

# FURUNO

## OPERATOR'S MANUAL

### *FISH SIZE INDICATOR*

Model **FCV-2100**

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(Product Name: FISH FINDER)

 FURUNO ELECTRIC CO., LTD.



[www.furuno.com](http://www.furuno.com)

**ECF**

(Elemental Chlorine Free)

The paper used in this manual  
is elemental chlorine free.

**FURUNO ELECTRIC CO., LTD.**

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Nishinomiya, 662-8580, JAPAN

• FURUNO Authorized Distributor/Dealer

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0 0 0 1 9 1 3 8 1 1 4

# IMPORTANT NOTICES

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## General

- This manual has been authored with simplified grammar, to meet the needs of international users.
- The operator of this equipment must read and follow the descriptions in this manual. Wrong operation or maintenance can cancel the warranty or cause injury.
- Do not copy any part of this manual without written permission from FURUNO.
- If this manual is lost or worn, contact your dealer about replacement.
- The contents of this manual and equipment specifications can change without notice.
- The example screens (or illustrations) shown in this manual can be different from the screens you see on your display. The screens you see depend on your system configuration and equipment settings.
- Save this manual for future reference.
- Any modification of the equipment (including software) by persons not authorized by FURUNO will cancel the warranty.
- The following concern acts as our importer in Europe, as defined in DECISION No 768/2008/EC.
  - Name: FURUNO EUROPE B.V.
  - Address: Siriusstraat 86, 5015 BT, Tilburg, The Netherlands
- The following concern acts as our importer in UK, as defined in SI 2016/1025 as amended SI 2019/470.
  - Name: FURUNO (UK) LTD.
  - Address: West Building Penner Road Havant Hampshire PO9 1QY, U.K.
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## How to discard this product

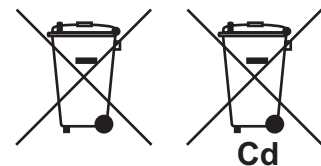
Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (<http://www.eiae.org/>) for the correct method of disposal.

## How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery, see the chapter on Maintenance. Follow the instructions below if a battery is used. Tape the + and - terminals of battery before disposal to prevent fire, heat generation caused by short circuit.

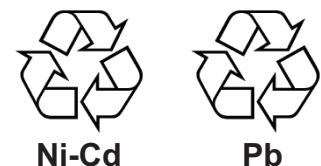
### In the European Union

The crossed-out trash can symbol indicates that all types of batteries must not be discarded in standard trash, or at a trash site. Take the used batteries to a battery collection site according to your national legislation and the Batteries Directive 2006/66/EU.



### In the USA

The Mobius loop symbol (three chasing arrows) indicates that Ni-Cd and lead-acid rechargeable batteries must be recycled. Take the used batteries to a battery collection site according to local laws.



### In the other countries

There are no international standards for the battery recycle symbol. The number of symbols can increase when the other countries make their own recycle symbols in the future.



# SAFETY INSTRUCTIONS

The operator must read the applicable safety instructions before attempting to operate the equipment.



## WARNING

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



## CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.



Warning, Caution



Prohibitive Action



Mandatory Action



## WARNING



### ELECTRICAL SHOCK HAZARD Do not open the equipment.

Hazardous voltage exists inside the equipment. Refer repair to authorized service personnel.



### Immediately turn off the power at the switchboard if something is dropped into the equipment.

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



### Immediately turn off the power at the switchboard if the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock. Contact a FURUNO agent for service.



### Immediately turn off the power at the switchboard if the equipment shows any abnormality.

If the unit exhibits any sign of abnormal heat or sound, turn the power off at the switchboard and consult your local dealer.



### Use only the specified power and signal cable.

Fire or damage to the equipment can result if a different cable is used.



## WARNING



### Do not disassemble or modify the equipment.

Fire, electrical shock or injury can result.



### Keep the equipment away from rain and water splash.

Fire, electrical shock or injury can result if water leaks into the equipment.



### Do not put containers with liquids on the top of the equipment.

Fire, electrical shock or injury can result.



### Do not operate the equipment with wet hands.

Electrical shock can result.







### Use the proper fuse.





Use of an incorrect fuse can damage the equipment and can cause fire.



### Do not maneuver the vessel based solely on the depth indication shown on the screen.

Grounding of the vessel can occur.

 <b>CAUTION</b>	
	<p><b>Do not use depth information for navigation while the picture advance speed is set to "stop".</b></p> <p>The depth indication is not refreshed while the picture is stopped. Use of depth data for navigation in this case could lead to grounding or other dangerous situation.</p>
	<p><b>Do not transmit with the transducer out of water.</b></p> <p>The transducer will be damaged.</p>
	<p><b>Keep the following points in mind regarding cables.</b></p> <ul style="list-style-type: none"> <li>• Keep the cables away from lubricants and fuels.</li> <li>• Avoid areas where the cable may be damaged.</li> <li>• Do not paint the cables. Solvents such as toluene, contained in paints, can damage the cable's protective covering.</li> <li>• Do not cut the cables. The cables may be damaged or become corroded.</li> <li>• Do not carry the equipment using only the cables. The cables may be damaged or become disconnected.</li> </ul>

 <b>CAUTION</b>	
	<p><b>Adjust the gain properly.</b></p> <p>Too little gain may present no picture. Too much gain shows excessive noise on the picture.</p>
	<p><b>Keep the bottom echo and depth indication shown stably.</b></p> <p>Unstable bottom echo and depth indication can result in grounding if the vessel is steered according to the informations on the display. If unstable, adjust the setting of [Bottom Level] or [TX Power].</p>
	<p><b>Do not connect/disconnect the cables connected to the processor unit while turning the power on.</b></p> <p>The unit may be damaged.</p>

### **Warning Label**

A warning label is attached to the Transceiver Unit. Do not remove the label. If the label is missing or illegible, contact your local dealer regarding a replacement.

 <b>WARNING</b> 
To avoid electrical shock, do not remove cover. No user-serviceable parts inside.
 <b>警告</b> 
感電の恐れあり。 サービスマン以外の方はカバーを開けないで下さい。内部には高電圧部分が多い数多くあり、万一さわると危険です。

Name: Warning Label (1)  
Type: 86-003-1011-3  
Code No.: 100-236-233-10

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# FOREWORD

---

## A Word to the Owner of the FCV-2100

Congratulations on your choice of the FCV-2100 Fish Finder and Fish Size Indicator. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

Since 1948, FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

Your equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless properly installed and maintained. Please carefully read and follow the operation and maintenance procedures set forth in this manual.

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

Thank you for considering and purchasing FURUNO.

## Features

The FCV-2100 is a color fish finder with split-beam technology for estimating fish sizes. The system is comprised of a Trackball Control Unit, Processor Unit, Transceiver Unit and Transducer. The FCV-2100 shows echoes on a monitor (local supply).

### **The main features of the FCV-2100 are:**

- Wide-band technology allows the display of high-resolution fish echoes.
- Fish-size graph allows estimation of fish distribution at a glance.
- Target location graph allows tracking of a designated fish target.
- Hardness graph allows monitoring of the seabed hardness.
- Data recording and screen-shot function allow easy review of past echoes and recordings.
- Scroll-back mode allows the user to review past data.
- Gain changes made at the FCV-2100 are applied to all screens currently displayed on the FCV-2100 (excludes external fish finders).
- Recorded data can be saved to an external recording device.
- Display up to three separate echo images; available with the connection of an externally networked fish finder (external fish finder), such as DFF3/DFF1-UHD.
- Constant stable display of echoes is achievable with the use of the heave offset function (requires connection to a SATELLITE COMPASS™).
- Location of fish schools can be output to connected navigational equipment.
- Easy to see fish sizes with the ACCU-FISH™ feature. (Requires connection to an external display and an external fish finder.)
- Seabed composition can be displayed on-screen in graphical or colored format. (Requires connection to an external display and an external fish finder.)

## Cautionary notes regarding external memory devices

- Do not use password-locked memory devices.
- Do not remove or disconnect the external device while data is being saved or loaded. This can cause data corruption or loss.
- Do not connect, or disconnect, external devices when the FCV-2100 is turned on. Turn the power to the FCV-2100 off before connecting or disconnecting an external device.
- For external hard drives, drives with a separate, external power supply are recommended.
- When recording echo data (see section 3.2), a device with 500 GB capacity or higher is recommended.
- When recording echo data and saving screenshots, connect the external device to the USB port of the processor unit. Do not connect external memory devices to the Trackball Control Unit's USB port.
- Log output can require up to 2.4 GB capacity. Where the external device has insufficient capacity, the log is output until the capacity is full. Any log entries after this point are not saved.
- The following external devices are known to be compatible with this system:

External device	Maker	Model	Capacity
USB Flash Memory	TDK	UFD32GE-SLBKA	32 GB
	Silicon Power	SP008GBUF2M01V1K	8 GB
USB External Hard Drive	I-O DATA	HDCL-UT1.0KB	1 TB
	BUFFALO	HD-LC1.0U3-BKD	1 TB
	ELECOM	LCH-MN1TU3TVS	1 TB
	TOSHIBA	HD-ED10TK	1 TB

## Terminology standards used in this manual

For the sake of brevity, procedures in this manual use the following terminology:

Terminology	Meaning
Select	Use the trackball to move the cursor onto the item indicated, then left-click. For example, "Select the [Display] icon from the InstantAccess bar™".
Left-click	Press the <b>Left button</b> once.
Double-click	Press the <b>Left button</b> two times, in quick succession.
Right-click	Press the <b>Right button</b> once.
Scroll	Rotate the <b>Scrollwheel</b> .
Drag and drop	Highlight the item with the cursor, then press and hold the <b>Left button</b> . Use the <b>Trackball</b> to move, or "drag", the item. Release the <b>Left button</b> to "drop" the item.
External Fish Finder	Used in reference to an external echo sounder connected to the FCV-2100. For example, DFF3.

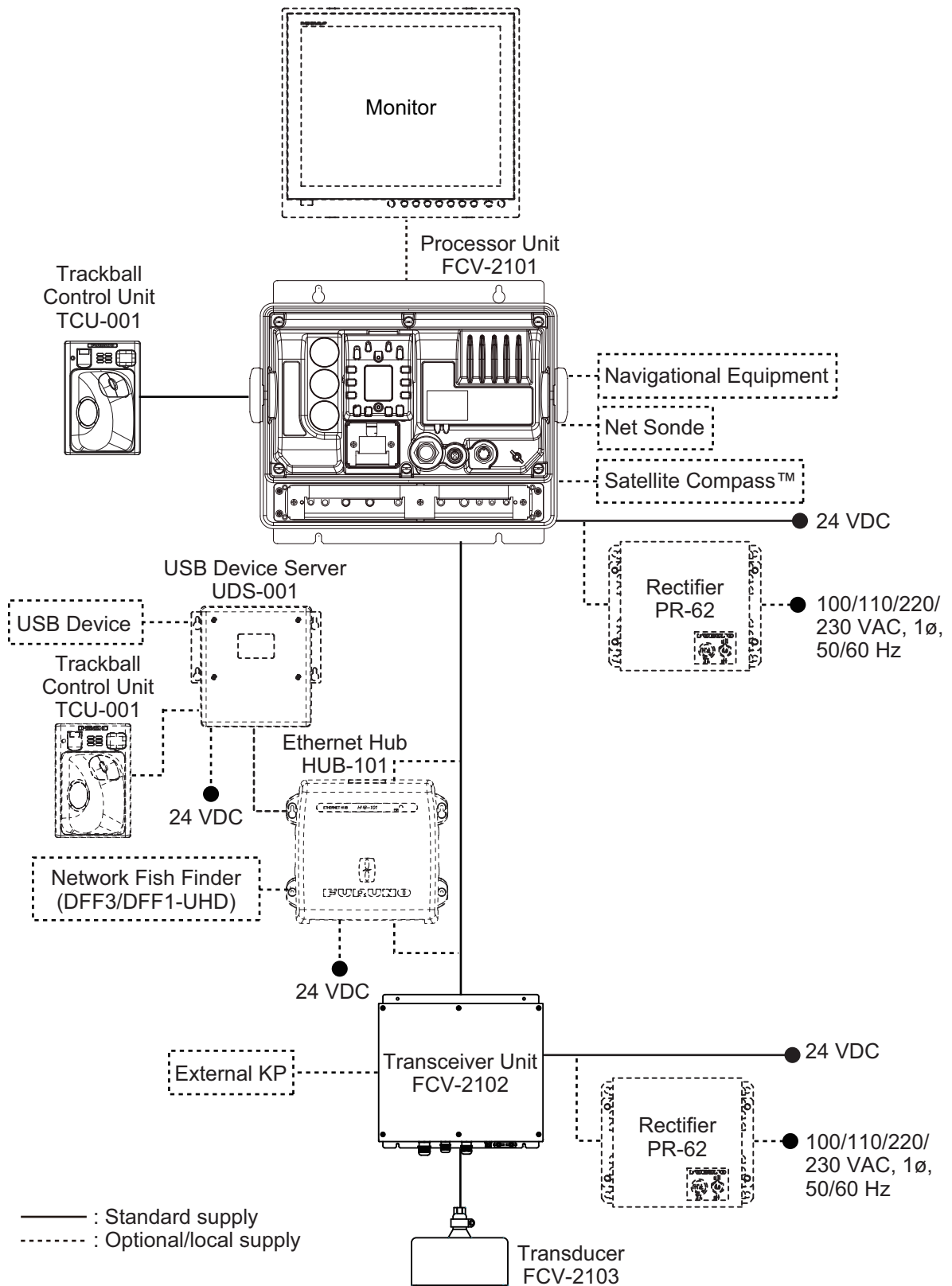
## CE/UKCA declaration

With regards to CE/UKCA declarations, please refer to our website ([www.furuno.com](http://www.furuno.com)) for further information about RoHS conformity declarations.

## Disclosure of Information about China RoHS

With regards to China RoHS information for our products, please refer to our website ([www.furuno.com](http://www.furuno.com)).

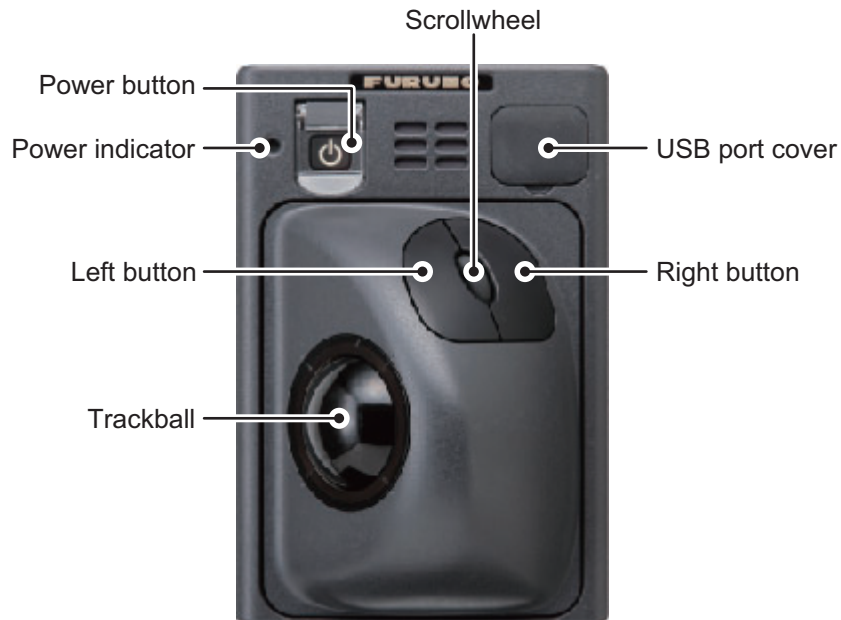
# SYSTEM CONFIGURATION




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# 1. OPERATION

## 1.1 Trackball Control Unit



Key	Function/Description
Power button 	Press to turn the power on or off.
Trackball	Moves the cursor.
Left button	<b>Short press:</b> Select the item highlighted with the cursor. <b>Double-click:</b> Inscribe a line (TLL). <b>Drag &amp; Drop:</b> Move the selected window/marker line etc.
Right button	<ul style="list-style-type: none"> <li>Show/hide the InstantAccess bar™.</li> <li>Cancel the selected operation.</li> </ul>
Scrollwheel	<b>Rotate (scroll):</b> Change the setting for the selected item. <b>Short press:</b> Take a screenshot (still image). <b>Long press:</b> Replay screenshots.
USB port cover	Remove to access the USB port. USB flash memory can be inserted here. When the USB port is not in use, cover the USB port with the port cover. <b>Note:</b> Do not use this port to connect external memory devices for data recording or saving screenshots.

## 1.2 How to Turn the Power On/Off

Open the power button cover on the Trackball Control Unit, then press the power button. An audible “beep” sound indicates that the power is now on, and the start-up screen is displayed.

When the start-up procedure is complete, the last used screen is displayed.

Where the setting for the power indicator brightness ([System] menu → [Control Unit] → [Brightness]) is set to other than [0], the Trackball Control Unit is lit to indicate that the power is on.

To turn the power off, open the power button cover, then press the power button.

**Note 1:** Always use the Trackball Control Unit to turn the system on or off. If the system is turned off from a switchboard or by other means, changes made to settings are not saved.

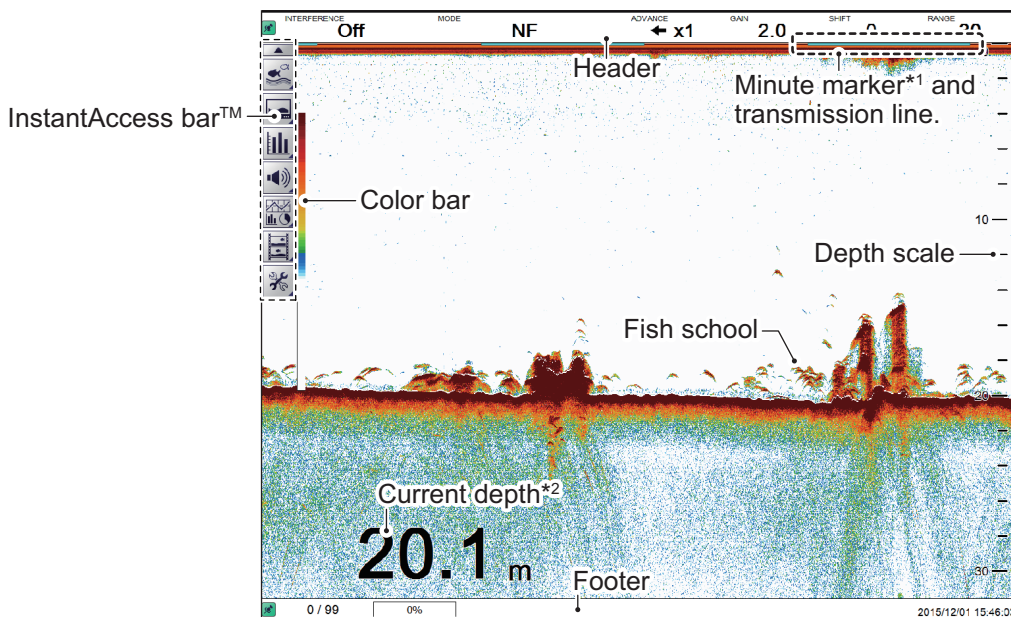
**Note 2:** Although the system is turned off, the system uses a small amount of power (Processor Unit: 60mA maximum; Transceiver: 280mA maximum). When the system is not used for a lengthy period of time, turn the system off normally, then turn the system’s power off from the switchboard.

**Note 3:** When there is no operation for a short while after the system is turned on, occasionally the power button will not work. If this happens, press the either the left or right button on the Trackball Control Unit, then press the power button to restart the system. You can also long-press the power button to force a system shut down.

## 1.3 Fish Finder Display

### 1.3.1 Display overview

The figure below shows a typical display example. Some indications are not shown in this example, however all functions and indications are covered later in this manual.

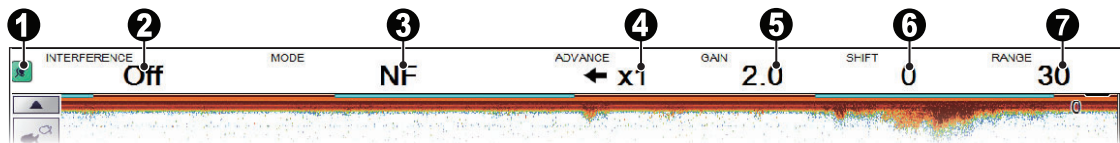


\*1: Each minute marker “bar ” denotes 30 seconds.

\*2: When [External Echo Sounder:Depth] is set to [On] at installation and the FCV-2100 cannot detect the seabed, the external sounder’s depth is displayed in orange color instead.

### 1.3.2 How to interpret the header

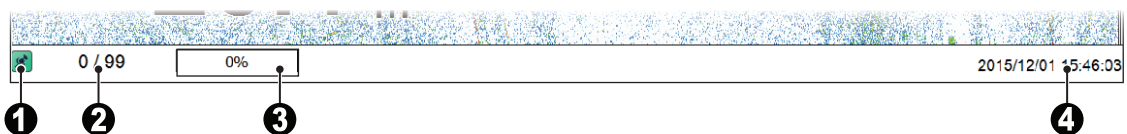
The header contains various settings and controls, all accessible with the cursor. Select an indication on the header to adjust that function.



No.	Name	Description
1	"Pinned" icon	Select the "Pinned" icon to "pin" or "unpin" the header. A "pinned" header is always visible at the top of the screen. An "unpinned" header is hidden until the cursor is placed on the header's location. This icon is shown in green color when "pinned".
2	Miscellaneous settings	Select the indication to activate the current function, then scroll to select the desired setting. The functions available from this section of the header are: <ul style="list-style-type: none"> <li>• Interference rejection. See section 1.9.</li> <li>• Smoothing. See section 1.10.</li> <li>• Clutter. See section 1.11.</li> <li>• Zoom mode. See section 1.12.</li> <li>• External fish finder Gain. See section 1.6.2.</li> </ul>
3	[MODE]	Select the Display mode. See section 1.4 for available modes.
4	[ADVANCE]	Select the speed at which echoes appear on the screen. See section 1.5.
5	[GAIN]	Select the transducer sensitivity level. See section 1.6.
6	[SHIFT]	Shift the displayed area. See section 1.7.
7	[RANGE]	Change the displayed range. See section 1.8.

### 1.3.3 How to interpret the footer

The footer displays the date and time, how many still images are saved, the amount of space available in the external memory.

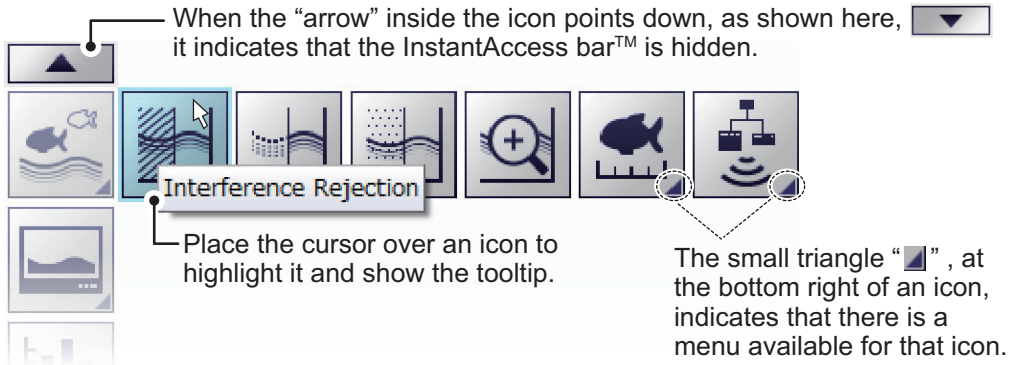


No.	Name	Description
1	"Pinned" icon	The footer can be "pinned" or "unpinned". A "pinned" footer is always visible at the bottom of the screen. An "unpinned" footer is hidden until the cursor is placed on the footer's location. This icon is shown in green color when "pinned".
2	Internal memory image counter	Shows the number of still images stored in the internal memory and the total capacity available. For example, if the indication reads "9/99", this means that nine images are saved and the total capacity is 99 images.
3	External memory capacity	Shows the available capacity on the external memory device.
4	Current date/time	Shows the current date and time.

### 1.3.4 How to use the InstantAccess bar™

The InstantAccess bar™ contains the menus for functions and features, all in one compact icon-based format. You can show/hide the InstantAccess bar™ at any time using the icon at the top of the bar. Another method to show/hide the InstantAccess bar™ is to place the cursor on a non-interactive section of the display, then right-click.

To access a feature or function, select the appropriate icon. The menu bar for that icon appears. The example below shows the [Sunder] section of the InstantAccess bar™.



#### **How to Create and Remove Shortcuts**

Most icons displayed on the InstantAccess bar™ can be stored as shortcuts. The shortcuts are displayed when the InstantAccess bar™ is hidden. Up to ten icons can be assigned to the shortcut bar. To assign an icon to the shortcut bar, do the following:



- 1 Display the icon you want to store, highlight it with the cursor, then press and hold the left button.
- 2 Drag the icon away from the menu with the trackball. The shortcut bar appears.
- 3 Drag and drop the icon to the shortcut bar.
- 4 The icon is now stored on the shortcut bar.

**Note:** [Internal Settings] save slot icons (see section 1.27) cannot be stored as shortcuts.















To remove an icon from the shortcut bar:

1. Hide the InstantAccess bar™ to show the shortcut bar.
2. Highlight the icon to be removed from the shortcut bar.
3. Drag and drop the icon away from the shortcut bar. The icon is no longer shown in the shortcut bar.





































### 1.3.5 InstantAccess bar™ icons list

The table below shows the InstantAccess bar™ menus, their respective menu items and available options, along with a brief description. For full details on each menu/function, see the respective sections of the manual.

















Icon		Description/Options
Menu	Item	
		[Sounder] menu. Select this icon to access the sounder-related settings.
		[Interference Rejection] icon. Select this icon to access the [Interference Rejection] function (see section 1.9 for details).
		[Smoothing] icon. Select this icon to access the [Smoothing] function (see section 1.10 for details).
		[Clutter] icon. Select this icon to access the clutter (low level noise reduction) function (see section 1.11 for details).
		[Zoom Mode] icon. Select this icon to access the zoom functions (see section 1.12 for details).
		[Measure Fish Size] icon. Select this icon to access the fish measurement area settings (see section 2.2.2 for details). The available settings are: <ul style="list-style-type: none"> <li> Measure fish at any location on the display. See section 2.2.2 for details.</li> <li> Only measure fish within a specified depth range. See section 2.2.3 for details.</li> <li> Only measure fish that appear near the seabed. See section 2.2.4 for details.</li> <li> Only measure fish within a specified area on the display. See section 2.2.5 for details.</li> </ul>
		[External Fish Finder Gain] icon. Select this icon to adjust the external fish finder gain (see section 1.6 for details). The available options are: <ul style="list-style-type: none"> <li> Select to adjust the high frequency external fish finder gain.</li> <li> Select to adjust the low frequency external fish finder gain.</li> </ul> <p><b>Note:</b> The [External Fish Finder Gain] icon is not available when there is no external fish finder connected, or if the [External Fish Finder Window] menu option is set to [On] at installation.</p>
		[Display] menu. Select this icon to access the display-related settings.

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Icon		Description/Options
Menu	Item	
		<p>[Display Division] icon. Select this icon to change the manner in which the display is divided (see section 1.4). The available options are:</p> <ul style="list-style-type: none"> <li> Divide the display vertically.</li> <li> Divide the display horizontally.</li> <li> Divide the display in a combination of horizontal and vertical split screens.</li> </ul>
		<p>[Window Color] menu. Select this icon to change the display colors to suit day or night viewing (see section 1.13 for details). The available options are:</p> <ul style="list-style-type: none"> <li> Set the display colors for Day-time viewing.</li> <li> Set the display colors for Night-time viewing.</li> </ul>
		<p>[A-Scope] icon. Select to show/hide the A-Scope (see section 1.14).</p>
		<p>[Depth] icon. Select to show/hide the depth indication (see section 1.15).</p>
		<p>[Depth Scale] icon. Select to show/hide the depth scale (see section 1.16).</p>
		<p>[VRM] icon. Select to show/hide the VRM line (See section 1.17). <b>Note:</b> When MZ (Marker Zoom) is selected, the VRM is constantly displayed, regardless of VRM settings.</p>
		<p>[Minute Marker] icon. Select to show/hide the minute marker (see section 1.18).</p>
		<p>[Color Bar] icon. Select to show/hide the color bar (see section 1.19).</p>
		<p>[External Echo Sounder] icon. Select to show/hide echoes from the external echo sounder on the sub display. <b>Note:</b> The [External Echo Sounder] icon is not available when the [External Fish Finder Window] menu option is set to [Off] at installation.</p>
		<p>[Graph] menu. Select this icon to access the graph functions. See chapter 2 for details.</p>
		<p>[Fish Size Graph]. Select this icon to activate/deactivate the fish size graph and measurement functions (see section 2.2).</p>
		<p>[Vertical Target Graph]. Select this icon to activate/deactivate the vertical target graph (see section 2.3.1).</p>

Icon		Description/Options
Menu	Item	
		[Horizontal Target Graph]. Select this icon to activate/deactivate the horizontal target graph (see section 2.3.2).
		[Sonde Graph]. Select this icon to activate/deactivate the sonde graph (see section 2.4).
		[Temp Graph]. Select this icon to activate/deactivate the water temperature graph (see section 2.5).
		[Hardness Graph]. Select this icon to activate/deactivate the seabed hardness graph (see section 2.6).
		[Alarm] menu. Select this icon to activate/deactivate alarms. See section 1.21 for details.
		[Bottom Alarm] icon. Select this icon to activate/deactivate the seabed depth alarm.
		[Fish Alarm] icon. Select this icon to activate/deactivate the fish alarm.
		[Bottom Fish Alarm] icon. Select this icon to activate/deactivate fish alarm for fish near the seabed.
		[Water Temperature Alarm] icon. Select this icon to activate/deactivate the water temperature alarm.
		[Fish Size Graph Alarm] icon. Select this icon to activate/deactivate the fish size alarm.
		[Combined Alarm] icon. Select this icon to activate/deactivate the combined alarm.
		[Data Display] menu. Select this icon to access settings for external data received. See section 1.22 for details.
		[Own Ship Position] icon. Select this icon to show/hide Own Ship latitude and longitude.
		[Time and Date] icon. Select this icon to show/hide the time and date.
		[Speed(SOG)] icon. Select this icon to show/hide your vessel's speed over the ground.
		[Speed(STW)] icon. Select this icon to show/hide your vessel's speed through the water.
		[Temperature] icon. Select this icon to show/hide the water temperature.

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Icon		Description/Options
Menu	Item	
		[Echo Recording] menu. Select this icon to access the echo recording and image recording functions.
		[Record] icon. Select this icon to begin recording echo data (see section 3.2.1).
		[Play] icon. Select this icon to playback echo data (see section 3.2.2).
		[Pause] icon. Select this icon to pause the echo data playback (see section 3.2.2).
		[Stop] icon. <ul style="list-style-type: none"> <li>• Select this icon to stop echo data recording (see section 3.2.1).</li> <li>• Select this icon to stop echo data playback (see section 3.2.2).</li> </ul>
		[Multi-Screenshot Start/Stop] icon. Select this icon to take multiple screenshots (see section 3.1.3).
		[Advanced Settings] menu. Select this icon to access the advanced settings menu, change various settings for the FCV-2100 and undo/redo actions.
		[Internal Settings] menu. Select this icon to save/load data to/from the processor unit's internal memory (see section 1.27).
	 [Save Settings] icon.	
	 [Load Settings] icon.	
		[External Settings] menu. Select this icon to save/load data to/from an external memory device (see section 1.27).
	 [Save External Unit Settings] icon.	
	 [Load External Unit Settings] icon.	
		[Advanced Settings] icon. Select this icon to access the [Advanced Settings] pop up menu. See chapter 4 for details.
		[Undo] icon. Select this icon to “undo” the last operation (see section 1.28).
		[Redo] icon. Select this icon to “redo” the last operation (see section 1.28).

## 1.4 How to Change Display Modes

The FCV-2100 has several display modes available, some of which can be displayed in split screen.

### 1.4.1 How to change the display mode for the FCV-2100

**Note:** To change the display mode on the external fish finder window, see section 1.20.1.


1. Display the header if it is not “pinned”. When the header is displayed, go to step 2.
2. Select the [MODE] indication on the header. The indication is now highlighted in a green color.



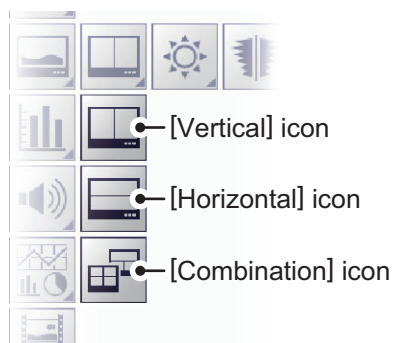
3. Scroll to show the desired mode. The available modes depend on the [Mode] menu settings in the [System] menu. See section 4.7.7 for details. The table below lists the modes with their abbreviation (as displayed on-screen) along with the meaning.

Abbreviation	Meaning	Abbreviation	Meaning
NF	Normal FCV-2100 mode.	BD	Bottom Discrimination. See section 1.12.4.
BL	Bottom Lock. See section 1.12.1.	HE	External HF sounder. See section 4.7.7.
BZ	Bottom Zoom. See section 1.12.2.	LE	External LF sounder. See section 4.7.7.
MZ	Marker Zoom. See section 1.12.3.		

**Note:** To display the external fish finder in the mode list, refer to section 4.7.7. Where External fish Finder Window is set to On at installation, the external fish finder echoes can be displayed on the sub monitor (see section 1.20).

4. Where two or more sounders are displayed, select the [Display] icon (  ) from the InstantAccess bar™, then select the [Display Division] icon\*.

\*: The icon displayed varies depending on the currently selected method of division. See the figure below for the available icons and divisions.

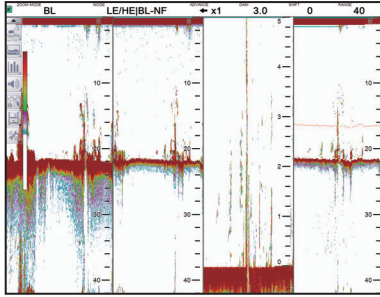


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5. Select the method in which you wish to “split” the display.

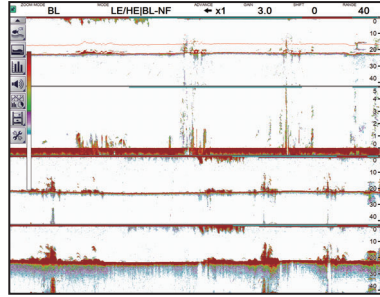
### Vertical split screens

This example shows a four sounder configuration.



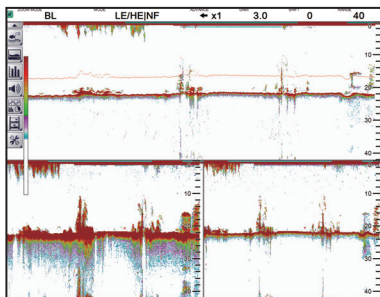
### Horizontal split screens

This example shows a four sounder configuration.

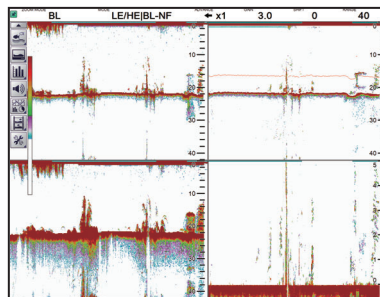


### Combination split screens

(For configurations with only two sounders connected, the combination screen is the same as the vertical split screen.)



This example shows a three sounder configuration.

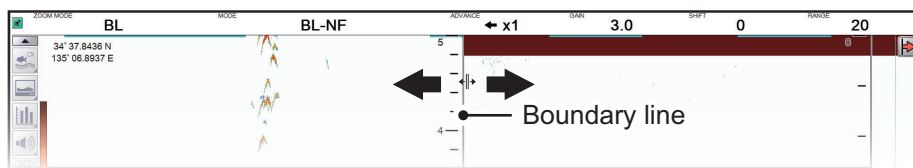


This example shows a four sounder configuration.

## 1.4.2 How to adjust the split screen division

You can adjust the size of each division of a split screen to suit your requirements. To adjust the size of a split screen, do the following:

1. Select the boundary line between the split screens. The example below shows vertically split screens.





2. Drag the boundary line to resize the screens as required.

## 1.5 Picture Advance

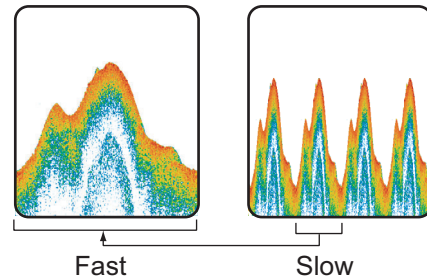
The picture advance speed determines how quickly the echoes are displayed on-screen. When setting a picture advance speed, keep in mind that a fast advance speed will expand echoes horizontally on the screen and a slow advance speed will contract them. A fast advance speed is useful for observing a rugged seabed closely. A slow advance speed is useful for observing a smooth seabed.

**Note:** When either the ACCU-FISH™ or Bottom Discrimination feature is active, the picture advance speed may be slowed.


CAUTION



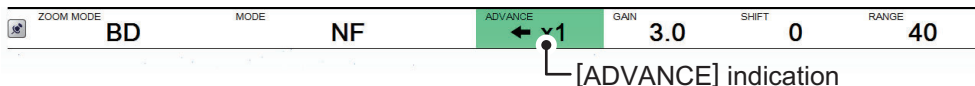
Neither the picture nor the depth indication is updated and when the picture is stopped. For those reasons, do not steer the vessel while monitoring the picture/depth indication when the picture is stopped.



### 1.5.1 Picture advance for FCV-2100 and external fish finders

Where [External Fish Finder Window] is set to [Off] at installation, the picture advance setting is applied to both the FCV-2100 and the external fish finder.

1. Display the header if it is not “pinned”. If the header is already displayed, go to step 2.
2. Select the [ADVANCE] indication on the header. The indication is now highlighted in a green color.



3. Scroll to select the appropriate advance speed. The table below lists each speed with a description.

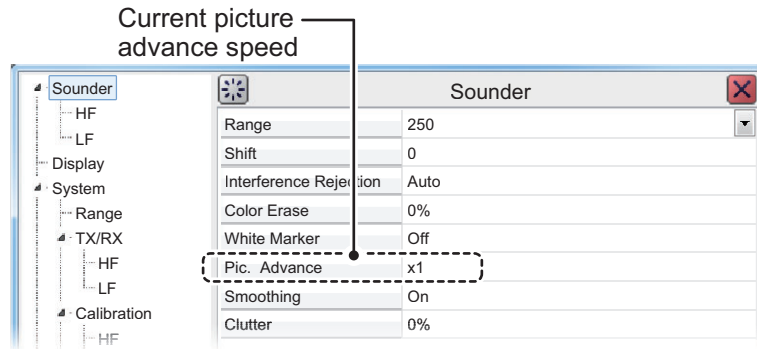
[ADVANCE] indication	Description
[STOP]	Picture is “paused”.
[1/4]	One quarter of the normal speed.
[1/2]	Half the normal speed.
[x1]	Normal speed.
[x2]	Twice as fast as normal speed.
[x4]	Four times as fast as normal speed.
[x8]	Eight times as fast as normal speed.

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### 1.5.2 Picture advance for external fish finders where [External Fish Finder Window] is set to [On] at installation

Where [External Fish Finder Window] is set to [On] at installation, follow the procedure below.

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.

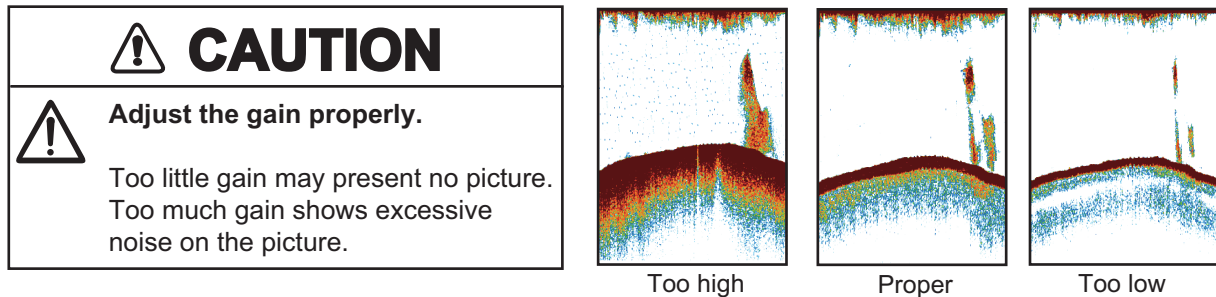


2. The [Sounder] item is already selected. At the right-side of the menu window, select [Pic. Advance].
3. Select the drop-down options button at the far right-hand side of the screen.
4. Select the appropriate speed.
5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.



## 1.6 How to Adjust the Gain

Depending on the signal strength, gain can be adjusted to hide noise and other unnecessary echoes. A high gain setting increases signal strength and can show excessive noise as well as smaller, hard to detect echoes. A low gain setting eliminates noise and gives a clearer picture, however smaller echoes may also be removed.







### 1.6.1 How to adjust the gain for the FCV-2100

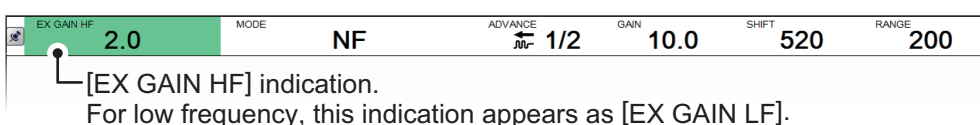
1. Display the header if it is not “pinned”. If the header is already displayed, go to step 2.
2. Select the [GAIN] indication on the header. The indication is now highlighted in a green color.



3. Scroll to change the amount of gain used. The current gain setting appears in on the header.  
 The gain setting affects previous echoes as well as new echoes. This allows you to adjust the gain to a “proper” level. A recommended gain level is where noise is only just starting to appear on the display.

### 1.6.2 How to adjust the gain for external fish finders where [External Fish Finder] is set to [Off] at installation

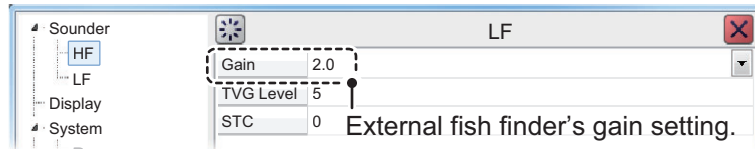
1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu appears.
2. Select the [External Fish Finder] icon (  ). The high/low frequency icons appear.
3. Select the appropriate icon,  for low frequency,  for high frequency. The indication on the header changes to [EX GAIN LF] or [EX GAIN HF] respectively and the indication changes to a green color.



4. Scroll to adjust the external fish finder's gain.

### 1.6.3 How to adjust the gain for external fish finders where [External Fish Finder Window] is set to [On] at installation

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. The [Sounder] menu is already selected. Select the [HF] or [LF] item from the [Sounder] menu. The settings for the external fish finder appear in the right-side of the menu window.

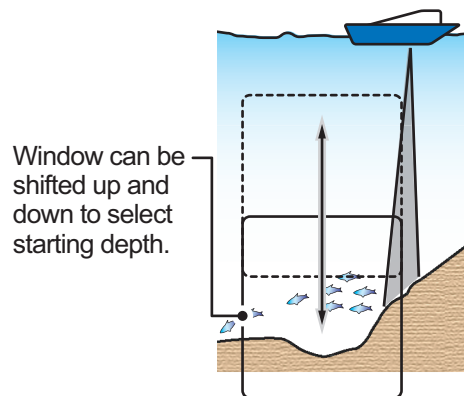


**Note:** The menu for [HF] and [LF] are the same, the example above shows [HF]. Where [LF] is selected, set the items in a similar manner to this procedure.

3. Select the [Gain] item from the settings. The setting value is now highlighted.
4. To the far right-hand side of the gain value, select the ◀ button to decrease the gain, or select the ▶ button to increase the gain.
5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.7 How to Shift the Display Range

When used together, the basic range and range shifting functions allow you to select the depth you can see on the screen. The basic range can be thought of as providing a “window” into the water column and range shifting as moving the “window” to the desired depth.



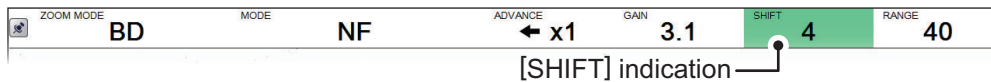
**Note 1:** This function is not available when auto range or auto shift is active.

**Note 2:** The seabed echo may be lost if the shift is at a greater value than the seabed depth.

### 1.7.1 How to shift the display range for the FCV-2100 and external fish finders

Where [External Fish Finder Window] is set to [Off] at installation, the shift function is applied to both the FCV-2100 and the external fish finder.

1. Display the header if it is not “pinned”. If the header is displayed, go to step 2.
2. Select the [SHIFT] indication on the header. The indication is now highlighted in a green color.



3. Scroll to change the amount of shift used. The current shift setting appears in on the header.

### 1.7.2 How to shift the display range for external fish finders where [External Fish Finder Window] is set to [On] at installation

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. The [Sounder] item is already selected. At the right-side of the menu window, select [Shift].
3. To the far right-hand side of the [Shift] setting value, select the ◀ button to decrease the setting, or select the ▶ button to increase the setting.
4. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.8 How to Change the Range

The range setting dictates the on-screen display distance and can be changed to suit your requirements. The system has eight presets, each of which can be changed. The default setting for the presets is listed in the table below.

Unit of measurement & Connected fish finder	Presets							
	1	2	3	4	5	6	7	8
m (FCV-2100/DFF1-UHD)	10	20	40	80	150	300	500	800
m (DFF3 - On)	5	10	20	40	80	150	300	1500
ft (FCV-2100/DFF1-UHD)	30	60	100	250	450	900	1500	2500
ft (DFF3 - On)	15	30	60	120	200	400	1000	4500
fa (FCV-2100/DFF1-UHD)	5	10	20	40	75	150	250	400
fa (DFF3 - On)	3	5	10	20	40	80	150	900
Hiro* (FCV-2100/DFF1-UHD)	6	12	25	50	100	200	300	500
Hiro* (DFF3 - On)	4	8	15	30	50	100	200	1200
pb (FCV-2100/DFF1-UHD)	6	12	25	50	90	200	300	450
pb (DFF3 - On)	3	5	15	30	50	100	200	900

\*: Japanese unit of depth measurement.

**Note 1:** The preset ranges for the DFF3 when [External Fish Finder Window] set to [On] at installation are listed below as “DFF3 - On”. Where [External Fish Finder Window] set to [Off] at installation, the defaults are the same as FCV-2100 and DFF1-UHD.

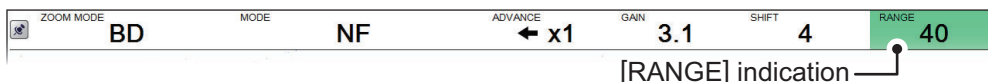
**Note 2:** You can change the preset range for of the presets, according to your requirements. See section 4.7.1 or section 4.8.4 for details.

### 1.8.1 How to change the range for FCV-2100 and external fish finders

Where [External Fish Finder Window] is set to [Off] at installation, the shift function is applied to both the FCV-2100 and the external fish finder.

To change the range, do the following:

1. Display the header if it is not “pinned”. If the header is already displayed, go to step 2.
2. Select the [RANGE] indication on the header. The indication is now highlighted in a green color.



3. Scroll to change the range. The display changes automatically with each change in range.

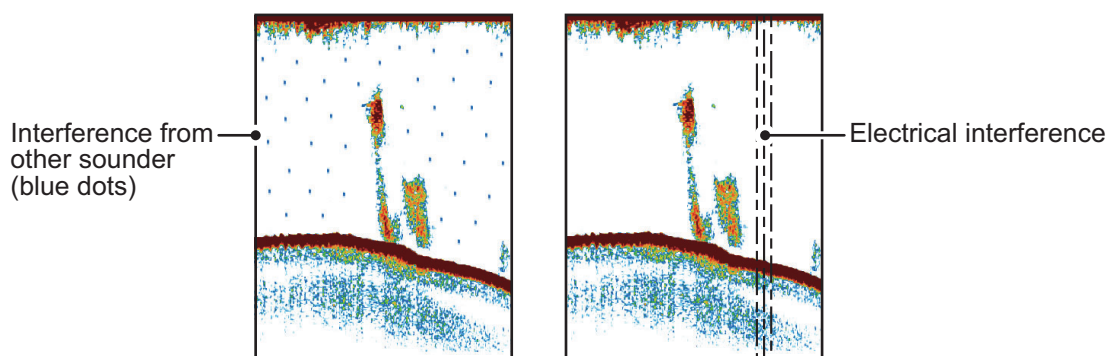
**Note 1:** Where either auto shift or auto range is active, range cannot be adjusted manually.

## 1.8.2 How to change the range for external fish finders where [External Fish Finder Window] is set to [On] at installation

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. The [Sounder] item is already selected. At the right-side of the menu window, select [Range].
3. Select the drop-down options button to show the preset range settings.
4. Select the appropriate range.
5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.



## 1.9 How to Reject Interference

Interference from other acoustic equipment operating nearby or other electronic equipment on your boat may show itself on the display as shown in the figure below. When this occurs use the interference rejector.



**Note:** A high setting for interference rejection can also remove weak echoes (small targets).

### 1.9.1 Interference rejection for the FCV-2100



1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu appears.
2. Select the [Interference] icon (  ). [INTERFERENCE] appears in the miscellaneous section of the header and is highlighted in a green color.

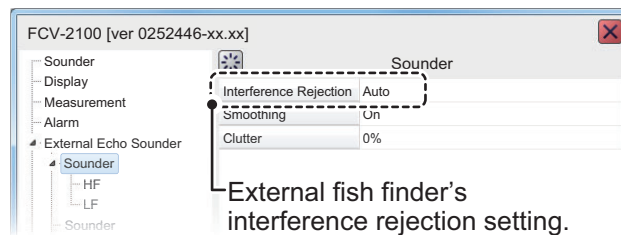


3. Scroll to adjust the level of interference rejection, referring to the table below.

Setting	Description
[Off]	Disable interference rejection.
[NL1]	Low level of rejection.
[NL2]	Medium level of rejection.
[NL3]	High level of rejection.
[Auto]	Automatically adjust the level of rejection to suit current conditions.

### 1.9.2 Interference rejection for external fish finders where [External Fish Finder Window] is set to [Off] at installation

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon (  ) from the [Advanced Settings] menu. The [Advanced Settings] window appears.
3. Select the [Sounder] item from the [External Fish Finder] menu, on the left-side of the window. The external fish finder settings are shown on the right-side of the window.



4. Select the [Interference] setting. The drop-down options box appears at the far right-side of the window.
5. Select the drop-down box, then select the appropriate interference level, referring to the table in section 1.9.1.
6. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.



### 1.9.3 Interference rejection for external fish finders where [External Fish Finder Window] is set to [On] at installation

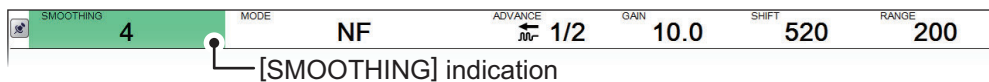
1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. The [Sounder] menu is already selected.
3. Select the [Interference] setting. The drop-down options box appears at the far right-side of the window.
4. Select the drop-down box, then select the appropriate interference level, referring to the table in section 1.9.1.
5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.10 How to Use the Smoothing Function

The smoothing function “smooths” echo presentation when enabled. This is particularly useful when echoes appear “spotty” or “jagged”. Smoothing can also be used to reduce screen flicker at night.



### 1.10.1 How to use smoothing for the FCV-2100

1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu appears.
2. Select the [Smoothing] icon (  ). [SMOOTHING] appears in the miscellaneous section of the header and is highlighted in a green color.



3. Scroll to adjust the level of smoothing. A high value increases the amount of smoothing applied to the picture.

### 1.10.2 How to use smoothing for external fish finders where [External Fish Finder Window] is set to [Off] at installation

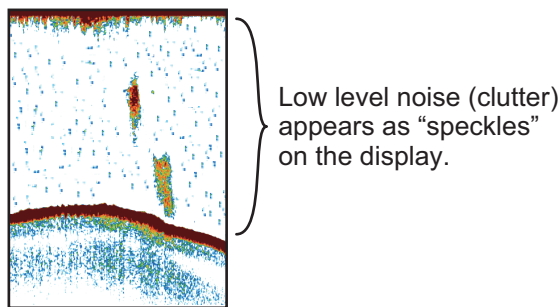
1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon (  ) from the [Advanced Settings] menu. The [Advanced Settings] window appears.
3. Select the [Sounder] item from the [External Fish Finder] menu, on the left-side of the window. The external fish finder settings are shown on the right-side of the window.
4. Select the [Smoothing] setting. The drop-down options box appears at the far right-side of the window.
5. Select the drop-down box, then select the appropriate smoothing level. A high value increases the amount of smoothing applied to the picture.
6. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

### 1.10.3 How to use smoothing for external fish finders where [External Fish Finder Window] is set to [On] at installation



1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. The [Sounder] menu is already selected.
3. Select the [Smoothing] setting. The drop-down options box appears at the far right-side of the window.
4. Select the drop-down box, then select the appropriate smoothing level. A high value increases the amount of smoothing applied to the picture.
5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.11 How to Reject Low Level Noise (Clutter)

Low intensity “speckles” are referred to as clutter, and can appear over most of the screen. Clutter is often caused by sediment in the water or noise. These unwanted echoes can be rejected.



### 1.11.1 How to reject clutter for the FCV-2100



1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu appears.
2. Select the [Clutter] icon (  ). [CLUTTER] appears in the miscellaneous section of the header and is highlighted in a green color.



3. Scroll to adjust the level of noise rejection. A high value setting reduces more noise, but can also remove weak echoes (small targets).



### 1.11.2 How to reject clutter for external fish finders where [External Fish Finder Window] is set to [Off] at installation

1. Select the [Advanced Settings] icon () from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon () from the [Advanced Settings] menu. The [Advanced Settings] window appears.
3. Select the [Sounder] item from the [External Fish Finder] menu, on the left-side of the window. The external fish finder settings are shown on the right-side of the window.
4. Select the [Clutter] setting. The drop-down options box appears at the far right-side of the window.
5. Select the drop-down box, then select the appropriate noise reduction level. A high value setting reduces more noise, but can also remove weak echoes (small targets).
6. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.



### 1.11.3 How to reject clutter for external fish finders where [External Fish Finder Window] is set to [On] at installation

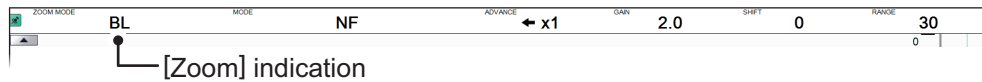
1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. The [Sounder] menu is already selected.
3. Select the [Clutter] setting ([40%] in the example figure above). The drop-down options box appears at the far right-side of the window.
4. Select the drop-down box, then select the appropriate noise reduction level. A high value setting reduces more noise, but can also remove weak echoes (small targets).
5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.12 Zoom Display

The zoom displays expand the specified area of the single frequency echo. Four modes are available: bottom lock, bottom zoom, marker zoom and bottom discrimination. The default mode is bottom lock.

To select a zoom mode, do the following:

1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu appears.
2. Select the [Zoom] mode icon (  ). [ZOOM MODE] appears in the miscellaneous section of the header.

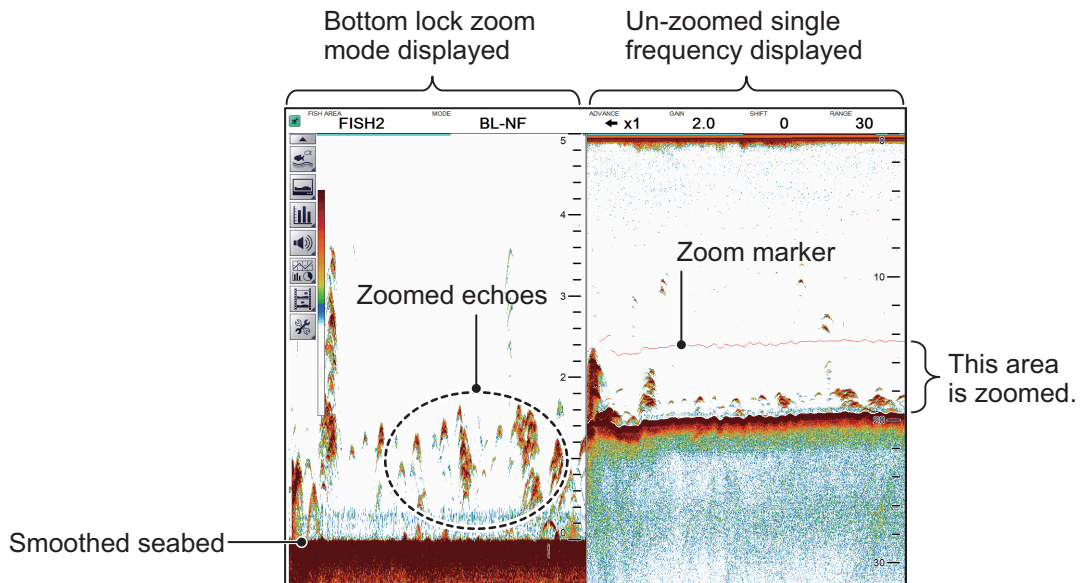


3. Scroll to show the desired zoom mode. The four modes are shown in abbreviated format, see the list below for reference.

- BL: Bottom lock
- BZ: Bottom zoom
- MZ: Marker zoom
- BD: Bottom discrimination

### 1.12.1 Bottom lock mode

Bottom lock mode provides a normal picture on the right-side of the screen and a magnified picture on the left-side of the screen. The zoomed area shows a smooth seabed, making it easier to detect fish near the seabed.

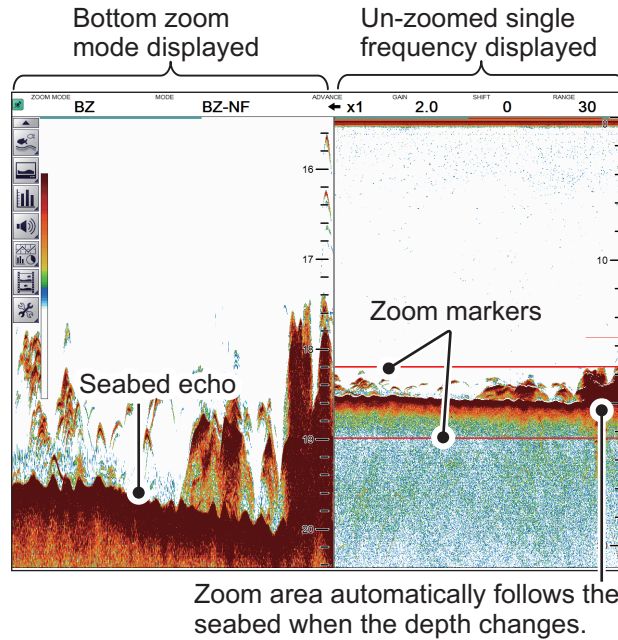


**Note 1:** The range for the zoom display can be adjusted from the [Range] menu. See section 4.7.1.

**Note 2:** To show or hide the zoom marker, change the setting for [Zoom Marker] in the [Display] menu. See section 4.3.

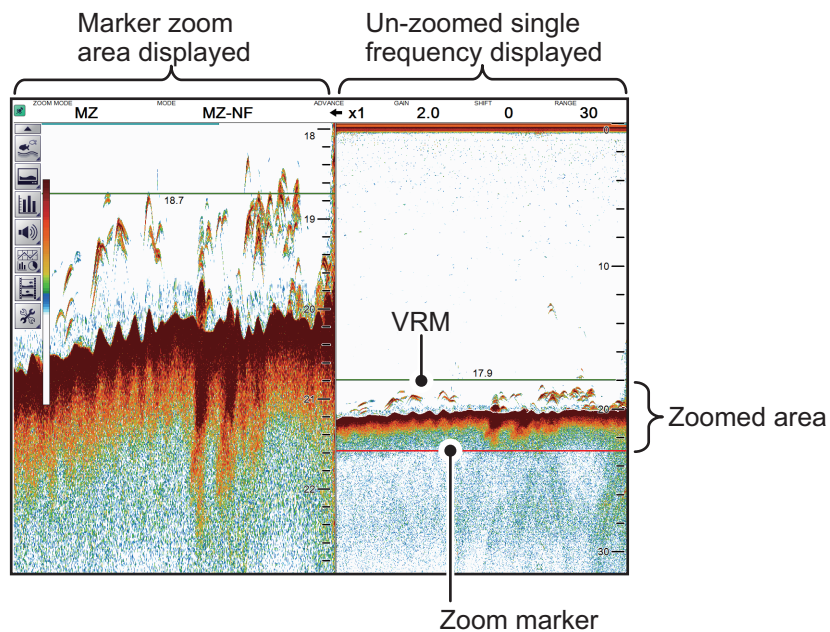
### 1.12.2 Bottom zoom mode

This mode magnifies the seabed, and also any fish near the seabed, on the left-side of the screen, and is useful for determining seabed contours. When the seabed depth increases, the display automatically shifts to keep the seabed echo at the lower part of the screen.



### 1.12.3 Marker zoom mode

The marker zoom mode magnifies the specified area of the normal picture to full vertical size of the screen on the left-side of the screen. You may specify the portion to expand by operating the VRM (Variable Range Marker). The area between the VRM and zoom marker is expanded. This mode is useful for determining the size of fish in the midwater.



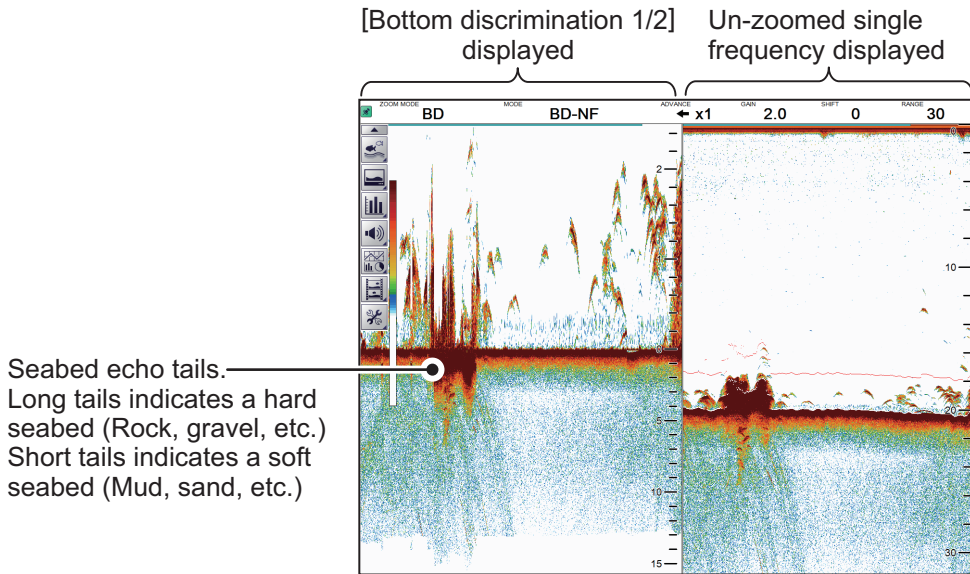
# 1. OPERATION

## 1.12.4 Bottom discrimination mode

Bottom discrimination mode has two zoom ratios which can be set from the [Range] section of the [System] menu. See section 4.7.1 for details.

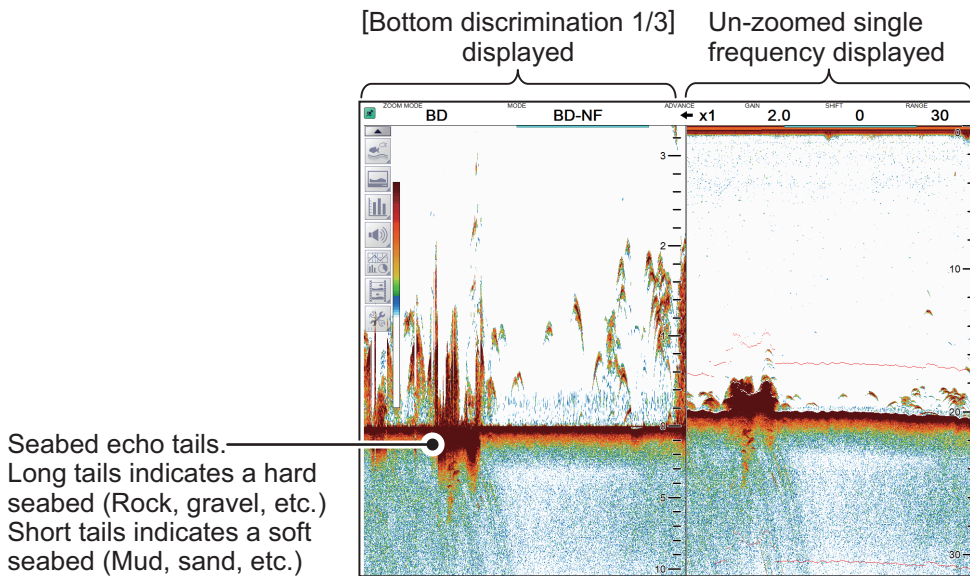
### Bottom discrimination at 1/2 ratio

The left-side of the screen show the seabed as a straight line at approximately the middle of the screen.



### Bottom discrimination at 1/3 ratio





The left-side of the screen show the seabed as a straight line at approximately one third of the screen-length from the screen bottom.

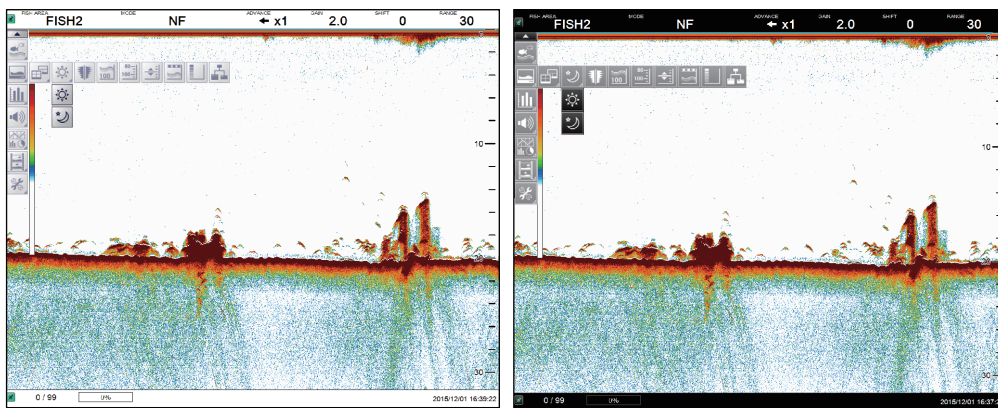


## 1.13 How to Switch Between Display Color Modes

To assist on-screen visibility, the system has a Day display color mode and a Night display mode. The modes can be changed at any time from the InstantAccess bar™ to suit your needs.

Unless otherwise specified, all example figures in this manual use the Day display mode.

1. Select the [Display] icon (  ) from the InstantAccess bar™. The [Display] menu bar appears.
2. Select the [Window Color] icon (  ). The menu options appear.
3. Select [Day] (  ) or [Night] (  ) as appropriate. Icon and text color is reversed, as shown in the example figures below.



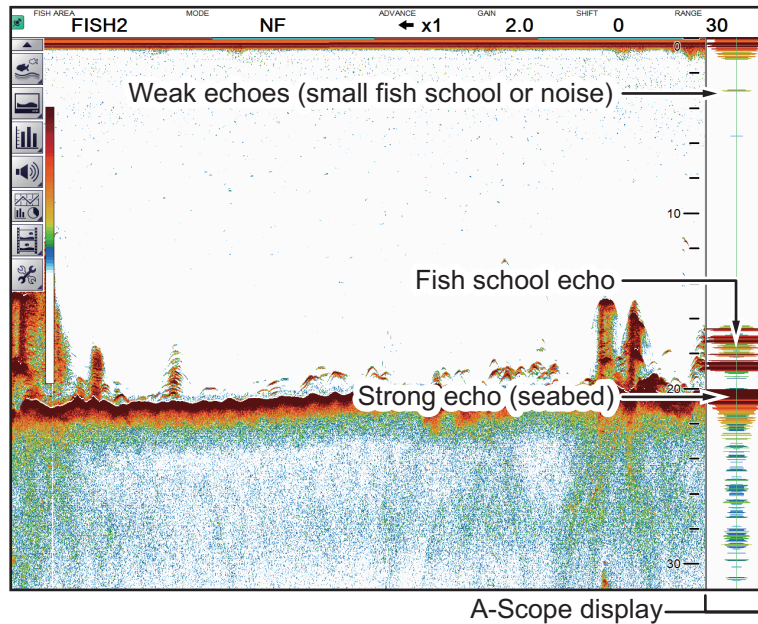
Day mode


Night mode

4. Select the [Display] (  ) icon to hide the menu bar.

## 1.14 How to Use the A-Scope Display


The A-Scope display shows echoes at each transmission with amplitudes and tone proportional to their intensities, on the right side of the screen. It is useful for estimating the species of a school of fish or determining bottom composition.



To show or hide the A-Scope display, select the [A-Scope] icon (  ) from the [Display] menu, on the InstantAccess bar™. The icon changes to green color when shown.

## 1.15 How To Show/Hide The Depth Indication


The current depth indication appears at the bottom-left of the screen. You can show or hide the depth indication to suit your preferences.

To show/hide the depth indication, select the [Depth] icon (  ) from the [Display] menu on the InstantAccess bar™. The icon changes to green color when shown.

**Note:** When [External Echo Sounder:Depth] is set to [On] at installation and the FCV-2100 cannot detect the seabed, the external sounder's depth is displayed in orange color instead.



## 1.16 How To Show/Hide The Depth Scale

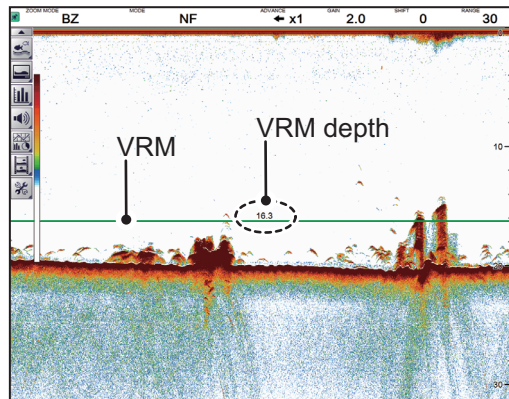
The depth scale is displayed to the far right-hand side of the screen.

To show/hide the depth scale, select the [Depth Scale] icon (  ) from the [Display] menu on the InstantAccess bar™. The icon changes to green color when shown.

## 1.17 How to Measure Depth

You can measure depth at any time with the VRM (Variable Range Marker), making fish and fish schools easier to target.

1. Select the [Display] icon (  ) from the InstantAccess bar™. The [Display] menu appears.
2. Select the [VRM] icon (  ). The [VRM] icon is now highlighted in green color and the VRM appears on the display.




3. Drag and drop the VRM so that it intersects the echo who's depth you want to measure. The depth is displayed above (or below) the VRM, at the center of the VRM.  
To hide the VRM, repeat steps 1 and 2, in order.

**Note:** When MZ (Marker Zoom) is selected as a display mode, the VRM is constantly displayed, regardless of VRM settings.


## 1.18 How To Show/Hide The Minute Marker

The Minute Marker appears at the top of the screen when displayed. It is displayed as a dashed line, with each dash, and gap between dashes, indicating a 30 second period of time. In other words, the time from the start of one dash to the start of the next dash is one minute.

To show/hide the time interval line, select the [Minute Marker] icon (  ) from the Display menu on the InstantAccess bar™. The icon changes to green color when shown.

## 1.19 How To Show/Hide The Color Bar

The color bar shows the echo color scale in use, with the strongest echo color at the top of the scale and weakest echo color at the bottom.



To show/hide the color bar, select the [Color Bar] icon (  ) from the Display menu on the InstantAccess bar™. The icon changes to green color when shown.

## 1.20 External Fish Finder Display

You can view an external fish finder's echoes on a sub display if your system configuration meets the following requirements:

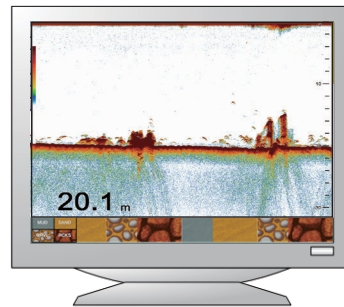
- Two monitors (main and sub-monitor) connected.
- External fish finder is connected to the FCV-2100.
- [External Fish Finder Window] is set to [On] at installation.

To show the external fish finder echoes on the sub display, do the following:

1. Select the [Display] icon (  ) from InstantAccess bar™. The Display menu appears.
2. Select the [External Echo Sounder] icon (  ). The sub monitor displays the external fish finder's echoes. Further, the [External Echo Sounder] icon changes to a green color.



Main monitor: Echoes from FCV-2100 fish finder displayed.



Sub monitor: Echoes from external fish finder displayed.

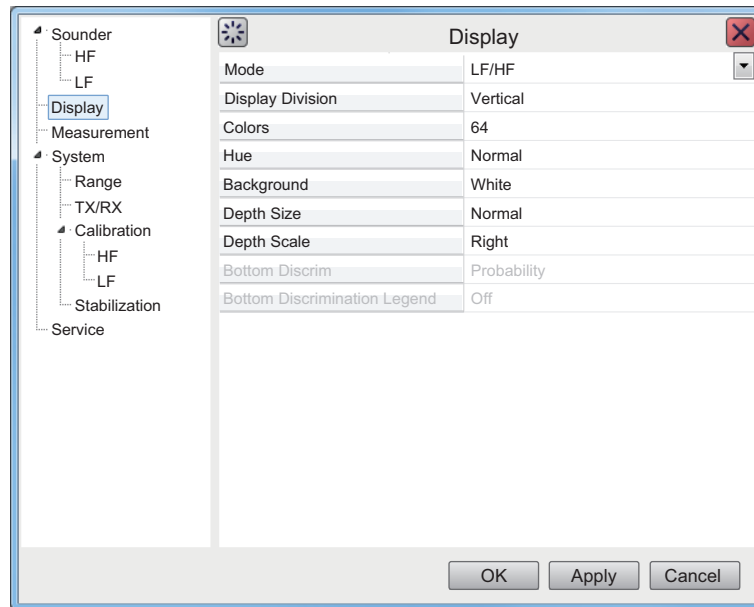
**Note:** When the external fish finder display is active, settings changes and adjustments made to the FCV-2100 display are not reflected on the external display (with the exception of language and units of measurement). Settings changes and adjustments for the external fish finder must be done from the sub monitor. Place the cursor inside the external fish finder screen, then right-click to display the external fish finder menu. (See section 4.8 for details.)



## 1.20.1 How to change the display mode on the external fish finder screen

You can change the display mode on an external monitor by doing the following:

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. Select [Display].



3. Select the drop-down icon for the [Mode] setting, on the right-side of the menu. The drop-down options appear.
4. Select the appropriate option:
  - [LF/HF] : High and low frequency images.
  - [HF] : High frequency images only.
  - [LF] : Low frequency images only.
5. If you select [LF] or [HF] at step 4, go to the step 6. If you selected [HF/LF] at step 4, set the screen division from the [Display Division] menu item, directly below the Mode menu item.
6. Select [Apply] to apply the changes and delete or edit a different mode. Select [OK] to apply the changes and close the menu. Select [Cancel] to cancel any changes made and close the menu.

## 1.20.2 How to use the ACCU-FISH™ feature

The ACCU-FISH™ feature requires connection to a compatible transducer.

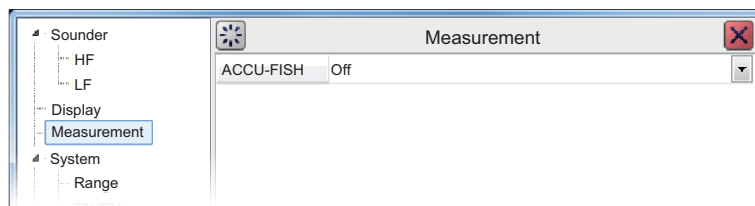
The ACCU-FISH™ feature outputs fish echoes with a mark and an estimated size.

### **Important considerations when using the ACCU-FISH™ feature**

- The ACCU-FISH™ feature is intended for reference purposes; it is not a completely accurate measurement of fish length.
- Echo intensity depends on fish species. When the fish length differs between the indicated length and the actual length, you can compensate the difference on the [Calibration] menu (see section 4.8.4).
- Fish at depths of less than two meters cannot be measured. However, if [Zero Line Rejector] is set to [On], fish within the area covered by the transmission line cannot be detected.
- The maximum depth at which the ACCU-FISH™ feature can detect fish varies, depending on transducer type, vessel configuration, sea conditions and other factors which may affect beam accuracy.
- In a school of fish, the echoes overlap. This causes a greater margin of error in fish size measurement.
- This feature cannot be used with inside-hull transducers. Depending on the transducer frequency, fish may not be detected. Further, even if fish are detected, their indicated length may be smaller than the actual length.
- The TX pulse length changes according to ACCU-FISH™ On/Off state. This causes a difference in both sensitivity and the echoes viewed.

### **How to activate/deactivate the ACCU-FISH™ feature**

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. Select [Measurement]. The ACCU-FISH™ setting appears in the right-side of the window.



3. Select the drop-down box to the far right-hand side of the menu, then select [On]. ACCU-FISH™ is now active, fish marks and sizes now appear on the screen.

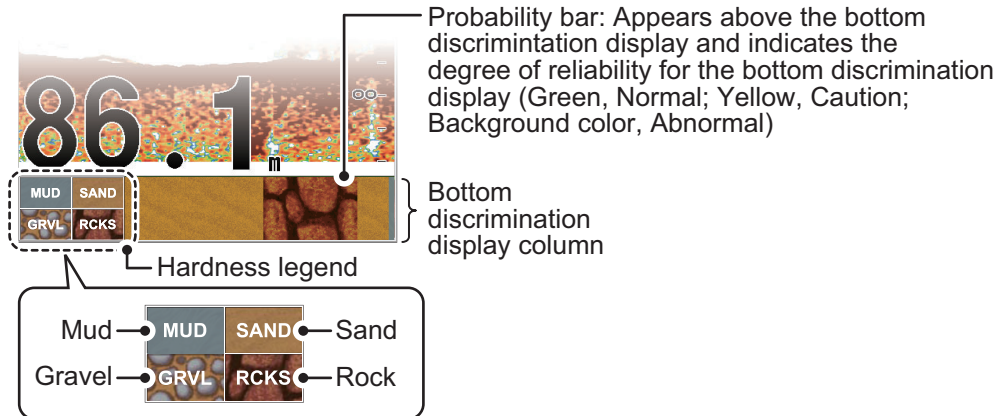
Fish size → 64 ← Fish mark

4. To deactivate ACCU-FISH™, repeat the procedure, then select [Off] at step 3.

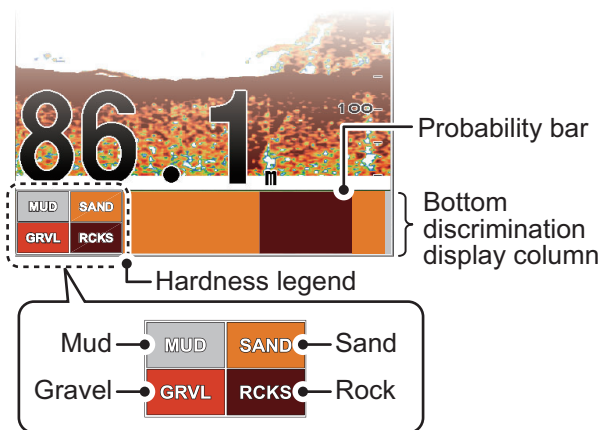
### 1.20.3 How to display seabed composition (bottom discrimination)

The bottom discrimination display analyzes the seabed echo to categorize hardness in one of four types (rocks, gravel, sand, mud), then shows the results in a colorful graphic display. This function requires connection to a DFF1-UHD (or a transducer compatible with bottom discrimination) and has the following three display formats:

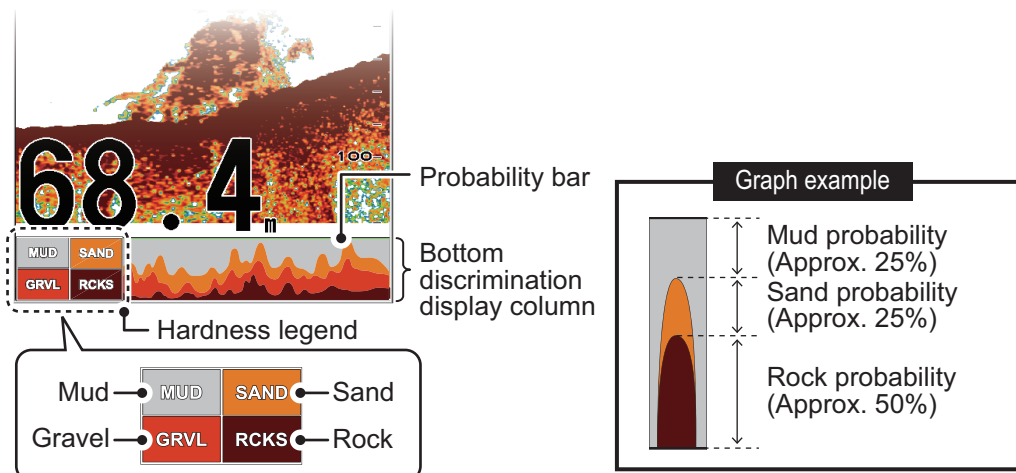
- **Graphic display:** The most probable seabed composition (mud, sand, gravel, rock) is indicated graphically.



- **Four colors display:** The most probable seabed composition (mud, sand, gravel, rock) is indicated with four colors.



- **Probability display:** The most probable seabed composition is indicated in proportion.



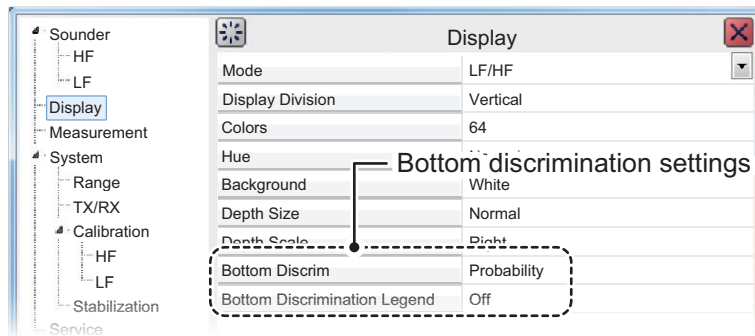
**Important considerations when using the bottom discrimination display**

- The bottom discrimination display provides an estimate of seabed composition. Actual composition may be different.
- Operating environment:
  - Depth: 5 to 100 m (16 to 328 ft)
  - Speed: 10 kn or less
- This feature uses the range from the ship’s draft; therefore, enter the ship’s draft (see section 4.7.5).
- Be sure that the transducer is mounted straight. Otherwise the bottom discrimination display may not function accurately.

**How to activate/deactivate the bottom discrimination display**

**Note:** Range and shift functions for the external fish finder are disabled when bottom discrimination is active.

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. Select [Display]. The Display setting appear in the right-side of the window.



3. Select the [Bottom Discrimination] setting.
4. Select the drop-down box to the far right-hand side of the menu, then select the appropriate display format. Select [Off] to deactivate this function.
5. Select the [Bottom Discrimination Legend] setting.
6. Select [On] to show the legend, select [Off] to hide the legend.



[Graphic] legend



[4 Colors] and [Possibility] legend

7. Select [Apply] to apply the changes and delete or edit a different mode. Select [OK] to apply the changes and close the menu. Select [Cancel] to cancel any changes made and close the menu.

## 1.21 How to Set, Show and Hide Alarms

The FCV-2100 has five alarms (Bottom Alarm, Fish Alarm, Bottom Fish Alarm, Temperature Alarm and Fish Size Alarm) and one Combined Alarm.

When an alarm is set and the conditions meet the alarm requirements, the system releases an audible beep and the applicable alarm icon appears at the bottom right corner. For combined alarms, all corresponding alarms messages and alarm icons are displayed.



: Bottom Alarm icon



: Bottom Fish Alarm icon



: Fish Size Alarm icon



: Fish Alarm icon



: Temperature Alarm icon

To silence the audible beep, click anywhere on the screen. The alarm icon remains visible on the display until the cause of the alarm is removed.

### **Alarm descriptions**


- Bottom Alarm: Alerts you when the seabed (bottom) enters the range set for this alarm.
- Fish Alarm: Alerts you when fish are detected within the range set for this alarm.
- Bottom Fish Alarm: Alerts you when fish are detected within the range set for this alarm.
- Temperature Alarm: Alerts you when the water temperature is within range or out of range, depending on your selection. This alarm requires connection to a temperature sensor.
- Fish Size Alarm: Alerts you when a fish detected meet or exceed the size and/or distribution set for this alarm.
- Combined Alarm: This alarm is a combination of two or more of the above alarms. When the requirements for all selected alarms are met, this alarm is triggered. When this alarm is selected, individual alarms are not available.

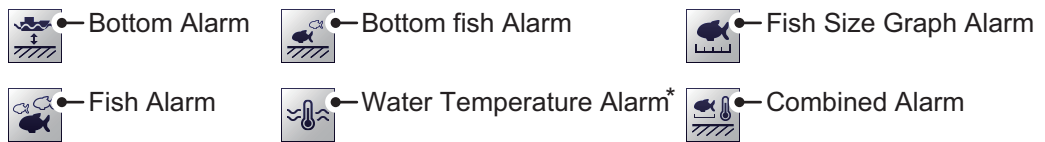
## 1. OPERATION

### 1.21.1 How to activate/deactivate the alarms

You can activate and deactivate alarms by selecting the respective alarm icon.

To activate or deactivate an alarm, do the following:

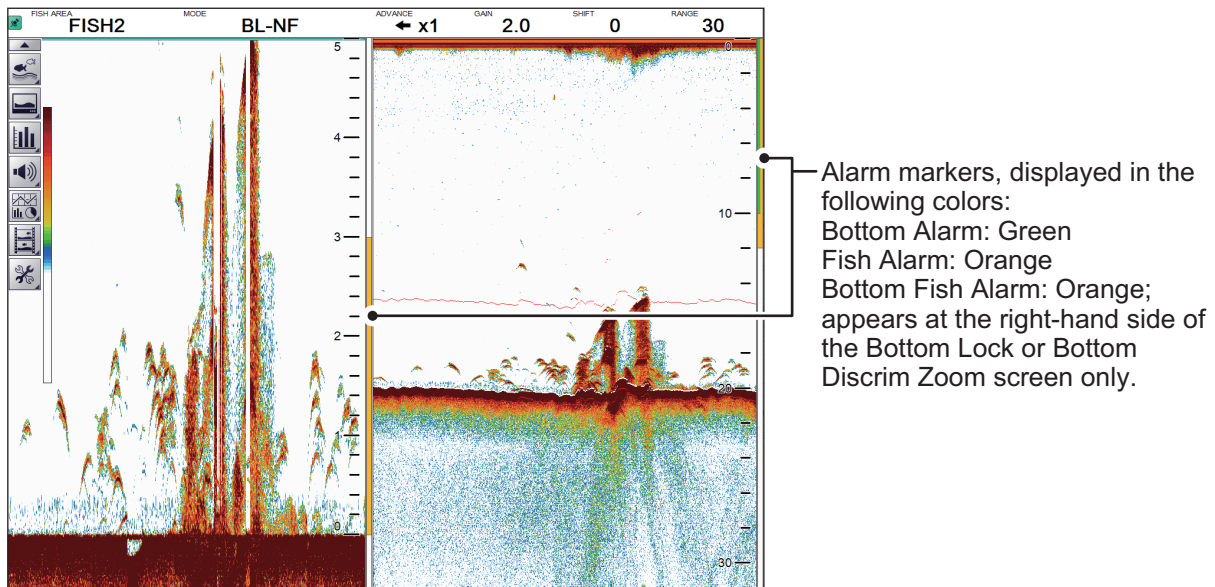
1. Select the Alarm icon (  ) from the InstantAccess bar™. The [Alarm] menu appears.
2. Referring to the figure below, select the alarm you want to activate or deactivate. The icon changes color depending on whether the status selected.



\*: Requires connection to a temperature sensor.

- Green: Alarm is active.
- Gray: Alarm is not active.

The Bottom Alarm, Bottom Fish Alarm and Fish Alarm also show an “alarm marker” on the right-side of the display. The alarm marker shows the alarm range.





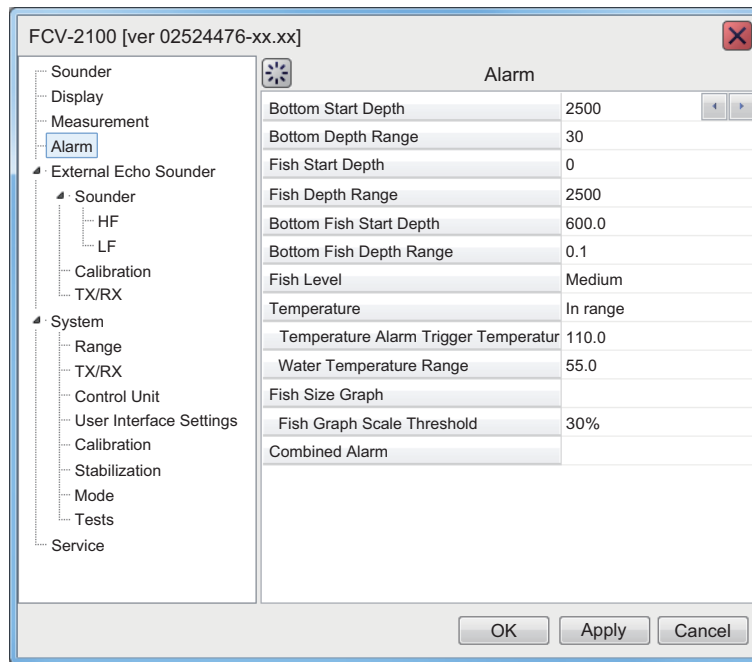
**Note:** When the [Combined Alarm] is active, individual alarms are not available. To activate alarms other than those included in the [Combined Alarm], do the following:

- Deactivate the [Combined Alarm], then activate the alarm(s) individually.

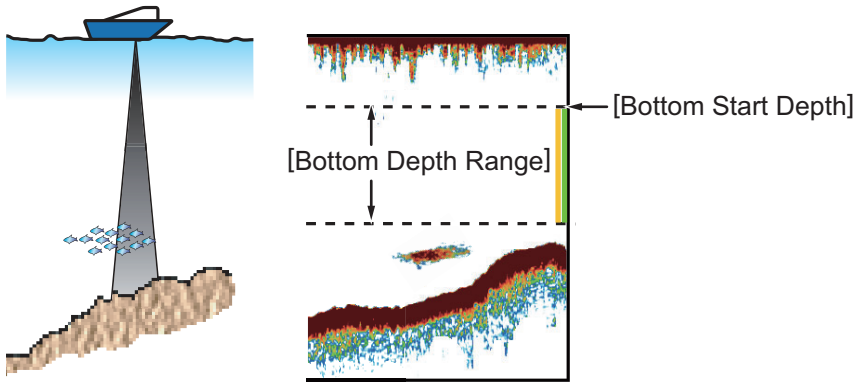
### 1.21.2 How to set the alarms

The FCV-2100 has five alarms and one combined alarm. To set the conditions for each alarm, do the following:

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon (  ) from the [Advanced Settings] menu. The [Advanced Settings] window appears.
3. Select the [Alarm] item on the left-hand side of the window. The [Alarm] menu appears on the right-side of the window.



4. Referring to the table below, set the alarms as required.

Menu item	Description
[Bottom Start Depth]	Set the starting depth for the depth alarm. The distance set here is measured from the location of the transducer face. <div style="text-align: center;">  </div>
[Bottom Depth Range]	Set the range (distance from [Bottom Start Depth]) for the depth alarm. (See figure above for reference.)
[Fish Start Depth]	Set the starting depth for the fish alarm. The distance set here is measured from the location of the transducer face.
[Fish Depth Range]	Set the range (distance from [Fish Start Depth]) for the fish alarm.

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Menu item	Description
[Bottom Fish Start Depth]	Set the starting depth for the bottom fish alarm. The distance set here is measured from the location of the transducer face.
[Bottom Fish Depth Range]	Set the range (distance from [Bottom Fish Start Depth]) for the fish alarm.
[Fish Level]	Set the echo strength at which the fish alarms are triggered. This setting is for both the [Fish Alarm] and the [Bottom Fish Alarm]. <ul style="list-style-type: none"> <li>• [Weak]: Echoes stronger than light blue trigger the alarm.</li> <li>• [Medium]: Echoes stronger than yellow trigger the alarm.</li> <li>• [Strong]: Echoes stronger than red trigger the alarm.</li> </ul>
[Temperature]*	Set the temperature alarm type. <ul style="list-style-type: none"> <li>• [In range]: The alarm is triggered when the temperature is within the set range.</li> <li>• [Out of range]: the alarm is triggered when the temperature is outside the set range.</li> </ul>
[Temperature Alarm Trigger Temp.]*	Set the start point for the temperate alarm range.
[Water Temperature Range]*	Set the range for the temperature alarm.
[Fish Size Graph]	Select the fish size(s) which trigger the Fish Size Graph Alarm. Multiple selections are available.
[Fish Graph Scale Threshold]	Set the distribution rate at which to trigger the alarm. For example, a settings of [30%] will trigger the alarm when the distribution rate for the selected sizes is over 30%.
[Combined Alarm]	Set a combination of two or more alarms. Referring to the list below, select the alarms to include in the combination. Active selections are marked with a "tick" in the box to the left. <ul style="list-style-type: none"> <li>• Bottom: Bottom alarm</li> <li>• Fish (Normal): Standard fish alarm</li> <li>• Fish (B/L): Bottom fish alarm</li> <li>• Temperature: Temperature alarm</li> <li>• Fish Size Graph: Fish size graph alarm</li> </ul>

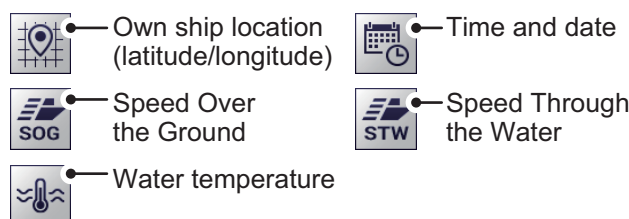
\*: Requires connection to a temperature sensor.

5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.22 How To Show/Hide Displayed Data

Various data received from connected sensors can be shown on screen, or hidden, at any time.

To show/hide data, select the [Data Display] icon () from the InstantAccess bar™, then, referring to the figure below, select the data to show on-screen.



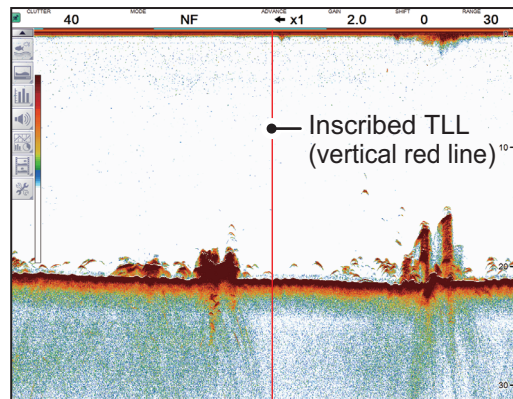


## 1.23 How to Inscribe TLL Lines

You can inscribe TLL (Target Latitude Longitude) lines on the display to mark the location of fish schools, shoals, or other points of interest. The position of each TLL is output to the connected chart plotter.

**Note 1:** The position output function requires connection to an external EPFS device which provides own ship position data.

**Note 2:** Data other than latitude and longitude can be output to connected chart plotters. (See section 5.7.2.)



To inscribe a TLL line, place the cursor on the display location to be inscribed, then double-click. A vertical line, red in color, appears at the location. The TLL moves with the inscribed location. You can inscribe multiple lines at any time.


Under default settings, the FCV-2100 also outputs the TLL to the connected chart plotter.

## 1.24 How to Use Scroll Back Mode

Scroll back mode allows the user to view past screens of fish finder images, making it handy for comparing fish schools sizes close to each other.

To use the scroll back mode, do the following:

1. Place the cursor on any location inside the display, other than the header, footer or menu bar.
2. Press and hold the right button.
3. Using the Trackball, drag the screen to the right. The displayed echo moves with the cursor and is also paused.

The display shows the scroll back mode indicator (Day mode: , Night mode:

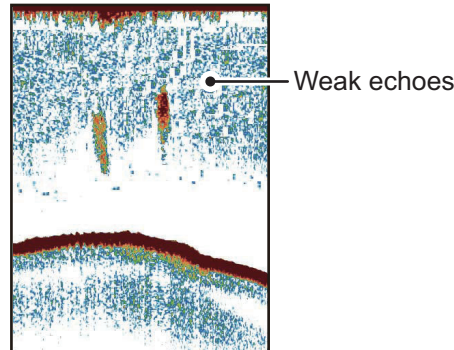
) at the top-right of the screen.

To cancel scroll back mode and return to normal echo display, select the scroll back mode indicator.

**Note:** All echoes stop when scroll back mode is active. Use caution with this feature and avoid use when the vessel is underway.



## 1.25 How to Erase Weak Echoes

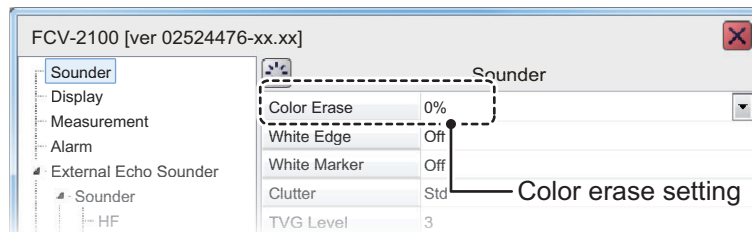
Sediment in the water or reflections from plankton may be painted on the display in low intensity tones, as shown in the illustration below. You can remove these unwanted echoes with the color erase feature.



### 1.25.1 How to erase weak echoes for the FCV-2100 and external fish finders

Where [External Fish Finder Window] is set to [Off] at installation, this setting is applied to the external fish finder also.

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon (  ) from the [Advanced Settings] menu. The [Advanced Settings] window appears.



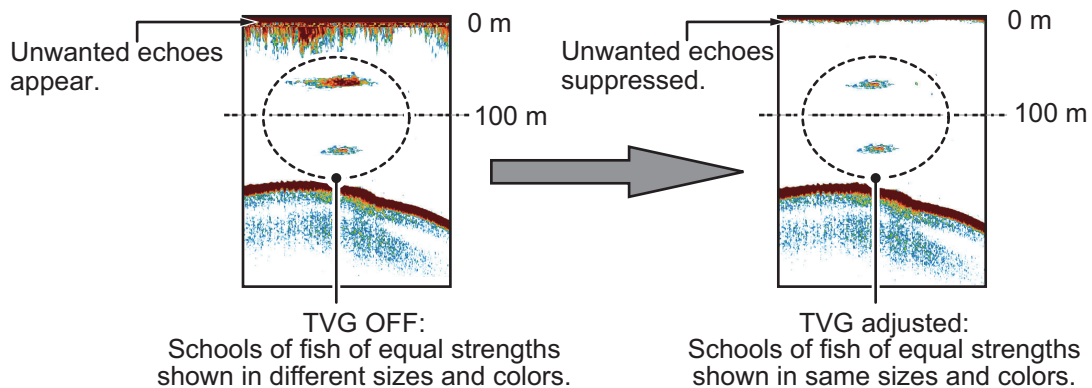
3. The [Sounder] menu item is already selected and the [Sounder] menu appears on the right-side of the window. Select [Color Erase] from the [Sounder] menu.
4. Adjust the [Color Erase] setting until the picture shows minimal reflections. As the setting increases, reflections are removed in order, from weakest to strongest.
5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

### 1.25.2 How to erase weak echoes for external fish finders where [External Fish Finder Window] is set to [On] at installation

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. The [Sounder] menu is already selected.
3. Select the [Color Erase] setting. The drop-down options box appears at the far right-side of the window.
4. Select the drop-down box, then select the appropriate color erasure level. As the setting increases, reflections are removed in order, from weakest to strongest.
5. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.



## 1.26 How to Adjust TVG (Time Varied Gain)

A school of fish at a deep depth is displayed in weak colors even if it is equal in strength to one in shallow waters. This is due to propagation attenuation of the ultrasonic wave. To compensate for this difference, use TVG. TVG automatically adjusts the gain with depth so that echoes of the same strength and different depths are shown in the same colors regardless of their depths. The gain is increased with depth to display echoes of equal strengths in the same colors. In the figure below, for example, the TVG is set for 100 m and the TVG level is adjusted. Then, unwanted echoes at a distance less than 100 m are deleted and echoes at depths greater than 100 m are not affected.





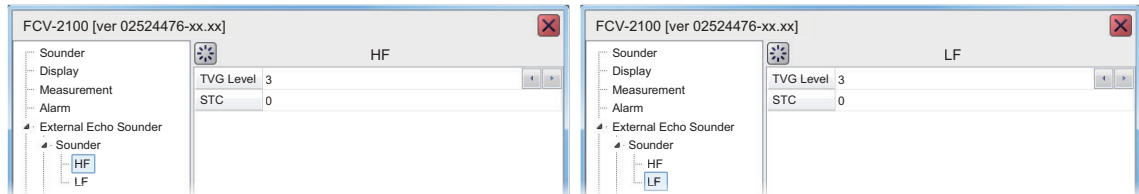
### 1.26.1 How to adjust TVG for FCV-2100

The procedure outlined below is for sounders connected directly to the FCV-2100. For external fish finder, see section 1.26.2.

1. Select the [Advanced Settings] icon () from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon () from the [Advanced Settings] menu. The [Advanced Settings] window appears.
3. The [Sounder] menu item is already selected and the [Sounder] menu appears on the right-side of the window.
4. Select [TVG Level] from the [Sounder] menu. The adjust buttons appear to the far right of the TVG level indication.
5. Select the ◀ button to decrease the setting, or select the ▶ button to increase the setting. A higher setting reduces the gain for nearby echoes.
6. Select [TVG Distance]. The adjust buttons appear to the far right of the [TVG distance] indication.
7. Select the ◀ button to decrease the distance from which TVG is applied, or select the ▶ button to increase the distance from which TVG is applied.
8. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.26.2 How to adjust TVG for external fish finders where [External Fish Finder Window] is set to [Off] at installation

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon (  ) from the [Advanced Settings] menu. The [Advanced Settings] window appears.



3. Select [HF] or [LF], as appropriate, from the [Sounder] item from the [External Fish Finder] menu, on the left-side of the window. The external fish finder settings are shown on the right-side of the window.
4. Select the [TVG Level] setting. The adjust buttons appear to the far right of the TVG level indication.
5. Select the ◀ button to decrease TVG, or select the ▶ button to increase TVG. This setting affects the DFF3 and DDF1-UHD as shown below.
  - DFF1-UHD: Increase the setting to increase gain at close range.
  - DFF3: Decrease the setting to increase gain at close range.
6. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.26.3 How to adjust TVG for external fish finders where [External Fish Finder Window] is set to [On] at installation

1. Place the cursor inside the external fish finder screen, then right-click. The [External Fish Finder] menu appears.
2. The [Sounder] menu is already selected.
3. Select the frequency for the sounder you want to adjust. [HF] for high frequency, [LF] for low frequency. The settings for the selected frequency appear on the right-side of the window.
4. Select [TVG Level]. The adjust buttons appear to the far right of the TVG distance indication.
5. Select the ◀ button to decrease TVG, or select the ▶ button to increase TVG. This setting affects the DFF3 and DDF1-UHD as shown below.
  - DFF1-UHD: Increase the setting to increase gain at close range.
  - DFF3: Decrease the setting to increase gain at close range.
6. Select [Apply] to save the current changes and change or adjust other settings. Select [OK] to save the current changes and close the menu window. Select [Cancel] to abort all changes and close the menu window.

## 1.27 How to Save and Load Settings




Settings can be stored to, or loaded from, either the FCV-2100 internal memory or an external storage device.

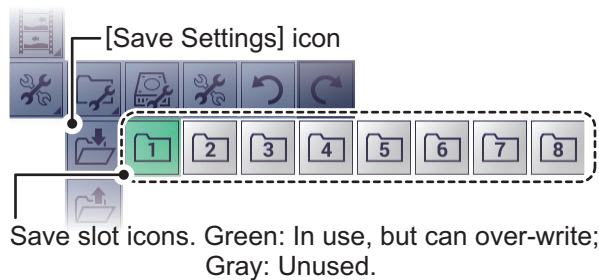
### 1.27.1 How to save settings

The internal memory can store up to 8 settings variations. For external memory, the maximum number of settings variations which can be stored depends on the external memory's available capacity.

**Note:** Settings which have been over-written (saved over) cannot be restored. Always check that the save location is correct before starting the save procedure.




#### How to save settings to internal memory

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the Internal Setting icon (  ). The internal setting save/load icons appear.
3. Select the Save Settings icon (  ). The save slot icons appear.



4. Select the save slot you want to use. A confirmation message pop up appears after the save process is complete.
5. Select [OK] to close the pop up.

#### How to save settings to external memory

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [External Setting] icon (  ). The external setting save/load icons appear.
3. Select the [Save External Unit Settings] icon (  ). A confirmation message pop up appears after the save process is complete.
 




**Note:** If there is no external memory connected, the [Save External Unit Settings] icon is gray and not selectable.
4. Select [OK] to close the pop up.

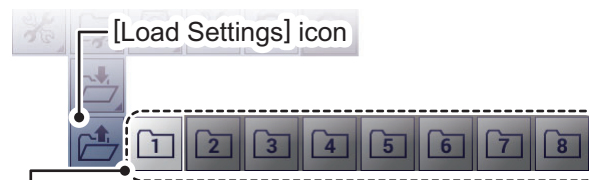
## 1.27.2 How to load settings

Previously saved settings can be loaded from their save location, either internal or external location, at any time.

**Note:** When the load procedure is complete, previous settings cannot be restored. Check that the settings to be loaded are correct before starting the procedure.

### How to load settings from internal memory

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Internal Setting] icon (  ). The internal setting save/load icons appear.
3. Select the [Load Settings] icon (  ). The load slot icons appear.






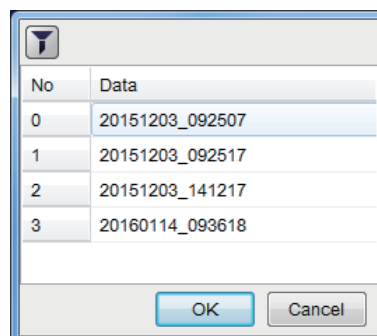
Load slot icons. Light-gray: Available to load from.  
Dark-gray: No data saved.

4. Select the load slot you want to use. The system applies the loaded settings.

### How to load settings from external memory

**Note:** This method requires connection to an external memory device. If there is no device connected, the [Load External Unit Settings] icon shown in the procedure below are not available.

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [External Setting] icon (  ). The external setting save/load icons appear.
3. Select the [Load External Unit Settings] icon (  ). A pop up window listing the available settings files appears.



4. Select the settings file to load.
5. Select [OK] to close the pop up.



## 1.28 How to Undo/Redo Operations

The system stores the last 20 operations in temporary memory. This allows you to “undo” a mistaken operation, or several mistaken operations, at any time. You can also “redo” an operation which was undone.


**Note 1:** The temporary memory is cleared when the power is turned off. The [Undo] and [Redo] functions are not available when the system restarted.

**Note 2:** The [Undo] and [Redo] functions are available only when an operation can be undone or redone, respectively.

### How to undo an operation

1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Undo] icon (  ). The last operation is undone.
3. Repeat step 2 as required.

### How to redo an operation

1. Select the [Advanced Settings] icon from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Redo] icon (  ). The last operation is redone.
3. Repeat step 2 as required.



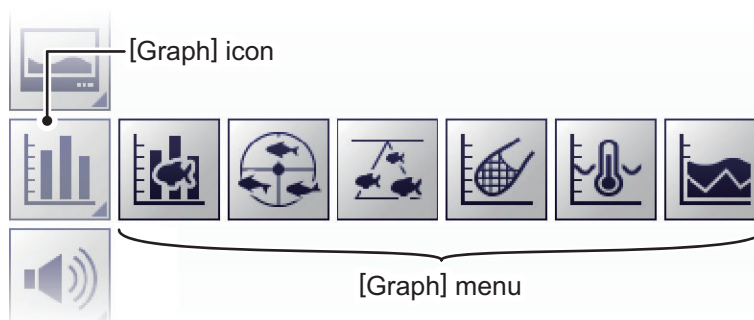
## 2. GRAPH FUNCTIONS

The FCV-2100 can display up to six graphs (listed in section 2.1, below), depending on vessel configuration.







### 2.1 How to Show/Hide Graphs

All graphs can be shown/hidden to suit your requirements. To show/hide a graph, do the following:

1. Select the [Graph] icon from the InstantAccess bar™. The [Graph] menu appears.



2. Select the appropriate graph to show/hide. The icon changes color accordingly, green for shown, gray for hidden.

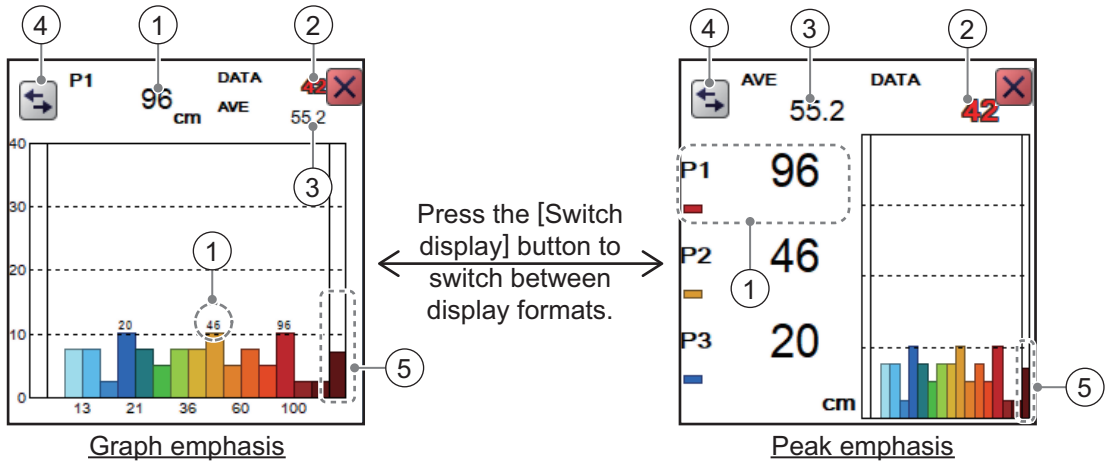
Menu icon	Description
	[Fish Size Graph]: Select to show/hide a bar graph which displays estimated fish size and related data (see section 2.2).
	[Vertical Target Graph]: Select to show/hide a graph which displays detected fish schools below your vessel (see section 2.3.1).
	[Horizontal Target Graph]: Select to show/hide a graph which displays fish schools detected in the stern direction of your vessel (see section 2.3.2).
	[Sonde Graph]: Select to show/hide a plotted graph which displays depth and water temperature data fed from the net sonde (see section 2.4).
	[Temp Graph]: Select to show/hide a plotted graph which displays the water temperature as a dotted line across the screen (see section 2.5).
	[Hardness Graph]: Select to show/hide a graph which displays the estimated hardness of the seabed (see section 2.6).

You can select multiple graphs to be displayed at the same time.

## 2.2 Fish Size Graph

The [Fish Size Graph] displays the fish size and distribution in a bar graph format.

In the following example, fish size (in centimeters) is shown from left to right and the distribution (as a percentage) is shown from bottom to top.



No.	Description
1	Estimated size of the largest fish detected (peak size) detected. Depending on the setting selected at [Graph Peak] in the [Measurement] menu, you can display up to the third largest fish (P1 to P3). (See section 2.2.7 for details.) <b>Note:</b> When the graph emphasis format is selected, only the estimated size of the largest fish (P1) is displayed.
2	Total number of fish detected.
3	Overall average size of fish detected.
4	[Switch Display] button. Select to switch between graph emphasis and peak emphasis display formats.
5	Estimated distribution outside the scale.

[Fish Sizes Graph]s can be moved to any location on the screen. Drag and drop the graph to move it.



### Notices regarding the fish size graph


- Fish at depths of less than two meters cannot be measured. However, if [Zero Line Rejector] is set to [On], fish within the area covered by the transmission line cannot be detected.
- In a school of fish, the echoes overlap. This causes a greater margin of error in fish size measurement.
- Echo intensity depends on fish species. When the fish length differs between the indicated length and the actual length, you can compensate the difference on the [Calibration] menu (see section 4.7.5).
- Fish size data is displayed in one of three colors, based on the reliability of the sensor data. The colors and their meaning are listed in the table below.

Color	Meaning
Green	Data is reliable, fish size is a mostly accurate.
Yellow	Data is not totally reliable, fish size is somewhat accurate.
Red	Data is not reliable, fish size accuracy is very low.

### 2.2.1 How to show/hide the fish size graph

To show/hide the [Vertical Target Graph], do the following:



1. Select the [Graph] icon (  ) from the InstantAccess bar™ to show the [Graph] menu.
2. Select the [Vertical Target Graph] icon (  ). The icon changes to a green color and the [Vertical Target Graph] appears.

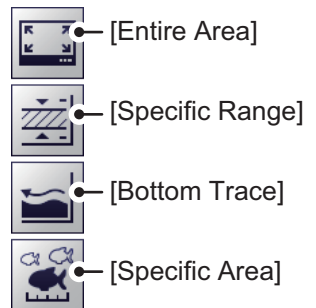
To close the graph, select the [Close Window] icon (  ), or select the graph icon.

### 2.2.2 How to set the method of measurement

The FCV-2100 has four methods of fish size measurement.




To select, or change, the method of measurement, do the following:

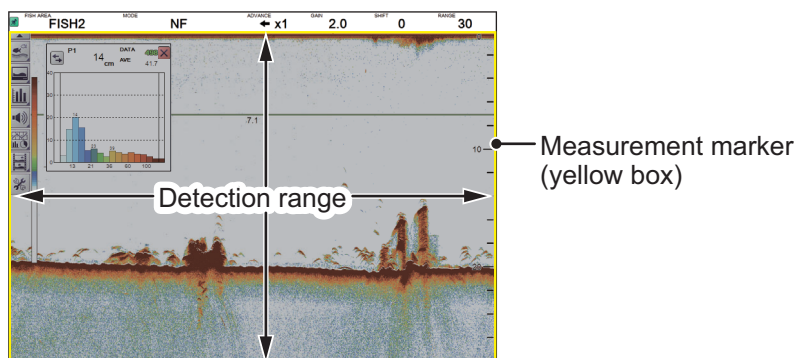
1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu bar appears.
2. Select the [Fish Size Measurement] icon (  ). The menu options appear.
3. Select the appropriate method of measurement icon, referring to the figure to the right.



### 2.2.3 Entire Area




This method measures all detected fish. When this method is active, the area of detection (the entire screen) is surrounded with a yellow box, as shown in the example figure below.

1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu bar appears.
2. Select the [Fish Size Measurement] icon (  ). The menu options appear.
3. Select the [Entire Area] icon (  ).

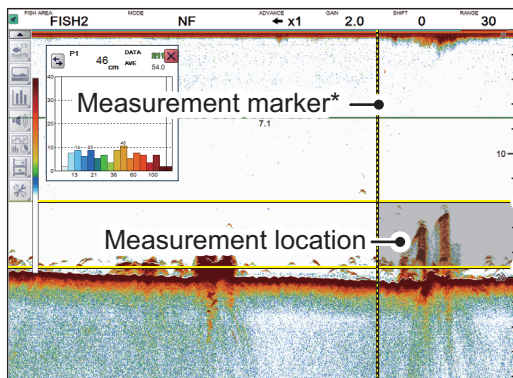


## 2.2.4 Specific Range

This method produces three marker lines, one vertical and two horizontal, which can be adjusted to set the specified range.

1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu bar appears.
2. Select the [Fish Size Measurement] icon (  ). The menu options appear.
3. Select the [Specific Range] icon (  ).

The upper and lower limits of measurement range are shown as horizontal solid yellow lines. The start time of the measurement area is shown as a vertical dotted (hashed) yellow line.






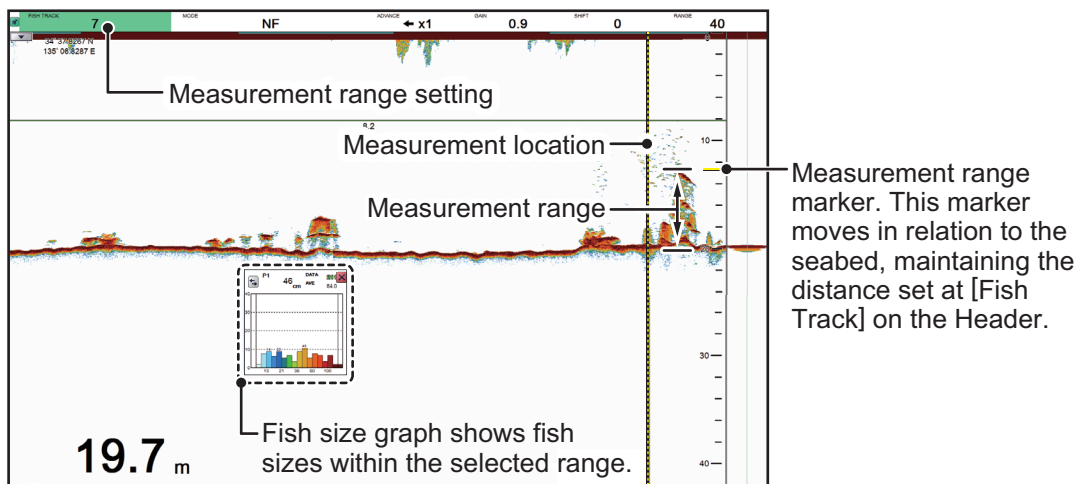
\*: The measure marker indicates the time at which measurement begins. The shortest available time is 30 dots from the right-side of the screen.

4. Drag and drop the area or limits to suit your requirements.
  - Drag and drop the measurement marker to adjust the horizontal width of the measurement range.
  - Drag and drop the upper limit bar to adjust the upper range limit.
  - Drag and drop the lower limit bar to adjust the lower range limit.
  - Drag and drop the measurement location to set where the fish measurements are made.

## 2.2.5 Bottom Trace

This method produces two marker lines. The horizontal, small line at the right-hand edge of the screen is the measurement range marker. The vertical line is the measurement location.

1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu bar appears.
2. Select the [Fish Size Measurement] icon (  ). The menu options appear.
3. Select the [Bottom Trace] icon (  ). [FISH TRACK] appears in the Miscellaneous section of the header.



Drag and drop the measurement location to set where the fish measurements are to be made.

**Note:** Where the depth indication shows bars " - - - " instead of a depth value, the measurement range marker and measurement location are not shown and measurement is not possible.




### How to adjust the measurement range

The measurement range marker moves dynamically, keeping a set range from the seabed. To change the range, do the following:

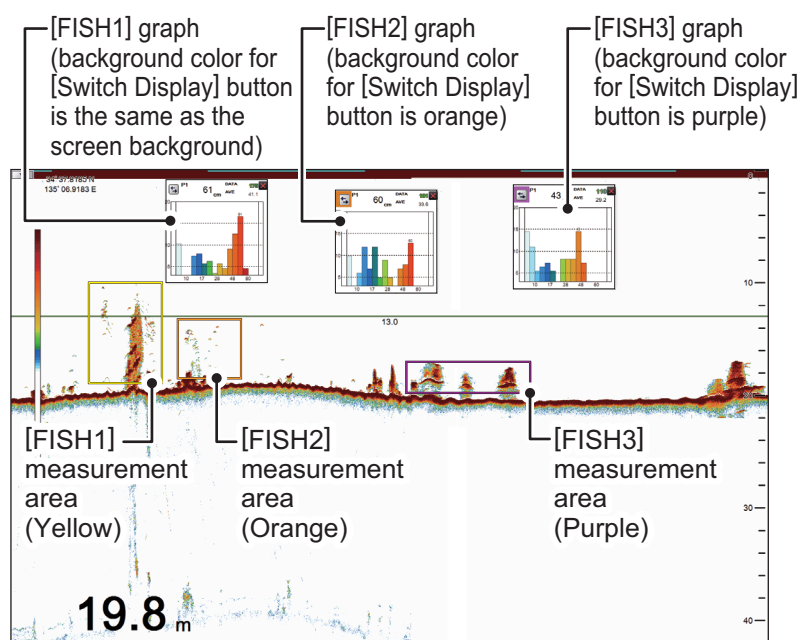
1. Select the [FISH TRACK] indication at the far left-hand side of the header. The indication is highlighted in green color.
2. Scroll to change the range. The range marker moves with each change in range.

## 2.2.6 Specific Area

This method allows you to specify up to three square-shaped areas. To set up one or more detection areas, do the following:

1. Select the [Sounder] icon (  ) from the InstantAccess bar™. The [Sounder] menu bar appears.
2. Select the [Fish Size Measurement] icon (  ). The menu options appear.
3. Select the [Specific Area] icon (  ). [FISH AREA] appears in the Miscellaneous section of the header.
4. Select the [FISH AREA] indication on the header. The indication is highlighted in green color.
5. Scroll to change the area you want to set. The indication reads "FISH1", "FISH2" or "FISH3", depending on your selection.
6. Place the cursor at the one corner of the area, then press and hold the **left button**.
7. Drag the cursor to the diagonally opposite corner of the area, then release the **left button**. The selected area is now highlighted with a colored box. The color changes, depending on the area number selected (see the list below for reference).  
[FISH1]: Yellow, [FISH2]: Orange, [FISH3]: Purple.

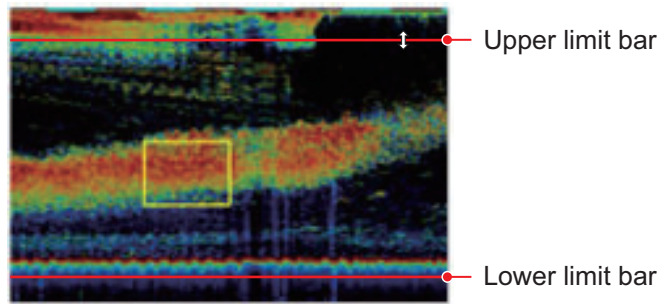
When set, each area's graph also appears, as shown in the example figure below.



To move an area drag the area to the desired location.



To adjust the size of an area, drag the outer lines of the area.

**Note:** To get automatic operation, set [Auto Specific Area] in the [Measurement] menu to [Off]. With automatic operation active, the measurement area appears automatically (shown as solid, red-colored bars) when you place the cursor on an echo. The upper and lower limit bars can be drag-and-dropped in the same manner as an area placed manually. Further, if there is no operation for a few seconds, the area automatically disappears.



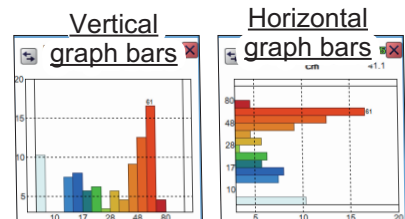
### 2.2.7 How to change graph settings

Several aspects of the graphs can be changed. To change graph settings, do the following:

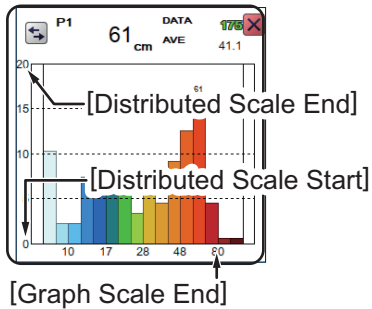
1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon (  ) from the [Advanced Settings] menu. The [Advanced Settings] window appears.
3. Select [Measurement]. The [Measurement] settings appear in the right-side of the window.

Measurement	
Graph Display	Vertical
Graph Scale End	39
Distributed Scale Start	3%
Distributed Scale End	50%
Graph Peak	1st
Emphasis Type	Off
Emphasis Rate	Medium
Updating Cycle	RT
Measurement Range	Std
Measurement Threshold	3
Auto Specific Area	Off
Target Measurement Area	FISH1
Updating Cycle	High
Auto Measurement Range Time Direction	1/3

4. Referring to the items below, select the measurement option to change, then change the settings as required.
  - [Graph Display]: Set the orientation of the graph.  
Select [Horizontal] or [Vertical] as required.



## 2. GRAPH FUNCTIONS

- [Graph Scale End]: Set the maximum fish size to be displayed on the graph. (See the figure to the right.)
  - [Distributed Scale Start]: Set the percentage of distribution at which data starts to appear on the graph. (See the figure to the right.)
  - [Distributed Scale End]: Set the percentage of distribution at which data stops appearing on the graph. (See the figure to the right.)
- 
- [Graph Peak]: Set the number of peak measurement to display on the graph. [1st]: Show only the highest peak measurement; [1st + 2nd]: Show the two highest peak measurements; [1st + 2nd + 3rd]: Show the two highest peak measurements
  - [Emphasis Type]: Set how to emphasize fish lengths.
    - [Off]: No emphasis is applied.
    - [Type1]: Smaller fish are emphasized.
    - [Type2]: Large and small fish are emphasized.
    - [Type3]: Larger fish are emphasized.
  - [Emphasis Rate]: Set the amount of emphasis to apply to the graph bar (not available if [Emphasis Type] is set to [Off]).  
The emphasis increases the length of the appropriate graph bar based on this setting. The amount of increase is directly proportionate to the settings; [Weak] for minimal emphasis, [Medium] for average emphasis and [Large] for maximum emphasis.
  - [Updating Cycle]: Set the interval at which to update graphs.  
[RT]: Real Time; [1s], [2s], [3s]: Interval, in seconds.
  - [Measurement Range]: Set the depth range for fish size measurement for all modes except bottom trace.  
[Std]: From transducer to seabed; [Entire Range]: Include fish echoes beyond the seabed. [Entire Range] is useful in situations where the seabed is not detected correctly, as it can detect fish which are below the incorrectly detected seabed.  
**Note:** Where [Bottom Search] in the [TX/RX] menu (see section 4.7.2) is set to [OFF], [Measurement Range] is not available.
  - [Measurement Threshold]: Set the minimum fish size at which to begin fish size detection.
  - [Auto Specific Area]: When the specific area measurement mode is active, select whether or not to use the measurement range automatic adjustment function. Three options are available, however only the measurement range selected at [Target Measurement Area] is automatically adjusted. [Auto Depth]: Even if the depth at which a single fish is present changes after setting the measurement range, the measurement range is automatically shifted to a position with a large number of single fish. During automatic adjustment function, the position and size of the measurement marker can be changed. [Auto Area]: The measurement range that was set is deleted once and the measurement range is automatically set to the place where the number of single fish is large. During automatic adjustment function, the position and size of the measurement marker can not be changed. [Off]: Disable automatic adjustment.





When this feature is active, the indication [AT] appears in the [FISH AREA] of the header. (Applicable only to the measurement range selected with [Target Measurement Area].

- [Target Measurement Area]: Available when [Auto Specific Area] is set to other than Off. Select the measurement area to use with the automatic area adjustment feature.
  - [Updating Cycle]: Available when [Auto Specific Area] is set to other than Off. Set the updating interval for automatic area adjustment, from among, High (5 s), Medium (15 s), and Low (30 s).
  - [Auto Measurement Range Time Direction]: Available when [Auto Specific Area] is set to other than Off. Set the area to use in automatic area adjustment. [Entire Area]: Automatic adjustment on all areas. [1/2]: Automatic adjustment is done from the right edge of the screen to 1/2 the screen width. [1/3]: Automatic adjustment is done from the right edge of the screen to 1/3 the screen width.
5. Click [OK] to apply the settings and close the menu,

## 2.2.8 How to calibrate the target echo strength

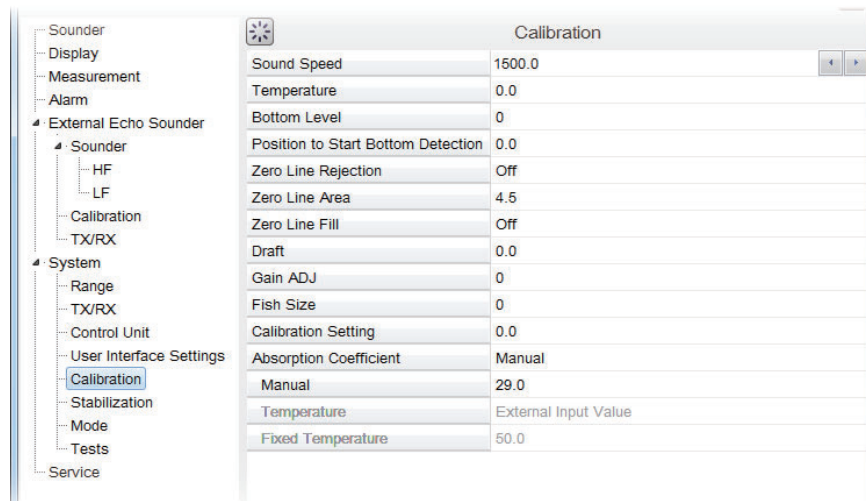
To accurately analyze fish distribution, it is necessary to calibrate target strength using a calibration sphere with a diameter of at least 38.1 mm. The calibration is done to match the target strength value displayed in the fish histogram dialog box with the target strength value of the calibration sphere.

To calibrate the target strength, do the following:

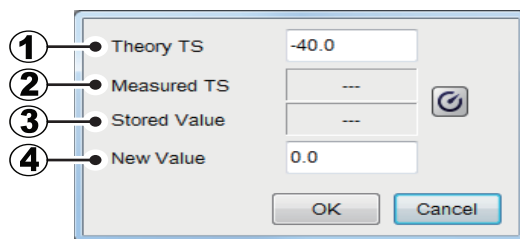
1. Suspend a calibration sphere at least 3 m below the transducer.
2. Set the measurement mode to [Specific Area] (see section 2.2.2).
3. Adjust the area marker (colored rectangle, see section 2.2.6) to place the calibration sphere echo inside the measurement area. Keep the measurement area small, to avoid unwanted echoes.
4. Check the fish size displayed on the graph in comparison to the calibration sphere. Note that calibration can be completed if there are other echoes present.
5. Confirm that the calibration sphere echo appears inside the area marker in consecutive scans before proceeding to the next step.
6. Select the [Advance Settings] icon () from the InstantAccess bar™.
7. Select the [Advanced Settings] icon () from the Menu bar. The [Advanced Settings] menu is displayed.

## 2. GRAPH FUNCTIONS

- Select [Calibration]. The [Calibration] options appear on the right of the menu.



- Select [Calibration Setting], then select the detail icon (⋮) to the right-side of the calibration value. The settings pop up window shown below appears.



Number	Description
1	[Theory TS]: The size of the calibration sphere.
2	[Measured TS]: Measured size of the calibration sphere.
3	[Stored Value]: Previously calculated calibration setting.
4	[New Value]: Calculated calibration setting. (Can be adjusted manually.)

- At [Theory TS], adjust the value to match the size of the calibrations sphere. Press ◀ to decrease the value, press ▶ to increase the value.
- Select the calibrate button (⌚). The system measures the size of the calibration sphere and the measurement appears in the [Measured TS] indication.
- If the calibration setting displayed at [New Value] requires manual adjustment, select the settings, then press ◀ to decrease the value, or press ▶ to increase the value.
- Select [OK] to apply the calibration settings. To cancel the new settings, select [Cancel].  
The newly applied calibration settings appear in the [Calibration] options.

## 2.3 Target Graphs

The target graphs plot fish locations in relation to your vessel. The [Vertical Target Graph] shows fish below your vessel and the [Horizontal Target Graph] shows fish in the stern direction.



**Note:** The measurement area for the target graphs is shared with the [Fish Size Graph].

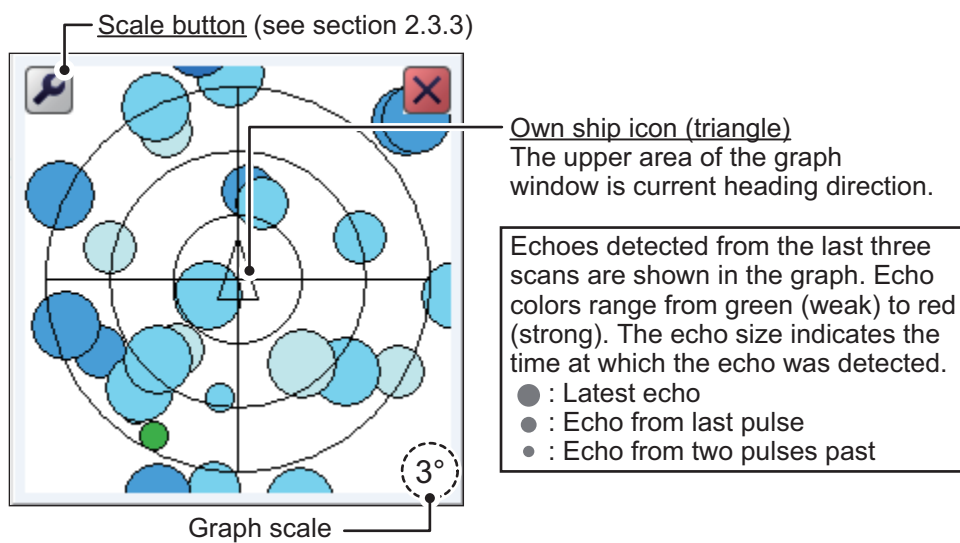
### 2.3.1 Vertical target graph

With a “bird’s-eye-view” of fish below your vessel and your vessel at the center of the graph display, this graph mode is ideal for keeping track of your heading in relation to fish schools and also determining fish distribution surrounding your vessel.

Fish echoes from the last three scans are displayed, which helps to track schools.

To show the [Vertical Target Graph], do the following:

1. Select the [Graph] icon (  ) from the InstantAccess bar™ to show the [Graph] menu.
2. Select the [Vertical Target Graph] icon (  ). The icon changes to a green color and the [Vertical Target Graph] appears.





To close the graph, select the [Close Window] icon (  ), or select the graph icon.

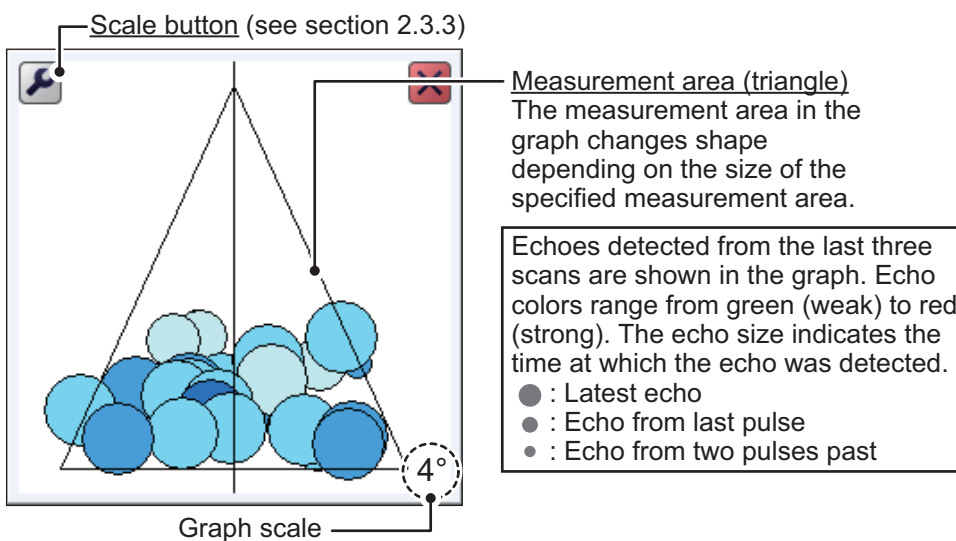
### 2.3.2 Horizontal target graph

The [Horizontal Target Graph] mode gives a view of fish echoes in the stern direction. The depth at which the echoes were detected and the distribution is displayed, making this mode ideal for estimating the type of fish.

Fish echoes from the last three scans are displayed, which helps to track schools.

To show the [Horizontal Target Graph], do the following:


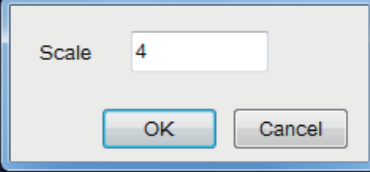

1. Select the [Graph] icon () from the InstantAccess bar™ to show the [Graph] menu.
2. Select the [Horizontal Target Graph] icon (). The icon changes to a green color and the [Horizontal Target Graph] appears.



To close the graph, select the [Close Window] icon () , or select the graph icon.

### 2.3.3 How to change the graph scale (target graphs only)

To change the target graph scale, do the following:



1. With either the vertical or horizontal target graph displayed, select the scale button () at the top left of the graph. The scale settings window appears.
 
2. Select the [Scale] value. The setting adjustment buttons () appear.
3. Select ◀ to decrease or ▶ to increase the scale. The available range is 2° to 8° from directly below own ship. A larger setting gives a wider detection area.
4. Select [OK].

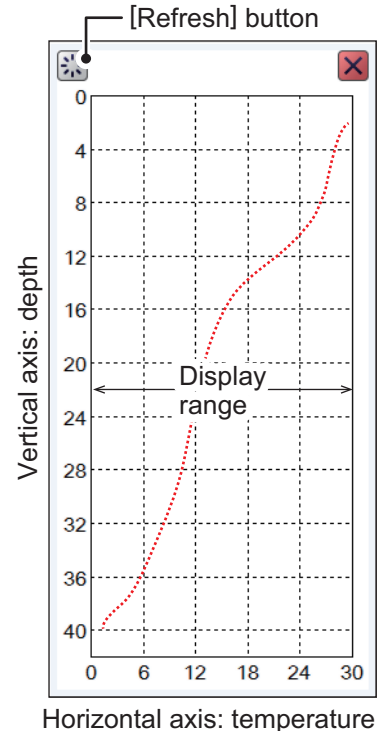
## 2.4 Sonde Graph

The [Sonde Graph] plots depth and water temperature data, input from a net sonde, in a red line.


The data displayed is input from the net sonde with the lowest number in the list of sondes selected at [Sonde Mark] from the [Display] section of the [Advanced Settings] menu. (See section 4.3.)

To show the [Sonde Graph], do the following:

1. Select the [Graph] icon () from the InstantAccess bar™ to show the [Graph] menu.
2. Select the [Sonde Graph] icon (). The icon changes to a green color and the [Sonde Graph] appears.  
The depth and temperature at the sonde location appears on the graph. The depth scale reflects any changes to the fish finder depth scale.



To close the graph, select the [Close Window] icon

() , or select the graph icon.

**Note:** You can clear the [Sonde Graph] and start a new graph at any time. Select the [Refresh] button (indicated in the figure above) to clear the graph and start a new graph.



## 2.5 Temp Graph

The [Temp Graph] plots water temperature, input from an external temperature sensor, in a blue dotted line across the screen.

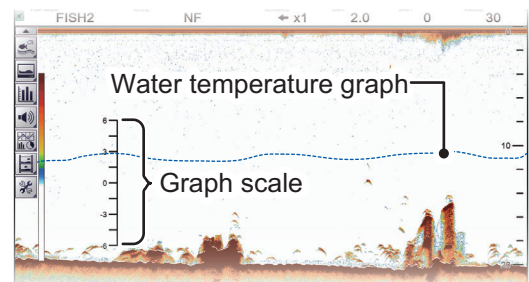
**Note 1:** A water temperature sensor must be connected to use this feature.

**Note 2:** The data source for water temperature input is set at installation. For details, consult your local dealer.

To show the [Temp Graph], do the following:

1. Select the [Graph] icon () from the InstantAccess bar™ to show the [Graph] menu.
2. Select the [Temp Graph] icon (). The icon changes to a green color and the [Temp Graph] appears.



To close the graph, select the [Close Window] icon () , or select the graph icon.

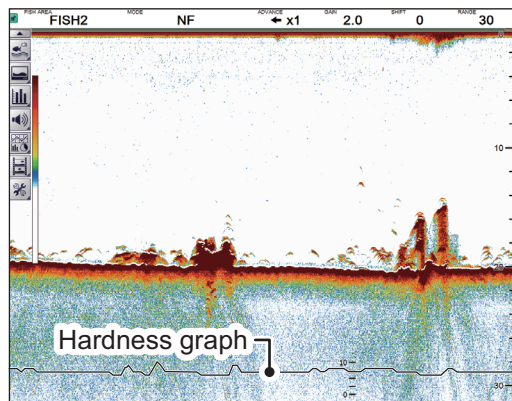


## 2.6 Hardness Graph

The [Hardness Graph] plots the estimated seabed hardness as a solid line graph along the bottom of the screen. The graph indicates estimated composition, such as rocks or gravel, making it a handy tool for finding the right fishing spot.

to show the [Hardness Graph], do the following:

1. Select the [Graph] icon () from the InstantAccess bar™ to show the [Graph] menu.
2. Select the [Hardness Graph] icon (). The icon changes to a green color and the [Hardness Graph] appears.



To close the graph, select the [Close Window] icon () , or select the graph icon.

# 3. STILL IMAGES & DATA RECORDING

## 3.1 Still Images (Screenshots)

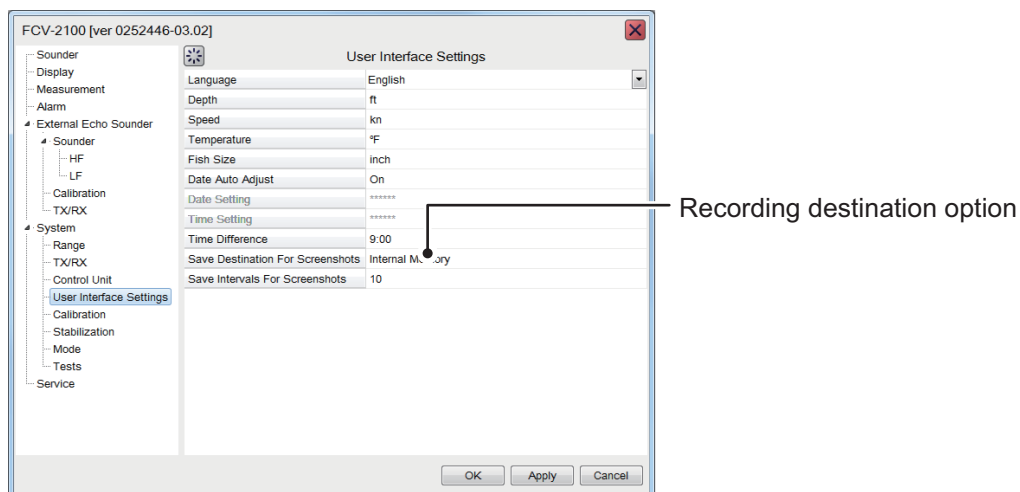
You can save a screenshot of the on-screen display and play it back at any time. This is helpful when comparing fish school sizes.

### 3.1.1 How to set the save destination for images

Images can be saved to the Processor Unit's internal memory, or to an external device. The Processor Unit can hold up to 99 image files. For external devices, the number of files that can be saved depends on the capacity of the external device.

To set the save destination for images, do the following:

1. Select the [Advance Settings] icon from the InstantAccess bar™.
2. Select the [Advanced Settings] icon from the Menu bar. The [Advanced Settings] menu is displayed.
3. Double-click [System] to show the [System] section of the menu.
4. Select [Setting]. The [Setting] options are shown to the right-side of the menu.
5. Select the [Screenshot Recording Destination] option (indicated in the figure below). The options button is now visible.



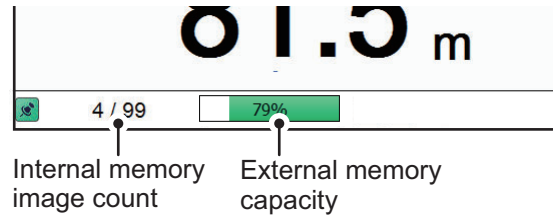
6. Select the options button, then select the appropriate destination. The available options are:  
[Internal Memory] - saves the images to the Processor Unit.  
[External Memory] - saves the images to the connected external device.
7. Select [Apply], then [OK], in that order. The destination is now set for saved images.

### 3.1.2 How to take a still image (screenshot)

To take a screenshot, press the wheel on the Trackball Control Unit.

### 3. STILL IMAGES & DATA RECORDING

Where the save destination is set to [Internal Memory], the footer shows the total number of screenshots saved to the Processor Unit.



Where the save destination is set to [External Memory], the footer shows the percentage of space available on the external device.

The file format for saved images is JPEG (Joint Photographic Experts Group).

**Note 1:** Where the internal or external memory has insufficient space to save a new image, the error message "Not enough memory to save screenshot. Delete unnecessary files." appears.

To rectify the problem, do one of the following:

- Delete unnecessary files (see section 3.1.6).
- Moved saved files to an external device (see section 3.1.5).

**Note 2:** If a still image is taken when [External Memory] is selected and no external device is connected, the error message "External memory is not connected." appears. Check that the external memory is connected correctly.

#### 3.1.3 How to take still images at a set interval


Several still images can be taken at set intervals. To use this function, do the following:

**Note 1:** The interval (in seconds) at which still images are recorded is set at [Screenshot Recording Interval] in the [System] section of the [Advanced Settings] menu.

**Note 2:** Connect the external device to the USB port on the Processor Unit. Do not connect the external device to the USB port on the Trackball Control Unit.

**Note 3:** [Static Display Recording: Start/Stop] is not selectable from the menu if the external device is not correctly connected.

**Note 4:** When you use the Multi-Screenshot function, use of an external HDD is recommended.

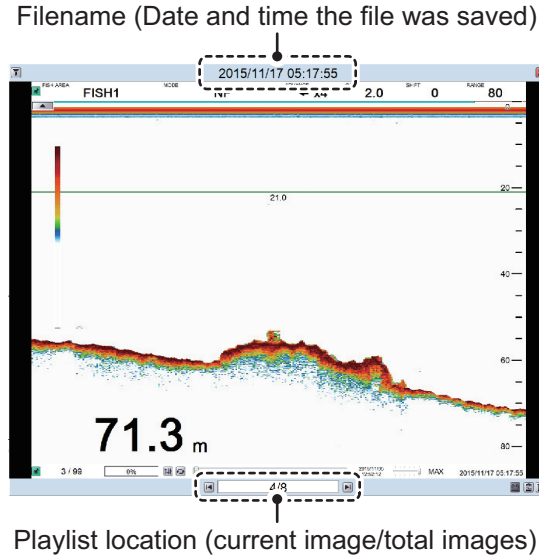
1. Select [Echo Recording] from the InstantAccess bar™.
2. Select the [Multi-Screenshot Start/Stop] icon () from the [Echo Recording] menu. Still images are now saved at regular intervals and the [Static Display Recording: Start/Stop] icon is displayed in green color.
3. Select the [Static Display Recording: Start/Stop] icon to stop recording.



### 3.1.4 How to replay a still image

To replay a saved still image, press and hold the wheel on the Trackball Control Unit. The replay screen is displayed and the oldest still image is shown. A total of 1000 images can be load to replay.

**Note:** Replay is not available on sub monitors.



To change the displayed file, press the arrow buttons (⏪ or ⏩).

To close the replay screen, press the icon a the top-right of the screen.

**Note 1:** Where there are no still images to play back and the wheel on the trackball is pressed and held, a blank screen (black color) appears.

**Note 2:** The indication for the number of current images and total images is located at the bottom of the screen (see figure above). This indication shows the number images at the time of opening the replay screen and does not reflect any new images taken while the replay screen is open. To refresh the count, close, then re-open the replay screen.

#### How to filter the images that are displayed

1. Select the filter icon () at the top-left of the screen to show the filtering options pop up window (shown to the right).
2. Select the appropriate check box to show the filtering options. You can select either of, or both of the filters.
  - [Specify Date]: Apply a filter based on date. you can select a single filter (for example, filter by month only) or a mixed filter (for example, filter by year, month and date).
  - [Specify Location]: Apply a filter based on a specific location and/or a nautical mile radius from the specified point.
3. Select [OK] to apply the filters.

### 3.1.5 How to copy images from internal to external memory

You can copy image files from the internal memory of the Processor Unit to an external device (for example a USB flash drive).

1. Press and hold the wheel on the trackball to show the replay screen.
2. Select the appropriate icon at the bottom-right of the screen.



The images are copied from the Processor Unit to the connected external device.

**Note 1:** If the external device does not have the capacity to store the image files, the error message "Not enough memory to copy screenshot. Delete unnecessary files." appears.

To rectify this problem, delete unnecessary files from the device to create room for the image files, then repeat the above procedure.

**Note 2:** If no external device is connected, the [Copy] and [Copy All] icons are gray in color and not available.

### 3.1.6 How to delete image files

You can delete image files in two manners: individually, or all at once. To delete image files, do the following:

1. Press and hold the wheel on the trackball to show the replay screen.
2. At the bottom-right of the screen, select the appropriate icon.



A confirmation message is displayed.

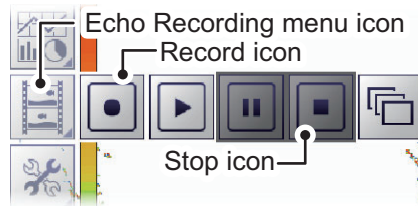
3. Select [Yes] to proceed with the file deletion. Select [Cancel] to abort the file deletion.

## 3.2 Echo Data Recording and Playback

The echo data recording and playback function requires connection to an external memory device. Echo data is recorded as a “movie”, allowing you to playback previously recorded echo data, such as fish schools, at your convenience.

### 3.2.1 How to record echo data

To start data recording, select the [Echo Recording] menu icon from the InstantAccess bar™, then select the [Record] icon. To stop the recording at any time, select the [Stop] icon.



The amount of memory used for recording echo data varies, depending on configuration and settings. For example, with no external fish finder connected, no display division and the range set to 150 m, the estimated memory usage is 4.7 GB per hour.

**Note 1:** When there is no external memory device connected, the [Echo Recording] icon is not selectable.

**Note 2:** An external device with 500 GB capacity, or higher, is recommended for this function.

**Note 3:** Connect the external device to the USB port on the Processor Unit. Do not connect the external device to the USB port on the Trackball Control Unit.

**Note 4:** When an external memory device is connected and the capacity for the device reaches its limit, recording is stopped and the message "Recording stopped because memory capacity is full. Check capacity." appears.

Delete unnecessary files from the external device, or take other appropriate measures to allow sufficient capacity to save the echo data.

**Note 5:** When the external memory device does not have sufficient memory to begin data recording, and you attempt to record data, the message "Not enough memory to start recording. Delete unnecessary files." appears.



Delete unnecessary files from the external device, or take other appropriate measures to allow sufficient capacity to save the echo data.

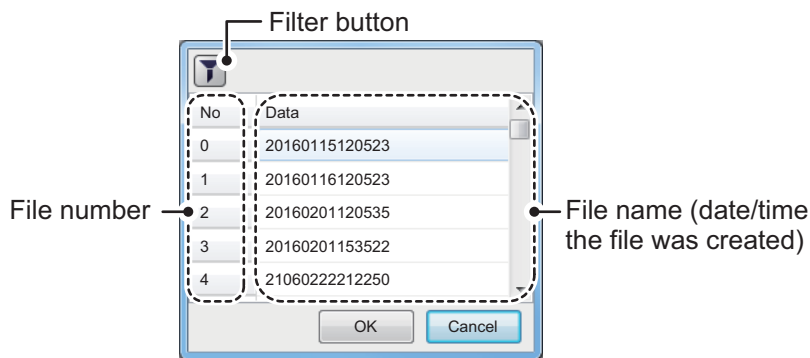
### 3.2.2 How to play back recorded echo data

The playback function lets you view echo data you previously recorded. The display mode used for playback should match the settings used when the echo data was recorded, or the echoes may not be displayed correctly.

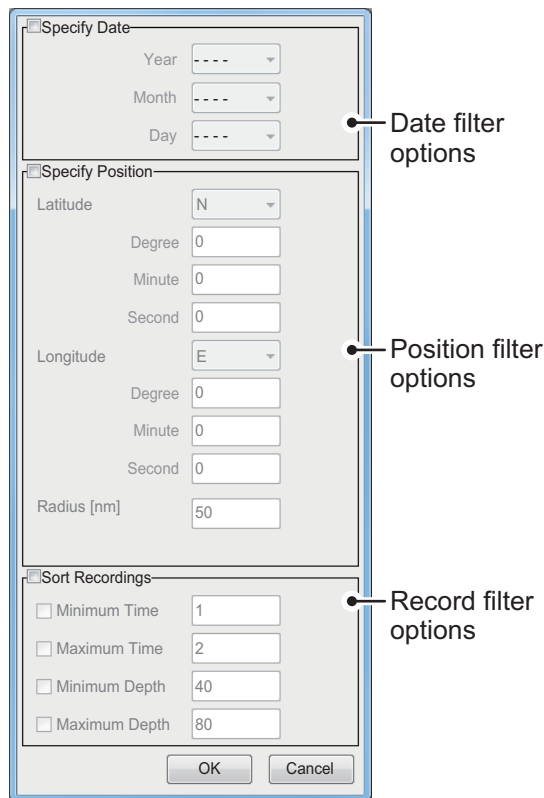
Adjustments made to gain and other echo settings are not reflected to the echo data being played back.

To play back recorded echo data, do the following:

1. Select the [Echo Recording] icon (  ) from the InstantAccess bar™, then select the Play icon (  ). The file selection dialog shown below appears.



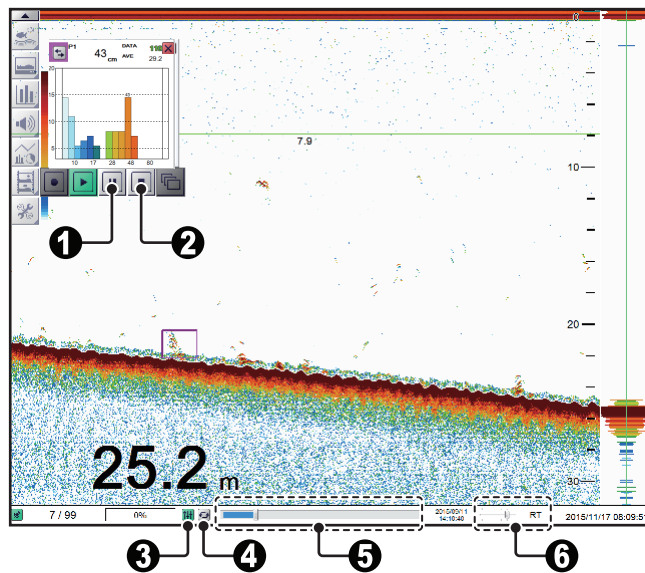
2. If you need to filter the files, select the filter button, indicated in the above figure. The filter options window, shown below, appears. If you have no need to filter the files, go to step 4.



3. Referring to the table below, set the appropriate file filters, then select [OK].

Filter type	Description
[Specify Date]	Apply a filter based on date. You can select a single filter (for example, filter by month only) or a mixed filter (for example, filter by year, month and date).
[Specify Position]	Apply a filter based on a specific location and/or a nautical mile radius from the specified point.
[Specify Record]	Apply a filter based on the playback time of the record, the depth recorded, or a mix of time and depth. <ul style="list-style-type: none"> <li>• [Minimum Time]/[Minimum Depth]: Records with a time/depth below this setting are not displayed.</li> <li>• [Maximum Time]/[Maximum Depth]: Records with a time/depth above this setting are not displayed.</li> </ul>

4. Select the file to play back, then select [OK]. The selected file is played back. Some settings, such as gain and fish size measurements, can be adjusted during playback.




No.	Name	Description
1	[Pause] icon	Select to pause the playback. Select the [Play] icon to continue playback.
2	[Stop] Icon	Select to stop the playback.
3	[Settings] icon	Apply your current settings to the playback file. This icon is shown in green color when in use.
4	[Loop] icon	Select to loop the playback.
5	[Playback Location] indicator	Indicates your current location in the overall playback. Select the slide bar, then drag the locator to change the playback location.
6	[Playback Speed]	Select the speed to playback the record. The available options are: <ul style="list-style-type: none"> <li>• [2000]/[1500]/[1000]/[500] ms: Play the record at the set millisecond speed.</li> <li>• [RT]: Play the record at real time speed (the speed at which it was recorded).</li> <li>• [MAX]: Play the record at maximum playback speed.</li> </ul>

5. Select the Stop icon (  ) to stop the playback.

### 3.3 How to Select an External Memory Device

Where more than one external memory device is connected to the FCV-2100, you can select the device which will be used for data recording and saving still images\*.

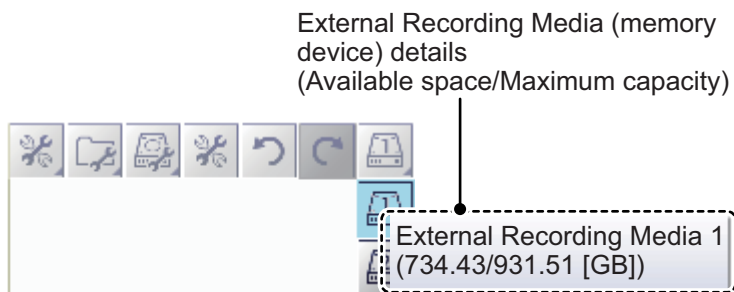
\*: [Screenshot Recording Destination] must be set to [External Memory] to save still images to an external memory device.

1. Select the [Advance Settings] icon (  ) from the InstantAccess bar™.

2. select the [Select External Recording Media] (  ) icon.

**Note:** The [Select External Recording Media] icon is only displayed when there is more than one external memory device connected to the FCV-2100.

3. Select the appropriate external memory device to use.  
When the cursor is place on the icon for an external memory device, the highlighted device's capacity (available space/maximum space) is displayed.



# 4. ADVANCED SETTINGS

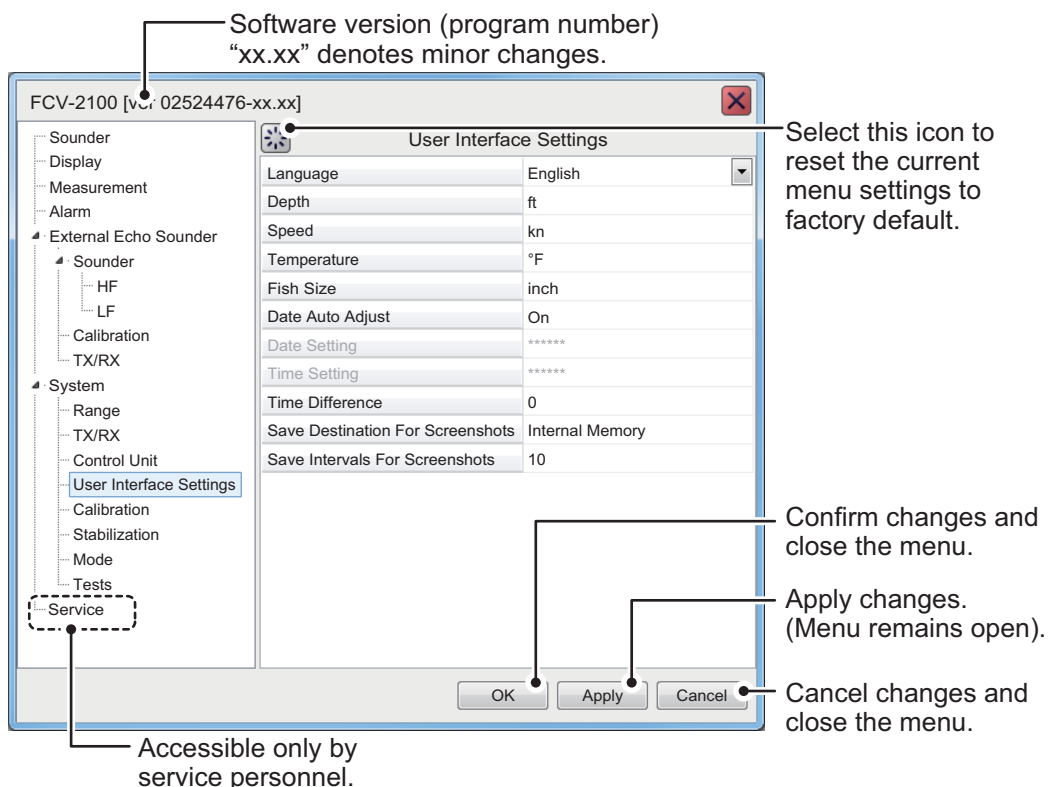
The Advanced Settings menu contains various settings, such as [Sounder], [Display] and [Measurement] settings.

## 4.1 How to Access the Advanced Settings Menu

Select the [Advance Settings] icon (  ) from the InstantAccess bar™.

Select the [Advanced Settings] icon (  ) from the Menu bar. The [Advanced Settings] menu is displayed.

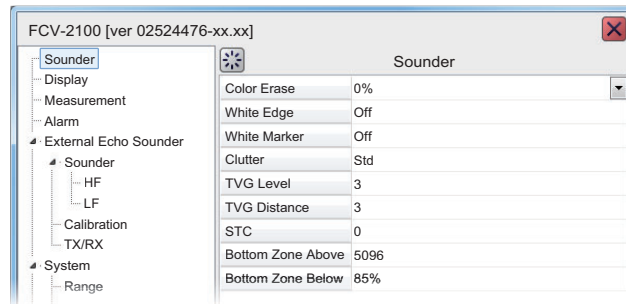
Where [External Fish Finder Window] is set to [On] at installation, you can access external fish finder settings from a sub monitor by right-clicking a non-interactive section of the screen. The external fish finder settings are not available from the [Advance Settings] menu. (See section 4.8.)



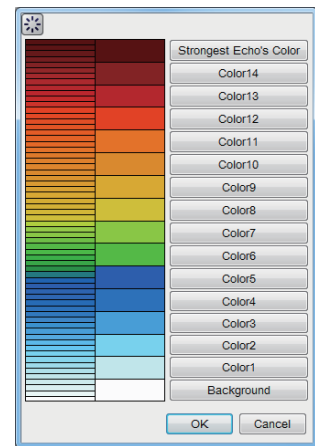
**Note:** External Fish Finder settings are displayed below [Alarm] if [External Fish Finder Window] is set on [Off] at installation and an external fish finder is connected correctly.

## 4.2 Sounder Menu

The [Sounder] section of the [Advanced Settings] menu contains the settings for sounders connected to the FCV-2100. For external sounders, see section section 4.6.



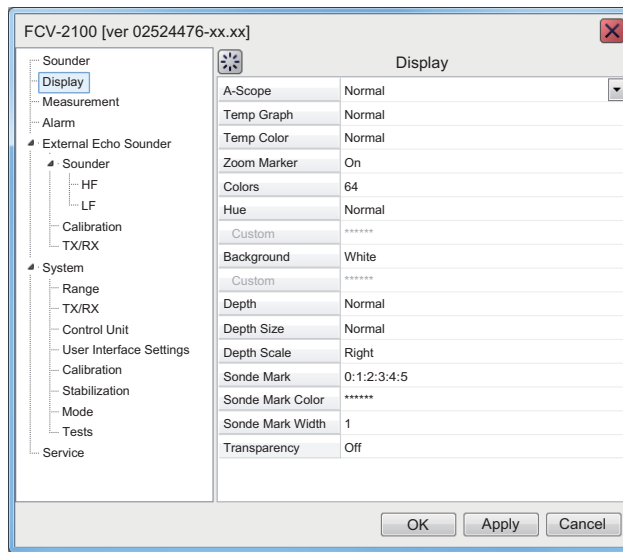
Menu item	Description
[Color Erase]	Erase unwanted noise. See section 1.25.
[White Edge]	Gives the seabed echo a white edge. Useful when trying to separate bottom-feeding fish from the seabed. Set a high value for a thick white line or a low value for a thin white line. Set to [Off] to disable this function.
[White Marker]	<p>Displays selected echoes in white color. Select the detail icon (⋮) to show the color selection pop up window, shown to the right.</p> <p>Select the echo color to be displayed as white, then select [OK].</p> <p>To cancel all changes, select [Cancel].</p>
[Clutter]	Remove unwanted echoes (sediment, etc.). See section 1.11.
[TVG Level]	Time Varied Gain. Adjusts the TVG level. See section 1.26.
[TVG Distance]	Adjust the maximum distance at which TVG is applied. See section 1.26.
[STC]	<p>Sensitivity Time Control. Remove unwanted echoes near the surface. Use this function when you want to see fish near the surface clearly.</p> <p>Set the STC value according to your requirement. A setting of [0] disables the STC.</p> <p><b>Note:</b> A high STC setting can erase fish echoes. It is recommended to watch your display when adjusting the STC.</p>
[Bottom Zone Above] & [Bottom Zone Below]	<p>Set the are in which the seabed is displayed when auto-range mode is active.</p> <p><b>Note:</b> This menu item is available only if [Auto Range] is not selected from the [Range] → [Auto] menu under the [System] menu.</p>



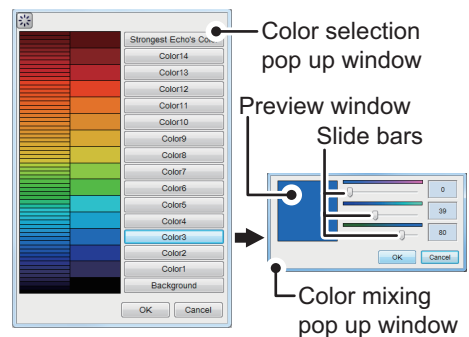


## 4.3 Display Menu

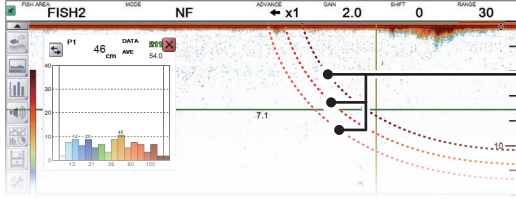
The [Display] section of the [Advanced Settings] menu contains the settings for what data to display and how to display the data on your screen.



Menu item	Description
[A-Scope]	Show echoes at each transmission with amplitudes and tone proportional to their intensities. <ul style="list-style-type: none"> <li>• [Normal]: The display shows echoes at each transmission with amplitudes and tone proportional to their intensities.</li> <li>• [Peak]: “Normal” A-scope display plus peak-hold amplitude picture for last five seconds in dots.</li> </ul>
[Temp Graph]	Requires connection to a temperature sensor. Display a graph showing the water temperature in one of three layouts ([Narrow], [Normal] or Wide).
[Temp Color]	Select the color in which the temperature graph displays temperatures. The “Normal” setting is light blue.
[Zoom Marker]	When the [Zoom] function is active, select whether to show or hide the zoom marker.
[Colors]	Select the number of colors available for the color bar and echoes.
[Hue]	Adjust the color scheme to suit your needs. There are eight options: <ul style="list-style-type: none"> <li>• [Normal]: Factory default color scheme.</li> <li>• [Hue1] to [Hue6]: Preset color schemes.</li> <li>• [Custom]: Create a custom color scheme.</li> </ul> Where [Custom] is selected, the Custom menu item is selectable. Select the detail icon (⋮) to show the color selection pop up window. Select a color, then adjust the color settings from the color mixing pop up window. Adjust the slide bars to create a suitable color, then press the <b>ENTER</b> key.



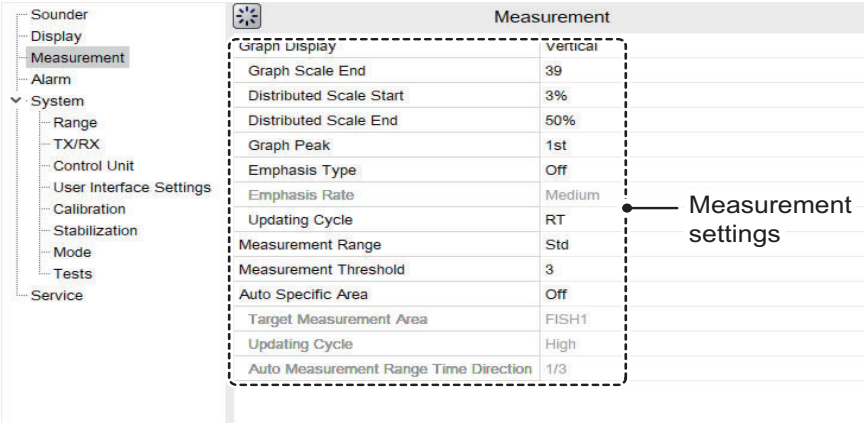
## 4. ADVANCED SETTINGS

Menu item	Description
[Background]	Change the background color. Select [Custom] to set a custom background color, or select a preset color. The [Custom] color here is not the same as the [Hue] → [Custom] color. However, the custom color can be set in a similar manner.
[Depth]	Set the location to show the depth. [Normal] to show depth at the left side of the display, [Right] to show depth at the right side of the display.
[Depth Size]	Select the size at which the indication for depth is displayed.
[Depth Scale]	Adjust the location at which the depth scale is displayed.
[Sonde Mark]	Shows the depth of the net sonde transmitter. You can display several sonde marks on-screen. The example below shows three sonde marks. <div style="text-align: center; margin-top: 10px;">  </div>
[Sonde Mark Color]	Set the color for the displayed sondes. <ol style="list-style-type: none"> <li>1) Select the detail icon (⋮) to show the color selection pop up window.</li> <li>2) Select the appropriate sonde number at the right-side of the color selection pop up window.</li> <li>3) Adjust the slide bar to change the displayed color of the sonde.</li> <li>4) Select [OK] to confirm the changes, or select [Cancel] to cancel the changes.</li> </ol>
[Sonde Mark Width]	Set the thickness at which the sonde line is displayed on-screen. Select a higher setting to increase the thickness.
[Transparency]	Adjust the level of transparency for the fish graph. A higher setting increases the transparency, however the graph bars, scale and indications in the graph are not made transparent.

## 4.4 Measurement Menu

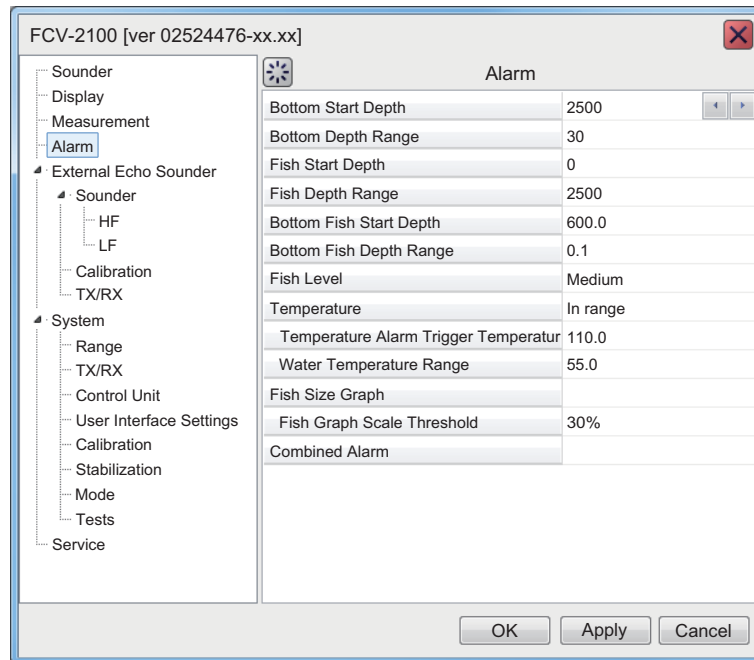
Graph-related measurement can be set from the [Measurement] section of the [Advanced Settings] menu. For further details on each setting, see section 2.2.7.

Measurement	Value
Graph Display	vertical
Graph Scale End	39
Distributed Scale Start	3%
Distributed Scale End	50%
Graph Peak	1st
Emphasis Type	Off
Emphasis Rate	Medium
Updating Cycle	RT
Measurement Range	Std
Measurement Threshold	3
Auto Specific Area	Off
Target Measurement Area	FISH1
Updating Cycle	High
Auto Measurement Range Time Direction	1/3



## 4.5 Alarm Menu

All alarms and their respective conditions can be set from the Alarm section of the [Advanced Settings] menu. For further details on setting alarms and their conditions, see section 1.21.



## 4.6 External Fish Finder Menu

The external fish finder can be set from the [External Fish Finder] section of the [Advanced Settings] menu.

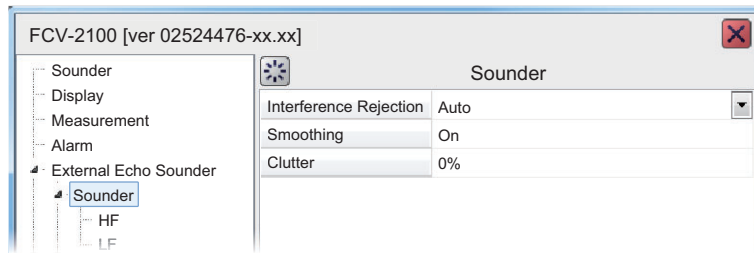
**Note 1:** The [External Fish Finder] section of the [Advanced Settings] menu is available only when an external fish finder is connected correctly.

**Note 2:** Where [External Fish Finder Window] is set to [On] at installation, you can access external fish finder setting from a sub monitor by right-clicking a non-interactive section of the screen. (See section 4.8.)

## 4. ADVANCED SETTINGS

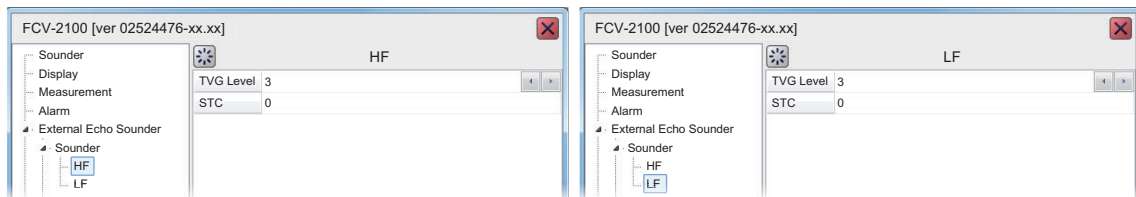
### 4.6.1 Sounder menu

You can adjust several echo display settings for the external sounder from the [Sounder] section of the [External Fish Finder] menu. To adjust settings for the FCV-2100, see section 4.2.



Menu item	Description
[Interference]	Reject interference from other equipment. See section 1.9.
[Smoothing]	Smooth echo presentation when enabled. Turn smoothing on when echoes appear “spotty” or “jagged”. See section 1.10.
[Clutter]	Low intensity “speckles” caused by sediments in the water or noise, may appear over most of screen. These speckles can be suppressed by adjusting the [Clutter]. See section 1.11.

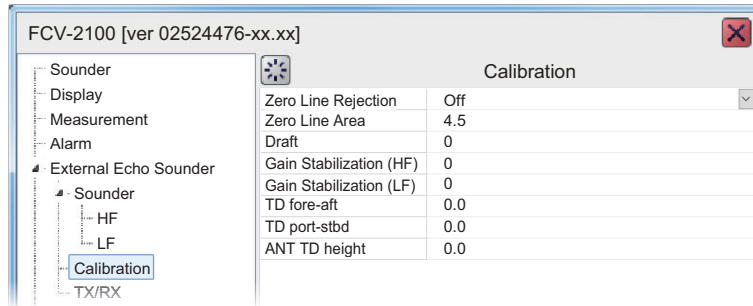
#### HF/LF (high/low frequency) settings



Menu item	Description
[TVG Level]	Adjusts the TVG (Time Varied Gain) level. See section 1.26.
[STC]	Sensitivity Time Control. Remove unwanted echoes near the surface. Use this function when you want to see fish near the surface clearly. Set the STC value according to your requirement. A setting of [0] disables the STC. <b>Note:</b> A high STC setting can erase fish echoes. It is recommended to watch your display when adjusting the STC.

## 4.6.2 Calibration menu

The external fish finder settings can be calibrated from the [Calibration] section of the [External Fish Finder] menu. To calibrate settings for the FCV-2100, see section 4.7.5.

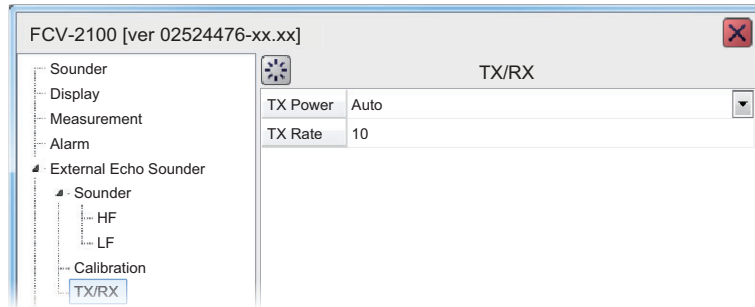


Menu item	Description
[Zero Line Rejector]	Turn the zero line (transmission line) on or off. When turned [On], the transmission line disappears, which allows you to see fish echoes near the surface clearly. The width of the transmission line changes with transducer used and installation characteristics.
[Zero Line Area]	Adjusts the transmission line so that the transmission line disappears when the [Zero Line Rejector] is turned on. For a long tail, increase the value. If the transmission line does not disappear, lower the TX power.
[Draft]	Sets the draft, allowing for the display of depth from the surface.
[Gain Stabilization (HF/LF)]	Stabilize the gain, allowing for a clear picture when the gain is set at a very low/high setting. This function is also helpful in that it balances the gain between HF and LF images.
[TD fore-aft]	Sets the fore-aft position of the external Fish Finder's transducer. This setting is done at installation, do not change this setting.
[TD port-stbd]	Sets the port-stbd position of the external Fish Finder's transducer. This setting is done at installation, do not change this setting.
[ANT TD height]	Sets the height of the SATELLITE COMPASS™ antenna. This setting is done at installation, do not change this setting.

#### 4. ADVANCED SETTINGS

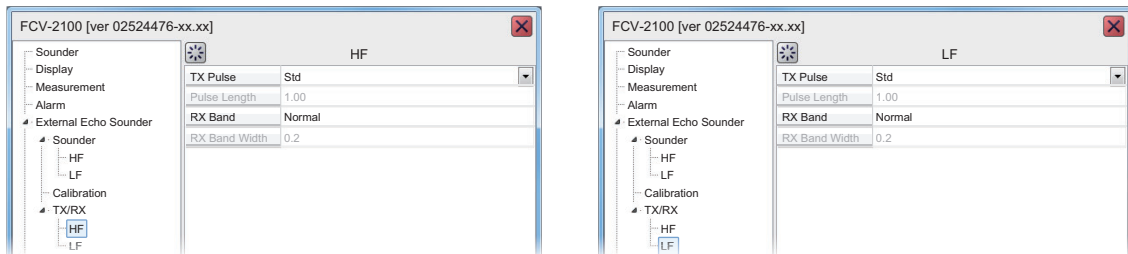
### 4.6.3 TX/RX menu

Settings for the external fish finder's transmission can be adjusted from the [TX/RX] section of the [External Fish Finder] → [Sounder] menu.



Menu item	Description
[TX Power]	<p>When using more than one fish finder with the same frequency, in close proximity, interference can occur. To reduce the interference, you can reduce the transmission power by lowering this setting. To disable this fish finder, set this setting to [Off].</p> <p>Depending on the connected fish finder, the settings options are as follows:  <b>DFF3:</b> [Off], [1] to [10]  <b>DFF1-UHD:</b> [Auto]*, [Off], [MIN] (Minimum), [MAX] (Maximum)                      *: Select [Auto] to automatically adjust the transmission power, which produces higher quality seabed echoes.</p>
[TX Rate]	<p>Changes the rate at which the fish finder transmits a pulse. Adjust this setting to erase false seabed echoes which may appear between the surface and the actual seabed.</p>

#### HF/LF settings for the external fish finder



**Note:** This section of the menu is available only when DFF3 sounder is connected to the FCV-2100.

Menu item	Description
[TX Pulse]	<p>Pulse width changes according to range and shift values. However, when long range detection or better resolution is your objective, you can manually adjust the pulse width. the available settings are:</p> <ul style="list-style-type: none"> <li>• [1/4]: Higher resolution, however range is lower than the [1/2] setting.</li> <li>• [1/2]: High resolution, however range is lower then the [Std] setting.</li> <li>• [Std]: Standard (default) setting. Range and resolution are balanced.</li> <li>• [×2]: Higher range than [Std], however resolution is lower.</li> <li>• [Manual]: Adjust the pulse width manually.</li> </ul>

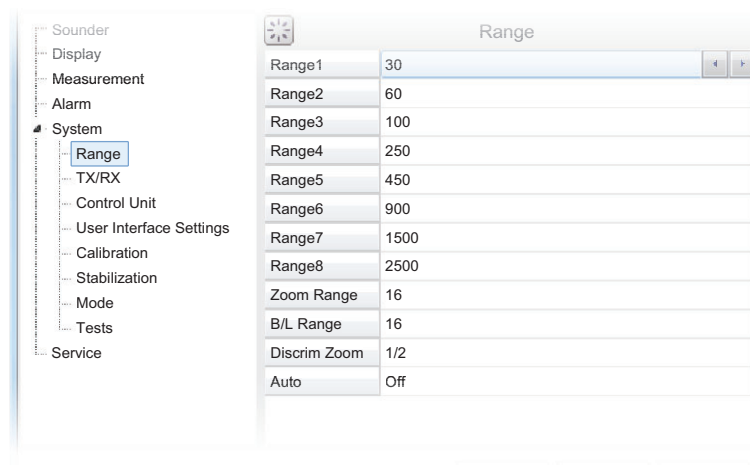
Menu item	Description
[Pulse Length]	Available only when [TX Pulse] is set to [Manual]. A low setting gives a higher resolution, however the range is lowered. A high setting give a longer range, however the resolution is lowered.
[RX Band]	Rx bandwidth is automatically set according to [TX Pulse] → [Pulse Length]. The [Normal] setting provides good performance. If noise is a problem switch to [Narrow]. For better resolution, select [Wide]. [Manual] enables manual setting of Rx band width, at [RX Band Width].
[RX Band Width]	Operative when [Manual] is selected at [RX Band]. A small value decreases the noise. On the other hand, a large value gives better resolution.

## 4.7 System Menu

The [System] menu contains settings which do not require regular adjustment.

### 4.7.1 Range menu

The Range section of the [System] menu contains range-related settings.

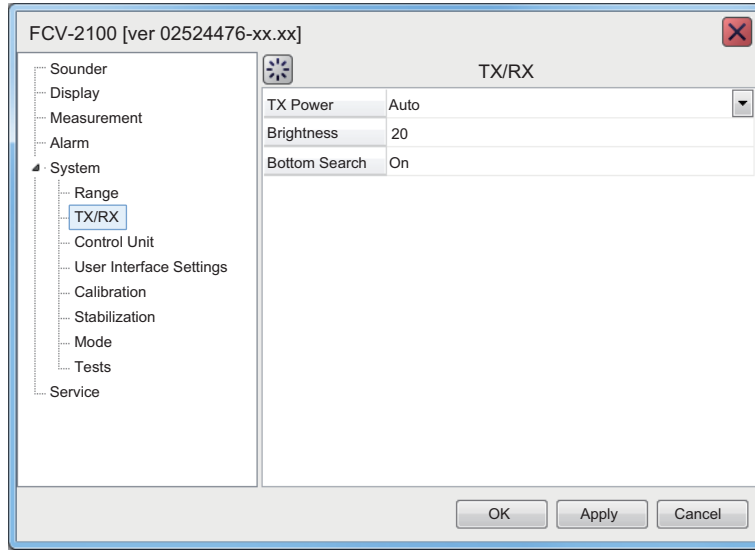


Menu item	Description
[Range1] to [Range8]	Change the range setting for the preset ranges.
[Zoom Range]	Change the range at which zoomed items appear on the display.
[B/L Range]	Bottom line range. Change the range for bottom line and bottom discrimination.
[Discrim Zoom]	Set the room ratio for the Discrimination Zoom function. See section 1.12.4.
[Auto]	Select [Auto Range] or [Auto Shift] to enable the respective functions. Select [Off] to disable both [Auto Range] and [Auto Shift]. <b>Note 1:</b> Both the [Auto Range] and [Auto Shift] can only be selected individually. <b>Note 2:</b> While [Auto Range] is active, the range indication on the header shows "AT" and the shift indication shows "N/A". Neither range nor shift can be operated manually. <b>Note 3:</b> While [Auto Shift] is active, the shift indication on the header shows "AT". Shift cannot be operated manually. Range can be adjusted.

## 4. ADVANCED SETTINGS

### 4.7.2 TX/RX menu

Settings for the FCV-2100 sounder can be changed from this menu. For external sounders, see section 4.6.3.



Menu item	Description
[TX Power]	When using more than one fish finder with the same frequency, in close proximity, interference can occur. To reduce the interference, you can reduce the transmission power by lowering this setting. To disable this fish finder, set this setting to [Off]. To display the seabed as best as possible, set the power level to [Auto].
[TX Rate]	Changes the rate at which the fish finder transmits a pulse. Adjust this setting to erase false seabed echoes which may appear between the surface and the actual seabed.
[Bottom Search]	Show/hide the seabed. Set this to [Off] when the seabed is not visible on-screen with the current range setting. For example, the seabed is at 200 m, the on-screen range is set to 100 m.

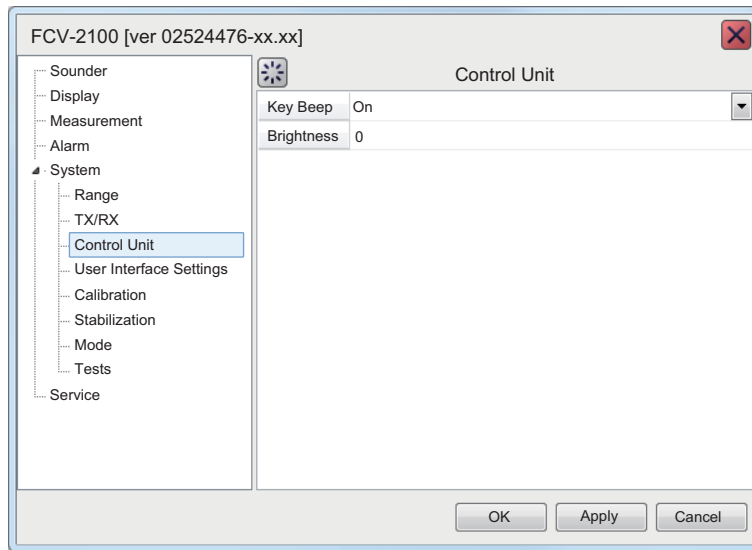
**Note:** Where [Bottom Search] is set to Off, the depth indication appears as "-.-" regardless of whether the seabed is displayed or not. The following features are also affected and may not function correctly:

- Bottom Alarm
- Bottom Zoom
- Bottom Discrimination
- Auto Shift
- Hardness Graph
- Measurement Range
- Bottom Fish Alarm
- Bottom Lock
- Auto Range
- Fish Size Graph (Bottom Trace)
- White Edge



### 4.7.3 Control unit menu

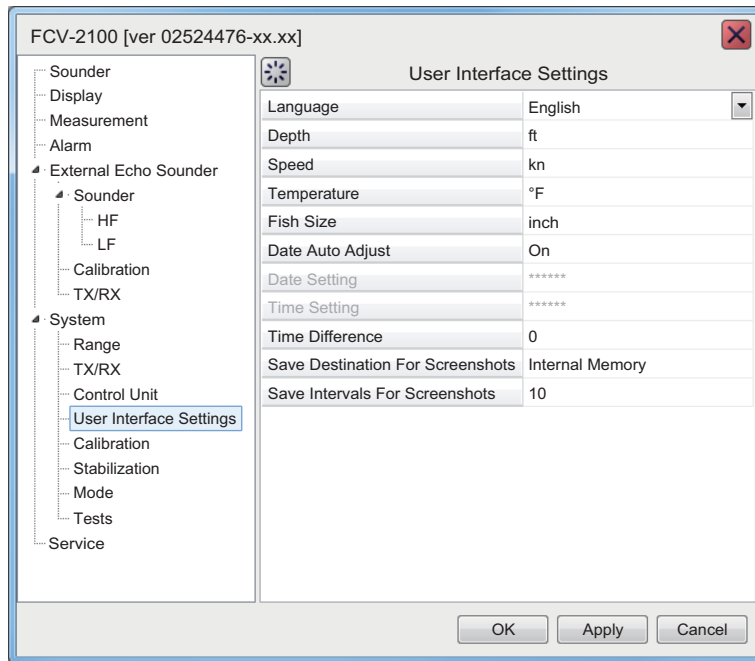
You can adjust Trackball Control Unit settings from the [Control Unit] section of the [System] menu.



Menu item	Description
[Key Beep]	Set to [On] or [Off] to enable or disable the key beeps.
[Brightness]	Adjust the brightness for the Trackball's power LED and the key back-light. Set to [0] to turn the Trackball Control Unit lights off.

### 4.7.4 User Interface Settings menu

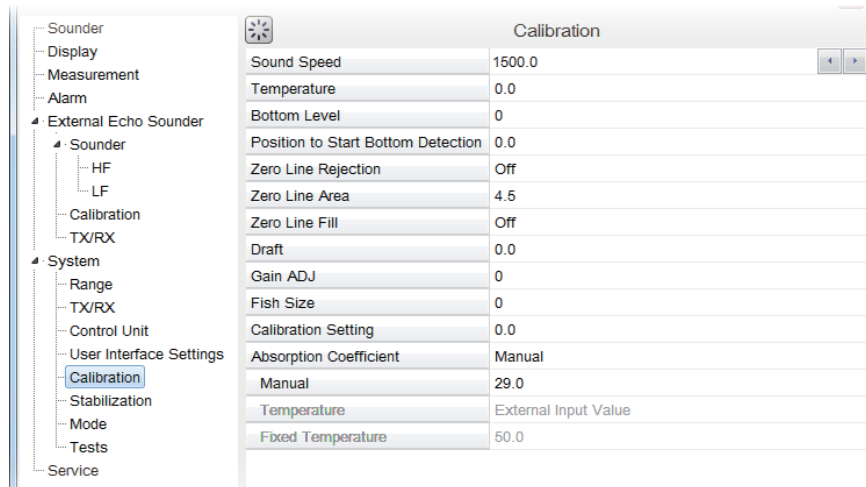
You can change the units used for measurement, adjust the time difference, change the displayed language, and change other settings from the [Setting] section of the [System] menu.



Menu item	Description
[Language]	Select the language to display the menus and on-screen indications in.
[Depth]	Select the unit of measurement for depth.
[Speed]	Select the unit of measurement for speed.
[Temperature]	Select the unit of measurement for temperature.
[Fish Size]	Select the unit of measurement for fish size.
[Date Auto Adjust]	To automatically adjust the date and time based on the data from a connected navigational aid, set this setting to [On]. Select [Off] to manually adjust date and time.
[Date Setting]	Select the detail icon (⋮) to show the date adjustment pop up window. Adjust the date as required, then select [OK] to apply the changes. Select [Cancel] to cancel the changes.
[Time Setting]	Select the detail icon (⋮) to show the time adjustment pop up window. Adjust the time as required, then select [OK] to apply the changes. Select [Cancel] to cancel the changes.
[Time Difference]	Apply an offset, in hours and minutes, to UTC time.
[Save Destination For Screenshots]	Select the save destination for screenshots (still images). See section 3.1.1.
[Save Intervals For Screenshots]	Select the interval timing for taking repeated screenshots. section 3.1.3.

## 4.7.5 Calibration menu

You can calibrate (offset) the speed of sound, water temperature and other information from [Calibrate] section of the [System] menu.



Menu item	Description
[Sound Speed]	Adjust the sound velocity of the TX/RX signal if the depth indication is incorrect, often caused by water temperature or salinity.
[Temperature]	If the water temperature indication is wrong, you can correct it here. For example, if the actual temperature is 2°C higher than the temperature displayed on screen, set the offset to [+2°C].
[Bottom Level]	In the default bottom level setting [0], the equipment judges consecutive strong echoes to be bottom echoes. If, in that setting, the depth indication is unstable, adjust the bottom level. If vertical lines extend upward from the bottom echo in the bottom lock display, lower the bottom level to erase the vertical lines. If the level is too low, however, it may be difficult to distinguish bottom fish from the bottom echo.
[Position to Start Bottom Detection]	Set the depth threshold at which the seabed is detected.
[Zero Line Rejector]	Turn the zero line (transmission line) on or off. When turned on, the transmission line disappears, which allows you to see fish echoes near the surface clearly. The length of the transmission line changes with transducer used and installation characteristics.
[Zero Line Area]	This function adjusts the transmission line so that the transmission line disappears when the menu item [Zero Line Rejection] is turned on. For a long tail, increase the value. If the transmission line does not disappear, lower the TX power.
[Zero Line Fill]	Turn off to see fish echoes within 1 m from the surface.
[Draft]	The default depth display shows the distance from the transducer. If you would rather show the distance from the sea surface, set your ship's draft. The draft line for HF and LF can be set respectively.
[Gain ADJ]	If the gain is too high or too low, or the gain for the low and high frequencies appears unbalanced, you can compensate it here.
[Fish Size]	Compensate for incorrect fish size indications. A positive value increases compensation, a negative value decreases compensation. Typical settings (In percentage) and resulting compensation are shown below. +300: x4, +200: x3, +100: x2, +50: x1.5 -50: 1/2, -65: 1/3, -75: 1/4, -90: 1/5

#### 4. ADVANCED SETTINGS

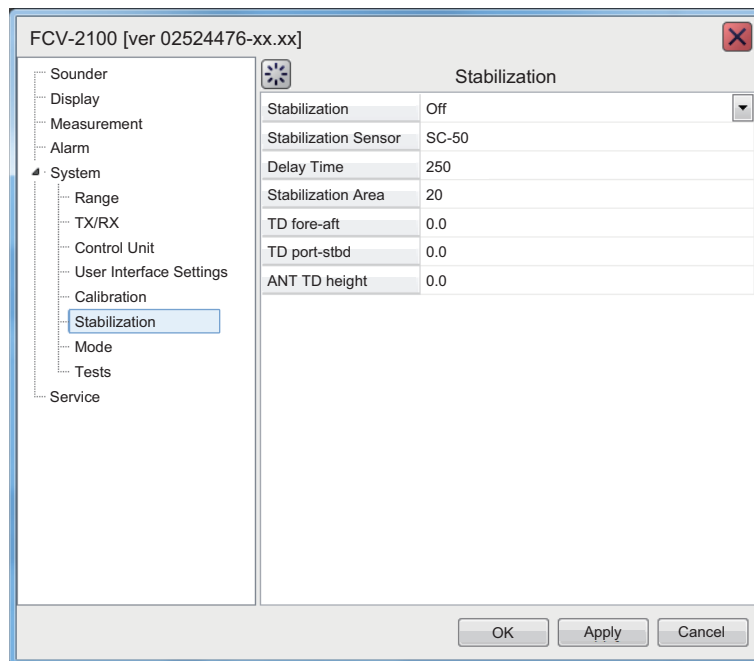
Menu item	Description
[Calibration Setting]	Set the target strength (echo strength for individual fish). If a calibration sphere was used, its value is shown. This value may be fine tuned. For further details, see section 2.2.8. The larger the calibration figure the longer the length of the individual fish, even if the received signal is the same strength.
[Absorption Coefficient], [Manual], [Temperature], [Fixed Temperature]	These items are for use by the service technician. See the installation manual.


### 4.7.6 Stabilization menu

You can adjust for heave in the [Stabilization] section of the [System] menu.

**Note 1:** This function require connection to a SATELLITE COMPASS™ and becomes inactive if data from the SATELLITE COMPASS™ is interrupted or lost.

**Note 2:** This function is unavailable if [TX Triggering] is set to [On] at installation.



Menu item	Description
[Stabilization]	Turn heaving compensation on or off. Turn it on when seas are rough, to get stable echoes, regardless of sea conditions. When turned on, the stabilization icon (  ) appears in the [Picture Advance] section of the header. <b>Note:</b> Where data from the SATELLITE COMPASS™ is interrupted or lost, the stabilization icon is overlaid with a cross to indicate that it is not in use. When data from the SATELLITE COMPASS™ is received again, the cross is removed.
[Stabilization Sensor]	Set at installation. Indicates the SATELLITE COMPASS™ connected to the FCV-2100. Do not change this setting.
[Delay Time]	Set at installation. Available only when [Stabilization Sensor] is set to [Manual]. Do not change this setting.

Menu item	Description
[Stabilization Area]	When heaving exceeds the value set here, stabilization is stopped and the stabilization icon at the top of the screen is displayed with an "X", indicating it has stopped. However, the setting for [Stabilization] is kept [On]. When heaving is once again less than the value set here, stabilization is restarted and the "X" disappears.
[TD fore-aft]	Set at installation. Indicates the location and height of the SATELLITE COMPASS™ antenna. Do not change these settings.
[TD port-stbd]	
[ANT TD height]	

### 4.7.7 Mode menu

You can "split" the display screen from the [Mode] section of the [System] menu. This allows you to display different information across two or more sections of the display.

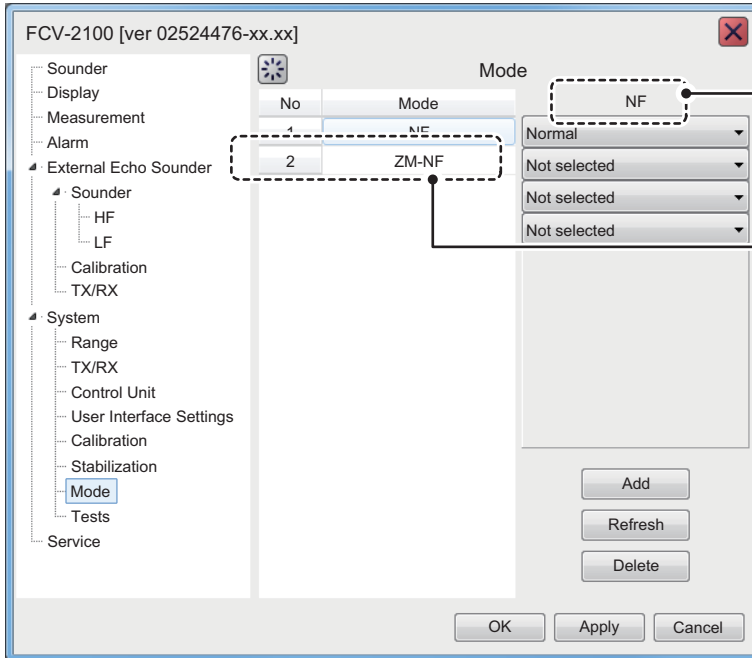
For details on split screen modes, see "SCREEN LAYOUTS" on page AP-5.

## 4. ADVANCED SETTINGS

### How to add a mode

You can add up to 8 modes. To add a mode, do the following:

1. Select the appropriate contents drop-down from the right-side of the menu. The contents are listed in line with their respective modes, as indicated in the figure above.



Items selected for the current display mode are abbreviated and shown in these two locations.

You can select up to four items to be displayed for each mode.

Menu item	Description
[Not selected]	No split screen is displayed. If the second item is set to [Not selected], the third and fourth items show no options.
[Zoom]	Displayed as "ZM" in the mode list. Adds the zoomed area to the split screen.
[High Frequency (External)]*	Displayed as "HE" in the mode list. Adds the external sounder's high frequency images to the split screen.
[Low Frequency (External)]*	Displayed as "LE" in the mode list. Adds the external sounder's low frequency images to the split screen.

\*: These menu items are displayed only when [External Fish Finder Window] is set to [Off] at installation.

2. Select the [Add] button, near the bottom-right of the menu. The new mode is added to the mode list.
3. Select [Apply] to apply the changes and delete or edit a different mode. Select [OK] to apply the changes and close the menu. Select [Cancel] to cancel any changes made and close the menu.

### How to edit a mode

You can edit the contents of a display mode at any time. To edit a mode, do the following:

1. With the [Mode] menu displayed, select the display mode you wish to edit, from the mode list.

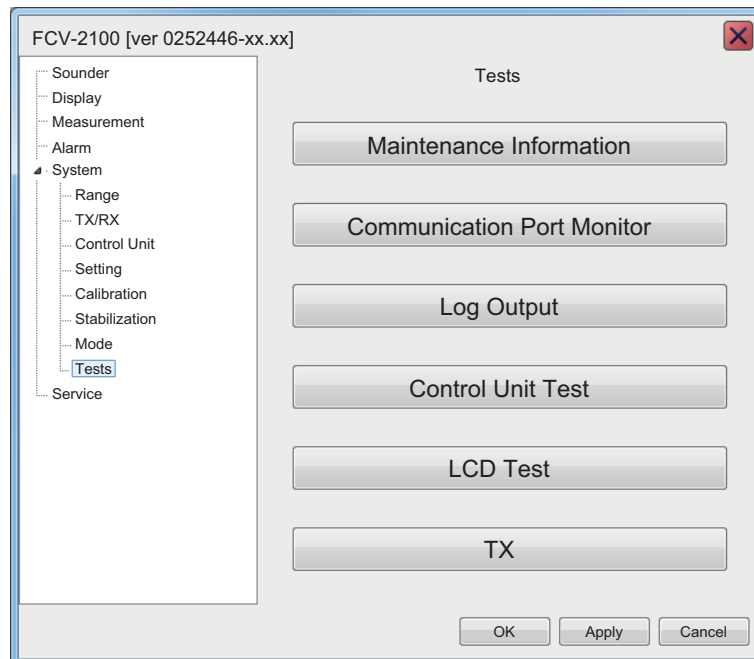
2. At the right-side of the menu window, select the contents you wish to change. A drop-down list of options appears.
3. Select the appropriate item, referring to the table in “How to add a mode” on the previous page.
4. Select [Apply] to apply the changes and edit a different mode. Select [OK] to apply the changes and close the menu. Select [Cancel] to cancel any changes made and close the menu.

### **How to delete a mode**

1. With the [Mode] menu displayed, select the display mode you wish to delete, from the mode list.
2. At the bottom-right of the window, select [Delete].
3. Select [Apply] to apply the changes and delete or edit a different mode. Select [OK] to apply the changes and close the menu. Select [Cancel] to cancel any changes made and close the menu.

## **4.7.8 Tests menu**

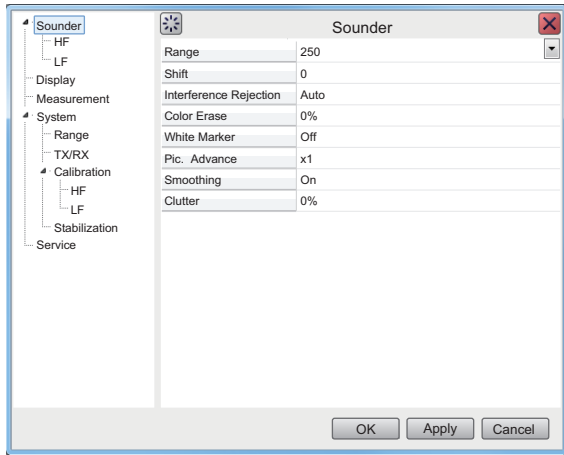
Maintenance information, diagnostic tests and other tools are found in the [Tests] section of the [System] menu.



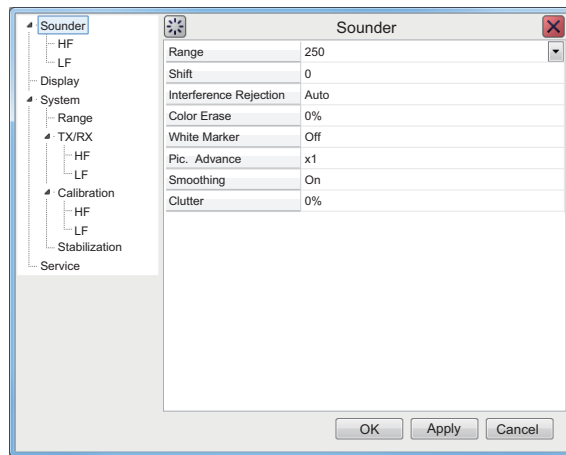
For details on this menu, see section 5.7.

## 4.8 External Fish Finder Window

For configurations where [External Fish Finder Window] is set to [On] at installation, the external fish finder's settings can be adjusted from the sub display. To access the external fish finder settings, right-click a non-interactive section of the screen.



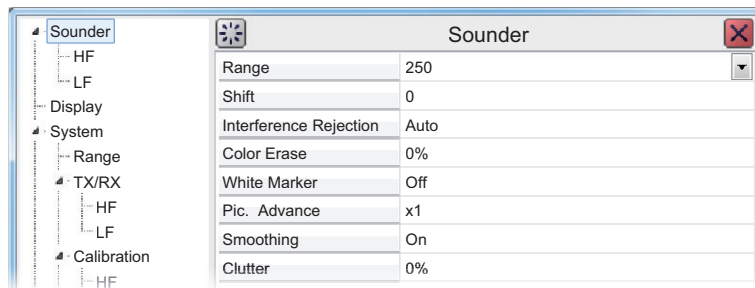
DFF1-UHD settings menu



DFF3 settings menu

### 4.8.1 Sounder menu

Settings for external sounders (DFF3 and DFF1-UHD) can be found in the [Sounder] section of the [External Fish Finder] menu.



Menu item	Description
[Range]	Change the range setting for the preset ranges. See section 1.8.
[Shift]	Shift the displayed echo are up or down. See section 1.7.
[Interference]	Reject interference from other equipment. See section 1.9.
[Color Erase]	Erase unwanted noise. See section 1.25.
[White Marker]	Displays selected echoes in white color. Select the detail icon (⋮) to show the color selection pop up window. Select the echo color to be displayed as white, then select [OK]. To cancel all changes, select [Cancel].
[Pic. Advance]	Set the [Picture Advance] speed. See section 1.5.
[Smoothing]	Smooth echo presentation when enabled. Turn smoothing on when echoes appear “spotty” or “jagged”. See section 1.10.
[Clutter]	Remove unwanted echoes (sediment, etc.). See section 1.11.



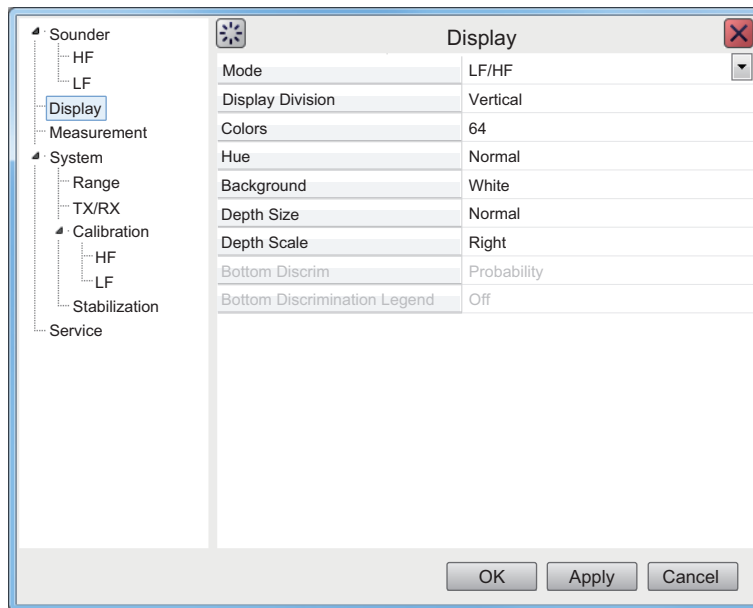
### HF/LF (High Frequency/Low Frequency) settings



Menu item	Description
[Gain]	Adjust the gain level. See section 1.6.
[TVG Level]	Time Varied Gain. Adjusts the TVG level. See section 1.26.
[STC]	Sensitivity Time Control. Remove unwanted echoes near the surface. Use this function when you want to see fish near the surface clearly. Set the STC value according to your requirement. A setting of [0] disables the STC. <b>Note:</b> A high STC setting can erase fish echoes. It is recommended to watch your display when adjusting the STC.

#### 4.8.2 Display menu

You can adjust the display settings for the external fish finder from the [Display] section of the [External Fish Finder] menu.



Menu item	Description
[Mode]	Select the display mode for the external fish finder. <ul style="list-style-type: none"> <li>• [HF/HF]: High and Low frequency.</li> <li>• [HF]: High frequency only.</li> <li>• [LF]: Low frequency only.</li> </ul>
[Display Division]	Select the method in which the display is divided. This option is only available when [Mode] is set to [HF/LF]. <ul style="list-style-type: none"> <li>• [Horizontal]: The dividing line runs horizontally (left to right) and the display shows high frequency input at the top of the screen.</li> <li>• [Vertical]: The dividing line runs vertically (top to bottom) and the display shows high frequency input to the left of the screen.</li> </ul>

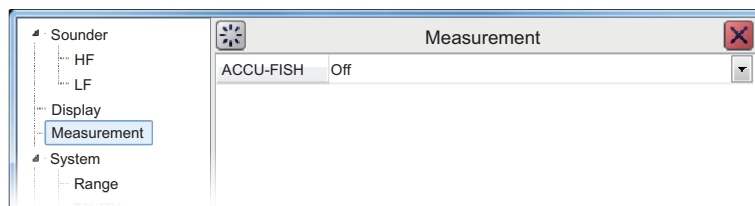
## 4. ADVANCED SETTINGS

Menu item	Description
[Colors]	Select the number of colors (16 or 64) available for the [Color Bar] and echo colors.
[Hue]	Select a hue to suit the ambient light. <ul style="list-style-type: none"><li>• [Normal]: Use the default hue settings.</li><li>• [Hue1] to [Hue6]: Use the custom hue settings for the respective selection.</li></ul>
[Background]	Select the background color for the display. Some indications will automatically change color according to the color selected here.
[Depth Size]	Select the size of the depth text indication.
[Depth Scale]	Select the location at which the depth scale is displayed. <ul style="list-style-type: none"><li>• [Off]: Hide the depth scale.</li><li>• [Right]: Show the scale at the far right-hand side of the screen.</li><li>• [Center]: Show the scale at the center of the screen.</li></ul>
[Bottom Discrimination]	Select the method of bottom discrimination (see section 1.20.3). Available only when a DDF1-UHD with compatible transducer is connected.
[Bottom Discrimination Legend]	Show/hide the bottom discrimination legend (see section 1.20.3). Available on when [Bottom Discrimination] is enabled.

### 4.8.3 Measurement menu

The [Measurement] menu is available only when an ACCU-FISH™ compatible transducer is connected.

Use this menu to activate/deactivate the ACCU-FISH™ feature.



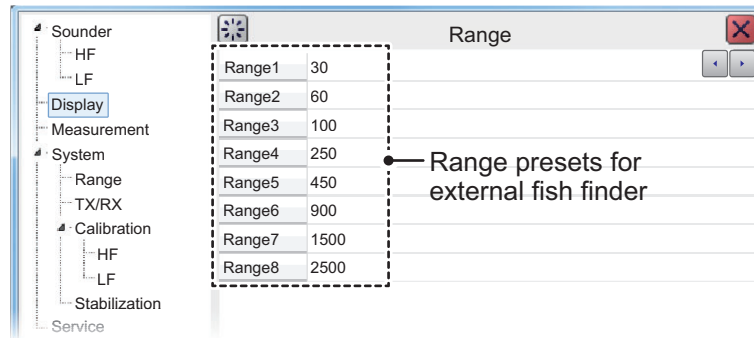
See section 1.20.2 for how to use this feature.

## 4.8.4 System menu

The [System] menu contains settings for items which do not require regular adjustment or change.

### Range menu

Change any of the eight available the preset ranges.



[Range 1] to [Range 8] can be adjusted to suit your preferences.

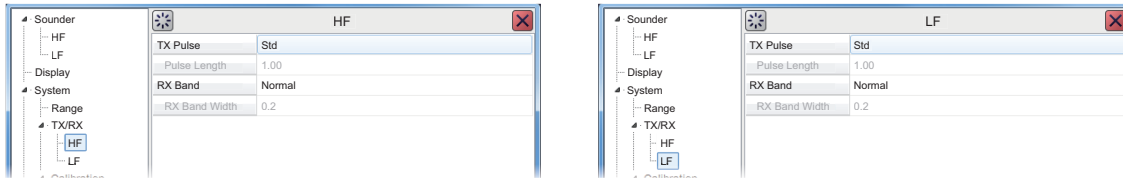
### TX/RX menu

The [TX/RX] menu contains settings for pulse transmission and receipt. Depending on your vessel's configuration, some menu items may not be available. See the lists below for more details.

Menu item	Description
[TX Power]	Adjusts the output power of the transducer. Where fish finders or other equipment causes interference, you can adjust the output power level to help reduce, or eliminate, the interference. You can also disable transmission completely by selecting the [Off] option. The setting options are different for DFF3 and DFF1-UHD: <b>DFF3:</b> [Off], [1] to [10] <b>DFF1-UHD:</b> [Auto]*, [Off], [MIN] (Minimum), [MAX] (Maximum) *: Select [Auto] to automatically adjust the transmission power, which produces higher quality seabed echoes.
[TX Rate]	Adjusts the transmission rate for the transducer. When in shallow waters second reflection echoes may appear between the surface and actual bottom echo. In this case, lower the TX rate level. Use a high rate for fast speed; a slow rate for slow speed.

#### 4. ADVANCED SETTINGS

### TX/RX menu (HF/LF settings)

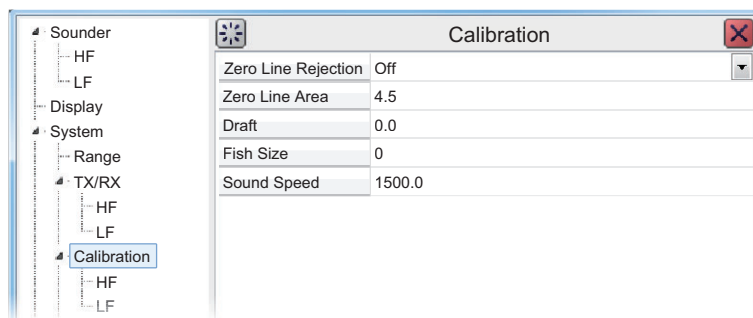


**Note:** These settings are only available when connected to a DFF3. See the table below for menu items and descriptions:

Menu item	Description
[TX Pulse]	Pulse width changes according to range and shift values. However, when long range detection or better resolution is your objective, you can manually adjust the pulse width. the available settings are: <ul style="list-style-type: none"> <li>• [1/4]: Higher resolution, however range is lower than the [1/2] setting.</li> <li>• [1/2]: High resolution, however range is lower than the [Std] setting.</li> <li>• [Std]: Standard (default) setting. Range and resolution are balanced.</li> <li>• [×2]: Higher range than [Std], however resolution is lower.</li> <li>• [Manual]: Adjust the pulse width manually.</li> </ul>
[Pulse Length]	Available only when [TX Pulse] is set to [Manual]. A low setting gives a higher resolution, however the range is lowered. A high setting give a longer range, however the resolution is lowered.
[RX Band]	Rx bandwidth is automatically set according to [TX Pulse] → [Pulse Length]. The [Normal] setting provides good performance. If noise is a problem switch to [Narrow]. For better resolution, select [Wide]. [Manual] enables manual setting of Rx band width, at [RX Band Width].
[RX Band Width]	Operative when [Manual] is selected at [RX Band]. A small value decreases the noise. On the other hand, a large value gives better resolution.

### Calibration menu

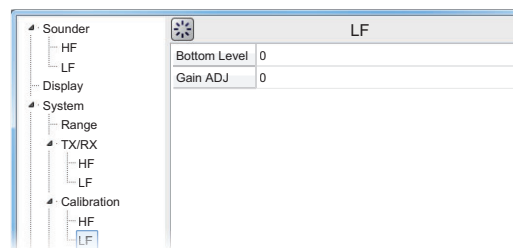
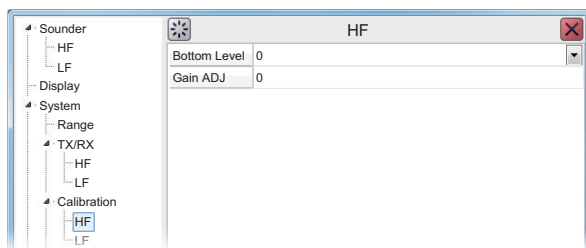
Use the Calibration menu to apply offsets for the external fish finder.



Menu item	Description
[Zero Line Rejection]	Turn the zero line (transmission line) on or off. When turned [On], the transmission line disappears, which allows you to see fish echoes near the surface clearly. The width of the transmission line changes with transducer used and installation characteristics.

Menu item	Description
[Zero Line Area]	Adjust the transmission line so that the transmission line disappears when the [Zero Line Rejector] is turned on. For a long tail, increase the value. If the transmission line does not disappear, lower the TX power.
[Draft]	The default depth display shows the distance from the transducer. If you would rather show the distance from the sea surface, set your ship's draft. The draft line for HF and LF can be set respectively.
[Fish Size]	Compensate for incorrect fish size indications. A positive value increases compensation, a negative value decreases compensation. For example [+50] increases the size indication by 1.5 times.
[Sound Speed]	Adjust the sound velocity of the TX/RX signal if the depth indication is incorrect, often caused by water temperature or salinity.

### **Calibration menu - HF/LF settings**

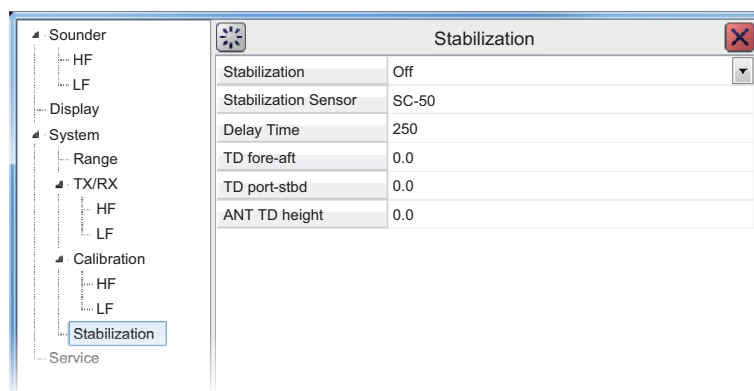


Menu item	Description
[Bottom Level]	In the default bottom level setting [0], the equipment judges consecutive strong echoes to be bottom echoes. If, in that setting, the depth indication is unstable, adjust the bottom level. If vertical lines extend upward from the bottom echo in the bottom lock display, lower the bottom level to erase the vertical lines. If the level is too low, however, it may be difficult to distinguish bottom fish from the bottom echo.
[Gain ADJ]	If the gain is too high or too low, or the gain for the low and high frequencies appears unbalanced, you can compensate it here.

#### 4. ADVANCED SETTINGS

##### **Stabilization menu**



You can adjust for heave on the external fish finder from the [Stabilization] menu. This function requires connection to a SATELLITE COMPASS™ and becomes inactive if data from the SATELLITE COMPASS™ is interrupted or lost.



Menu item	Description
[Stabilization]	Turn heaving compensation on or off. To get stable seabed echoes regardless of sea conditions, turn [Stabilization] on when seas are rough.
[Stabilization Sensor]	Set at installation. Indicates the SATELLITE COMPASS™ connected to the FCV-2100. Do not change this setting.
[Delay Time]	Set at installation. Available only when [Stabilization Sensor] is set to [Manual]. Do not change this setting.
[TD fore-aft], [TD port-stbd], [ANT TD height]	Set at installation. Indicates the location and height of the SATELLITE COMPASS™ antenna. Do not change these settings.

# 5. MAINTENANCE AND TROUBLESHOOTING

This chapter contains maintenance and troubleshooting procedures for the operator.

 <b>WARNING</b>	 <p><b>ELECTRICAL SHOCK HAZARD</b> Do not open the equipment.</p> <p>This equipment uses high voltage that can cause electrical shock. Only qualified persons can work inside the equipment.</p>	<b>NOTICE</b>
<p>Do not apply paint, anti-corrosive sealant or contact spray to plastic parts or equipment coating.</p> <p>Those items contain products that can damage plastic parts and equipment coating.</p>		

## 5.1 Maintenance

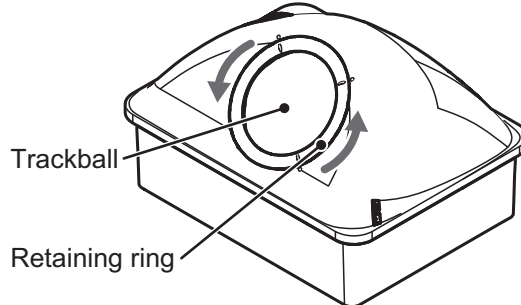
Regular maintenance is essential for good performance. Check the points shown in the table below.

Check Point	Action	Remedy, remarks
Cable	Check that all cabling is firmly connected and is not damaged.	<ul style="list-style-type: none"> <li>• Connect the cable if it has loosened.</li> <li>• Replace damaged cables.</li> </ul>
Connectors on units	Check for tight connection.	<ul style="list-style-type: none"> <li>• Reconnect as necessary.</li> </ul>
Ground on units	Check for tight connection and rust.	<ul style="list-style-type: none"> <li>• Fasten if loosened.</li> <li>• Remove rust if present.</li> </ul>
Dust	Remove the dust or dirt from the units with a soft, dry cloth.	<ul style="list-style-type: none"> <li>• Do not use chemical cleaners to clean the equipment because they can remove paint and markings.</li> </ul>
Transducer	Marine life on the transducer face will result in a gradual decrease in sensitivity. Check the transducer face for cleanliness each time the boat is dry-docked.	<ul style="list-style-type: none"> <li>• Carefully remove any marine life to prevent the damage to the transducer.</li> <li>• Do not paint the transducer.</li> <li>• Do not use chemical cleaners to clean the transducer.</li> </ul>

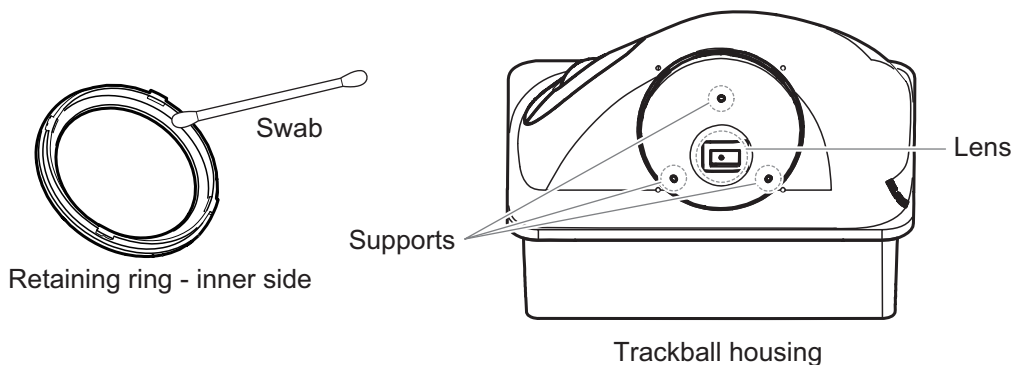
## 5.2 Trackball Maintenance

If the cursor moves abnormally, clean the trackball and inside the trackball housing (including the lens) as shown below:

1. Turn the retaining ring on the trackball module in the direction of the arrows (see figure below) to unlock it, then remove the retaining ring.



2. Use cellophane tape to remove the trackball from the trackball housing. Place the trackball and the retaining ring on a clean, soft cloth laid on a flat surface.
3. Clean the ball with a damp, soft cloth, then use a dry, lint-free cloth to carefully wipe the ball dry.
4. Use a swab, moistened with water, to carefully clean the inside of the retaining ring, the inside of the trackball housing, the supports and the lens. Change the swab regularly so that dirt and dust build-up is easily removed. Use a dry swab to wipe away moisture.



5. Re-set the ball and retaining ring. Be sure the retaining ring is not inserted reversely.

## 5.3 Fuse Replacement

The power cable for the Processor Unit and the Transceiver each have a fuse, to protect the units from overvoltage and internal faults.

**⚠ WARNING**


**⚠ Use the proper fuse.**  
Use of a wrong fuse can cause fire or damage the equipment.



Fuse location	Fuse type	Part code
Processor unit	FGBO-A 125V 5A PBF	000-155-853-10
Transceiver	FGBO-A 125V 3A PBF	000-155-850-10

If a fuse blows find the cause before replacing it. If it blows again after replacement, contact your dealer for advice.

## 5.4 Battery Replacement

 <b>CAUTION</b>
<p><b>Only use the specified battery. When replacing the battery, make sure the polarity is correct.</b></p> <p>Incorrect replacement of the battery can cause the battery to explode or damage the equipment.</p>

The processor unit contains a battery. When the battery voltage becomes low, the internal clock may display the time incorrectly. The table below shows the estimated life of a battery under normal, nominal operating conditions. To ensure your system is always functioning at its best, arrange a replacement battery through your local dealer.

Name	Type	Code	Estimated life
Lithium battery	CR2032H	-	Approx. 40,574 hours or 4.63 years

**Note:** Used batteries should be disposed of according to the applicable local standards and laws.

## 5.5 Troubleshooting

The table below provides basic troubleshooting procedures which the user may follow to restore normal operation. If you can not restore normal operation, do not check inside the unit. Contact your dealer to check the equipment.

Problem	Reason, remedy
Cannot turn on power.	<ul style="list-style-type: none"> <li>• The power cable is disconnected or damaged. Check the power cable. If damaged, replace it.</li> <li>• The cable connected to the Trackball Control Unit or the Transceiver is disconnected or damaged. Check the cable, and reconnect or replace it as necessary.</li> <li>• Check ship's mains.</li> <li>• Check the fuse on the processor unit and transceiver unit. If the fuse has blown, find the cause then replace it.</li> </ul>
There is no response when the Trackball Control Unit is operated.	<ul style="list-style-type: none"> <li>• The cable connected to the Trackball Control Unit is disconnected or damaged. Check the cable, and reconnect or replace it as necessary.</li> <li>• Reboot the system. If you do not get a response, the Trackball Control Unit may be damaged. Contact your dealer for instructions.</li> </ul>

## 5. MAINTENANCE AND TROUBLESHOOTING

Problem	Reason, remedy
No echo appears but fixed range scale appears.	<ul style="list-style-type: none"> <li>Picture advance is stopped. Referring to section 1.5, set [Pic. Advance] to other than [Stop].</li> <li>Transducer cable is disconnected or damaged. Check the cable, and reconnect or replace it as necessary.</li> </ul>
Echo appears but no zero line.	<ul style="list-style-type: none"> <li>The displayed area is shifted. Referring to section 1.7, set the shift to [0].</li> <li>The zero line rejection is turned on. Referring to section 4.7.5, turn it off.</li> <li>The setting of the draft line is improper. Referring to section 4.7.5, set the draft correctly.</li> </ul>
Sensitivity is low.	<ul style="list-style-type: none"> <li>Gain setting is too low. Referring to section 1.6, increase the gain.</li> <li>Marine life is adhering to transducer face. Clean the transducer face.</li> <li>Vessel is in heavily sedimented water.</li> <li>Bottom is too soft to return an echo.</li> </ul>
Extreme interference or noise.	<ul style="list-style-type: none"> <li>Transducer is located too close to the engine. Relocate the transducer.</li> <li>Ground wire has loosened or damaged. Check the wire, and reconnect or replace it as necessary.</li> <li>Same-frequency echo sounder is operating nearby.</li> </ul>
No depth indication.	<ul style="list-style-type: none"> <li>Bottom is off the screen. Referring to section 1.8, adjust the range setting.</li> <li>Depth indication is hidden. Referring to section 1.15, show the depth indication.</li> <li>[Bottom Level] setting is incorrect. Referring to section 4.7.5, adjust the setting.</li> <li>[Bottom Search] is set to [Off]. Referring to section 4.7.2, change the setting to [On].</li> </ul>
Speed and/or water temperature readout is unrealistic or not shown.	<ul style="list-style-type: none"> <li>The sensor cable is disconnected or damaged. Check the cable, and reconnect or replace it as necessary.</li> <li>The sensor is malfunctioning. Check the sensor.</li> </ul>
Position readout is unrealistic or not shown.	<ul style="list-style-type: none"> <li>The cable connected to the navigation equipment is disconnected or damaged. Check the cable, and reconnect or replace it as necessary.</li> <li>The navigation equipment is malfunctioning. Check the navigation equipment.</li> </ul>
On-screen display is not showing correctly after replacing the monitor.	A new monitor must be set up from the [Service] menu. Contact your local dealer.









### 5.6 Error Messages and Icons

When an error occurs, the system releases an audible alert and displays an error message and error icon. Select [OK] on the error message to silence the audible alert. The error icon is displayed until the cause of the error is rectified.

If an error occurs frequently, contact your local dealer for service.

**Note:** Error codes displayed in error messages change depending on the nature and cause of the error.



The table below shows the error messages with their icons, probable cause and remedy.

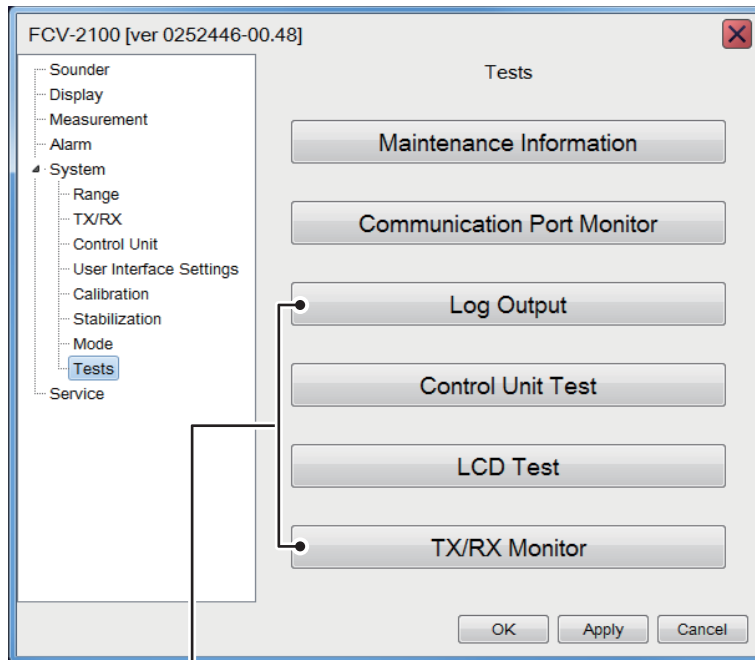
Error message	Icon	Possible cause/remedy
 <p><b>Control Unit Communication Error</b></p> <p>Error Code: C01/            Connection error between control unit and processor unit.            Check if the cable of control unit is firmly connected to the processor unit.            Contact your dealer if this error frequently occurs.</p> <p>OK</p>		<p>Communication error between the Trackball Control Unit and Processor Unit. Check the connection between the Trackball Control Unit and Processor Unit.</p>
 <p><b>Transceiver Unit System Error</b></p> <p>Error Code: T01/            Immediately turn off the power of transceiver unit and contact your dealer.</p> <p>OK</p>		<p>Communication error between the transceiver unit and processor unit. Check the connection between the transducer and processor unit.</p>
 <p><b>Processor Unit System Error</b></p> <p>Error Code: P03/            Immediately turn off the power of processor unit and contact your dealer.</p> <p>OK</p>		<p>Error in the processor unit.            Turn the equipment off, then contact your local dealer for service.</p>
 <p><b>External E/S communication Error</b></p> <p>Error Code: E01/            Connection error between the processor unit and the external fish finder.            Contact your dealer if this error frequently occurs.</p> <p>OK</p>		<ul style="list-style-type: none"> <li>• Communication error between the external fish finder and processor unit. Check the connection between the external fish finder and processor unit or the connection between the Ethernet HUB (HUB-101) and the external fish finder.</li> <li>• This error also appears if, when using a DFF3 fish finder, the FCV-2100 power is not turned on within approximately one minute of turning the power on for the DFF3. Connection can take up to seven minutes. When the connection is complete, this error disappears.</li> </ul>

## 5.7 Test Menu

You can run a diagnostic test, or view detailed information about your equipment, from the [Tests] menu.

To access the [Tests] menu, do the following:


1. Select the [Advanced Settings] icon (  ) from the InstantAccess bar™. The [Advanced Settings] menu appears.
2. Select the [Advanced Settings] icon (  ) from the [Advanced Settings] menu. The [Advanced Settings] window appears.
3. Select [Tests]. The [Tests] menu appears on the right-hand side of the window.




These items are for maintenance/service purposes and are not accessed normally.



5. MAINTENANCE AND TROUBLESHOOTING

No.	Item name	Description
1	Port tabs	Select a tab to show the corresponding port details in the display area. <ul style="list-style-type: none"> <li>• Serial Port 1/2(NMEA)*: Shows incoming NMEA data for port 1 or 2.</li> <li>• Serial Port 3(CIF)*: Shows incoming CIF data for port 3.</li> <li>• Network: Shows incoming NETWORK port data.</li> </ul> *: The bracket indication (NMEA/CIF) changes according to the setting for [Data Type].
2	[Refresh] button	Select to update the display area.
3	Display area	Shows the incoming data details for the selected port.
4	[Settings] button	Access the output settings window for the selected port. <b>Note:</b> This button is not available for the [Network] tab. <div style="text-align: center; margin: 10px 0;">  <p style="margin: 0 100px;">← for researchers →</p> </div> <ul style="list-style-type: none"> <li>• [Data Type]: Set the output sentence type                          [NMEA]: Output sentences in NMEA format.                          [CIF]: Output sentences in CIF format.</li> <li>• [NMEA Format]: Set the NMEA format to use for data output.  <b>Note:</b> [Echo] is a special setting for researchers. Do not use the setting if the objective is fishing. With [Echo] selected, echo data is output from the NMEA port (baud rate: 38400, 57600 or 115200 (bps), however data cannot be received from the GPS navigator. Available options are: [Ver1.5], [Ver2.0], [Ver3.0] or [Squid-Fishing]).</li> <li>• [Output Data]*: Where [TLL Output] is set to [FURUNO-TLL], select the information to output. More than one item can be selected from [Depth], [Temperature], [Hardness] or [Fish Size].  <b>Note:</b> [Fish Size] is only available where [Baud Rate] is set to [38400bps].</li> <li>• [TLL Output]*: Select which TLL data to output. The data will be output when a TLL line is inscribed.                          [Off]: No TLL data is output.                          [TLL]: Only latitude and longitude are output.                          [FURUNO-TLL]: Latitude, longitude and items selected at [Output Data] are output. (Requires connection to a FURUNO-TLL compatible device.)</li> <li>• [Baud Rate]*: Set the data transfer speed. Available options are listed below. Where [Data Type] is set to [NMEA] and [NMEA Format] is set to [Ver1.5], [Ver2.0] or [Ver3.0]: 600, 4800, 38400 (bps). Where [Data Type] is set to [CIF]: 600, 1200, 2400, 4800 (bps).</li> <li>• [Start Bit]: Shows the text size of the data to be output.</li> <li>• [Data Length]: Shows the length of the data to be output.</li> <li>• [Stop Bit]: Shows the stop bit size.</li> <li>• [Parity]: Shows the data parity.</li> </ul> *: Where [NMEA Format] is set to [Squid-Fishing], these options are fixed.

To close the [Communication Port Monitor], select the [Close Window] icon (  ) at the top-right corner of the window.

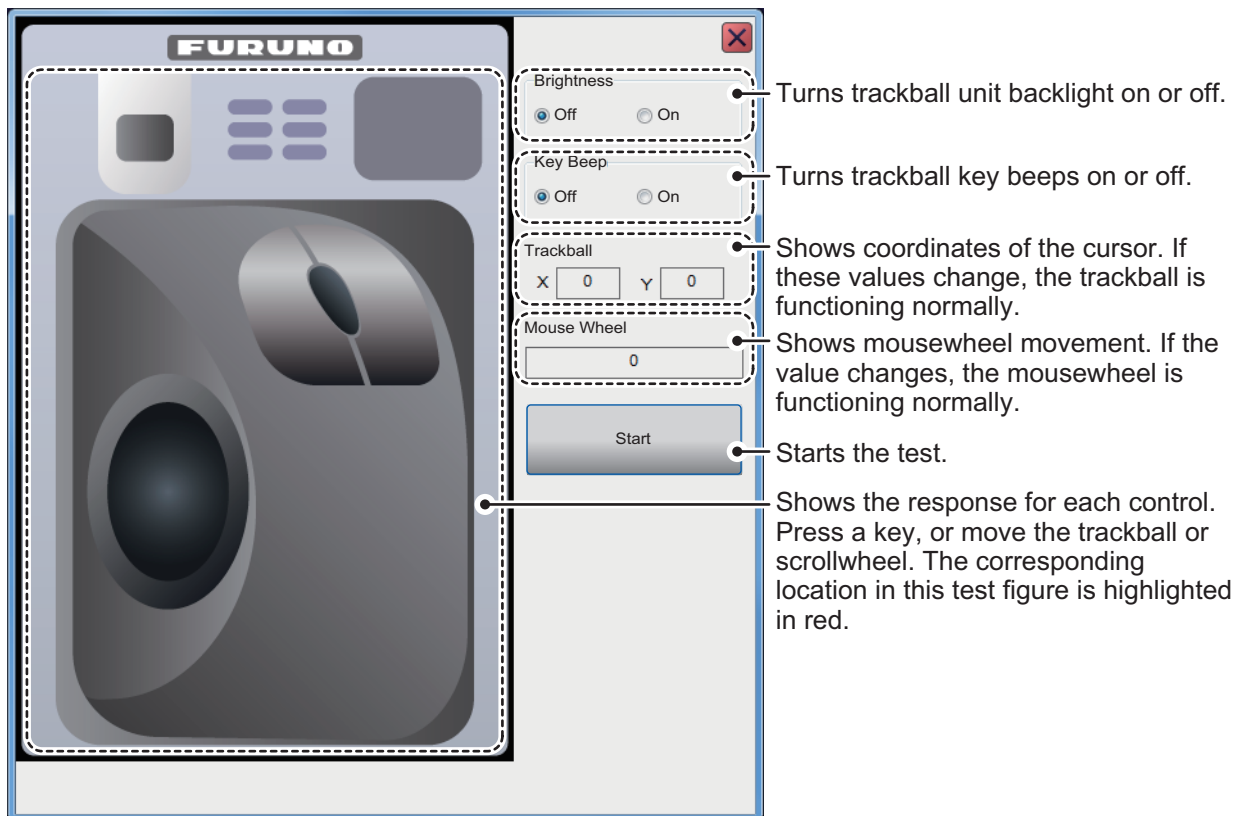
**Note 1:** When [CIF] is selected as the [Data Type], only [Baud Rate] can be changed. All other items are gray and not selectable. (See above figure for reference.)


**Note 2:** Latitude, longitude and water temperature output requires connection to the appropriate sensors.

### 5.7.3 How to test the control unit

You can test the buttons, scrollwheel and trackball at any time.

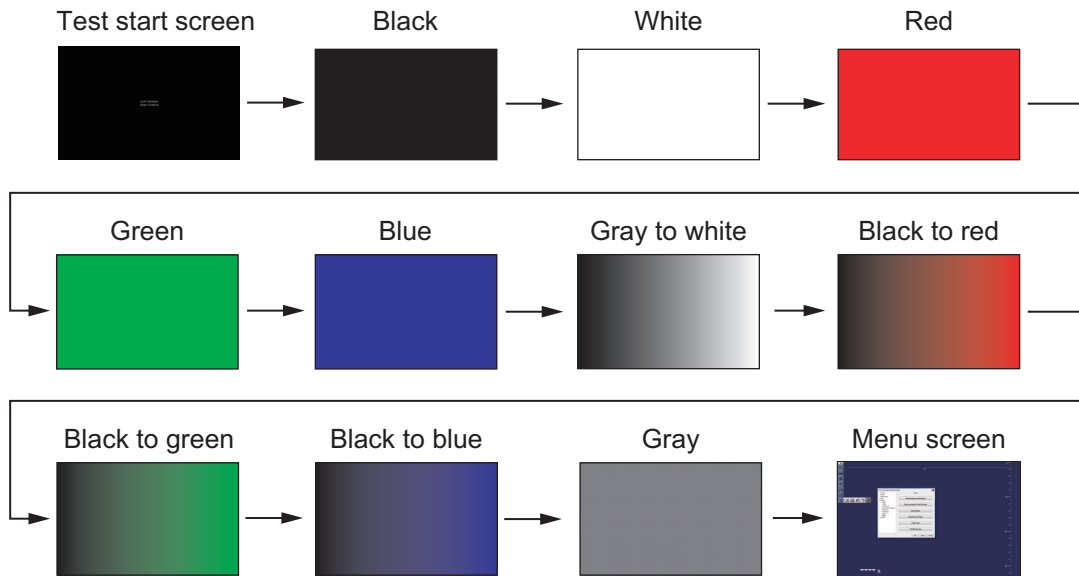
To test the Trackball Control Unit, select [Control Unit Test] from the [Tests] menu.



To close the [Control Unit Test], **right-click** three times, or select the [Close Window] icon (  ) at the top-right corner of the window.

### 5.7.4 LCD Test

The [LCD Test] tests if the LCD can display all available colors clearly. **Left-click** to change screens in the order shown below. To stop the test at anytime, **right-click**.





# APPENDIX 1 MENU TREE

## [Advanced Settings] menu



**Default settings shown  
in bold italic font.**

- Sounder
  - Color Erase (**0%**, to 50%)
  - White Edge (**Off**, 1 to 10)
  - White Marker (**Off**, Shows the settings window)
  - Clutter (**Std**, Linear)
  - TVG Level (0 to 9; **3**)
  - TVG Distance (100 to 2500 (ft); **300**)
  - STC (**0** to 10)
  - Bottom Zone Above (15% to 70%; **50%**)
  - Bottom Zone Below (30% to **85%**)
- Display
  - A-Scope (**Normal**, Peak)
  - Temp Graph (Narrow, **Normal**, Wide)
  - Temp Color (**Normal**, White, Red, Black, Yellow)
  - Zoom Marker (Off, **On**)
  - Colors (16, **64**)
  - Hue (**Normal**, Hue1 to Hue6, Custom)
  - Custom (Shows the settings window)
  - Background (White, Light Blue, Blue, **Dark Blue**, Black, Custom)
  - Custom (Shows the settings window)
  - Depth (**Normal**, Right)
  - Depth Size (**Normal**, Zoom)
  - Depth Scale (**Right**, Center)
  - Sonde Mark (**0**, **1**, **2**, **3**, **4**, **5**, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)
  - Sonde Mark Color (Shows the settings window)
  - Sonde Mark Width (**1** to 4)
  - Transparency (**Off**, 1 to 4)
- Measurement
  - Graph Display (Horizontal, **Vertical**)
  - Graph Scale End (16, 24, 32, **39**, 47, 63, 79 (in))
  - Distributed Scale Start (0% to 5%; **3%**)
  - Distributed Scale End (10% to 100%; **50%**)
  - Graph Peak (**1st**, 1st+2nd, 1st+2nd+3rd)
  - Emphasis Type (**Off**, Type1, Type 2, Type3)
  - Emphasis Rate (Weak, **Medium**, Strong)
  - Updating Cycle (**RT**, 1s, 2s, 3s)
  - Measurement Range (**Std**, Entire Range)
  - Measurement Threshold (2 to 8 (in); **3**)
  - Auto Specific Area (**Off**, Auto Depth, Auto Area)
  - Target Measurement Area (**FISH1**, FISH2, FISH3)
  - Updating Cycle (**High**, Medium, Low)
  - Auto Measurement Range Time Direction (Entire Area, 1/2, **1/3**)
- Alarm
  - Bottom Start Depth (**0** to 2500 (ft))
  - Bottom Depth Range (1 to 2500 (ft); **30**)
  - Fish Start Depth (**0** to 2500 (ft))
  - Fish Depth Range (1 to 2500 (ft); **30**)
  - Bottom Fish Start Depth (**0.0** to 600.0 (ft))
  - Bottom Fish Depth Range (**0.1** to 600.0 (ft))
  - Fish Level (Weak, **Medium**, Strong)
  - Temperature (**In range**, Out of range)
  - Temperature Alarm Trigger Temperature (20.0 to 110.0 (°F); **65.0**)
  - Water Temperature Range (0.1 to 55.0 (°F); **1.0**)
  - Fish Size Graph (g1 to g16; **unselected**)
  - Fish Graph Scale Threshold (5% to 50%; **30%**)
  - Combined Alarm (Bottom, Fish (Normal), Fish (B/L), Temperature, Fish Size Graph; **unselected**)



②

②

Service

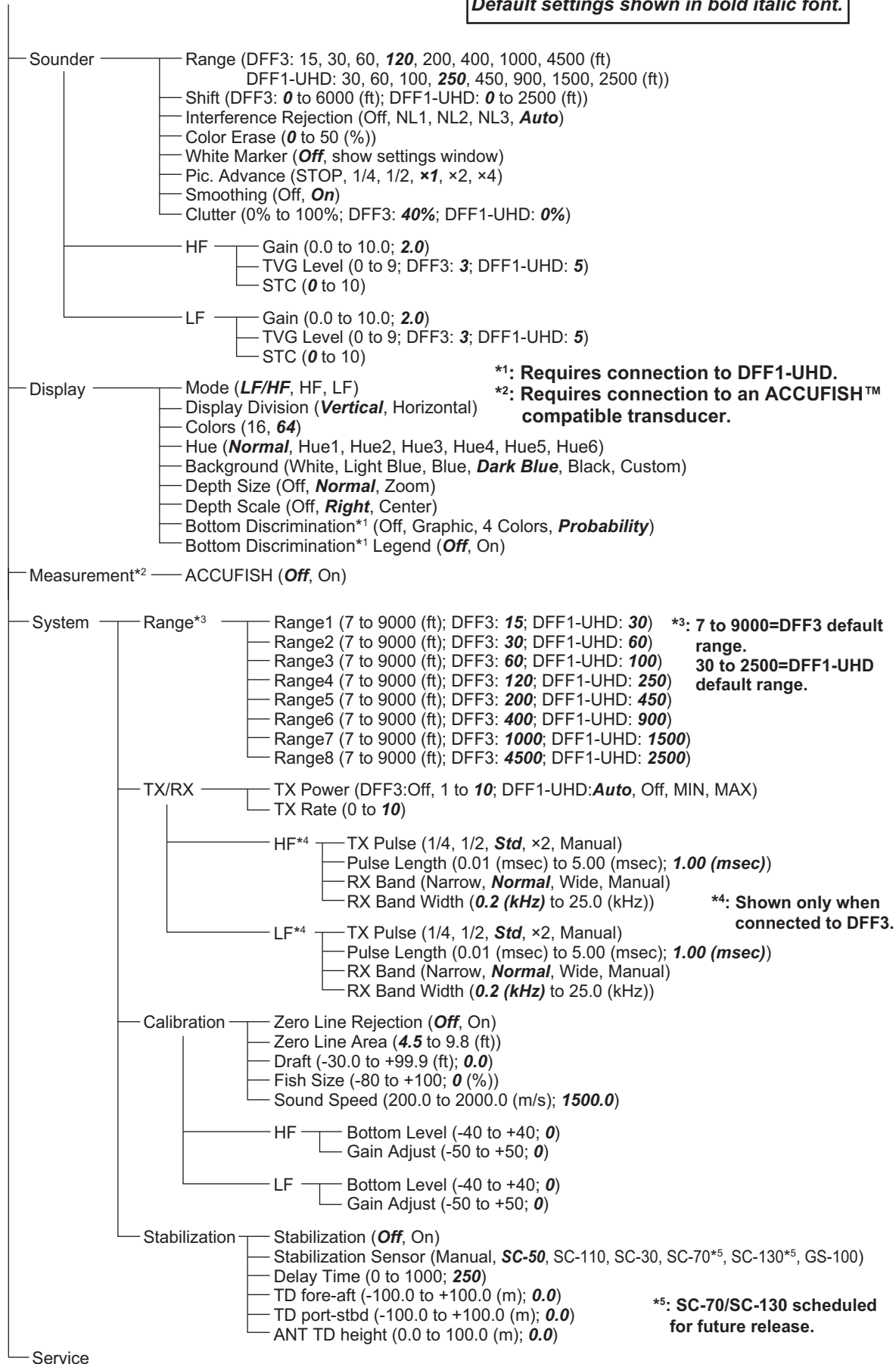
- Calibration —
  - Sound Speed (200.0 to 2000.0 (m/s); **1500.0**)
  - Temperature (-35.0 to +35.0 (°F); **0.0**)
  - Bottom Level (-40 to +40; **0**)
  - Position to Start Bottom Detection (**0.0** to 70.0 (ft))
  - Zero Line Rejection (**Off**, On)
  - Zero Line Area (**4.5** to 9.8 (ft))
  - Zero Line Fill (**Off**, On)
  - Draft (-30.0 to +99.9 (ft); **0**)
  - Gain ADJ (-50 to +50; **0**)
  - Fish Size (-80 to +300 (%); **0**)
  - Calibration Setting (Shows the settings window)
  - Absorption Coefficient (**Manual**, Auto)
  - Manual (0.0 to 60.0; **29.0** (dB))
  - Temperature (**External Input Value**, Fixed Temperature)
  - Fixed Temperature (32.0 to 122.0; **50.0** (°F))
  
- Stabilization —
  - Stabilization (**Off**, On)
  - Stabilization Sensor (Manual, **SC-50**, SC-110, SC-30, SC-70\*, SC-130\*, GS-100)
  - Delay Time (0 to 1000; **250**)
  - Stabilization Area (0 to **20**)
  - TD fore-aft (-100.0 to +100.0 (m); **0.0**)
  - TD port-stbd (-100.0 to +100.0 (m); **0.0**)
  - ANT TD height (0.0 to 100.0 (m); **0.0**)
  
- Mode — (Shows the Mode settings window)
  
- Tests —
  - Maintenance Information
  - Communication Port Monitor
  - Log Output
  - Control Unit Test
  - LCD Test
  - TX/RX Monitor

\*: SC-70/SC-130 scheduled for future release.

**External Fish Finder Menu**

Right-click the external fish finder display

**Default settings shown in bold italic font.**

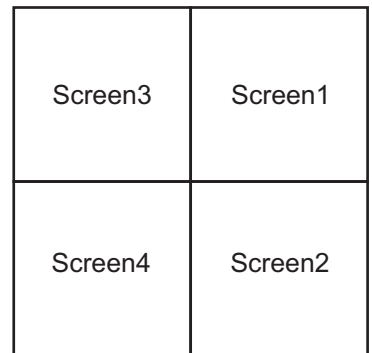
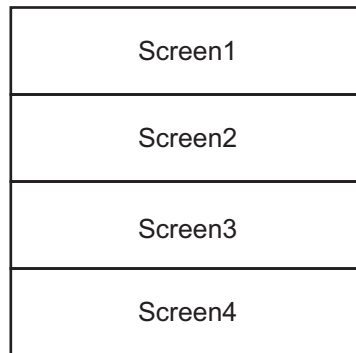
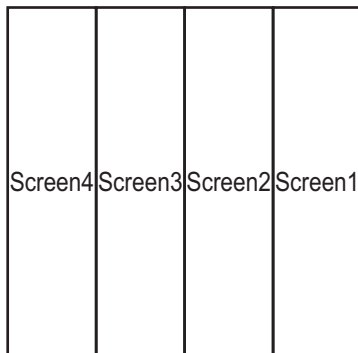
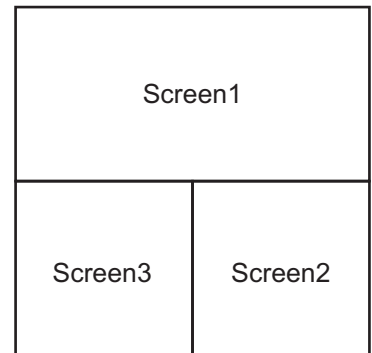
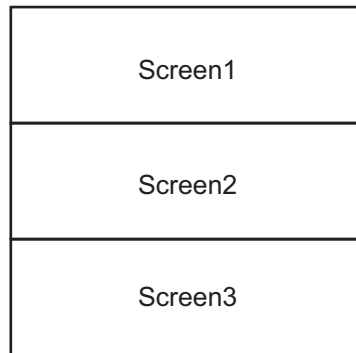
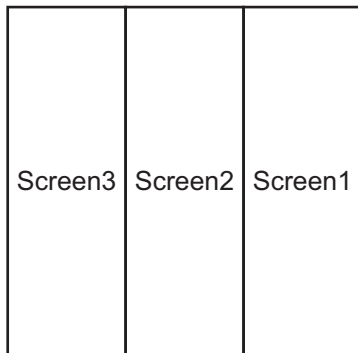
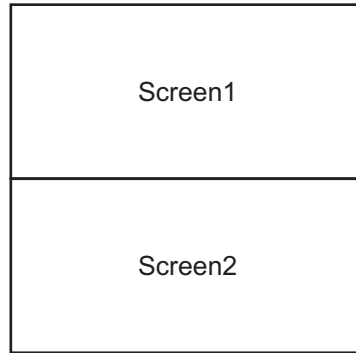
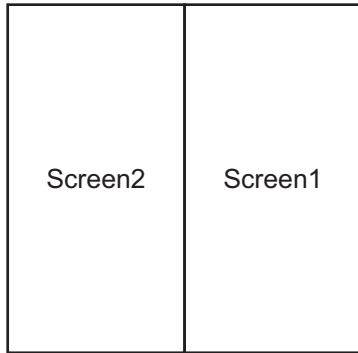


# APPENDIX 2 SCREEN LAYOUTS

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The following figures are examples of screen layouts, depending on your selected settings.

A-Scope not shown



Vertical division

Horizontal division

Mixed division

A-Scope Shown

Screen1 A-Scope	
Screen1	Screen2

Screen1 A-Scope	Screen2 A-Scope
Screen1	Screen2

Screen1 A-Scope		
Screen1	Screen2	Screen3

Screen1 A-Scope	Screen2 A-Scope	Screen3 A-Scope
Screen1	Screen2	Screen3

Screen1 A-Scope	Screen1	
Screen2 A-Scope	Screen2	Screen3

Screen1 A-Scope			
Screen1	Screen2	Screen3	Screen4

Screen1 A-Scope	Screen2 A-Scope	Screen3 A-Scope	Screen4 A-Scope
Screen1	Screen2	Screen3	Screen4

Screen1 A-Scope	Screen1	Screen3
Screen2 A-Scope	Screen2	Screen4

Vertical division

Horizontal division

Mixed division

**SPECIFICATIONS OF FISH FINDER  
FCV-2100**

**1 GENERAL**

- 1.1 Transmitting frequency 100 kHz nominal
- 1.2 Output power 1 kW, FM transmission
- 1.3 Transmitting rate 800 pulse/min or less
- 1.4 Pulselength 0.04 ms

**2 PROCESSOR UNIT**

- 2.1 Color indication 64 colors (16 colors setting available)
- 2.2 Hue 8 steps (Standard, Hue 1 to 6, customized)
- 2.3 Echo display mode Single mode, Zoom, External sounder display
- 2.4 Zoom display Bottom-lock expansion, Bottom zoom, Marker zoom, Discrimination zoom
- 2.5 Fish size measurement Histogram
- 2.6 Depth range 10 to 800 m
- 2.7 Range shift 800 m max.
- 2.8 Expansion range 5 to 200 m
- 2.9 Display advance speed 7 steps (Lines/TX: Freeze, 1/4, 1/2, 1/1, 2/1, 4/1, 8/1)
- 2.10 Data recording Echo pictures and raw data can be recorded (The raw data recording requires external memory)
- 2.11 Language English, French, Japanese, Norwegian, Spanish

**3 INTERFACE**

- 3.1 Number of port (processor unit ports, external KP control port: on the transceiver unit)
  - Main monitor 1 port, DVI-D, XGA (1024x768), SXGA (1280x1024) , Full-HD (1920x1080), UXGA (1600x1200) , WUXGA (1920x1200)
  - Sub monitor 2 ports, DVI: 1 ports, RGB: 1 port (Vertical sync:70Hz), XGA only
  - NMEA 3 ports, NMEA0183 V1.5/2.0/3.0
  - LAN 1 port, Ethernet, 100Base-TX, between processor unit and transceiver unit
  - USB 3 ports, USB2.0 (type-A)
  - CIF 1 port, Furuno format for Net sonde connection
  - External KP control 1 port
- 3.2 NMEA0183 data sentences
  - Input GGA, GLL, GNS, MTW, VHW, VTG, ZDA
  - Output DBT, DBS, DPT, TLL, MTW
- 3.3 Output proprietary sentences
  - PFEC SDafl, SDbtm, SDes1, SDes2, SDesd, SDflg, SDmrk, pidat

**4 POWER SUPPLY**

- 4.1 Transceiver unit 24 VDC: 1.6 A
- 4.2 Processor unit 24 VDC: 2.5 A
- 4.3 Rectifier (PR-62, option) 100/110/220/230 VAC, 1 phase, 50/60Hz

**5 ENVIRONMENTAL CONDITIONS**

## 5.1 Ambient temperature

Transceiver unit -15°C to +55°C (storage: -30°C to +70°C)

Processor/ Trackball control unit -15°C to +55°C

## 5.2 Relative humidity 95% or less at +40°C

## 5.3 Degree of protection

Processor/ Transceiver unit IP22

Trackball control unit IP22 (IPX0: USB cover opened)

## 5.4 Vibration IEC 60945 Ed.4

**6 UNIT COLOR**

## 6.1 Processor/ Trackball control unit / Transceiver unit

N2.5



# INDEX

## A

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  - measurement ..... 4-4
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## Declaration of Conformity



We **FURUNO ELECTRIC CO., LTD.**

(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan

(Address)

declare under our sole responsibility that the product

**FISH FINDER FCV-2100**

(Model name, type number)

to which this declaration relates conforms to the following standard(s) or other normative document(s)

**EU**  
EMC Directive 2014/30/EU

**UK**  
SI 2016 No.1091 EMC Regulations 2016 as amended

IEC 60945 Ed.4.0: 2002

EN 60945: 2002

For assessment, see

- Test report  
Labotech International Co., Ltd.  
LIC 12-15-148, 7 Jan 2016

For assessment, see

- Test report  
Labotech International Co., Ltd.  
LIC 12-15-148, 7 Jan 2016

(title and/or number and date of issue of the standard(s) or other normative document(s))

On behalf of Furuno Electric Co., Ltd.

Nishinomiya City, Japan  
26 July 2021

(Place and date of issue)

Akihiko Kanechika  
Department General Manager  
Quality Assurance Department

(name and signature or equivalent marking of authorized person)