KODEN

OPERATION MANUAL

TOTAL NAVIGATOR
KTN-70AF

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

KTN-70AF Operation Manual
Doc No:0093107012

Document Revision History

No.	Doc. No.- Rev. No.	Revised Date (Y/M/D)	Revised Content
0	0093107012-00	2017/10/13	First edition
1	0093107012-01	2019/08/10	For Your Safe Operation, Introduction, Configuration of Equipment, Chapter 1, Chapter 2
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Document No. Revised Version Norm

When part of the document needs to be revised, the document has advanced revision number.

The document No. is indicated at the lower right side on the cover and at the left or right side of the footer region of each page.
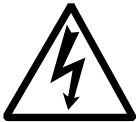
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For Your Safe Operation

Symbol used in this Operation Manual

The following pictograms are used in this manual. The meaning of each symbols shall be well understood and the maintenance and inspection shall be carried out.
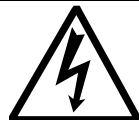
Symbol	Meaning
⚠ Warning	**Mark for warning** This mark denotes that there is a risk of death or serious injury when dealt with incorrectly.
⚡	**Mark for danger of high voltage** This mark denotes that there is a risk of death or serious injury due to electric shock when dealt with incorrectly.
⚠ Caution	**Mark for caution** This mark denotes that there is a risk of slight injury or damages of devices when dealt with incorrectly.
🚫	**Mark for prohibition** This mark denotes prohibition of specified conducts. Description of the prohibition is displayed near the mark.

Caution items on equipment

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

	Measures against static electricity
⚠ Caution	Static electricity may be generated from the carpet on the floor in the cabin or clothes made of synthetic fiber, and it may destroy the electronic components on circuit boards. The circuit boards shall be handled with appropriate measures against static electricity.
⚠ Caution	**Caution at installation of Transducer unit** Transducer unit shall be installed at locations where there is no effect by bubble and noise. Bubble and noise may seriously degrade the performance of this equipment.

Cautions on handling

⚠ Warning	No disassembly or modification of this equipment is allowed. It may lead to failure, firing, smoking or electric shock. In case of failure, please contact Koden's dealers or Koden.
⚠ Warning	In case of smoking or firing, switch off the power in the boat and of this equipment. It may lead to firing, electric shock or damages.
⚡	**Be careful of residual high voltage** High voltage may remain in capacitors for several minutes after switching off the power. Before inspection of the inside, please wait at least 5 minutes after switching off or discharge the residual electricity in an appropriate manner. Then, start the work.
⚠ Caution	The information displayed on this equipment is not intended to use for your navigation. For your navigation, be sure to see the specified materials.
⚠ Caution	Please use the specified fuses. If un-specified fuses are used, they may cause firing, smoking or damages.
⚠ Caution	Be sure to submerge the Transducer unit in water before transmission. If not, it may be damaged.
⚠ Caution	Press the power key at just 2 seconds, when putting the power on. If you press and hold it further, the countdown display may not appear at the end. There is no problem on the operation.

Contents

Introduction

- 7-inch 800X480 (WVGA) resolutions; LED-backlight, wide viewing angle, unlimited backlight adjustment, comfortable night usage mode.

- Wide range voltage designed; input voltage between 10.8 to 31.2 volts DC.

- Easy to upgrade via SD card. SD card can be SD (2GB) or SDHC (4GB-32GB).

- Text-to-speech technology, voice prompts and supports.

- Can store up to 400,000 track points, 1000 other ship track, 50,000 waypoints, 200 routes, 50,000 markers, 10000 drawing nodes, 1000 beacons, 20 POB.

- Possess the function of AIS (Automatic Identification System).

- Possess the function of Fish Finder.

- Detailed navigation information for major international ports, free charts and software upgraded regularly.

Configuration of Equipment
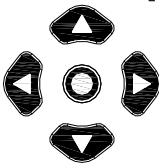
Standard Equipment Configuration List

NO	Name of item	Type	Remark	Weight/Length	Qty
1	Display	KTN-70AF	Built in AIS Receiver Include Stand	1430g	1
2	Cover	KTN-70ABSCV	Be fixed with front panel	135g	1
3	Stand	KTN-70ABSMS	Prop up the Display	275g	1
4	Knob	XNM8-30	Fix the Stand and Display	55g	2
5	Tapping Screw	ST5-20 ST3-20	Be used to fix on the embedded installation	10.6g/1Set 3.8g/1Set	4 4
6	GPS Antenna	GP80-10M		452g	1
7	GPS Antenna Holder	GP-H-150		75g	1
8	Power Cable	CW-274-2M		102g/2m	1
9	Connector	CW-108-6A	6 pin connector	11g	1
10	Transducer	TD-500T-3B	8 pin connector		1
11	Operation Manual	KTN-70AF.OM.E			1
12	Quick Reference	KTN-70AF.QR.E			1

Chapter 1 Preparation

Operation unit of KTN-70AF
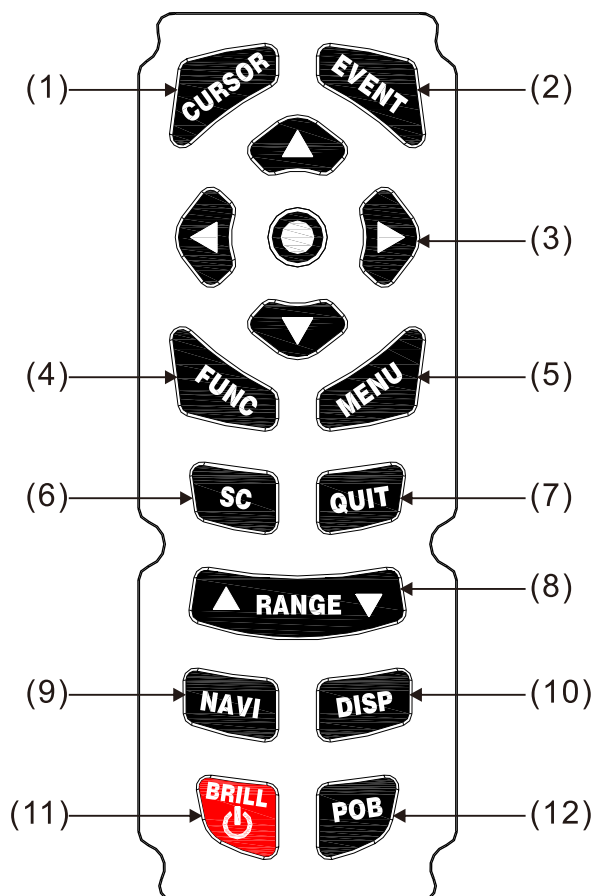
No.	Key Name	Description
1	[CURSOR]	Plotter: Use to display or hide the cursor in the chart. Fish Finder: Use to display the VRM. Use to change the shift.
2	[EVENT]	Use for add the mark.
3	[ARROW+ENTER]	ARROW KEY: Use to move the cursor, to select the menu and input method. ENTER KEY: Use for input or confirm.
4	[FUNC]	The state of an effective screen of the plotter function and the fish finder function changes whenever the FUNC key is pushed.

5	[MENU]	Use to display all menu.
6	[SC]	Use for quick operation.
7	[QUIT]	Use for exit or cancel the current operation.
8	[RANGE]	Plotter: ZOOM IN: Use to adjust chart scale to display a smaller area with more detail. ZOOM OUT: Use to adjust chart scale to display a large area with less detail. Fish Finder: ZOOM IN: Use to adjust the Range, selected item in range menu will move up. ZOOM OUT: Use to adjust the Range, selected item in range menu will move down.
9	[NAVI]	Use to call out [Navigation]. Can select Waypoint, Forward invoke and Reverse invoke.
10	[DISP]	1. Press once to view the page. 2. Long press to select the page.
11	[BRILL]	1. Press once to adjust the volume and brightness. 2. Long press to shut down.
12	[POB]	Use for add POB, to save the current ship position.

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

1. Press: Press the key with a finger and release immediately.

2. Long press: Keep pressed until the screen display responds.

Normal operation is done with [Press].

When the relevant key is long-pressed, the menu box of the function defined for the key is displayed. Release the finger from the key, once the menu box is displayed.
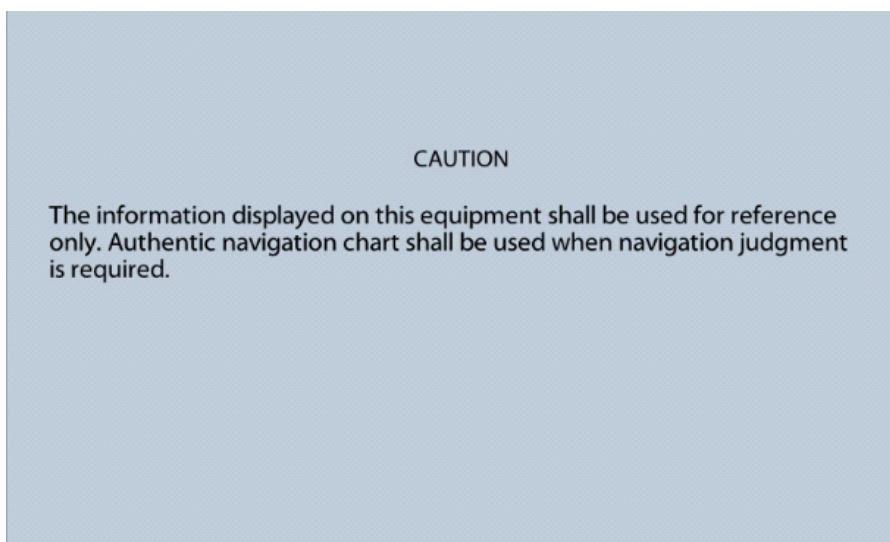
1.2 Power ON/OFF

1.2.1 Power ON

Long press ![BRILL] hold for 2 seconds to display start-up screen, and then enter the start-up screen, as shown below, it will stay 5 seconds.

And then enter the statement screen, as shown below, it will stay 10 seconds.

> ⚠ **Caution: Please wait until the screen is displayed after the power is turned on.**
> **It takes about 15 seconds.**

> ⚠ **Caution: Press the power key at just 2 seconds, when putting the power on.**
> **If you press and hold it further, the countdown display may not appear at the end.**
> **There is no problem on the operation.**

1.2.2 Power OFF

Long press , pop-up the window [Power Off], as shown below, and then appear "0".

The system shutdown.

1.3 Chart Operation in Normal Navigation State
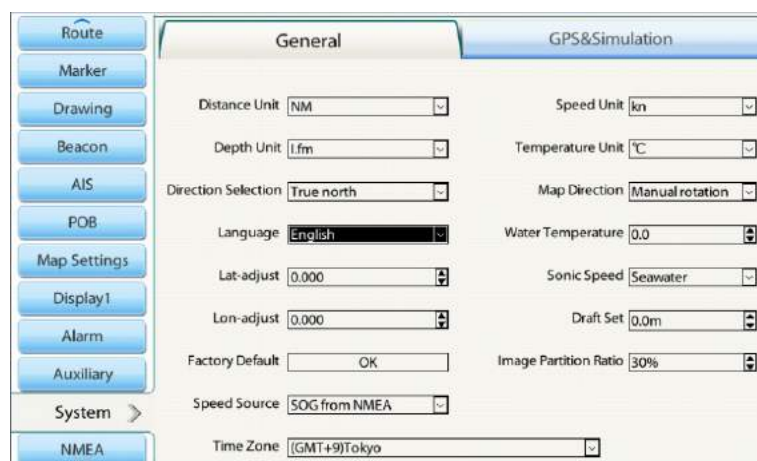
1.Move the Chart

Move cursor through to view the chart. When cursor moved to the edge of the page, the chart will refresh automatically. Press to display your boat at the center of the chart.

2.Zoom IN/OUT the Chart
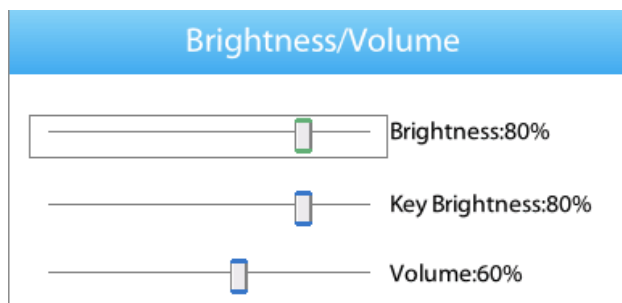
Press to enlarge the chart, and press to zoom out the chart.

1.4 Language setting

Press twice → to select [System] → press twice → to select the language.

1. Press to select the language.

2. After setting, press to exit from the setting and turn to the chart page.

Note: It provides various languages for user to select.

1.5 Adjust Brightness/Volume

1.5.1 Adjust the screen brightness

When appeared [Brightness/Volume], focus [Brightness], use to adjust the screen brightness.

Press → [Brightness] → →

1.5.2 Adjust the keypad brightness

When appeared [Brightness/Volume], push key to choose [Key Brightness], use to adjust the key brightness.
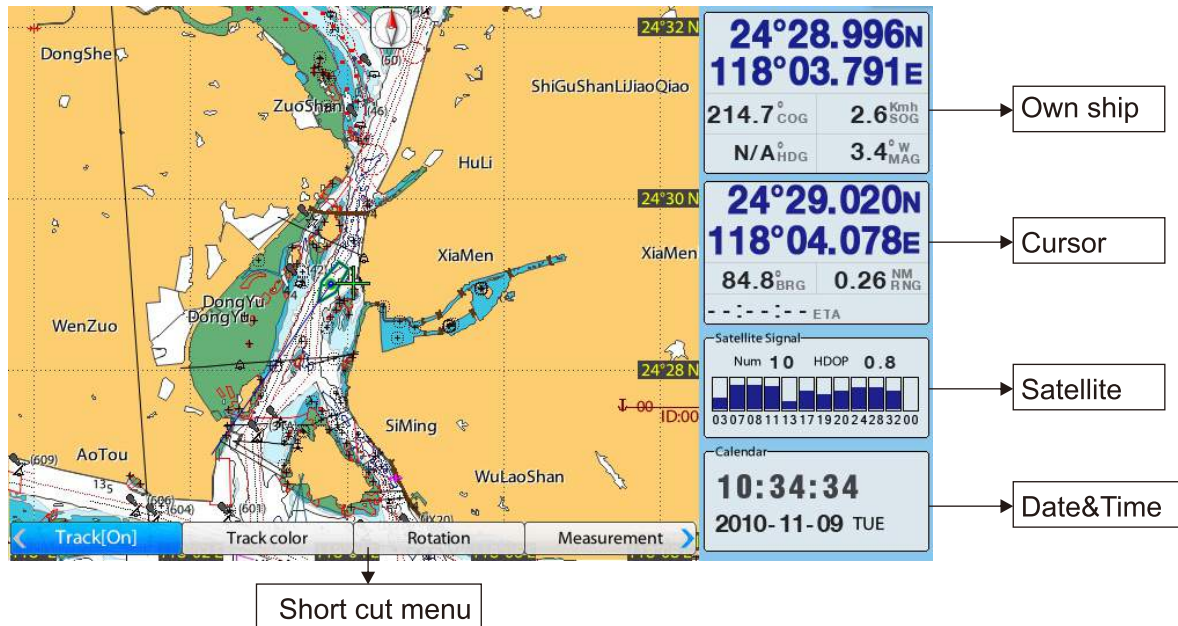
Press → → [Key Brightness] → →

1.5.3 Adjust the volume

When appeared [Brightness/Volume], push key to choose [Volume], use to adjust the volume.

Press → → [Volume] → →

1.6 Main page data

The main page displays the map, data information of own ship, cursor, satellite and time. If you press [MENU] or [SC] , the menu will appear.

Own ship

Cursor

Satellite

Date&Time

Short cut menu

Note: The chart is subject to the actual display.

Press [MENU] → [Custom Panel] → press twice ◯ → ◯

1. Own ship position data window

Own ship Lat / Lon

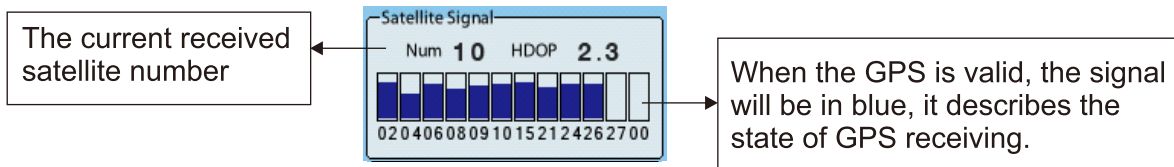Own ship course, speed, heading and magnetic declination.
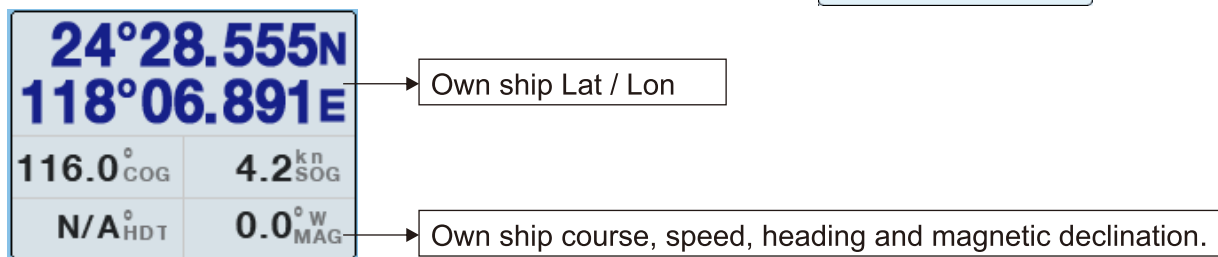
Note: The window describes the state of GPS receiving. When the GPS is valid, longitude and latitude will be in blue, and when GPS is invalid, it will be in gray.
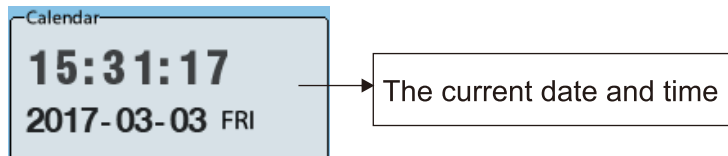
2. Cursor window

Cursor Lat / Lon

The bearing and distance of cursor relative to the current position

Estimated time of arrival
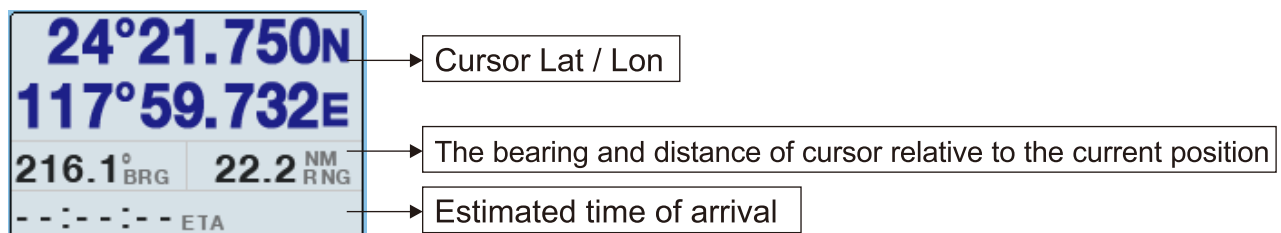
Note: The window describes cursor position data, it changes according with cursor.

3. Satellite Signal window

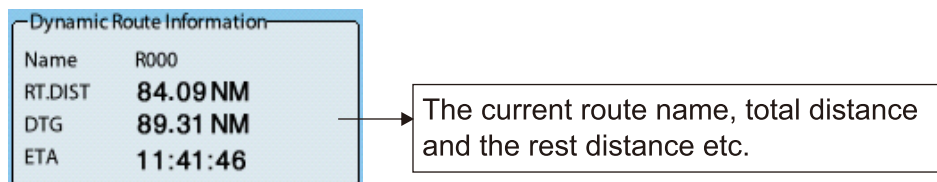The current received satellite number

When the GPS is valid, the signal will be in blue, it describes the state of GPS receiving.

4. Calendar window

The current date and time

5. Navigation Waypoint window

The information of waypoint in current navigation.
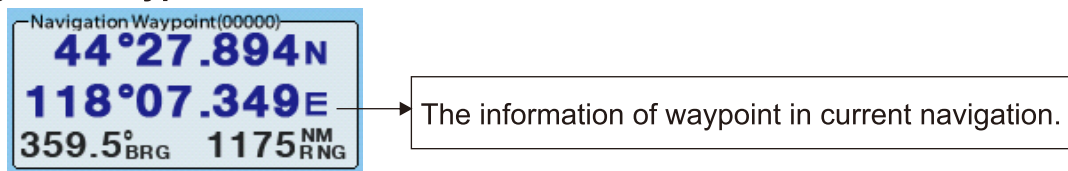
6. Dynamic Route Information window

The current route name, total distance and the rest distance etc.

7. AIS window

To display the Navaid, vessel, base and total number.
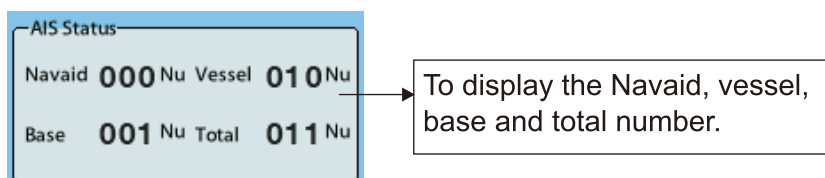
8. External Signal window

The state of external signal, when it is normally connected, it will be in green. Otherwise, it will be in gray.
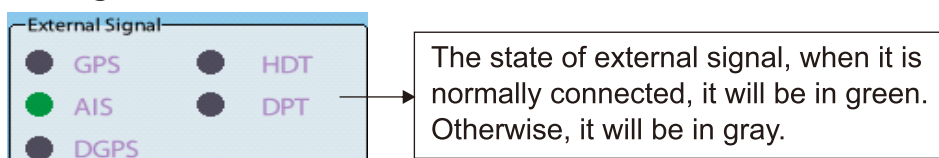
9. Temperature Graph window

When the temperature is received, the graph will display how the temperature changes.
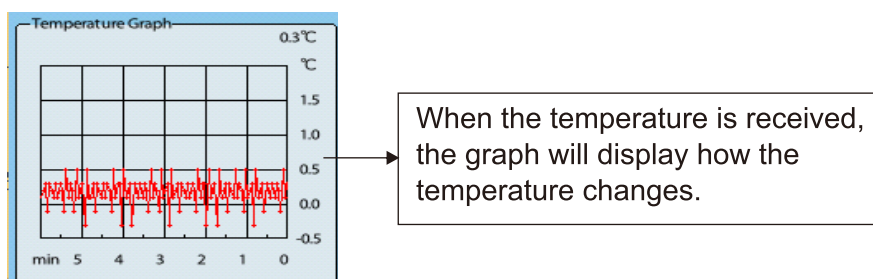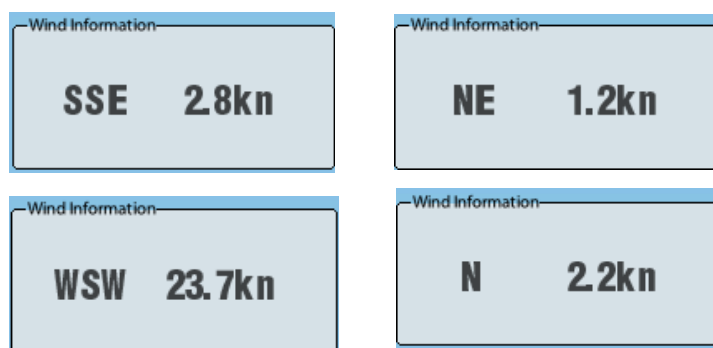
10. Wind Information window

The data of wind direction and wind speed get from NMEA0183, they display as follow.


The value for the wind is converted into the alphabet and it displays as follows.

| Value for wind (°)	Mark	Value for wind (°)	Mark
348.75 to 11.25	N	168.75 to 191.25	S
11.25 to 33.75	NNE	191.25 to 213.75	SSW
33.75 to 56.25	NE	213.75 to 236.25	SW
56.25 to 78.25	ENE	236.25 to 258.75	WSW
78.25 to 101.25	E	258.75 to 281.25	W
101.25 to 123.75	ESE	281.25 to 303.75	WNW
123.75 to 146.25	SE	303.75 to 326.25	NW
146.25 to 168.75	SSE	326.25 to 348.75	NNW

11. Short Cut Menu

In Plotter Page:
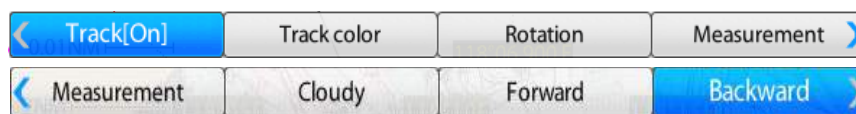
It includes Track (on), Track color, Rotation, Measurement, Display Mode, Forward and Backward.
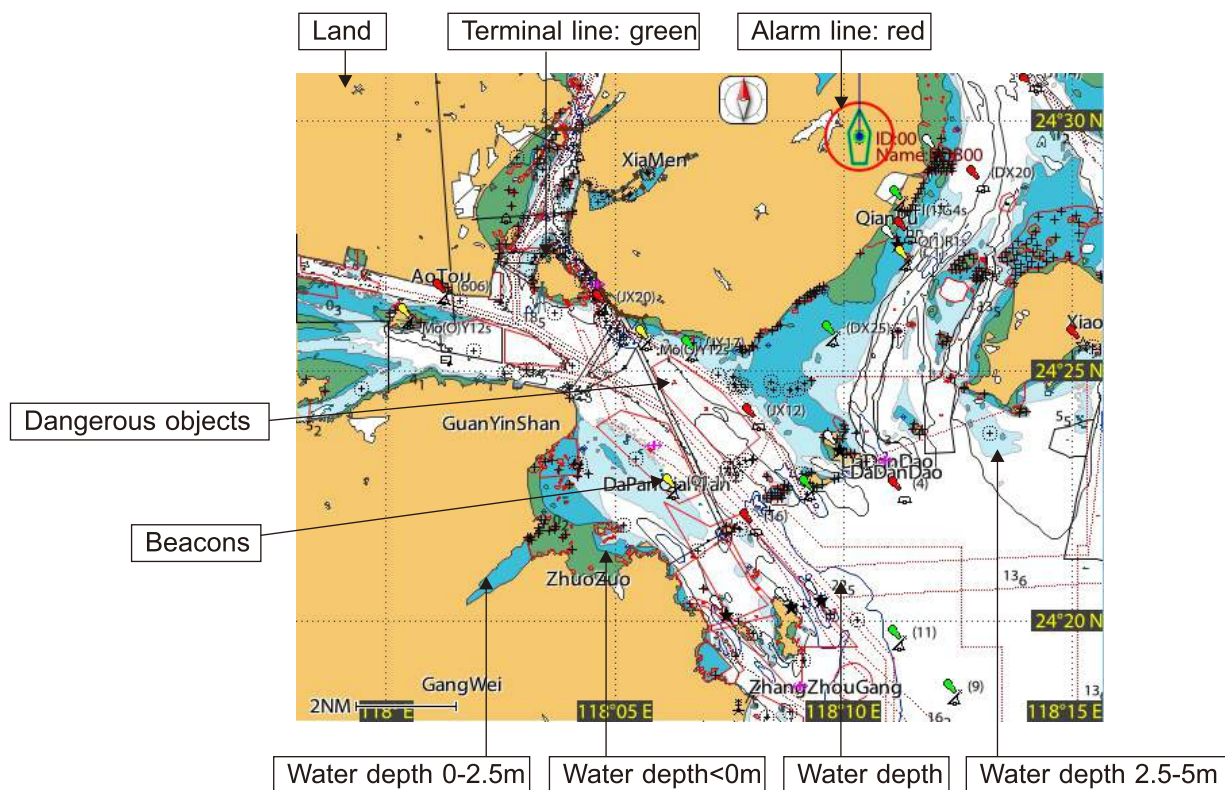
In Fish Finder Page:
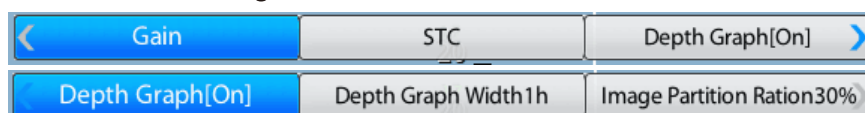
It includes Gain, STC, Depth Graph [On], Depth Graph Width and Image Partition Ratio.

Note: Press , and shortcut menu will show up. Shortcut menu will disappear automatically after 5 seconds or when is pressed.

1.7 Map Data

Here makes a description about the map data.

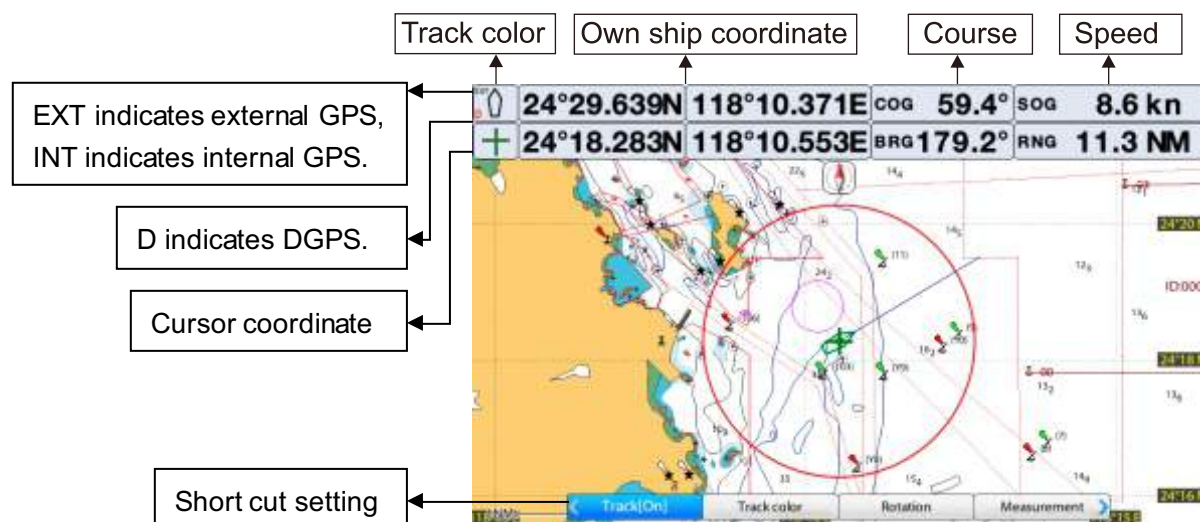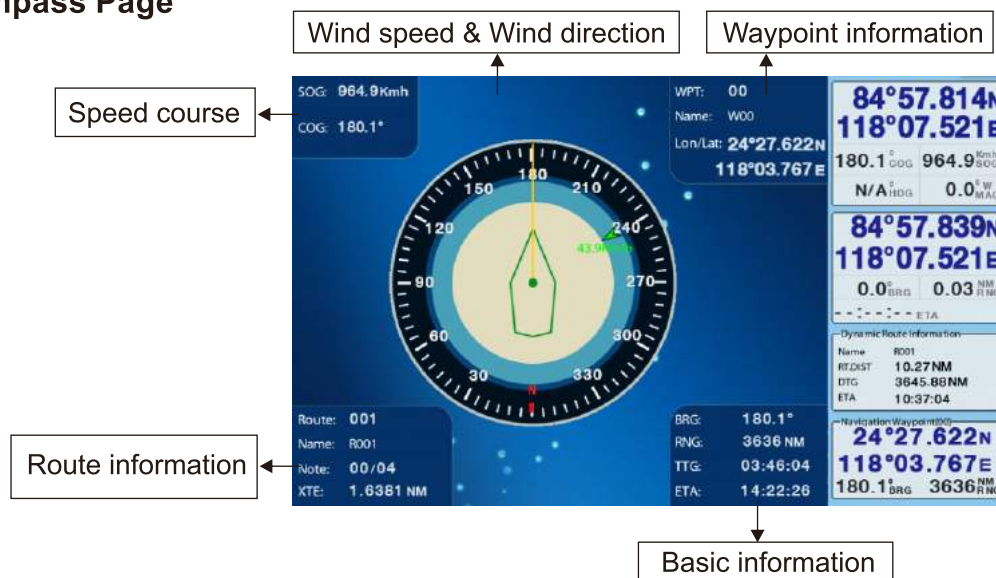As shown below:

Land | Terminal line: green | Alarm line: red

Dangerous objects

Beacons

Water depth 0-2.5m | Water depth<0m | Water depth | Water depth 2.5-5m

1.8 Main Page Introduction

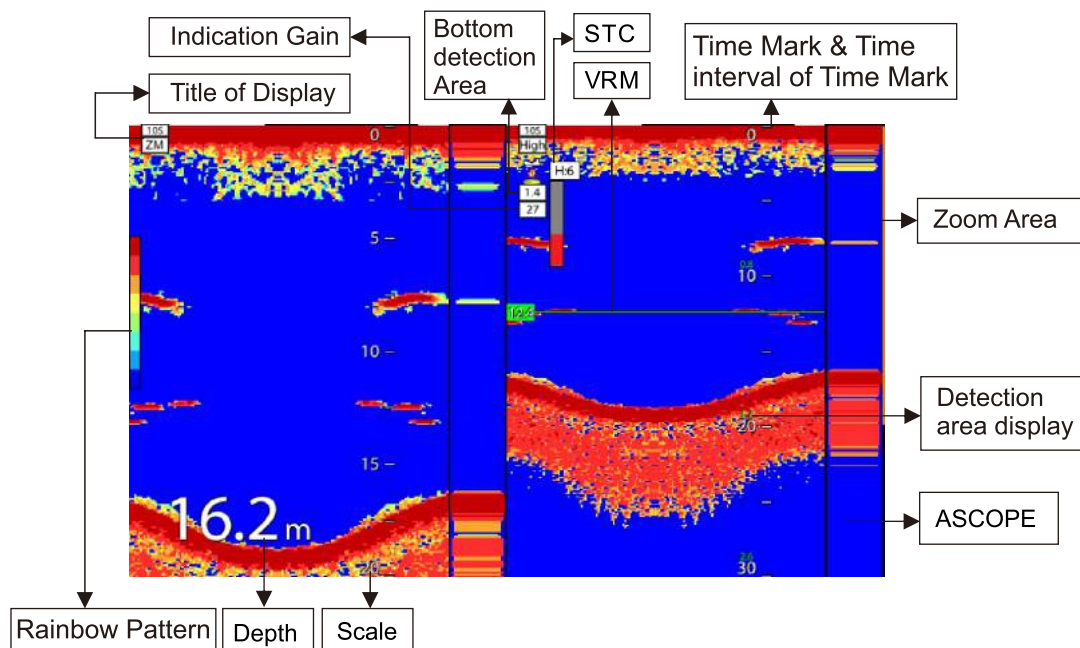Press **DISP** to switch the page.

1.Chart Page (full screen)

Track color | Own ship coordinate | Course | Speed

EXT indicates external GPS, INT indicates internal GPS.

D indicates DGPS.

Cursor coordinate

Short cut setting

2. **Compass Page**

Wind speed & Wind direction

Waypoint information

Speed course

Route information

Basic information

3.Data Page

Own ship coordinate

Satellite information

Course, Speed, Heading

Magnetic declination, Bearing, Time

Wind information, Temperature, Depth

4. Fish Finder Page

Indication Gain

Bottom detection Area

STC

VRM

Time Mark & Time interval of Time Mark

Title of Display

Zoom Area

Detection area display

ASCOPE

Rainbow Pattern

Depth

Scale

5. Map/Fish Finder Page (Up/Down)

Press [DISP] to select the Map/Fish Finder (Up/Down) page to display.

Own ship coordinate and cursor coordinate

Press [FUNC] to change the effective screen.
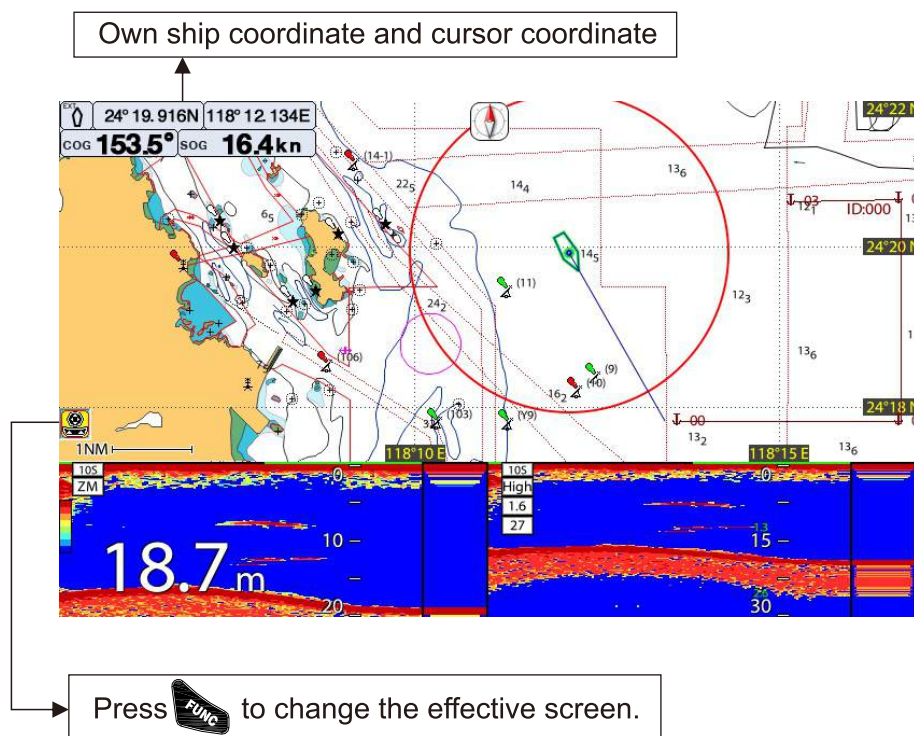
6. Map/Fish Finder Page (Left/Right)

Press [DISP] to select the Map/Fish Finder (Left/Right) page to display.

- This page intentionally left blank.-

Chapter 2   Function Setting

2.1 Main Menu

2.1.1 Initial Value

The default value, as listed below.

Functions	Functions setting	Factory Setting
AIS Display	Vessel (OFF/ON)	ON
	MMSI (OFF/ON)	ON
	Flag (OFF/ON)	ON
	Nation (OFF/ON)	ON
	Name (OFF/ON)	ON
	Voyage Status (OFF/ON)	ON
	Ship Size (Small/Medium/Large)	Medium
	Scale Range (Small/Medium/Large)	Small
	Ship Shape (Ship shape/Triangle)	Triangle
	Direction Type (BRG/COG)	COG
	AIS Vector (OFF/1min/3min/6min/12min/24min)	1min
	AIS Direction (Course/HDG&COG)	HDG&COG
Map Settings Map Layer	Depth Zone (Low water line/2.5m line/5m line)	5m
	Depth Level (OFF/6L/7L/8L/9L/10L)	6L
	Contour of 10 Meter (OFF/6L/7L/8L/9L/10L)	6L
	Contour of 20 Meter (OFF/6L/7L/8L/9L/10L)	6L
	Separation Lane (OFF/6L/7L/8L/9L/10L)	6L
	Dangerous Objects (OFF/6L/7L/8L/9L/10L)	6L
	Miscellaneous Line (OFF/6L/7L/8L/9L/10L)	6L
	Road (OFF/6L/7L/8L/9L/10L)	6L
	Sounding (ON/OFF)	ON
	Cable (OFF/6L/7L/8L/9L/10L)	6L
	Pipeline (OFF/6L/7L/8L/9L/10L)	6L
	Boundary Line (OFF/6L/7L/8L/9L/10L)	6L
	Navaid Line (OFF/6L/7L/8L/9L/10L)	6L
User Layer	Display Route (OFF/6L/7L/8L/9L/10L)	6L
	Route Name (OFF/ID/Name/ALL)	ID
	Display Waypoints (OFF/6L/7L/8L/9L/10L)	6L
	Waypoint Name (OFF/ID/Name/ALL)	ID
	Display Markers (OFF/6L/7L/8L/9L/10L)	6L
	Marker Name (OFF/ID/Name/ALL)	ID
	Display Beacons (OFF/6L/7L/8L/9L/10L)	6L
	Beacon Name (OFF/ID/Name/ALL)	ID
	Display POB (OFF/6L/7L/8L/9L/10L)	6L
	POB Name (OFF/ID/Name/ALL)	ALL
	Display Drawing (OFF/6L/7L/8L/9L/10L)	6L
	Drawing Name (OFF/ID/Comment/ALL)	ID

Display	Cursor Line (ON/OFF)	ON
	Destination Line (ON/OFF)	ON
	Grid (ON/OFF)	ON
	Map Direction Pointer (ON/OFF)	ON
	Length of Course Line (OFF/Short/Medium/Long)	Medium
	Width of Course Line (Thin/Medium/Thick)	Thin
	OWNSHP Style (Traditional/Ship shape)	Ship shape
	Map's Font (Small/Medium/Large)	Large
	Mode of Map Moving (Center/Drag)	Center
	Destline Width (Thin/Thick)	Thick
	Setting of Map Area (China/Vietnam/Indonesia/Myanmar/Malaysia/ India/Bangladesh/Thailand/Pakistan/Turkey)	Malaysia
Alarm Alarm1	Anchor Watch Alarm (ON/OFF)	OFF, 0.01NM
	XTE Alarm (ON/OFF)	ON, 0.01NM
	Arrival Alarm (ON/OFF)	ON, 0.03NM
	Over speed Alarm (ON/OFF)	OFF, 10.00kn
	AIS(CPA) Alarm (ON/OFF)	ON, 2.00NM
	AIS(TCPA) Alarm (ON/OFF)	ON, 10min
	Lower Depth Alarm (ON/OFF)	OFF, 1.00m
	Higher Depth Alarm (ON/OFF)	OFF, 50.00m
	Drawing Alarm (ON/OFF)	OFF, 0.03NM
	Distance to Turn Waypoint (ON/OFF)	ON, 0.01NM
Alarm2	Water Temperature Alarm (OFF/On-inside range/On-out of range)	OFF
	Lower Temperature (-5 to +45.9)	15.0
	Higher Temperature (-5.9 to 45.0)	20.0
	Depth Alarm (ON/OFF)	OFF
	Lower Depth (0 to 600m)	5m
	Higher Depth (1 to 600m)	50m
	Fish Alarm (ON/OFF)	OFF
	Fish Alarm From (0 to 600m)	5m
	Fish Alarm Span (1 to 600m)	50m
	Fish Alarm Color (■ ■ ■ ■ ■ ■ ■)	■ (Blue)
	Fish Alarm Level (Weak/Medium/Strong)	Medium
System General	Distance Unit (km/NM)	NM
	Temperature Unit (˚C/˚F)	˚C
	Depth Unit (m/fm/I.fm/ft)	m
	Speed Unit (km/h/kn)	kn
	Water Temperature (-10.0~10.0)	0.0
	Map Direction (Manual rotation/Auto rotation)	Manual rotation

GPS & Simulation	Direction Selection (True north/Magnetic north)	True north
	Language (English/Chinese/...)	English
	Lon-adjust (-59.999 to +99.999)	0.000
	Lat-adjust (-59.999 to +99.999)	0.000
	Speed Source (SOG from NMEA / STW from Sensor)	SOG from NMEA
	Time Zone (-12~12,10:30,9:30,8:45,6:30, 5:45,5:30,3:30,-3:30)	(GMT+9)Tokyo
	Sonic Speed (Seawater/Freshwater)	Seawater
	Draft Set (0.0 to 10.0m)	0.0m
	Image Partition Ration (30% to 70%)	30%
	SOG Filtering (ON/OFF, 2 to 59)	ON, 5
	COG Filtering (ON/OFF, 2 to 59)	ON, 10
	MAG (Auto/Manual, W/E, 0.0 to 359.9)	Auto, E, 0.0
	Execute (Navigate/Custom, Start/Stop)	Navigate
	Start Position	Own Ship's Lat & Lon
	SOG (0 to 27kn)	3kn
	Rudder Angle (-90° to +90°)	1°
	COG (0° to 359°)	0°
	Fish Finder Simulation (Start/Stop)	Stop
NMEA1/NMEA2 Output	Check sum (ON/OFF)	ON
	RMC (ON/OFF)	ON
	GGA (ON/OFF)	ON
	VTG (ON/OFF)	ON
	GLL (ON/OFF)	ON
	HDT (ON/OFF)	OFF
	DPT (ON/OFF)	OFF
	RMA (ON/OFF)	OFF
	RMB (ON/OFF)	OFF
	ZDA (ON/OFF)	ON
	XTE (ON/OFF)	ON
	APB (ON/OFF)	ON
	BOD (ON/OFF)	OFF
	BWC (ON/OFF)	OFF
	MTW (ON/OFF)	OFF
	MWD (ON/OFF)	OFF
	MWV (ON/OFF)	OFF
	TLL (ON/OFF)	OFF
	RTE (ON/OFF)	OFF
	RTE(K) (ON/OFF)	OFF
	AIS (ON/OFF)	OFF
Input Baud Rate	Input (GPS/AIS/NMEA1/NMEA2)	GPS
	NMEA1 (4800, 9600, 19200, 38400)	4800
	NMEA2 (4800, 9600, 19200, 38400)	4800

SYSTEM Display	Scenario Mode (Auto/Standard/Day/Night/Cloudy)	Auto
	Temperature Width (6min/12min/30min/60min)	6min
	Temperature Range (2/5/10)	2 ˚C
	Chart (OFF/ON)	OFF
Fish Finder Image Adjust	Image Speed (Speed1/Speed2/Stop/Speed3/Speed4/Speed5/ Speed6/Speed7)	Speed 2
	IR (Weak/Medium/Strong)	Weak
	Color Erase (1 to 16)	1
	Noise Reduction (0 to 10)	0
	Gain Select (Manual/Auto)	Auto
	STC Low (1 to 16)	1
	STC High (1 to 16)	1
	Pulse Width (Short/Medium/Long)	Medium
	Dynamic Range (1 to 6)	3
Display 1 Settings	Image Mode (Zoom (High) /Normal (High) /Dual frequency/Zoom (Low) /Normal (Low))	Dual frequency
	Zoom type (Bottom/B.D./ZOOM)	Bottom
	Zoom Range (2.5 to 200m)	20m
	Zoom Start (0 to 300.0m)	0m
Range Preset	Range1 (2.5 to 400.0m)	5.0m
	Range2 (2.5 to 400.0m)	10.0m
	Range3 (2.5 to 400.0m)	20.0m
	Range4 (2.5 to 400.0m)	50.0m
	Range5 (2.5 to 400.0m)	80.0m
	Range6 (2.5 to 400.0m)	100.0m
	Range7 (2.5 to 400.0m)	160.0m
	Range8 (2.5 to 400.0m)	200.0m
Display 2 Settings	A Scope (Off/On)	Off
	White Line (Off/1 to 5)	Off
	Background Color (Pale blue/Marine blue/Blue/Dark blue/Black/Dark Khaki/Medium sea green/Light grey/White)	Blue
	Color Tone (Monochrome/8 Color/16 Color)	8 Color
	Image Partition (Vertical/Horizontal)	Vertical
	Depth Value (Off/Small/Large)	Small
	Unit Display (Off/On)	On
	Bottom Detection (Auto/High frequency/Low Frequency)	Auto
	Detection Area Display (Off/On)	On
	Scale Display (Off/Side/Center)	Side
	Scale (Small/Large)	Small
	Graph Width (1 to 24h)	12h

Color	VRM	Green
	Depth	White
	Scale	White
	VRM Edge	Black
	Depth Edge	Black
	Scale Edge	Black
Other Adjust	Sounding Limit (0 to 600m)	600m
	Bottom Limit (1.0 to 20.0m)	1.5m
	Bubble Time Set (Off/1 to 10min)	Off

2.2 First Menu

When the cursor is on, press [MENU] , pop-up the menu, as shown below.
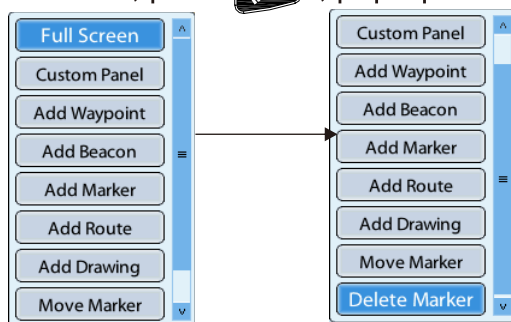
2.2.1 Open full screen/Close full screen

In the chart page, press [MENU] select [Full Screen] / [Exit Full Screen] → ◯
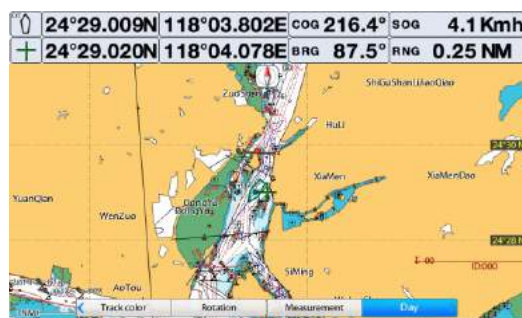
Full screen

Exit Full Screen

2.2.2 Custom Panel

In the chart page and exit full screen, press [MENU] → [▼] → [Custom Panel] → [○]
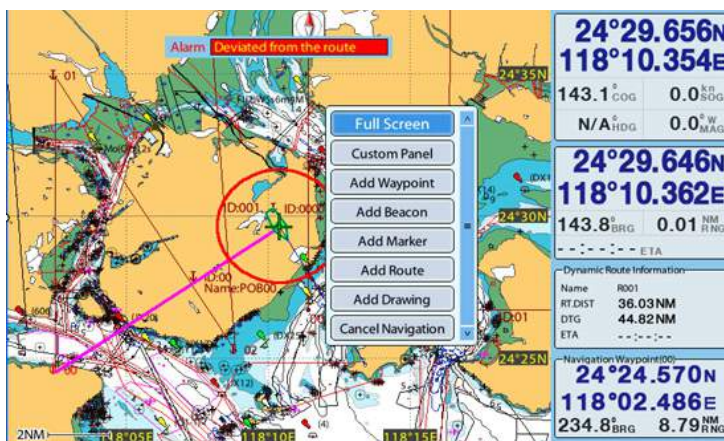
Note: As shown above, the Satellite Signal window and Calendar window are for custom setting, but the own ship data window and cursor data window can't be changed.

2.2.3 Add Waypoint

[CURSOR] → [+] → [◄○►] → [MENU] → [Add Waypoint] → [○] (see figure 2.1)

2.2.4 Add Beacon

[CURSOR] → [+] → [◄○►] → [MENU] → [Add Beacon] → [○] (see figure 2.1)

2.2.5 Add Marker

[CURSOR] → [+] → [◄○►] → [MENU] → [Add Marker] → [○] (see figure 2.1)

2.2.6 Add Route

[CURSOR] → [+] → [◄○►] → [MENU] → [Add Route] → [○] → [◄○►] → [○]

→ [◄○►] → [○] Repeat the above step to add waypoint → [QUIT] (see figure 2.1)

Note: A route consists of two waypoints at least.

2.2.7 Add Drawing

CURSOR → ✛ → [navigation pad] → MENU → [Add Drawing] → O → [navigation pad] → O

→ [navigation pad] → O Repeat the above step to add node → QUIT (see figure 2.1)

Note: A drawing consists of two nodes at least. The [Save Drawing] window will not pop-up if there have only two nodes.

2.2.8 Move the point

CURSOR → ✛ Select the point → MENU → [Move**] → O

Note: The following points " ** " are allowed to be moved includes waypoint, beacon, marker, drawing node and POB.

2.2.9 Delete the point

CURSOR → ✛ Select the point → MENU → [Delete**] → O

Note: The following points " ** " are allowed to be deleted includes waypoint, beacon, marker, drawing node, POB and route.

2.2.10 User data on the map

The user data displays on the map, shown as below.
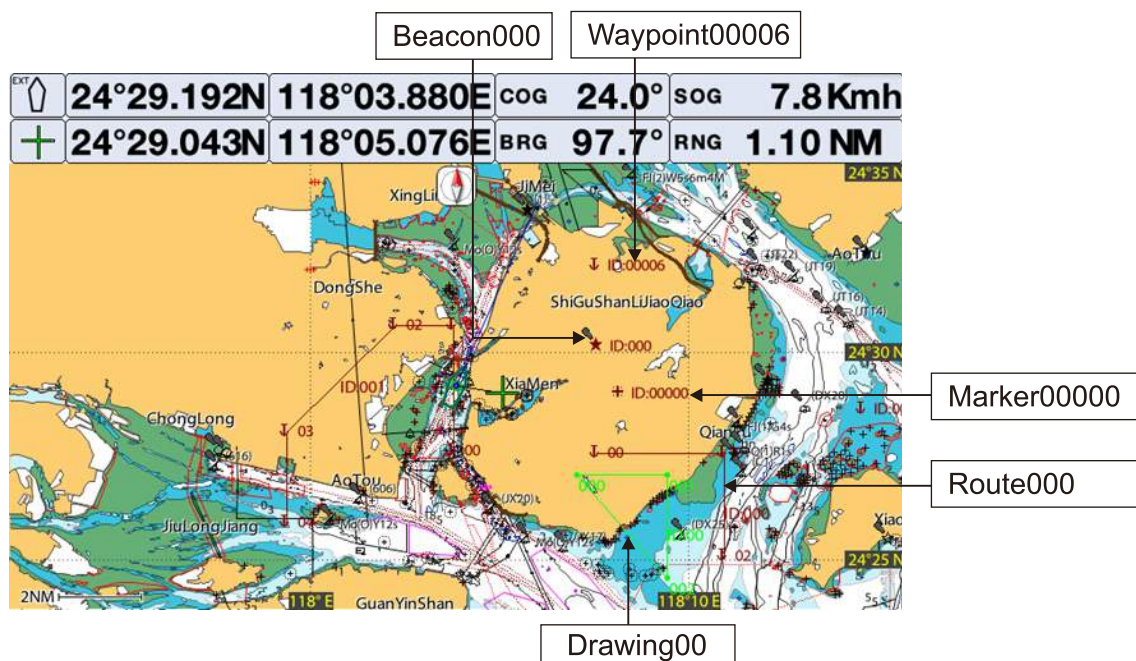
Figure 2.1

2.3 Secondary Menu (Main Menu)

2.3.1 Track

It is used to record the own ship's track, totals are 800 records. Each record max can accommodate 20000 points.

Users can do the operations of Setting, Edit, Display On/Off, View, Delete and All Clear.

Press twice → [Track] → ◯ enter to [Track] list.

Press

Press

1. Settings

Method 1: To set the record mode.

[Track] list → → [Settings] → ◯ →

→ ◯ → → QUIT
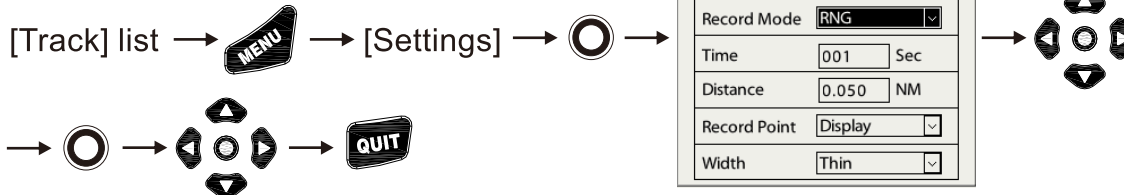
Method 2: To set the record mode, name, color and style.

[Track] list → Select the blank column → → [Start Recording]
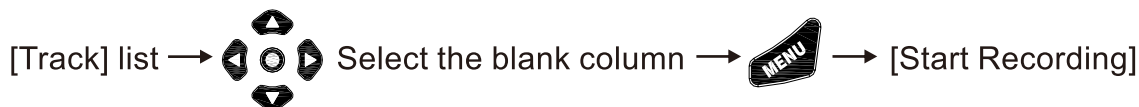
Note: If you do the settings through method 2, the name, color and type are effective to the only track. The record mode, time and distance are effective to all tracks.

2. Search

[Track] list → → [Search] → ◯ →

to edit → [ID] / [Name] / [Cancel]
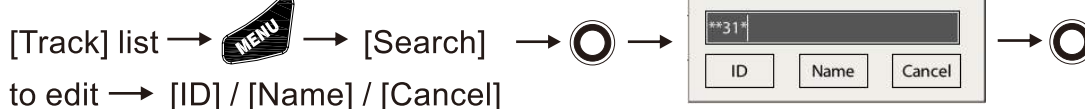
Note: The search functions in this chapter are all intelligent.

(1) ID search：You need to input the character not less than the ID digit number. And the character can be consisted of * and digital. For example, when input *10*1, you will

find that all IDs (the second character is 1, the third character is 0 and the fifth character is 1) are selected. Search since the second times.

(2) Name search: You need to input the string not less than 2 characters but not more than 16 characters. And the character can be consisted of *, digital and letter. For example, when input *Xi*o you will find that all Names (the second character is X the third character is i and the fifth character is o) are selected. Search since the second times.

3. Edit

[Track] list ⟶ MENU ⟶ [Edit] ⟶ ◯ to edit ⟶ [OK]

4. Display Off

[Track] list ⟶ MENU ⟶ [Display Off] ⟶ ◯ ⟶ [Display On]

5. View

[Track] list ⟶ MENU ⟶ [View] ⟶ ◯ the system will view the track in the chart automatically

6. Delete

[Track] list ⟶ MENU ⟶ [Delete] ⟶ ◯ to pop-up a prompt box ⟶ [OK]

7. All Clear

[Track] list ⟶ MENU ⟶ [All Clear] ⟶ ◯ to pop-up a prompt box ⟶ [OK] to delete all data.

2.3.2 Other Ship Track

It is used to show other ships' track, totals are 50 records. Each record max can accommodate 1000 points.

Users can do the operations Edit, Display On/Off, View, Delete and All Clear.

Press twice MENU ⟶ ▼ ⟶ to select [Other Ship Track] ⟶ ◯ to enter to [Other Ship Track] list .

Note: The other ship track can't be saved after restart.
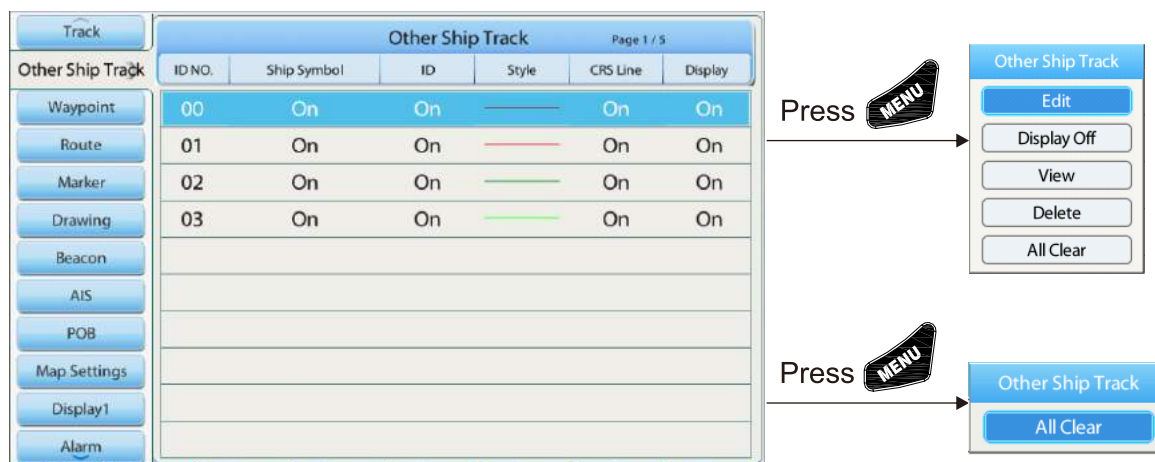
1. Edit

[Other Ship Track] list ⟶ MENU ⟶ [Edit] ⟶ ⟶ ◉ to edit ⟶ [Save]

2. Display Off

[Other Ship Track] list ⟶ MENU ⟶ [Display Off] ⟶ ◉ ⟶ [Display On]

3. View

[Other Ship Track] list ⟶ MENU ⟶ [View] ⟶ ◉

The system will view the track in the chart automatically.

4. Delete

[Other Ship Track] list ⟶ MENU ⟶ [Delete] ⟶ ◉ to pop-up a prompt box ⟶ [OK]

5. All Clear

[Other Ship Track] list ⟶ MENU ⟶ [All Clear] ⟶ ◉ to pop-up a prompt box ⟶ [OK]
to delete all data

2.3.3 Waypoint

It is used to store waypoints, totals are 50000 points.

Users can do the operations of Search, Edit, Navigate, View, Add, Delete and All Clear.

Press twice [MENU] → [▼] to select [Waypoint] → [○] enter to [Waypoint] list.

Press [MENU] →

Press [MENU] →

1.Search

[Waypoint] list → [MENU] → [Search] → [○] → Please input a valid value: **10* → [○] to edit → [ID/Name]

2. Add

Method 1: [Waypoint] list → [◄○►▲▼] to select blank column → [MENU] → [Add] → [○] to edit.

Save the waypoint and exit.

Call-out the navigation.

Exit and cancel the operation.
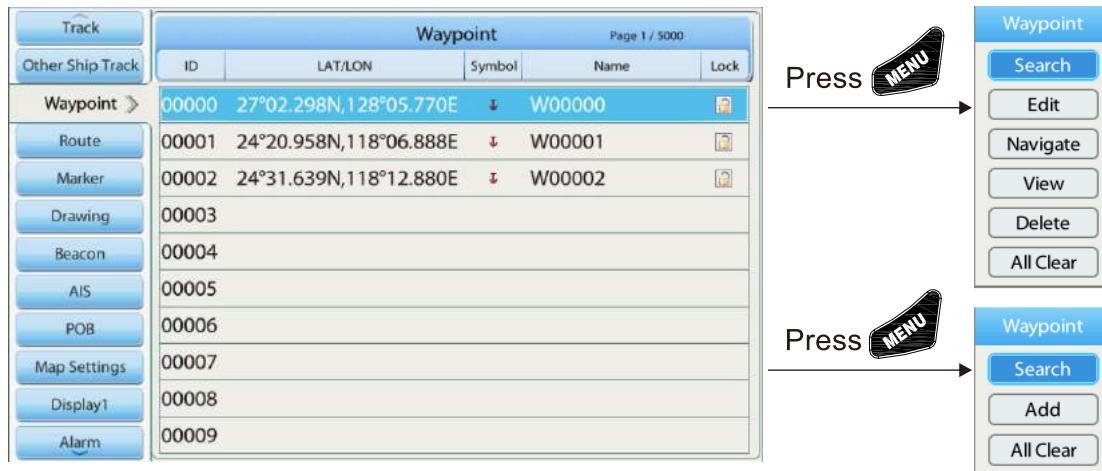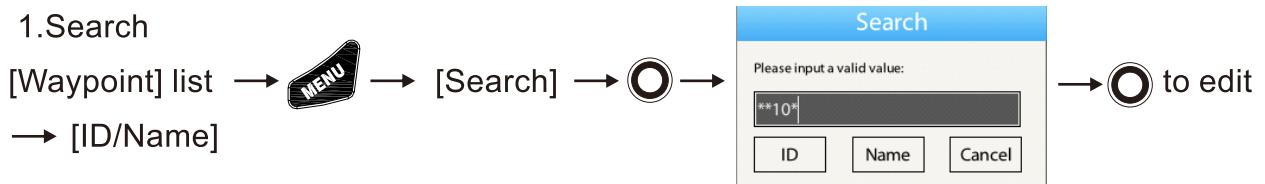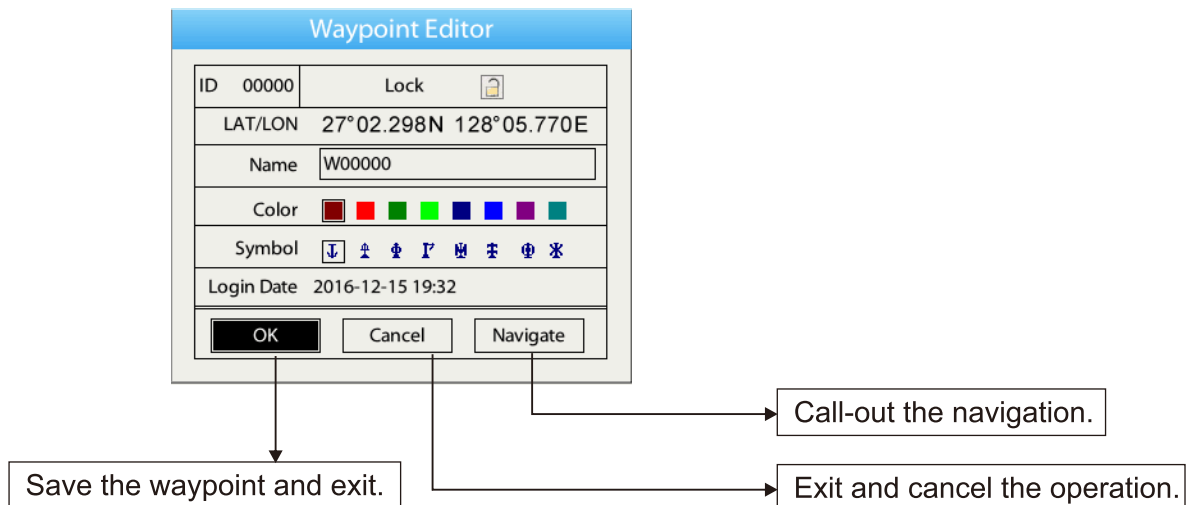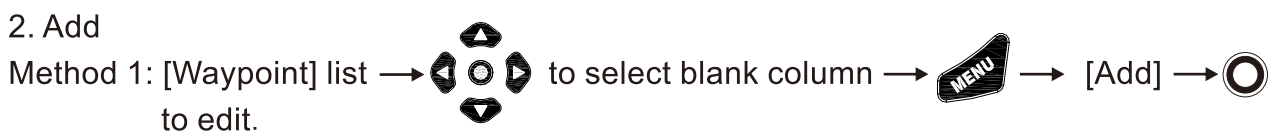
Method 2: [Waypoint] list → ◄○► to select blank column → ○ to edit → ◄○►
As shown below,

Track					
Other Ship Track		Waypoint		Page 1 / 5000	
	ID	LAT/LON	Symbol	Name	Lock
Waypoint ❯	00000	27°02.298N,128°05.770E	⬇	W00000	🔒
Route	00001	24°20.958N,118°06.888E	⬇	W00001	🔒
Marker	00002	24°31.639N 118°12.880E	⬇	W00002	🔒
Drawing	00003				
Beacon	00004				
AIS	00005				
POB	00006				
Map Settings	00007				
Display1	00008				
Alarm	00009				

3. Edit

[Waypoint] list → MENU → [Edit] → ◄○► → ○ to edit → [OK]

Note: The screen similar to Add is displayed.

4. Navigate

[Waypoint] list → ◄○► to select a desired one → MENU → [Navigate] → ○

to start to navigate in the chart

5. View

[Waypoint] list → ◄○► to select a desired one → MENU → [View] → ○

The system will view the waypoint in the chart automatically.

6. Delete

[Waypoint] list → MENU → [Delete] → ○ to pop-up a prompt box → [OK]

7. All Clear

[Waypoint] list → MENU → [All Clear] → ○ to pop-up a prompt box → [OK]
to delete all data.

Note: The waypoint in navigation or locked can't be deleted.

2.3.4 Route

It is used to store routes, totals are 200 records. Each record max can accommodate 48 waypoints.
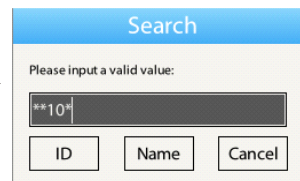
Users can do the operations of Search, Edit, Forward Invoke, Reverse Invoke, View, Add, Delete and All Clear.

Press twice → to select [Route] → to enter to [Route] list.
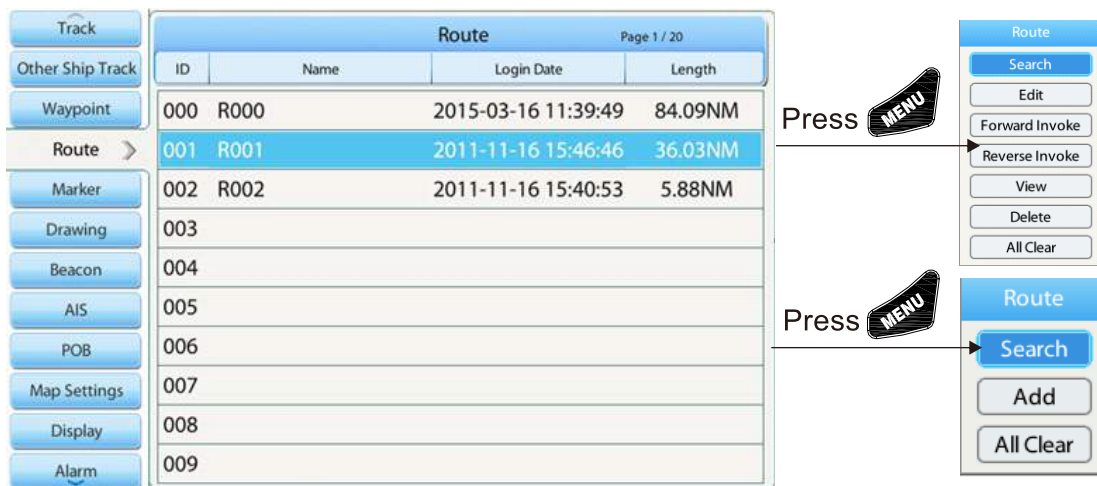
1. Search

[Route] list → → [Search] → → → to edit → [ID/Name]

2. Add

[Route] list → to select blank column → → [Add] →

→ → [Insert Waypoint]/〔Add Waypoint]/[Insert Mark] → to edit.

As shown below,
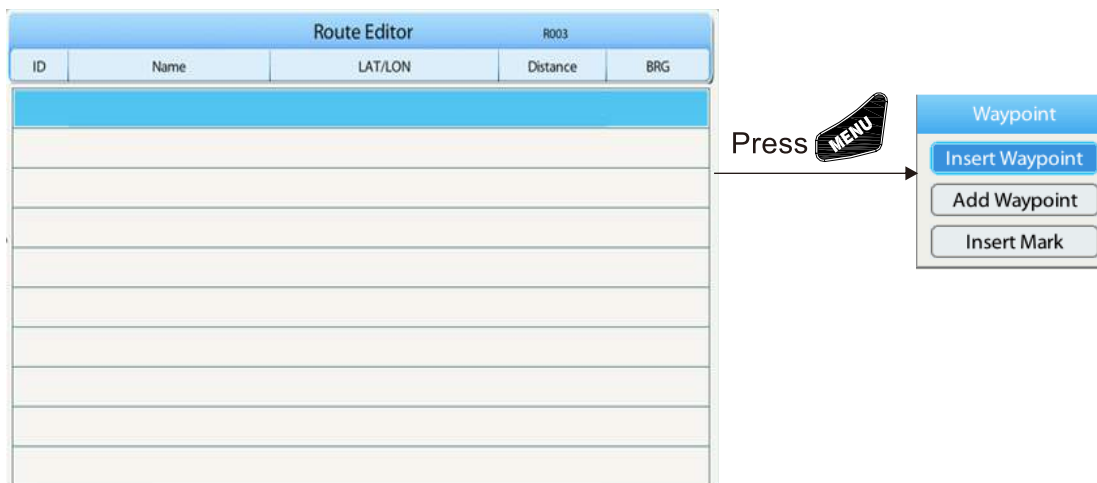
[Insert Waypoint] ⟶ ⬤ to pop-up input box ⟶ ⬤ to edit⟶ ✛ to select⟶ ⬤
As shown below,
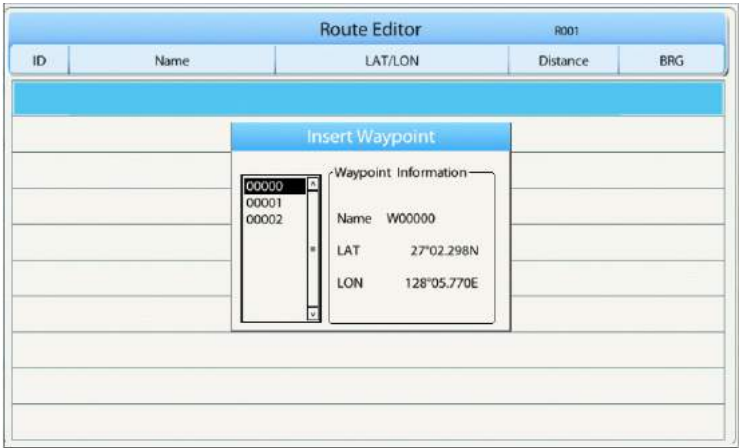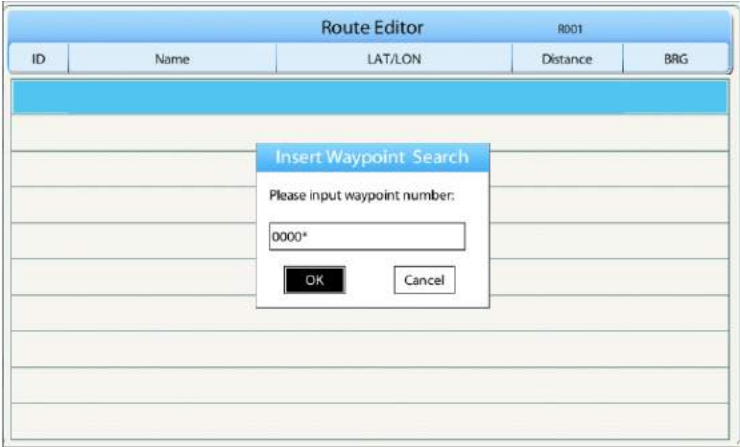
[Add Waypoint] ⟶ ⬤ to pop-up input box ⟶ ✛ to select ⟶ ⬤ ⟶ ✛
to select⟶ ⬤
As shown below,

[Insert Mark] ⟶ ⬤ to pop-up input box ⟶ ⬤ to edit ⟶ ◀⬤▶ to select ⟶ ⬤
As shown below,

3.Edit

[Route] list ⟶ ◀⬤▶ to select a desired one ⟶ MENU ⟶ [Edit] ⟶ ⬤ ⟶ MENU

⟶ [Insert Waypoint] / [Add Waypoint] / [Insert Mark] / [Edit] / [Delete] ⟶ ⬤ to edit.
As shown below,
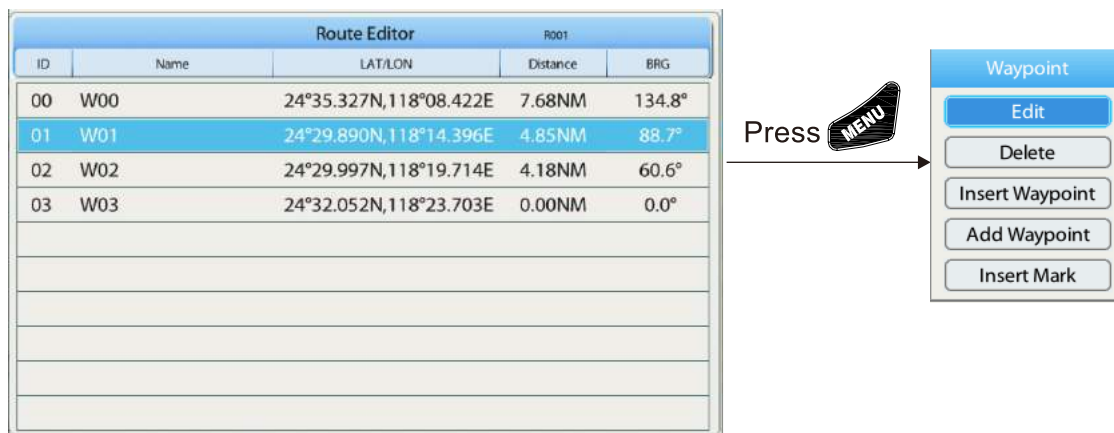
Note: The above step is to edit the waypoint, and then you can do the operation according to the step to add route.

[Route] list ➝ ⬥⬥◉⬥ to select blank column ➝ ⬤ to edit ➝ ⬤
As shown below,

Track	Route			Page 1 / 20
Other Ship Track	ID	Name	Login Date	Length
Waypoint	000	R000	2016-12-12 18:07:49	1.76NM
Route >	001	R001	2017-03-30 09:37:40	16.71NM
Marker	002			
Drawing	003			
Beacon	004			
AIS	005			
POB	006			
Map Settings	007			
Display1	008			
Alarm	009			

4.Forward Invoke

[Route] list ➝ ⬥◉⬥ to select a desired one ➝ MENU ➝ [Forward Invoke] ➝ ⬤

to start to navigate in the chart .

5.Reverse Invoke

[Route] list ➝ ⬥◉⬥ to select a desired one ➝ MENU ➝ [Reverse Invoke] ➝ ⬤

to start to navigate in the chart .

6.View

[Route] list ➝ ⬥◉⬥ to select a desired one ➝ MENU ➝ [View] ➝ ⬤

The system will view the route in the chart automatically .

7.Delete

[Route] list ➝ ⬥◉⬥ to select a desired one ➝ MENU ➝ [Delete] ➝ ⬤ to

pop-up a prompt box ➝ [OK] .

8. All Clear

[Route] list ➝ ⬥◉⬥ [All Clear] ➝ ⬤ to pop-up a prompt box ➝ [OK] to

delete all data.

Note: The route in navigation can't be deleted.

2.3.5 Marker

It is used to store markers, totals are 50000 points.

Users can do the operations of Search, Edit, View, Add, Delete and All Clear.

Press twice MENU ⟶ ▼ to select [Marker] ⟶ ◯ enter to [Marker] list.
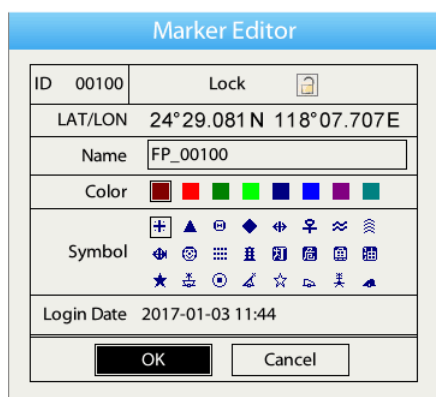
1.Search

[Marker] list ⟶ MENU ⟶ [Marker] ⟶ ◯ ⟶ [Search input] ⟶ ◯ to edit
⟶ [ID/Name]

2. Add

Method 1: [Marker] list ⟶ [arrows] to select blank column⟶ MENU ⟶ [Add] ⟶ ◯
to edit.

As shown below,

Method 2: [Marker] list ⟶ ◁◉▷ to select blank column ⟶ ◯ to edit ⟶ ◁◉▷
As shown below,

		Marker		Page 27 / 5000	
	ID	LAT/LON	Symbol	Name	Lock
	00265	24°29.081N,118°07.707E	✛	FP_00265	🔓
	00266	24°29.081N,118°07.707E	✛	FP_00266	🔓
	00267	24°32.052N 118°23.703E	✛	M00267	🔓
	00268	24°29.081N,118°07.707E	✛	FP_00268	🔓
	00269	24°29.081N,118°07.707E	✛	FP_00269	🔓
	00270	24°29.081N,118°07.707E	✛	FP_00270	🔓
	00271	24°29.081N,118°07.707E	✛	FP_00271	🔓
	00272	24°29.081N,118°07.707E	✛	FP_00272	🔓
	00273	24°29.081N,118°07.707E	✛	FP_00273	🔓
	00274	24°29.081N,118°07.707E	✛	FP_00274	🔓

Menu tabs: Track, Other Ship Track, Waypoint, Route, Marker ›, Drawing, Beacon, AIS, POB, Map Settings, Display1, Alarm

3.Edit
[Marker] list ⟶ MENU ⟶ [Edit] ⟶ ◁◉▷ ⟶ ◯ ⟶ to edit ⟶ [OK]

4.View
[Marker] list ⟶ ◁◉▷ to select a desired one ⟶ MENU ⟶ [View] ⟶ ◯

The system will view the marker in the chart automatically.

5.Delete
[Marker] list ⟶ ◁◉▷ to select a desired one ⟶ MENU ⟶ [Delete] ⟶ ◯ to
pop-up a prompt box ⟶ [OK] .
Note: It will pop-up a prompt box when the marker locked is to be deleted.

6.All Clear
[Marker] list ⟶ MENU ⟶ [All Clear] ⟶ ◯ to pop-up a prompt box ⟶ [OK] to
delete all data
Note: The marker locked can't be deleted.
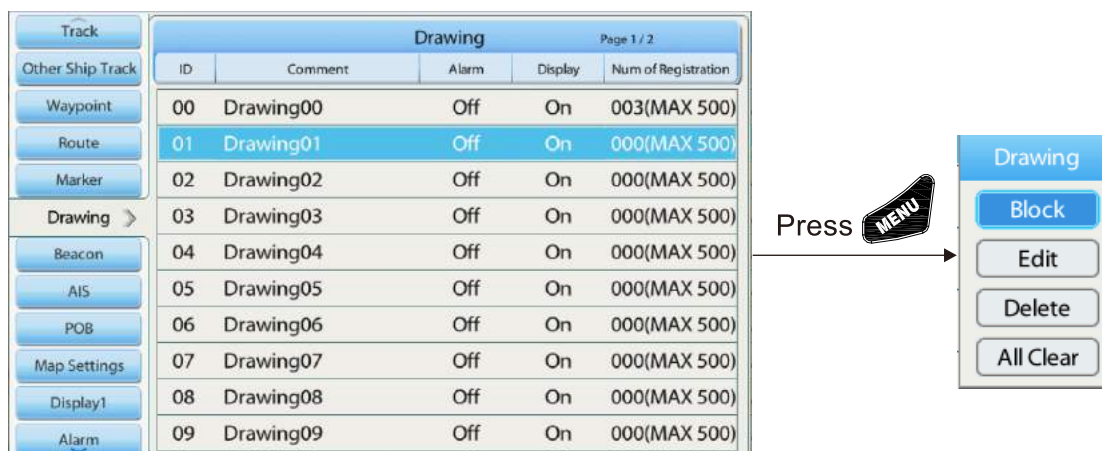
2.3.6 Drawing

It is used to store drawings, totals are 20 records. Each record max can accommodate
500 nodes. It can be consisted by multiple lines or polygons.
Users can do the operations of Block, Edit, Delete and All Clear.
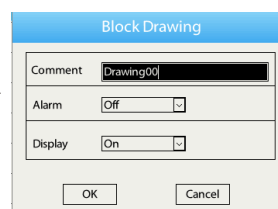
Press twice [MENU] → [▼] to select [Drawing] → [○] to enter to [Drawing] list.

Press [MENU]

1.Block Drawing
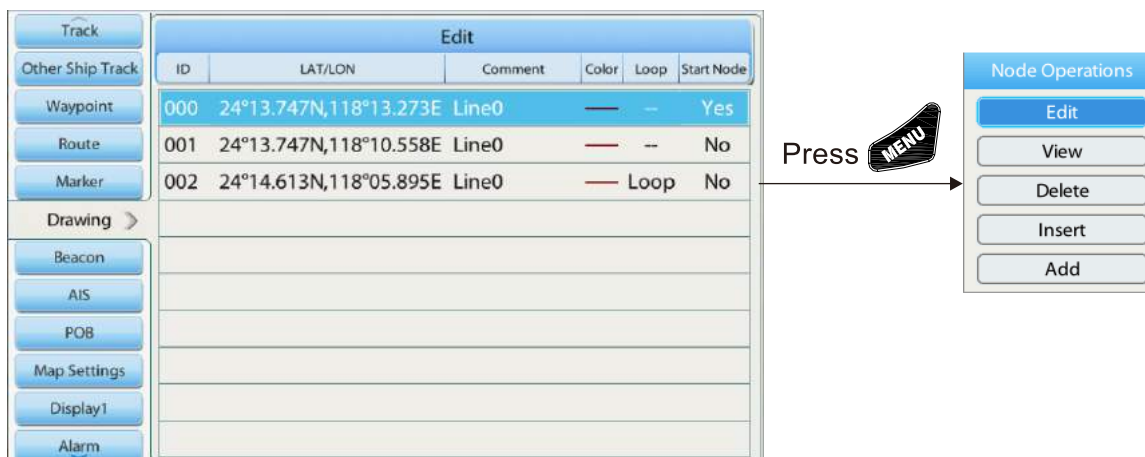
[Drawing] list → [MENU] → [Block] → [○] → to edit
→ [OK]

2.Edit

[Drawing] list → [MENU] → [Edit] → [○] → [Edit] list → [MENU] → [Edit] / [View] /
[Delete] / [Insert] / [Add] → [○] to edit.

As shown below,

Press [MENU]

(1) Edit Node

[Edit] list → [MENU] → [Edit] → [○] → to edit
→ [OK]

(2) View Node

[Edit] list → ⊙ to select a desired one → MENU → [View] → ○

The system will view the node in the chart automatically.

(3) Delete Node

[Edit] list → ⊙ to select a desired one → MENU → [Delete] → ○ to

pop-up a prompt box → [OK]

(4) Insert Node

[Edit] list → MENU → [Insert] → ○ →
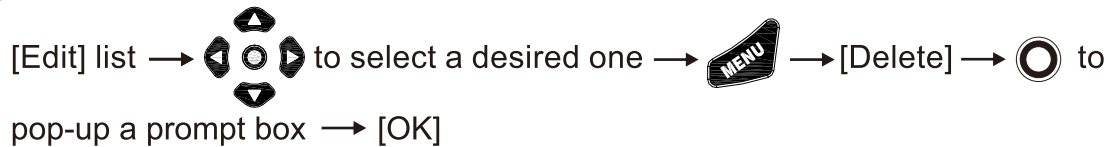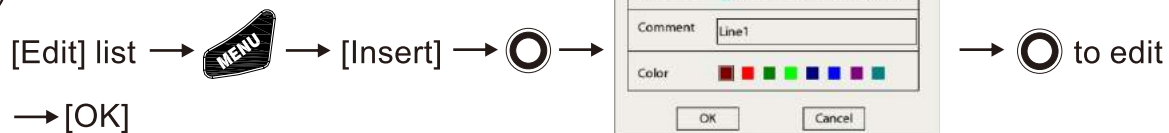
Node Editor	
Coordinate	24°35.506N 118°09.858E
Comment	Line1
Color	▮ ▮ ▮ ▮ ▮ ▮ ▮
OK	Cancel

→ ○ to edit

→ [OK]

Note: The node inserted will be located under the selected column.

(5) Add Node

[Edit] list → MENU → [Add] → ○ →
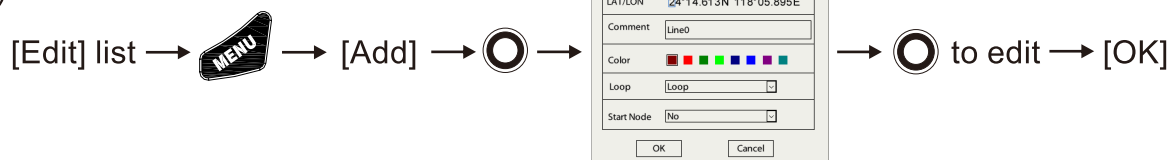
Node Add	
LAT/LON	24°14.613N 118°05.895E
Comment	Line0
Color	▮ ▮ ▮ ▮ ▮ ▮ ▮
Loop	Loop
Start Node	No
OK	Cancel

→ ○ to edit → [OK]

Note: The node added will be located at the final column.

3. Delete
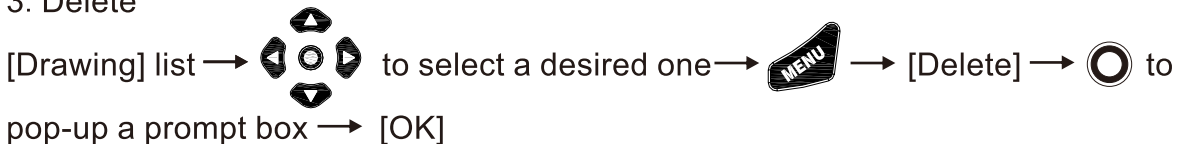
[Drawing] list → ⊙ to select a desired one → MENU → [Delete] → ○ to

pop-up a prompt box → [OK]

Note: The comment, alarm and display condition will restore to initial settings when the block is deleted.

4. All Clear
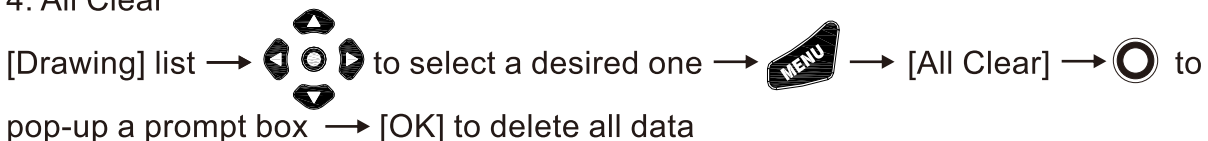
[Drawing] list → ⊙ to select a desired one → MENU → [All Clear] → ○ to

pop-up a prompt box → [OK] to delete all data

Note: The comment, alarm and display condition will restore to initial settings when the blocks are all cleared.

2.3.7 Beacon

It is used to store beacons, totals are 1000 points.

Users can do the operations of Search, Edit, View, Add, Delete and All Clear.

Press twice → to select [Beacon] → to enter to [Beacon] list.
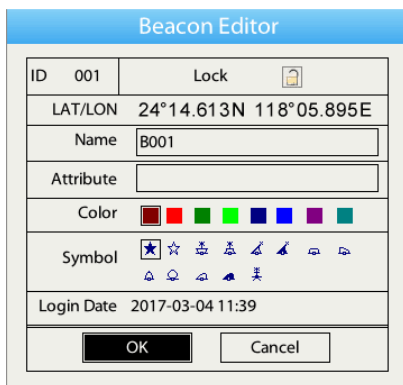
1.Search

[Beacon] list → → [Beacon] → → → to edit
→ [ID/Name]

2. Add

Method 1: [Beacon] list → to select blank column → → [Add] →
                to edit .

As shown below,

Method 2: [Beacon] list → ⬆⬅◉➡⬇ to select blank column → ◯ to edit → ⬆⬅◉➡⬇

As shown below,

ID	LAT/LON	Symbol	Name	Lock
000	22°29.805N,118°50.937E	★	B000	🔒
001	24°14.613N,118°05.895E	★	B001	🔒
002	22°29.705N 118°50.937E	★	B002	🔒
003				
004				
005				
006				
007				
008				
009				

Beacon — Page 1 / 100

Left menu: Track, Other Ship Track, Waypoint, Route, Marker, Drawing, Beacon, AIS, POB, Map Settings, Display1, Alarm

3.Edit

[Beacon] list → MENU → [Edit] → ⬆⬅◉➡⬇ → ◯ to edit → [OK]

Note: The ID and Login Date can't be edited.

4.View

[Beacon] list → ⬆⬅◉➡⬇ to select a desired one → MENU → [View] → ◯

The system will view the beacon in the chart automatically.

5.Delete

[Beacon] list → ⬆⬅◉➡⬇ to select a desired one → MENU → [Delete] → ◯ to pop-up a prompt box → [OK]

6. All Clear

[Beacon] list → MENU → [All Clear] → ◯ to pop-up a prompt box → [OK] to delete all data.

Note: The beacon locked can't be deleted.

2.3.8 AIS

The navigator is convenient to be connected with AIS equipment, dynamically display AIS targets on the map. It provides the relevant information about the ship nearby for collision avoidance and navigation, including the ship's coordinate, course, speed, MMSI, call sign, ship's name, ship's size and etc.

Press twice [MENU] → [▼] to select [AIS] → [O] enter to [AIS] list → [◄] [►] to select

[Vessel Information] / [Display] → [O]

ID	[..MMSI..]	RNG	SOG	BRG
0002	211831000	28.25NM	19.8kn	53°
0003	356866000	21.62NM	0.1kn	358°
0004	376227000	29.91NM	0.1kn	354°
0005	412043390	30.68NM	0.0kn	8°
0006	412043410	24.27NM	7.5kn	6°
0007	412096010	22.70NM	19.2kn	358°
0008	412326380	17.65NM	7.7kn	46°
0009	412441740	24.76NM	0.0kn	346°
0010	412441810	28.46NM	0.0kn	351°

Total 25 vessels.

1. Vessel Information

It is used to show the simple AIS targets information. Maximum displayed Vessel's information is 400. Users can customize the order of list.

[AIS] list → [O] → [Vessel Information] → [O] → [MENU]

ID	[..MMSI..]	RNG	SOG	BRG
0042	565452000	25.95NM	0.0kn	348°
0043	576297000	23.71NM	0.1kn	347°
0044	636013457	29.47NM	0.0kn	354°
0045	636091266	29.34NM	0.0kn	353°
0046				
0047				
0048				
0049				
0050				

Total 46 vessels.

Press [MENU] → AIS: View / Sort

Press [MENU] → AIS: Sort

(1) View

[Vessel Information] list → [navigation keys] to select a desired one → [MENU] → [View] → [O]

The system will view the vessel in the chart automatically.

(2) Sort

The order of list can be set as MMSI (up/down), RNG (up/down) and SOG(up/down).

[Vessel Information] list ⟶ MENU ⟶ [MMSI↑ / RNG↓ / SOG↓] ⟶ ◯ to sort.

ID	[..MMSI..]	RNG	SOG	BRG
0039	412654321	23.98NM	0.1kn	355°
0040	412666000	15.16NM	12.9kn	33°
0041	412693350		17.4kn	348°
0042	412700740		0.0kn	349°
0043	412701450		0.2kn	359°
0044	412702050	27.57NM	0.0kn	352°
0045	413122000	21.66NM	12.5kn	56°
0046	413273000	25.66NM	0.1kn	352°
0047	413421980	27.87NM	0.0kn	352°

Total 65 vessels.

Track / Other Ship Track / Waypoint / Route / Marker / Drawing / Beacon / AIS / POB / Map Settings / Display1 / Alarm

a. The vessel information can be ascending or descending sorted by MMSI, RNG and SOG.

b. As shown below, press ◯ , the vessel information will be sorted descending by MMSI.

MMSI↑ / RNG↓ / SOG↓

c. As shown below, press ◯ , the vessel information will be sorted ascending by MMSI.

MMSI↓ / RNG↑ / SOG↑

d.The sorting of RNG and SOG is same with MMSI sorting.

RNG: the distance from own ship to the target ship, its unit is NM.

BRG: the bearing relative to the target ship.

(3) View the detail information

It is used to call out the vessel's detail information displaying on the right of list.

[Vessel Information] list ⟶ ◁◯▷ to select a desired one ⟶ ◯ ⟶ [********* detail]
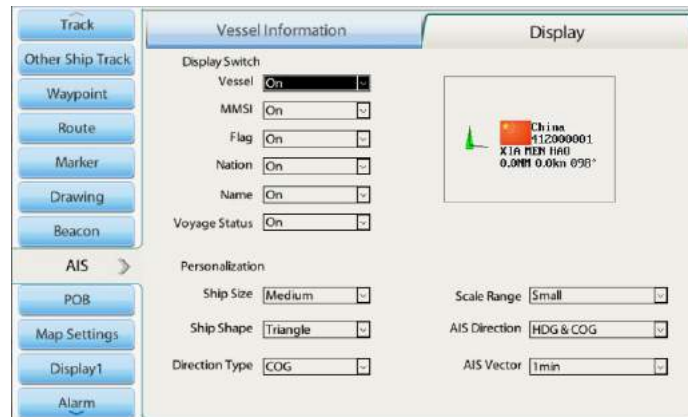⟶ QUIT

As shown below,

2. Display

It is not only can be used to switch the display on/off of the AIS parameters, but also can be used to do the personalized settings of AIS vessels.

[AIS] list ⟶ ⟶ ⟶ [Display] ⟶ ⟶ to edit

(1) Ship Size

Users can select the ship size from small, medium or large.

(2) Ship Shape

Users can select the ship shape from ship shape or triangle.

(3) Direction Type

Users can select the direction type of AIS vessel's information from BRG or COG.

(4) Scale Range

Users can select the initial displaying scale of AIS vessels from small (less 10NM), medium (less 2NM) or large (less 0.5NM).

(5) AIS Direction

Users can select the display of AIS vessel's heading according to Course or HDG&COG.

(6) AIS Vector

The AIS vessel's voyage of this period time will be displayed on the map. Users also can set it as off.

2.3.9 POB

It is used to store emergency points, totals are 20 points.

Users can do the operations of Edit, Navigate, View, Delete and All Clear.

Press twice [MENU] ⟶ [▼] to select [POB] ⟶ [◯] to enter to [POB] list
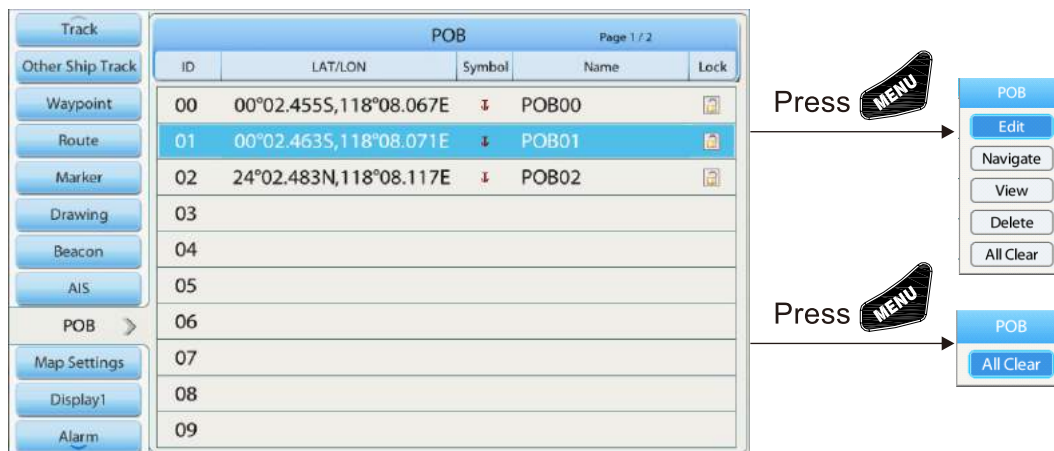
Note: When in navigation, press [POB], the current coordinate will be saved. You can view, edit, delete and navigate in the POB list.

1. Edit

[POB] list ⟶ [MENU] ⟶ [Edit] ⟶ [◄◯►] to edit ⟶ [OK]

2. Navigate

[POB] list ⟶ [◄◯►] to select a desired one ⟶ [MENU] ⟶ [Navigate] ⟶ [◯] to start to navigate in the chart

3. View

[POB] list ⟶ [◄◯►] to select a desired one ⟶ [MENU] ⟶ [View] ⟶ [◯]

The system will view the POB in the chart automatically.

4. Delete

[POB] list ⟶ [MENU] ⟶ [Delete] ⟶ [◯] to pop-up a prompt box ⟶ [OK]

5. All Clear

[POB] list ⟶ [MENU] ⟶ [All Clear] ⟶ [◯] to pop-up a prompt box ⟶ [OK] to delete all data

Note: The POB in navigation or locked can't be all cleared.
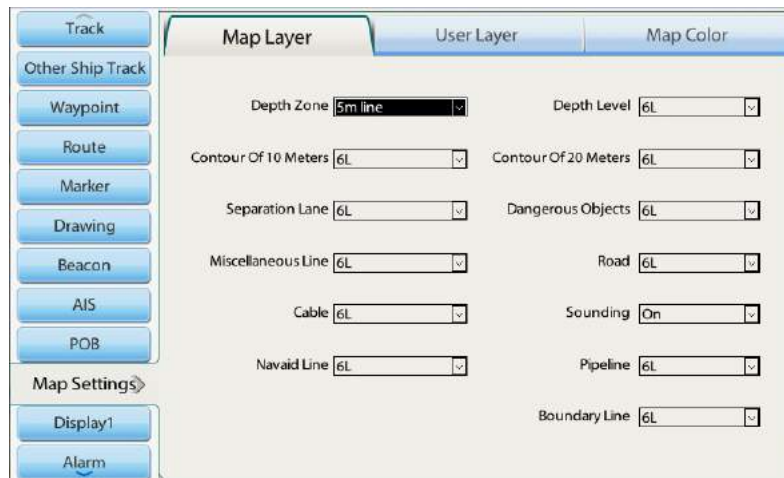
2.3.10 Map Settings

Press twice ⬟MENU → ▼ to select [Map Settings] → ◯ to enter to [Map Settings]
list → ◀ ▶ to select [Map Layer] / [User Layer] / [Map Color] → ◯ to edit

1. Map Layer

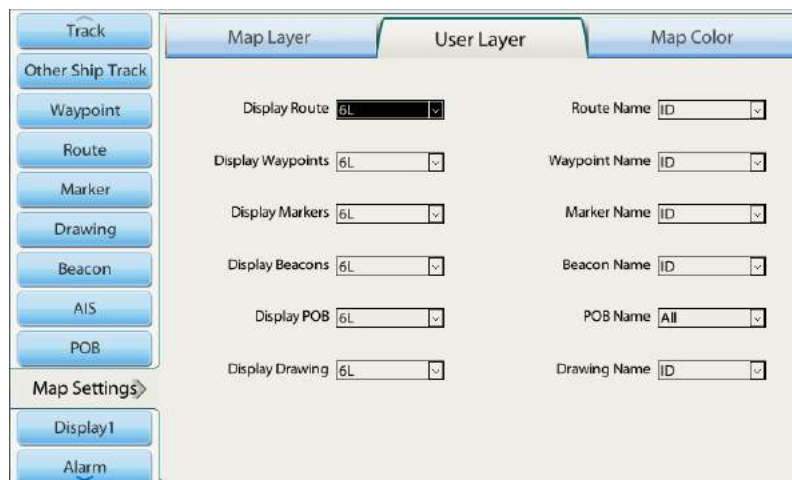It is used to set the display levels of map layer elements.

[Map Settings] list → ◯ → [Map Layer] → ◯ → ◀◯▶ to edit

2. User Layer

It is used to set the display levels and contents of user data.

[Map Settings] list → ◯ → ◀ ▶ → [User Layer] → ◯ → ◀◯▶ to edit

3. Map Color

It is used to custom the map layer's color.

[Map Settings] list → ◯ → ◁ ▷ → [Map Color] → ◯ → ◁◯▷ to edit.
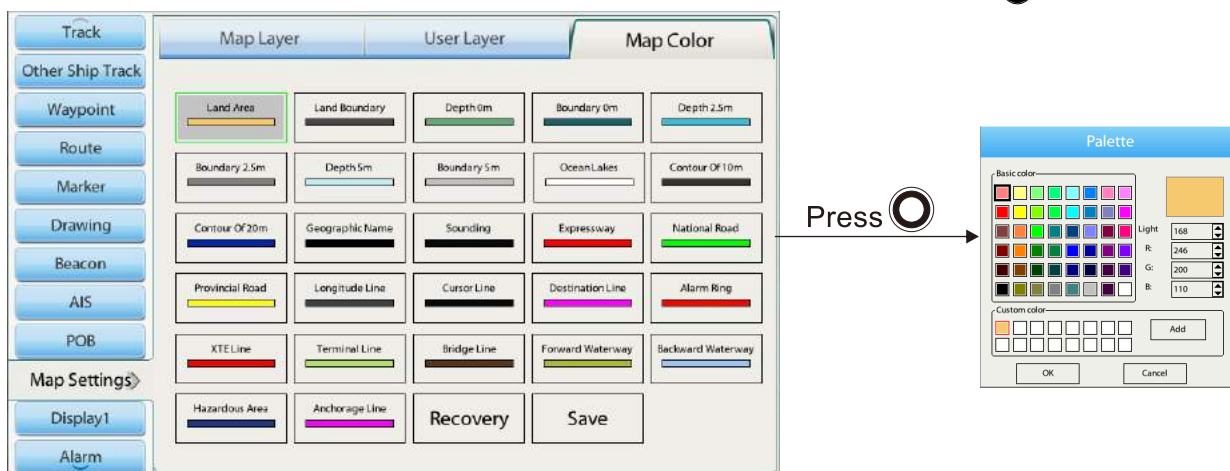
Note: The color setting is separate for each display mode (day, night, cloudy, auto, standard).

2.3.11 Display1

Press twice [MENU] → ▼ to select [Display1] → ◯ to enter to [Display] list → ◁ ▷ to select [Display] / [Map Query] → ◯ to edit.

1. Display

It is not only can be used to switch the on/off of course line, destination line, map direction pointer and gird, but also can be used to set the display style of course line, destination line, own ship style and map's font. The map moving mode and map area also can be set here.

[Display] list → ◯ → [Display1] → ◯ → ◁◯▷ to edit.
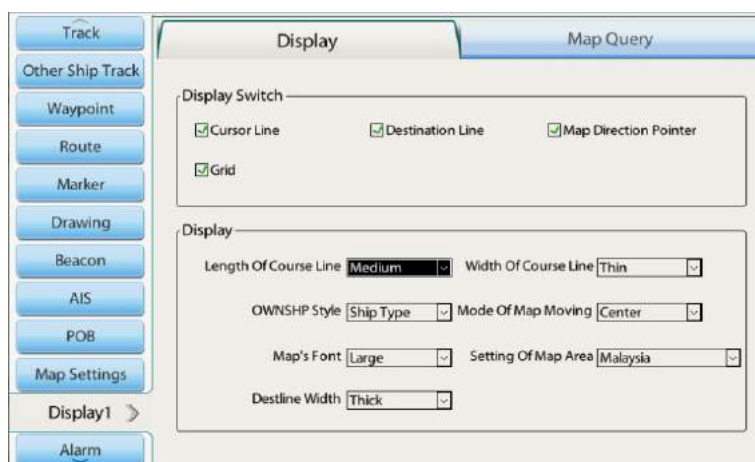
2. Map Query

It is related to the Setting of Map Area, the Map Query displays the cities of map area setting.

[Display] list → ◯ → ◁ ▷ → [Map Query] → ◯ → ◁◯▷ to edit.

Note: The country displayed on the chart can be set through [Setting of Map Area] in the [Display] list.

2.3.12 Alarm

Press twice MENU → ▽ to select [Alarm] → ◯ to enter to [Alarm] list → ◁◯▷ to edit.

2.3.12.1 Alarm1

1. CPA: The distance between own ship and the target ship.

2. TCPA: The estimated time before own ship and the target ship pass each other.

3. Anchor Watch Alarm: This alarm is to trigger the alarm when the vessel is moving away from the present anchored location by more than the preset range.

4. XTE Alarm: This alarm is to trigger the alarm when the vessel is deviating from the intended course by more than the preset cross-track error (XTE) limit.
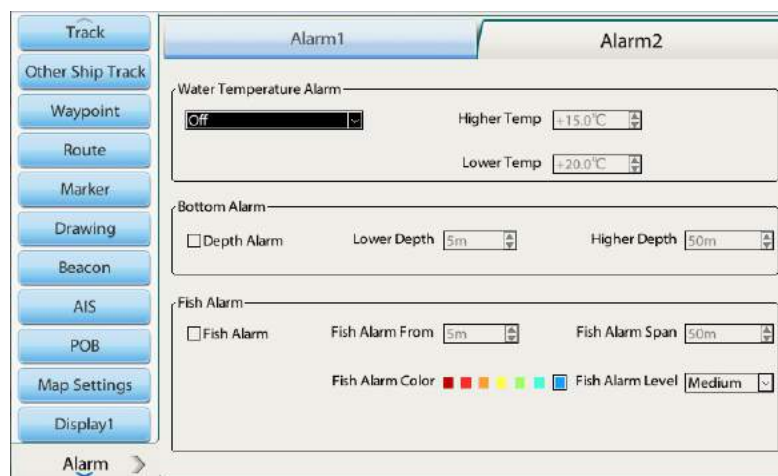
5. Arrival Alarm: This alarm is to trigger the alarm when the vessel is arriving at a specific distance from the destination.

6. Lower Depth Alarm: This alarm is to trigger the alarm when the area is lower than the preset range.

7. Higher Depth Alarm: This alarm is to trigger the alarm when the area is deeper than the preset range.

8. Over speed Alarm: This alarm is to trigger the alarm when the speed is out of the preset range.

9. Drawing Alarm: This alarm is to trigger the alarm when the vessel is deviating from the safety zone by more than the preset limit.

10. Distance to Turn Waypoint: This alarm is to trigger the alarm when the vessel is arriving at a specific distance to turn to next waypoint.

Note: When the important alarm is triggered, press [QUIT], the alarm will appear again after 20 seconds if the other alarm isn't triggered. If the other alarm is triggered in 20 seconds, they will appear together. When the standard alarm is triggered, press [QUIT], the alarm will appear again after 5 minutes if the other alarm isn't triggered. If the other alarm is triggered in 5 minutes, they will appear together.

Important Alarm: XTE Alarm, CPA, TCPA, Lower Depth Alarm, Higher Depth Alarm, Drawing Alarm (20 seconds), Bottom Alarm, Fish Alarm
Standard Alarm: Anchor Watch Alarm, Arrival Alarm, Over speed Alarm, Distance To Turn Waypoint (5 minutes)

2.3.12.2 Alarm2

1. Water temperature alarm: The system is to trigger the alarm when the water temperature data is beyond the Higher Temp or below the Lower Temp.

Note: The alarm has three options: (1) Off (2) On-Inside range (3) On-Out of range.And it has Lower temperature setting and Higher temperature setting. The alarm is important alarm. The alarm interval is 20 seconds.

2. Bottom Alarm: Alarm will be triggered when depth reaches higher than preset highest depth or lower than preset lowest depth for alarm.

3. Fish Alarm: Alarm will be triggered when the fish schools meet the conditions of Fish Alarm From, Fish Alarm Span, Fish Alarm Color and Fish Alarm Level set.

Note: The fish alarm color sets the color judged that the shoal of fish warning is a shoal of fish. Weak reacts to a small shoal of fish, and Strong reacts to a big shoal of fish. When the alarm is triggered, press 【QUIT】 , the alarm will appear again after 20 seconds if another alarm isn't triggered. If another alarm is triggered in 20 seconds, they will appear together.

2.3.13 Auxiliary

Press twice 【MENU】 → 【▼】 to select [Auxiliary] → 〇 → 【◀】【▶】 to select[Calendar] / [Tidal] / [Satellites] / [System Test] / [LCD Test] → 〇 to edit.

1. Calendar

It is used to show the current date, also can view the calendar from the year of 1999 to 2100.

[Auxiliary] list → 〇 → [Calendar] → 〇 → 【◀▲▶▼】 to edit

2. Tidal

It is used to show current date's tide data of different port. Users can select the tidal station on the list according to their requirement.

[Auxiliary] list → 〇 → [Tidal] → 〇 → 【◀▲▶▼】 to edit
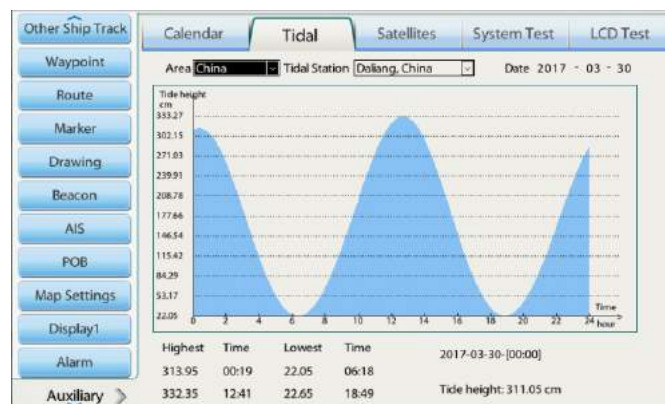
3. Satellites

It is used to show the satellites received and their signal strength.

[Auxiliary] list ⟶ ⊙ ⟶ [Satellites] ⟶ ⊙ ⟶ ⬤ to view.

Coordinate

ID & Bearing
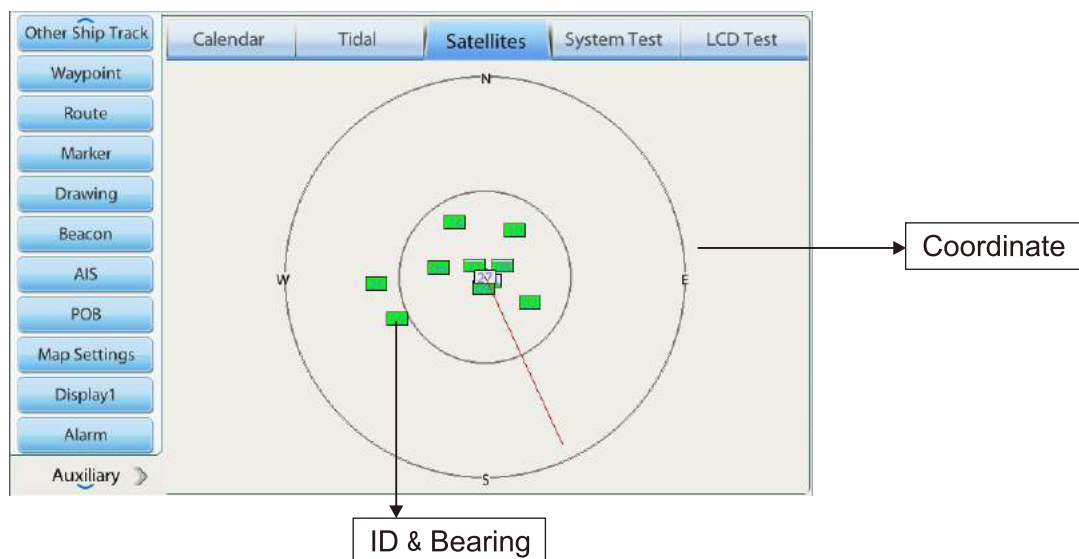
4. System Test

It is used to check the Memory, Port and Key can normally work or not.

[Auxiliary] list ⟶ ⊙ ⟶ [System Test] ⟶ ⊙
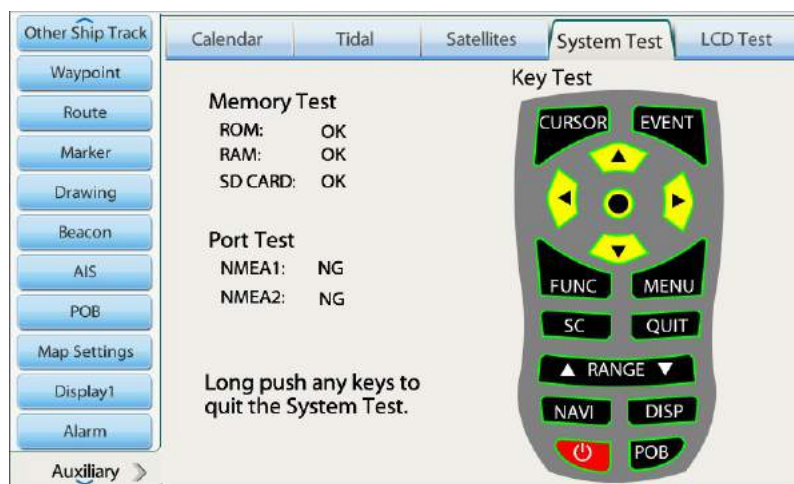
Note: When doing the key test, press key randomly on the keypad, the key on the screen turns yellow, as shown above.

5. LCD Test

It is used to check the LCD can normally work or not by changing different colors.

[Auxiliary] list ⟶ ◎ ⟶ [LCD Test] .

Press ◎ continuously, the page will switch as follow.

Red--Green--Blue--White--Cross Line--Normal.

Red

Green

Cross Line   White   Blue
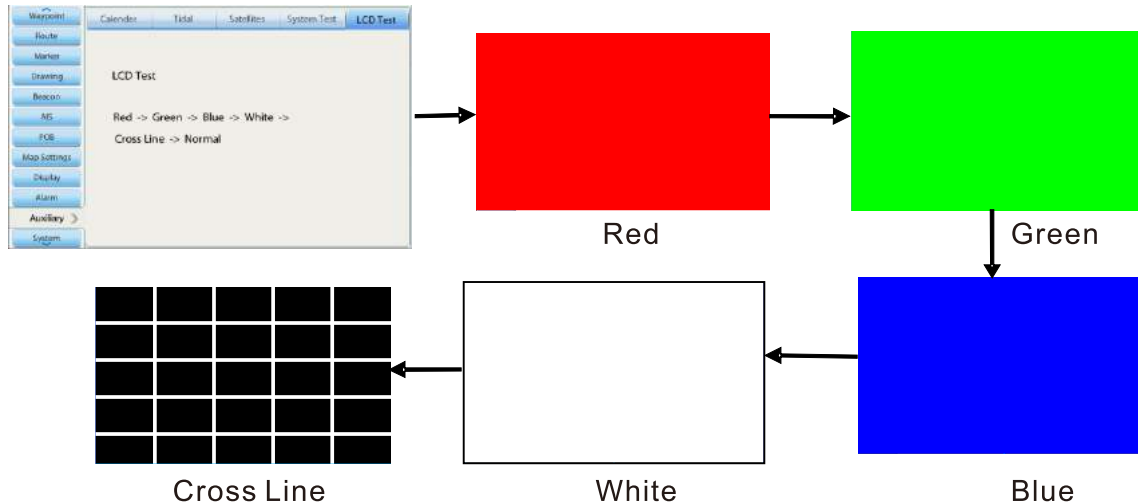
2.3.14 System

Press twice MENU ⟶ ▼ to select [System] ⟶ ◎ ⟶ ◀ ▶ to select [General] / [GPS & Simulation]⟶ ◎ to edit.

1. General

[System] list ⟶ ◎ ⟶ [General] ⟶ ◎ to edit.
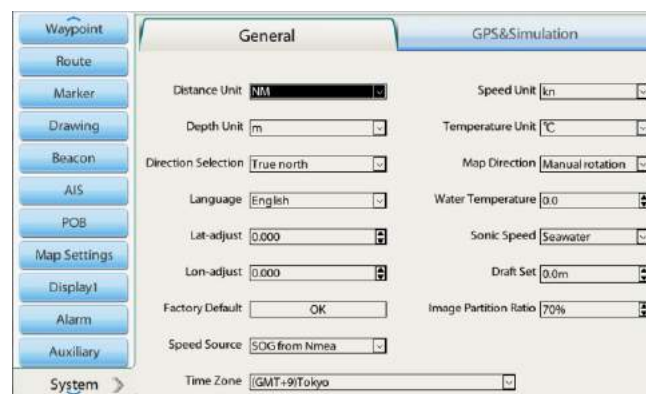
(1) Distance Unit/Speed Unit/Depth Unit/Temperature Unit

Users can select the distance unit according to their daily usage habits.

(2) Direction Selection

Users can select the direction reference from the true north or magnetic north.

(3) Map Direction

Users can select the map direction from the manual rotation or automatic rotation.

(4) Language

There are various language for selection, users can select their local language as the system language.

(5) Lon-adjust / Lat-adjust

The map correct according to the setting value of Lon-adjust / Lat-adjust.

(6) Water Temperature

Users can set the correction value of water temperature.

(7) Factory Default

Users can reset to defaults of menu setting.

(8) Speed Source

Users can select speed either form NMEA (SOG from NMEA) or speed from sensor (STW from sensor).

(9) Time Zone

Users can set the time zone according to their position.

(10) Sonic Speed

Users can set the Sonic Speed being on Seawater or Freshwater according to their requirement.

(11) Draft Set

Users can set the draft value being 0.0 to 10.0 according to their requirement.

(12) Image Partition Ratio

Users can set the image partition ratio of Map/Fish Finder page.

2. GPS & Simulation

[System] list ⟶ ◯ ⟶ [GPS & Simulation] ⟶ ◯ to edit.
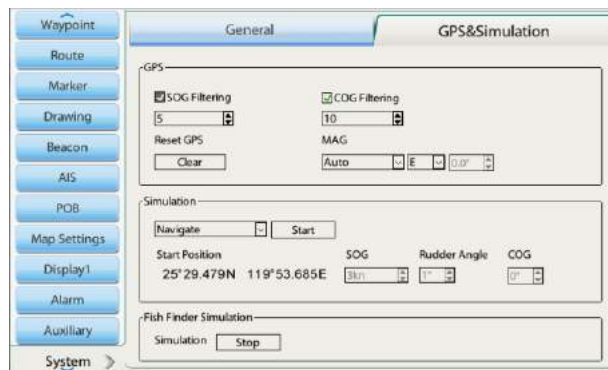
(1) SOG Filtering/COG Filtering

It is used to make the SOG/COG output being automatic smoothing.

(2) Reset GPS

It is used to reset the GPS module parameter.

(3) MAG

To set the MAG output manual or automatic.

(4) Simulation

To set the navigation on or off in the normal navigation mode.

In the custom mode, the navigation SOG/Rudder Angle/COG will depend on the user's setting. The start position depends on the GPS input or not. GPS input, the start position is the own ship position, GPS disconnect, the start position can be custom made.

(5) Fish Finder Simulation

Enables Simulation mode to be used to show operation.

2.3.15 NMEA

Press twice [MENU] → [▼] to select [NMEA] → [○] → [◄] [►] to select [Output] / [Input] / [Baud Rate] → [○] to edit.

1. Output

[NMEA] list → [○] → [Output] → [◄○►] to edit.
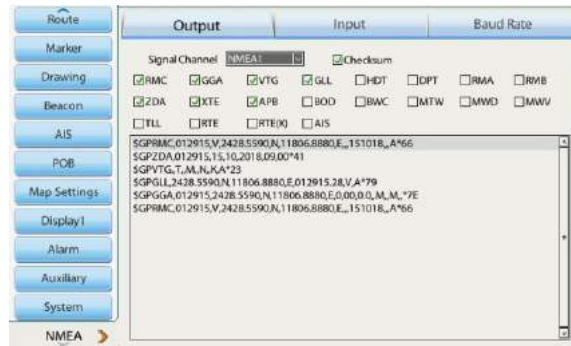
The system will output NMEA0183 sentence selected, and the printed information will display on the screen.

(1) NMEA1 sentence output or input, select the data port with seven cores at rear panel.
   1, 2 pin is power port, 3 pin is ground wire, 4, 5 pin is for 0183 output, 6, 7 pin is for 0183 input.

(2) NMEA2 sentence output or input, select the data port with six cores at rear panel.
   1 pin is ground wire, 2, 3 pin is for 0183 output, 4, 5 pin is for 0183 input, 6 pin is NC.

For the detailed information of data interface definitions, please see in Chapter 5.

Note:

1. RMC,GGA,VTG,GLL sentence are all normally open. If you want to view the other signal output, please select the ones in Signal Channel.

2. If AIS option is selected, other sentences will be disable.
   When AIS is checked, the Baud Rate of the set port automatically switches to 38400 bps.

2. Input

[NMEA] list → [○] → [Input] → [◄○►] to edit.
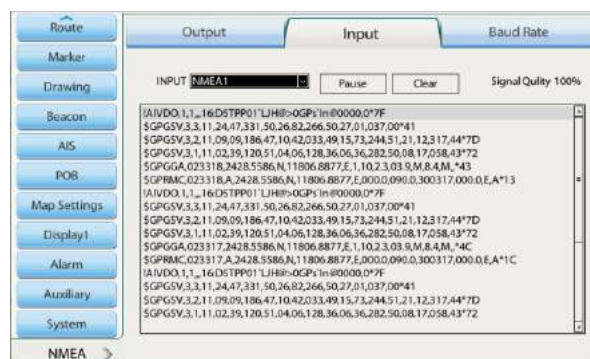
Note: Can show the NMEA sentences the unit received.

3. Baud Rate

It is used to select the baud rate of NMEA1 and NMEA2.

[NMEA] list ⟶ ◯ ⟶ [Baud Rate] ⟶ ◯ ⟶ ◁◯▷ to edit
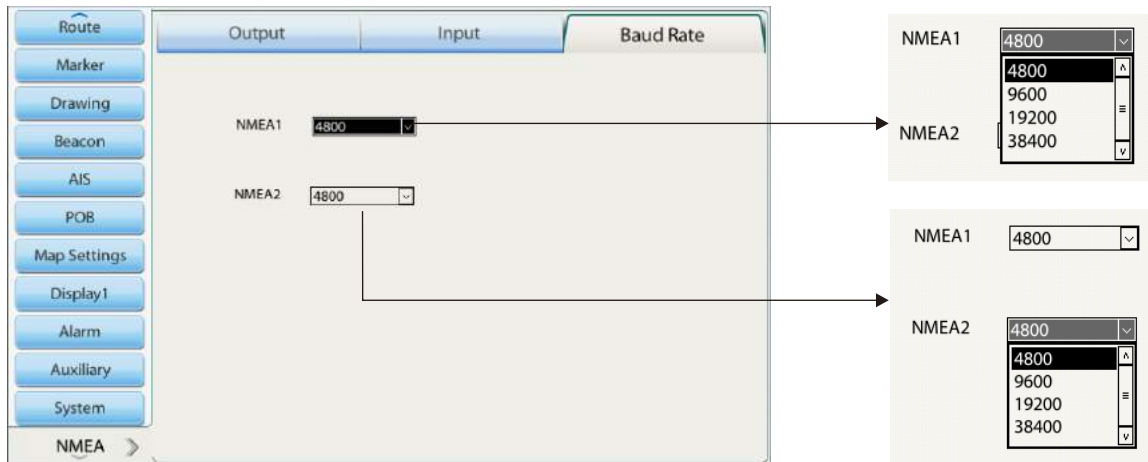
2.3.16 Display Setting in SYSTEM Menu

Press twice **MENU** ⟶ **FUNC** ⟶ ▽ to select [Display] ⟶ ◯ ⟶ ◁◯▷ to edit
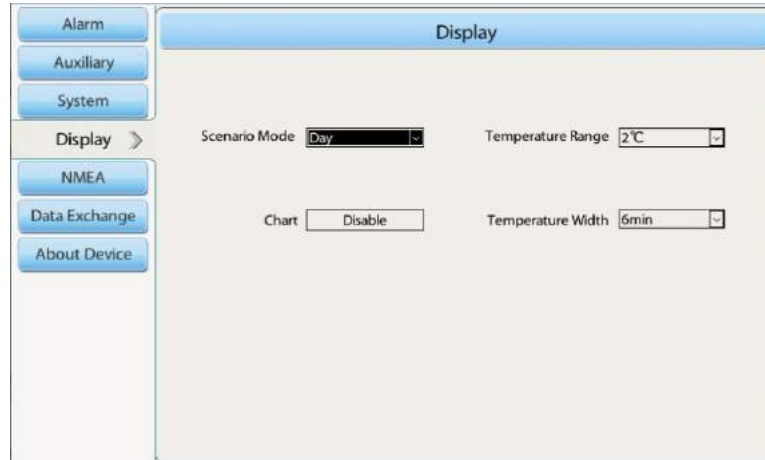
(1) Scenario Mode

It is used to set the scenario mode of current map display.

(2) Chart

It is used to set the chart disable / enable, no matter the chart disable / enable, the grid always displays.

(3) Temperature Range / Width

It is used to set the range and width of temperature graph.

Note: The Alarm setting, Auxiliary setting, System setting and NMEA setting in FUNC Menu is same as operation in Main Menu. To display chart, please input the password: 3300300.

2.3.17 Data Exchange

Press twice MENU → FUNC → ▼ to select [Data Exchange] → ○ → ◄ ► to

select [Data Export] / [Data Import] / [Data Save] / [Data Load] → ○ → ◄○► to

select → ○

Without SD card

SD card inserted

Press【OK】
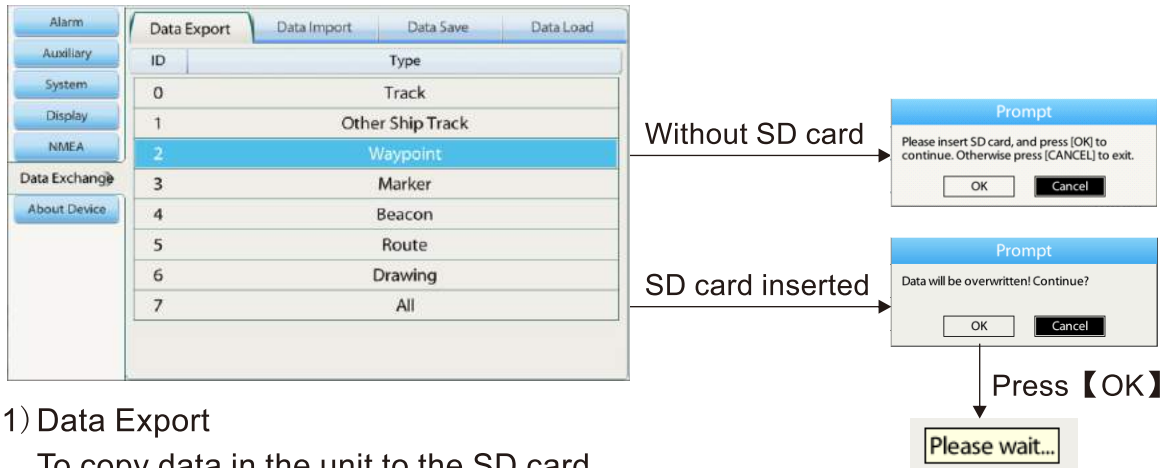
(1) Data Export

To copy data in the unit to the SD card.

(2) Data Import

To copy data in the SD to the unit.

(3) Data Save

To save data as Original format.

(4) Data Load

To load data as Original format.

Note:

The SD cards that can be used are as follows.

SD: 2 GB

SDHC: 4 to 32 GB

2.3.18 About Device

It is used to show the detail information about the device.

Press twice MENU → FUNC → ▼ to select [About Device] → ○ to view.

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Chapter 3 Fish Finder Introduction

3.1 Function Introduction

3.1.1 Function Key

3.1.1.1 VRM

The VRM (Variable Range Marker) shown by the green line can be moved up and down.

It is convenient to measure the depth by aligning with the target as school of fish.

Press [CURSOR] : Display the VRM.

→ [▲▼] : The movable marker moves up and down.

The movable marker and the numerical value of marker depth are simultaneously highlighted.

3.1.1.2 Auto Range

Will automatically follow the bottom, making it easy to see entire image from surface to the bottom.

The range value changes
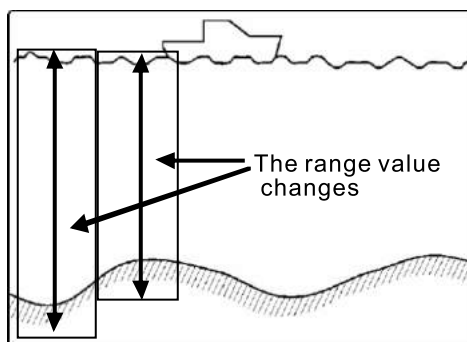
Press [▲ RANGE ▼] to select [Auto Range].

3.1.1.3 Manual Range

The range can be manually selected. Press [▲ RANGE ▼] to select range.

3.1.1.4 Auto Shift

The image is automatically shifted so that the bottom is always displayed.

Press [▲ RANGE ▼] to select [Auto Shift].

3.1.1.5 Manual Shift (Shift)

The image range is shifted up and down. (Setting: m, fm, I.fm: 0 to 300, ft: 0 to 1000)
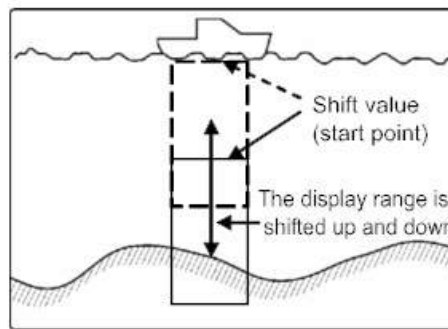
The shift function works only when the VRM is disabled,

Press ![MENU] ⟶ to Shift ON / OFF.

Shift function is enabled when selecting the "Shift OFF" of Quick Menu. Press ![arrows] .

The image range will shift up and down.

Shift function is disabled when selecting the "Shift ON" of Quick Menu.

3.1.2 SC Menu

In the fish finder page, press ![SC] .
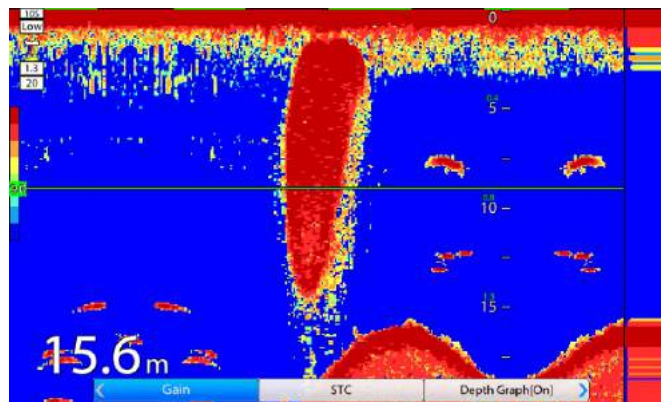
3.1.2.1 Gain

In the fish finder page, press ![SC] ⟶ ![◀] ![▶] to select [Gain] ⟶ ![O]

There will be a window to show the current Gain value ⟶ ![arrows] to adjust the Gain value.

(The Gain can be manual set only when it is on Manual situation)
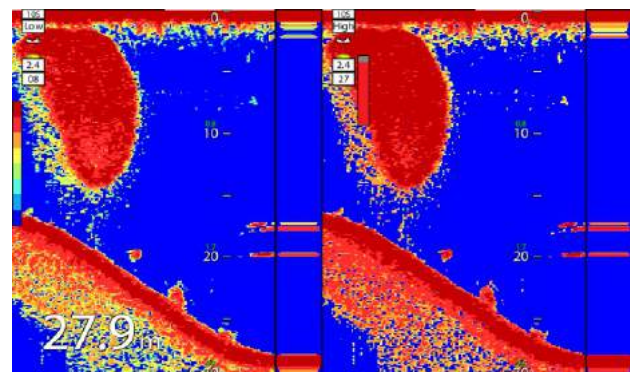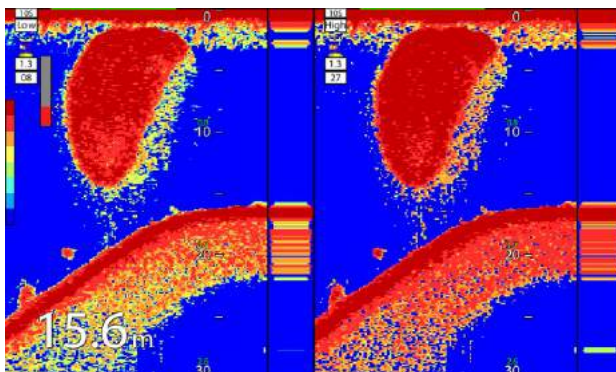
3.1.2.2 STC

In the fish finder page, press [SC] → [◄] [►] to select [STC] → [O]

There will be a window to show the current STC value → [▲][▼] to adjust the STC value.
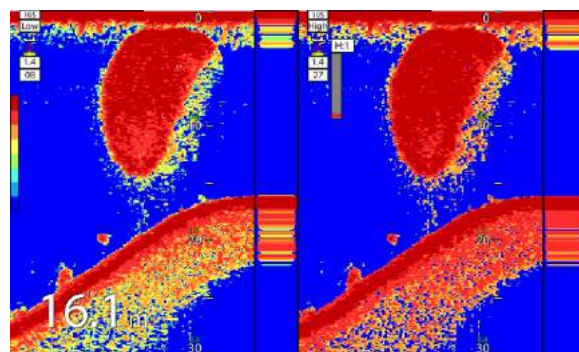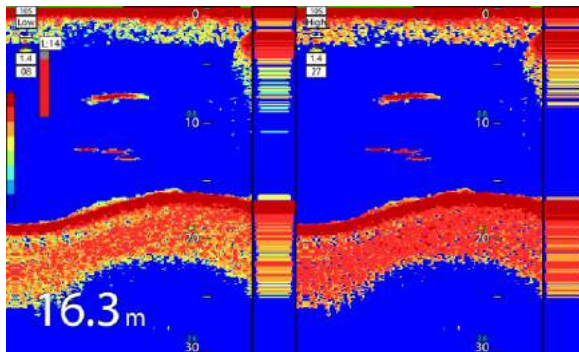
3.1.2.3 Depth Graph

In the fish finder page, press [SC] → [◄] [►] to select [Depth Graph [ON]] → [O] to display the Depth Graph, press [▲ RANGE ▼] to adjust the value of depth graph width.
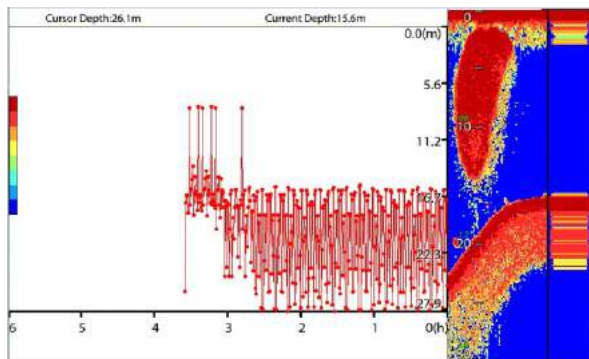
3.1.2.4 Depth Graph Width

In the fish finder page, press [SC] → [◄] [►] select [Depth Graph Width *h], press [O] to quickly adjust the value of depth graph width.

| ◄ Depth Graph[On] | Depth Graph Width6h | Image Partition Ration70% |

*Depth Graph Width: 1h, 6h, 12h, 18h, 24h.

3.1.2.5 Image Partition Ratio

In the fish finder page, press [SC] → [◄] [►] to select [Image Partition**%] → [O] press to quickly adjust the Image Partition Ratio.
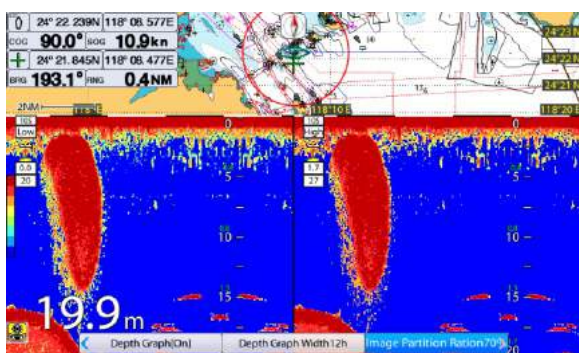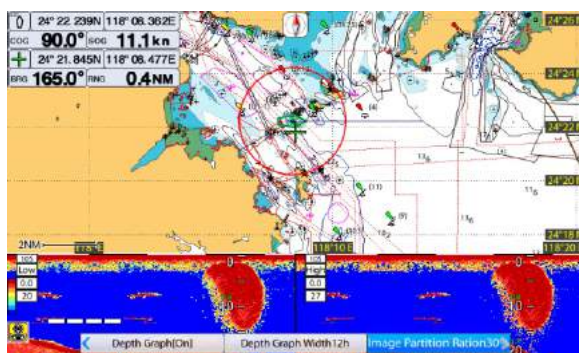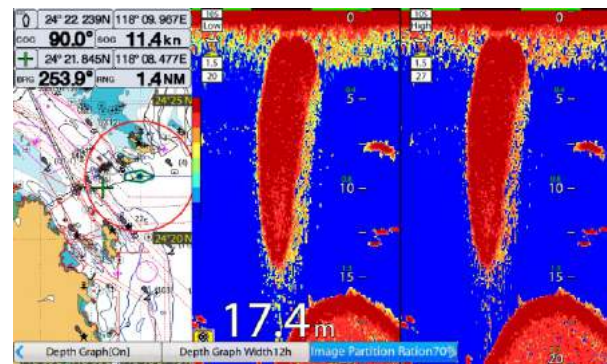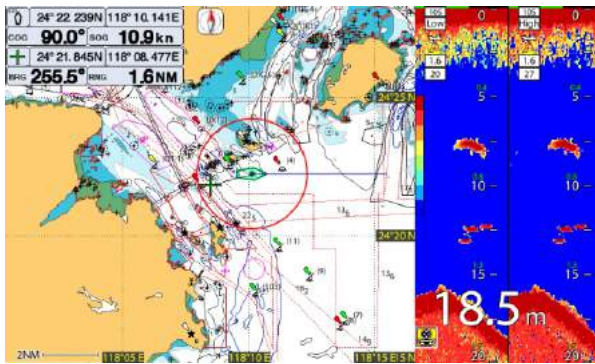
**Image Partition: 30%, 40%, 50%, 60%, 70%.

3.1.3 First Menu

In the fish finder page, press 〈MENU〉 →

(Full Screen/Exit Full Screen only work on the Map page)

3.1.3.1 Image Speed
In the fish finder page, press 〈MENU〉 → [Image Speed] → ▲▼ → ◯ to select the image speed.
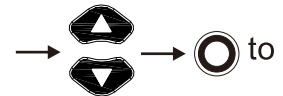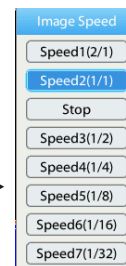
3.1.3.2 Image Mode
In the fish finder page, press 〈MENU〉 → [Image Mode] → ▲▼ → ◯ to select the image mode.
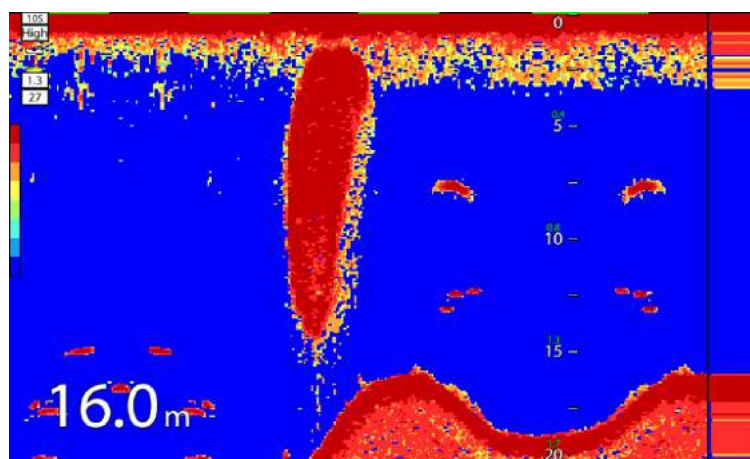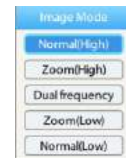
Normal (High)
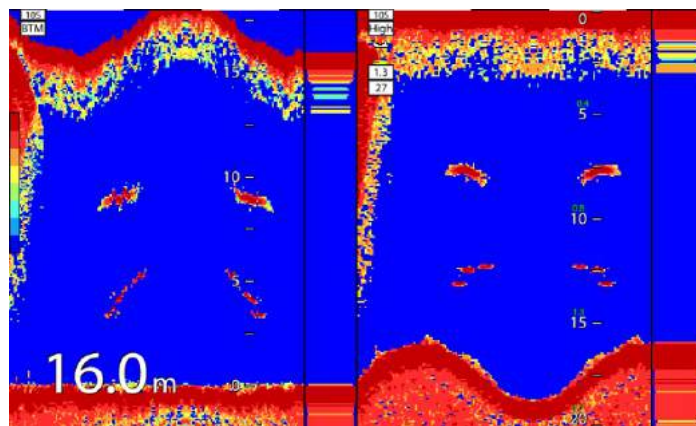
Zoom (High)
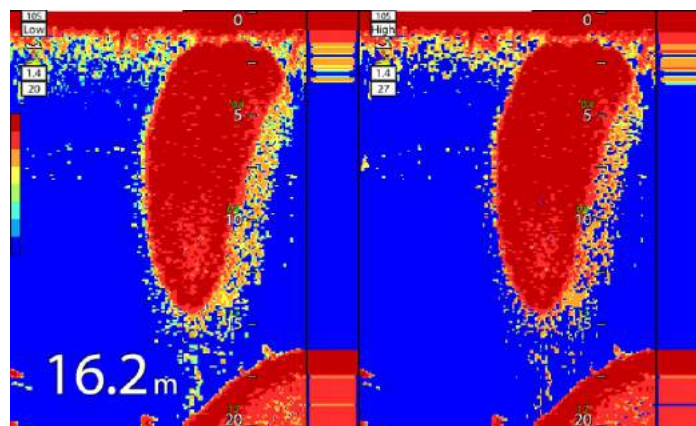
Dual frequency
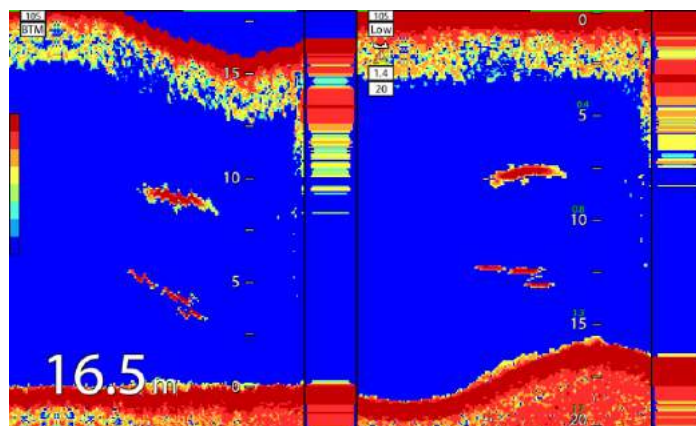
Zoom (Low)
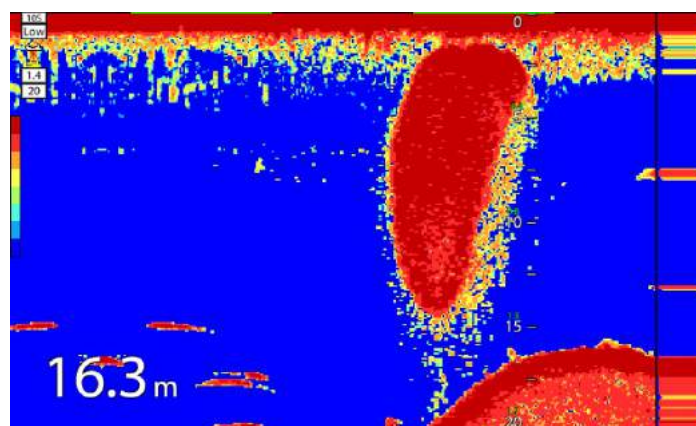
Normal (Low)

3.1.3.3 IR

In the fish finder page, press → [IR] → → → ⭕ to select the value of IR.
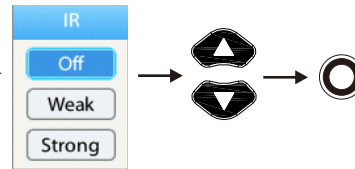
3.1.3.4 Gain Select

In the fish finder page, press → [Gain Select] → → → ⭕ to select the value of Gain Select.
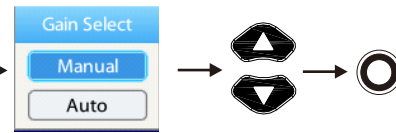
When on [Manual], Users can quickly set the Gain value on [SC] menu.

3.1.3.5 Zoom Type

In the fish finder page, press → [Zoom Type] → → → ⭕ to select the value of Zoom Type.

Zoomed range

0m

This is the limit width which set at Bottom
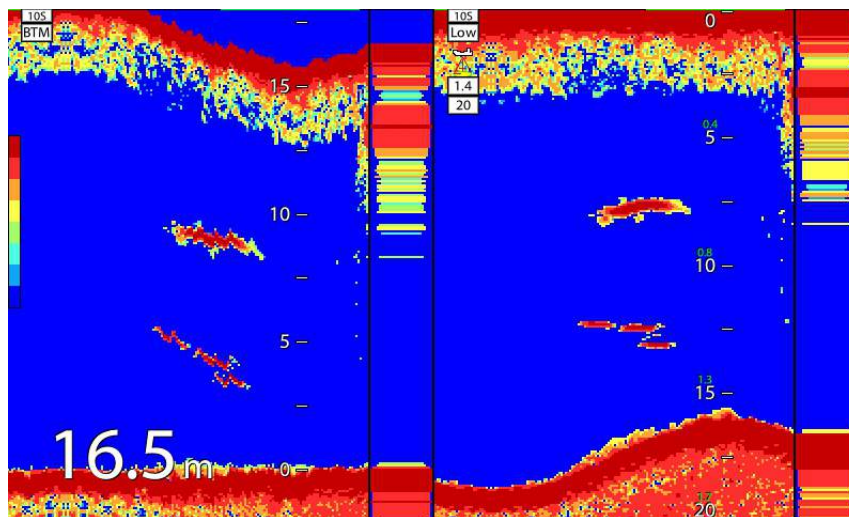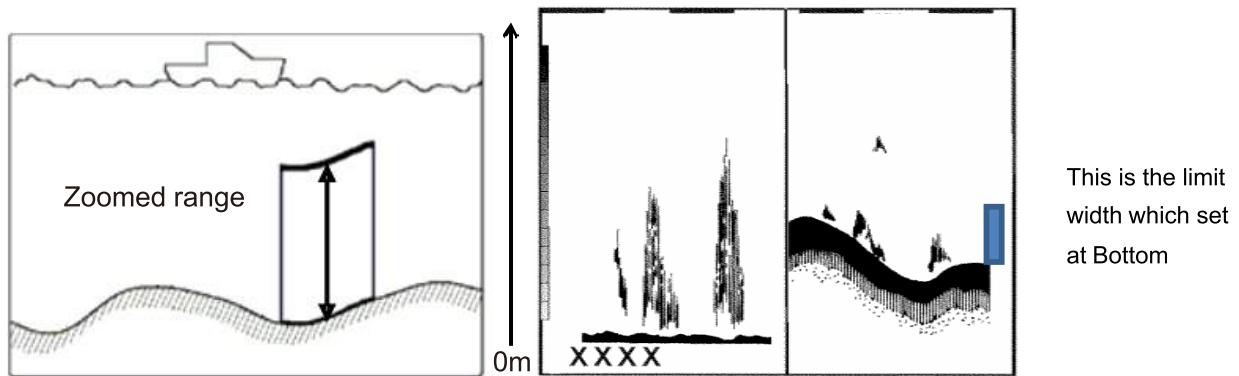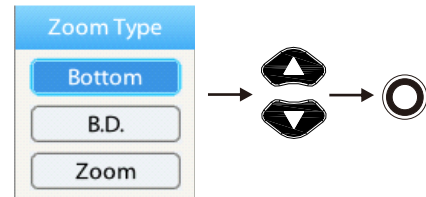
Bottom: Bottom display at 90% position from top of fish finder screen display area as straight line.
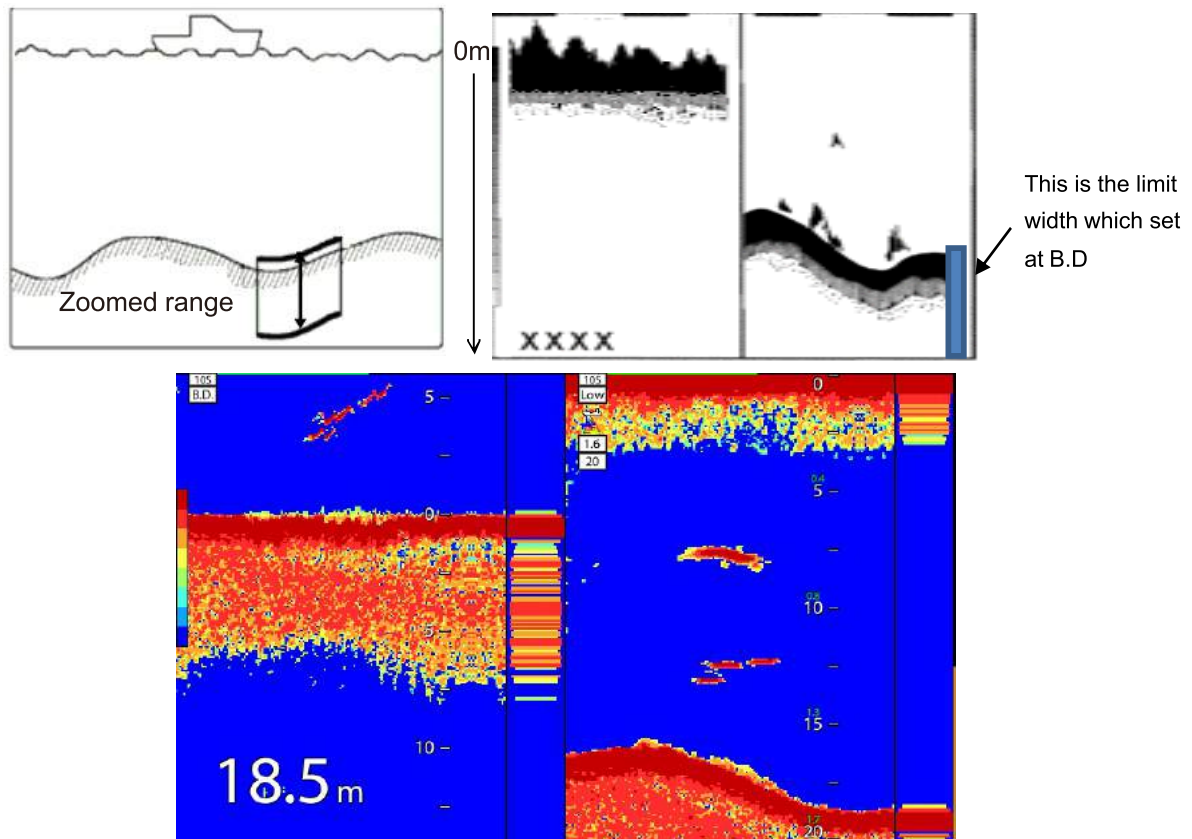
B.D: B.D display at 30% position from top of fish finder screen display area as straight line.
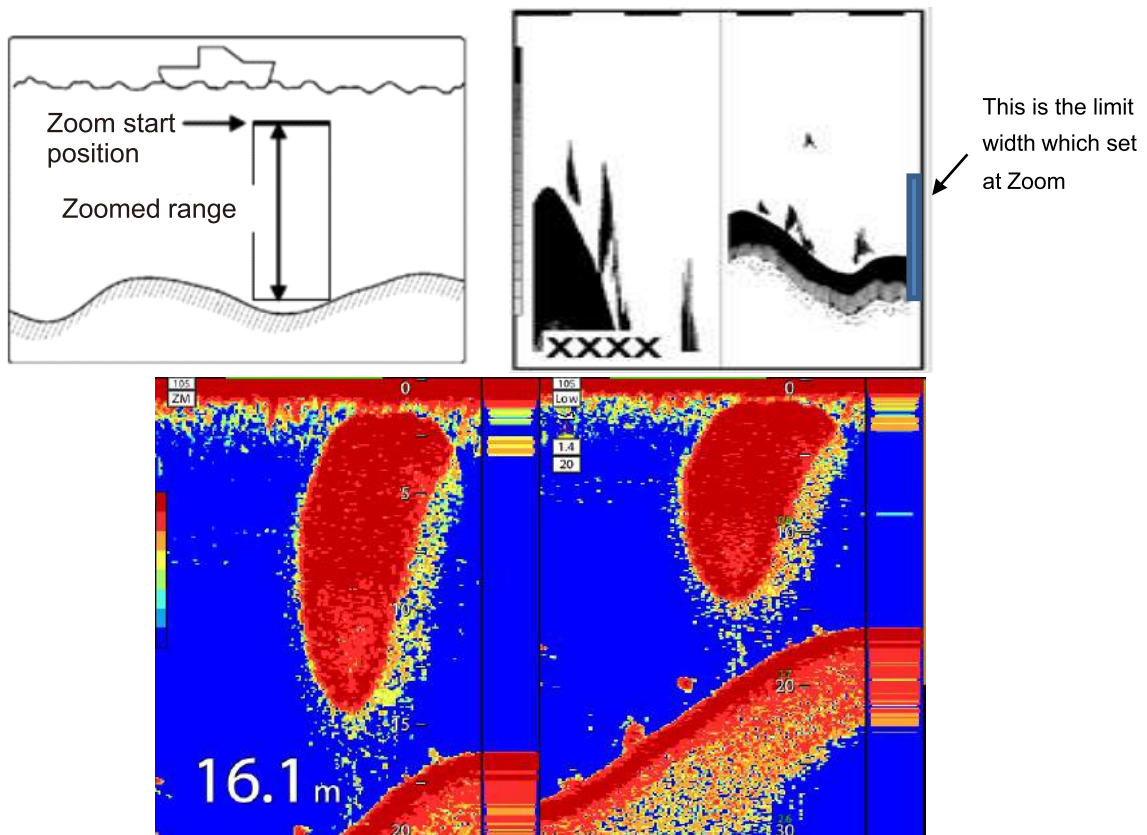
Zoom: Zoom display from zoom start point to zoom range, Zoom image display Fish finder screen display area.

3.1.3.6 Shift On

In the fish finder page, press ![MENU] ⟶ [Shift On] ⟶ ![▲▼] to select the value of Shift On. You can adjust the value of offset.
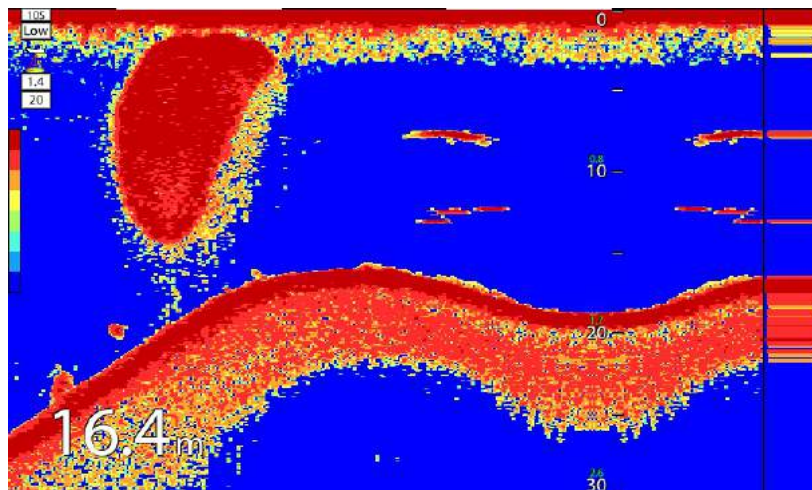
When it is the shift On , the shift value will return to the value which is set previously.

3.1.3.7 Shift Off

In the fish finder page, press ![MENU] ⟶ [Shift Off] ⟶ ![▲▼] to select the value of Shift Off. You can't adjust the value of offset.
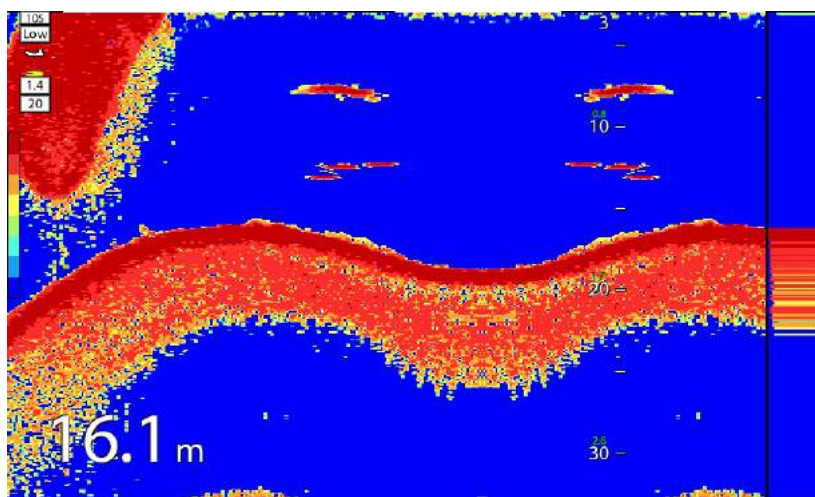
When it is the shift Off , the shift value returns to 0.

3.1.4 Second Menu

In the fish finder page, press twice ![MENU] .

3.1.4.1 Image Adjust

Press ![FUNC] ⟶ [Image Adjust] ⟶ ![O] ⟶ ![◄O►] to select the value of image speed.
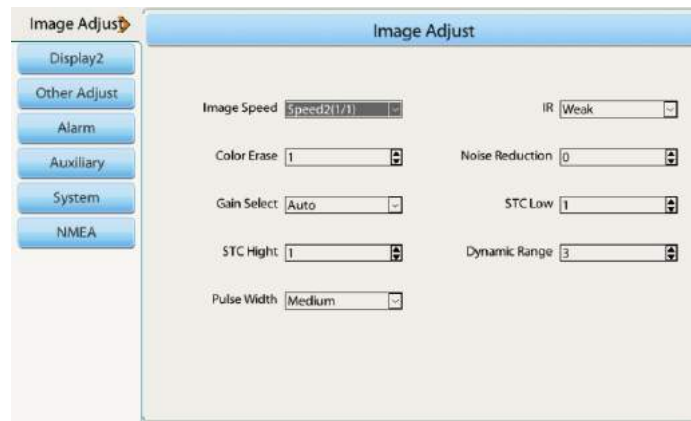
1. Image Speed: Users can set the Image Speed value being 2/1, 1/1, 1/2, 1/4, 1/8, 1/16, 1/32 according to their preferences.

2. IR: The IR can be set as Off, Weak or Strong.

3. Color Erase: The levels of bottom color that on the rainbow bar will be erased and not display on the fish finder page.

4. Noise Reduction: The influence of noise can be reduced based on your setting value of 0 to 10.

5. Gain Select: Users can set the Gain value changed being as Manual or Auto.

6. STC Low: To adjust the STC value when on low frequency.

7. STC High: To adjust the STC value when on high frequency.

8. Dynamic Range: Adjust Dynamic Range being as 1,2,3,4,5,6.

9. Pulse Width: Adjust the Pulse Width being as Short, Medium or Long.

3.1.4.2 Display 2

1. Display 1 Settings

Press ![FUNC] → [Display2] → ◯ to select the menu item that want to → ◄◯► set to adjust the setting value.
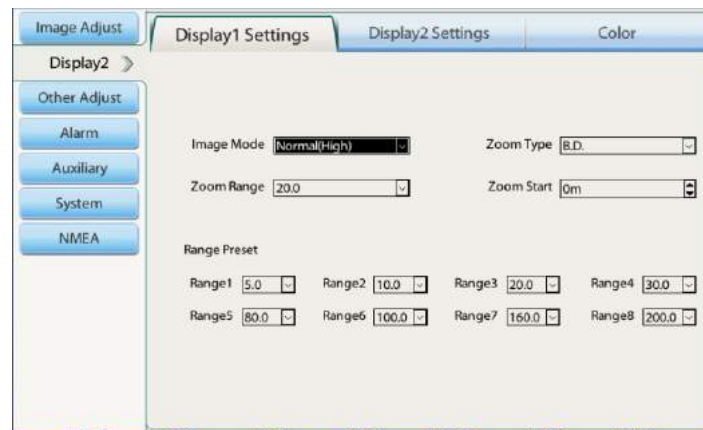
(1) Image Mode: The image mode of Fish Finder can be set as Normal (High), Zoom (High), Low/High, Normal (Low) or Zoom (Low) according to your preferences.

(2) Zoom Type: The zoom type of Fish Finder can be set as Bottom, B.D. or Zoom according to your preferences.

(3) Zoom Range: The zoom range of Fish Finder can be set as 2.5, 5.0, 7.5, 10.0, 15.0, 20.0, 25.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0, 120.0, 140.0, 160.0, 180.0 and 200.0 according to your preferences.

(4) Zoom Start: It is used to set the zoom start position when on zoom situation.

(5) Range Preset: It is used to preset the Range.
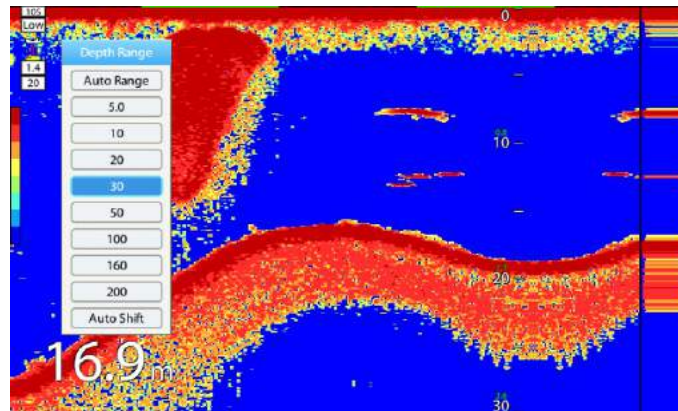
Press ◀ ▶ to set the current range measurement.
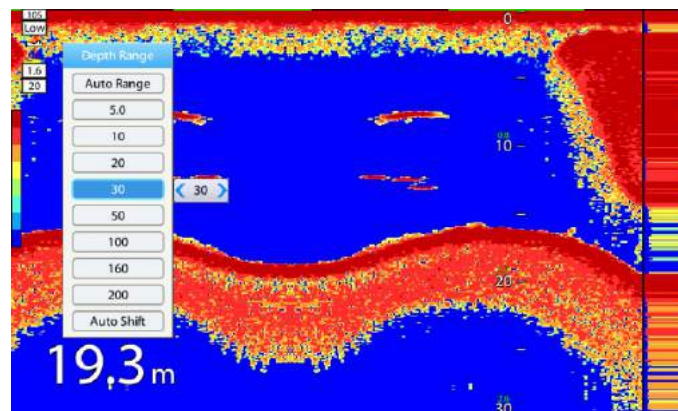
2. Display 2 Settings

Press 🔘FUNC → [Display2] → ⭕ [Display 2 Settings] → ◀⭕▶ to adjust the setting value.
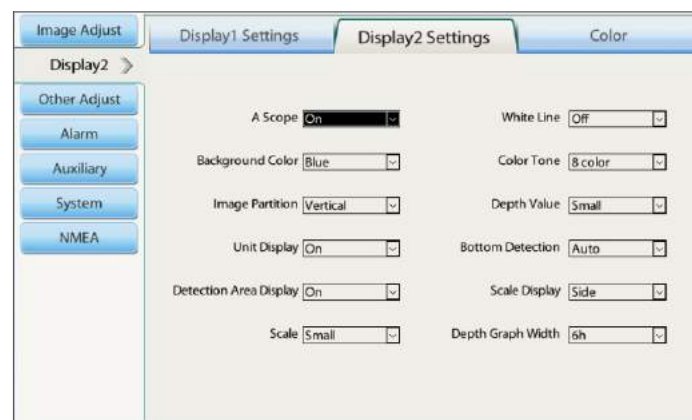
(1) A Scope: The A Scope of Fish Finder can be set as On / Off according to your preferences.

(2) White Line: The white Line of Fish Finder can be set as the surface of bottom is marked with the white line of constant width, the school of fish at the bottom can be easily identified.

(3) Background Color: The background color of Fish Finder can be set as Responding to the ambient brightness, and the background color of display can be changed.

(4) Color Tone: The color tone can be set as 8 color, 16 color or monochrome according to your preferences.

(5) Image Partition: The image partition of Fish Finder can be set as the image partition change to "Horizontal split" or "Vertical split".

(6) Depth Value: The depth value of Fish Finder can be set as the display size of depth value changed.

(7) Unit Display: The unit value of Fish Finder can be set as the unit to display the depth value.

(8) Bottom Detection: The bottom detection of Fish Finder can be set as the bottom detection is selected either in a specified image or auto select.

(9) Detection Area Display: The range of the search that can be detected in the angle of beam spread of the transducer used can be displayed.

(10) Scale Display: The scale display can be set as the displayed position for scale of fish finder screen.

(11) Scale: The scale can be set as the displayed font size be changed according with scale of fish finder screen.

(12) Depth Graph Width: The depth graph width can be set as the displayed passed time of depth graph screen.

3. Color

Press ![FUNC] ⟶ [Display2] ⟶ ◯ [Color] ⟶ ◁◯▷ to adjust the setting value.
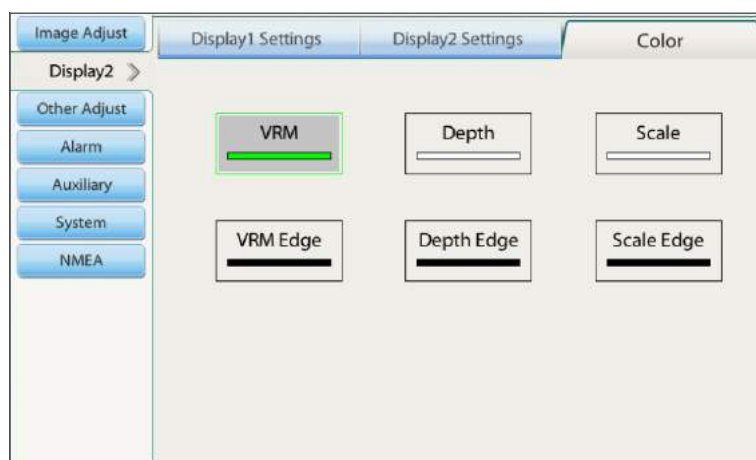
3.1.4.3 Other Adjust

Press ![FUNC] ⟶ [Other Adjust] ⟶ ◯ to select the menu item that want to set ⟶

to adjust the setting value.
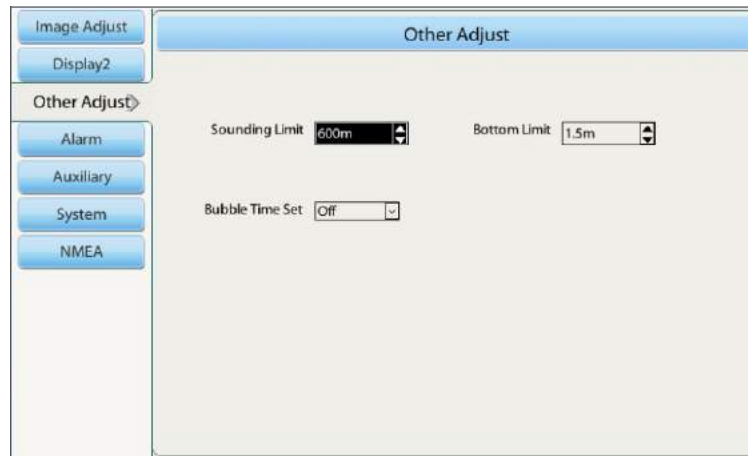
1. Sounding Limit: When the sea bottom cannot be detected at Auto-Range, Auto-Shift, the maximum depth to detect the bottom shall be set.
2. Bottom Limit: The bottom limit sets the lowest depth to determine the sea bottom.
3. Bubble Time Set: The "Bubble Time Set" will set the time to hold the image of the current situation between the bubbles.

3.1.4.4 Alarm

Press ![FUNC] ⟶ [Alarm] ⟶ ◯ ⟶ [Alarm2] ⟶ to adjust the setting value.
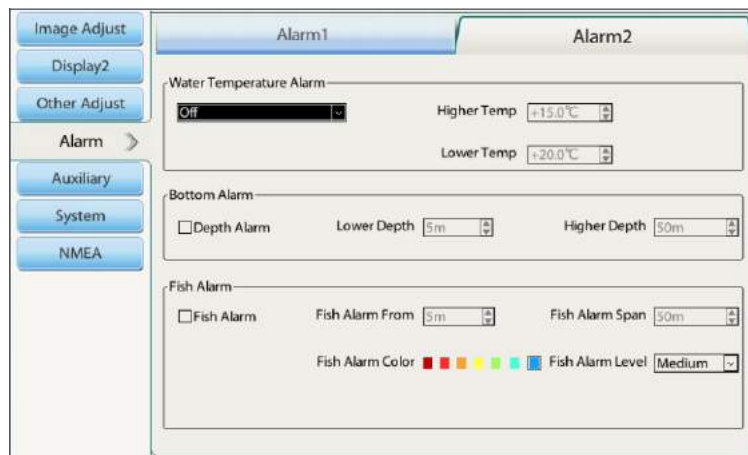
1. Water temperature alarm: System will trigger alarm when the water temperature is beyond the Higher Temp or below the Lower Temp.

Note: The alarm has three options: (1) Off (2) On-Inside range (3) On-Out of range. And it has Lower temperature setting and Higher temperature setting. The alarm is important alarm. The alarm interval is 20 seconds.

2. Bottom Alarm: System will trigger alarm when the depth value is beyond the Higher Depth or below the Lower Depth.

3. Fish Alarm: System will trigger alarm when the fish schools meet the conditions of Fish Alarm From, Fish Alarm Span, Fish Alarm Color and Fish Alarm Level set.

Note: The fish alarm color sets the color judged that the shoal of fish warning is a shoal of fish. Weak reacts to a small shoal of fish, and Strong reacts to a big shoal of fish. When the alarm is triggered, press QUIT , the alarm will appear again after 20 seconds if another alarm isn't triggered. If another alarm is triggered in 20 seconds, they will appear together.

3.1.4.5 Auxiliary
Please See 2.3.13 Auxiliary.

3.1.4.6 System
1. General

Press FUNC ⟶ [System] ⟶ ◯ ⟶ [General] ⟶ ◄◯► to adjust the setting value.
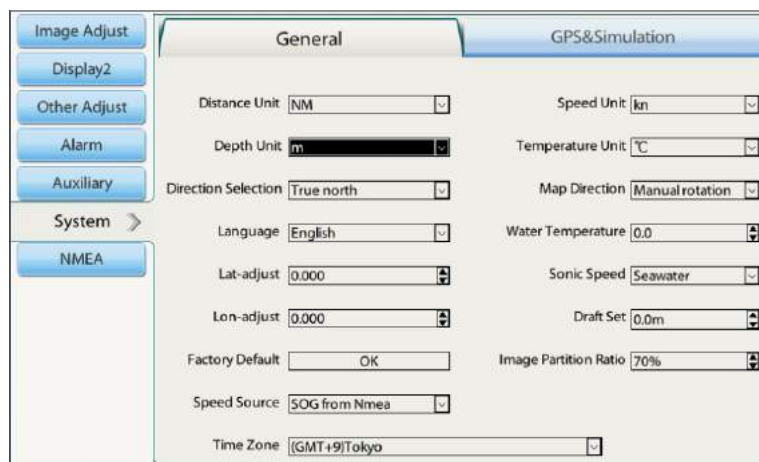
(1) Sonic Speed

Users can set the Sonic Speed being on Seawater or Freshwater according to their preferences.

(2) Draft Set

Users can set the draft value being 0.0 to 10.0 according to their preferences.

(3) Image Partition Ratio

Users can set the image partition ratio of Map/Fish Finder page.

2. GPS & Simulation

Press ~~FUNC~~ → [System] → ⊚ → [GPS & Simulation] → ✛ to adjust the setting value.
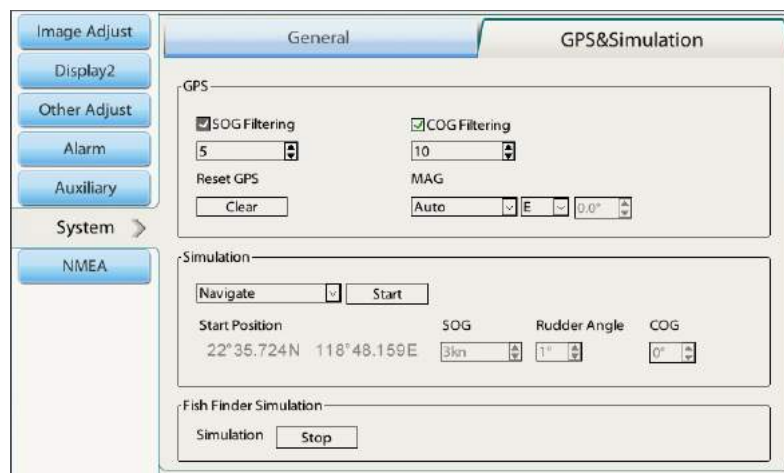
Please see 2.3.14 System.

3.1.4.7 NMEA
Please see 2.3.15 NMEA

Chapter 4 Soft Keyboard Introduction

4.1 Introduction

The window is for letter and symbol input, as shown below:
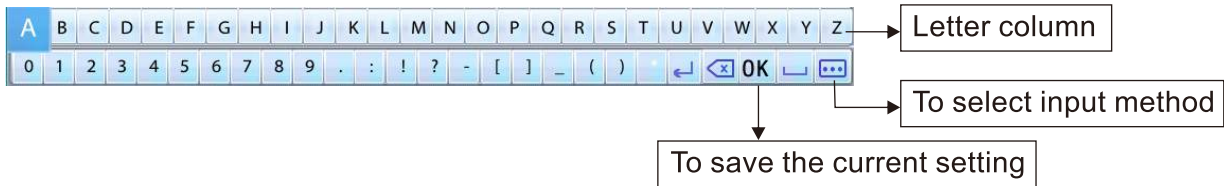
Symbol	Function
↵	Enter Key
⌫	Delete Key
OK	To exit and save the current setting
␣	Space Key
⋯	To switch input method, 1, A B C 2, a b c

4.2 Operation Method

1. To call out virtual keyboard:

Move the cursor to the input box, press ⬤ , to pop-up the virtual keyboard.

2. How to operate:

Press ⬤ to select letter or number. And then press ⬤ to confirm.

Select 〖 OK 〗 on the virtual keyboard to save the current parameters.

Press QUIT to cancel the operation.

Note: The system provides only two input methods. You can press ⬤ to switch. It includes upper and lower case letters.

Chapter 5 Installation

5.1 Installation Considerations

Qualified servicemen should perform the installation of KTN-70AF that comprises of the following operations:

1. Unpacking each component of the system.
2. Inspection of the exterior of each component unit and accessory.
3. Checking the ship's mains voltage and current capacity.
4. Determining the Display unit.
5. Installing the Display unit.
6. Mounting the accessories.
7. Planning the cable routing and connections.
8. Adjustment and setups.

5.2 Checking of The Items

Unpack your package and check if all of the items stated in the packing list are contained in the package. If not, report this to an insurance agent for tracing missing goods or refund.

5.3 Inspection of The Equipment

Carefully check the exterior of each component unit for dents, damage and etc. In particular, the LCD is vulnerable to physical damage. During transportation, the LCD is liable to breakage despite its protective packing.

5.4 Proper Location for Setup

To achieve best operational performance, the following factors must be considered.

1. The display unit should be positioned in the location where the external situation can be viewed.
2. This unit should be positioned where the navigator or operator can easily see the screen.
3. Select a position safe and free from dampness, water spray, rain and direct sunlight.
4. Provide enough space for servicing. Consider access to the rear panel for connecting various cables.
5. Position the display unit as far away as possible away from other radio equipment.

5.5 Cable Routing and Connections

1. The transducer cables should be securely fastened to the display using cable clamps and run separately away from other cables such as, radio antenna feeder, power cables and etc. Under no circumstances should it be in parallel arrangement with other cables. These precautions are essential to avoid radio interference to/from other equipment

installed on the ship. If this arrangement is not possible, either cable set should be screened with a metal conduit or another form of shielding.

2. The display unit should be grounded to the hull with a wire cut as short as possible. We recommend using a wide and heavy copper braid or plate to be connected to a grounding stud at the of the display unit.

3. The power supply cable should be connected directly to the ship's battery to avoid RF noise conducted from other equipment on board.

5.6 Display Installation

The display unit is designed for table mount and flush mount. Refer to the following description for installation. (Refer to Figure 5.1 to 5.4)

5.6.1 Table mounting

1. Remove the two knurled fixing knobs that fix the display unit to the mounting bracket.
2. Remove the display unit from the bracket and place it on a flat and safe area.
3. Place the mounting bracket to the place where the display unit is to be installed, and fix the bracket with four (4) M5 tapping screws. Provide enough space for servicing. (Refer to Figure 5.2)
4. Reset the display unit on to the bracket and fix using the two knobs that were removed in step (1).
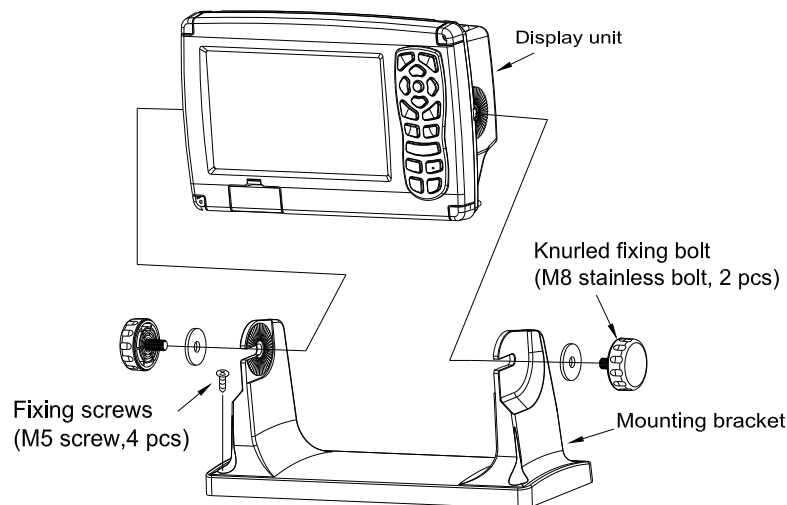
Figure 5.1 Fitting detail
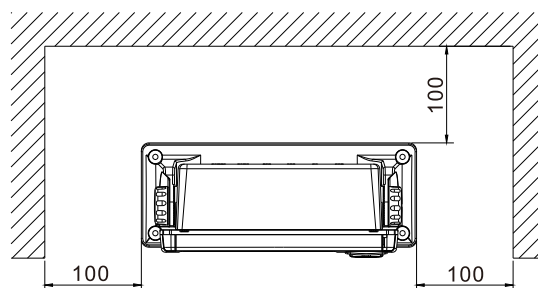
Figure 5.2 Servicing Access space required

Unit: mm

5.6.2 Flush mounting

1. Cut a rectangle opening. (Refer to Figure 5.4)
2. Loosen two (2) fixing bolts that fasten the display unit on to the mounting bracket.
3. Remove four (4) plastic screw covers, with are fitted on each corner of the display front face. (Pull up and out for easy removal.) Do not lose these screw covers.
4. Put the display on the opening and fix with four (4) tapping screws. In case you use M3 screws to fix the display, select an appropriate screw length that best suits fixing the unit to the panel thickness.
5. Refit the covers removed in step (3).
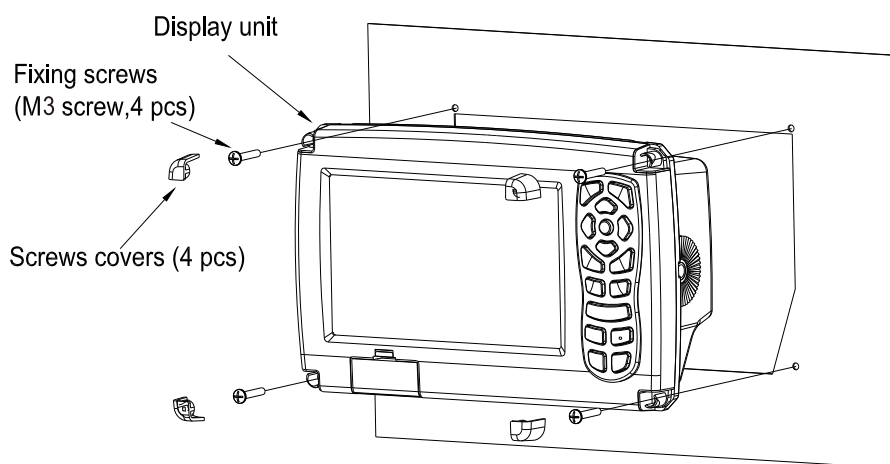
Figure 5.3 Flush mounting
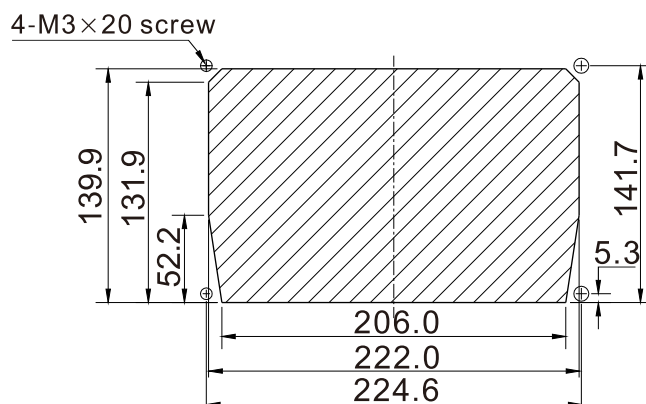
Figure 5.4 Dimensions of opening and fixing holes for flush mounting

Unit: mm

5.7 GPS Antenna unit installation

1. Selecting the best site of GPS antenna

Make sure to install the antenna unit at a location where nothing shades the antenna of a view above the horizon. Objects placed above the antenna unit or too close to the antenna unit may cause signal to noise ratio to degrade and shorten measuring time.

(1) As far away from any metallic objects as possible.

(2) At least 4 meters (14.2 feet) away from the MF/HF reversed L-type TX antenna, VHF or HF whip antenna.

(3) At least 1.5 meter (5.9 feet) above the MF/HF reversed L-type TX antenna.

(4) At least 1 meter (4.3 feet) away from the receiving antenna.

(5) Outside radar transmitting beam (30° to 40°).

(6) At least 1 meter (4.3 feet) away from the radar antenna.

(7) At least 5 meters (16.5 feet) away from the Inmarsat antenna.

(8) At least 3 meters (9.8 feet) away from the loop antenna.

(9) At least 0.5 meters (1.6 feet) above the large metal surface.
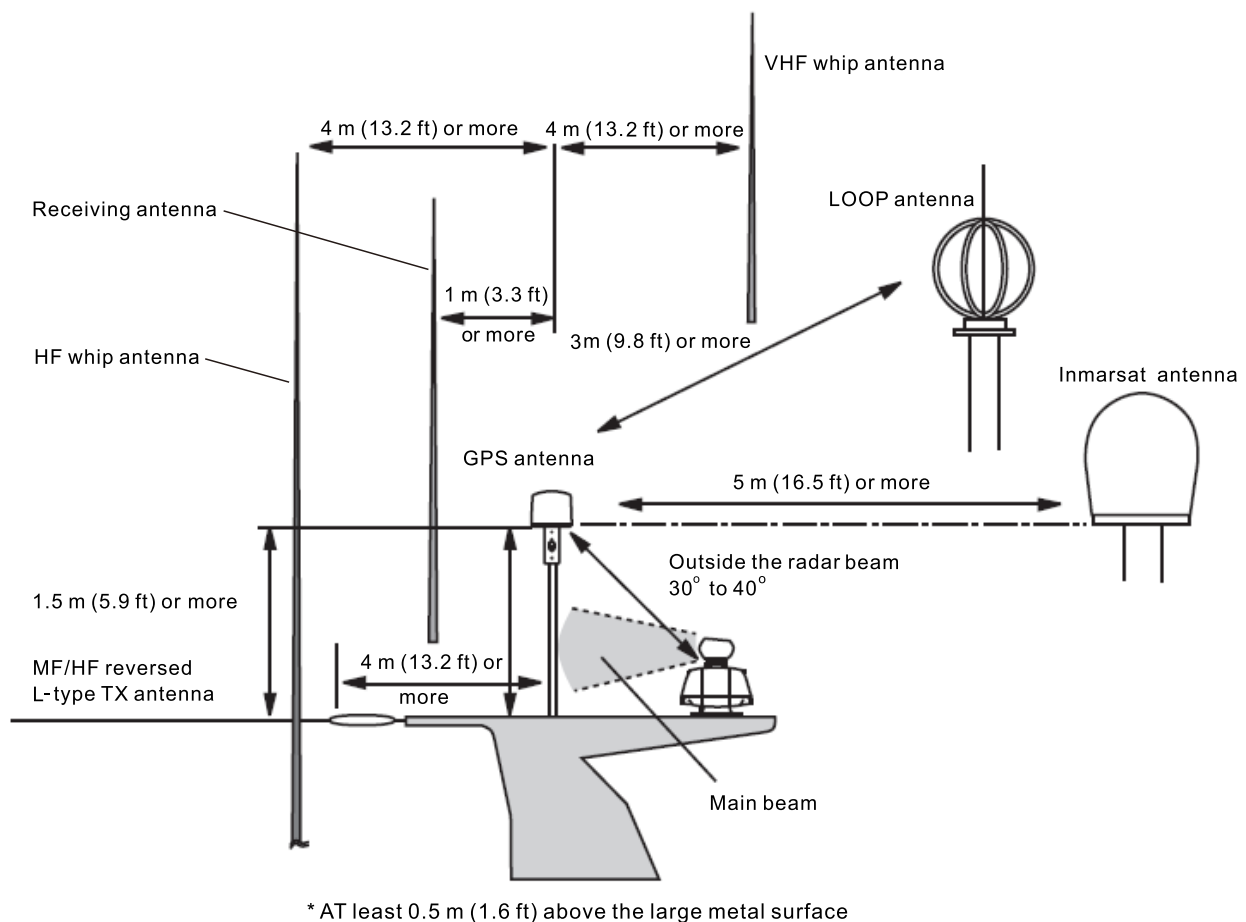
Figure 5.5 Recommended GPS Antenna installation

2.Fixing the GPS antenna unit

(Case1)   Antenna unit
GP80-10M

(Case2)   Antenna unit
GP80-10M

Hose clamp
(not supplied)

Screw
(M28XP2)

GP-H-150   Mast (pole)
(not supplied)

Antenna
extension pole
(not supplied)
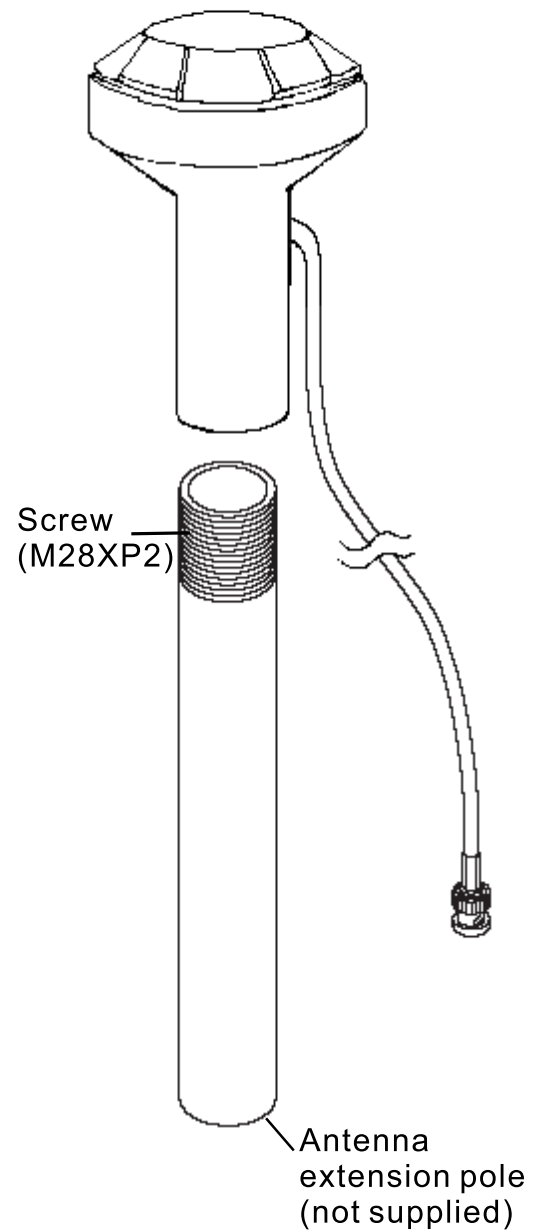
Figure 5.6 Fixing the GPS antenna unit

5.8 Inter-connections of The System

The standard installation of the transducer is shown in figure 5.7.
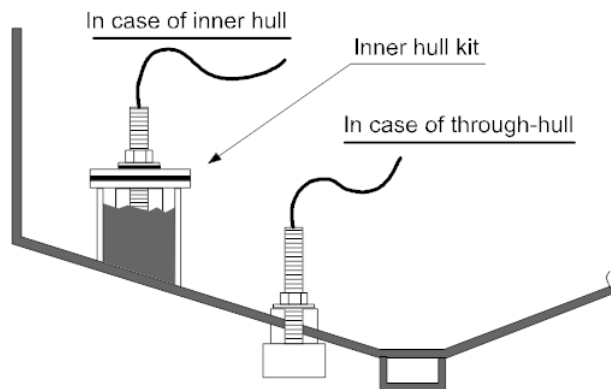
Figure 5.7 Installation of Transducer

5.8.1 In case of Inner-hull

Using the optional Inner-hull kit (MFB-04), install the transducer to the inner side of ship's bottom.

Caution on installation
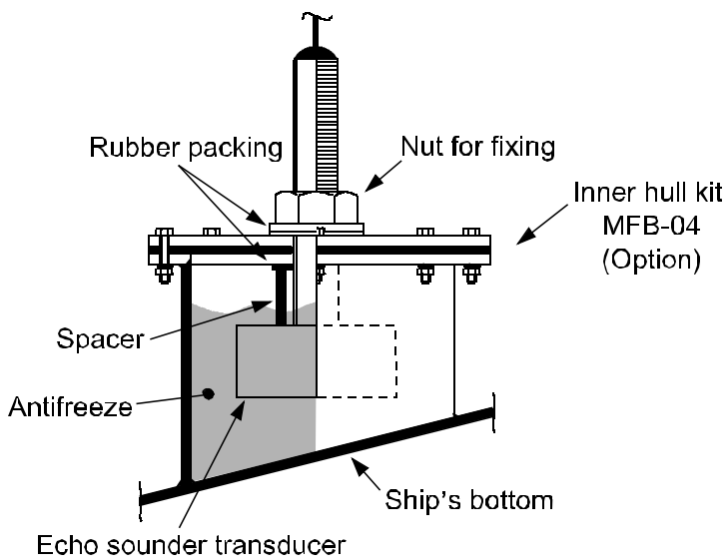
Figure 5.8 Inner-hull installation

(1) Select the location where no bubble is generated during navigation.
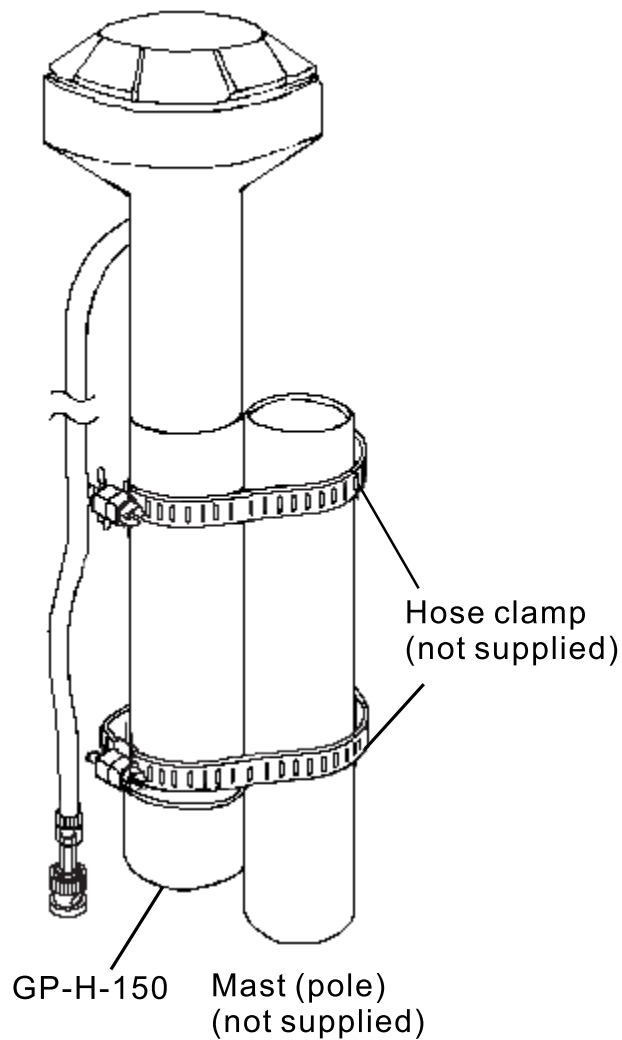(2) Select the relatively thin location of ship's bottom.
(3) Be sure to remove oil on the contact surface. File the contact surface with sand paper (#400) so that the adhesive strength will increase.
(4) The adhered surface will dry in about two hours.
(5) Leave the unit for a whole day and fill in the coolant. More than 80% of the transducer should be submerged in the coolant.

⚠ Caution: It is strongly recommended to confirm the location of the installation of Inner-hull with the ship manufacturer. The Inner-hull device is more simplified method. The gain falls dramatically in comparison with the Through-hull performance. Low frequency (50 kHz) may not be used due to large signal attenuation in some cases. Depth range performance using 200 kHz Transducer in case of Inner-hull can be less about 50% than that of Through-hull.

⚠ Caution: Fishing boats may have structure with FRP contained air bubbles and foamed materials that would prevent ultrasound from penetration. Therefore, the location convenient for installation may not be locations where attenuation of ultrasound is low enough.

5.8.2 In case of Through-hull

Install the transducer directly to the ship's bottom.

Installation Procedure

(1) Select the installing location.

(2) Remove the fixing nut and one piece of rubber packing.

(3) If the slope of ship's bottom is greater than 5°, make a wooden base to fit to the slope of ship's bottom. To reduce the water resistance, cut the bow direction tip of wooden base at the outer side of ship's bottom in the triangle shape.

(4) Make holes at the installing location. If the wooden base is used, make holes in the wooden base.

(5) Thread the rubber packing in the transducer and then the cable.

(6) To prevent water from seeping through the gap between the transducer and the hole, fill out the gap with FRP or silicon glue. (Glue the wooden base likewise.)

(7) Thread the rubber packing and fix it with the fixing nut firmly.

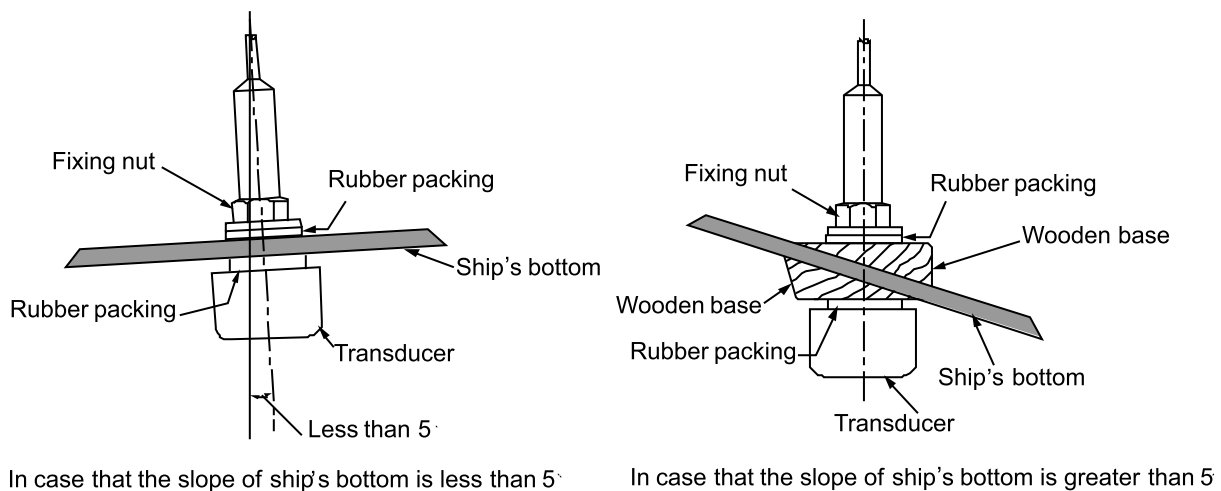(8) Connect the transducer cable to the connector of KTN-70AF Display unit.

In case that the slope of ship's bottom is less than 5°   In case that the slope of ship's bottom is greater than 5°

Figure 5.9 Through-hull Installation

5.9 Inter-connections of The System

As shown below, connect the various cables to their prescribed locations on the rear panel of the display unit.
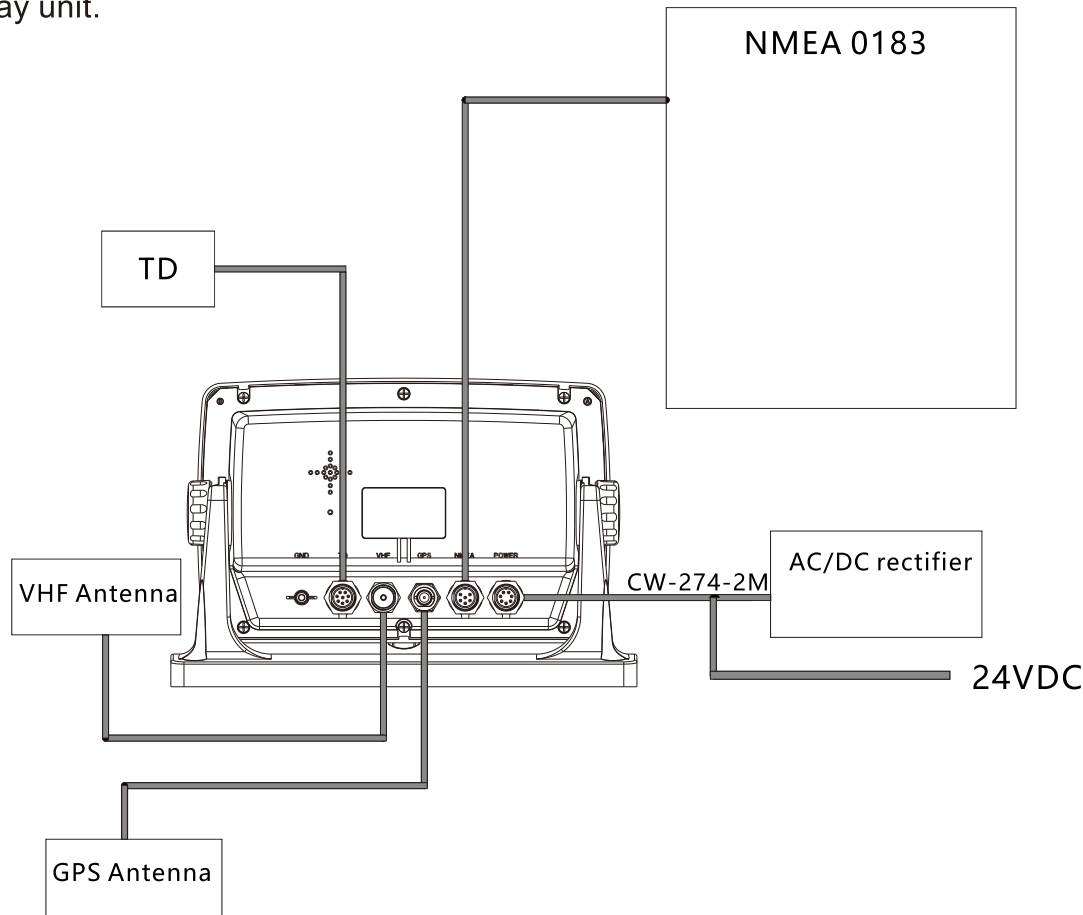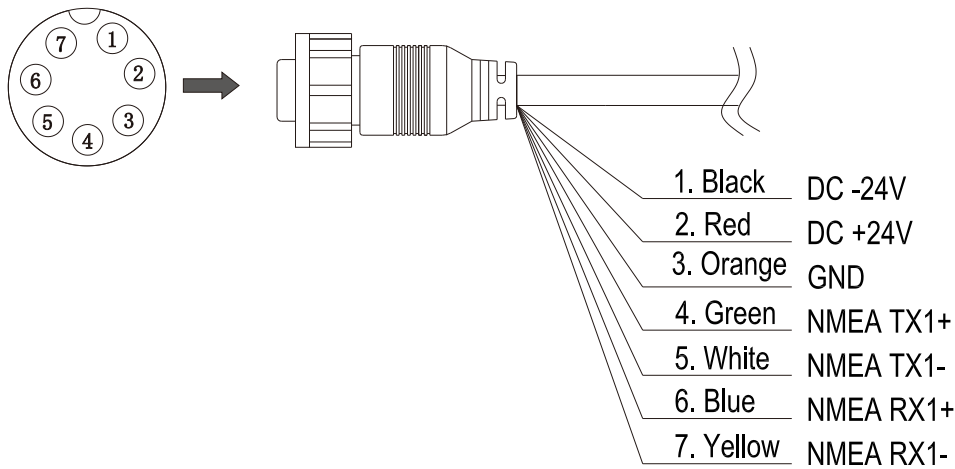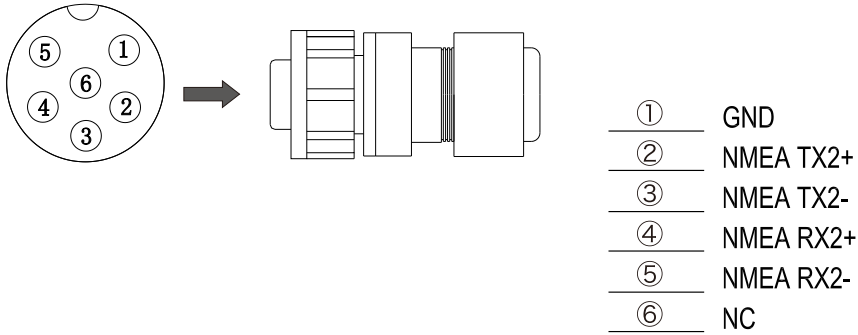
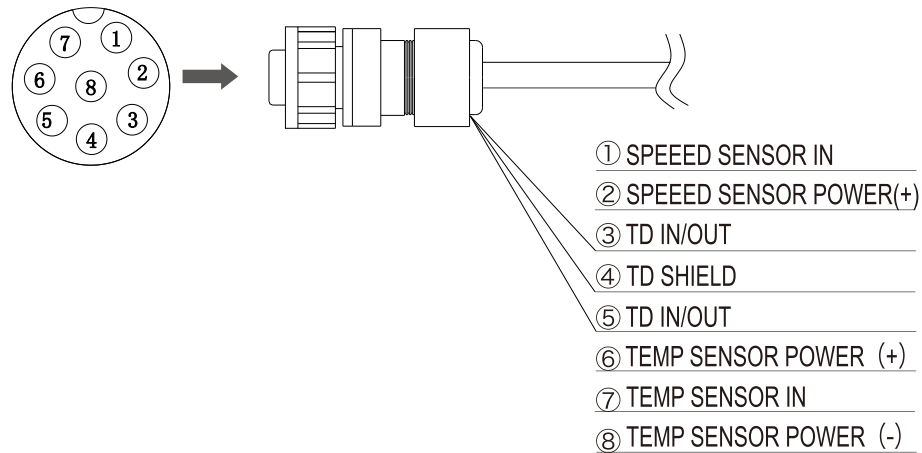Display unit.

Figure 5.10 Inter-connections
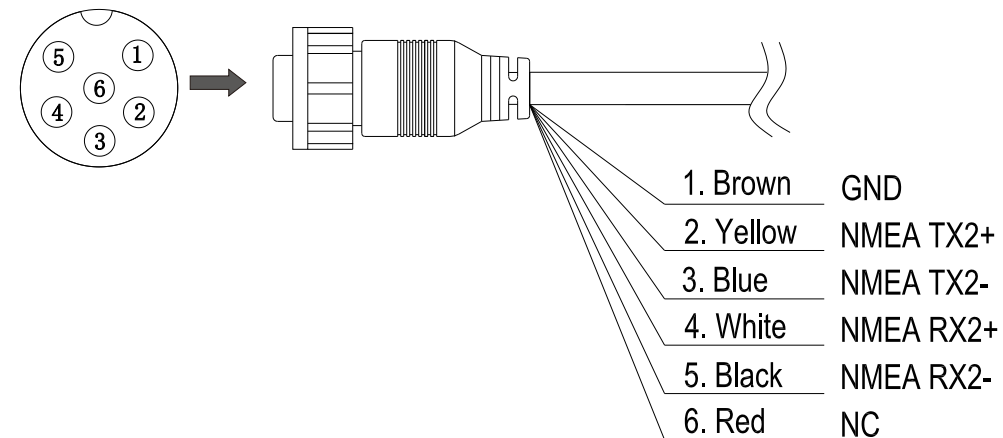
5.9.1 Preparation of DC Power cable (CW-274-2M)

1. Black   DC -24V
2. Red   DC +24V
3. Orange GND
4. Green   NMEA TX1+
5. White   NMEA TX1-
6. Blue   NMEA RX1+
7. Yellow NMEA RX1-

5.9.2 The data interface definitions (CW-108-6A)

①	GND
②	NMEA TX2+
③	NMEA TX2-
④	NMEA RX2+
⑤	NMEA RX2-
⑥	NC

5.9.3 Preparation of TD (TD-500T-3B)

① SPEEED SENSOR IN
② SPEEED SENSOR POWER(+)
③ TD IN/OUT
④ TD SHIELD
⑤ TD IN/OUT
⑥ TEMP SENSOR POWER （+）
⑦ TEMP SENSOR IN
⑧ TEMP SENSOR POWER （-）

5.9.4 OPTION preparation of NMEA connector (CW-414-1.2M)

1. Brown	GND
2. Yellow	NMEA TX2+
3. Blue	NMEA TX2-
4. White	NMEA RX2+
5. Black	NMEA RX2-
6. Red	NC

5.10 Post-installation Inspections

Before you turn the KTN-70AF on, check the following points to make sure the KTN-70AF operates properly:

1. Is the ship's supply voltage and current within the proper range?
   Input voltage: 24 VDC at POWER connector.
2. Are the cables routed and connected properly? No wrong connections, no short circuits and etc.?

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