FURUNO

GPS Navigator
GP-33

W3D   12/31/09   16:03:31

38°00.257'N
123°01.103'W

SOG **20.0** kn   COG M **263°**

DISP   GO TO   MENU ZOOM

BRILL   WPT MOB   ENT

FURUNO ELECTRIC CO., LTD.

www.furuno.co.jp

ECF

(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

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Pub. No. OME-44580-B

(HIMA) GP-33

FURUNO Authorized Distributor/Dealer

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B : JUL. 05, 2010

00017317711

IMPORTANT NOTICE

General

- This manual has been authored with simplified grammar, to meet the needs of international users.

- The operator of this equipment must read and follow the descriptions in this manual. Wrong operation or maintenance can cancel the warranty or cause injury.

- Do not copy any part of this manual without written permission from FURUNO.

- If this manual is lost or worn, contact your dealer about replacement.

- The contents of this manual and equipment specifications can change without notice.

- The example screens (or illustrations) shown in this manual can be different from the screens you see on your display. The screens you see depend on your system configuration and equipment settings.

- Save this manual for future reference.

- Any modification of the equipment (including software) by persons not authorized by FURUNO will cancel the warranty.

- All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

## How to discard this product

Discard this product according to local regulations for the disposal of industrial waste. For disposal in the USA, see the homepage of the Electronics Industries Alliance (http://www.eiae.org/) for the correct method of disposal.

How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery(ies), see the chapter on Maintenance. Follow the instructions below if a battery(ies) is used.

In the European Union

The crossed-out trash can symbol indicates that all types of batteries must not be discarded in standard trash, or at a trash site. Take the used batteries to a battery collection site according to your national legislation and the Batteries Directive 2006/66/EU.
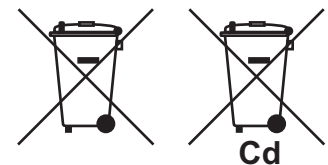
In the USA

The Mobius loop symbol (three chasing arrows) indicates that Ni-Cd and lead-acid rechargeable batteries must be recycled. Take the used batteries to a battery collection site according to local laws.
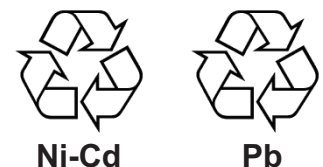
In the other countries

There are no international standards for the battery recycle symbol. The number of symbols can increase when the other countries make their own recycle symbols in the future.

⚠ SAFETY INSTRUCTIONS

⚠ **WARNING**	Indicates a condition that can cause death or serious injury if not avoided.
⚠ **CAUTION**	Indicates a condition that can cause minor or moderate injury if not avoided.

Safety Instructions for the Operator

⚠ WARNING

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can occur.

Turn off the power immediately if water leaks into the equipment or smoke or fire is coming from the equipment.

Failure to turn off the equipment can cause fire or electrical shock.
Contact a FURUNO agent for service.

⚠ CAUTION

The glass of an LCD panel breaks easily. Handle the LCD carefully.

Injury can result if the glass breaks.

No single navigation aid (including this unit) should ever be relied upon as the exclusive means for navigating your vessel.

The navigator is responsible for checking all aids available to confirm his position. Electronic aids are intended to assist, not replace, the navigator.

Safety Instructions for the Installer

⚠ WARNING

Turn off the power at the switchboard before you install the equipment.

Fire or electrical shock can occur if the power is left on.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or equipment damage. The voltage rating of the equipment appears on the label above the power connector.

⚠ CAUTION

Ground the equipment to prevent mutual interference.

Observe the following compass safe distances to prevent interference to a magnetic compass:

Model	Standard compass	Steering compass
GP-33	0.65 m	0.45 m

TABLE OF CONTENTS

FOREWORD

A Word to the Owner of the GP-33

Congratulations on your choice of the GP-33 GPS Navigator.

For over 60 years FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics is furthered by our extensive global network of agents and dealers.

Your navigator is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless installed, operated and maintained properly. Please carefully read and follow the recommended procedures for installation, operation and maintenance.

We would appreciate feedback from you, the end-user, about where we are achieving our purposes.

Thank you for considering and purchasing FURUNO equipment.

Features

The main features of the GP-33 are as shown below.

• High-resolution color LCD
• WAAS capability
• Storage for 10,000 waypoints, 100 routes and 3,000 track points
• Alarms: Arrival/Anchor, XTE (Cross-track Error), Trip, Odometer, Time, WAAS and Speed
• Man overboard feature records position at time of man overboard and provides continuous updates of range and bearing when navigating to the MOB position.
• Unique Highway display provides a graphic presentation of boat's progress toward a waypoint.
• User-programmable nav data displays provide analog and digital navigation data.
• Navigation data output to the autopilot when connecting.
• Waypoint and route data can be uploaded from a PC and downloaded to a PC.

Program No.

Name	No.	Ver.
CPU MAIN	2051530-01.**	January, 2010
CPU Boot	2051531-01.**	January, 2010
CPU CAN LD	2051532-01.**	January, 2010
GPS	48502640-**	January, 2010

**: Minor change

SYSTEM CONFIGURATION

Standalone system

Antenna Unit
GPA-017

Navigation

PC

MOB Switch

External Alarm

Receiver Unit
GP-33

12-24VDC
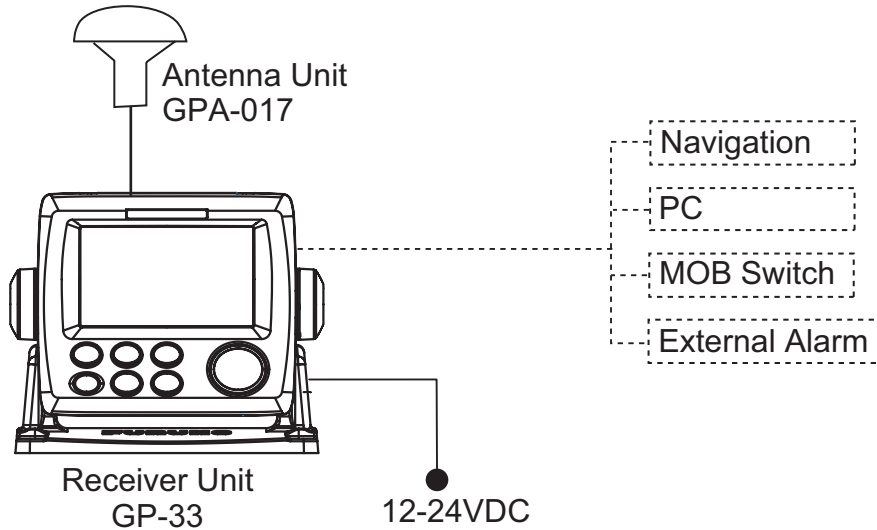
Standard configuration is shown with solid line.

CAN bus network

When optional junction box FI-5002 is connected

Antenna Unit
GPA-017

Navigation

PC

MOB Switch

External Alarm

FI-504/507

Receiver Unit
GP-33

Junction Box
FI-5002

12 VDC
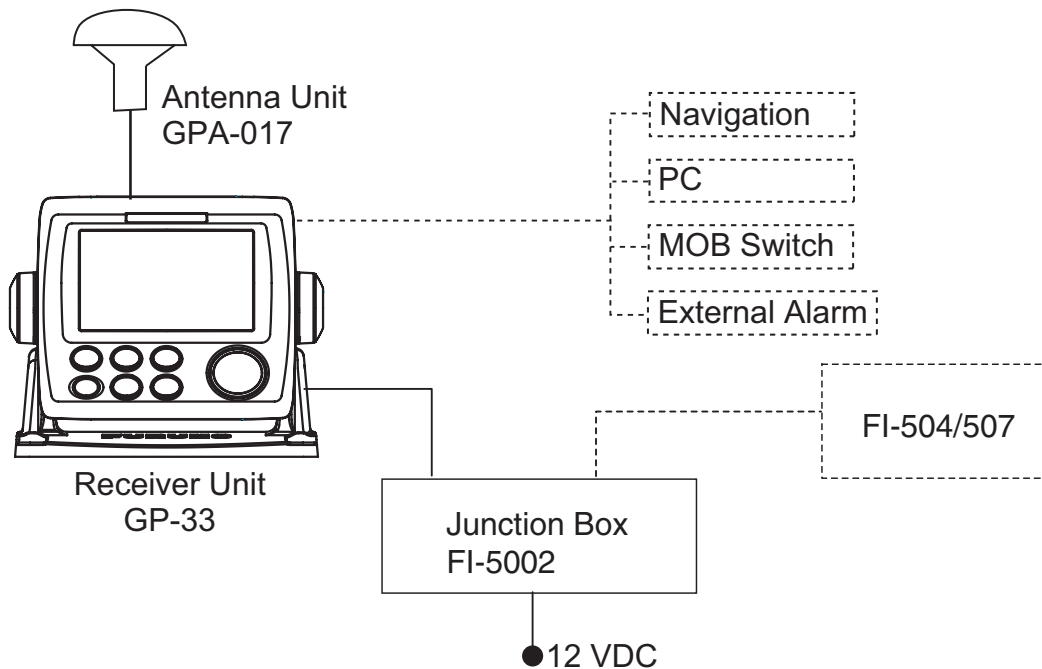
When no FI-5002 is connected

Antenna Unit
GPA-017

Navigation

PC

MOB Switch

External Alarm

Receiver Unit
GP-33

Backbone cable
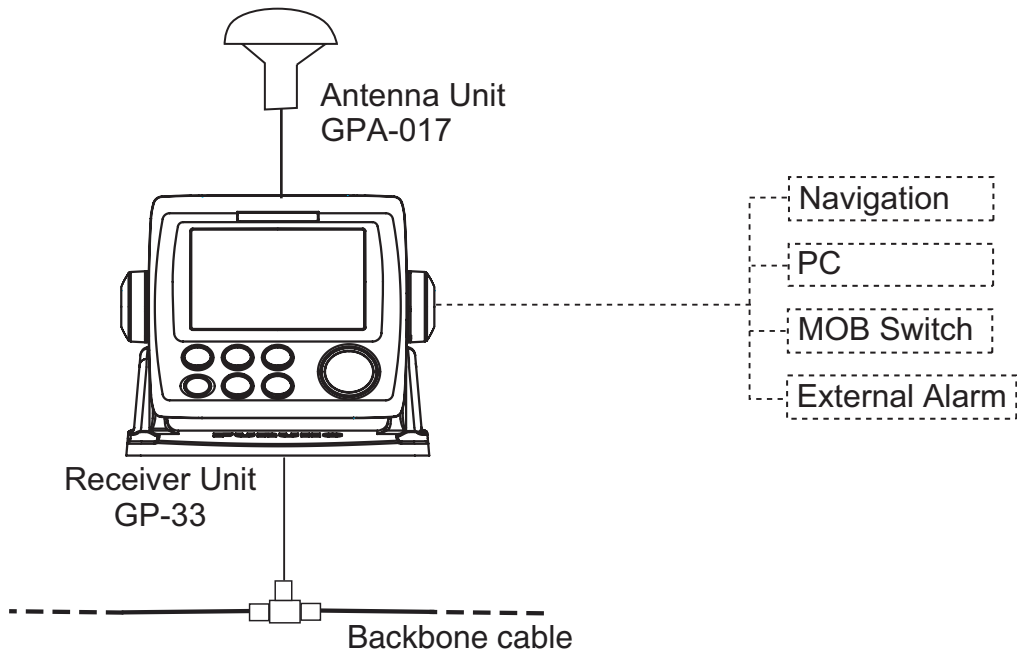
Category of Units

Units	Category
Antenna Unit GPA-017	Exposed to weather
Receiver Unit GP-33	Protected from weather
Junction Box FI-5002 (Option)	

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1. OPERATIONAL OVERVIEW

1.1 Controls

Key	Description
DISP	Selects display mode.
GO TO	Sets destination.
MENU ZOOM	-Opens the Menu. (plotter and highway displays: twice, others: once) -Shows the zoom window (plotter and highway displays only).
(Cursorpad)	-Shifts the cursor. -Selects item on menus.
BRILL	-Long press: Turns power off. -Momentary press: Turns power on./Shows Brill window.
WPT MOB	-Long press: Inscribes MOB mark. -Momentary press: Registers own boat position as MOB position.
ENT	-Long press: Returns own boat position to center (plotter display only). -Momentary press: Confirms selection on menus.

How to detach the hard cover from the unit

Put your thumbs on the front and forefingers on the catches at the sides of the cover, and pull it toward you.

Catches
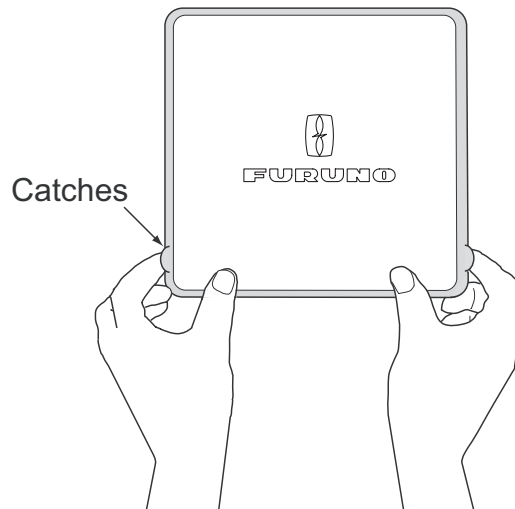
1.2 How to Turn Power On/Off

1. Press the ⏻ **/BRILL** key to turn on the power. The unit beeps and then starts up with the last-used display mode. Your equipment takes about 90 seconds to find its position. The equipment shows receiver status indication at the top left-hand corner in most display modes. The table below shows these indications and their meanings.

Status indications

Indication	Meaning
2D	2D GPS position fixed
3D	3D GPS position fixed
W2D	2D WAAS position fixed
W3D	3D WAAS position fixed
DOP*	2D: HDOP larger than 4 3D: PDOP larger than 6
SIM	Simulation mode
- - -	Not fixed

*: DOP (Dilution of Precision) is the index of position accuracy, and it is the distribution pattern of satellites used in position fixing. Generally, the smaller the figure the better the position accuracy. (HDOP: Horizontal DOP, PDOP: Position DOP)

2. To turn off the power, press and hold down the ⏻ **/BRILL** key for three seconds. The time remaining until the power is turned off is counted down on the display.

1.3 How to Adjust LCD and Key Panel Brilliance

1. Press the ⏻ /BRILL key to show the following window.

```
Brill

LCD  ◀ Min        Max ▶
 4   [████████████      ]
KEY  ▼ Min        Max ▲
 3   [████████          ]
```
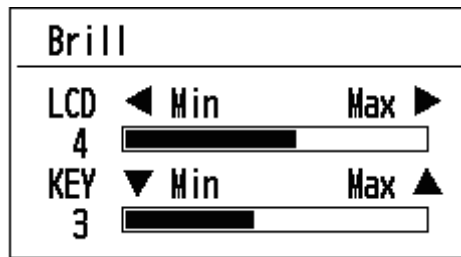
2. To adjust the LCD brilliance, press ⏻ /BRILL key.
   The setting changes "0→1→…→7→6…0→1…" continuously. Maximum setting is 7. You can use also the cursorpad (◀, ▶) to adjust the brilliance.

3. To adjust the panel brilliance, press the cursorpad (▲, ▼, max: 7).

4. Press ENT or MENU/ZOOM key.

1.4 Display Modes

Your unit has seven display modes: Plotter Display, Highway Display, Steering Display, Nav Data Display, Satellite Monitor Display and User Display 1/2. Press the DISP key to select a display mode. Each time the key is pressed, the display mode changes in the sequence shown below. To step through the displays in reverse order, press the DISP key more than three seconds.

[1]: Plotter display   [2]: Highway display   [3]: Steering display

[4]: Nav Data display

[7]: User display 2   [6]: User display 1   [5]: Satellite Monitor display
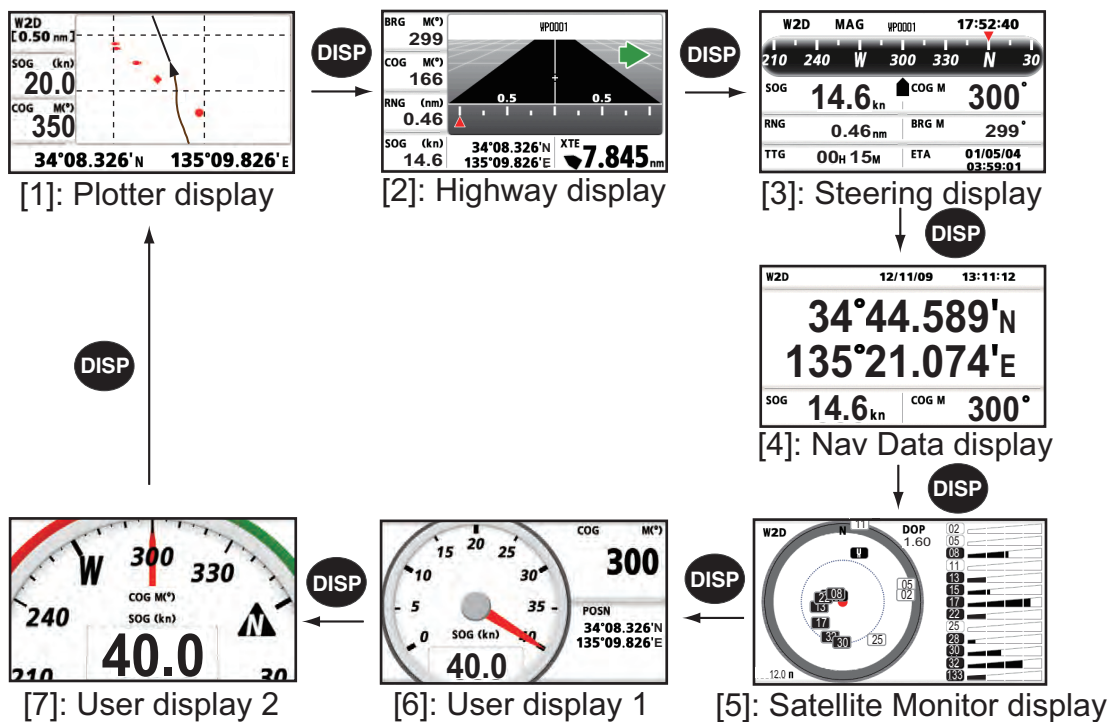
Plotter Display

The plotter display traces own boat's track.

Cursor
(displayed for approx.
seven seconds)

Waypoint mark
(Shape selectable)

Own boat mark

Course bar

Receiver status

W2D

Horizontal display → [0.50 nm]
range scale

N 34 08.375

RNG + (nm)

Range to cursor*→ 0.46

Lat/Lon
grids

N 34 08.250

BRG + M(°)

Bearing to cursor*→ 92

Boat's track

E 135 09.500   E 135 09.750

+ 34°08.326'N   135°09.826'E

Cursor position
(Own boat position when cursor is not displayed.)
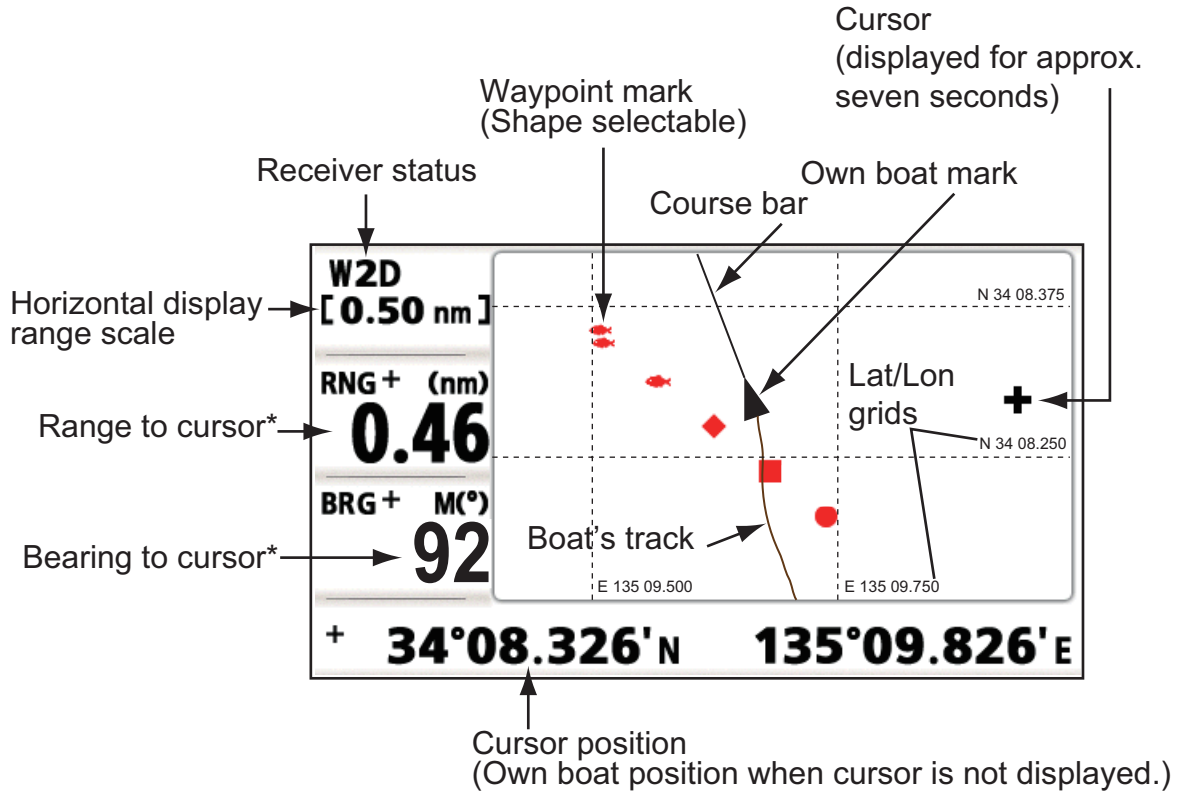
*:COG and SOG replace bearing to cursor and
range to cursor when the cursor is not displayed.

Highway Display

The highway display provides a 3-D view of own boat's progress toward destination.

XTE (Cross-track error) scale and arrow mark
Arrow shifts with boat's XTE. When the arrow
is aligned with the center line the boat is on
course. The arrow blinks if boat's XTE is
greater than XTE scale range.

"N (North)" is displayed, instead of the arrow,
at the center of the scale when no destination
is set.

Direction to steer
(to return to course)
←: Steer right. →: Steer left.

Bearing from
own boat to
destination
waypoint

Destination
waypoint name

Course
over
ground

BRG ▼ M(°)
299

COG M(°)
→ **166**

RNG (nm)
→ **0.46**

SOG (kn)
14.6

WP0001

0.5   0.5

34°08.326'N
135°09.826'E

XTE
▼ **7.845** nm

Speed
over
ground

Current
position

Digital XTE indication
(in nautical miles)

Range from own
boat to destination
waypoint

Own boat mark
The boat mark displays course as follows:
When no waypoint is set;
The mode is North-up and
the arrow shows boat's course.
When a waypoint is set;
The arrow shows boat's
course towards destination.

Steering Display

The steering display provides steering information.

Speed over ground

Receiver status

Bearing reference; MAG(netic) or TRUE

Time

| W2D | MAG | WP0001 | | 17:52:40 |

Bearing destination

Bearing scale

210   240   W   300   330   N   30

Own boat mark

| SOG | 14.6 kn | COG M | 300° |

Course over ground

| RNG | 0.46 nm | BRG M | 299° |

Bearing to the destination

| TTG | 00H 15M | ETA | 12/11/09 17:57:40 |

Time-To-Go to destination

Range from own boat to destination

Estimated Time of Arrival at destination

Nav Data Display

Receiver status

| W2D | 12/11/09 | 13:11:12 |

Date and time

$$34°44.589'N$$
$$135°21.074'E$$

Position in latitude and longitude

| SOG | 14.6 kn | COG M | 300° |

Course over ground

Speed over ground

Satellite Monitor Display

The satellite monitor display shows the condition of GPS and GEO (WAAS) satellites. Number, bearing and elevation angle of all GPS and GEO satellites (if applicable) in view of your receiver appear.

Elevation 45°

Receiver status

DOP value

W2D   N   DOP 1.60

GEO satellite

Receiver signal level Bars show signal level. Satellites whose signal level are high are used in fixing position.

12.0 m

Altitude

Area not used for positioning (set at menu)

Elevation 5°

Satellite numbers in reverse video are used for positioning.
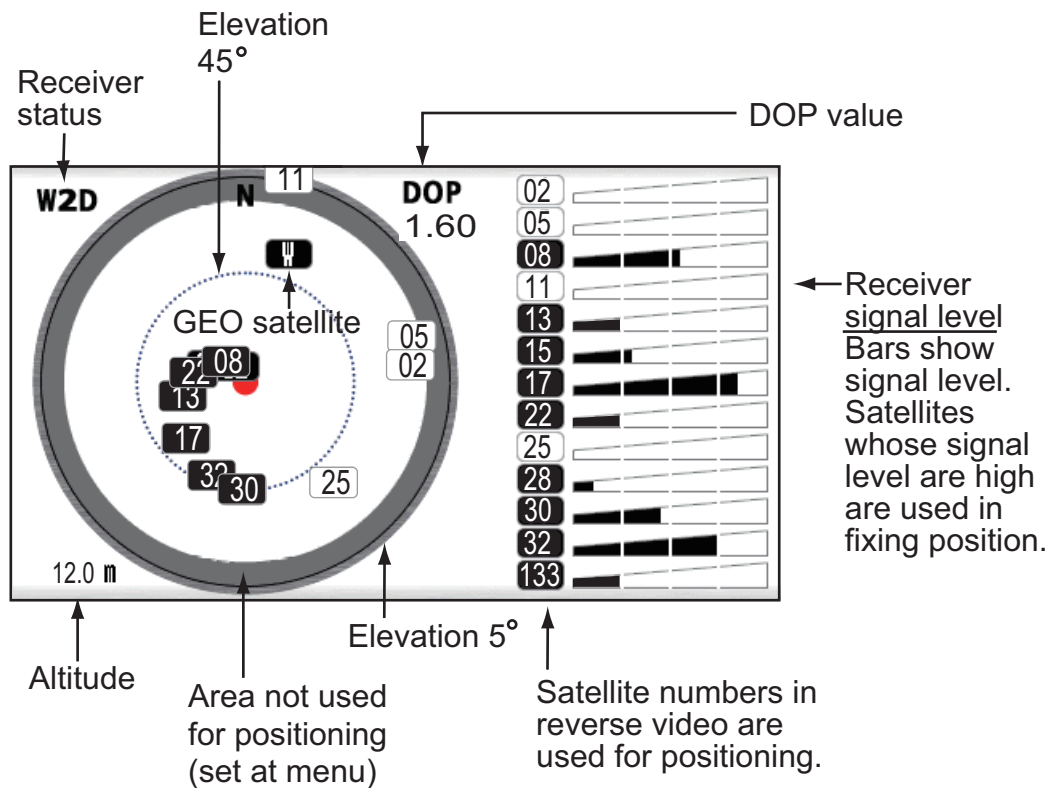
User Display 1, User Display 2

- Digital display
  The digital display shows digital navigation data. You can select what data to display in one to four cells. The choices of data are time, date, speed over ground, cross-track-error, odometer distance, position, course over ground, time-to-go to destination, trip distance, power source voltage, range and bearing to waypoint and estimated time of arrival at destination.

- Speedometer display
  The speedometer display provides both digital and analog displays of speed over ground.

- COG display
  The COG display shows both analog course over ground, and digital speed over ground.

Volts (V)	SOG (kn)
23.9	**15.8**
Trip (nm)	COG M(°)
55.7	**335**
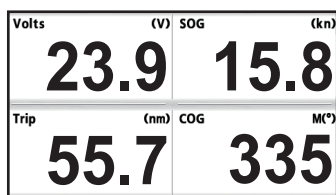
Digital display (four cells)

COG M(°) 300

15 20 25
10   30
5   35
0   SOG (kn)

POSN
34'08.326'N
135'09.826'E

40.0
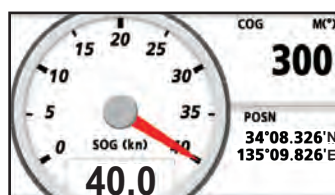
Speedometer display
(default: User display 1)

W   300   330
240   COG M(°)
       SOG (kn)
40.0
210   30
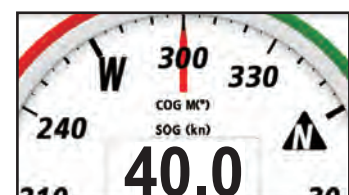
COG display
(default: User display 2)

1.5 Menu Overview

Most operations of your unit are done through the menu. Below is a quick introduction to how to select a menu and change menu settings. If you get lost in operation, press the **MENU/ZOOM** key to return to the main menu.

1. Press the **MENU/ZOOM** key once or twice to display the main menu.
   Press once: Steering display, nav data display, satellite monitor display, user display 1/2.
   Press twice: Plotter display, highway display

   Note: Following explanation takes the menus for the plotter display as an example.

```
Menu
┌──────────────────────────────────────────┐
│ Ship To Center *                         │
│ Tracks                                   │
│ Waypoints                                │
│ Routes                          ↑        │
│ Plotter Setup                  Cursor    │
│ Alarms                                   │
│ Messages                                 │
│ Delete                                   │
│ GPS Setup                                │
│ WAAS                                     │
├──────────────────────────────────────────┤
│ [MENU/ZOOM]:Cancel/Back [ENT]:Enter  ▲/▼:Select │
└──────────────────────────────────────────┘
```
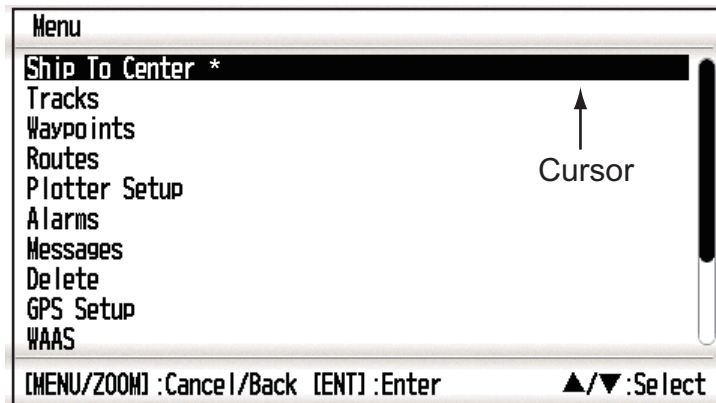
　　　　*: Shown only when the
　　　　　　MENU/ZOOM key is
　　　　　　pressed at the plotter display.

2. Press ▲ or ▼ to select an item, and press the **ENT** key.

3. Press **ENT** (or ▶) key.
   For example, select [Plotter Setup] and press the **ENT** key.

```
Menu >Plotter Setup
┌──────────────────────────────────────────┐
│ Auto Waypoint Entry(COG) : Off     60 °  10 s │
│ COG Line                 : On            │
│ COG/BRG ref.             : Mag           │
│ Magnetic Variation       : Auto    E12 ° │
│ WP Name                  : Disp All      │
│ TTG/ETA SPD              : Auto    60 s   │
└──────────────────────────────────────────┘
```
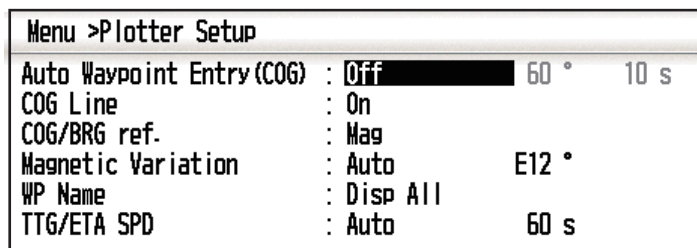
4. Press ▲ or ▼ to select option desired.
   For example, select [COG/BRG ref.]

5. Press the **ENT** key (or ▶).
   A window shows the options for the item selected.

```
┌──────┐
│ True │
│ Mag  │
└──────┘
```
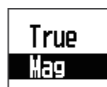
6. Press ▲ or ▼ to select option desired.

7. Press the **ENT** key (or ▶).

8. Press the **MENU/ZOOM** key (or ◀) twice to close the menu.

How to enter alphanumeric data

Some menu operations require you to enter alphanumeric data (A to Z, 0 to 9) and symbols (&, _, #,' , -, > and space). The procedure which follows shows how to enter alphanumeric data. For example, to change the waypoint name "WP0006" to "KOBE", do the follows:

Cursor → [WP0006]
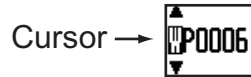
1) Press ▲ or ▼ to select "K".
2) Press ▶, and press ▲ or ▼ to select "O".
3) Press ▶, and press ▲ or ▼ to select "B".
4) Press ▶, and press ▲ or ▼ to select "E".
5) Press ▶, and press ▲ or ▼ to select " "(space).
6) Press ▶, and press ▲ or ▼ to select " " (space).
7) Press the **ENT** key.

1.6   How to Enter the MOB Mark

The MOB mark denotes man overboard position. Only one MOB mark is displayed. Each time the MOB mark is entered the previous MOB mark and its position data are overwritten.

1.   Press and hold the **WPT/MOB** key down to show the following message.

```
┌─────────────────────────────────────────────┐
│ MOB                                          │
├─────────────────────────────────────────────┤
│                 Saved To MOB                 │
│                                              │
│                  Goto MOB ?                  │
│                                              │
│                                              │
│            Yes           No                  │
│                                              │
│                                              │
│                                              │
├─────────────────────────────────────────────┤
│ [MENU/ZOOM]:Cancel/Back [ENT]:Enter   ▲/▼:Select │
└─────────────────────────────────────────────┘
```
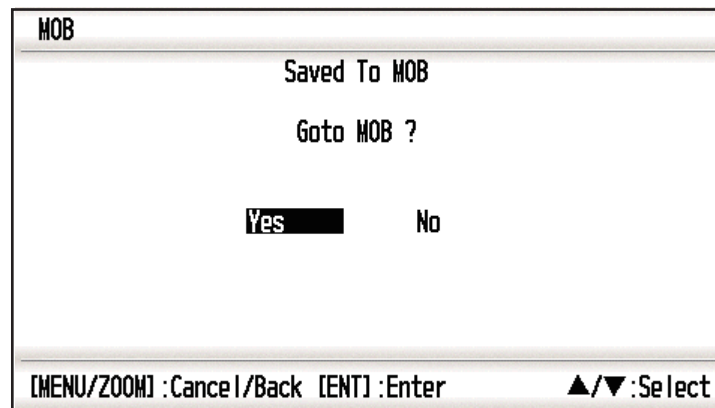
2.   To set MOB position as destination, confirm that [Yes] is chosen and press the **ENT** key. MOB mark ("M") appears and a blue line is drawn between own boat mark and the MOB mark. This line shows the shortest course to go to the MOB position, and arrows on the line show the direction to the MOB position.

Shortest course from own boat to MOB position (blue)

MOB mark (red)

Bearing from own boat to MOB position

Range from own boat to MOB position
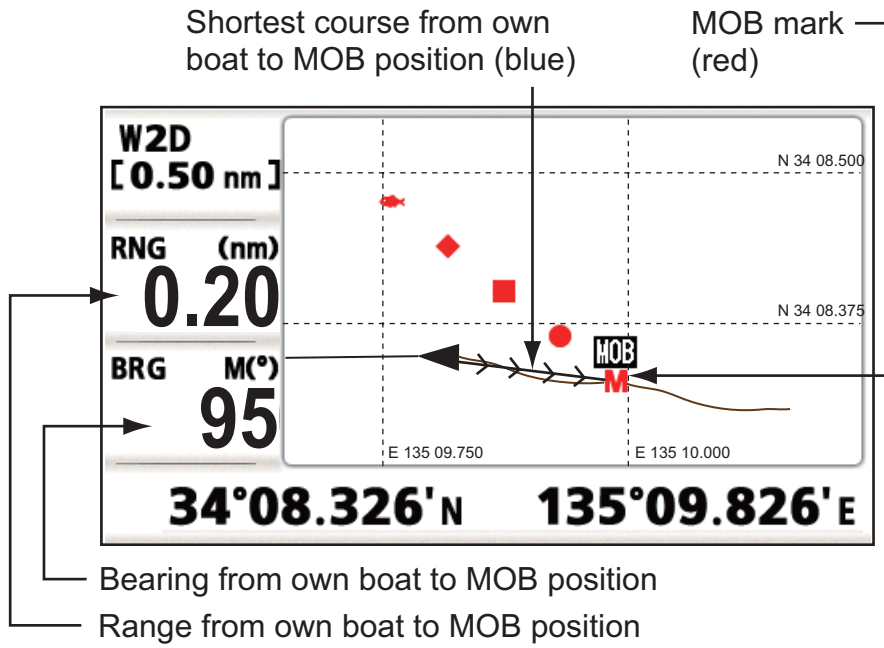
2. PLOTTER DISPLAY OVERVIEW

2.1 How to Select the Display Range

You can change the display range on the plotter and highway displays. The horizontal range in the plotter display is available among 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 40, 80, 160 and 320 nautical miles. The horizontal range in the highway display is available among 0.2, 0.4, 0.8, 1, 2, 4, 8 and 16 nautical miles.

1. Press the **MENU/ZOOM** key on the plotter or highway display.
   The following window appears.

(Plotter display)   *(Highway display)*

2. Press ▲ or ▼ to select range you want.

3. Press the **ENT** key.

2.2 How to Shift the Cursor

Use the cursorpad to shift the cursor. The cursor moves in the direction of the arrow or diagonal.

Cursor state and position indication

The position indication, shown at bottom of the plotter display, changes according to cursor state.

Cursor at rest

When the cursor is not shown, boat's position in longitude and latitude or TDs (depending on the menu setting) appears at the bottom of the display.

Cursor state and position indication

Cursor position is displayed in latitude and longitude or TDs at the bottom of the plotter display when the cursor is shown.

If there is no operation for about seven seconds, the cursor disappears.

Range from own boat to cursor — COG line

Own boat's mark

Cursor

Bearing from own boat to cursor — Cursor position in latitude and longitude
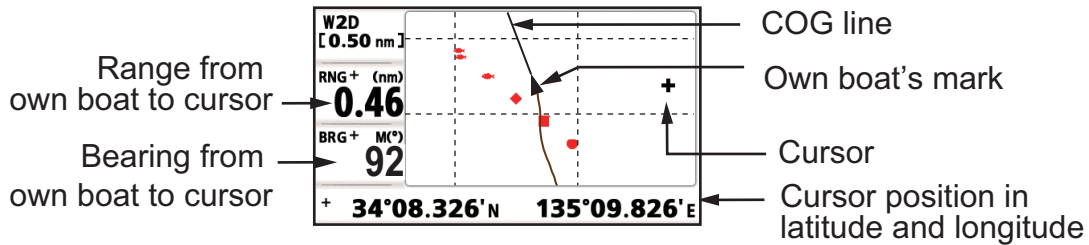
2.3 How to Shift the Display

The display can be shifted on the plotter display.

1. Press the cursorpad to show the cursor.
2. Press and hold down an arrow on the cursorpad.
    When the cursor is placed at an edge of the screen, the display shifts in the direction opposite to cursorpad operation.

Centering own boat's position

When own boat tracks off the plotter display, the own boat mark is automatically returned to the screen center. You can also return it manually by pressing and holding the **ENT** key for more than three seconds.

2.4 How to Change Track Plotting Interval, Stop Recording

To trace the boat's track, the boat's position is stored into the memory at an interval of distance or according to display range. For distance, a shorter interval provides better reconstruction of the track, but the storage time of the track is shorten. When the track memory becomes full, the oldest track is erased to make room for the latest. The current percentage of the memory used can be confirmed by choosing [Tracks] on the menu.

1. Press the **MENU/ZOOM** key twice to show the main menu.

2. Select [Tracks], and press the **ENT** key.

```
Menu >Tracks
Rec           : Distance     0.10 nm
Color         : Brown
Delete        : All

Track Memory Used 100%

            ↑
    Percentage of the memory used


[MENU/ZOOM]:Cancel/Back  [ENT]:Enter        ▲/▼:Select
```
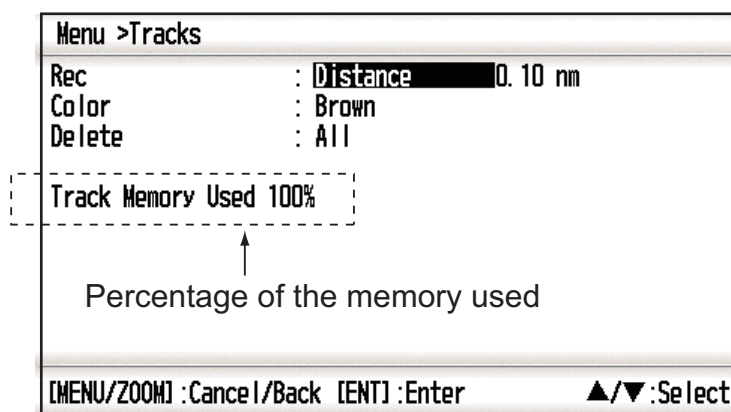
3. Confirm that the [Rec] is selected, and press the **ENT** key.

```
Off
Distance
Auto
```
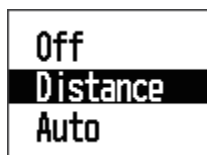
4. Select [Off], [Distance] or [Auto], and press the **ENT** key.
   Off: Track is not recorded. This setting is useful when you do not need to record track.
   Distance: Track is recorded and plotted at the distance interval set.
   Auto: Plotting and recording interval changes with display range selected.

5. For [Off] or [Auto], go to step 6. For [Distance], enter the recording interval as follows:

   1) Press ▶.

   2) Press **ENT** key.

```
▲
0.10 nm
▼
```
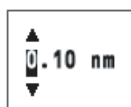
   3) Use the cursorpad to enter the interval, and press the **ENT** key.
      For entering the numeric data, see page 1-9.

6. Press the **MENU/ZOOM** key twice to close the menu.

2.5 How to Change Track Color

You can select the color for the tracks among red, yellow, green, blue, purple, black and brown. It is useful to change the color to distinguish tracks at different times of a day, for example.

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Tracks], and press the **ENT** key.
3. Select [Color], and press the **ENT** key.

```
Red
Yellow
Green
Blue
Purple
Black
Brown
```

4. Select the color to use for the track, and press the **ENT** key.
5. Press the **MENU/ZOOM** key twice to close the menu.

2.6 How to Erase Track

The tracks can be erased collectively or by color. The tracks cannot be restored once erased, therefore be absolutely sure you want to erase the tracks.

2.6.1 How to erase track by color

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Tracks], and press the **ENT** key.
3. Select [Delete], and press the **ENT** key.

```
All
By Color
```
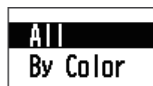
4. Select [By Color], and press the **ENT** key.

```
Red
Yellow
Green
Blue
Purple
Black
Brown
```
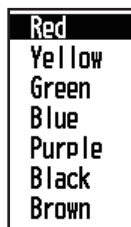
5. Select the track color to erase, and press the **ENT** key.
   The window shown below appears.

```
Delete all tracks by color
in Red.
Are you sure ?
        Yes        No
```
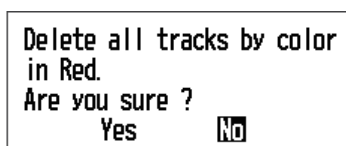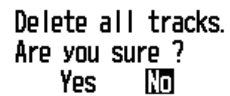
6. Press ◄ to select [Yes], and press the **ENT** key.
   The tracks with the color chosen at step 5 are erased.

Note: To cancel, select [No] at this step.

7. Press the **MENU/ZOOM** key twice to close the menu.

2.6.2 How to erase all tracks

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Tracks], and press the **ENT** key.
3. Select [Delete], and press the **ENT** key.
4. Select [All], and press the **ENT** key.

```
Delete all tracks.
Are you sure ?
   Yes    No
```

5. Press ◄ to select [Yes], and press the **ENT** key to erase all tracks.
   [Track Memory Used] on the Tracks menu shows "0%".
6. Press the **MENU/ZOOM** key twice to close the menu.

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3. WAYPOINTS

3.1 How to Enter Waypoints

In navigation terminology a waypoint is a particular location on a voyage, whether it be a starting, intermediate or destination waypoint. Your unit can store 10,000 waypoints. Waypoints can be entered on the plotter display: at cursor position, at own boat's position, through the waypoints list and at the MOB position. Also, waypoints can be entered automatically when your boat changes course prominently.

3.1.1 How to enter a waypoint with the cursor

1. Use the cursorpad to place the cursor on the location desired for a waypoint.
2. Press the **ENT** key to enter the waypoint mark (default shape: green solid circle). This waypoint is named with the youngest unused waypoint number, and saved to the waypoint list.

3.1.2 How to enter a waypoint at own boat position

Press the **WPT/MOB** key to enter the waypoint mark (default shape: green solid circle). This waypoint is named with the youngest unused waypoint number, and saved to the waypoint list.

3.1.3 How to enter a waypoint through the list

1. Press the **MENU/ZOOM** key to show the main menu.
2. Select [Waypoints], and press the **ENT** key.

3. Press the **ENT** key to show the waypoint list.

4. Confirm that [New] is chosen, and press the **ENT** key.

```
Waypoints >Waypoint List >Waypoint Info.
Name          : WP0006
Symbol        : ●
Color         : Green
Lat           :  63°56.708'N
Lon           : 138°39.266'E
Comment       : 15:50 17NOV09
RNG (nm)      :   196
BRG (°)       : 197


[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼ :Select
```

The default name, Lat/Lon and Comment are as follows:
Name: The youngest unused waypoint number.
Lat, Lon: Current own boat position
Comment: Current date/time

5. To change the waypoint name, press the **ENT** key.

Cursor → WP0006

6. Operate the cursorpad to change the waypoint name (max. 8 characters).

7. To change the mark shape, select [Symbol] and press the **ENT** key.

8. Select a mark desired, and press the **ENT** key.

9. To change the mark color, select [Color], and press the **ENT** key.

```
Red
Yellow
Green
Blue
Purple
Black
Brown
```

10. Select a color desired, and press the **ENT** key.

11. To change the position, do as follows:

1) Select [Lat], and press the **ENT** key.

2) Enter latitude, and press the **ENT** key.

3) Press ▼ to select [Lon], and press the **ENT** key.

4) Enter longitude, and press the **ENT** key.

12. To change the comment, select [Comment] and press the **ENT** key.

13. Enter the comment, and press the **ENT** key.

14. Press the **MENU/ZOOM** key to register the new waypoint into the list.

15. To register other waypoints, repeat steps 4 through 14.

16. Press the **MENU/ZOOM** key several times to close the menu.

3.1.4 How to enter waypoints automatically

Waypoints can be entered automatically when your course changes by a specified degree. This function is useful for reversely following the waypoints recorded on an outward voyage when you return home. To set the criteria for automatic entering of waypoints, do the following:

1. Press the **MENU/ZOOM** key twice to show the main menu.

2. Select [Plotter Setup], and press the **ENT** key.

```
Menu >Plotter Setup

Auto Waypoint Entry(COG) : Off          60 °    10 s
COG Line                 : On
COG/BRG ref.             : Mag
Magnetic Variation       : Auto         E12 °
WP Name                  : Disp All
TTG/ETA SPD              : Auto         60 s
```

3. Select [Auto Waypoint Entry (COG)], and press the **ENT** key.

4. Select [On], and press the **ENT** key.

5. Press ▶ to select the degree setting, and press the **ENT** key.

6. Enter the degree, and press the **ENT** key (setting range: 15 to 150°).

7. Press ▶ to select the seconds setting, and press the **ENT** key.

8. Enter the seconds, and press the **ENT** key (setting range: 1 to 60 seconds).

9. Press the **MENU/ZOOM** key twice to close the menu.

3.2   How to Display Waypoint Name

You can display waypoint names as follows:

1. Press the **MENU/ZOOM** key twice to show the main menu.

2. Select [Plotter Setup], and press the **ENT** key.

```
Menu >Plotter Setup

Auto Waypoint Entry(COG)  : Off          60 °     10 s
COG Line                  : On
COG/BRG ref.              : Mag
Magnetic Variation        : Auto         E12 °
WP Name                   : Disp Goto
TTG/ETA SPD               : Auto         60 s




[MENU/ZOOM] :Cancel/Back  [ENT] :Enter          ▲/▼ :Select
```

3. Select [WP Name], and press the **ENT** key.

```
Disp Goto
Disp All
Disp Route
```
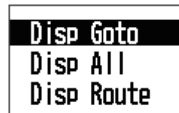
4. Select [Disp Goto], [Disp All] or [Disp Route], and press the **ENT** key.
    Disp Goto: Displays only the destination waypoint name.
    Disp All: Displays all waypoint names.
    Disp Route: Displays all waypoint names in the route when it is set as destination.

5. Press the **MENU/ZOOM** key twice to close the menu.

3.3 How to Edit Waypoints

Waypoint position, name, mark shape and comment can be edited on the plotter display or through the waypoint list.

Note: When the waypoint chosen is set as the destination, the message "Change The Waypoint. Are you sure?" appears.

3.3.1 How to edit waypoints on the plotter display

1. Operate the cursorpad to place the cursor on the waypoint to edit.
2. Press the **ENT** key to show the pop-up window.

```
WP0003
─────────
Goto
Move
Edit
Delete
```
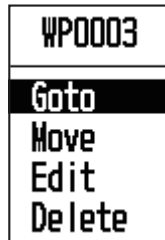
3. Select [Edit], and press the **ENT** key to show the waypoint information.
4. Edit the waypoint (see the paragraph 3.1.3).
5. Press the **MENU/ZOOM** key to return to the plotter display.

3.3.2 How to edit waypoints through the list

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Waypoints], and press the **ENT** key.
3. Select [Alpha] or [Local], and press the **ENT** key.
   Alpha: The list shows waypoints in alphabetical order.
   Local: The list shows waypoints from the nearest to the furthest.
4. Select the waypoint to edit, and press the **ENT** key to show the pop-up window.

```
Goto
Edit
Delete
```

5. Select [Edit], and press the **ENT** key to show the waypoint information.
6. Edit the waypoint data (see the paragraph 3.1.3).
7. Press the **MENU/ZOOM** key several times to close the menu.

3.4 How to Move Waypoints

You can move waypoints to any position on the plotter display.

1. Operate the cursorpad to place the cursor on the waypoint to move.

2. Press the **ENT** key to show the pop-up window.

```
WP0003
Goto
Move
Edit
Delete
```
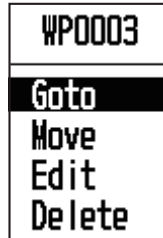
3. Select [Move], and press the **ENT** key to show the waypoint information.

4. Operate the cursorpad to move the cursor to the new position.

5. Press the **ENT** key.

3.5 How to Erase Waypoints

You can erase each or all waypoint(s).

Note: You cannot erase the waypoint used as the current destination. (See paragraphs paragraph 3.5.1, paragraph 3.5.2.)

3.5.1 How to erase a waypoint on the plotter display

1. Operate the cursorpad to place the cursor on the waypoint to erase.
2. Press the **ENT** key to show the pop-up window.

```
WP0003
─────────
Goto
Move
Edit
Delete
```
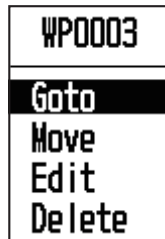
3. Select [Delete], and press the **ENT** key.

3.5.2 How to erase a waypoint through the waypoint list

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Waypoints], and press the **ENT** key.
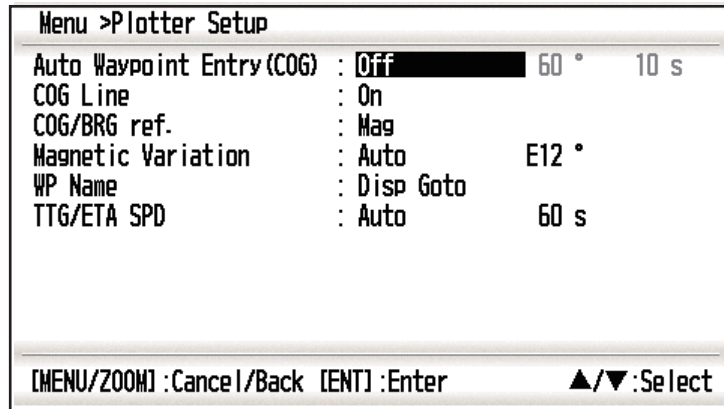3. Select [Alpha] or [Local], and press the **ENT** key.
4. Select the waypoint to erase, and press the **ENT** key.

```
Goto
Edit
Delete
```

5. Select [Delete], and press the **ENT** key.
6. Press the **MENU/ZOOM** key several times to close the menu.

3.5.3 How to erase all waypoints

1. Press the **MENU/ZOOM** key twice to show the main menu.

2. Select [Delete], and press the **ENT** key.

```
Menu >Delete
All Waypoints      : Off
All Routes         : Off




[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼ :Select
```

3. Confirm that [All Waypoints] is chosen, and press the **ENT** key.

```
Off
Delete
```

4. Select [Delete], and press the **ENT** key.

```
Delete all waypoints.
Are you sure ?
       Yes      No
```

When no waypoint is set as destination

```
Waypoint is set as a destination.
Are you sure to delete all waypoints ?
       Yes              No
```
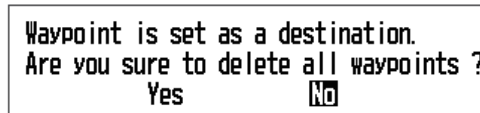
When a waypoint is set as destination

5. Select [Yes], and press the **ENT** key to erase all waypoints.
Note: To cancel, select [No].

6. Press the **MENU/ZOOM** key twice to close the menu.

4. ROUTES

In many cases a trip from one place to another involves several course changes, requiring a series of waypoints which you navigate to, one after another. The sequence of waypoints leading to the ultimate destination is called a route. Your unit can automatically advance to the next waypoint on a route, so you do not have to change the destination waypoint repeatedly.

4.1 How to Create Routes

You can store up to 100 routes, and a route can have 30 waypoints. A route is constructed with the waypoints you have entered.
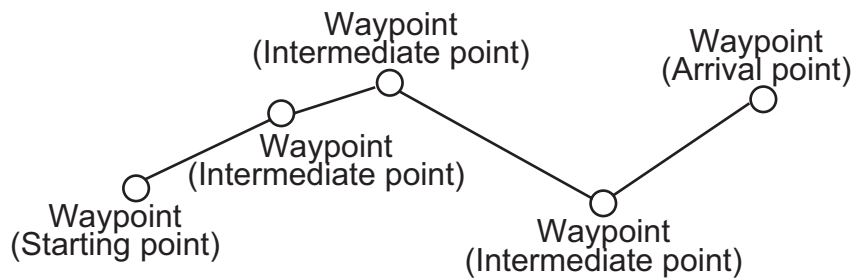
Sample route

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Routes], and press the **ENT** key.
3. Press the **ENT** key to show the route list.

4. Confirm that [New] is chosen, and press the **ENT** key to show the route information.

```
Routes >Route List >Route Info.
Name   : RT0001         Total LEG 0.00nm  0 Points
Cmnt   :          ->          LEG              BRG
   1 _____ :
   2 _____ :             ___nm              ___
   3 _____ :             ___nm              ___
   4 _____ :             ___nm              ___
   5 _____ :             ___nm              ___
   6 _____ :             ___nm              ___
   7 _____ :             ___nm              ___
   8 _____ :             ___nm              ___
[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼:Select
```

5. Press the **ENT** key to change the route name.

```
    ▲
  RT0001
    ▼
```

6. Operate the cursorpad to enter the route name, and press the **ENT** key (maximum: six characters).

7. Press ▼ then **ENT** key.

```
  ▲
  ▮           ->
  ▼
```
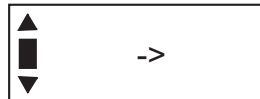
8. Operate the cursorpad to enter the comment (maximum: 18 characters).

9. Press ▼ to move the cursor to [1], and press the **ENT** key.

```
  Change
  Add
  Skip
  Delete
```
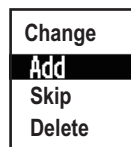
10. Confirm that [Add] is chosen, and press the **ENT** key.

11. Select [Alpha] or [Local], and press the **ENT** key to show the waypoint list.

12. Select the waypoint to add to the route, and press the **ENT** key.
The chosen waypoint (as the starting point) is registered to [1].

13. Press ▼ to select [2], and press the **ENT** key.

14. Repeat steps 10 through 13 to complete the route.

15. Press the **MENU/ZOOM** key several times to close the menu.

4.2 How to Edit Routes

You can edit the route created.

Note: When the route chosen is set as route navigation, the message "Route is set as a destination. Are you sure?" appears.

4.2.1 How to replace a waypoint in a route

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Routes], and press the **ENT** key.
3. Select [Alpha] or [Local], and press the **ENT** key to show the route list.
4. Select the route to edit, and press the **ENT** key.

```
Goto
Edit
Delete
```

5. Select [Edit], and press the **ENT** key to show the route list.
6. Select the waypoint to replace, and press the **ENT** key.

```
Change
Add
Skip
Delete
```
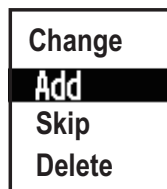
7. Select [Change], and press the **ENT** key.
8. Select [Alpha] or [Local], and press the **ENT** key to show the waypoint list.
9. Select the new waypoint, and press the **ENT** key.
10. Press the **MENU/ZOOM** key several times to close the menu.
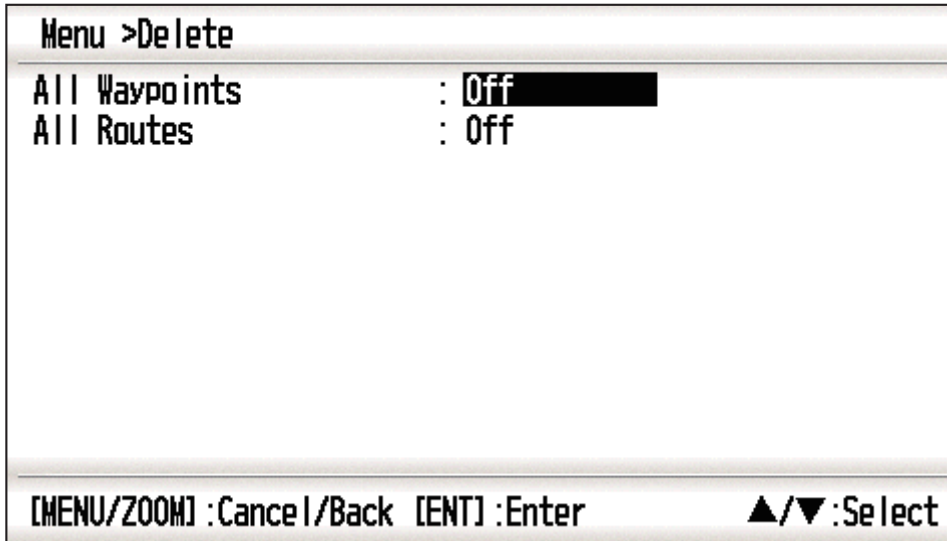
4.2.2 How to delete a waypoint from a route

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Routes], and press the **ENT** key.
3. Select [Alpha] or [Local], and press the **ENT** key to show the route list.
4. Select the route to edit, and press the **ENT** key.
5. Select [Edit], and press the **ENT** key to show the route information.
6. Select the waypoint to delete from the route, and press the **ENT** key.
7. Select [Delete], and press the **ENT** key.
8. Press the **MENU/ZOOM** key several times to close the menu.
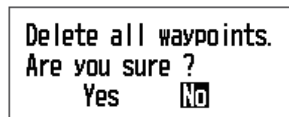
4.2.3 How to insert a waypoint in a route

To insert a waypoint in a route, do the following:

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Routes], and press the **ENT** key.
3. Select [Alpha] or [Local], and press the **ENT** key to show the route list.
4. Select the route to edit, and press the **ENT** key.
5. Select [Edit], and press the **ENT** key to show the route list.
6. Select the waypoint which will come after the waypoint to be inserted, and press the **ENT** key.
7. Select [Add], and press the **ENT** key.
8. Select [Alpha] or [Local], and press the **ENT** key to show the waypoint list.
9. Select the waypoint, and press the **ENT** key.
10. Press the **MENU/ZOOM** key several times to close the menu.

4.2.4 How to temporarily deselect a waypoint in a route

You can temporarily deselect an unnecessary waypoint from a route. Using the route created in the illustration shown below as an example, deselect the second intermediate waypoint.
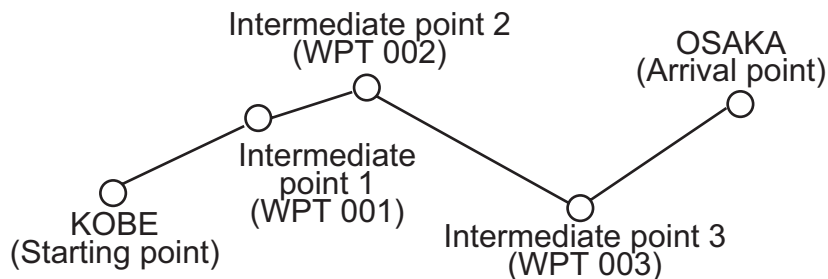
If you reconstruct the route without the second intermediate point it would look like the illustration below.

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Routes], and press the **ENT** key.
3. Select [Alpha] or [Local], and press the **ENT** key to select the route list.
4. Select the route to edit, and press the **ENT** key.
5. Select [Edit], and press the **ENT** key to show the route information.
6. Select the waypoint to skip, and press the **ENT** key.

8. Press the **MENU/ZOOM** key several times to close the menu.

Note: To restore waypoint to a route, select [Skip Off] at step 7, and press the **ENT** key.

4.3 How to Erase a Route

You can erase routes individually or collectively.

4.3.1 How to erase a route through the route list

Note: The route used as route navigation can not be erased.

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Routes], and press the **ENT** key.
3. Select [Alpha] or [Local], and press the **ENT** key to show the route list.
4. Select the route to erase, and press the **ENT** key.
5. Select [Delete], and press the **ENT** key to erase the route chosen at step 4.
6. Press the **MENU/ZOOM** key several times to close the menu.

4.3.2 How to erase all routes

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Delete], and press the **ENT** key.
3. Select [All Routes], and press the **ENT** key.
4. Select [Delete], and press the **ENT** key to show the following message.

```
Delete all routes.
Are you sure?
Yes    No
```

When no route is set as destination

```
Route is set as destination.
Are you sure to delete all routes?
Yes    No
```

When a route is set as destination

5. Select [Yes], and press the **ENT** key to erase all routes.
   Note: To cancel, select [No].
6. Press the **MENU/ZOOM** key twice to close the menu.

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5. DESTINATION

Destination can be set four ways: by cursor, by waypoint, by route and by MOB position. Previous destination is cancelled whenever a new destination is set. The setting by MOB position is described in chapter 1. When setting a destination, a blue line is shown between own boat and the destination selected. Also, the range and bearing from own boat to the destination are shown at the left-hand side of the screen.

Destination waypoint
Destination waypoint name

Range from own boat to the destination

W2D
[0.50 nm]

RNG (nm)
0.23

BRG M(°)
37

34°08.326'N   135°09.826'E

WP0001   N 34 08.500

N 34 08.375

E 135 09.750   E 135 10.000

Bearing from own boat to the destination

Shortest course (blue)
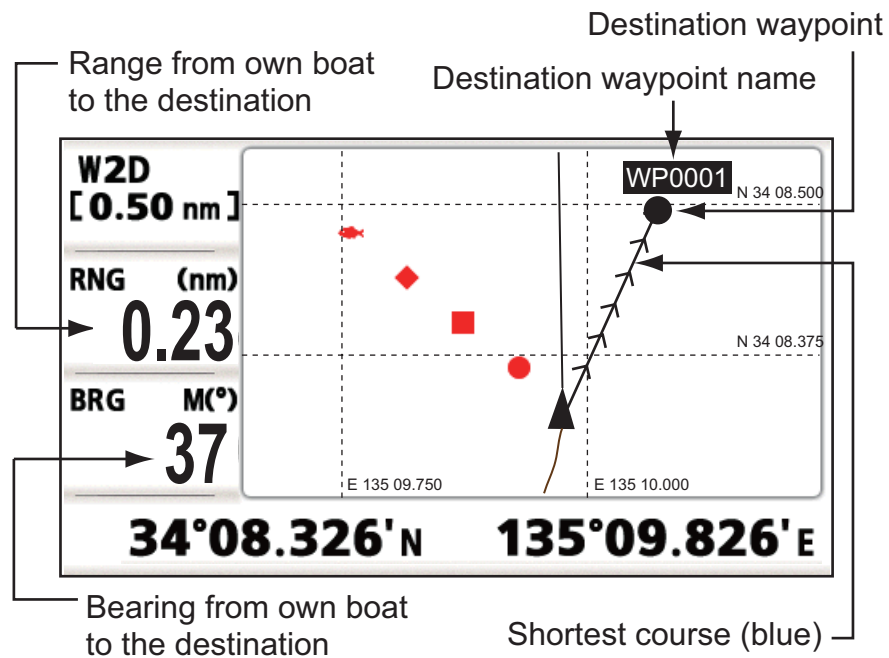
5.1 How to Set Destination by Cursor Position

You can set a destination at the position with no waypoint. This destination is called "Quick Point".

1. On the plotter display, operate the cursorpad to place the cursor on the location desired for destination.

2. Press the **GO TO** key to enter the waypoint as the quick point.
   The quick waypoint is shown with a green solid circle, and named as "QP". This point is saved in the waypoint list automatically.

3. Cancel the destination, referring to section 5.4, when arriving at the waypoint.

Note: The quick point set is erased when a new one is entered.

5.2 How to Set Destination by Waypoint

You can set a waypoint as destination by using the cursor or the waypoints list.

5.2.1 How to set a destination waypoint with the cursor

1. On the plotter display, operate the cursorpad to place the cursor on the waypoint which you want to set as the destination.
2. Press the **ENT** key.

```
    WP0000
  Goto
  Move
  Edit
  Delete
```

3. Select [Goto], and press the **ENT** key.
4. Cancel the destination referring to section 5.4 when arriving at the waypoint.

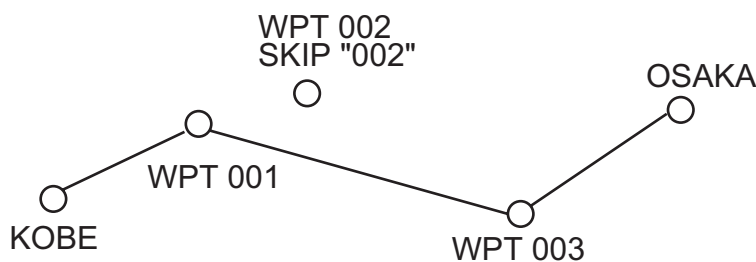### 5.2.2 How to set a destination waypoint through the list

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Waypoints], and press the **ENT** key.
3. Select [Alpha] or [Local], and press the **ENT** key to show the waypoint list.

```
Menu >Waypoints >Waypoint List

Name      Symbol    Color    RNG(nm)   BRG(°)
[New]
G WP0001    ●       ■ Red      115       115
  WP0002    ■       ■ Red      116       116
  WP0003    ◆       ■ Red      117       117
  WP0004   ⤙◄       ■ Red      118       118
  WP0005    ⚓       ■ Red      119       119

[MENU/ZOOM]:Cancel/Back  [ENT]:Enter        ▲/▼:Select
```

4. Select the waypoint to set as a destination, and press the **ENT** key.

```
  Goto
  Edit
  Delete
```

5. Select [Goto], and press the **ENT** key to show the plotter display.
6. Cancel the destination referring to section 5.4 when arriving at the waypoint.

5.3 How to Set Route as Destination

You can set a route as destination through the list.

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Route], and press the **ENT** key.

3. Select [Alpha] or [Local], and press the **ENT** key.

```
Menu >Routes >Route List
Name                        TLEG (nm)  Number
  [New]
 RT000  : WP000  ->WP0001      0.85      2
 RT001  : WP003  ->WP0001      0.06      2
 RT002  : WP001  ->WP0005      1.83      3
 RT003  : WP001  ->WP0004      3.54      4



[MENU/ZOOM] :Cancel/Back  [ENT] :Enter    ▲/▼:Select
```

4. Select the route to set as a destination, and press the **ENT** key.

```
Goto
Edit
Delete
```

5. Select [Goto], and press the **ENT** key.

6. Select [Forward] or [Reverse].
   Forward: Follows waypoints in order registered (1→2→3…)
   Reverse: Follows waypoints in reverse order registered (30 (when maximum entered) →29→28…→1)

7. Press the **ENT** key to show the plotter display. The destination route is shown with waypoints connected with legs.

8. Cancel the destination referring to section 5.4 when arriving at the waypoint.

How to change the following direction after you set a route as destination

After you start doing the route destination, you can change the following direction, [Forward]→[Reverse] or vice versa. Place the cursor on a leg of the route, and press the **ENT** key to show the following pop-up window. Select [Reverse] (or [Forward]). Then, select [Yes] and press the **ENT** key.

```
      RT0000
Cancel Route
Reverse
Route Info.
```

Note: If your boat has not yet arrived at the first waypoint in the route, the current route destination is cancelled if you select [Reverse] (or [Forward]). Set the route destination again.

5.4 How to Cancel Destination

You can cancel destination by using the cursor, or through the list.

5.4.1 How to cancel destination with the cursor

1. On the plotter display, operate the cursorpad to place the cursor on the waypoint (route) set as the current destination.

2.   Press the **ENT** key.

WP0001
Move
Cancel Goto
Edit
Delete

(for waypoint destination)

QP0001
Move
Cancel Goto
Edit
Delete

(for QP destination)

WP0001
Move
Skip
Cancel Route
Edit

(for route navigation)

RT0000
Cancel Route
Reverse
Route Info.

(for route leg)

3.   Select [Cancel Goto (Route)], and press the **ENT** key.

Cancel Goto. Are you sure? Yes   **No**

(for waypoint destination)

Cancel Route Navigation. Are you sure? Yes   **No**

(for route navigation)

4.   Chose [Yes], and press the **ENT** key.
To cancel, select [No].

5.4.2   How to cancel destination through the list

1.   Press the **MENU/ZOOM** key twice to show the main menu.

2.   Select [Waypoints] (or [Routes]), and press the **ENT** key twice.

3.   Select the waypoint (route) set as the current destination.

Menu >Waypoints >Waypoint List

Name	Symbol	Color	RNG (nm)	BRG (°)
[New]				
G WP0001	●	🟥 Red	115	115
WP0002	■	🟥 Red	116	116
WP0003	◆	🟥 Red	117	117
R WP0004	🐟	🟥 Red	118	118
WP0005	🐠	🟥 Red	119	119

Destination mark → G WP0001

Waypoint used for → R WP0004
destination route

[MENU/ZOOM] :Cancel/Back   [ENT] :Enter   ▲/▼ :Select

4.   Press the **ENT** key.

Cancel Goto
Edit
Delete

(for waypoint destination)

Cancel Route
Edit
Delete

(for route navigation)

5.   Select [Cancel Goto (Route)], and press the **ENT** key.

Cancel Goto. Are you sure? Yes   **No**

(for waypoint destination)

Cancel Route Navigation. Are you sure? Yes   **No**

(for route navigation)

6.   Select [Yes], and press the **ENT** key.
To cancel, select [No].

7.   Press the **MENU/ZOOM** key several times to close the menu.

6. ALARMS

6.1 Overview

There are nine alarm conditions which generate both audio and visual alarms: Arrival alarm, Anchor watch alarm, XTE (Cross-Track Error) alarm, Speed alarm, Speed Based Output alarm, WAAS alarm, Time alarm, Trip alarm and Odometer alarm.

When an alarm setting is violated, the buzzer sounds and the name of the offending alarm and the alarm icon appear on the display (alarms other than Speed Based Output).

You can silence the buzzer and remove the alarm name indication by pressing any key. The alarm icon remains on the screen until the reason for the alarm is cleared.

```
Menu >Alarms                              (!) ◄──── Alarm icon (flashing)
Buzzer              ┌─ XTE ALARM! ─┐  ◄──────────── Alarm message
Arrival/Anchor    : Off      0.50 nm
XTE               : Off      0.005 nm
Speed             : Off      10.0 kn
Speed Based Output : Off     10.0 kn    Close
                             10.0 kn    Open
WAAS              : Off
Time              : Off      0:00
Trip              : Off         0 nm
Odometer          : Off         0 nm

[MENU/ZOOM]:Cancel/Back [ENT]:Enter        ▲/▼:Select
```
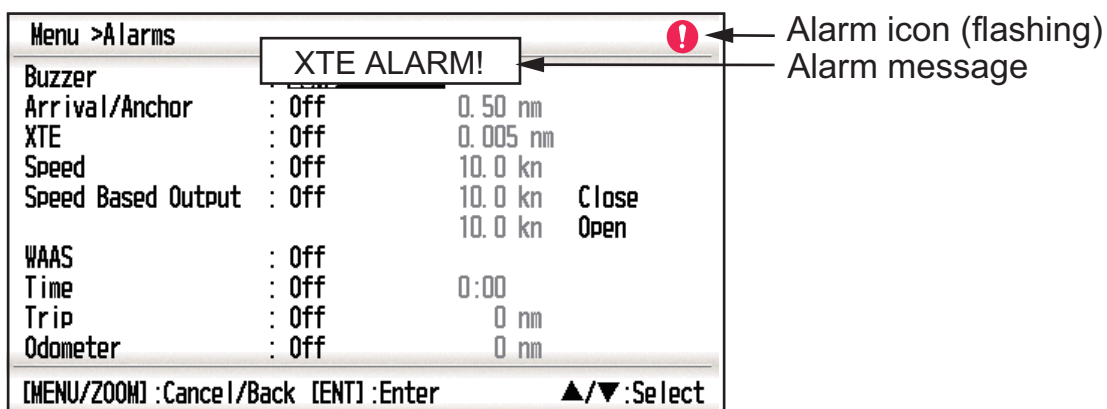
To know which alarm has been violated, do the following procedure.

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Messages], and press the **ENT** key.

```
Menu >Messages                            (!)
SPEED ALARM!




[MENU/ZOOM]:Cancel/Back [ENT]:Enter        ▲/▼:Select
```
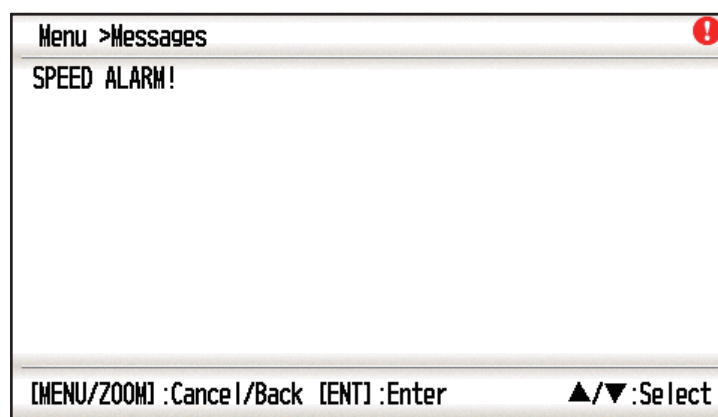
Example alarm message

The display shows the names of offending alarms. When there are no alarms, the message "No Message! " appears.

<u>**Message and meanings**</u>

Message	Meaning
XTE ALARM!	The boat is off its intended course by the range set.
TIME ALARM!	The time set has come.
SPEED ALARM!	The boat's speed is higher than the range set.
ARRIVAL ALARM!	The boat is approaching the arrival area.
TRIP ALARM!	The boat has traveled further than the preset trip distance.
ODOMETER ALARM!	The boat has traveled the total distance set.
ANCHOR WATCH!	The boat has moved a certain distance (when it should be at rest).
NO WAAS SIGNAL!	WAAS signal cannot be found.

Note: The message screen also shows equipment trouble. See section 8.3.

6.2   Buzzer Type Selection

The buzzer sounds whenever an alarm setting is violated. You can select the type of buzzer as follows:

1. Press the **MENU/ZOOM** key twice to show the main menu.
2. Select [Alarms], and press the **ENT** key.
3. Select [Buzzer], and press the **ENT** key.

```
┌─────────────┐
│ Short       │
│ Long        │
│ Continuous  │
└─────────────┘
```

4. Select buzzer type, and press the **ENT** key.
    Short: A short beep sounds.
    Long: Three long beeps sound.
    Continuous: Continuous long beeps sound until a key is pressed.
5. Press the **MENU/ZOOM** key twice to close the menu.

6.3   How to Set an Alarm

Set alarms as below:

Note: For the Anchor alarm, press the **WPT/MOB** key to enter the waypoint at own boat's position, and set it as destination referring to paragraph 5.2.1.

1. Press the **MENU/ZOOM** key twice to show the main menu.

2. Select [Alarms], and press the **ENT** key.

```
┌──────────────────────────────────────────────┐
│ Menu >Alarms                                   │
│ Buzzer            : [Long]                      │
│ Arrival/Anchor    : Off        0.50 nm         │
│ XTE               : Off        0.005 nm        │
│ Speed             : Off        10.0 kn         │
│ Speed Based Output: Off        10.0 kn  Close   │
│                                10.0 kn  Open    │
│ WAAS              : Off                        │
│ Time              : Off        0:00            │
│ Trip              : Off           0 nm         │
│ Odometer          : Off           0 nm         │
│                                                │
│ [MENU/ZOOM]:Cancel/Back [ENT]:Enter  ▲/▼:Select│
└──────────────────────────────────────────────┘
```

3. Select an alarm item, and press the **ENT** key.

4. Do one of the following:
   (Arrival/Anchor)
   1) Select [Arrival] or [Anchor], and press the **ENT** key.
   2) Press ▶ and **ENT** key.
   3) Enter the alarm area, and press the **ENT** key.

   (XTE, Speed, Trip and Odometer)
   1) Select [On], and press the **ENT** key.
   2) Press ▶ and **ENT** key.
   3) Enter the value, and press the **ENT** key.

   (WAAS)
   Select [On], and press the **ENT** key.
   (Time)
   1) Select [On], and press the **ENT** key.
   2) Press ▶ and **ENT** key in order.
   3) Enter the time, and press the **ENT** key.
   4) For 12-hour clock, press ▶ and **ENT** key.
   5) Select [AM] or [PM], and press the **ENT** key.

   (Speed Based Output)
   1) Select [On], and press the **ENT** key.
   2) Press ▶ and **ENT** key.
   3) Enter the speed at which to close the contact signal, and press the **ENT** key.
   4) Press ▼ and **ENT** key.
   5) Enter the speed to open the contact signal, and press the **ENT** key.

5. Press the **MENU/ZOOM** key twice to close the menu.

Note 1: To cancel an alarm, select [Off] at 1) on step 4.

Note 2: You can activate the arrival alarm or the anchor watch alarm; they cannot be activated together.

6.4   Alarm Descriptions

Arrival alarm

The arrival alarm informs you that own boat is approaching a destination waypoint. The area that defines an arrival zone is that of a circle which you approach from the outside of the circle. The alarm will activate if your boat enters the circle.
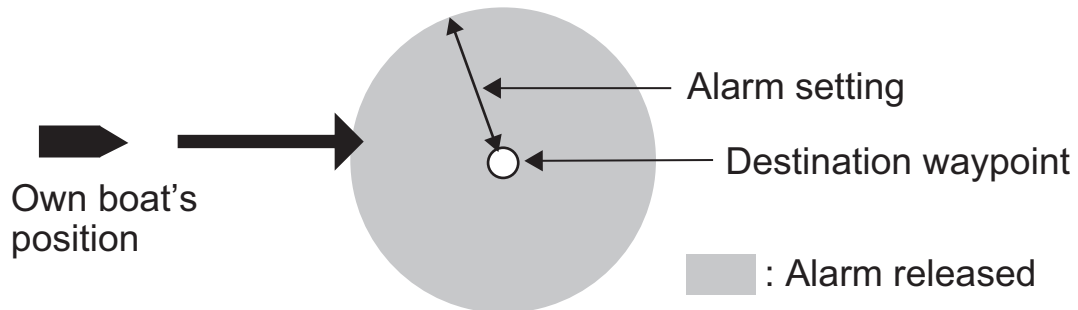
How the arrival alarm works

Anchor watch alarm

The anchor watch alarm sounds to warn you that your boat is moving when it should be at rest. Before setting the anchor watch alarm, set current position as destination waypoint.
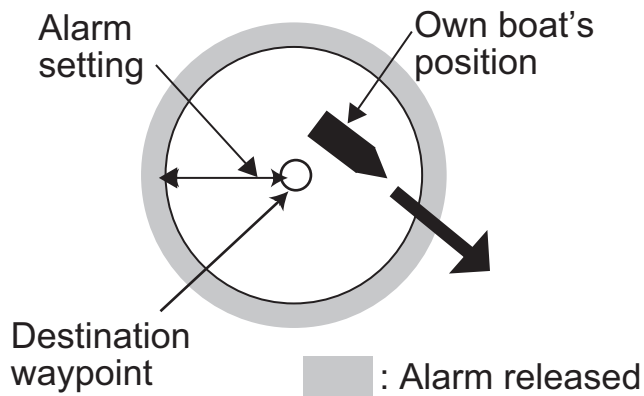
How the anchor watch alarm works

XTE (Cross-Track Error) alarm

The XTE alarm warns you when own boat is off its intended course.

How the XTE alarm works
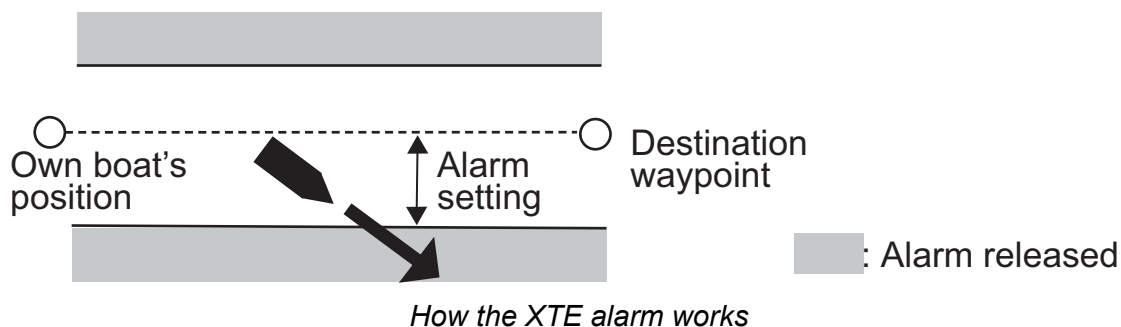
Speed alarm

The speed alarm alerts you when the boat's speed is higher than the alarm range set.

WAAS alarm

This alarm alerts you when the WAAS signal is lost. Note that On cannot be chosen if [Mode] in Menu>WAAS is set to GPS.

Time alarm

The time alarm works like an alarm clock, releasing audio and visual alarms when the time entered has come.

Trip alarm

The trip alarm tells you when your boat has traveled further than the preset trip distance.

Odometer alarm

This alarm alerts you when your boat has traveled the total distance you set.

Speed Based Output

This alarm is for a boat that has a control system that applies the boat's speed. The contact signal is normal open. When your boat's speed is faster than the [Close] setting, the contact signal is closed. When your boat's speed is less than the [Open] setting, the contact signal is opened.

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7. OTHER FUNCTIONS

This chapter describes menu items not carried in other chapters.

7.1   Plotter Setup Menu

```
Menu >Plotter Setup

Auto Waypoint Entry(COG)  : Off          60 °    10 s
COG Line                  : On
COG/BRG ref.              : Mag
Magnetic Variation        : Auto         E12 °
WP Name                   : Disp Goto
TTG/ETA SPD               : Auto         60 s




[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼ :Select
```
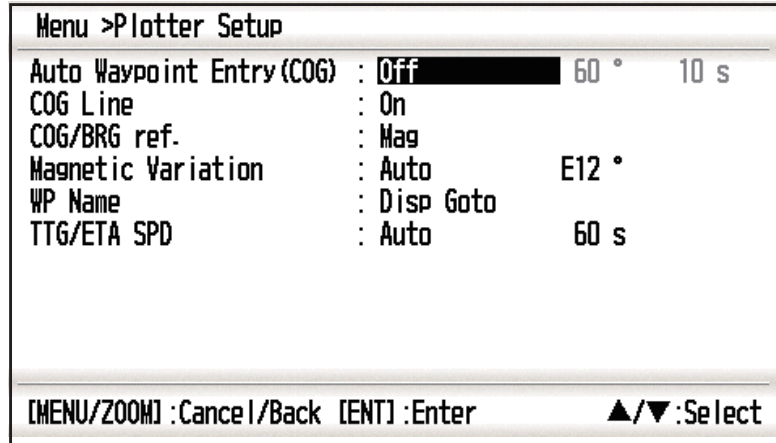
COG Line

You can show or hide the COG line on the plotter display.

COG/BRG ref.

Boat's course and bearing to a waypoint are displayed in true or magnetic bearing. Magnetic bearing is true bearing plus (or minus) earth's magnetic variation. Select the bearing reference in according to the compass installed: magnetic for magnetic compass, true for gyrocompass or satellite compass using true bearing.

Magnetic Variation

The location of the magnetic north pole is different from the geographical north pole. This causes a difference between the true and magnetic north direction. The difference is called magnetic variation, and varies with respect to the observation point on earth. Your unit is pre-programmed with all the earth's magnetic variation. However, you may wish to enter variation manually to refine accuracy using the latest chart. Set [COG/BRG ref.] on the Plotter Setup menu to [Mag] to use magnetic variation.

To enter magnetic variation manually, do the following:

1) If necessary, change coordinate from east to west or vice versa.
2) Enter the value referring to a recent nautical chart.
3) Press the **ENT** key.

TTG/ETA SPD

To calculate time to go and estimated time of arrival, enter your speed as below.

-Auto (GPS calculated speed)

1. Press ▶ and **ENT** in order.
2. Enter the speed average (1 to 999 sec.) to use, and press the **ENT** key.

-Manual (Speed calculated manually)

1. Press ▶ and **ENT** in order.
2. Enter speed (1 to 999 knot), and press the **ENT** key.

7.2 GPS Setup Menu

The GPS Setup menu smooths position and course, averages speed, applies position offset, and deactivates unhealthy satellites.

```
Menu >GPS Setup
Datum          : WGS84         3
Navigation     : Rhumb Line
Smooth Position :    0 s
Smooth S/C     :    5 s
Lat Offset     : 0. 000'N
Lon Offset     : 0. 000'E
Disable SV     : -- -- --
SV ELV         :  5 °


[MENU/ZOOM] :Cancel/Back [ENT] :Enter          ▲/▼:Select
```
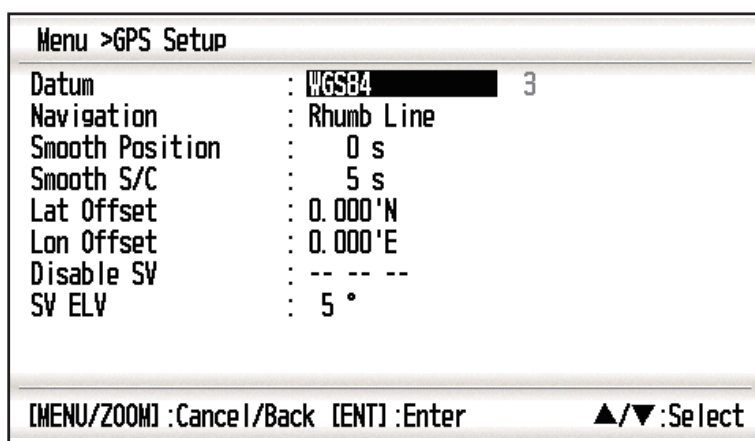
Datum

Your unit is programmed to recognize most of the major chart systems of the world. Although the WGS-84 system, the GPS standard, is now widely used other categories of charts still exist. Select the same datum which is used in your nautical charts. Select WGS84 (default setting), WGS72 or Other (required the datum number entering).

Navigation

When you set a destination, the equipment displays the range, bearing and course to that destination. Range and bearing are calculated by the Great Circle or Rhumb Line method. Route total distance is also calculated. Cross-track error is only calculated in the Rhumb Line method.

Rhumb line: This method calculates the range and bearing between two points drawn on a nautical chart. Since the bearing is kept constant it is ideal for short-range navigation.

Great circle: This course line is the shortest course between two points on the surface of the earth, like stretching a piece of string between two points on earth. Frequent bearing changes are required to navigate by this method. For long-range navigation, divide the Great Circle route into several routes, and navigate each route by Rhumb Line.

Smooth Position

When the receiving condition is unfavorable, the GPS fix may change randomly, even if the boat is dead in water. This change can be reduced by smoothing the raw GPS fixes. The setting range is from 0 (no smoothing) to 999 seconds. The higher the setting the more smoothed the raw data, however too high a setting slows response time to change in latitude and longitude. This is especially noticeable at high boat speeds. "0" is the normal setting; increase the setting if the GPS fix changes randomly.

Smooth S/C (speed/course)

During position fixing, your boat's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. The setting range is from 0 (no smoothing) to 9999 seconds.

Lat Offset, Lon Offset

If there is the error between the positions shown on your equipment and chart when docking at a pier, you may apply an offset to latitude and longitude position. Mark own boat's position on the chart to calculate the error with latitude and longitude, and enter the values.

Disable SV (satellite)

Every GPS satellite is broadcasting abnormal satellite number(s) in its Almanac, which contains general orbital data about all GPS satellites. Using this information, the GPS receiver automatically eliminates any malfunctioning satellite from the GPS satellite schedule. However, the Almanac sometimes may not contain this information. You can disable an inoperative satellite manually. Enter satellite numbers (max. three satellites) in two digits.

SV ELV (satellite elevation)

Set the minimum elevation of satellites to use to fix position.

7.3 WAAS Menu

```
Menu >WAAS

Mode            : WAAS
WAAS Search     : Auto        134
Corrections Data Set:  0 *




[MENU/ZOOM]:Cancel/Back [ENT]:Enter    ▲/▼:Select
```
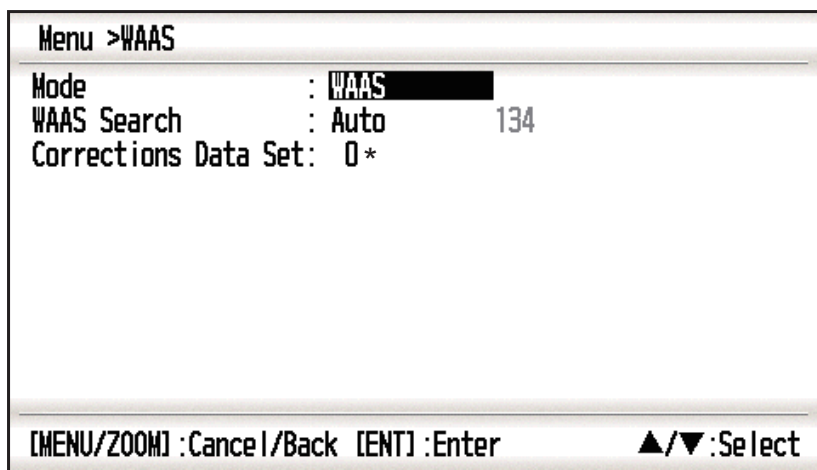
*Use "0" (as default setting).

Mode

You can select GPS or WAAS for the position fixing mode.

WAAS Search

For WAAS setting, the GEO satellite is searched automatically or manually. For GEO satellite number, see page AP-3.

Auto: The system automatically searches for the optimum GEO satellite from your current position. (All satellites are searched.)

Manual: Enter a GEO satellite number manually.

Correction Data Set

Use [0] as default setting.

7.4 Position Display Format

Position can be shown in latitude and longitude or TDs (Loran C). Loran C chain data is programmed into the equipment.

```
Menu >Pos/TD Setup

Display    : XX.XXX'
Loran C    : 7980:Southeast USA       23-43
△TD1       : + 0.0
△TD2       : + 0.0




[MENU/ZOOM]:Cancel/Back [ENT]:Enter    ▲/▼:Select
```
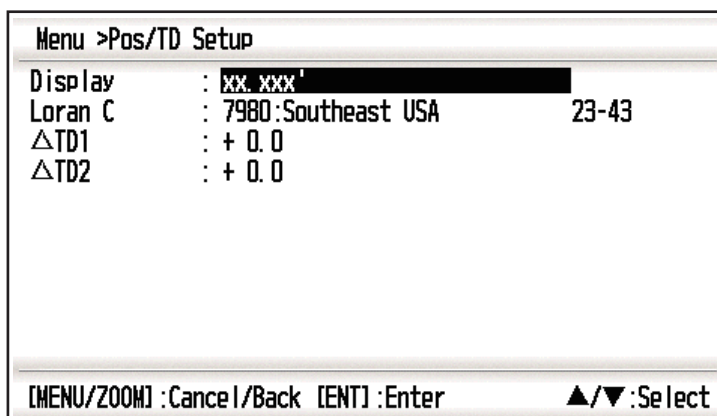
Display

Select the position format.

- xx.xxx': Shows L/L position with no seconds.
- xx'xx.x": Displays L/L position with seconds.
- LC TD: Loran C TDs

Loran C

When choosing LC TD at Display, do the following:

1) Press the **ENT** key.
2) select the GRI code, and press the **ENT** key.
3) Press ▶ and **ENT** key.
4) Select the pair of slave station, and press the **ENT** key.

△TD1, △TD2

Enter TD offsets to refine Loran C position accuracy.

7.5 System Menu

In the System menu, you can customize various display settings, for example, time and date formats, etc.

```
Menu >System

Key Beep          : Off
Language          : English
Units             : nm, kn
Time Offset       : - 8:00
Daylight Saving Time : Off
Time Display      : 24Hour
Date Display      : DD/MMM/YY
Demo
Self Test
Reset

[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼:Select
```

Key Beep

This item turns the key beep on or off.

Units

The Units item lets you select the unit of measurement for range, speed and distance, from the units shown below.

```
nm, kn
km, km/h
sm, mph
```

Time Offset

GPS uses UTC time. If you would rather use local time, enter the time difference (range: -14:00 to +14:00, 15 minutes step) between it and UTC time.

Daylight Saving Time

For countries that use daylight savings time, select On to enable daylight savings time.

Time Display

You can display the time in 12 or 24 hour format.

Date Display

Select the date display, DD/MMM/YY or MM/DD/YY.

Demo

The demonstration display provides simulated operation of this unit. You may set the speed manually and course manually or automatically. All controls are operative - you may enter marks, set destination, etc.

• **Mode:** select [On]. The indication SIM appears at the top left-hand side to inform you that the simulation mode in use. To cancel, select [Off].

• **Speed:** Enter the speed (two digits) to use for the demonstration mode.

• **Course:** Select Auto or Manual. For manual entry of course, enter course in three digits. The Auto course tracks a circular course.

• **Lat, Lon:** Enter latitude and longitude of the position to start the demonstration.

Reset (Trip)

You can reset the trip meter to zero. Select [On] at [Trip] on System>Reset menu.

```
Menu >System >Reset
Trip(100.0 nm)          : Off
GPS *                   : Off
Menu Settings *         : Off
Factory Reset *         : Off




[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼ :Select
```
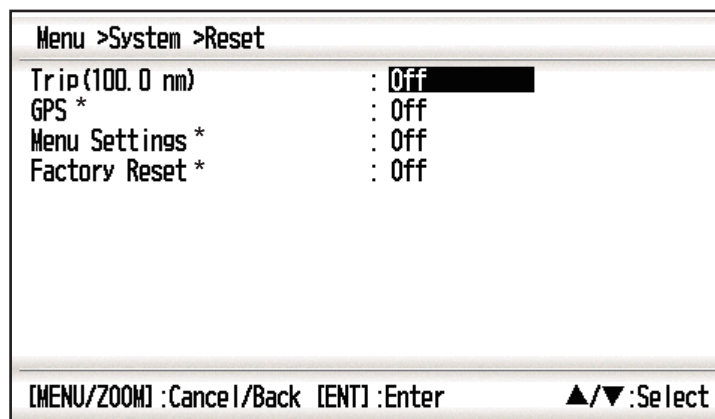
*: Items to be cleared (See section 8.5.)

7.6 User Display Menu

To customize user displays, which are [6] and [7] appeared when the **DISP** key is pressed (see section 1.4), use the User Display menu.

	DISP key is pressed	**Item name on User Display menu**
User display 1	Display [6]	Display 1
User display 2	Display [7]	Display 2


```
Menu >User Display
Graphic      : B
Display 1    : Speedmeter    0-40  kn
Display 2    : COG




[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼ :Select
```
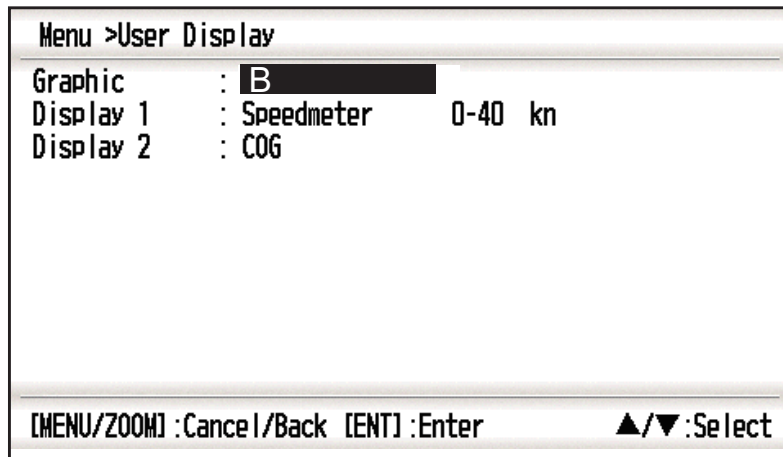
Note: You can show the User Display menu by pressing the **ENT** key more than three seconds at the User display 1 (display [6]) and 2 ([7]).

Graphic

You can select the graphic type for the analog COG and speedometer displays from two patterns (A and B) which have different character font and scale steps. Note that the graphic selected here can affect minor changes to other displays.

Graphic: A

Graphic: B

COG display
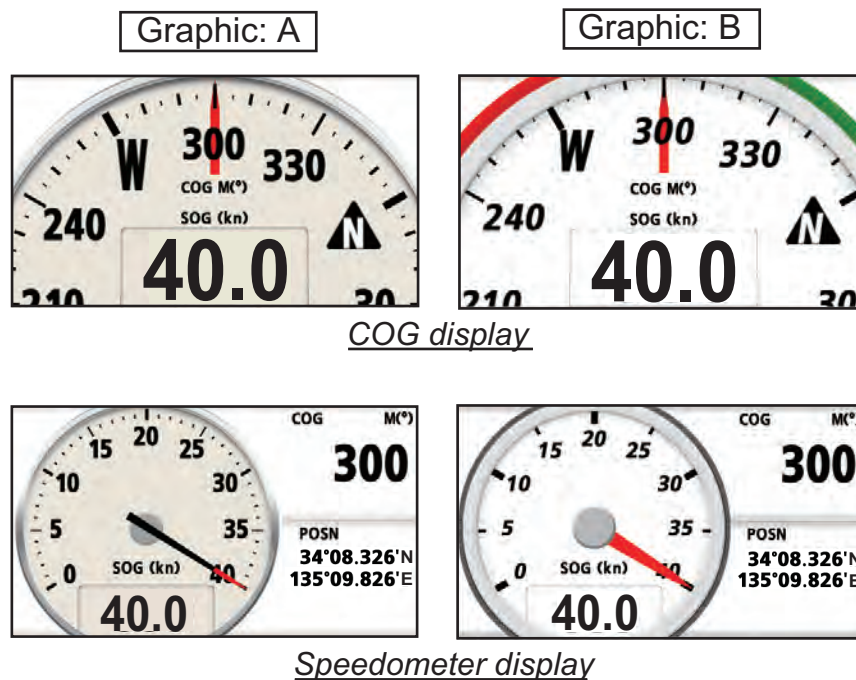
Speedometer display

Display 1, Display 2

You can select items to show on the User display 1 (display [6]) and 2 ([7]), from among digital data, speedometer and COG (see page 1-7). When choosing [Off] for Display 2, for example, the display [7] is not shown.

```
Digital
Speedometer
COG
Off
```
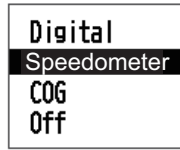
For [Digital], you can display one to four items of digital navigation data on the user display.

1. Press ▶ and **ENT** key in order to show the following window.

2. Select the screen division, which is the number of data to display, and press the **ENT** key.
   The display now looks something like the one shown below, showing data choices and screen division selected.

```
User Display >Display 1 >Data Select
A        : Volts              ┌─────┬─────┐   *
B        : SOG                │  A  │  B  │
C        : Trip               ├─────┼─────┤
D        : COG                │  C  │  D  │
                              └─────┴─────┘



[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼ :Select
```
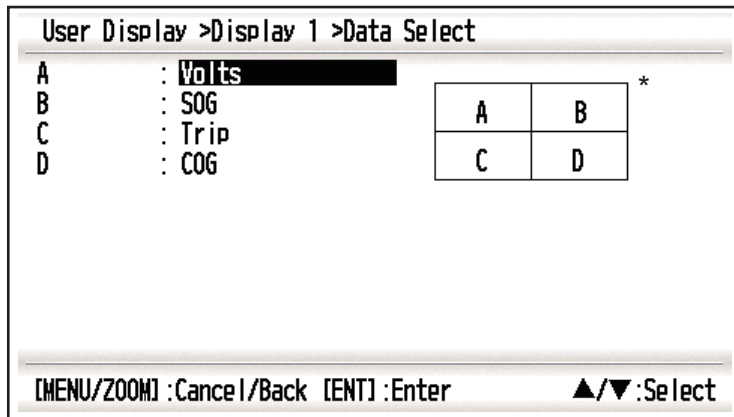
*: Depending on the selection at step 2.

```
┌───┐  ┌───┐  ┌───┐
│ A │  │ A │  │ A │
│   │  │ B │  │B│C│
└───┘  └───┘  └───┘
```
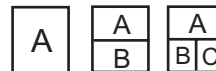
3. Select [A], [B], [C] or [D], and press the **ENT** key.

```
┌──────┐ ┌──────┐
│ ODO  │ │Volts │
│ Trip │ │ SOG  │
│ Time │ │ COG  │
│ Date │ │ RNG  │
│ POSN │ │ BRG  │
│ Volts│ │ XTE  │
│ SOG  │ │ TTG  │
│ COG  │ │ ETA  │
│ RNG  │ │ WPT  │
│ BRG  │ │ None │
└──────┘ └──────┘
 Page 1   Page 2
```

ODO: Odometer distance
Trip: Trip distance
Time: Time
Date: Date
POSN: Position
Volts: Power voltage
SOG: Speed over ground
COG: Course over ground
RNG: Range
BRG: Bearing

XTE: Cross-track error
TTG: Time to go
(to destination)
ETA: Estimated time to
arrival (to destination)
WPT: Range and bearing
to waypoint
None: No display

4.   Select data desired, and press the **ENT** key.

5.   Repeat steps 3 and 4 to set other data.

You can select digital data also from the User display 1 (display [6]) and 2 ([7]) directly.

1.   Press the **DISP** key several times to show User display 1 or 2 desired, and press the **ENT** key to show the cursor.

Cursor (displayed approx. seven seconds)

Volts (V)	SOG (kn)
23.9	**15.8**
Trip (nm)	COG M(°)
100.0	**300**

2.   Operate the cursorpad to select the column to select data, and press the **ENT** key.

ODO: Odometer distance   XTE: Cross-track error
Trip: Trip distance   TTG: Time to go
Time: Time   (to destination)
Date: Date   ETA: Estimated time to
POSN: Position   arrival (to destination)
Volts: Power voltage   WPT: Range and bearing
SOG: Speed over ground   to waypoint
COG: Course over ground   None: No display
RNG: Range
BRG: Bearing

Page 1   Page 2

3.   Select the item to show, and press the **ENT** key.

4.   Repeat steps 2 and 3 for other displays if necessary.

Speedometer
When choosing [speedometer], you can select the range for the speedometer to show on the User display 1 or 2.

0-20 / 0-40 / 0-80 (kn, mph)   0-40 / 0-80 / 0-160 (km/h)

7-9
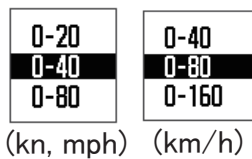
7.7 I/O Setup Menu

Waypoint and route data can be uploaded from your unit to a PC, or downloaded from a PC to your unit.

There are two kinds of data for route data: route data and route comment data.

```
Menu >I/O Setup
Data 2 *                    : REM1
Data 3 *                    : REM1
NMEA0183 Version*           : 3.0
Save WPT/RTE -> PC
Load WPT/RTE <- PC
Wiring Info. NMEA 0183
Wiring Info. CAN bus Devices *


[MENU/ZOOM]:Cancel/Back [ENT]:Enter      ▲/▼:Select
```
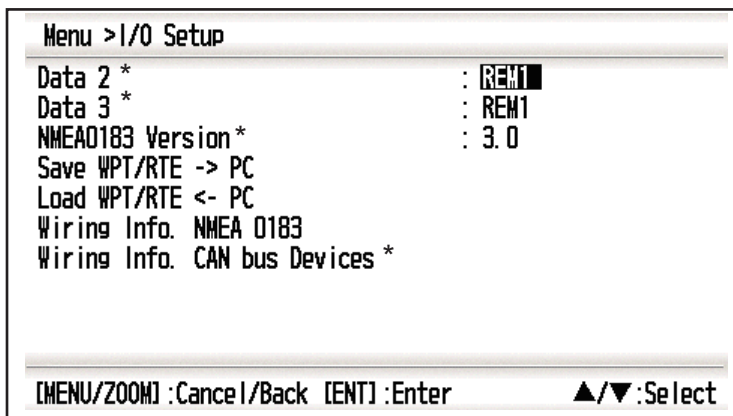
*: See chapter 9.

Note: No position fix is available during uploading or downloading.

Setting for communication software on PC

Baud Rate	38400 bps
Character Length	8 bit
Parity	None
Stop Bit	1 bit
Flow Control	XON/OFF

Waypoint data format

$PFEC, GPwpl, llll.ll, a, yyyyy.yy, a, c—c, c, c—c, a, hhmmss, xx, xx, xxxx <CR><LF>
           1   2   3   4   5 6 7   8   9   10 11 12

1: Waypoint latitude

2: N/S

3: Waypoint longitude

4: E/W

5: Waypoint name (1 to 8 characters)

6: Waypoint color

   (NULL/0: black, 1: red, 2: yellow, 3: green, 4: brown, 5: purple, 6: blue)

7: Waypoint comment ("@_ (see below.)" + 0 to 13 characters)
   -Internal mark code is 0x10 through 0x19. 0x71 through 0x7A are always
    place at 2nd byte of mark code.
   -Following characters can be used for comments:

   _ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789&()+-/=?> (space)
    0x10: ● @q, 0x11: ■ @r, 0x12: ◆ @s:, 0x13: ◖ @t,   0x14: ⬓ @u,

    0x15: ⬓ @v, 0x16: ⬐ @w, 0x17: ⚓ @x, 0x18: ☠ @y, 0x19: ⚑ @z

8: Flag marking waypoint (A: displayed, V: Not displayed)

9: UTC (Always NULL)

10: Day (Always NULL)

11: Month (Always NULL)

12: Year (Always NULL)

Route data format

$GPRTE, x.x, x.x, a, c--c, c--c, ... , c--c <CR><LF>
        1   2 3 4   5   12

1: Number of sentences required for one
   complete route data (1 to 6) See note.

2: Number of sentences currently used (1 to 6)

3: Message mode (Always set to "C".)

4: Route No. (1 to 100)

5 to 12: Waypoint name (1 to 8 characters, length
         of each waypoint name is fixed to 7 byte)
         1st byte: "-" (hyphen)= skip ON,
         " " (space)= skip OFF
         After 2nd byte: Waypoint name
                    (1 to 8 characters)

Note: A route can contain max.30 waypoints and GPRTE sentence for one route data may exceed 80 byte limitation. In this case, route data is divided into several GPRTE sentences (max. 4 sentences). This value shows the number of sentences route data has been divided.

Route comment data format

$PFEC, GPrtc, x, c--c, c--c <CR><LF>
              1 2   3

1: Route No. (1 to 100)

2: Route comment (Max. 18 characters, variable length)

3: Route name (Max. 6 characters, variable length)

End of sentence

$PFEC, GPxfr, CTL, E <CR><LF>

7.7.1   Uploading data to a PC

1. Connect a PC to your GP-33, referring to the interconnection diagram at the back of this manual.

2. Press the **MENU/ZOOM** key twice to show the main menu.

3. Select[I/O Setup], and press the **ENT** key.

4. Select [Save WPT/RTE -> PC], and press the **ENT** key.

```
Menu >I/O Setup >Save WPT/RTE

        All WPT/RTE will be saved to PC.

  Set PC port to 38400bps, 8bit, p-n, s1, Xon/Xoff.

              Saving Start ?


        Yes         No

[MENU/ZOOM] :Cancel/Back  [ENT] :Enter       ▲/▼:Select
```
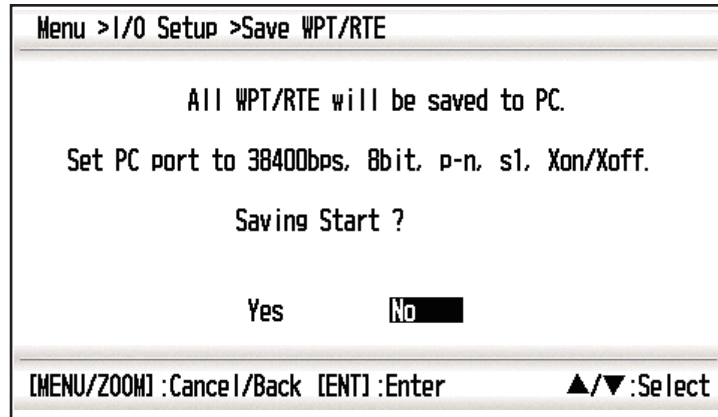
5. Press ◄ to select [Yes], and press the **ENT** key to start the uploading.

6. When the completion message appears, press any key to finish.

7.7.2   Downloading data from PC

Note that all waypoint and route data stored in the GP-33 will be deleted when data is downloaded from PC.

1. Connect a PC to your GP-33, referring to the interconnection diagram at the back of this manual.

2. Press the **MENU/ZOOM** key twice to show the main menu.

3. Select [I/O Setup], and press the **ENT** key.

4. Select [Load WPT/RTE <- PC], and press the **ENT** key.

```
Menu >I/O Setup >Load WPT/RTE

Current WPT/RTE will be erased and load PC data.

Set PC port to 38400bps, 8bit, p-n, s1, Xon/Xoff.

              Loading Start ?


        Yes         No

[MENU/ZOOM] :Cancel/Back  [ENT] :Enter       ▲/▼:Select
```
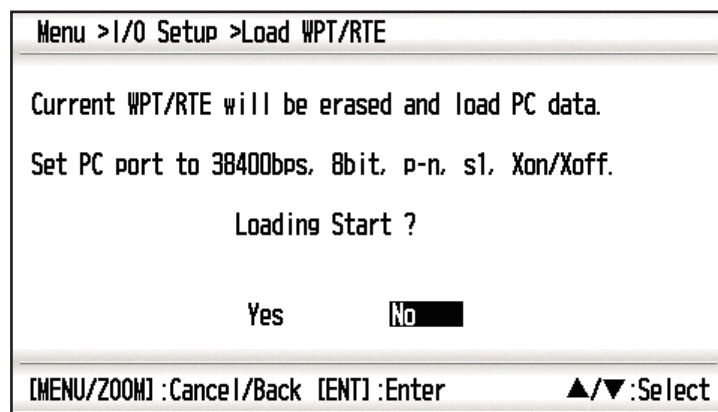
5. Press ◄ to select [Yes], and press the **ENT** key to start the downloading.

6. After the completion message appears, press any key to finish.

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8. MAINTENANCE, TROUBLE-SHOOTING

> ## NOTICE
>
> **Do not apply paint, anti-corrosive sealant or contact spray to plastic parts or equipment coating.**
>
> Those items contain products that can damage plastic parts and equipment coating.

8.1 Maintenance

Regular maintenance is important to maintain performance. Check the following points to help maintain performance.

- Check that connectors on the rear panel are firmly tightened and free of rust.
- Check that the ground system is free of rust and the ground wire is tightly fastened.
- Check that battery terminals are clean and free of rust.
- Dust or dirt may be removed from the cabinet with soft cloth. Water-diluted mild detergent may be used if desired. DO NOT use chemical cleaners to clean the display unit; they may remove paint and markings.
- Wipe the LCD carefully to prevent scratching, using tissue paper and an LCD cleaner. To remove dirt or salt deposits, use an LCD cleaner, wiping slowly with tissue paper so as to dissolve the dirt or salt. Change paper frequently so the salt or dirt will not scratch the LCD. Do not use solvents such as thinner, acetone or benzene for cleaning. Also, do not use degreaser or antifog solution, as they can strip the coating from the LCD.

Life of LCD

The life of the LCD is approximately 50,000 hours. The actual number of hours depends on ambient temperature and humidity. When the brilliance cannot be raised sufficiently, ask your dealer about replacement.

8.2   Troubleshooting

This section provides simple troubleshooting procedures which the user can follow to restore normal operation. If you cannot restore normal operation, do not attempt to check inside the unit. Any trouble should be referred to a qualified technician.

Symptom	Remedy
You cannot turn on the power.	Check that power cable is firmly fastened.
	Check for damaged power cable and connector.
	Check battery for proper voltage output.
No picture appears.	Press the ⏻ /**BRILL** key several times to adjust the brilliance.
There is no response when a key is pressed.	Turn off and on the power. If no change, ask your dealer.
Position is not fixed within 90 seconds.	Check that antenna connector is firmly fastened.
	Check the number of satellites on Satellite Monitor display. If there are two or less, check for obstructions between antenna unit and satellites.
Position is wrong.	Check that the correct geodetic chart system is selected on the GPS Setting screen.
	Enter position offset on the GPS Setting screen.
Loran C TDs do not appear.	Check Loran C chain data on the Pos/TD Setup screen.
Loran C TDs are wrong.	Enter TD offset on the Pos/TD Setup screen.
Bearing is wrong.	Check Magnetic Variation on the Plotter Setup screen.

8.3 Displaying the Message Board

When an error occurs, a message and an alarm icon appear on the screen. The message board displays the error messages (see page 6-2) shown in table below.

Messages and meanings

Message	Meaning, remedy
GPS ERROR!	Request service.
GPS NO FIX!	No GPS signal. Check antenna cable.
RAM ERROR!	Request service.
ROM ERROR!	Request service.
BACKUP ERROR!	RAM data corrupted. Try to clear backup data.

8.4 Diagnostics

The diagnostic test checks the ROM, RAM, input data, GPS core, keyboard and LCD performance. The user can do the tests to help the service technician in troubleshooting.

1. Press the **MENU/ZOOM** key twice to show the menu.

2. Select [System], and press the **ENT** key.

3. Select [Self Test], and press the **ENT** key.

4. Select [System Test], and press the **ENT** key to start the test.
   The results are individually displayed as OK or NG (No Good). If NG appears, try the test again. If NG re-appears, contact your dealer for advice.
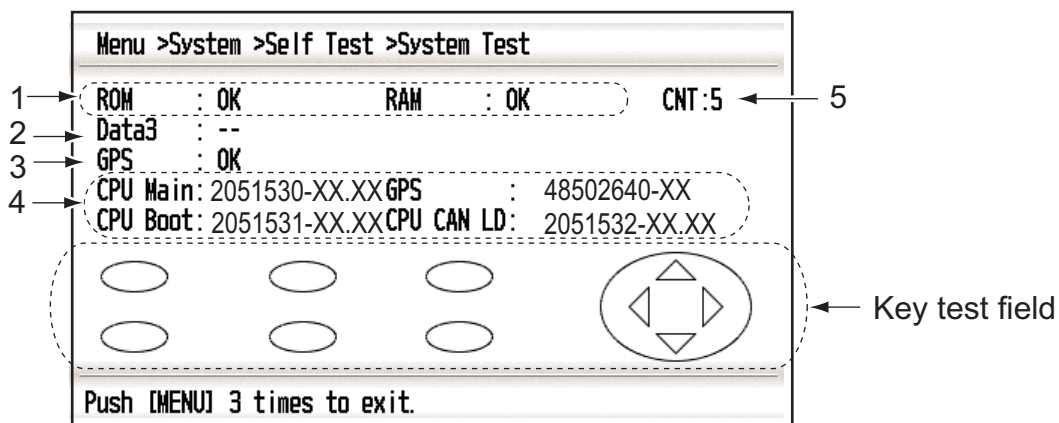
XX: Program version No.

8-3

No.	Test Items	Description
1	ROM, RAM test	Correct: "OK", Wrong: "NG"
2	Data3 test	"-" (This test is used at factory only.)
3	GPS test	Correct: "OK", Wrong: "NG"
4	Program version No.	The program version No. which is currently used appears.
5	CNT	Number of test repetition.

5. Press each key one by one.
   The corresponded mark on the display turns red if the key is functioning properly.

6. Press the **MENU/ZOOM** key three times to close the test screen.

7. Select [LCD Test], and press the **ENT** key.
   Each press of this key changes the LCD pattern in the sequence shown below.
   Red→Green→Blue→Red (gradation)→Green (gradation)→Blue (gradation)→White→Black→White/Black (gradation)→return to System screen.
   Note: To cancel the test, press the **MENU/ZOOM** key.

8. Press the **MENU/ZOOM** key twice to close the menu.

8.5   Clearing Data

You can clear GPS data, menu settings* and all backup data* to start afresh (*other than Language, Units and TD).

1. Press the **MENU/ZOOM** key twice to show the menu.

2. Select [System], and press the **ENT** key.

3. Select [Reset], and press the **ENT** key.

```
Menu >System >Reset
Trip(100.0 nm)          : Off
GPS                     : Off
Menu Settings           : Off
Factory Reset           : Off




[MENU/ZOOM] :Cancel/Back  [ENT] :Enter        ▲/▼:Select
```
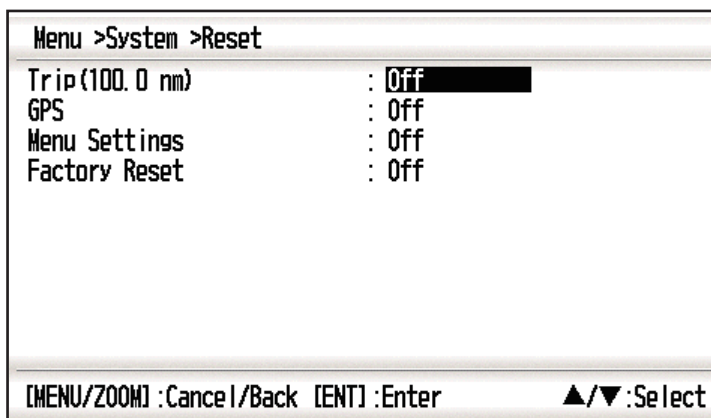
4. Select [GPS], [Menu Settings] or [Factory Reset], and press the **ENT** key.

5. Select [On], and press the **ENT** key.

6. Press ◄ to select [Yes], and press the **ENT** key.
   [Menu Settings], [Factory Reset]: Go to Initial Setting screen. Select the language, then press **ENT** and **MENU/ZOOM** key in order.

9. INSTALLATION

9.1 Equipment Lists

Standard Supply

Name	Type	Code No.	Qty	Remarks
Receiver unit	GP-33	-	1	
Antenna Unit	GPA-017	-	1	w/10 m cable
Installation Materials	CP20-03300	-	1 set	-M12-05BM+05BF-060 -CP20-03310
Accessories	FP20-01200	-	1 set	See the packing list at the back of this manual.

Optional Supply

Name	Type	Qty	Remarks
Junction Box	FI-5002	000-010-765	
Cable Assy.	KON-004-02M	001-090-910	w/o packing material: 000-156-405
Right Angle Antenna Base	NO.13-QA330	000-803-239	For mounting the antenna unit, select one.(See the installation procedure at the back of this manual.)
L-type Antenna Base	NO.13-QA310	000-803-240	
Handrail Antenna Base	NO.13-RC5160	000-806-114	
Mast Mounting Kit	CP20-01111	004-365-780	
NMEA Connector	SS-050505-FMF-TS001	000-168-603-10	CAN bus distributor, micro style
	NC-050505FMF-TS001	000-160-507-10	CAN bus distributor, mini style

9.2 Installation of Receiver Unit

9.2.1 Installation consideration

The receiver unit can be installed on a desktop, underside of table or in a panel. Refer to the outline drawings at the end of this manual for installation instructions. When selecting a mounting location, keep in mind the following points:

• Locate the unit away from exhaust pipes and vents.

• The mounting location should be well ventilated.

• Mount the unit where shock and vibration are minimal.

- Locate the unit away from equipment which generates electromagnetic fields such as a motor or generator.
- Allow sufficient maintenance space at the sides and rear of the unit and leave sufficient slack in cables, to facilitate maintenance and servicing.
- Observe compass safe distances noted on page ii to prevent interference to a magnetic compass.
- Locate the unit away from direct sunlight. An LCD may black out if it is exposed to direct sunlight for a long time.
- The optimal viewing distance is 0.6 m. Select a suitable mounting location considering the distance.

9.2.2 Desktop and underside of table mount

1. Unscrew knobs to dismount the receiver unit from the hanger.
2. Prepare four pilot holes (for 5x20 self-tapping screws) at the mounting location.
3. Fix the hanger to the mounting location with four self-tapping screws (5x20, supplied).
4. Attach cables to the back of the receiver unit (see section 9.4).
5. Set the receiver unit to the hanger, and fasten knobs to fix it.

Receiver Unit

Self-tapping Screw
(5x20, 4 pcs.)
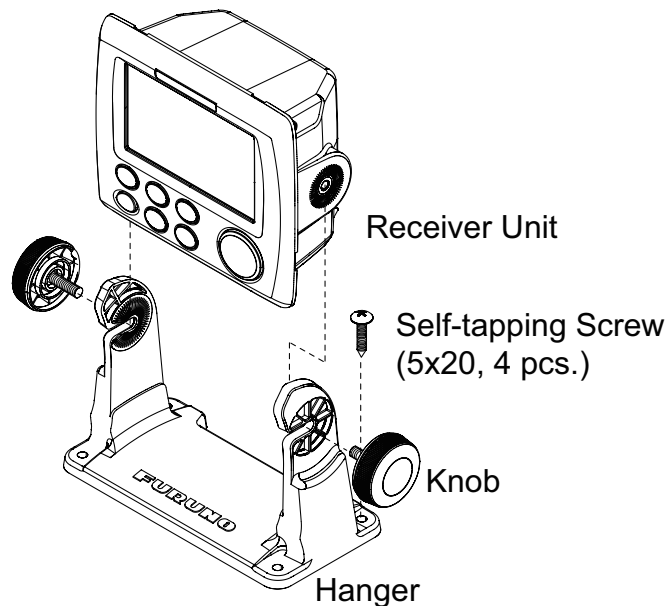
Knob

Hanger

9.2.3 Flush mount

1. Using the template (supplied), cut out a hole in the mounting location.

2. Prepare four pilot holes (for 3x20 self-tapping screws) at the mounting location.

3. Unscrew knobs to dismount the receiver unit from the hanger.
    This hanger can be discarded.

4. Remove the front panel from the receiver unit by unfastening the catches at the rear of the panel by hands, in the order shown in the figure below.
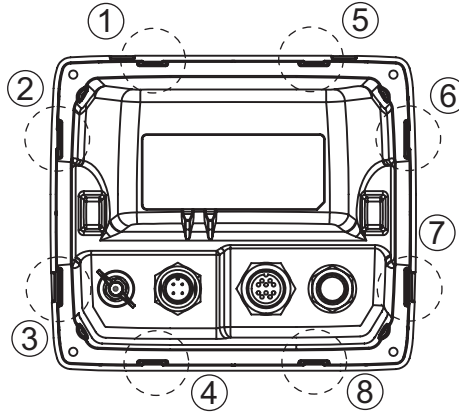
5. Attach the mount cushion (sponge) to the hole made at step 1, or receiver unit.

6. Connect cables to the back of the receiver unit (see section 9.4).

7. Use four self-tapping screws (3x20, supplied) to fasten the receiver unit to the mounting location, and re-attach the front panel.
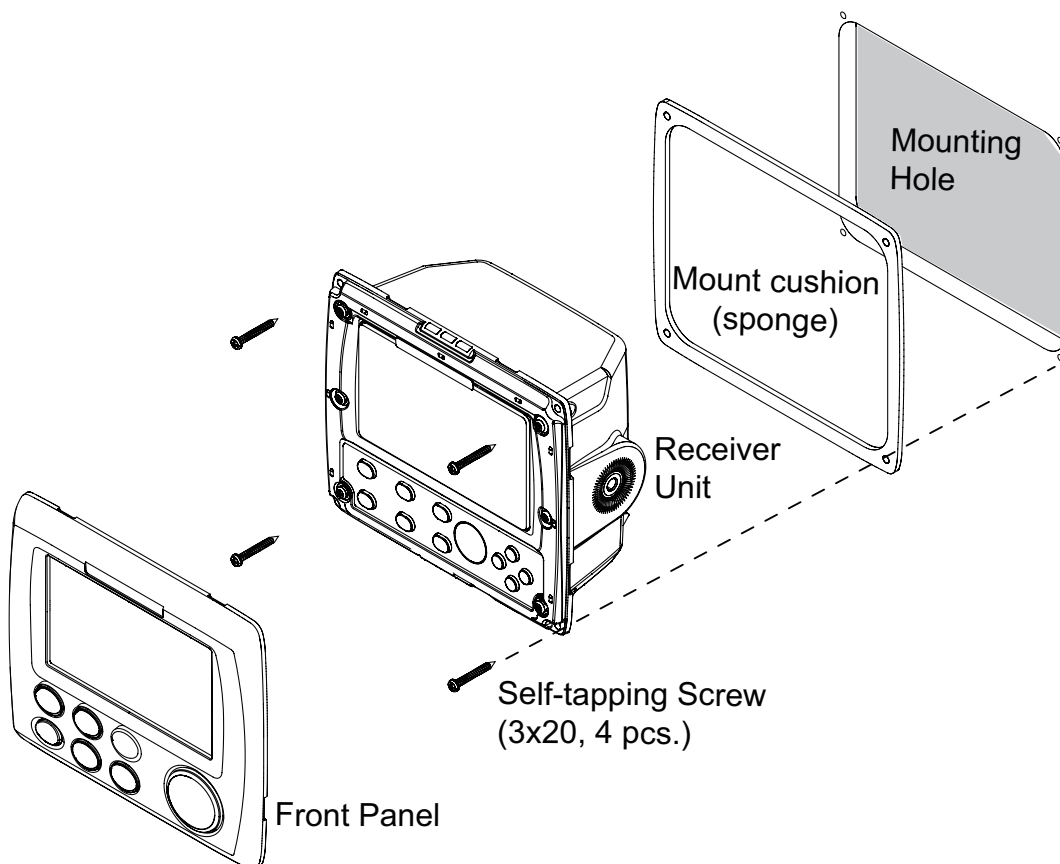
Note: When removing the equipment from the flush mounted location, use the remover (supplied) to remove the panel as shown below.

① Insert
② Pull down
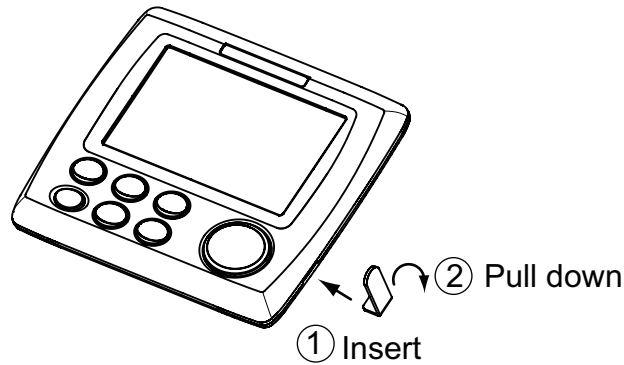
9.3   Installation of Antenna Unit

Install the antenna unit referring to the antenna installation diagram at the back of this manual. When choosing a mounting location for the antenna unit, keep in mind the following points:

• Select a location out of the radar beam. The radar beam will obstruct or prevent reception of the GPS signal.

• The location should be well away from a VHF/UHF antenna. A GPS receiver is interfered by a harmonic wave of a VHF/UHF antenna.

• There should be no interfering object within the line-of-sight to the satellites. An object within line-of-sight to satellites, for example, a mast, may block reception or prolong acquisition time.

• Mount the antenna unit as high as possible to keep it free from interfering objects and water spray. Freezing water can interrupt reception of the GPS satellite signal.

Note 1: Do not shorten the antenna cable.

Note 2: If the antenna cable is to be passed through a hole which is not large enough to pass the connector, unfasten the connector with a needle nose pliers and 3/8-inch open-end wrench. Refasten it as shown below, after running the cable through the hole.
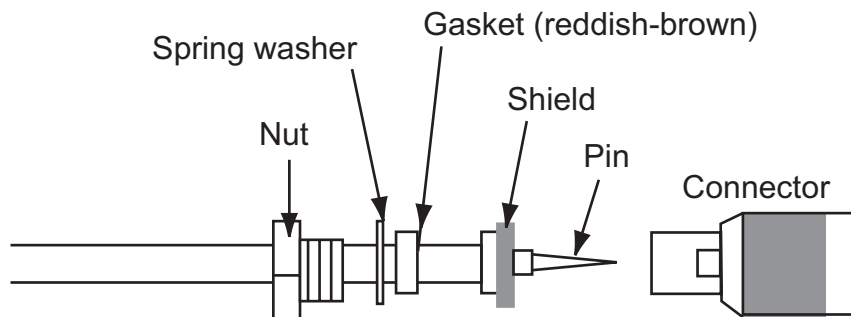
9.4 Wiring

When no CAN bus equipment is connected

When connecting no CAN bus equipment, use the red and black-colored cores of M12-05BM+05BF-060 cable to connect to the 12-24 VDC switch board. (For other cores, cut them and tape individually.)

Antenna Unit
GPA-017

Receiver Unit
GP-33

w/10 m cable

Ground

KON-004-02M cable
(for NMEA 0183)

Navigator, PC,
External Alarm, etc.

M12-05BM+05BF-060 cable, 6 m

(Red: +, Black: -)

to switchboard
(12-24VDC)
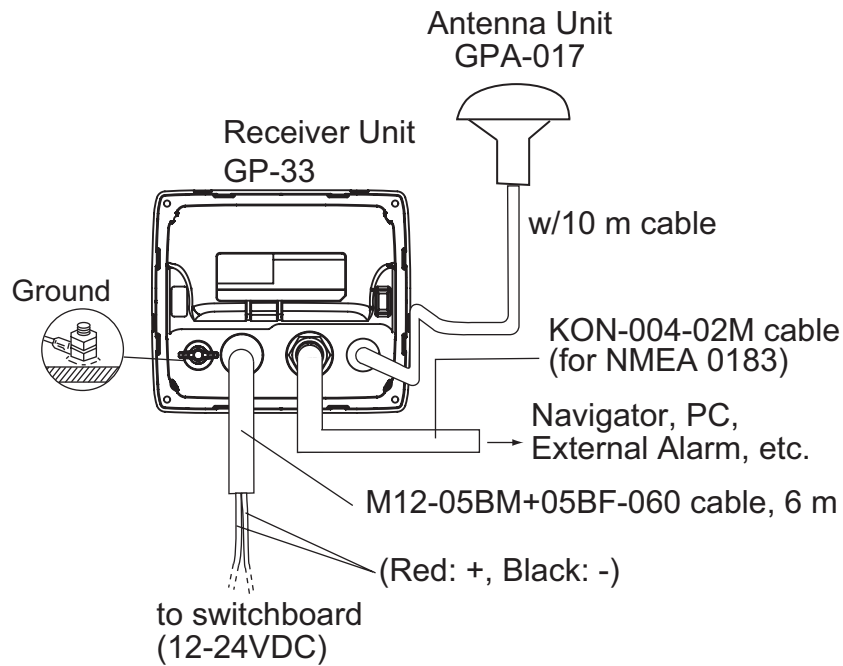
Connection with the optional junction box FI-5002

Detailed information for the service technician about CAN bus wiring is in the document titled "Furuno CAN bus Network Design Guide (TIE-00170-*)" separately.

M12-05BM+05BF-060 (6 m)

Use CN2 to CN5.

Power cable (2m)

White   Black

⊕   ⊖

to switchboard
(12 VDC)

Side view

FI-5002 (option)

| 12VDC | CN3 - CN5 DROP | CN2 BACKBONE |

MC connector

Top view

Fix cable with
cable tie (supplied).
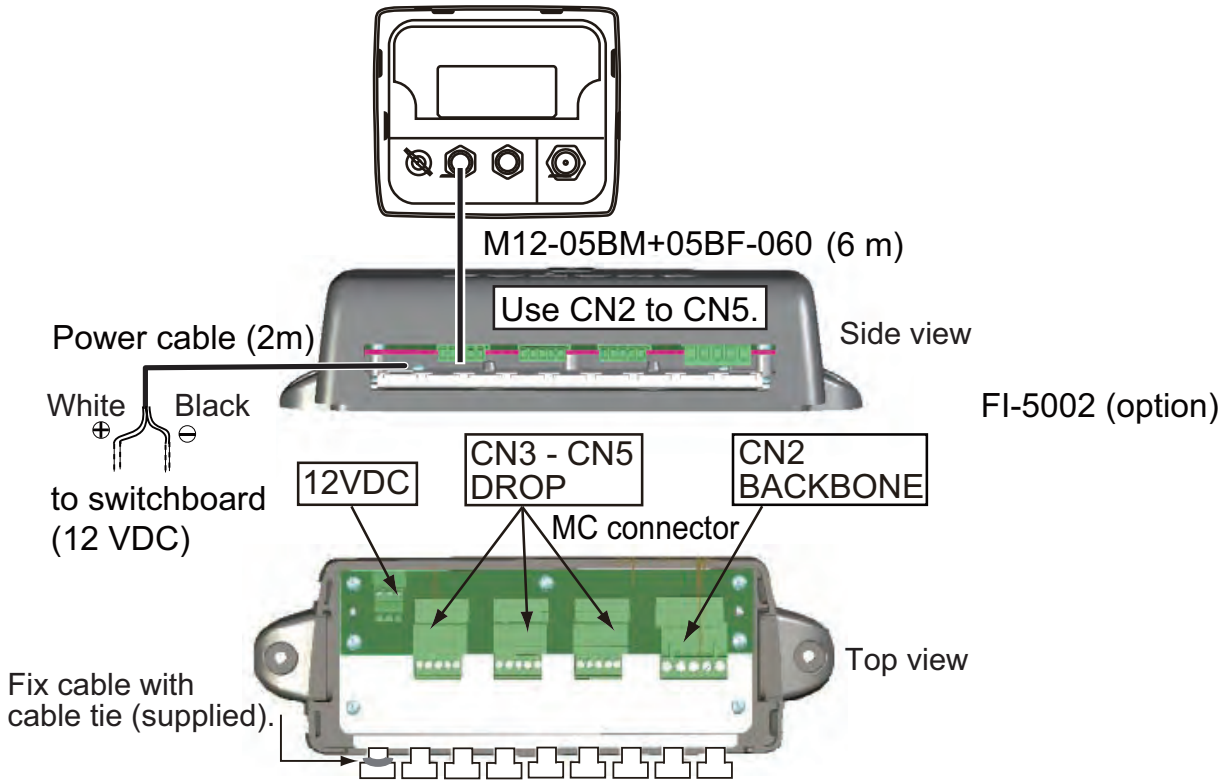
- Fabrication of M12-05BM+05BF-060 cable and MC connector

Drain wire

6 mm   *How to fabricate cable*
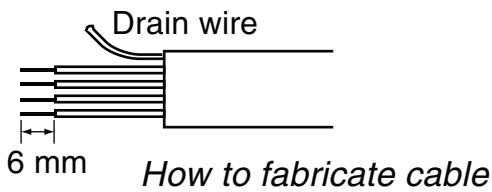
Drain	#1
Red	#2
Black	#3
White	#4
Blue	#5
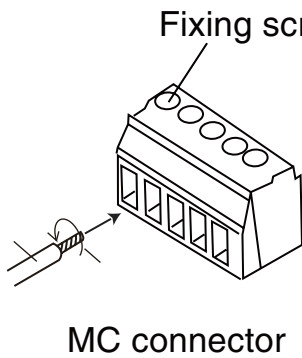
Fixing screw

1. Twist wires.
2. Loosen fixing screw in plug.
3. Insert wire into hole.
4. Tighten fixing screw.

MC connector   5. Pull wire to confirm the connection.

How to insert wire

Terminator

• When connecting to backbone cable

GP-33

MFD-BB/8/12

Terminator   Backbone cable   Terminator
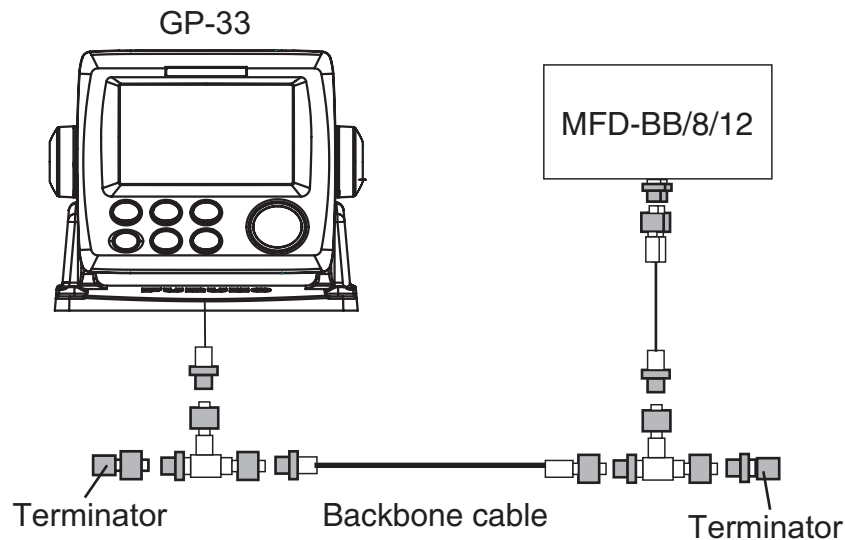
Attach the following terminators to both ends of the backbone cable.

Name	Type	Code No.	Remarks
Terminator (male)	LTWMN-05AMMT-SL8001	000-160-508-10	Mini connector
Terminator (female)	LTWMN-05AFFT-SL8001	000-160-509-10	Mini connector
Terminator (male)	LTWMC-05BMMT-SL8001	000-168-604-10	Micro connector
Terminator (female)	LTWMC-05BFFT-SL8001	000-168-605-10	Micro connector

When connecting to the optional junction box FI-5002

There are two terminal resistors (R1 and R2) inside the FI-5002.

• No backbone cable is connected: Set both R1 and R2 to "ON".
• Backbone cable is connected: Set a resister to "ON".
• Two backbone cables are connected: Set both R1 and R2 to "OFF".

Setting position

☐ ▢▢ : ON

▢▢ ☐ : OFF

R2 R1

CN1
CN3 CN4 CN5 CN2

CN2   CN2
CN3   CN4   CN5
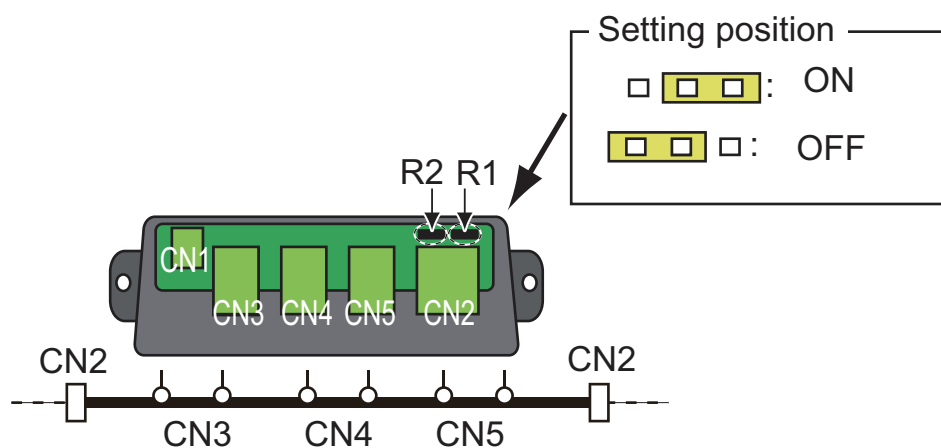
9.5 Language Setting

When you first turn the power on after installation, you are asked the language to use on the equipment. Press ▲ or ▼ to select the language, and press the **ENT** key.

```
Installation

Language     : English
Units        :   English
Time Offset  :   Français
Demo             Español
                 Deutsch
                 Italiano
                 Português
                 Dansk
                 Svenska
                 Norsk
[MENU/ZOOM]:Cancel/Back Suomi          ▲/▼:Select
```
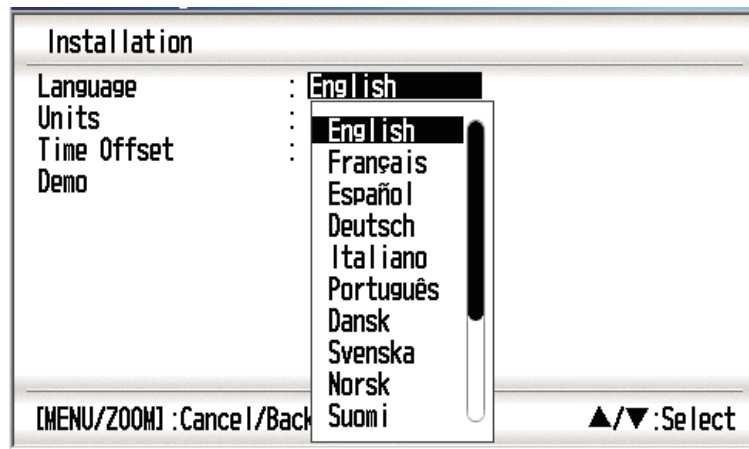
9.6 Input/Output Data

This equipment inputs/outputs NMEA0183 or CAN bus data shown below. Note that NMEA 0183 version (2.0 or 3.0) can be a selected from the I/O setup screen.

Data 1: CAN bus port (input)

PGN	Description	Remark
059904	ISO Request	
060928	ISO Address Claim	
061184 #4=0	Self Test Group Function	
065286	Proprietary; Boot State Request	
126208	Request Group Function	
	Command Group Function	
126720 #4=1	Memory Clear Group Function	
126720 #4=2	Reset Group Function	

Data 1: CAN bus port (output)

PGN	Description	Output cycle
059392	ISO Acknowledgement	N/A
060928	ISO Address Claim	N/A
061184	Self Test Group Function	N/A
126208	NMEA-Acknowledge group function	N/A
126464	PGN List Transmit and Received PGNs Group Function	N/A
126720-1	Memory Clear Group Function	N/A
126720-2	Reset Group Function	N/A
126992	System Time	1000
126996	Product Information	N/A
127258	Magnetic Variation	1000
129026	COG & SOG, Rapid Update	1000
129029	GNSS Position Data	1000
129033	Time & Date	1000
129044	Datum	10000
129283	Cross Track Error	1000
129284	Navigation Data	1000
129285	Navigation -Route/WP information	N/A
129538	GNSS Control Status	N/A
129539	GNSS DOPs	1000
129540	GNSS Sats in View	1000
130822	Unit Division Code	N/A
130823	Browser Control Status	N/A

Data 2/Data 3: NMEA Output Sentence

Format**	REM1	REM2	AP	GPS
AAM*			ON	
APB*			ON	
BOD*			ON	
BWC*		ON	ON	
BWR*		ON	ON	
DTM	ON	ON		
GGA	ON	ON		ON
GLL	ON		ON	
GSA				ON
GSV				ON
RMB*	ON	ON		
RMC	ON	ON		
VTG	ON	ON	ON	ON
XTE			ON	
ZDA	ON	ON	ON	
RTE	For PC only. (See Chapter 7.)			

REM1/REM2: Radar, echo sounder, etc.

AP: Autopilot

*: Not output when no waypoint is set.
**: Talker; GP

Output setting

1. Press the **MENU/ZOOM** key twice to show the main menu.

2. Select [I/O Setup], then press the **ENT** key.

3. Select [Data 2], [Data 3] or [NMEA0183 Version] depending on the equipment connected.

4. Press the **ENT** key. One of the following screens appears depending on the item selected at step 3.
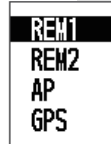
"Data2/Data3"   "NMEA0183 Version"

5. Press ▲ or ▼ to select the option.
    REM1, 2: Output data to radar, echo sounder.
    AP: Output data to an autopilot.
    GPS: Output GPS data (used for the service)
    2.0, 3.0: select the NMEA version of external equipment. If you are unsure of the version number, try both and select the one which successfully outputs data.

6. Press the **ENT** key.

7. Press the **MENU/ZOOM** key twice to close the menu.

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APPENDIX 1 MENU TREE

MENU
ZOOM ——— Ship To Center (only when the plotter display is shown)

— Tracks ——————— Rec (Off, **Distance**, Auto; 0.00 to 9.99, **0.1 nm**)
                          — Color (Red, Yellow, Green, Blue, Purple, Black, **Brown**)
                          — Delete (**All**, By Color)
                          — Track Memory Used (**%)

— Waypoints ——— **Alpha**
                      — Local

— Routes ——————— **Alpha**
                      — Local

— Plotter Setup —— Auto Waypoint Entry (COG)
                          (**Off**, On: 15 to 150°, 1 to 60 s)
                          — COG Line (Off, **On**)
                          — COG/BRG ref. (True, **Mag**)
                          — Magnetic Variation (**Auto**, Manual)
                          — WP Name (**Disp Goto**, Disp All, Disp Route)
                          — TTG/ETA SPD (**Auto; 60s**, Manual; 20 kn)

— Alarms ——————— Buzzer (Short, **Long**, Continuous)
                          — Arrival/Anchor
                          (**Off**, Arrival, Anchor, 0.00 to 99.99 nm)
                          — XTE (**Off**, On, 0.000 to 99.999 nm)
                          — Speed (**Off**, On, 0.0 to 999.9 kn)
                          — Speed Based Output (**Off**, On; 0.0 to 999.9 kn)
                          — WAAS (**Off**, On)
                          — Time (**Off**, On; 00:00 to 23:59)
                          — Trip (**Off**, On; 0 to 99999 nm)
                          — Odometer (**Off**, On; 0 to 99999 nm)

— Messages (Alarm and error messages are shown when occurred.)

— Delete ——————— All Waypoints (**Off**, Delete)
                          — All Routes (**Off**, Delete)

①

Bold: Default setting

① 1

— GPS Setup —— Datum (**WGS84**, WGS72, Other; 003 to 173)
├ Navigation (**Rhumb Line**, Great Circle)
├ Smooth Position (0 to 999 s, **0 s**)
├ Smooth S/C (0 to 9999 s, **5 s**)
├ Lat Offset (0.000 N/S to 9.999 N/S, **0.000' N**)
├ Lon Offset (0.000 E/W to 9.999 E/W, **0.000'E**)
├ Disable SV
└ SV ELV (5 to 90°, **5°**)

— WAAS —— Mode (**WAAS**, GPS)
├ WAAS Search (**Auto**, Manual; 120 to 138)
└ Correction Data Set (0 to 27, 99; **0**)

— I/O Setup —— Data 2 (**REM1**, REM2, AP, GPS)
├ Data 3 (**REM1**, REM2, AP, GPS)
├ NMEA0183 Version (2.0, **3.0**)
├ Save WPT/RTE -> PC
├ Load WPT/RTE <- PC
├ Wiring Info. NMEA 0183
└ Wiring Info. CAN bus Devices

— User Display —— Graphic (A, **B**)
├ Display 1 (Digital, **Speedometer**, COG, Off; 0-20, **0-40**, 0-80)
└ Display 2 (Digital, Speedometer, **COG**, Off)

— Pos/TD Setup —— Display (**xx.xxx'**, xx'xx.x", LC TD)
├ Loran C (**4990: Central Pacific, 11-29**)
├ TD1 (-99.9 to +99.9; **+0.0**)
└ TD2 (-99.9 to +99.9; **+0.0**)

— System —— Key Beep (Off, **On**)
├ Language (**English**, others)
├ Units (**nm-kn**, km-km/h, sm-mph)
├ Time Offset (-14:00 to +14:00; **-8:00**)
├ Daylight Saving Time (**Off**, On)
├ Time Display (12Hours, **24Hours**)
├ Date Display (DD/MMM/YY, **MM/DD/YY**)
├ Demo —— Mode (**Off**, On)
│ ├ Speed (0 to 99 kn; **20 kn**)
│ ├ Course (**Auto**, Manual; 0 to 359°)
│ ├ Lat (**N**/S; **38 00'N**)
│ └ Lon (E/**W**; **123°00'W**)
├ Self Test (**System Test**, LCD Test)
└ Reset —— Trip (0.00 nm) (**Off**, On)
  ├ GPS (**Off**, On)
  ├ Menu Settings (**Off**, On)
  └ Factory Reset (**Off**, On)

APPENDIX 2 WHAT IS WAAS?

WAAS, available in North America, is a provider in the worldwide SBAS (Satellite Based Augmentation System) navigation system. CBAS provides GPS signal corrections to SBAS users, for even better position accuracy, typically better than three meters. There are three more SBAS providers, MSAS (Multi-Functional Satellite Augmentation System) for Japan, EGNOS (Euro Geostationary Navigation Overlay Service) for Europe and GAGAN (GPS And GEO Augmented Navigation) for India. The illustration below shows the coverage area. (Accuracy may be affected when using a GEO satellite not within your current location.) This manual uses "WAAS" for these three providers generically.
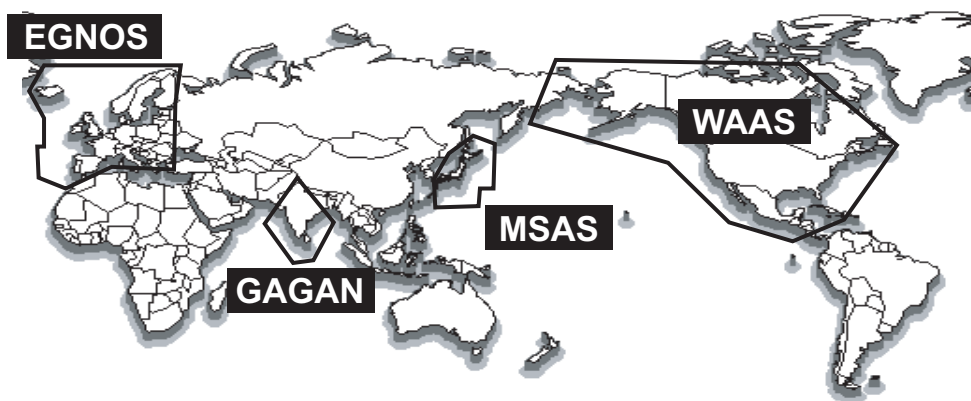
Provider	Satellite type	Longitude	Satellite No.
WAAS	Intelsat Galaxy XV	133°W	135
	TeleSat Anik F1R	107.3°W	138
EGNOS	Inmarsat-3-F2/AOR-E	15.5°W	120
	Artemis	21.5°E	124
	Inmarsat-3-F5/IOR-W	25°E	126
MSAS	MTSAT-1R	140°E	129
	MTSAT-2	145°E	137
GAGAN	Inmarsat-4-F1/IOR	64°E	127

APPENDIX 3 LIST OF TERMS

The following table shows the terms used in GP-33.

Terms/Symbols	Meaning
● ■ ◆ 🐟 🐟 🐟 ⚓ 💀 ▷	Waypoints
▲ , ◗	Own Boat
"**M**"	Man Overboard
→→→	Shortest course to the destination
+	Cursor
%	Percentage
2D,	2D GPS position fix
3D	3D GPS position fix
W2D	2D WAAS position fix
W3D	3D WAAS position fix
AP	Autopilot
APR	April
AUG	August
Auto	Automatic
Brill	Brilliance
BRG	Bearing
Cmnt	Comment
COG	Course Over Ground
DD	Day
DEC	December
Demo, SIM	Demonstration Mode
Disp	Display
DOP	Dilution Of Precision
E	East
ELV	Elevation
ENT	Enter

Terms/Symbols	Meaning
ETA	Estimated Time of Arrival
FEB	February
G	Go to
GPS	Global Positioning System
I/O	Input/output
HDOP	Horizontal Dilution Of Precision
JAN	January
JUL	July
JUN	June
km	kilometre
kn	knot
Lat	Latitude
Lon	Longitude
LC	Loran-C
M, Mag	Magnetic
MAR	March
MAY	May
MM (MMM)	Month
mph	mile per hour
N	North
nm	Nautical Mile
NMEA	National Marine Electronics Association
NOV	November
OCT	October
Odo	Odometer
PDOP	Position Dilution Of Precision
Pos	Position
ref.	Reference
QP	Quick Point
REM	Remote
RNG	Range
RTE, RT	Route
S	South
s	seconds

Terms/Symbols	Meaning
S/C	Speed/Course
SEP	September
sm	Statute Mile
SOG	Speed Over Ground
SPD	Speed
T	True
TD	Time Difference
TTG	Time To Go
Volt	Voltage
W	West
WAAS	Wide Area Augmentation System
WPT, WP	Waypoint
XTE	Cross Track Error
YY	Year

SPECIFICATIONS OF GPS NAVIGATOR
GP-33

1   GENERAL

1.1	Display system	4.3-inch color LCD
1.2	Effective area	95.04 x 53.85 mm, 480 x 272 dots (WQVGA)
1.3	Projection	Mercator
1.4	Display mode	Plotter, Steering, Highway, NAV data, Destination, User display
1.5	Memory capacity	Track: 3,000 pts, Waypoint: 10,000 pts w/ comment (13 character)
1.6	Storage capacity	100 routes w/ 30 waypoint each
1.7	Alarms	Arrival and anchor watch, Cross track error, Odometer alarm, Ship's speed, Timer, Trip, WAAS, Voltage
1.8	Display scale	
	Plotter display	0.02/0.05/0.1/0.2/0.5/1/2/5/10/20/40/80/160/320 NM
	Highway display	0.2/0.4/0.8/1/02/4/8/16 NM

2   GPS RECEIVER

2.1	Receiving channels	
	GPS	12 channels parallel, 12 satellites tracking
	WAAS	2 channel
2.2	Rx frequency	1575.42 MHz
2.3	Rx code	C/A code, WAAS
2.4	Position fixing system	All in view, 8-state Kalman filter
2.5	Position accuracy	
	GPS	10 m (95% of the time, 2drms)
	WAAS	3 m (95% of the time, 2drms)
2.6	Tracking velocity	999.9 kn
2.7	Position fixing time	Within 90 s (cold start)
2.8	Position update interval	1 s

3   INTERFACE

3.1	Number of port	CAN bus: 1 port, NMEA0183: 2 ports
3.2	Serial output	NMEA0183 Ver2.0/3.0 (current loop and RS-232C)
	Data sentences	AAM,APB,BOD,BWC,BWR,DTM,GGA,GLL,GSV,RMB,RMC,RTE, VTG,XTE,ZDA
3.3	CAN bus PGN (NMEA2000)	
	Input data	059904, 060928, 061184, 065286, 126208/720
	Output data	059392, 060928, 061184, 126208/464/720/992/996, 127258, 129026/029/033/044/283/284/285/538/539/540, 130822/823
3.4	Contact signal	Event switch (MOB input), Speed alarm (output)

FURUNO

4   POWER SUPPLY

15 VDC: LEN 7 (CAN bus)

12-24 VDC: 0.24-0.12 A (Non CAN bus)

5   ENVIRONMENTAL CONDITION

5.1   Ambient temperature

Antenna unit   -25°C to +70°C

Receiver unit   -15°C to +55°C

5.2   Relative humidity   93% at 40°C

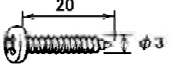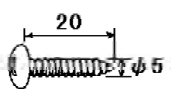5.3   Degree of protection   IP56

5.4   Vibration   IEC 60945

6   UNIT COLOR
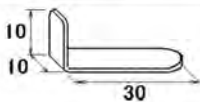
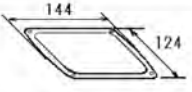6.1   Antenna unit   N9.5

6.2   Receiver unit   N2.5

FURUNO

CODE NO.	001-087-240-00	20BE-X-9401 -0
TYPE	CP20-03310	1/1

工事材料表
INSTALLATION MATERIALS

GP-33/RD-33

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	+ナベ タッピンネジ 1シュ SELF-TAPPING SCREW	20 φ3	3X20 SUS304		4	
			CODE NO.	000-163-884-10		
2	+トラスタッピンネジ 1シュ SELF-TAPPING SCREW	20 φ5	5X20 SUS304		4	
			CODE NO.	000-162-608-10		

FURUNO

CODE NO.	001-087-250-00	20BE-X-9501 -1
TYPE	FP20-01200	1/1

付属品表
ACCESSORIES

GP-33/RD-33

番 号 NO.	名 称 NAME	略 図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	パネルリムーバー PANEL REMOVER	10 10 30	19-028-3124-1		1	
			CODE NO.	100-340-471-10		
2	F_MOUNT CUSHION F_MOUNT CUSHION	144 124	20-032-1064-1		1	
			CODE NO.	100-357-181-10		

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
　（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO ., LTD.
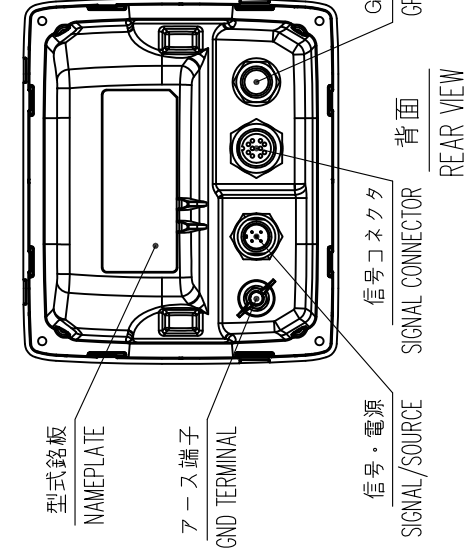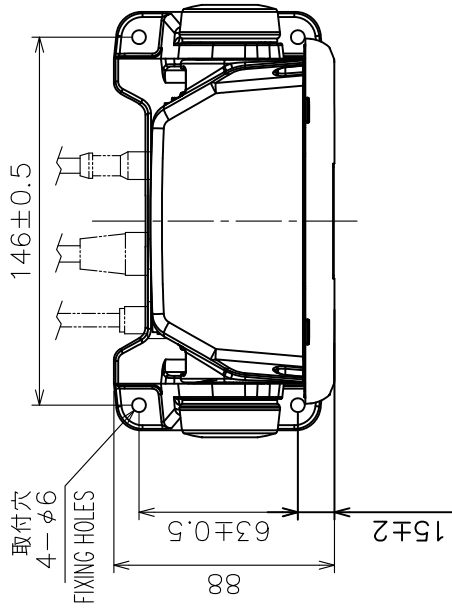
FURUNO

表1 TABLE1

寸法区分（ｍｍ） DIMENSION	公差（ｍｍ） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

GPS空中線部
GPS ANTENNA

背面
REAR VIEW

型式銘板
NAMEPLATE

アース端子
GND TERMINAL

信号コネクタ
SIGNAL CONNECTOR

信号・電源
SIGNAL/SOURCE

#80

73

35°

23±3

154

#80

125

172

145

146

#80

146±0.5

取付穴
4-φ6
FIXING HOLES

63±0.5

88

15±2
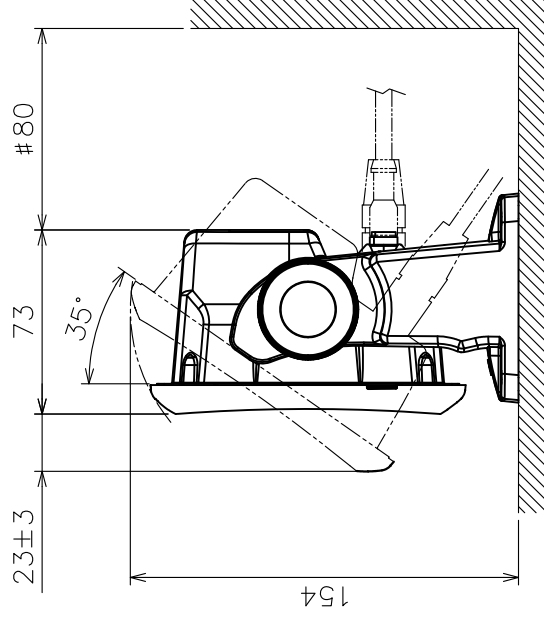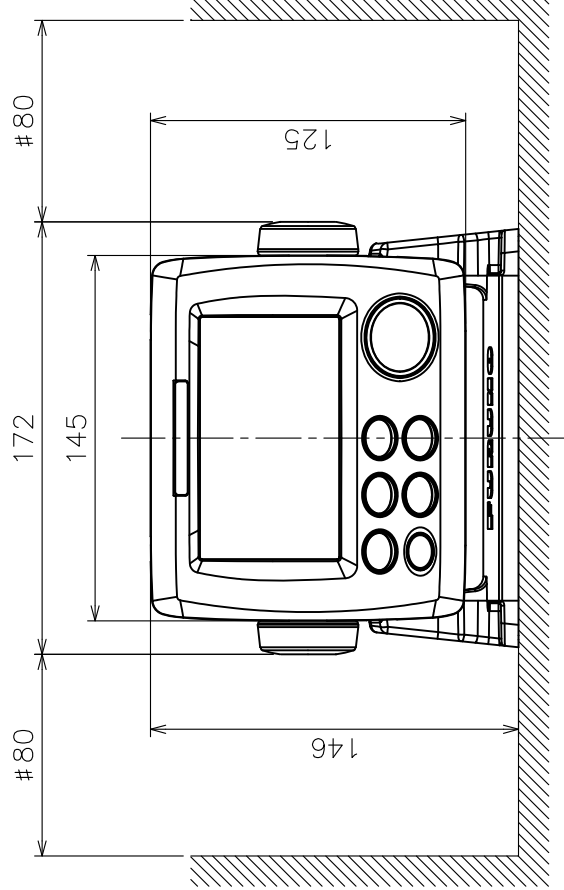
注記
1) 指定外寸法公差は表1による。
2) #印寸法は、最小サービス空間寸法とする。
3) 取付にはトラスタッピンネジ呼び径5×20を使用のこと。
NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ5x20 FOR FIXING THE UNIT.

DRAWN	13/Nov/09 T.YAMASAKI
CHECKED	16/Nov/09 T.TAKENO
APPROVED	24/Nov/09 R.Esumi
SCALE	MASS 0.72 kg 質量はケーブルを含まず MASS W/O CABLE
DWG.No. C4458-G01-A	REF.No. 20-032-1006-1

TITLE GP-33
名称 受信演算部（卓上装備）
外寸図
NAME RECEIVER UNIT (TABLETOP MOUNT)
OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

D-2

取付穴 PILOT HOLES
110±0.5
110±1
127±0.5
130±1
R12
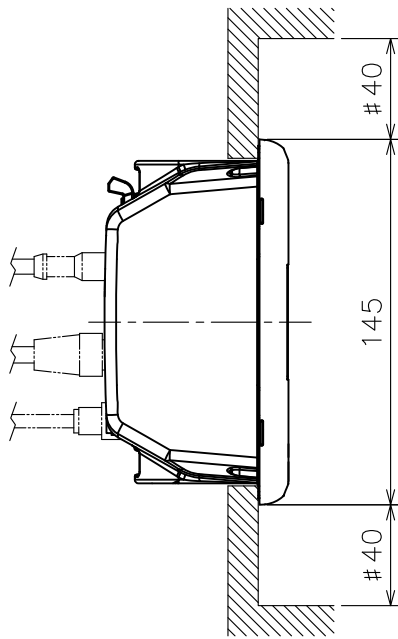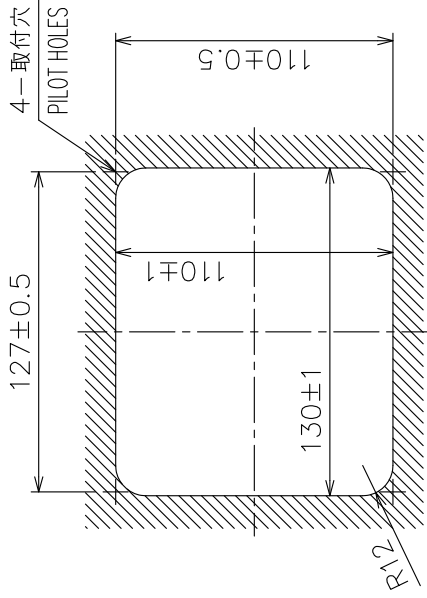
取付穴寸法図
CUTOUT DIMENSIONS

GPS空中線部
GPS ANTENNA

信号コネクタ
SIGNAL CONNECTOR

型式銘板
NAMEPLATE

アース端子
GND TERMINAL

信号・電源
SIGNAL/SOURCE

表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

#80
61
12
#40
125
#40

#40
145
#40

取付穴
4-φ3.5
FIXING HOLES
110
127
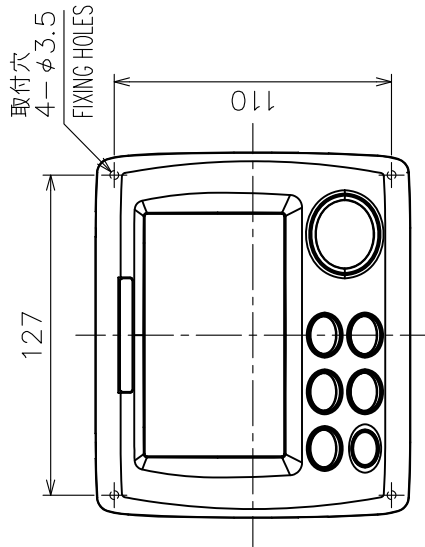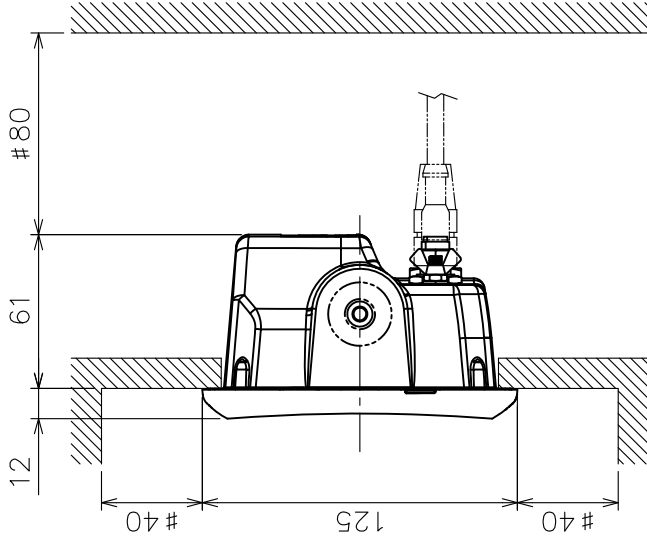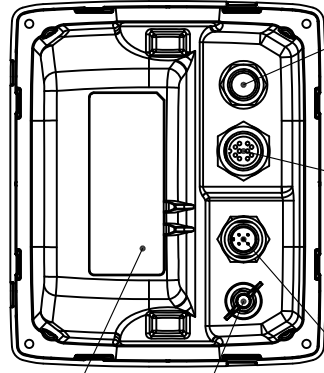
注 記
1） 指定外寸法公差は表1による。
2） #印寸法は、最小サービス空間寸法とする。
3） 取付にはナベタッピンネジ呼び径3×20を使用のこと。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. #: MINIMUM SERVICE CLEARANCE.
3. USE TAPPING SCREWS φ3x20 FOR FIXING THE UNIT.

DRAWN	13/Nov/09	T.YAMASAKI
CHECKED	16/Nov/09	T.TAKENO
APPROVED	24/Nov/09	R.Esumi

MASS 0.61 kg
質量はケーブルを含まず
MASS W/O CABLE

TITLE GP-33
名称 受信演算部 （埋込装備）
RECEIVER UNIT (FLUSH MOUNT)
NAME 外寸図
OUTLINE DRAWING

SCALE
DWG.No. C4458-G02-A 4
REF.No. 20-032-1110G-1

FURUNO ELECTRIC CO., LTD.

FURUNO

FURUNO

Ø69

R100 R14

24

R10

(85)

61
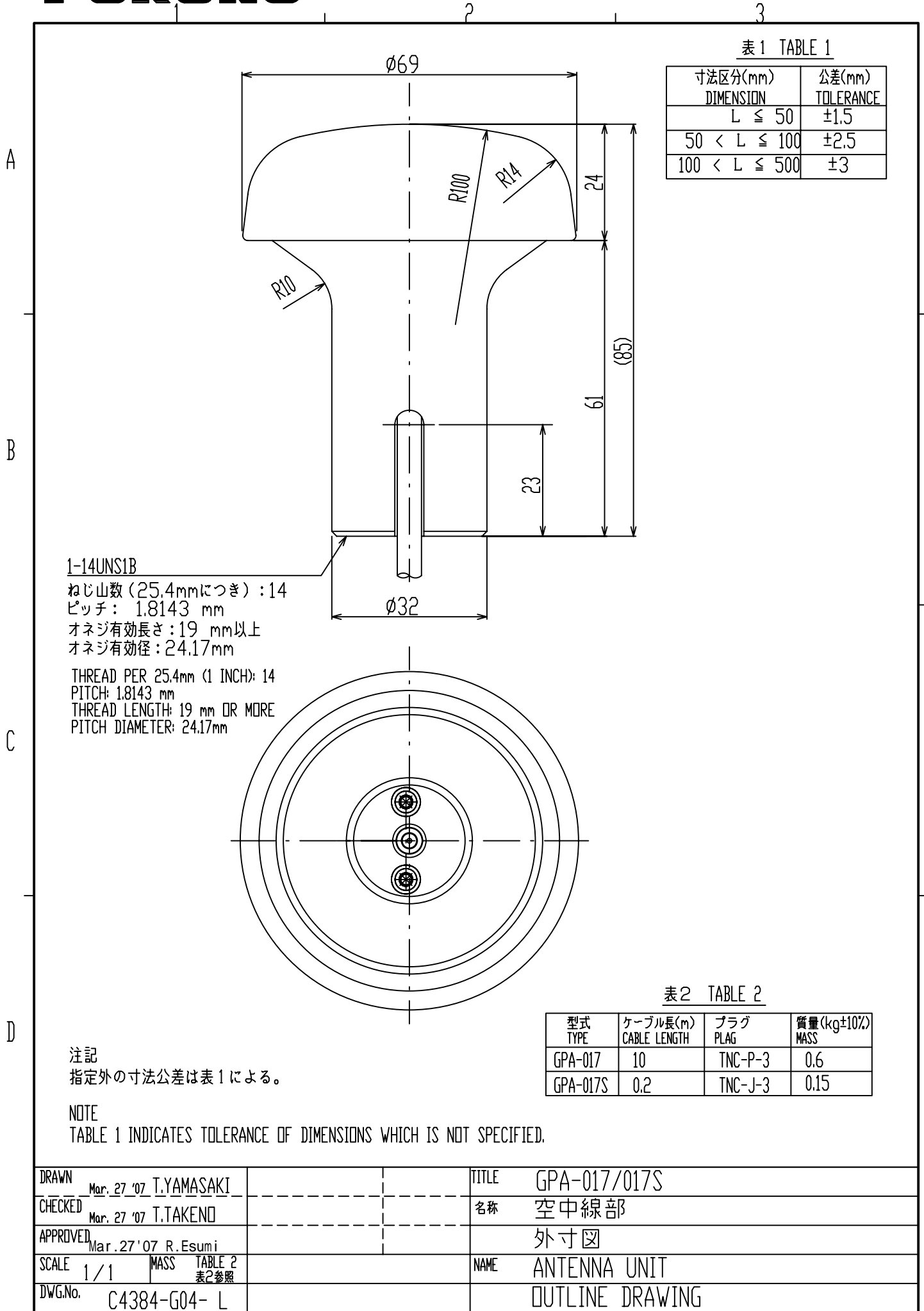
23

1-14UNS1B
ねじ山数（25.4mmにつき）：14
ピッチ： 1.8143 mm
オネジ有効長さ：19 mm以上
オネジ有効径：24.17mm

THREAD PER 25.4mm (1 INCH): 14
PITCH: 1.8143 mm
THREAD LENGTH: 19 mm OR MORE
PITCH DIAMETER: 24.17mm

Ø32

表1 TABLE 1

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

表2 TABLE 2

型式 TYPE	ケーブル長(m) CABLE LENGTH	プラグ PLAG	質量(kg±10%) MASS
GPA-017	10	TNC-P-3	0.6
GPA-017S	0.2	TNC-J-3	0.15

注記
指定外の寸法公差は表1による。

NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

DRAWN Mar. 27 '07 T.YAMASAKI		TITLE GPA-017/017S
CHECKED Mar. 27 '07 T.TAKENO		名称 空中線部
APPROVED Mar. 27' 07 R. Esumi		外寸図
SCALE 1/1	MASS TABLE 2 表2参照	NAME ANTENNA UNIT
DWG.No. C4384-G04- L		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

取付位置　他の機器のアンテナから下の図の距離以上離す。
MOUNTING LOCATION　THIS FIGURE SHOWS THE SEPARATION DISTANCES FROM OTHER ANTENNAS TO AVOID MUTUAL INTERFERENCE.

INMARSAT B/F ANTENNA
インマルサットB/Fアンテナ

INMARSAT C ANTENNA
インマルサットCアンテナ

LOOP ANTENNA
ループアンテナ

WHIP ANTENNA
ホイップアンテナ(VHF/UHF)

RX WHIP ANTENNA
受信ホイップアンテナ

WHIP ANTENNA
ホイップアンテナ(VHF/UHF)

GPS ANTENNA
GPSアンテナ

WHIP ANTENNA
ホイップアンテナ(MF/HF)

TX ANTENNA(MF/HF)
送信アンテナ(MF/HF)

MAIN MAST
メインマスト

1.5 m

1 m 以上　1 m以上
4 m 以上
4 m 以上
3m以上
0.5m以上

MORE THAN 4 m.
DO NOT MOUNT WITHIN INMARSAT BEAM.
4m以上。インマルサットビーム外に取付け。

レーダービーム外に取付け。
DO NOT MOUNT WITHIN RADAR BEAM.

※：支柱の大きさにより変わる。
※：DISTANCE DEPENDS ON MAST DIAMETER OF 'a'.

αの直径 DIA. OF 'a'	確保する距離 DISTANCE (MIN)
10 cm	1.5 m
30 cm	3 m

B) スタンションやハンドレールに取付けるとき
レール用アンテナベース No.13-RC5160
（取付可能レール直径：φ19～φ32)
（コード番号：000-806-114）

HANDRAIL MOUNTING
USE HANDRAIL MOUNTING BASE No.13-RC5160
(CODE No.000-806-114, OPTION).
THE DIAMETER OF THE HANDRAIL MAY BE
FROM φ19mm TO φ32mm.

ANTENNA BASE
アンテナベース

固定ボルト
FIXING BOLT

テープを巻く
WIND TAPE

注記 1) パイプやアンテナベースはアンテナユニットにねじ込んだ後に固定する。
2) アンテナを固定するときはパイプ（アンテナベース）をアンテナにねじ込むこと。
アンテナ側をねじるとコネクタ部ケーブルに無理がかかり、故障の原因となる。

NOTE 1. FASTEN PIPE(ANTENNA BASE) TO ANTENNA UNIT FIRST THEN FIX THEM TO MAST OR HANDRAIL.
2. WHEN FIXING ANTENNA, TURN PIPE OR ANTENNA BASE; NOT THE ANTENNA.
TURNING THE ANTENNA MAY TWIST THE CABLE AND PLACE STRESS ON CONNECTOR.

A) マストへの取付け　MAST MOUNTING
a) マスト取付金具CP20-01111(工事材料)でマストに固定する。
USE MAST MOUNTING KIT CP20-01111.

b) パイプのみを使うとき
USE A PIPE ONLY.

ケーブル溝のある場合
USING CABLE GUIDE

ケーブル固定板
CABLE FIXTURE

テープを巻く
WIND TAPE

コンベックス（現地手配）
CABLE TIE (LOCAL SUPPLY)

パイプで傷つかないよう
ケーブルを脇へよける
KEEP CABLE ASIDE TO AVOID INJURY FROM PIPE.

パイプ
PIPE

アンテナケーブル
ANTENNA CABLE

マスト MAST φ25～70

ホースクランプ
HOSE CLAMP

コンベックス（現地手配）
CABLE TIE (LOCAL SUPPLY)

テープを巻く
WIND TAPE

取付補助金具
MOUNTING BRACKET

パテでケーブルを固定する
FIX CABLE WITH SEALANT

パイプ
PIPE

アンテナケーブル
ANTENNA CABLE

120

アンテナベース基部
MOUNTING DIMENSIONS OF ANTENNA BASE.

4-M5 サラ穴
COUNTERSUNK

φ76
φ61
90°
45°

C) 取付ける場所が傾斜しているとき　ANTENNA BASE MOUNTING
オプションのアンテナベースを使う。
USE OPTIONAL ANTENNA BASE.

傾斜 INCLINATION	-5° - 33°	32° - 65°	65° - 98°
装備方法 MOUNTING METHOD	33° / 0° / -5° / 115	65° / 32° / 0° / 173	65° 98° / 0° / 173
アンテナ ベース形式 ANT. BASE TYPE	直型アンテナベース RIGHT ANGLE ANTENNA BASE No.13-QA330	L型アンテナベース L-TYPE ANTENNA BASE No.13-QA310	
コード番号 CODE No.	000-803-239	000-803-240	

DRAWN	Dec.14,'05 EMIYOSHI	TITLE	GPA series		名称	空中線部
CHECKED	TAKAHASHI.T					装備要領図
APPROVED	Y.Hatai				NAME	ANTENNA UNIT
SCALE	MASS					INSTALLATION PROCEDURE
DWG.No.	C4384-Y01- E					

FURUNO ELECTRIC CO.,LTD.

FURUNO

FURUNO ELECTRIC CO., LTD.

空中線部
ANTENNA UNIT

GPA-017

GPA-017

GP-33

CAN bus
J101
SHIELD 1
NET-S 2
NET-C 3
NET-H 4
NET-L 5

LTW12-05BFFM
-SL8000

M12-05BM+05BF, 6m, φ6

Micro-C

パソコン側ポートの設定を必ず確認してください。
CONFIRM THE PORT SETTINGS ON PC.

パソコン接続の例
EXAMPLE FOR PC CONNECTION

GP-33
J104
TD-C/SG 2   KON-004-02M, 2m, φ6.5
SD 3   アオ BLU
RD 4   キ YEL
        ミドリ GRN
9
10

PC (RS-232C)
※
Dsub9P
1
5 GND
2 RXD
3 TXD
4 DTR
6 DSR
7 RTS
8
9 CTS

TITLE   GP-33
名称   GPS航法装置
        相互結線図
NAME   GPS NAVIGATOR
        INTERCONNECTION DIAGRAM

DRAWN   13/May/2010   T. YAMASAKI
CHECKED   13/May/2010   T. TAKAHASHI
APPROVED   14/May/2010 Y.NISHIYAMA
SCALE   MASS   kg
DWG. No.   C4458-C01- D   REF. No.   20-032-5001-1

受信演算部
RECEIVER UNIT
GP-33

CAN bus
J101
SHIELD 1
NET-S 2
NET-C 3
NET-H 4
NET-L 5

ANT
J105
TNC-P-3   10m, φ5.3

NMEA
J104
TD-H 1   シロ WHT
TD-C/SG 2   アオ BLU
SD 3   キ YEL
RD 4   ミドリ GRN
MOB-H 5   チャ BRN
MOB-C 6   ダイ ORG
SPD_ALM-H 7   アカ RED
SPD_ALM-C 8   クロ BLK
NC 9
FG 10

KON-004-02M, 2m, φ6.5
LTWBU-10BFFM-
LL7000

*1
IV-1.25sq.

航法装置 (カレントループ)
NAV EQUIPMENT (CURRENT LOOP)
PC (RS-232C)
GND
RXD
TXD
リモートイベントスイッチ
MOBスイッチ
REMOTE EVENT SWITCH
(Man Overboard SWITCH)
スピードアラーム
SPEED ALARM

LTW12-05BFFM
-SL8000

12-24VDC *3
(+)
(-)
M12-05BFFM, 1/2/6m, φ6 (*2)
M12-05BM+05BF, 6m, φ6 (*4)
アカ RED
クロ BLK
シロ WHT
アオ BLU

CAN-BUS NETWORK

T-コネクタ *2
T-CONNECTOR
SS050505-FMF
-TS001 (LIGHT)
NC050505-FMF
-TS001 (HEAVY)

ジャンクションボックス
JUNCTION BOX
FI-5002 *2

CN1 12VDC
1 (+)
2 (-)
3 SHIELD

12VDC FI-5002-POWERCABLE, 2m シロ WHT
(VV-SA0.75x2C)   クロ BLK

接続箱
JUNCTION BOX
CAN bus NETWORK
(BACKBONE)

CN2 BACKBONE_U
1 SHIELD
2 NET-S
3 NET-C
4 NET-H
5 NET-L

CN2 BACKBONE_L
1 SHIELD
2 NET-S
3 NET-C
4 NET-H
5 NET-L

CN3 DROP_U
1 SHIELD
2 NET-S
3 NET-C
4 NET-H
5 NET-L

CN3 DROP_L
1 SHIELD
2 NET-S
3 NET-C
4 NET-H
5 NET-L

同上
DITTO

CN4 DROP_U
1 SHIELD
2 NET-S
3 NET-C
4 NET-H
5 NET-L

CN4 DROP_L
1 SHIELD
2 NET-S
3 NET-C
4 NET-H
5 NET-L

同上
DITTO

CN5 DROP_U
1 SHIELD
2 NET-S
3 NET-C
4 NET-H
5 NET-L

CN5 DROP_L
1 SHIELD
2 NET-S
3 NET-C
4 NET-H
5 NET-L

同上
DITTO

注記
*1) 造船所手配。
*2) オプション。
*3) CAN busネットワークを使用しないとき。
*4) コネクタプラグを切断して接続のこと。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: WHEN CAN bus NETWORK IS NOT USED.
*4: CONNECT WIRES AFTER CONNECTOR PLUG REMOVED.

INDEX

FURUNO

FURUNO ELECTRIC CO., LTD.
9-52 Ashihara-cho, Nishinomiya, 662-8580, Japan
Tel: +81 (798) 65-2111   Fax: +81 (798) 65-4200
www.furuno.co.jp

Declaration of Conformity

CE 0560

We   FURUNO ELECTRIC CO., LTD.

(Manufacturer)

9-52 Ashihara-Cho, Nishinomiya City, 662-8580, Hyogo, Japan

(Address)

declare under our sole responsibility that the product

GPS NAVIGATOR GP-33

(Model name, type number)

is in conformity with the essential requirements as described in the Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment (R&TTE Directive) and satisfies all the technical regulations applicable to the product within this Directive

EN 300 440-1 V1.5.1: 2009 Spurious related items
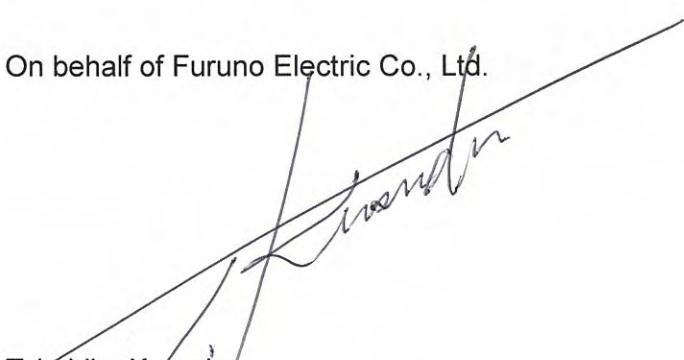IEC 60945 Ed.4.0: 2002 EMC related items
IEC 60950-1 Ed.1.0: 2001 Safety related items

(title and/or number and date of issue of the standard(s) or other normative document(s))

For assessment, see

• Statement of Opinion No: 10214092 issued by Telefication, The Netherlands.

On behalf of Furuno Electric Co., Ltd.

Takahiko Kusuda
Manager, QMS Secretariat
Quality Assurance Department

Nishinomiya City, Japan
June 1, 2010

(Place and date of issue)   (name and signature or equivalent marking of authorized person)