COLOR DGPS/PLOTTER
COLOR GPS/PLOTTER

MODEL
GP-1850WD, GP-1850W FURUNO/NAVIONICS
GP-1850WD, GP-1850W FURUNO/C-MAP NT
SAFETY INSTRUCTIONS

**WARNING**

Do not open the equipment.

Hazardous voltage which can cause electrical shock, burn or serious injury exists inside 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.

Do not operate the equipment with wet hands.

Electrical shock can result.

Use the proper fuse.

Fuse rating is shown on the power cable. Use of a wrong fuse can result in damage to the equipment.

**CAUTION**

Do not use the equipment for other than its intended purpose.

No one navigation device should ever be solely relied upon for the navigation of a vessel.

Always confirm position against all available aids to navigation, for safety of vessel and crew.

Use the proper gain setting.

Incorrect gain may produce wrong depth indication, possibly resulting in a dangerous situation. See "Adjusting the gain" on page 2-6.

The picture is not refreshed when picture advancement is stopped.

Maneuvering the vessel in this condition may result in a dangerous situation.

A warning label is attached to the equipment. Do not remove the label. If the label is missing or illegible, contact a FURUNO agent or dealer.

**WARNING**

To avoid electrical shock, do not remove cover. No user-serviceable parts inside.

Name: Warning Label (1)
Type: 86-003-1011-1
Code No.: 100-236-231

---

**About the TFT LCD**

The TFT LCD is constructed using the latest LCD techniques, and displays 99.99% of its pixels. The remaining 0.01% of the pixels may drop out or blink, however this is not an indication of malfunction.
# TABLE OF CONTENTS

**FOREWORD** .................................. iv  
**SYSTEM CONFIGURATION** ........ v  
**WHAT IS WAAS?** ......................... vi  

## 1. OPERATIONAL OVERVIEW
1.1 Display Unit Controls .......................... 1-1  
1.2 Remote Controller .............................. 1-2  
1.3 Inserting Mini Chart Card ...................... 1-3  
1.4 Turning the Power On/Off ..................... 1-3  
1.5 Adjusting Tone and Brilliance ............... 1-4  
1.6 Plotter Displays ................................ 1-5  
1.7 Steering/Highway Displays .................... 1-5  
1.8 Menu Operation, Soft Keys ................. 1-6  
1.9 Demonstration Display ........................ 1-7  

## 2. PLOTTER DISPLAYS
2.1 Presentation Modes .............................. 2-1  
2.2 Cursor ............................................ 2-2  
2.3 Shifting the Display ............................ 2-2  
2.4 Displaying Nav Information Window .... 2-2  
2.5 Selecting Chart Scale/Range ............... 2-3  
2.6 Mini Chart Cards ................................ 2-3  
2.7 Navigation Data Display ....................... 2-6  
2.8 Steering Display ................................ 2-7  
2.9 Highway Display ................................ 2-8  
2.10 Changing Operation Mode .................... 2-9  
2.11 Navigation Trip Distance .................... 2-10  

## 3. TRACK
3.1 Displaying Track ............................... 3-1  
3.2 Stopping/Restarting Plotting of Track .... 3-1  
3.3 Changing Track Color .......................... 3-2  
3.4 Track Plotting Method, Interval ......... 3-2  
3.5 Changing Track Memory Capacity .......... 3-3  
3.6 Erasing Tracks .................................. 3-4  

## 4. MARK
4.1 Entering Marks ................................. 4-1  
4.2 Changing Mark Attributes .................... 4-2  
4.3 Changing Mark Size ............................ 4-3  
4.4 Erasing Marks ................................... 4-3  
4.5 Displaying Track and Mark Points .......... 4-4  
4.6 Target Mark ..................................... 4-4  

## 5. WAYPOINTS
5.1 Entering Waypoints ............................. 5-1  
5.2 Erasing Individual Waypoints .............. 5-4  
5.3 Changing Waypoint Data ..................... 5-5  
5.4 Changing Waypoint Position on the Plotter Display 5-5  
5.5 Waypoint Mark Size ........................... 5-6  
5.6 Searching Waypoints .......................... 5-6  

## 6. ROUTES
6.1 Entering Routes ................................ 6-1  
6.2 Connecting Routes ................................ 6-2  
6.3 Inserting, Removing Waypoints ............ 6-3  
6.4 Creating Track-based Routes ............... 6-5  
6.5 Erasing Routes .................................. 6-6  

## 7. NAVIGATION
7.1 Navigating to “Quick Points” .......... 7-1  
7.2 Navigating to Waypoints (waypoint list) .... 7-2  
7.3 Navigating to Ports, Port Services .......... 7-2  
7.4 Following a Route ............................. 7-4  
7.5 Canceling Navigation ......................... 7-6  

## 8. PLOTTER ALARMS
8.1 Introduction ....................................... 8-1  
8.2 Audio Alarm On/Off ............................. 8-1  
8.3 Arrival Alarm ..................................... 8-2  
8.4 Anchor Watch Alarm ............................ 8-2  
8.5 XTE (Cross Track Error) Alarm ........... 8-3  
8.6 Speed Alarm ....................................... 8-3  
8.7 Proximity Alarm .................................. 8-3  
8.8 Alarm Information ............................... 8-4  

## 9. MEMORY CARD OPERATIONS
9.1 Formatting Memory Cards ................. 9-1  
9.2 Saving Data to Memory Card .............. 9-2  
9.3 Loading Data from Memory Card .......... 9-3
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1</td>
<td>CHART SETUP OPTIONS menu</td>
<td>10-1</td>
</tr>
<tr>
<td>10.2</td>
<td>DISPLAY OPTIONS menu</td>
<td>10-3</td>
</tr>
<tr>
<td>10.3</td>
<td>GPS/DGPS/TD OPTIONS menu</td>
<td>10-4</td>
</tr>
<tr>
<td>10.4</td>
<td>CONFIGURATION menu</td>
<td>10-8</td>
</tr>
<tr>
<td>11.1</td>
<td>Inserting Chart Card</td>
<td>11-1</td>
</tr>
<tr>
<td>11.2</td>
<td>Cursor and Data Display</td>
<td>11-2</td>
</tr>
<tr>
<td>11.3</td>
<td>Tidal Information</td>
<td>11-3</td>
</tr>
<tr>
<td>11.4</td>
<td>Navigating to Ports, Port Services</td>
<td>11-4</td>
</tr>
<tr>
<td>11.5</td>
<td>Setting Chart Setup Options</td>
<td>11-6</td>
</tr>
<tr>
<td>11.6</td>
<td>Selecting Chart Scale/Range</td>
<td>11-7</td>
</tr>
<tr>
<td>11.7</td>
<td>Displaying Program Number</td>
<td>11-8</td>
</tr>
<tr>
<td>12.1</td>
<td>Maintenance</td>
<td>12-1</td>
</tr>
<tr>
<td>12.2</td>
<td>Replacement of Fuse, Battery</td>
<td>12-2</td>
</tr>
<tr>
<td>12.3</td>
<td>Simple Troubleshooting</td>
<td>12-2</td>
</tr>
<tr>
<td>12.4</td>
<td>Error Messages</td>
<td>12-3</td>
</tr>
<tr>
<td>12.5</td>
<td>Diagnostic Tests</td>
<td>12-3</td>
</tr>
<tr>
<td>12.6</td>
<td>Clearing Memories</td>
<td>12-6</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>MENU TREE</td>
<td>A-1</td>
</tr>
<tr>
<td></td>
<td>LORAN C CHAINS</td>
<td>A-3</td>
</tr>
<tr>
<td></td>
<td>DECCA CHAINS</td>
<td>A-4</td>
</tr>
<tr>
<td></td>
<td>WORLD TIME</td>
<td>A-5</td>
</tr>
<tr>
<td></td>
<td>GEODETIC CHART LIST</td>
<td>A-6</td>
</tr>
<tr>
<td>SPECIFICATIONS</td>
<td></td>
<td>SP-1</td>
</tr>
<tr>
<td>INDEX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DECLARATION OF CONFORMITY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FOREWORD

A Word to GP-1850WD/1850W Owners

Congratulations on your choice of the FURUNO GP-1850WD COLOR DGPS/PLOTTER, GP-1850W COLOR GPS/PLOTTER. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

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.

This equipment 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 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-1850WD provides a totally integrated DGPS beacon receiver, WAAS function, GPS receiver and color video plotter. The GP-1850W mostly shares the same features with the GP-1850WD except it does not have a DGPS beacon receiver.

Navigation information is displayed on a bright 6.5-inch color TFT LCD. On-screen information shown are position, range and bearing to cursor position, range, bearing, ETA and TTG to waypoint, etc. A high sensitivity receiver tracks up to twelve (WAAS: thirteen) satellites simultaneously. An 8-state Kalman filter ensures optimum accuracy in determination of vessel position, course and speed.

C-MAP NT-FP chart card is available for the GP-1850WD/1850W.

The main features of the GP-1850WD/1850W are

• WAAS capability.
• Comprehensive navigation data displays.
• Bright 6.5-inch color TFT LCD with temperature compensated tone and brilliance control.
• Automatic coastline chart loading.
• Position display in latitude and longitude, Loran C or Decca TDs.
• Improved position accuracy with optional DGPS beacon receiver (GP-1850W).
• Accepts both FURUNO and NAVIONICS chart card or FURUNO and C-MAP NT mini chart cards.
• Alarms: Arrival, Anchor Watch, Cross-track Error, Speed and Proximity.
• Man overboard feature records latitude and longitude coordinates at time of man overboard.
• “Highway” display provides graphic presentation of ship’s track and is useful for monitoring cross track error.
SYSTEM CONFIGURATION

This GPS receiver complies with Canadian standard RSS-210 (Low Power License-Exempt Radio communication Devices). Operation is subject to the following two conditions:

(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.
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. 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, SBAS is still under development. (Providers are expected to have initial operations capability from the times shown above.) During this developmental period, which may last for several years, there is no guarantee of the accuracy, integrity, continuity, or availability of the SBAS signal. 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 while using the SBAS signal in the developmental phase.

**Note:** This manual uses “WAAS” when referring to any SBAS provider.
1. OPERATIONAL OVERVIEW

This chapter acquaints you with the basics of your unit - from turning on the power to the soft key menu operation.

1.1 Display Unit Controls

- Registers own ship’s positions.
- Marks man overboard position, event position.

- Registers items on menus.

- Enter alphanumeric data.

- Soft key’s functions change depending on the display.

- Displays the alarm menu.

- Displays the waypoint & route menu.

- Alternately selects Steering display and Highway display.

- Alternately selects Plotter display and Navigation data display.

- Mini chart card slot.

- Opens/closes the main menu.

- Opens the window for adjustment of tone and brilliance.

- Cursor pad
  - Shifts cursor and display.
  - Selects items on menus.

- Clears data.
- Erases selected waypoint.
- Silences audible alarm.

- Displays/hides the soft key menu, nav data, mode indication.

- Touch and release: Turns power on.
- Long press: Turns power off.

Display unit
1.2 Remote Controller

- **MOB**
  - Inscribes MOB mark.

- **SAVE**
  - Displays alarm menu.

- **ALARM**
  - Displays alarm menu.

- **SW 1**
  - Enter, cancel, clear alphanumeric data.

- **SW 2**
  - Enter, cancel, clear alphanumeric data.

- **SW 3**
  - Enter, cancel, clear alphanumeric data.

- **SW 4**
  - Enter, cancel, clear alphanumeric data.

- **SW 5**
  - Enter, cancel, clear alphanumeric data.

- **SHOWHIDE**
  - Shows/hides soft key menu.

- **BRILL**
  - Adjust brilliance.

- **TONE**
  - Adjust tone.

- **ZOOM IN/OUT**
  - Expand, shrink chart.

- **CANCEL**
  - Functions same as cursor pad.

- **MENU**
  - Displays the waypoint & route menu.

- **ENTER**
  - Enter, cancel, clear alphanumeric data.

- **#0**
  - Enter, cancel, clear alphanumeric data.

- **ABC 1**
  - Enter, cancel, clear alphanumeric data.

- **DEF 2**
  - Enter, cancel, clear alphanumeric data.

- **GHI 3**
  - Enter, cancel, clear alphanumeric data.

- **JKL 4**
  - Enter, cancel, clear alphanumeric data.

- **MNO 5**
  - Enter, cancel, clear alphanumeric data.

- **PQR 6**
  - Enter, cancel, clear alphanumeric data.

- **STU 7**
  - Enter, cancel, clear alphanumeric data.

- **VWX 8**
  - Enter, cancel, clear alphanumeric data.

- **YZ 9**
  - Enter, cancel, clear alphanumeric data.

- **CLEAR**
  - Functions same as cursor pad.

- **PLOT**
  - Selects Plotter or Navigation data display.

- **XTE/HIWAY**
  - Selects Steering or Highway display.

- **WPT RTE**
  - Selects Plotter or Navigation data display.

**Note:** The remote controller is not waterproof. Keep it in its vinyl case always.
1.3 Inserting Mini Chart Card

Insert appropriate mini chart card before turning on the power.

**Note:** Static electricity can be passed through your fingers to a memory card and destroy the contents of the card. To prevent this, always touch a metallic object, such as a steel desk, before handling a memory card.

1. Push down the lid catch to open the mini chart card slot cover.

2. Insert appropriate mini chart card groove side up.

3. Close the slot cover to protect the chart drive. (Keep the slot cover closed at all times.)

**Note:** Turn off power before inserting or ejecting the mini chart card.

1.4 Turning the Power On/Off

**Turning the power on**
Press the [POWER/BRILL] key at bottom left-hand side of the display unit to turn on the power. When the unit is turned on, it proceeds in the sequence shown in the figure in below, after displaying the FURUNO information display.

![Start-up sequence diagram]

- **START UP TEST**
  - PROGRAM: OK
  - RAM: OK
  - BACKUP DATA: OK
  - INTERNAL BATTERY: OK
  - GPS: OK

- **WARNING**
  - NO NATIONAL HYDROGRAPHIC OFFICE HAS VERIFIED THE INFORMATION IN THIS COASTLINE DATA CARD AND NONE ACCEPT LIABILITY FOR THE ACCURACY OF REPRODUCTION OR ANY MODIFICATIONS MADE THEREAFTER. THIS PRODUCT WITH THIS COASTLINE DATA CARD DOES NOT REPLACE THE REQUIREMENT TO USE THE APPROPRIATE PRODUCTS FOR NAVIGATION ACCORDING TO NATIONAL AND INTERNATIONAL REGULATIONS.

FURUNO ELECTRIC CO., LTD.

- **Start-up sequence**

For any NG on the start up test display, request service.

The GP-1850WD/1850W takes about 90 seconds to find its position when turned on for the very first time. This is because the equipment has no satellite data, called the Almanac, in its database. If you want to lessen the time needed to find position you may enter your position manually (default position: San Francisco, USA) on the GPS SETUP OPTIONS menu.

Thereafter it takes about 12 seconds to find position each time the power is turned on.
When the satellite signal is being received normally, the GP-1850WD/1850W displays various abbreviations at the bottom left-hand corner of the display which show DGPS/GPS receiver status. The table in below shows these abbreviations and their meanings.

<table>
<thead>
<tr>
<th>Display abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication</td>
</tr>
<tr>
<td>GPS 2D</td>
</tr>
<tr>
<td>GPS 3D</td>
</tr>
<tr>
<td>DGPS 2D (GP-1850WD)</td>
</tr>
<tr>
<td>DGPS 3D (GP-1850WD)</td>
</tr>
<tr>
<td>NO FIX</td>
</tr>
<tr>
<td>DOP</td>
</tr>
<tr>
<td>DEMO</td>
</tr>
<tr>
<td>GPS W2D</td>
</tr>
<tr>
<td>GPS W3D</td>
</tr>
</tbody>
</table>

### Turning the power off

Press and hold down the [POWER/BRILL] key until the screen goes blank. The time remaining until the power is turned off is shown on the screen.

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

### 1.5 Adjusting Tone and Brilliance

1. Press the [POWER/BRILL] key with a touch-and-release action. The tone and brilliance setting window appears.

![Tone and display brilliance setting window](image)

#### Tone and brilliance adjustment window

2. Press ◀ or ▶ on the cursor pad to adjust display tone.
3. Press ▲ or ▼ on the cursor pad to adjust display brilliance.

Note that tone and brilliance can also be adjusted by soft keys. After pressing the [POWER/BRILL] key, use the appropriate soft key to adjust tone or brilliance.

**Note:** Tone or brilliance must be adjusted within 10 seconds after pressing the [POWER/BRILL] key or the tone and brilliance adjustment window will be erased.
1.6 Plotter Displays

Press the [PLOT] key. Each time this key is pressed, the display mode changes in the sequence shown below. For display mode, refer to Chapter 2.

1.7 Steering/Highway Displays

Press the [XTE/HIWAY] key. Each time this key is pressed, the display mode changes in the sequence shown below. For display mode, refer to Chapter 2.
1.8 Menu Operation, Soft Keys

Most operations are carried out through the menu which is opened and closed with the [MENU] key. Menus may be selected with the five soft keys to the right of menus. Options are selected with the cursor pad.

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

2. Press appropriate soft key to display desired menu. For example, press the DISPLAY OPTIONS soft key. The name of the menu in use appears at the top right corner of the display.

3. Select item with the cursor pad, and press the EDIT soft key. For example, select TIME DISPLAY.

4. Use the cursor pad to change the setting.

5. Press the ENTER soft key or [ENTER] key.

6. Press the RETURN soft key.

7. Press the [PLOT] key to finish.
1.9 Demonstration Display

The demonstration display provides simulated operation of this unit. On the plotter display, own ship tracks, at the speed selected, a figure eight course or any course you enter, starting from position entered. All controls are operative; you may set destination, enter waypoints, etc.

1. Press the [MENU] key, followed by the CONFIGURATION and SYSTEM MENU soft keys to open the system menu.
2. Press the DEMONSTRATION MODE soft key to open the demonstration setting screen.

![Demo setting screen]

3. Press ▲ or ▼ to select DEMO MODE.
4. Press the EDIT soft key to show the demo mode window.

![Demo mode window]

5. Press ▲ to select ON.
6. Press the ENTER soft key or the [ENTER] key.
7. Select DEMO SPEED and press the EDIT soft key. Enter speed. Select digit with ◀/▶ and enter appropriate numeric value with the numeric keys.
8. Press the ENTER soft key or [ENTER] key.
9. Select DEMO COURSE and press the EDIT soft key. Select how you want the courseline to be traced; by FIGURE 8 or DIR.(ection). For DIR., enter course.
10. Press the ENTER soft key or [ENTER] key.
11. Select DEMO START LAT, and press the EDIT soft key. Enter latitude. Use the N<->S soft key to switch coordinates if necessary.
12. Press the ENTER soft key or [ENTER] key.
13. Select DEMO START LON, and press the EDIT soft key. Enter longitude. Use the E<->W soft key to switch coordinates if necessary.
14. Press the ENTER soft key or [ENTER] key.
15. Press the RETURN soft key.

To cancel the demonstration display, set DEMO MODE to OFF.
This page is intentionally left blank.
2. PLOTTER DISPLAYS

2.1 Presentation Modes

The plotter display mainly shows chart, ship’s track, waypoints, and navigation data.

Three types of display presentations are provided for the normal plotter display: north-up, course-up and auto course-up. To change the mode, use the presentation mode selection soft key, which is the 3rd soft key from the top.

North-up

Press the NORTH UP soft key to show the north-up display. North (zero degree) is at the top of the display and own ship is at the center of the screen. Own ship marker is a filled circle. This mode is useful for long-range navigation.

Auto course-up

Press the AUTO C.U. soft key to show the automatic course-up display. When destination is set it is at the top of the screen, and the north mark appears at the upper left side of the screen and points to north. A filled triangle marks own ship’s position.

When destination is not set, the course is upward on the screen at the moment the course-up mode is selected.

Course-up

Press the COURSE UP soft key to show the course-up display. When destination is set it is at the top of the screen, and the north mark appears at the upper left side of the screen and points to north. A filled triangle marks own ship’s position.

When destination is not set, the course is upward on the screen at the moment the course-up mode is selected.
2. PLOTTER DISPLAYS

2.2 Cursor

Turning on the cursor, shifting the cursor

Press the cursor pad to turn the cursor on, and the cursor appears at the own ship’s position. Operate the cursor pad to shift the cursor. The cursor moves in the direction of the arrow or diagonal pressed on the cursor pad.

Cursor position is displayed in latitude and longitude or Loran or Decca TDs (depending on menu setting) at the top of the plotter display when the cursor is on.

Turning off the cursor, returning own ship marker to screen center

The CENTER soft key turns off the cursor and returns own ship marker to screen center.

When the cursor is off, own ship position is shown.

2.3 Shifting the Display

The display can be shifted on the plotter display.

1. Press the cursor pad to display the cursor.
2. Locate the cursor at a screen edge. The screen shifts in the direction opposite of cursor location.

2.4 Displaying Nav Information Window

The nav information window can show four data: own ship position, waypoint position, own ship’s speed/course and off.

Press the soft key at the bottom of screen. Each press key changes data in the sequence shown below. Soft key name also changes.

```
NAV POS soft key
Displays own ship’s position, course and speed.

NAV WPT soft key
Displays range/bearing to the selected waypoint, chart scale and own ship’s course.

NAV S/C soft key
Displays own ship’s course/speed and water temperature*/depth.

NAV OFF soft key
Turns off the window.
```

*: Water temperature sensor is required.

Sequence of pressing the bottom soft key

When the cursor is on, the window at the top of the display shows the cursor position instead of own ship’s position. To change the window mode when the cursor is on, press the CENTER soft key to show the appropriate soft key.
2.5 Selecting Chart Scale/Range

Chart scale (range) may be selected with the ZOOM IN or ZOOM OUT soft key. ZOOM IN expands the chart; ZOOM OUT shrinks it.

2.6 Mini Chart Cards

The mini chart cards contain nautical charts. When you insert a suitable mini chart card in the slot and your boat is near land, a chart appears.

When a wrong card is inserted or a wrong chart scale is selected, the land will be hollow. Insert the proper card and select a suitable chart scale. Chart icons appear to help you select a suitable chart scale. The table below shows the chart icons and their meanings.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Icon]</td>
<td>Proper card is not inserted or chart scale is too small. Press the ZOOM IN soft key to adjust chart scale.</td>
</tr>
<tr>
<td>![Icon]</td>
<td>Chart scale is too large. Press the ZOOM OUT soft key to adjust chart scale.</td>
</tr>
<tr>
<td>![Icon]</td>
<td>Suitable chart scale is selected.</td>
</tr>
</tbody>
</table>

Indices and chart enlargement

When the ZOOM OUT soft key is used, you will see several frames appear on the chart. These frames are called indices and they show you what parts of the chart can be enlarged in the current picture range. The areas circumscribed with smaller frames can be enlarged, but the area enclosed by the largest frame cannot.
2. PLOTTER DISPLAYS

Sample chart (Japan and South Korea) showing indices

Remarks on chart display
A chart will not be displayed in the following conditions:

- When the chart scale is too large or too small.
  When this happens, select proper chart scale.
- When scrolling the chart outside the indices.

Chart symbols

FURUNO mini chart card
The table below shows FURUNO mini chart symbols and their meanings.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>△</td>
<td>Summit</td>
</tr>
<tr>
<td>++</td>
<td>Wreck</td>
</tr>
<tr>
<td>⚡️</td>
<td>Lighthouse</td>
</tr>
<tr>
<td>📦</td>
<td>Lighted Buoy</td>
</tr>
<tr>
<td>🔴</td>
<td>Buoy</td>
</tr>
<tr>
<td>📺</td>
<td>Radio Station</td>
</tr>
<tr>
<td>⚪️</td>
<td>Position of Sounding</td>
</tr>
<tr>
<td>✗</td>
<td>Obstruction</td>
</tr>
<tr>
<td>🐟</td>
<td>Fishing Reef</td>
</tr>
<tr>
<td>☐</td>
<td>Platform</td>
</tr>
<tr>
<td>🧭</td>
<td>Anchorage</td>
</tr>
</tbody>
</table>

Comparison of FURUNO and Nav-Charts™ chart cards

<table>
<thead>
<tr>
<th>Item</th>
<th>FURUNO</th>
<th>Nav-Charts™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dot scrolling capability</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Course-up display</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Lighthouse data presentation</td>
<td>YES *3</td>
<td>YES</td>
</tr>
<tr>
<td>Zoom at cursor position</td>
<td>YES</td>
<td>*1</td>
</tr>
<tr>
<td>Range at Equator</td>
<td>0.125, 0.5, 1, 2... 2048 nm</td>
<td>Same as left</td>
</tr>
<tr>
<td>Chart offset data entry</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Centering</td>
<td>YES</td>
<td>*2</td>
</tr>
</tbody>
</table>

*1 Nav-Charts™ chart may not center the cursor perfectly.
*2 Nav-Charts™ chart may not center own ship’s position perfectly.
*3 Newly designed chart cards containing lighthouse data. Chart cards for North America area are completed, and others are in production.
*4 Nav-Charts™ is the registered trademark of NAVIONICS INC.
Aid to navigation data

Selected FURUNO and NAVIONICS mini chart cards can show buoy and lighthouse data. Simply place the cursor on the lighthouse or buoy mark.

Place the cursor on a lighthouse or buoy mark.

Placing the cursor on the mark

Example of data displayed

Range and bearing from own ship

- NAVAID: /FL 6S 12M
- FROM OS
- 52.38nm 48.0°

Period (ex.: 6 seconds)

Visibility in nautical mile (ex.: 12 miles)

FL : Flashing
F : Fixed light
F FL : Fixed and Flashing light
MO : Morse code light
Oc : Occulting light

Example of buoy, lighthouse data

Port service icons (Nav-Charts™ cards)

Selected Nav-Charts™ mini chart cards show by icons services available at ports. Use the cursor pad to place the cursor on the sailboat icon (denotes a port or harbor), and then press the [ENTER] key. The services available appear at the top of the display.

Port service icons
2.7 Navigation Data Display

The navigation data display provides generic navigation data and DGPS/GPS information. Press the [PLOT] several times to show the navigation data display.

**Navigation data display**

The navigation data display shows your position by L/L or TD (Loran-C, Decca). To change the position format, press the appropriate LAT/LON or TD soft key.

**Enlarging an indication**

An indication on the screen may be enlarged as follows:

1. Use the cursor pad to select the indication which you wish to enlarge. Selected indication is circumscribed with a red cursor.
2. Press the ZOOM soft key.

To return to the normal nav data display, press the RETURN soft key.

**GPS satellite monitor display**

The GPS satellite monitor display shows information about GPS satellites. Press the SAT INFO soft key. Your display should look something like the following illustration.

For WAAS satellite*

*Only when WAAS fix mode is used.
Beacon information display

The DGPS beacon receiver-equipped model, can show DGPS reference station information. Press the BEACON INFO soft key to show the DGPS reference station information.

**SS:** SS (Signal Strength) displays a numeric representation of field strength of the received signal on the selected frequency. The higher the number the stronger the received signal. (should read at least 60.) If noise is present at reception band width, the figure gets bigger.

**SN:** SN (Signal-to-Noise) ratio displays the ratio between the desired signal and unwanted noise on the selected frequency. The higher the SN ratio the better the quality of the signal. (should read at least 21.)

**Note:** If your equipment does not have a DGPS receiver, the message “NO DIFFERENTIAL DATA” appears when the BEACON INFO soft key is pressed. Also when connecting with the external beacon receiver, this message appears.

2.8 Steering Display

The steering display provides steering information such as range, bearing, ETA to destination, course and speed. Press the [XTE/HIWAY] key several times to show the steering display.

**How to read the compass display**

The solid inverted triangle at the center of the compass shows own ship’s course. The hollow inverted triangle shows the bearing to destination waypoint. When own ship’s course is changed, the hollow inverted triangle moves with course change.

**Note:** Course means the direction which own ship moves to. It is different from own ship’s heading. Tidal current and wind may affect the course.
How to read the XTE indication

The black boat-shaped mark shows own boat’s movement and direction, and the amount to steer to return to course. Using the figure shown on the previous page as an example, you would steer right by 000.02 nautical miles to return to course. When this mark is out of range of the XTE scale, the mark color changes from black to yellow. The range of the XTE scale can be set as shown below.

Setting the range of the XTE scale

1. Press the EDIT XT-LMT soft key to display the following window.

```
EDIT XTE LIMIT
0 .1nm
```

2. Use the cursor pad to select digit to change.
3. Press appropriate alphanumeric key.
4. Press the [ENTER] key. To cancel entry, press the CANCEL soft key instead of the [ENTER] key.

Note that all digits may be cleared by pressing the [CLEAR] key.

2.9 Highway Display

The highway display provides a graphic presentation of ship's course. It is useful for monitoring XTE - the XTE scale shows direction and amount in nautical miles to steer to return to course. In the figure below, for example, you would steer right by 0.02 nm to return to course.

Press the [XTE/HIWAY] key once or twice to show the highway display.
2.10 Changing Operation Mode

Operation mode can be changed among PLEASURE, FISHING1 and FISHING2. FISHING1 or 2 mode provides mark/line entry at the cursor or own ship’s position. On FISHING 1 or 2 mode, pressing the [HIDE/SHOW] key changes the function of soft keys. Holding track, changing track color, and selecting color and form of mark/line can be performed by the soft keys directly. For detail information of FISHING 1 and FISHING 2 mode, see Chapter 4.

Sequence of pressing the [HIDE/SHOW] key at FISHING 1 or 2 mode
2. PLOTTER DISPLAYS

Selecting fishing 1, fishing 2 mode

1. Press the [MENU] key and the DISPLAY OPTIONS soft key. The display setup1 menu appears.

![Display setup1 menu](image)

2. Press ▼ to select OPERATION MODE.
3. Press the EDIT soft key to show the OPERATION MODE window.

![Operation mode window](image)

4. Press ▲ or ▼ to select PLEASURE, FISHING1 or FISHING2.
5. Press the ENTER soft key or the [ENTER] key to finish.

2.11 Navigation Trip Distance

The navigation trip distance is displayed on the navigation data display. Press the [PLOT] key several times to show the navigation data display.

![Navigation data display](image)

Note: When you enlarge POSITION, TRIP is not displayed.

Resetting trip distance

1. Press the [MENU] key followed by the CONFIGURATION and SYSTEM MENU soft keys.
2. Press the MEMORY/TRIP CLEAR soft key to open the clear memory menu.

![Clear memory menu](image)

3. Press ▼ to select TRIP METER RESET.
4. Press the EDIT soft key.
5. Press ▲ to select YES.
6. Press the ENTER soft key or the [ENTER] key to reset trips distance.
## 3. TRACK

### 3.1 Displaying Track

1. Press the [MENU] key to open the main menu.

   ![Main menu](image)

2. Press the CHART SETUP OPTIONS soft key to open the CHART SETUP OPTIONS menu.

   ![Chart setup menu](image)

3. Press the TRACK CONTROL soft key to open the TRACK CONTROL menu.

   ![Track control menu](image)

4. Press ▲ to select DISPLAY TRACK.

5. Press the EDIT soft key to show the display track window.

6. Press ▲ or ▼ to select ON or OFF as appropriate.

7. Press the ENTER soft key or the [ENTER] key.

8. Press the [PLOT] key to close the menu.

   The default setting is ON, which traces ship's track in accordance with ship’s movements.

   Number of track and mark points used appears in the TRACK STATUS window on the TRACK CONTROL display. Using the illustration at the bottom of the page as an example, it shows that 1000 out of 2000 track points and 5 out of 3000 mark shave been used.

### 3.2 Stopping/Restarting Plotting of Track

When your boat is at anchor or returning to port you probably won’t need to record its track. You can stop recording the track, to conserve the track memory, as follows:

1. Press the [MENU] key followed by the CHART SETUP OPTIONS and TRACK CONTROL soft key.

2. Press the STOP TRACK soft key. The indication “TRACKING” in the TRACK STATUS window changes to “NOT TRACKING”.

   On the plotter display, [H] icon appears.

   To restart recording the track, press the START TRACK soft key at step 2 in the above procedure.
3. TRACK

When the fishing mode is selected, you can stop or restart plotting the track with the soft key only on the plotter display. Press the [HIDE/SHOW] key several times to show the STOP TRACK soft key on the plotter display. Press the STOP TRACK soft key to stop plotting of track. The message of HOLD TRACK PLOTTING appears approx. 2 seconds and then own ship mark changes to hollow circle. To restart plotting the track, press the START TRACK soft key again. The message START TRACK PLOTTING appears approx. 2 seconds and then plotting restarts.

3.3 Changing Track Color

Track can be displayed in red, yellow, green, light-blue, purple, blue or white. It can be useful to change track color to discriminate between previous day’s track, past track, etc.

1. Press the [MENU] key followed by the CHART SETUP OPTIONS and TRACK CONTROL soft keys.
2. Press ▲ or ▼ to select TRACK COLOR.
3. Press the EDIT soft key to display the TRACK COLOR window.
4. Press ▲ or ▼ to select the color desired.
5. Press the ENTER soft key to finish.

When the fishing mode is selected, you can change track color with the soft key only on the track display.

3.4 Track Plotting Method, Interval

In drawing the track, first the ship’s position (fed from the DGPS/GPS receiver, WAAS) is stored into the unit’s memory at an interval of time or 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.

Track plotting method

1. Press the [MENU] key followed by the CHART SETUP OPTIONS and TRACK CONTROL soft keys.
2. Press ▲ or ▼ to select PLOT.
3. Press the EDIT soft key to display the PLOT window.
4. Press ▲ or ▼ to select TIME or DISTANCE. Distance is useful for conserving track memory, since no track is recorded when the boat is stationary.
5. Press the ENTER soft key or the [ENTER] key.
Track plotting interval

1. Press the [MENU] key followed by the CHART SETUP OPTIONS and TRACK CONTROL soft keys.
2. Press ▲ or ▼ to select TIME INTERVAL or DIST INTERVAL.
3. Press the EDIT soft key to display the INTERVAL window.

   TIME INTERVAL
   01 m 00 s
   (When selecting TIME INTERVAL.)

   DIST INTERVAL
   0.10 nm
   (When selecting DIST INTERVAL.)

Interval window

4. Use the cursor pad to place the cursor on the digit desired. The [CLEAR] key functions to clear an entire line of data.
5. Press appropriate alphanumeric key to enter value.
6. Repeat steps 4 and 5 to complete.
7. Press the ENTER soft key or the [ENTER] key.

3.5 Changing Track Memory Capacity

The equipment stores a total of 5000 points of track and marks. This total may be freely apportioned as desired. The default setting is 2000 points of track and 3000 marks. Note that when the track memory capacity is changed, all tracks and marks in the memory are erased.

1. Press the [MENU] key followed by the CHART SETUP OPTIONS and TRACK CONTROL soft keys.
2. Press ▼ to select TRACK MEMORY.
3. Press the EDIT soft key to display the TRACK MEMORY window.

   TRACK MEMORY
   1000/5000 POINTS

Track memory window

The track memory window may be erased by pressing the CANCEL soft key to escape.
4. Enter number of track memory points desired, with the alphanumeric keys.

   Note that all digits may be cleared by pressing the CLEAR soft key or the [CLEAR] key.

5. Press the ENTER soft key or the [ENTER] key. The following window appears to ask you if you are sure to change the track memory capacity.

   ▶️ RESETTING ERASES TRACK, MARK/LINE
   ALREADY SAVED. OK?
   YES ... "ENTER" key
   NO ... "CLEAR" key

Erase message

6. Press the [ENTER] key to change apportion, or press the [CLEAR] key to escape.
3.6 Erasing Tracks

Be absolutely sure you want to erase track; erased track cannot be restored.

**Erasing tracks by area**

You can erase tracks within an area you set.

1. Press the [MENU] key followed by the CHART SETUP OPTIONS, TRACK CONTROL and ERASE T & M soft keys.

   ![Erase menu]

2. Select ERASE TRACK BY AREA, and then press the EDIT soft key.
3. Move the cursor to the starting point of the area to erase.
4. Press the START soft key.
5. Move the cursor to the ending point of the area to erase.
6. Press the END soft key. You are asked if you sure to erase.
7. Press the [ENTER] key to erase, or press the [CLEAR] key to escape.

**Erasing tracks by color**

Tracks can be erased by on color.

1. Press the [MENU] key followed by the CHART SETUP OPTIONS, TRACK CONTROL and ERASE T & M soft key.
2. Select ERASE TRACK BY COLOR, and then press the EDIT soft key.
3. Select the color which you want to erase.
4. Press the ENTER soft key or [ENTER] key. You are asked if you are sure to erase.
5. Press the [ENTER] key to erase, or press the [CLEAR] key to escape.

**Erasing all track**

You can erase all track.

1. Press the [MENU] key followed by the CHART SETUP OPTIONS, TRACK CONTROL and ERASE T & M soft keys.
2. Select ERASE ALL TRACKS, and then press the EDIT soft key.
   You are asked if you sure to erase all track.
3. Press the [ENTER] key to erase, or press the [CLEAR] key to escape.
4. MARK

You can enter marks to denote important locations, such as a good fishing spot. In the default condition, you may enter 3000 marks.

4.1 Entering Marks

Select the FISHING 1 or FISHING 2 mode to enable entry of marks on the PLOTTER display. Select the location desired with the cursor, or turn off the cursor to enter the mark at own ship position. Press the MARK ENTRY soft key to enter the mark. The mark is entered in the shape and color selected from the MARK SHAPE and MARK COLOR windows.

In the FISHING 1 or FISHING 2 mode, pressing the [HIDE/SHOW] key changes the function of the soft keys as follows.

---

Plotter display

Changing displays

(PLOTTER display)
4. MARK

4.2 Changing Mark Attributes

You can select shape, line and color of marks and lines on the plotter display.

1. Press the [HIDE/SHOW] key to show the MARK EDIT soft key.
2. Press the MARK EDIT soft key to show the MARK/LINE window.

```
MARK SHAPE
MARK LINE
MARK COLOR  YELLOW
```

3. Press the MARK SHAPE soft key to change mark shape, the MARK LINE soft key to change mark line, or the MARK COLOR soft key to change mark color.

Mark shape

Press the MARK SHAPE soft key to display the MARK SHAPE window. Press ▲ or ▼ to select mark shape desired.

```
MARK SHAPE
▲
○
●
□
△
■
□
○
●
▼
```

Mark shape window

Mark line

Press the MARK LINE soft key to display the MARK LINE window. Press ▲ or ▼ to select mark line desired.

```
MARK LINE
▲
●
□
○
▼

Mark does not have a line.
```

Mark line window

Mark color

Press the MARK COLOR soft key to display the MARK COLOR window. Press ▲ or ▼ to select mark color desired.

```
MARK COLOR
▲
○ RED
○ YELLOW
○ GREEN
○ LIGHT BLUE
○ PURPLE
○ BLUE
○ WHITE
▼
```

Mark color window

4. Press the ENTER soft key or the [ENTER] key.
5. Press the RETURN soft key to finish.

Marks/lines entered hereafter are inscribed in the shape, color and line type selected here.
4.3 Changing Mark Size

Mark size can be selected from STD (standard) and SMALL.

1. Press the [MENU] key to display the main menu.
2. Press the CHART SETUP OPTIONS soft key.
3. Press the CHART DETAILS soft key to open the CHART DETAILS menu.

<table>
<thead>
<tr>
<th>Chart details menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAT/LON GRID</td>
</tr>
<tr>
<td>TEXT INFO</td>
</tr>
<tr>
<td>WAYPOINT</td>
</tr>
<tr>
<td>WAYPOINT NAME</td>
</tr>
<tr>
<td>INDEX</td>
</tr>
<tr>
<td>LANDMASS</td>
</tr>
<tr>
<td>BACKGROUND</td>
</tr>
<tr>
<td>NAV AIDS</td>
</tr>
<tr>
<td>SECTOR INFO</td>
</tr>
<tr>
<td>OTHER SYMBOLS</td>
</tr>
<tr>
<td>MARK SIZE</td>
</tr>
</tbody>
</table>

4. Press ▼ to select MARK SIZE.
5. Press the EDIT soft key.
6. Press ▲ or ▼ to select STD (standard) or SMALL.
7. Press the [ENTER] key.

4.4 Erasing Marks

Erasing individual marks/lines

1. Operate the cursor pad to place the cursor on the mark you want to erase.
2. Press the [CLEAR] key. The mark selected is erased.

**Note:** To erase a line, place the cursor on an edge of the line. The line segment will be erased.

Erasing marks/lines in an area

You can erase marks and lines within an area you select.

1. Press the [MENU] key followed by the CHART SETUP OPTIONS, TRACK CONTROL and ERASE T & M soft keys.
2. Press ▲ or ▼ to select ERASE MARKS BY AREA, and then press the EDIT soft key.
   The plotter display appears.
3. Move the cursor to the starting point of the area to erase.
4. Press the cursor to the starting point of the area to erase.
5. Press the START soft key.
6. Press the END soft key.
   You are asked if you sure to erase the marks/lines in the area you selected.
7. Press the [ENTER] key to erase, or press the [CLEAR] key to escape.

Erasing all marks/lines

You can erase all marks and lines. Be absolutely sure you want to erase all marks and lines; erased marks and lines cannot be restored.

1. Press the [MENU] key followed by the CHART SETUP OPTIONS, TRACK CONTROL and ERASE T & M soft keys.
2. Select ERASE ALL MARKS/LINES. And then press the EDIT soft key.
   You are asked if you are sure to erase all marks and lines.
3. Press the [ENTER] key to erase, or press the [CLEAR] key to escape.
4.5 Displaying Track and Mark Points

Number of track and mark points used appears in the TRACK STATUS window on the TRACK CONTROL display.

![Track control menu]

Number of marks in use.

Track control menu

4.6 Target Mark

A target mark (☆) shows a radar target’s position. This mark is inscribed on the plotter display and saved as a waypoint when a certain key is pressed on the radar. Some FURUNO radars can output a target mark to this plotter.
5. WAYPOINTS

5.1 Entering Waypoints

In navigation terminology, a waypoint is a particular location on a voyage whether it be a starting, intermediate or destination point. A waypoint is the simplest piece of information your equipment requires to get you to a destination, in the shortest distance possible. This unit has 835 waypoints (including quick waypoints) into which you can enter position information. There are five methods by which you can enter a waypoint: at own ship’s position, at MOB position, by cursor, by range and bearing, and through the waypoint list (manual input of latitude and longitude).

Entering waypoints at own ship’s position

You can save your current position as a waypoint. Press the [SAVE/MOB] key with a touch-and-release action to store your position. This new waypoint will automatically be saved in the waypoint list under the next consecutive waypoint number.

For FISHING 2 mode, immediately after pressing the MOB key, you can change the mark shape, color etc. similar to that shown in the procedure on the next page. Press the SAVE soft key to enter the mark.

Entering waypoints at MOB position

The MOB mark functions to mark man overboard position.

1. When man overboard, press the [SAVE/MOB] key several seconds to display the following message.

   ![MOB message]

   2. Press the [ENTER] key to select MOB position as destination, or the [CLEAR] key to only mark MOB position.

   3. To show range and bearing to the MOB position, press the NAV L/L soft key followed by the NAV WPT soft key.

   ![MOB concept]

   To erase a MOB mark in the FISHING 1 and PRESSURE modes, you must erase both the waypoint it is registered under and the MOB mark itself. Place the cursor on the MOB mark and press the [CLEAR] key followed by the [ENTER] key to erase the waypoint. (A flashing diamond appears over the waypoint when it has been correctly selected.) Repeat to erase the MOB mark.

Entering waypoints by the cursor

1. Press the [WPT/RTE] key to open the WAYPOINT & ROUTE menu.

   ![Waypoint & route menu]

2. Press the [SAVE/MOB] key with a touch-and-release action to store your position. This new waypoint will automatically be saved in the waypoint list under the next consecutive waypoint number.

3. To show range and bearing to the MOB position, press the NAV L/L soft key followed by the NAV WPT soft key.

   ![MOB concept]

   To erase a MOB mark in the FISHING 1 and PRESSURE modes, you must erase both the waypoint it is registered under and the MOB mark itself. Place the cursor on the MOB mark and press the [CLEAR] key followed by the [ENTER] key to erase the waypoint. (A flashing diamond appears over the waypoint when it has been correctly selected.) Repeat to erase the MOB mark.
2. Press the WAYPOINTS soft key to display the WAYPOINTS menu.

3. Press the WAYPOINT BY CURSOR soft key. The plotter display appears.

4. Operate the cursor pad to place the cursor on the location desired.

5. Press the NEW WPT soft key. The waypoint window appears and it shows mark shape, waypoint name, comment (default: date), position of waypoint and proximity alarm radius.

6. If you do not need to change the waypoint data, simply press the SAVE soft key to register the waypoint and return to the plotter display. If you want to change waypoint data as shown in the next several paragraphs, be sure to press the SAVE soft key only after changing all data you want to change.

Changing the shape and color of waypoint mark

1. Press the SELECT MARK soft key.

2. Press the MARK SHAPE soft key to open the mark shape selection window.

3. Operate the cursor pad to select shape desired.

4. Press the ENTER soft key or the [ENTER] key.

5. Press the SELECT MARK soft key.

6. Press the MARK COLOR soft key to open the mark color selection window.

7. Press ▲ or ▼ to select the color desired, and then press the ENTER soft key or the [ENTER] key.
Changing waypoint name, comment, proximity alarm radius

1. If necessary, you can change the name (up to 6 characters), comment (up to 13 characters), L/L position and the proximity alarm radius (explained in detail in Chapter 8) as follows:
   a) Select the NAME, COMMENT or PROXIMITY ALARM RADIUS field.
   b) Use the cursor pad to select character or digit.
   c) Enter appropriate data with the alphanumeric keys.

Note: You cannot change shape and color of a waypoint when it has a proximity alarm radius entered. To change shape or color, enter all zeroes as the proximity alarm radius.

Changing waypoint position

1. Use the cursor pad to place the cursor in the LAT LON field.
2. Operate the cursor pad to place the cursor on digit to change. Enter appropriate data with the alphanumeric keys.
3. You can switch co-ordinates with the N<-->S/E<-->W soft key.

Entering waypoints by range and bearing

This method is useful when you want to enter a waypoint using range and bearing to a target found on a radar.

1. Press the [WPT/RTE] key to open the WAYPOINT & ROUTE menu.
2. Press the WAYPOINTS soft key to open the WAYPOINT menu.
3. Press the WAYPOINT BY RANGE & BEARING soft key. The plotter screen appears.

4. Operate the cursor pad to place the cursor on the location desired. The range and bearing from own ship to cursor appear at the top of the screen.

Note: The origin point of range and bearing can be shifted to the place you desire. Operate the cursor pad to select location, and then press the soft key START POINT. “X” appears at the cursor position.

5. Press the NEW WPT soft key to show the waypoint window.
6. If necessary, change data as you did in “Entering waypoints by the cursor.”
7. Press the SAVE soft key to register the waypoint.
5. WAYPOINTS

Entering waypoints by latitude and longitude position

1. Press the [WPT/RTE] key to open the WAYPOINT & ROUTE menu.
2. Press the WAYPOINTS soft key to open the WAYPOINT menu.
3. Press the LOCAL LIST (lists waypoints in order from nearest to furthest) or ALPHA/NUMERIC LIST (lists waypoints in alphanumeric order) soft key.

4. Press the NEW WPT soft key to show the waypoint window. Own ship’s position is shown. Change the data similar to how you did in “Entering waypoints by the cursor.”
5. Press the SAVE soft key.

5.2 Erasing Individual Waypoints

Individual waypoints can be erased by the cursor or through the waypoint list.

Erasing waypoints by the cursor

1. Press the cursor pad to turn on the cursor.
2. Operate the cursor pad to place the cursor on the waypoint you want to erase. A flashing diamond mark appears over the waypoint when it is correctly selected.
3. Press the [CLEAR] key. You are asked if you are sure to erase the waypoint.
4. Press the [ENTER] key. The waypoint is erased from both the plotter screen and the waypoint list.

Erasing waypoints through the waypoint list

1. Press the [WPT/RTE] key to open the WAYPOINT & ROUTE menu.
2. Press the WAYPOINTS soft key to open the WAYPOINTS menu.
3. Press the LOCAL LIST or ALPHA/NUMERIC LIST soft key.
4. Press ▲ or ▼ to select the waypoint you want to erase.
5. Press the ERASE WPT soft key. You are asked if you are sure to erase the waypoint.
6. Press the [ENTER] key. The waypoint is erased from both the waypoint list and the plotter screen.
5. WAYPOINTS

5.3 Changing Waypoint Data

You can change the waypoint data through the waypoint list.

1. Press the [WPT/RTE] key, WAYPOINTS, and LOCAL LIST or ALPHA/NUMERIC LIST soft keys.
2. Press ▲ or ▼ to select the waypoint you want to change.
3. Press the EDIT WPT soft key.
4. Change data as you did in “Entering waypoints by the cursor.”
5. Press the SAVE soft key.

5.4 Changing Waypoint Position on the Plotter Display

You may change the position of waypoints on the plotter display as follows:

1. Press the [WPT/RTE] key followed by the WAYPOINTS soft key to open the WAYPOINTS menu.
2. Press the WAYPOINT BY CURSOR soft key. The plotter display appears.
3. Operate the cursor pad to place the cursor on the waypoint which you want to change. A flashing diamond mark appears on the waypoint when it is correctly selected.
4. Press the EDIT/MOVE soft key.
5. Press the MOVE WPT soft key.
6. Operate the cursor pad to place the cursor on the location desired.
7. Press the [ENTER] key.

The waypoint moves to the cursor position and its new position is recorded on the waypoint list. If the waypoint is set as destination or is part of a route, you are asked if you are sure to move the waypoint. In this case, press the [ENTER] key again to move the waypoint, or the [CLEAR] key to cancel move.
5. WAYPOINTS

5.5 Waypoint Mark Size

You may change the size of all waypoint marks to small or large (default), or turn them off.

1. Press the [MENU] key to open the main menu.
2. Press the CHART SETUP OPTIONS soft key.
3. Press the CHART DETAILS soft key to open the CHART DETAILS menu.
4. Press ▲ or ▼ to select WAYPOINT.
5. Press the EDIT soft key.
6. Press ▲ or ▼ to select LARGE, SMALL or OFF. LARGE shows mark in actual shape as shown on page 5-2. SMALL displays all waypoints with an “X” regardless of mark shape selected.
7. Press the ENTER soft key or [ENTER] key.

5.6 Searching Waypoints

You can search for a waypoint through the alphanumeric list as follows:

1. Press the [WPT/RTE] key, and then press the WAYPOINTS and ALPHA/NUMERIC LIST soft keys to show the alpha/numeric list. At the bottom of the display the search window appears.

   ![Search window]

2. Use the alphanumeric keys to enter the first 1 - 3 characters in the search window. The waypoint searched appears at the top of the screen.
6. ROUTES

Often a trip from one place to another involves several course changes, requiring a series of route points (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.

You can store up to 200 routes. A route may consist of 35 points.

6.1 Entering Routes

Entering routes through the route list

This method constructs routes using existing waypoints.

1. Press the [WPT/RTE] key to open the WAYPOINT & ROUTE menu.
2. Press the ROUTES soft key to open the ROUTE menu.
3. Press the NEW ROUTE soft key to open the new route entry window.

Route menu

New route entry window
6. ROUTES

4. If desired you can change the route name shown and/or add a comment. To change route name, press the [CLEAR] key to clear the route name. Use the cursor pad to position the cursor and then press appropriate alphanumeric key. To enter a comment, place the cursor in the COMMENT window. Use the cursor pad and alphanumeric keys to enter your comment. A route name may consist of six characters; comment, 13 characters.

5. Press the LOCAL LIST or ALPH LIST soft key to open the waypoint list.

6. Press ▲ or ▼ to select a waypoint, and press the ADD WPT soft key to add it to the route.

7. Repeat step 6 to complete the route. When you want to clear a waypoint selected, press the ERASE LST WP soft key. Each press of this key deletes the last waypoint entered.

8. Press the SAVE soft key to register the route.

**Entering routes by the cursor**

This method allows you to construct a route directly on the plotter display, using existing waypoints or new locations. Any new location will be saved as a waypoint, under the next consecutive waypoint number.

1. Follow step 1-4 in “Entering routes through the route list.”
2. Press the PLOT soft key. The plotter display appears.
3. Operate the cursor pad to place the cursor on an existing waypoint (ADD WPT soft key appears) or new location (ADD NEW WPT soft key appears).
4. Press the ADD WP (ADD NEW WPT) soft key.
5. Repeat steps 3 and 4 to complete the route.
6. Press the [ENTER] key to register the route.

**6.2 Connecting Routes**

Two routes can be connected as follows:

1. Press the [WPT/RTE] key followed by the ROUTES and NEW ROUTE soft keys to open the NEW ROUTE menu.
2. Enter the name for new route.
3. Press the CONECT ROUTE soft key.
4. Enter the registered route name for the first route beneath FIRST in the CONNECT ROUTE window.

```
CONNECT ROUTE
FIRST                        SECOND
FORWARD                      REVERSE

NEW ROUTE
F<-->R
SAVE
CANCEL
```

**Connect route window**

5. Press the F<-->R soft key to select direction to transverse the waypoints of the route; forward or reverse.
6. Enter the route name of the second route similar to how you did for the first route.
7. Press the SAVE soft key.

**Note:** The maximum number of waypoints in a route is 35. If this number is exceeded an error message appears. In this case, delete waypoints in one or both routes so the total number of waypoints does not exceed 35.
6. ROUTES

6.3 Inserting, Removing Waypoints

Inserting waypoints through the route list

Waypoints can be inserted in routes as follows:

1. Press the [WPT/RTE] key followed by the ROUTES soft key to open the ROUTE menu.
2. Select a route by pressing ▲ or ▼.
3. Press the EDIT ROUTE soft key. The route name screen appears.
4. Press the LOCAL LIST soft key. All waypoints in the route are displayed.

5. Press ▲ or ▼ to place the cursor at the location where you want to insert a waypoint.
6. Press the INSERT WPT soft key to show the waypoint list.

Changing waypoints through the list

Waypoints used in a route can be changed with others.

1. Press the [WPT/RTE] key followed by the ROUTES soft key to open the ROUTE menu.
2. Select a route by pressing ▲ or ▼.
3. Press the EDIT ROUTE soft key. The route name screen appears.
4. Press the LOCAL LIST soft key.
5. Select the waypoint which you want to change (remove).
6. Press the CHANGE WPT soft key to show the local list.
7. Select the waypoint which you want to change (insert).
8. Press the CHANGE WPT soft key to change the waypoint.

Press ▲ or ▼ to select the waypoint you want to insert. You can switch between the local list and alphanumeric list by pressing the LOCAL LIST or ALPH LIST soft key.
6. ROUTES

Inserting waypoints on the plotter display

Inserting waypoints before the first waypoint or after the last waypoint

1. Press the [WPT/RTE] key followed by the ROUTES soft key to open the ROUTE menu.
2. Press ▲ or ▼ to select the route desired.
3. Press the EDIT ROUTE soft key.
4. Press the PLOT soft key to show the plotter screen.
5. Operate the cursor pad to place the cursor on the first or last waypoint of the route which you want to insert.
6. Press the ADD TO START (ADD TO END) soft key.
7. Operate the cursor pad to place the cursor on an existing waypoint (ADD WPT soft key appears) or new location (ADD NEW WPT soft key appears).
8. Press the ADD WPT (ADD NEW WPT) soft key.

When you want to insert waypoints after the last waypoint, press the “ADD TO END” soft key at step 6.

Inserting waypoints in an intermediate location within a route

1. Follow steps 1 through 4 in “Inserting waypoints before the first waypoint or after the last waypoint.”
2. Operate the cursor pad to place the cursor on a line connecting waypoints.
3. Press the SPLIT LEG soft key. The selected line turns red.
4. Operate the cursor pad to place the cursor on an existing waypoint (INSERT WPT soft key appears) or new location (INSERT NEW WPT soft key appears).
5. Press the appropriate soft key, INSERT WPT or INSERT NEW WPT.

Removing waypoints from routes

Removing route waypoints through the route list

1. Press the [WPT/RTE] key followed by the ROUTES soft key to open the ROUTE menu.
2. Press ▲ or ▼ to select the route desired.
3. Press the EDIT ROUTE and LOCAL LIST soft keys to show the waypoint list.
4. Press ▲ or ▼ to select the waypoint you want to delete.
5. Press the REMOVE WPT soft key.

Removing route waypoints from the plotter display

1. Press the [WPT/RTE] key followed by the ROUTES soft key to open the ROUTE menu.
2. Press ▲ or ▼ to select the route desired.
3. Press the EDIT ROUTE soft key.
4. Press the PLOT soft key to show the plot screen.
5. Operate the cursor pad to place the cursor on the waypoint you want to remove from the route.
6. Press the REMOVE WPT soft key.
6. ROUTES

6.4 Creating Track-based Routes

You can create routes based on your ship’s track by entering waypoints at own ship’s position. This feature is useful when you wish to retrace a track.

1. Press the [WPT/RTE] key to open the WAYPOINT & ROUTE menu.
2. Press the CREATE VOYAGE BASED ROUTE soft key to show the save route menu.

   ![Save route menu]

3. Press the NEW soft key to show the new route window.

   ![New route window]

4. If required, you may change the route name and enter a comment, using the [CLEAR] key, cursor pad and alphanumeric keys.

5. Press the START LOG soft key to show the track-based route screen. If you entered an existing route name at step 4, you are asked if you want to add track-based waypoints to the existing route. Then, press the [ENTER] key to select YES, or the [CLEAR] key to escape.

   ![Route contents display]

6. Press the [PLOT] key to show the plot display. The SAVE icon appears at the bottom of the screen.

   ![SAVE icon appearance on the plotter display]
6. ROUTES

7. Press the [SAVE/MOB] key with a touch-and-release action to enter a waypoint mark at own ship position. A new waypoint is created under the next consecutive waypoint number and that waypoint is added to the route.

8. Repeat step 7 whenever you change course. 35 waypoints can be entered.

9. To stop creating the track-based route, press the [WPT/RTE] key followed by the CREATE VOYAGE BASED ROUTE soft key.

10. Press the FINISH LOG soft key to register the route. The SAVE icon disappears.

6.5 Erasing Routes

1. Press the [WPT/RTE] key followed by the ROUTES soft key to open the route menu.

2. Press ▲ or ▼ to select a route you want to erase.

3. Press the ERASE ROUTE soft key. You are asked if you are sure to erase the route.

4. Press the [ENTER] key to erase the route.
7. NAVIGATION

7.1 Navigating to “Quick Points”

The “quick point” feature allows you to navigate to point(s) without retaining the data indefinitely in your unit’s memory. Each time a quick point is entered previous quick points have the same numbers as newly entered ones are written over.

Selecting quick point entry method

You need to tell your unit how to set the quick point: 1 POINT, 35 POINT (up to 35 points) or WPT/PORT SERV. (For WPT/PORT SERV, see the next page.)

1. Press the [MENU] key.
2. Press the DISPLAY OPTIONS soft key.
3. Select SET GO TO METHOD and press the EDIT soft key. The following display appears.

   SET GO TO METHOD
   ▲ 1 POINT
   ◇ 35 POINT
   ◇ WPT/PORT SER
   ▼

   SET GOTO METHOD window

4. Select method desired.
5. Press the ENTER soft key.
6. Press the RETURN soft key to finish.

Navigating to a single quick point

1. Select 1 POINT in “Selecting quick point entry method,” and return to the plotter display.
2. Place the cursor on an existing waypoint (GO TO WPT soft key appears) or a new location (GO TO CURSOR soft key appears).
3. Depending on the selection you made at step 2, press the GO TO CURSOR or GO TO WPT soft key.

A light-blue line connects between own ship and destination, marked “QP<01>”, and it shows the shortest course to the destination. Arrows on the line show the direction to follow to get to the quick point. Range and bearing from own ship to the destination appear at the top of screen. This location is saved to the waypoint list as waypoint “QP01.”

Navigating to multiple quick points

1. Select 35 POINT in “Selecting quick point entry method,” and return to the plotter display.
2. Press the GO TO soft key.
3. Place the cursor on an existing waypoint (SELECT WPT soft key appears) or a new location (ADD QP soft key appears).
4. Depending on the selection you made at step 3, press the SELECT WPT or ADD QP soft key. “QP<01>” appears at the cursor location. To erase last-entered waypoint, press the ERASE LST WPT soft key.
5. Repeat steps 3 and 4 to enter other quick points.
6. After entering all waypoints (up to 35 points), press the [ENTER] key to register the route.

A light-blue line connects between own ship and all quick points, and it shows the shortest course to destination. Arrows on the line show the direction to follow the route. Quick points are numbered in sequential order from QP<01> and are saved to the waypoint list. Range and bearing from own ship to the first destination appear at the top of screen. The unit saves the points as a route, under the name “Q<RTE” (Quick Route).
7.2 Navigating to Waypoints (waypoint list)

1. Press the [WPT/RTE] key to open the WAYPOINT & ROUTE menu.
2. Press the WAYPOINTS soft key to open the WAYPOINTS menu.
3. Press the LOCAL LIST or ALPHA/NUMERIC LIST soft key to show corresponding waypoint list.
4. Select a waypoint.
5. Press the GO TO soft key. The plotter display appears. A light-blue line runs between destination selected and own ship’s position. Arrows on the line show the direction to follow. Waypoint data appear at the top of screen.

7.3 Navigating to Ports, Port Services

Some Nav-Charts™ and C-MAP chart cards have a port service list which shows services available at ports or harbors. (See page 2-5.) You can use the list to set destination as follows:

1. Press the [MENU] key to open the main menu.
2. Press the DISPLAY OPTIONS soft key.
3. Press ▼ to select SET GO TO METHOD and press the EDIT soft key.
4. Press the ▲ or ▼ to select WPT/PORT SER and press the [ENTER] key or the ENTER soft key.
5. Press the [PLOT] key to return to the plotter display.
6. Press the GO TO soft key. Soft key titles change as in the figure below.

7. Press the PORT or NEAR SRVICE soft key depending on objective. PORT shows a list of ports in your area. NEAR SRVICE displays the port service list.

Sample port list (southern Italy)
8. If you selected PORT at step 7, use the cursor pad to select a port and press the [ENTER] key. Make a route using the soft keys and press the [ENTER] key. (If you want to go directly to that port, simply press the soft key ADD QP followed by the [ENTER] key.)

If you selected NEAR SERVICE in step 7, select service mark desired and then press the ENTER soft key. Then, the display shows the locations of those services nearest you. (The figure at right shows the location of filling stations in an area in southern Italy.) Use ▲ or ▼ to place the “hand cursor” on the port service icon desired and press the ENTER soft key. Make a route using the soft keys and press the [ENTER] key. (If you want to go directly to location selected, simply press the soft key ADD QP followed by the [ENTER] key.)
7. NAVIGATION

7.4 Following a Route

1. Press the [WPT/RTE] key followed by the ROUTE soft key to open the route list.
2. Press ▲ or ▼ to select a route.
3. Press the GO TO soft key to show the plotter display.

Plotter display, route selected as destination

The cursor is on the route waypoint nearest own ship.

4. Operate the cursor pad to place the cursor on the waypoint or leg desired in the route.
5. Press the GO TO WPT or FOLLOW LEG soft key (depending on the choice made at step 4).

Green lines connect all route waypoints and arrows on the lines point in the direction to traverse the route.

Navigate route waypoints in reverse order

Press the RVSE ROUTE soft key to reverse the order to traverse waypoints. The arrows on the route line point in the direction selected.

Navigate directly to a route waypoint

If you want to go directly to a route waypoint, place the cursor on the waypoint to show the flashing diamond, and then press the GO TO WPT soft key.

Navigate along specific leg of route

Place the cursor on the leg to display it in a white and red flashing line, and then press the FOLLOW LEG soft key.

Restarting navigation

When you steer to avoid an obstacle or the vessel drifts, you may go back your intended course (Line 1 in the figure below). Use the steering or highway display to help you return to course.

Also, if you don’t need to return to the original course, you can go directly to the waypoint (Line 2 in the figure below) using the restart function below.

Example of when to restart navigation

1. Set a destination.
2. Press the [WPT/RTE] key to open the WAYPOINT & ROUTE menu.
3. Press the LOG soft key.

TO Waypoint (WPT no. in reverse video) Passed waypoint (gray characters) Estimated Time of Arrival at last waypoint

Log display

4. Press the RESTART soft key.
7. NAVIGATION

Setting speed for ETA calculation

Speed, which may be input manually or automatically, is required to calculate ETA (Estimated Time of Arrival) to a waypoint.

1. Press the [WPT/RTE] key to display the WAYPOINT & ROUTE menu.
2. Press the LOG soft key.
3. Press the SPEED soft key.

<table>
<thead>
<tr>
<th>SELECT SPEED FOR ETA</th>
</tr>
</thead>
<tbody>
<tr>
<td>▲ SPD 10.0kt</td>
</tr>
<tr>
<td>○ GPS AVG SPD</td>
</tr>
<tr>
<td>▼</td>
</tr>
</tbody>
</table>

Select speed for ETA window

4. Key in speed manually in the SPD field, or use GPS speed data by selecting GPS AVG SPD.
5. Press the ENTER soft key to register your selection.

Switching waypoints

When you arrive to a waypoint on a route, you can switch to the next waypoint three ways: AUTO1, AUTO2 and MANUAL.

**AUTO1**: Automatically switches the TO waypoint when your boat is within the arrival alarm area. For how to set the arrival alarm area, see “8.3 Arrival Alarm” on page 8-2.

**AUTO2**: Automatically switches the TO waypoint when the boat enters the arrival alarm range or the boat passes an imaginary perpendicular line passing through the center of the destination waypoint.

Switches to the next waypoint on the perpendicular though own ship is off the arrival alarm range.

**MANUAL**: When the boat enters the arrival alarm area, the TO waypoint may be switched by using the RESTART soft key (on the LOG display). If the arrival alarm is not set, the waypoint will not be switched. To be alerted when you arrive at a waypoint turn on the audio alarm. For further details, see “8.2 Audio Alarm On/Off” on page 8-1.

To select waypoint switching method do the following:

1. Press the [MENU] key.
2. Press the DISPLAY OPTIONS soft key.
3. Select WAYPOINTS SW.
4. Press the EDIT soft key to show the waypoint sw window.

<table>
<thead>
<tr>
<th>WAYPOINT SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>▲ AUTO 1</td>
</tr>
<tr>
<td>● AUTO 2</td>
</tr>
<tr>
<td>○ MANUAL</td>
</tr>
<tr>
<td>▼</td>
</tr>
</tbody>
</table>

Waypoint SW window

5. Select appropriate waypoint switching method.
6. Press the ENTER soft key to close the window.
7. NAVIGATION

7.5 Canceling Navigation

1. Press the [WPT/RTE] key.
2. Press the LOG soft key.
3. Press the STOP soft key.
4. Press the [ENTER] key to go stand by.
5. Press the RELEASE soft key.
6. Press the [ENTER] key.
8. PLOTTER ALARMS

8.1 Introduction

There are five plotter-related alarms which generate both audible and visual alarms: Arrival alarm, Anchor Watch alarm, XTE (Cross Track Error) alarm, Proximity alarm, and Speed alarm.

When an alarm setting is violated the buzzer sounds, and the speaker icon ( شكراً) appears in red. You may silence the alarm by pressing the [CLEAR] key. The icon remains on the screen until the cause of the alarm is removed or the alarm is deactivated.

8.2 Audio Alarm On/Off

The audio alarm sounds whenever an alarm setting is violated. You can enable or disable the audio alarm as follows:

1. Press the [ALARM] key to show the ALARM menu.

```
<table>
<thead>
<tr>
<th>ALARM INFORMATION</th>
<th>AUDIO ALARM</th>
<th>ARRIVAL ALARM</th>
<th>ANCHOR ALARM</th>
<th>PROXIMITY ALARM</th>
<th>XTE ALARM</th>
<th>SPEED ALARM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ON</td>
<td>ON 0.100nm</td>
<td>ON 0.050nm</td>
<td>ON</td>
<td>ON 0.100nm</td>
<td>OVER/UNDER 12.5 ~ 15.0kt</td>
</tr>
<tr>
<td></td>
<td>NO ALARM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

2. Press ▲ or ▼ to select AUDIO ALARM.
3. Press the EDIT soft key to show the audio alarm window.

```
AUDIO ALARM
▲ ON
▼ OFF
```

4. Press ▲ or ▼ to select ON or OFF.
5. Press the ENTER soft key or the [ENTER] key to register your selection.
8.3 Arrival Alarm

The arrival alarm informs you that your boat is approaching a destination waypoint. The area that defines an arrival zone is that of a circle which you approach from the outside of the circle. The alarm will be released if your boat enters the circle. When the arrival alarm is active, a red dashed circle marks the arrival alarm area.

How the arrival alarm works

1. Press the [ALARM] key to open the alarm menu.
2. Press ▲ or ▼ to select ARRIVAL ALARM.
3. Press the EDIT soft key to show the arrival alarm window.
4. Press ▲ to select ON.
5. Operate the cursor pad to place the cursor on the digit desired.
6. Key in the alarm range desired. The arrival alarm range is 0.001 to 9.999 miles.
7. Press the ENTER soft key or the [ENTER] key.

8.4 Anchor Watch Alarm

The anchor watch alarm informs you that your boat is moving when it should be at rest. When the anchor watch is active, a red dashed circle marks the anchor watch area.

How the anchor watch alarm works

1. Press the [ALARM] key to open the alarm menu.
2. Press ▲ or ▼ to select ANCHOR ALARM.
3. Press the EDIT soft key to open the anchor alarm window.
4. Press ▲ to select ON.
5. Key in the alarm range desired. The anchor watch range is 0.001 to 9.999 miles.
6. Press the ENTER soft key or the [ENTER] key to register your selection.

The anchor alarm range appears with the circle, its center is the own ship location when pressing the [ENTER] key. If own ship goes out this range, the alarm works.
8.5 XTE (Cross Track Error) Alarm

The XTE alarm warns you when your boat is off its intended course. When the XTE alarm is active, two red dashed lines mark the XTE alarm area.

How the XTE alarm works

1. Press the [ALARM] key to open the alarm menu.
2. Press ▲ or ▼ to select XTE ALARM.
3. Press the EDIT soft key to open the XTE alarm window.
4. Press ▲ or ▼ to select ON.
5. Key in the alarm range desired.
6. Press the ENTER soft key or the [ENTER] key to register your selection.

8.6 Speed Alarm

The speed alarm warns you when your boat’s speed is within, over/under or under the speed range set.

1. Press the [ALARM] key to open the alarm menu.
2. Press ▲ or ▼ to select SPEED ALARM.
3. Press the EDIT soft key to display the speed alarm window.
4. Press ▲ or ▼ to select WITHIN or OVER/UNDER.
5. Key in the alarm range desired.
6. Press the ENTER soft key or the [ENTER] key to finish.

8.7 Proximity Alarm

The proximity alarm alerts you when your vessel nears a waypoint by the distance set for that waypoint on the waypoint list. This distance is called the proximity alarm radius. The waypoint having a proximity alarm radius is displayed with . You can globally activate or deactivate the proximity alarm here.

1. Press the [ALARM] key to open the alarm menu.
2. Press ▲ or ▼ to select PROXIMITY ALARM.
3. Press the EDIT soft key to show the proximity alarm window.
4. Select ON or OFF by the cursor pad.
5. Press the ENTER soft key or the [ENTER] key to register your selection.
8.8 Alarm Information

When an alarm setting has been violated the buzzer sounds and the speaker icon (shown in red) appears. You can see which alarm has been violated, as well as silence the buzzer, on the alarm menu display.

1. Press the [ALARM] key.

2. Press the CLEAR ALARM soft key to silence the buzzer. The color of the alarm message and the speaker icon changes from red to black.

Note: The speaker icon is displayed in red until all alarms have been acknowledged on the alarm menu display. If more than one alarm has been violated the message CONTINUE appears at the bottom of the display. In this case press the NEXT INFO soft key to see which other alarms have been violated.

---

### Alarm messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>YOU HAVE ARRIVED AT WAYPOINT.</td>
<td>Arrival alarm setting violated.</td>
</tr>
<tr>
<td>YOU HAVE EXCEEDED ANCHOR WATCH LIMIT.</td>
<td>Anchor watch alarm setting violated.</td>
</tr>
<tr>
<td>YOU HAVE ENTERED AN AVOIDANCE AREA.</td>
<td>Proximity alarm setting violated.</td>
</tr>
<tr>
<td>YOU HAVE EXCEEDED XTE LIMIT.</td>
<td>XTE alarm setting violated.</td>
</tr>
<tr>
<td>YOU HAVE EXCEEDED SPEED ALARM LIMIT.</td>
<td>Speed alarm setting violated.</td>
</tr>
</tbody>
</table>

---

Alarm information (Example: Arrival alarm)
9. MEMORY CARD OPERATIONS

The following data can be saved to memory cards:

- Mark/line
- Waypoints/routes
- Track
- Configuration (menu settings)

9.1 Formatting Memory Cards

Before you can use a memory card it must be formatted. Note that formatting a used card erases all saved data.

1. Turn the power off.
2. Insert the memory card you want to format into the slot.
3. Turn the power on.
4. Press the [MENU] key followed by the CONFIGURATION and UPLOAD/DOWNLOAD DATA soft keys.
5. Press the SAVE DATA TO MEMORY CARD.
6. Press the FORMAT soft keys. You are asked if you are ready to format the memory card.
7. Press the [ENTER] key to format (or press the [CLEAR] key to escape). NowFormatting MEMORY CARD appears. Do not remove the card while it is being formatting. When the formatting is completed, FORMAT COMPLETED appears.

8. Press the [ENTER] key to finish. Now you can record data to the memory card.

Note: Chart cards cannot be formatted.

9.2 Saving Data to Memory Card

The memory card can save four items of data; track, mark/line, waypoint/route and configuration.

Saving data

1. Insert a formatted memory card into the slot.
2. Press the [MENU] key followed by the CONFIGURATION and UPLOAD/DOWNLOAD DATA soft keys.
3. Press the SAVE DATA TO MEMORY CARD soft key. The SAVE DATA display appears.
4. Press ▲ or ▼ to select item to save.
5. Press the EDIT soft key to open the TRACK, MARK/LINE, WAYPOINTS/ROUTES or CONFIGURATION window.
6. Press ▲ to select ON.
7. Press the ENTER soft key or the [ENTER] key.
8. Repeat steps 4 to 7 to save other data if desired.
9. Press the SAVE DATA soft key. The following message appears and saving starts. Do not remove the memory card while data is being saved.

NOW SAVING DATA TO MEMORY CARD. DO NOT TURN OFF THE POWER UNTIL SAVING COMPLETED.

SAVE DATA message

When saving is completed, COMPLETE SAVING DATA appears.

9. MEMORY CARD OPERATIONS

9.3 Loading Data from Memory Card

Data (track, marks, waypoints, configuration) can be loaded from a memory card and displayed on the screen. This feature is useful for observing past data and setting up the equipment for a specific purpose (with "configuration").

1. Press the [MENU] key followed by the soft keys CONFIGURATION and UPLOAD/DOWNLOAD DATA.
2. Press the LOAD DATA FROM MEMORY CARD soft key to show the LOAD DATA display.

   ![Load data display](image)

3. Press ▲ or ▼ to select item to load.
4. Press the EDIT soft key to show the ON/OFF selection window.
5. Press ▲ to select ON. Press the ENTER soft key or the [ENTER] key. If the memory card does not contain the item selected, the buzzer sounds and ON cannot be selected.
6. After you select all items desired, press the LOAD DATA soft key to load data. The following message appears.
NOW LOADING DATA FROM MEMORY CARD. DO NOT TURN OFF THE POWER UNTIL LOADING COMPLETE.

Load data message

After loading is completed, the following message appears.

COMPLETE LOADING DATA. PRESS "ENTER" KEY TO CONTINUE.

Complete message

7. Press the [ENTER] key.

Notes on loading data

Track
Since loaded track data is added to internal track, oldest track in the memory of the unit will be deleted when the track memory capacity is exceeded.

Waypoint/route
Waypoints/routes in the memory of the unit are deleted to make room for loaded ones.

Mark/line
The loaded data is added to internal data. When the mark/line memory becomes full, no marks may be entered.

Configuration
The loaded data replaces current configuration settings. Press the [ENTER] key to restart. If the memory card is ejected while loading, or data could not be loaded, press the [ENTER] key to restart with default settings. Note that the track memory capacity setting is not saved or loaded.
10. CUSTOMIZING YOUR UNIT

This section describes the various options which allow you to set up your unit to suit your needs.

10.1 CHART SETUP OPTIONS menu

The chart offset options menu provides three menus: chart offset, track control, and chart details.

1. Press the [MENU] key to open the main menu.
2. Press the CHART SETUP OPTIONS soft key.

   CHART SETUP
   
   DGPS 3D
   
   CHART OFFSET
   TRACK CONTROL
   CHART DETAILS
   
   RETURN

   Chart setup options menu

CHART OFFSET menu

In some instances position may be off by a few minutes. For example, the position of the ship is shown to be at sea while it is in fact moored at a pier. You can compensate for this error by offsetting chart position as follows:

1. Press the [MENU] key followed by the CHART SETUP OPTIONS and CHART OFFSET soft keys.
2. Use the cursor pad to place the cursor where to offset chart position.
3. Press the SET OFFSET soft key.
4. Press the RETURN soft key to finish.

To cancel chart offset, press the RESET OFFSET soft key at step 3 in the above procedure.

TRACK CONTROL menu

This menu mainly controls track color and track plotting interval. For further details see Chapter 3.
10. CUSTOMIZING YOUR UNIT

CHART DETAILS menu

1. Press the [MENU] key followed by the CHART SETUP OPTIONS and CHART DETAILS soft keys.

2. Use the cursor pad to select item and press the EDIT soft key.
3. Select option with the cursor pad and press the RETURN soft key to finish.

Chart details menu description

LAT/LONG GRID: Turns lat/long grid on/off and changes its color.

TEXT INFO: Turns geographic name display on/off.

WAYPOINT: Turns waypoint on or off and selects size to large or small. “LARGE” displays waypoint in shape selected; “SMALL” shows waypoints as an X regardless of actual shape. “OFF” only display waypoints when they are used in navigation.

WAYPOINT NAME: Turns waypoint name on/off.

INDEX: Turns chart indices on/off.

LANDMASS: Selects brightness and color of land.

BACKGROUND: Selects background color to black or blue.

NAV AIDS: Turns aids to navigation symbols (for example, buoys) on/off. When OFF is selected, symbols are displayed but information is not.

SECTOR INFO: Turns lighthouse viewable angle indication (on FURUNO charts) on/off. Viewing angle is shown as an arc extending from lighthouse position. Arc color, white or green, is the color of the light beam. This feature is available with selected charts.

OTHER SYMBOLS: Selects color of all other chart symbols.

MARK SIZE: Selects the mark size STD (standard) or SMALL (appearing “x”).

DEPTH INFO soft key: Turns depth info display on/off and sets it color.
10. CUSTOMIZING YOUR UNIT

10.2 DISPLAY OPTIONS menu

This menu contains items for setting up the plotter displays.

1. Press the [MENU] key.
2. Press the DISPLAY OPTIONS soft key. The display setup menu appears.

Display setup menu

DISPLAY SETUP menu description

RNG & BRG MODE

The GPS receiver calculates the range, bearing, cross track error (XTE) and ETA to TO waypoint when you set a destination. The range and bearing can be calculated by GREAT CIRCLE (straight line between two points) or RHUMB LINE (straight line between two points on nautical chart) method.

RANGE/SPEED UNIT

Selects the unit for range and speed; nm/kt, km/ km/h, sm/ sm/h.

DEPTH UNIT

Selects unit of depth measurement among feet, fathoms, and meters.

TEMP UNIT

Selects unit of water temperature measurement between Celsius and Fahrenheit.

LAT/LON DISPLAY

Displays the minutes of latitude and longitude positions in hundredths, thousandths or ten thousandths.

TIME DISPLAY

Selects time display format for 12 hour or 24 hour.

WAYPOINT SW

Provides automatic or manual waypoint switching when following a route. For further details, see page 7-5.

COURSE VECTOR

You may extend a line from the own ship position to show ship’s course. The line can be a vector (the length depends on the ship’s speed) or course bar (course bar).

BEARING

A navigation device outputs both true and magnetic bearings. A magnetic bearing is true bearing plus (or minus) earth’s magnetic deviation. Thus the equation for finding magnetic bearing is;

true bearing ±x (magnetic variation)° = magnetic bearing

You can display your ship’s course and bearing to waypoint in true or magnetic bearing.
The magnetic variations for all areas of the earth are preprogrammed into this unit. The preprogrammed variation is accurate for most instances, however you may wish to manually enter a updated variation referring to the latest navigation chart.

1. Select MAG VARIATION, and press the EDIT soft key to show the mag variation window.

   MAG VARIATION
   �leur AUTO MANUAL 0.7°W

   Mag variation window

2. Select MANUAL.
3. Key in magnetic deviation value.
4. Press the W<-->E soft key to switch between East and West and vice versa, if necessary.
5. Press the ENTER soft key or the [ENTER] key to finish.

TD DISPLAY
Position may be shown in Loran C TDs, Decca TDs, or latitude and longitude. To display position in TDs, select Loran C or Decca here and choose TD at “POSITION DISPLAY” below. You can select the Loran C or Decca chain to use on the TD SETUP menu. For details see “TD SETUP menu” on page 10-7 and 8.

POSITION DISPLAY
Displays position in latitude and longitude or TD (time difference).

SET GO TO METHOD
Selects the method for entering the quick point: 1 POINT, 35 POINT (2-35 points), or WPT/PORT SER. For further details see pages 7-1 and 7-2.
GPS SETUP OPTIONS menu description

This menu provides items for setting up the GPS receiver. To display it, display the menu shown above, and then press the GPS SETUP OPTIONS soft key.

- LOCAL TIME OFFSET
- GPS uses UTC time. If you would rather use local time, enter the time difference between it and UTC time. Use the +<-->- soft key to switch from plus to minus and vice versa.

- GEODETIC DATUM
- Your equipment is preprogrammed with most of the major chart systems of the world. Although the WGS-84 system, the GPS standard, is now widely used other categories of charts still exist. Select the chart system used, not the area where your boat is sailing. The default chart system is WGS-84.

1. Select GEODETIC DATUM.
2. Press the EDIT soft key to show the geodetic datums window.

3. Press ▲ or ▼ to select the chart system you are using. If UNKNOWN appears in the GEODETIC DATUM window, select a different chart system.
4. Press the ENTER soft key or the [ENTER] key to register your selection.

**POS SMOOTHING**

When the DOP or receiving condition is unfavorable, the GPS fix may change, even if the vessel is dead in water. This change can be reduced by smoothing the raw GPS fixes. A setting between 000 to 999 is available. 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. 000 is the normal setting; increase the setting if the GPS fix changes.

**SPD/CSE SMOOTHING**

During position fixing, ship’s velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. For no smoothing, enter all zeroes. The default setting is 005 (sec).
10. CUSTOMIZING YOUR UNIT

**GPS SPEED AVE**
Calculation of ETA 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, which is suitable for most conditions.

**LAT OFFSET, LON OFFSET**
GPS-generated position may be off from the chart. In this case, you can apply an offset to GPS position to refine position accuracy. Mark the equipment indication on the chart, and then calculate the L/L error.

1. Select LAT OFFSET or LON OFFSET.
2. Press the EDIT soft key.
3. Key in the error value. To switch the north and south (east and west), press the N<-->S (W<-->E) soft key.
4. Press the ENTER soft key or [ENTER] key.

**DISABLE SATELLITE**
Every GPS satellite is broadcasting abnormal satellite number(s) in its Almanac, which contains general orbital data about all GPS satellites, including those which are malfunctioning. 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. If you hear about a malfunctioning satellite from another source, you can disable it manually. Enter satellite number (max. 3 satellites) in two digits and press the ENTER soft key or the [ENTER] key.

**LATITUDE, LONGITUDE**
The default latitude and longitude position is San Francisco, USA (38.00.000’N, 123.00.000’W). When the unit is turned on for the first time it begins searching for its actual position. To lessen the time required to find position, you may enter your position manually. To switch from North to South and vice versa, use the N<-->S soft key, and to switch from West to East and vice versa, use the W<-->E soft key. Finally, press the ENTER soft key or the [ENTER] key.

**ANT. HEIGHT**
Enter the height of the antenna unit above sea surface. For further details refer to the Installation Manual.

**FIX MODE**
You can choose the position-fixing mode from 2D or 2D/3D. 2D requires three satellites to fix position; 2D/3D requires three or four satellites, whichever is available.

**DGPS/WAAS SETUP OPTIONS menu**
This menu sets parameters for the DGPS beacon receiver. (GP1850WD, or GP1850W equipped with DGPS beacon receiver.) and WAAS. To display it, press the [MENU] key followed by the GPS/DPGS/TD OPTIONS and DGPS SETUP OPTIONS soft keys.

<table>
<thead>
<tr>
<th>DGPS/WAAS MODE</th>
<th>AUTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEACON FREQUENCY</td>
<td>AUTO</td>
</tr>
<tr>
<td>BEACON BAUD RATE</td>
<td>AUTO</td>
</tr>
<tr>
<td>WAAS SEARCH</td>
<td>AUTO</td>
</tr>
<tr>
<td>CORRECTION DATA SET</td>
<td>02</td>
</tr>
<tr>
<td>DGPS/WAAS ALARM</td>
<td>ON</td>
</tr>
</tbody>
</table>

**DGPS/WAAS menu**

**DGPS/WAAS MODE**
Select DGPS, WAAS or AUTO. (Position is fixed by WAAS when DGPS correction data is not available.)

**BEACON FREQUENCY (for DGPS)**
DGPS reference station can be searched automatically or manually. For manual
search, select MANUAL here, and use the cursor pad to select frequency of DGPS reference station. The default setting is AUTO.

**BEACON BAUD RATE (for DGPS)**

Selects the transmission rate of the DGPS reference station nearest you, among AUTO (default setting), 50, 100 or 200 bps. This setting is only effective when DGPS mode is “manual”; baud rate cannot be changed in automatic DGPS mode.

**WAAS SEARCH (for WAAS)**

Choose AUTO for automatic search or MANUAL for manual search. For MANUAL, enter appropriate WAAS satellite number, referring to the illustration below.

**AUTO mode and GEO satellite (in JUNE 2002)**

<table>
<thead>
<tr>
<th>Longitude Range</th>
<th>Satellite</th>
</tr>
</thead>
<tbody>
<tr>
<td>120.25°E to 117°W</td>
<td>134</td>
</tr>
<tr>
<td>119°W to 33.75°W</td>
<td>122</td>
</tr>
<tr>
<td>35.75°W to 25.5°E</td>
<td>120</td>
</tr>
<tr>
<td>23.5°E to 122.25°E</td>
<td>131</td>
</tr>
</tbody>
</table>

**CORRECTIONS DATA SET (for WAAS)**

Determines how to use the WAAS signal, currently in the test mode. Enter appropriate two-digit numeric. Use “02” (default setting) until the WAAS System changes from its current “Testing Status” to “Operational Status”.

**DGPS/WAAS ALARM**

This alarm alerts you by aural and visual alarms when the WAAS/DGPS signal is lost.

**TD SETUP menu**

This menu selects the Loran C or Decca chain to use to display position in TDs. To display it, press the [MENU] key followed by the GPS/DGPS/TD OPTIONS and TD SETUP soft keys.

<table>
<thead>
<tr>
<th>LORAN C</th>
<th>TD SETUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRI</td>
<td>EDIT</td>
</tr>
<tr>
<td>U.S. WEST COAST</td>
<td></td>
</tr>
<tr>
<td>CORRECTION1 +000.0µs</td>
<td></td>
</tr>
<tr>
<td>CORRECTION2 +000.0µs</td>
<td></td>
</tr>
<tr>
<td>DECCA</td>
<td></td>
</tr>
<tr>
<td>DEC CHAIN 20 R-P</td>
<td></td>
</tr>
<tr>
<td>FRENCH</td>
<td></td>
</tr>
<tr>
<td>CORRECTION1 +00.00 lane</td>
<td></td>
</tr>
<tr>
<td>CORRECTION2 +00.00 lane</td>
<td></td>
</tr>
</tbody>
</table>

**Displaying LORAN C TDs**

1. Select GRI and press the EDIT soft key to show the GRI & STA. PAIR window.

   **GRI & STA. PAIR**

2. Press ▲ or ▼ to select GRI code. Press ► to enable selection of station pair, and then press ▲ or ▼ to select station pair. See the Loran C chain list at the end of this manual for GRI and station pairs.

3. Press the ENTER soft key or the [ENTER] key to register your selection.

4. If necessary, you may enter a position offset to refine Loran C position. Select LORAN C CORRECTION1 or CORRECTION2 and press the EDIT soft key. Enter correction value and press the ENTER soft key or the [ENTER] key. Use the + <-> - soft key to switch from plus to minus and vice versa.
10. CUSTOMIZING YOUR UNIT

Displaying DECCA TDs

1. Select DEC CHAIN and press the EDIT soft key to show the chain sta. pair window.

<table>
<thead>
<tr>
<th>CHAIN STA. PAIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>▲</td>
</tr>
<tr>
<td>20 ▶ P-R</td>
</tr>
<tr>
<td>▼</td>
</tr>
<tr>
<td>FRENCH</td>
</tr>
</tbody>
</table>

2. Press ▲ or ▼ to select Decca chain number. Press ▶ to enable selection of lane, and then press ▲ or ▼ to select lane pair (R: red, G: green and P: purple). Refer to the Decca chain list at the end of this manual.

3. Press the ENTER soft key or the [ENTER] key to register your selection.

4. If necessary, you may enter position offset to refine Decca position. Select DECCA CORRECTION1 or CORRECTION2 and press the EDIT soft key. Enter correction value and press the ENTER soft key or the [ENTER] key. Use the + <-> - soft key to switch from plus to minus and vice versa.

10.4 CONFIGURATION menu

The CONFIGURATION menu has facilities for setting up data ports, uploading/downloading data, self test, demonstration mode setup, and memory clearing.

1. Press the [MENU] key.
2. Press the CONFIGURATION soft key to display the configuration menu.

<table>
<thead>
<tr>
<th>CONFIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>SETUP NMEA PORT 1</td>
</tr>
<tr>
<td>SETUP NMEA/DGPS PORT 2</td>
</tr>
<tr>
<td>UPLOAD/DOWNLOAD DATA</td>
</tr>
<tr>
<td>SYSTEM MENU</td>
</tr>
</tbody>
</table>

Configuration menu

SETUP NMEA PORT 1 menu description

This menu sets up DATA PORT 1 according to the specifications of the equipment connected to it. The menu can be displayed by pressing the [MENU] key followed by the CONFIGURATION and SETUP NMEA PORT 1 soft key. For detailed information, see the Installation Manual.

Setup NMEA port 1 (or 2) menu
10. CUSTOMIZING YOUR UNIT

FORMAT
Selects NMEA0183 version 1.5 or 2.0. If you are unsure of the version number, try both equipment and choose the one which outputs data correctly.

LAT/LON FORMAT (GGA only)
Selects the minutes of latitude and longitude positions in hundredths, thousandths or ten thousandths.

SELECT SNTNC. soft key
This key enables/disables input/output of data sentences.

SETUP NMEA/DGPS PORT 2 menu description
This menu should be set according to the specifications of the equipment connected to connectors PORT 2 (DGPS) at the rear of the display unit. The menu can be displayed by pressing the [MENU] key followed by the CONFIGURATION and SETUP NMEA PORT 2 soft keys. For detailed information, see the Installation Manual.

FORMAT
Selects data format of connected equipment; NMEA0183 version 1.5, version 2.0, RTCM104 (EXTRN), RTCM104 (INTRN) or RTCM104 (OUTPUT). RTCM104 (INTRN) or RTCM104 (OUTPUT) is for GP-1850WD only.

LAT/LON FORMAT (GGA only)
This setting can be performed when NMEA0183 Ver.1.5 or 2.0 is selected as the FORMAT. It displays the minutes of latitude and longitude positions in hundredths, thousandths or ten thousandths.

UPLOAD/DOWNLOAD DATA menu
This menu allows you to upload waypoint and route data to a PC or download the same data from a PC, via the DGPS connector at the back of display unit. The menu can be displayed by pressing the [MENU] key followed by the CONFIGURATION and UPLOAD/DOWNLOAD DATA soft keys. For detailed information, see the Installation Manual.

Set communication software on the PC as follows:
- Baud Rate: 4800 bps
- Character Length: 8 bit
- Stop bit: 1 bit
- Parity: None
- X Control: XON/XOFF
The following data can be downloaded/uploaded between a personal computer and this equipment:

- Waypoint data (In alphanumeric order)
- Route data (In order of route number)
- End of sentence

**Note 1:** There are two kinds of data for route data: route data and route comment data.

**Note 2:** DGPS position fix is not available when uploading or downloading data.

**Download waypoint/route to PC**

1. Connect the PC to the GP-1850W series as shown on the next page.
2. Press the DOWNLOAD WPT/RTE TO PC soft key. You are asked if you are ready to download waypoints and routes.
3. Press the [ENTER] key to download.

**Upload waypoint/route from PC**

Note that all waypoint and route data stored in this unit will be deleted when data is uploaded.

1. Connect the PC to the GP-1850W series as shown below.
2. Press the UPLOAD WPT/RTE FROM PC soft key. You are asked if you are ready to upload waypoints and routes.
3. Press the [ENTER] key to upload.

![Connection diagram of GP-1850WD/GP-1850W to PC](image-url)
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
7: Waypoint comment (1 byte for mark code + 13 characters of comment.)
   1st byte of mark code: Fixed to ‘@’.
   2nd byte of mark code: Internal mark code. See Note 1.
8. Information of marking waypoint. Always set to “A”.
   “A”: Displayed
   “V”: Not displayed

Note 1: Following characters can be used for comments:

Character available for comment

Route data format

1: Number of sentences required for one complete route data (1 to 4). See Note 2.
2: Number of sentences currently used (1 to 4)
3: Message mode (Always set to C)
4: Route No. (001 to 300, 3 digits required)
5 through 12: Waypoint name (Max. 8 names, length of each waypoint name is fixed to 7 byte)

Note 2: A route can may contain 35 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 the route data has been divided.

Route comment data format

1: Route No. (01 to 200, 3 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
11. USING C-MAP NT MODEL

The GP-1850WD/1850W C-MAP NT series uses FURUNO mini chart cards and C-MAP NT-FP chart cards. These charts show accurate coastlines, depth contours, place names, aids to navigation such as buoys and lighthouses, and other navigational marks.

11.1 Inserting Chart Card

1. Push down the lid catch to open the chart card slot cover.

![Card slot](image)

*Location of chart card slot cover*

2. Insert appropriate chart card groove side up.

3. Close the slot cover to protect the chart drive. (Keep the slot cover closed at all times.)

**Note 1:** Turn off the power before inserting or ejecting the chart card.

**Note 2:** When using C-MAP NT-FP card, do not eject it while a chart is being drawn. This may cause the equipment to stop working.
11.2 Cursor and Data Display

Besides its fundamental functions of providing position data, the cursor can also show caution area, depth area, source of data, etc. Further, you can display information about an icon by placing the cursor on it.

1. Press the cursor pad to turn the cursor on.

Plotter display

2. Use the cursor pad to place the cursor on the position desired.

3. Press the [ENTER] key to open the Objects window. For example the following window appears.

Objects window

4. Press ▲ or ▼ to select the item desired.

5. Press the ENTER soft key or the [ENTER] key to display details for object selected Objects.

Caution area

Information
LEUCHTFEUER DIE KARTE ENTHALT NUR DIE LAGEN DER WICHTIGEN FEUER. LIGHTS ONLY THE PRINCIPAL LIGHTS ARE SHOWN ON THIS CHART. MISSWEISUNG SIEHE KARTEN GROSSEREN MASSSTABS. MAGNETIC VARIATION LOCAL MAGNETIC ANOMALIES SEE LARGER SCALE CHARTS.

Example of caution area window

6. Press the CANCEL soft key to close the window.

7. Repeat steps 4 to 6 to select other item.

8. Press the CANCEL soft key to close the Objects window.

When you place the cursor on any icon, its information appears.

1. Place the cursor on a lighthouse icon.

Lighthouse icon

2. Press the [ENTER] key. For example, the following window appears.
11.3 Tidal Information

The C-MAP NT-FP chart card provides for calculation of the tide heights for any date. Additionally it displays the times of sunrise and sunset.

1. Press the cursor pad to place the cursor on a Tide icon.

2. Press the [ENTER] key to open the Objects window.

3. Press ▲ or ▼ to select Tide height.
4. Press the ENTER soft key or the [ENTER] key to open the TIDE window.

Sample lighthouse data

5. Press the CANCEL soft key to close the Objects window.
5. Press the DATE soft key to open the DATE window.

<table>
<thead>
<tr>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DD/MM/YYYY</td>
</tr>
<tr>
<td>01 / 01 / 2000</td>
</tr>
</tbody>
</table>

DATE window

6. Use ◀ or ▶ to position the cursor where desired and then press the appropriate numeric keys to enter a date.

7. Press the ENTER soft key or the [ENTER] key to show the tidal graph for entered date.

8. Press ◀ or ▶ to locate the vertical cursor on the time desired. Time and height are shown to the left of the graph.

9. Press ▲ or ▼ to shift the level cursor. Draught is shown to the left of the graph.

10. Press the CANCEL soft key to close the TIDE window.

11.4 Navigating to Ports, Port Services

The C-MAP NT-FP chart provides detailed information on aids to navigation (buoy, lighthouse) and port service information. The port service information includes the availability of water and fuel supplies, shipyards, first aid, etc. You can use the list to set destination as follows:

1. Press the [MENU] key to open the main menu.
2. Press the DISPLAY OPTIONS soft key.
3. Press ▼ to select SET GO TO METHOD and press the EDIT soft key. The SET GO TO METHOD window appears.

<table>
<thead>
<tr>
<th>SET GO TO METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>▲</td>
</tr>
<tr>
<td>○ 1 POINT</td>
</tr>
<tr>
<td>○ 35 POINT</td>
</tr>
<tr>
<td>▼ WPT/PORT SER</td>
</tr>
</tbody>
</table>

SET GO TO METHOD window

4. Press ▼ to select WPT/PORT SER and press the ENTER soft key or the [ENTER] key.

5. Press the [PLOT] key once or twice to return the plotter display.

6. Press the GO TO soft key. Soft key titles change. If the GO TO soft key is not displayed, press the cursor pad.

Plotter display
11. USING C-MAP NT MODEL

7. Press the NEAR SRVICE soft key. The SELECT PORT SERVICE window appears.

8. Use the cursor pad to select service mark desired. Currently selected icon is circumscribed. The name of currently selected icon appears at the top of the window. Refer to the user’s manual of C-MAP NT for details about the icons.

9. Press the ENTER soft key or the [ENTER] key. Then, the display shows the locations of those services nearest you.

10. Press ▲ or ▼ to place the "hand cursor" on the port service icon desired and press the ENTER soft key or the [ENTER] key.

11. Do one of the following:
   - **Go directly to port service selected:** Press the [ENTER] key. The own ship and the port service is connected by a blue line. The range and bearing from own ship to the port service appears at the navigation data display. You can go to the port service directly by steering the ship to the heading indicated.
   - **Go to port service selected via waypoints, make a route as follows:**
     a) Move the cursor to the nearest waypoint of the port service.
     b) Press the ADD QP soft key.
     c) Repeat the above steps a) and b) to enter other waypoints.
     d) Press the [ENTER] key to finish. A line connects between own ship, waypoints and the port service. Further, the range and bearing from own ship to first waypoint appears.

   **Note:** Destination is automatically cancelled if there is no port for service selected.
11.5 Setting Chart Setup Options

**CHART DETAILS menu**

1. Press the [MENU] key followed by the CHART SETUP OPTIONS and CHART DETAILS soft key.

<table>
<thead>
<tr>
<th>Menu Item</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAT/LON Grid</td>
<td>GREEN</td>
</tr>
<tr>
<td>Text info</td>
<td>ON</td>
</tr>
<tr>
<td>Waypoint</td>
<td>LARGE</td>
</tr>
<tr>
<td>Waypoint name</td>
<td>ON</td>
</tr>
<tr>
<td>Index</td>
<td>ON</td>
</tr>
<tr>
<td>Landmass</td>
<td>BRT YELLOW</td>
</tr>
<tr>
<td>Background</td>
<td>BLUE</td>
</tr>
<tr>
<td>NAV AIDS</td>
<td>ON</td>
</tr>
<tr>
<td>Sector info</td>
<td>ON</td>
</tr>
<tr>
<td>Other symbols</td>
<td>WHITE</td>
</tr>
<tr>
<td>Mark size</td>
<td>STD</td>
</tr>
</tbody>
</table>

2. Press ▲ or ▼ to select item and press the EDIT soft key.

3. Select option with cursor pad and press the ENTER soft key or the [ENTER] key.

4. Press the RETURN soft key to finish.

Items which are concerned with C-MAP NT-FP chart cards are described here.

**LANDMASS:** Selects brightness and color of land. When you select OFF, color of land is black.

**BACKGROUND:** Not available with C-MAP NT-FP chart card.

**NAV AIDS:** Turns aids to navigation symbols (for example, buoys) on/off. When OFF is selected, symbols are displayed but information is not displayed (at the upper part of the screen).

**SECTOR INFO:** Turns lighthouse viewable angle indication on C-MAP NT-FP chart on/off. Viewing angle is shown as an arc extending from lighthouse position. This feature is available with selected charts. When OFF is selected, the visual information is not displayed and the lighthouse is displayed as "!".

**OTHER SYMBOLS:** Selects color of all other chart symbols. When OFF is selected, navaid icons are not displayed but alarm icons are displayed.

**DEPTH INFO soft key:** Turns the DEPTH INFO display on/off and sets it color on FURUNO charts, or selects the depth areas limit and spot sounding & bathymetric range in C-MAP NT-FP chart.
11. USING C-MAP NT MODEL

1. With the CHART DETAILS menu displayed, press the DEPTH INFO soft key to show the following display.

   **FOR FURUNO CHART**
   - DEPTH < 10 m: RED
   - DEPTH = 10 m: YELLOW
   - DEPTH > 10 m: LIGHT BLUE
   - 10 m : APPROX. 30 ft or 5 fa

   **FOR C-MAP CHART**
   - SHADE CHANGE DPTH: 0020, 0164 ft
   - SPOT SOUNDING & BATHYMETRIC RANGE: 0033~3000 ft

   Depth info display

2. Press ▲ or ▼ to select item and press the EDIT soft key or enter the appropriate value by using numeric keys.

3. Select option with cursor pad and press the ENTER soft key or the [ENTER] key.

4. Press the RETURN soft key several times to finish.

**SHADE CHANGE DPTH**: Sets two values in the range of Depth Limit on the DEPTH INFO display when the C-MAP NT-FP chart is used. The Depth Areas are shown on the screen in three colors depending on depth.

- 0 to left value: Blue
- left value to right value: Light-blue
- greater than right value: Light-gray

(Maximum value: 12000 meter or 39369 ft)

In the figure above, as the following,
- 0 - 20 ft: Blue
- 20 - 164 ft: Light-blue
- greater than 164 ft: Light-gray

**Note 1**: Depth data depends on the registered value at "depth area".

**Note 2**: It may be difficult to distinguish colors of track and mark/line in sea areas painted in light-blue or green.

**SPOT SOUNDING & BATHYMETRIC RANGE**: Sets the depth range to display the spot sounding on the C-MAP NT-FP chart. The depth range is displayed red.

11.6 Selecting Chart Scale/Range

Chart scale (range) may be selected with the ZOOM IN or ZOOM OUT soft key. ZOOM IN expands the chart; ZOOM OUT shrinks it. The range selected is momentarily displayed at the lower left-hand corner.

**Note**: When the display is expanded or shrunk beyond the range of the chart card in use the chart is not displayed, and an appropriate chart icon appears.
11.7 Displaying Program Number

1. Press the [MENU] key to open the main menu.
2. Press the CONFIGURATION soft key to show the CONFIGURATION menu.
3. Press the SYSTEM MENU soft key to open the SYSTEM MENU.
4. Press the SELF TEST soft key to open the TEST menu.
5. Press the MEMORY, I/O TEST soft key to start the test. Test results and program numbers are shown as below.

Memory, I/O test results
12. MAINTENANCE & TROUBLESHOOTING

12.1 Maintenance

Regular maintenance is essential for good performance. A maintenance program should be established and should at least include the items listed in below.

**WARNING**

Do not open the equipment.

Hazardous voltage which can cause electrical shock, burn or serious injury exists inside the equipment. Only qualified personnel should work inside the equipment.

---

<table>
<thead>
<tr>
<th>Item</th>
<th>Check point</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna</td>
<td>Check for loosened and corroded bolts.</td>
<td>Tighten loosened bolts. Replace heavily corroded bolts.</td>
</tr>
<tr>
<td>Antenna cable</td>
<td>Check connection point for watertightness.</td>
<td>Replace damaged pats.</td>
</tr>
<tr>
<td></td>
<td>Check connector for tightness and corrosion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check cables for damage.</td>
<td></td>
</tr>
<tr>
<td>Display unit connectors</td>
<td>Check for tight connection.</td>
<td>Tighten loosened connectors.</td>
</tr>
<tr>
<td>Ground terminal</td>
<td>Check for tight connection and corrosion.</td>
<td>Clean or replace as necessary.</td>
</tr>
<tr>
<td>Display unit</td>
<td>Dust and foreign material on the display unit.</td>
<td>Dust may be removed with a soft cloth, if necessary anti-static cleaner may be used. Never use chemical solvents to clean the display; they can remove paint and markings.</td>
</tr>
<tr>
<td>LCD</td>
<td>Dust and foreign material on the screen.</td>
<td>Wipe the LCD carefully to prevent scratching, using tissue paper and an LCD cleaner. To remove dirt or salt deposits, use an LCD cleaner, wiping slowly with tissue paper so as to dissolve the dirt or salt. Change paper frequently so the salt or dirt will not scratch the LCD. Do not use solvents such as thinner, acetone or benzene for cleaning.</td>
</tr>
</tbody>
</table>
12. MAINTENANCE & TROUBLESHOOTING

12.2 Replacement of Fuse, Battery

The fuse on the power cable protects the system from reverse polarity of the ship’s mains and equipment fault. If the fuse blows, find the cause before replacing it. Use only a 5 A fuse. Using the wrong fuse will damage the unit and void the warranty.

Use the correct fuse.

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

A battery installed on the circuit board inside display unit preserves data when the power is turned off. The life of the battery is about three years. When the battery voltage is low the battery icon (🔋) appears on the display. When this happens, contact your dealer to request replacement of the battery.

<table>
<thead>
<tr>
<th>Type</th>
<th>Code Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Battery</td>
<td>CR2450-F2 ST2L 000-144-941</td>
</tr>
</tbody>
</table>

Note: Use only the specified battery. Use of an incorrect battery may cause explosion. Dispose of the battery in accordance with local regulations.

12.3 Simple Troubleshooting

Below are simple troubleshooting procedures which the user can follow to restore normal operation.

**Simple troubleshooting (plotter)**

<table>
<thead>
<tr>
<th>If …</th>
<th>Then …</th>
</tr>
</thead>
<tbody>
<tr>
<td>you cannot turn on the power</td>
<td>check for blown fuse.</td>
</tr>
<tr>
<td></td>
<td>check that the power connector is firmly tightened.</td>
</tr>
<tr>
<td></td>
<td>check for corrosion on power cable connector.</td>
</tr>
<tr>
<td></td>
<td>check for damaged power cable.</td>
</tr>
<tr>
<td></td>
<td>check ship’s battery for proper voltage output (12/24 V).</td>
</tr>
<tr>
<td>power is on but nothing appears</td>
<td>press the [POWER/BRILL] key and then the cursor pad to adjust display brilliance and tone.</td>
</tr>
<tr>
<td>there is no response when a key is pressed</td>
<td>turn on the power again.</td>
</tr>
<tr>
<td>position is not fixed within 90 seconds.</td>
<td>check for loosened antenna connector.</td>
</tr>
<tr>
<td></td>
<td>check GPS receiver status indication.</td>
</tr>
<tr>
<td>track is not plotted</td>
<td>plotting is stopped. (“H” appears on the plotter display.)</td>
</tr>
<tr>
<td>bearing is wrong</td>
<td>check that correct magnetic variation is entered on the DISPLAY OPTIONS menu.</td>
</tr>
<tr>
<td>loran or Decca TDs do not appear</td>
<td>check that proper Loran or Decca chain codes are entered on the DISPLAY UNIT.</td>
</tr>
<tr>
<td>loran TDs are wrong</td>
<td>enter TD offset on the GPS/DGPS/TD OPTIONS menu.</td>
</tr>
<tr>
<td>ship’s speed display is not zero after ship is stopped</td>
<td>try to decrease GPS speed smoothing setting on the GPS/DGPS/TD OPTIONS menu.</td>
</tr>
</tbody>
</table>
12.4 Error Messages

This GP-1850W/1850WD displays the following error messages on the alarm menu to alert you to possible trouble.

<table>
<thead>
<tr>
<th>Error Message</th>
<th>Meaning, remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO GPXS FIX</td>
<td>No GPS signal. Check antenna cable.</td>
</tr>
<tr>
<td>NO DIFFERENTIAL GPS CORRECTION. (GP-1850WD only)</td>
<td>No DGPS signal. Check antenna.</td>
</tr>
<tr>
<td>VOLTAGE OF INTERNAL BATTERY IS LOW.</td>
<td>Voltage of internal battery is low. Request replacement of battery.</td>
</tr>
</tbody>
</table>

12.5 Diagnostic Tests

Memory, I/O port test

This test conducts a general check of the display unit and the antenna unit. The unit displays the results for each device or component checked as OK or NG (No Good).

1. Press the [MENU] key to open the main menu.
2. Press the CONFIGURATION soft key to show the CONFIGURATION menu.
3. Press the SYSTEM MENU soft key to open the SYSTEM menu.
4. Press the SELF TEST soft key to open the TEST menu.
12. MAINTENANCE & TROUBLESHOOTING

Test menu

5. Press the MEMORY•I/O TEST soft key to start the test. Test results and program nos. are shown as below.

---

Keyboard test

This test checks all controls for proper operation.

1. Press the [MENU] followed by the CONFIGURATION, SYSTEM MENU and SELF TEST soft keys to display the TEST menu.

2. Press the KEYBOARD TEST soft key to display the screen for testing the keyboard.

3. Press each key one by one. The pressed key's on-screen location turns black if the key is functioning properly.

4. To escape, press the [CLEAR] key three times.

---

Memory, I/O test results

6. The test runs continuously. To return to the TEST menu, press the RETURN soft key.

Note: BEACON RECEIVER results only appear on GP-1850WD.
Display test

1. Press the [MENU] key followed by the CONFIGURATION, SYSTEM MENU and SELF TEST soft keys to display the TEST menu.
2. Press the TEST PATTERN soft key to open the test pattern display.
3. Press the [ENTER] key to change the test pattern.

Remote controller test

This test checks the controls of the remote controller for proper operation.

1. Press the [MENU] key followed by the soft keys CONFIGURATION, SYSTEM MENU and SELF TEST to display the self test menu.
2. Press the REMOTE CONTROLLER TEST soft key to display the screen for testing the remote controller.
3. Press the any key. The pressed key's on-screen location turns black if the key is functioning properly.
4. To escape, press the RETURN soft key on the display unit, or press the [CLEAR] key three times on the remote controller.
12.6 Clearing Memories

The memory, which stores marks, tracks and initial settings, can be cleared to start afresh. When this done all default settings are restored.

1. Press the [MENU] key followed by the CONFIGURATION and SYSTEM MENU soft key.
2. Press the MEMORY/TRIP CLEAR soft key to open the clear memory menu.

```
CLEAR PLOTTER MEMORY NO
CLEAR GPS MEMORY NO
CLEAR ALL MEMORY NO
TRIP METER RESET NO
```

3. Press ▲ or ▼ to select memory or trip meter reset.
4. Press the EDIT soft key.
5. Press ▲ to select YES.
6. Press the ENTER soft key or the [ENTER] key to clear item selected.

**Note:** For CLEAR PLOTTER MEMORY and CLEAR ALL MEMORY, all waypoints and routes are cleared and default settings are restored. If you require this data, save it to a PC beforehand.
1. CONFIGURATION
   1.1 SETUP NMEA PORT 1
       - FORMAT (NMEA0183 Ver. 1.5, 2.0)
       - LAT/LON FORMAT
         (DD°MM.MM', DD°MM.MMM', DD°MM.MMMM)
   1.2 SETUP NMEA/DGPS PORT 2
       - FORMAT (NMEA0183 Ver. 1.5, 2.0, RTCM104EX, RTCM104OUT)
       - LAT/LON FORMAT
         (DD°MM.MM', DD°MM.MMM', DD°MM.MMMM)
   1.3 SELECT SNTNC. soft key
       - (AAM, APB, BOD, BWC/BWR*, GGA, GLL, MTW, RMA, RMB, RMC, VTG, WPL, XTE, ZDA)
       *: BWR: For RHUMB LINE
       BWC: For GREAT CIRCLE
   1.4 UPLOAD/DOWNLOAD DATA
       - DOWNLOAD WAYPOINT/RTE TO PC
       - UPLOAD WAYPOINT/RTE FROM PC
       - SAVE DATA TO MEMORY CARD
       - LOAD DATA FROM MEMORY CARD
   1.5 SYSTEM MENU
       - SELF TEST (MEMORY, I/O, KEYBOARD, TEST PATTERN, REMOTE CONTROLLER TEST)
       - DEMONSTRATION MODE
         - DEMO MODE
         - DEMO SPEED
         - DEMO START LAT
         - DEMO START LON
       - MEMORY/TRIP CLEAR
         - CLEAR PLOTTER MEMORY (NO, YES)
         - CLEAR GPS MEMORY (NO, YES)
         - CLEAR ALL MEMORY (NO, YES)
         - TRIP METER RESET (NO, YES)

WPT/RTE key
   - WAYPOINTS
     - LOCAL LIST
     - ALPHA/NUMERIC LIST
     - WAYPOINT BY CURSOR
     - WAYPOINT BY RANGE & BEARING
   - ROUTES
   - LOG
   - CREATE VOYAGE BASED ROUTE

ALARM key
   - AUDIO ALARM (ON, OFF)
   - ARRIVAL ALARM (ON, OFF)
   - ANCHOR ALARM (ON, OFF)
   - PROXIMITY ALARM (ON, OFF)
   - XTE ALARM (ON, OFF)
   - SPEED ALARM (WITHIN, OVER/UNDER, OFF)
## LORAN C CHAINS

<table>
<thead>
<tr>
<th>Chain</th>
<th>GRI</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
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</table>
## DECCA CHAINS

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<th>Chain</th>
<th>Chain code</th>
<th>Location</th>
<th>Chain No.</th>
<th>Chain</th>
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<td>34</td>
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<td>35</td>
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<td>07</td>
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<td>41</td>
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<td>9C</td>
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<td>5C</td>
<td>Persian Gulf &amp; India</td>
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</table>
# SPECIFICATIONS OF
COLOR GPS/ PLOTTER: GP-1850W  
COLOR DGPS/ PLOTTER: GP-1850WD

## 1 GENERAL

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<table>
<thead>
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<tbody>
<tr>
<td>1.1</td>
<td>Display</td>
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<td>1.2</td>
<td>Projection</td>
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<td>1.3</td>
<td>Usable Area</td>
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<tr>
<td>1.4</td>
<td>Display Mode</td>
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<tr>
<td>1.5</td>
<td>Alarms</td>
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## 2 GPS RECEIVER

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<tbody>
<tr>
<td>2.1</td>
<td>Receiving Channels</td>
</tr>
<tr>
<td>GPS</td>
<td>12 channels parallel, 12 satellite tracking</td>
</tr>
<tr>
<td>WAAS</td>
<td>1 channel</td>
</tr>
<tr>
<td>2.2</td>
<td>Rx Frequency</td>
</tr>
<tr>
<td>2.3</td>
<td>Rx Code</td>
</tr>
<tr>
<td>2.4</td>
<td>Position Fixing System</td>
</tr>
<tr>
<td>2.5</td>
<td>Position Accuracy</td>
</tr>
<tr>
<td>GPS</td>
<td>10 m (95% of the time, HDOP ≤ 4)</td>
</tr>
<tr>
<td>DGPS</td>
<td>5 m (95% of the time), external data required for GP-1850W</td>
</tr>
<tr>
<td>WAAS</td>
<td>3 m (95% of the time)</td>
</tr>
<tr>
<td>2.6</td>
<td>Tracking Velocity</td>
</tr>
<tr>
<td>2.7</td>
<td>Position-fixing Time</td>
</tr>
<tr>
<td>2.8</td>
<td>Position Update Interval</td>
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## 3 DISPLAY SECTION

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<thead>
<tr>
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<tr>
<td>3.1</td>
<td>Effective Area</td>
</tr>
<tr>
<td>3.2</td>
<td>Display Pixels</td>
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<td>3.3</td>
<td>Position Indication</td>
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## 4 PLOTTER

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<thead>
<tr>
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<tbody>
<tr>
<td>4.1</td>
<td>Effective Projection Area</td>
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<tr>
<td>4.2</td>
<td>Track Display</td>
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<tr>
<td>4.3</td>
<td>Colors</td>
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<td>4.4</td>
<td>Memory Capacity</td>
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<tr>
<td>4.5</td>
<td>Storage Capacity</td>
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<tr>
<td>4.6</td>
<td>MOB</td>
</tr>
<tr>
<td>4.7</td>
<td>Quick Route</td>
</tr>
</tbody>
</table>
4.8 Electronic Chart

FURUNO or NAVIONICS chart card available, C-MAP chart card also available for C-MAP NT Model

5 INTERFACE

5.1 Input Data

IEC61162-1, NMEA 0183 Ver1.5

$**DBT, $**DPT, $**MTW, $**TLL, $GPWPL

5.2 Output Data

IEC61162-1, NMEA 0183 Ver1.5

$GPAAM, $GPAPB, $GPBOD, $GPBWR/GPBWC, $GPGLL, $GPGGA, $GPRMA, $GPRMB, $GPRMC, $GPVTG, $GPXTE, $GPZDA, $GPWPL

6 POWER SOURCE

6.1 Display Unit

12-24 VDC: 1.2-0.5 A

6.2 Rectifier (PR-62, option)

100/110/115/220/230 VAC, 1 phase, 50/60 Hz

7 ENVIRONMENTAL CONDITIONS

7.1 Ambient Temperature

Antenna Unit: -20°C to +70°C
Display Unit: -15°C to +55°C

7.2 Relative Humidity

95% at +40°C

7.3 Waterproofing (IEC 60529)

Antenna Unit: IPX6
Display Unit: IPX5

7.4 Vibration

IEC 60529

8 COATING COLOR

8.1 Display Unit

Cover: Munsell 2.5GY5/1.5, Panel: N3.0

8.2 Antenna Unit

N9.5 (white)
INDEX

A
Alarm information window 8-4
ALARM key 8-1
Alarm messages 8-4
Alarms
   alarm information window 8-4
   alarm message 8-4
   anchor watch alarm 8-2
   arrival alarm 8-1 8-2
   audio alarm 8-1
   DGPS alarm 10-7 10-8
   proximity alarm 8-3
   speed alarm 8-3
   XTE alarm 8-2 8-3
   Anchor watch alarm 8-2
   Arrival alarm 8-1 8-2
   Audio alarm 8-1
Antenna height 10-7
Auto course-up mode 2-1

B
Background color
   chart 10-2
Battery replacement 12-2
Beacon baud rate 10-7
Beacon frequency 10-7
Beacon information display 2-7
Brilliance adjustment 1-3
Buoy data 2-4 2-5

C
Chart details menu 10-2
Chart offset menu 10-1
Chart scale 2-3
Chart setup options menu 10-1 10-2
Configuration menu 10-11 10-14
Course vector 10-3
Course-up mode 2-1
Cross-track error alarm. See XTE alarm
Cursor 2-2
Cursor data 11-2

D
Decca chains A-5
DECCA station selection 11-8

Demonstration display 1-6
DGPS/WAAS alarm 10-7
DGPS beacon information display 2-7
DGPS/WAAS mode 10-6
DGPS/WAAS setup options menu 10-6 10-7
Diagnostics
   display test 12-3
   keyboard test 12-4
   memory, I/O test 12-3
Disable satellite 10-6
Display options menu 10-3 10-4
Display test 12-3
Downloading data 10-10

E
Error messages 12-3

F
Fix mode 10-6
Fuse replacement 12-2

G
Geodetic chart list A-6
Geodetic datum 10-5
GPS satellite monitor display 2-6
GPS/DGPS/TD options menu 10-4 10-8
Great circle 10-3
Grid 10-2

H
Highway display 2-8

I
Indications
   enlargement of nav data 2-6

K
Keyboard test 12-4

L
Lat/lon display resolution 10-3
Lighthouse data 2-5
Local time 10-5
Loran C chains A-3
Loran C station selection 10-7
INDEX

M
Magnetic bearing 10-3
Magnetic variation 10-4
Maintenance 12-1
Mark
color 4-3
number used 4-4
entering 4-1
erasing 4-4
line 4-3
displaying 4-4
shape 4-2
Memory card
formatting 9-1
loading data 9-3
saving data 9-2
Memory clear 12-5
Memory, I/O port test 12-3
MENU key 1-5
Menu tree A-1–A-2
Mini chart cards
aids to navigation data 2-4
background color 10-2
buoy data 2-4
chart scale 2-3
chart symbol color 10-2
chart symbols 2-4
depth info 10-2
grid 10-2
Indices 2-3, 10-2
inserting 1-2
landmass color 10-2
lighthouse data 2-5
nav aids 10-2
port service icons (NAVIONICS) 2-5
text info 10-2
MOB 5-1

N
Nav data display 2-6
Navigation
cancelling 7-6
multiple quick points 7-1
ports, port service 7-2
quick points 7-1
restarting 7-4
route 78-4
route in reverse order 7-4
single quick point 7-1
specific route leg 7-4
switching route waypoints 7-5
waypoints 7-2
North-up mode 2-1

O
Object 11-2
Operation mode 2-9

P
Pleasure mode 2-9
PLOT key 1-4
Port services
description 2-5
navigating to 7-2
Position format selection 10-4
Position input 10-6
Power on/off 1-2
POWER/BRILL key 1-3
Presentation modes 2-1
Program number 11-8, 12-3
Proximity alarm 8-3
activating, deactivating 8-3
setting radius for individual waypoints 5-3

Q
Quick points
ever method 7-1
multiple points 7-1
single point 7-1

R
Range selection 2-3
Range unit 10-3
Rhumb line 10-3
Routes
connecting (two) 6-2
entering by cursor 6-2
entering through route list 6-1
entering track based 6-4
erasing 6-6
inserting waypoints on the plotter display 6-3
inserting waypoints through route list 6-3
navigating 7-4
navigating in reverse order 7-4
removing from plotter display 6-4
removing waypoints through route list 6-3
restarting navigation of 7-4
switching waypoints 7-5

Index-2
INDEX

S
SAVE/MOB key 5-1
Sector info (lighthouse viewable angle) 10-2
Setup NMEA port 1 menu 10-9
Setup NMEA port 2 menu 10-9
Smoothing
  position 10-5
  speed/course 10-5
Soft keys 1-5
Speed
GPS speed averaging 10-6
  input (for ETA calculation) 7-5
  unit 10-3
Speed alarm 8-3
Steering display 2-7
System configuration v
System menu 10-12
SYSTEM SETUP soft key 11-8

T
TD setup menu 10-7
Temperature unit 10-3
Tidal Information 11-3
Time
  display selection 10-3
  local 10-5
Trip 2-10
Tone adjustment 1-3
Track
  color 3-2
  displaying 3-1
  erasing 34-4
  plotting interval 3-2
  stopping/restarting plotting of 3-1
Track based route 6-4
Trip distance reset 12-5
Troubleshooting 12-2

U
Upload/download data menu 10-9
Uploading data 10-10

W
Waypoints
  changing data 5-5
  changing position at entry 5-2
  changing position on plotter screen 5-5
  color 5-2
  comments 5-3

entering at MOB position 5-1
entering at own ship's position 5-1
entering by cursor 5-1
entering by latitude and longitude position 5-4
entering by range and bearing 5-3
erasing 5-4
mark size 5-6
name entry 5-3
name on/off 10-2
navigating by 7-2
proximity alarm radius 5-3
searching 5-6
shape 5-2
size 10-2
World time A-5
WPT/RTE key 5-1

X
XTE alarm 8-3
XTE scale 2-8

Index-3
Declaration of Conformity

We, FURUNO ELECTRIC CO., LTD.,

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

declare under our sole responsibility that the product

Color DGPS/Plotter/Sounder Models:
GP-1850: GPS plotter
GP-1850D: DGPS plotter
GP-1850F: GPS plotter/sounder
GP-1850DF: DGPS plotter/sounder
GP-1850W: GPS/WAAS plotter
GP-1850WD: DGPS/WAAS plotter
GP-1850WF: GPS/WAAS plotter/sounder
GP-1850WDF: DGPS/WAAS plotter/sounder

are 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


For assessment, see

• Statement of Opinion N° 01214012/AA/01 of 18 July 2002 issued by Telefication, The Netherlands
• Safety Test Report FLI 12-02-025 of 28 June 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
August 12, 2002

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