

Important Notice

Manual Handling	Keep this manual in a safe place where you can access it quickly.
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The Global Positioning System (GPS) consists of a total 24 GPS satellites that orbit the earth, enabling you to determine your position anywhere in the world, 24 hours a day, if you can receive satellite signals. During actual navigation, carefully compare the position data with all available navigation sources such as Loran C, Decca, other navigators, charts, visual navigation, depth, water temperature and others. It is your responsibility to make navigation judgments.

The Electronic Chart :

Only official authorized charts and notices to mariners contain all the information needed for the safety of navigation and, as always remember, the user is responsible for their prudent use.

Pictorials

This manual uses the following symbols for easy understanding safety instructions. Always follow these instructions carefully.

 WARNING	Always follow this safety instruction to prevent death or injury.
 CAUTION	Follow this safety instruction to avoid possible injury or damage to your property. Symbol “△” is a CAUTION or WARNING label indicating the safety instruction.
 WARNING	This symbol is an Electrical Shock WARNING label.
	Symbol is an instruction that you must not violate. (This symbol instructs NOT to disassemble the system components)
	Symbol is an operation instruction that you must follow. (This symbol shows the main power OFF instruction.)



WARNING <For System Operators>

Always follow this instruction to prevent death or personal injury.

	Turn power off During abnormality.	If smoke or a small of burning occurs, a fire or an electrical short circuit may result. Turn the power switch OFF and shut down the power supply immediately. Never try to repair the system yourself. Call for service.
	Do not open Cabinet.	High voltage exists in the instrument. Contact with voltage may cause possible injury or death.
	Do not touch back side of the equipment.	Harmful line voltage is present on back side of the equipment. Never try to touch back side while power is turned on.
	Avoid excessive shock to display unit.	The LCD display module contains a liquid. Do not apply any mechanical shock to the display. If the display broken, liquid may leak and injure your skin and eyes.
	Do not use with poor ventilation.	If you cover this unit or use in an enclosed place, it may malfunction or become damaged as a result of overheating. Use only where there is sufficient ventilation.

Installation Cautions <For service Personnel>

Follow installation instructions to avoid personal injury and system malfunction.

Installation in rigid location.	Mount your Vega series on a rigid frame or base to prevent your unit from working loose.
Use correct Installation materials.	Use the installation materials provided in the standard accessory pack only. If you use hardware of insufficient strength, your system may loosen causing damaged.
Keep away from direct sunlight.	Keep your system out of direct sunlight as it may become damaged by overheating.
Keep away from water.	Take care not to get water on or in your unit as it may be damaged and/or cause an electrical shock.
Keep away from heat source.	Keep your system away from other heat source as it may malfunction, be damaged, or burn.

Use correct power source.	Operate your system within the specified power voltage. An incorrect power supply may cause
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Maintenance Cautions<For Maintenance Personnel>

Use the following safety precaution internal inspection.

Discharge capacitors.	High voltage may be retained in the capacitors if the high-tension circuit several minutes after you have turned the power switch off.
Check that power is OFF	To prevent an electrical injury due to erroneous power switching, make sure that the main power supply and the system power switch are both in the off position. Additionally, attach a safety label showing that service is in progress.
Avoid EMI.	Take care not to damage the ESDs (Electrostatic Sensitive Devices) by static electricity from carpet and cloths.
Avoid dust.	Wear a safety mask so as not to breath in dust during inspection or cleaning inside your system instruments.

Operation Notes <For operators>

Observe the following operation notes, otherwise the system failure or deterioration can result. And periodical inspection and maintenance are required for keeping the system in an optimum condition.

Backup important data.	The waypoint and other registered data may become unreadable by unexpected failure. We recommend recording this data separately.
Use correct transducer only.	If you use incorrect transducer, the transmitter circuit may be damaged due to a matching error. Consult is for system information.
Check transducer Connection before power on	Do not turn the power switch ON if the transducer is disconnected or if it is not inserted into the water. If done, the transducer or transmitter circuit may be damaged.
Always clean the transducer	Since transducer performance can drop due to accumulated bottom growth, keep the transducer clean. Never paint transducer surface.

Transducer must be installed by authorized personnel.	Consult us for transducer installation by authorized personnel.
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 WARNING	This product is designed to assist a navigation. When you are sailing, use the certified chart from the Government or IMO.
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Vega Series System

Welcome

Vega series opens a new chapter of performance and integration in vessel navigation system display and management. Whether you are a Cruiser or Sport fisherman or both, Vega series gives you the information you need.



CAUTION

Vega series is Color LCD Charting Systems employs the latest in proven technology to provide accurate navigation information. The Plotter functions of Vega series are totally dependent upon the capability of the navigation source to provide accurate position information. This device is only an aid to navigation. It should be used in conjunction with all other navigation accuracy. For safety, always resolve any uncertainty before continuing navigation.



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DISPLAY BREAKAGE WARNING

The LCD display module contains a liquid. If the display is broken and the liquid contacts your skin, wash it off immediately in running water for 15 minutes. If the liquid contacts your eyes, immediately flush your eyes with running water for 15 minutes. Contact a physician if any abnormal symptom is experienced.

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There is no direct relationship between the color of water areas and their depth. The navigator shall always query the area for depth information and use the official paper chart.



CAUTION

The performance of LCD displays is degraded by continuous direct exposure to ultraviolet rays. Locate your Vega series Display away from direct sunlight. When not in use. Keep the display covered.

Vega Series System



DISPLAY BREAKAGE WARNING

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INDICATION NOTICE

*: It is important or warning notice on front of article

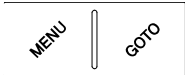
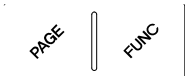
#: It is only functions for the Combo unit on front of article.

[]: Keyboard.

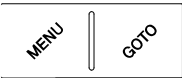
Getting Started

1. The Keyboard

1.1. Chartplotter

KEY	Description
	use this to select menu items, move the on-screen cursor
	Rotary: use this to select menu items Button: push the end of the everything to confirm a selection or entry
	Setting up Using Frequently key function.
	Change the chart of scale
	[MENU]: Open the menu [GOTO]: Select the Goto function
	[PAGE]: Select the configuration & modification you wish. [FUNC]: Choose your favorite function.
	[WPT]: Press to place a waypoint and access the waypoint option. Press and hold to place a MOB marker at your current position. [TRACK]: Start and stop AIS tracks & Vessel tracks .
	[CANCEL]: Cancel the setting or exists from the menu [PWR]: Power on/off, Restart, Control BRG, Day/Night, Lock touch screen, WiFi, Bluetooth, Data layout, etc.

1.2. Chartplotter+Fishfinder

KEY	Description
	use this to select menu items, move the on-screen cursor and Choosing the frequency
	Rotary: use this to select menu items and Adjustment of gain & STC level with turning. Button: push the end of the everything to confirm a selection or entry
	Setting up Using Frequently key function.
	Change the chart of scale
	[MENU]: Open the menu [GOTO]: Select the Goto function
	[PAGE]: Select the configuration & modification you wish. [FUNC]: Choose your favorite function.
	[WPT]: Press to place a waypoint and access the waypoint option. Press and hold to place a MOB marker at your current position. [TRACK]: Start and stop AIS tracks & Vessel tracks .
	[CANCEL]: Cancel the setting or exists from the menu [PWR]: Power on/off, Restart, Control BRG, Day/Night, Lock touch screen, WiFi, Bluetooth, Data layout, etc.

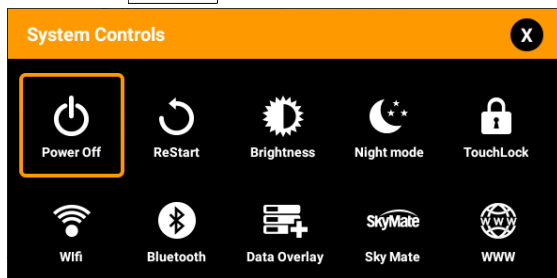
1.3. Chartplotter+Fishfinder

KEY	Description
	use this to select menu items, move the on-screen cursor and Choosing the frequency
[FUNC1][FUNC2] [FUNC3]	Setting up Using Frequently key function.
[+][-]	Change the chart of scale and Setting up the depth range
[MENU]	Open the menu
[MODE]	Selects the map orientation & Fishfinder mode.
[PAGE]	Select the configuration & modification you wish.
[SELECT]	Selects the key, when plotter and Fish finder are displayed on the screen.
	Turns the cursor on/off.
[QUICK NAV]	Uses instant navigation.
[TRACK ON/OFF]	Start and stop AIS tracks & Vessel tracks.
[WPT INPUT]	Press to place a waypoint and access the waypoint option.
[STOP NAV]	Stops the present navigating.
[TRACK COLOR]	Changes the color of the tracks.
[WPT COLOR]	Changes the color of the WPT.
[SETUP NAV]	Changes and sets up WPT and route.
[TRACK ERASE]	Erases the tracks.
[WPT SYMBOL]	Changes the symbol of the WPT.
[CLEAR]	Cancel the setting or exists from the menu.
[ENTER]	The end of the everything to confirm a selection or entry



Power “on/off”, brightness and day/night mode.

1.4. How to use



(Fig.1.1)

1.3.1. Turn on

 Switch on.

1.3.2 Turn off

1.3.2 Turn off

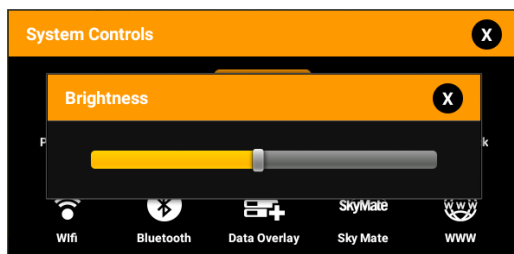
Choose “Power off” on (Fig. 1.1).

1.3.3 Restart

Choose Restart on (Fig. 1.1).

1.3.3. Adjust brightness

Choose “Brightness” on (Fig.1.1).



(Fig.1.2)

1.3.4. Use day/night mode

Choose “night mode” on (Fig.1.1).

1.3.6. How to lock the tough screen

Keep pressing “Toughlock” on (Fig.1.1) and the color changes to orange and activate. In touchlock, touch icons disappear on the screen and deactivate. For activate, keep pressing “ToughLock”.

1.3.7. WiFi

Choose “WiFi” on (Fig.1.1).

1.3.8. Bluetooth

Choose “Bluetooth” on (Fig.1.1).

1.3.9. Data Layout

Choose “Data Layout” on (Fig.1.1).

(*For detailed information, PLS refer how to use data layout)

1.3.10. Sky Mate

Choose “Sky Mate” on (Fig.1.1).

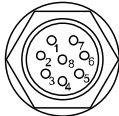
1.3.11. Web Browser

Choose “WWW” on (Fig.1.1).

2. Specification of the connectors

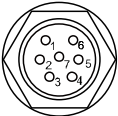
2.1. Metal connectors

2-TD



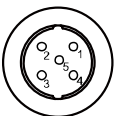
NO	NAME
1	SPD_PULSE
2	SPD_VCC
3	TD1
4	TD_GND
5	TD2
6	TEMP_VCC
7	TEMP_SIG
8	SPD_GND

3-TD



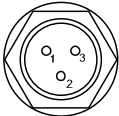
NO	NAME
1	UDL_TD 2
2	UDL_TD 1
3	UFF_TD 2
4	UFF_TD 1
5	TEMP_VCC
6	TEMP_SIG
7	TD_GND

NMEA 2000



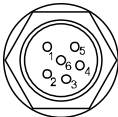
NO	NAME
1	SHIELD
2	DC + 12V
3	DC -
4	CAN_H
5	CAN_L

POWER



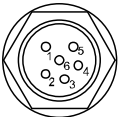
NO	NAME
1	DC +(12V~36V)
2	DC -
3	NC

NMEA0183



NO	NAME
1	GND
2	TX +
3	GND
4	RX +
5	RX -
6	NC

AIS

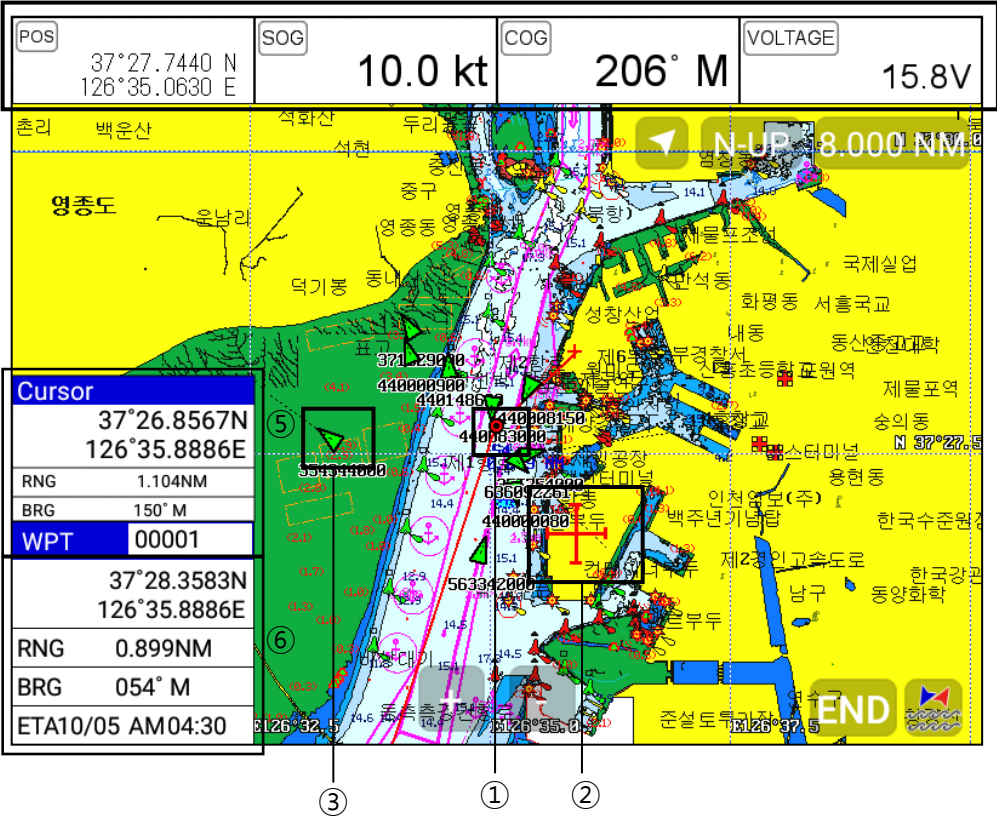


NO	NAME
1	GND
2	TX +
3	GND
4	RX +
5	RX -
6	NC

3. Screen Overview

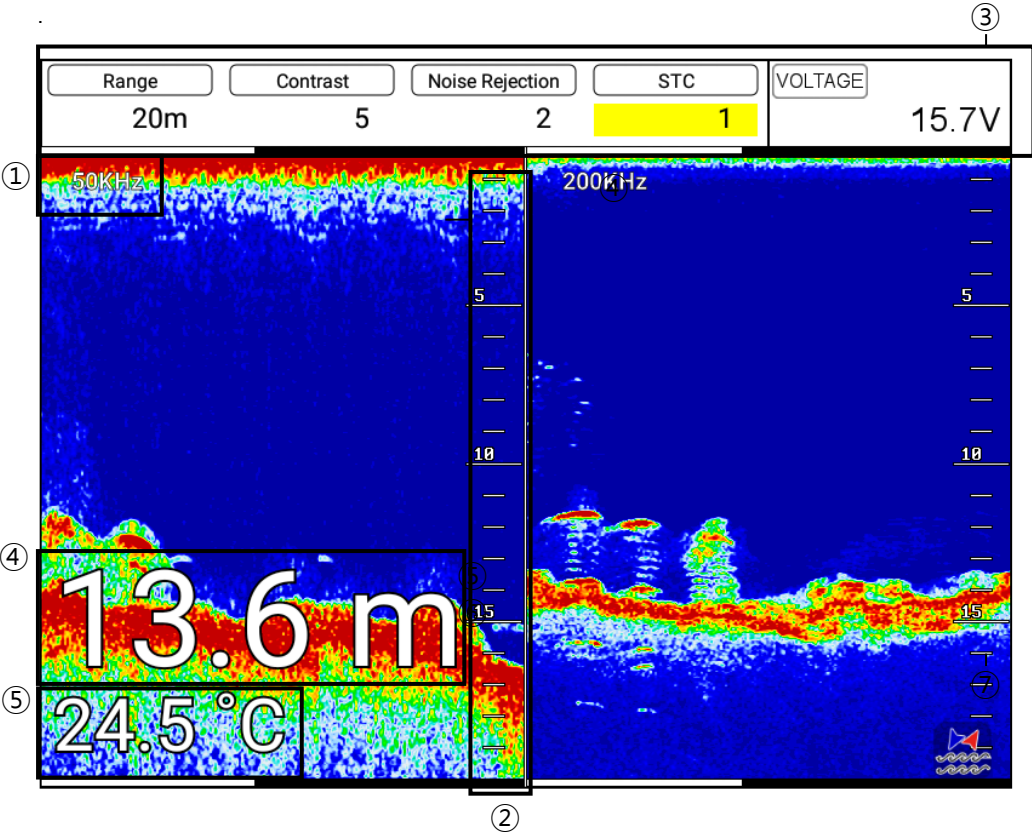
3.1. Chartplotter page

④



①	Vessel icon	The present position.
②	Cursor	Showing the cursor icon.
③	AIS target	Showing the received AIS target.
④	Databar	Showing various data on the top or bottom.
⑤	Cursor INFO	The information of the cursor.
⑥	WPT INFO	The information of WPT such as LAT/LOT, Range, etc.

3.2. Fishfinder page



①	Frequency	Showing the using frequency.
②	Depth bar	The current depth.
③	Databar	Showing various data on the top or bottom.
④	Depth	Showing the current depth of water.
⑤	Temperature	Showing the current water temperature.

3.3. Navigation Data page

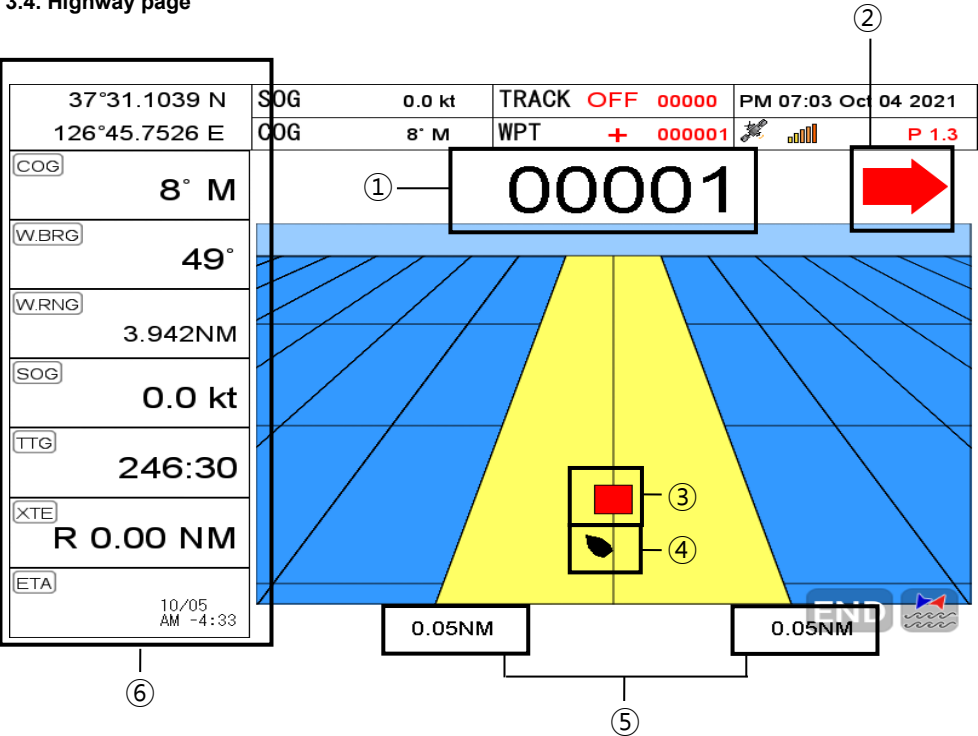
3.3.1. Navigation Data Type1

40°52.266 N	SOG	10.0 kt	TRACK OFF 00000	AM 01:13 2021Oct05
74°03.115 W	COG	12° M	WPT + 000001	  P 1.1
40° 52. 2665 N 74° 03. 1152 W				
SOG	COG	TOT TIME		
10.0 kt	12° M	0:06		
TRACK	WINFO	HDOP PDOP	WBRG	
OFF 00000	+ 000001	0.75 1.11	- - - ° -	
DATE	TIME	VOLTAGE	XTE	
2021.Oct.05	AM 01:13	15.8V	- . - - 	

3.3.2. Navigation Data Type2

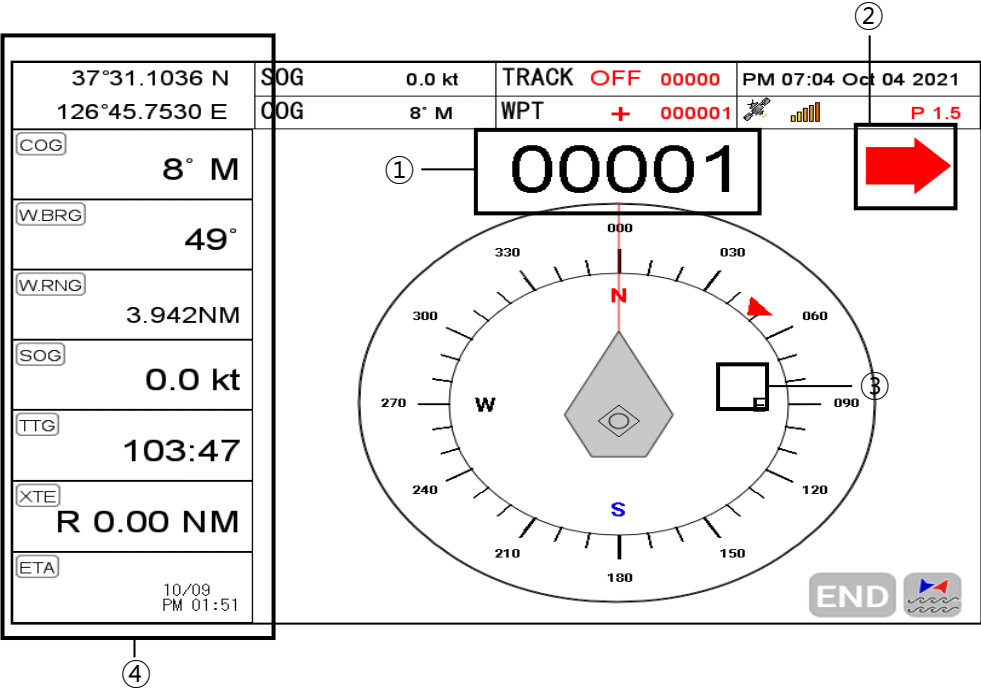
37°31.1030 N	SOG	0.0 kt	TRACK OFF 00000	PM 02:52 2021Oct13
126°45.7538 E	COG	27° M	WPT + 000001	  P 1.3
POS	37° 31. 1030 N 126° 45. 7538 E		WPOG	37° 30. 4677 N 126° 44. 7882 E
TRACK	WINFO	WName	WBRG	
OFF 00000	+ 000001	POINT00	238°	
DATE	TIME	WRNG	TTG	
2021.Oct.13	PM 02:52	0.996 NM	124:33	
ETA	TOT TIME	XTE	DEPTH	
10/19 AM 06:25	0:01	R 0.00 NM	--.- m	
TRACK	WINFO	VOLTAGE	TEMP	
OFF 00000	+ 000001	16.1V	END 	

3.4. Highway page



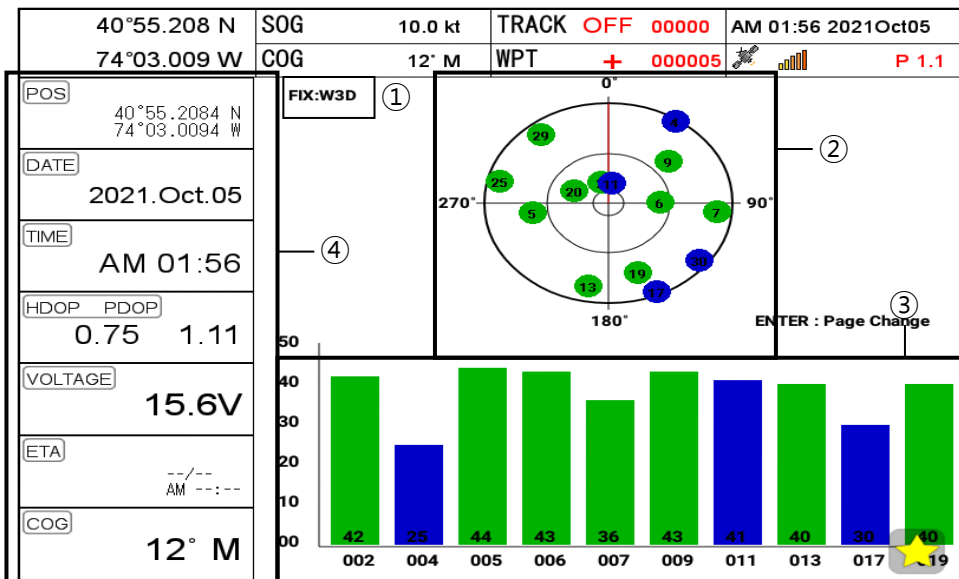
①	WPT name	The current WPT name.
②	Direction of steer	The best direction of the steering.
③	WPT icon	The remaining distance of the WPT.
④	Vessel	The out of the range from the best.
⑤	XTE Range	The range of the XTE alarm.
⑥	Navigation Data	The information of the various data.

3.5. Steering page



①	WPT name	Name of the WPT.
②	Direction of steer	The best direction of the steering.
③	WPT icon	Showing the WPT and the bearing
④	Navigation Data	Information of the various data.

3.6. GPS Status page



①	Receiver status	The current GPS status.
②	Position of SAT.	Position of the satellites.
③	SNB Graph	Showing the WPT and the bearing.
④	Navigation Data	Information of the various data.

* Colors of the GPS status

Black: Tracked, but no signal

Blue: Tracked, but not used, Satellite

Green: Used Satellite

Light Blue: SBAS Satellite

4. Databar

Showing various data on the top or bottom.

POS 40°55.264 N 74°03.009 W	SOG 10.0 kt	COG 12° M	VOLTAGE 15.6V
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4.1. Mode

► [MENU]->Advance->Setup->Customizing->Databar->Mode

Databar has three meanings as below.

4.1.1. GPS

Showing the largest LAT/LOT.

40°55.301 N 74°03.009 W	SOG	10.0 kt
	COG	12° M

4.1.2. HY

Showing the LAT/LOT, SOG, COG and userdata.

40°55.330 N	SOG	10.0 kt	TRACK OFF 00000	AM 01:58 2021Oct05
74°03.009 W	COG	12° M	WPT + 000005	  P 1.1

4.1.3. HY2

Showing LON/LAT, mark, track and time/date.

WGS-84	40°55.355 N	+ 000005	Stop 00000	AM 01:58 2021 Oct 05
	74°03.009 W			

4.1.4. Customizing

Showing various data as what the user wants.

► [MENU]->Advance->Setup->Customizing->Databar->Edit or keep pressing the databar on the screen.

Chart DataBar Custume

◀

▶

ENTER

CANCEL

(Fig.1.3.1)

The databar is coming as (Fig.1.3.1), and choose the frame with [◀][▶].

Four frames are available as (Fig 1.3.2).

Chart DataBar Custume

◀

▶

ENTER

CANCEL

Chart DataBar Custume

◀

▶

ENTER

CANCEL

Chart DataBar Custume

◀

▶

ENTER

CANCEL

Chart DataBar Custume

◀

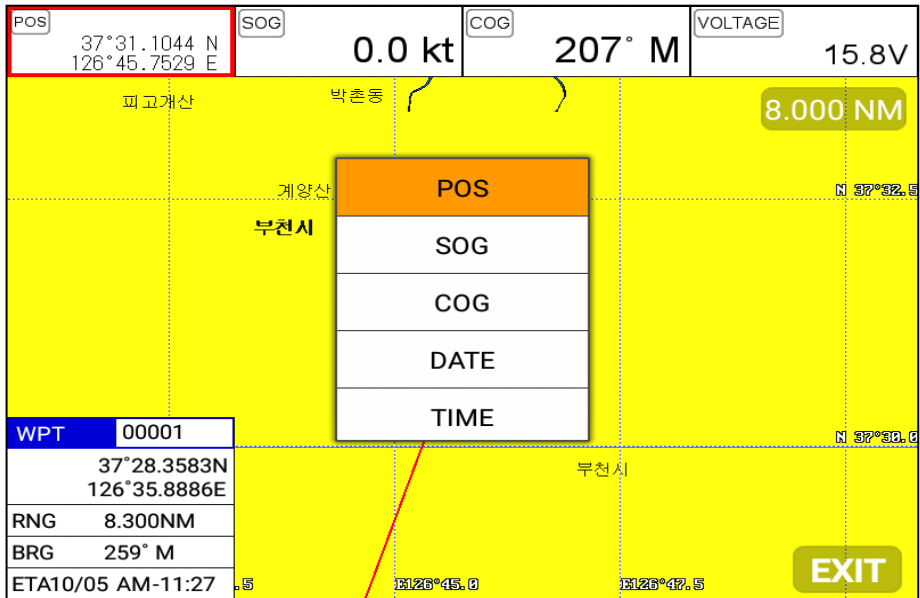
▶

ENTER

CANCEL

(Fig.1.3.2)

When choosing the frame, setting up in each box as (Fig.1.3.3).



(Fig.1.3.3)

When finishing the set up, press [CANCEL] to exit or touch “EXIT” on the screen..

(*Please, refer “Customizing” for further question.)

4.2. Display

► [MENU]->Advance->Setup->Customizing->Databar->Display

Setting the databar, “Shown/Hidden”.

4.3. Position

► [MENU]->Advance->Setup->Customizing->Databar->Position

Setting the databar position on the top or bottom.

5. Cursor

5.1. Calling the cursor

Press [◀][▶][▼][▲] on the chart, the cursor comes out.

5.2. Moving

Press [◀][▶][▼][▲], the cursor is moving to the direction.

Press [◀][▼] together, the cursor is moving to “↙”.

Press [▶][▼] together, the cursor is moving to “↘”.

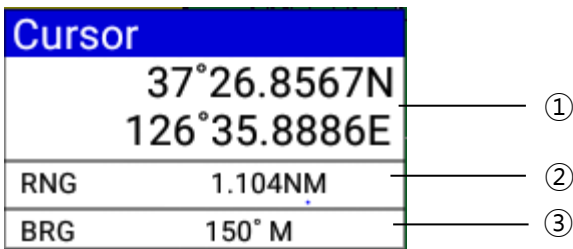
Press [◀][▲] together, the cursor is moving to “↖”.

Press [▶][▲] together, the cursor is moving to “↗”.

5.3. Removing the cursor

Press CANCEL to remove the cursor.

5.4. Cursor information window



①	Latitude/Longitude	LAT/LON of the cursor.
②	Range	Distance between the cursor and the present position.
③	Bearing	Bearing from the present position to the cursor.

5.5 . Cursor information window shown/hidden

► MENU->Advance->Setup->Customizing->INFO window->Cursor

Cursor information window “Shown/Hidden”.

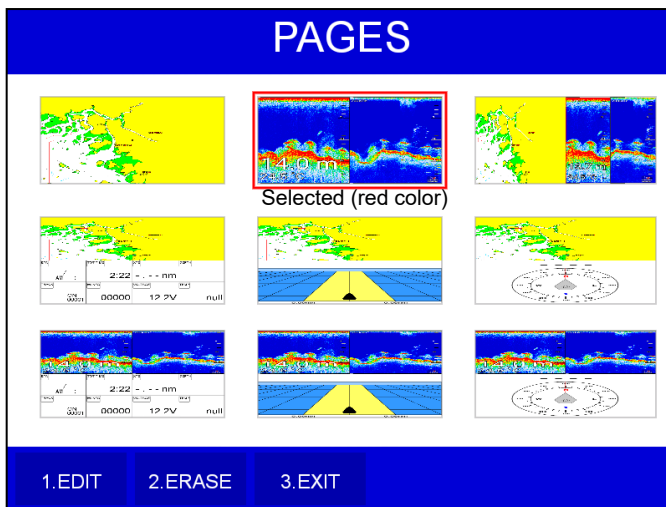
6. Page

►[PAGE]

Choosing the various pages that set up pages or customized.

Move the red box to choose the page.

Rotate the knob or press [◀][▶][▼][▲] to move the red box on your page and Enter to finish.



(Fig.1.4)

6.1. Page mode

►[MENU]->Advance->Setup->Customizing->Page mode

Two ways to choose the page.

6.1.1. Standard

With seeing the set up page, choosing the page or modifying.

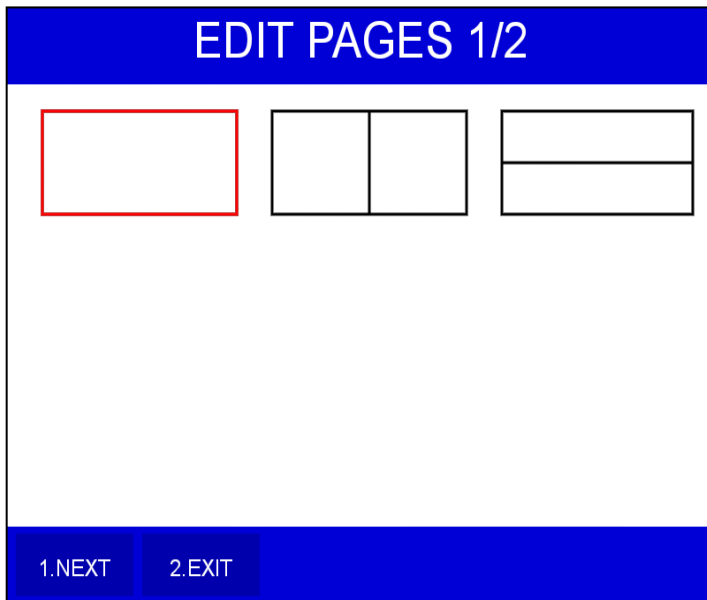
6.1.2. Flip

Showing the set up pages in order.

(* In Flip mode, modifying the order is available.)

6.2. Modify

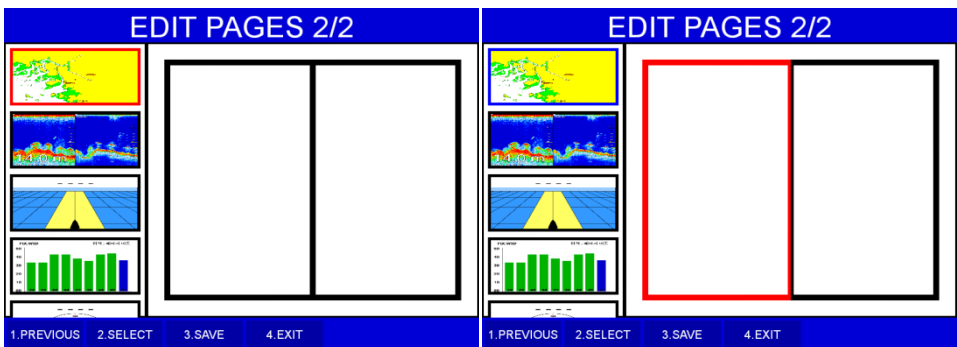
Move the red box on your page of (Fig1.4) and keep pressing [PAGE] or long press to move (Fig.1.4.1).



(Fig.1.4.1)

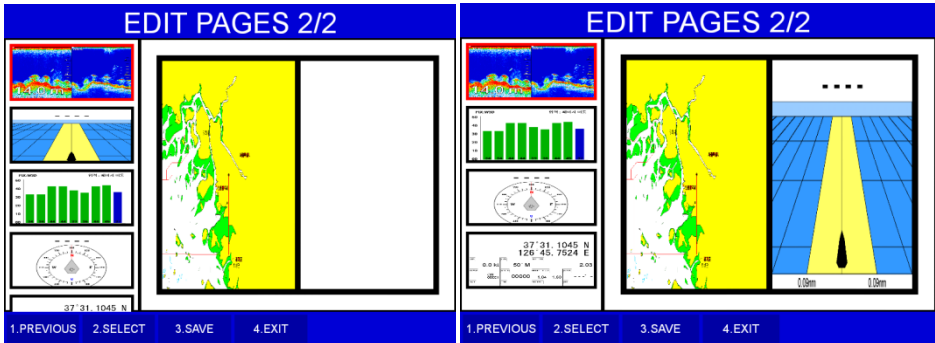
Choose your frame on (Fig.1.4.1).

Using key: use [▼][▲] and move the red box to choose the pages and press [►]. When you finish, press [Enter].



1. Choose the pages with [▼][▲]

2. Press [►], choose with [▼][▲]

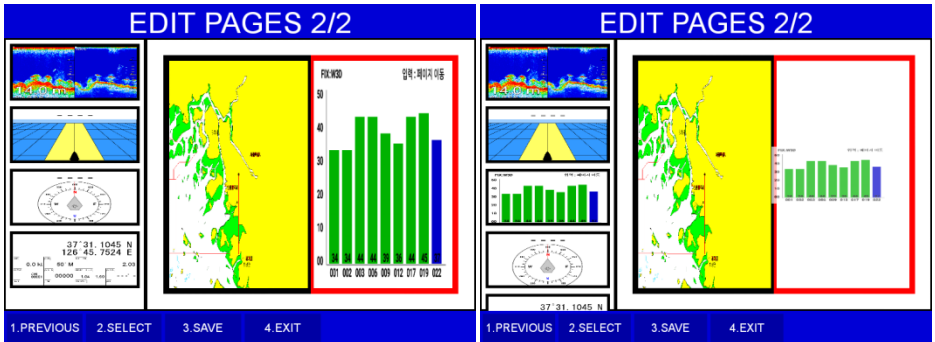


3. press [Enter]

(Fig.1.4.2)

4. Keep choosing and Enter to finish

Long press: Choose the page and long press for drag the page into the frame..



(Fig.1.4.3)

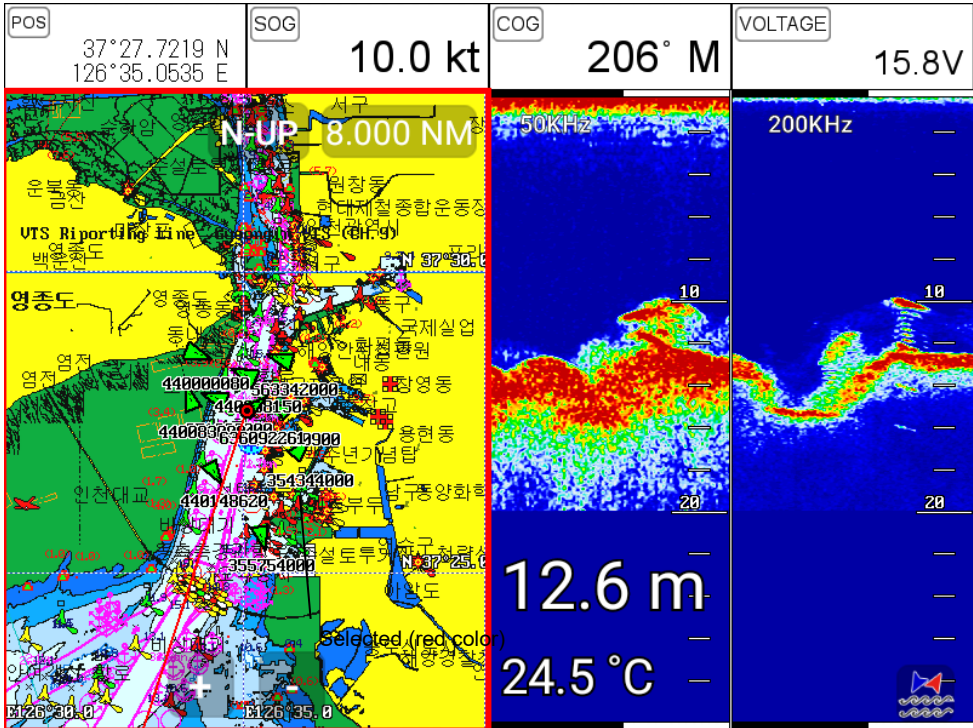
When complete, press [Enter] to finish.

7. Active

▶[ACTIVE]

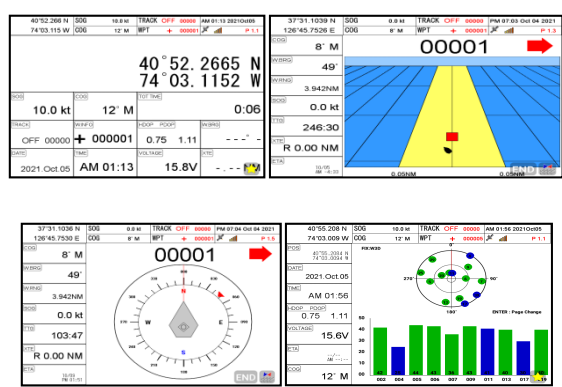
When pressing [FUNC], the red box moves to to chartplotter or fishfinder.

(*All key functions change to chartplotter or fishfinder)



8. Navigation Data

Navigation data is available in Navigation data page, Steering page, Highway page as (Fig.1.5).



(Fig.1.5)

8.1. Type

►[MENU]->Advance->Setup->Customizing->Navigation data->Type

Two types of Navigation data page.

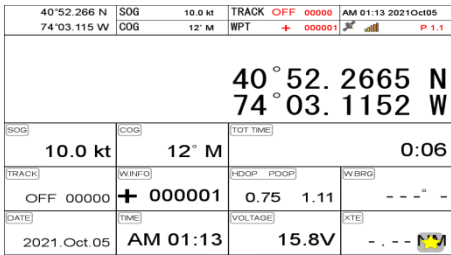
8.1.1.Type1

Large LAT/LOT as (Fig.1.5.1).

(*Editing the LAT/LOT is unavailable)

8.1.2. Type2

Various data as (Fig.1.5.2).



(Fig.1.5.1)

(Fig.1.5.2)

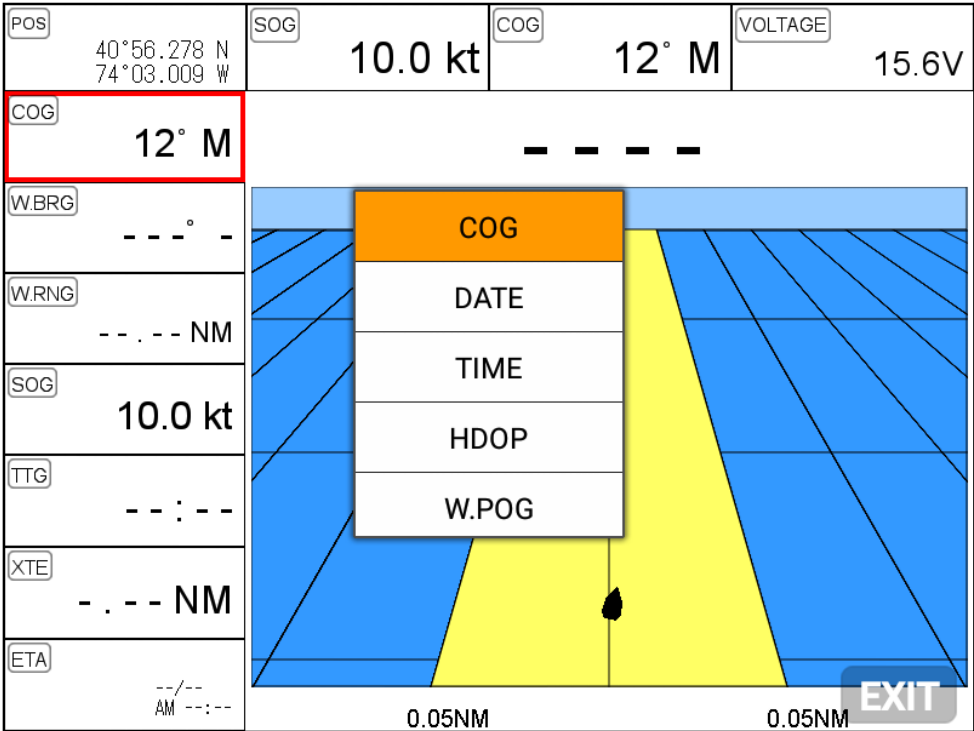
8.2. Edit

(*If there is no navigation data on the page, editing the navigation data is unavailable)

► [MENU]->Advance->Setup->Customizing->Navigation data->Edit

After finishing as (Fig.1.5.3), press [CANCEL] to exit.

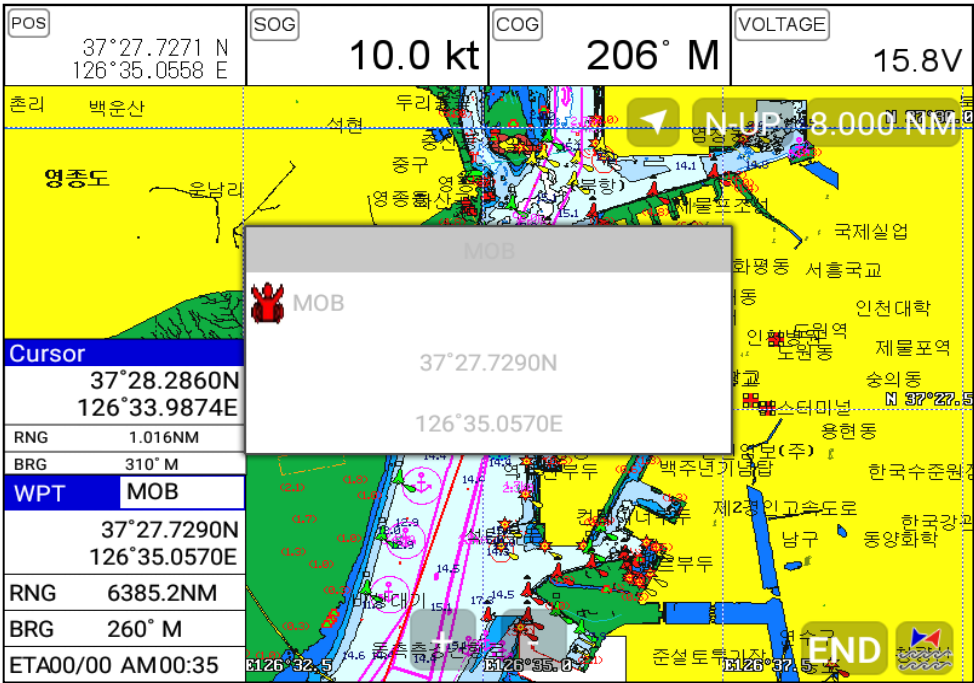
(*Please, refer “Customizing” for further question)



(Fig.1.5.3)

9.MOB

If a person or missing an object overboard and you need to get present position, use the MOB function.



(Fig.1.6)

9.1. Inputing

Keep pressing [WPT] until the window comes out as [Fig.1.6] and then “MOB” comes out with alarm.

9.2. Exiting the alarm

When alarming, press [CANCEL] and you may exit the alarm.

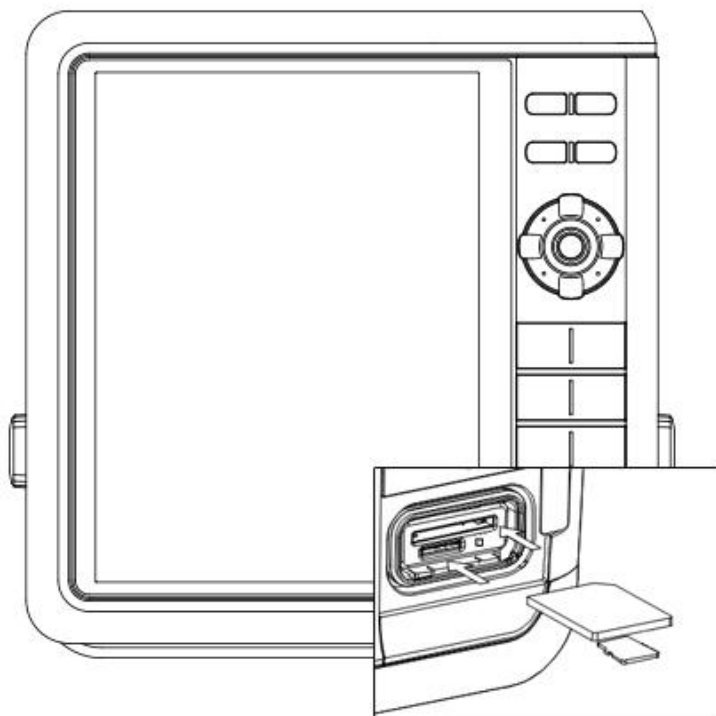
9.3. Removing

While MOB is setting, press [WPT] again and you may remove the “MOB”.

(*MOB is not stored in the flash memory)

10. Memory Card

Inserting the SD and micro SD as (Fig.1.7.1).



(Fig.1.7.1)

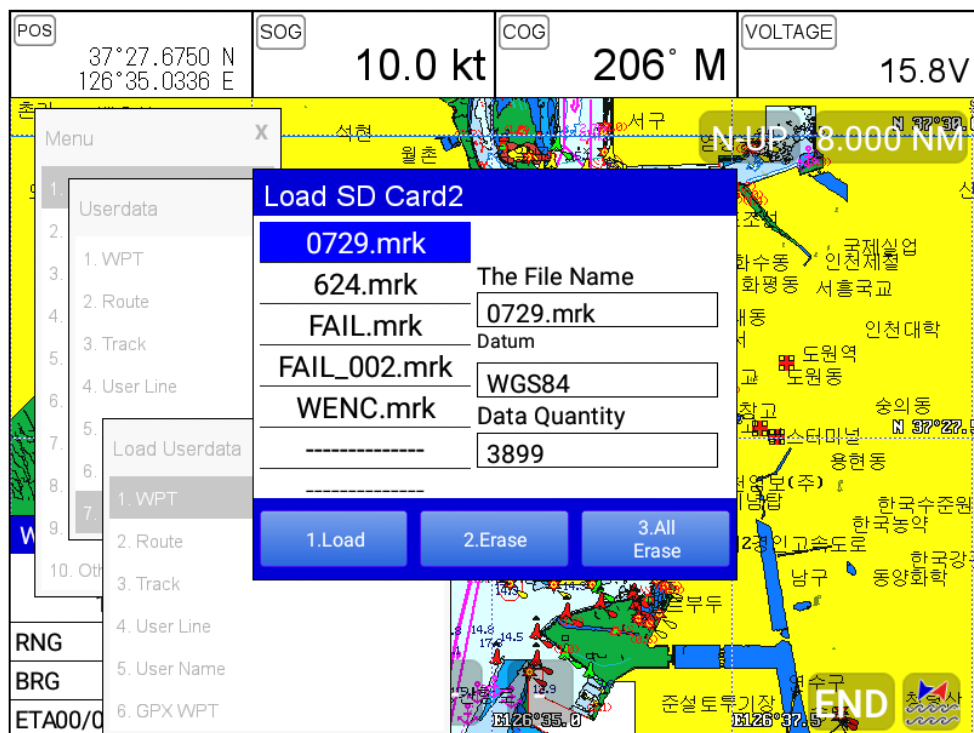
11. Save Userdata

► [MENU]->Userdata->Save Userdata

Userdata is stored in the external SD/Micro SD. So if you want to save the userdata, a SD/

Micro SD must be inserted in the slot.

(*Userdata is in “..\HY\UserData”)



11.1. WPT

WPT can be stored in a SD/Micro SD.

When storing, give it a name and you will be able to store many WPT' in the SD/Micro SD.

11.2. Route

Route can be stored in a SD/Micro SD.

When storing, give it a name and you will be able to store many routes in the SD/Micro SD.

11.3. Track

11.3.1. Type1

Track can be stored in a SD/Micro SD.

When storing, give it a name and you will be able to store many tracks in the SD/Micro SD.

11.3.2. Type2

Track can be stored in a SD/Micro SD.

Index will be a standard in Type2. After choosing the index, stored it.

11.4. User Line

User Line can be stored in a SD/Micro SD.

When storing, give it a name and you will be able to store many user lines in the SD/Micro SD.

11.5. User Name

User Name can be stored in a SD/Micro SD.

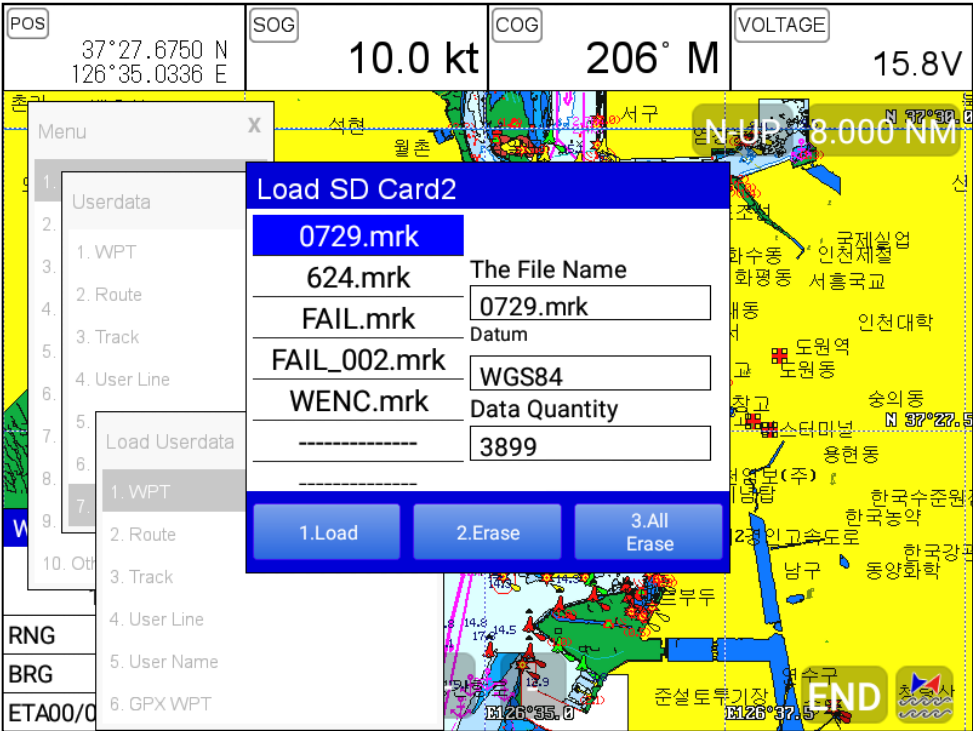
When storing, give it a name and you will be able to store many user names in the SD/Micro SD.

12. Load Userdata

▶ [MENU]->Userdata->Load Userdata

Userdata loads from the stored SD/MicroSD. If you need to load the userdata, the stored SD/MicroSD must be inserted in the slot.

(*Userdata is in “..\HY\UserData”)



12.1. WPT

WPT loads from the stored SD/MicroSD.

All of WPT in the SD/MicroSD show on the list. Choose one of them and it will show.

There are two ways to load WPT.

First, showing the stored WPT as well as the existing on the screen. After loading the stored, you will see the window and press [MENU].

Second, showing only stored WPT. After loading the stored, press [ENTER].

12.2. Route

Route loads from the stored SD/MicroSD.

All of route in the SD/MicroSD show on the list. Choose one of them and it will show.

12.3.Track

12.3.1. Type1

Track loads from the stored SD/MicroSD.

All of track in the SD/MicroSD show on the list. Choose one of them and it will show.

12.3.2. Type2

Track loads from the stored SD/MicroSD.

Index will be a standard in Type2. After choosing the index, stored it.

12.4. User Line

User line loads from the stored SD/MicroSD.

All of user line in the SD/MicroSD show on the list. Choose one of them and it will show.

12.5. User Name

User name loads from the stored SD/MicroSD.

All of user name in the SD/MicroSD show on the list. Choose one of them and it will show.

Chartplotter getting started

1. GOTO

1.1. Goto type1

1.1.1. Setting

► [MENU]->Navigation->Goto type->type1

Setting GOTO with creating a route at the same time.

Move the cursor to the position where you want to go and press [ENTER].

(*While navigating, WPT can be added in the route)

1.1.1.2. Exit/Store

If you want to exit, remove the cursor and press [GOTO]. The window to store or not shows up.

Choose one of them and you will exit.

(*If you have one WPT in the route, the WPT will be stored. If you have more than two, all of WPT and the route will be stored together)

1.2. Goto type2

1.2.1. Setting

► [MENU]->Navigation->Goto type->type2

Direct GOTO where you want to go. Only one destination is available.

1.2.2. Exit/Store

If you want to exit, remove the cursor and press [GOTO]. The window to store or not shows up.

Choose one of them and you will exit.

1.2.3. Changing

While navigating, you can change a new destination. Move the cursor and press [GOTO] for the new destination.

2. WPT

2.1. List

►[MENU]->Userdata->WPT->List

Editing, creating, erasing and navigating are available on the WPT list.

WPT List

◀ Page 1/434 ▶

Latitude/Longitude②

①

00809 – Selected

00810

00985

00986

01001

01002

01005

01006

01022

34°34.865 N

127°01.834 E

WPT Name ③

2019.01.29 AM 01:49

Depth ⑤

8ft

BRG ⑥

92°

RNG ⑦

6125NM

Symbol ⑧

Color ⑨

1.Edit

2.Add

3.Erase

4.Sort

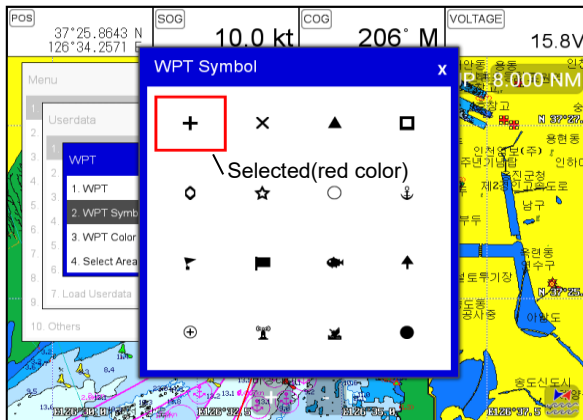
5.All Erase

6.Goto

①	List	Showing all of the stored WPT.
②	Latitude/Longitude	LAT/LOT of the WPT.
③	Name	Name of the WPT.
④	Date & Time	Date and time of the WPT when stored
⑤	Depth	Depth of the WPT.
⑥	Bearing	Bearing between the WPT and the present position.
⑦	Range	Distance between the WPT and the present position.
⑧	Symbol	Symbol of the WPT.
⑨	Color	Color of the WPT.

2.2. Setting the WPT symbol

► [MENU]->WPT Symbol

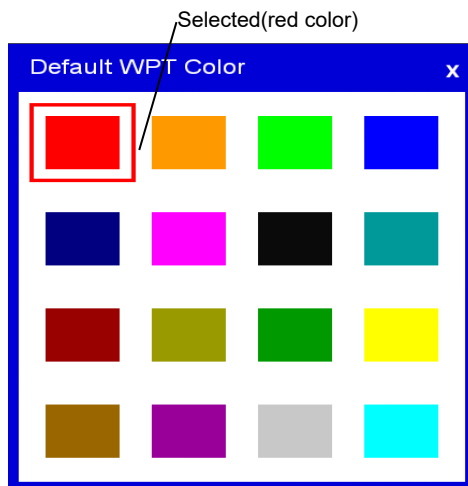


Choose the symbol and press [ENTER].

The chosen symbol will show when inputting WPT.

2.3. Setting WPT Color

► [MENU]->WPT Color



Choose the color and press [ENTER].

The chosen color will show when inputting WPT.

2.4. Creating

2.4.1. Creating on the list

►[MENU]->Userdata->WPT->List->[2.Add]

Adding WPT with pressing [2.Add].

(*When adding, LAT/LOT show the present position and current symbol/color show for the WPT)

2.4.1. Inputting on the chart

Call the cursor and move the position where you want, and press [WPT].

(*The current symbol/color show for the WPT)

2.5. Erasing

2.5.1. Erasing on the list

►[MENU]->Userdata->WPT->List->[3.Erase]

Choose the WPT you want to erase and press [3.Erase]

2.5.2. Erasing on the chart

Call the cursor and put it on the WPT, and press [ENTER].



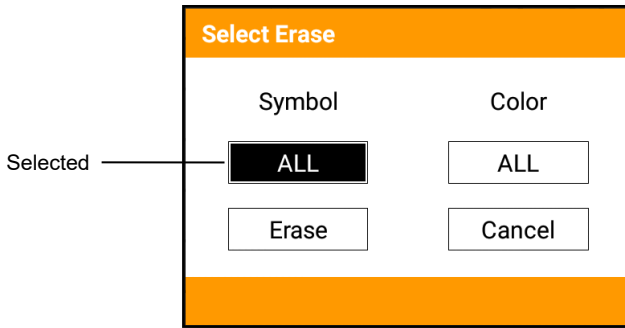
2.6 Erasing all of WPT

►[MENU]->Userdata->WPT->List->[5.All Erase]

On the WPT list, press [5.All Erase].

1. Erase all: Choose “ALL” of symbol and color and “Erase” and Enter.

2. Erase by color and symbol: Choose the color and the symbol and “Erase” and Enter.



(Fig.1.8.)

2.7. Moving the WPT

1. Call the cursor and move it on the WPT, and press [ENTER].
2. Choose "Move".



3. Move the WPT to the position where you want to move, and press [ENTER].

2.8. Navigating

2.8.1. Navigating on the list

► [MENU]->Userdata->WPT->List->[6.Goto]

Choose the WPT on the list and press [6.Goto].

2.8.2. Navigating on the chart

Call the cursor and move it on the WPT, and press [ENTER]. Choose "GOTO" to start.



2.10. Sorting

► [MENU]->Userdata->WPT->List->[4.Sort]

Sorting the order of WPT on the list.

WPT List		Latitude/Longitude	
◀ Page 1/434 ▶			
00809		34°34.8653 N	
00810		127°01.8346 E	
00985			
00986			
01001			
01002			
01005			
01006			
01022			
WPT Name		Date & Time	
00809		2019.01.29 AM 01:49	
Depth		BRG	
2m		175°	
RNG		Symbol	Color
176NM		▼ ○	▼ ■
1.Name	2.Recent	3.Old	4.Range
5.Symbol	6.Color		

2.11. Editing

► [MENU]->Userdata->WPT->List

Editing the WPT on the list.

WPT List

X

◀ Page 1/1088 ▶

Latitude/Longitude Edit Selected

WPT00000	WPT Selected 34°24.776 N 126°20.172 E WPT Name WPT00000 Date & Time 2013.05.25 AM 09:42 Depth 0ft BRG 92° RNG 6144NM Symbol ▼ + Color ▼
WPT00001	
WPT00002	
WPT00003	
WPT00004	
WPT00005	
WPT00006	
WPT00007	
WPT00008	

1.Edit

2.Add

3.Erase

4.Sort

5.All Erase

6.Goto

- 1. Choose the WPT as the blue and press [ENTER].
- 2. Choose the item as the green and you may begin to edit.
- 3. After finishing, press [CANCEL] to exit.

3. Route

3.1. List

►[MENU]->Userdata->Route->List

Route List

X

◀ Page 1/1 ▶

Route Name ②

Number of WPT ③

①

ROUTE001

ROUTE001

Total distance ④

0.0nm

Date & Time ⑥

2021.10.5 AM 02:24

Start WPT ⑦

Name

00000

LAT/LON

0°00.000 N

0°00.000 E

End WPT ⑧

Name

00000

LAT/LON

0°0.000 N

0°0.000 E

1.Edit

2.Add

3.Erase

4.Detail

5.Sort

6.Goto

3.2. Route detail

► [MENU]->Userdata->Route->List->[4.Detail]

ROUTE DETAIL

X

◀ Page 1/1 ▶

Latitude/Longitude ②

①

00002

00003

00004

40°52.002 N

74°02.999 W

WPT Name ③

00004

Date & Time ④

2021.10.5 AM 02:34

Depth ⑤

0ft

BRG ⑥

0°

RNG ⑦

0NM

Symbol ⑧

▼

+

Color ⑨

▼

1.Edit

2.Saved WPT

3.New WPT

4.Erase

5.Find

①	List	Showing the stored WPT
②	Latitude/Longitude	LAT/LOT of the WPT
③	Name	Name of the WPT
④	Date & Time	Date and time of the WPT when stored
⑤	Depth	Depth of the WPT
⑥	Bearing	Bearing between the WPT and the present position
⑦	Range	Distance between the WPT and the present position
⑧	Symbol	Symbol of the WPT
⑨	Color	Color of the WPT

3.3. Creating

Two ways to create route

The first uses “GOTO type1” and the second is “Creating new route” on the list.

3.3.1. Using “GOTO”

Use “GOTO type1” and create a route. Press [ENTER] to start.

Press [GOTO] to exit and choose “Store” if needed.

3.3.2. Creating new route on the list

► MENU->Userdata->Route->List

Press [2.Add] on the list to create a route.

Route List

X

◀ Page 1/1 ▶

Selected — ROUTE001

Route Name

ROUTE001

Total distance

0.0nm

Date & Time

2021.10.5 AM 02:24

Start WPT

Name

00000

LAT/LON

0°00.000 N

0°00.000 E

End WPT

Name

00000

LAT/LON

0°0.000 N

0°0.000 E

Number of WPT

0

Display

ON

1.Edit

2.Add

3.Erase

4.Detail

5.Sort

6.Goto

3.4. Edit

► MENU->Userdata->Route->List

Choose the route on the list to edit.

ROUTE DETAIL [X]

Page 1/1 Latitude/Longitude

00001	37°31.1030 N 126°45.7521 E	
-----	WPT Name	Date & Time
-----	00001	2021.10.14 AM 04:21
-----	Depth	BRG
-----	0m	0°
-----	RNG	Symbol Color
-----	0NM	[v] [+] [v] [Red Box]

1 Edit 2 Saved WPT 3 New WPT 4 Erase 5 Find

3.5. Detail edit

► [MENU]->Userdata->Route->List->[4.Detail]

Choose the route on the list and press [4.Detail]. The window of Route detail shows.

3.5.1. Adding WPT

Two ways to add WPT

3.5.1.1. Adding the stored WPT

► [MENU]->Userdata->Route->List->[PAGE]->[2.Saved WPT]

ROUTE DETAIL [X]

WPT

WPTName	Symbol	Color
0 0 0 0 1	[+]	[Red Box]
Latitude/Longitude		
37°31.1030 N 126°45.7521 E		
Date&Time		
2021.10.14 AM 04:21		

1 Edit 2 Saved WPT 3 New WPT 4 Erase 5 Find

(Fig.2.1)

Press [2.Saved WPT] on the Route detail and you may add the stored WPT as (Fig.2.1).

3.5.2.1. Adding new WPT

Press [3.New WPT] on Rout detail and you may add new WPT.

3.5.3. Erasing WPT

Choose the WPT and press [4.Erase].

3.6. Navigating

► [MENU]->Userdata->Route->List->[6.Goto]

Choose the route on Route list and press [6.Goto].

3.7. Erasing

Choose the route and press [3.Erase].

4. Track

The maximum point is 50,000.

Two ways to manage the track. The first is to manage the total 50,000 points by colors. The second is to divide 50,000 points in five rooms, and you can store 10,000 points for the maximum in each room.

Tracking has two types, "by time and by distance".

4.1. Track on/off

► Press [TRACK]

4.2. Choosing the track

4.2.1. By time

► [MENU]->Userdata->Track->Track Setup->Record Setup->Time

Tracking by the set time.

4.2.2. Setting the time interval

► [MENU]->Userdata->Track->Track Setup->Time Interval

Setting the time interval.

4.2.3. By distance

► [MENU]->Userdata->Track->Track Setup->Record Setup->Distance

Tracking by the set distance.

4.2.4. Setting the distance interval

► [MENU]->Userdata->Track->Track Setup->DIST Interval

Setting the distance interval.

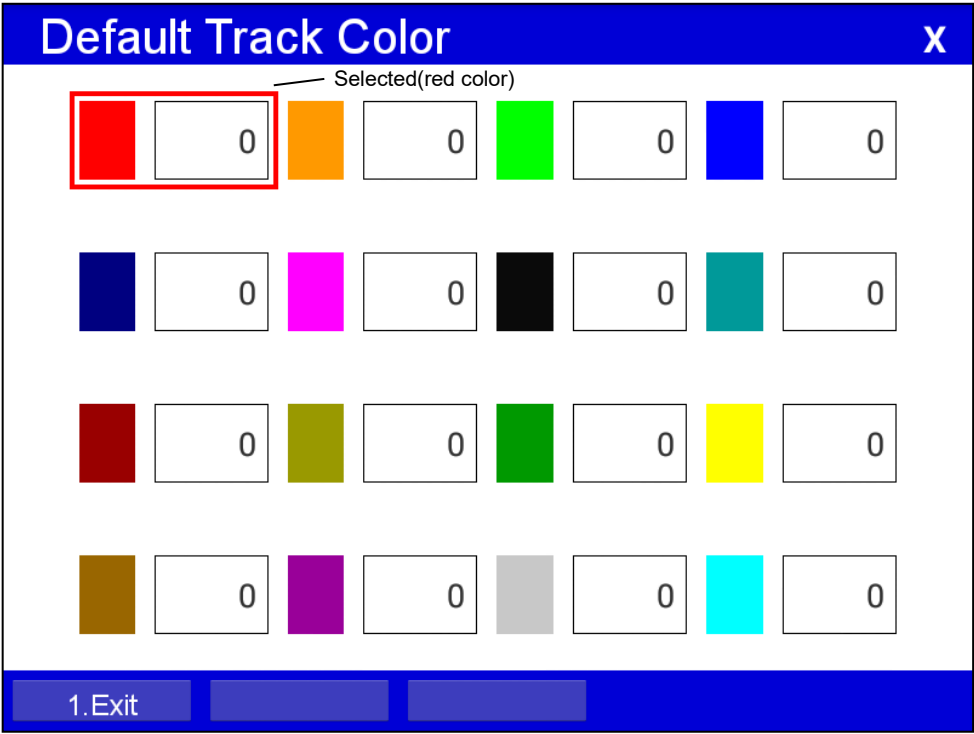
4.3. Setting the thickness

► [MENU]->Userdata->Track->Track Setup->Thickness

Setting the track thickness.

4.4. Track Color

► [MENU]->Track Color



Choose the color and press [ENTER].

(* The number next the color shows the number point of the track color)

4.5. Track type

4.5.1. Type1

► [MENU]->Userdata->Track->Track Setup->Type1

4.5.1.1. Erasing

► [MENU]->Userdata->Track->Erase

Choose the color and press [ENTER].

(*The number next the color shows the number point of the track color.)

Track Erase

X

Selected(red color)

5616

0

0

0

1089

2194

1775

2471

1563

1610

1631

1600

1621

1403

1446

2523

1.All

2.Partial

3.Exit

4.5.1.2. Erasing all of track

► [MENU]->Userdata->Track->Erase

Press [1.All Erase].

4.5.1.3. Erase with cursor

► [MENU]->Userdata->Track->Erase->Partial Erase

Choose [2.Cursor].

Track Erase

x

	5616		0		0		0
	1089		2194		1775		2471
	1563		1610		1631		1600
	1621		1403		1446		2523

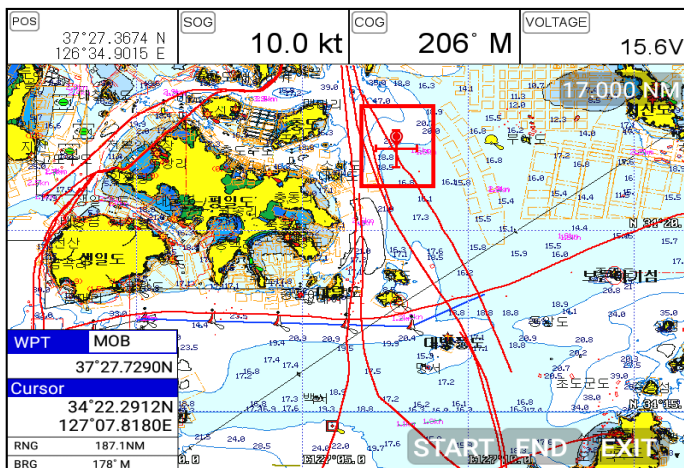
1.All

2.Partial

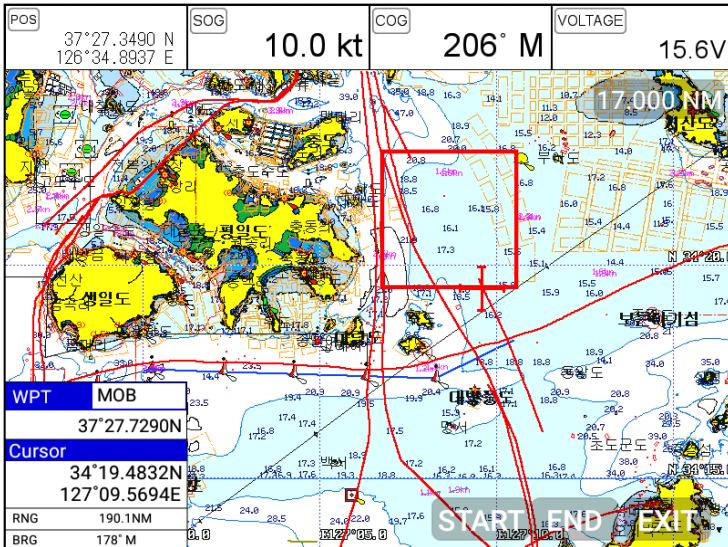
3.Exit

Long press where you want to start erasing the track.

(*1 should show on the left top.)



Choose the end of the track to erase.



4.5.2. Type2

► [MENU]->Userdata->Track->Track Setup->Type2

4.5.2.1. Select index

► [MENU]->Userdata->Track->Select Index

Five rooms in the index. The maximum is 10,000 points in each room.

In Type2, storing, loading and erasing are available to manage in the room.

4.5.2.2. List

Showing the information of each room.

Track List

X

① TRACK1

TRACK2

TRACK3

TRACK4

TRACK5

On / Off ②

OFF

Color ③

▼

Number of Point ④

0

Display ⑤

ON

Date & Time ⑥

00.00.0000 AM 00:00

Start WPT ⑦

LAT/LON

0°0.0000 N

0°0.0000 E

End WPT ⑧

LAT/LON

0°0.0000 N

0°0.0000 E

1.Edit

2.Erase

(Fig.2.2)

①	List	Showing the track room
②	Number of Point	Total track point in the track room
③	Date&Time	Date and time of the track room when stored
④	Color	Color of the track room
⑤	On/Off	Track status on the index
⑥	Display	Show/Hidden the track room
⑦	Start Point	The beginning of the track room
⑧	End Point	The end of the track room

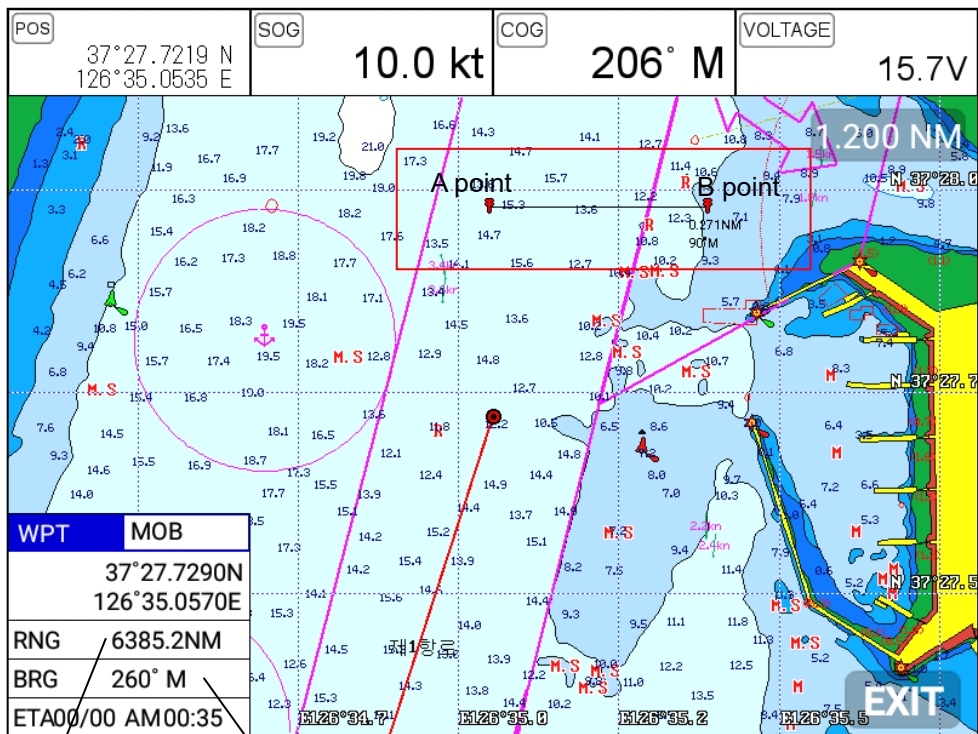
4.5.2.3. Erasing

Choose the track room on the list and press [2.Erase] .

5. Measuring the distance and bearing

Measuring two points, "A" and "B".

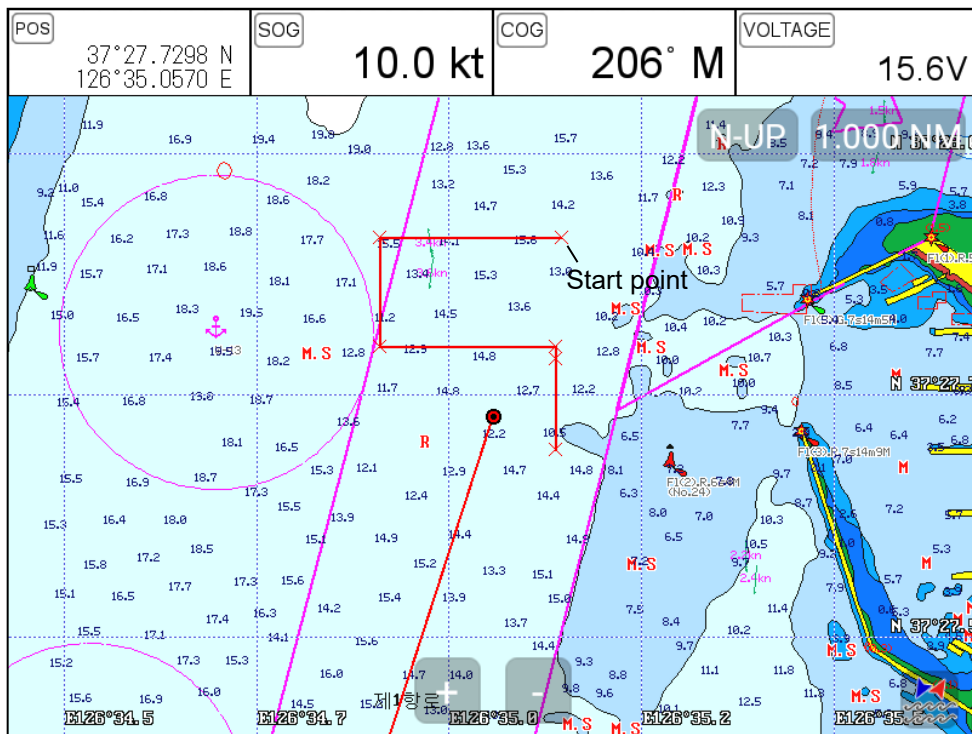
1. Call the cursor and move it on the point, "A".
2. Call the cursor and move it on the point, "B".
3. Move the cursor on the point, "B".
4. The cursor windows provides the distance and bearing between A and B.
5. Press [CANCEL] to exit.



6. User Line

Adding lines directly on the chart.

1. Call the cursor.
2. Press [ENTER] and "User Line" shows.
3. Move the cursor to the beginning point and press [ENTER].
4. Keep moving the cursor and press [ENTER] each time.
5. Press [CANCEL] to exit.

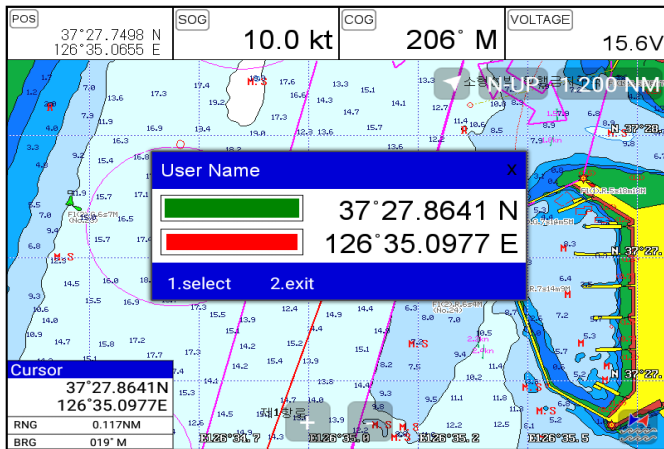


7. User Name

Adding a place name directly on the chart.

1. Call the cursor and move it to the point.
2. Press [ENTER] and choose "User Name".
4. Inputting letters with [◀][▶][▼][▲].

5. Press [CANCEL] to exit.



8. Correction Offset

When the chart position is wrong, making it correct.

1. Call the cursor and move it to the correct position.
2. Press [ENTER] and choose "Correction Offset".

(* The maximum range of Correction Offset is 5nm.)

|| Chartplotter operation

1. Map Orientation

► [MENU]->9.Advance->6.Map Setup->1.Map Orientation

1.1. True Motion

► [MENU]->Advance->Map Setup->Map Orientation->True motion

The True Motion is in the way the vessel position is presented. In True Motion mode, the vessel icon moves over the map while the map remains stationary.

(* It is not available to operate on Course up and Head up.)

1.2. North Up/South Up/East Up/West Up

► [MENU]->Advance->Map Setup->Map Orientation->Up mode

They setting the vessel present position remains fixed in the center of the Main Screen while the map moves under it.

1.3. Course Up

► [MENU]->Advance->Map Setup->Map Orientation->Up mode

The Course Up mode screen orientation is determined by whether or not navigation is in progress. During navigation vessel present position is in the center of the Screen and the course line to the destination is straight up. As your present position changes, the map moves under the stationary vessel icon.

(*If navigation is stopped, the Main Screen appears as Head up.)

1.4. Head Up

► [MENU]->Advance->Map Setup->Map Orientation->Up mode

For Head Up mode, vessel present position is fixed in the center of the Main Screen and vessel heading is upward. As your present position changes, the map moves under the vessel icon.

2. Map setup

► [MENU]->9.Advance->6.Map Setup

2.1. Map orientation

2.1.1. True motion

You can select "True motion"

( The default setting is OFF.)

2.1.2. Up mode

You can select "Map Orientation"

( The default setting is North Up.)

2.2. UserData Display

Setting up shown/hide the user data on the display.

2.3. INFO Display

Setting up shown/hide common item between the HY-MAP and the C-MAP on the display.

2.4. Map scale

Setting up the map scale on the display.

2.5. Palette

It is possible to the palette used to enhance the visibility of the screen depending on the surround light condition. The possible choices are listed in the table below:

2.5.1. Normal

It set the maps are displayed in ordered to use colors as similar as possible to the ones used in the original paper charts.

2.5.2. Sunlight

It is designed to enhance the visibility of the screen when Vega series is exposed to the sunlight. The maps are much brighter than in the other displays.

2.5.3. NOAA

Allows setting NOAA paper chart colors presentation.

(*It is available NOAA menu on C-MAP.)

2.6. LAT. Modification

Though GPS information is accurate, there could be an error in the chart at latitude. The error can be modified in the chart latitude modification.

2.7. LOT. Modification

Though GPS information is accurate, there could be an error in the chart at longitude. The error can be modified in the chart longitude modification.

2.8. Chart

Select the chart among HY-MAP,C-MAP and External map.

2.9-1. HY-Map (*Only for *HY-MAP mode.)

2.9-1.1. Depth Line

Setting up 2m,5m,10m,20m,50m of the depth line on the HY-MAP.

2.9-1.2. Rock

Setting up the Rock on the HY-MAP

( The default setting is shown.)

2. 9-1.3. Fishing Banks

Setting up the Fishing Banks on the HY-MAP.

( The default setting is shown.)

2.9-1.4. Land Color

Select the land color as you want.

( The default setting is yellow.)

2.9-1.5. Lighthouse Info

Setting up the Lighthouse on the HY-MAP.

( The default setting is shown.)

2.9-1.6. EEZ

Setting up the EEZ line on the HY-MAP.

( The default setting is shown.)

2.9-1.7. Screen Magnification

Setting up the Screen Magnification on the HY-MAP. (*MAX Magnification [ON = 0.05nm, OFF = 0.2nm])

( The default setting is on.)

2.9-1.8. Fishery information

Setting up the Fishery information on the HY-MAP.

( The default setting is shown.)

2.9-2. C-Map (*Only for *C-MAP mode.)

2.9-2.1. Chart Configuration

You can set the screen of Land, Marine, Depth, and NavAdis on the map.

2.9-2.2. Chart Presentation

You can set the font, symbol size, and map color of the map.

2.9-2.3. Raster Setting

You can set the Raster mode of the map.

2.9-2.4. 3D View

You can set up 3D View.

2.9-2.5. Multi Language

Select language for name of the place, lighthouse or buoy.

2.9-2.6. Quick View

It is available to set up. Place the cursor on buoys or icons on the C-MAP, the information window is shown up automatically.

( The default setting is hidden.)

2.9-2.7. Touch

You can set the multi-touch function of the map.

3. Vessel

3.1. Vessel Icon Size

The size of the present position is adjustable from 0 to 9. The biggest size is '0'.

( The default setting is 9.)

3.2. Heading Line

The length of the heading line is adjustable from 50 until 300. The bigger number, the longer line. The heading line is used in modes of the true motion and the north up.

( The default setting is 270.)

3.3. Vessel style (Circle/Arrow/Vessel)

Select the vessel symbol among Circle, Arrow and vessel.

( The default setting is circle.)

3.4. Orient. Resolution

Sets you preferred Rolling Road Scale.

( The default setting is 0.)

4. Alarm

4.1. Navigation

4.1.1. Arrival Alarm:

When you approach into the waypoint range, it gives you a notice with alarm.

( The default setting is OFF.)

4.1.2. Arrival Radius:

It is to adjust the range of arrival from your waypoint. If you have a route, it changes to the next waypoint automatically.

( The default setting is 0.05nm.)

4.1.3. XTE Alarm:

If you are out of the course, it gives you a notice with alarm.

( The default setting is OFF.)

4.1.4. XTE Radius:

It is to adjust the range of the off course.

( The default setting is 0.25nm.)

4.2. Anchor

4.2.1. Anchor Alarm:

It is necessary when your vessel anchors.

( The default setting is OFF.)

4.2.2. Anchor Radius:

If your vessel is out of the range of the anchor, it gives you notice with alarm.

( The default setting is 0.05nm.)

4.3. Interval

5.3.1. Interval Alarm:

It alarms every time you set.

( The default setting is OFF.)

5.3.2. Interval Time

The time is available from one minute until sixty minutes.

( The default setting is 3 min.)

4.4 User Line

4.4.1. User Line Alarm

It alarms if it breaks into the setting area.

( The default setting is OFF.)

4.4.2. User Line Range

It sets the range of the course alarm.

( The default setting is 0.05nm.)

|| AIS getting started

1. What is AIS?

AIS is an Automatic Identification System. It has been introduced to improve the safety of navigation by assisting in the efficient operation of ship to ship, ship reporting and VTS applications. The system should enable operators to obtain information from the ship automatically, requiring a minimum of involvement of ship's personnel, and should have a high level of availability.

Connecting to the chart plotter an AIS receiver, vessels with AIS transponder within VHF range are displayed on screen giving the skipper or navigator a visual interpretation of the data of nearby vessels. This improves safety, and specifically for collision avoidance reasons.

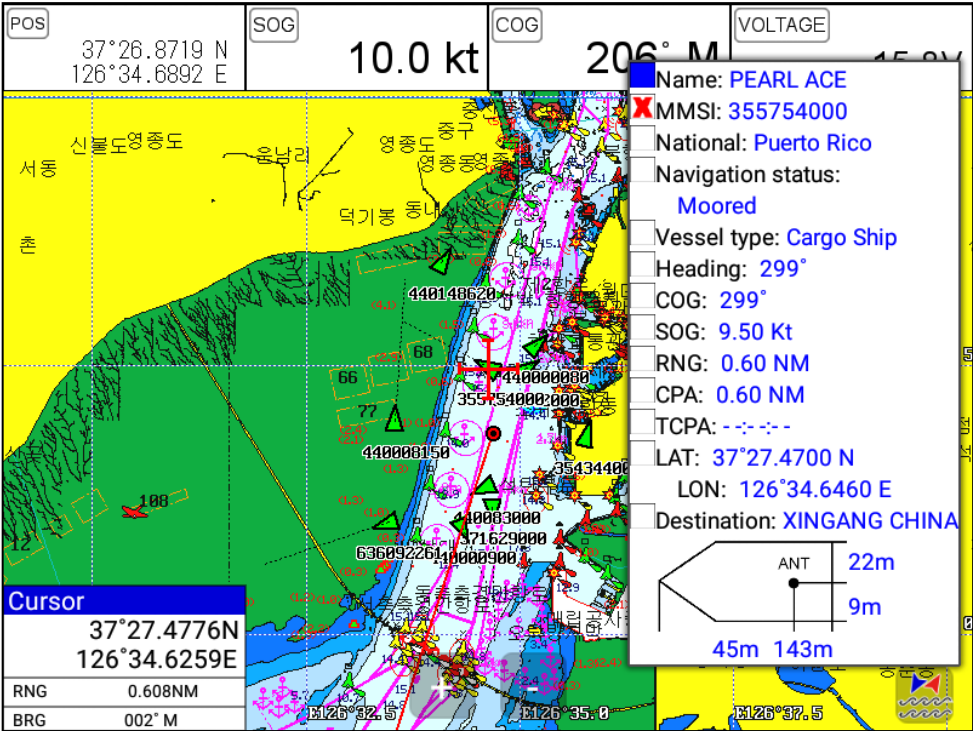
2. AIS system definitions

CPA	Closest Point of Approach is the closest distance that will be achieved between your vessel and the tracked target, based on your vessel's speed and direction and the target's speed and direction.
TCPA	Time to Closest Point of Approach is the time remaining until the CPA will occur.
Name	Name of ship, 20 characters.
MMSI	Maritime Mobile Service Identity.
MMSI number	A unique 9 digit number that is assigned to DSC radio station. It primarily registers the boat information in the U.S. Coast Guard's national distress database for use in emergency situations.
Target 	It is a vessel equipped with AIS. Information about the targets is being received by AIS Receiver and displayed on the screen.
Active Target 	Target located within the Activation Range. Active target is represented by oriented triangle with COG and Heading vectors. Rate of turn may also be displayed.
Selected Target 	Target selected with cursor. Can view AIS information window.
Dangerous	Target detected by CPA or TCPA Alarm. Dangerous target is Active Target by definition. For better visibility Dangerous Target symbol is changed from basic color

Target 	to red color.
Sleeping Target 	Target located outside the Activation Range. Sleeping target is represented by a small oriented triangle.
Lost Target 	When the AIS info is not received from that vessel. The presentation will be marked X on the target.

3. AIS information window

Press [ENTER] key on Target which wants to see. It shows Information of “AIS INFO” window.



(Fig.3.1)

4. Quick INFO on AIS target

Choose “AIS information window” on (Fig.3.1) and AIS data shows under the AIS target.

(*Up to four kinds of data is available to choose in Quick INFO)



II AIS operation

► [MENU]-> 8. AIS

1. AIS On/Off

Turns the display of AIS targets overlay on the screen On or Off. (☞ The default setting is On.)

2. List

2.1. List

Selected(blue color)

AIS List							Page[1/2]	X
Name ①	② MMSI	③ RNG	④ COG	SOG	⑤ TCPA	⑥ NATION	⑦	
KOTA KASTURI	563342000	0.71 NM	56°	1.00 Kt	--:--	Singapore		
MOL ASPIRATION	371629000	1.50 NM	201°	15.00 Kt	--:--	Panama		
DAEBOK GAS	440148620	1.99 NM	0°	5.50 Kt	--:--	South Korea		
ORIENTAL PEARL	354344000	0.89 NM	16°	4.10 Kt	--:--	Panama		
MUGUNGHWA 19	440083000	0.53 NM	267°	1.70 Kt	--:--	South Korea		
PEARL ACE	355754000	0.86 NM	321°	5.40 Kt	--:--	Puerto Rico		
531INCHEON	440000900	1.15 NM	110°	8.30 Kt	--:--	South Korea		
IL MOOK NO.1	440008150	1.28 NM	345°	12.50 Kt	--:--	South Korea		
INCHEON526HO	440000080	1.42 NM	46°	12.50 Kt	--:--	South Korea		
1.Detail 2.Track 3.Sort 4.Find								

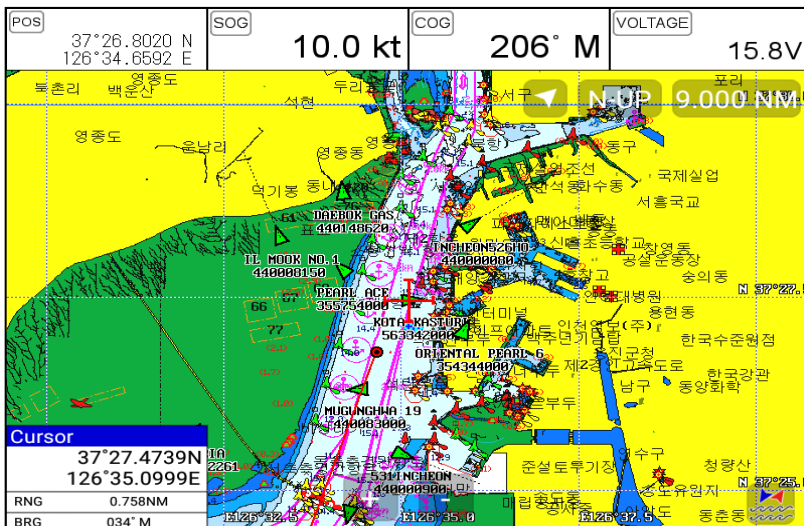
(Fig.3.2)

①	Name	Name of the AIS target
②	MMSI	MMSI of the AIS target
③	CPA	Distance between AIS target and your position
④	COG	BRG between AIS target and your position
⑤	SOG	Speed between AIS target and your position
⑥	TCPA	ETA from AIS target
⑦	NATION	Nationality of AIS target

Choose the AIS target and press [ENTER].

2.3. Goto

Choose the AIS target and press [4.Find].



2.4. Sort

Press [3.Sort] to choose how to sort on (Fig.3.2).

AIS List		Page[1/2]				
Name	MMSI	RNG	COG	SOG	TCPA	NATION
KOTA KASTURI	563342000	1.35 NM	239°	2.30 Kt	----	Singapore
MOL ASPIRATION	371629000	1.08 NM	113°	2.50 Kt	00:23:42	Panama
DAEBOK GAS	440148620	0.52 NM	267°	5.50 Kt	00:05:14	South Korea
ORIENTAL PEARL	354344000	1.21 NM	292°	3.30 Kt	----	Panama
MUGUNGHWA 19	440083000	1.23 NM	173°	4.70 Kt	----	South Korea
PEARL ACE	355754000	0.46 NM	343°	2.30 Kt	----	Puerto Rico
531INCHEON	440000900	1.36 NM	339°	11.40 Kt	----	South Korea
IL MOOK NO.1	440008150	0.19 NM	124°	11.50 Kt	----	South Korea
INCHEON526HO	440000080	1.48 NM	336°	9.90 Kt	----	South Korea

1.Vessel Name

2.MMSI Sort

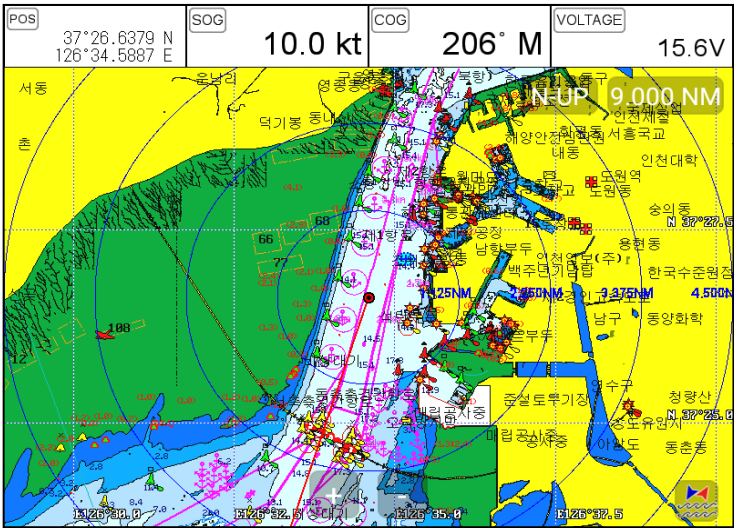
3.Range Sort

4.Brg Sort

3. Display radius

Displays range rings centered on your current position.

(The default setting is OFF.)



4. AIS target size

Choose the size of AIS target.

( The default setting is Large.)

5. Display vessels by Color

Different types of AIS transmissions can be selected to display different colors of icons on the chart display.

6. Display vessels by Type

Different types of AIS transmissions can be selected to display different types of icons on the chart display.

7. Filter AIS types

This function allows you to turn on or off reception from different types of AIS transmissions, for instance if you only wanted to view Class B vessels on the chart display then select Class B On and all the others Off.

8. Alarm

8.1. CPA Alarm

The CPA alarm is the closest approach alarm, this allows you to set a distance when the alarm will sound if a vessel comes within that distance .

( The default setting is OFF.)

8.2. CPA Range

The values allowed are from 0.1nm to 10nm.

( The default setting is OFF.)

8.3. TCPA Alarm

The TCPA alarm is the time that a vessel will take to be in the same position as you currently are.

( The default setting is OFF.)

8.4. TCPA Limit

The values allowed are from 1 to 50 min.

( The default setting is 1 min.)

8.5. Radius Menu

8.5.1. Radius Alarm

When any AIS target breaks into the radius, alarming.

( The default setting is off.)

8.5.2. Radius

The values allowed are from 0.1nm to 50nm.

8.5.3. Repeat Alarm

It causes the alarm to sound repeatedly at a set time periodically.

8.5.4. MMSI List

When you register a specific MMSI number and name, only the AIS targets listed will sound the alarm when they are inside Radius.

8.5.5. Color

Only AIS targets registered in the MMSI list can display the color selected separately.

8.5.6. External Save

You can save the MMSI list to external memory.

8.5.7. External Load

You can invoke an MMSI list stored in external memory.

8.6. Ignore Vessels if Speed Less

If you want the alarms to ignore vessels that are travelling at less than a particular speed then switch ON.

8.7. Speed less than

The values allowed are from 0.1kt to 9.9kt.

9. Set up AIS outs etc

9.1. Mark vessels as lost after

Setting the time of "Lost target".

( The default setting is 7min.)

9.2. Remove lost vessels after

If the updating AIS target is unavailable in the set time, erasing the AIS target on the screen..

( The default setting is 10min.)

9.3. Vessel target

It is available to setup the own vessel's AIS target display on the screen.

( The default setting is On.)

10. Others

10.1. Labels on vessels

10.1.1. Popup Select

You can select whether to use the show/hidden function of the label in the Cursor Box.

( The default setting is off.)

10.1.2. Labels on vessels

This menu controls what details are displayed alongside the vessels icons on the chart display.

10.2. Cursor Box info

When you move the cursor in chart mode over an AIS target a box appears showing details of that vessel.

10.3. Test View

Showing the text message of SART Message.

( The default setting is Off.)

10.4. Display Scale

It is possible to setup AIS Targets with Scale

Fishfinder getting started

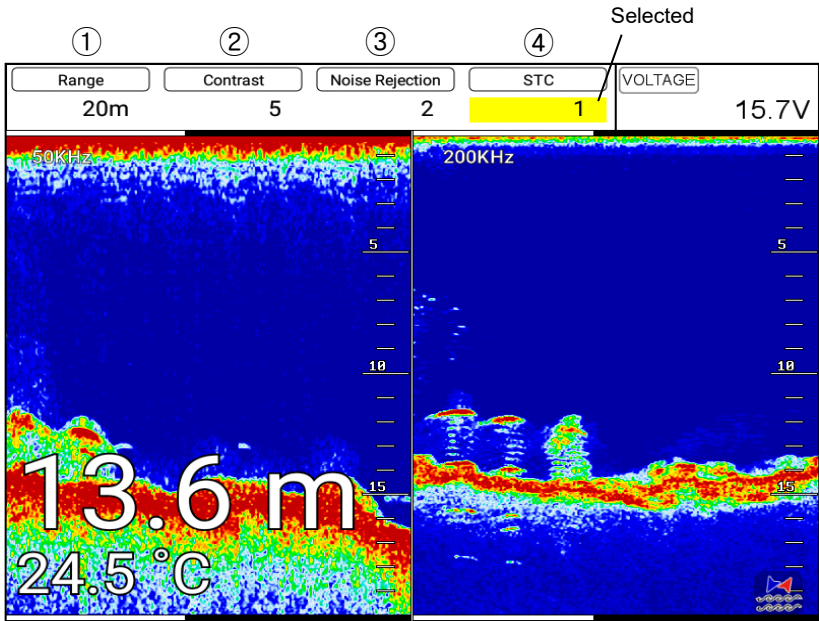
1. Depth/Gain/STC

► [MENU]-> 3.Gain/STC->1.Mode

1.1. Dual Mode

You can select items using the [◀][▶] key. The color selected is different for each item.

(* Range: Red, Contrast: Blue, Noise Rejection: Green, STC: Yellow)



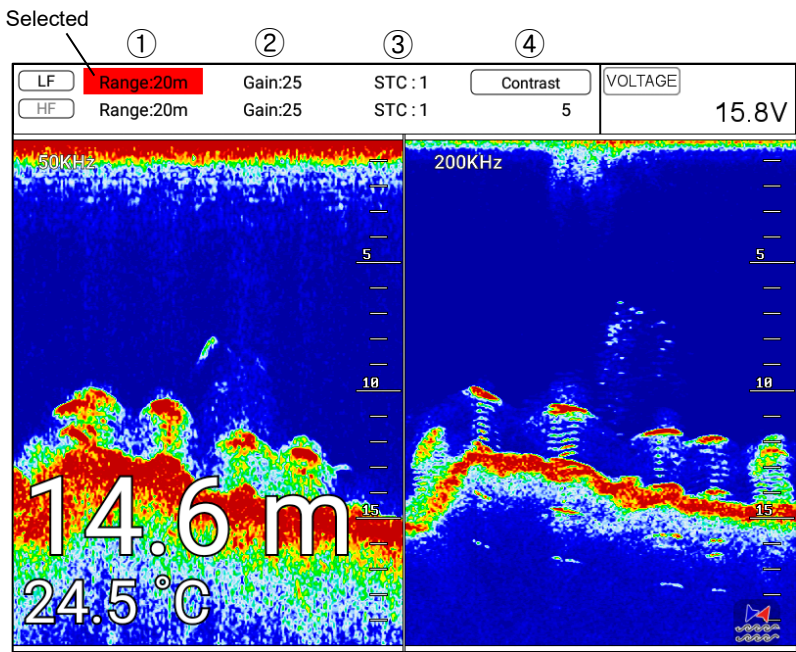
①	Range	If the depth method is automatic, it is displayed as 'automatic' and if it is manual, the set depth meter is displayed (*Use the [Enter] key for automatic/manual changes.)
②	Contrast	You can adjust the intensity of the image color contrast displayed on the fish detector screen. (You can set it from -20 to +20)
③	Noise Rejection	It is used to remove noise from the image of the fish detector. (Can be set from 0 to 30)
④	STC	Used to remove oscillation line noise. (Can be set from 0 to 20)

(*You can change it by using [+],[-] key or rotary.)

1.2. Single Mode

You can use the [▲][▼] key to select the frequency and the [◀] [▶] key to select the item. The color selected is different for each item.

(* Range: Red, Gain: Magenta, STC: Yellow, Contrast: Blue)



①	Range	If the depth method is automatic, it is displayed as 'automatic' and if it is manual, the set depth meter is displayed (*Use the [Enter] key for automatic/manual changes.)
②	Gain	The sensitivity of the fish group detector can be adjusted (*Use the [Enter] key for automatic/manual changes) (Automatic sensitivity: -10 to 10, Manual sensitivity: 0 to 50)
③	STC	Used to remove oscillation line noise. (Can be set from 0 to 20)
④	Contrast	You can adjust the intensity of the image color contrast displayed on the fish detector screen. (You can set it from -20 to +20)

(*You can change it by using [+],[-] key or rotary.)

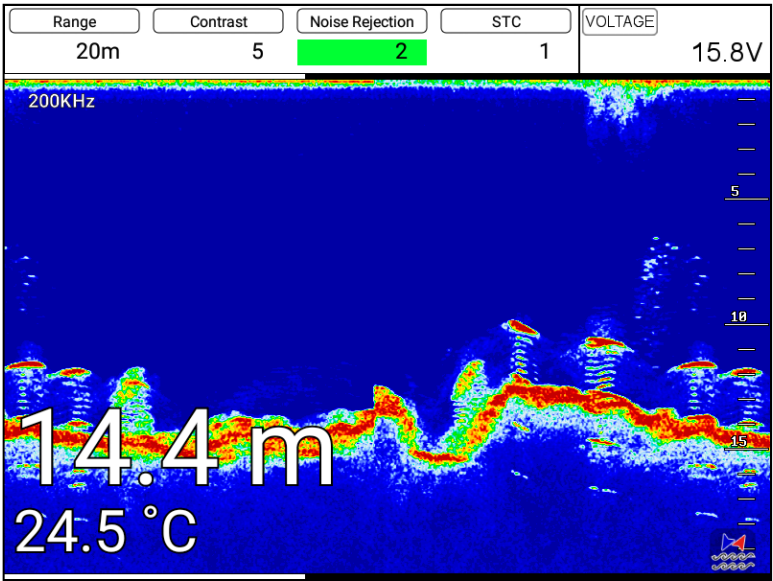
2. Mode

► [MENU]->Mode

Four kinds in Fishfinder.

2.1. Normal

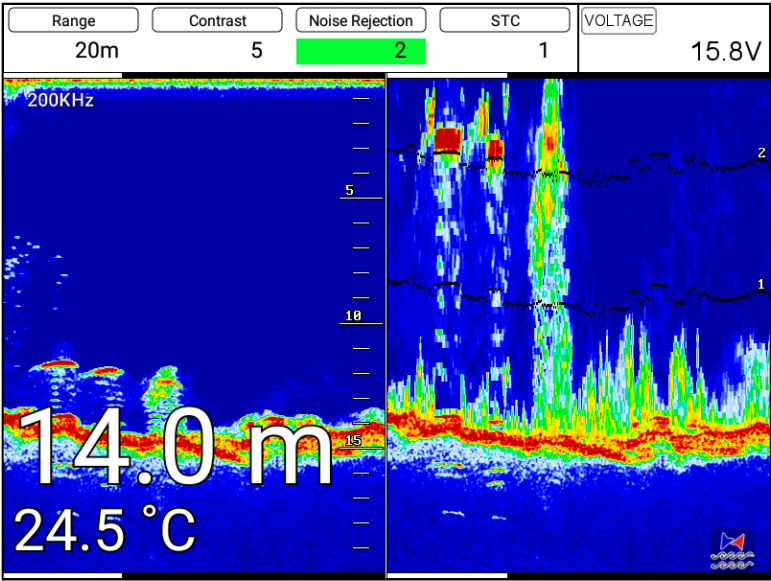
Normal mode (with Auto Range active) displays the sounder image with the surface at the top of the screen and the sea bottom in the lower part of the screen. The depth scale indicates the depth range appearing in the display. Bottom contours and fish echoes are displayed at the depths where they are detected. If the depth Range is set manually to a value less than actual water depth, sea bottom echoes are not displayed, but all other echoes within the Range setting are displayed.



2.2. Bottom Zoom

Bottom Zoom magnifies the sounder display from the sea bottom toward the surface for a short distance. The sea bottom contour is displayed and additional contour lines are added at intervals above the sea bottom to aid in determining distances of echoes near the bottom. Use the Sounder Menu to set the magnified Bottom Range from 2.5 to 20m (10 to 60ft.). Default setting is 10m (40ft.). If the depth Range is set manually, the setting must place the sea bottom echo in the lower portion of the

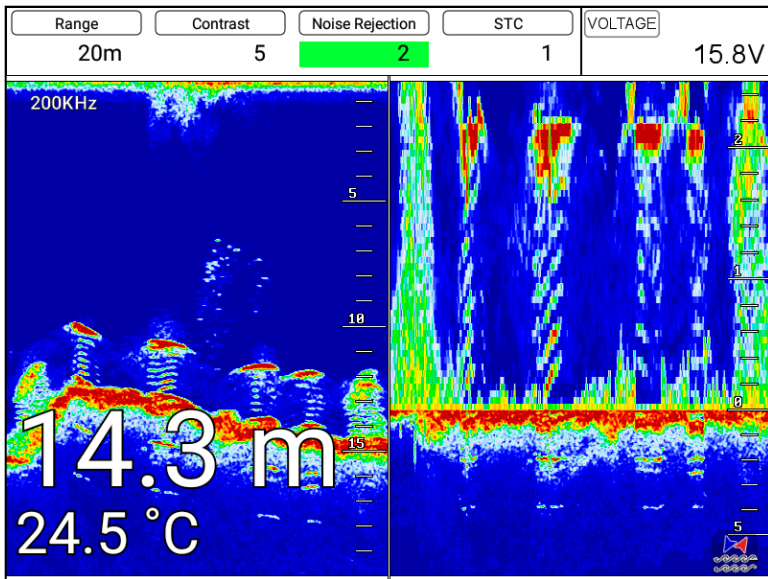
screen for Bottom Zoom to be effective.



2.3. Bottom Lock

Bottom Lock divides the Fishfinder main screen image for the selected Fishfinder into two sections. The left hand section displays a Normal Mode image. The right hand section of the screen displays the Fishfinder image relative to the sea bottom. The sea bottom appears as a straight line with the Fishfinder image magnified for a short distance toward the surface. A scale appears on the right for estimating distances of echoes near the bottom. Use the Fishfinder Manu to set the magnified Bottom range from 2.5 to 20m (10 to 60ft.). Default setting is 10m (40ft.). If the depth Range is set manually, the setting must place the sea bottom echo in the lower portion of the screen for Bottom Lock to be effective.

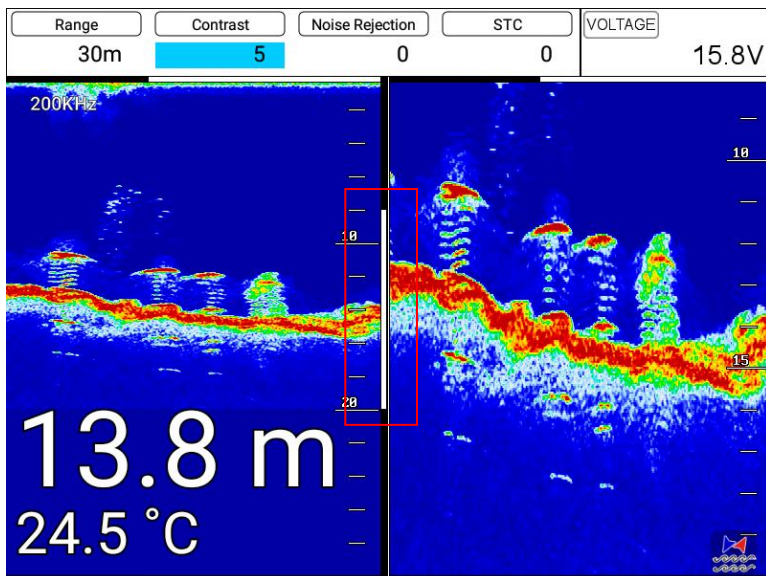
Fishfinder modes are selectable for single frequency or dual and some functions, for example bottom zoom or lock.



2.4. Part Zoom

Shows an enlarged fishfinder screen of the set range.

You can show the screen of left is normal screen and screen of right is part zoom



3. Scroll

► [MENU]->6. Scroll.

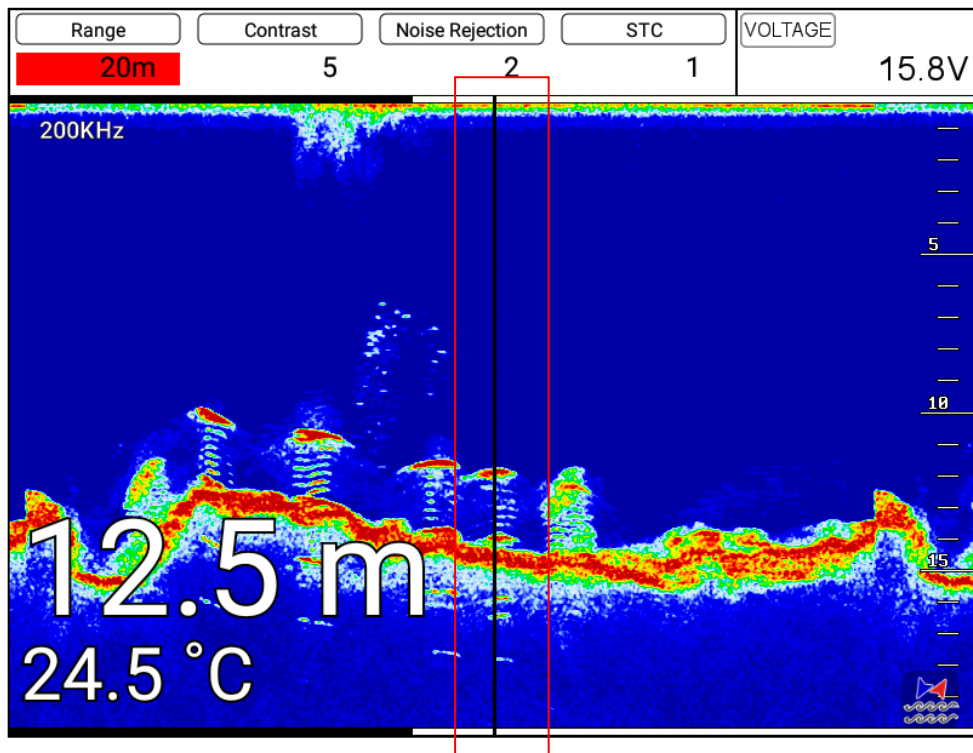
This function allows the users to view the screen in the past fishfinder.

When the cursor is called You can see past the screen using the [←][→] key.

Then after [WPT] key is pressed, the input position is marked in the past.

(★ Input position is incorrect error range according to the situation.)

(★ Length of past fishfinder screen by scrolling depend on depth.)



#Fishfinder operation

1.Menu

► [MENU]

1.1. Userdata

It is same as Chartplotter. PLS refer the Chartplotter operation manual.

1.2. Depth Range

Vega selects the best condition for measuring the depth automatically in the environment of the sea.

(※ The default setting is Auto.)

1.3. Gain/STC

You can select the mode to adjust Gain/STC.

Dual: 50/200KHz Depth, Contrast, Noise Rejection, STC, Auto Gain, etc. can be adjusted at the same time.

Single: 50/200KHz Gain, STC, etc. can be adjusted separately by frequency.

1.4. Shift

A user selects this function to see more detailed bottom of the sea. When you turn up the shift, the range of Fish finder shall go up from the shift range. For example, if you raise 5m of shift at 20m range, the surface shall start 5m and the bottom range shall be 25m.

(※ The default setting is 0m.)

1.5. Mode

Fish finder modes are selectable for single frequency or dual and some functions.

1.6. Rejection

1.6.1. Interference Rejection

When there are another boats around you on sailing, your Fish finder could be disturbed to work. The step of the function is from off to level 2. The bigger number, the more rejection.

(※ The default setting is OFF.)

1.6.2. Noise Rejection

Your Fish finder could be disturbed by the engine noise. This function can reject the noise from the engine or other machinery instruments.

1.7. Scroll

This function allows the users to view the screen in the past fishfinder.

When the cursor is called You can see past the screen using the [←][→] key.

Then after [WPT] key is pressed, the input position is marked in the past.

(★ Input position is incorrect error range according to the situation.)

(★ Leghth of past fishfinder screen by scrolling depend on depth.)

1.8. Part Zoom

You can set the depth range when using the part zoom.

2. Advanced Menu

► [MENU] -> Advance

2.1. Display

2.1.1. A-scope

A-scope shows the research under the water by a scope to see the environment under the water.

( The default setting is OFF.)

2.1.2. Image Speed:

Select the speed of Fish finder image from 4X until 1/32X.

( The default setting is 1X.)

2.1.3. White Line

It is necessary to research a detailed fish on the bottom or a seaweed under the sea. The color of the bottom changes into white or black to see the bottom easier than red.

( The default setting is OFF.)

2.1.4. Depth

Shown/Hidden the depth range on the screen.

( The default setting is shown.)

2.1.5. Depth Font

Select the depth range font size on the screen.

( The default setting is Large.)

2.1.6. TEMP

Shown/Hidden the temperature on the screen.

( The default setting is Hidden.)

2.1.7. TEMP Font

Select the temperature font size on the screen.

( The default setting is Large.)

2.1.8. Frequency display

Choosing the frequency of the display.

2.1.9. Image Filtering

This function is reduction of the noise.

( The default setting is On.)

2.1.10. Fish

2.1.10.1 Fish symbol

Fish symbol with sizes and levels show for targets.

(*Fish symbol is only for reference. This could be different from the real.)

2.1.10.2. Fish size

Setup to display of the size of fish.

( The default setting is Off.)

2.2. Color

2.2.1. Color Rejection

There are 16 color levels for Fish finder. The color bar is on the left of the Fish finder. If the level is higher, the color of the bar is deleted one by one.

2.2.2. Screen Color

Select the background color of the Fish finder for your convenience.

2.2.3. Image Filter

You can choose whether to use horizontal/vertical image filters.

If you use an image filter, the screen of the fish detector looks smoother, but the details of the fish detector screen are slightly lower.

2.3. Alarm

2.3.1. Depth

2.3.1.1. Deep Depth Alarm

It alarms when the set deep depth is out of the range.

( The default setting is OFF.)

2.3.1.2. Deep Depth Range

Setup the range of deep depth alarm

( The default setting is 0M.)

2.3.1.3. Shallow Depth alarm

It alarms when the set shallow depth is out of the range.

( The default setting is OFF.)

2.3.1.4. Shallow Depth range

Setup the range of shallow depth alarm

( The default setting is 0M.)

2.3.2. TEMP(Temperature)

2.3.2.1. Low Alarm

It alarms when the set low temperature is out of the range.

( The default setting is OFF.)

2.3.2.2. Low Range

It alarms when the set low temperature is out of the range.

( The default setting is 0.)

2.3.2.3. High Alarm

It alarms when the set high temperature is out of the range.

( The default setting is OFF.)

2.3.2.4. High Range

It alarms when the set high temperature is out of the range.

( The default setting is 0.)

2.3.3. Fish-School

2.3.3.1. Fish-School Alarm

It alarms when it detects school of fish.

It will detect school of fish depend on set depth, range and level of the fishfinder.

( The default setting is OFF.)

2.3.3.2. Fish-school Depth

If the alarm is on, It is available to setup the depth of the Fish-school

( The default setting is 10m.)

2.3.3.3. Fish-School Range

If the the alarm is on, It is available to setup the Range(hight) of the Fish-school.(The bar, next of display is shown)

( The default setting is 50m.)

2.3.3.4. Alarm Interval

If the the alarm is on, It is available to setup the alarm interval.

( The default setting is middle)

2.3.3.5. Color Level

If the the alarm is on, It is available to setup the color level.

It is available to setup the color level

2.4. Touch Mode

This function is used when the scroll function malfunctions due to incorrect touch of the screen.

( The default setting is on)

2.5. Others

2.5.1. Pulse

Select the pulse of the output from the transducer. Levels are among Low, Medium and High, which depends upon the depth. Low is proper to research precise a fish school but it is not suitable to measure a deep depth. High is opposite from Low.

( The default setting is Medium.)

2.5.2. Water Temp

The error of water temp value can be corrected.

(setting:-10.0 ~ 10.0°C,-10 ~ 10°F)

( The default setting is 0.)

2.5.3. Boat Speed

The tolerance of boat speed value can be corrected. When the [Speed source] is set to the [Sensor], it is corrected by %. (setting:-50 ~ 50%) When the [Speed source] is set to the [NMEA], it is corrected by numeral. (setting:-10.0 ~ 10.0)

( The default setting is 0.)

2.5.4. Draft Set

The tolerance of depth can be corrected.

(^{ESP} The default setting is 0.0m.)

2.5.5. TD Setup

Choosing the frequency of the TD.

2.5.6. Speed Source

Switch the Sensor/NMEA.

- InsideSensor: Use the built-in speed meter for sensor.

- NMEA: Use the external input value for NMEA.

(^{ESP} The default setting is NEMA.)

2.5.7. Bottom Zoom Range

Select the range of the bottom zoom or lock. It is necessary to modify the bottom.

(^{ESP} The default setting is 10m.)

|| General operation

1. GPS

It is available to control and confirm information in GPS receiver.

1.1. Coordinate System

It sets coordinate system of GPS or Loran.

( The default setting is GPS.)

1.2. Datum

It shows GPS Datum. WGS-84, which is the worldwide standard is only available.

( The default setting is WGS-84.)

1.3. Fix Correcede

1.3.1. LAT Modification

There could be a receiving signal error from satellites. If it is on the latitude, modify in the latitude modification.

1.3.2. LON Modification

There could be a receiving signal error from satellites. If it is on the longitude, modify in the longitude modification.

1.4. Average Speed

Apply filters of COG and SOG according to the usage environment.

( The default setting is Fast.)

1.5. Average Speed Setup

1.5.1. POG filtering

Step 0(OFF)~59(MAX) the POG Filter. When it is On(over step 1), you can filter the POG of the vessel, to optimize it.

( The default setting is incorrect every the country.)

1.5.2. COG filtering

Step 0(OFF)~119(MAX) the COG Filter. When it is On(over step 1), you can filter the COG of the

vessel, to optimize it.

( The default setting is incorrect every the country.)

1.5.3. SOG filtering

Step 0(OFF)~119(MAX) the SOG Filter. When it is On(over step 1), you can filter the SOG of the vessel, to optimize it.

( The default setting is incorrect every the country.)

1.5.4. SOG Range

You can set the speed with Average SOG. Average SOG is only applied below the set speed.

( The default setting is 3.0kt.)

1.5.5. COG

Different COG calculation methods can be selected and used.

U Version: COG's response is slow but stable. It is used a lot by fishing boats with a lot of low-speed navigation.

C Version: The reaction of COG is fast, but it can also seem too sensitive. It is used a lot on fishing boats that need a quick reaction.

1.6. LAT/LON Unit

It is to select the number of the unit for Lat/Lon.

( The default setting is 4 unit.)

1.7. Receiving Port

It is to select Inter receiver Internal, External and AIS.

( The default setting is Internal.)

2. Setup

It is available to set the menu or units for user's visual confidence.

2.1. Unit

2.1.1. DIST/Speed

Select desired unit of measure for distance and speed. Choose from: nautical mile/knots (nm/kt), kilometer/kilometers per hour(km/kmh), yard/knot(yd/kt).

cf) 1nm = 1.852km, 1kt /h= 1.852km/h, less than 1nm display in yard and over 1nm display in mile

(^{ESP} The default setting is Nm/Kt.)

2.1.2. Depth

Select desired unit of measure for depth of water. Choose from: meter(M), foot(ft), fathom(fm), Italian Fathom(lfm), Japanese fathom(Jfm).

cf) $1\text{m} = 3.281\text{ft} = 0.549\text{fm} = 0.609\text{lfm} = 0.660\text{jfm}$

(^{ESP} The default setting is Meter.)

2.1.3. TEMP

Select desired unit of measure for temperature of water. Choose from: Celsius(°C), or Fahrenheit(°F).

cf) $1^{\circ}\text{C} = +32^{\circ}\text{F}$

2.2. Compass

2.2.1. BRG

There is a difference degree where you are in the earth. This function is to modify the error from true and Magnetic.

(^{ESP} The default setting is Auto.)

2.2.2. Variation

There could be a difference between the magnetic compass and the GPS compass. An error depends upon your area.

2.2.3. External compass

You can use electronic compass by NEMA.

2.2.4. External Compass Smoothing

When using an external compass, the main line of the smash of the compass is shown to move smoothly.

(^{ESP} The default setting is off.)

2.3. Time & Date

2.3.1. Reference

Available to adjust the collect local time by the UTC time from the GPS.

(^{ESP} The default setting is incorrect every the country.)

2.3.2. Time Format

Sets you preferred time between 12 hour or 24 hour.

( The default setting is 12 hour.)

2.3.3. Date Format

Sets you preferred date among YY-MM-DD, MM-DD-YY or DD-MM-YY.

( The default setting is incorrect every the country.)

2.3.4. Month format

Sets you preferred date between Character or Number.

2.4 Input/Output

2.4.1. Output Sentences

The chartplotter allows customizing the NMEA-0183 sentence.

DESCRIPTIONS	CONTENTS OF DATA FIELD	DEFAULT
\$GPGGA	Global Positioning System Fix Data	ON
\$GPVTG	Course and Ground Speed	ON
\$GPZDA	Time and Date	OFF
\$GPRMB	Recommended minimum navigation information	OFF
\$GPRMC	Recommended Minimum Specific GPS/TRANSIT DATA	OFF
\$GPAPB	Heading/track controller (Autopilot) sentence B	ON
\$GPXTE	Cross-track error, measured	OFF
\$GPBOD	Bearing, origin to destination	OFF
\$GPBWC	Bearing and distance to waypoint	ON
\$SYPLT	Samyoung autopilot	OFF

2.4.2. Transmit

Available to adjust transmit speed of input/output in each ports.

2.4.3. Output Version

Available to adjust Output Version.

( Standard is 2.3.)

2.5. Buzzer

It is can be buzzer on/off.

( The default setting is on.)

2.7. Customizing

2.7.1. Databar

2.7.1.1. Display

Setting up shown/hide the databar on the display.

( The default setting is Shown.)

2.7.1.2. Position

Setting up up/down the position of databar on the display.

( The default setting is Down.)

2.7.1.3. Edit

It customizes the data bar information.

2.7.1.4 Mode

It is available to set up the data bar.

- Customizing : It is selectable and modifiable the data bar by user.
- GPS/HY/NAV: It is fixed data bar by default. It is not available selectable and modifiable the data bar by user.

( The default is Customizing.)

2.7.2. Navigation Data

2.7.2.1. Type

It is a select the navigation data type.

( The default setting is Type1.)

2.7.2.2. Edit

It customizes the Navigation data section except activated the fishfinder section.

2.7.3. Menu

2.7.3.1. Type

Three kinds of Menu, "Smart" , "HGP" and "Touch".

2.7.3.2. Color

Changing the menu color.

( The default setting is blue.)

2.7.4. INFO Window

2.7.4.1 WPT

While navigating, shown/hidden "WPT information".

( The default setting is shown.)

2.7.4.2 Cursor

When the cursor is on the screen, shown/hidden the cursor window.

( The default setting is shown.)

2.7.4.3 Position Setup

Choose the position of Information window.

( The default setting is Auto.)

4.8.4.4. Subscreen size

Choose the subscreen size.

( Standard is Large)

2.7.5. Userdata

2.7.5.1. WPT

16 kinds of symbol and color. Choose the symbols and the colors.

2.7.5.1.1. Symbol Setup

In 16 kinds of the symbols, you can choose as many as you want, and those will show on the WPT symbol window.

2.7.5.1.2. Color Setup

In 16 kinds of the colors, you can choose as many as you want, and those will show on the WPT color window.

2.7.5.2. Track

2.7.5.2.1. Color Setup

In 16 kinds of the colors, you can choose as many as you want, and those will show on the track color window.

4.8.5.3. Selection Method

Choose mark symbol, color and track color.

- Standard: Available to choose a symbol and color.

- Flip: rotation of symbol and color.

( Standard is Flip)

4.8.5.4. Total Distance Reset

Resetting "0" in Databar, Navigation Data page, Steering page, Highway page, GPS Status page.

2.7.6. Alpha Bleinding

You can set the transparency of the background in databar and subscreen.

2.7.7. Page mode

It is a select the page mode.

- Standard: Choosing Page and customizing is available.

- Flip: Showing the chosen pages in order.

( The default setting is Standard.)

2.7.8. Cursor

2.7.1. Size

You can set the cursor's size.

( The default setting is Large.)

2.7.2. Magnetic

If the cursor is located near the WPT on the map, move the cursor to the nearest WPT.

( The default setting is off.)

2.7.3. Vessel Line

Marks lines that make distance and orientation easy from charity to cursor.

( The default setting is off.)

2.7.4. Move Cursor

You can set the cursor movement interval when expanding the map.

( The default setting is Normal.)

2.8. User Convenience

2.8.1. Auto Backup

It automatically backs up WPT and Track data when the machine shuts down.

( The default setting is On.)

2.8.2. Screen Layout

You can choose the direction in which to use the machine.

( The default setting is Vertical.)

2.8.3. Auto Night Mode

Night Mode can be automatically changed at the set time.

2.8. TD Setup

It sets Chain, Pair, ASF

3. Maintenance

It is necessary to check the system or the version for maintenance and demonstrate Vega series with the simulators

3.1. Program Version

It contains ID and the program version, and it has important information for maintenance and upgrade.

3.2. OS Version

It contains the version of OS, which is necessary for maintenance and upgrade

3.3. MAP Version

It contains the version of the chart, the datum and the number, which is necessary for maintenance and upgrade

3.4. Simulator

It is necessary for an indoor demonstration. The simulations of GPS, Fish finder or AIS in the memory..

3.5. Language

Select the language.

3.6. Remote control settings

3.6.1. Remote control

You can set whether to use the remote control.

3.6.2. Remote control register

The remote control allows you to register your product.

3.6.3. Remote control unregister

This is used to unregister the remote control.

3.7. Initialization

3.7.1. User Initialization

The stored setting is initialized in the user setting.

3.7.1. Setup Initialization

reset without deleting user data.

3.7.2. Factory Initialization

returning to the initial system from the releasing of factory.

(*All user data will be deleted)

3.8. Wire LAN

Setting the wire LAN IP.

3.9. Online Update

You can update programs and maps while connecting Wi-Fi.

4. Calendar

It is available to check the solar/moon calendar and tide.

5. Others

5.1. Save User Setting

Storing the user initialization for the default. The current is storing.

5.2.SubScreen

You can overlay the window of the information you want at the bottom of the screen.

( The default setting is Undisplay.)

5.2. Screen capture

This is the function of save the current screen

Note: The capture file is stored in external SD card.

(*The storage location is “..\HY\Capture\” in SD card).

5.2. Capture List

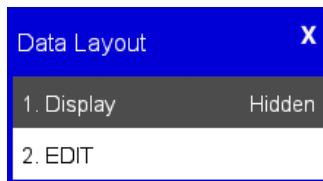
Available to display and delete the capture file

5.3. Save User Setting

Storing the user initialization for the default. The current is storing.

Data layout

1. Display

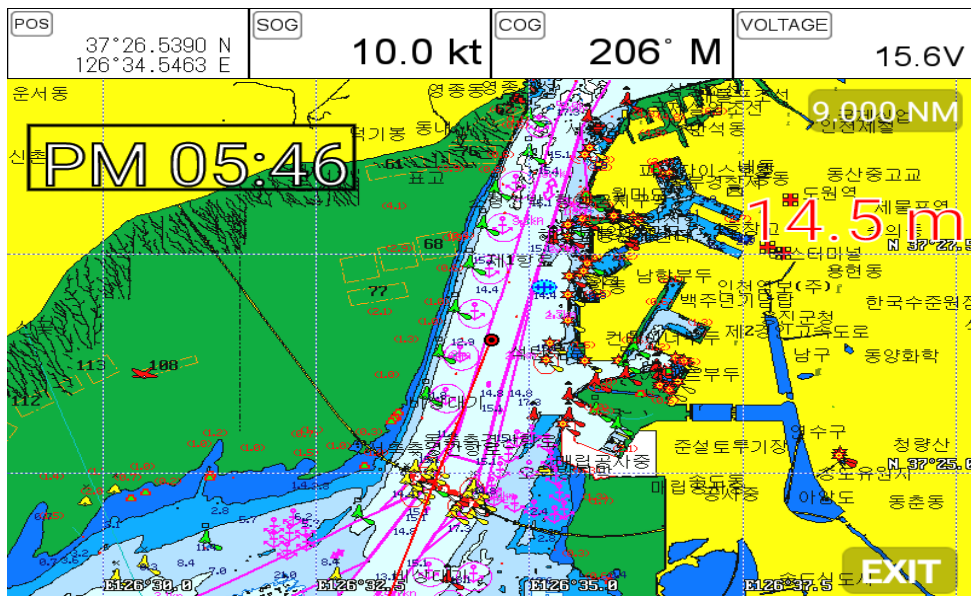


Setting the data layout on the screen. Only available in “Shown”.

(Standard is Hidden)

2. EDIT

2.1. Move



Available to move the layout data with drag and drop. Touch “EXIT” to finish.

(*Available when more than one data layout on the screen)

2.2. GPS

Showing the layout, Position, SOG and COG.

2.3. Time&Date

Showing the layout, Time and Date.

2.4. Userdata Display

Showing the layout, WPT and Track..

2.5. Fishfinder

Showing the layout, Depth and Temp.

2.6. Unspecified

Showing the layout, Voltage.

General specification

- | | |
|---------------------------|---|
| 1. Display Screen: | 12.1inch Color LCD with LED backlight |
| 2. Resolution: | SVGA (800 X 600 pixels) |
| 3. Power Supply: | DC 12V~36V(+/-10%) 13W |
| 4. Operating Temperature: | -15°C~+50°C |
| 5. Performance Standard: | IMO Resolution MSC.112(73) |
| 6. Option: | SD/MicroSD, *External GPS Antenna, * Remote control |
- [* Items may different by country..]

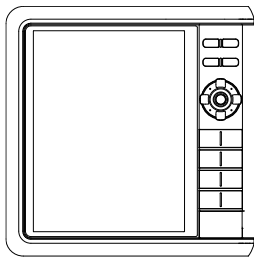
GPS Receiver specification

- | | |
|------------------------------------|--------------------------------------|
| 1. GNSS Receiver Capabilities | |
| GPS | L1 C/A code |
| GLONASS | L1OF/ |
| QZSS | L1 C/A code |
| Galileo | E1B/E1C/L1 |
| 2. Number of Channel: | 52 channels |
| 3. Horizontal Positioning Accuracy | |
| Autonomous | 2.5m (CEP 50%) |
| 4. Sensitivity | |
| Acquisition | -148 dBm |
| Tracking | -165 dBm |
| Reacquisition | -162 dBm |
| 5. Nav Update: | 1Hz, 5Hz |
| 6. Support: | DGPS, SBAS(EGNOS, WAAS, MASA, GAGAN) |

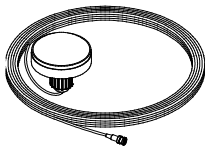
Chartplotter specification

- | | |
|---------------------|--|
| 1. Display Method: | Mercado Projection |
| 2. Display Mode: | True motion / N/S/E/W up / Course up / Head up |
| 3. Latitude Limits: | Between 85°N to 85°S |
| 4. Map Scale: | 0.05nm to 1500nm |
| 5. Map Datum: | WGS-84 |
| 6. Waypoint: | 100,000 points
*Total of 16 colors and 16 icons are selectable each point with name tag (8 alphanumeric characters) |
| 7. Track Point: | 50,000 points(2 types) |
| 8. Route: | Max capacity 100 Routes
*20 WPTs per each Route. Each with name tags (8 alphanumeric characters) |
| 9. Draw Point: | 1,000 points |
| 10. Area Name: | 1,000 points |
| 11. Chart Data: | HY-MAP(Built-in or External)/ C-MAP 4D |
| 12. Output Data: | NMEA-0183 |
| 13. Input Data: | NMEA-0183 |
| 14. Alarm: | Arrival, Anchor, XTE, Interval timer, User line |

Standard Equipment Configuration List



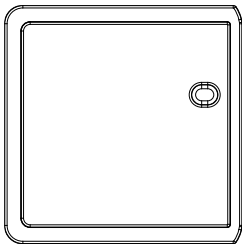
Display unit



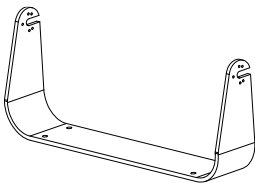
External GPS ANT(option)



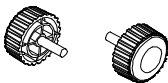
Manual



Protector



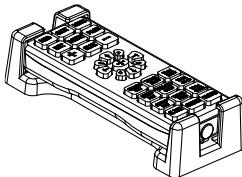
Mounting Bracket



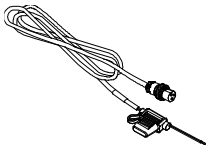
Knobs



Fuse & Bolt

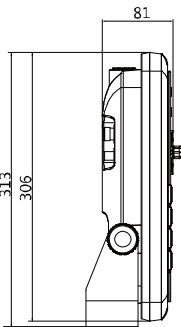
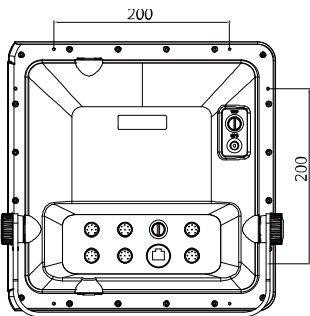
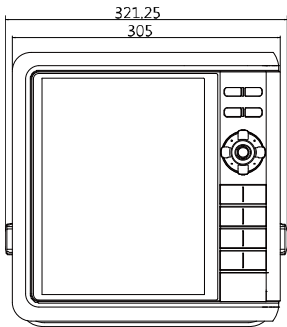


Remote control(option)



Power cable

Dimension



VG-12CF

General specification

- | | |
|---------------------------|---|
| 1. Display Screen: | 12.1inch Color LCD with LED backlight |
| 2. Resolution: | SVGA (800 X 600 pixels) |
| 3. Power Supply: | DC 12V~36V(+/-10%) 18W |
| 4. Operating Temperature: | -15°C~+50°C |
| 5. Performance Standard: | IMO Resolution MSC.112(73) |
| 6. Option: | SD/MicroSD, *External GPS Antenna, * Remote control |

[** Items may different by country..]

GPS Receiving specification

- | | |
|------------------------------------|--------------------------------------|
| 1. GNSS Receiver Capabilities | |
| GPS | L1 C/A code |
| GLONASS | L1OF/ |
| QZSS | L1 C/A code |
| Galileo | E1B/E1C/L1 |
| 2. Number of Channel: | 52 channels |
| 3. Horizontal Positioning Accuracy | |
| Autonomous | 2.5m (CEP 50%) |
| 4. Sensitivity | |
| Acquisition | -148 dBm |
| Tracking | -165 dBm |
| Reacquisition- | 162 dBm |
| 5. Nav Update: | 1Hz, 5Hz |
| 6. Support: | DGPS, SBAS(EGNOS, WAAS, MASA, GAGAN) |

Chartplotter specification

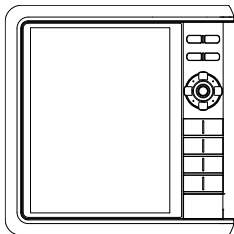
- | | |
|---------------------|---|
| 1. Display Method: | Mercado Projection |
| 2. Display Mode: | True motion / N/S/E/W up / Course up / Head up |
| 3. Latitude Limits: | Between 85°N to 85°S |
| 4. Map Scale: | 0.05nm to 1500nm |
| 5. Map Datum: | WGS-84 |
| 6. Waypoint: | 30,000 points
*Total of 16 colors and 16 icons are selectable each point with name tag (8 alphanumeric characters) |
| 7. Track Point: | 50,000 points(2 types) |
| 8. Route: | Max capacity 100 Routes
*20 WPTs per each Route. Each with name tags (8 alphanumeric characters) |
| 9. Draw Point: | 1,000 points |
| 10. Area Name: | 1,000 points |
| 11. Chart Data: | HY-MAP(Built-in or External)/ C-MAP |
| 12. Output Data: | NMEA-0183 |
| 13. Input Data: | NMEA-0183 |
| 14. Alarm: | Arrival, Anchor, XTE, Interval timer, User line |

Fishfinder specification

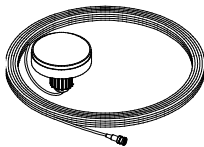
- | | |
|------------------|---|
| 1. Display Mode: | Normal (single/dual-frequency), Bottom-lock, Bottom-zoom, A-scope |
|------------------|---|

2. Frequency: 50 and 200 KHz (single or dual)
3. Output Power: 600W/1.5W
4. Range: 600W : 2.5m ~ 600m / 1.5KW: 2.5m ~ 1200m
5. Image speed: Fixed 8 speeds (4/1, 2/1, 1/1, 1/2, 1/4, 1/8, 1/16, 1/32) and stop
6. Rejection: Interferences rejection:3 levels, Noise rejection:4 levels
7. Function: Gain(auto/manual), Range(auto/manual),
Depth with shift(auto/manual)
Pulse length selection, White/Black line
Water temperature, Support speed sensor

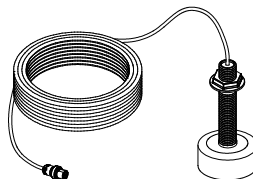
Standard Equipment Configuration List



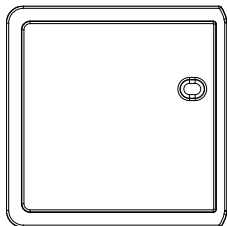
Display unit



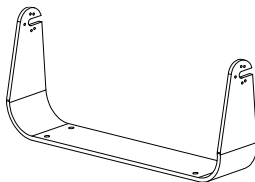
External GPS ANT(option)



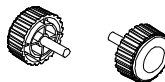
Transducer(option)



Protector



Mounting Bracket



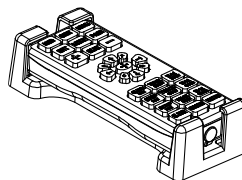
Knobs



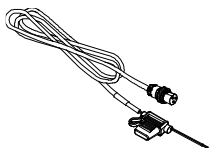
Fuse & Bolt



Manual



Remote control
(option)



Power cable

General specification

- | | |
|---------------------------|---|
| 1. Display Screen: | 12.1inch Color LCD with LED backlight |
| 2. Resolution: | SVGA (800 X 600 pixels) |
| 3. Power Supply: | DC 12V~36V(+/-10%) 13W |
| 4. Operating Temperature: | -15°C~+50°C |
| 5. Performance Standard: | IMO Resolution MSC.112(73) |
| 6. Option: | SD/MicroSD, *External GPS Antenna, * Remote control |

[* Items may different by country..]

GPS Receiver specification

- | | |
|------------------------------------|--------------------------------------|
| 1. GNSS Receiver Capabilities | |
| GPS | L1 C/A code |
| GLONASS | L1OF/ |
| QZSS | L1 C/A code |
| Galileo | E1B/E1C/L1 |
| 2. Number of Channel: | 52 channels |
| 3. Horizontal Positioning Accuracy | |
| Autonomous | 2.5m (CEP 50%) |
| 4. Sensitivity | |
| Acquisition | -148 dBm |
| Tracking | -165 dBm |
| Reacquisition | -162 dBm |
| 5. Nav Update: | 1Hz, 5Hz |
| 6. Support: | DGPS, SBAS(EGNOS, WAAS, MASA, GAGAN) |

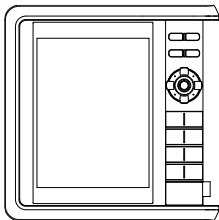
Chartplotter specification

- | | |
|---------------------|--|
| 1. Display Method: | Mercado Projection |
| 2. Display Mode: | True motion / N/S/E/W up / Course up / Head up |
| 3. Latitude Limits: | Between 85°N to 85°S |
| 4. Map Scale: | 0.05nm to 1500nm |
| 5. Map Datum: | WGS-84 |
| 6. Waypoint: | 100,000 points
*Total of 16 colors and 16 icons are selectable each point with name tag (8 alphanumeric characters) |
| 7. Track Point: | 50,000 points(2 types) |
| 8. Route: | Max capacity 100 Routes
*20 WPTs per each Route. Each with name tags (8 alphanumeric characters) |
| 9. Draw Point: | 1,000 points |
| 10. Area Name: | 1,000 points |
| 11. Chart Data: | HY-MAP(Built-in or External)/ C-MAP |
| 12. Output Data: | NMEA-0183 |
| 13. Input Data: | NMEA-0183 |
| 14. Alarm: | Arrival, Anchor, XTE, Interval timer, User line |

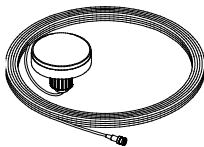
AIS specification

1. Connector	VHF antenna(PI-259)
2. Frequency	156.025MHz ~ 162.025MHz - Default channel 88B, AIS(162.025MHz) - Default channel 87B, AIS(161.975MHz)
3. Channel Spacing	25KHz
4. Frequency stability rate	±10RPM(-20℃ ~ +60℃)
5. Data Rate	25KHz GMSK (AIS, TX and RX) 25KHz AFSK (DSC, RX only)
6. Sensitivity	-107dBm(Message error rate: 20%)
7. Display stats	ON, TX, RX1, RX2
8. Output power	2W(33dBm ±1.5dB)
9. Demodulation	GMSK

Standard Equipment Configuration List



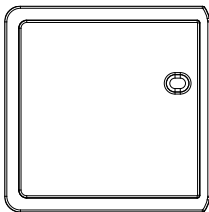
Display unit



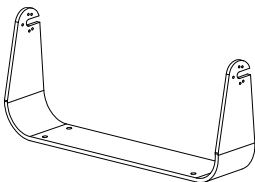
External GPS ANT
(option)



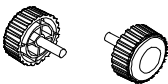
Manual



Protector



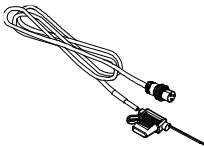
Mounting Bracket



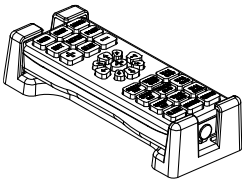
Knobs



Fuse & Bolt

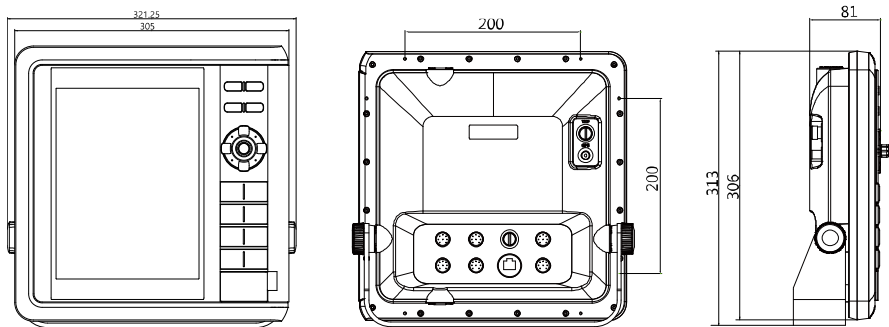


Power cable



Remote control
(option)

Dimension



Customizing items

POG	LAT/LOT of the present position. (Red: out of GPS service/Black: GPS on service/Blue: SBAS or DGPS on service)
SOG	(Speed Of Ground) Boat speed.
COG	(Course Of Ground) Boat direction.
DATE	Date of today.
TIME	Present time.
HDOP	Horizontal Dilution Of Precision.
PDOP	Position Dilution Of Precision.
W.POG	WPT Position Of Ground
W.NAME	(WPT Name) the present WPT of the destination
#DEPTH	Present depth.
#TEMP	(Temperature) Present water temperature.
TOT TIME	(Total Time) Total using time
VOLTAGE	Present voltage. (unstable voltage shows in red)
TTG	(Time To Goal) Remaining time to the destination.
ETA	Estimated time of arrival.
XTE	Cross track error.
W.RNG	Distance from the present position to the WPT.
W.BRG	Bearing between the present position and the WPT.
W.INFO	The total number of WPT and shows the WPT symbol/color.
TRACK	The total number of track and shows the track color.
DATE&TIME	The current date and time.
C.POG	LAT/LOT of the cursor.
C.BRG	Bearing between the present position and the cursor.
C.RNG	Distance between the present position and the cursor.

HY-MAP Icon

Icon	Description	Icon	Description
	Anchor berths		Beacon with color and topmark
	No Anchoring Area		Position of fog signal
	Pilot boarding place		Radar reflector
	Wreck showing any part of hull or superstructure at the level of Chart Datum.		Wreck, in over 200m or depth unknown, which is not considered dangerous to surface navigation
	Marine farm		Lighthouse
	Wreck, depth unknown, which is considered dangerous to surface navigation		Military restricted area into which entry is prohibited
	Radar transponder beacons		Yacht harbor, Marina
	Fishing prohibited		Lighted offshore platform
	Conical buoy, nun buoy, ogival buoy		Oil tanks
	Can buoy, cylindrical buoy		Wrecks
	Spherical buoy		Lights
	Pillar buoy		Barrel buoy, tun buoy
	Spar buoy, spindle buoy		Superbuoy. Superbuoys are very large buoys
	Tides		Port information

|| Display Unit Installation

Vega series brings expandable display technology to your bridge or navigation station. A careful installation will assure maximum benefit from Vega series integrated features.

Display Unit Location

Select a location for your Vega series display unit that provides easy viewing from all likely operator's positions. The display unit is designed to be mounted on either a console or from an overhead surface. The Vega series display is also designed for flush mounting using six threaded holes on the rear panel. Locate the display in an area with protection from the elements and avoid direct sunlight on the viewing window. Also, consider access to the rear panel of the unit for connecting power and cables to the various remote sensors. The mounting surface must be flat and solid to support the unit and prevent vibration. There should be access to the inside of the surface to permit through bolt fastening for the mounting bracket.

Display Unit Installation

Temporarily install the mounting bracket on the Genesis display unit and place the unit at the selected location.



The Vega series display unit is unstable when the mounting bracket is not secured. Hold the unit in place at all times.

Check the suitability of the location and make any adjustments. When all is satisfactory, use the holes in the mounting bracket as a guide and mark the holes locations on the mounting surface.

Drill a 1/4 in. diameter hole at each marked location. Mount the Vega series display bracket using bolts through the mounting surface. Place large flat washers on the opposite side of the mounting surface from the bracket and then install lock washers and nuts. Tighten securely.

Install the display unit into the mounting bracket. Check alignment and operation of the pivots and security of the mounting. Make any adjustments necessary to prevent binding and assure even meshing of the pivot locking washers. It is advised to remove the display unit and store it in a safe

place to prevent damage during the rest of the installation process.

- Power Connection

Power is supplied to the Vega series Charting System through a connector on the rear panel of the display unit.

Route the power cable from the Vega series location to the ship's power distribution panel.

Connect the black wire to a battery negative (-) terminal of the power panel.

Connect the white wire to a fused battery positive (+) terminal of the power panel (12 to 24 Vdc nominal). If a fused terminal is not available, install an in-line fuse holder.

- Care and Cleaning

Vega series is made to withstand marine elements but a little care ensures a trouble free life.

Accumulations of salt and sand, if not removed, will eventually mar the finish. No solvents or harsh cleaners should be used. The display unit may be wiped down with a damp cloth while avoiding the display window. Be careful not to scratch the display window surface. Gently remove any sand or other grit particles before cleaning the display window. The display window should be cleaned only with water and a clean soft cloth using very light pressure.

Reference

- NMEA

A standard developed by the National Marine Electronics Association and used by most marine equipment manufacturers for data communication is known as NMEA 0183 version 1.5 and version 2.0. NMEA0183 specifications offer many recognized sentences for exchanging data between many types of marine equipment.

The following technical information is provided for reference and is accurate to the best of our knowledge at the time of printing. Please refer to the appropriate NMEA specifications for details and the latest information.

The data sentences used by the HGP-660 are as follows.

Output sentences:

Descriptions	Contents of data field
\$GPGGA	Global Positioning System Fix Data
\$GPGLL	Geographic Position, Latitude/Longitude
\$GPGSA	GPS DOP and active satellites
\$GPGSV	GPS Satellites in View
\$GPVTG	Course and Ground Speed
\$GPZDA	Time & Date
\$GPRMC	Recommended Minimum Specific GPS/TRANSIT DATA
\$GPAPB	Heading/track controller (Autopilot) sentence B
\$GPXTE	Cross-track error, measured
\$GPBOD	Bearing, origin to destination
\$GPRMB	Recommended minimum navigation information

GPS Antenna Installation

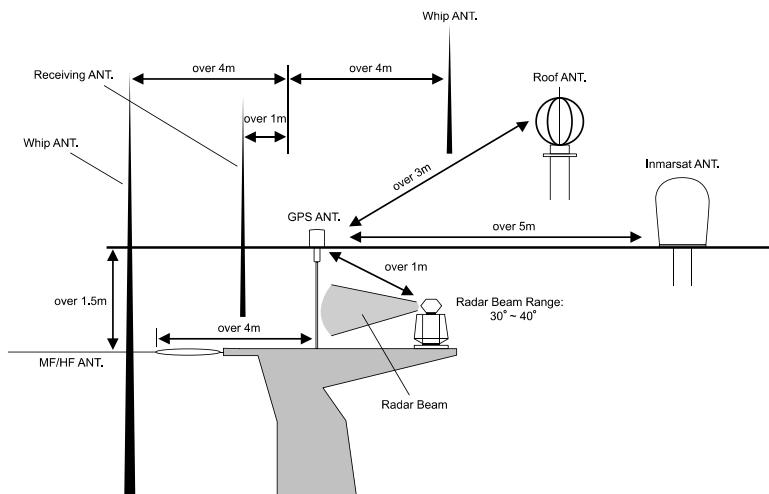
For centuries, sailors have been searching for a reliable and precise method of travelling the world's waterways. From celestial navigation to the modern navigation techniques as Loran, Decca navigator, Omega or Transit Satnav, each system has had its problems with weather, range and reliability. Without doubt, the "Global Positioning System", or GPS for short, is the most significant advance in navigation: it gives the navigator a position 24 hours a day, 365 days a year in any weather condition. GPS is a satellite based navigation system which provides suitably equipped users with accurate position, velocity and time data. Originally the GPS, developed by the U.S. Department of Defense, was conceived for military purposes, but now it is used in a host of civilian applications. GPS navigation uses satellite signals to determine your position in relation to a set of satellites orbiting the earth. The GPS constellation of satellites continuously send radio signals, containing the precise position for each satellite back to earth. By knowing the position of 3 or 4 satellites and calculating various time differences between transmitted signals, the GPS receiver can determine its present position anywhere on earth, and thanks to continuous updates, calculate speed and course information.

The installation of the GPS ANT.

The GPS ANT must be installed at the highest area of the boat and the easiest place to catch the signal from the satellites. If there are obstacles around the GPS ANT, it isn't able to catch all signals. The receiving time would be longer or the receiving power would be weaker. Please, follow the instruction for your installation.

1. Keep from a metal.
2. Over 4m away from a MF/HF ANT, VHF or HF whip ANT.
3. Over 1.5m upper away from MF/HF ANT.
4. Over 1m away from a receiving ANT.
5. Don't put the GPS ANT into the range of radar's beam. (Range: 30° ~ 40°)

6. Over 1m away from the scanner of the radar.
7. Over 5m away from the ANT of the inmarsat.
8. Over 3m away from the ANT of the roof.
9. Over 2m away from the engine.
10. Over 0.5m away from the metal surface.



⊗ Warning: Not less than 0.5m away from the metal surface.

If the environment can't be satisfied from 1 to 10, have NO. 10 satisfied and consider the others.

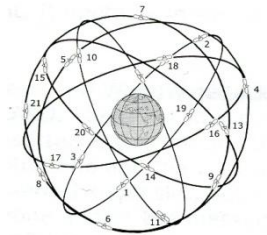
GPS

HOW GPS WORKS

Currently, the GPS constellation consists of 26 orbiting satellites (including 3 spares), but this number will increase in the future.

The GPS receiver computes an accurate position by calculating the distance to the GPS satellites that orbit the earth. Signals are required from 3 satellites for two dimensional (2D) position calculation whilst 4 satellites are required for three dimensional (3D) position calculation.

As mentioned earlier, GPS satellites are not geostationary, but they are orbiting the earth as illustrated on the following figure:

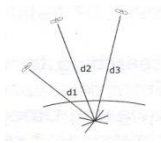


[The GPS constellation]

Note that position is repeatedly fixed through the following three steps while any 3 satellites are in line of sight.

The position calculation procedure is indicated in the following three steps:

1. GPS satellites continuously transmit their own precise orbital data and the GPS receiver computes their locations by receiving this data.
2. In this receiving process, the GPS receiver measures very accurate distances to the satellites, using the "Spread Spectrum Modulation" method. Excellence in GPS's position-fixing accuracy is mainly due to this technology.
3. When the satellite locations and their distances are known, the GPS receiver fixes its own position by triangulation:

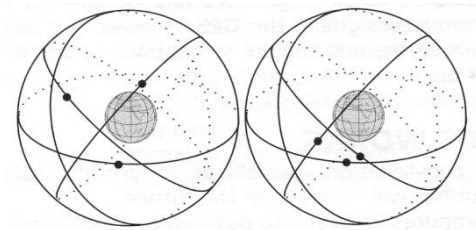


[The GPS position calculation]

As illustrated in the previous figure, the position is calculated as the meeting point of three spheres which are drawn around the three satellites with diameters d_1 , d_2 and d_3 .

Position Fixing Accuracy: HDOP

The GPS fix accuracy is due to the locations of 3 satellites in the sky. High accuracy is obtainable when the satellites are widely scattered in the sky; on the contrary, accuracy is reduced when the satellites have gathered in a narrow space. In the following figure, in both cases it is possible to obtain the GPS fix, but in the left case the accuracy will be higher than the right:



[HDOP]

The index for position-fixing accuracy is called HDOP (*"Horizontal Dilution Of Precision"*). The smaller the HDOP value, the more accurately the position can be fixed.

II Transducer Installation

An input designation means, in put to Fishfinder unit and an output designation means, output from Vega series. Sensors will have similar designations, but from the sensors point of view. Therefore, a sensor output will connect to an Vega series input and a sensor input will connect to an Fishfinder unit output.

Transducer Installation

If you have chosen a Sonar option for your fishfinder a transducer must be installed on your vessel unless an exiting compatible transducer is installed. The installation of sonar transducers requires some planning and skill to achieve the best result. It is strongly advised hat you read the installation instructions completely before starting. The two basic types of transducers are transom mount and through-hull mount. There are variations within each type to provide for options such as temperature sensors, speed sensors and for different beam angels and sonar frequencies. Several different transducers may be used with the VEGA series. Refer to the optional Equipment list for the variations available.

CAUTION

Mounting a sonar transducer for your digital fishfinder requires drilling holes into the hull of your boat which could affect its water integrity. Therefore, installation should be attempted only by qualified individuals. If you have any doubt about your ability to complete the process successfully, we recommend you obtain the services of a HAIYANG dealer or marine service center with knowledge and experience in transducer installation .

Since your digital fishfinder performance depends upon how well the transducer is installed, please carefully observe the following mounting procedures.

For proper performance, the transducer's mounting location must be chosen carefully. The transducer must be mounted in a location that is free from turbulence and air bubbles created by movement of the boat through water. Air bubbles greatly reduce the efficiency of the transducer. It is also strongly

recommended, for transom mounted transducers, the transducer be mounted in an area with the least amount of disturbed water passing under the transom. To determine the best mounting location, operate the boat at several different speeds and observe the water as it passes under the transom. Turbulence caused by the trim tabs, motor mounting, the keel, and lifting strakes.

Transom Mounting

Transducers designed for transom mounting give good performance when installed on most boat types, however, the transom transducer style should not be used on boats with inboard engines. For boats with poor water flow under the transom or on in-boards, consider selecting a through-hull transducer. HAIYANG offers many styles of transducers.

Determine the transducer mounting place by referring to the steps mentioned above. For best result, the transducer face should be level. Also, the transducer face should be mounted from flush to 1/4 inch below the under surface of the hull. The trailing edge of the housing should be about 1/8 inch below the leading edge. The adjustable stainless steel bracket is designed to allow fine tuning of the transducer position once the installation is completed.

Route the transducer cable as far as possible away from the boat's power cables, engine controls and other electrical cables. Do not route transducer cables near your VHF radio power or antenna cables. Assemble the transducer using the brackets and hardware supplied. Actual fastening to the hull of your boat depends upon the hull construction and hull material. If additional items must be used, be sure to obtain marine stainless steel hardware. Also, be sure to use marine waterproof sealant on all through hull fastenings. Do not use silicone RTV, since it does not have long life underwater.

Transom Transducer Maintenance

If your boat is kept in the water, sea growth can quickly accumulate on the face of the transducer. In just two weeks in some locations, your Sonar performance could be affected. It is recommended that at least the face of the transducer be coated with special transducer antifouling paint. Alternatively, the entire transducer can be painted and is easier to keep clean. **Do not use regular antifouling paint.** All copper base antifouling paints are unsatisfactory and will prevent normal operation. If fouling does occur, use a stiff brush or putty knife to remove growth. Be careful not to gouge the face of the Transducer. Occasional wet sanding of the transducer face is permissible with #220 grit or finer wet or

dry paper.

Do not use solvents to clean your transducer. The high impact polycarbonate housing is very durable but solvents will destroy it. Keep acetone, MEK, lacquer thinner and most other thinner/solvents away from your transducer.

Through-hull Transducers

Through-hull transducers are recommended for in-boards and other vessels with disturbed water flow under the transom. HAIYANG offers several models of bronze through-hull transducers. To enjoy the full capability of your Sonar, select a dual frequency model with temperature sensor. Sturdy bronze construction assures a secure installation and provides a strong base for fairing blocks, if needed, to compensate for hull shape.

The transducer should be installed in a location free of bubbles and away from disturbed water flow. Smooth water flow around the transducer and along its surface is very important for consistent operation.

Areas in the center third of water line length at cruising speed are usually satisfactory.

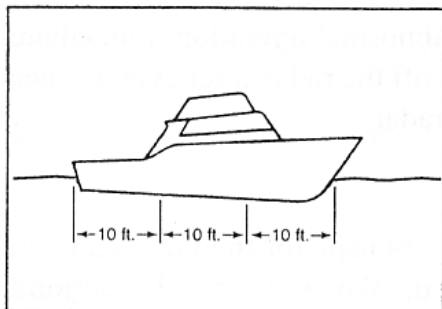
Locations forward of the engine and in a flat area near the center line of the boat are preferred. Do not install the transducer behind water intakes, other through-hull fittings or irregularities in the hull.

Dead-rise

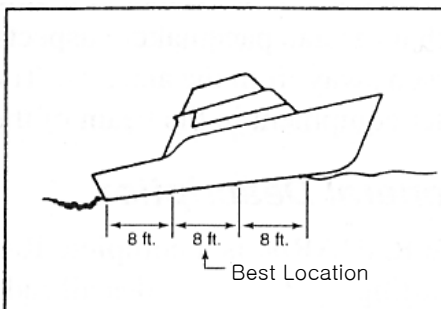
On hulls with dead-rise of 5 or less, the transducer may be mounted directly through the hull. Where dead-rise is greater than 5, fairing blocks must be used to orient the face of the transducer parallel with the water surface.

In this case, no fairing block is necessary. To prevent leakage, any gaps between the stem threads and holes drilled in the hull should be completely filled with waterproof marine sealant.

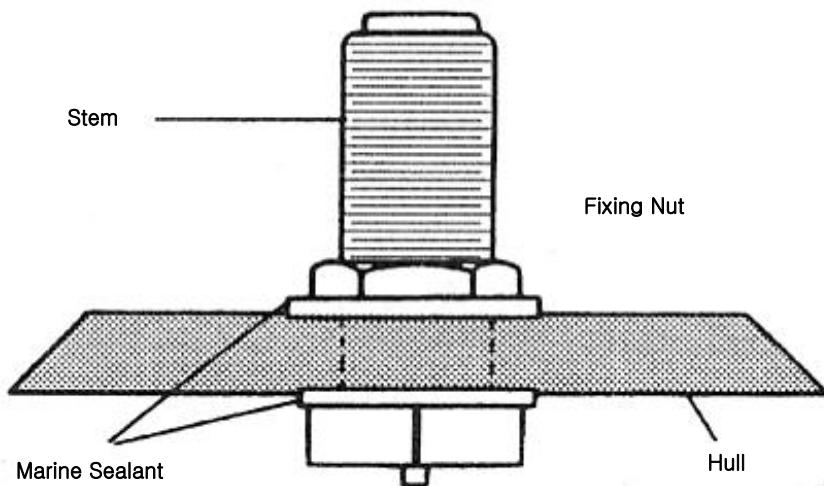
Tighten the stem nuts securely but do not over tighten. In this situation, install fairing blocks both inside and outside the hull. Install the transducer with the face aiming straight down. To prevent leakage, any gaps between the stem threads and holes drilled in the hull should be completely filled with waterproof marine sealant. Tighten the stem nuts securely but do not over tighten.



Water Line Drifting



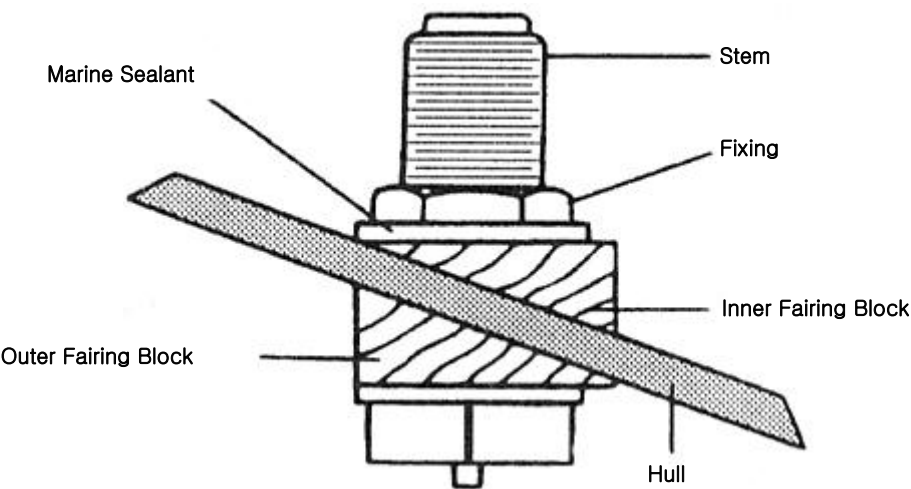
Water Line Cruising

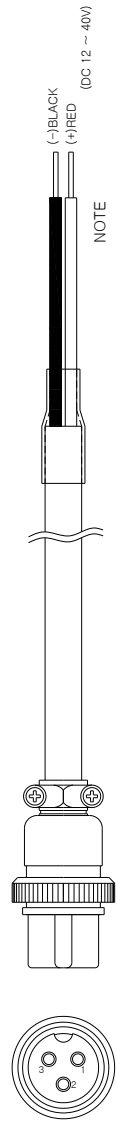
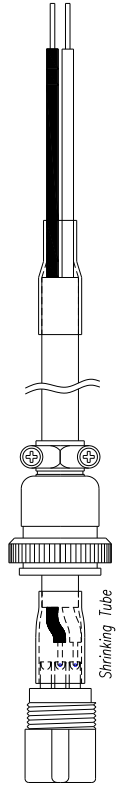
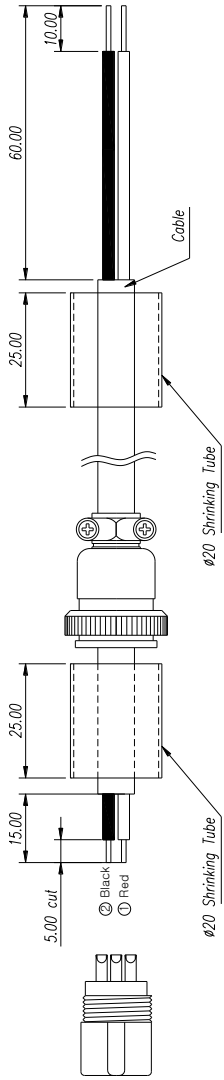


Through-hull Transducer Maintenance

If your boat is kept in the water, performance of your digital fishfinder will be adversely affected by accumulations of sea growth on the face of the transducer. To prevent sea growth effects, the face of the transducer may be coated with antifouling paint specially formulated for transducers. Do not use

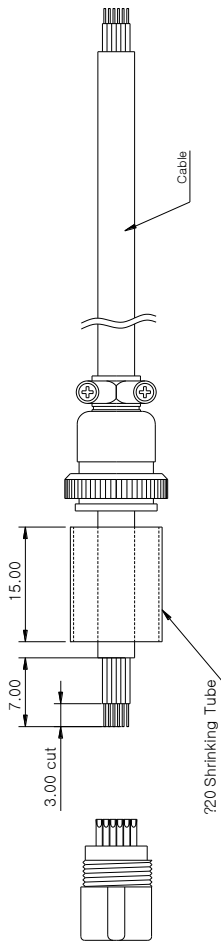
regular antifouling paint on the face of the transducer. The bronze housing may be coated with any antifouling paint. If fairing blocks are used, especially if made of wood, complete sealing prior to painting is important.



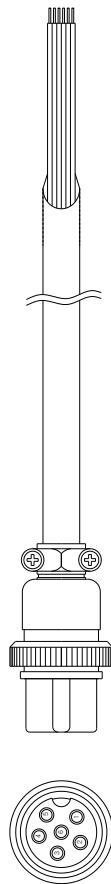
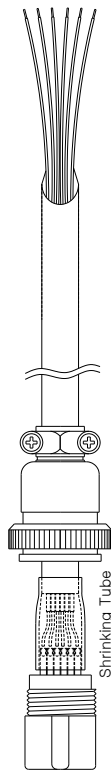


MATERIAL		DESCRIPTION	
SCALE	MODEL	Smart Series	Power Cable
PERN	CHK BY	DES BY	DWG. NO.
Y.S.KIM	Y.S.KIM	Y.S.KIM	S7-DC10303M
Y.S.KIM	Y.S.KIM	Y.S.KIM	05.07.2012

HAIYANG POLIX CO.,LTD



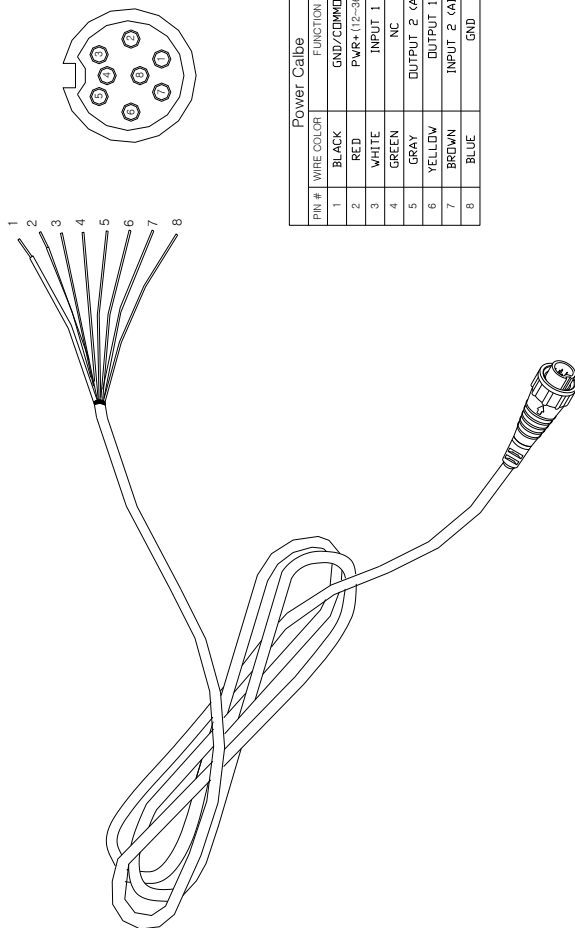
Data Cable	
PIN #	FUNCTION
1	GND
2	TX+
3	GND
4	RX+
5	RX-
6	NC



16-06P
To HD-70 series (J2/J3)

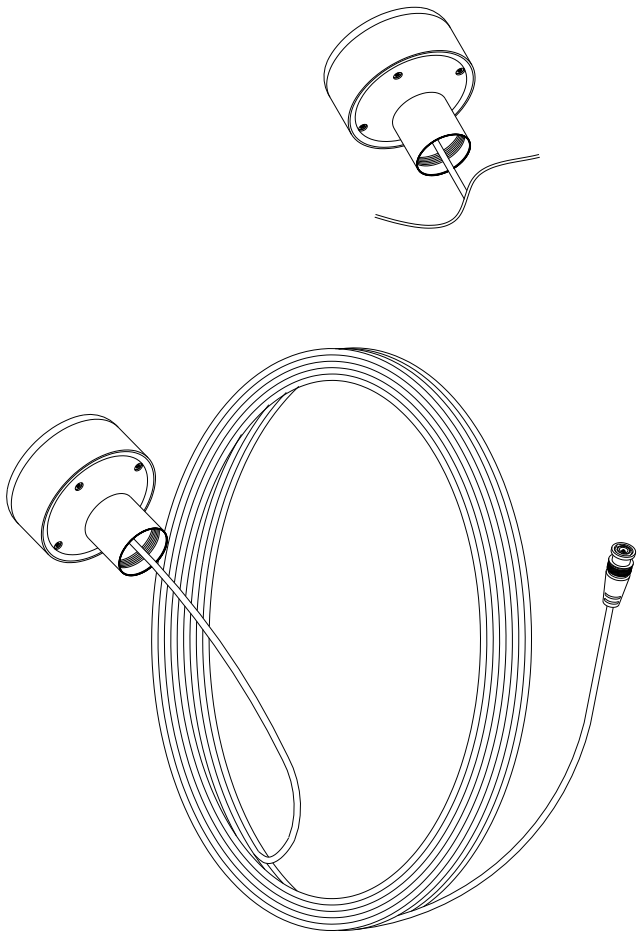
MATERIAL		DESCRIPTION	
SCALE	MODEL	Smart Sereils	Data Cable
NONE			
PERIN	CHK BY	DES. BY	DWG. NO.
Y.S.KIM	Y.S.KIM	Y.S.KIM	S7-DC10103M
		DATE	
		05.07.2012	

HAIYANO OLIX CO.,LTD

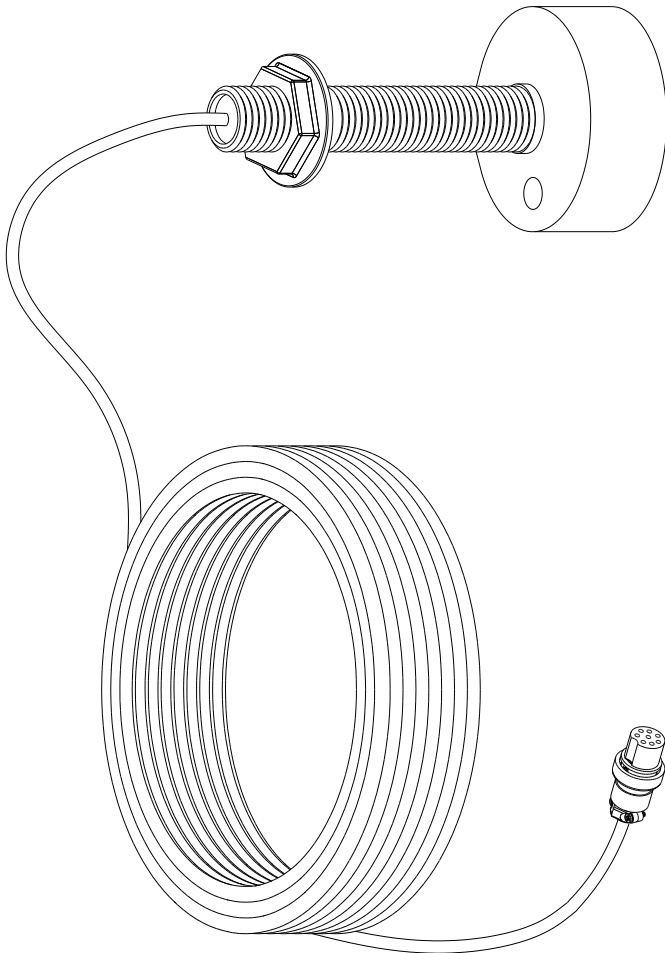


Power Cable	
PIN #	WIRE COLOR
1	BLACK
2	RED
3	WHITE
4	GREEN
5	GRAY
6	YELLOW
7	BROWN
8	BLUE
FUNCTION	
GND/COMMON	
PWR+ (12~36)	
INPUT 1	
NC	
OUTPUT 2 (AIS)	
OUTPUT 1	
INPUT 2 (AIS)	
GND	

	MATERIAL	---		DESCRIPTION	
	SCALE	1/2		Power Cable & I/O	
	MODEL	Smart Series		DWG. NO.	
	PERIN	CHK. BY	DRA. BY	DATE	S7-DC10301P
K/m Y.S.		K/m Y.S.	Park D.J.	2012.05.07	HAIYANG OLIX CO.,LTD

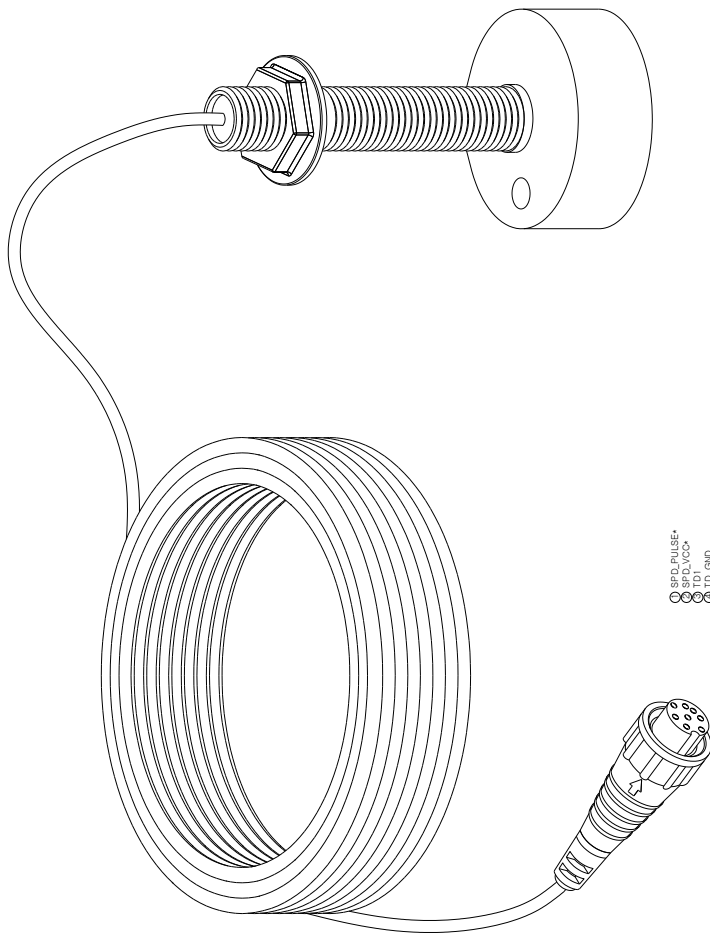


	MATERIAL		-----		DESCRIPTION	
	MODEL	Smart Series			GPS ANT	
SCALE	1/1					
PERN	CHK. BY	DES. BY	DRA. BY	DATE	DWG. NO.	S7-P490101
	KIM Y/S	KIM Y/S	D.J.PARK	2012.05.07		
HAIYANO OJIX CO., LTD						



- ① SPD_PULSE*
- ② SPD_VCC*
- ③ I2C
- ④ T2
- ⑤ TEMP_VCC
- ⑥ TEMP_VCC
- ⑦ SPD_GND*
- * mark option

MATERIAL		DESCRIPTION	
	SCALE	Smart Series	
	NONE	Transducer	
PERN	CHK. BY	DWG. NO.	TDS5502M
	Kim Y.S.	2014.02.05	
Kim Y.S.	DES. BY	Seuk.J.E.	
		DATE	
		2014.02.05	
		HAIYANG OILX CO.,LTD	



○ SFD_PULSE+
 ○ SFD_PULSE-
 ○ TD1_VCC+
 ○ TD1_VCC-
 ○ TD1_GND
 ○ TEMP_VCC+
 ○ TEMP_VCC-
 ○ TEMP_SIG
 ○ SFD_GND+
 ○ SFD_GND-

* mark option

	MATERIAL		Smart Series		DESCRIPTION	
	SCALE	MODEL	CHK. BY	DIS. BY	DWG. NO.	Transducer
PERN	NO/IE		Kim Y.S.	DRA. BY		
Kim Y.S.			Kim Y.S.	DATE	TDSS502P	
			Souk.J.E.	201.02.05		
						HAIVANG OJUK CO.,LTD

Declaration of Warranty

Declares of under his sole responsibility that the produced Plotter with Fish Finder manufactured by

HAIYANG OLIX Co., LTD.

103-903 BucheonTechnopark 22 Samjakro

Bucheon Gyeonggi, Korea

TEL +82 32 4712 FAX +82 32 327 4713

Web-site: <http://www.haiyang.co.kr>

Guarantee for One Year

Haiyang Electronic Equipment Co., LTD warrants the produced equipment, Equipment for One (1) year for guarantee as bellows.

1. Main Unit: One (1) year guarantee after a user purchases the product within one (1) year
2. Accessories: One (1) year for consumed accessories (including TD) after a user purchases them.

Service in Charge

1. Over the term from the guarantee
2. Damage from user's carelessness (inundation, impact)
3. Intentional dismantle, modification or remodeling of the unit.
4. Unauthorized parts, components or accessories are used in the unit.
5. Installed or maintained by unauthorized person
6. Consumed parts and components (batteries, LCD, etc) run out.
7. Faults or damages from other reasons.

Model		Serial No.	
Date of Purchase		Customer Name	
Name of Dealer		Price	

※ Caution – Keep this warranty card with the receipt for fast and good service