KODEN

OPERATION MANUAL

CHART PLOTTER

GTD-120

GTD-120.OM.E 0093101202-05

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Koden Electronics Co.,Ltd.
5278 Uenohara, Uenohara-shi
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409-0112 Japan

Declaration of Conformity

We, Koden Electronics Co., Ltd.; 5278 Uenohara Uenohara-Shi,Yamanashi-Ken; 409-0112, Japan

declare as manufacturer under our sole responsibility that the

Koden Chart Plotter GTD-120

intended for use as a Chart Plotter on vessels to which this declaration relates conforms to the following standards or other normative documents refering to EU directives and UK regulations

EU	UK
Electromagnetic Compatibility Directive 2014/30/EU	**SI 2016 No. 1091 Electromagnetic Compatibility Regulations 2016**
EMC IEC 60945 Ed.4.0 2002 (EMC related items)	**EMC** IEC 60945 Ed.4.0 2002 (EMC related items)

For assessment, see

- Test Report No. 77-2731U-F003 prepared by Koden Electronics Co.,Ltd.
-

RoHS conformity

EU	UK
RoHS Directive 2011/65/EU as amended by the Commission delegated directive (EU) 2015/863	**SI 2012 No. 3032 RoHS Regulations 2012 as amended**

Type names: GTD-120

Consisting of: Display Unit: GTD-120
Power Cable: CW-259-2M

- Software: Display Unit: KM-F72* (* is used as wildcard)

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Date: 17 October, 2022

This certificate expires if new regulations come in force or latest at 31 December 2027

Jun Harayama
Manager / Quality Assurance Department

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GTD-120 Operation Manual

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2	0093101202-02	2019/08/07	Chapter 18, Declaration
3	0093101202-03	2021/03/10	Configuration of Equipment, Chapter 16, Chapter 18, Cover
4	0093101202-04	2022/08/09	Chapter 4, Chapter 8, Chapter 12, Chapter 13
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6			
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Document No. Revised Version Norm

When part of the document needs to be revised, the document has advanced revision number.
The document No. is indicated at the lower right side on the cover and at the left or right side of the footer region of each page.

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For Your Safe Operation

Symbol used in this Operation Manual

The following pictograms are used in this manual. The meaning of each symbols shall be well understood and the maintenance and inspection shall be carried out.

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

Caution related to Equipment

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

 **Caution**	**Caution on location of equipment** Do not install the equipment where it is excessively damp and suffers from excessive water drops.
 **Caution**	**Escaping from static electricity** The static electricity may be generated from the carpet on the floor in the cabin or clothes made of synthetic fiber. The static electricity may destroy the electronic parts on the circuit board. Handle the circuit board, taking the measure of static electricity free.

Caution related to Handling

 **Warning**	Do not disassemble or modify. It may leads to trouble, fire, smoking or electric shock. In case of trouble, contact our dealer or our company.
 **Warning**	In case of smoke or fire, boat power off and the power of this unit. It may cause fire, electric shock or damage.
	Be cautious of remaining high voltage. A high voltage may remain in the capacitor for several minutes after you have powered off. Before inspecting inside, wait at least 5 minutes after powering off or discharge the remaining electricity in an appropriate manner. Then, start the work.
 **Caution**	The information displayed in this unit is not provided directly for your navigation. For your navigation, be sure to see the specified material.
 **Caution**	Use the specified fuse. If un-specified fuse is used, it may cause a fire, smoke or damage.

Contents

Introduction

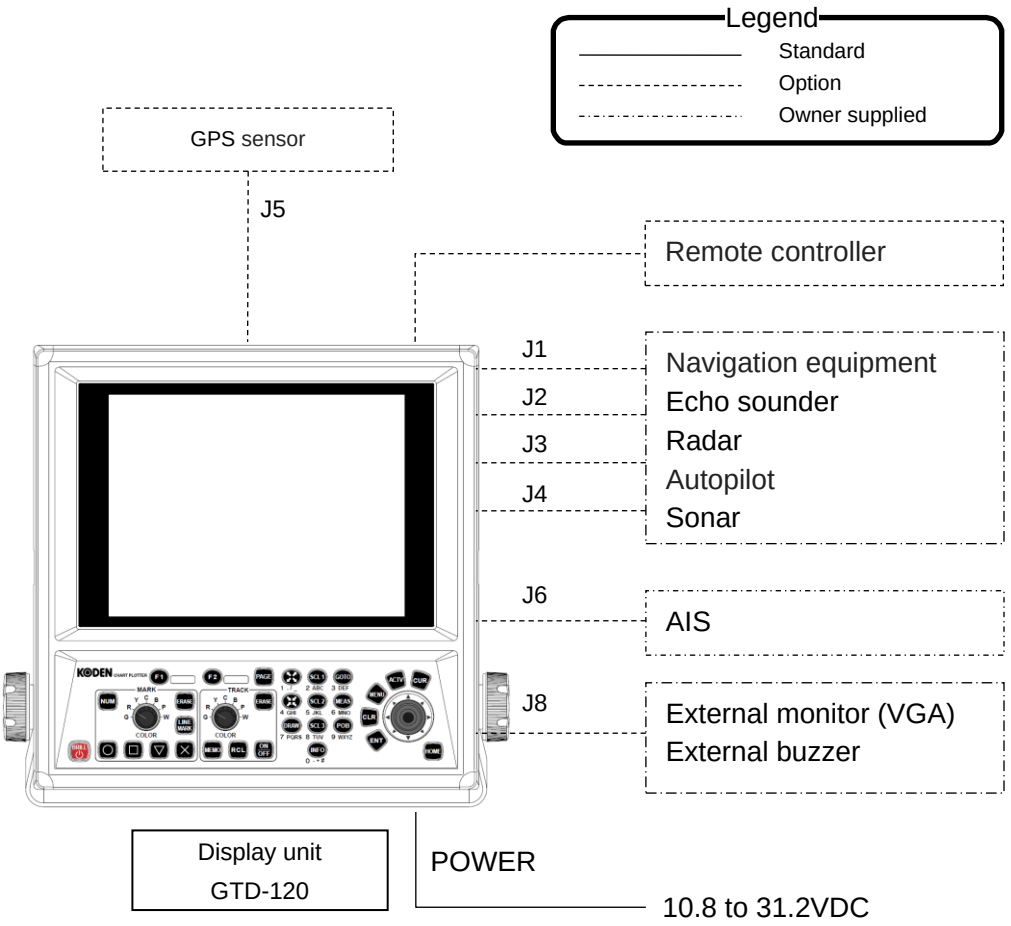
GTD-120 is a high-performance GPS plotter with many useful functions.

Main features of GTD-120 are as follows.

- Dual range map, ability to display two different ranges on one screen.
- Available Bird view display.
- Equipped with AIS display function*. Up to 128 target symbols can be displayed.
  (*In order to use the AIS display function, it is necessary to connect with the AIS receiver is necessary.)
- High performance LCD ensures high visibility under all conditions.
- Adoption of special filter (AR coat).
  The image is clearly displayed in sunlight, and reflection on the LCD screen is also prevented.
- Supports SD card sizes between 2 and 8GB.
- Easy flush mount installation from the front.
- With standard equipment for analog RGB output. The plotter images can be displayed on an external monitor, so you can check it even in a place away from the Display unit. (External monitor will be arranged by customer.)

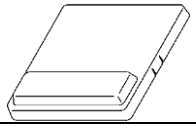
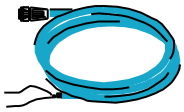
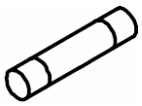
System Configuration

Connection diagram



Configuration of Equipment

Standard equipment configuration list

No	Name of item	Type	Remarks	Weight/ Length	Quantity
1	Display unit 	GTD-120	With mounting bracket and knobs	8.0 kg	1
2	Hard cover 	A30MB10250		390g	1
3	DC power cable 	CW-259-2M	With 3-pin water resistant connector and one end plain	2m	1
4	Fuse 	F-7161-5A Cylinder (φ6.4 x 30)	Normal fusion type for main power		1
5	Operation Manual	GTD-120.OM.E	English		1
6	Quick Reference	GTD-120.QR.E	English		1

Optional List

No	Item Name	Type	Remarks	Weight/ Length
1	GPS sensor	GPS-20A-10M-B [KODEN]	For GPS position fixing with power & signal cable connector	0.6kg/10m
2	GPS compass	KGC-222	With Display unit and GPS Antenna	
3	Remote controller	RCW-15	With 5m cable, (Assembled the connection cable into the Operation unit)	
4	SD card	AF4GSD3A-MRB201	4GB	
5	GPS antenna holder	RAH-29	Ratchet mount	
6	Connecting cable	CW-373-5M	6 pin waterproof connectors both ends	5m
7		CW-376-5M	Fly leads / 6 pin waterproof connector	5m
8		CW-387-5M	Fly leads / 8 pin waterproof connector	5m
9		CW-429-5M	Fly leads / 8 pin waterproof connector	5m
10		CW-576-0.5M	With a 10-pin water resistant connector and D-Sub connector (analog RGB) + Alarm out	0.5m
11		CW-420-5M	7 pin waterproof connectors both ends	5m
12	Power rectifier	PS-010	With 2 pieces of 5A fuse	
13	AC power cable	VV-2D8-3M	Both ends plain	3m
14	Connector	BD-06BFFA- LL6001	6 pin waterproof connector	
15		BD-07BFFA- LL6001	7 pin waterproof connector	
16		BD-08BFFA- LL6001	8 pin waterproof connector	
17	Operation Manual	GTD-120.OM.E	English	
18	Quick Reference	GTD-120.QR.E	English	

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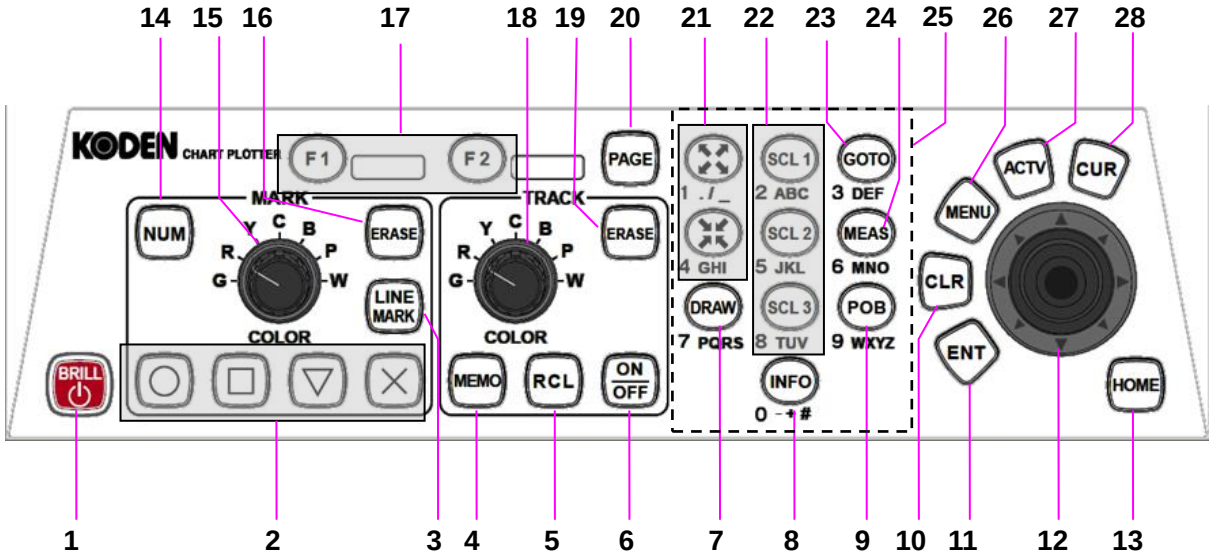
Chapter 1 Basic Operation

1.1 To use keys



1. [BRILL⏻]
   Press: Power ON
   Adjust brightness of screen/operation panel
   Long press: Power OFF
2. [○], [□], [▽], [X]
   Enter a mark
3. [LINE MARK]
   Enter a marked line
4. [MEMO]
   Save recorded track
5. [RCL]
   Saved track Display ON / OFF
6. [ON/OFF]
   Recoad track ON/OFF
7. [DRAW]
   Create drawing, parallel line drawing, diamond line drawing
8. [INFO]
   Display map information etc.
9. [POB]
   Setting POB
10. [CLR]
    Cancel WPT navigation
    Cancel RTE navigation
    Cancel POB navigation
    Stop alarm sound
11. [ENT]
    Confirm setting value etc.
12. [Joystick]
    Move chart / cursor
    Select menu item
13. [HOME]
    Menu screen OFF
    Cursor OFF
    Return own ship to the center.
14. [NUM]
    Enter mark by numeric input
15. [MARK] knob
    Change mark color
16. [ERASE]
    Erase mark
17. [F1], [F2]
    Call up the registered function
18. [TRACK] knob
    Change track color
19. [ERASE]
    Erase track
20. [PAGE]
    Switch display screen
21. [ ], [ ]
    Chart zoom In / Out
    Scroll the list
22. [SCL1], [SCL2], [SCL3]
    One touch scale adjustment
23. [GOTO]
    Set a WPT
    Reset a WPT
    Skip a WPT on the route
24. [MEAS]
    Measure a distance and a direction between two points
25. [Numeric keypad]
    Enter numbers and characters
26. [MENU]
    Menu screen ON / OFF
27. [ACTV]
    Select active screen on split screen display
    Select menu item
28. [CUR]
    Cursor Display ON / OFF

⚠ CAUTION: The [↑] [↓] [←] [→] notation in this manual indicates the direction of knocking down the joystick.
: [Zoom in] : [Zoom out]

1.2 How to insert / remove SD card

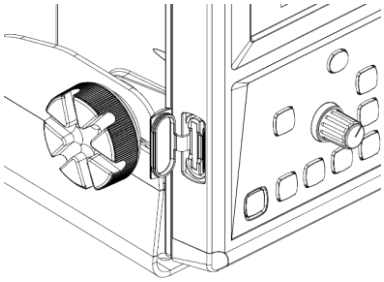
GTD-120 can display C-MAP chart of SD card. C-MAP chart card is owner supplied.
In addition, store data such as marks and track by using a commercially available SD card.
When using the SD card for the first time, be sure to initialize it with this unit. For the procedure to initialize, refer to "Chapter 12 Save to SD card and import from SD card to Display unit, 12.1 Initialize the SD card".

⚠ **CAUTION: Please only use SD card sizes between 2 and 8GB.**

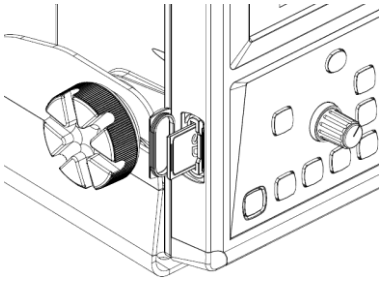
⚠ **CAUTION: Some SD cards may not work in the unit.**

Insert SD card

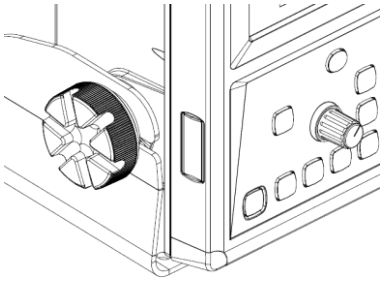
1. Open the cover of the SD card slot.



2. Insert the SD card.
   Be careful with the orientation of the SD card and insert until slight click is heard.



3. Close the cover securely for waterproofing.



Remove SD card

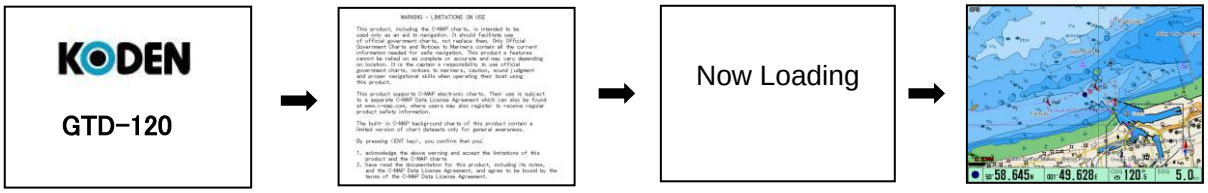
Open the cover of the SD card slot. Push the SD card once and gently release the finger, the SD card will eject and can be removed.

⚠ **CAUTION: After removing the SD card, please close the cover securely. If cover is not closed properly water and dust may enter and cause malfunctions.**

1.3 Power ON/OFF

Power ON

1. Press [BRILL⏻] key.
   After power on, the screen switches in the following order.



Initial screen → Warning screen → Data loading screen → Normal screen

2. While the "Warning screen" is displayed, press [ENT] key. (After “By pressing <ENT key>” display by red character)
   The “Data loading” screen is displayed.
   The “Normal screen” is displayed and the plotter system can be used.

Power OFF

1. Press and hold the [BRILL⏻] key for 3 seconds or longer.
   After power off, please install a hard cover to protect the LCD screen.

1.4 Adjust brightness of screen / operation panel

Adjust brightness of screen

Adjust screen brightness for better visibility.
E ach time [BRILL⏻] key is pressed, [LCD brilliance] and [PANEL brilliance] will be selected.

1. Press [BRILL⏻] key. The [LCD brilliance] window is displayed.
2. Use joystick [←] [→] to adjust the screen brightness.

3. Press [Menu] to close the [LCD brilliance] window.

Adjust brightness of operation panel

Adjust the brightness of the operation panel.
Each time press [BRILL⏻] key, [LCD brilliance] and [PANEL brilliance] changes.

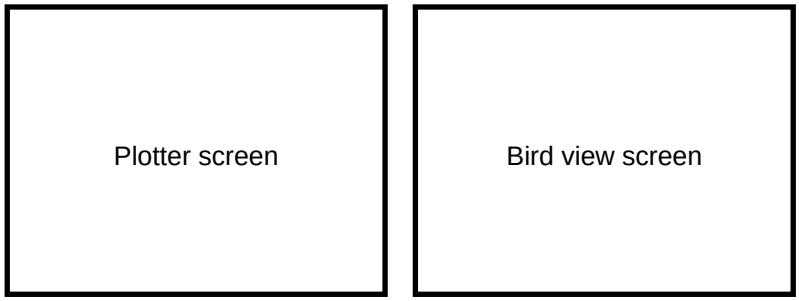
1. Press [BRILL⏻] key briefly. The [PANEL brilliance] window is displayed.
2. Use joystick [←] [→] to adjust the operation panel brightness.

3. Press [Menu] key to close the [PANEL brilliance] window.

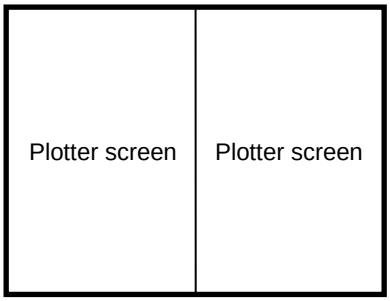
1.5 Select screen

There are 5 different displays that can be selected. Each time [PAGE] key is pressed, different display will be brought up.
By factory default 3 displays are setup which are outlined below with a thicker line.

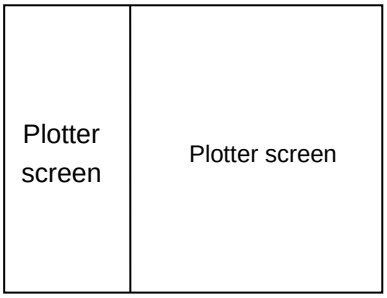
●Full screen



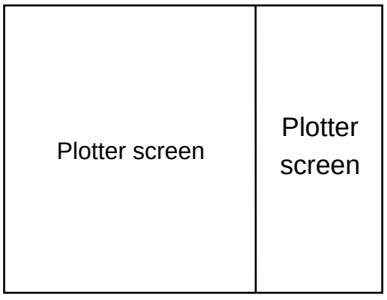
●2 screen display (Split 1:1)



●2 screen display (Split 1:2)

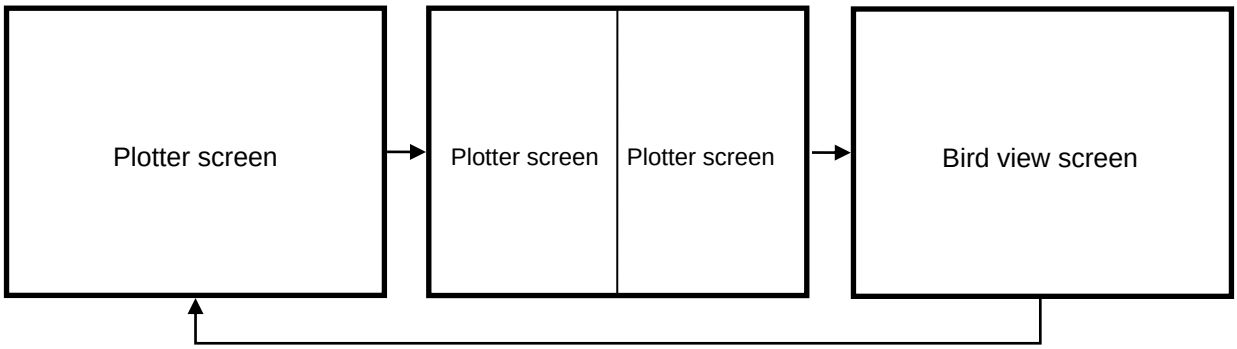


●2 screen display (Split 2:1)



Switch display screens

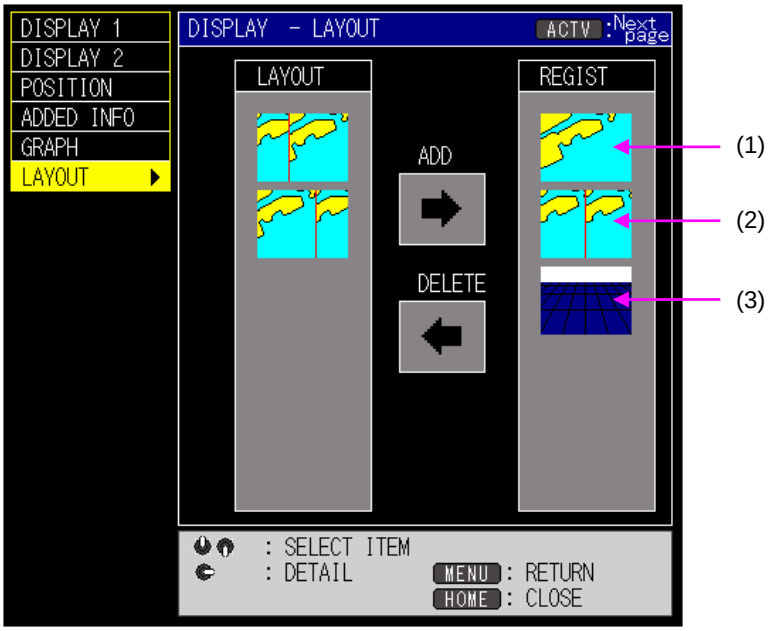
1. Each time [PAGE] key is pressed, the screen changes.
   (The figure below shows how to change the display screen when shipped from the factory.)



Register the display screen

You can edit registration of the display modes to different ones.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [LAYOUT], and use joystick [→].
2. Use joystick [↑] [↓] to select the screen to be registered from [LAYOUT].
   Use joystick [→], and move the cursor to [ADD].
3. Press [ENT] key, add the screen selected in [LAYOUT].



The switching order by pressing [PAGE] of the display screen is as follows.
(1)→(2)→(3)→(1)→(2)→(3)→・・・

4. To register more screens, repeat steps 2 and 3.
5. Press [MENU] key several times to close the menu.

Delete the registered screen

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [LAYOUT], and use joystick [→].

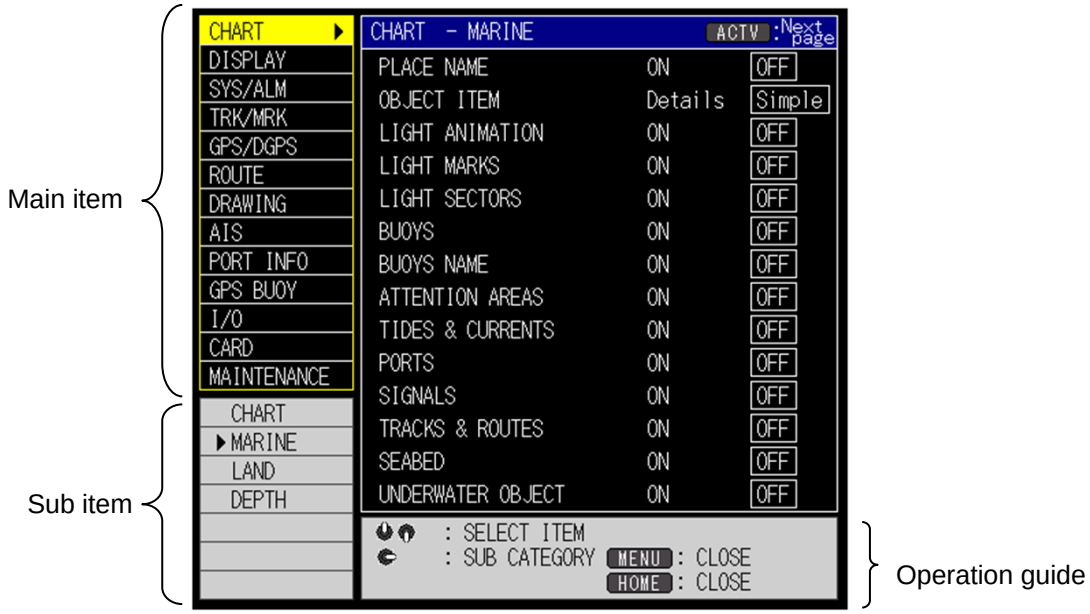
2. Use joystick [↑] [↓] to select the screen to be deleted from [REGIST].
   Use joystick [←], and move the cursor to [DELETE].
3. Press [ENT] key, delete the screen selected in [LAYOUT].
4. To delete more screens, repeat steps 2 and 3.
5. Press [MENU] key several times to close the menu.

1.6 Overview of menu operation

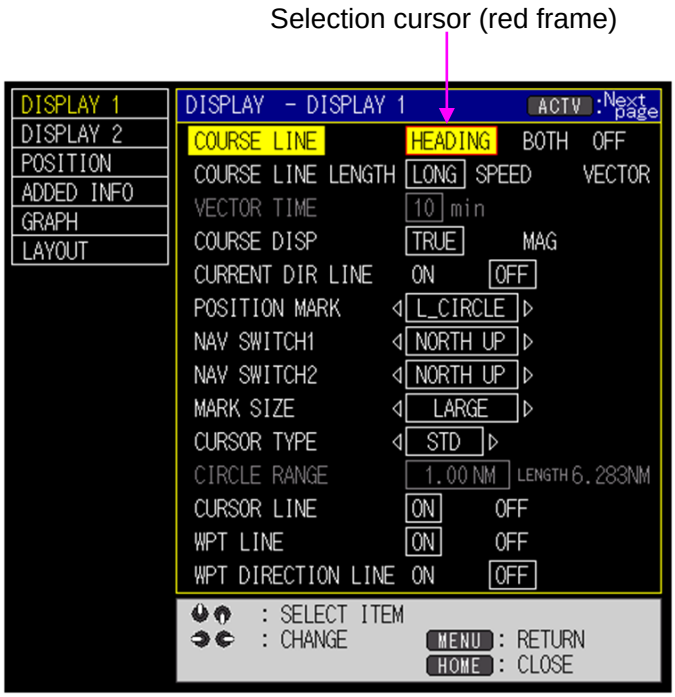
To change various settings etc., open the menu.
Here, the basic menu operation procedure is shown, but there are many menus with special operations. In that case, please follow the operation guide displayed on the screen.

Menu operation

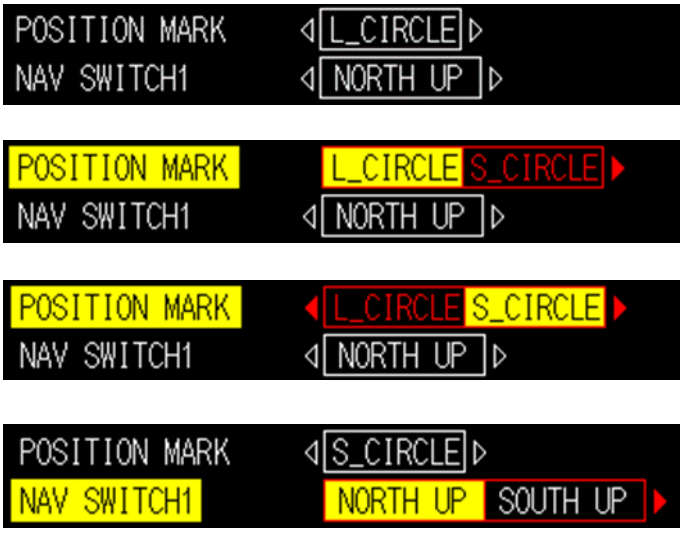
1. Press [MENU] key to display the menu screen.



2. Use joystick [↑] [↓] to select main item, and use joystick [→].
   *While selecting the main item, switch sub items by pressing [ACTV] key.



3. Use joystick [↑] [↓] to select sub item.
4. Use joystick [←] [→] and select the setting value with the selection cursor (red frame).
   If the setting value is 4 or more items, the following operations are performed.



In case, no selection cursor (red frame)

[↑], [↓] to select [POSITION MARK]

↓

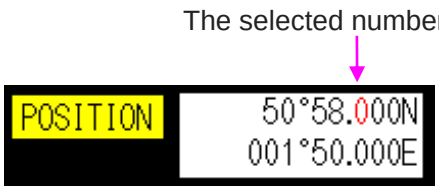
[→]

↓

[↓]

5. Press [MENU] key several times to close the menu.
   *Close the menu with one touch by pressing [HOME] key.

Entering a numerical value



*To enter the latitude and longitude continuously, press [OFF/ON] key and specify the digit to the start positon for entering. The background color of the enter start digit changes.

.

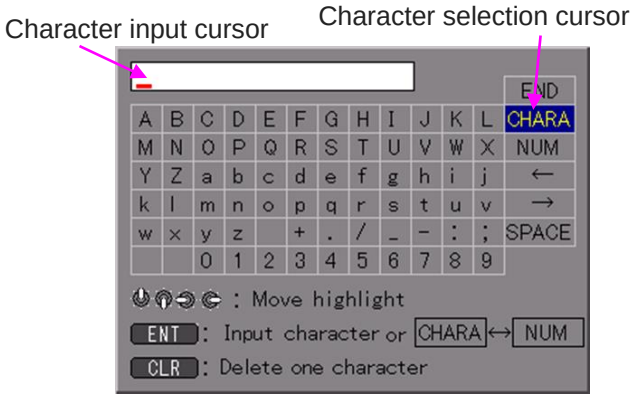
1) Use joystick [←] [→], specify the digit from which the numerical value is to be changed.

(2) Use joystick [↑] [↓] to change the value.
[↑]: The numeric value increases.
[↓]: The numeric value decreases.
*Also possible to enter with the numeric keypad.
After entering the numerical value, move to the digit by using joystick [←] [→].

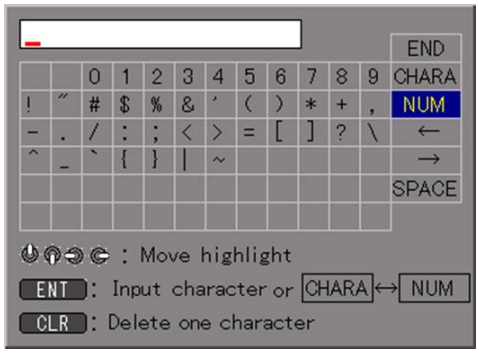
(3) Press [MENU] key to end input.

Also switch between north latitude (N) <=> south latitude (S), east longitude (E) <=> west longitude (W) by pressing [PAGE] key.

Entering characters



Alphabet input screen



Numeric and symbol input screen

(1) Select the character format to enter.
Move the character selection cursor, select [CHARA] and press [ENT] key to enter [Alphabet input screen].
Move the character selection cursor, select [NUM] and press [ENT] key to enter [Numeric and symbol input screen].
*The same operation can be done by pressing [ACTV] key.

(2) Move the character selection cursor and select the first character.
*Also possible to enter with the numeric keypad.

(3) Press [ENT] key.
*If mistake is made in entering characters, select [←] with the character selection cursor and press [ENT] key to return to that character and select the correct character again.
Select [←] with the character selection cursor and press [ENT] key to move the character input cursor to the left.
Select [→] with the character selection cursor and press [ENT] key to move the character input cursor to the right.
To enter spaces, select [SPACE] with the character selection cursor and press [ENT] key.

(4) Repeat the procedure (1) to (3) and enter characters.

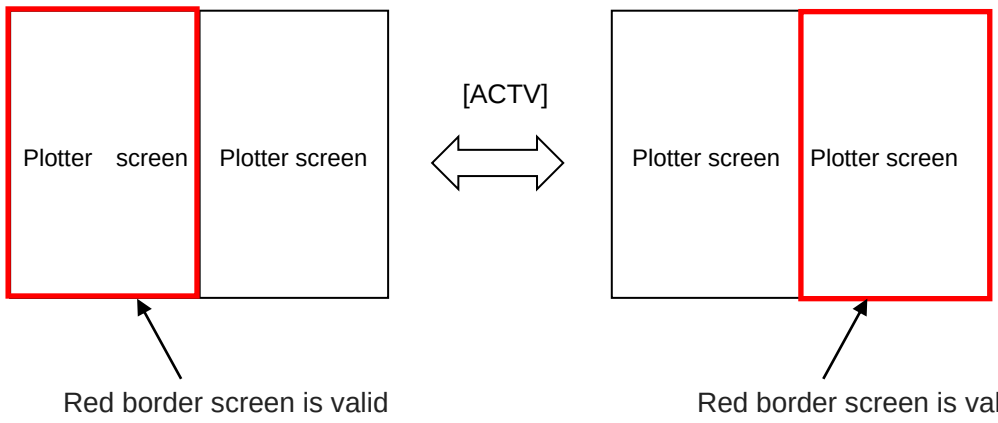
(5) Finally, select [END] with the character selection cursor, and press [ENT] key.
*The same operation can be done by pressing [MEMO] key.

● List of assignment of each key when entering characters

Key	Numeric	Alphabet	Symbol
	1		. / _ - : ;
	2	A B C a b c	
	3	D E F d e f	
	4	G H I g h i	
	5	J K L j k l	
	6	M N O m n o	
	7	P Q R S p q r s	
	8	T U V t u v	
	9	W X Y Z w x y z	
	0		- + #

1.7 Use [ACTV] key

On the 2 screen display, press the [ACTV] key, and the effective screen changes.
The screen with the red frame is effective screen, so you can change the scale, operate the cursor, etc. in the effective screen.



*In addition to switching the effective screen, perform operations such as sub item switching by menu operation.

1.8 Use [HOME] key

Press [HOME] key, for example, when own ship has disappeared from the screen (return to own ship from outside the screen) or close the menu screen.

Press [HOME] key, the following operation is performed.

When the menu screen and various windows are displayed, close them all.
When the cursor is displayed, hide the cursor.
Return own ship's position to the center of the screen.

1.9 Use [F1] and [F2] keys

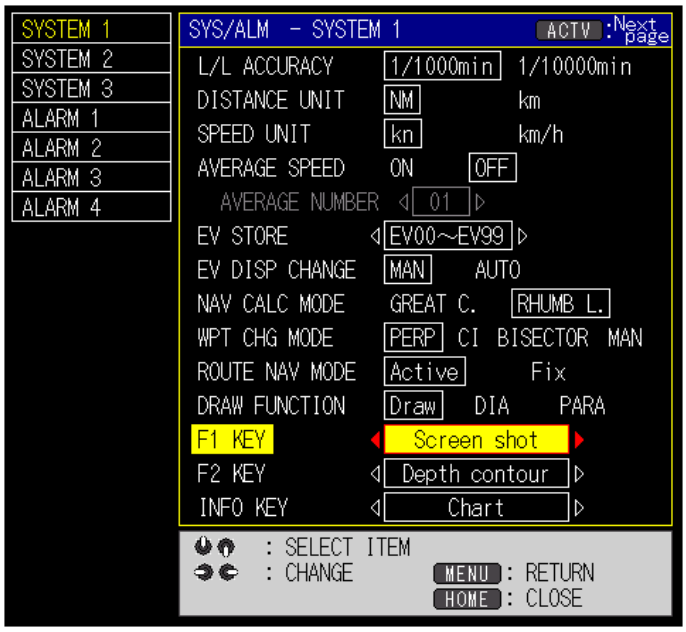
[F1] and [F2] keys are to call registered functions with one touch. By simply pressing this key, call up the registered function, enabling quick operation.

1. Press [F1] (or [F2]) key.
   The setting items are displayed on the screen.
2. Change the setting by using joystick [↑] [↓] [←] [→] as necessary.

Register function in [F1] or [F2] keys

At factory default value, [Nav switch] is registered in [F1] key, [Screen shot] is registered in [F2] key.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].
2. Use joystick [↑] [↓] to select [F1 KEY] (or [F2 KEY]).
3. Use joystick [←] [→] to select the function to be registered.



4. Press [MENU] key several times to close the menu.

[F1] and [F2] keys setting items

Item	Function content
Stabilization	Set the speed display stability. 1: Response is slow 2: Response is between 1 and 3 3: Response is fast *When moving at low speed, setting "1" may improve the stability of the speed.
Nav switch	Sets the direction of the upward screen. NORTH UP: Always keeps displaying true north on the top of the screen. SOUTH UP: Always keeps displaying true sourth on the top of the screen. EAST UP: Always keeps displaying true east on the top of the screen. WEST UP: Always keeps displaying true west on the top of the screen. COURSE UP*: Always keeps displaying a waypoint positoin on the top of the screen. *Except WPT navigation and RTE navigation, Always keeps displaying true north on the top of the screen. HEAD UP: Always keeps displaying a heading line on the top of the screen and own ship is fixed in the center of the screen while the map moves according to own ship's movement.
VRM	This mode is used when measuring a distance from own ship. ON: Variable Measuring Marker display ON. OFF: Variable Measuring Marker display OFF.
Screen shot	Memorize a current displayed image. (Max:100)
Map color	Change the arrangement of color in the map.

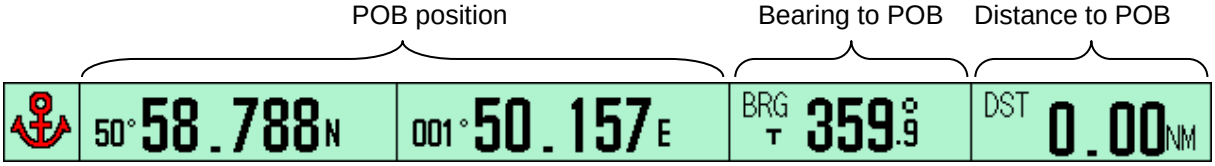
Temp/Dpt Graph	Water depth graph or Water temperature graph ON / OFF. Dpt: The water depth graph is ON. Temp: Water temperature graph is ON. Both: The water depth graph and water temperature graph are ON. OFF: All graphs are OFF.
WPT history	Set WPT from the registered WPT. (Up to the last 5 past WPT are registed in the history table.)
Route exec	Select the registered route and execute the RTE navigation. CURSOR: Select the route with the cursor. VALUE: Select a route from the list.
Place name	Place name on map ON / OFF. ON: Place name is ON. OFF: Place name is OFF.
Mark shape SW	Switch the mark shape to be entered when press the [○] [□] [▽] [X] key.
Floating VRM	Display a Variable Measuring Marker at any position on the map.
Position data	Switch a position data in the order of [L/L] and [LORAN C].
WPT setting	Set the cursor position to the destination with one touch.

1.10 Marking the POB (Person Over Board) location

This is an emergency event function to mark the location of an accident such as a person overboard. To use this function, simply press the [POB] key.
This function has priority over WPT navigation and RTE navigation.

Setting the POB point

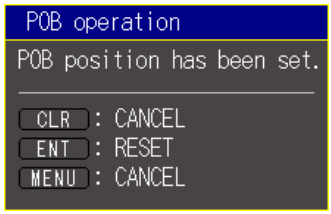
1. Press [POB] key.
   Display the POB mark ( ) at own ship's position.
   The POB point is marked with its position (latitude/longitude), bearing and distance (NM) shown at the bottom of the screen.



POB infomation

Resetting the POB point

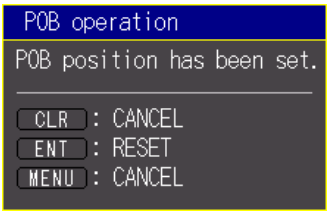
1. Press [POB] key.
   [POB operation] window is displayed.



2. Press [ENT] key.
   Reset the POB point.

Canceling the POB

1. Press [POB] key.
   [POB operation] window is displayed.



2. Press [CLR] key.
   POB is canceled, POB information is hide.

1.11 Use [INFO] key

Press [INFO] key to display the following information.

Information on objects shown on the chart.
AIS Information.
Numeical screen.

Register function in [INFO] key

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].
2. Use joystick [↑] [↓] to select [INFO KEY].
3. Use joystick [←] [→] to select the information to display.

Information on objects shown on the chart

Press [INFO] key, information of objects displayed on the chart can be shown. Available information depends on whether the cursor is displayed as shown below:

Cursor display: The object information around the cursor is shown in the [OBJECT INFORMATION] window.

Non-cursor display: The object information around the ship is shown in the [OBJECT INFORMATION] window.

Detailed information display

Detailed information on selected items is displayed at the right side of the screen. When the detailed information has many pages, it can be accessed by the following method.

1. Use joystick [→]
   The frame of the detailed information window will change to yellow.
2. Use joystick [↑] [↓] to select the page of the detailed information window
3. Use joystick [←] to return to the item selection.
4. Press [MENU] key several times to close the [OBJECT INFORMATION] window.

Photograph display

In the items of OBJECT INFORMATION, photographs are included in the MULTIMEDIA CONTENT and PORT/MARINA section. In this case, the color of the items which can display photographs is mint green.

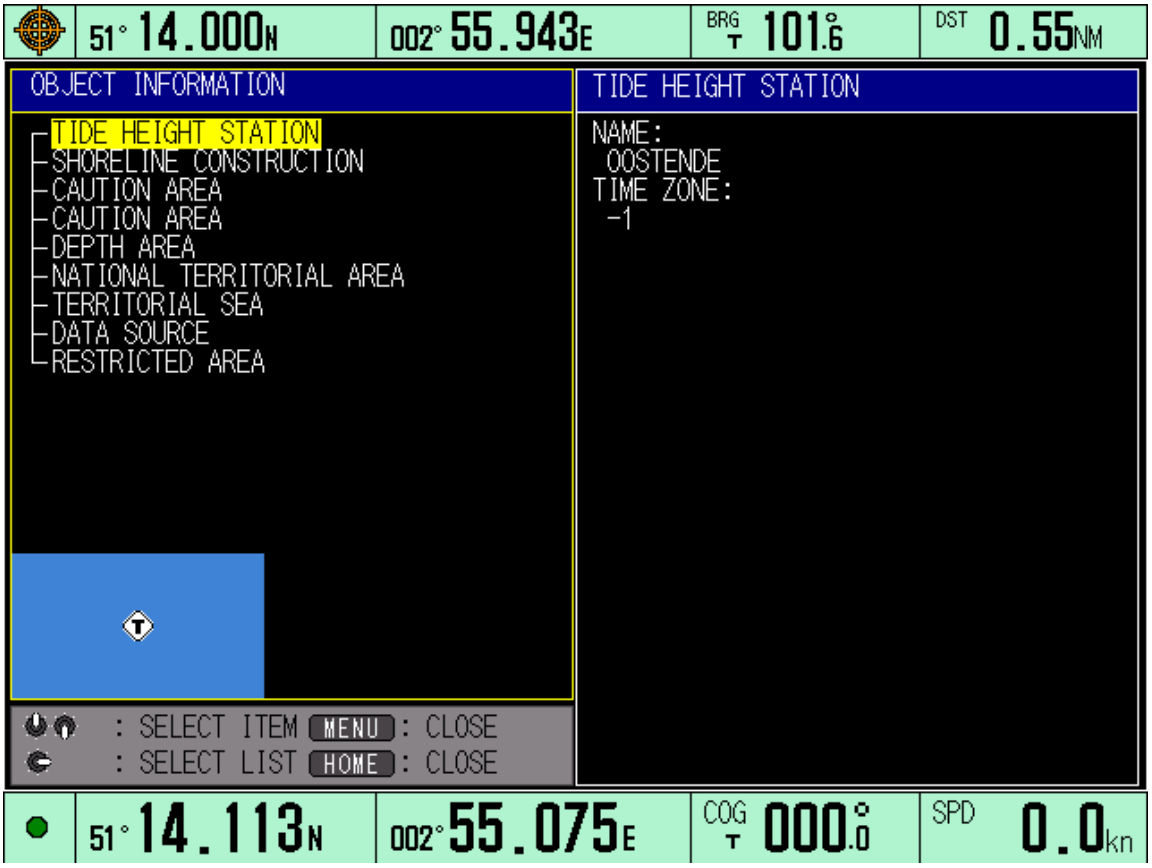
Press the [ENT] key after the mint green item has been highlighted.

Then, photographs will start appearing. It takes several tens of seconds for photographs to be transmitted in full. A transmission progress bar is displayed in the lower screen section.

Press the [MENU] key to end the photograph display.

Tidal information display

TIDE HEIGHT STATION and TIDE STREAM STATION contain Tide graph data. The color of items that can display Tide graphs is brown.



Press the [ENT] key after highlighting a brown item.

The Tide graph screen will be displayed.

The operation of Tide graphs will be explained in detail in the next section.

Press the [MENU] key to end the Tide graph display.

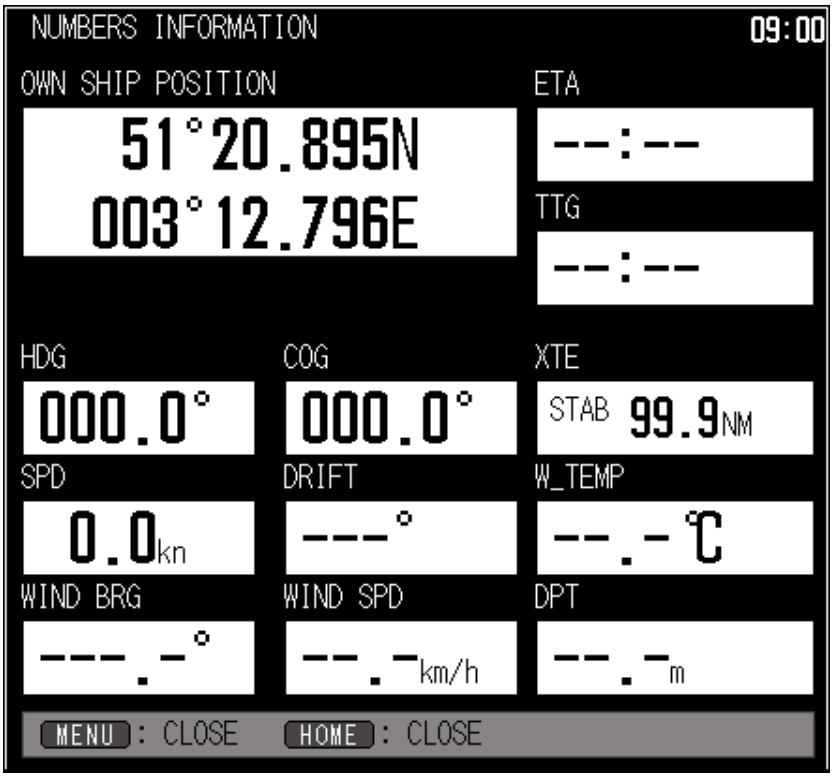
AIS information

Built-in AIS interface board, display other ship information by connecting the AIS receiver. Each time [ACTV] key is pressed, it switches to [Receive Order], [Ship Name Ascending Order], [Ship Name Descending], [Ship Name Descending], [Distance Ascending Order], [CPA Ascending Order], and [TCP Ascending Order]. Press [Zoom in] or [Zoom out], the list scrolls.

*CPA: Closest Point of Approach, TCPA: Time to CPA

Numeric screen

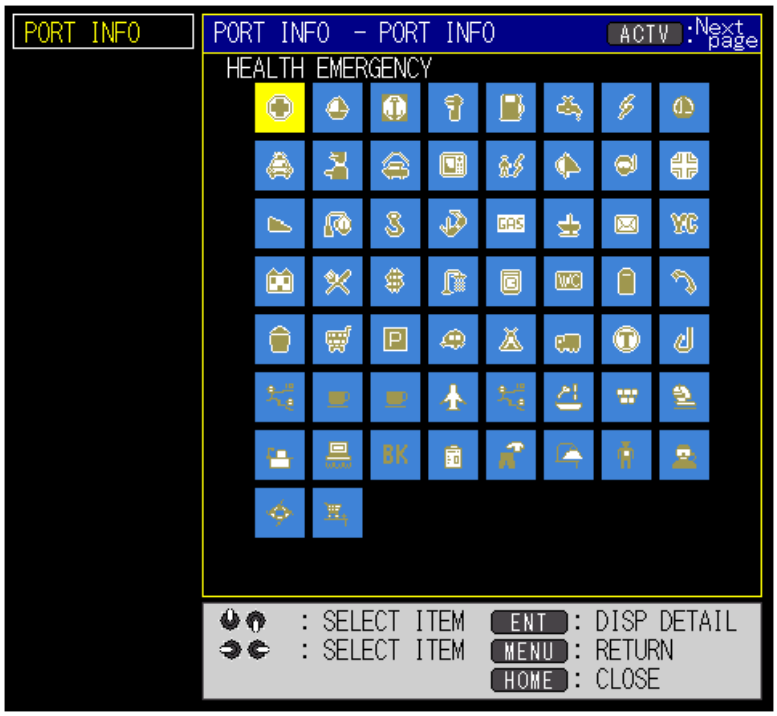
It displays information such as the latitude, longitude, course and speed of own ship's position.



1.12 Nearest port info

Display information close to own ship's position or the cursor position.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [PORT INFO], and use joystick [→].
   Select [PORT INFO], and use joystick [→].
   [Nearest port info] screen is displayed.



2. Use joystick [↑] [↓] [←] [→] to select an icon.
3. Press [ENT] key.
   Information on the item (NAME, DST, BRG) list is displayed.

4. Use joystick [↑] [↓] to select item.
5. Press [ENT] key.
   Detailed information on the item is displayed.

6. Press [ENT] key.
   [Nearest port info] screen is not displayed, and the cursor position jumps to place of the target item on the map.

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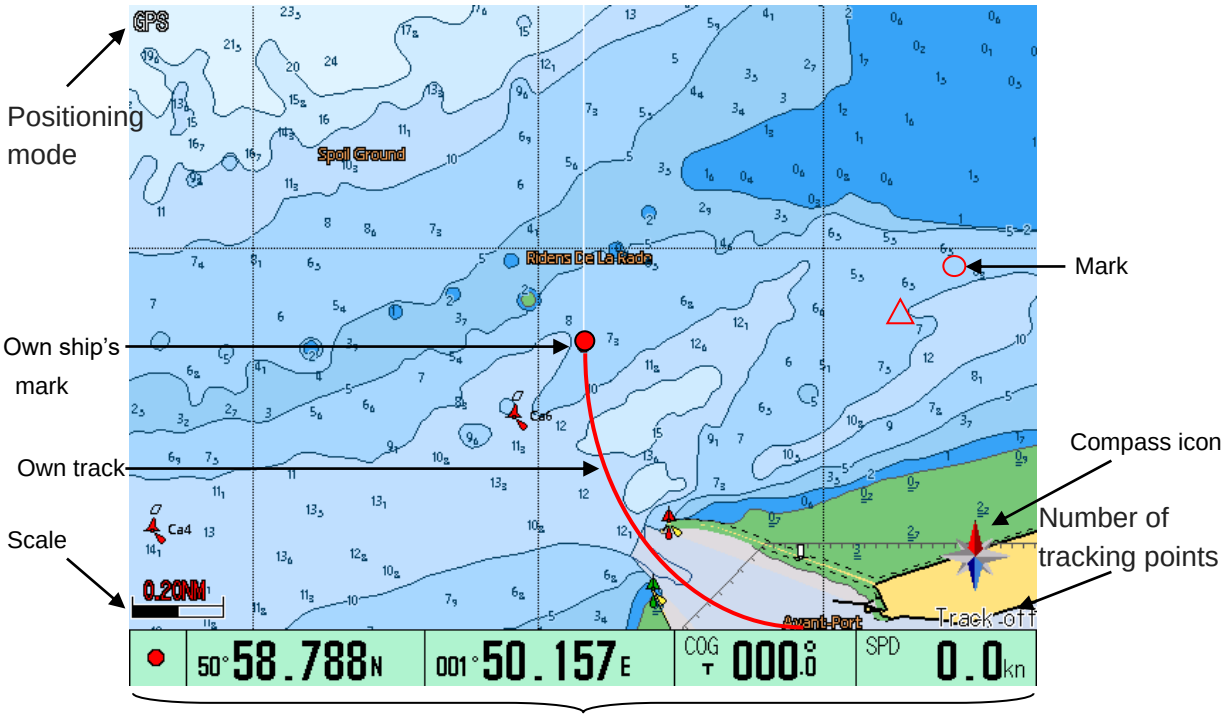
Chapter 2 Plotter display

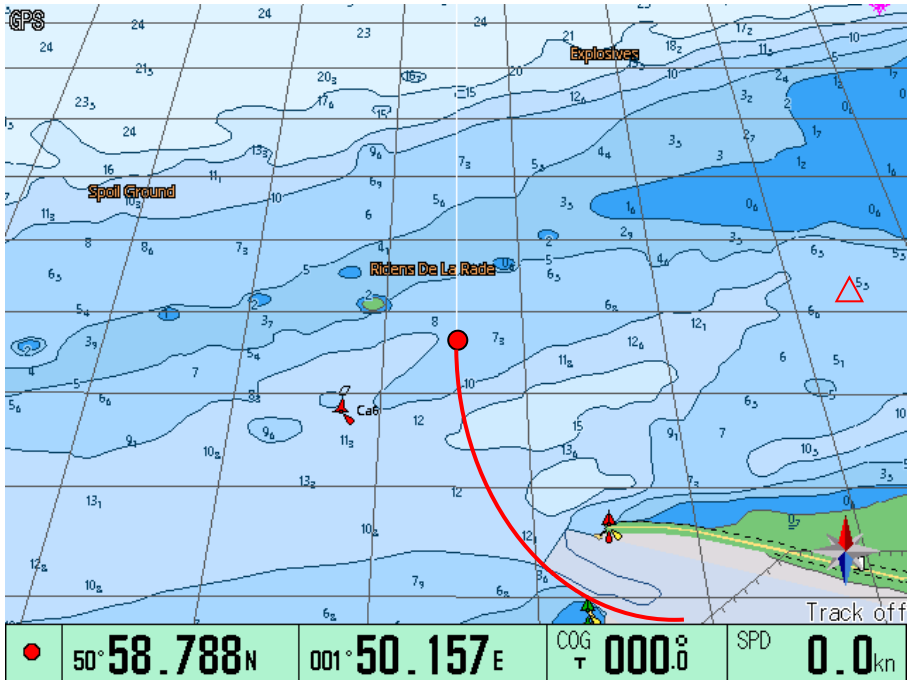
2.1 Plotter screen

On the plotter screen, coastlines, track lines, marks, etc. are displayed.



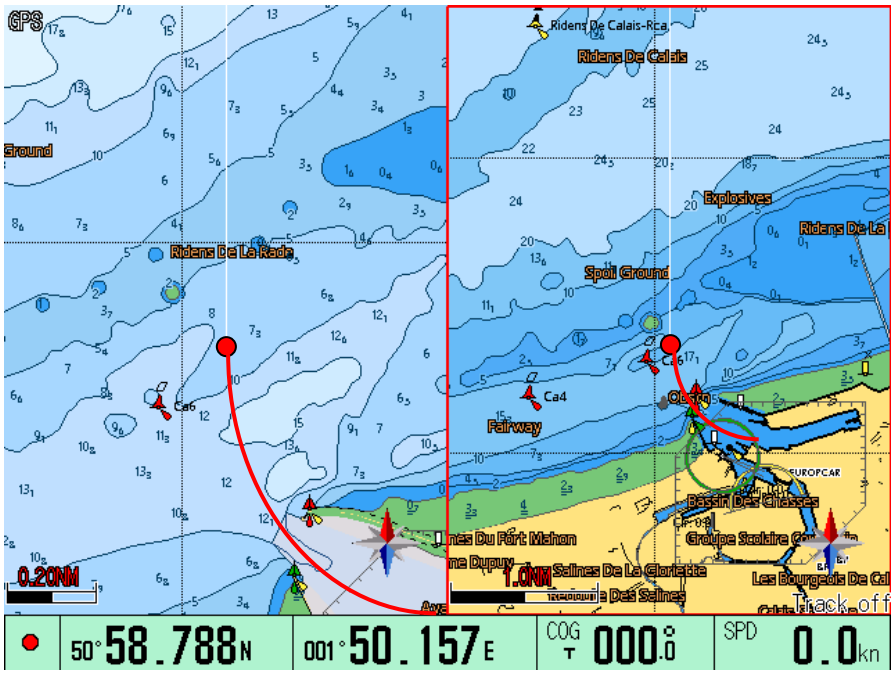
2.2 Bird view screen

Bird view screen is an elevated view of an object from above. It shows the direction of heading while showing the details of the position of own ship, so it is easy to navigate while checking the direction of the waypoint.



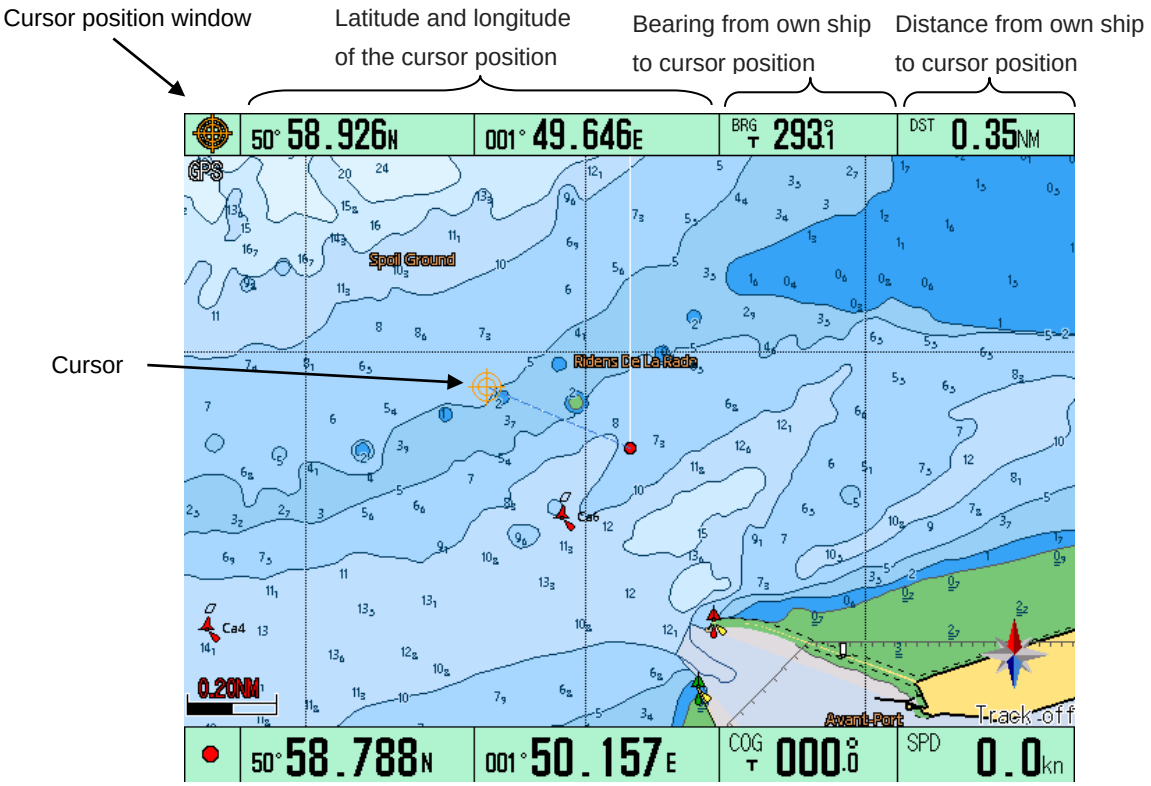
2.3 2 screen display

You can choose two different scales at the same time by setting the plotter screen side by side.



2.4 Operate the cursor

1. Press [CUR] key.
   The cursor and cursor position window are displayed on the screen. Each time [CUR] key is pressed, display switches ON / OFF.



2. Use a joystick.
   The cursor moves in the direction operated the joystick.
3. While cursor is displayed, press [CUR] key, and the cursor will switch ON / OFF.
   For the operation of cursor OFF, refer to "Chapter 13 How to use the menu, 13.3 SYS/ ALM menu, System 3 for each menu item, CURSOR OFF".

2.5 Move the chart

The position of the display screen can be moved freely with cursor OFF.
There are two modes for moving a chart: [View] and [Chart].
In [View], the chart moves in the direction opposite to the direction in which the joystick operated.
In [Chart], the chart moves to the direction in which the joystick operated.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM2], and use joystick [→].
2. Use joystick [↑] [↓] to select [SCRL DIRECT].
3. Use joystick [←] [→] to select, [View] or [Chart].
4. Press [MENU] key several times to close the menu.

2.6 Zoom in / out the chart

To change the scale[*1] of the chart, press [Zoom in], [Zoom out], [SCL 1], [SCL 2] or [SCL 3] key.
[SCL 1], [SCL 2] and [SCL 3] keys are one touch scale adjsutment by calling a registered scale.

Cursor OFF

Zoom in / out around the center on own ship's position. If own ship is not displayed on the screen, zoom in / out around the center of the screen.

Cursor ON

Zoom in / out around the center on the cursor's position.

Set the scale for [SCL 1], [SCL 2] and [SCL 3]

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM2], and use joystick [→].
2. Use joystick [↑] [↓] to select [FIX SCALE 1] (or [FIX SCALE 2] or [FIX SCALE 3]).
3. Use joystick [←] [→] to select the scale to be registered.
4. Press [MENU] key several times to close the menu.

[*1] When [Radar] is selected in [Scale mode], the range value is displayed like radar method as radius. When [Plotter] is selected in [Scale mode], the range value is displayed as screen width.

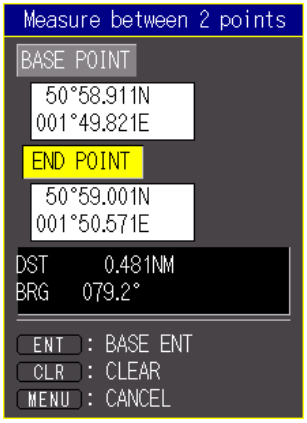
2.7 Measure the distance and bearing between two points

You can measure the distance and bearing between any two points. There are 3 methods of measurement: [CURSOR POS], [2 POINTS], [DIST/BRG].

CURSOR POS

This method is to measure a distance and a bearing between a base point and an end point with the cursor.

1. Press [CUR] key to set to cursor ON.
2. Press [MEAS] key.
   [Measure between 2 points] window is displayed.

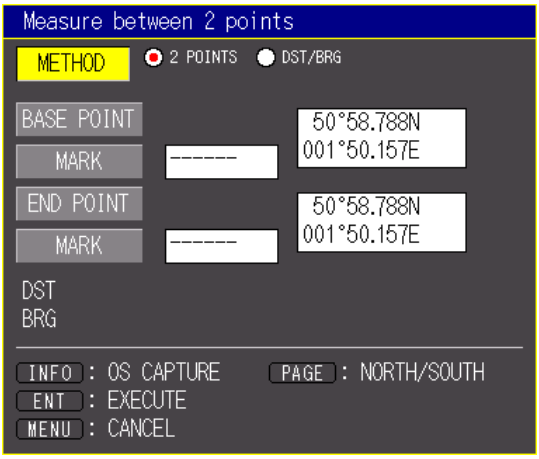


3. Move the cursor to the base point and press [ENT] key.
4. Move the cursor to the end point.
   The distance and bearing from the base point to the end point are displayed.
   Press [ENT] key, the base position is reset.
   Press [CLR] key to return to the state that the [Measure between 2 points] window is displayed
5. Press [MENU] key, the [Measure between 2 points] window is OFF.
6. To end the measure between two points, press [MEAS] key.

2 POINTS

This method is to measure the distance and bearing between a base point and an end point with numerical values of a latitude and a longitude.

1. Press [CUR] key to set to cursor OFF.
2. Press [MEAS] key.
   [Measure between 2 points] window is displayed.

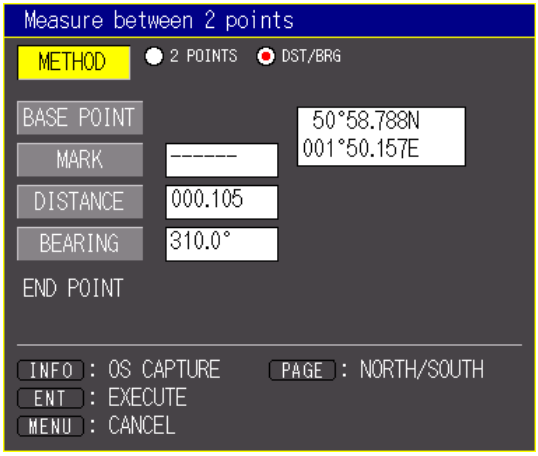


3. Use joystick [←] [→] to select [2 POINTS].
4. Use joystick [↓] to select [Base point].
   In case, the registered mark as the base point, select [Mark].
5. Use joystick [↑] [↓] [←] [→] to enter the position or mark number.
   Press [INFO] key, register with own ship's position as the base point.
6. Use joystick [↓] to select [End point].
   In case, the registered mark as the end point, select [Mark].
7. Use joystick [↑] [↓] [←] [→] to enter the position or mark number.
   Press [INFO] key, register with own ship's position as the base point.
8. Press [ENT] key.
   The distance and bearing from the base point to the end point is displayed.
9. Press [MENU] key, the [Measure between 2 points] window is OFF.
10. To end the measure between two points, press [MEAS] key.

DIST/BRG

This method is to measure the latitude and longitude between a base point and an end point with a distance and a bearing.

1. Press [CUR] key to set to cursor OFF.
2. Press [MEAS] key.
   [Measure between 2 points] window is displayed.



3. Use joystick [←] [→] to select [DIST/BRG].
4. Use joystick [↓] to select [Base point].
   In case, the registered mark as the base point, select [Mark].
5. Use joystick [↑] [↓] [←] [→] to enter the position or mark number.
   Press [INFO] key, register with own ship's position as the base point.
6. Use joystick [↓] to select [Distance].
   Enter the distance from the base point.
7. Use joystick [↓] to select [Bearing].
   Enter the bearing from the base point.
8. Press [ENT] key.
   The latitude and longitude are displayed.
9. Press [MENU] key, the [Measure between 2 points] window is OFF.
10. To end the measure between two points, press [MEAS] key.

2.8 Display floating VRM

Display a floating Variable Measuring Marker (floating VRM) at any position on the chart. It is convenient to use for distance measurement between any two points and display of entry prohibited area.

> ⚠ **CAUTION: To use the floating VRM, need to register [Floating VRM] in [F1] or [F2].**
> **Refer to "Chapter 1 Basic Operation, 1.9 Use [F1] and [F2] keys".**

1. Press [F1] or [F2] key.
   (Hereafter, the key in which "Floating VRM" is registered is called [FUNC] key)
   Floating VRM is displayed on the chart.
2. Use a joystick and move the center of the floating VRM.
3. Press [FUNC] key, the center position of the floating VRM is fixed, and use joystick [↑] [↓], the ring radius can be changed. (The value of the radius is displayed in the upper right of the screen.)
   To fix the center position without changing the radius, press [ENT] key.
   The floating VRM is fixed. (Fixed state)
4. Use joystick [↑] [↓], change the radius of the floating VRM.
5. Press [ENT] key, fix the radius of the floating VRM. (Fixed state)
6. While the floating VRM is in the fixed state, press [FUNC] key, the floating VRM is OFF.

The center position / radius of the floating VRM is stored in the memory.
Perform step 1 again, the chart display moves to the memory position of the floating VRM.

To change the color of the floating VRM, [MAINTENANCE] => [COLOR] => [No.71] on the menu.

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Chapter 3 Mark

You can put marks on fish schools, fish reefs, shallows and fishing points found by fish finder. The shape of the mark can be selected arbitrarily. In addition, you can choose a mark color from 7 colors.

Marks are stored in blocks. Refer to following table.

Mark block	Mark number	Number of marks
A	A00000 to A14999	15,000
B	B00000 to B14999	15,000
C	C00000 to C14999	15,000
D	D00000 to D14999	15,000
E	E00000 to E14999	15,000
F	F00000 to F14999	15,000
L	L00000 to L14999	15,000
EV	EV00 to EV99	100
T	T000 to T999	1,000

3.1 Enter a mark

There are 3 ways to enter marks as follows.

Enter a mark at own ship's position
Enter a mark at the cursor position
Enter a mark by entering the latitude and longitude numerically

Enter a mark at own ship's position

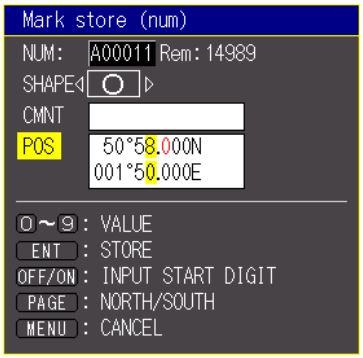
1. Press [CUR] key with cursor OFF.
2. Press [○], [□], [▽], [X] key.
   Enter a mark at own ship's position.
3. To enter a comment, press [ENT] key with [Comment input] screen while [Mark store] screen is displayed. For details, refer to "Chapter 1 Basic Operation, 1.6 Overview of menu operation, Entering characters".

Enter a mark at the cursor position

1. Press [CUR] key with cursor ON.
2. Use a joystick and move the cursor to enter a mark.
3. Press [○], [□], [▽], [X] key.
   Enter a mark at the cursor position.
4. To enter a comment, press [ENT] key with [Comment input] screen while [Mark store] screen is displayed. For details, refer to "Chapter 1 Basic Operation, 1.6 Overview of menu operation, Entering characters".

Enter a mark by entering the latitude and longitude numerically

1. Press [NUM] key to display the [Mark store] window.

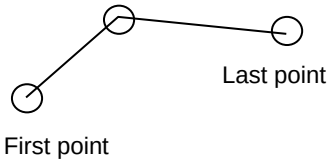


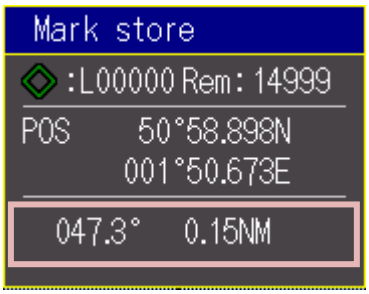
2. Use joystick [↑] [↓] to select [Shape].
3. Use joystick [←] [→] to select the shape of mark.
4. Use joystick [↑] [↓] to select [Comment].
   To enter a comment, refer to "Chapter 1 Basic Operation, 1.6 Overview of menu operation, Entering characters"
5. Use joystick [↑] [↓] to select [Position].
6. Use joystick [↑] [↓] [←] [→] to enter the position.
7. Press [ENT] key.

3.2 Enter a marked line

Enter coastline, landfill site, prohibited area, etc. at marked line.

1. Press [CUR] key to display the cursor.
2. Use a joystick and move the cursor to enter a marked line. (First point)
3. Press [LINE MARK] key.
4. Use a joystick and move the cursor to enter a next marked line.
   At this time, the direction and distance from the first point to the cursor are displayed in the Mark store window.
5. Press [LINE MARK] key.
6. Repeat steps 4 and 5 to enter the line.
7. Press [MENU] key to complete the line.





Change mark shape of marked line

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM3], and use joystick [→].
2. Use joystick [↑] [↓] to select [LINE MARK].
3. Use joystick [←] [→] to select a mark shape.
4. Press [MENU] key several times to close the menu.

Change line style of marked line

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM3], and use joystick [→].
2. Use joystick [↑] [↓] to select [LINE MARK STYLE].
3. Use joystick [←] [→] to select a line style.
4. Press [MENU] key several times to close the menu.

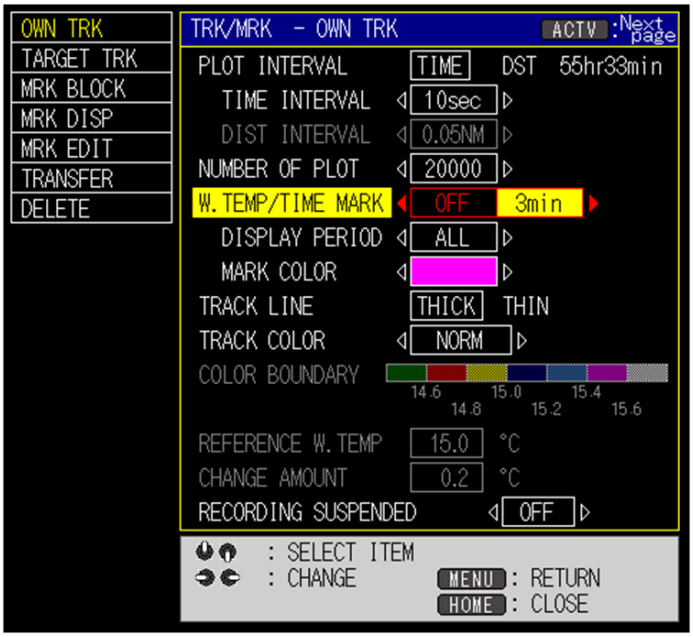
3.3 Enter a water temperature / time mark

Enter the water temperature / time mark on the screen at the set interval with reference to every positive time.

Ex. 1) When “W.TEMP/TIME MARK” is set to “1hr” and the current time is 14:30, the first mark input time is 15:00 and the next mark input time is 16:00.

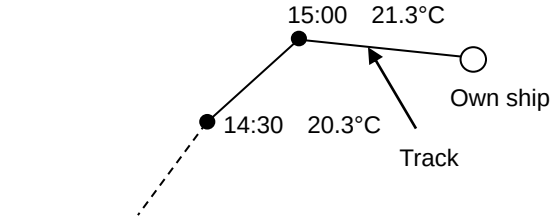
Ex. 2) When “W.TEMP/TIME MARK” is set to “3mim” and the current time is 14:35, the first mark input time is 14:36, and the next input tiem is 14:39.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [OWN TRK], and use joystick [→].



2. Use joystick [↑] [↓] to select [TEMPERATURE/TIME MARK].
3. Use joystick [←] [→] to select the interval time.
   (Setting: OFF, 3min, 10min, 30min, 1hr, 2hr, 4hr, 6hr, 8hr, 12hr, 24hr)
4. Use joystick [↑] [↓] to select [DISPLAY PERIOD].
5. Use joystick [←] [→] to select the period to display.
   (Setting: ALL, TODAY, 2DAYS, 3DAYS)
6. Use joystick [↑] [↓] to select [MARK COLOR].
7. Use joystick [←] [→] to select the mark color.

8. Press [MENU] key several times to close the menu.



In case, water temperature data is input and the interval is 30 min

CAUTION: To display the water temperature, input of water temperature data is necessary. When water temperature data is not input, water temperature is not displayed.

3.4 Event temporary store (EV)

Enter a mark as a temporary event. Select mark point number from 100, 90, 80, 70, 60, 50, 40, 30, 20, and 10.

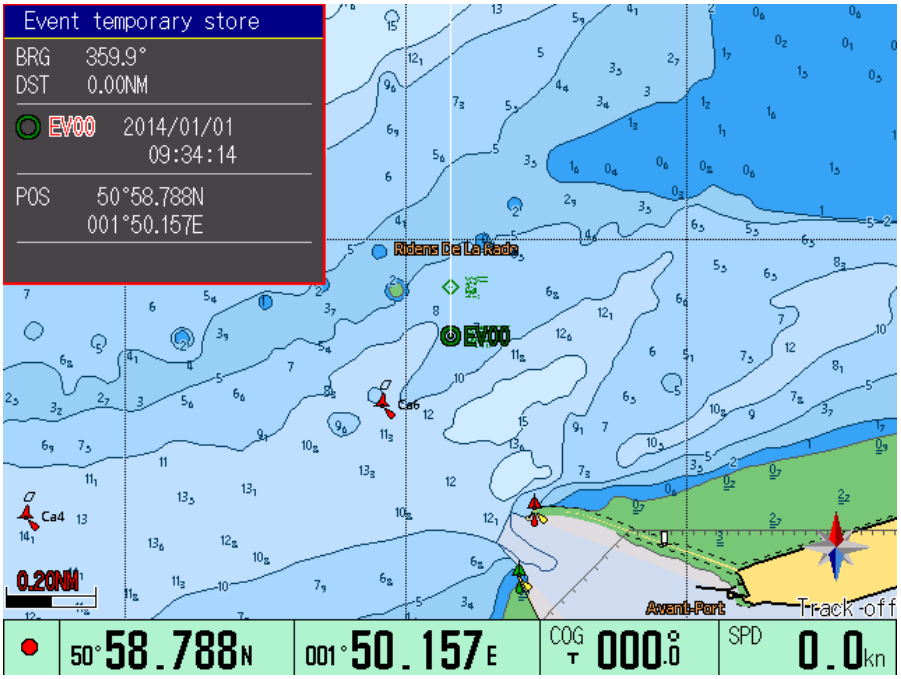
Setting and mark points is refer to following table.

Setting	Mark points	Setting	Mark points
EV00 to EV99	100	EV00 to EV49	50
EV00 to EV89	90	EV00 to EV39	40
EV00 to EV79	80	EV00 to EV29	30
EV00 to EV69	70	EV00 to EV19	20
EV00 to EV59	60	EV00 to EV09	10

For example, if set to EV 00 to EV 99, you can enter the mark up to EV99, then enter the next mark is stored from EV00. At this time, old marks will be overwritten with new marks.

Event temporary store Window

When it is in red frame, refer to data information with [↑] [↓].

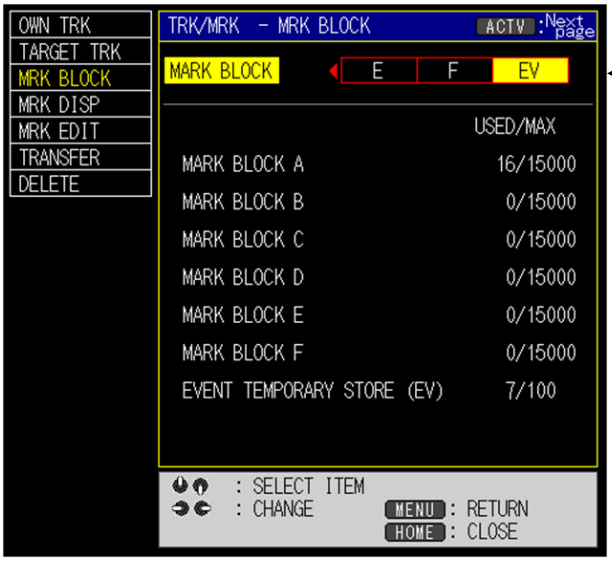


In using event temporary store, the following settings are necessary.

- Set mark block to [EV]
- Set the mark points
- Set how to switch event display

Set mark block to [EV]

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [MRK BLOCK], and use joystick [→].
2. Use joystick [→] to select [EV]

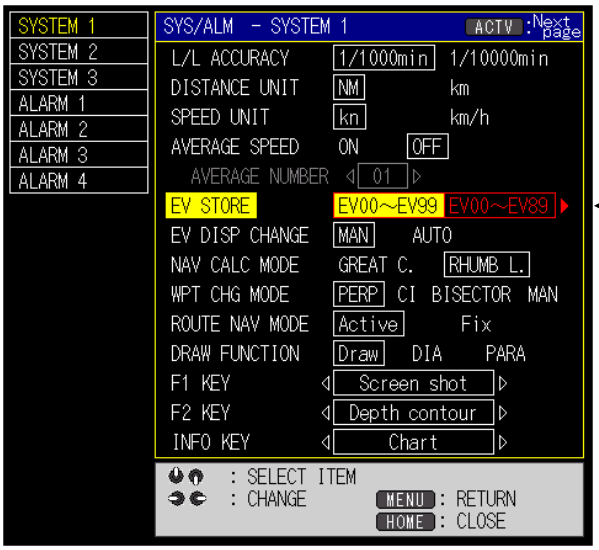


Select [EV]

3. Press [MENU] key several times to close the menu.

Set the mark points

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].

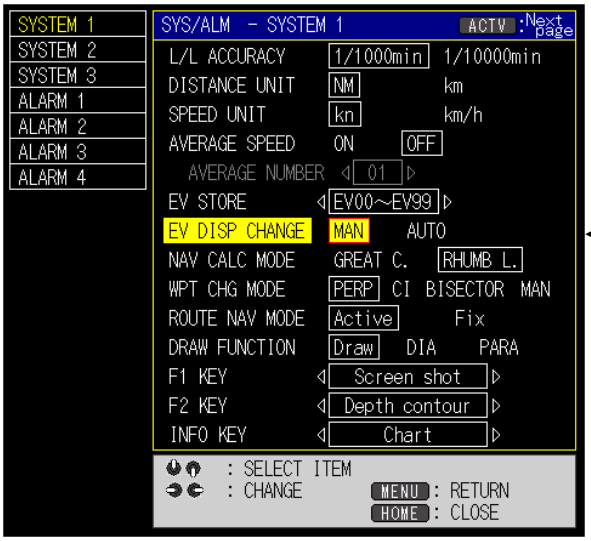


Select mark points

2. Use joystick [↑] [↓] to select [EVENT TEMPORARY STORE].
3. Use joystick [←] [→] to select the mark points.
4. Press [MENU] key several times to close the menu.

Set how to switch event display

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].



Select how to switch event display

2. Use joystick [↑] [↓] to select [EV DISP CHANGE].
3. Use joystick [←] [→] to select how to switch event display.

MAN	When [CLR] key is pressed, the event temporary store window will be a yellow frame.
AUTO	After a certain period of time, the event temporary store window will be a yellow frame.

When the event temporary store window will be a yellow frame, you can move the map or move the cursor with the joystick operation.

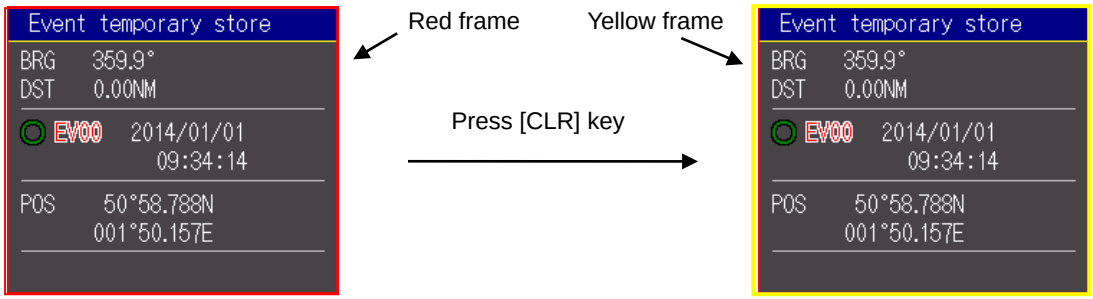
4. Press [MENU] key several times to close the menu.

Event temporary store window operation

When the event temporary store window is in the red frame, you can change the mark that displays information with using joystick [↑] [↓].

Red frame

When press the [CLR] key in the red frame, it will change to a yellow frame, and you can move the map or move the cursor with the joystick operation.



When [CLR] key is pressed in the yellow frame, the event temporary store window is OFF.
To re-display, press [CLR] key again.

3.5 Change the color of mark

The color of the mark can be selected from seven colors: green, red, yellow, cyan, blue, pink and white.
Turn [Mark color] knob to select the color.

3.6 Change the size of mark

Choose the size of the mark. The size of all marks will be changed without regard to the mark color or shape.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [DISPLAY 1], and use joystick [→].
2. Use joystick [↑] [↓] to select [MARK SIZE]
3. Use joystick [←] [→] to select the mark size.
4. Press [MENU] key several times to close the menu.

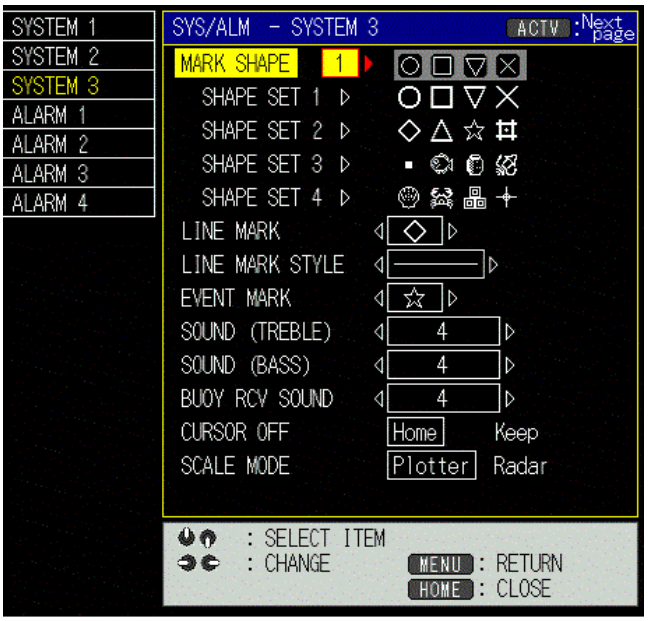
3.7 Switching the mark shape set

There are the following types of marks.

You can assign an above mark to [○], [□], [▽], [X] keys.
For this operation, refer to "Chapter 13 How to use the menu, 13.3 SYS/ALM menu, System 3 for menu Item, SHAPE SET 1 to 4".

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM 3], and use joystick [→].
2. Use joystick [↑] [↓] to select [MARK SHAPE].
3. Use joystick [←] [→] to select [1] to [4].

[1] to [4] means [SHAPE SET 1] to [SHAPE SET 4].



4. Press [MENU] key several times to close the menu.

3.8 Erase mark

There are 3 ways to erase marks as follows.

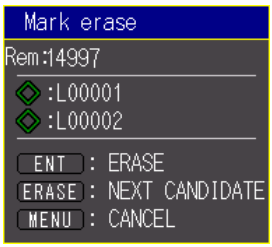
- Erase a mark by cursor
- Erase a mark by selecting a mark color and shape
- Erase a mark by selecting a mark list

> **CAUTION: Erased marks cannot be undone.**

Erase a mark by cursor

1. Press [CUR] key to cursor ON.
2. Use a joystick and move the cursor to erase a mark or line of marked line.
3. Press [MARK ERASE] key.
   [MARK ERASE] window is displayed.

Example of display when cursor is aligned with mark



Example of display when the cursor is aligned with the line marked line

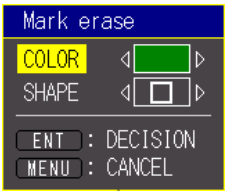
Displays mark choices near the cursor. If there are multiple marks near the cursor, repeatedly press [Mark erase] to switch the choices and display the mark to erase.

4. Press [ENT] key.
   Erase the selected mark.
5. To erase more marks, repeat steps 2 and 4.

6. Press [MENU] key several times to close the menu.

Erase a mark by selecting a mark color and a shape

1. Press [CUR] key to cursor OFF.
2. Press [MARK ERASE] key.
   ［MARK ERASE］window is displayed.



3. Use joystick [↑] [↓] to select [COLOR].
4. Use joystick [←] [→] to select color.
5. Use joystick [↑] [↓] to select [SHAPE].
6. Use joystick [←] [→] to select shape.
7. Press [ENT] key.
   Erase a selected color and shape mark.

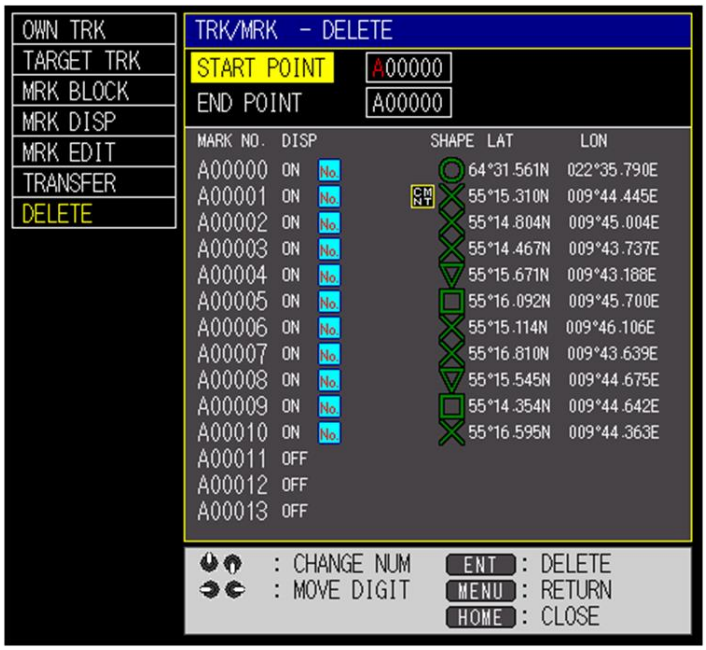
CAUTION: When [All] is selected for [color], all marks of the shape selected by [shape] will be erased.

CAUTION: When [All] is selected for [shape], all marks of the color selected by [color] will be erased.

CAUTION: When [All] is selected for [color] and, [All] is selected for [shape], all marks will be erased.

Erase a mark by selecting a mark list

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [DELETE], and use joystick [→].

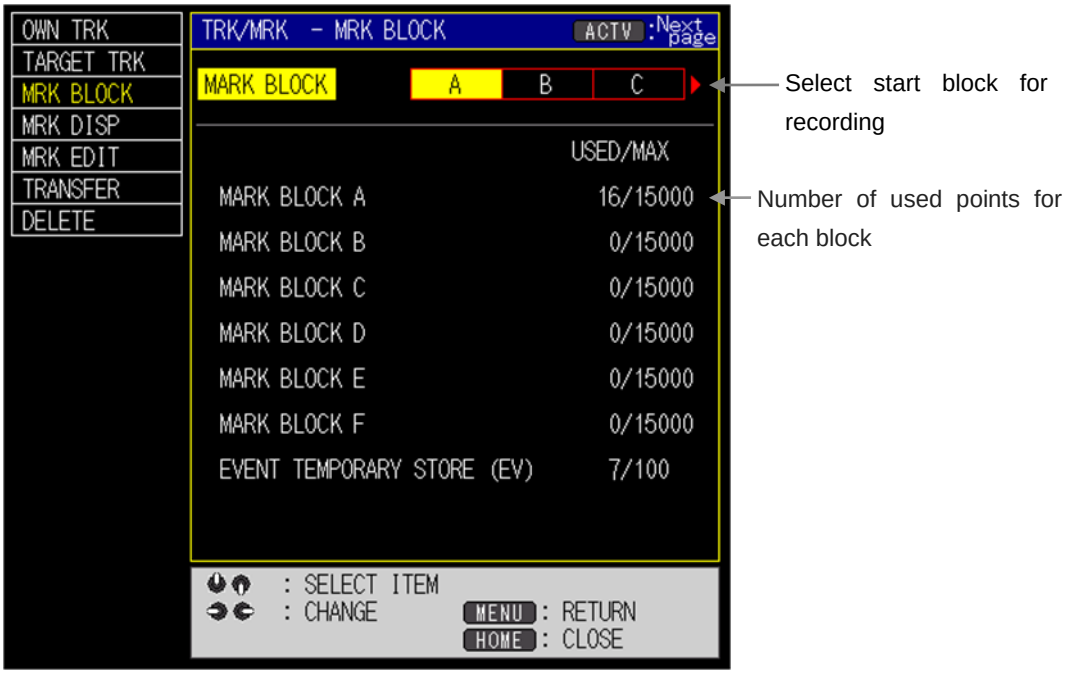


2. Use joystick [→] to select [START POINT].
3. Use joystick [↑] [↓] [←] [→] to input the mark number of the starting point to be deleted.
4. Use joystick [↑] [↓] to select [END POINT].
5. Use joystick [↑] [↓] [←] [→] to input the mark number of the end point to be deleted.
6. Press [ENT] key.
   Erase the mark from the start point to the end point.
7. Press [MENU] key several times to close the menu.

3.9 Change a start block for recording a mark

Marks are managed in blocks. The block consists of 7 blocks, MARK BLOCK A to F and EV Block. MARK BLOCKs (A to F) can store 15,000 points per block and EV can store 100 points. You can choose a start block for recording a mark.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [MRK BLOCK], and use joystick [→].



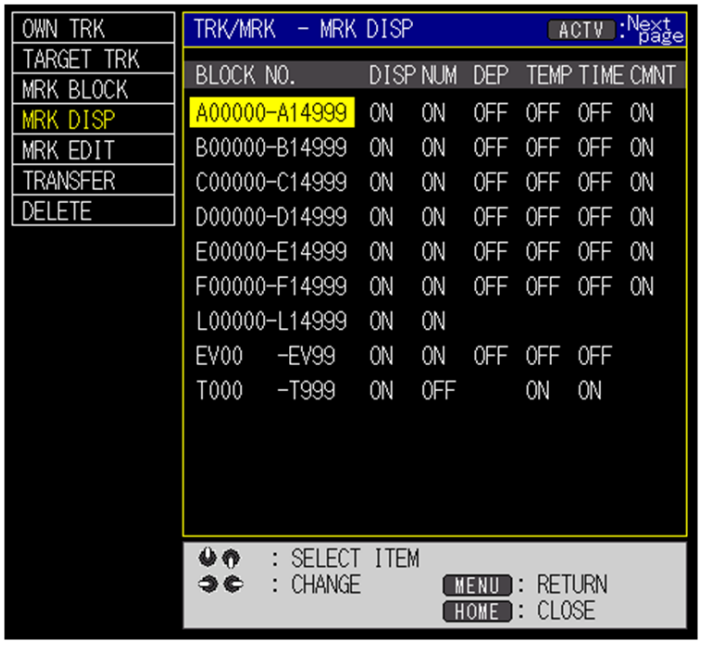
2. Use joystick [←] [→] to select the mark block.
3. Press [MENU] key several times to close the menu.

3.10 Edit entered marks

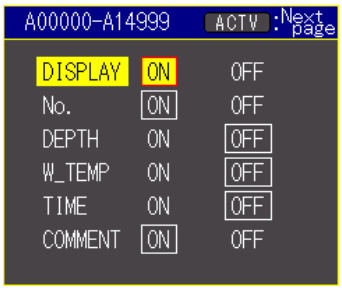
You can edit an enterted mark.

Change mark display settings

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [MRK DISP], and use joystick [→].
2. Use joystick [↑] [↓] to select mark block.



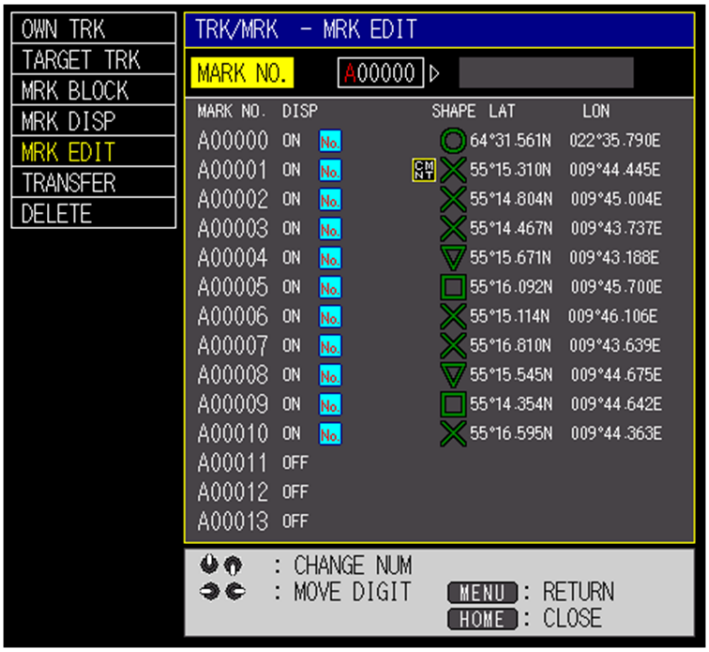
3. Use joystick [→] to display the [MRK DISP] window.
   Use joystick [↑] [↓] to select the item, use joystick [←] [→] to change the setting.



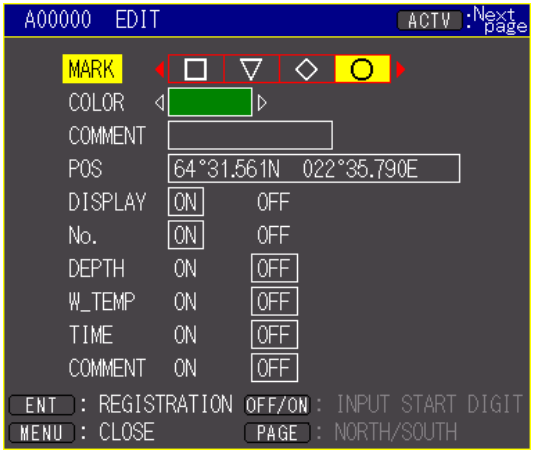
4. Press [MENU] key several times to close the menu.

Change the color, shape, position, etc. of the input mark

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [MRK EDIT], and use joystick [→].
2. Use joystick [↑] [↓] [←] [→] to input the mark number to be edited.



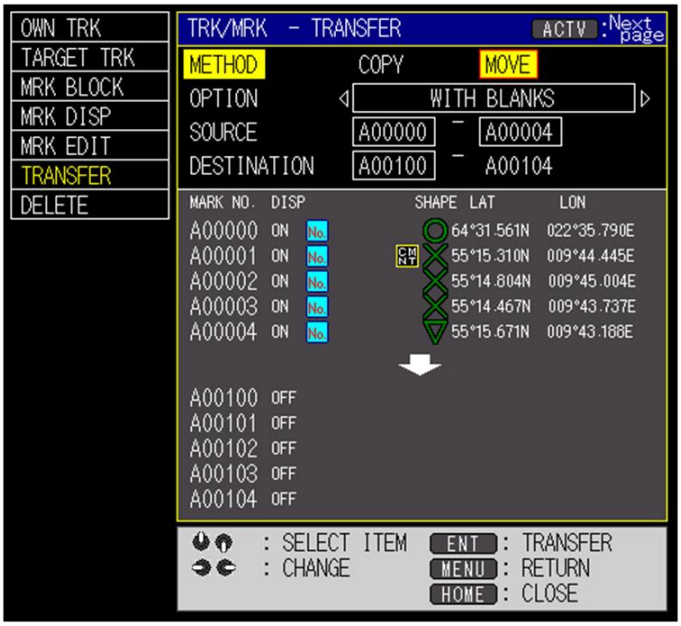
3. Press [MENU] key to display the [MRK EDIT] window.
   Use joystick [↑] [↓] to select the item, use joystick [←] [→] to change the setting.



4. After changing the setting, press [ENT] key.
5. Press [MENU] key several times to close the menu.

Transfer the input mark to another block etc.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [TRANSFER], and use joystick [→].



2. Use joystick [↑] [↓] to select [METHOD].
   Use joystick [←] [→] to select [COPY] or [MOVE].

COPY	After transfer, the original data of the transfer remains.
MOVE	After transfer, the original data of the transfer erases.

3. Use joystick [↑] [↓] to select [OPTION].
   Use joystick [←] [→] to select [WITH BLANKS], [The blank squeezes up.], [Overwrite prohibition.] or [Event mark transfer.].

WITH BLANKS	When there is a blank within the range of the transfer source, the blank spaces are also transferred. ⚠ **If there is a mark in the transferred destination, be careful as it will be overwritten and transferred.**
The blank squeezes up.	When there is a blank within the range of the transfer source, blank spaces are filled in data and transferred. ⚠ **If there is a mark in the transferred destination, be careful as it will be overwritten and transferred.**
Overwrite prohibition.	Transfer source mark is transferred to blank spot of a transfer destination. ⚠ **If the blank area is not large enough, marks may not be transferred to the transfer destination fully.**

Event mark transfer.	It is used to transfer EV marks (EVent temporary store marks). ⚠ **If there is a mark in the transferred destination, be careful as it will be overwritten and transferred.**

4. Use joystick [↑] [↓] to select [SOURCE].
   Use joystick [↑] [↓] [←] [→] to input the mark number to be transferred.
5. Use joystick [↑] [↓] to select [DESTINATION].
   Use joystick [↑] [↓] [←] [→] to input the mark number of the transfer destination.
6. Press [Enter], transfer of mark starts.

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Chapter 4 Track

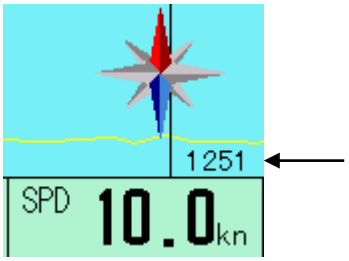
This chapter covers track information, such as display track on the screen, how to store a track, how to change color and select storing interval as well as other useful functions.

4.1 Record own ship's track ON / OFF

When shipped from factory, it is set to [Track off]. To change the setting, please do the following operation.

1. Press [ON/OFF] key.
   The message of [Start track record.] will be displayed.

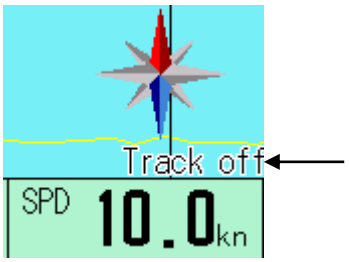
   The number of tracking record points is displayed at the lower right of the screen.



Tracking record points

2. To interrupt the track record, press [ON/OFF] key again.
   The message of [Interrupt track record.] will be displayed.

   [Track off] is displayed at the lower right corner of the screen.



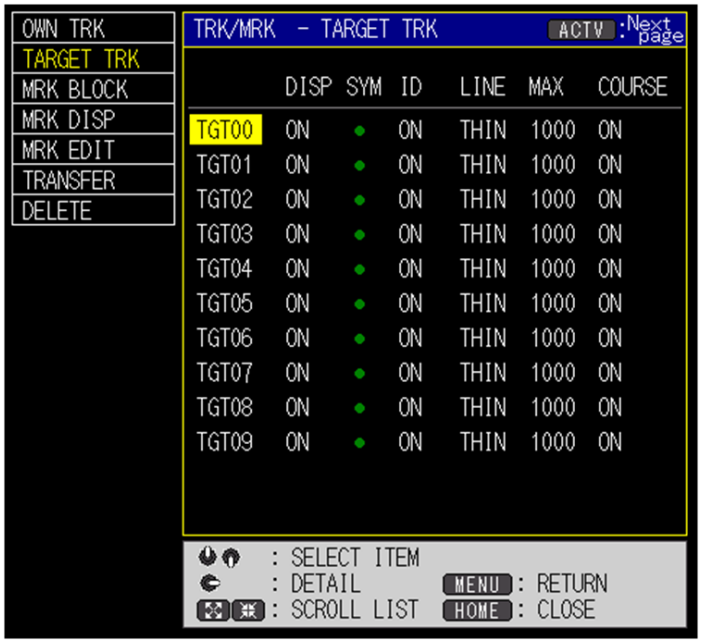
Interrupt track record

3. To start the track record, press [ON/OFF] key.

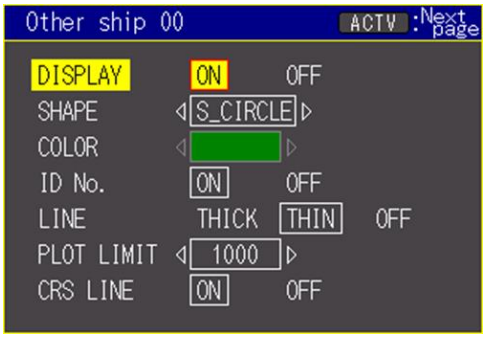
4.2 Record other ship's track

You can track a target when the track data is provided from a radar as other ship's track data. You can display other ship's track of up to 100 targets and set other ship's shape, color, track record number and so on.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [TARGET TRK], and use joystick [→].



2. Use joystick [↑] [↓] to select other ship number, and use joystick [→].
   Press [Zoom out], other ship numbers on the next page are displayed.
   Press [Zoom in], other ship numbers on the previous page are displayed.
3. Use joystick [↑] [↓] to select the item, use joystick [←] [→] to change the setting.

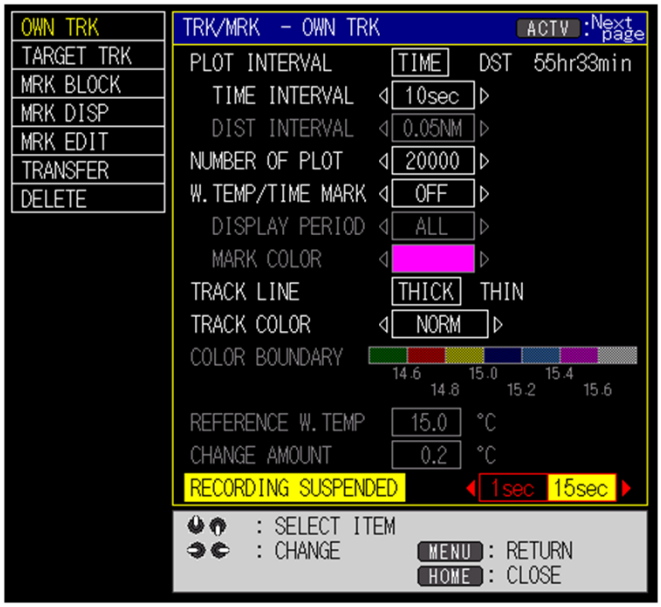


   When the course line is [ON], the length of the course line changes according to the speed of other ships.
4. Press [MENU] key several times to close the menu.

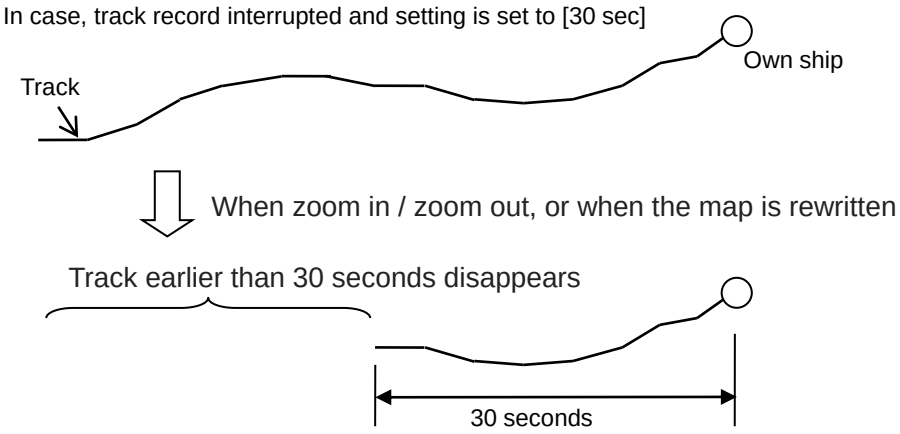
4.3 Set track indication while track record is interrupted

When a track record is interrupted, you can set whether own ship's track is displayed on the screen.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [OWN TRK], and use joystick [→].
2. Use joystick [↑] [↓] to select [RECORDING SUSPENDED].



3. Use joystick [←] [→] to select [OFF], [1sec], [15sec], [30sec], [1min], [3min], [6min], [15min] or [30min].
   •[OFF]
   The track is not displayed while the track record is interrupted.
   •[1sec] to [30min]
   The track is displayed while the track record is interrupted. A track will be erased less than [RECORDING SUSPENDED] when an own ship runs off the screen such as auto scroll, move the map by cursor, zoom in / zoom out, etc. Also, the track data during the track record interruption is not stored in memory, it will be erased when the power is turned off. (It does not restore by turning on the power again)



4. Press [MENU] key several times to close the menu.

4.4 Change the color of track

The color of the track can be selected from seven colors: green, red, yellow, cyan, blue, pink and white.

Change the color of own ship's track

1. Turn [Track color] knob to select the color.

Change the color of own ship's track with water temperature range

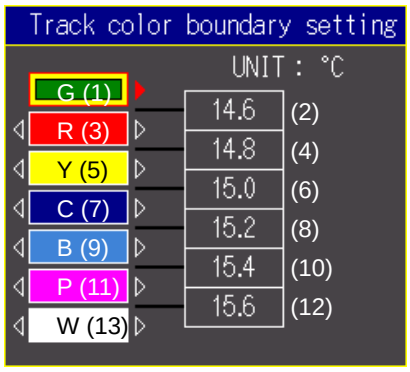
A temperature range is set, a track is displayed in the same color in temperature range. For example, when the range is set from 14.6 °C to 14.8 °C in red, it will be displayed in red in range.

> ⚠ **CAUTION: Water temperature data is necessary to change the color of own ship's track.**

> ⚠ **CAUTION: When water temperature data is not input, the track color will be orange.**

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [OWN TRK], and use joystick [→].
2. Use joystick [↑] [↓] to select [TRACK COLOR].
3. Use joystick [←] [→] to select [W_TEMP].
4. Use joystick [↑] [↓] to select [COLOR BOUNDARY].

5. Use joystick [→] to display the [Track color boundary setting] window.



(2) ~14.6°C (1) (Green) color
(4) 14.6°C ~14.8°C (3) (Red) color
(6) 14.8°C ~15.0°C (5) (Yellow) color
(8) 15.0°C ~15.2°C (7) (Cyan) color
(10) 15.2°C ~15.4°C (9) (Blue) color
(12) 15.4°C ~15.6°C (11) (Pink) color
15.6°C ~ (13) (White) color

6. Set the water temperature range corresponding to each color.
   For example, to set the water temperature range displayed in green under 13.5°C, carry out the following operation.
   1. Use joystick [↑] [↓] to select in the above setting menu at (1).
   2. Use joystick [←] [→] to select Green color.
   3. Use joystick [↑] [↓] to select in the above setting menu at (2).
   4. Use joystick [→], the numeric input state is entered.
   5. Press [1], [3] and [5] key in order.
      Use joystick [→] the digit will move to the left.
   6. For the water temperature range of other colors, set by the same operation.

CAUTION: Always arrange the water temperature value in ascending order.

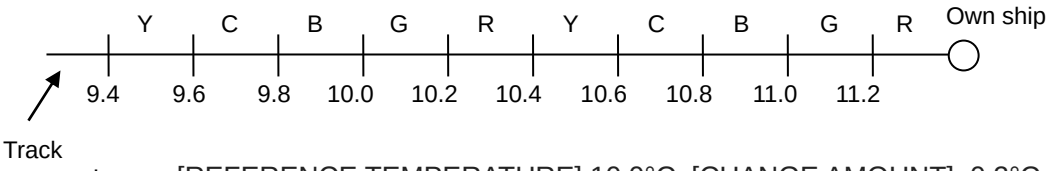
7. Press [MENU] key several times to close the menu.

Change the color of own ship's track with water temperature width

A temperature width is set, a track is displayed in the same color in temperature width. The color changes cyclically in five level of green, red, yellow, cyan and blue depending on a temperature width.
[REFERENCE TEMPERATURE] is the based temperature color as green for own ship's track color.
[CHANGE AMOUNT] is the boundary value to change own ship's track color.
For example, when the [REFERENCE TEMPERATURE] is 10.0°C and the [CHANGE AMOUNT] is 0.2°C, own ship's track color turns red at 10.2°C and turns yellow at 10.4°C. When the water temperature continues to rise, it will return to blue at 10.8°C and green at 11.0°C.
Also, when the water temperature keeps decreasing from the reference temperature of 10.0°C, it switches to blue, cyan, yellow, red, green at 0.2°C increments.

CAUTION: Water temperature data is necessary to change the color of own ship's track.

CAUTION: When water temperature data is not input, the track color will be orange.



In case [REFERENCE TEMPERATURE]:10.0°C, [CHANGE AMOUNT]: 0.2°C

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [OWN TRK], and use joystick [→].
2. Use joystick [↑] [↓] to select [TRACK COLOR].
3. Use joystick [←] [→] to select [CHANGE].
4. Use joystick [↑] [↓] to select [REFERENCE TEMPERATURE].
   Use joystick [→] , the numeric input state is entered. Enter the reference temperature.
5. Use joystick [←] [→] to select [CHANGE AMOUNT].
   Use joystick [→] , the numeric input state is entered. Enter the change amount.
6. Press [MENU] key several times to close the menu.

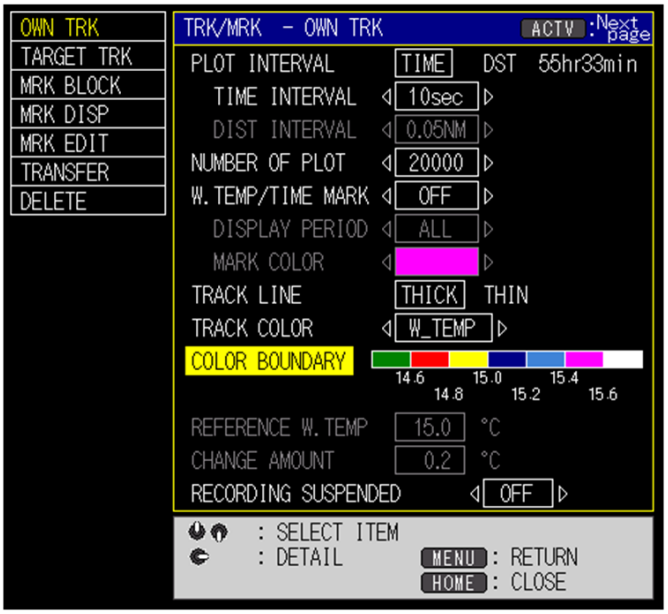
Change the color of own ship's track with water depth range

When water depth range is set, a track is displayed in the same color in water depth range. For example, when set 20.0m to 30.0m in red, it will be displayed in red in range.

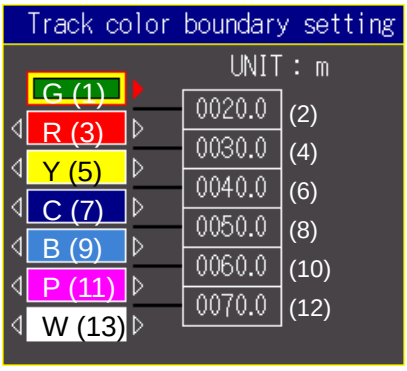
CAUTION: Depth data is necessary to change the color of own ship's track.

CAUTION: When water temperature data is not input, the track color will be orange.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [OWN TRK], and use joystick [→].
2. Use joystick [↑] [↓] to select [TRACK COLOR].
3. Use joystick [←] [→] to select [DPT].
4. Use joystick [↑] [↓] to select [COLOR BOUNDARY].



5. Use joystick [→] to display the [Track color boundary setting] window.



(2) ~20.0m (1) (Green) color
(4) 20.0m~30.0m (3) (Red) color
(6) 30.0m~40.0m (5) (Yellow) color
(8) 40.0m~50.0m (7) (Cyan) color
(10) 50.0m~60.0m (9) (Blue) color
(12) 60.0m~70.0m (11) (Pink) color
70.0m~ (13) (White) color

6. Set the depth range corresponding to each color.
For example, to set the depth range displayed in green under 20.0m, carry out the following operation.
1) Use joystick [↑] [↓] to select In the above setting menu at (1).
2) Use joystick [←] [→] to select Green color.
3) Use joystick [↑] [↓] to select In the above setting menu at (2).
4) Use joystick [→], he numeric input state is entered.
5) Press [2], [0] and [0] key in that order.
Use joystick [→] the digit will move to the left.
6) For the depth range of other colors, set by the same operation.

CAUTION: Always arrange the depth setting in ascending order.

7. Press [MENU] key several times to close the menu.

4.5 Change the type of own ship's track line

There are 2 types of track lines, thick or thin.

1. Press [MENU] key to display the menu screen.
Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
Use joystick [↑] [↓] to select [OWN TRK], and use joystick [→].
2. Use joystick [↑] [↓] to select [TRACK LINE].
3. Use joystick [←] [→] to select track line type.
4. Press [MENU] key several times to close the menu.

4.6 Setting the number of recording points and recording interval of own ship's track

Own ship's track can record own ship's position at fixed distance intervals or the time intervals. When the recording interval is short, draw a track smoothly, but the total recordable time of the track will be shorter. On the other hand, when the recording interval is long, track will be rought, but the total recordable time will be longer. When the track record reaches the recording capacity, overwrite it with a new track in order from the oldest track.

Set the number of record points of own ship's track

Own ship's track of record points can be choosen from 6 types of number, 2000 points, 4000 points, 5000 points, 7000 points, 10000 points or 20000 points.

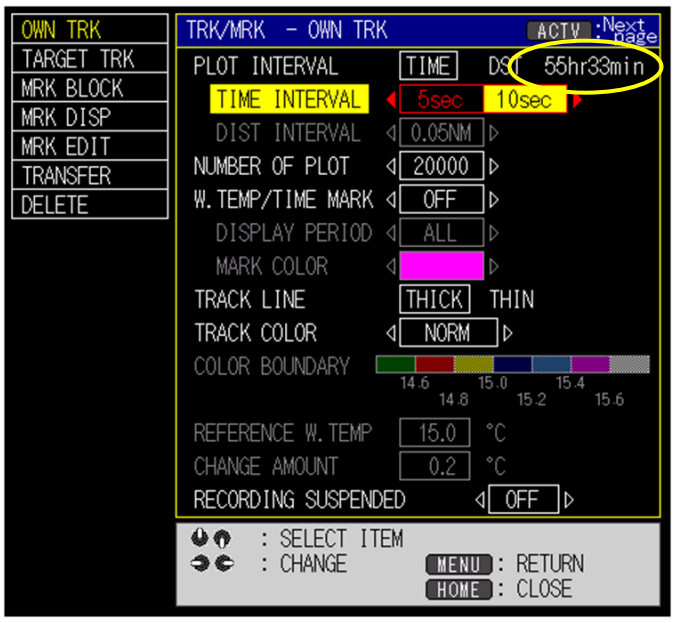
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [OWN TRK], and use joystick [→].
2. Use joystick [↑] [↓] to select [NUMBER OF PLOT].
3. Use joystick [←] [→] to select the number of record points.
4. Press [MENU] key several times to close the menu.

Set recording interval of own ship's track

The ship's track is recorded at fixed distance intervals or time intervals. At factory default value, the track record interval is set to [TIME] and the time interval is set to [10 sec].

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [TRK/MRK], and use joystick [→].
   Use joystick [↑] [↓] to select [OWN TRK], and use joystick [→].
2. Use joystick [↑] [↓] to select [PLOT INTERVAL].
3. Use joystick [←] [→] to select [TIME] or [DST].
4. Use joystick [↑] [↓] to select [TIME] (or [DST]).
5. Use joystick [←] [→] to select time intervals (or distance intervals).

6. Press [MENU] key several times to close the menu.



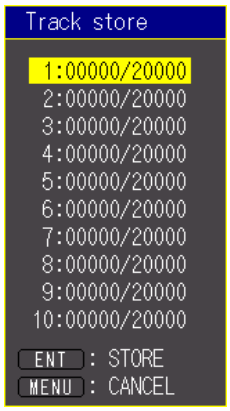
When [PLOT INTERVAL] is [TIME], the estimated time of the full record is displayed.
(Please use just for reference)

When [PLOT INTERVAL] is [DST], the estimated distance of the full record is displayed.
(Please use just for reference)

4.7 Save recorded track

When the track record reaches the recording capacity, overwrite it with a new track in order from the oldest track. If you keep an old track, you must save the track before the track record reaches the recording capacity.

1. Press [MEMO] key.
   [Track store] window is displayed.

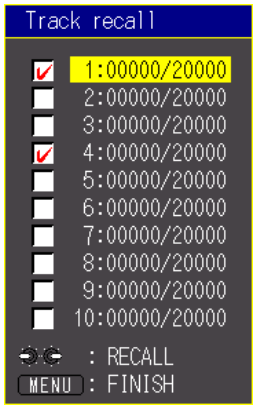


2. Use joystick [↑] [↓] to select the destination.
3. Press [ENT] key.
   Save the track to the selected the destination.

4.8 Display ON / OFF the saved track on the screen

Display the saved tracks on the screen or hide them.

1. Press [RCL] key.
   [Track recall] window is displayed.



2. Use joystick [↑] [↓] to select the display track.
3. Use joystick [→] to check.
   When checked, the saved track will be displayed on the screen.

   To hide saved tracks, uncheck in step 3.

4.9 Erase track

Erase own ship's track and other ship's track. There are 3 ways to erase the track.

Erase the track by selecting a color
Erase the track by selecting an area
Erase the track automatically at power on startup

> ⚠ **CAUTION: Erased tracks cannot be undone.**

Erase the track by selecting a color

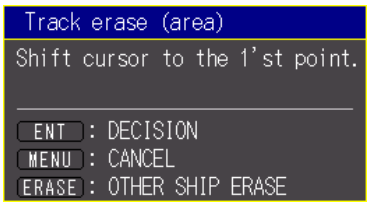
1. Press [CUR] key to cursor OFF.
2. Press [TRACK ERASE] key.
   [Track erase (color)] window is displayed.

3. Use joystick [←] [→] to select [OWN SHIP].
4. Use joystick [↑] [↓] to select erase track color.
5. Press [ENT] key.
   Erase the track of the selected color.

To erase other ship's track, select [OTHER SHIP] in step 3.

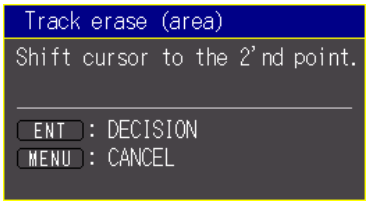
Erase the track by selecting an area

1. Press [CUR] key to display the cursor.
2. Press [TRACK ERASE] key.
   [Track erase (area)] window is displayed.

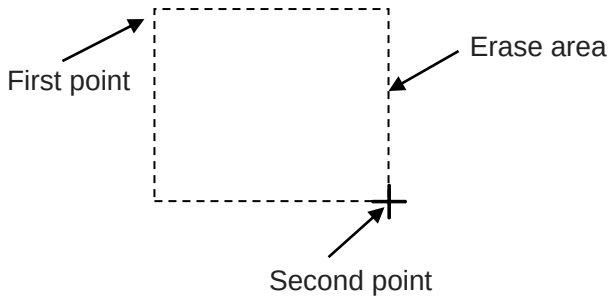


3. Use joystick to decide the starting point (first point) of area specification.

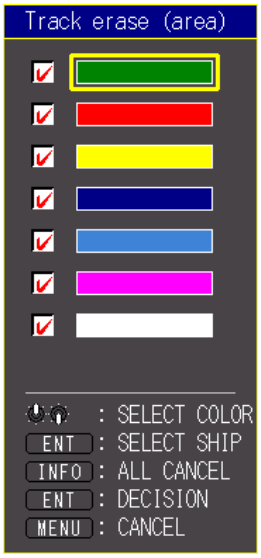
4. Press [ENT] key.
   [Track erase (area)] window is displayed.



5. Use joystick to decide the end point (second point) of area specification.
   While moving the cursor, the erase area is indicated by a dotted line.



6. Press [ENT] key.
   [Track erase (area)] window is displayed.

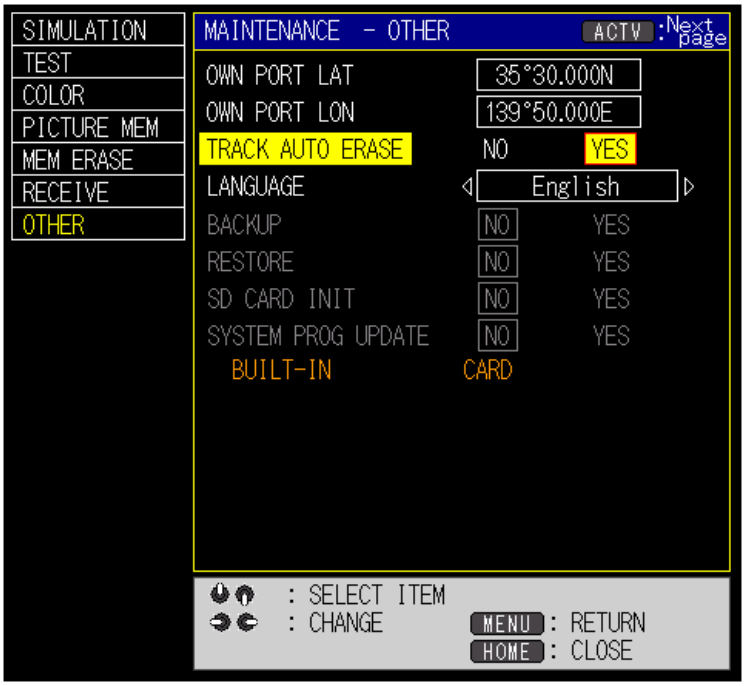


7. Use joystick [↑] [↓] to select erase colors, and use joystick [←] [→] to check.
   Press [INFO], cancel all colors or select all colors.
8. Press [ENT] key.
   Erase the track of the selected color within the specified area.

Erase the track automatically at power on start

You can erase the current track and other ship's track automatically when the power is turned on. It is useful to save time to erase when the old track is unnecessary.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [OTHER], and use joystick [→].

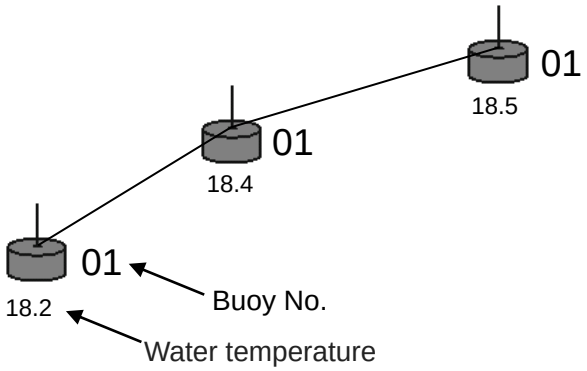


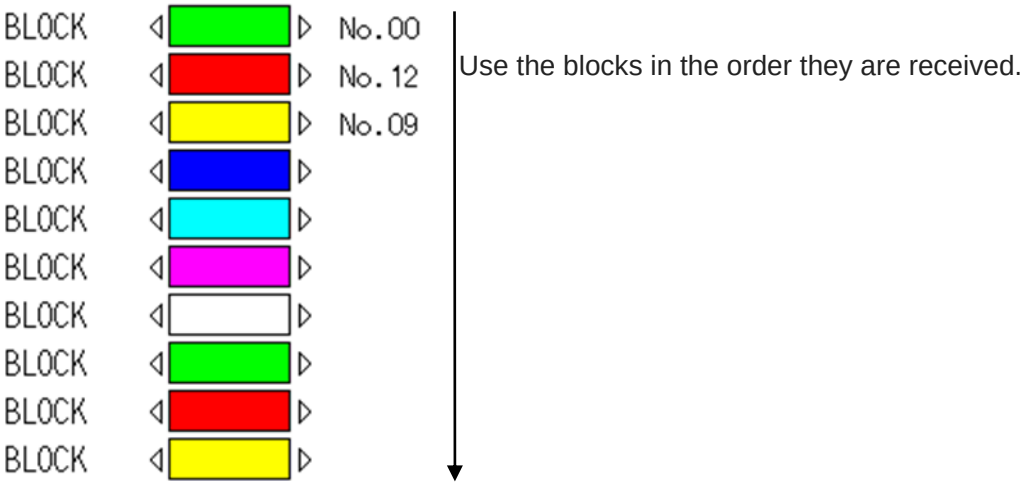
2. Use joystick [↑] [↓] to select [TRACK AUTO ERASE].
3. Use joystick [→] to select [YES].
4. Press [MENU] key several times to close the menu.

4.10 GPS buoy

By connecting with the GPS buoy receiver, GPS buoy data can be displayed up to 10 received GPS buoy on the screen.

There are 10 memories (100 points per memory) for recording GPS buoy track information. When the GPS buoy's track reaches 100 points, overwrite it with new track in order from the oldest track.





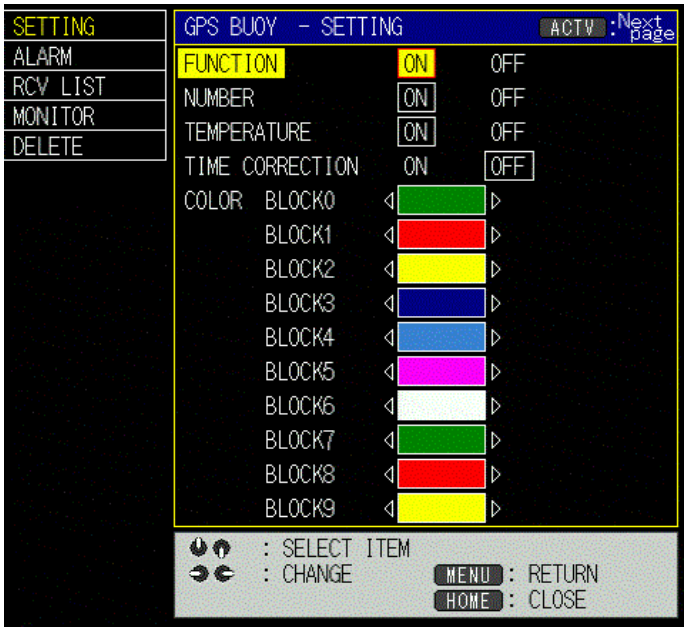
CAUTION: In order to use all the blocks and receive data of a new buoy number, it is necessary to erase the block being used.

Enable the GPS buoy function

By enabling the GPS buoy function, you can use this function.

> **CAUTION: In order to use the GPS buoy function, a corresponding GPS buoy receiver is required. Please contact our dealer or our company for details.**

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [SETTING], and use joystick [→].



2. Use joystick [↑] [↓] to select [FUNCTION].
3. Use joystick [←] to select [ON].
4. Press [MENU] key several times to close the menu.

To disable the GPS buoy function, set to [OFF] in step 3.

Display ON / OFF GPS buoy number and water temperature

The buoy number is displayed besides the symbol, and the water temperature is displayed under the symbol.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [SETTING], and use joystick [→].
2. Use joystick [↑] [↓] to select [NUMBER].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [TEMPERATURE].
5. Use joystick [←] [→] to select [ON].
6. Press [MENU] key several times to close the menu.

Display OFF the buoy number and water temperature, set [OFF] in steps 3 and 5.

Enable the time correction function

The time correction is added to time information of GPS buoy.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [SETTING], and use joystick [→].
2. Use joystick [↑] [↓] to select [TIME CORRECTION].
3. Use joystick [←] [→] to select [ON].
4. Press [MENU] key several times to close the menu.

To disable the time correction, set [OFF] in step 3.
The amount of correction is linked to [TIME CORR] in [SYSTEM2] of [SYS/ALM].

Change the color of GPS buoy

The color of the GPS buoy can be selected from 7 colors. The track color of the GPS buoy becomes the same color as the color of the GPS buoy.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [SETTING], and use joystick [→].
2. Use joystick [↑] [↓] to select a block.
3. Use joystick [←] [→] to select a color.
4. Press [MENU] key several times to close the menu.

Enable the GPS buoy alarm function

Set the GPS buoy alarm for each buoy ID.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [SETTING], and use joystick [→].
2. Use joystick [↑] [↓] to select [COLOR BLOCK 0 to 9] that sounds the alarm.
3. Press [INFO] key to display 🔔.
4. Press [MENU] key several times to close the menu.

To turn off the GPS buoy alarm, repeat step 3 to turn off the 🔔 display.

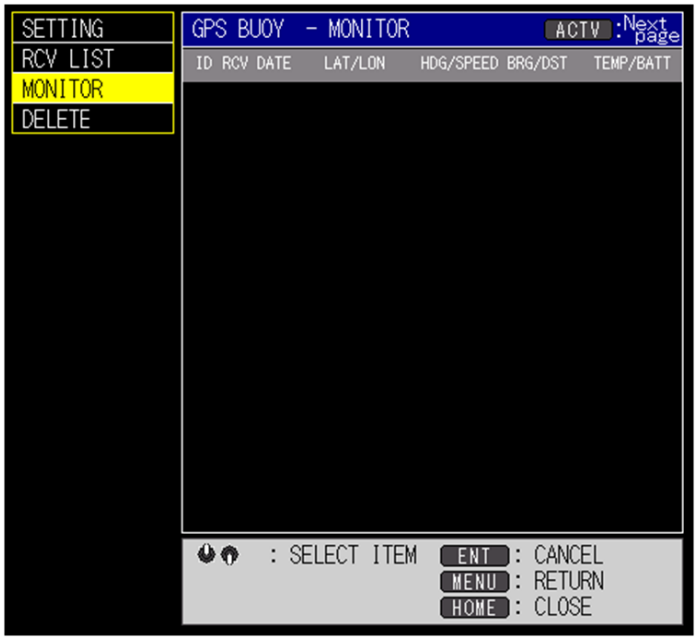
View received data from GPS buoy

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [RCV LIST].

2. Use joystick [←] [→] to select the block number to view.
   The latest data will be displayed at the top.
3. Press [MENU] key several times to close the menu.

Monitor received data from GPS buoy

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [MONITOR].



   The latest data is displayed at the bottom.
   To stop the monitor, press [ENT] key. To resume, press [ENT] key again.

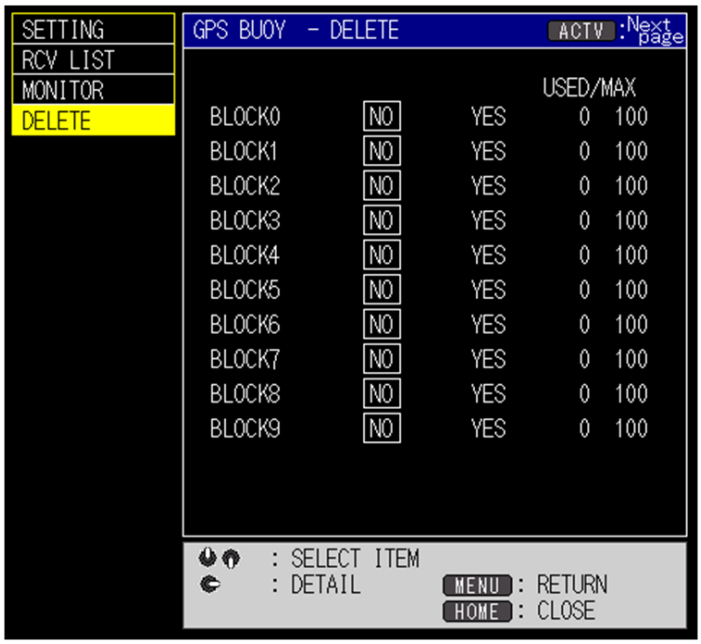
2. Press [MENU] key several times to close the menu.

Delete GPS buoy data

Delete recorded GPS buoy data for each block number.

> **CAUTION: Deleted GPS buoy data cannot be undone.**

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [DELETE], and use joystick [→].



2. Use joystick [↑] [↓] to select a block.
3. Use joystick [←] [→] to select [YES].
4. Press [ENT] key.
   Display the [Delete] window.
5. Press [ENT] key.
   Deletes the data of the selected block.
6. Press [MENU] key several times to close the menu.

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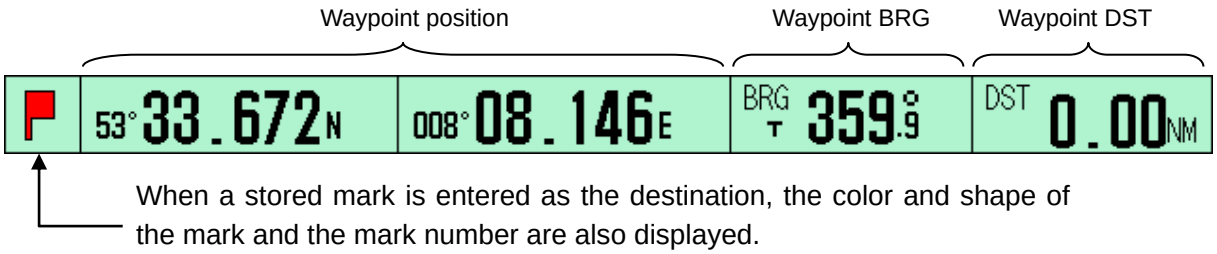
Chapter 5 Waypoint Navigation

Waypoint is specific point such as a departure point, a transfer point, and an end point of a voyage.
By using waypoint navigation, you can navigate to the point with the shortest distance.
When the waypoint navigation is executed, a line (waypoint line) connects the executed position with the waypoint, and a flag ( ) is displayed at the waypoint.
Also, the waypoint information screen is displayed at the bottom of the screen.

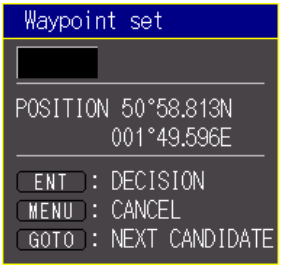


5.1 Setting the input mark to the waypoint

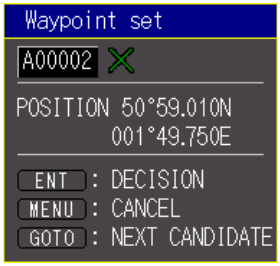
There are 2 ways to set the mark as the waypoint.
Specify a mark with the cursor
Specify a mark number

Specify a mark with the cursor

1. Press [CUR] key to display the cursor.
2. Press [GOTO] key.
   [Waypoint set] window is displayed.



3. Move the cursor to place the cursor on the mark to be the waypoint.
   The mark choices near the cursor are displayed in the mark number box of the [Waypoint set] window.

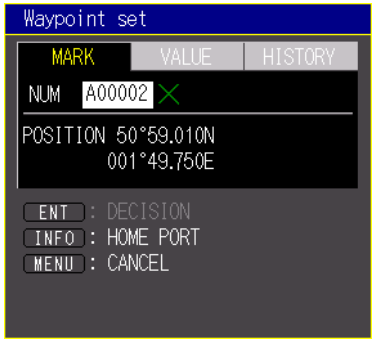


   If there are multiple marks near the cursor, press [GOTO] repeatedly to switch the mark choices and display the mark to be the waypoint.

4. Press [ENT] key.
   Waypoint navigation is executed and the waypoint information screen is displayed at the bottom of the screen.

Specify a mark number

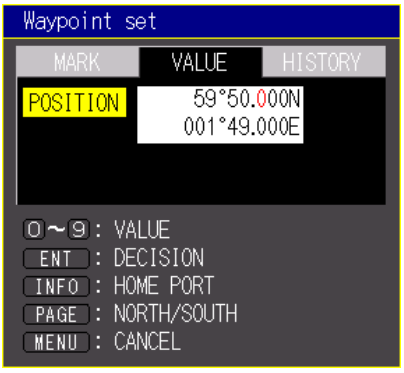
1. Press [CUR] key to cursor OFF.
2. Press [GOTO] key.
   [Waypoint set] window is displayed.



3. Use joystick [←] [→] to select [MARK].
4. Use joystick [↓] to select [NUMBER], and use joystick [→].
5. Use joystick [↑] [↓] [←] [→] to input the mark number to set the waypoint.
6. Press [ENT] key.
   Waypoint navigation is executed and the waypoint information screen is displayed at the bottom of the screen.

5.2 Enter the latitude and longitude and set the destination

1. Press [CUR] key to cursor OFF.
2. Press [GOTO] key.
   [Waypoint set] window is displayed.

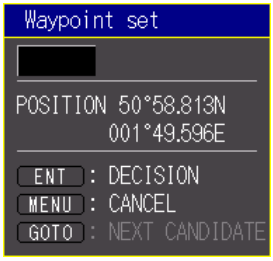


3. Use joystick [←] [→] to select [VALUE].
4. Use joystick [↓] to select [POS], and use joystick [→].
5. Use joystick [↑] [↓] [←] [→] to input the latitude and longitude to set the waypoint.
6. Press [ENT] key.
   Waypoint navigation is executed and the waypoint information screen is displayed at the bottom of the screen.

5.3 Setting the cursor position as the destination

Move the cursor to any point and set that point as the waypoint. Also move the cursor to the mark and set the mark as the waypoint.

1. Press [CUR] key to display the cursor.
2. Move the cursor to place the cursor to be the waypoint.
3. Press [GOTO] key.
   [Waypoint set] window is displayed.



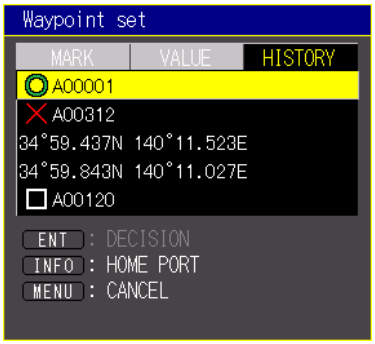
The mark choices near the cursor are displayed in the mark number box of the [Waypoint set] window.
If there are multiple marks near the cursor, press [GOTO] repeatedly to switch the mark choices and display the mark to be the waypoint.

4. Press [ENT] key.
   Waypoint navigation is executed and the waypoint information screen is displayed at the bottom of the screen.

5.4 Setting the waypoint from the waypoint history

You can register the waypoint from the past point which is up to the last 5. To set the waypoint again, perform the following operation. When the number of registrations becomes 5 or more, deleted from the history in order from the old waypoint.

1. Press [CUR] key to cursor OFF.
2. Press [GOTO] key.
   [Waypoint set] window is displayed.

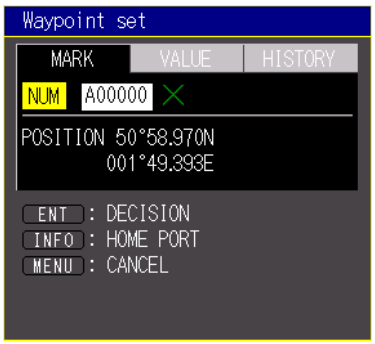


3. Use joystick [←] [→] to select [HISTORY].
4. Use joystick [↑] [↓] to select the waypoint.
5. Press [ENT] key.
   Waypoint navigation is executed and the waypoint information screen is displayed at the bottom of the screen.

5.5 Setting own port as the waypoint

In order to set own port to waypoint, need to register the location of own port in advance.
(Refer to "Chapter 14 Maintenance, 14.6 Regist own port".)

1. Press [CUR] key to cursor OFF.
2. Press [GOTO] key.
   [Waypoint set] window is displayed.



3. Press [INFO] key.
   Waypoint navigation is executed and the waypoint information screen is displayed at the bottom of the screen.

5.6 Displaying ON / OFF the course line

Course line is displayed as a straight line from the starting point to the waypoint positon when waypoint navigation (or route navigation) is executed. You can choose displaying the waypoint lines ON / OFF.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [DISPLAY 1], and use joystick [→].
2. Use joystick [↑] [↓] to select [COURSE LINE].
3. Use joystick [←] [→] to select [ON].
4. Press [MENU] key several times to close the menu.

*To remove the course line, set to [OFF] in step 3.

5.7 Setting the ship speed for calculating the TTG

To calculate the TTG (Time To Go), own ship's speed data is necessary. You can set it manually or automatically.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM2], and use joystick [→].
2. Use joystick [↑] [↓] to select [REQUIRED TIME].
3. Use joystick [←] [→] to select [Actual speed] or [Constant].

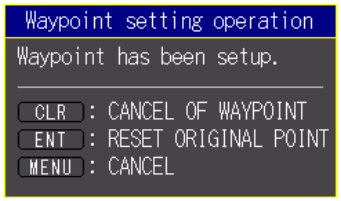
Actual speed	Calculate by the actual own ship's speed data.
Constant	Calculate by the enterd speed data.

4. Use joystick [↑] [↓] to select [Constant].
5. Use joystick [←] [→] to select ship's speed.
6. Press [MENU] key several times to close the menu.

5.8 Resetting the origin of the course line

You can reset the origin of the course line during waypoint navigation.

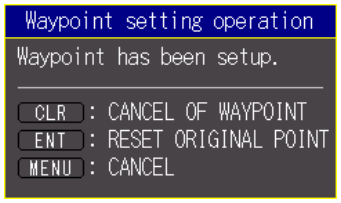
1. Press [GOTO] key during waypoint navigation.
   [Waypoint setting operation] window is displayed.



2. Press [ENT] key.
   Reset with the current position as the origin of the course line.

5.9 Cancel waypoint navigation

1. Press [GOTO] key during waypoint navigation.
   [Waypoint setting operation] window is displayed.



2. Press [CLR] key.
   Cancel the waypoint navigation.

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Chapter 6 Route Navigation

You can use Route Navigation which is created by connecting each waypoint.

6.1 Creating routes

You can create up to 50 routes and you can register 50 waypoints in one route. Also, you can use marks already entered at the waypoint.

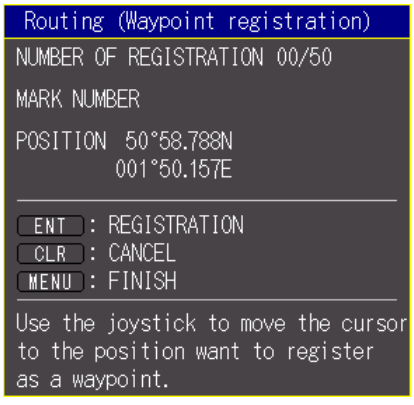
There are 2 ways to create a route.

- Create a route with a cursor
- Create a route by input the latitude and longitude

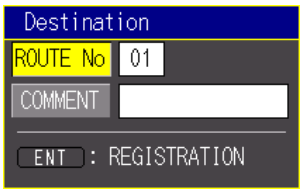
Create a route with a cursor

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [ROUTING], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].

3. Use joystick [→].
   [Routing (Waypoint registration)] window is displayed.



4. Move the cursor to the waypoint.
5. Press [ENT] key.
   Register the waypoint.
6. Repeat steps 4 and 5 to register the waypoint.
   Position the cursor over the mark and press [ENT] key to register the position of that mark as a waypoint.
   Up to 50 waypoints can be registered serially.
7. Press [MENU] key.
   [Destination] window is displayed.



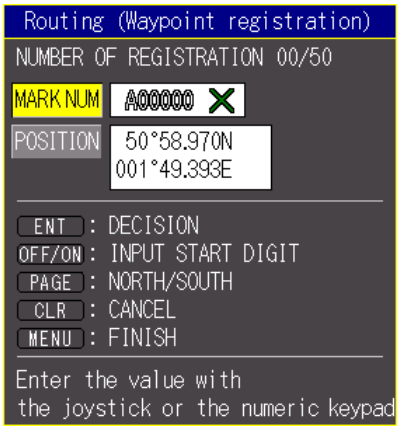
8. Use joystick, enter the route number and comment.
9. Press [ENT] key.
   The created route is memorized.

> ⚠ **CAUTION:** **In case select a created route number, it will not be memorized even if [ENT] key is pressed.**

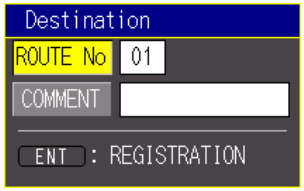
Create a route by input the latitude and longitude

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [ROUTING], and use joystick [→].
2. Use joystick [↑] [↓] to select [INPUT VALUE].

3. Use joystick [→].
   [Routing (Waypoint registration)] window is displayed.



4. Use joystick and enter the mark number or latitude and longitude to be registered as a waypoint.
5. Press [ENT] key.
   Register the waypoint.
6. Repeat steps 4 and 5 to register the waypoint.
   Up to 50 waypoints can be registered serially.
7. Press [MENU] key.
   [Destination] window is displayed.



8. Use joystick, enter the route number and comment.
9. Press [ENT] key.
   The created route is memorized.

CAUTION: In case select a created route number, it will not be memorized even if [ENT] key is pressed.

6.2 Execute route navigation

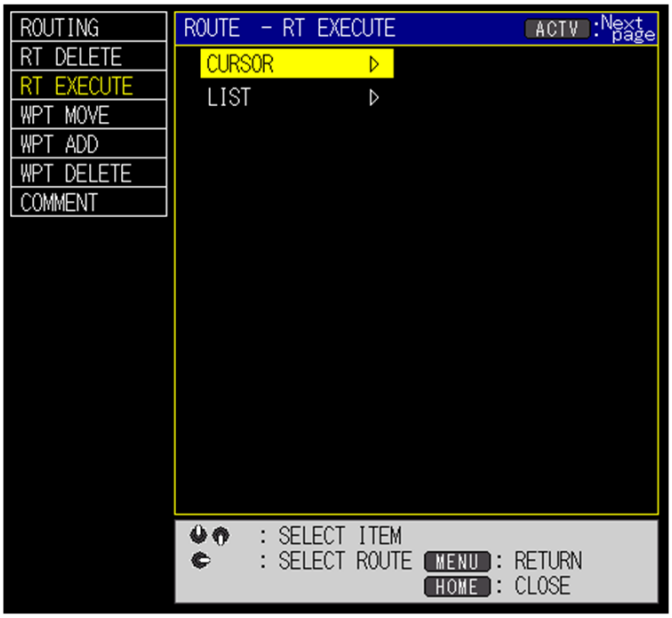
There are 2 ways to execute route navigation.

Select with cursor and execute
Select from the list and execute

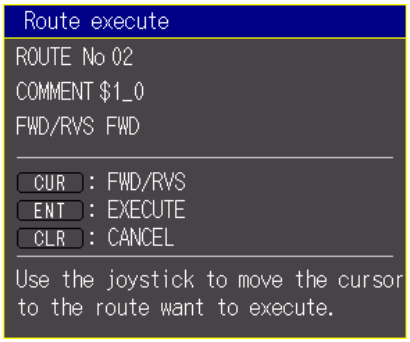
CAUTION: In order to execute route navigation, it is necessary to create a route in advance.

Select with cursor and execute

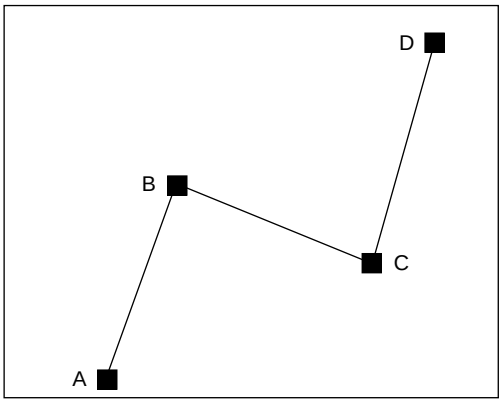
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [RT EXECUTE], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].



3. Use joystick [→].
   [Route execute] window is displayed.

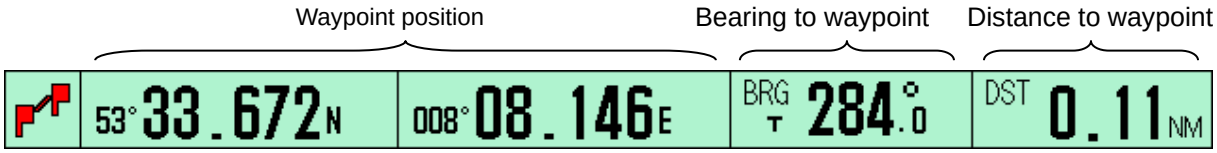


4. Use joystick and move the cursor to the route to be executed.
   After recognizing the route, the route number, comment and forward / reverse are displayed on the [Route execute] window. Change forward / reverse by pressing [CUR] key while displaying the route number.



If the registration order of the waypoints is A → B → C → D, the waypoints in the order of A → B → C → D in the case of forward movement and in the case of backward movement the waypoint is D → C → B → A It switches in order.

5. Press [ENT] key.
   Route navigation is executed and the waypoint information screen is displayed at the bottom of the screen.

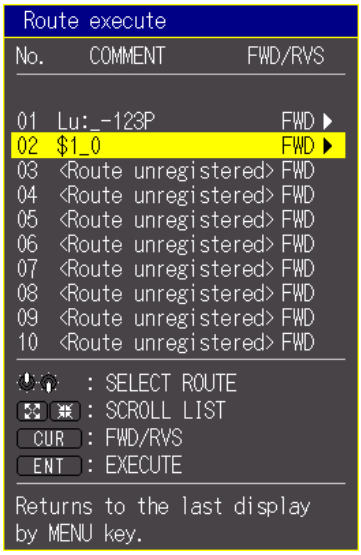


CAUTION: If route number is not displayed, route navigation will not be executed even if [ENT] key is pressed.

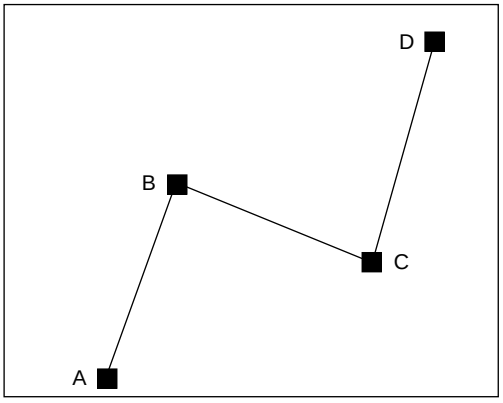
Select from the list and execute

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [RT EXECUTE], and use joystick [→].
2. Use joystick [↑] [↓] to select [LIST].

3. Use joystick [→].
   [Route execute] window is displayed.

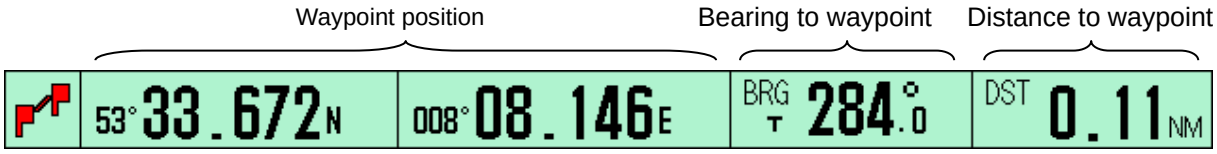


4. Use joystick [↑] [↓] to select the route to be executed.
   Press [Zoom out] to display the [Route execute] window of the next page.
   Press [Zoom in] to display the [Route execute] window of the previous page.
   Change forward / reverse by press [CUR] key.



If the registration order of the waypoints is A → B → C → D, the waypoints in the order of A → B → C → D in the case of forward movement and in the case of backward movement the waypoint is D → C → B → A It switches in order.

5. Press [ENT] key.
   Route navigation is executed and the waypoint information screen is displayed at the bottom of the screen.



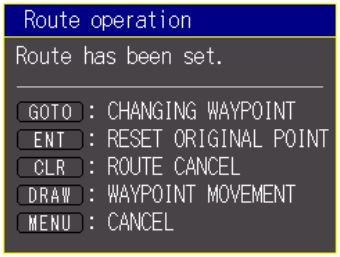
CAUTION: If route number is not displayed, route navigation will not be executed even if [ENT] key is pressed.

6.3 Changing the waypoint switching during route navigation

You can skip the current waypoint and set the next waypoint.

To switch to the next waypoint automatically when approaching the waypoint, refer to "6.7 Setting the switching method of the waypoint".

1. Press [GOTO] key.
   [Route operation] window is displayed.



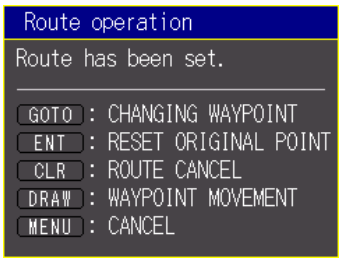
2. When [GOTO] key is pressed while the [Route operation] window is displayed, can switch the waypoint movement.
   Each time you press [GOTO] key, it recognizes the next waypoint, displays the flag, and erases the previous waypoint and course line from the screen.

When waypoint is only one and [GOTO] key is pressed, all the waypoints on the route are displayed for remainder, and continues the route navigation to the first waypoint as the new destination.

6.4 Resetting the starting point during route navigation

During route navigation, reset the starting point.

1. Press [GOTO] key.
   [Route operation] window is displayed.



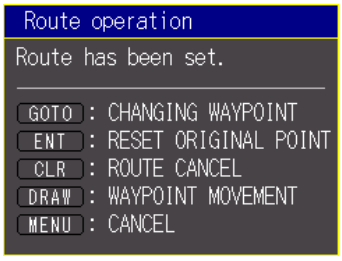
2. When [ENT] key is pressed while the [Route operation] window is displayed.
   Reset the current position as a new starting point.

CAUTION: When the ROUTE NAV MODE is [Fix], starting point resetting can not be executed.

6.5 Canceling route navigation

You can cancel a route navigation.

1. Press [GOTO] key.
   [Route operation] window is displayed.

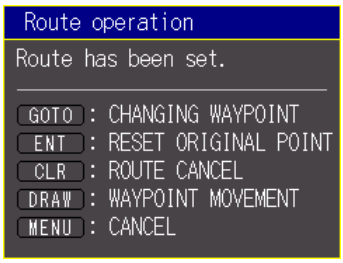


2. When [CLR] key is pressed while the [Route operation] window is displayed, the executing route navigation is canceled.

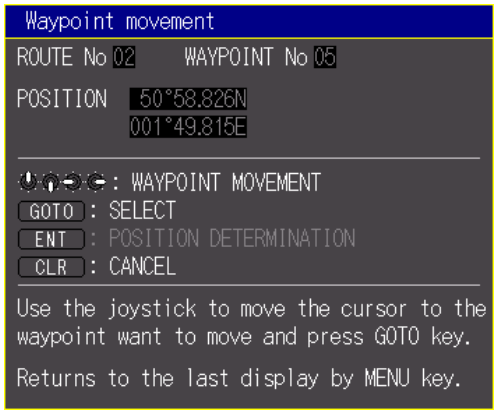
6.6 Move the waypoint during route navigation

Move to the waypoint on the route during route navigation.
This function is useful when want to change the route temporarily.

1. Press [GOTO] key.
   [Route operation] window is displayed.



2. When [DRAW] key is pressed while the [Route operation] window is displayed, [Waypoint movement] window is displayed.



3. Use joystick and move the cursor to the waypoint where you move.
4. Press [GOTO] key.
   Display the waypoint choices near the cursor.
   If there are multiple points of change near the cursor, press [GOTO] key repeatedly to toggle between waypoint choices and display the moving waypoint.
5. Use joystick and move the cursor to the new position of the waypoint.
6. Press [ENT] key.
   The selected waypoint moves to the new position.
7. Repeat steps 3 to 6 as necessary to move the point where the movement is necessary.
8. Press [MENU] key to close the window.

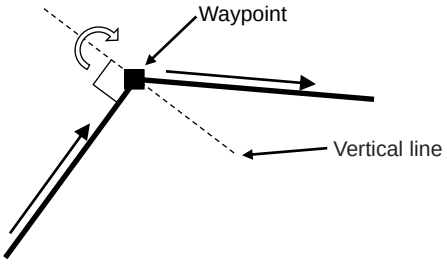
CAUTION: If move the waypoint, the information indicating TTG, ETA, the distance, etc. will also be updated according to the movement.

CAUTION: The change result made by this function is not stored as route data. Route execution of the same route number again calls the previous route.

6.7 Setting the switching method of the waypoint

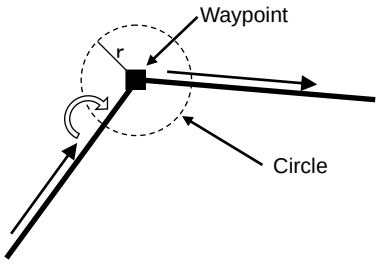
There are 4 ways to switch the waypoint during route navigation.

PERP



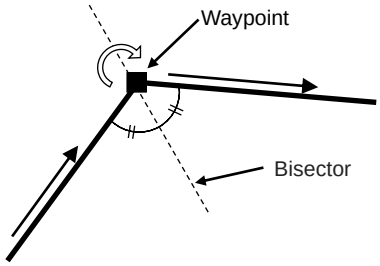
Switch the next waypoint after crossing the vertical line intersecting the waypoint on the route.

CI



Switch the next waypoint when you reach a circle centered on the waypoint on the route.
*The radius of the circle is set in [RANGE] of [ARRIVAL ALARM]. Refer to "Chapter 8 Alarm, 8.2 Setting arrival alarm".

BISECTOR



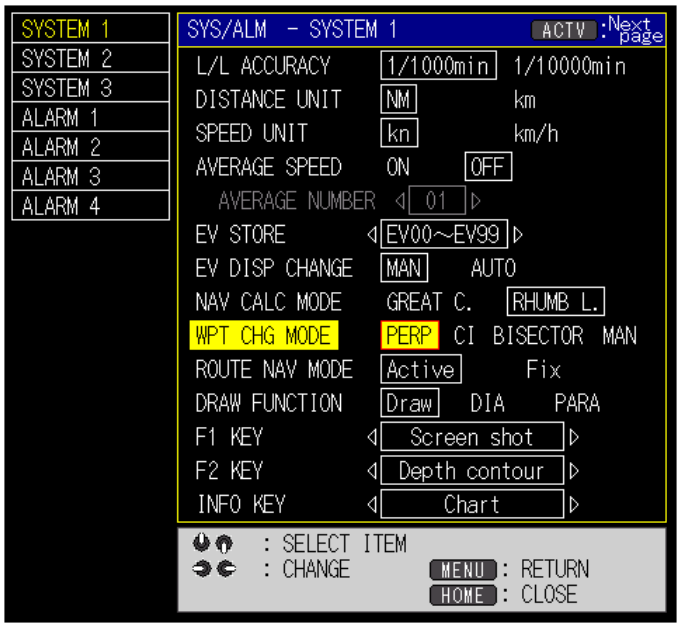
Switch the next waypoint after crossing the bisector passing through the waypoint on the route.

MAN

Press [GOTO] key to switch the waypoint manually (it will not switch automatically).
*For the procedure for manually switching the waypoint, refer to "6.3 Changing the waypoint switching during route navigation".

To change the waypoint, follow the procedure below.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].
2. Use joystick [↑] [↓] to select [WPT CHG MODE].



3. Use joystick [←] [→] to select the switching method of waypoint.
4. Press [MENU] key several times to close the menu.

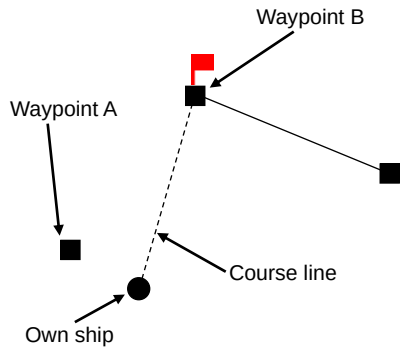
6.8 Setting the route navigation mode

There are 2 ways to set the route navigation mode as follows.

Active

When route navigation is executed, the first waypoint becomes the waypoint position. Also, at the time of route navigation execution and switching waypoint, own ship's position becomes the starting position.

Passing through the waypoint A



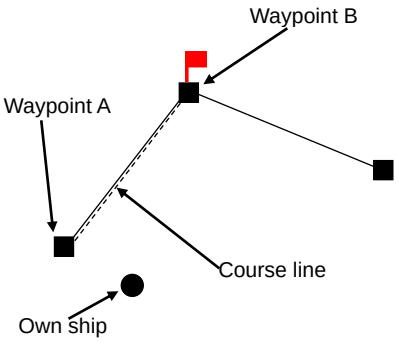
When the changeover condition of waypoint A is satisfied, waypoint B switches to the waypoint position. In active mode, own ship's position at this time is the starting position.

In addition, the route that passed through will disappear one after another.
After passing through the final waypoint, will end the route navigation.

Fix

When route navigation is executed, the first waypoint is the starting point position and the second waypoint is the waypoint. Also, at the time of changing the waypoint, the point where the waypoint is the starting point is the starting point position, and the waypoint after switching is the waypoint.

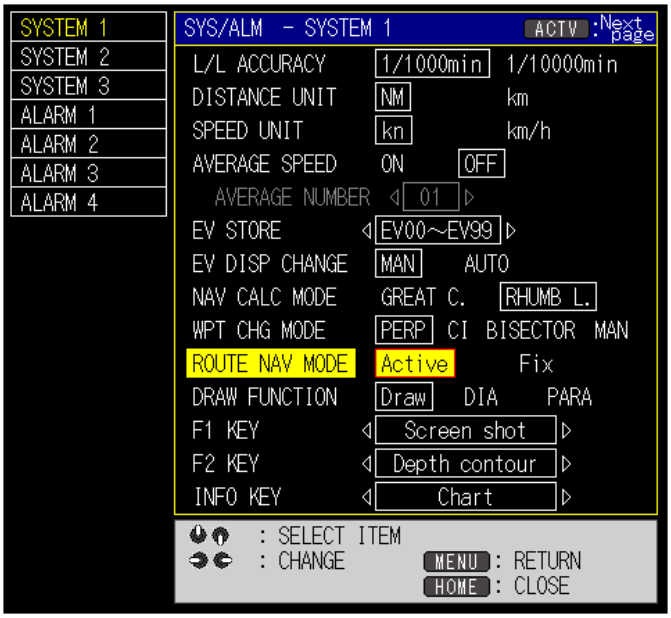
Passing through the waypoint A



When the changeover condition of waypoint A is satisfied, waypoint B switches to the waypoint position. In the fix mode, the position of the waypoint A changes to the starting position.
Also, the course line that passed through will remain on the map as it is.
Keep the before state after passing through the final waypoint.

To change the route navigation mode, follow the procedure below.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].
2. Use joystick [↑] [↓] to select [ROUTE NAV MODE].



3. Use joystick [←] [→] to select the route navigation mode.
4. Press [MENU] key several times to close the menu.

6.9 Delete the route

Deletes registered routes. There are 2 ways to delete the route.

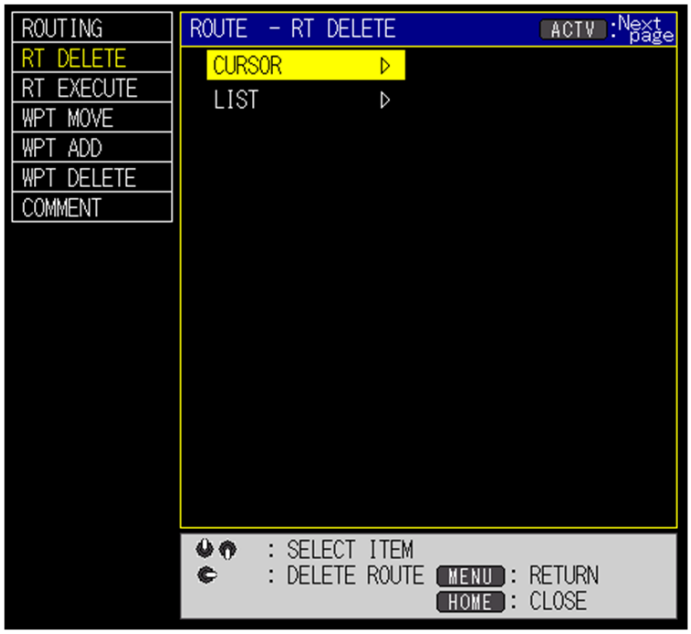
Select with the cursor to delete the route

Select from the list to delete the route

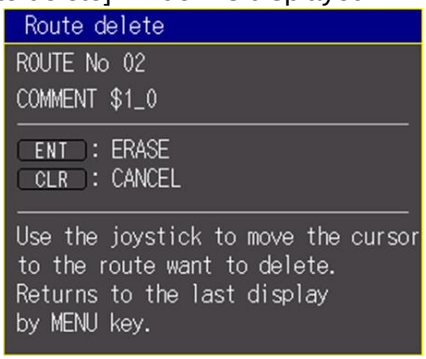
> ⚠ **CAUTION: Deleted routes cannot be undone. Also, cannot delete routes during route navigation.**

Select with the cursor to delete the route

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [RT DELETE], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].



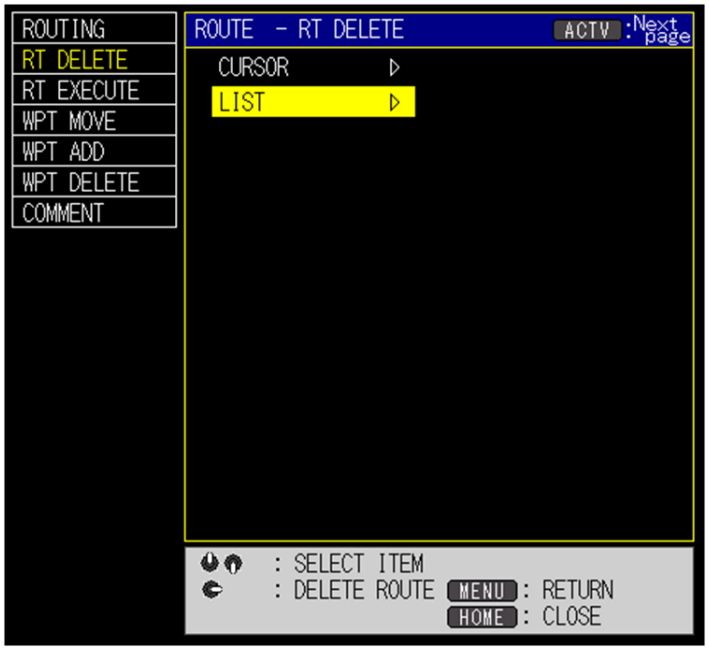
3. Use joystick [→].
   [Route delete] window is displayed.



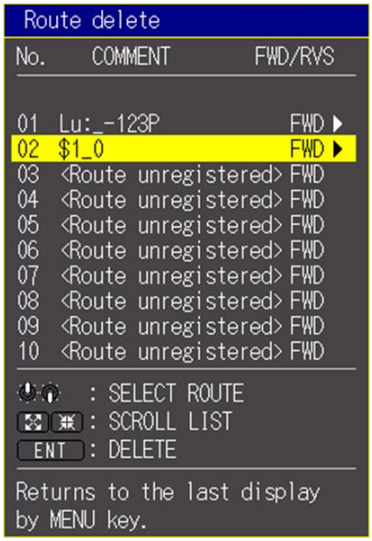
4. Use joystick and move the cursor to the route to be deleted.
5. Press [ENT] key.
   Delete the selected route.

Select from the list to delete the route

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [RT DELETE], and use joystick [→].
2. Use joystick [↑] [↓] to select [LIST].



3. Use joystick [→].
   [Route delete] window is displayed.



4. Use joystick to select the deleted route.
   Press [Zoom out] to display the [Route delete] window of the next page.
   Press [Zoom in] to display the [Route delete] window of the previous page.
5. Press [ENT] key.
   Delete the selected route.

6.10 Move the waypoint of the created route

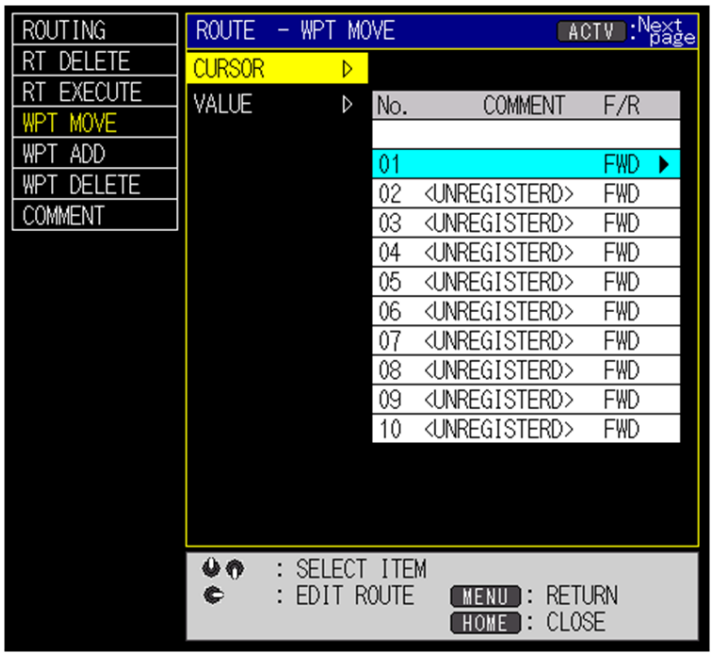
Move the waypoint of the created route. There are 2 ways to move the waypoint.

Use the cursor to move the waypoint

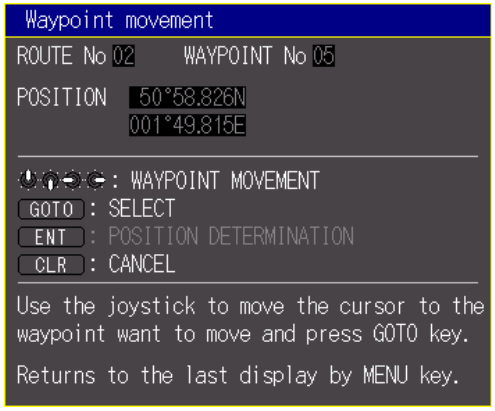
Enter the latitude and longitude to move the waypoint

Use the cursor to move the waypoint

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [WPT MOVE], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].



3. Use joystick [→].
   [Waypoint movement] window is displayed.

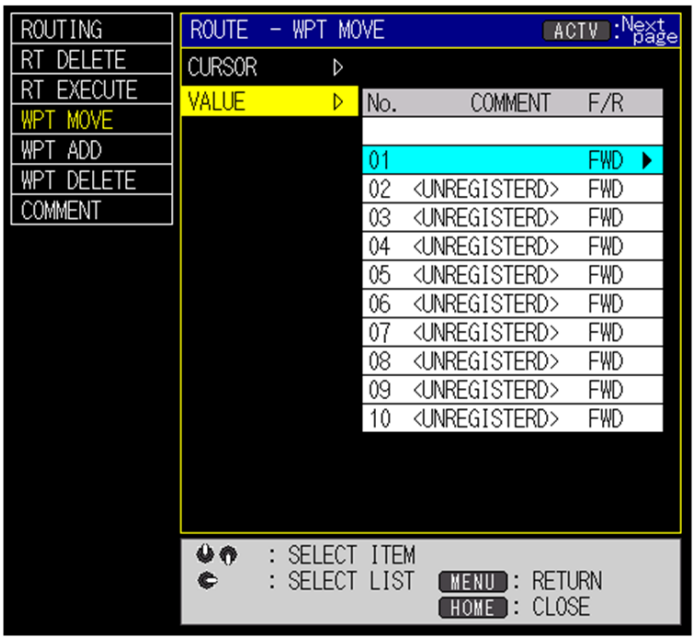


4. Use joystick and move the cursor to the waypoint to move.
5. Press [GOTO] key.
   Display choices for the waypoint near the cursor. If there are multiple waypoints near the cursor, press [GOTO] key repeatedly to toggle between choices and display the moving waypoint.
6. Use joystick and move the cursor to the new position of the waypoint.
7. Press [ENT] key.
   The selected waypoint moves to the new position.

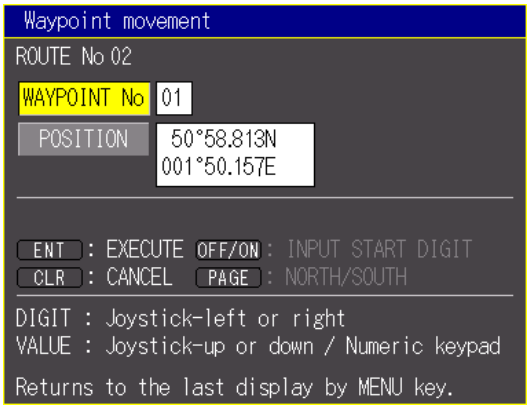
8. Repeat steps 5 to 7 as necessary to move the waypoint where the movement is necessary.
9. Press [MENU] key several times to close the menu.

Enter the latitude and longitude to move the waypoint

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [WPT MOVE], and use joystick [→].
2. Use joystick [↑] [↓] to select [VALUE].



3. Use joystick [→].
   Use joystick to select the route.
   Press [Zoom out] to display the route list of the next page.
   Press [Zoom in] to display the route list of the previous page.
4. Use joystick [→].
   [Waypoint movement] window is displayed.



5. Use joystick and select [WAYPOINT No].
6. Use joystick [→].
   Move the cursor to the setting box of the waypoint number.
7. Use joystick to set [WAYPOINT No].
8. Use joystick [←] [→] to exit from the menu.

9. Use joystick to select [POSITION].
10. Use joystick [→].
    Move the cursor to the position setting box.
11. Use joystick to set latitude and longitude.
    Press [CLR] to return to the original value.
12. Press [ENT] key.
    The selected waypoint moves to the new position.
13. Repeat steps 5 to 12 as necessary to move the waypoint where movement is necessary.
14. Press [MENU] key several times to close the menu.

6.11 Add the waypoint to the created route

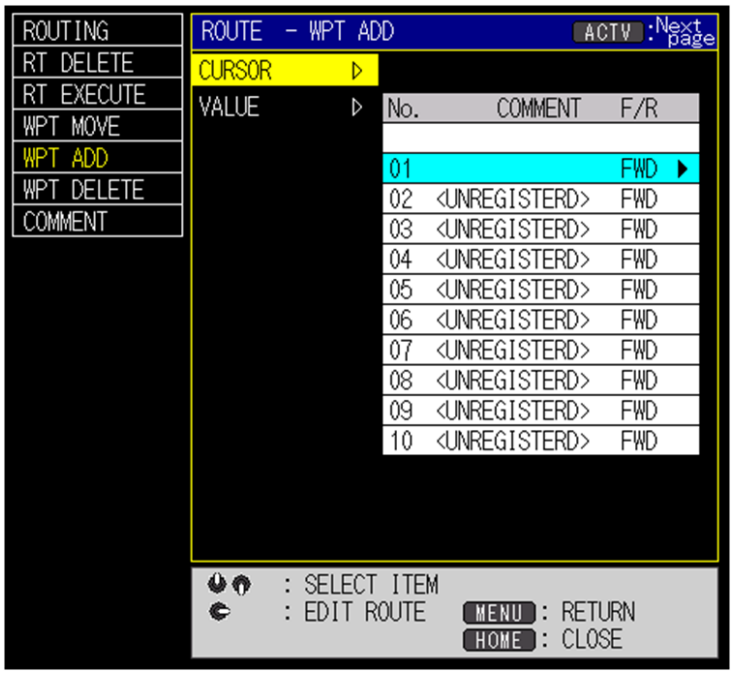
Add the waypoint for the created route. There 2 two ways to add the waypoint.

Use the cursor to add the waypoint

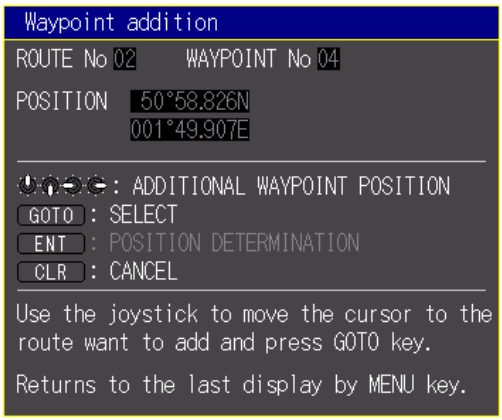
Enter the latitude and longitude to add the waypoint

Use the cursor to add the waypoint

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [WPT ADD], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].



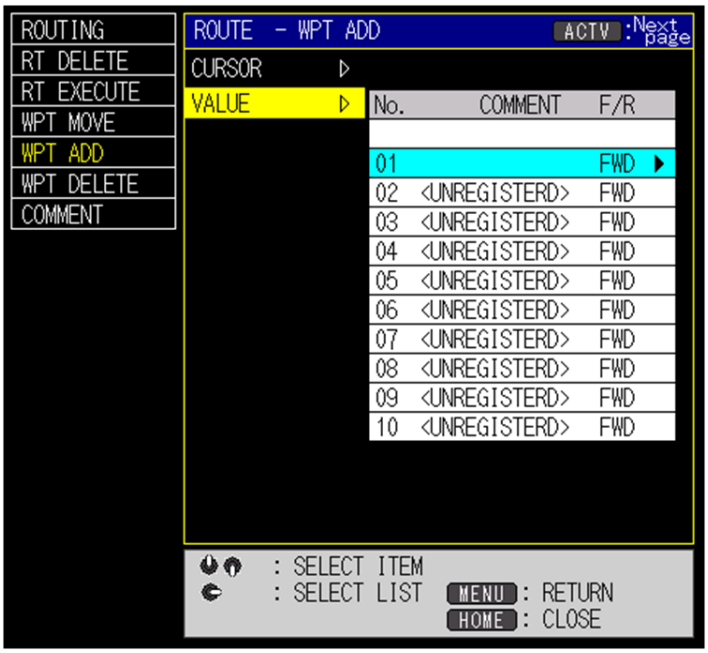
3. Use joystick [→].
   [Waypoint addition] window is displayed.



4. Use joystick and move the cursor to the route line between two waypoints.
5. Press [GOTO] key.
   Display choices for routes near the cursor. If there are multiple routes near the cursor, press [GOTO] key repeatedly to toggle the choices and display the route to add the waypoint.
6. Use joystick and move the cursor to the new position of the waypoint.
7. Press [ENT] key.
   Add a new waypoint to the route.
8. Repeat steps 4 to 7 as necessary to add a waypoint.
9. Press [MENU] key several times to close the menu.

Enter the latitude and longitude to add the waypoint

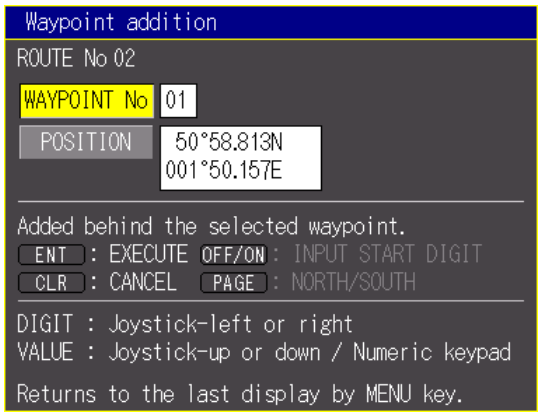
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [WPT ADD], and use joystick [→].
2. Use joystick [↑] [↓] to select [VALUE].



3. Use joystick [→].
   Use joystick to select the route.

Press [Zoom out] to display the route list of the next page.
Press [Zoom in] to display the route list of the previous page.

4. Use joystick [→].
   [Waypoint addition] window is displayed.



5. Use joystick and select [WAYPOINT No].
6. Use joystick [→].
   Move the cursor to the setting box of the waypoint number.
7. Use joystick to set [WAYPOINT No].
8. Use joystick [←] [→] to exit from the menu.
9. Use joystick to select [POSITION].
10. Use joystick [→].
    Move the cursor to the position setting box.
11. Use joystick to set latitude and longitude.
    Press [CLR] to return to the original value.
12. Press [ENT] key.
    Add a new waypoint.
13. Repeat steps 5 to 12 as necessary to add a waypoint.
14. Press [MENU] key several times to close the menu.

6.12 Delete the waypoint of the created route

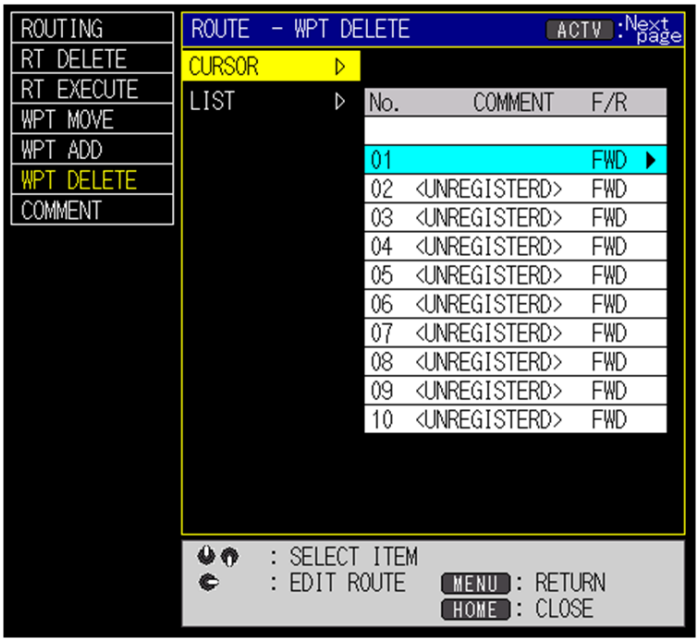
Delete the waypoint of the created route. There are 2 ways to delete the waypoint.

- Use the cursor to delete the waypoint
- Enter the waypoint number to delete the waypopint

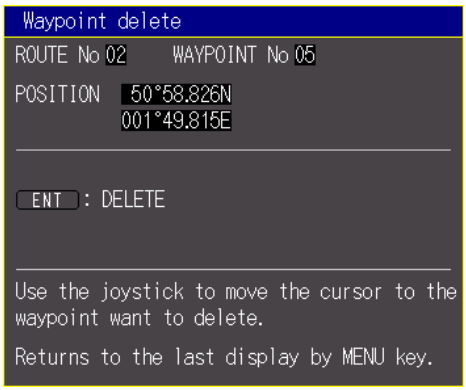
Use the cursor to delete the waypoint

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [WPT DELETE], and use joystick [→].

2. Use joystick [↑] [↓] to select [CURSOR].



3. Use joystick [→].
   [Waypoint delete] window is displayed.

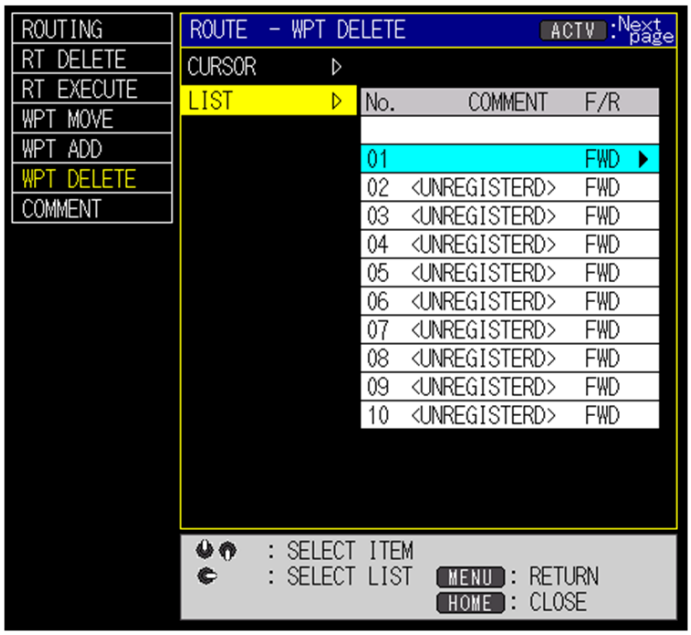


4. Use joystick and move the cursor to the waypoint to delete.
5. Press [ENT] key.
   Delete the selected waypoint.
6. Repeat steps 4 and 5 as necessary to delete the waypoint.
7. Press [MENU] key several times to close the menu.

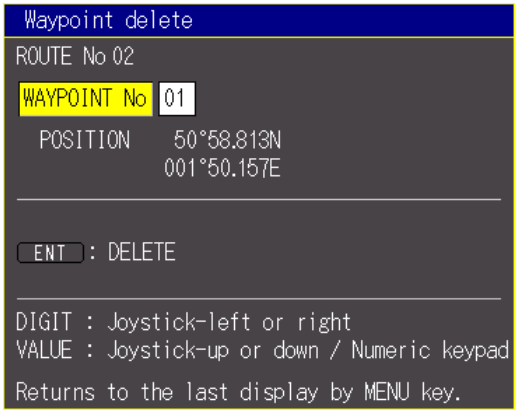
Enter the waypoint number to delete the waypopint

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [WPT DELETE], and use joystick [→].

2. Use joystick [↑] [↓] to select [LIST].



3. Use joystick [→].
   Use joystick to select the route.
   Press [Zoom out] to display the route list of the next page.
   Press [Zoom in] to display the route list of the previous page.
4. Use joystick [→].
   [Waypoint delete] window is displayed.

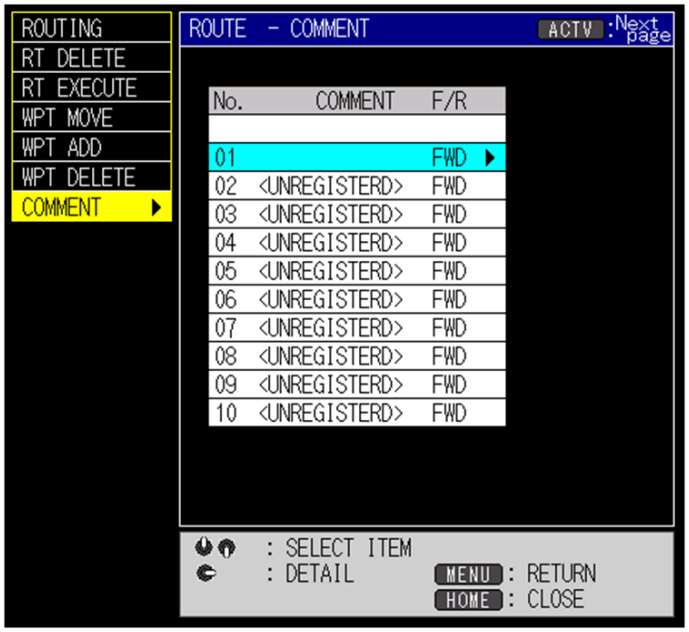


5. Use joystick and select [WAYPOINT No].
6. Use joystick [→].
   Move the cursor to the setting box of the waypoint number.
7. Use joystick to set [WAYPOINT No].
8. Use joystick [←] [→] to exit from the menu.
9. Press [ENT] key.
   Delete the selected waypoint.
10. Repeat steps 6 to 9 as necessary to delete the waypoint.
11. Press [MENU] key several times to close the menu.

6.13 Edit comments

Edit the comment of the created route.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [ROUTE], and use joystick [→].
   Use joystick [↑] [↓] to select [COMMENT], and use joystick [→].
2. Use joystick and select the route for editing comments.
   Press [Zoom out] to display the route list of the next page.
   Press [Zoom in] to display the route list of the previous page.



3. Use joystick [→].
   [Entering Characters] window is displayed.
   For the procedure of entering comments, refer to "Chapter 1 Basic Operation, 1.6 Overview of menu operation".
4. Press [MENU] key several times to close the menu.

Chapter 7 Drawing

You can edit a coastline, prohibited area, etc. in line. In addition, you can also edit parallel line and diamond line.

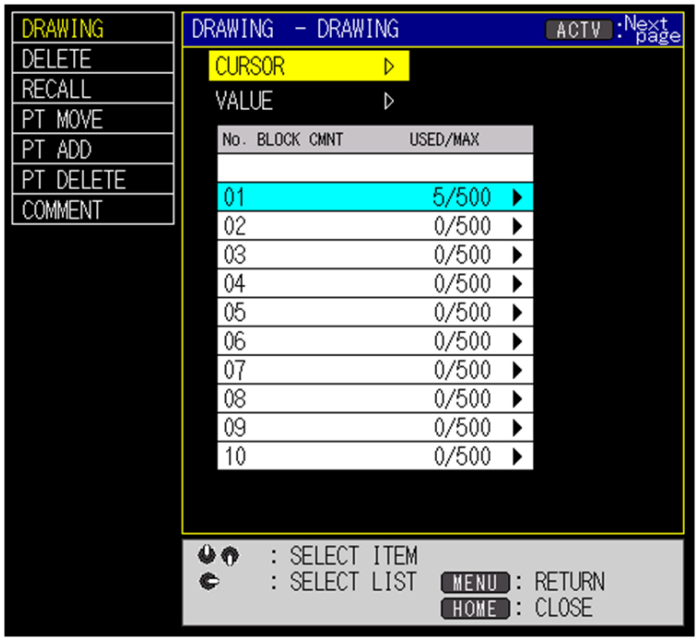
7.1 Creating drawings

You can create up to 20 blocks drawings and you can register 500 points in one block.

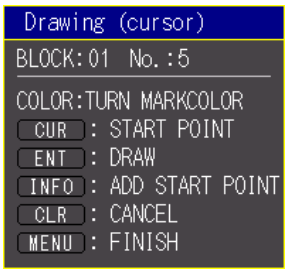
There are 3 ways to create a drawing.
• Create a drawing with a cursor
• Create a drawing by entering the latitude and longitude
• Create a drawing by using the [DRAW] key

Create a drawing with a cursor

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].

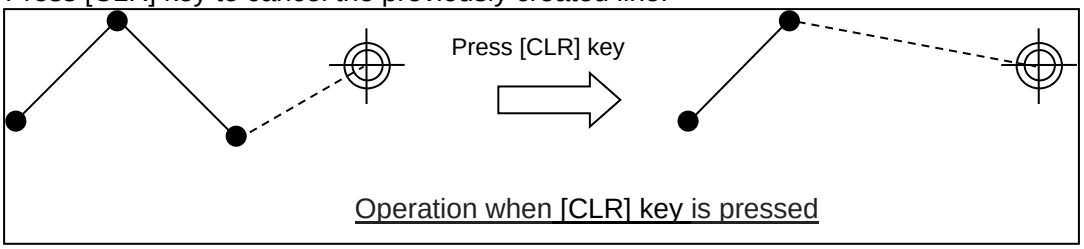


3. Use joystick [→].
   Use joystick [↑] [↓] to select the block to store the drawing points.
4. Use joystick [→].
   [Drawing (cursor)] window is displayed.

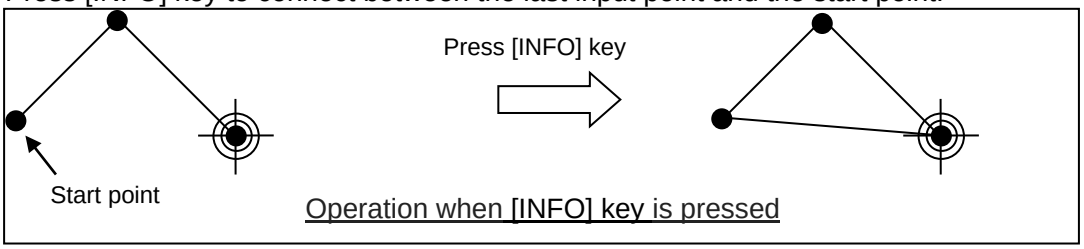


5. Use joystick and move the cursor to the start point of the line.
6. Press [ENT] key.
   Register the start point.
7. Use joystick and move the cursor to the next point.
   Turn [MARK COLOR] knob to change the color of the line.
8. Press [ENT] key.
   Display lines.

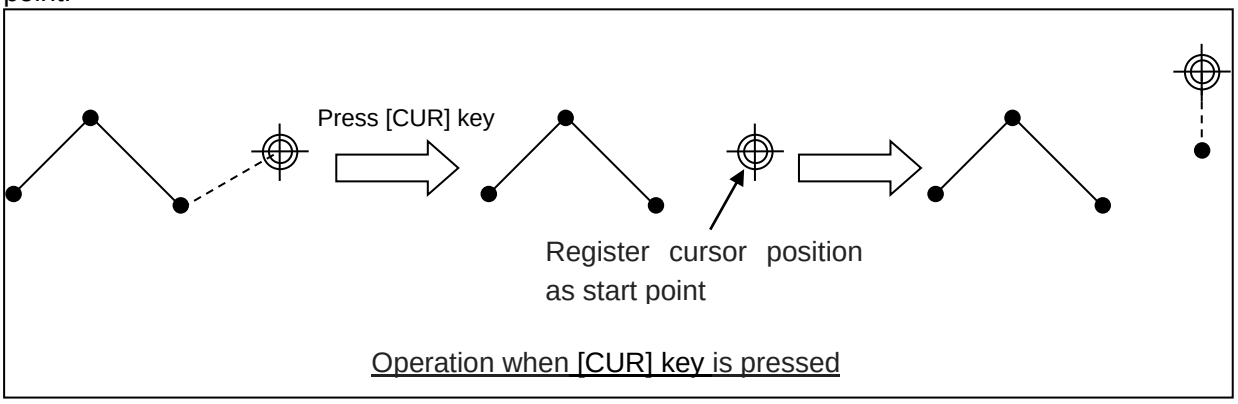
Press [CLR] key to cancel the previously created line.



Press [INFO] key to connect between the last input point and the start point.



Press [CUR] key, the dotted line disappears and the cursor position is registered as the start point.

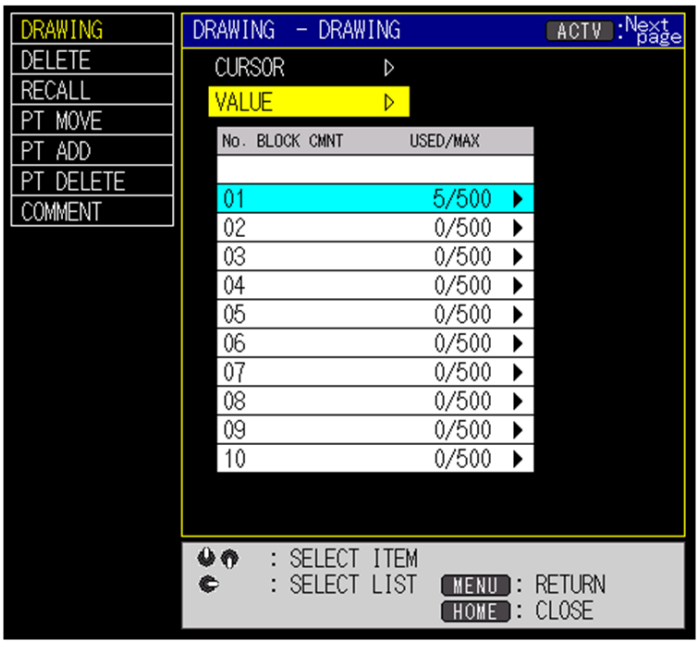


9. Repeat steps 7 and 8 to create a drawing.
   Up to 500 points can be registered.
10. Press [MENU] key to finish drawing.

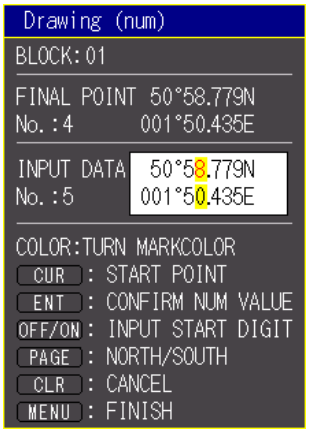
Create a drawing by entering the latitude and longitude

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].

2. Use joystick [↑] [↓] to select [VALUE].

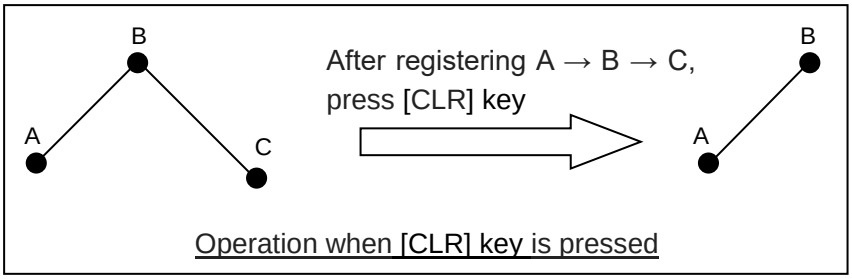


3. Use joystick [→].
   Use joystick [↑] [↓] to select the block to store the drawing points.
4. Use joystick [→].
   [Drawing (num)] window is displayed.



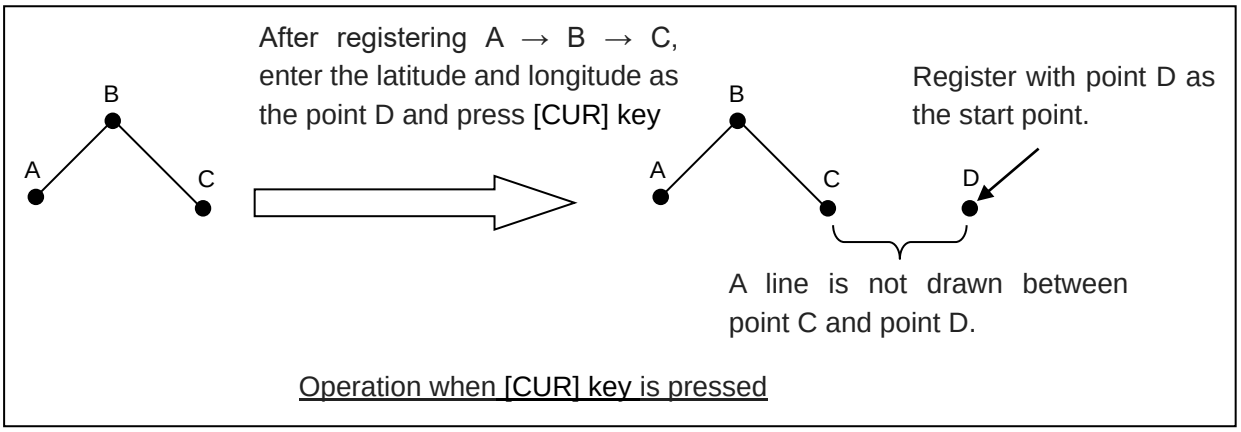
5. Use joystick and enter the mark number or latitude and longitude.
6. Press [ENT] key.
   Register the start point.
7. Use joystick and enter the mark number or latitude and longitude to the next point.
   Turn [MARK COLOR] knob to change the color of the line.
8. Press [ENT] key.
   Display lines.

Press [CLR] key to cancel the previously created line.



Operation when [CLR] key is pressed

Press [CUR] key, registered as the start point.



Operation when [CUR] key is pressed

9. Repeat steps 7 and 8 to create a drawing.
   Up to 500 points can be registered.
10. Press [MENU] key to finish drawing.

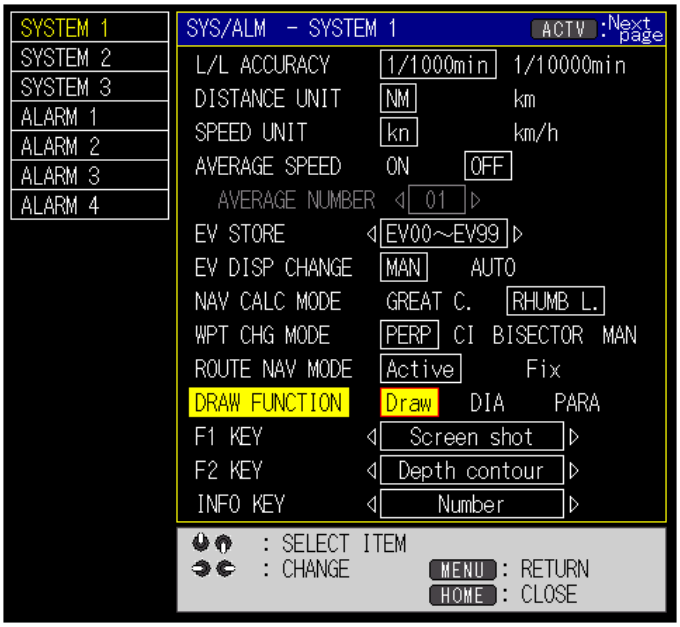
Create a drawing by using the [DRAW] key

By using the [DRAW] key, easily create the drawing.

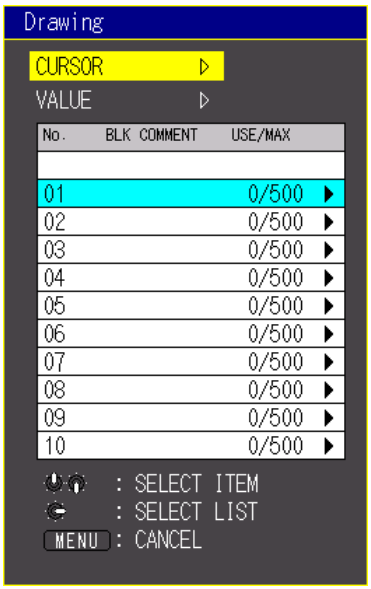
CAUTION: Drawing by using the [DRAW] key cannot be used together with parallel drawing or diamond drawing.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].

2. Use joystick [↑] [↓] to select [DRAW FUNCTION].



3. Use joystick [←] [→] to select [Draw].
4. Press [MENU] key several times to close the menu.
5. Press [DRAW] key.
   [Drawing] window is displayed.



6. To create a drawing using the cursor, select [CURSOR], enter latitude and longitude and select [VALUE] to create a drawing.
7. For the operation method, refer to step 3 onward in “Create a drawing with a cursor” and “Create a drawing by entering the latitude and longitude”.

7.2 Delete the drawing

Deletes registered drawing. There are 2 ways to delete the drawing.

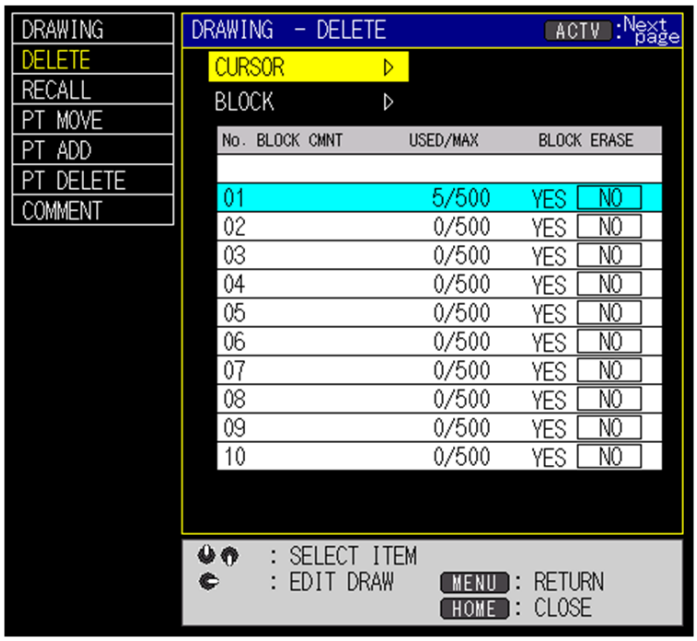
Select with the cursor to delete the drawing

Select from the list to delete the drawing

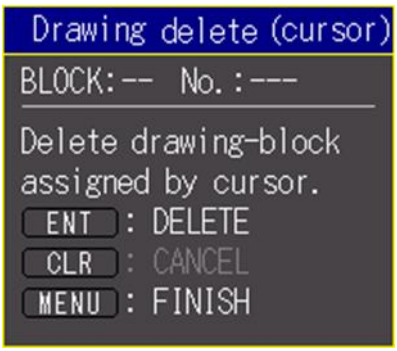
CAUTION: Delete every block (500 points). Deleted drawings cannot be undone.

Select with the cursor to delete the drawing

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [DELETE], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].



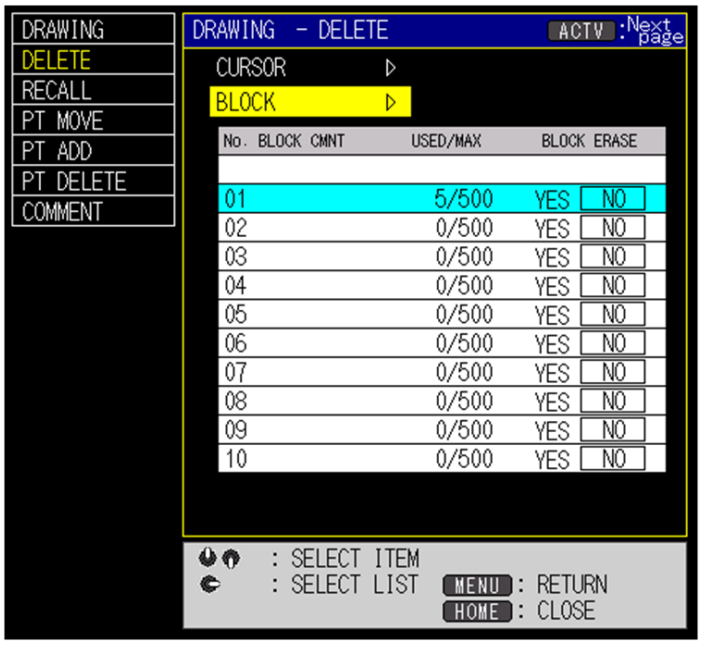
3. Use joystick [→].
   [Drawing delete (cursor)] window is displayed.



4. Use joystick and move the cursor to the drawing to be deleted.
5. Press [ENT] key.
   The selected drawing will turn red and blink.
   Press [CLR] to stop blinking display and cancel the decision.
6. Press [MENU] key.
   Deletes the selected drawing.

Select from the list to delete the drawing

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [DELETE], and use joystick [→].
2. Use joystick [↑] [↓] to select [BLOCK].



3. Use joystick [→].
   Use joystick [↑] [↓] to select the drawing block to delete.
   The selected drawing block will be blinking.
4. Use joystick [←] [→] to select [YES].
5. Press [ENT] key.
   The following message will be displayed.

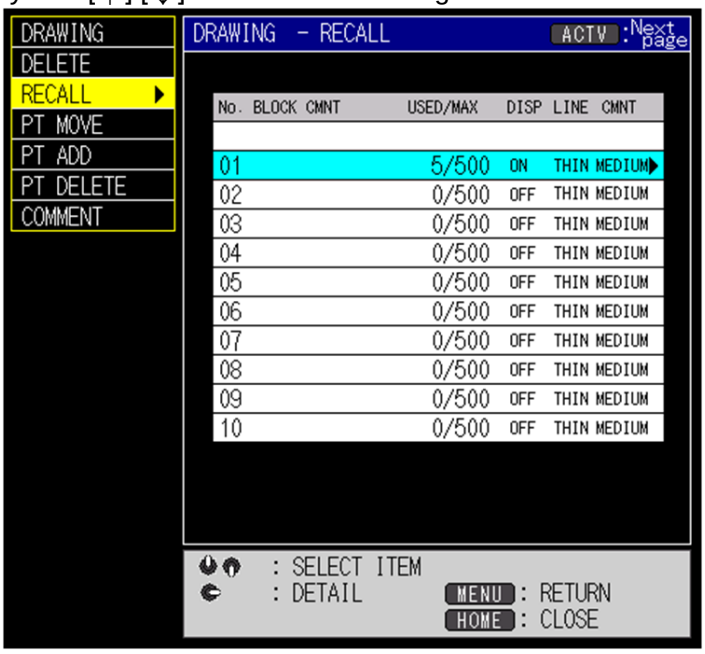
6. Press [ENT] key to delete the drawing of the specified block.
7. Press [MENU] key several times to close the menu.

7.3 Display the drawing or change the width of the drawing line

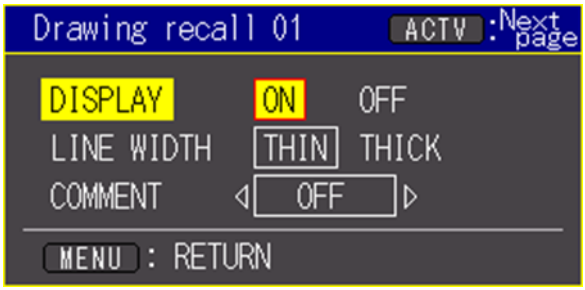
For each block, you can display the created drawing on the screen or change the width of the drawing line.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [RECALL], and use joystick [→].

2. Use joystick [↑] [↓] to select the drawing block.



3. Use joystick [→].
   [Drawing recall] window is displayed.



4. Use joystick [↑] [↓] to select the item, use joystick [←] [→] to change the setting.
5. Press [MENU] key several times to close the menu.

7.4 Move the point of created drawings

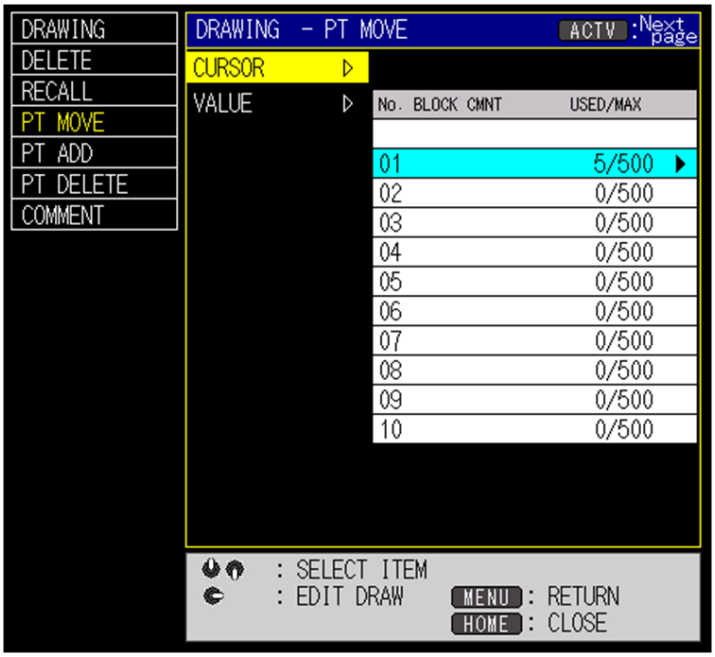
Move the point of created drawings. There are 2 ways to move the point.

- Use the cursor to move the point
- Enter the latitude and longitude to move the point

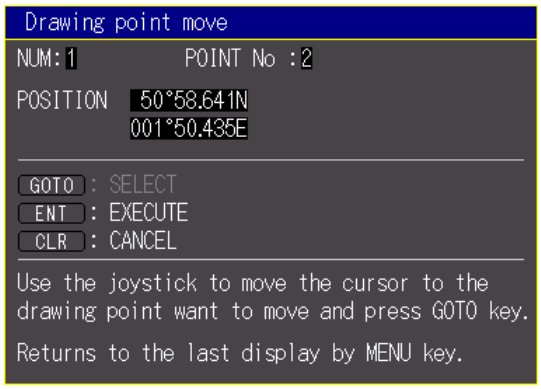
Use the cursor to move the point

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [PT MOVE], and use joystick [→].

2. Use joystick [↑] [↓] to select [CURSOR].



3. Use joystick [→].
   [Drawing point move] window is displayed.

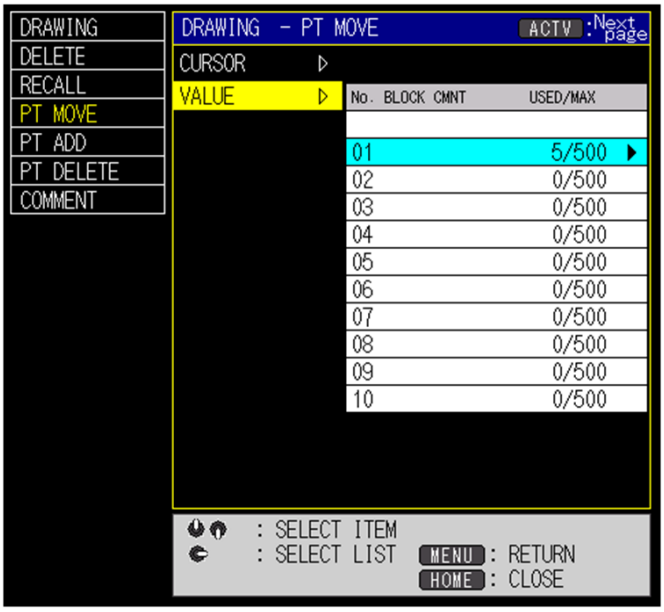


4. Use joystick and move the cursor to the point to move.
5. Press [GOTO] key.
   Display choices for the point near the cursor. If there are multiple points near the cursor, press [GOTO] key repeatedly to toggle between choices and display the moving point.
6. Use joystick and move the cursor to the new position of the point.
7. Press [ENT] key.
   The selected point moves to the new position.
8. Repeat steps 5 to 7 as necessary to move the point where the movement is necessary.
9. Press [MENU] key several times to close the menu.

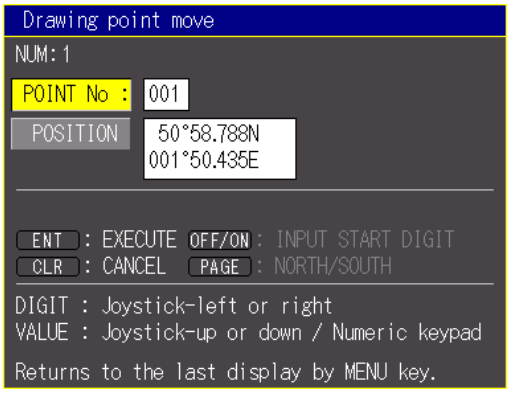
Enter the latitude and longitude to move the point

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [PT MOVE], and use joystick [→].

2. Use joystick [↑] [↓] to select [VALUE].



3. Use joystick [→].
   Use joystick to select the drawing block.
   Press [Zoom out] to display the drawing list of the next page.
   Press [Zoom in] to display the drawing list of the previous page.
4. Use joystick [→].
   [Drawing point move] window is displayed.



5. Use joystick and select [POINT No].
6. Use joystick [→].
   Move the cursor to the setting box of the point number.
7. Use joystick to set [POINT No].
8. Use joystick [←] [→] to exit from the menu.
9. Use joystick to select [POSITION].
10. Use joystick [→].
    Move the cursor to the position setting box.
11. Use joystick to set latitude and longitude.
    Press [CLR] to return to the original value.
12. Press [ENT] key.
    The selected point moves to the new position.
13. Repeat steps 5 to 12 as necessary to move the point where movement is necessary.
14. Press [MENU] key several times to close the menu.

7.5 Add the point to the created drawing

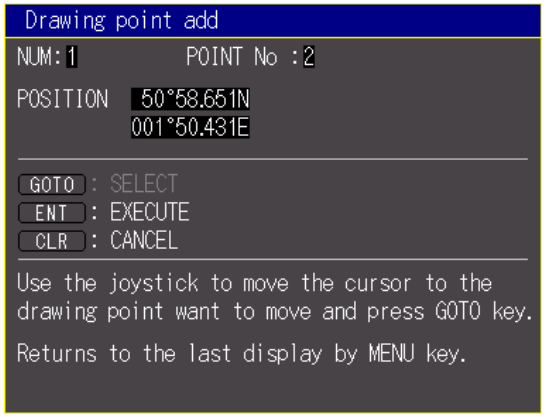
Add the point for the created drawing. There are 2 ways to add the point.

- Use the cursor to add the point
- Enter the latitude and longitude to add a point

Use the cursor to add the point

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [PT ADD], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].

3. Use joystick [→].
   [Drawing point add] window is displayed.

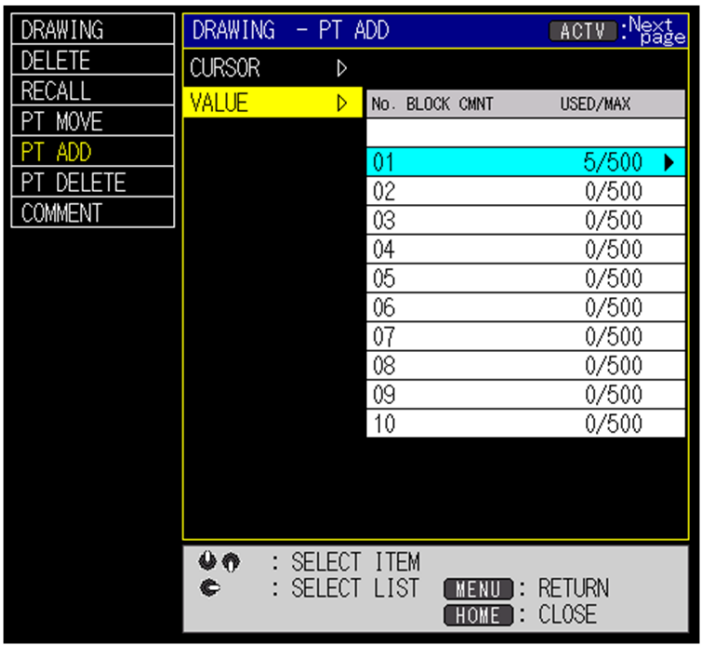


4. Use joystick and move the cursor to the drawing line between the point and the point.
5. Press [GOTO] key.
   Display choices for drawings near the cursor. If there are multiple drawings near the cursor, press [GOTO] key repeatedly to toggle the candidate and display the drawing to add the point.
6. Use joystick and move the cursor to the new position of the point.
7. Press [ENT] key.
   Add a new point to the drawing.
8. Repeat steps 4 to 7 as necessary to add a point.

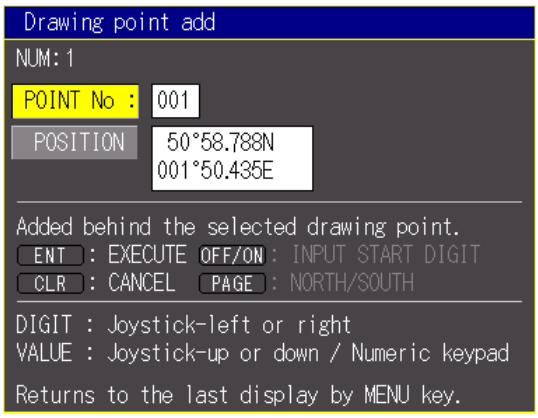
9. Press [MENU] key several times to close the menu.

Enter the latitude and longitude to add a point

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [PT ADD], and use joystick [→].
2. Use joystick [↑] [↓] to select [VALUE].



3. Use joystick [→].
   Use joystick to select the drawing.
   Press [Zoom out] to display the drawing list of the next page.
   Press [Zoom in] to display the drawing list of the previous page.
4. Use joystick [→].
   [Drawing point add] window is displayed.



5. Use joystick and select [POINT No].
6. Use joystick [→].
   Move the cursor to the setting box of the point number.
7. Use joystick to set [POINT No].
8. Use joystick [←] [→] to exit from the menu.
9. Use joystick to select [POSITION].

10. Use joystick [→].
    Move the cursor to the position setting box.
11. Use joystick to set latitude and longitude.
    Press [CLR] to return to the original value.
12. Press [ENT] key.
    Add a new point.
13. Repeat steps 5 to 12 as necessary to add a point.
14. Press [MENU] key several times to close the menu.

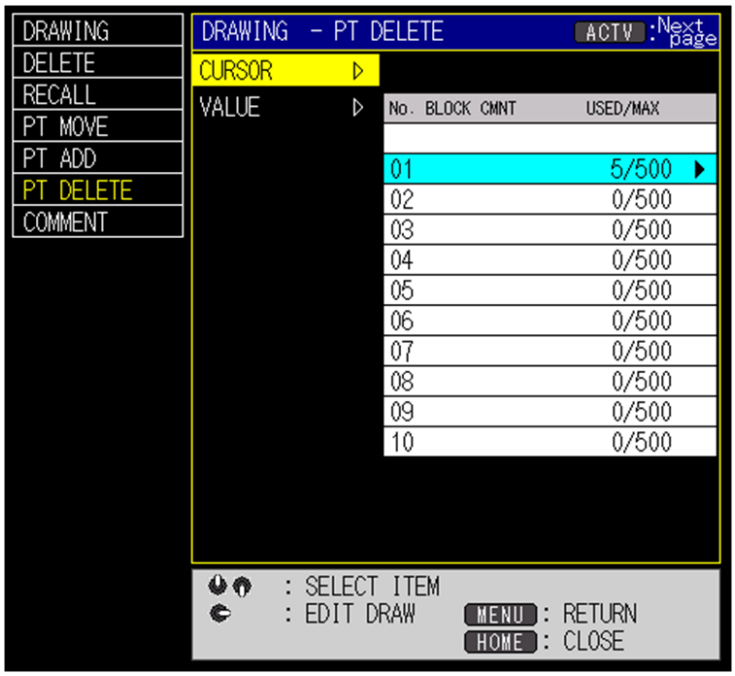
7.6 Delete the point of the created drawing

Delete the point of the created drawing. There are 2 ways to delete the point.

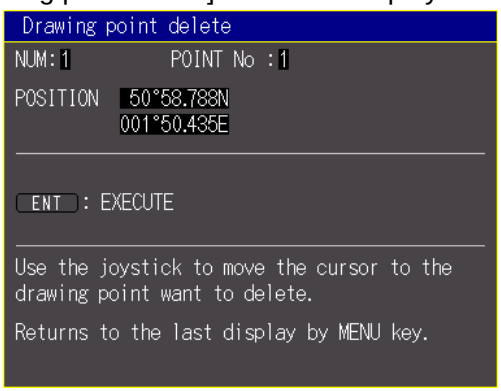
- Use the cursor to delete the point
- Enter the point number to delete the point

Use the cursor to delete the point

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [PT DELETE], and use joystick [→].
2. Use joystick [↑] [↓] to select [CURSOR].



3. Use joystick [→].
   [Drawing point delete] window is displayed.



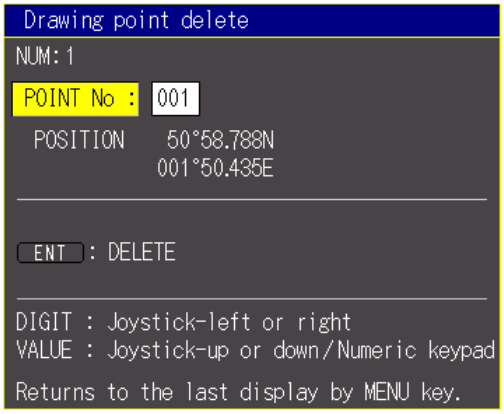
4. Use joystick and move the cursor to the point to delete.
5. Press [ENT] key.
   Delete the selected point.
6. Repeat steps 4 and 5 as necessary to delete the point.
7. Press [MENU] key several times to close the menu.

Enter the point number to delete the point

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [PT DELETE], and use joystick [→].
2. Use joystick [↑] [↓] to select [VALUE].

3. Use joystick [→].
   Use joystick to select the drawing block.
   Press [Zoom out] to display the drawing list of the next page.
   Press [Zoom in] to display the drawing list of the previous page.

4. Use joystick [→].
   [Drawing point delete] window is displayed.



5. Use joystick and select [POINT No].
6. Use joystick [→].
   Move the cursor to the setting box of the point number.
7. Use joystick to set [POINT No].
8. Use joystick [←] [→] to exit from the menu.
9. Press [ENT] key.
   Delete the selected point.
10. Repeat steps 6 to 9 as necessary to delete the point.
11. Press [MENU] key several times to close the menu.

7.7 Edit comments

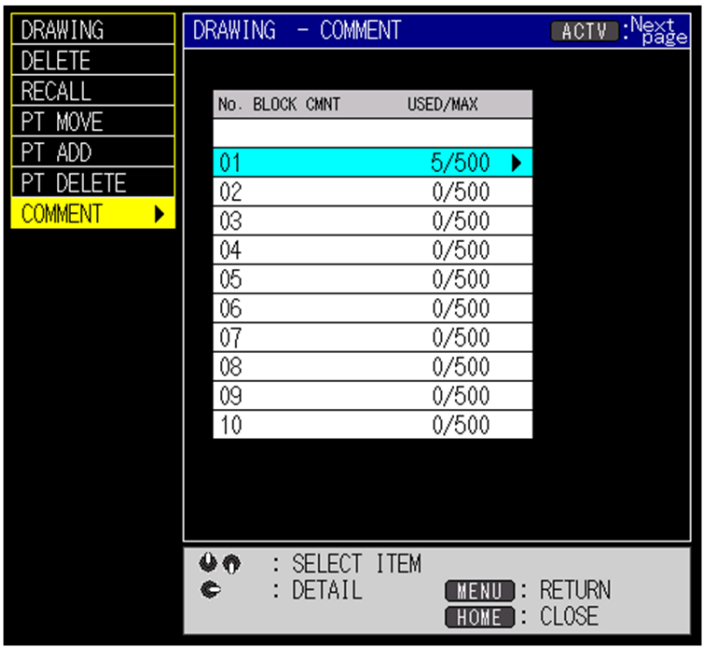
Enter and edit comments on the created drawing.

Enter comments for each drawing block

Enter comments for each drawing block (01 to 20).

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DRAWING], and use joystick [→].
   Use joystick [↑] [↓] to select [COMMENT], and use joystick [→].

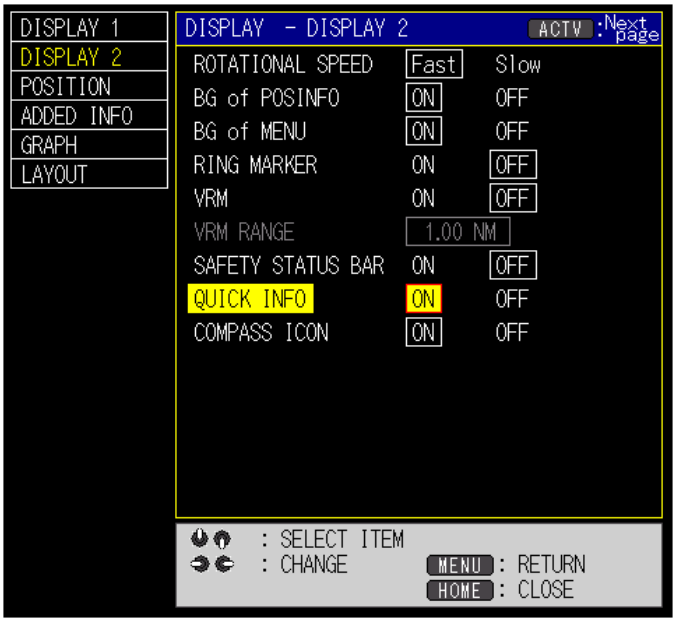
2. Use joystick and select the drawing block for editing comments.
   Press [Zoom out] to display the drawing block of the next page.
   Press [Zoom in] to display the drawing block of the previous page.



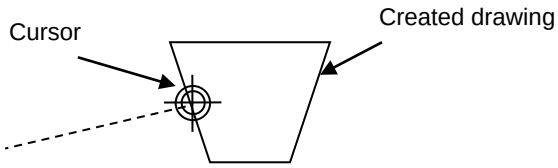
3. Use joystick [→].
   [Entering Characters] window is displayed.
   For the procedure of entering comments, refer to "Chapter 1 Basic Operation, 1.6 Overview of menu operation".
4. Press [MENU] key several times to close the menu.

Enter comments on created drawings

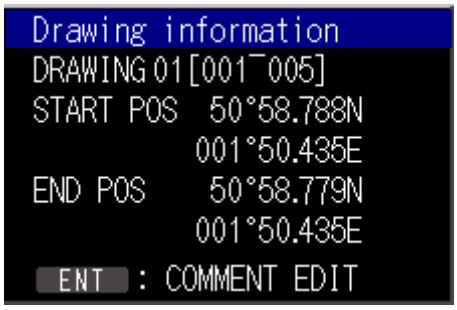
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [DISPLAY 2], and use joystick [→].
2. Use joystick [↑] [↓] to select [QUICK INFO].



3. Use joystick [←] [→] to select [ON].
4. Press [MENU] key several times to close the menu.
5. Press [CUR] key to display the cursor.
6. Use joystick and move the cursor to the created drawing.



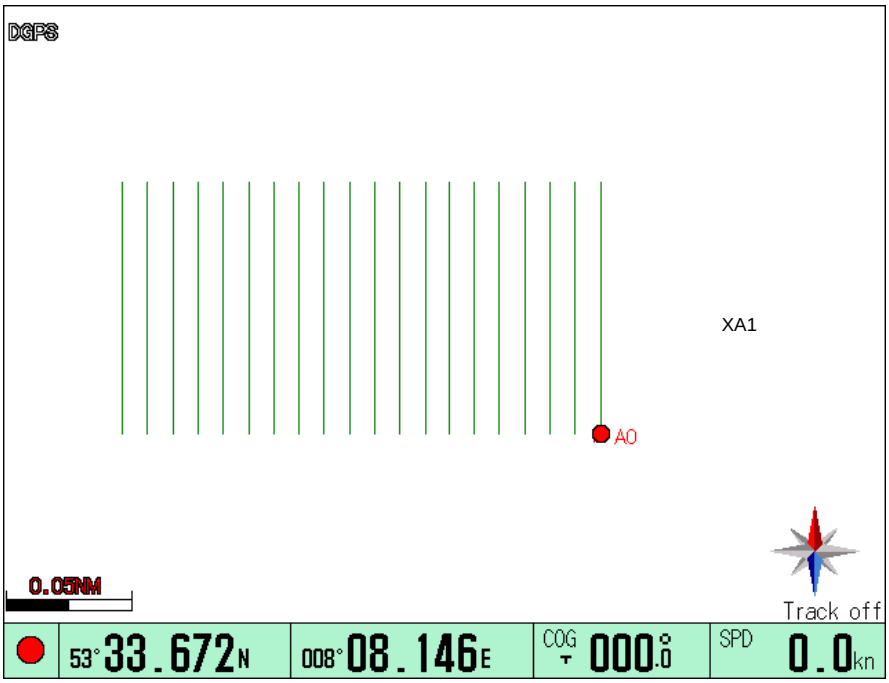
7. [Drawing information] window is displayed.



8. Press [ENT] key.
   [Entering Characters] window is displayed.
   For the procedure of entering comments, refer to "Chapter 1 Basic Operation, 1.6 Overview of menu operation".

7.8 Parallel drawing

Parallel line drawing is a function of linking the two points with a line (baseline) and displaying a line parallel to the line on the map.

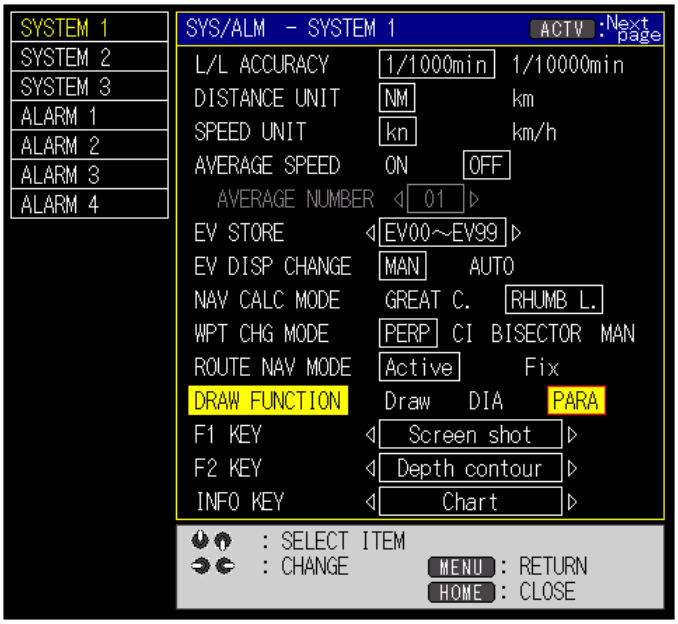


Register the parallel drawing in the [DRAW] key

By registering in the [DRAW] key, it becomes possible to perform parallel drawing.

> ⚠ **CAUTION: Cannot be used with diamond drawing.**

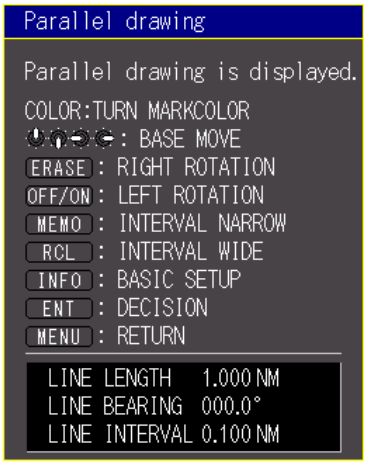
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].
2. Use joystick [↑] [↓] to select [DRAW FUNCTION].



3. Use joystick [←] [→] to select [PARA].
4. Press [MENU] key several times to close the menu.

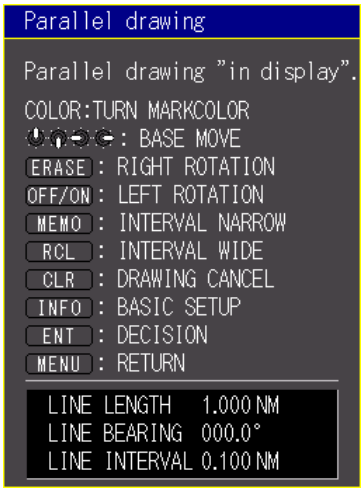
Display ON / OFF parallel drawing

1. Press [DRAW] key.
   Display the [Parallel drawing] window, and display parallel lines on the map.



2. Press [ENT] key.
   [Parallel drawing] window is OFF.

3. To erase parallel lines, press [DRAW] key.
   [Parallel drawing] window is displayed.



4. Press [CLR] key.
   Erase the parallel lines.

Setting the drawing method for parallel drawing

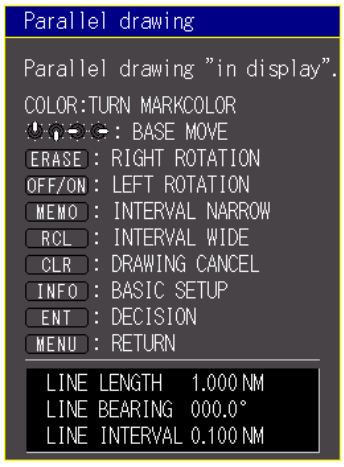
There are 3 ways to draw parallel line.

- DST/BRG
- 2 POINTS
- COURSE LINE

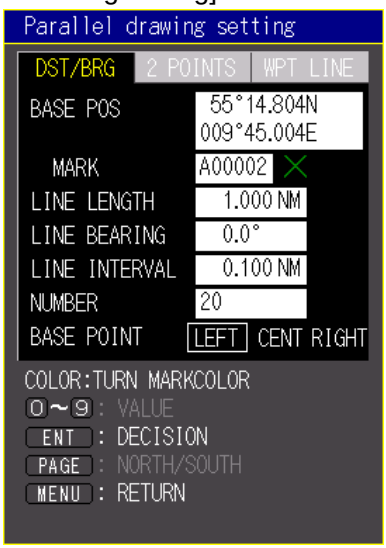
● DST/BRG

Draw a parallel line by specifying the base position, distance (DST) and bearing (BRG).

1. Press [DRAW] key.
   [Parallel drawing] window is displayed.



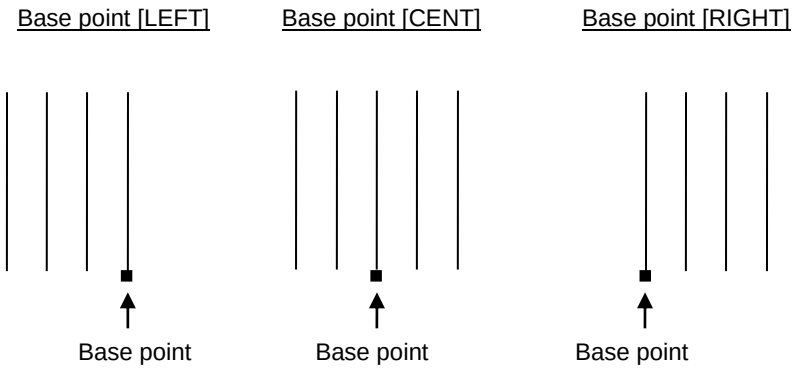
2. Press [INFO] key.
   [Parallel drawing setting] window is displayed.



3. Use joystick [←] [→] to select [DST/BRG].
4. Use joystick [↑] [↓] to select [BASE POS] or [MARK].

BASE POS	Specify the base point position with the latitude and longitude.
MARK	Specify the base position with a mark.

5. Use joystick, enter the base point, and press [ENT] key.
6. Use joystick [↓] to move the cursor to [LINE LENGTH].
7. Use joystick and enter the length.
8. Use joystick [↓] to move the cursor to [LINE BEARING].
9. Use joystick and enter the bearing.
10. Use joystick [↓] to move the cursor to [LINE INTERVAL].
11. Use joystick and enter the interval.
12. Use joystick [↓] to move the cursor to [NUMBER].
13. Use joystick and enter the number.
14. Use joystick [↓] to move the cursor to [BASE POINT].
15. Use joystick [←] [→] to select the bearing in which parallel lines are displayed with the base point.

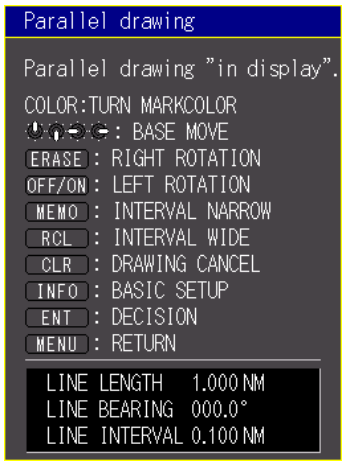


16. Press [ENT] key.
    Display parallel lines with the contents entered.

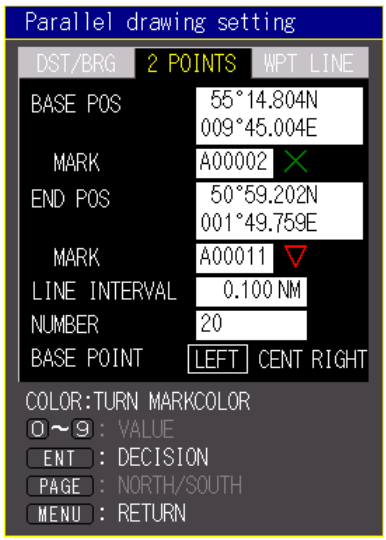
● 2 POINTS

Draw a parallel line by specifying the base point and end point position.

1. Press [DRAW] key.
   [Parallel drawing] window is displayed.



2. Press [INFO] key.
   [Parallel drawing setting] window is displayed.



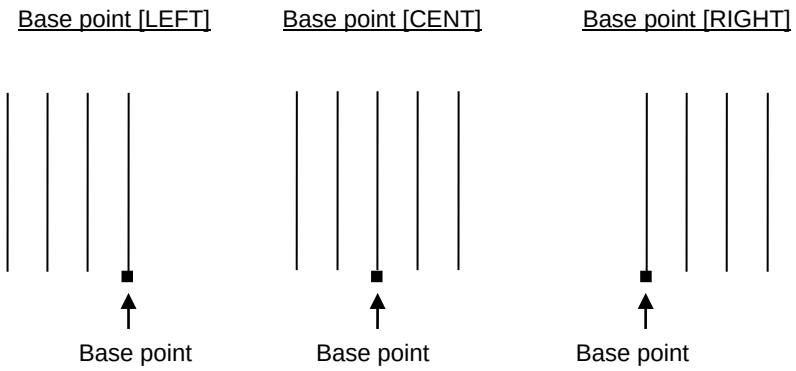
3. Use joystick [←] [→] to select [2 POINTS].
4. Use joystick [↑] [↓] to select [BASE POS] or [MARK].

BASE POS	Specify the base point position with the latitude and longitude.
MARK	Specify the base position with a mark.

5. Use joystick, enter the base point, and press [ENT] key.
6. Use joystick [↑] [↓] to select [END POS] or [MARK].

END POS	Specify the end point position with the latitude and longitude.
MARK	Specify the end position with a mark.

7. Use joystick, enter the end point, and press [ENT] key.
8. Use joystick [↓] to move the cursor to [LINE INTERVAL].
9. Use joystick and enter the interval.
10. Use joystick [↓] to move the cursor to [NUMBER].
11. Use joystick and enter the number.
12. Use joystick [↓] to move the cursor to [BASE POINT].
13. Use joystick [←] [→] to select the bearing in which parallel lines are displayed with the base point.

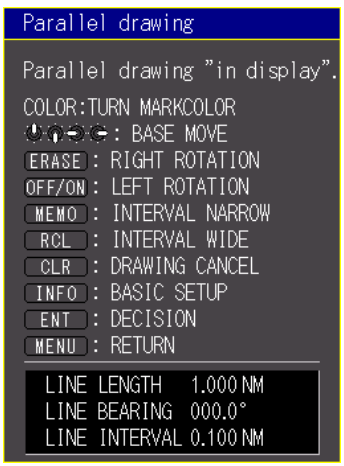


14. Press [ENT] key.
    Display parallel lines with the contents entered.

● COURSE LINE

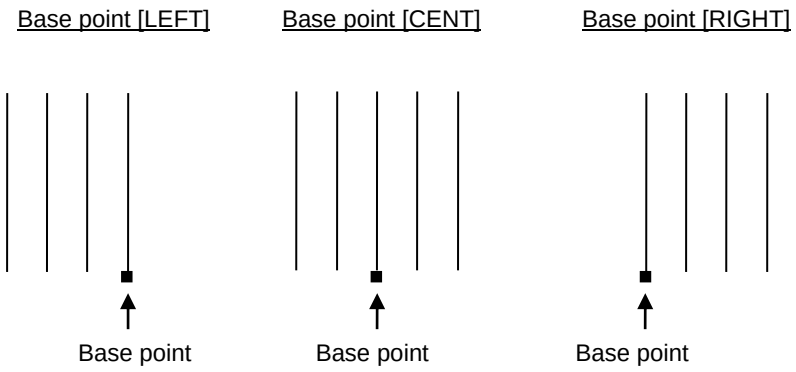
Draw a parallel line by overlaying the base line with the course line.

1. Press [DRAW] key.
    [Parallel drawing] window is displayed.



2. Press [INFO] key.
   [Parallel drawing setting] window is displayed.

3. Use joystick [←] [→] to select [COURSE LINE].
4. Use joystick [↓] to move the cursor to [LINE INTERVAL].
5. Use joystick and enter the interval.
6. Use joystick [↓] to move the cursor to [NUMBER].
7. Use joystick and enter the number.
8. Use joystick [↓] to move the cursor to [BASE POINT].
9. Use joystick [←] [→] to select the bearing in which parallel lines are displayed with the base point.

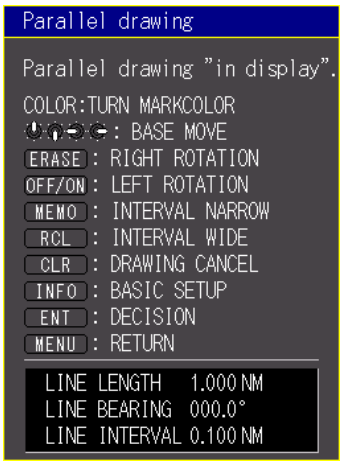


10. Press [ENT] key.
    Display parallel lines with the contents entered.

Fine adjustment the parallel drawing

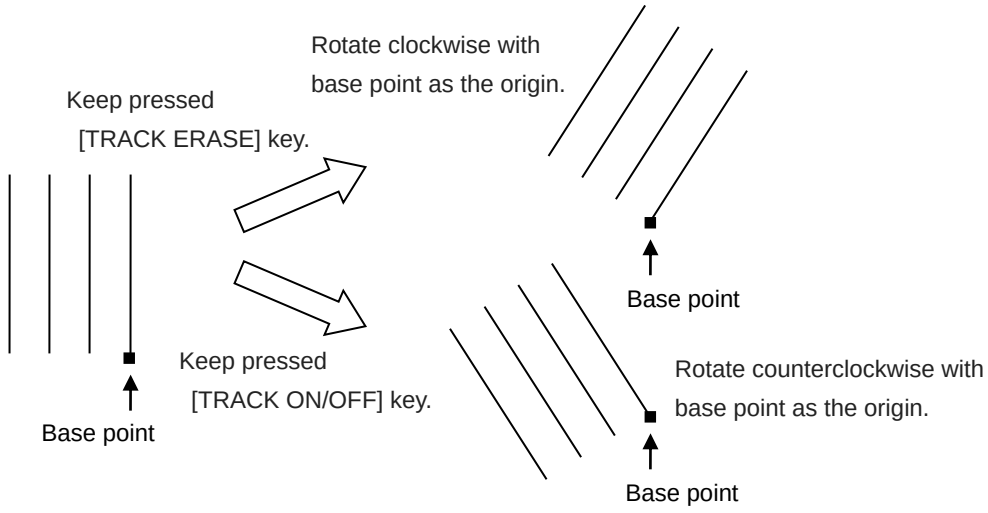
Fine adjustment the set parallel line.

1. Press [DRAW] key.
   [Parallel drawing] window is displayed, and display parallel lines on the map.

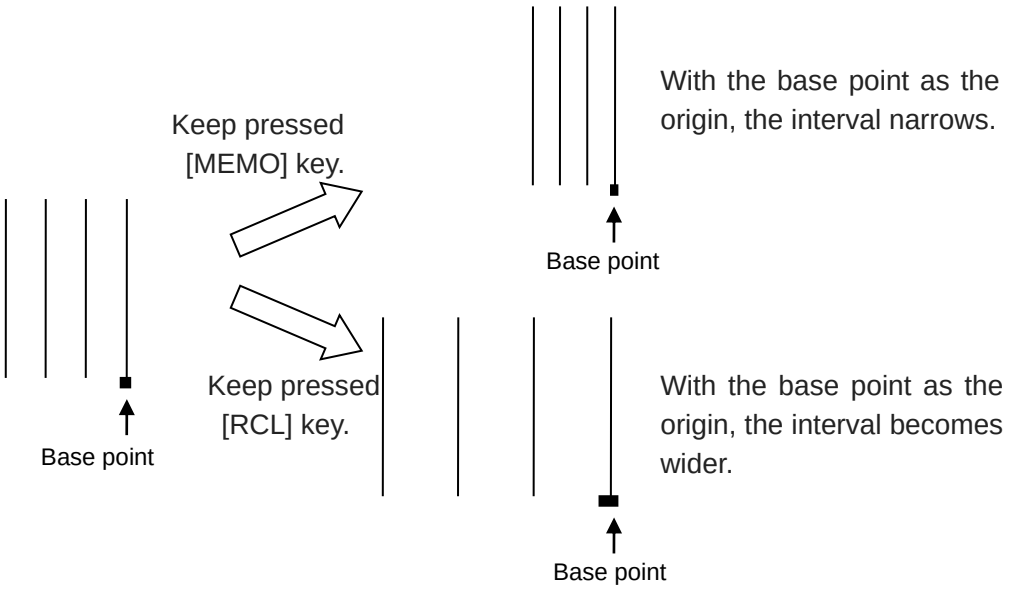


2. Fine adjustment is possible by the following operation.

● Press [TRACK ERASE] key or [TRACK ON/OFF] key



● Press [MEMO] key or [RCL] key

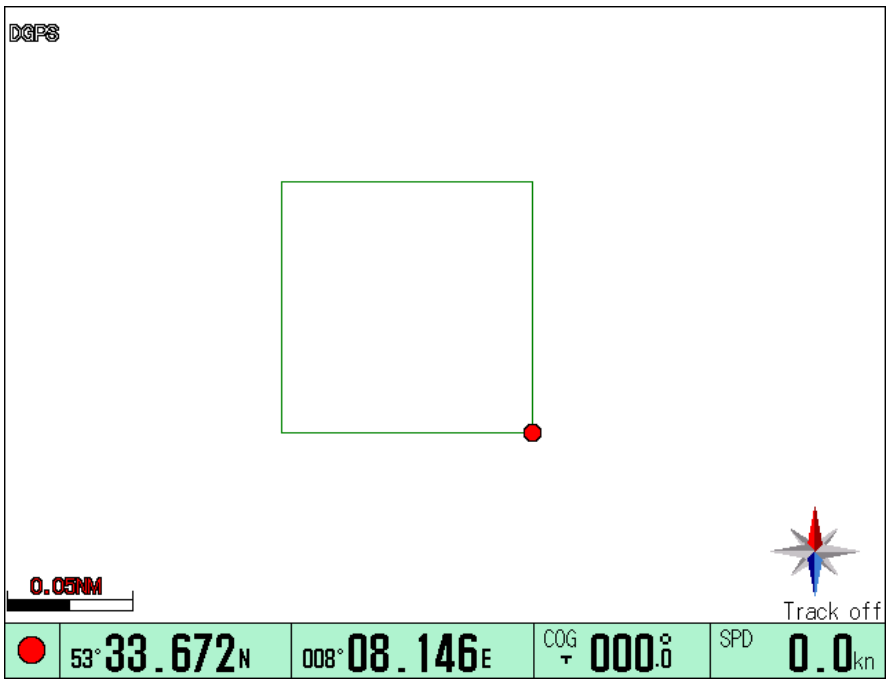


*Turn [MARK COLOR] knob to select the parallel drawing color.

3. Press [ENT] key.
   Display parallel lines with adjusted contents.

7.9 Diamond drawing

Diamond drawing is a function of specifying the length of one side and the angle, and displaying a diamond line on the map.
It can be used for net fishing as a guide for dropping a net.

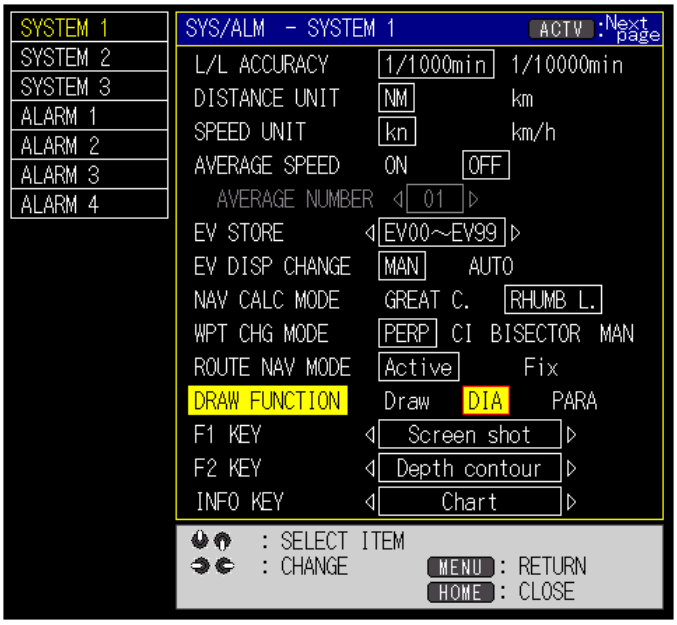


Register the diamond drawing in the [DRAW] key

By registering in the [DRAW] key, you can quickly perform diamond drawing function.

> ⚠ **CAUTION: Cannot be used with parallel drawing.**

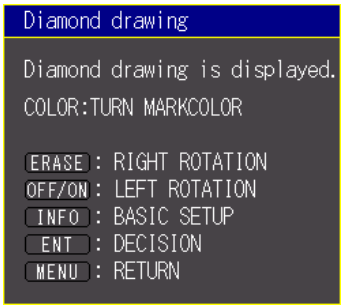
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM1], and use joystick [→].
2. Use joystick [↑] [↓] to select [DRAW FUNCTION].



3. Use joystick [←] [→] to select [DIA].
4. Press [MENU] key several times to close the menu.

Display ON / OFF diamond drawing

1. Press [DRAW] key.
   [Diamond drawing] window is displayed, and display diamond lines on the map.



2. Press [ENT] key.
   [Diamond drawing] window is OFF.

3. To erase diamond lines, press [DRAW] key.
[Diamond drawing] window is displayed.

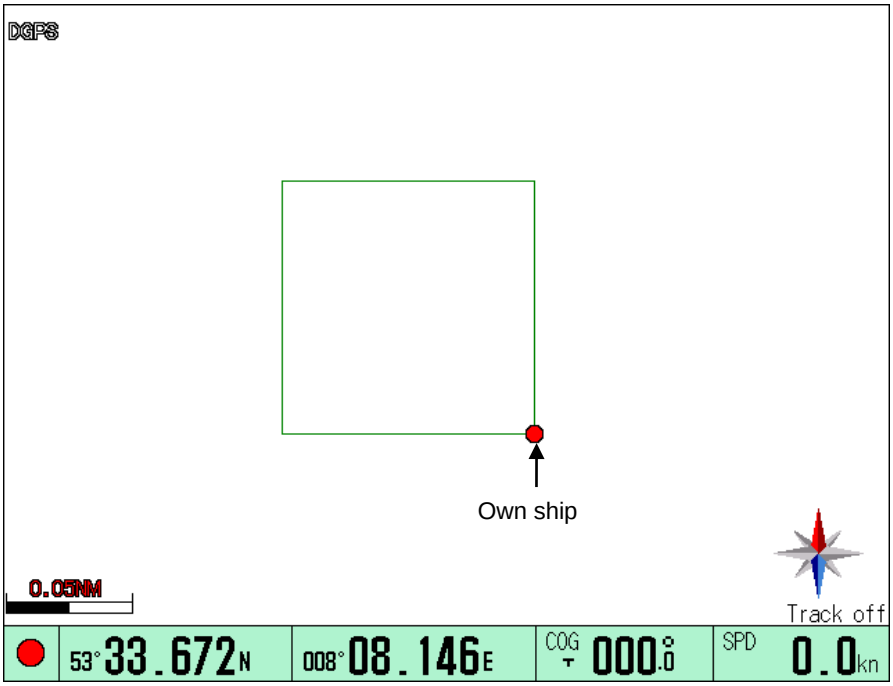
4. Press [CLR] key.
Erase diamond lines.

Setting the drawing method for diamond drawing

There are 2 ways of diamond drawing.
• OS POS
• CUR POS

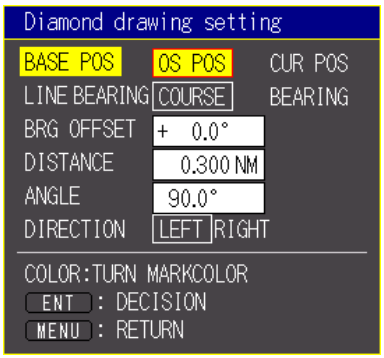
● OS POS

Draw a diamond line with its own ship position (OS POS) as the base point.



1. Press [DRAW] key.
   [Diamond drawing] window is displayed.

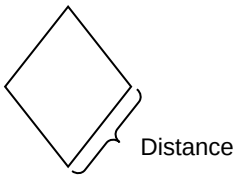
2. Press [INFO] key.
   [Diamond drawing setting] window is displayed.



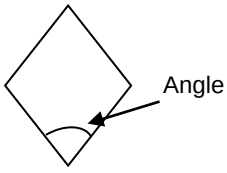
3. Use joystick [←] [→] to select [OS POS].
4. Use joystick [↓] to select [LINE BEARING].
5. Use joystick [←] [→] to select [COURSE] or [BEARING].

COURSE	Set the direction of the baseline to the course direction.
BEARING	Set the direction of the baseline to the bearing direction.

6. Use joystick [↓] to move the cursor to [BRG OFFSET].
7. Use joystick and enter the bearing offset.
8. Use joystick [↓] to move the cursor to [DISTANCE].
9. Use joystick and enter the distance.



10. Use joystick [↓] to move the cursor to [ANGLE].
11. Use joystick and enter the angle.



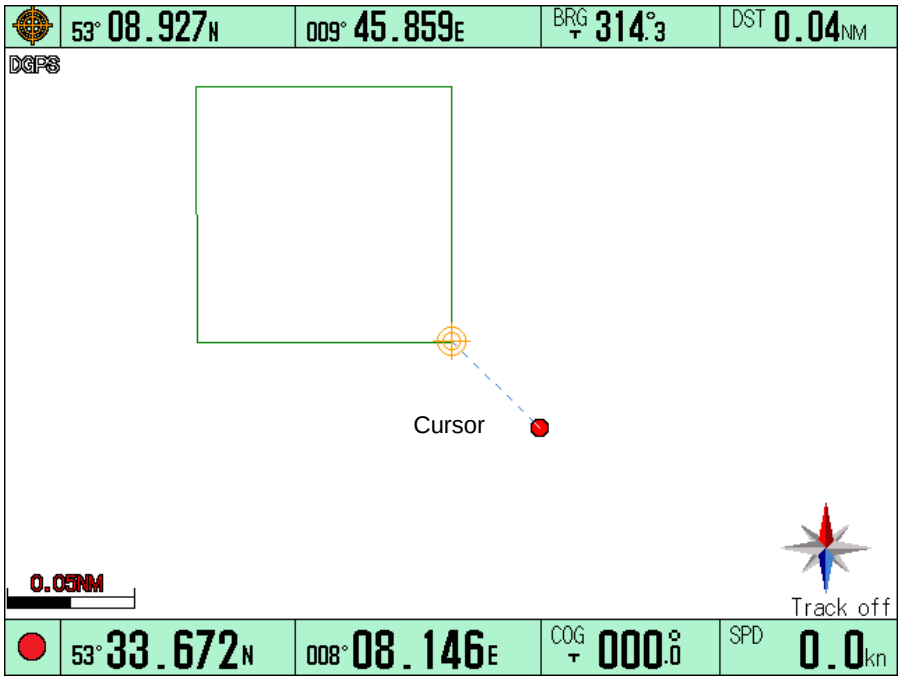
12. Use joystick [↓] to move the cursor to [DIRECTION].
13. Use joystick [←] [→] to select the direction in which the diamond line is displayed relative to the base line bearing.

DIRECTION [LEFT] DIRECTION [RIGHT]

14. Press [ENT] key.
    Display diamond lines with the contents entered.

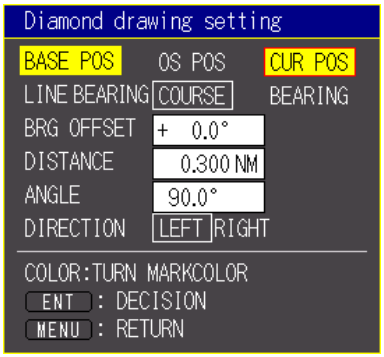
● CUR POS

Draw a diamond line with its cursor position (CUR POS) as the base point.



1. Press [DRAW] key.
    [Diamond drawing] window is displayed.

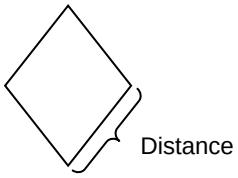
2. Press [INFO] key.
   [Diamond drawing setting] window is displayed.



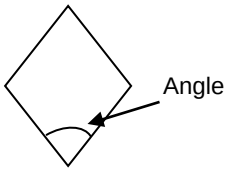
3. Use joystick [←] [→] to select [CUR POS].
4. Use joystick [↓] to select [LINE BEARING].
5. Use joystick [←] [→] to select [COURSE] or [BEARING].

COURSE	Set the direction of the baseline to the course direction.
BEARING	Set the direction of the baseline to the bearing direction.

6. Use joystick [↓] to move the cursor to [BRG OFFSET].
7. Use joystick and enter the bearing offset.
8. Use joystick [↓] to move the cursor to [DISTANCE].
9. Use joystick and enter the distance.

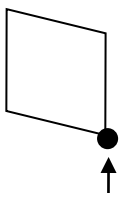


10. Use joystick [↓] to move the cursor to [ANGLE].
11. Use joystick and enter the angle.

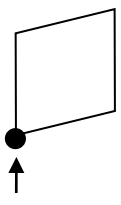


12. Use joystick [↓] to move the cursor to [DIRECTION].
13. Use joystick [←] [→] to select the direction in which the diamond line is displayed relative to the base line bearing.

DIRECTION [LEFT]



DIRECTION [RIGHT]



14. Press [ENT] key.
Display diamond lines with the contents entered.

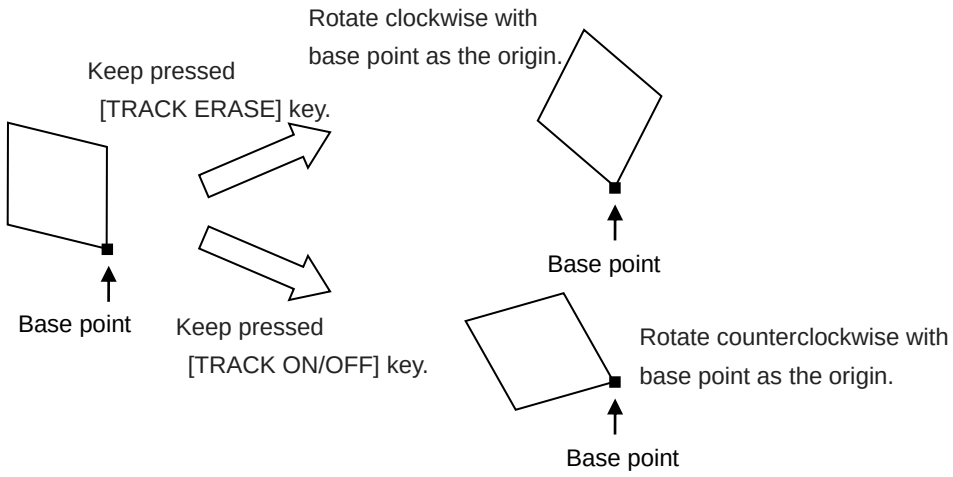
Fine adjustment the diamond drawing

Fine adjustment the set diamond line.

1. Press [DRAW] key.
[Diamond drawing] window is displayed, and display diamond lines on the map.

2. Fine adjustment is possible by the following operation.

● Press [TRACK ERASE] key or [TRACK ON/OFF] key



*Turn [MARK COLOR] knob to select the diamond drawing color.

3. Press [ENT] key.
Display diamond lines with adjusted contents.

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Chapter 8 Alarm

There are 8 types of alarm functions such as arrival, POB, XTE, area, drawing, CPA / TCPA, ship speed and GPS buoy distance. When the alarm function is set, an alarm will sound when the alarm condition occurs. Press [CLR] key to stop the alarm. When the alarm condition occurs again, alarm will sound. When multiple alarms are set, an alarm will sound for the latest alarm.

8.1 Displaying / not displaying the alarm zone

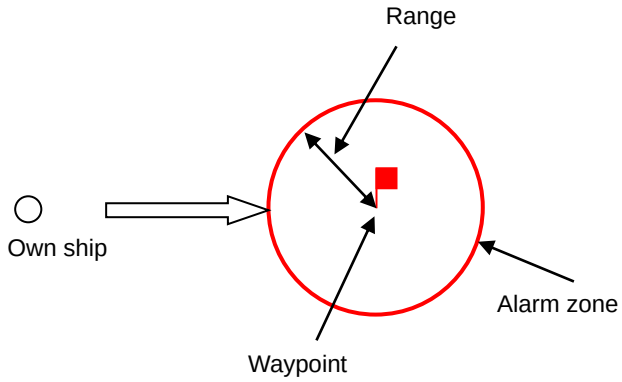
When the alarm zone is set to [ON], the alarm zone is displayed on the map. When the alarm zone is set to [OFF], the alarm zone is OFF.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 1], and use joystick [→].
2. Use joystick [↑] [↓] to select [ALARM ZONE].

3. Use joystick [←] [→] to select [ON] or [OFF].
4. Press [MENU] key several times to close the menu.

8.2 Setting arrival alarm

Arrival alarm is a function to sound an alarm when own ship enters into the alarm zone of the waypoint. The zone is displayed with a red circle.

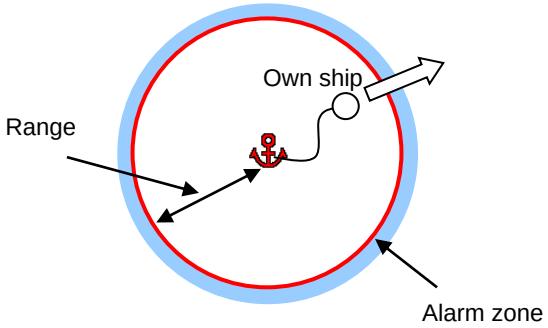


1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 1], and use joystick [→].
2. Use joystick [↑] [↓] to select [ARRIVAL ALARM].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [RANGE].
5. Use joystick [←] [→] to select the range.
6. Press [MENU] key several times to close the menu.

CAUTION: To cancel the arrival alarm, set to [OFF] in step 3.

8.3 Setting POB alarm

POB (Person Overboard) alarm is a function to sound an alarm when own ship leaves from the alarm zone of the POB. The alarm zone is displayed with a red circle.



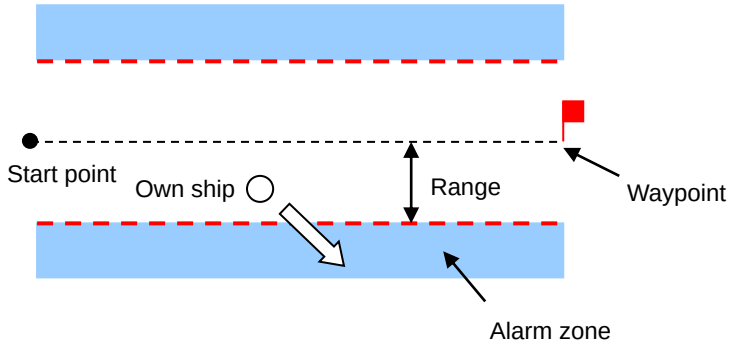
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 1], and use joystick [→].
2. Use joystick [↑] [↓] to select [POB ALARM].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [RANGE].
5. Use joystick [←] [→] to select the range.

6. Press [MENU] key several times to close the menu.

CAUTION: To cancel the POB alarm, set to [OFF] in step 3.

8.4 Setting XTE alarm

XTE (Cross Track Error) alarm is a function to sound an alarm when own ship is away from the course range. The red dotted alarm range is displayed on both sides of the set course.



1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 1], and use joystick [→].
2. Use joystick [↑] [↓] to select [XTE ALARM].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [RANGE].
5. Use joystick [←] [→] to select the range.
6. Press [MENU] key several times to close the menu.

CAUTION: To cancel the XTE alarm, set to [OFF] in step 3.

8.5 Setting CPA/TCPA alarm

The CPA / TCPA alarm is a function to sound an alarm when CPA (Closest Point of Approach) and TCPA (Time to CPA) of the AIS target ship becomes less than the set value.
The triangle mark of the target ship to be alarmed is turned red.

CAUTION: The range of CPA / TCPA alarm should be set taking into account the size, weight, speed, turning ability, etc. of own ship.

CAUTION: CPA / TCPA alarm is an auxiliary function to predict collision with other ships. Always visually check the surrounding situation.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 1], and use joystick [→].

2. Use joystick [↑] [↓] to select [CPA/TCPA ALARM].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [CPA].
5. Use joystick [→], and set the distance.
6. Use joystick [↑] [↓] to select [TCPA].
7. Use joystick [→], and set the time.
8. Press [MENU] key several times to close the menu.

CAUTION: To cancel the CPA/TCPA alarm, set to [OFF] in step 3.

8.6 Setting speed alarm

Speed alarm is a function to sound an alarm when own ship's speed increases or decreases below the set value.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 1], and use joystick [→].
2. Use joystick [↑] [↓] to select [SPEED ALARM].
3. Use joystick [←] [→] to select [Upper] or [Under].

Upper	An alarm sounds when own ship's speed increases from the setting of [SPEED].
Under	An alarm sounds when own ship's speed decreases from the setting of [SPEED].

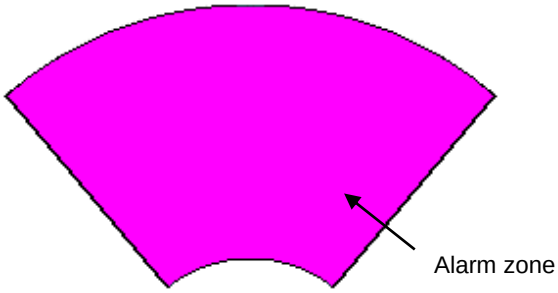
4. Use joystick [↑] [↓] to select [SPEED].

5. Use joystick [←] [→] to select the range.
6. Press [MENU] key several times to close the menu.

> **CAUTION: To cancel the speed alarm, set to [OFF] in step 3.**

8.7 Setting area alarm

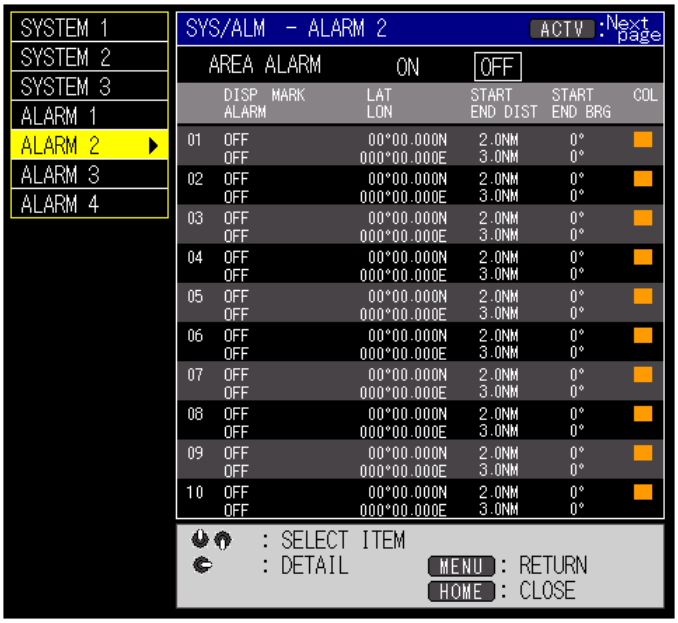
Area alarm is a function to sound an alarm when own ship enters into the set range.
It is an alarm range indicated by a circle or a sector. 10 area alarms can be set.



Set the function of area alarm

When set to [ON], enable the area alarm function.
When set to [OFF], the area alarm function is disabled and the alarm range is not displayed.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 2], and use joystick [→].

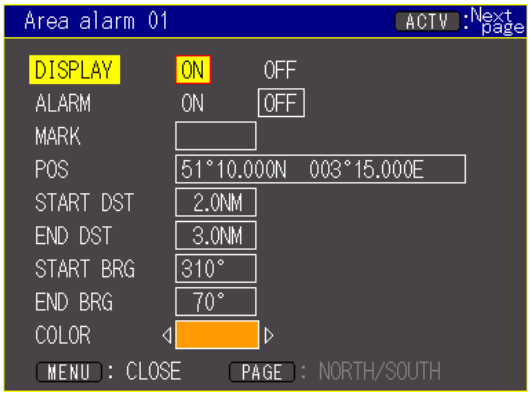


2. Use joystick [→].
   The cursor moves to [AREA ALARM].
3. Use joystick [←] [→] to select [ON].

To cancel the area alarm, set to [OFF].

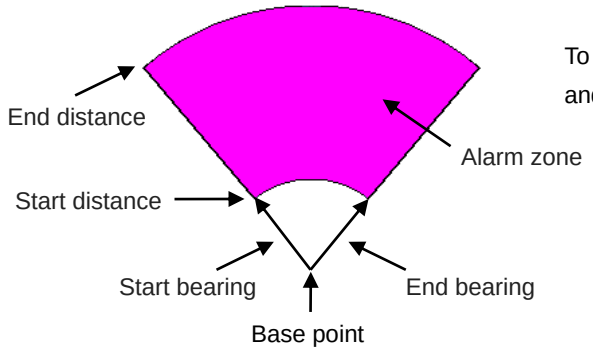
Set the area alarm range

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 2], and use joystick [→].
   The cursor moves to [AREA ALARM].
2. Use joystick [←] [→] to select [ON].
3. Use joystick [↑] [↓] to select one of [01] to [10].
4. Use joystick [→].
   [Area alarm] window is displayed.



5. Use joystick [↑] [↓] to select the item, and set.
6. Press [MENU] key several times to close the menu.

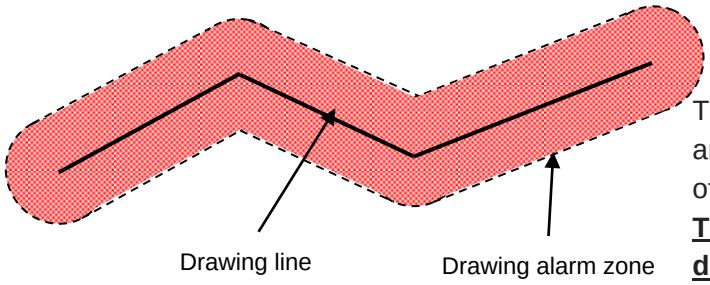
DISPLAY	[ON]: Alarm zone is displayed. [OFF]: Alarm zone is not displayed.
ALARM	[ON]: When own ship enters into the alarm zone, the alarm will sound. [OFF]: When own ship enters into the alarm zone, the alarm will not sound.
MARK, POS	Enter the position of the base point (center of circle or sector). Also can use the mark as a base point.
START DST	Sets the start distance of the alarm zone.
END DST	Sets the end distance of the alarm zone.
START BRG	Sets the start bearing of the alarm zone.
END BRG	Sets the end bearing of the alarm zone.
COLOR	Select the color of the alarm zone.



To make it into a circle, set the start bearing and the end bearing to the same value.

8.8 Setting drawing alarm

Drawing alarm is a function that will trigger alarm when own ship enters inside the drawn zone. The area alarm can be created as alarm zones using free form.



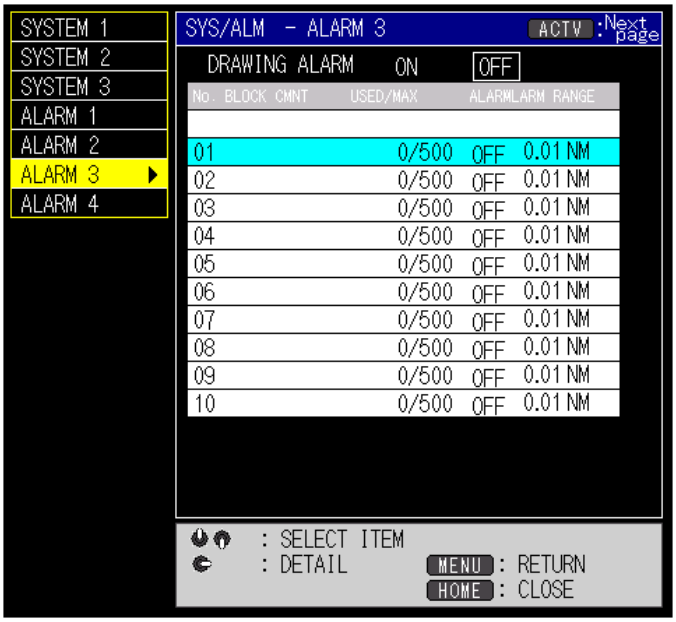
The zone specified in [ALARM RANGE] around the construction line is the range of drawing alarm.
The drawing alarm zone indicated by the dashed line and filled area is not displayed on the actual screen.

Different alarm setting can be set for each drawing block. You cannot specify to sound or not to sound alarm within same block. It is recommended to use for normal drawing blocks or for alarm drawing blocks.

Set drawing alarm function

When set to [ON], the function of plotting alarm is enabled.
When set to [OFF], the function of plotting alarm is disabled.

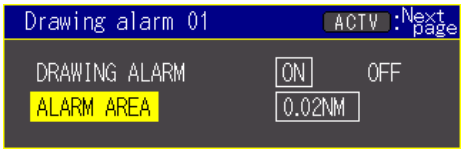
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 3].



2. Use joystick [→].
   The cursor moves to [DRAWING ALARM].
3. Use joystick [←] to select [ON].
   To disable the drawing alarm function, select [OFF].

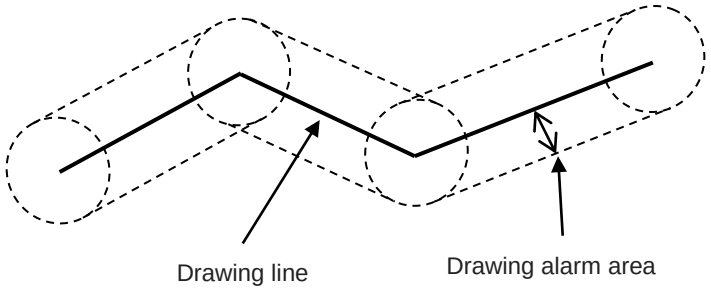
Set the drawing alarm range

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 3], and use joystick [→].
   The cursor moves to [DRAWING ALARM].
2. Use joystick [←] to select [ON].
3. Use joystick [↑] [↓] to select the block to set the drawing alarm function from [01] to [20].
4. Use joystick [←].
   [Drawing alarm] window is displayed.



5. Use joystick [↑] [↓] to select the item, and set.
6. Press [MENU] key several times to close the menu.

DRAWING ALARM	[ON]: When own ship enters the alarm zone, the alarm will sound. [OFF]: When own ship enters the alarm zone, the alarm will not sound.
ALARM AREA	Specify the range to sound the alarm by the distance from the drawing line. The range can be set from 0.01 to 1.00 NM (0.01 to 2.00 km).



8.9 Setting GPS buoy distance alarm

GPS buoy distance alarm is an alarm function that uses the GPS buoy function, and sounds an alarm when the distance between any two GPS buoys is out of the set range.
Any buoy ID can be specified for the alarm setting, and up to 20 sets can be set. There are three conditions for sounding the alarm, out of range, within range, and unequal of distance, depending on the set values of allowable distance (near) and allowable distance (far).

Set the function of GPS buoy distance alarm

When set to [ON], enable the GPS buoy distance alarm function.
When set to [OFF], disable the GPS buoy distance alarm function.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM], and use joystick [→].
2. Use joystick [↑] [↓], the cursor moves to [BUOY DISTANCE ALARM].
3. Use joystick [←] to select [ON].
   To disable the [BUOY DISTANCE ALARM] function, select [OFF].

Set the auto acknowledge of GPS buoy distance alarm

If set to [5 sec], [10 sec], [30 sec], or [60 sec], the alarm will be automatically canceled (approved) after the specified time has passed after the alarm sounds.
When set to [OFF], use the operation panel to cancel the alarm sound.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM], and use joystick [→].
2. Use joystick [↑] [↓], the cursor moves to [ALARM AUTO ACK].
3. Use joystick [←] [→] to select [5 sec], [10 sec], [30 sec], or [60 sec].
   To disable [ALARM AUTO ACK] function, select [STOP].

Set the condition of GPS buoy distance alarm

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS BUOY], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM], and use joystick [→].
2. Use joystick [↑] [↓] to select the block to set the GPS buoy distance alarm function from [01] to [20].
   Use joystick [→].
   [BUOY DISTANCE ALARM] window is displayed.
   Use joystick [↑] [↓] to select setting item.
3. Press [MENU] key several times to close the menu.

ALARM(🔔)	[ON]: The alarm sounds when the alarm condition is met. [OFF]: The alarm does not sound even if the alarm condition is met.
BUOY ID (A) BUOY ID (B)	Specify the buoy ID. Monitor the distance between the specified buoy IDs.
DISTANCE RANGE (NEAR) DISTANCE RANGE (FAR)	Set the alarm range by the distance. There are three conditions for sounding the alarm depending on the setting method. (1) Out of range: When the set value is [NEAR] < [FAR], the alarm sounds outside the range of [NEAR] to [FAR]. (2) Within range: When the set value is [NEAR] > [FAR], the alarm sounds within the range of [NEAR] to [FAR]. (3) Unequal of distance: When the set value is [NEAR] = [FAR], the alarm sounds when [NEAR] and [FAR] does not match.
LINE BETWEEN BUOYS	[ON]: The line between GPS buoys is displayed. [OFF]: The line between GPS buoys is not displayed.
LINE COLOR	Select the color of the line to display between GPS buoys.

8.10 Setting depth limit alarm

This alarm is activated when the depth value of own ship's position becomes shallower than the set value.

Set the function of depth limit alarm

When set to [ON], enable the depth limit alarm function.
When set to [OFF], disable the depth limit alarm function.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 4], and use joystick [→].
2. Use joystick [→].
   The cursor moves to [DEPTH LIMIT ALARM].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [DEPTH LIMIT RANGE].
5. Use joystick [←] [→] to select the range (depth).
6. Press [MENU] key several times to close the menu.

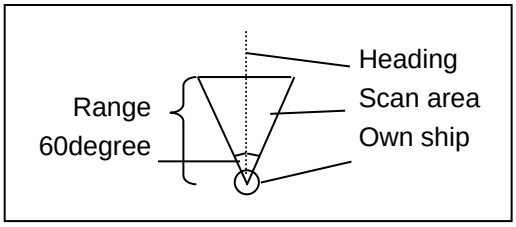
CAUTION: To cancel the depth limit alarm, set to [OFF] in step 3.

8.11 Setting grounding alarm

This alarm is activated when the depth value of own ship's position becomes shallower than the set value.

This alarm is activated when the danger of running aground is detected. This function has been achieved by regularly scanning the map data forward of own ship's position. The scanning interval is 2 seconds. The figure below shows the range of scanning.

Detected dangerous items are as follows: shallow water, land, rocks, obstructions, shoreline constructions



1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [ALARM 4], and use joystick [→].
2. Use joystick [→].
   The cursor moves to [GROUNDING ALARM].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [GROUNDING DEPTH LIMIT].
5. Use joystick [←] [→] to select the range (depth).
6. Use joystick [↑] [↓] to select [GROUNDING ARARM RANGE].
7. Use joystick [←] [→] to select the range (front distance).
8. Press [MENU] key several times to close the menu.

When the alarm is activated, the source of the grounding can be confirmed by the [GROUNDING ALARM REPORT] menu.

When the [GROUNDING ALARM] is set to [ON], a warning message window is displayed. You can dismiss the warning after acknowledgement.

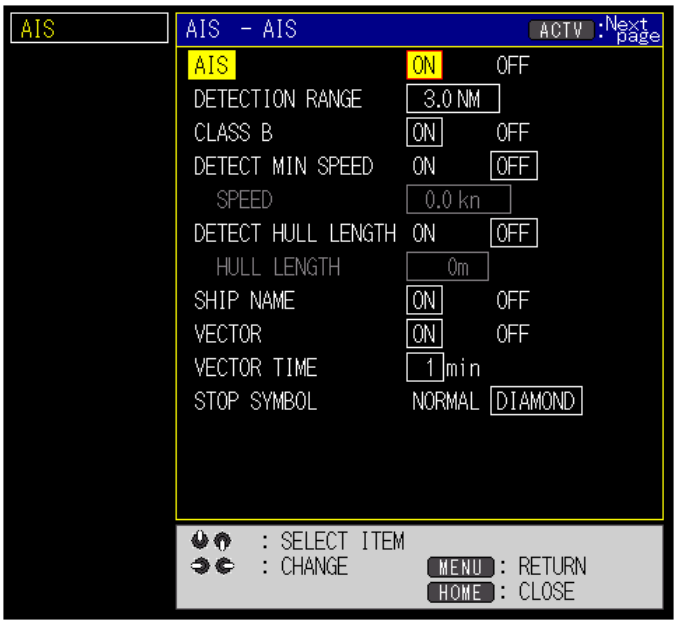
Chapter 9 AIS

By connecting to AIS receiver, AIS symbols wil be displayed on the screen. Up to 128 AIS symbols can be displayed.

9.1 Enable the AIS display function

When AIS display is set to [ON], this function is enabled. If this is set to [OFF], this function is disabled.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
2. Use joystick [↑] [↓] to select [AIS].



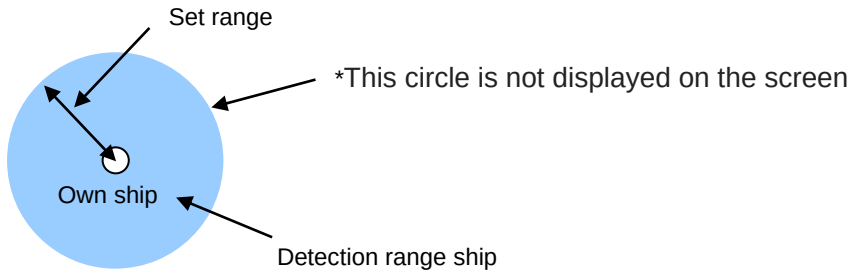
3. Use joystick [←] to select [ON].
4. Press [MENU] key several times to close the menu.

To disable this function, select [OFF] in step 3.

9.2 Setting the detection range

Set the range to detect (display) the AIS symbol. The ship inside of the set range from own ship can be displayed and the ship outside of the set range cannot be displayed.

CAUTION: If the detection range is expanded too much, the number of AIS symbols will easily exceed 128 ships. More than 129 ships cannot be displayed.



1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
2. Use joystick [↑] [↓] to select [DETECTION RANGE].
3. Use joystick [→].
   The cursor moves to the numerical value box.
4. Use joystick [↑] [↓] to enter a numerical value, and use joystick [←] [→] to move the digit.
   Also enter with the numeric keypad.
5. After entering the numerical value, use joystick [→] to exit from the numerical value box.
6. Press [MENU] key several times to close the menu.

CAUTION: For this operation, need to set AIS display to [ON].
Refer to "9.1 Enable the AIS display function".

9.3 Display ON / OFF Class B AIS targets

Set whether to display class B target ship.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
2. Use joystick [↑] [↓] to select [CLASS B].
3. Use joystick [←] [→] to select [ON].
4. Press [MENU] key several times to close the menu.

* To NOT display Class B target ship, select [OFF] in Step 3.

CAUTION: For this operation, need to set AIS display to [ON].
Refer to "9.1 Enable the AIS display function".

9.4 Setting minimum detection speed

Set the minimum speed to display AIS symbols.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
2. Use joystick [↑] [↓] to select [DETECTION MIN SPEED].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [SPEED].
5. Use joystick [→].
   The cursor moves to the numerical value box.
6. Use joystick [↑] [↓] to enter a numerical value, and use joystick [←] [→] to move the digit.
   Also enter with the numeric keypad.
7. After entering the numerical value, use joystick [→] to exit from the numerical value box.
8. Press [MENU] key several times to close the menu.

*Do not set the minimum detection speed, select [OFF] in step 3.

CAUTION: For this operation, need to set AIS display to [ON].
Refer to "9.1 Enable the AIS display function".

9.5 Setting minimum hull length

Set the minimum hull length to be displayed as AIS symbol.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
2. Use joystick [↑] [↓] to select [DETECTION HULL LENGTH].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [HULL LENGTH].
5. Use joystick [→].
   The cursor moves to the numerical value box.
6. Use joystick [↑] [↓] to enter a numerical value, and use joystick [←] [→] to move the digit.
   Also enter with the numeric keypad.
7. After entering the numerical value, use joystick [→] to exit from the numerical value box.
8. Press [MENU] key several times to close the menu.

*Do not set the minimum detection hull length, select [OFF] in step 3.

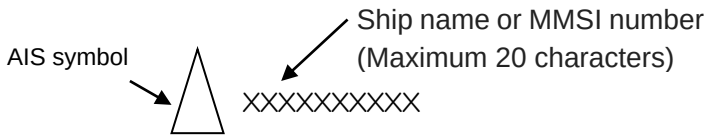
CAUTION: For this operation, need to set AIS display to [ON].
Refer to "9.1 Enable the AIS display function".

9.6 Display ON / OFF ship name

Display the ship name on the AIS symbol.

*If there is no ship name data, MMSI number is displayed.

*MMSI number: Identification number assigned to each AIS device by maritime mobile service identification



1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
2. Use joystick [↑] [↓] to select [SHIP NAME].
3. Use joystick [←] [→] to select [ON].
4. Press [MENU] key several times to close the menu.

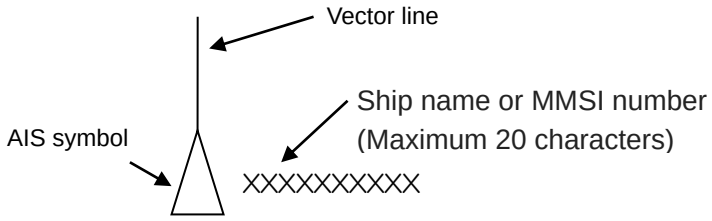
* To NOT display the ship name, select [OFF] in step 3.

CAUTION: For this operation, need to set AIS display to [ON].
Refer to "9.1 Enable the AIS display function".

9.7 Display ON / OFF vector lines

Vector lines can be displayed on the AIS symbol.

To change the color of the AIS symbol, use [MAINTENANCE] => [COLOR] => [No.68] on the menu.



1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
2. Use joystick [↑] [↓] to select [VECTOR].
3. Use joystick [←] [→] to select [ON].
4. Use joystick [↑] [↓] to select [VECTOR TIME].
5. Use joystick [→].
   The cursor moves to the numerical value box.
6. Use joystick [↑] [↓] to enter a numerical value, and use joystick [←] [→] to move the digit.
   Also enter with the numeric keypad.

7. After entering the numerical value, use joystick [→] to exit from the numerical value box.
8. Press [MENU] key several times to close the menu.

* To NOT display a vector line, select [OFF] in step 3.

CAUTION: For this operation, need to set AIS display to [ON].
Refer to "9.1 Enable the AIS display function".

9.8 Change the shape of the stop symbol

Display AIS symbols at berth in a shape different from ordinary symbols.
To change the color of the AIS symbol, use [MAINTENANCE] => [COLOR] => [No.68] on the menu.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
   Use joystick [↑] [↓] to select [AIS], and use joystick [→].
2. Use joystick [↑] [↓] to select [STOP SYMBOL].
3. Use joystick [←] [→] to select [DIAMOND].
4. Press [MENU] key several times to close the menu.

*To display the AIS symbol normally (△), select [NORMAL] in Step 3.

Display example at [NORMAL]

Display example at [DIAMOND]

CAUTION: For this operation, need to set AIS display to [ON].
Refer to "9.1 Enable the AIS display function".

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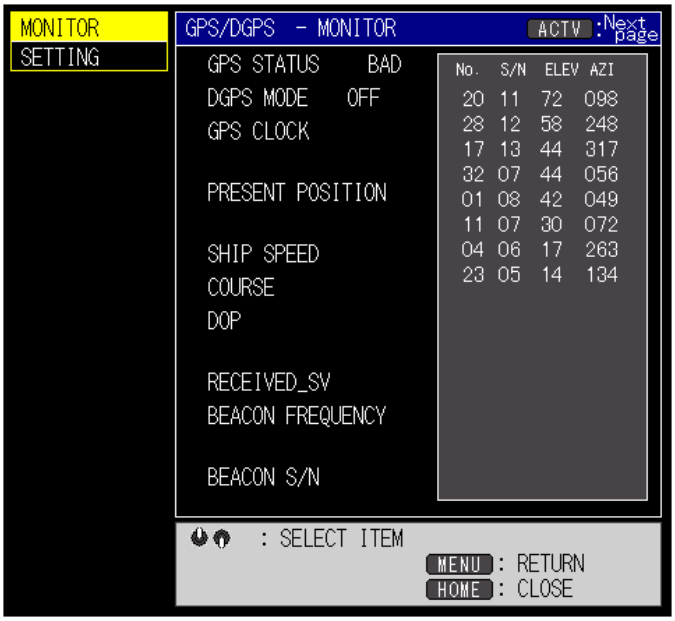
Chapter 10 GPS/DGPS

Check the setting of GPS / DGPS and the received status of the beacon receiver.

10.1 GPS / DGPS monitor screen

The GPS / DGPS monitor screen displays signal status of GPS satellites.



GPS STATUS	It displays [OK] position is available [BAD] if not available.
DGPS MODE	[ON] if it is DGPS mode, [OFF] if it is not DGPS mode.
GPS CLOCK	Displays GPS clock.
PRESENT POSITION, SHIP SPEED, COURSE	Displays the positioning information.
DOP	It shows the spread of satellites in the sky used for positioning. The smaller the value, the higher the accuracy of positioning.
RECEIVED_SV	Displays the value of satellites being received.
BEACON FREQUENCY	Displays the frequency that the beacon receiver is receiving.
BEACON S/N	Displays numerical signal to noise ratio of received signal. The larger the numeral, the better the quality of the signal.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS/DGPS], and use joystick [→].
   Use joystick [↑] [↓] to select [MONITOR].
2. Press [MENU] key several times to close the menu.

10.2 GPS / DGPS settings

Set GPS / DGPS.

STABILIZATION	Set the speed of response to movement. [3] is the fastest response. *When moving at low speed, the speed display stability may be better when set to [1].
BEACON SELECT	If the beacon frequency and baudrate of the area to be used are known, select [MAN] and set the frequency and baudrate.
DGPS MODE	To use as DGPS, select [BEACON]. To use as SBAS, select [SBAS].
GPS INIT	Not used under normal operation of the unit. Operate when it is necessary to initialize the GPS receiver, such as when the GPS operation becomes bad. Select [YES] and press [ENT] key to execute initialization.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [GPS/DGPS], and use joystick [→].
   Use joystick [↑] [↓] to select [SETTING], and use joystick [→].
2. Use joystick [↑] [↓] to select the item.
3. Use joystick [←] [→] to select the setting.
4. Press [MENU] key several times to close the menu.

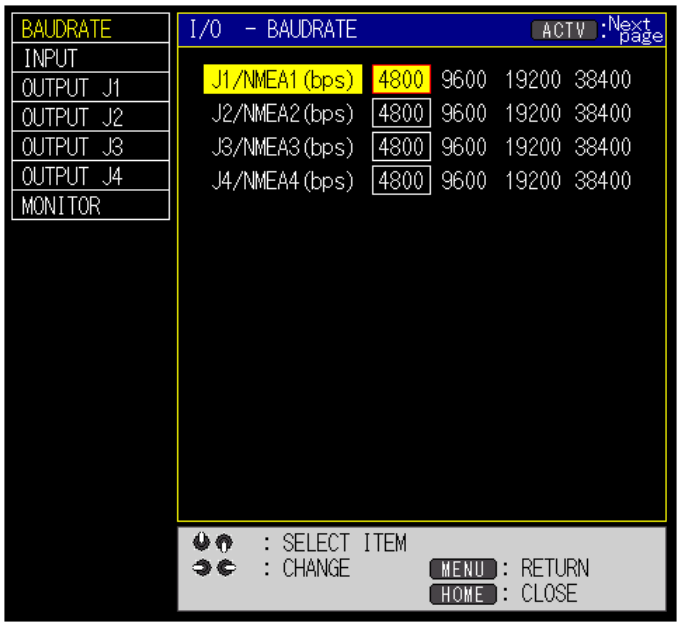
Chapter 11 Setup I/O Interface

In the [I/O] menu, change settings to input / output data. This menu should be set when installed. If incorrect settings are set, there is a possibility that connected devises will not communicate properly.

11.1 Set the baudrate (transmission speed)

Sets the baudrate of the data. Match the baudrate with the device to be connected.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [I/O], and use joystick [→].
   Use joystick [↑] [↓] to select [BAUDRATE], and use joystick [→].
2. Use joystick [↑] [↓] to select the connector.
3. Use joystick [←] [→] to select the baudrate.

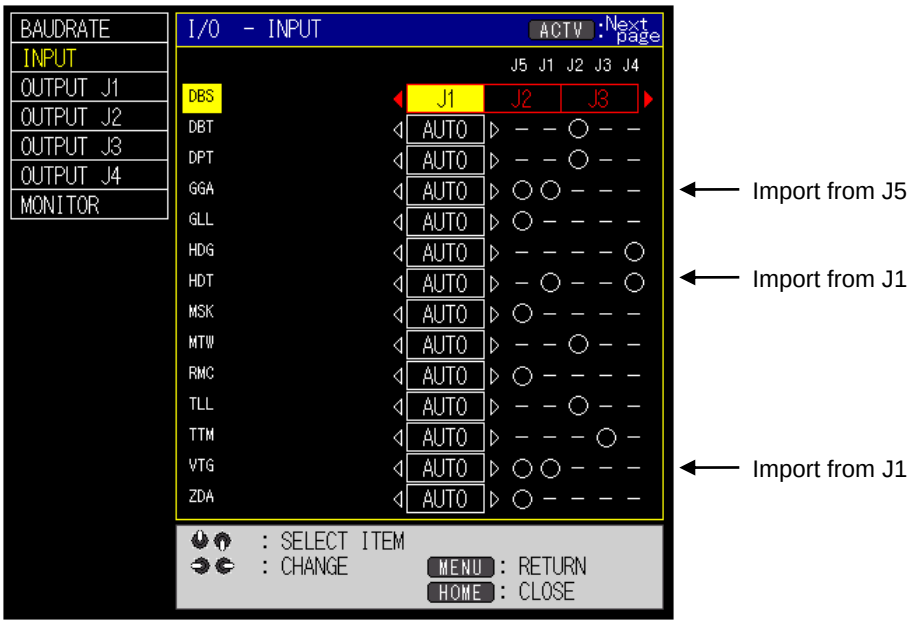


4. Press [MENU] key several times to close the menu.

11.2 Set the input sentence

You can select which individual port to use for any given sentence input.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [I/O], and use joystick [→].
   Use joystick [↑] [↓] to select [INPUT], and use joystick [→].
2. Use joystick [↑] [↓] to select the sentence.
3. Use joystick [←] [→] to select the connector number.
   Set to [AUTO]: When the same sentence is input to multiple connectors, import from the connector with the highest priority (J5> J1> J2> J3> J4).



4. Press [MENU] key several times to close the menu.

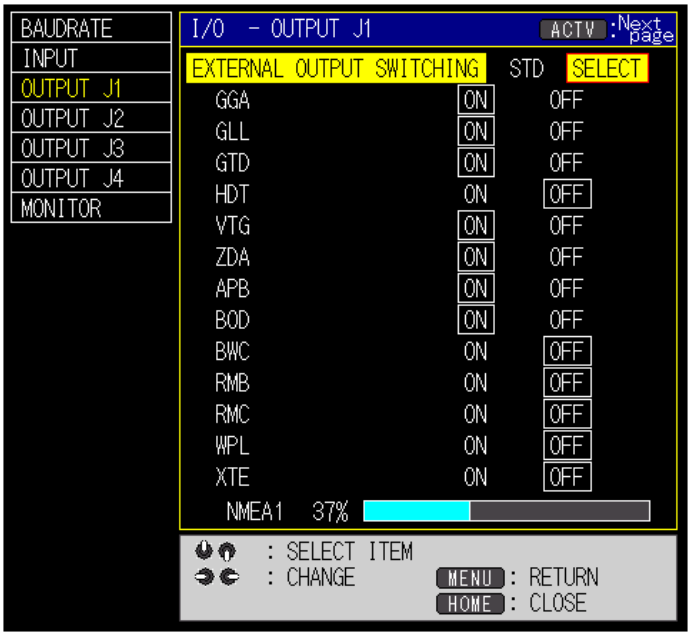
CAUTION: **If you set the input connector selection to [AUTO], if the sentence from the connector with the highest priority is interrupted, it switches to receiving the sentence from the connector with the next highest priority.**
In addition, it takes some time to switch to confirm the input sentence.

11.3 Set output sentence

Set the sentence to be output. The factory default setting is [STD].

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [I/O], and use joystick [→].
   Use joystick [↑] [↓] to select [OUTPUT J1], and use joystick [→].

2. Use joystick [←] [→] to set external output switching to [EXTERNAL OUTPUT SWITCHING].



3. Use joystick [↑] [↓] to select the sentence.
4. Use joystick [←] [→] to select [ON] or [OFF].

*Set the external outputs J2, J3, J4 in the same way.

CAUTION: When external output switching is [Standard], cannot switch between [ON] or [OFF].

5. Press [MENU] key several times to close the menu.

CAUTION: [HDT] can be output when HDT sentence has been input in GTD-120.

CAUTION: [GTD] can be output when position data is set to [LORAN C].

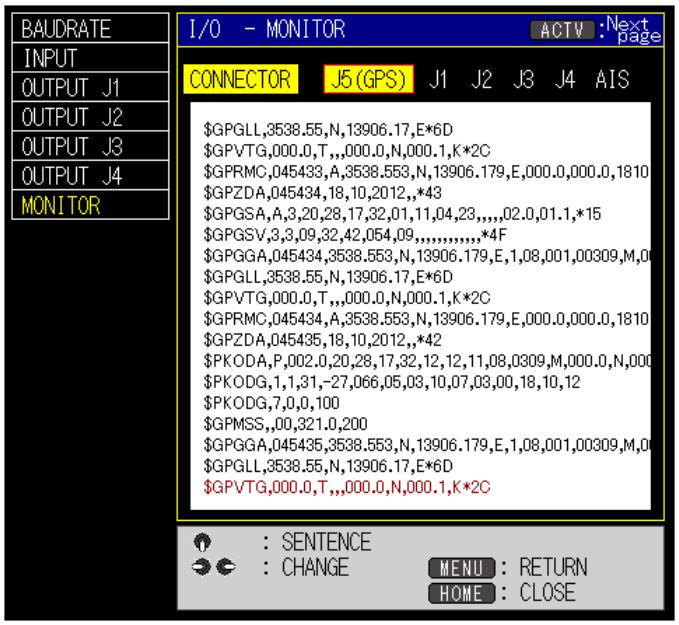
CAUTION: [APB], [BOD], [BWC], [RMB], [WPL], and [XTE] are output at the time of waypoint navigation.

11.4 Monitoring input sentences

Monitor the input sentence. You can check the input sentence.

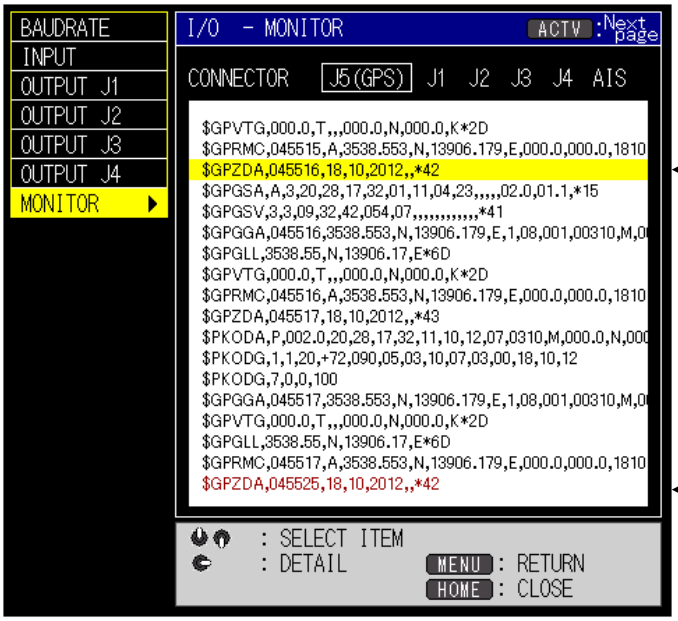
1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [I/O], and use joystick [→].
   Use joystick [↑] [↓] to select [MONITOR], and use joystick [→].

2. Use joystick [←] [→] to select the connector number.
   Monitor the input sentence.



If you watch only a specific sentence, do the following operation.

3. Use joystick [↑] [↓] to select the sentence.
   Scrolling of the monitor screen stops.



4. Use joystick [←] [→] to scroll the selected sentence
5. Press [MENU] key several times to close the menu.

Chapter 12 Save to SD card and import from SD card to Display unit

The display unit has "memory" inside, and data of [MARK], [OWN TRACK], [DRAW], [TARGET TRK], [ROUTE], [PICTURE] and [SETTING] can be saved in the “memory” at any time.
It is recommended to save important data in this “memory” to SD card.
Data can be saved and imported between the “memory” and the SD card.
The recommended SD card specifications are as follows.

<Compliant standard>
SD Memory Card Specification Part1 PHYSICAL LAYER SPECIFICATION Ver 2.0
<Speed class>
Class 6
<Command class>
Class 10 or more

KODEN standard SD card (Refer to “Optional list” page xv)

CAUTION: Use SD card size ranges from 2GB to 8GB

CAUTION: Depending on the SD card you use, read/write may not work.

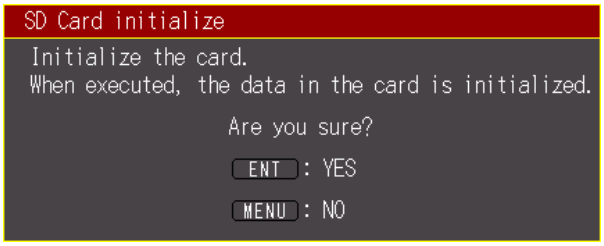
12.1 Initialize the SD card

When using the SD card for the first time, be sure to format it with this unit. By initializing, you can use it with GTD-120.
*For the method of inserting the SD card, refer to "Chapter 1 Basic Operation, 1.2 How to insert / remove SD card".

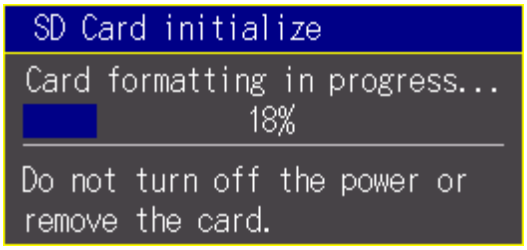
1. Press [MENU] key to display the menu screen.
Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
Use joystick [↑] [↓] to select [OTHER], and use joystick [→].

2. Use joystick [↑] [↓] to select [SD CARD INIT].

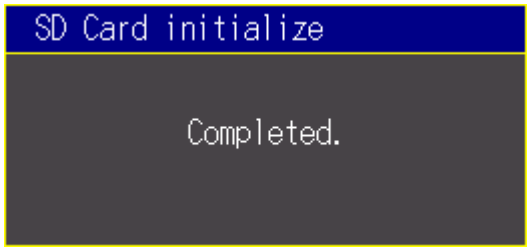
3. Use joystick [→].
[SD Card initialize] window is displayed.



4. Press [ENT] key.
SD card initialization screen is displayed.



When initialization is completed, the following message will be displayed.

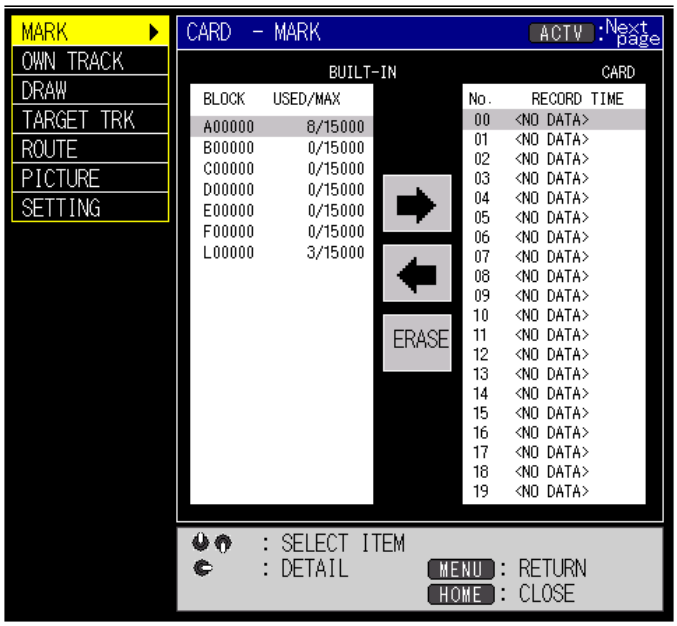


5. Press [MENU] key several times to close the menu.

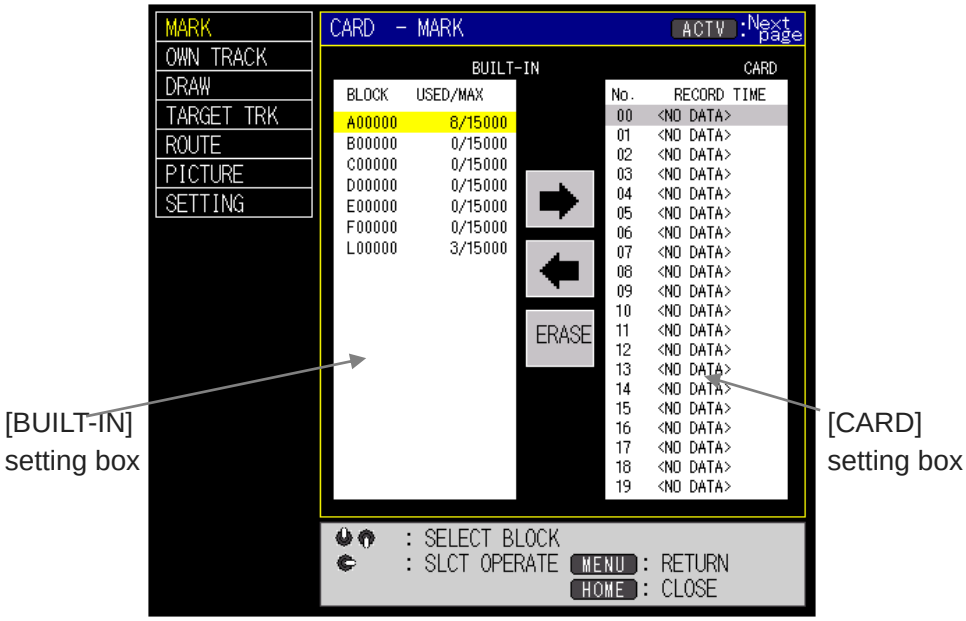
12.2 Save data to SD card

Data (MARK, OWN TRACK, DRAW, TARGET TRK, ROUTE, PICTURE and SETTING) can be saved in the SD card.

1. Insert the initialized SD card or the SD card which is saved the existing data into the card slot.
2. Press [MENU] key to display the menu screen.
3. Use joystick [↑] [↓] to select [CARD].
4. Use joystick [→].

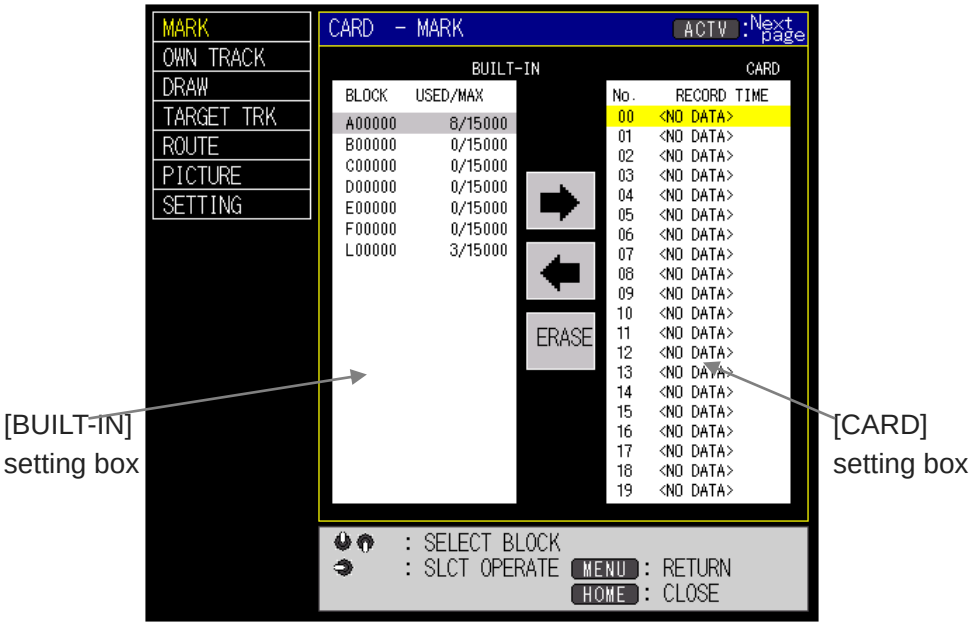


5. Use joystick [↑] [↓] to select the item to save.
   [SETTING] is the current various setting state that the customer changed according to the intended use.
6. Use joystick [→].
   The cursor will move to the [BUILT-IN] setting box.

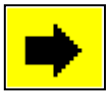


7. Use joystick [↑] [↓] to select the data to save.
   Selected [DRAW], [TARGET TRK], [ROUTE] or [PICTURE] in step 5:
   Press [Zoom out], and [BUILT-IN] setting box of the next page is displayed.
   Press [Zoom in], and [BUILT-IN] setting box of the previous page is displayed.
   Selected [DRAW] or [ROUTE] in step 5:
   Every time press [CUR] key, “the stored date and time” <=> “comment” will be displayed in the [CARD] setting box.
8. Use joystick [→] to move the cursor to [CARD] setting box.

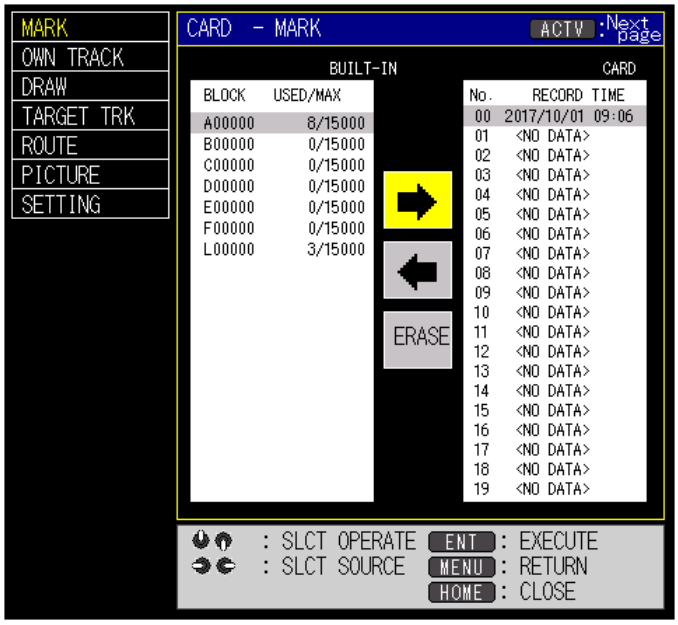
> ⚠ **CAUTION: When an uninitialized SD card is inserted, nothing is displayed in the [CARD] setting box.**



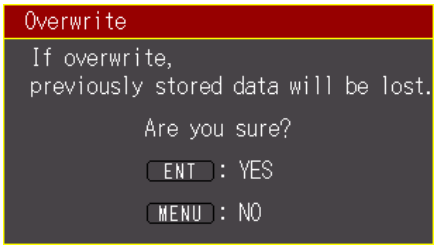
9. Use joystick [↑] [↓] to select number.
   Press [Zoom out], and [CARD] setting box of the next page is displayed.
   Press [Zoom in], and [CARD] setting box of the previous page is displayed.
10. Use joystick [←] to select the right arrow.



11. Press [ENT] key.
    Save the data to the selected number in step 9 and display the date and time.



In step 9, select the number that has already been saved, and then press [ENT] key in step 11, the [Overwrite] window will be displayed.



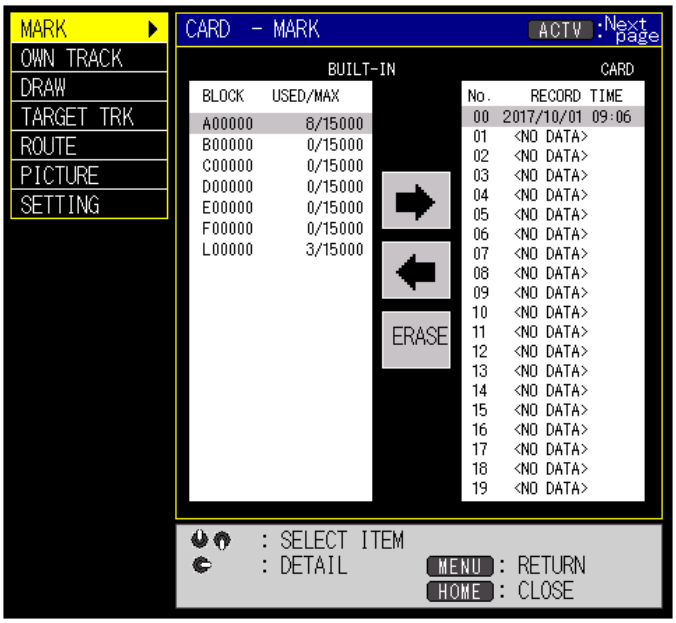
CAUTION: Press [ENT] key to overwrite the original data.

12. Repeat steps 5 to 11 if there are other items to save.
13. Press [MENU] key several times to close the menu.

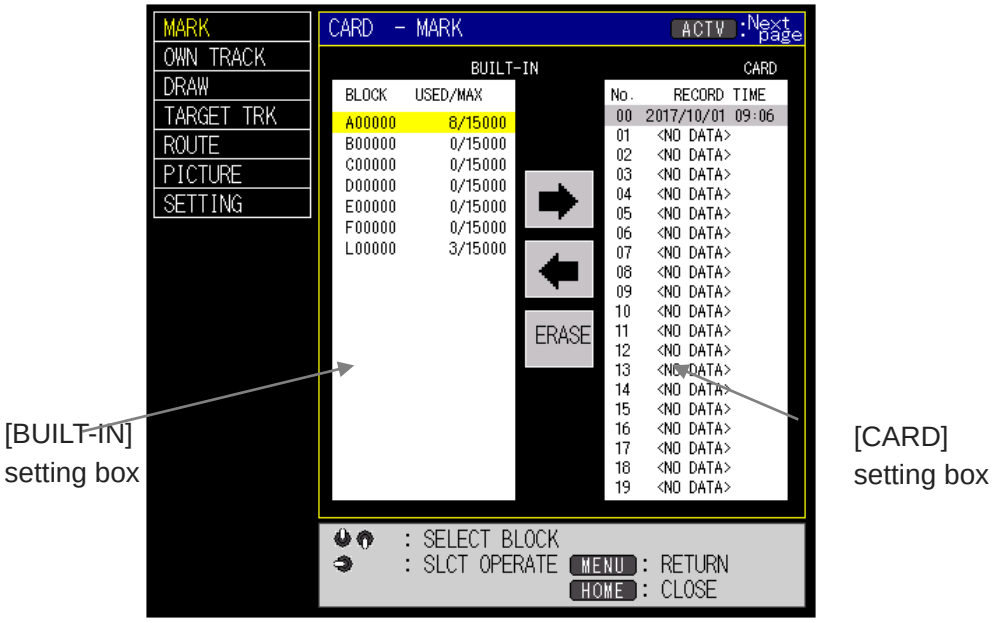
12.3 Save the data of the SD card to the internal memory

Read the data saved in the SD card and import it into the internal memory of the Display unit.

1. Insert the SD card which is saved the data into the card slot.
2. Press [MENU] key to display the menu screen.
3. Use joystick [↑] [↓] to select [CARD].
4. Use joystick [→].



5. Use joystick [↑] [↓] to select the item to save.
   [SETTING] is the current various setting state that the customer changed according to the intended use.
6. Use joystick [→].
   The cursor will move to the [BUILT-IN] setting box.

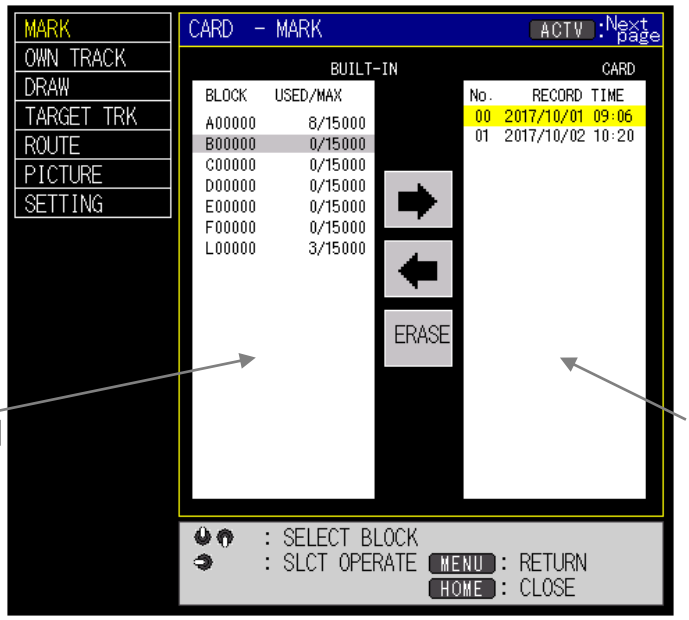


[BUILT-IN] setting box

[CARD] setting box

7. Use joystick [↑] [↓] to select the block number to save.
   Selected [DRAW], [TARGET TRK], [ROUTE] or [PICTURE] in step 5:
   Press [Zoom out], and [BUILT-IN] setting box of the next page is displayed.
   Press [Zoom in], and [BUILT-IN] setting box of the previous page is displayed.
8. Use joystick [←] to select the left arrow.

   In the [CARD] setting box, data saved in the SD card is displayed.
9. Use joystick [→] to move the cursor to [CARD] setting box.

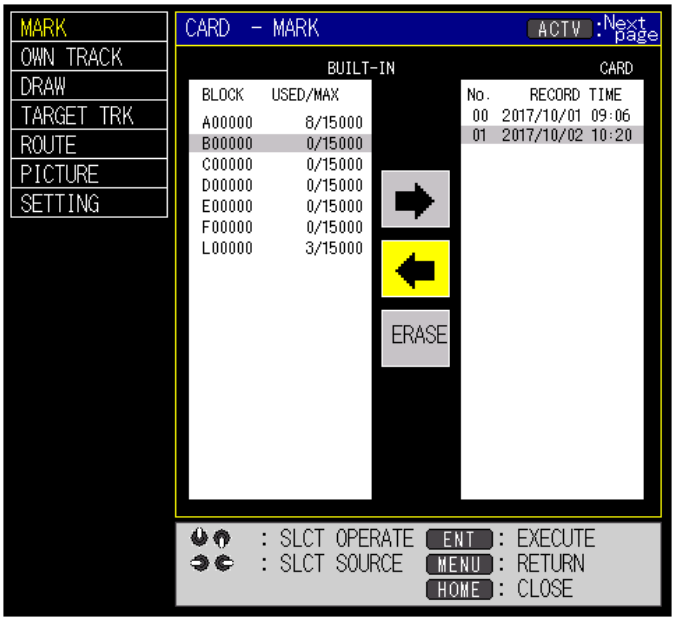


[BUILT-IN] setting

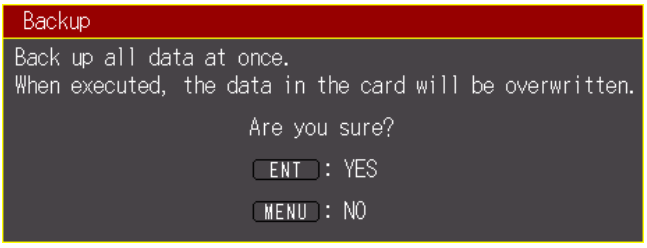
[CARD] setting box

10. Use joystick [↑] [↓] to select number.
    Press [Zoom out], and [CARD] setting box of the next page is displayed.
    Press [Zoom in], and [CARD] setting box of the previous page is displayed.
11. Use joystick [←] to select the left arrow.

12. Press [ENT] key.
    Save the data to the selected number in step 7.



In step 7, select the number that has already been saved, and then press [ENT] key in step 12, the [Backup] window will be displayed.



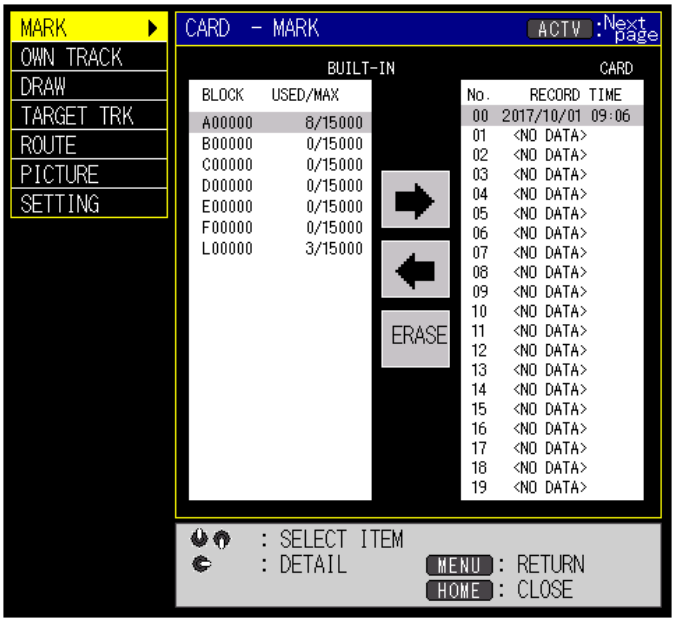
CAUTION: Press [ENT] key to overwrite the original data.

13. Repeat steps 5 to 12 if there are other items to save.
14. Press [MENU] key several times to close the menu.

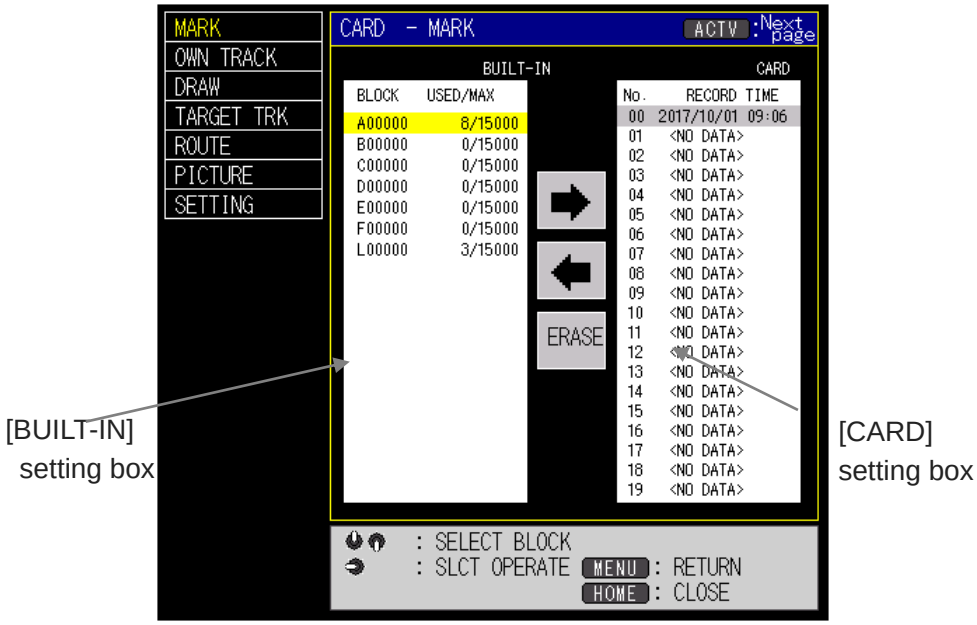
12.4 Erase data in the SD card

Unnecessary data saved in the SD card can be erased.

1. Insert the SD card which is saved the data into the card slot.
2. Press [MENU] key to display the menu screen.
3. Use joystick [↑] [↓] to select [CARD].
4. Use joystick [→].



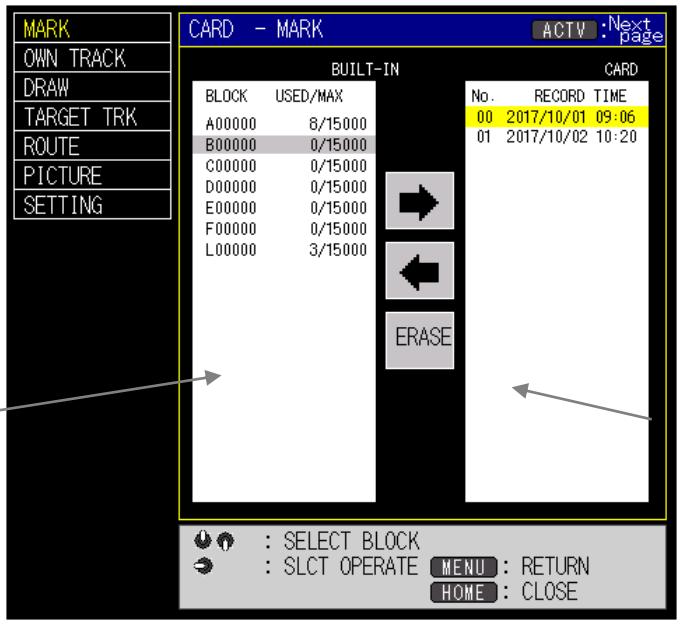
5. Use joystick [↑] [↓] to select the item to erase.
   [SETTING] is the current various setting state that the customer changed according to the intended use.
6. Use joystick [→].
   The cursor will move to the [BUILT-IN] setting box.



7. Use joystick [→] to select the [ERASE].

The [Built-in] setting box is grayed out, and the [Card] setting box shows the data saved in the SD card.

8. Use joystick [→] to move the cursor to [CARD] setting box.

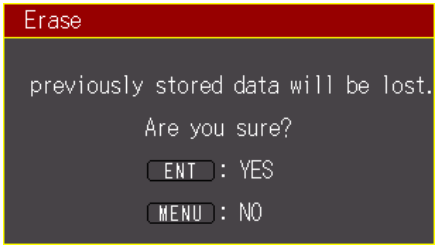


[BUILT-IN] setting box

[CARD] setting box

9. Use joystick [↑] [↓] to select number.
   Press [Zoom out], and [CARD] setting box of the next page is displayed.
   Press [Zoom in], and [CARD] setting box of the previous page is displayed.
10. Use joystick [←] to select the [ERASE].

11. Press [ENT] key.
    [Erase] window is displayed.



12. Press [ENT] key.
    Erase the data to the selected number in step 7.
13. Repeat steps 8 to 12 if there are other items to erase.
14. Press [MENU] key several times to close the menu.

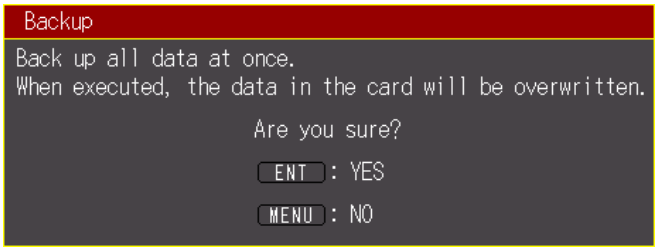
12.5 Backup

Backup the internal data of the Display unit (MARK, OWN TRACK, DRAW, TARGET TRK, ROUTE, PICTURE and SETTING) at once.

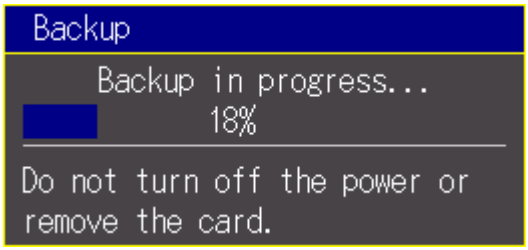
1. Insert the SD card into the card slot.
2. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [OTHER], and use joystick [→].
3. Use joystick [↑] [↓] to select [BACKUP].

> ⚠ **CAUTION: If an SD card is not inserted in the card slot, [BACKUP] will be grayed out and can not be selected.**

4. Use joystick [←] [→] to select [YES].
   [Backup] window is displayed.



5. Press [ENT] key.
   Start the backup and display the following message.



When the backup is completed, the following message will be displayed.

6. Press [MENU] key several times to close the menu.

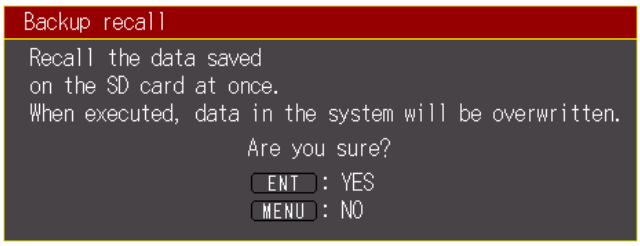
12.6 Restore

Restore the back up data (MARK, OWN TRACK, DRAW, TARGET TRK, ROUTE, PICTURE and SETTING) back to the unit all at once. All internal data of the Display unit will be overwritten.

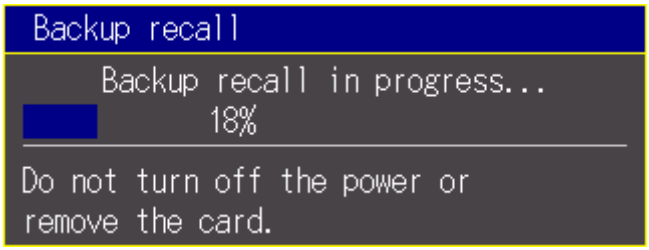
1. Insert the SD card into the card slot.
2. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [OTHER], and use joystick [→].
3. Use joystick [↑] [↓] to select [RESTORE].

> ⚠ **CAUTION: If an SD card is not inserted in the card slot, [RESTORE] will be grayed out and can not be selected.**

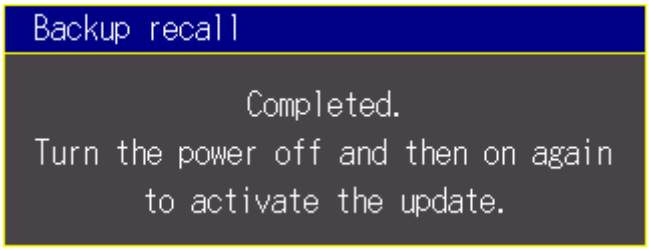
4. Use joystick [←] [→] to select [YES].
   [Backup recall] window is displayed.



5. Press [ENT] key.
   Start the backup recall and display the following message.



When the backup recall is completed, the following message will be displayed.



6. Please long press [BRILL⏻] key, turn off the power, then press [BRILL⏻] key again and restart.

Chapter 13 Menu Operation

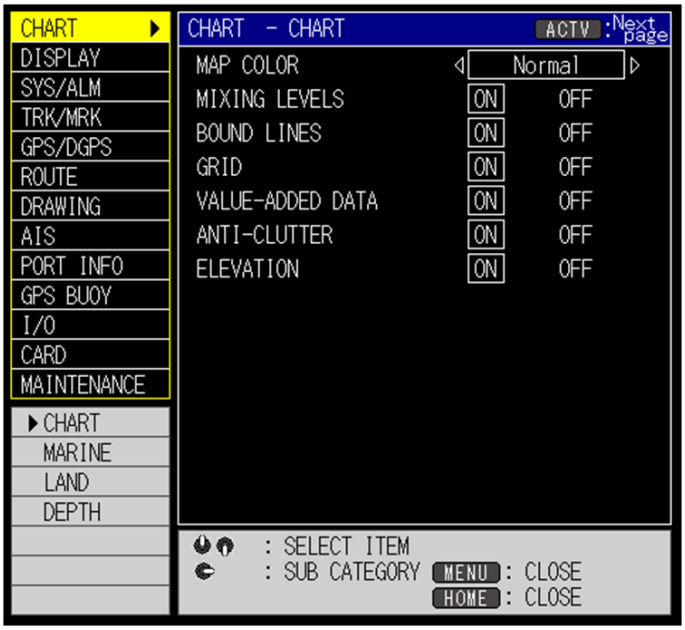
13.1 Chart data menu

This menu is to set or modify chart data display.

Chart for each menu item

These settings are about the chart display, MAP COLOR, MIXING LEVELS, BOUND LINES, GRID, VALUE-ADDED DATA, ANTI-CLUTTER and ELEVATION.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [CHART], and use joystick [→].
   Use joystick [↑] [↓] to select [CHART], and use joystick [→].
2. Use joystick [↑] [↓] to select the item.



3. Use joystick [←] [→] to change the setting.
4. Press [MENU] key several times to close the menu.

● MAP COLOR

Four color settings are available.
(Normal / Sunlight / Night Vision / NOAA)

● MIXING LEVELS

Overlay a map on different scales of maps.

● BOUND LINES

The scale map is shown with the frame.

● GRID
The Lat/Lon line display ON / OFF.
In the Perspective View mode, the depth of the screen is shown in the grid.

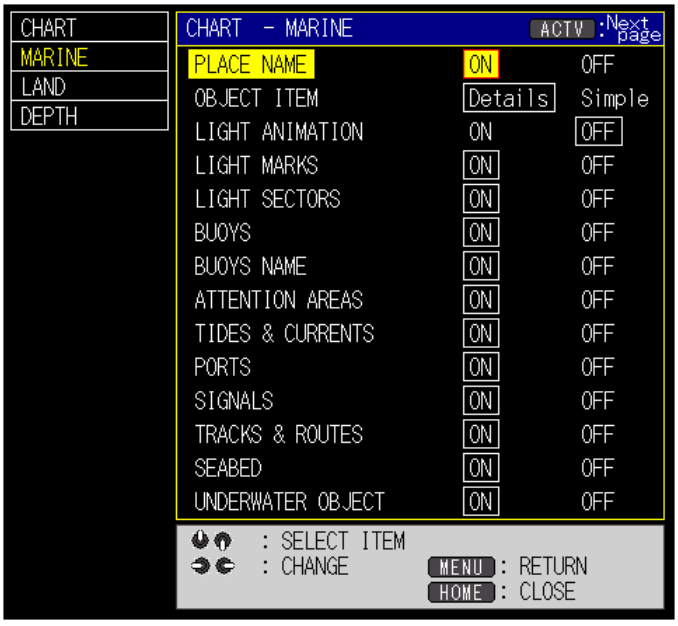
● VALUE-ADDED DATA
Value-Added Data (VAD) on the map display ON / OFF.

● ANTI-CLUTTER
Makes anti-clutter effective.

● ELEVATION
Depth and Land elevation shown by color gradient display ON / OFF.

Marine
These settings are about the chart display, PLACE NAME, OBJECT ITEM, LIGHT ANIMATION, LIGHT MARKS, LIGHT SECTORS, BUOYS, BUOYS NAME, ATTENTION AREAS, TIDES & CURRENTS, PORTS, SIGNALS, TRACKS & ROUTES, SEABED and UNDERWATER OBJECT.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [CHART], and use joystick [→].
   Use joystick [↑] [↓] to select [MARINE], and use joystick [→].
2. Use joystick [↑] [↓] to select the item.



3. Use joystick [←] [→] to change the setting.
4. Press [MENU] key several times to close the menu.

● PLACE NAME
Place name display ON / OFF.

● OBJECT ITEM
The display form of a lighthouse and a buoy select Details / Simple.

● LIGHT ANIMATION
Displays a lighthouse or buoy as animation effect. Typically this function is used to show the visible lighthouses from the actual ship's position.
Black light: The light of the lighthouse is not visible from the point of observation.
Gray light: The light of the lighthouse is off.
(Red/Green/Yellow) light: Color of the lighthouse.

● LIGHT MARKS
The light mark on a lighthouse or buoy display ON / OFF

● LIGHT SECTORS
Light sectors display ON / OFF

● BUOYS
Buoys display ON / OFF.

● BUOYS NAME
Buoys name display ON / OFF.

● ATTENTION AREAS
Attention areas (Fishing facility, Anchor berth, etc.) display ON / OFF.

● TIDES & CURRENTS
Tides and currents display ON / OFF.

● PORTS
Port display ON / OFF.

● SIGNALS
Signals display ON /OFF.

● TRACKS & ROUTES
Tracks and routes display ON /OFF.

● SEABED
Seabed (Sand waves, Weed, Kelp, etc.) display ON /OFF.

● UNDERWATER OBJECT
Underwater objects (Obstruction, Wreck, Cable, etc.) display ON /OFF.

Land
These settings are about the chart display, LANDMARKS, LAKE & RIVER, CULTURAL FEATURES, ROADS, ROAD NAME, RAILWAY and POI.

● LANDMARKS
Landmarks display ON /OFF.

● LAKE & RIVER
Lake or river display ON /OFF.

● CULTURAL FEATURES
Cultural features display ON /OFF.

● ROADS
Roads display ON /OFF.

● ROAD NAME
Road names display ON /OFF.

● RAILWAY
Railways display ON /OFF.

● POI
Points Of Interest display ON /OFF.

Depth
These settings are about the chart display, SOUNDINGS, SOUNDING RANGE MIN, SOUNDING RANGE MAX, ROCKS, DEPTH CONTOUR LABEL, DEPTH UNIT, DEPTH AREA HIGHLIGHTS, HIGHLIGHTS RANGE MIN, HIGHLIGHTS RANGE MAX and REVERSE CONTOUR COLOR.

● SOUNDINGS
Soundings display ON /OFF.

● SOUNDING RANGE MIN
Sets the minimum value for the Sounding Range setting.

● SOUNDING RANGE MAX
Sets the maximum value for the Sounding Range setting

● ROCKS
Rocks display ON /OFF.

● DEPTH CONTOUR LABEL
Depth Contour Labels display ON /OFF.

● DEPTH UNIT
Selects the setting for the display of Depth Unit (m, fm, D.fm, ft)

● DEPTH AREA HIGHLIGHTS
Depth Area Highlights display ON /OFF.

● HIGHLIGHTS RANGE MIN
Sets the minimum value for the Highlights Range setting.

● HIGHLIGHTS RANGE MAX
Sets the maximum value for the Highlights Range setting.

● REVERSE CONTOUR COLOR
Reverses the order of the contour coloring.

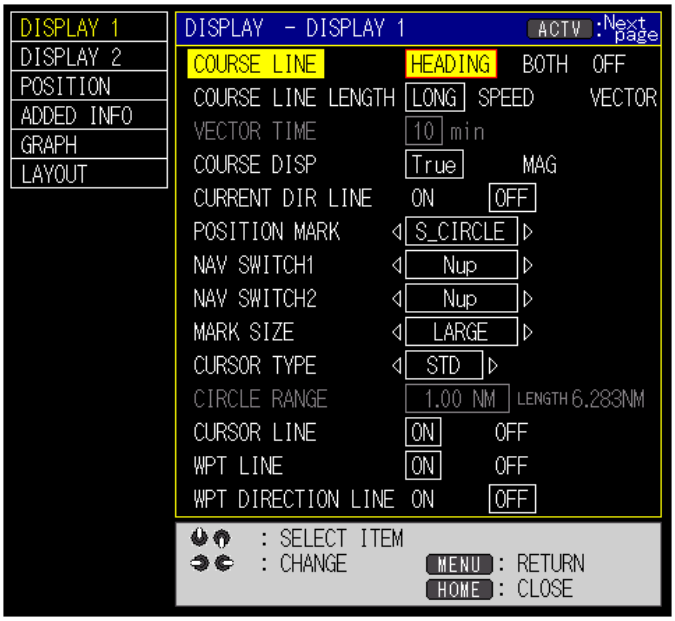
13.2 Display menu

This menu is to make display changes.

Screen display 1

These settings are about the screen display; [COURSE LINE], [COURSE LINE LENGTH], [VECTOR TIME], [COURSE DISPLAY], [CURRENT DIR LINE], [POSITION MARK], [NAV SWITCH1/2], [MARK SIZE], [CURSOR TYPE], [CIRCLE RANGE], [CURSOR LINE], [WPT LINE] and [WPT DIRECTION LINE].

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [DISPLAY 1], and use joystick [→].
2. Use joystick [↑] [↓] to select the item.



3. Use joystick [←] [→] to change the setting.
   To enter a numerical value, use joystick [→] and move the cursor to the numerical value input box.
   Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→].
   *Can also enter by pressing the numeric keypad.
   After entering the numerical value, use joystick [→] several times to exit from the numerical value input box.
4. Press [MENU] key several times to close the menu.

● COURSE LINE

It is a line showing the direction of own ship. Select whether to display (priority of course, both).

HEADING	When the heading signal is input, the line is indicated to the heading direction in white. *When the heading signal is not input, the line is indicated to the course direction of own ship in white.
BOTH	When the heading signal is input, the line is indicated to the heading direction in white and the course direction of own ship in dotted white. *When the heading signal is not input, the line is indicated to the course direction of own ship in white.

To change the color of the heading line, use [MAINTENANCE] => [COLOR] => [No.73] on the menu.

● COURSE LINE LENGTH

Select the length of the heading line.

LONG	Display a fixed length line.
SPEED	The length is changed depending on the ship speed. The faster the ship speed is, the longer it displays.
VECTOR	It shows the speed and course of own ship, the tip of the vector indicates the position where own ship is supposed to be moving after the time set in [VECTOR TIME]. The length varies with the ship's speed.

● VECTOR TIME

Set it when [VECTOR] is selected for [COURSE LINE LENGTH]. For example, if set it to [3 min], it shows the position where own ship is supposed to be moving 3 minutes after the current position.

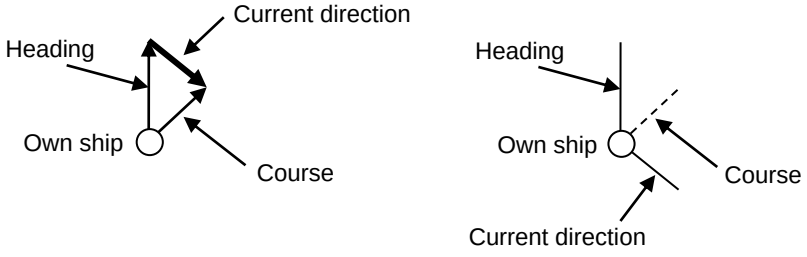
● COURSE DISP

The course and direction to the destination can be displayed in true or magnetic. Magnetic is calculated by the magnetic deviation and true direction. When you navigate with a true direction such as GPS / gyro compass, set to [TRUE]. When you navigate with a magnet compass, set to [MAG].

● CURRENT DIR LINE

CURRENT DIR LINE is calculated by the difference from course and heading. The line is displayed in blue.

CAUTION: To display the current direction line, heading signal is required.



Example: When [COURSE LINE] is [Both]

To change the color of the current direction line, [MAINTENANCE] => [COLOR] => [No.152] on the menu.

● POSITION MARK

Set the shape of own ship mark.

● NAV SWITCH1 / 2

Set the direction of the upward screen by [NAV SWITCH1] / [NAV SWITCH2].
[NAV SWITCH1] is to switch at the full screen / left side of plotter 2 screen.
[NAV SWITCH2] is to switch at the right side of plotter 2 screen.

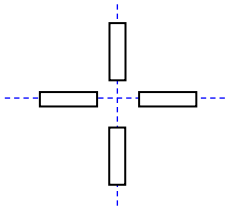
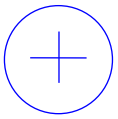
NORTH UP	Always keeps displaying true north on the top of the screen.
SOUTH UP	Always keeps displaying true south on the top of the screen.
EAST UP	Always keeps displaying true east on the top of the screen.
WEST UP	Always keeps displaying true west on the top of the screen.
COURSE UP	Always keeps displaying a waypoint positoin on the top of the screen. Except WPT navigation and RTE navigation, always keeps displaying true north on the top of the screen.
HEAD UP	Always keeps displaying a heading (course) line on the top of the screen and own ship is fixed in the center of the screen while the map moves according to own ship's movement. When [ROTATION SPEED] is set to [Slow], the heading (course) of own ship will be changed when own ship's heading (course) changes by ± 10 degrees or more from current heading (course).

● MARK SIZE

Sets the size of the mark. It applies to all mark shapes.

● CURSOR TYPE

Sets the shape of the cursor.

STD	CROSS	LONG	CIRCLE
		 The dotted lines are displayed from the edge to edge of the screen.	 Set the radius of the circle as [CIRCLE CURSOR RANGE].

To change the color of the cursor, use [MAINTENANCE] => [COLOR] => [No.152] on the menu.

● CIRCLE RANGE

Set the radius of the circle cursor.
The setting is available when [CURSOR TYPE] is set to [CIRCLE].

● CURSOR LINE

Select whether a line is connected to own ship and cursor.
To change the color of the cursor line, use [MAINTENANCE] => [COLOR] => [No.152] on the menu.

● WPT LINE

Select whether a line is connected to the starting point and the waypoint.
To change the color of the course line, use [MAINTENANCE] => [COLOR] => [No.152] on the menu.

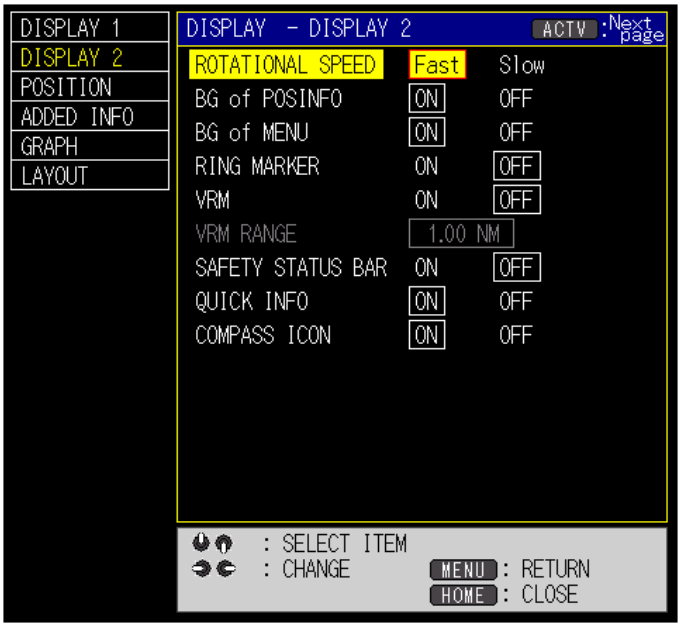
● WPT DIRECTION LINE

Select whether a line is connected to own ship and the waypoint.
To change the color of the wpt direction line, use [MAINTENANCE] => [COLOR] => [No.152] on the menu.

Screen display 2

These settings are about the screen display; [ROTATIONAL SPEED], [BG of POSINFO], [BG of MENU], [RING MARKER], [VRM], [VRM RANGE], [SAFETY STATUS BAR], [QUICK INFO], and [COMPASS ICON].

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [DISPLAY 2], and use joystick [→].
2. Use joystick [↑] [↓] to select the item.



3. Use joystick [←] [→] to change the setting.
   To enter a numerical value, use joystick [→] to move the cursor to the numerical value input box.
   Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→].

*Can also enter by pressing the numeric keypad.
After entering the numerical value, use joystick [→] a few times to exit from the numerical value input box.

4. Press [MENU] key several times to close the menu.

● ROTATIONAL SPEED

Change speed of map rotation in Hup display mode.

*To set to Hup display, refer to "13.2 Display menu, NAV SWITCH1, 2".

*When the cursor is displayed, the map does not rotate.

Fast	The map rotates so that the heading direction is always just above the screen.
Slow	The map rotates when the heading direction changes by ± 10 degrees or more from directly above the screen.

● BG of POSINFO

Select whether the background of the POSINFO screen is visible.

BG of POSINFO [ON]

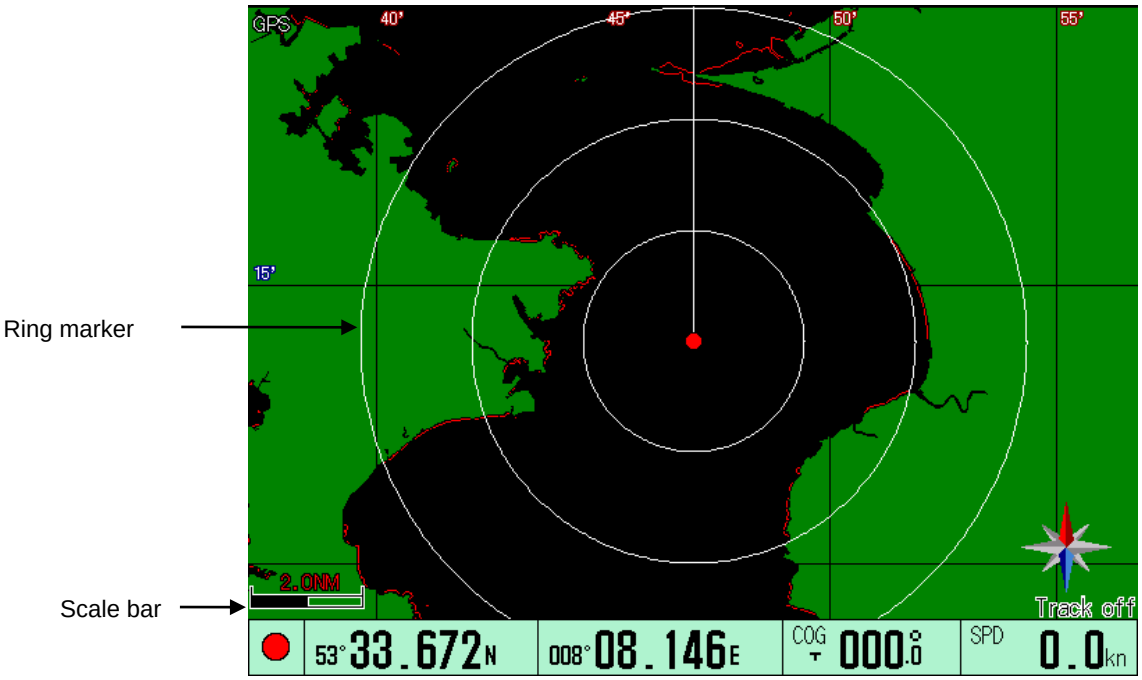
BG of POSINFO [OFF]

● BG of MENU

Select whether the background of the menu screen is semi-transparent.

● RING MARKER

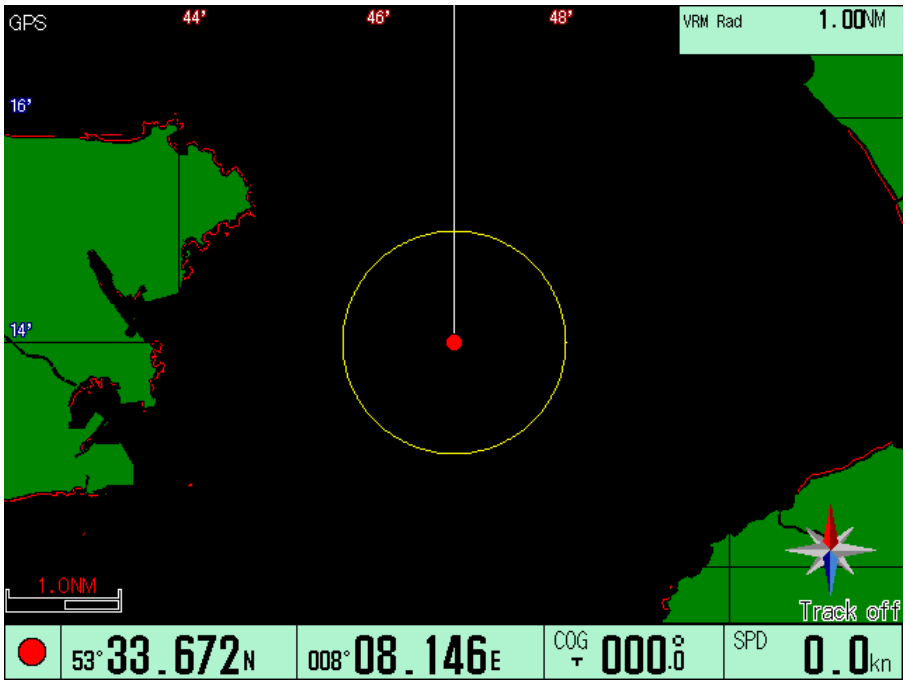
Select whether RING MARKER is displayed.



To change the color of the ring marker, use [MAINTENANCE] => [COLOR] => [No.152] on the menu.

● VRM

Select whether VRM (Variable Range Marker) is displayed around own ship. The VRM size can be changed, so it is convenient when you keep a certain distance from the restricted area etc. The radius of the VRM is displayed on the upper right of the screen.
To change the color of the VRM, use [MAINTENANCE] => [COLOR] => [No.152] on the menu.



● VRM RANGE

Set the radius of the VRM to be displayed when [VRM] is set to [ON].

● SAFETY STATUS BAR

This is to display a status bar with 6 functions. Any warning or alarm conditions are identified by red color for indicating a possible risk.

(1) Zoom

Normal Zoom	When the chart is displayed at normal scale
Under Zoom	White: Normal status. Red: When the chart is out of under-zoomed more than twice of the normal scale.
Over Zoom	White: Normal status. Red: When the chart is out of over-zoomed more than twice of the normal scale.

(2) Best Map

Red: When a more detailed chart is available at own ship's position.

(3) Data Off
Red: When at least one of the following objects or layers is turned off (by the user); Depth*, Attention Areas, Track & Routes, Lighthouse, Buoys, Signals, Light animation, Underwater Objects.
(*Depth Range Min setting is more than 20m, or Depth Range Max setting is less than 20m)

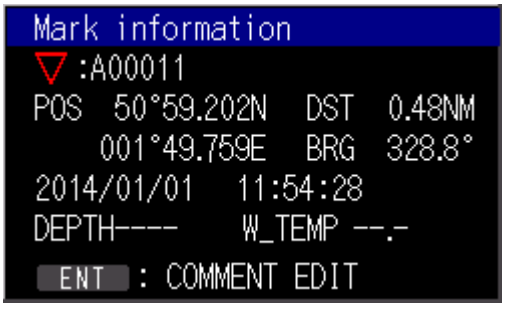
(4) Declutter
Red: When Anti clutter function is ON.

(5) Dangers
Red: When at least one of the following objects “Guardian Technology” are detected; Land, Intertidal, Depth Area, Rocks, Obstruction, Shoreline Constructions, Fishing Facility, Wrecks, Dragged area, Diffuser, Mooring/Warping facility, Pingo, Production installation.

(6) Cautions
Red: When “Guardian Technology” is detected in a cautionary or restricted area.

● QUICK INFO

When a cursor moves to a point on the map (such as Ports, Tide, Lighthouse, Buoys, Beacons, Obstructions, Landmarks, etc.), mark, drawing, AIS symbol, other ship symbol, GPS buoy symbol, information window is displayed.



Example of display when cursor is placed on mark

CAUTION: To display water depth and water temperature, water depth data and water temperature data are required.

When the map data (such as Ports, Tide, Lighthouse, Buoys, Beacons, Obstructions, Landmarks, etc.) is displayed, press [INFO] key to display the [OBJECT INFORMATION] window.
Refer to "Chapter 1 Basic Operation, 1.11 Use [INFO] key".

● COMPASS ICON

Choose whether the compass icon is displayed at the bottom right of the map.

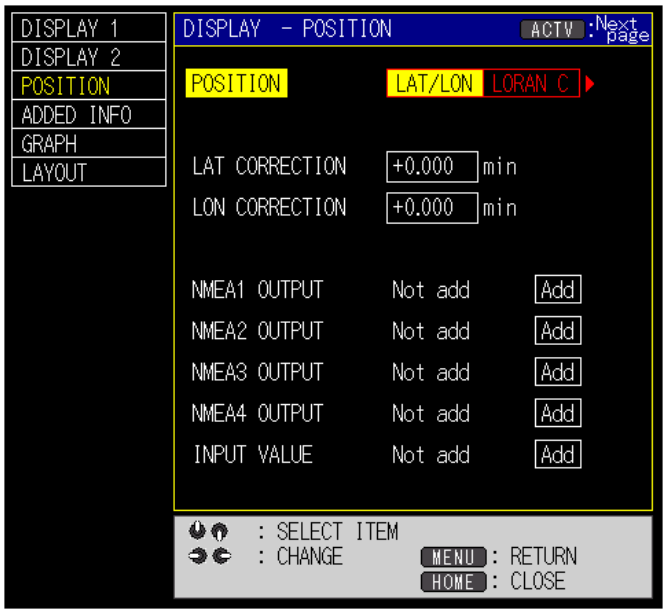
Set position indication

Set the data to be displayed on the position information screen.

● Display in latitude and longitude

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [POSITION], and use joystick [→].

2. Use joystick [←] [→] to select [LAT/LON].



If you need to make corrections, carry out the procedure from step 3.

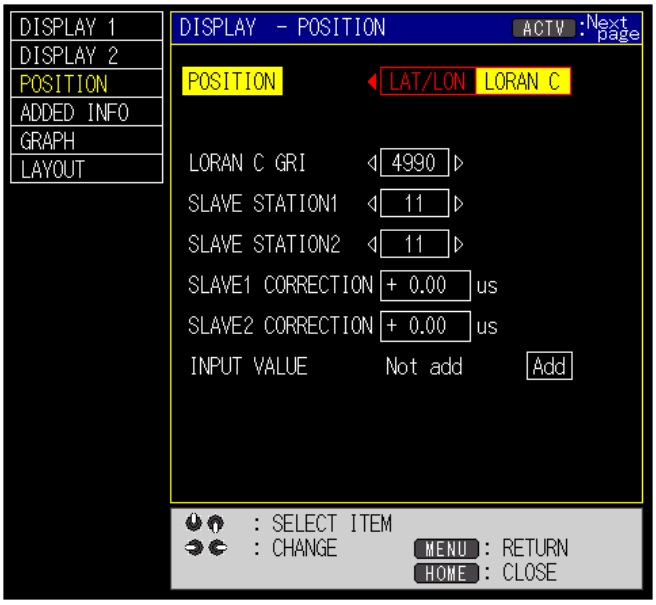
3. Use joystick [↑] [↓] to select [LAT CORRECTION].
   Use joystick [→]. The cursor moves to the numerical value input box.
   Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→].
   *Can also enter by pressing the numeric keypad.
   After entering the numerical value, use joystick [→] a few times to exit from the numerical value input box.
4. Press [MENU] key several times to close the menu.

⚠ **CAUTION:** **When [INPUT VALUE] is set to [ADD], all entering data of the "Latitude / Longitude" is added to [LAT CORRECTION] / [LON CORRECTION] value.**
When [INPUT VALUE] is set to [Not add], all entered data of the "Latitude / Longitude" is NOT added to [LAT CORRECTION] / [LON CORRECTION] value.

5. Use joystick [↑] [↓] to select [NMEA1 OUTPUT].
   Use joystick [→] to select [Add].
6. Repeat step 5 to set [NMEA 2 to 4 output].
7. Press [MENU] key several times to close the menu.

● Display in LORAN C

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [POSITION], and use joystick [→].
2. Use joystick [↑] [↓] to select [LORAN C].



3. Use joystick [↑] [↓] to select [GRI].
   Use joystick [←] [→] to select GRI code.
4. Use joystick [↑] [↓] to select [SLAVE STATION1].
   Use joystick [←] [→] to select the slave station.
5. Use joystick [↑] [↓] to select [SLAVE STATION2].
   Use joystick [←] [→] to select the slave station.

   If you need to make corrections, carry out the procedure from step 6.

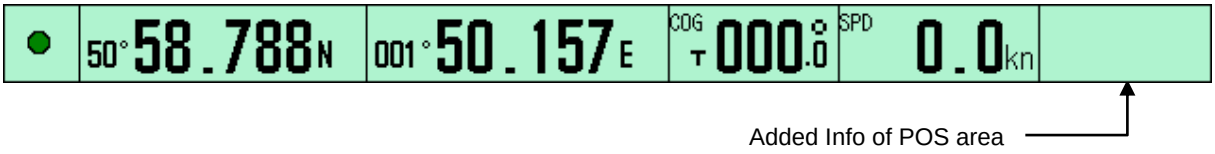
6. Use joystick [↑] [↓] to select [SLAVE1 CORRECTION].
   Use joystick [→]. The cursor moves to the numerical value input box.
   Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→].
   *Can also enter by pressing the numeric keypad.
   After entering the numerical value, use joystick [→] a few times to exit from the numerical value input box.
7. Repeat the procedure in step 6 to input the correction value of [SLAVE2 CORRECTION].
8. Press [MENU] key several times to close the menu.

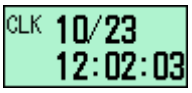
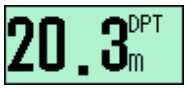
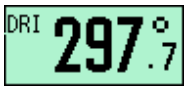
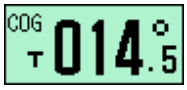
⚠ CAUTION: When [INPUT VALUE] is set to [ADD], all entered data of the "SLAVE STATION1 / SLAVE STATION2" is added to [SLAVE1 CORRECTION] / [SLAVE2 CORRECTION] value.
When [INPUT VALUE] is set to [Not add], all entered data of the "SLAVE STATION1 / SLAVE STATION2" is NOT added to [SLAVE1 CORRECTION] / [SLAVE2 CORRECTION] value.

Set additional information display

● Added Info of POS

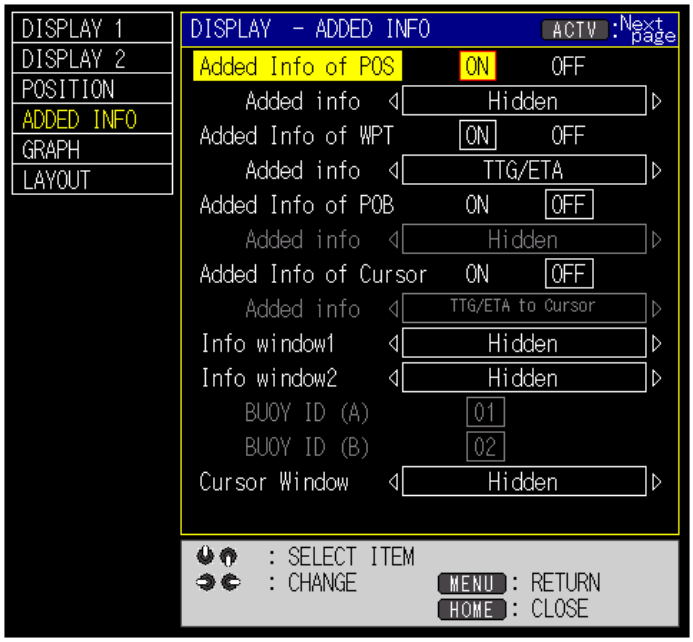
Add additional information display area to own ship's position window.



Clock		Displays the date, the day of the week, and the current time.
HDG		Display the heading. By displaying the heading, it is possible to display the heading and course at the same time. *To display the heading, a heading signal is required.
Water Temperature		Display the water temperature. *To display the water temperature, a water temperature signal is required.
Depth		Display the depth. *To display the depth, a depth signal is required.
Current Direction		Display the Current Direction. It is calculated by the difference from course and heading. *To display the current direction, a heading signal is required.
Course		Display the course. By displaying the course, it is possible to display the course and heading at the same time. *To display the heading, a heading signal is required.
Mark Shape		Display the mark shape to be entered when pressing [○] [□] [▽] [X] key is displayed.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [ADDED INFO], and use joystick [→].

2. Use joystick [↑] [↓] to select [Added Info of POS].

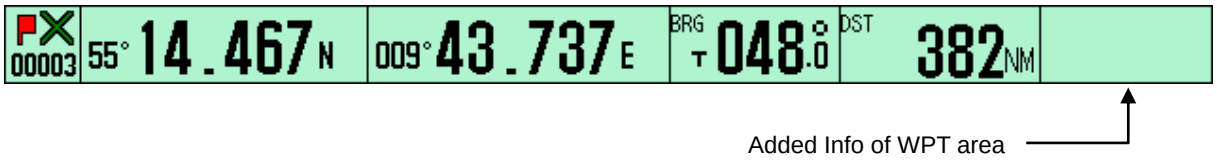


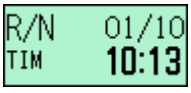
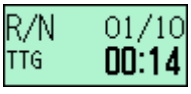
3. Use joystick [↑] [↓] to select [ON].
   Add additional information display area to own ship position window.
4. Use joystick [↑] [↓] to select [Added info].
5. Use joystick [←] [→] to select the display information.
6. Press [MENU] key several times to close the menu.

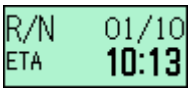
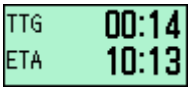
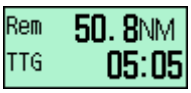
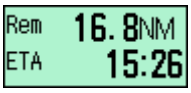
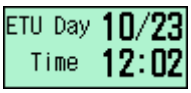
To hide the additional information display area, select [OFF] in step 3.

● Added Info of WPT

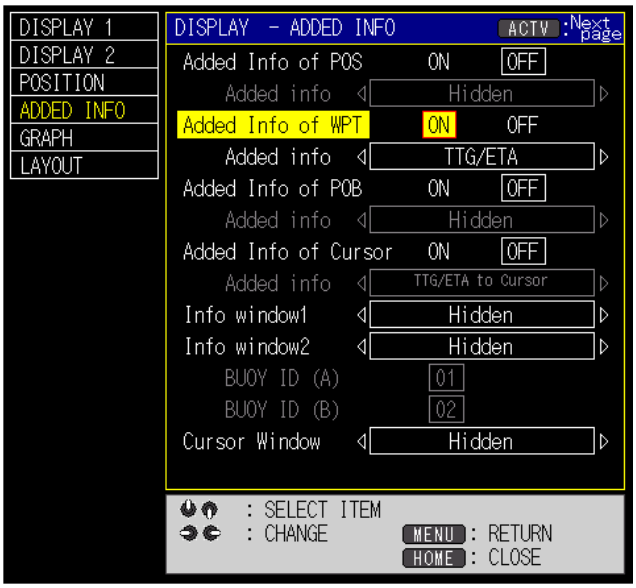
Add additional information display area to the waypoint window.



XTE (To the course)		The distance and direction from own ship's position to the WPT line are displayed.
XTE (From the course)		The distance and direction from the WPT line to own ship's position is displayed.
Passed time of WPT		The route number, waypoint number, and transit time of the waypoint are displayed.
Time required to WPT		The required time, route number and waypoint number to the waypoint are displayed.

Arrival time of WPT		The time of arrival at the waypoint, the route number, and the waypoint are displayed.
TTG/ETA		TTG (Time To Go) and ETA (Estimated Time of Arrival) are displayed.
Remaining route		The remaining distance in route navitation is displayed.
Remaining route/TTG		The remaining distance and TTG (Time To Go) in route navitation is displayed.
Remaining route/ ETA		The remaining distance ETA (Estimated Time of Arrival) are displayed.
Arrival date & time		The arrival date and time to the waypoint are displayed.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [ADDED INFO], and use joystick [→].
2. Use joystick [↑] [↓] to select [Added Info of WPT].

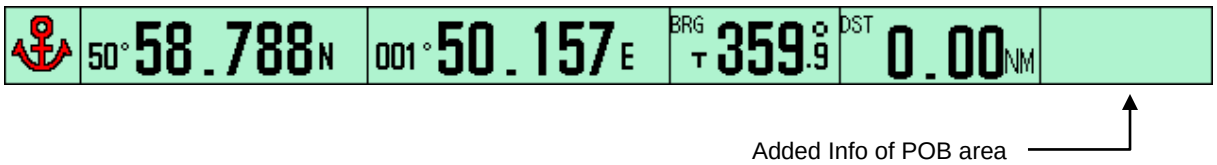


3. Use joystick [↑] [↓] to select [ON].
   Add additional information display area to waypoint window.
4. Use joystick [↑] [↓] to select [Added info].
5. Use joystick [←] [→] to select the display information.
6. Press [MENU] key several times to close the menu.

To hide the additional information display area, select [OFF] in step 3.

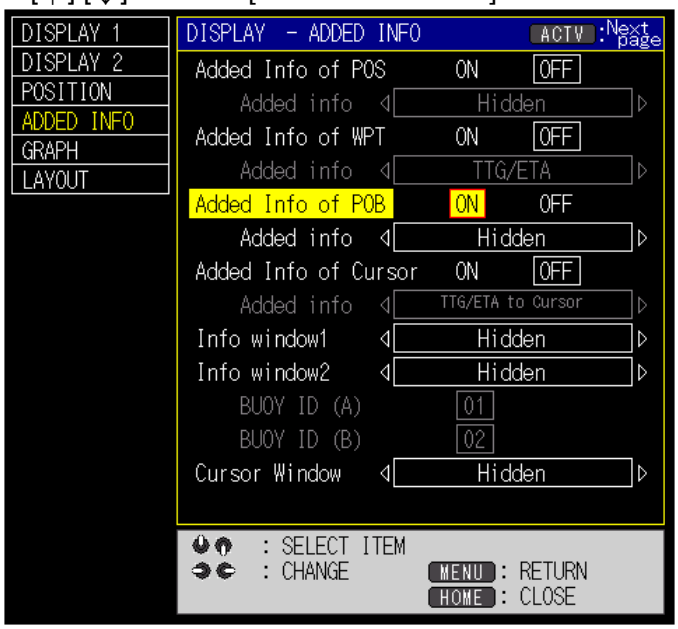
● Added Info of POB

Add additional information display area to the POB window.



Speed Average	AVE SPD 1.751kn	The travel distance from the POB point is displayed as the average speed. Can check the drift.
Elapsed time of POB	POB elapsed 00:13:54	The elapsed time since setting the POB is displayed.
Setting time of POB	POB Setting 12:28:58	The clock when the POB was set is displayed.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [ADDED INFO], and use joystick [→].
2. Use joystick [↑] [↓] to select [Added Info of POB].

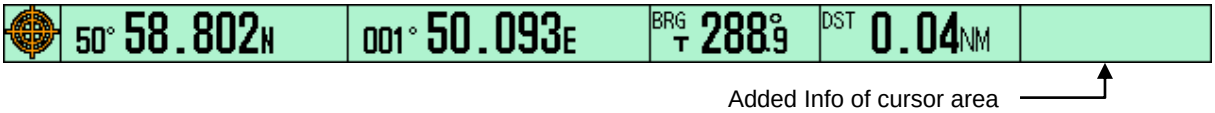


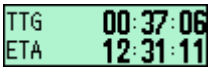
3. Use joystick [↑] [↓] to select [ON].
   Add additional information display area to POB window.
4. Use joystick [↑] [↓] to select [Added info].
5. Use joystick [←] [→] to select the display information.
6. Press [MENU] key several times to close the menu.

To hide the additional information display area, select [OFF] in step 3.

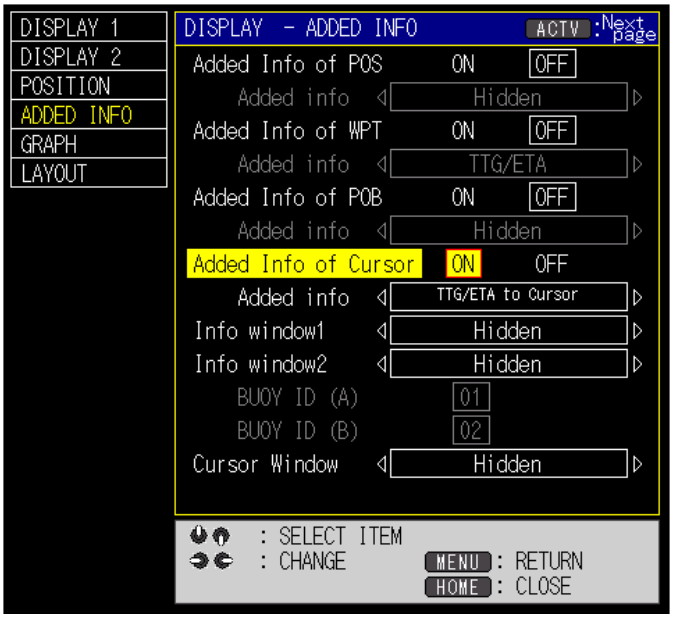
● Added Info of Cursor

Add additional information display area to the cursor window.



TTG/ETA to Cursor		TTG (Time To Go) and ETA (Estimated Time of Arrival) are displayed.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [ADDED INFO], and use joystick [→].
2. Use joystick [↑] [↓] to select [Added Info of Cursor].

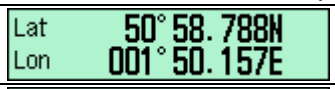
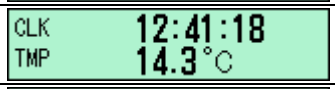
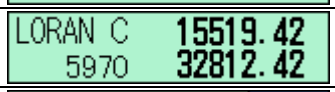
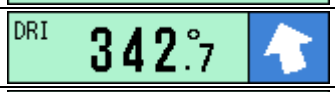
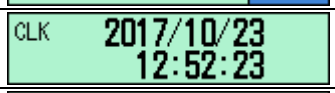
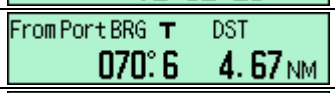
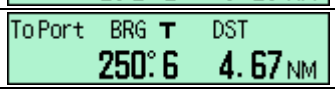
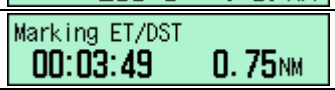
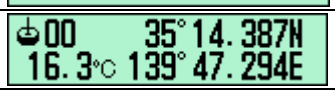
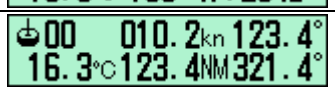
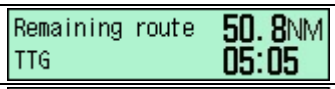
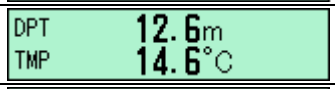
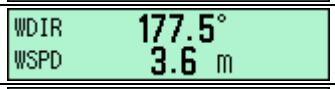
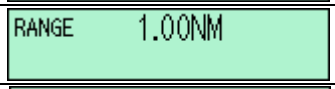
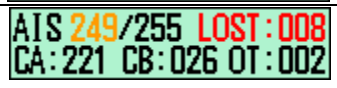
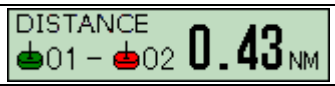


3. Use joystick [↑] [↓] to select [ON].
   Add additional information display area to cursor window.
4. Use joystick [↑] [↓] to select [Added info].
5. Use joystick [←] [→] to select the display information.
6. Press [MENU] key several times to close the menu.

To hide the additional information display area, select [OFF] in step 3.

● Info window1, Info window2

Up to two information windows can be displayed on the upper right of the screen.

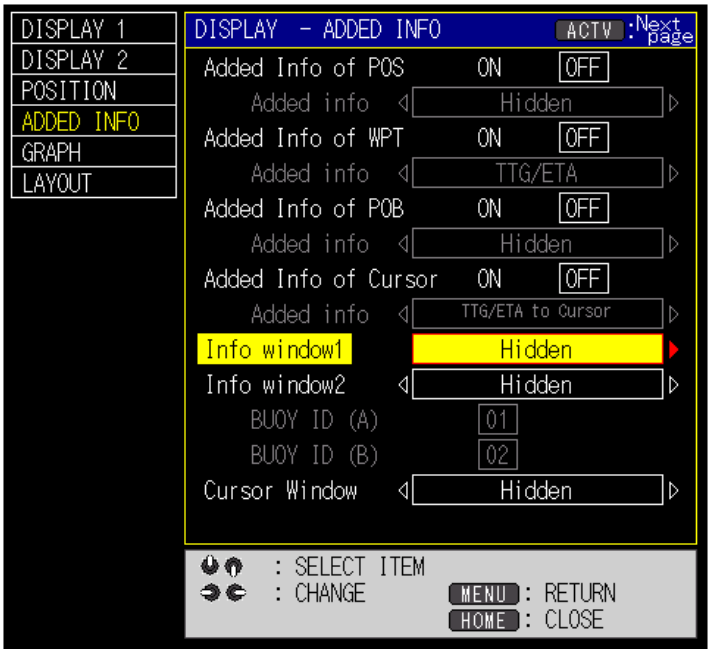
Lat/Lon		The latitude and longitude of own ship's position are displayed.
Clock/Water Temp.*1		The current time and the water temperature are displayed.
Clock/TTG		The current time and TTG (Time To Go) are displayed.
Clock/ETA		The current time and ETA (Estimated Time of Arrival) are displayed.
Loran C		Own ship's position with Lolan C is displayed.
Current Direction*2		Display the Current Direction. It is calculated by the difference from course and heading.
Clock		The current time is displayed.
From port*3		The distance and direction from own port to own ship's position are displayed.
To port*3		The distance and direction from own ship's position to own port are displayed.
Passed of mark		The elapsed time and distance since the mark input are displayed.
GPS buoy POS*4		The position of the GPS buoy is displayed. (The position is the latest received information.)
GPS buoy speed/HDG*4		The speed and heading of the GPS buoy are displayed. (The speed and the heading are the latest received information.)
Remaining route/TTG		The remaining distance and TTG (Time To Go) in route navitation is displayed.
Parallel line		The number, bearing, length, and interval of parallel line are displayed.
Depth*5/ W.Temp.*1		The water depth and the water temperature are displayed.
Wind*6		Wind direction and wind speed are displayed.
Scale		The current scale is displayed.
AIS*7		AIS information is displayed. AIS: Number of recieve targets LOST: Number of lost targets CA: Number of Class A targets CB: Number of Class B targets OT: Number of Other targets
GPS Buoy distance*8		Display the distance between GPS buoys. Buoy ID is specified by BUOY ID (A) and (B).

*1 To display the water temperature, a water temperature signal is required.
*2 To display the Current Direction, a heading signal is required.
*3 To display the [From port] or [To port], set own port position in [MAINTENANCE] => [OTHER].
*4 To display the GPS buoy information, it is necessary to connect with the GPS buoy receiver.

*5 To display the water depth, a water depth signal is required.
*6 To display the wind, a wind signal is required.
*7 To display the AIS, connection with the AIS receiver are required.
*8 To display the GPS Buoy distance, 2 or more GPS Buoys are set.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [ADDED INFO], and use joystick [→].

2. Use joystick [↑] [↓] to select [Info window1] (or [Info window2]).



3. Use joystick [←] [→] to select the display information.
4. Press [MENU] key several times to close the menu.

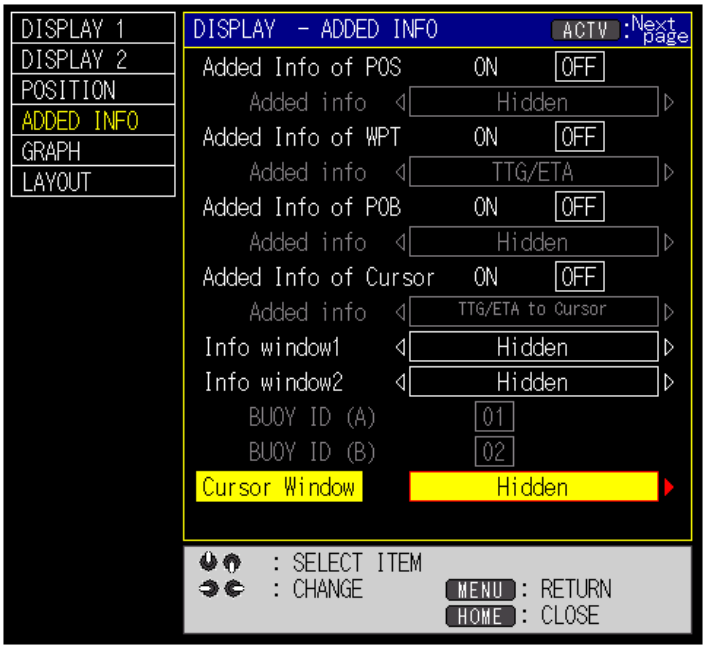
To hide the information window, select [OFF] in step 3.

● Cursor Window

Display the cursor position window on the upper right of the screen.

Lat/Lon	CSR 50°58.791N 001°50.157E	The latitude and longitude of the cursor position are displayed.
Loran C	CSR 5970 15520.24 32812.66	The Loran C of the cursor position is displayed.
TTG to Cursor	CSR TTG 00:14	TTG (Time To Go) to the cursor position is displayed.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [ADDED INFO], and use joystick [→].
2. Use joystick [↑] [↓] to select [Cursor Window].



3. Use joystick [←] [→] to select the display information.
4. Press [MENU] key several times to close the menu.

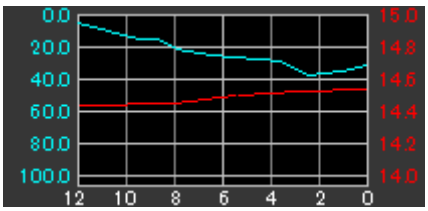
To hide the cursor window, select [OFF] in step 3.

Display water temperature / water depth graph

Water temperature / water depth graph can be displayed.

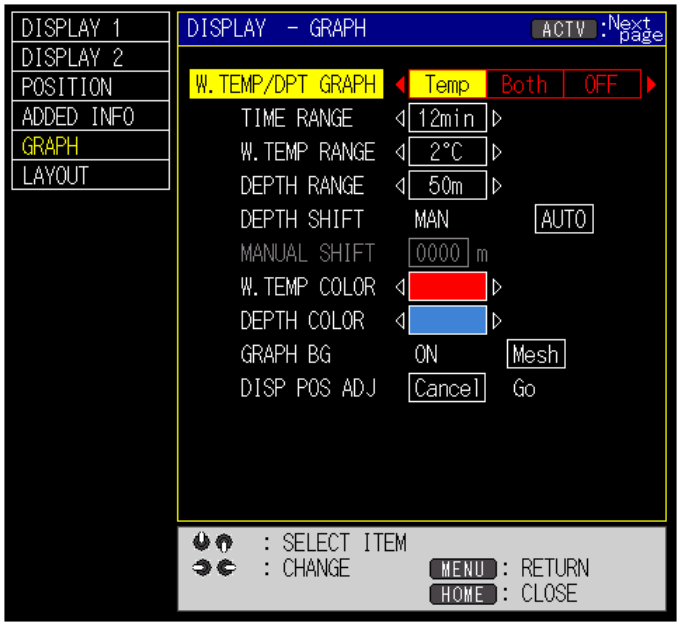
CAUTION: To display the water temperature graph, need a water temperature signal.

CAUTION: To display the water depth graph, need a water depth signal.



1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [DISPLAY], and use joystick [→].
   Use joystick [↑] [↓] to select [GRAPH], and use joystick [→].

2. Use joystick [↑] [↓] to select [W.TEMP/DEPTH GRAPH].



3. Use joystick [←] [→] to select the type of graph.

DPT	The water depth graph is displayed.
Temp	The water temperature graph is displayed.
Both	The water depth and temperature graph are displayed.

4. Use joystick [↑] [↓] to select a item to change.
5. Use joystick [←] [→] to change the setting.
6. Press [MENU] key several times to close the menu.

To hide the water temperature / water depth graph, select [OFF] in step 3.

● TIME RANGE

Select the time on the horizontal axis of the graph.

● W.TEMP RANGE

Select the range (change amount) from the top to the bottom of the water temperature graph.

● DEPTH RANGE

Select the range from top to bottom of the water depth graph.

● DEPTH SHIFT

There are two types of water depth shift as follows.

MAN	Depending on the water depth, the graph is no longer displayed, but always observe a specific depth.
AUTO	Automatically adjust the start depth according to the water depth so that the water depth graph is always displayed.

● MANUAL SHIFT

Set the start depth of the water depth graph.
You operate it when [DEPTH SHIFT] is set to [MAN].

● W.TEMP COLOR, DEPTH COLOR

Select the color of water temperature graph and water depth graph.

● GRAPH BG

Select the background of the water temperature graph from [ON] (Fill) or [Mesh].

● DISP POS ADJ

Change the display position of water temperature / water depth graph.
Select [Go] to display the confirmation screen, so adjust the display position as described on the screen.
The display position is memorized for each display screen. Adjust the display position each time switching display screen.

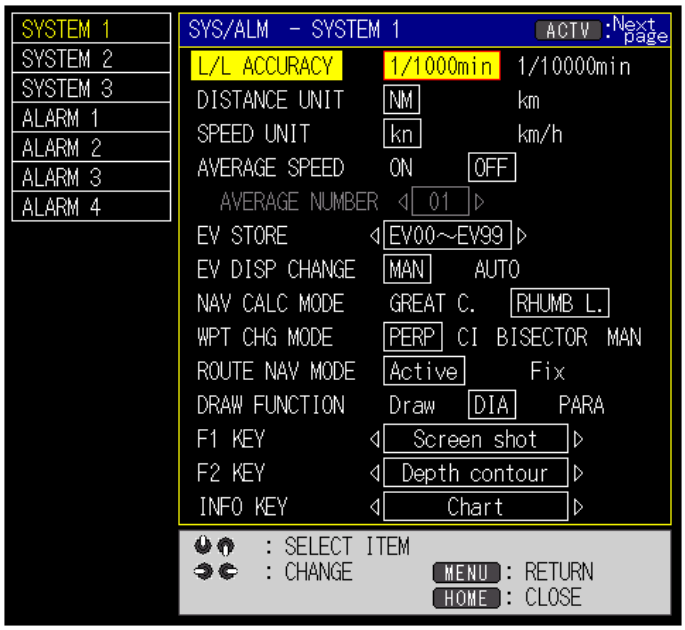
13.3 SYS/ALM menu

Configure settings related to the system. Refer to “Chapter 3” for system setting 3 and “Chapter 8” for alarms.

System 1

These settings are about the system; L/L ACCURACY, DISTANCE UNIT, SPEED UNIT, AVERAGE SPEED, AVERAGE NUMBER, EV STORE, EV DISP CHANGE, NAV CALC MODE, WPT CHG MODE, ROUTE NAV MODE, DRAW FUNCTION, F1/F2 KEY and INFO KEY.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM 1], and use joystick [→].
2. Use joystick [↑] [↓] to select the item.



3. Use joystick [←] [→] to change the setting.
4. Press [MENU] key several times to close the menu.

● L/L ACCURACY
Select the display of latitude and longitude from [1/1000 min] or [1/10000 min].

● DISTANCE UNIT
Select the unit of distance from [NM] or [km].

● SPEED UNIT
Select the unit of speed from [kn] or [km/h].

● AVERAGE SPEED
Set [ON] to stabilize the speed display when running at low speed.

● AVERAGE NUMBER
It can be set when [AVERAGE SPEED] is set to [ON].
Increasing the number will make the avarage level is high and own ship's speed is more stable. However, the tracking response of own ship becomes worse.

● EV STORE
Refer to "Chapter 3 Mark, 3.4 Event temporary store (EV)".

● EV DISP CHANGE
Refer to "Chapter 3 Mark, 3.4 Event temporary store (EV)".

● NAV CALC MODE
When waypoint is set, the direction and distance to the waypoint are displayed. You can choose a calculating method of the direction and distance from [GREAT C.] or [RHUMB L.].

GREAT C.	The intersection of the spherical surface and a plane containing the two points A and B and the center of the sphere.
RHUMB L.	A straight line on a Mercator projection.

● WPT CHG MODE
Refer to "Chapter 6 Route Navigation, 6.7 Setting the switching method of the waypoint".

● ROUTE NAV MODE
Refer to "Chapter 6 Route Navigation, 6.8 Setting the route navigation mode".

● DRAW FUNCTION
Refer to “Chapter 7 Drawing”.

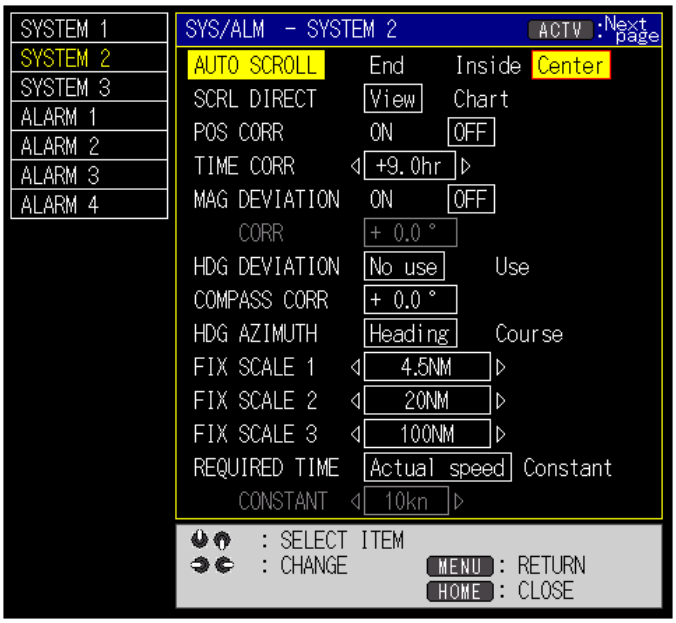
● F1 KEY
Refer to "Chapter 1 Basic Operation, 1.9 Use [F1] and [F2] keys".

● F2 KEY
Refer to "Chapter 1 Basic Operation, 1.9 Use [F1] and [F2] keys".

System 2

These settings are about the system; AUTO SCROLL, SCRL DIRECT, POS CORR, TIME CORR, MAG DEVIATION, CORR, HDG DEVIATION, COMPASS CORR, HDG AZIMUTH, FIX SCALE, REQUIRED TIME and CONSTANT.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM 2], and use joystick [→].
2. Use joystick [↑] [↓] to select the item.



3. Use joystick [←] [→] to change the setting.
   To enter a numerical value, Use joystick [→] to move the cursor to the numerical value input box.
   Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→].
   *Can also enter by pressing the numeric keypad.
   After entering the numerical value, use joystick [→] a few times to exit from the numerical value input box.
4. Press [MENU] key several times to close the menu.

● AUTO SCROLL

When own ship moves, select the method to rewrite the screen so that own ship's position on the screen does not protrude from the screen.

End	When own ship's position moves to the edge of the screen, screen will refresh.
Inside	When own ship's position moves to a position slightly inside the edge of the screen, screen will refresh.
Center	Rewrite the screen as own ship moves so that own ship's position is always at the center of the screen.

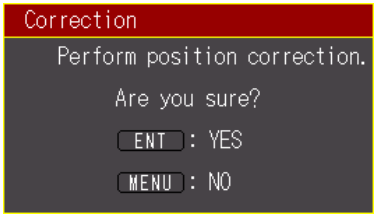
● SCRL DIRECT

Refer to "Chapter 2 Plotter display, 2.5 Move the chart".

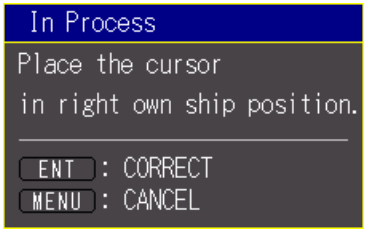
● POS CORR

The coastline position may be slightly different from the actual position. For example, if own ship is in the harbor but it is displayed in different location, such as on land. In this case, correction is required.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM 2], and use joystick [→].
2. Use joystick [↑] [↓] to select [POS CORR].
3. Use joystick [←].
   The [Correction] window is displayed.



4. Press [ENT] key.
   [In Process] window and cursor are displayed.



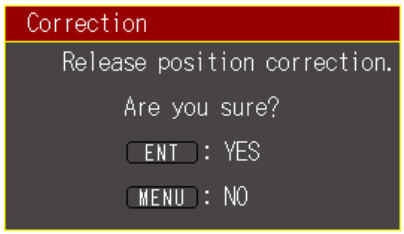
5. Move the cursor to the correct own ship's position.

> ⚠ **CAUTION: Position correction is within 2 NM from own ship.**

6. Press [ENT] key.
7. Own ship moves to the cursor position and a position correction mark () is displayed at the lower left of the screen.

   To cancel the position correction, perform the procedure after step 8.

8. In step 3, use joystick [→].
   The [Correction] window is displayed.



9. Press [ENT] key.
   The position correction is canceled and the position correction mark (▣) disappears in the lower left of the screen.
10. Press [MENU] key several times to close the menu.

● TIME CORR

You can correct the time input from the external device to a local time. When GPS antenna is connected, time information is received as UTC (Universal standard time).

● MAG DEVIATION, CORR

GTD-120 calculates the bearing in the true bearing. When [COURSE DISP] of [DISPLAY 1] is set to [MAG], it is necessary to correct the magnetic deviation. In GTD-120, all magnetic deviation on the earth is memorized, so you can use [AUTO]. In order to improve the accuracy more, input the deviation value written on the latest actural marine chart by [MAN].

1. Use joystick [↑] [↓] to select [MAG DEVIATION].
2. Use joystick [←] [→] to select [MAN].
3. Use joystick [↑] [↓] to select [CORR].
4. Use joystick [→] to move the cursor to the numerical value input box and input the magnetic deviation value.
5. Press [MENU] key several times to close the menu.

● HDG DEVIATION

Set this when using the HDG sentence. When you navigate with a true bearing, set [Use].
When you navigate with a magnetic bearing, set [No use].

● COMPASS CORR

When the heading and the actual bearing are different, correction can be made.

● HDG AZIMUTH

Select heading to be displayed in own ship's position information from [Heading] or [Course].

● FIX SCALE 1 / 2 / 3

Refer to "Chapter 2 Plotter display, 2.6 Zoom in / out the chart".

● REQUIRED TIME

Refer to "Chapter 5 Waypoint Navigation, 5.7 Setting the ship speed for calculating the TTG".

● CONSTANT

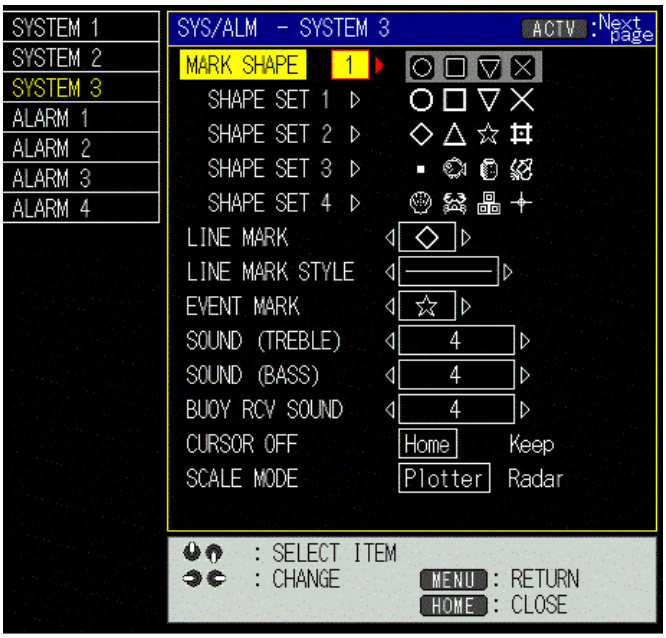
Refer to "Chapter 5 Waypoint Navigation, 5.7 Setting the ship speed for calculating the TTG".

System 3

These settings are about the system; MARK SHAPE, SHAPE SET, LINE MARK, EVENT MARK, SOUND, CURSOR OFF and SCALE MODE.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [SYS/ALM], and use joystick [→].
   Use joystick [↑] [↓] to select [SYSTEM 3], and use joystick [→].

2. Use joystick [↑] [↓] to select the item.



3. Use joystick [←] [→] to change the setting.
   To enter a numerical value, Use joystick [→] to move the cursor to the numerical value input box.
   Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→] .
   *Can also enter by pressing the numeric keypad.
   After entering the numerical value, use joystick [→] a few times to exit from the numerical value input box.
4. Press [MENU] key several times to close the menu.

● MARK SHAPE

Refer to "Chapter 3 Mark, 3.7 Switching the mark shape set".

● SHAPE SET 1 to 4

Change the contents of the mark shape set.

1. Use joystick [↑] [↓] to select [SHAPE SET 1] to [SHAPE SET 4] you want to change.
2. Use joystick [→].

3. Use joystick [↑] [↓] to select the key assign.
4. Use joystick [←] [→] to select the mark shape.
5. Press [MENU] key several times to close the menu.

● LINE MARK STYLE

Refer to “Chapter 3 Mark, 3.2 Enter a marked line”, “Change mark shape of marked line” and “Change line style of marked line”.

● EVENT MARK

When a sentence of the external event mark (TLL) is recieved from an external device (Echo sounder, radar, etc.), the point is registered as a mark including the latitude and longitude.
This setting is to select the shape of the external event mark shape.

● SOUND (TREBLE) / SOUND (BASS) / BUOY RCV SOUND

Change the tone of the operation sound. Select the appropriate tone according to the usage environment.
Select [OFF], [1] to [7] for [Treble] and [Bass] respectively.
[1] is the lowest tone, the tone increases step by step, [7] is the highest tone.

SOUND (TREBLE)	Setting of the sound which is sounded by normal operation.
SOUND (BASS)	Setting of the sound which sounds when input is not accepted.
BUOY RCV SOUND	Setting of the sound which sounds when BLV sentence is received.

● CURSOR OFF

Set the map display operation when the cursor is set to OFF (not display).
For setting, select from [Home] or [Keep].

Home	When the cursor is OFF (not displayed), the map is moved to the center of own ship, and the scale will be returned to the status of before cursor ON.
Keep	When the cursor is OFF, keep the map display position. If you need to return the map display to own ship's position, press [Home] key.

● SCALE MODE

Set scale range when [Zoom in], [Zoom out], [SCL 1], [SCL 2], and [SCL 3] are pressed.
For setting, select from [Plotter] or [Radar].

Plotter	The range value is displayed as screen width.
Radar	The range value is displayed like radar method as radius.

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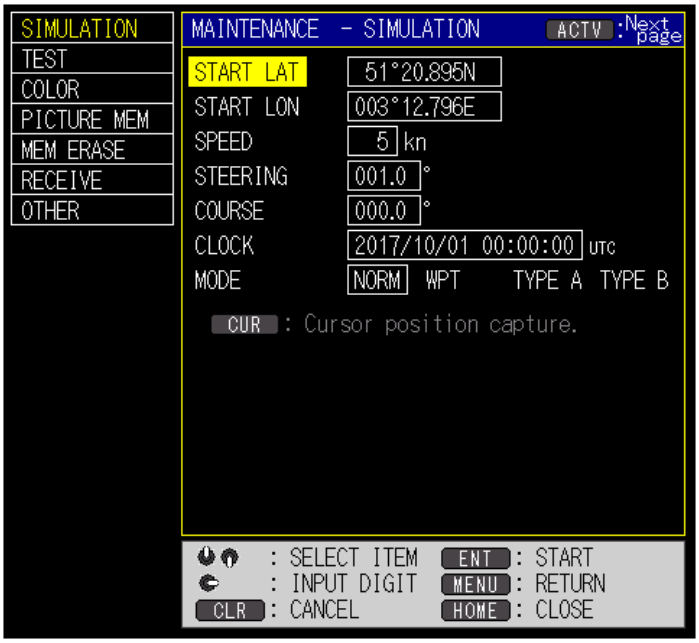
Chapter 14 Maintenance

14.1 Simulation

Using simulation, you can try to operate the plotter without navigation. All keys are available to operate in the same way as normal.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [SIMULATION], and use joystick [→].
2. Use joystick [↑] [↓] to select the item.



3. Use joystick [←] [→] to change the setting.
   To enter a numerical value, Use joystick [→] to move the cursor to the numerical value input box.
   Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→].
   *Can also enter by pressing the numeric keypad.
   After entering the numerical value, use joystick [→] a few times to exit from the numerical value input box.
4. Press [ENT] key to start simulation.

   To cancel the simulation, press [CLR] in step 2.

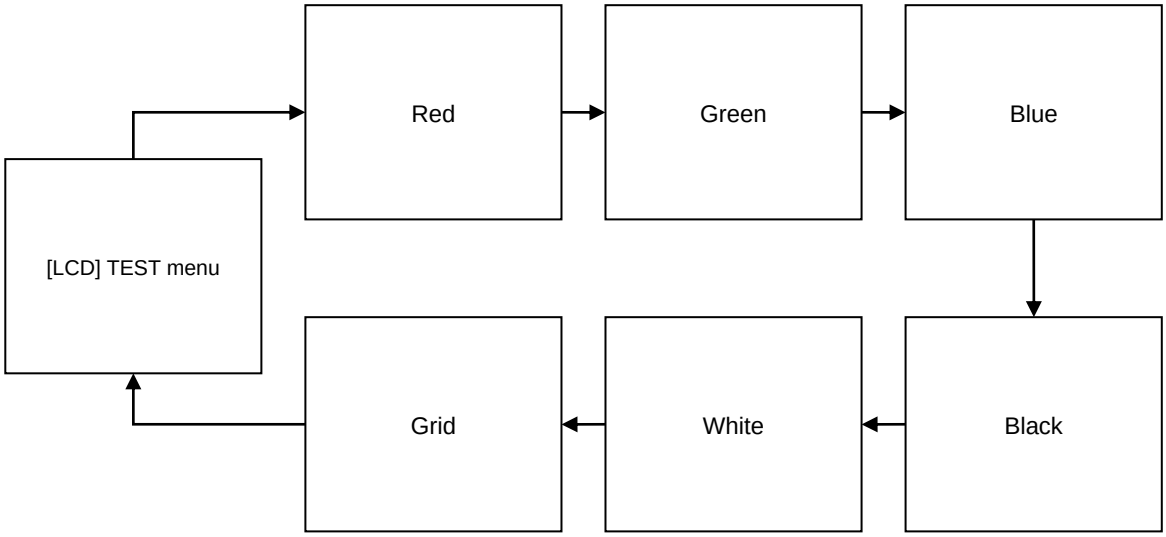
14.2 System test

This section explains the test items for checking the operation status of GTD-120. There are 7 types of system tests: LCD test, memory test, operation unit test, brightness test, communication test, system information and power supply information.

● LCD

This test is to see if the color of the screen is displayed correctly.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [TEST], and use joystick [→].
2. Use joystick [↑] [↓] to select [LCD].
3. Use joystick [→].
4. Press [ENT] key.
   Each time press [ENT] key, the test pattern switches as follows.



5. Press [MENU] key during the test to return to the [LCD Test] menu.
6. Press [MENU] key several times to close the menu.

● MEMORY

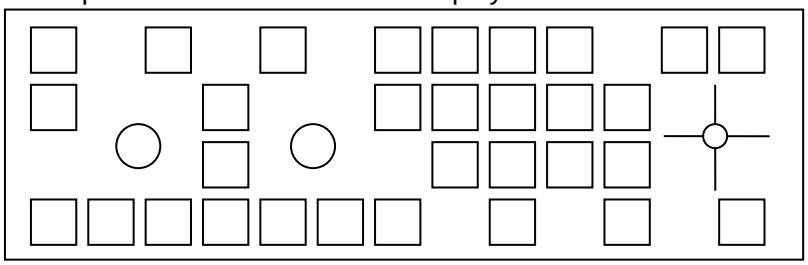
This test checks each memory circuit. There is some problem when it is displayed as [NG].
If [NG] is displayed, please contact for repair.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [TEST], and use joystick [→].
2. Use joystick [↑] [↓] to select [MEMORY].
3. Use joystick [→].
4. Press [ENT] key.
   The check is started.
5. Confirm that [OK] is displayed for all items.
   *To display [SD CARD] in [OK], need to insert a commercially available SD card in the SD card slot.
6. Press [MENU] key several times to close the menu.

● OPE UNIT

This test checks whether the key operation of the operation unit is performed normally or whether the buzzer sounds normally.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [TEST], and use joystick [→].
2. Use joystick [↑] [↓] to select [OPE UNIT].
3. Use joystick [→].
   The cursor move to [BUZZER].
4. Use joystick [←] [→] to select [TREBLE] or [BASS].
5. Press [ENT] key.
   Operation unit test screen is displayed.



6. Check the keys, knobs and joystick.
   In checking the key, if it is normal, pressing the key changes the position corresponding to the key on the screen to gray.
   In the check of the knob, it is normal if the position corresponding to the knob on the screen changes from green → red → yellow → cyan → blue → pink → white every time the knob is turned clockwise.
   In checking the joystick check, when you move the joystick, the position corresponding to the joystick on the screen moves in the same direction.
7. To end the test, press any key twice to return to the [OPE UNIT] menu.
8. Press [MENU] key several times to close the menu.

● BRILL

This test confirms whether the brightness of the screen and the brightness of the operation panel are properly illuminated.

> ⚠ **CAUTION: The brightness settings are applied to the screen brightness adjustment and panel adjustment brightness immediately.**

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [TEST], and use joystick [→].
2. Use joystick [↑] [↓] to select [BRILL].
3. Use joystick [→].
   The cursor move to [LCD BRIGHT].
4. Use joystick [↑] [↓] to select the item.
   Every time use joystick [↑] [↓], the LCD brightness or panel brightness is illuminated with the set brightness.
5. To change the brightness, use joystick [→] to move the cursor to the numerical value input box.

Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→].
*Can also enter by pressing the numeric keypad.
After entering the numerical value, use joystick [→] a few times to exit from the numerical value input box.

6. Press [MENU] key several times to close the menu.

● COM

This test confirms the signal input / output circuit. To do this test, a special jig is required.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [TEST], and use joystick [→].
2. Use joystick [↑] [↓] to select [COM].
3. Use joystick [→].
   The cursor moves to [PORT].
4. Use joystick [←] [→] to select the connector to test.
5. Use joystick [↑] [↓] to select [TEST SIGNAL].
6. Use joystick [←] [→] to select [TRANS].
   Transmit the test signal.
   Confirm that [OK] number is increased. If [NG] number is increased while connected with a test tool, please contact for repair.
7. To test with another connector, repeat steps 4 to 6.
8. Press [MENU] key several times to close the menu.

● SYS INFO

System information is a screen to check the version etc. of the modules that make up GTD-120.

IPL	Version information of boot program.
System	Version information of system program. The same version number is displayed on the opening screen.
FPGA	Version information of the program used for the integrated circuit.
Panel	Version information of the program used for the operation panel.
AIS	Version information of the program used for the AIS board. It is not displayed when the AIS board is not installed.
PICC	Version information of the IC that controls peripheral circuits.

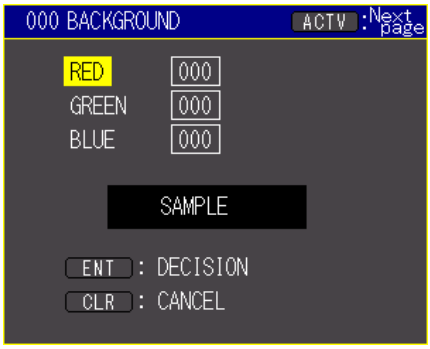
●POW INFO

The power supply information provides the current power status and past 10 records of "ABNORMAL HISTORY".

14.3 Color palette

You can change the item color by color palette. Set 3 primary colors of red, green and blue.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [COLOR], and use joystick [→].
2. Use joystick [↑] [↓] to select the color palette number you want to change.
   Press [Zoom out] to display the color palette screen of the next page.
   Press [Zoom in] to display the color palette screen of the previous page.
3. Use joystick [→].
   The sub window is displayed.



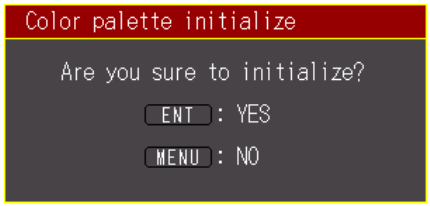
4. Use joystick [→] to move the cursor to the numerical value input box.
   Use joystick [↑] to increase the number, and use joystick [↓] to decrease the number. Also, move the digit with [←] [→].
   While looking at the [SAMPLE], change to the color of favorite choice.
   After entering the numerical value, use joystick [←] [→] a few times to exit from the numerical value input box.
5. After setting "RED", "GREEN", "BLUE", press [ENT] key. It changes to the color.
   Representative color settings are shown in the table below.

	RED	GREEN	BLUE
Black	0	0	0
Blue	0	0	255
Green	0	255	0
Light blue	0	255	255
Red	255	0	0
Pink	255	0	255
Yellow	255	255	0
White	255	255	255
Orange	255	152	0
Navy blue	0	0	128
Gray	128	128	128

6. Repeat steps 2 through 5 as necessary.
7. Press [MENU] key several times to close the menu.

CAUTION: **If you press [CLR] key in step 3 (displaying the sub window), the color of the color palette selected in step 2 will return to the factory default color.**

CAUTION: **In step 2, press [INFO] key to display the [Color palette initialize] window.**



Press [ENT] key, all color palettes will return to the factory default color.

Color palette list

No.	Color name	Initial			No.	Color name	Initial		
		R	G	B			R	G	B
0	BACKGROUND	0	0	0	64	TGT TRK WHITE	255	255	255
1	GREEN	0	128	0	65	HEADING LINE	255	255	255
2	RED	255	0	0	66	CURRENT DIRECTION LINE	58	128	208
3	YELLOW	255	255	0	67	CURSOR LINE	58	128	208
4	CYAN	0	0	128	68	AIS SYMBOL	255	255	255
5	BLUE	58	128	208	69	WPT DIRECTION LINE	0	0	0
6	PINK	255	0	255	70	BG of OPERATION GUIDE	204	204	204
7	WHITE	255	255	255	71	FLOATING VRM	255	255	255
8	BLACK	0	0	0	72	CURSOR	255	152	0
9	DARK GRAY	64	64	64	73	COURSE LINE	255	255	255
10	GRAY	128	128	128	74	TGT CRS LINE	0	255	0
11	LIGHT GRAY	192	192	192	75	RING MARKER	255	255	255
12	DARK RED	144	0	0	76	DATUM	255	255	255
13	PURPLE	128	0	128	77	Reserve*1			
14	ORANGE	255	152	0	78	Reserve*1			
15	LIGHT GREEN	0	255	0	79	W_TEMP/DPT GRAPH G	0	128	0
16	LIGHT BLUE	0	255	255	80	W_TEMP/DPT GRAPH R	255	0	0
17	Reserve*1	170	242	203	81	W_TEMP/DPT GRAPH Y	255	255	0
18	Reserve*1	64	128	128	82	W_TEMP/DPT GRAPH C	0	0	128
19	Reserve*1	128	128	0	83	W_TEMP/DPT GRAPH B	58	128	208
20	Reserve*1	255	204	152	84	W_TEMP/DPT GRAPH P	255	0	255
21	Reserve*1	255	152	204	85	W_TEMP/DPT GRAPH W	255	255	255
22	Reserve*1	0	120	68	86	AREA ALARM RED	255	0	0
23	Reserve*1	129	90	51	87	AREA ALARM BLUE	58	128	208
24	Reserve*1	86	60	34	88	AREA ALARM YELLOW	255	255	0
25	TRACK GREEN	0	128	0	89	AREA ALARM GREEN	0	128	0
26	TRACK RED	255	0	0	90	AREA ALARM ORANGE	255	152	0
27	TRACK YELLOW	255	255	0	91	AREA ALARM GRAY	128	128	128
28	TRACK CYAN	0	0	128	92	AREA ALARM PINK	255	0	255
29	TRACK BLUE	58	128	208	93	AREA ALARM CYAN	0	0	128
30	TRACK PINK	255	0	255	94	AREA ALARM LIGHT BLUE	0	255	255
31	TRACK WHITE	255	255	255	95	AREA ALARM WHITE	255	255	255
32	TRACK ORANGE	255	152	0	96	GPS BUOY GREEN	0	128	0
33	MEM TRK GREEN	0	128	0	97	GPS BUOY RED	255	0	0
34	MEM TRK RED	255	0	0	98	GPS BUOY YELLOW	255	255	0
35	MEM TRK YELLOW	255	255	0	99	GPS BUOY CYAN	0	0	128
36	MEM TRK CYAN	0	0	128	100	GPS BUOY BLUE	58	128	208
37	MEM TRK BLUE	58	128	208	101	GPS BUOY PINK	255	0	255
38	MEM TRK PINK	255	0	255	102	GPS BUOY WHITE	255	255	255
39	MEM TRK WHITE	255	255	255	103	GPS BUOY (DARK) GREEN	0	64	0
40	MEM TRK ORANGE	255	152	0	104	GPS BUOY (DARK) RED	128	0	0
41	MARK GREEN	0	128	0	105	GPS BUOY (DARK) YELLOW	128	128	0
42	MARK RED	255	0	0	106	GPS BUOY (DARK) CYAN	0	0	64
43	MARK YELLOW	255	255	0	107	GPS BUOY (DARK) BLUE	40	40	128
44	MARK CYAN	0	0	128	108	GPS BUOY (DARK) PINK	128	0	128
45	MARK BLUE	58	128	208	109	GPS BUOY (DARK) WHITE	128	128	128
46	MARK PINK	255	0	255	110	Reserve*1			
47	MARK WHITE	255	255	255	111	Reserve*1			
48	WPT MARK	255	0	0	112	Reserve*1			
49	POB MARK	255	0	0	113	Reserve*1			
50	WPT LINE	255	0	0	114	Reserve*1			
51	RTE LINE	0	0	0	115	Reserve*1			
52	RTE POINT	0	0	0	116	Reserve*1			
53	XTE LINE	255	0	0	117	Reserve*1			
54	ARRIVAL ALARM LINE	255	0	0	118	Reserve*1			
55	POB ALARM LINE	255	0	0	119	Reserve*1			
56	BG of POSINFO	170	242	203	120	Reserve*1			
57	VRM	255	255	255	121	Reserve*1			
58	TGT TRK GREEN	0	128	0	122	Reserve*1			
59	TGT TRK RED	255	0	0	123	Reserve*1			
60	TGT TRK YELLOW	255	255	0	124	Reserve*1			
61	TGT TRK CYAN	0	0	128	125	Reserve*1			
62	TGT TRK BLUE	58	128	208	126	Reserve*1			
63	TGT TRK PINK	255	0	255					

*1 Do not change “reserve” color.

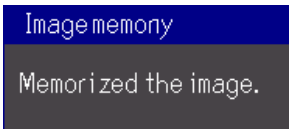
14.4 Screen shot

Up to 100 pictures can be stored as screen shots. Stored pictures can be displayed on GTD-120. To store pictures as a bitmap file in the SD card, refer to “Chapter 12 Save to SD card and import from SD card to Display unit, 12.2 Save data to SD card".

Execute screen shot

To store a screen shot, it is necessary to set [Screen shot] in [F1] or [F2] key.
Refer to "Chapter 1 Basic Operation, 1.9 Use [F1] and [F2] keys".

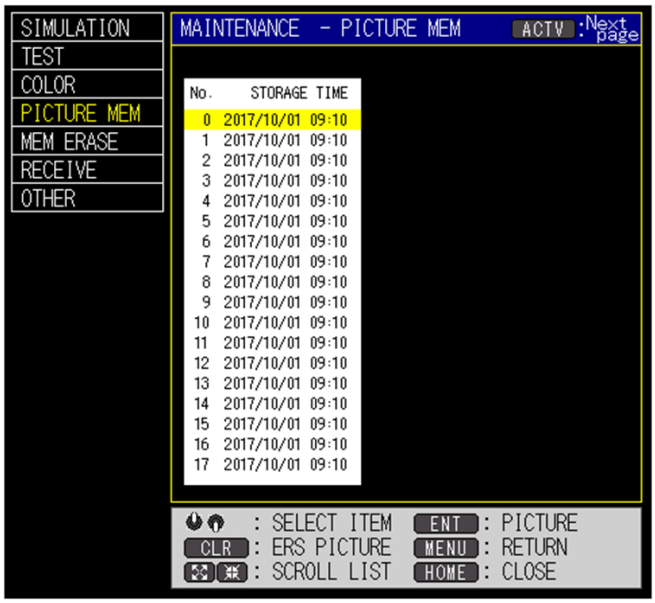
1. Press [F1] or [F2] key.
   The following message is displayed and the picture being displayed is memorized.



Display of stored pictures

Saved picture can be displayed on GTD-120.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [PICTURE MEM], and use joystick [→].
2. Use joystick [↑] [↓] to select the number to display.
   Press [Zoom out] to display the stored picture list screen of the next page.
   Press [Zoom in] to display the stored picture list screen of the previous page.



3. Press [ENT] key.
   Display the picture with the selected number.

   While displaying, "Replaying" and numbers are displayed at the upper left of the screen.
   Use joystick [↑] to display the picture with the previous number.
   Use joystick [↓] to display the picture with the next number.
4. Press [MENU] key several times to close the menu.

Erase stored pictures

There are 2 ways to erase stored pictures.

Erase the picture being displayed

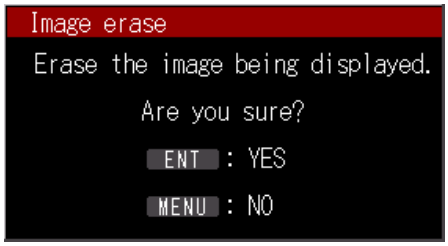
Erase the picture of the selected number from stored picture list.

> ⚠ **CAUTION: Erased pictures can not be recovered.**

● Erase the picture being displayed

Refer to the previous section to display the memorized picture.

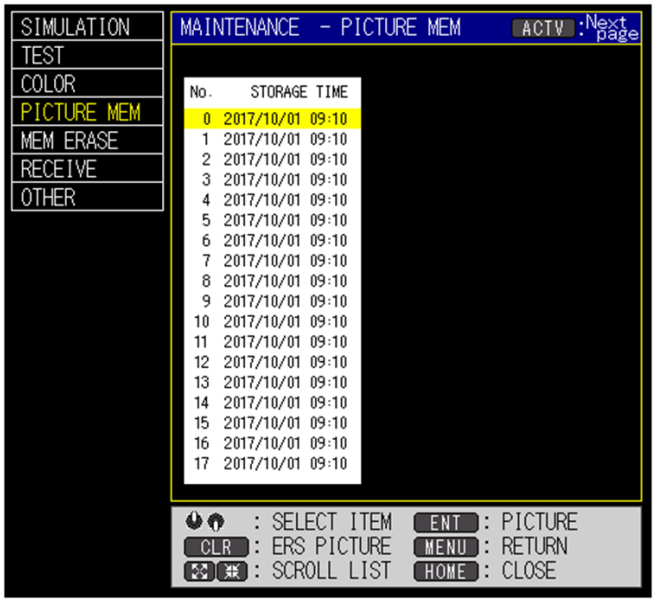
1. Press [CLR] key during picture display.
   The following message will be displayed.



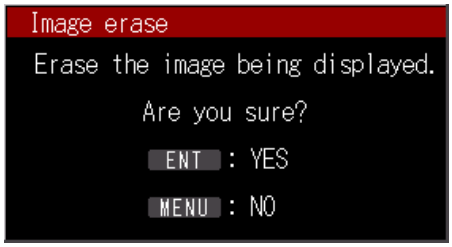
2. Press [ENT] key.
   Erase the picture being displayed.

● Erase the picture of the selected number from stored picture list.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [PICTURE MEM], and use joystick [→].
2. Use joystick [↑] [↓] to select the number to erase.
   Press [Zoom out] to display the stored picture list screen of the next page.
   Press [Zoom in] to display the stored picture list screen of the previous page.



3. Press [CLR] key.
   The following message will be displayed.



4. Press [ENT] key.
   Erase the picture.

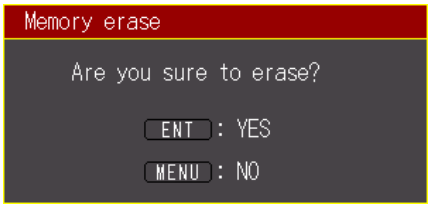
14.5 Memory erase

Erase the data saved in the memory of GTD-120. However, it is not possible to undo erased data, so be careful when erasing it.

Erase mark

Marks can be erased by each block.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [MEM ERASE], and use joystick [→].
2. Use joystick [↑] [↓] to select [MARK].
3. Use joystick [→].
   The cursor move to [BLOCK A].
4. Use joystick [↑] [↓] to select the block to erase.
5. Use joystick [→].
   The cursor move to [YES].
   Similarly, move to the block to be erased and select [YES].
6. Press [ENT] key.
   [Memory erase] window is displayed.



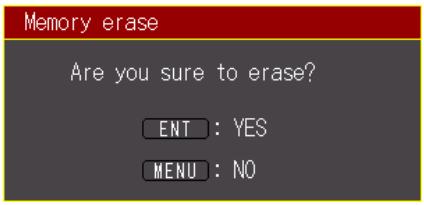
7. Press [ENT] key.
   Erase the data.
8. Press [MENU] key several times to close the menu.

Erase track

Tracks can be erased by each block.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [MEM ERASE], and use joystick [→].

2. Use joystick [↑] [↓] to select [OWN TRACK].
3. Use joystick [→].
   The cursor move to [TRACK].
4. Use joystick [↑] [↓] to select the block to erase.
5. Use joystick [→].
   The cursor move to [YES].
   Similarly, move to the block to be erased and select [YES].
6. Press [ENT] key.
   [Memory erase] window is displayed.

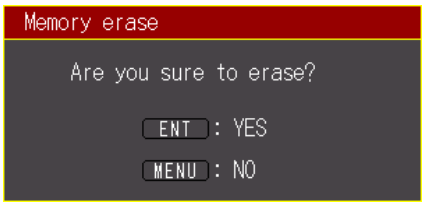


7. Press [ENT] key.
   Erase the data.
8. Press [MENU] key several times to close the menu.

Erase drawing

Drawings can be erased by each block.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [MEM ERASE], and use joystick [→].
2. Use joystick [↑] [↓] to select [DRAWING].
3. Use joystick [→].
   The cursor move to [BLOCK 01].
4. Use joystick [↑] [↓] to select the block to erase.
   Press [Zoom out] to display the drawing list screen of the next page.
   Press [Zoom in] to display the drawing list screen of the previous page.
5. Use joystick [→].
   The cursor move to [YES].
   Similarly, move to the block to be erased and select [YES].
6. Press [ENT] key.
   [Memory erase] window is displayed.

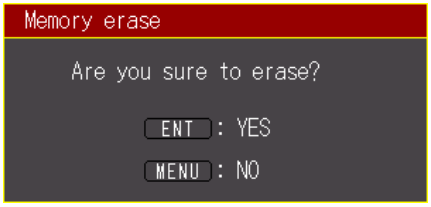


7. Press [ENT] key.
   Erase the data.
8. Press [MENU] key several times to close the menu.

Erase TGT track

TGT tracks can be erased by each block.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [MEM ERASE], and use joystick [→].
2. Use joystick [↑] [↓] to select [TGT TRACK].
3. Use joystick [→].
   The cursor move to [TGT TRACK 00].
4. Use joystick [↑] [↓] to select the block to erase.
   Press [Zoom out] to display the TGT track list screen of the next page.
   Press [Zoom in] to display the TGT track list screen of the previous page.
5. Use joystick [→].
   The cursor move to [YES].
   Similarly, move to the block to be erased and select [YES].
6. Press [ENT] key.
   [Memory erase] window is displayed.

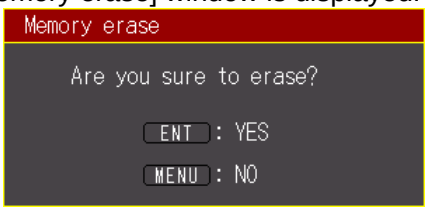


7. Press [ENT] key.
   Erase the data.
8. Press [MENU] key several times to close the menu.

Erase route

Routes can be erased by each block.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [MEM ERASE], and use joystick [→].
2. Use joystick [↑] [↓] to select [ROUTE].
3. Use joystick [→].
   The cursor move to [ROUTE 01].
4. Use joystick [↑] [↓] to select the block to erase.
   Press [Zoom out] to display the route list screen of the next page.
   Press [Zoom in] to display the route list screen of the previous page.
5. Use joystick [→].
   The cursor move to [YES].
   Similarly, move to the block to be erased and select [YES].
6. Press [ENT] key.
   [Memory erase] window is displayed.

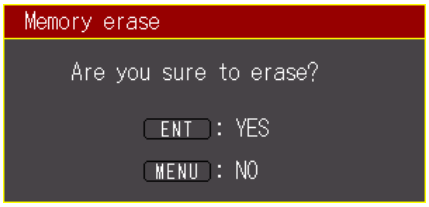


7. Press [ENT] key.
   Erase the data.
8. Press [MENU] key several times to close the menu.

Erase picture

Pictures can be erased all at once.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [MEM ERASE], and use joystick [→].
2. Use joystick [↑] [↓] to select [PICTURE].
3. Use joystick [→].
   The cursor move to [PICTURE FILE].
4. Use joystick [→].
   The cursor move to [YES].
5. Press [ENT] key.
   [Memory erase] window is displayed.



6. Press [ENT] key.
   Erase the data.
7. Press [MENU] key several times to close the menu.

14.6 Regist own port

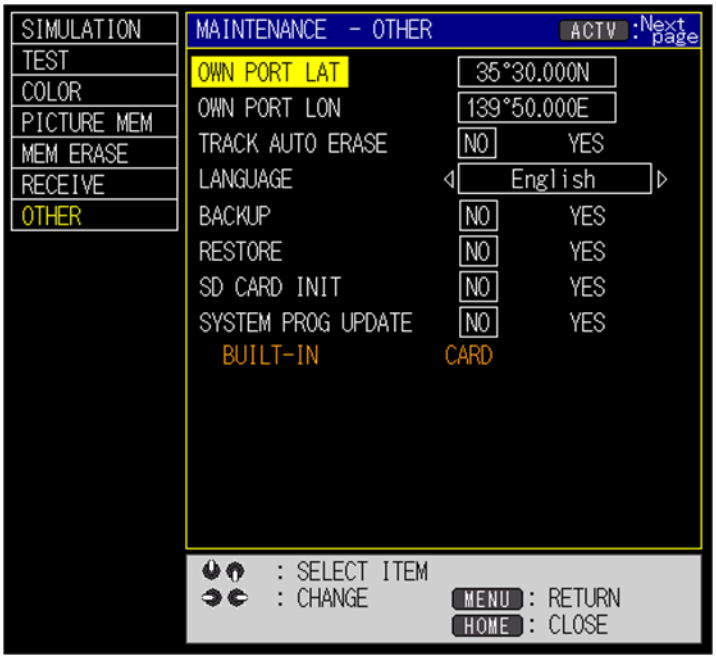
By registering own port, the following functions can be used effectively.

By selecting [From port] in [Info window1] or [Info window2], always monitor the distance and direction from own port to own ship position. By selecting [To port] in [Info window1] or [Info window2], always monitor the distance and direction from own ship position to own port.

Set own port as a waypoint.

1. Press [MENU] key to display the menu screen.
   Use joystick [↑] [↓] to select [MAINTENANCE], and use joystick [→].
   Use joystick [↑] [↓] to select [OTHER], and use joystick [→].

2. Use joystick [↑] [↓] to select [OWN PORT LAT].



3. Use joystick [→] , enter the numeric input state, so enter the latitude of own port.
4. Press [ENT] key to regist the latitude of own port.
5. Use joystick [↑] [↓] to select [OWN PORT LON].
6. Use joystick [→] , enter the numeric input state, so enter the longitude of own port.
7. Press [ENT] key to regist the longitude of own port.
8. Press [MENU] key several times to close the menu.

*Press [INFO] key while [OWN PORT LAT] or [OWN PORT LON] is selected, the current own ship's position is imported as its own port’s latitude / longitude.

Chapter 15 Inspection

15.1 Inspection

The daily maintenance and inspection extend the life of equipment. To keep the equipment always in the best conditions, implement the periodical inspection shown in the table below.

Item	Inspection item
Connectors at the rear of the Display unit	Check the looseness
Wiring of cables	Check the wiring of cables connecting the equipment and the damage of cable
Grounding of Display unit	Scrape the rust off the ground terminal and keep good contact.

15.2 Cleaning

Display unit

Contamination on the screen may cause faint images. For cleaning the screen, wipe it with soft and clean cloth dipped in diluted neutral detergent. Pay full attention as the screen gets scratched easily. No solvent such as thinner shall be used.

Caution **The display screen has a special coating. Do not use a solvent such as paint thinner, acetone, alcohol, and benzene, etc. Strong rubbing may cause scratch.**

For cleaning the chassis, do not use solvent such as thinner or alcohol. Painting on the surface and characters at the operating unit may be dissolved. After wiping with soft and clean cloth dipped with diluted neutral detergent, wipe away with dry soft and clean cloth.

15.3 Fuse Replacement

Warning Use the specified fuse. If you use a fuse other than specified one, it may lead to a serious accident.

Fuse blows out when such a trouble occurs inside at too high input voltage or over current. Please replace with the fuse listed in the list of standard components.

15.4 If you suspect a trouble

Symptom	Possible cause of trouble	Countermeasure
Even if the power is powered on, nothing is displayed.	The fuse is blown. The power supply voltage is out of the specified range (10.8 to 31.2 VDC). Faulty connection between power cable and battery.	Replace the fuse. (See [15.3 Fuse Replacement]) Use the power supply within the specified range. Check the connection between the power cable and the battery.
Own ship's position is not shown in the screen.	The cursor is displayed in the screen. Scroll the map.	Press [CUR] key or [HOME] key to cursor OFF. Press [HOME] key.
Own ship's mark does not blink and value of own ship position is red.	Faulty connection between Display unit and GPS sensor. There is an obstacle around the GPS sensor and it cannot be received.	Connect the GPS sensor to the J5 connector. Change the installation position of the GPS sensor.

Chapter 16 Installation

16.1 Items of Caution on Installation

To realize the full performance of GPS plotter, the installation of GTD-120 must be performed by an engineer who is officially authorized by our company. The installation work includes the following content.

(1) Unpacking the components
(2) Inspection of configuration unit, spare, accessories and material for installation
(3) Check of power voltage and capacity of current
(4) Decision of installing location
(5) Installation of Display unit
(6) Installation of accessories
(7) Plan and execution of cable laying and connection
(8) Adjustment after completion of installation

Unpacking the components

Unpack the components and confirm that all of the items match with the contents on the equipment configuration list. If not matched, Contact the dealer you purchased or our sales company.

Inspection of components and accessories

Inspect the appearance of each components and accessories and check that no dents or damage exist.

If any dents or damage exist and they are believed to be caused by accident during transportation, contact the transportation and insurance company and consult our sales company or our dealer nearest to you.

Decision of Installing Location

To realize the full performance of equipment, install the equipment, considering the points mentioned below.

(1) Install the equipment at the location in the bridge so that its display can be easily seen.
(2) Select a safe location where the equipment is not exposed to humidity, water splash, rain and direct sunshine.
(3) Keep enough space for maintenance. Especially, secure enough space at the rear panel where many cables are concentrated.
(4) Keep the equipment as far away from the wireless transmitter/receiver as possible.

Laying and Connection of Cable

(1) Keep the power cable as far away from the cables of other electronic equipment as possible.

(2) The cabinet of Display unit shall be securely grounded to the hull, using the ground terminal on the rear panel.

⚠ **Caution: The ground side of power input of this equipment is connected to the ground terminal.**
In case of + (positive) ground, it cannot be used. The power may short-circuit.

(3) If you connect the power cable directly to the battery, the interference from other electronic equipment is not subject to occurrence. (See Fig. 16.1.)

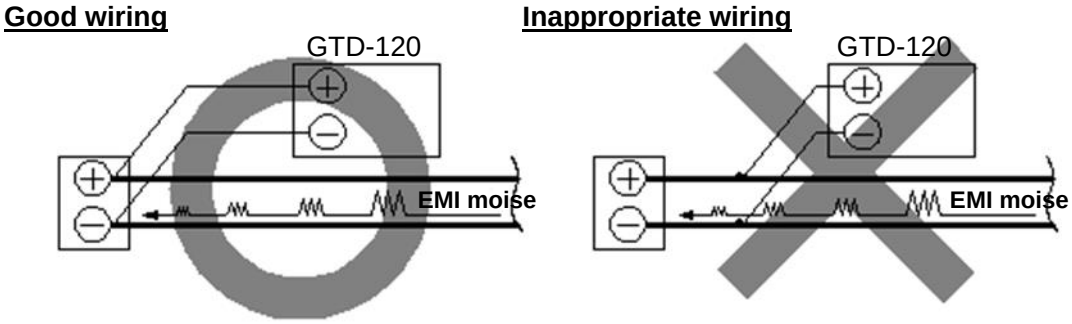


Fig. 16.1 Connection of Power Line

Confirmation after Installation

Be sure to confirm the following items before starting up this equipment. The confirmation is mandatory to operate the equipment normally.

(1) Is the power voltage in the boat within the appropriate voltage range? Is the current capacity enough?
Voltage Range: 10.8 to 31.2 VDC when measured at the power connector input.

(2) Is the electric current capacity sufficient? (Power consumption: 25 W)

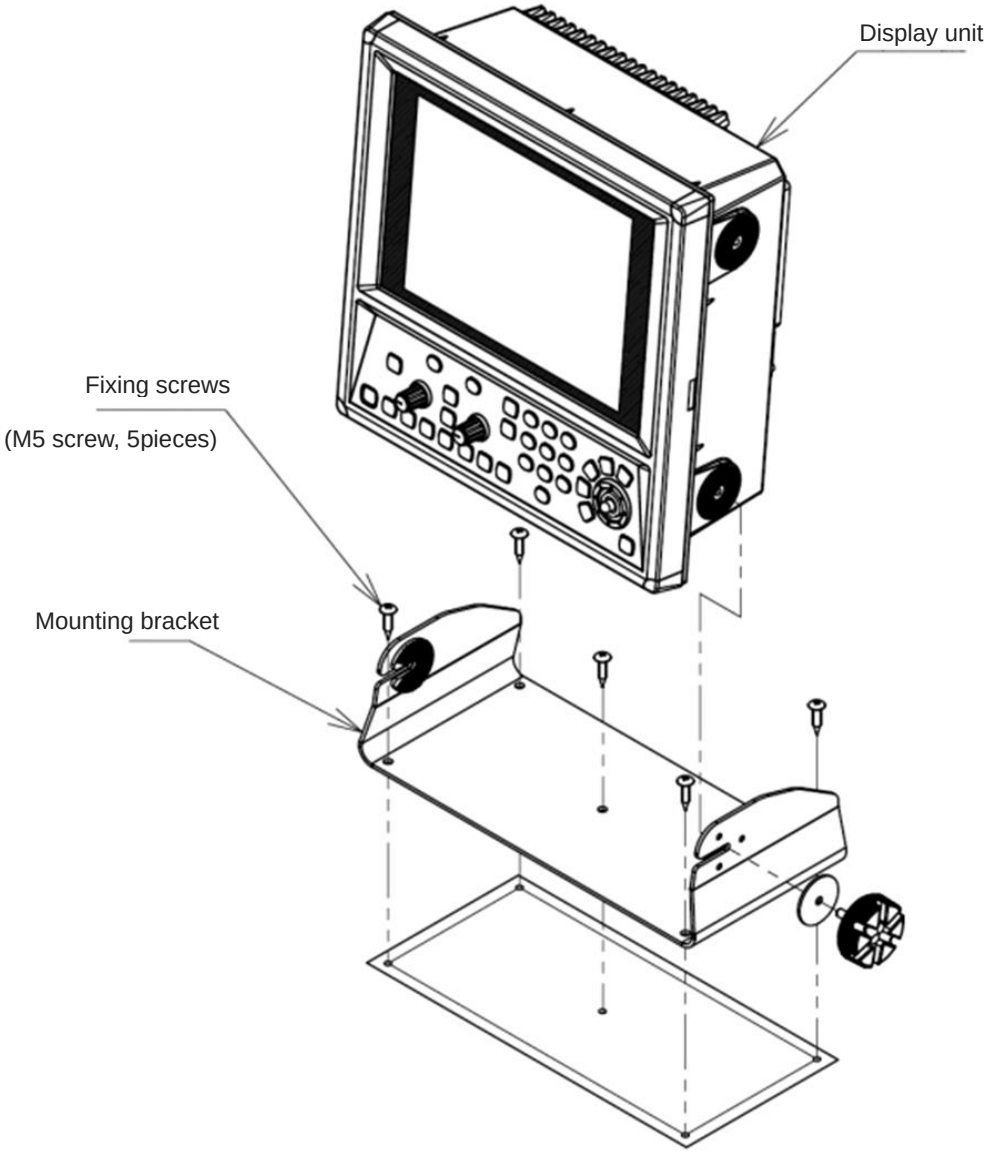
(3) Is the wiring of cable correct? Is the wiring shorted?

16.2 Display unit installation

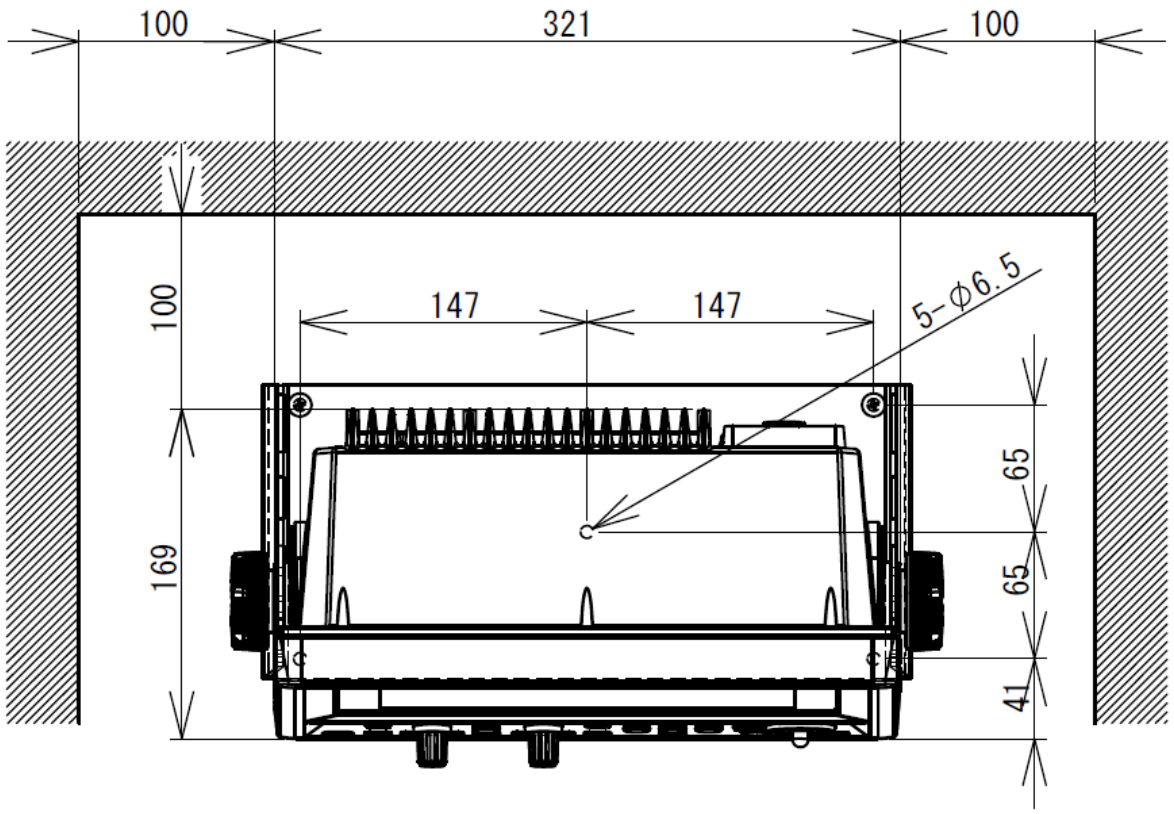
The Display unit is designed for table mount and flush mount. Refer to the following descriptions for installation.

Table mounting

(1) Remove the two fixing knobs that fix the Display unit to the mounting bracket.
(2) Remove the Display unit from the bracket and place it on a flat and safe area.
(3) Place the mounting bracket to the place where the Display unit is to be installed, and fix the bracket with five (5) tapping screws.
(4) Reset the Display unit on to the bracket and fix it using the two screws that were removed in step (1).



Fitting detail of GTD-120 in table mounting mode



Unit: mm

Service space required for GTD-120

Flush mounting

(1) Make a rectangle hole at the location to be installed.

(2) Loosen the two (2) fixing knobs that fasten the Display unit onto the fixing bracket. Knobs and bracket are not used.

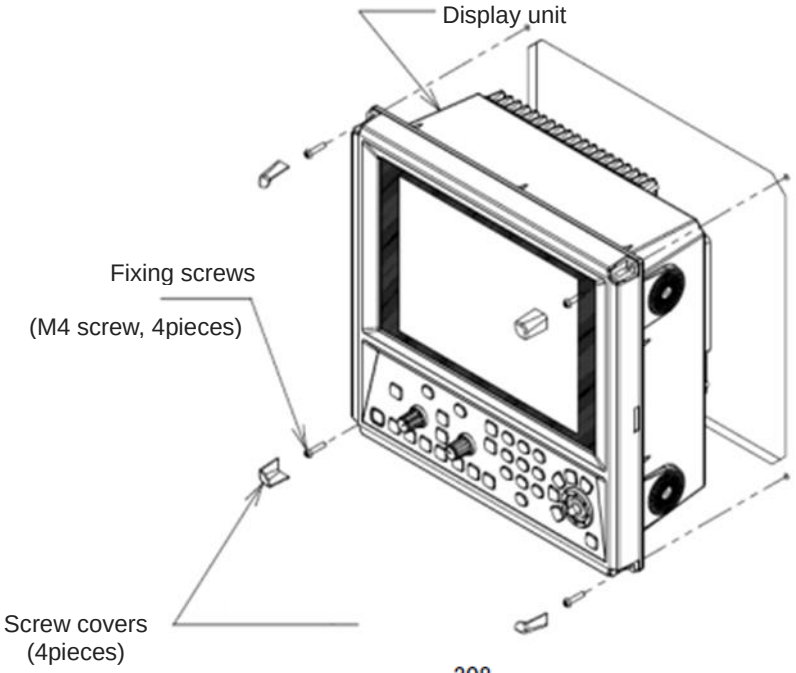
(3) Remove the four (4) plastic screw covers, which are fitted on each corner of the display front face.

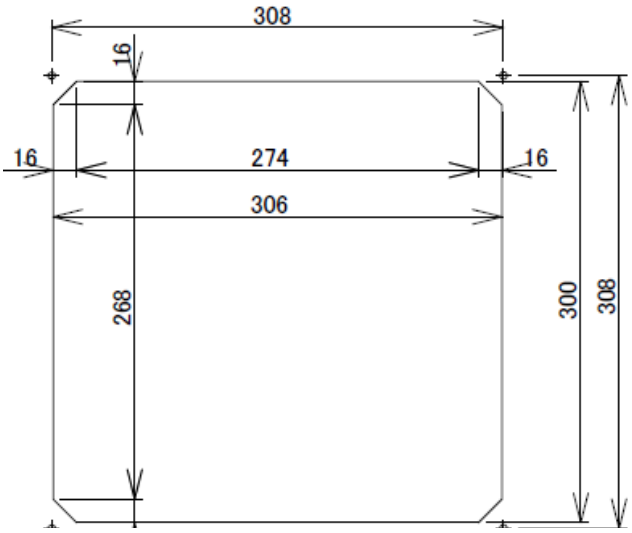
(4) Confirm whether the Display unit and the rectangular hole meet or not. Correct the rectangular hole if it is defective.

(5) Connect the power supply connector to the Display unit.

(6) Put the display on the opening and fix with four (4) tapping screws. In case you use M4 screws to fix the display, select an appropriate screw length that best suits fixing the unit to the panel thickness.

(7) Refit the coverings removed in step (3).





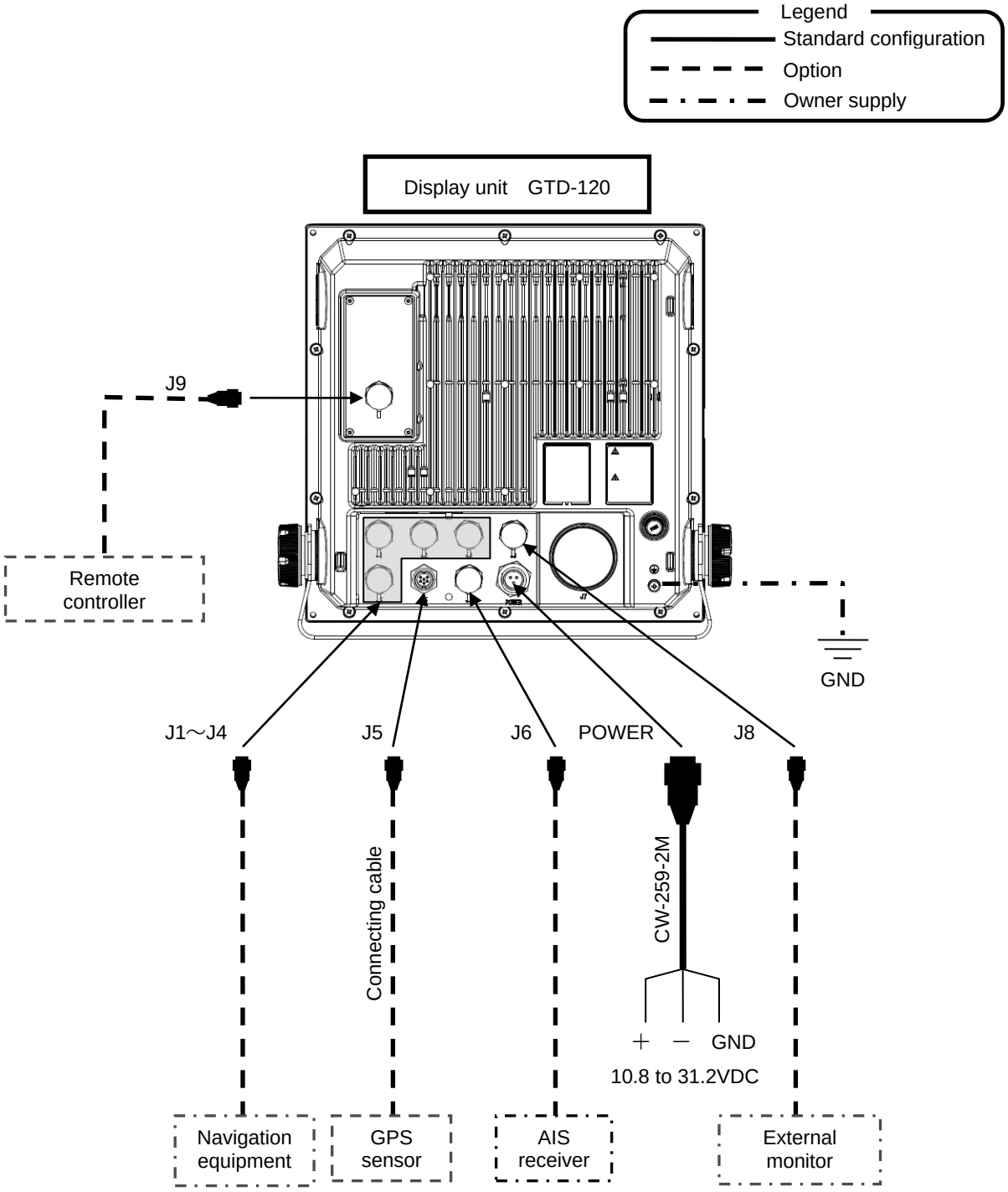
Unit: mm

Dimensions of opening and fixing holes for GTD-120

16.3 Cable connection

Cable connection to Display unit

In addition to the power cable and the GPS sensor cable, if there are options such as navigation equipment, connect those cables also to the specified connector.



⚠ Caution: For details of input sentences from Navigation equipment, GPS sensor and AIS receiver, refer to "Chapter 11, 11.4 Monitoring input sentences".

Connector pin assignment

It is a pin assignment seen from the back of the Display unit.

NMEA I/O 1

(1) GND
(2) NMEA TX1+
(3) NMEA TX1-
(4) NMEA RX1+
(5) NMEA RX1-
(6) NC

J1

NMEA I/O 2

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

J2

NMEA I/O 3

(1) GND
(2) NMEA TX3+
(3) NMEA TX3-
(4) NMEA RX3+
(5) NMEA RX3-
(6) NC

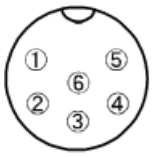
J3

NMEA I/O 4

(1) GND
(2) NMEA TX2+
(3) NMEA TX2-
(4) NMEA RX2+
(5) NMEA RX2-
(6) +12V (200mA MAX)

J4

GPS I/O



(1) GND
(2) GPSOUT+
(3) GPSOUT-
(4) GPSIN+
(5) GPSIN-
(6) +12V

J5

AIS input

(1) GND
(2) AISIN+
(3) AISIN-
(4) NC
(5) NC
(6) GND
(7) NC
(8) NC

J6

External monitor / buzzer output

(1) R
(2) R-GND
(3) G
(4) G-GND
(5) B
(6) B-GND
(7) H-SYNC
(8) V-SYNC
(9) Ext. buzzer +
(10) Ext. buzzer

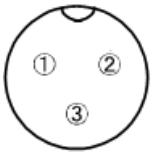
J8

Remote controller

(1) RXD
(2) TXD
(3) +5V
(4) GND
(5) NC
(6) NC
(7) NC

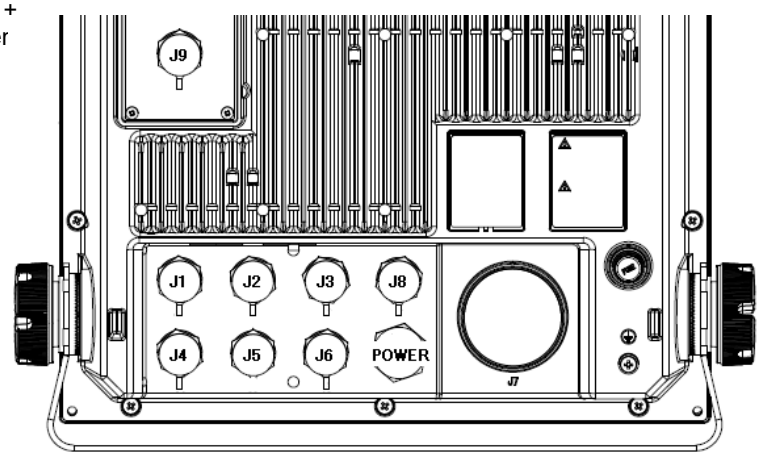
J9

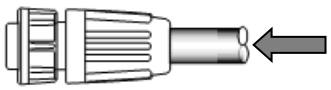
Power supply input



(1) Power –
(2) Power +
(3) GND

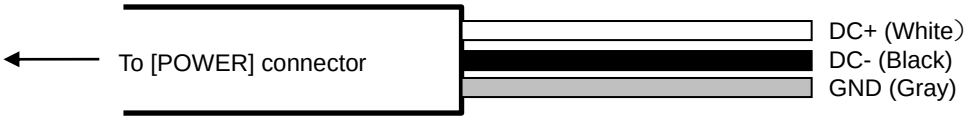
POWER



Caution  The pin assignment is viewed from here.

DC power cable connection (CW-259-2M)

Connect to the [POWER] connector of the Display unit.



Grounding

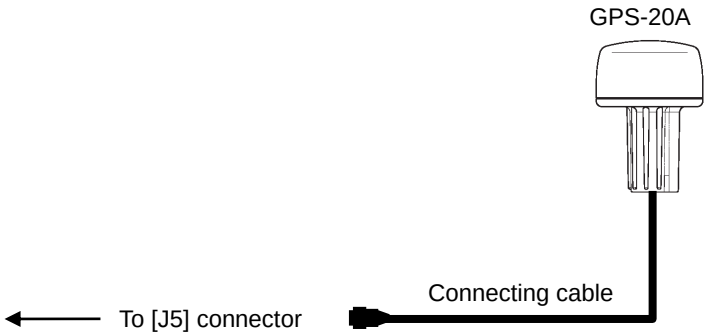
Use heavy gauge cable for grounding wire.

Connect the grounding wire to the grounding material in a short distance.

When connecting the external equipment of which positive polarity is connected to the ground line, do not connect the ground of signal line to the cabinet ground.

Connection the GPS sensor

Connect to the [J5] connector of the Display unit.

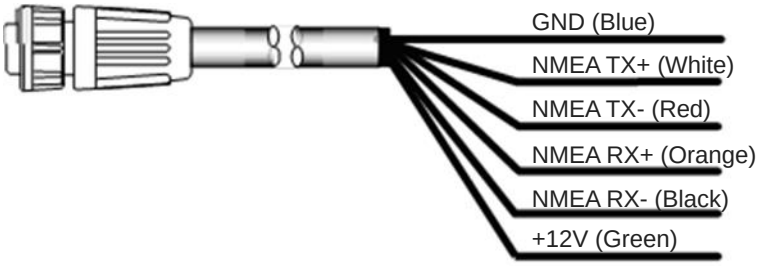


Connection with navigation equipment (J1, J2, J3, J4)

Four NMEA0183/IEC61162 input/output ports are provided. Connect the navigation equipment and the external equipment to them. The optional cable with connectors at both ends is available. The CW-376-5M of which one end is left untreated is also available. Prepare a cable suitable for the equipment you desire to connect.
The connection cable CW-376-5M consists of six core wires and the shield wire around them. A signal is outputted from the white (NMEA TX+) and red (NMEA TX-) wires, and a signal is inputted from the orange (NMEA RX+) and black (NMEA RX-) wires.
For wiring of CW-376-5M, refer to the illustration below.
After soldering, perform the waterproof and insulation treatment on the junction with a self-fusion tape.

+12V (Maximum 200mA) can be supplied for only 6 pin connecter of J4.

Structure of CW-376-5M



Note: “+12V” is [J4] connector only.

Caution: Wind the insulation tape around the un-used lead wire for core-wires not to contact each other.

Connection with AIS receiver (J6) (Prepared by a customer)

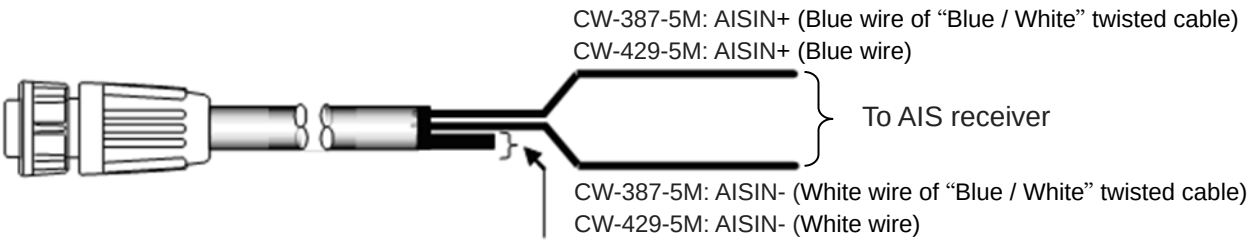
Use the CW-387-5M (Optional) / CW-429-5M (Optional) when installing the AIS receiver. For connecting any equipment, one end of the CW-387-5M / CW-429-5M is left un-treated. Prepare a connector suitable for the equipment you desire to connect.

• CW-387-5M
The connection cable (CW-387-5M) consists of 14 core wires (7 pairs) and the shield wire around them. A signal is inputted from the blue wire of “Blue / White” twisted cable (AISIN+) and the white wire of “Blue / White” twisted cable (AISIN-) wires.

• CW-429-5M
The connection cable (CW-429-5M) consists of 2 core wires and the shield wire around them. A signal is inputted from the blue wire (AISIN+) and the white wire (AISIN-) wires.

• Connection with AIS receiver
Refer to the illustration below.
After soldering, perform the waterproof and insulation treatment on the junction with a self-fusion tape.

Structure of CW-387-5M/CW-429-5M



Please insulate other wires (including shielded wires).

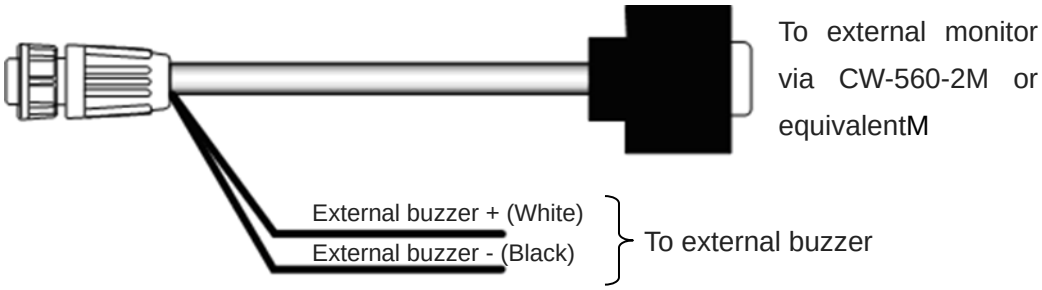
Connection of external buzzer and external monitor (J8) (Prepared by a customer)

When installing an external buzzer or external monitor (VGA monitor, analog RGB input), connect it via CW-576-0.5M. For its wiring, see the figure below.

After soldering, implement the waterproof and insulation treatment on the connected part with the self-melting tape.

Caution: For the rated voltage of the buzzer, use the same DC voltage of the ship’s power supply to which the radar Display unit is connected.

Structure of CW-576-0.5M



Caution: Wind the insulation tape around the un-used lead wire for core-wires not to contact each other.

Connection of remote controller (RCW-15) (J9) (Option)

Connect to the [J9] connector of the Display unit.

Data transfer from GTD-110 / 150

Data can be transferred from the existing GTD-110 or GTD-150.

An optional cable is required to transfer. (CW-420-5M)

For the transfer method, please contact our dealer or our company for details.

Chapter 17 Input / Output sentence list

17.1 Input sentence

Input the sentences shown in the table below.

Input formats are NMEA0183 Ver1.5, Ver 2.0 and Ver 3.0.

Information	Sentence	Connector No. J5	Connector No. J1 to 4
Latitude / Longitude	GGA > RMC > GLL	○	○
Course	VTG > RMC	○	○
Heading	THS > HDT > HDG	○	○
SOG	VTG > RMC	○	○
Date	ZDA > RMC	○	○
Time	ZDA > GGA	○	○
Depth	DBS > DBT > DPT	○	○
Water temperature	MTW	○	○
Wind	MWV > MWD	○	○
Event mark	TLL	○	○
Tracked target	TTM	○	○
GPS buoy	BLV	○	○
Beacon receiver status	MSK	○	－
Beacon receiver information	MSS	○	－
Satellite reception accuracy	GSA	○	－
Satellite information	GSV	○	－
Satellite information (KODEN original)	PKODA	○	－
Satellite information (KODEN original)	PKODG, 1	○	－
Satellite information (KODEN original)	PKODG, 7	○	－

○: Input possible

－: Input impossible

Set [AUTO] to [I / O] → [INPUT] on the menu, if the same sentence is entered for multiple connectors, import from the connector with the highest priority. (J5 > J1 > J2 > J3 > J4)

17.2 Output sentence

Output the sentences shown in the table below.

Input formats are NMEA0183 Ver 2.0. (DBT is Ver 2.0)

Information	Sentence	Connector No. J5	Connector No. J1 to 4
Latitude / Longitude, date, time	GGA	－	○
Latitude / Longitude, time	GLL	－	○
Loran C	GTD	－	○
Heading	HDT	－	○
Course, COG	VTG	－	○
Date, time	ZDA	－	○
Autopilot	APB	－	△
Bearing origin to destination	BOD	－	△
Bearing and distance to waypoint	BWC	－	△
Recommended minimum navigation information	RMB	－	△
Recommended minimum specific GNSS data	RMC	－	○
Waypoint location	WPL	－	△
Cross-track error, measured	XTE	－	△

○: Output possible

－: Output impossible

△: Output only at waypoint / route navigation

Chapter 18 Appendix

18.1 Menu tree

CHART	⇒	CHART	⇒	MAP COLOR	⇒	Normal, SunLight, NightVision, NOAA
				MIXING LEVELS	⇒	ON, OFF
				BOUND LINES	⇒	ON, OFF
				GRID	⇒	ON, OFF
				VALUE-ADDED DATA	⇒	ON, OFF
				ANTI-CLUTTER	⇒	ON, OFF
				ELEVATION	⇒	ON, OFF
		MARINE	⇒	PLACE NAME	⇒	ON, OFF
				OBJECT ITEM	⇒	Details, Simple
				LIGHT ANIMATION	⇒	ON, OFF
				LIGHT MARKS	⇒	ON, OFF
				LIGHT SECTORS	⇒	ON, OFF
				BUOYS	⇒	ON, OFF
				BUOYS NAME	⇒	ON, OFF
				ATTENTION AREAS	⇒	ON, OFF
				TIDES & CURRENTS	⇒	ON, OFF
				PORTS	⇒	ON, OFF
				SIGNALS	⇒	ON, OFF
				TRACKS & ROUTES	⇒	ON, OFF
				SEABED	⇒	ON, OFF
				UNDERWATER OBJECT	⇒	ON, OFF
		LAND	⇒	LANDMARKS	⇒	ON, OFF
				LAKE & RIVER	⇒	ON, OFF
				CULTURAL FEATURES	⇒	ON, OFF
				ROADS	⇒	ON, OFF
				ROAD NAME	⇒	ON, OFF
				RAILWAY	⇒	ON, OFF
				POI	⇒	ON, OFF
		DEPTH	⇒	SOUNDINGS	⇒	ON, OFF
				SOUNDING RANGE MIN	⇒	00000 to 99999 m
				SOUNDING RANGE MAX	⇒	00000 to 99999 m
				ROCKS	⇒	ON, OFF
				DEPTH CONTOUR LABEL	⇒	ON, OFF
				DEPTH UNIT	⇒	m, fm, D.fm, ft
				DEPTH AREA HIGHLIGHTS	⇒	ON, OFF
				HIGHLIGHTS RANGE MIN	⇒	00000 to 99999 m
				HIGHLIGHTS RANGE MAX	⇒	00000 to 99999 m
				REVERSE CONTOUR COLOR	⇒	ON, OFF

DISPLAY	⇒	DISPLAY 1	⇒	COURSE LINE	⇒	HEADING, BOTH, OFF
				COURSE LINE LENGTH	⇒	LONG, SPEED, VECTOR
				VECTOR TIME	⇒	1 to 60 min
				COURSE DISP	⇒	TRUE, MAG
				CURRENT DIR LINE	⇒	ON, OFF
				POSITION MARK	⇒	L_CIRCLE, S_CIRCLE, DOT, L_SHIP, S_SHIP
				NAV SWITCH1	⇒	NORTH UP, SOUTH UP, EAST UP, WEST UP, COURSE UP, HEAD UP
				NAV SWITCH2	⇒	NORTH UP, SOUTH UP, EAST UP, WEST UP, COURSE UP, HEAD UP
				MARK SIZE	⇒	LARGE, MEDIUM, SMALL
				CURSOR TYPE	⇒	STD, LONG, CROSS, CIRCLE
				CIRCLE RANGE	⇒	0.01 to 10.00 NM
				CURSOR LINE	⇒	ON, OFF
				WPT LINE	⇒	ON, OFF
				WPT DIRECTION LINE	⇒	ON, OFF
		DISPLAY 2	⇒	ROTATIONAL SPEED	⇒	Fast, Slow
				BG of POSINFO	⇒	ON, OFF
				BG of MENU	⇒	ON, OFF
				RING MARKER	⇒	ON, OFF
				VRM	⇒	ON, OFF
				VRM RANGE	⇒	0.01 to 10.00 NM
				SAFETY STATUS BAR	⇒	ON, OFF
				QUICK INFO	⇒	ON, OFF
				COMPASS ICON	⇒	ON, OFF
		POSITION	⇒	POSITION	⇒	LAT/LON, LORAN C
				LAT/LON		
				LAT CORRECTION	⇒	-0.300 to +0.300
				LON CORRECTION	⇒	-0.300 to +0.300
				NMEA1 OUTPUT	⇒	Add/Not, add
				NMEA2 OUTPUT	⇒	Add/Not, add
				NMEA3 OUTPUT	⇒	Add/Not, add
				NMEA4 OUTPUT	⇒	Add/Not, add
				INPUT VALUE	⇒	Add/Not, add
				LORAN C		
				LORAN C GRI	⇒	4990, 5930, 5970, 5990, 6731, 7001, 7170, 7270, 7499, 7930, 7950, 7960, 7970, 7980, 7990, 8000, 8290, 8930, 8940, 8970, 8990, 9007, 9610, 9930, 9940, 9960, 9970, 9980, 9990
				SLAVE STATION1	⇒	10, 11, 12, 22, 23, 25, 26, 27, 28, 29, 30, 31, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 50, 51, 52, 54, 55, 56, 59, 60, 61, 65, 69, 70, 81
				SLAVE STATION2	⇒	10, 11, 12, 22, 23, 25, 26, 27, 28, 29, 30, 31, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 50, 51, 52, 54, 55, 56, 59, 60, 61, 65, 69, 70, 81
				SLAVE1 CORRECTION	⇒	-30.00 to +30.00 µs
				SLAVE2 CORRECTION	⇒	-30.00 to +30.00 µs
				INPUT VALUE	⇒	Add/Not, add
		ADDED INFO	⇒	Added Info of POS	⇒	ON, OFF
				Added info	⇒	Hidden, Clock, HDG, Water Temperature, Depth, Current Direction, Course, Mark Shape

DISPLAY	⇒	ADDED INFO	⇒	Added Info of WPT	⇒	ON, OFF
				Added info		Hidden, XTE (To the course), XTE (From the course), Passed time of WPT, Time required to WPT, Arrival time of WPT, TTG/ETA, Remaining route, Remaining route/TTG, Remaining route/ETA, Arrival date & time
				Added Info of POB	⇒	ON, OFF
				Added info	⇒	Hidden, Speed Average, Elapsed time of POB, Setting time of POB
				Added Info of Cursor	⇒	ON, OFF
				Added info	⇒	Hidden, TTG/ETA to Cursor
				Info window1	⇒	Hidden, Lat/Lon, Clock/Water Temp., Clock/TTG, Clock/ETA, Loran C, Current Direction, Clock, From port, To port, Passed of mark, GPS buoy POS, GPS buoy speed/HDG, Remaining route/TTG, Parallel line, Depth/W.Temp., Wind, Scale, AIS GPS Buoy distance
				Info window2	⇒	*Same as "Info window1"
				BUOY ID (A)	⇒	00 to 99
				BUOY ID (B)	⇒	00 to 99
				Cursor Window	⇒	Hidden, Lat/Lon, Loran C, TTG to Cursor
		GRAPH	⇒	W.TEMP/DPT GRAPH	⇒	DPT, Temp, Both, OFF
				TIME RANGE	⇒	6min, 12min, 30min, 60min
				W.TEMP RANGE	⇒	2˚ C, 5˚ C, 10˚ C
				DEPTH RANGE	⇒	5 to 1000 m
				DEPTH SHIFT	⇒	MAN, AUTO
				MANUAL SHIFT	⇒	0000 to 3000 m
				W.TEMP COLOR	⇒	7 colors
				DEPTH COLOR	⇒	7 colors
				GRAPH BG	⇒	ON, Mesh
				DISP POS ADJ	⇒	Go, Cancel
		LAYOUT	⇒	LAYOUT	⇒	5 screens

SYS/ALM	⇒	SYSTEM 1	⇒	L/L ACCURACY	⇒	1/1000min, 1/10000min
				DISTANCE UNIT	⇒	NM, km
				SPEED UNIT	⇒	kn, km/h
				AVERAGE SPEED	⇒	ON, OFF
				AVERAGE NUMBER	⇒	01 to 60
				EV STORE	⇒	EV00-EV99, EV00-EV89, EV00-EV79, EV00-EV69, EV00-EV59, EV00-EV49, EV00-EV39, EV00-EV29, EV00-EV19, EV00-EV09
				EV DISP CHANGE	⇒	MAN, AUTO
				NAV CALC MODE	⇒	GREAT C., RHUMB L.
				WPT CHG MODE	⇒	PERP, CI, BISECTOR, MAN
				ROUTE NAV MODE	⇒	Active, Fix
				DRAW FUNCTION	⇒	Draw, DIA, PARA
				F1 KEY	⇒	Stabilization, Nav switch, VRM, Screen shot, Map color, Temp/Dpt Graph, WPT history, Route exec, Place name, Mark shape SW, Floating VRM, Position data, WPT setting
				F2 KEY	⇒	*Same as "F1 KEY"
				INFO KEY	⇒	Chart, AIS, Number
		SYSTEM 2	⇒	AUTO SCROLL	⇒	End, Inside, Center
				SCRL DIRECT	⇒	View, Chart
				POS CORR	⇒	ON, OFF
				TIME CORR	⇒	-13.5 to +13.5 hr
				MAG DEVIATION	⇒	AUTO, MAN
				CORR	⇒	-90.0 to +90.0°
				HDG DEVIATION	⇒	No use, Use
				COMPASS CORR	⇒	-90.0 to +90.0°
				HDG AZIMUTH	⇒	Heading, Course
				FIX SCALE 1	⇒	0.01 to 1000 NM
				FIX SCALE 2	⇒	0.01 to 1000 NM
				FIX SCALE 3	⇒	0.01 to 1000 NM
				REQUIRED TIME	⇒	Actual speed, Constant
				CONSTANT	⇒	1 to 50 kn
		SYSTEM 3	⇒	MARK SHAPE	⇒	1, 2, 3, 4
				SHAPE SET 1	⇒	
				SHAPE SET 2		
				SHAPE SET 3		
				SHAPE SET 4		
				LINE MARK	⇒	*Same as "SHAPE SET"
				LINE MARK STYLE	⇒	4 styles
				EVENT MARK	⇒	*Same as "SHAPE SET"
				SOUND (TREBLE)	⇒	OFF, 1, 2, 3, 4, 5, 6, 7
				SOUND (BASS)	⇒	OFF, 1, 2, 3, 4, 5, 6, 7
				BUOY RCV SOUND	⇒	OFF, 1, 2, 3, 4, 5, 6, 7
				CURSOR OFF	⇒	Home, Keep
				SCALE MODE	⇒	Plotter, Radar
		ALARM 1	⇒	ARRIVAL ALARM	⇒	ON, OFF
				RANGE	⇒	0.05 to 5.00 NM
				POB ALARM	⇒	ON, OFF
				RANGE	⇒	0.05 to 5.00 NM
				XTE ALARM	⇒	ON, OFF
				RANGE	⇒	0.05 to 5.00 NM
				ALARM ZONE	⇒	ON, OFF
				CPA/TCPA ALARM	⇒	ON, OFF
				CPA	⇒	0.0 to 20.0 NM
				TCPA	⇒	1.0 to 60.0 min
				SPEED ALARM	⇒	OFF, Upper, Under
				SPEED	⇒	0.0 to 100.0 kn

SYS/ALM	⇒	ALARM 2	⇒	AREA ALARM	⇒	ON, OFF
				AREA ALARM01		
				DISPLAY	⇒	ON, OFF
				ALARM	⇒	ON, OFF
				MARK	⇒	
				POS	⇒	90°00.000S to 90°00.000N 180°00.000W to 180°00.000E
				START DST	⇒	0.00 to 99.9 NM
				END DST	⇒	0.00 to 99.9 NM
				START BRG	⇒	0 to 359 °
				END BRG	⇒	0 to 359 °
				COLOR	⇒	10 colors
				AREA ALARM02 to AREA ALARM10	⇒	*Same as "AREA ALARM01"
		ALARM 3	⇒	DRAWING ALARM	⇒	ON, OFF
				DRAWING ALARM01		
				ALARM	⇒	ON, OFF
				ALARM RANGE	⇒	0.01 to 1.00 NM
				DRAWING ALARM02 to 20	⇒	*Same as "DRAWING ALARM01"
		ALARM 4	⇒	DEPTH LIMIT ALARM	⇒	ON, OFF
				DEPTH LIMIT RANGE	⇒	0 to 999 m
				GROUNDING ALARM	⇒	ON, OFF
				GROUNDING DEPTH LIMIT	⇒	0 to 99 m
				GROUNDING ALARM RANGE	⇒	0.25, 0.5, 1 NM
				GROUNDING ALARM REPORT >	⇒	LAND AREA, INTERTIDAL AREA, DEPTH AREA, ROCKS, SHORELINE CONSTRUCT, OBSTRUCTIONS, WRECKS, DREDGED AREA, DIFFUSER, MOORING/WARPING FACILITY, PINGO, PRODUCTION INSTALLATION, NO DATA AVAILABLE Note: The red square shows a detected caution.

TRK/MRK	⇒	OWN TRK	⇒	PLOT INTERVAL	⇒	TIME, DST
				TIME INTERVAL	⇒	1sec, 2sec, 5sec, 10sec, 20sec, 30sec, 60sec, 120sec, 300sec, 600sec
				DIST INTERVAL	⇒	0.01NM, 0.02NM, 0.05NM, 0.1NM, 0.2NM, 0.5NM, 1.0NM, 2.0NM, 5.0NM, 10.0NM
				NUMBER OF PLOT	⇒	2000, 4000, 5000, 7000, 10000, 20000
				W.TEMP/TIME MARK	⇒	OFF, 3min, 10min, 30min, 1hr, 2hr, 4hr, 6hr, 8hr, 12hr, 24hr
				DISPLAY PERIOD	⇒	ALL, TODAY, 2DAYS, 3DAYS
				MARK COLOR	⇒	7 colors
				TRACK LINE	⇒	THICK, THIN
				TRACK COLOR	⇒	NORM, W_TEMP, CHANGE, DPT
				COLOR BOUNDARY	⇒	-1.0 to 50.0 ° C
				REFERENCE W.TEMP	⇒	-1.0 to 50.0 ° C
				CHANGE AMOUNT	⇒	0.1 to 9.9 ° C
				RECORDING SUSPENDED	⇒	OFF, 1sec, 15sec, 30sec, 1min, 3min, 6min, 15min, 30min
		TARGET TRK	⇒	TGT00		
				DISPLAY	⇒	ON, OFF
				SHAPE	⇒	L_CIRCLE, S_CIRCLE, DOT
				COLOR	⇒	7 colors
				ID No.	⇒	ON, OFF
				LINE	⇒	THICK, THIN, OFF
				PLOT LIMIT	⇒	50, 100, 200, 500, 1000
				CRS LINE	⇒	ON, OFF
				TGT01 to TGT99	⇒	*Same as "TGT00"
		MRK BLOCK	⇒	MARK BLOCK	⇒	A, B, C, D, E, F, EV

TRK/MRK	⇒	MRK DISP	⇒	A00000 - A14999		
				DISPLAY	⇒	ON, OFF
				No.	⇒	ON, OFF
				DEPTH	⇒	ON, OFF
				W_TEMP	⇒	ON, OFF
				TIME	⇒	ON, OFF
				COMMENT	⇒	ON, OFF
				B00000 - B14999, C00000 - C14999, D00000 - D14999, E00000 - E14999, F00000 - F14999 L00000 - L14999	⇒	*Same as "A00000 - A14999"
				DISPLAY	⇒	ON, OFF
				No.	⇒	ON, OFF
				EV00 - EV99		
				DISPLAY	⇒	ON, OFF
				No.	⇒	ON, OFF
				DEPTH	⇒	ON, OFF
				W_TEMP	⇒	ON, OFF
				TIME	⇒	ON, OFF
				T000 - T999		
				DISPLAY	⇒	ON, OFF
				No.	⇒	ON, OFF
				W_TEMP	⇒	ON, OFF
				TIME	⇒	ON, OFF
		MRK EDIT	⇒	A00000 - A14999, B00000 - B14999, C00000 - C14999, D00000 - D14999, E00000 - E14999, F00000 - F14999		
				MARK	⇒	
				COLOR	⇒	7 colors
				COMMENT	⇒	12 characters
				POS	⇒	90°00.000S to 90°00.000N 180°00.000W to 180°00.000E
				DISPLAY	⇒	ON, OFF
				No.	⇒	ON, OFF
				DEPTH	⇒	ON, OFF
				W_TEMP	⇒	ON, OFF
				TIME	⇒	ON, OFF
				COMMENT	⇒	ON, OFF
		TRANSFER	⇒	METHOD	⇒	COPY, MOVE
				OPTION	⇒	WITH BLANKS, The blank squeezes up., Overwrite prohibition., Event mark transfer.
				SOURCE	⇒	A00000 - A14999, B00000 - B14999, C00000 - C14999, D00000 - D14999, E00000 - E14999, F00000 - F14999
				DESTINATION	⇒	A00000 - A14999, B00000 - B14999, C00000 - C14999, D00000 - D14999, E00000 - E14999, F00000 - F14999
		DELETE	⇒	START POINT	⇒	A00000 - A14999, B00000 - B14999, C00000 - C14999, D00000 - D14999, E00000 - E14999, F00000 - F14999
				END POINT	⇒	A00000 - A14999, B00000 - B14999, C00000 - C14999, D00000 - D14999, E00000 - E14999, F00000 - F14999

GPS/DGPS	⇒	MONITOR	⇒	GPS STATUS		
				DGPS MODE		
				GPS CLOCK		
				PRESENT POSITION		
				SHIP SPEED		
				COURSE		
				DOP	⇒	GPS receive status
				RECEIVED_SV		
				BEACON FREQUENCY		
				BEACON S/N		
				No.		
				S/N		
				ELEV		
				AZI		
		SETTING	⇒	STABILIZATION	⇒	1, 2, 3
				BEACON SELECT	⇒	AUTO, MAN
				FREQUENCY	⇒	283.5 to 325.0 kHz
				BAUDRATE	⇒	50, 100, 200
				DGPS MODE	⇒	OFF, BEACON, SBAS
				GPS INIT	⇒	NO, YES

ROUTE	⇒	ROUTING	⇒	CURSOR >	⇒	To cursor input mode
				INPUT VALUE >		
		RT DELETE	⇒	CURSOR >	⇒	To cursor input mode
				LIST >		
		RT EXECUTE	⇒	CURSOR >	⇒	To cursor input mode
				LIST >		
		WPT MOVE	⇒	CURSOR >	⇒	To cursor edit mode
				VALUE >		
		WPT ADD	⇒	CURSOR >	⇒	To cursor edit mode
				VALUE >		
		WPT DELETE	⇒	CURSOR >	⇒	To cursor edit mode
				LIST >		
		COMMENT	⇒	>		

DRAWING	⇒	DRAWING	⇒	CURSOR >	⇒	To cursor input mode
				VALUE >		
		DELETE	⇒	CURSOR >	⇒	To cursor input mode
				BLOCK >		
		RECALL	⇒	01 to 20		
				DISP	⇒	ON, OFF
				LINE	⇒	THIN, THICK
				CMNT	⇒	OFF, SMALL, MEDIUM, LARGE
		PT MOVE	⇒	CURSOR >	⇒	To cursor edit mode
				VALUE >		
		PT ADD	⇒	CURSOR >	⇒	To cursor edit mode
				VALUE >		
		PT DELETE	⇒	CURSOR >	⇒	To cursor edit mode
				VALUE >		
		COMMENT	⇒	>		

AIS	⇒	AIS	⇒	AIS	⇒	ON, OFF
				DETECTION RANGE	⇒	1.0 to 64.0 NM
				CLASS B	⇒	ON, OFF
				DETECT MIN SPEED	⇒	ON, OFF
				SPEED	⇒	0.0 to 50 kn
				DETECT HULL LENGTH	⇒	ON, OFF
				HULL LENGTH	⇒	0 to 500 m
				SHIP NAME	⇒	ON, OFF
				VECTOR	⇒	ON, OFF
				VECTOR TIME	⇒	1 to 60 min
				STOP SYMBOL	⇒	NORMAL, DIAMOND

PORT INFO	⇒	PORT INFO	⇒	NAME
				DST
				BRG

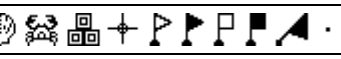
GPS BUOY	⇒	SETTING	⇒	FUNCTION	⇒	ON, OFF
				NUMBER	⇒	ON, OFF
				TEMPERATURE	⇒	ON, OFF
				TIME CORRECTION	⇒	ON, OFF
				COLOR		
				BLOCK0 to BLOCK9	⇒	7 colors
		ALARM		BUOY DISTANCE ALARM	⇒	ON, OFF
				ALARM AUTO ACK	⇒	STOP, 5sec, 10sec, 30sec, 60sec
				GPS BUOY RANGE ALARM 01 to 20		
				ALARM	⇒	ON, OFF
				BUOY ID (A)	⇒	00 to 99
				BUOY ID (B)	⇒	00 to 99
				DISTANCE RANGE (NEAR)	⇒	0.0 to 50.0 NM
				DISTANCE RANGE (FAR)	⇒	0.0 to 50.0 NM
				LINE BETWEEN BUOYS	⇒	ON, OFF
				LINE COLOR	⇒	7 colors
		RCV LIST	⇒	BLOCK	⇒	ALL, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
		MONITOR	⇒	GPS Buoys receive status		
		DELETE	⇒	BLOCK0 to BLOCK9	⇒	NO, YES

I/O	⇒	BAUDRATE	⇒	J1/NMEA1(bps)	⇒	4800, 9600, 19200, 38400
				J2/NMEA2(bps)	⇒	4800, 9600, 19200, 38400
				J3/NMEA3(bps)	⇒	4800, 9600, 19200, 38400
				J4/NMEA4(bps)	⇒	4800, 9600, 19200, 38400
		INPUT	⇒	DBS:	⇒	J5, J1, J2, J3, J4, AUTO
				DBT:	⇒	J5, J1, J2, J3, J4, AUTO
				DPT:	⇒	J5, J1, J2, J3, J4, AUTO
				GGA:	⇒	J5, J1, J2, J3, J4, AUTO
				GLL:	⇒	J5, J1, J2, J3, J4, AUTO
				HDG:	⇒	J5, J1, J2, J3, J4, AUTO
				HDT:	⇒	J5, J1, J2, J3, J4, AUTO
				MSK:	⇒	J5, J1, J2, J3, J4, AUTO
				MTW:	⇒	J5, J1, J2, J3, J4, AUTO
				RMC:	⇒	J5, J1, J2, J3, J4, AUTO
				TLL:	⇒	J5, J1, J2, J3, J4, AUTO
				TTM:	⇒	J5, J1, J2, J3, J4, AUTO
				VTG:	⇒	J5, J1, J2, J3, J4, AUTO
				ZDA:	⇒	J5, J1, J2, J3, J4, AUTO
		OUTPUT J1	⇒	EXTERNAL OUTPUT SWITCHING	⇒	STD, SELECT
				GGA:	⇒	ON, OFF
				GLL:	⇒	ON, OFF
				GTD:	⇒	ON, OFF
				HDT:	⇒	ON, OFF
				VTG:	⇒	ON, OFF
				ZDA:	⇒	ON, OFF
				APB:	⇒	ON, OFF
				BOD:	⇒	ON, OFF
				BWC:	⇒	ON, OFF
				RMB:	⇒	ON, OFF
				RMC:	⇒	ON, OFF
				WPL:	⇒	ON, OFF
				XTE:	⇒	ON, OFF
		OUTPUT J2	⇒	*Same as "OUTPUT J1"		
		OUTPUT J3	⇒	*Same as "OUTPUT J1"		
		OUTPUT J4	⇒	*Same as "OUTPUT J1"		
		MONITOR	⇒	CONNECTOR	⇒	J5(GPS), J1, J2, J3, J4, AIS

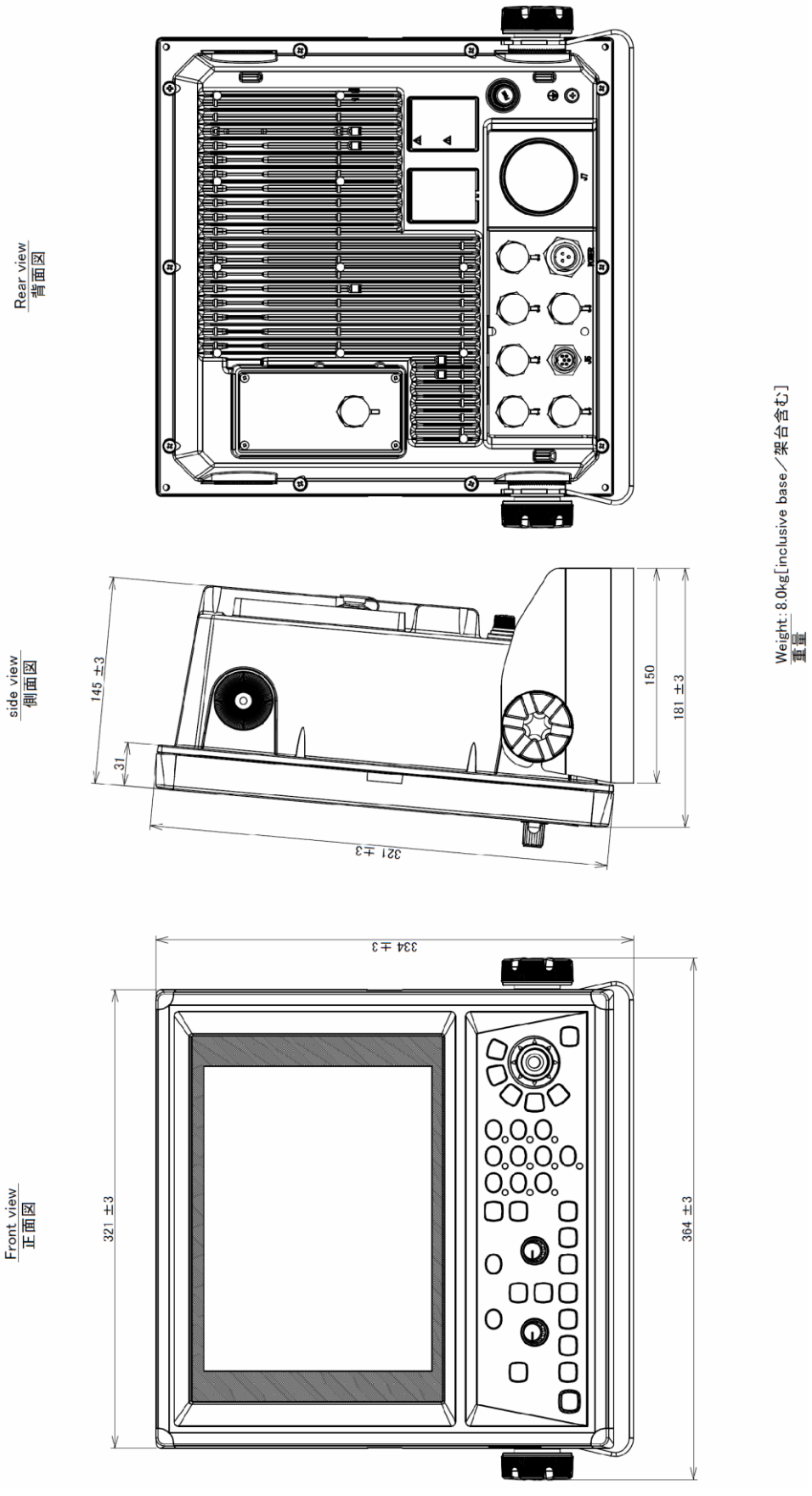
CARD	⇒	MARK	⇒	TRANSFER (→)	⇒	To SD card
				TRANSFER (←)	⇒	From SD card
				ERASE		
		OWN TRACK	⇒	TRANSFER (→)	⇒	To SD card
				TRANSFER (←)	⇒	From SD card
				ERASE		
		DRAW	⇒	TRANSFER (→)	⇒	To SD card
				TRANSFER (←)	⇒	From SD card
				ERASE		
		TARGET TRK	⇒	TRANSFER (→)	⇒	To SD card
				TRANSFER (←)	⇒	From SD card
				ERASE		
		ROUTE	⇒	TRANSFER (→)	⇒	To SD card
				TRANSFER (←)	⇒	From SD card
				ERASE		
		PICTURE	⇒	TRANSFER (→)	⇒	To SD card
				TRANSFER (←)	⇒	From SD card
				ERASE		
		SETTING	⇒	TRANSFER (→)	⇒	To SD card
				TRANSFER (←)	⇒	From SD card
				ERASE		

MAINTENANCE	⇒	SIMULATION	⇒	START LAT	⇒	90°00.000S to 90°00.000N
				START LON	⇒	180°00.000W to 180°00.000E
				SPEED	⇒	0 to 50 kn
				STEERING	⇒	0.0 to 359.9 ˚
				COURSE	⇒	0.0 to 359.9 ˚
				CLOCK	⇒	2017/01/01 00:00:00 ~
				MODE	⇒	NORM, WPT, TYPE A, TYPE B
		TEST	⇒	LCD		
				MEMORY		
				OPE UNIT	⇒	BUZZER TREBLE, BASS
				BRILL	⇒	LCD BRIGHT PANEL BRIGHT
				COM	⇒	PORT J5, J1, J2, J3, J4, RS232C TEST SIGNAL STOP, TRANS
				SYS INFO		
				POW INFO		
		COLOR	⇒	No.000 to 126 (Refer to "14.3 Color palette")		
		PICTURE MEM	⇒	RECALL, ERASE		
		MEM ERASE	⇒	MARK	⇒	BLOCK A, B, C, D, E, F, LINE MARK, W.T.TIME, EVENT
				OWN TRACK	⇒	TRACK, STORED 1 to 10
				DRAWING	⇒	BLOCK 01 to 20
				TGT TRACK	⇒	TGT TRACK 00 to 99
				ROUTE	⇒	ROUTE 01 to 50
				PICTURE	⇒	PICTURE FILE
		RECEIVE	⇒	MARK	⇒	BLOCK A, B, C, D, E, F
				TRACK	⇒	CURRENT TRACK, TRACK 1 to 10
				DRAW	⇒	BLOCK 01 to 20
				TGT TRACK	⇒	TGT 00 to 99
		OTHER	⇒	OWN PORT LAT	⇒	90°00.000S to 90°00.000N
				OWN PORT LON	⇒	180°00.000W to 180°00.000E
				TRACK AUTO ERASE	⇒	NO, YES
				LANGUAGE	⇒	English, Korean, Spanish, Traditional Chinese, Japanese, Portuguese, Thai, Italian
				BACKUP	⇒	NO, YES
				RESTORE	⇒	NO, YES
				SD CARD INIT	⇒	NO, YES
				SYSTEM PROG UPDATE	⇒	NO, YES

18.2 Specifications

Display unit		GTD-120
Display size and type		10.4 inch color TFT LCD
Map mode		Mercator projection
Display mode		Nup, Sup, Eup, Wup, Cup Hup
Display resolution		480 x 640 (VGA)
Zooming range		0.01 to 1,000 NM (or 0.02 to 2,000 km)
Effective map creation area		Below the latitude 80 degree
Plotting interval	Time	1, 2, 5, 10, 20, 30, 60, 120, 300, 600 sec
	Distance	0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10.0 NM / km
No. of plots		2,000 / 4,000 / 5,000 / 7,000 / 10,000 / 20,000 points (Upper limit switching 6 types) + saved track 20,000 points x 10 blocks
Track color		7 colors
Position data display		Lat / Lon, Loran C LOP
Navigation data display		Own ship's position, Own ship's course, Own ship's speed, Waypoint position, Waypoint bearing, Waypoint distance, POB position, POB bearing, POB distance,Cursor position, Cursor bearing, Cursor distance
Position registration		15,000 points x 6 blocks + Marked line 15,000 points (All points can be registered as waypoint)
Mark color		7 colors
Mark shape		
Drawing	Nodes	500 points x 20 blocks
	Color	7 colors
Alarm		Arrival, POB, Cross track error, CPA/TCPA, Area, Drawing, Ship's speed, Depth limit, Grounding, GPS buoy distance
Positional correction		By cursor or by Lat / Lon or LOP data
Magnetic compass correction		Auto, Manual
Language		English, Korean, Spanish, Traditional Chinese, Japanese, Portuguese, Thai, Italian
Input data and sentences		NMEA0183 Ver1.5 / 2.0 / 3.0 DBS, DBT, DPT, GGA, GLL, HDG, HDT, MSK, MTW, MWD, MWV, RMC, THS, TLL, TTM, VTG, ZDA
Output data and sentences		NMEA0183 Ver 2.0 GGA, GLL, GTD, HDT, VTG, ZDA, APB, BOD, BWC, RMB, RMC, WPL, XTE
NMEA ports		Input / Output : 4 ports (General), Input (GPS) : 1 port
Data output cycle		1 sec
Power supply		10.8 to 31.2 VDC
Power consumption (at 24 VDC)		25W or less
Temperature		-15 to +55°C
Water protection		IPX5
Storage temperature		-30 to +70 °C
Upper limit humidity		93% ±3% (at +40°C)

18.3 External view and dimensions



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