

**COLOR VIDEO SOUNDER
CVS-109 & CVS-109DF
OPERATION MANUAL**



DOC NO. CVS-109 & CVS-109DF 08-92

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1. IMPORTANT NOTICE

Congratulations on your purchase of the SI-TEX CVS-109 Color Video Sounder. The CVS-109 has a plotter function as well. It is recommended that you read through the operation manual prior to installing and operating the unit.

The CVS-109 contains a built-in simulator that may help you understand the operation of the CVS-109 better. Only a DC power source is necessary.

To turn the simulator on, touch ON key first. The beeper will sound. While the beeper is sounding, press and hold MENU key. Release it when the beeper sound stops.

To get out of the simulator mode, you need to turn the power off by pressing OFF key.

If after reading the operation manual you still do not understand the operation and installation of your unit, we recommend you contact your dealer or SI-TEX Marine Electronics Customer Service Department.



WARNINGS:

- A. Exposing the CVS-109 to excessive heat will result in damage to the unit.
- B. Do not install the CVS-109 near magnetic material as it will cause color distortions.
- C. Do not operate the CVS-109 without the transducer connected.
The transducer must be in the water before the power is turned on.
- D. Transducers supplied by other than SI-TEX may cause degradation of performance.
- E. The CVS-109 is not waterproof. When installing the unit, please take this into consideration.
Do not install the CVS-109 in a location where it will be exposed to direct spray or rain. Water damage is not covered by the warranty.
- F. Make sure when connecting the power cable to the battery to match polarity. The white lead is for positive and the black lead is for negative.
- G. It is recommended that you install the CVS-109 as far from any radio antennas as possible to prevent noise interference.
- H. Position and speed information by NMEA0183 data format from a navigation equipment is required for plotter function.

2. INTRODUCTION

The CVS-109 is available in two types: the dual frequency unit or the single frequency unit. The dual frequency unit is a combination of 200kHz and 50kHz, and the single frequency unit is either 200kHz or 50kHz.

For the dual frequency unit, you can select the frequency mode among 200/50kHz, 200kHz and 50kHz with FREQ key. When in the dual frequency mode (200/50kHz), the unit will simultaneously display the dual frequency images. However, when in the single frequency mode (200kHz or 50kHz), it will display the single frequency images. The CVS-109 is set for manual modes at the factory. You may need to adjust them so as to meet the actual conditions of your application.

In addition to the echo sounder functions, the CVS-109 has plotter functions that show your vessel's track on the screen using the position information given by an external navigation unit, such as a GPS, Loran C etc.

3. TRANSDUCER INSTALLATION

SI-TEX provides various transducers as the standard ones for both the single and dual frequency versions. (Refer to section 5.1 for its information.) However, since they are basically either transom type or thru-hull type, the mounting procedures will be explained with transom and thru-hull mounting transducers in sections 3.1 and 3.2 as examples.



CAUTION:

Mounting your transducer requires drilling holes into boat structure which can affect its water integrity and, therefore, should be attempted only by competent persons. If you are not sure where and how to attempt this installation, we recommend you take your boat to a marine dealer or a marina that has people qualified and experienced in transducer installations.

Saltwater Maintenance

Antifouling paint - If the vessel is kept in saltwater, sea growth can accumulate rapidly on the transducer face and seriously reduce the performance in a matter of weeks. It is recommended that at least the acoustic face of the transducer be coated with a special transducer antifouling paint. All copper base paints are unsatisfactory. If fouling does occur, use a stiff brush or putty knife to remove growth. Wet sanding of fouled surface is permissible with #220 or finer grade wet or dry paper.

3.1 TRANSOM MOUNT

The Figure 1 shows the transom mounting dual frequency transducer with temperature and speed sensors (#239-50-200ST).

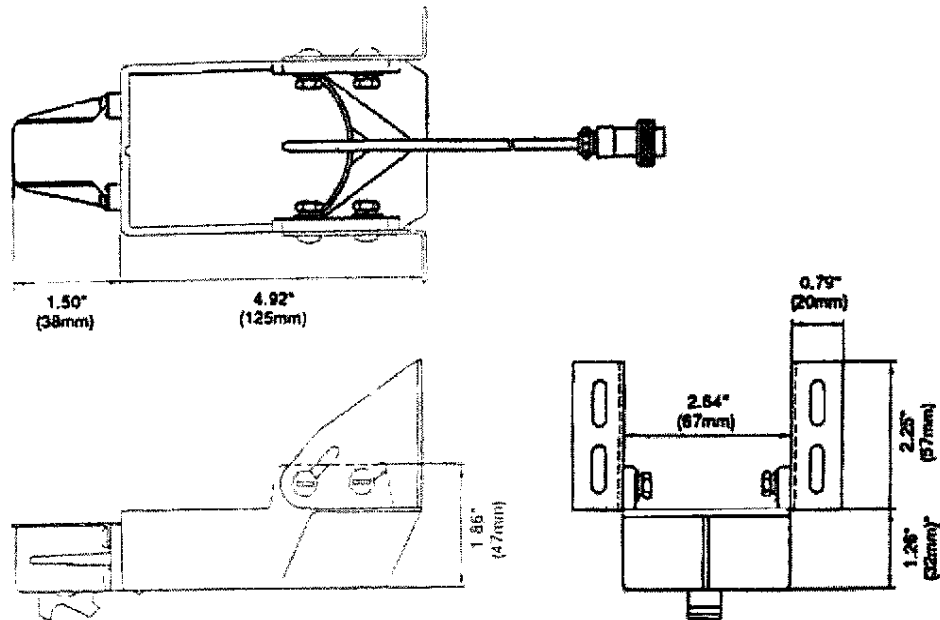


Figure 1 Transom Mount Transducer
(Example of 239-50-200ST)

Since your echo sounder's performance depends on how well the transducer has been installed, please carefully read through the following mounting procedures:

- 1) For proper performance, the transducer's mounting location must be chosen carefully. The transducer should be mounted in a location that is free from turbulence and air bubbles created by movement of the boat as it travels through water. Air bubbles greatly reduce the efficiency of the transducer. It is also strongly recommended that transducer be mounted on the port side and not in front of the propeller.
To determine the best mounting location, operate the boat at several different speeds and observe the water as it passes under the transom. Study the turbulence created by the hull structure, the keel and the lifting strakes. Keep the transducer and its cables as far as possible from the boat's power cable, tachometer and other electrical cables.
- 2) This transducer has been designed to give you excellent readings by being installed on the transom of almost all boat types, however, the transom transducer should not be mounted on boats with in-board engines or trim tabs. In these instances, the thru-hull transducer should be used.

- 3) Determine the transducer mounting place by referring to the above mentioned procedures 1 and 2. For best results, the face of the wedge housing should be parallel to the water's surface. Also the wedge should be mounted from 1/8" to 1/4" below the surface of the hull. The trailing edge of the housing should be about 1/8" below the leading edge.

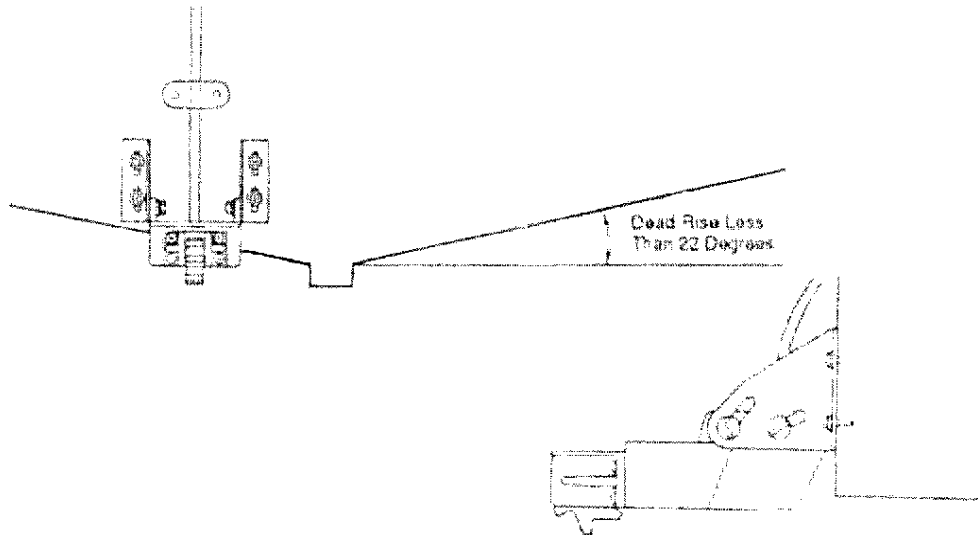


Figure 2 Transom Mounting

- 4) To actually mount the transducer, first fix the two bracket plates to the transducer tentatively using 4 sets of screws, nuts and washers. Then mark the screw holes to fix the bracket plates to the hull making fine adjustments of the transducer position. Fix the bracket plates to the hull with the provided tapping screws and tighten the nuts between the bracket plates and the transducer.

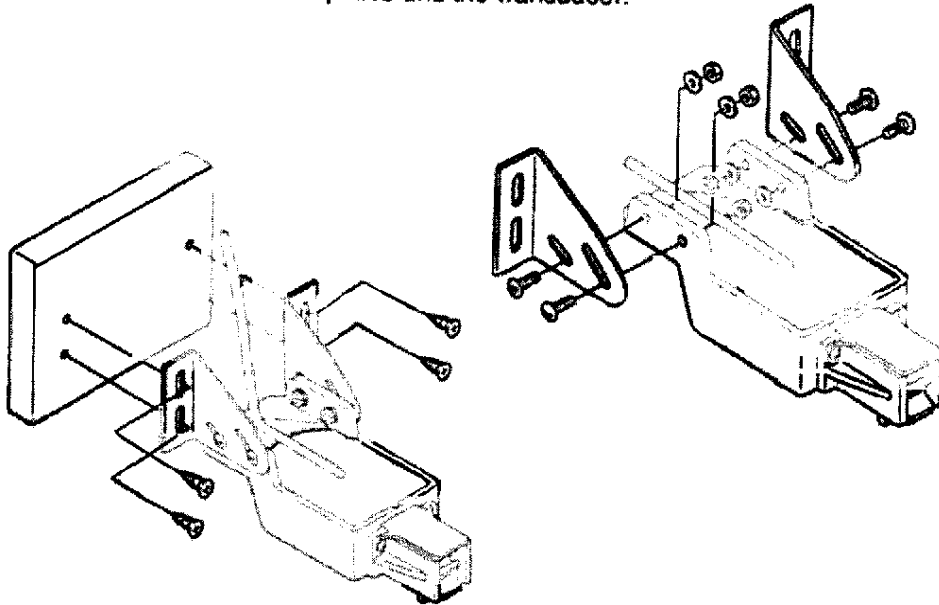


Figure 3 Transom Bracket

3.2 THRU-HULL MOUNT

Basically this instruction can be applied to the installation of any kind of thru-hull transducer.

The Figure 4 shows the thru -hull mounting dual frequency transducer with temperature and speed sensors (#403-50-200ST).

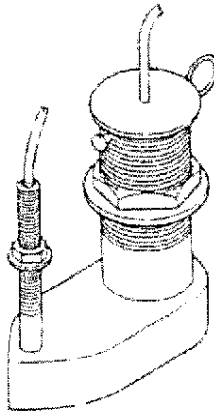
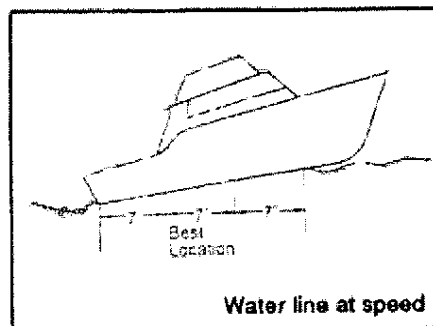
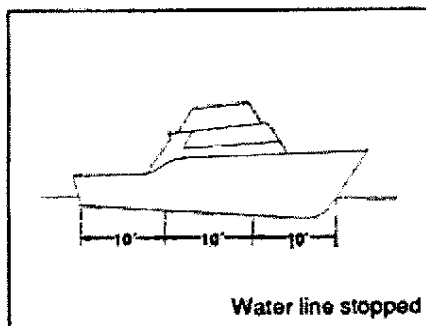


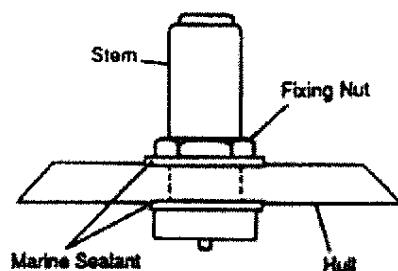
Figure 4 Thru-Hull Mount Transducer

- 1) The transducer should be installed at a place where no bubbles and no water spiral are generated around it.
- 2) The transducer should be installed as far from the engine as possible, but not too close to the bow. Normally it should be installed in the middle 1/3 of the hull at speed as shown below.



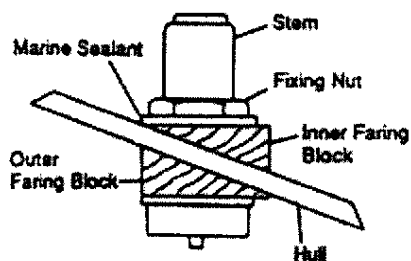
- 3) The transducer should be installed so as to maintain the acoustic face in parallel to the water surface. Therefore some boat hulls may require fairing blocks for this alignment.

DEAD RISE ANGLE LESS THAN 5°



In this case, no fairing blocks are necessary. To prevent water intrusion any gaps between the stem threads and the holes should be filled with marine sealant.

DEAD RISE ANGLE MORE THAN 5°



Apply fairing blocks inside and outside of the hull, and install the transducer with its face to be parallel to the water surface.

To prevent water intrusion, any gaps between the stem threads and the block should be filled with marine sealant.

4. INSTALLATION OF THE UNIT

The CVS-109 should be mounted on a flat, solid surface for maximum stability. Either table top or overhead mounting is available.

The interference among the marine electronics machines on board is a serious problem recently. Consider this matter when selecting a location. Also, some other points are mentioned below.

- Convenience of operation
- Protection from high heat

Protection from direct rain and spray
Room for access to remove the mounting knobs and the rear connectors, and to change fuse.

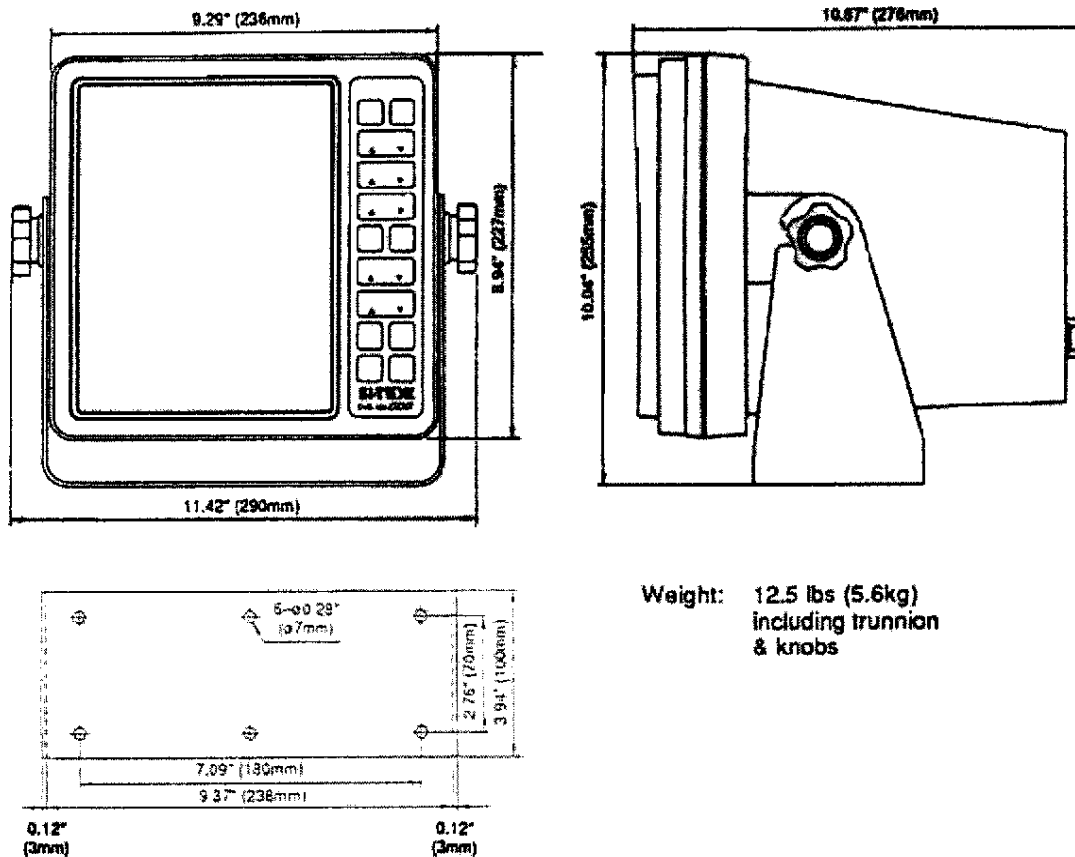
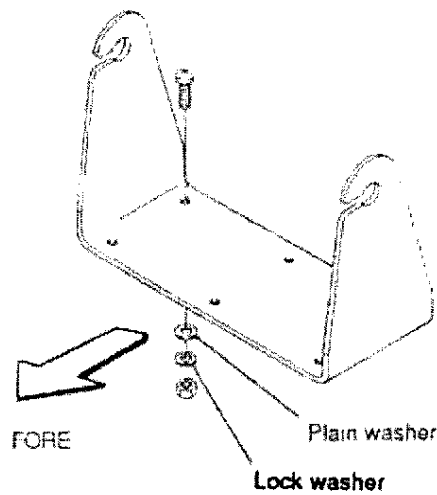


Figure 5 Dimensions/Weight



Trunnion should be mounted with its grooves to face forward. Because of the possible stresses encountered on the sea, 1/4" stainless steel bolts are suggested with plain washers and lock washers.

Figure 6 Trunnion Bracket

The unit is mounted with knobs as shown in the following figure

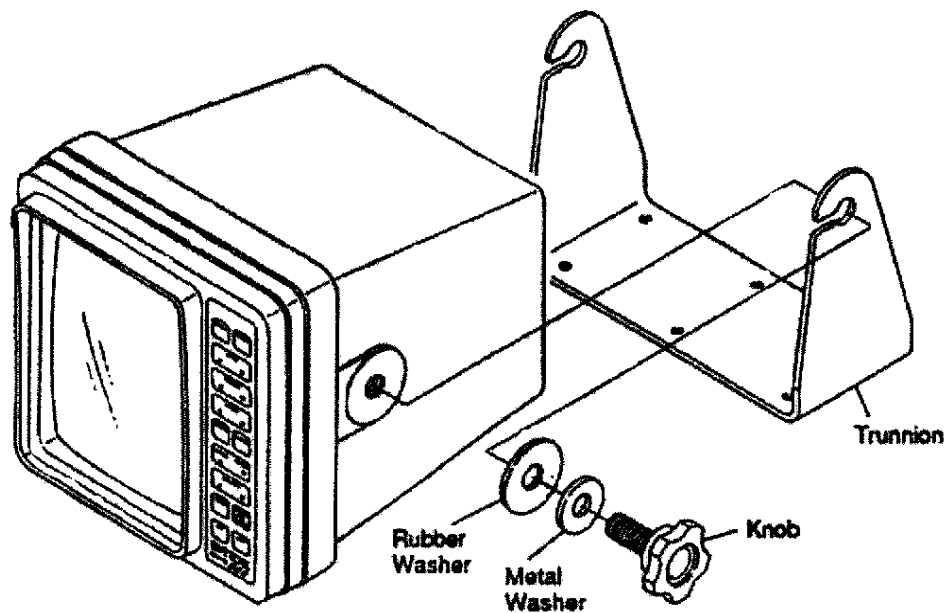
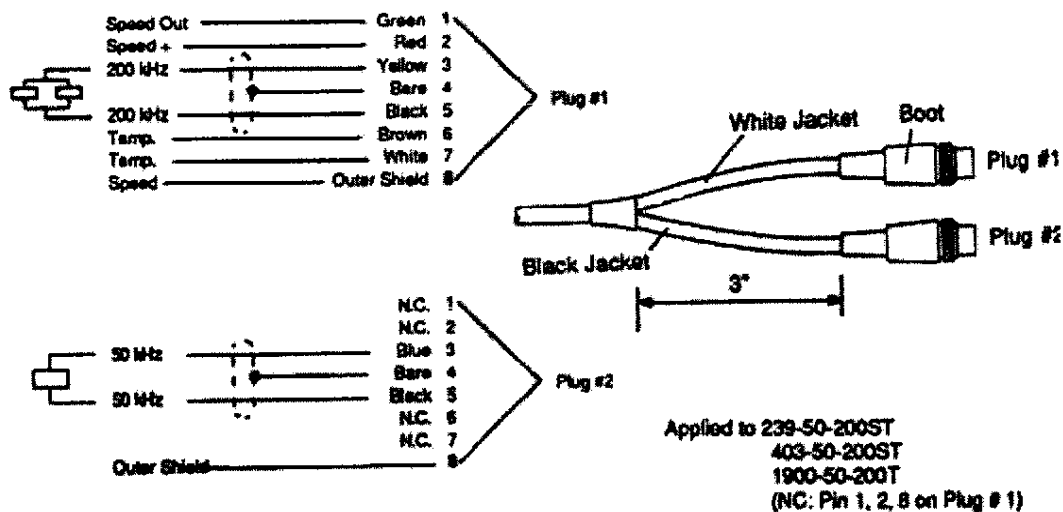


Figure 7 Mounting CVS-109

Select the transducer depending on your application.

APPLICATION	FREQUENCY		
	50kHz	200kHz	Dual Frequency
Deep Water	1900-50T (w/o speed.thru hull)	705-200T (w/o speed.thru hull)	1900-50T + 705-200T (w/o speed. thru hull)
	552-50T (w/o speed.thru hull)	30-087 (w/o speed.thru hull)	1900-50-200T (w/o speed. thru hull)
Shallow Water	236-50ST (transom)	236-200ST (transom)	239-50-200ST (transom)
	402-50ST (thru hull)	402-200ST (thru hull)	236-50ST + 236-200ST (transom)
			403-50-200ST (thru hull)
			402-50ST + 402-200ST (thru hull)

As indicated in the above table, the dual frequency version can use two single frequency transducers for 200kHz and 50kHz respectively, or a dual frequency single transducer with the speed and temperature sensors. The cable of the dual frequency single transducer is divided into two at its end, and each has an 8 pin connector respectively. One is for the 200kHz and the other is for the 50kHz. The temperature and speed sensor wires are connected to the 200kHz connector plug. You are advised to set for 200kHz temperature and speed sensors in the Menu page.



5. CABLE CONNECTIONS

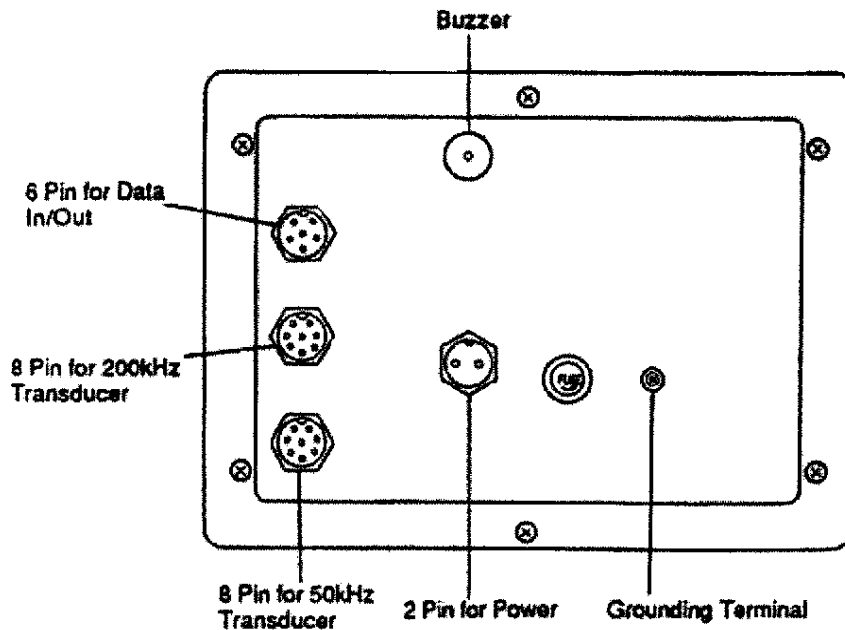


Figure 8 Rear View

5.1 TRANSDUCER

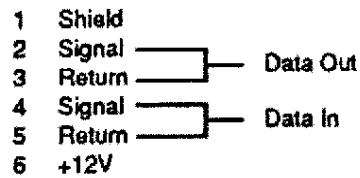
As shown in Figure 8, the two 8 pin plug receptacles are used for the transducers. The 200kHz is upper side and the 50kHz is the lower side. In case of the single frequency version, the unused receptacle hole is sealed with a rubber gasket.

As the table shows, various transducers are available for the CVS-109 so that you can make a proper selection to your need. The following diagram shows the internal wiring of the transducer plug receptacles. You may use a transducer without speed or with speed and temperature. However, regardless of the transducer type you use, when you disconnect the connector plug out of the transducer cable, please make sure to reconnect the cable wires to the correct function pins by referring to the diagram.

1 Speed	5 Transducer
2 Speed + 5V	6 Temperature
3 Transducer	7 Temperature
4 Shield	8 Ground

5.2 DATA INPUT/OUTPUT

As mentioned in the drawing, the data interfacing connector plug is optionally available. It should be connected to the cable with the following wiring.



5.3 POWER

The power cable supplied in the unit uses a 2 pin connector plug with the wiring as below.



6. OPERATIONS

6.1 CVS-109

6.1.1 Plotter Mode and Echo Sounder Mode

The CVS-109 is a combination echo sounder and plotter. To switch between echo sounder mode and plotter mode, press PLOTTER ON/OFF key (MODE side and MENU side at the same time).

When MODE key is pressed in Echo Sounder Mode, three displays of Echo Sounder Mode are selected in rotation. These three displays are different between single frequency and dual frequency as below:

Single Frequency	Normal		Zoom	Normal	Bottom* Zoom	Normal
Dual Frequency	Normal	Normal	Zoom	Zoom	Bottom* Zoom	Bottom* Zoom

(* : The unit has Bottom Lock selection as another way to see closely the area near the bottom in addition to Bottom Zoom. The selection between Bottom Zoom and Bottom Lock can be done in Menu page.)

When MENU key is pressed, the following four Menus appear on the screen in Echo Sounder Mode.

MENU 1	MENU 2	MENU 3	BIG NUMBER
-----------	-----------	-----------	---------------

Menu 1, 2 and 3 are used for setting the conditions in advance relating to the echo sounding.

When MODE key is pressed after Plotter Mode has been selected, two displays of Plotter Mode are alternately displayed on the screen.

PLOTTER DISPLAY	NAVIGATION DISPLAY
--------------------	-----------------------

When MENU key is pressed, the following two displays of Plotter Mode alternately appear on the screen.

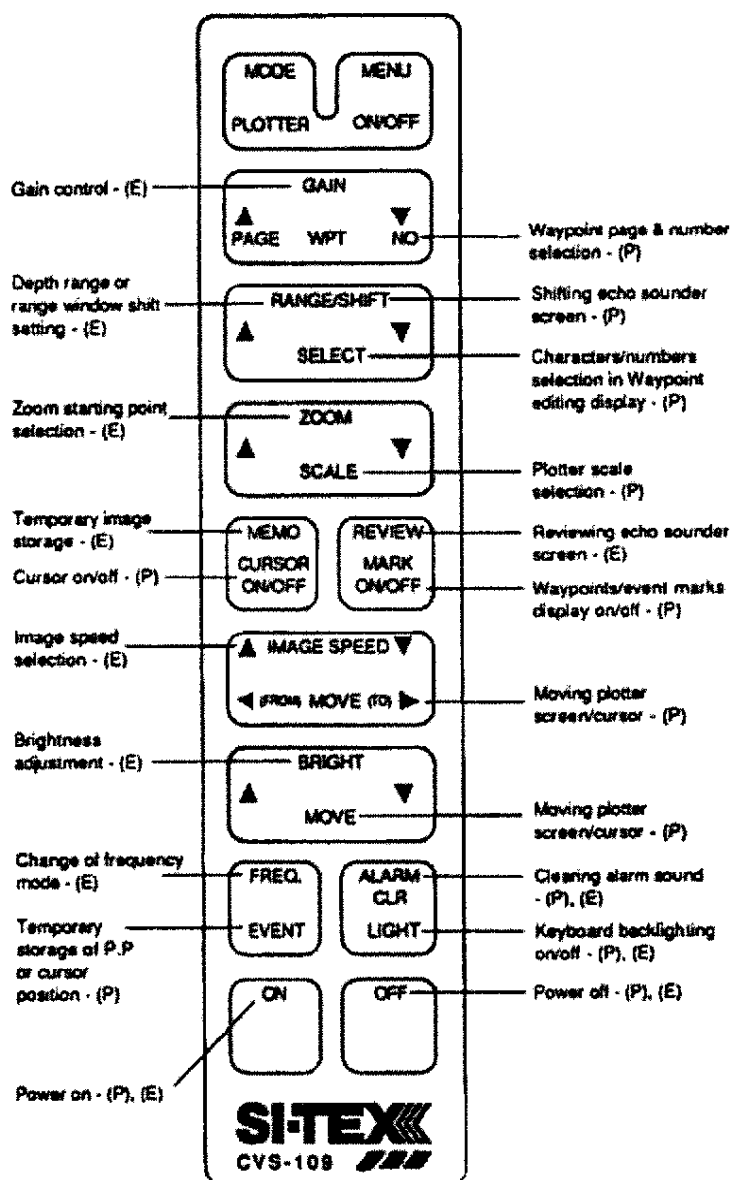
MENU DISPLAY	WAYPOINT EDITING DISPLAY
-----------------	--------------------------------

6.1.2 Keyboard

During echo sounder mode the keys are assigned to control the echo sounder functions while during plotter mode the keys are assigned to control the plotter functions. Basically the echo sounder functions are indicated in white letters, and the plotter functions are indicated in yellow letters on the keyboard.

The drawing below explains the key functions. (P) indicates a plotter function and (E) indicates an echo sounder function.

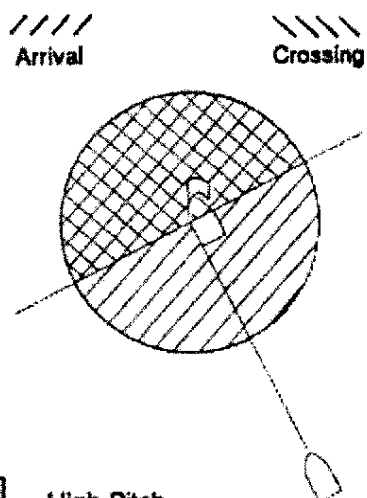
Please refer to 6.1.1 for the functions of the top two keys.



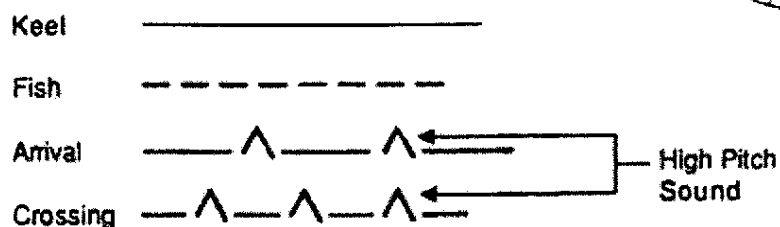
6.1.3 Alarm Sounds of CVS-109

The CVS-109 has four alarms - keel alarm, fish alarm, arrival alarm and crossing alarm. The sound format of each alarm differs from the others.

Keel and fish alarms can be set in Echo Sounder Menu, and arrival alarm can be set in Plotter Menu. Crossing alarm will sound when the boat goes over the navigation waypoint. See the figure indicating the alarm sounding areas of arrival and crossing.



The alarm tones of those alarms are



The highest priority of sounding is Keel alarm and then, Crossing, Arrival and Fish in turn. When two alarms are activated at the same time, the one with the higher priority will sound.

6.2 ECHO SOUNDER MODE

As explained in 6.1, the echo sounder mode has three image display screens and three menu displays.

6.2.1 Menu Displays

Pressing MENU key while in Echo Sounder Mode will show three menu displays on the screen in rotation. Menu 1 and Menu 2 are displays to set conditions of echo sounder in advance. Big Number shows depth, temp, boat speed and log with big numbers.

Menu 1

Keys to Use

GAIN AUTO	ZOOM AUTO	<div> <div>GAIN</div> <div> <div>△</div> <div>PAGE</div> </div> <div> <div>▽</div> <div>NO</div> </div> </div>	△ key for Gain Auto or Manual. ▽ key for Zoom Auto or Manual.
RANGE	AUTO	<div> <div>RANGE/SHIFT</div> <div> <div>△</div> <div>SELECT</div> </div> <div>▽</div> </div>	△ key to select Range or Shift. ▽ key for Auto or Manual.
ZOOM RANGE	10	<div> <div>ZOOM</div> <div> <div>△</div> <div>SCALE</div> </div> <div>▽</div> </div>	△ and ▽ keys to select Zoom range. Selection rotates in either way.
B. ZOOM 10	BOTTOM ZOOM	<div> <div>MEMO</div> <div>CURSOR ON/OFF</div> </div> <div> <div>REVIEW</div> <div>MARK ON/OFF</div> </div>	MEMO to select Bottom Lock or Zoom range. REVIEW for Bottom Lock or Zoom.
KEEL ALARM	OFF	<div> <div>△ IMAGE SPEED ▽</div> <div>◀ (FROM) MOVE (TO) ▶</div> </div>	△ and ▽ keys to set Keel Alarm range.
FISH ALARM	OFF	<div> <div>BRIGHT</div> <div> <div>△</div> <div>MOVE</div> </div> <div>▽</div> </div>	△ and ▽ keys to set Fish Alarm level.
A-SCOPE OFF	SCALE ON	<div> <div>FREQ.</div> <div>ALARM CLR</div> </div> <div> <div>EVENT</div> <div>LIGHT</div> </div>	FREQ key for A-Scope On or Off. ALARM/CLR for Scale Lines On or Off.

ZOOM RANGE

Zoom range can be selected among 10, 20, 40, 80, 120, 160, 240, 320, 480, 640 feet. The selected range window shifts automatically or manually by setting "ZOOM AUTO" or "ZOOM MANUAL".

RANGE & SHIFT

When "RANGE" is selected on the left and "AUTO" is selected on the right, the auto ranging is activated. When "SHIFT" is selected on the left with "AUTO" on the right, the auto shift function is activated.

The range mode always shows 0 at the top of the screen and changes only the bottom side.

The shift mode shifts the pre-set range window up or down. The normal range that was used before turning the shift function on will become the shift range. The minimum shift range is 40 feet.

In either "RANGE" or "SHIFT" mode, the auto function automatically selects the next range when the bottom goes out of the screen to bring it back to the center.

BOTTOM LOCK or BOTTOM ZOOM

Bottom lock and bottom zoom both show a certain area up from the bottom.

Bottom lock shows it by displaying the bottom with a straight line. Bottom zoom shows it by displaying the same bottom as the normal display.

Refer to 6.2.2 Image Displays.

KEEL ALARM

Keel alarm is used to set a depth that activates alarm when the bottom becomes shallower than that depth. Depth can be set up to 300 feet. By pressing ALARM CLR key, you can stop the sound.

FISH ALARM

Fish alarm is used to decide the strength of the returned echo from the fish that activates alarm. The number "1" shows the weaker fish echo and the number "7" shows the strongest fish echo.

A-SCOPE

A-scope is displayed at the right end of the image display. It indicates the strength of returned echo directly under your vessel at that instant with the width and color of the bar. The wider the bar, the stronger the echo, and the widest bar is shown in red.

Menu 2

Keys to Use

A CLUTTER

GAIN
△ PAGE WPT ▽ NO

△ or ▽ key to set Anti Clutter Level.

C. ECHO OFF T. GRAPH OFF

RANGE/SHIFT
△ SELECT ▽

△ key for Clean Echo On or Off.
▽ key for Temp. Graph On or Off.

POWER HIGH NAV PSTN L/L

ZOOM
△ SCALE ▽

△ key to select Power High, Medium or Low. ▽ key to select L/L, TD or Off as Nav Position Unit.

PULSE M B. GROUND BLUE

MEMO CURSOR ON/OFF REVIEW MARK ON/OFF

MEMO key to select Pulse Width.
REVIEW key to select Blue or Black for Background Color.

S. T. C. 200KHZ 0

△ IMAGE SPEED ▽
< (FROM) MOVE (TO) >

△ and ▽ keys to set S.T.C. level for 200kHz. This will not be displayed for 50kHz unit.

S. T. C. 50KHZ 0

BRIGHT
△ MOVE ▽

△ and ▽ keys to set S.T.C. level for 50kHz. This will not be displayed for 200kHz unit.

COLOR 7654321 1

FREQ. ALARM CLR
EVENT LIGHT

FREQ key to select a color number to change.
ALARM/CLR key to change the color of selected number.

ANTI CLUTTER

Anti clutter is the function used to change the weakest echo color into the background color until the fourth weakest echo color is changed.

Normally the anti clutter is not needed and is left at the OFF position where all seven colors are displayed. However, debris in the water or heavy concentration of plankton can cause the upper portion of screen to be cluttered with false images. They are displayed in weak level colors. The anti clutter is then turned on and set to the lowest level that will make the screen useable.

CLEAN ECHO

Normally the clean echo is left in the OFF position. However, if your vessel is close to another one which has a sounder of the same frequency as yours, two sounders will talk to each other causing noise to appear on each other's screen. If you turn the clean echo on, your CVS-109 will no longer talk to the other sounder.

TEMPERATURE GRAPH

The temperature graph is displayed only in the normal image area. It will reflect the past history of changes in temperature on the screen. The temperature range is automatically selected by the CVS-109 based on your present temperature.

POWER

Reducing the output power is another way to prevent interference from the same frequency on a nearby boat.

NAV POSITION

The CVS-109 is capable of interfacing with a navigational instrument like a GPS or a loran. The selected indication of "L/L" or "TD" will display the present position, the bearing of STG and the distance of XTE. ("TD" is available only in a loran.)

PULSE

Pulse will change among "L" (long), "M" (medium) and "S" (short). Generally the short pulses are better for shallow water detection and the long pulses are better for deep water detection.

S.T.C.

The STC lowers the sensitivity near the surface to prevent clutter of the screen by the echoes from debris and planktons. In the case of single frequency, only the line for the used frequency is displayed.

COLOR

The echo levels are divided into seven and each level is displayed in a different color as the color bar shows. However, you can change their priorities or reduce the colors to display. In order to use this function effectively it is suggested you get familiar with the color video sounder.


Menu 3

FISH SYMBOL OFF	<div> <div>Keys to Use</div> <div> <div>GAIN</div> <div> <div>△</div> <div>PAGE</div> </div> <div> <div>▽</div> <div>NO</div> </div> </div> </div>	△ or ▽ key for Fish Symbol On or Off.
SPEED DATA INT	<div> <div>RANGE/SHIFT</div> <div> <div>△</div> <div>SELECT</div> </div> <div>▽</div> </div>	△ or ▽ key to select Internal or External for Boat Speed Data Source.
SPEED ADJUST 100	<div> <div>ZOOM</div> <div> <div>△</div> <div>SCALE</div> </div> <div>▽</div> </div>	△ and ▽ key for Boat Speed Adjustment.
SPEED HF	<div> <div>MEMO</div> <div>CURSOR</div> <div>ON/OFF</div> </div> <div> <div>REVIEW</div> <div>MARK</div> <div>ON/OFF</div> </div>	MEMO key to select High or Low Frequency for Boat Speed Data.
TEMP HF	<div> <div>IMAGE SPEED</div> <div> <div>△</div> <div>MOVE</div> </div> <div>▽</div> </div>	△ key to select High or Low Frequency for Water Temperature Data.

NOTE:

For single frequency unit, the last two lines are not displayed since no selection is necessary.

FISH SYMBOL

Fish Symbol is displayed with three sizes of the actual fish image (). The size and color will be determined by the strength of returned echo. They do not necessarily indicate the actual fish size. School of small fish are displayed by a large, red fish image if the echo is strong enough.

NOTE:

Fish symbols are displayed only in Normal Display screen.

SPEED DATA

The CVS-109 displays the boat speed information on the screen. You can determine its data source between the paddlewheel speed sensor and the equipment like GPS, Ioran if it is connected.

INTERNAL means the paddlewheel speed sensor was selected as the data source, and EXTERNAL means the connected equipment was selected.

SPEED ADJUSTMENT

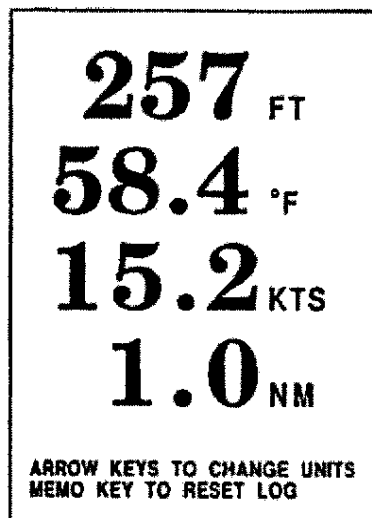
If you run a known distance with your vessel and the log does not reflect that distance correctly, the speed adjustment can be used to calibrate your unit. If the log distance is less than your known distance, pressing UP arrow of ZOOM key will increase the percentage up to 150 percent. Pressing DOWN arrow in the opposite case will decrease the percentage up to 50 percent.

SPEED & TEMP

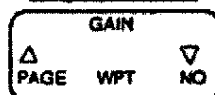
As explained earlier, this function is provided just for the dual frequency version. Regardless of the type of transducer you use, you have to select the frequency from which the CVS-109 will obtain the speed and temperature data.

- (a) when you are using two separate transducers, both of them may have the speed and temperature sensors. In that case, the CVS-109 receives two separate data of speed and temperature through two connector plugs. The CVS-109 has to decide which data to use.
- (b) In case of the dual frequency single transducer (#239 or 403-50-200ST), it has two connector plugs at the cable end, and the speed and temperature sensors are wired to the 200kHz connector plug with its depth sensor. The 50kHz connector plug just has the depth sensor. You have to tell it to the CVS-109.

Big Number



Keys to Use



△ key to select FT, MT or FA.



△ key to select °F or °C.



△ key to select KTS/NM, MPH/SM or KPH/KM as Speed/Log units.



MEMO key to reset log counter.

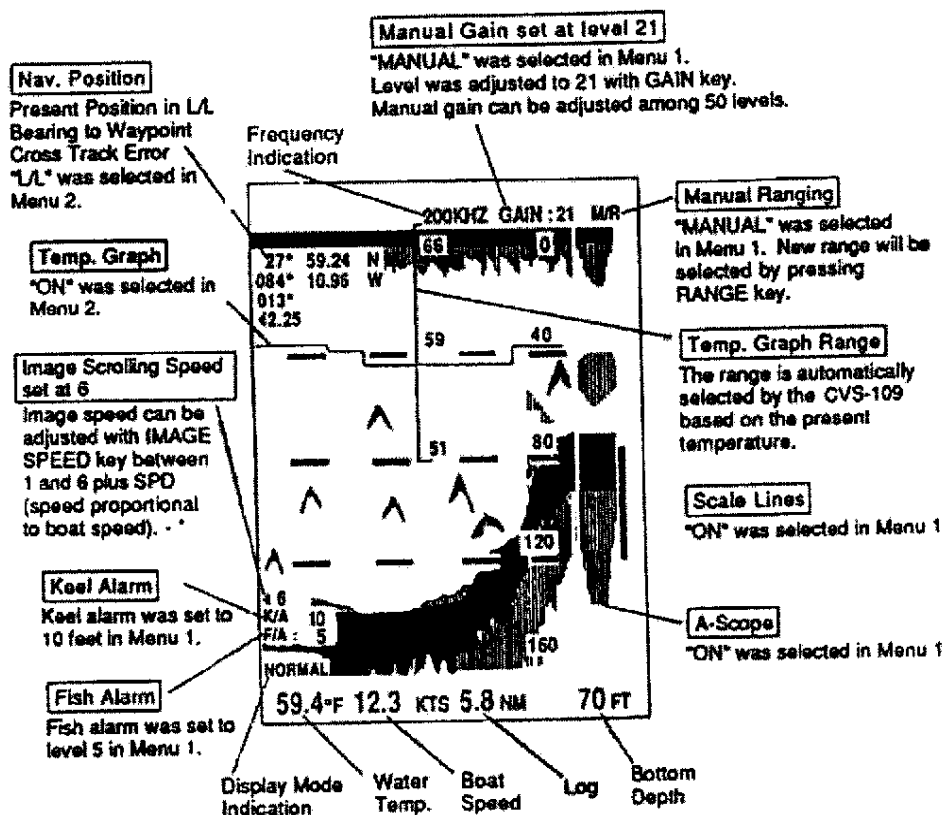
NOTE:

To use "SM" or "KM" for Plotter scale, select the unit you need here

6.2.2 Image Displays

Pressing MODE key while in Echo Sounder Mode will show three image displays on the screen in rotation.

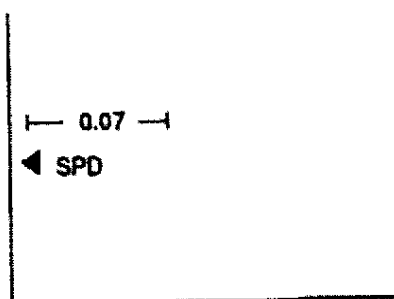
Normal Display (in Single Frequency Mode)



- * When "SPD" was selected, the image scrolling speed varies according to the boat speed. As the figure shows, a horizontal scale is displayed on the screen. It shows a certain distance. Referring to it, you can see how much the image advanced.

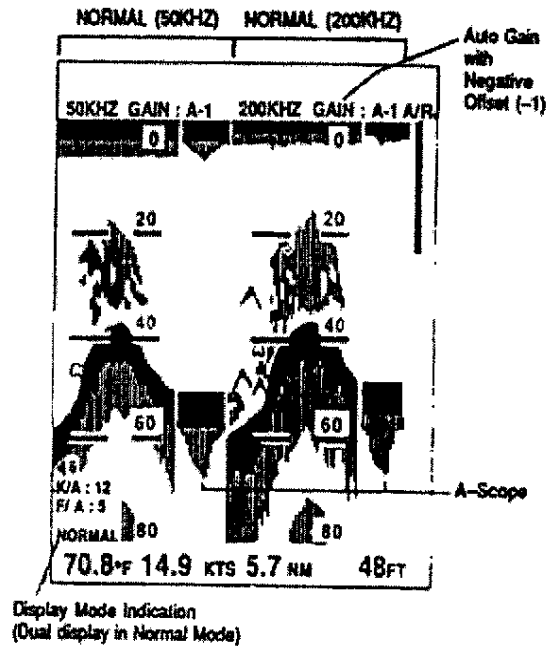
NOTE:

When the boat speed exceeds 15 knots, the image scrolling speed is fixed, and the distance number itself will change by the increase of the boat speed.



- 1) The above example shows a normal display in single frequency mode.

If dual frequency mode, a normal display of 200kHz is displayed on the right half of the screen, and a normal display of 50kHz is displayed on the left half of the screen.

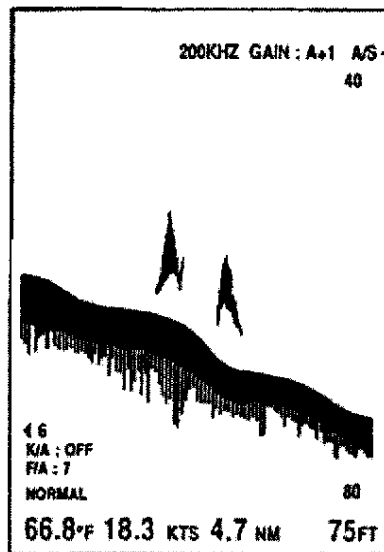


The dual frequency unit can display single frequency mode as well as dual frequency mode. Pressing FREQ key selects the mode as below:



The FREQ key is inoperative in single frequency unit.

- 2) This display shows the example of shift ranging.



Auto Shift Ranging

"SHIFT" and "AUTO" were selected in Menu 1. It is indicated as "A/S" at the top right corner of the screen.

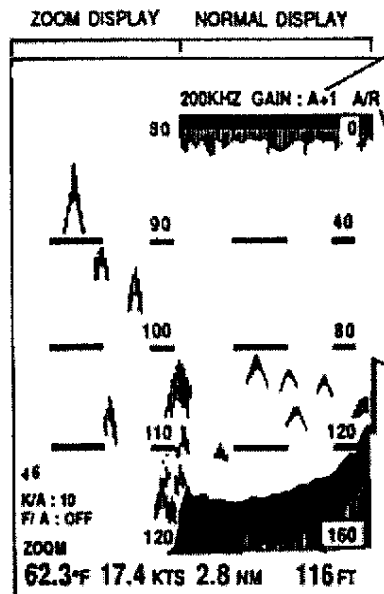
This example shows 40 to 80 feet range. This means that the original range of 0 to 40 feet was shifted to it with this Auto Shift function when the bottom became deeper than 40 feet.

If the bottom becomes deeper than 80 feet again, the new shift range, 60 - 100, will be selected without changing the 40 - foot range window.

Normal + Zoom Display (in Single Frequency Mode)

Zoom Range set to 40 feet

Zoom range can be changed in Menu 1. The selected range is indicated with a bar at the right side of the screen.



Auto Gain

"AUTO" was selected in Menu 1. Positive offset (+1) was applied with GAIN key. Offset value varies between -5 and +5.

Auto Ranging

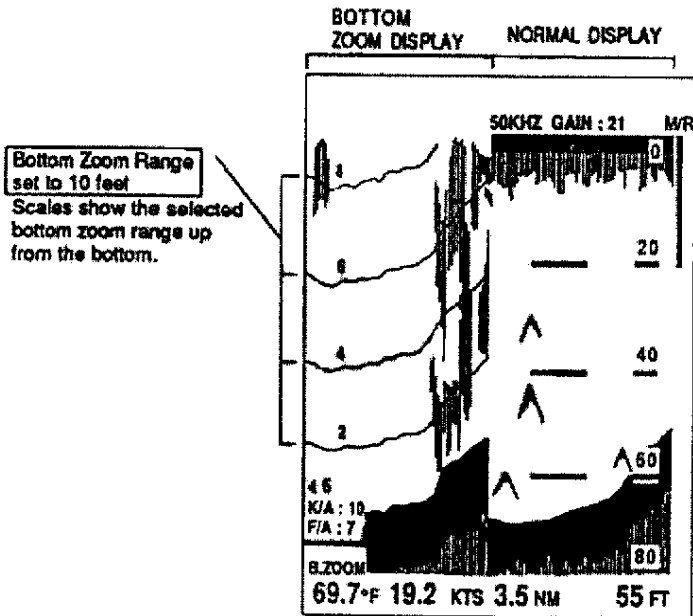
"AUTO" was selected in Menu 1.

Zoom Bar

This area is displayed on the left half of the screen. The zoom bar position can be adjusted with ZOOM key.

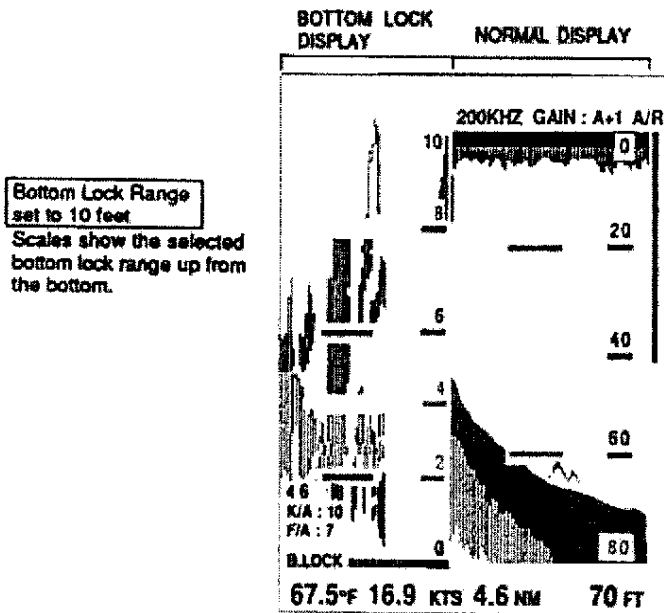
- 1) When in dual frequency mode, a zoom image of 200kHz is displayed on the right half of the screen, and a zoom image of 50kHz is displayed on the left half of the screen.

Normal + Bottom Zoom (in Single Frequency Mode)



Bottom Zoom shows the expanded image close to the bottom by displaying the same bottom image as the normal display.

- 1) The CVS-109 has another way to show the image close to the bottom called Bottom Lock. The selection between Bottom Zoom and Bottom Lock is performed in Menu 1



Bottom Lock shows the expanded image close to the bottom by showing the bottom as a straight line. The bottom is regarded to zero.

- 2) When in dual frequency mode, a bottom zoom (or bottom lock) image of 200kHz is displayed on the right half of the screen, and a bottom zoom (or bottom lock) image of 50kHz is displayed on the left half of the screen.

6.2.3 Other Key Functions In Echo Sounder Mode

MEMO Key

1. Pressing MEMO key stores the image of one screen of that instant.
2. The screen image is split vertically.
The right half of the screen shows sounding image as you have operated, while the left half of the screen displays half of the stored image. Pressing REVIEW key shifts the image to show the other half of the stored image. The stored image will be repeatedly displayed as long as REVIEW key is pressed.
3. Press MODE key to resume the normal sounding display without memory.
This will erase the stored image.
4. Since it is not a permanent, but a temporary storage, it will be lost when the unit is turned off or replaced with new screen image every time MEMO key is pressed.

REVIEW Key

1. You can review the last two screen pages. Keep pressing REVIEW key to scroll the screen image. Scrolling ends when the screen page prior to the current screen image is displayed. When the press of REVIEW key stops, scroll of the screen stops.
2. To return to normal operation, press MODE key.

BRIGHT Key

The screen brightness can be controlled in 8 steps. Pressing UP arrow of BRIGHT key increases the brightness, and pressing DOWN arrow decreases it.

ALARM CLEAR Key

When a pre-selected alarm, either Fish Alarm or Keel Alarm, sounds, the alarm is deactivated by momentarily pressing ALARM CLR key.

LIGHT Key

Pressing the key turns the backlight of key panel on or off.

6.3 PLOTTER MODE

As explained in 6.1, the plotter mode has two mode displays (Plotter & Navigation) and two menu displays (Menu & Waypoint Editing).

6.3.1 Menu Displays

Pressing MENU key while in Plotter Mode will show Menu display and Waypoint Editing display alternately.

Menu

Keys to Use

PLOT INT TIME	TRK. PLOT OFF
------------------	------------------

GAIN		
△	WPT	▽
PAGE		NO

△ key for Time or Dist for Plot Interval.
▽ key for Track Plotting On or Off.

PLOT TIME	55
-----------	----

RANGE/SHIFT		
△		▽
SELECT		

△ and ▽ keys to select Plot Interval.

ARRIVAL ALARM OFF

ZOOM		
△		▽
SCALE		

△ and ▽ keys to set Arrival Alarm range.

TRK SMOOTH OFF		TRACK DEPTH	
COLOR		4	
7	20	4	120
6	40	3	120
5	60	2	120

MEMO CURSOR ON/OFF	REVIEW MARK ON/OFF
--------------------------	--------------------------

MEMO for Track Smooth On or Off. REVIEW to select Depth, Temp or Select for Track Color.

△	IMAGE SPEED	▽
◀ (FROM) MOVE (TO) ▶		

△ and ▽ keys to select Track Color number.

BRIGHT		
△		▽
MOVE		

When Depth or Temp was selected for Track Color:
△ and ▽ keys to set the range for the selected color.

PLOTS AVAIL 258	CENTERING AUTO
--------------------	-------------------

FREQ.	ALARM CLR
EVENT	LIGHT

FREQ key to erase older plots.
ALARM CLR for centering the present position automatically or manually.

PLOT INTERVAL

Plot interval can be set in time or distance. When distance was selected, the second line is displayed like **PLOT DIST 0.1NM**.

Refer to Specifications for available plot intervals.

TRACK PLOT

Track plot can be turned off and on again. When "OFF" is selected, the track from that point will not be displayed nor stored in the memory. So, you can keep some track line until "ON" is selected without reference to the time or distance you have traveled. It is useful if you want to trace the same route when you return, or if you want to make a simple coast line or a guard line as a reference.

ARRIVAL ALARM

This is used to set the alarm range around the waypoint to tell you of your arrival at its area. It can be set between 0.1 and 9.9.

TRACK COLOR

You can designate the color of the track. "TRACK" menu changes among DEPTH, TEMP and SELECT with REVIEW key.

When TRACK SELECT is selected, one color out of seven as track color is selectable with IMAGE SPEED key. The table under "COLOR 4" indication is not related to TRACK SELECT.

When DEPTH or TEMP is selected, you can use six colors shown in the table under "COLOR 4" indication. For the color number selected with IMAGE SPEED key, the range for depth or temp can be set with BRIGHT key.

DEPTH

Color number 7 is always the shortest range, and you can set the deeper ranges toward color number 2. Reverse way is impossible. Therefore, when the range of color 7 becomes the same range as other colors by increasing the range, the ranges of other colors change at the same time and all show the same range.

If some colors show the same range, the strongest level color among them is used as the track color for the selected range.

The example shows the following:

Color #7 (red) will be used to show the track at the depth between 0 and 20 feet.

Color #6 (orange) will be used to show the track at the depth between 20 and 40 feet.

Color #5 (yellow) will be used to show the track at the depth between 40 and 60 feet.

Color #4 (green) will be used to show the track at the depth between 60 and 120 feet.

Color #3 (cyan) and #2 (white) indicate the same range as #4. The stronger level color (#3 in this case) will be used to show the track at the depth greater than the set-up maximum range of 120 feet.

TEMP

Being different from depth ranges, temperature ranges are set from high to low as the table shows.

So, each color shows the range as below:

- Color #7 (red) - higher temperature than 65.0 °F
- Color #6 (orange) - 65.0 °F to 62.4 °F
- Color #5 (yellow) - 62.4 °F to 60.2 °F
- Color #4 (green) - 60.2 °F to 58.6 °F
- Color #3 (cyan) - 58.6 °F to 55.8 °F
- Color #2 (white) - 55.8 °F to 51.0 °F
- Color #1 (lt. blue) - lower temperature than 51.0 °F

7	65.0	4	58.6
6	62.4	3	
5	60.2	2	

NOTE:

Temperature can be set in 0.1 increments for Centigrade, and in 0.2 increments for Fahrenheit.

TRACK SMOOTH

Smoothing means to average the position information to display a smooth track line instead of a zigzag line. This function is mostly used when you get the position information from a loran.

PLOTS AVAILABLE

The total tracking points available are 500. This menu shows the unused point number. When the full 500 points are used, the older ones will be automatically replaced with new ones. However, you may want to erase some older points purposely in order to make more points available for the rest of your navigation. By pressing FREQ key, the older plots can be erased and the number here increases until the key is released.

CENTERING

Auto or Manual is selectable for this function.

When the present position is close to the plotter screen edge, Auto centering automatically shifts the track display to place the present position on the screen center. When Manual centering has been selected, move the present position with (FROM) MOVE (TO) and/or MOVE keys. Of course, these two keys also move the present position while in Auto mode, but it will be automatically brought back to the center when it goes to the screen edge.

Waypoint Editing

Page Selection

There are ten pages from 0 to 9, each of which has 10 points from 0 to 9. Pressing PAGE key will select next page. Page 0 is used for event marks and page 9 for route waypoints. They are displayed here as PAGE 0 [EVENT] and PAGE 9 [ROUTE]. As to route setting, please refer to the example explained later.

Number Selection

Pressing NO key will select next number. The selected waypoint is displayed in green.

PAGE 3		COPY FROM 0-0 TO 3-0	
0 [	29° 59.82 N 079° 59.68 W 120 FT 52.6°F	5	00° 00.00 N 000° 00.00 W FT °F
1 [	29° 21.35 N 079° 31.74 W 238 FT 51.3°F	6	00° 00.00 N 000° 00.00 W FT °F
2 [POINT Z]	29° 03.15 N 079° 24.88 W FT °F	7	00° 00.00 N 000° 00.00 W FT °F
3 [	00° 00.00 N 000° 00.00 W FT °F	8	00° 00.00 N 000° 00.00 W FT °F
4 [	00° 00.00 N 000° 00.00 W FT °F	9	00° 00.00 N 000° 00.00 W FT °F

Copying a Waypoint

Select a "FROM" waypoint with PAGE and/or NO keys. Touch FROM key. "FROM" waypoint is registered at the top right of screen. Select a "TO" waypoint in the same way, and touch TO key. "FROM" waypoint is now copied into "TO" waypoint.

Direct Entry of a Waypoint

For example, to enter a L/L coordinate into WPT 3-2:

1. Select waypoint page 3 with PAGE key.
2. Select number 2 with NO key.
3. Touch ▽ of lower MOVE key. A cursor is displayed at the name entry position.
4. Put the position name on this line; Select an alphabet or a number with Δ or ▽ of SELECT key, and then move the cursor to the next position with (TO) of upper MOVE key. (FROM) returns the cursor to the previous position for reentry of an alphabet. Repeat this procedure till you finish the entry.
If you do not want to put a name, skip this procedure.
5. Touch ▽ of lower MOVE key, and place the cursor at the L/L entry position.
6. As in item 4, select a number with SELECT key and move the cursor with upper MOVE key.
7. When you finish the entry of numbers, touch ▽ of lower MOVE key, and place the cursor at the symbol entry position.
8. Select a symbol with Δ of SELECT key, and put a color to it with ▽ of this key. If you do not want a symbol mark, you can also skip this procedure.

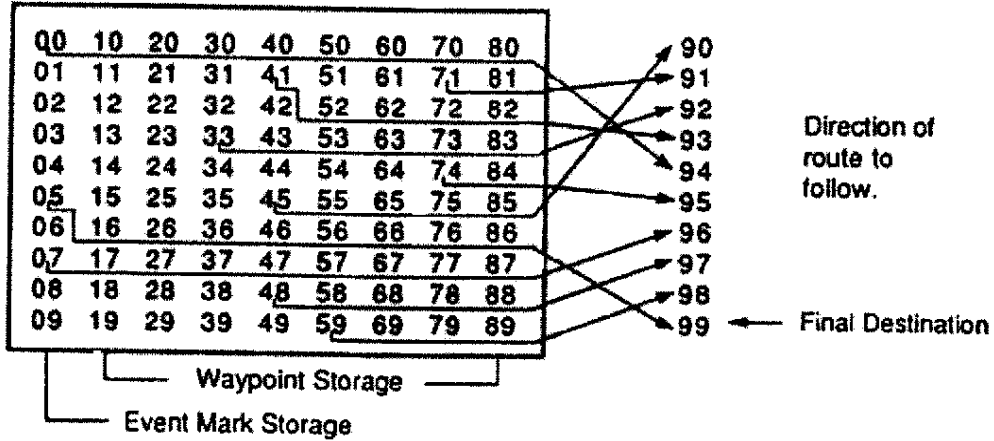
Available symbol marks					
------------------------	---	---	---	---	---

The cursor moves among three entry positions of Name, L/L and Symbol in either way with Δ or ▽ key of lower MOVE key.

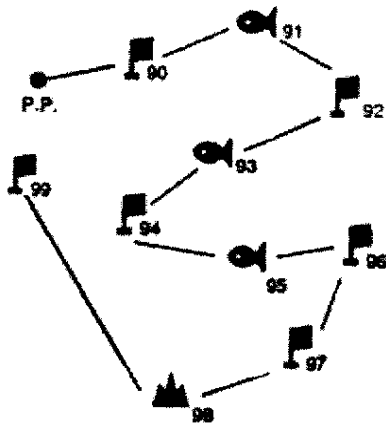
Route Setting

Maximum 10 waypoints (90 through 99) can be used to form a route by copying points to PAGE 9 in the way explained earlier.

Memory Storage (00 thru 89)



Display on the Screen

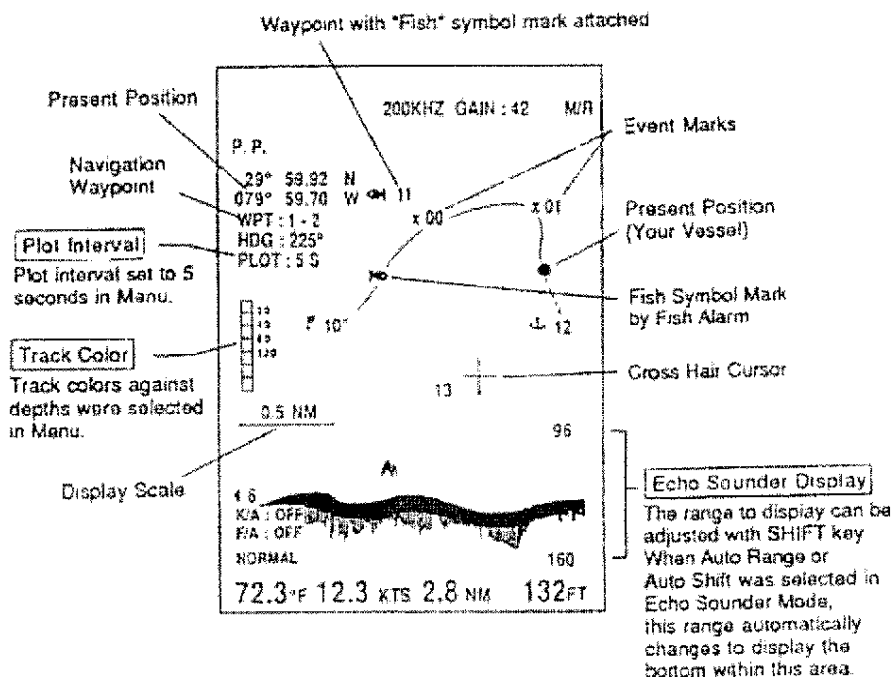


Any number 90 through 99 can be selected as the starting waypoint in a route. Direct waypoint is switched to the next one automatically when the vessel arrives at a waypoint on the route. 99 is the final destination point.

6.3.2 Plotter Mode Displays

Pressing MODE key while in Plotter Mode will show two displays on the screen alternately.

Plotter Display



Navigation Waypoint

The example shows that the navigation waypoint was set to 12. "1" indicates the waypoint page and "2" indicates the waypoint number in that page. All waypoints of the page indicated here (page 1 in the example) are displayed on the screen as well as the stored all event marks when MARK key is turned on. You can select a new waypoint to navigate with PAGE and NO keys. A dotted line is drawn from the present position to the selected waypoint.

Event Marks

Page 0 is assigned to event marks. Ten events can be entered into points 0 to 9. Pressing EVENT key stores the cross hair cursor position (when the cross hair cursor is on) or the present position (when the cross hair cursor is off) in the waypoint editing page and also displays it on the screen as the example shows. If the present position is stored, the depth and the water temperature at that spot are stored in the waypoint editing page as well as the present position information. When the cross hair cursor position is stored, the depth and the water temperature are not stored.

Fish Symbol Mark by Fish Alarm

If the fish alarm is set in Echo Sounder Mode, the activated alarm shows the maximum 10 fish marks as the example indicates. Since the fish colors change according to the strength of echoes, you can understand the density of the fish school.

Cross Hair Cursor

Pressing CURSOR key turns the cross hair cursor on or off. When it is turned on, the present position information at the left top of the screen will momentarily change to its position. "P.P." will be replaced with "CRS". It is also indicated when the cursor is moved with MOVE keys.

Display Scale

Pressing SCALE key changes the display area. When the cross hair cursor is on, it is changed to bring the cursor position to the center. When the cursor is off, it is changed to bring the present position to the center.

The scale line on the screen shows about 1/4 the selected scale.

Marks On/Off

When pressing MARK ON/OFF key while displaying waypoints and event marks as the example shows, all points except for the last event mark will be turned off. Pressing it again turns them on. The waypoints stored in the indicated page "1" are displayed with MARK ON key.

Movement of Track Display or Cross Hair Cursor

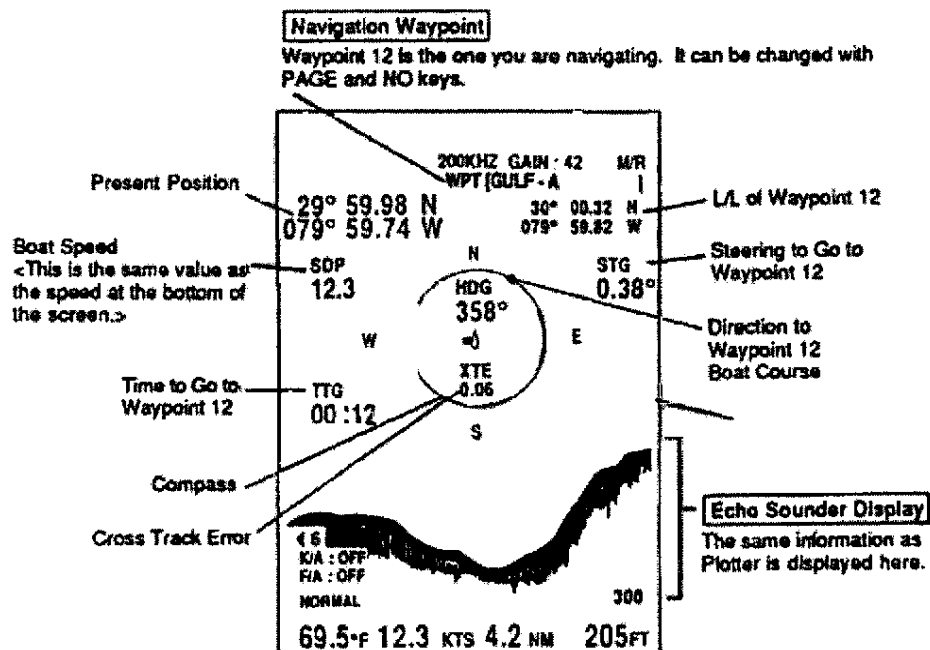
By pressing (FROM) MOVE (TO) and MOVE keys, you can move the cross hair cursor anywhere within the plotter screen, or move the track display (when the cross hair cursor is off).

Correction of Present Position

If the present position displayed is not the actual position on the map, you can correct it as below:

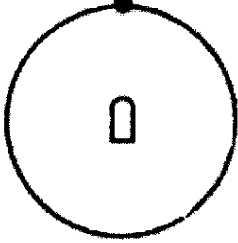
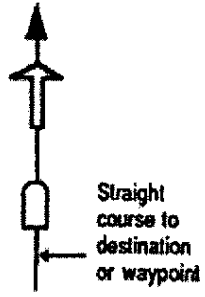
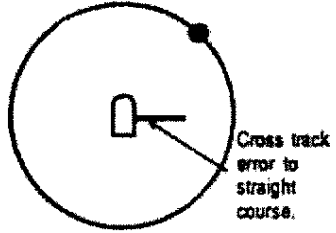
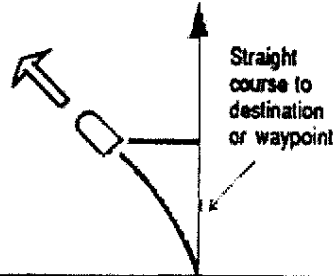
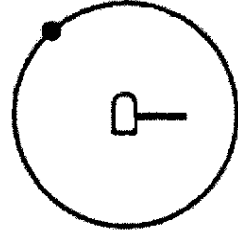
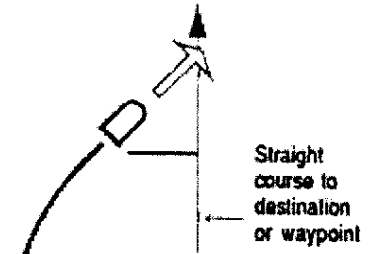
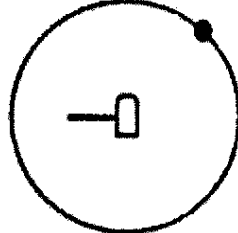
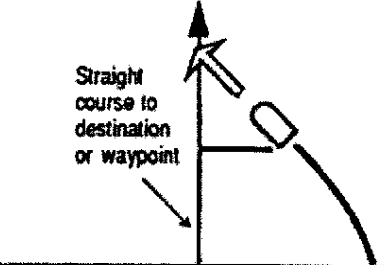
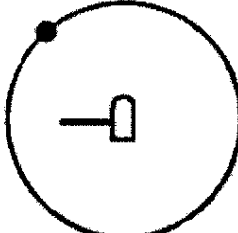
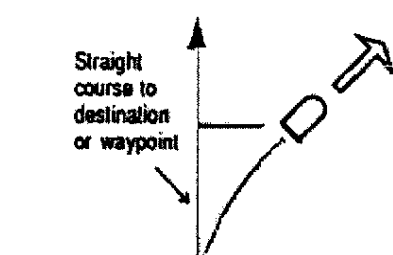
1. Turn the cursor on.
2. Press CURSOR and MARK keys at the same time. The present position will shift to the cursor, and move with the applied correction.
3. To cancel the correction mode, turn the cursor off. Then, press CURSOR and MARK keys at the same time.

Navigation Display



Cross Track Error

- 1) The bar indicates the amount of the cross track error as well as the direction to steer. The fully extended bar on the screen shows 0.4 nm, sm or km. Please check the actual amount of error with the number indicated under "XTE".
- 2) The following example shows typical graphic displays. This graphic display will not function unless waypoint or route navigation is selected.

	Graphic Display	Actual Ship Course
Example 1	<p>Steering to destination or waypoint based on straight course.</p> 	
Example 2		
Example 3		
Example 4		
Example 5		

6.4 INITIAL SETTINGS

- 1) The CVS-109 will preserve the used settings when the power is turned off, and it will operate with previously used settings at the next turn-on.
- 2) If you want to return to the initial factory settings, first touch ON key. As the beeper will sound, press and hold MEMO key until the beeper sound stops. The CVS-109 will start operating with the pre-determined settings listed below.

NOTE:

Please be careful that this will also clear all waypoints entered. If you want to clear the settings except for waypoints, touch ON key and press and hold ALARM CLR key until the beeper stops.

Echo Sounder

Menu 1

GAIN MANUAL	ZOOM MANUAL
----------------	----------------

RANGE	MANUAL
-------	--------

ZOOM RANGE	10
------------	----

B. ZOOM 10	BOTTOM ZOOM
---------------	----------------

KEEL ALARM	OFF
------------	-----

FISH ALARM	OFF
------------	-----

A-SCOPE OFF	SCALE OFF
----------------	--------------

Menu 3

FISH SYMBOL	OFF
-------------	-----

SPEED DATA	INT
------------	-----

SPEED ADJUST	100
--------------	-----

SPEED	HF
-------	----

TEMP	HF
------	----

Menu 2

A. CLUTTER [] [] [] [] [] []	TEMP HF
---------------------------------------	------------

C. ECHO OFF	T. GRAPH OFF
----------------	-----------------

POWER HIGH	NAV PSTN OFF
---------------	-----------------

PULSE L	B. GROUND BLUE
------------	-------------------

S. T. C.	200KHZ 0
----------	----------

S. T. C.	50KHZ 0
----------	---------

COLOR	7654321 1
-------	-----------

Plotter

Menu

PLOT INT TIME	TRK. PLOT ON
------------------	-----------------

PLOT TIME	5S
-----------	----

ARRIVAL ALARM	OFF
---------------	-----

TRK. SMOOTH OFF	TRACK SELECT
--------------------	-----------------

COLOR	1
-------	---

PLOTS AVAIL 500	CENTERING AUTO
--------------------	-------------------

7. SPECIFICATIONS

CRT	8"Color
TEMPERATURE RANGE	0 - 50°C
POWER REQUIREMENT	11 - 40V DC (Approx. 36 watts)
ECHO SOUNDER	
FREQUENCY	Dual - 200kHz/50kHz Single - 200kHz or 50kHz
OUTPUT POWER	H - 600 Watts RMS M - 150 Watts RMS L - 25 Watts RMS
PULSE LENGTH	L - 0.06 ~ 2.5 msec M - 0.04 ~ 2.5 msec S - 0.02 ~ 1.1 msec
DEPTH RANGES	0-10, 20, 40, 80, 120, 160, 240, 320, 480, 640, 960, 1280, 1920, 2560 Ft. 0-5, 10, 20, 40, 60, 80, 120, 160, 240, 320, 480, 640, 800 Mt. 0-5, 10, 20, 40, 60, 80, 120, 160, 240, 320, 480 Fa.
ZOOM RANGES	10, 20, 40, 80, 120, 160, 240, 320, 480, 640 Ft. 5, 10, 20, 40, 60, 80, 120, 160, 240, 320 Mt. 5, 10, 20, 40, 60, 80, 120, 160, 240, 320 Fa.
BOTTOM ZOOM (or LOCK) RANGES	10, 20, 30 Ft. 5, 10, 15 Mt. 5, 10, 15 Fa.
DATA	7 Colors (Red, Orange, Yellow, Green, Cyan, White, Lt. Blue)
BACKGROUND	Blue or Black
BRIGHTNESS	Adjustable in 8 levels
DISPLAY MODE	Dual Frequency Mode : Normal + Normal, Zoom+Zoom, Bottom Zoom+Bottom Zoom (Bottom Lock+ Bottom Lock) Single Frequency Mode : Normal, Normal+Zoom, Normal+Bottom Zoom (Bottom Lock)
A-SCOPE IMAGE	Selectable
ALARM	Keel Alarm - 300Ft. , 100Mt. or 50Fa. in one unit increments Fish Alarm - 7 Levels
IMAGE SPEED	7 plus Freeze Including speed proportional to boat speed(Boat speed needs to be obtained from an external navigation equipment.)
IMAGE MEMORY	One screen of image
DISPLAY REVIEW	Recall of last two screens
OTHER FUNCTIONS	Range Shift, Clean Echo, Anticlutler, S. T. C.
TEMPERATURE GRAPH	Selectable

PLOTTER

SCALE ACROSS THE SCREEN	1, 2, 4, 8, 16, 32, 64, 128, 256, 512 nm, sm
TRACK MEMORY	2, 4, 6, 15, 30, 60, 118, 236, 474, 948 km
PLOT INTERVAL	500 points
	Time : 5, 10, 30 sec, 1, 5, 10 min
	Distance : 0.05, 0.1, 0.5, 1, 2, 4, 8 nm
	0.05, 0.1, 0.5, 1, 2, 4, 9 sm
	0.09, 0.18, 0.92, 1, 3, 7, 14 km

DISPLAY MODE	Plotter, Navigation
EVENT MARKS	10 points
WAYPOINTS	90 points
ARRIVAL ALARM	0.0 - 9.9
OTHER FUNCTIONS	Track Colors assignable by Depths or Temperatures

SERIAL DATA INPUT/OUTPUT	NMEA 0183
--------------------------	-----------

Input	xxGLL (Lat/Lon)
	xxGTD (TD's)
	xxVTG (Boat Speed & Heading)
	xxRMC (Boat Speed & Heading)
Output	SDDBS (Depth)
	SDVHW (Speed)
	SDVLW (Log)
	SDMTW (Temp)
	xxBWC (Nav. Info.)
	xxGLL (Lat/Lon) Retransmission or simulator position
	xxXTE (Cross Track Error)
	xxAPB (Heading to Steer)

* Specifications subject to change without notice.

8. STANDARD EQUIPMENT

CVS-109 Control/Display Unit	1	11.5 lbs
Trunnion	1	
Knobs	2	
Metal and Rubber Washers	2	
Transducer	1	
Transducer Plug	1	8 pin (2 plugs for the dual frequency)
Power Cable	1	10 feet
Fuse	1	5 Amp.
Sun Hood		
Data Interfacing Connector Plug	1	6 pin
Operation Manual	1	

9. ADJUSTMENT OF SCREEN

The display position can be adjusted up and down, or to right and left.

- 1) Touch ON key. The beeper will sound. While the beeper is sounding, press and hold MODE key. Release it when the beeper sound stops.
At this moment, please confirm that the CVS-109 is in Echo Sounder mode. If it is in Plotter mode, change it to Echo Sounder mode.
- 2) Touch MENU key. A cross hatched pattern appears on the screen.
- 3) Adjust the position of cross hatched pattern with GAIN and RANGE/SHIFT keys.
GAIN key moves the pattern up or down, and RANGE/SHIFT key moves it to right or left.

10. TROUBLESHOOTING

When the CVS-109 does not operate properly, please read this section carefully. If you are unable to correct the problem by performing these procedures, contact your authorized SI-TEX dealer.

PROBLEM	COUNTERMEASURES
No power	Verify that the power connector is securely inserted, and check the fuse. If the polarity is reversed by mistake, the fuse will be blown. In this case, try to reverse the polarity and replace 5A fuse.
Power is on, but the sea bottom is not displayed.	Verify that the transducer connector is securely inserted or that the transducer cable is not broken. Enable auto gain and auto range.
Screen display is weak, loss of sensitivity.	Check the connection of the transducer. Make sure the transducer is properly mounted and pointed correctly. Verify that no marine creatures stick on the transducer face. They are susceptible to accumulate on it. Take care not to damage the transducer face when you scrape them off. Disable anticlutter or clean echo.
Excessive noise is present on display	Check for interference from other boats. Also, check if the other equipment is operating properly. Verify that the unit is not affected by the engine noise, and make sure that it is not picking up noise due to its proximity to noise source.

CERTIFICATE OF LIMITED WARRANTY

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

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

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

LIMITED WARRANTY EXCEPTIONS

SI-TEX will not be responsible for equipment which has been subjected to water or lightning damage, accident, abuse, or misuse, nor any equipment on which the serial number label has been removed, altered or mutilated. SI-TEX assumes no responsibility for damage incurred during installation.

This Limited Warranty is effective only with respect to the original purchaser. Any cost associated with transducer replacement, other than the cost of the transducer itself, is specifically excluded from this Limited Warranty. Travel cost incurred will not be accepted for SI-TEX products. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF.

SPECIFIC EXCLUSIONS

Charges for overtime, stand-by, holiday, and per diem are specifically excluded from the Limited Warranty. Chart paper, stylus, stylus belt, lamps, and fuses are consumable items and are not covered by this Limited Warranty. Installation workmanship or materials, except as provided directly by SI-TEX, are not covered by this Limited Warranty. SI-TEX equipment or parts thereof which have been repaired or altered except by an authorized SI-TEX dealer or service center are not warranted in any respect.

Transducer, software update, battery, microphone, magnetron, and microwave components and water damage on water resistant VHF radio are items excluded from the two-year warranty and are covered by warranty for a period of one year for both parts and labor. SI-TEX will not, at any time, assume any costs or labor charges for checkout or external line fuse replacement or problems not found to be at fault in equipment itself.

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

HOW TO OBTAIN SERVICE UNDER THIS WARRANTY

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

- a) Contacting an authorized SI-TEX service station (The closest service station may be found by contacting your dealer of purchase.) OR
- b) Shipping your equipment prepaid via UPS or truck with insurance prepaid to SI-TEX at the address provided below. SI-TEX will, whenever possible, make all repairs covered by Limited Warranty within two weeks of receiving the equipment in Florida and return same to you, freight prepaid.
- c) You must present a copy of your Purchase Sales Slip at the time you request warranty service.

Shipping/Mailing Address:

SI-TEX

Koden America, Inc.

11001 Roosevelt Blvd., Suite 800

St. Petersburg, FL 33716

727-576-5734

SI-TEX offers a complete line of quality marine electronics including echo sounders, electronic charting systems, radars, autopilots, GPS/WAAS/Loran receivers, SSB receivers, VHF radios, and integrated systems.

For more information, contact your SI-TEX dealer or the main office, located in St. Petersburg, Florida.

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