
to close the CM menu ([CM] key lit red).

Configuration of zoomed image display :

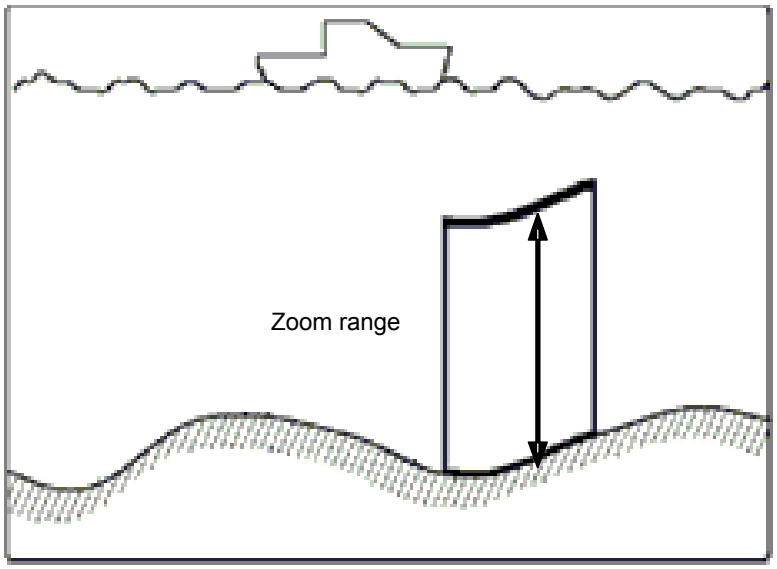
The zoom image is displayed with normal image on the upper side of the screen and the zoom image at the bottom side of the screen, except for the case of [B.Z.].
[Zoom range bar] is shown in orange on the side of the latest normal image, to indicate the range of zoom image.
The screen width of zoom range can be changed by [MENU]. (for the details, see “To change the screen Width of Zoom Image”, p 2 - 13)

Types of zoomed images

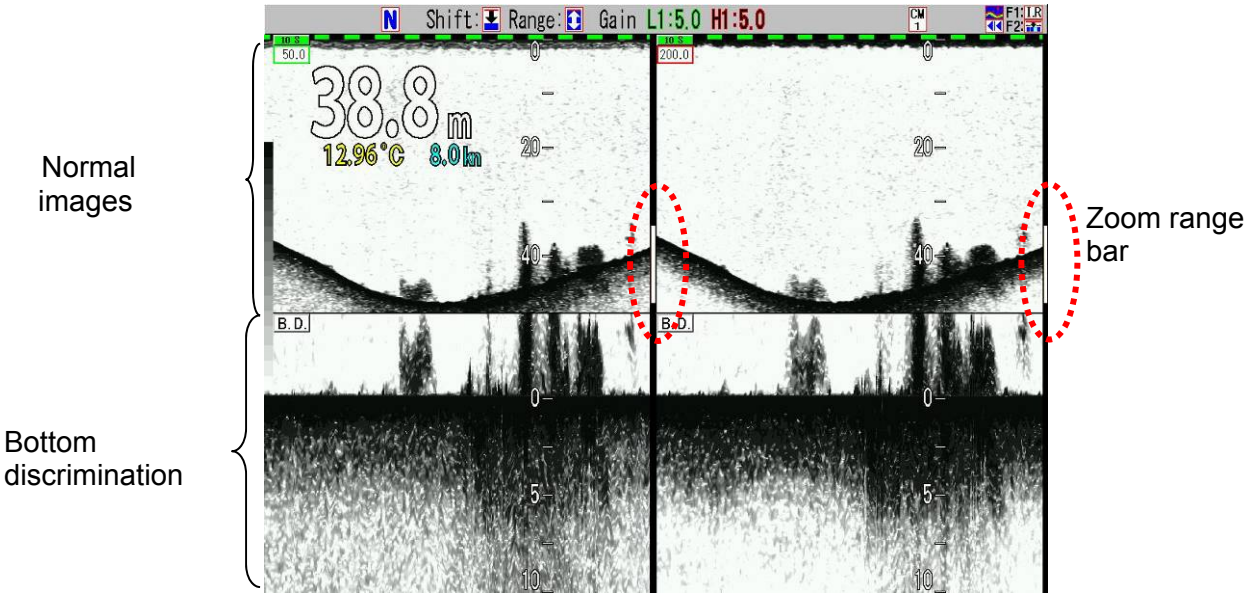
1. Bottom



Sea bottom is fixed at 10% bottom of the screen, and the image above is displayed in the specified zoom range. As the image on sea bottom is magnified, this is an effective zooming mode to identify fish schools, etc. near the bottom.

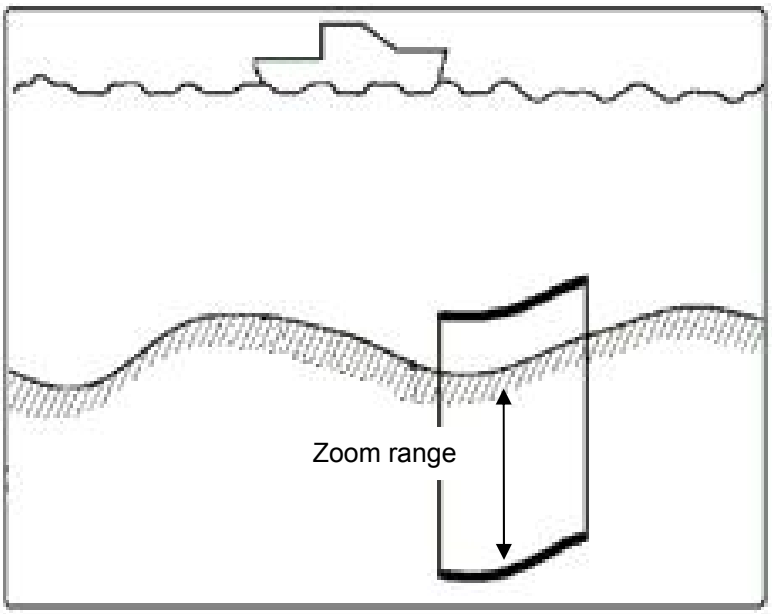


2. Bottom discrimination

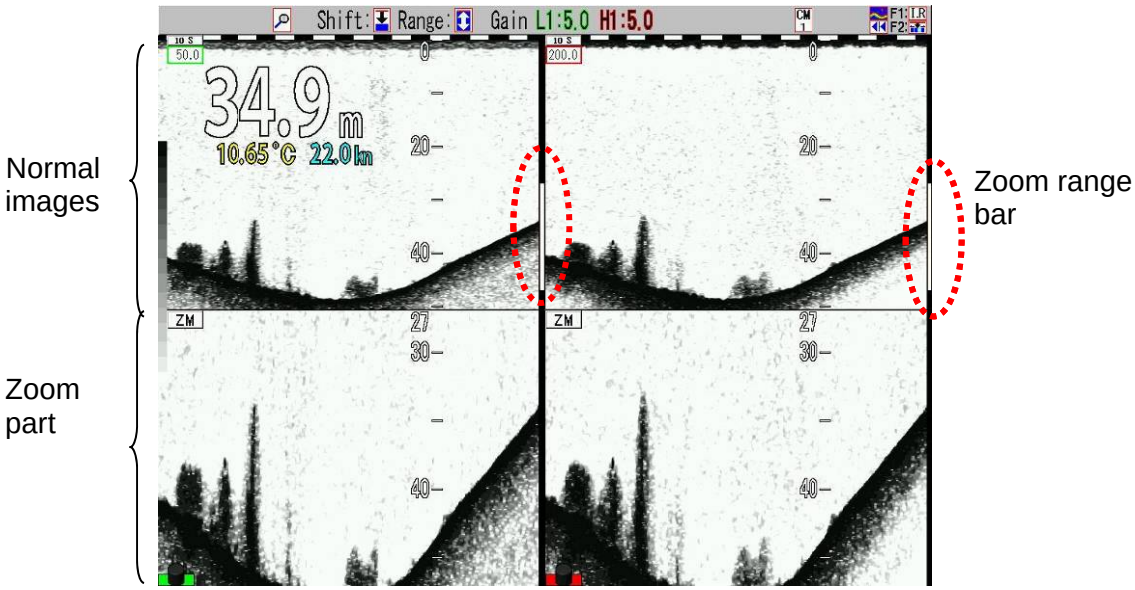


Sea bottom is fixed at 30% bottom of the screen, and the image of bottom is displayed in the specified zoom range.

As the sea bottom image is magnified, this is an effective zoom mode to judge the sea bottom condition.

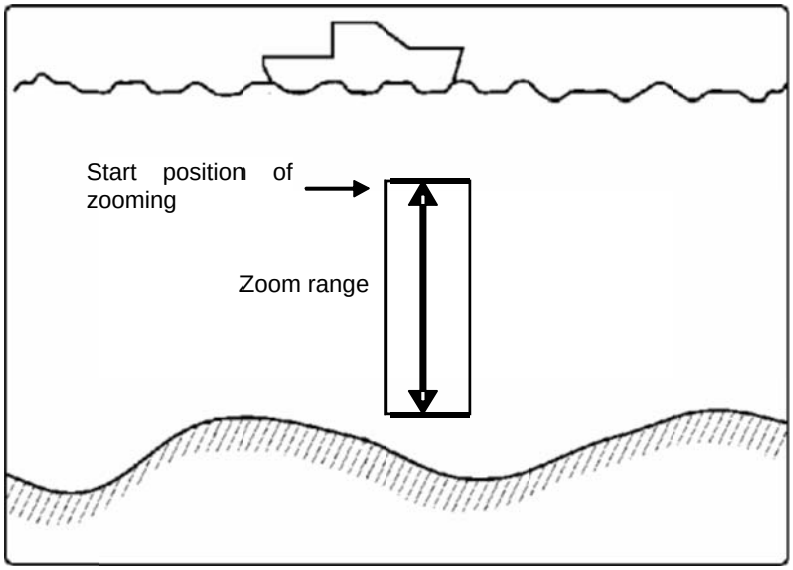


3. Zoom



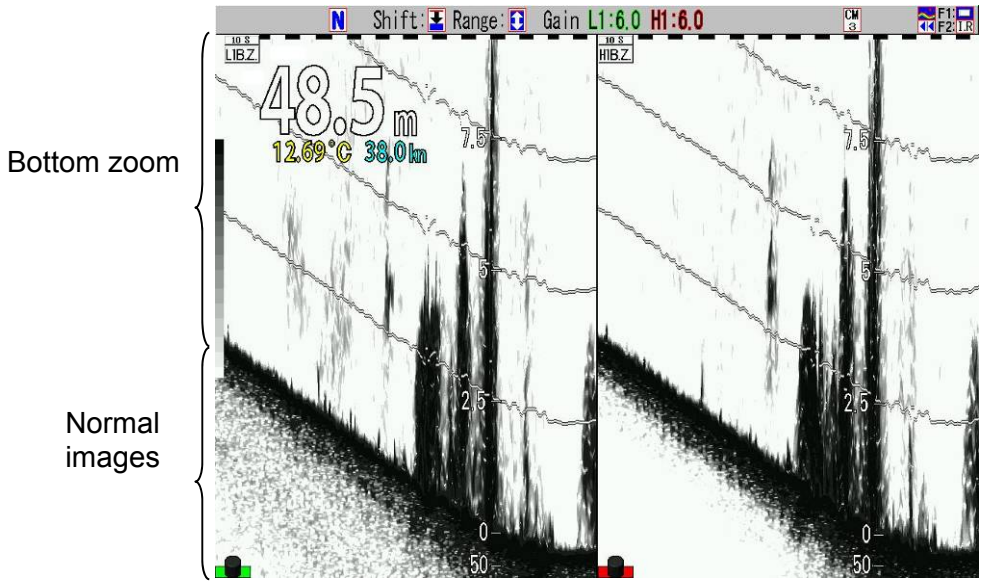
Specifying a shift position, the images under the position is displayed in the specified zoom range.

As the zoomed image at the specified positions is displayed, this is an effective zooming mode for the case when image at particular depth is required for fishing of alfonsino, etc.



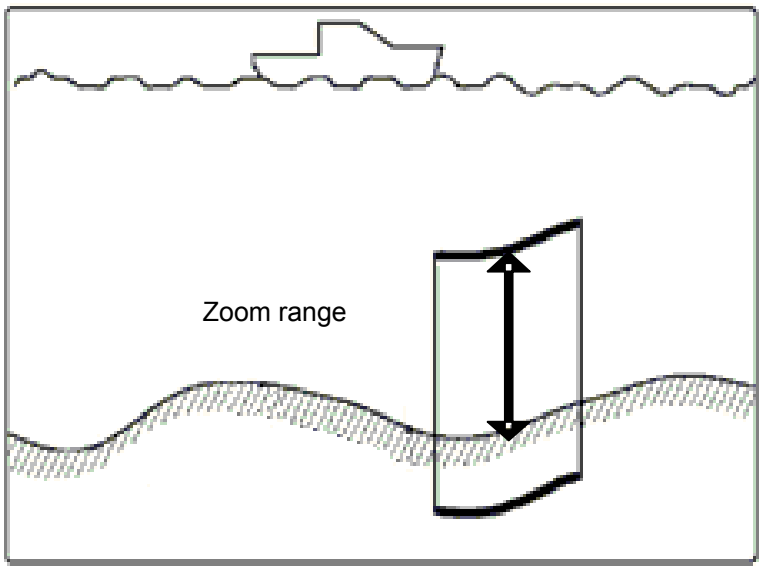
As for operation of shift position of zooming, please see “To change the shift position of Zoom”, p 2 - 12.

4. Bottom zoom

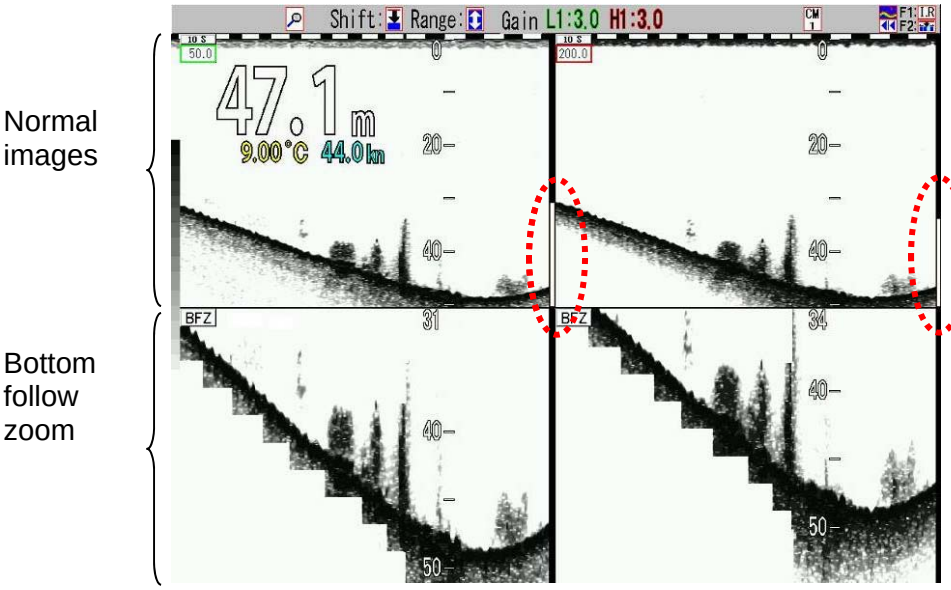


Mixed images above bottom in a specified zoom range are displayed onto the normal image.

This is an effective mode to identify fish schools, etc. near sea bottom with watching the geomorphic changes of sea bottom.

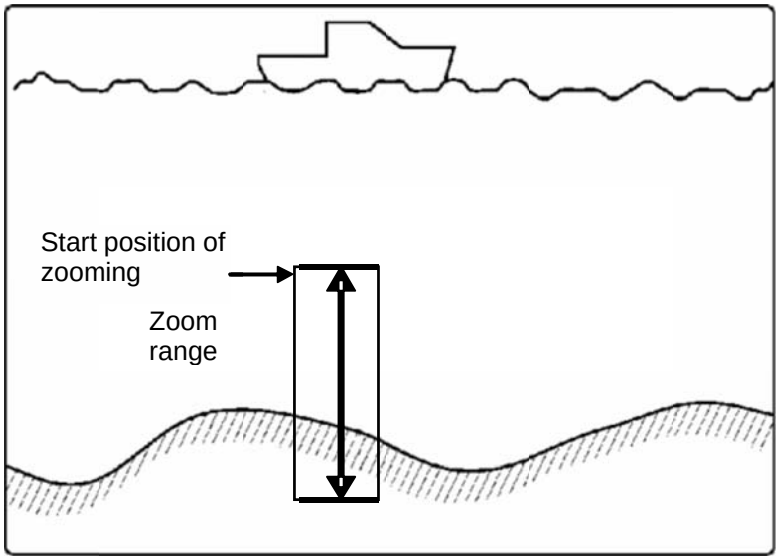


5. Bottom follow zoom



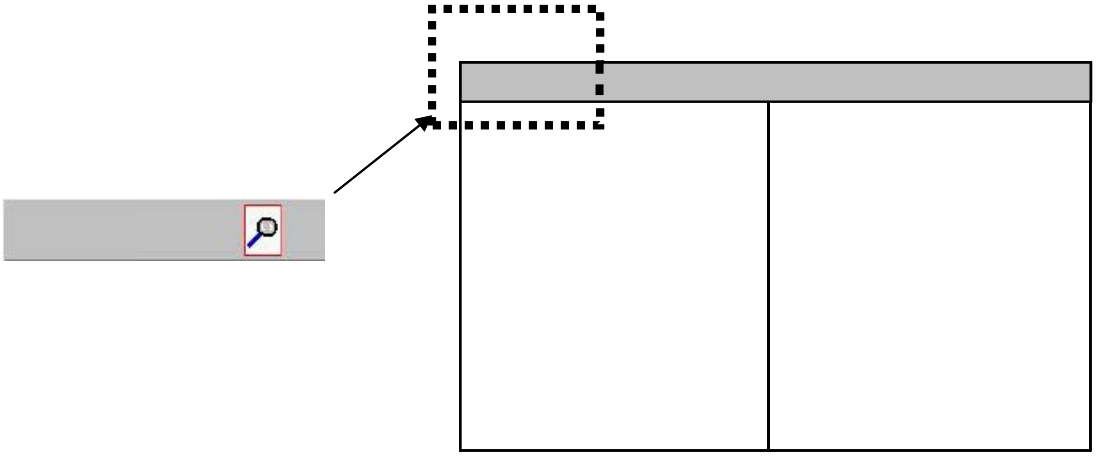
In a specified zoom range, the sea bottom is displayed by automatic shift to be displayed within a range between 30 % and 90 % from the top of images

This is an effective zooming mode to determine the geomorphic changes of sea bottom.



To change the range of zoomed images

When the icon to show the mode of [Range] and [Shift] keys is in header display, the range of the zoomed images can be changed.



1. When the icon of header display part is , press [NORMAL/ZOOM] key .
2. Check that the icon of the header display part is indicating zooming operation.
3. With [▲] of [RANGE] key , the range is changed to the zoom range in shallow side and with [▼], the range turns to the zoom range in deep side.

To change the shift position of Zoom:

When the icon to show the mode of [RANGE] [SHIFT] keys in header display is , the shift of zoomed images can be changed.

1. When the icon of header display is , press [NORMAL/ZOOM] key .
2. Check that the icon of header display is indication zooming operation.
3. With [▲] of [SHIFT] key , the zooming position shifts upward and with [▼] downward.

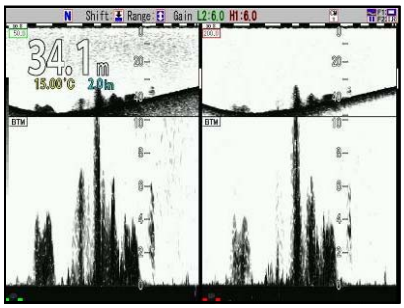
   If the key is kept pressed, the digit moves upward changing the value.

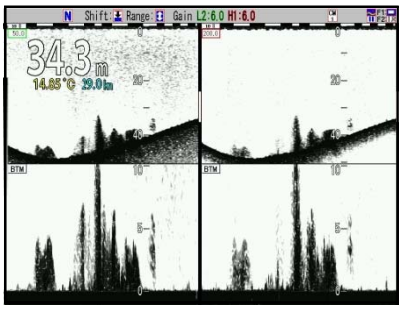
The shift of zoom can be also changed by operation of [Shift Setup] [Zoom Shift Position] in the main Menu.

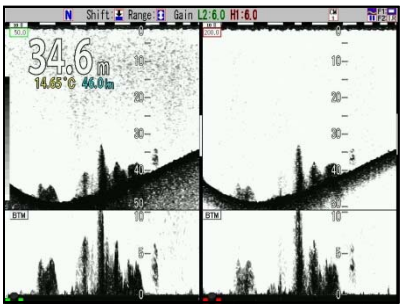
Screen Width of Zoom Image:

The screen width of zoomed images can be changed to 3 steps of [Wide], [Medium] and [Narrow] depending on preference.

<Examples of Width of Zoom Image (in the case of Bottom)>


Wide


Medium

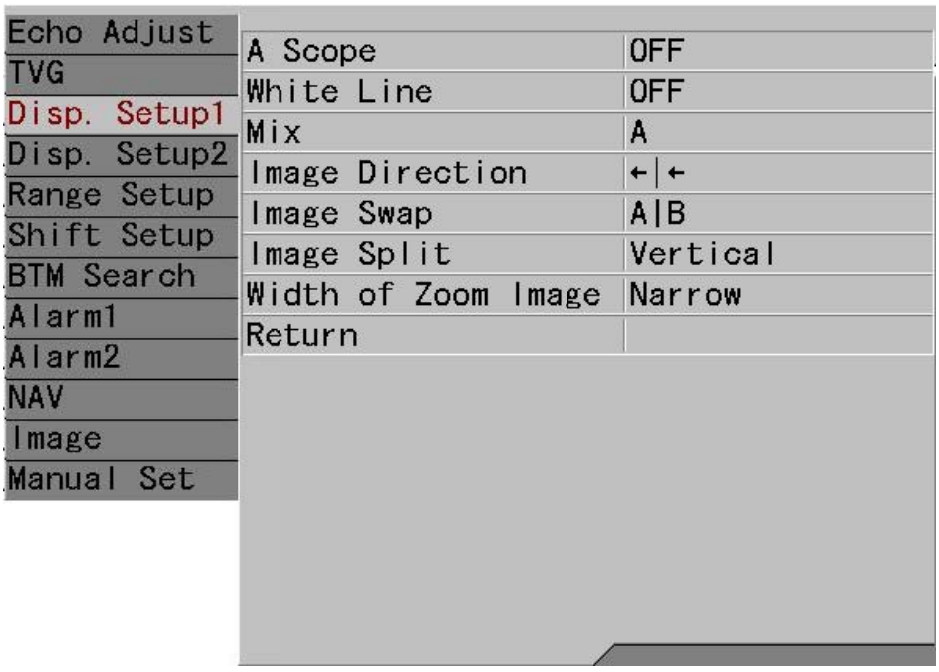

Narrow

To change the screen Width of Zoom Image:

1. Press [MENU] key

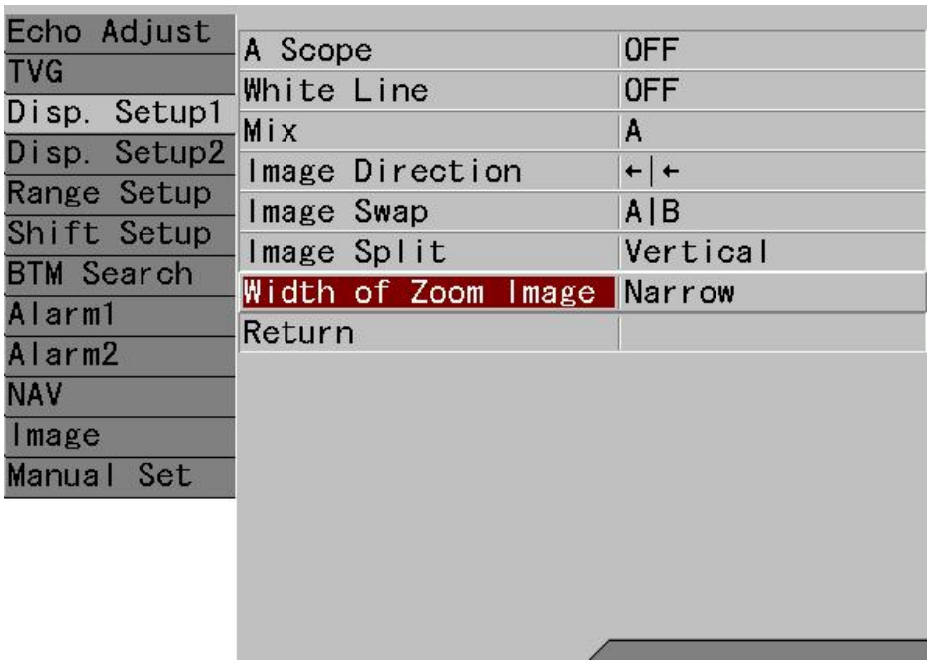
.

2. The menu is displayed. With [▲] or [▼] keys of , point the cursor to [Disp. Setup 1].

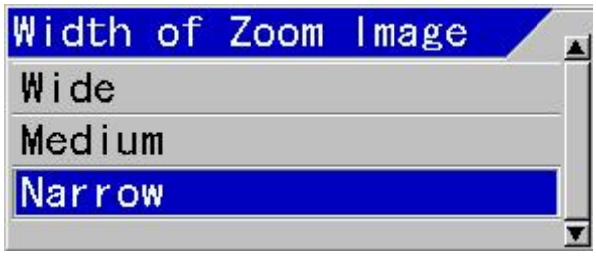


3. Press [▶] key of .

4. [Disp. Setup 1] of Menu is displayed. With [▲] or [▼] keys of , point the cursor to [Width of Zoom Image].



5. Press [►] key of .
6. [Width of Zoom Image] is displayed. With [▲] or [▼] keys of , select [Wide], [Medium] or [Narrow]



7. When [MENU] key MENU is pressed, the menu disappears and the selected [Width of Zoom Image] is set.

2.1.4 Display of mixed images

Mixed images are combination of high and low frequency images by signal processing. The main purpose is to identify small fish, such as whitebait, from other fish school. There are 5 types for mixing methods and they are switchable in application.

Types of mixed images:

1. Mix type A
   Images in high frequency and low frequency are compared. The red level signal indicates high frequency images. For the signal at lower level than that, the high frequency signal is displayed in gray color.
   As fish schools with strong high frequency signal are highlighted, this is helpful for identification of fish schools near own boat's position.

2. Mix type B
   Only when high frequency signal is stronger than low frequency signal, the low frequency signal is subtracted from the high frequency signal, and the difference is displayed with color gradation.
   The images existing only in high frequency are highlighted.
   Small fish such as whitebait can be displayed in high frequency, but not in low frequency. This is helpful, therefore, for identification of schools of small fish.

3. Mix type C
   Images in high frequency and low frequency are compared. The red level signal indicates high frequency images. For the signal at lower level than that, only when the high frequency signal is stronger than the low frequency signal, the low frequency is subtracted from the high frequency and the difference is displayed with color gradation.
   Strong signal with high frequency and images only in high frequency are highlighted.
   This is helpful, therefore, for identification of fish school near own boat and school of small fish such as whitebait.

4. Mix type D
   Signals of images of high and low frequencies are compared, and the stronger signal is displayed with color gradation.
   This is completely combined image of high and low frequencies. Without viewing of each of high and low frequencies images, only this one image can tell the conditions in water.

5. Fish size in fish school size
   Comparing signals of high and low frequencies, only signal with higher level of high frequency is displayed as difference in the order of strength, from red (strongest) to greenish yellow with color gradation. Low frequency images are indicated in greenish yellow to light blue with color gradation and the mixed image of them is displayed.
   For example, when high frequency is 200 kHz, the wavelength of underwater acoustic wave is 0.75 cm, and when low frequency is 50 kHz, the wavelength of underwater acoustic wave is 3.0 cm. In the image of low frequency 50 kHz, fish smaller than 3 cm is hardly detected.
   As school of small fish such as whitebait is clearly displayed in high frequency signal with short wavelength, only school of small size fish is displayed in warm color from red to greenish yellow in fish school mode.
   By this, it is easy to identify smaller size than 3.0 cm.

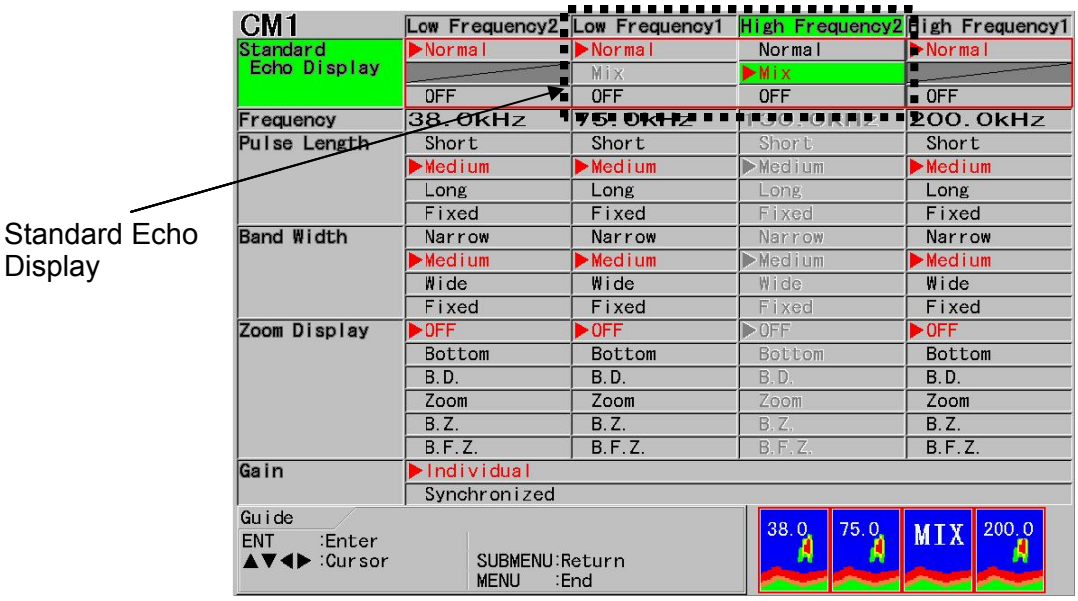
To display mixed images:

1. Press [CM] key used (Lights red).

   When CM1 is lit red, press it (CM1).

2. CM menu is displayed.

3. Moving cursor with , point the cursor to [Mix] of high frequency 2 or Low frequency 1 of Standard Echo Display items.



4. Press [ETN] key (ENT) .

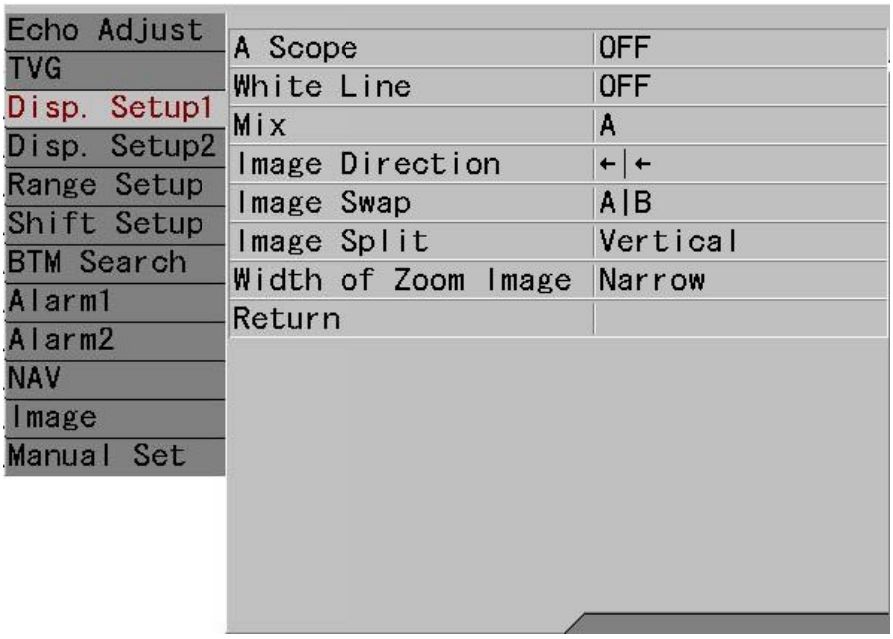
> **Caution:** Mixing can be selected only when images at right and left sides of the display screen are displayed. 3 types of mixed image are selectable: high frequency 1 and low frequency 1 mixings, high frequency 1 and low frequency 2 mixings, and high frequency 2 and low frequency 2 mixings can be selected.

> **Caution:** Mixed image cannot be displayed when range is set at [Scr. Individual] and shift is set at [Scr. Individual], and when zoom display is at [Zoom], [B. Z.] and [B. F. Z.], mixed image cannot be displayed.

To change the type of mixed image:

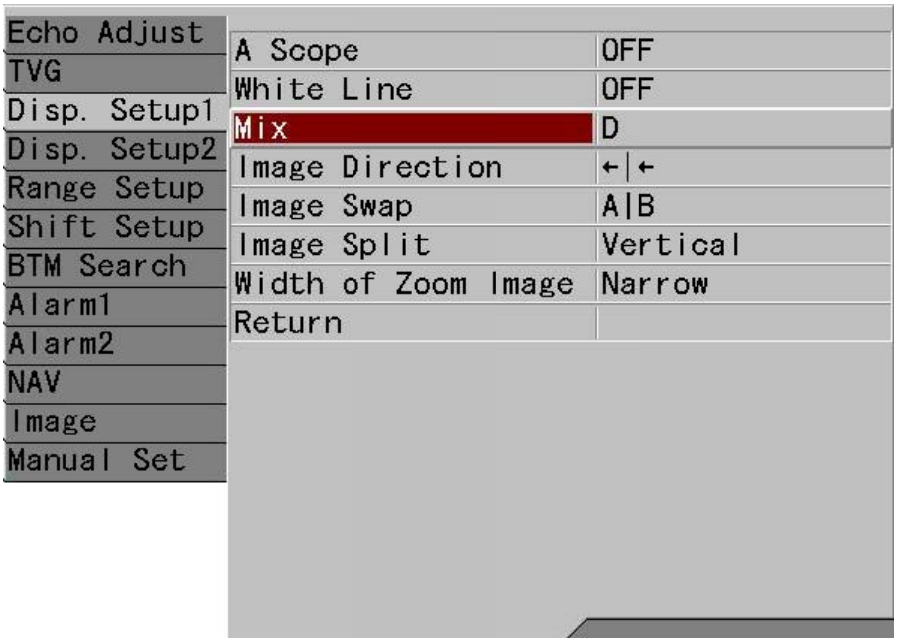
1. Press [MENU] key

.
2. The menu is displayed. Move the cursor to [Disp. Setup1] with [▲] or [▼] keys of .



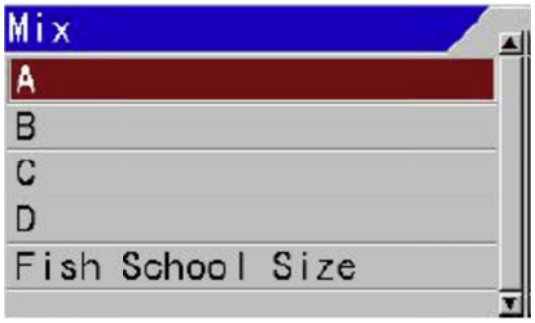
3. Press [▶] key of .

4. [Disp. Setup1] of the menu is displayed. Move the cursor to [Mix] with [▲] and [▼] keys of .



5. Press [▶] key of .

6. [Mix] of the menu is displayed. Move the cursor to the desired mix type with [▲] and [▼] keys of to select.



7. Pressing [MENU] key

, the menu disappears and the selected mix mode is set.

2.1.5 Selection of pulse length

Pulse length can be switched to 4 steps: of Short, Medium, Long and Fixed.

This change of pulse length causes changes in resolution of images from the echo sounder and the signal to be displayed changes. Shorter pulse length increases resolution, but its power decreases. Other way around, longer width decreases resolution but increases power. By this nature, **the pulse length is switched depending on the range**: to Short (narrow) at shallow range and to Long (wide) at deep range, except for the case of setting at [Fixed].

When pulse length is switched:

1. For the setup up of pulse length, based on the setup at [Medium] as reference, at [short], the pulse length is switched to the same pulse length as [Medium] pulse length with 1/2 of the range used, and at [Long], to the same pulse length as [Medium] pulse length with 1.5 times of the range used.

   When signals in images of fish are not visible at the range used, setup at [Short] increases small response, and setup at [Long] highlights larger response while decreasing small responses.

2. When pulse length is set at [Fixed], the width is constant regardless of switching of range. Please set at [Fixed], to avoid change of response from fish by switching of range.

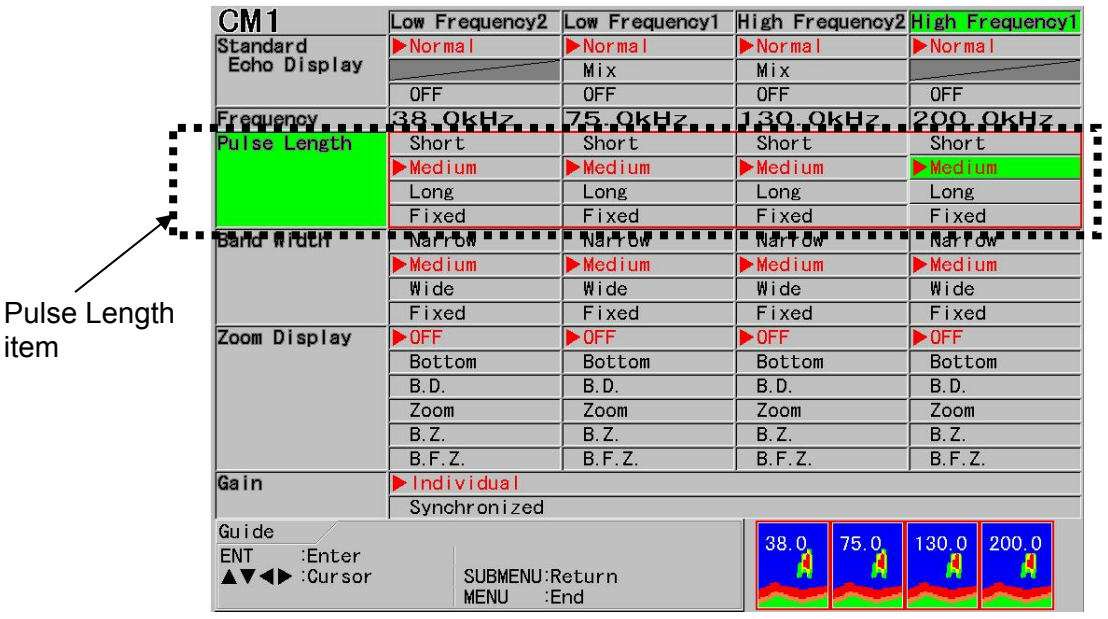
To select pulse length:

1. Press [CM] key (lights red) used.
   When CM1 is lit red, press [CM1] key

.

2. CM menu is displayed.

3. Moving the cursor with , select [Short], [Medium], [Long] or [Fixed] of high frequency 1 in Pulse Length items.



4. Press [ENT] key

.

5. Repeat the procedures 3 and 4 above for pulse length of high frequency 2, low frequency 1 and low frequency 2

6. Press [CM1] key

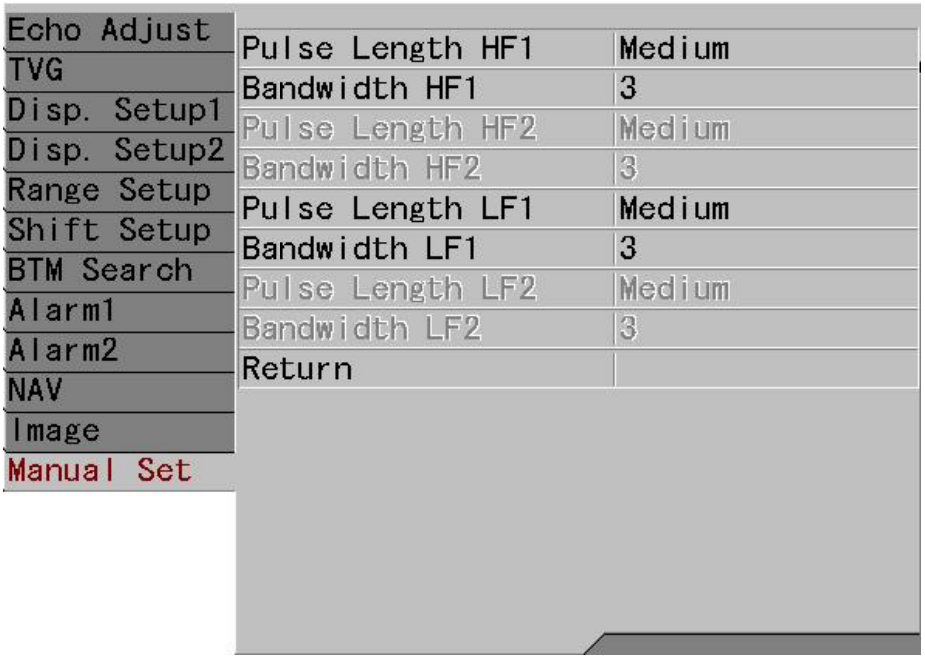
to close CM menu ([CM] key lit red).

Adjustment when [Fixed] for pulse length is selected:

1. Press [MENU] key

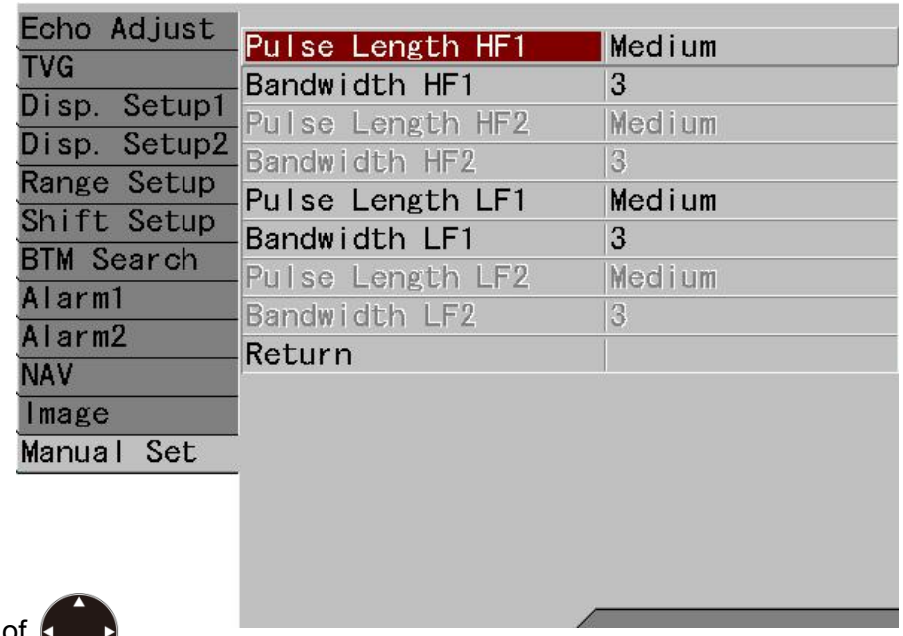
.

2. The menu is displayed. Move the cursor at [Manual Set] with [▲] or [▼] key of
.



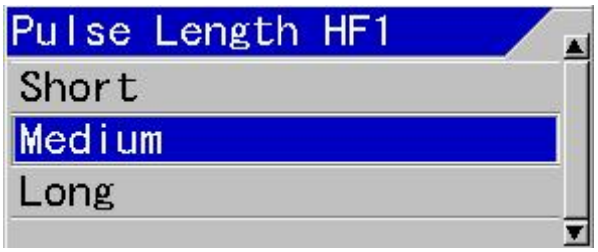
3. Press [►] key of
.

4. [Manual Set] of menu is displayed. Move the cursor at [Pulse Length HF1] with [▲] or [▼] keys of .



5. Press [▶] of .

6. [Pulse Length HF1] of the menu is displayed. Move the cursor with [▲] or [▼] keys of , and select one of [Short], [Medium] or [Long].



7. Press [SUBMENU] key SUB MENU to return the menu to [Manual Set].
8. To set the fixed value of the pulse length on the next screen, repeat the procedures 4 to 7.
9. Press [MENU] key of MENU , the menu disappears and the selected fixed pulse length is set.

> ⚠ **Caution:** The menu for [Manual Set] is available if [Pulse Length] of CM menu is not set at [Fixed]

The pulse length when [Fixed] of pulse length is selected:

1. The pulse length is 210 μsec when setting of [MENU], [Manual Set] and [Pulse Length] is [Short].
2. The pulse length is 1000 μsec when setting of [MENU], [Manual Set] and [Pulse Length] is [Medium].
3. The pulse length is 3000 μsec when setting of [MENU], [Manual Set], and [Pulse Length] is [Long].

2.1.6 Selection of frequency bandwidth

Frequency bandwidth can be switched to 4 steps: Narrow, Medium, Wide and Fixed. The change of frequency bandwidth results in change of the resolution of echo sounder and change of signals in the displayed images. If the frequency bandwidth is wide, the resolution becomes high. Other way around, if it is narrow, resolution becomes low.
By this nature, **the frequency bandwidth** is switched depending on the range: to wide at shallow range and to narrow at deep range, except for the case of setting at [Fixed].

When frequency bandwidth is switched:

1. For the setup of frequency bandwidth, based on the setup at [Wide] as reference, at [Medium], the bandwidth is switched over to the same bandwidth of [Wide] bandwidth that is 1.5 times of the range used, and at [Narrow], to the minimum bandwidth.
   When size of target fish matches the frequency wavelength in use, setup up at [Medium] or [Narrow] highlights the images and increase visibility. When pulse length is set at [Short] and frequency bandwidth at [Narrow], response smaller than wavelength is reduced and noise reduction effect is expected.
   2. When frequency bandwidth is setup at [Fixed], the bandwidth is constant regardless of switching of range.

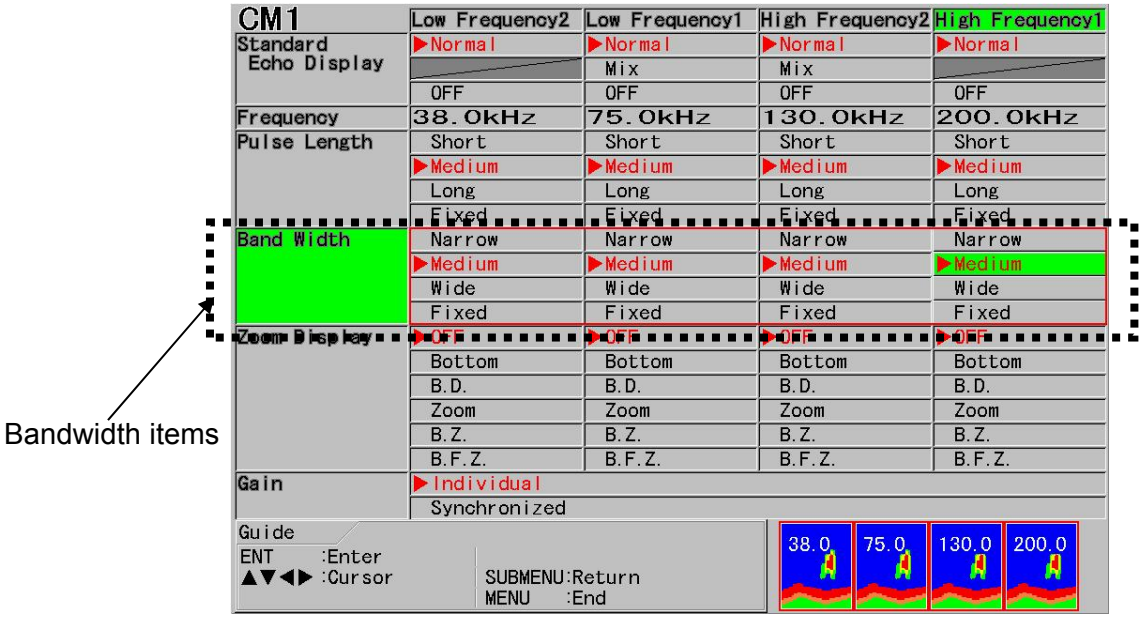
To select frequency bandwidth:

1. Press [CM] key (lights red) used.
   When CM1 is lit red, press [CM1] key

.

2. CM menu is displayed.

3. Moving the cursor with , select [Narrow], [Medium], [Wide] or [Fixed] of high frequency 1 in frequency bandwidth items.



4. Press [ENT] key

.

5. Repeat the procedures 3 and 4 for frequency bandwidth of high frequency 2, low frequency 1 and low frequency 2

6. Press [CM1] key

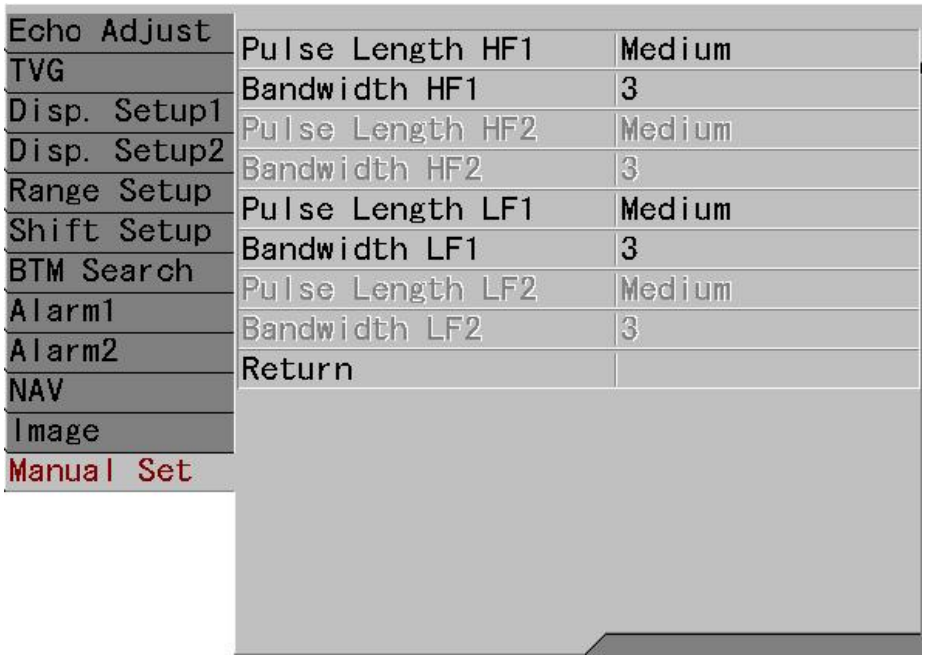
to close CM menu ([CM] key lights red).

Adjustment when the time of selection of [Fixed] of frequency bandwidth is set [Fixed]:

1. Press [MENU] key

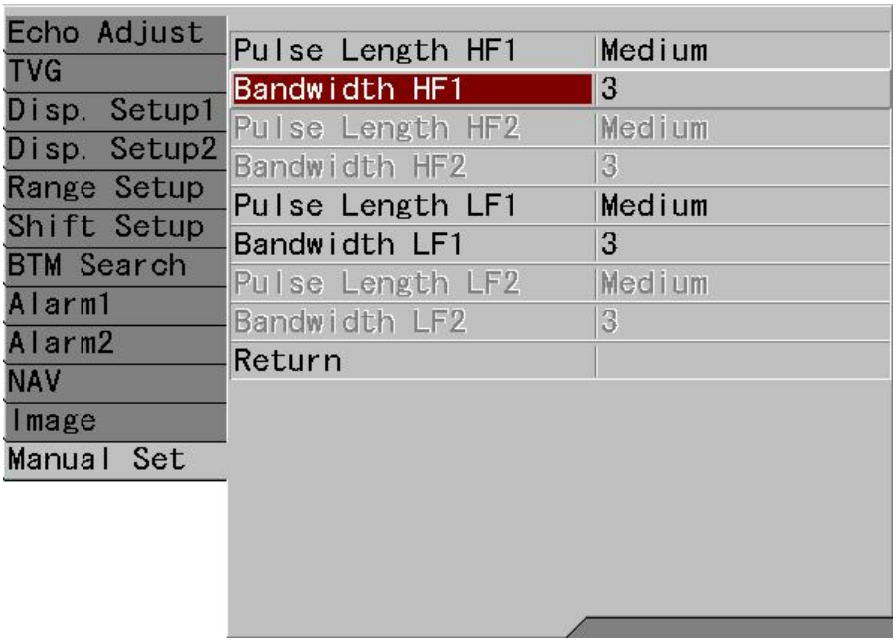
.

2. The menu is displayed. Move the cursor at [Manual Set] with [▲] or [▼] keys of
.



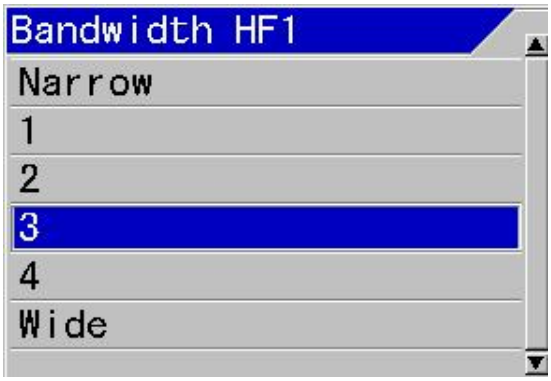
3. Press [▶] key of
.

4. [Manual Set] of the menu is displayed. Move the cursor to [Bandwidth HF 1] with [▲] or [▼] keys of .



5. Press [▶] of .

6. [Bandwidth HF 1] of menu is displayed, Move the cursor with [▲] or [▼] keys of , and select [Narrow], [1], [2], [3], [4] or [Wide].



7. Press [SUBMENU] key of SUB MENU to return to [Manual Set].

8. Repeat the procedures 4 to 7 for setup of fixed bandwidth on the next screen.

9. Press [MENU] key of MENU , and the menu disappears and the selected fixed bandwidth is set.

> ⚠ **Caution:** The menu for [Manual Set] will not be available unless [Bandwidth] of CM menu is set at [Fixed]

2.1.7 Selection of gain changing method

CVS-FX2/FX2BB can display images up to 4 frequencies and gain can be adjusted for each images. Adjustment of gain is individually done with two gain knobs after selecting of a screen to adjust.
In addition, after having gain optimized individually for each screen, it is also possible to adjust gain of all screens with operation of only one gain knob. This is **synchronized gain**.

In the synchronized gain, the whole gain varies while keeping the difference in gain of each screen.

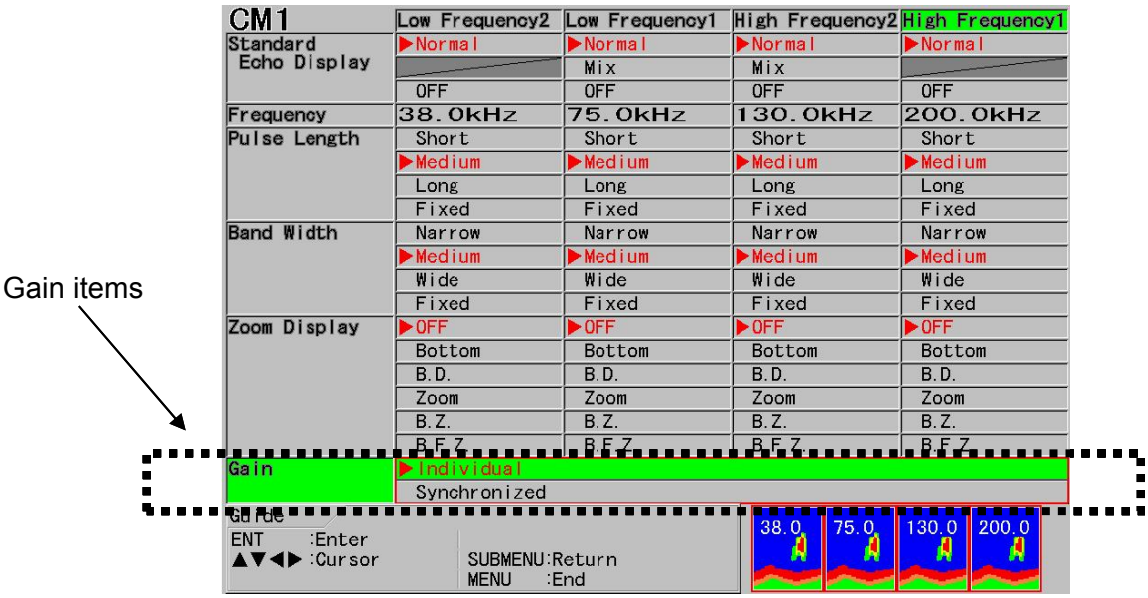
To select the changing method of gain:

1. Press [CM] key used ([CM] key lights red).

   When CM1 is lit red, press [CM1] key (CM1) .

2. CM menu is displayed.

3. Move the cursor with (◀▶▲▼) and select [Individual] [Synchronized] of [High Frequency 1] in gain items.



4. Press [ENT] key (ENT) .

5. Press [CM1] key (CM1) to close CM menu ([CM] key lit red).

As for the details of gain operation, see “2.2.5 Adjustment of image gain”, p 2 - 46.

2.2 Adjustment of echo sounder

To use echo sounder, it is necessary to adjust depth range (Range) and gain depending on the circumstances.

The main adjustment items are as follows:

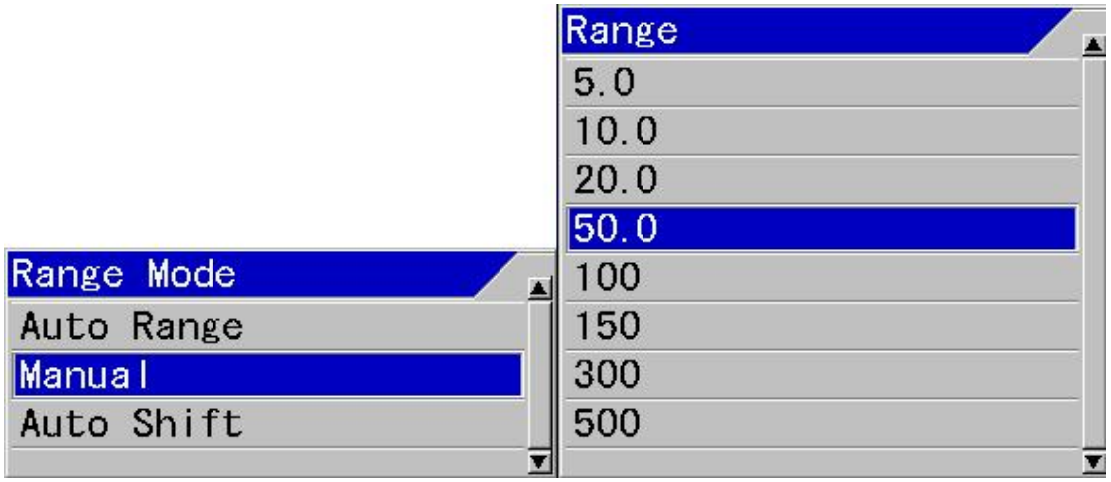
- Switching Range mode
- Switching the role of range key to change of normal image range or zoom image range
- Manual change of range
- Manual change of shift position
- Adjustment of image gain
- Setup of TVG

2.2.1 Switching of depth range mode

There are 3 types of Range Mode: [Auto Range], [Manual] and [Auto Shift].
[Auto Range] is the mode to automatically switch depth range so as to display sea bottom constantly in a display screen.
[Manual] is the mode to manually switch depth range with range key operation, and shift with shift key operation.
[Auto Shift] is the mode to automatically shift the preset depth range so as to display constantly sea bottom in a display screen.

To switch [Range Mode]:

1. Keep [SHIFT/M OFF] key pressed until [Range Mode] menu is displayed.
2. Move the cursor with [▲] or [▼] keys of and select one of [Auto Range], [Manual] or [Auto Shift]

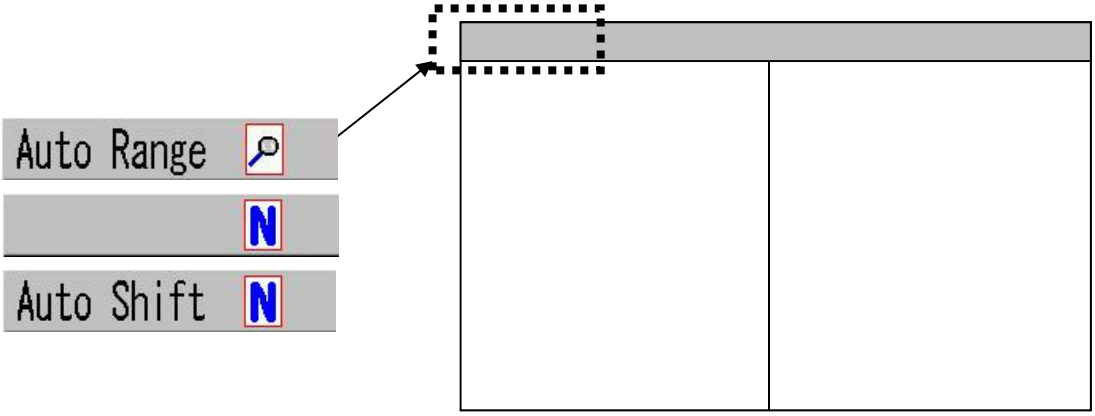


3. Press [ENT] key . The selected Range mode is set.

When [Auto Range] is set, [Auto Range] is displayed in the header showing Range Mode.

When [Manual] is set, display of the header showing the Range Mode disappears.

When [Auto Shift] is set, [Auto Shift] is displayed in the header showing Range Mode.



As for the details of [Auto Range], see “4.3.2 Setting of auto range”, p 4 - 4.

As for the details of [Manual], see “2.2.3 Manual change of a range for normal image”, p 2 - 29.

As for the details of [Auto Shift], see “4.3.3 Setting of auto shift”, p 4 - 6

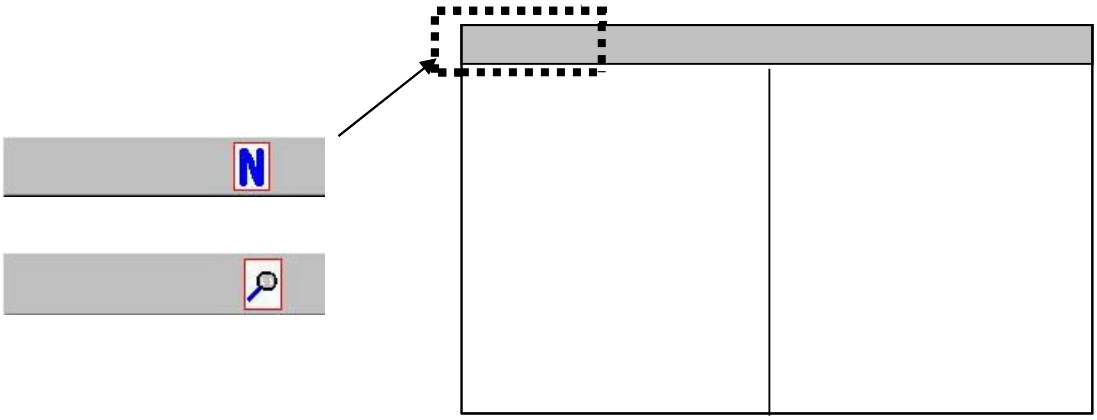
2.2.2 Switching of Normal/Zoom for range and shift operation

The range key has two functions of “to change range of normal image” and “to change range of zoomed image”, and the shift key has two functions of “to change shift of normal image” and “to change shift of zoomed image”, respectively.

When Range mode is [Manual] or [Auto Shift] and zoomed image is displayed:

1. Press [NORMAL/ZOOM] key

. Each time the key is pressed, the icon in the header showing range key changes as follows:



2. When

is shown, the range and shift of the normal image can be changed.

When is shown, the range of zoomed image and shift of zoomed image can be changed.

> **Caution:** is displayed only when a zoomed image is displayed.

When Range mode is [Auto Range]:

1. [Range] key

can be used only for the change of range of zoomed images.

[Shift] key

can be used only for change of shift of zoom.

Display of header

> **Caution:** When Range mode is [Auto Range], icon is always displayed. When the zoom screen is not on display, the key operation is invalid.

2.2.3 Manual change of a range for normal image

When Range mode is Manual, the range can be changed manually.

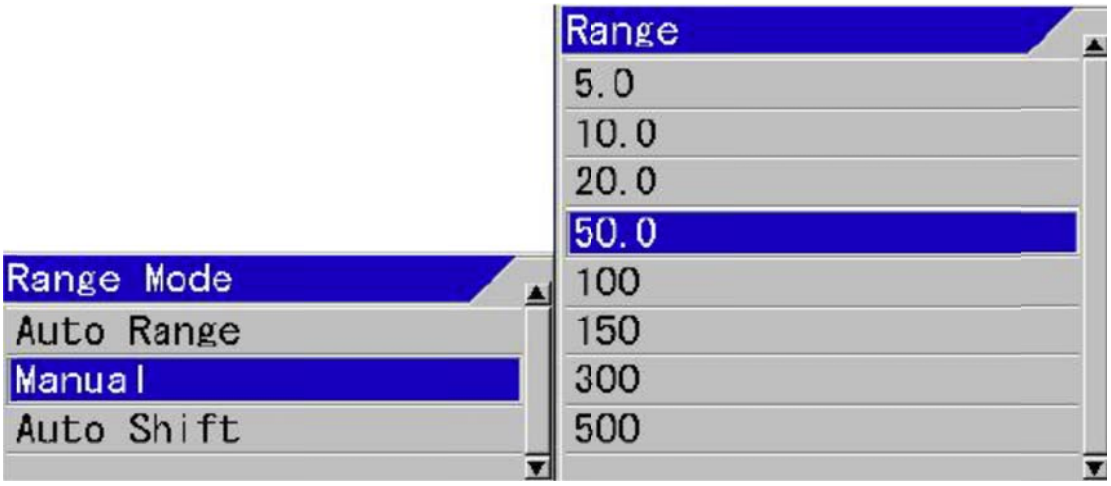
In manual range, each time range key is pressed range changes among the 8 ranges registered.

In addition, at manual range, either all range of images of 4 frequencies can be changed with [All Screens Same], or with [Scr. Individual] by image of each frequency.

To set up Range mode to [Manual]:

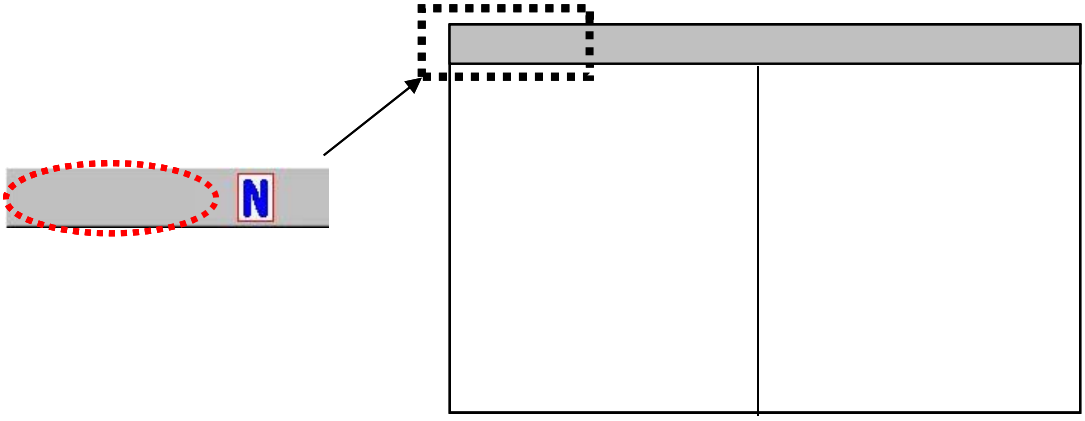
1. Keep [Shift/M OFF] key

pressed until [Range Mode] menu is displayed.
2. Move the cursor with [▲] or [▼] keys of , and select [Manual].



3. Press [ENT] key

. Then, [Manual] is set and turns to manual range and the header showing the Range Mode disappears.

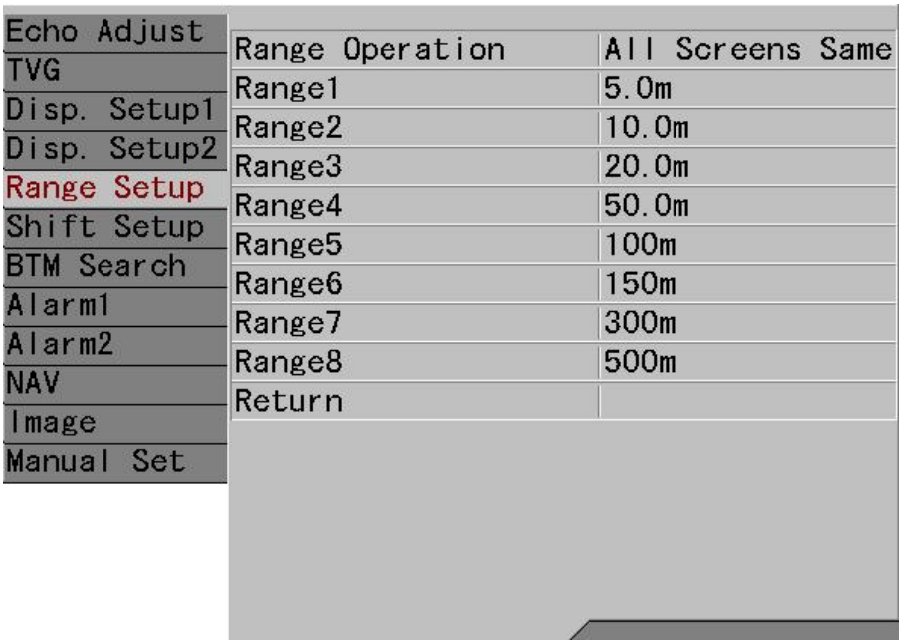


Switching the range operation to “Change with [All Screens Same]” or to “Change with [Scr. Individual]:

1. Press [MENU] key

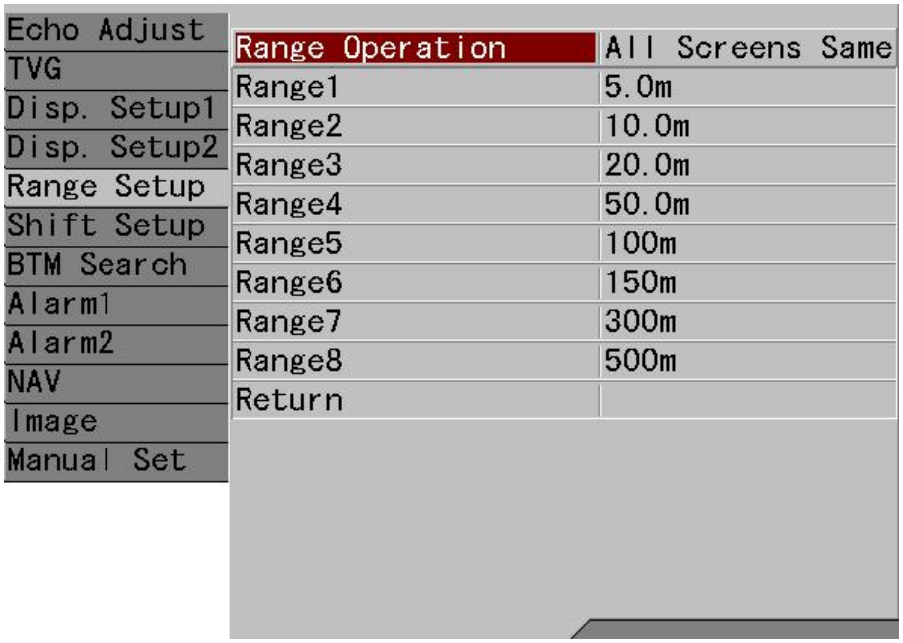
.

2. The menu is displayed. Move the cursor to [Range Setup] with [▲] or [▼] keys of .



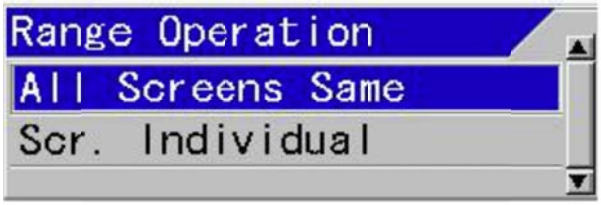
3. Press [▶] of .

4. [Range Setup] of menu is displayed. Move the cursor to [Range Operation] with [▲] or [▼] of .



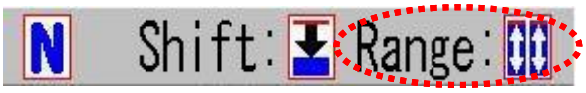
5. Press [▶] key of .

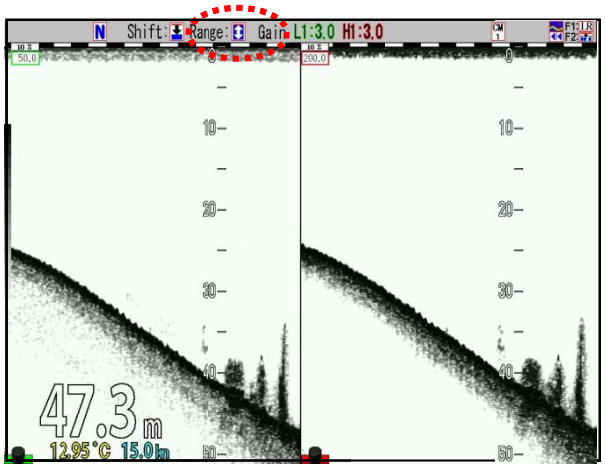
6. [Range Operation] of menu is displayed. Moving the cursor with [▲] or [▼] keys of , select [All Screens Same] or [Scr. Individual].

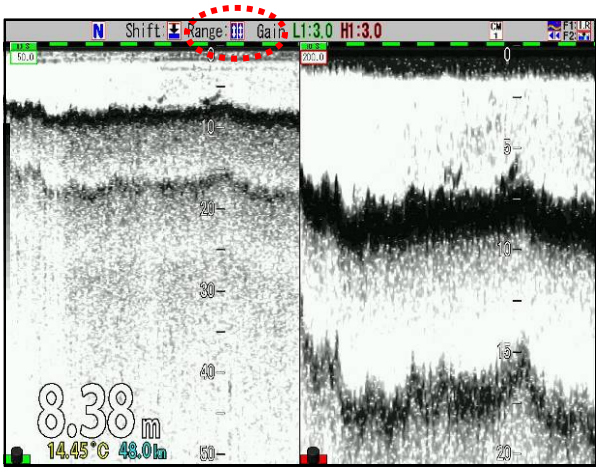


7. When [MENU] key is pressed, the menu disappears and the setup of range operation is complete.

Icon showing the range condition in header changes as follows:







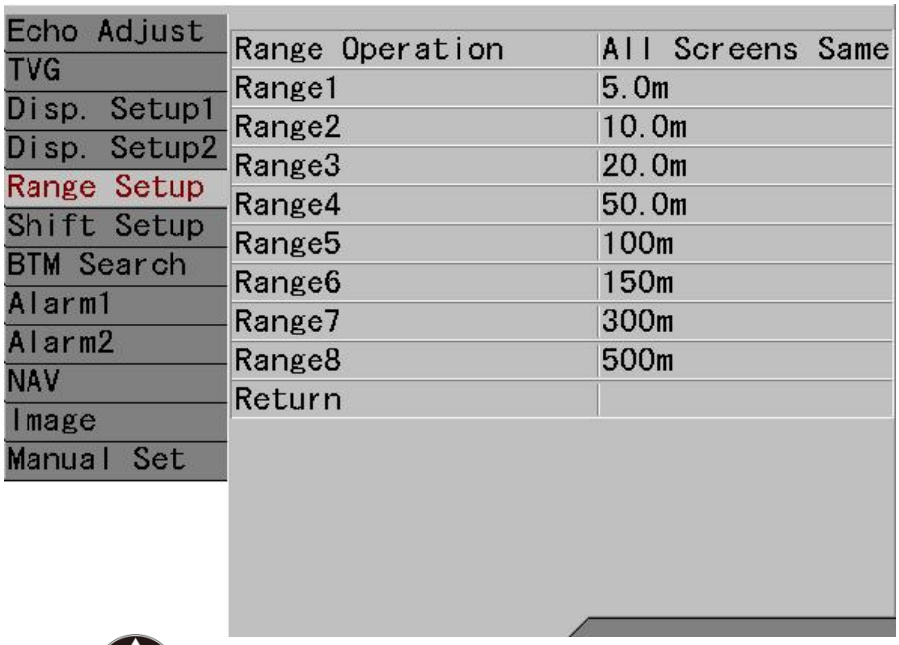
All Screens Same range Scr. Individual range

Caution: When [Scr. Individual] range is set, the speed of [Image Speed] will be the speed of the deepest range set.

To register ranges:

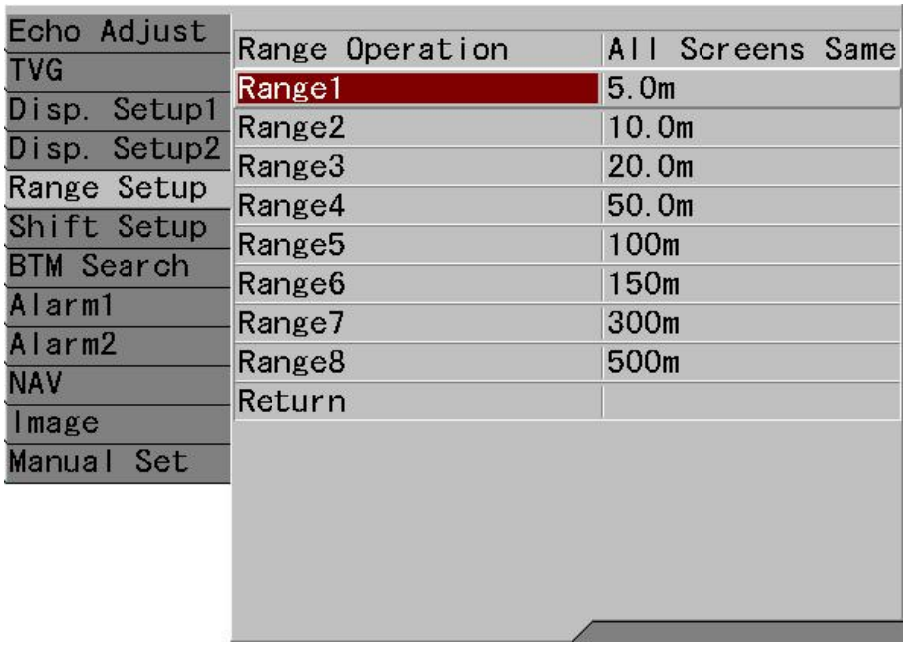
1. Press [MENU] key MENU .

2. The menu is displayed. Move the cursor to [Range Setup] with [▲] or [▼] keys of .



3. Press [▶] of .

4. [Range Setup] of the menu is displayed. Move the cursor to [Range1] with [▲] or [▼] keys of .

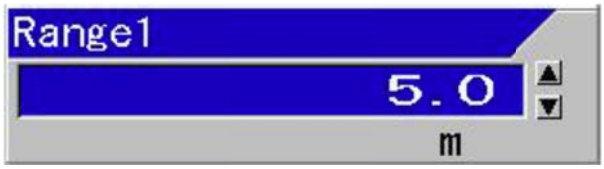


5. Press [▶] key of .

6. [Range1] of the menu is displayed. Set range by increasing or decreasing numeric value with [▲] or [▼] keys of .

- The numeric value increases with [▲] key.
- The numeric value decreases with [▼] key.

When the key is kept pressed, the value automatically shifts to the upper digit.



7. When [SUBMENU] key

is pressed, the menu returns to [Range Setup].
8. For setup of the next range registration, the procedures 4 to 7 shall be repeated.
9. When [MENU] key

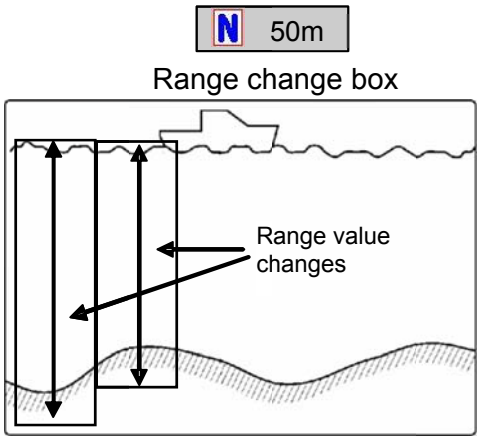
is pressed, the menu disappears and range registration is complete.

⚠ **Hint:** It is recommended to assign smaller number to shallow range and larger number to deeper range. If so arranged, range key can be operated in such a way [▲] is for shallow direction and [▼] for deeper direction.

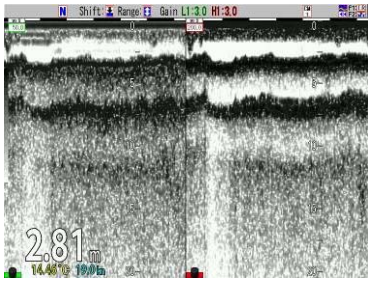
To change ranges:

1. When the header display is , range of normal images can be changed.
   If the header display is , press [NORMAL/ZOOM] key to turn to .
2. When [▲] of [RANGE] key is pressed, the No. of the registered range turns one number smaller.
   When [▼] is pressed, the No. turns one number larger.

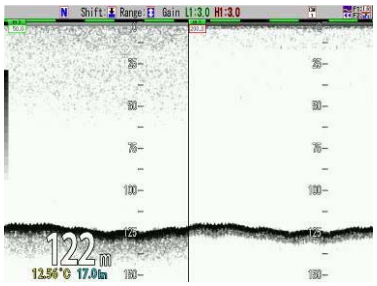
When the range is changed, the range change box is displayed on the screen for 5 seconds.



<Examples of display>



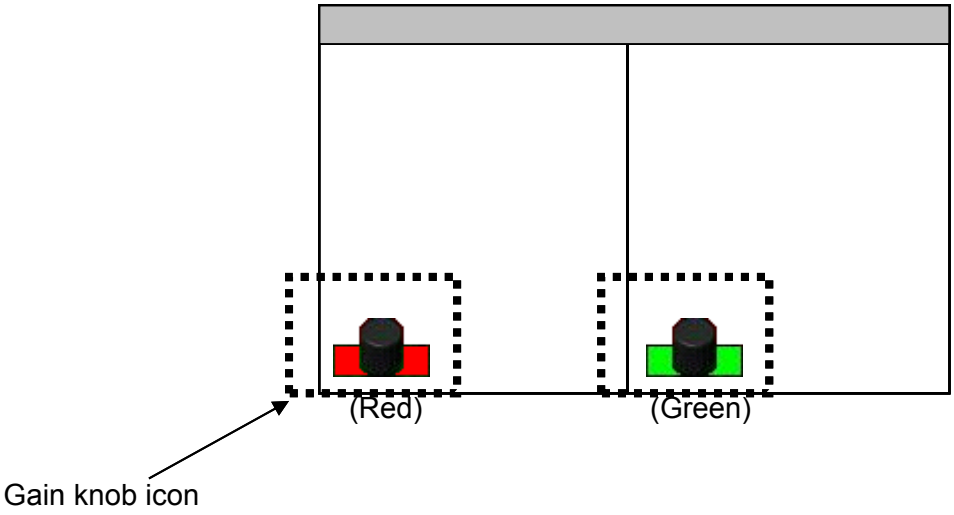
Shallow depth range



Deep depth range

To switch the operation screen for individual range:

1. At the left bottom corner of each screen, nothing is shown, or [Gain knob icon] of (red) or (green) is displayed.
   The range operation can be performed on the screen where [Gain knob icon] (red) is displayed.



2. To switch over [Gain knob icon] to (red), keep pressing [GAIN-L/SEL] at left side, and [GAIN-R/SEL] at right side pressed until [Gain knob icon] turns to (red).

3. [Range] key is pressed, the range of the screen with [Gain knob icon] (red) changes.

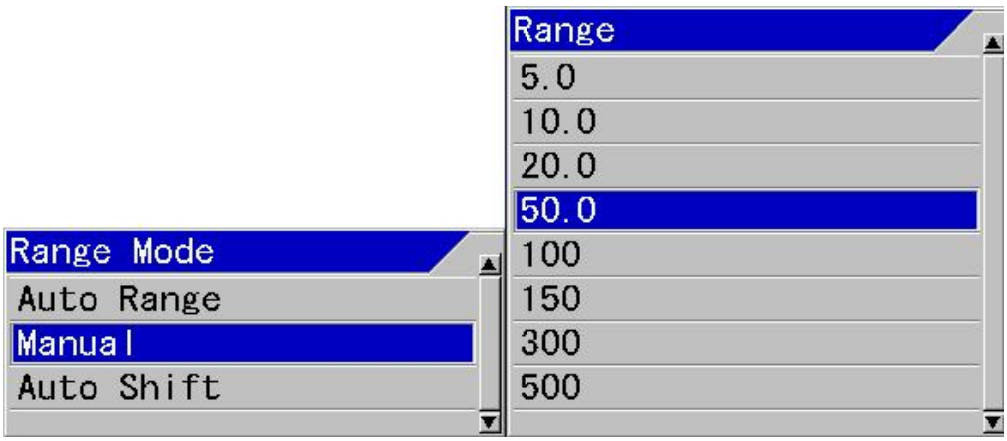
2.2.4 Manual change of shift positions of normal images

When Range Mode is set at manual, shift can be changed manually.
In the manual shift, there are two ways: one is to change shift positions of 4-frequency images with [All Screens Same] and another is to change images per frequency with [Scr. Individual].
The manual shift can be switched over among 4 types of shift types, [Numeric Value], [Range Dependant], [Preset Value] and [Range Ratio].
In [Numeric Value], the shift value is changed directly.
In [Range Dependant], the shift value is changed to the most appropriate shift value specified per range.
In [Preset Value], each time shift key is pressed, 8 registered shift values switch in sequence.
In [Range Ratio], the shift value changes at every 1/5 of a range.

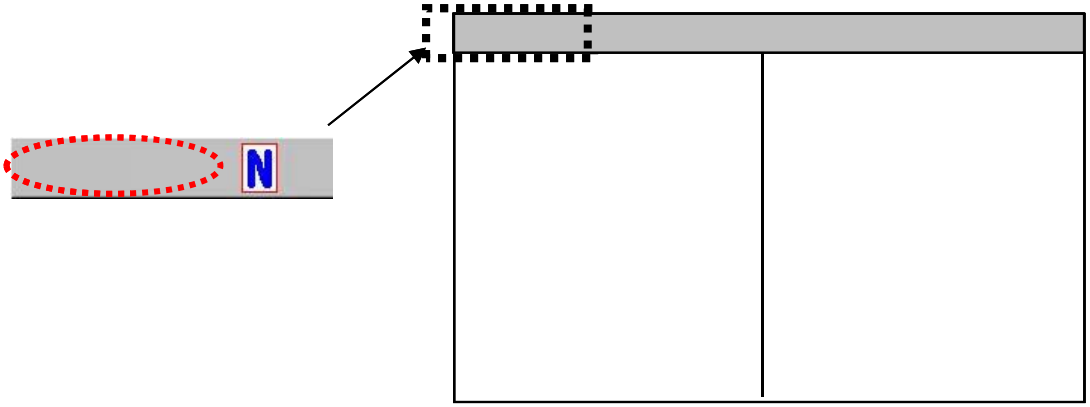
In addition, if [Shift digit input] is set at [F1] key (F1) or [F2] key (F2), shift operation with a specified digit of shift value can be performed regardless of the operation mode above.

To set Range Mode at [Manual]:

1. Keep [SHIFT/M OFF] key (SHIFT M OFF) pressed until [Range Mode] menu is displayed.
2. Move the cursor with [▲] or [▼] keys of (◀▶▲▼) to select [Manual].



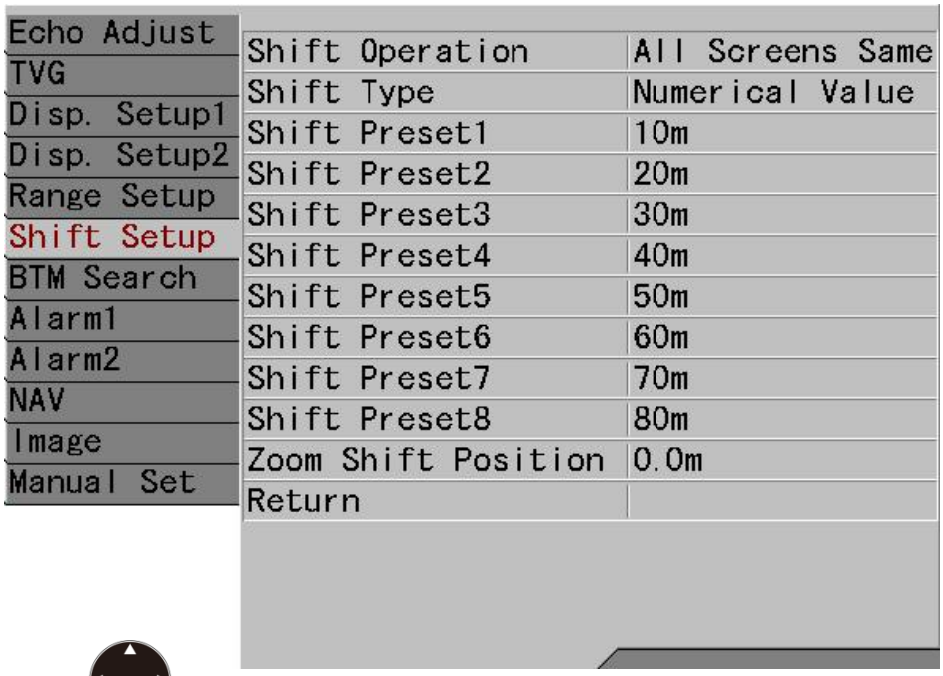
3. Press [ENT] key (ENT). The mode is set at [Manual] and turns in manual shift.
   The header showing Range Mode disappears.



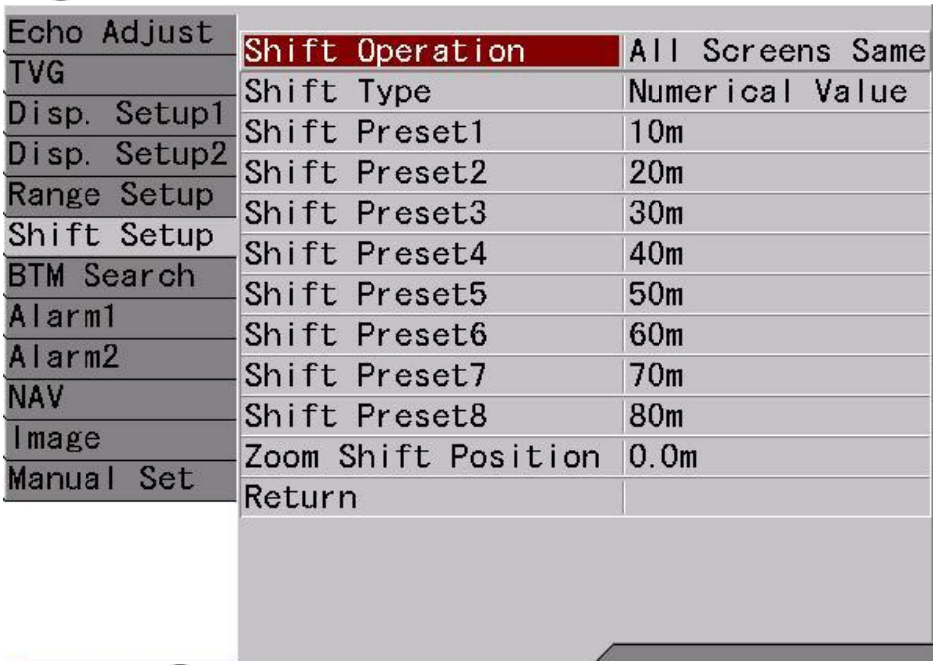
To switch shift operation into “Changes with [All Screens Same] “or “Change with [Scr. Individual]”:

1. Press [MENU] key

.
2. The menu is displayed. Move the cursor to [Shift Setup] with [▲] or [▼] keys of .

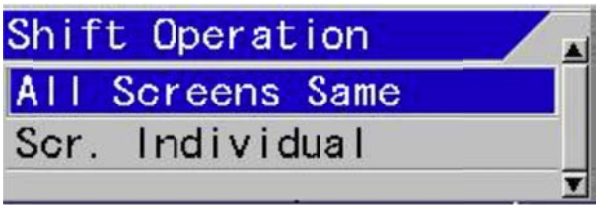


3. Press [▶] of .
4. [Shift Setup] of the menu is displayed. Move the cursor to [Shift Operation] with [▲] or [▼] keys of .



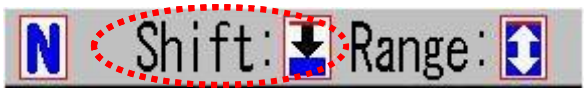
5. Press [▶] key of .

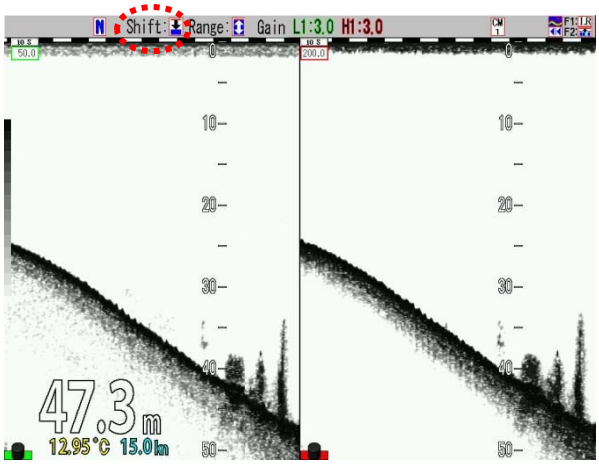
6. [Shift Operation] of the menu is displayed. Move the cursor with [▲] or [▼] keys of and select [All Screens Same] or [Scr. Individual].

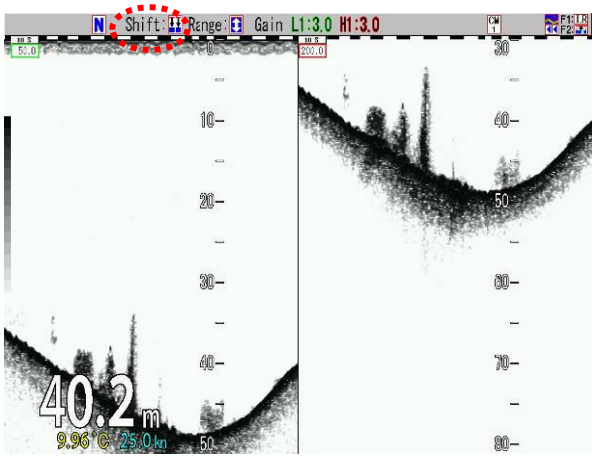


7. Press [MENU] key MENU , and the menu disappears and the setup of shift operation is complete.

The icon showing the shift conditions in header display changes:







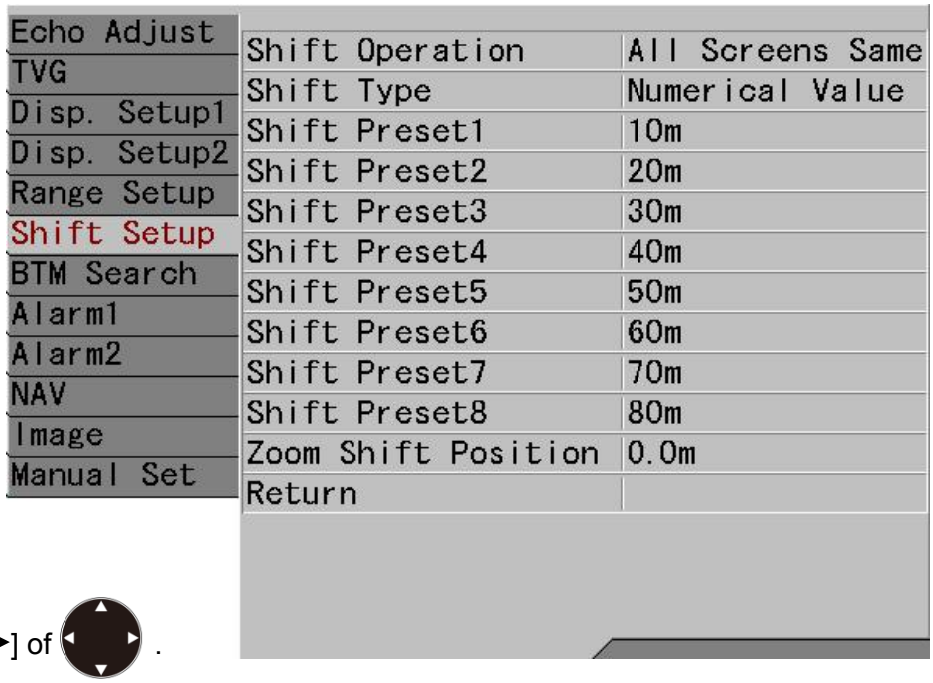
All Screens Same Scr. Individual

Caution: When [Scr. Individual] is set, the speed of [Image Speed] turns to the speed of the deepest shift.

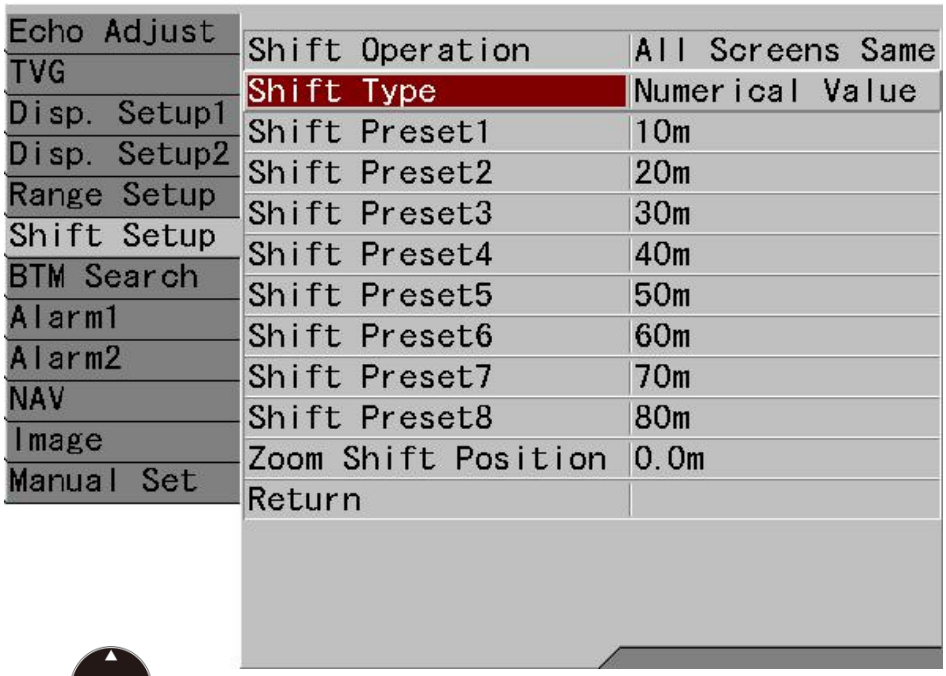
To switch over the shift operation type:

1. Press [MENU] key

.
2. The menu is displayed. Move the cursor to [Shift Setup] with [▲] or [▼] keys of .

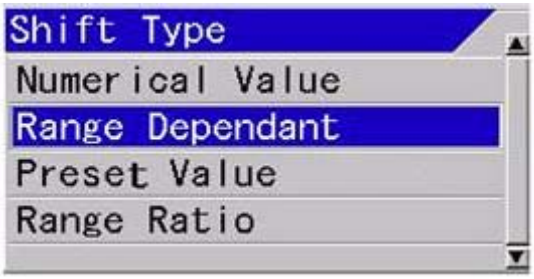


3. Press [▶] of .
4. [Shift Setup] of the menu is displayed. Move the cursor to [Shift Type] with [▲] or [▼] keys of .



5. Press [▶] of .

6. [Shift Type] of the menu is displayed. Move the cursor with [▲] or [▼] keys of and to select one of [Numerical Value], [Range Dependant], [Preset Value] or [Range Ratio].



7. Press [MENU] key

, and the menu disappears and the setup of shift type is complete.

Details of shift type:

1. Numeric Value

Each time shift key is pressed, the numeric value of shift changes.

When [▲] of [Shift] key

is pressed, it shifts to the shallower direction.

When [▼] of [Shift] key is pressed, it shifts to the deeper direction.

With one press of the shift key, the digit of 1 of shift changes.

When shift key [▼] is kept pressed, the digit of 1 increases in sequence and after 9 it shifts up to the digit of 10. If it is kept pressed further, the digit of 10 increases up to 90 in sequence and then shifts up to the digit of 100. If the key is kept pressed, the digit of 100 increases in sequence. After that, even in case of beyond the digit of 1000, the digit of 100 increases.

When shift key [▲] is kept pressed, the digit of 1 decreases in sequence and after 0 it shifts up to the digit of 10. If it is kept pressed further, the value decreases down to 00 and shifts up to the digit of 100. If the key is kept pressed, the digit decreases. After this, only the digit of 100 decreases even in case of beyond the digit of 1000. When a digit shifts, the value decreases in sequence in one lower digit.

Keep pressing the key until just before the intended shift value, release once from the key and press it again. Repeat this operation until it can shift to the intended depth.

2. Range Dependant

Shift value varies for each range as described the following table.

Range	Shift value
1 ~ 7.5 m	1 m
10 ~ 20 m	2 m
25 ~ 40 m	5 m
50 ~ 90 m	10 m
100 ~ 240 m	20 m
260 ~ 450 m	50 m
500 ~ 900 m	100 m
1000 ~ 2400 m	200 m
2600 ~ 3000 m	500 m

3. Preset Value

Total 8 shift preset from [Main Menu], [Shift Setup], [Shift Preset1] to [Shift Preset8] can be switched each time shift key is pressed.

When [▲] of [Shift] key

is pressed, the shift changes to the registered range with one number smaller.

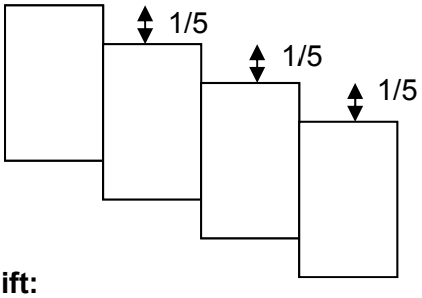
When [▼] of [Shift] key

is pressed, the shift changes to the registered range with one number greater.

This is an effective type of shift in the case where a constant shift value is specified depending on fishing.

4. Range Ratio

Independent of the range, it can shift at approximately 1/5 unit for the whole range:

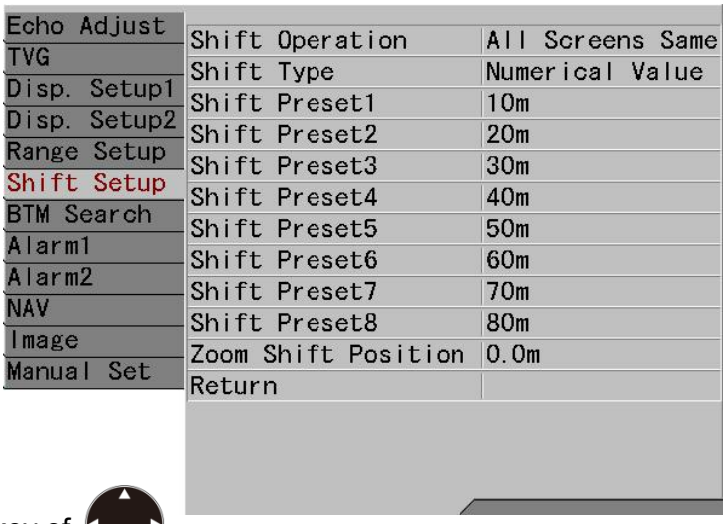


To register shift:

1. Press [MENU] key

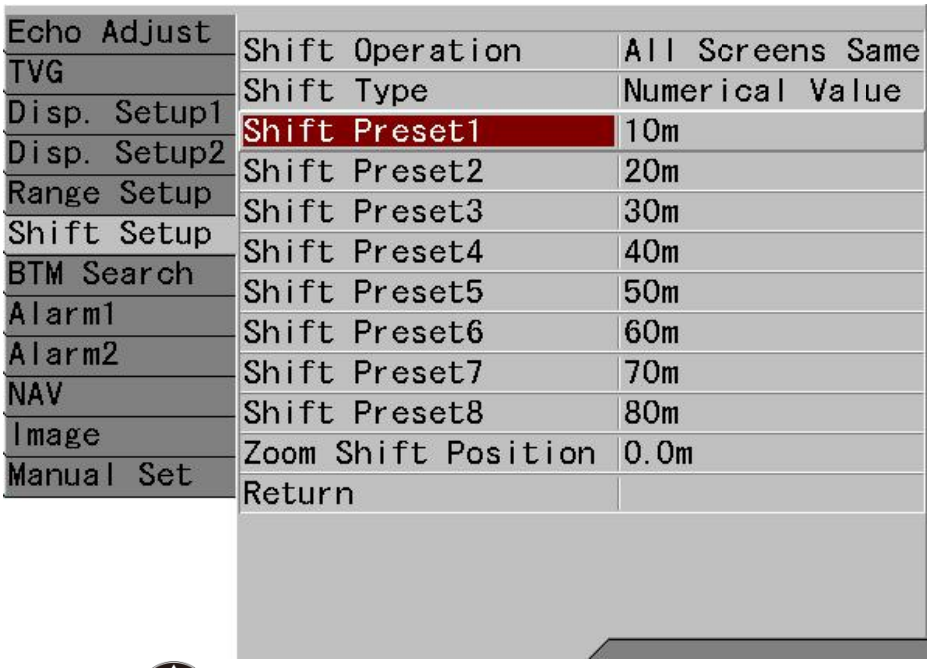
.

2. The menu is displayed. Move the cursor to [Shift Setup] with [▲] or [▼] keys of .



3. Press [▶] key of .

4. [Range Setup] of the menu is displayed. Move the cursor to [Shift Preset1] with [▲] or [▼] keys of .



5. Press [▶] key of .

6. [Shift Preset1] of the menu is displayed. Set the range by increasing/decreasing of the numeric values with [▲] or [▼] keys of .

With [◀] key, the digit can be moved to larger side.
With [▶] key, the digit can be moved to smaller side.
With [▲] key, the numeric value increases.
With [▼] key, the numeric value decreases.

7. When [SUBMENU] key SUB MENU is pressed, the menu returns to [Shift Setup].

8. To set the next shift preset, repeat the procedures 4 to 7.

9. Press [MENU] key MENU , and the menu disappears and the shift preset is complete.

Hint: It is recommended to assign smaller number to shallow shift and larger number to deeper shift. If so arranged, shift key can be operated in such a way [▲] is for shallow direction and [▼] for deeper direction.

To change shift:

1. When the header display is , shift of normal images can change.

   When the header display is , press [NORMAL/ZOOM] key

to turn to .

2. When [▲] of [Shift] key

is pressed, it shifts to shallow direction.

   When [▼] of [Shift] key is pressed, it shifts to deep direction.

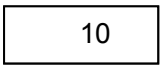
   In the case [Shift Type] is [Preset Value]:

   When [▲] of [Shift] key

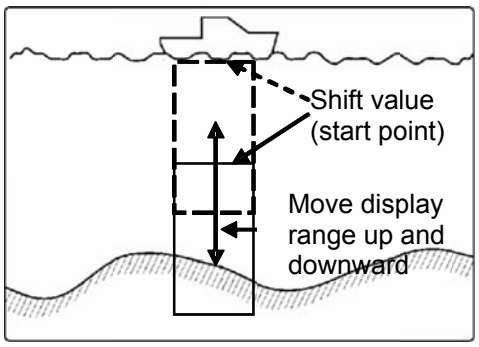
is pressed, the range changes to the registered range with one number smaller.

   When [▼] of [Shift] key is pressed, the range shifts to the registered range with one number greater.

When the shift is changed, a shift change box is displayed for 5 seconds at the upper side of the shift scale.



Shift change box



To switch ON/OFF of shift:

1. Each time [SHIFT/M OFF] key is pressed , the shift is switched on or off.

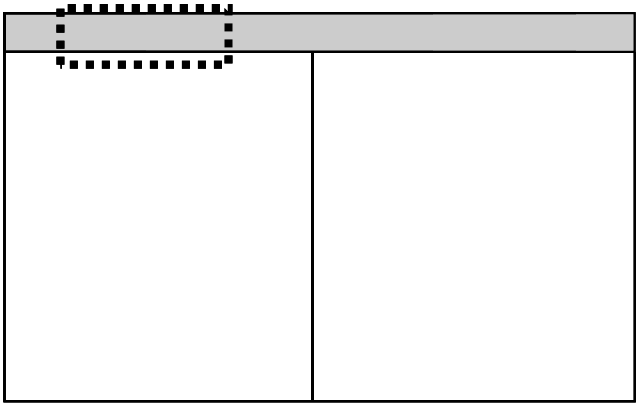
The icon showing the shift conditions in header display changes:

Shift at [All Screens Same] : ON

Shift : [OFF]

Shift at [Scr. Individual] : ON

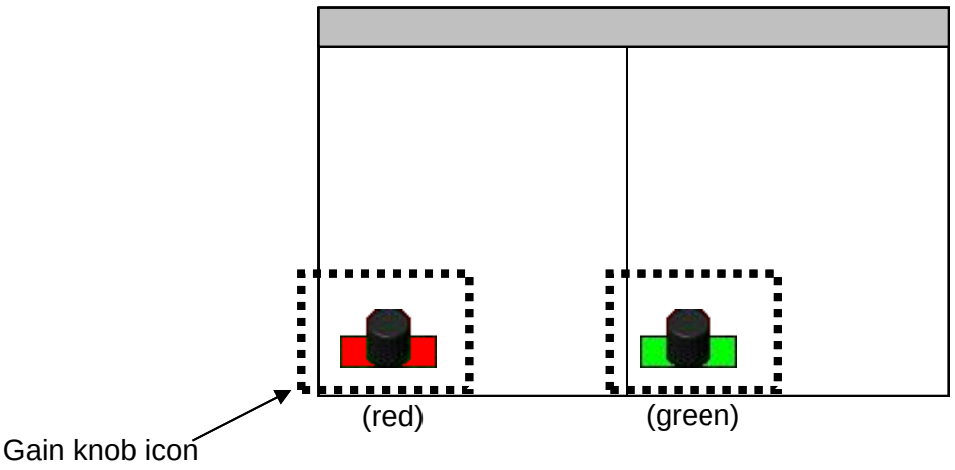
Icon for shift status



To switch the operation screen for screen individual shift:

1. At the lower left side of each screen, nothing is displayed or [Gain knob icon] of (red) or (green) is displayed.

Range operation can be performed on the screen where [Gain knob icon] (red) is displayed.



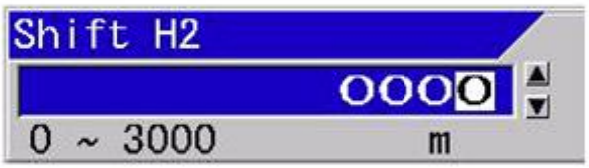
2. To turn [Gain knob icon] to (red), press [GAIN-L/SEL] for the left screen and [GAIN-R/SEL] for the right screen until [Gain knob icon] turns (red).
3. When [Shift] key is pressed, [Gain knob icon] turns to (red) shift.

[Shift Synchronized] (Shift digit input) by [F1]/[F2] key

1. If [Shift Synchronized] is set on [F1] key or [F2] key , shift can be changed in values regardless of the setup of [Shift Type].

   As for the setup on [F1]/[F2] keys, please see “4.2.2 Assign intended operations to function keys ([F1]/[F2])”, p 4 - 2.
2. Press [F1] key or [F2] key .

   [Shift Synchronized] box is displayed:



3. Set range by increasing/decreasing numeric values with [▲] or [▼] keys of .

   The digit can be larger with [◀] key.
   The digit can be smaller with [▶] key.
   The value increases with [▲] key.
   The value decreases with [▼] key.

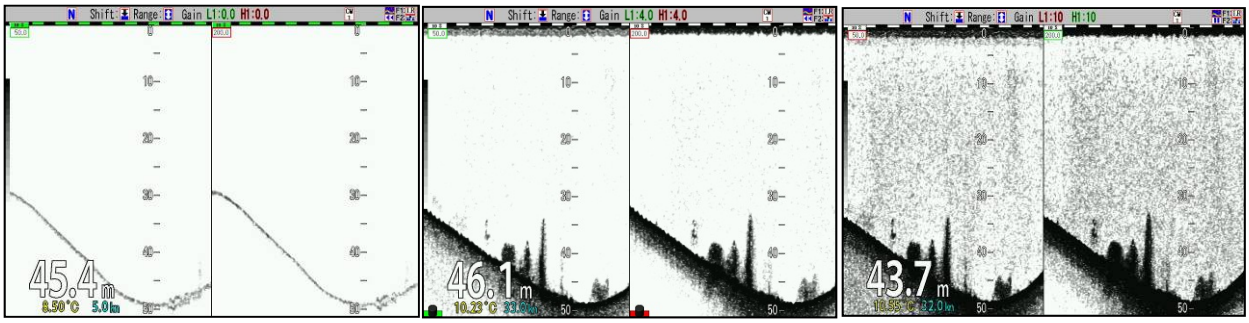
2.2.5 Adjustment of image gain

On CVS-FX2/FX2BB, gain of 4-frequency images can be adjusted individually.
For gain adjustment, there are two modes: individual mode and synchronized mode. In the individual mode, the gain is adjusted individually on a selected operation screen. In synchronized mode, the gain on all screens are adjusted all together by one gain adjustment knob after gain adjustment is optimized individually for each screens.
In the synchronized gain, the gain of all screens change keeping the gain difference between screens.
On CVS-FX2/FX2BB, the gain of all screens including images in the past changes by operation of the gain knobs. Also, it can be switched to a mode in which only the gain of the current image changes, to watch changes by the gain operation.

If the gain is increased too much, there is too much noise to make distinctions with signs of fish.
If the gain is decreased too much, images and fish signs become too faint to distinguish.

Adjust the gain to your preference while watching the image.

<Example of gain adjusted images>

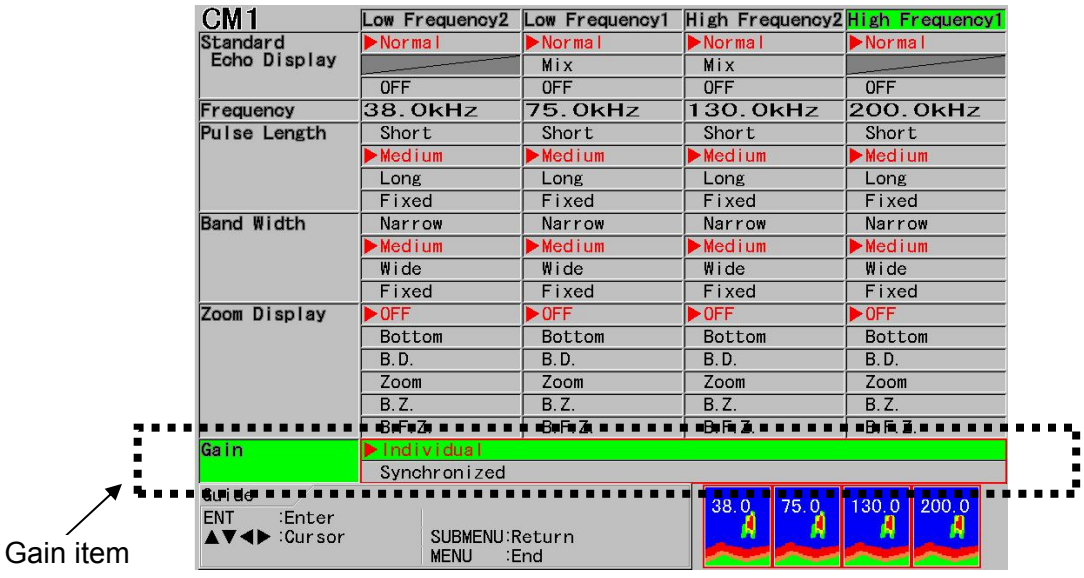


Too low Appropriate Too high

For gain adjustment (individual) per screen:

1. At CM1, press [CM1] key (lights red [CM1] key)

2. CM menu is displayed. Point the cursor to “Individual” of gain item with .



3. Press [ENT] key

.

4. Press [CM1] key (lights red [CM] key)

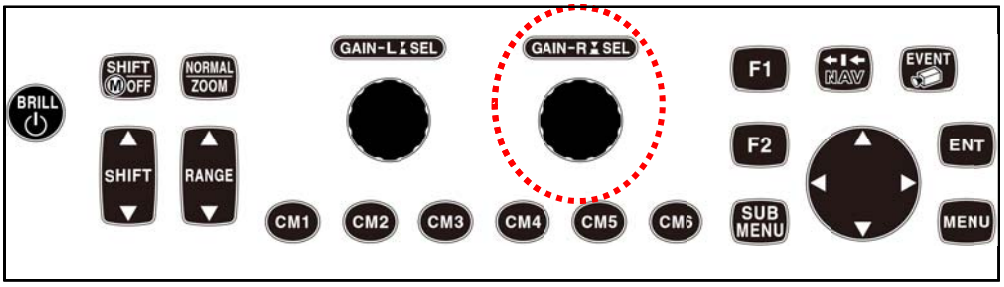
to close CM menu.

For adjustment of gain per screen (individually):

- In the case of single frequency screen:

  Regardless of frequency, operate with [GAIN-R/SEL]

.



If [GAIN-R/SEL]

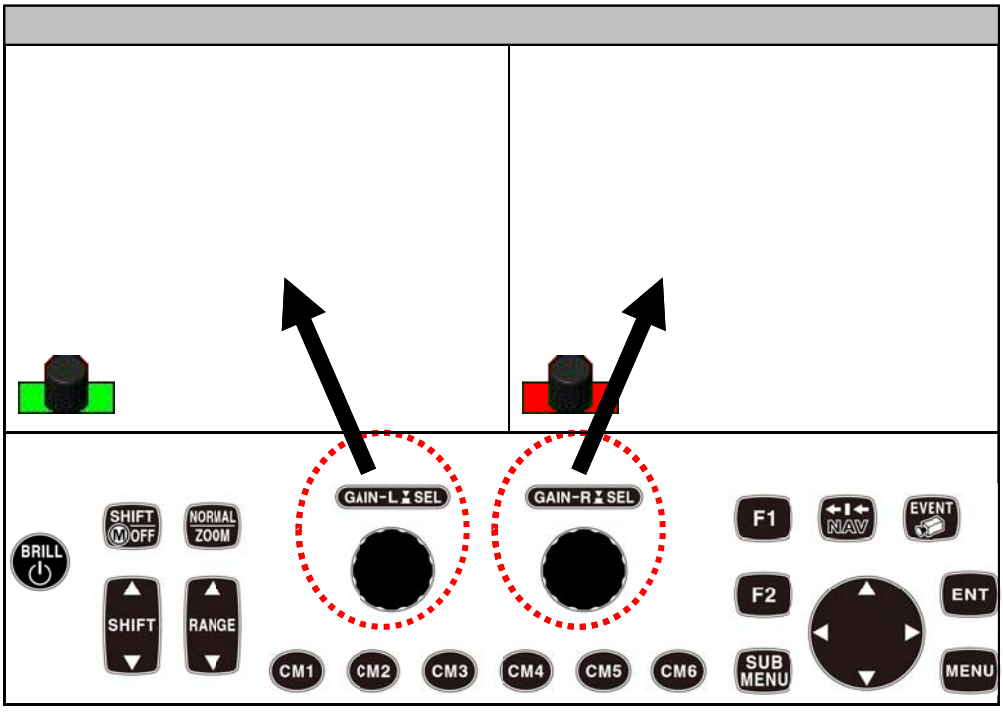
is turned to right, the gain increases, and the gain decreases if turned to left. The gain knob at the left side is invalid.

- In the case of dual frequency screen:

  The gain for the left side screen is operated with [GAIN-L/SEL]

  and the right side with [GAIN-R/SEL]

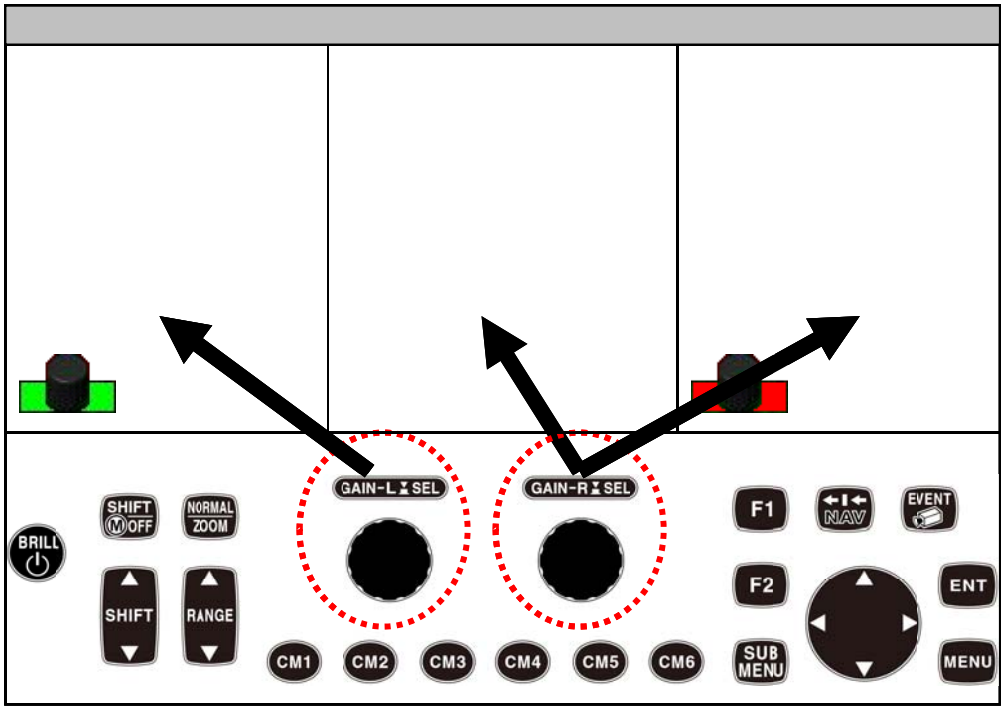
.



When [GAIN-L/SEL] or [GAIN-R/SEL] are turned to right, the gain increases, and when turned to left, the gain decreases.

- In the case of 3-frequency screen:

Regardless of frequency, the gain at left side screen is operated with [GAIN-L/SEL] , and the gain at the center screen and the right side screen are operated with [GAIN-R/SEL] .



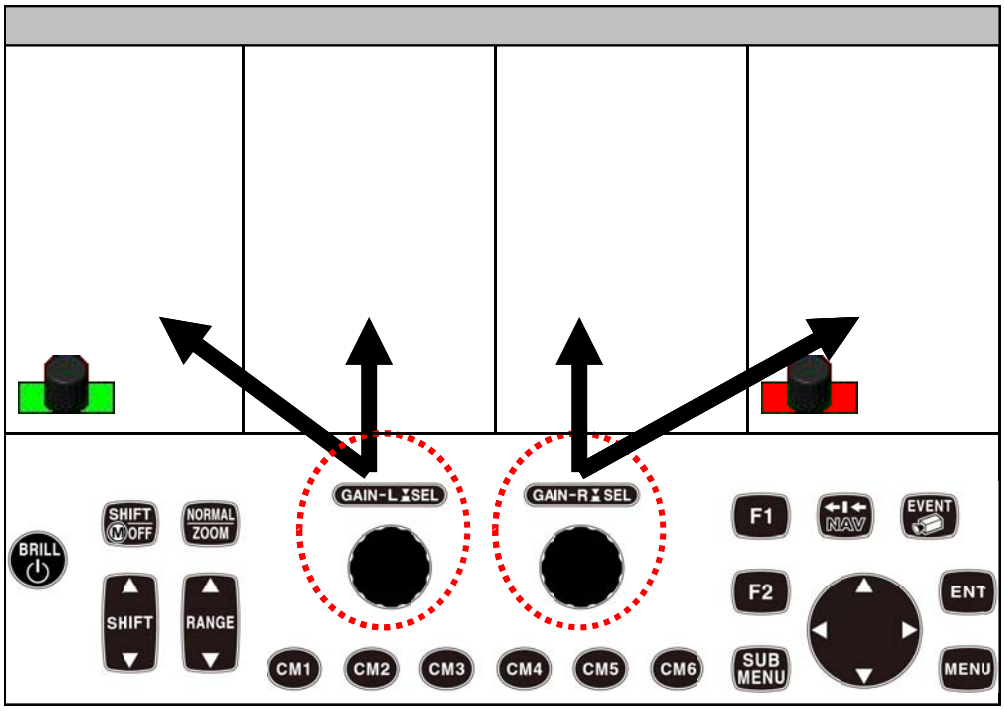
The gain can be adjusted of the screens on which (red) or (green) [Gain knob icon] on the lower left of screen are displayed.

When [GAIN-L/SEL] and [GAIN-R/SEL] are turned to right, the gain increases and when turned to left the gain decreases.

To switch gain adjustment at the center and the right side, press [Gain-R/SEL] until [Gain knob icon] (red) appears on the lower left of the aimed screen.

- In the case of 4-frequency screen:

Regardless of frequency, the gain of two left screens (Low frequency 2/Low frequency 1) is operated with [GAIN-L/SEL] and the gain of two right screens (High frequency 2/ High frequency 1) with [GAIN-R/SEL] .



The gain can be adjusted of the screen in which [Gain knob icon] of (red) or (green) is shown at the lower left of screen.

If [GAIN-L/SEL] or [GAIN-R/SEL] is turned to the right, the gain increases, and if turned to the left the gain decreases.

To switch the gain adjustment at left side (Low frequency 2/Low frequency 1), press [GAIN-L/SEL] until [Gain knob icon] of (red) appears at the lower left of the aimed screen.

To switch the gain adjustment at right side (High frequency 2/High frequency 1), press [GAIN-R/SEL] until [Gain knob icon] of (red) appears at the lower left of the aimed screen.

To adjust the gain:

The gain can be adjusted on the screens on which [Gain knob icon] of (red) or (green) is displayed at the lower left.

When gain knob is not displayed on the lower left of the screen of which the gain is intended to be adjusted keep [GAIN-L/SEL] pressed for the left side (Low frequency 2/Low frequency 1) and [GAIN-R/SEL] for right side (High frequency 2/High frequency 1) until [Gain knob icon] of (red) appears at the lower left of the aimed screen.

When [GAIN-L/SEL] is turned to the right in the left screen (Low frequency 2/Low frequency 1) or [GAIN-R/SEL] in the right screen (High frequency 2/High frequency 1), the gain increases, and when turned to the left, the gain decreases.

When the gain knob is turned, gain adjustment box is displayed in the applicable operation effective screen and gain value is indicated. The numeric value and the progress bar increase or decrease depending on the operation.

At the same time, indication of gain values of the corresponding screen also increases/decreases in the header display also increases or decreases.

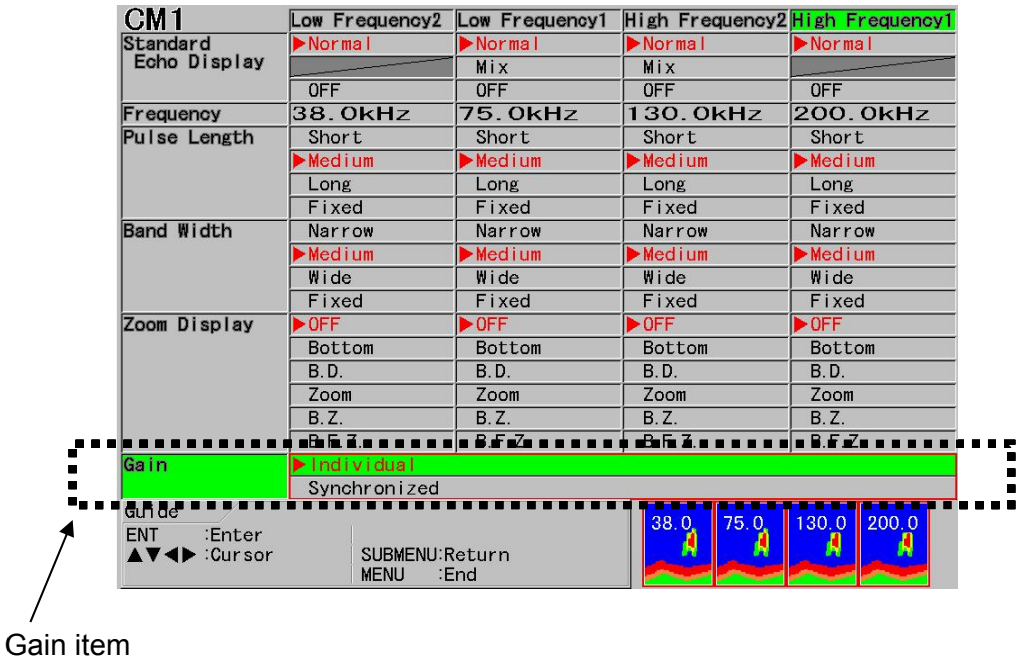
<Indication of gain values in header display>

L2: Low frequency2 L1: Low frequency1 H2: High frequency2

Caution: The gain adjustment box automatically disappears after 5 seconds from completion of operation. It also disappears when the menu key is pressed. The gain value per screen is reflected in the header display.

For gain adjustment of all screens at the same time (synchronized):

1. At CM1, press [CM1] key (CM1) (Lights red [CM] key).
2. CM menu is displayed. Move the cursor to [Synchronized] of the Gain item with .



3. Press [ENT] key (ENT) .
4. Press [CM1] key (CM1) to close CM menu (lights red [CM] key)

At synchronized gain, operation of one gain knob can change the gain for maximum 4 screens (8 screens including zoom) at the same time, by increasing/decreasing with the same change step, from the gain of each screen set individually.

When gain is set in [Synchronized], [Gain knob icon] (red) at the lower side of screens will turns to (red).

(red) indicates the screen where VRM operation is valid and when TVG is assigned to [F1/F2] keys.

To switch the active screens for VRM and [F1]/[F2] keys, press [GAIN-L/SEL] (GAIN-L/SEL) for left screen, [GAIN-R/SEL] (GAIN-R/SEL) for right screen.

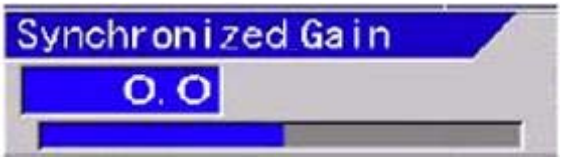
For gain adjustment of all screens at same time (synchronized):

1. If [GAIN-L/SEL]

or [GAIN-R/SEL]

is turned, the [Synchronized Gain] box is displayed.

   This [Synchronized Gain] box indicates amount of change in ± value commonly given to the gain individually set per each screen.



2. If [GAIN-L/SEL]

or [GAIN-R/SEL]

is turned to the right, the gain increases, and if turned to the left, the gain decreases.

   The gain of all screens can be changed simultaneously taking the gain of each screen as reference.

> ⚠ **Caution**: Synchronized gain adjustment box disappears automatically after 5 seconds from the completion of operation. It also disappears by pressing of the menu key.

The values of gain per screen plus the adjusted value of synchronized gain is indicated in the header display

<Example of indication>

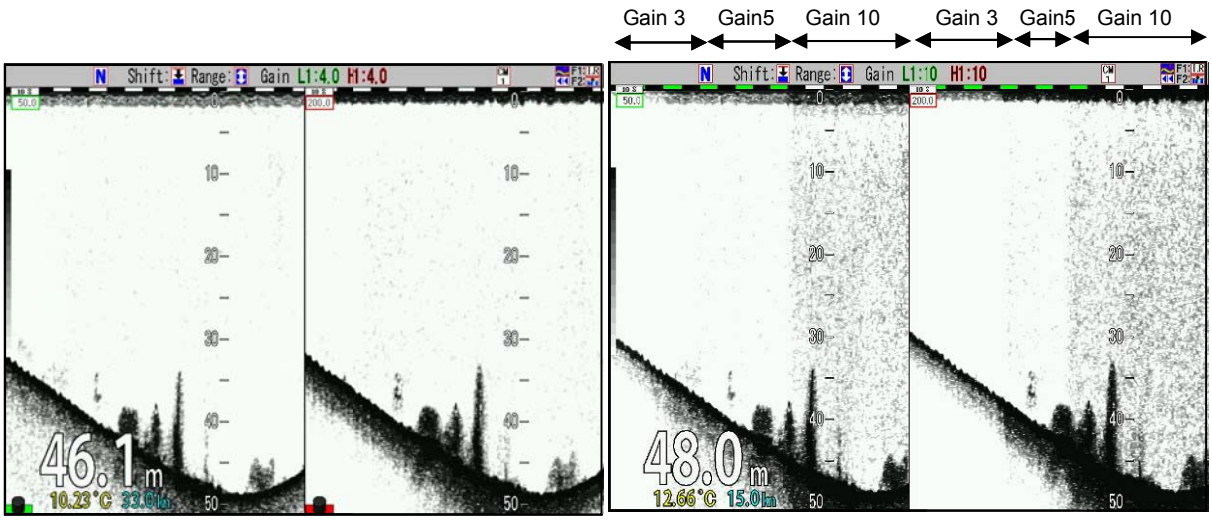
Changing the synchronized gain to 1.0

L2: Low frequency2	L1: Low frequency1	H2: High frequency2	L2: Low frequency2	L1: Low frequency1	H2: High frequency2

Types of gain change:

There are two types of gain change when gain adjustment is done with a gain knob. One is that the gain of all screens including images in the past is changed and the other is that only the gain of the current mages is changed.

<Examples of images of gain change types>



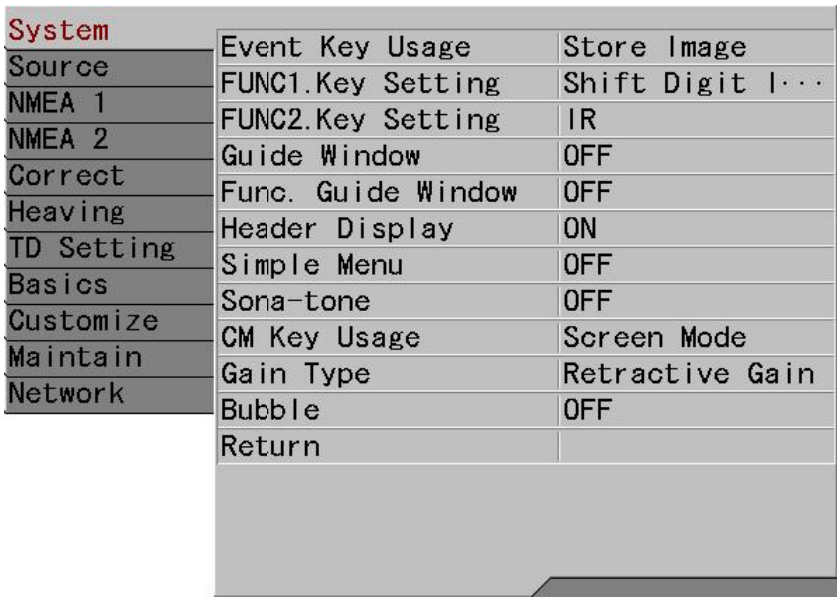
All screens Current images only

To switch over change type of gain:

1. Press [SUBMENU] key

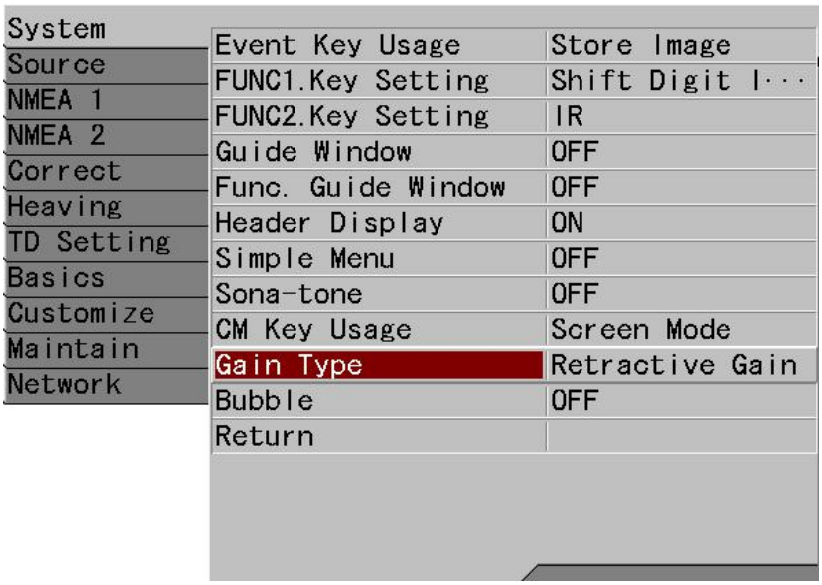
.

2. The SUBMENU is displayed. Move the cursor to [System] with [▲] or [▼] keys of .



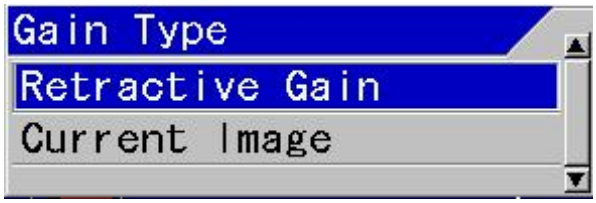
3. Press [▶] key of .

4. [System] of the SUBMENU is displayed. Move the cursor to [Gain Type] with [▲] or [▼] keys of .



5. Press [►] key of .

6. [Gain Type] of the SUBMENU is displayed. Move the cursor to [Retractive Gain] or [Current Image] with [▲] or [▼] keys of .



7. Press [MENU] key MENU, and the SUBMENU disappears and the selected [Gain Type] is set.

⚠ **Caution:** When the Gain Type is switched, the color of the past images changes. This is because that the display method of images for the switched gain type and that of previous type are different.
After scroll of one screen, normal images will be on display.

2.2.6 Adjustment of TVG

The reflected signals of echo sounder have less sensitivity due to attenuation, as depth is deeper.

This means that the same fish schools at shallower positions are displayed stronger and those at deeper positions are displayed weaker.

TVG is the function, according to the characteristics of ultrasonic sound, to correct the reflected signals attenuated according to their depth and to equalize the gain of the images along the change of depth.

In the range of depth where TVG function is effective, fish schools of the same size can be displayed with the same sensitivity even when their depth is different.

Method of TVG can be switched over between [Optimized] and [Manual].

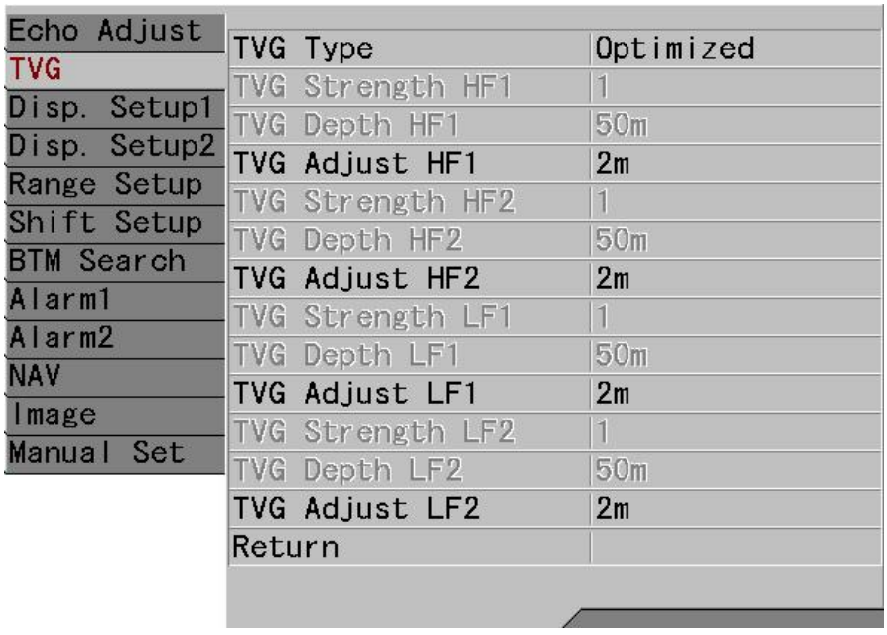
[Optimized] is the mode with gain correction depending on the depth, based on the correction curve optimized by diffusional attenuation and absorption attenuation depending on frequency of ultrasonic.

[Manual] is the mode to adjust the setting of [Strength], [Depth] and [Adjust] to fit the images to preference.

To switch between [Optimized] and [Manual]:

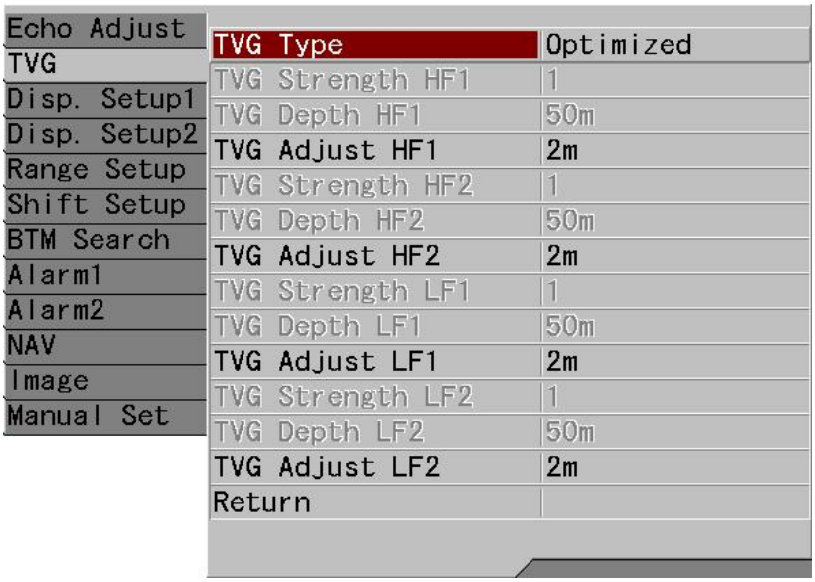
1. Press [MENU] key

.
2. The menu is displayed. Move the cursor to [TVG] with [▲] or [▼] keys of .



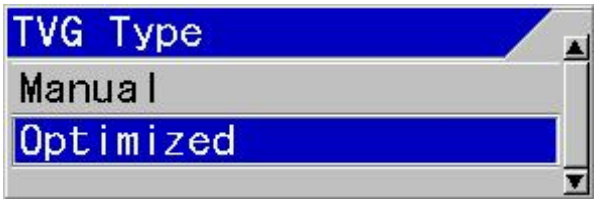
3. Press [▶] key of .

4. [TVG] of the menu is displayed. Move the cursor to [TVG Type] with [▲] or [▼] keys of .



5. Press [▶] of .

6. [TVG Type] of the menu is displayed. Move the cursor and select [Manual] or [Optimized] with [▲] or [▼] keys of .

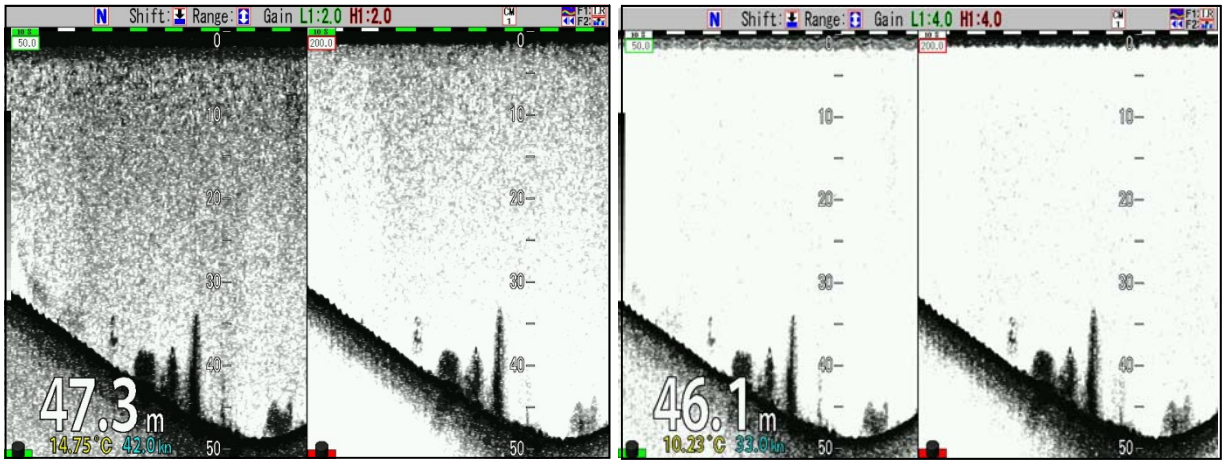


7. Press [MENU] key , and the menu disappears and the selected TVG is set.

To use of optimized TVG:

- Optimized TVG corrects the reflected signal from shallower than the [Depth] where color is produced with maximum level. This is done by having room for gain adjustment, in reference to the diffusional attenuation and absorption attenuation of ultrasonic sound.
- By optimized TVG, unnecessary reflection such as noise is eliminated, and necessary reflection from single fish and fish schools is clearly displayed at the same sensitivity regardless of their depth.
- As optimized TVG always corrects optimized TVG, no adjustment is basically needed. Only fitting to a desired gain with a gain knob is required.
  However, when it is felt that the gain is short due to the excess correction of TVG for shallower range, please adjust to a desired gain by changing the [Adjust].

<Example of optimized TVG images>



Without TVG Optimized TVG

When adjustment is needed due to excess TVG correction for shallower range:

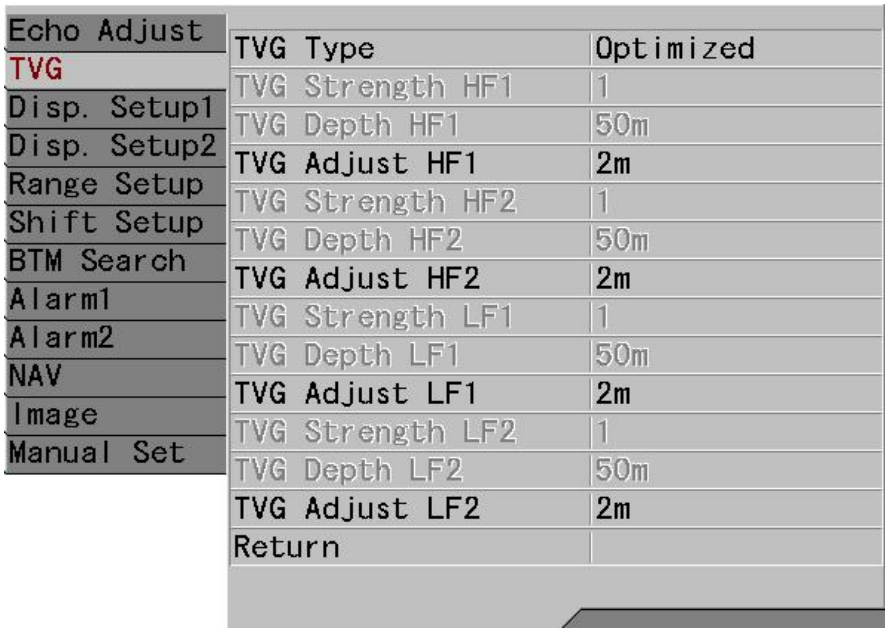
There are two ways of TVG adjustment: to adjust in the main menu and to assign [F1]/[F2] keys to adjust by the function keys.

To adjust TVG Adjust in main menu:

1. Press [MENU] key

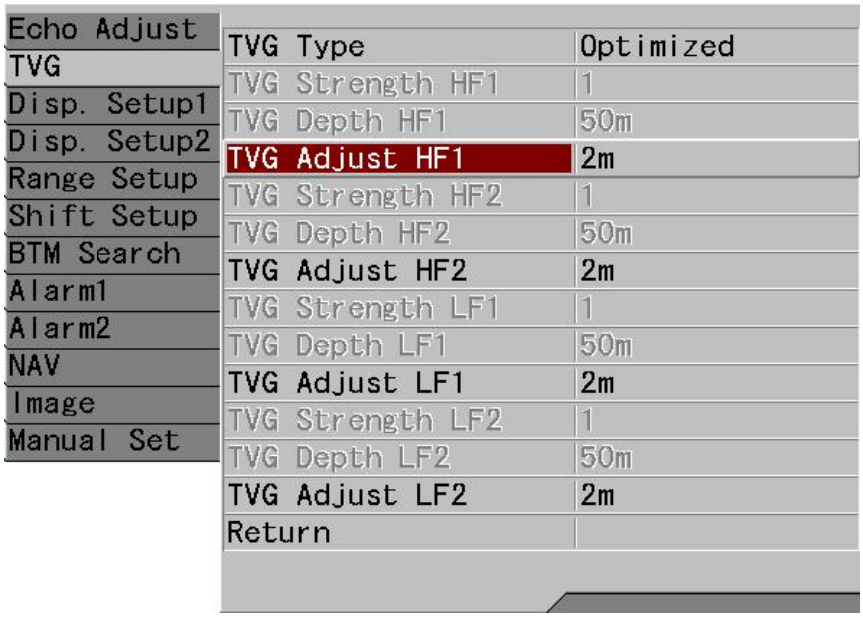
.

2. The menu is displayed. Move the cursor to [TVG] with [▲] or [▼] keys of .



3. Press [▶] key of .

4. [TVG] of the menu is displayed. Move the cursor to [TVG Adjust HF1] with [▲] or [▼] keys of .



5. Press [▶] key of .

6. [TVG Adjust HF1] of the menu is displayed. Set [TVG Adjust HF1] by increasing and decreasing the numeric value with [▲] or [▼] keys of .

   With [▲] key, the value increases.
   With [▼] key, the value decreases.

7. Press [SUBMENU] key SUB MENU to return to [TVG].
8. To set the next [TVG Adjust HF2], repeat the procedures 4 to 7.

To adjust TVG Adjust with [F1]/[F2] keys:

1. At first, assign [MENU] key MENU or [F2] key F2 with [TVG].

   As for the setup method of [F1]/[F2] keys, see "4.2.2 Assign intended operation to function keys ([F1]/[F2])", p 4 - 2.

2. Press [F1] key F1 or [F2] key F2
3. The [TVG Adjust XXX] box is displayed.

4. Select the screen for adjustment of TVG.

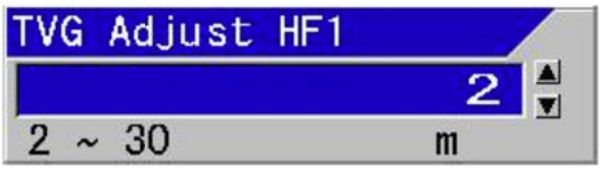
   When the left hand screen is to be selected, press [GAIN-L/SEL] GAIN-L/SEL , and when the right hand screen is to be selected, press [GAIN-R/SEL] GAIN-R/SEL to show [Gain knob icon] blinking at the lower left on the screen to be operated.

   The title display of [TVG Adjust XXX] box changes to [TVG Adjust LF1] [TVG Adjust LF2] or [TVG Adjust HF1] [TVG Adjust HF2].

Caution: [Gain knob icon] at the lower left of the screen changes to (red) when gain setting is [Individual] and to (red) when [Synchronized].

5. Adjust the numeric value with [▲] or [▼] keys of to set [TVG Adjust HF1].

With [▲] key, the value increases.
With [▼] key, the value decreases.



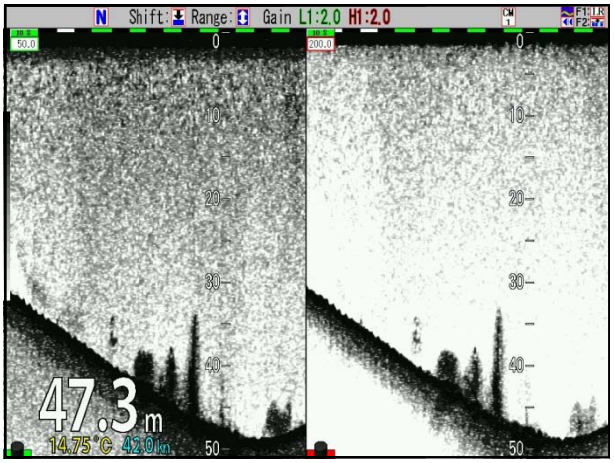
6. Press [SUBMENU] key or [MENU] key , and [TVG Adjust XXX] box disappears.

Caution: [TVG Adjust XXX] box automatically disappears 5 seconds after release of a key.

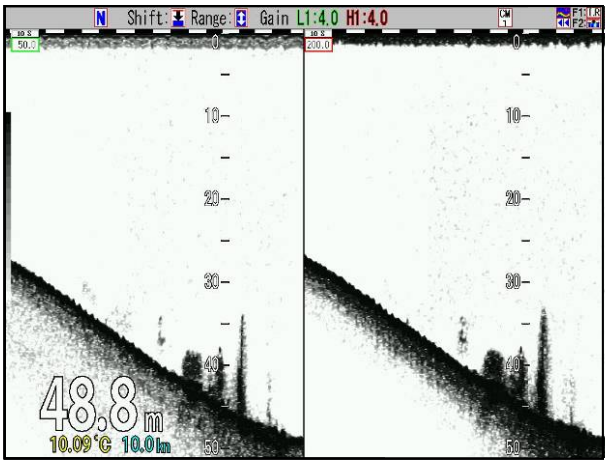
To adjust with manual TVG:

There are two ways of TVG adjustment: to adjust in the main menu and to assign [F1]/[F2] keys to adjust by the function keys.

<Examples of manual TVG images>



Without TVG



Manual TVG

To manually adjust TVG in main menu:

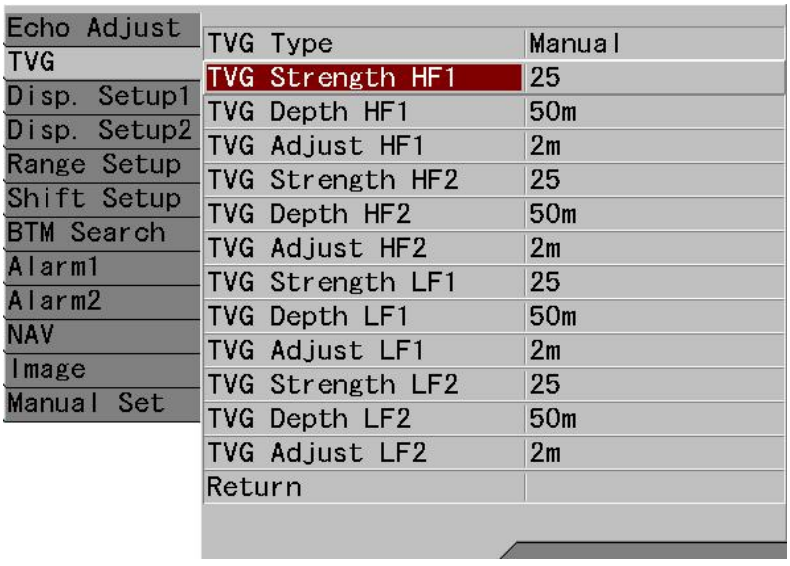
1. Press [MENU] key

.

2. The main menu is displayed. Move the cursor to [TVG] with [▲] or [▼] keys of .

3. Press of [▶] key of .

4. [TVG] of the menu is displayed. Move the cursor to [TVG Strength HF1] with [▲] or [▼] keys of .



5. Press [▶] key of .

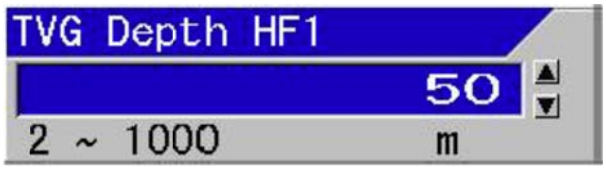
6. [TVG Strength HF1] of the menu is displayed. Increase or decrease the numeric value with [▲] or [▼] keys of to set [TVG Strength HF1].

   With [▲] key, the value increases.
   With [▼] key, the value decreases.

7. Press [SUBMENU] key to return to [TVG].
8. Point the cursor to [TVG Depth HF1] with [▲] or [▼] keys of .
9. Press [►] key of .

10. [TVG Depth HF1] of the menu is displayed. Set [TVG Depth HF1] by increasing or decreasing the numeric value with [▲] or [▼] keys of .

    With [▲] key, the value increases.
    With [▼] key, the value decreases.



11. Press [SUBMENU] key to return to [TVG].
12. Point the cursor to [TVG Adjust HF1] with [▲] or [▼] keys of .
13. Press [►] key of .

14. [TVG Adjust HF1] of the menu is displayed. Set [TVG Adjust HF1] by increasing or decreasing the numeric value with [▲] or [▼] keys of .

    With [▲] key, the value increases.
    With [▼] key, the value decreases.

15. Press [SUBMENU] key to return to [TVG].
16. For setting of the next TVG, repeat the procedures 4 to 15.

To manually adjust TVG with [F1]/[F2] keys:

1. At first, assign [MENU] key MENU or [F2] key F2 with [TVG].

   As for the setting method of [F1]/[F2] keys, see "4.2.2 Assign intended operation to function keys ([F1]/[F2])", p 4 - 2.

2. Press [F1] key F1 or [F2] key F2 .

3. TVG adjustment box is displayed.

   Each time [F1] key or [F2] key is pressed, the TVG adjustment box will switched over among [TVG Strength], [TVG Depth] and [TVG Adjust]. Select the intended item.

[TVG Strength]

[TVG Depth]

[TVG Adjust]

4. Select the screen to perform TVG adjustment.

   When the screen at the left side is selected, press [GAIN-L/SEL] GAIN-L/SEL , and when the screen at the right side is selected, press [GAIN-R/SEL] GAIN-R/SEL to make (red) blinking at the lower left of the screen to be adjusted.

   The title display of TV adjustment box will change to [TVG XX LF1] and [TVG XX LF2], or [TVG XX HF1] and [TVG XX HF2].

> ⚠ **Caution:** [Gain knob icon] at the lower left of the screen changes to (red) when gain setting is [Individual] and to (red) when [Synchronized].

5. In the case of [TVG Strength HF1], set [TVG Strength HF1] by increasing and decreasing the numeric value with [▲] or [▼] keys of .

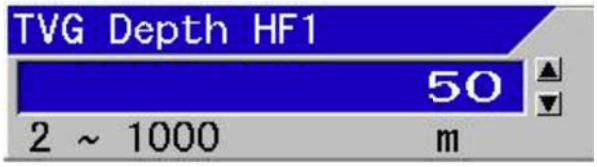
   With [▲] key, the value increases
   With [▼] key, the value decreases

6. Press [SUBMENU] key SUB MENU or [MENU] key MENU , and [TVG Strength XXX] box disappears.

> ⚠ **Caution:** [TVG Strength XXX] box automatically disappears 5 seconds after release of a key.

7. In the case of [TVG Depth HF1], set [TVG Depth HF1] by increasing or decreasing the numeric value with [▲] or [▼] keys of .

With [▲] key, the value increases.
With [▼] key, the value decreases



8. Press [SUBMENU] key SUB MENU or [MENU] key MENU , and [TVG Depth XXX] box disappears.

> ⚠ **Caution:** [TVG Depth XXX] box automatically disappears 5 seconds after release of a key.

9. In the case of [TVG Adjust High 1], set [TVG Adjust HF1] by increasing or decreasing the numeric value with [▲] or [▼] keys of .

With [▲] key, the value increases.
With [▼] key, the value decreases.

10. Press [SUBMENU] key SUB MENU or [MENU] key MENU , and [TVG Adjust XXX] box disappears.

> ⚠ **Caution:** [TVG Adjust XXX] box automatically disappears 5 seconds after release of a key.

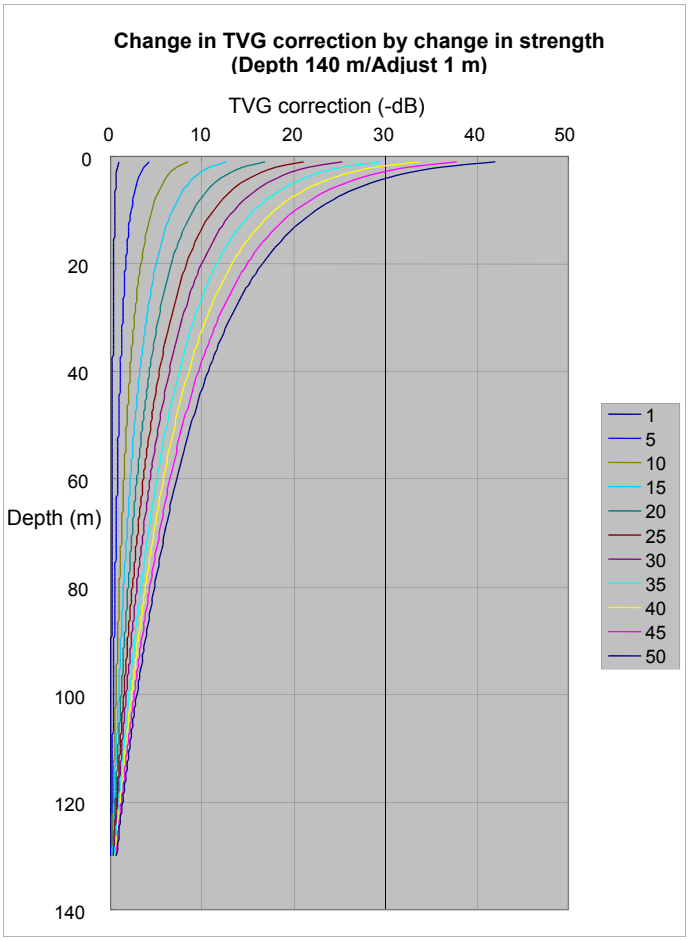
To manually correct TVG:

The reflected signals of echo sounder have less sensitivity due to attenuation, as depth is deeper.
In the TVG correction for CVS-FX2/FX2BB, a reference point of depth for correction is to be determined. This reference point is [TVG Depth].
Reflected signals from a shallower depth than this reference point are corrected to have the same sensitivity as that of the reference point.
In [Strength], the amount of change in this correction is set. The larger the value of [Strength] becomes, the larger the amount of change becomes. (See the figure below)
For reflected signals from shallower positions, amount of correction becomes larger. When [Strength] is set large, the correction amount for shallow depth may seem too much. In such cases, if the [Adjust] is set at the depth at which correction seems too much, the correction amount at shallower depth than the depth becomes the same as the correction amount at the starting position, and can set off the over correction.

Setting should be performed in combination of the items above.

Adjustment of TVG strength of manual TVG:

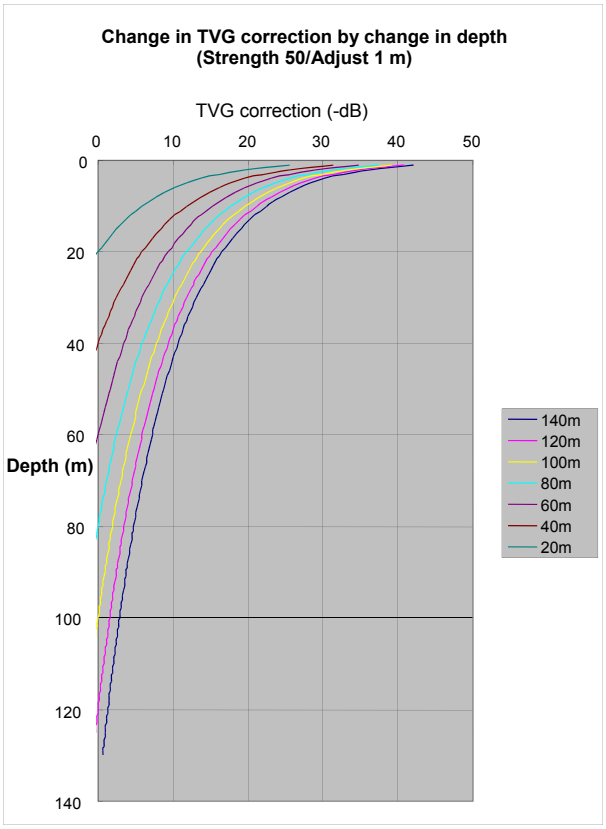
[TVG Strength] decides the amount of change for TVG correction. The larger the value of [TVG Strength] is, the bigger the amount of change is.



The far left side line is Strength 1 and the far right side line is Strength 50 in the graph.

Adjustment of TVG Depth of manual TVG

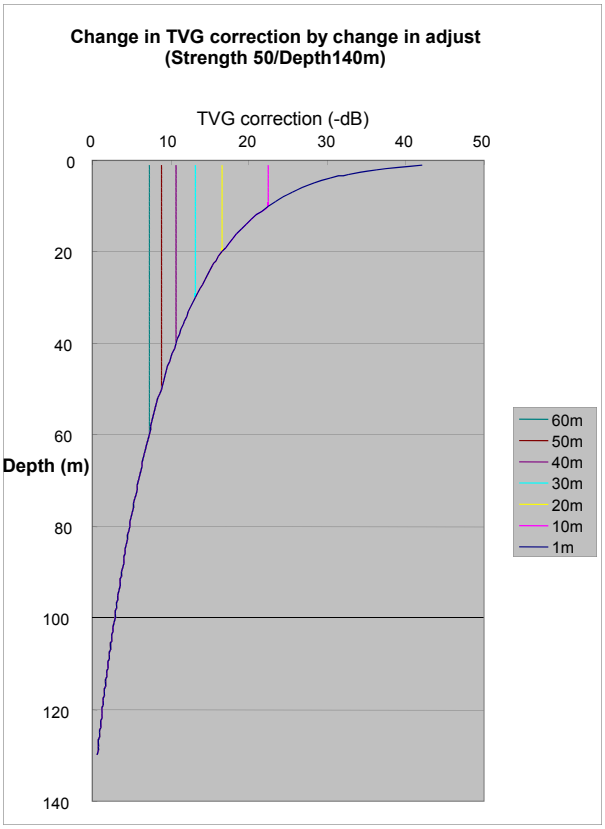
[TVG Depth] is the reference point of depth for correction. The deeper the setup becomes, the wider the correction range becomes.



The far left line is at correction depth 20 m, and the line at far right is at correction depth 140 m in the graph.

Adjustment of TVG Adjust (start point) of manual TVG

[TVG Adjust] adjusts the excessive correction by TVG against shallow signals, making the amount of correction at the point shallower than the start point to be the same correction amount at the start point.



The far left line is at correction depth 60 m, and the line at far right is at correction depth 1 m in the graph.

2.3 Changing of the image scroll speed

The image scroll speed can be changed at 10 steps of [Speed 1], [Stop], [Speed 2], • • • [Speed 9]. The larger the speed number is, the slower the image scroll speed becomes.

The image scroll speed of echo sounders is faster for shallow ranges and slower for deeper ranges depending on the display ranges.

When the image speed at shallow ranges seems too fast, [Image Speed] is used to make the speed slower.

When sea bottom is bedrock and has strong reflection strength, the multipath reflection between seawater surfaces remains as reverb and **may display false image*[1].** To **eliminate the false images**, the image scroll speed may be slowed down to wait the next transmission and reception until the reverb disappears.

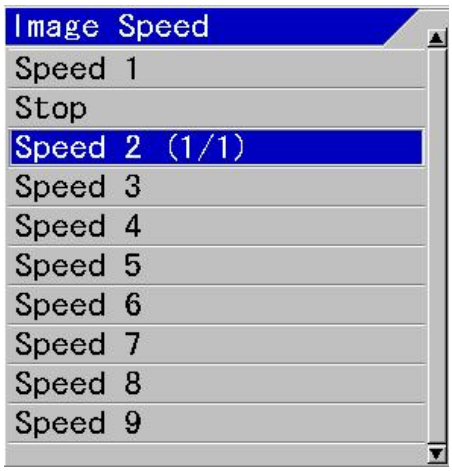
The scroll of images can be stopped.

It is possible to enlarge images by 2 times and double speed of scroll.

To change image scroll speed:

1. Press [Image Speed] key (NAV).

   [Image Speed] adjustment box is displayed.



To speed up image scroll speed:

1. While [Image Speed] adjustment box is displayed, press [Image Speed] key (NAV).

   Move upward the cursor, and [Image Speed] is set to a faster speed.

*[1]False image: When sea bottom material is bedrock with high reflection ratio of ultrasonic sound, the reflected signals at the sea bottom are reflected by the seawater surface and again by the sea bottom. This may be repeated many times. This repeat of reflection remains as reverb. If the reverb remains at the next transmission and reception, the image is a mixture with normal reflection and the reverb. This reverb is called as false images.

To stop image scroll:

1. While [Image Speed] adjustment box is displayed, move the cursor to [Stop] with [▲] key of .
   When the cursor is at [Speed 2 (1/1)], press [Image speed] key , and the cursor moves to [Stop].

To slow down image scroll speed:

1. While [Image Speed] adjustment box is displayed, move the cursor downward with [▼] key of , and [Image Speed] is set to a slower speed.

To wipe out false images:

1. While [Image Speed] adjustment box is displayed, move the cursor one step down with [▼] key of to observe images.
   While false images remain, move the cursor one more step down and observe the image.
   Repeat this operation and adjust the image speed by making slower until the false images disappear.

2.4 Finding out depth of targets in images (VRM operation)

VRM (Variable Range Marker) is a mobile marker to measure the depth of targets such as fish schools, and indicates lines and depth values of the lines.

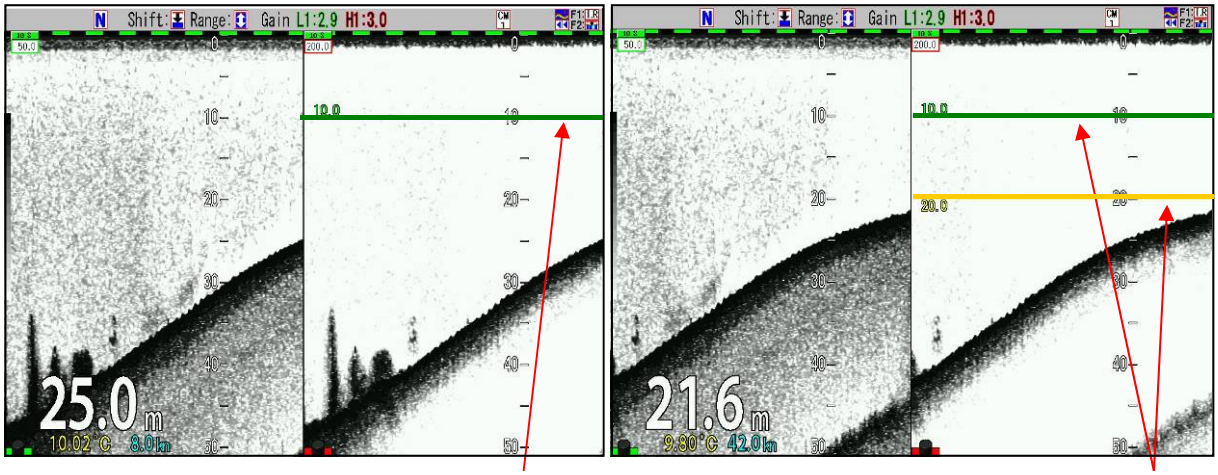
This can be also used as an indication of depth for casting net, etc.

VRM can display the second VRM set at a certain interval under the first VRM. This second VRM follows the movement of the first one with the interval. This can be used as a measure for depth of casting net.

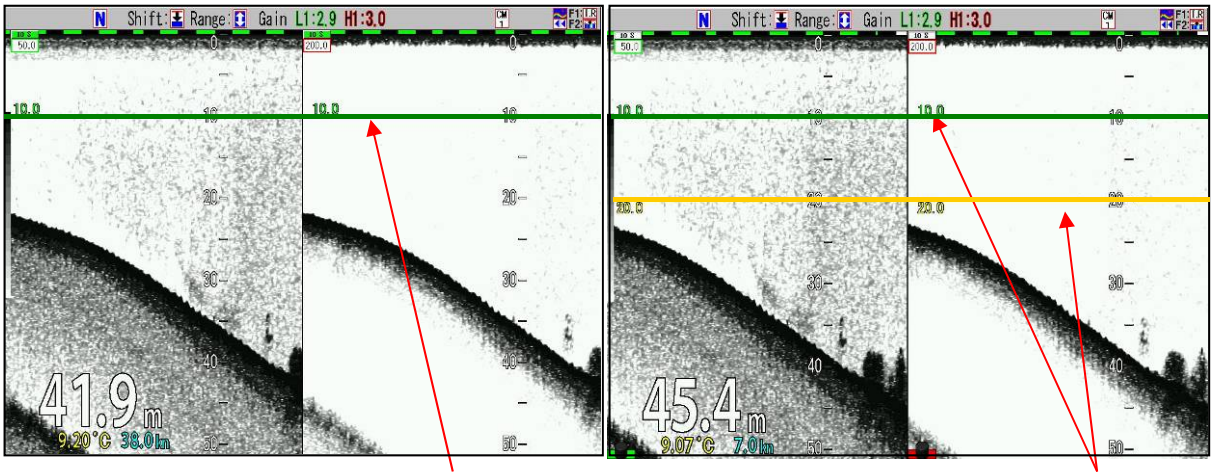
There are two modes: to display on only one screen of the 4 frequencies and to display across the all 4 screens.

In the display on the whole screen mode, the same depth is indicated on all screens at synchronized range/shift. Display and operation can be done on each screen at individual range/shift.

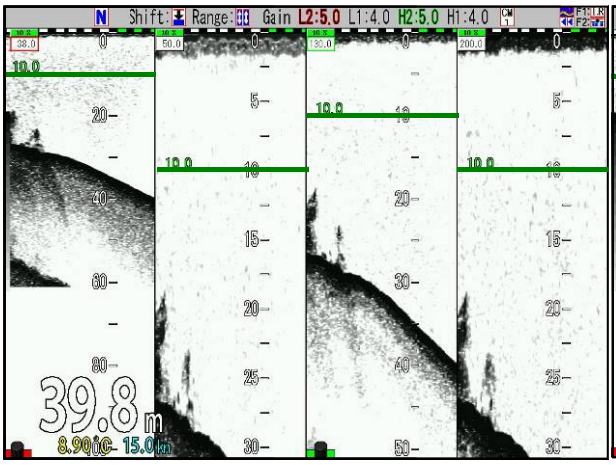
<Example of display VRM on specific screen>



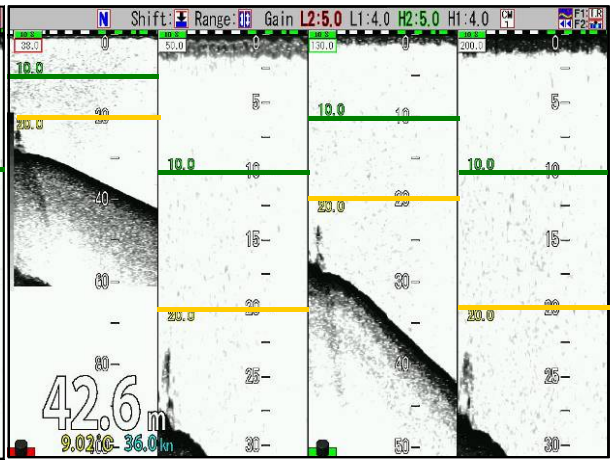
<Example of display of VRM whole screen (All screens same range)>



<Example of display of VRM whole screen (Screen individual range)>



VRM 1 line



VRM 2 lines

2.4.1 Changing of VRM follow interval

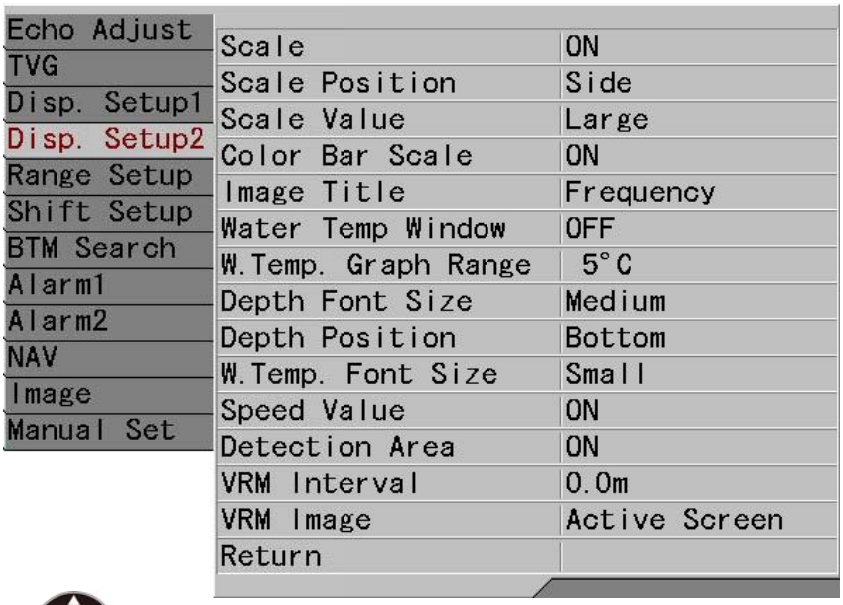
Under the first VRM, another VRM with interval can be displayed. This VRM follows the movement of the first VRM keeping the interval, and this is intended to use as a guidance of depth for casting a net.

To change the displayed interval of the second VRM:

1. Press [MENU] key

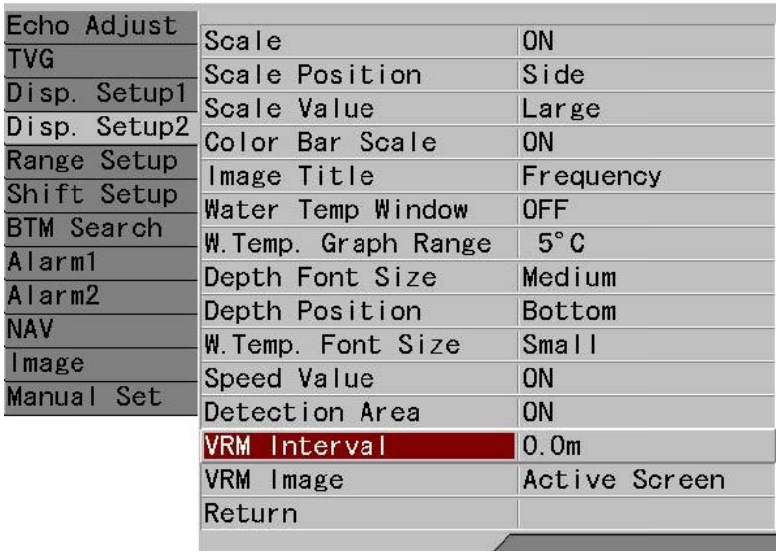
.

2. The menu is displayed. Move the cursor to [Display Setup 2] with [▲] or [▼] keys of .



3. Press [▶] key of .

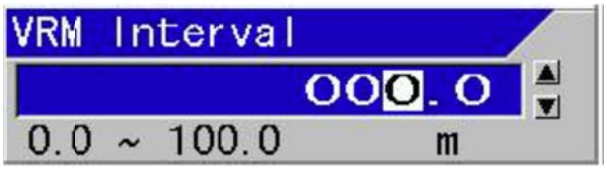
4. The menu [Disp. setup 2] is displayed. Move the cursor to [VRM Interval] with [▲] or [▼] keys of .



5. Press [▶] key of .

6. The menu [VRM Interval] is displayed. Set an interval by increasing or decreasing a numeric value with [▲] or [▼] keys of .

With [◀] key, the digit can be moved to larger side.
With [▶] key, the digit can be moved to smaller side.
With [▲] key, the value increases.
With [▼] key, the value decreases.



7. Press [MENU] key , and the menu disappears and the selected VRM follow interval is set.

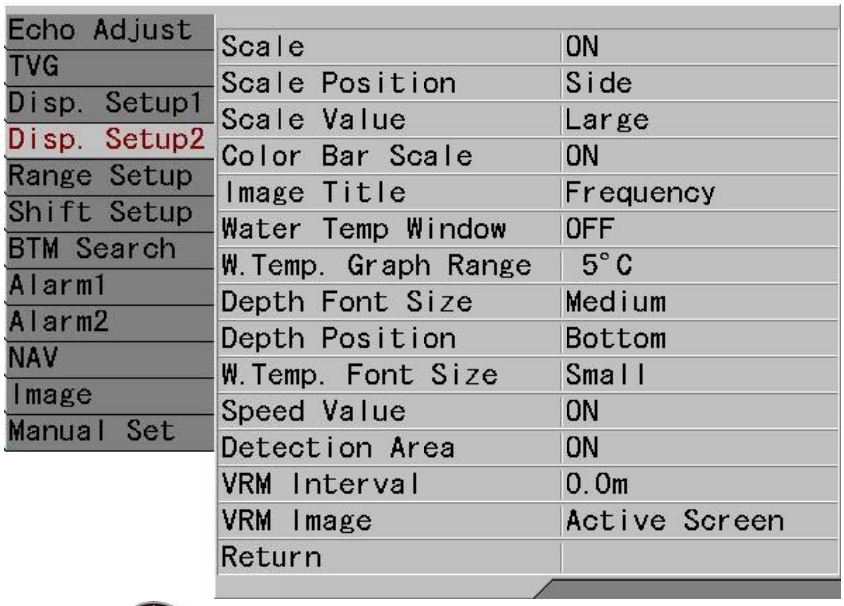
2.4.2 Operation of VRM in Active Screen

To switch VRM display to Active Screen:

1. Press [MENU] key

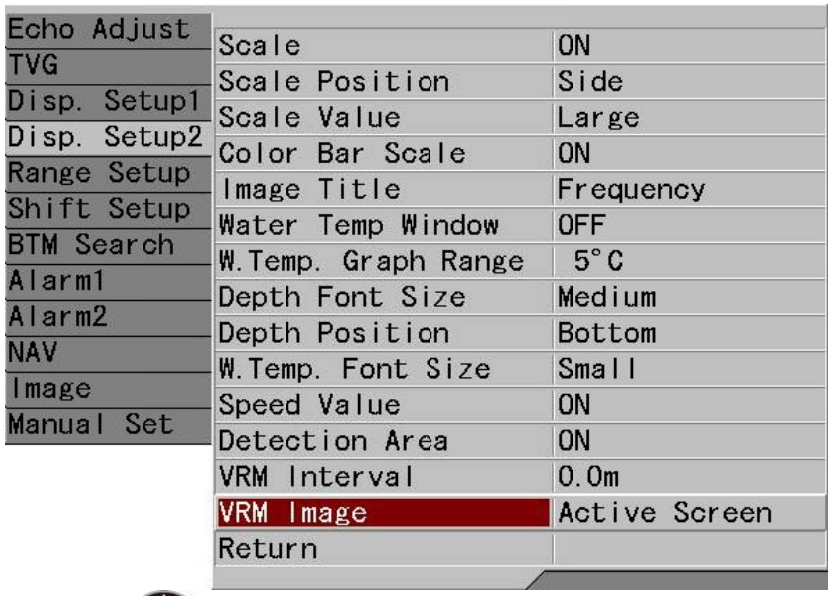
.

2. The menu is displayed. Move the cursor to [Disp. Setup 2] with [▲] or [▼] keys of .



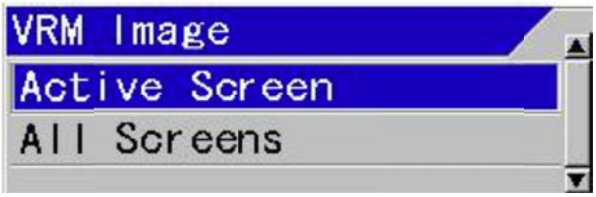
3. Press [►] key of .

4. The menu [Disp. Setup2] is displayed. Move the cursor to [VRM Image] with [▲] or [▼] keys of .



5. Press [►] key of .

6. The menu [VRM Image] is displayed. Move the cursor with [▲] or [▼] keys of , and select [Active Screen] and [All Screens].



7. Press [MENU] key

, and the menu disappears and the selected VRM image is set.

Operation of VRM:

To move VRM downward:

If [▼] of is pressed, the line of VRM is highlighted with black edge and its value is displayed in double sized characters.

Keep pressing [▼], and VRM moves downward. The display of value is updated at the depth.

When the second VRM is displayed, the second VRM also moves simultaneously downward.

When it comes near the aimed position, release the key. And by pressing a few times, fine adjustment of the position can be done.

To move VRM upward:

If [▲] of is pressed, the line of VRM is highlighted with black edge and its value is displayed in double sized characters.

Keep pressing [▲],and VRM moves upward. The display of value is updated at the depth.

When the second VRM is displayed, the second VRM also moves simultaneously upward.

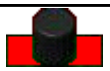
When it comes near the aimed position, release the key. And by pressing a few times, fine adjustment of the position can be done.

To move VRM Image to Active Screen:

To select the left screen, press [GAIN-L/SEL]

and to select the right screen, press [GAIN-R/SEL]

, and display (red) blinking at the bottom of the screen to be operated.

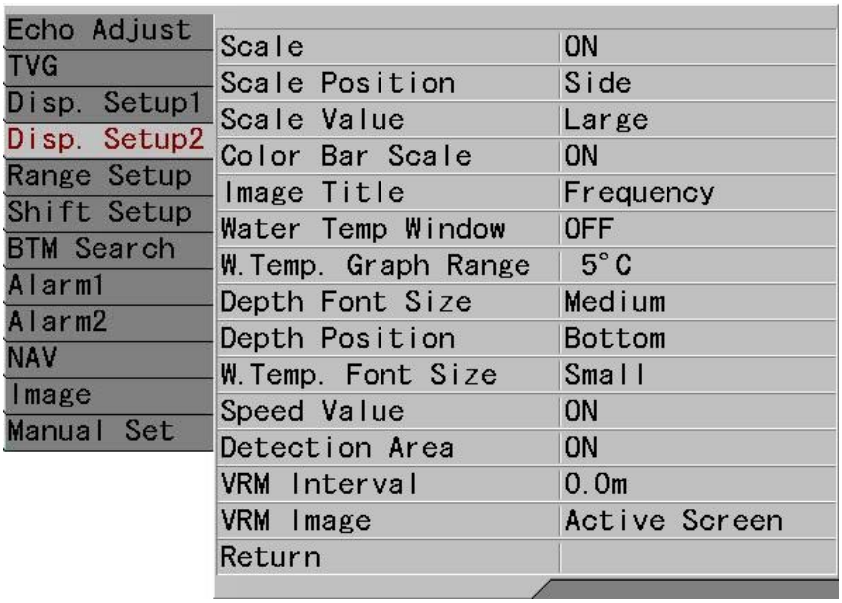
Caution: [Gain knob icon] at the bottom of screen changes to  (red) when gain setting is [Individual] and to (red) when [Synchronized].

2.4.3 Operation of VRM on all Screens

To switch over VRM Image to All Screens:

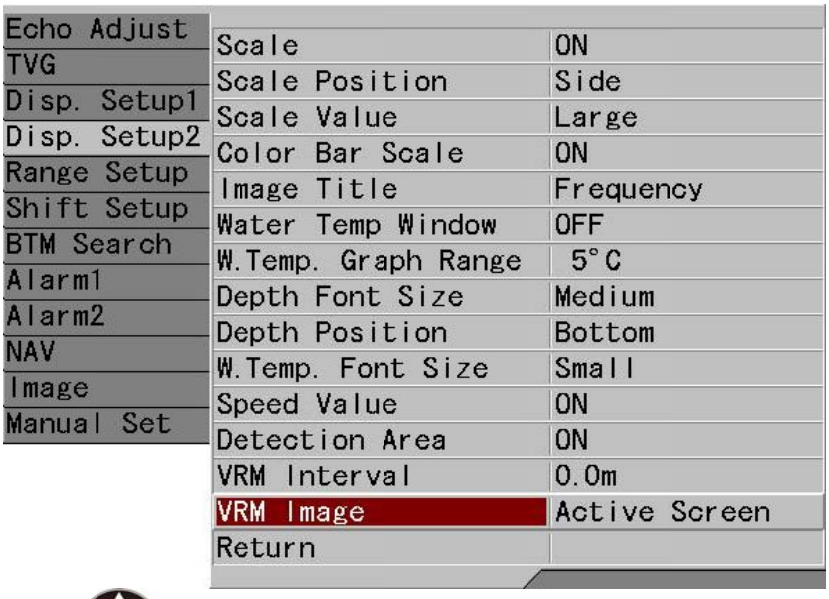
1. Press [MENU] key MENU.

2. The menu is displayed. Move the cursor to [Disp. Setup2] with [▲] or [▼] keys of .



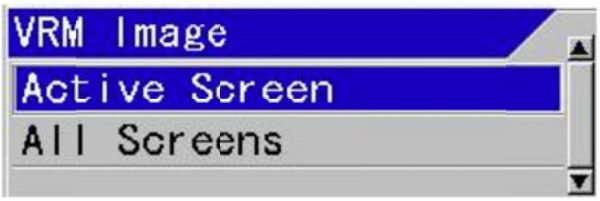
3. Press [►] key of .

4. The menu [Disp. Setup2] is displayed. Move the cursor to [VRM Image] with [▲] or [▼] keys of .



5. Press [►] key of .

6. The menu [VRM Image] is displayed. Select [Active Screen] [All Screens] by moving the cursor with [▲] or [▼] keys of .



7. Press [MENU] key MENU , and the menu disappears and the selected VRM Image is set.

Operation of VRM:

To move VRM of [All Screens] downward:

Press [▼] of , and the line of VRM is highlighted with black edge and VRM value is indicated in double sized characters.
Keep pressing [▼] key, and VRM moves downward. The display of value is updated at the depth.
When the second VRM is displayed, the second VRM also moves simultaneously downward.
When it comes near the aimed position, release the key. And by pressing a few times, fine adjustment of the position can be done.

To move VRM of [All Screens] upward:

Press [▲] of and the line of VRM is highlighted with black edge and VRM value is indicated in double sized characters.
Keep pressing [▲] key, VRM moves upward. The display of value is updated at the depth.
When the second VRM is displayed, the second VRM also moves simultaneously upward.
When it comes near the aimed position, release the key. And by pressing a few times, fine adjustment of the position can be done.

> **Caution:** At [All Screens Same (range)] and [All Screens Same (shift)], VRM on all screens moves simultaneously. At [Scr. Individual (range)] and [Scr. Individual (shift)], VRM individually moves per Active Screen.

To move VRM Image to an active screen at [Screen individual range]/[Screen individual shift], to select the left screen, press [GAIN-L/SEL] GAIN-L SEL and to select the right screen, press [GAIN-R/SEL] GAIN-R SEL , to display (red) blinking at the bottom of the screen to be operated.

> **Caution:** [Gain knob icon] at the bottom of screen changes to (red) when gain setting is [Individual] and to (red) when [Synchronized].

2.5 Reduction of noise on images

Images of echo sounders display noise due to various causes.

The causes of noise are:

1. Interference caused by reception of signals transmitted by other echo sounders
2. Blur due to micro animate beings such as plankton
3. Noise caused by electric signal synchronized with transceiver

CVS-FX2/FX2BB is equipped with functions to weaken the effect by each cause.

2.5.1 To reject interference

Interference is generated by the reception of signals transmitted by other echo sounders.

CVS-FX2/FX2BB can eliminate interference by the following two methods:

1. To shift your own frequency from the frequency used by other echo sounders, to avoid reception of interference wave.
2. To reject interference by setting [IR (Interference Rejection)] function.

<Example of IR (Interference Rejection) images>

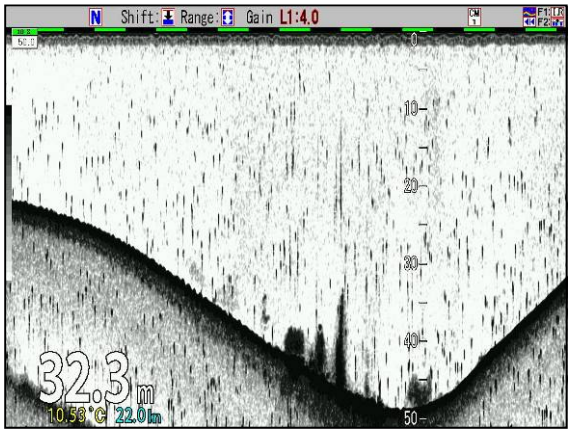


Image with interference

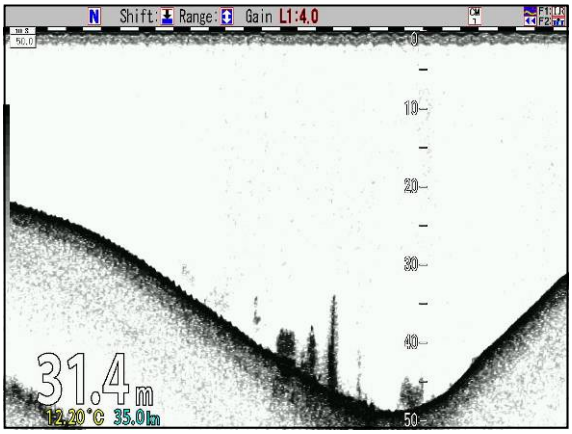
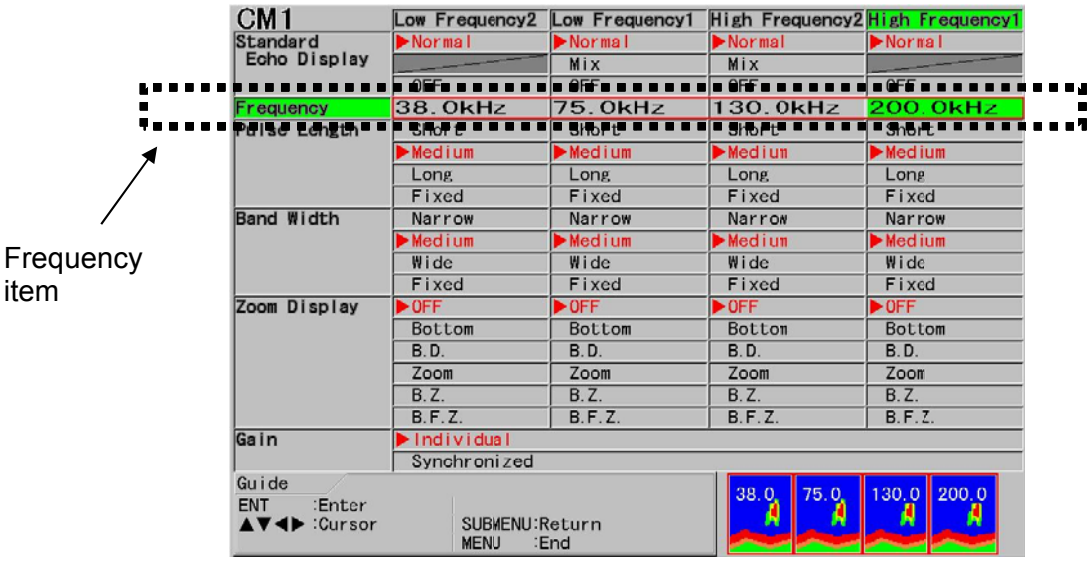


Image after rejection of interference

To avoid the reception of interference wave by shifting your own frequency:

1. Press the CM key used (lights red [CM] key).
   Press the [CM1] key (CM1) when CM1 is lit red.
2. CM menu is displayed.
3. Move the cursor to the position of the frequency to be shifted in the frequency display items with ( ).



Frequency item

4. Press [ENT] key (ENT).
5. [Frequency] change box is displayed.
6. By increasing or decreasing the numeric value with [▲] or [▼] of ( ), the frequency is set.

   With [▲] key, the value increases.
   With [▼] key, the value decreases.

   Keep pressing the key, and the digit carries up automatically.

   If the frequency is shifted by approximately 10 kHz, interference wave would not be received.

7. Adjust by viewing image, and press [ENT] key (ENT) when interference disappears.

To setup [IR] (Interference Rejection) function and to eliminate interference wave:

There are 3 steps of setting: [OFF], [Low] and [High] for interference rejection function.

If interference does not disappear at the set of [Low], then the set change the setting to [High].

The interference rejection is set stronger from [Low] to [High], interference rejection effect is stronger, but with more deterioration of images. Image of fast moving individual fish, etc. is harder to be detected in the stronger setting.

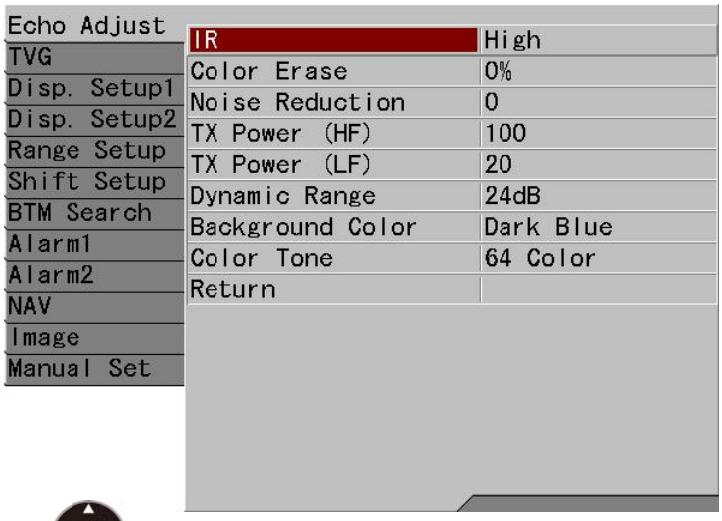
1. Press [MENU] key

.

2. The menu is displayed. Move the cursor to [Echo Adjust] with [▲] or [▼] keys of .

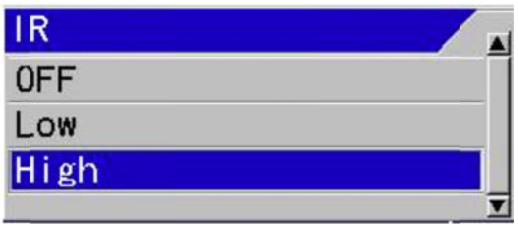
3. Press [▶] key of .

4. The menu [Echo Adjust] is displayed. Point the cursor to [IR] with [▲] or [▼] keys of .



5. Press [▶] key of .

6. The menu [IR] is displayed. Select [Low] with [▲] or [▼] of .



7. By viewing images, confirm that interference has disappeared.
8. If not, select [High] with [▲] or [▼] keys of .
9. Press [MENU] key , and the menu disappears.

2.5.2 To erase the weak response from dust and plankton, etc.

To erase the weak response from dust and microbes such as plankton in seawater, there are following 4 methods:
1. Setting TVG
2. Shortening pulse length and narrowing frequency bandwidth
3. Setting [Color Erase] function
4. Setting [IR] (Interference rejection) function

When TVG is effective:
In order to erase the response from dust and plankton at shallow depth of the displayed screen, setting TVG is effective.
TVG can be set in two ways, [Optimized TVG] and [Manual TVG].
In the case of setting in [Optimized TVG], the images are clear with less interference noise down to water depth of approximately 100 m.

As for the setting of [Optimized TVG], see “To use of optimized TVG”, p 2 - 57.

By setting [Manual TVG], noise reduction setting is possible to preference.

As for the setup of [Manual TVG], see “To adjust with manual TVG”, p 2 - 60.

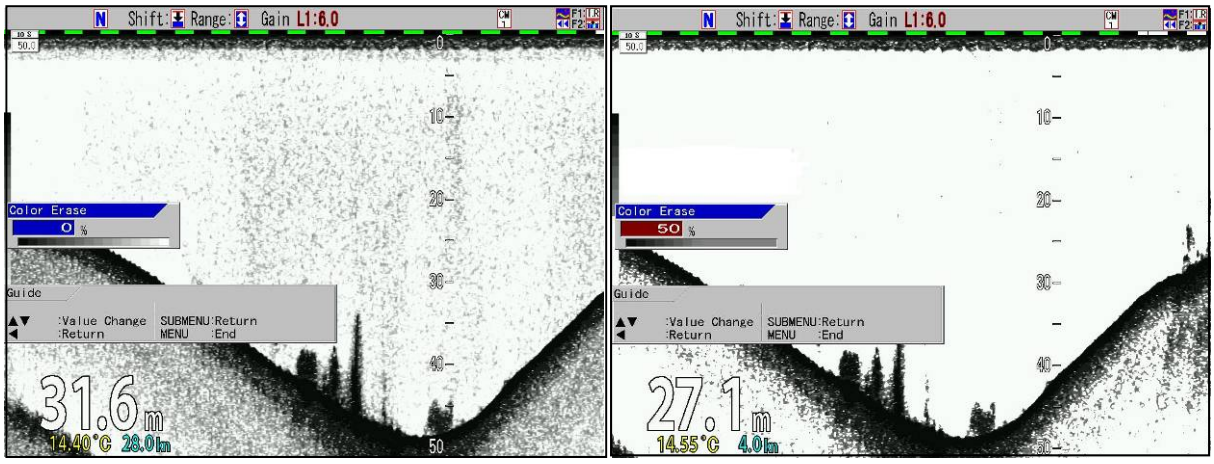
When shortening pulse length and narrowing frequency bandwidth are effective:
When the range used is less than 100 m and the response from dust and plankton on whole screen is to be erased, it would be effective to set the pulse length at [Short] and the frequency bandwidth at [Narrow].
By this setting, fine images such as dust and plankton are erased.
It can be used for highlighting of images of aimed fish and erasing of response smaller than those.

As for the setup of [Pulse Length], see “2.1.5 Selection of pulse length”, p 2 - 19.
As for the setup of [Frequency Bandwidth], see “2.1.6 Selection of frequency bandwidth”, p 2 - 22.

When [Color Erase] is effective:

When the response from dust and plankton displayed in light bluish color is to be erased, it is effective to use [Color Erase] function.
The response of dust and plankton displayed in stronger color than green could not be erased.
The color of aimed fish images and appearance of expanding response are displayed as it is and unnecessary response from dust and plankton is erased.

<Example of images with color erasing>



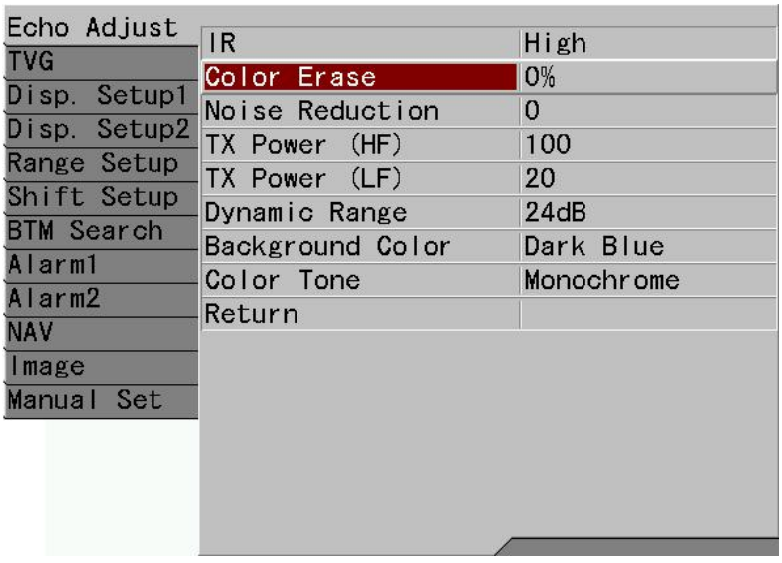
Color erase 0 % Color erase 50 %

To set [Color Erase]:

1. Press [MENU] key MENU.
2. The menu is displayed. Move the cursor to [Echo Adjust] with [▲] or [▼] of .

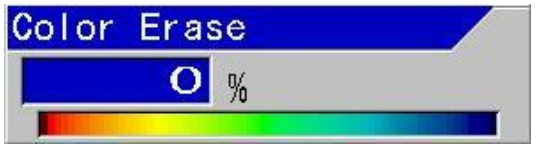
3. Press [▶] key of .

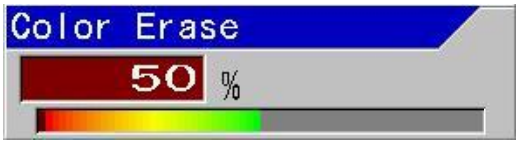
4. The menu [Echo Adjust] is displayed. Move the cursor to [Color Erase] with [▲] or [▼] keys of .



5. Press [▶] key of .

6. The menu of [Color Erase] is displayed. Adjust [%] with [▲] or [▼] keys of .





With [▲] key, [%] increases (Bluish color first disappears first).

With [▼] key, [%] decreases (Disappeared color comes out).

Adjustment can be performed within a range from 0 % to 50 %.
At 50 %, color from blue to mint green disappears.
Displayed color can be confirmed with the [Color Bar Scale] in the [Color Erase] box and the color bar scale at edge of screen.

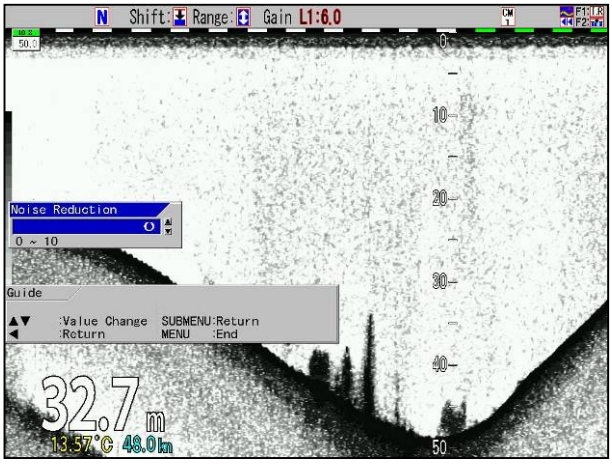
7. Press [MENU] key , and the menu disappears.

When [Noise Reduction] is effective:

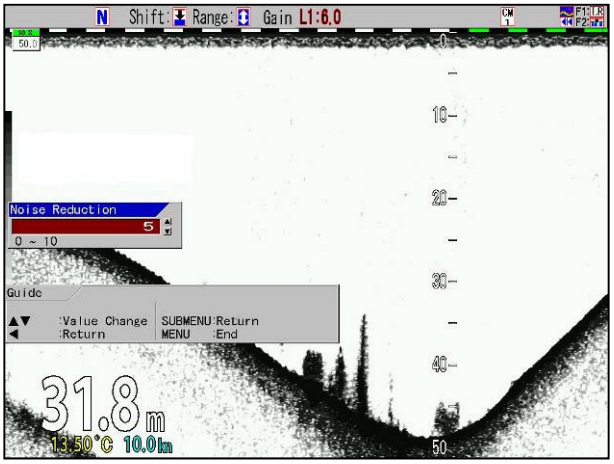
When the response from dust and plankton is to be diminished regardless of water depth and color, [Noise Reduction] is effective.

For [Noise Reduction] function, by narrowing the dynamic range and reducing tone graduation of colors, the color of weak response level becomes less visible.

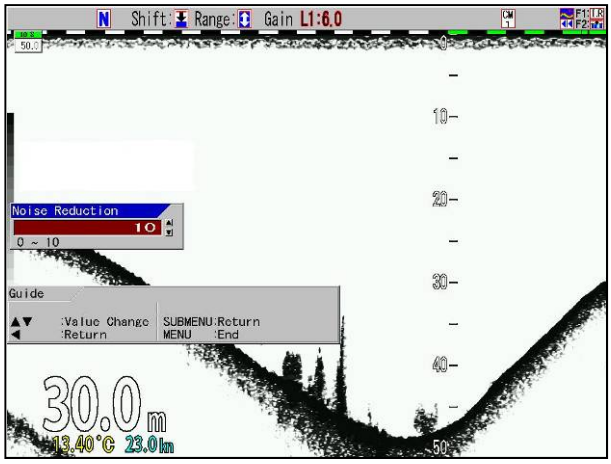
<Example of Noise Reduction images>



Noise Reduction 0



Noise Reduction 5



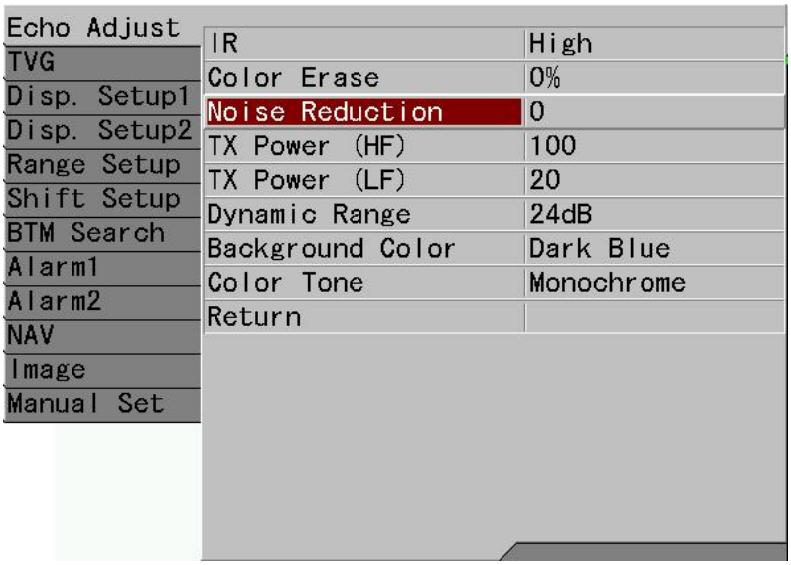
Noise Reduction 10

To set [Noise Reduction]:

1. Press [MENU] key (MENU).
2. The menu is displayed. Move the cursor to [Echo Adjust] with [▲] or [▼] keys of .

3. Press [▶] key of .

4. The menu [Echo Adjust] is displayed. Move the cursor to [Noise Reduction] with [▲] or [▼] keys of .



5. Press [▶] key of .

6. The menu [Noise Reduction] is displayed. Adjust the value with [▲] or [▼] keys of .

With [▲] key, the value increases.
With [▼] key, the value decreases.

The bigger the value becomes, the more effective Noise Reduction becomes.

7. Press [MENU] key , and the menu disappears.

2.5.3 To reduce noise

CVS-FX2/FX2BB is equipped with the [Noise Reduction] function.

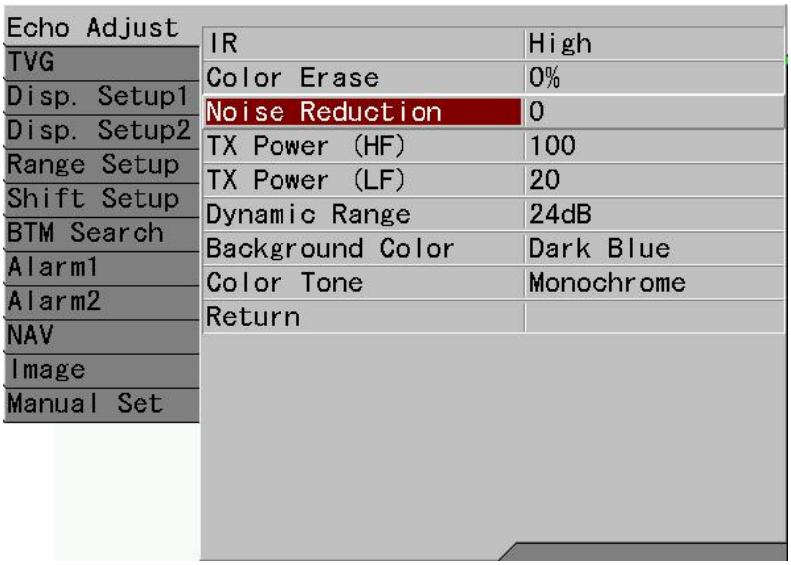
For [Noise Reduction] function, by narrowing the dynamic range and reducing tone graduation of colors, the color of weak response level becomes less visible.

To set [Noise Reduction]:

1. Press [MENU] key (MENU).
2. The menu is displayed. Move the cursor to [Echo Adjust] with [▲] or [▼] keys of .

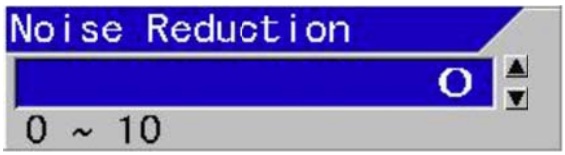
3. Press [▶] key of .

4. The menu [Echo Adjust] is displayed. Move the cursor to [Noise Reduction] with [▲] or [▼] keys of .



5. Press [▶] key of .

6. The menu [Noise Reduction] is displayed. Adjust the numeric value with [▲] or [▼] keys of .



With [▲] key, the value increases.
With [▼] key, the value decreases.

The bigger the value becomes, the more effective Noise Reduction becomes.

7. Press [MENU] key , and the menu disappears.

Chapter 3 To make the best of [CM] keys

3.1 To use [CM] keys

[CM] (Condition Memory) key is used to **memorize setting conditions of an echo sounder** and **recall them with one touch of a key button**. For example, it is possible to switch the setting for seine fishing to the setting of squid fishing with one touch of a key button. CVS-FX2/FX2BB is equipped with six [CM] keys, so can be used as if six units of echo sounders were used at a time.

[CM] key has three major functionality:

- Switching screen mode
- Switching all settings with one touch of a button (setting values for each fishing method can be memorized, recalled and switched with one touch of a button)
- Usually it is used for switching screen modes, and when the type of fishing is changed, a particular setting can be switched to the other setting with one touch of a button, if specific values are memorized.

Please proceed to the corresponding pages for the functionality of your interest.

◆ To use as a switching key of screen modes:

Types of screen (4-frequency, 2-frequency, Single-frequency, Zoom) are switched over frequently.
Settings of menu, shift and gain, etc. are not decided.

Please proceed to “3.1.1 To use [CM] key for switching screen modes”, p 3-2.

◆ To use as one touch switching key of all settings

Types of screen are rarely changed.
Settings of menu, range, shift and gain, etc. have been determined by fishing methods, and all settings should be changed at once when fishing method is changed.

Please proceed to “3.1.2 To use [CM] keys as one touch switch to memorized setting to the fishing positions”, p 3-6.

◆ Usually the key is used for switching screen modes, and when fishing method is changed, it is used as one touch switching key.

Types of screen (4-frequency, 2-frequency, Single-frequency, Zoom) are switched over frequently.
Type of screen, menu setup, range, shift and gain, etc. have been determined by fishing methods, and all settings should be changed at once when fishing method is changed.

Please proceed to “3.1.3 Use [CM] keys as screen mode switch and one touch switch of setting”, p 3-10.

3.1.1 To use [CM] key for switching screen modes

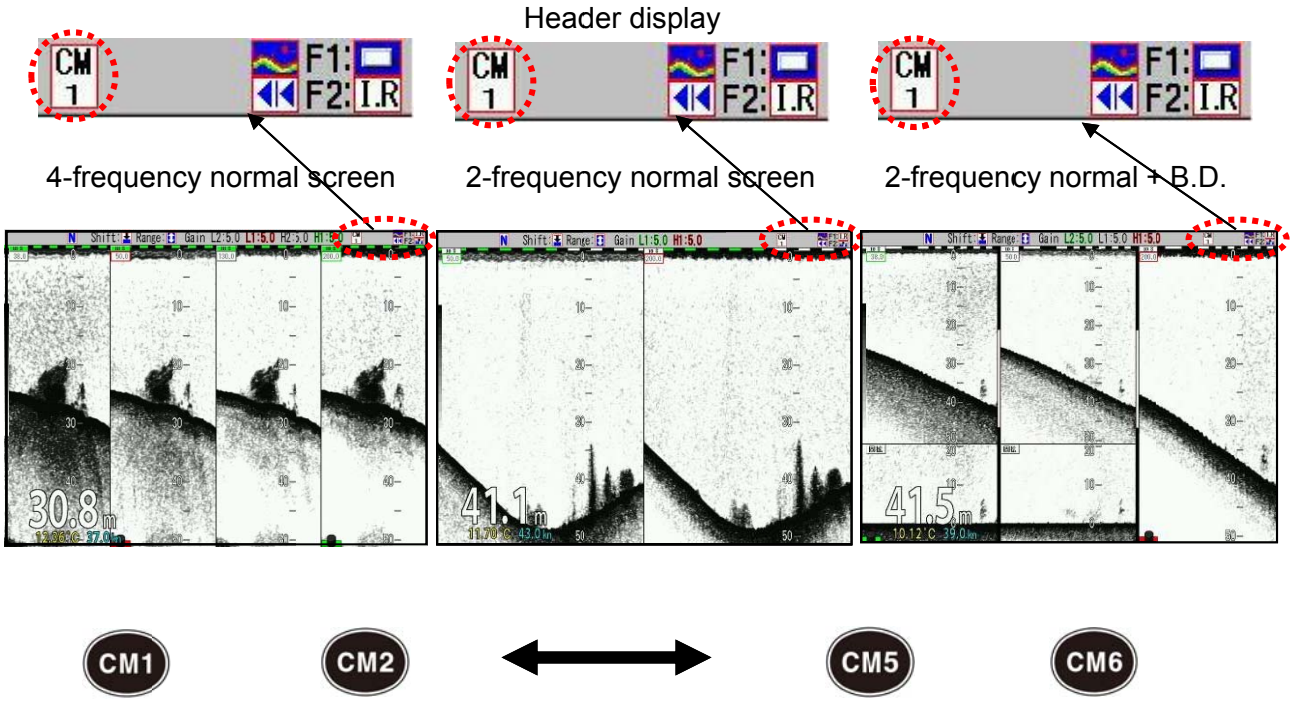
CVS-FX2/FX2BB is not equipped with the switching knobs or dedicated keys for screen modes like conventional echo sounders. Instead, 6 types of screen modes*[1] can be memorized with 6 keys of CM1 to CM6.

By pressing each key of CM1 to CM6 ([CM] key lit green), and the screen mode turns to the setting mode (Color of light turns red).

Screen modes (Normal screen, Zoom screen, 4-frequency, 2-frequency, single frequency, etc.) are switched. The setting values of range, shift, gain and pulse length, etc. do not change.

The CM number in the header display does not change even when switching the [CM] key, to indicate the CM number selected before the CM key was set to [Screen mode switching]

When CM1 is displayed, CM1 remains as it is.



*[1] As for the displayed content in screen mode, see “2.1 Switch screen images (Setting of CM menu)”, p 2 -1

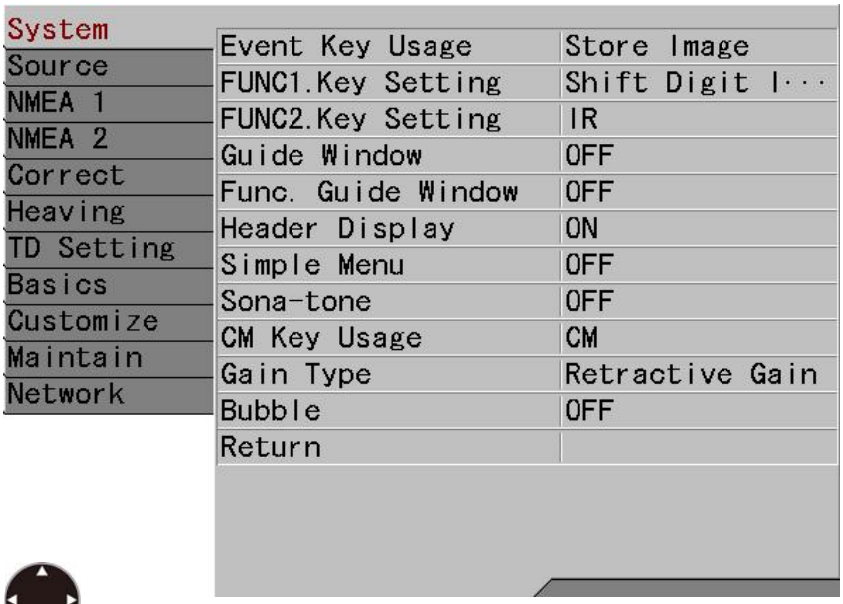
To set [CM] key to [Screen mode switching]:

1. Press [SUBMENU] key

.

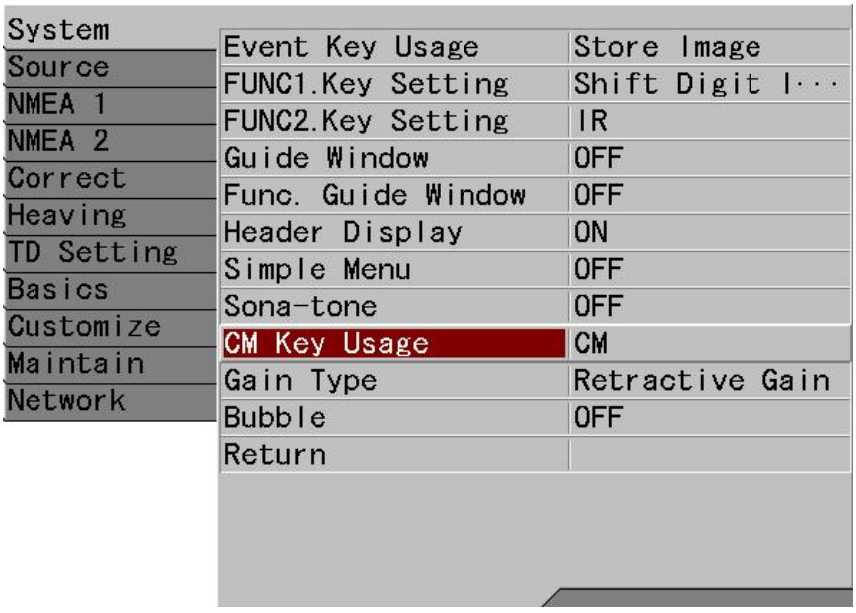
2. The SUBMENU is displayed. Move the cursor to [System] with [▲] or [▼] keys of

.



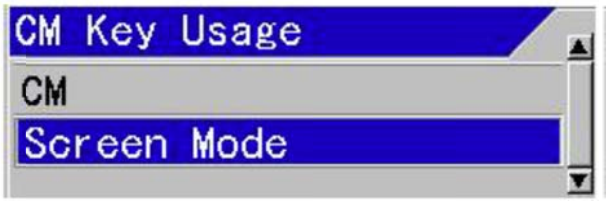
3. Press [▶] of
.

4. The SUBMENU [System] is displayed. Move the cursor to [CM Key Usage] with [▲] or [▼] keys of
.



5. Press [▶] of .

6. The SUBMENU [CM Key Usage] is displayed. Move the cursor to [Screen Mode] with [▲] or [▼] keys of .

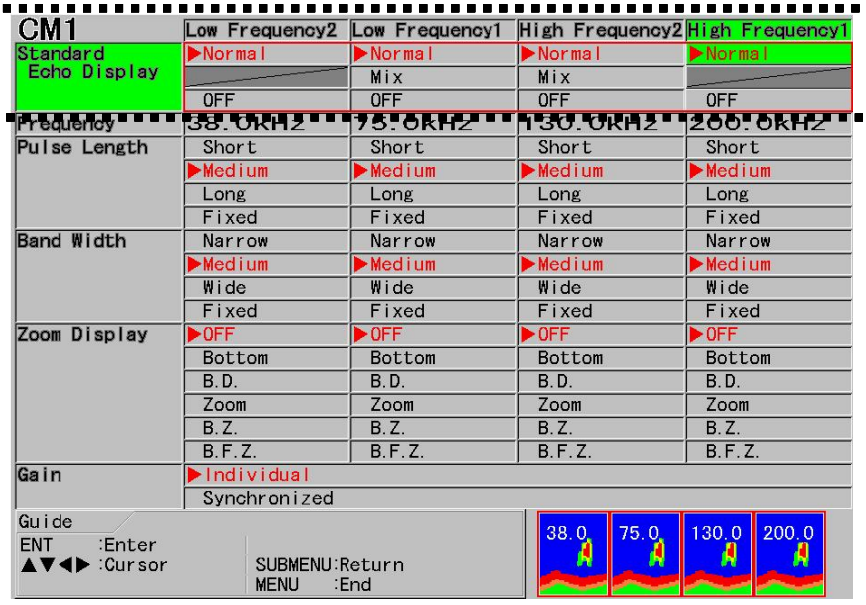


7. Press [MENU] key , the SUBMENU disappears and CM key is set at [Screen Mode Switching].

To set screen mode per CM key:

1. Press the CM key at which a screen mode is to be set.
2. Press again the same [CM] key (lit red).
   In case of CM1, press [CM1] key .
3. The CM Menu is displayed.
4. Select display of normal images. Move the cursor with to select [Normal] and [OFF] for high frequency 1 in the standard echo display items.

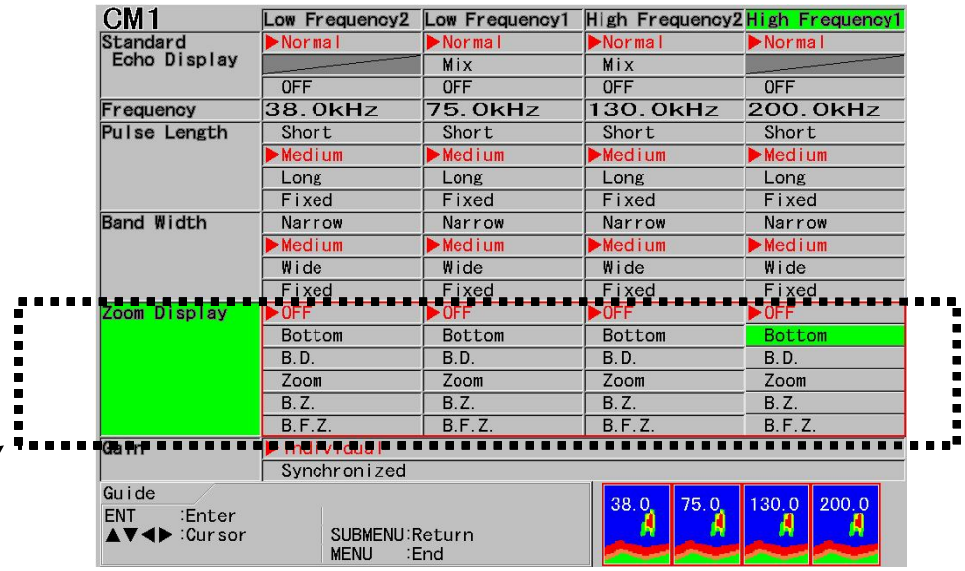
Standard Echo Display items



5. Press [ENT] key .

6. For selection of Standard Echo Display of high frequency 2, low frequency 1 and low frequency 2, repeat the procedures 4 and 5.

7. Select Zoom Display. Move the cursor with to select [OFF], [Bottom], [B.D.], [Zoom], [B.Z.] and [B.F.Z.] for high frequency 1 in the Zoom Display items.



Zoom Display items

8. Press [ENT] key ENT.

9. For selection of Zoom Display of high frequency 2, low frequency 1 and low frequency 2, repeat the procedures 7 and 8.

10. Press [CM] key CM1, and the CM menu ([CM] key lit red) disappears.

11. Set CM 2 to CM6 keys in the same way.

3.1.2 To use [CM] keys as one touch switch to the memorized setting to the fishing positions

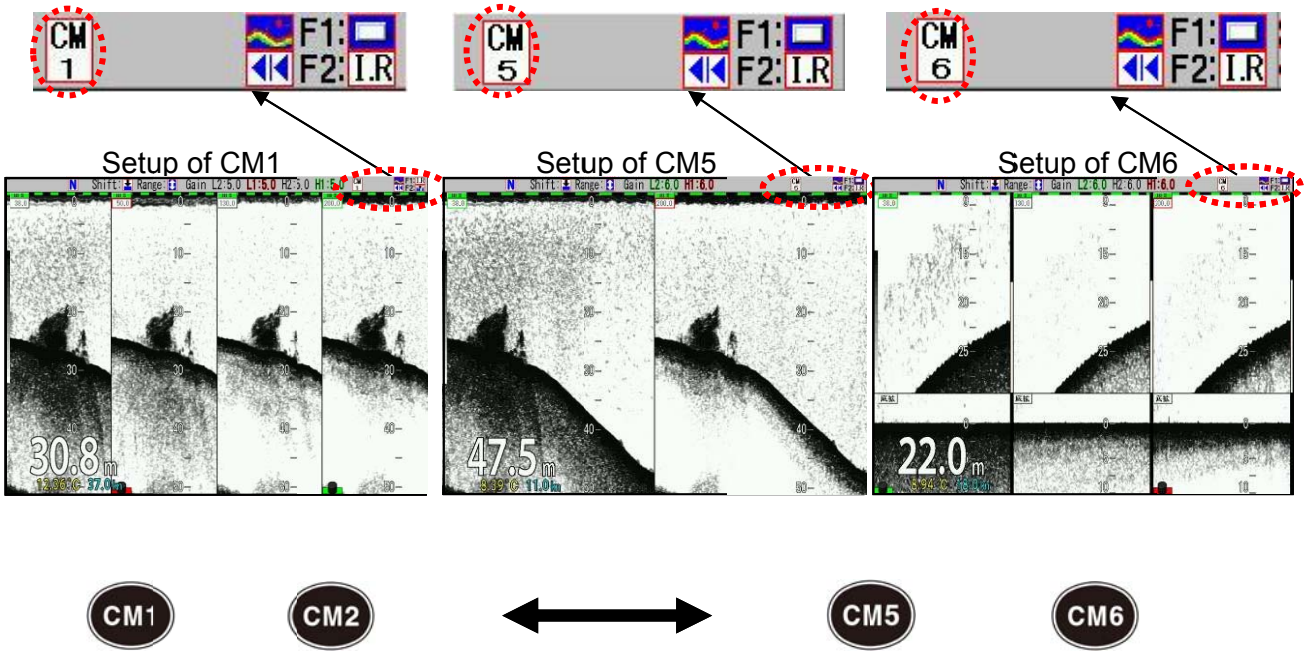
When one of the CM1 to CM6 keys (CM key lit green) is pressed, screen mode, range, shift, gain, MENU set items and SUBMENU set items are switched over to the preset setting in the key (light color turns red).

> ⚠ **Caution:** [CM*▶▶▶CM*] is displayed for a few seconds, during the time until setting is switched after [CM] key is pressed.

Usually, settings of range, shift and gain value position are changed depending on fishing conditions in shallow or deep water. Once settings are memorized in CM keys, settings can be recalled by one touch of a button.

CM key function enables such switching as required, after saving maximum 6 different settings.

Header display indicates [CM] key number used.



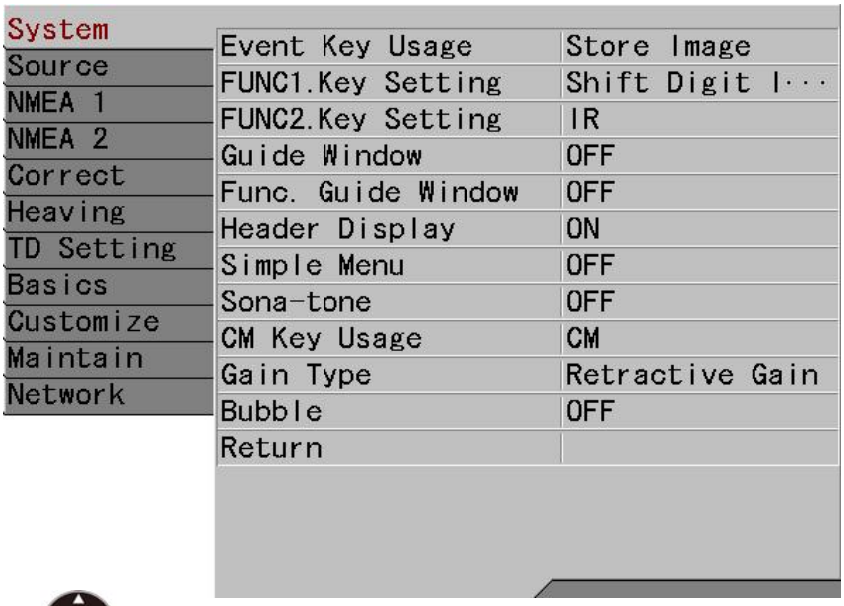
The key of the same CM number as the CM number in the header display lights red.

To set [CM] key to [One touch switch of setting] :

1. Press [SUBMENU] key

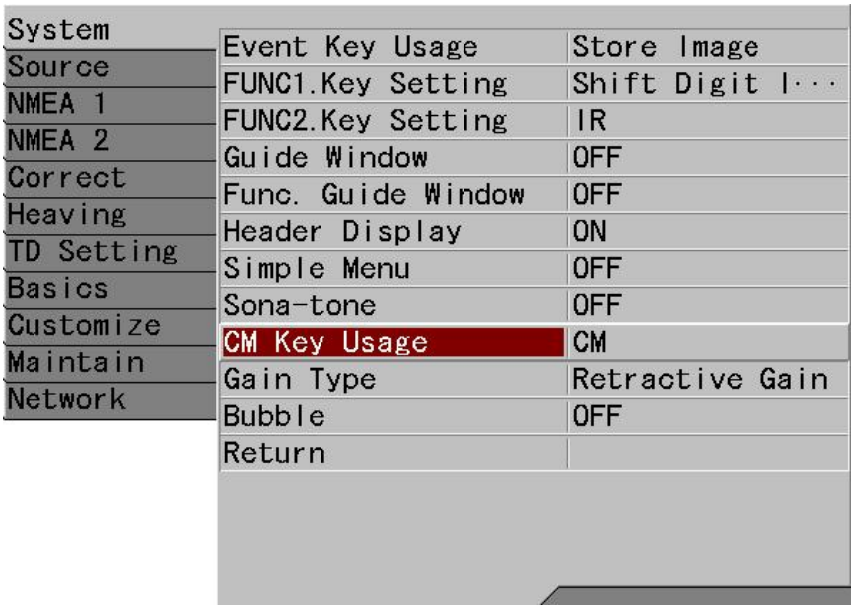
.

2. The SUBMENU is displayed. Move the cursor to [System] with [▲] or [▼] of .



3. Press [▶] of

4. The SUBMENU [System] is displayed. Move the cursor to [CM Key Usage] with [▲] or [▼] of .



5. Press [▶] of .

6. The SUBMENU [CM Key Usage] is displayed. Move the cursor to [CM] with [▲] or [▼] of .

7. Press [MENU] key , and the SUBMENU disappears and the CM key is set to [Setup one touch switching].

To store in [CM] keys:

The present settings are stored in the [CM] key currently lit red.

There is no special operation necessary for storage.

Each time screen mode, range, shift, gain or setup of MENU, etc. is operated, the changes are stored in the [CM] keys lit red.

To store in a new [CM] key:

1. Press the [CM] key to which the settings to be stored (CM key lit green).

   If the key is to be changed from CM1 to CM2, press [CM2] .

   The key is now switched from CM1 to CM2 ([CM2] key turns from green to red), and the settings changes to the settings stored in CM2.

2. Each time screen mode, range, shift, gain or setting of menu, etc. is operated, the changes are stored in the [CM2] key lit red.

To store a new setting in another [CM] key based on a particular setting in a [CM] key:

The setting can be stored easily by copying operation.

1. The setting in the present [CM] key is copied in the [CM] key to be stored.

   If new setting is to be stored in [CM2] key, based on the present setting in [CM1] key:

- Press [CM1] key .
- CM is switched over to CM1.

> ⚠ **Caution:** [CM*▶▶▶CM*] is displayed for a few seconds, during the time until setting is switched after [CM] key is pressed.

2. Then, keep pressing the key [CM2] CM2 until a guide of [Save setting to CM2] is indicated.
   [CM2] key blinks in red and green.

3. Move the cursor to [Yes] with [▲] or [▼] of .
4. Press [ENT] key ENT .
5. The pop-up message of [The copy was completed to CM2] is displayed and copy of the setup in [CM1] to [CM2] key is complete.
6. Press [CM2] key CM2 . CM1 is switched to [CM2].

> ⚠ **Caution:** [CM*►►►CM*] is displayed for a few seconds, during the time until setting is switched after [CM] key is pressed.

[CM2] key lights red.
The setting of CM2 is the same as CM1.

7. Each time screen mode, range, shift, gain or setup of MENU, etc. is operated, the changes are stored in the [CM2] key lit red.

> ⚠ **Caution:** When [CM] key is used as [One touch switch of setting], pressing another [CM] key by mistake changes the setting. To prevent this, it is recommended to lock the [CM] key after switched to the intended setting by [CM] key. To lock the key, see the Full Menu reference, “5.18 To lock the keys not to be operated”.

About the settings not stored by [CM] key:

Only the items of “HF TD*[1] Type” and “LF TD Type” in SUBMENU “TD Setting” are set in all CM keys commonly, not by each CM key.

*[1] TD: Transducer

3.1.3 Use [CM] keys as screen mode switching and one touch switch of setting:

This is to use [CM] key as screen mode switching normally, and to change to one touch switch of setting when fishing method changes.

Per each [CM] key for one touch switch of setting, 6 types (CM1 to CM6) of screen mode can be set up.

Therefore, total 36 types of screen modes, 6 types per CM1 to CM6, can be stored.

To store settings per fishing method in [CM] keys:

1. Change [CM] keys to [One touch switch of setting]. Refer to “To set [CM] key to [One touch switch of setting]”, p 3-7 for details.

   Change [CM Key Usage] to [CM].

   The [CM] key with the same CM number as in the header display lights red.

2. Settings are stored in [CM] keys. Refer to “To store in [CM] keys”, “To store in a new [CM] key” and “To store a new setting in another [CM] key based on a particular setting in a [CM] key”, p 3-8 for details.

To store screen mode in the setting of [CM] key per fishing method:

1. Press the [CM] key in which screen mode to store. To store in CM1, press [CM1] key

. The header display turns to CM1.

2. Change [CM] key to [Screen mode switching]. Refer to “To set [CM] key to [Screen mode switching], p 3-3, [CM] key is changed to [Screen mode switching].

3. Store the screen mode in [CM1] to [CM6] keys, as described in “To set screen mode per CM key”, p 3-4, the screen mode is preset to [CM1] to [CM6] key. The CM number in the header display does not change. The [CM] key pressed lights red.

4. Store the screen mode in each CM key, by repeating procedures 1 and 2 above.

To use [CM] keys normally as [Screen mode switching]:

1. Press the [CM] key that is set as normal in use. In the case of CM1, press [CM1]

.
2. Change [CM] key to [Screen mode switching] by referring to “To set [CM] key to [Screen mode switching]”, p 3-3.
3. Each time CM1, CM2, • • • CM6 is pressed, the screen mode switches.

To recall the setting when fishing method changes:

1. Change [CM] key to [One touch switch of setting] , by referring to “To set [CM] key to [One touch switch of setting]”, p 3-7.

   Change [CM Key Usage] to [CM].
   [CM] key with the same number as CM number in the header display lights.
2. Press the [CM] key that is set as normal in use. In the case of CM1, press [CM1]

.

   Each time CM1, CM2, • • • CM6 is pressed, the setting switches to the setting stored in the [CM] key pressed.

> ⚠ **Caution:** [CM*►►►CM*] is displayed for a few seconds, during the time until setting is switched after [CM] key is pressed.

Chapter 4 Useful operation

4.1 Temporary change of images for better view

In the images of echo sounders, normally such various information is overlaid as image title, water depth, water temperature, boat speed, color bar scale, alarm range bar, enlargement range bar. When the images are too busy with such information to see, the information can be temporarily deleted.

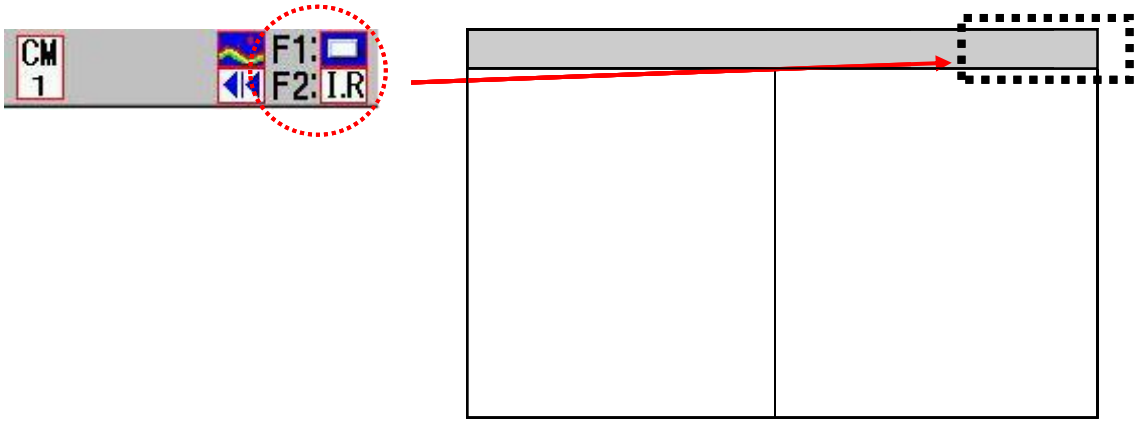
To delete image title, water depth, etc. temporarily

Press [ENT] key ENT .

The display of image title, water depth etc. disappears and comes back on display after 5 seconds.

4.2 Use function keys ([F1]/[F2])

[F1]/[F2] keys can be assigned with the functions used frequently, to be operated with one touch operation. The icons for the assigned functions are displayed in the header display area.



4.2.1 To use function keys ([F1]/[F2])

1. Press [F1] key F1 or [F2] key F2 .
2. The control box assigned to [F1]/[F2] is displayed.
3. Move the cursor with [▲] or [▼] keys of to select items.
4. The control box automatically disappears 5 seconds after release of the key.

The control box can be also manually erased by pressing [MENU] key MENU .

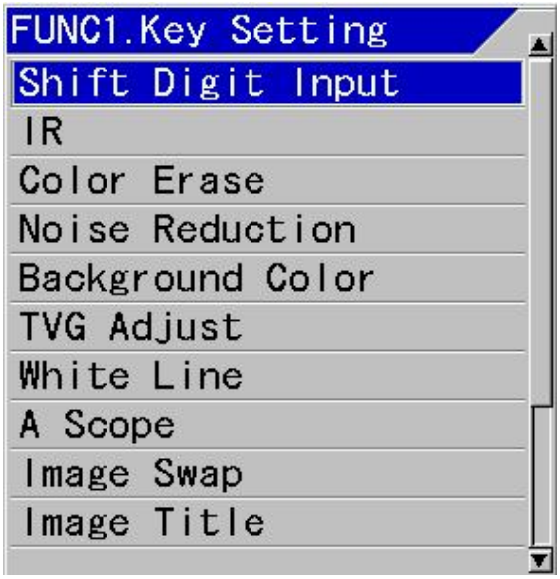
4.2.2 Assign intended operation to function keys ([F1]/[F2])

The functions can be assigned to [F1]/[F2]:

Icon	Function
	Shift Digit Input
I.R	IR (Interference Rejection)
C.E	Color Erase
N.R	Noise Reduction
	Background Color
TVG	TVG Adjust
	White Line
	A Scope
AB	Image Swap
	Image Title
	VRM Interval
	Sona-tone
	NAV Start
CALL	Image Recall

To set functions to [F1]/[F2] keys:

1. Keep pressing [F1] key (F1) or [F2] key (F2) .
2. The [FUNC1./ FUNC2. Key Setting] box is displayed.



3. Move the cursor with [▲] or [▼] keys of (◄►▲▼) to select items.
4. The [FUNC1./ FUNC2. Key Setting] box automatically disappears 5 seconds after release of the key.

The control box can be also manually erased by pressing [MENU] key (MENU) .

4.3 Switching of range mode

There are 3 types of range modes: [Auto Range], [Manual] and [Auto Shift].

[Auto Range] is the mode to switch the depth range automatically to display sea bottom always on the display screen.

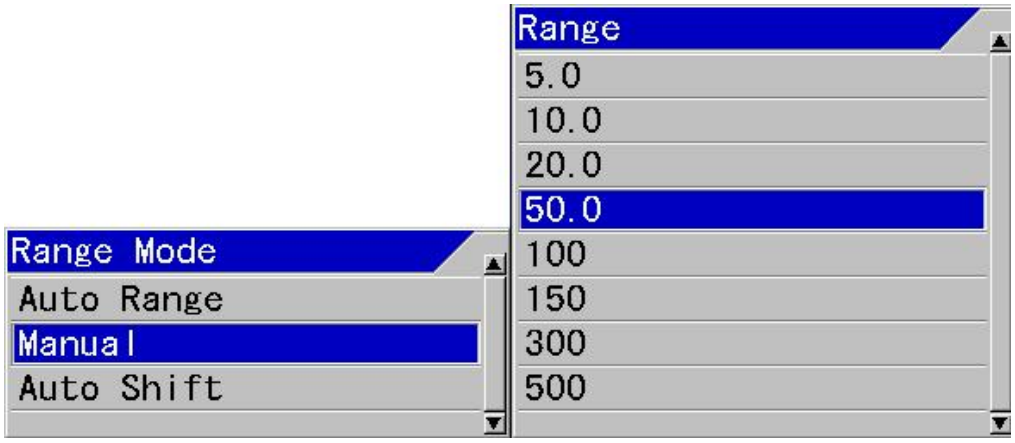
[Manual] is the mode to switch the depth range manually by operation of the range key and shift by operation of the shift key.

[Auto Shift] is the mode to shift depth range automatically set to display sea bottom always on the display screen.

4.3.1 Switch to manual operation

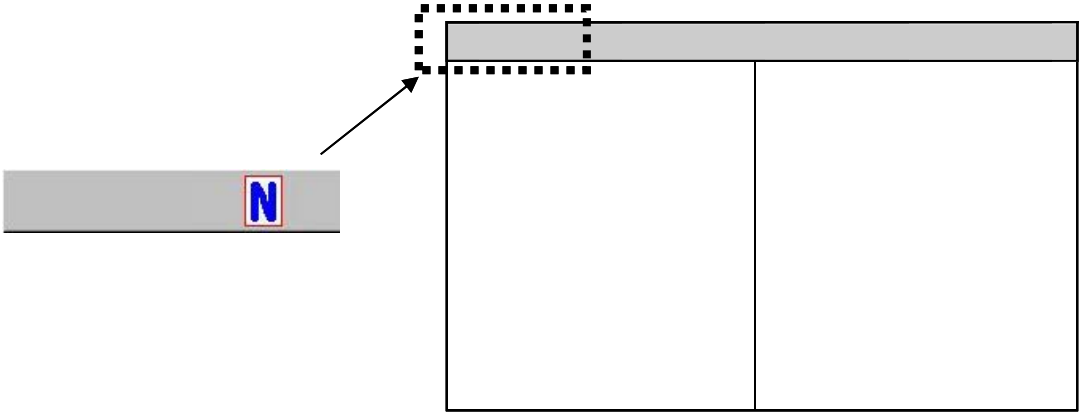
To switch range mode to manual operation:

1. Keep pressing [SHIFT/M OFF] key (SHIFT M OFF) until [Range mode] menu is displayed.
2. Move the cursor with [▲] or [▼] keys of (cursor pad), and select [Manual].



3. Press [ENT] key (ENT). Range mode is set at [Manual].

   The header display showing range mode disappears, once set to [Manual].



4.3.2 Setting of auto range

[Auto Range] is the function to switch depth range automatically to display sea bottom always on the displayed screen.

When sea bottom falls outside of the display screen, it turns to the sea bottom search mode with deeper range after a specific number of transmission (depending on the ranges, more frequent at shallower range and less frequent at deeper range).

The sea bottom search mode has a deep range to search sea bottom. Therefore, if sea bottom is not found quickly, a number of transmissions are done at the deep range and the cycle period of transmission becomes longer.

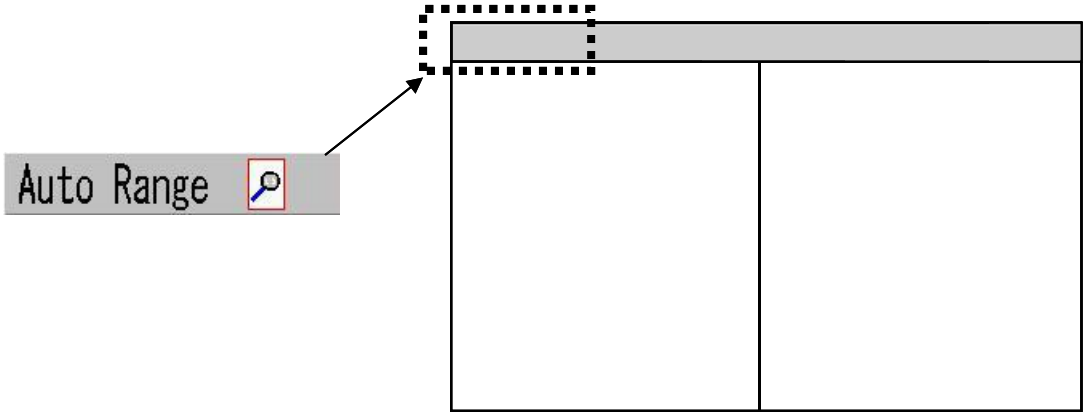
To reduce this deterioration of cycle period, there is a function to specify the maximum search range.

To switch depth range to auto range:

1. Keep pressed [SHIFT/M OFF] key (SHIFT M OFF) until [Range Mode] menu is displayed.
2. Move the cursor and select [Auto Range] with [▲] or [▼] keys of (◄ ► ▲ ▼) .

3. Press [ENT] key (ENT) . Range mode is set to [Auto Range].

   [Auto Range] is displayed in the header display for range mode, once set to [Auto Range].



⚠ **Caution:** During the operation of auto range, [Range] and [Shift] keys are disabled. In addition, the range operation is set to [All Screen Same], and the [Scr. Individual] range and the [Scr. Individual] shift are not available either.

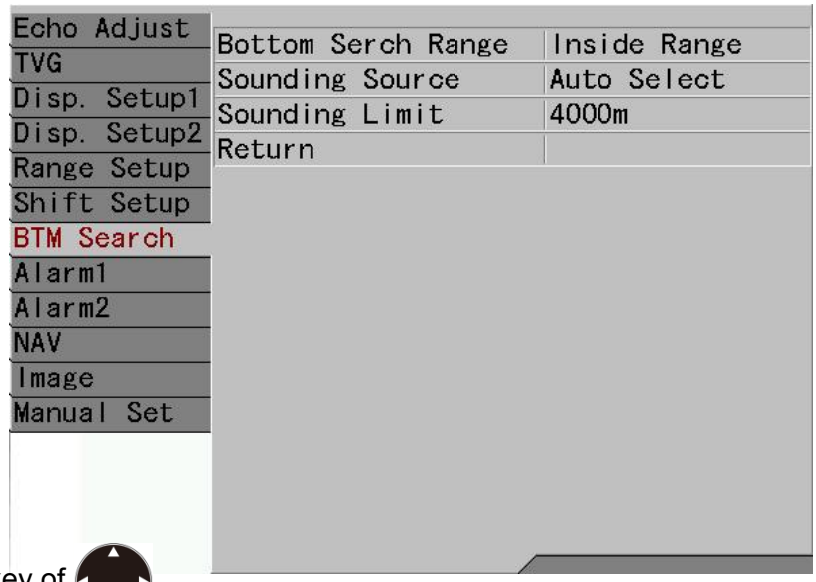
Function to specify the maximum search range so as to reduce deterioration of cycle period:

To set [Sounding Limit] at sea bottom search mode:

1. Press [MENU] key

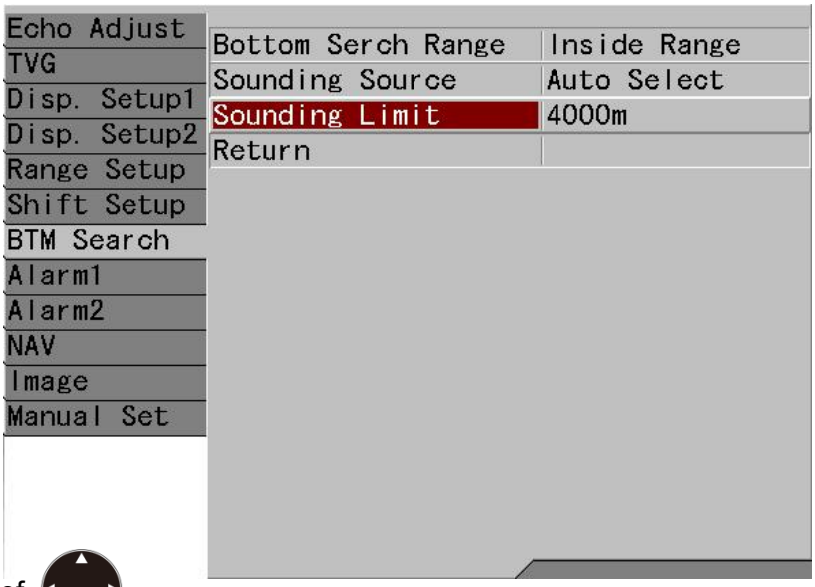
.

2. The menu is displayed. Move the cursor to [BTM Search] with [▲] or [▼] keys of .



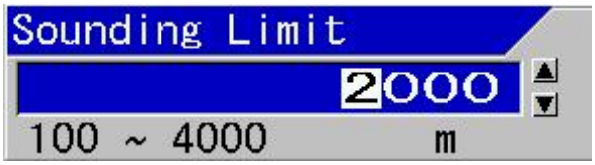
3. Press [▶] key of .

4. The menu [BTM Search] is displayed. Move the cursor to [Sounding Limit] with [▲] or [▼] keys of .



5. Press [▶] key of .

6. The menu [Sounding Limit] is displayed. Adjust the depth by increasing/decreasing the value with [▲] or [▼] keys of .



With [◀] key, the value moves to larger digit.
With [▶] key, the value moves to smaller digit.
With [▲] key, the value increases.
With [▼] key, the value decreases.

7. Press [MENU] key

, and the menu disappears.

4.3.3 Setting of auto shift

[Auto Shift] is the function to switch shift positions automatically to display sea bottom always on the displayed screen.

When sea bottom falls outside of the displayed screen, it turns temporarily to sea bottom search mode of Auto Range with deeper range after specific number of transmission (depending on the ranges, more frequent at shallower range and less frequent at deeper range).

Sea bottom search mode has a deep range to search sea bottom. Therefore, when sea bottom cannot be found quickly, a number of transmissions are done at the deep range and the cycle period of transmission becomes longer.

To reduce this deterioration of cycle period, there is a function to specify the maximum search range.

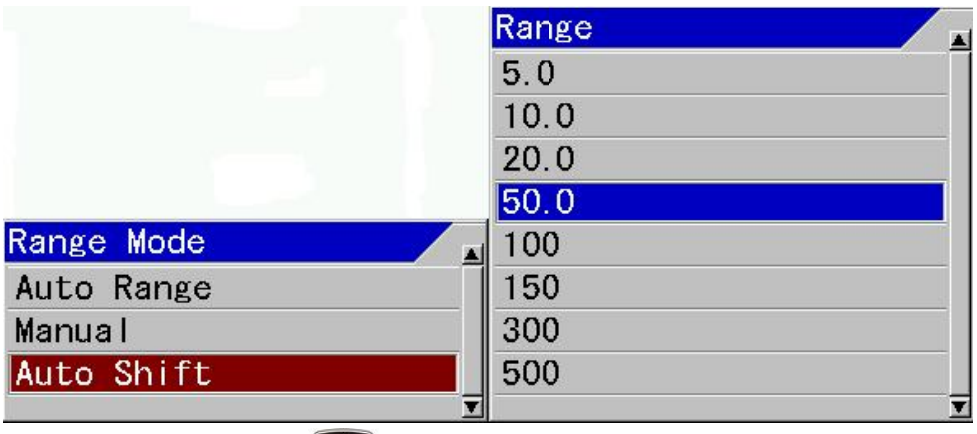
(See “4.3.2 Setting of auto range”)

To switch over Range Mode to Auto Shift:

1. Keep pressing [SHIFT/M OFF] key

until [Range Mode] menu is displayed.

2. Move the cursor and select [Auto Shift] with [▲] or [▼] keys of .



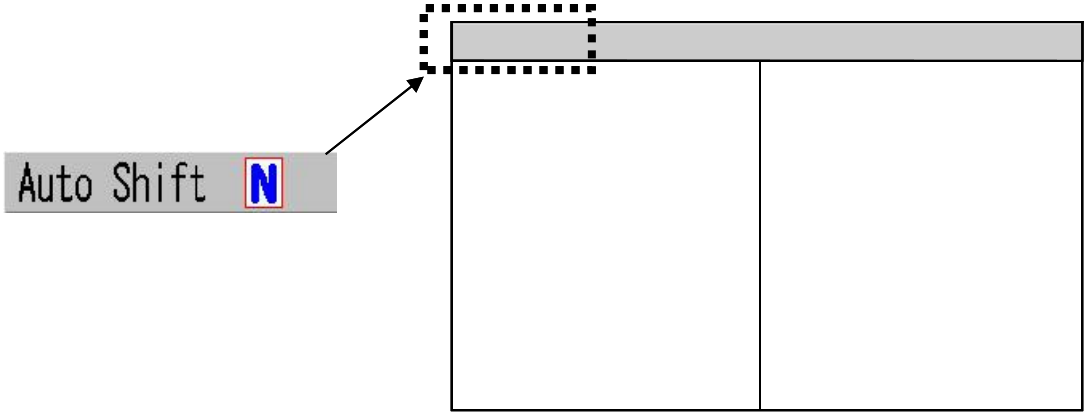
With [▲] or [▼] keys of [Range]

, the range can be selected.

3. Press [ENT] key

. Range Mode is set at [Auto Shift].

When [Auto Shift] is set, [Auto Shift] is displayed in the header display showing Range Mode.



Caution: During the operation of auto shift, [Shift] key is disabled. In addition, the shift operation is set to [All Screen Same], and the [Scr. Individual] range and the [Scr. Individual] shift are not available either.

4.4 To use event key

[Event] key

can be switched over among 3 functions: [Store Position] to register waypoints and to output the position information externally as TLL data, [Store Image] to store fish images as image files on screen, and [Homing] to assist return to the positions where events have been registered.

4.4.1 Registration of waypoints

To enable [Store Position], it is necessary to input latitude/longitude data such as GGA, RMC and GLL of NMEA0183.

1. When [Event] key

is pressed, the position information input from outside is registered as waypoints.
2. A message box Waypoint list # X is registered. is displayed and a red line is displayed on the screen.

> **Caution:** Maximum 10 waypoints can be registered. When there are more waypoints to be registered, please delete unnecessary waypoints. To delete waypoints, please see the Full Menu Reference: “3.4 Deletion of waypoints” in “Chapter 3 NAV Operation”

4.4.2 To store images

1. When [Event] key

is pressed, images are stored as bit-mapped files.

   During the storage operation, image scroll is stopped.
2. When storage is completed, a message box Image data list #XXX is registered.

   is displayed and image scroll resumes.

> **Caution:** Maximum 500 images can be stored in the Image List. When there are more images to be stored, please delete unnecessary images. To delete images, please see the Full Menu Reference: “4.3 Deleting of Image” and “4.4 Deletion of all images in the Image List” in “Chapter 4 Image List.”

To display the images stored images, see the Full Menu Reference: “4.1 Recall of Image” in “Chapter 4 Image List”

4.4.3 Starting up Homing

To enable [Homing], it is necessary to input latitude/longitude data such as GGA, RMC and GLL of NMEA0183.

1. When [Event] key

is pressed, the position information input from outside is registered as waypoints, and the waypoint navigation starts taking the position information as waypoints.

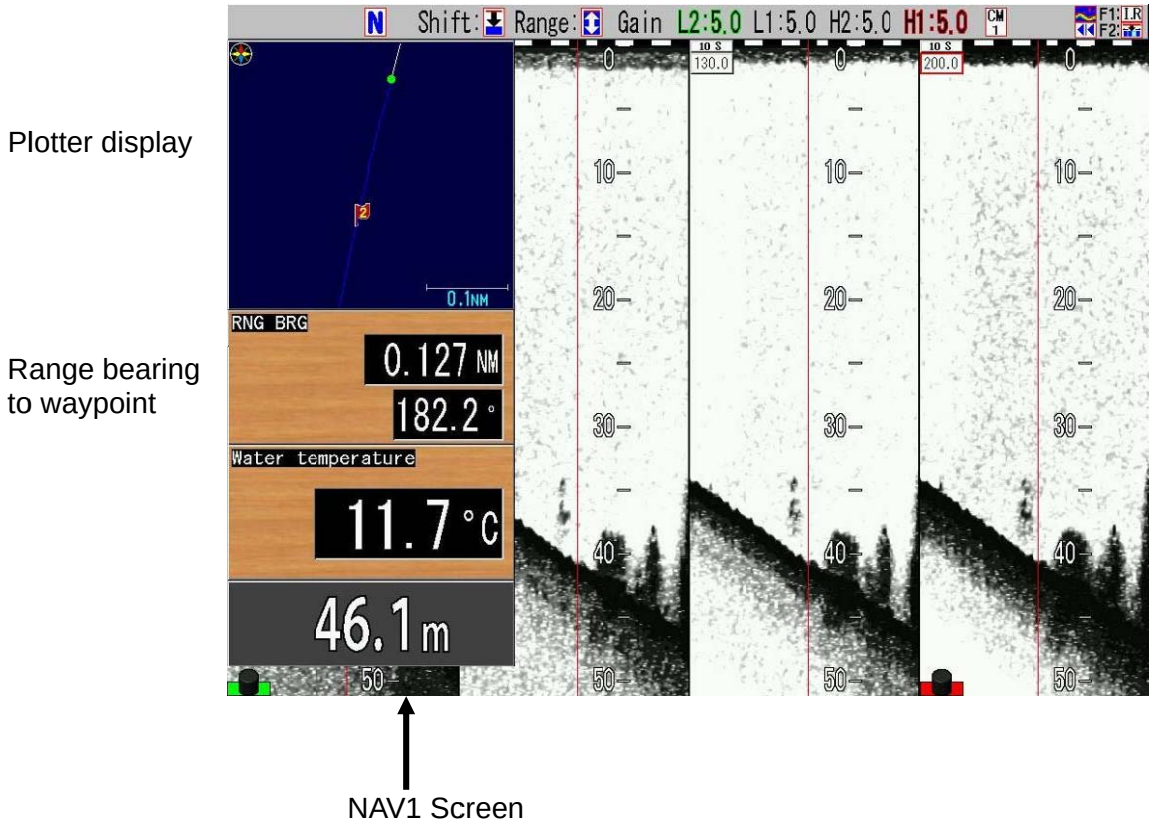
2. NAV1 Screen is displayed.

Caution: After 10 waypoints are registered, no more points can be registered. When additional waypoint is to be registered, message box

A Wpt list is full. Registration is not completed.

appears.

In this case, waypoints are not registered and navigation calculation starts. If you want to register the waypoints, delete unnecessary waypoints. To delete waypoints, see the Full Menu Reference: “3.4 Deletion of waypoints” in “Chapter 3 NAV Operation”.



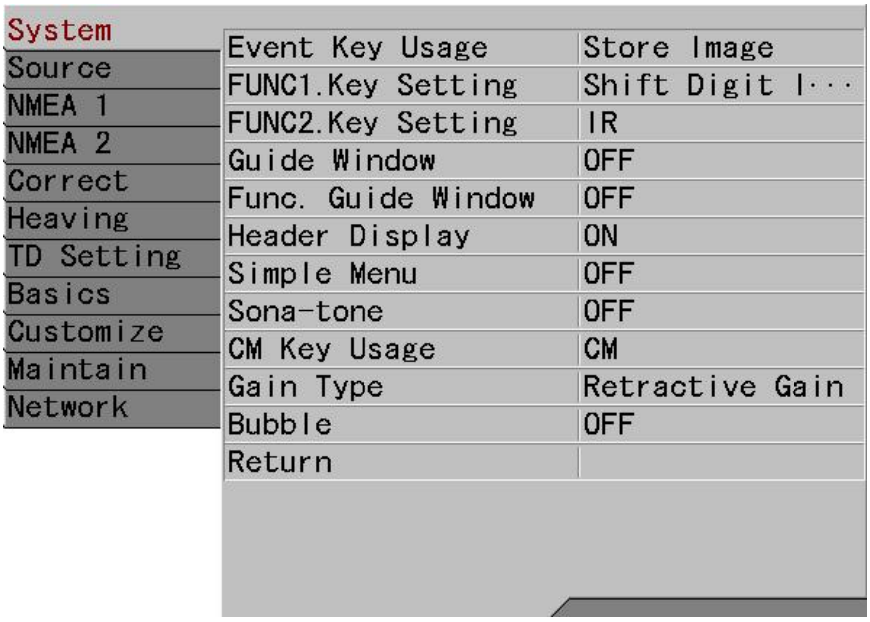
4.4.4 Selection of event key function

To select function of [Event] key:

1. Press [SUBMENU] key

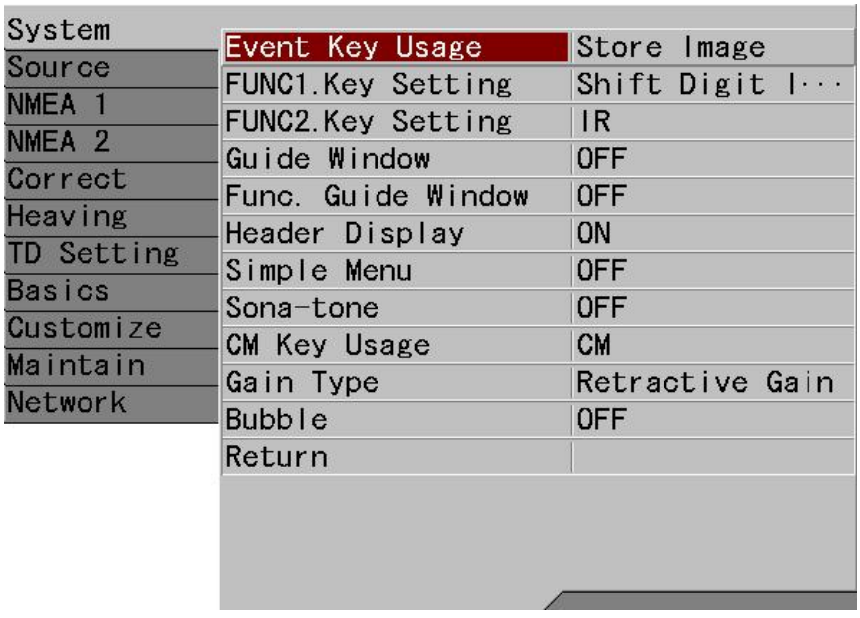
.

2. The SUBMENU is displayed. Move the cursor to [System] with [▲] or [▼] keys of .



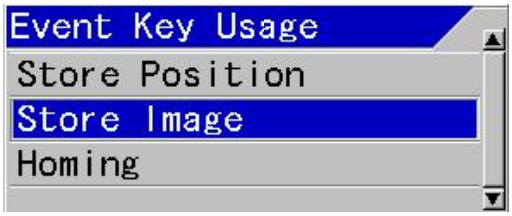
3. Press [►] of .

4. The SUBMENU [System] is displayed. Move the cursor to [Event Key Usage] with [▲] or [▼] keys of .



5. Press [▶] of .

6. The SUBMENU [Event Key Usage] is displayed. Select a function to be set with [▲] or [▼] of .



7. When [MENU] key is pressed, the SUBMENU is closed and the selected function is set on the [Event] key.

4.5 Shortcut to range registration menu

When the registered range in use is to be changed, there is a shortcut function to change the registered range directly with one touch operation not by menu operation.

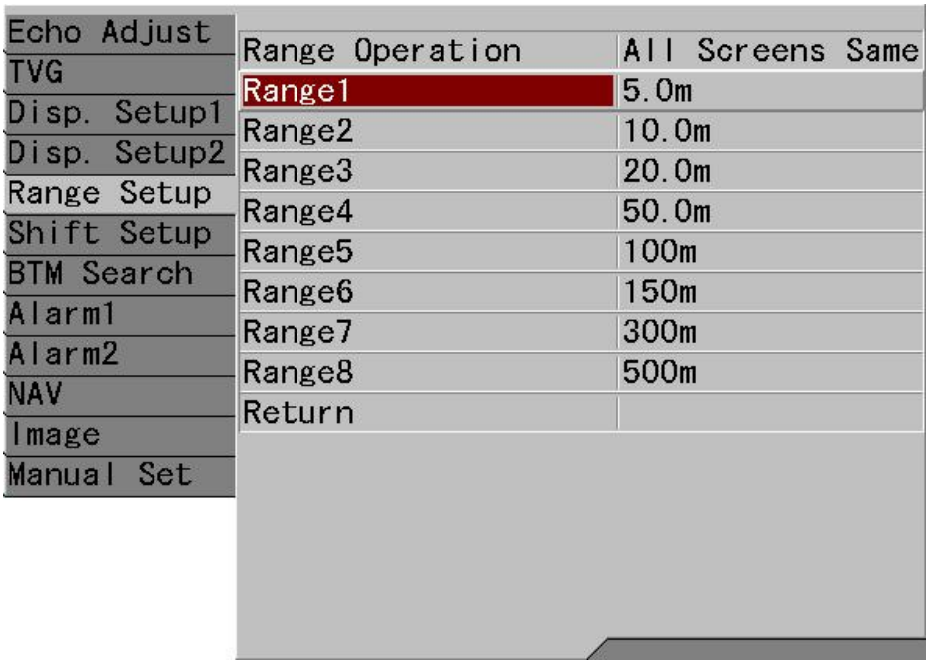
To change the Registered range in use by shortcut:

1. Keep pressing [NORMAL/ZOOM] key

.

2. The menu [Range Setup] is displayed.

   The cursor is located at the position of registered range currently in use.



3. Press [►] key of .

4. The menu [Range X] is displayed. Set the range with [▲] or [▼] key of .

   With [▲] key, the value increases.
   With [▼] key, the value decreases.

   Keep pressing the key and the digit automatically shifts up.

   Along the operation, the range on display changes to the range changed.

5. Press [Menu] key

to close the menu and registration of range is completed.

4.6 To move the position of menu

The MENU or SUBMENU is displayed half transparent at the upper left of the screen, overlaid on echo images.

There is a function to move the menu position, to see the echo images blocked by the display of MENU or SUBMENU.

To move the display position of the MENU and the SUBMENU:

1. While MENU or SUBMENU is on display, keep pressing [MENU] key

.
2. The menu turns to menu moving mode, with a blip sound.

   When Guide Window is displayed, the Guide Window switches to menu moving mode.

3. The MENU or SUBMENU can be moved upward and downward with [▲] or [▼] keys of

   The MENU or SUBMENU can be moved right and left with [◄] or [►] keys.
4. When the position is determined, press [ENT] key

.

   Position moving mode of the MENU and the SUBMENU is completed. The changed position is memorized.

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