ONWA®

KC

OPERATOR'S MANUAL

GPS CHART PLOTTER WITH FISHFINDER

CE FC

SAFETY INSTRUCTIONS

Safety Instructions for the Operator

WARNING

Do not open the equipment.

Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

Fire,electrical shock or serious injury can result.

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

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

Use the proper fuse.

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

Be sure the power supply is compatible with the equipment.

Incorrect power supply may cause the equipment to overheat.

The useable temperature range -15℃ to 55℃ for the display unit.

Use of the equipment out of those ranges may damage the equipment.

Safety Instructions for the Installer

WARNING

Do not open the cover unless totally familiar with electrical circuits and service manual.

Improper handling can result in electrical shock.

Turn off the power at the switchboard before beginning the installation.

Fire or electrical shock can result if the power is left on.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or equipment damage.

Use the proper fuse.

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

CONTENTS

FOREWORD

The KCOMBO ONWA GPS PLOTTER aid are specially designed for the vessel traffic management, ONWA is a professional brand of the domestic and foreign navigation products.

The products are designed to be all-sealed and waterproof, can be rapid position-fixing and resistant to poor environment. The software is powerful by using the advanced ARM9 processors，can be capable to display faster, and the design for operation is professional and reasonable, can be easy to use. The built-in Large-capacity map storage space provides intuitive and accurate indication to navigation. It's applicable to the navigation and position-fixing of various vessels at sea and rivers, as well as the hydrographic information collection, river management, etc. For the application for different types of the products please refer to the following：

FEATURES

- Easy to operate
- Ultra high brightness LCD, viewable under strong sunlight
- Compatiable with dual mapping system,C-MAP NT MAX and ONWA K-Chart
- Built-in GPS antenna, external antenna can be used as an option
- Digital HD fishfinder technology
- Built-in commercial fishfinder module which is widely using in worldwide commercial fishing bost
- IPX7 waterproof panel

MAIN PERFORMANCE AND SPECIFICATIONS

Plotter Char

Waypoints/icons	12000 user waypoints with name, symbol. 3 system waypoints: MOB, Start , Cursor 10 proximity waypoints
Routes	Max 30 routes. And up to 170 points for each one
Tracks	8000 points automatic track log; 10 saved tracks (up to 8000 track points each). Let you retrace your path in both directions
Alarms	XTE, Anchor drag, arrival, speed, voltage, proximity waypoint and time,AIS alarm.
Palette	Normal Daylight exposed to sunlight Night in dark environment NOAA paperchart colors
Tides	Tide data
Projection	Mercator projection
Position format	Degree of minutes and UTM
Basemap	Built-in Onwa K-Chart
External Map	SD Cards slot for C-Map MAX and ONWA K-Chart
User data storage	Internal backup of user settings, or external SD-card
Plot Interval	5s to 60min 0.01nm to 10nm Automatic way
Plotting scales	0.001nm to 1000nm
Nav Data	Inputs: $--GGA, $--GLL,$--GSA, $--GSV, $--RMC, $--VTG, $--ZDA, $--VWR,$--VWT,$--MWD, $--VPW Outputs: “GGA”,“GLL”,“RMC”,“AAM”, “APA”, “APB”, “BOD”, “BWC”, “BWR”,“DBT” “DPT”,” HDT”, “MTW”, “RMB”, “TLL”, “VTG”, “WPL”, “XTE”, “ZDA”, “ZTG”, “ZDL”, “MWD”, “VPW”,“VWR”, “VWT”, Outputs for autopilot: $--APB,$--BOD,$--XTE,$--APA
Perspective View	On/off
Celestial	Sunrise/Sunset Moonrise/Moonset

Power Supply

10.5 to 35VDC, current drain<1.0A at 12V

Physical

Size:	243mm(H)X155mm(W)X82mm(D)
Weight:	0.6kg
Display:	7-inches ColorTFT day-view LCD 800×600 pixels
Input & Output Port:	one opto-isolated input Port
	one RS232 Output Port
Waterproofing:	Display unit: IPX5
Temperature range:	Display unit: -15℃ to +55℃
	Antenna unit: -25℃ to +70℃

GPS Receiver Ch

Receiver:	50 parallel channel GPS receiver continuously tracks and uses up to 50 satellites to compute and update your position
Acquisition time:	Cold start: 60 seconds average
	Hot start: 45 second average
Update rate:	1/second,continuous
	Position: 2.5 meters(95%) without S/A
	Velocity: 0.1 meter/sec without S/A
	Time: 100ns synchronized to GPS time
Dynamics:	Altitude: 50,000m Max
	Velocity: 500 m/s
	Acceleration: 4g Max
Datum:	WGS 84 and user define

Equipment List

Standard

1. Display unit
2. Operator manual
3. Installation materials and standard spare parts

AIS interface

Data input: NMEA 0183, RS232

Baud rate: 38,400

Option Accessories

1) GPS antenna KA-07

2) Transducers

Dual Frequency Thru-Hull Transducer

- 600W Bronze NMM40-50/200
- 600W Plastic NBM40-50/200
- 600W Airmar Bronze Transducer w/Temp seosor B45

Dual Frequency Transom Mount Transducer

- 600W Onwa Transducer w/Temp seosor KTD-520_TM
- 600W Airmar transducer w/Temp seosor P58

3) Temperature seosor

Onwa Thru-Hull temperature seosor KTS-10K_TH

Onwa Transom Mount Temperature seosor KTS-10K_TM

HD Fishfinder Ch

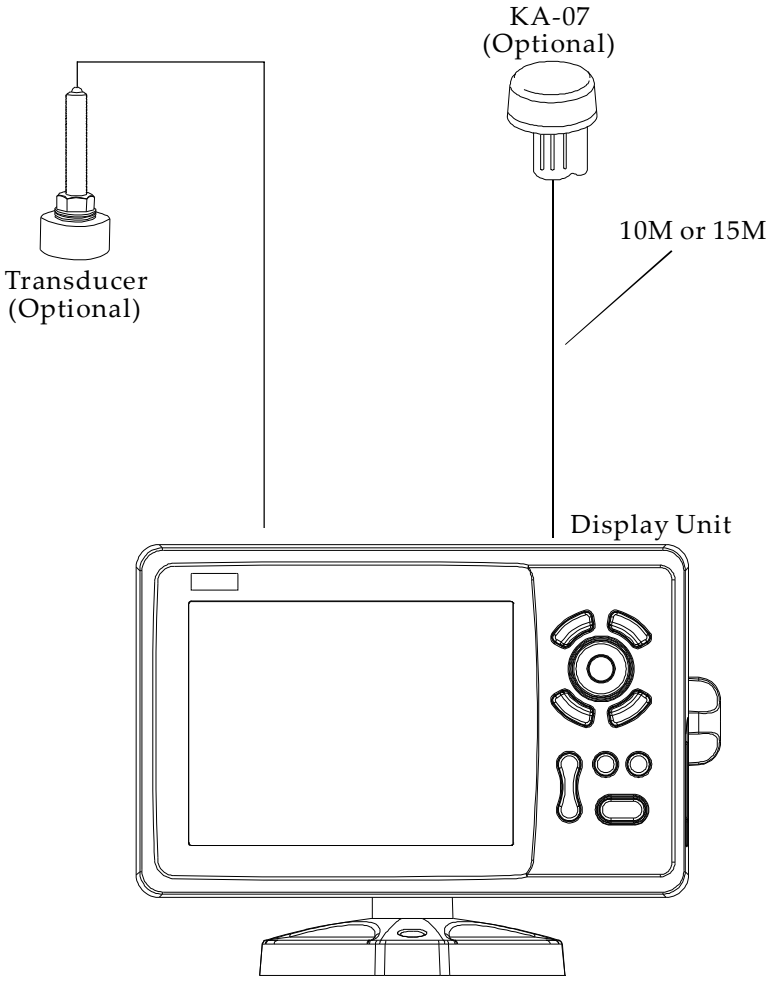
Echo Color	16 colors (including background color) according to echo intensity. The background color is selectable from blue, light blue, white and black.
Basic Range	Meters 5/10/20/40/80/150/200/300/600/1000 Feet 15/30/60/120/200/400/600/1000/2000/3000 Fathoms 3/5/10/20/40/80/100/150/300/600
Range Shift	80 meters, 200 feet, 100fathoms
Zoom Range	Times 2,3,4,6
Bottom Lock Expansion	5/10meters,10/20feet, 2/5fathoms
Auto Mode	Automatic adjustment of range and gain
Display Mode	High Frequency (200KHz),Low Frequency (50KHz), Dual (200K and 50K 1/2display on each), Zoom (200KHz and 50KHz zoom) and A-scope Display
Zoom Display	Marker Zoom, Bottom Zoom and Bottom-lock Expansion
Display Advance Speed	Lines/TX:Freeze,1/8,1/4,1/2,1/1,2/1
TX Frequency	50 and 200kHz (alternately transmitted)
Power Output	600W

Pulse-length/TX rate

Display End Depth (m)	5	10	20	40	80	150	200	300	600	1000
Pulse-Length (ms) 200K	0.12	0.22	0.32	0.52	0.92	1.02	1.02	1.02	1.02	1.02
Pulse-Length (ms) 50K	0.17	0.27	0.37	0.57	0.97	1.07	1.07	1.07	1.07	1.07
TX Rate (Pulse/min)	2400	1500	857	444	231	125	95	63	38	30

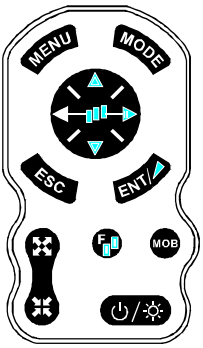
Interference Rejecter	Rejects unwanted signals by comparing last and present echoes in strength.
Alarm	Fish and Bottom alarms, Temperature alarm (sensor required)

CONFIGERATION



1. OPERATION OVERVIEW

1.1 Keypad instruction



Plotter function: Moving the cursor upward or to change the setting.
Sounder function: Moving the VRM upward.

Plotter function: Moving the cursor to the right.
Sounder function:
Long Press - Activates feeding rate selection for picture advancement
Short Press - Setting the depth range (setting upper range limit).

MENU Pressing it once displays the menu of the current page, pressing it twice enters the main menu.
Plotter + Sounder Function:
Long press - Activates split ratio selection.
Short Press - Displays the menu of the screen that has >50% screen coverage.

MODE Display the seven main screens circularly, turn over the listed interfaces.
Plotter Function: Press and hold to change track color.
Sounder Function: Press and hold to activate sonar mode selection.

ESC Withdraw from an optional operation, or display the previous page in reverse-cycle order.
Plotter function: Press and hold to switch track ON/OFF.

ENT/ Confirms the input or data.
Plotter function: Long Press - Activates Drawing Mark option.
Short Press - Activates waypoint attribute edit window.
Sounder function: Long Press - To switch from manual gain to automatic gain and vice versa.
Short Press - To adjust gain level.

Plotter and AIS Function: Enlarges the scale of the maps and charts.
Sounder Function: Decreases the depth range for shallow waters.

Plotter and AIS Function: Reduces the scale of the maps and charts.
Sounder Function: Increases the depth range for deeper water.

F Plotter function: Display other function (GOTO, tide table, search, etc.) menu.
Sounder function: Provides signal level selection. Eliminates low intensity echoes (up to light-blue echoes) each level.

MOB The MOB mark denotes man overboard position.

Long Press - Turn the power ON/OFF.
Short Press - Adjust the screen brightness and control panel dim. .

1.2 Turning ON and OFF Power

Turning on the power

Press the **[⏻/☼]** key. The unit beeps and displays the "**ONWA**" logo. After a few seconds, it starts up with the last used display mode.

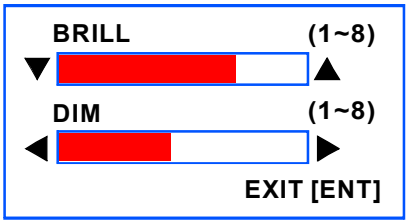
Turning off the power

Press and hold down the **[⏻/☼]** key until the screen goes blank (about four seconds).

1.3 Adjusting Brilliance and DIM

You can adjust display brilliance as shown below.

1. Press the **[⏻/☼]** key. The adjusting window appears.

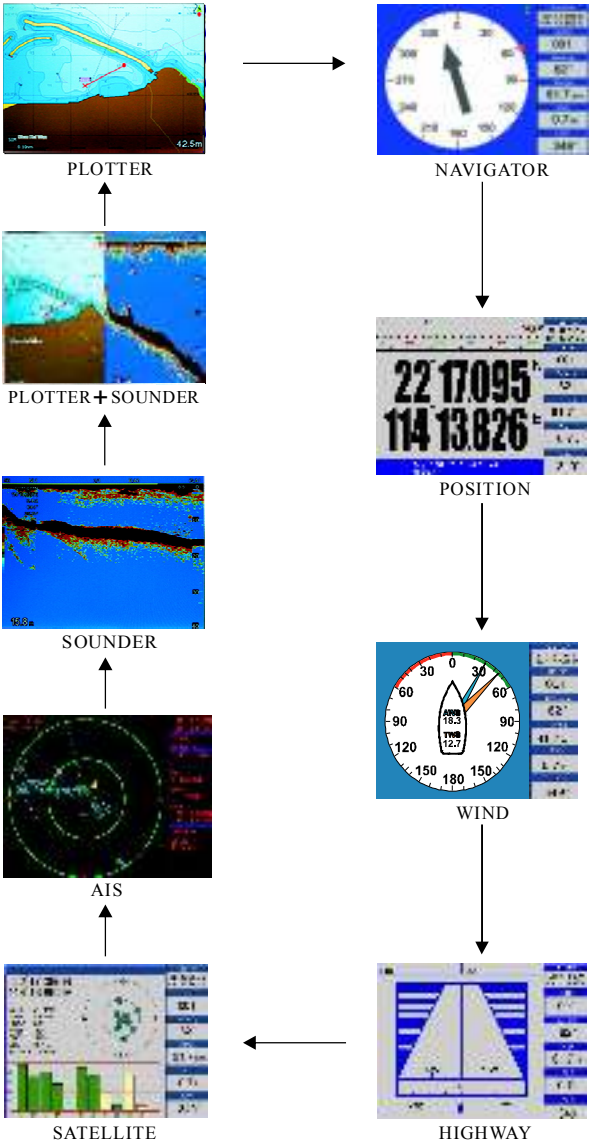


2. Press **[▲]** or**[▼]** to adjust LCD display brightness.
3. Press **[▶]** or **[◀]** to adjust keypad backlight.
4. Press the **[ESC]** key to confirm and exit.

1.4 Display Modes

Your unit has eleven display modes: PLOTTER SCREEN, NAVIGATOR SCREEN, WIND SCREEN, POSITION SCREEN, SATELLITE SCREEN, HIGHWAY SCREEN, AIS SCREEN, SOUNDER SCREEN and PLOTTER + SOUNDER SCREEN.

Press the **[MODE]** key to choose a display mode. Each time the key is pressed, the display mode changes in the sequence shown below.



2. PLOTTER DISPLAY OVERVIEW

2.1 Choosing the Zoom Display Range

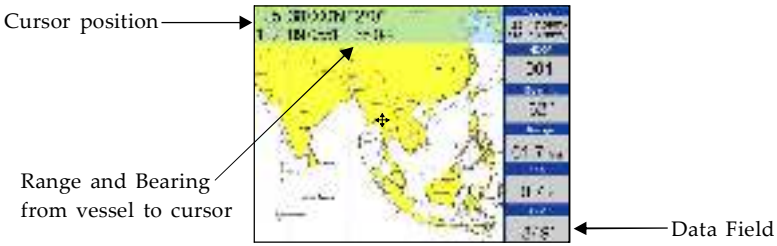
You may press ⊠ to Zoom In and ⊠ to Zoom Out as desired **on the PLOTTER** display.

2.2 Moving the Cursor

Press the cursor pad to move the cursor. The cursor moves in the direction of the pressed arrow. Whether up **[▲]**, down **[▼]**, left **[◄]**, right **[►]** or diagonal **[⊠]**.

Cursor Position Turned On

Cursor position is displayed in latitude and longitude at the top left corner of the **PLOTTER** display when the cursor is on. The range and bearing from own ship to the cursor appears at the top left corner of the display too.



Cursor Position Turned Off

Press the **[ESC]** key to clear the cursor. Cursor position data will disappear when the cursor is off.

2.3 Panning the PLOTT

Using the cursor, pan left, right, up or down on your desired area. Place the cursor at the edge of the screen to start panning. The display shifts in the direction opposite to cursor pad operation.

2.4 Centering Own Ship's Position

Press the **[ESC]** key for centering own ship's position.

2.5 Coordinates

Coordinate Systems are ways of splitting up the world in order to form transferable units (numbers) that relate to points on a map.

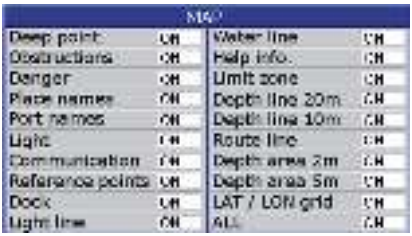
1. Press **[MENU]** key in **PLOTTER** screen.

2. Choose **Coordinates** and then press **[ENT]** key to select.

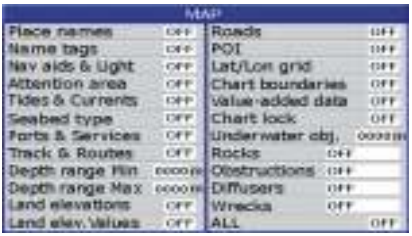
3. Choose "**N/E**" or "**UTM**" as desired then press **[ENT]** key to finish.

2.6 Map

1. Press [**MENU**] key in PLOTTER screen.
2. Choose **Map** and then press [▶] key to select.
3. Choose the layer "ON" or "OFF" as desired and then press [**ENT**] key to finish.



(K-Chart)



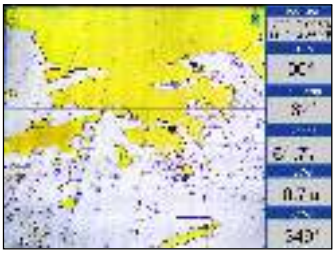
(C-MAP)

2.7 Perspective View

1. Press **[MENU]** key in **PLOTTER** screen.
2. Choose **Perspective** and then press **[ENT]** key to select.

3. Choose "**ON**" or "**OFF**" as desired and then press **[ENT]** key to finish.

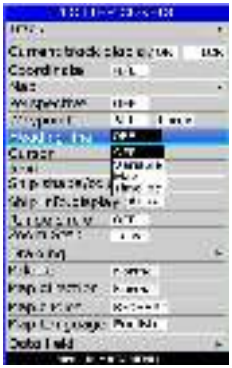
4. Choose the layer "ON" as desired and then press [**ENT**] key to finish.



5. Choose the layer "OFF" as desired and then press [**ENT**] key to finish.

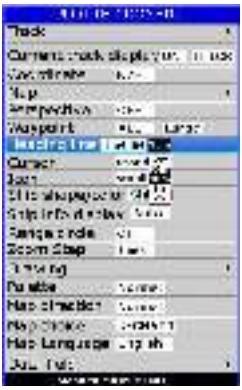
2.8 Heading Line

1. Press **[MENU]** key in **PLOTTER** screen.
2. Choose **Heading Line** and then press **[ENT]** key to select.



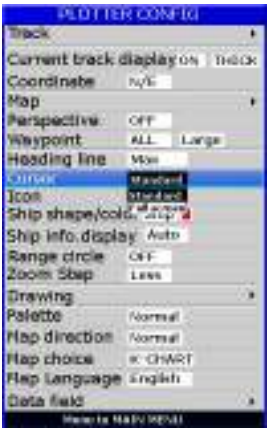
3. **Choose "Off", "Variable", "Max"** or **"Timeline"** as desired and then press **[ENT]** key to finish.

4. Heading Line option: "COG Time Line" selection
   The length of heading line will vary according to the SOG to show the estimated point of destination after the set period. Example, if you set the COG Time Line to 10 minutes then the length of the heading line will point to the position that your boat will reach after 10 minutes.



2.9 Cursor

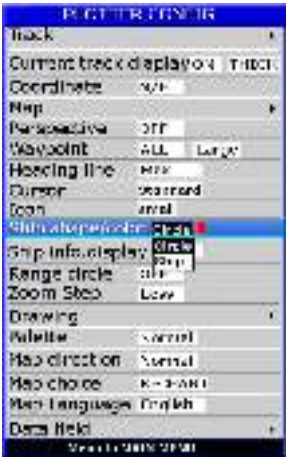
1. Press **[MENU]** key in **PLOTTER** screen.
2. Choose **Cursor** and then press **[ENT]** key to select.



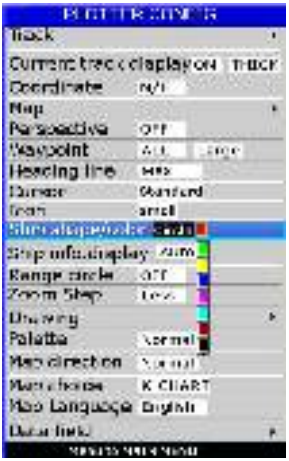
3. Choose "**Standard**" or "**Full Screen**" as desired and then press **[ENT]** key to finish.

2.10 Ship shape/color

1. Press **[MENU]** key in **PLOTTER** screen.
2. Choose **Ship shape/color** and then press **[ENT]** key to select.



Press [▶] key and then press **[ENT]** key.



2.11 Rang

1. Press **[MENU]** key in **PLOTTER** screen.
2. Choose **Range Circle** and then press **[ENT]** key to select.

3. Choose "ON" (if you choose "ON", you need to input the radius of the circle manually), or "OFF" as desired and then press **[ENT]** key to finish.

2.12 Drawing

1. Press **[MENU]** key in **PLOTTER** screen.
2. Choose **Drawing** and then press **[ENT]** key to select.

3. Choose "Mark", "Line" or "Place name" as desired and then press [**ENT**] key to finish.
4. User can change the size of User Marks.

5. User can change the size of Drawing Lines.

2.13 Palette

1. Press [**MENU**] key in **PLOTTER** screen.
2. Choose **Palette** and then press [**ENT**] key to select.

3. Choose "Normal", "Daylight", "Night" or "NOAA" as desired and then press [**ENT**] key to finish.

2.14 Map Direction

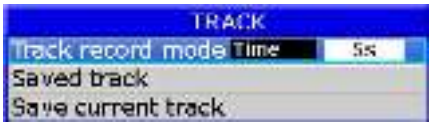
1. Press **[MENU]** key in **PLOTTER** screen.
2. Choose **Map Direction** and then press **[ENT]** key to select.

3. Choose "Normal", "North Up", "WPT Up" or "COURSE Up" as desired and then press [**ENT**] key to finish.

3.1 Changing Track Pl

When the track memory becomes full, the oldest track is erased to make room for the latest.

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Track record** and then press **[▶]** key to select.



3. Choose Track record mode and then press [▶] key select.

4. Choose "Time", "Distance", "Auto" or "Off".

Time: Track is recorded and plotted at the time interval set.

Distance: Track is recorded and plotted at the distance interval set.

Auto: Plotting and recording interval changes with display range selected.

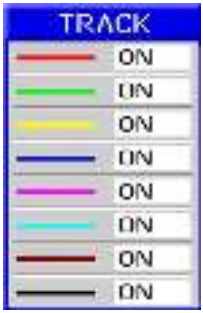
Off: Track is neither recorded nor plotted.

5. For Time and Distance, enter the recording interval as follows:
   a) Press the [▶] key to choose "5s", "10s", "30s", "1min", "5min", "10min", "30min" or "60min".
   b) Use [▲] or [▼] to select value.

6. Press **[ENT]** key to finish.

3.2 Displaying the Tr

1. Press **[MENU]** key in **PLOTTER** screen.
2. Choose **Track** and then press **[►]** key to select.



3. Choose the color and if you want to turn it "ON" or "OFF".
4. Press [**MENU**] key to finish.

3.3 Creating Track Data

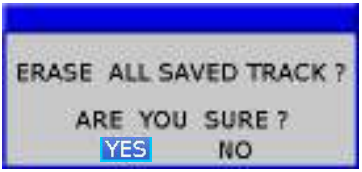
1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Track Record** and then press **[►]** key to select.
3. Choose Save Current Track and then press [**ENT**] key.
   The following window will appear.

Track Data can be used for navigation.

3.4 Erasing Track

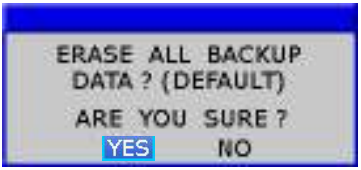
1. Press **[MENU]** key twice to enter main menu.
2. Choose **Erase** and then press **[►]** key to select.

3. Choose **Current track** or **Saved track**.
4. If **Saved track** is chosen, press **[►]** key to choose the color that you want to erase or choose **ALL** if you want to erase all tracks and then press **[ENT]** key. The following window will appear:



3.5 Erasing All Backup Data

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Erase** and then press **[►]** key to select.
3. Choose **All backup data** and then press **[ENT]** key. The following window will appear.



4. WAYPOINT/MOB

4.1 Entering Waypoints

Waypoints can be entered on the **PLOTTER** display in three ways: by cursor position, at own ship's position, and from the waypoint edit.

Entering a waypoint with the cursor

1. Use the cursor pad to place the cursor on the location desired for a waypoint.
2. Press the **[ENT]** key. The following window appears.

3. This window is where you can rename, edit LON and LAT, choose mark shape and color, and enter a comment.
4. Choose "**SAVE**" to finish.

Entering a waypoint at own ship's position

1. Momentarily press [**ENT**] key when no cursor is seen.
   The following window appears.

2. If you do not need to change anything, choose "SAVE" to finish.

Entering a waypoint from the waypoint list

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press **[►]** key to select.

3. Choose **Waypoint** and then press [**ENT**] key.
   The following window will appear

4. Choose **NEW** then press [**ENT**] key.
   The following window appears.

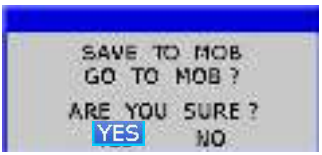
5. If you do not need to change anything, choose "SAVE" to finish.

4.2 Entering the MOB Mark

Only one MOB mark may be entered.

Each time the MOB mark is entered, the previous MOB mark and its position data are over-written.

1. Long press the **[MOB]** key on any display mode.
   The following display appears.



2. To set MOB position as destination, press [▶] to choose "YES" and then press [**ENT**] key. Choosing "NO" saves the position as a waypoint called "MOB".

4.3 Displaying Waypoint Name

You may display waypoint name as follows:

1. Press the **[MENU]** key on the **PLOTTER** screen.
2. Choose **Waypoint** and then press the **[ENT]** key. The following window will appear.

3. Choose "**All**", "**Goto**", "**Route**", "**Icon**" or "**OFF**" as desired and then press the **[ENT]** key.

All: Displays all waypoint names.

Goto: Displays only the GOTO waypoint name.

Route: Displays all waypoint names when a route is set as destination.

OFF: Do not display any waypoint name.

4. User can change the size of Waypoint Marks

4.4 Operation on the Waypoint Editing

Waypoint position, waypoint name, mark shape, mark color and comment can be edited from the Waypoint Edit.

1. Press the [**MENU**] key twice to enter main menu.
2. Choose Edit and then press [▶] key to select.
3. Choose Waypoint and then press the [**ENT**] key.
   The following window will appear.

4. Choose waypoint to edit and then press the [**ENT**] key.
   The following window will appear.

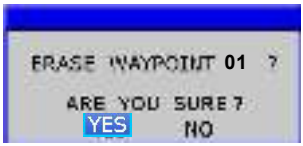
5. Choose the object you want to edit and then press the [**ENT**] key to select.
6. Change name, position, mark shape, mark color, comment as desired.
7. Choose "SAVE" and then press [**ENT**] key to finish.

4.5 Erasing Waypoints

1. Press the **[MENU]** key twice to main menu.
2. Choose **Edit** and then press **[►]** key to select.
3. Choose **Waypoint** and then press the **[ENT]** key. The following window will appear.

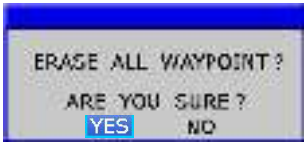
4. Select a waypoint and press **[ENT]** key.
5. The confirm window will appear. Choose "ERASE" and then press [**ENT**] key.

6. Choose "YES" and then press [**ENT**] key to finish.



Erase All Waypoints

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Erase** and then press **[►]** key to select.
3. Choose **All waypoint/MOB** and then press **[ENT]** key.
   The confirming window will appear.



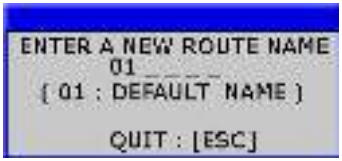
4. Choose "YES" and then press [**ENT**] key to erase all waypoints.

5. ROUTES

5.1 Creating Routes

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press **[▶]** key to select.
3. Choose **Route** and then press **[ENT]** key.
   The following window will appear.

4. Choose "NEW" and then press [**ENT**] key.
   The following window will appear.



5. Use [▲] or [▼] to enter the route name and then press [**ENT**] key to finish. The following will appear.

6. Choose the location (e.g. 01) and then press [**ENT**] key.
   A new window will open which will let you choose a waypoint.

7. Choose the waypoint name that you want to include in the route and then press [**ENT**] key (e.g., 001). You can also create a new waypoint if needed.
8. Repeat step 6 and 7 until the route is complete.

5.2 Editing Routes

Replacing waypoints in a route

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press **[▶]** key to select.
3. Choose **Route** and then press **[ENT]** key to select.
4. Choose the route to edit and then press **[ENT]** key.
5. Place the cursor on the waypoint to replace, press the **[ENT]** key to show the route options.

6. Choose "Change" and then press [**ENT**] key.
   The waypoint select window will appear.

7. Choose the waypoint name that you want to include in the route and then press [**ENT**] key.
8. Repeat step 5 to 8 until finish edit.

Permanently deleting a waypoint from a route

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press the **[▶]** key to select.
3. Choose **Route** and then press **[ENT]** key to select.
4. Choose the route desired and then press **[ENT]** key to select.
5. Choose the waypoint you want to delete and then press **[ENT]** key to show the route edit options.

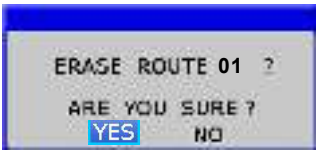
6. Choose "Remove" and then press [**ENT**] key to finish.

5.3 Erasing Routes

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press **[▶]** key to select.
3. Choose **Route** and then press the **[ENT]** key. The following window will appear.

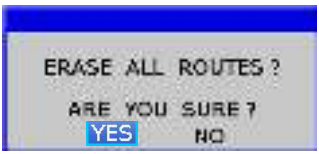
4. Select a route then press **[ENT]** key.
5. The confirm window will appear. Choose "**ERASE**" and then press **[ENT]** key.

6. Choose "YES" and then press [**ENT**] key to finish.



Erase All Routes

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Erase** and then press **[▶]** key to select.
3. Choose **All routes** and then press **[ENT]** key.
   The confirming window will appear.

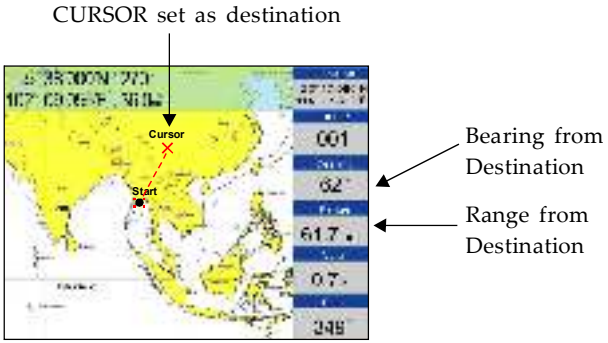


4. Choose "YES" and then press [**ENT**] key to erase all routes.

6.1 Setting Destination by Cursor

1. Press **[F]** key to display the **FUNCTION** window.
2. Choose **Goto cursor** and then press **[ENT]** key to select.
3. The cursor appears with "?".

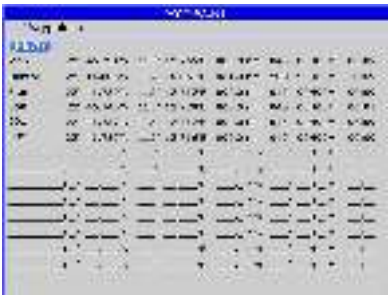
4. Use the cursor pad to place the cursor on the location desired for destination.
5. Press the [**ENT**] key to mark destination.



6.2 Setting Destination by Waypoint (WPT)

1. Press the **[F]** key to display the **FUNCTION** window.

2. Choose **Goto WPT** and then press [**ENT**] key to select.
3. The **WAYPOINT** list appears.



4. Choose a waypoint and then press [**ENT**] key to finish.

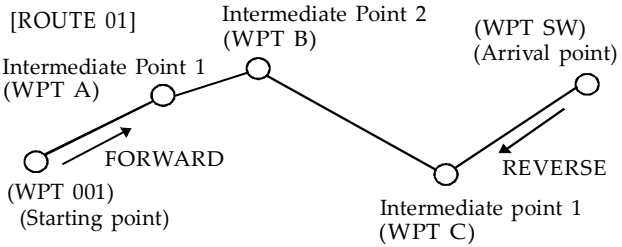
6.3 Setting R

1. Press the [**F**] key to display the **FUNCTION** window.
2. Select Goto route and then press [**ENT**] key to select.

3. The **ROUTE** list appears.

4. Choose a route and then press [**ENT**] key. The following window appears.

5. Choose "Forward" or "Reverse" in order to traverse the waypoints in the route, and then press [**ENT**] key to finish.



Meaning of forward and reverse

6.4 Setting Track Data as Destination

Track Data can be used for navigation.

1. Press the **[F]** key to display the **FUNCTION** window.
2. Choose **Goto track** and then press the **[ENT]** key to select.

3. The **SAVED TRACK** window will appear.

4. Choose the track that you want to set as destination, and then press **[ENT]** key.

5. Choose Forward or Reverese to start Goto track navigation.

Once a Goto track has been activated, the track will divide it into segments. Up to 200 temporary waypoints are created (named T1,T2, T3, etc. and END) to mark the most significant features of the track, duplicating your exact path as closely as possible. To get the most out of the Goto track feature, remember the following tips:

- Always clear the track log at the point that you want to go back to.
- There must be at least two track log points stored in memory to create a track route.
- If the receiver is turned off or satellite coverage is lost during your trip, it will draw a straight line between any point where coverage was lost and where it resumed.
- If your track's changes in distance and direction are too complex, 200 waypoints may not mark your path accurately.

The receiver then assigns the 200 waypoints to the most significant points of your track, and simplifies segments with fewer changes in direction.

6.5 Canceling Destination

You can cancel a destination as follows.

1. Press the [**F**] key to display the FUNCTION window.

2. Choose Stop goto and press [**ENT**] key to finish.

6.6 Distance

Measure the distance of several points and save it as a route.

1. Press **[F]** key in **PLOTTER** screen to display **FUNCTION** window.

2. Select "**Distance**" and press **[ENT]** key to activate the distance measurement function.

Note:

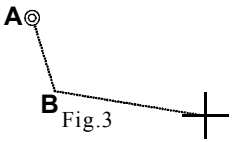


Fig.3

a) LON/LAT is the position of the cursor (point C)

b) BRG is the bearing of cursor to the last point (point B)

c) LEG is the distance of cursor to the last point (point B)

d) DST is the total distance from the cursor to the starting point (AB + BC)

e) M is Magnetic North, T is True North

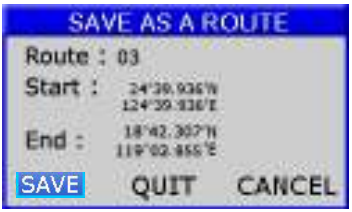
3. Move the cursor to the starting point (A) and press **[ENT]** to set up starting point. Now all BRG, LEG and DST are display 0.
4. Move the cursor to the next point (B). Now the BRG and LEG display the Bearing and Distance from point A to point B, DST=0.

5. Press [**ENT**] key, now DST= distance from point A to point B is shown, while BRG and LEG turns to 0.

6. Move the cursor to the next point (C). Now the BRG and LEG displays the Bearing and Distance from point B to point C. DIST displays the total distance from point A to point B.

7. Press [**ENT**] key, now DIST = distance of point AB + distance of point BC is shown, while BRG and LEG turns to 0.

8. Repeat steps 3, 4 and 5 to measure the distance of several points.
9. Press [**ESC**] key during the step 3, 4 or 5, the following menu will pop out.



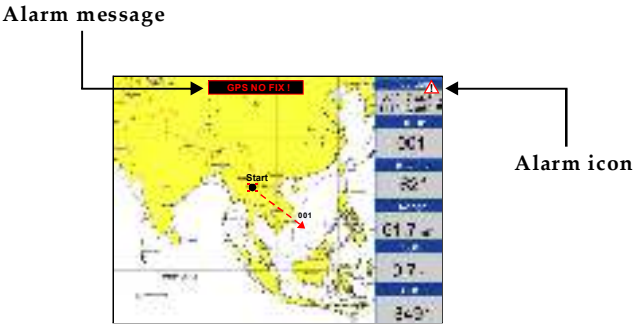
10. You can select :
    A) "SAVE" to save the measurement as a route.
    B) "QUIT" to quit the distance measurement function without saving.
    C) "CANCEL" to continue the distance measurement.

7. ALARM

There are six alarm conditions which generates both audio and visual alarms: **Arrival alarm**, **Anchor drag alarm**, **XTE (Cross-Track Error) alarm**, **Speed alarm**, **Voltage alarm** and **Timer alarm**.

When the alarm setting is violated, the buzzer sounds and the name of the offending alarm and the alarm icon appears on the display.

You can silence the buzzer and remove the alarm name indication by pressing any key. The alarm icon remains on the screen until the reason for the alarm is cleared.



7.1 Anchor Drag Alarm

Anchor Drag Alarm informs you that own ship is moving when it should be at rest and when the ship moves out a certain set range.

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Alarm** and then press **[►]** key to display **ALARM** menu.

3. Choose Anchor and then press [**ENT**] key. The alarm options appear.

4. Press [▶] key to select the alarm value and then press [**ENT**] key to setup the value.
5. Choose "ON" and then press [**ENT**] key to enable the alarm.

7.2 Arrival Alarm

Arrival Alarm informs you that own ship is approaching your set destination.

1. Press **[MENU]** key to enter main menu.
2. Choose **Alarm** and then press **[▶]** key to display **ALARM** menu.
3. Choose **Arrival** and then press **[ENT]** key. The alarm options appear.

4. Press [▶] key to select the alarm value and then press [**ENT**] key to setup the value.
5. Choose "ON" and then press [**ENT**] key to enable the alarm.

7.3 XTE (Cross-Track Error) Alarm

XTE (Cross-Track Error) Alarm warns you when own ship is off its intended course.

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Alarm** and then press **[►]** key to display **ALARM** menu.
3. Choose **XTE** and then press **[ENT]** key. The alarm options appear.

4. Press [►] key to select the alarm value and then press [**ENT**] key to setup the value.
5. Choose "ON" and then press [**ENT**] key to enable the alarm.

7.4 Speed Alarm

Speed Alarm provides visual and aural alerts when the ship's speed is higher or lower than the alarm range set.

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Alarm** and then press **[►]** key to display **ALARM** menu.
3. Choose **Speed** and then press **[ENT]** key. The alarm options appear.

4. Press [►] key to select the alarm value and then press [**ENT**] key to setup the value.
5. Choose "ON" and then press [**ENT**] key to enable the alarm.

7.5 Voltag

Voltage Alarm warns you when the input voltage in the unit is higher than the set value.

1. Press [**MENU**] key to enter main menu.
2. Choose Alarm and then press [▶] key to display ALARM menu.
3. Choose Voltage and then press [**ENT**] key. The alarm options appear.

4. Press [▶] key to select the alarm value and then press [**ENT**] key to setup the value.
5. Choose "ON" and then press [**ENT**] key to enable the alarm.

7.6 Timer Alarm

Timer Alarm provides audio and visual alarms when the time set has expired.

1. Press **[MENU]** key to enter main menu.
2. Choose **Alarm** and then press **[▶]** key to display **ALARM** menu.
3. Choose **Timer** and then press **[ENT]** key. The alarm options appear.

4. Press [▶] key to select the alarm value and then press [**ENT**] key to setup the value.
5. Choose "ON" and then press [**ENT**] key to enable the alarm.

7.7 Buzzer Type Selection

The buzzer sounds whenever an alarm setting is violated.

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Alarm** and then press **[►]** key to select.
3. Choose **Buzzer** and then press **[►]** key to select.
4. Choose buzzer type desired and then press **[ENT]** key to finish.

Short: Two short beeps

Long: Three long beeps

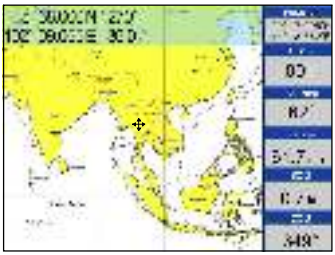
Constant: Continuous beeps

Disabling the alarm

1. Press any key to disable the buzzer of any alarm.
2. The Alarm Icon will not disappear until the reason for the alarm is cleared.

8.1 Drawing Marks

1. Press [**F**] key to display the **FUNCTION** window.
2. Choose Drawing and then press [▶] key to select.
3. Choose **Mark** and then press [**ENT**] key.
   The cursor appears with "+?" on the PLOTTER screen.



4. Use the cursor pad to place the cursor on the location desired, add a mark and then press [**ENT**] key. The following window appears.

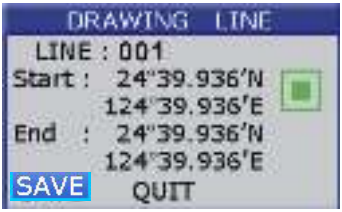
5. Edit Lat/Lon or mark, and then choose "SAVE" to finish.

Changing the Symbol and Color

1. Move the cursor to the mark and press [**ENT**] key to select.
2. Use [▲] or [▼] to select color or symbol then press [**ENT**] key.
3. Select "SAVE" to finish.

8.2 Drawing Lines

1. Press [**F**] key to display the **FUNCTION** window.
2. Choose Drawing and then press [▶] key to select.
3. Choose Line and then press [**ENT**] key.
   The cursor appears with "+?" on the **PLOTTER** screen.
4. Use the cursor pad to place the cursor on the location desired, add a point of the line and then press [**ENT**] key.
5. Repeat step 4 to complete the line.
6. Press [**ESC**] key to finish, and then the save confirmation window will appear.



7. Move the cursor to the color and press [**ENT**] key to modify the color, if required.
8. Choose "SAVE" and then press [**ENT**] key to save the line.

8.3 Drawing Place name

1. Press [**F**] key to display the **FUNCTION** window.
2. Choose **Drawing** and then press [▶] key to select.
3. Choose **Place name** and then press [**ENT**] key.
4. The cursor appears with a "+?" on the PLOTTER screen.
5. Use the cursor pad to place the cursor on the location desired, add a name and then press [**ENT**] key. The save confirmation window will appear.

6. Enter the name and then choose "SAVE" to finish.

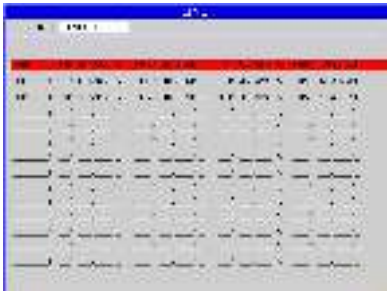
8.4 Editing Drawing Marks

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press **[▶]** key to select.
3. Choose **Drawing marks** and then press **[ENT]** key.
   The following window appears.

4. Select a mark then press [**ENT**] key to edit.
5. After editing, choose "SAVE" and then press [**ENT**] key to finish.

8.5 Editing Drawing Lines

1. Press [**MENU**] key twice to enter main menu.
2. Choose Edit and then press [▶] key to select.
3. Choose Drawing lines and then press [**ENT**] key.
   The following window appears.

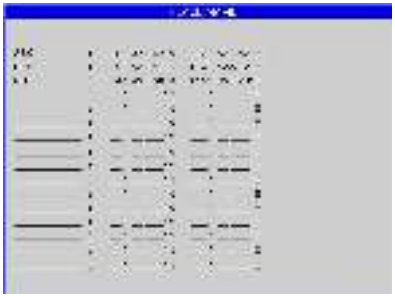


4. Choose the line that you want to edit and then press [**ENT**] key.
   The following window appears.

5. Choose the point that you want to edit and then press [**ENT**] key.
6. After editing, choose "SAVE" and then press [**ENT**] key to finish.

8.6 Editing Drawing Place Name

1. Press [**MENU**] key twice to enter main menu.
2. Choose Edit and then press [▶] key to select.
3. Choose Drawing placename and then press [**ENT**] key.
   The following window appears.



4. Choose the place name that you want to edit and then press [**ENT**] key.
   The following window appears.

5. After editing, choose "SAVE" and then press [**ENT**] key to finish.

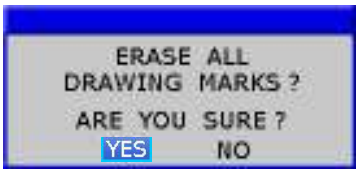
8.7 Erasing Drawing Marks

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press **[►]** key to select.
3. Choose **Drawing marks** and the press **[ENT]** Key.
4. Choose the mark that you want to clear, and then press **[ENT]** key.
   The confirmation window will appears.

5. Choose "ERASE" and then press [**ENT**] key.
6. The confirmation window will appear then choose "YES" to finish.

Erasing All Drawing Marks

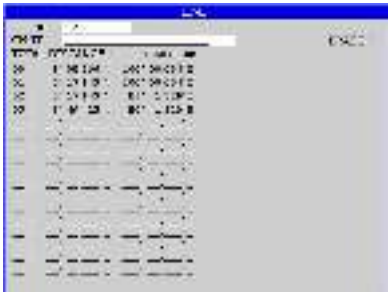
1. Press [**MENU**] key twice to enter main menu.
2. Choose **Erase** and then press [►] key to select.
3. Choose All drawing marks and then press [**ENT**] key.
   The confirmation window will appears.



4. Choose "YES" to erase all drawing marks.

8.8 Erasing Drawing Lines

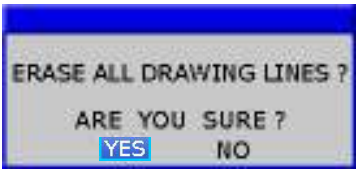
1. Press **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press **[▶]** key to select.
3. Choose **Drawing lines** and the press **[ENT]** key to select.
4. Choose the line that you want to erase, and then press **[ENT]** key.
   The confirmation window appears.



5. Choose "ERASE" and then press [**ENT**] key to select.
6. The confirmation window will appear then choose "YES" to finish.

Erasing All Drawing Line

1. Press [**MENU**] key twice to enter main menu.
2. Choose **Erase** and then press [▶] key to select.
3. Choose All drawing lines and then press [**ENT**] key.
   The confirmation window will appear.



4. Choose "YES" to erase all drawing lines.

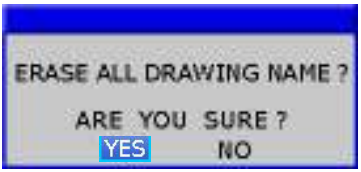
8.9 Erasing Drawing Place Name

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Edit** and then press **[▶]** key to select.
3. Choose **Drawing placename** and then press **[ENT]** key to select.
4. Choose the place name that you want to erase, and then press **[ENT]** key.
   The confirmation window appears.

5.Choose "ERASE" and then press [**ENT**] key.
6. The confirmation window will appear then choose "YES" to finish.

Erasing All Drawing Place Name

1. Press **[MENU]** key twice to main menu.
2. Choose **Erase** and then press **[▶]** key to select.
3. Choose **All drawing name** and then press **[ENT]** key.
   The confirmation window will appears.



4. Choose "YES" to erase all place names.

9.1 Map Scale

You can change the map scale display format.

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Setup** and then press **[▶]** key to select.

3. Choose Map scale and then press **[ENT]** key to select.
4. Choose "Miles" or "Ratio" as desired and then press **[ENT]** key to finish.

9.2 Unit of Measurement

Speed Unit

Distance/speed can be displayed in nautical miles/knots, kilometers/kilometers per hour, or statute miles/kilometers per hour.

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Setup** and then press **[▶]** key to select.
3. Choose **Speed unit** and then press **[ENT]** key to select.

4. Choose "nm, kt", "km, kmh" or "sm, kph" as desired and then press **[ENT]** key to finish.

Depth Unit

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Setup** and then press **[▶]** key to select.
3. Choose **Depth unit** and then press **[ENT]** key to select.

4. Choose "feet", "fathom" or "meter" as desired and then press **[ENT]** key to finish.

9.3 Bearing Reference

Ship's course and bearing to a waypoint may be displayed in true or magnetic bearing. Magnetic bearing is true bearing plus (or minus) earth's magnetic deviation. Use the bearing reference in accordance with the compass interfaced: magnetic for magnetic compass, true for gyrocompass.

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Setup** and then press **[▶]** key to select.
3. Choose BRG. REF. and then press **[ENT]** key to select.

4. Choose "True" or "Magnetic" as desired and then press **[ENT]** key to finish.

9.4 Magnetic Variation

The location of the magnetic North Pole is different from the geographical North Pole. This causes a difference between the true and magnetic north direction. This difference is called magnetic variation, and varies with respect to the observation point on earth.

Your unit is pre-programmed with all the earth's magnetic variation. However, you may want to enter variation manually to refine accuracy. Set **BRG. REF** on the **PLOTTER** screen to "Magnetic" to use magnetic variation.

1. Press **[MENU]** key twice to enter main menu.
2. Choose **Setup** and then press **[►]** key to select.
3. Choose MAG. VAR. and then press [**ENT**] key to select.

4. Choose "Auto" or "Manual" (if you choose "Manual", you need to input the value manually) as desired and then press [**ENT**] key to finish.

9.5 Deviation

You can input the deviation of the ship or map manually to correct the position error from GPS error or map error.

1. Press [**MENU**] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **Deviation** and then press [**ENT**] key to select.

4. Input the value as desired and then press [**ENT**] to finish. To disable deviation, input "0" into the value.

9.6 Time

GPS uses UTC time. If you would rather use local time, enter the Time difference (range: -13:30 to +13:30) between it and UTC time.

You may display the time in 12 or 24 hour format.

1. Press [**MENU**] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **Time** and then press [▶] key to select.

4. Input the time difference as desired. Choose "24H" or "12H" as desired and then press [**ENT**] key to finish.

9.7 TTG/ET

To calculate time-to-go and estimated time of arrival, enter your speed as below.

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Setup** and then press **[►]** key to select.
3. Choose **TTG/ETA speed** and then press **[ENT]** key select.

4. Choose "**Auto**" for automatic speed input (GPS calculated speed), or "**Manual**" for manual input.

9.8 Key beep

you can set the key sound

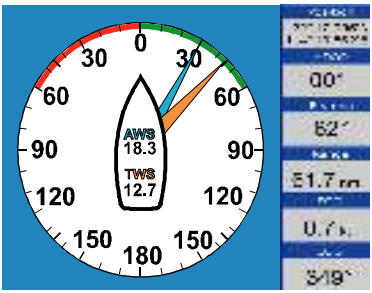
1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Setup** and then press **[►]** key to select.
3. Choose **Key beep** and then press **[ENT]** key select.

4. Choose "OFF" or "ON" and then press [**ENT**] key to finish.

9.9 Wind screen

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Setup** and then press **[►]** key to select.
3. Choose **Wind screen** and then press **[ENT]** key select.

4. Choose **ON** and then press [**ENT**] key to finish. The following message appears



9.10 GPS setting

9.10.1 Choosing GPS output data

The unit's default is using an internal GPS module for position fixing. On the other hand, you can use external GPS data for position fixing.

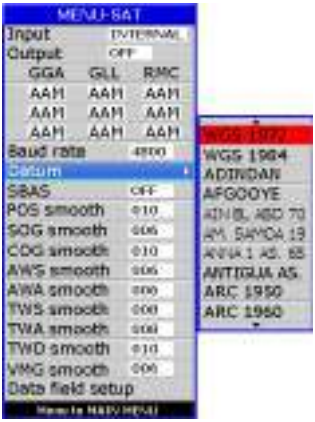
1. Press **[MENU]** key on the **SATELLITE** screen.
2. Choose **Output** and then press **[ENT]** key to select.

3. Choose "ON" or "OFF" as desired and then press [**ENT**] key.
4. Press [▶] key to select your desired output data, press [**ENT**] key to finish.

9.10.2 Datum setting

You can choose 6 types of data output at the same time.

1. Press **[MENU]** on the **SATELLITE** screen.
2. Choose **Datum** and press **[ENT]** key to select.

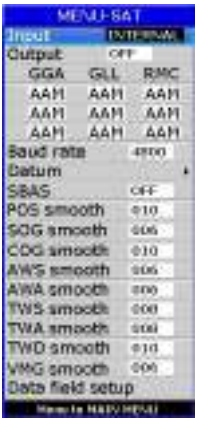


3. Choose your desired datum and press [**ENT**] key to confirm.

9.10.3 Smoothing

You can setup position smoothing, speed smoothing and course smoothing.

1. Press [**MENU**] key on the **SATELLITE** screen.



2. Choose **POS** smooth to enter position smoothing data.
3. Choose **SOG** smooth to enter speed smoothing data.
4. Choose **COG** smooth to enter course smoothing data.

9.11 NMEA data display

1. Press [**MENU**] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **NMEA** data display and then press [**ENT**] key.

4. NMEA data display is used during the installation to check whether the NMEA input and output data to and from other equipment onboard is normal. Press [⤧] key to switch between the input and output ports. Press [**ENT**] key to stop scrolling of NMEA data and press [**ENT**] key again to restart NMEA data scrolling. Press [**ESC**] key to quit the NMEA data display.

10. THE AIS FUNCTION

10.1 Vessels list

1. Press **[MENU]** on the **AIS** screen.

2. Choose AIS detail list and then press [**ENT**] key. The AIS SHIP LIST window will appear.

10.2 The collision alarm

1. Press [**MENU**] on the AIS screen.

2. Select CPA Limit or TCPA Limit then press [**ENT**] key to enter a value.
3. Select CPA Alarm or TCPA Alarm then press [**ENT**] key to choose "ON" or "OFF".

10.3 Own ship's information

There are two ways to display "Own Ship Info"

1. Enter the "**Vessels list**", and press the **[MENU]** key, and then select the "**Own Ship Info**" to check all the information of your own ship.
2. Move the cursor to select your AIS Vessel on the chart screen and press the **[ENT]** key.

10.4 Chart Screen

Users can check all AIS vessels being received in real-time on the chart screen, as well as the specific position and track of your own ship on the charts.

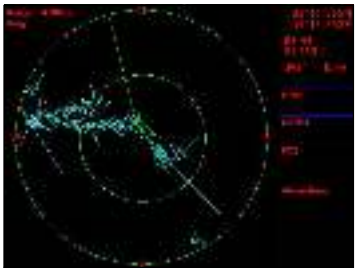
The track length of AIS vessels depends on the equipment memory space, generally not less than 20 track points.

10.5 View AIS vessels' information on chart screen

There are two ways to view AIS vessels' information: one is to move the cursor to select AIS vessel on the charts screen, and press the [**ENT**] key.
The other is to select the AIS vessel from the AIS vessels list, and press the [**ENT**] key.

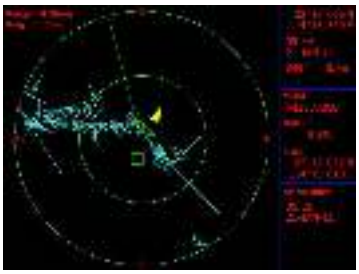
10.6 Check all AIS ships within the scope of Radar (AIS screen)

Displays all AIS ships within the current scope of the Radar. The current location of the own ship is at the center of the map, appearing as a white hollow triangle, and the vertex angle of the triangle stands for the current direction of your own ship. The blue hollow triangle stands for the vessels of CLASS B. The green hollow triangle stands for CLASS A vessels. The green hollow square stands for BASE STATION. Circle stands for no direction.
The collision alarm setting and the current scope of radar can be displayed on the upper left corner of the Radar, and the scope can be adjusted by pressing the [ ] key and [ ] key.
The message display frame on the upper right corner of the Radar displays the following information: the own ship's position, the current time, the current speed/direction of the own ship.



10.7 Emergency alarm

The information of the emergency alarm received is displayed on the bottom right corner. The emergency alarm is always available and can not be deleted, if the emergency alarm information is not read, after exiting the alarm menu, the "emergency alarm" window will pop up a little later. The warning ship displayed on the Radar will be yellow and flashing.



The relevant data (including the time, place, the relevant ship's information, etc.) will also be saved by the display terminals. It can be the basis of analysis in the event of any accident.

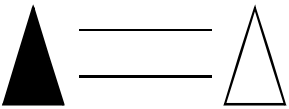
10.8 Entry/Departure setting

The Entry/Departure setting is for the temporary shut down or restart of the collision alarm. When entering the port, the collision alarm will be temporarily closed. When leaving the port, the collision alarm will be opened.

1. Press the **[MENU]** key at the **AIS** screen.
2. Choose **Status** then press **[ENT]** key to select.
3. Select "**In Port**" or "**Out Port**" as desired and press **[ENT]** key to finish.

10.9 AIS Vessel

1. User can define the AIS vessel display as either "**Fill**" or "**Line**".

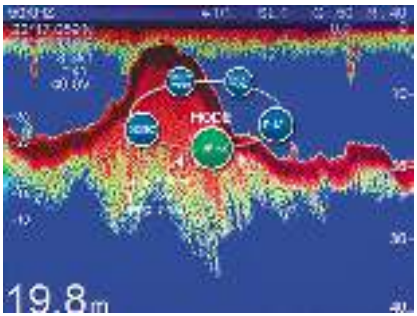


Fill Line

11. HD FISHFINDER OVERVIEW

11.1 Sonar mode

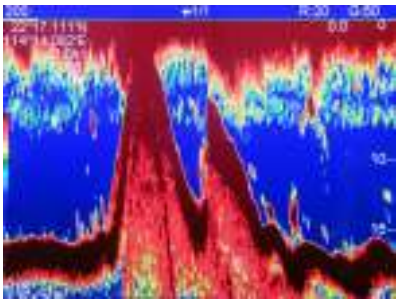
1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Sonar mode** and then press **[ENT]** key or press and hold **[MODE]** key in the **SOUNDER** screen. The following window will appear.



MODE	Function
200KHz	Provides the high frequency (200KHz)normal picture on the full screen.
50KHz	Displays the low frequency (50KHz)normal picture on the full screen.
DUAL	Displays the normal display for high frequency (200KHz) on the right half and low frequency (50KHz) on the left half.
200KHz ZOOM	Shows the normal display of the high frequency (200KHz) on the right half and its zoom display on the left half.
50KHz ZOOM	Provides the normal display of the low frequency (50KHz)on the right half and its zoom display on the left half.

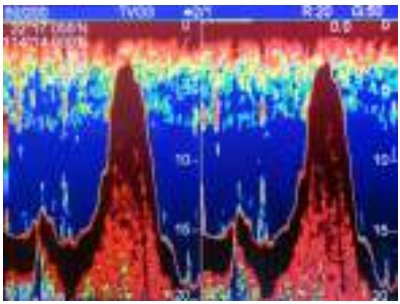
200KHz, 50KHz (high frequency, low frequency) mode

The sounder uses ultrasonic pulses to detect bottom conditions. The lower the frequency of the pulse the wider the detection area. Therefore, the 50KHz frequency is useful for general detection and judging bottom conditions, while the 200KHz frequency is useful for detailed observation of fish schools.



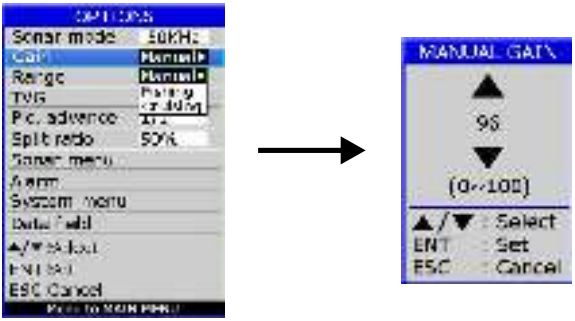
DUAL frequency mode

This mode provides the 50KHz picture on the left-half of the screen and the 200KHz on the right half, and is useful for detecting fish schools which have different reflection characteristics with frequency. For example, a school of tiny fish like minnow returns stronger echoes on a high frequency compared to a low frequency.



11.2 Gain

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Gain** and then press **[ENT]** key, or press **[ENT]** key in the **SOUNDER** screen to adjust gain manually. The following window will appear.



3. Choose Manual, Fishing or Cruising as desired and then press the **[ENT]** key, or press and hold **[ENT]** key in SOUNDER screen. **AUTO 1** (fishing) mode is activated which is for ground fishing with automated gain adjustments. Press **[ENT]** key again to activate the **AUTO 2** (cruising) mode with automatic gain adjustments for cruising. Press and hold **[ENT]** key to return to manual gain mode.

11.3 Range

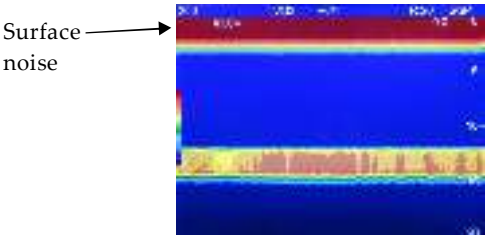
1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Range** and then press **[ENT]** key to select.
3. Choose "**Manual**" or "**Auto**" and then press the **[ENT]** key or when in the **SOUNDER** screen, press and hold **[ ]** or **[ ]** to change to Manual or Auto.
4. If you choose Manual, press the **[ESC]** key to return to **SOUNDER** screen. Press **[ ]** or **[ ]** to increase or decrease in the depth range.

11.4 TVG

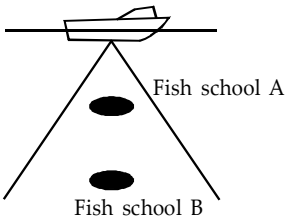
1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **TVG** and then press **[ENT]** key. The following window will appear.

3. Choose "**Off**" or "**Manual**" as desired then press **[ENT]** key.

The TVG compensates for propagation loss of sound, so that the echoes from the same fish school size are displayed in the same color. Normally, set it between "0" and "5". Avoid excessive TVG; weak echoes may not be displayed. The TVG is also useful for reducing surface noise.



Appearance of surface noise



How TVG compensates for propagation loss of sound

Note: Surface noise appearing in the range of 0 to 40 m can be reduced by the Clutter function.

11.5 Picture advance

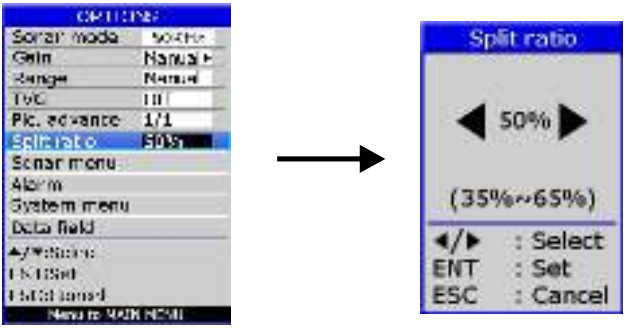
The picture advance speed determines how quickly the vertical scan lines run across the screen.

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Pic. advance** and then press **[ENT]** key or press and hold **[▶]** key in **SOUNDER** screen. The following window will appear.

3. Press the **[▲]** or **[▼]** key to select speed: 2/1(FAST), 1/1, 1/2, 1/4, 1/8 (SLOW) or STOP advance.

11.6 Split ratio

1. When in **PLOTTER+SOUNDER** screen and the **SOUNDER** screen is ≧50%, press **[MENU]** key.
2. Choose **Split ratio** and then press **[ENT]** key to setup split ratio, or press and hold **[MODE]** key in the **PLOTTER+SOUNDER** screen. The following window will appear.



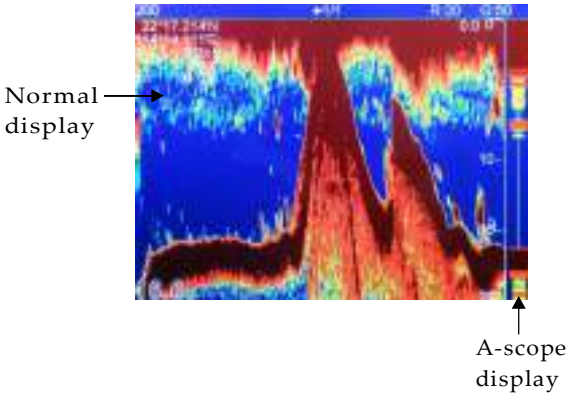
11.7 Sonar Menu

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press **[ENT]** key. The following window will appear.

11.7.1 A-Scope

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press **[ENT]** key to select.
3. Choose **A-Scope** and then press **[ENT]** key. The following window will appear.
4. Press the **[▲]** or **[▼]** key to enable or disable the A-Scope.

This display shows echoes at each transmission with amplitudes and tone proportional to their intensities, on the right 1/4 of the screen. It is useful for estimating the kind of fish school and bottom composition.



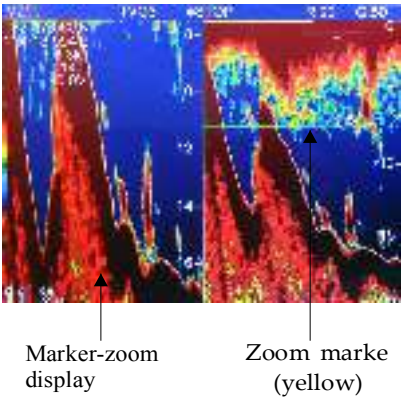
11.7.2 Zoom modes

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press **[ENT]** key to select.
3. Choose **Zoom mode** and then press **[ENT]** key. The following window will appear.

4. Choose "**Marker Zoom**", "**Bottom lock**" or "**Bottom zoom**" as desired then press **[ENT]** key to finish.

MARKER ZOOM

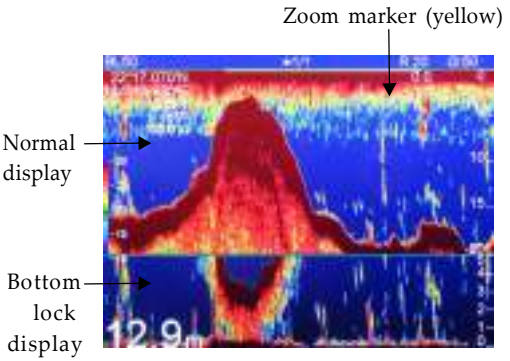
This mode expands selected area of the normal picture to full vertical size of the screen on the left-half window. You may specify the portion to expand with the VRM (Variable Range Marker), which you can shift with [▲] or [▼] key. The area between the VRM and the zoom range marker is expanded. The length of the segment is equal to one division of the depth scale.



BOTTOM LOCK

This display provides a compressed normal picture on the top 2/3 of the screen and a 5 or 10 meter (10 or 20 feet) wide layer in contact with the bottom is expanded onto the bottom 1/3 of the screen. This mode is useful for bottom discrimination. Note that the seabed should be steadily and distinctly plotted in red or reddish-brown. Adjust the gain if necessary.

Note: The zoom marker can be turned on/off on the system menu.

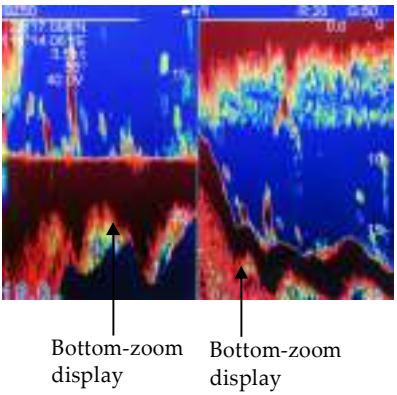


BOTTOM ZOOM

This mode expands bottom and bottom fish echoes two to five times to vertical size of the screen, and it is useful for determining bottom hardness. A bottom displayed with a short echo tail usually means it is a soft, sandy bottom. A long echo tail means a hard bottom.

The zone automatically moves so that the bottom echoes locate on the lower half of the screen.

Note: The zoom marker can be turned on/off on the system menu.



11.7.3 Noise limiter

Light-blue dots may appear over most of the screen. This is mainly due to unclean water or noise. This noise can be suppressed by adjusting Clutter on the menu.

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press **[ENT]** key to select.
3. Choose **Noise limiter** and then press **[ENT]** key. The following window will appear.

4. Choose "Off" , "Low" , "Medium" or "High" as desired and then press **[ENT]** key to finish.

11.7.4 Hue Selection

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press **[ENT]** key to select.
3. Choose **Hue Selection** and then press **[ENT]** key. The following window will appear.

Hue Ho.	Background color	Echo color
1	Blue	7 colors, bottom reddish-brown
2	Blue	6 colors, bottom red
3	Black	7 colors, bottom reddish-brown
4	Black	6 colors, bottom red
5	White	7 colors, bottom reddish-brown
6	White	6 colors, bottom red
7	Black	Monochrome yellow, 8 intensities

4. Press the [▲] or [▼] key to select the background and press [**ENT**] key to finish.

11.7.5 Signal level

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press **[ENT]** key to select.
3. Choose **Signal level** and then press **[ENT]** key. The following window will appear.

4. Press the [▲] or [▼] key to select the signal level and press [**ENT**] key to finish.

11.7.6 Marker

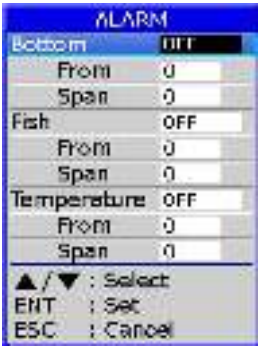
1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press **[ENT]** key to select.
3. Choose **Marker** and then press **[ENT]** key. The following window will appear.

4. Choose "VRM" or "WHT" as desired and then press [**ENT**] key to finish.

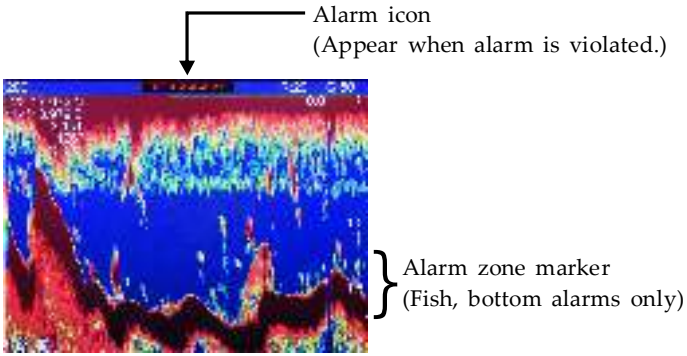
The white marker functions to display a particular echo color in white. For example, you may want to display the bottom echo (reddish-brown) in white to discriminate fish echoes near the bottom. Note that the bottom must be displayed in reddish-brown for the white marker to function.

11.8 Alarm

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **ALARM** and then press **[ENT]** key. The following window will appear.



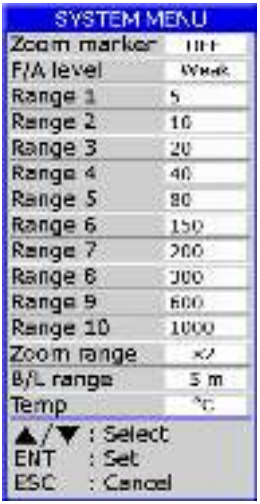
3. Press [▲]or [▼]key to select an alarm.
4. Press **[ENT]** key to select "OFF", "ON", "IN" or "OUT". (For the water temperature alarm, select "IN" to get the alarm when the water temperature is within the alarm zone range, or "OUT" to get the alarm when the water temperature is higher than the alarm zone range.)
5. Choose From then press **[ENT]** key to adjust alarm starting depth. Press [▲] or [▼] to adjust value.
6. Choose Span then press **[ENT]** key to adjust alarm range. Press [▲] or [▼] to adjust value.



7. To deactivate an alarm, select "OFF" at step 4 in the above procedure.

11.9 System Menu

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **System menu** and then press **[ENT]** key. The following window will appear.



RANGE 1- 10: Activates or deactivates specific range scales. Default ranges are 5, 10, 20, 40, 80, 150, 200, 300, 600, and 1000 (meters). Setting area is 2m to 800m.

Note: Ranges must be set in numerical order. For example, if range 1 is 5 m and range 3 is 20m, range 2 should be between 6 and 19 m.

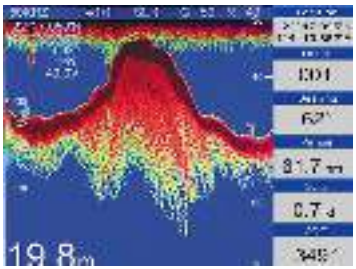
11.10 Data field

1. Press **[MENU]** key in **SOUNDER** screen.
2. Choose **Data field** and then press **[ENT]** key. The following window will appear.

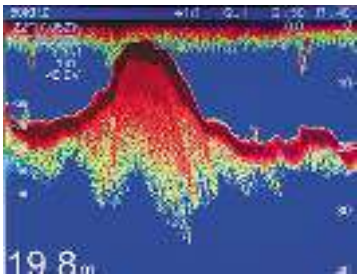
3. Data field setup

The Data Field will appear on the right-side of the screen. The black area is the data area of which may be changed.

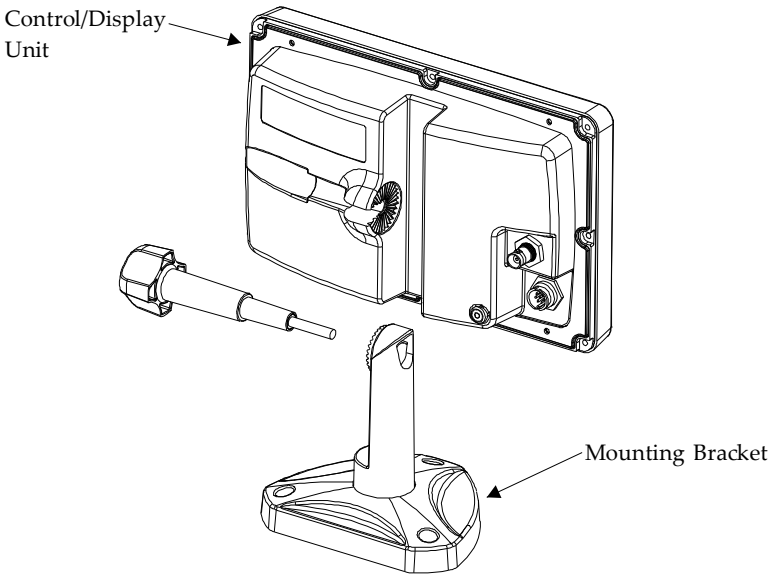
- Press [**ENT**] key and a data table will appear.
- Press the [◀], [▶], [▼] or [▲] key to select the one you want to display on the data field, then press [**ENT**] to finish.



4. User can **Show/hide data field** as desired.



12. INSTALLATION

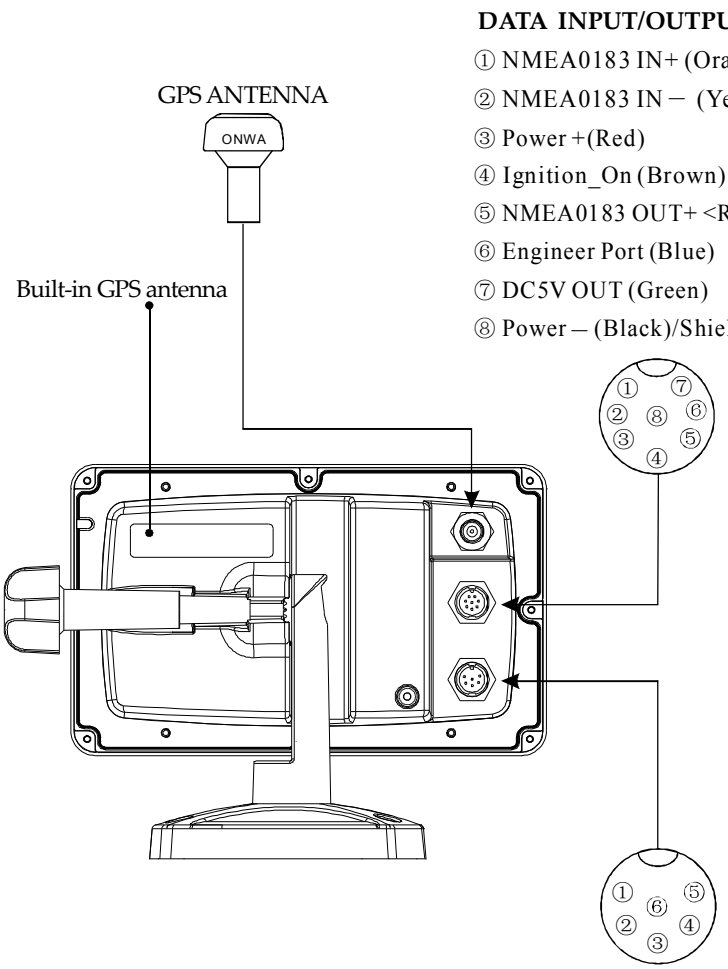


Notice: The unit should be mounted on a flat, solid surface for maximum stability. Be sure to fix the mounting bracket with screws. Otherwise, the display unit may fall down by the boat's pitching and rolling to the lead to the fire or the injury.

(1) The mounting bracket should be fixed with 6mm screws.
- Do not install the unit at the places that are affected by vibration or might be affected with spray or rain.
- Avoid the places where there is sunlight because visibility might be limited and the unit will be exposed to heat too much.
- Be sure that the space between the rear side of the unit and the wall is more than 10cm.

(2) Fix the unit to the mounting bracket firmly with the knobs so as to prevent it to get out of the bracket while running.

13. INTERCONNECTION DIAGRAM



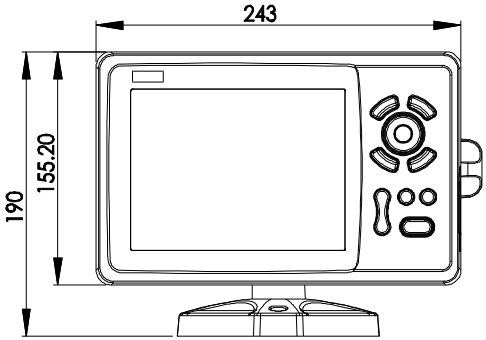
DATA INPUT/OUTPUT

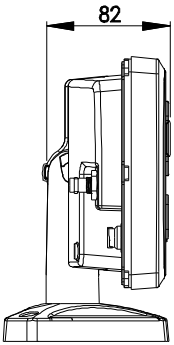
① NMEA0183 IN+ (Orange)
② NMEA0183 IN－ (Yellow)
③ Power +(Red)
④ Ignition_On (Brown)
⑤ NMEA0183 OUT+ <RS-232> (White)
⑥ Engineer Port (Blue)
⑦ DC5V OUT (Green)
⑧ Power－(Black)/Shield

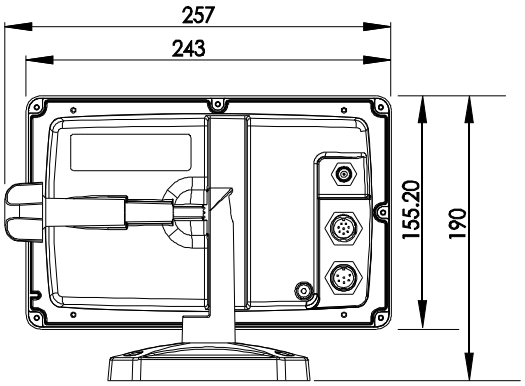
TRANSDUCER

① SONAR+
② SPEED/TEMP.GND
③ SPEED+
④ TEMP.
⑤ SONAR-
⑥ SONAR GND

14. DISPLAY SIZE







15. SHORTCUTS

Shortcuts in Plotter screen

1) Press and hold [**MODE**] to change the track color.
2) Press and hold [**ESC**] to turn track record on and off.
3) Press and hold [**ENT**] to activate the User Mark drawing function.

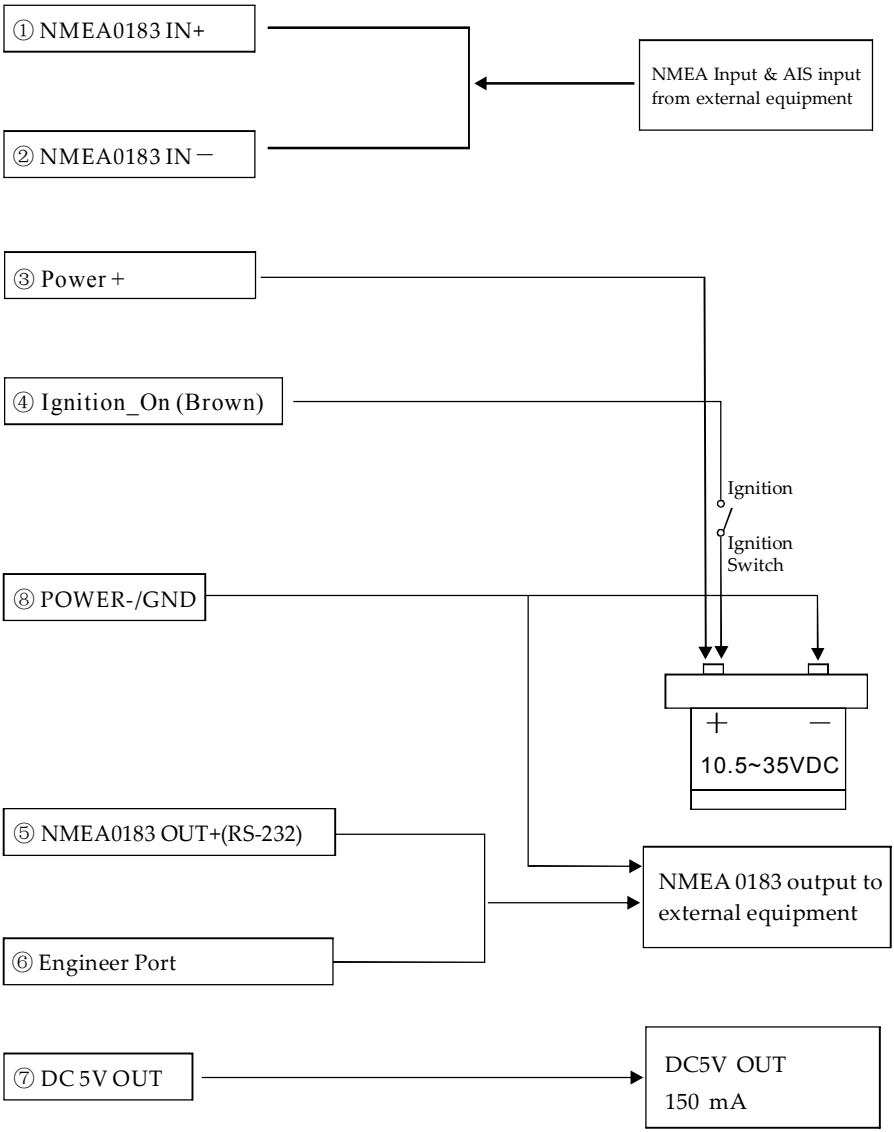
Shortcuts in Fishfinder (Sounder) screen

1) Press and hold [**MODE**] to change the Sonar mode, 50KHz, 200KHz, DUAL, 50KHz/ZOOM and 200KHz/ZOOM.
2) Press and hold [**ENT**] key to switch between Auto and Manual gain.
3) On manual gain slightly press [**ENT**] key to adjust manual gain.
4) On auto gain slightly press [**ENT**] key to switch between Auto-1 and Auto-2 mode.
5) Press and hold either [ ] or [ ] key to switch between Auto and Manual range.
6) Slightly press [**F**] key to change Signal Level.
7) Press and hold [▶] key to adjust picture advance speed.
8) Slightly press [◀] [▶] key to shift range.
9) Slight press [▲] [▼] key to move VRM.

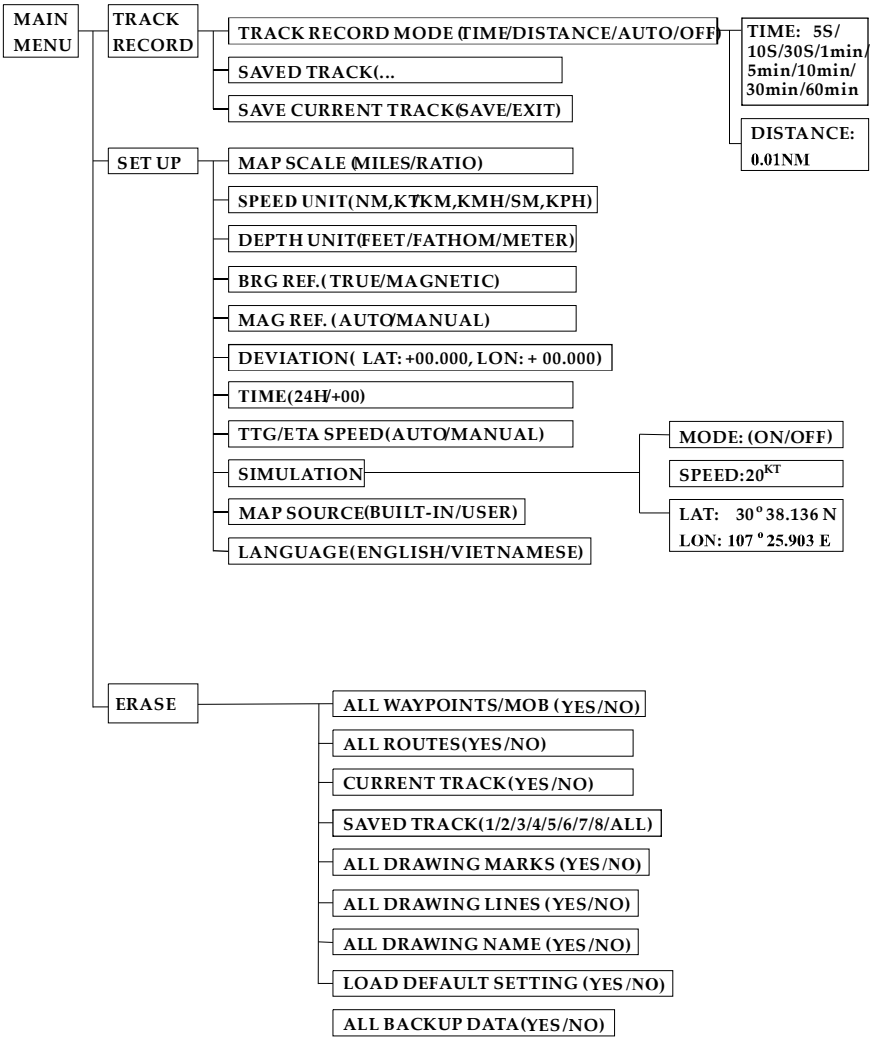
Shortcuts in Plotter/Sounder mode

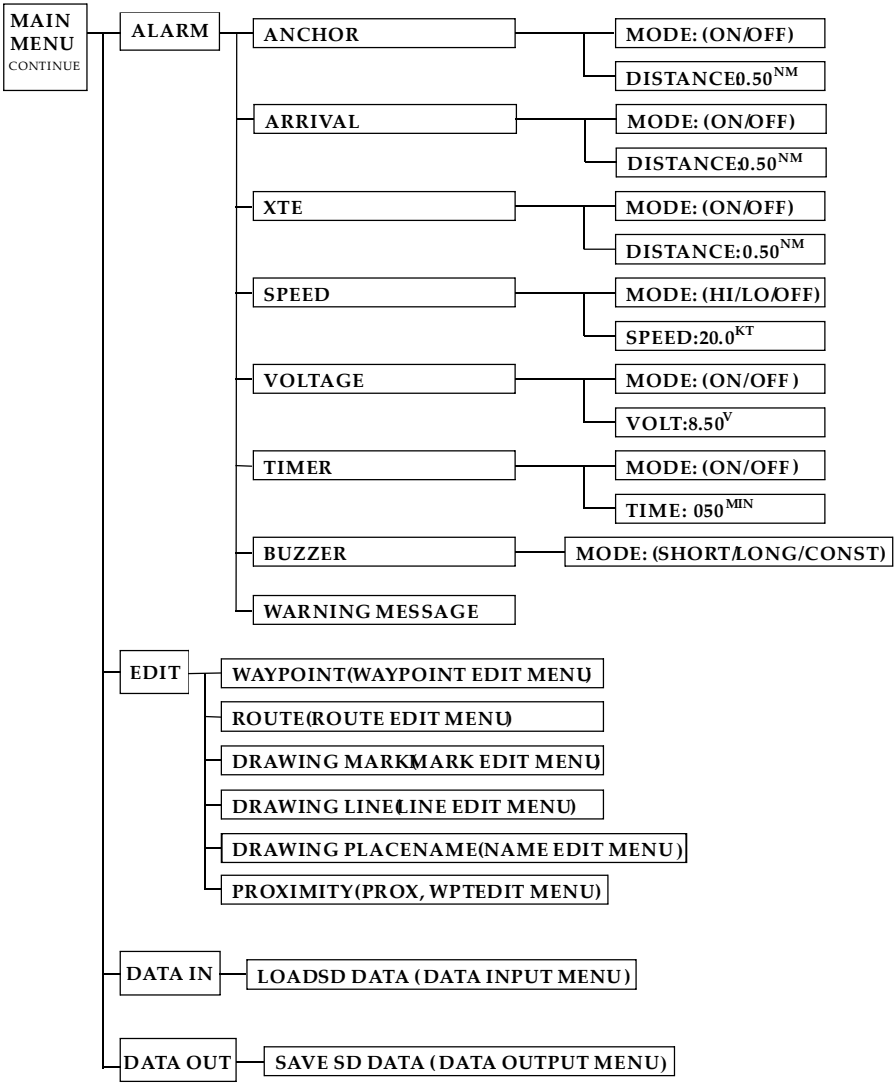
1) Press and hold [**MENU**] key to change the **PLOTTER** and **SOUNDER** screen split ratio.
2) When **SOUNDER** screen is≧50%, all key functionalities are the same as in **SOUNDER** screen only.
3) When **PLOTTER** screen is >50% all key functionalities are the same as in **PLOTTER** screen only.

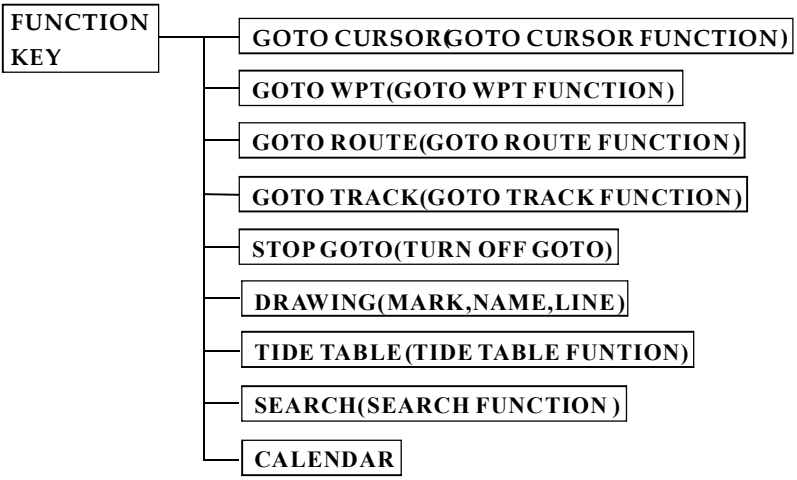
16. DATA IN/OUT DESCRIPTION

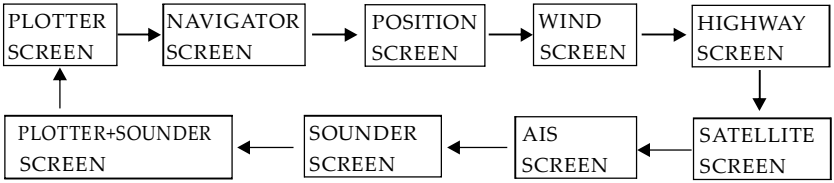


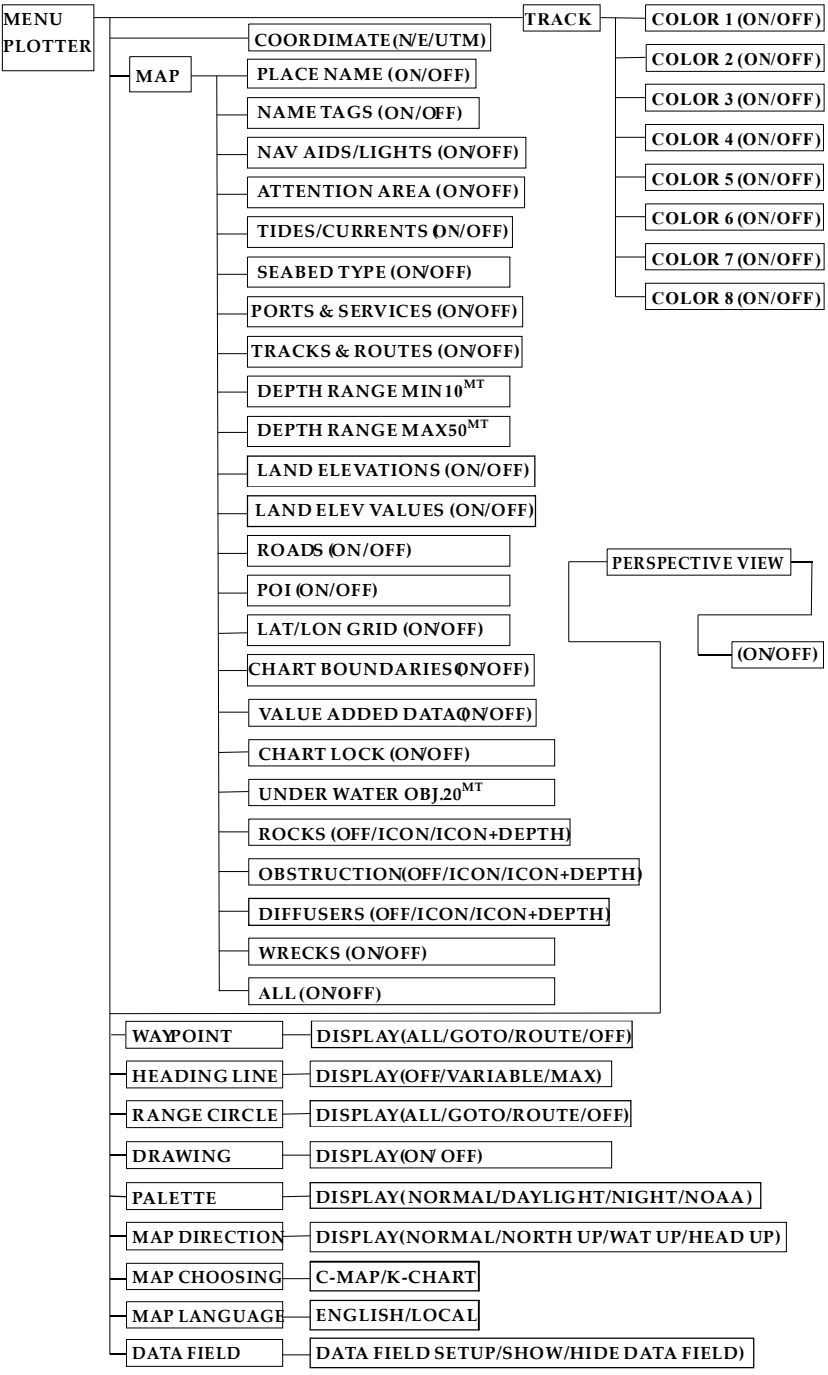
17. MENU TREE

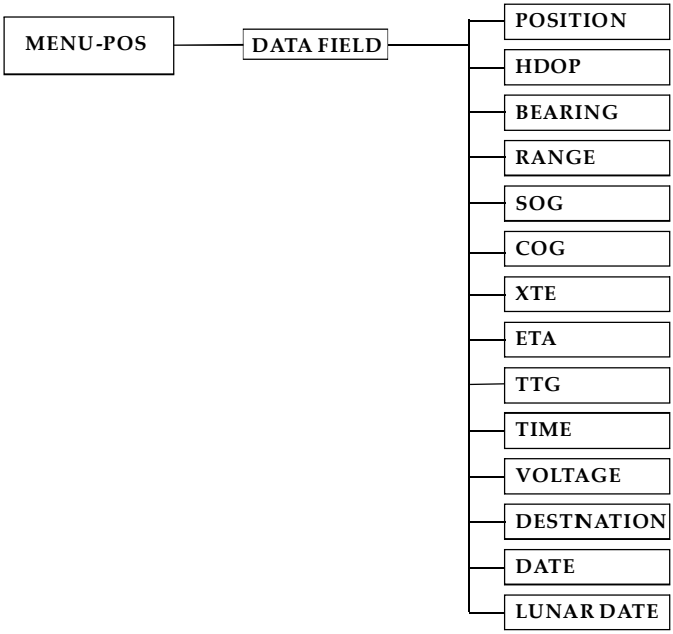

MAIN MENU
TRACK RECORD
TRACK RECORD MODE (TIME/DISTANCE/AUTO/OFF)
TIME: 5S/ 10S/30S/1min/ 5min/10min/ 30min/60min
DISTANCE: 0.01NM
SAVED TRACK(...
SAVE CURRENT TRACK(SAVE/EXIT)
SET UP
MAP SCALE (MILES/RATIO)
SPEED UNIT(NM,KT,KM,KMH/SM,KPH)
DEPTH UNIT(FEET/FATHOM/METER)
BRG REF.(TRUE/MAGNETIC)
MAG REF. (AUTO/MANUAL)
DEVIATION(LAT: +00.000, LON: + 00.000)
TIME(24H/+00)
TTG/ETA SPEED(AUTO/MANUAL)
SIMULATION
MODE: (ON/OFF)
SPEED:20KT
LAT: 30° 38.136 N
LON: 107° 25.903 E
MAP SOURCE(BUILT-IN/USER)
LANGUAGE(ENGLISH/VIETNAMESE)
ERASE
ALL WAYPOINTS/MOB (YES/NO)
ALL ROUTES(YES/NO)
CURRENT TRACK(YES/NO)
SAVED TRACK(1/2/3/4/5/6/7/8/ALL)
ALL DRAWING MARKS (YES/NO)
ALL DRAWING LINES (YES/NO)
ALL DRAWING NAME (YES/NO)
LOAD DEFAULT SETTING (YES/NO)
ALL BACKUP DATA(YES/NO)

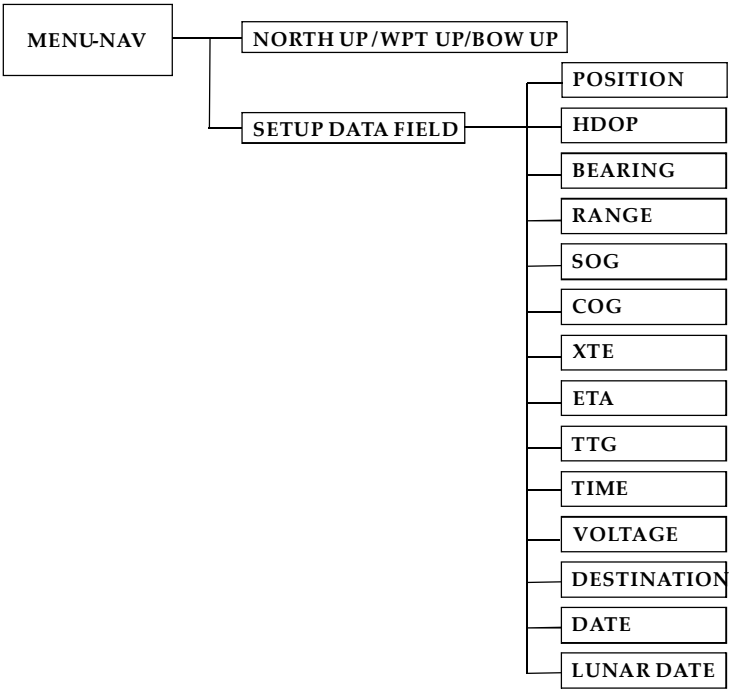

MAIN MENU
CONTINUE
ALARM
ANCHOR
MODE: (ON/OFF)
DISTANCE0.50NM
ARRIVAL
MODE: (ON/OFF)
DISTANCE0.50NM
XTE
MODE: (ON/OFF)
DISTANCE:0.50NM
SPEED
MODE: (HI/LO/OFF)
SPEED:20.0KT
VOLTAGE
MODE: (ON/OFF)
VOLT:8.50V
TIMER
MODE: (ON/OFF)
TIME: 050MIN
BUZZER
MODE: (SHORT/LONG/CONST)
WARNING MESSAGE
EDIT
WAYPOINT(WAYPOINT EDIT MENU)
ROUTE(ROUTE EDIT MENU)
DRAWING MARK(MARK EDIT MENU)
DRAWING LINE(LINE EDIT MENU)
DRAWING PLACENAME(NAME EDIT MENU)
PROXIMITY(PROX, WPTEDIT MENU)
DATA IN
LOADSD DATA (DATA INPUT MENU)
DATA OUT
SAVE SD DATA (DATA OUTPUT MENU)

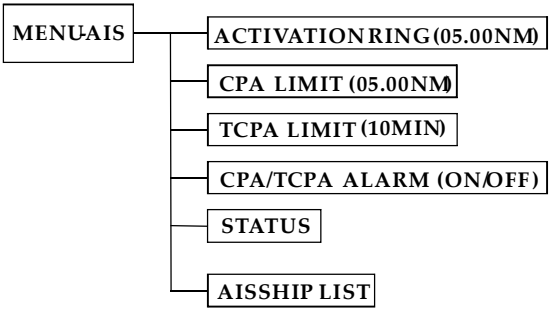

FUNCTION KEY
GOTO CURSOR(GOTO CURSOR FUNCTION)
GOTO WPT(GOTO WPT FUNCTION)
GOTO ROUTE(GOTO ROUTE FUNCTION)
GOTO TRACK(GOTO TRACK FUNCTION)
STOP GOTO(TURN OFF GOTO)
DRAWING(MARK,NAME,LINE)
TIDE TABLE(TIDE TABLE FUNTION)
SEARCH(SEARCH FUNCTION)
CALENDAR

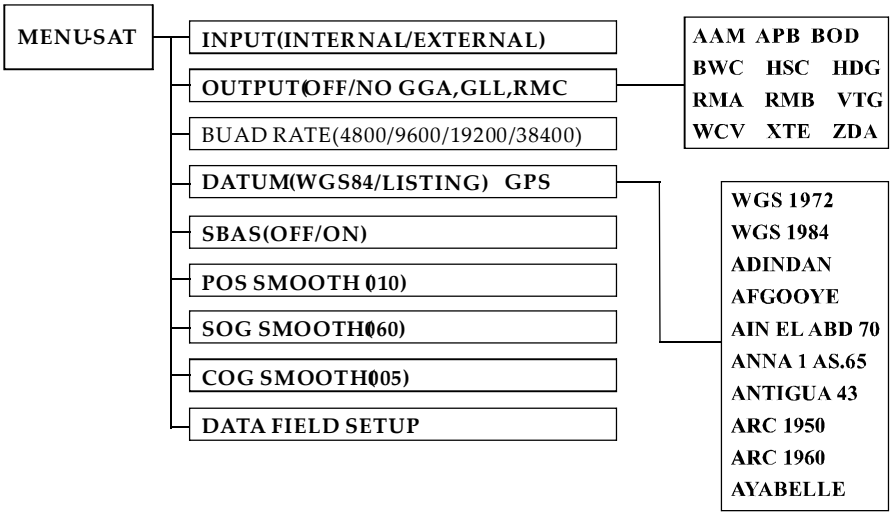

PLOTTER SCREEN
NAVIGATOR SCREEN
POSITION SCREEN
WIND SCREEN
HIGHWAY SCREEN
SATELLITE SCREEN
AIS SCREEN
SOUNDER SCREEN
PLOTTER+SOUNDER SCREEN


MENU PLOTTER
TRACK
COLOR 1 (ON/OFF)
COLOR 2 (ON/OFF)
COLOR 3 (ON/OFF)
COLOR 4 (ON/OFF)
COLOR 5 (ON/OFF)
COLOR 6 (ON/OFF)
COLOR 7 (ON/OFF)
COLOR 8 (ON/OFF)
COORDIMATE (N/E/UTM)
MAP
PLACE NAME (ON/OFF)
NAME TAGS (ON/OFF)
NAV AIDS/LIGHTS (ON/OFF)
ATTENTION AREA (ON/OFF)
TIDES/CURRENTS (ON/OFF)
SEABED TYPE (ON/OFF)
PORTS & SERVICES (ON/OFF)
TRACKS & ROUTES (ON/OFF)
DEPTH RANGE MIN 10MT
DEPTH RANGE MAX 50MT
LAND ELEVATIONS (ON/OFF)
LAND ELEV VALUES (ON/OFF)
ROADS (ON/OFF)
POI (ON/OFF)
LAT/LON GRID (ON/OFF)
CHART BOUNDARIES (ON/OFF)
VALUE ADDED DATA (ON/OFF)
CHART LOCK (ON/OFF)
UNDER WATER OBJ. 20MT
ROCKS (OFF/ICON/ICON+DEPTH)
OBSTRUCTION (OFF/ICON/ICON+DEPTH)
DIFFUSERS (OFF/ICON/ICON+DEPTH)
WRECKS (ON/OFF)
ALL (ON/OFF)
PERSPECTIVE VIEW
(ON/OFF)
WAYPOINT
DISPLAY (ALL/GOTO/ROUTE/OFF)
HEADING LINE
DISPLAY (OFF/VARIABLE/MAX)
RANGE CIRCLE
DISPLAY (ALL/GOTO/ROUTE/OFF)
DRAWING
DISPLAY (ON/ OFF)
PALETTE
DISPLAY (NORMAL/DAYLIGHT/NIGHT/NOAA)
MAP DIRECTION
DISPLAY (NORMAL/NORTH UP/WAT UP/HEAD UP)
MAP CHOOSING
C-MAP/K-CHART
MAP LANGUAGE
ENGLISH/LOCAL
DATA FIELD
DATA FIELD SETUP/SHOW/HIDE DATA FIELD)


MENU-POS
DATA FIELD
POSITION
HDOP
BEARING
RANGE
SOG
COG
XTE
ETA
TTG
TIME
VOLTAGE
DESTINATION
DATE
LUNAR DATE


MENU-NAV
NORTH UP/WPT UP/BOW UP
SETUP DATA FIELD
POSITION
HDOP
BEARING
RANGE
SOG
COG
XTE
ETA
TTG
TIME
VOLTAGE
DESTINATION
DATE
LUNAR DATE


MENU-AIS
ACTIVATION RING (05.00NM)
CPA LIMIT (05.00NM)
TCPA LIMIT (10MIN)
CPA/TCPA ALARM (ON/OFF)
STATUS
AISSHIP LIST


MENU-SAT
INPUT(INTERNAL/EXTERNAL)
OUTPUT(OFF/NO GGA,GLL,RMC
BUAD RATE(4800/9600/19200/38400)
DATUM(WGS84/LISTING) GPS
SBAS(OFF/ON)
POS SMOOTH (010)
SOG SMOOTH(060)
COG SMOOTH(005)
DATA FIELD SETUP
AAM APB BOD
BWC HSC HDG
RMA RMB VTG
WCV XTE ZDA
WGS 1972
WGS 1984
ADINDAN
AFGOOYE
AIN EL ABD 70
ANNA 1 AS.65
ANTIGUA 43
ARC 1950
ARC 1960
AYABELLE

18. ABBREVIATIONS

Abbreviations	Word
ESC	Escape
ENT	Enter
SBAS	Satellite-based augmentation system
POS	Position
SOG	Speed Over Ground
COG	Course Over Ground
AWS	Apparent Wind Speed
AWA	Apparent Wind Angle
TWS	True Wind Speed
TWA	True Wind Angle
TWD	True Wind Direction
VMG	Velocity Made Good
INFO	Information
LAT	Latitude
LON	Longtitude
TTG	Total Time to Go
ETA	Estimate Time of Arrival
XTE	Cross Track Error
HDOP	Horizontal Dilution of Precision
TVG	Time Variable Gain
PIC	Picture
B/L	Bottom Lock
F/A	Fish Alarm
MAG.VAR.	Magnetic Variation

19. GLOSSARY

ACA	(AIS) Regional Assignment Channel Assignment Message
ACK	Acknowledgement
ACS	(AIS) Channel management information source messages
AFSK	Auto frequency-shift keying
ALR	(AIS) Alarm Message
A to N	Aid to Navigation
AIS	Automatic Identification System
BIIT	Built In Integrity Testing
BNC	Bayonet fitting type Therefore connector
COG	Course over Ground
CR	Carriage Return
CS	Carrier Sense
CSTDMA	Carrier Sense Time Division Multiple Access
DC	Direct Current
DGNSS	Differential Global Navigation Satellite System
DSC	Digital Selective Calling
GLONASS	Global Navigation Satellite System
GNSS	Global Navigation Satellite System
GMSK	Gaussian Minimum Shift Keying
GPS	Global Positioning Satellite / System
HF	High Frequency
IMO	International Maritime Organization
IEC	International Electro technical Commission
LED	Light Emitting Diode
LF	Line Feed
LNA	Low-noise Amplifier
MF	Medium Frequency
MKD	Minimum Keypad and Display

MMSI	Maritime Mobile Service ldentity
MPE	Maximum Permissible Exposure
NMEA	National Marine Electronics Association
PC	Personal Computer
PI	Presentation Interface
RF	Radio Frequency
RTCM	Radio Technical Commission for Maritime Services Commission
RX	Receive or Receiver
RFI	Radio Frequency Interference
SAR	Specific Absorption Rate
SELV	Separated Extra Low Voltage
SMS	Short Message System
SOG	Speed over Ground
SRM	Safety Related Message
TDMA	Time-division Multiple Access
TNC	Threaded type RF connector
TX	Transmit or Transmitter
UTC	Universal Time Co-ordinated
VDM	(AIS) VHF Data Link Messages
VDO	(AIS) VHF data link own vessel messages
VHF	Very High Frequency
VSWR	Voltage Standing Wave Ratio