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KODEN

OPERATION MANUAL

GPS NAVIGATOR

KGP-915

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

KGP-915 Operation Manual
Doc No: 0093129152

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

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For Your Safe Operation

Symbol used in this Operation Manual

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

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

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

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

Contents

Introduction

KGP-915 is a GNSS navigator for GPS/GLONASS system.

GPS is a navigation system using 24 satellites (21 plus 3 in service) orbiting 20,183 km high from the earth every 11 hours 58 minutes. And GLONASS is orbiting 19,100 km high from the earth 11 hours 15 minutes.

The main features of this unit are as follows:

- KGP-915 consists of two main components, Display and Antenna.
  Display unit has processor, receiver and LCD display built-in.

- KGP-915 has high-resolution color LCD of high brightness type.

- KGP-915 can support DGPS by connecting an external beacon receiver.

- Also support DGPS by SBAS (Satellite Based Augmentation System).

- KGP-915 can storage 10,000 waypoints, 100 routes, and 3,000 track points.

- KGP-915 has two data port of NMEA 0183.

System Configuration

Connection diagram

Legend
Standard configuration
Option
Owner supply
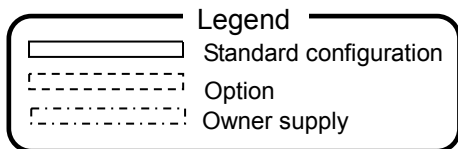
Software virsion:
KM-E34G and after
is required.

GPS antenna   GA-09

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KBG-3

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Display unit KGP-915

With mounting bracket and cover

POWER Connector

DATA 2 Connector

CW-276-2M

DATA 2 Connector

CW-373-5M

Marine radar
Chart Plotter
Echo sounder
Auto pilot

CW-376-5M

DATA 1 Connector

CW-373-5M

Marine radar
Chart Plotter
Echo sounder
Auto pilot

CW-376-5M

Red +

10.8 to 31.2VDC

Black -
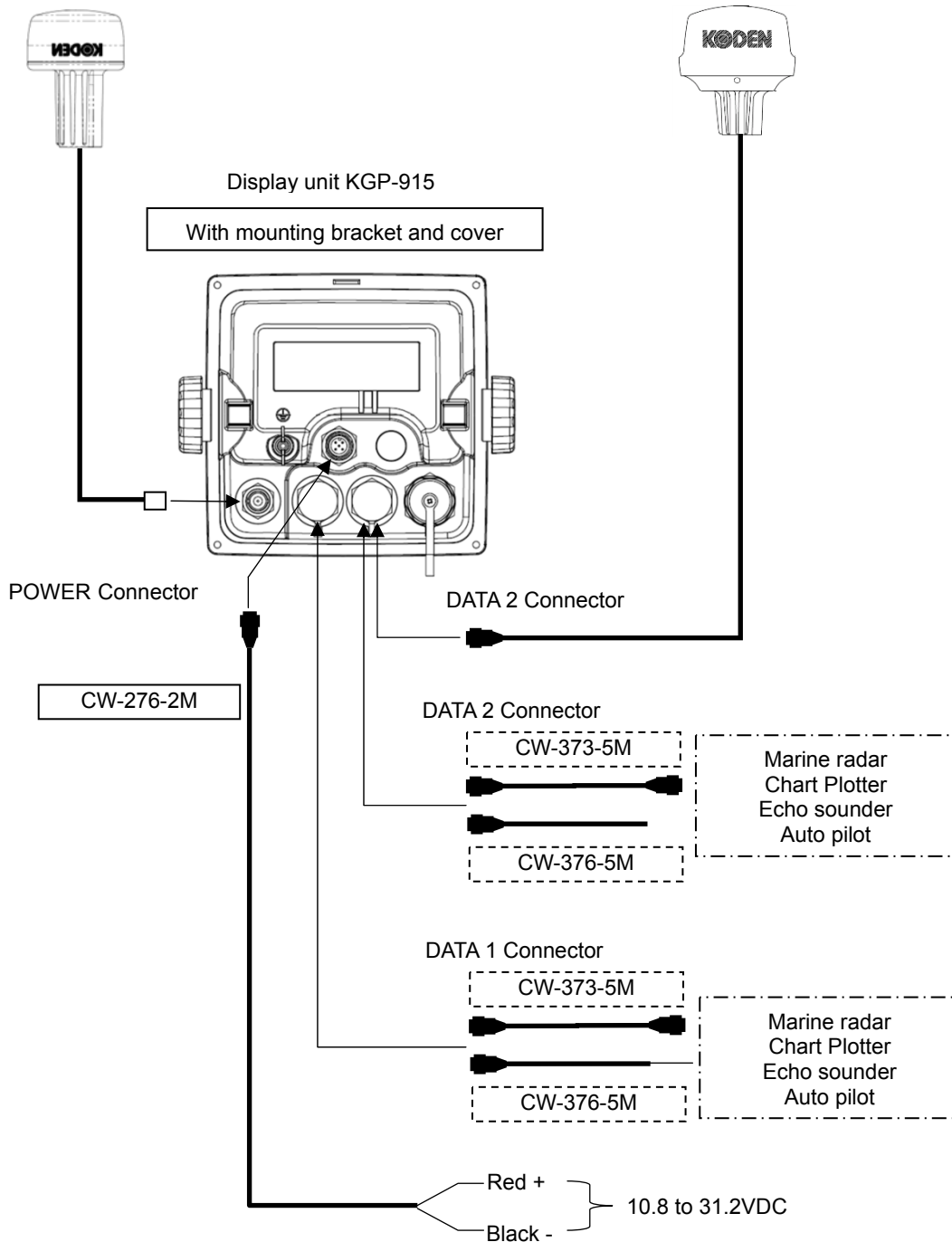
System Configuration (with Junction box)

Connection diagram

Legend
Standard configuration
Option
Owner supply

Software virsion:
KM-E34G and after
is required.

KBG-3

GPS antenna   GA-09

KODEN

KODEN

Display unit KGP-915

With mounting bracket and cover

DATA 2 Connector

POWER Connector

DATA 2 Connector

CW-373-5M

Marine radar
Chart Plotter
Echo sounder
Auto pilot

CW-276-2M

CW-376-5M

CW-376-5M

CW-376-5M

DATA 3 Connector

Marine radar
Chart Plotter
Echo sounder
Auto pilot

CW-376-5M

Junction Box

DATA 4 Connector

Marine radar
Chart Plotter
Echo sounder
Auto pilot

CW-376-5M

DATA 1 Connector

Marine radar
Chart Plotter
Echo sounder
Auto pilot

CW-376-5M

Red +
Black -
10.8 to 31.2VDC

Configuration of Equipment

Standard Equipment Configuration List

No	Item	Type name	Remarks	Weight/Length	Q'ty
01	Display unit	KGP-915.MU	With mounting bracket and front cover	0.74 kg	1
02	Antenna unit	GA-09[10M]	Connected to GA-09, other end BNC connector	0.68kg 10m	1
03		GA-09[15M]		0.89kg 15m	
04		GA-09[0.5M]	Connected to GA-09, other end N-P connector	0.29kg 0.5m	
05	DC power cable	CW-276-2M	With 5-pin connector, other end plain	2.0m	1
06	Truss tapping screw	TPT5X20U	For mounting bracket		4
07	Operation manual	KGP-915.OM.E	English		1

Option List

No	Item	Type name	Remarks	Weight/Length
01	Antenna holder	RAH-29	Ratchet mount	0.68kg
02	Connecting cable	CW-373-5M	6 pin water resistant connectors both ends	5m
03		CW-376-5M	6 pin water resistant connector and other end plain	5m
04	Junction box	JB-35	1 input, 3 outputs with CW-376-5M	--
05	Hose band	738-1015	2pcs for antenna fixture	--
06	Power rectifier	PS-010	With 5A fuses 2pcs	3.5kg
07	AC power cable	VV-2D8-3M	For PS-010, both ends plain	3 m
08	Connector	BD-06BFFA-LL6001	6 pin water resistant connector for TD, CVS	--
09	Antenna cable extension kit	CW-839-30M KIT	5DFB cable with N-J connector and other end plain, N-J connector, and CW-826-0.5M	30m
10*	Antenna cable extension kit	CW-394-60M KIT	8DSFA cable with N-J connector and other end plain, N-J connector, N-BNC connector* and CW-826-0.5M	60m
11	Conversion cable	CW-826-0.5M	A BNC connector / N-P connector	0.5m
12	Operation manual	KGP-915.OM.E	English	
13	Service manual	KGP-915.SM.E	English	

*10. N-BNC connector in the kit will not be used.

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Chapter 1   Basic Operation

1.1 The name and function of each part

GNSS Receiver display

Knob

Control panel

Knob

Mounting bracket

1.1.1   Control panel

Recalls memory position,
entry of numerical values,
and selection
North or South latitude or
East or West longitude.

Selects NAV1, NAV2, NAV3,
NAV4, NAV5 or NAV6 screen.

Recalls the menu

Activates POB (People
Over Board) function.

Enters a numeric/optional
parameter.

• Turns the power on
• Press and hold the power OFF
• Changes the brightness

Clears numeric/optional
parameter or stops alarm
sound temporarily.

1.2 Power On/Off

BRILL ⏻   Press to power on.

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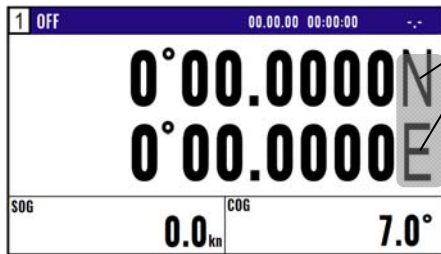
Blinking

Blink when NAVIGATOR is searching GPS satellites.

No blinking

When NAVIGATOR receives signals from 3 or more satellites, it displays present latitude and longitude position with solid N (or S) and W (or E).
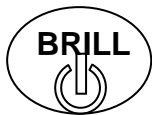
BRILL ⏻   Press until [Power off 3sec] is displayed for turn NAVIGATOR off.
All data before power-off is kept in memory for later use.

1.3 Adjusting brightness of display and panel key
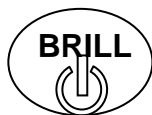
BRILL ⏻   Press to change the LCD brightness in 7 levels.
After the popup of below was displayed, push the ◇ key.
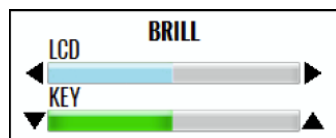
NOTE: *This setup is memorized and turns into the same setup next time at the time of a power supply ON.*

1.4 Selecting the screen

1.4.1   Display Modes

KGP-915 has 6 display modes: Nav data display1 (NAV1), Nav data display2 (NAV2), Nav data display3 (NAV3), Navigation Graph display (NAV4), Highway display (NAV5), Plotter display (NAV6) Screen will change in two ways.

1. Press numeric key on the upper-left corner of the screen

2. Press (MODE) key to select the display mode.

Nav data display1   Nav data display2   Nav data display3

Plotter display   Highway display   Navigation Graph display
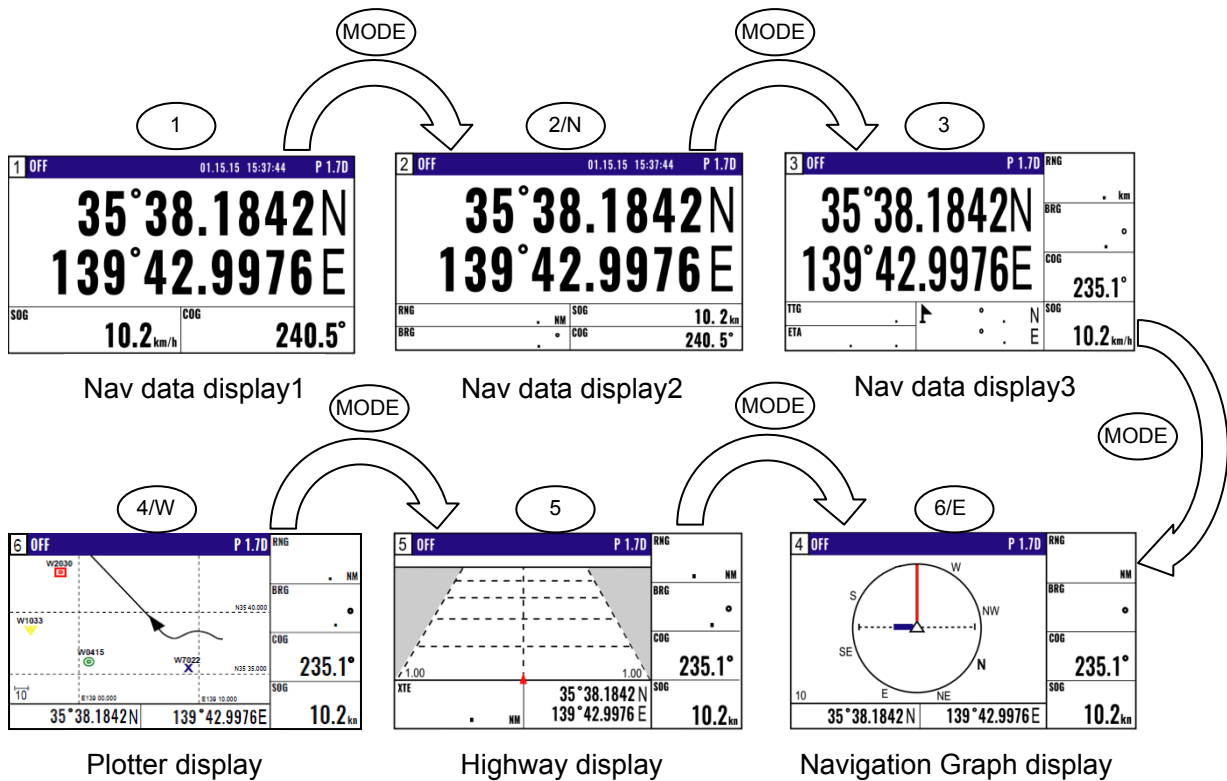
1.4.2   Nav data display1 (NAV1) screen : Nav data1 mode
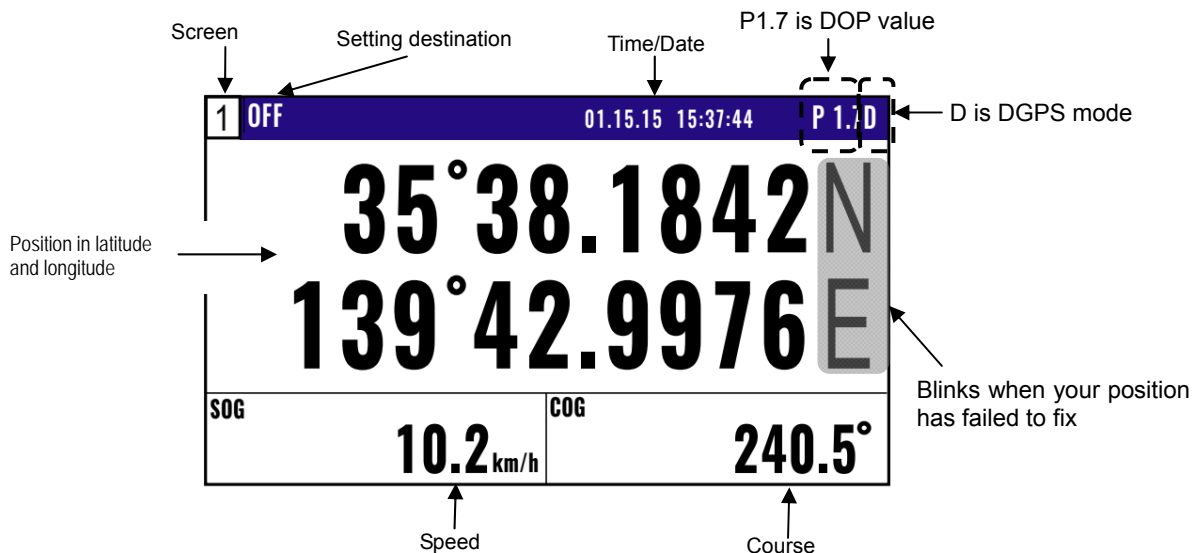
1.4.3   Nav data display2 (NAV2) screen : Nav data2 mode

Position in latitude
and longitude →
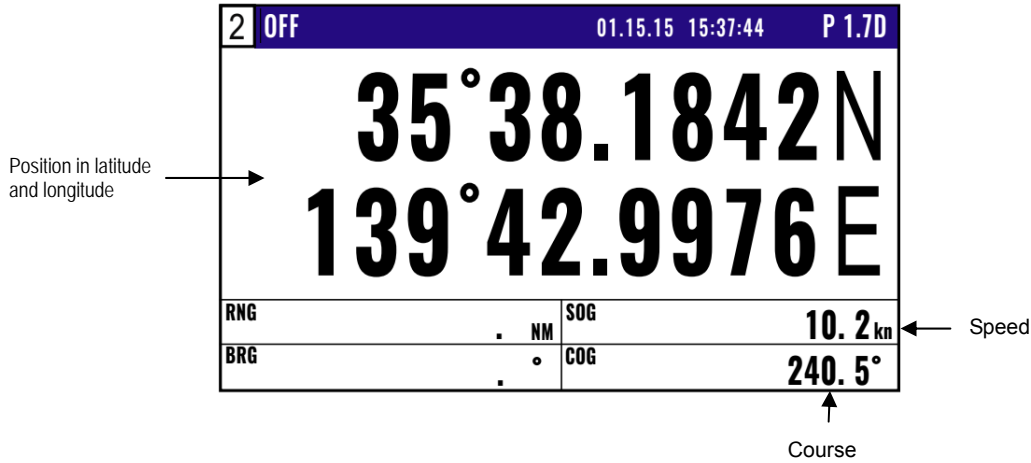
1.4.4   Nav data display3(NAV3) screen : Nav data3 mode

Position in latitude
and longitude →
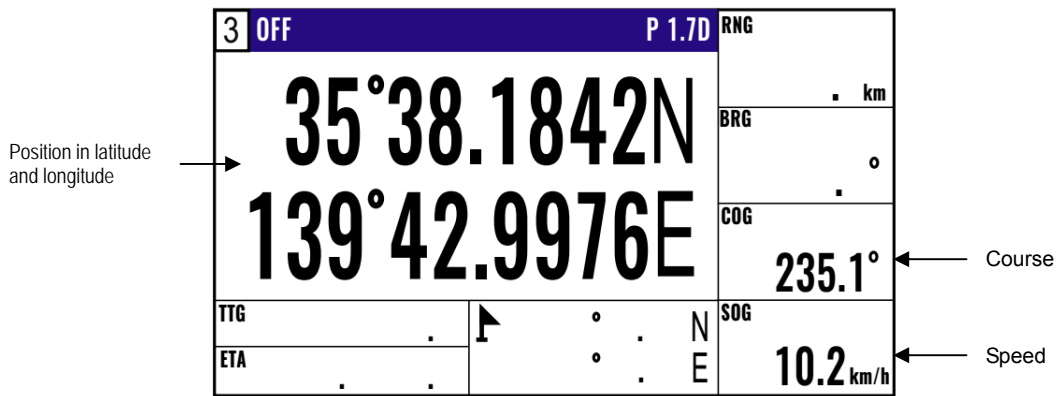
1.4.5   Navigation Graph display (NAV4) screen : Navigation Graph mode
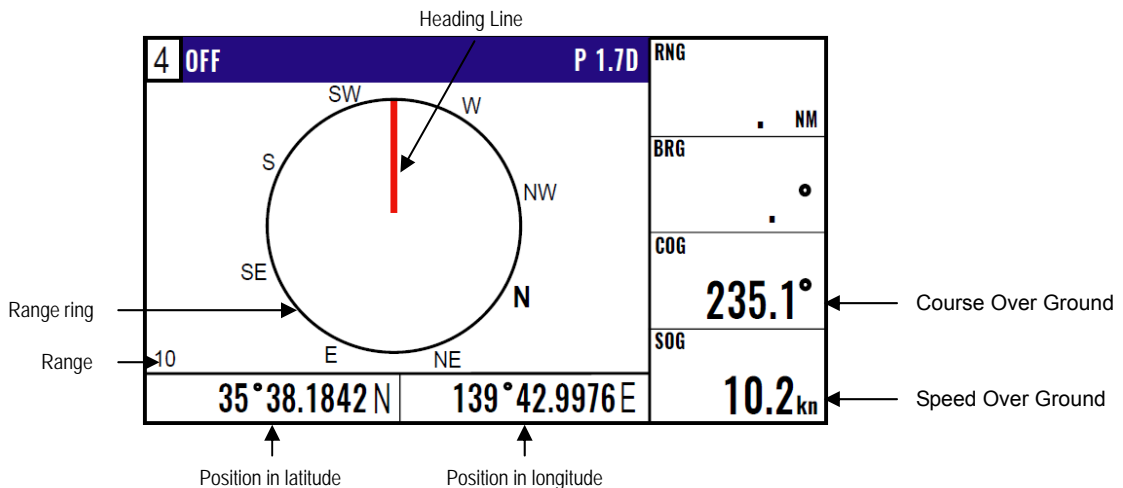
1.4.6   Highway display (NAV5) screen : Highway mode

XTE alarm range

Course Over Ground

Speed Over Ground

Position in latitude
and longitude
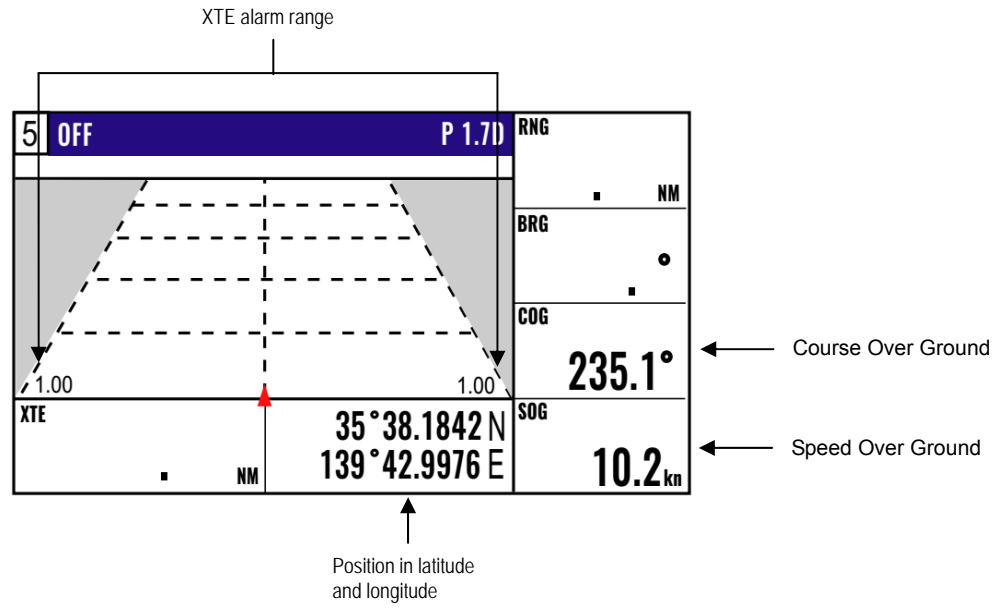
1.4.7   Plotter display (NAV6) screen : Plotter mode

Heading Line   Own boat mark

Range

Course Over Ground

Speed Over Ground

Position in latitude   Position in longitude
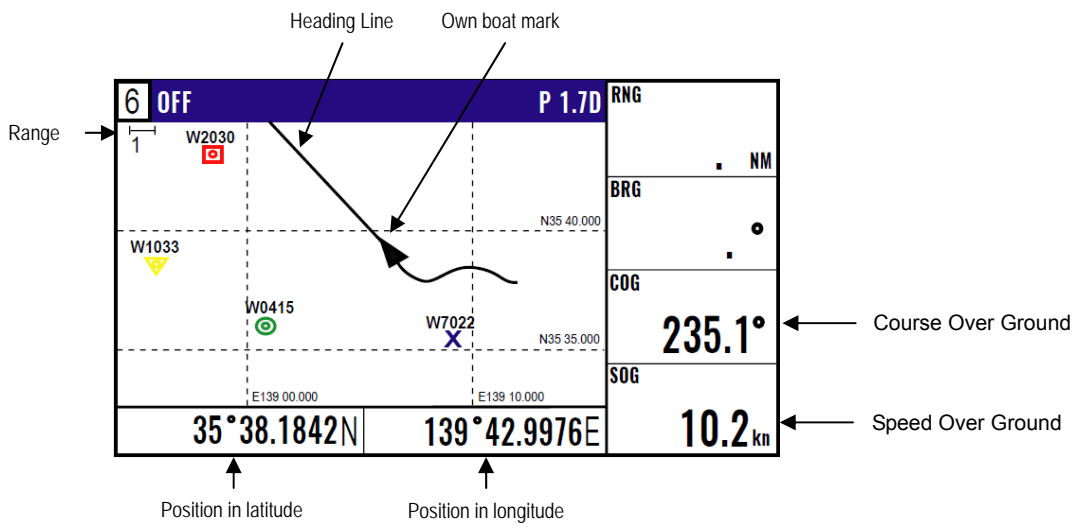
1.5 Storing present position (EVENT)

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 on the PLOT screen) 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.

• 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*)

> **CAUTION**
> ⚠ *EVT key does not function when positioning is invalid*

1.5.1   AUTO

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

POB
EVT

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

(2) Press (ENT) key to store your present position.

(3) You can store up to 999 present positions by pressing this key. They have storage numbers 0001 to 0999.

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

> **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 show the registration number display window.

(2) Press (ENT) key to store your present position.

(3) Specify a desired registration number by numeric keys.

(4) Press (ENT) key. The event will be registered to the number specified.

Blinks for 10 seconds

```
EVT=W0001->0000 ──────── The latest event number
  + 15   04 : 59 ──────── Storage date (Day, Hour, Minute)
    35°38 . 180N
   139°42 . 990E ──────── Storage position (Lat, Long)
```

> **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 (0) key to select "**10: Plotter**".

```
10: Plotter
1: Mark symbol      = ⊚
2: Mark display     = Symbol+Number
3: Track color      = ▬▬▬
4: Plot             = 5sec
5: Track clear
```

(3) Various settings

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

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

Select symbol

Key board cursor   (ENT) Press 👉
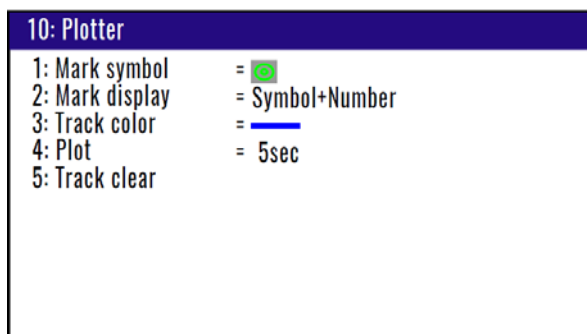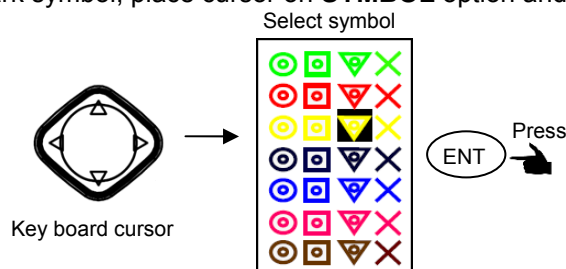
Initial setup:

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

You can select whether or not to display the POB mark information.

```
Symbol+Number
Symbol
Number
OFF
```

Press 👉 (ENT)
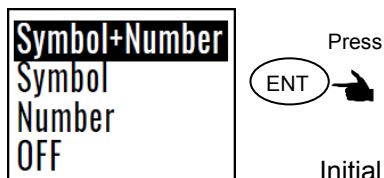
Initial setup: Symbol + Number

1.6 Using POB (People over-board)

POB function is provided for an emergency situation (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
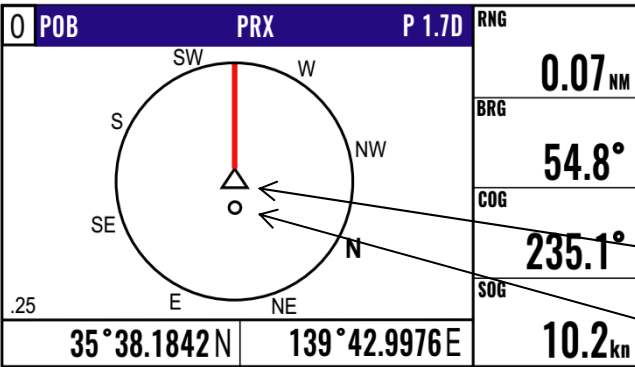
(1) Press (POB) key to appear the pop-up.
(2) Press (POB) key to store POB position.

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

Proximity alarm (blinking)
Alarm sounds when you approached 0.1 nm from the point you pressed POB key.

POB appears

0 POB	PRX	P 1.7D

SW   W
S
NW
△
○
SE
N
.25   E   NE
35°38.1842 N   139°42.9976 E

RNG
0.07 NM

BRG
54.8°

COG
235.1°

SOG
10.2 kn

Distance (in nm) from your present position to the point you pressed POB key

Bearing to the point where you pressed POB key

Present position

Point where you pressed POB key

Latitude of POB position

Longitude of POB position

CLR

Clears the POB mode, and returns to the previous screen when you pressed POB key. When alarm sounds, press CLR key to stop it. Press it again to return to the screen you were at before you pressed POB key.

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:WAYPOINT".

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

> **NOTE:** *000:   Position data where you pressed POB key*
> *0001 to 0999: Position data that contains events*

```
1:Waypoints
P 0000   X  35°38.209N  139°06.749E      03  06:38          P0000 is POB position data
W1001   □  35°38.337N  139°06.035E
W1002   ▽  35°38.052N  139°06.977E
W1003   □  35°38.229N  139°06.428E
W1004   ▽  35°37.810N  139°06.385E
W1005   X  35°37.727N  139°06.549E          W0001～W0999 is
W1006   X  35°36.245N  139°05.448E
W1007   ◉  35°38.222N  139°06.339E          Event position data
W1008   ◉  35°38.092N  139°06.165E
W1009   X  35°38.706N  139°06.015E
                    ●
                    ●
                    ●
              W0999
```

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.

```
Set                                 1:Waypoints
Reset                  P 0000   ◉  35°38.209N  139°06.749E   15  06:38
Edit                   W0001   ◉  35°38.337N    Copy          18  13:56
Copy          Press    W0002   ▽  35°38.052N  0002→0000       16  11:23
Delete        → ENT    W0003   ◉  35°38.229N                  03  23:37
                       W0004   ▽  35°37.810N  W0000            21  17:29
                       W0005   ◉  35°37.727N                  15  14:58
                       W0006   ◉  35°36.245N      0°00.000N    15  19:47
                       W0007   ◉  35°38.222N      0°00.000E    22  19:53
                       W0008   ◉  35°38.092N  139°06.165E      16  04:52
                       W0009   ◉  35°38.085N  139°06.144E      16  04:59
```

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 (0001 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.

Set
Reset
Edit
Copy
Delete

Press
👉 (ENT)

1:Waypoints

W1000	X	35°38.209N	139°06.749E	03.07.15 06:38
W1001	▣	35°38.337N	139°06.035E	
W1002	▽	35°38.052N	139°06.977E	YOKOHAMA 1
W1003	◉	35°38.229N		04.19.15 13:38
W1004	▽	35°37.810N		YOKOHAMA 2
W1005	X	35°37.727N		04.19.15 14:58
W1006	X	35°36.245N		
W1007	◉	35°38.222N	139°06.339E	URAYASU
W1008	◉	35°38.092N	139°06.165E	ODAIBA
W1009	X	35°38.706N	139°06.015E	05.11.15 14:18

Delete
Are you sure?
Yes   No

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 and 0999) are reserved for MOB 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.

1:Waypoints

W3622	▽	35°38.052N	139°06.977E	YOKOHAMA 1
W3623	▣	35°38.229N	139°06.428E	15 13:38
W3624	▽	35°37.810N	139°06.385E	YOKOHAMA 2
W3625	X	35°37.727N	139°06.549E	15 14:58
W3626	X	35°36.245N	139°05.448E	
W3627	◉	35°38.222N	139°06.339E	URAYASU
W3628	◉	35°38.092N	139°06.165E	ODAIBA
W3629	X	35°38.706N	139°06.015E	15 14:18
W3630	▣	35°38.556N	139°06.683E	
W3631	X	35°38.406N	139°06.115E	
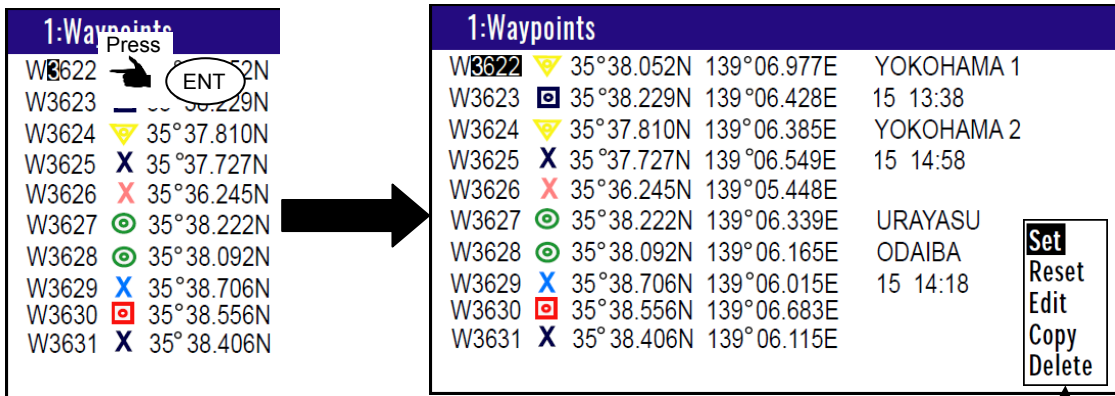
Pop-up appear

(6) Move the cursor to where you want to change. [Mark] or [Latitude] or [Longitude] or [Comment]

• Press [▶] [◀] key to move the cursor.
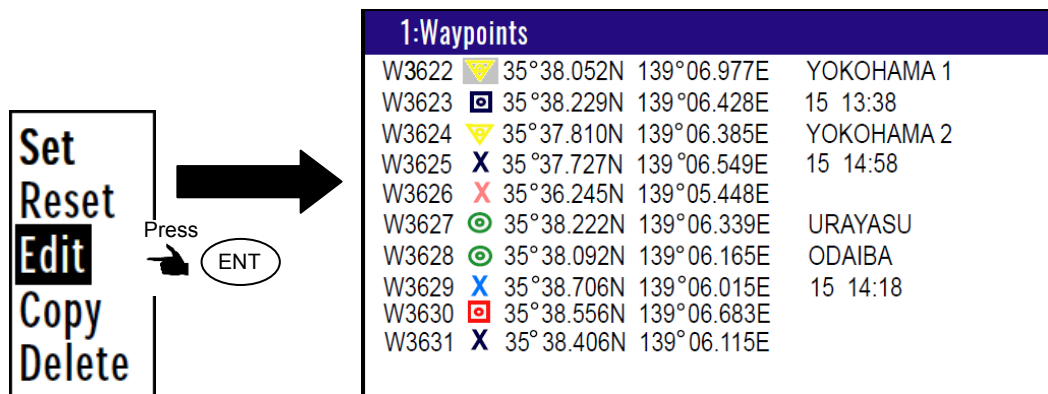
(7) If you want to change the [Mark].

    1) Press (ENT) key to select of the [Mark].

    2) Press [◇] key to select the shape of the mark.

    3) Press (ENT) key.

(8) If you want to change the [Latitude] and [Longitude].

    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) If you want to change the [Comment].

    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 [**DECISION**] in the pop-up.

(10) Press [▲] [▼] 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.

Original number   Enter the number of the copy destination

```
Set
Reset
Edit
Copy
Delete
```
Press
👉 (ENT)

1:Waypoints
W1000 X 35°38.209N 139°06.749E   03.07.15 06:38
W1001 ▣ 35°38.337N   Copy
W1002 ▽ 35°38.052N 1002→0**000**   YOKOHAMA 1
W1003 ▣ 35°38.229N   04.19.15 13:38
W1004 ▽ 35°37.810N W0000
W1005 X 35°37.727N   YOKOHAMA 2
W1006 X 35°36.245N   0° 00.000N   04.19.15 14:58
W1007 ⊙ 35°38.222N   0° 00.000E   URAYASU
W1008 ⊙ 35°38.092N 139°06.165E   ODAIBA
W1009 X 35°38.706N 139°06.015E   05.11.15 14:18

Information of the copy destination

2.1.3 Erasing a single waypoint
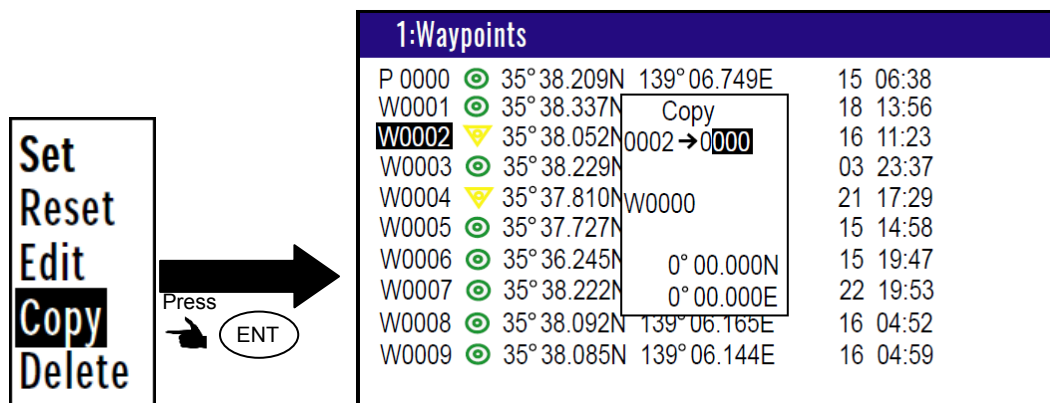
(1) Press (MENU) key until Menu options 1 to 10 appears.

(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.

```
Set
Reset
Edit
Copy
Delete
```
Press
👉 (ENT)

1:Waypoints
W1000 X 35°38.209N 139°06.749E   03.07.15 06:38
W1001 ▣ 35°38.337N 139°06.035E
W1002 ▽ 35°38.052N 139°06.977E   YOKOHAMA 1
W1003 ▣ 35°38.229N   04.19.15 13:38
W1004 ▽ 35°37.810N   Delete
W1005 X 35°37.727N   Are you sure?   YOKOHAMA 2
W1006 X 35°36.245N   Yes   **No**   04.19.15 14:58
W1007 ⊙ 35°38.222N 139°06.339E   URAYASU
W1008 ⊙ 35°38.092N 139°06.165E   ODAIBA
W1009 X 35°38.706N 139°06.015E   05.11.15 14:18
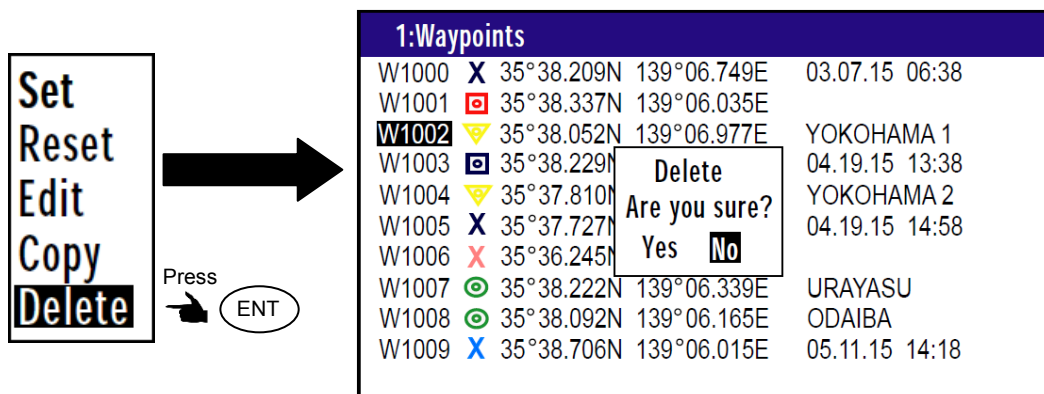
NOTE: *To erase an entire data from memory simultaneously, see "**WPT./Route clear**" (page 6-5).*

2.2 Setup of waypoint navigation
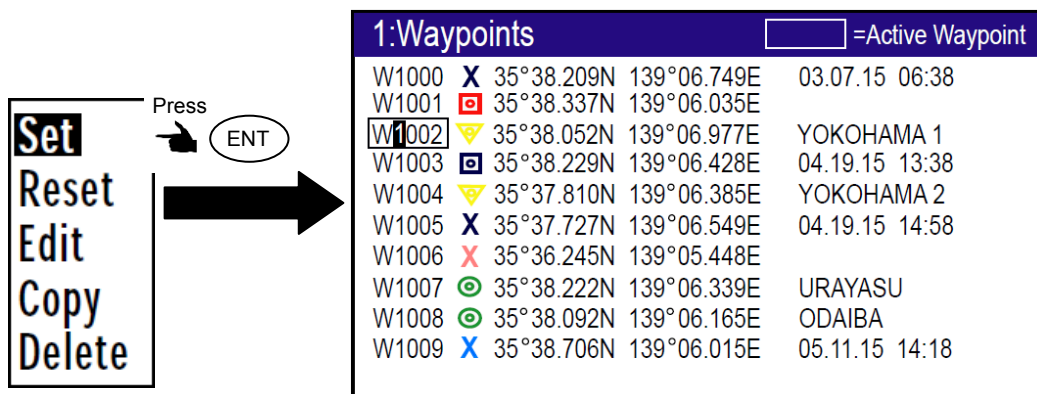
◀ **NOTE:** *Press to backspace the cursor to correct an input error.*

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 **A** (NAV1), **B** (NAV2), **C** (NAV3) or **D** (PLOT) screen (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.

Press ➡ (ENT)

```
Set
Reset
Edit
Copy
Delete
```

➡
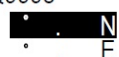
1:Waypoints				▢=Active Waypoint
W1000	X	35°38.209N	139°06.749E	03.07.15 06:38
W1001	▣	35°38.337N	139°06.035E	
W1002	▽	35°38.052N	139°06.977E	YOKOHAMA 1
W1003	▣	35°38.229N	139°06.428E	04.19.15 13:38
W1004	▽	35°37.810N	139°06.385E	YOKOHAMA 2
W1005	X	35°37.727N	139°06.549E	04.19.15 14:58
W1006	X	35°36.245N	139°05.448E	
W1007	◉	35°38.222N	139°06.339E	URAYASU
W1008	◉	35°38.092N	139°06.165E	ODAIBA
W1009	X	35°38.706N	139°06.015E	05.11.15 14:18

2.2.2 Quick waypoint setup

Quick WPT (first priority waypoint) can be set by specifying it directly either from the NAV1, NAV2, NAV3, NAV4, NAV5 or NAV6 screen. 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 1st to 6th pages of either the NAV1, NAV2, NAV3, NAV4, NAV5 or NAV6, are displayed.

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

```
Quick  Waypoint
     Q9998
  °  .      N
  °  .      E
```

(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 NAV1, NAV2, NAV3, NAV4, NAV5 or NAV6 screen. There are two ways.

• Cancel from [MENU].

• Cancel from NAV1, NAV2, NAV3, NAV4, NAV5 or NAV6 screen.

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.

Set		
Reset	Press → ENT	
Edit		
Copy		
Delete		

1:Waypoints
W1000 X 35°38.209N 139°06.749E 03.07.15 06:38
W1001   35°38.337N 139°06.035E
W1002   35°38.052N 139°06.977E YOKOHAMA 1
W1003   35°38.229N 139°06.428E 04.19.15 13:38
W1004   35°37.810N 139°06.385E YOKOHAMA 2
W1005 X 35°37.727N 139°06.549E 04.19.15 14:58
W1006 X 35°36.245N 139°05.448E
W1007   35°38.222N 139°06.339E URAYASU
W1008   35°38.092N 139°06.165E ODAIBA
W1009 X 35°38.706N 139°06.015E 05.11.15 14:18

2) When Reset from NAV 1, NAV 2, NAV 3, NAV4, NAV5 or NAV6 screen.

(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.

**Waypoint reset
Are you sure?
Yes   No**
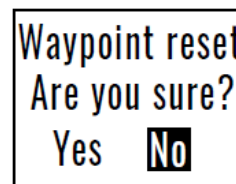
2.2.4 NAV2 screen during waypoint navigation

Alarm

ANCH: Anchor watch alarm
PROX: Proximity alarm
XTE: Cross track error alarm
CDI: Course deviation angle alarm

Waypoint number

Time

Position in latitude
and longitude

Distance from present
position from WPT

```
2  W1852          XTE      01.15.15  15:37:44      P 1.7D

          35°38.1842N
         139°42.9976E

RNG                   SOG
            54. 8 NM              10. 2 kn
BRG                   COG
            355. 4°               240. 5°
```

Speed

Bearing from present
position from WPT
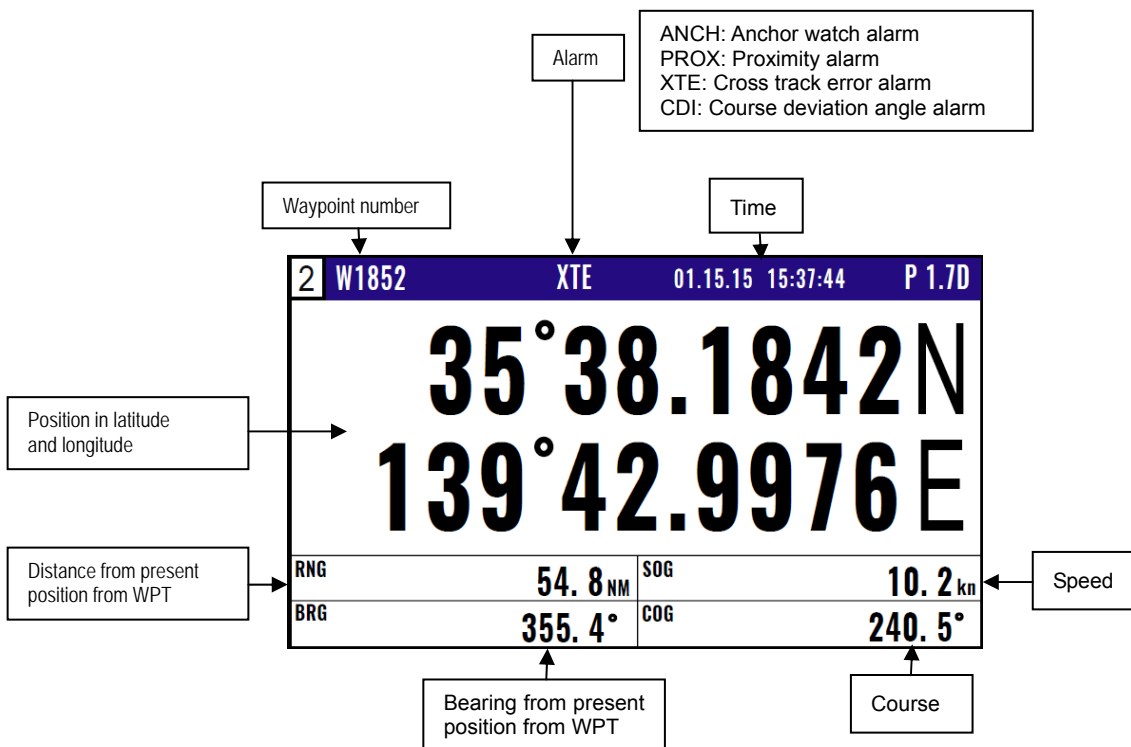
Course

2.2.5 NAV3 screen during waypoint navigation

Position in latitude
and longitude

Time-To-Go
to destination

```
3  W1852          CDI           P 1.7D  RNG
                                            283.1 km
          35°38.1842N               BRG
         139°42.9976E               157.9°
                                         COG
TTG                                         235.1°
        2:15    ⚑  35°39.512N        SOG
ETA                 139°41.867E          10.2 km/h
    04.28  17:52
```

Distance from present
position from WPT

Bearing from present
position from WPT

Course

Speed

Estimated-Time-of-Arrival
at destination

Latitude and Longitude
of WPT
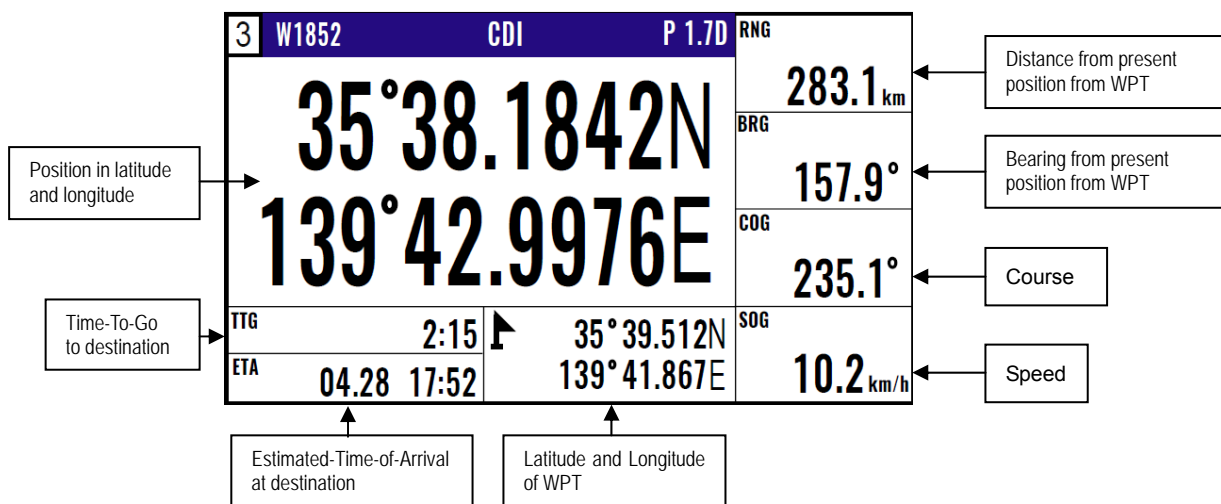
2.2.6   NAV4 screen during waypoint navigation

Heading Line

Own boat mark

Waypoint

Range ring

Range

| 4 | W1852 | | P 1.7D |

SW

W

S

NW

SE

N

10

E   NE

35°38.1842 N   139°42.9976 E

RNG
18.2 NM

BRG
224.9°

COG
235.1°

SOG
10.2 kn

Distance from present position from WPT

Bearing from present position from WPT

Course Over Ground

Speed Over Ground

Position in latitude

Position in longitude
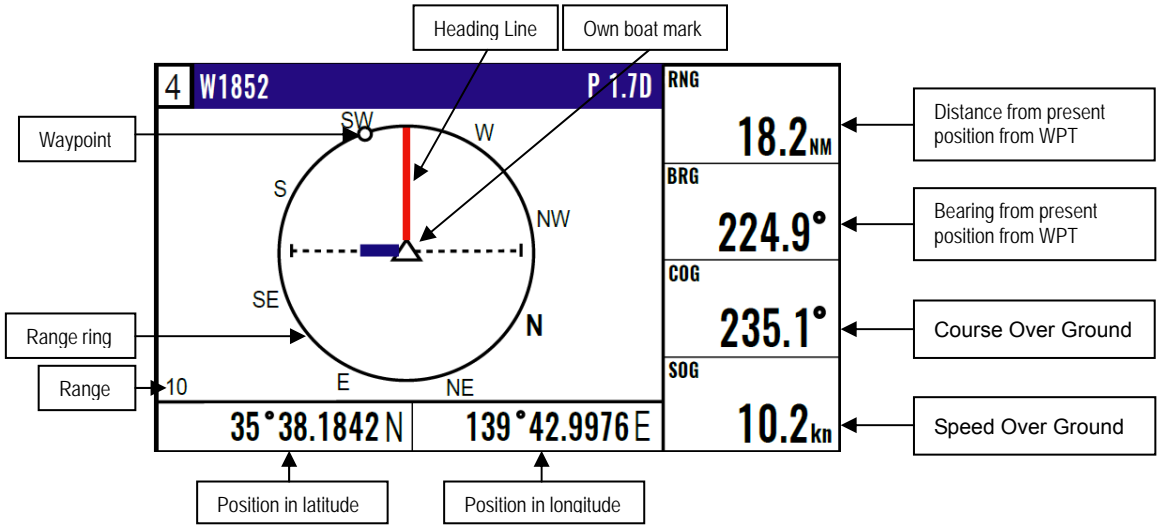
2.2.7   NAV5 screen during waypoint navigation

XTE alarm range

| 5 | W1852 | | P 1.7D |

4

2

1.00   1.00

XTE
0.23 NM

35°38.1842 N
139°42.9976 E

RNG
3.68 NM

BRG
157.9°

COG
152.1°

SOG
10.2 kn

Distance from present position from WPT

Bearing from present position from WPT

Course Over Ground

Speed Over Ground

Digital XTE indication

Position in latitude and longitude
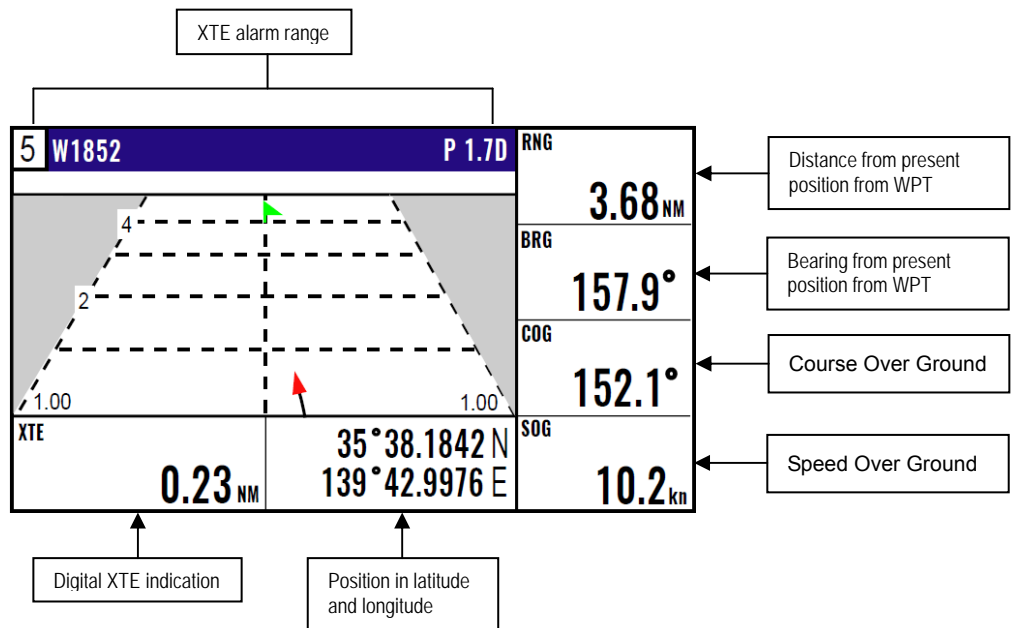
2.2.8   NAV6 screen during waypoint navigation
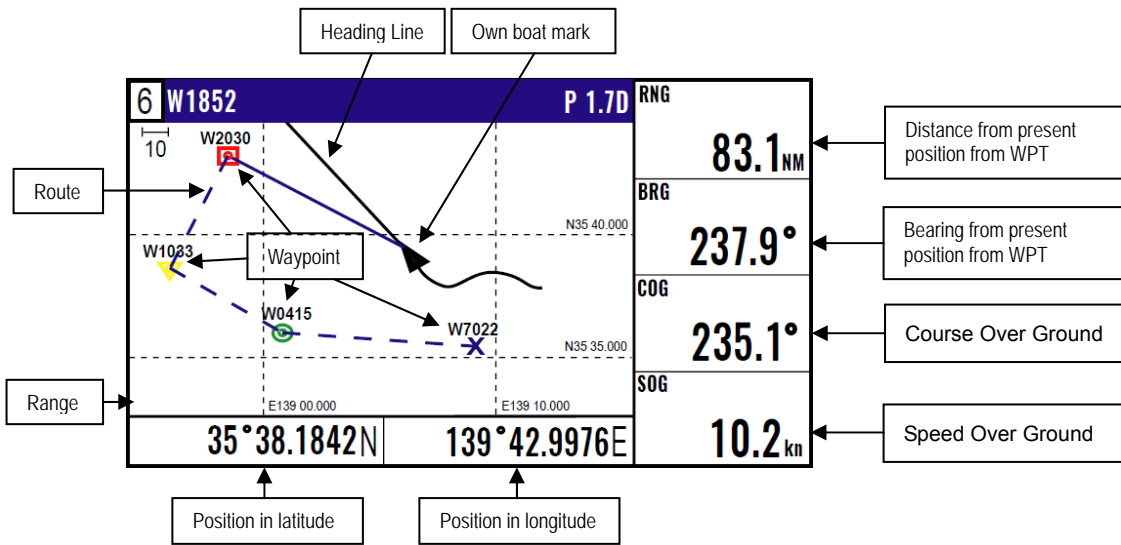
2.3 Cross track error and course deviation angle

2.3.1   Navigation graph of NAV4 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 XTE 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).

Waypoint

Distance from present
Position to WPT

True north

Bearing to WPT

Steer to the left to get back
to the original course.

Course deviation angle

Course

4 W1852	P 1.7D	RNG
		1.82км
NE E		BRG
N		352.9°
SE		COG
NW		65.1°
W SW S		SOG
25		
35°38.1842 N	139°42.9976 E	10.2кn

Steering direction

Steer to the right to get back
to the original course.

4 W1852	P 1.7D	RNG
NW N		1.82км
		BRG
W	NE	352.9°
		COG
SW		302.1°
S SE		SOG
25		
35°38.1842 N	139°42.9976 E	10.2кn

NOTES:

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

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

1. *Press [**MODE**] key until **NAV4** screen appears.*

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)

Origin

2.3.2 Highway display (NAV5) screen

Use the three-dimensional chart for navigation on the course line. You can set a course width from Menu (**6: 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, sm, km), the 4(nm, sm, km) course line is shown on the screen. When you have sailed 2 (nm, sm, km), the present position indication moves toward you and the next 4 (nm, sm, km) are shown.

Waypoint

Distance to WPT

Distance on course line

E

At point **E**   You are sailing outside of course width.

Present position
This marking moves at the course edge.

1.00   0   1.00

Course line length on the screen

Course line

Examples: The screen changes as follows when you sail along points **A**, **B**, **C** and **D**.

At point **C**

1.00   0   1.00

Present position

At point **D**

1.00   0   1.00

Present position

At point **A**

1.00   0   1.00

Present position

At point **B**

1.00   0   1.00

Present position

D

C

B

A

4

3

2

1

0

1.00   0   1.00

XTE alarm range
You can change the XTE alarm range by "**Setting and canceling**" (page 3-3/4).

(Nearing to the WPT)

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

NOTES: *WPT marking changes:*

When distance on course line is greater than 4 (nm, sm, km)

When distance on course line is less than 4 (nm, sm, km)

At point **K**: Distance to WPT is greater than 1 (nm, sm, km).

Present position

Waypoint

The WPT indication remains close to you, but the course length increases to 1 (nm, sm, km), 2 (nm, sm, km), and 4 (nm, sm, km). The WPT indication changes when the length exceeds 4 (nm, sm, km).

At point **J**: You have reached the waypoint.

Waypoint

The WPT marking moves toward you.

Present position

At point **I**: You are 0.5 (nm, sm, km) away from waypoint.

Waypoint

The WPT marking moves to the center of course line.

Present position

At point **H**: You are 1 (nm, sm, km) away from waypoint.

Waypoint

The course length closing up to 1 (nm, sm, km) scale from 2 (nm, sm, km) scale.

Present position

At point **F**: You are 4 (nm, sm, km) away from waypoint.

Waypoint

The present position indication moves toward you and the WPT indication changes when you have reached 4 (nm, sm, km) on the course line away from the waypoint.

Present position

2.4 Storing and erasing routes

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

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 (01 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.

(6) Move the cursor to where you want to change. [Comment] or [Waypoint]

• Press [▲] [▼] key to move the cursor.

Input of Comment

Input location of Waypoint

(7) If you want to change the [Comment]

1) Press (ENT) key to select of the [Comment].

2) Press [◇] key to select a comment letter in pop-up.

3) Press (ENT) key to after moved a cursor to the [**DECISION**] in the pop-up.

(8) If you want to change the [Waypoint]

   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.

(9) Repeat (8) 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   **BI-SECTOR** mode

Proximity
Alarm circle

Course line A   Waypoint   Course line B   Waypoint

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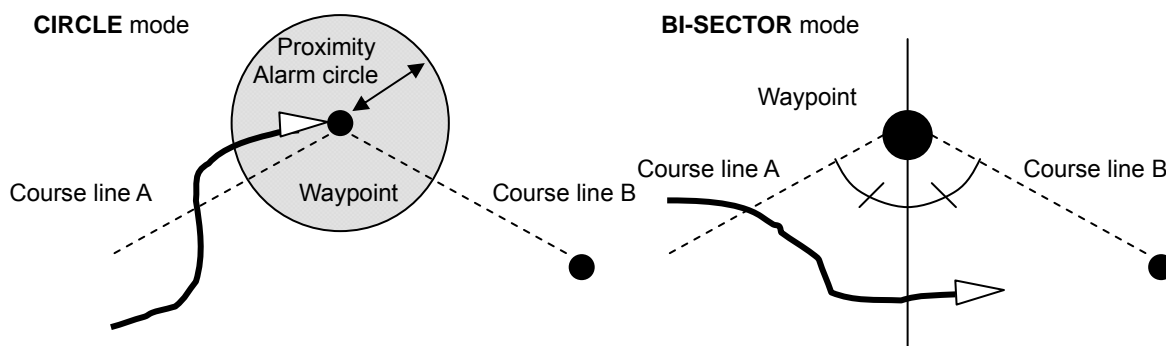
When you reach the proximity alarm circle,   When you cross a half-angle line, the
the course line is switched from A to B. To   course line is switched from A to B.
change the proximity alarm range, see
"**Setting and canceling**" (page 3-3/4).

(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: CHANGE**".

(4) Press [▲] or [▼] key to locate cursor to select a mode.

(5) Press (ENT) key. The selected mode will be shown.

2:Routes
1:Route Set / Edit
2:Waypoint change   = Circle
                       Bisector

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 (01 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.
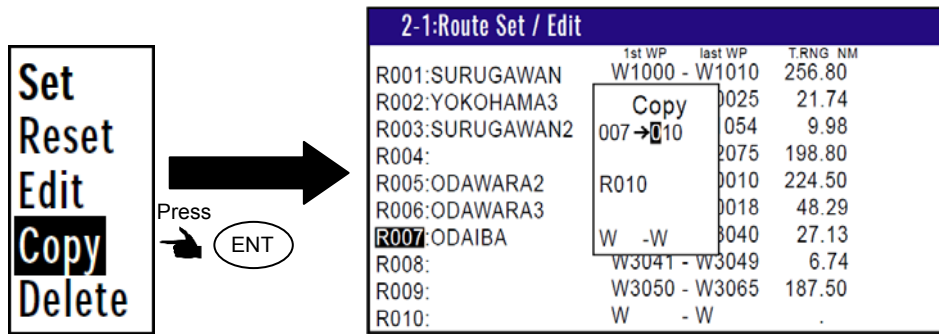
2.4.4 Erasing point data

(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 (01 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) If you want 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.
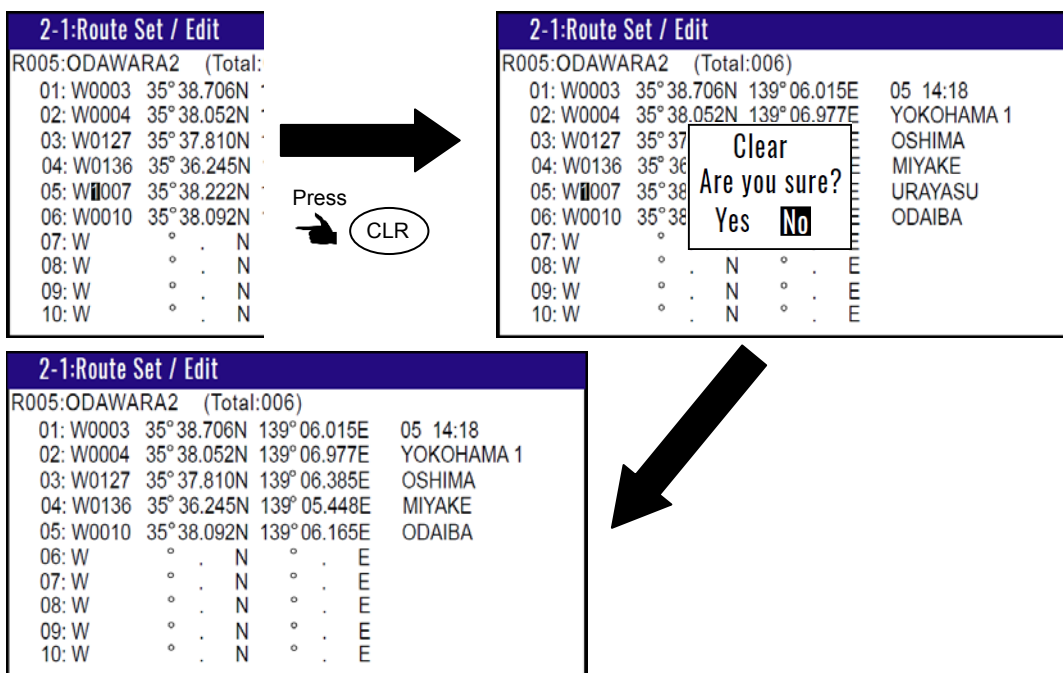
2.4.5 Erasing a single route

(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.

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

(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.

2-1:Route Set / Edit

	1st WP	last WP	T.RNG NM
R001:SURUGAWAN	W1000 - W1010		256.80
R002:YOKOHAMA3	W0020 - W0025		21.74
R003:SURUGAWAN2	W1011 - W1054		9.98
R004:		075	198.80
R005:ODAWARA2		010	224.50
R006:ODAWARA3		018	48.29
R007:ODAIBA		040	27.13
R008:	W3041 - W3049		6.74
R009:	W3050 - W3065		187.50
R 10:	W - W		.

(Pop-up: Delete / Are you sure? / Yes No)

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 final 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 "**2.1 Storing waypoints (LAT/LONG) data**" (page 2-1).

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 final 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 (01 to 100) by numeric keys and press (ENT) key.

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

2-1:Route Set / Edit

R005:ODAWARA2   (Total:006)
01: W0003	35°38.706N	139°06.015E	05 14:18	
02: W0004	35°38.052N	139°06.977E	YOKOHAMA 1	
03: W0127	35°37.810N	139°06.385E	OSHIMA	
04: W0136	35°36.245N	139°05.448E	MIYAKE	
05: W1007	35°38.222N	139°06.339E		
06: W0010	35°38.092N	139°06.165E		
07: W	° . N	° . E		
08: W	° . N	° . E		
09: W	° . N	° . E		
10: W	° . N	° . E		

Route — Direction — First destination

Route R005 → 01
W1003 35°38.706N
139°06.015E
▲ : → Foward
▼ : ← Reverse
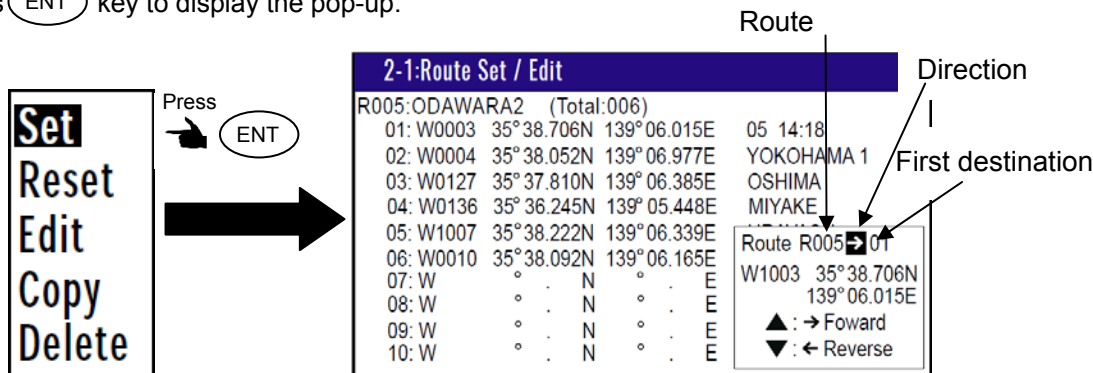
(6) Select [**Set**] in the pop-up and press (ENT) key.

(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) Determined by (ENT) key.

(8) Number is surrounded by square.

2-1:Route Set / Edit				:Active Route
	1st WP	last WP	T.RNG NM	
R001:SURUGAWAN	W1000	- W1010	256.80	
R002:YOKOHAMA3	W0020	- W0025	21.74	
R003:SURUGAWAN2	W1011	- W1054	9.98	
R004:	W2022	- W2075	198.80	
R005:ODAWARA2	W0003	- W0010	224.50	
R006:ODAWARA3	W0004	- W0018	48.29	
R007:ODAIBA	W3000	- W3040	27.13	
R008:	W3041	- W3049	6.74	
R009:	W3050	- W3065	187.50	
R010:	W	- W	.	

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 (01 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.

2-1:Route Set / Edit

R005:ODAWARA2   (Total:006)

01: W0003	35°38.706N	139°06.015E	05 14:18	
02: W0004	35°38.052N	139°06.977E	YOKOHAMA 1	
03: W0127	35°37.810N	139°06.385E	OSHIMA	
04: W0136	35°36.245N	139°05.448E	MIYAKE	
05: W1007	35°38.222N	139°06.339E	URAYASU	
06: W0010	35°38.092N	139°06.165E	ODAIBA	
07: W	° . N	° . E		
08: W	° . N	° . E		
09: W	° . N	° . E		
10: W	° . N	° . E		

2.5.3 Canceling route navigation

To cancel waypoint navigation, turn Route to OFF on A (NAV1), B (NAV2), C (NAV3) or D (PLOT) screen.

• Cancel from [MENU]

• Cancel from NAV 1, NAV 2, NAV 3, NAV4, NAV5 or NAV6 screen.

1) When Reset from [MENU]
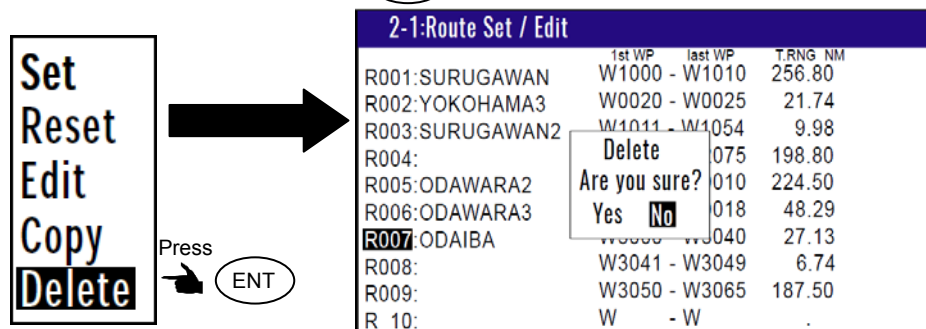
(1) Press (MENU) key until Menu options 1 to 10 appears.

(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 (01 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.

2-1:Route Set / Edit			
	1st WP	last WP	T.RNG NM
R001:SURUGAWAN	W1000	- W1010	256.80
R002:YOKOHAMA3	W0020	- W0025	21.74
R003:SURUGAWAN2	W1011	- W1054	9.98
R004:	W2022	- W2075	198.80
R005:ODAWARA2	W0003	- W0010	224.50
R006:ODAWARA3	W0004	- W0018	48.29
R007:ODAIBA	W3000	- W3040	27.13
R008:	W3041	- W3049	6.74
R009:	W3050	- W3065	187.50
R010:	W	- W	.

2) When Reset from NAV1, NAV2, NAV3, NAV4, NAV5 or NAV6 screen.

(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.

Waypoint reset
Are you sure?
Yes   No
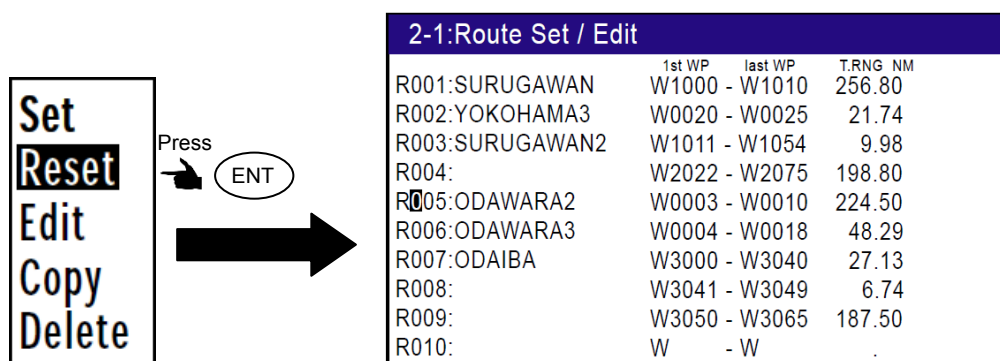
2.5.4 Switching between distance and time to go

When you select the "**RNG**" (Distance to WPT) or "**TRNG**" (Total distance) on NAV2, NAV3, NAV4, NAV5 or NAV6 screen in route navigation, the respective "**TTG**" (Time to go to WPT) or "**T.TTG**" (Total time to go) is shown.

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

(1) Press (MODE) key until NAV2, NAV3, NAV4, NAV5 or NAV6 screen appears.

(2) Press [◀] key to display "**RNG**" "**TTG**".

2 R001➡01 XTE 01.15.15 15:37:44 P 1.7D **35°38.1842N** **139°42.9976E** RNG **54.8 NM** SOG **10.2 kn** BRG **355.4°** COG **240.5°**	**3** R001➡01 CDI P 1.7D **35°38.1842N** **139°42.9976E** TTG **2:15** 35°39.512N SOG ETA 04.28 17:52 139°41.867E **10.2 km/h** RNG **283.1 km** BRG **157.9°** COG **235.1°**
4 R001➡01 PRX P 1.7D 35°38.1842N 139°42.9976E RNG **0.33 NM** BRG **158.6°** COG **235.1°** SOG **10.2 kn**	**5** R001➡01 P 1.7D XTE **0.23 NM** 35°38.1842N 139°42.9976E RNG **3.68 NM** BRG **157.9°** COG **152.1°** SOG **10.2 kn**

6 R001➡01 P 1.7D 35°38.1842N 139°42.9976E RNG **83.1 NM** BRG **237.9°** COG **235.1°** SOG **10.2 kn**

(3) Press [▶] key to display "**TRNG**" "**T.TTG**".

2 R001➡01 XTE 01.15.15 15:37:44 P 1.7D **35°38.1842N** **139°42.9976E** TRNG **96.2 NM** SOG **10.2 kn** BRG **355.4°** COG **240.5°**	**3** R001➡01 CDI P 1.7D **35°38.1842N** **139°42.9976E** T.TTG **2:15** 35°39.512N SOG ETA 04.28 17:52 139°41.867E **10.2 km/h** T.RNG **371.4 km** BRG **157.9°** COG **235.1°**
4 R001➡01 PRX P 1.7D 35°38.1842N 139°42.9976E **15.8 NM** BRG **158.6°** COG **235.1°** SOG **10.2 kn**	**5** R001➡01 P 1.7D XTE **0.23 NM** 35°38.1842N 139°42.9976E T.RNG **7.68 NM** BRG **157.9°** COG **152.1°** SOG **10.2 kn**

6 R001➡01 P 1.7D 35°38.1842N 139°42.9976E T.RNG **13.1 NM** BRG **237.9°** COG **235.1°** SOG **10.2 kn**

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

You can set the anchor position from the NAV2, NAV3, NAV4, NAV5 or NAV6 screen.

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 (6/E) key to select "**6: Alarms**".
(3) Press (2/N) key to select "**2: ANCH**".
(6) Select [**ON**] in the pop-up and press (ENT) key.

```
MENU                          6: Alarms
1: Waypoints                  1: GNSS Fix   = OFF
2: Routes                     2: ANCH       = OFF  1.00NM
3: GNSS                       3: PROX       = ON   1.00NM
4: DGNSS                      4: XTE        = ON   1.00NM
5: Compensation               5: CDI        = ON    45°
6: Alarms          Press      6: Message
7: Calculation      👉 6/E
8: Initial setup
9: Interface
10: Plotter
```
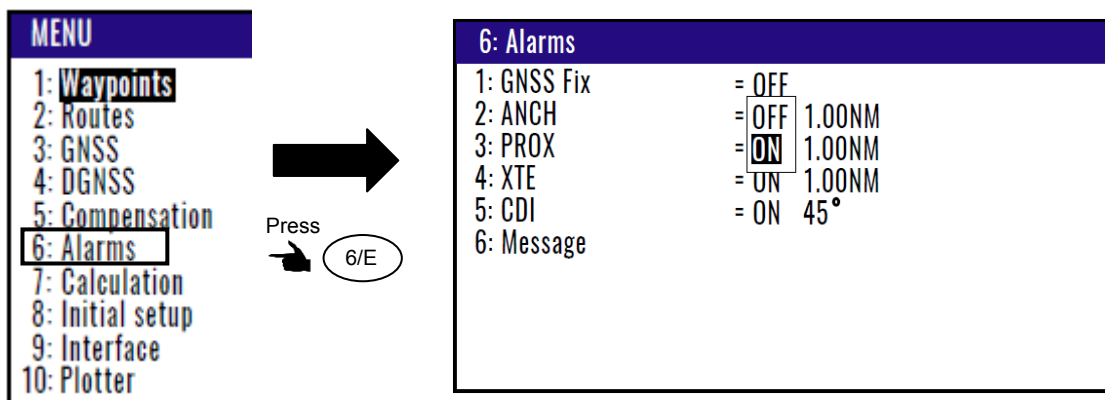
(5) Press (MODE) key until NAV2, NAV3, NAV4, NAV5 or NAV6 screen appears.
(6) Press (POB) key.
(7) Press (6/E) key. (Goto ANCH)

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

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

Anchor setting mark

```
2 ANCH        01.15.15 15:37:44   P 1.7D
   35°38.1842N
  139°42.9976E
RNG        0.08 NM   SOG    10. 2 kn
BRG        355. 4°   COG    240. 5°
```

```
3 ANCH                    P 1.7D  RNG
                                   0.55 km
   35°38.1842N              BRG
  139°42.9976E              157.9°
                                   COG
TTG    2:15  ▶ 35°39.512N   235.1°
ETA  04.28 17:52  139°41.867E  SOG  10.2 km/h
```

Anchor position

Anchor mark

4 ANCH	P 1.7D	RNG	1.46 NM
		BRG	237.9°
		COG	235.1°
5		SOG	
35°38.1842 N	139°42.9976 E		10.2 kn

5 ANCH	P 1.7D	RNG	0.18 NM
		BRG	157.9°
		COG	152.1°
XTE	1.00 1.00	SOG	
NM	35°38.1842 N		
	139°42.9976 E		10.2 kn

Anchor position

6 ANCH	P 1.7D	RNG	0.23 NM
.25		BRG	237.9°
W1033	N35 40.000	COG	235.1°
W0415 A9997 W7022	N35 35.000	SOG	
E139 00.000 E139 10.000			
35°38.1842 N	139°42.9976 E		10.2 kn

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

2.6.2 Canceling anchor position

(1) Press (MODE) key until NAV1, NAV2, NAV3, NAV4, NAV5 or NAV6 screen 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 NAV6 screen.

2.7.1   Display a cross cursor on NAV6 screen

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

(How to use cross cursor)

(1) Press (MODE) key until NAV6 screen appears.

(2) When you press (ENT) key, cursor appears.

(3) Press [◇] key to move display cursor.

Move quickly display cursor by pressing a long time [◇] key
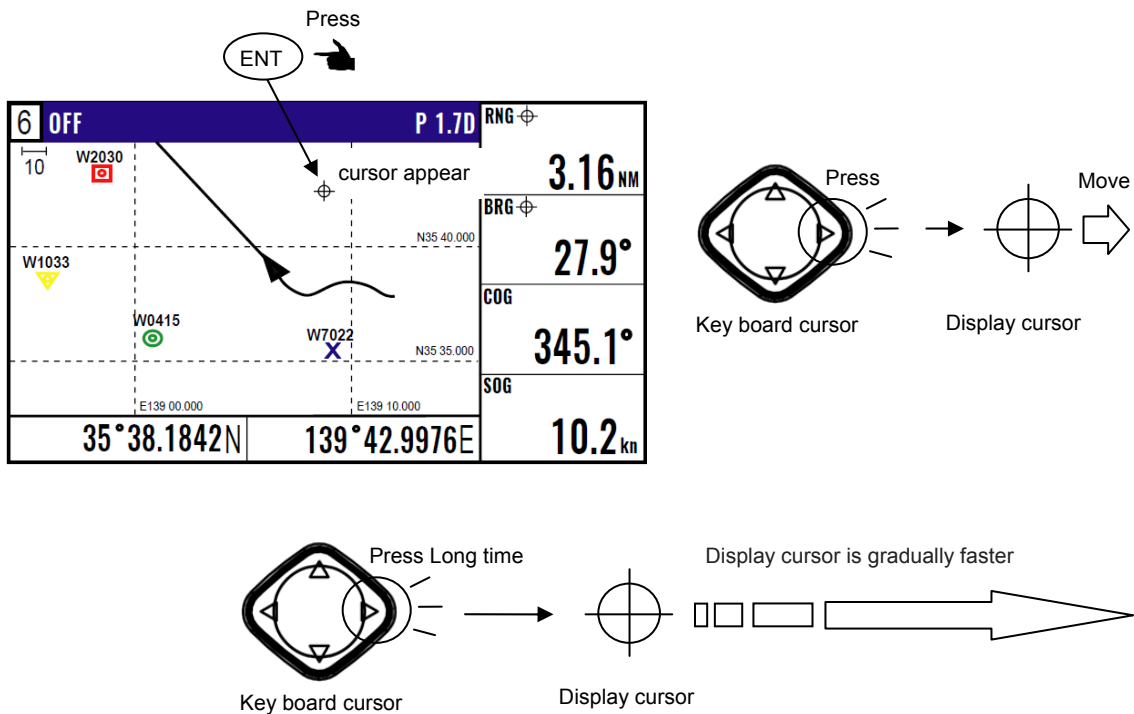
(How to store display cursor position)

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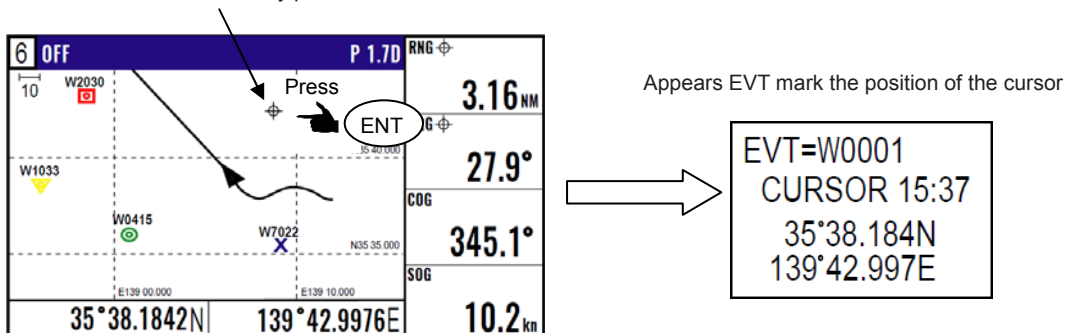
2.7.2   Screen scrolling

You can scroll the NAV6 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.

NAV6 screen moves by pressing [🔘] key, when display cursor is not displayed.

Press (5) key when you return to the current position.

2.7.3   Scaling the PLOT screen

You can select a display scale of PLOT (pages: 1, 2, 4) screen.

(1) Press to (2/N) or (8/S) key to select a desired range.

The range that can be changed is as follows.

(0.25, 0.5, 1, 2, 5, 10, 20)
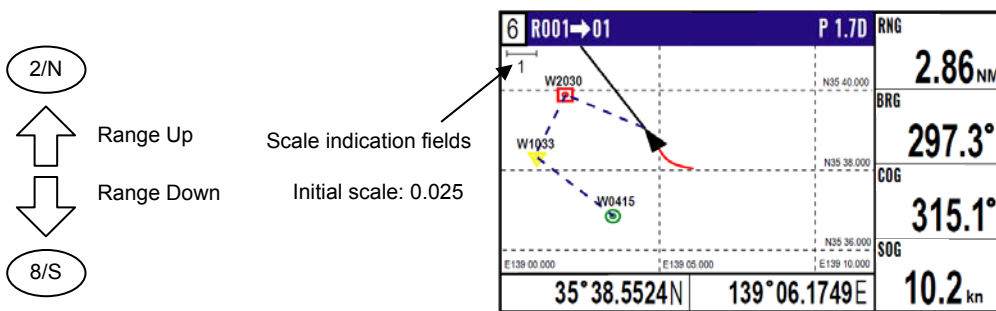
NOTE: *You can change the scale unit from Menu* **2: UNIT (nm)** *of* **8: INITIAL**

2.7.4   Changing the setup contents

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

(2) Press [**0**] 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.

Select symbol

Key board cursor

Press

ENT

Initial setup: ⊙ (Green)

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

You can select whether or not to display the Event mark information.

Symbol+Number
Symbol
Number
OFF

Press

ENT

Initial setup: Symbol + Number
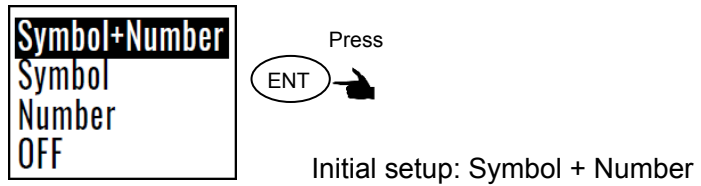
3) 3: Track color (Press (3) key)

You can select the color of the future Track.

Color select

Press

ENT

Initial setup: ▬▬ (Green)
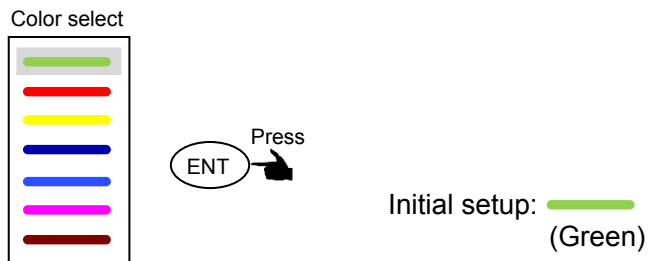
4) 4: Plot (Press (4W) key)

To adjust the track recording interval (time or distance interval), locate cursor on **PLOT** option, and press **ENT** key.
You can set the unit of track distance interval from the Menu **8-2: Units**

Select color

5sec	.01NM	OFF
10sec	.05NM	
20sec	.1NM	
30sec	.5NM	
1min	1NM	

Press

ENT

Initial setup: 5sec.

Plot speed select
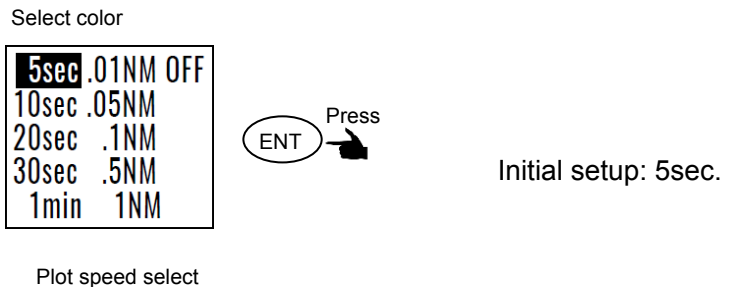
5) 5: Track clear (Press ⑤ key)

You can delete the track according to color or all color.

If you press the **ENT** key when the cursor is positioned at **Track clear**, the pop-up of select color will appear. Press **ENT** key after select color.

Select delete color
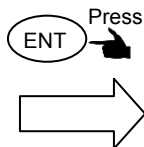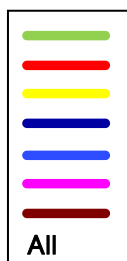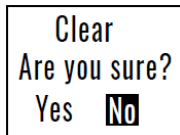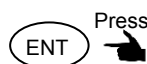
Chapter 3   Alarms

3.1   Kinds of alarms

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

```
6: Alarms
1: GNSS Fix      = OFF
2: ANCH          = OFF  1.00NM
3: PROX          = ON   1.00NM
4: XTE           = ON   1.00NM
5: CDI           = ON   45°
6: Message
```

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.

3.1.2   Anchor watch alarm (ANCH)

An anchor watch alarm can alert you if your boat drifts a set distance from where it is activated. This alarm function will not work if the alarm range is set to "0.00". **ANCH** letters blink and buzzer (short beep) sounds when outside of alarm range. Please refer **2.6.1 Storing an anchor position**. Press **CLR** key If you want to turn off buzzer.

Preset anchor watch alarm range   Blink

Anchor position
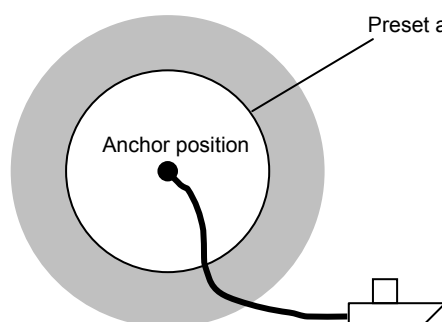
```
3 ANCH          ANCH          P 1.7D  RNG
                                             0.55 km
     35°38.1842N                     BRG
                                           157.9°
    139°42.9976E                     COG
                                           235.1°
TTG        2:15   35°39.512N   SOG
ETA   04.28 17:52  139°41.867E     10.2 km/h
```

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

3.1.3   Proximity alarm (PROX)

A proximity alarm alerts you when you arrive to within a preset distance to a waypoint.
The proximity alarm will not work if the alarm range is set to "0.00". Note: you will automatically advance to the next waypoint at the alarm range if you have selected the CIRCLE mode of route navigation by "Automatic switching of waypoints" (page 2-13). **PRX** letters blink and buzzer (short beep) sounds when I arrive. Press **CLR** key, if you want to turn off buzzer.
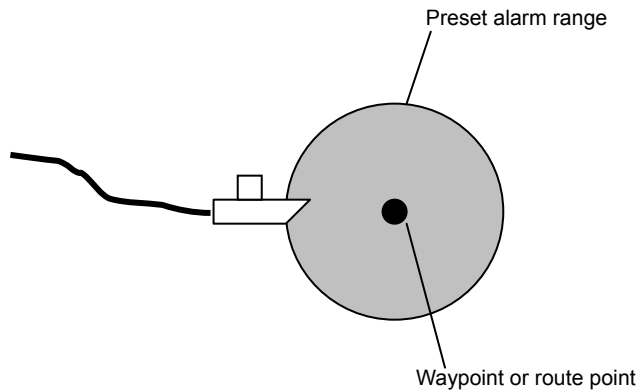
Preset alarm range

Blink

Waypoint or route point

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

3.1.4   Cross track error alarm (XTE)

The cross track error (XTE) alarm alerts you when you have deviated from your course line by a predetermined distance. The alarm function does not work if the alarm range is set to '0.00'. The course width shown on NAV3 screen is the same as the XTE alarm value you have set. **XTE** letters blink and buzzer (long beep) sounds when I'm away from XTE range.
Press **CLR** key, if you want to turn off buzzer.

Present alarm range

Blink

Origin

Waypoint or route point

Course line

Cross track error (XTE)

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

3.1.5 Course deviation angle alarm (CDI)

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". **CDI** letters blink and buzzer (long beep) sounds when I'm away from CDI range. Press **CLR** key, if you want to turn off buzzer.
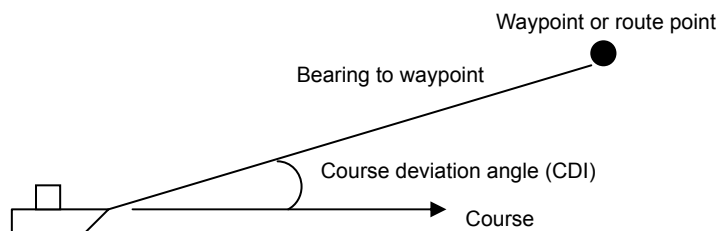
Initial setup: ON, 45 degrees
Enter an alarm range: 00 to 99 degrees

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

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

(3) Select item number of the alarm to be set by numeric keys.

(4) Press [▲] or [▼] key to move cursor to **ON**.

(5) Press (ENT) key.

(Changing alarm range)

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

(2) Press (6/E) key to select "**6: 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. CDI alarm range is 2-digit.

(6) Press (ENT) key.

1.00NM

(Canceling alarm)

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

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

(3) Select desired alarm number by numeric keys.

(4) Press [▲] or [▼] key to move cursor to [**OFF**].

(5) Press (ENT) key.

OFF
ON

Chapter 4   Setup Procedure

4.1   Menu options

```
MENU
1: Waypoints
2: Routes
3: GNSS
4: DGNSS
5: Compensation
6: Alarms
7: Calculation
8: Initial setup
9: Interface
10: Plotter
```

> **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 erase waypoints. (See pages 2-1 to 2-5)

```
1:Waypoints
W1000  X  35°38.209N  139°06.749E    03.07.15  06:38
W1001  □  35°38.337N  139°06.035E
W1002  ▽  35°38.052N  139°06.977E    YOKOHAMA 1
W1003  ◘  35°38.229N  139°06.428E    04.19.15  13:38
W1004  ▽  35°37.810N  139°06.385E    YOKOHAMA 2
W1005  X  35°37.727N  139°06.549E    04.19.15  14:58
W1006  X  35°36.245N  139°05.448E
W1007  ◉  35°38.222N  139°06.339E    URAYASU
W1008  ◉  35°38.092N  139°06.165E    ODAIBA
W1009  X  35°38.706N  139°06.015E    05.11.15  14:18
```

(2) Routes
Store and erase a route. Forward/backward navigation Selection. Automatic route switching. Waypoint data switching. (See pages 2-12 to 2-18).

```
2-1:Route Set / Edit
R010:■              (Total:000)
  01: W      °  .  N      °  .  E
  02: W      °  .  N      °  .  E
  03: W      °  .  N      °  .  E
  04: W      °  .  N      °  .  E
  05: W      °  .  N      °  .  E
  06: W      °  .  N      °  .  E
  07: W      °  .  N      °  .  E
  08: W      °  .  N      °  .  E
  09: W      °  .  N      °  .  E
  10: W      °  .  N      °  .  E
```

(3) GNSS
Display GNSS satellite status. Switch (2- and 3-dimensional) positioning modes. Select datum. Set antenna height (above sea level). See DOP value to limit fix data Set satellite elevation angle limit. Select RAIM function. Select RAIM accuracy.

```
3: GNSS
1: GNSS monitor
2: GNSS mode         = GPS
3: Datum             = WGS-84
4: C/N mask          = 35dB
5: Elevation mask    =  5°
```

(4) Differential GNSS (DGNSS)
Select DGNSS style. Select DGNSS mode. Set DGNSS timeout. Select beacon station. Set beacon frequency. Select beacon bit rate. Set DGNSS input baud rate. Monitor DGNSS data. Monitor beacon message.

```
4: DGNSS
1: DGNSS mode        = Auto
2: Time out          = 060 sec.
3: SBAS selection    = Auto
4: SBAS Other        = PRN 120
5: Beacon selection  = Auto
6: Frequency         = 283. 5 kHz
7: Bit rate          = 200 bps
8: Baud rate         = 4800 bps
9: Beacon monitor
```

(5) Compensation
Position correction (LAT/LONG, LOPs) Compass correction Time difference

```
5: Compensation
1: Latitude / Longitude
2: LOP
3: Magnetic variation  = Auto
                       = +006.8°
4: Time difference     = +00:00
```

(6) Alarm (See pages 3-1 to 3-4)
Anchor watch alarm. Proximity alarm. XTE alarm. CDI alarm. Alarm message.

```
6: Alarms
1: GNSS Fix    = OFF
2: ANCH        = OFF  1.00NM
3: PROX        = ON   1.00NM
4: XTE         = ON   1.00NM
5: CDI         = ON   45°
6: Message
```

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

```
7: Calculation
1: 2Points
2: L/L→LOP
3: Navigation plan
```

(8) Initial setup
Set average constants. Select distance/speed units. Select antenna height (above sea level) units. Select navigation mode. Select position display mode (LAT/ LONG, LOPs). Select LAT/LONG display digits Set chain.

```
8: Initial setup
1: Averaging      = 0
2: Units          = NM
3: Sailing mode   = Great circle
4: Position       = L/L
5: L/L units      = .001
6: GNSS source    = Internal
7: Language       = Engrish
8: Lop            = LoranC
9: Chain          = 0000-0-0
```

(9) Interfacing
Select output format. Edit the output format (IEC 61162-1). Select ACK/ALARM output

```
9: Interface
1: Connector      = DATA1
2: Format         = NMEA 0183 Ver.2.0
3: Baud rate      = 4800
4: Main Talker ID = System dependent
5: Sentence edit
```

(10) Plotter
You can change the settings of [**Plotter**]. NAV6 screen

```
10: Plotter
1: Mark symbol    = ⊙
2: Mark display   = Symbol+Number
3: Track color    = ▬▬▬
4: Plot           = 5sec
5: Track clear
```

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**". Reason for alarm notification is displayed
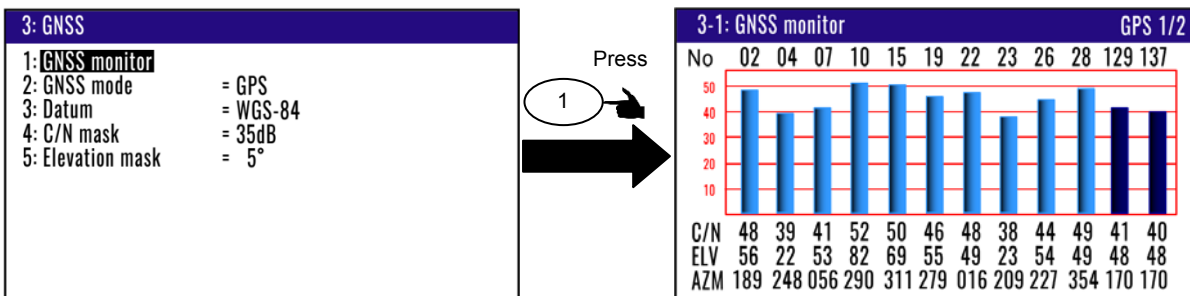
4.2.2 Selecting a GNSS mode

There are the three modes, GPS, GPS+GLONASS. Usually, it is used in GPS mode.

(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.
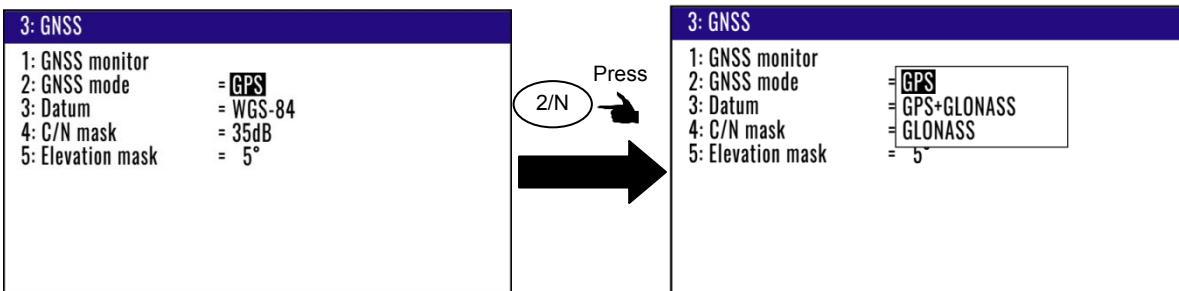
Initial setup: GPS

4.2.3 Selecting a geodetic datum

The latitude and longitude are calculated based on the WGS-84 with GNSS system. However, the charts used in many countries are based on different geodetic datum. You can compensate this difference from your chart by converting GNSS position data into your actual chart system. To select a geodetic datum, see "Local Geodetic Systems" (Chapter 9 Annex).

(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: DATUM**".

(4) Press [▲] or [▼] key to move cursor onto the desired geodetic datum.

(5) Press (ENT) key.

```
3: GNSS
1: GNSS monitor
2: GNSS mode        = GPS
3: Datum            = WGS-84
4: C/N mask         = 35dB
5: Elevation mask   =  5°
```
Press (3) Press →

```
3-3: Datum                              1/5
00: WGS-84          10: NRD-83
01: WGS-72          11: ICELAND 55
02: TOKYO           12: IRELAND 65
03: NRD-27          13: NEWZELAND
04: ALASKA/KANADA   14: EUROPIAN 79
05: EUROPIAN 50     15: ROME 40
06: AUSTRALIAN 84   16: SOUTH AFRICA
07: SOUTH ASIA      17: SAUDI ARABIA
08: SOUTH AMERICA   18: INDIAN/NEPAL
09: GREENLAND       19: PHILPPINES
```

Initial setup: WGS-84

4.2.4 Setting the mask level of carrier-to-noise ratio

Usually this set value is used initial set other than the special case.

(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: C/N mask**".

(4) Press [▲] or [▼] key to move cursor onto the desired C/N mask.

(5) Press (ENT) key.

```
3: GNSS
1: GNSS monitor
2: GNSS mode        = GPS
3: Datum            = WGS-84
4: C/N mask         = 10dB
5: Elevation mask   =  5°
```
Press (4/W) →

```
3: GNSS
1: GNSS monitor
2: GNSS mode        = 45
3: Datum            = 40  S-84
4: C/N mask         = 35  B
5: Elevation mask   = 30
                      25
                      20
                      15
                      10
```
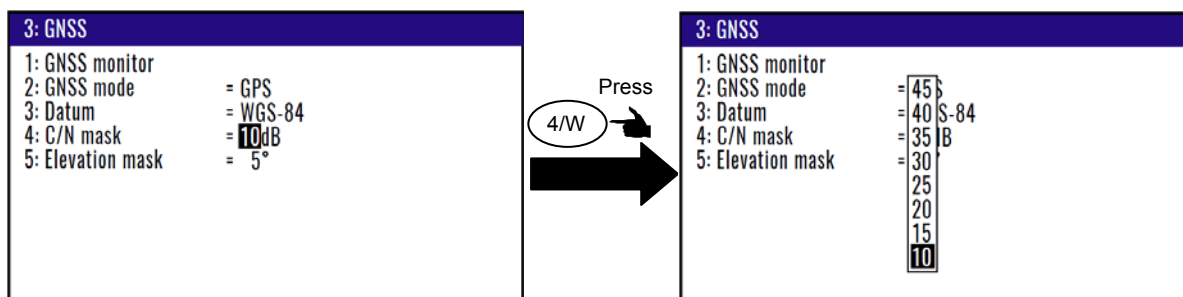
Initial setup: 10dB

4.2.5   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 (5) key to select "**5: Elevation mask**".

(4) Press [▲] or [▼] key to move cursor onto elevation angle masking.

(5) Press (ENT) key.
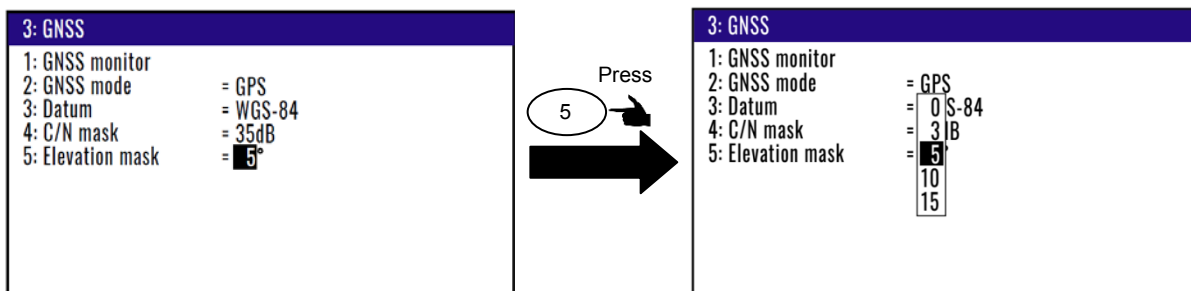
Initial setup: 5°

4.3   Menu 4: Differential GNSS(DGNSS)

This DGNSS system can improve the GNSS positioning accuracy. There are three styles, Auto and SBAS and Beacon. "BEACON" requires a signal from the external receiver system which outputs the compensation data of RTCM SC-104. (Example KBG-3 or other brand)
"AUTO" mode is automatically changes SBAS and Beacon which continue DGNSS performance.

4.3.1   Displaying DGNSS

When the DGNSS is set, the DGNSS status is displayed with letters **D** by the top right corner of the screen.

4.3.2   Selecting a style of DGNSS

Auto: DGNSS correction takes place when DGNSS correction data is received.
BEACON: DGNSS for RTCM SC-104.
SBAS: WAAS / EGNOS / MSAS / GAGAN / SDCM / Other
OFF: Normal GNSS positioning takes place. **D** letter is not shown.
(1) Press (MENU) key until Menu options 1 to 10 appears.
(2) Press (4)   key to select "**4: DGNSS**".
(3) Press (1)   key to select "**1: DGNSS mode**".
(4) Press [▲] or [▼] key to move cursor onto "**Auto**" or "**SBAS**" or "**BEACON**" or "**OFF**".
(5) Press (ENT) key.
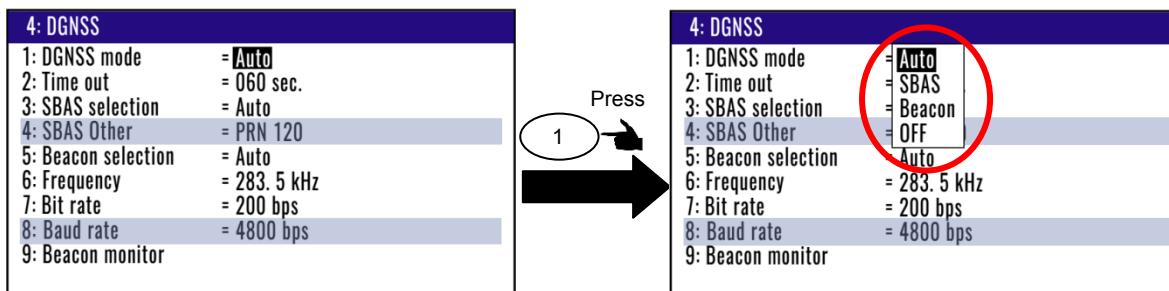
Initial setup: Auto

4.3.3   Setting a DGNSS timeout

If the correction data from beacon receiver is interrupted or has errors, NAVIGATOR holds the last differential correction for the duration of timeout. You can set Time out to 005 to 100 seconds. However, the position accuracy degrades as Time out lengthens.

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

(2) Press (4) key to select "**4: DGNSS**".

(3) Press (2/N) key to select "**2: Time out**".

(4) Enter a timeout (005 to 100 seconds) by numeric keys.

(5) Press (ENT) key.

```
4: DGNSS
1: DGNSS mode        = Auto
2: Time out          = 060 sec.
3: SBAS selection    = Auto
4: SBAS Other        = PRN 120
5: Beacon selection  = Auto
6: Frequency         = 283. 5 kHz
7: Bit rate          = 200 bps
8: Baud rate         = 4800 bps
9: Beacon monitor
```

Initial setup: 60 sec

4.3.4   Selecting a SBAS station

KGP-915 can utilize the SBAS. Kind of receivable SBAS is WAAS, EGNOS, MSAS, GAGAN, SDCM, Other. There is an Auto function in the selection of SBAS. Auto function selects the nearest station. PRN number zone becomes valid if you select the other. This mode is disable when "**1: DGNSS mode**" is selected "**BEACON**" or "**OFF**".

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

(2) Press (4) key to select "**4: DGNSS**".

(3) Press (3) key to select "**3: SBAS selection**".

(4) Press [▲] or [▼] key to move cursor onto selecting function.

(5) Press (ENT) key.

```
4: DGNSS
1: DGNSS mode        = Auto
2: Time out          = 060 sec.
3: SBAS selection    = Auto
4: SBAS Other        = PRN 120
5: Beacon selection  = Auto
6: Frequency         = 283. 5 kHz
7: Bit rate          = 200 bps
8: Baud rate         = 4800 bps
9: Beacon monitor
```

Press
(3)

```
4: DGNSS
1: DGNSS mode        = Auto
2: Time out          = 060 sec.
3: SBAS selection    Auto
4: SBAS Other        WAAS
5: Beacon selection  EGNOS
6: Frequency         MSAS   Hz
7: Bit rate          GAGAN
8: Baud rate         SDCM   s
9: Beacon monitor    Other
```

Initial setup: Auto

(Selecting a station in the Other mode)

(6) Press (4) key to select "**4: SBAS Other**".

(7) Enter a PRN number (120 to 158) by numeric keys.

(8) Press (ENT) key.
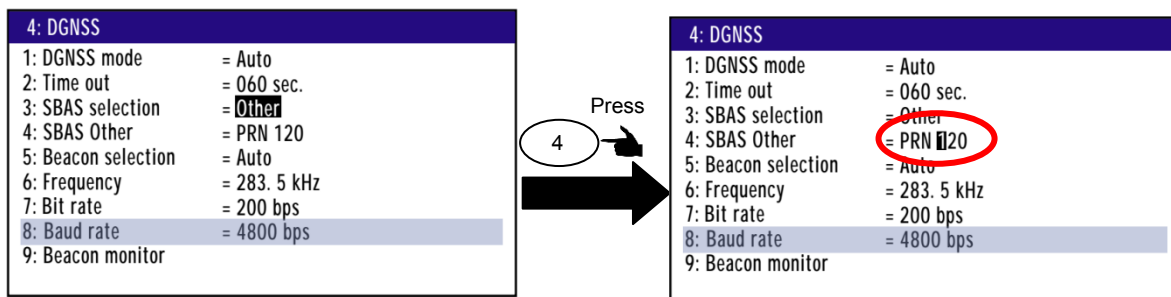
Initial setup: PRN120

4.3.5   Selecting a beacon station (Beacon DGNSS only)

A beacon station is selectable in both the manual or auto mode. This mode is disable when "**1: DGNSS mode**" is "**SBAS**" or "**OFF**".

If the beacon receiver to be connected supports automatic tuning, in the auto mode, the nearest station will be selected based on actual longitude and latitude among all the stored beacon stations.

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

(2) Press (4) key to select "**4: DGNSS**".

(3) Press (5) key to select "**5: Beacon selection**".

(4) Press [▲] or [▼] key to move cursor settings you select

(5) Press (ENT) key.
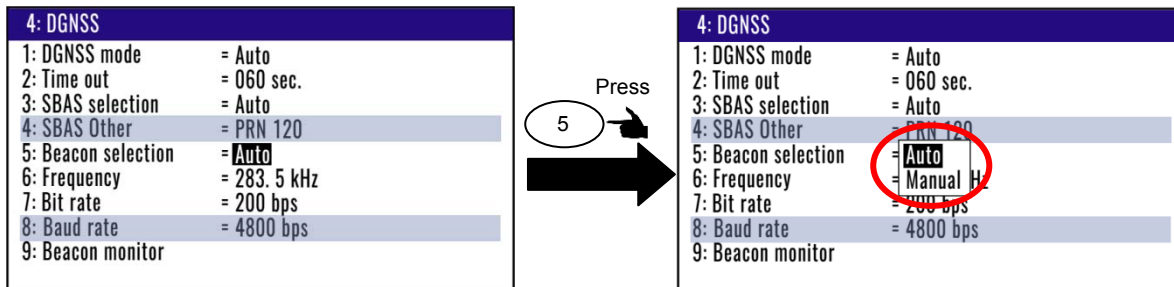
Initial setup: Auto

4.3.6   Setting receiving frequency and bit rate of a beacon station

You can set the receiving frequency (283.5 kHz to 325.0 kHz) that is transmitted from a beacon station. In addition, Bit rate you can also change "50bps", "100bps", "200bps". This mode is disabled when "**5: Beacon selection**" is "**AUTO**".

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

(2) Press (4) key to select "**4: DGNSS**".

(3) Press [▲] or [▼] key to move cursor "**6: Frequency**".

(4) Specify receiving frequency (4-digit) of beacon station by numeric keys (0 to 9).

(5) Press (ENT) key to set receiving frequency.

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

(7) Press (ENT) key.

(8) Press [▲] or [▼] key to set bit rate "50bps", "100bps", "200bps".

(9) Press (ENT) key.

Frequency Initial setup: **283.5 kHz**
Selectable range: **283.5 to 325.0 kHz**
Bit rate Initial setup: **200 bps**

4.3.7   Selecting the DGNSS input signal baud rate

Adjust the baud rate of RTCM SC-104 format signal reception to the output signal baud rate of beacon receiver.

To change the baud rate, the following settings are required

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

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

(3) "**1: Connector**". = "**DATA2**"

   "**2: Format**". = "**RTCM**"

*Note: Without "**9: Interface**" setting, "**4: DGNSS**" in "**8: Baud rate**" cannot change

To change the baud rate

This mode is disabled when "**5: Beacon selection**" is "**AUTO**".

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

(2) Press (4) key to select "**4: DGNSS**".

(4) Press (8) key to select "**8: Baud rate**".

(5) Press [▲] or [▼] key to move cursor onto the correct baud rate "2400", "4800", "9600",.

(6) Press (ENT) key.
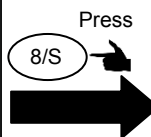
4.3.8 Beacon monitor

DGNSS monitor provides information on the DGNSS beacon receiver interface and receiving status.

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

(2) Press (4) key to select "**4: DGNSS**".

(3) Press (9) key to select "**9: Beacon monitor**".

```
4: DGNSS
1: DGNSS mode        = Auto
2: Time out          = 060 sec.
3: SBAS selection    = Auto
4: SBAS Other        = PRN 120
5: Beacon selection  = Auto
6: Frequency         = 283. 5 kHz
7: Bit rate          = 200 bps
8: Baud rate         = 4800 bps
9: Beacon monitor
```

Press
9 →

```
4-9: Beacon monitor
Frequency        = 309.0 kHz
Bit rate         = 200 bps
S/N              = 28 dB
ID No.           = 686
Data age         = 004
Beacon Health    = 0

Type 16 message: Type16 no data
```
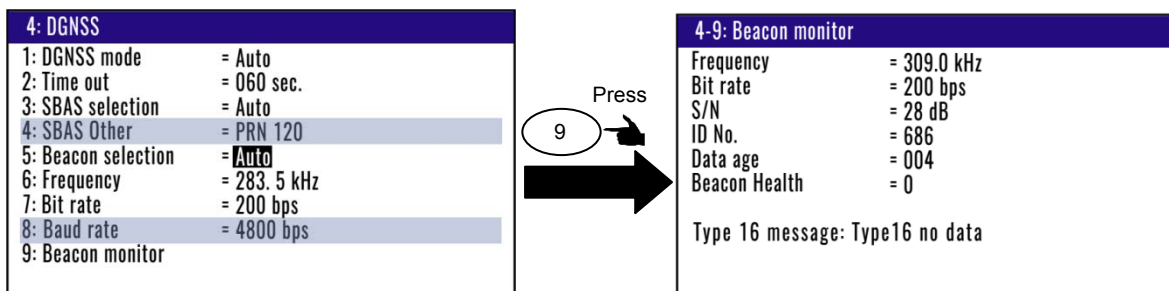
4.4   Menu 5: Compensation

4.4.1   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.

```
5: Compensation
1: Latitude / Longitude
2: LOP
3: Magnetic variation    = Auto
                         = +006.8°
4: Time difference       = +00:00
```
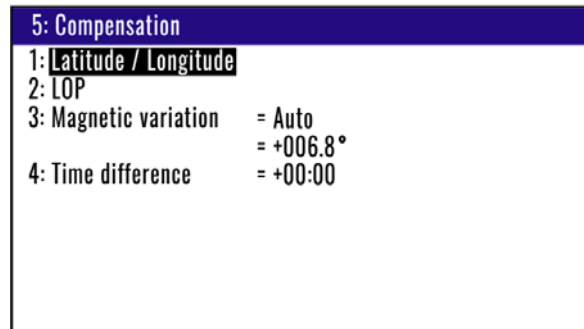
(Direct entry of actual position data)

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 (5) key to select "**5: Compensation**".

(3) Press (1) key to select "**1: Latitude / Longitude**".

(4) Enter the correct latitude and longitude value.

Example: The position "N35°38.544 / E139°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**], [**9**], [**0**], [**6**], [**1**], [**8**], [**3**], [**E**], [**ENT**]

```
5-1: Latitude/Longitude
Latitude         =  35°38.544N
Longitude        = 139°06.183E

Latitude         =  00°00.008S
Longitude        = 000°00.003E
```

Actual position →
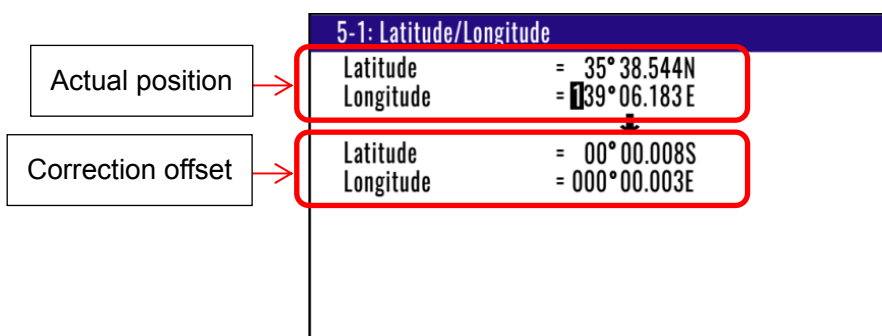
Correction offset →

(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 (5) key to select "**5: Compensation**".

(3) Press (1) key to select "**1: 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]

```
5-1: Latitude/Longitude
```

Corrected position → Latitude   = 35° 38.544N
                      Longitude   = 139° 06.183E

Correction offset → Latitude   = 00° 00.008S
                     Longitude   = 000° 00.003E
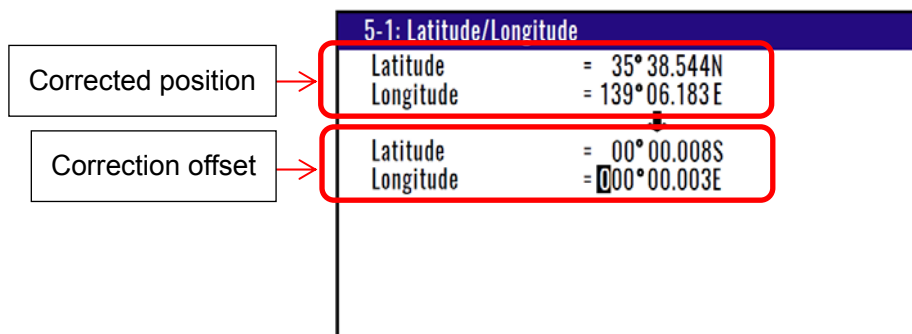
4.4.2 Disable position correction

To delete and disable the correction offset follow these steps:

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

(2) Press (5) key to select "**5: Compensation**".

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

```
Delete
Are you sure?
Yes   No
```
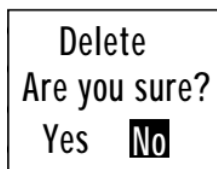
4.4.3 Compensating the LOP

KGP-915 is converted from Latitude and Longitude to LoranC, LoranA and Decca. It can be corrected in the converted data.

To change the "2: LOP", the following settings are required

You can set of LoranA, LoranC or Decca of "**2: LOP**" change when you changed **8: Lop** and **9: Chain** in the **Menu9: Initial setup.**

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

(2) Press (8) key to select "**8: Initial setup**".

(3) Press (8) key to select "**8: Lop**".

(4) Setting "LoranA" or "LoranC" or "Decca"

(5) Press (ENT) key.

(6) Press (9) key to select "**9: Chain**".

(7) Select a station you want to measure

```
8: Initial setup
1: Averaging          = 0
2: Units              = NM
3: Sailing mode       = Great circle
4: Position           = Lop
5: L/L units          = .001
6: GNSS source        = Internal
7: Language           = Engrish
8: Lop                = LoranC
9: Chain              = 9970-3-5
```

To change the "2: LOP"

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

(2) Press (5) key to select "**5: Compensation**".

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

Actual position →
```
5-2: LOP
S1                = 35558.1
S2                = 60214.0
```

Correction offset →
```
S1                = +0001.0
S2                = -0000.8

LoranC
Chain    9970-3-5
```

Corrected position →
```
5-2: LOP
S1                = 35558.1
S2                = 60214.0
```

Correction offset →
```
S1                = +0001.0
S2                = -0000.8

LoranC
Chain    9970-3-5
```

In the case of LoranA

```
5-2: LOP
S1                = 4398.3
S2                = 1254.3
          ↓
S1                = -001.2
S2                = +000.9

LoranA
Chain    2S1-2S2
```

In the case of DECCA

```
5-2: LOP
 S1                    = O F:31:95
 S2                    = 0G:53:19
                           ↓
 S1                    = +:00:02
 S2                    = +:00:05

DECCA
Chain    Auto
         41-GP
```

4.4.4   Compensating the compass

The course and bearing to waypoint is 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 (5) key to select "**5: Compensation**".

(3) Press (3) key to select "**3: Magnetic variation**".

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

(5) Press (ENT) key.

```
5: Compensation
1: Latitude / Longitude
2: LOP
3: Magnetic variation    = Auto
                         = Manual
4: Time difference       = 00:00
```
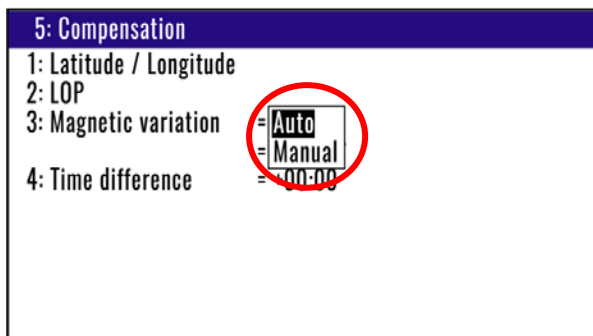
Initial setup: AUTO

(Manual compensation)

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

(5) Press (ENT) key.

(6) Press (ENT) key to change the correction offset.

(7) Press [▲] or [▼] key to use the current positive (+) or negative (-) sign as it is.

(8) Enter a (4-digit) compensation offset by numeric keys.

(9) Press (ENT) key.

5: Compensation
1: Latitude / Longitude
2: LOP
3: Magnetic variation   = Manual
                         = +000.0°
4: Time difference   = +00:00
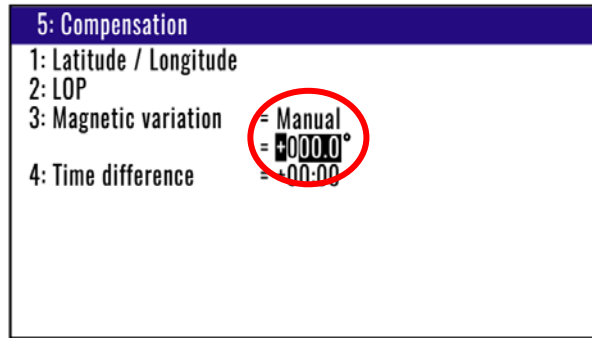
Initial setup: 0.0°
Setup range: -180.0° to +180.0°

4.4.5 Displaying local time

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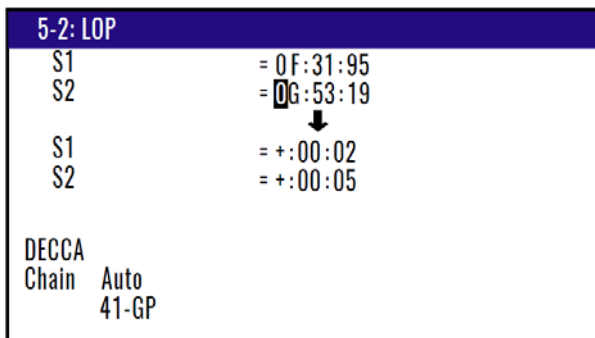
See the following figure 4.1 to determine zone time difference.

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

(2) Press (5) key to select "**5: Compensation**".

(3) Press (4/W) key to select "**4: Time difference**".

(4) Press (ENT) key to change the correction offset.

(5) Press [▲] or [▼] key to use the current positive (+) or negative (-) sign as it is.

(6) Enter a (4-digit) compensation offset by numeric keys.

(7) Press (ENT) key.

> **CLR**   **NOTE:** *Press to clear incorrect input. You can reenter a "+" or "-" sign and numeric data.*
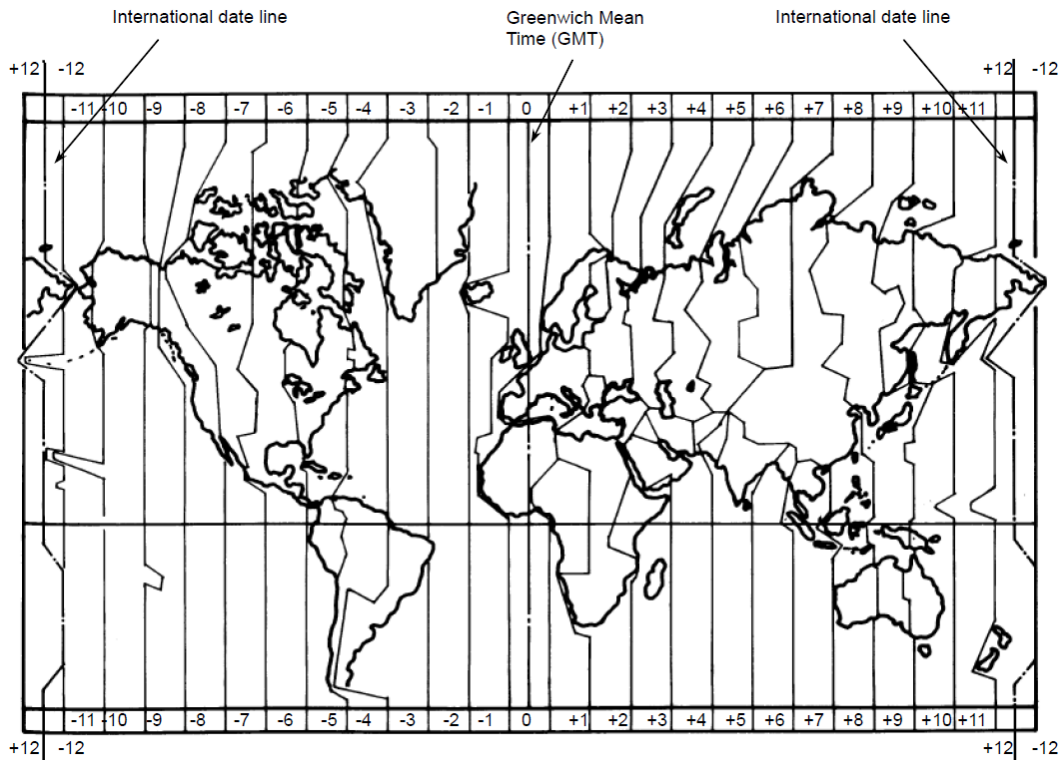
Figure 4.1 Time difference chart

Initial setup: 00:00 hour

4.5   Menu 7: Calculation

4.5.1   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 (7) key to select "**7: Calculation**".

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

(4) Enter a (4-digit) origin WPT number (0000 to 9999).

(6) Press (ENT) key.

(7) Press [▶] key.

(7) Enter a (4-digit) final WPT number (0000 to 9999).

(8) Enter "N" for north or "S" for south latitude.

(9) Press (ENT) key.
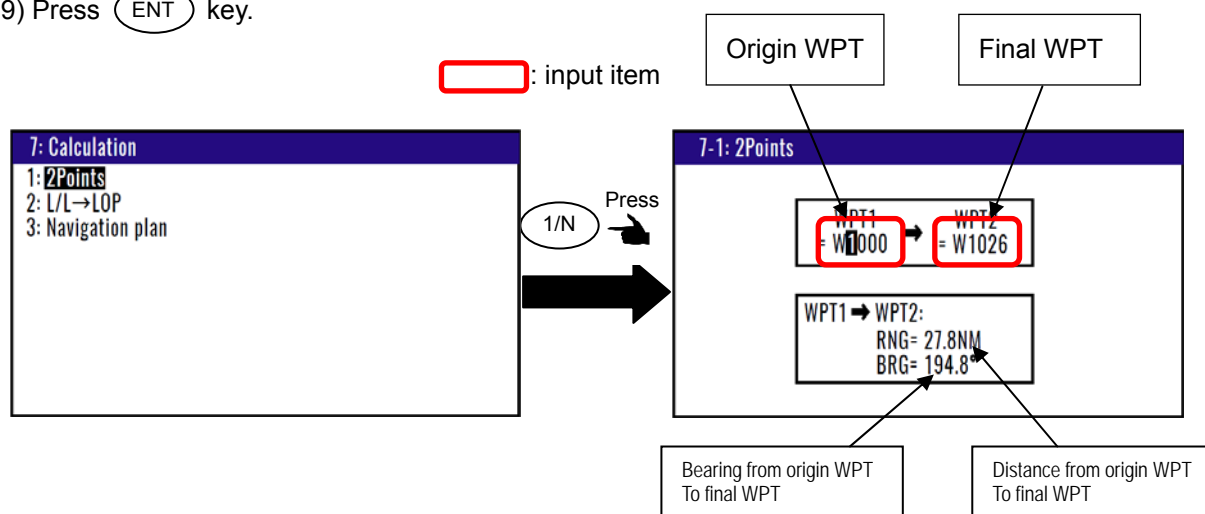
4.5.2   Calculating LOPs based on LAT/LONG data

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.

To change the "2: LOP", the following settings are required

You can set of LoranA, LoranC or Decca of "**2: LOP**" change when you changed **8:Lop** and

9:Chain in the **Menu9: Initial setup.**

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

(2) Press (8) key to select "**8: Initial setup**".

(3) Press (8) key to select "**8: Lop**".

(4) Setting "LoranA" or "LoranC" or "Decca"

(5) Press (ENT) key.

(6) Press (9) key to select "**9: Chain**".

(7) Select a station you want to measure

In the case of LoranC

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

(2) Press (7) key to select "**7: Calculation**".

(3) Press (2) key to select "**2: L/L→LOP**".

(4) Enter (4-digit) Loran C chain number.

(5) Enter the first digit of two Loran C secondary 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.
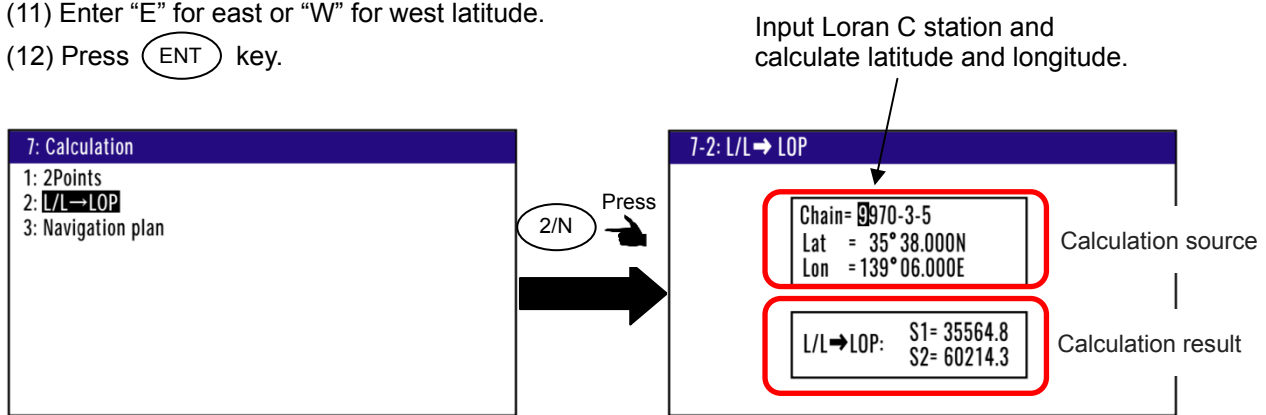
Input Loran C station and calculate latitude and longitude.

If you 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 secondary 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 (7) key to select "**7: Calculation**".

(3) Press (2) key to select "**2: L/L→LOP**".

(4) Press (ENT) key.

(5) Press [▲] or [▼] [▶] or [◀] key to select the secondary station 1.

(6) Press (ENT) key.

(7) Press [▶] key to move the cursor to secondary station 2 field.

(8) Press (ENT) key.

(9) Press [▲] or [▼] key to select the secondary station 2.

(10) Press (ENT) key.

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

(12) Enter a (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.

```
2S0 2S6
2S1 2S7
2S2 2H4
2S3 2H5
2S4 2H6
2S5 2H7
```
To choose from this

```
7-2: L/L ➡ LOP

Chain= 2S1-2S2
Lat  = 35° 38.000N
Lon  =139° 06.000E

L/L➡LOP:   S1= 4398.3
           S2= 1252.2
```

If you 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 (7) key to select "**7: Calculation**".

(3) Press (2) key to select "**2: L/L→LOP**".

(4) Press (ENT) key.

(4) Enter (2-digit) Decca chain number.

(5) Press (ENT) key.

(6) Press [▶] key to move the cursor to combination field of secondary stations.

(7) Press (ENT) key.

(8) Press [▲] or [▼] key to select a combination of secondary stations.

(9) Press (ENT) key.

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

(11) Enter (7-digit) latitude using numeric keys.

(12) Enter "N" for north or "S" for south latitude.

(13) Press (ENT) key.

(14) Enter (8-digit) longitude using numeric keys.

(15) Enter "E" for east or "W" for west latitude.

(16) Press (ENT) key.
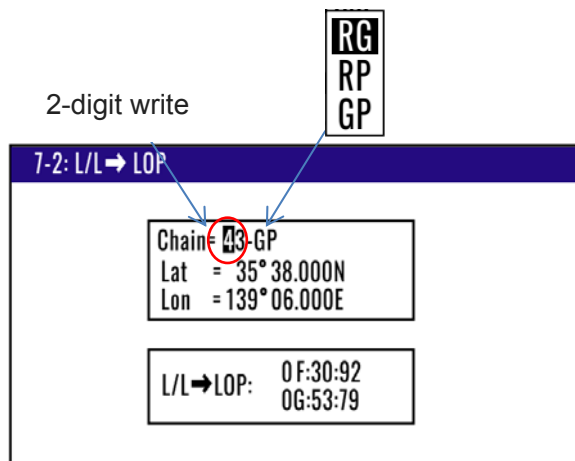
2-digit write

If you store the calculation result
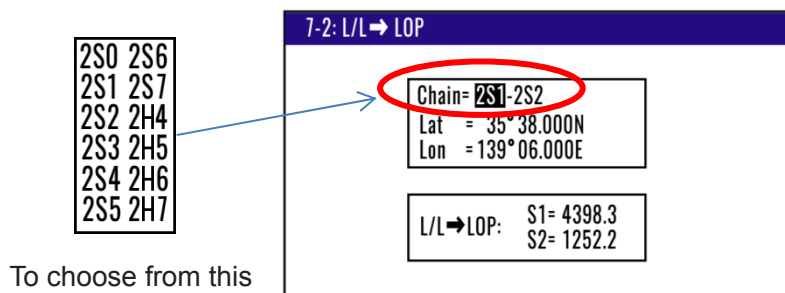
(1) Press [▼] key to display page 2/2.

(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.

4.5.3   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 (7) key to select "**7: 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.
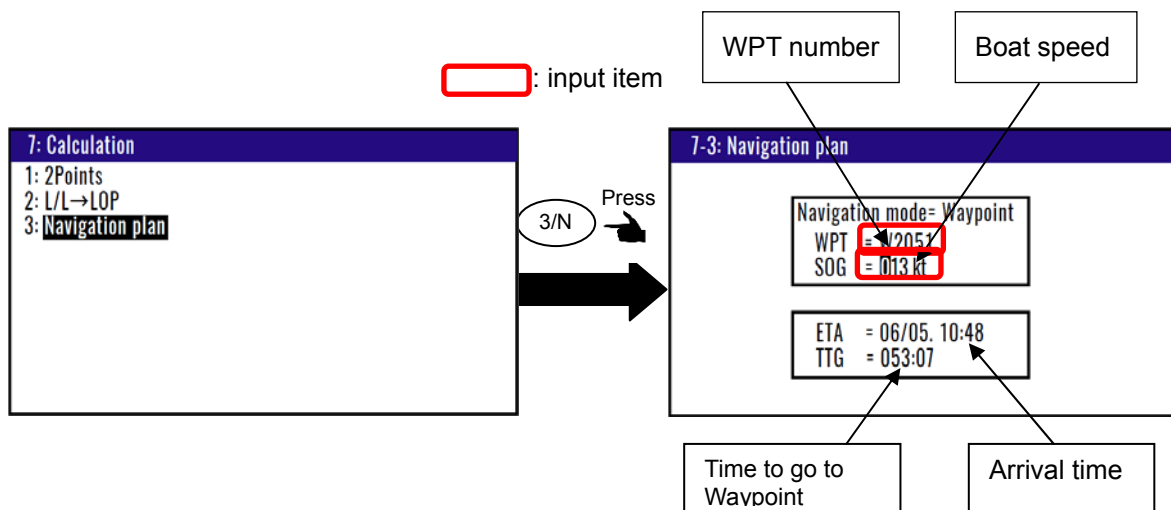
: input item

WPT number   Boat speed

7: Calculation
1: 2Points
2: L/L→LOP
3: Navigation plan

Press
3/N

7-3: Navigation plan
Navigation mode= Waypoint
WPT = 1/2051
SOG = 013 kt
ETA = 06/05. 10:48
TTG = 053:07

Time to go to Waypoint   Arrival time

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 (7) key to select "**7: 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.

: input item

WPT number   Boat speed

7: Calculation
1: 2Points
2: L/L→LOP
3: Navigation plan

Press
3/N

7-3: Navigation plan
Navigation mode= Waypoint
WPT = 1/2051
SOG = 013 kt
ETA = 06/05. 10:48
TTG = 053:07

Time to go to Waypoint   Arrival time

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 (7) key to select "**7: 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.

▭ : input item

Route plan   Boat speed

```
7: Calculation
1: 2Points
2: L/L→LOP
3: Navigation plan
```

3/N Press

```
7-3: Navigation plan

Navigation mode= Route
   WPT = R001 → 07
   SOG = 013 kt

   ETA = 06/05. 10:48
   TTG = 029:28
```
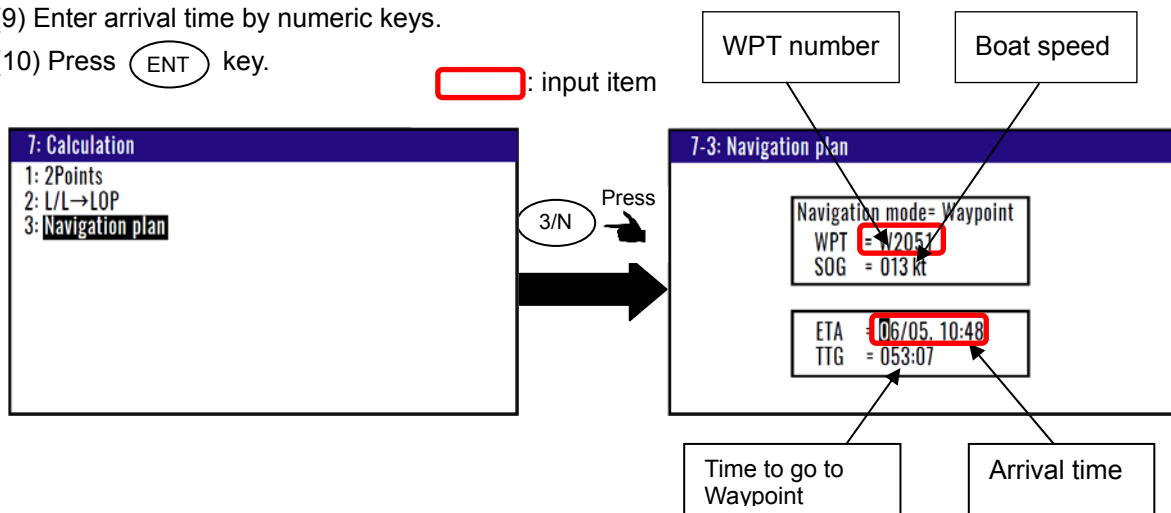
Total navigation time   Arrival time

Calculating boat speed and time to go to waypoint from WPT number and arrival time.
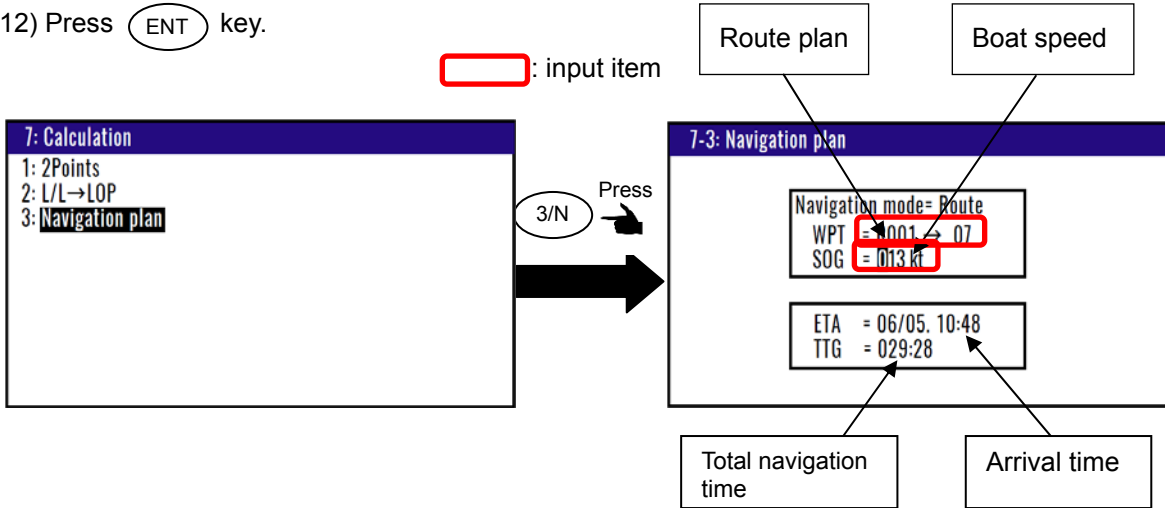
(1) Press (MENU) key until Menu options 1 to 10 appears.

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

▭ : input item

Route plan   Boat speed

```
7: Calculation
1: 2Points
2: L/L→LOP
3: Navigation plan
```

3/N Press

```
7-3: Navigation plan

Navigation mode= Route
   WPT = R001 → 07
   SOG = 013 kt

   ETA = 06/05. 10:48
   TTG = 029:28
```

Total navigation time   Arrival time
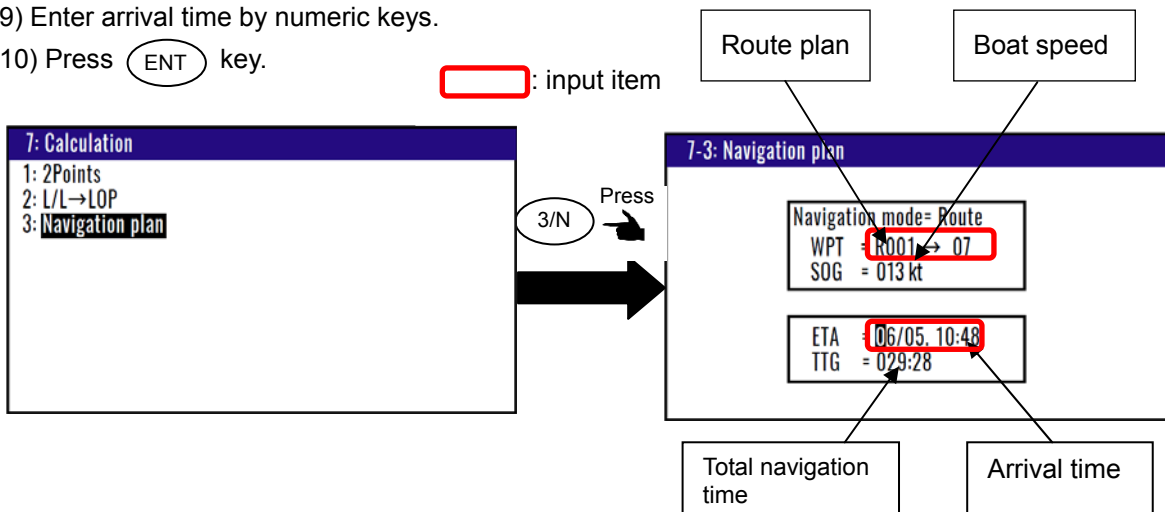
4.6   Menu 8: Initial setup

4.6.1   Setting average constants(measuring position, speed and course)

Use the averaging function to compare GNSS sensor signals several times and get their average. This stabilizes the GNSS position (latitude and longitude), speed and course data. The maximum averaging rate is "4" and the minimum averaging rate is "0". When you select "4" value, data is averaged more often and the display data has smaller variations. However, delays for updating occur. When you select a "0" value, data is averaged less but the display data responds quicker.

Selecting a constant (averaging constant) suitable for your boat speed will provide you with smoother data of the boat position, course and speed.

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

(2) Press (8) key to select "**8: Initial setup**".

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

(4) Press [▲] or [▼] key to move cursor onto the average constants to select "0 to 4".

(5) Press (ENT) key.
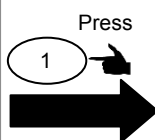
Initial setup: 0

4.6.2   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) key to select "**8: Initial setup**".

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

(4) Press [▲] or [▼] key to move cursor onto the distance or speed unit "NM", "km", "sm".

(5) Press (ENT) key.
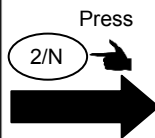
Initial setup: NM

4.6.3   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) key to select "**8: Initial setup**".

(3) Press (3) key to select "**3: Sailing mode**".

(4) Press [▲] or [▼] key to move cursor onto the sail mode to "Great circle", "Mercator".

(5) Press (ENT) key.

Initial setup: Great circle
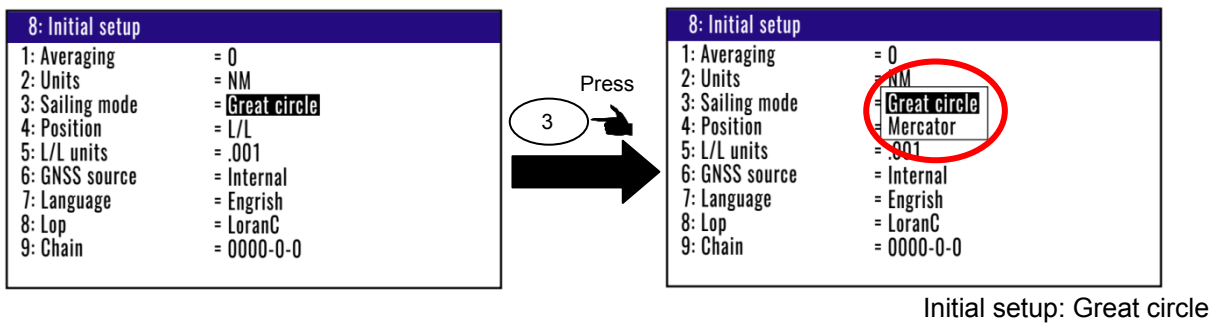
4.6.4   Displaying position data in LAT/LONG mode

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) key to select "**8: Initial setup**".

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

(4) Press [▲] or [▼] key to move cursor to "L/L", "Lop".

(5) Press (ENT) key.

Initial setup: L/L

4.6.5 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) key to select "**8: Initial setup**".

(3) Press (5) key to select "**5: L/L units**".

(4) Press [▲] or [▼] key to move cursor to ".001", ".0001".

(5) Press (ENT) key.

Press
5

8: Initial setup	
1: Averaging	= 0
2: Units	= NM
3: Sailing mode	= Great circle
4: Position	= L/L
5: L/L units	= .0001
6: GNSS source	= Internal
7: Language	= Engrish
8: Lop	= LoranC
9: Chain	= 0000-0-0
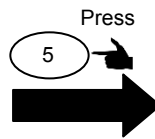
8: Initial setup	
1: Averaging	= 0
2: Units	= NM
3: Sailing mode	= Great circle
4: Position	= L/L
5: L/L units	= .001
6: GNSS source	= .0001
7: Language	= Engrish
8: Lop	= LoranC
9: Chain	= 0000-0-0

Initial setup: .0001'

4.6.6 Selecting GNSS source

You can select the GNSS source from Internal or External. If you select External, you can use KGP-915 as a remote indicator. At that time, connect external equipment to DATA2 connector, and input GGA / VTG / ZDA of NMEA sentence.

The procedure is as follows:

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

(2) Press (8) key to select "**8: Initial setup**".

(3) Press (6) key to select "**6: GNSS source**".

(4) Press [▲] or [▼] key to move cursor to "Internal" or ".External".

(5) Press (ENT) key.

Press
6/E

8: Initial setup	
1: Averaging	= 0
2: Units	= NM
3: Sailing mode	= Great circle
4: Position	= L/L
5: L/L units	= .001
6: GNSS source	= Internal
7: Language	= Engrish
8: Lop	= LoranC
9: Chain	= 0000-0-0
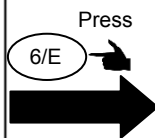
8: Initial setup	
1: Averaging	= 0
2: Units	= NM
3: Sailing mode	= Great circle
4: Position	= L/L
5: L/L units	= .001
6: GNSS source	= Internal
7: Language	= External
8: Lop	= LoranC
9: Chain	= 0000-0-0

Initial setup: Internal'

4.6.7   Selecting a Language

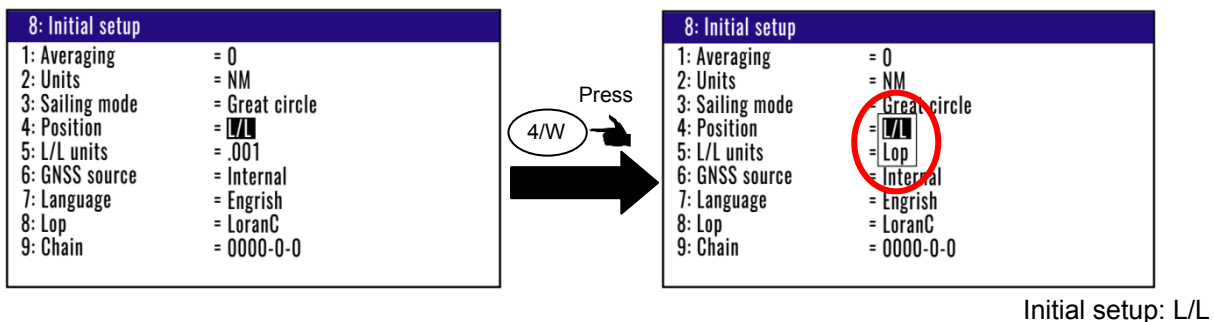You can select the language from the pop-up.

The procedure is as follows:

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

(2) Press (8) key to select "**8: Initial setup**".

(3) Press (7) key to select "**7: Language**".

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

(5) Press (ENT) key.

8: Initial setup	
1: Averaging	= 0
2: Units	= NM
3: Sailing mode	= Great circle
4: Position	= L/L
5: L/L units	= .001
6: GNSS source	= Internal
7: Language	= **Engrish**
8: Lop	= LoranC
9: Chain	= 0000-0-0

Press
(7) →

8: Initial setup	
1: Averaging	= 0
2: Units	= NM
3: Sailing mode	= Great circle
4: Position	= L/L
5: L/L units	= .001
6: GNSS source	= Internal
7: Language	= **English**
8: Lop	= 日本語
9: Chain	= 0000-0-0
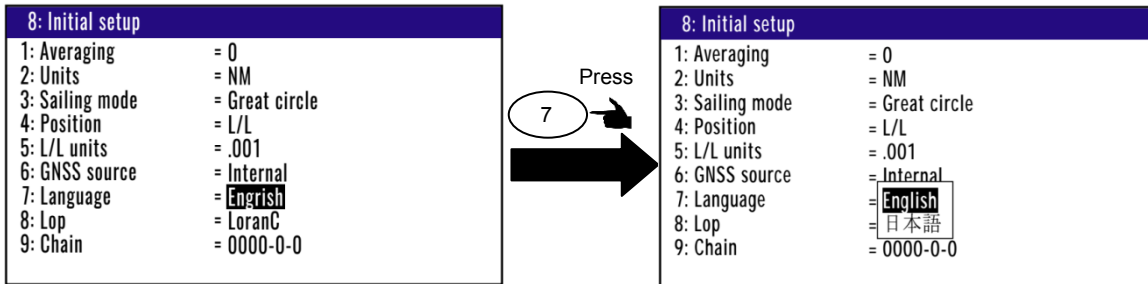
Initial setup: English

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

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

The procedure is as follows:

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

(2) Press (8) key to select "**8: Initial setup**".

(3) Press (8) key to select "**7: 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 "**9: Chain**".

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

(8) Press (ENT) key.
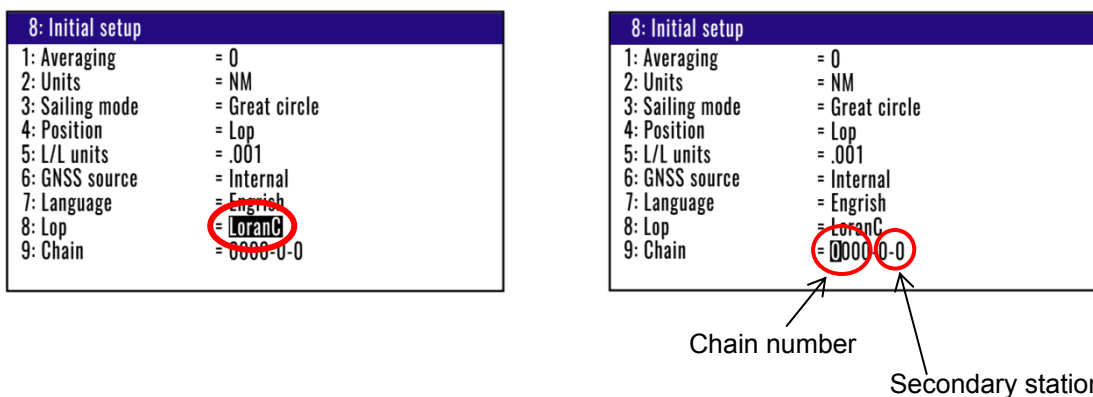
8: Initial setup	
1: Averaging	= 0
2: Units	= NM
3: Sailing mode	= Great circle
4: Position	= Lop
5: L/L units	= .001
6: GNSS source	= Internal
7: Language	= Engrish
8: Lop	= **LoranC**
9: Chain	= 0000-0-0

8: Initial setup	
1: Averaging	= 0
2: Units	= NM
3: Sailing mode	= Great circle
4: Position	= Lop
5: L/L units	= .001
6: GNSS source	= Internal
7: Language	= Engrish
8: Lop	= LoranC
9: Chain	= 0000-0-0

Chain number

Secondary station

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 "**9: Chain**" and press (ENT) key.

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

```
8: Initial setup
1: Averaging      = 0
2: Units          = NM
3: Sailing mode   = Great circle
4: Position       = Lop
5: L/L units      = .001
6: GNSS source    = Internal
7: Language       = Engrish
8: Lop            = LoranA
9: Chain          = 2S0
                    2S0
```

```
8: Initial setup
1: Averaging      = 0
2: Units          = NM
3: Sailing mode   = Great circle
4: Position       = Lop
5: L/L units      = .001
6: GNSS source    = Internal
7: Language       = Engrish
8: Lop            = LoranA
9: Chain          = 2S0
                    2S0
```
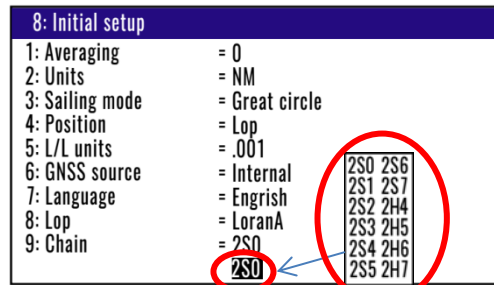2S0 2S6
2S1 2S7
2S2 2H4
2S3 2H5
2S4 2H6
2S5 2H7

Station 1

```
8: Initial setup
1: Averaging      = 0
2: Units          = NM
3: Sailing mode   = Great circle
4: Position       = Lop
5: L/L units      = .001
6: GNSS source    = Internal
7: Language       = Engrish
8: Lop            = LoranA
9: Chain          = 2S0
                    2S0
```
2S0 2S6
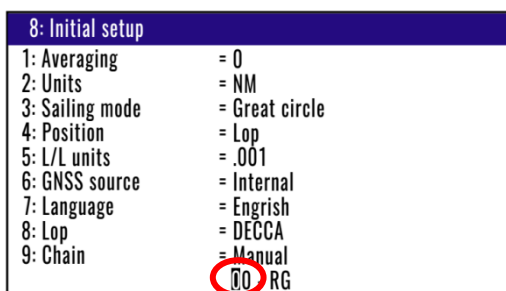2S1 2S7
2S2 2H4
2S3 2H5
2S4 2H6
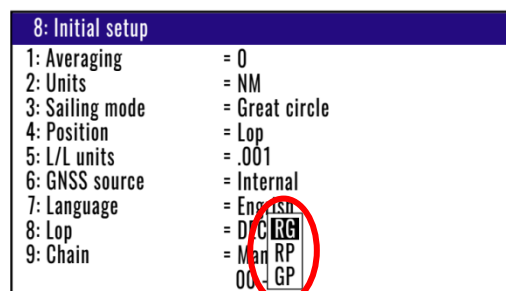2S5 2H7

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 "**9: Chain**" and press (ENT) key.

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

(8) Press (ENT) key.

If you select "Manual"

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

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

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

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

(13) Press (ENT) key.

```
8: Initial setup
1: Averaging      = 0
2: Units          = NM
3: Sailing mode   = Great circle
4: Position       = Lop
5: L/L units      = .001
6: GNSS source    = Internal
7: Language       = Engrish
8: Lop            = DECCA
9: Chain          = Manual
                    00 RG
```

Chain number

```
8: Initial setup
1: Averaging      = 0
2: Units          = NM
3: Sailing mode   = Great circle
4: Position       = Lop
5: L/L units      = .001
6: GNSS source    = Internal
7: Language       = Engrish
8: Lop            = DECCA   RG
9: Chain          = Man     RP
                    00      GP
```
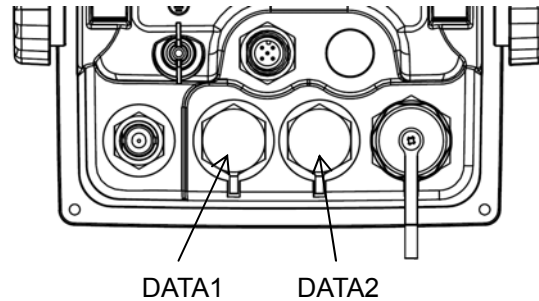
Combination of two secondary station
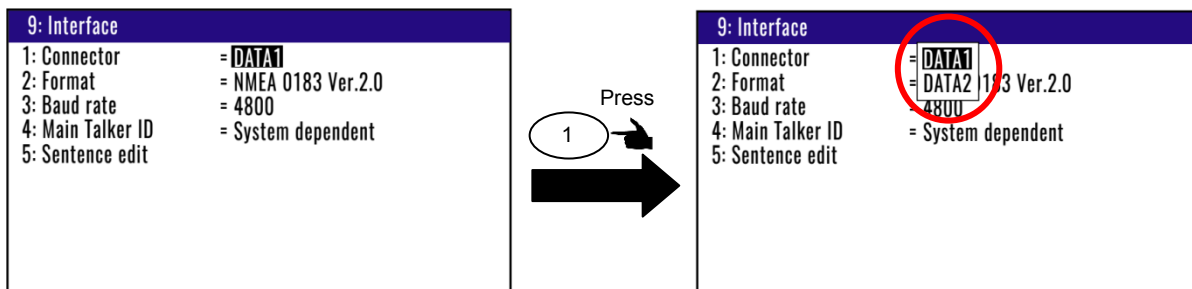
4.7   Menu 9: Interface

4.7.1   Selecting a DATA port to setting.

DATA1   DATA2

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" or "DATA2".

(5) Press (ENT) key.

```
9: Interface
1: Connector     = DATA1
2: Format        = NMEA 0183 Ver.2.0
3: Baud rate     = 4800
4: Main Talker ID = System dependent
5: Sentence edit
```

Press (1) →

```
9: Interface
1: Connector     = DATA1
2: Format        = DATA2 183 Ver.2.0
3: Baud rate     = 4800
4: Main Talker ID = System dependent
5: Sentence edit
```
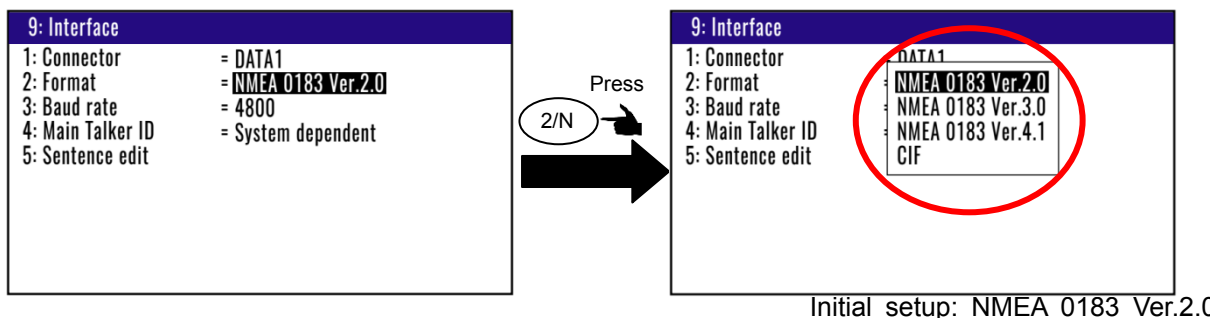
4.7.2   Selecting an output data format of DATA1 and DATA2 port

You can select the format of output data format.

(1) Press (9) key until Menu options 1 to 10 appears.

(2) Press (MENU) key to select "**9: Interface**".

(3) Press (2) key to select "**2: Format**".

In the case "DATA1" of "1: Connector"

(4) Press [▲] or [▼] key to move cursor onto the output data format to select "DATA1".

(5) Press (ENT) key.

```
9: Interface
1: Connector     = DATA1
2: Format        = NMEA 0183 Ver.2.0
3: Baud rate     = 4800
4: Main Talker ID = System dependent
5: Sentence edit
```

Press (2/N) →

```
9: Interface
1: Connector     DATA1
2: Format        NMEA 0183 Ver.2.0
3: Baud rate     NMEA 0183 Ver.3.0
4: Main Talker ID NMEA 0183 Ver.4.1
5: Sentence edit  CIF
```
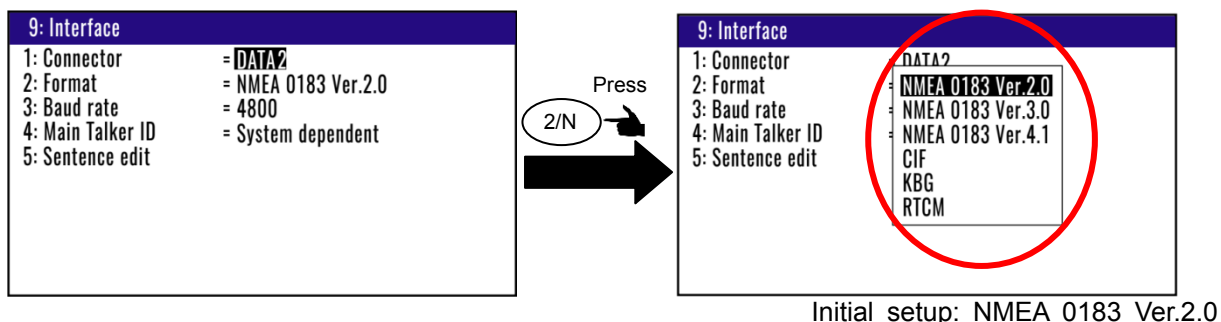
Initial setup: NMEA 0183 Ver.2.0

You can select from four formats.

1) NMEA0183 Ver2.0

2) NMEA0183 Ver3.0

3) NMEA0183 Ver4.1

4) CIF (Furuno's format)

* DATA1 is Output only

In the case "DATA2" of "1: Connector"

(4) Press [▲] or [▼] key to move cursor onto the output data format to select "DATA1".

(5) Press (ENT) key.

Initial setup: NMEA 0183 Ver.2.0

You can select from six formats.

1) NMEA0183 Ver2.0

2) NMEA0183 Ver3.0

3) NMEA0183 Ver4.1

4) CIF (Furuno's format)

5) KBG (When you connected KBG, select this)

6) RTCM (When you connected external beacon receiver, select this)

4.7.3   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 (3) key to select "**3: Baud rate**".

(5) Press [▲] or [▼] key to move cursor onto the baud rate "4800", "9600", "19200" "38400".
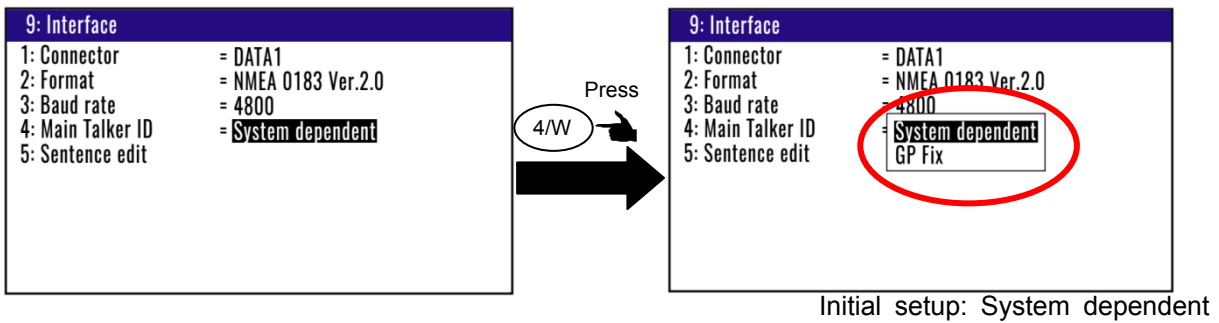
(6) Press (ENT) key.
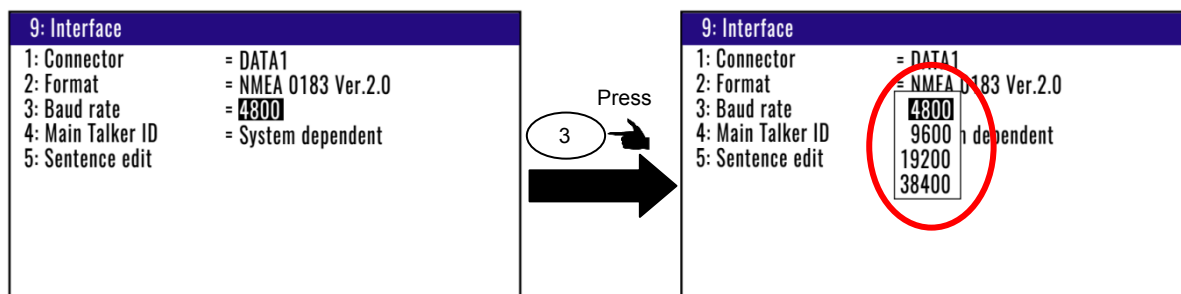
Initial setup: 4800

4.7.4   Setting the output Talker ID

You can change the Talker ID "GP" only or System dependent ("GP", "GL" and "GN")

(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: Main Talker ID**".

(5) Press [▲] or [▼] key to move cursor onto the baud rate "GP", "System dependent".

(6) Press (ENT) key.

```
9: Interface                          9: Interface
1: Connector    = DATA1               1: Connector    = DATA1
2: Format       = NMEA 0183 Ver.2.0   2: Format       = NMEA 0183 Ver.2.0
3: Baud rate    = 4800                3: Baud rate    = 4800
4: Main Talker ID = System dependent  4: Main Talker ID  System dependent
5: Sentence edit                      5: Sentence edit   GP Fix
```

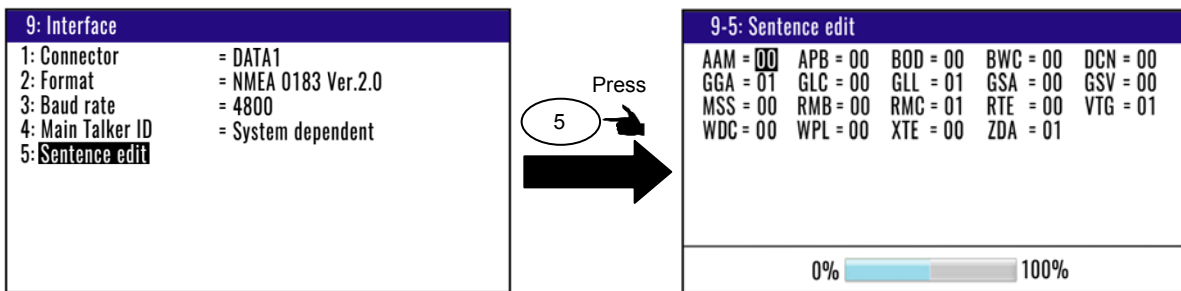Press 4/W

Initial setup: System dependent

4.7.5   Selecting an output sentence

To determine the sentence to be output from the NMEA0183 or CIF:

Output interval can sets 01 to 99 seconds. Sentence does not output when output interval sets 00 second.

(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: Sentence edit**".

```
9: Interface                          9-5: Sentence edit
1: Connector    = DATA1               AAM = 00  APB = 00  BOD = 00  BWC = 00  DCN = 00
2: Format       = NMEA 0183 Ver.2.0   GGA = 01  GLC = 00  GLL = 01  GSA = 00  GSV = 00
3: Baud rate    = 4800                MSS = 00  RMB = 00  RMC = 01  RTE = 00  VTG = 01
4: Main Talker ID = System dependent  WDC = 00  WPL = 00  XTE = 00  ZDA = 01
5: Sentence edit

                                               0%            100%
```

Press 5

(4) Press [▲] or [▼] or [▶] or [◀] key to select the output sentence.

(5) Press numeric keys to change output interval. Set **00** if you want to stop output.

* Bar meter at the bottom of screen is the occupancy rate of the NMEA. Please set to be 100% or less.
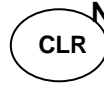
0%   100%

Chapter 5   How to use LOPs

5.1   Initial setup for LOPs display

Measured longitude and latitude can be translated into loran C, loran A or DECCA. To turn on the LOPs mode, the following initial setup is required.
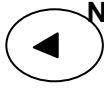
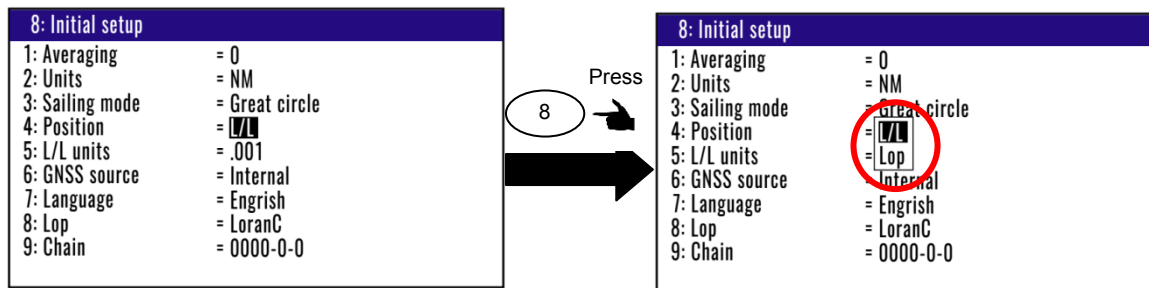| ◀	**NOTE:** *Press to backspace the cursor to correct an input error.*	**CLR**	**NOTE:** *Press to clear incorrect Input. You can reenter Numeric data.*

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

You can 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) key to select "**8: Initial setup**".

(3) Press (8) key to select "**7: Lop**".

```
8: Initial setup
1: Averaging        = 0
2: Units            = NM
3: Sailing mode     = Great circle
4: Position         = L/L
5: L/L units        = .001
6: GNSS source      = Internal
7: Language         = Engrish
8: Lop              = LoranC
9: Chain            = 0000-0-0
```

Press (8) ☞

```
8: Initial setup
1: Averaging        = 0
2: Units            = NM
3: Sailing mode     = Great circle
4: Position         = L/L
                      Lop
5: L/L units        = .001
6: GNSS source      = Internal
7: Language         = Engrish
8: Lop              = LoranC
9: Chain            = 0000-0-0
```
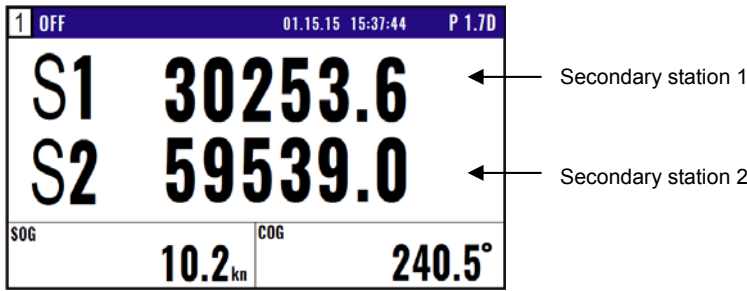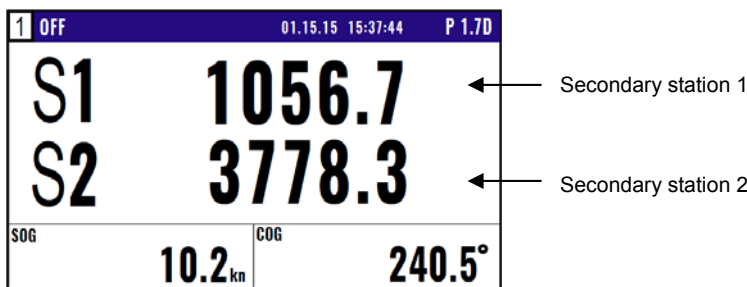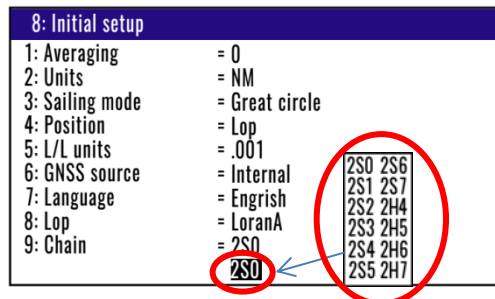
In the case "LoranC"

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

(5) Press (ENT) key.

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

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

```
8: Initial setup
1: Averaging        = 0
2: Units            = NM
3: Sailing mode     = Great circle
4: Position         = Lop
5: L/L units        = .001
6: GNSS source      = Internal
7: Language         = Engrish
8: Lop              = LoranC
9: Chain            = 0000-0-0
```
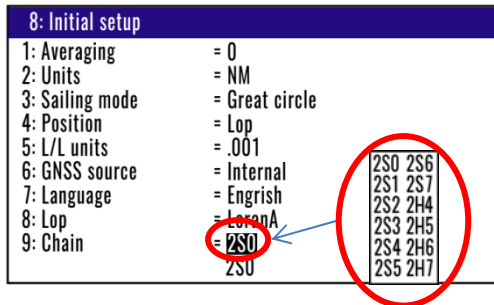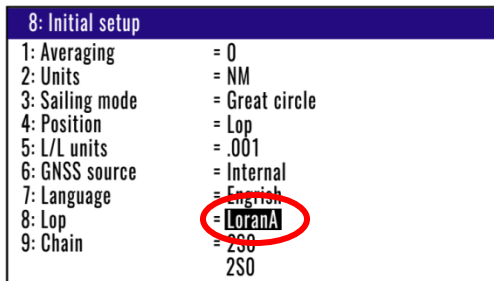
```
8: Initial setup
1: Averaging        = 0
2: Units            = NM
3: Sailing mode     = Great circle
4: Position         = Lop
5: L/L units        = .001
6: GNSS source      = Internal
7: Language         = Engrish
8: Lop              = LoranC
9: Chain            = 9970-3-5
```

When serect Loran C, you must select station

Secondary station 1

Secondary station 2

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 "**9: Chain**".

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

Secondary station 1

Secondary 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 "**9: Chain**".

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

(8) Press (ENT) key.

When select auto mode, KGP-915 finds the optimal station

If you select "Manual"

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

(10) Press [▶] key.

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

(12) Press (ENT) key.

When select auto mod, 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.*
◀

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

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 and 0999) are reserved for MOB 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 9 appears.

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

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

LAT/LONG mode (Example)

MENU
1: Waypoints
2: Routes
3: GNSS
4: DGNSS
5: Compensation
6: Alarms
7: Calculation
8: Initial setup
9: Interface
10: Plotter

Press (1) Key ➡

Storage position: **LoranC**

Numbe	Mark	S1	S2	Comment
1:Waypoints				
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**

Numbe	Mark	S1	S2	Comment
1:Waypoints				
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

Storage position: **DECCA**

Numbe	Mark	S1	S2	Comment
1:Waypoints				
W1000	X	51:47:19	6F:79:06	07 06:38
W1001	▣	01:32:04	0J:77:46	
W1002	▽	01:33:44	0J:73:96	YOKOHAMA1
W1003	▣	01:34:24	0J:71:97	19 13:38
W1004	▽	01:34:14	0J:72:27	YOKOHAMA2
W1005	X	01:34:15	0J:72:29	19 14:58
W1006	X	01:33:70	0J:73:34	
W1007	◉	01:32:51	0J:76:40	URAYASU
W1008	◉	01:31:72	0J:78:38	ODAIBA
W1009	X	01:31:15	0J:79:78	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

KGP-915 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 4.4.3 "Compensating the LOP"

• "In the case of LoranC" (See page 4-14)

• "In the case of LoranA" (See page 4-14)

• "In the case of DECCA" (See page 4-15)

5.4   Calculating LOPs based on LAT/LONG data

  KGP-915 can calculate the LOPs based on the specified LAT/LONG data and displays the LOP values.

• "In the case of LoranC" (See page 4-18)

• "In the case of LoranA" (See page 4-18/19)

• "In the case of DECCA" (See page 4-19/20)

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Chapter 6   Data backup and initialization

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.

USB mark

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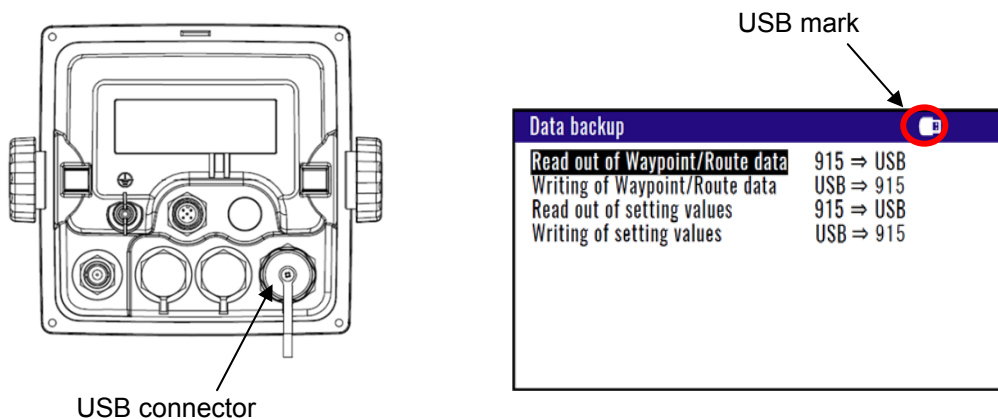
NOTE: *If USB mark is not appear,
        Change USB memory for new one.*

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.

Read out complete

(4) If a message called "Read out complete" appears, it is the end.

   *The name of data file is "KM-F60_WPT_RTE.dat".
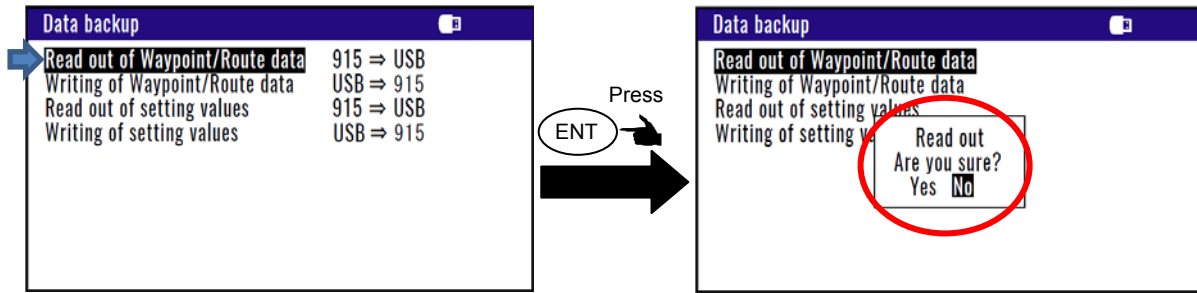
In the case "Read out of setting values"

(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 called "Read out complete" appears, it is the end.

   *The name of data file is "KM-F60_SETUP.dat".

Read out complete
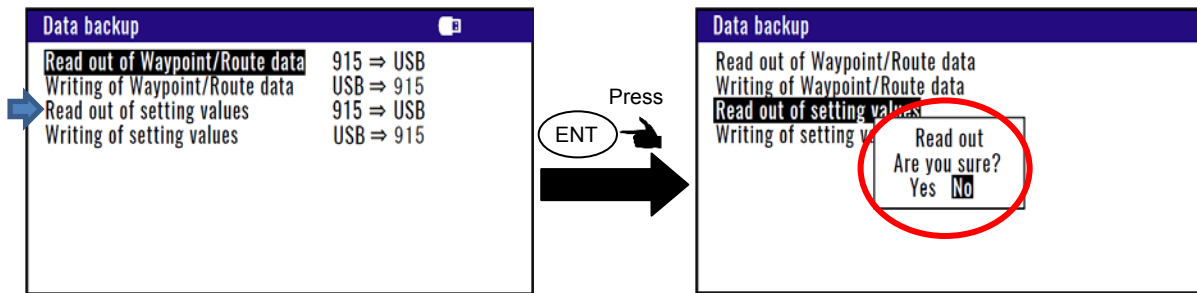
6.1.4   Writing of data

In the case "Writing of Waypoint / Route data"

   *The data file is necessary in USB memory named "KM-F60_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 called "Writing complete" appears, it is the end.

Writing complete

⚠ **CAUTION**
Data is overwritten
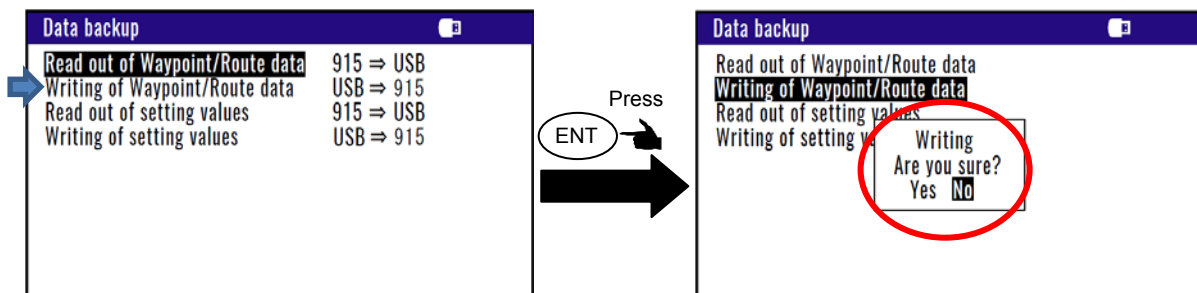
In the case "Writing of setting value"

   *The data file is necessary in USB memory named "KM-F60_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 called "Writing complete" appears, it is the end.

> Writing complete

┌─────────────────────────────────┐
│   ⚠ **CAUTION**   │
│   *Data is overwritten* │
└─────────────────────────────────┘

Data backup	
Read out of Waypoint/Route data	915 ⇒ USB
Writing of Waypoint/Route data	USB ⇒ 915
Read out of setting values	915 ⇒ USB
➡ Writing of setting values	USB ⇒ 915

Press (ENT) →

Data backup	
Read out of Waypoint/Route data	
Writing of Waypoint/Route data	
Read out of setting values	
Writing of setting v...	Writing Are you sure? Yes No
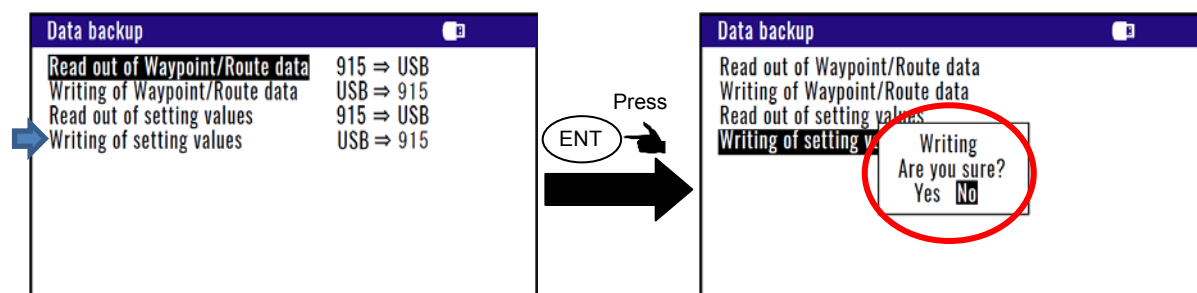
6.2   Initialization

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.

```
Initial menu
1: Initialize
2: Language          = English
3: WPT./Route clear
4: Event             = Auto
5: L/L default       = N/W
6: Buzzer            = 1


              [Mode key to exit]
```
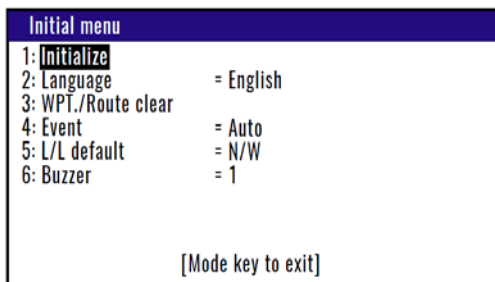
6.2.2   Initialize

Before initializing please note all system parameters and reset them after initialize, or backup for setting value in USB memory. (Refer page 6-2)

(1) Press [▲] or [▼] key to move cursor onto the "**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, MOBs and routes remain unchanged.*

```
Initial menu                              Initial menu
1: Initialize                             1: Initialize
2: Language      = English                2: Language      = English
3: WPT./Route clear          Press        3: WPT./Route clear
4: Event         = Auto                   4: Event      Initialize
5: L/L default   = N/W       ENT          5: L/L default Are you sure?
6: Buzzer        = 1                      6: Buzzer      Yes  No


         [Mode key to exit]
```
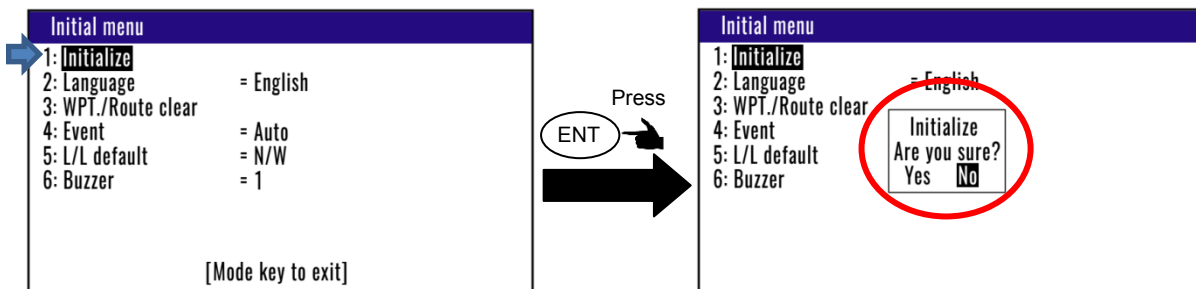
> **NOTE:** *If you want to go back up for before initialize, please write setting value of USB memory. Refer page 6-2*

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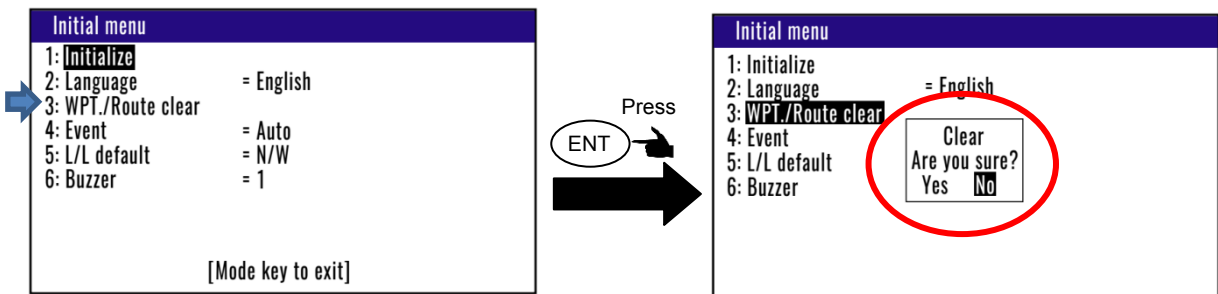
> **Note:** *If you want to go back up for before clear data,*
> *please write Waypoint/Route data of USB memory.*
> *Refer page 6-2*

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
through 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.
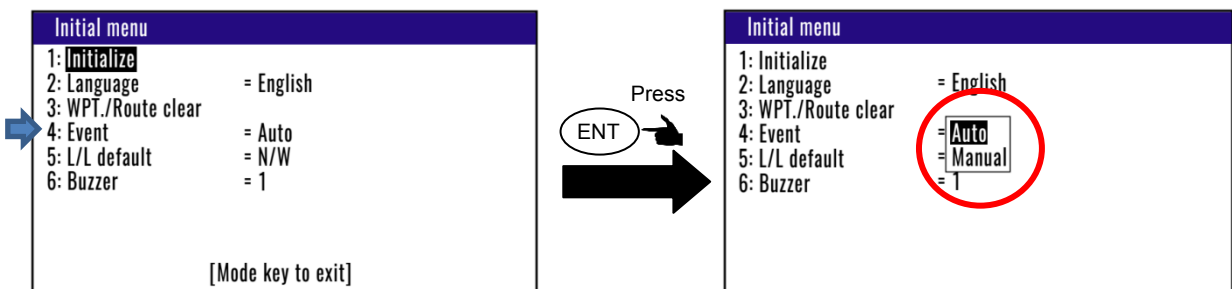
initial setup: AUTO

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

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

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

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

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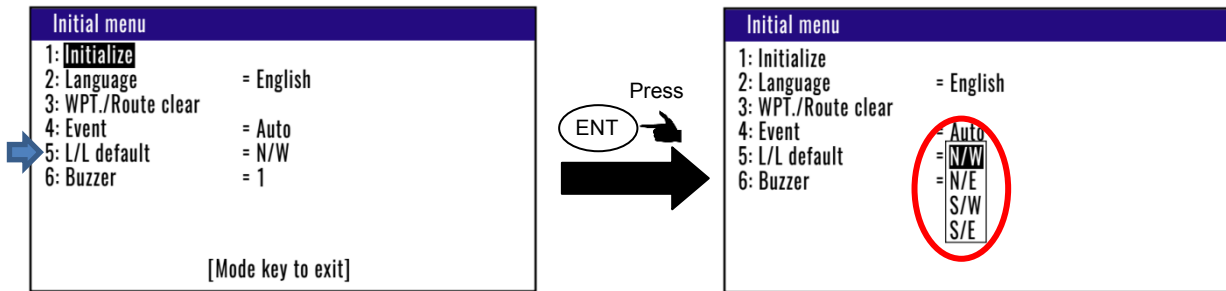
Initial setup: N/W

6.2.6   Frequency adjustment of the buzzer

You can change the frequency of the buzzer. You can select the four frequencies. "**0**" is the lowest sound. "**4**" is the Highest sound.
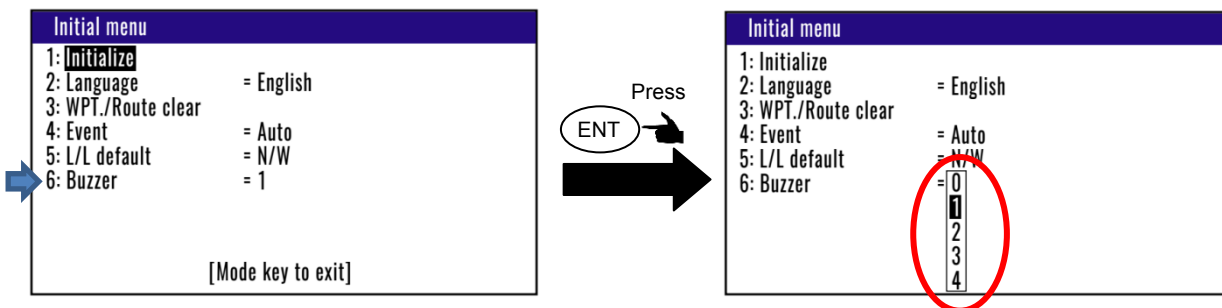
Chapter 7   Installation

7.1   Installation consideration

Qualified service technicians should perform the installation of the KGP-915 series 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) Installing the 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 of the items stated in the packing list are contained in the package. If not, report this to an insurance agent for tracing missing goods or refund.

| No.	Name of item	Type	Remark	Qty
1	Display unit	KGP-915.MU	With mounting bracket and hard cover	1
2	DC power cable	CW-276-2M	With a 5-pin connector and one end plain	1
3	GPS antenna	GA-09[*M]	With 3D-2V coaxial cable	1
4	Installation material	TPT5X20U	Truss tapping screw	4
5	Operation Manual	KGP-915.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   Siting the units

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

(1) The display unit should be positioned in the location where the external situation can be viewed.

(2) Locate the display so that it provides easy viewing from all likely operator's positions.

(3) Select a position safe and free from dampness, water spray, rain and direct sunlight.

(4) Provide enough space for servicing. Consider access to the rear panel for connecting cables.

(5) Position the display unit as possible away from other radio equipment.

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   Table mounting

(1) Remove the two knurled fixing knobs that fix the display unit to the mounting bracket.

(2) Remove the display unit from the bracket and place it on a flat and safe area.

(3) Place the mounting bracket to the place where the display unit is to be installed, and fix the bracket with four tapping screws.

(4) 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.
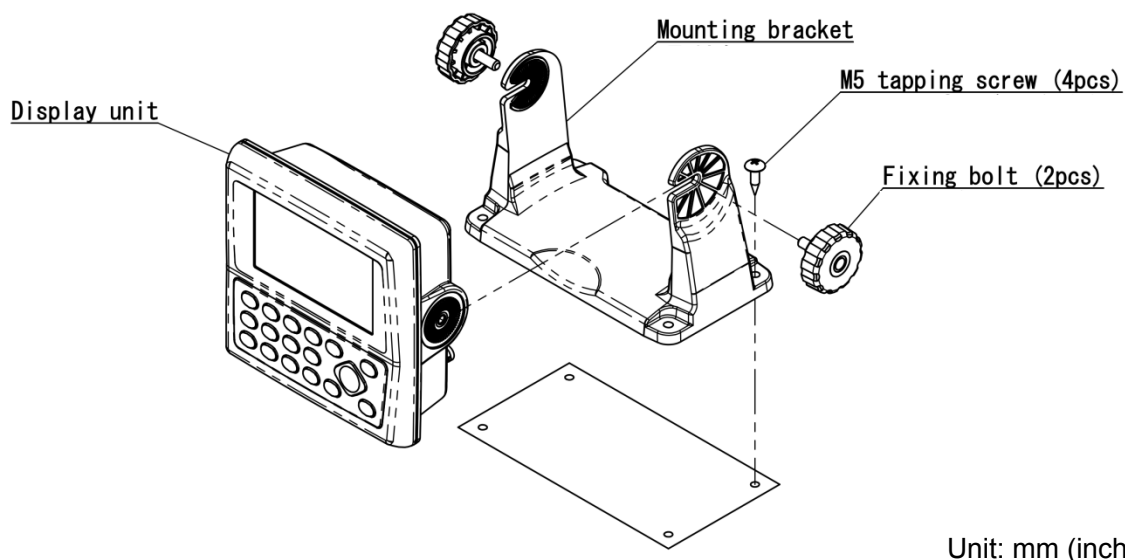
Unit: mm (inch)

Figure 7.1 Fitting detail of KGP-915 in table mounting mode
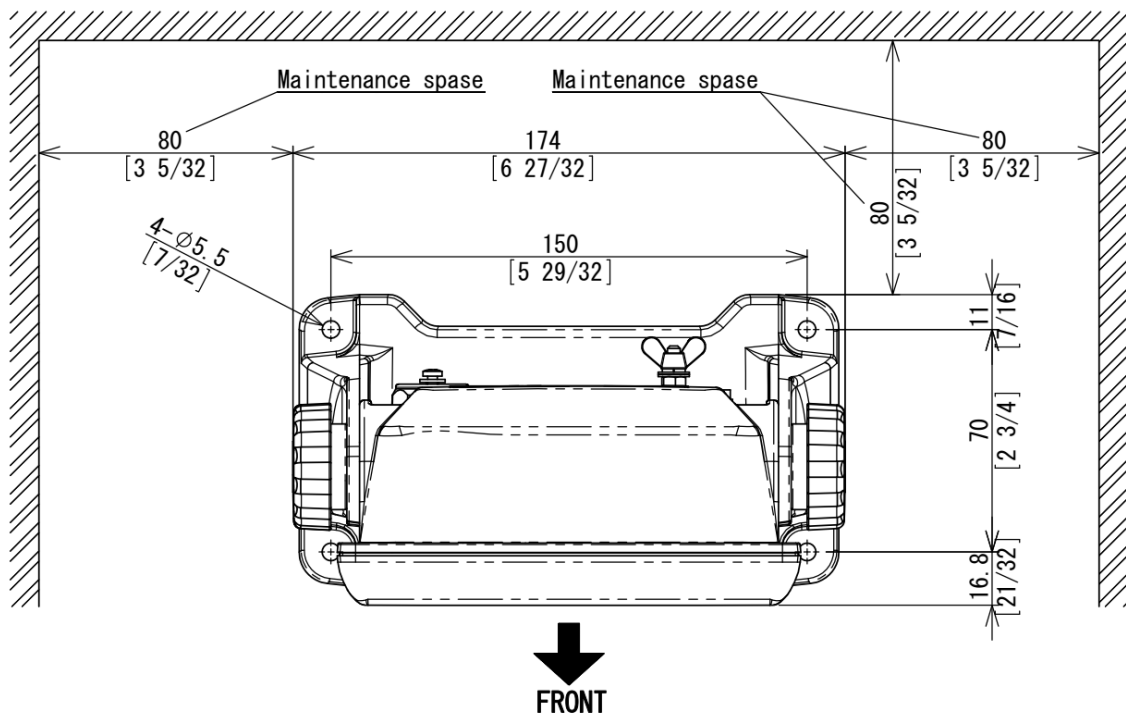
Figure 7.2 Maintenance space required for KGP-915

Unit: mm (inch)

7.4.2 Flush mounting

(1) Cut a rectangle opening as shown in a figure 7.3.

(2) Loosen two fixing knobs that fasten the display unit onto the mounting bracket.

(3) Put the display on the flush mount and fix with two slotted –head screws.

(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.
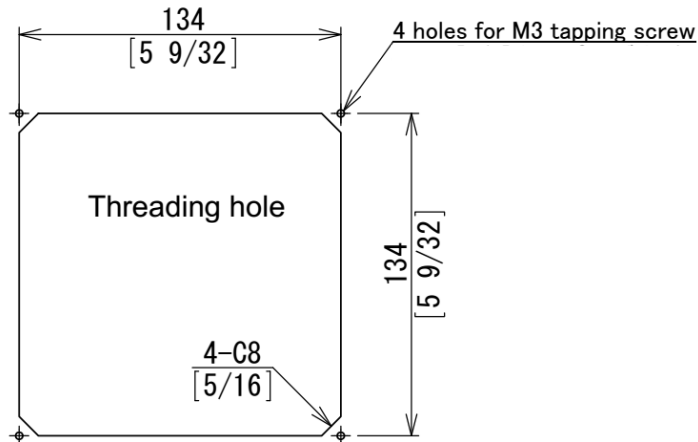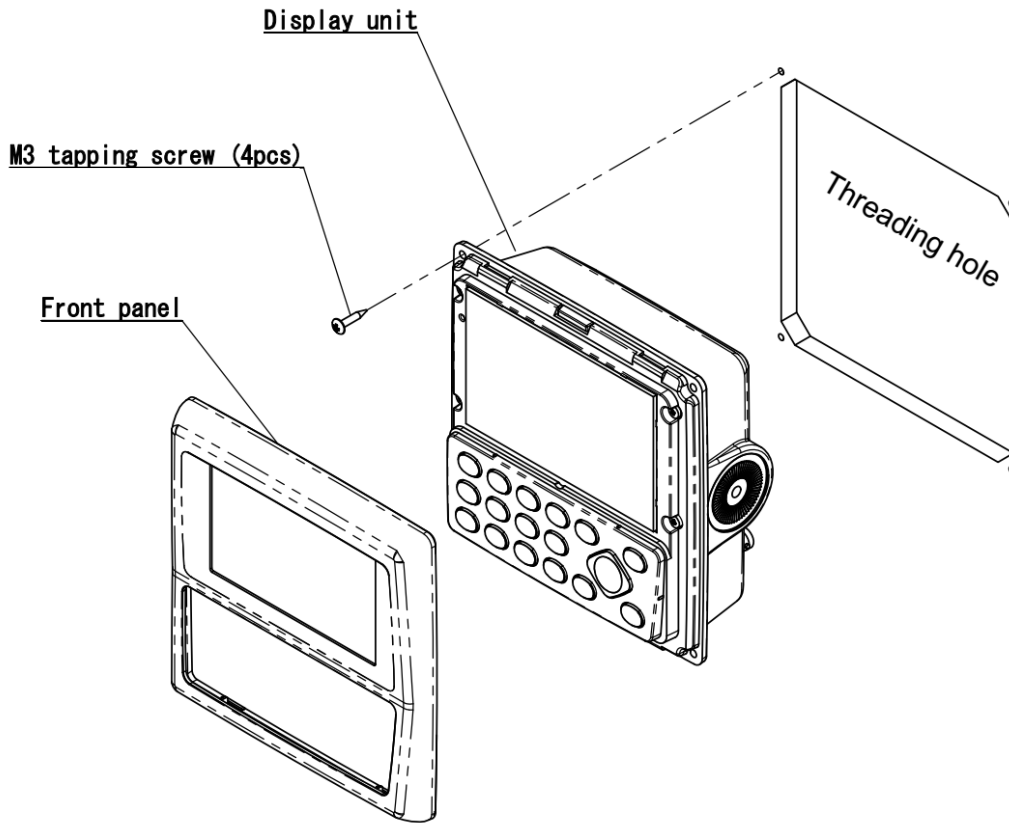
Figure 7.3 Flush Mount installation

Unit: mm (inch)

7.5   Antenna unit installation

7.5.1   Selecting the best site of GNSS / Beacon antenna

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

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

(2) At least 4 meters (13.2 feet) away from the MF/HF reversed L-type TX antenna, VHF or HF whip antenna.

(3) At least 1.5 meter (4.9 feet) above the MF/HF reversed L-type TX antenna.

(4) At least 1 meter (3.3 feet) away from the receiving antenna.

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

(6) At least 1 meter (3.3 feet) away from the radar antenna.

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

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

(9) At least 0.5 meters (1.6 feet) above the large metal surface.

* AT least 0.5 m (1.6 ft) above the large metal surface
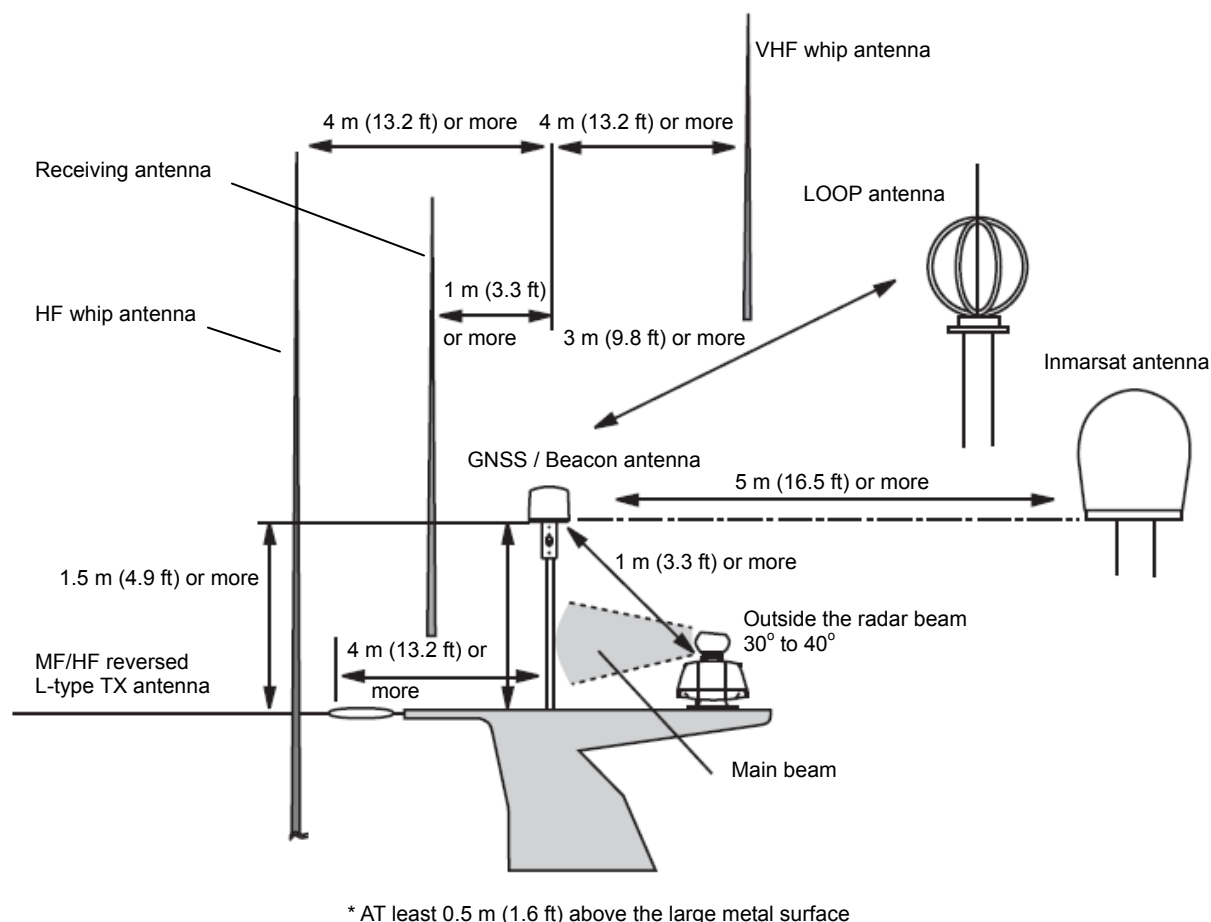
Figure 7.4 Recommended GPS / Beacon Antenna installation

7.5.2   Fixing the GNSS antenna unit

(Case1)   **(Case2)**

Antenna
unit
GA-09[10M]
GA-09[15M]

Hose clamp
(Option)

Antenna
unit
GA-09[10M]
GA-09[15M]

Screw
(1"-14UNS-2B)

Mast (pole)
(not supplied)

Antenna
extension pole
(not supplied)
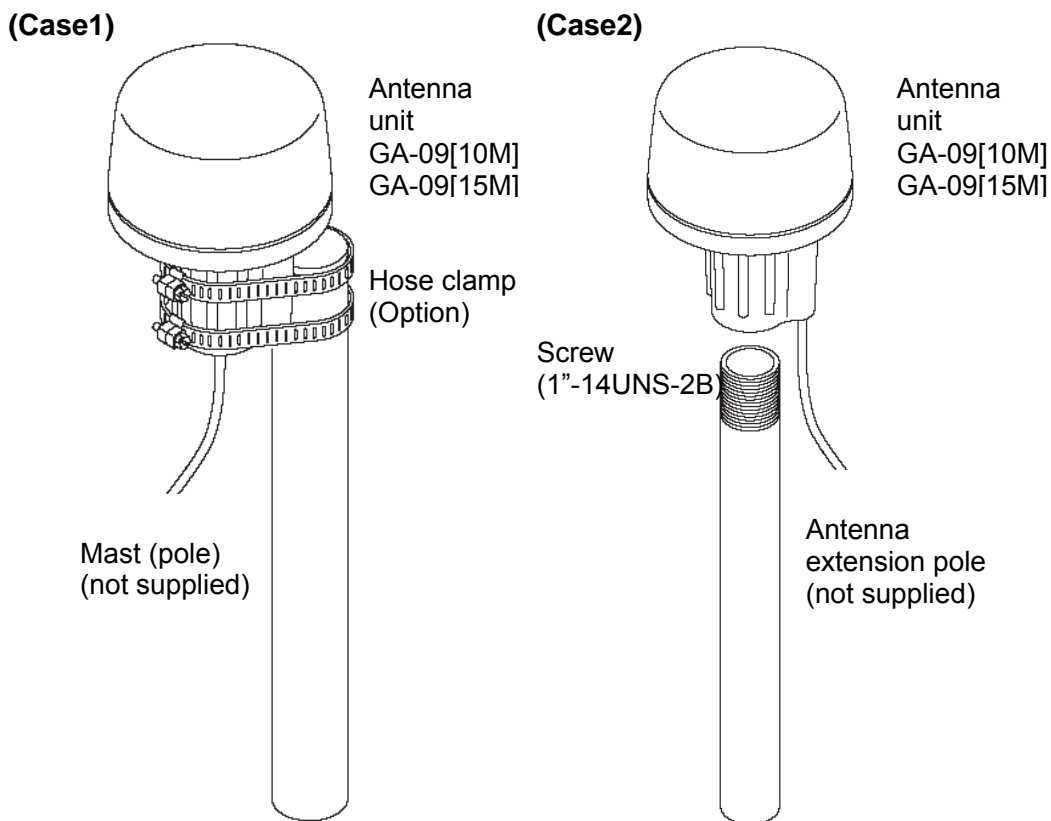
Installation precautions

(1)   Adhesive plastic sealant or silicone for plastic is recommended for fixing screws.

> ⚠ **CAUTION**
> *Use of other solvent or anaerobic based-bond may cause cracking*
> *Of the chassis*

(2)   Stroke of screw insertion should be up to 25mm.

> ⚠ **CAUTION**
> *Overtightening of the screw may cause cracking of the chassis*

7.5.3   Extension of an antenna cable

Although the standard length of an antenna cable is 10m or 15m, extension of 30m or 60m is possible by the antenna and extension cable of an option.

GA-09[0.5M]

Waterproofing

Conversion
Cable Assy

0.5m

Antenna

To display unit

30m: CW-839-30M
60m: CW-394-60M

CW-826-0.5M
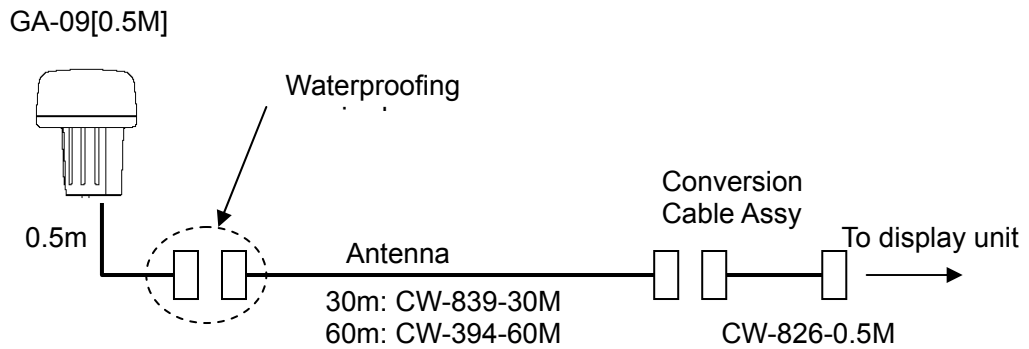
● **Waterproofing on the connector jointing section**

(1)   Wind the self-fusible tape around the jointing section.
Pull the tape end to stretch its length to be doubled and wind it overlaid by half to 3 plies. When winding is completed, apply gentle pressure over the surface with fingers to expedite the fusion.
(2)   Apply windings of PVC tape to reinforce the protection.
PVC tape should not be strained. Wind it overlaid by half to 3 plies. When finished, press the surface evenly without strain for complete adhesion of the tape.

Connectors

Self-fusible tape

PVC tape for protection
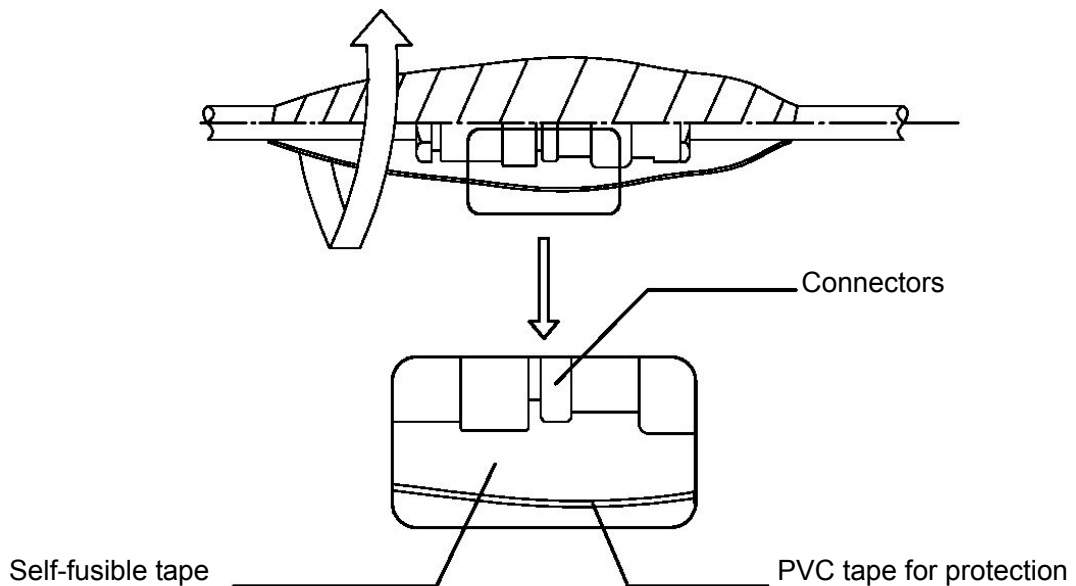
Figure 7.5 Processing on the coax cable jointing section

7.6   Cable connections to KGP-915

7.6.1   Single connection

Legend
Standard configuration
Option
Owner supply

Software virsion:
KM-E34G and after
is required.

KBG-3

GPS antenna   GA-09

POWER Connector

Display unit KGP-915

With mounting bracket and vinyl cover

CW-276-2M

DATA 2 Connector

DATA 2 Connector

CW-373-5M

Marine radar
Chart Plotter
Echo sounder
Auto pilot

CW-376-5M

DATA 1 Connector

CW-373-5M

Marine radar
Chart Plotter
Echo sounder
Auto pilot

CW-376-5M

Red +
Black -
10.8 to 31.2VDC

7.6.2 Multi connections

Legend

☐	Standard configuration
⬚ (dashed)	Option
⬚ (dash-dot)	Owner supply

Software virsion:
KM-E34G and after
is required.

KBG-3
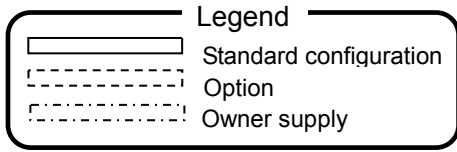
GPS antenna   GA-09
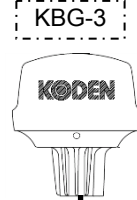
POWER Connector

Display unit KGP-915

With mounting bracket and vinyl cover

DATA 2 Connector

DATA 2 Connector

CW-276-2M

CW-376-5M

CW-373-5M

| Marine radar |
| Chart Plotter |
| Echo sounder |
| Auto pilot |

CW-376-5M

Junction Box JB-35

DATA 3 Connector

CW-376-5M

| Marine radar |
| Chart Plotter |
| Echo sounder |
| Auto pilot |

DATA 4 Connector

CW-376-5M

| Marine radar |
| Chart Plotter |
| Echo sounder |
| Auto pilot |

DATA 1 Connector

CW-376-5M

| Marine radar |
| Chart Plotter |
| Echo sounder |
| Auto pilot |

Red +
Black -
10.8 to 31.2VDC

7.7   Connector pin outs

POWER

1: DC +
2: F.GND
3: DC -

DATA1

1: GND/SHIELD
2: TXD (+)
3: TXD (-)
4: RXD (+)
5: RXD (-)
6: +15V

(General data output)

DATA 2

1: GND/SHIELD
2: TXD (+)
3: TXD (-)
4: RXD (+)
5: RXD (-)
6: +15V

(General data output)

(DATA1 and DATA 2 port)

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

Note: **"9: Interface": Refer to "Chapter 4 4.7 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?

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

(3) Are the cables routed and connected properly?

Chapter 8   Specifications

8.1   Specification

8.1.1   Main function

Receiving frequency		1575.42 MHz±1MHz, 1602MHz±4MHz
Receiving channel		72 channel parallel
Receiving code		C/A code
Sensitivity		Better than –148 dBm
Accuracy	Position	4.2 m 2drms(GNSS), 3.3 m 2drms(DGNSS)
	SOG	0.1 kt rms
HDOP: 4 or less	COG	± 1.0 $^\circ$
Display		4.3 inch color LCD (480×272 dot's, effective picture area: 95.04 x 53.86 mm)
Display mode		NAV1, NAV2, NAV3, NAV4, NAV5, NAV6, POB (People Over Board)
Track display	Display range	0.025, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20 nm (sm, km)
	Usable ground	Within 80° in latitude
	Plotting interval	5, 10, 20, 30 seconds, 1 minutes, 0.01, 0.05, 0.1, 0.5, 1 nm (sm, km)
	Plotting capacity	3,000 points
Position data display		Latitude/longitude in increments of 0.0001 minute, converted Loran C LOPs, converted Loran A LOPs, converted Decca LOPs,
Navigational display		Speed, course, velocity made good/course made good/elapsed time, altitude, distance/bearing/cross track error/course deviation/time to go to waypoint, total time to go and distance on route, DOP value, present time (UTC or LTC), satellite status, beacon receiving status, distance/bearing between two points, POB display
Instant (event) memory		1000 points
Waypoint memory		9000 points
Route memory		100 routes reverse trail possible
Alarm		Proximity, cross track error, CDI, anchor watch
Position compensation		Latitude/longitude, LOPs, Datum
Magnetic compensation		Auto or manual
Parameters		Loran C LOPs conversion, Loran A LOPs conversion, Decca LOPs conversion, memory of waypoints and name (up to 10 letters), selection of measuring unit (nm, sm, km), averaging (smooth) factor, position mode (2D/3D automatic selection), beacon stations selection
Output data format (DATA1/2 connector)		NMEA 0183 Ver.2.0/3.0/4.1 CIF (AAM, APB, BOD, BWC, DCN, DTM, GGA, GLC, GLL, GSA, GSV, MSS, RMB, RMC, RTE, VTG, WPL, XTE, ZDA)
Input data format		RTCM SC104 Ver.2.0 (DGNSS) NMEA 0183 (GNSS source: External)

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

8.1.2   Power requirements

Input voltage: 10.8 to 31.2 VDC

Power consumption: Less than 4.5 W (at 24VDC)

AC Operation: AC/DC rectifier PS-010 is required.

Input voltage range: 115 VAC or 230 VAC

8.1.3   Compass safe distance

Standard: 0.8m

Steering: 0.4m

8.1.4   Environmental conditions

(1) Temperature and humidity

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

(2) Vibration

The equipment operates normally under the following vibrating conditions.

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

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

(3) Water proof

Display unit: IPX5

Antenna unit: IPX6

8.2   External dimensions and weight

8.2.1   External dimensions and weight of the display unit: KGP-915.MU

External dimensions: Width x Height x Depth

Dimensions (WxHxD):   146 x 146 x 70 (mm)

Weight: 0.74 kg

Unit: mm
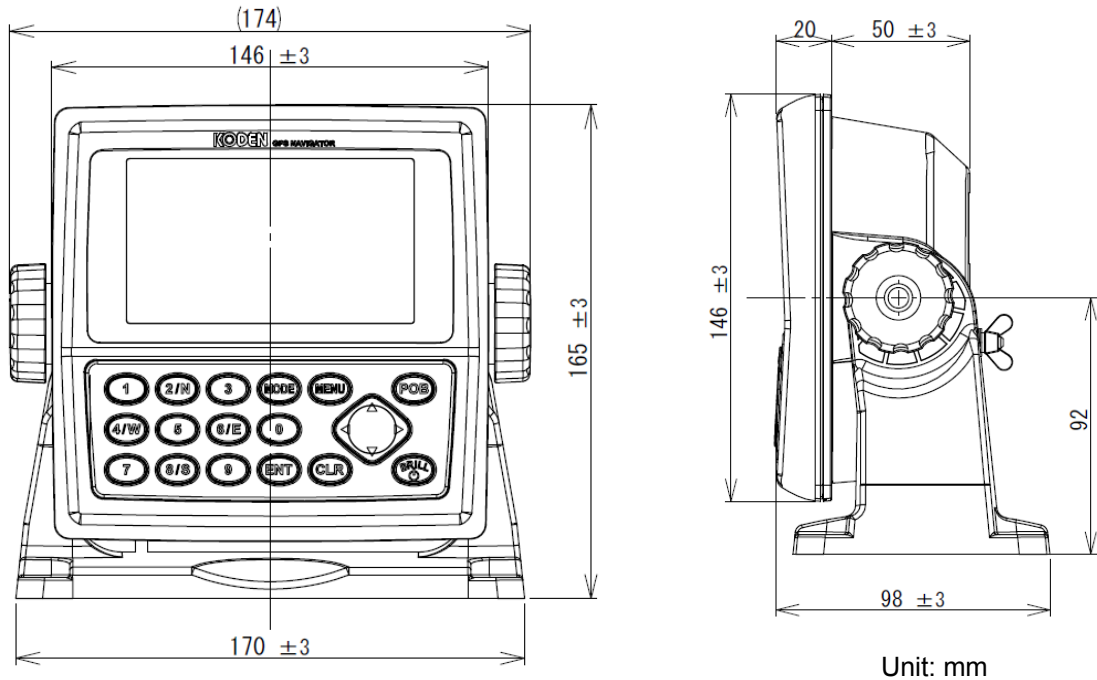
8.2.2   External dimensions and weight of the antenna unit: GA-09

The length of the cable
GA-09[10M]: with cable (10m)
GA-09[15M]: with cable (15m)
GA-09[0.5M]: with cable (0.5m, for extension)

Weight
Without cable: 0.23kg
GA-09[10M]: 0.68kg
GA-09[15M]: 0.89kg
GA-09[0.5M]: 0.29kg

Unit: mm (inch)
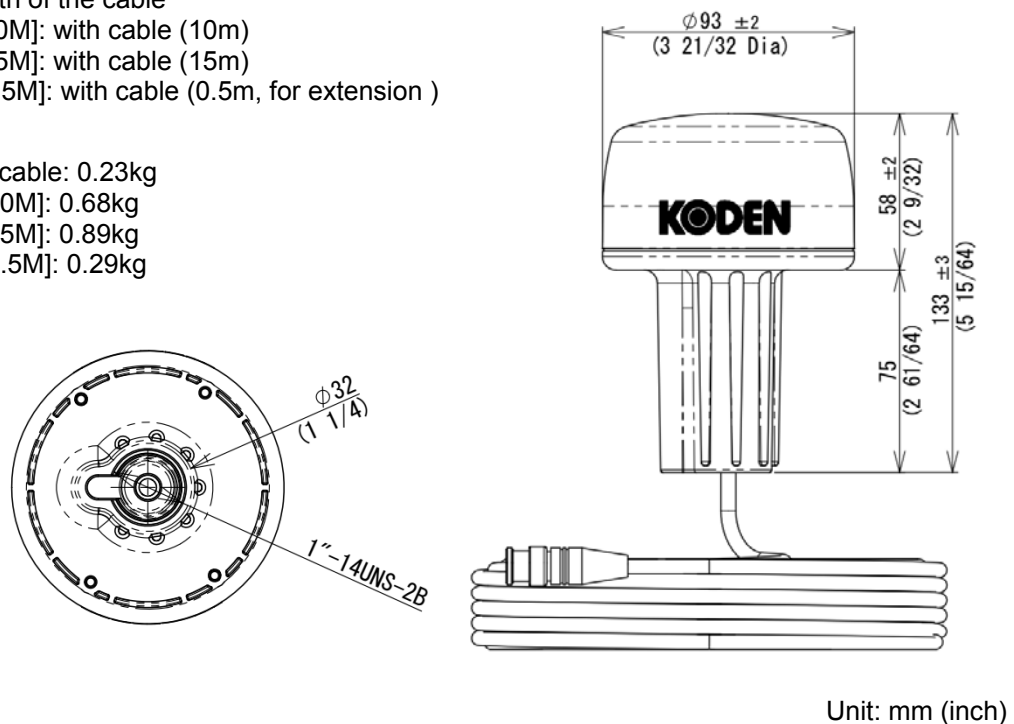
- This page intentionally left blank.-

Chapter 9   Annex

9.1   Menu configuration

The factory set value is shown by the surrounding boxes.

MENU

— 1: Waypoints

— 2: Routes ——— 1: Route Set / Edit
— 2: Waypoint change ([Circle], Bisector)

— 3: GNSS ——— 1: GNSS monitor
— 2: GNSS mode ([GPS], GPS+GLONASS, GLONASS)
— 3: Datum ([00] to 87)
— 4: C/N mask ([10], 15, 20, 25, 30, 35, 40, 45)
— 5: Elevation mask (0, 3, [5], 10, 15)

— 4: DGNSS ——— 1: DGNSS mode ([Auto], SBAS, Beacon, OFF)
— 2: Time out (005s ~ [060s] ~100s)
— 3: SBAS selection ([Auto], WAAS, EGNOS, MSAS, GAGAN, SDCM, Other)
— 4: SBAS Other ([120] to 158)
— 5: Beacon selection ([Auto], Manual)
— 6: Frequency ([283.5 kHz] to 325.0 kHz)
— 7: Bit rate (50, 100, [200])
— 8: Baud rate (2400, [4800], 9600)
— 9: Beacon monitor

— 5: Compensation ——— 1: Latitude / Longitude
— 2: LOP
— 3: Magnetic variation (Auto, Manual [-180°~ [+000.0°] ~ +180.0°])
— 4: Time difference (-13:30 ~ [+00:00] ~ +13:00)

— 6: Alarms ——— 1: GNSS Fix (ON [0.00 to 9.99], [OFF])
— 2: ANCH (ON [0.00 to 9.99], [OFF])
— 3: RPOX ([ON] [0.00 to 9.99], OFF)
— 4: XTE ([ON] [0.00 to 9.99], OFF)
— 5: CDI ([ON] [0.00 to 9.99], OFF)
— 6: Message

— 7: Calculation ——— 1: 2Points
— 2: L/L→LOP
— 3: Navigation plan

A

```
┌───┐
│ A │
└─┬─┘
  │
  ├─ 8: Initial setup ─┬─ 1: Averaging ([0], 1, 2, 3, 4)
  │                    ├─ 2: Units ([NM], km, sm)
  │                    ├─ 3: Sailing mode ([Great circle], Mercator)
  │                    ├─ 4: Position ([L/L], Lop)
  │                    ├─ 5: L/L units ([.001], .0001)
  │                    ├─ 6: GNSS source ([Internal], External)
  │                    ├─ 7: Language ([English], 日本語, -------, ------- )
  │                    ├─ 8: Lop ([LoranC], LoranA, DECCA)
  │                    └─ 9: Chain
  │
  ├─ 9: Interface ─┬─ 1: Connector ([DATA1], DATA2)
  │                ├─ 2: Format ([NMEA 0183 Ver.2.0], NMEA 0183 Ver.3.0, NMEA 0183 Ver.4.1, CIF
  │                │              *[KBG, RTCM]) *KBG/RTCM: DATA2 only
  │                ├─ 3: Baud rate ([4800], 9600, 19200, 38400)
  │                ├─ 4: Main Talker ID ([System dependent], GP Fix)
  │                └─ 5: Sentence edit
```

```
┌──────────────────────────────────────────────────────────┐
│ AAM=00    APB=00    BOD=00    BWC=00    DCN=00             │
│ DTM=00    GGA=01    GLC=00    GLL=00    GSA=00             │
│ GSV=00    MSS=00    RMB=00    RMC=00    RTE=00             │
│ VTG=00    WPL=00    XTE=00    ZDA=01                       │
│ (*Initial setting for DATA1 / DATA2)                      │
└──────────────────────────────────────────────────────────┘
```

```
  └─ 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   Local Geodetic Systems

The number assigned to each place name is the set values used in the "Selecting a geodetic datum"
(Page 4-5)

Name	No.	Name	No.	Name	No.
ALASKA / CANADA	04	FLORIDA	41	PHOENIX	40
ARC 50	29	GREENLAND	09	PITCAIRN	69
ARC 60	30	GUADALCANAL	50	PORTO SANTO	77
ARGENTIN	39	GUAM 63	49	PUERTO RICO	71
ASCENSION	31	HAWAII	21	QATAR	72
AUSTRALIAN 84	06	HONG KONG 63	51	ROME 40	15
BAHRAIN	27	ICELAND 55	11	SALVAGE	59
BERMUDA	37	INDIAN / NEPAL	18	SANTA MARIA	75
BRAZIL	45	IRELAND 65	12	SANTO	74
CANARY	68	IWO JIMA	32	SAUDIARABIA	17
CAYMAN BRAC	56	JAPAN	24	SOMALIA	26
CHATHAM	43	JOHNSTON	53	SOUTH AFRICA	16
COCOS	28	KELGUELEN	55	SOUTH AMERICA	08
COLOMBIA	38	LIBERIA 64	57	SOUTH ASIA	07
CORVO/FLORES	65	MAHA 71	58	SOUTH CHILE	70
DIEGO GARCIA	52	MALAYSIA	23	SRILANKA	54
DJAKARTE	22	MALDIVE	48	ST.HELENA	34
EAST FALKLAND	76	MARCUS	35	SURINAM	83
EAST MALAYSIA	79	MARSHALL	82	SWEDEN	85
EASTER	47	MASCARENE	73	TERN	33
EFATE	36	MIDWAY 61	62	TOKYO	02
EGYPT	66	MOROCCO	61	TRINIDAD	64
ENGLAND	20	NAD-27	03	TRISTAN	80
ERITREA	60	NAD-83	10	TUNISIA	42
ETHIOPIA	25	NEW GEORGIA	46	WGS-72	01
EUROPEAN 50	05	NEW ZELAND	13	WGS-84	00
EUROPEAN 79	14	NIGERIA	63	HU-TZU-SHAN	86
FAIAL	78	OMAN	67	RUSSIA	87
FIJI	81	PARAGUAY	44		
FINLAND	84	PHILLIPPINES	19		

KODEN