FURUNO

OPERATOR'S MANUAL

DGPS NAVIGATOR
GPS NAVIGATOR

MODEL **GP-37 /GP-32**

•Your Local Agent/Dealer

FIRST EDITION : MAY   2002
C1   : JAN.10, 2003

* 00080928800 *

* OME44200C10 *

⚠ SAFETY INSTRUCTIONS

Safety Instructions for the Operator

⚠ WARNING

Do not open the equipment.

Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Immediately turn off the power at the switchboard if the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock. Contact a FURUNO agent for service.

Use the proper fuse.

Use of a wrong fuse can damage the equipment or cause fire.

NOTICE

Be sure the power supply is compatible with the equipment.

Incorrect power supply may cause the equipment to overheat.

The useable temperature range for the antenna unit is -25°C to 70°C; -15°C to 55°C for the display unit.

Use of the equipment out of those ranges may damage the equipment.

Safety Instructions for the Installer

⚠ WARNING

Do not open the cover unless totally familiar with electrical circuits and service manual.

Improper handling can result in electrical shock.

Turn off the power at the switchboard before beginning the installation.

Fire or electrical shock can result 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.

Use the proper fuse.

Use of a wrong fuse can damage the equipment or cause fire.

NOTICE

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

	Standard compass	Steering compass
Display unit	0.8 m	0.55 m

TABLE OF CONTENTS

iv

FOREWORD

A Word to the Owner of the GP-37, GP-32

Congratulations on your choice of the GP-37 DGPS Navigator, GP-32 GPS Navigator.

For over 50 years FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment. This dedication to excellence 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 hearing from you, the end-user, about whether we are achieving our purposes.

Thank you for considering and purchasing FURUNO equipment.

Features

The GP-37/GP-32 is a totally integrated GPS receiver and video plotter, and mainly consists of a display unit and an antenna unit. The GP-37 is additionally equipped with a DGPS beacon receiver, built in the display unit.

The high sensitivity GPS receiver tracks up to 13 satellites (12 GPS, 1 WAAS) simultaneously. An 8-state Kalman filter ensures optimum accuracy in determination of vessel position, course and speed.

The main features of the GP-37/GP-32 are

- A DGPS beacon receiver may be connected to the GP-32 to add DGPS capability.
- WAAS capability.
- Storage for 999 waypoints and 50 routes
- Alarms: Arrival/Anchor Watch, XTE (Cross-track Error), Trip, Odometer, Time, WAAS/DGPS, 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.
- Bright 95 x 60 mm LCD with adjustable contrast and brilliance.
- Autopilot (option) may be connected, and steering data output to the autopilot.
- Unique Highway display provides a graphic presentation of ship's progress toward a waypoint.
- User displays definable by operator.
- Waypoint and route data can be uploaded from a PC and downloaded to a PC.

SYSTEM CONFIGURATION

Note: This equipment is intended for use on marine vessels. Do not use it in other applications.

ANTENNA UNIT
GPA-019

PROCESSOR UNIT*

NAVIGATOR

PERSONAL COMPUTER

* = With DGPS beacon receiver

————— : Standard Supply

------ : Option

12/24 VDC

GP-37 system configuration

ANTENNA UNIT
GPA-017

PROCESSOR UNIT

NAVIGATOR

DGPS BEACON RECEIVER

PERSONAL COMPUTER

————— : Standard Supply

------ : Option

12/24 VDC
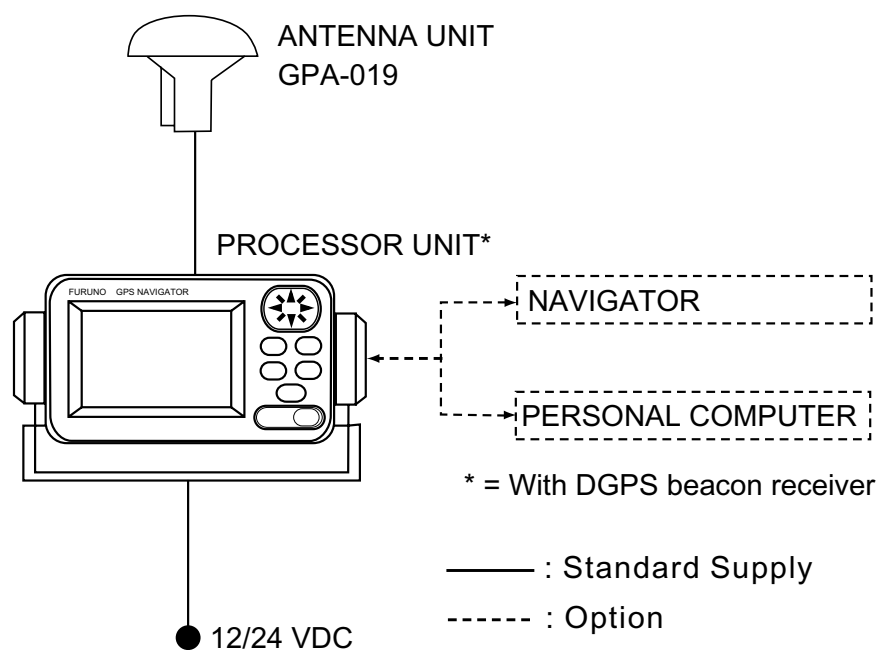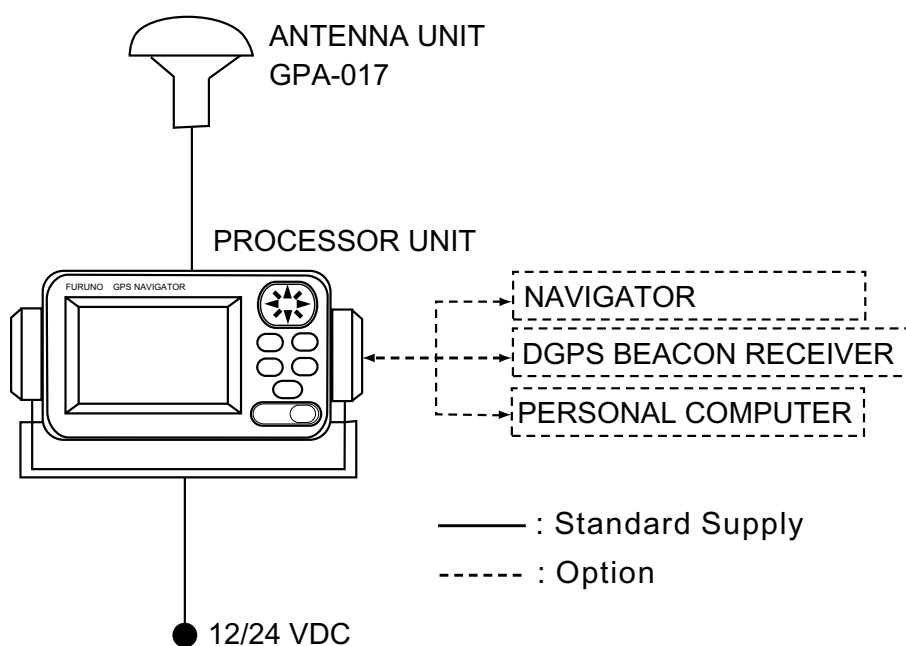
GP-32 system configuration

WHAT IS WAAS?

WAAS, available in North America, is a provider in the worldwide SBAS (Satellite Based Augmentation System) navigation system. An SBAS provider furnishes GPS signal corrections to SBAS users, for even better position accuracy, typically better than three meters. Two more SBAS providers are also currently under development, MSAS (Multi-Functional Satellite Augmentation System) for Japan and EGNOS (Euro Geostationary Navigation Overlay Service) for Europe. All providers will be compatible with one another, thus providing "seamless" position fixes to SBAS users.

At the time of this software release, WAAS is still in the developmental phase. During this developmental phase, which may last several years, there is no guarantee of the accuracy, integrity, continuity, or availability of the WAAS signal. Therefore, FURUNO will accept no responsibility for the use of the signal for other than the above stated purpose. It is the user's responsibility to exercise common prudence and navigational judgment when using the WAAS signal.
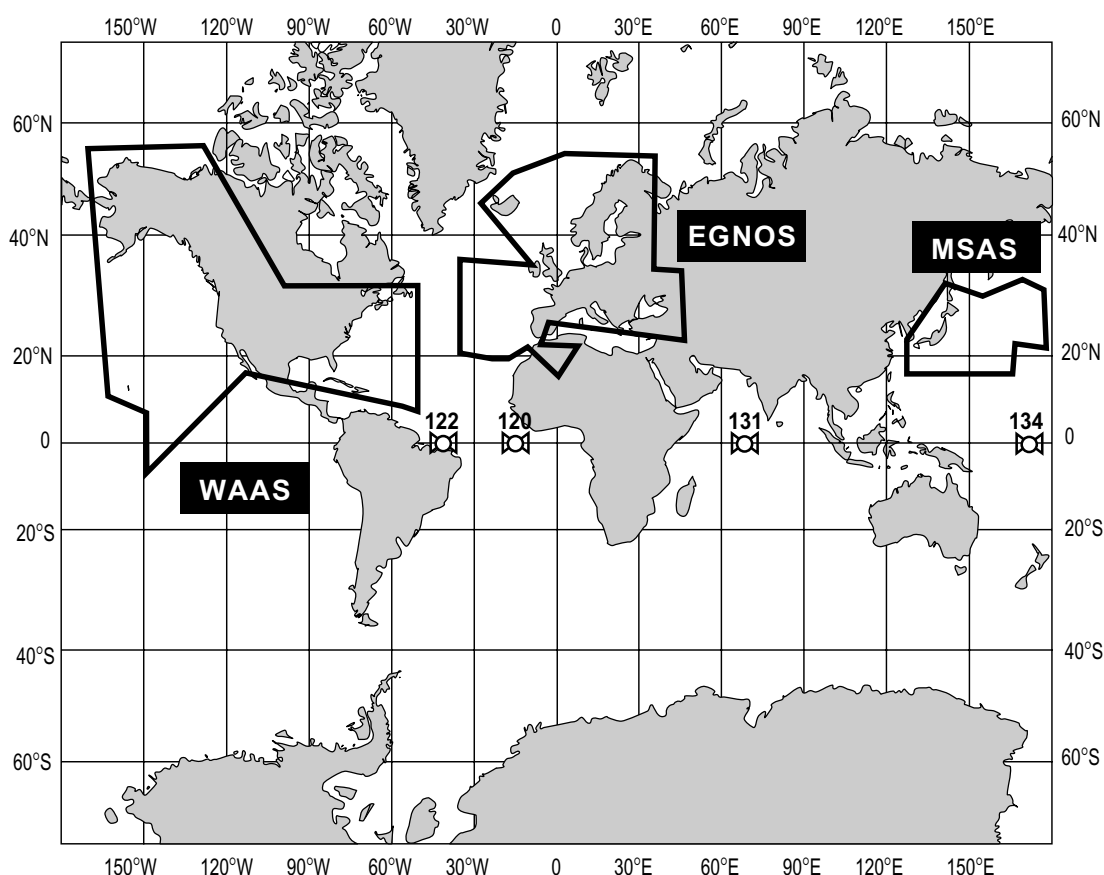
Satellite, Region	Position
120, AOR-E	15.5°W
122, AOR-W	54°W
131, IOR	64.5°E
134, POR	178°E

Expected operations capability
WAAS: 2003
EGNOS: 2004
MSAS: 2005

Note: This manual uses "WAAS" when referring to any SBAS provider.

EQUIPMENT LISTS

Standard supply

Name	Type	Qty	Remarks
Display Unit	GP-37	1	With hanger, knob
	GP-32		
Antenna Unit	GPA-019	1	For GP-37, w/10 m cable
	GPA-017	1	For GP-32, w/10 m cable
Installation Materials	CP20-02310	1 set	• Power/data cable (1 pc.) (Type: MJ-A7SPF0009-020, Code No.: 000-145-612) • Tapping screw (4 pcs.) (Type: 5X20, Code No.: 000-802-081)
Spare Parts	SP20-01001	1 set	Fuse (2 pcs.) (Type: FGMB1A, Code No.: 000-114-805)
Template	C42-00201	1	Code No. 000-809-299, flush mounting template
Hard Cover	FP14-02801	1	Code No. 004-366-960

Optional equipment

Name	Type	Code No.	Qty	Remarks
Right Angle Antenna Base	NO.13-QA330	000-803-239	1	For mounting the antenna unit, choose one
L-type Antenna Base	NO.13-QA310	000-803-240	1	
Handrail Antenna Base	NO.13-RC5160	000-806-114	1	
Mast Mounting Kit	CP20-01111	004-365-780	1 set	
Cable Assy.	MJ-A7SPF0009-020	000-145-612	1	
Flush Mounting Kit F	OP20-29	000-041-405	1 set	For flush mounting the display unit, choose one
Flush Mounting Kit S	OP20-17	000-040-720	1 set	

1. OPERATIONAL OVERVIEW

1.1 Controls

Cursor Pad
- Shifts cursor (cursor displayed) and display (cursor off).
- Selects items on menus.
- Enters alphanumeric data.

Press once: Zoom, centering, or escapes from current operation, depending on display in use.
Press twice: Opens menu.

Chooses display mode.

MENU

ENT — Registers items on menus.

DISP

GOTO — Sets/cancels destination.

MARK MOB — **Momentary press:** Inscribes mark.
Long press: Inscribes MOB mark.

DIM PWR — **Momentary press:** Turns power on. With the power on, press to adjust dimmer and contrast.
Long press: Turns power off.

Control panel

How to attach and remove the hard cover

To attach the hard cover, set it to the display unit at an angle.

To remove the hard cover, do as follows:

Press at arrows and pull toward you to remove.

FURUNO
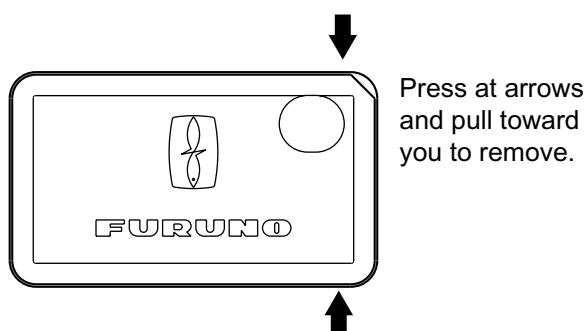
1.2 Turning On and Off Power

Turning on the power

Press the [DIM/PWR] key. The unit beeps and then starts up with the last-used display mode.

Note: The example screens shown in this manual may not match the screens you see on your display. The screen you see depends on your system configuration and equipment settings.

Your equipment takes about 90 seconds to find its position when turned on for the very first time. Thereafter it typically takes about 12 seconds.

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.

Receiver status indications

Indication	Meaning
2D	2D GPS position fix
3D	3D GPS position fix
D2D	2D DGPS position fix
D3D	3D DGPS position fix
W2D	2D WAAS position fix
W3D	3D WAAS position fix
DOP*	2D: HDOP larger than 4
	3D: PDOP larger than 6
SIM	Simulation mode

* = DOP (Dilution of Precision) is the index of position accuracy and is the distribution pattern of satellites used in position fixing. Generally, the smaller the figure the better the position accuracy.

Turning off the power

Press and hold down the [DIM/PWR] key until the screen goes blank (about three seconds). The time remaining until the power is turned off is counted down on the display.

1.3 Adjusting Brilliance and Contrast

1. Press the [DIM/PWR] key momentarily. The display shown below appears.

```
 BRILL        (1~8)
 ▼▐███▌      ▲ 4
 CONTRAST (0~63)
 ◄▐████▌     ► 41
          EXIT:[ENT]
```
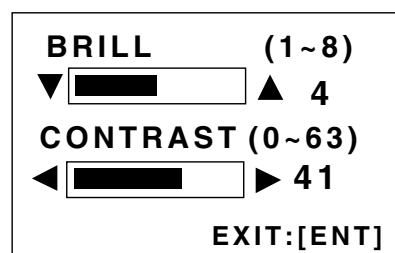
Brilliance and contrast adjustment window

2. To adjust the brilliance, press ▲ or ▼. Current setting is shown to the right of ▲. Maximum setting is 8.
3. To adjust the contrast, press ◄ or ►. Current setting is shown to the right of ►. Maximum setting is 63.
4. Press the [ENT] key to finish.

Note: If the last-used contrast setting is 36 or higher, the equipment starts up with that setting. If the setting is 35 or lower, the equipment starts up with setting 36.

2

1.4 Display Modes

Your unit has five display modes: Plotter Display, Highway Display, Steering Display, Nav Data Display and User Display (digital data and speedometer). Press the [DISP] key to choose a display mode. Each time the key is pressed, the display mode changes in the sequence shown below.

[User Display: Speedometer]
(Display format depends on user setting.)

[Plotter Display]

[User Display: Digital Data]
(Display format depends on user setting.)

[Highway Display]

[Nav Data Display]

[Steering Display]
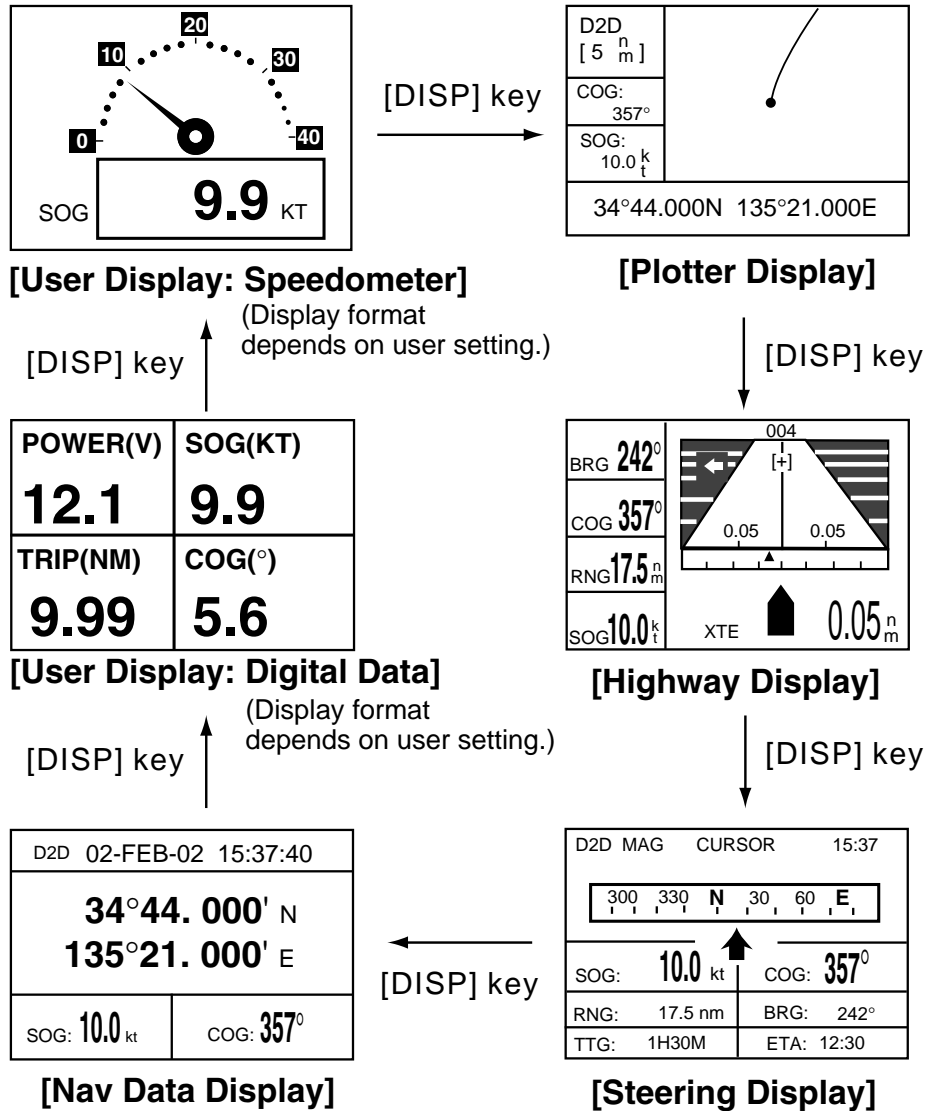
Display modes (default user displays)

Note 1: The unit measures distances up to 9999 nm. Any distance greater than 9999 nm is shown as "*999".

Note 2: Position data can be shown in latitude and longitude or TDs (Loran C or Decca).

Plotter display

The plotter display traces own ship's track, and shows position, bearing to cursor, range to cursor, horizontal display range setting and receiver status.

Receiver status
(See table on page 2.)   Own ship mark (blinking)

D2D

Horizontal display range setting → [40 $\frac{n}{m}$]

BRG: +
Bearing to cursor* → 180°

RNG: +
Range to cursor* → 12.0 $\frac{n}{m}$

Waypoint mark
(Shape selectable)

Boat's track

Cursor
(Displayed six seconds.)

34°44.000N 135°21.000E ←

Cursor position
(Own ship position when cursor is not displayed.)

* = COG and SOG replace bearing to cursor and range to cursor when the cursor is not displayed.

Plotter display

Highway display

The highway display provides a 3-D view of own ship's progress toward destination (waypoint). Nav data is also shown.

Direction to steer (to return to course)
Appears to right or left of centerline depending on direction to steer;
➡: Steer right, ⬅: Steer left.

Bearing from own ship to destination waypoint

BRG 11⁰

COG 11⁰
Course over ground

RNG 9.0 $\frac{n}{m}$

SOG 12.5 $\frac{k}{t}$
Speed over ground

CURSOR ←

Destination waypoint name
"CURSOR" (cursor-selected destination) or waypoint name

[+]

Destination waypoint
Moves forward as boat nears destination.

0.5   0.5

XTE   0.05 $\frac{n}{m}$

Δ C (Delta Course)
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.

Range from own ship to destination waypoint

Analog XTE (Cross-track error) scale
Arrow shifts with boat's XTE. When the arrow is aligned with the centerline 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 when no destination is set.

Digital XTE indication
(in nautical miles)

Highway display

Steering display

The steering display provides steering information such as ship's speed, course, range, bearing, ETA and TTG.

Receiver status

Bearing reference (MAG or TRUE)

Destination (CURSOR or waypoint name)

Time

Bearing from own ship to destination

Bearing scale

Own ship mark

D2D   MAG   CURSOR   04:32

W   300   330   N   30   60   E

SOG: **12.5** kt   COG: **354**⁰

Speed over ground → Course over ground

RNG: 0.16 nm   BRG: 60°

Range from own ship to destination → Bearing

TTG: 1H 30M   ETA: 12:30

Time-To-Go to destination (*9H*9M is displayed when TTG is over 99 h59min.)

Estimated Time of Arrival at destination (*9:*9 shown when ETA is over 99h59min.)

Steering display

Nav data display

The nav data display shows receiver status, position in latitude and longitude (or TDs), course over ground, speed over ground, date and time.

Receiver status

D2D   10-JAN-02   16 :44 :15   Date and time

$34°44.000'$ N

Position in latitude and longitude

$135°21.000'$ E

SOG: **12.5** kt COG: **7°**   Course over ground

Speed over ground →

Nav data display

User displays

Two user displays are available, digital and speedometer.

Digital display

The digital display shows digital navigation data. The user may choose what data to display in one to four cells. The choices of data are time, 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.

POWER(V)	SOG(KT)
12.1	**9.9**
TRIP(NM)	COG(°)
9.99	**5.6**

Digital display (default display)

Speedometer display

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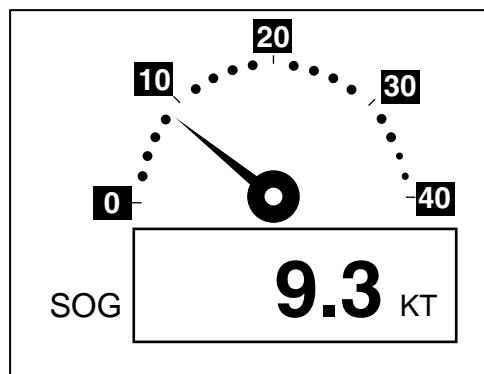
Speedometer display

1.5 Menu Overview

Most operations of your unit are carried out through the menu. Below is a quick introduction to how to choose a menu and change menu settings. If you get lost in operation, press the [MENU] key to return to the MAIN MENU. For your reference, a complete menu tree appears in the Appendix.

1. Press the [MENU] key once or twice to display the menu.
    One press: Steering display, nav data display and user display.
    Two presses: Plotter display, highway display.

```
▓▓▓▓▓    MAIN MENU    ▓▓▓▓▓

WAYPOINTS         MESSAGES
ROUTES            SATELLITE
PLOTTER           USER DISP
ALARMS            GPS SETUP
ERASE             SYS SETUP
WAAS/DGPS         I/O SETUP
CALCULATE         TD SETUP
```

Main menu

2. Operate the cursor pad to choose a menu and then press the [ENT] key. For example, choose PLOTTER and then press the [ENT] key.
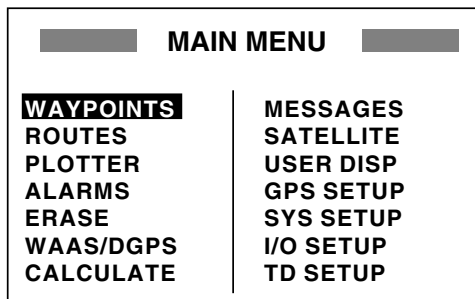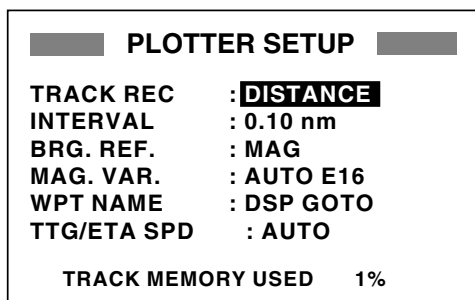
```
▓▓▓    PLOTTER SETUP    ▓▓▓

TRACK REC    : DISTANCE
INTERVAL     : 0.10 nm
BRG. REF.    : MAG
MAG. VAR.    : AUTO E16
WPT NAME     : DSP GOTO
TTG/ETA SPD   : AUTO

   TRACK MEMORY USED    1%
```

PLOTTER SETUP menu

3. Use ▲ or ▼ to choose menu item. For example, choose TRACK REC.
4. Press the [ENT] key. A window shows the options for the item selected. (The illustration at the top of the next shows the options available for TRACK REC.)

```
OFF
DISTANCE
AUTO
```
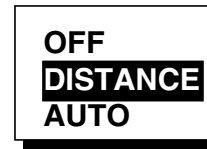
Track recording options

5. Press ▲ or ▼ to choose option desired.
6. Press the [ENT] key to register your selection.
7. Press the [MENU] key twice to close the menu.

How to enter alphanumeric data

In some instances it is necessary to enter alphanumeric data. The example below shows how to enter a time difference of -6:30, to use local time instead of UTC time.

1. Press the [MENU] key once or twice to display the menu.
2. Choose SYS SETUP and then press the [ENT] key.

```
▓▓▓▓    SYSTEM SETUP    ▓▓▓▓

LANGUAGE : ENGLISH
DATUM        : WGS84
UNITS        : nm, kt
TIME DIFF    : +00 : 00
TIME DISP    : 24HOUR
TEST?
SIMULATOR?
EXCHANGE BATTERY?
```
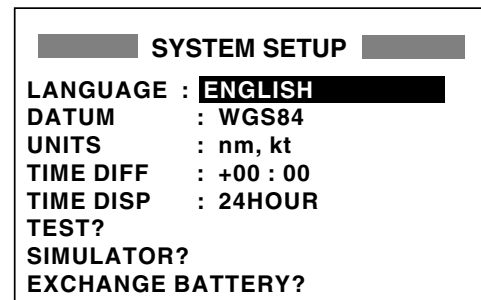
SYSTEM SETUP menu

3. Choose TIME DIFF.
4. Press the [ENT] key. A cursor circumscribes "+". This cursor appears whenever selected data can be changed with the cursor pad.

```
▓▓▓▓    SYSTEM SETUP    ▓▓▓▓

LANGUAGE : ENGLISH
DATUM        : WGS84
UNITS        : nm, kt
TIME DIFF    : ⊞00 : 00
TIME DISP    : 24HOUR
TEST?
SIMULATOR?
EXCHANGE BATTERY?
```
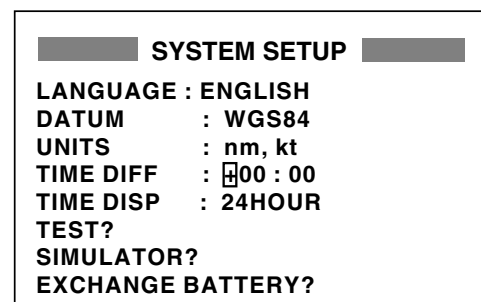
SYSTEM SETUP menu,
TIME DIFF selected

5. Press ▲ to display "-".
6. Press ► to send the cursor to the next digit.
7. Press ▲ or ▼ to display "0."
8. Press ► to send the cursor to the next digit.
9. Press ▲ or ▼ to display "6."
10. Press ► to send the cursor to the next digit.
11. Press ▲ or ▼ to display "3."
12. Press ► to send the cursor to the last digit.
13. Press ▲ or ▼ to display "0."
14. Press the [ENT] key.
15. Press the [MENU] key twice to finish.

1.6 Simulation Display

The simulation 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.

1. Press the [MENU] key once or twice to display the menu.
2. Choose SYS SETUP and then press the [ENT] key.
3. Choose "SIMULATOR?" and then press the [ENT] key. (Note that position shown depends on language selected on the SYS SETUP menu. After changing the language, the memory is cleared.)

```
        ▬▬▬   SIMULATOR   ▬▬▬

   MODE    :  OFF
   SPEED   :  20 kt
   COURSE  :  AUTO
   LAT     :   38°00'N
   LON     :  123°00'W
```

SIMULATOR menu

4. The cursor is selecting MODE. Press the [ENT] key. A window shows the choices ON and OFF.
5. Choose ON and then press the [ENT] key.

6. Press the [ENT] key, use the cursor pad to enter speed to use for the simulation, and then press the [ENT] key.
7. Press the [ENT] key.
8. Choose course (AUTO or MAN) and then press the [ENT] key. For manual entry of course, press the [ENT] key, enter course with the cursor pad, and then press the [ENT] key. The AUTO course tracks a circular course.

   Note: Course must be AUTO to set simulation destination.

9. Press the [ENT] key, enter latitude with the cursor pad, and then press the [ENT] key.
10. Press the [ENT] key, enter longitude, and then press the [ENT] key.
11. Press the [MENU] key twice.
12. Choose the PLOTTER display with the [DISP] key. SIM appears at the upper left-hand corner when the simulator display is active.

Simulation mode active
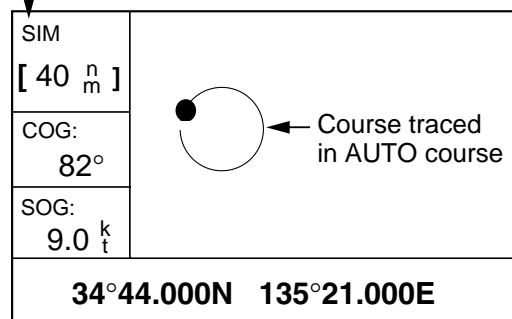
Simulator display, auto course selected

13. To turn off the simulator display, choose OFF at step 5 in this procedure, press the [ENT] key and then press the [MENU] key twice to finish.

Note: If the power is turned off while the simulator display is in use, the indication SIMULATION MODE appears at the top of the screen at the next power up, in addition to the indication SIM. SIMULATION MODE disappears when any key is pressed, however the simulation mode continues.

8

2. PLOTTER DISPLAY OVERVIEW

2.1 Choosing the Display Range

You may choose the display range on the plotter and highway displays. The horizontal range in the plotter display is available among 0.02 (40 yd), 0.05 (101 yd), 0.1 (202 yd), 0.2 (405 yd), 0.5, 1, 2, 5, 10, 20, 40, 80, 160 and 320 nautical miles. (Nautical mile is the default unit of display range. Display range may also be shown in kilometers or miles. Ranges sh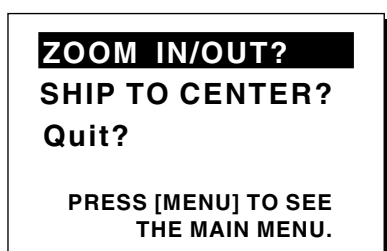orter than the 0.5 nm are also shown in yards or meters on the plotter display.) The horizontal range in the highway display is available among 0.2, 0.4, 0.8, 1, 2, 4, 8 and 16 nautical miles.

1. Press the [MENU] key. The zoom, ship centering window appears.

```
ZOOM  IN/OUT?
SHIP TO CENTER?
Quit?

    PRESS [MENU] TO SEE
      THE MAIN MENU.
```

Zoom, ship centering window

Note: "SHIP TO CENTER?" does not appear when the highway display mode is active.

2. ZOOM IN/OUT is selected. Press the [ENT] key to show the zoom window.

```
      ZOOM

   ▲ OUT

     20 $\frac{n}{m}$

   ▼ IN

    EXIT:
    [ENT]
```
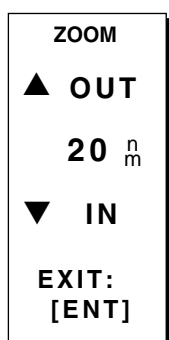
Zoom window

3. Use ▲ (increase) or ▼ (decrease) to choose range desired.
4. Press the [ENT] key to close the zoom, ship centering window.

2.2 Shifting the Cursor

Use the cursor pad to shift the cursor. The cursor moves in the direction of the arrow or diagonal pressed on the cursor pad.

Cursor state and data

Cursor state determines what data is shown on the display.

Cursor turned on

Cursor position is displayed in latitude and longitude or TDs (depending on menu setting) at the bottom of the plotter display when the cursor is on. The range and bearing from own ship to the cursor appear at the left-hand side of the display.

Plotter display, cursor turned on

9
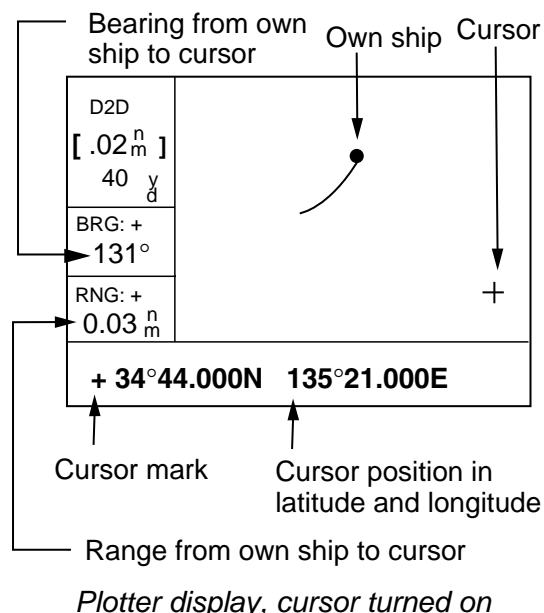
Cursor turned off

The cursor is erased when there is no cursor pad operation for about six seconds. Ship's position, speed and course appear when the cursor is off.
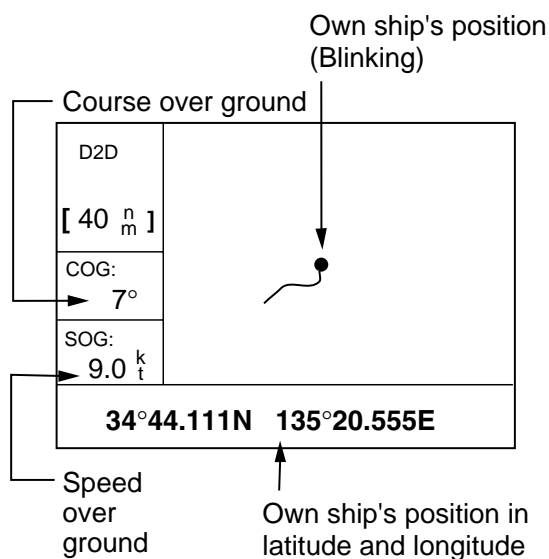
Plotter display, cursor turned off

2.3 Shifting the Display

The display can be shifted on the plotter display. Operate the cursor pad to place the cursor at an edge of the screen. The display shifts in the direction opposite to cursor pad operation.

2.4 Centering Own Ship's Position

When own ship tracks off the plotter display, the own ship mark is automatically returned to the screen center. You can also return it manually as follows:

1. Press the [MENU] key.
2. Choose "SHIP TO CENTER?".
3. Press the [ENT] key.

2.5 Changing Track Plotting Interval, Stopping Plotting

To trace the ship's track, the ship'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 reduced. When the track memory becomes full, the oldest track is erased to make room for the latest.

1. Press the [MENU] key once or twice to display the menu.
2. Choose PLOTTER.
3. Press the [ENT] key.

PLOTTER SETUP menu

4. The cursor is selecting TRACK REC. Press the [ENT] key to show the track recording method options.

Track recording method options

5. Choose OFF, DISTANCE or AUTO and then press the [ENT] key.

   OFF: Track is neither recorded nor plotted. This setting is useful when you do not need to record track, for example, when returning to port.

   DISTANCE: Track is recorded and plotted at the distance interval set.

   AUTO: Plotting and recording interval changes with display range selected.

6. For AUTO or OFF, go to step 7. For DISTANCE, enter the recording interval as follows:

   a) Press the [ENT] key.

   b) Use ◄ or ► to choose digit to change.

   c) Use ▲ or ▼ to change value.

   d) Press the [ENT] key after setting the recording interval.

7. Press the [MENU] key twice to finish.

2.6 Erasing Track

All track can be erased. Track cannot be restored once erased, therefore be absolutely sure you want to erase all track.

1. Press the [MENU] key once or twice to display the menu.

2. Choose ERASE and then press the [ENT] key to display the ERASE menu.

```
━━━━━━  ERASE  ━━━━━━

WAYPOINTS/MARKS?
ROUTES?
TRACK?
RESET TRIP?        (6.40nm)
RESET ODO?         (6.40nm)
GPS DATA?
MENU SETTINGS?
ALL BACKUP DATA?
```
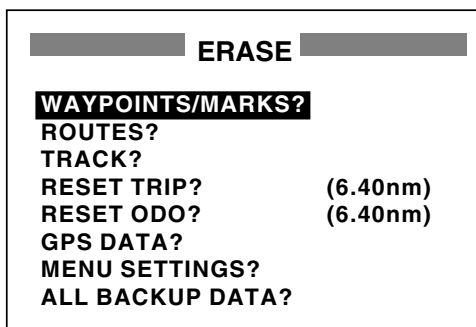
ERASE menu

3. Choose "TRACK?" and then press the [ENT] key. The message shown below appears.

```
ERASE TRACK.

ARE YOU SURE?
YES      NO
```
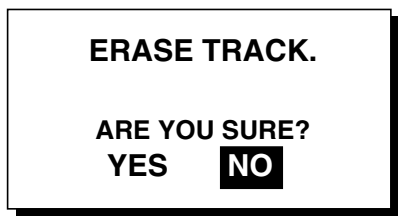
Prompt for erasure of track

4. Press ◄ to choose YES and then press the [ENT] key.

5. Press the [MENU] key twice to finish.

2. PLOTTER DISPLAY OVERVIEW

(This page intentionally left blank.)

3. WAYPOINTS (MARKS)

3.1 Entering 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 999 waypoints. Waypoints can be entered on the plotter display three ways: at cursor position, at own ship's position, and from the waypoint list.

Entering a waypoint with the cursor

1. Use the cursor pad to place the cursor on the location desired for a waypoint.
2. Press the [ENT] key. The following window appears.

```
CURSOR  POS.   →  WPT

ENTER A NEW WPT NAME.
       0 0 1 _ _ _ ?
(001:DEFAULT NAME)

              QUIT: [MENU]
```

Waypoint name entry window

3. The cursor is on the second line of the display. This is where you may enter waypoint name, which may consist of six alphanumeric characters. The number shown is the youngest empty waypoint number. If you would rather have the unit register the waypoint under that number, and you do not need to change mark shape or enter a comment, press the [ENT] key twice to register the waypoint and finish. To enter KOBE as the waypoint name, for example, do the following:

a) Press ▲ or ▼ to display K.
b) Press ► to move the cursor one place and then press ▲ or ▼ to display O.

c) Press ► to move the cursor one place and then press ▲ or ▼ to display B.
d) Press ► to move the cursor one place and then press ▲ or ▼ to display E.
e) Press the [ENT] key. The following window appears.

Comment (default: date/time)

Mark shape

```
NAME:  KOBE
  34°39.836'N        MARK
135°12.059'E           x
10-JAN-02             10:25
TTG 02H00M   ETA: 12:25
Exit?   LOG RTE?
```

TTG and ETA calculated according to speed set at TTG/ETA SPEED on PLOTTER menu.

Waypoint attribute edit window

4. This window is where you can choose mark shape, enter a comment, and log the waypoint to a route (LOG RTE?). (If you do not need to change mark shape or enter a comment, choose "Exit?" and then press the [ENT] key to finish. "LOG RTE?" is discussed in chapter 4.)

a) Use the cursor pad to place the cursor under "MARK."
b) Press the [ENT] key.
c) Use ▲ or ▼ to choose mark desired.

Press ▼.

Note: Operating ▲ changes the sequence reversely.
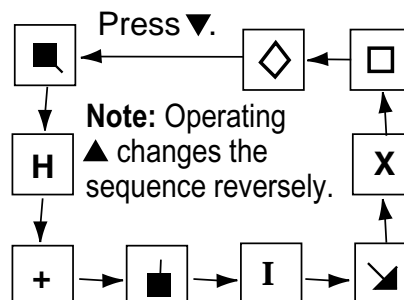
Mark selection sequence

d) Press the [ENT] key. The cursor is selecting date/time, the default comment. Press the [ENT] key.

e) Enter a comment (max. 16 alphanumeric characters) with the cursor pad and then press the [ENT] key. To create a space, choose the "blank" character. To remove all characters which follow the cursor, choose the underline.

f) The cursor is on "Exit?." Press the [ENT] key to finish.

Entering a waypoint at own ship position

1. Press the [MARK/MOB] key momentarily on any display. The following window appears.

```
GPS  POS.   →  MARK

 NAME:  001
  34°39.836'N         MARK
 135°12.059'E          x
 10-JAN-02          10:25D*

 TTG 02H00M   ETA: 12:25
 Exit?  LOG RTE?
```

* D = Position fixed by DGPS
  W = Position fixed by WAAS

Waypoint attribute edit window

2. If you want to register the waypoint under the number shown, and you do not need to change mark shape or enter a comment, press the [ENT] key to finish.

3. To change name, choose NAME, press the [ENT] key, enter name with the cursor pad, and then press the [ENT] key. The display below appears.

```
CREATE?
RENAME?
Quit?
```

Create, rename, quit options

4. Create is selected; press the [ENT] key.

5. To change mark shape, place the cursor under "MARK." Press the [ENT] key, use ▲ or ▼ to choose mark desired, and then press the [ENT] key again.

6. The cursor is selecting date/time. To change the date/time to your own comment, press the [ENT] key, enter a comment with the cursor pad, and then press the [ENT] key again.

7. Place the cursor on "Exit?." Press the [ENT] key to finish.

Entering a waypoint from the waypoint list

1. Press the [MENU] key once or twice to display the menu.

2. Choose WAYPOINTS.

3. Press the [ENT] key to show the waypoint list options. Choose LIST. (NEAREST displays waypoints from nearest to furthest; however, waypoints cannot be entered from this display.)

```
LIST
NEAREST
```

Waypoint list options

4. Press the [ENT] key. The WPTS/MARKS list appears.

```
█ WPTS/MARKS (LIST) █

[NEW?]     CURSOR      MOB
START     _ _ _ _ _   _ _ _ _ _
_ _ _ _ _  _ _ _ _ _   _ _ _ _ _
_ _ _ _ _  _ _ _ _ _   _ _ _ _ _
_ _ _ _ _  _ _ _ _ _   _ _ _ _ _
_ _ _ _ _  _ _ _ _ _   _ _ _ _ _
_ _ _ _ _  _ _ _ _ _   _ _ _ _ _
```

WPTS/MARKS list

CURSOR: Cursor position when destination is set with cursor.
MOB: Man overboard position.
START: Starting point when destination is selected.

5. The cursor is selecting "NEW?"; press the [ENT] key.

```
ENTER A NEW WPT NAME.

  0 0 4_ _ _?

(004:DEFAULT NAME)
           Quit: [MENU]
```

Waypoint name entry window

6. Enter name (if desired) with the cursor pad and then press the [ENT] key.

```
NAME:  004
 34°39.836'N*        MARK
135°12.059'E*          x
10-JAN-02           10:25D
TTG 02H00M   ETA: 12:25
Exit?   LOG  RTE?
```

 * Current position

Waypoint attribute edit window

7. The cursor is selecting latitude. Press the [ENT] key. Enter latitude with the cursor pad and then press the [ENT] key.

8. Press the [ENT] key, enter longitude in similar fashion as you did with latitude and then press the [ENT] key.

   Note: To enter position by TDs, see paragraph 7.7.

9. To change mark shape, choose the mark currently shown and then press the [ENT] key. Use ▲ or ▼ to choose mark desired and then press the [ENT] key.

10. To change date and time to the comment of your choice, press the [ENT] key, enter comment with the cursor pad, and then press the [ENT] key again.

11. Place the cursor on "Exit?." Press the [ENT] key.

12. Press the [MENU] key twice to finish.

3.2 Entering the MOB Mark

The MOB mark denotes man overboard position. Only one MOB mark may be entered. Each time the MOB mark is entered the previous MOB mark and its position data are written over.

1. Press the [MARK/MOB] key on any display until the following display appears.

```
SAVED TO MOB.
GO TO MOB ?

ARE YOU SURE?
YES   NO
```

MOB window

2. To set MOB position as destination, press ◄ to choose YES and then press the [ENT] key. Then, the plotter display marks MOB position as shown in the illustration below.

   Note: Selecting "NO" saves the position as a waypoint.

MOB position set as destination

```
D2D
[ 40 $^n_m$ ]

BRG:
    1°
RNG:
 0.06$^n_m$

34°44.000N   135°21.000E
```

 Bearing and range to MOB position
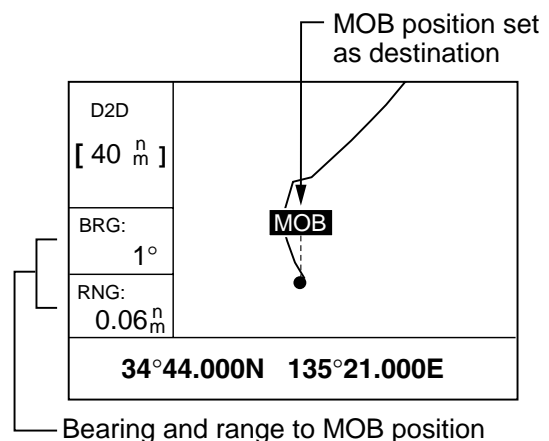
Plotter display when MOB is set as destination

3.3 Displaying Waypoint Name

You may display waypoint name as follows:

1. Press the [MENU] key once or twice to display the menu.
2. Choose PLOTTER and then press the [ENT] key.
3. Choose WPT NAME and then press the [ENT] key to show the waypoint name display options.

```
DSP GOTO
DSP RTE
DSP ALL
```

Waypoint name display options

4. Choose DSP GOTO, DSP RTE or DSP ALL as appropriate and then press the [ENT] key.
   DSP GOTO: Displays only the GOTO waypoint name.
   DSP RTE: Displays all waypoint names when a route is set as destination.
   DSP ALL: Displays all waypoint names.
5. Press the [MENU] key twice to finish.

3.4 Operations on the Waypoint List

Editing waypoints

Waypoint position, waypoint name, mark shape and comment can be edited from the WPTS/MARKS List.

1. Press the [MENU] key once or twice to display the menu.
2. Choose WAYPOINTS and then press the [ENT] key.
3. Choose LIST or NEAREST and then press the [ENT] key.
4. Choose waypoint to edit and then press the [ENT] key.

   Note: CURSOR, MOB and START are automatically updated according to destination setting or MOB setting. Therefore, editing these items has no meaning.

5. Choose NAME and then press the [ENT] key.
6. Change name with the cursor pad and then press the [ENT] key. You are then asked if you want to create or rename the waypoint, or quit (escape) the display.

```
CREATE?
RENAME?
Quit?
```
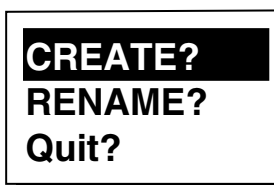
Waypoint edit options

7. Choose objective desired and then press the [ENT] key.
8. Change position, mark shape, comment as desired.
9. Choose "Exit?" and then press the [ENT] key.
10. Press the [MENU] key twice to finish.

Showing nearest waypoints by distance, TTG and ETA

1. Press the [MENU] key once or twice to open the menu.
2. Choose WAYPOINTS and then press the [ENT] key.
3. Choose NEAREST and then press the [ENT] key. The display should look something like the one shown below, listing waypoints in order of distance from own vessel, from closest to furthest.

```
■WPTS/MARKS  (NEAREST)■

KOBE  :  10.0 nm     344°
002   :  20.0 nm     337°
003   :  25.0 nm     357°
004   :  40.0 nm     143°
005   :  50.0 nm      90°
006   :  60.0 nm     200°
007   :  70.0 nm     320°
```

WPTS/MARKS list (NEAREST) by distance

4. To display ETA and TTG for each waypoint, press ►.

```
■WPTS/MARKS  (NEAREST)■

KOBE  :  1H00M     12:00
002   :  2H00M     13:00
003   :  2H30M     13:30
004   :  4H00M     15:00
005   :  5H30M     16:30
006   :  6H00M     17:00
007   :  7H00M     18:00
```

WPTS/MARKS (NEAREST) list by TTG to ETA

5. To return to the waypoint list by distance, press ◄.
6. Press the [MENU] key twice to close the menu.

3.5 Erasing Waypoints

1. Press the [MENU] key once or twice to display the menu.
2. Choose ERASE and then press the [ENT] key.

```
ERASE

WAYPOINTS/MARKS?
ROUTES?
TRACK?
RESET TRIP?         (6.40nm)
RESET ODO?          (6.40nm)
GPS DATA?
MENU SETTINGS?
ALL BACKUP DATA?
```

ERASE menu

3. The cursor is selecting "WAYPOINTS/MARKS?". Press the [ENT] key.

```
ERASE WPTS/MARKS

[ALL?]    CURSOR   KOBE
MOB       START    001
002       003      004
005       006      007
－－－－－ －－－－－ －－－－－
－－－－－ －－－－－ －－－－－
－－－－－ －－－－－ －－－－－
```

ERASE WPTS/MARKS display

4. Choose the waypoint you want to erase.

   Note: You cannot erase CURSOR, MOB or START. To erase all waypoints, choose ALL.

5. Press the [ENT] key. A screen showing position and other particulars of the waypoint selected appears.

```
NAME:  KOBE
 34°39.836'N        MARK
135°12.059'E          x
10-JAN-02           10:25D

TTG 02H00M  ETA: 12:25
Quit?              ERASE?
```

Waypoint data

6. Press ► to choose "ERASE?" and then press the [ENT] key.
7. Press the [MENU] key twice to finish.

17

3.6 Speed for Calculating Time-to-Go, Estimated Time of Arrival

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

1. Press the [MENU] key once or twice to open the menu.
2. Choose PLOTTER and then press the [ENT] key.
3. ChooseTTG/ETA and then press the [ENT] key.
4. Choose AUTO for automatic speed input (GPS calculated speed), or MAN for manual input.
5. Press the [ENT] key.
6. For automatic speed input, go to step 7. For manual speed input, press the [ENT] key, enter speed with the cursor pad and then press the [ENT] key.
7. Press the [MENU] key twice to finish.

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 Creating Routes

You can store up to 50 routes (numbered 01 to 50) and one LOG route, which is used to temporarily store a route. A route may be constructed four ways: by the cursor, by waypoints entered from the waypoint list, by waypoints entered from route menu, and by storing current position automatically or manually.

A route may contain 30 waypoints. When 30 waypoints have been saved, a message informs you that you can no longer save waypoints to the route. Press the [ENT] key to erase the message and save the route, under the name of the first and last waypoint numbers used in the route.

Note: Be sure to record all important routes in a separate log. This unit is not a fail-safe record keeping device.

WAYPOINT
(Intermediate point)

WAYPOINT
(Arrival point)

WAYPOINT
(Intermediate point)

WAYPOINT
(Starting point)

WAYPOINT
(Intermediate point)
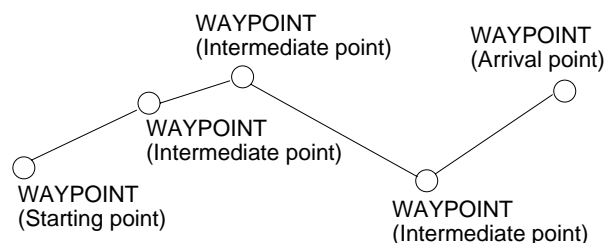
Sample route

Creating a route with the cursor

This is probably the easiest method by which to create a route.

1. Use the cursor pad to place the cursor on position desired. (Cursor position is shown at the bottom of the screen.)
2. Press the [ENT] key. The following window appears.

```
CURSOR  POS.   →  WPT
```

```
ENTER A NEW WPT NAME.
   0 0 1 _ _ _?
(001:DEFAULT NAME)

              QUIT: [MENU]
```

Waypoint name entry window

The cursor is on the second line of the display. This is where you may enter waypoint name. The number shown is the youngest empty waypoint number. If you want to register the waypoint under that number, and you do not need to change mark shape or enter a comment, press the [ENT] key to register the waypoint, and then go to step 5.

3. If desired, change the waypoint name. Press the [ENT] key.

```
NAME:  004
 34°39.836'N*        MARK
135°12.059'E*          x
10-JAN-02           10:25D

TTG 02H00M   ETA: 12:25
Exit?   LOG  RTE?
```

* Current position

Waypoint attribute edit window

4. If necessary, change waypoint, position, mark shape, and comment (date and time).

5. Choose "LOG RTE?" and then press the [ENT] key.

6. Repeat steps 1 through 5 to complete the route.

7. When you have entered all the waypoint positions desired, press the [MENU] key twice, choose ROUTES and then press the [ENT] key.

```
▬▬▬▬▬  ROUTES  ▬▬▬▬▬
VOYAGE ROUTE:        STOP
INTERVAL: TIME       00H10M
NO   [NEW?]
LOG  001→ 003
__  _____
__  _____
__  _____
```

ROUTES menu

8. "LOG" shows the first and last waypoints entered for the log route you are currently creating. Choose LOG and then press the [ENT] key.

```
EDIT?
MOVE?
```

Route processing options

9. "MOVE?" is selected; press the [ENT] key. The route is moved from "LOG" and is registered under the next sequential route number. (To edit the route before saving it, choose "EDIT?". For how to edit a route, see paragraph 4.2.)

Creating a route from the route menu

The procedure which follows describes how to create a route from two preregistered waypoints, KOBE and OSAKA.

1. Press the [MENU] key once or twice to display the menu.

2. Choose ROUTES.

3. Press the [ENT] key.

```
▬▬▬▬▬  ROUTES  ▬▬▬▬▬
VOYAGE ROUTE:        STOP
INTERVAL: TIME       00H1M
NO   [NEW?]
LOG EMPTY ROUTE
01   001 → 003
__  _____
__  _____
```

ROUTES list

4. "NEW?" is selected; press the [ENT] key. The screen shown below appears.

```
▬▬▬  ROUTE-01  ▬▬▬    Exit?
CMNT: EMPTY ROUTE
TOTAL DISTANCE        _ _ _ nm
 01. _____         _ _ _ nm _ _ _°
 02. _____         _ _ _ nm _ _ _°
 03. _____         _ _ _ nm _ _ _°
 04. _____         _ _ _ nm _ _ _°
 05. _____
```

Screen for entering route by waypoint

5. Choose location (01, etc.) and then press the [ENT] key. Use ▲ or ▼ to display waypoint name. (In the example, KOBE.)

6. Press the [ENT] key.

7. Repeat steps 5 and 6 until you have entered all waypoints desired.

Note: If you enter a waypoint which has not been registered, your screen will show a message which looks something like the one below. Press ◄ to choose YES and then press the [ENT] key to create a new waypoint; choose NO to return to the route entry screen.

```
NEW WPT NAME.
CREATE 008?

ARE YOU SURE?
YES      NO
```

New waypoint creation screen

When you choose YES, the following screen appears. Edit the waypoint as necessary, choose "Exit?" and then press the [ENT] key.

```
NAME:  008
34°39.836'N          MARK
135°12.059'E          x
10-JAN-02            11:25D
TTG 02H00M  ETA: 12:25
Exit?
```

Waypoint attribute edit window

8. "CMNT" shows the name of the route: the names of the first and last waypoints in the route. If you want to change the name, press ▲ to choose CMNT, press the [ENT] key, enter route name with the cursor pad and then press the [ENT] key.

9. Choose "Exit?" at the top of the screen.

10. Press the [ENT] key to register the route, under the next sequential route number. Then, the ROUTES list shows the name of the first and last waypoints used, next to route number.

```
▰▰▰▰ ROUTES ▰▰▰▰
VOYAGE ROUTE:      STOP
INTERVAL: TIME     00H10M
NO   [NEW?]
LOG  EMPTY ROUTE
01     001 → 003
02     KOBE → OSAKA
－ －  － － － － － － － － － － － － － －
```

ROUTES list

11. Press the [MENU] key twice to finish.

Creating a route from the waypoint list

1. Press the [MENU] key once or twice to display the menu.

2. Choose WAYPOINTS and then press the [ENT] key.

3. Choose LIST or NEAREST and then press the [ENT] key.

```
▰   WPTS/MARKS  (LIST) ▰

[NEW?]     001        002
003        CURSOR     MOB
START      － － － － － －   － － － － － －
－ － － － － －   － － － － － －   － － － － － －
－ － － － － －   － － － － － －   － － － － － －
－ － － － － －   － － － － － －   － － － － － －
－ － － － － －   － － － － － －   － － － － － －
```

WPTS/MARKS (list)

4. Choose a waypoint and then press the [ENT] key. Your screen should look something like the one below.

```
NAME:  001
 34°39.836'N          MARK
135°12.059'E          x
10-JAN-02            10:25D
TTG 02H00M  ETA: 12.25
Exit?   LOG  RTE?
```

Waypoint attribute edit window

5. Choose "LOG RTE?" and then press the [ENT] key.

6. Repeat steps 4 and 5 to complete the route.

7. Press the [MENU] key once.

8. Choose ROUTES and then press the [ENT] key. Your screen should now look something like the one shown below.

```
▰▰▰▰ ROUTES ▰▰▰▰
VOYAGE ROUTE:      STOP
INTERVAL: TIME     00H10M
NO   [NEW?]
LOG  004→ 006
01     001→ 003
02     KOBE → OSAKA
－ －  － － － － － － － － － － － － － －
```

ROUTES list

9. Choose LOG and then press the [ENT] key.

```
EDIT?
MOVE?
```

Route processing options

10. "MOVE?" is selected; press the [ENT] key. The route is moved from LOG and assigned the next sequential route number.

11. Press the [MENU] key twice to finish.

Creating a track-based route

There are two methods by which you can create a track-based route: manual input of track points using the [MARK/MOB] key and automatic input of track points from the ROUTES menu. A track-based route is useful for retracing your track.

Creating a track-based route manually

This method creates a route by storing position each time the [MARK/MOB] key is pressed.

1. Press the [MARK/MOB] key momentarily.

```
NAME: 001
  34°39.836'N        MARK
135°12.059'E           x
10-JAN-02          10:25D
TTG 02H00M  ETA: 12:30
Exit?   LOG  RTE?
```

Waypoint attribute edit window

2. Change name, comment and mark shape if desired. Choose "LOG RTE?" and then press the [ENT] key.
3. Repeat steps 1 and 2 when you change course.
4. When you have entered all the waypoint positions desired, press the [MENU] key twice, choose ROUTES and then press the [ENT] key.

```
■■■■■■ ROUTES ■■■■■■
VOYAGE ROUTE:      STOP
INTERVAL: TIME     00H10M
NO   [NEW?]
LOG  001→ 003
01   KOBE → OSAKA
__   _____
__   _____
```

ROUTES menu

5. Choose LOG and then press the [ENT] key.

```
EDIT?
MOVE?
```

Route processing options

6. "MOVE?" is selected; press the [ENT] key. The route is moved from "LOG" and is registered under the next sequential route number.
7. Press the [MENU] key twice to finish.

Creating a track-based route automatically

This method creates a route by automatically storing position at intervals of time or distance.

1. Press the [MENU] key once or twice to open the menu.
2. Choose ROUTES and then press the [ENT] key.
3. Choose INTERVAL and then press the [ENT] key.

```
TIME
DISTANCE
```

4. Choose TIME or DISTANCE (the method by which position will be stored) as appropriate and press the [ENT] key.
5. Press the [ENT] key. Use the cursor pad to set time or distance value and then press the [ENT] key.
6. Choose VOYAGE ROUTE and then press the [ENT] key.

```
START
STOP
```

Voyage start options

7. Choose START and then press the [ENT] key.

22

8. Press the [MENU] key twice to finish.

The current position is saved under the next sequential waypoint number, the display shows "***SAVED!" (*** = waypoint number) and a beep sounds. Thereafter waypoints are saved at the interval of time or distance set.

When 30 waypoints have been saved, a message informs you that you can no longer save waypoints to the route. Press the [ENT] key to erase the message. The route is automatically saved to "LOG" in the ROUTES menu, under the name of the first and last waypoint numbers used. Then, open the ROUTES menu and go to step 13.

You can manually stop saving waypoints and save the route by going to step 9.

9. After the desired number of waypoints have been entered, press the [MENU] key once or twice to open the menu.
10. Choose ROUTES and then press the [ENT] key.
11. Choose VOYAGE ROUTE and then press the [ENT] key.
12. Choose STOP and then press the [ENT] key.
13. Choose LOG and then press the [ENT] key.
14. "MOVE?" is selected; press the [ENT] key. The route is moved from "LOG" and is registered under the next sequential route number.
15. Press the [MENU] key twice to finish.

4.2 Editing Routes

Replacing waypoints in a route

1. Press the [MENU] key once or twice to display the menu.
2. Choose ROUTES and then press the [ENT] key.
3. Choose the route to edit.
4. Press the [ENT] key.

5. Place the cursor on the waypoint to replace.
6. Press the [ENT] key to show the route edit options.

```
CHANGE?
REMOVE?
INSERT?
SKIP?
Quit?
```

Route edit options

7. "CHANGE?" is selected; press the [ENT] key.

```
NAME: 001
  34°39.836'N          MARK
135°12.059'E             x
10-JAN-02            10:25D
TTG 02H00M  ETA: 12:25
Exit?
```

Waypoint attribute edit screen

8. NAME is selected. Press the [ENT] key. Use the cursor pad to enter waypoint name.
9. Press the [ENT] key.

Note: If the name entered at step 8 does not exist, the window shown below appears. Choose "CREATE?", "RENAME?" or "Quit?" as appropriate and then press the [ENT] key.

```
CREATE?
RENAME?
Quit?
```

Waypoint name options

10. Choose "Exit?."
11. Press the [ENT] key.
12. Press the [MENU] key twice to finish.

23

Permanently deleting a waypoint from a route

1. Press the [MENU] key once or twice to display the menu.
2. Choose ROUTES and then press the [ENT] key.
3. Choose the route desired.
4. Press the [ENT] key.
5. Choose the waypoint you want to delete.
6. Press the [ENT] key.
7. Choose "REMOVE?."
8. Press the [ENT] key.
9. Press the [MENU] key twice to finish.

Inserting a waypoint in a route

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

1. Press the [MENU] key once or twice to display the menu.
2. Choose ROUTES and then press the [ENT] key.
3. Choose the route desired.
4. Press the [ENT] key.
5. Choose the waypoint which will come after the waypoint to be inserted. In the illustration below, for example, if you want to insert the waypoint between KOBE and 001, choose 001.

```
████ ROUTE-01 ████      Exit?

CMNT: KOBE → OSAKA
 TOTAL DISTANCE    21.0nm
  01. KOBE
                  10.2nm 180°
  02.  001
                   9.8 nm   90°
  03.  OSAKA
  04. _ _ _ _ _ _
  05. _ _ _ _ _ _
```

Route contents (Route-01)

6. Press the [ENT] key.
7. Choose "INSERT?."
8. Press the [ENT] key.
9. Use the cursor pad to enter waypoint.
10. Press the [ENT] key.
11. Press the [MENU] key twice to finish.

Temporarily deselecting a waypoint in a route

You can temporarily deselect an unnecessary waypoint from a route. Using the route created in the illustration at the top of the next column as an example, deselect the 2nd intermediate waypoint.
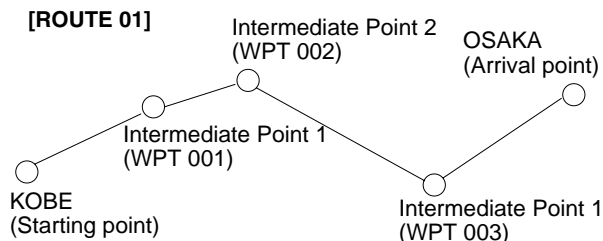
Sample route

If you reconstruct the route without the 2nd intermediate point it would look like the illustration below.
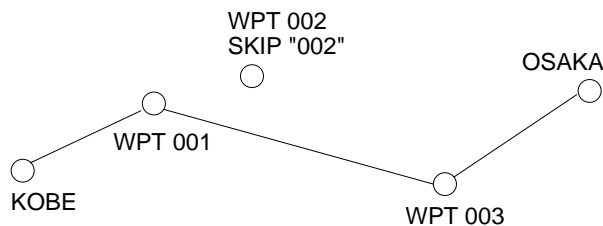
Reconstruction of sample route above without the 2nd intermediate waypoint

1. Press the [MENU] key once or twice to display the menu.
2. Choose ROUTES and then press the [ENT] key.
3. Choose route desired and then press the [ENT] key.
4. Place the cursor on the waypoint to skip.
5. Press the [ENT] key.
6. Choose "SKIP?" and then press the [ENT] key. "X" appears to the left of the waypoint skipped as shown in the illustration below.

```
████ ROUTE-01 ████      Exit?

CMNT: KOBE → OSAKA
 TOTAL DISTANCE    21.0nm
  01. KOBE
                        10.2nm 180°
Skipped — x 02.  001
waypoint              9.8 nm   90°
  03.  OSAKA
  04. _ _ _ _ _ _
  05. _ _ _ _ _ _
```

Route contents (Route-01)

7. Press the [MENU] key twice to finish.

To restore a waypoint to a route, choose "SKPoFF ?"at step 6 in this procedure, press the [ENT] key and then press the [MENU] key twice to finish.

Changing route comment (name)

You can change the comment (name) for a route as below. Up to 16 alphanumeric characters may be used.

1. Press the [MENU] key or twice to display the menu.
2. Choose ROUTES and then press the [ENT] key.
3. Choose route number and then press the [ENT] key.
4. Choose CMNT and then press the [ENT] key.
5. Enter comment with the cursor pad and then press the [ENT] key.
6. Press the [MENU] key twice to finish.

4.3 Erasing Routes

1. Press the [MENU] key or twice to display the menu.
2. Choose ERASE and then press the [ENT] key.
3. Choose "ROUTES?" and then press the [ENT] key.
4. Choose the route you want delete. If you want to delete all routes, choose "ALL?."
5. Press the [ENT] key. You are asked if you are sure to delete the route(s).

ERASE ROUTE 01 ?

ARE YOU SURE?
YES   NO
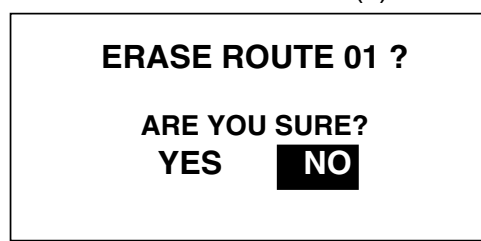
Erase route options

6. Choose YES and then press the [ENT] key.
7. Press the [MENU] key twice to finish.

25

4. ROUTES

(This page intentionally left blank.)

5. DESTINATION

Destination can be set four ways: by cursor, by waypoint, by route, and by MOB position. Previous destination is cancelled whenever a destination is newly set.

5.1 Setting Destination by Cursor

1. Press the [GOTO] key to display the GOTO options window.

```
████████ GOTO ████████
WPT-LIST?  _ _ _ _ _ _ ?
WPT-NEAR? OFF?
ROUTE?
CURSOR?    SETUP?
```

GOTO options

2. Choose "CURSOR?."
3. Press the [ENT] key. The plotter display appears, with "?" shown to the right of the cursor.

Cursor appears with "?".

```
2D
[ 40 $^n_m$ ]              +?
+GOTO?
BRG: +
  72°
RNG: +
  54.5$^n_m$
    34°44.000N  135°21.000E
```

*Cursor appearance
when setting destination by cursor*

4. Use the cursor pad to place the cursor on the location desired for destination.
5. Press the [ENT] key.

A dashed line connects own ship and the destination, which is marked with "CURSOR" and an "X," as shown in the illustration below.

Destination set by cursor
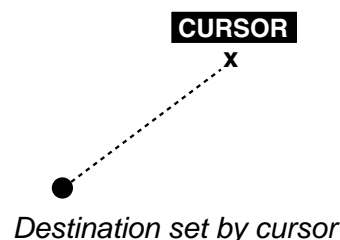
5.2 Setting Destination by Waypoint

1. Press the [GOTO] key.
2. Choose "WPT-LIST?" or "WPT-NEAR?".
3. Press the [ENT] key. The SELECT GOTO WPT list appears.

```
████ SELECT GOTO WPT ████

[NEW?]    001       002
003       004       005
006       007       008
CURSOR    KOBE      MOB
OSAKA     START     _ _ _ _ _ _
_ _ _ _ _ _  _ _ _ _ _ _  _ _ _ _ _ _
_ _ _ _ _ _  _ _ _ _ _ _  _ _ _ _ _ _
```

WPT-LIST

```
████ SELECT GOTO WPT ████

START     : 2.97 nm     68°
OSAKA     : 1.90 nm     335°
006       : 3.53 nm     15°
005       : 4.79 nm     11°
004       : 4.86 nm     15°
008       : 5.21 nm     345°
CURSOR    : 6.41 nm     356°
```

WPT-NEAR

SELECT GOTO WPT screens

4. Choose a waypoint.
5. Press the [ENT] key.

Own ship's position becomes the starting point and a dashed line runs between it and the waypoint selected, which is shown in reverse video.

5.3 Setting Route as Destination

1. Press the [GOTO] key.
2. Choose "ROUTE?".
3. Press the [ENT] key.

```
┌─────────────────────────────────┐
│ ▓▓▓ │ SELECT GOTO ROUTE │ ▓▓▓    │
│                                 │
│  NO   [NEW?]                    │
│  LOG  EMPTY ROUTE               │
│  01   017→021                   │
│  02   OSAKA→KOBE                │
│  03   EIMI→KIMI                 │
│  04   BOSTON                    │
│                                 │
└─────────────────────────────────┘
```

GOTO ROUTE list

4. Choose a route.
5. Press the [ENT] key. The following options window appears.

```
┌─────────────────┐
│ FORWARD?        │
│ REVERSE?        │
└─────────────────┘
```

Route following direction options

6. Choose "FORWARD?" or "REVERSE?", the order in which to traverse the route waypoints, and then press the [ENT] key.

[ROUTE 01]
Intermediate Point 2 (WPT 002)
OSAKA (Arrival point)
Intermediate Point 1 (WPT 001)
FORWARD
KOBE (Starting point)
REVERSE
Intermediate Point 1 (WPT 003)
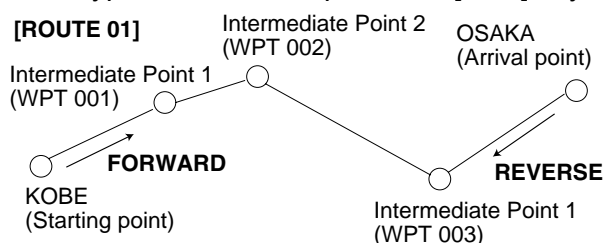
Meaning of forward and reverse

Current position becomes the starting point. A dashed line runs between the starting point and all route waypoints. Next destination waypoint is shown in reverse video.

The destination waypoint is automatically switched when the boat enters the arrival alarm range or the boat passes an imaginary perpendicular line passing through the center of the destination waypoint. For how to set the arrival alarm, see paragraph 6.1.

5.4 Setting User Waypoint as Destination

You may place a desired waypoint in the GOTO options window and use it to set destination.

Choosing user waypoint

1. Press the [GOTO] key.
2. Choose "SETUP?" and then press the [ENT] key.

```
┌─────────────────────────────────┐
│ ▓▓▓ │ SELECT USER WPT │ ▓▓▓      │
│                                 │
│  [NEW?]     001      002         │
│  003        004      005         │
│  006        007      008         │
│  CURSOR     KOBE     MOB          │
│  OSAKA      START    _ _ _ _ _ _  │
│  _ _ _ _ _ _  _ _ _ _ _ _  _ _ _ _ _ _ │
│  _ _ _ _ _ _  _ _ _ _ _ _  _ _ _ _ _ _ │
└─────────────────────────────────┘
```

SELECT USER WPT list

3. Choose waypoint desired and then press the [ENT] key. The GOTO window appears, showing the waypoint selected as below.

```
┌─────────────────────────┐
│ ▓▓▓ │ GOTO │ ▓▓▓         │
│ WPT-LIST?  001 ─────────── Location of
│ WPT-NEAR? OFF?            user waypoint
│ ROUTE?                    (Example: 001)
│ CURSOR?    SETUP?         │
└─────────────────────────┘
```

GOTO options

4. Choose user waypoint and then press the [ENT] key.

A dashed line connects own ship and the waypoint selected, which is shown in reverse video.

5.5 Canceling Destination

You can cancel destination as follows:

1. Press the [GOTO] key.
2. Choose "OFF?".
3. Press the [ENT] key.

6. ALARMS

There are eight alarm conditions which generate both audio and visual alarms: Arrival alarm, Anchor watch alarm, XTE (Cross-Track Error) alarm, Speed alarm, WAAS/DGPS 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.

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.

In some instances, multiple alarms may have been violated. You can see which alarm(s) is sounding by displaying the message board. The keying sequence is [MENU] (once or twice), MESSAGE, [ENT]. The message board is discussed in paragraph 8.2 "Displaying the Message Board."

To disable an alarm, choose OFF as its option, press the [ENT] key and then press the [MENU] key twice.
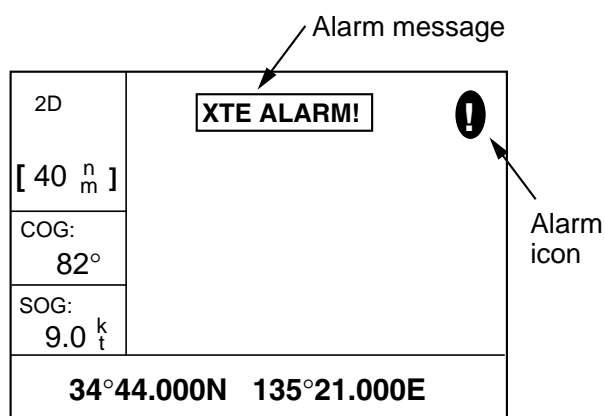
Location of alarm message and alarm icon

6.1 Arrival Alarm, Anchor Watch Alarm

You may activate the arrival alarm or the anchor watch alarm; they cannot be activated together.

Arrival alarm

The arrival alarm informs you that own ship 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 be released if own ship enters the circle.
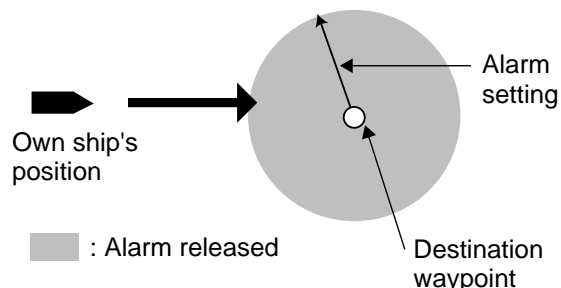
How the arrival alarm works

1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key to show the ALARMS menu.

ALARMS menu

4. Choose ARV/ANC and then press the [ENT] key.

Arrival/anchor watch options

5. Choose ARV and then press the [ENT] key.
6. Press the [ENT] key. Enter the alarm range (0.0-99.99 nm) with the cursor pad.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

When own ship nears the GOTO waypoint by the range set here, the buzzer sounds and the message ARV ALARM! appears.

Anchor watch alarm

The anchor watch alarm sounds to warn you that own ship is moving when it should be at rest.
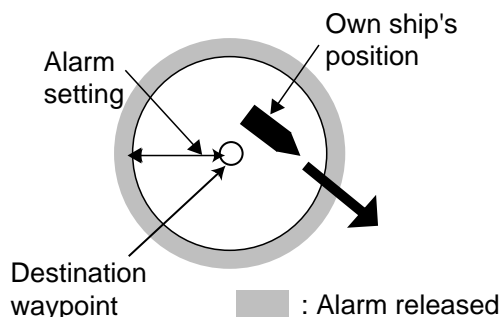
How the anchor watch alarm works

Before setting the anchor watch alarm, set current position as destination waypoint, referring to paragraph 5.2.

1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key.
4. Choose ARV/ANC and then press the [ENT] key.
5. Choose ANC and then press the [ENT] key.

6. Press the [ENT] key. Enter the alarm range (0.01-99.99 nm) with the cursor pad.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

When own ship drifts more than the range set here, the buzzer sounds and the message ANC ALARM! and the alarm icon appear.

6.2 XTE (Cross Track Error) Alarm

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

How the XTE alarm works

1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key.
4. Choose XTE and then press the [ENT] key.
5. Choose ON and then press the [ENT] key.
6. Press the [ENT] key. Enter alarm range (0.0-99.99 nm) with the cursor pad.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

When own ship strays from the intended track by the range set here, the buzzer sounds and message XTE ALARM! and the alarm icon appear.

6.3 Speed Alarm

The speed alarm provides visual and aural alerts when the ship's speed is higher (or lower) than the alarm range set.

1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key.
4. Choose SPEED and then press the [ENT] key.
5. Choose LOW or HIGH as appropriate and then press the [ENT] key.

   LOW: Alarm sounds when speed is lower than speed set.

   HIGH: Alarm sounds when speed is higher than speed set.
6. Press the [ENT] key. Enter speed (0.0-999.9 kt) with the cursor pad.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

When the speed alarm setting is violated, the buzzer sounds and the message SPD ALARM! and the alarm icon appear.

6.4 WAAS/DGPS Alarm

This alarm alerts you by aural and visual alarms when the WAAS/DGPS signal is lost. Note that ON cannot be selected if "MODE" in the WAAS/DGPS menu is set to GPS.

1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key.
4. Choose WAAS/DGPS and then press the [ENT] key.
5. Choose ON.
6. Press the [ENT] key.
7. Press the [MENU] key twice to finish.

When the DGPS/WAAS signal is lost, the buzzer sounds and a message (see table below) and the alarm icon appear. Further, the default position is shown.

WAAS/DGPS mode and alarm message

MODE on WAAS/DGPS menu	Alarm condition, alarm message
WAAS	Alarms released when receiver status changes from W2D or W3D to 2D or 3D. "WAAS ERROR!" and the alarm icon appear when this occurs.
INT BEACON, EXT BEACON	Alarms released when receiver status changes from D2D or D3D to 2D or 3D. "DGPS ERROR!" and the alarm icon appear when this occurs.
AUTO	Alarms released when receiver status changes from D2D, D3D, W2D or W3D to 2D or 3D. "WAAS/DGPS ERROR!" and the alarm icon appear when this occurs.

6.5 Time Alarm

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

1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key.
4. Choose TIME and then press the [ENT] key.
5. Choose ON and then press the [ENT] key.
6. Press the [ENT] key.
7. Enter time desired with the cursor pad.
8. Press the [ENT] key.
9. Press the [MENU] key twice to finish.

When the time entered has come, the buzzer sounds and the message TIME ALARM! and the alarm icon appear.

31

6.6 Trip Alarm

This alarm alerts you by aural and visual alarms when your boat has traveled a distance greater than the trip alarm distance.
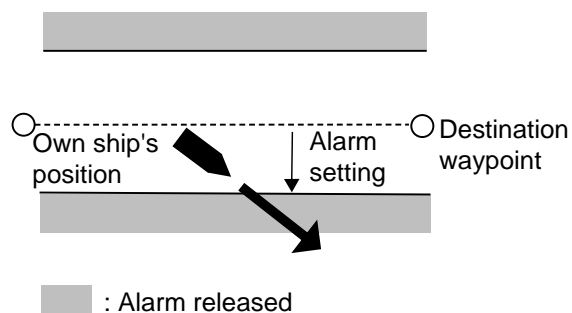
1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key.
4. Choose TRIP and then press the [ENT] key.
5. Choose ON and then press the [ENT] key.
6. Press the [ENT] key. Enter distance desired (001-999 nm) with the cursor pad.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

When the boat has traveled further than the preset trip distance, the buzzer sounds and the message TRIP ALARM! and the alarm icon appear.

6.7 Odometer Alarm

This alarm alerts you by aural and visual alarms when your boat has traveled the total distance you set.

1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key.
4. Choose ODOMETER and then press the [ENT] key.
5. Choose ON and then press the [ENT] key.
6. Press the [ENT] key. Enter distance desired (001-999 nm) with the cursor pad.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

When the boat has traveled further than the preset trip distance, the buzzer sounds and the message ODOMETER ALARM! and the alarm icon appear.

6.8 Buzzer Type Selection

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

1. Press the [MENU] key once or twice to open the menu.
2. Choose ALARMS.
3. Press the [ENT] key.
4. Choose BUZZER and then press the [ENT] key.

Buzzer sound options

5. Choose buzzer type desired and then press the [ENT] key.
   SHORT: Two short beeps
   LONG: Three long beeps
   CONSTANT: Continuous beeps
6. Press the [MENU] key twice to finish.

7. OTHER FUNCTIONS

7.1 Calculating Range, Bearing, TTG and ETA

Range and bearing between two waypoints

1. Press the [MENU] key once or twice to open the menu.
2. Choose CALCULATE and then press the [ENT] key.

```
████    CALCULATION    ████

MODE: WAYPOINTS
FROM: _ _ _ _ _ _
TO   : _ _ _ _ _ _
SPD  : AUTO

TTG: _ _H_ _M    ETA: _ _:_ _
RNG: _ . _ _ nm  BRG: _ _ _°
```

CALCULATION menu

3. The cursor is selecting MODE. Press the [ENT] key.

```
WAYPOINTS
ROUTE
```

Range and bearing calculation options

4. Choose WAYPOINTS and then press the [ENT] key.
5. Press the [ENT] key.
6. Enter the FROM waypoint and then press the [ENT] key.
7. Press the [ENT] key, enter the TO waypoint and then press the [ENT] key.
8. Press the [ENT] key to display the speed input options.

```
AUTO
MAN
```

Speed input options

9. Choose AUTO or MAN and then press the [ENT] key. AUTO uses ship's average speed; MAN is for manual entry of speed. For AUTO, see the illustration after step 10 for sample range and bearing calculation. For MAN, go to step 10.

10. Press the [ENT] key. Enter speed with the cursor pad and then press the [ENT] key.

The illustration below shows what the display might look like using waypoints KOBE and OSAKA as the FROM and TO waypoints, respectively.

```
┌─ Time-to-Go
│         Estimated Time of Arrival ─┐
│                                    │
████    CALCULATION    ████

MODE: WAYPOINTS
FROM: KOBE
TO   : OSAKA
SPD  : AUTO

►TTG: 1H39M    ETA: 5:57 ◄
 RNG: 9.06 nm  BRG: 80°

      Range      Bearing
```

Typical range and bearing calculation between two waypoints

11. Press the [MENU] key twice to finish.

Range, TTG and ETA between first and final waypoints of a route

You can easily find the range, TTG and ETA between the first and final waypoints of a route as follows:

1. Press the [MENU] key once or twice to open the menu.
2. Choose CALCULATE and then press the [ENT] key.
3. Press the [ENT] key.
4. Choose ROUTE and then press the [ENT] key.
5. Press the [ENT] key.
6. Choose route number from the route list with the cursor pad.
7. Press the [ENT] key to open the speed input options window.
8. Choose AUTO or MAN. AUTO uses ship's average speed; MAN is for manual entry of speed.

9. Press the [ENT] key. If you selected AUTO no further operation is necessary. See the illustration below for a calculation example. For MAN, press the [ENT] key, enter speed with the cursor pad and then press the [ENT] key.

   The illustration below shows what the display might look like using Route-01 as an example.

Time-to-Go
Estimated Time of Arrival

```
▓▓▓▓▓  CALCULATION  ▓▓▓▓▓

MODE :  ROUTE
NO.  :  01  (WPTS: 4)
        KOBE → OSAKA
SPD  :  AUTO

►TTG: 1H55M      ETA: 07:17◄
 RNG: 11.25 nm   BRG: _ _ _°
```
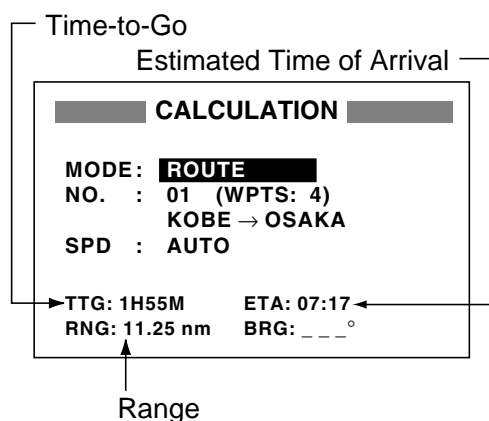
Range

Typical TTG, ETA, range calculation for route

10. Press the [MENU] key twice to finish.

7.2 WAAS Setup

1. Press the [MENU] key once or twice to open the menu.
2. Choose WAAS/DGPS and then press the [ENT] key.

```
▓▓▓▓  WAAS/DGPS SETUP  ▓▓▓▓

MODE            : AUTO
WAAS SEARCH: AUTO        120
CORRECTIONS DATA SET:    02
DGPS STATION: AUTO
RATE         :  200BPS
FREQ         :  310.0 kHz
STATION : GOOD  DATA: GOOD
SIG.S: 55.2 dB      SNR: 22.0dB
```

WAAS/DGPS SETUP menu

3. The cursor is selecting MODE; press the [ENT] key.

```
GPS ───────────── GPS position fixing
WAAS
INT BEACON ──┐
EXT BEACON ──┴── DGPS position fixing
AUTO
```
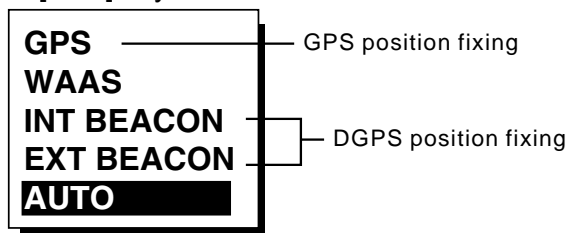
WAAS/DGPS mode options

4. Choose appropriate mode referring to the descriptions below. Press the [ENT] key.
   WAAS: Position fix by WAAS
   AUTO: Position fix in priority order of DGPS, WAAS, and GPS.
5. Press the [ENT] key.
6. WAAS SEARCH is selected; press the [ENT] key.

```
AUTO
MANUAL
```

WAAS search options

7. Choose AUTO for automatic search or MANUAL for manual search and then press the [ENT] key. For MANUAL, press the [ENT] key, enter appropriate WAAS satellite number, referring to the illustration below and then press the [ENT] key.

AUTO mode and GEO satellite (as of April 2002)

Provider	GEO Satellite	Longitude
WAAS	POR (134)	178°E
	AOR-W (122)	54°W
EGNOS	AOR-E (120)	15.5°W
	IOR (131)	64.5°E

```
118°W    34.75°W    24.5°E    121.25°E
  |2°       |2°        |2°        |2°
  122      120        131        134
  ▷◁       ▷◁         ▷◁         ▷◁
  AOR-W    AOR-E      IOR        POR
  54°W     15.5°W     64.5°W     178°E
```
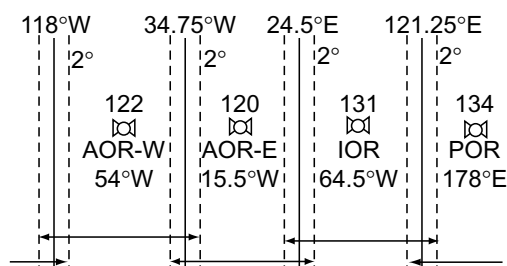
One-degree threshold

Longitude Range	Satellite
120.25°E to 117°W	134
119°W to 33.75°W	122
35.75°W to 25.5°E	120
23.5°E to 122.25°E	131

GEO satellite and coverage area

34

8. The cursor is now selecting CORRECTIONS DATA SET; press the [ENT] key.
CORRECTIONS DATA SET determines how to use the WAAS signal, currently in the test mode. Use the default setting (02) until the WAAS system becomes operational, then change the setting to "00".
9. Press the [ENT] key.
10. Press the [MENU] key twice to close the menu.

7.3 DGPS setup

1. Press the [MENU] key once or twice to open the menu.
2. Choose WAAS/DGPS.

```
    WAAS/DGPS SETUP
MODE          : GPS
WAAS SEARCH: AUTO        120
CORRECTIONS DATA SET:     02
DGPS STATION: AUTO
RATE          :  200BPS
FREQ          :  310.0 kHz
STATION : ---*  DATA: ---*
SIG.S: 00.0 dB *       SNR: 02.0dB*
```

* = See note below.

WAAS/DGPS SETUP menu

DGPS Data

STATION: Shows GOOD or NG.

DATA: Shows GOOD or NG.

SIG. S: Signal Strength. A figure between 0 and 99 is shown. The higher the figure the stronger the beacon signal.

SNR: Signal to Noise Ratio. A figure between 1and 22 is shown. A figure under 18 means position will be inaccurate. When your boat is in the service area of a beacon station, SNR should be 21 or 22. If not, the problem may lie with the grounding, radar interference or generator noise on own boat.

3. Press the [ENT] key to show the mode options window.
4. Choose one of the following and then press the [ENT] key.

INT BEACON: Position fix by internal DGPS beacon receiver (GP-37 only, cannot be selected on GP-32)
EXT BEACON: Position fix by external DGPS beacon receiver (GP-32)
AUTO: Position fix by DGPS, WAAS and GPS, in order of availability.

Note: When connecting FURUNO external DGPS beacon receiver GR-80 to the GP-32, turn the GR-80's remote function on to set up the beacon receiver with data set on the GP-32.

5. DGPS STATION is selected; press the [ENT] key.
6. Choose DGPS beacon station selection method: AUTO, MANUAL or LIST.
AUTO: Automatically searches for best of five nearest DGPS beacon station. It first searches DGPS beacon stations from closest to furthest. If unsuccessful it searches stations by signal strength. This procedure is repeated until a suitable station is found.
MANUAL: Manually enter DGPS beacon station specifications at RATE and FREQ, referring to a DGPS beacon station list.
LIST: Lists five of the closest DGPS beacon stations, including user-programmed stations.
7. Press the [ENT] key. If you selected AUTO no further operation is required; go to step 8. If you selected MANUAL or LIST, do one of the following and then go to step 8.

MANUAL

a) The cursor is selecting RATE. Press the [ENT] key.
b) Choose the transmission rate of the DGPS beacon station to be used, among 50, 100 or 200 bps. Press the [ENT] key.
c) The cursor is selecting FREQ. Press the [ENT] key.

35

d) Use the cursor pad to enter the transmission frequency of the DGPS beacon station to be used and then press the [ENT] key.

LIST

a) The following display appears after pressing the [ENT] key at step 6.

```
▄▄ ▄ STATION (NEAREST) ▄ ▄▄
[EXIT]    [USER]
310.0     29.1 nm       92°
287.0     56.7 nm      134°
292.0     160 nm       320°
321.0     234 nm       134°
302.0     426 nm       121° *
```

Tx frequency of beacon station

"*" denotes user channel.

Range (ref. only) and bearing from ship to beacon station

DGPS beacon station list

b) Use the cursor pad to choose station desired.

c) Press the [ENT] key.

8. Press the [MENU] key twice to finish.

Programming DGPS user channels (stations)

The user may program 20 DGPS beacon stations from which to use in DGPS beacon station selection. Whenever a new station is constructed you can add it to the list.

1. Press the [MENU] key twice to open the menu.
2. Choose DGPS/WAAS and then press the [ENT] key.
3. Choose DGPS STATION and then press the [ENT] key.
4. Choose LIST and then press the [ENT] key.
5. Choose USER and then press the [ENT] key.

```
▄▄ ▄ STATION (USER) ▄ ▄▄
[EXIT]      [NEW?]       [CLR?]
01 – – – – – – – – – – – – – – – –
02 – – – – – – – – – – – – – – – –
03 – – – – – – – – – – – – – – – –
04 – – – – – – – – – – – – – – – –
05 – – – – – – – – – – – – – – – –
06 – – – – – – – – – – – – – – – –
```

DGPS STATION (USER) list

6. Choose "NEW?" and then press the [ENT] key.

```
┌─────────────────────────────┐
│      NEW USER CHANNEL        │
└─────────────────────────────┘

▄▄ ▄ STATION (USER) ▄ ▄▄
FREQ  :     310.0kHz
RATE  :     200BPS
LAT   :      37°59'N
LON   :     123°00'W

EXIT?  SAVE?
```

NEW USER CHANNEL (DGPS) set up menu

7. Press the [ENT] key, enter frequency of the station, and then press the [ENT] key.
8. Press the [ENT] key, enter baud rate of the station, and then press the [ENT] key.
9. Press the [ENT] key, enter latitude of the station, and then press the [ENT] key.
10 Press the [ENT] key, enter longitude of the station, and then press the [ENT] key.
11. Choose "SAVE?" and then press the [ENT] key.
12. Press the [MENU] key twice to finish.

Editing DGPS user channels

1. Press the [MENU] key twice to open the menu.
2. Choose WAAS/DGPS and then press the [ENT] key.
3. Choose DGPS STATION and then press the [ENT] key.
4. Choose LIST and then press the [ENT] key.
5. Choose USER and then press the [ENT] key.

6. Choose a station from the list and then press the [ENT] key. The display looks something like the one below.

```
FREQ  :      310.0kHz
RATE  :      200BPS
LAT   :       37°59'N
LON   :      123°00'W

EXIT?  SAVE?  ERASE?
```

Screen for entering DGPS station data

7. Choose item, press the [ENT] key, edit data, and then press the [ENT] key.
8. Choose "SAVE?" and then press the [ENT] key.
9. Press the [MENU] key twice to finish.

Erasing all user channels

1. Press the [MENU] key twice to open the menu.
2. Choose DGPS/WAAS and then press the [ENT] key.
3. Choose DGPS STATION and then press the [ENT] key.
4. Choose LIST and then press the [ENT] key.
5. Choose USER and then press the [ENT] key.
6. Choose "CLR?" and then press the [ENT] key. The following message appears.

```
ERASE ALL ?

ARE YOU SURE ?
YES        NO
```

DGPS channel erase options

7. Press ◄ to choose YES and then press the [ENT] key.
8. Press the [MENU] key twice to finish.

Erasing individual user channels

1. Press the [MENU] key twice to open the menu.
2. Choose DGPS/WAAS and then press the [ENT] key.
3. Choose DGPS STATION and then press the [ENT] key.
4. Choose LIST and then press the [ENT] key.
5. Choose USER and then press the [ENT] key.
6. Choose a channel from the list and then press the [ENT] key.
7. Choose "ERASE?".
8. Choose YES and then press the [ENT] key.
9. Press the [MENU] key twice to finish.

7.4 Bearing Reference

Ship's course and bearing to a waypoint may be displayed in true or magnetic bearing. Magnetic bearing is true bearing plus (or minus) earth's magnetic deviation. Use the bearing reference in accordance with the compass interfaced: magnetic for magnetic compass, true for gyrocompass. The default setting displays magnetic bearings.

1. Press the [MENU] key once or twice to open the menu.
2. Choose PLOTTER.
3. Press the [ENT] key.
4. Choose BRG. REF.
5. Press the [ENT] key.

```
MAG
TRUE
```

Bearing reference options

6. Choose MAG or TRUE as appropriate.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

7.5 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. This difference is called magnetic variation, and varies with respect to the observation point on earth. Your unit is preprogrammed with all the earth's magnetic variation. However, you may wish to enter variation manually to refine accuracy. Set "BRG REF" on the PLOTTER is set to "MAG" to use magnetic variation.

1. Press the [MENU] key once or twice to open the menu.
2. Choose PLOTTER and then press the [ENT] key.
3. Choose MAG. VAR.
4. Press the [ENT] key.
5. Choose AUTO or MAN as appropriate and then press the [ENT] key. For automatic magnetic variation, current magnetic variation appears to the right of AUTO.
6. If you selected AUTO, no further operation is necessary; go to step 7. For MAN, press the [ENT] key and enter magnetic variation as follows:
   a) If necessary, change coordinate from east to west or vice versa by pressing ▲ or ▼.
   b) Press ► to shift cursor, use ▲ or ▼ to set value, referring to a nautical chart.
   c) Press the [ENT] key.
7. Press the [MENU] key twice to finish.

7.6 Geodetic Chart System

Your unit is preprogrammed 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. Choose the chart system used, not the area where your boat is sailing. The default chart system is WGS-84.

1. Press the [MENU] key once or twice to open the menu.
2. Choose SYS SETUP and then press the [ENT] key.

```
┌─────────────────────────────────┐
│  ████   SYSTEM SETUP   ████      │
│                                  │
│  LANGUAGE : ENGLISH              │
│  DATUM      : WGS84              │
│  UNITS      : nm, kt            │
│  TIME DIFF  : +00 : 00          │
│  TIME DISP  : 24HOUR            │
│  TEST?                           │
│  SIMULATOR?                      │
│  EXCHANGE BATTERY?               │
└─────────────────────────────────┘
```

SYSTEM SETUP menu

3. Choose DATUM and then press the [ENT] key.
4. Choose WGS84 (GPS standard), WGS72 or OTHER as appropriate and then press the [ENT] key.
5. If you selected WGS84 or WGS72, go to step 6. For OTHER, do the following:
   a) Press the [ENT] key.
   b) Use the cursor pad to enter chart number, referring to the geodetic chart list on page AP-3.
   c) Press the [ENT] key.
6. Press the [MENU] key twice to finish.

7.7 Units of Measurement

Distance/speed can be displayed in nautical miles/knots, kilometers/kilometers per hour, or statute miles/miles per hour.

1. Press the [MENU] key once or twice to open the menu.
2. Choose SYS SETUP and then press the [ENT] key.
3. Choose UNITS.
4. Press the [ENT] key.
5. Choose combination desired; nm, kt; km, km/h; sm, mph.
6. Press the [ENT] key.
7. Press the [MENU] key twice to finish.

7.8 Position Display Format

Position may shown in latitude and longitude or TDs (Loran C or Decca) as follows. Decca and Loran C chain data is preprogrammed.

1. Press the [MENU] key once or twice to open the menu.
2. Choose TD SETUP and then press the [ENT] key.

```
████████    TD SETUP    ████████

DISPLAY :   XX.XXX'
LORAN C :   7980: 23-43
 ΔTD1    :   +00 . 0
 ΔTD2    :   +00 . 0
DECCA    :   25: G-P
 ΔTD1    :   +00 . 0
 ΔTD2    :   +00 . 0
```

TD SETUP menu

3. The cursor is on the first line. Press the [ENT] key.

```
XX.XXX'
XX'XX.X"
LC TD
DE TD
```

Position display options

4. Choose desired 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
    DE TE: Decca TDs
5. Press the [ENT] key. If you selected a latitude and longitude format, go to step 7.
6. For Loran C or Decca, do one of the following and then go to step 7.

    For Loran C TD:

    a) The cursor is on LORAN C. Press the [ENT] key.

    b) Use the cursor pad to choose appropriate GRI code and secondary codes, referring to the Loran C chain list on page AP-4.

    c) Press the [ENT] key.

d) If necessary enter TD offsets at ΔTD1 and ΔTD2 to refine position accuracy.

For Decca TD:

a) Choose DECCA and then press the [ENT] key.

b) Use the cursor pad to choose appropriate Decca chain number and lane pair (R, Red, G, Green, P, Purple), referring to the Decca chain list on page AP-5.

c) Press the [ENT] key.

d) If necessary enter TD offsets at ΔTD1 and ΔTD2 to refine position accuracy.

7. Press the [MENU] key twice to finish.

7.9 Time Difference (using local time), Time Format

GPS uses UTC time. If you would rather use local time, enter the time difference (range: -13:30 to +13:30) between it and UTC time.

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

1. Press the [MENU] key once or twice to open the menu.
2. Choose SYS SETUP and then press the [ENT] key.
3. Press ▼ to choose TIME DIFF and then press the [ENT] key.
4. Press ▲ or ▼ to display "+" or "-" as appropriate.
5. Enter time difference with the cursor pad.
6. Press the [ENT] key.
7. The cursor is selecting TIME DISP. Press the [ENT] key.
8. Choose 12 HOUR or 24 HOUR as appropriate and then press the [ENT] key.
9. Press the [MENU] key twice to finish.

7.10 GPS Setup

The GPS SETUP menu smoothes position and course, averages speed, applies position offset, and deactivates unhealthy satellites.

1. Press the [MENU] key once or twice to open the menu.
2. Choose GPS SETUP and then press the [ENT] key.

```
▬▬▬▬  GPS SETUP  ▬▬▬▬

SMOOTH POS :  0SEC
SMOOTH S/C :   5SEC
AVR. SPEED :  60SEC
LAT  OFFSET :  0.000'N
LON OFFSET :  0.000'E
DISABLE  SV :  _ _ _ _ _ _
FIX MODE   :  2/3D
```
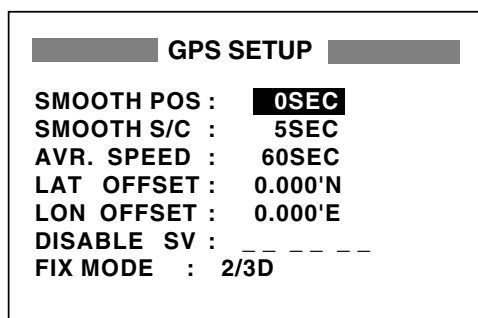
GPS SETUP menu

3. Choose item and then press the [ENT] key.
4. Change setting with the cursor pad and then press the [ENT] key.
5. Press the [MENU] key twice to finish.

GPS SETUP menu description

SMOOTH POS (Smoothing position)

When the DOP (Dilution of Precision, the index for position-fixing accuracy) or receiving condition is unfavorable, the GPS fix may change greatly, even if the vessel 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 ship's speeds. "0" is the normal setting; increase the setting if the GPS fix changes greatly.

SMOOTH S/C (Smoothing speed/course)

During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may changes 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.

AVR. SPEED (Speed averaging)

Calculation of ETA and TTG, etc. is based on average ship's speed over a given period. If the period is too long or too short, calculation error will result. Change this setting if calculation error occurs. The default setting is 60 seconds. The setting range is from 0 (no averaging) to 9999 seconds.

LAT/LON OFFSET (L/L position offset)

You may apply an offset to latitude and longitude position generated by the GPS receiver, to increase position accuracy.

DISABLE SV

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 number in two digits and then press the [ENT] key. To restore a satellite enter "00".

DISABLE GEO

Like GPS satellites, the GPS receiver automatically eliminates any malfunctioning WAAS satellite. To disable a WAAS satellite manually, enter three-digit satellite number with the cursor pad and then press the [ENT] key. To restore a satellite, enter "000".

FIX MODE

Chooses position fixing method; 2D or 2/3D. 2D requires three satellites in view of the GPS receiver; 2/3D requires three or four satellites in view of the GPS receiver, whichever is available. When the 2D mode is selected, enter the antenna height above the waterline, to obtain accurate position data. The default setting is 5 m.

7.11 User Display Setup

The user displays, which appear when the [DISP] key is pressed several times, provide user-customized digital data and a speedometer.

Digital data

The user may choose 1-4 items of navigation data to display on the digital display.

1. Press the [MENU] key once or twice to open the menu.
2. Choose USER DISP and then press the [ENT] key.

```
████████ USER DISPLAY ████████

1: DIGITAL                    ⊞
2: SPEEDOMETER
```
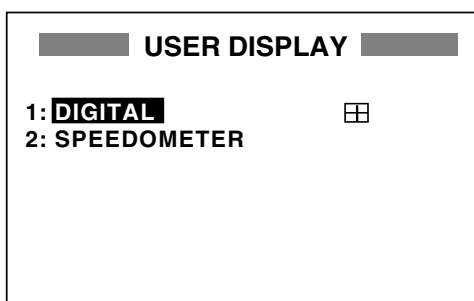
USER DISPLAY menu

3. Choose 1 or 2 and then press the [ENT] key.

```
OFF
DIGITAL
SPEEDOMETER
```

User display type options

4. Choose DIGITAL and then press the [ENT] key.
5. The cursor is selecting the square at the right side of the screen. Press the [ENT] key.

```
□        □ : 1 indication
▤        ▤ : 2 indications
▦        ▦ : 3 indications
▦        ▦ : 4 indications
```
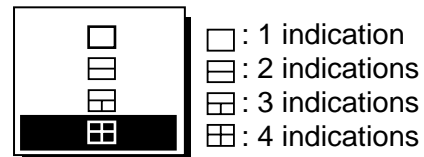
User display screen division options

6. Choose the screen division desired, that is, the number of data to display, and then press the [ENT] key. The display now looks something like the one shown below.

```
████████ USER DISPLAY ████████

A: POWER
B: TRIP            ┌─┬─┐
C: SOG             │A│C│ *
D: COG             ├─┼─┤
                   │B│D│
                   └─┴─┘
```
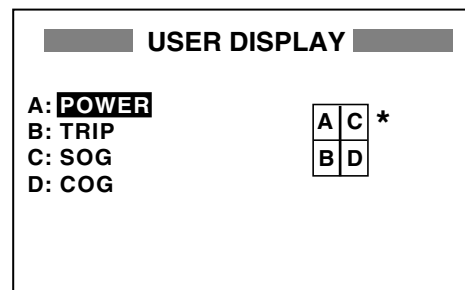
* = Changes according to selection at step 6.

```
┌───┐   ┌───┐   ┌───┐
│ A │   │ A │   │ A │
│   │   ├───┤   ├─┬─┤
└───┘   │ B │   │B│C│
        └───┘   └─┴─┘
```
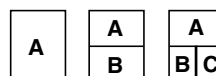
USER DISPLAY menu,
default digital display settings

7. "A" is selected. Press the [ENT] key.

```
NONE  ODO   TRIP
TIME  POSN  POWER
SOG   COG   WPT
XTE   TTG   ETA
```
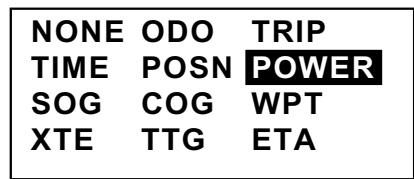
Digital data options

8. Use the cursor pad to choose data desired and then press the [ENT] key.
   NONE: No display
   ODO: Odometer distance
   TRIP: Trip distance
   TIME: Time and date
   POSN: Position
   POWER: Power source voltage
   SOG: Speed over ground
   COG: Course over ground
   WPT: Rng and brg to waypoint
   XTE: Cross-track error
   TTG: Time to go (to destination)
   ETA: Estimated time of arrival (at destination)
9. Control returns to the User display setup, with "B" selected. Depending on the selection made at step 5, set other indications similar to how you did with "A".
10. Press the [MENU] key twice to finish.

Speedometer display

1. Press the [MENU] key once or twice to open the menu.
2. Choose USER DISP and then press the [ENT] key.
3. Choose 1 or 2 and then press the [ENT] key.
4. Choose SPEEDOMETER and then press the [ENT] key.

```
┌──────────────────────────────────┐
│ ███████  SPEEDOMETER  ███████     │
│                                   │
│                                   │
│ START FROM: ▮+ 0                  │
│ INTERVAL   :  10                  │
│                                   │
│  ▮0    ▮10    ▮20    ▮30    ▮40   │
└──────────────────────────────────┘
     Start point   Interval
```
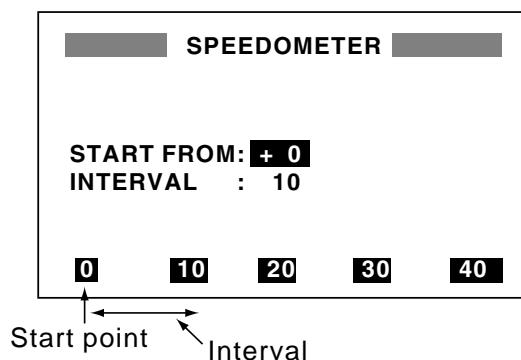
Speedometer menu

5. The cursor is selecting START FROM. Press the [ENT] key.
6. Enter starting speed: Use ◄ or ► to select location and ▲ or ▼ to enter value and switch from plus to minus and vice versa. The setting range is -99 to +99.
7. Press the [ENT] key, and the cursor shifts to INTERVAL.
8. Press the [ENT] key.

42

9. Enter scale interval: Use ◄ or ► to choose location and ▲ or ▼ to enter value. The setting range is 1 to 99.
10. Press the [ENT] key.
11. Press the [MENU] key twice to close the menu.

7.12 Resetting Trip and Odometer Distances

1. Press the [MENU] key once or twice to open the menu.
2. Choose ERASE and then press the [ENT] key.
3. Choose "RESET TRIP?" (or "RESET ODO?") and then press the [ENT] key. One of following displays appears.

```
┌──────────────────────────┐
│ RESET                    │
│   TRIP METER?            │
│     ARE YOU SURE?        │
│   YES      ▮NO▮          │
└──────────────────────────┘
```

```
┌──────────────────────────┐
│ RESET                    │
│   ODOMETER?             │
│     ARE YOU SURE?        │
│   YES      ▮NO▮          │
└──────────────────────────┘
```
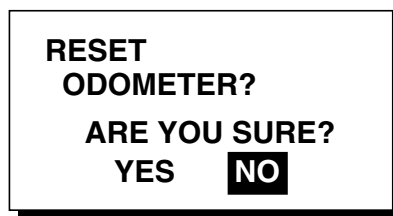
Reset trip meter, odometer options

4. Press ◄ to choose YES and then press the [ENT] key to reset distance to zero.
5. Press the [MENU] key twice to finish.

7.13 Uploading, Downloading Waypoint, Route Data

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

Wiring

Your equipment provides a wiring diagram which shows how to connect to a PC using a DSUB 9-pin connector (EIA-574). You may display it as follows.

1. Press the [MENU] key once or twice to open the menu.
2. Choose I/O SETUP and then press the [ENT] key.
3. Choose WIRING INFO and then press the [ENT] key to display the wiring diagram.

```
━━━━━━━━ WIRING INFO ━━━━━━━━
1 TD-H ──── WHITE        PC/AT  DSUB-9
2 TD-C/SG ──────── BLUE ──────── 5 GND
3 SD ──────── YELLOW ──────── 2 RXD
4 RD ──────── GREEN ──────── 3 TXD
5  + ──── RED ─┐            ┌── 4 DTR
6  - ── BLACK ┐│            └── 6 DSR
7 FG        - +            ┌── 7 RTS
                           └── 8 CTS

GP-32/37          12/24VDC
```
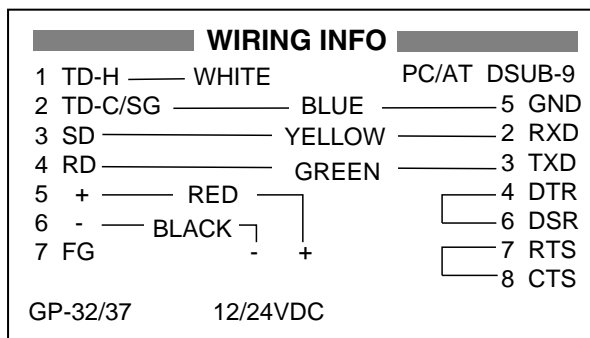
Wiring diagram, using DSUB 9-pin connector

Note: A DSUB 25-pin (EIA-232) may also be used to make the connection. In this case the wiring diagram is as follows.

```
1 TD-H ── WHITE
2 TD-C/SG ──────── BLUE ──────── 7 GND
3 SD ──────── YELLOW ──────── 3 RXD
4 RD ──────── GREEN ──────── 2 TXD
5  + ──── RED ─┐            ┌── 4 RTS
6  - ── BLACK ┐│            └── 5 CTS
7 FG        - +            ┌── 6 DSR
                           └── 20 DTR
```
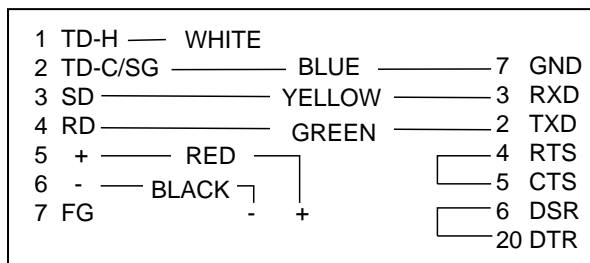
Wiring diagram, using DSUB 25-pin connector

Setting for communication software on PC

Baud Rate: 4800 bps
Character Length: 8 bit
Stop Bit: 1 bit
Parity: None
X Control: XON/OFF

Downloading/Uploading between PC and GP-37/GP-32

Waypoint data and route data can be downloaded/uploaded between a personal computer and the GP-37/GP-32.

Note 1: There are two kinds of data for route data: route data and route comment data.
Note 2: No position fix is available during uploading or downloading.

Downloading data to a PC

1. Press the [MENU] key once or twice to open the menu, choose I/O SETUP and then press the [ENT] key.

```
━━━━━━━━ I/O  SETUP ━━━━━━━━
DATA1     :  NMEA-REM1
DATA2     :  NMEA-REM
NMEA VER  :  VER2.0
SAVE WPT/RTE → PC?
LOAD WPT/RTE ← PC?
LOAD WPT← YEOMAN?
WIRING INFO?
```
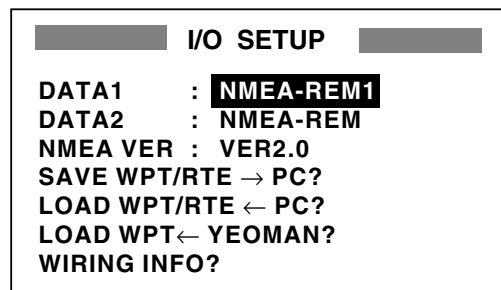
I/O SETUP menu

2. Choose SAVE WPT/RTE → PC?.
3. Press the [ENT] key.

```
━━━━━ SAVE WPT/RTE ━━━━━

  ALL WPTS/ROUTES
  WILL BE SAVED TO PC.

  SET PC PORT TO 4800
  8 BIT, P-N, S1, XON/OFF.

       CONTINUE?
```
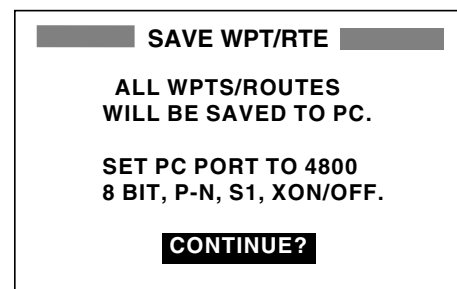
SAVE WP/RTE display

4. Press the [ENT] key.

```
┌──────────────────────────┐
│     SAVING START?        │
│     (PC READY?)          │
│                          │
│     ARE YOU SURE?        │
│     YES   ██NO██         │
└──────────────────────────┘
```

SAVING START? prompt

5. Set up the computer to receive data.
6. Press ◄ to choose YES and then press the [ENT] key to download.

```
┌─────────────────────┐
│  WPTS & ROUTES      │
│    SAVING ...       │
│                     │
│    ██CANCEL?██      │
└─────────────────────┘
```
Data is being saved. To cancel, press the [ENT] key.

↓

```
┌─────────────────────┐
│     SAVING          │
│   COMPLETED         │
│                     │
│    HIT ANY KEY.     │
└─────────────────────┘
```
Saving is completed. Hit any key to escape.

Downloading sequence

7. Press any key to escape.

Uploading data from a PC

Note that all waypoint and route data stored in the GP-37/GP-32 will be deleted when data is uploaded.

1. Press the [MENU] key once or twice to open the menu, choose I/O SETUP and then press the [ENT] key.
2. Choose LOAD WPT/RTE ← PC?.
3. Press the [ENT] key.

```
┌────────────────────────────┐
│ ████  LOAD WPT/RTE  ████   │
│                            │
│  LOADING ERASES CUR-       │
│  RENT WPT/RTE DATA.        │
│                            │
│  SET PC PORT TO 4800       │
│  8 BIT, P-N, S1, XON/OFF.  │
│                            │
│     ██CONTINUE?██          │
└────────────────────────────┘
```

LOAD WP/RTE display

4. Press the [ENT] key.

```
┌──────────────────────────┐
│    LOADING START?        │
│    (PC READY?)           │
│                          │
│    ARE YOU SURE?         │
│    YES   ██NO██          │
└──────────────────────────┘
```

LOADING START? prompt

5. Set up the computer to output data.
6. Press ◄ to choose YES and then press the [ENT] key to upload.

   Note: The waypoint and route data are deleted when the [ENT] key is pressed.

```
┌─────────────────────┐
│  WPTS & ROUTES      │
│   LOADING....       │
│                     │
│   ██CANCEL?██       │
└─────────────────────┘
```
Now loading data

To cancel, press [ENT] key.

Message when data is being loaded

7. When the loading is completed, the following message appears.

```
┌─────────────────────┐
│     LOADING         │
│   COMPLETED.        │
│                     │
│    HIT ANY KEY.     │
└─────────────────────┘
```

Message when data is loaded successfully

8. Press any key to escape.

Loading data from a YEOMAN

Waypoint data from a YEOMAN has the same format as does the NMEA 0183 data sentence WPL.

1. Press the [MENU] key twice, choose I/O SETUP and then press the [ENT] key.
2. Choose LOAD WPT ← YEOMAN?.
3. Press the [ENT] key.

```
┌────────────────────────────┐
│ ████  LOAD YEOMAN WPT ████ │
│                            │
│  LOADING YEOMAN WPT        │
│  DATA.                     │
│                            │
│                            │
│                            │
│     ██CONTINUE?██          │
└────────────────────────────┘
```

LOAD YEOMAN WP display

4. Press the [ENT] key.

```
┌─────────────────────────────┐
│   LOADING START?            │
│   (YEOMAN READY?)           │
│                             │
│     ARE YOU SURE?           │
│     YES   NO                │
└─────────────────────────────┘
```

LOADING START? prompt

5. Set up the YEOMAN to output data.
6. Press ◄ to choose YES and then press the [ENT] key to load data.

```
┌──────────────────┐
│  WAYPOINTS       │   Now loading
│  LOADING....     │   data
│                  │
│    END?          │   To quit loading,
│                  │   press the [ENT] key.
└──────────────────┘
```

Message when waypoints are being loaded

7. Data is loaded to empty location and the buzzer sounds twice to signify successful loading. If there is not enough memory free to store the waypoints, the message below appears.

```
┌──────────────────────┐
│  WAYPOINTS FULL      │
│  FULLNOT LOADING     │
│                      │
│      HIT ANY KEY.    │
└──────────────────────┘
```

*Message when waypoints
could not be loaded*

Waypoint data format

```
$PFEC, GPwpl, llll.lll,  a, yyyyy.yyy,  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
```

Waypoint data format

1: Waypoint latitude
2: N/S
3: Waypoint longitude
4: E/W
5: Waypoint name (Number of characters is fixed to 6 and space code is placed when the number of characters are less than 6.)
6: Waypoint color (This field is always kept NULL.)

7: Waypoint comment (2 byte for mark code + 16 characters of comment.)
1st byte of mark code: Fixed to '@'.
2nd byte of mark code: Internal mark code + 'a' (0 x 61). See Note 1 on the next page.
Number of characters for comment is less than 16 (variable length). See Note 2 on the next page.
8: Flag making waypoint. Always set to "A".
"A": Displayed
"V": Not displayed
9: UTC (Always NULL)
10: Day (Always NULL)
11: Month (Always NULL)
12: Year   (Always NULL)

Note 1: Internal mark code is 0 x 10 through 0 x 18. 0 x 71 through 0 x 79 are always placed at 2nd byte of mark code.

Note 2: Following characters can be used for comments:

```
┌─────────────────────────────────────────────────┐
│ _ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789&()+-/=?}   │
│                                                 │
│ 0x10: □ (q)  0x11: ✕ (r)  0x12: ╲ (s)  0x13: ⌇ (t)  0x14: ◼ (u) │
│                                                 │
│ 0x15: ＋ (v)  0x16: ⊢ (w)  0x17: ◣ (x)  0x18: ✦ (y) │
└─────────────────────────────────────────────────┘
```

Characters available for comments

Route data format

```
┌──────────────────────────────────────────────────────┐
│ $GPRTE, x, x, a, cc, c----c, c----c, ..., c----c <CR><LF> │
│         1  2  3   4     5       6             12       │
└──────────────────────────────────────────────────────┘
```

Route data format

1: Number of sentences required for one complete route data (1 to 4). See Note.
2: Number of sentences currently used (1 to 4)
3: Message mode (Always set to C).
4: Route No. (01 to 51 (51 is LOG route, 2 digits required)
5 through **12**: Waypoint name (Max. 8 names, length of each waypoint name is fixed to 7 byte)

45

1st byte: Skip code '-' (Hyphen) = Skip ON, Space code = Skip OFF

After 2nd byte: Waypoint name (fixed to 6 bytes)

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, <u>xx</u>, <u>c----c</u> <CR><LF>
              1   **2**

Route comment data format

1: Route No. (01 to 51, 2 digits required)
2: Route comment (Max. 16 characters, variable length)
The same characters of the comment for waypoint comment can be used.

End of sentence

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

End of sentence format

7.14 Language

English and other languages are available.

1. Press the [MENU] key.
2. Choose SYS SETUP and then press the [ENT] key.
3. The cursor is selecting LANGUAGE. Press the [ENT] key.

ENGLISH	**ESPANOL**
FRANCAIS	**ITALIANO**
PORTUGUES	**DEUTSCH**
NEDERLANDS	**JAPANESE**
TIENG VIET	

Language options

4. Choose language desired and then press the [ENT] key.
5. Press the [MENU] key once to return to the main menu.
6. Clear all backup data as shown in paragraph 8.7.

8. MAINTENANCE & TROUBLESHOOTING
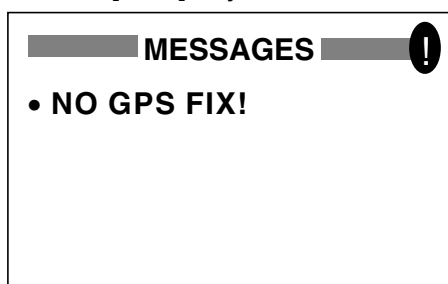
8.1 Maintenance

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

- Check the antenna for damage. Replace if damaged.

- Dust and dirt on the keyboard and display screen may be removed with a soft cloth. Do not use chemical cleaners to clean the equipment; they may remove paint and markings. Use special care when cleaning the LCD – it is easily scratched.

8.2 Displaying the Message Board

The message board displays error messages and alerts. You can display it as follows:

1. Press the [MENU] key once or twice to open the menu.
2. Choose MESSAGES.
3. Press the [ENT] key.

```
┌─────────────────────────────┐
│ ▬▬▬▬▬ MESSAGES ▬▬▬▬  ❗ │
│                             │
│ ● NO GPS FIX!               │
│                             │
│                             │
│                             │
│                             │
└─────────────────────────────┘
```

MESSAGE board

4. Press the [MENU] key twice to quit the message board.

Messages

Messages and their meanings

| Message	Meaning, Remedy
ANCHOR WATCH!	Anchor watch alarm violated.
ARRIVAL ALARM!	Arrival alarm violated.
BACKUP ERROR DATA/	RAM data corrupted. Try to clear backup data. See para. 8.4.
BATTERY ALARM!	Voltage of battery in display unit is low. Request replacement.
NO DGPS SIGNAL!	WAAS/DGPS alarm violated. *1
GPS NO FIX!	No GPS signal. Check antenna cable.
HIGH VOLTAGE!	Power source voltage too high.
LOW VOLTAGE!	Power source voltage too low.
ODOMETER ALARM!	Odometer distance alarm violated.
RAM ERROR!	Request service.
ROM ERROR!	Request service.
RTC ERROR!	Request service.
SPEED ALARM!	Speed alarm violated.
TIME ALARM!	Time alarm violated.
TRIP ALARM!	Trip distance alarm violated.
NO WAAS SIGNAL!	WAAS/DGPS alarm violated. *2
NO WAAS/DGPS SIGNAL!	WAAS/DGPS alarm violated. *3
XTE ALARM!	XTE alarm violated.

*1 = WAAS/DGPS mode: INT/EXT BEACON
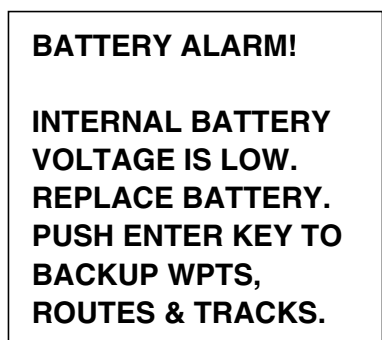
*2 = WAAS/DGPS mode: WAAS

*3 = WAAS/DGPS mode: AUTO

8.3 Replacing the Fuse

The fuses (1A) in the power cable (+/- lines) protects the equipment from overcurrent, reverse polarity of the power source and equipment fault. If the fuse blows, find the cause before replacing the fuse. If the fuse blows again after replacement, request service.

⚠ WARNING

Use the proper fuse.

Use of a wrong fuse can result in damage to the equipment.
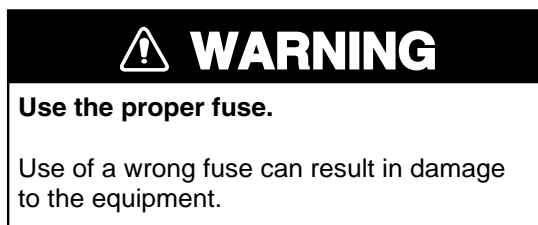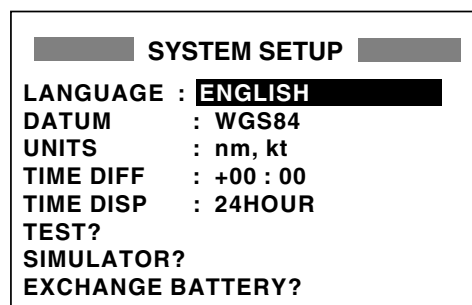

8.4 Replacing the Battery

A lithium battery (type: CR2354-1F2, code no.: 000-142-305) on the circuit board inside the display unit preserves data when the power is turned off. The life of the battery is 3-5 years. When its voltage is low, the message shown below appears and data is transferred from the RAM to the flash memory.

BATTERY ALARM!

INTERNAL BATTERY VOLTAGE IS LOW. REPLACE BATTERY. PUSH ENTER KEY TO BACKUP WPTS, ROUTES & TRACKS.

Low battery voltage warning

When this message appears, all open windows are closed, no alarm will be generated and no key input other than the [ENT] key is accepted. Press the [ENT] key to back up data and then turn off the power. Contact your dealer to request replacement of the battery. Below is the procedure for replacing the battery.

1. Turn on the power and then press the [MENU] key once or twice to open the menu.
2. Choose SYS SETUP and then press the [ENT] key.

```
┌─────────────────────────────────┐
│  �  SYSTEM SETUP  ▰▰▰▰     │
│  LANGUAGE : ENGLISH              │
│  DATUM     : WGS84               │
│  UNITS     : nm, kt              │
│  TIME DIFF : +00 : 00            │
│  TIME DISP : 24HOUR              │
│  TEST?                           │
│  SIMULATOR?                      │
│  EXCHANGE BATTERY?               │
└─────────────────────────────────┘
```

SYSTEM SETUP menu

3. Choose "EXCHANGE BATTERY?" and then press the [ENT] key. The display shows the following message.

```
┌────────────────────────┐
│ EXCHANGE               │
│ BATTERY?               │
│      ARE YOU SURE?     │
│  YES      NO           │
└────────────────────────┘
```
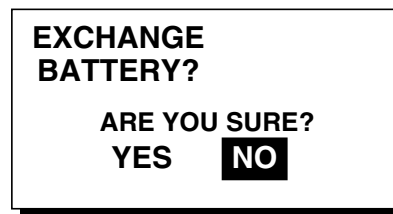
Exchange battery prompt

4. Press ◄ to choose YES and then press the [ENT] key. The following display appears.

```
┌────────────────────────┐
│ READY FOR              │
│ BATTERY CHANGE.        │
│ PRESS ANY KEY          │
│     TO SHUT DOWN.      │
└────────────────────────┘
```
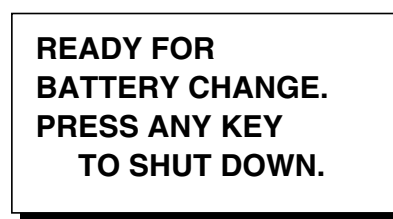
Battery exchange confirmation window

5. Press any key to automatically turn off the unit.
6. Replace the battery.

Note 1: When it is expected that the equipment will not be used for a long time, execute the above procedure before turning the power off, to prevent loss of data.

Note 2: Data is copied from the flash memory to the RAM at the next power up.

8.5 Satellite Monitor Display

The satellite monitor display shows information about GPS and GEO satellites.

1. Press the [MENU] key once or twice to open the menu.
2. Choose SATELLITE.
3. Press the [ENT] key.
    Number, bearing and elevation angle of all GPS and GEO satellites (if applicable) in view of your receiver appear. Satellites being used in fixing position are displayed in reverse video; satellites not being used are shown in normal video.

Satellite monitor display

4. Press the [MENU] key twice to quit the SATELLITE display.

8.6 Diagnostics

The diagnostic test checks ROM, RAM, data port, beacon receiver, battery, RTC, keyboard and LCD for proper operation.

1. Press the [MENU] key once or twice to open the menu.
2. Choose SYS SETUP and then press the [ENT] key.
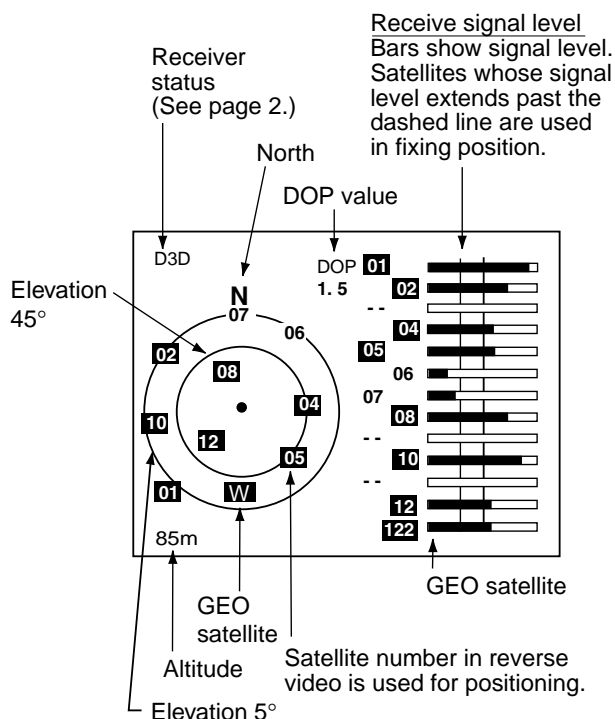3. Choose "TEST?" and then press the [ENT] key. You are asked if you are ready to start the test.

```
TEST START ?
(STOP: PWR OFF)

ARE YOU SURE ?
YES      NO
```
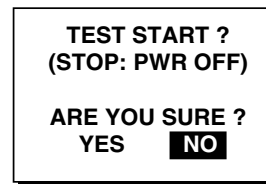
TEST START? prompt

4. Press ◄ to choose YES and then press the [ENT] key to start the test.
5. The equipment tests ROM, RAM, data port, beacon receiver, internal battery and RTC. The results are individually displayed as OK or NG (No Good).

```
              TEST

ROM     : OK
RAM     : OK
DATA2   : - - (STOP: PWR OFF)
BEACON  : OK   085-0182-0XX
BATTERY : OK
RTC     : OK   205-1412-0XX
   CNT: 001       205-1411-0XX
```

XX = Program version no.

TEST results (GP-37)

Note 1: BEACON test result shown as NONE when no beacon receiver is connected to the GP-32.

Note 2: DATA2 requires a special connector to check. "- -" appears as the result when no connector is connected.

Note 3: No program number shown for BEACON in case of the GP-32.

Note 4: CNT shows the number of times the test has been executed consecutively.

6. After the equipment has displayed the test results, a beep sounds and the message PUSH KEY appears at the top right-hand corner.

7. Press each key one by one. The name of the key pressed momentarily appears at the top right-hand corner if the key is functioning properly.

   Note: If no key is pressed within approx. five seconds, the equipment automatically proceeds to step 8.

8. The equipment displays the following message to inform you that it is now going to check the LCD:

```
   <LCD CHECK>

   ALL ON 2 SEC.
   ALL OFF 3 SEC.
```

LCD check

9. The LCD is checked, and then the test is repeated. To stop the test, turn off the power.

8.7 Clearing Data

You may clear GPS data, menu settings and all backup data to start afresh.

1. Press the [MENU] key once or twice to open the menu.
2. Choose ERASE and then press the [ENT] key.
3. Choose GPS DATA, MENU SETTINGS, or ALL BACKUP DATA as appropriate and then press the [ENT] key. One of the following messages appears.

```
   ERASE GPS DATA?


   ARE YOU SURE?
   YES      NO
```

GPS DATA

```
   MENU SETTINGS
      TO DEFAULT?

   ARE YOU SURE?
   YES      NO
```

MENU SETTINGS

```
   ERASE ALL BACKUP
   DATA? (DEFAULT)

   ARE YOU SURE?
   YES      NO
```

BACKUP DATA

Prompt for erasure of GPS data, menu settings, backup data

4. Press ◄ to choose YES and then press the [ENT] key. The following display appears.

```
   RESTART FOR
   ERASING DATA.

   PUSH ANY KEY.
```

Prompt for restarting

5. Hit any key to erase item selected. A beep sounds while the selected item is being erased.

Note 1: If you were using the simulation mode when data is cleared, the message "Start Simulation – Are You Sure? appears. Choose YES and press the [ENT] key to start the simulation mode, or press the [ENT] key to start normal operation

Note 2: When the memory is cleared the default position is restored as below.

Language and default position, unit and time difference

Language	Default Position	Unit	Time Difference
English	38°N, 123°W	nm, kt	0:00
German	54°N, 10°E	nm, kt	0:00
French	44°51E, 0°40W	km, km/h	0:00
Spanish	40°26E, 3°40W	nm, kt	+2:00
Italian	42°N, 12°E	nm, kt	+1:00
Portuguese	22°44S, 43°10W	nm, kt	-3:00
Dutch	38°N, 123°W	nm, kt	0:00
Vietnamese	12°15N, 109°13E	nm, kt	+7:00
Japanese	34°44N, 135°21E	nm, kt	+9:00

8. MAINTENANCE & TROUBLESHOOTING

(This page intentionally left blank.)

9. INSTALLATION

9.1 Installation of Display Unit

Mounting considerations

The display unit can be installed on a desktop, on the overhead, or in a panel (optional flush mounting kit required). Refer to the outline drawings at the end of this manual for installation instructions. When choosing 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 noted on page ii to prevent interference to a magnetic compass.

Desktop and overhead mounting
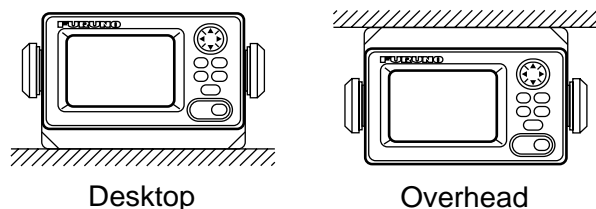
Desktop   Overhead

Desktop and overhead mounting methods

Flush mounting

There are two types of flush mounting kits. For details, see the outline drawings at the end of this manual.

Flush mount F kit

Flush mount F kit
Type: OP20-29   Code No. 000-041-405

Name	Type	Code No.	Qty
Cosmetic panel	20-016-1051	100-251-370	1
Tapping screw	5X20 SUS304	000-802-840	4
Hexagon-head bolt	M6X12 SUS304	000-862-127	2
Spring washer	M6 SUS304	000-864-260	2

1. Using the template (supplied), cut out a hole 92(H)X183(W) in the mounting location.
2. Fasten the cosmetic panel to the display unit with hexagon-head bolts and spring washers.
3. Set the display unit to the mounting location and fix it with tapping screws.

Flush mount S kit

Flush mount S kit
Type: OP20-17   Code No. 000-040-720

Name	Type	Code No.	Qty
Flush mount fixture	20-007-2401	100-183-190	2
Hexagon-head bolt	M6X12 SUS304	000-862-127	2
Wing bolt	M4X30 YBSC2 MBN12	000-804-799	4
Wing nut	M4 YBSC2 MBN12	000-863-306	4
Spring washer	M6 SUS304	000-864-260	2

1. Using the template (supplied), cut out a hole (92(H)X167(W)) in the mounting location.
2. Fix the two flush mount fixtures to the display unit with hexagon-head bolts and spring washers.
3. Screw in wing nut in wing bolt.
4. Set the display unit to the mounting location and fix it with wing bolts and wing nuts from the rear side.

9.2 Installation of Antenna Unit

Mounting considerations

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

- Do not shorten the antenna cable.

- The antenna unit can be installed three ways: screwed into a pipe (local supply), fixed to a post with the optional mast mounting kit, or screwed into an optional mounting base. For fixing by post or pipe, it is recommended to use stays to secure the post or pipe to prevent damage to the GPS receiver by vibration.

- Choose 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. Objects within line-of-sight to a satellite, for example, a mast, may block reception or prolong acquisition time.

- Mount the antenna unit as high as possible to keep it free of interfering objects and water spray, which can interrupt reception of GPS satellite signal if the water freezes.

- See the outline drawing for the antenna unit at the back of this manual for minimum separation distances from other antennas.

- If the antenna cable is to be passed through a hole which is not large enough to pass the connector, you may 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.
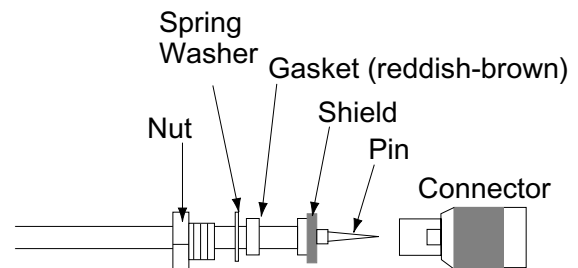
How to assemble the connector

54

9.3 Wiring

The illustration below shows where to connect cables on the rear of the display unit. Please review the INSTALLATION GUIDELINES at the front of this manual before wiring the equipment.

ANTENNA UNIT
GPA-017
(For GP-32)

ANTENNA UNIT
GPA-019
(For GP-37)

OR

DISPLAY UNIT
GP-32 OR GP-37

With 10 m cable

MJ-A7SPF0009-020, 2 m

Ground

Black ⊖   * ⊕ Red

POWER
(12-24 VDC)

1A Fuse
(+/- line)

* = Cut unused cores
and tape individually.
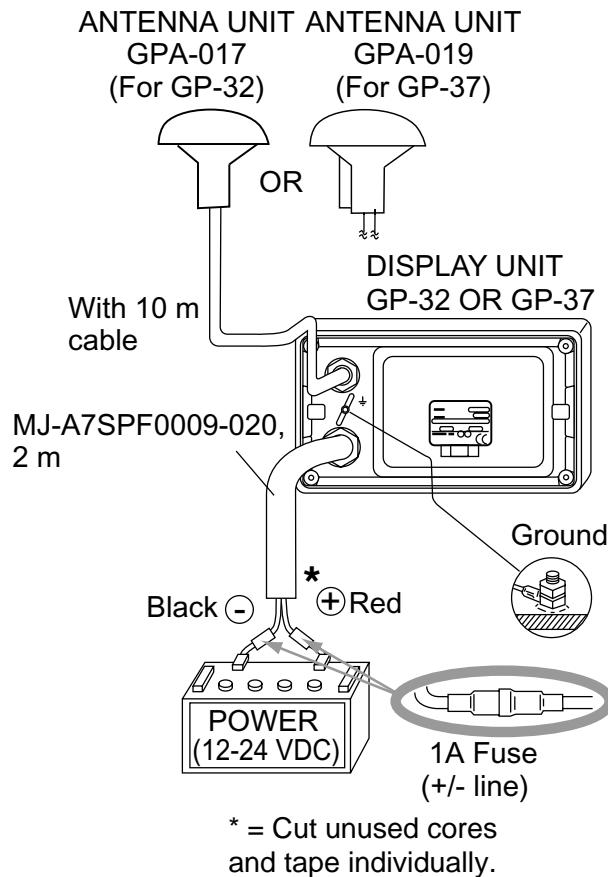
Wiring

Note: The fuse holder contains a spring that fixes the fuse. To prevent detachment of the spring, which would cause loss of power, tie the line as shown below.

Fuse Holder

+ Line (Red)
- Line (Black)

Fix here.
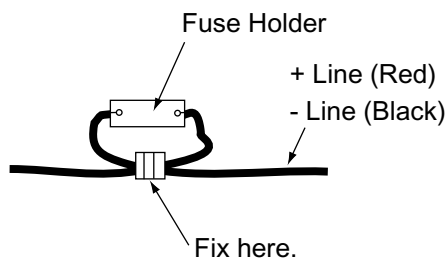
How to fix spring in fuse holder

Grounding

The display unit contains a CPU. While it is operating, it radiates noise, which can interfere with radio equipment. Ground the unit as follows to prevent interference:

● The ground wire for the display unit should be 1.25sq or larger and as short as possible.

● The signal ground and frame ground are separated, however the power line is not isolated. Therefore, do not connect the signal ground to the frame ground when connecting other equipment to a positive ground battery.

External equipment

The power supply port is commonly used for connection of external equipment such as a radar. Refer to the interconnection diagram on page S-1 or S-2 for connection of external equipment.

9.4 Initial Settings

This equipment can output navigation data to external equipment, in NMEA 0183 format. For example, it can output position data to a radar or echo sounder for display on its display screen.

Output data format, data sentences

NMEA 0183 version 1.5 or 2.0 can be selected from the I/O SETUP menu.

DATA1: Current loop data

With waypoint		
AP	REM1	REM2
GLL	GLL	GLL
VTG	GGA	GGA
ZDA	VTG	VTG
AAM[*2]	ZDA	ZDA
APB[*2]	RMC	RMA (Ver 2.0)[*1]
BOD[*2]	RMB[*2]	GTD (Ver 1.5)[*1]
BWC[*2]		RMC
XTE[*2]		RMB[*2]
		BWC[*2]
(1 s interval)	(1s interval)	(2 s interval)

[*1]: Output when Loran C TDs are displayed.

[*2]: Not output when no waypoint is set.

AP: Autopilot

REM1/REM2: Radar, echo sounder, etc.

DATA2: RS-232C level

With waypoint	
AP	REM
GLL	GLL
VTG	GGA
ZDA	VTG
AAM[*2]	ZDA
APB[*2]	RMA (Ver 2.0)[*1]
BOD[*2]	GTD (Ver 1.5)[*1]
BWC[*2]	RMC
XTE[*2]	RMB[*2]
	BWC[*2]

[*1]: Output when Loran C TDs are displayed.

[*2]: Not output when no waypoint is set.

DATA2

External Beacon Receiver Setting	Internal Beacon Receiver Setting
Output GGA MSK . Input Correction data of external beacon receiver	Output of internal beacon receiver's correction data (correction data and $CRMSS)

BEACON on WAAS/DGPS SETUP menu set to EXT

BEACON on WAAS/DGPS SETUP menu set to INT

Data sentence description

Sentence	Description
AAM	Arrival alarm
APB	Autopilot data (XTE and bearing to waypoint)
BOD	Bearing from own ship to destination
BWC	Range and bearing to waypoint (great circle navigation)
GGA	GPS position fixing condition (time of fix, latitude, longitude, receiving condition, number of satellites used, DOP)
GLL	Latitude and longitude
GTD	Loran-C time difference
RMA	Generic navigational information (latitude, longitude, Loran-C time differences, ground speed, true course
RMB	Generic navigational information (cross track error, steering direction, starting waypoint no., destination waypoint no., latitude and longitude of starting waypoint, latitude and longitude of destination waypoint, range and bearing to waypoint, range and bearing from present position to destination waypoint, velocity to destination, arrival alarm)
RMC	Generic navigational information (UTC time, latitude, longitude, ground speed, true course, day, month, year)
VTG	Actual track and ground speeds
XTE	Course error amount and direction to steer
ZDA	UTC time (day, month, year)

Output setting

1. Press the [MENU] key once or twice to open the menu.
2. Choose I/O SETUP.
3. Press the [ENT] key.

```
━━━━━━━  I/O  SETUP  ━━━━━━━

DATA1     :  NMEA-REM1
DATA2     :  NMEA-REM
NMEA VER  :  VER2.0
SAVE WPT/RTE → PC?
LOAD WPT/RTE ← PC?
LOAD WPT← YEOMAN?
WIRING INFO?
```
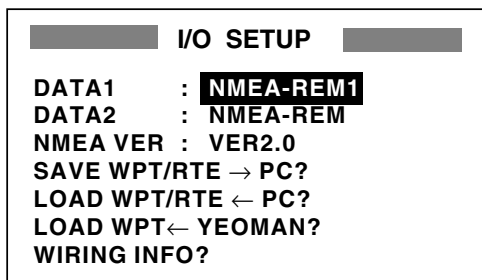
I/O SETUP menu

4. Choose DATA1, DATA2 or NMEA VER as appropriate.
5. Press the [ENT] key. One of the following screens appears depending on the item selected at step 4.

```
NMEA-REM1      NMEA-REM       VER 1.5
NMEA-REM2      NMEA-AP        VER 2.0
NMEA-AP        RTCM-OUT*
```
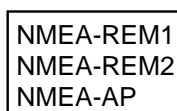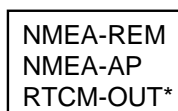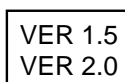
For DATA1   For DATA2   For NMEA
                                  Version

*= For GP-37, fixed at "BEACON" when MODE on DGPS/WAAS menu is set to EXT BEACON.

DATA1, DATA 2 and NMEA version options

6. Use ▲ or ▼ to choose desired option.
   NMEA-REM1, 2: Output data to radar, echo sounder, etc.
   NMEA-AP: Output data to an autopilot.
   RTCM-OUT: Choose when equipped with internal DGPS beacon receiver (GP-37).
   VER 1.5, 2.0: Choose the NMEA version of external equipment. If you are unsure of the version number, try both and choose the one which successfully outputs data.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

9. INSTALLATION

(This page intentionally left blank.)

APPENDIX

Menu Tree

Default settings shown in bold italics.

```
(MENU)── WAYPOINTS ── LIST, NEAREST

       ── ROUTES ──┬─ VOYAGE ROUTE (START, STOP)
                   └─ INTERVAL (TIME, 00H01M - 99H99M, 00H10M;
                        DISTANCE, 0.1 - 99.9 nm, 2 nm)

       ── PLOTTER ──┬─ TRACK REC (OFF, DISTANCE, AUTO)
                    ├─ INTERVAL (0.10 nm)
                    ├─ BRG. REF (MAG, TRUE)
                    ├─ MAG. VAR. (AUTO, MAN)
                    ├─ WPT NAME (DSP GOTO, DSP ROUTE, DSP ALL)
                    └─ TTG/ETA SPD (AUTO, MAN)

       ── ALARMS ──┬─ BUZZER (SHORT, LONG, CONSTANT)
                   ├─ ARV/ANC (OFF, ARV, ANC)
                   ├─ XTE (OFF, ON)
                   ├─ SPEED (OFF, LOW, HIGH)
                   ├─ WAAS/DGPS (OFF, ON)
                   ├─ TIME (OFF, ON)
                   ├─ TRIP (OFF, ON)
                   └─ ODOMETER (OFF, ON)

       ── ERASE ──┬─ WAYPOINTS/MARKS?
                  ├─ ROUTES?
                  ├─ TRACK?
                  ├─ RESET TRIP?
                  ├─ RESET ODO?
                  ├─ GPS DATA?
                  ├─ MENU SETTINGS?
                  └─ ALL BACKUP DATA?

       ── WAAS/DGPS ──┬─ MODE (GPS, WAAS, INT BEACON, EXT BEACON, AUTO)
                      ├─ WAAS SEARCH (AUTO, MANUAL)
                      ├─ CORRECTIONS DATA SET (00-99, 02)
                      ├─ DGPS STATION (AUTO, MANUAL, LIST)
                      ├─ RATE (50, 100, 200 BPS)
                      └─ FREQ (310.0 kHz)

       ── CALCULATE ── MODE (WAYPOINTS, ROUTE), SPD (AUTO, MAN)

       ── MESSAGES ── Displays operational messages.

       ── SATELLITE ── Shows satellite status display.
```

(Continued on next page)

(Continued from previous page)

```
├── USER DISP ┬── 1 (OFF, DIGITAL
│              │       SPEEDOMETER) ┬── DIGITAL  (Display division: ☐, ☐, ☐, ☐
│              └── 2 (OFF, DIGITAL  │              Available data: Odometer, trip, time,
│                      SPEEDOMETER) │              position, power voltage, SOG, COG,
│                                   │              range and bearing to waypoint, XTE,
│                                   │              TTG and ETA)
│                                   └── SPEEDOMETER
│                                          ├── START FROM (-99 to +99; 0)
│                                          └── INTERVAL (01 to 99; 10)
│
├── GPS SETUP ┬── SMOOTH POS (0-999 SEC; 0 SEC)
│              ├── SMOOTH S/C (0-9999 SEC; 5 SEC)
│              ├── AVR. SPEED (0-9999 SEC; 60 SEC)
│              ├── LAT OFFSET
│              ├── LON OFFSET
│              ├── DISABLE SV (Disable GPS satellite.)
│              └── FIX MODE (2D/ 2/3D) For 2D, default antenna height is 5 m.
│
├── SYS SETUP ┬── LANGUAGE (ENGLISH, FRANCAIS, PORTUGUES, NEDERLANDS,
│              │       TIENG VIET, ESPANOL, ITALIANO, DEUTSCH, (JAPANESE))
│              ├── DATUM (WGS84, WGS72, OTHER)
│              ├── UNITS (nm, kt; km, km/h; sm, mph)
│              ├── TIME DIFF (+00:00)
│              ├── TIME DISP (12HOUR, 24HOUR)
│              ├── TEST?
│              ├── SIMULATOR? (MODE: ON, OFF, SPEED: 0-99 kt, 20 kt,
│              │       COURSE: MAN (40°), AUTO; LAT, 38°00'N, LON, 123°00'W)
│              └── EXCHANGE BATTERY?
│
├── I/O SETUP ┬── DATA1 (NMEA-REM1, NMEA-REM2, NMEA-AP)
│              ├── DATA2 (NMEA-REM, NMEA-AP, RTCM-OUT*)
│              ├── NMEA VER (VER 1.5, VER 2.0)
│              ├── SAVE WPT/RTE → PC?
│              ├── LOAD WPT/RTE ← PC?
│              ├── LOAD WPT ← YEOMAN?
│              └── WIRING INFO?
│
└── TD SETUP ┬── DISPLAY (XX.XXX', XX'XX.X" LC TD, DE TD)
             ├── LORAN C (7980: 23-43)
             ├── LORAN C ΔTD1, ΔTD2 (-99.9-+99.9; +00.0)
             ├── DECCA (25: G-P)
             └── DECCA ΔTD1, ΔTD2 (-9.99-+9.99; +0.0)
```

* = For GP-37. Replaced with "BEACON" when MODE on DGPS/WAAS menu
    is set to EXT BEACON.

Geodetic Chart List

001:	WGS84	
002:	WGS72	
003:	TOKYO	: Mean Value (Japan, Korea & Okinawa)
004:	NORTH AMERICAN 1927	: Mean Value (CONUS)
005:	EUROPEAN 1950	: Mean Value
006:	AUSTRALIAN GEODETIC 1984	: Australia & Tasmania
007:	ADINDAN	: Mean Value (Ethiopia & Sudan)
008:		: Ethiopia
009:		: Mali
010:		: Senegal
011:		: Sudan
012:	AFG	: Somalia
013:	AIN EL ABD 1970	: Bahrain Is.
014:	ANNA 1 ASTRO 1965	: Cocos Is.
015:	ARC 1950	: Mean Value
016:		: Botswana
017:		: Lesotho
018:		: Malawi
019:		: Swaziland
020:		: Zaire
021:		: Zambia
022:		: Zimbabwe
023:	ARC 1960	: Mean Value (Kenya & Tanzania)
024:		: Kenya
025:		: Tanzania
026:	ASCENSION IS. 1958	: Ascension Is.
027:	ASTRO BEACON ÒEÓ	: Iwo Jima Is.
028:	ASTRO B4 SOR. ATOLL	: Tern Is.
029:	ASTRO POS 71/4	: St. Helena Is.
030:	ASTRONOMIC STATION 1952	: Marcus Is.
031:	AUSTRALIAN GEODETIC 1966	: Australia & Tasmania
032:	BELLEVUE (IGN)	: Efate & Erromango Islands
033:	BERMUDA 1957	: Bermuda Islands
034:	BOGOTA OBSERVATORY	: Columbia
035:	GAUPO INCHAUSPE	: Argentina
036:	CANTON IS. 1966	: Phoenix Islands
037:	CAPE	: South Africa
038:	CAPE CANAVERAL	: Mean Value (Florida & Bahama Islands)
039:	CARTHAGE	: Tunisia
040:	CHATHAM 1971	: Chatham Is. (New Zealand)
041:	CHUA ASTRO	: Paraguay
042:	CORREGO ALEGRE	: Brazil
043:	DJAKARTA (BATAVIA)	: Sumatra Is. (Indonesia)
044:	DOS 1968	: Gizo Is. (New Georgia Is.)
045:	EASTER IS. 1967	: Easter Is.
046:	EUROPEAN 1950 (Con't)	: Western Europe
047:		: Cyprus
048:		: Egypt
049:		: England, Scotland, Channel & Shetland Islands
050:		: England, Ireland, Scotland, & Shetland Islands
051:		: Greece
052:		: Iran
053:		: Italy, Sardinia
054:		: Italy, Sicily
055:		: Norway & Finland
056:		: Portugal & Spain
057:	EUROPEAN 1979	: Mean Value
058:	GANDAJIKA BASE	: Republic of Maldives
059:	GEODETIC DATUM 1949	: New Zealand
060:	GUAM 1963	: Guam Is.
061:	GUX 1 ASTRO	: Guadalcanal Is.
062:	HJORSEY 1955	: Iceland
063:	HONG KONG 1363	: Hong Kong
064:	INDIAN	: Thailand & Vietnam
065:		: Bangladesh, India & Nepal
066:	IRELAND 1965	: Ireland
067:	ISTS 073 ASTRO 1969	: Diego Garcia
068:	JOHNSTON IS. 1961	: Johnston Is.
069:	KANDAWALA	: Sri Lanka
070:	KERGUELEN IS.	: Kerguelen Is.
071:	KERTAU 1948	: West Malaysia & Singapore
072:	LA REUNION	: Mascarene Is.
073:	L. C. 5 ASTRO	: Cayman Brac Is.
074:	LIBERIA 1964	: Liberia
075:	LUZON	: Philippines (excl. Mindanao Is.)
076:		: Mindanao Is.
077:	MAHE 1971	: Mahe Is.
078:	MARCO ASTRO	: Salvage Islands
079:	MASSAWA	: Eritrea (Ethiopia)
080:	MERCHICH	: Morocco
081:	MIDWAY ASTRO 1961	: Midway Is.
082:	MINNA	: Nigeria
083:	NAHRWAN	: Masirah Is. (0man)
084:		: United Arab Emirates
085:		: Saudi Arabia
086:	NAMIBIA	: Namibia
087:	MAPARIMA, BWI	: Trinidad & Tobago

088:	NORTH AMERICAN 1927	: Western United States
089:		: Eastern United States
090:		: Alaska
091:	:	Bahamas (excl. San Salvador Is.)
092:		: Bahamas, San Salvador Is.
093:		: Canada (incl. Newfoundland Is.)
094:		: Alberta & British Columbia
095:		: East Canada
096:		: Manitoba & Ontario
097:		: Northwest Territories & Saskatchewan
098:		: Yukon
099:		: Canal Zone
100:		: Caribbean
101:		: Central America
102:		: Cuba
103:		: Greenland
104:		: Mexico
105:	NORTH AMERICAN 1983	: Alaska
106:		: Canada
107:		: CONUS
108:		: Mexico, Central America
109:	OBSERVATORIO 1966	: Corvo & Flores Islands (Azores)
110:	OLD EGYPTIAN 1930	: Egypt
111:	OLD HAWAIIAN	: Mean Value
112:		: Hawaii
113:		: Kauai
114:		: Maui
115:		: Oahu
116:	OMAN	: Oman
117:	ORDNANCE SURVEY OF GREAT BRITAIN 1936: Mean Value	
118:		: England
119:		: England, Isle of Man & Wales
120:		: Scotland, & Shetland Islands
121:		: Wales
122:	PICO DE LAS NIVIES	: Canary Islands
123:	PITCAIRN ASTRO 1967	: Pitcairn Is.
124:	PROVISIONS SOUTH CHILEAN 1963: South Chile (near 53°S)	
125:	PROVISIONAL SOUTH AMERICAN 1956: Mean Value	
126:		: Bolivia
127:		: Chile-Northern Chile (near 19°S)
128:		: Chile-Southern Chile (near 43°S)
129:		: Columbia
130:		: Ecuador
131:		: Guyana
132:		: Peru
133:		: Venezuela
134:	PUERTO RICO	: Puerto Rico & Virgin Islands
135:	QATAR NATIONAL	: Qatar
136:	QORNOQ	: South Greenland
137:	ROME 1940	: Sardinia Islands
138:	SANTA BRAZ	: Sao Maguel, Santa Maria Islands (Azores)
139:	SANTO (DOS)	: Espirito Santo Is.
140:	SAPPER HILL 1943	: East Falkland Is.
141:	SOUTH AMERICAN 1969	: Mean Value
142:		: Argentina
143:		: Bolivia
144:		: Brazil
145:		: Chile
146:		: Columbia
147:		: Ecuador
148:		: Guyana
149:		: Paraguay
150:		: Peru
151:		: Trinidad & Tobago
152:		: Venezuela
153:	SOUTH ASIA	: Singapore
154:	SOUTHEAST BASE	: Porto Santo & Madeira Islands
155:	SOUTHWEST BASE	: Faial, Graciosa, Pico, Sao Jorge, & Terceira Is.
156:	TIMBALAI 1948	: Brunei & East Malaysia (Sarawak & Sadah)
157:	TOKYO	: Japan
158:		: Korea
159:		: Okinawa
160:	TRISTAN ASTRO 1968	: Tristan da Cunha
161:	VITI LEVU 1916	: Viti Levu Is. (Fiji Islands)
162:	WAKE-ENIWETOK 1960	: Marshall Islands
163:	ZANDERIJ	: Surinam
164:	BUKIT RIMPAH	: Bangka & Belitung Islands (Indonesia)
165:	CAMP AREA ASTRO	: Camp Mcmurdo Area, Antarctica
166:	G. SEGARA	: Kalimantan Is. (Indonesia)
167:	HERAT NORTH	: Afghanistan
168:	HU-TZU-SHAN	: Taiwan
169:	TANANARIVE OBSERVATORY 1925 : Madagascar	
170:	YACARE	: Uruguay
171:	RT-90	: Sweden
172:	Pulkovo 1942	: Russia
173:	FINNISH KKJ	: Finland

Loran C Chains

Chain	GRI	S1	S2	S3	S4	S5
Central Pacific	4990	11	29	–	–	–
Canadian East Coast	5930	11	25	38	–	–
Commando Lion (Korea)	5970	11	31	42	–	–
Canadian West Coast	5990	11	27	41	–	–
South Saudi Arabia	7170	11	26	39	52	–
Labrador Sea	7930	11	26	–	–	–
Eastern Russia	7950	11	30	46	61	–
Gulf of Alaska	7960	11	26	44	–	–
Norwegian Sea	7970	11	26	46	60	–
Southeast USA	7980	11	23	43	59	–
Mediterranean Sea	7990	11	29	47	–	–
Western Russia	8000	10	25	50	65	–
North Central USA	8290	11	27	42	–	–
North Saudi Arabia	8990	11	25	40	56	69
Great Lakes	8970	11	28	44	59	–
South Central USA	9610	11	25	40	52	65
West Coast USA	9940	11	27	40	–	–
Northeast USA	9960	11	25	39	54	–
Northeast Pacific (old)	9970	11	30	55	81	–
Icelandic	9980	11	30	–	–	–
North Pacific	9990	11	29	43	–	–
Suez	4991	10	24			
England, France	8940	12	30			
Northwest Pacific	8930	11	30	50	70	
Newfoundland East Coast	7270	11	25			
Lessay	6731	10	39			
BØ	7001	11	27			
Sylt	7499	11	26			
Ejde	9007	10	23	38		
Saudia Arabia North	8830	11	25	39	56	
Saudia Arabia South	7030	11	25	37	55	

AP-4

Decca Chains

Chain No.	Chain	Chain code	Location	Chain No.	Chain	Chain code	Location
01	South Baltic	0A	Europe	25	Skagerrak	10B	"
02	Vestlandet	0E	"	26	North Persian Gulf	5C	Persian Gulf & India
03	Southwest British	1B	"	27	South Persian Gulf	1C	"
04	Northumbrian	2A	"	28	Bombay	7B	"
05	Holland	2E	"	29	Calcutta	8B	"
06	North British	3B	"	30	Bangladesh	6C	"
07	Lofoten	3E	"	31	Saliyah	2F	"
08		3F	"	32	Hokkaido	9C	Japan
09	North Baltic	4B	"	33	Tohoku	6C	"
10	North West	4C	"	34	Kanto	8C	Japan
11	Trondelag	4E	"	35	Shikoku	4C	"
12	English	5B	"	36	Hokuriku	2C	"
13	North Bothnian	5F	"	37	Kita Kyushu	7C	"
14	Southern Spanish	6A	"	38	Namaqualand	4A	Southern Africa
15	North Scottish	6C	"	39	Cape	6A	"
16	Gulf of Finland	6E	"	40	Eastern Province	8A	"
17	Danish	7B	"	41	South West Africa	9C	"
18	Irish	7D	"	42	Natal	10C	"
19	Finnmark	7E	"	43	Dampier	8E	Australia
20	French	8B	"	44	Port Headland	4A	"
21	South Bothnian	8C	"	45	Anticosti	9C	Northern America
22	Hebridean	8E	"	46	East Newfoundland	2C	"
23	Frisian Islands	9B	"	47	Cabot Strait	6B	"
24	Helgeland	9E	"	48	Nova Scotia	7C	"

(This page intentionally left blank.)

SPECIFICATIONS OF
GPS NAVIGATOR GP-32
DGPS NAVIGATOR GP-37

1   GPS RECEIVER

1.1	Receiving Channels	
	GPS	12 channels parallel, 12 satellites tracking
	WAAS	1 channel
1.2	Rx Frequency	1575.42 MHz
1.3	Rx Code	C/A code, WAAS
1.4	Position Fixing System	All in view, 8-state Kalman filter
1.5	Position Accuracy	
	GPS	10 m (95% of the time, HDOP 4)
	DGPS	5 m (95% of the time, external data required)
	WAAS	3 m (95% of the time)
1.6	Tracking Velocity	999 kt
1.7	Position-Fixing Time	Warm start: 12 s approx., Cold start: 90 s approx.
1.8	Position Update interval	1 s
1.9	Beacon Receiver (GP-37 only)	
	Frequency Range	283.5 kHz to 325.0 kHz
	MSK Rate	50,100,200 bps (Auto/Manual selectable)

2   RECEIVER UNIT

2.1	Display System	Monochrome LCD, 95 (W) x 60 (H) mm, 120 x 64 dots
2.2	Display Mode	Plotter, Steering, Highway, NAV data, Destination, User display
2.3	Projection	Mercator
2.4	Memory Capacity	Track: 1000 pts, Waypoint: 999 pts w/ comment
2.5	Storage Capacity	50 routes w/ 30 waypoint each
2.6	Alarms	Arrival and anchor watch, Cross track error, Odometer alarm, Ship's speed in and out alarms, Time alarm, Trip alarm, WAAS/DGPS alarm
2.7	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

3   INTERFACE

3.1	Data 1	Current Loop
	Output Data:	NMEA0183 Ver 1.5/2.0 selected

NMEA-REM1: GLL, GGA, VTG, ZDA, RMC, RMB

NMEA-REM2: GLL, GGA, VTG, ZDA, RMC, RMB, BWC,
    RMA (Ver2.0), GTD (Ver1.5) when TD indication selected

NMEA-AP: GLL, VTG, ZDA, AAM, APB, BOD, BWC, XTE

3.2   Data 2   RS-232C

        Output Data: NMEA0183 Ver 1.5/2.0 selected

                        NMEA-REM: GLL, GGA, VTG, ZDA, RMC, RMB, BWC,
    RMA (Ver2.0), GTD (Ver1.5) when TD indication selected

                        NMEA-AP: GLL, VTG, ZDA, AAM, APB, BOD, BWC, XTE

                        DGPS RTCM SC-104 (GP-37 only)

                        Downloading to PC (WP/ Route Data)

        Input Data: DGPS RTCM SC-104 Ver 2.1

                        Uploading from PC (WP/ Route Data)

                        NMEA WPL (WP Data)

4   POWER SUPPLY

4.1 GP-32:   12-24 VDC: 240-120 mA

4.2 GP-37:   12-24 VDC: 340-170 mA

5   ENVIRONMENTAL CONDITION

5.1 Ambient Temperature   Antenna unit: -25°C to +70°C

                                    Receiver unit: -15°C to +55°C

5.2 Damp Heat   93% or less at 40°C

5.3 Waterproofing   Antenna unit: IPX6

      (IEC 60529)   Receiver unit: IPX5 (USCG CFR-46)

5.4 Vibration   IEC 60945

6   COATING COLOR

6.1 Antenna Unit   N9.5

6.2 Receiver Unit   Chassis: 2.5GY5/1.5, Panel: N3.0

FURUNO

 = D - 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1 TABLE 1

ø69

R100 R14 24

R10

(85)

61

23
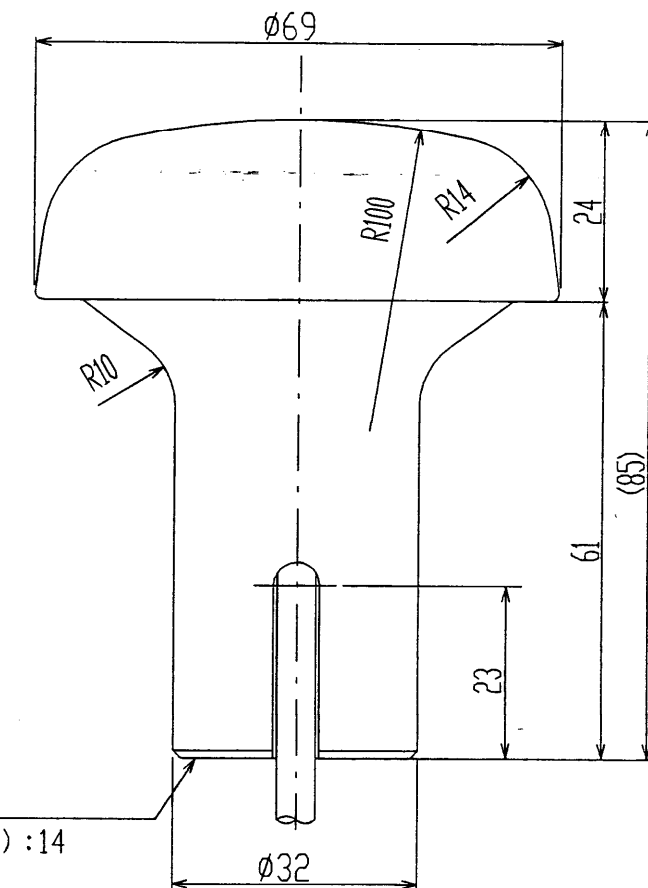
1-14UNS1B

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

THREAD PER 25.4mm (1 INCH): 14
PITCH: 1.8143 mm
THREAD LENGTH: 15.17 mm
PITCH DIAMETER: 24.17 mm
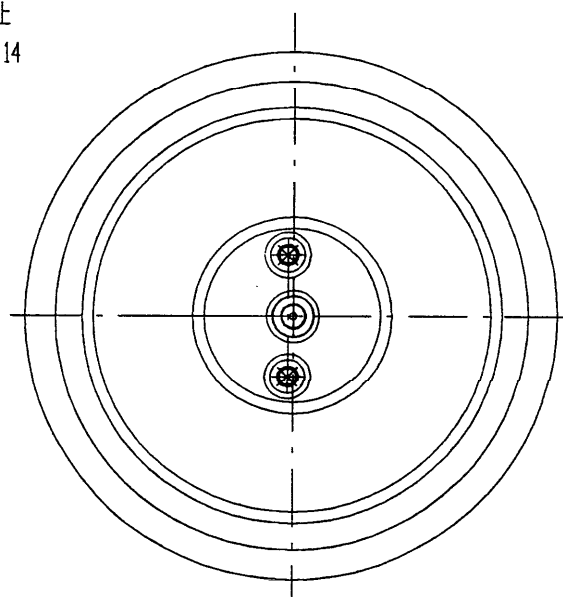
ø32

注記
指定外の寸法公差は表1による。

NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

型式 TYPE	ケーブル長(m) CABLE LENGTH	プラグ PLAG	質量 MASS
GPA-017	10	TNC-P-3	585±30g
GPA-017S	0.2	TNC-J-3	125±30g

表 2 TABLE 2

DRAWN July 22 '02 T.YAMASAKI			TITLE	GPA-017/017S
CHECKED July 22 '02 Y.Kina			名称	空中線部
APPROVED July 22 '02 Y.Kina				外寸図
SCALE 1/1	MASS TABLE 2 表2参照		NAME	ANTENNA UNIT
DWG.No. C4384-G04-H				OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

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

表 1 TABLE 1

φ156

116

FURUNO
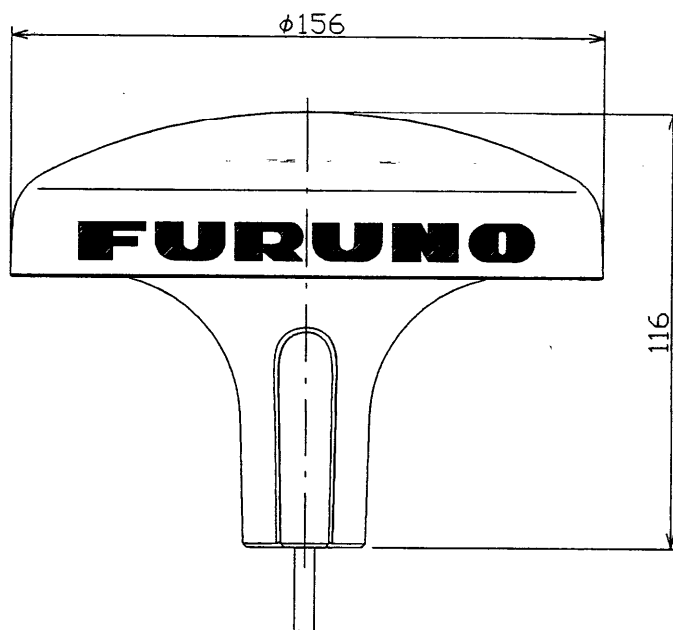
1-14UNS1B

ねじ山数(25.4mmにつき): 14
ピッチ: 1.8143 mm
オネジ有効長さ: 15.17 mm
オネジ有効径: 24.17 mm

THREAD PER 25.4mm (1 INCH): 14
PITCH: 1.8143 mm
THREAD LENGTH: 15.17 mm
PITCH DIAMETER: 24.17 mm

ケーブル固定板
CABLE FIXTURE

注記: 指定外の寸法公差は表1による

NOTE: TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
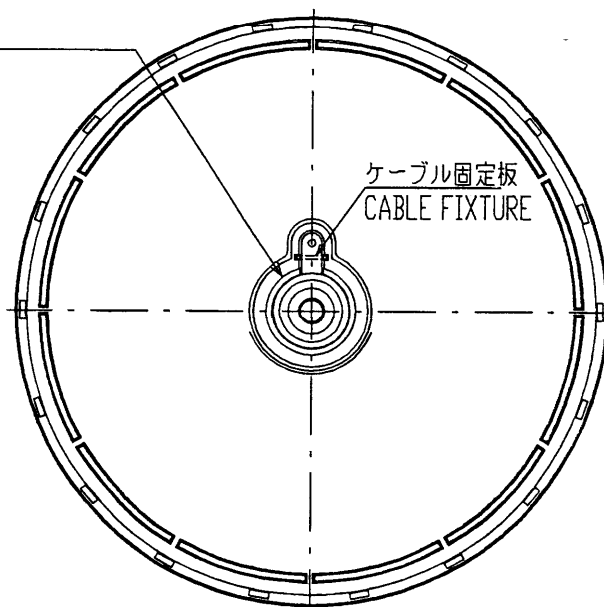
型式 TYPE	ケーブル長(m) CABLE LENGTH	プラグ PLUG	質量(kg) MASS
GPA-019	10	TNC-P-3	1.0
GPA-019S	0.2	TNC-J-3	0.54

表 2 TABLE 2

DRAWN July 22 '02 T.YAMASAKI			TITLE GPA-019/019S
CHECKED July 22 '02 Y.Kim			名称 空中線部
APPROVED July 22 '02 Y.Kim			外寸図
SCALE 1/2	MASS TABLE 2 表2参照		NAME ANTENNA UNIT
DWG. No. C4400-G01-E			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

取付場所　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.

WHIP ANTENNA ホイップアンテナ(MF/HF)
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
LOOP ANTENNA ループ・アンテナ
INMARSAT ANTENNA インマルサットアンテナ
GPS ANTENNA GPSアンテナ
MAIN MAST メインマスト
TX ANTENNA(MF/HF) 送信アンテナ(MF/HF)

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

5 m NOT WITHIN INMARSAT BEAM インマルサットビーム内に入らないこと
NOT WITHIN RADAR BEAM レーダービーム内に入らないこと

※：支社の大さにより変わる。
※：DISTANCE DEPENDS ON MAST DIAMETER OF 'a'.

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

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

マーカークランプ HOSE CLAMP
テープを巻く WIND TAPE
取付補助金具 MOUNTING BRACKET
コンベックス(現地手配) CABLE TIE (LOCAL SUPPLY)
コネクタに力がかからないように、少し余絡をもたせる
LEAVE SLACK HERE TO RELIEF STRESS ON CONNECTOR.
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
φ61
φ76
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 ベース型式 ANT. BASE TYPE コード番号 CODE No.	直型アンテナベース RIGHT ANGLE ANTENNA BASE No.13-QA330 000-803-239	L型アンテナベース L-TYPE ANTENNA BASE No.13-QA310 000-803-240	

B) スタンションやハンドレールにつけるとき
レール用アンテナベース No.13-RC5160
(取付可能径：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.

テープを巻く WIND TAPE
固定ボルト FIXING BOLT
アンテナベース ANTENNA BASE

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や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.
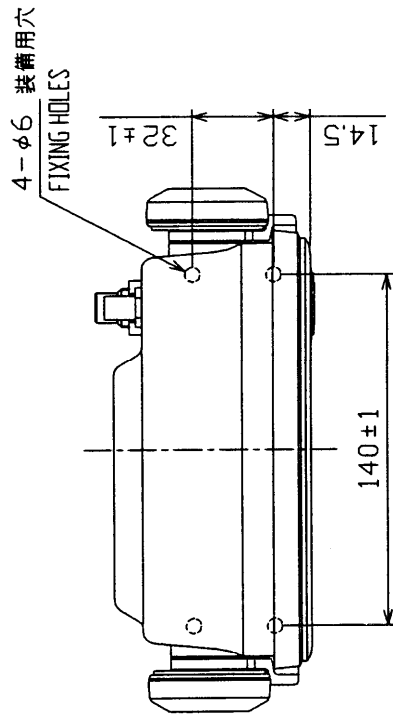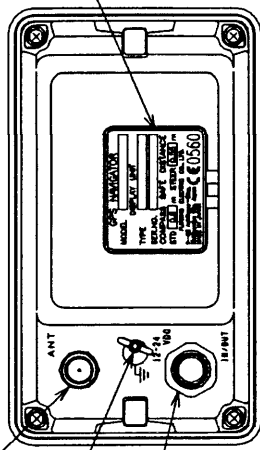
DRAWN	July 22 '02	T.YAMASAKI	TITLE	GPA series
CHECKED			名称	空中線部
APPROVED				装備要領図
SCALE		MASS	NAME	ANTENNA UNIT INSTALLATION PROCEDURE
DWG No.	C4384-Y01- A			

FURUNO ELECTRIC CO., LTD.

FURUNO

FURUNO ELECTRIC CO., LTD.

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	質量(kg±10%) MASS
GP-32	0.54
GP-37	0.68

型式銘板 NAMEPLATE

空中線部 ANTENNA

アース端子 GND TERMINAL

電源 SOURCE

背面 REAR VIEW

#150

85

78

15

17

30°

136

A

4-φ6 装備用穴 FIXING HOLES

32±1

14.5

140±1

#80

100

209

175

125

#80
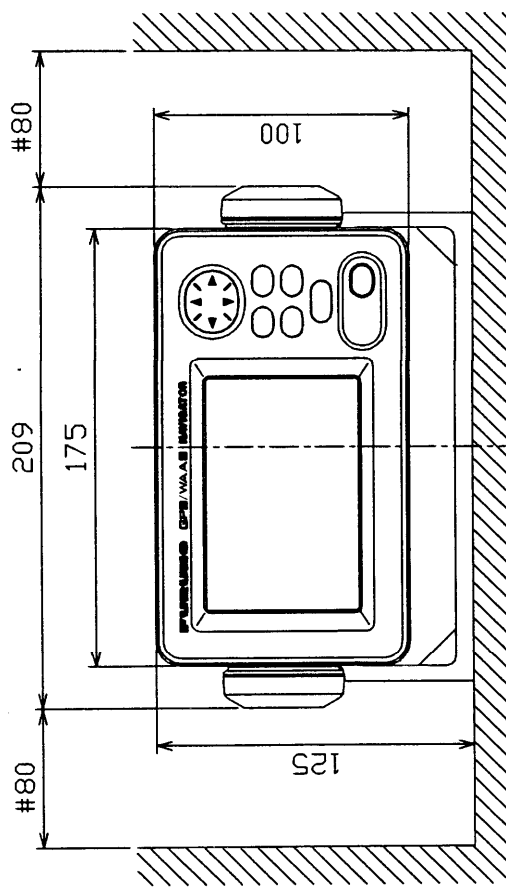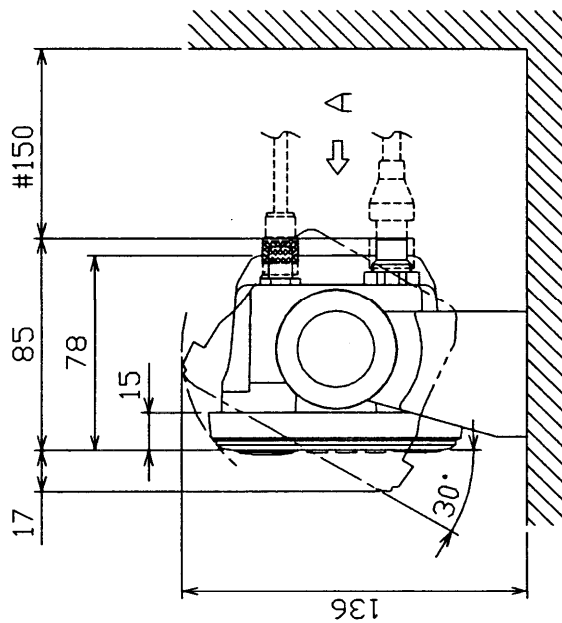
注記
1) 装備ケーブルはサービス時、本体を前方に引出せるよう余裕を持たせること。
2) 取付用ネジはトラスタッピンネジ呼び径5×16を使用のこと。
3) #印寸法は推奨する最小サービス空間を示す。
4) 指定外寸法公差は表1による。

NOTE
1. KEEP SUFFICIENT CABLE LENGTH BEHIND THE UNIT.
2. USE TAPPING SCREWS 5x16 FOR FIXING THE UNIT.
3. #: RECOMMENDED SERVICE CLEARANCE.
4. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN Mar. 29 '02 T.YAMASAKI
CHECKED
APPROVED

TITLE GP-32/37
名称 受信演算部 (卓上装備)
外寸図
NAME RECEIVER UNIT (DESKTOP MOUNT)
OUTLINE DRAWING

SCALE 1/3
MASS 表2 TABLE 2

DWG.No. C4420-G01-A   20-022-1006-0
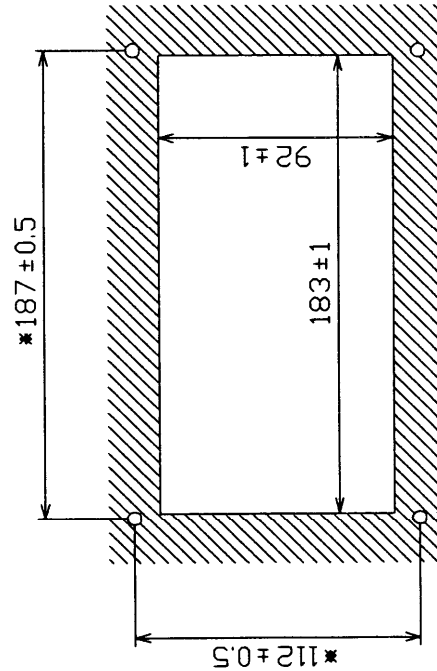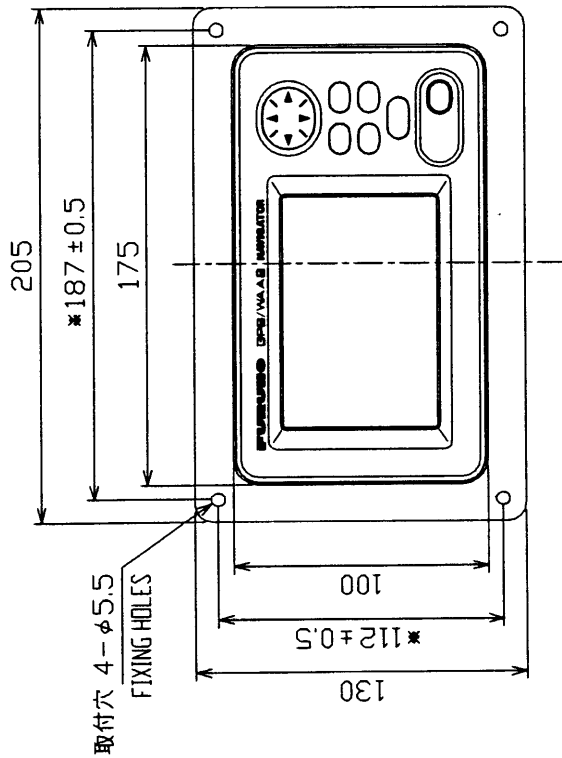
FURUNO

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	質量(kg±10%) MASS
GP-32	0.52
GP-37	0.66

アース端子
GND TERMINAL

#100
68
61
17
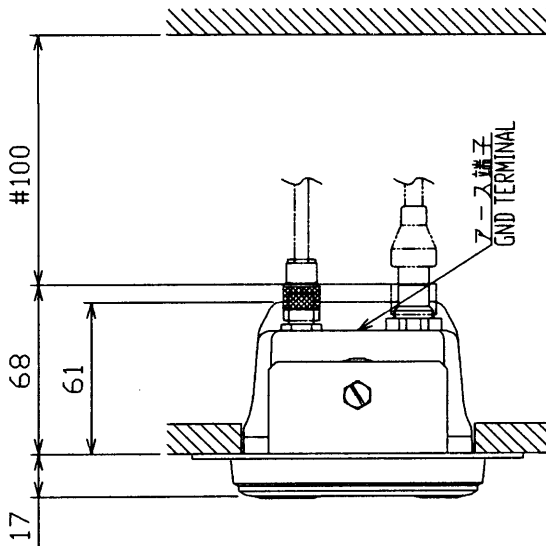
注記
1) ※印寸法は取付穴位置寸法とする。
2) 取付用ネジはタッピンネジ呼び径5×20を使用のこと。
3) 指定外の寸法公差は表1による。
4) #印寸法は推奨する最小サービス空間を示す。

NOTE
1. ※: DIMENSIONS FOR FIXING HOLES PITCH.
2. USE TAPPING SCREWS 5x20 FOR FIXING THE UNIT.
3. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
4. #: RECOMMENDED SERVICE CLEARANCE.

205
※187±0.5
175
100
※112±0.5
130

取付穴 4-φ5.5
FIXING HOLES

取付穴寸法図（参考図）
CUTOUT DIMENSIONS

※187±0.5
92±1
183±1
※112±0.5

DRAWN Mar. 29 '02 T.YAMASAKI
CHECKED
APPROVED
SCALE 1/3 MASS 表2 TABLE 2
DWG.No. C4420-G02-A

TITLE GP-32/37
名称 受信演算部(埋込装備F)
外寸図
NAME RECEIVER UNIT (FLUSH MOUNT F) OUTLINE DRAWING

GP-32/37
20-022-1106-0

FURUNO ELECTRIC CO., LTD.

FURUNO

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	質量(kg±10%) MASS
GP-32	0.52
GP-37	0.66

#100

70

63

MAX12

15

アース端子
GND TERMINAL

注記　1）指定外の寸法公差は表1による。
　　　2）＃印寸法は推奨する最小サービス空間を示す。

NOTE　1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
　　　2. ＃: RECOMMENDED SERVICE CLEARANCE.

215

175

70

100

取付穴寸法図（参考図）
CUTOUT DIMENSIONS

92±1

167±1

DRAWN	Mar. 29 '02	T.YAMASAKI	TITLE	GP-32/37
CHECKED	Mar.18 '02 Y.Ki		名称	受信演算部（埋込装備S）
APPROVED		GP-32/37		外寸図
SCALE 1/3	MASS 表2 TABLE 2		NAME	RECEIVER UNIT (FLUSH MOUNT S)
				OUTLINE DRAWING
DWG.No.	C4420-G03-A	20-022-1206-0		

FURUNO ELECTRIC CO., LTD.

FURUNO

空中線部
ANTENNA UNIT
GPA-017

3D-2V, 10m, φ5.3

TNC-P-3

ANT

受信演算部
RECEIVER UNIT
GP-32

*4
[DATA1] CURRENT LOOP
NMEA0183 (Ver1.5/2.0)
[DATA2] RS-232C
NMEA0183 (Ver1.5/2.0)
RTCM SC-104
UP LOAD/DOWN LOAD
(WP, ROUTE)
12-24VDC IN

J1
1 ← TD-H
2 ← TD-C/SG
3 ← SD
4 ← RD
5 ← (+)
6 ← (-)
7 ← FG

GND *1
IV-1.25SQ

MJ-A7SPF0009, 2m

*2
MJ-A7SPFD

WHT シロ
BLU アオ
YEL キ
GRN ミドリ
RED アカ
BLK クロ

FUSE 1A
1A

整流器
RECTIFIER *1

(+)(-)

(+)(-)

RD-H
RD-C

PC SG
RD
SD

外部機器
例)
レーダー
魚群探知機
オートパイロット
リモートディスプレイ
プロッタ

EXT EQUIPMENT
EX:
RADAR
ECHO SOUNDER
AUTOPILOT
REMOTE DISPLAY
PLOTTER

パーソナルコンピュータ
PC
外部ビーコン受信機
EXTERNAL BEACON RECEIVER

船内電源
SHIP'S MAINS (+)
12-24 VDC (-)

100/110/115/
220/230 VAC
1φ, 50/60Hz

注記
*1) 現地手配
*2) コネクタは工場にて取付済み
*3) オプション
*4) メニューにより選択

NOTE
*1. LOCAL SUPPLY.
*2. FITTED AT FACTORY.
*3. OPTION.
*4. SELECT ON MENU.

DRAWN Mar. 14 '02 T. YAMASAKI
CHECKED
APPROVED
SCALE   MASS   kg
DWG. No.   C4420-C01- A

TITLE GP-32
名称   GPS航法装置
      相互結線図
NAME   GPS NAVIGATOR
      INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

空中線部
ANTENNA UNIT
GPA-019

3D-2V, 10m, φ5.3

TNC-P-3

ANT

受信演算部
RECEIVER UNIT
GP-37

*4 [DATA1] CURRENT LOOP
NMEA0183(Ver1.5/2.0)
[DATA2] RS-232C
NMEA0183(Ver1.5/2.0)
RTCM SC-104[OUTPUT]
UP.LOAD/DOWN.LOAD
(WP.ROUTE)
12-24VDC IN

J1
1 ← TD-H
2 ← TD-C/SG
3 ← SD
4 ← RD
5 ← (+)
6 ← (-)
7 ← FG

GND *1
1V-1.25SQ

*2
MJ-A7SPFD

MJ-A7SPF0009, 2m

シロ WHT
アオ BLU
キ YEL
ミドリ GRN
アカ RED
クロ BLK

FUSE 1A
1A

整流器
RECTIFIER *1

(+)(-) *1

外部機器
例)
レーダー
魚群探知機
オートパイロット
リモートディスプレイ
プロッタ

EXT EQUIPMENT
EX:
RADAR
ECHO SOUNDER
AUTOPILOT
REMOTE DISPLAY
PLOTTER

RD-H
RD-C

パーソナルコンピュータ
PC

SG
RD
SD

PC

船内電源
SHIP'S MAINS (+)
12-24 VDC (-)

100/110/115/
220/230 VAC
1φ, 50/60Hz

注記
*1) 現地手配
*2) コネクタはエ場にて取付済み
*3) オプション
*4) メニューにより選択

NOTE
*1. LOCAL SUPPLY.
*2. FITTED AT FACTORY.
*3. OPTION.
*4. SELECT ON MENU.

DRAWN Mar. 14 '02 T. YAMASAKI		TITLE	GP-37
CHECKED Mar 28 '02 Y.K.		名称	DGPS航法装置
APPROVED Mar 28 '02 Y.K.			相互結線図
SCALE	MASS kg	NAME	DGPS NAVIGATOR
DWG. No. C4419-C01- A			INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

INDEX

Pub NO. DOC-474

Declaration of Conformity C E 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 model GP-32

(Model name, serial 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 60945: 1997-01 (IEC 60945 Third edition: 1996-11)
EN 60950: 2000 (IEC 60950 Third edition: 1999-04)

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

For assessment, see

- Statement of Opinion N° 02214098/AA/00 of 29 May 2002 issued by Telefication, The Netherlands

- EMC Test report FLI 12-02-010 of 18 April 2002 prepared by Furuno Labotech International Co., Ltd.

- Safety Test report FLI 12-02-012 of 22 April 2002 prepared by Furuno Labotech International Co., Ltd.

On behalf of Furuno Electric Co., Ltd.

Hiroaki Komatsu
Manager,
International Rules and Regulations

Nishinomiya City, Japan
June 18, 2002

(Place and date of issue)

(name and signature or equivalent marking of authorized person)

Pub NO. DOC-475

Declaration of Conformity C€ 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 model GP-37

(Model name, serial 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 60945: 1997-01 (IEC 60945 Third edition: 1996-11)
EN 60950: 2000 (IEC 60950 Third edition: 1999-04)

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

For assessment, see

- Statement of Opinion N° 02214098/AA/00 of 29 May 2002 issued by Telefication, The Netherlands

- EMC Test report FLI 12-02-011 of 18 April 2002 prepared by Furuno Labotech International Co., Ltd.

- Safety Test report FLI 12-02-013 of 22 April 2002 prepared by Furuno Labotech International Co., Ltd.

On behalf of Furuno Electric Co., Ltd.

Hiroaki Komatsu
Manager,
International Rules and Regulations

Nishinomiya City, Japan
June 18, 2002

(Place and date of issue)

(name and signature or equivalent marking of authorized person)