KODEN

OPERATION MANUAL

GNSS COMPASS

KC-1400

KC-1400.OM.E 0093179022-01

Koden Electronics Co.,Ltd.
2-13-24 Tamagawa Ota-ku
146-0095 Tokyo
Japan

Declaration of Conformity

We, Koden Electronics Co., Ltd. with factory in 5278 Uenohara,Uenohara-Shi, Yamanashi,409-0112, Japan

declare as manufacturer under our sole responsibility that the

Marine GNSS Compass KC-1400

intended for use as a Marine Transmitting Heading Device (THD) for use aboard non-SOLAS vessels to which this declaration relates conforms to the following standards or other normative documents referring to EU directives and UK regulations

EU	UK
Radio Equipment Directive (RED) 2014/53/EU	**SI 2017 No. 1206 Radio Equipment Regulations 2017 as amened**
Health & Safety (article 3.1a) DIN EN 62368-1:2016-05 IEC 62368-1:2014 / Cor.2015, Ed.2 Council Recommendation 1999/519/EC	**Health & Safety (article 6.1a)** DIN EN 62368-1:2016-05 IEC 62368-1:2014 / Cor.2015, Ed.2 Council Recommendation 1999/519/EC
EMC (article 3.1b) EN 301 489-1 V2.2.3, EN 301 489-19 V2.2.1 IEC 60945: 2002 (relevant parts for RED)	**EMC (article 6.1b)** EN 301 489-1 V2.2.3, EN 301 489-19 V2.2.1 IEC 60945: 2002 (relevant parts for RED)
Radio Spectrum (article 3.2) EN 303 413 V1.2.1	**Radio Spectrum (article 6.2)** EN 303 413 V1.2.1

Type names: KC-1400

Consisting of: GNSS compass Unit: KC-1000 / Display Unit: KC-14

Software: KC-14: System KM-F90*; Language: KM-F91* / KC-1000: KM-F92*
*= minor changes, no effect on compliance to the standards

Frequency: GNSS: GPS operating frequency range : (1559 – 1610)MHz (L1) ; GLONASS operating frequency range : (1559 – 1610)MHz (G1) ; Galileo operating frequency range : (1559 – 1610)MHz (E1) ; Beidou operating frequency range : (1559 – 1610)MHz (B1I); SBAS operating frequency range: (1559 – 1610)MHz (L1)

For assessment, see

EU-type examination (Module B) certificate no: **EU24-0190-01-TEC** issued by CTC advanced (0682), Germany

RoHS conformity

EU	UK
RoHS Directive 2011/65/EU as amended by the Commission delegated directive (EU) 2015/863 EN IEC 63000:2018	**SI 2012 No. 3032 RoHS Regulations 2012 as amended** EN IEC 63000:2018

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Date: 10 December, 2024

This certificate expires if new regulations comes in force.

Jun Harayama
Manager / Quality Assurance Department

Document No. 84-2731U-X019

KC-1400 Operation Manual

Doc No: 0093179022

Document Revision History

No.	Doc. No-Rev. No.	Date revised (Y/M/D)	Revised content
0	0093179022-00	2024/10/01	First edition
1	0093179022-01	2025/02/18	Declaration
2			
3			
4			
5			
6			
7			
8			
9			
10			

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.

Important Notice

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- If this manual is lost or damaged, consult a dealer of Koden or Koden.
- The specification of the products and the contents in this manual are subject to change without notice.
- The contents displayed on the menu of product may be different from the expression of this manual. The fonts and shapes of the keys and menus in the illustration may differ from the actual ones, and some parts may be omitted.
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- If the stored data are changed or lost, irrespective of causes of troubles and damages, Koden is not liable for them.
- Koden is not liable for any damages arisen from malfunction caused by combination of software and connected equipment in which Koden is not engaged.

For Your Safe Operation

Symbol used in this Operation Manual

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

Symbol	Meaning
 Warning	**Mark for warning** This mark denotes that there is a risk of death or serious injury when dealt with incorrectly.
	**Mark for danger of high voltage** This mark denotes that there is a risk of death or serious injury due to electric shock when dealt with incorrectly.
 Caution	**Mark for caution** This mark denotes that there is a risk of slight injury or damages of devices when dealt with incorrectly.
	**Mark for prohibition** This mark denotes prohibition of specified conducts. Description of the prohibition is displayed near the mark.

Precautions on equipment

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

 **Caution**	**Measures against static electricity** Static electricity may be generated from the carpet on the floor in the cabin or clothes made of synthetic fiber, and it may destroy the electronic components on circuit boards. The circuit boards shall be handled with appropriate measures against static electricity.

Precautions on handling

 **Warnin**	No disassembly or modification of this equipment is allowed. It may lead to failure, firing, smoking or electric shock. In case of failure, please contact Koden's dealers or Koden.
 **Warning**	In case of smoking or firing, switch off the power in the boat and of this equipment. It may lead to firing, electric shock or damages.
	**Be careful of residual high voltage** High voltage may remain in capacitors for several minutes after switching off the power. Before inspection of the inside, please wait at least 5 minutes after switching off or discharge the residual electricity in an appropriate manner. Then, start the work.
 **Caution**	The information displayed on this equipment is not intended to use for your navigation. For your navigation, be sure to see the specified materials.

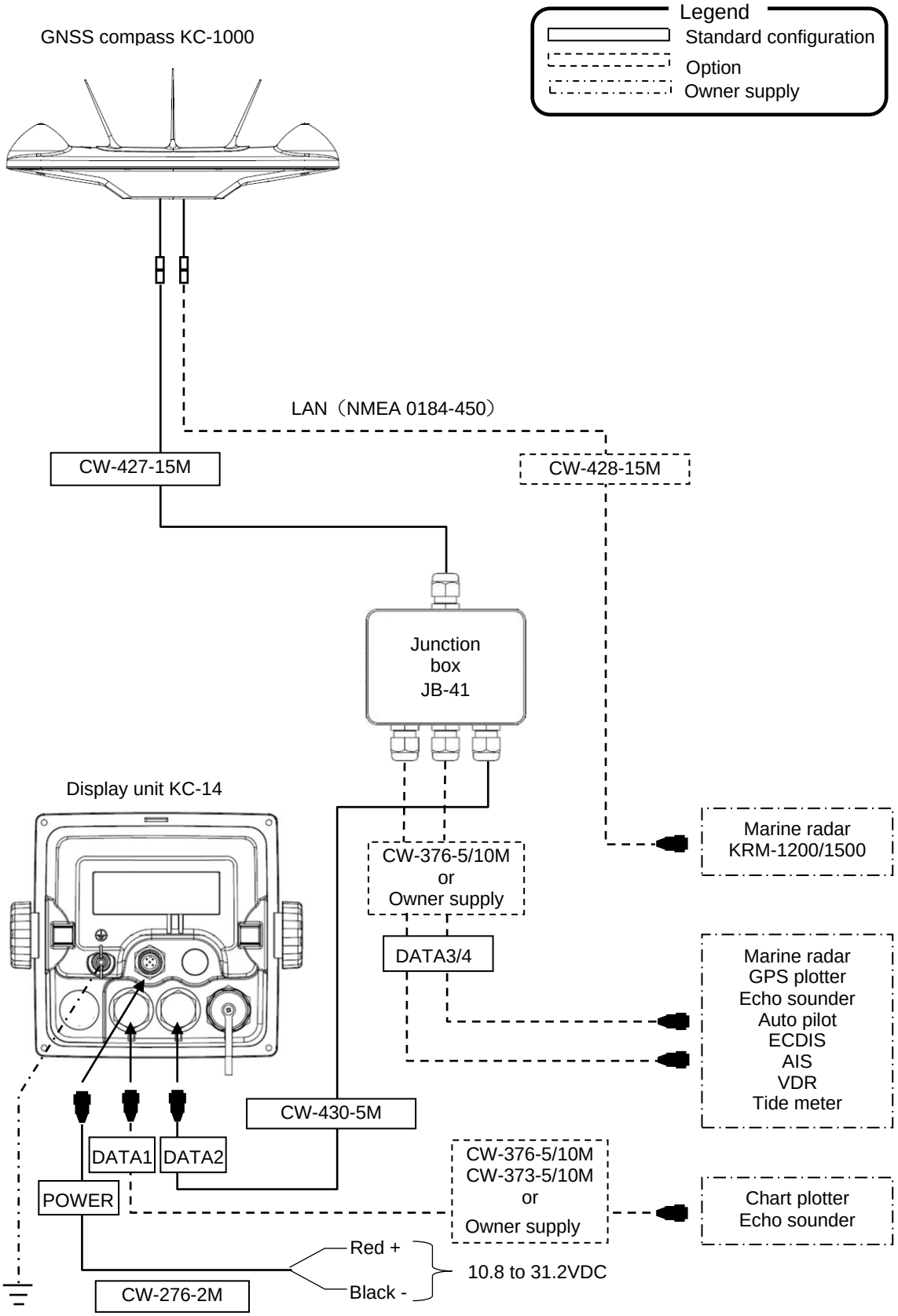
Contents

Introduction

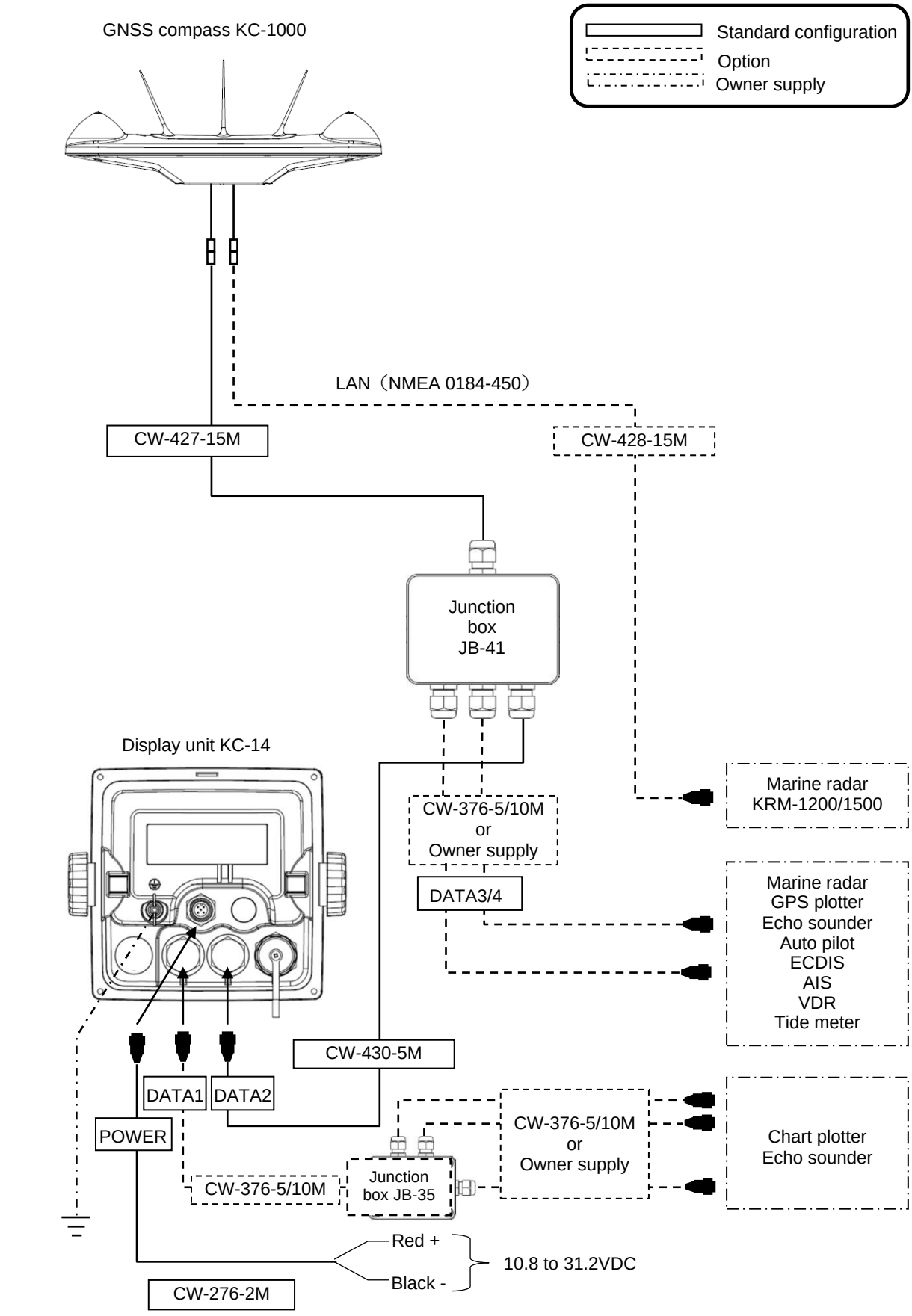
- KC-1400 is a compass and navigation device using GNSS (satellite navigation system).
- By measuring the phase difference between two GNSS antennas using radio waves from GNSS satellites, the ship's heading can be detected with high precision. It also has a navigation calculation function, so it can be used as a GNSS navigation device.
- The main features of this unit are as follows:
- Consists of two units: GNSS compass and display. The display uses a 4.3-inch high-brightness color liquid crystal display for excellent visibility under sunlight.
- There are four satellite positioning systems that can be used: GPS/Quasi-Zenith Satellite (Michibiki), Galileo, GLONASS, and BeiDou, so stable direction output is possible.
- In addition to heading, rolling, pitching, and heaving data can be output. If you use an echo sounder with a heaving correction function, you can observe fish sound images that are free from the effects of swells and waves.
- As a GNSS navigation device can storage 10,000 waypoints, 100 routes, and 3,000 track points.
- NMEA0183 x 3 and LAN (IEC 61162-450) x 1 are available for outputting direction/ navigation information to radar, plotter, etc.

System Configuration

Connection diagram



System Configuration (with Junction box)



Configuration of Equipment

Standard Equipment Configuration List

No	Item	Type name	Remarks	Weight/Length	Q'ty
1	GNSS compass	KC-1000	With bird protector	2.5 kg	1
2	Display unit	KC-14	With protective cover, mounting base, and knobs	0.89kg	1
3	DC power cable	CW-276-2M	With 5-pin connector and one end plain	2m	1
4	NMEA cable	CW-427-15M	12-pin water resistant connector and one end plain	15m	1
5	Connecting cable	CW-430-5M	6-pin water resistant connector and one end plain	5m	1
6	Junction box	JB-41	For connection between Display unit and GNSS compass	0.48kg	1
7	Installation materials	TPT5X20U	Truss tapping screw (4)		1 Set
		T.5X20MMX10M	Self-bonding tape (1)		
		10M mono [gray]	PVC tape (1)		
		Plain washer	2W8U (4)		
		Spring washer	SW8U (4)		
		B8X25U	Mounting bolt (4)		
8	Operation manual	KC-1400.OM.E	English		1

Option List

No	Item	Type name	Remarks	Weight/ Length
1	Connecting cable	CW-376-5M	6-pin water resistant connector and one end plain	5m
2		CW-376-10M	6-pin water resistant connector and one end plain	10m
3		CW-373-5M	With 6-pin water resistant connectors on both ends	5m
4		CW-373-10M	With 6-pin water resistant connectors on both ends	10m
5	Junction box	JB-35	3 inputs / outputs	-
6	Power rectifier	PS-010	With 5A fuses 2pcs * Not available for sale in Europe	3.5 kg
7	AC power cable	VV-2D8-3M	For PS-010, both ends plain	3 m
8	LAN cable	CW-428-15M	With RJ45 connectors on both ends	15m
9	Extension cable	CW-427-30M	NMEA 30m extension cable	30m
		CW-427-60M	NMEA 60m extension cable	60m
		CW-428-30M	LAN 30m extension cable	30m
		CW-428-60M	LAN 60m extension cable	60m
10	Mount base	D86MB21110	KC-1000 mounting stand	

11	Attachment	D86MB21120	GA-11 mounting hole → KC-1000 mounting hole conversion bracket	
12	Operation manual	KC-1400.OM.E	English	
13	Service manual	KC-1400.SM.E	English	

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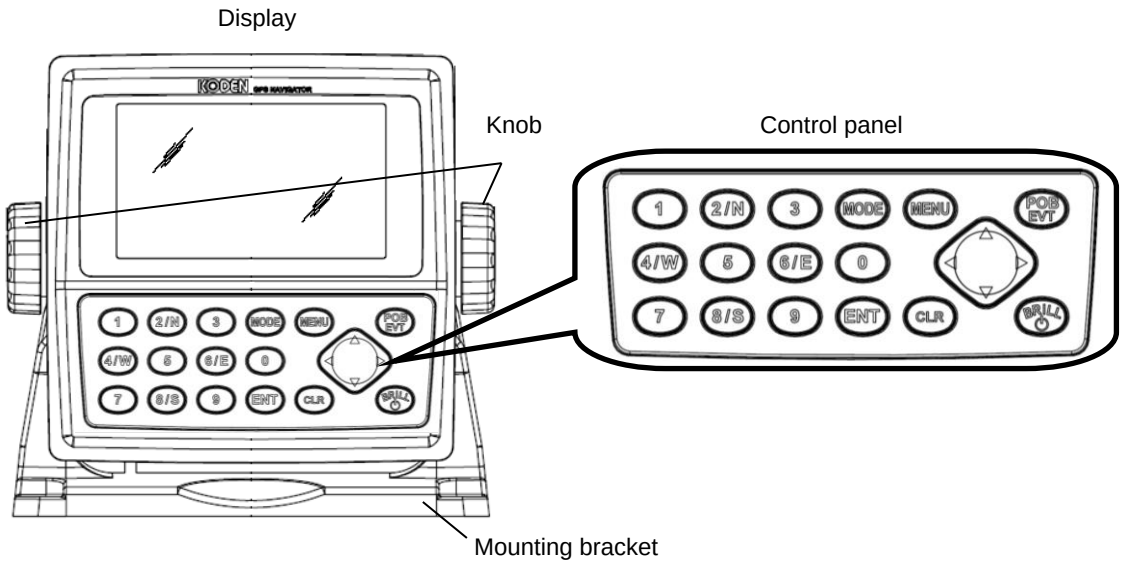
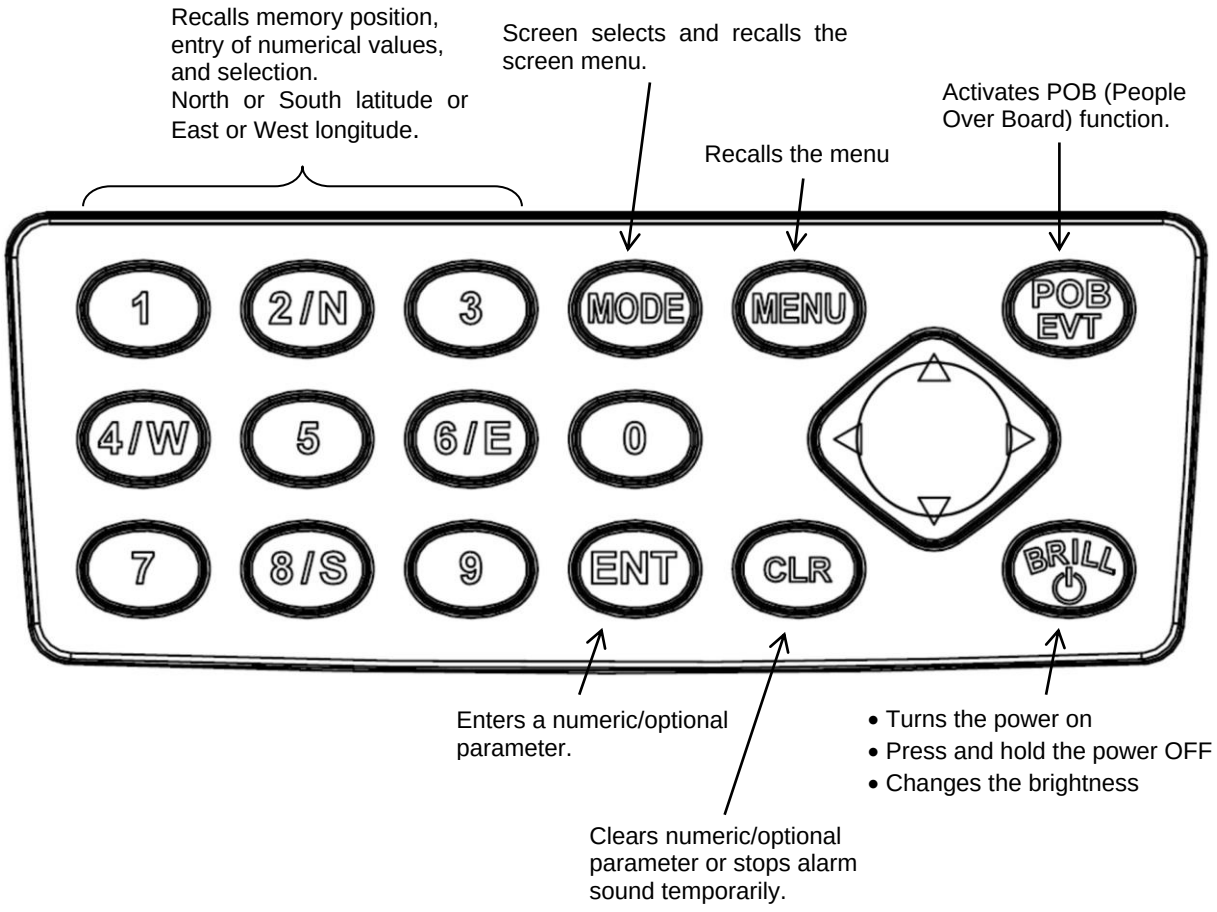
Chapter 1 Basic Operation

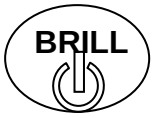
1.1 The name and function of each part



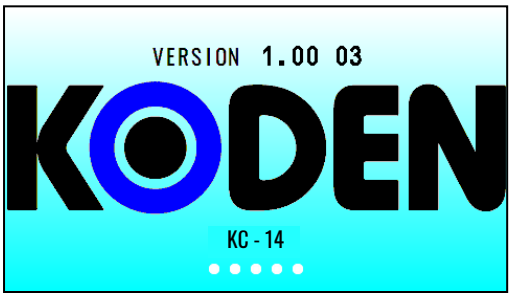
1.1.1 Control panel



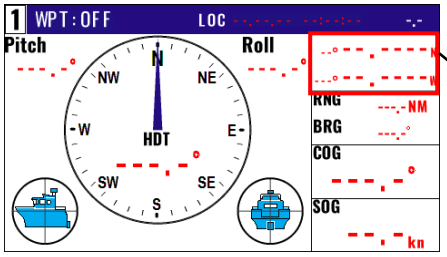
1.2 Power On/Off



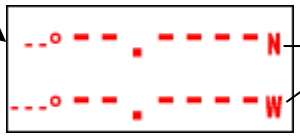
Press to power on.



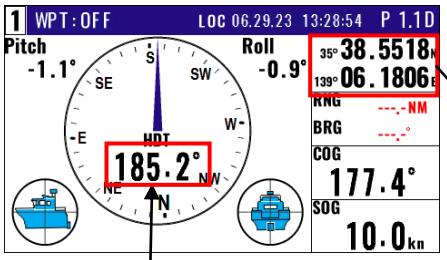
Initial message appears during power-on.
The receiver is performing the self-check.



Blink when NAVIGATOR is searching GPS satellites.

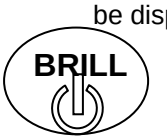


Red – – will be displayed.



Latitude/longitude in black will be displayed.

After the latitude and longitude of the current position are displayed, the ship's heading will be displayed after a while.



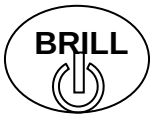
Press until [Power off 3sec] is displayed for turn NAVIGATOR off.
All data before power-off is kept in memory for later use.

Note

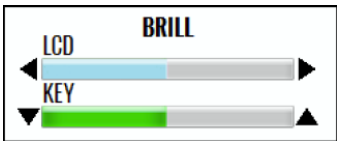
Be sure to turn off the power using the steps above. Avoid turning off the power by turning off the main power supply.

1.3 Adjusting brightness of display and panel key

1.3.1 Adjusting brightness of display and panel key



Press to change the LCD brightness in 7 levels.
After the popup of below was displayed, push the  key.

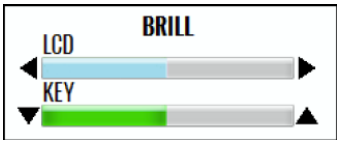


NOTE: *This setup is memorized and turns into the same setup next time at the time of a power supply ON.*

1.3.2 Switching between Day mode / Night mode

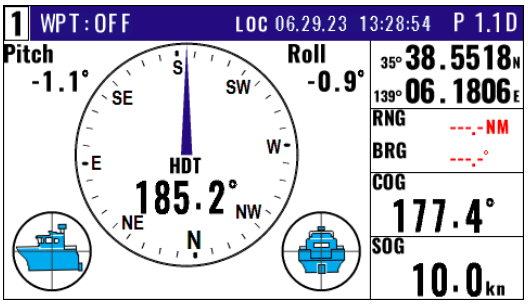
Switch between Day mode, which is used during bright daylight hours, and night mode, which is used with reduced brightness in a dark ship at night.

1. Press  key short time and the following display appears.

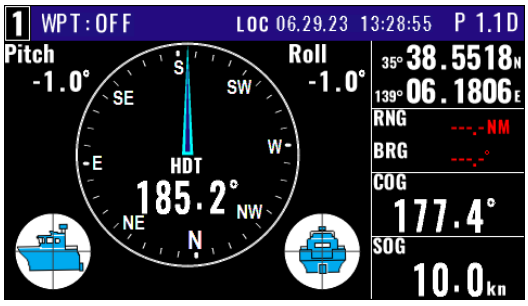


2.With the above “Brightness Pop-up” screen displayed, press  key.

Determine "Day mode" and "Night mode".



Day mode



Night mode

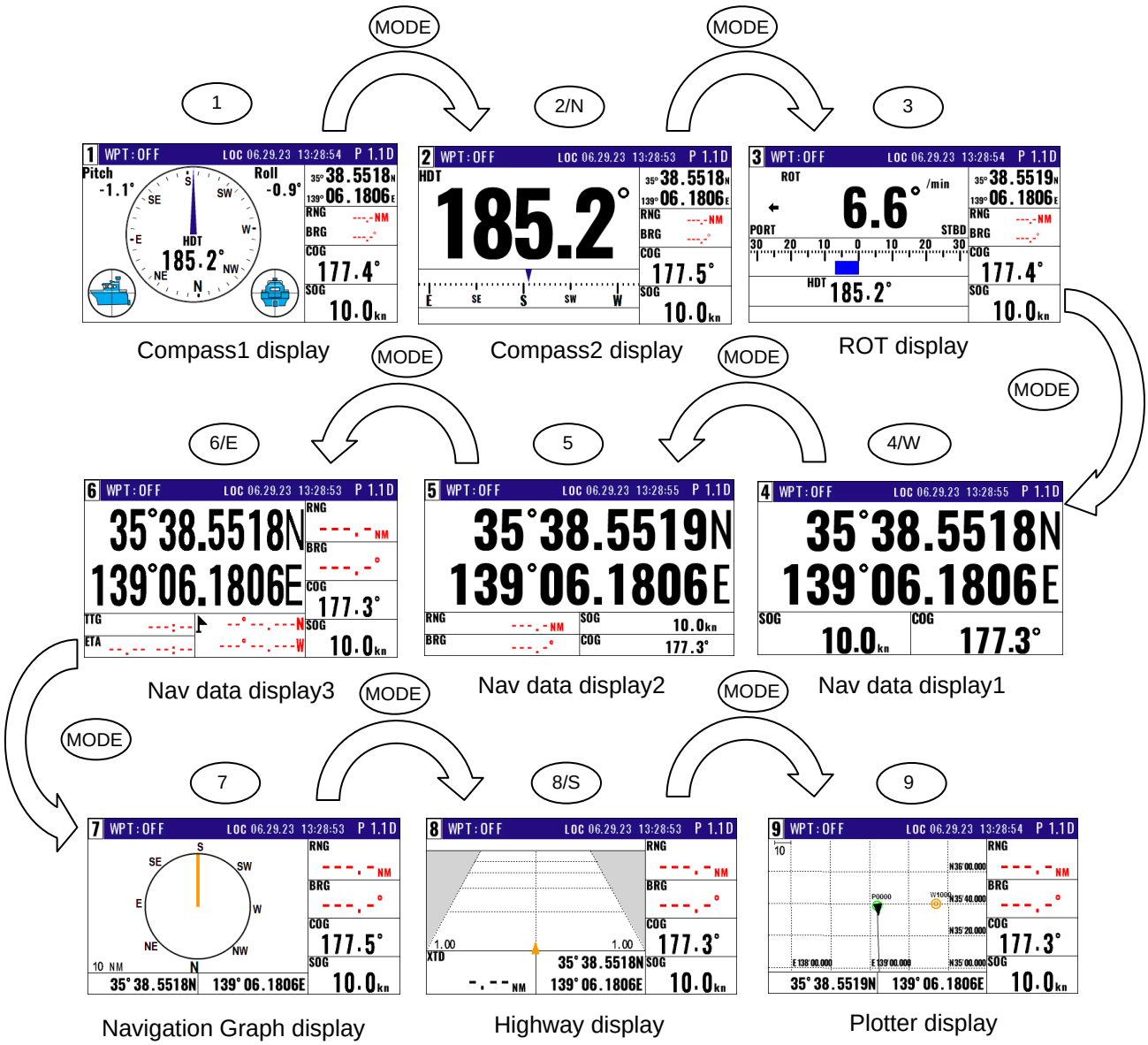
1.4 Selecting the screen

1.4.1 Display Modes

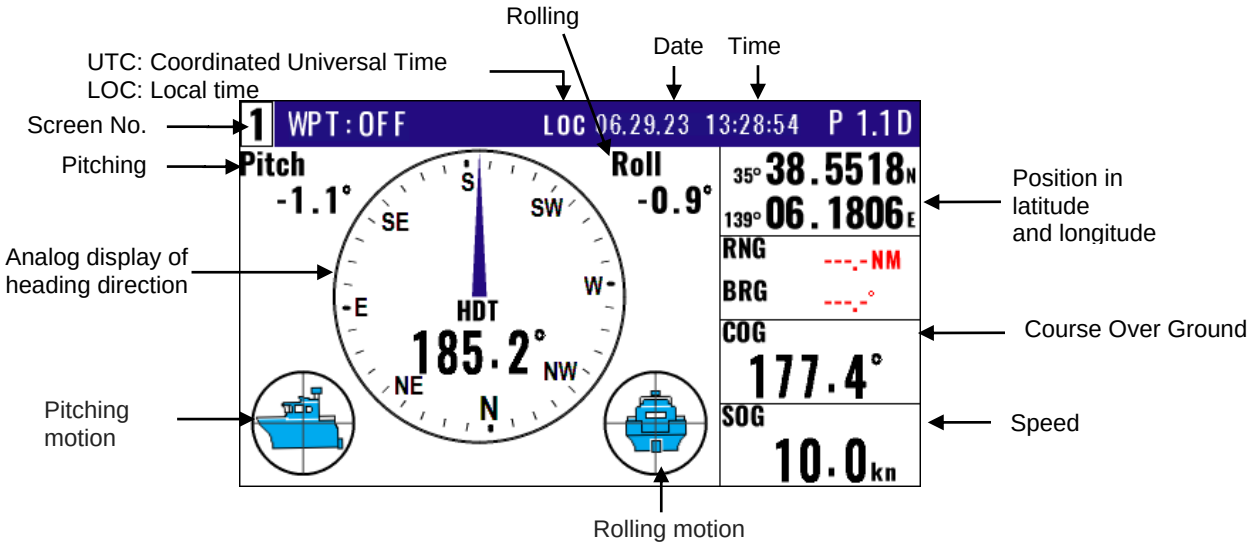
KC-1400 has 9 display modes: Compass1 display, Compass2 display, ROT display, Nav data display1, Nav data display2, Nav data display3, Navigation Graph display, Highway display, Plotter display.

There are two ways to change the display modes.

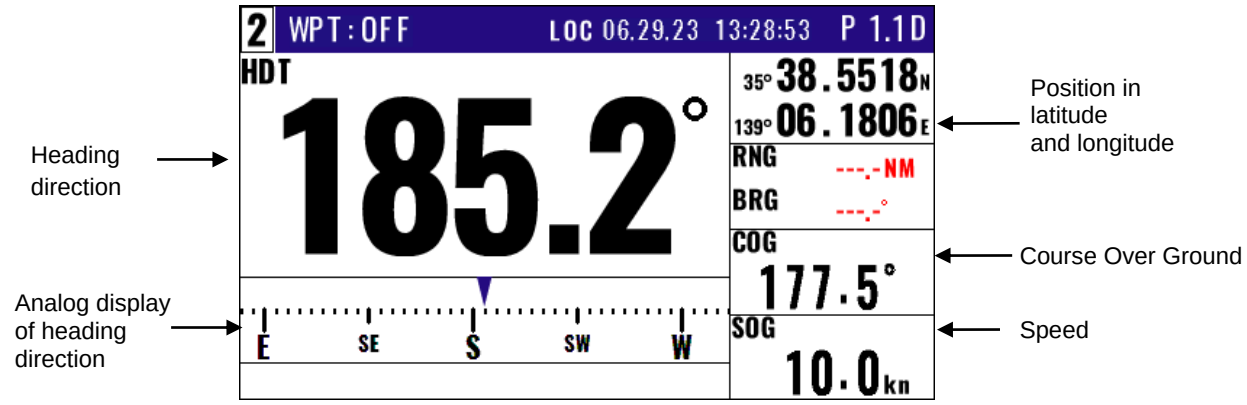
1. Press numeric key on the upper-left corner of the screen.
2. Press (MODE) key to select the display mode.



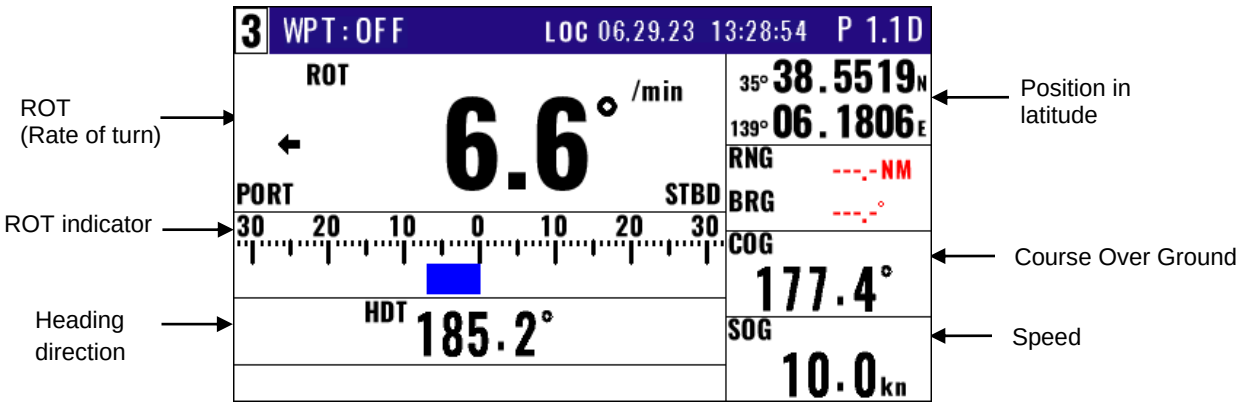
1.4.2 Compass1 display screen (GENERAL INFO)



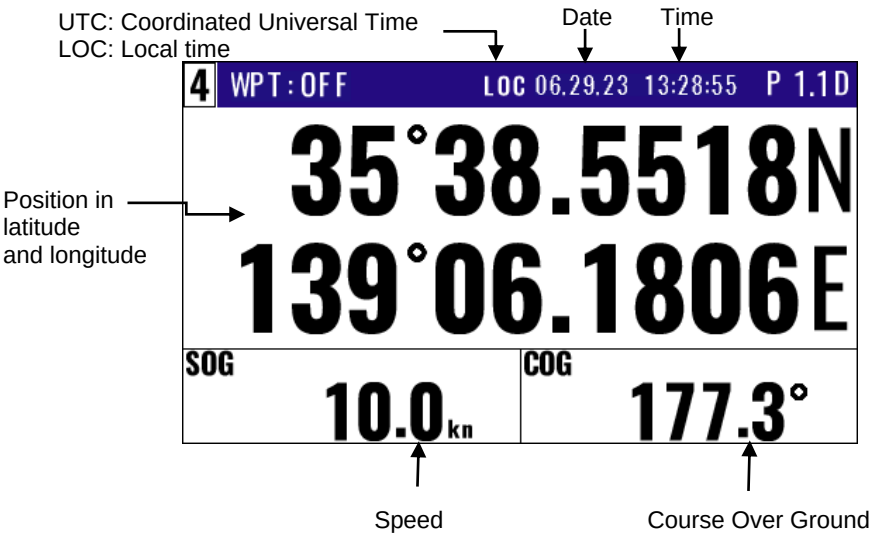
1.4.3 Compass2 display screen (NAVIGATION INFO)



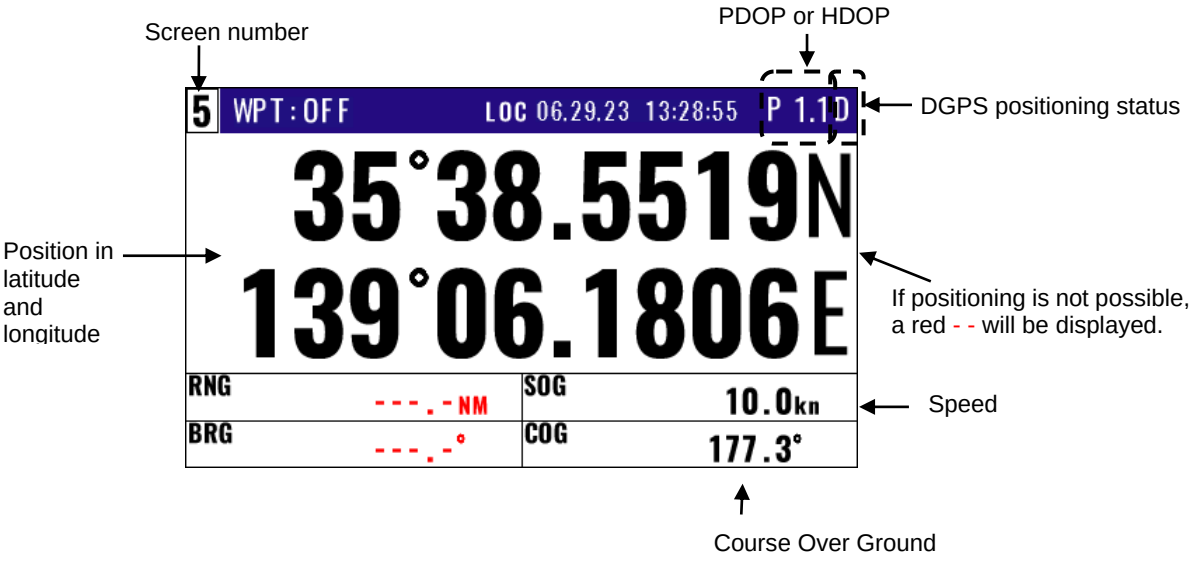
1.4.4 Rate of turn display (ROT) screen (HULL INFO)



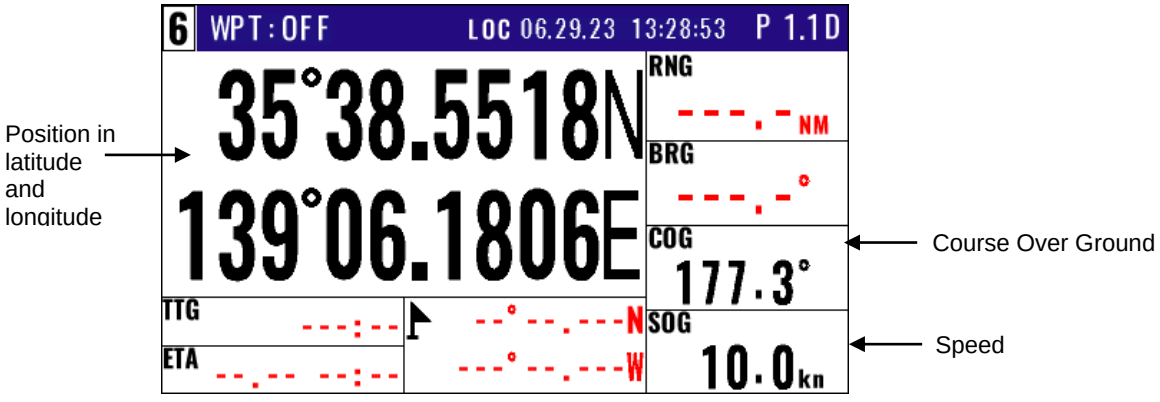
1.4.5 Nav data display1 screen (HULL INFO)



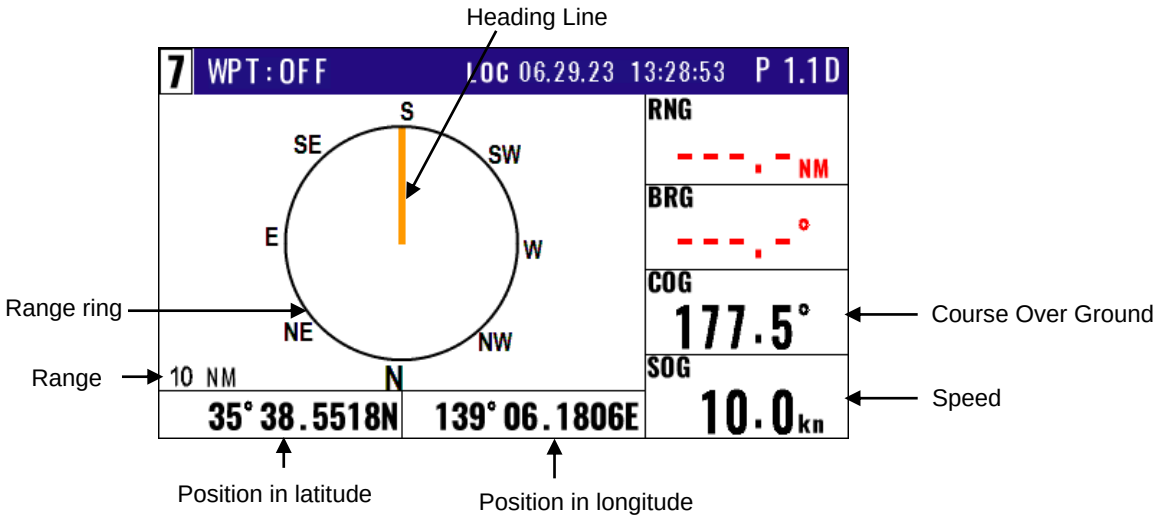
1.4.6 Nav data display2 screen(Navigation information)



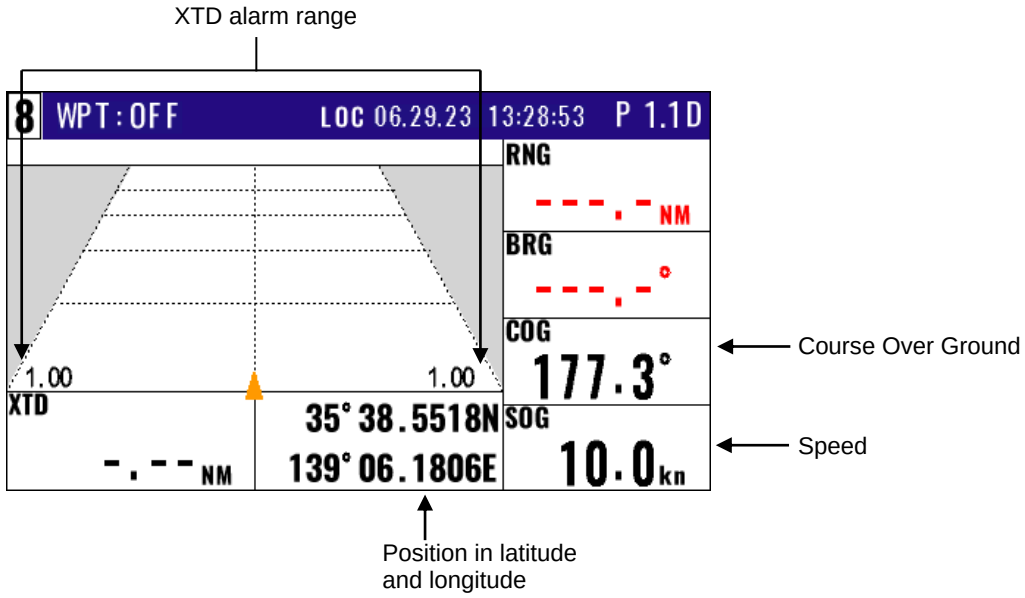
1.4.7 Nav data display3 screen(Navigation information)



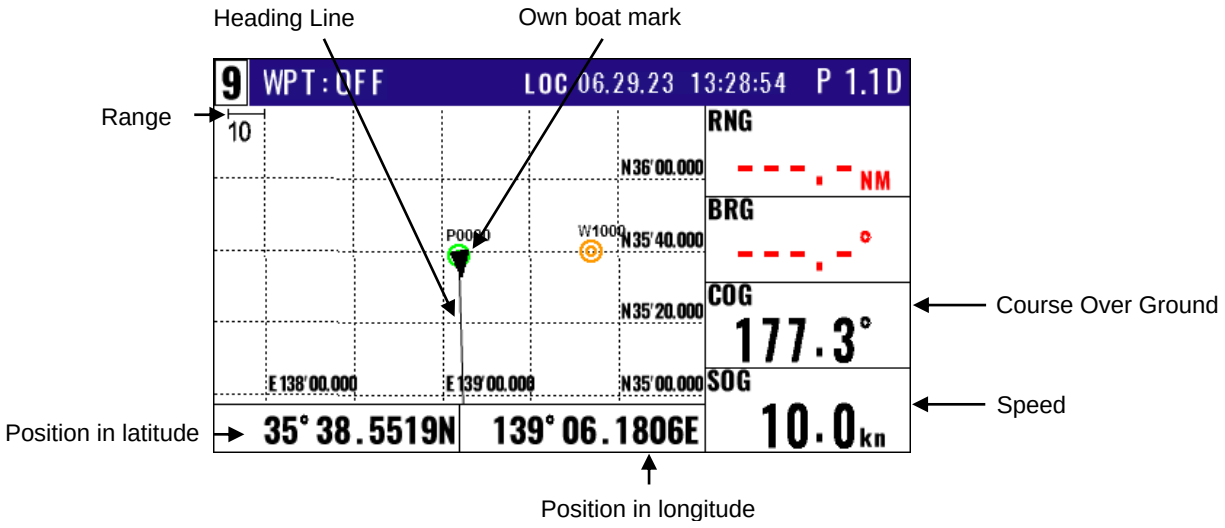
1.4.8 Navigation Graph display screen (NAVIGATION INFO)



1.4.9 Highway display screen (NAVIGATION INFO)



1.4.10 Plotter display screen (NAVIGATION INFO)



1.5 Storing present position (EVENT)

You can store up to 999 present positions with numbers 0001 to 0999. When you store additional positions, the oldest position is deleted, and the newest position is stored in its place.

- The storage date, hours and minutes, position data, and symbols (selectable in “10: Plotter”) can be stored.
- It is convenient to store the present position for use later in route navigation.
- These positions can be used as targets or waypoints.

CAUTION
EVT key does not function when positioning is invalid

- **Event numbering is available both in the automatic or manual mode. Auto or Manual selection is made at the “6.2.4 Changing a storing method for present position (Event)” (Refer Page 6-5)**

1.5.1 AUTO

POB
EVT

(1) Press (POB) key to appear the pop-up.
(2) Press (ENT) key to store your present position.

```
Goto POB  :[POB]
Goto Event:[ENT]
Cancel    :[CLR]
```

(3) You can store up to 999 present positions by pressing this key. They have storage numbers 0001 to 0999. It is store in order from the vacant location in the WPT list.

```
EVT=W0001   ← Increment Waypoint
15 15:37    ← Storage date (Day, Hour, Minute)
35°38.184N  ← Storage position (Lat, Long)
139°42.997E
```

NOTE: *Auto or Manual selection is made at the **“6.2.4 Changing a storing method for present position (Event)”***

1.5.2 MANUAL

POB
EVT

(1) Press (POB) key to appear the pop-up.
(2) Press (ENT) key to store your present position.
(3) Specify a desired EVENT number by numeric keys.
(4) Press (ENT) key. The event will be registered to the number specified.

```
Goto POB  :[POB]
Goto Event:[ENT]
Cancel    :[CLR]
```

Blinks for 10 seconds

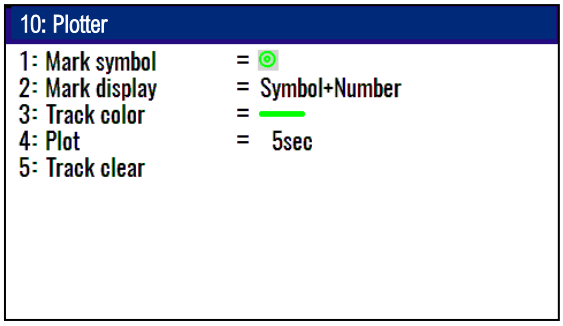
```
EVT=W0001   ← Increment Waypoint
 15  04 : 59  ← Storage date (Day, Hour, Minute)
   35°38 . 180N  ← Storage position (Lat, Long)
  139°42 . 990E
```

NOTE: *Auto or Manual selection is made at the **“6.2.4 Changing a storing method for present position (Event)”***

1.5.3 Changing the setup contents

(1) Press (MENU) key until Menu options 1 to 10 appears.

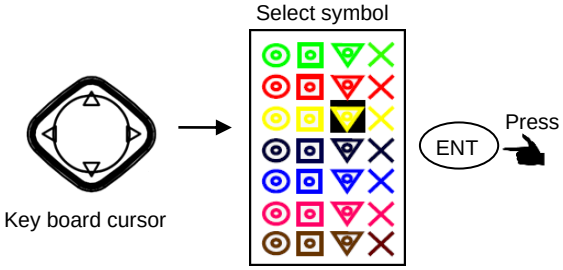
(2) Press (9) key to select "**10: Plotter**".



(3) Various settings

1) 1: Mark symbol (Press (1) key)

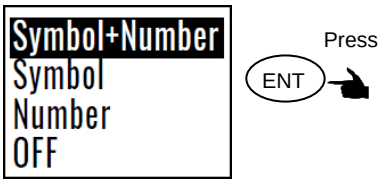
To change the Mark symbol, place cursor on **SYMBOL** option and press (ENT) key.



Initial setup: (Green)

2) 2: Mark display (Press (2/N) key)

You can choose whether to display the mark or not.



Initial setup: Symbol + Number

1.6 Using POB (People over-board)

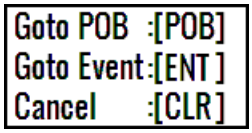
POB function is provided for an emergency (if a person falls into the water) to make it easier to return to POB point.

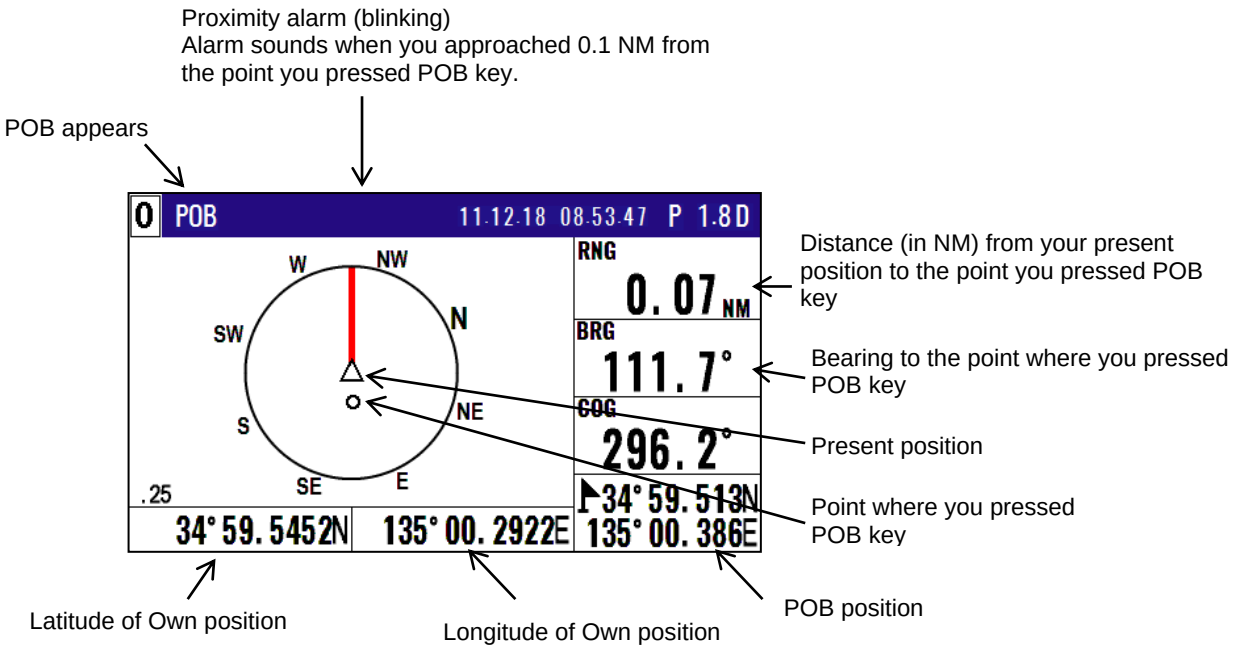
CAUTION
POB key does not function when positioning is invalid

POB
EVT

(1) Press (POB) key to appear the pop-up.

(2) Press (POB) key to store POB position.





CLR Pressing the "CLR" key will stop the alarm and pressing the "CLR" key again will return you to the screen before the POB key was pressed.

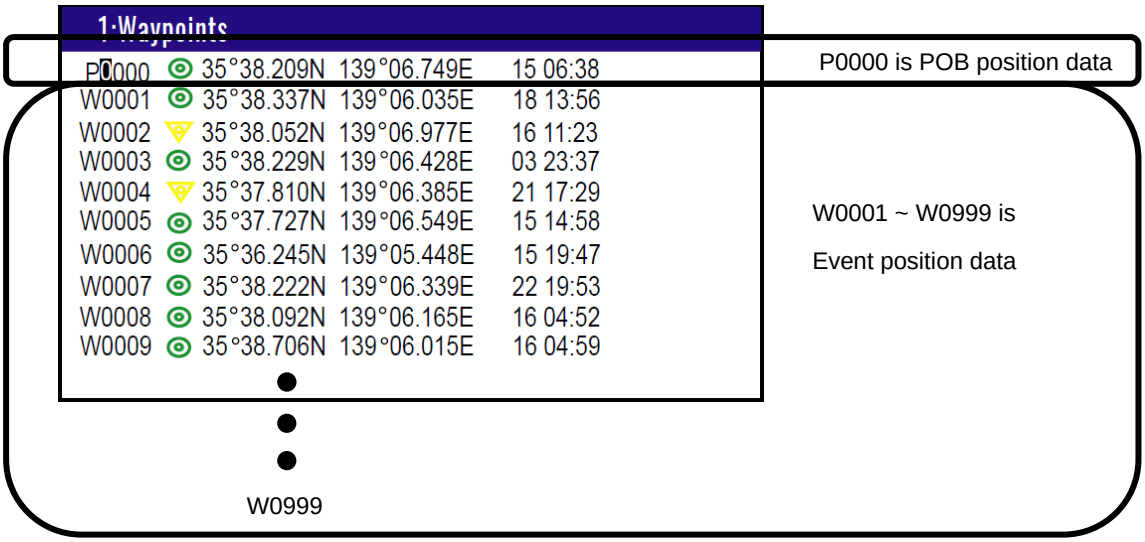
1.7 Recalling Event and POB position

(1) Press (MENU) key until menu options 1 to 10 appears.

(2) Press (1) key to select "1: Waypoints".

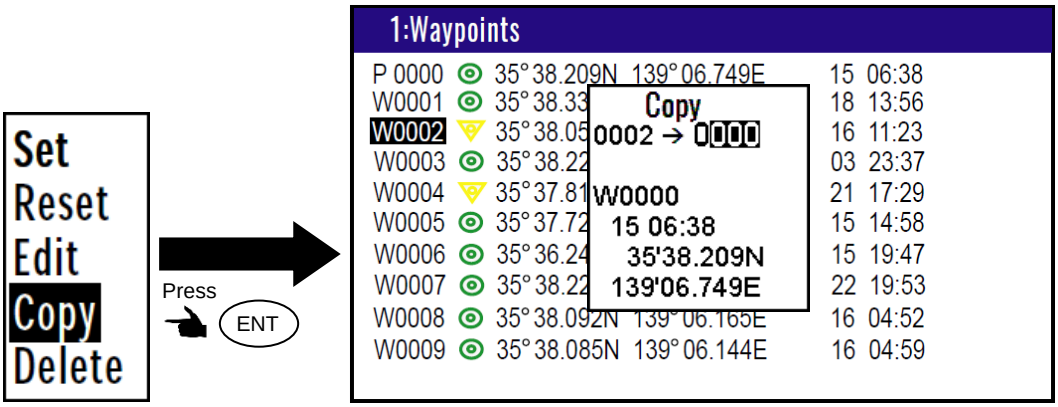
(3) Enter a storage number P0000 and W0001 to W0999 is POB and Event position data.

NOTE: *P0000 : Position data where you pressed POB key*
W0001 to W0999 : Position data that contains events

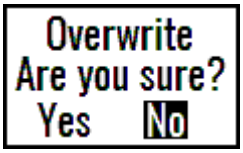


1.8 Copying Event and POB position

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 1 key to select "**1: Waypoints**"
(3) Enter storage number (0000 to 0999) by numeric keys and press ENT key.
(4) Press ENT key to display the pop-up.
(5) Select [**Copy**] in the pop-up and press ENT key.
(6) Enter a source point number (0000 to 0999) by numeric keys.
(7) Press ENT key to copy the storage data.

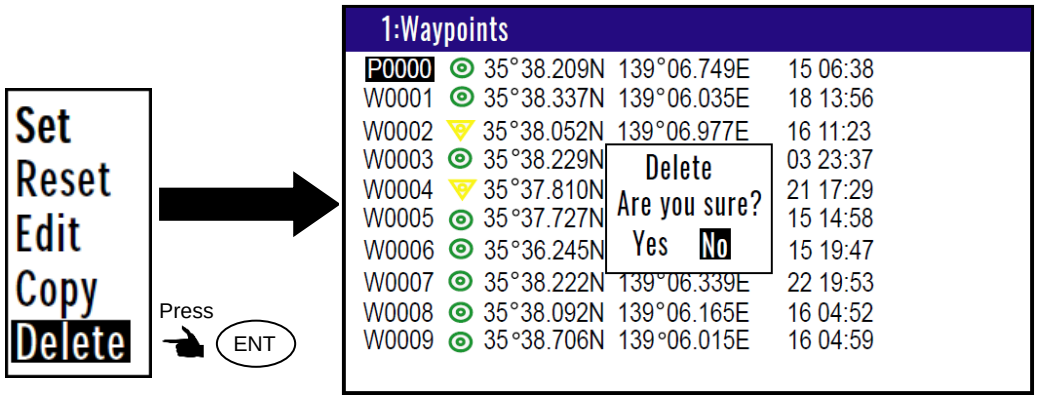


(8) If OK, select [**Yes**] in the pop-up and press ENT key.
If cancel overwriting, select [**No**] in the pop-up and press ENT key.



1.8.1 Erasing Event and POB position

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 1 key to select "**1: Waypoints**".
(3) Enter storage number (0000 to 0999) by numeric keys and press ENT key.
(4) Press ENT key to display the pop-up.
(5) Select [**Delete**] in the pop-up and press ENT key.
(6) If OK, select [**Yes**] in the pop-up and press ENT key.
If cancel erasing, select [**No**] in the pop-up and press ENT key.



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Chapter 2 Various Navigation

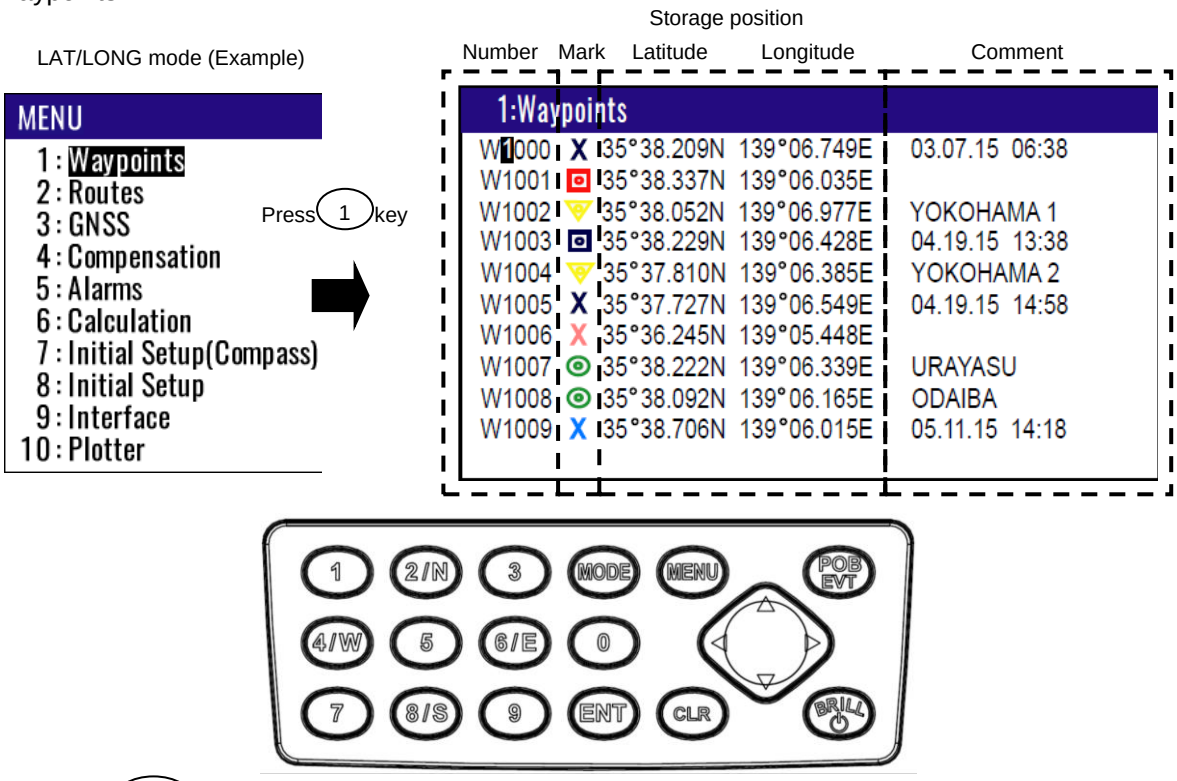
2.1 Storing waypoints (LAT/LONG) data

◀ **NOTE:** *Press to backspace the cursor to correct an input error.*

CLR **NOTE:** *Press to clear incorrect Input. You can reenter Numeric data.*

2.1.1 Storing a new waypoint or updating an existing a waypoint

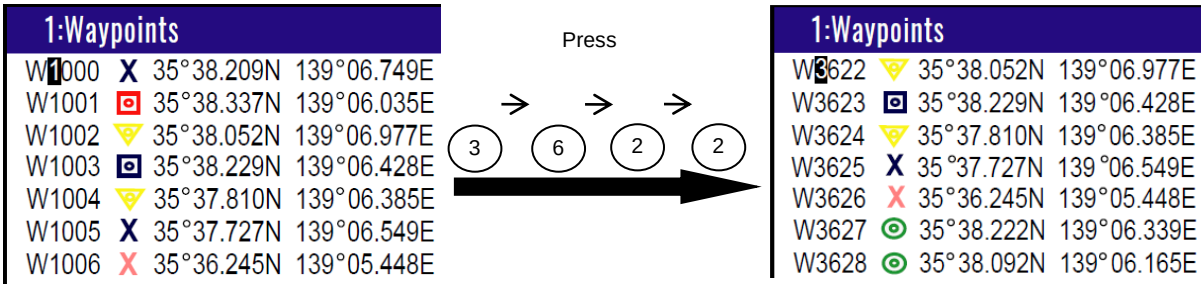
Up to 10000 waypoints can be stored in memory. As 1000 points (numbers: 0000 to 0999) are reserved for POB and event registration, you can use 1000 to 9999 (total of 9000 points) to store waypoints.



(1) Press (MENU) key until Menu options 1 to 10 appears.

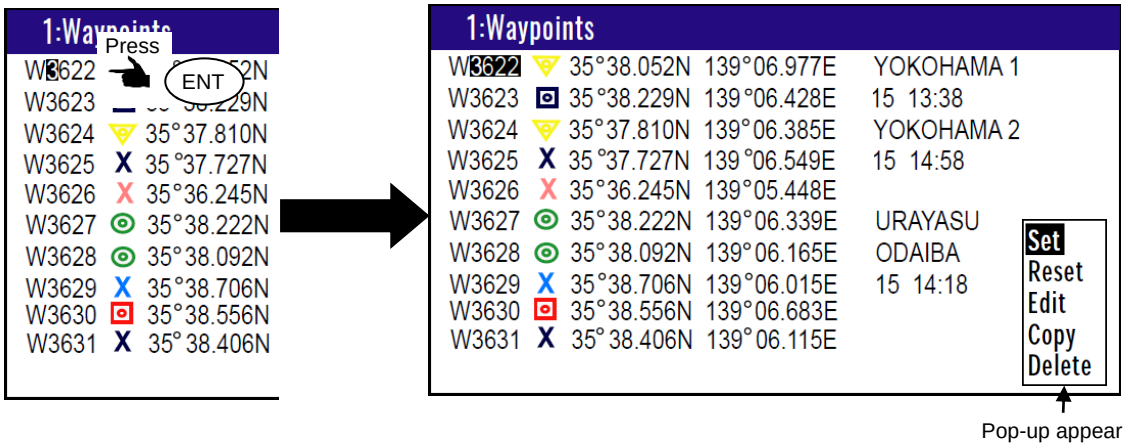
(2) Press (1) key to select "**1: Waypoints**".

(3) Enter storage number (0000 to 9999) by numeric keys and press (ENT) key.

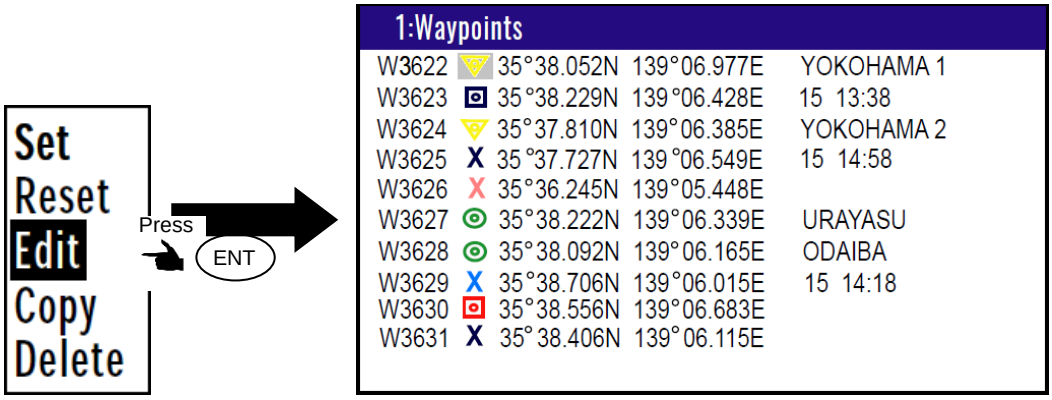


(4) Press (ENT) key to display the pop-up.

(5) Select [**Edit**] in the pop-up and press (ENT) key.



(6) Press [▶] [◀] key to move the cursor to select [Mark], [Latitude], [Longitude] or [Comment].



(7) [Mark] settings:

1) Press ENT key to select the [Mark].
2) Press [◇] key to select the shape of the mark.
3) Press ENT key.

(8) [Latitude] and [Longitude] settings:

Example: The position “N35°38.180 / E139°42.990” is entered by pressing the following keys in exact order given below. **[3]**,**[5]**,**[3]**,**[8]**,**[1]**,**[8]**,**[0]**,**[N]**,**[1]**,**[3]**,**[9]**,**[4]**,**[2]**,**[9]**,**[9]**,**[0]**,**[E]**.

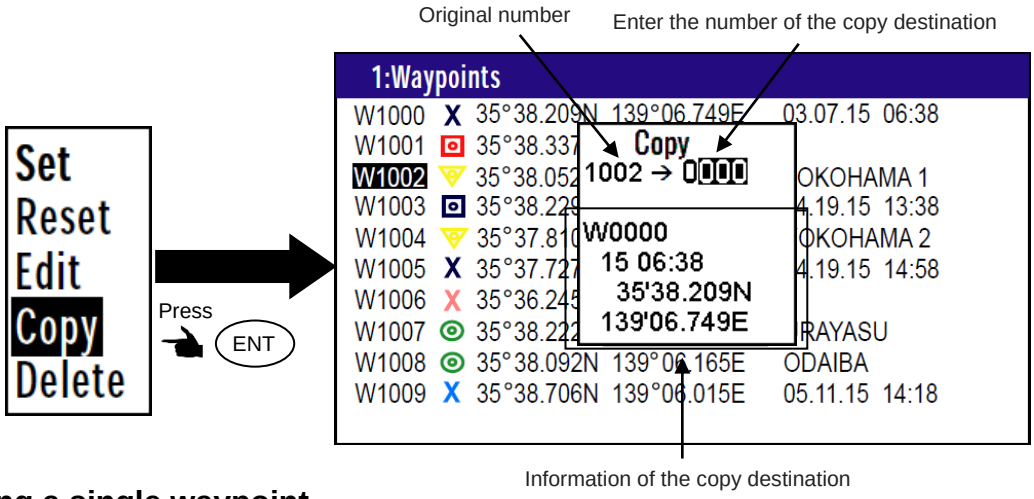
(9) [Comment] settings:

1) Press ENT key to select of the [Comment].
2) Press [◇] key to select a comment letter in the pop-up.
3) Finally press ENT key after moved a cursor to the [APPLY] in the pop-up.
4) Press [▲] or [▼] key when the work has been completed.

2.1.2 Copying a position

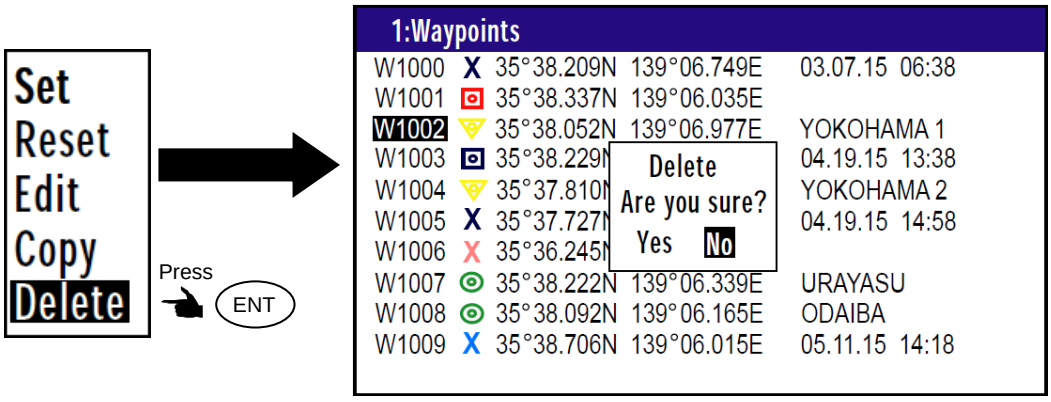
You can copy the position data (stored with numbers 0000 to 9999) to the waypoint data (having numbers 1000 to 9999).

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 1 key to select "**1: Waypoints**".
(3) Enter storage number (0000 to 9999) by numeric keys and press ENT key.
(4) Press ENT key to display the pop-up.
(5) Select [**Copy**] in the pop-up and press ENT key.
(6) Enter a source point number (1000 to 9999) by numeric keys.
(7) Press ENT key to copy the storage data.



2.1.3 Erasing a single waypoint

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 1 key to select "**1: Waypoints**".
(3) Enter storage number (0001 to 9999) by numeric keys and press ENT key.
(4) Press ENT key to display the pop-up.
(5) Select [**Delete**] in the pop-up and press ENT key.
(6) If OK, select [**Yes**] in the pop-up and press ENT key.
If cancel erasing, select [**No**] in the pop-up and press ENT key.



NOTE: *To erase an entire data from memory simultaneously, see* ***"WPT. / Route clear"*** *(page 6-5).*

2.2 Setup of waypoint navigation

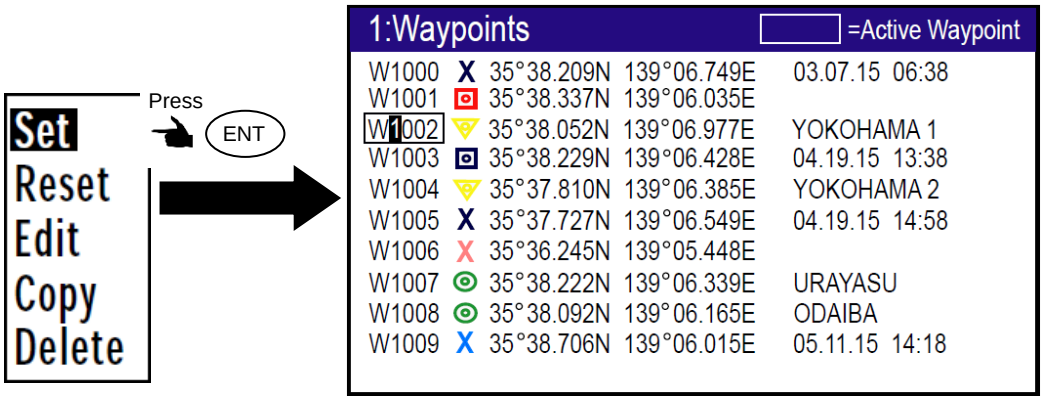
◀ **NOTE:** *Press to backspace the cursor to correct an input error.*

CLR **NOTE:** *Press to clear incorrect Input. You can reenter Numeric data.*

2.2.1 Setting waypoint navigation

The position data for each waypoint must be set prior to navigating to waypoints. You can use the data already stored from Menu, or you can set the waypoints on screen 1 to screen 9 (called the quick waypoint navigation).

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 1 key to select "**1: Waypoints**".
(3) Enter storage number (0000 to 9999) by numeric keys and press ENT key.
(4) Press ENT key to display the pop-up.
(5) Select [**Set**] in the pop-up and press ENT key.
(6) Number is surrounded by square.

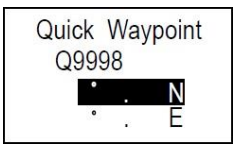


2.2.2 Quick waypoint setup

Quick WPT (priority waypoint) can be set by specifying it directly from the screen 1 to screen 9. When the new waypoint is selected, the waypoint navigation to it will commence and the specified position, along with the comment (**QUICK**), will be assigned to the position number 9998. Old data is replaced with a new during quick WPT setup.

While the pages of the screen 1 to screen 9 are displayed.

(1) Press 0 key to display "**QUICK**" pop-up menu.



(2) Enter latitude and longitude.

For example, if “N35°38.180 / E139°42.990” is inputted, a key will be pressed in order of [**3**],[**5**],[**3**],[**8**],[**1**],[**8**],[**0**],[**N**],[**1**],[**3**],[**9**],[**4**],[**2**],[**9**],[**9**],[**0**],[**E**].

(3) The waypoint is set, and the point data is stored in number 9998.

2.2.3 Canceling waypoint navigation

To cancel waypoint navigation, turn WPT to reset on screen 1 to screen 9. There are two ways.

- Cancel from [MENU].
- Cancel from screen 1 to screen 9.

1) When reset from [MENU].

(1) Press (MENU) key until Menu options 1 to 10 appears.

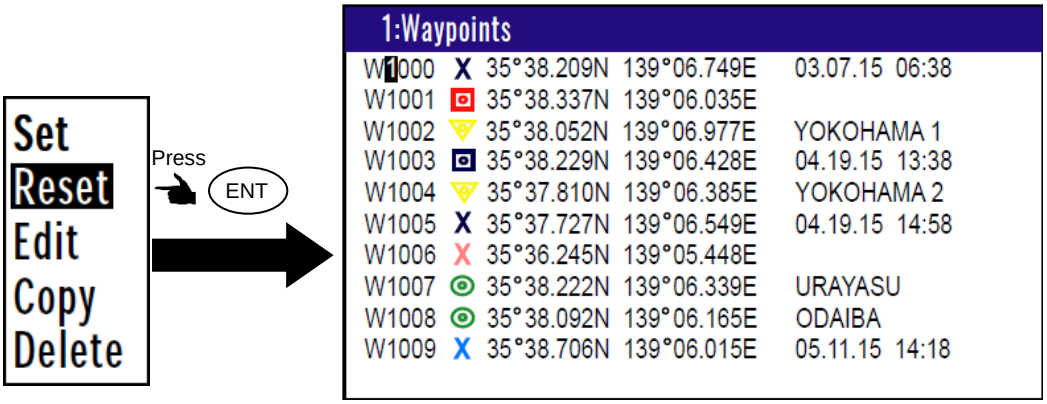
(2) Press (1) key to select “**1: Waypoints**”.

(3) Enter storage number (0000 to 9999) by numeric keys and press (ENT) key.

(4) Press (ENT) key to display the pop-up.

(5) Select [**Reset**] in the pop-up and press (ENT) key.

(6) No square from Number.

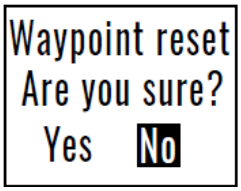


2) When reset from screen 1 to screen 9.

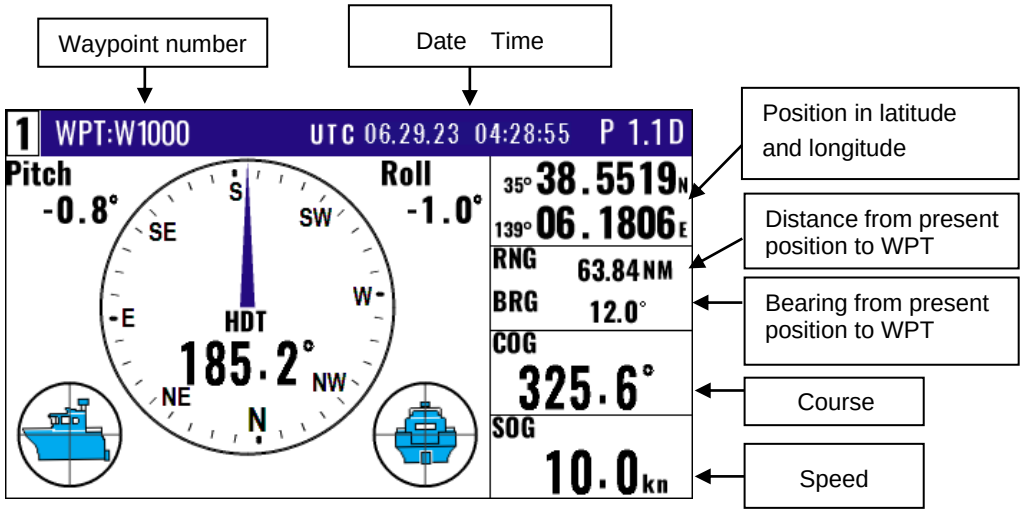
(1) Press (CLR) key.

(2) If OK, select [**Yes**] in the pop-up and press (ENT) key.

If cancel erasing, select [**No**] in the pop-up and press (ENT) key.

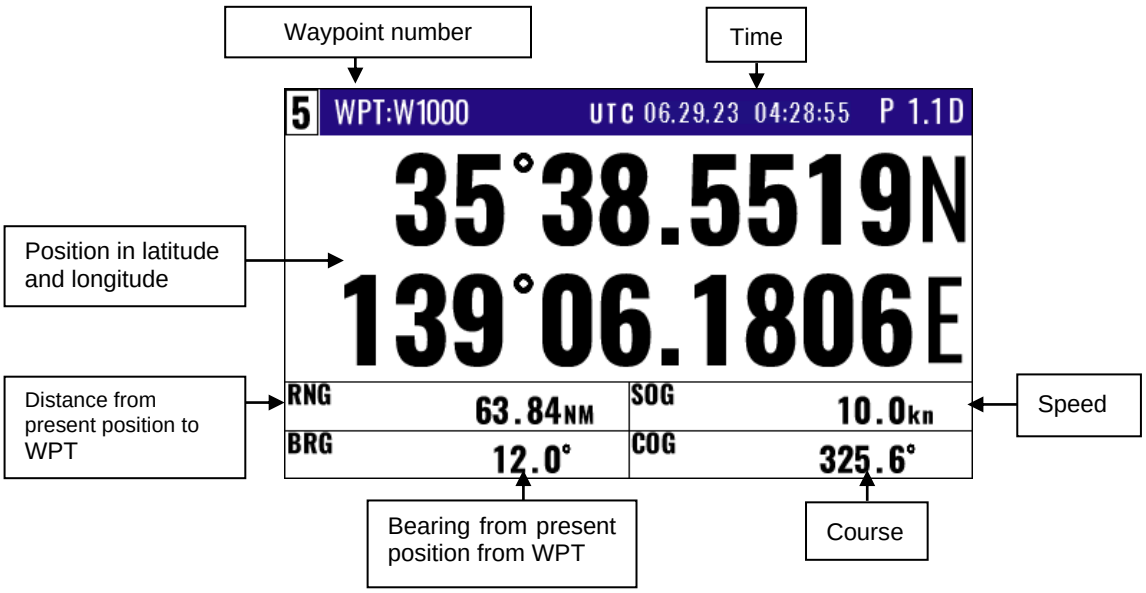


2.2.4 Compass screen and turning angular velocity screen in waypoint navigation

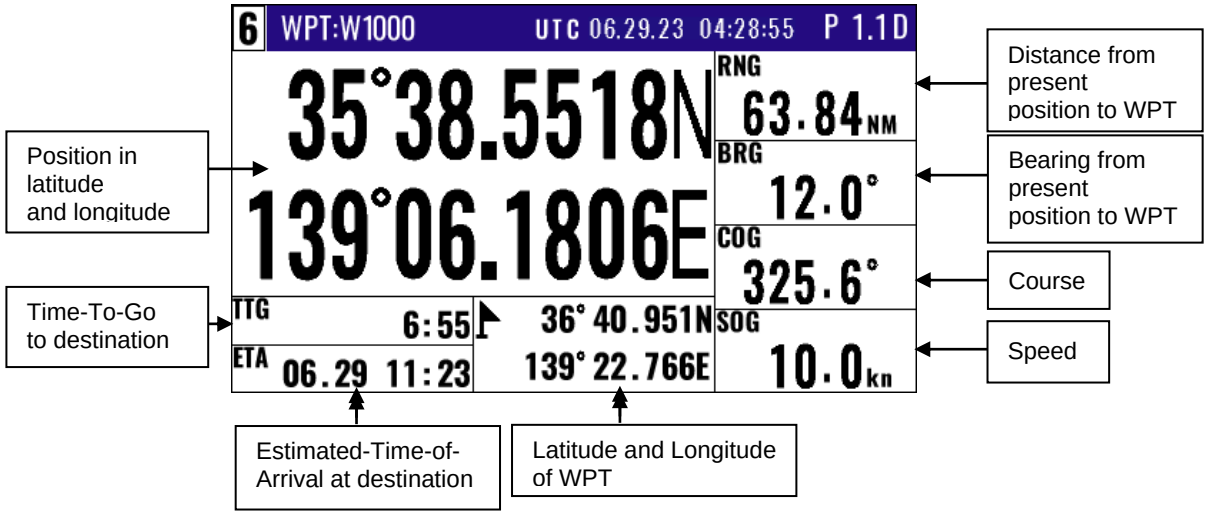


*The compass 2 screen/turning angular velocity screen is also viewed in the same way.

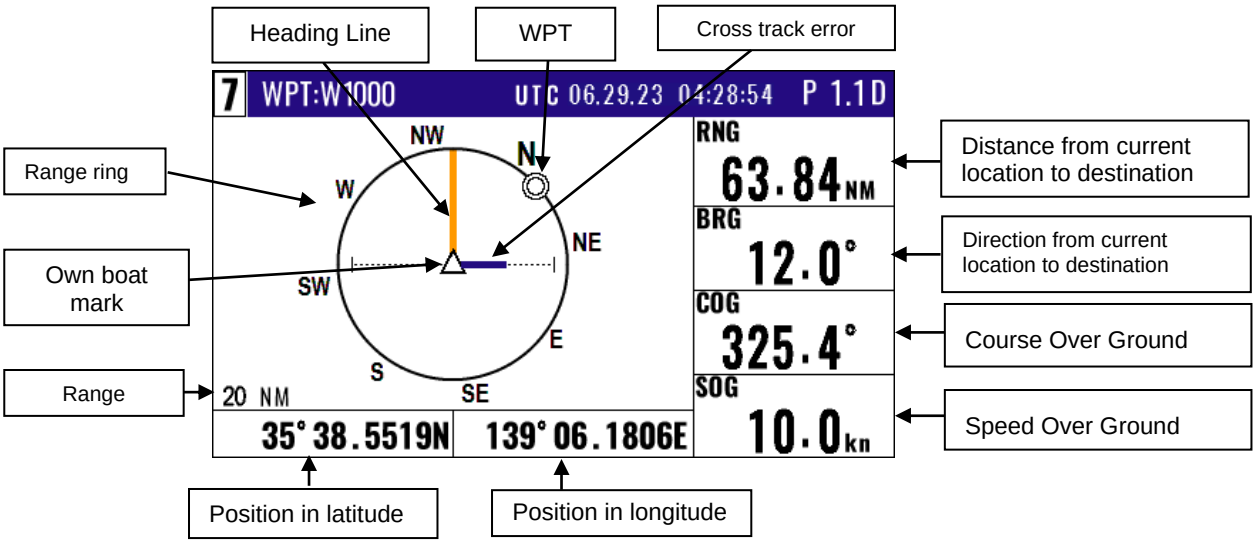
2.2.5 NAV2 screen during waypoint navigation



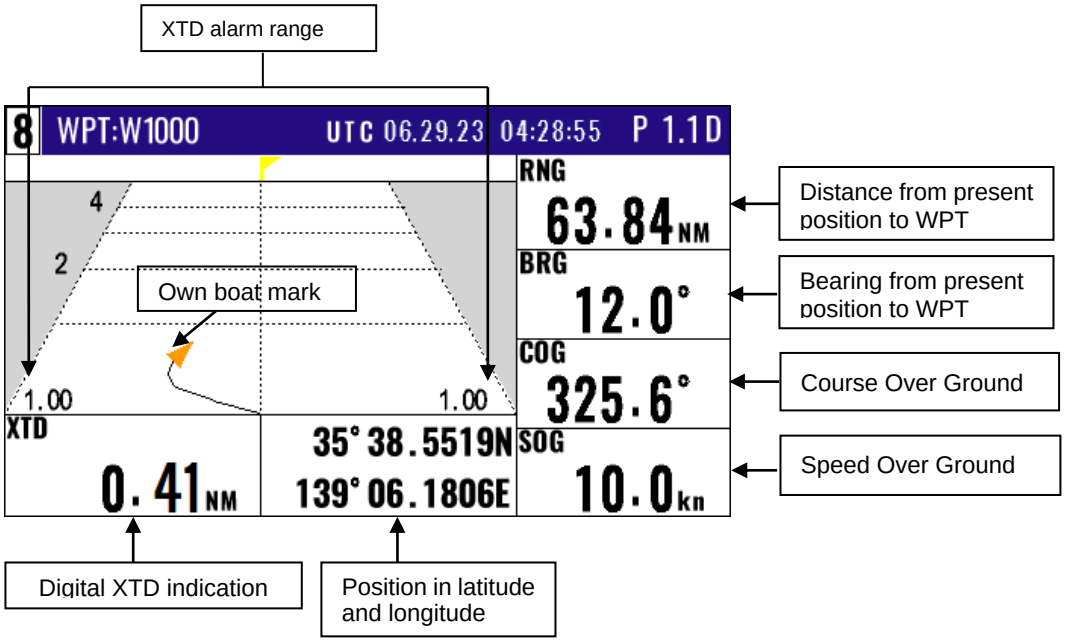
2.2.6 NAV3 screen during waypoint navigation



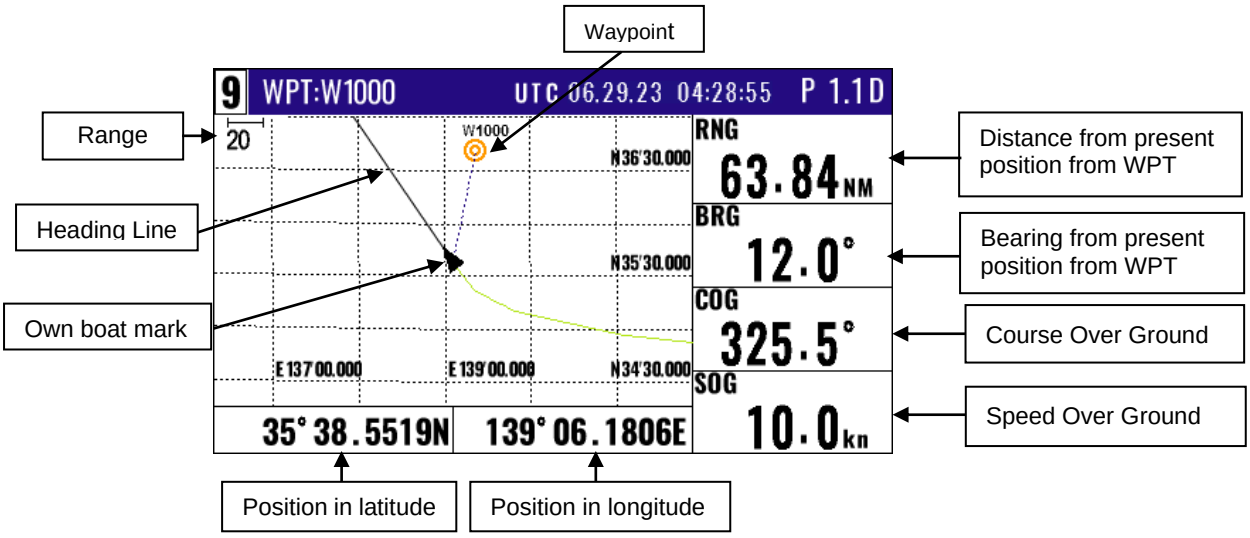
2.2.7 Navigation Graph display screen during waypoint navigation



2.2.8 Highway screen during waypoint navigation



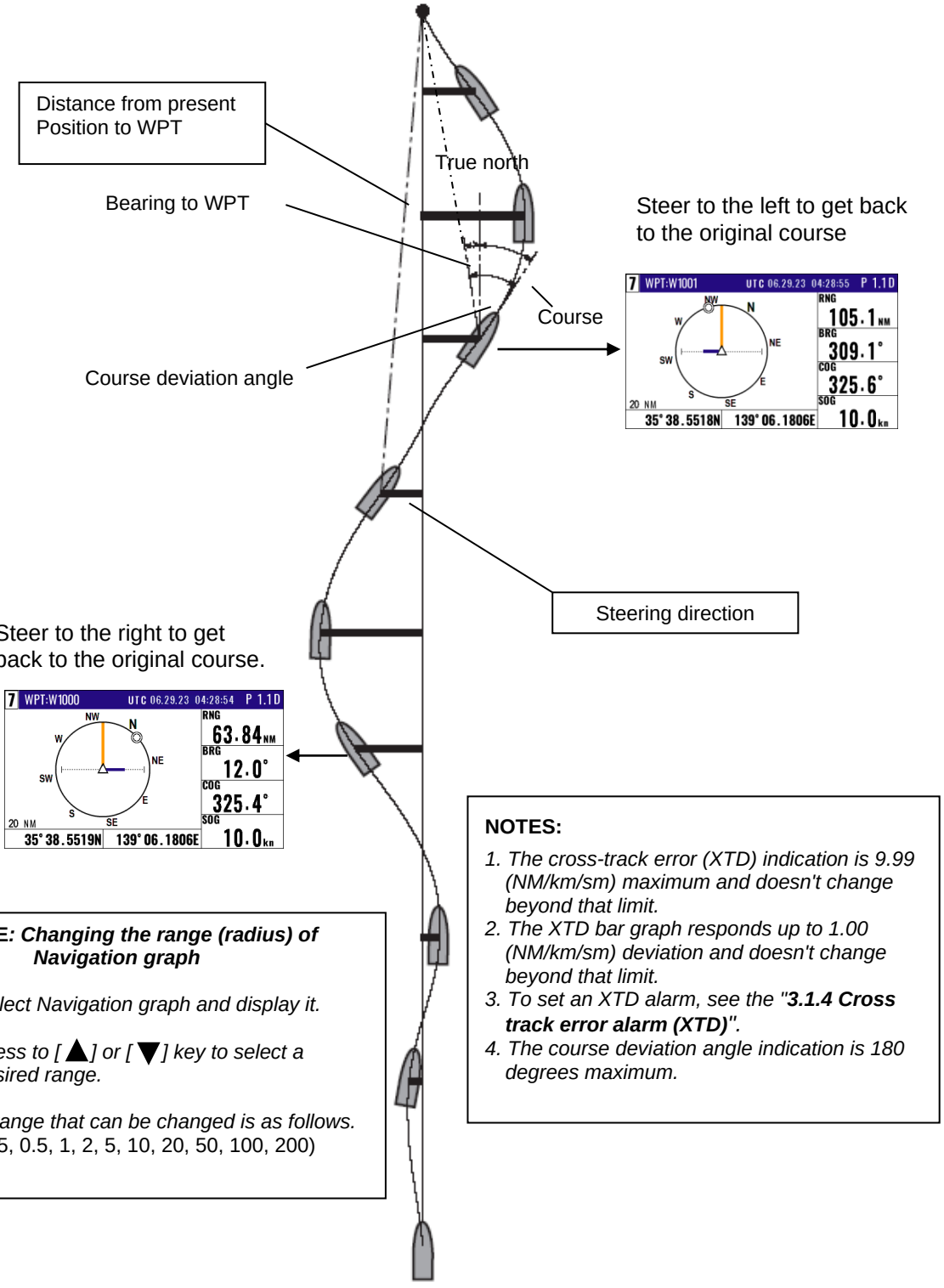
2.2.9 Plotter screen during waypoint navigation



2.3 Cross track error and course deviation angle

2.3.1 Navigation graph screen

Use the navigation graph to check the distance and bearing to the waypoint. When the distance to WPT is further than the range (radius) of navigation graph, the WPT locates on the circle of navigation graph. When the distance is closer than the graph range, the WPT marking is shown in the circle. The XTD bar graph and course deviation angle bar graphs appear only when the WPT is on the circle (these graphs are cleared in the short distance).



NOTE*: Changing the range (radius) of Navigation graph*

1. Select Navigation graph and display it.

2. Press to [▲] or [▼] key to select a desired range.

The range that can be changed is as follows.
(0.25, 0.5, 1, 2, 5, 10, 20, 50, 100, 200)

NOTES:

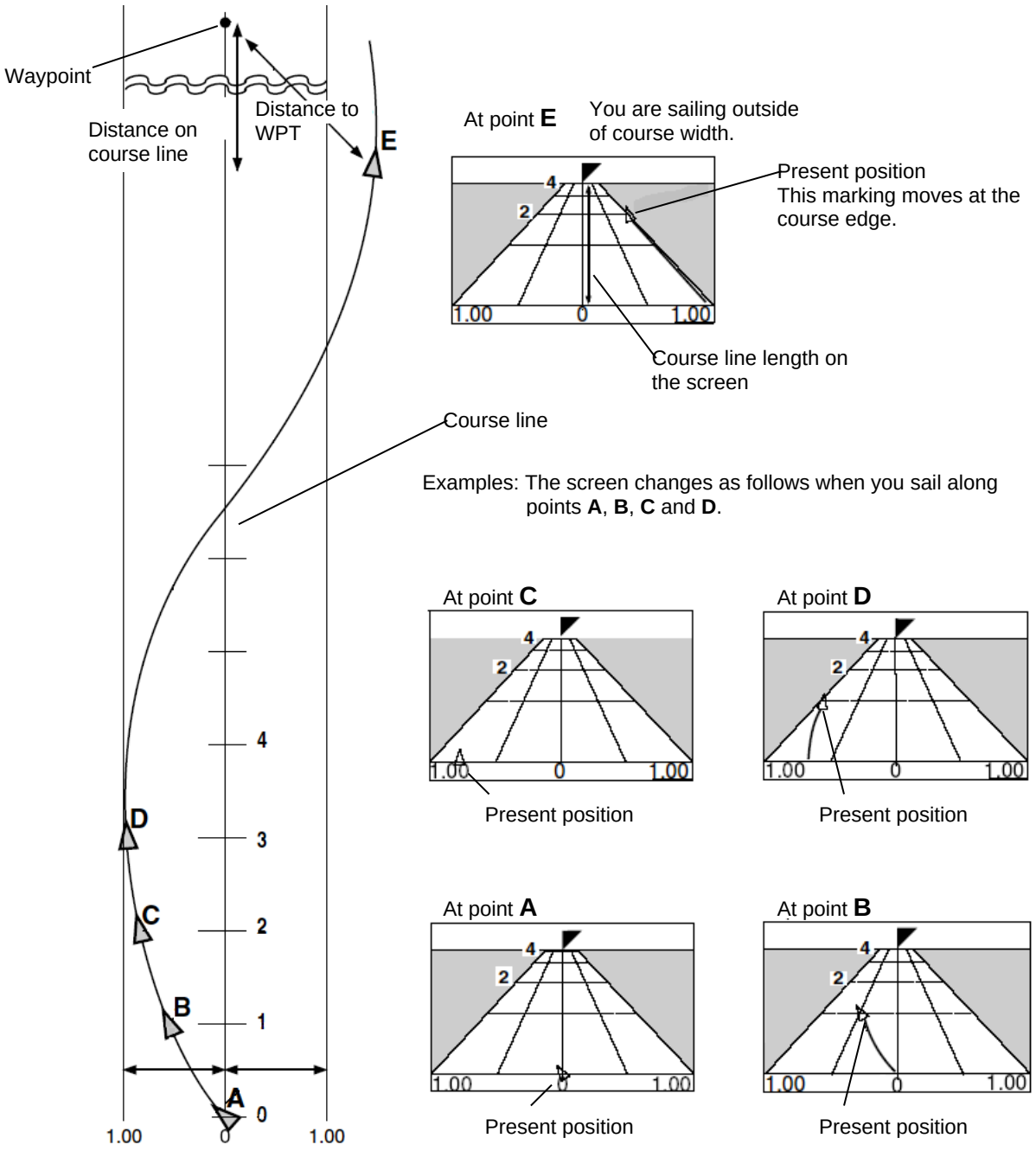
1. The cross-track error (XTD) indication is 9.99 (NM/km/sm) maximum and doesn't change beyond that limit.
2. The XTD bar graph responds up to 1.00 (NM/km/sm) deviation and doesn't change beyond that limit.
*3. To set an XTD alarm, see the "**3.1.4 Cross track error alarm (XTD)**".*
4. The course deviation angle indication is 180 degrees maximum.

2.3.2 Highway display screen

Use the three-dimensional chart for navigation on the course line. You can set a course width from Menu (**5: Alarm**). Symbol " " shows the waypoint, and your ship and track are shown along the course line.

(When waypoint is distance)

When the distance is greater than 4 (NM/km/sm), the 4 (NM/km/sm) course line is shown on the screen. When you have sailed 2 (NM/km/sm), the present position indication moves toward you and the next 4 (NM/km/sm) are shown.

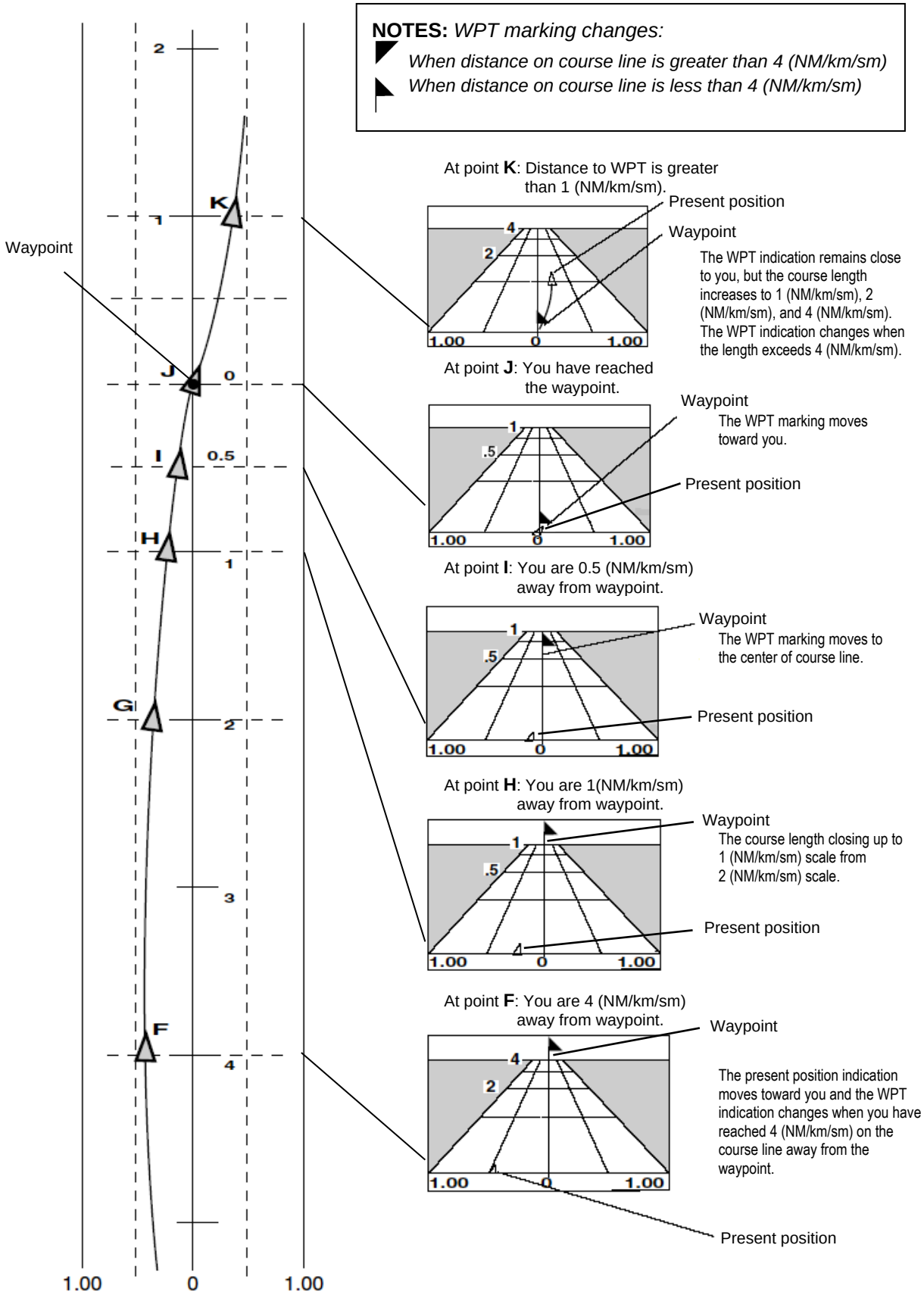


XTD alarm range

To set an XTD alarm, see the "**3.1.4 Cross track error alarm (XTD)**".

(Nearing to the WPT)

When you are close to the waypoint, the course line length decreases to 4 (NM/km/sm), 2 (NM/km/sm) and 1 (NM/km/sm). Then, the WPT marking closes to your ship.



2.4 Storing and erasing routes

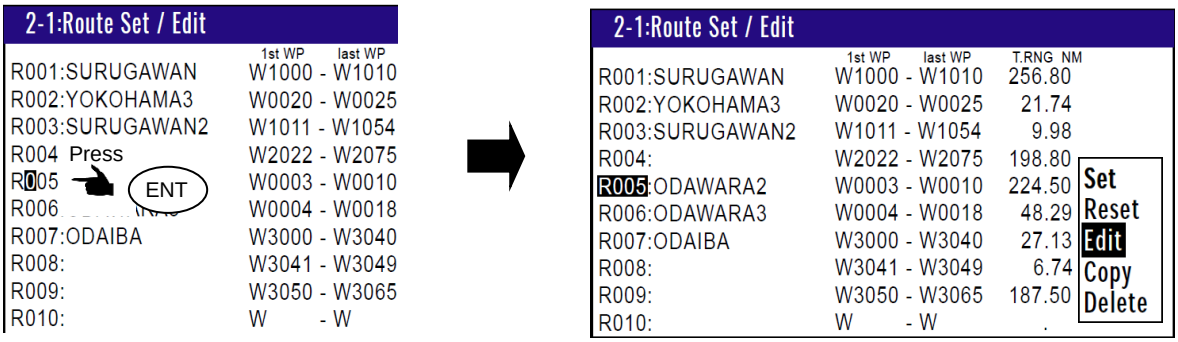
◀ **NOTE:** *Press to backspace the cursor to correct an input error.*

CLR **NOTE:** *Press to clear incorrect Input. You can reenter Numeric data.*

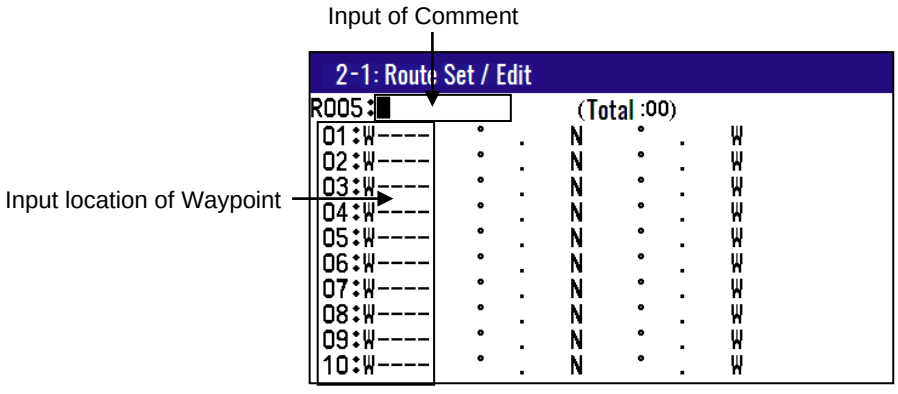
2.4.1 Storing your route

Up to 100 routes and 50 waypoints can be registered for one route.

(1) Press ENT key until Menu options 1 to 10 appears.
(2) Press 2/N key to select "**2: Route**".
(3) Press 1 key to select "**1: Route Set / Edit**". Route Input screen is displayed.
(4) Enter a route number (001 to 100) by numeric keys and press ENT key.
(5) Press ENT key to display the pop-up.
(6) Select [**Edit**] in pop-up and press ENT key.



(7) Press [▲] or [▼] key to move the cursor to select [Comment] or [Waypoint].



(8) [Comment] settings:
1) Press ENT key to select of the [Comment].
2) Press [◇] key to select a comment letter in pop-up. Press ENT key to input.
3) Press ENT key to after moved a cursor to the [APPLY] in the pop-up.
(9) [Waypoint] settings:
1) Press ENT key to select of the Input location of Waypoint.

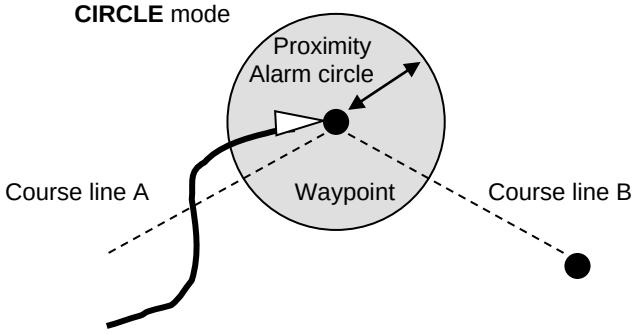
2) Enter a waypoint number (0000 to 9999) of the route by numeric keys. (You can check its memory data on the screen.)
3) Press (ENT) key to store the waypoint number.

(10) Repeat (9) steps to set another waypoint in the route.

2.4.2 Automatic switching of waypoints

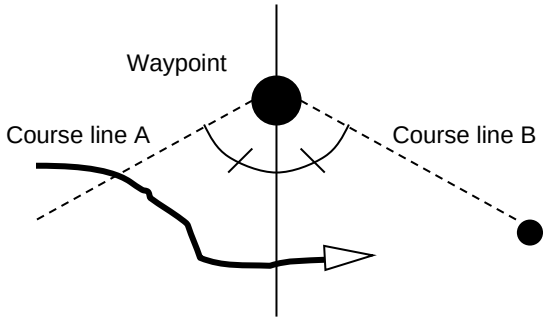
Route navigation can switch the current waypoint in two ways: switching in CIRCLE mode and switching in BI-SECTOR mode. In CIRCLE mode, the next waypoint is shown when you reach the proximity alarm circle. In BI-SECTOR mode, the next waypoint is shown when you cross a half-angle line.

CIRCLE mode



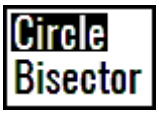
When you reach the proximity alarm circle, the course line is switched from A to B. To change the proximity alarm range, see "**Setting and canceling**" (page 3-4).

BI-SECTOR mode



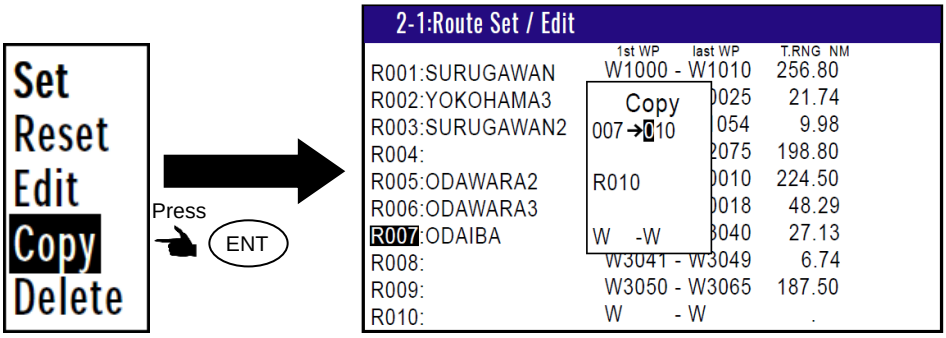
When you cross a half-angle line, the course line is switched from A to B.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (2/N) key to select "**2: Route**".
(3) Press (2/N) key to select "**2: Waypoint change**".
(4) Press [▲] or [▼] key to locate cursor to select a mode.
(5) Press (ENT) key. The selected mode will be shown.



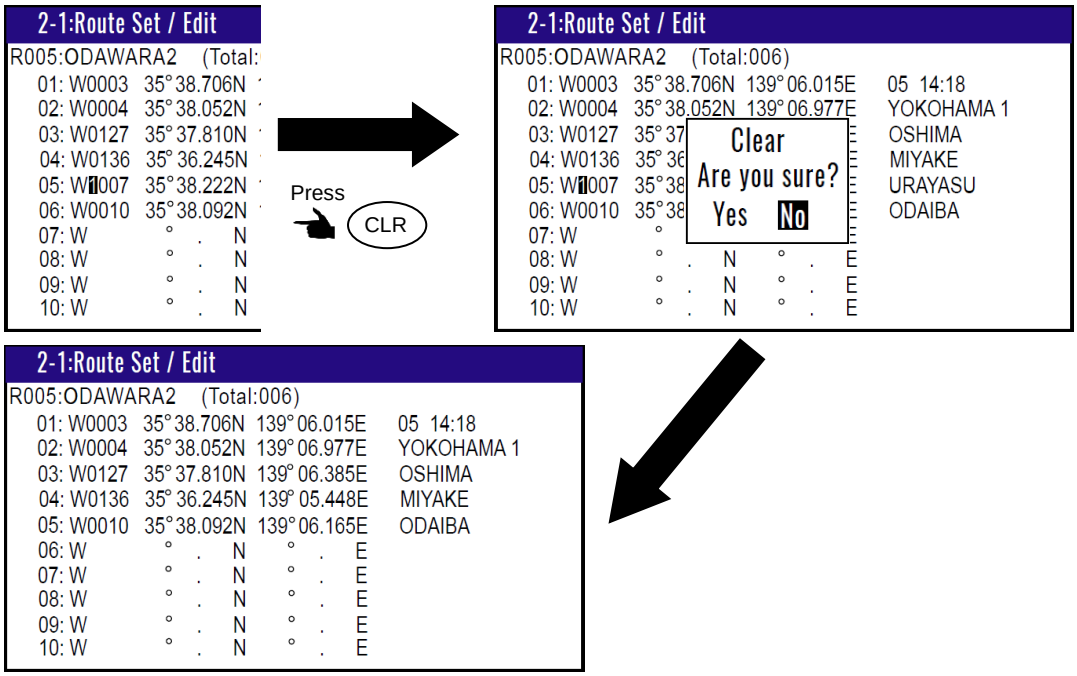
2.4.3 Copying a single route

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (2/N) key to select "**2: Route**".
(3) Press (1) key to select "**1: Route Set / Edit**". Route Input screen is displayed.
(4) Enter a route number (001 to 100) using numeric keys and press (ENT) key.
(5) Press (ENT) key to display the pop-up.
(6) Select [**Copy**] in the pop-up and press (ENT) key.
(7) Enter a source point number (001 to 100) by numeric keys.
(8) Press (ENT) key to copy the route data.



2.4.4 Erasing point data

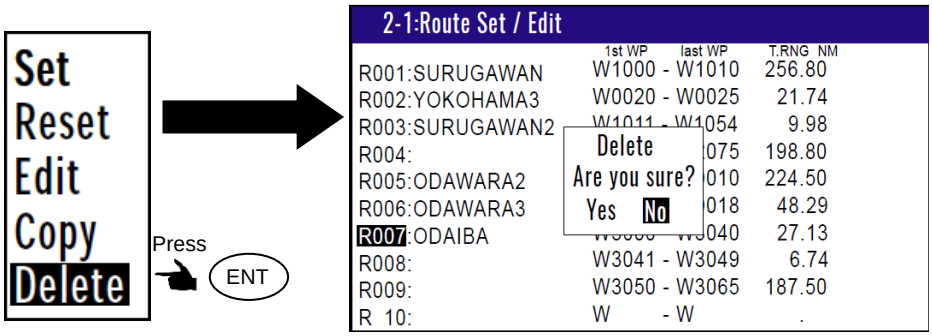
(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 2/N key to select "**2: Route**".
(3) Press 1 key to select "**1: Route Set / Edit**". Route Input screen is displayed.
(4) Enter a route number (001 to 100) by numeric keys and press ENT key.
(5) Press ENT key to display the pop-up.
(6) Select [**Edit**] in the pop-up and press ENT key.
(7) To delete any Waypoint, press CLR key in a place that is registered
(8) If OK, select [**Yes**] in the pop-up and press ENT key.
If Cancel, select [**No**] in the pop-up and press ENT key.



2.4.5 Erasing a single route

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 2/N key to select "**2: Route**".
(3) Press 1 key to select "**1: Route Set / Edit**". Route Input screen is displayed.
(4) Enter a route number (01 to 100) by numeric keys and press ENT key.

(5) Press ENT key to display the pop-up.
(6) Select [**Delete**] in the pop-up and press ENT key to display the pop-up.
(7) If OK, select [**Yes**] in the pop-up and press ENT key.
If cancel, select [**No**] in the pop-up and press ENT key.



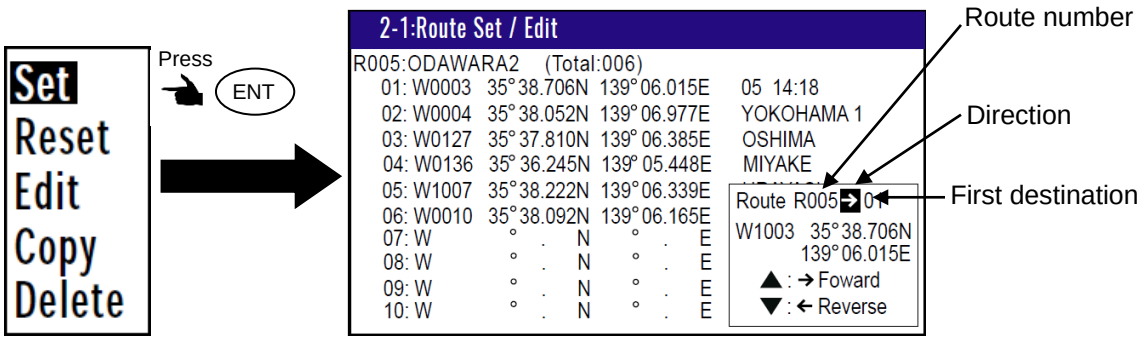
NOTE: *To erase all stored data from memory, see* ***"WPT. / Route clear"*** *(page 6-5).*

2.5 Route setup

You can use up to 50 points to go to a destination using route navigation. You can also reverse the navigation route to return to the start point. To do so, you must first store the waypoints and route from MENU 1. See "**2.4.1 Storing your route**" (page 2-12).
You can set the route by entering a route number, forward/backward navigation, and start waypoint number of the route.

2.5.1 Selecting route navigation

You navigate on a route, following the course line, which is automatically updated as you reach each waypoint. Use the following steps to start route navigation.
Select the reverse navigation only after you have reached the destination, or the route navigation may not work properly.
(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 2/N key to select "**2: Route**".
(3) Press 1 key to select "**1: Route Set / Edit**". Route Input screen is displayed.
(4) Enter a route number (001 to 100) by numeric keys and press ENT key.
(5) Press ENT key to display the pop-up.
(6) Select [**Set**] in the pop-up and press ENT key.



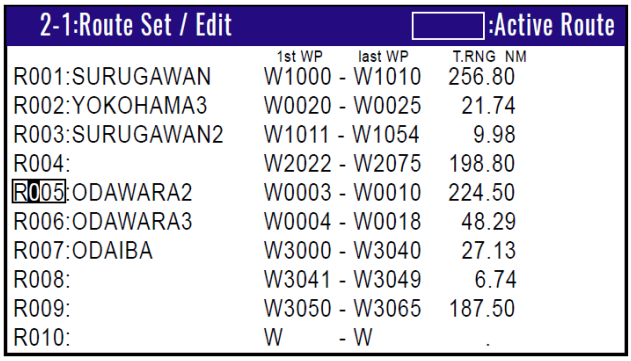
(7) You can select the first destination. In addition, you can be selected to Forward and Reverse.

1) Press [▲] key if you go Forward.
Press [▼] key if you go Reverse.

2) Select the first destination.

3) Press (ENT) key.

(8) Number is surrounded by square.



2.5.2 Checking a route point position

You can check the waypoints on a route from the Menu.

(1) Press (MENU) key until Menu options 1 to 10 appears.

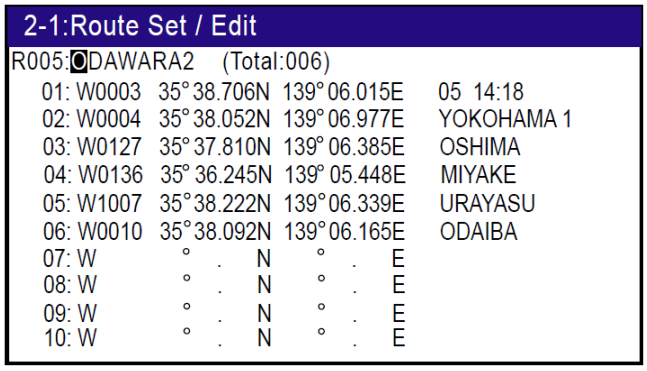
(2) Press (2/N) key to select "**2: Route**".

(3) Press (1) key to select "**1: Route Set / Edit**". Route Input screen is displayed.

(4) Enter a route number (001 to 100) by numeric keys and press (ENT) key.

(5) Press (ENT) key to display the pop-up.

(6) Select [**Edit**] in the pop-up and press (ENT) key.



2.5.3 Canceling route navigation

There are two ways to cancel route navigation.

- Cancel from [MENU]
- Cancel from screen 1 to screen 9.

1) Cancel from [MENU]

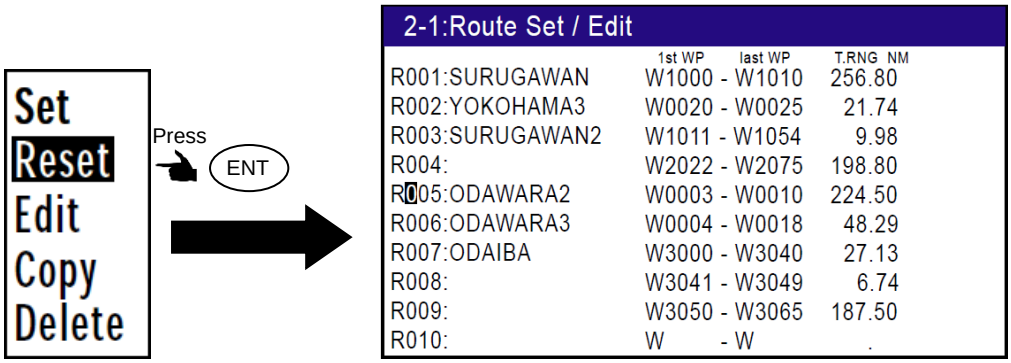
(1) Press (MENU) key until Menu options 1 to 10 appears.

(2) Press (2/N) key to select "**2: Route**".

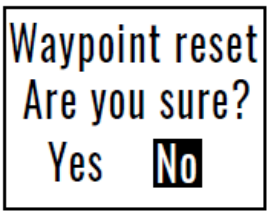
(3) Press (1) key to select "**1: Route Set / Edit**". Route Input screen is displayed.

(4) Enter a route number (001 to 100) by numeric keys and press (ENT) key.

(5) Press (ENT) key to display the pop-up.
(6) Select [**Reset**] in the pop-up and press (ENT) key.



2) Cancel from screen 1 to screen 9.
(1) Press (CLR) key.
(2) If OK, select [**Yes**] in the pop-up and press (ENT) key.
If cancel, select [**No**] in the pop-up and press (ENT) key.

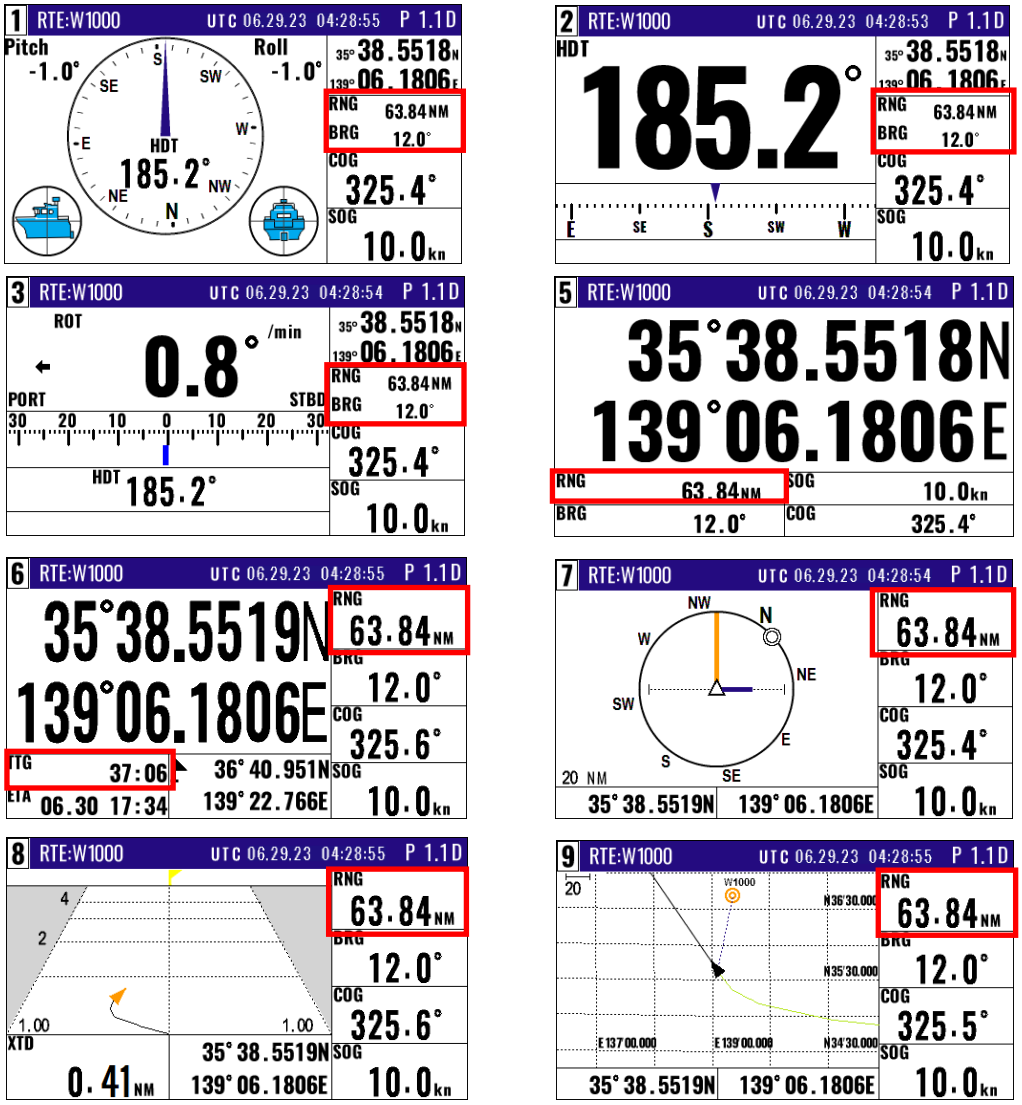


2.5.4 Switching between distance and time to go

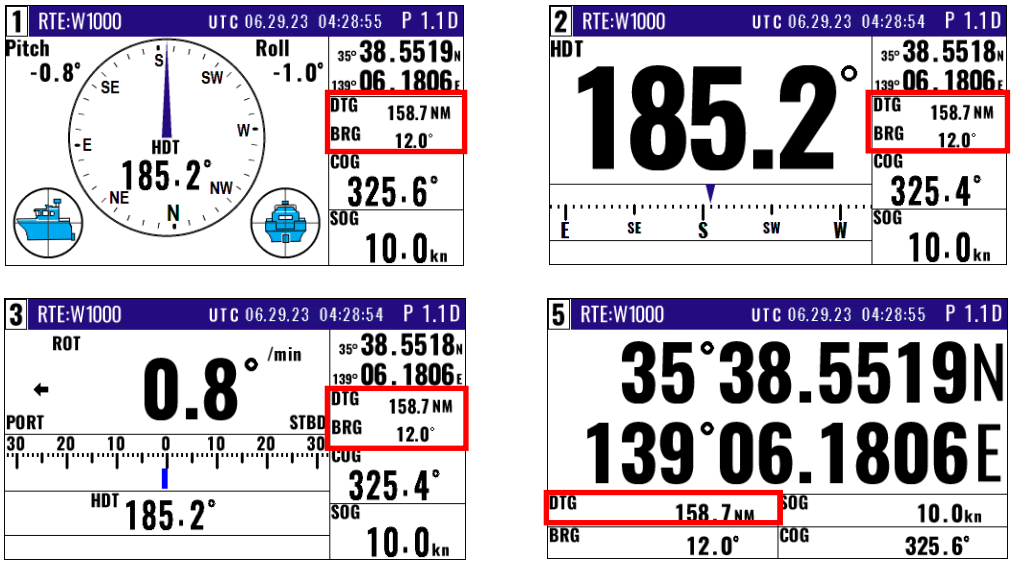
When you select the "**RNG**" (Distance to WPT) or "**DTG**" (Total distance) on screen 1 to screen 9 in route navigation, the respective "**TTG**" (Time to go to WPT) or "**TOA**" (Total time to go) is shown.

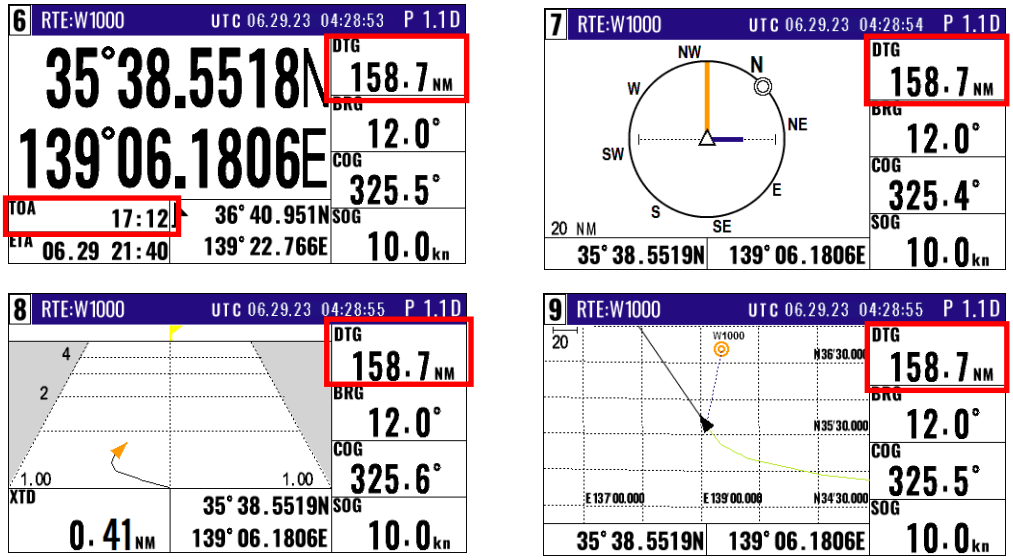
> **NOTE:** *"**RNG**" shows the distance to the next waypoint.*
> *"**DTG**" shows the total distance to the final destination.*
> *"**TTG**" shows the time to the next waypoint.*
> *"**TOA**" shows the total time to the final destination.*

(1) When the screen of the destination distance or the required time to the destination is selected, Press (MODE) key until screen 1 to screen 9 appears.
(2) Press [◀] key to display "**RNG**" and "**TTG**".



(3) Press [▶] key to display total distance to final destination "**DTG**" and total time required "**TOA**".





(4) Press [◀] key to display "**RNG**" and "**TTG**"

2.6 Setting an anchor position

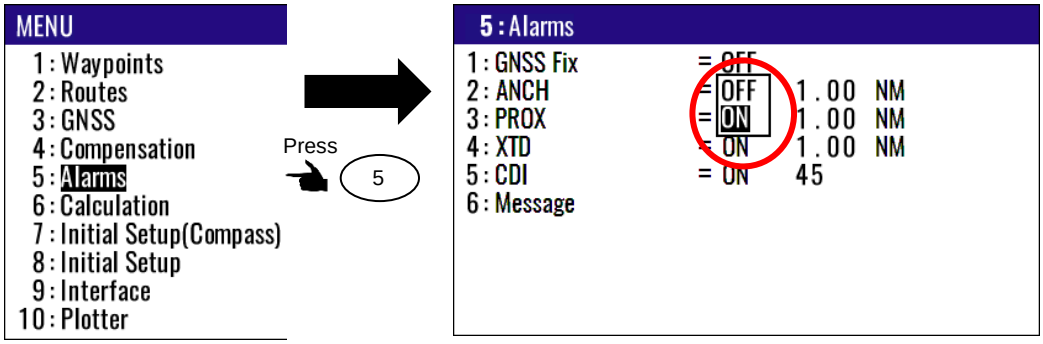
After arriving at your destination, it is possible to drift from the anchor position due to a tide or wind. Once the anchor position is stored in memory, it is easy to check the distance and bearing moved from the anchor position.

2.6.1 Storing an anchor position

When the current position information is input from the outside, you can set the anchor position from the screen 1 to screen 9.

The following operations allow you to store and specify the current position as the anchor position. The anchor position is registered to memory number A9997 along with the comment.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (5) key to select "**5: Alarms**".
(3) Press (2/N) key to select "**2: ANCH**".
(4) Select [**ON**] in the pop-up and press (ENT) key.

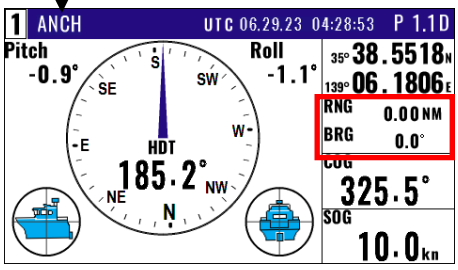


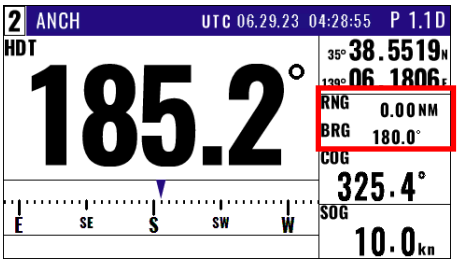
(5) When either the destination distance or the destination position screen is selected,
Press (MODE) key until screen 1 to screen 9 appears.
(6) Press (POB) key.
(7) Press (6/E) key. (Goto ANCH)

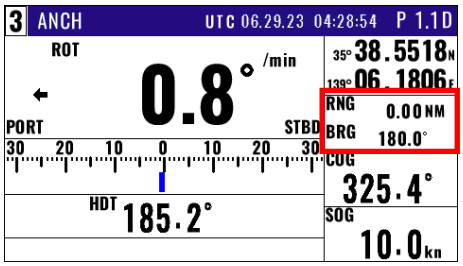
Goto POB :[POB]
Goto Event :[ENT]
⇨ Goto ANCH:[6/E]
Cancel :[CLR]

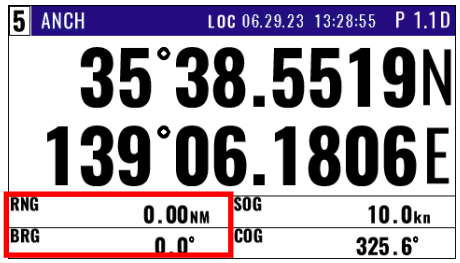
Anchor setting mark

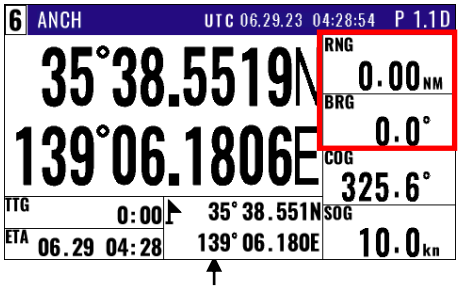
RNG: Distance from anchor position.
BRG: Bearing from anchor position



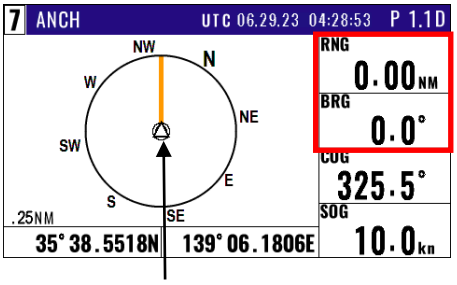




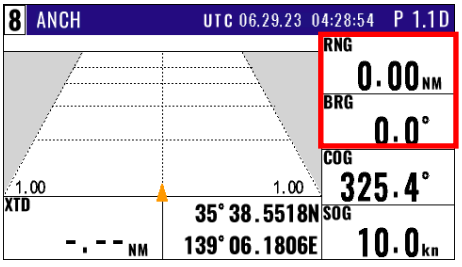


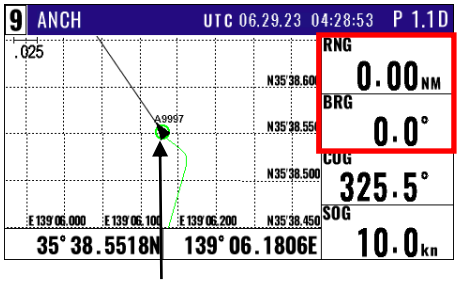


Anchor position



○:Anchor position

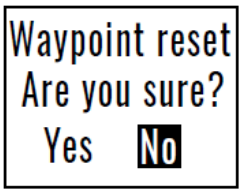




A9997:Anchor position

2.6.2 Canceling anchor position

(1) Press (MODE) key until screen 1 to screen 9 appears.
(2) Press (CLR) key.
(3) If OK, select [**Yes**] in the pop-up and press (ENT) key.
If Cancel, select [**No**] in the pop-up and press (ENT) key.



2.7 Track display

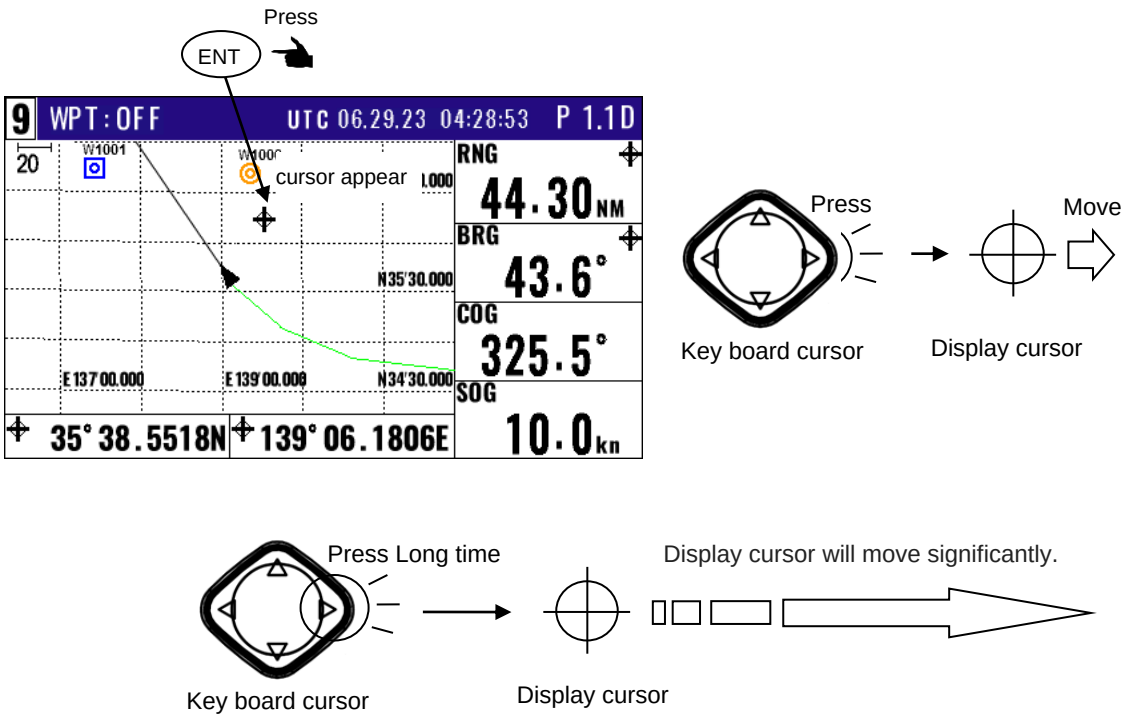
You can display track, the waypoint, course line, and cross cursor on the Plotter screen.

2.7.1 Display a cross cursor on Plotter screen

You can display a cursor and position it on the screen.

(How to use cross cursor)

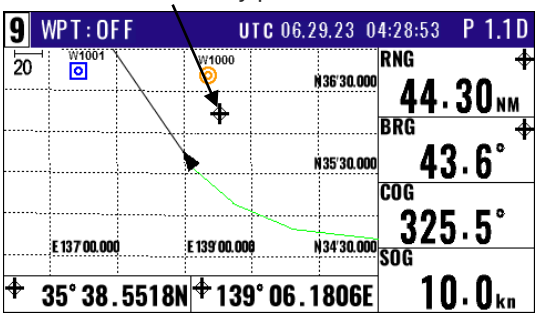
(1) Display the Plotter screen.
(2) Press (ENT) key, cursor appears.
(3) Press [◈] key to move display cursor.
Move quickly display cursor by pressing a long time [◈] key
(4) Press (CLR) key, cursor disappears.



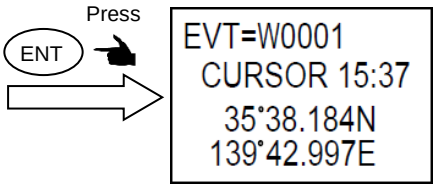
(How to store display cursor position)

(1) With the display cursor activated, press (ENT) key to store the display cursor position. (Note: not the present ship's position).

Move the cursor to any point on the screen



Appears EVT mark the position of the cursor



2.7.2 Screen scrolling

You can scroll the Plotter screen in any direction so that your ship is always shown on the screen. If your ship moves off the screen, it will automatically return to the center of the display.

Press [◇] key while pressing the left upper number of selected screen.

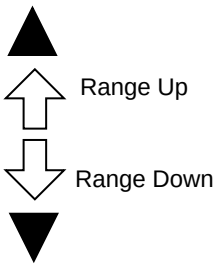
2.7.3 Scaling the Plotter screen

You can select a display scale of Plotter screen.

(1) Press to [▲] or [▼] key to select a desired range.

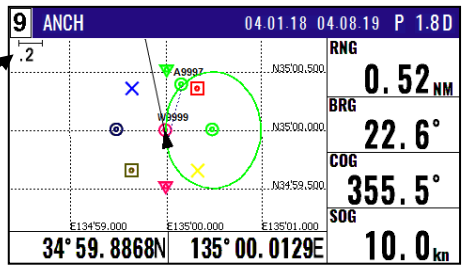
The range that can be changed is as follows.

(0.025, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20)



Scale indication fields

Initial scale: 0.025

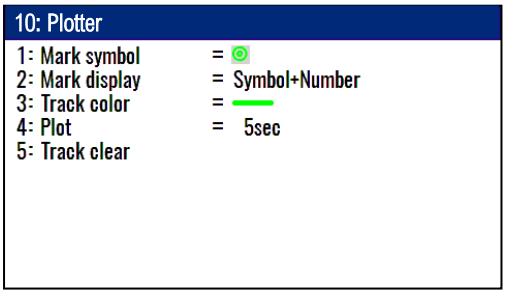


NOTE: *You can change the scale unit from Menu **2: UNIT** of **7: INITIAL** options.*

2.7.4 Changing the setup contents

(1) Press (MENU) key until Menu options 1 to 10 appears.

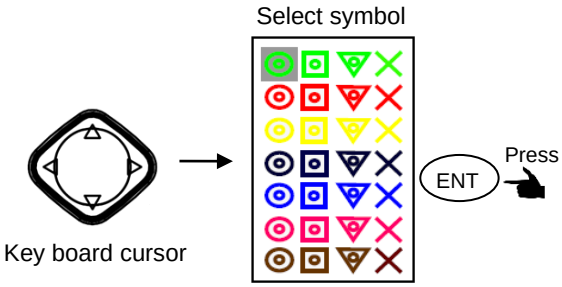
(2) Press (10) key to select "**10: Plotter**".



(3) Various settings

1) 1: Mark symbol (Press (1) key)

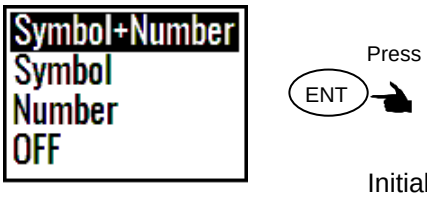
To change the Mark symbol, place cursor on **SYMBOL** option and press (ENT) key.



Initial setup: (Green)

2) 2: Mark display (Press (2/N) key)

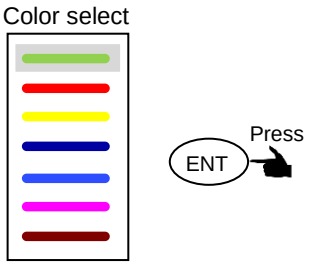
Select the state in which the mark will be displayed. You can also select "OFF" to display nothing.



Initial setup: Symbol + Number

3) 3: Track color (Press (3) key)

You can select the color of the future Track.

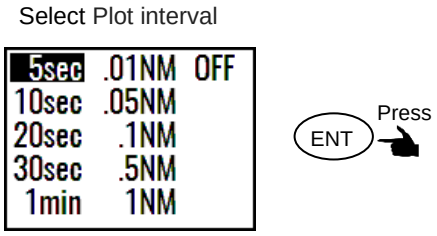


Initial setup: (Green)

4) 4: Plot (Press 4/W key)

To adjust the track recording interval (time or distance interval), locate cursor on **Plotter** option, and press ENT key.

You can set the unit of track distance interval from the Menu **7-2: Units**



Initial setup: 5sec.

5) 5: Track clear (Press 5 key)

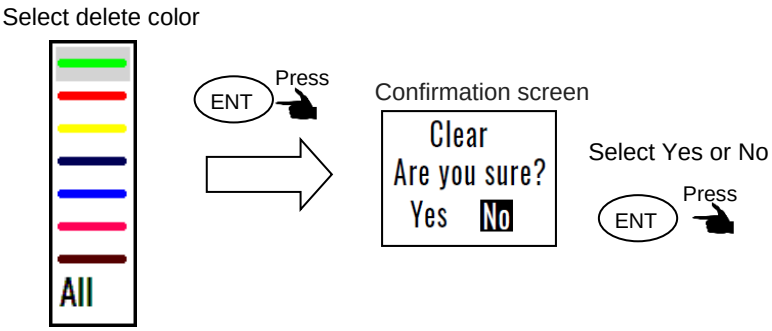
To delete the track according to color or all color, press 5 key.

The pop-up of select color will appear.

Select Track color to delete in the pop-up and press ENT key.

If OK, select [**Yes**] in the pop-up and press ENT key.

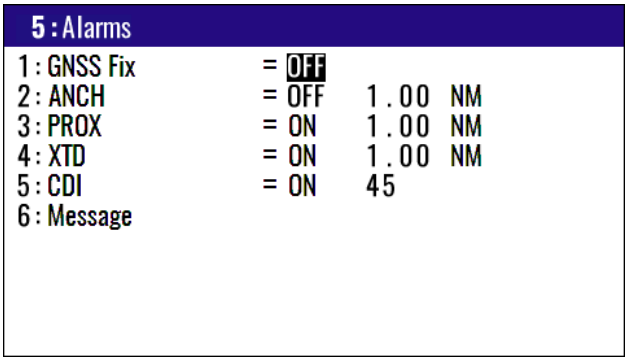
If Cancel, select [**No**] in the pop-up and press ENT key.



Chapter 3 Alarms

3.1 Kinds of alarms

There are five kinds of alarms, **GNSS Fix**, anchor watch (**ANCH**), proximity (**PROX**), cross track error (**XTD**), course deviation angle (**CDI**).



3.1.1 GNSS Fix

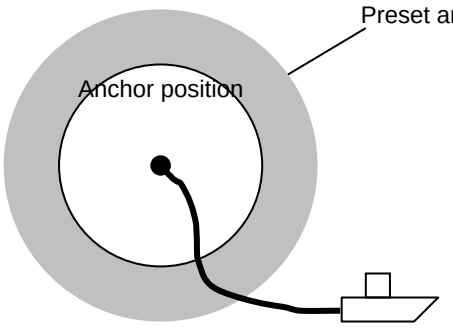
If you set ON of GNSS Fix alarm, alarm warns by short beep once when position is lost. And alarm warns again after position fix.

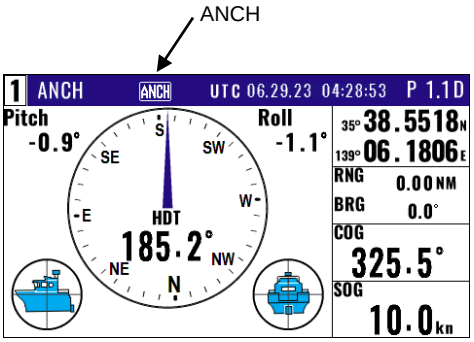
Initial setup: OFF

3.1.2 Anchor watch alarm (ANCH)

If you set the anchor dragging alarm to on after dropping the anchor when anchored, if the anchor drags beyond the set range, "ANCH" will be displayed, and a buzzer will sound at regular intervals to notify you. If the alarm range is set to 0.00, the alarm will not work. In addition to this setting, 2.6.1: Storing an anchor position (see page 2-19) is also required.

If you press CLR key, the buzzer will stop sounding.



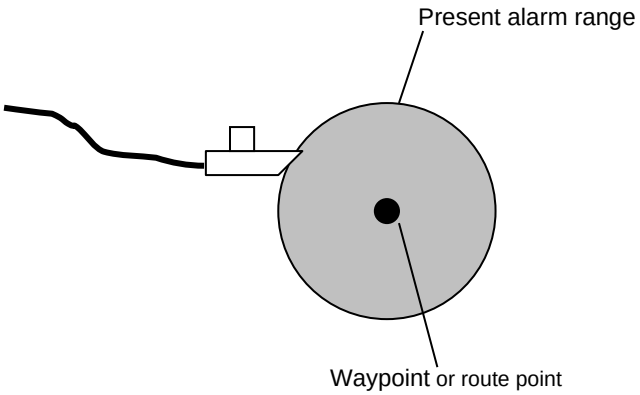


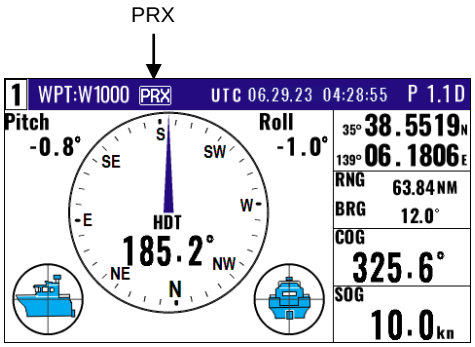
Initial setup: OFF, 1.00NM
Enter an alarm range: 0.00 to 9.99

3.1.3 Proximity alarm (PRX)

When navigating a destination or route, when your ship arrives or passes within the set range, "PRX" will be displayed, and a buzzer will sound at regular intervals to notify you. The alarm function does not work if the alarm range is set to '0.00'. There are also two methods for setting the arrival range during route navigation. For details, please refer to 2.4.2: Automatic switching of waypoints (page 2-13).

Press CLR key to turn off buzzer.

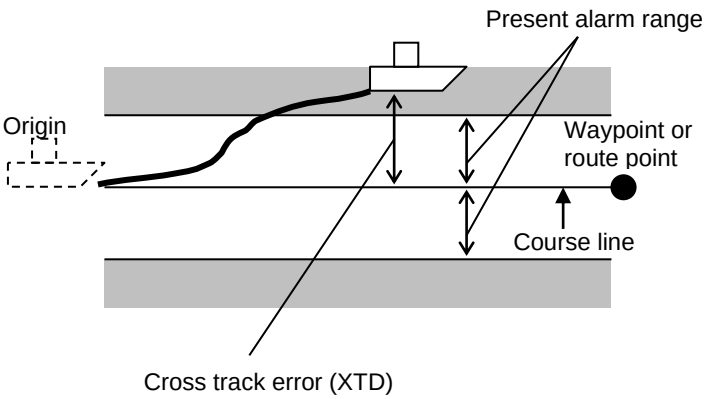


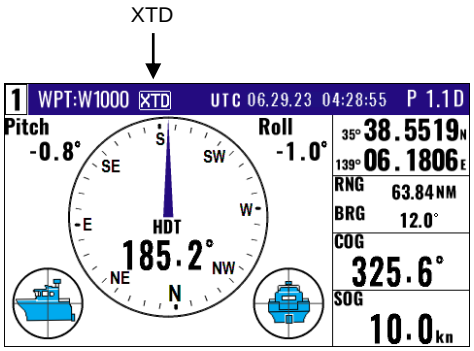


Initial setup: ON, 1.00
Enter an alarm range: 0.00 to 9.99

3.1.4 Cross track error alarm (XTD)

When navigating to a destination or route, if the ship's course goes outside the set range, "XTD" will be displayed, and a buzzer will sound at regular intervals. The alarm function does not work if the alarm range is set to '0.00'. For details, please refer to 2.3: Cross track error and course deviation angle (page 2-9). If you press CLR key, the buzzer will stop sounding.

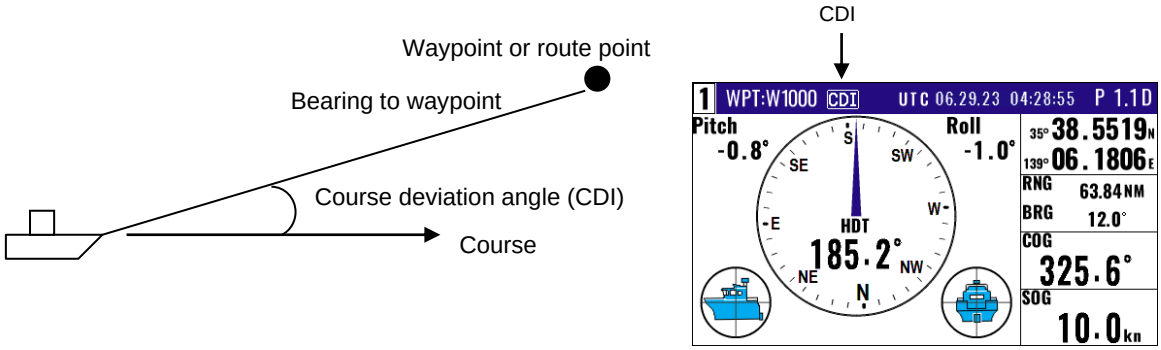




Initial setup: ON, 1.00
Enter an alarm range: 0.00 to 9.99

3.1.5 Course deviation angle alarm (CDI DGNSS)

The CDI alarm alerts you when you deviate from your course to steer by a predetermined margin. The alarm function does not work if the alarm range is set to “00”. **"Course deviation angle alarm (CDI)"** appears in the popup window and buzzer (long beep) sounds when I’m away from CDI range. Press (CLR) key to turn off buzzer. And the alarm popup window is also hidden.

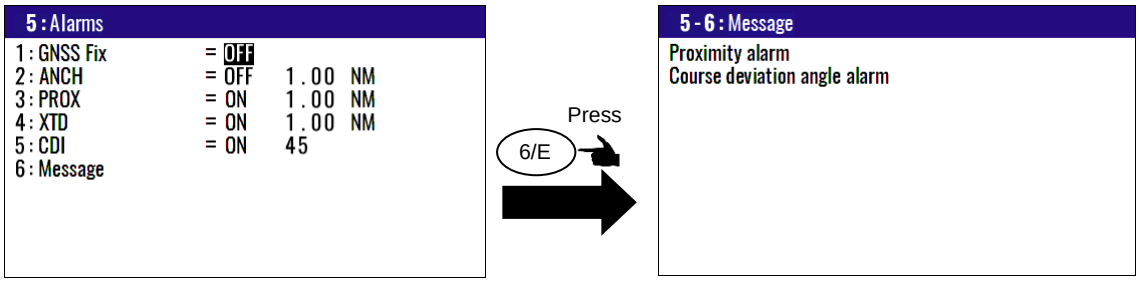


Initial setup: ON, 45 degrees
Enter an alarm range: 00 to 99 degrees

3.2 Alarm explanation

The reason of an alarm can be seen in the following ways.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (5) key to select “**5: Alarms**”.
(3) Press (6/E) key to select “**5-6: Message**”. Reason for alarm notification is displayed.



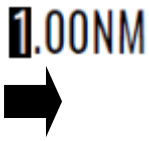
3.3 Setting and canceling

(Setting alarm)

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (5) key to select "**5: Alarms**".
(3) Select item number of the alarm to be set by numeric keys.
(4) Press [▲] or [▼] key to move cursor to setting item.
(5) Press (ENT) key.

(Changing alarm range)

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (5) key to select "**5: Alarms**".
(3) Select item number of the alarm to be set by numeric keys.
(4) Press [▶] key to move cursor to alarm range field.
(5) Enter an alarm range by numeric keys.
(6) To correct to (-), move the cursor to the "+/-" place and press the " ▼ " key.
(7) Press (ENT) key.

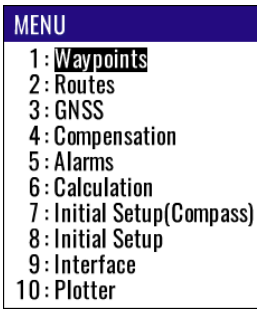


(Canceling alarm)

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (5) key to select "**5: Alarms**".
(3) Select desired alarm number by numeric keys.
(4) Press [▲] or [▼] key to move cursor to [**OFF**].
(5) Press (ENT) key.

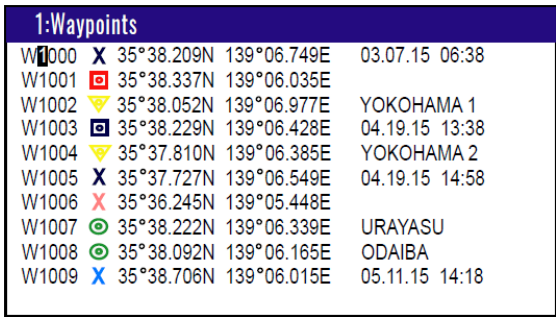
Chapter 4 Setup Procedure

4.1 Menu options

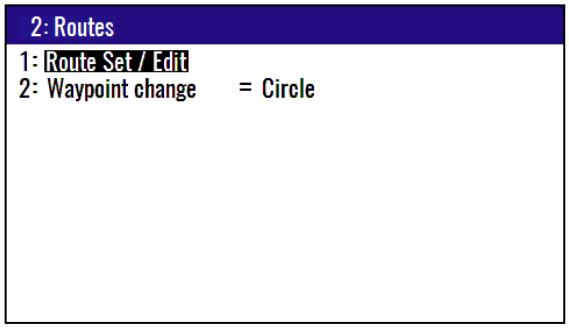


NOTE: *You can select an option from Menu in two ways: by direct numeric key entry or by cursor shifting. This manual explains how to enter numeric values for easy understanding, but you can also use the cursor for option selection.*

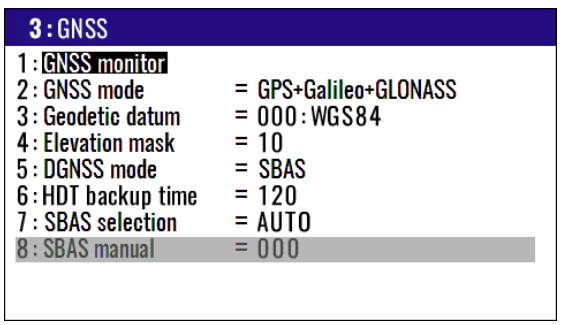
(1) Waypoints
Store, edit, copy, and delete waypoints. (See pages 2-1 to 2-5)



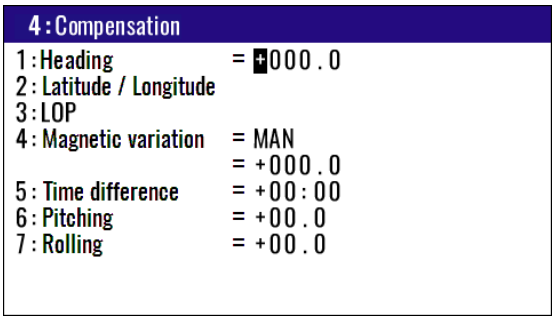
(2) Routes
Store and delete a route. Forward/backward navigation Selection. Automatic route switching. Waypoint data switching. (See pages 2-12 to 2-19).



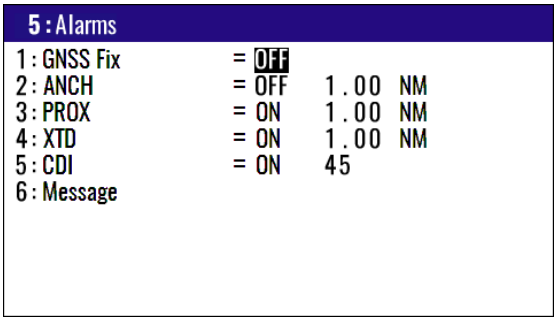
(3) GNSS
Display GNSS satellite status. Switch (2- and 3-dimensional) positioning modes. Selection of geodetic system. See DOP value to limit fix data Set satellite elevation angle limit. Selection DGNSS mode. Setting the dead reckoning duration time. Setting the SBAS satellite selection method. SBAS satellite settings



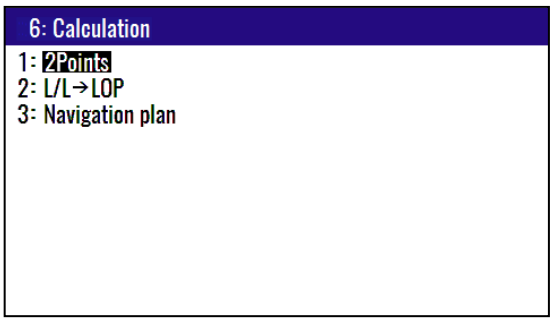
(4) Compensation
Heading correction. Position correction (LAT/LONG, LOP). Compass correction. Time difference. Pitching correction. Rolling correction.



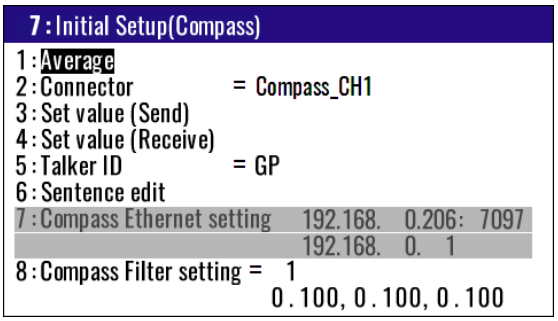
(5) Alarms (See pages 3-1 to 3-4)
GNSS Fix alarm. Anchor watch alarm. Proximity alarm. XTD alarm. CDI alarm. Alarm message.



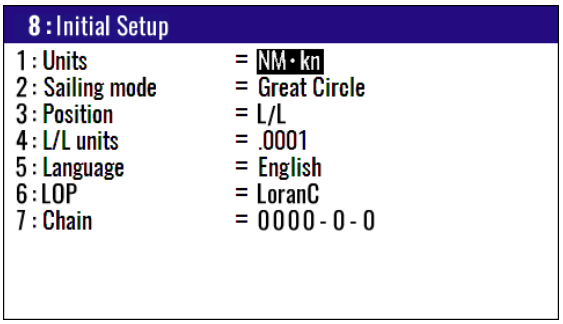
(6) Calculation
Distance and bearing between two points LAT/LONG into LOP data conversion Calculation of estimated time length from the current position to the destination or required speed.



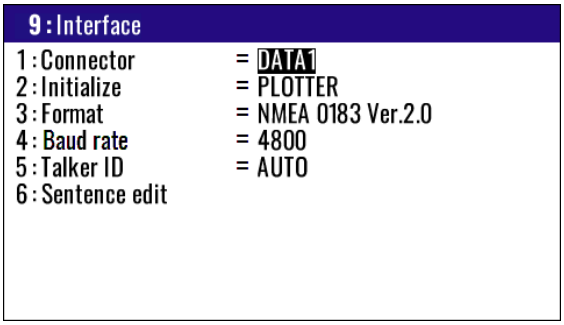
(7) Initial setup(compass)
Averaging settings for position/speed, heading, etc. Set the output from the antenna section. Transfer display settings to antenna unit. Transfer antenna settings to display unit. Selection of talker ID for antenna output. Setting the IP address of the antenna part. MEMS sensor filter settings



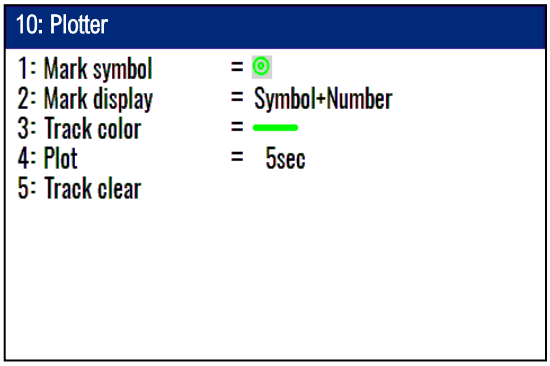
(8) Initial setup
Set units. Select navigation mode. Select position display mode (LAT/ LONG, LOP). Select LAT/LONG display digit. Select language. LOP switching. LOP chain settings



(9) Interface
Select output format. Edit the output format (IEC 61162-1).



(10) Plotter
You can change the settings of [**Plotter**] screen.

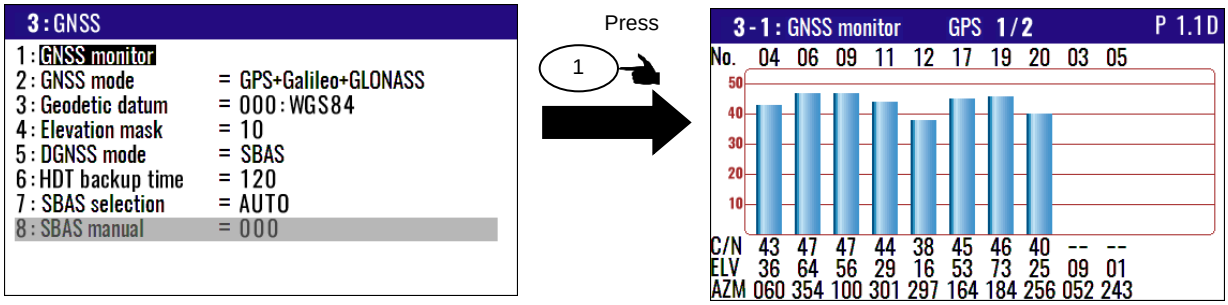


4.2 Menu 3: GNSS

4.2.1 Monitoring GNSS satellite signal reception

You can monitor the signal status from GNSS (SBAS) satellites. The signals from 3 satellites are used for two-dimensional positioning, but signals from 4 or more satellites are required for three-dimensional positioning.

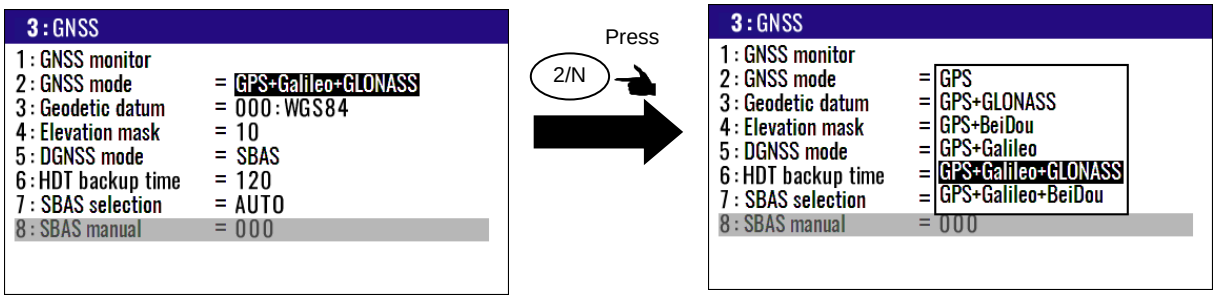
(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 3 key to select "**3: GNSS**".
(3) Press 1 key to select "**1: GNSS monitor**".



4.2.2 Selecting a GNSS mode

There are the six modes, "GPS alone", "GPS+GLONASS", "GPS+BeiDou", "GPS+Galileo", "GPS+Galileo+GLONASS", and "GPS+Galileo+BeiDou".

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 3 key to select "**3: GNSS**".
(3) Press 2/N key to select "**2: GNSS mode**".
(4) Press [▲] or [▼] key to select desired measuring system mode.
(5) Press ENT key.



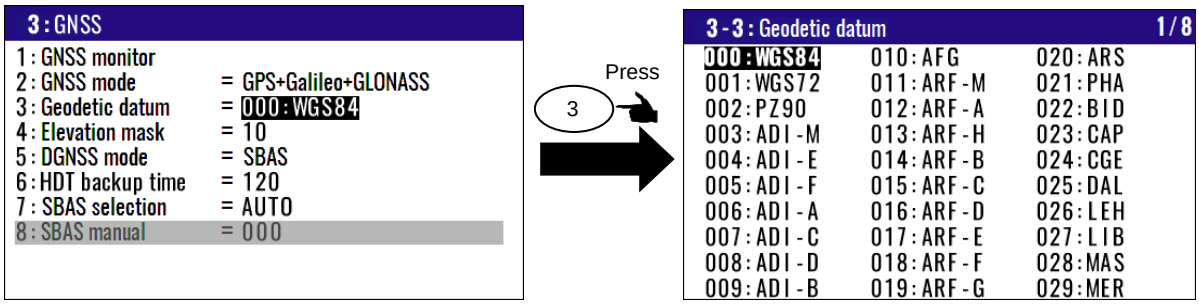
Initial setup: GPS+Galileo+GLONASS

GPS also includes the quasi-zenith satellite ``Michibiki''.

4.2.3 Setting the geodetic system

The GNSS geodetic system calculates latitude and longitude based on WGS-84, but nautical charts used in different countries around the world have different geodetic systems that are the basis for creating nautical charts. You can set the geodetic system of the nautical chart by following the steps below. Please refer to “9.2: Geodetic system list” for each geodetic system.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (3) key to select “**3: GNSS**”.
(3) Press (3) key to select “**3: Geodetic datum**”.
(4) Press [▲] or [▼] key to move cursor onto the desired geodetic datum.
(5) Press (ENT) key.

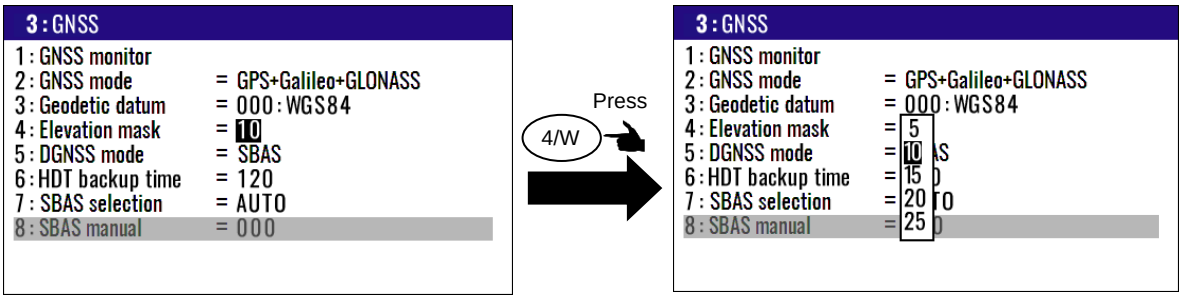


Initial setup WGS-84

4.2.4 Masking satellite elevation angle

When the satellite is below 5 degrees above the horizon, signal reflection and interference can cause erroneous positioning. You can improve the positioning accuracy by masking the elevation angle. However, a large mask value shortens the signal receive time and most satellite combinations are rejected.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (3) key to select “**3: GNSS**”.
(3) Press (4/W) key to select “**4: Elevation mask**”.
(4) Press [▲] or [▼] key to move cursor onto elevation angle masking.
(5) Press (ENT) key.



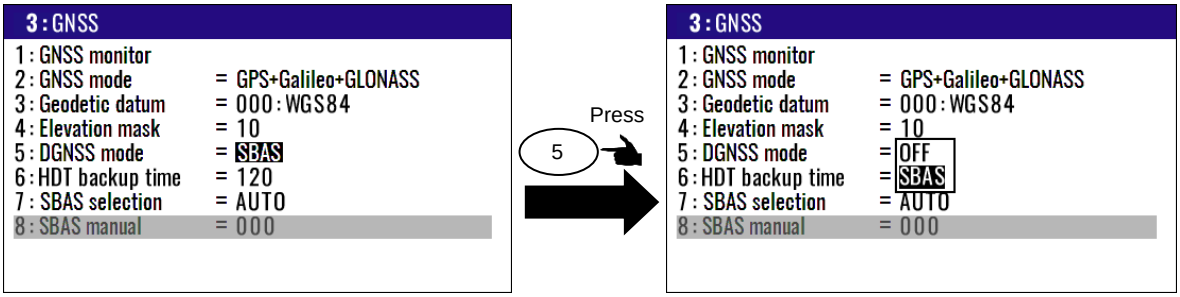
Initial setup: 10

4.2.5 DGNSS mode selection

SBAS: WAAS/EGNOS/MSAS/GAGAN/SDCM/DGNSS using other geostationary satellites.

OFF: DGNSS positioning off

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 3 key to select "**3: GNSS**".
(3) Press 5 key to select "**5: DGNSS mode**".
(4) Press [▲] or [▼] key to select OFF/SBAS.
(5) Press ENT key.

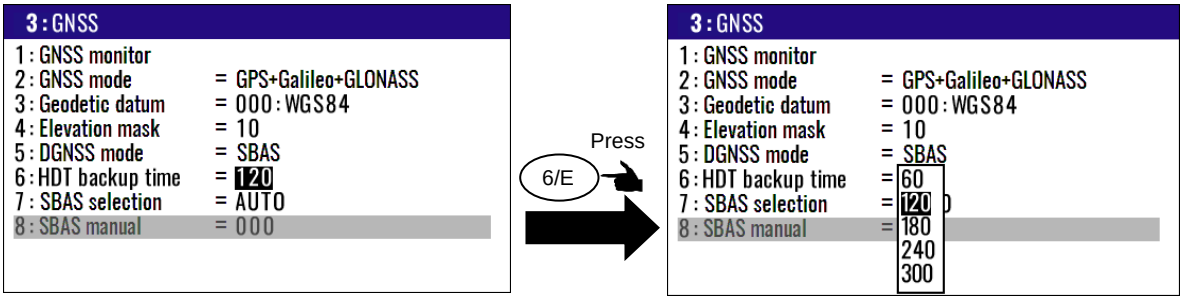


Initial setup: SBAS

4.2.6 Duration of HDT backup time

By setting the duration of HDT backup time, HDT output can be continued using backup sensor when the signal is interrupted for a short time, such as when passing under a bridge. Settings can be made from 60 second to 300 seconds**.**

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 3 key to select "**3: GNSS**".
(3) Press 6/E key to select "**6: HDT backup time**".
(4) Press [▲] or [▼] key to move cursor onto backup time.
(5) Press ENT key.

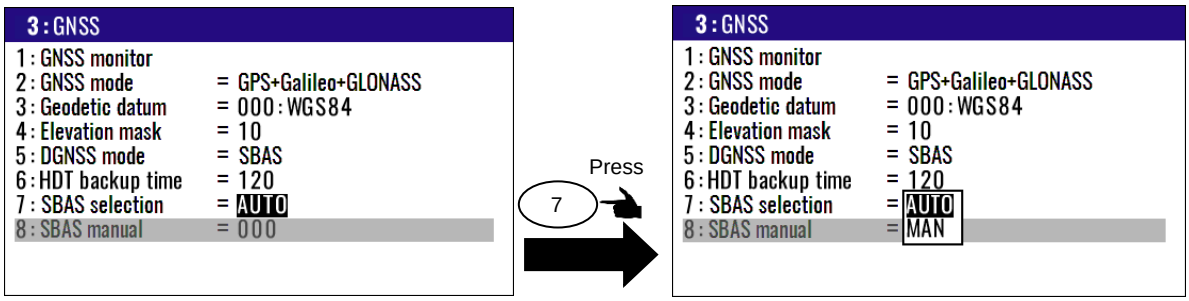


Initial setup: 120 second

4.2.7 SBAS satellite

This unit has a DGNSS positioning mode that receives position correction data from SBAS satellites. The SBAS satellites that can be received can be WAAS/EGNOS/MSAS/GAGAN/SDCM or manually selected. If you select Auto, the most suitable SBAS satellite will be automatically selected. However, this operation is disabled if “1: DGNSS mode” is “OFF”.

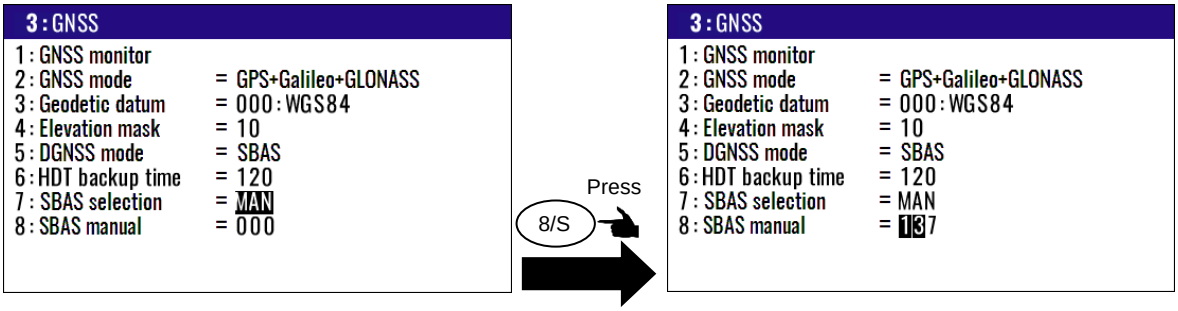
(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (3) key to select “**3: GNSS**”.
(3) Press (7) key to select “**7: SBAS selection**”.
(4) Press [▲] or [▼] key to select automatic/manual using the key.
(5) Press (ENT) key.



Initial setup: Auto

(Manual SBAS satellite selection)

(5) Select "**MAN**" in (4) above.
(6) Press (8/S) key to move the cursor to the satellite number entry area.
(7) Enter the SBAS satellite number by numeric keys.
(8) Press (ENT) key.

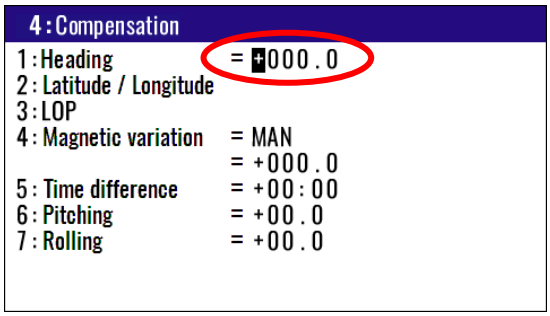


4.3 Menu 4: Compensation

4.3.1 Compensating the heading

The ship heading is received from the GPS compass and displayed. You can correct the deviation of the actual ship heading azimuth by the following operation:

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select "**4: Compensation**".
(3) Press (1) key to select "**1: Heading**".
(4) Enter a (4-digit) compensation offset by numeric keys.
(5) To correct to (-), move the cursor to the "+/-" place and press [▼] key.
(6) Press (ENT) key.

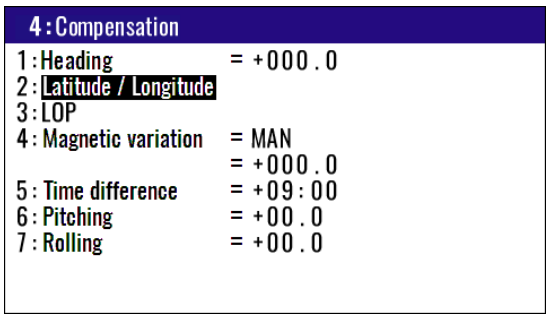


Initial setup: +000.0°

4.3.2 Correcting your position

You can compensate your GNSS present position given by GNSS in the following two ways:

- Enter the latitude and longitude of your actual position by numeric keys.
- Enter the correction offset to use.



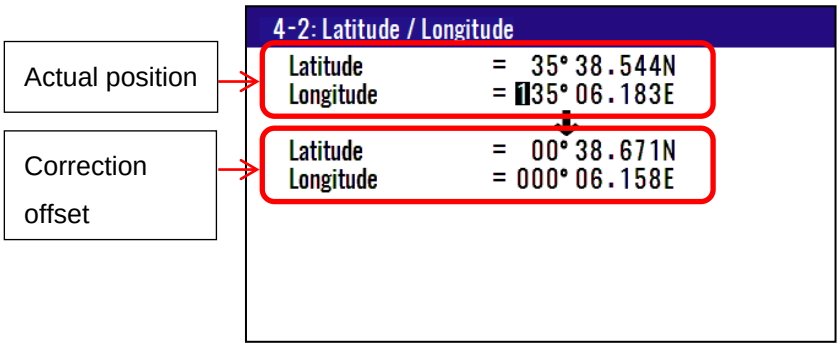
(Direct entry of actual position data)

When your present position is displayed in Latitude / Longitude mode, you can correct it by entering the known Latitude/Longitude data.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select "**4: Compensation**".
(3) Press (2/N) key to select "**2: Latitude / Longitude**".
(4) Enter the correct latitude and longitude value.

Example: The position “N35°38.544 / E135°06.183” is entered by pressing the following keys in exact order given below.

[**3**], [**5**], [**3**], [**8**], [**5**], [**4**], [**4**], [**N**], [**ENT**], [▼]
[**1**], [**3**], [**5**], [**0**], [**6**], [**1**], [**8**], [**3**], [**E**], [**ENT**]



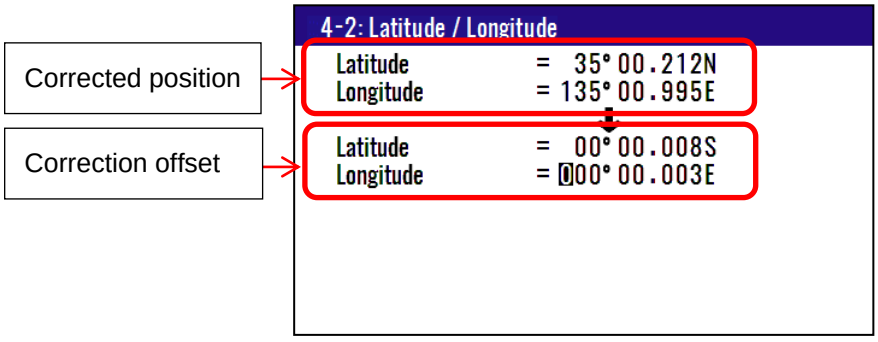
(Entry of correction offset)

When your present position is displayed in Latitude / Longitude mode, you can correct it by entering the Latitude/Longitude correction data.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select “**4: Compensation**”.
(3) Press (2/N) key to select “**2: Latitude / Longitude**”.
(4) Press [▲] or [▼] key to move cursor onto correction offset field of latitude.
(5) Enter the latitude and longitude correction offset.

Example: The position “S0°00.008 / E0°00.003” is entered by pressing the following keys in exact order given below.

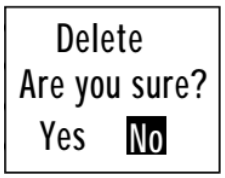
[**0**], [**0**], [**0**], [**0**], [**0**], [**0**], [**8**], [**S**], [**ENT**], [▼]
[**0**], [**0**], [**0**], [**0**], [**0**], [**0**], [**0**], [**3**], [**E**], [**ENT**]



4.3.3 Disable position correction

To delete and disable the correction offset follow these steps:

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select "**4: Compensation**".
(3) Press (2/N) key to select "**2: Latitude / Longitude**".
(4) Press (CLR) key to set 0 of offset corrections.
(5) If OK, select [**Yes**] in the pop-up and press (ENT) key.
If cancel, select [**No**] in the pop-up and press (ENT) key.



4.3.4 Compensating the LOP

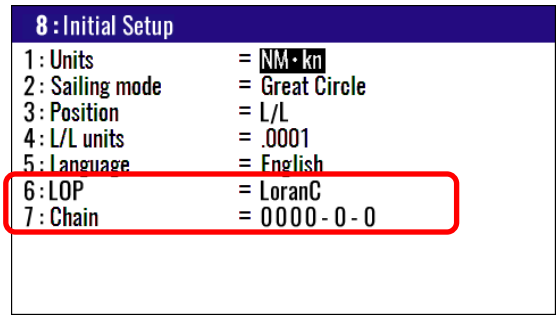
KC-1400 is converted from Latitude and Longitude to LoranC, LoranA and Decca. It can be corrected in the converted data. (Caution: Can not convert Decca LOP.)

To change the "3: LOP", the following settings are required.

You can set of LoranA, LoranC or Decca of "**3: LOP**" change when you changed **6: Lop** and **7: Chain** in the **Menu7: Initial setup.**

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (8/S) key to select "**8: Initial setup**".
(3) Press (6/E) key to select "**6: Lop**".
(4) Setting "LoranA" or "LoranC" or "Decca"
(5) Press (ENT) key.
(6) Press [▼] key to input chain number.

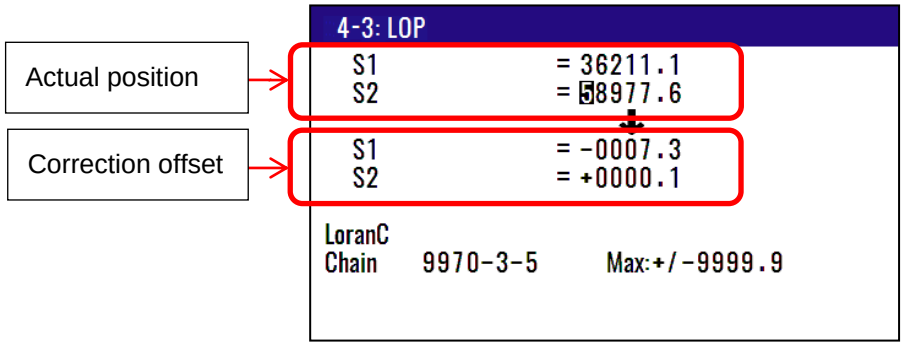
Select Loran C: Set the (4-digit) chain number, and the first digit of two slave stations by numeric keys.
Select Loran A / Decca: Select the chain number and the slave stations in the pop-up.

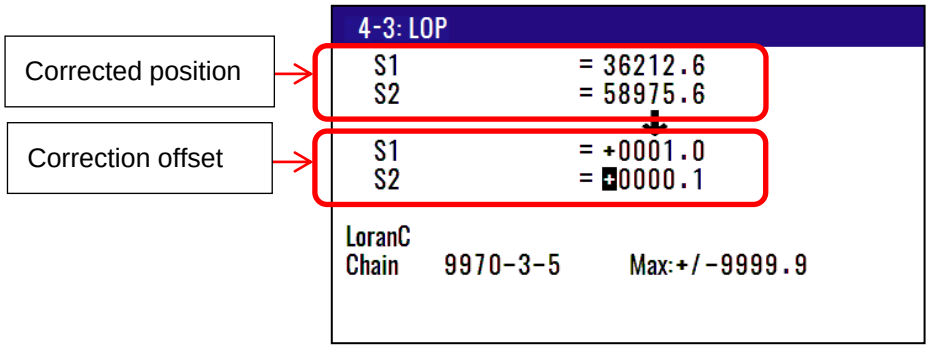


To change the "3: LOP"

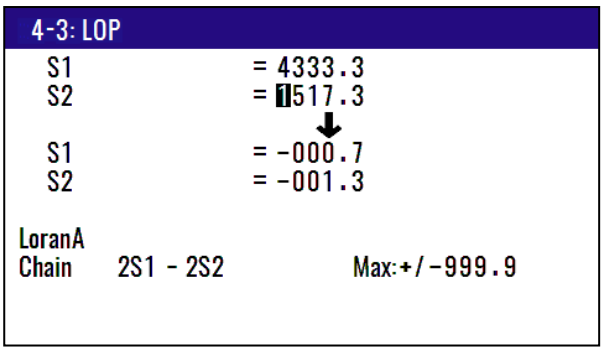
(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select "**4: Compensation**".
(3) Press (3) key to select "**3: LOP**".
(4) Enter the correct S1 and S2 value. The difference between the GNSS position is reflected in the correction offset when you enter the actual position.

In the case of LoranC

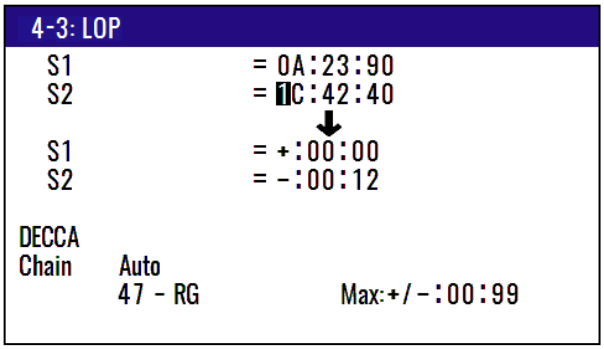




In the case of LoranA



In the case of DECCA



Initial setting: Manual

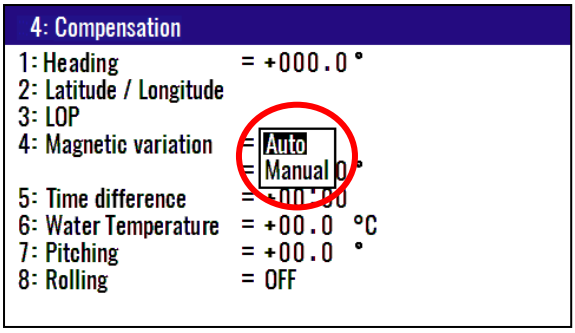
4.3.5 Compensating the compass

The course and bearing to waypoint are shown in true bearing. You can adjust the GNSS true bearing to the magnetic compass bearing.

(Automatic compensation)

In the Auto mode, the magnetic compass is compensated based on the built-in global magnetic variation maps. However, avoid using this mode if you are higher than 75 degrees North or South latitude. The compass may have a small error because the system contains world maps. Manual correction is recommended. For areas that do not allow exact translation of a true bearing to a magnetic bearing, despite the map covering the whole world, the resulting value may differ from the actual deviation.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select "**4: Compensation**".
(3) Press (4/W) key to select "**4: Magnetic variation**".
(4) Press [▲] or [▼] key to move cursor onto "**Auto**".
(5) Press (ENT) key.



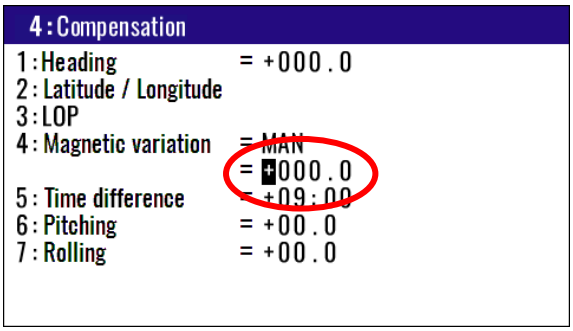
Initial setup: Manual

(Manual compensation)

Following (1) to (3) above:

(4) Press [▲] or [▼] key to move cursor onto "**Manual**".
(5) Press (ENT) key.
(6) Press (ENT) key to change the correction offset.
(7) Enter a (4-digit) compensation offset by numeric keys.

(8) To correct to (-), move the cursor to the "+/-" place and press [▼] key.
(9) Press (ENT) key.



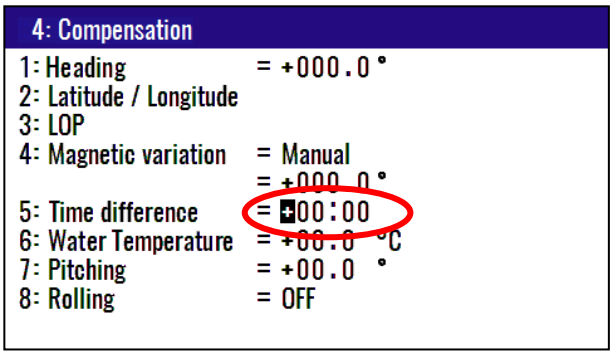
Initial setup: +000.0°
Setup range: -180.0° to +180.0°

4.3.6 Displaying local time

You can display your local time by entering a time difference from the Greenwich Mean Time (GMT).
See the following figure 4.1 to determine zone time difference.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select "**4: Compensation**".
(3) Press (5) key to select "**5: Time difference**".
(4) Enter a (4-digit) time difference by numeric keys.
(5) To correct to (-), move the cursor to the "+/-" place and press [▼] key.
(6) Press (ENT) key.

(CLR) **NOTE:** *Press to clear incorrect input. You can reenter a "+" or "-" sign and numeric data.*



Initial setup: 00:00 hour

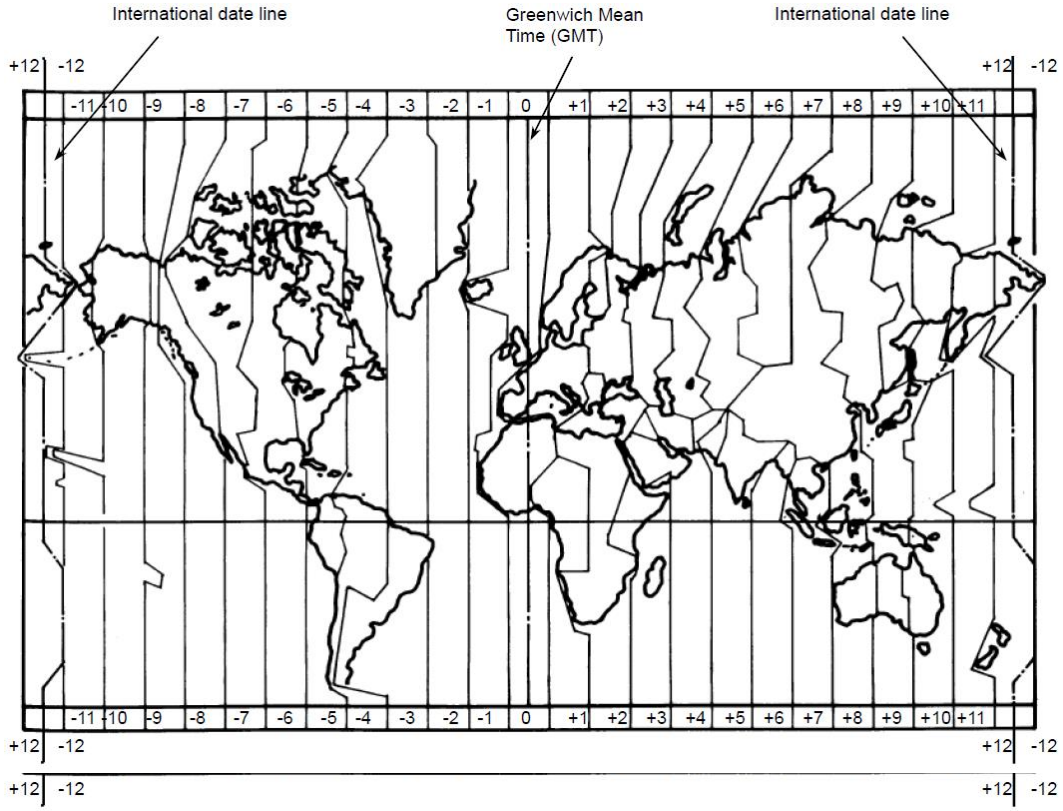


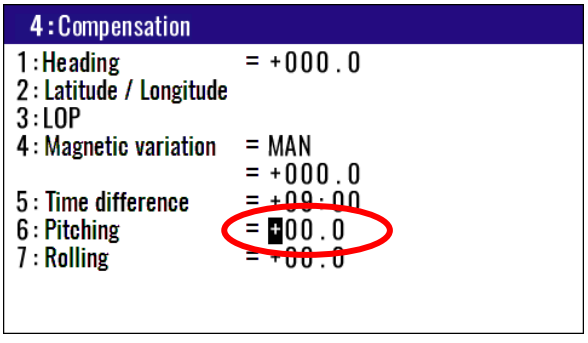
Figure 4.1 Time difference chart

4.3.7 Correcting pitching

The pitching value input from the antenna section can be corrected.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select "**4: Compensation**".
(3) Press (6/E) key to select "**6: Pitching**".
(4) Enter a (3-digit) compensation offset by numeric keys.
(5) To correct to (-), move the cursor to the "+/-" place and press [▼] key.
(6) Press (ENT) key.

> (CLR) **NOTE:** *Press to clear incorrect input. You can reenter a "+" or "-" sign and numeric data.*

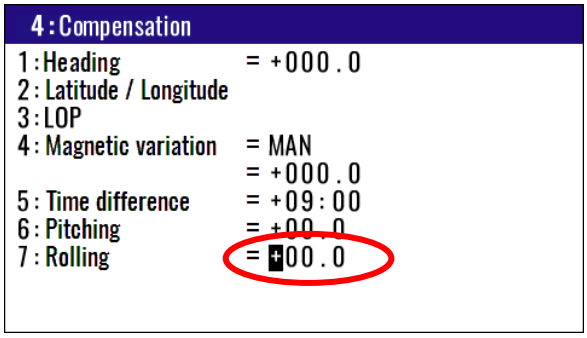


Initial setup: +00.0

4.3.8 Correcting rolling

It is possible to correct the rolling value input from the antenna section.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4/W) key to select "**4: Compensation**".
(3) Press (7) key to select "**7: Rolling**".
(4) Press [▲] or [▼] key to move cursor onto "**ON**".
(5) Press (ENT) key.



(CLR) **NOTE:** *Press to clear incorrect input. You can reenter a "+" or "-" sign and numeric data.*

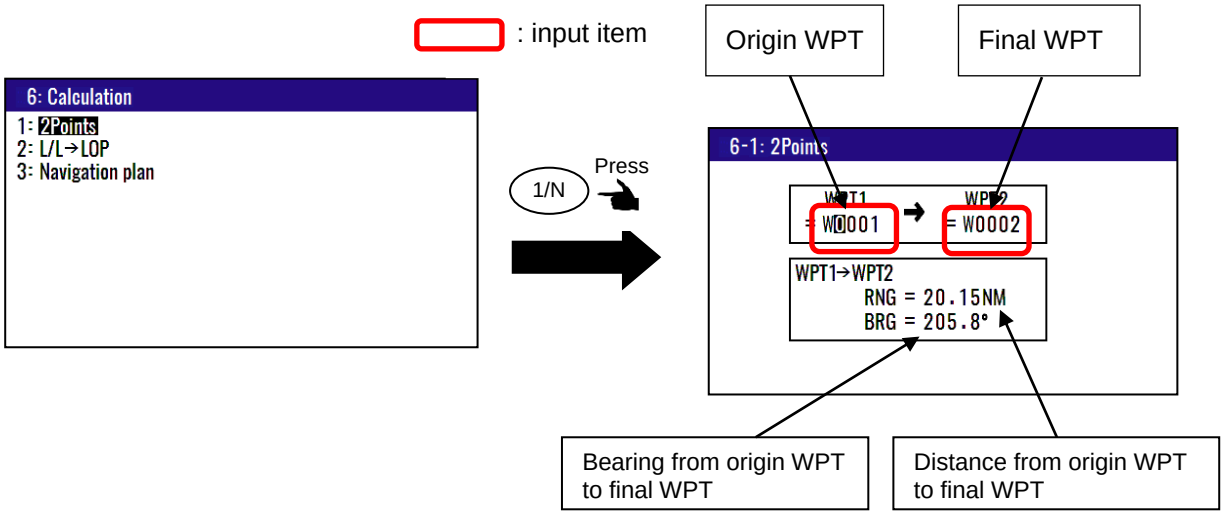
Initial setup: +00.0

4.4 Menu 6: Calculation

4.4.1 Calculating the distance and bearing between two points

You can calculate the distance and bearing between two points stored in memory.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (6/E) key to select "**6: Calculation**".
(3) Press (1) key to select "**1: 2Points**".
(4) Enter a (4-digit) origin WPT number (0000 to 9999).
(5) Press (ENT) key.
(6) Press [▶] key.
(7) Enter a (4-digit) final WPT number (0000 to 9999).
(9) Press (ENT) key.



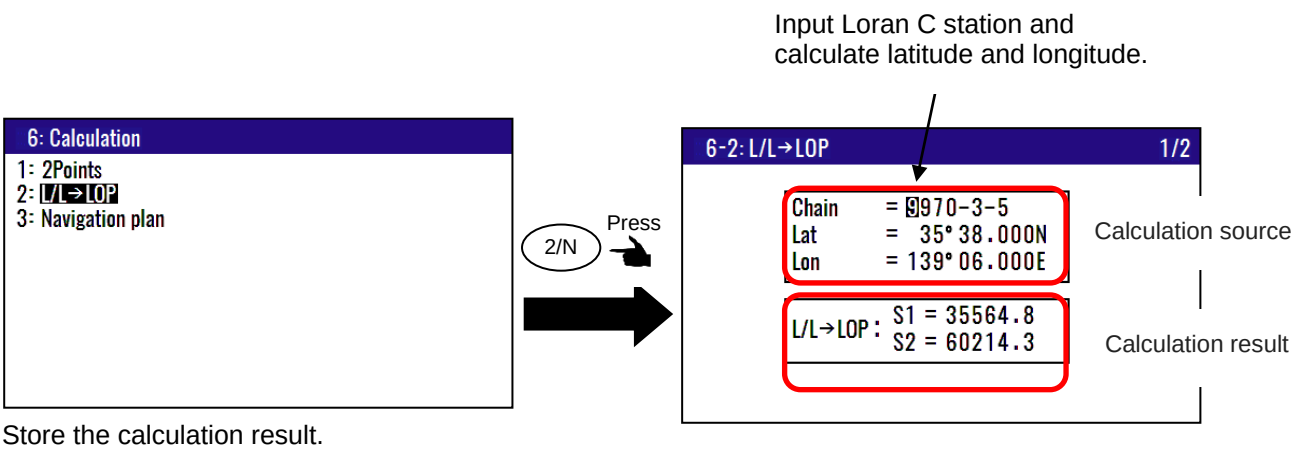
4.4.2 Calculating LOP based on LAT/LONG data

You can enter a Loran C or Loran A or DECCA chain number and two secondary stations, NAVIGATOR calculates the LOPs based on the specified LAT/LONG data and displays the LOP values.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (8/S) key to select "**8: Initial setup**".
(3) Press (6/E) key to select "**6: Lop**".
(4) Setting "LoranA" or "LoranC" or "Decca"
(5) Press (ENT) key.
(6) Press [▼] key to input Chain number.
(7) Select Loran C: Set the (4-digit) chain number, and the first digit of two slave stations by numeric keys. Select Loran A / Decca: Select the chain number and the slave stations in the pop-up. Please refer to "4.6.6 Specifying the chain and secondary stations for Loran C, Loran A or Decca.

In the case of Loran C

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (6/E) key to select "**6: Calculation**".
(3) Press (2/N) key to select "**2: L/L→LOP**".
(4) Enter (4-digit) Loran C chain number.
(5) Enter the first digit of two Loran C slave stations.
(6) Press (ENT) key.
(7) Enter (7-digit) latitude using numeric keys.
(8) Enter "N" for north or "S" for south latitude.
(9) Press (ENT) key.
(10) Enter (8-digit) longitude using numeric keys.
(11) Enter "E" for east or "W" for west latitude.
(12) Press (ENT) key.



Store the calculation result.

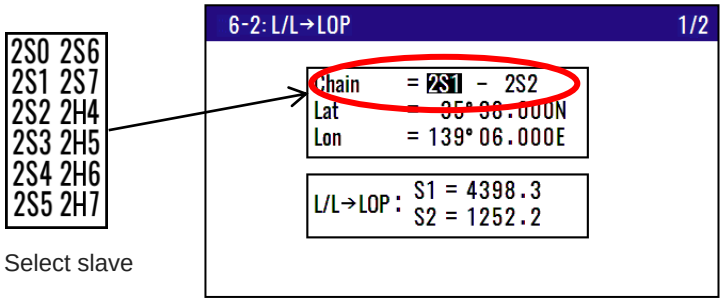
(1) Press [▼] key to display page 2/2.
(2) Enter a data number (1000 to 9999) using numeric keys.
(3) The existing data, if any, is displayed for your checkout.
(4) Press (ENT) key.

In the case of Loran A

When you enter a combination of two slave stations of Loran A, NAVIGATOR calculates the Loran A LOPs based on the specified LAT/LONG data and displays the LOP values.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (6/E) key to select "**6: Calculation**".
(3) Press (2/N) key to select "**2: L/L→LOP**".
(4) Press (ENT) key.
(5) Press [▲] or [▼], [▶] or [◀] key to select the slave station 1.
(6) Press (ENT) key.
(7) Press [▶] key to move the cursor to slave station 2 field.
(8) Press (ENT) key.
(9) Press [▲] or [▼] key to select the slave station 2.
(10) Press (ENT) key.

(11) Press [▼] key to move the cursor to latitude field.

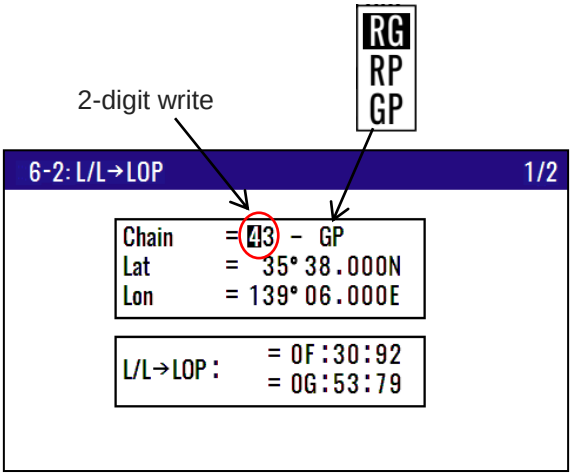


Store the calculation result.

(1) Press [▼] key to display page 2/2.
(2) Enter a data number (1000 to 9999) using numeric keys.
(3) The existing data, if any, is displayed for your checkout.
(4) Press (ENT) key.

In the case of DECCA

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (6/E) key to select "**6: Calculation**".
(3) Press (2/N) key to select "**2: L/L→LOP**".
(4) Press (ENT) key.
(5) Enter (2-digit) Decca chain number.
(6) Press (ENT) key.
(7) Press [▶] key to move the cursor to combination field of slave stations.
(8) Press (ENT) key.
(9) Press [▲] or [▼] key to select a combination of slave stations.
(10) Press (ENT) key.
(11) Press [▼] key to move the cursor to latitude field.
(12) Enter (7-digit) latitude using numeric keys.
(13) Enter "N" for north or "S" for south latitude.
(14) Press (ENT) key.
(15) Enter (8-digit) longitude using numeric keys.
(16) Enter "E" for east or "W" for west latitude.
(17) Press (ENT) key.



Store the calculation result.

(1) Press [▼] key to display page 2/2.

(2) Enter a data number (1000 to 9999) using numeric keys.

(3) The existing data, if any, is displayed for your checkout.

(4) Press (ENT) key.

4.4.3 Calculating navigation plan

You can calculate the following various navigation plan.

Navigation mode = **Waypoint**: Boat speed, Arrival time, Time to go to waypoint.

Navigation mode = **Route**: Boat speed, Final arrives time, Total navigation time.

Calculating arrival time and time to go to waypoint from WPT number and boat speed.

(1) Press (MENU) key until Menu options 1 to 10 appears.

(2) Press (6/E) key to select "**6: Calculation**".

(3) Press (3) key to select "**3: Navigation plan**".

(4) Press (ENT) key and select "**Waypoint**" in the pop-up.

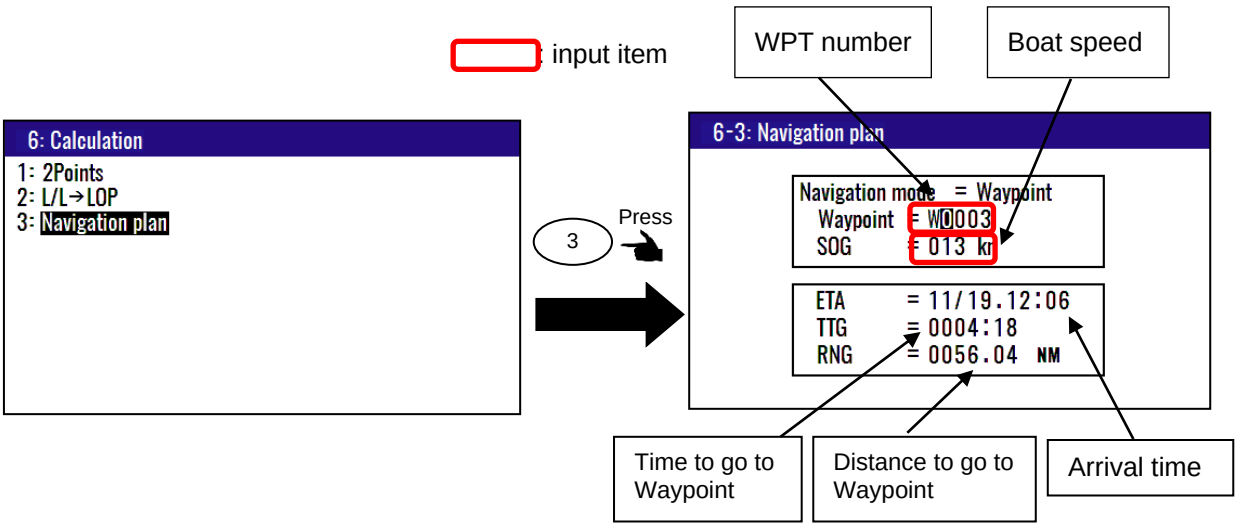
(5) Press (ENT) key.

(6) Press [▼] key and enter an (4-digit) origin WPT number (0000 to 9999).

(7) Press (ENT) key.

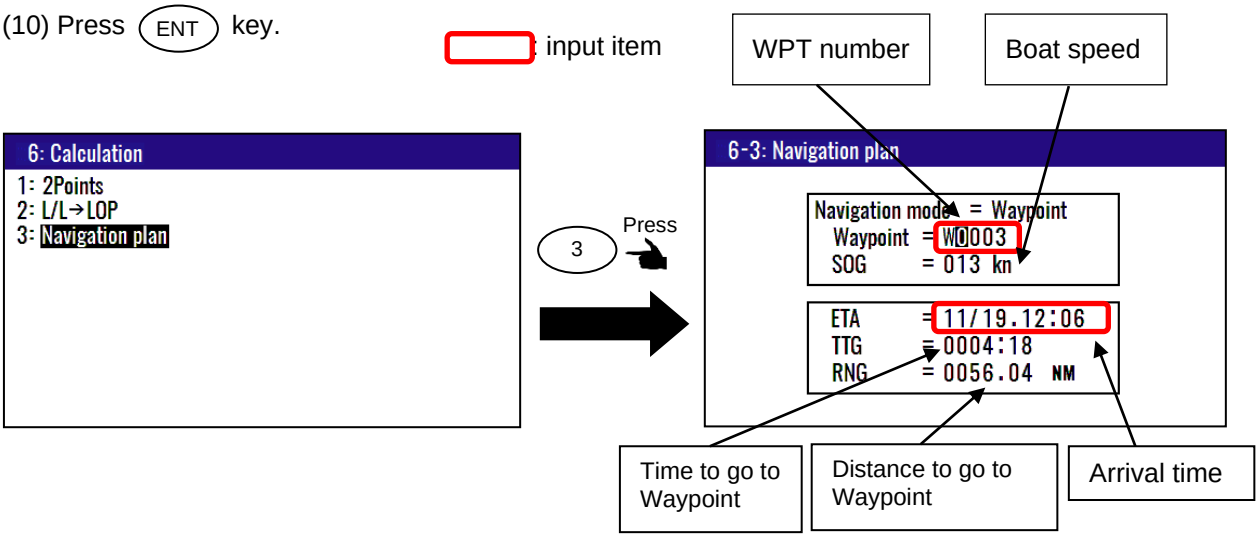
(8) Press [▼] key and enter a (3-digit) boat speed.

(9) Press (ENT) key.



Calculating boat speed and time to go to waypoint from WPT number and arrival time.

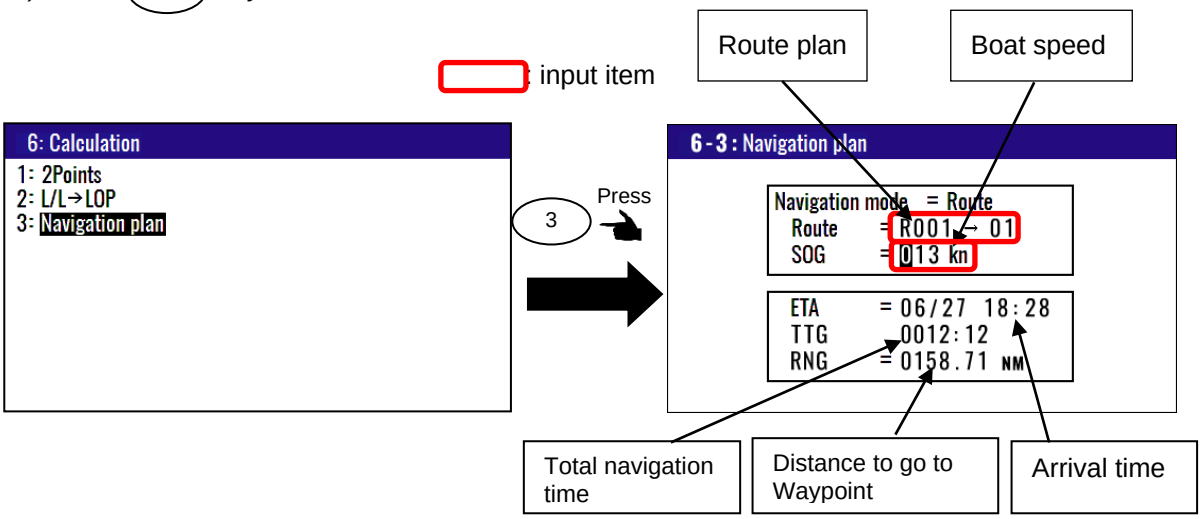
(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (6/E) key to select "**6: Calculation**".
(3) Press (3) key to select "**3: Navigation plan**".
(4) Press (ENT) key and select "**Waypoint**" in the pop-up.
(5) Press (ENT) key.
(6) Press [▼] key and enter an (4-digit) origin WPT number (0000 to 9999).
(7) Press (ENT) key.
(8) Press [▼] key two times.
(9) Enter arrival time by numeric keys.
(10) Press (ENT) key.



Calculating arrival time and total navigation time from route plan and boat speed

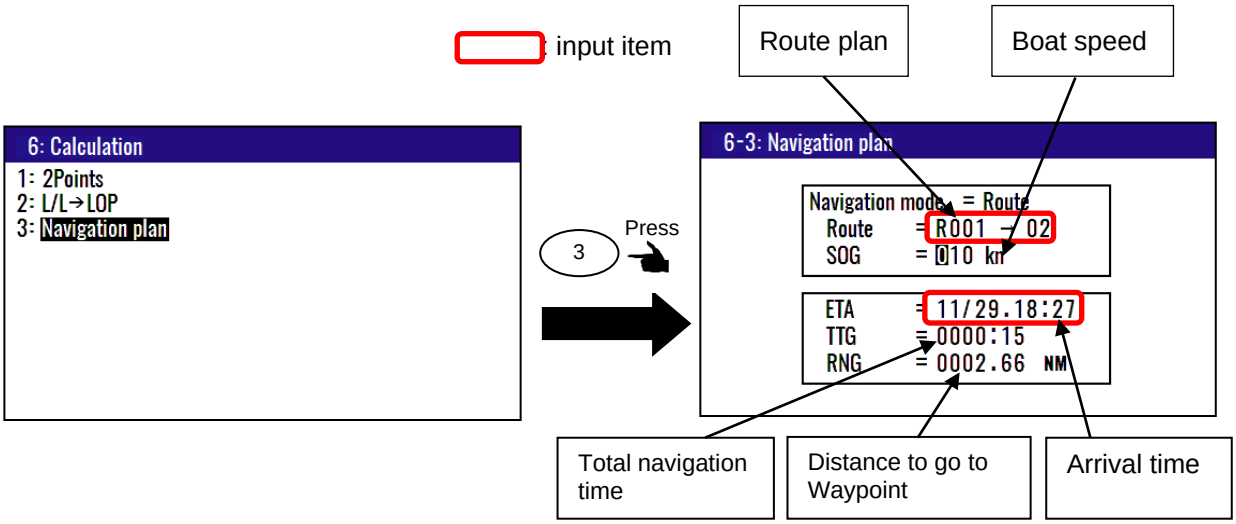
(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (6/E) key to select "**6: Calculation**".
(3) Press (3) key to select "**3: Navigation plan**".
(4) Press (ENT) key and select "**Route**" in the pop-up.
(5) Press (ENT) key.

(6) Press [▼] key and enter a (3-digit) route number (001 to 100).
(7) Press ENT key.
(8) Press [▶] key and press ENT key to select Forward or Revers.
(9) Press [▶] key and enter an (2-digit) origin waypoint number (01 to 50).
(10) Press ENT key.
(11) Press [▼] key and enter a (3-digit) boat speed.
(12) Press ENT key.



Calculating boat speed and time to go to waypoint from route number and arrival time.

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 6/E key to select "**6: Calculation**".
(3) Press 3 key to select "**3: Navigation plan**".
(4) Press ENT key and select "**Route**" in the pop-up.
(5) Press ENT key.
(6) Press [▼] key and enter an (3-digit) route number (001 to 100).
(7) Press ENT key.
(8) Press [▶] key and press ENT key to select Forward or Revers.
(9) Press [▶] key and enter an (2-digit) origin waypoint number (01 to 50).
(10) Press ENT key.
(11) Press [▼] key two times.
(12) Enter arrival time by numeric keys.
(13) Press ENT key.

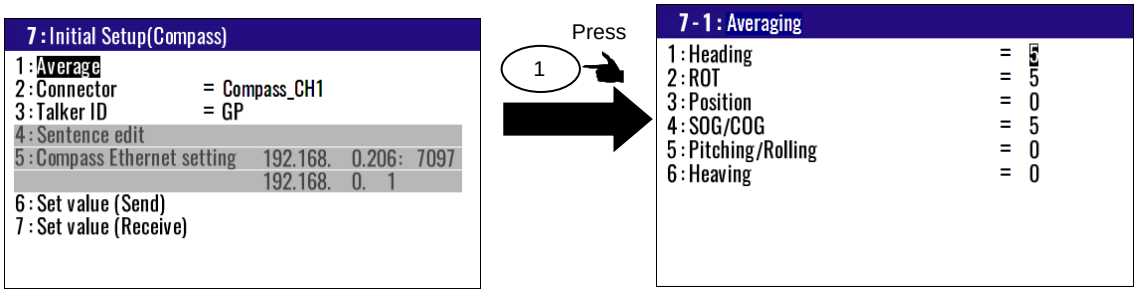


4.5 Menu 7: Initial Setup (Compass)

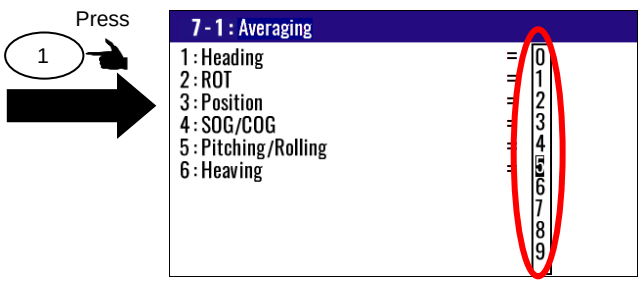
4.5.1 Setting the averaging constant (Heading)

The ability to add and average data stabilizes heading data. For averaging, 9 is the maximum and 0 is the minimum. The higher the value you select, the stronger the averaging will be, and the less variation there will be in the displayed and output data. Also, the smaller the value you select, the weaker the averaging becomes, and the better the ability to track instantaneous movements. A stable heading can be obtained by setting constants appropriate for the vessel.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (7) key to select "**7: Initial Setup (Compass)**".
(3) Press (1) key to select "**1: Averaging**".



(4) Press (1) key to select "**1: Heading**".
(5) Press [▲] or [▼] key to move cursor onto the average constants to select "0 to 9".
(6) Press (ENT) key.

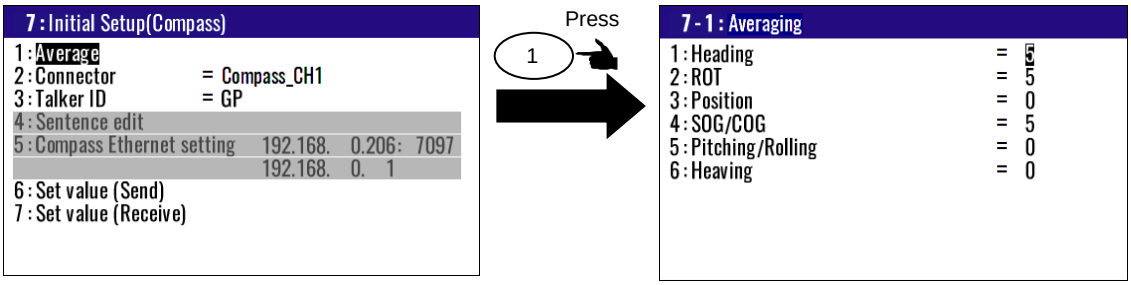


Initial setup: 5

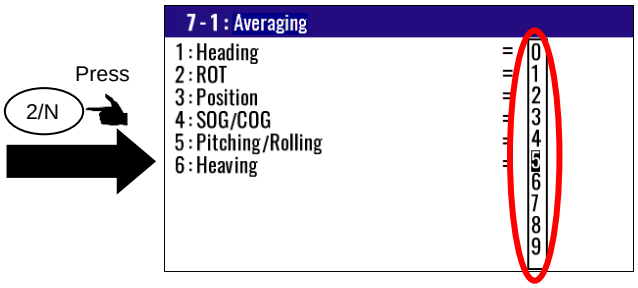
4.5.2 Setting average constants (Rotation angular velocity)

Stabilizes turning angular velocity by adding and averaging data. For averaging, 9 is the maximum and 0 is the minimum. The higher the value you select, the stronger the averaging will be, and the less variation there will be in the displayed and output data. Also, the smaller the value you select, the weaker the averaging becomes, and the better the ability to track instantaneous movements. A stable turning angular velocity can be obtained by setting the constant according to the vessel.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (7) key to select "**7: Initial Setup (Compass)**".
(3) Press (1) key to select "**1: Averaging**".



(4) Press (2/N) key to select "**2: ROT**.
(5) Press [▲] or [▼] key to move cursor onto the average constants to select "0 to 9".
(6) Press (ENT) key.

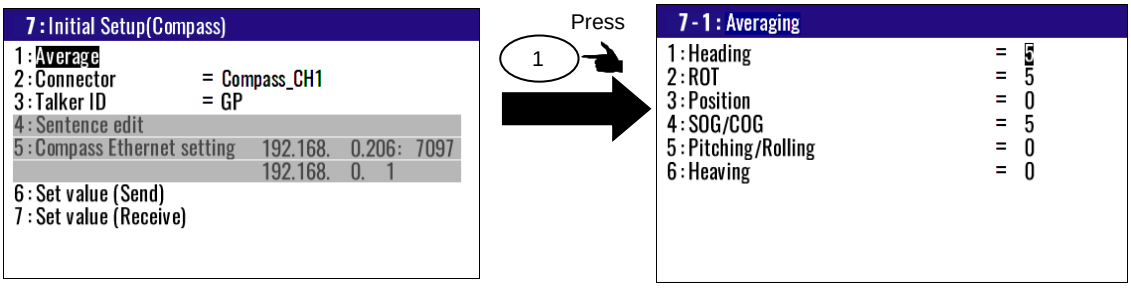


Initial setup: 5

4.5.3 Setting the averaging constant (Position)

Stabilizes position data by adding and averaging data. For averaging, 9 is the maximum and 0 is the minimum. The higher the value you select, the stronger the averaging will be, and the less variation there will be in the displayed and output data. Also, the smaller the value you select, the weaker the averaging becomes, and the better the ability to track instantaneous movements. Stable position and speed can be obtained by setting constants according to the vessel's cruising speed.

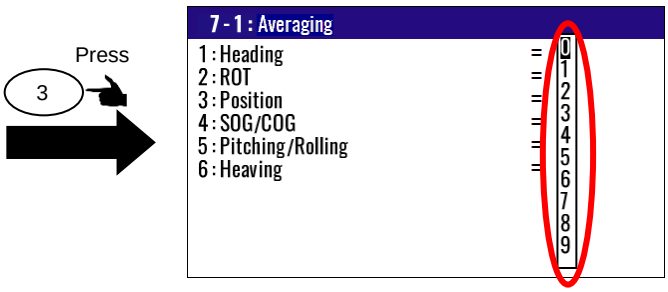
(1) Press (MENU) key until Menu options 1 to 10 are displayed.
(2) Press (7) key to select "**7: Initial Setup (Compass)**".
(3) Press (1) key to select "**1: Averaging**".



(4) Press (3) key to select "**3: Position**".

(5) Press [▲] or [▼] key to move cursor onto the averaging constant to select "0 to 9".

(6) Press (ENT) key.



Initial setup: 0

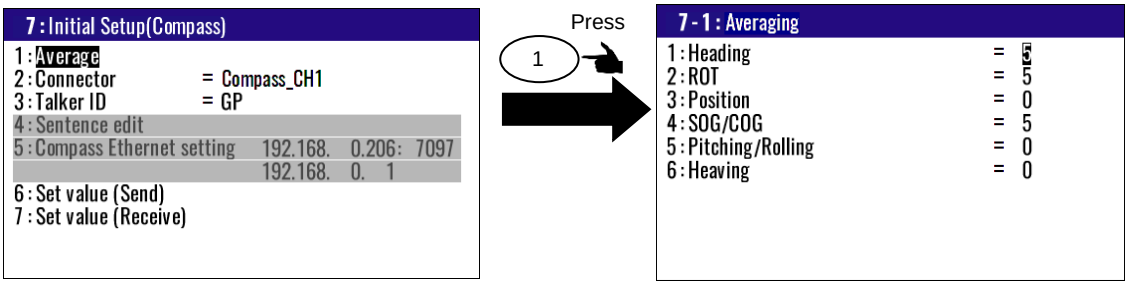
4.5.4 Setting the averaging constant (velocity / course)

Stabilizes velocity/course data by adding and averaging data. For averaging, 9 is the maximum and 0 is the minimum. The higher the value you select, the stronger the averaging will be, and the less variation there will be in the displayed and output data. Also, the smaller the value you select, the weaker the averaging becomes, and the better the ability to track instantaneous movements. Stable position and speed can be obtained by setting constants according to the vessel's cruising speed.

(1) Press (MENU) key until Menu options 1 to 10 appears.

(2) Press (7) key to select "**7: Initial Setup (Compass)**".

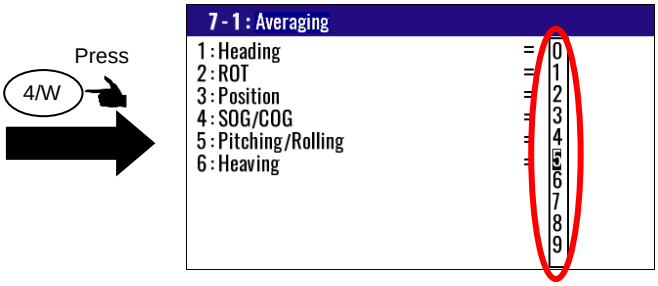
(3) Press (1) key to select "**1: Averaging**".



(4) Press (4/W) key to select "**4: SOG/COG**".

(5) Press [▲] or [▼] key to move cursor onto the averaging constant to select "0 to 9".

(6) Press (ENT) key.

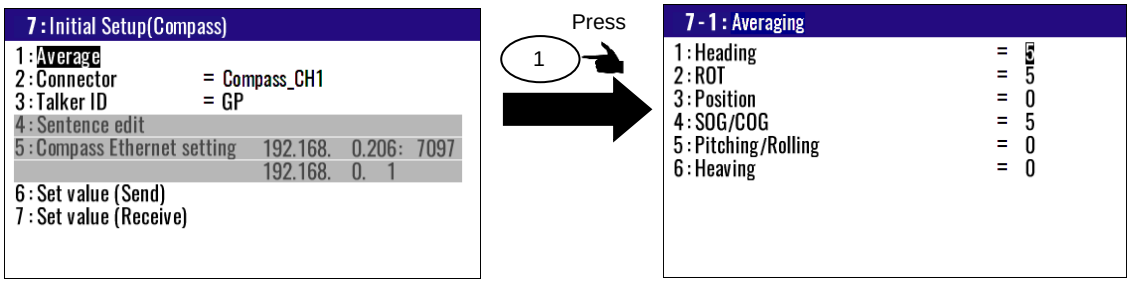


Initial setup: 5

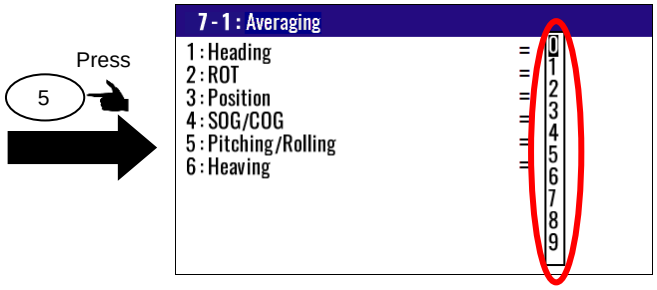
4.5.5 Setting the averaging constant (Pitching/Rolling)

The ability to add and average data stabilizes pitching/rolling data. For averaging, 9 is the maximum and 0 is the minimum. The higher the value you select, the stronger the averaging will be, and the less variation there will be in the displayed and output data. Also, the smaller the value you select, the weaker the averaging becomes, and the better the ability to track instantaneous movements. A stable heading can be obtained by setting constants appropriate for the vessel.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (7) key to select "**7: Initial Setup (Compass)**".
(3) Press (1) key to select "**1: Averaging**".



(4) Press (5) key to select "**5: Pitching/Rolling**.
(5) Press [▲] or [▼] key to move cursor onto the average constants to select "0 to 9".
(6) Press (ENT) key.



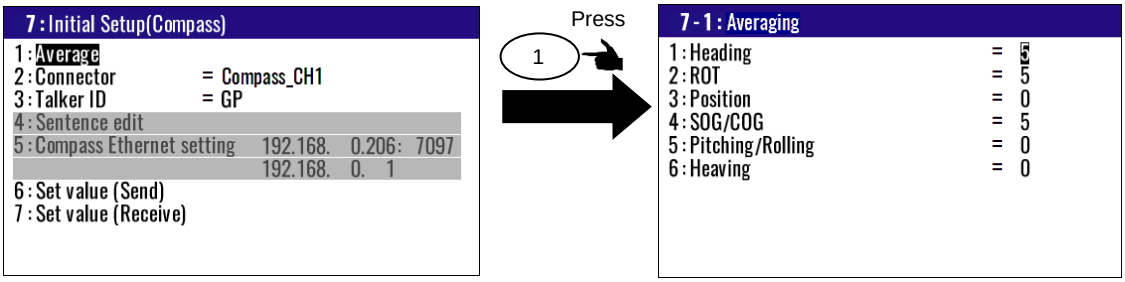
Initial setup: 0

4.5.6 Setting average constants (Heaving)

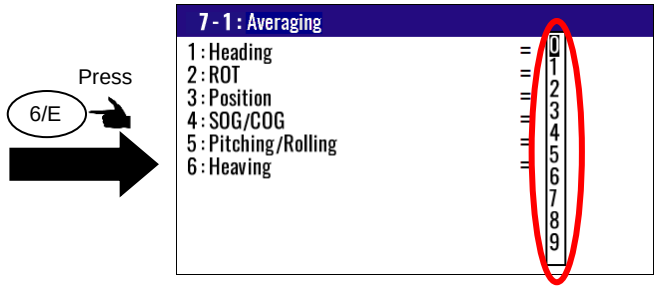
Stabilizes turning heaving data by adding and averaging data. For averaging, 9 is the maximum and 0 is the minimum. The higher the value you select, the stronger the averaging will be, and the less variation there will be in the displayed and output data. Also, the smaller the value you select, the weaker the averaging becomes, and the better the ability to track instantaneous movements. A stable

turning angular velocity can be obtained by setting the constant according to the vessel.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (7) key to select "**7: Initial Setup (Compass)**".
(3) Press (1) key to select "**1: Averaging**".



(4) Press (6/E) key to select "**6: Heaving**.
(5) Press [▲] or [▼] key to move cursor onto the average constants to select "0 to 9".
(6) Press (ENT) key.

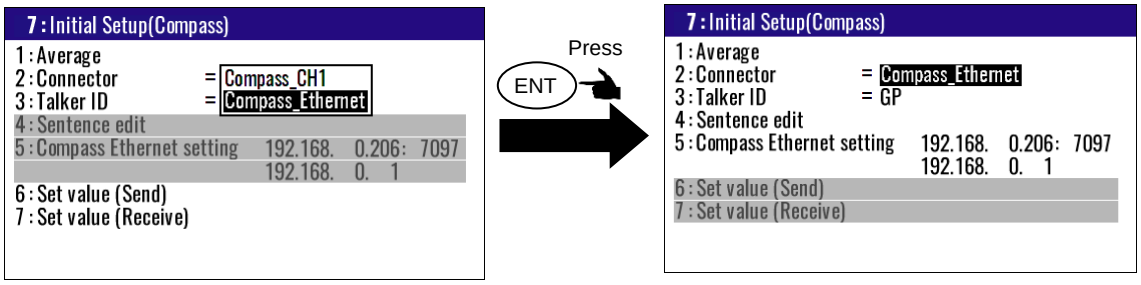


Initial setup: 0

4.5.7 LAN data talker ID and sentence editing

You can edit the talker ID and sentence of the LAN (IEC 61162-450) data output from the antenna section by following the steps below.

(1) Press (MENU) key until menu items 1 to 10 are displayed.
(2) Press (7) key to select "**7: Initial Setup (Compass)**"
(3) Press (2/N) key to select "**2: Connector**".
(4) Press [▲] or [▼] key to select "Compass Ethernet".
(5) Press (ENT) key.



(Change talker ID)

(6) Press (3) key to select "**3: Talker ID**".

(7) Press [▲] or [▼] key to select the Talker ID.

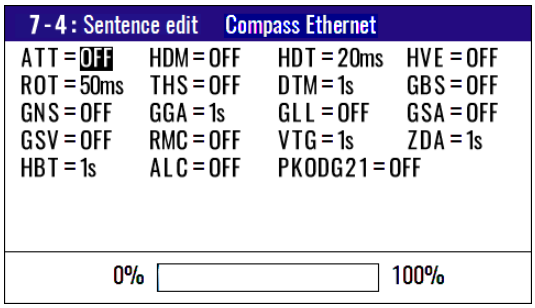
(8) Press (ENT) key.

If you select "AUTO" at this time, the talker ID will be based on the reception mode.

Initial setup: GP

(Edit sentence)

(9) Press (4/W) key to select "**7-4: Sentence edit**".

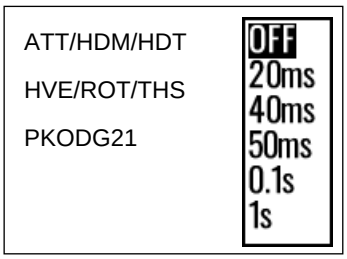


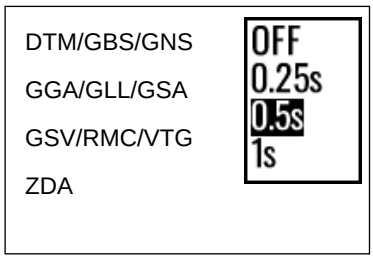
(10) Press [▲], [▼], [▶] or [◀] key to move cursor onto the sentence to be edited.

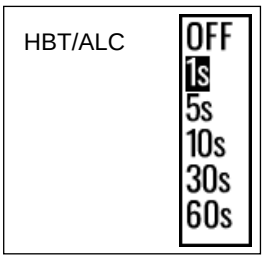
(11) Press (ENT) key to select the output cycle.

(12) Press [▲] or [▼] key to select the output cycle.

(13) Press (ENT) key.







4.5.8 When sending display unit settings to the GNSS compass

When replacing the GNSS compass: KC-1000, or upgrading the KC-1000, you can send the current settings to the KC-1000 using the steps below to make the settings the same as before replacement.

(1) Press (MENU) key until menu items 1 to 10 are displayed.

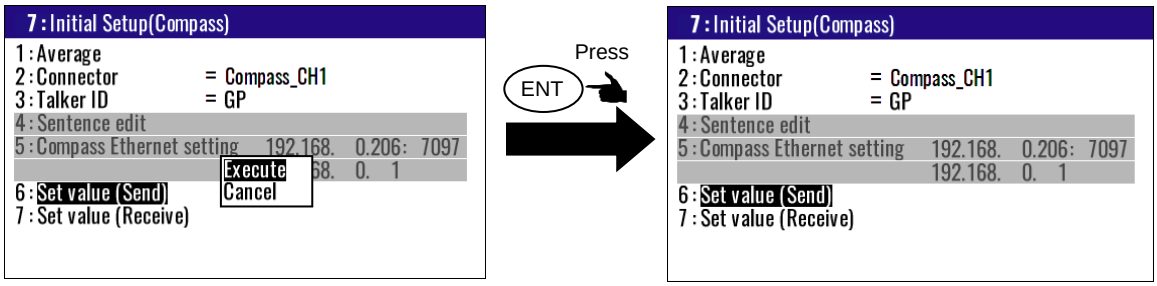
(2) Press (7) key to select "**7: Initial Setup (Compass)**" .

(3) Press (6/E) key to select "**6: Set value (Send)**".

(4) Press [▲] or [▼] key to select "**Execute**".

(5) Press (ENT) key.

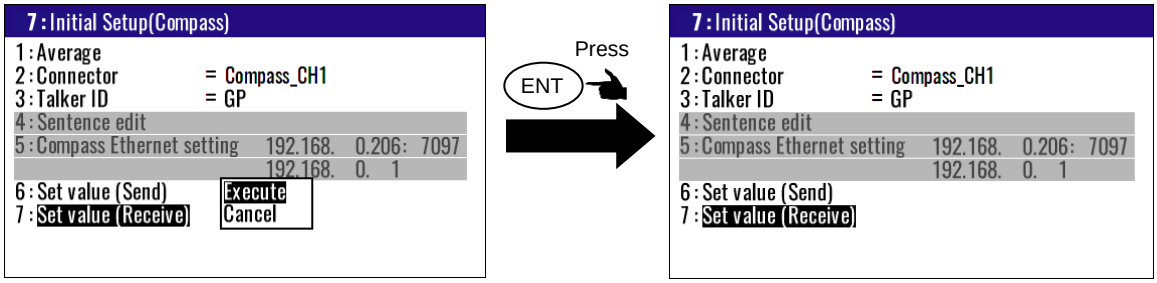
If the popup "Accessing" appears and then disappears, it's complete.



4.5.9 When receiving GNSS compass settings on the display unit

When replacing the display unit: KC-14, or upgrading the KC-14, you can receive the current settings from the KC-1000 side by following the steps below and set them to the same settings as before replacement.

(1) Press MENU key until menu items 1 to 10 are displayed.
(2) Press 7 key to select "**7: Initial Setup (Compass)**".
(3) Press 7 key to select "**7: Set value (Receive)**".
(4) Press [▲] or [▼] key to select "**Execute**".
(5) Press ENT key.
If the popup "Accessing" appears and then disappears, it's complete.



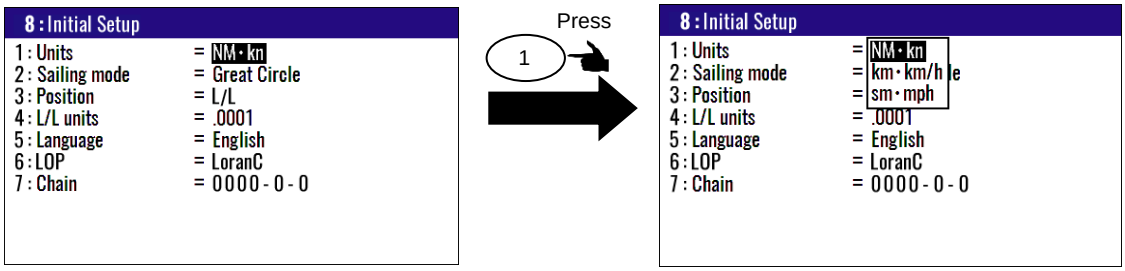
*__Execute__ means execution, __Cancel__ means cancellation.

4.6 Menu 8: Initial Setup

4.6.1 Changing the distance or speed unit

You can change the measuring unit of distance (to WPT or final destination) and speed.

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 8/S key to select "**8: Initial Setup**".
(3) Press 1 key to select "**1: Units**".
(4) Press [▲] or [▼] key to move cursor onto the distance and speed unit "NM•kn", "km•km/h", "sm•mph".
(5) Press ENT key.



Initial setup: NM•kn

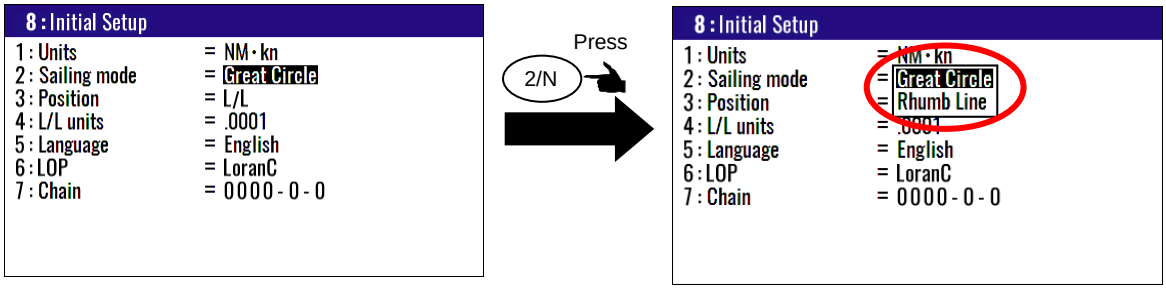
4.6.2 Changing sail mode

You can change the navigation mode. There are two navigation modes.

Great Circle course: The shortest course on a sphere.

Rhumb Line course: Straight course on a Mercator chart.

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 8/S key to select "**8: Initial Setup**".
(3) Press 2/N key to select "**2: Sailing mode**".
(4) Press [▲] or [▼] key to move cursor onto the sail mode to "Great Circle", "Rhumb Line".
(5) Press ENT key.

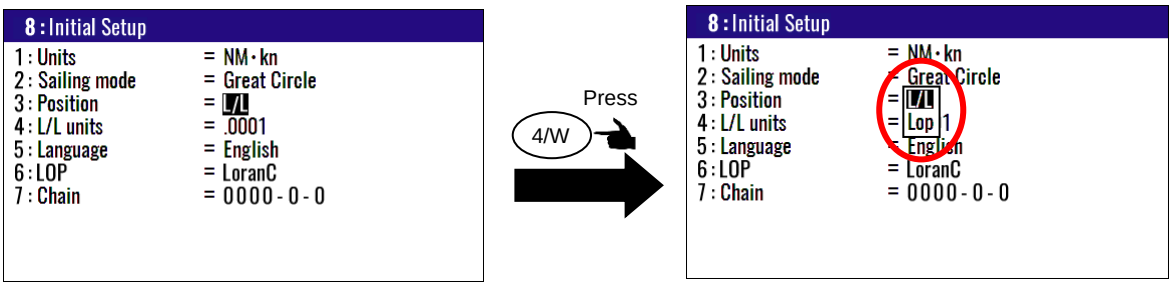


Initial setup: Great Circle

4.6.3 Displaying position data in LAT/LONG mode

You can change the displaying position data, “LAT/LONG” or “Lop”.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (8/S) key to select “**8: Initial Setup**”.
(3) Press (3) key to select “**3: Position**”.
(4) Press [▲] or [▼] key to move cursor to “L/L”, “Lop”.
(5) Press (ENT) key.

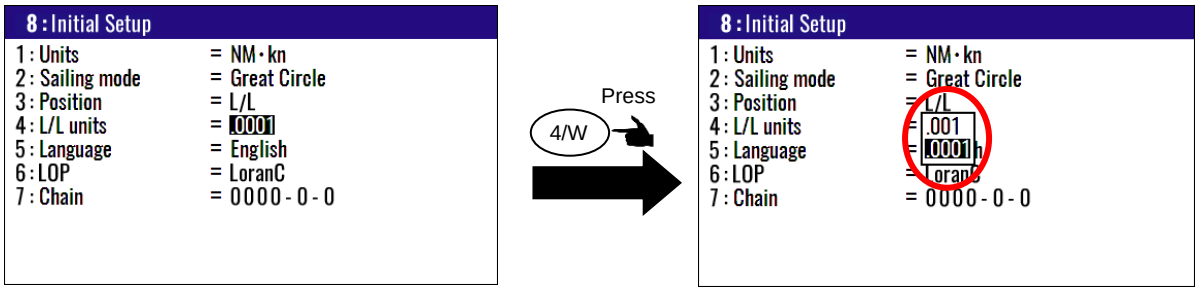


Initial setup: L/L

4.6.4 Changing the latitude and longitudinal display digits

The following operations enable to display the latitude and longitude of present position 0.0001 or 0.001minute.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (8/S) key to select “**8: Initial Setup**”.
(3) Press (4/W) key to select “**4: L/L units**”.
(4) Press [▲] or [▼] key to move cursor to “.001” or “.0001”.
(5) Press (ENT) key.



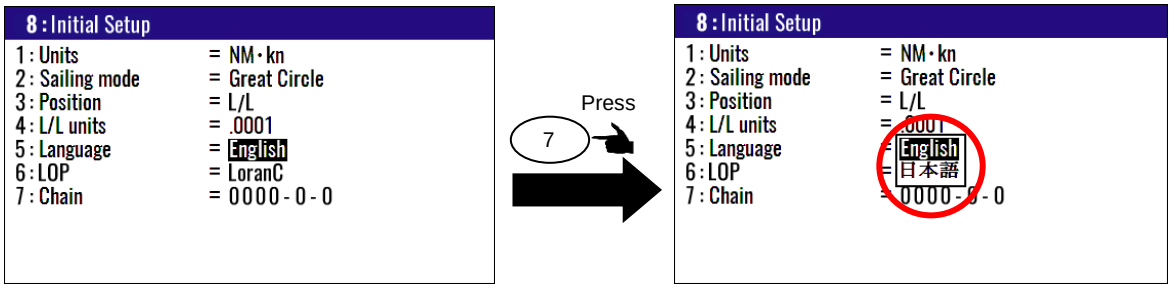
Initial setup: .0001

4.6.5 Selecting a Language

You can select the language from the pop-up.

The procedure is as follows:

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (8/S) key to select “**8: Initial Setup**”.
(3) Press (5) key to select “**5: Language**”.
(4) Press [▲] or [▼] key to move cursor onto the language.
(5) Press (ENT) key.



Initial setup: English

4.6.6 Specifying the chain and secondary stations for Loran C, Loran A or Decca

For the operating procedure, refer to 5.1 "Initial setup for LOP display".

The procedure is as follows:

(1) Press (MENU) key until Menu options 1 to 10 appears.

(2) Press (8/S) key to select "**8: Initial Setup**".

(3) Press (6/E) key to select "**6: Lop**".

In the case "LoranC"

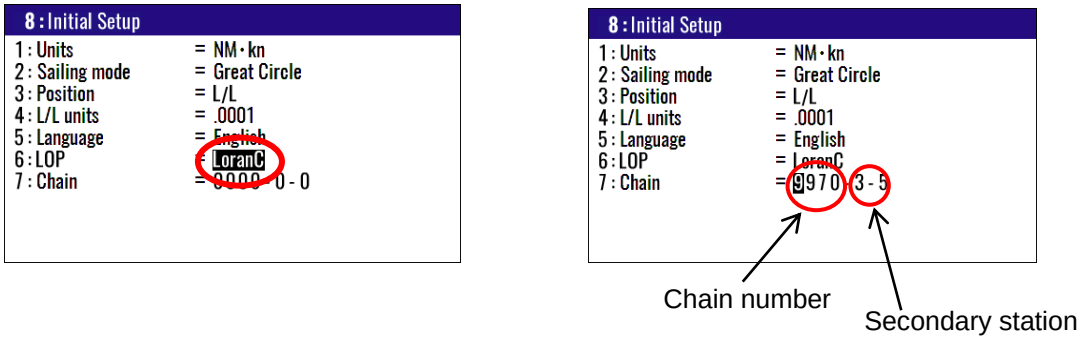
(4) Press [▲] or [▼] key to move cursor onto the "LoranC".

(5) Press (ENT) key.

(6) Press [▼] key to move cursor onto the "**7: Chain**".

(7) Input chain number and first digit of two secondary stations of LoranC by numeric keys.

(8) Press (ENT) key.



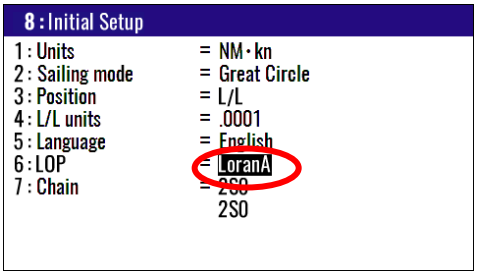
In the case "LoranA"

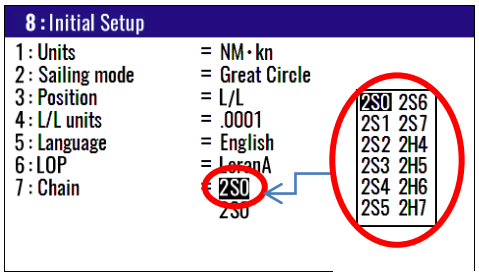
(4) Press [▲] or [▼] key to move cursor onto the "LoranA".

(5) Press (ENT) key.

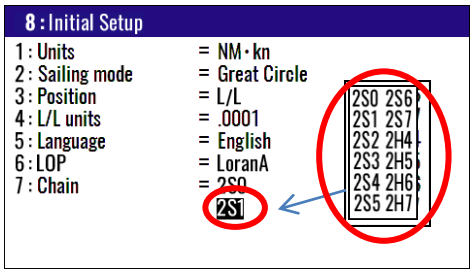
(6) Press [▼] key to move cursor onto the "**7: Chain**" and press (ENT) key.

(7) Select two stations of LoranA by a [▲] or [▼], [▶] or [◀] key and press (ENT) key.





Station 1



Station 2

In the case "DECCA"

(4) Press [▲] or [▼] key to move cursor onto the "DECCA".

(5) Press (ENT) key.

(6) Press [▼] key to move cursor onto the "**7: Chain**" and press (ENT) key.

(7) Press [▲] or [▼] key to move cursor onto the "Auto" or "Manual".

(8) Press (ENT) key.

Select "Manual"

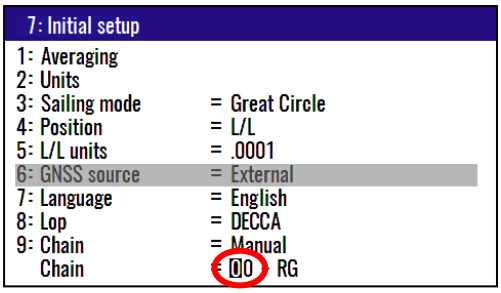
(4) Press [▼] key to move cursor onto cursor chain number.

(5) Input chain number of DECCA by numeric keys and press (ENT) key.

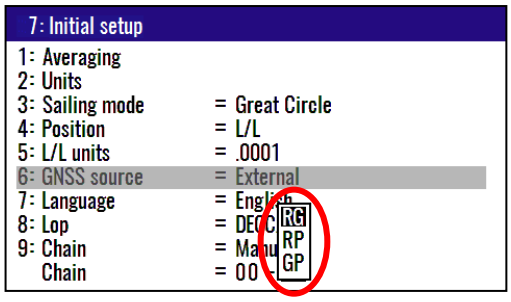
(6) Press [▶] key to move cursor onto secondary station and press (ENT) key.

(7) Select combination of two secondary station of DECCA by [▲] or [▼] key.

(8) Press (ENT) key.



Chain number

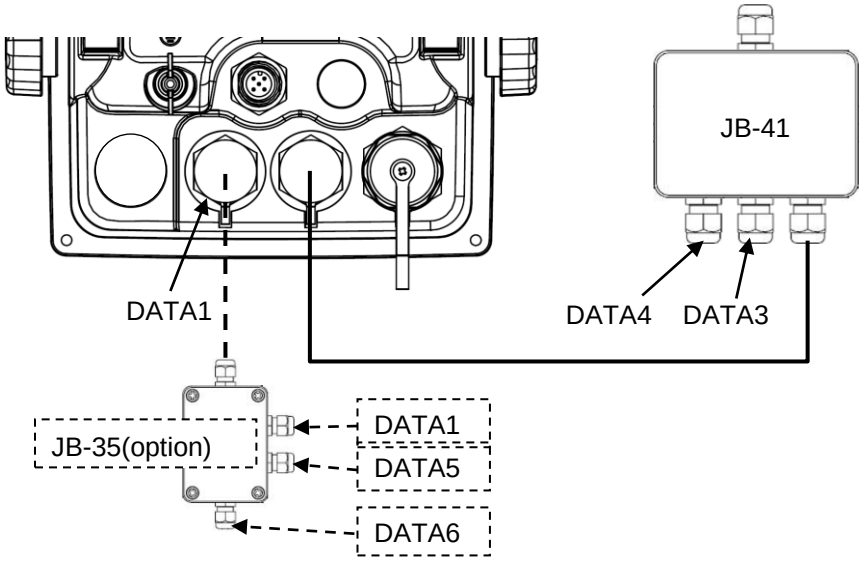


Combination of two secondary station

Initial setup: LoranC

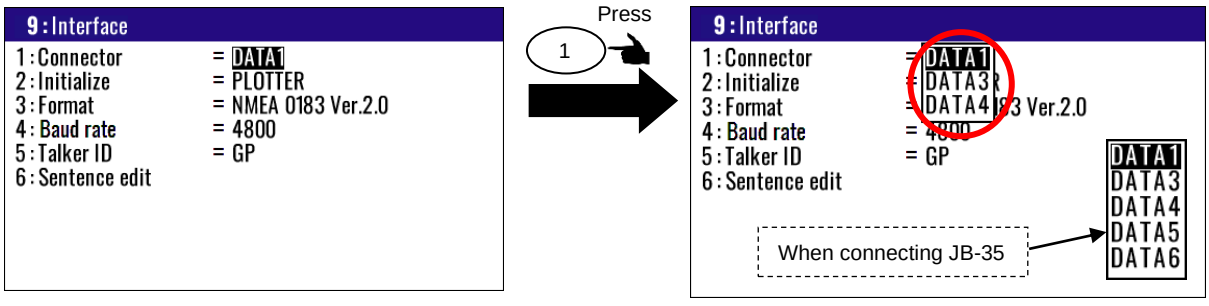
4.7 Menu 9: Interface

4.7.1 Selecting a DATA port to setting



KC-1400 has three standard data output systems. The DATA1 connector of Display unit has one output port (DATA1) and Junction box (JB-41) has two output ports (DATA3/DATA4).
When the optional Junction box (JB-35) is connected to DATA1 port, a total of 5 outputs are possible, including 3 outputs from the Display unit. For each connector, "Format", "Baud rate", and "Sentence edit" can be setting.
You can select the format of output data.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (9) key to select "**9: Interface**".
(3) Press (1) key to select "**1: Connector**".
(4) Press [▲] or [▼] key to move cursor onto the data port to select "DATA1", "DATA3" or "DATA4".
(5) Press (ENT) key.



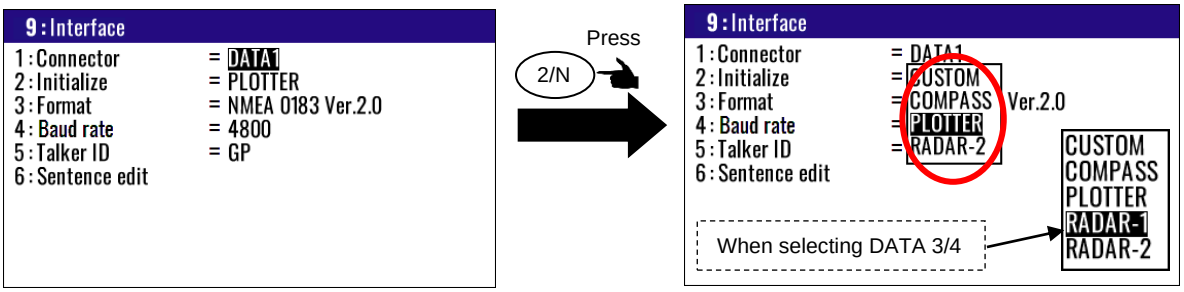
When connecting JB-35, DATA5 and DATA6 are added as selection items.
After selecting DATA5 and DATA6, you can set each item using the same procedure as DATA1.

4.7.2 Output format initialization

Initialize the output format to be optimal for our connected equipment.

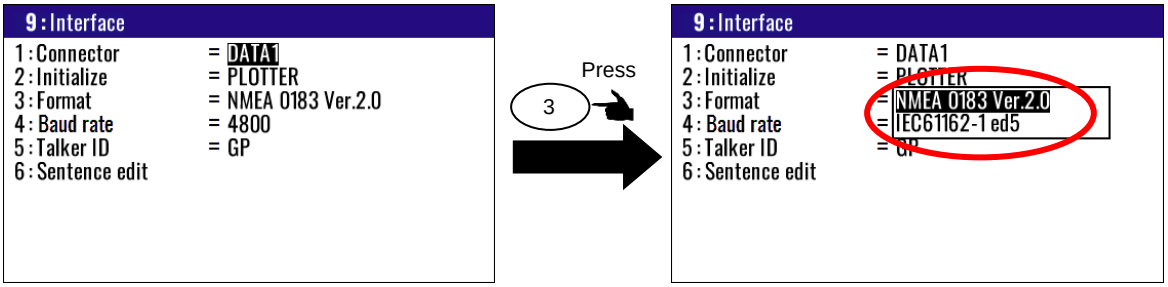
Custom:	For general-purpose equipment. (Set by customer.)
Compass:	Provides a fast update heading output for radar, etc.
Plotter:	You can get the best output for our plotters (GTD-120, etc.).
Radar 1:	Provides the optimal output for our radar (MDC-5200/5500/7000/7900 series). (*Can be selected for DATA3/DATA4)
Radar 2:	Provides the optimal output for our radar (MDC-900(A)/2000(A) series).

(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 9 key to select "**9: Interface**".
(3) Press 2/N key to select "**2: Initialize**".
(4) Press [▲] or [▼] key to move cursor onto the initialization format.
(5) Press ENT key.



4.7.3 Selecting an output data format of DATA1 and DATA2 port

You can select the format of output data format.



(1) Press MENU key until Menu options 1 to 10 appears.
(2) Press 8/S key to select "**8: Interface**".
(3) Press 3 key to select "**3: Format**".
(4) Press [▲] or [▼] key to move cursor onto the output data format.
(5) Press ENT key.

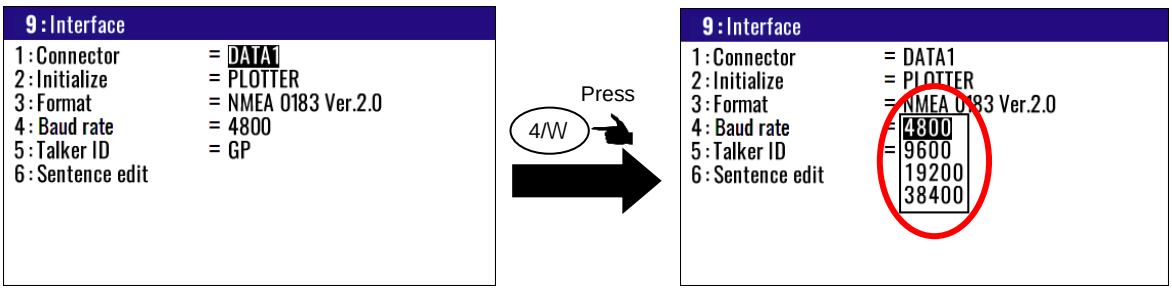
Initial setup: Depends on other items

4.7.4 Setting the Baud rate

You can change the Baud rate of DATA1 and DATA2.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (9) key to select "**9: Interface**".
(3) Press (4/W) key to select "**4: Baud rate**".
(4) Press [▲] or [▼] key to move cursor onto the baud rate "4800", "9600", "19200", "38400".
(5) Press (ENT) key.

(

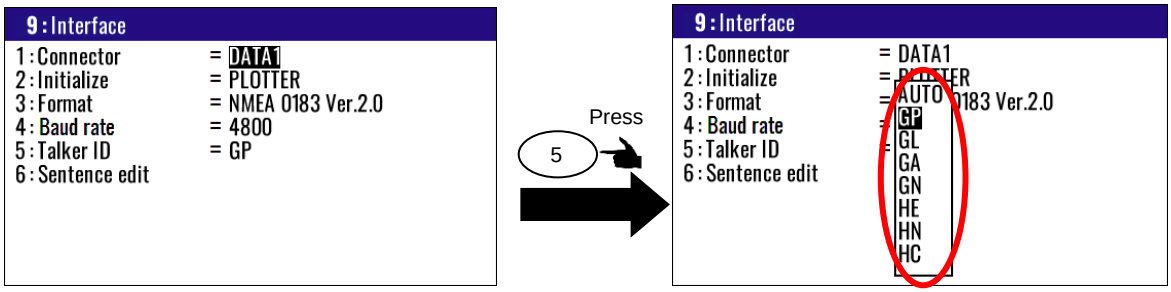


Initial setup: 4800

4.7.5 Setting the output Talker ID

You can change the talker ID of the output sentence by the following operation. If set to AUTO, it will automatically switch to GP/GL/GA/GN depending on the selected GNSS mode.

(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (9) key to select "**9: Interface**".
(3) Press (5) key to select "**5: Talker ID**".
(4) Press [▲] or [▼] key to move cursor onto the "Talker ID" to select.
(5) Press (ENT) key.



Initial setup: GP

4.7.6 Selecting an output sentence

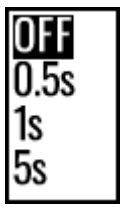
Determine the sentence to be output from the NMEA0183 or IEC61162-1 ed5.

(1) Press (9) key until Menu options 1 to 10 appears.
(2) Press (MENU) key to select "**9: Interface**".
(3) Press (6/E) key to select "**6: Sentence edit**".
(4) Press [▲] or [▼], [▶] or [◀] key to select the output sentence.
(5) Press (ENT) key.

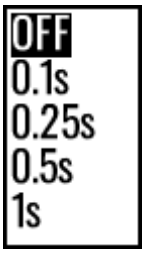
The output cycle that can be selected varies depending on the data connector and sentence and can be selected from the following 5 types.

"DATA1/5/6" *DATA5/6 when connected to JB-35

AAM、APB、BOD、BWC
DTM、GBS、GGA、GLL
GNS、GSA、GSV、RMB
RMC、RTE、VTG、WPL
XTE、ZDA



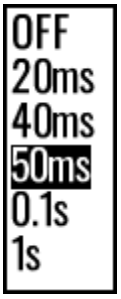
ATT、HDM、HDT、HVE
ROT、THS、PKODG21



DATA3/4

DTM、GBS、GGA、GLL
GNS、GSA、GSV、RMC
VTG、ZDA

ATT、HDM、HDT、HVE
ROT、THS、PKODG21



HBT、ALC

(6) Press [▲] or [▼] key to move cursor onto the output interval.

* Bar meter at the bottom of screen is the occupancy rate of the NMEA. Please set to be 100% or less.

Chapter 5 How to use LOP

5.1 Initial setup for LOP display

Measured longitude and latitude can be translated into loran C, loran A or DECCA. To turn on the LOP mode, the following initial setup is required.

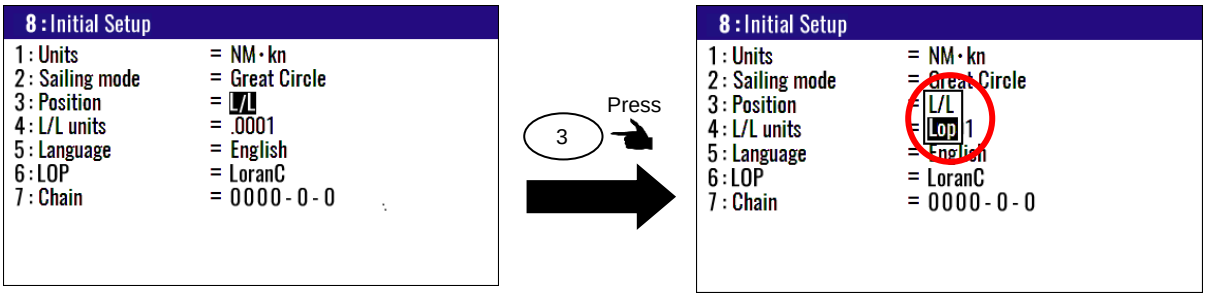
◀	**NOTE:** *Press to backspace the cursor to correct an input error.*
CLR	**NOTE:** *Press to clear incorrect Input. You can reenter Numeric data.*

5.1.1 Selecting LOP (Loran C, Loran A or DECCA)

Select the type to translate from longitude and latitude.

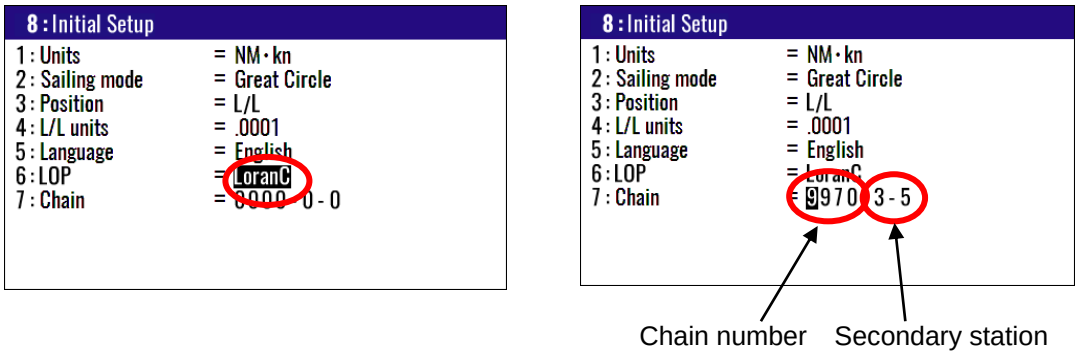
The procedure is as follows:

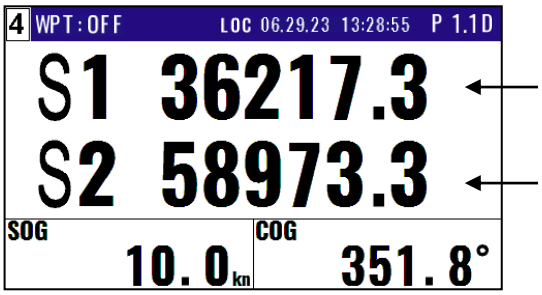
(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (8/S) key to select "**8: Initial setup**".
(3) Press (3) key to select "**3: Position**".
(4) Press [▲] or [▼] key to move cursor onto the "**Lop**".
(5) Press (ENT) key.



In the case "LoranC"

(6) Press (6/E) key to select "**6: LOP**".
(7) Press [▲] or [▼] key to move cursor onto the "**LoranC**".
(8) Press (ENT) key.
(9) Press [▼] key to move cursor onto the "**7: Chain**".
(10) Input the station of LoranC by numeric keys.





In the case "LoranA"

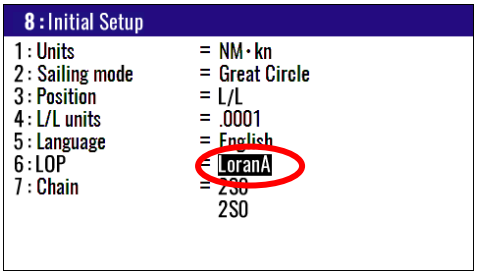
(6) Press (6/E) key to select "**6: LOP**".

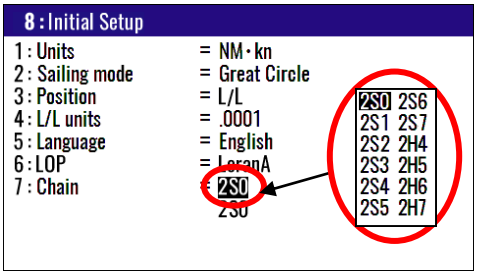
(7) Press [▲] or [▼] key to move cursor onto the "LoranA" .

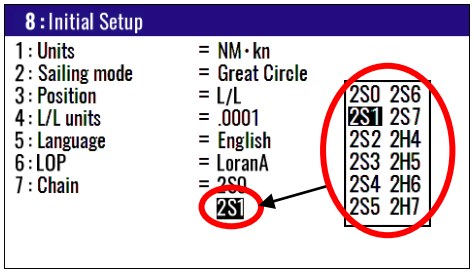
(8) Press (ENT) key.

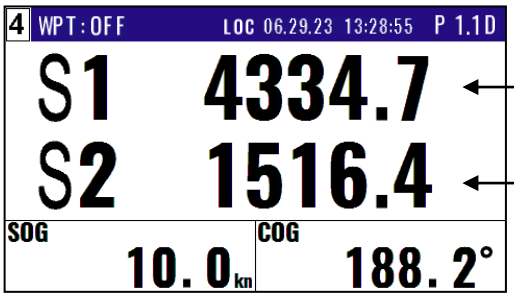
(9) Press [▼] key to move cursor onto the "**7: Chain**".

(10) Input the station of LoranA use to [▲], [▼], [▶] or [◀] key.









In the case "DECCA"

(6) Press (6/E) key to select "**6: LOP**".

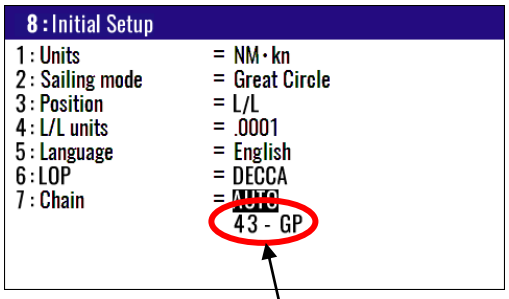
(7) Press [▲] or [▼] key to move cursor onto the "DECCA".

(8) Press (ENT) key.

(9) Press [▼] key to move cursor onto the "**7: Chain**".

(10) Press [▲] or [▼] key to move cursor onto the "Auto" or "Manual".

(11) Press (ENT) key.



When select auto mode, KC-1400 finds the optimal station

Select "Manual"

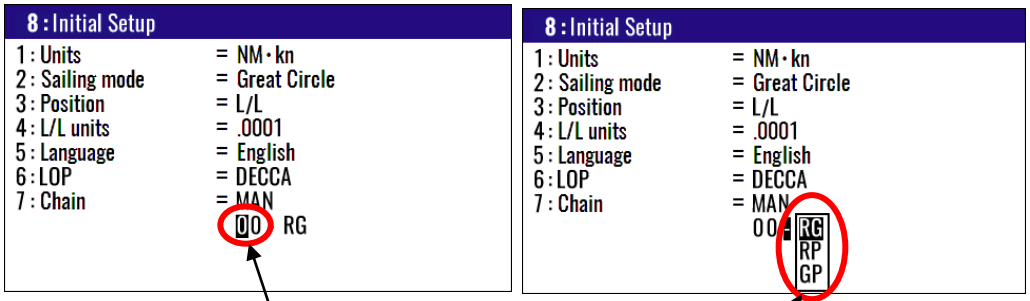
(6) Press [▼] key to move cursor onto the station of DECCA.

(7) Input the station of DECCA by numeric keys.

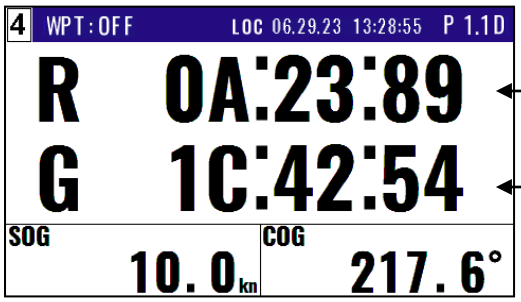
(8) Press [▶] key and press (ENT) key.

(9) Input the station of DECCA use to [▲] or [▼] key. You can select "RG", "RP" or "GP".

(10) Press (ENT) key.



When select manual mode, you must select station



Red station

Green station

5.2 Storing waypoints (LOPs data)

◀ **NOTE:** *Press to backspace the cursor to correct an input error.*

CLR **NOTE:** *Press to clear incorrect Input. You can reenter Numeric data.*

5.2.1 Storing a new position or updating an existing one

Up to 10000 waypoints can be stored in memory. As 1000 points (numbers: 0000 to 0999) are reserved for POB and event registration, you can use 1000 to 9999 (total of 9000 points) to store waypoints.

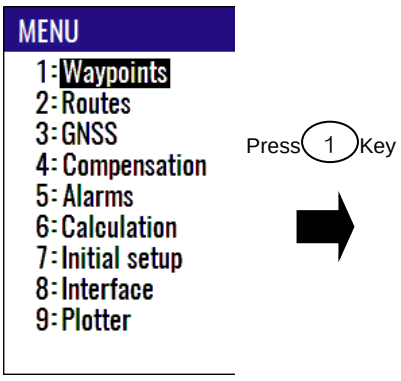
(1) Press (MENU) key until Menu options 1 to 10 appears.

(2) Press (1) key to select "**1: Waypoints**".

(3) Enter storage number (0000 to 9999) by numeric keys and (ENT) key.

(4) Select "Edit" in the pop-up and press (ENT) key.

LOP mode (Example)



Storage position: **LoranC**

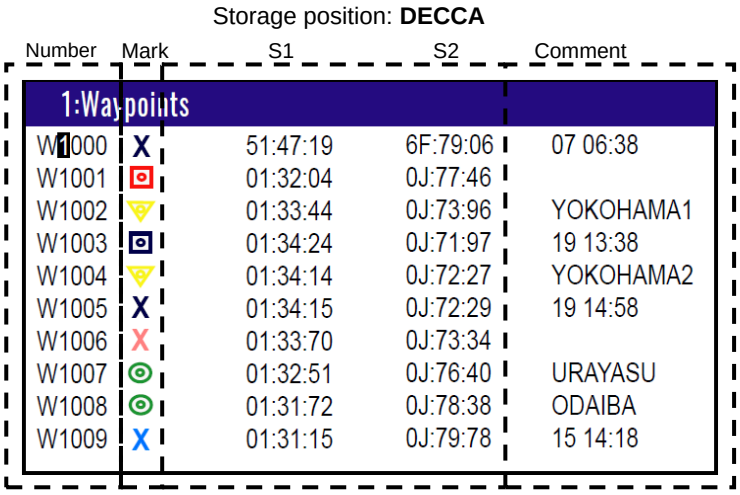
1:Waypoints

Number	Mark	S1	S2	Comment
W1000	X	30013.6	58330.4	07 06:38
W1001	⊡	30016.7	58370.5	
W1002	▽	30029.1	58486.0	YOKOHAMA1
W1003	⊡	30037.5	58548.1	19 13:38
W1004	▽	30035.0	58512.9	YOKOHAMA2
W1005	X	30034.1	58494.2	19 14:58
W1006	X	30028.7	58444.5	
W1007	◎	30018.0	58351.3	URAYASU
W1008	◎	30011.5	58270.1	ODAIBA
W1009	X	30008.1	58224.2	15 14:18

Storage position: **LoranA**

1:Waypoints

Number	Mark	S1	S2	Comment
W1000	X	1155.2	3765.1	07 06:38
W1001	⊡	1151.4	3766.3	
W1002	▽	1139.1	3769.8	YOKOHAMA1
W1003	⊡	1132.5	3771.5	19 13:38
W1004	▽	1134.6	3770.9	YOKOHAMA2
W1005	X	1135.4	3770.6	19 14:58
W1006	X	1139.8	3769.4	
W1007	◎	1150.2	3766.5	URAYASU
W1008	◎	1158.2	3764.0	ODAIBA
W1009	X	1163.5	3762.3	15 14:18



For the following operations, refer to 2.1 "Storing waypoints (LAT/LONG) data"

- "Writing or changing comment" (See page 2-1/2)
- "Copying a position" (See page 2-3)
- "Erasing a single waypoint" (See page 2-3)

5.3 Compensating the LOP

KC-1400 can be converted from Latitude and Longitude to LoranC, LoranA and DECCA. It can be corrected in the converted data.

For the following operations, refer to 4.3.4 "Compensating the LOP"

- "In the case of LoranC" (See page 4-11)
- "In the case of LoranA" (See page 4-11)
- "In the case of DECCA" (See page 4-12)

5.4 When calculating LOP from latitude/longitude

KC-1400 can calculate the LOPs based on the specified LAT/LONG data and displays the LOP values.

- "In the case of LoranC" (See page 4-17)
- "In the case of LoranA" (See page 4-17)
- "In the case of DECCA" (See page 4-18)

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Chapter 6 Data backup, initialization and NMEA monitor

6.1 Data backup

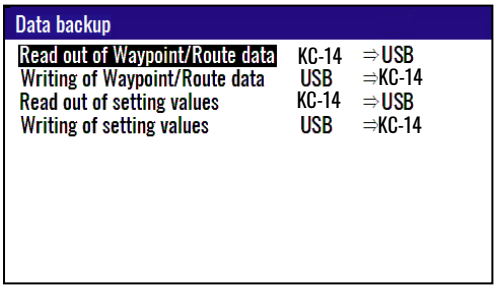
You can back up the waypoint/route data and setting values by USB memory.

6.1.1 Displaying the “Data backup” menu

The procedure is as follows:

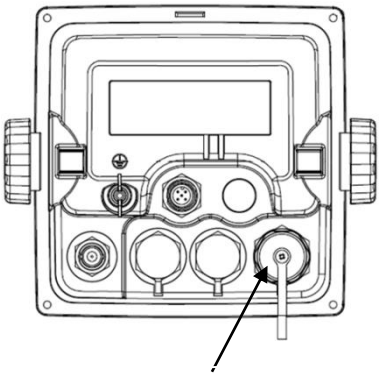
(1) Press (7) key and Power ON.

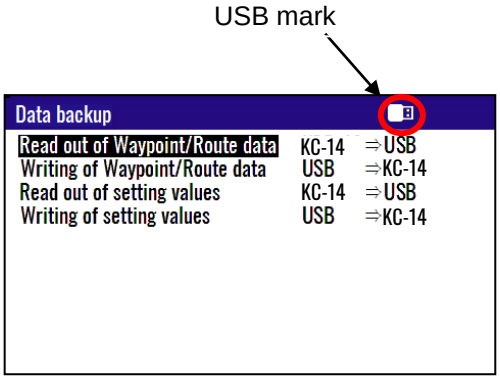
(2) Release your finger from (7) key when appear opening screen.



6.1.2 Insert USB memory

Insert USB memory in the USB connector of the rear panel and confirm USB mark on the display.





NOTE: *If USB mark is not appear,*
Change USB memory for new one.

6.1.3 Read out of data

In the case “Read out of Waypoint / Route data”

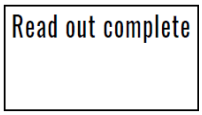
(1) Press [▲] or [▼] key to move cursor onto the “Read out of Waypoint / Route data”.

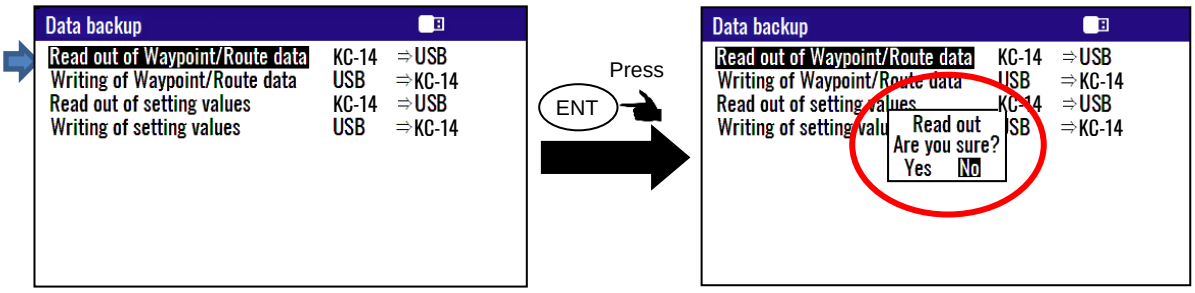
(2) Press (ENT) key.

(3) Select “Yes” in the pop-up and press (ENT) key.

(4) If a message of “Read out complete” appears, it is completed.

*The name of data file is “KM-F90_WPT_RTE.dat”.





In the case "Read out of setting values"

(1) Press [▲] or [▼] key to move cursor onto the "Read out of setting values".

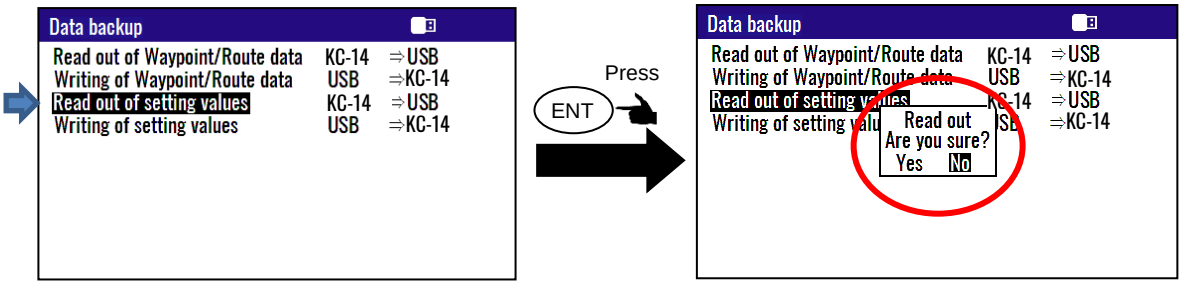
(2) Press ENT key.

(3) Select "Yes" in the pop-up and press ENT key.

(4) If a message of "Read out complete" appears, it is completed.

*The name of data file is "KM-F90_SETUP.dat".

Read out complete



6.1.4 Writing of data

In the case "Writing of Waypoint / Route data"

*The data file is necessary in USB memory named "KM-F90_WPT_RTE.dat".

(1) Press [▲] or [▼] key to move cursor onto the "Writing of Waypoint / Route data".

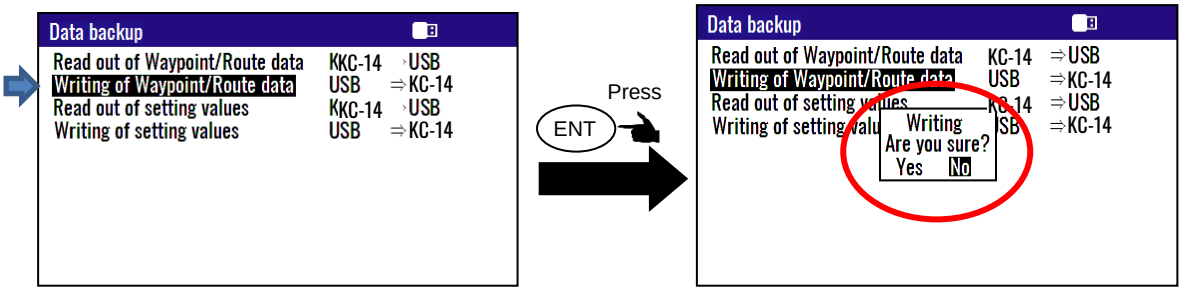
(2) Press ENT key.

(3) Select "Yes" in the pop-up and press ENT key.

(4) If a message of "Writing complete" appears, it is completed.

Writing complete

CAUTION
Data is overwritten



In the case "Writing of setting value"

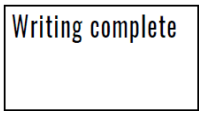
*The data file is necessary in USB memory named "KM-F90_SETUP.dat".

(1) Press [▲] or [▼] key to move cursor onto the "Writing of setting value".

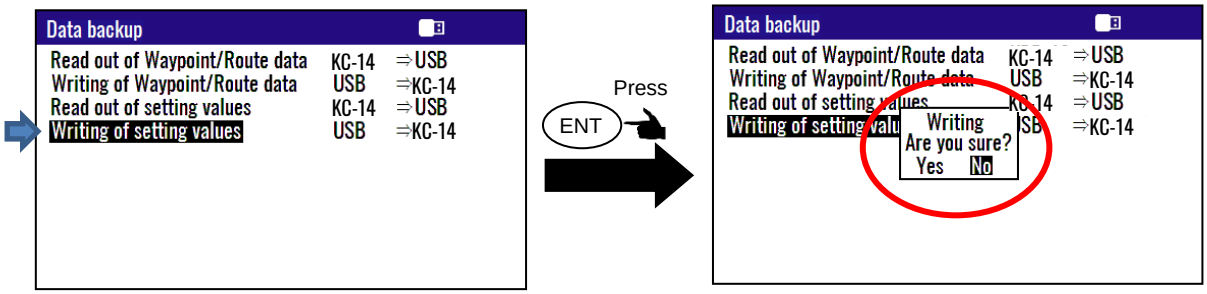
(2) Press (ENT) key.

(3) Select "Yes" in the pop-up and press (ENT) key.

(4) If a message of "Writing complete" appears, it is completed



CAUTION
Data is overwritten



6.2 Initialization

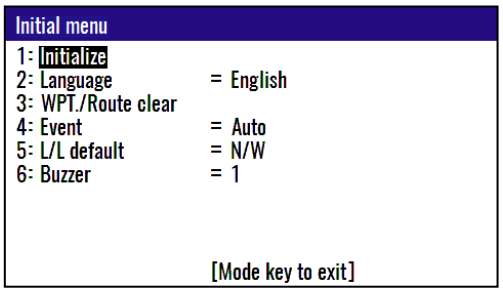
When some malfunction of Display unit is found, following initialization procedure may be required. It returns all the settings in the menu to the factory settings.

6.2.1 Displaying the “Initial menu”

The procedure is as follows:

(1) Press (MENU) key and (ENT) key, and Power ON.

(2) Release your finger from (MENU) key and (ENT) key when opening screen appears.



6.2.2 Initialize

When initializing, please note all system parameters beforehand, or use USB memory to back up.

And reset after initialization. (Refer to 6.1 "Data backup")

(1) Press [▲] or [▼] key to move cursor onto the “**1: Initialize**”.

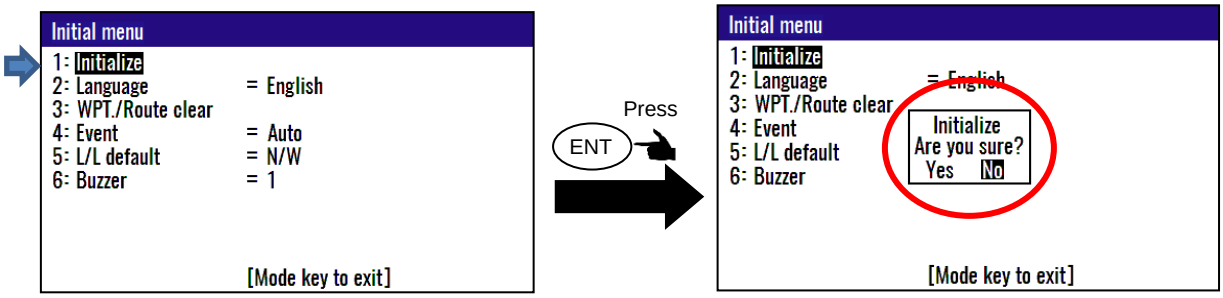
(2) Press (ENT) key.

(3) Select “Yes” in the pop-up and press (ENT) key.

(4) Select language in the pop-up and press (ENT) key.

(5) Press (MODE) key to exit initial menu.

> **NOTE:** *Already registered data on the waypoints, events, POBs and routes remain unchanged.*

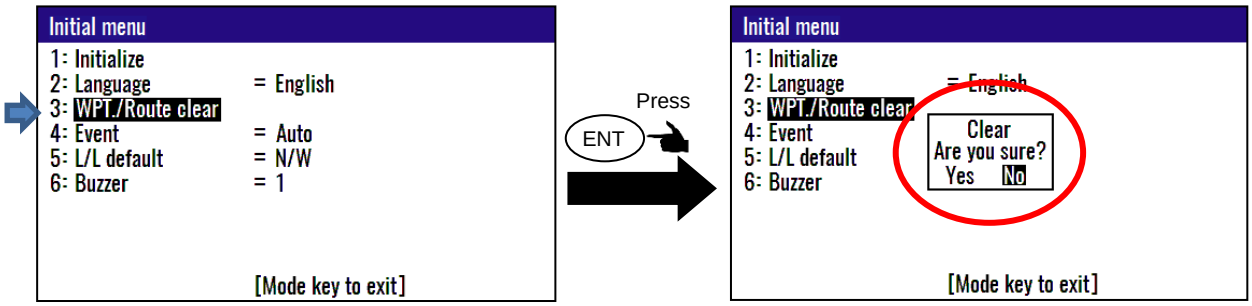


> **NOTE:** *If you want to go back up for before initialize, Please write setting values data to USB memory. See page 6-1 to 6-3*

6.2.3 WPT. / Route clear

You can erase the entire data such as waypoints, events, POB, and routes from internal memory.

(1) Press [▲] or [▼] key to move cursor onto the “WPT. / Route clear”.
(2) Press (ENT) key.
(3) Select “Yes” in the pop-up and press (ENT) key.
(4) Press (MODE) key to exit initial menu.



Note: *If you want to go back up for before clear data, Please write Waypoint/Route data to USB memory. Refer page 6-1/2*

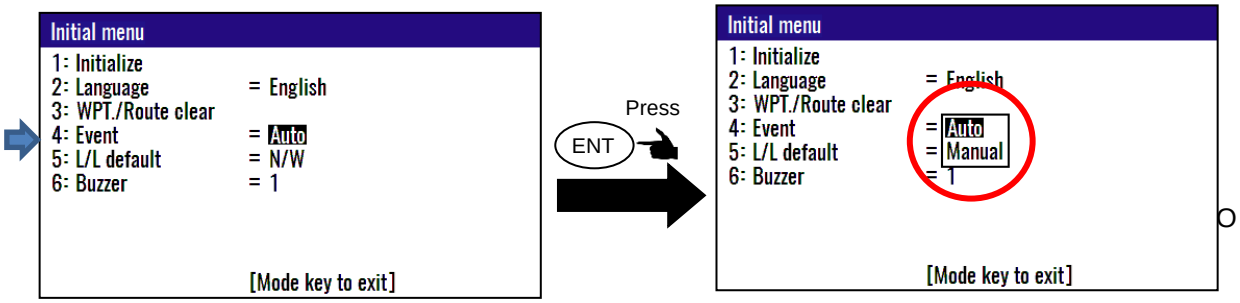
6.2.4 Changing a storing method for present position (Event)

You can use either of the following two procedures for registering your current position (Event).

(1) Press [▲] or [▼] key to move cursor onto the “Event”.
(2) Press (ENT) key.
(3) Select “Auto” or “Manual” in the pop-up and press (ENT) key.
(4) Press (MODE) key to exit initial menu.

AUTO: Pressing the **EVT** key automatically registers the points starting from No. 0001 to 0999. When the 1000th point is reached, the number is returned to 0001 again and the older data is sequentially replaced by the newer one.

MANUAL: Press the **EVT** key, then specify desired registration numbers (in the range of 0001 to 0999) by numeric keys.



6.2.5 Selecting an initial value (North, South, East, West) of latitude/longitude

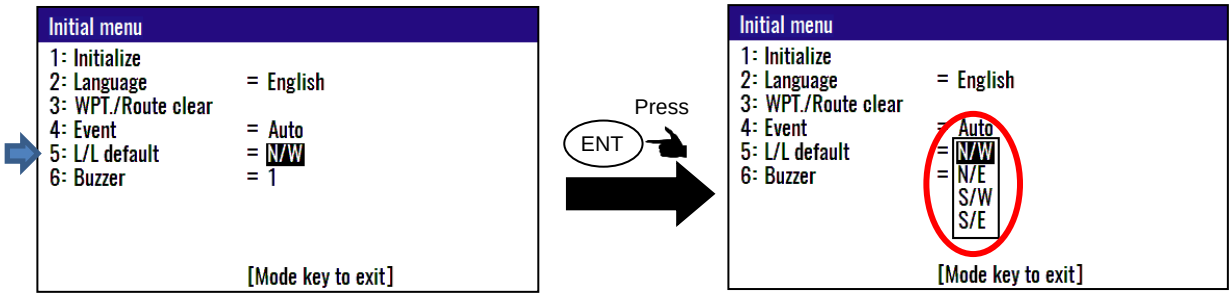
Entry / edit operation can be performed easily by inputting deciding the initial value of (Northern latitude / Southern longitude / East longitude / West longitude).

N/W (N. Lat. / W. Long.): When editing a waypoint, position is started using the north latitude/west longitude region as the initial value.

N/E (N. Lat. / E. Long.): When editing a waypoint, position is started using the north latitude/east longitude region as the initial value.

S/W (S. Lat. / W. Long.): When editing a waypoint, position is started using the south latitude/west longitude region as the initial value.

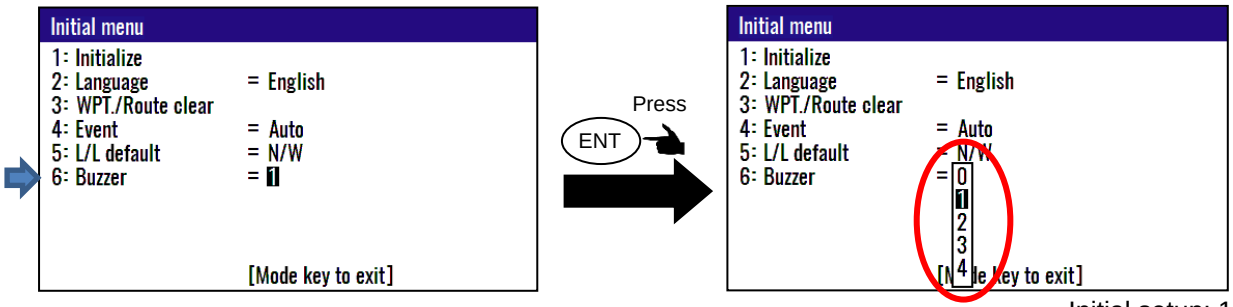
S/E (S. Lat. / E. Long.): When editing a waypoint, position is started using the south latitude/east longitude region as the initial value.



Initial setup: N/W

6.2.6 Frequency adjustment of the buzzer

You can change the frequency of the buzzer. You can select the five frequencies. "**0**" is the lowest sound. "**4**" is the highest sound.



Initial setup: 1

6.3 NMEA monitor

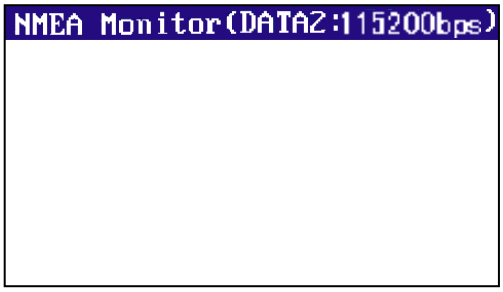
You can check the NMEA data input to the display from the KC-1000.

6.3.1 Displaying the “NMEA monitor”

The procedure is as follows:

(1) Press (8/S) key and Power ON.

(2) Release your finger from (8/S) key when appear NMEA monitor screen.



If the NMEA monitor screen shown on the left is not displayed, turn off the power once and repeat the operation from (1).

6.3.2 When performing “Pause” and “Resume” on the NMEA monitor screen

Since the NMEA monitor checks the sentence displayed on the screen, the screen can be set to “Pause”. In the paused state, check the detailed input sentence from the displayed sentence.

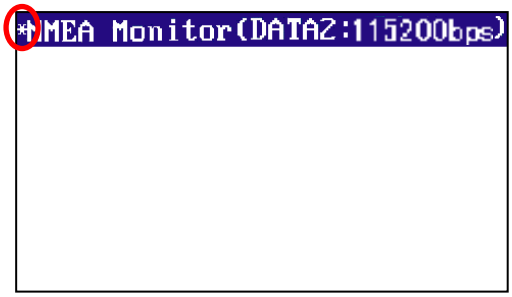
In addition, resume from the “Pause” state.

The procedure is as follows:

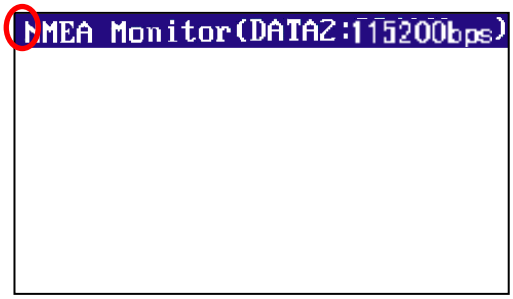
(1) When (ENT) key is pressed, “*” is displayed on the upper left of the screen, and “Pause” status is entered.

(2) When (ENT) key is pressed in the “Pause” state, “*” is hidden and “Normal” state is entered.

The display update will resume.



"Pause" state



"Normal” state

CAUTION

To exit the NMEA monitor, press the power key until the screen disappears.
The countdown is not displayed.

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Chapter 7 Installation

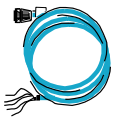
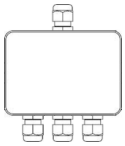
7.1 Installation consideration

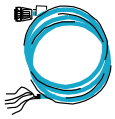
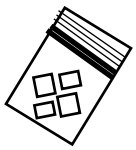
Qualified service technicians should perform the installation of the KC-1400 that comprises the following operations.

(1) Unpacking each component of the system.
(2) Inspection of the exterior of each component unit and accessory.
(3) Checking the ship's mains voltage and current capacity.
(4) Determining the installation site
(5) Installation of antenna and display unit
(6) Planning the cable routing and connections
(7) Adjustment and setups

7.2 Unpacking of the goods

Unpack your package and check if all the items stated in the packing list are contained in the package. If there is any trouble in the contents, please contact your dealer or our office.

No	Name of item	Type	Remarks	Weight/ Length	Qty
1	GNSS compass 	KC-1000	with bird protector	2.5kg	1
2	Display unit 	KC-14	with protective cover mounting stand, knob	0.89kg	1
3	NMEA cable 	CW-427-15M	With a 12-pin waterproof connector and one end plain	15m	1
4	DC power cable 	CW-276-2M	With a 5-pin waterproof connector and one end plain	2m	1
5	Junction box 	JB-41	Connection between KC-1000⇔ KC-14 and for DATA3/4 output	480g	1

6	Connecting cable 	CW-430-5M	With a 6-pin waterproof connector and one end plain for KC-14 connection	5m	1
7	Installation material 	TPT5X20U	Truss tapping screw (4)		1set
		T.5X20MMX10M	Self-fusing tape (1)		
		10M[Gray]	PVC tape (1)		
		B8X25U	Mounting bolt (4) （with 2W8U(4)／SW8U(4)）		
8	Operation manual 	KC-1400.OM.E	English		1

Note: Option of equipment is not included.

7.2.1 Inspection of the goods

Carefully check the exterior of each component unit for dents, damage, etc. Also check the inside of component units for electrical and mechanical damages.

7.3 GNSS compass installation

7.3.1 Selection of installation location for GNSS compass

Install the GNSS compass in a location where there are no obstacles nearby and where it can easily receive radio waves from satellites. If there are obstacles in the sky around the antenna, it will not be possible to receive radio waves from the satellite evenly, which may reduce the time available for calculating the direction or deteriorate the accuracy of the direction.

(1) Choose a location as far away from metal objects as possible.

(2) Keep it at least 4m away from the inverted L-shaped transmitting antenna for MF/HF, VHF or HF whip antenna.

(3) Place it at least 1.5m above the inverted L-shaped transmitting antenna for MF/HF.

(4) Keep the receiver at least 1m away from the receiving antenna.

(5) Avoid entering the radar beam. (Vertical beam width: 30° to 40°)

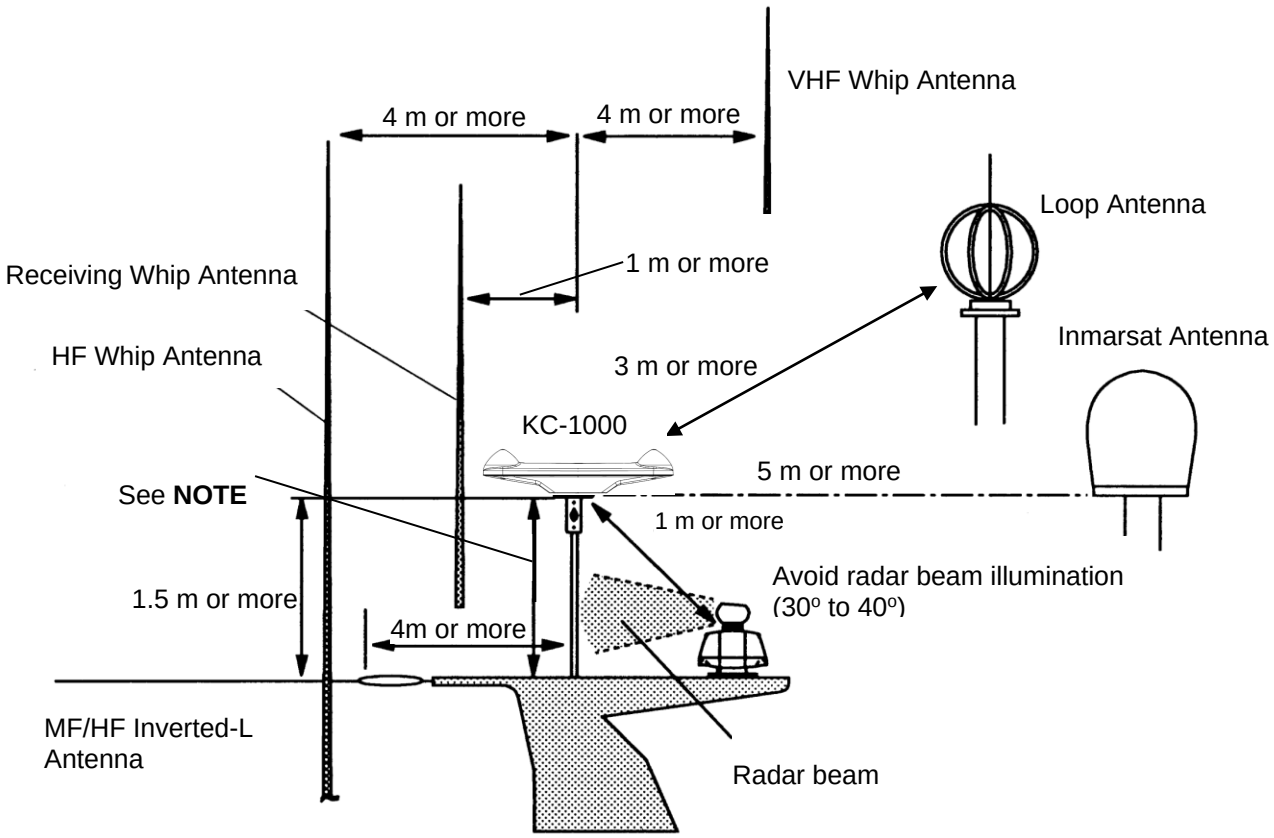
(6) Keep at least 1m away from the radar antenna.

(7) Please keep at least 5m away from the Inmarsat antenna.

(8) Keep the loop antenna at least 3m away.

(9) Keep it at least 2m away from the engine.

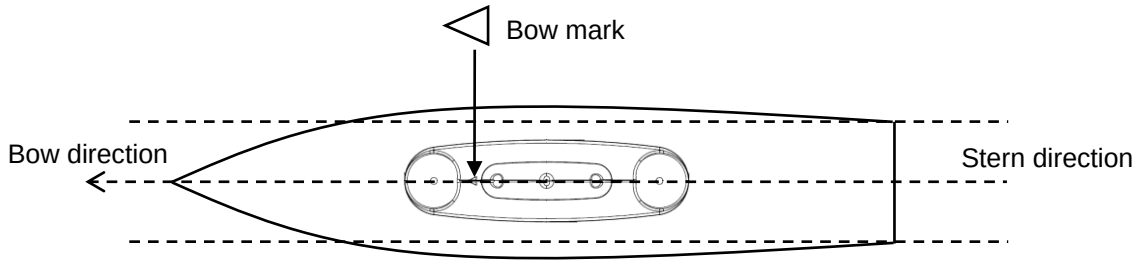
(10) Keep it at least 0.5m away from the surface of metal objects.



NOTE: Keep away from metallic objects at least 0.5 m.

Figure 7.1 Recommended GNSS compass installation location

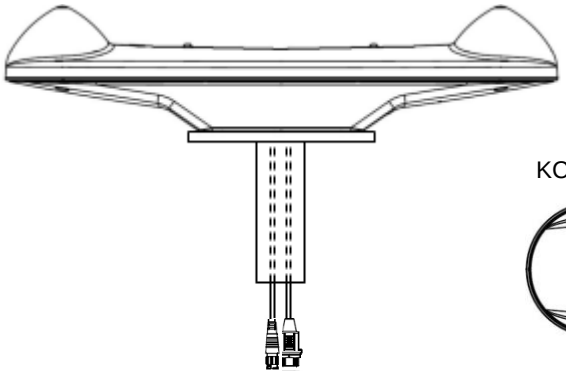
The GNSS compass, KC-1000, is installed parallel to the straight line connecting the bow and stern, with the BOW mark pointing toward the bow as shown in the figure below. It doesn't have to be on the center line connecting the bow and stern, but if you install it near the center in the longitudinal direction, there will be less discrepancy between the heading data and course data.

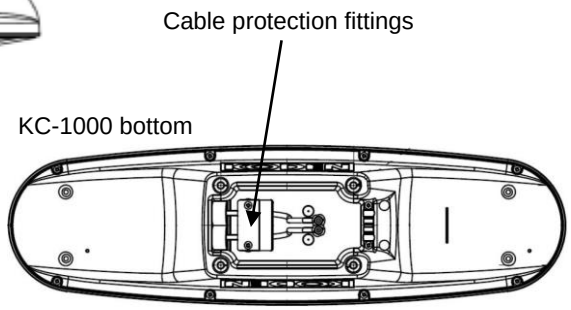


7.3.2 Pulling out the NMEA/LAN cable

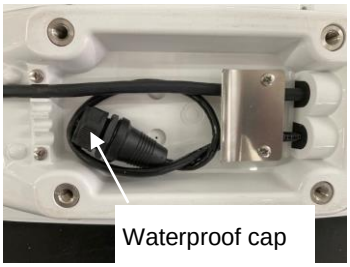
There are two ways to pull out the NMEA/LAN cable.

(1) How to pull out the compass from the center and route it through the mast pipe of the mounting base to the display unit.



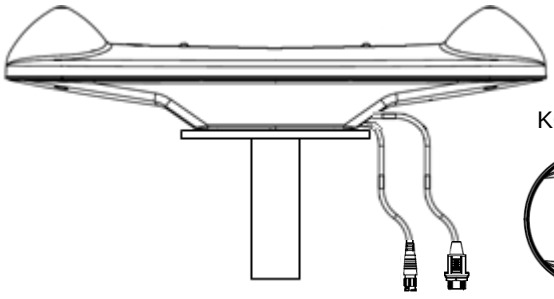


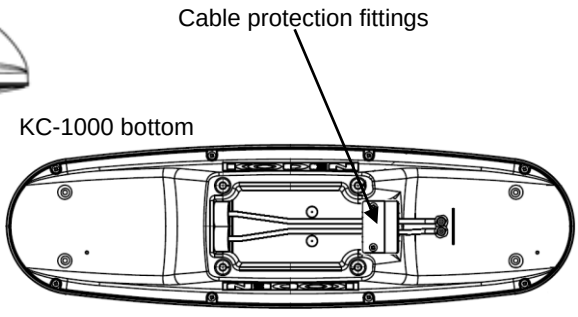
Note
(1) and (2) When not using the LAN cable, attach a waterproof cap to the connector and store it rolled up inside the recess as shown in the figure on the right.



(2) Pull it out from the side without passing it through the mast pipe of the mounting base.

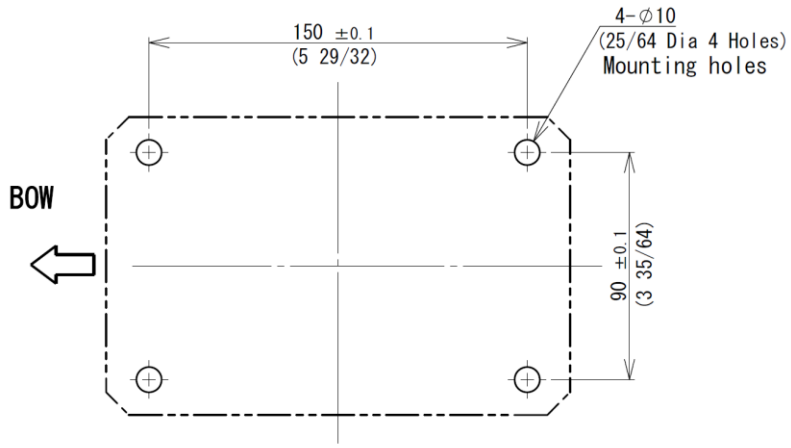
In this case, it is necessary to replace the cable protection fittings.





7.3.3 Installing the GNSS compass

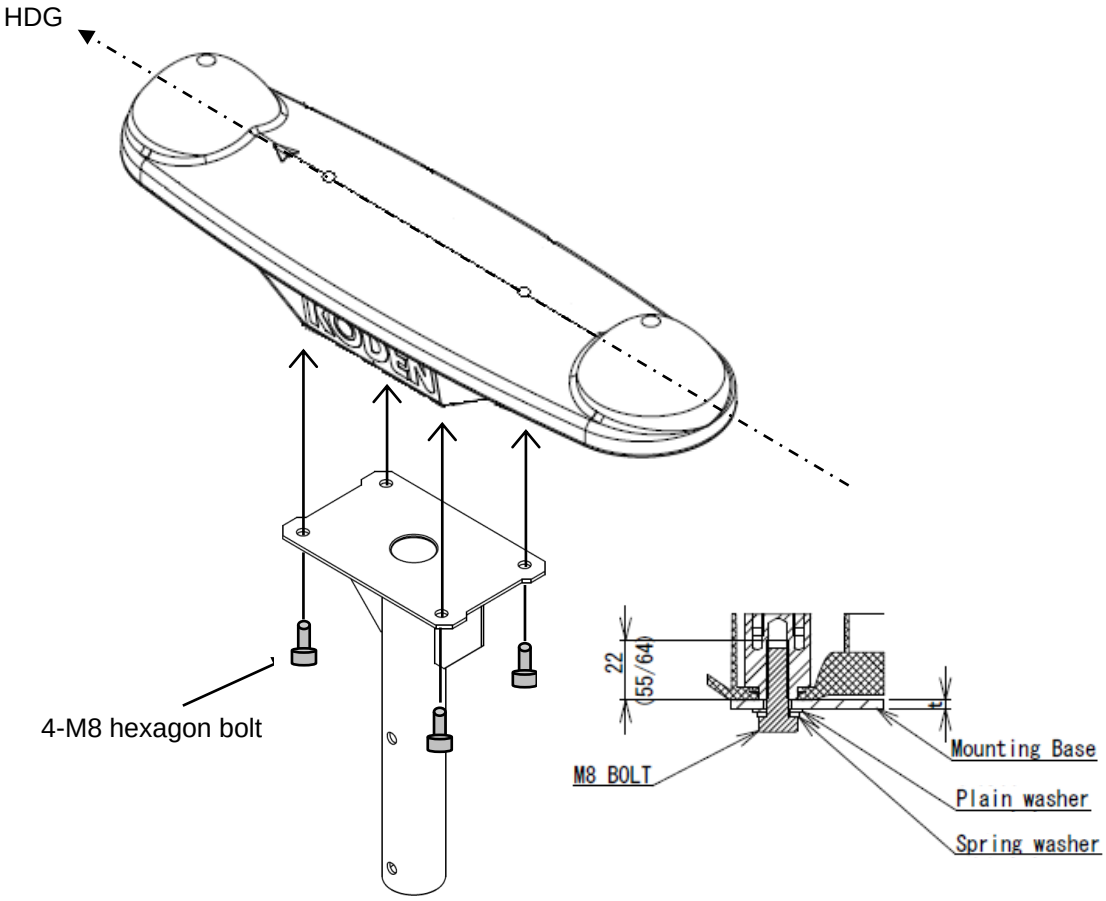
To attach the GNSS compass, four (4) M8 bolts are used. Referring to the illustration below, make four (4) holes on the cradle, fix the bracket. When the thickness of the bracket is 4 to 5mm, supplied bolts may be used (M8 x 25). When the bracket is more than 6 mm thick, the bolts should be chosen from the below table.



Unit: mm (inch)

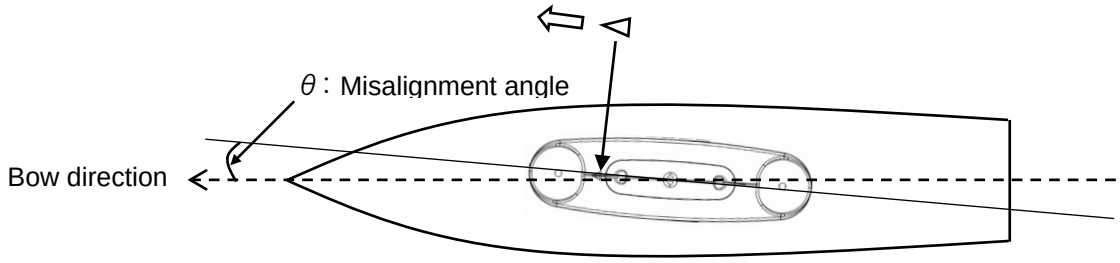
Drawing of work for mounting holes

Platform thickness	Bolt for fixing
4 to 5 mm	M8x25
6 to 10 mm	M8x30



7.3.4 Correction of installation angle

During installation, if the direction of the antenna and the heading of the ship are unavoidably misaligned, please correct the heading of the ship. If the deviation is clockwise with respect to the bow direction, enter "-θ", and if the deviation is counterclockwise, enter "+θ" to correct it. Please refer to “4.3.1 Compensating the heading” (page 4-8).

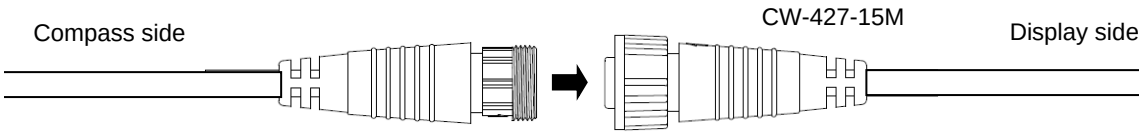


7.3.5 Connector joining and waterproofing

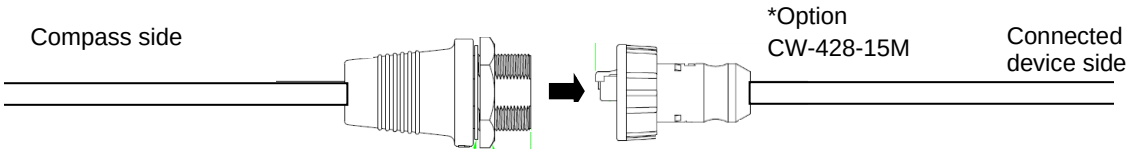
When connecting the GNSS compass and NMEA/LAN cable, be sure to properly waterproof the connector to prevent rainwater/seawater from entering inside the connector.

(1) Connect the cable on the display side (JB-41 side) to the cable coming out from the compass side as shown in the figure below.

（NMEA cable）



（LAN cable）

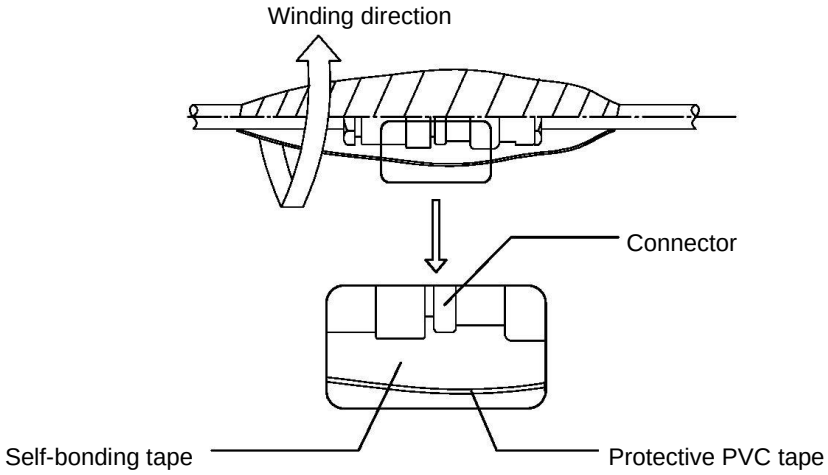


(2) After connecting the connector, wrap it with self-fusing tape.

Pull the tape in the winding direction shown on the next page (the direction in which the connector is tightened) until it is approximately twice as long, and wrap it in 3 layers, 1/2 overlap. After wrapping the tape, apply finger pressure to promote fusion.

(3) Wrap with protective PVC tape.

Wrap it in 3 layers, 1/2 overlap, without pulling as much as possible in the winding direction shown in the figure on the next page (direction to tighten the connector). Crimp the end of the roll without applying any tension, then apply finger pressure all over the area to ensure complete adhesion.



Note
Wrapping the tape in the opposite direction to the direction in which the connector is tightened may cause the connector to come loose.

7.4 Display unit installation

The Display unit is designed for table mount and flush mount. Refer to figure 7.1, 7.2 or 7.3 for installation.

7.4.1 Selection of display installation location

(1) Select a position where the screen is easy to see.
(2) Choose a safe location that is not exposed to moisture, splashes, rain, or direct sunlight.
(3) Choose a location away from magnetic objects such as magnetic compasses.
(4) Secure space for maintenance. Sufficient space is required on the back panel where cables are concentrated.
(5) Choose a location as far away from the wireless device as possible.

7.4.2 Table mounting

(1) Remove the two knurled fixing knobs that fix the Display unit to the mounting bracket.
(2) Remove the Display unit from the bracket and place it on a flat and safe area.
Place the mounting bracket to the place where the Display unit is to be installed and fix the bracket with four tapping screws.
(3) Reset the Display unit on to the bracket and fix it using the two knurled fixing knobs that were removed in step (1). Refer to Figure 7.1 for detail.

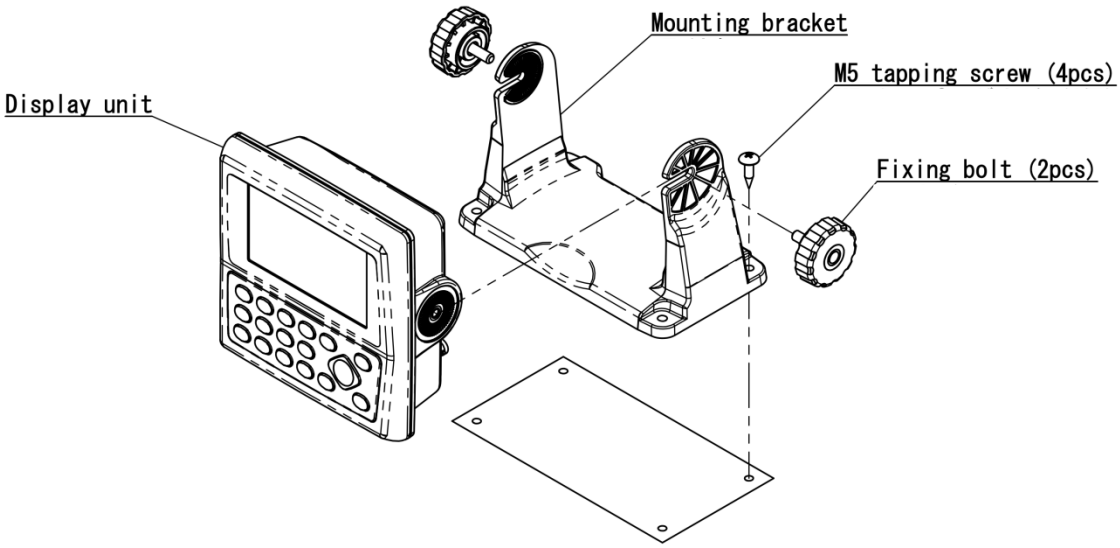


Figure 7.1 Fitting detail of KC-14 in table mounting mode

CAUTION

When installing on a table, provide a maintenance space as shown in the diagram below.

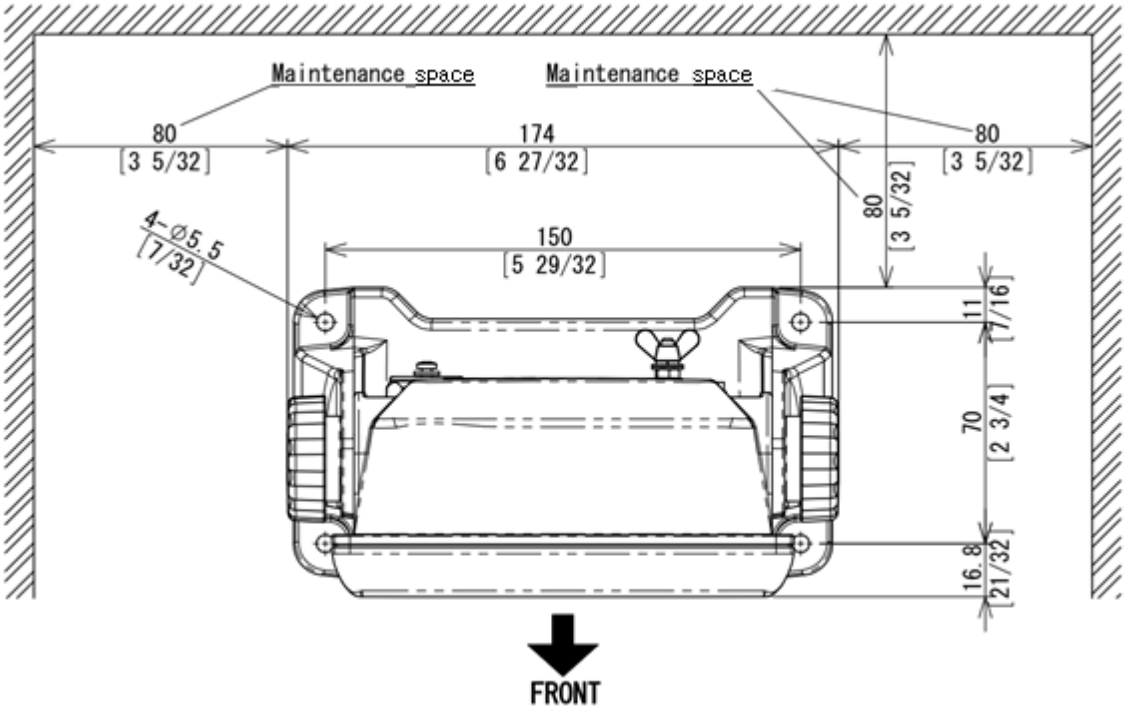


Figure 7.2 Maintenance space required for KC-14

Unit mm (inch)

7.4.3 Flush mount installation

(1) Loosen two fixing knobs that fasten the Display unit onto the mounting bracket.

(2) Insert a coin in the two gaps at the lower part of the Display unit and remove the front frame.

(3) Connect the connectors for power, data and others to the Display unit respectively.

(4) Put the display on the opening and fix with four tapping screws. In case you use M3 screws to fix the display, select an appropriate screw length that best suits fixing the unit to the panel thickness.

(5) Install the front frame removed in step (3).

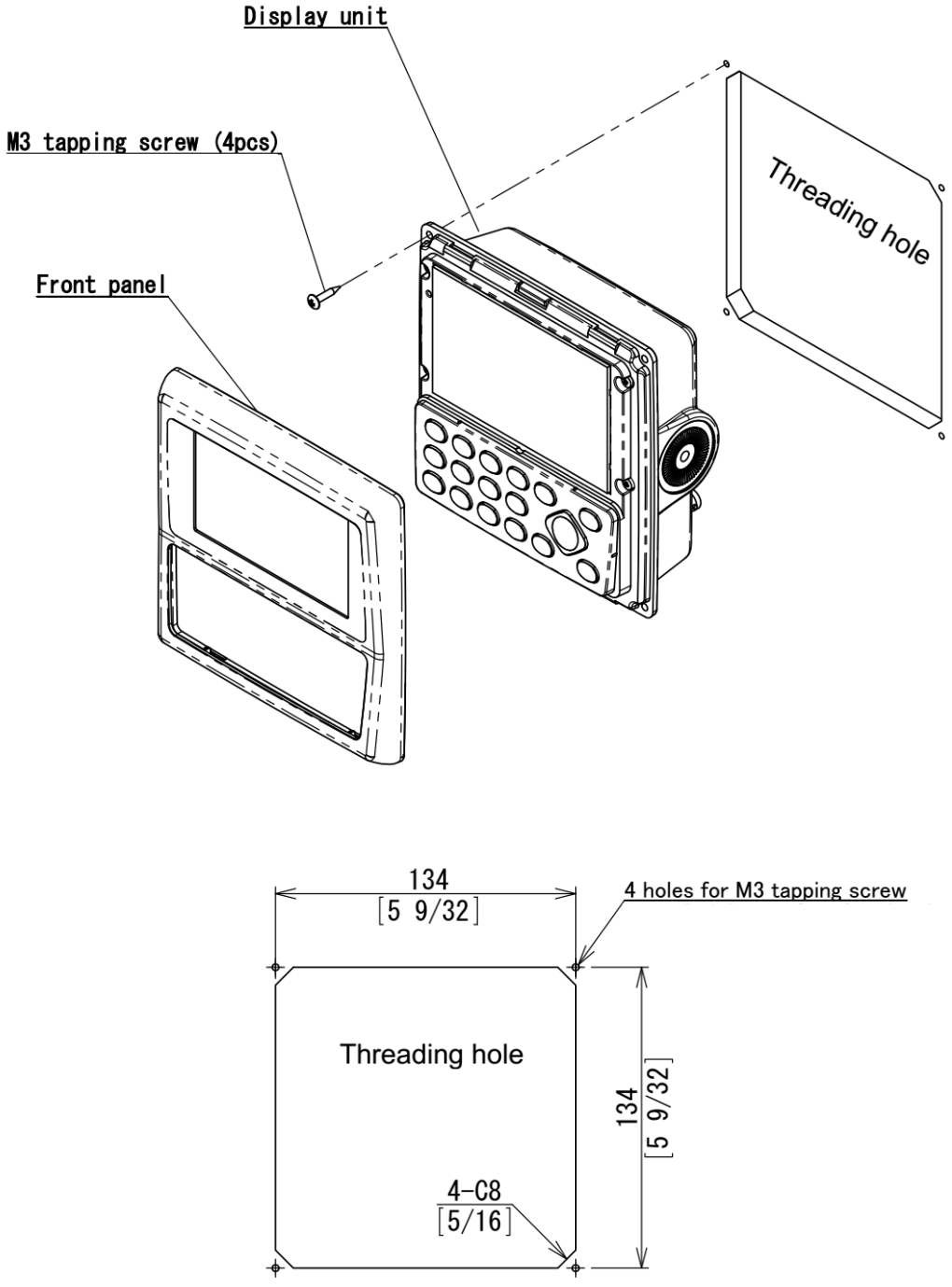
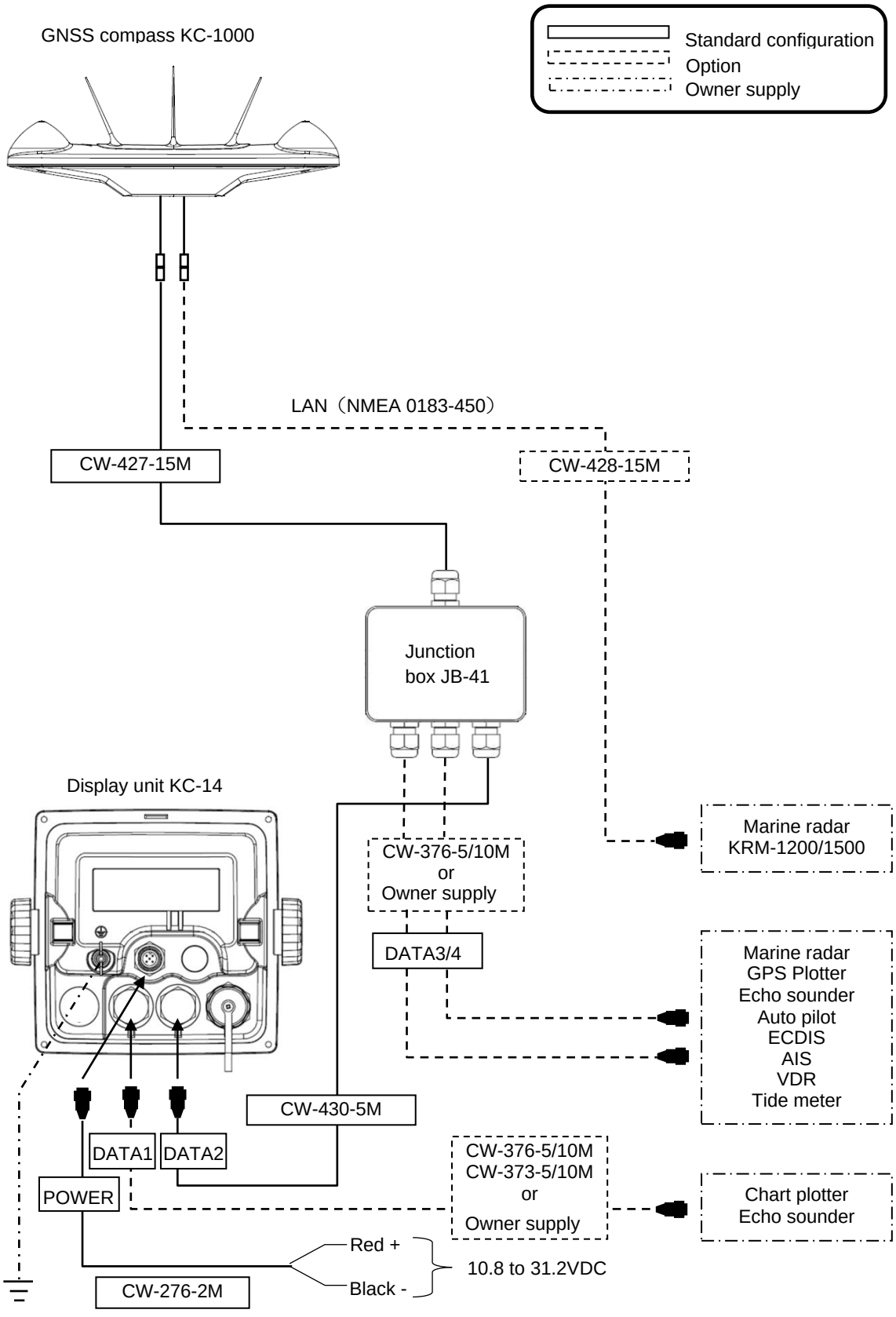


Figure 7.3 Flush Mount installation

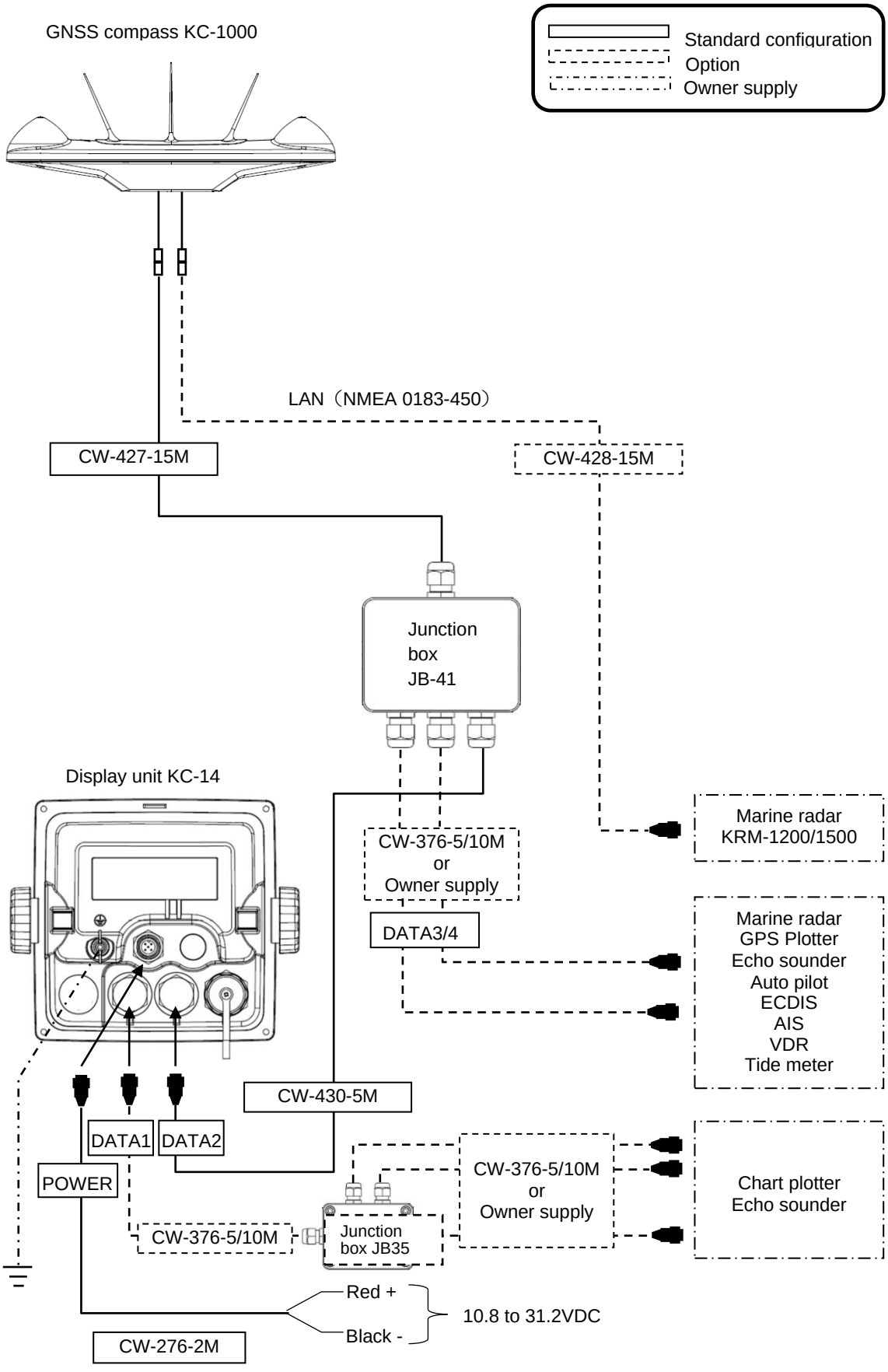
Unit: mm (inch)

7.5 Inter-device connection diagram

7.5.1 Standard connection

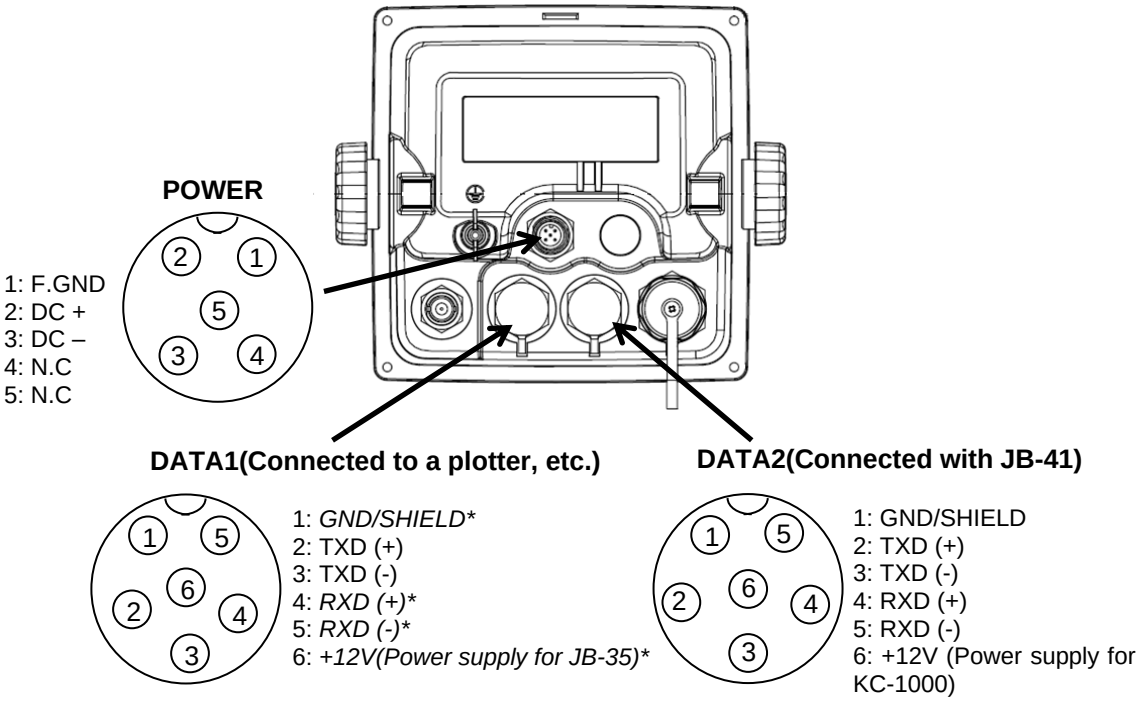


7.5.2 Multi connections



7.6 Connector pin outs

7.6.1 Display unit pin outs



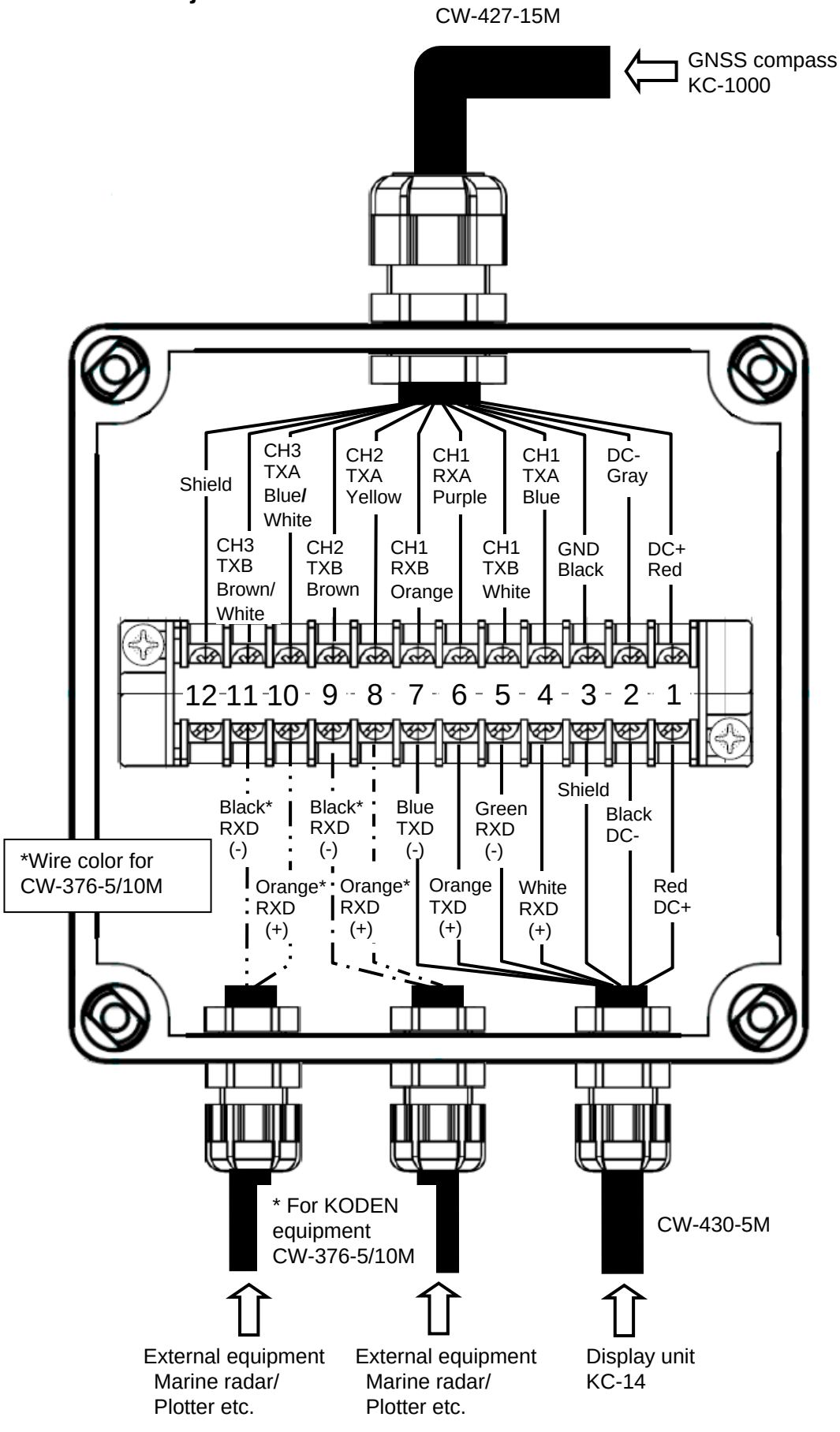
***DATA1 pins 1/4/5/6 should be left unconnected if JB-35 is not connected.**

(DATA1 port)

This port is general data output port. Output data is selected by the menu **"9: Interface"**.

Note: **"9: Interface": Refer to "Chapter 4.7 Menu 9: Interface"**

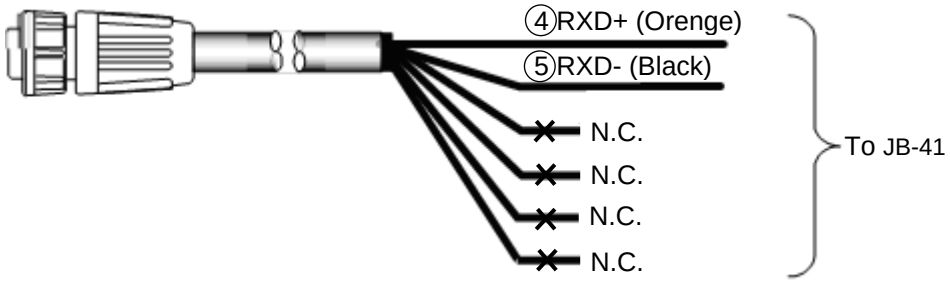
7.6.2 Connection with junction box JB-41



7.6.3 Connection with external equipment using CW-376-5/10M

When connecting to external equipment such as a radar/plotter using the optional cable CW-376-5/10M, unused blue/(GND+shield), white (TX+), red (TX-), Please cut the green (+12V) short and insulate it from the core wires of other cables and other wiring.

Structure of CW-376-5/10M



CAUTION

Wind the insulation tape around the un-used lead wire for core-wires not to contact each other.

7.6.4 Precautions when connecting with KODEN marine radar

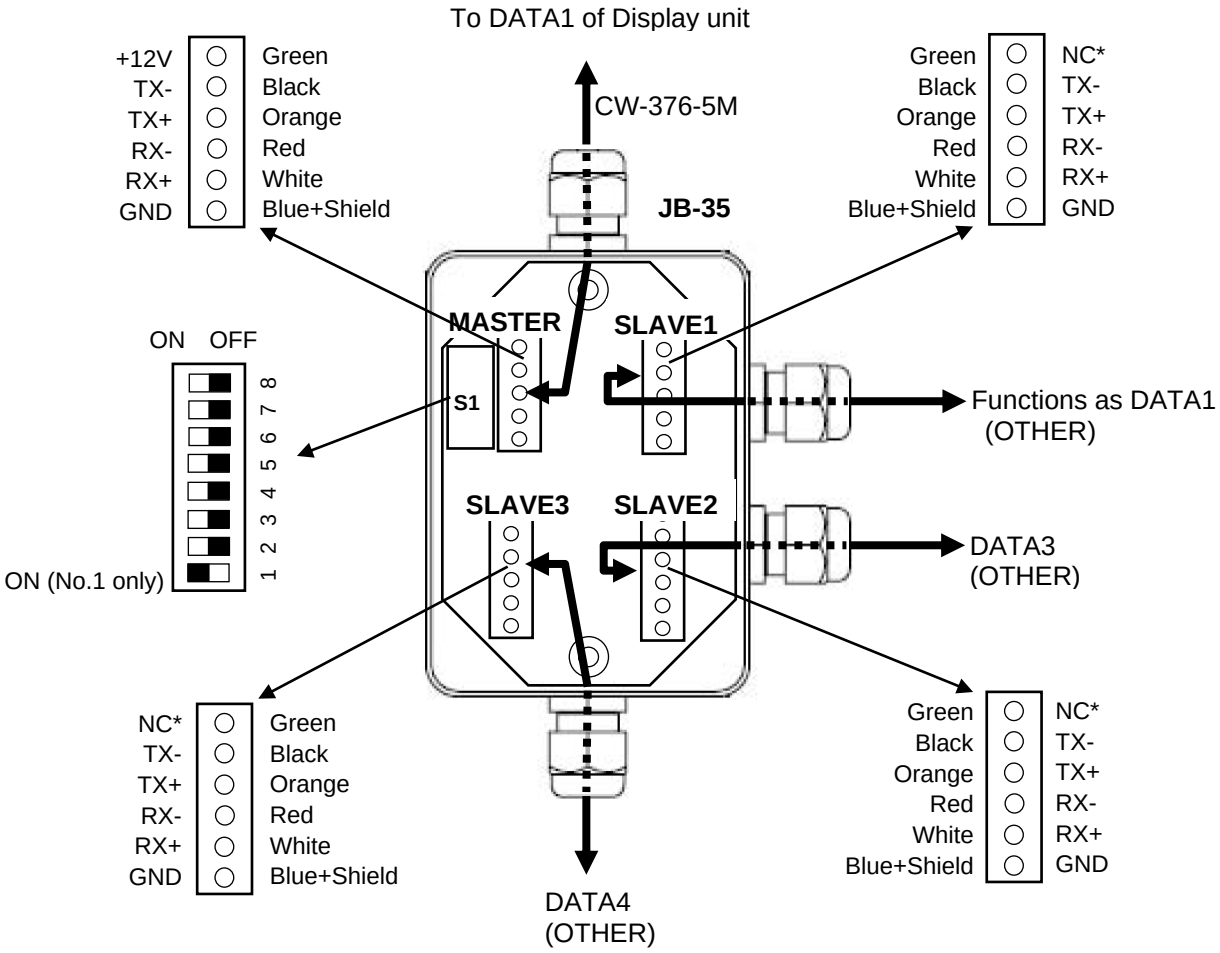
The "KGC settings → initialization" operation from the radar side, which was effective when connecting KODEN conventional GPS compass and KODEN radar, is disabled with this device KC-1400. Please match the input baud rate on the radar side to the output baud rate of KC-1400. If you select "Radar 1" or "Radar 2" in Menu 9-2: Initialize of KC-1400, the baud rate will be 38400bps. See “4.7.2 Output format initialization” on page 4-34.

7.7 How to use junction box JB-35

When connecting JB-35 and increasing the DATA connector, connect as shown below.

Set the DIP switch (S1) as shown below.

When connecting using the optional CW-376-5M, wire as shown in the color diagram below.



CAUTION

Make sure that the cable is not connected to the NC pin of SLAVE1, SLAVE2, and SLAVE3.

Note: Before turning on KC-1400, connect JB-35 to the KC-1400 connector DATA1. KC-1400 automatically recognizes the connection of JB-35 at startup, and DATA5 and DATA6 are added as “1: Connector” to the menu “9: Interface”.

7.8 Inspection after installation

Before you turn the unit on, check the following points to make sure the system operates properly.

(1) Is the ship's supply voltage and current within the rated range?

Voltage range: 10.8 to 31.2 VDC measured at the power connector input

Power consumption: MAX 12 W

(2) Is the connection between the display and other unit, correct?

(3) Are the cables routed and connected properly?

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Chapter 8 Specification

8.1 Specification

8.1.1 Specifications

Receiving frequency		1575.4200MHz / 1561.0980MHz / 1602.5625MHz		
Receiving channel		72 channels		
Received signal		GPS QZSS Galileo SBAS	1575.4200MHz	L1 C/A L1 C/A, L1 S E1 B/C L1 C/A
		BeiDou	1561.0980MHz	B1
		GLONASS	1602.5625MHz	L1 OF
Sensitivity		–148 dBm or less		
Settling time		90 seconds or less (standard)		
Time to position fix		50 seconds or less (standard)		
Accuracy	Heading	0.5° rms or less		
	Position	GPS: 10m (2 drms, SA: OFF, PDOP: 3 or less) SBAS: 3m (2 drms, SA: OFF, PDOP: 3 or less)		
	Velocity	0.1m / sec (rms, SA: OFF, PDOP: 3 or less)		
Heading resolution		0.1° or less		
Maximum rate of turn		45°/sec or more		
Maximum role/pitch angle		30° or more		
Maximum follow-up acceleration		1g		
Base line length		0.5m		
Display		4.3-inch color LCD (480x272 dots, effective picture area: 95.04x53.86 mm)		
Presentation mode		Compass 1, Compass 2, ROT, NAV1, NAV2, NAV3, Navigation Graph, Highway, Plotter, POB		
Position data display		Latitude/longitude in increments of 0.0001 minutes, converted Loran C LOPs, converted Loran A LOPs, converted Decca LOPs		
Navigational display		Speed, Course, Distance/Bearing/XTD/CDI/Time to Waypoint, Present time (UTC or LOC), Satellite status, Distance/Bearing between two points, POB display		
Instant (event) memory		1,000 points		
Waypoint memory		9,000 points		
Route memory		100 routes reverse trail possible		
Alarm		GNSS Fix, ANCH, PROX, XTD, CDI		
Compensation		Heading, Latitude/Longitude, LOP, Time difference, Pitch/Roll		
Magnetic compensation		Automatic or Manual		

Parameters	Sailing mode (Great circle / Rhumb Line), Position display (L/L Lop), Language, LOP (Loran C, Loran A, Decca), Memory of waypoints and name (up to 10 letters), Selection of measuring unit (nm, sm, km), Position/Velocity/Heading/Pitching/Rolling/ROT/Heaving averaging constant
Output data format and sentences	NMEA 0183 Ver.2.0, IEC 61162-1ed5, IEC 61162-450 AAM, APB, ATT, BOD, BWC, DTM, GBS, GGA, GLL, GNS, GSA, GSV, HDM, HDT, HVE, RMB, RMC, ROT, RTE, THS, VTG, WPL, XTE, ZDA, PKODG21, ALC, HBT (DATA3/4 only)

Note: Accuracy is subject to change in accordance with DoD civil GNSS user policy.

8.1.2 Power specifications

Power supply voltage: 10.8 to 31.2 VDC

Power consumption: 12W or less (at 24VDC)

AC Operation: AC/DC rectifier PS-010 is required. (Power supply voltage: 115 VAC / 230 VAC)

8.1.3 Compass safe distance

Standard: 0.4m

Steering: 0.2m

8.1.4 Environmental conditions

(1) Temperature and humidity

Operating temperature	GNSS compass: - 25°C to + 55°C Display unit: -15°C to +55°C
Humidity	93% (+40°C)

(2) Vibration

The equipment operates normally under the following vibrating conditions.

2 - 5 Hz to 13.2 Hz: Amplitude ±1mm ±10 % (Maximum acceleration of 7 m/s^2 at 13.2 Hz)

13.2 Hz to 100 Hz: Maximum acceleration of 7 m/s^2 being applied

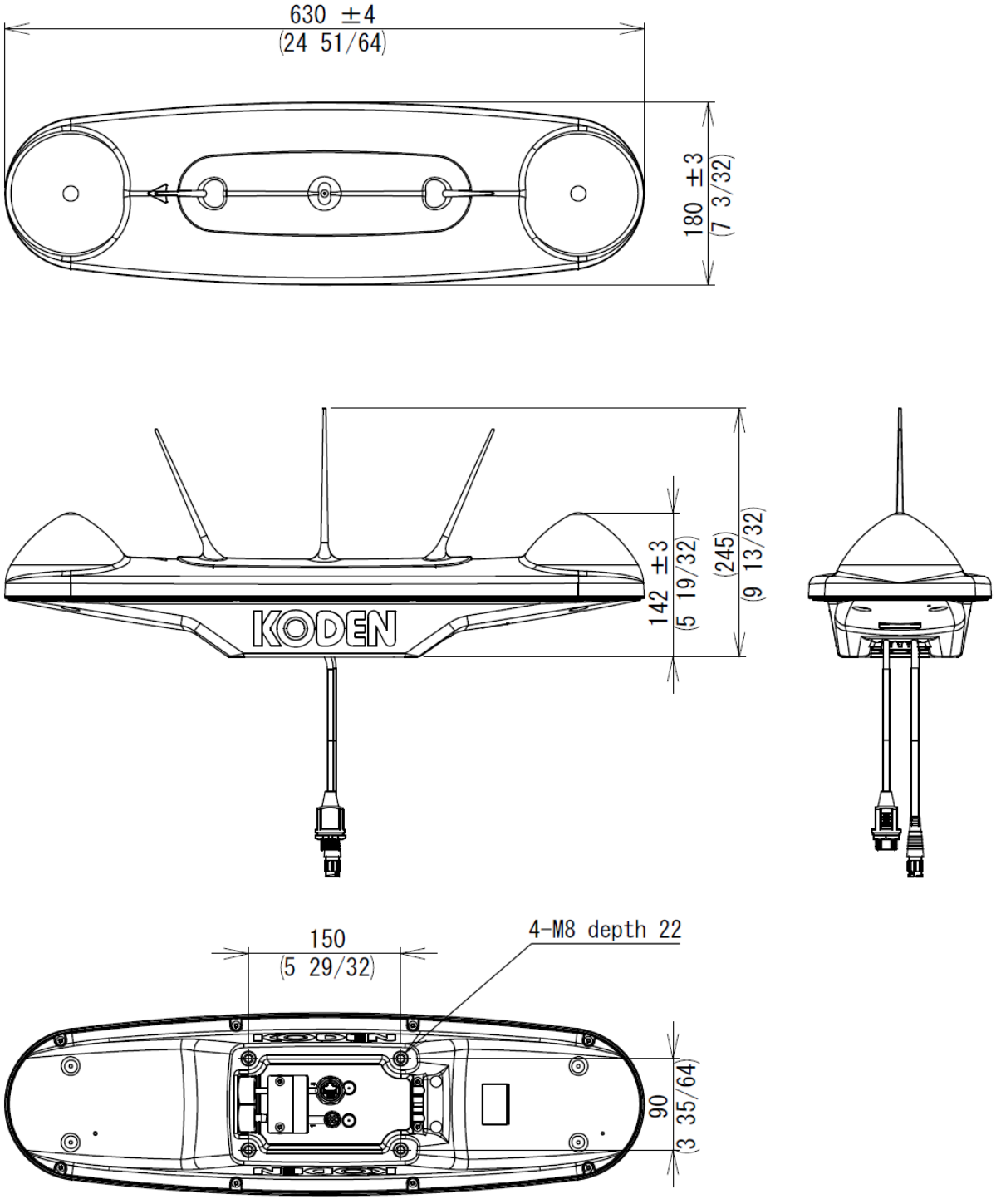
(3) Waterproof

GNSS compass: IPX6 (water resistant)

Display unit: IPX4 (splash-proof type)

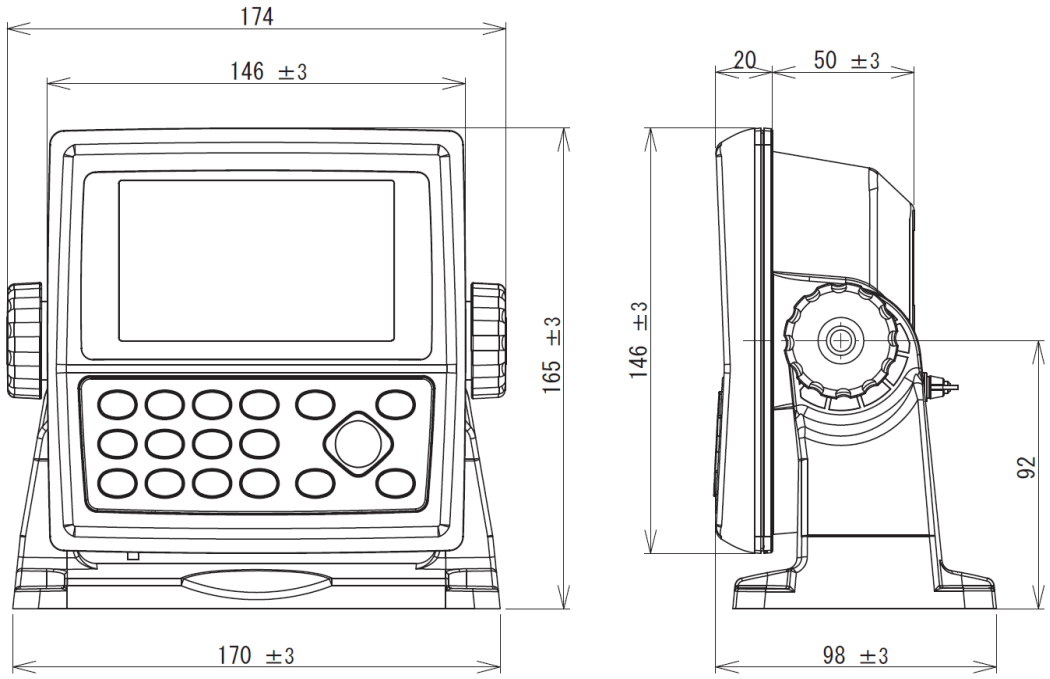
8.2 External dimensions and weight

8.2.1 GNSS compass: KC-1000



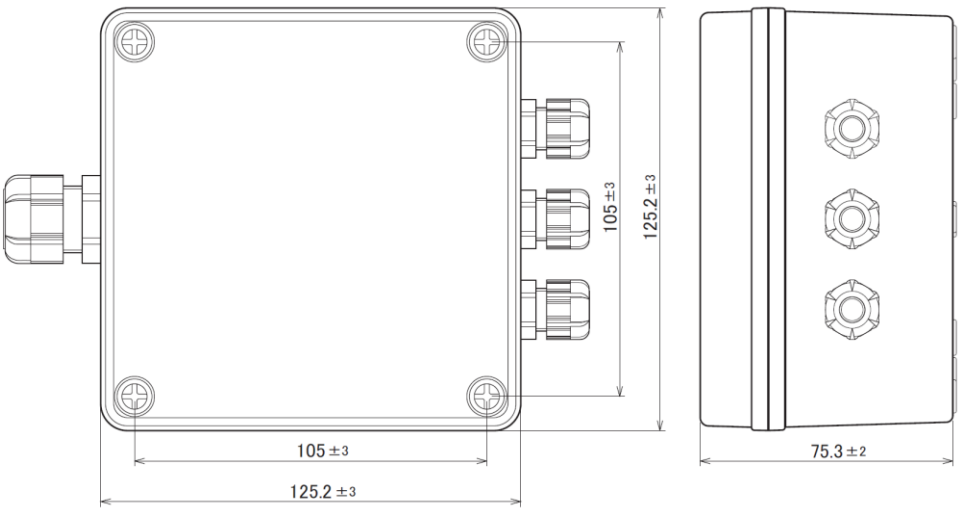
Weight: 2.5kg
Unit: mm (inch)

8.2.2 Display unit: KC-14



Weight: 0.89kg (excluding protective cover)
Unit: mm

8.2.3 Juncction box: JB-41

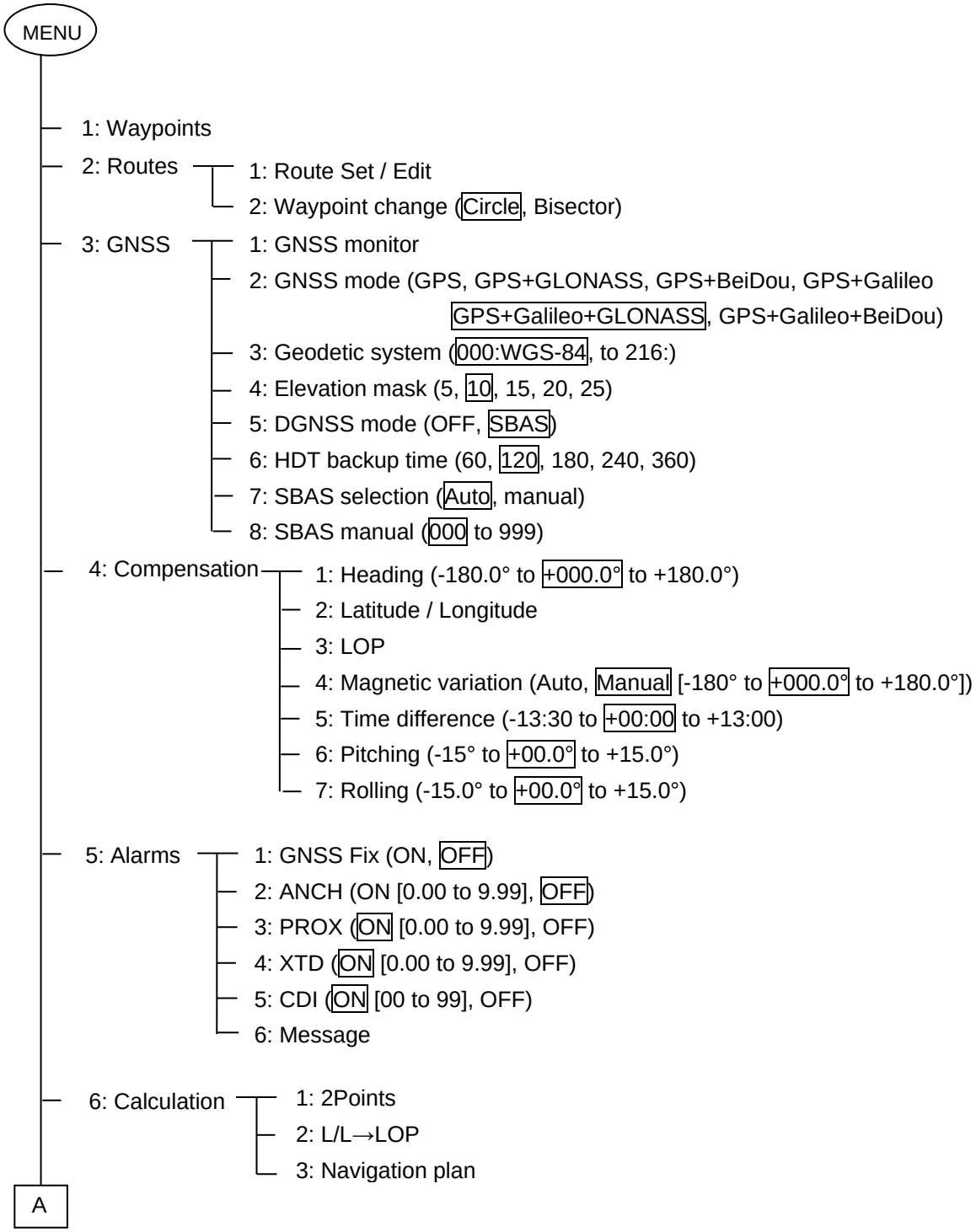


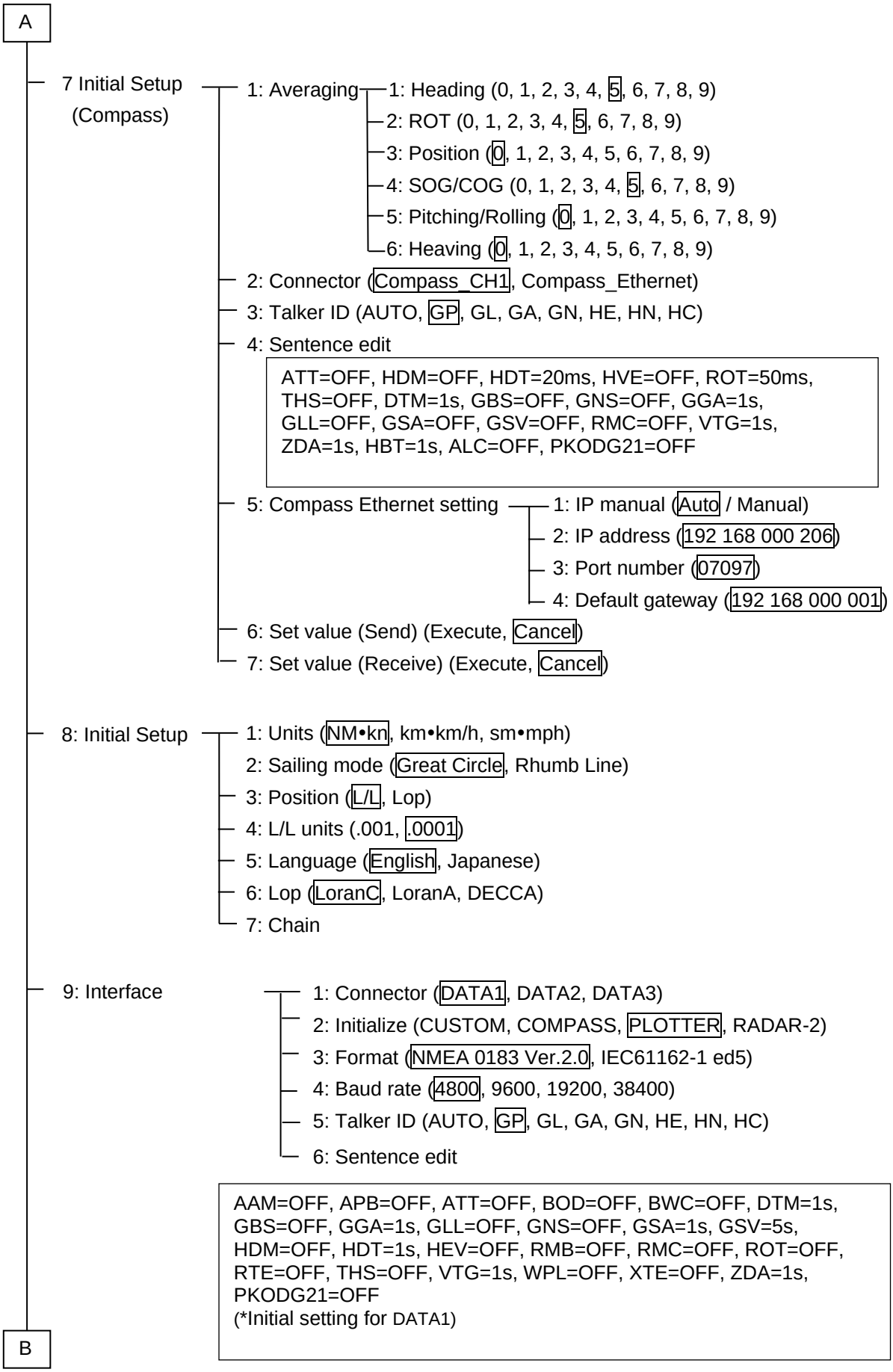
Weight: 0.48kg
Unit: mm

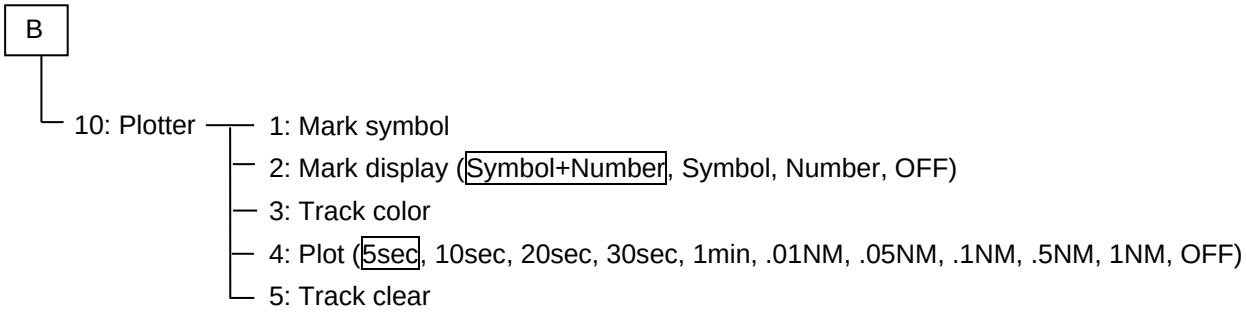
Chapter 9 Annex

9.1 Menu configuration

The factory set value is shown by the surrounding boxes.




A
7 Initial Setup
(Compass)
1: Averaging
1: Heading (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
2: ROT (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
3: Position (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
4: SOG/COG (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
5: Pitching/Rolling (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
6: Heaving (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)
2: Connector (Compass_CH1, Compass_Ethernet)
3: Talker ID (AUTO, GP, GL, GA, GN, HE, HN, HC)
4: Sentence edit
ATT=OFF, HDM=OFF, HDT=20ms, HVE=OFF, ROT=50ms,
THS=OFF, DTM=1s, GBS=OFF, GNS=OFF, GGA=1s,
GLL=OFF, GSA=OFF, GSV=OFF, RMC=OFF, VTG=1s,
ZDA=1s, HBT=1s, ALC=OFF, PKODG21=OFF
5: Compass Ethernet setting
1: IP manual (Auto / Manual)
2: IP address (192 168 000 206)
3: Port number (07097)
4: Default gateway (192 168 000 001)
6: Set value (Send) (Execute, Cancel)
7: Set value (Receive) (Execute, Cancel)
8: Initial Setup
1: Units (NM•kn, km•km/h, sm•mph)
2: Sailing mode (Great Circle, Rhumb Line)
3: Position (L/L, Lop)
4: L/L units (.001, .0001)
5: Language (English, Japanese)
6: Lop (LoranC, LoranA, DECCA)
7: Chain
9: Interface
1: Connector (DATA1, DATA2, DATA3)
2: Initialize (CUSTOM, COMPASS, PLOTTER, RADAR-2)
3: Format (NMEA 0183 Ver.2.0, IEC61162-1 ed5)
4: Baud rate (4800, 9600, 19200, 38400)
5: Talker ID (AUTO, GP, GL, GA, GN, HE, HN, HC)
6: Sentence edit
AAM=OFF, APB=OFF, ATT=OFF, BOD=OFF, BWC=OFF, DTM=1s,
GBS=OFF, GGA=1s, GLL=OFF, GNS=OFF, GSA=1s, GSV=5s,
HDM=OFF, HDT=1s, HEV=OFF, RMB=OFF, RMC=OFF, ROT=OFF,
RTE=OFF, THS=OFF, VTG=1s, WPL=OFF, XTE=OFF, ZDA=1s,
PKODG21=OFF
(*Initial setting for DATA1)
B


B
10: Plotter
1: Mark symbol
2: Mark display (Symbol+Number, Symbol, Number, OFF)
3: Track color
4: Plot (5sec, 10sec, 20sec, 30sec, 1min, .01NM, .05NM, .1NM, .5NM, 1NM, OFF)
5: Track clear

9.2 Geodetic system list

The numbers are the setting values used in “4.2.3 Setting the geodetic system” (page 4-5).

No.	Abbreviation	No.	Abbreviation	No.	Abbreviation	No.	Abbreviation	No.	Abbreviation
000	WGS84	044	IND-B	088	MOD	132	SAN-M	176	IBE
001	WGS72	045	IND-I	089	SPK	133	SAN-A	177	CAO
002	PZ90	046	INF-A	090	CCD	134	SAN-B	178	CHI
003	ADI-M	047	ING-A	091	CAC	135	SAN-C	179	GIZ
004	ADI-E	048	ING-B	092	NAS-C	136	SAN-D	180	EAS
005	ADI-F	049	INH-A	093	NAS-B	137	SAN-E	181	GEO
006	ADI-A	050	IDN	094	NAS-A	138	SAN-F	182	GUA
007	ADI-C	051	KAN	095	NAS-D	139	SAN-J	183	DOB
008	ADI-D	052	KEA	096	NAS-V	140	SAN-G	184	IDN
009	ADI-B	053	NAH-A	097	NAS-W	141	SAN-H	185	JOH
010	AFG	054	NAH-B	098	NAS-Q	142	SAN-I	186	KUS
011	ARF-M	055	NAH-C	099	NAS-R	143	SAN-K	187	LUZ-A
012	ARF-A	056	FAH	100	NAS-E	144	SAN-L	188	LUZ-B
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