KODEN

ADVANCED OPERATION MANUAL

Multi Function Display

KSD-1100
KSD-1210

KSD-1100/1210.AM.E-05

KSD-1100/1210 Advanced Operation Manual

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Document No. Revised Version Norm

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

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For Your Safe Operation

Pictorial used in this Operation Manual

This Operation Manual uses the following pictorials. Understand the meaning of each pictorial and implement the maintenance and inspection.

Symbol	Meaning
Warning	**Mark for warning** This symbol denotes that there is a risk of death or serious injury when not dealing with it correctly.
	Mark for danger high voltage This symbol denotes that there is a risk of death or serious injury caused by electric shock when not dealing with it correctly.
Caution	**Mark for caution** This symbol denotes that there is a risk of slight injury or damage of device when not dealing with it correctly.
	Mark for prohibition This symbol denotes prohibition of the specified conduct. Description of the prohibition is displayed near the mark.

Caution Item on Equipment

	Be careful of a high voltage inside. A high voltage, which may risk your life, is used. This high voltage remains in the circuit after you have powered off switch. To prevent touching the high voltage circuit inadvertently, the hard cover is provided to the high voltage circuit and the high voltage caution label is affixed. Ensure to power off switch for your safety and discharge the electricity remaining in the capacity before starting to check. An engineer authorized by our company should inspect and maintain
Warning	**Be sure to power off in the boat.** If the power switch is inadvertently powered on during work, you will be electrified. To prevent such accident from occurring, ensure to power off in the boat and the power of equipment. Furthermore, it is safer to hang the caution tag described as [Under Work] near the power switch of equipment.
Warning	**Be careful of dust** Inhaling dust may cause A respiratory disease. When cleaning the inside of equipment, be careful not to inhale dust. Wearing a safety mask is recommended.

Caution	**Caution on location of equipment** Do not install the equipment where it is excessively damp and suffers from excessive water drops.
Caution	**Escaping from static electricity** The static electricity may be generated from the carpet on the floor in the cabin or clothes made of synthetic fiber. The static electricity may destroy the electronic parts on the circuit board. Handle the circuit board, taking the measure of static electricity free.
Caution	Firmly installation of this unit is necessary to avoid damage caused by falling down.
Caution	Power supply should be grounded to avoid static and lightning. If this unit is not in use, please turn off this unit.

Caution Item on Handling

Warning	Do not disassemble or modify. It may leads to trouble, fire, smoking or electric shock. In case of trouble, contact our dealer or our company.
Warning	In case of smoke or fire, boat power off and the power of this unit. It may cause fire, electric shock or damage.
	Be cautious of remaining high voltage. A high voltage may remain in the capacitor for several minutes after you have powered off. Before inspecting inside, wait at least 5 minutes after powering off or discharge the remaining electricity in an appropriate manner. Then, start the work.
Caution	The information displayed in this unit is not provided directly for your navigation. For your navigation, be sure to see the specified material.
Caution	Use the specified fuse. If un-specified fuse is used, it may cause a fire, smoke or damage.
Caution	Please do not use this unit without original power adapters. Otherwise, the navigator may not work properly or the performance might be affected or even this unit will be damaged because of the circuit designs. Do not exceed the voltage range of this unit. KSD-1100: 10.8 to 31.2VDC, KSD-1210: 21.6 to 31.2VDC.

Caution	If the position data of the device cannot be fixed for a long time, please check the following: whether the antenna is installed properly; the connection; any forms of interference around the antenna. Before starting of this unit, please make sure the antenna cable joints are intact; there is no short-circuit or open circuit; and follow the correct antenna installation procedure. During the start-up stage, please do not arbitrarily remove the antenna in order to avoid damages to this unit.
Caution	When external temperature is too high, this unit may not function properly. Stop using this unit until the temperature returns to normal and restart this unit.
Caution	Avoid direct sunlight on the LCD screen. You can adjust the angle of the screen anytime to get the best visual effects.
Caution	When hardware failure occurs (for example, power lines are burned, machine is damaged or foreign bodies fall into this unit, etc.), please shut down the power and contact with the distributor immediately.
Caution	Virtually, all data sources might contain some inaccurate or incomplete data. The data is only for your reference and we cannot guarantee any accident, injury or proper damage. All legal responsibility and other obligation will not be taken by Koden.

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Introduction

The KSD series products provide an intelligent system and multitask running marine equipment networking solution.

The main features of this unit are as follows:

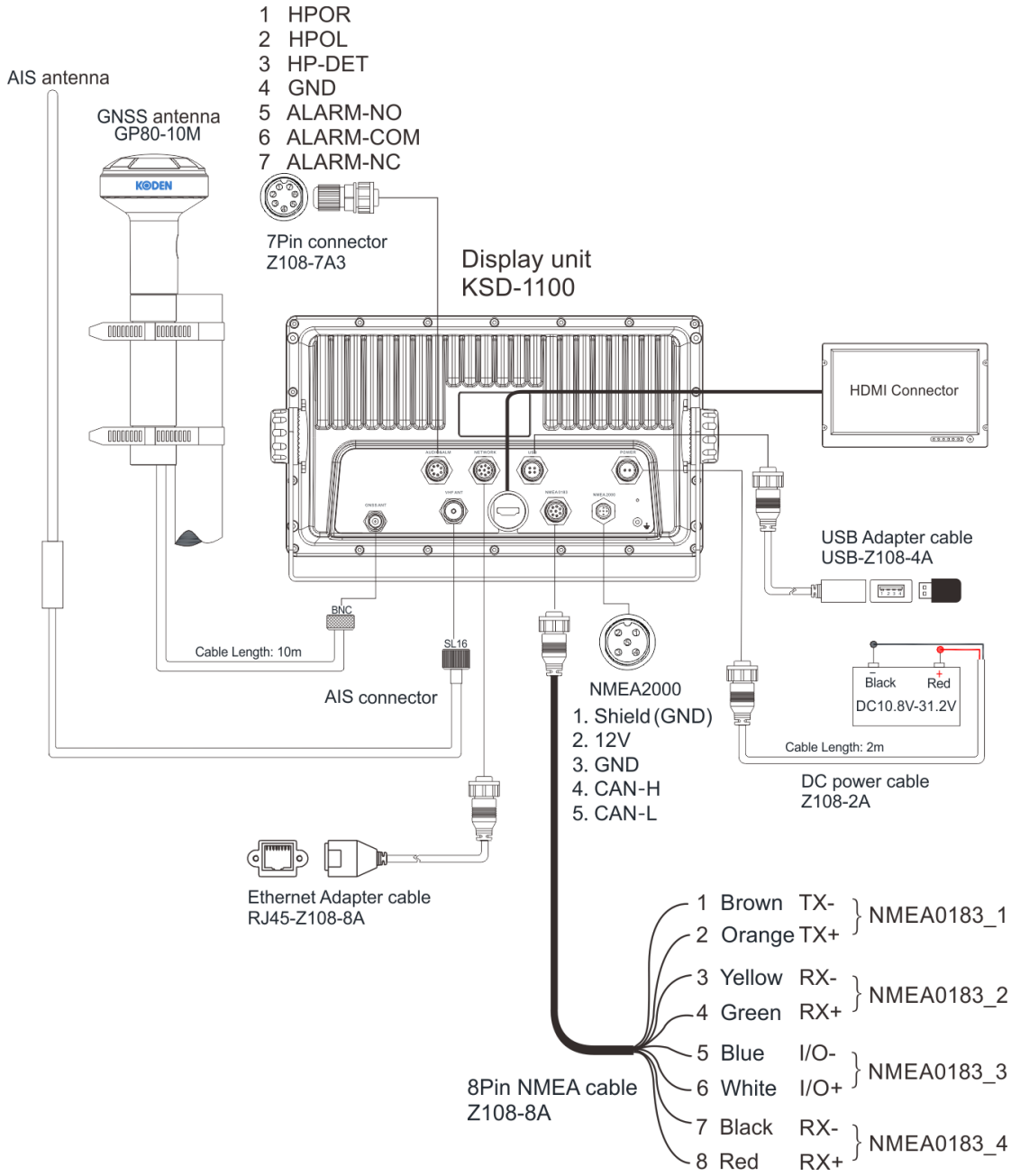
- The touch screen is flexible and easy to use, with clear picture, superior performance and strong sense of control.
- The system integrates functional modules such as GNSS, chart plotters, Class B AIS, CCTV and realizes cloud services such as online upgrades through multiple networking methods such as Wi-Fi, Ethernet, and Bluetooth.

Note: The device is not used for navigating directly.

When use the device, please refer to other available navigation sources, including the information from other navigation aids and actual sea conditions, such as: official chart, visual sightings, radar, tides, hydrology, weather and so on.

System Configuration

Connection Diagram of KSD-1100



MicroSD card & USB memory & HDMI cable & NMEA2000 cable: Owner supplied

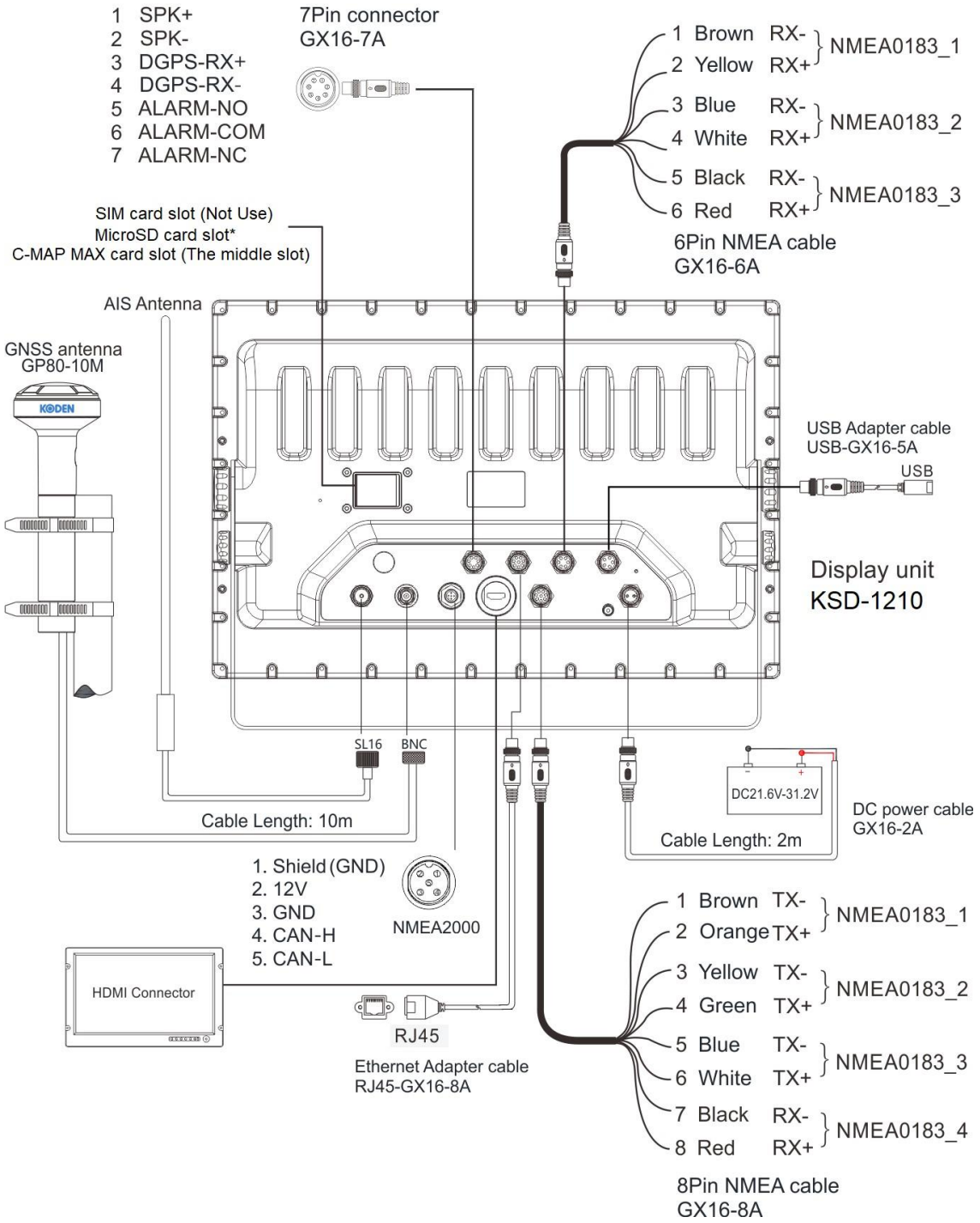
Note:

[1] Default values of NMEA0183 output are RMC, GGA, VTG, GLL, ZDA, XTE and APB. They also can be set by “Settings-Advanced settings-NMEA-Output”.

[2] For input data, set the input source port for each data in "Settings - Advanced Settings - Data Source". NMEA2000 is not supported for software version is V1.X.XX.

[3] NMEA0183_3 (I/O) can be set as receive or transmit. It can be set by “Settings-Advanced settings-NMEA- NMEA0183_3 Configuration”, default value is AIS output.

Connection Diagram of KSD-1210



*: MicroSD card slot or TF card slot

MicroSD card & USB memory & HDMI cable & NMEA2000 cable: Owner supplied

Note:

NMEA0183_1: This port can be selected for GNSS sentences output, AIS output or GNSS & AIS output. Baud rate is 38400 bps.

NMEA0183_2: This port can be selected for AIS output or other sentences.

NMEA0183_3: This port is fixed for AIS sentence output.

Configuration of Equipment

Standard Equipment Configuration List of KSD-1100

No.	Name of item	Type	Remark	Weight/ Length	Quantity
1	Display unit	KSD-1100		2.1kg	1
2	Mount Bracket (Standard)	WJ20000011		0.76kg	1
3	Power cable	Z108-2A	2-pin	2 m	1
4	Connecting cable	Z108-8A	With an 8-pin plastic connector and one end plain (cable for NMEA 0183)	1.2 m	1
5	Connector	Z108L-7A3	Waterproof plastic 7-pin (Connect to AUDIO&ALM interface of MFD*)	10 g	1
6	Adapter cable for USB connector	USB-Z108-4A	For connection of the external USB Flash Drive	0.35m	1
7	Adapter cable for Ethernet connector	RJ45-Z108-8A	For connection of the Ethernet	0.35m	1
8	GNSS Antenna	GP80-10M		10 m	1
9	GNSS Antenna holder	GP-H-150	For holding the GNSS Antenna	35x150mm	1
10	Sun Cover	GJ10C00000	Protect the display		1
11	Fixed Knob	XN0833AA00	M8 x 33mm (For fixing the bracket and Display unit)		2
12	Rubber Gasket	FC06000019	30 x 8.2 x 2.5mm (For M8 fixing knob)		2
13	Screw	WJ07000032	M4 x 12mm (For flush mount installation)		4
14	Self-tapping screw	WJ06000003	TA 4.8 x 20mm (For desk top installation)		4
15	HDMI connector cap	GJ87000001			1
16	NMEA2000 connector cap	GJ87000002			1
17	AIS connector cap	SJ87V00000			1
18	Operation manual	KSD-1100/1210.OM.E	English		1

*: Multi Function Display

Standard Equipment Configuration List of KSD-1210

No.	Name of item	Type	Remark	Weight/ Length	Quantity
1	Display unit	KSD-1210		7.4kg	1
2	Flush Mount Bracket	WJ20000017	For flush mount installation	0.2kg	2
3	Mount Bracket (Standard)	WJ20000016	For desk top installation	2.6kg	1
4	Triangular mounting plate	WJ23000062	For fastening the mount bracket	0.26kg	2
5	Power cable	GX16-2A	2-pin	2 m	1
6	Connecting cable	GX16-6A	With a 6-pin metal connector and one end plain (cable for NMEA0183)	1.2 m	1
7	Connecting cable	GX16-8A	With an 8-pin metal connector and one end plain (cable for NMEA0183)	1.2 m	1
8	Connector	GX16-7A	Metal 7-pin (Connect to AUDIO&ALM interface of MFD*)	10 g	1
9	Adapter cable for USB connector	USB-GX16-5A	For connection of the external USB Flash Drive	0.35m	1
10	Adapter cable for Ethernet connector	RJ45-GX16-8A	For connection of the Ethernet	0.35m	1
11	GNSS Antenna	GP80-10M		10 m	1
12	GNSS Antenna holder	GP-H-150	For holding the GNSS Antenna	35x150mm	1
13	Fixed Knob	XN0633AA00	M6 x 33mm		2
14	Fixed Knob	XN0833AA00	M8 x 33m		2
15	Rubber Gasket	FC06000018	22.2 x 6.4 x 3.2mm (For M6 fixing knob)		4
16	Rubber Gasket	FC06000019	30 x 8.2 x 2.5mm (For M8 fixing knob)		4
17	Screw	WJ07000024	M6 x 30mm For desk top installation		4
18	Nut	WJ14000009	M6 For desk top installation		4

19	Screw	WJ07000016	M3 x 8mm 8pcs: For fastening the Triangular mounting plate and the mount bracket 4pcs: For desk top installation and for fastening flush mount bracket		12
20	Screw	WJ07000059	M6 x 20mm For flush mount installation		4
21	HDMI connector cap	GJ87000001			1
22	NMEA2000 connector cap	GJ87000002			1
23	AIS connector cap	SJ87V00000			1
24	Operation manual	KSD-1100/1210.OM.E	English		1

*: Multi Function Display

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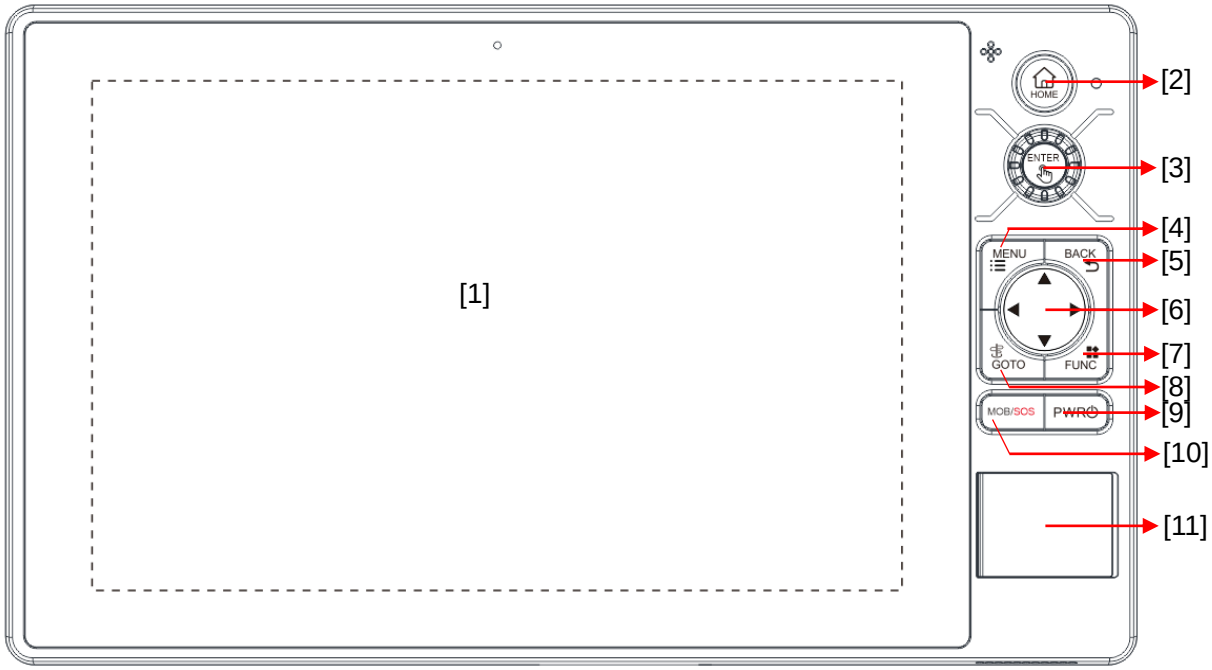
Chapter 1 Overview

1.1 Appearance Introduction

1.1.1 KSD-1100 (10.1”) key definition

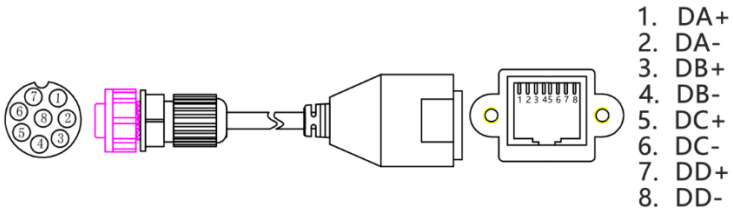
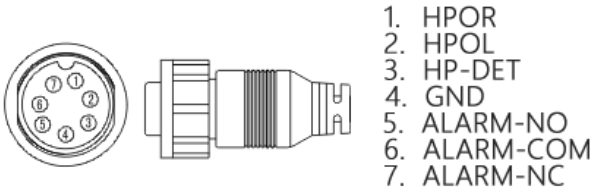
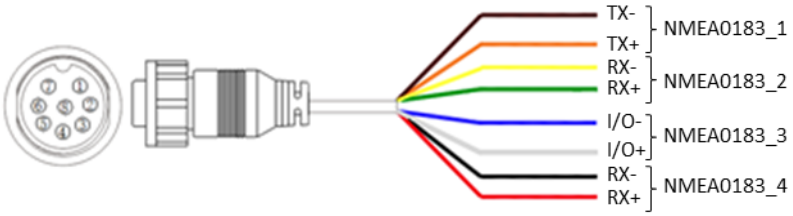
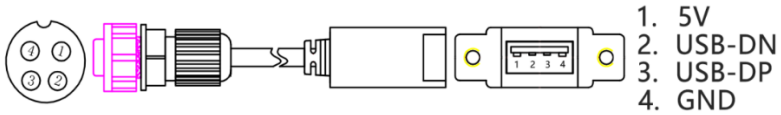


No.	Key	Function description
[1]	Touch Screen	You can directly select, call up menu items, zoom in and out charts, etc.
[2]	[HOME]	Back to [HOME] page.
[3]	[ENTER] knob	1) Clockwise rotation to zoom in the chart Counterclockwise rotation to zoom out the chart. 2) Press to perform "OK" or "Confirm"
[4]	[MENU]	Press to enter the main menu.
[5]	[BACK]	Cancel the operation or return to the previous page.
[6]	[Direction Key]	Press to move focus. When on chart page, press to move the chart.
[7]	[FUNC]	The function of [FUNC] can be customized by users on system setting.
[8]	[GOTO]	Press to select a data to quickly begin a navigation.
[9]	[PWR]	1) Press to power ON the device. After the startup screen is displayed, the [HOME] page is displayed. 2) Long press to power OFF the device. After the "Power off after ..." countdown is displayed, release your finger when the "Shutting down…" message appears. 3) Press while the power is on: "Adjust the screen brightness" or "Adjust the volume".

No.	Key	Function description
[10]	[MOB/SOS]	1) Short press to quickly create MOB* point. 2) Long press to jump to [SOS] page.
[11]	Card Slot	1) The SIM card can be inserted into the first card slot (left card slot). **SIM card is not used.** 2) The microSD card (TF card) can be inserted into the second (middle card slot) or third (right card slot) card slot. 3) The C-MAP card can be inserted into the third card slot (right card slot).

*MOB: Man Over Board (an emergency in which a person has fallen off a boat or ship into the water)

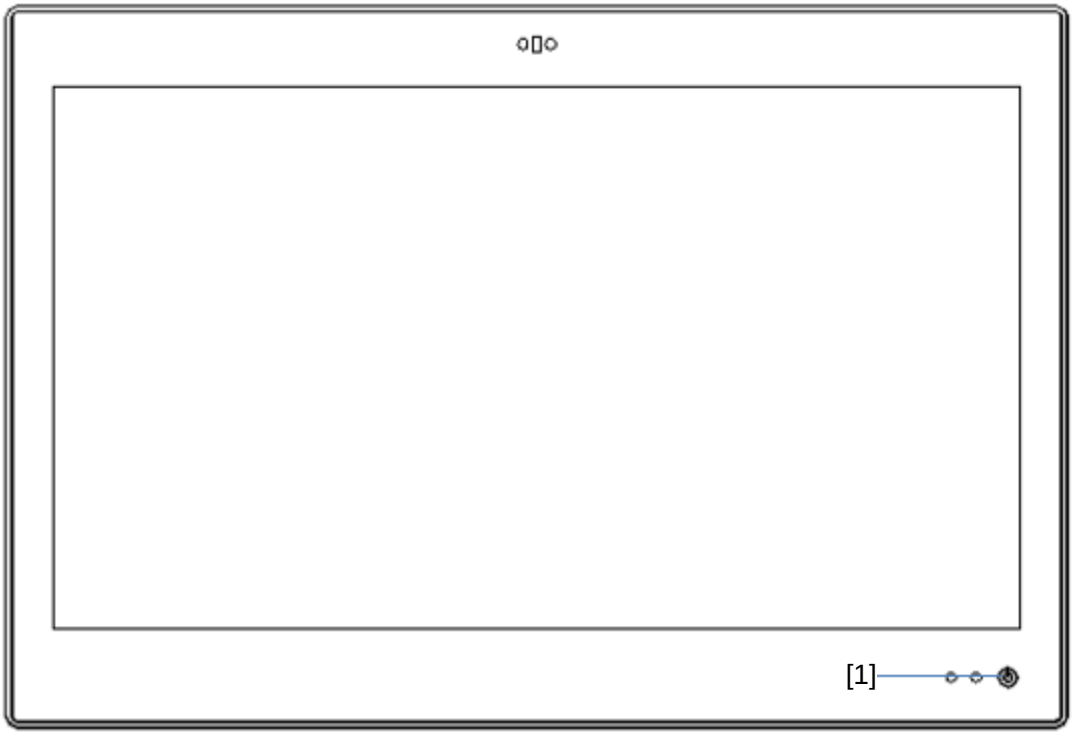
Interface definition

Interface	Detailed Definition
[1] GNSS Antenna Interface	For connection of the GNSS antenna
[2] VHF Antenna Interface	For connection of the VHF antenna
[3] Network Interface 8 pin	
[4] HDMI Interface	For connection of the HDMI
[5] Audio and Alarm Output Interface 7 pin	
[6] NMEA 0183 Interface 8pin NMEA0183 Input/ Output	 Note: [1] Default values of NMEA0183 output are RMC, GGA, VTG, GLL, ZDA, XTE and APB. They also can be set by [Settings-Advanced settings-NMEA-Output]. [2] The NMEA0183 input can be analysis normally, if three input ports all input a same kind of sentence, the analytic priority ranking should be NMEA0183_2, NMEA0183_3, NMEA0183_4. [3] The NMEA0183_3 (I/O) can be set as receive or transmit. It can be set by [Settings-advanced settings-NMEA0183_3 Configuration], default value is AIS output.
[7] USB Interface	

Interface	Detailed Definition
[8] NMEA 2000 Interface 5pin	1. CAN-H 2. 12V 3. GND 4. GND 5. CAN-L
[9] Power Interface	1.Red DC+ 2.Black DC-

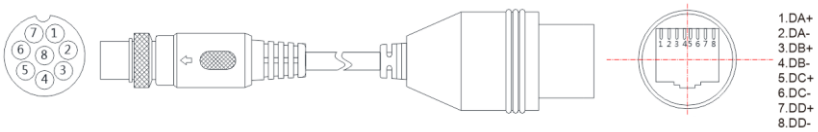
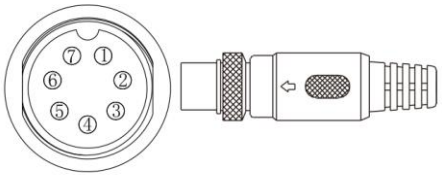
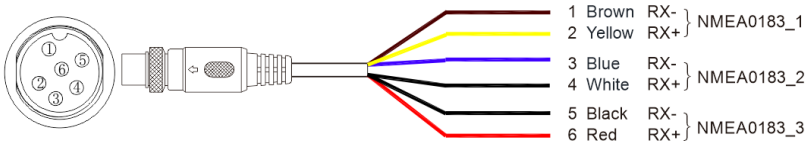
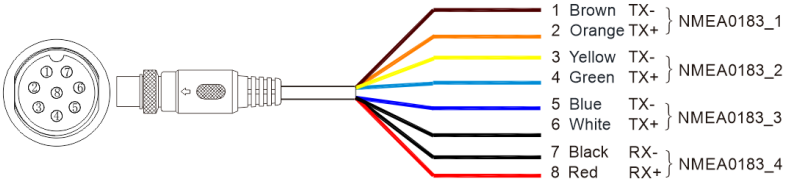
Note: After connecting the aviation socket, it must be tightened to avoid loosening due to other reasons during navigation.

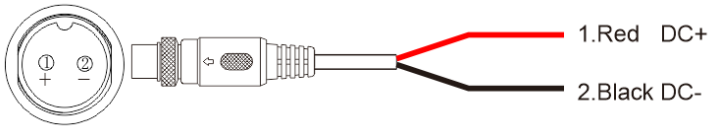
1.1.2 KSD-1210 (21.5”) key definition



NO.	Key	Function Description
[1]	(POWER)	1) Short press to adjust screen brightness and device volume while the power is on. 2) Long press to power off / reboot the device.

Interface definition

Interface	Detailed Definition
[1] GNSS Antenna Interface	For connection of the GNSS antenna
[2] VHF Antenna Interface	For connection of the VHF antenna
[3] Network Interface 8 pin	
[4] HDMI Interface	For connection of the HDMI
[5] Audio and Alarm Output Interface 7 pin	
[6] NMEA 0183 Interface 6pin NMEA0183 Input	 NMEA 0183_1, NMEA 0183_2, NMEA 0183_3 can input DPT, GGA, GLL, HDT, MTW, MWD, MWV, RMC, THS, VTG, and ZDA.
[6] NMEA 0183 Interface 8pin NMEA0183 Input/ Output	 NMEA0183_1: This port can be selected for GNSS sentences output, AIS output or GNSS & AIS output. Baud rate is 38400 bps. NMEA0183_2: This port can be selected for AIS output or other sentences. NMEA0183_3: This port is fixed for AIS sentence output. NMEA 0183_4: This port can input sentences such as DPT, GGA, GLL, HDT, MTW, MWD, MWV, RMC, THS, VTG, and ZDA.
[7] USB Interface	

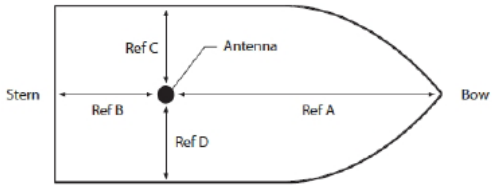
Interface	Detailed Definition
[8] NMEA 2000 Interface 5pin	1. Shield (GND) 2. 12V 3. GND 4. CAN-H 5. CAN-L
[9] Power Interface	

Note: After connecting the aviation socket, it must be tightened to avoid loosening due to other reasons during navigation.

1.2 Installation

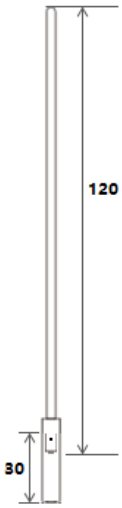
1.2.1 Installation of GNSS antenna

GNSS antenna should be without continuous obstacles in the level 360º, elevation 5° to 90°. Apart from more than 3m from the s-band radar and INMARSAT system and other high power antenna beam. Measure A/B/C/D distance data to set up the ship's static parameter.



1.2.2 Installation of VHF antenna

VHF antenna



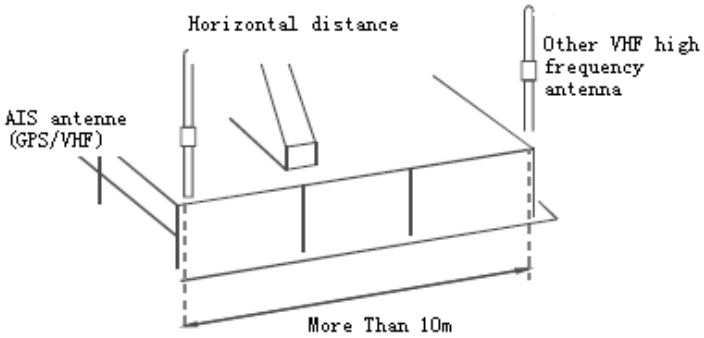
VHF antenna base fixed

1.2.2.1 Horizontal Installation

[1] VHF antenna should be installed in the level 360º without any obstacles.

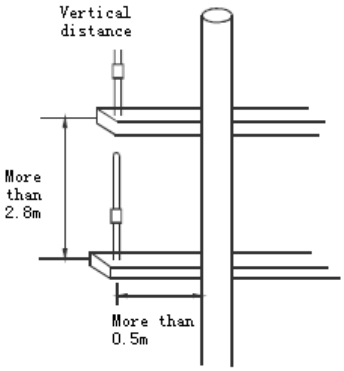
[2] VHF antenna should be kept more than 2m away from conductor structure in horizontal position. It also should be kept more than 3m away from the transmitted beam of radar and high power source antenna.

[3] VHF antenna should be kept more than 10m away from ship's other VHF in horizontal position, if it must be in a same horizontal plane.



1.2.2.2 Vertical Installation

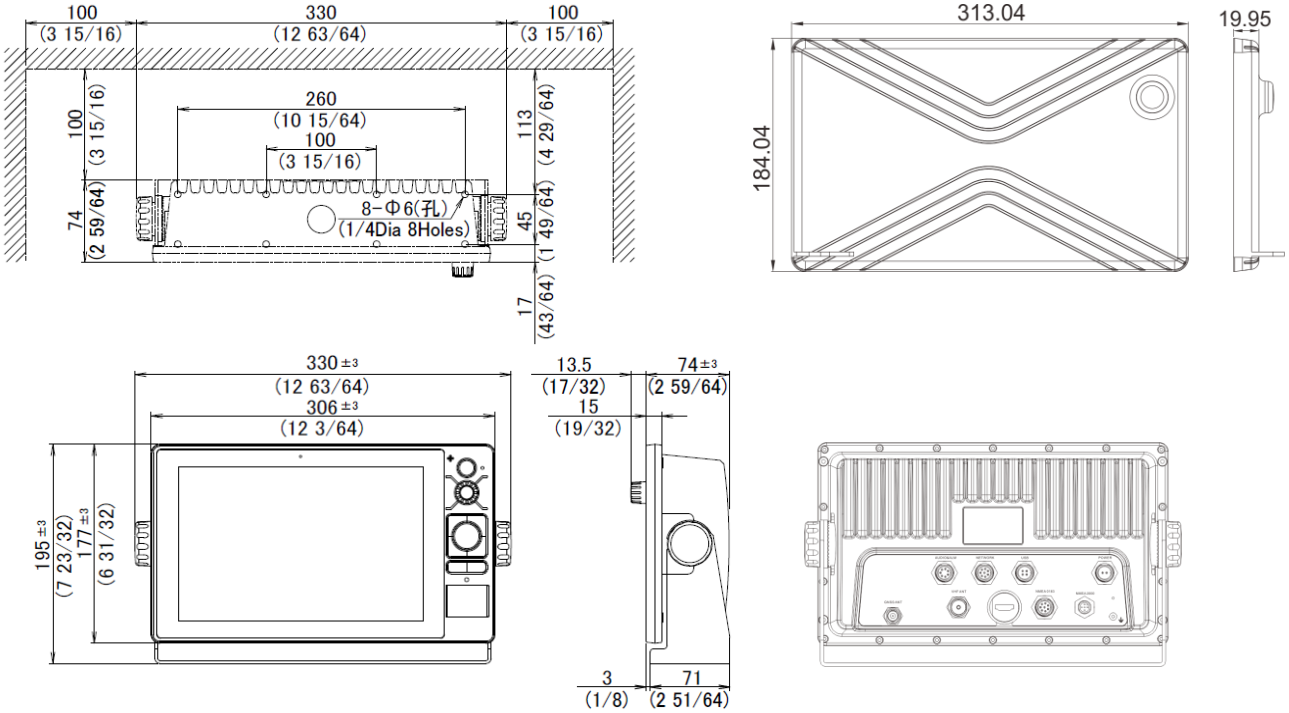
VHF antenna must be kept more than 2.8m away from ship's other VHF antenna in vertical position.



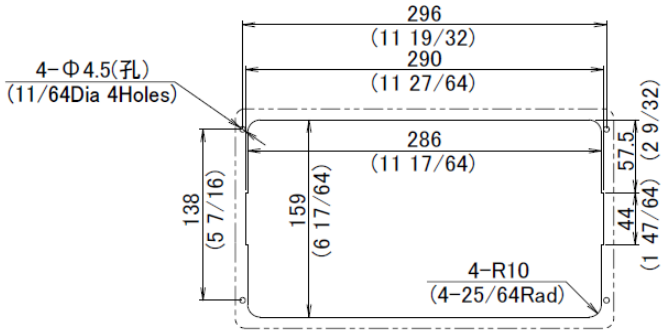
1.2.3 Equipment Installation

1.2.3.1 KSD-1100 (10.1”) Installation

Desk top Installation



Flush mount installation

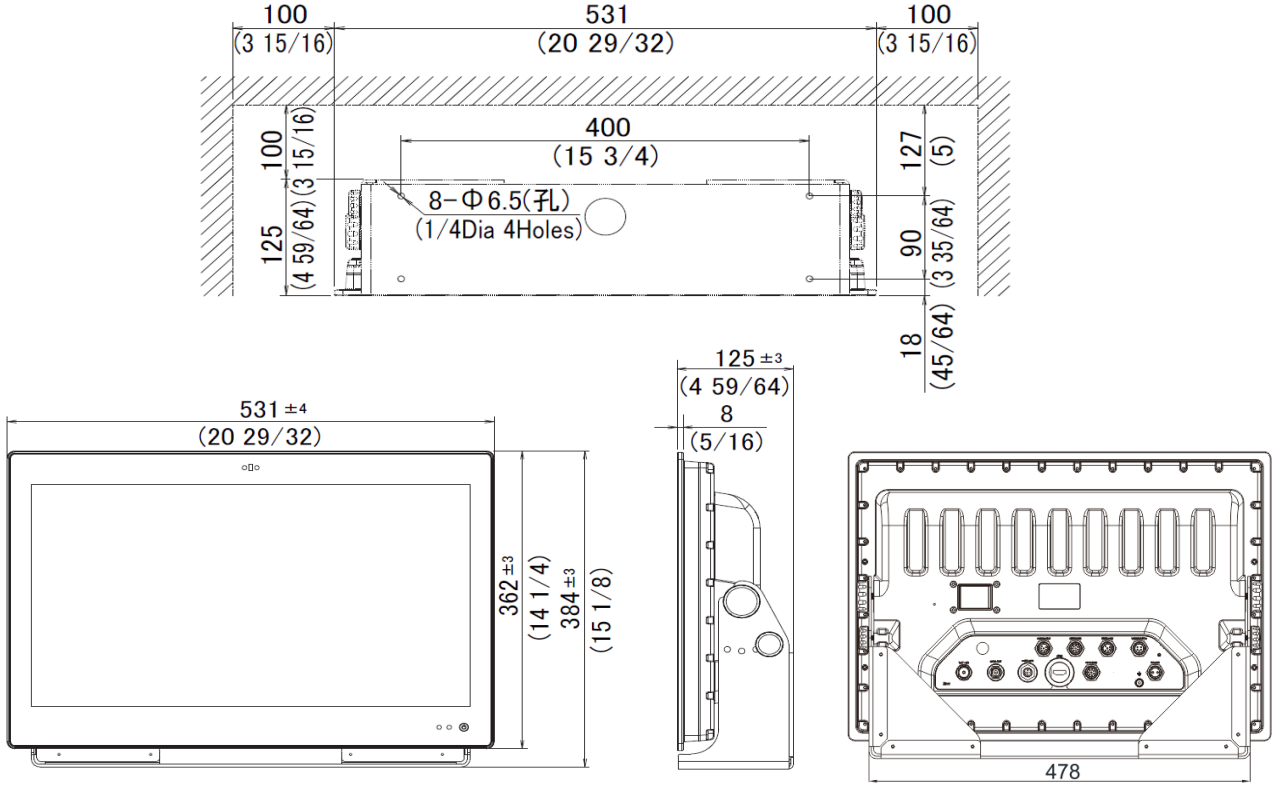


Weight: 2.1 kg

Unit: mm (inch)

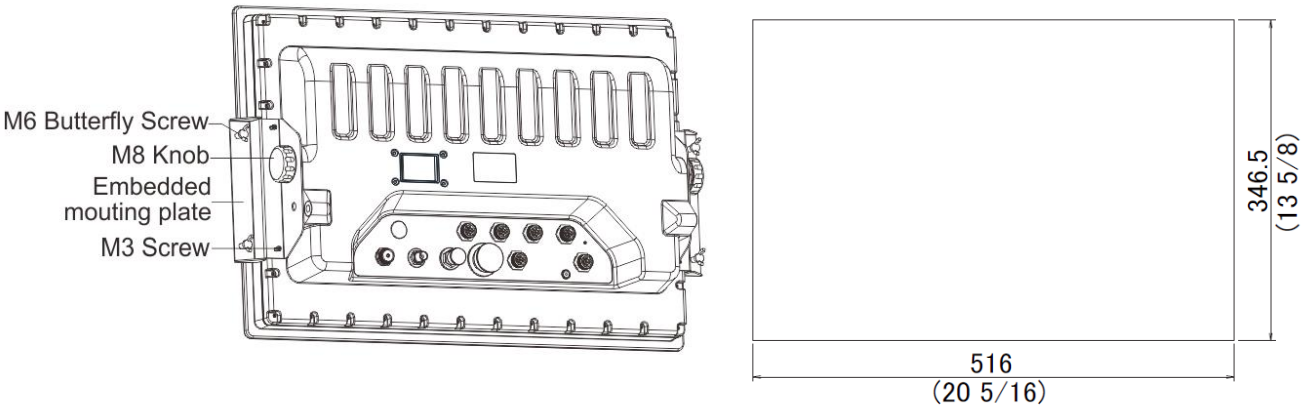
1.2.3.2 KSD-1210 (21.5”) Installation

Desk top Installation



Weight: 7.4 kg
Unit: mm (inch)

Flush mount Installation



Flush Mounting: First process the installation hole as required and then put the equipment into it. Install the embedded mounting plate. Lock the M8 knob and M3 screw to the back of the KSD-1210. And tighten and fix the 4 butterfly screws.

Note: After the terminal is installed, there should be enough space after connecting to the port for easy wiring.

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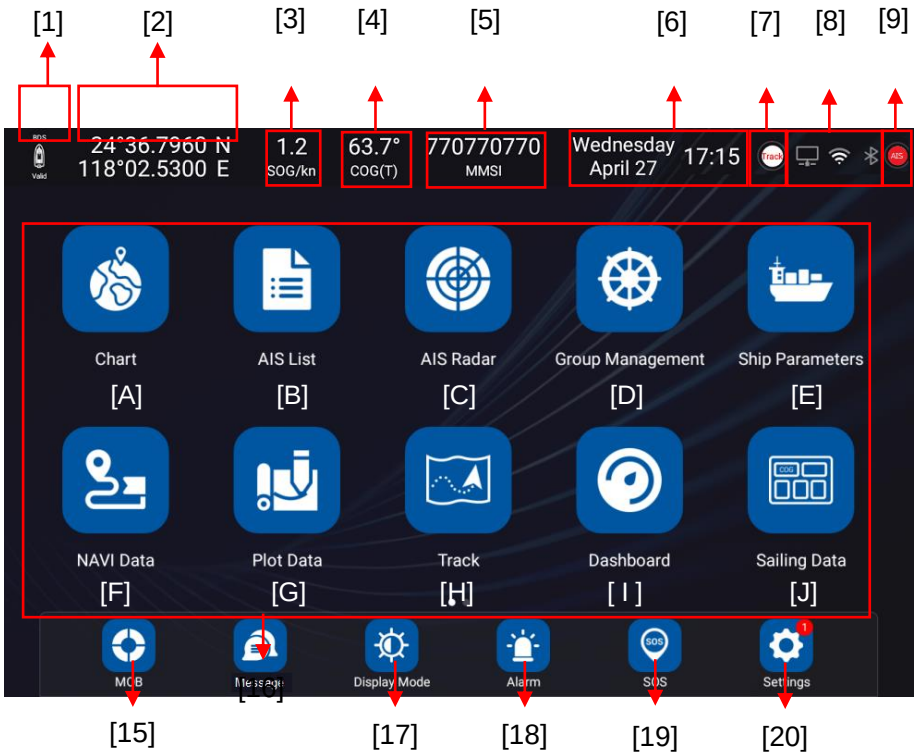
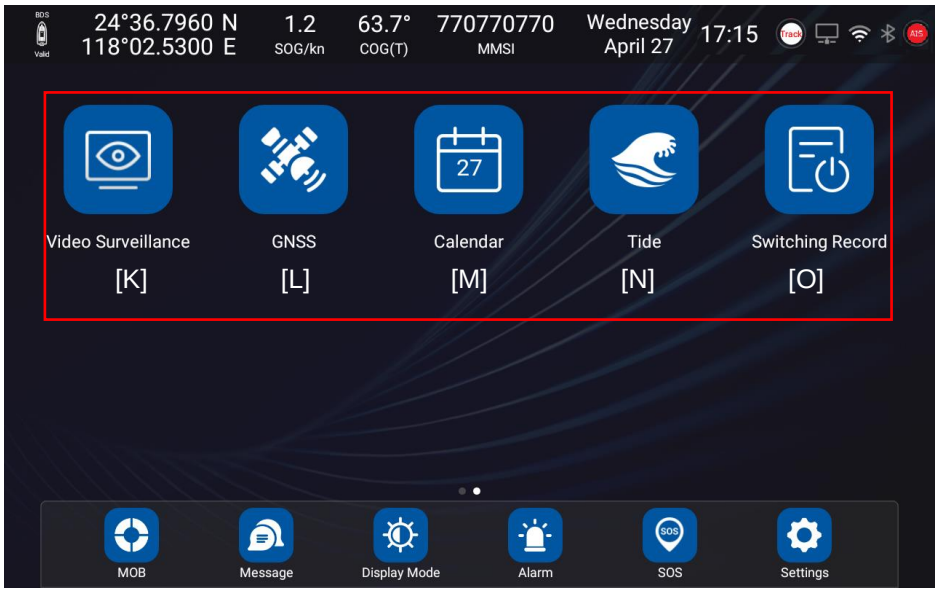
Chapter 2 Operation and Setting

2.1 [HOME] page

When KSD-1100/1210 is powered on, press and hold the [PWR] key ( ) to start up and enter the [HOME] page. Swipe left on the [HOME] page to turn it to the next page. See the following figure for details. For KSD-1210: The MOB icon is displayed on the [HOME] page. For details, refer to "2.13 MOB".





2.1.1 Introduction to the status bar

[1] GNSS positioning display mark

GNSS positioning normal display: Valid / Not positioning display: Invalid.

[2] Display the longitude and latitude coordinates of the ship.

Display the longitude and latitude coordinates of the latest positioning when not positioning.

[3] SOG

Display the current sailing speed of the ship.

[4] COG

Display the current course of the ship.

[5] MMSI

Display the MMSI of the ship.

[6] Time and date

Date display forma: year month day, day month year, month / day / year to set

Time display format: 12 hour format, 24 hour format.

[7] Track record display

Showing track record status and current track record data capacity.

[8] Ethernet network / Wi-Fi signal / Bluetooth signal

Click directly to enter the setting.

Connected status: icon color white

Not connected status: icon color gray.

[9] AIS setting status display

Display the transmission status of AIS.

Transmission stats: icon color red

Other status: icon color gray

2.1.2 App dynamic bar introduction

[A] Chart

Click [Chart] to go to [CHART] page.

You can select and switch between INT-MAP, C-MAP and ENC. (C-MAP card / ENC card: Owner supplied)

[B] AIS List

Click to view the AIS list.

Display the AIS target information of the ship and its surrounding areas, and only display the latest 1000 AIS target information.

[C] AIS Radar

Click to enter the AIS radar page.

You can view the number of AIS within the set field of vision, static information of selected target, navigation data and operation, etc.

[D] Group Management

Group management can monitor the dynamics of ships, and the group management list can hold up to 100 groups. The total number of ships in all groups can support up to 1000.

[E] Ship Parameters

Ship parameter management includes ship static parameter setting.

[F] NAVI Data

Click to enter the navigation data page.

You can select waypoint and route data to quickly call navigation, edit, and add navigation data.

[G] Plot Data

Click to enter the Plot data page including the drawing Points, Lines, and Polygon. You can select to view, edit, and create new Plot data.

[H] Track

Click to enter the track page. You can select record, view, edit, and add a new track.

[I] Dashboard

Click to enter the digital dashboard page to support the customized display of COG, HDT, SOG, BRG, Lat/Lon, DPT, Wind, TEMP, STW, XTE and other data.

[J] Sailing Data

Click to enter the Sailing Data management page to support the customized display of ship SOG, COG, HDOP, VDOP, HDT, DPT, Wind, TEMP, STW, XTE, RNG, BRG, ETA and other data.

[K] Video Surveillance

Click to enter the video monitoring APP to view the real-time video picture of the currently connected camera, and to support automatic video recording.

[L] GNSS

Click to enter the GNSS ephemeris. You can select GNSS source and location mode to view the ephemeris.

[M] Calendar

Click to enter the Calendar APP to view the current time.

[N] Tide

Click to enter the tide page to view the tide time and tide height information of the site.

[O] Switching Record

Click to enter the Switching Record. You can view the device boot time, last working time, off time, and working hours.

2.1.3 App fixed column introduction

[15] MOB

Display the records of MOB mark points / view MOB mark records / quickly call navigation.

[16] Message

View the received and sent short messages / add contacts and common words.

[17] Display mode

Chart display mode, sound and screen brightness can be set.

[18] Alarm

Click to enter the alarm setting page, the following item can be set. Alarm setting of the ship / AIS alarm setting and alarm log / Main alarm switch

[19] SOS

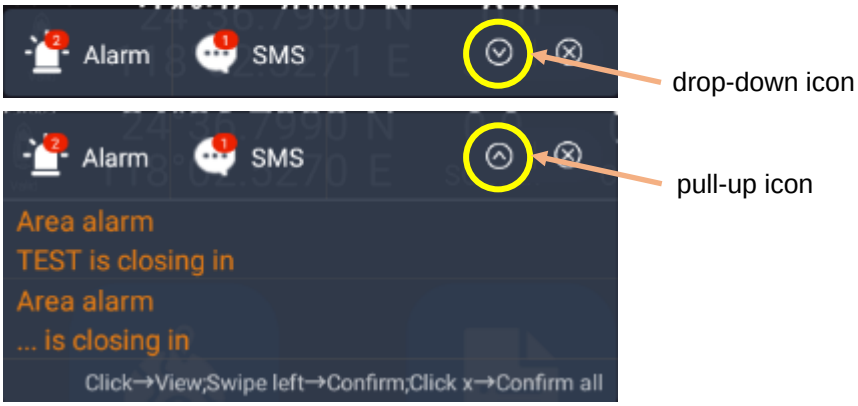
Enter the SOS page, you can quickly broadcast the alarm and distress information through AIS.

[20] Settings

Click to enter the system settings page, the following item can be set. Version Update / Network/ Func & cursor / NMEA / Device settings / Hardware information

2.1.4 Message notification popup

[1] Information window (if pop-up window appears)



(a) Click the drop-down icon to view all alarm or SMS messages.

(b) Click the pull-up icon to put away the alarm or SMS message.

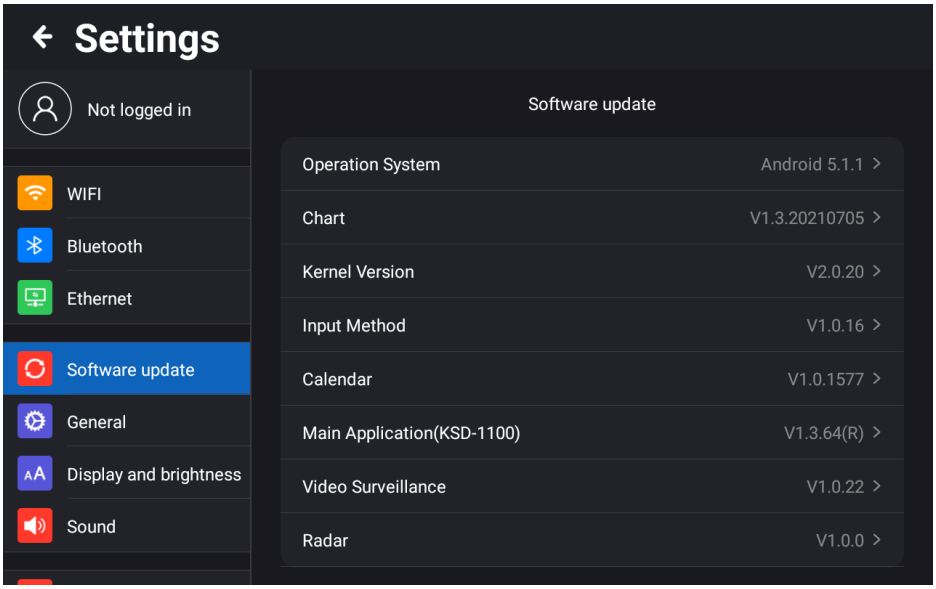
(c) Swipe left on alarm information to confirm the current alarm. Click the close button in the upper right corner to confirm all the current alarm information. When the alarm is triggered again, the alarm window will pop up again.

(d) The number in the upper right corner of the icon is the number of received alarm messages or SMS messages.

(e) Alarm types are as follows, over speed, arrival, XTE, anchor watch, plotting point / line / polygon and AIS CPA, area, ship type Alarm, etc.

2.2 Settings

On the [HOME] page, click [Settings] to go to setting page.

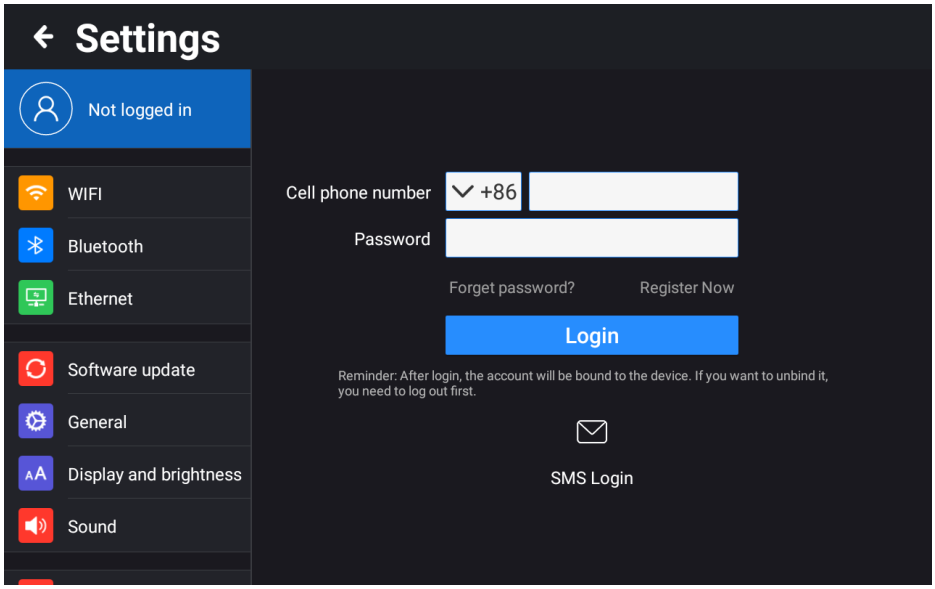


2.2.1 User login

On the [HOME] page, click [Settings] to go to setting page and click [Not logged in] to enter the user login page.

Note: Users need to connect to the network (Wi-Fi or network) when logging in.

If you do not need SMS function using this server, user registration is not required.



[1] For users without registered account, click [Register Now] to enter the registration page and input the mobile phone number, password and confirm the password. Then click [Get code] to input the code received by SMS and click [Register]. And you can complete the registration and log in automatically.

[2] For users with registered account, directly enter the user's cell phone number and password on the login page, and then click login, or verify the quick login by scanning QR code or SMS. If you forget your password, click forget password to retrieve it.

2.2.2 WIFI

You can set the wireless LAN on/off. When it is set to on, select the wireless network you want to connect. And enter the password according to the prompt to connect and use. If the network to be connected is not displayed in the list, you can select [Add network] and enter the network name to add a network.

2.2.3 Bluetooth

Bluetooth on/off can be set. When it is set to on, search for nearby Bluetooth devices. Tap the Bluetooth device to be connected for pairing to prompt the Bluetooth pairing request. When the pairing device and pairing code are displayed, tap pairing and the other party's consent is required to connect and pair success.

2.2.4 Ethernet

Ethernet on/off can be set. When it is set to on, the IP address, netmask, gateway, and DNS information will be displayed after connecting to the network. Set the Ethernet mode [dhcp] or [static]. Select [dhcp] to automatically obtain the IP address, gateway, netmask, and DNS. Select [static] to manually fill in the IP address, netmask, Gateway, and DNS.

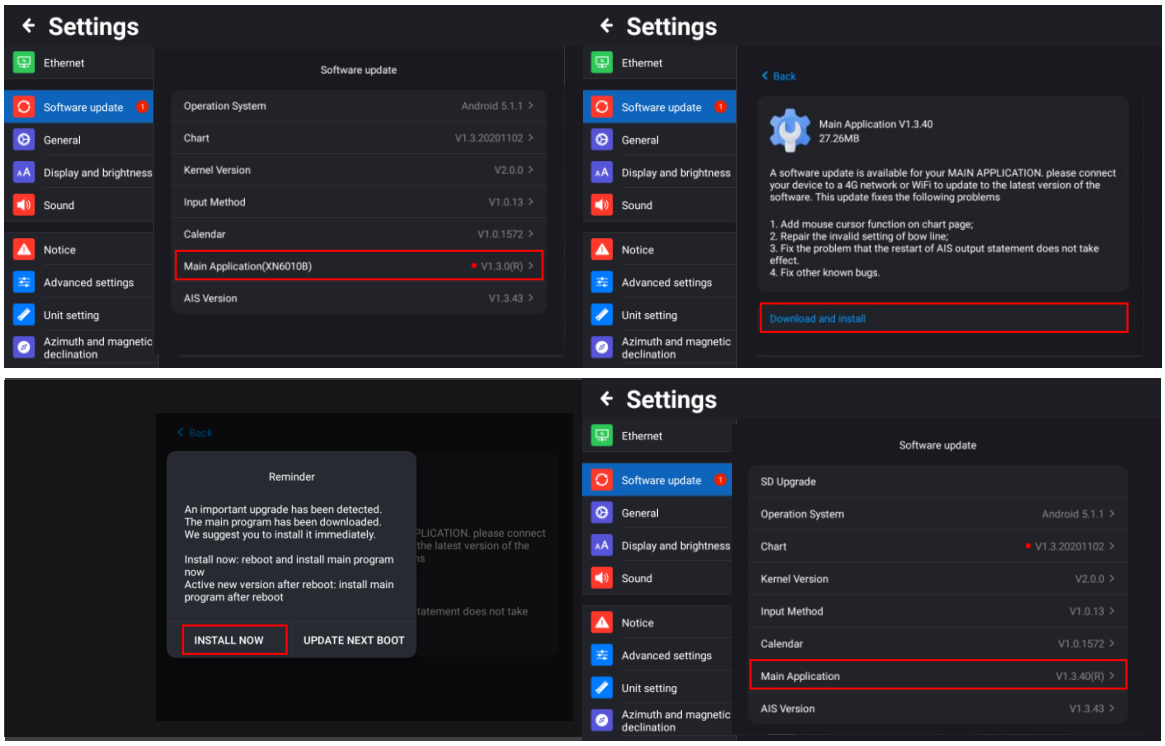
2.2.5 Software update

Click [Software update] to view the version information of equipment system, chart, input method, calendar, main application and AIS version, and be supported online and local SD card upgrade.

2.2.5.1 Online Upgrade

Connect to the network, click to check if there is a new version and detect the new version.

Click to start the update to pop up the upgrade menu. Select [Update Now→Start Download→ Download Complete → Prompt New version is ready now, do you want to update right now → Install now → After the installation is complete], the device will automatically reboot. Check that the version has been updated to the latest version, as shown in the figure below.



2.2.5.2 SD Upgrade

[1] Format the microSD card (TF card) to FAT32 format

[2] Download upgrade package

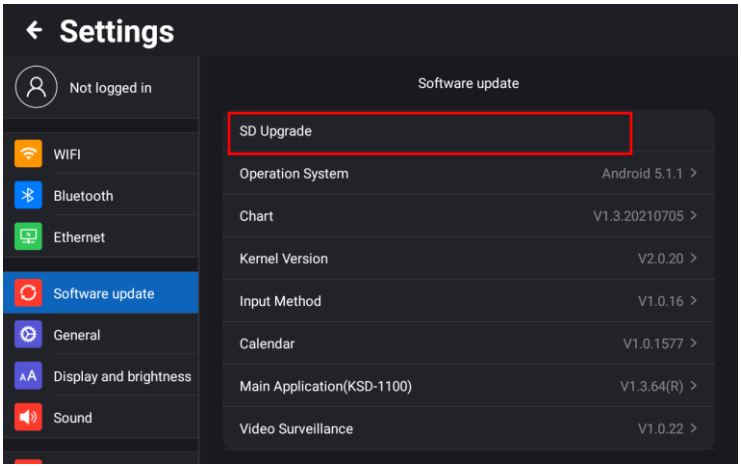
Get the latest download link from Koden to download the upgrade program, including the main, calendar, input method, chart data, and other upgrade program.

[2] Unzip File

Unzip the update file to microSD card (TF card) and put the microSD card (TF card) into the card slot of the device.

[4] Update

After putting the microSD card into the card slot of the device, the SD Card Update menu will appear automatically on the version information page. Click the [SD Upgrade] menu button to start updating.



Note:

1. When the microSD card (TF card) is inserted into the device, the [SD Upgrade] menu will be displayed on the device settings page.

2. Click [SD Upgrade], the device will automatically detect whether there is a new version. Click [Confirm] to open the installation prompt box. Click [INSTALL] and wait for the installation prompt to succeed.

2.2.6 General

[1] Language: Simplified Chinese, English, Japanese, Spanish and Thai can be set.

[2] Date Format: Year-Month-Day, Day-Month–Year, Month/Day/ Year can be set.

[3] Time Format: 12hours, 24 hours can be set.

[4] Time Zone: Local time zone can be set.

[5] Hardware Information:

Click [Hardware Information] to view the device-related hardware information, the following items will be shown in the figure below.

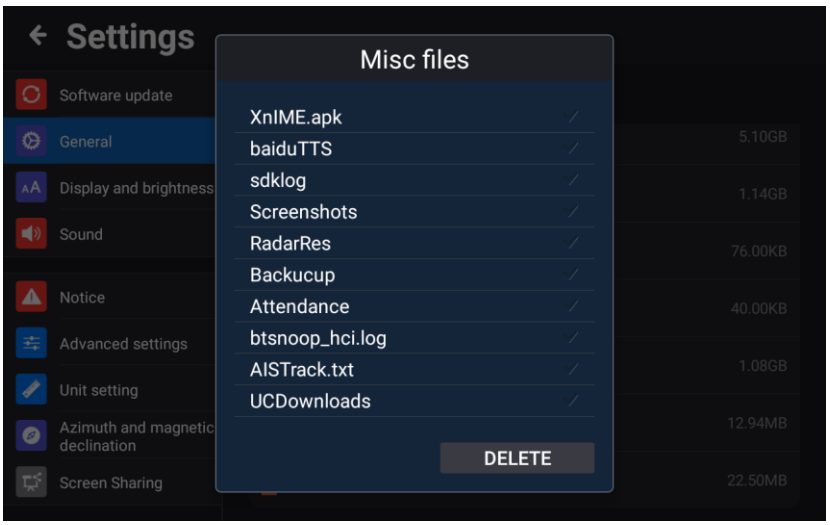
Serial No. / Hardware Information / User Permit / System / Kernel Version / CPU / CPU speed / RAM / FLASH / Video engine / Keyboard (KSD-1100) / Touch panel / Size / Brightness / Viewing angle / Resolution / Power voltage / Power consumption / GNSS / Audio / Micro SD card slot / Bluetooth / Wi-Fi / Input / Wi-Fi MAC address / Output / Lan Network / Operating temperature / NMEA2000 / Standard / Frequency / Bandwidth / Modulation / Data rate / Number of AIS transmitter / Number of AIS receiver / Transmitting power / Rx sensitivity

[6] Legal information: Click [Legal Information] and Click [Open Source License] to view “Open Source” information.

[7] Delete data pop-up confirmation: If set to on, “Delete data pop-up confirmation” window is displayed on screen when deleting data.

[8] Storage: you can view device storage related new information, including Internal storage, available, Apps (app data & media content), Pictures, videos, Audio, Downloads, Cached data, etc.

Misc files (other files added by users) can be deleted to adjust the storage, as shown in the pop-up below.



[9] Reset Setting: Click [Reset Setting] allows you to “Restore default menu settings” and “Clear User Data”. "Restore default menu settings" returns the setting values to the initial state. MMSI numbers, user data, etc. will not be erased. "Clear User Data" erases data such as tracks, plot data, and NAVI data.

2.2.7 Display and brightness

The screen brightness adjustment range is 0 to 100%. When the screen brightness value is lower than 25%, the brightness value of the restart device is automatically set to 40%.

2.2.8 Sound

[1] Volume: Equipment volume range 0 to 15.

[2] Touch tone: You can set the button sound on/off.

2.2.9 Notice

You can set the alarm message, short message and AIS message on/off. After the notification message is off, the message notification pop-up window will be cancelled. And the message reception and voice reminder will not be affected. The received message can be viewed in the [SMS] APP.

2.2.10 Advanced settings

2.2.10.1 Custom keys

[FUNC] key (KSD-1100) functions can be used to set the following items.

Track on or off / Track color switch / Alarm on or off / Chart full screen switch / Screen on or off switch / AIS transmitter on or off

(A) Track on/off: Press [FUNC] key to quickly turn on or off track record.

(B) Track color switch: When recording a track, press [FUNC] to switch the track color.

(C) Alarm on/off: Press [FUNC] key to quickly turn on or off all set alarms, including sounds and prompts.

(D) Chart full screen switch: Press [FUNC] to quickly turn on or off the full-screen chart mode.

(E) Screen on/off switch: Press [FUNC] key to turn off the screen or light up the screen.

(F) AIS transmitter on/off: Press the [FUNC] key to toggle the AIS transmitter on/off.

2.2.10.2 NMEA

You can view signal input and output information. You can select different channels to view input and output data, set the baud rate of each channel, and configure the NMEA0183_3 port as input or output (KSD-1100 only). And you can check the connected NMEA2000 device.

Note: NMEA2000 is not supported for software version V1.X.XX.

[1] Input

Click [Input] to enter the input signal channel setting page. The details are as follows.

Click the serial port box on the right of [Signal Channel] to select input channels, GNSS&AIS,

NMEA0183_1 (KSD-1210 only), NMEA 0183_2, NMEA 0183_3, NMEA 0183_4, NMEA 2000. You can directly check the input sentence on the page. However, for "NMEA2000", you can check the sentence input status, but you cannot see the details of the sentence.

Note: [NMEA0183_3] is a configurable channel, and input or output can be set in [Advanced Settings] - [NMEA 0183_3 Configuration], which can be configured as input or output. (KSD-1100 only)

Click [Pause] in Signal check out to pause the input sentence screen to view the input sentence. Click [Reset] to refresh the sentence and re-enter.

[2] Output

Click [Output] to enter the output signal channel setting page. The details are as follows.

(A) If [NMEA0183_3] is set as output, the output page signal channel has NMEA0183_1, NMEA0183_2 (KSD-1210 only), NMEA0183_3 and NMEA 2000 to choose from.

(B) Click the [Protocol Version] selection box to set the protocol version, including: V2.00 (default), V3.01, V4.10.

(C) Click the [Checksum] switch to turn the check code of the sentence on or off.

(D) Clicking [Output] will pop up all sentence types.

When NMEA 0183 is selected:

You can set the sentence data on / off, and turn on or off the corresponding output sentence, including, AIS, APB, BOD, BWC, DPT, GGA, GLL, GSA, RMC, VTG, XTE, ZDA, etc.

When NMEA 2000 is selected:

You can set the sentence data on / off. Turn on or off the corresponding output sentence including GNSS, AIS, HDT and NAVI DATA.

(E) Click [Output Content] displays the signal monitor where you can check the contents of the output. Click [Pause] in “Signal check out” to pause the input sentence screen to view the output sentence. Click [Reset] to refresh the sentence and re-enter. However, for "NMEA2000", you can check the sentence output status, but you cannot see the details of the sentence.

[3] Baud rate

Click [Baud Rate] to set the baud rate of NMEA_0183 serial port: 4800/9600/19200/38400.

[4] Data Sources

Click [Data Sources] to display the selection screen for each data input source.

(A) Click [GNSS] to select from GNSS & AIS (sensor), NMEA0183_1 (KSD-1210 only), NMEA0183_2, NMEA0183_3, NMEA0183_4, NMEA2000. If you select NMEA2000, select the input source "NMEA2000 Device".

(B) Click [AIS] to select from GNSS & AIS (sensor), NMEA0183_1 (KSD-1210 only), NMEA0183_2, NMEA0183_3, NMEA0183_4, NMEA2000. If you select NMEA2000, select the input source "NMEA2000 Device".

(C) Click [HDT] to select from NMEA0183_1 (KSD-1210 only), NMEA0183_2, NMEA0183_3, NMEA0183_4, NMEA2000. If you select NMEA2000, select the input source "NMEA2000 Device".

(D) Click [DPT] to select from NMEA0183_1 (KSD-1210 only), NMEA0183_2, NMEA0183_3, NMEA0183_4.

(E) Click [TEMP] to select from NMEA0183_1 (KSD-1210 only), NMEA0183_2, NMEA0183_3, NMEA0183_4.
(F) Click [STW] to select from NMEA0183_1 (KSD-1210 only), NMEA0183_2, NMEA0183_3, NMEA0183_4.
(G) Click [Wind speed and wind direction] to select from NMEA0183_1 (KSD-1210 only), NMEA0183_2, NMEA0183_3, NMEA0183_4.
[5] NMEA 0183_3 Configuration (KSD-1100 only)
You can be configured as input or output. When Output is selected, only AIS output is available.
[6] NMEA2000 Devices
This function is to check the connected NMEA2000 device.
[7] Tx Power Setting
Select [Silent] to stop transmitting AIS own ship information. Select [2W] to transmit AIS own ship information. The setting is "2W" when the power is turned on.

2.2.10.3 Speed and course Filtering

Type of ship: Select the averaging process according to the shape of the ship. You can choose from Fishing boat (Low speed boat) / Cargo boat (Medium speed boat) / Yacht (High speed boat) / Low speed (complex) / Custom.
When "Custom" is selected, the following custom items are displayed.
[1] Filtering mode: Select the strength of averaging from "Normal / Enhance".
[2] SOG Filtering: Setting speed averaging process according on / off.
[3] SOG Filtering Setting: The setting range is 1 to 30, and the smooth value can be set according to the time operation needs. The speed change has a mitigation process. The larger the value, the slower the change.
[4] COG Filtering: Setting heading averaging process according on / off.
[5] COG Filtering Setting: The setting range 1 to 30, and the smooth value can be set according to the time operation needs. The heading change has a mitigation process. The larger the value, the slower the change.

2.2.10.4 Test the distress flare window

This function is used when conducting a distress signal test. If the setting is "ON", a distress signal test pop-up window will be displayed when distress signal test information is received. The default setting is "OFF". Regardless of the setting value, received distress signal test information will be displayed on the AIS list. Like other AIS information, the information will be deleted according to the lost time period in the AIS settings.

2.2.11 Unit setting

[1] Distance Unit: NM, Km
[2] Speed Unit: Kn, Km/h

[3] Depth Unit: m, fm, ft

[4] Temperature Unit: °C, °F

2.2.12 Azimuth and magnetic declination

[1] BRG: True north, Magnetic north

[2] Magnetic Declination: Manual setting range 0.0 to 179.9° W (E).

2.2.13 Screen Sharing

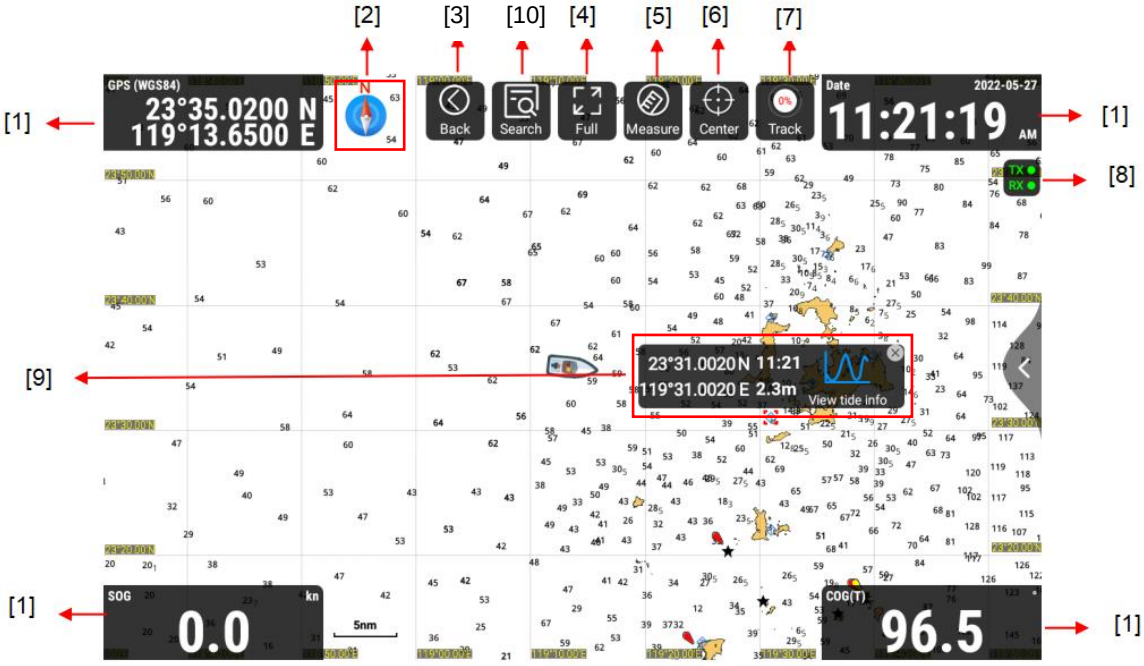
First connect the monitor to output the projection screen display through HDMI and adjust the display position of the monitor to obtain the best display effect.

[1] HDMI mode: including auto, 1920 x 1080p-60, 1280 x 720p-60 for setting.

2.3 Chart

On the [HOME] page, click [CHART] to enter the [CHART] page. The corresponding operation can be carried out on the chart. For KSD-1210: The MOB icon is displayed on the [CHART] page. For details, refer to "2.13 MOB".

2.3.1 Chart Page Data Description



[1] Data window: Can independently set and display relevant data information, including Own ship Lat/Lon, Date, SOG COG, HDT, DPT, Wind, Temp, MMSI/NAME and STW.

[2] Compass: North up, Heading/Course Up, route up can be set.

[3] Back: Back to [HOME] page.

[4] Full: Click to enter the full screen mode of the chart. The [CHART] page only displays the chart and does not display the data window and other display items.

[5] Measure: Two or more points can be measured on the chart to show the distance and bearing between adjacent measurement points.

[6] Center: Automatically center the ship, in any case, quickly refresh the chart and display the position of own ship in the middle of the screen.

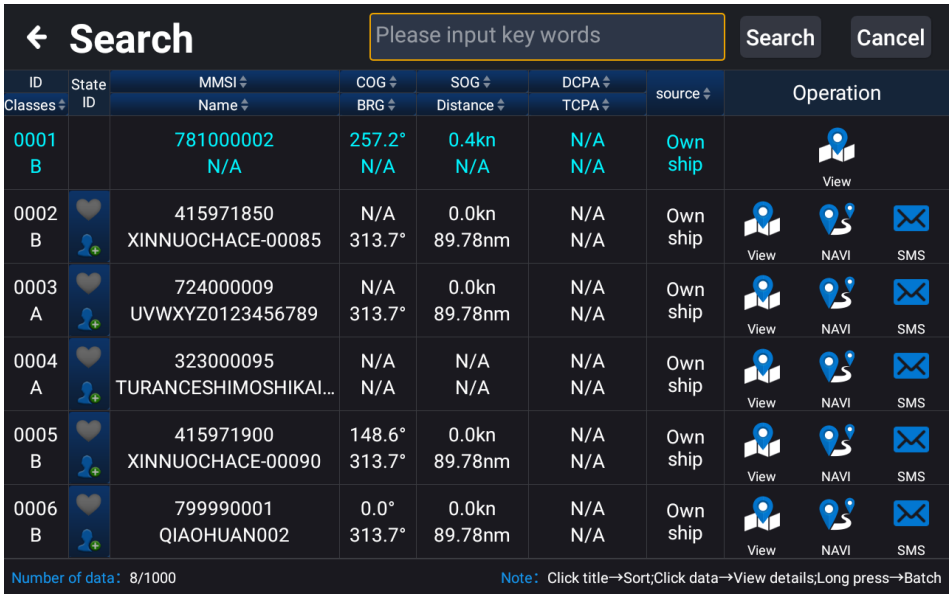
[7] Track: Control the start / stop of track recording and display the storage ratio of the current track data.

[8] AIS Signal Light: There are two types of signal lights, TX signal light and RX signal light. The signal light has the following three states:

1. Green: Normal working state.
2. Blinking green and gray: Transmit/receive (TX/RX) status.
3. Gray and crossed: Failure / AIS is not transmitted for 3 minutes, or longer / AIS signal not received for more than 10 minutes (not a failure).

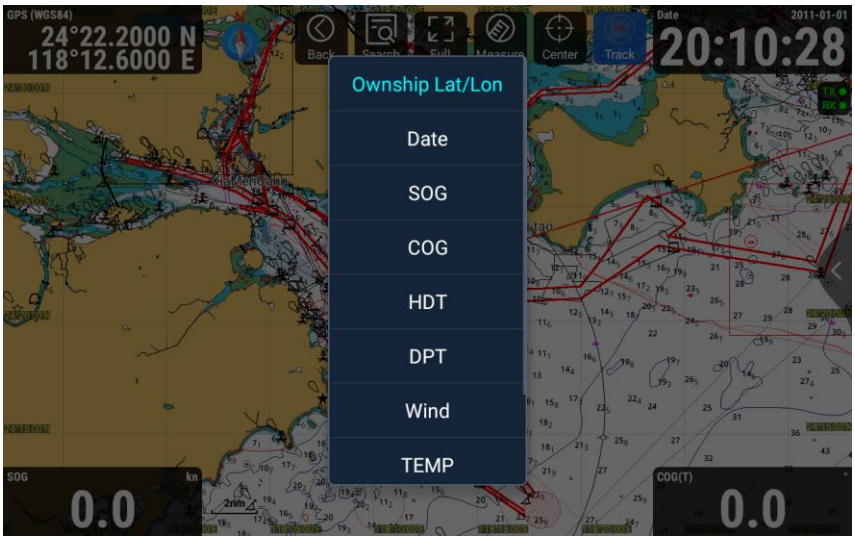
[9] Tide: Select a tide site, you can choose to view the tide table to enter the tide data page quickly.

[10] Search: Click [Search] turn to the search list to search the AIS data received by the current device, as described below.



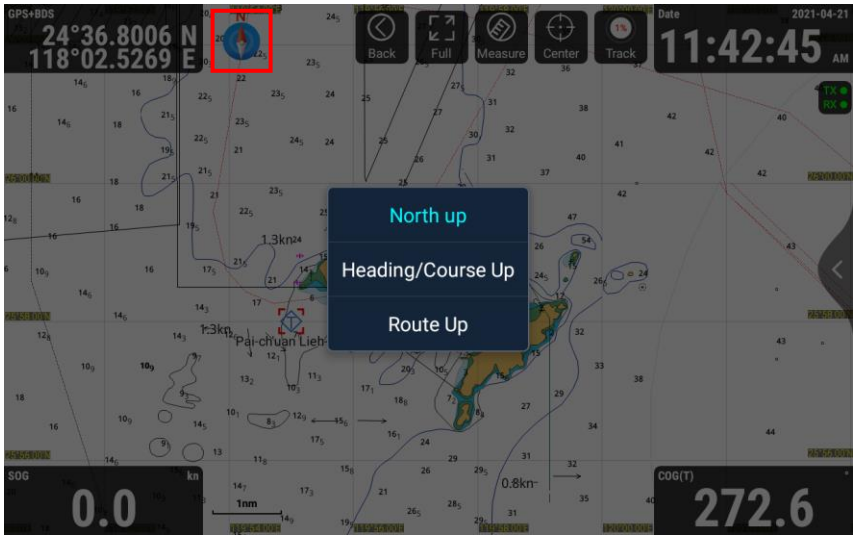
2.3.1.1 Data Window

The data window can display relevant data information, including the own ship Lat/Lon, Date, SOG COG, HDT, DPT, Wind, Temp, MMSI/NAME and STW. The Settings box is as shown in the figure below. Click any window to replace the displayed content of the data window. Click [Reset] to reset all four data windows to their default settings.



2.3.1.2 Compass

Clicking the [Compass] icon will pop up the chart direction selection box, providing three modes of North up (default), Heading/Course up, and Route up, as shown in the figure below.



[1] North up: The chart is displayed north just above the chart. (Refer to Figure 2.1)

[2] Heading/Course up: The chart is displayed with the ship's heading/course up. When there is heading data, the heading up mode is used. When there is no heading data, the course up mode is used. (Refer to Figure 2.2)

[3] Route up: The chart is displayed upward with the route. (Refer to Figure 2.3)

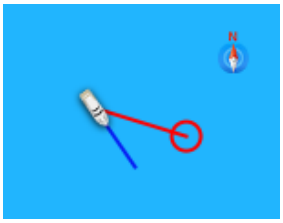


Figure 2.1 North up

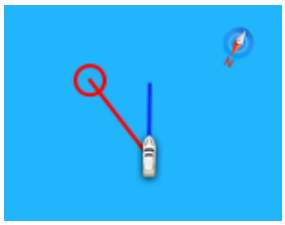


Figure 2.2 Heading/Course up

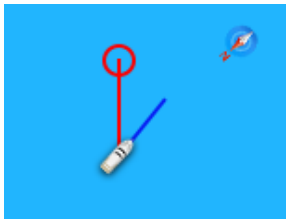
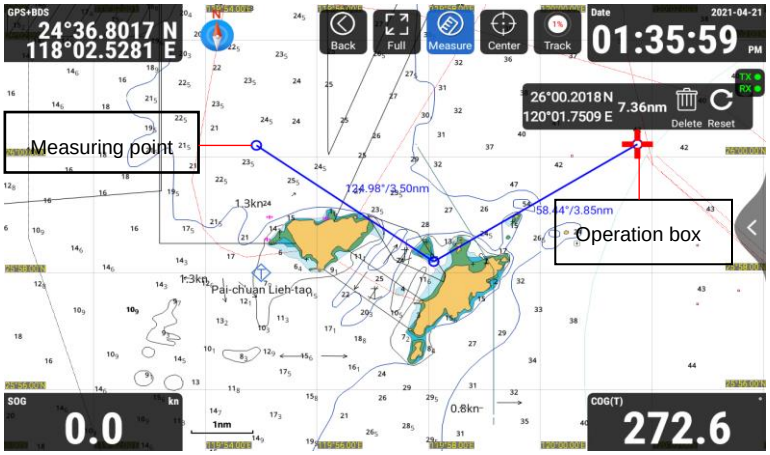


Figure 2.3 Route up

2.3.1.3 Measure

Click the [Measure] to enter the ranging state. Click on the chart as the starting point for distance measurement. Continue to click to automatically measure the distance and bearing between adjacent measurement points.



[1] Distance: Distance between two points.

[2] Bearing: Measure the bearing of two adjacent points, that is, the bearing value of the current point relative to the previous point.

[3] Total distance: The total distance between the measured points will be displayed on the Operation box.

[4] Operation box: Select [Delete] to delete the current measure point and select [Reset] to clear all the measure points. Click the [Measure] button to exit the measuring.

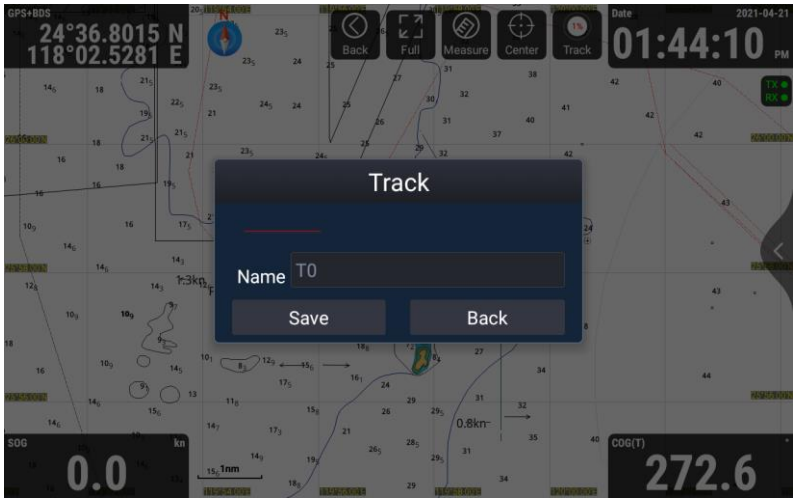
2.3.1.4 Center

Click the [Center], in any case, quickly refresh the chart, and display the position of own ship in the middle of the screen.

2.3.1.5 Track

[1] Click the [Track] to start recording the track, then click again to stop recording the track.

[2] Long press the [Track] to pop up the track new window. Enter the track name, select [Save], complete the new creation, and start recording. Select [Back] to cancel the track recording.



2.3.1.6 Add Waypoint

On the [CHART] page, long press the position where you want to add waypoints, and the information window as shown in figure 2.4 (a) will pop up. Click [Add] in the window, and the information editing window as shown in figure 2.4 (b) will pop up.

Figure 2.4 (a) Add page

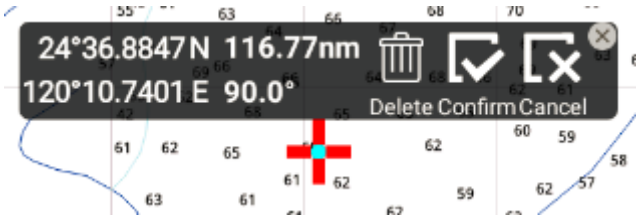
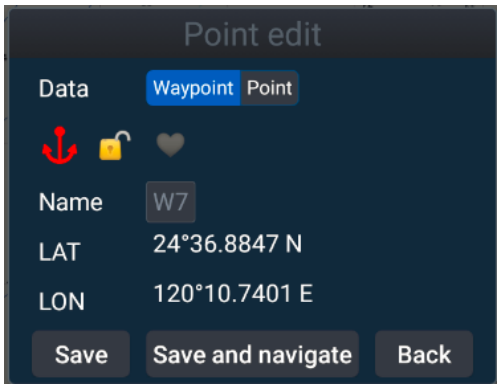


Figure 2.4 (b) New waypoint page

[1] Click [Confirm] to quickly create a point at this location and enter the data attribute editing window (as shown in figure 2.5).

[2] Click [Delete] to exit the operation of adding waypoint.

[3] Click [Cancel] to exit the point editing state and return to Figure 2.4 (b).



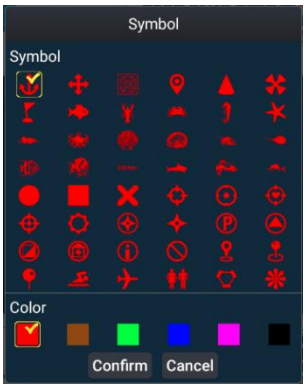


Figure 2.5 (a) point edit page Figure 2.5 (b) Symbol edit page

Enter the point edit window, you can edit the attributes of the new point, including the following contents.

[1] Select the data type as waypoint.

[2] Clicking on the symbol icon will pop up the symbol editing window shown in Figure 2.5 (b). There are 48 icons and 6 colors for waypoint settings.

[3] Click the lock icon to set to lock or unlock the newly created waypoint data. The locked point cannot be deleted directly.

[4] Click the heart icon to set the focus or not to focus, and the focused waypoint will be placed in front of the list.

[5] Click on the name edit to enter the waypoint name.

After editing the waypoint, you can choose to save, save and navigate or back to the [CHART] page, the details are as follows.

[1] Select [Save] to save the new waypoint to the navigation data list.

[2] Select [Save and navigate] to save the new waypoint and start navigating with that point as the destination.

[3] Select [Back] to cancel editing, the waypoint will not be saved.

[4] On the [CHART] page, click on the waypoint to be edited to perform [Edit], [NAVI] or [Delete] operations, as shown in Figure 2.6.

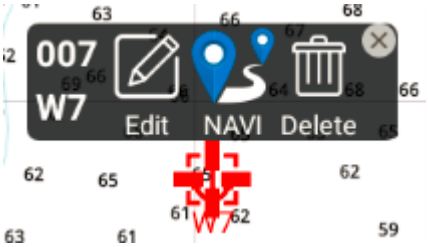


Figure 2.6 Waypoint edit page

2.3.1.7 Add Route

On the [CHART] page, long press the position where you want to add a route, and the information page shown in Figure 2.7 (a) will pop up. Click [Add] in this page to confirm the position of the first route node. Click the second position on the chart to confirm the second route node, and so on multiple clicks to add multiple nodes. After setting the required nodes for the route, click [Confirm] to enter the line attribute editing page, as shown in Figure 2.8 (a).

Figure 2.7 (a) Add page

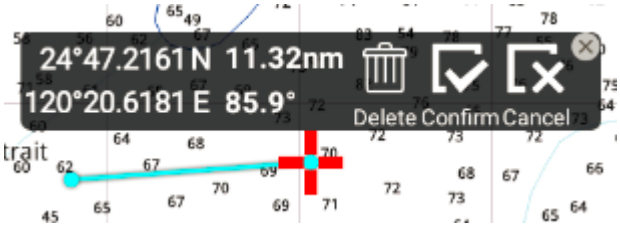


Figure 2.7 (b) Add route information page

Enter the line edit window, you can edit the attributes of the new route, including the following contents.

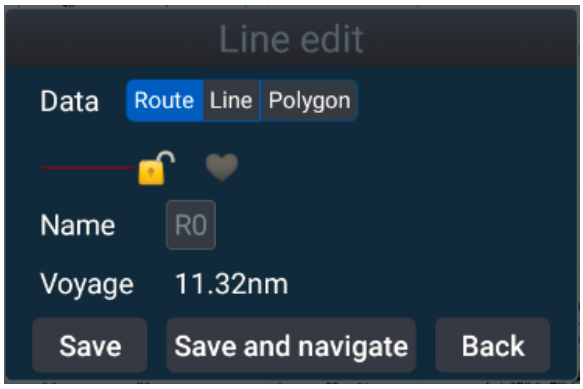


Figure 2.8 (a) Line edit page

Figure 2.8 (b) Symbol edit page

[1] Select the data type as route.

[2] Click the line symbol to provide 8 line styles, 3 line widths and 6 colors for line style settings.

[3] Click the lock icon to set to lock or unlock the newly created route data. The locked route cannot be deleted directly.

[4] Click the heart icon to set the favorite or unfavorite, and the favorite route will be placed in front of the list.

[5] Click on the name edit to enter the route name.

After editing the route attributes, you can choose to save, save and navigate, or back to the [CHART] page, as detailed below.

[1] Select [Save] to save the new route to the navigation data list.

[2] Select [Save and navigate] to save the new route and start navigating with that route as the destination.

[3] Select [Back] to cancel editing, the route will not be saved.

[4] On the [CHART] page, select the route to be edited, and you can also perform the operations of

[Edit], [NAVI], [Add note], and [Delete], as shown in Figure 2.9.

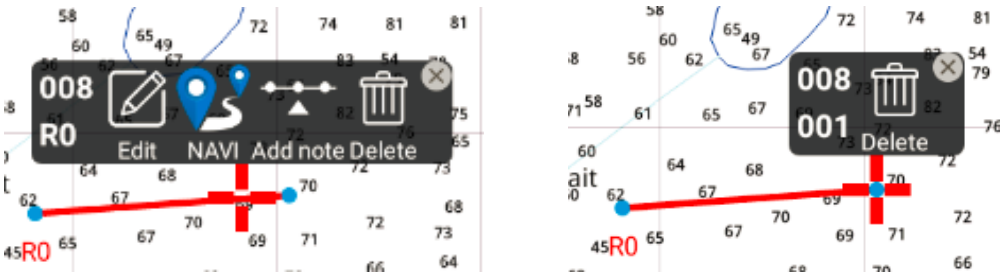


Figure 2.9 Route editing window on the chart

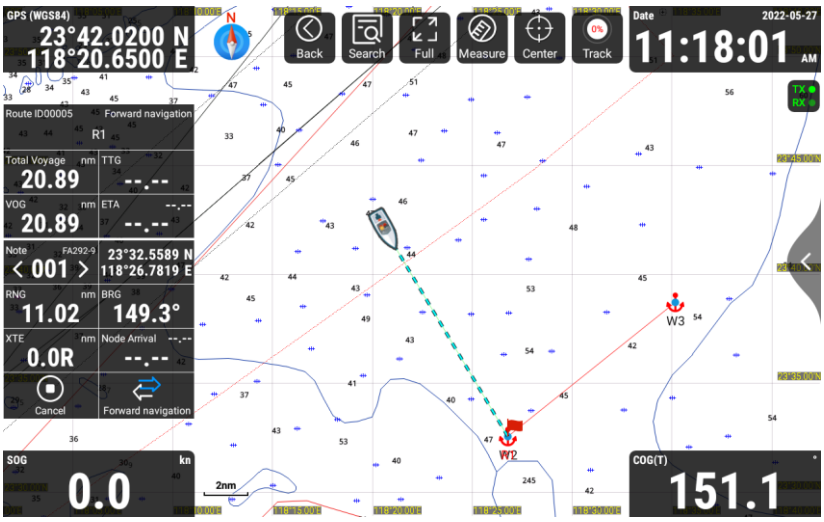
2.3.1.8 Waypoint navigation page

When the navigation type is waypoint navigation, the display window on the [CHART] page is shown below.

[1] The navigation window displays own ship's latitude and longitude, total voyage, bearing (BRG), cross track error (XTE), estimated arrival time (ETA), etc. Click [Cancel] to end navigation.

2.3.1.9 Route navigation page

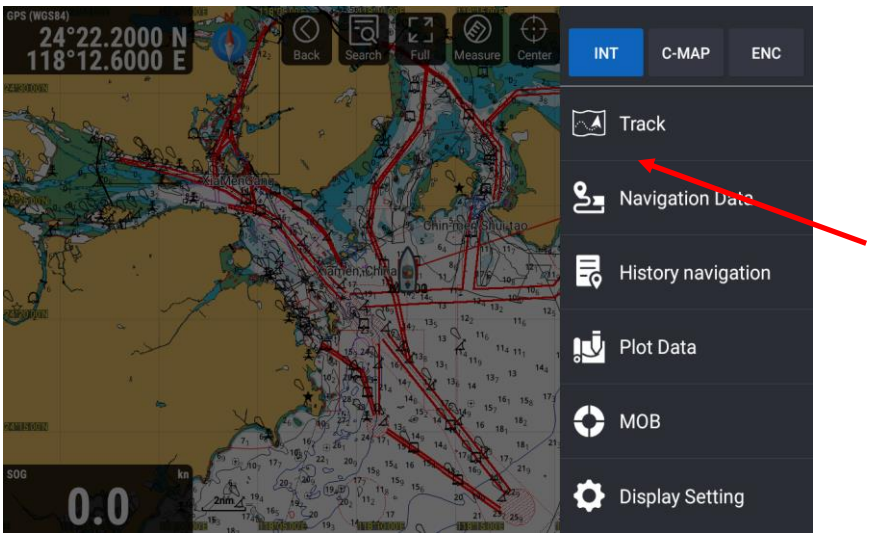
When the navigation type is route navigation, the display window on the [CHART] page is shown below.



[1] The navigation window displays own ship's latitude and longitude, total voyage, bearing (BRG), time to go to WPT (TTG), Remaining voyage (VOG), cross track error (XTE), estimated arrival time (ETA), etc. Click [Cancel] to end navigation.

2.3.2 Chart page operation

On the [CHART] page, click [<] mark of the screen right side or press the [MENU] button (KSD-1100) to call up the function menu items, including chart data source switch, Track, Navigation Data, MOB, History navigation, Plot Data, Display Setting.



2.3.2.1 Chart data source switch

Support the installation and display of INT-MAP, C-MAP* (MAX), ENC* charts. If the charts have been installed, you can click the corresponding data source to switch. (*: Owner supplied)

If select C-MAP

a) Please make sure the C-MAP card is MAX format.

b) Please make sure the C-MAP MAX card is inserted on the third card slot of the right side (KSD-1100) or the second card slot (center side) of the back panel of the Display unit (KSD-1210).

If select ENC

Preparing to install ENC S-57 map

a) Prepare a microSD card*, download the S-57 electronic chart data from the website.

Put the “S-57 map” data folder in the microSD card* root directory.

Preparing to install ENC S-63 map

A User Permit is required to use the ENC S-63 map.

a) Click “Settings” on the [HOME] page and click “Ethernet”. Turn on "Ethernet" and set the Ethernet mode to "dhcp" or "static" (requires IP address configuration). Connect your device to the internet.

Or click "WIFI". Turn on "WIFI" and connect the device to the Internet.

b) Click "Settings" on the [HOME] page, then click "Hardware Information" under "General" in the settings menu.

c) Click "REFRESH" on the top right of the hardware information screen to get "User Permit".

d) Use this "User Permit" to purchase ENC S-63 maps.

e) After purchasing the ENC map, prepare a microSD card* and copy all the S-63 data files to the root directory of the microSD card *.

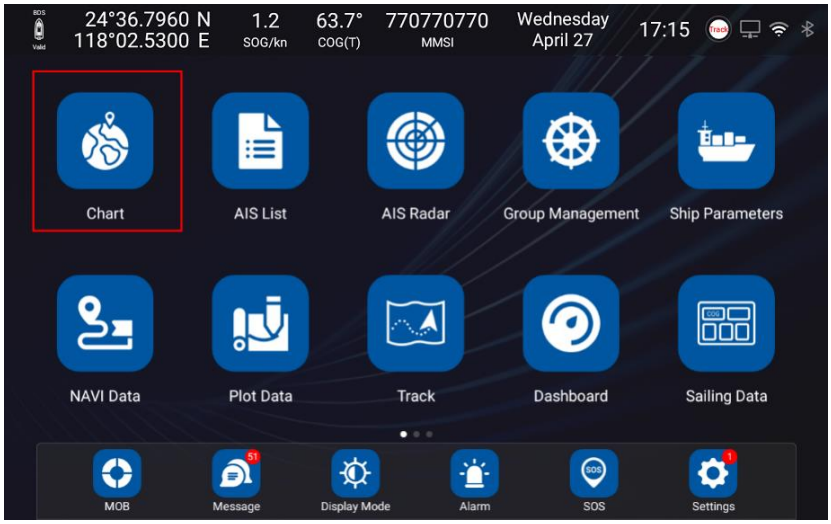
*: Micro SD card or TF card

Note: The root directory is the top-level directory in a specified drive.

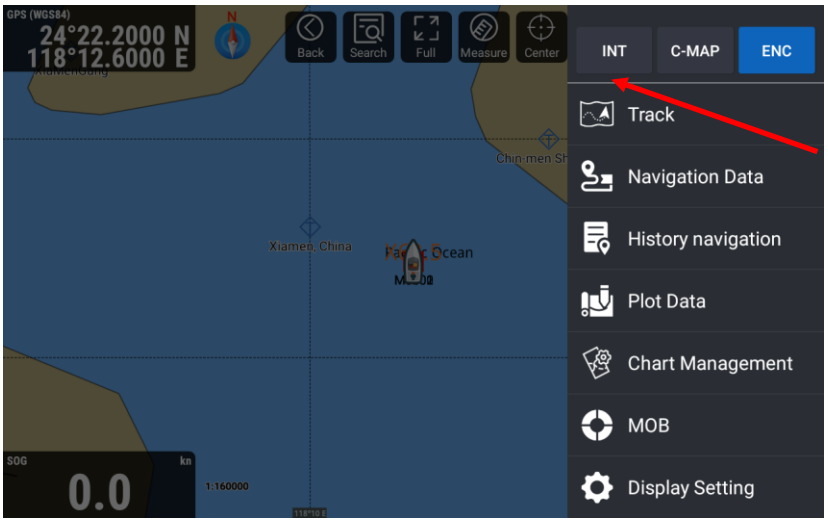
Instruction of ENC MAP installation

Note: Instruction of S-57 map installation (Note: Unless to be functioned, click [Skip] to proceed.)

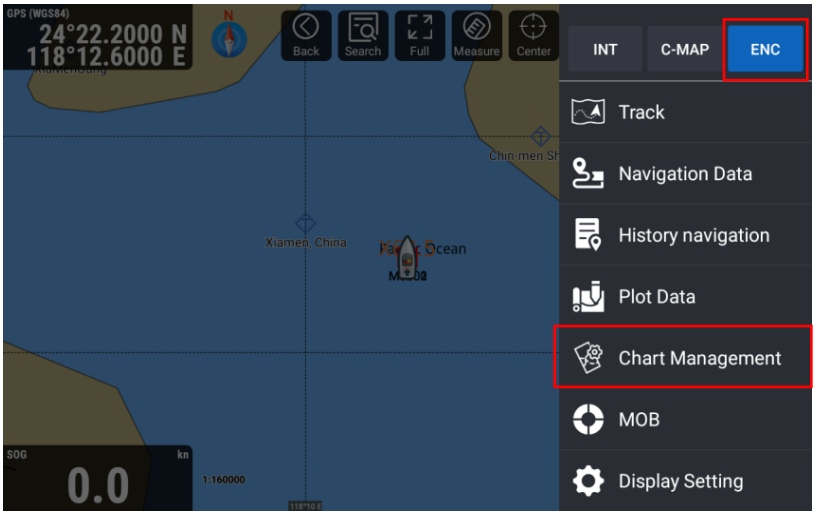
a) Click [Chart] on the [HOME] page to enter the Chart page.

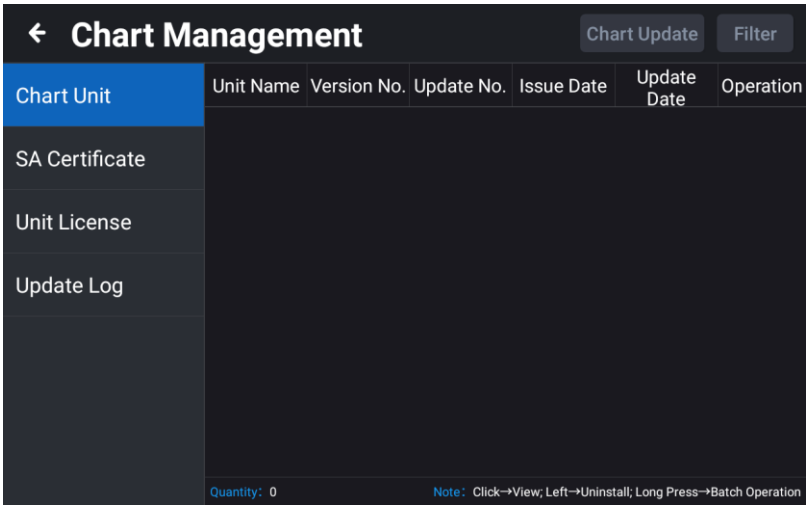


b) Swipe left from the right edge of the screen or press the [MENU] button (KSD-1100) to call up the main menu.

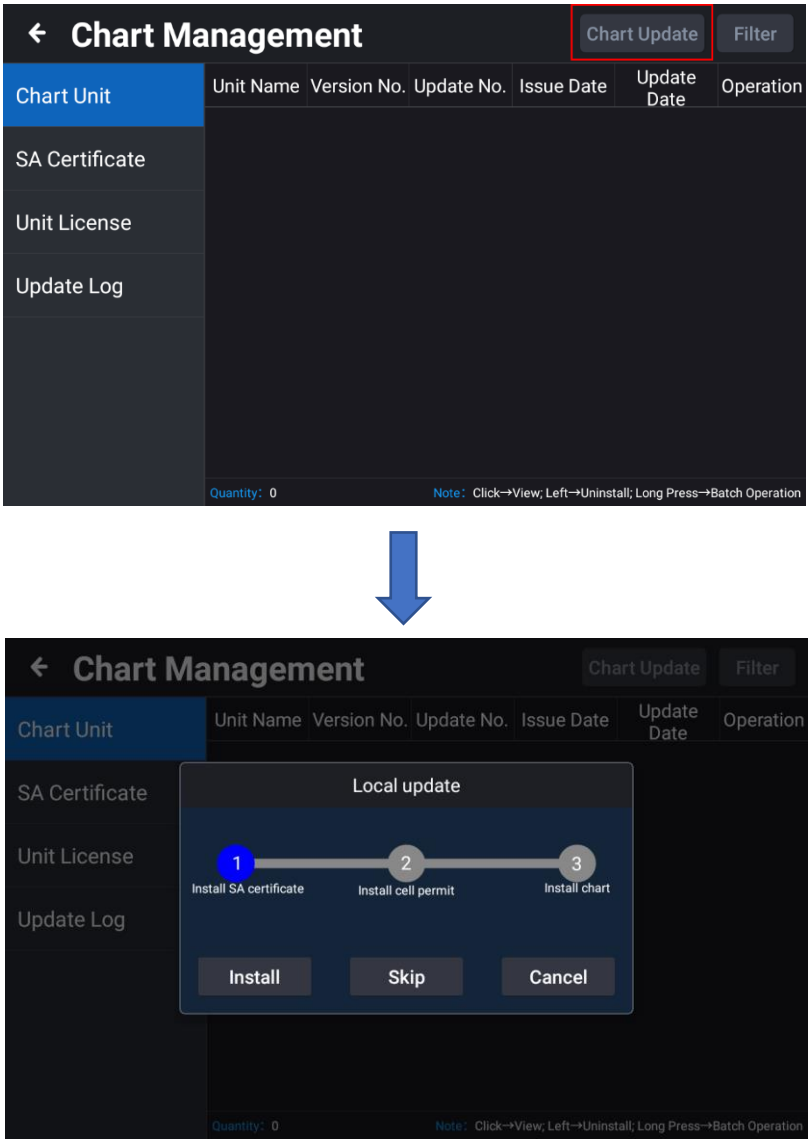


c) Click [ENC] → click [Chart Management] to enter the page of Chart Management.

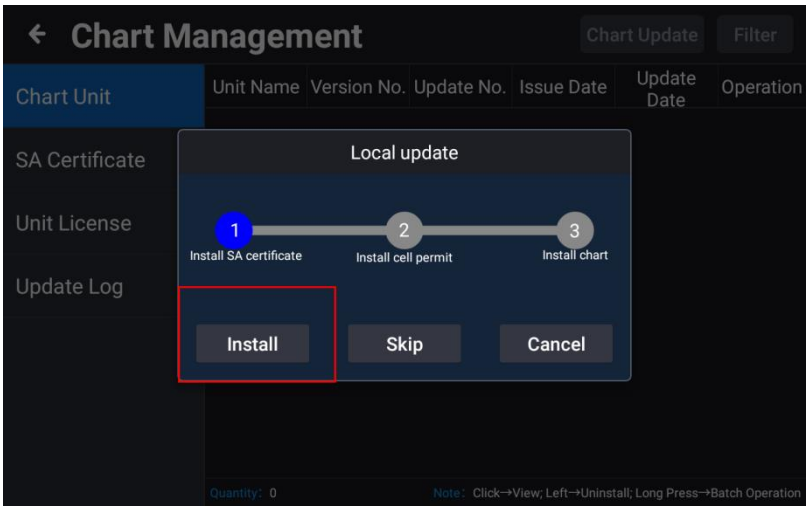




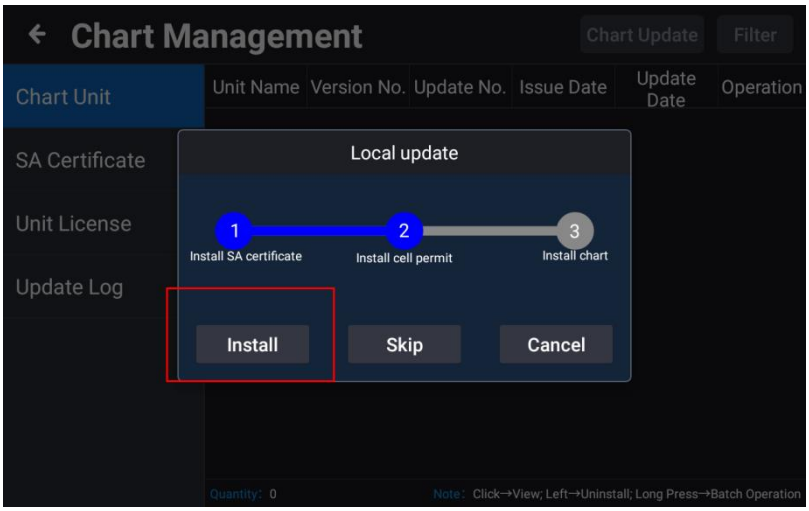
d) Click [Chart Update] to pop up the [Local Update] window.



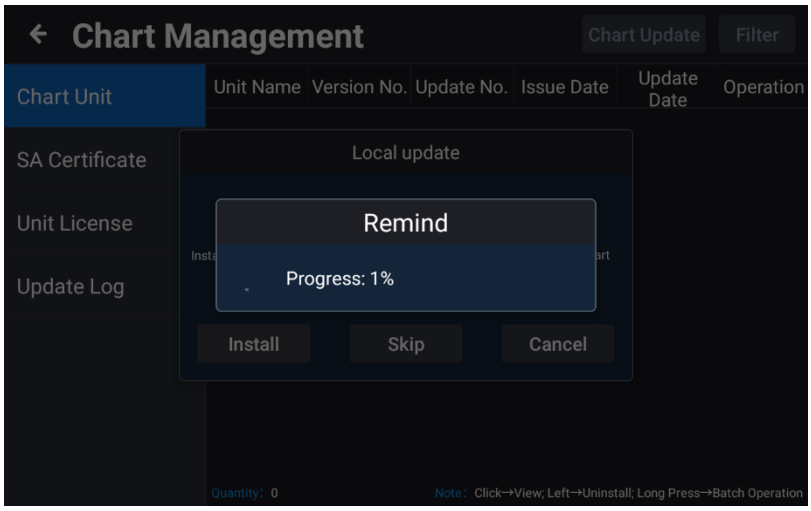
e) Click [Install] to install the SA certificate.



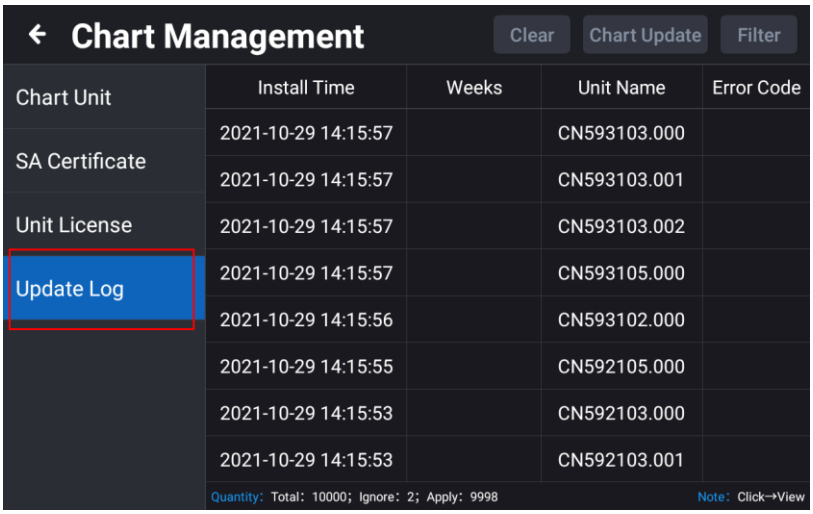
f) After the SA certificate is installed, click [Install] again to install unit license.



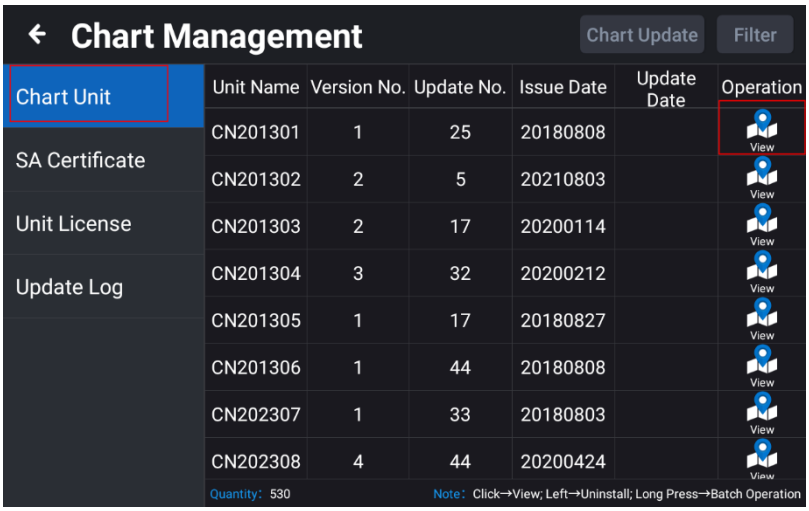
g) After the unit license installation is complete, click [Install] again to install the chart.

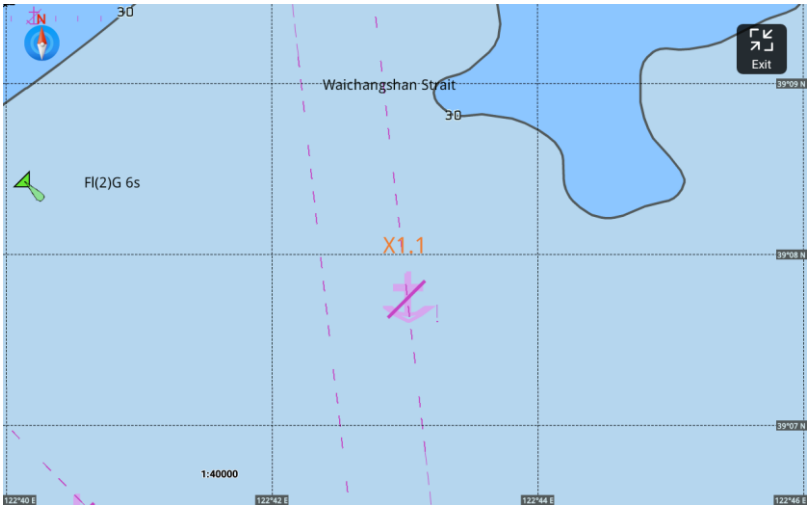


h) After the installation is completed, click [Update Log] to view the information of update logs.



i) In the [Chart Unit] page, click [View] to jump to the [CHART] page to view the chart details.





2.3.2.2 Track

Click [Track] to enter the track list. For specific operation, refer to the “2.10 Track”.

2.3.2.3 Navigation Data

Click [Navigation Data] to enter the navigation data list. For specific operations, refer to “2.8 NAVI Data”.

2.3.2.4 History navigation

Click [History Navigation] to enter the history navigation list. For details, refer to “2.8.2 History NAVI”.

2.3.2.5 Plot data

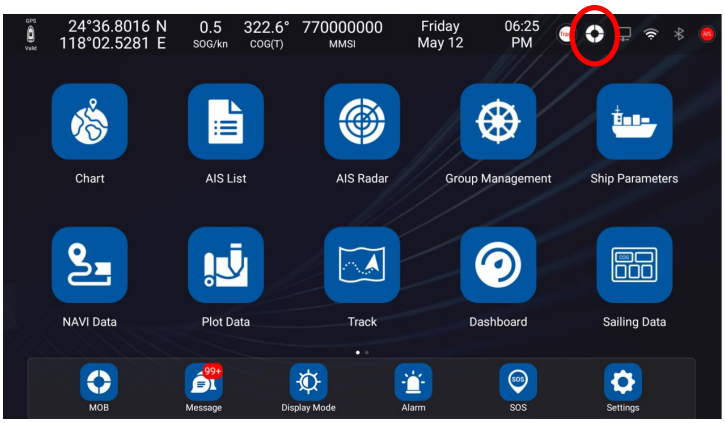
Click [Plot Data] to enter the list of plotting data. For details, refer to “2.9 Plot Data”.

2.3.2.6 MOB

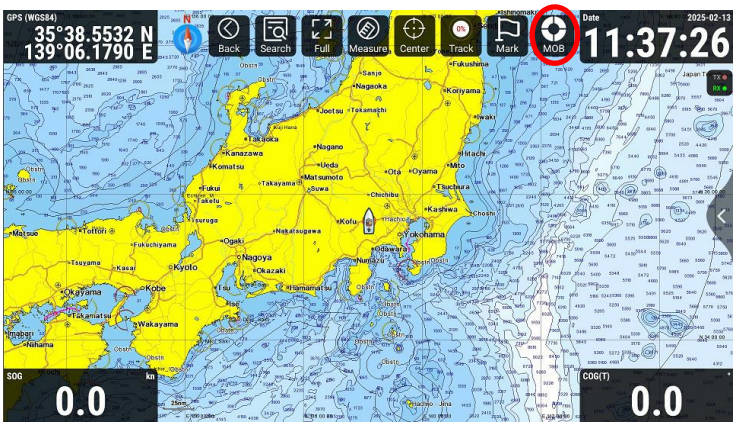
[1] Click [MOB] to enter the MOB list, refer to “2.13 MOB” for details.

[2] For KSD-1100: Press the [MOB SOS] key to quickly add a MOB point at the current ship position.

For KSD-1210: Press the [MOB] icon in upper right on [HOME] page or [CHART] page to quickly add a MOB point at the current ship position.



[MOB] icon on [HOME] page of KSD-1210



[MOB] icon on [CHART] page of KSD-1210

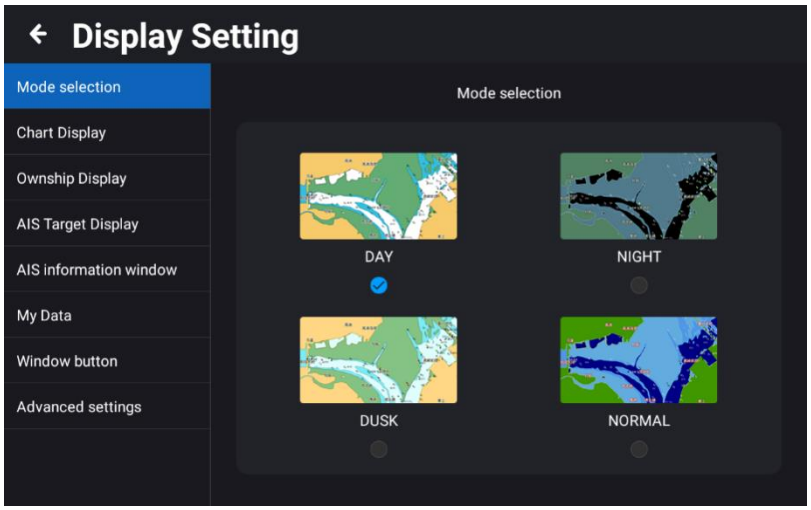
2.3.2.7 Display setting

Click "Display Setting" to enter the display settings page, you can choose the mode, such as mode selection, Chart Display, Ownship Display, AIS Target Display, AIS information window, My data, Window button and Advanced settings.

2.3.2.7.1 Mode selection

Click "Mode Selection" to set the chart display mode, and choose day, night, dusk and other modes.

Note: Mode selection items depend on the type of chart selected.



For INT map is selected

2.3.2.7.2 Chart display

2.3.2.7.2.1 INT map is selected

Click "Chart Display" to enter the display setting page of the chart screen.

[1] Chart direction: Set the chart direction to North up, Heading/Course up, and Route up.

[2] Tide Station Display: Provide on / off selection for setting, if set to on, the tide station can be displayed on the chart.

[3] Water depth mark: Provide on / off selection for setting. If set to on, the water depth line will be displayed on the chart.

[4] Fishing area: Provide on / off selection for setting, if set to on, the fishing area will be displayed on the chart.

[5] Latitude-longitude grid display: Provide on / off selection for setting. If set to on, the latitude and longitude grid lines are displayed on the chart.

[6] Compass overlay: Provide on / off options for setting, if set to on, overlay compass is displayed on the chart.

[7] Text size of place names: Set the font size of the place names displayed on the chart, small, medium and large are available.

[8] Hazard display: Hazard display switch, the display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[9] Subsea obstruction: Subsea obstruction display switch, the display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[10] 10m depth contour: 10m depth contour display switch, display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[11] 20m depth contour: 20m depth contour display switch, display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm /0.5nm.

[12] Miscellaneous line display: Miscellaneous line display switch, the display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[13] The line aids to navigation: Navigation indicator line display switch, the display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[14] Boundary: Boundary display switch, display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[15] Cable: Cable display switch, display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[16] Oil and gas pipeline: Oil and gas pipeline display switch, the display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[17] Yangtze lane: Channel display switch, display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

[18] Color filled between the depth contour: The display content of the water depth area can be set, low water line, 2.5 depth contour, 5 depth contour.

[19] Color filled between the depth contour display: Water depth area display switch, display level can be set, close / 2nm / 1.25nm / 1nm / 0.75nm / 0.5nm.

2.3.2.7.2.2 C-MAP is selected

Click "Chart Display" to enter the display setting page of the chart screen.

[1] Chart direction: Set the chart direction to North up, Heading/Course up, and Route up.

[2] Tidal Station Display: Provide on / off selection for setting. If set to on, the tide station can be displayed on the chart.

[3] Latitude-longitude grid display: Provide on / off selection for setting. If set to on, the latitude and longitude grid lines are displayed on the chart.

[4] Road: Provide on / off options for setting. If set to on, roads are displayed on land.

[5] Satellite Image Overlay: Provide on / off options for setting. If set to on, satellite images are superimposed on the chart.

[6] Object Info Window

Provide on / off options for setting. If set to on, object info window is displayed on the chart.

[7] Compass overlay: Provide on / off options for setting. If set to on, overlay compass is displayed on the chart.

[8] Text size of place names: Set the font size of the place names displayed on the chart, small, medium, and large are available.

2.3.2.7.2.3 ENC is selected

Click "Chart Display" to enter the display setting page of the chart screen.

[1] Chart direction: Set the chart direction to North up, Heading/Course up, and Route up.

[2] Tidal Station Display: Provide on / off selection for setting. If set to on, the tide station can be displayed on the chart.

[3] Latitude-longitude grid display: Provide on / off selection for setting. If set to on, the latitude and

longitude grid lines are displayed on the chart.

[4] Compass overlay: Provide on / off options for setting. If set to on, overlay compass is displayed on the chart.

[5] Solid line length of beacon sector: Provide on / off options for setting. If set to on, a long irradiation range line is displayed. If set to off, the irradiation range line is displayed short.

[6] Highlight in shallow water: Provide on / off options for setting. If set to on, areas of shallow water on the chart are highlighted. Dangerous areas for vessels with deep drafts can be avoided.

[7] Location Quality: Provide on / off options for setting. If set to on, indicates the quality or reliability of location information.

[8] Small scale filtering: Provide on / off options for setting. If set to off, detailed information of the land on the chart is displayed.

[9] Point symbol: Provide Simplified / Paper chart options for setting. If set to Simplified, the symbol is displayed in simpler shapes. If set to Paper chart, the symbol will be displayed in the shape shown on the chart.

[10] Area boundary symbol: Provide Plain / Symbolized options for setting. If set to Symbolized, boundaries of specific areas such as port or marine parks are emphasized.

[11] Depth shade: Provide Two colors / Four colors options for setting. If set to Four colors, the color tone of depth is expressed in four colors. If set to Two colors, the color tone of depth is expressed in two colors.

[12] Deep water contour: This function is to display the deep depths than the water depth contours on the chart close to the set value in white in day mode and in black in other modes.

This function is effective when Depth shade is Four colors.

[13] Shallow water contour: This function is to display shallower depths in blue than water depth contours on the chart that are close to the set value. However, if it is set deeper than the safe contour line, it will not be displayed. This function is effective when Depth shade is Four colors.

[14] Safety Contour: This function is to display the water depth contours on the chart that are close to the set value as thick lines, while shallow water depth areas are highlighted in light blue. This is useful when navigating vessels with deep drafts.

[15] Safe depth line: This function is to highlights shallows by filling in light blue circles around areas with depth values shallower than the set value. This is useful when navigating vessels with deep drafts.

2.3.2.7.3 Layer Management

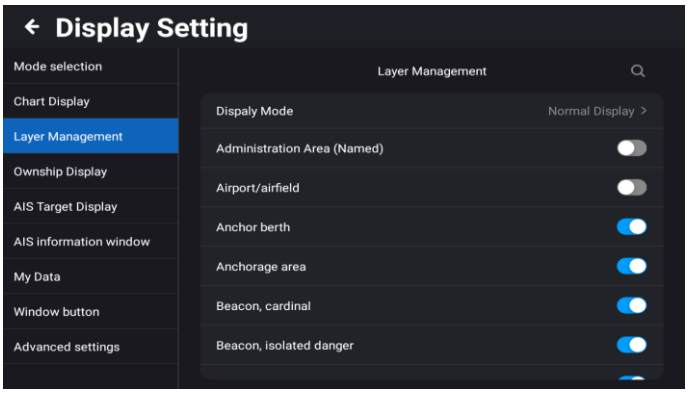
Click “ENC” → click "Layer Management" to enter the Layer Management setting page.

[1] Display mode

Provide Base Display / Normal Display / Other Display options for setting, if set to Base Display, only the basic minimum display is selected on. If set to Normal Display, the display that is selected for base display and general display items. If set to Other Display, display will turn on all items.

[2] Individual settings (Each display item)

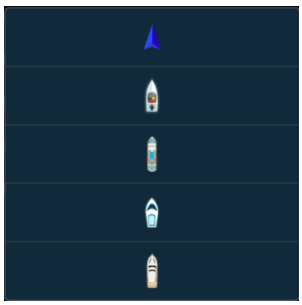
After selecting a display mode, this is to turn the display on or off individually as needed.



2.3.2.7.4 Own ship Display

Click "Ownship Display" to enter the ownship display setting page. The specific settings include the following.

[1] Ownship Symbol: The display symbol of own ship can be set, 5 styles can be set, the display symbol is shown in the figure below.



[2] Heading line: Can be set to close, the heading line display length (short, medium, long) and time position vector (1 minute position vector, 3 minutes position vector, 6 minutes position vector, 12 minutes position vector). The position vector line can be calculated according to the current speed x time.

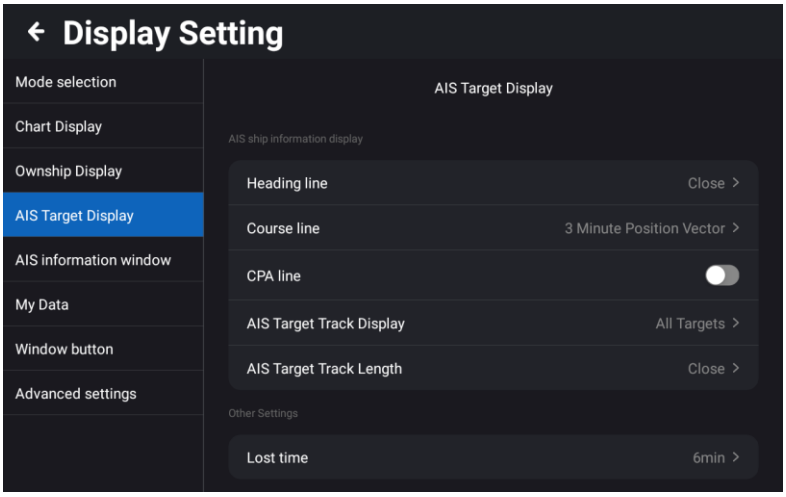
[3] Course line: Can be set to close, course line display length (short, medium, long) and time position vector (1 minute position vector, 3 minutes position vector, 6 minutes position vector, 12 minutes position vector). The position vector line can be calculated according to the current speed x time.

[4] Position tracking: Provide on / off selection for setting. If set to on, the ship position can be displayed on the screen according to the setting item of [Display Position].

[5] Refresh position: When [Position tracking] set to on, provide Center of the screen / One third from the edge screen for selection settings. When select screen center, refresh the position of the ship in the center of the screen every 10 seconds. When select one third from the edge screen, when the ship sails out of the screen, automatically adjust the position of the ship in the forward direction of the ship one third from the edge screen position.

2.3.2.7.5 AIS Target Display

Click "AIS target display" to enter the AIS target display setting page, with details as shown in the figure below.



[1] Heading line (HDT): Choose to turn off the heading line display and set the display length (short, medium, long) and time position vector line (1 minute position vector, 3 minutes position vector, 6 minutes position vector, 12 minutes position vector, 24 minutes position vector). The time position vector line refers to the expected walking length within the set time.

[2] Course line (COG): Choose to turn off the bow line display and set the display length (short, medium, long) and time position vector line (1 minute position vector, 3 minutes position vector, 6 minutes position vector, 12 minutes position vector, 24 minutes position vector).

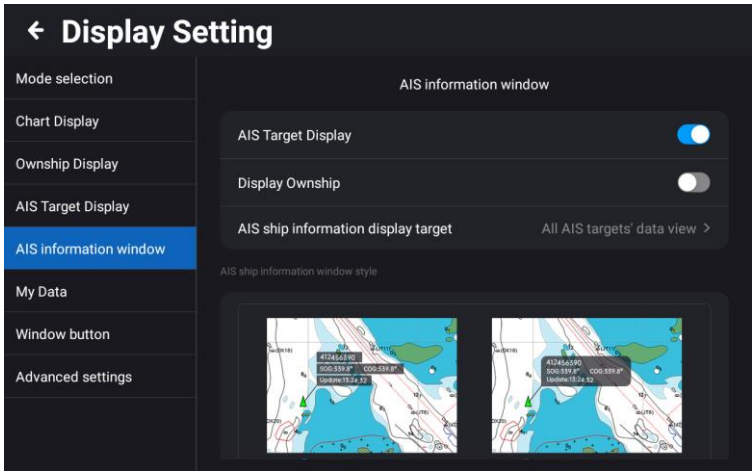
[3] CPA line: Turn on or off the display of the CPA line between the ship and the target ship.

[4] AIS Target Track Display: The targets for displaying trails can be set to all targets, Class A targets, Class B targets, and Favorite AIS targets.

[5] AIS Target Track Length: AIS target track length can be turned on or off and the display duration can be set. The display duration can be set to 3 minutes, 6 minutes, 12 minutes or 24 minutes.

[6] Lost time: If the AIS vessel does not update the information within the set not updated blanking time, the vessel will be automatically blanked from the chart and the list. The duration can be set to 6 minutes or 12 minutes.

2.3.2.7.6 AIS information window



[1] AIS target display: provide on / off for selection settings. And set to display or hide all AIS ships on the chart.

[2] Display Ownship: provide on / off for selection settings, if set to on, display own ship's AIS information

[3] AIS ship information display target: All off (Close display) / Set to All AIS targets' data view, Class A targets' data view, Class B targets' data view, Targets' data view that may encounter, Favorite targets' data view.

[4] AIS ship information window style: Bar Display Window and Card Display Window can be set.

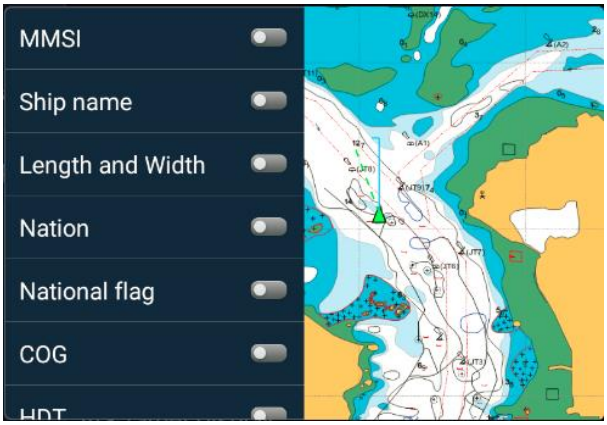
[5] AIS ship information display mode: Specific display modes can be selected, including Custom, Auto and Simplified display.

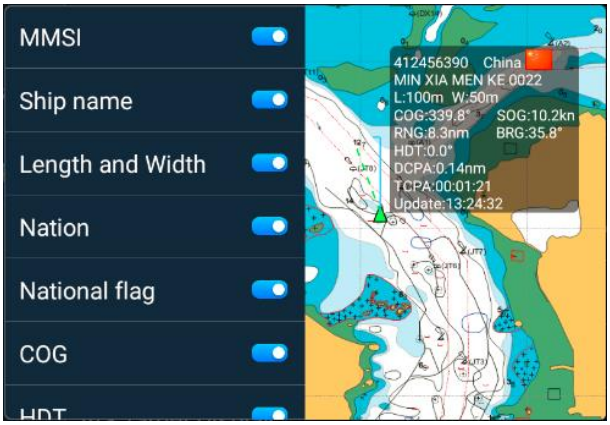
Custom display mode: self-definable display AIS information display content

Auto display: according to the size of the display window adjusted to streamline the display of ship name, course and speed

Simplified display: only display the name and speed of the ship

[6] Information display content: The information display content is displayed only when the AIS ship information display mode is set to the custom mode. The display contents can be selected, including MMSI, Ship name, Nationality, National flag, Course, Heading, Bearing, Speed, Distance, DCPA, TCPA, and latest update.





2.3.2.7.7 My Data

Click "My Data" to enter the My Data Settings page. The specific settings are shown below.

[1] NAVI Data Display Scale: Set the navigation data to display the level and switch on the chart.

INT Map and C-MAP setting items: Close / 25nm / 10nm / 5nm / 2nm / 1nm / All.

ENC setting items: Close / 1:160000 / 1:80000 / 1:40000 / 1:20000 / 1:10000 / All

[2] NAVI Data Display contents: Set navigation data to display symbols, names, symbols, and names on the chart. Setting items, Symbol / Symbol & Id / Symbol & Name / Symbol & Id & Name.

[3] Track Display Scale: Set the track display level and master switch on the chart.

INT Map and C-MAP setting items: Close / 25nm / 10nm / 5nm / 2nm / 1nm / All.

ENC setting items: Close / 1:160000 / 1:80000 / 1:40000 / 1:20000 / 1:10000 / All

[4] Track Display contents: Track display content, set the track to display symbols, names, symbols and names on the chart. Setting items, Symbol / Symbol & Id / Symbol & Name / Symbol & Id & Name.

[5] Plot Data Display Scale: Plotting data display level, set the plotting data display level and switch on the chart.

INT Map and C-MAP setting items: Close / 25nm / 10nm / 5nm / 2nm / 1nm / All.

ENC setting items: Close / 1:160000 / 1:80000 / 1:40000 / 1:20000 / 1:10000 / All

[6] Plot Data Display contents: Set the plotting data to display symbols, names, symbols, and names on the chart. Setting items, Symbol / Symbol & ID / Symbol & Name / Symbol & ID & Name.

2.3.2.7.8 Window button

Open or close the [CHART] page window buttons, including Upper left data information window, Upper right data information window, Lower left data information window, Lower right data information window, Search, Full, Measure, Center, Track and TX/RX signal indicator.

2.3.2.7.9 Advanced settings

[1] Cursor View content: Including data info operation items and operation items. When "Data Information and Operation Items" is selected, the selected data number and name and operation item cursor information will be displayed when operating on the chart. When "Operation items" is selected, when operating on the cursor on the chart, only the operation items are displayed, and the number and name are not displayed.

[2] Cursor Auto Hide: The time for automatically hiding the chart cursor can be set, including Never, 10 seconds, 30 seconds, and 60 seconds for setting.

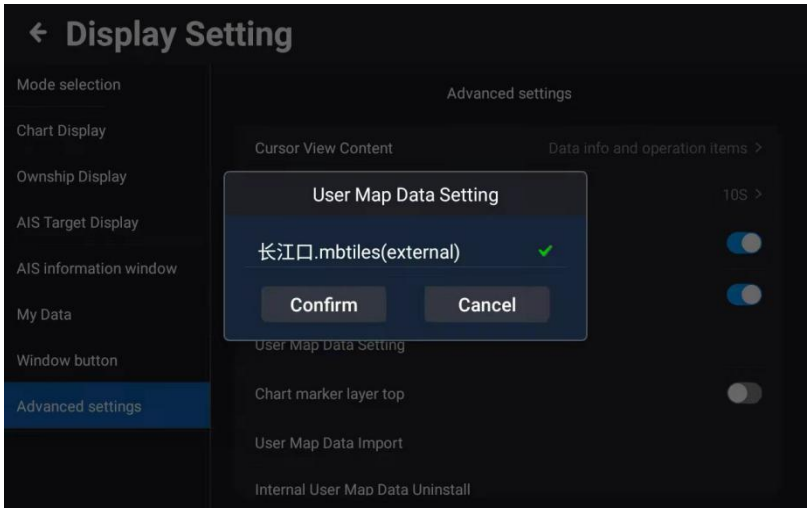
[3] Cursor Line Display: After the cursor line is closed, the connection line between the ship and the cursor will not be displayed.

[4] User Map Display: User map display switch.

[5] User Map Data Setting: User map data can be imported according to user's requirements. User can choose to use map of data which is imported to equipment or use microSD card map data directly.

Copy the mbtiles format file of the user map to the microSD card, insert it into the microSD card slot, click [user map data setting] to select the layer file, and click [Confirm] to display the layer on the

[INT-MAP] chart.



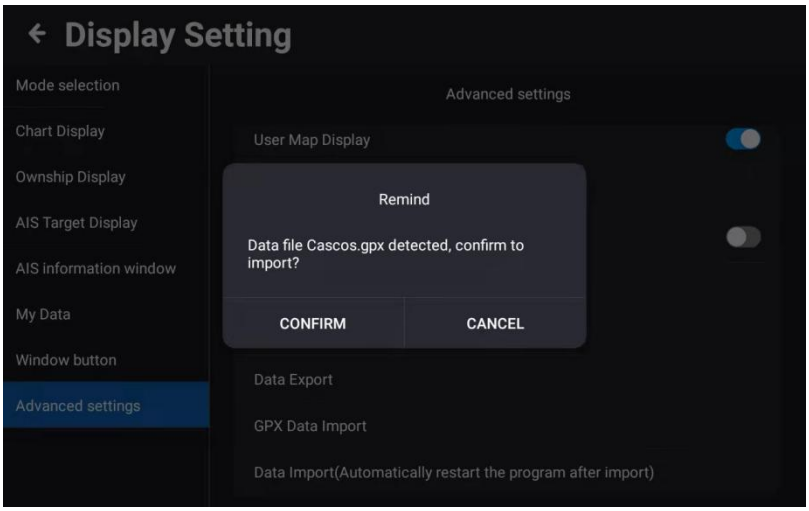
[6] Chart Marker Map Top: When the user map display is turned on, turn on the nautical chart object map top switch to display the nautical chart object icon on top of the user map.

[7] User Map Data Import: Click "user map data import" to select the map file and click "Confirm" to import the map file into the terminal

[8] Internal User Map Data Uninstall: You can choose to uninstall the user map data imported into the device.

[9] Data Export: The user data can be exported to the storage device, the exported user data can be imported to another Multi Function Display, and the exported user data file is in DB format.

[10] GPX Data Import: User data in GPX format is imported to the terminal.



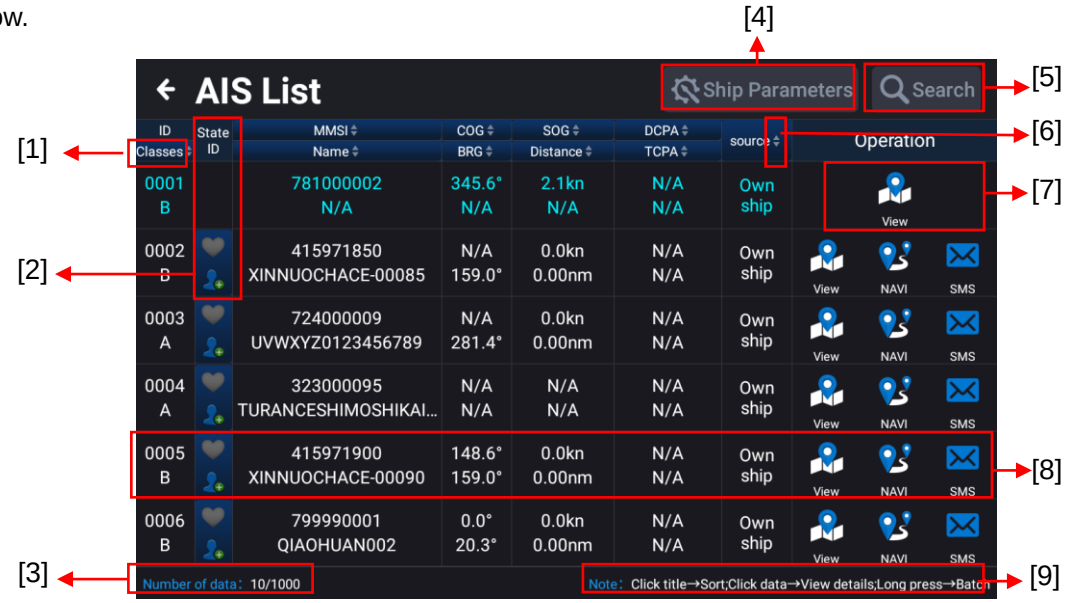
[11] Data Import (Automatically restart the program after import): Importing user data in. DB format exported by other Multi Function Display terminals requires restarting the terminal to take effect.

Note: KSD-1210 (21 inch) can use the cursor function by connecting a USB mouse.

2.4 AIS List

2.4.1 AIS list page

On the [HOME] page, click [AIS List] to enter the AIS List page. The details are shown in the figure below.



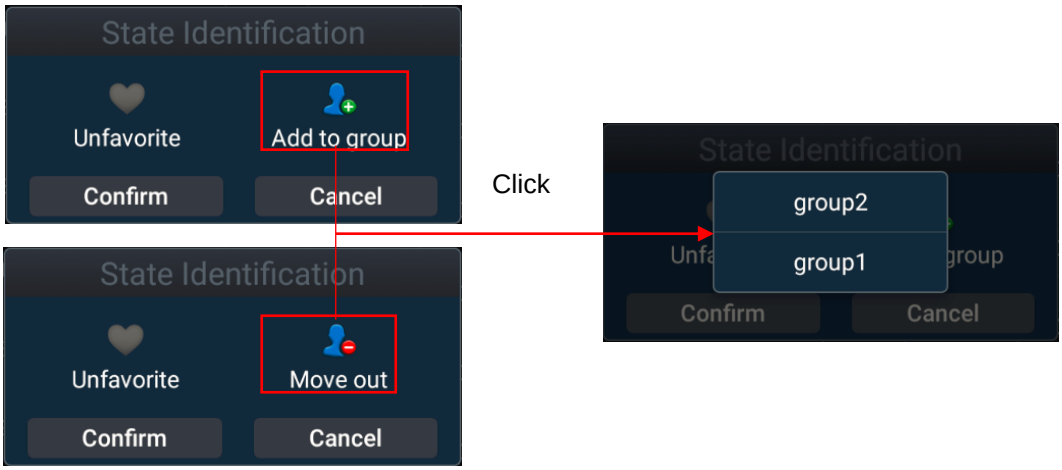
[1] ID and Classes

Click [Classes] to sort by category A, category B, base station, or navigation aids.

[2] State ID

(A) Click the heart icon, the heart icon of the current ship turns red, and the current ship will move to the top of the list.

(B) Click the portrait icon, the status operation information serial port as shown below will pop up and click [Add to group] or [Move out] to select the name of the group. Click [Confirm] to add or remove the current vessel from the group. Refer to “2.6 Group Management” for specific management operations.



[3] Number of data

Display the quantity of AIS data. The AIS list can hold up to 1000 ships.

[4] Ship parameters

Click [Ship Parameters] to enter the static parameter settings.

[5] Search

Click [Search] to enter keywords such as MMSI or ship name in the input box. You can search for ships in the AIS list.

[6] Sort

Click [Classes], [MMSI], [Name], [COG], [BRG], [SOG], [Distance], [DCPA], [TCPA], [Source] in turn, the list can be switched from top to bottom or sort from bottom to top.

Note: You can only choose one sort, not multiple choices.

[7] Operation

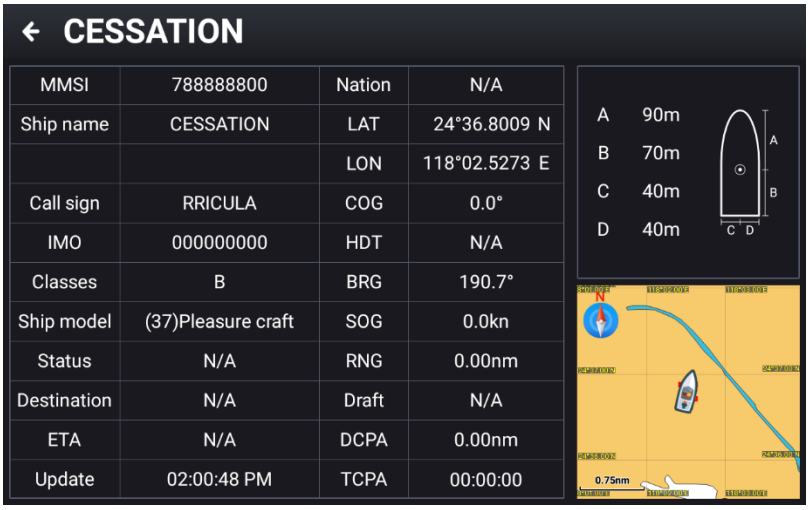
(a) NAVI: Select a ship and click the [NAVI] icon to open the chart and use the ship's position as the navigation destination.

(b) SMS: Select a ship and click the [SMS] icon to open the AIS short message window to send AIS short messages to the ship.

(c) View: Select a ship and click the [View] icon to open the chart and switch to the position of the currently selected ship.

[8] Data Information Window

Click the data information corresponding to any ship to view the detailed information of the ship, as shown in the figure below.

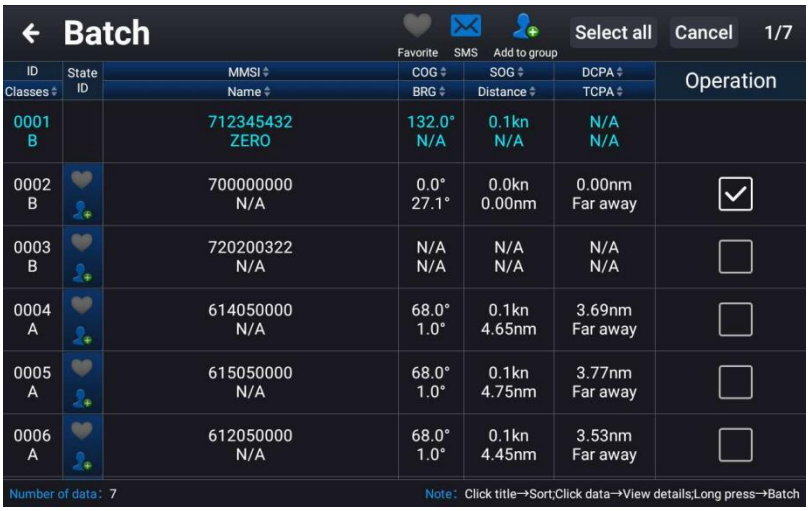


[9] Note

(a) Click title; AIS list can be sorted.

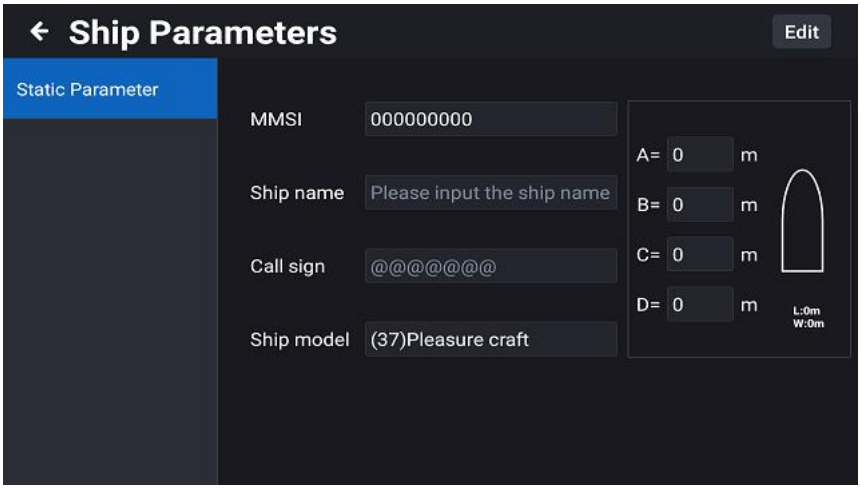
(b) Click data; Click the data window corresponding to a ship in the list to view the detailed information of the currently selected ship.

(c) Long press; Long press the data corresponding to a certain ship in the list, as shown in the following figure, you can batch follow the list of ships, send AIS short message, add the group, follow, etc.



2.4.2 Ship Parameters

On the AIS list page, click [Ship Parameters] to enter the static parameter settings.



There are contained the ship's MMSI, ship name, call sign, ship model (see Table 2.1 for specific ship type description), captain (sum of A and B) and ship width (sum of C and D). The distance A indicates the distance from the bow to the position of the GPS antenna. The distance B indicates the distance from the stern to the position of the GPS antenna. The distance C indicates the distance from the port to the position of the GPS antenna. The distance D indicates the distance from the starboard to the position of the GPS antenna.

Note: MMSI can only be set once. Do not input the wrong number.

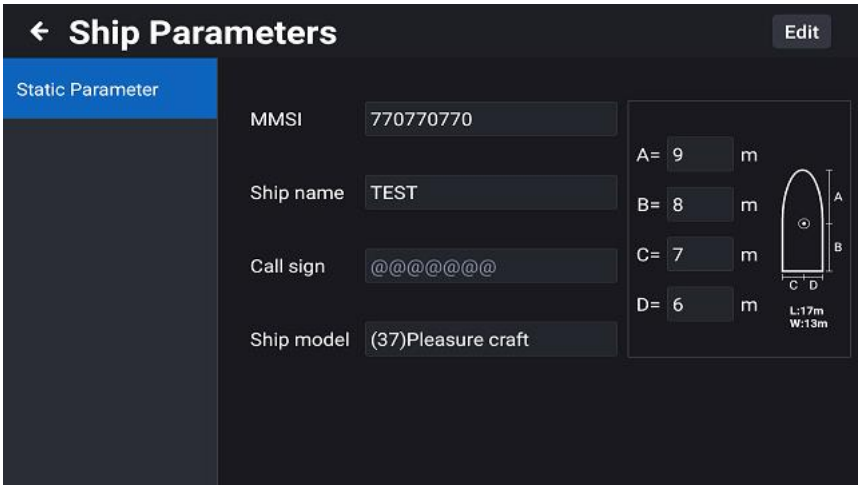


Table 2.1 Ship type description

number	ship model	number	ship model	number	ship model
0	Undefined	41	Hazardous HSC X	63	Hazardous Passenger ships Z
20	WIG	42	Hazardous HSC Y	64	Hazardous Passenger ships OS
21	Hazardous WIG X	43	Hazardous HSC Z	70	Cargo ships
22	Hazardous WIG Y	44	Hazardous HSC OS	71	Hazardous cargo X
23	Hazardous WIG Z	50	Pilot Vessel	72	Hazardous cargo Y
24	Hazardous WIG OS	51	Search And Rescue Vessel	73	Hazardous cargo Z
30	Fishing Vessel	52	Tugs	74	Hazardous cargo OS
31	Towing Vessel	53	Port tenders	80	Tanker
32	Towing Vessel L>200m B>25m	54	With anti-pollution equip	81	Hazardous Tanker X
33	Dredge or underwater operation	55	Law enforcement vessel	82	Hazardous Tanker Y
34	Vessel-diving operation	58	Medical Transport	83	Hazardous Tanker Z
35	Vessel-military operation	59	Ships and aircraft of States not parties to an armed conflict	84	Hazardous Tanker OS
36	Sailing vessel	60	Passenger ships	90	Other types of ship
37	Pleasure craft	61	Hazardous Passenger ships		
40	HSC	62	Hazardous Passenger ships		

2.5 AIS Rader

On the [HOME] page, click [AIS Radar] to go to AIS radar page, as shown in Figure 2.10 below. The AIS radar page displays four distance marking circles fixedly, and the field of view can be adjusted by zooming in or out.

Figure 2.10 AIS radar display page

[1] Back to [HOME] button: Click to back to the [HOME] page.

[2] Field of view data information window: Display the range circle, the size of the field of view and the total number of AIS targets in the field of view.

[3] Number of AIS targets: Click this button to quickly jump to the AIS list, the display number is the total number of AIS targets received by the device.

[4] Setting: Click this button to independently control the display of the heading line, course line and AIS target track length on the AIS radar page. For the specific parameter values, please refer to 2.3.2.7.4 “AIS Target Display”.

[5] Zoom in / out button of range circle: Click the [+] / [-] buttons to zoom in / zoom out to adjust the field of view, providing eight levels of 2nm, 5nm, 10nm, 15nm, 20nm, 30nm, 40nm and 50nm the field of view can be adjusted.

[6] Own ship data display window: Display the own ship's latitude and longitude, COG, HDT, SOG and other data.

[7] AIS target display window: Displays AIS targets within the field of view, specific details are as follows.

(a) This window displays the CPA line with the most dangerous ship that may be encountered. If the cursor selects the AIS target that may be encountered, the corresponding CPA line will be drawn simultaneously for reference.

(b) This window will flash the AIS target that is currently alarming.

(c) If the area alarm switch is turned on, the area alarm circle will be drawn in synchronization with the own ship's position in this window.

[8] AIS target number information display window: Contains A-type targets, B-type targets, base stations, mobile base stations, navigation aids, current alarm targets, and the number of online members of the group.

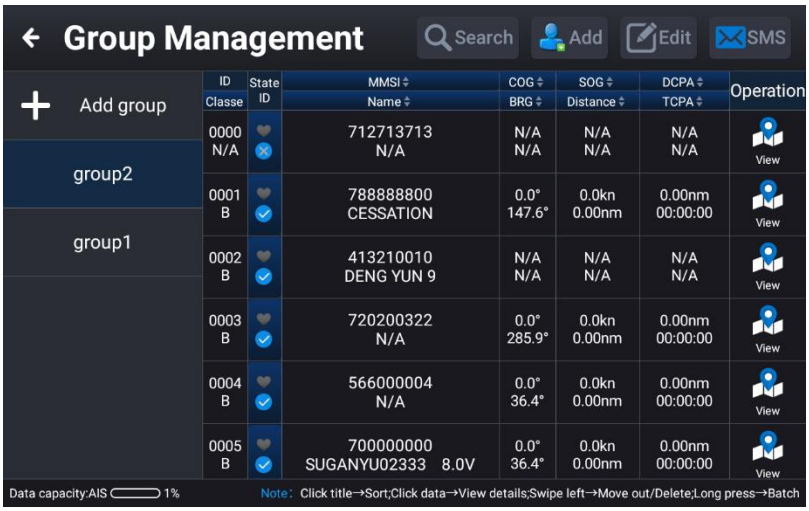
[9] AIS target data information bar: Displays detailed information such as static data and navigation data of the selected AIS target, if there is no selected AIS target, the display is empty.

[10] Selected AIS target operation bar: Contains the related operations of navigation, favorite, joining a group, and short messages. For details of the operation, see the 2.4.2 ship parameter setting section, if no AIS target is selected, the corresponding AIS operation menu button will be grayed out Clicked to use.

[11] Azimuth adjustment: Select and display the upward direction of the AIS radar screen from North up, Heading/Course Up, and Route Up. By matching it with the chart screen, the position of the AIS target becomes easy to understand.

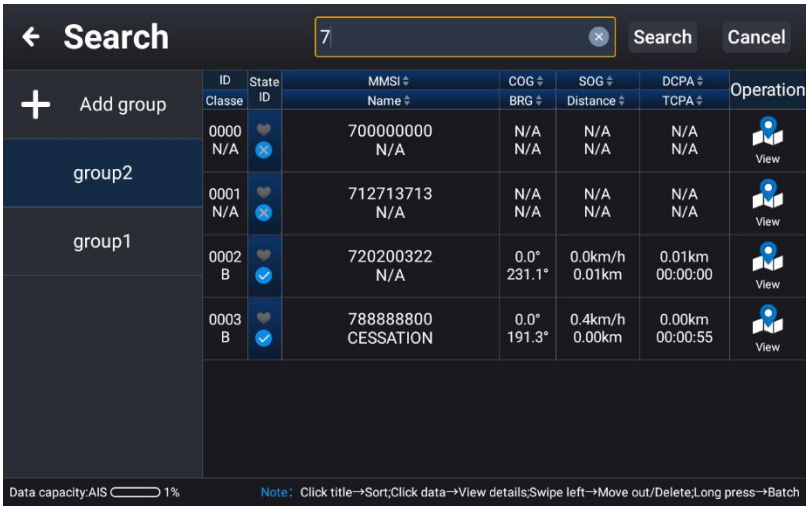
2.6 Group Management

Click [Group Management] to enter the list of group management, as shown below. Group management can monitor the dynamics of ships, and the group management list can hold up to 100 groups. The total number of ships in all groups can support up to 1000.



[1] Search

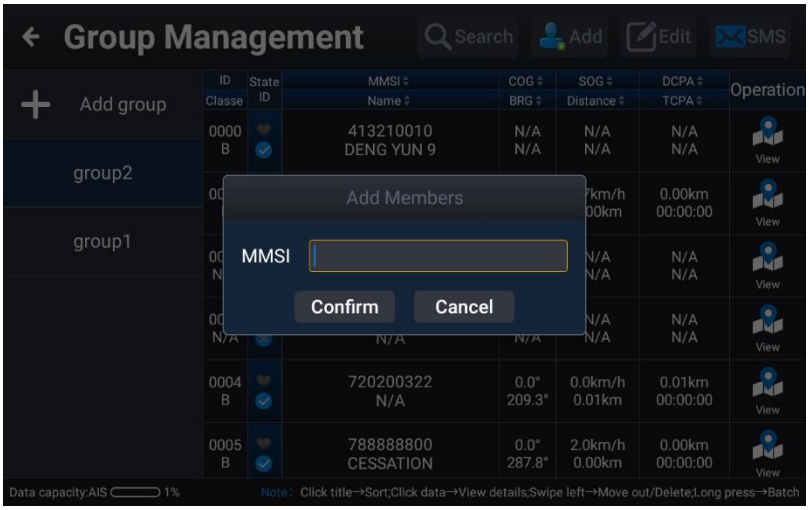
Click [Search], enter MMSI or ship name and other keywords in the input box to search for ships in the group.



[2] Add

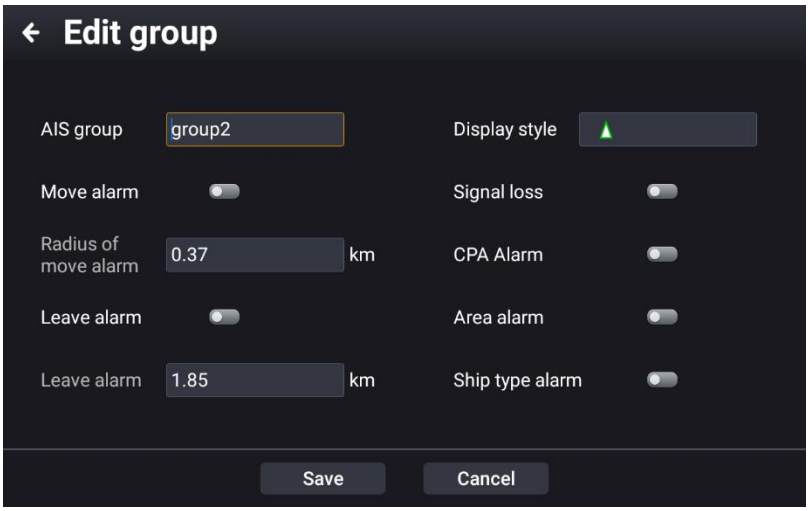
Click [Add], select [AIS list] or [Manual input]. Select AIS list to add, open the AIS list and select the corresponding vessel to add to the fleet.

Manual input: Pop up the add member window to enter the MMSI of the corresponding vessel. Click [Confirm] to complete the addition.



[3] Edit

Click [Edit] to edit the group information, including the Group name / Display style / Move alarm (shift alarm circle) / Leave alarm (leave alarm circle) / Signal loss alarm / CPA alarm / Area alarm / Ship type alarm. Please refer to 2.17.2 “AIS Alarm” for details of alarm setting.

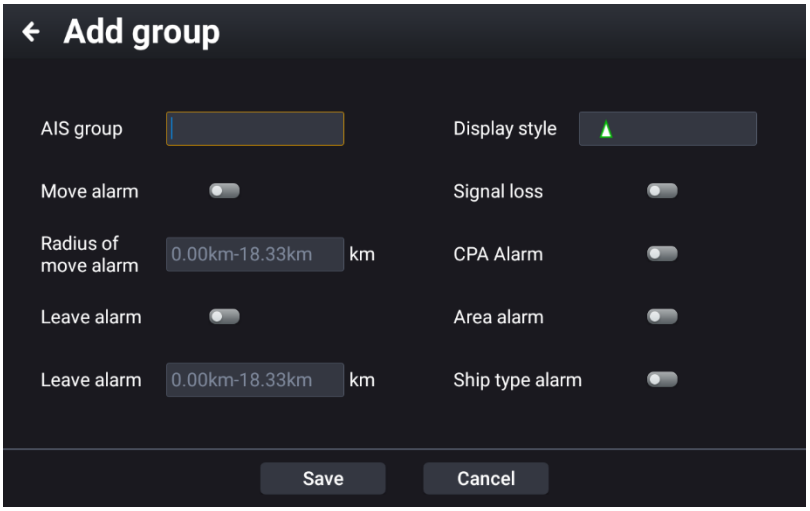


[4] SMS

Click [SMS] and select [Addressing] to send AIS short message to the corresponding vessel. Select [Broadcast] to broadcast and send AIS short message.

[5] Add group

Click [Add group] to create a new group. Enter the Name, Display style, Move alarm (shift alarm circle), Leave alarm (leave alarm circle), Signal loss alarm, CPA alarm, Area alarms, and Ship type alarm, as shown in the figure below.



(a) AIS group: Enter group name.

(b) Display style: Set the display style of the ship. After the setting is completed, all the ship of the group are displayed in the selected style on the [CHART] page.

(c) Move alarm: Turn on the move alarm switch to set the move alarm circle. Specifically taking the current position of each ship as the center and draw a circle to indicate the range of the ship's alarm circle. If any ship in the group exceeds its own alarm circle, it will trigger a move alarm. Click the move

alarm switch to reset the alarm circle.

(d) Leave alarm: Turn on the leave alarm switch to set the leave alarm circle. Specifically, draw an alarm circle around the own ship. The leave alarm is triggered when the position of a ship in the group exceeds the circle in the own alarm range.

(e) Signal loss: Turn on the signal loss alarm switch, any ship in the group does not receive the AIS signal and disappears from the chart, triggering the signal loss alarm.

(f) CPA alarm: See the CPA alarm setting in chapter 2.17.2 “AIS Alarm” CPA Alarm.

2.7 Ship Parameters

On the [HOME] page, click [Ship Parameters] to enter the own ship parameters page, including static parameters.

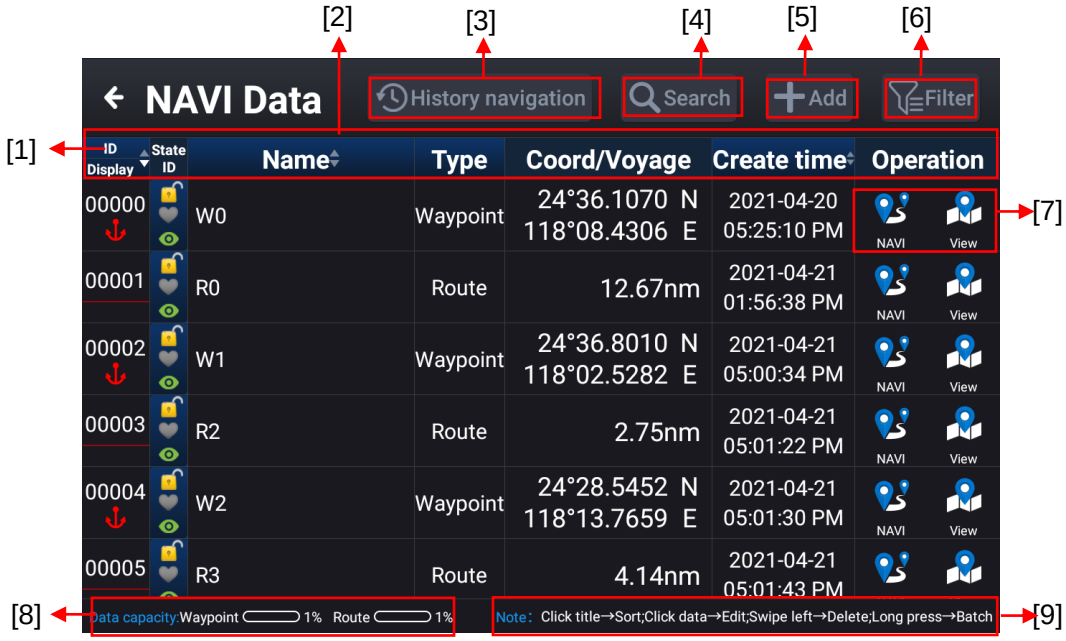
2.8 NAVI Data

2.8.1 Navi data list

There are two ways to enter the navigation list. The specific details are as follows.

Method 1: On the [HOME] page, click [NAVI Data] to enter the navigation data list.

Method 2: On the [CHART] page, click [<] mark of the screen right side or press the [MENU] button (KSD-1100). In the pop-up function menu, click [NAVI Data] to enter the navigation data list.



[1] ID Display: Display the number and style of the corresponding navigation data. Click to set the ID to sort from large to small or from small to large.

[2] Data title: ID, Status ID, Name, Type, Coord / Voyage, Create time, Operation.

(a) Click [Name] to sort by the first letter of the name.

(b) Click [Create time] to sort by creation time.

(c) Click on any row of navigation data to edit it.

[3] History Navigation: The corresponding data after navigation will be automatically saved in the [History Navigation] list.

[4] Search: Enter a number or name keyword to search for waypoints or routes

[5] Create navigation data: You can add new navigation data. For specific operation details, refer to “2.8.3 Waypoint and Route Operation” “[1] Add Navigation Data”.

[6] Filter: You can filter the data in the list by type with lock (unlock) and favorite (unfavorite) status.

[7] Navigation data operation.

(a) NAVI: Select the waypoint or route to be navigated. Click [NAVI] to jump to the [CHART] page and navigate with the current waypoint or route.

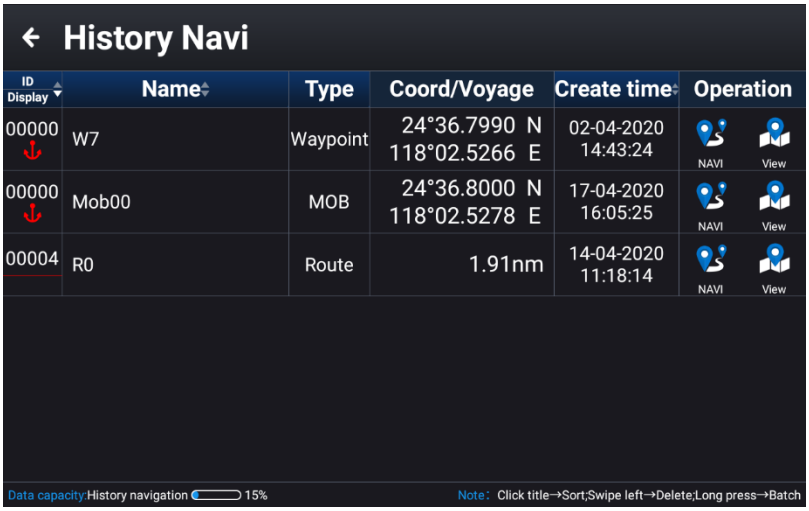
(b) View: Select the waypoint or route to be viewed. Click [View] to jump to the [CHART] page, and the current waypoint or route will be displayed in the middle of the screen.

[8] Data capacity: Shows the waypoint and route storage percentage.

[9] Operation instructions: In the operation instruction column, click the title→sort, click data→edit, swipe left→delete, long press→ batch operation.

2.8.2 History Navi

History navigation data (including waypoints, routes and MOB): The corresponding data after navigation will be automatically saved to the [History Navi] list. The details of the historical navigation list are shown below.



There are two ways to enter the history navigation list.

Method 1: On the [HOME] page, click [NAVI Data] → click [History navigation] to enter the list of history navigation list.

Method 2: On the [CHART] page, click [<] mark of the screen right side or press the [MENU] button (KSD-1100), a function item window will pop up. Click [History navigation], you can also enter the historical navigation data list.

The operation details are as follows.

[1] NAVI: Select the waypoint, route, or MOB to be navigated. Click [NAVI], the screen will jump directly

to the [CHART] page, and navigate with the currently selected waypoint, route, or MOB.

[2] View: Select the waypoint, route, or MOB to be viewed. Click [View], the screen will jump directly to the [CHART] page, and the currently selected waypoint, route or MOB will be displayed in the middle of the screen.

[3] Swipe to the left the data bar to be deleted to call up the delete button. Click [Delete] to delete the data, or long press a historical navigation data to enter the batch operation page. Multiple (all) data can be deleted in batches.

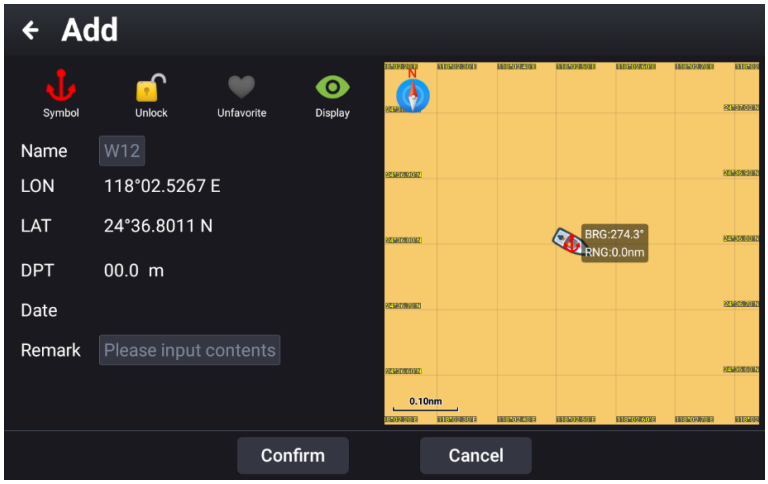
2.8.3 Waypoint and Route operation

[1] Add Navigation Data

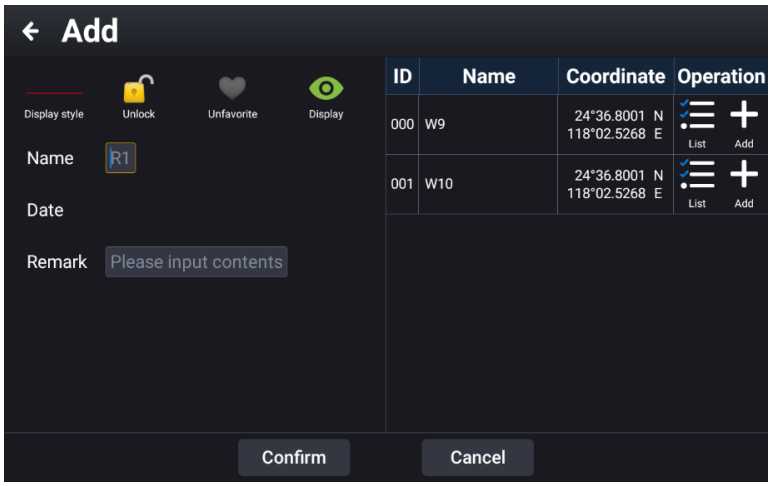
Method 1: On the [CHART] page, long press the position of the starting point of the new waypoint / route to be created. In the pop-up operation box, click the [Add] button to enter the add data state. For specific operation details, refer to “2.3.1.6 Add Waypoint” and “2.3.1.7 Add Route”.

Method 2: On the [HOME] page, click [NAVI Data] to enter the navigation data list. Click [Add] to select a waypoint or route to enter the add page. In the add page, detailed operations are as follows.

(a) Select the add waypoint and the following edit box pops up.



(b) Select the add route, the following edit box pops up. You can click [Add] to add or [List] to select a waypoint from the list to add a route.



[2] Delete navigation data

Method 1: Click on the [CHART] page to select the navigation data to be deleted. Click [Delete] in the pop-up operation box to delete the data.

Method 2: On the [HOME] page, click the [NAVI Data] button to enter the navigation data list. Swipe the data bar to be deleted to call the [Delete] button. Click the [Delete] button to delete the data.

[3] Batch edit navigation data

On the [HOME] page, click the [NAVI Data] button to enter the navigation data list. Long press the navigation data list to enter the batch operation page and select multiple or all navigation data. Then select batch Lock (Unlock), Favorite (Unfavorite), Display (Hide) or Delete to perform the operation.

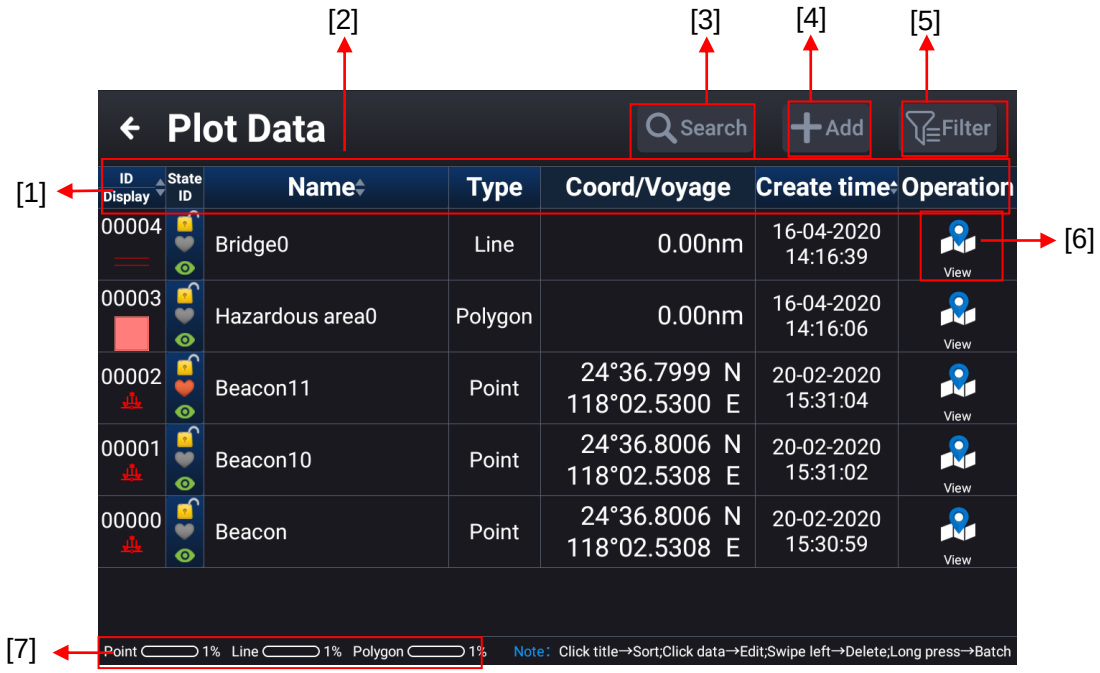
2.9 Plot Data

2.9.1 Plot data list

There are two ways to enter the plot data list.

Method 1: On the [HOME] page, click [Plot Data] to enter the plotting data list.

Method 2: On the [CHART] page, click [<] mark of the screen right side or press the [MENU] button (KSD-1100). In the pop-up function item window, click [Plot data] to enter the Plot data list.



[1] ID display: Display the number and style. Click to set ID sorting from large to small or from small to large.

[2] Data title: ID, Status ID, Name, Type, Coord / Voyage, Create time, Operation.

(a) Click [Name] to sort by the first letter of the name.

(b) Click [Create time] to sort by creation time.

(c) Click on any row of plot data to edit it.

[3] Search: Enter the number or name keyword to search the plot point / line / polygon.

[4] Add: To add plotting data, refer to “2.9.2 Plot Data Operation”

[5] Filter: You can filter the data in the list by lock / unlock, favorite / unfavorite, point / line / polygon.

[6] View: Select the point / line / polygon to be viewed, click [View] to jump to the [CHART] page. The current point / line / polygon is in the middle of the display screen.

[7] Data capacity: Display storage percentage of points / line / polygon.

2.9.2 Plot data operation

[1] Add plot data

Method 1: On the [CHART] page, press and hold the position where you want to add a new plot point, plot line start point, or plot polygon start point. Click the [Add] button in the pop-up operation box to enter the new data state. For specific operation details, refer to “2.9.2.1 Add Plot Point”, “2.9.2.2 Add Plot Line” and “2.9.2.3 Add Plot polygon”.

Method 2: On the [HOME] page, click [Plot Data] to enter the plot data list, or on the [CHART] page, click [<] mark of the screen right side, a menu item window will pop up. Click [Plot Data] to enter the Plot data list and click [Add] Select to create a plot point / plot line / plot polygon to enter the new page.

Method 3: Display the [CHART] page to add plot data directly to the own ship position. For specific operation details, refer to “2.9.2.1”.

[2] Delete plot data

Method 1: On the [CHART] page, click to select the plot data to be deleted, and click [Delete] in the pop-up operation box to delete the data.

Method 2: Enter [Plot Data] in the plot data list, swipe the data bar to be deleted to call up the delete button. Click [Delete] to delete the plot data.

[3] Batch editing plot data

Enter [Plot Data] in the plot data list, long press the plot data list to enter batch operation page and select multiple or all plot data. Then select batch Lock (Unlock), Favorite (Unfavorite), Display (Hide) or Delete to perform the operation.

2.9.2.1 Add plot point

Method 1: On the [CHART] page, select the position to add the plotting point, long press the position to open the information window as shown in figure 2.11 (a). Click [Add] in the window to open the information editing window as shown in figure 2.11 (b).

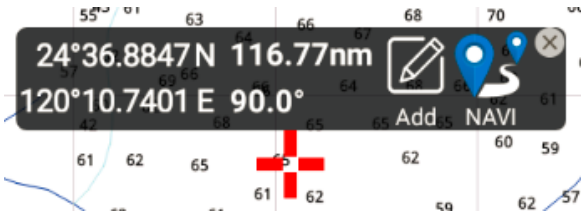


Figure 2.11 (a) Add window on chart page

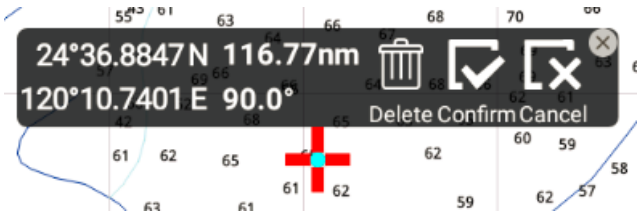


Figure 2.11 (b) Add window on chart page

[1] Click [Confirm] to enter the point editing page (as shown in Figure 2.12).

[2] Click [Delete] to exit the operation of adding plot points.

[3] Click [Cancel] to return to the location where you choose to add plot points.

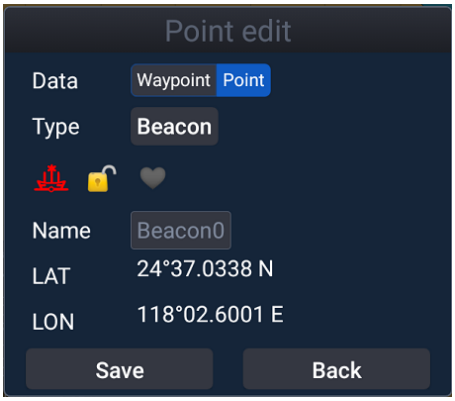


Figure 2.12 Plotting point editing window

Enter the point editing window, you can edit the newly add point, including the following contents.

[1] Data selection: Select Point.

[2] Type selection: Set Beacon, Hazard marker or Others.

[3] Symbol icon: You can set icon and color (provide 16 icons and 6 colors).

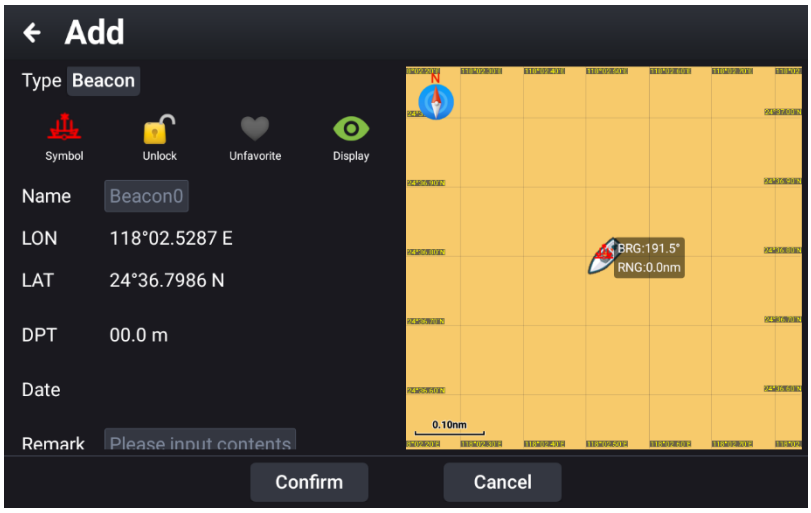
[4] Lock icon can be set to lock or unlock.

[5] Heart-shaped icon: You can set to favorite or unfavorite. The plotted point of favorite will be placed in front of the list.

[6] Name box: You can enter the name of the plot point.

[7] After editing, select [Save], the newly added plot point will be saved to the plot data list. Select [Back] to return to the [CHART] page.

Method 2: On the [Plot Data] page, click [Add] to select [Point]. Enter the add page to select the plotting type (Beacon / Hazard marker / Others). Select the symbol, Lock (Unlock), Favorite (Unfavorite), Display (Hide), input name, latitude and longitude and other information. And click [Confirm] to save.



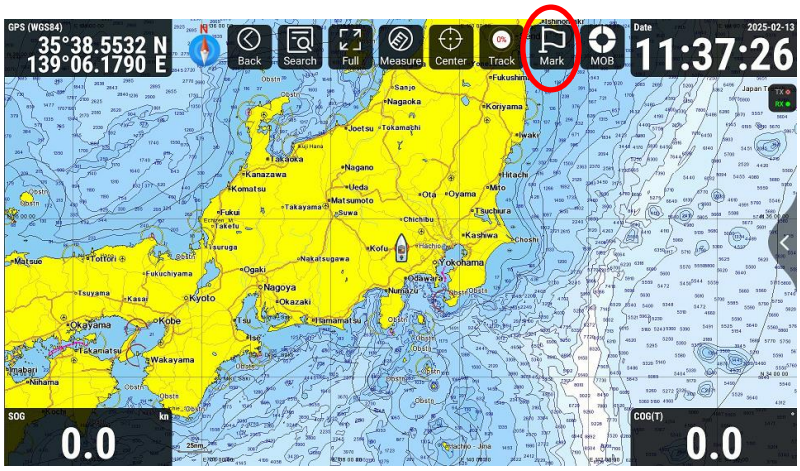
Method 3: On the [CHART] page, add plot data to the own ship position as shown below.

The "type", "symbol", and "color" of the plot data will be saved with their current settings.

The registered plot data can be edited by selecting it on the chart or from the plot data list.

[1] For KSD-1100, press the [ENTER] button on the operation panel. Plot data is added to the own ship position.

[2] For KSD-1210, click [Mark] icon of the screen upper side. Plot data is added to the own ship position.



2.9.2.2 Add plot line

Method 1: On the [CHART] page, long press to add the position of the first point, a window will pop up. Click [Add] to determine the position of the first point and click the second position on the chart to determine the second point (refer to Figure 2.13). Multiple points can be added by clicking the chart multiple times. After the drawing line is selected, click [Confirm] to enter the plot line editing window, and select [Line] as the data to perform related editing of the line (refer to Figure 2.14), as described below.

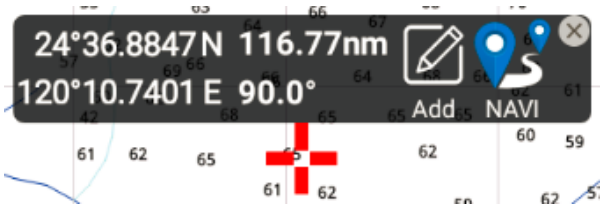


Figure 2.13 (a) Add window on chart page

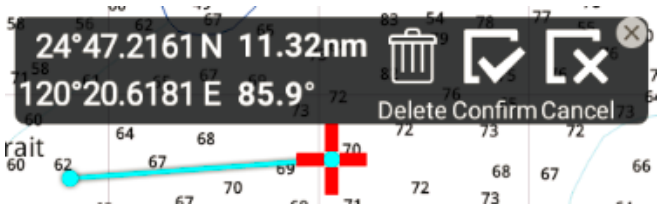


Figure 2.13 (b) Add window on chart page

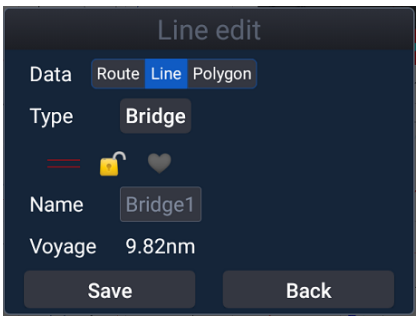


Figure 2.14 Plotted line editing window

[1] Data can select the Line.

[2] The selection type: You can choose the type of plotting line as bridge, cables and pipes, boundary, or others.

[3] Display style: When Boundary line or Others is selected, you can set the style, width and color (available in 8 line styles, 3 line widths and 6 colors).

[4] Lock icon can be set to lock or unlock.

[5] Heart-shaped icon: You can set to favorite or unfavorite. The plotted line of favorite will be placed in front of the list.

[6] Name box: You can enter the name of the plot line.

[7] After editing, select [Save] to save directly to the plotting data list. Select [Back] to return to the [CHART] page.

Method 2: On the [Plot Data] page, click [Add], as shown in figure 2.15. In the add window of plotting line, select [Line] to enter the add page. Select plotting type (Bridge / cables and pipes / boundary / others, select style, Lock (Unlock), Favorite (Unfavorite), Display (Hide)), and enter name. Click [add] to add at least 2 points or click [List] to select from plotting points. Click [Confirm] to save to the plot data list.

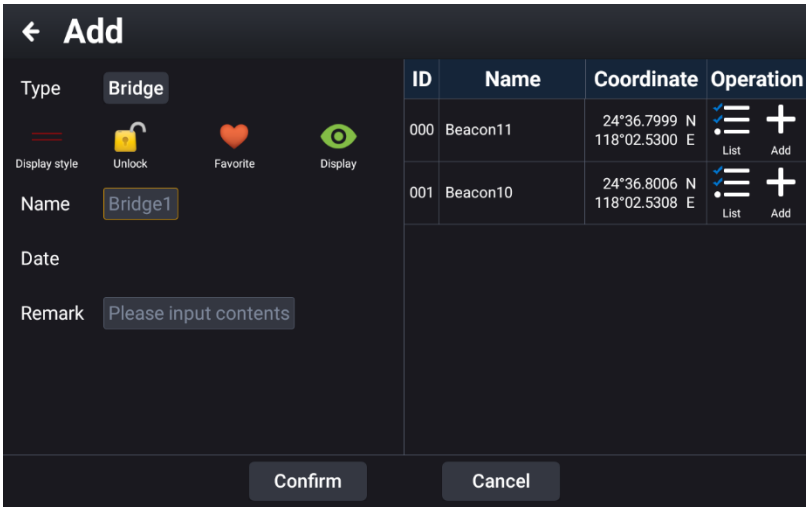
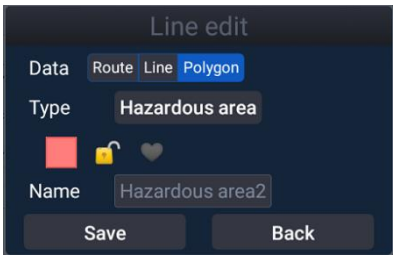
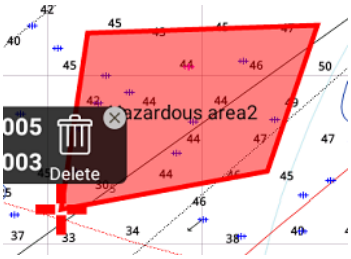


Figure 2.15 plot line new window

2.9.2.3 Add plot polygon

Method 1: On the [CHART] page, long press to add the position of the first point, and an information window will pop up. Click [Add] to determine the position of the first point, click the second position on the chart, determine the second point. Multiple points can be added to the graph by clicking the chart multiple times. After selecting the plotting points, click [Confirm] to enter the plotting polygon editing window, and select [Polygon] to edit the plotting polygon, as described below.





[1] Data can select the polygon.

[2] The selection type: You can choose Hazardous area, Marine operation area, Fishing area, Forbidden fishing area, Anchorage, Anchorage-prohibited area, Restricted area, Caution area or Others.

[3] Display style: You can set the style, width and color (available in 8 line styles, 3 line widths and 6 colors).

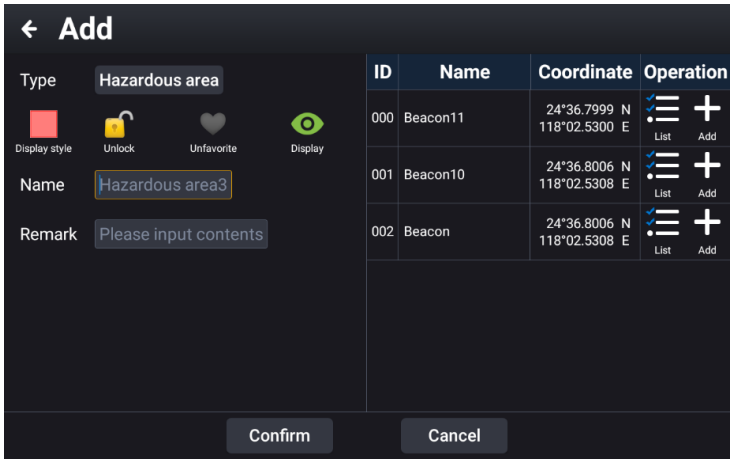
[4] Lock icon can be set to lock or unlock.

[5] Heart-shaped icon: You can set to favorite or unfavorite. The plotted polygon of favorite will be placed in front of the list.

[6] Name box: You can enter the name of the plot polygon.

[7] After editing, select [Save] to save the edited plot polygon directly to the plot data list. Select [Back] to return to the [CHART] page.

Method 2: On the [Plot Data] page, click [Add] to select [Polygon]. Enter the add page to select the plotting type (Hazardous area, Marine operation area, Fishing area, Forbidden fishing area, Anchorage, Anchorage-prohibited area, Restricted area, Caution area or Others). Select the style, Lock (Unlock), Favorite (Unfavorite), Display (Hide) and input a name. Click [Add] to add, the polygon edit cannot be less than 3 points. Click [List] to select from the plot points and click [Confirm] to save to the plot data list.



2.10 Track

The way to enter the track management page is as follows.

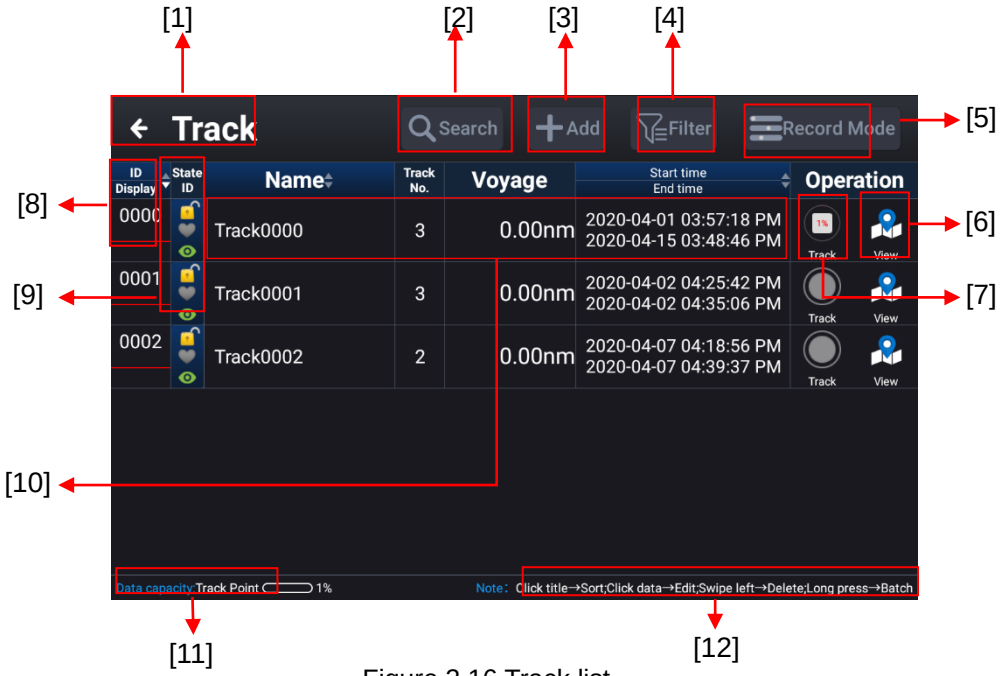


Figure 2.16 Track list

Method 1: On the [HOME] page, click [Track] to enter the track list.

Method 2: On the [CHART] page, click [<] mark of the screen right side or press the [MENU] button (KSD-1100), a function item window will pop-up. Click [Track] to enter the track list.

[1] Click to return to the [HOME] page.

[2] Search: Enter keywords such as name to search the built track.

[3] Add: New track.

[4] Filter: You can filter by style, line width, color.

[5] Record Mode: Set track record mode, time, RNG or automatic. Select time to set time interval. Select RNG to set distance interval.

Select automatic, heading between consecutive track points does not exceed 15°. Intermediate track points are not recorded. It is recorded to the 17th track point.

[6] View: You can view the corresponding track point. Click to jump to the [CHART] page.

[7] Track: Click to start or stop recording the track.

[8] ID display: Display the category and display style of the track.

[9] Status ID: Lock / Unlock, Favorite / Unfavorite, Display / Hide.

[10] Data window: Click to enter the editing window and long press for batch operation.

[11] Data capacity: Shows the proportion of the used capacity of the track point.

[12] Operation instructions: In the operation instruction column, click the title→sort, click data→edit, swipe left→delete, long press→ batch operation.

2.10.1 Track record

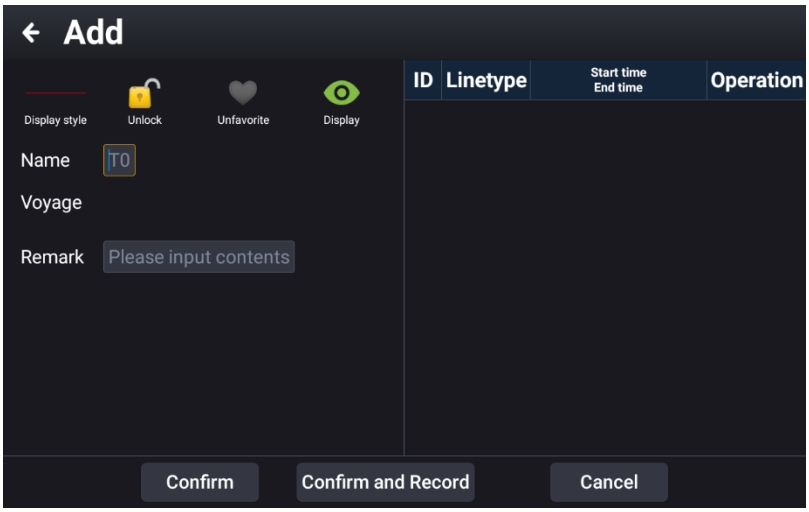
The related operations of track record are as follows.

[1] Add a new record

Method 1: Long press the [Track] button on the [CHART] page, a pop-up window prompts to add a new track. Click [Save] and start recording. Click the [Track] button again to stop add a new track.

Method 2: On the [HOME] page, click [Track] → [Add]. Select the display style, Lock (Unlock), Favorite (Unfavorite), Display (Hide), and input a name.

Click [Confirm] when finished. Click [Confirm and Record], the track is newly created, and recording begins. As shown below.



[2] Continue to the previous record:

Click the [Track] button on the [CHART] page to start the previous track record. Click the [Track] button again to stop track recording.

[3] Choose one to continue recording:

(a) On the [CHART] page, click to select the track to continue recording, and click the [Track] button in the pop-up operation box to continue the recording of the track.

(b) On the [HOME] page, click the [Track] button to enter the track list, and click the [Track] button in the operation bar to the right of the track to continue recording to continue the track record.

2.10.2 Track color switch

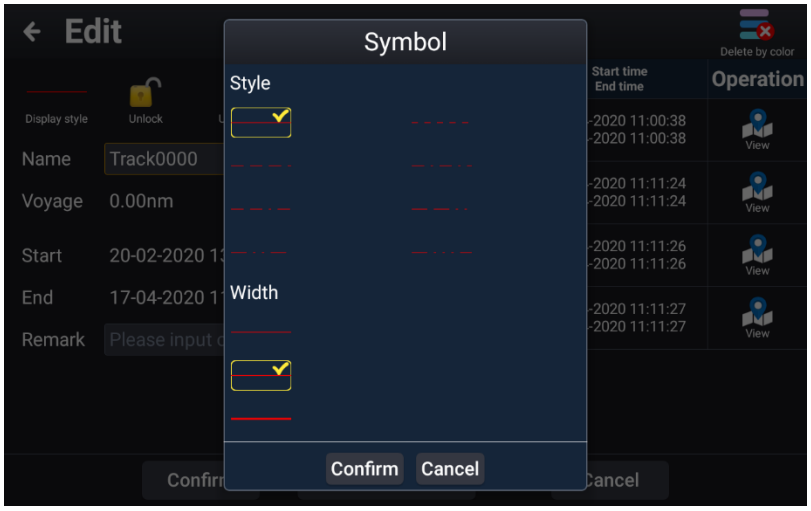
There are three methods to switch the track color.

[1] On the [CHART] page, click to select the track that needs to switch colors. Click the [Edit] - [Track line Display] in the pop-up operation box to enter the data editing window, and display the track style (style, width, Color) to choose.

[2] On the [HOME] page, click [Track] to enter the track list. Click [Track line Display] to switch the track color to enter the edit window. Select the display style (style, width, color) of the track.

[3] If the [FUNC] button (KSD-1100) is customized as “track color switch”, press [FUNC] to switch the track color. For details, refer to “2.2.10.1 Custom keys”.

Note: The switching of the display style (style, width, color) of the track is only valid for the newly generated data after switching.



2.10.3 Track deletion

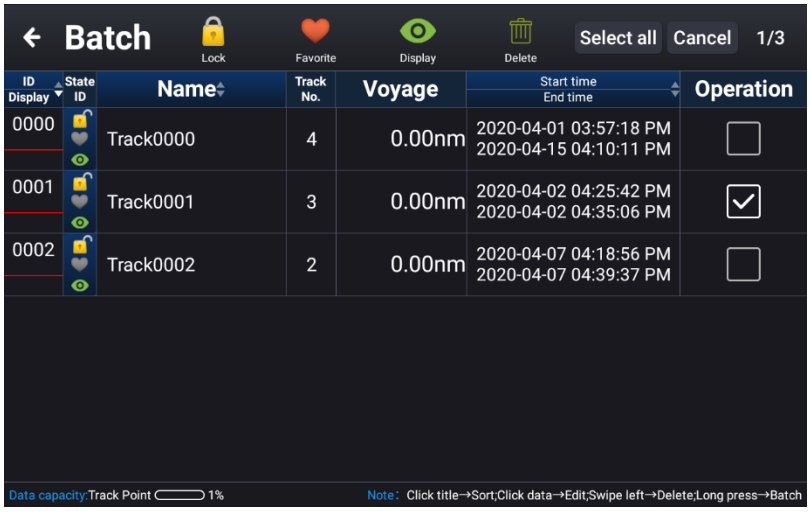
You can delete tracks one by one or in batches. The specific operations are as follows.

[1] Delete a single track

(a) On the [CHART] page, click to select the track to be deleted, and click the [Delete] button in the pop-up operation box to delete the track.

(b) On the [HOME] page, click [Track] button to enter the track list, and swipe the data bar to be deleted to the left to call up the delete button.

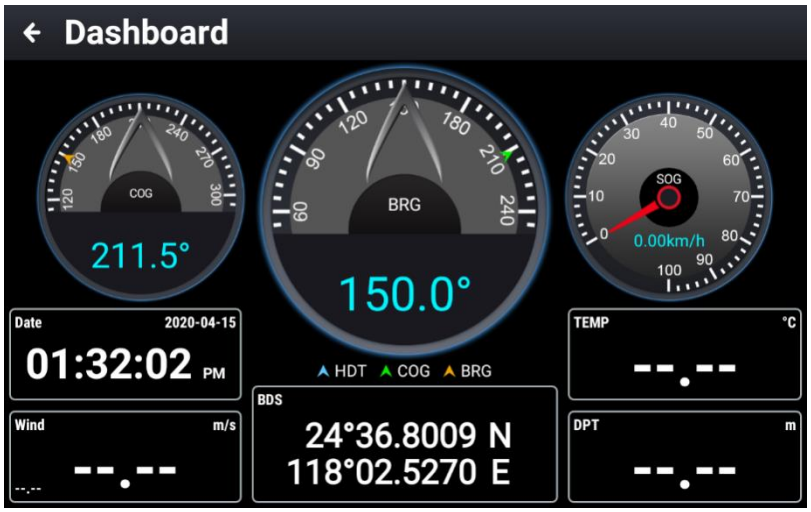
[2] Batch edit (delete) tracks



On the [HOME] page, click [Track] button to enter the track list, and long press a track to enter the batch operation page. You can perform batch Lock (Unlock), Favorite (Unfavorite), Display (Hide), and delete operations on multiple (all) track data.

2.11 Dashboard

On the [HOME] page, click [Dashboard] to enter the dashboard page, as shown below.



[1] Click any disk to switch the display content to COG, HDT, SOG, STW or BRG, as shown in figure 2.17 (a) dashboard settings below. BRG is functioned when set to waypoint navigation or route navigation.

[2] Click any data frame to switch the display content to the Own ship Lat/Lon, date, DPT, Wind, TEMP, STW, XTE, RNG, BRG, ETA as shown in Figure 2.17 (b) dashboard setting below.

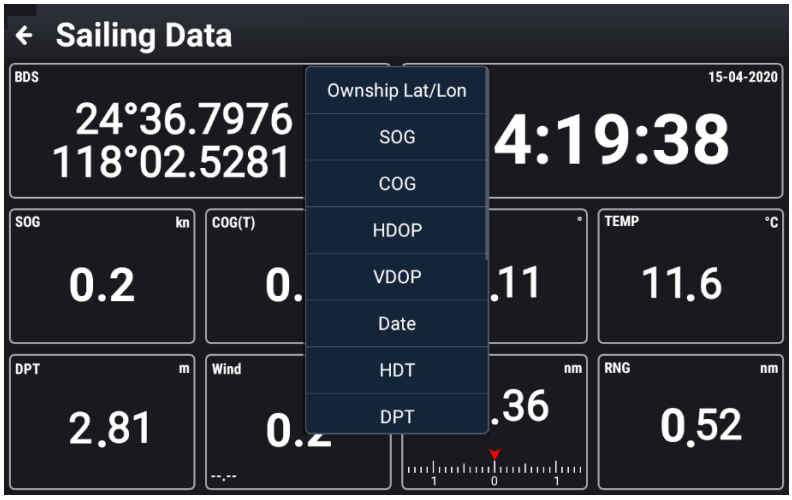
Figure 2.17 (a) dashboard setting

Figure 2.17 (b) dashboard setting

2.12 Sailing Data

On the [HOME] page, click [Sailing Data] to enter the navigation data management page, as shown below.

Click any data frame to switch the display contents as follows: Own ship Lat/Lon, SOG, COG, HDOP, VDOP, Date, HDT, DPT, Wind, TEMP, STW, XTE, RNG, BRG, ETA or Reset. Refer to the figure below.



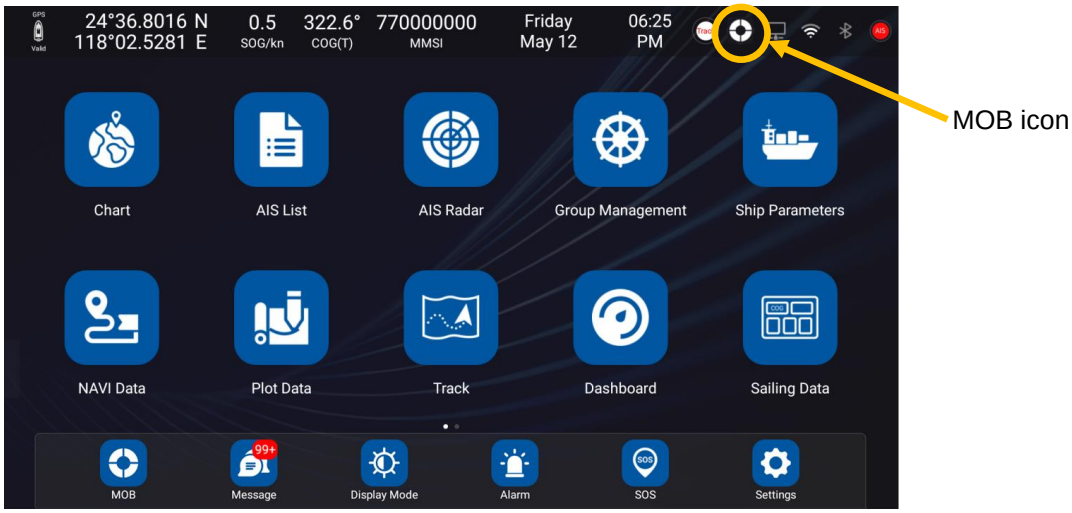
Note: Reset reverts to the factory setting.

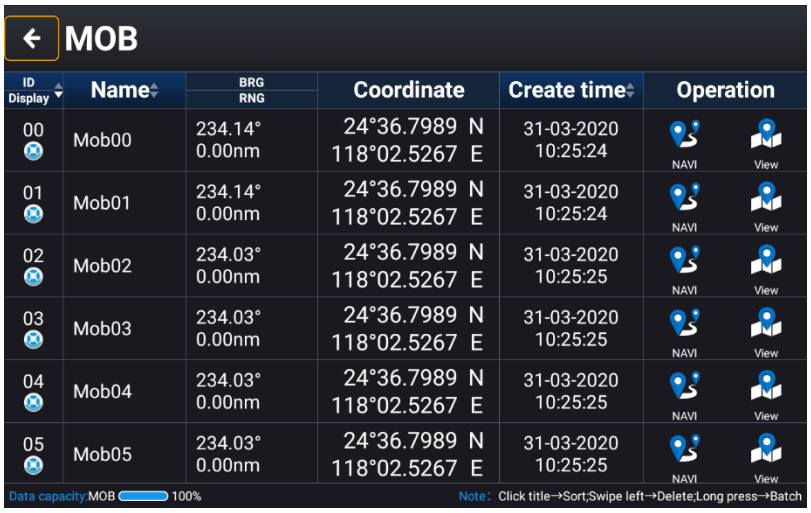
2.13 MOB

The water drop mark is used to indicate the location of a person in the boat who has fallen into the water by pressing [MOB SOS] key (KSD-1100) in an emergency. This function is convenient when turning back by ship to find the person who has fallen into the water. The position of the MOB is just the reference position where a person fell into the water. It is used by the driver and will not be sent out by mistake. The specific details of the way to enter the MOB list are as follows.

For KSD-1100: Press the [MOB SOS] key to quickly create a MOB point at the current ship position and save it to the MOB list.

For KSD-1210: Press the [MOB] icon in upper right on [HOME] page or [CHART] page to quickly create a MOB point at the current ship position and save it to the MOB list.





[1] On the [HOME] page, click [MOB] (icon in lower left) to enter the MOB list.

[2] On the [CHART] page, click [<] mark of the screen right side or press the [MENU] button (KSD-1100). In the pop-up function item window, click [MOB] to enter the MOB list.

[3] KSD-1210: Long press [MOB] (icon in upper right) on the [HOME] page or [CHART] page to enter the MOB list.

[4] Swipe left the data bar to be deleted to call up the delete button, click [Delete] to delete the data. Long press a certain MOB mark to enter the batch operation page. Multiple (all) data can be deleted in batches.

2.14 Display mode

On the [HOME] page, click [Display Mode] to enter the mode adjustment window. You can adjust the display brightness and volume. And you can set the chart mode and the automatic switching mode. Turn on the [Automatic Switching of Chart Modes] switch, the chart will be automatically switch to day mode after 06:00. Automatically switch to night mode after 18:00.

2.15 Message

Click [Message] to enter the short message page, as shown below.

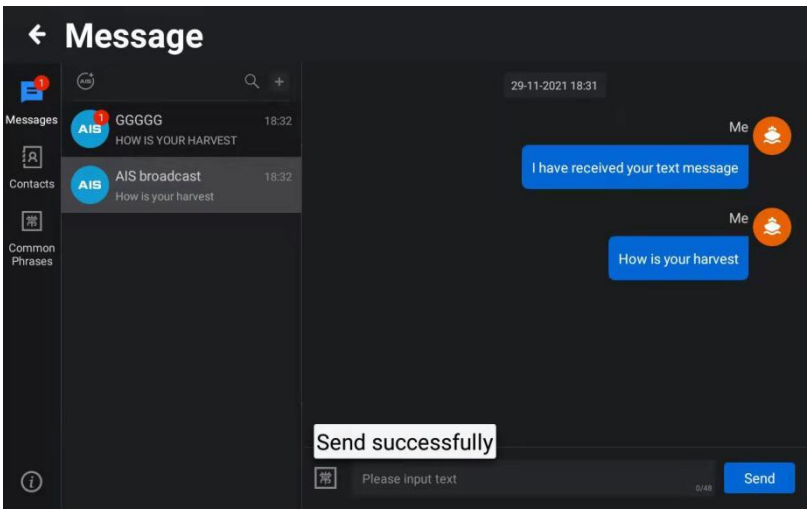


Figure 2.18 (a) Message screen settings

[1] Message list: You can view the message directly. Click a message to view all the information sent by the account. (Refer to Figure 2.18 (a) Message screen settings)

[2] Contacts List: You can view the members in the address book. Click the address book member to open the message dialog box.

Note: If you are not in a group, click [+] on the information screen. A message dialog box opens. (Refer to Figure 2.18 (b) Message screen settings)

Click "AIS Message" to display the "New AIS Message" screen. Enter the MMSI number of the person you want to send the message to in "Recipient". Enter your text and click “Send”.
(Refer to Figure 2.18 (b) Message screen settings)

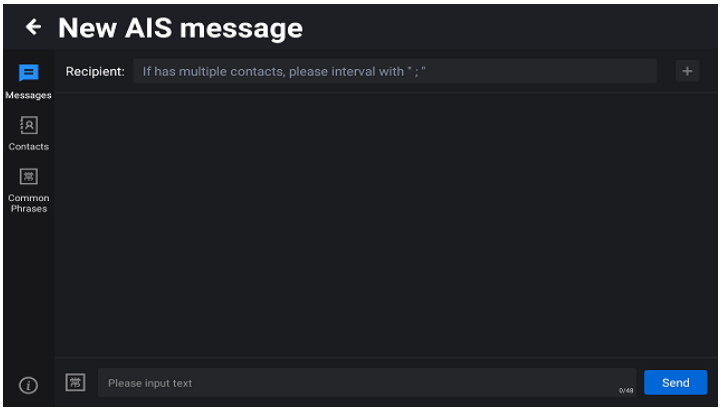


Figure 2.18 (b) Message screen settings

[3] Search: Enter keywords in the search box on the message list page, and the message list will display the relevant information of search keywords. (Refer to Figure 2.18 (a) Message screen settings) In the address book page, enter keywords to display the key members of address book. (Refer to Figure 2.18 (c) Message screen settings)

[4] New: Click [Contacts] to enter the contact management screen and click [+] to add new member information to the address book.

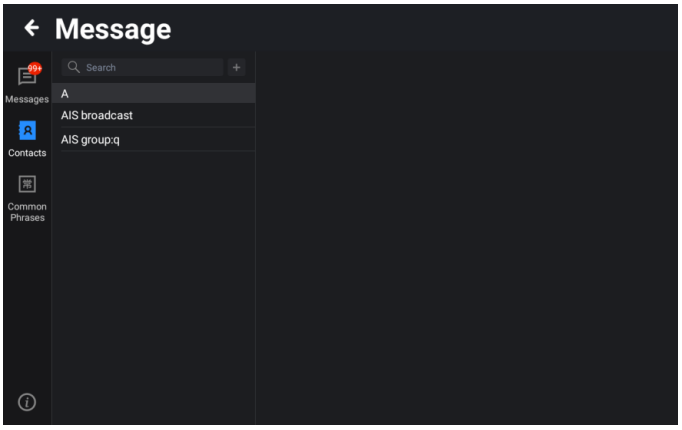


Figure 2.18 (c) Message screen settings

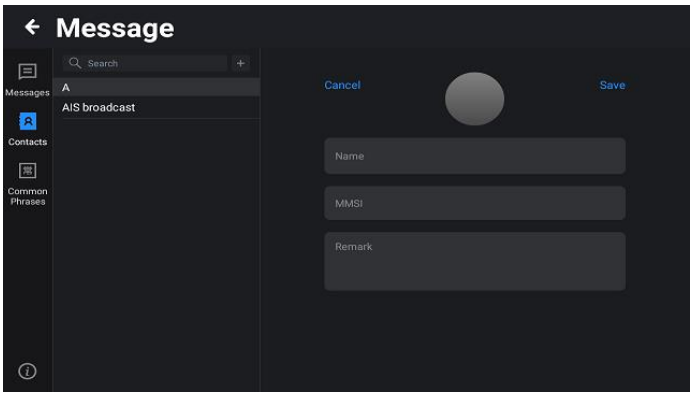


Figure 2.18 (d) Message screen settings

[5] Click [Common Phrases] to enter the Common Phrase Management screen and click [Add Common Phrase] to add common words. (Refer to Figure 2.18 (e) Message screen settings)

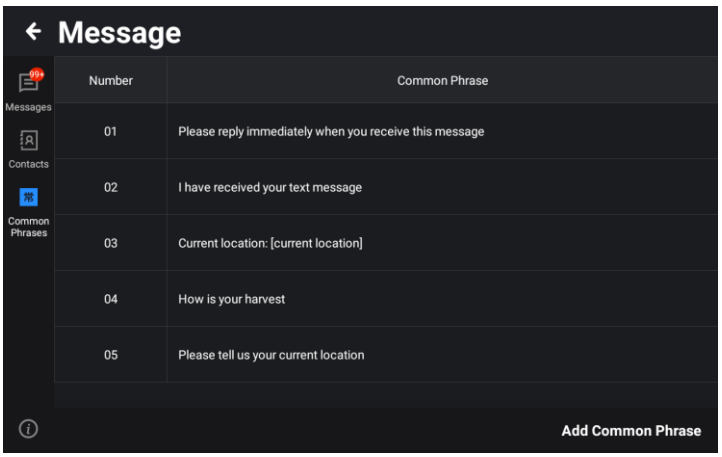
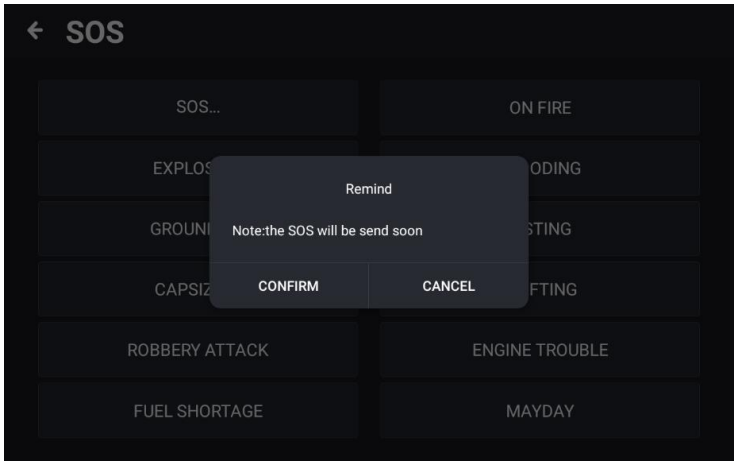


Figure 2.18 (e) Message screen settings

2.16 SOS

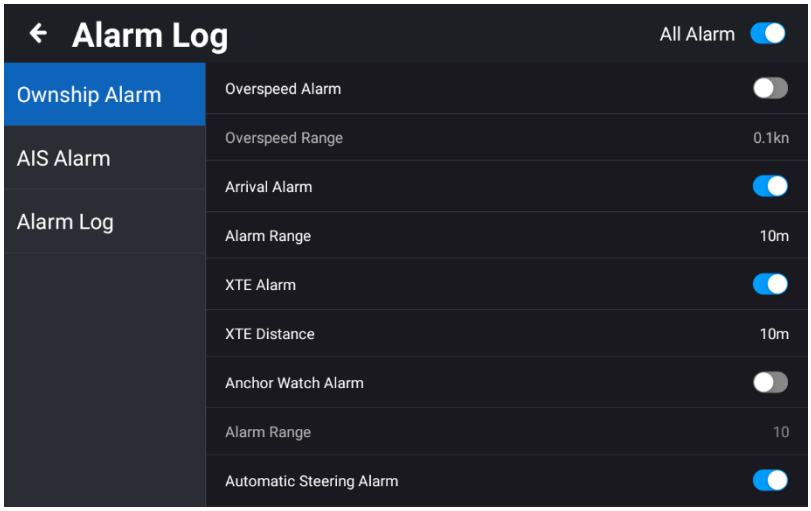
On the [HOME] page, click [SOS] or long press the [MOB SOS] key (KSD-1100) to enter the security information page, as shown in the figure below. Clicking on the content of the message to be sent will pop up a reminder window. Click [CONFIRM] and the message will be sent in the form of broadcast. Click [CANCEL] to cancel the message sending.



2.17 Alarm

On the [HOME] page, click [Alarm] to enter the alarm setting/log window, as shown below.

Turn on the alarm setting in the upper right corner to activate it as an alarm function. (Ownship Alarm, AIS Alarm)



2.17.1 Ownship Alarm

On the alarm page, click [Ownship Alarm] to set the alarm items related to own ship, as shown in the figure above. Swipe the page to view all the alarm setting items.

[1] Overspeed Alarm: On / off can be set, when set to on, the alarm speed is set, and the alarm is triggered when the speed of own ship exceeds the setting value of the alarm speed.

[2] Arrival Alarm: On / Off can be set. When it is set to on, the radius of the arrival alarm is set. When the distance between own ship and the destination is equal to the radius of the alarm, the alarm is triggered.

[3] XTE Alarm: On / off can be set. When it is set to on, the distance value of cross track error alarm is set, and the alarm is triggered when the ship exceeds the cross track error. Both sides of the route between the ship and the destination will have two deviation routes to the right, and the position of the deviation route is determined by the setting value of the cross track error.

[4] Anchor Watch Alarm: On / off can be set, when set to on, the radius value of off-anchor alarm is set. When the ship moves out of the circle range with the set off-anchor alarm value as the radius, the alarm is triggered.

When the anchor watch alarm is turned on, draw a circle with the current position of own ship as the center point and the radius as the setting value of the alarm radius. When the own ship moves out of this circle, the alarm is triggered.

[5] Automatic Steering Alarm: On / off can be set. When set to on, the ship has multiple waypoints (inflection points) in the course of route navigation. It will turn every time it reaches an inflection point and an alarm will be triggered.

[6] Plot Point Alarm: On / off can be set. When set to on, the alarm radius is set with the plot point as the center. The alarm is triggered when own ship enters the alarm range of the plot point. Alarm type can

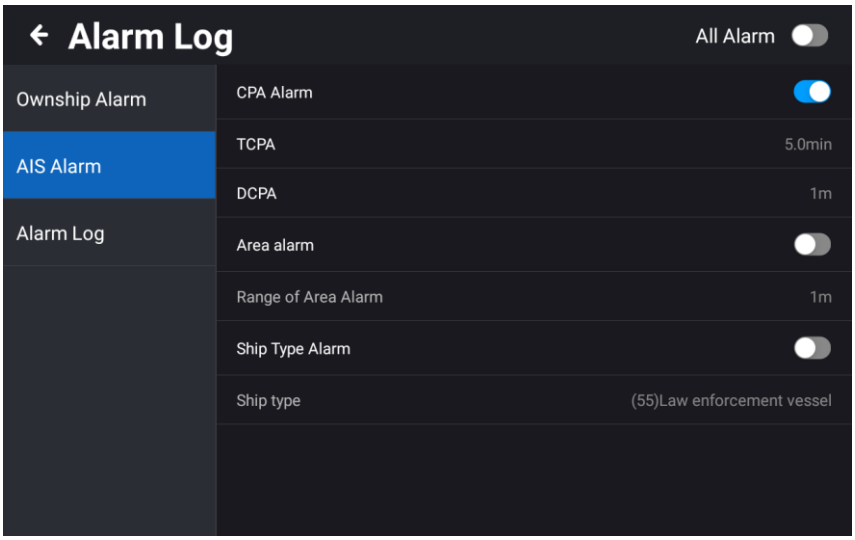
be set to beacon, hazard marker or others.

[7] Plot Line Alarm: On / Off can be set. When it is set to on, the alarm radius is set with the plot line as the center. The alarm is triggered when own ship enters the alarm range of the plot line. Alarm type can be set to bridge, cables and pipes, boundary line or other.

[8] Plot Polygon Alarm: Set an alarm radius from the edge of the plot polygon. The alarm is triggered when own ship is within the alarm orientation of the plot polygon. The alarm type can be set to hazardous area, maritime operation area, fishing area, forbidden fishing area, anchorage, anchorage-prohibited area, restricted area, caution area or others.

2.17.2 AIS Alarm

On the alarm setting page, click [AIS Alarm] to set the alarm items related to the AIS target, as shown in the figure below.



[1] CPA Alarm: On / off can be set. When it is set to on, the alarm will be triggered when the set approach time and approach distance are met. The ship and other AIS ships will encounter an alarm.

TCPA: Set the trigger time of the approach alarm between own ship and other AIS ships (1 to 60min).

DCPA: Set the trigger distance (1 to 10,000m) of the approach alarm between the ship and other AIS ships.

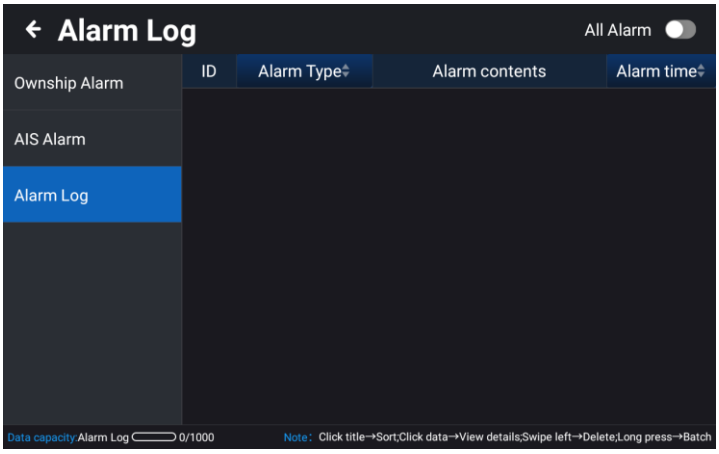
[2] Area alarm: Draw a range circle centered on the ship. The AIS vessel will trigger the alarm when it enters the alarm circle.

Regional alarm setting range: 1 to 100,000m

[3] Ship type alarm: The device receives the set alarm ship type signal (see Table 2.1 Ship type description in 2.4 “AIS List”) and triggers the alarm.

2.17.3 Alarm Log

On the alarm setting page, click [Alarm Log] to view the historical alarm records. The specific contents include ID, alarm type, alarm content and alarm time, as shown in the figure below.



2.18 GNSS

On the [HOME] page, click [GNSS] to view GNSS information. GNSS source includes GNSS & AIS / NMEA0183_2 / NMEA0183_3 / NMEA0183_4 / NMEA2000. (NMEA0183_3 of KSD-1100 can be switched when [Settings] -> [Advanced settings] -> [NMEA0183_3 Configuration] is set to [Input].)

Location Mode can be selected when GNSS & AIS is selected in GNSS Source. Location mode includes GPS / BDS / GPS&BDS.

Devices (when GNSS source is set to NMEA2000): Select the NMEA2000 input source device.

Note: If no NMEA2000 device is connected, the device will not be displayed.

[1] HDOP: Calculated from the satellite distribution at the time of positioning. The range is 0.5 to 99.9. The smaller the value, the higher the position accuracy.

[2] VDOP: Calculated from the satellite distribution during positioning. The range is 0.5 to 99.9. The smaller the value, the higher the height accuracy.

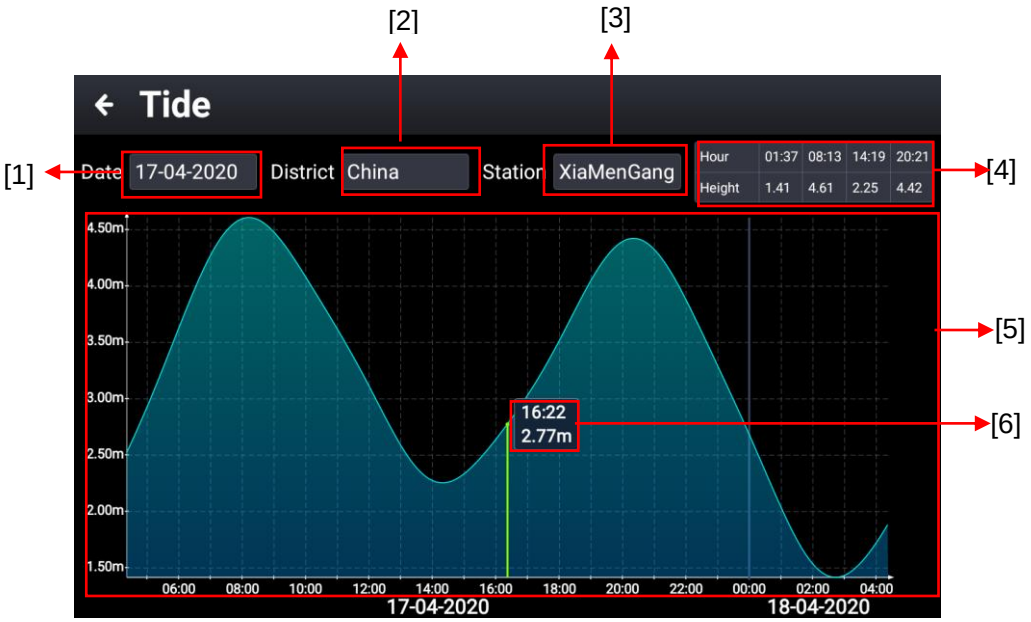
[3] Altitude: The altitude of the current location.

[4] In View: Number of satellites in the field of view.

[5] In Use: Number of satellites in use.

2.19 Tide

On the [HOME] page, click [Tide] to enter the tide window. The specific details are shown below.



[1] Date: The date of the tide, click to select the tide status at other date.

[2] District: Click to select another district to view the tides in that district.

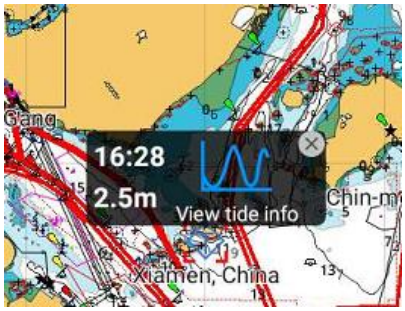
[3] Station: Click to view other tidal stations.

[4] Corresponding to the tide time and height of the tide station.

[5] Swipe the tide graph left or right to view the tide at different time points

[6] Time and high tide when entering.

On the chart, click the tidal station icon, the relevant information of the tidal station will also pop up. You can directly click to view the detailed tidal information of the current tidal station, as shown below.



2.20 Calendar

On the [HOME] page, swipe the screen to the left to switch pages, and click [Calendar] to view the calendar.

2.21 Switching Record

On the [HOME] page, click [Switching Record] to view the device boot time, last working time, off tie, and working hours, as shown in the following figure.

Switching Record

ID	Boot Time	Last Working Time	Off Time	Working Hours
01	15-04-2020 14:39:45	17-04-2020 17:43:37		002D03H03M55S
02	15-04-2020 13:46:39	15-04-2020 13:54:09	15-04-2020 13:54:22	000D00H07M43S
03	14-04-2020 11:00:20	14-04-2020 17:36:37	14-04-2020 17:36:38	000D06H36M18S
04	07-04-2020 13:56:04	07-04-2020 14:09:11	07-04-2020 14:09:56	000D00H13M52S
05	07-04-2020 13:24:05	07-04-2020 13:48:53	07-04-2020 13:49:01	000D00H24M56S
06	02-04-2020 14:22:58	02-04-2020 14:46:47	02-04-2020 14:46:56	000D00H23M58S
07	02-04-2020 13:45:15	02-04-2020 14:15:27	02-04-2020 14:15:29	000D00H30M14S
08	01-04-2020 14:02:32	01-04-2020 14:07:55	01-04-2020 14:08:11	000D00H05M39S

2.22 Video Surveillance

The device supports up to four network cameras, which can be used for video monitoring, video recording, screen capture, mobile monitoring alarm and other functions.

KODEN recommends the following manufacturer and model of the Camera to be used. (Camera: Owner supplied)

Manufacturer	Model	Manufacturer	Model
Hikvision	DS-2DC2402IW-DE3	Dahua (DH)	DH-IPC-HFW1025B
Hikvision	DS-2CD2225CD-I3	SV3C	B08W-5MP-HX
Hikvision	DS-2CD3T56WD-I3	SV3C	B08POW-5MPL-A
Hikvision	DS-2CD1221-I3		

Note: The specifications of the connected camera must be ONVIF compatible and must be capable of LAN connection.

2.22.1 Installation connection diagram

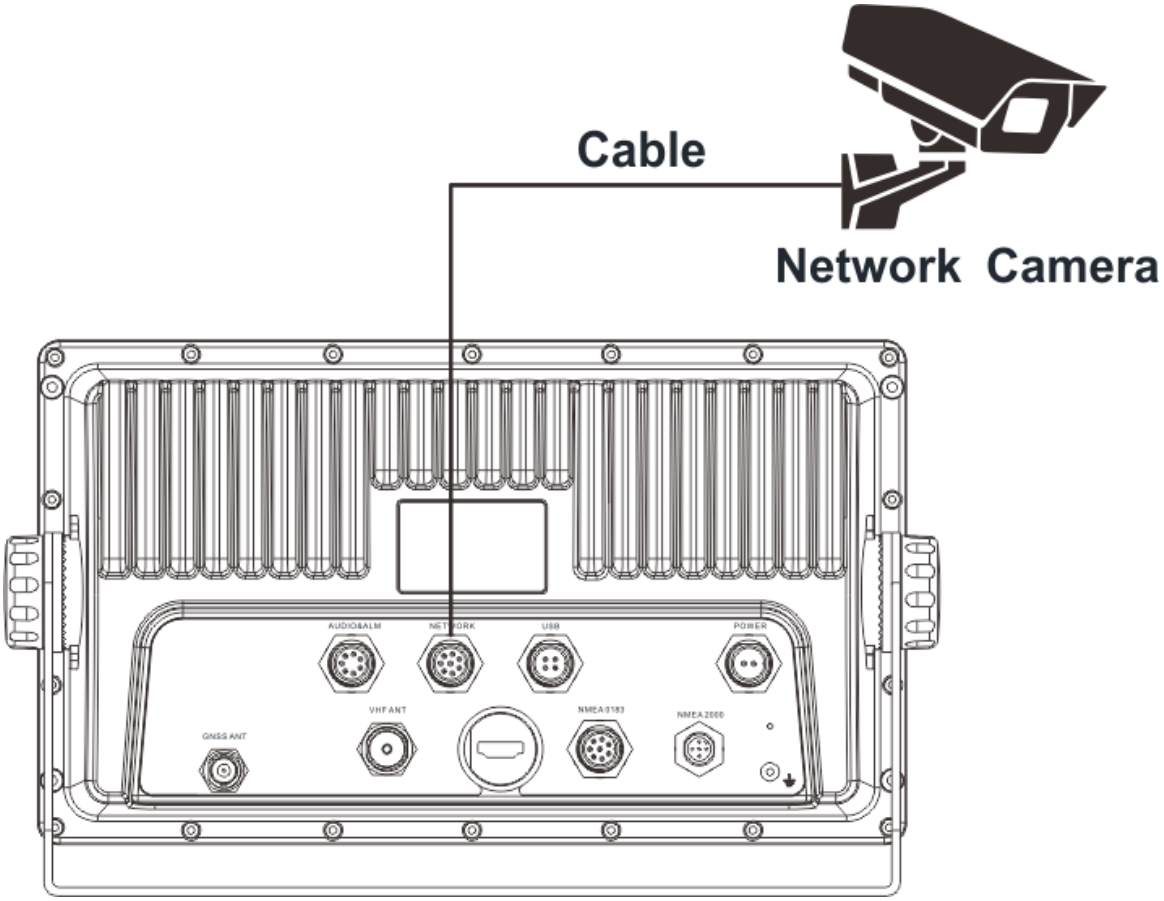


Figure 2.19: Video monitoring connection diagram

Note: Camera and LAN cable are owner supplied.

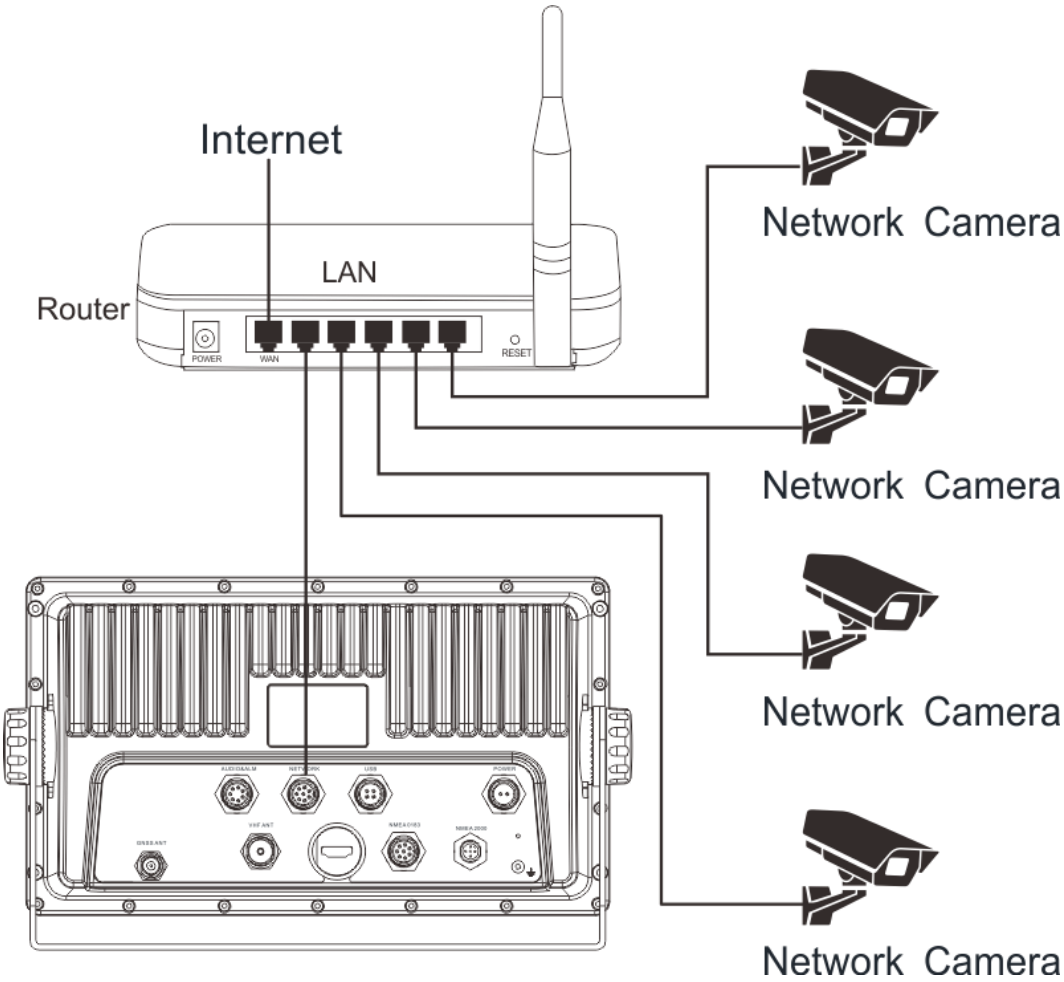


Figure 2.20: Video monitoring connection diagram

Note: Camera, Router and LAN cable are owner supplied.

Note: Use the router with DHCP settings.

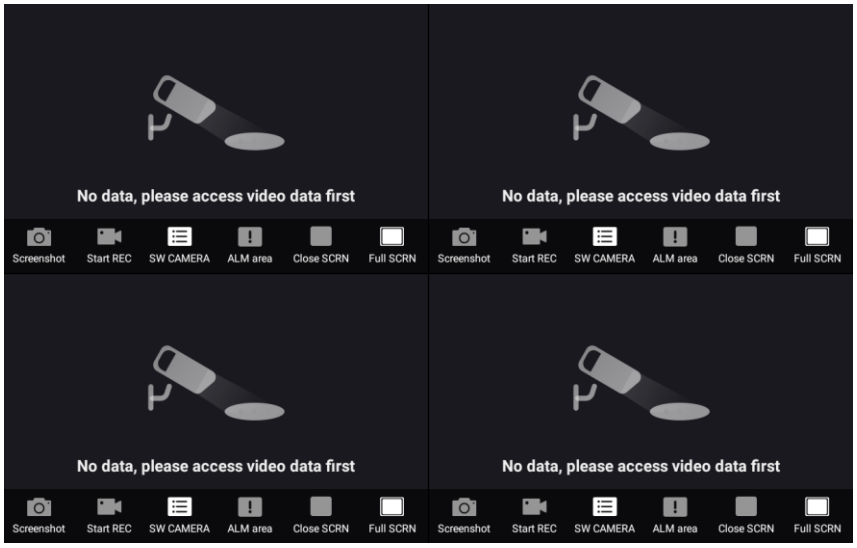
2.22.2 Video input screen

After connecting the camera, click "Settings" on the "HOME" screen and select "Ethernet" or "Wi-Fi". For a wired LAN connection from router, turn on "Ethernet" and set the Ethernet mode to "DHCP". For a Wi-Fi connection form router, turn on "WIFI" and configure the settings with the connected device.

After access to the camera, click "Video Surveillance" APP on the [HOME] page to enter the video monitoring screen. Through the shortcut button on the video monitoring screen, you can realize screenshot, video recording, channel switching, alarm area setting, monitor transmission on or off, full screen display and other operations.

Note: Need to prepare a microSD card or TF card (used to store screenshot pictures and video recordings). Be sure to specify the insertion position of the MicroSD card or TF card where the data will be stored.

(Refer to “2.22.3.4 [4] Storage Setting” in Video Monitoring Setting.)



(1) Screenshot

Click “Screenshot” to capture the page image and save it in the microSD card / TF card of the device, which can be viewed in “2.22.3.2 Screenshot Management”.

(2) Start REC

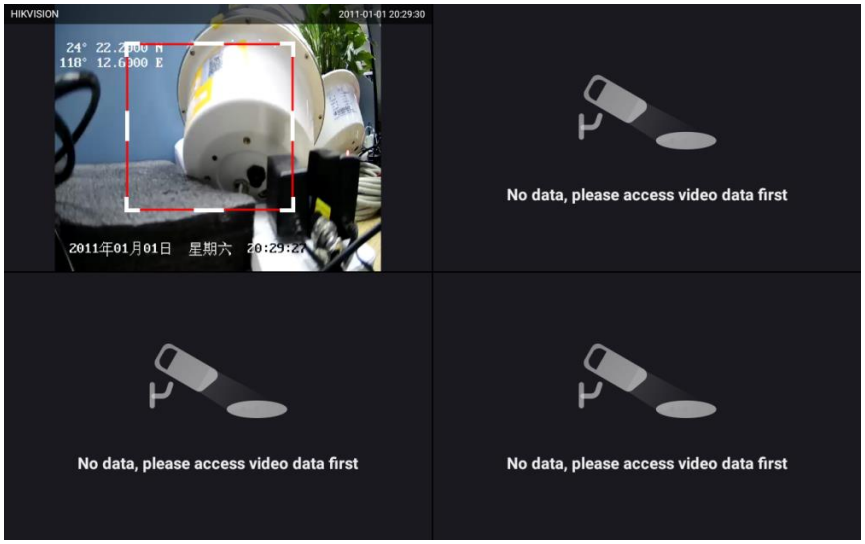
Click "Start REC" and click again to end the recording. The recording is saved in the microSD card of the device, which can be viewed in “2.22.3.1 Video Management”.

(3) SW CAMERA

Click "SW CAMERA ", and four-way camera channels are available for selection and display. Select one channel, the monitoring screen will display the monitoring image of the channel.

(4) ALM area

Click "ALM area", and the alarm area setting box will pop up on the screen. The frame can be flexibly set to monitor the alarm area of the monitoring screen. The alarm area can be moved and monitored, and the alarm screen can be moved to the alarm area to generate an alarm. The alarm information can be alarmed at “2.22.3.3 Alarm Information Management”, set as shown in the figure below.

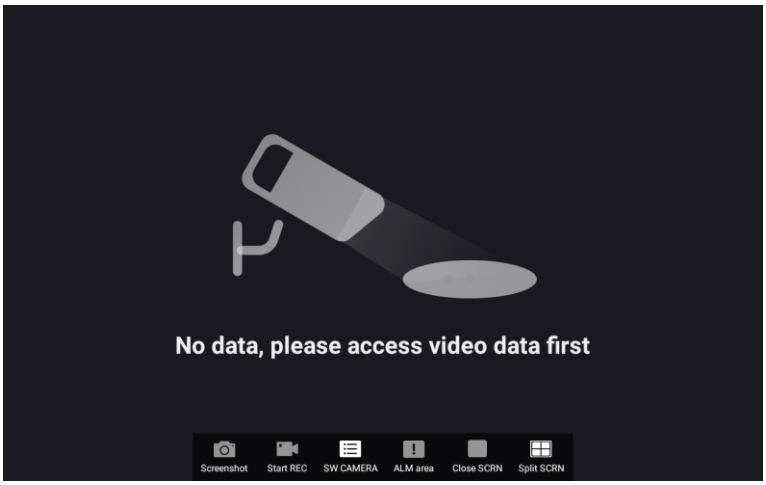


(5) Close SCRN

Click "Close SCRN" to turn on or off the display of the channel image.

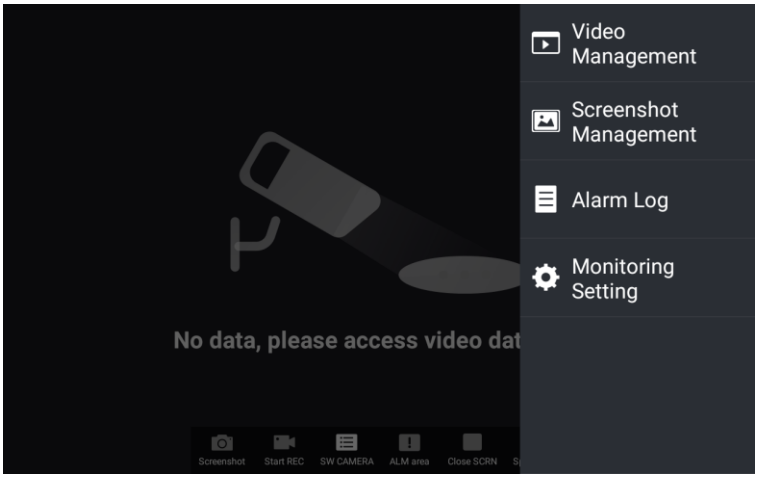
(6) Full SCRN

Click "Full SCRN" to display the monitoring image of the channel in full screen. Click "Split SCRN" to exit the full screen.



2.22.3 Operation menu

Under the video surveillance page, swipe to the left on the right upper edge of the screen or press the [MENU] button (KSD-1100) to call up the video surveillance operation menu. It can be used for monitoring, including Video management, Screenshot management, Alarm Log, Monitoring settings.



2.22.3.1 Video Management

Manage the video stored in the device to play, pause, drag progress, search, and delete the video file.

Long press the list to go to the batch operation (batch operation) screen. Multiple/all data can be deleted.

Click the "Filter" icon to display the list by time or by camera (device).

While the video is playing (or paused), you can capture the video by clicking the camera icon at the top right of the screen.

2.22.3.2 Screenshot Management

Manage pictures stored in device screenshots to share, search, and delete pictures.

Long press the list to go to the batch operation (batch operation) screen. Multiple/all data can be deleted.

Click the "Filter" icon to display captured images by time and by camera (device).

2.22.3.3 Alarm Information Management

Manage the historical alarm records of the camera, including alarm time, alarm camera name, alarm type, etc.

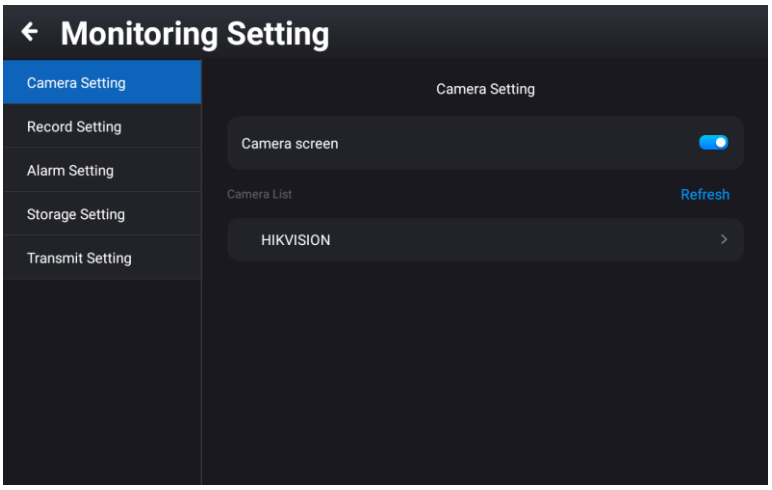
To delete an alarm history, swipe left on the corresponding data bar to reveal the "Delete" icon and click to delete. To delete multiple data or all data at once, long press the list to enter batch operation.

Click the "Filter" icon to display alarm history by camera (by device), by alarm type, and by time. (Multiple cameras can be selected)

2.22.3.4 Video Monitoring Setting

Monitoring setting include menus for Camera Setting, Record Setting, Alarm Setting, Storage Setting, and Transmit Setting.

[1] Camera Setting

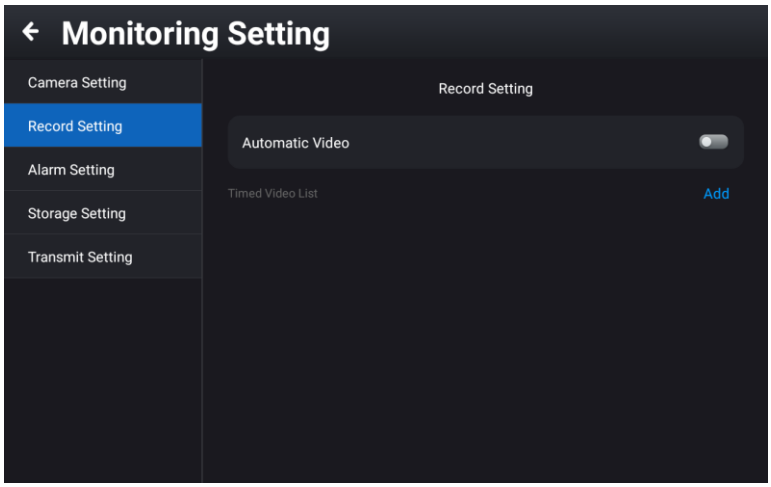


Camera screen: The camera screen display switch is turned on by default. If it is turned off, the video screen of the connected camera will not be displayed.

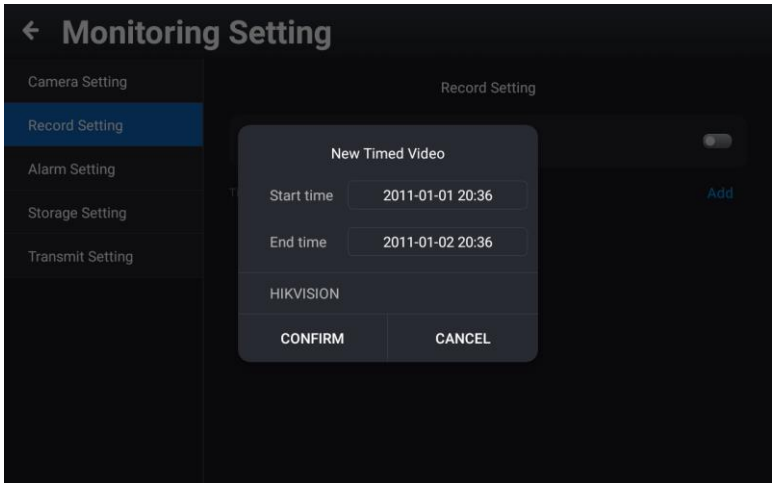
Camera List: The connected cameras are displayed. The name of the camera can also be changed.

[2] Record Setting

When the automatic video mode is turned on, the system will automatically save the full-time recording.

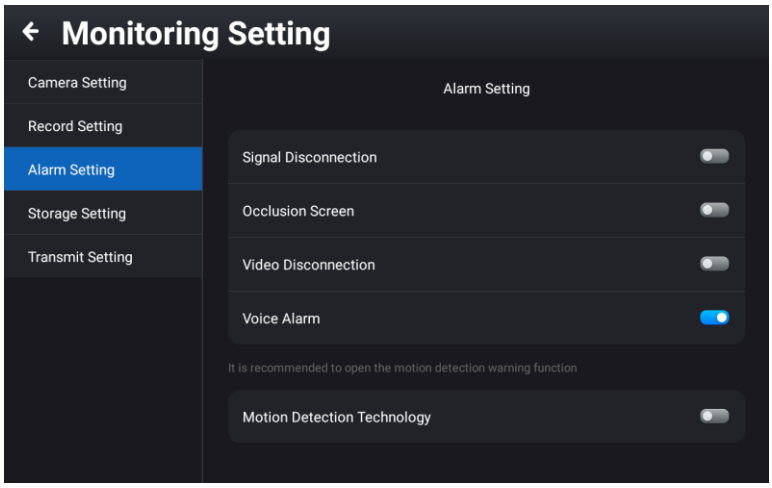


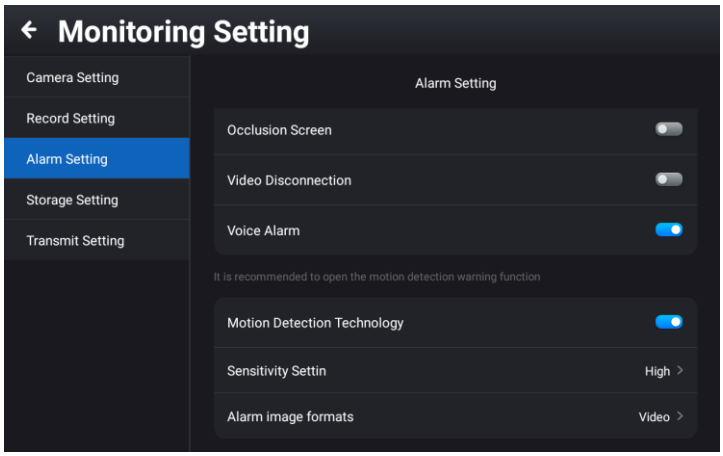
When the automatic video mode is turned off, the user can set the time record as needed. Click [Add] to set the date and time for the start / end for [New Timed Video].



[3] Alarm Setting

There are four alarm types of signal disconnection, occlusion screen, video disconnection and voice alarm, which can be set by the user according to the actual use.





Signal Disconnection: When setting is turned on, the camera will alert you when a signal interruption occurs due to a broken wire, etc.

Occlusion Screen: When setting is turned on, the camera will alert you if it is blocked by an object.

Video Disconnection: When setting is turned on, the camera will alarm when a video interruption occurs, for example, due to a broken wire.

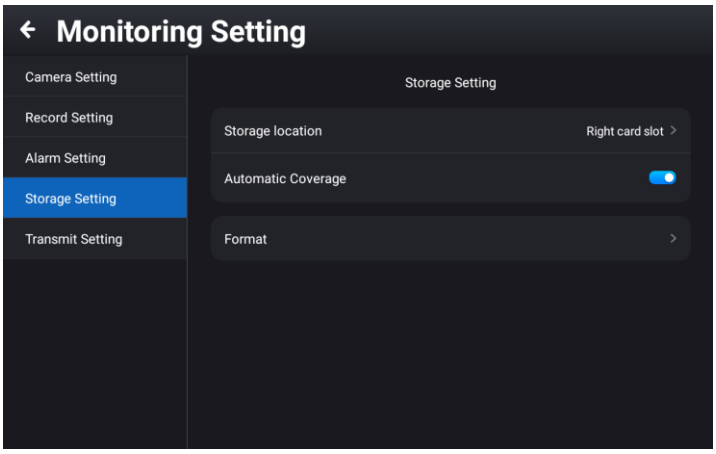
Audio Alarm: When setting is turned on, an audio alarm is played to alert the user of video surveillance. (KSD-1210 requires speaker* connection.) (*Speaker: Owner supplied)

When the motion detection technology mode is turned on, you can set motion detection or full-time recording. If selected motion detection, you can set low / medium / high sensitivity, report alarm information and turn on the video switch.

You can set alarm image formats. If select "Screenshot" for the alarm image format, set the specific "Number of screenshots" and "Screenshot interval". When the alarm is triggered, the corresponding number of screenshots will be captured according to the specific screenshot interval.

Note: This function is auxiliary and may not work depending on the image.

[4] Storage Setting



Storage location: Users can choose the data storage location according to actual needs.

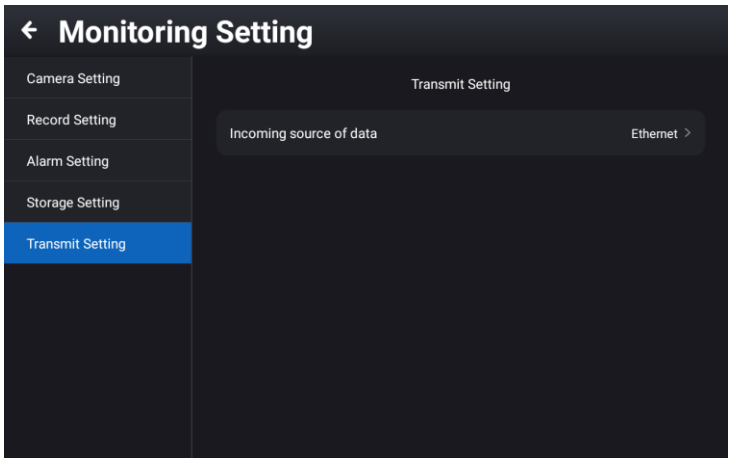
Note: Only the slot in which the card is inserted will be displayed. Do not select the wrong location to store the MicroSD card for the C-MAP card.

Automatic Coverage: For the data storage of the microSD card (TF card), a mode of automatic overwriting is provided when the data is full. When setting is turn off, when the storage capacity of the microSD card (TF card) is lower than 20%, it will automatically remind the user.

Format: Format the target the microSD card (TF card).

Note: Erased data cannot be returned.

[5] Transmit Setting



You can select the camera that you want to connect according to the data source, including wired network or wireless network and so on.

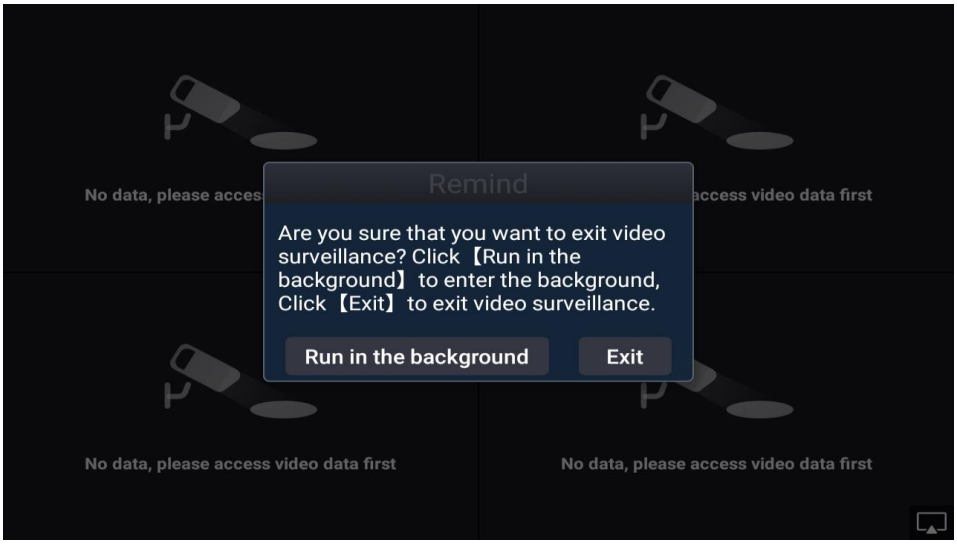
2.22.4 Exit Video Surveillance

Under the video surveillance page, do the following operation.

For KSD-1100: Press the [BACK] button to call up the exit video surveillance window.

For KSD-1210: Swipe to the left on the right center edge or the right lower edge of the screen to call up the exit video surveillance window.

“Are you sure that you want to exit video surveillance?” will appear. To exit video surveillance, click [Exit]. To run video surveillance in the background, click [Run in the background].



2.23 Connecting external speaker or buzzer

This is to use an external speaker or buzzer, please follow the steps below:

(1) External speaker

How to connect KSD-1100:

Connect pin No.1 or pin No.2 of the 7-pin connector (supplied) to the + (positive) side of the external speaker and pin No.4 to the - (negative) side of the external speaker. And then connect pin No.3 and No.4 directly.

Connect as shown in the figure below.

Notice: The main unit speaker cannot be used when an external speaker is used.

How to connect KSD-1210:

Connect pin No.1 of the 7-pin connector (supplied) to the + (positive) side of the external speaker and pin No.2 to the - (negative) side of the external speaker.

(2) External buzzer

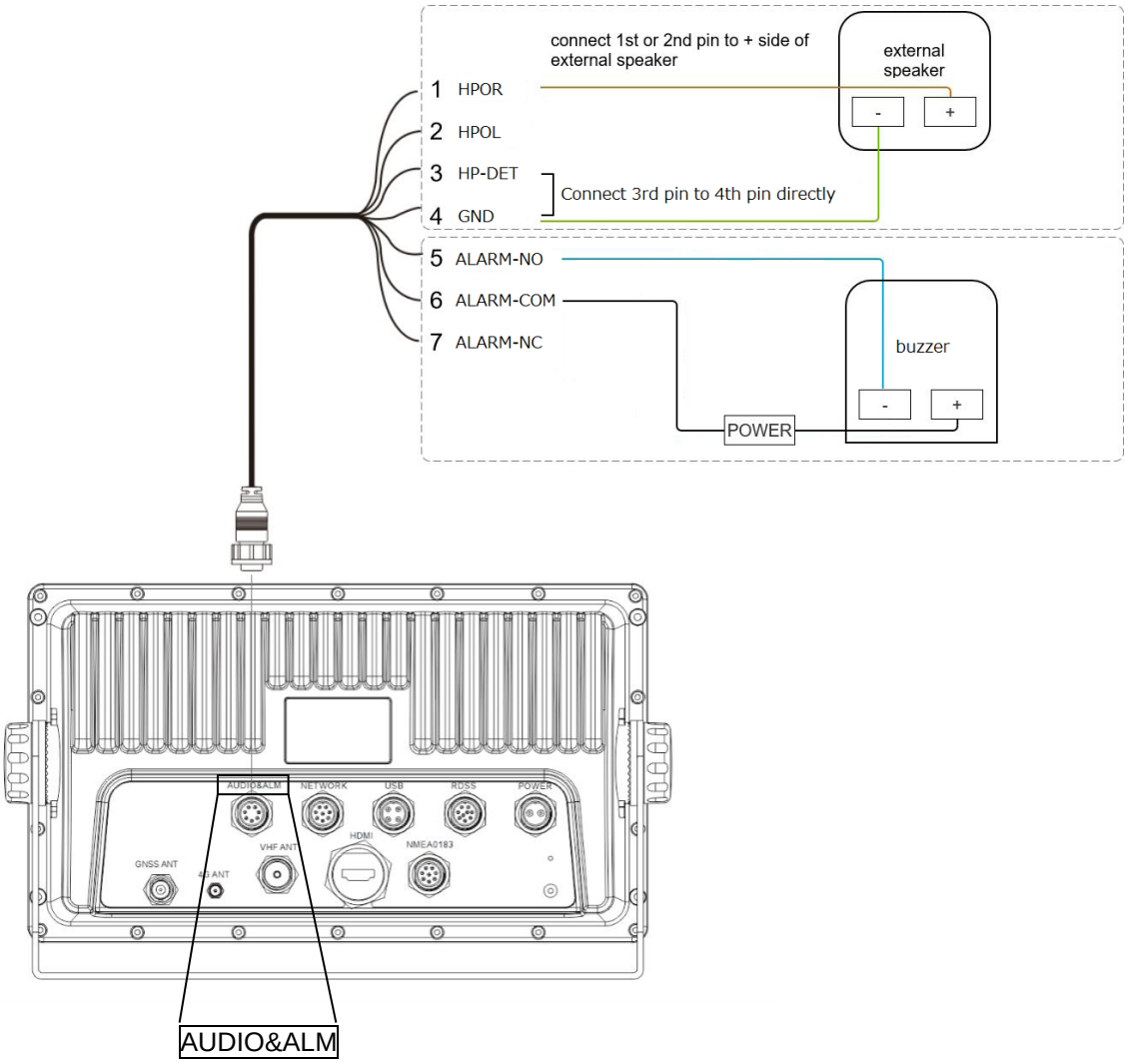
The relay contacts are switched ON for 1 second and OFF for 1.5 seconds when the alarm occurs. When the alarm condition is cleared, the relay contacts should be OFF.

Connection method:

Connect pin No.6 of the 7-pin connector (supplied) to the + (positive) side of the external buzzer, pin No.5 to the - (negative) side of external buzzer.

Connect as shown in the figure below. (There is no difference in the way the buzzer is connected to the model.)

Notice: As for the self-excited buzzer, use to a maximum current of 500mA and 12V to 24V as a guide, considering the safety margin.



Note: External speaker and buzzer are owner supplied.

Chapter 3 Specifications

3.1 Specification

Model	KSD-1100	KSD-1210
Operation System	Android 5.1 with OpenGL ES 3.0 & OpenCL 1.1	
CPU	Cortex-A17 quad core	
CPU speed	1.8 GHz 32 bit	
RAM	2 GB DDR3 1333 MHz	
Flash memory	16 GB	
Display size and type	10.1 inch Capacitive multi touch screen	21.5 inch Capacitive multi touch screen
Brightness	600 cd/m^2 (Max)	800 cd/m^2 (Max)
Display resolution	1280 x 800 (WXGA)	1920 x 1080 (1080P)
Power supply	10.8 VDC to 31.2 VDC	21.6 VDC to 31.2 VDC
Power consumption	15 W	60 W
GNSS	GPS / BDS / GPS & BDS	
	Position accuracy < 10m, 95% typical	
	Cold start time: 32 sec or less, Warm start time: 1 sec or less	
Audio power	1 W	3 W
MicroSD card slot*	2 ports (Support MicroSD card 32GB or less)	
Bluetooth	BT 4.0	
Wi-Fi	802.11 b/g/n	
Input data formats and sentences	NMEA0183 DPT, GGA, GLL, HDT, MTW, MWD, MWV, RMC, THS, VHW, VTG, ZDA	
Output data formats and sentences	NMEA0183 APB, BOD, BWC, DPT, GGA, GLL, GSA, GSV, HDT, MTW, MWD, MWV, RMB, RMC, THS, VTG, WPL, XTE, ZDA	
NMEA ports	Total: 4 ports Input: 2 Output: 1 Input / Output: 1 (Output: AIS fixed)	Total: 7 ports Input: 4 Output: 3 (GNSS or AIS or GNSS & AIS: 1, NMEA or AIS: 1, AIS fixed: 1)
Audio output	1	
Alarm output	1	
LAN net work	1000 Mbps	
Operating Temperature	-15°C to +55°C	
Water protection	IPX4	

AIS Class B	
Frequency	156.025 to 162.025 MHz
Bandwidth	25 kHz
Modulation	GMSK / FM
Number of AIS transmitter	1 channel
Number of AIS receiver	2 channels: Channel A CH87B (161.975MHz), Channel B CH88B (162.025MHz)
Output power	2W
Rx sensitivity	< -107 dBm @ PER<20%

*: MicroSD card slot or TF card slot

3.2 NMEA2000 PGN

Input and output PGN of NMEA2000 are as follows.

NMEA2000 is not supported if the software version is V1.X.XX.

Input PGN	
PGN	Content
129025	Position, Rapid Update
129026	COG ＆ SOG, Rapid Update
129029	GNSS Position Data
129033	Local Time Offset
129539	GNSS DOP
129540	GNSS Sats in View
126992	System Time
127250	Vessel Heading
127258	Magnetic Variation
129038	AIS Class A Position Report
129040	AIS Class B Extended Position Report
129041	AIS Aids to Navigation (AtoN) Report
129793	AIS UTC and Date Report
129794	AIS Class A Static and Voyage Related Data
129809	AIS Class B “CS” Static Data Report, Part A
129810	AIS Class B “CS” Static Data Report, Part B
129795	AIS Addressed Binary Message
129797	AIS Binary Broadcast Message
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message

Output PGN	
PGN	Content
129025	Position, Rapid Update
129026	COG ＆ SOG, Rapid Update
129029	GNSS Position Data
129033	Local Time Offset
129539	GNSS DOP
129540	GNSS Sats in View
127250	Vessel Heading
129038	AIS Class A Position Report
129039	AIS Class B Position Report
129040	AIS Class B Extended Position Report
129041	AIS Aids to Navigation (AtoN) Report
129793	AIS UTC and Date Report
129794	AIS Class A Static and Voyage Related Data
129809	AIS Class B “CS” Static Data Report, Part A
129810	AIS Class B “CS” Static Data Report, Part B
129795	AIS Addressed Binary Message
129797	AIS Binary Broadcast Message
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129283	Cross Track Error
129284	Navigation Data
129285	Navigation-Route/WP information

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