IMPORTANT NOTICE

General

• This manual has been authored with simplified grammar, to meet the needs of international users.
• The operator of this equipment must read and follow the descriptions in this manual. Wrong operation or maintenance can cancel the warranty or cause injury.
• Do not copy any part of this manual without written permission from FURUNO.
• If this manual is lost or worn, contact your dealer about replacement.
• The contents of this manual and equipment specifications can change without notice.
• The example screens (or illustrations) shown in this manual can be different from the screens you see on your display. The screens you see depend on your system configuration and equipment settings.
• Save this manual for future reference.
• Any modification of the equipment (including software) by persons not authorized by FURUNO will cancel the warranty.
• All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

How to discard this product

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

How to discard a used battery

Some FURUNO products have a battery(ies). To see if your product has a battery(ies), see the chapter on Maintenance. Follow the instructions below if a battery(ies) is used. Tape the + and - terminals of battery before disposal to prevent fire, heat generation caused by short circuit.

In the European Union

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

In the USA

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

In the other countries

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

| ![WARNING] | Indicates a condition that can cause death or serious injury if not avoided. |
| ![CAUTION] | Indicates a condition that can cause minor or moderate injury if not avoided. |

### Warning, Caution

#### Prohibitive Action

- **WARNING**
  - Do not disassemble or modify the equipment.
    - Fire, electrical shock or serious injury can occur.
  - Turn off the power immediately if water leaks into the equipment or smoke or fire is coming from the equipment.
    - Failure to turn off the equipment can cause fire or electrical shock.
    - Contact a FURUNO agent for service.
  - Use the correct fuse.
    - A wrong fuse can cause fire or serious damage to the equipment.

#### Mandatory Action

- **CAUTION**
  - The glass of an LCD panel breaks easily. Handle the LCD carefully.
    - Injury can result if the glass breaks.
  - Do not connect/disconnect the signal cable while turning the power on.
    - The unit may be damaged.
  - No single navigation aid (including this unit) should ever be relied upon as the exclusive means for navigating your vessel.
    - The navigator is responsible for checking all aids available to confirm his position. Electronic aids are intended to assist, not replace, the navigator.

### 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.

### Caution Label(s)

Caution label(s) is(are) attached to the equipment. Do not remove the label(s). If a label is missing or damaged, contact a FURUNO agent or dealer about replacement.

<table>
<thead>
<tr>
<th>Name: Caution Label</th>
<th>Type: 20-035-1003-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code No.: 100-386-200-10</td>
<td></td>
</tr>
</tbody>
</table>
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A Word to the Owner of the GP-170

Congratulations on your choice of the FURUNO GP-170 GPS Navigator. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

Since 1948, FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

Your equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless properly installed and maintained. Please carefully read and follow the operation and maintenance procedures set forth in this manual.

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

Thank you for considering and purchasing FURUNO equipment.

Features

The main features of the GP-170 are as shown below.

• High-resolution color LCD
• Comprehensive navigation data displays
• A DGPS beacon receiver (internal or external) can be connected to the GP-170 to add DGPS capability.
• Storage for 1,000 waypoints, 100 routes (99 for creating, one for external input), 1,000 tracks and 2,000 marks
• External USB flash memory capability
• Notices: Arrival/Anchor, XTE (Cross-track Error), Ship speed, Trip
• Alerts: Warning, Caution
• Man overboard feature records position at time of man overboard and provides continuous updates of range and bearing when navigating to the MOB position.
• Unique Highway display provides a graphic presentation of ship’s progress toward a waypoint.
• User-programmable nav data displays provide digital navigation data.
• Two dual differential GPS navigator systems are available.
• Ethernet port for connection to a LAN

Program No.

MAIN: 2051542-01.XX, GPS: 48504650XX,
BEACON: 2051544-01.XX (Requires internal beacon receiver.)
XX: Minor change

Open Source Acknowledgement

This product makes use of the following open source software:
b64: Base-64 Encoding Library (http://synesis.com.au/software/b64.html)
Portions of this software are copyright © 2012 Synesis Software Pty Ltd. All rights reserved.
Basic configuration is shown with solid line.

**Single configuration**

![Diagram of system configurations]

- **Antenna Unit**
  - GPA-021S*
  - GPA-020S**
  - GPA-017S**

- **Display Unit**
  - 12-24 VDC
  - MENU ESC
  - NU/CU ENT
  - LIST
  - DISPLAY ROUTE GO TO
  - MOB MARK
  - 12 3
  - EVENT 5
  - PLOT
  - ON/OFF 6
  - 78 9
  - ZOOM
  - CENTER ZOOM OUT
  - ACK
  - DELETE CURSOR
  - ON/OFF 0

- **Rectifier**
  - PR-240
  - 100 to 115/200 to 230 VAC

- **Rectifier**
  - PR-62
  - 110/220 VAC

- **USB Flash Memory**

- **Switching Hub**
  - HUB-100

- **Radar**, **Echo Sounder**, **Autopilot**, **Printer (PP-505FP)**, **Beacon Receiver**, **Interface Unit IF-2503**

*: w/internal beacon receiver
**: w/o internal beacon receiver
**Dual configuration**

![System Configuration Diagram](image)

- **Antenna Unit** GPA-021S*
- **Antenna Unit** GPA-020S**
- **Antenna Unit** GPA-017S**
- **Display Unit** 12-24 VDC

*: w/internal beacon receiver
**: w/o internal beacon receiver

**Environmental category**

<table>
<thead>
<tr>
<th>Units</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna Unit</td>
<td>Exposed to the weather</td>
</tr>
<tr>
<td>Display Unit</td>
<td>Protected from the weather</td>
</tr>
</tbody>
</table>
1. OPERATIONAL OVERVIEW

1.1 Controls

The keys are arranged according to the function.

<table>
<thead>
<tr>
<th>No.</th>
<th>Control</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MENU/ESC</td>
<td>• Closes the menu.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Quits current operation.</td>
</tr>
<tr>
<td>2</td>
<td>NU/CU ENT</td>
<td>Confirms a selection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Switches the orientation mode between north-up and course-up on the plotter display.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Confirms a selection then closes the setting window.</td>
</tr>
<tr>
<td>3</td>
<td>Cursorpad</td>
<td>• ▲ or ▼: Selects the menu item.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ◄: Goes back one layer in multi-layer menu.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ►: Goes forward one layer in multi-layer menu.</td>
</tr>
<tr>
<td>4</td>
<td>LIST</td>
<td>• Opens the list.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Switches the list (any display → mark list → route list → station list (requires the internal beacon receiver) → any display). Long-press to switch the list in reverse order.</td>
</tr>
<tr>
<td>5</td>
<td>(Right-click)</td>
<td>–</td>
</tr>
</tbody>
</table>

The keys are arranged according to the function.
1. OPERATIONAL OVERVIEW

Key sound

When you operate a key, a single beep sounds. If you do not need the key beep, deactivate the beep sound as follows (see section 1.5):

1. Press the **MENU/ESC** key to open the main menu.
2. Select [4 Notice Setting] then [9 Sound].
3. Select [2 Key Sound].
4. Select [2 Off].
5. Press the **MENU/ESC** key to close the main menu.

<table>
<thead>
<tr>
<th>No.</th>
<th>Control</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>DISPLAY/1</td>
<td>• Selects and confirms the selected menu item.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Enters a numeric character.</td>
</tr>
<tr>
<td>7</td>
<td>ROUTE/2</td>
<td>Starts/stops the registration of a route on the plotter display.</td>
</tr>
<tr>
<td>8</td>
<td>GO TO/3</td>
<td>• Sets a destination at the cursor position on the plotter display with cursor on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Opens the context menu for Go To on the plotter display with cursor off.</td>
</tr>
<tr>
<td>9</td>
<td>MOB/4</td>
<td>Marks a man overboard position and sets a destination on the plotter display.</td>
</tr>
<tr>
<td>10</td>
<td>MARK EVENT/5</td>
<td>• Puts a mark at the cursor position on the plotter display with cursor on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Puts an event mark at own ship’s position on the plotter display with cursor off.</td>
</tr>
<tr>
<td>11</td>
<td>PLOT ON/OFF/6</td>
<td>Resumes/stops track plotting on the plotter display.</td>
</tr>
<tr>
<td>12</td>
<td>ZOOM IN/7</td>
<td>Zooms in the plotter display.</td>
</tr>
<tr>
<td>13</td>
<td>CENTER/8</td>
<td>• Centers the cursor position on the plotter display with cursor on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Centers own ship’s position on the plotter display with cursor off.</td>
</tr>
<tr>
<td>14</td>
<td>ZOOM OUT/9</td>
<td>Zooms out the plotter display.</td>
</tr>
<tr>
<td>15</td>
<td>CURSOR ON/OFF/0</td>
<td>Turns the cursor on or off on the plotter display.</td>
</tr>
<tr>
<td>16</td>
<td>ACK/DELETE</td>
<td>• Acknowledges an unacknowledged alert when the pop-up appears.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Deletes all setting values on the setting window when there is no unacknowledged alerts.</td>
</tr>
<tr>
<td>17</td>
<td>BRILL</td>
<td>Opens the brilliance adjustment window.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adjusts the display brilliance when the adjustment window opens.</td>
</tr>
<tr>
<td>18</td>
<td>(Power)</td>
<td>Turns the power on or off.</td>
</tr>
<tr>
<td>19</td>
<td>USB port</td>
<td>For connection of USB flash memory.</td>
</tr>
</tbody>
</table>

**Menu screen**

- **Selects and confirms the selected menu item.**

**Display mode**

- **Selects the display mode.**

- **Starts/stops the registration of a route on the plotter display.**

- **Sets a destination at the cursor position on the plotter display with cursor on.**

- **Opens the context menu for Go To on the plotter display with cursor off.**

- **Marks a man overboard position and sets a destination on the plotter display.**

- **Puts a mark at the cursor position on the plotter display with cursor on.**

- **Puts an event mark at own ship’s position on the plotter display with cursor off.**

- **Resumes/stops track plotting on the plotter display.**

- **Zooms in the plotter display.**

- **Zooms out the plotter display.**

- **Turns the cursor on or off on the plotter display.**

- **Acknowledges an unacknowledged alert when the pop-up appears.**

- **Deletes registered data (marks, etc.) at the cursor-selected position on the plotter display when there are no unacknowledged alerts.**

- **Acknowledges an unacknowledged alert when the pop-up appears.**

- **Deletes registered data (marks, etc.) at the cursor-selected position on the plotter display when there are no unacknowledged alerts.**

- **Opens the brilliance adjustment window.**

- **Adjusts the display brilliance when the adjustment window opens.**
1.2 How to Turn the Power On/Off

Press the key to turn the power on. The start-up screen appears for 30 seconds then the last-used screen appears.

DGPS beacon receiver

The GP-170 is available in two specifications, with DGPS beacon receiver and no DGPS beacon receiver. Only the beacon receiver equipped GP-170 has DGPS capability. To get DGPS capability, install the optional internal beacon receiver (name: beacon receiver set, type: OP20-42, code no.: 000-023-637) or connect an external beacon receiver.

Status indications

<table>
<thead>
<tr>
<th>Indication</th>
<th>2D positioning</th>
<th>3D positioning</th>
<th>System</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-2D</td>
<td>GP-3D</td>
<td>GPS</td>
<td></td>
</tr>
<tr>
<td>GP-S2D</td>
<td>GP-S3D</td>
<td>GPS + SBAS</td>
<td></td>
</tr>
</tbody>
</table>
1. OPERATIONAL OVERVIEW

2D positioning: Three satellites are used.
3D positioning: More than four satellites are used.

Note 1: GLONASS, GALILEO and Multi are reserved for future use.
Note 2: The screen refreshes slower in low ambient temperature.

To turn the power off, press the \( \) key.

1.3 How to Adjust the Brilliance of the Display and Panel

1. Press the BRILL key to show the following setting window.

```
Brilliance Setting

Display 14
[ ] +

Panel 7
[ ] +

:Switch Preset
(Hold):Return to Default.
```

2. To adjust the display brilliance, use the cursorpad (\( \) or \( \)) or the BRILL key (setting range: 0 to 15, default: 14 for day mode/6 for night mode).

3. To adjust the panel brilliance, use the cursorpad (\( \) or \( \)) (setting range: 0 to 9, default: 7 for day and night modes).

4. Press the MENU/ESC key to close the setting window.
Note 1: The default settings for night mode is 6 for [Display] and 7 for [Panel]. If the display is difficult to see when switching to the night mode, use the cursorpad (►) to increase the display brilliance.

Note 2: Whenever the brilliance mode is changed, the last-used brilliance for the selected mode is set.

Note 3: When the brilliance is preset, the background color is also preset (see paragraph 2.1.1). So both the brilliance and the background color are restored to the default when long-pressing the  key.

1.4 How to Select the Display Mode

There are five display modes: PLOTTER, INTEGRITY, HIGHWAY, COURSE and DATA. Press the DISPLAY key to select the display mode, in the following sequence. To reverse the order, long-press the DISPLAY key.

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [9 Display Select].
3. Select [3 Highway], [4 Course] or [5 Data].
4. Select [1 On] or [2 Off]. The display modes which are set to off are skipped when operating the DISPLAY key.
   Note: The plotter and integrity displays can not be disabled.
5. Press the MENU/ESC key to close the main menu.

The data is arranged according to data type.

*: The alert information is displayed when an alert occurs.
1. OPERATIONAL OVERVIEW

**Plotter Display**

This icon appears when the number of satellites used for positioning is more than four and the high precision speed computing is available.

This icon appears during the synchronization with ECDIS.

Distance for RAIM reliability

Spinner rotates when the equipment is functioning normally.

HDOP: 2D

PDOP: 3D

RAIM reliability

Datum

**Integrity Display**

Satellites used for positioning (Satellite numbers used for positioning are displayed in white, or black if not used for positioning.)

**Note:** The color of the ship's position data depends on positioning status.

Black: GPS position fix

Red: No GPS position fix

*: Shows the ship’s position adjusted with the setting position offset based on the selected datum (refer to paragraph 9.3.5).
1. OPERATIONAL OVERVIEW

**Highway Display**

- Course over ground
- Speed over ground
- Course information
- Waypoint
- Attitude gauge
- Weather data

**Course Display**

- Estimated time and date of arrival
- Range
- Velocity to destination
- Trip distance
- Cross track distance indication
1. OPERATIONAL OVERVIEW

Data Display

1.5 Main Menu Overview

1. Press the MENU/ESC key to open the main menu.

2. Use the cursorpad (▲ or ▼) to select a menu item then press the NU/CU ENT key. You can also select a menu item by pressing the numeric keys. This manual states this operating procedure as “Select [No. menu name].” The menu items that have a ► indicate additional menus.

Note: When invalid data is input, “- - - -” is displayed.
3. Select an option.
4. Press the **MENU/ESC** key to close the main menu.

### 1.6 List Overview

The **LIST** key displays the mark list, route list and station list, in the sequence shown below.

**How to save position in a list**

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [7 List Number].
4. Select [1 Keeping] or [2 Not Saved].
   - **[Keeping]**: Saves position in lists.
   - **[Not Saved]**: No. 0001 is always displayed at the top of the list.
5. Press the **MENU/ESC** key to close the main menu.
1. OPERATIONAL OVERVIEW

**How to change the data to display on the mark list**

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [8 List Information].
4. Select [1 L/L] or [2 Range/Bearing].
   - [L/L]: Displays latitude and longitude.
   - [Range/Bearing]: Displays the bearing and distance from own ship to a mark or a waypoint.
5. Press the **MENU/ESC** key to close the main menu.

![L/L Range/Bearing](image)

1.7 **Context Menu Overview**

You can display a context menu for track, mark, route, waypoint or MOB. For example, do the following to open the context menu for a mark.

1. Press the **CURSOR ON/OFF** key to turn the cursor on.
2. Use the cursorpad to select a mark then press the **key**. The context menu opens.
2. PLOTTER DISPLAY OVERVIEW, TRACK

2.1 How to Set the Display

2.1.1 How to select the background color
You can select the background color to suit lighting conditions or environment (see section 1.3).

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [1 Back Ground].
3. Select [1 White] or [2 Black].
4. Press the MENU/ESC key to close the main menu.

2.1.2 How to zoom in or out the display
You can change the range scale on the plotter display. Press the ZOOM IN key to zoom in the display and the ZOOM OUT key to zoom out the display. The horizontal range is available among 0.125, 0.25, 0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256, 512 and 1024 NM.

2.1.3 How to change the display orientation
The display orientation for the plotter display can be selected to north-up or course-up. Press the NU/CU ENT key to change the display orientation.

North-up
True north (0°) is at the top of the display. Own ship moves on the display in accordance with true motion. The land is stationary.
2. PLOTTER DISPLAY OVERVIEW, TRACK

**Course-up**
When the destination is set, the destination is at the top of the display and the north mark (▲) appears at the left side of the display.

When the destination is not set, own ship's course is upward on the display at the moment you select the course-up and the north mark (▲) appears at the left side of the display.

**2.1.4 How to turn the cursor on/off, change cursor size**
Press the CURSOR ON/OFF key to turn the cursor on or off.

**Cursor size**
You can change the cursor size.

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [6 Cursor Size].
3. Select [1 Large] or [2 Small].
4. Press the MENU/ESC key to close the main menu.

**2.1.5 How to move the cursor**
You can move the cursor with the cursorpad.

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Press or hold down the cursorpad. The cursor moves in the direction of the arrow or diagonal. The display shifts when the cursor reaches an edge of the display, in the direction opposite of the arrow pressed on the cursorpad. When the cursor is turned on, the cursor position, the bearing and range from own ship to the cursor appear at the right side of the display (see the plotter display on page 1-6).

**2.1.6 How to shift the display**
You can shift the display on the plotter display.

1. Press the CURSOR ON/OFF key to turn the cursor off.
2. Press or hold down the cursorpad.
2.1.7 How to center the cursor position or ship’s position

**Cursor position**
1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Press the CENTER key.

**Ship’s position**
1. Press the CURSOR ON/OFF key to turn the cursor off.
2. Press the CENTER key.

*Note:* When own ship reaches an edge of the display, own ship’s mark is automatically centered.

2.1.8 How to show or hide the grid and change its color

You can show or hide the grid and change its color (see "Plotter Display" on page 1-6).

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [2 Grid].

3. Select the grid color. To turn the grid off, select [8 Off]. When selecting [7 White/Black], the grid color depends on the background color.

<table>
<thead>
<tr>
<th>Background color</th>
<th>Grid color</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>Black</td>
<td>White</td>
</tr>
</tbody>
</table>

4. Press the MENU/ESC key to close the main menu.

2.1.9 How to show or hide the XTL line and change its color

The XTL lines (see the illustration on page 5-1) straddle the intended course line and they mark the XTL range. You can show or hide the lines and change their color.

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [3 Lines Color].
2. PLOTTER DISPLAY OVERVIEW, TRACK

3. Select [1 XTL Line].
4. Select the XTL line color. To turn the XTL line off, select [8 Off].
5. Press the MENU/ESC key to close the main menu.

2.1.10 How to show or hide the heading line and change its color

You can show or hide the heading line and change its color.

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [3 Lines Color].
3. Select [2 Heading Line].
4. Select the heading line color. To turn the heading line off, select [8 Off].
5. Press the MENU/ESC key to close the main menu.

2.1.11 How to set the COG vector

The COG vector is a vector line that runs from own ship’s icon. This vector shows speed and course of own ship. The top of a vector shows estimated position of own ship after the selected vector time elapses.

**Note:** The COG vector is not displayed when there is no position data.

**How to show or hide the COG vector and change its color**

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [3 Lines Color].
3. Select [3 Course Vector].
4. Select the COG vector color. To turn the COG vector off, select [8 Off].
5. Press the MENU/ESC key to close the main menu.

**How to set the COG vector time**

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [3 Lines Color].
3. Select [4 Course Vector Time].
4. Select the time for the COG vector. If you select [9 Continuous], the COG vector extends to the edge of the display.
5. Press the MENU/ESC key to close the main menu.
2.1.12 How to display the time mark

You can display the time mark on the track every hour on the hour.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [1 Display] then [4 Time Mark].
3. Select the color for the time mark. To turn the time mark off, select [8 Off].
4. Press the **MENU/ESC** key to close the main menu.

2.1.13 How to display the names for marks and waypoints

You can display the names for marks and waypoints.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [1 Display] then [5 Mark/WPT Name].
3. Select [1 On (All)], [2 On (WPT)] or [3 Off].
   - [On (All)]: Displays the names for marks and waypoints.
   - [On (WPT)]: Displays the waypoint names.
   - [Off]: Turns off the names.
4. Press the **MENU/ESC** key to close the main menu.

2.1.14 How to show or hide the weather data

You can display the direction and the speed of the wind analyzed from type 16 message when the weather data is received from a beacon station (see page 7-2).

*Note:* This menu requires an internal or external beacon receiver.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [1 Display] then [0 Data Overlay].
3. Select [1 Weather (Type16)], then [1 On] or [2 Off].
   - [On]: Displays the weather data (type 16 message) on the plotter display.
   - [Off]: Turns off the weather data (type 16 message) on the plotter display.
   *Note:* On the highway display, the weather data is displayed regardless of on/off.
4. Press the **MENU/ESC** key to close the main menu.
2.2 Bearing Reference

Ship's course and bearing to a waypoint are displayed in true or magnetic bearing. Magnetic bearing is true bearing plus (or minus) earth's magnetic variation.

2.2.1 How to select bearing reference

The default setting displays true bearing.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [1 Bearing Reference].
4. Select [1 True] or [2 Magnetic].
   [True]: Gyrocompass or satellite compass using true bearing
   [Magnetic]: Magnetic compass
5. Press the MENU/ESC key to close the main menu.

When selecting [2 Magnetic] at step 4, follow the steps at paragraph 2.2.2.

2.2.2 How to set the magnetic variation

The location of the magnetic north pole is different from the geographical north pole. This causes a difference between the true and magnetic north direction. This difference is called magnetic variation, and varies with respect to the observation point on the earth. Magnetic variation is entered automatically or manually.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [2 Magnetic Variation].
4. Select [1 Auto] or [2 Manual]. If you select [1 Auto], go to step 7. For [2 Manual], go to step 5.
5. Enter the variation with the numeric keys. To change the coordinate, select "E" then press one of keys from 0 to 9.
6. Move the cursor to [Enter] then press the NU/CU ENT key.
7. Press the MENU/ESC key to close the main menu.
2.3 About Tracks

The GP-170 stores 1,000 points of track.

2.3.1 How to start or stop plotting and recording of the track

Press the PLOT ON/OFF key to start or stop plotting and recording of the track. The pop-up message "Resuming Track Plot" or "Stopping Track Plot" appears at the left side of the display for two seconds. When track plotting is stopped, the icon appears at the bottom left corner of the display.

2.3.2 How to set the track plotting interval

In drawing the track, the position of your ship is stored into the memory of this equipment 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.

1. Press the MENU/ESC key to open the main menu.
2. Select [2 Track/Mark] then [1 Track REC].
3. Select [1 Time] or [2 Distance].
   [Time]: Enter the time interval with the numeric keys (setting range: 0001 (1 sec) to 6000 (60 min)).
   [Distance]: Enter the distance interval with the numeric keys (setting range: 00.01 to 99.99 NM).
4. Move the cursor to [Enter] then press the NU/CU ENT key.
5. Press the MENU/ESC key to close the main menu.
2.3.3 How to set the track color

You can select the track color as follows:

1. Press the MENU/ESC key to open the main menu.
2. Select [2 Track/Mark] then [2 Track Color].
3. Select the track color.
4. Press the MENU/ESC key to close the main menu.

How to change the color of selected track

1. Put the cursor on the track.
2. Press the key to open the context menu.
3. Select [1 Change Color].
4. Select the color to change.
5. Press the MENU/ESC key to close the context menu.

2.3.4 How to erase the track

How to erase all tracks from the main menu

1. Press the MENU/ESC key to open the main menu.
2. Select [2 Track/Mark] then [9 Erase Track].
3. Select [1 Erase Track]. The confirmation message appears.

How to erase all tracks from the context menu

1. Put the cursor on a track.
2. Press the key to open the context menu.
3. Select [2 Erase All]. The confirmation message appears.
4. Select [1 Yes].
5. Press the MENU/ESC key to close the main menu.
You can put marks on the plotter display to indicate good fishing spot, location of traps, etc. Marks have 16 shapes and seven colors. Also, marks can be connected with lines.

3.1 How to Enter a Mark on the Plotter Display

3.1.1 How to preset mark appearance
Set the default mark shape, color, line type to use when entering a mark.

**Mark shape**
You can select a mark shape from 16 types.
1. Press the MENU/ESC key to open the main menu.
2. Select [2 Track/Mark] then [3 Mark Shape].
3. Use the cursorpad to select the shape then press the NU/CU ENT key.
4. Press the MENU/ESC key to close the main menu.

**Mark color**
You can select a mark color from seven colors.
1. Press the MENU/ESC key to open the main menu.
2. Select [2 Track/Mark] then [4 Mark Color].
3. Select the color.
4. Press the MENU/ESC key to close the main menu.

**Mark line**
Marks can be connected with lines, and three types of lines are available.
1. Press the MENU/ESC key to open the main menu.
2. Select [2 Track/Mark] then [5 Mark Line].

![Mark Line Color](image)

3. Select the line type.

- [None]: None
- [Solid]: ________
- [Dash]: -- -- -- --
- [Alternate Dash]: - - - - -

4. Press the MENU/ESC key to close the main menu.

When continuously entering marks by the method described in paragraph 3.1.2, the marks are connected with the selected line.

**Mark line color**

You can select a mark line color from seven colors.

1. Press the MENU/ESC key to open the main menu.
2. Select [2 Track/Mark] then [6 Line Color].
3. Select the color.
4. Press the MENU/ESC key to close the main menu.

**3.1.2 How to enter a mark at the cursor position**

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to place the cursor on the location for a mark.
3. Press the MARK EVENT key to put the mark. This mark is named with the youngest unused mark number (for example, "POINT0001"), and saved to the mark list.

**3.1.3 How to enter a mark from the mark list**

**At the cursor position**

1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [1 Mark Registration].
3. With the cursor on the [New] line, press the **NU/CU ENT** key.

4. Select [1 Cursor].
5. Use the cursorpad to select the position for the mark.
6. Press the **NU/CU ENT** key.

7. Change the name (see page 4-6), position, symbol or color if necessary.
8. Select [9 Register]. The confirmation message appears.

9. Select [1 Yes] or [2 No].
   - [Yes]: Marks are registered with connection lines.
   - [No]: Marks are registered without connection lines.

10. Press the **MENU/ESC** key to close the main menu.

**By entering L/L**

1. Press the **MENU/ESC** key to open the main menu.
2. Select [3 Navigation] then [1 Mark Registration].
3. With the cursor on the [New] line, press the **NU/CU ENT** key.
3. MARKS

4. Select [2 Input L/L].

5. Enter latitude and longitude with the numeric keys. (To change the coordinate, select "N" or "E" then press one of keys from 0 to 9.)

6. Move the cursor to [Enter] then press the NU/CU ENT key.

7. Change the name (see page 4-6), position, symbol or color if necessary.

8. Select [9 Register]. The confirmation message appears.

9. Select [1 Yes] or [2 No].
   [Yes]: Marks are registered with connection lines.
   [No]: Marks are registered without connection lines.

10. Press the MENU/ESC key to close the main menu.
3.2 How to Enter an Event Mark

Event marks can be used to mark an important present position on the plotter display.

3.2.1 How to preset event mark appearance

Set the default event mark shape and color to use when entering an event mark.

**Event mark shape**

You can select an event mark shape from 16 types.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [2 Track/Mark] then [7 Event Mark].
3. Use the cursorpad to select the shape then press the **NU/CU ENT** key.
4. Press the **MENU/ESC** key to close the main menu.

**Event mark color**

You can select an event mark color from seven colors.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [2 Track/Mark] then [8 Event Color].
3. Select the color.
4. Press the **MENU/ESC** key to close the main menu.

3.2.2 How to enter an event mark at own ship’s position

1. Press the **CURSOR ON/OFF** key to turn the cursor off.
2. Press the **MARK EVENT** key on the plotter display. This mark is named with the youngest unused mark number (for example, "POINT0001"), and saved to the mark list.

3.2.3 How to enter an event mark from the mark list

1. Press the **MENU/ESC** key to open the main menu.
2. Select [3 Navigation] then [1 Mark Registration].
3. With the cursor on the [New] line, press the **NU/CU ENT** key.
4. Select [3 OwnShip Position].

5. Change the name (see page 4-6), position, symbol or color if necessary.

6. Select [9 Register]. The confirmation message appears.

7. Select [1 Yes] or [2 No].
   [Yes]: Marks are registered with connecting lines.
   [No]: Marks are registered without connecting lines.

8. Press the MENU/ESC key to close the main menu.

3.3 How to Enter a MOB Mark on the Plotter Display

The MOB mark denotes man overboard position. You can use it as an aid to rescue.

Press the MOB key to put a MOB mark. When the key is pressed, own ship's position is registered as a MOB mark ( ). The following message appears.

Select [1 Yes]. The position for the MOB mark becomes the destination. A line is drawn between own ship and the MOB mark. This line shows the shortest course to go to the MOB position. The bearing and range from own ship to the MOB position are displayed at the right of the display. Only one MOB mark can be put on the plotter display, and each time the MOB key is operated the previous MOB mark and its position data are written over.
3.4 How to Edit a Mark or an Event Mark

You can edit name, position, shape and color for a mark or an event mark on the plotter display or through the mark list.

**On the plotter display**

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to select the (event) mark to edit then press the key to open the context menu.
3. Select appropriate options to edit then set them.
4. Press the MENU/ESC key to close the context menu.

**From the mark list**

1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [1 Mark Registration].
3. Use the cursorpad (▲ or ▼) to select the (event) mark to edit then press the NU/CU ENT key. The [Edit] window same as above appears.
   **Note:** You can select the (event) mark to edit by entering its mark no. with the numeric keys.
4. Select appropriate options to edit then set them.
5. Press the MENU/ESC key to close the main menu.

Enter the mark no. (e.g. “0001”) with the numeric key then press the NU/CU ENT key.
3.5 How to Erase Marks

You can erase a mark(s), an event mark(s) or a MOB mark.

Note: You cannot erase the mark used as the current destination except the MOB mark.

How to erase a mark from the context menu

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to select the mark to erase then press the \( \) key to open the context menu.
3. Select [2 Delete].

How to erase a mark with the ACK/DELETE key

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to select the mark to erase then press the ACK/DELETE key. The confirmation message appears.
3. Select [1 Yes].

How to erase a mark from the mark list

Note: This menu is not available for a MOB mark.

1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [1 Mark Registration].
3. Use the cursorpad (\( \) or \( \)) to select the mark to erase then press the NU/CU ENT key.
4. Select [2 Delete].
5. Press the MENU/ESC key to close the main menu.

How to erase all marks

Note: This menu is not available for a MOB mark.

1. Press the MENU/ESC key to open the main menu.
2. Select [2 Track/Mark] then [9 Erase Track].
4. Select [1 Yes].
5. Press the MENU/ESC key to close the main menu.
4. ROUTES

To navigate from one place to another, several course changes are required. The point for course change is called a waypoint. The sequence of waypoints (marks for course changes) leading to the last destination is called a route.

4.1 How to Create a Route

A maximum of 99 routes can be created and a route can have a maximum of 1,000 waypoints.

4.1.1 How to preset the settings for routes

**XTL (Cross-track limit) range**

The XTL range is the maximum distance your boat is allowed to go off course before the XTE notice (see section 6.3) is given.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [6 Initial XTL/Arrival/Stay].
4. Select [1 XTL].
5. Enter the XTL distance with the numeric keys (setting range: 0.001 to 9.999 NM).
6. Move the cursor to [Enter] then press the NU/CU ENT key.
7. Press the MENU/ESC key to close the main menu.
4. ROUTES

**Arrival radius**
You can receive an audiovisual notice when you are within the specified distance from a waypoint (see section 6.2).

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [6 Initial XTL/Arrival/Stay].
4. Select [2 Arrival Radius].
5. Enter the arrival radius with the numeric keys (setting range: 0.001 to 9.999 NM).
6. Move the cursor to [Enter] then press the **NU/CU ENT** key.
7. Press the **MENU/ESC** key to close the main menu.

**Staying time**
You can set the time the GP-170 waits at a waypoint in a followed route before it switches to the next waypoint. See the note in "Departure time" on this page.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [6 Initial XTL/Arrival/Stay].
4. Select [3 Stay Time].
5. Enter the staying time at the waypoint with the numeric keys.
6. Move the cursor to [Enter] then press the **NU/CU ENT** key.
7. Press the **MENU/ESC** key to close the main menu.

**SOG**
Set the speed to use to follow a route.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [6 Initial XTL/Arrival/Stay].
4. Select [4 SOG].
5. Enter the speed with the numeric keys.
6. Move the cursor to [Enter] then press the **NU/CU ENT** key.
7. Press the **MENU/ESC** key to close the main menu.

**Departure time**
You can set the date and time to depart from the waypoint on the route.

**Note:** When the departure date and time set is before the current date and time, the staying time has priority. When the departure date and time set is after the current date and time, the departure time has priority.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [6 Initial XTL/Arrival/Stay].
4. Select [5 Departure Time].
5. Enter the date and time departing from the starting point with the numeric keys.
6. Move the cursor to [Enter] then press the NU/CU ENT key.
7. Press the MENU/ESC key to close the main menu.

**Range and bearing calculation method**

When you set a destination, the equipment displays the range, bearing and course to the destination. Range and bearing are calculated by the Rhumb Line or Great Circle method.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [3 Calculation].
4. Select [1 RL] or [2 GC].
   - [RL] (Rhumb Line): This method calculates the range and bearing between two points drawn on a nautical chart. Since the bearing is kept constant it is ideal for short-range navigation.
   - [GC] (Great Circle): This course line is the shortest course between two points on the surface of the earth, like stretching a piece of string between two points on earth. Frequent bearing changes are required to navigate by this method. For long-range navigation, divide the Great Circle route into several routes, and navigate each route by Rhumb Line.
5. Press the MENU/ESC key to close the main menu.

**Route color**

You can select the route color from seven colors.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [6 Initial XTL/Arrival/Stay].
4. Select [6 Route Color].
5. Select a color for route lines and waypoints.
6. Press the MENU/ESC key to close the main menu.

**4.1.2 How to create a new route with the cursor and the ROUTE key**

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Long-press the ROUTE key. The message "Route Setting" appears on the display.
3. Use the cursorpad to place the cursor on the location for the first waypoint then press the NU/CU ENT key.
4. Use the cursorpad to place the cursor on the location for the next waypoint then press the **NU/CU ENT** key. Repeat this step to enter all waypoints.

5. At the last waypoint, press the **ROUTE** key to complete the route.

### 4.1.3 How to create a new route from the route list

**With the cursorpad**

1. Press the **MENU/ESC** key to open the main menu.
2. Select [3 Navigation] then [2 Route Registration].

3. With the cursor on the [New] line, press the **NU/CU ENT** key.

4. Select [1 Cursor].
5. Use the cursorpad to select the position for the first waypoint.
6. Press the **NU/CU ENT** key.

The values set in paragraph 4.1.1 are displayed at the menu items [3 XTL] to [7 DEP TIME]. You can change these values for each waypoint if required.
7. Select [9 Add] to enter the waypoint.
8. Repeat steps 4 to 7 to enter all waypoints.
9. Press the MENU/ESC key to complete the route and close the main menu.

By entering L/L
1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [2 Route Registration].
3. With the cursor on the [New] line, press the NU/CU ENT key.
4. Select [2 Input L/L].
5. Enter latitude and longitude for the first waypoint with the numeric keys. (To change the coordinate, select "N" or "E" then press one of keys from 0 to 9.)
6. Move the cursor to [Enter] then press the NU/CU ENT key.
7. If necessary, change the settings of the route.
8. Select [9 Add] to enter the waypoint.
9. Repeat steps 4 to 8 to enter all waypoints.
10. Press the MENU/ESC key to complete the route and close the main menu.

From the mark list
1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [2 Route Registration].
3. With the cursor on the [New] line, press the NU/CU ENT key.
4. Select [3 From Mark List] to show the mark list.
5. Use the cursorpad (▲ or ▼) to select the mark to use for the route.
6. Press the NU/CU ENT key.
7. If necessary, change the settings of the route.
8. Select [9 Add] to enter the waypoint.
9. Repeat steps 4 to 8 to enter all waypoints.
10. Press the MENU/ESC key to complete the route and close the main menu.
4. ROUTES

4.2 How to Edit a Route

You can edit a route from the plotter display or through the route list.

4.2.1 How to change the route name or color

From the route list

1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [2 Route Registration] to display the route list.
3. Use the cursorpad (▲ or ▼) or enter the route no. at the “Jump” position to select the route to edit then press the NU/CU ENT key.

4. To change the name, select [3 Name].

5. To add characters, use the cursorpad to select a character to add then press the NU/CU ENT key.
   To delete characters, use the cursorpad to select [BS] then press the NU/CU ENT key.

6. Use the cursorpad to select [Enter] then press the NU/CU ENT key.
7. To change the color, select [4 Color], then select the new color.
8. Press the MENU/ESC key to close the main menu.
4. ROUTES

On the plotter display
1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Put the cursor on any route line of the route to edit then press the key. The context menu opens.
3. Do steps 4 to 7 in "From the route list" on page 4-6 as appropriate.
4. Press the MENU/ESC key to close the context menu.

4.2.2 How to edit a waypoint in a route
1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to select the waypoint in the route to edit then press the key to open the context menu.

3. To change the name, select [1 Name].
4. To add characters, use the cursorpad to select a character to add then press the NU/CU ENT key.
   To delete characters, use the cursorpad to select [BS] then press the NU/CU ENT key.
5. Use the cursorpad to select [Enter] then press the NU/CU ENT key.
6. To change the position, select [2 POS], then enter latitude and longitude for the waypoint with the numeric keys. (To change the coordinate, select "N" or "E" then press one of keys from 0 to 9.)
7. Use the cursorpad to select [Enter] then press the NU/CU ENT key.
8. To change the XTL range scale, select [3 XTL], then enter the XTL range scale with the numeric keys.
9. Use the cursorpad to select [Enter] then press the NU/CU ENT key.
10. To change the arrival radius, select [4 ARV], then enter the arrival radius with the numeric keys.
11. Use the cursorpad to select [Enter] then press the NU/CU ENT key.
12. To change the staying time, select [5 STAY], then enter the staying time at the waypoint with the numeric keys.

13. Use the cursorpad to select [Enter] then press the NU/CU ENT key.

14. To change the SOG, select [6 SOG], then enter the speed with the numeric keys.

15. Use the cursorpad to select [Enter] then press the NU/CU ENT key.

16. To change the departure time, select [7 DEP TIME], then enter the date and time departing from the waypoint with the numeric keys.

17. Use the cursorpad to select [Enter] then press the NU/CU ENT key.

18. Press the MENU/ESC key to close the context menu.

4.2.3 How to temporarily deselect a waypoint in a route

You can temporarily deselect an unnecessary waypoint from a route. Using the route created in the illustration shown below as an example, deselect "POINT0003".

If you reconstruct the route without "POINT0003" it would look like the illustration below.

1. Press the CURSOR ON/OFF key to turn the cursor on.

2. Use the cursorpad to select the waypoint in the route to skip then press the key. The context menu opens.

3. Select [8 Skip].

4. Select [2 On].

5. Press the MENU/ESC key to close the context menu.
**How to restore the skipped waypoint**

To restore the skipped waypoint if you have not passed it, do the following:

1. Press the **CURSOR ON/OFF** key to turn the cursor on.
2. Put the cursor on any route line of the route which contains the skipped waypoint then press the **ENT** key to open the context menu.

3. Select [6 WPT List]. The (=image) icon is displayed on the skipped waypoint.

4. Use the cursorpad (▲ or ▼) to select the skipped waypoint then press the **NU/CU ENT** key.

5. Select [8 Skip].

6. Select [1 Off].

7. Press the **MENU/ESC** key to close the context menu.

**4.2.4 How to delete a waypoint from a route**

**How to erase a waypoint from the context menu**

1. Press the **CURSOR ON/OFF** key to turn the cursor on.

2. Use the cursorpad to select the waypoint to delete then press the **ENT** key to open the context menu.

3. Select [0 Delete].
4. ROUTES

How to erase a waypoint with the ACK/DELETE key
1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to select the waypoint to delete then press the ACK/DELETE key. The confirmation message appears.
3. Select [1 Yes].

How to erase a waypoint from the route list
1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [2 Route Registration].
3. Use the cursorpad (▲ or ▼) to select the route no. which contains the waypoint to delete then press the NU/CU ENT key.
4. Select [6 WPT List].
5. Use the cursorpad (▲ or ▼) to select the waypoint to delete then press the NU/CU ENT key.
6. Select [0 Delete].
7. Press the MENU/ESC key to close the main menu.

4.2.5 How to insert a waypoint in a route
You can insert a waypoint backward or forward of the selected waypoint in a route. For example, to insert a waypoint backward or forward of "POINT0003", do the following:

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to select the waypoint (in this example, "POINT0003") then press the key to open the context menu.
3. Select [9 Insert].
4. Select [1 Forward] or [2 Back].
   [Forward]: Insert a waypoint forward of the selected waypoint.
   [Back]: Insert a waypoint backward of the selected waypoint.
5. Select [1 Cursor], [2 Input L/L] or [3 From Mark List].
6. Set a waypoint position refer to paragraph 4.1.3. The context menu closes after selecting [9 Add].
4. ROUTES

4.2.6 How to change the route direction

You can change the direction to travel a route.

1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [2 Route Registration] to show the route list.
3. Use the cursorpad (▲ or ▼) to select the route to change its direction then press the NU/CU ENT key to display the [Edit] window. This window can be opened as the context menu (see "On the plotter display" in paragraph 4.2.1).
4. Select [5 Forward/Reverse].
5. Select [1 Forward] or [2 Reverse].
   [Forward]: Follow the waypoints in the order they were entered.
   [Reverse]: Follow the waypoints in reverse order. The arrows on the route point in the direction to follow the route (see the illustration on page 5-1).
6. Press the MENU/ESC key to close the main menu.

The (_reverse_icon) icon is displayed on the route for which [Reverse] is selected.

4.2.7 How to copy the route

The copy feature lets you save a registered route under a new route number. This is useful for creating a new route with parts of a previously registered route.

1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [2 Route Registration] to show the route list.
3. Use the cursorpad (▲ or ▼) to select the route to copy then press the NU/CU ENT key to display the [Edit] window. This window can be opened as the context menu (see "On the plotter display" in paragraph 4.2.1).
4. ROUTES

4. Select [7 Route Copy]. "ROUTE1" is copied in the illustration below.

5. Edit the route as appropriate (see section 4.2).

6. Press the MENU/ESC key to close the main menu.

4.3 How to Erase a Route

How to erase a route from the context menu

1. Press the CURSOR ON/OFF key to turn the cursor on.

2. Put the cursor on any route line of the route to delete then press the ◀ key to open the context menu.

3. Select [2 Delete].

How to erase a route from the route list

1. Press the MENU/ESC key to open the main menu.

2. Select [3 Navigation] then [2 Route Registration].

3. Use the cursorpad (▲ or ▼) to select the route to delete then press the NU/CU ENT key.

4. Select [2 Delete].

5. Press the MENU/ESC key to close the main menu.
5. DESTINATION

Destination can be set five ways: by cursor, by waypoint, by mark, by route and by MOB position. The setting by MOB position is described in section 3.3. When setting a destination, a line (shortest course) appears between own ship and the destination selected.

Note: When a destination is set, ETA and ETA(Plan) are displayed instead of COG and SOG at the bottom right of the plotter display with the cursor off.

5.1 How to Set a Destination

Note: When the ECDIS synchronization is on, the destination can not be set on the GP-170 (see section 9.8).

5.1.1 How to set a cursor position as a destination

You can set a destination at the position selected with the cursor.

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to place the cursor on the location for a destination.
3. Press the GO TO key.

Note: This destination set is erased when a new destination is entered.

5.1.2 How to set a waypoint as a destination

You can set a waypoint as a destination.

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to place the cursor on a waypoint as a destination.
3. Press the key to open the context menu.
5. DESTINATION

4. Use the cursorpad to select [GoTo/Cancel] then press the **NU/CU ENT** key.

5.1.3 How to set a registered mark as a destination

You can set a registered mark as a destination.

**From the main menu**

1. Press the **MENU/ESC** key to open the main menu.
2. Select [3 Navigation] then [6 Goto (Mark Number)].

```
Input Mark Number
0 0 0
Enter Cancel
```

3. Enter the mark number to set as a destination with the numeric keys.
4. Move the cursor to [Enter] then press the **NU/CU ENT** key.
5. Press the **MENU/ESC** key to close the main menu.

**From the context menu**

1. Press the **CURSOR ON/OFF** key to turn the cursor on.
2. Use the cursorpad to place the cursor on a mark as a destination.
3. Press the **key** to open the context menu.
4. Select [1 GoTo/Cancel].
5. DESTINATION

5.1.4 How to set a registered route as a destination

You can set a registered route as a destination.

**From the main menu**

1. Press the MENU/ESC key to open the main menu.
2. Select [3 Navigation] then [7 Goto (Route Number)].
3. Enter the route number to set as a destination with the numeric keys.
4. Move the cursor to [Enter] then press the NU/CU ENT key.
5. Press the MENU/ESC key to close the main menu.

**From the context menu**

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Put the cursor on any route line of the route as a destination.
3. Press the key to open the context menu.
4. Select [1 GoTo/Cancel].

5.2 How to Cancel a Destination

To cancel a destination, do one of the following three methods.

5.2.1 How to cancel a destination with the GO TO key

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to place the cursor on a destination.
3. Press the GO TO key.

5.2.2 How to cancel a destination from the main menu

1. Press the MENU/ESC key to open the main menu.
3. Press the MENU/ESC key to close the main menu.
5. DESTINATION

5.2.3 How to cancel a destination from the context menu

Note: This procedure is not available for the destination set with a mark (excluding the MOB mark).

1. Press the CURSOR ON/OFF key to turn the cursor on.
2. Use the cursorpad to place the cursor on a destination.
3. Press the key to open the context menu.

4. For a route line or a waypoint, select [1 Yes] then [GoTo/Cancel]. For a MOB mark, select [1 GoTo/Cancel].

5.3 How to Calculate the Distance, Bearing and TTG (Time To Go) Between Two Points

You can display the distance, bearing and time to go between two points.

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [7 Manual Calculation].
3. Enter latitude and longitude for the starting and ending positions with the numeric keys. To change the coordinate, select "N" or "E" then press one of keys from 0 to 9.
4. Move the cursor to [Enter] then press the **NU/CU ENT** key.

```
From: 12°34.5678’N 123°45.6789’E
To: 13°45.6789’N 134°56.7890’E
Distance: 658.49 NM
Bearing: 083.8°
TTG (Manual): 02Day 17Hour 51Min
TTG (Estimated): 01Day 08Hour 55Min
```

[TTG (Manual)]: Time to go calculated by SOG set on page 4-2
[TTG (Estimated)]: Time to go calculated by actual SOG

5. Press the **NU/CU ENT** key then press the **MENU/ESC** key to close the main menu.

### 5.4 How to Display the ETA and TTG

You can display the ETA and TTG to waypoints on the plotter display.

**ETA**: The arrival date and time calculated by SOG set on page 4-2  
**TTG**: The arrival date and time calculated by actual SOG (TTG is displayed when the SOG is 0.4 kn or above.)

When the departure date and time set is before the current date and time, the ETA and TTG are calculated by the staying time set. When the departure date and time set is after the current date and time, the ETA and TTG are calculated by the departure time set. See "Staying time" and "Departure time" on page 4-2.

1. Press the **MENU/ESC** key to open the main menu.

3. Select [1 Off], [2 ETA] or [3 ETA+TTG].  
   [Off]: Hides the ETA and TTG.  
   [ETA]: Shows the ETA.  
   [ETA+TTG]: Shows the ETA and TTG.

4. Press the **MENU/ESC** key to close the main menu.

ETA is shown in green.  
TTG is shown in pink.
5. DESTINATION

5.5 How to Calculate the Trip Distance

You can calculate the trip distance as follows:

1. Press the MENU/ESC key to open the main menu.
2. Select [4 Notice Setting] then [4 Trip].

```
Trip
1 Status : Stop
2 Range
```

3. Select [1 Status].

```
Stop
Start/Restart
Clear
```

4. Select [1 Stop], [2 Start/Restart] or [3 Clear].
   [Stop]: Stops the trip distance calculation.
   [Start/Restart]*: Starts or restarts the trip distance calculation.
   [Clear]: Resets the trip distance.
5. Press the MENU/ESC key to close the main menu.

*: You can receive a notice, when your ship has travelled a preset distance. See section 6.5 for details.

5.6 How to Set the Drift

You can set the time for which the drift value is averaged. The longer the time setting, the more stable the drift value.

1. Press the MENU/ESC key to open the main menu.
2. Select [1 Display] then [8 Set/Drift AVR].

```
1 Off
2 10 min
3 20 min
4 30 min
5 1 H
6 2 H
7 3 H
8 5 H
9 6 H
```

3. Select an option.
   [Off]: Displays the latest drift value.
   Others: Displays the average drift value per the setting time.
4. Press the MENU/ESC key to close the main menu.
6. NOTICES

There are five notice conditions which generate both audio and visual notices: Arrival, Anchor, XTE, Ship Speed and Trip. When the conditions of a notice are met, the buzzer sounds according to the notice sound setting and the icon related to the notice turns from gray to blue at the top right-hand corner of the display.

You can silence the buzzer by pressing the **ACK/DELETE** key.

**Note:** You can not set both arrival and anchor notices at the same time.

6.1 Audio Notice Type

You can select the audio notice type as follows. When the conditions of a notice are met, the icon color related to the notice changes regardless of the audio notice type.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [4 Notice Setting] then [9 Sound].
6. NOTICES

3. Select [1 Notice Sound].

4. Select [1 Off], [2 On] or [3 Continuous].
   [Off]: No sound, only visual notice (an icon turns blue)
   [On]: Three long beeps and visual notice (related icon turns blue)
   [Continuous]: This buzzer sounds until the ACK/DELETE key is operated to acknowledge the notice. Visual notice (related icon turns blue).

5. Press the MENU/ESC key to close the main menu.

6.2 Arrival/Anchor Notice

Note: You can not set both arrival and anchor notices at the same time.

6.2.1 Arrival notice

The arrival notice alerts you when you are within the specified distance from a destination waypoint.

Before setting arrival notice, set the arrival radius (see "Arrival radius" on page 4-2).

1. Press the MENU/ESC key to open the main menu.
2. Select [4 Notice Setting] then [1 Arrival/Anchor].
3. Select [1 Arrival]. The arrival notice icon ( ) appears in gray at the top right-hand corner of the display.
4. Press the MENU/ESC key to close the main menu.

To turn off the arrival notice, select [3 Off] at step 3.

6.2.2 Anchor notice

The anchor notice alerts you that your ship is moving when your ship should be at rest.

Before setting anchor notice, set the arrival radius (see "Arrival radius" on page 4-2).
1. Press the MENU/ESC key to open the main menu.
2. Select [4 Notice Setting] then [1 Arrival/Anchor].
3. Select [2 Anchor]. The anchor notice icon ((sensor) appears in gray at the top right-hand corner of the display.
4. Press the MENU/ESC key to close the main menu.
To turn off the anchor notice, select [3 Off] at step 3.

6.3 XTE Notice

The XTE (Cross-track error) notice alerts you when your ship is off its intended course (the line from the start point to the destination waypoint) by the distance specified.

Before setting XTE notice, set the XTL range (see "XTL (Cross-track limit) range" on page 4-1).
1. Press the MENU/ESC key to open the main menu.
2. Select [4 Notice Setting] then [2 XTE].
3. Select [2 On]. The XTE notice icon (sensor) appears in gray at the top right-hand corner of the display.
4. Press the MENU/ESC key to close the main menu.
To turn off the XTE notice, select [1 Off] at step 3.

6.4 Ship Speed Notice

The ship speed notice alerts you when your ship’s speed is lower or higher than the speed notice setting or within the range set.
1. Press the MENU/ESC key to open the main menu.
2. Select [4 Notice Setting] then [3 Ship Speed].
3. Select [1 Status].
6. NOTICES

4. Select [2 In] or [3 Out]. The ship speed notice icon (🕒) appears in gray at the top right-hand corner of the display.
   [In]: The notice alerts you when your ship’s speed is within the range set.
   [Out]: The notice alerts you when your ship’s speed is lower or higher than the range set.

5. Select [2 Speed].

6. Enter the minimum and maximum speeds with the numeric keys.

7. Move the cursor to [Enter] then press the NU/CU ENT key.

8. Press the MENU/ESC key to close the main menu.

To turn off the ship speed notice, select [1 Off] at step 4.

6.5 Trip Notice

The trip notice alerts you when your ship’s trip has travelled the distance specified.

1. Press the MENU/ESC key to open the main menu.

2. Select [4 Notice Setting] then [4 Trip].

3. Select [2 Range].

4. Enter the trip distance with the numeric keys.

5. Move the cursor to [Enter] then press the NU/CU ENT key.

6. Select [1 Status] then [2 Start/Restart]. The trip notice icon (🕒) appears in gray at the top right-hand corner of the display.

7. Press the MENU/ESC key to close the main menu.

To turn off the trip notice, select [1 Stop] at step 6.
There are five display modes: PLOTTER, INTEGRITY, HIGHWAY, COURSE and DATA. This chapter describes the display modes except for PLOTTER.

7.1 Integrity Display

The integrity display provides information about GPS satellite position, beacon station information and signal quality. There are four integrity displays: GNSS, beacon, graph for signal noise ratio and graph for satellite angle.

Use the cursorpad (▲ or ▼) to change the displays, in the following sequence.

- **GNSS**
  - The GNSS display shows the condition of satellite positioning system. Number, azimuth and elevation angle of all satellites (if applicable) in view of your receiver appear.
  - Use the cursorpad (◄ or ►) to change the satellite positioning system in the following sequence.

The following illustration is an example integrity display for GPS.

Satellites used for positioning (Satellite numbers used for positioning are displayed in white, or black if not used for positioning.)
7. DISPLAYS

**Elevation**

The area set on [Elevation Mask] is displayed in white. See "Satellite elevation" on page 9-5 for how to set elevation mask.

![Elevation Mask]

Beacon

The beacon display shows the beacon station information.

**Beacon Station Information**

- Press the ◄ or ► key to select [Next 1]* or [Next 2]*.
  - [Receive]: Station used for positioning (the nearest station)
  - [Next 1]: Second nearest station
  - [Next 2]: Third nearest station
  - *: w/internal beacon receiver

**Detailed Beacon Station Information**

- Press the NU/CU ENT key.

- **Type 16 message**
  - Press the NU/CU ENT key.
Graph
The graph displays show signal to noise ratio and satellite angle used for positioning for the last six hours.
7. DISPLAYS

7.2 Highway Display

The highway display provides a 3-D view of own ship’s progress toward destination. Use the cursorpad (↑ or ↓) to change the data at the right-hand of the display.

![Highway Display Diagram]

- North mark
- Waypoint
- Weather data (wind direction and speed) (See paragraph 2.1.14.)
- Attitude gauge (See page 9-3.)

- Press the ► key.
- Press the ◄ key.

When weather data is received from the beacon station.

When the data for roll, pitch or heave is received.

ROLL: Starboard
↑: Port
PITCH: Up
↓: Down
7.3 Course Display

The course display shows the course information. The information at the right-hand side of the display is different between autopilot connection and no autopilot connection.

**With autopilot connection**

- Bearing from own ship to destination waypoint
- Velocity to destination
- Autopilot mode
- Autopilot-set heading
- Rudder angle
- Course angle
- Speed over ground
- Required time to destination
- Required time to next destination
- Range

**No autopilot connection**

- Estimated time and date of arrival
- Trip distance
- Bearing from own ship to destination waypoint
- Velocity to destination
- Autopilot mode
- Autopilot-set heading
- Rudder angle
- Course angle
- Speed over ground
7.4 Data Display

The data display shows the navigation data. Use the cursorpad (← or →) to change the data to display.

How to customize the display

You can arrange the data to display and show the data in the order desired. Availability of data depends on the sensors connected.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [4 User Defined].

<table>
<thead>
<tr>
<th>User Defined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom 1 : RNG</td>
</tr>
<tr>
<td>Custom 2 : SOG</td>
</tr>
<tr>
<td>Custom 3 : HDG</td>
</tr>
<tr>
<td>Custom 4 : COG</td>
</tr>
<tr>
<td>Custom 5 : ETA</td>
</tr>
<tr>
<td>Custom 6 : Route Distance</td>
</tr>
<tr>
<td>Custom 7 : ETA/ETA(Plan)</td>
</tr>
<tr>
<td>Custom 8 : TTG</td>
</tr>
</tbody>
</table>

4. Select [1 Custom 1].

- [TTG]: Time to go to destination
- [TRIP]: Distance to go to destination
- [TRIP TIME]: Time elapsed since the destination was set
- [Route TTG]: Time to go to the final destination
- [VTD]: Velocity to destination
- [ETA/ETA(Plan)]: ETA is estimated time of arrival at destination. ETA(Plan) is planned estimated time of arrival at destination.

5. Select an option.

6. Repeat steps 4 and 5 to select options for [2 Custom 2] to [8 Custom 8].

7. Press the MENU/ESC key to close the main menu.
7. DISPLAYS

**How to zoom information**

1. Press the CURSOR ON/OFF key. An information is highlighted as follows.

   ![Highlighted information](image1)

2. Use the cursorpad (▲ or ▼) to select the information to zoom in. SOG is highlighted in the following example.

   ![Highlighted SOG information](image2)

3. Press the ZOOM IN key to zoom in the SOG information.

   ![Zoomed SOG information](image3)

To go to the original display, press the ZOOM OUT key.

4. Press the CURSOR ON/OFF key to deselect the SOG information.
“Alert” is a generic name for a notice to any unusual or potentially dangerous situation generated within the system. There are two types of alerts, warning and caution.

**Warning**: Conditions or situations which require immediate attention for precautionary reasons.

**Caution**: Awareness of a condition which continues to require attention out of the ordinary consideration of the situation.

## 8.1 Overview

The GP-170 has eight types of alerts as follows:

<table>
<thead>
<tr>
<th>ID</th>
<th>Message</th>
<th>Type</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>• D3D turned to 3D. • D3D turned to 2D. • D2D turned to 3D. • D2D turned to 2D. • S3D turned to 3D. • S3D turned to 2D. • S2D turned to 3D. • S2D turned to 2D. • D3D turned to &quot;No Fix&quot;. • D2D turned to &quot;No Fix&quot;. • S3D turned to &quot;No Fix&quot;. • S2D turned to &quot;No Fix&quot;.</td>
<td>Caution</td>
<td>The positioning system turns from DGPS to GPS.</td>
</tr>
<tr>
<td>210</td>
<td>HDOP exceeded.</td>
<td>Caution</td>
<td>The value of HDOP (Horizontal Dilution of Precision) is 4 or above. HDOP threshold being permanently set to 4.</td>
</tr>
<tr>
<td>211</td>
<td>No calculation of position.</td>
<td>Warning</td>
<td>The signal from core is not received for three seconds.</td>
</tr>
</tbody>
</table>

**Abbreviated messages**

- D3D → 3D.
- D3D → 2D.
- D2D → 3D.
- D2D → 2D.
- S3D → 3D.
- S3D → 2D.
- S2D → 3D.
- S2D → 2D.
- D3D → "No Fix".
- D2D → "No Fix".
- S3D → "No Fix".
- S2D → "No Fix".

- No calculation of POSN.
### 8. ALERTS

<table>
<thead>
<tr>
<th>ID</th>
<th>Message</th>
<th>Type</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>213</td>
<td>Loss of differential signal.</td>
<td>Caution</td>
<td>More than 10 seconds have passed since the last beacon message is received.</td>
</tr>
<tr>
<td></td>
<td>Abbreviated messages: Loss of DGNSS signal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>215</td>
<td>Differential integrity status.</td>
<td>Caution</td>
<td>The beacon station selected automatically is unhealthy.</td>
</tr>
<tr>
<td></td>
<td>Abbreviated messages: DGNSS integrity status.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>009 or</td>
<td>Antenna short-circuited.</td>
<td>Warning</td>
<td>The antenna has shorted out.</td>
</tr>
<tr>
<td>40109*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>009 or</td>
<td>Antenna short-circuited.</td>
<td>Warning</td>
<td>The antenna has shorted out.</td>
</tr>
<tr>
<td>401950*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>950 or</td>
<td>Communication error with BAM.</td>
<td>Caution</td>
<td>Communication error with alert management system</td>
</tr>
<tr>
<td>401950*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*: When the alert mode is set to [Alert I/F 2] (only for serviceman), the alert ID number is displayed in six digits.

**Note:** When a warning is not acknowledged within three minutes, the warning is repeated.

When an alert condition occurs, the buzzer sounds (except for a caution) and the name of the alert appears at the bottom of the display.

**Example 1:** Warning

```
00° 00.0000 N
000° 00.0000 E
```

**Example 2:** Caution

```
34° 12.3456 N
134° 12.3456 E
```

Ship’s position, ship’s mark and time of position fix are displayed in red for the caution “210 HDOP exceeded”.

---

*Example 1: Warning*

*Example 2: Caution*
Alert category

<table>
<thead>
<tr>
<th>Type</th>
<th>Icon</th>
<th>Visual indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning</td>
<td>Circle</td>
<td>• Acknowledged: Yellow-orange</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Not acknowledged: Yellow-orange, flashing</td>
</tr>
<tr>
<td>Caution</td>
<td>Square</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

For details, see page AP-8.

8.2 Alert List

The alert list shows all currently violated alerts and state of acknowledgment. All unacknowledged alerts are shown, even those whose reason for alert has passed (except for a caution).

1. Press the MENU/ESC key to open the main menu.
2. Select [5 Alert] then [1 Active Alert] to show the alert list. Unacknowledged alerts flash (except for a caution).
3. Press the MENU/ESC key to close the alert list.
8.3 Alert Log

The alert log shows the latest 50 alerts. When the log becomes full, the oldest entry is erased to make room for current alerts.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [5 Alert] then [4 Alert Log] to show the alert log.
3. Press the **MENU/ESC** key to close the alert log.

8.4 How to Acknowledge Alerts

**With the ACK/DELETE key**

When an alert condition occurs, the buzzer sounds (except for a caution) and the name of the alert appears at the bottom of the display. Press the **ACK/DELETE** key to acknowledge the alert. The buzzer stops for a warning. If multiple alerts are violated, a high-priority alert is acknowledged in order.

**How to acknowledge an alert from the alert list**

1. Open the alert list (see section 8.2).
2. Use the cursorpad (▲ or ▼) to select the alert to acknowledge then press the **NU/CU ENT** key.

**How to acknowledge all alerts from the alert list**

1. Open the alert list (see section 8.2).
2. Use the cursorpad (▲) to select [Acknowledge All] then press the **NU/CU ENT** key.
9. OTHER FUNCTIONS

This chapter describes menu items not described in other chapters.

9.1 Unit Setup Menu

You can set the units of measurement for distance, depth and water temperature.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [3 Unit Setup].

3. **Distance:** Select [1 Unit of Distance].
   **Depth:** Select [2 Unit of Depth].
   **Water temperature:** Select [3 Unit of Temperature].

4. Select the unit.
5. Press the MENU/ESC key to close the main menu.

**Note:** When changing the units of measurement, the setting values for the notice setting can exceed the setting range. Reset the values (see paragraph 4.1.1 and chapter 6).

9.2 Correction, Offset Menu

**Position offset**

You may apply an offset to the position to further refine its accuracy.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [4 Correction, Offset].
9. OTHER FUNCTIONS

3. Select [1 Position Offset].

4. Enter the offset value with the numeric keys. Mark your ship’s position on the chart to calculate the error with latitude and longitude, and enter the values. To change the coordinate, select "N" or "E" then press one of keys from 0 to 9.

5. Move the cursor to [Enter] then press the NU/CU ENT key.

6. Press the MENU/ESC key to close the main menu.

**Note:** When you set the position offset, the Datum indication changes to 999 (User Defined).

**Time difference**

You can display time in UTC or local. For local time, enter the time difference between local time and UTC.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [4 Correction, Offset].
3. Select [2 Local Time].
   - [Off]: Uses UTC (Universal Time Coordinated). Go to step 7.
   - [Manual Input]: Sets the time manually. Go to step 5.
5. Enter the difference time with the numeric keys. (If necessary, switch + and - with pressing one of keys from 0 to 9.)
6. Move the cursor to [Enter] then press the NU/CU ENT key.
7. Press the MENU/ESC key to close the main menu.

"LOCAL means the time is local time."
Ship size and antenna position

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [4 Correction, Offset].
3. Select [3 Ship Size/Antenna Position].

4. Enter the value for each item with the numeric keys. Refer to the figure at the right-hand of the display.
5. Move the cursor to [Enter] then press the **NU/CU ENT** key.
6. Press the **MENU/ESC** key to close the main menu.

**Input Value**

<table>
<thead>
<tr>
<th>Equipment No.</th>
<th>01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship’s Width</td>
<td>30.0 m</td>
</tr>
<tr>
<td>Ship’s Length</td>
<td>100.0 m</td>
</tr>
<tr>
<td>ANT Position X</td>
<td>000.0 m</td>
</tr>
<tr>
<td>ANT Position Y</td>
<td>000.0 m</td>
</tr>
<tr>
<td>ANT Position Z</td>
<td>000.0 m</td>
</tr>
</tbody>
</table>

①: Set the width and length of your ship. Enter the values as correct as possible because these values influence the output sentence “POS”. Note that these values are the upper limits for the values of ②.

②: Set the mounting location for the antenna unit.
   - X: The horizontal distance from the reference position "0" to the antenna position.
   - Y: The forward distance from the reference position "0" to the antenna position.
   - Z: The height from the ship bottom to the antenna unit.

Attitude gauge

The attitude gauge is displayed when the data for roll, pitch or heave is received.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [4 Correction, Offset].
3. Select [4 Attitude Gauge].

4. Select [1 On] or [2 Off].
   - [On]: Displays the attitude gauge (see the illustration in "Highway Display" on page 1-7) instead of the ship’s icon on the highway display. When the data for roll, pitch or heave is not received, the ship’s icon is displayed.
   - [Off]: Hides the attitude gauge on the highway display.
5. Press the **MENU/ESC** key to close the main menu.
9. OTHER FUNCTIONS

9.3 GNSS Menu

9.3.1 How to select the positioning system

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [1 Method].
4. Select [1 GPS].
5. Press the MENU/ESC key to close the main menu.

9.3.2 How to set the time for smoothing of position, speed and speed average

**Position smoothing:** When the receiving condition is unfavorable, the GPS fix may change randomly, even if the ship is dead in water. This change can be reduced by smoothing the raw GPS fixes. 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. Increase the setting if the GPS fix changes randomly.

**Speed 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.

**Speed average:** This speed is used to calculate the COG and SOG on the data display (see page 7-6).
1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [2 GPS Smoothing].

4. Select [1 Position], [2 Speed] or [3 Speed Average].

5. Enter the time for smoothing with the numeric keys.

6. Move the cursor to [Enter] then press the NU/CU ENT key.

7. Press the MENU/ESC key to close the main menu.

9.3.3 How to set the positioning condition

Satellite elevation

You can set the minimum elevation of satellites to use to fix position.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [3 Condition].

4. Select [1 Elevation Mask].
5. Enter the elevation with the numeric keys.
6. Move the cursor to [Enter] then press the NU/CU ENT key.
7. Press the MENU/ESC key to close the main menu.

Disable satellite

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

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [3 Condition].
9. OTHER FUNCTIONS

4. Select [2 Not Used GPS].
5. Enter the satellite numbers with the numeric keys.
6. Move the cursor to [Enter] then press the NU/CU ENT key.
7. Press the MENU/ESC key to close the main menu.

**Core filter**

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [3 Condition].
4. Select [5 Core Filter].
5. Select [1 No] or [2 Yes].
   - [No]: The tracking sensitivity is better than [Yes], however the ship’s track is traced less smoothly than [Yes].
   - [Yes]: The ship’s track is traced smoother than [No], however the tracking sensitivity is not as good as [No].
6. Press the MENU/ESC key to close the main menu.

### 9.3.4 How to select the RAIM function

RAIM (Receiver Autonomous Integrity Monitoring) is a diagnostic function which tests the accuracy of the GPS signal. To use the RAIM function, enter the range (from own ship in meters) for which you want to know position confidence. The receiver estimates position confidence using range value and detected satellite error, and displays (provided the RAIM function is active) the results as one of three levels of position confidence, at the top right-hand corner of the display. The three levels are as follows:

- **Safe**: GPS signal is normal. The positioning accuracy satisfies the setting value.
- **Caution**: RAIM accuracy cannot be calculated. (Signals from more than five GPS satellites are necessary.) The positioning accuracy does not satisfy the setting value.
- **Unsafe**: GPS signal is abnormal, therefore the positioning accuracy is not reliable.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [4 RAIM].
4. Select [1 Setting].
5. Select [1 On] or [2 Off].
   - [Off]: Don’t use RAIM function. Go to step 9.
6. Select [2 Accuracy Level].
7. Enter the distance with the numeric keys.
8. Move the cursor to [Enter] then press the **NU/CU ENT** key.
9. Press the **MENU/ESC** key to close the main menu.

### 9.3.5 How to select the datum

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

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [5 Datum].
4. Select an option. For [6 Other], go to step 5. For others, go to step 7.
5. Enter the datum number with the numeric keys.
6. Move the cursor to [Enter] then press the **NU/CU ENT** key.
7. Press the **MENU/ESC** key to close the main menu.

### 9.3.6 How to set the initial position

You can set the initial position to use when the equipment is restarted.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [6 Init Position].
4. Enter the position with the numeric keys. To change the coordinate, select "N" or "E" then press one of keys from 0 to 9.
5. Move the cursor to [Enter] then press the **NU/CU ENT** key.
6. Press the **MENU/ESC** key to close the main menu.
9. OTHER FUNCTIONS

9.3.7 How to set the positioning cycle

You can set the positioning cycle. Position is updated faster with the 5Hz or 10Hz setting, however the accuracy may not be as good as with the 1Hz setting. It is recommended to use the 1Hz setting for vessels other than high speed craft.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [9 Cycle].

4. Select [1 1Hz], [2 5Hz] or [3 10Hz]. The confirmation message appears.

5. Select [1 Yes]. The GP-170 restarts.

9.3.8 How to turn the anti-multipath mode on/off

You can prevent multipath, reflection of the satellite signal by some object, to prevent position “jump”.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [5 GNSS].
3. Select [0 Anti-Multipath Filter].


5. Select [1 Yes]. The GP-170 restarts.
9.4 Beacon/SBAS Menu

This menu sets the beacon and SBAS.

9.4.1 How to select the differential corrections to use

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [6 Beacon/SBAS].
3. Select [1 Mode].
4. Select an option.
   - [GNSS]: Uses neither beacon nor SBAS for positioning.
   - [GNSS+SBAS (+QZSS)]: Uses SBAS and QZSS.
   - [GNSS+Internal Beacon]*: Uses internal beacon.
   - [GNSS+Beacon (Data1, Data2 or Data4)]*: Uses external beacon.
   - [Auto]: Switches mode among differential (beacon), SBAS and no use. The priority is Differential (beacon) > SBAS > No use.
   * : See the table below.
5. Press the MENU/ESC key to close the main menu.

<table>
<thead>
<tr>
<th>Menu item</th>
<th>With internal beacon receiver</th>
<th>Without internal beacon receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNSS+Internal Beacon</td>
<td>Available</td>
<td>Not available</td>
</tr>
<tr>
<td>GNSS+Beacon (Data1, Data2 or Data4)</td>
<td>Not available</td>
<td>Available</td>
</tr>
</tbody>
</table>

9.4.2 How to set SBAS and beacon

SBAS

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [6 Beacon/SBAS].
3. Select [2 SBAS Search].
   - [Auto]: Automatically selects the satellite on the highest elevation among available satellites. Go to step 7.
   - [Manual]: Selects the satellite manually. Go to step 5.
9. OTHER FUNCTIONS

5. Enter the satellite number with the numeric keys (setting range: 120 to 138).

6. Move the cursor to [Enter] then press the NU/CU ENT key.

7. Press the MENU/ESC key to close the main menu.

**Beacon**

1. Press the MENU/ESC key to open the main menu.

2. Select [8 System Setting] then [6 Beacon/SBAS].

3. Select [3 Beacon Station].

4. Select [1 Auto], [2 Set Parameter] or [3 Select Station ID].

   - **[Auto]**: Automatically selects the nearest station among available stations. Go to step 8.
   - **[Set Parameter]**: Selects the station with entering the frequency or selecting the bit rate. Go to step 5.
   - **[Select Station ID]**: Selects the station from the station list (requires the internal beacon receiver). Go to step 7.

5. Select [1 Frequency] or [2 Bit Rate].

6. For [Frequency], enter the frequency with the numeric keys and move the cursor to [Enter] then press the NU/CU ENT key.

   For [Bit Rate], select the bit rate from five options. Go to step 8.

7. Use the cursorpad (▲ or ▼) to select the station ID then press the NU/CU ENT key.

8. Press the MENU/ESC key to close the main menu.

**9.4.3 How to open the station data**

**Station database**

Note: This menu requires the internal beacon receiver.

1. Press the MENU/ESC key to open the main menu.

2. Select [8 System Setting] then [6 Beacon/SBAS].
3. Select [4 Station Database] to show the [Station List] for 1020 station data.

4. Press the MENU/ESC key to close the main menu.

**Registered stations**

You can register up to 20 beacon stations.

**Note:** This menu requires the internal beacon receiver.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [6 Beacon/SBAS].
3. Select [5 Registered Stations] to show the [Edit Station Information] list.

Enter the station no. (e.g. “0001”) with the numeric key then press the NU/CU ENT key to display the information of the selected station at the right side of the screen.
9. OTHER FUNCTIONS

4. Use the cursorpad (▲ or ▼) to select ID no. then press the NU/CU ENT key.

```
Station Name: EAZAKI
POS: 35°49'.6508"N 136°31'.8592"E
Frequency: 320.5kHz
Bit Rate: 200bps
```

5. Edit the name, position, frequency or bit rate.
6. Press the MENU/ESC key to close the main menu.

**Disable satellite**

You can disable a maximum of three satellites.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [6 Beacon/SBAS].
3. Select [6 Not Used Satellite].

```
Not Used Satellite
1 SBAS
2 QZSS
```

4. Select [1 SBAS] or [2 QZSS].
5. Enter the disable satellite numbers with the numeric keys (setting range: 120 to 138 for SBAS, 183 to 187 and 193 to 197 for QZSS).
6. Move the cursor to [Enter] then press the NU/CU ENT key.
7. Press the MENU/ESC key to close the main menu.

**9.5 Language**

The available languages are English and Japanese.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [1 Language].
3. Select a language.
4. Press the MENU/ESC key to close the main menu.
9.6 I/O Menu

Besides its fundamental function of displaying position, the GP-170 can also output various data to external equipment. Before outputting data to external equipment, first determine what data the external equipment requires. Output only necessary data to ensure data will be output correctly.

All data transmitted by marine electronics equipment are prefixed with a two character code called a talker. The same talker must be shared by the transmitting and receiving equipment to transmit and receive data successfully.

9.6.1 How to set the output 1, 2, 3 or 4

1. Press the MENU/ESC key to open the main menu.
2. Select [7 I/O].
3. Select [1 Output Data1].
4. Select [1 Mode].
5. Select [1 IEC/NMEA] or [2 RTCM].
   - [IEC/NMEA]: NMEA sentence output
   - [RTCM]: Binary output
7. Select [1 IEC 61162-1 Ed.4], [2 IEC 61162-1 Ed.3], [NMEA V2.0] or [NMEA V1.5].
8. Select [3 Talker].
9. Select [1 GP] or [4 GN].

No. 2 and 3 are reserved for future use.
10. Select [4 BPS].
11. Select [1 4800 bps], [2 9600 bps] or [3 38400 bps].
12. Select [5 Sentence].
13. Use the cursorpad to select the sentence then press the NU/CU ENT key.
14. Use the cursorpad (W or X) to select the TX interval. TX interval is available in [- - -] (off), [0.1s]*, [0.2s]*, [1s], [2s], [3s], [4s], [5s], [6s], [10s], [15s], [20s], [30s], [60s] and [90s].
   *: Only for GGA, GLL, GNS, RMC and VTG when selecting [38400 bps] at step 11.
15. Press the NU/CU ENT key.
   Note 1: Keep the Load Rate below 100% when setting the TX intervals. The TX interval for other than the ZDA sentence cannot be guaranteed if the rate exceeds 100%.
   Note 2: For the TX interval of [0.1s] or [0.2s], set the positioning cycle (refer to paragraph 9.3.7) as follows:
   • For [0.1s], set the positioning cycle at 10Hz.
   • For [0.2s], set the positioning cycle at 5Hz or 10Hz.
17. Press the MENU/ESC key to close the main menu.

9.6.2 How to set the Ethernet
1. Press the MENU/ESC key to open the main menu.
2. Select [7 I/O] then [5 Ethernet].
3. Select [1 Sentence].
4. Use the cursorpad to select the sentence then press the NU/CU ENT key.
5. Use the cursorpad (W or X) to select the TX interval. TX interval is available in [- - -] (off), [0.1s]*, [0.2s]*, [1s], [2s], [3s], [4s], [5s], [6s], [10s], [15s], [20s], [30s], [60s] and [90s].
   *: Only for GGA, GLL, GNS, RMC and VTG.
6. Press the **NU/CU ENT** key.
   **Note:** For the TX interval of [0.1s] or [0.2s], set the positioning cycle (refer to paragraph 9.3.7) as follows:
   - For [0.1s], set the positioning cycle at 10Hz.
   - For [0.2s], set the positioning cycle at 5Hz or 10Hz.

7. Press the **MENU/ESC** key to close the sentence window.
8. Press the **MENU/ESC** key to open the main menu.
9. Select [7 I/O] then [5 Ethernet].
10. Select [2 IP ADR /Port].

![Image of IP Address and Port]

11. Enter the IP address and port (setting range: 49152 to 65535) with the numeric keys. When setting dual configuration (see section 9.7), set “239.192.000.004” for IP address and “60004” for port.
12. Move the cursor to [Enter] then press the **NU/CU ENT** key.
13. Select [3 MP].
14. Select [1 Enable] or [2 Disable]. For [1 Enable], go to step 15. For [2 Disable], go to step 18.
15. Select [4 MP IP ADR /Port].
16. Enter the MP IP address and port with the numeric keys.
17. Move the cursor to [Enter] then press the **NU/CU ENT** key.
18. Press the **MENU/ESC** key to close the main menu.

### 9.6.3 How to select the input data

1. Press the **MENU/ESC** key to open the main menu.
2. Select [7 I/O] then [6 Data Source Select].

![Image of Data Source Select]

3. Select [1 HDG].
4. Select the port for heading data. For [5 Ethernet], go to step 5. For [1 Data1], [2 Data2] or [4 Data4], go to step 6.
5. When selecting [5 Ethernet], do the following:
   1) Press the **ACK/DELETE** key to move the cursor to the leftmost of the input position.

   ![Image 1](image1.png)

   ![Image 2](image2.png)

   2) Enter the Ethernet SFI with the cursorpad and the numeric keys (combination of two alphabets and four numerals). SFI (System Function ID) is an identification code used by the system.

   3) Move the cursor to [Enter] then press the **NU/CU ENT** key. Go to step 9.

   **Note:** Set the SFI to eliminate overlap with other ones.

6. Select [1 HDG].

7. Select [7 User Priority].

8. Enter the priority for heading data by data number. For example, to set the priority order as Data1, Data2, Data4, enter 1, 2, 4.

9. Set the input data for [2 STW] (speed through water), [3 SST] (sea surface temperature) and [4 DPT] (water depth) as well.

10. Press the **MENU/ESC** key to close the main menu.

### 9.6.4 Line monitor log

**Line monitor**

The data output from the data ports (Data1 - Data4) can be monitored, and the data can be saved to a USB flash memory.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [7 I/O] then [7 Line Monitor].
3. Select [Data1] (or 2, 3, 4).

4. Set a USB flash memory in the USB port.
   **Note 1:** Do not use an encrypted USB flash memory.
   **Note 2:** Keep water away from the unit when the USB flash memory is inserted. The USB port is not waterproof while its cover is removed.

5. Press the **NU/CU ENT** key.
   **Note:** Do not save the log from multiple ports simultaneously. The log data may not be saved correctly depending on the specification or capacity of the USB flash memory.

6. Press the **NU/CU ENT** key to complete the saving.
   **Note:** Remove the USB flash memory after the saving is completed.

7. Press the **MENU/ESC** key to close the main menu.

**Ethernet error counter**

1. Press the **MENU/ESC** key to open the main menu.
2. Select [7 I/O] then [7 Line Monitor].
3. Select [0 Ethernet Error Counter].
   Press the **ACK/DELETE** key to reset all counts to 0.
4. Press the **MENU/ESC** key to close the main menu.
9. OTHER FUNCTIONS

9.7 How to Set Dual Configuration

You can configure two dual differential GPS navigator systems and an interface unit.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [7 I/O] then [8 Dual].
3. Select [1 No], [2 Serial (Data2)] or [3 Ethernet].
   - [No]: Don’t set dual configuration.
   - [Serial (Data2)]: Sets dual configuration using data2.
   - [Ethernet]: Sets dual configuration using Ethernet.
4. Press the **MENU/ESC** key to close the main menu.

9.8 How to Set ECDIS Sync Configuration

When connecting the ECDIS (FMD-3x00 series) via LAN, you can display the ECDIS-set monitored route on the display of the GP-170.

1. Press the **MENU/ESC** key to open the main menu.
3. Select [2 ECDIS IP ADR].
4. Enter the IP address for the connected ECDIS with the numeric keys.
5. Move the cursor to [Enter] then press the **NU/CU ENT** key.
6. Select [3 ECDIS SFI].
7. Press the **ACK/DELETE** key to move the cursor to the leftmost of the input position.
8. Enter the SFI for the connected ECDIS with the cursorpad and the numeric keys (combination of two alphabets and four numerals).
9. Move the cursor to [Enter] then press the **NU/CU ENT** key.
10. Select [1 Mode].

11. Select [2 On].

   **Note:** When selecting [2 On], you can not set a destination on the GP-170.

12. Press the **MENU/ESC** key to close the main menu.

To turn the synchronization off, select [1 Off] at step 11.

**Note 1:** When selecting [1 Off] during the synchronization with the ECDIS, the destination is canceled on the GP-170.

**Note 2:** The GP-170 uses waypoint information from the ECDIS when they are synched to one another. Therefore, some delay occurs between the arrival notice and next waypoint. This is not an indication of malfunction but the difference of criterion for waypoint updating between the ECDIS and the GPS receiver. If you do not need the arrival notice on the GP-170, turn it off (see paragraph 6.2.1).

**Note 3:** The no. 100 route on the route list is reserved for the monitored route output from the ECDIS. This route is automatically written over when the GP-170 receives a new monitored route.

### How to Change the User Password

You can set a four-character password to prevent unauthorized entry into certain menus. The default setting is no password.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [2 Plotter].
3. Select [9 Password].
   
   **Note:** The default setting is "0000", which means no password is set. When the password is "0000", the [Input Password] screen does not appear.
4. Enter the password (four characters) with the numeric keys.
5. Enter the new password (four characters) with the numeric keys.
6. Enter the password (four characters) with the numeric keys again.
7. Press the **NU/CU ENT** key.
8. Press the **MENU/ESC** key to close the main menu.
9. OTHER FUNCTIONS

9.10 How to Set the Demo Mode

A demo mode, which shows internally generated navigation data, is provided to acquaint you with the features of the GP-170. You can set the demo mode as follows:

1. Press the **MENU/ESC** key to open the main menu.
2. Select [8 System Setting] then [8 Demo].

3. Select [1 Parameter].

4. Enter each setting with the numeric keys refer to the left figure.
   - [Date]: Set the starting date and time in UTC.
   - [Position]: Set the starting position. To change the coordinate, select "N" or "E" then press one of keys from 0 to 9.
   - [1. Direction]: Set the direction for translatory movement.
   - [2. SOG]: Set the speed for translatory movement in kn.
   - [3. Direction]: Select the direction for rotary motion from [CW] (clockwise) and [CCW] (counterclockwise).
   - [4. Radius]: Set the radius for rotary motion in NM.
   - [5. Angular Speed]: Set the angular speed for rotary motion.

5. Move the cursor to [Start] then press the **NU/CU ENT** key. The equipment restarts. The [SIM] icon (simulation) appears at the top left corner of the screen.

**Note:** To cancel the demo mode, turn the power off and on.
10. MAINTENANCE, TROUBLE-SHOOTING

10.1 Maintenance

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

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

Life of LCD

The life of the LCD is approximately 60,000 hours. The actual number of hours depends on ambient temperature and humidity. When the brilliance cannot be raised sufficiently, ask your dealer about replacement.

NOTICE

| Do not apply paint, anti-corrosive sealant or contact spray to plastic parts or equipment coating. |
| Those items contain products that can damage plastic parts and equipment coating. |
10.2 **Fuse Replacement**

![WARNING]

**Use the proper fuse.**
A wrong fuse can damage the equipment and cause fire.

The fuse (type: FGBO-A 125V 3A PBF, code no.: 000-155-850-10) in the power cable protects against overvoltage and equipment trouble. If you cannot turn on the power, first check the fuse. If the fuse has blown, replace the fuse with the specified fuse. If the fuse blows again after replacement, contact your dealer.

10.3 **Troubleshooting**

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

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>You cannot turn on the power.</td>
<td>• Check for damaged power cable and connector.</td>
</tr>
<tr>
<td></td>
<td>• Check if the power cable is firmly fastened.</td>
</tr>
<tr>
<td></td>
<td>• Check the battery for proper voltage output.</td>
</tr>
<tr>
<td></td>
<td>• Check if the fuse in the power cable has blown.</td>
</tr>
<tr>
<td>No picture appears.</td>
<td>Adjust the brilliance using the BRILL key.</td>
</tr>
<tr>
<td>There is no response when a key is</td>
<td>Turn off and on the power. If no change, ask your dealer.</td>
</tr>
<tr>
<td>pressed.</td>
<td></td>
</tr>
<tr>
<td>Position is not fixed.</td>
<td>• Check if the antenna connector is firmly fastened.</td>
</tr>
<tr>
<td></td>
<td>• Check the number of satellites on the integrity display.</td>
</tr>
<tr>
<td></td>
<td>If there are two or less, check for obstructions between antenna</td>
</tr>
<tr>
<td></td>
<td>unit and satellites.</td>
</tr>
<tr>
<td></td>
<td>• Clear the GPS memory on the [8 System Setting] - [9 Clear Memory] -</td>
</tr>
<tr>
<td>Position is wrong.</td>
<td>• Check if the correct geodetic chart system is selected on the [8</td>
</tr>
<tr>
<td></td>
<td>• Enter the position offset on the [8 System Setting] - [4 Correction,</td>
</tr>
<tr>
<td>Bearing is wrong.</td>
<td>Check the magnetic variation on the [8 System Setting] - [2 Plotter] -</td>
</tr>
<tr>
<td></td>
<td>[2 Magnetic Variation] menu.</td>
</tr>
<tr>
<td>Data are not transmitted to external</td>
<td>• Check if the data format is correct on the [7 I/O] menu.</td>
</tr>
<tr>
<td>equipment.</td>
<td>• The TX interval may be set to off. Select the proper interval.</td>
</tr>
<tr>
<td></td>
<td>• Check the appropriate settings on the external equipment.</td>
</tr>
<tr>
<td></td>
<td>• Check the connections:</td>
</tr>
<tr>
<td></td>
<td>GP-170</td>
</tr>
<tr>
<td></td>
<td>TD4-A</td>
</tr>
<tr>
<td></td>
<td>RD4-A</td>
</tr>
<tr>
<td></td>
<td>TD4-B</td>
</tr>
<tr>
<td></td>
<td>RD4-B</td>
</tr>
</tbody>
</table>
10.4 Equipment Information

You can display information about this equipment from the menu.

1. Press the MENU/ESC key to open the main menu.
2. Select [6 Maintenance] then [1 Information].
3. Select [1 Main], [2 Panel], [3 GPS], [4 Beacon] (requires internal beacon receiver) or [5 Database].
4. Press the NU/CU ENT key to close each information window.
5. Press the MENU/ESC key to close the main menu.
10.5 **Self Test**

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

**Memory test**

1. Press the **MENU/ESC** key to open the main menu.
2. Select [6 Maintenance] then [2 Self Test].

3. Select [1 Memory Test]. The test results are displayed as "OK", "NG" (No Good) or "--". If any NG is displayed, contact your dealer. The test result of DATA3, checked using a dedicated connector at the factory, is normally displayed as "--".

![Self Test menu](image)

<table>
<thead>
<tr>
<th>Self Test: memory. I/O. Data test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restart: Push &quot;NU/CU ENT&quot; or &quot;方位モード 入力&quot; Key</td>
</tr>
<tr>
<td>Exit: Push &quot;MENU ESC&quot; or &quot;メニュー 退出&quot; Key</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>Start Time: 2014.04.15 12:18</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Main</th>
<th>GPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB: OK 2014.04.15 12:18</td>
<td>Flash: OK 2014.04.15 12:18</td>
</tr>
<tr>
<td>Data1: OK 2014.04.15 12:18</td>
<td>Beacon</td>
</tr>
<tr>
<td>Data3: --</td>
<td>RAM: OK 2014.04.15 12:18</td>
</tr>
<tr>
<td>Data4: OK 2014.04.15 12:18</td>
<td>Memory: OK 2014.04.15 12:18</td>
</tr>
<tr>
<td>LAN: OK PHY is OK.</td>
<td>ANT: OK 2014.04.15 12:18</td>
</tr>
</tbody>
</table>

4. Press the **MENU/ESC** key to close the memory test window.
10. MAINTENANCE, TROUBLESHOOTING

Keyboard test

1. Press the **MENU/ESC** key to open the main menu.
2. Select [6 Maintenance] then [2 Self Test].
3. Select [2 Keyboard Test].
4. Press each key one by one. A key's corresponding location on the display turns blue if the key is normal.
5. Press the **MENU/ESC** key three times to close the keyboard test window.

LCD test

1. Press the **MENU/ESC** key to open the main menu.
2. Select [6 Maintenance] then [2 Self Test].
3. Select [3 LCD Test]. The operation instructions display opens.
4. Press the **NU/CU ENT** key. Each press of this key changes the LCD pattern in the sequence shown below.

   ![LCD patterns](image)

   **Note:** You can cancel the test at any time by pressing the **MENU/ESC** key.

5. Press the **MENU/ESC** key to close the test pattern window.

### Automatic test

The memory, keyboard and LCD tests are automatically tested.

1. Press the **MENU/ESC** key to open the main menu.
2. Select [6 Maintenance] then [2 Self Test].
3. Select [4 Automatic Test]. The GP-170 automatically repeats the following sequence.
   - Information screen (refer to section 10.4) → Memory → Keyboard → LCD
   **Note 1:** You can cancel the test at any time by pressing the **MENU/ESC** key.
   **Note 2:** The test stops if the check result for an item other than [Data3] is "NG" or "– –".
4. Press the **MENU/ESC** key to close the automatic test window.

### 10.6 Backup

The GP-170 can save or load the settings and registered data.

1. Set a USB flash memory in the USB port.
   **Note 1:** Do not use an encrypted USB flash memory.
   **Note 2:** Keep water away from the unit when the USB flash memory is inserted. The USB port is not waterproof while its cover is removed.
2. Press the **MENU/ESC** key to open the main menu.
4. Select [1 Backup User Setting], [2 Load User Setting], [3 Import GPX (Overwrite)],
[4 Import GPX (Addition)] or [5 Export GPX].
- [Backup User Setting]: Saves the current settings to a USB flash memory.
- [Load User Setting]: Loads the saved settings from a USB flash memory.
- [Import GPX (Overwrite)]: Imports the GPX data (marks, waypoints and routes) from a USB flash memory. The GPX data in the GP-170 are deleted.
- [Import GPX (Addition)]: Imported data is added to the GPX data in the GP-170. (You can store a maximum of 2,000 marks, 100 routes, and 1,000 waypoints.)
- [Export GPX]: Exports the GPX data (marks, waypoints and routes) in the GP-170 to a USB flash memory.
The confirmation message appears.

5. Select [1 Yes]. The message “Now Processing....” appears.

After the process is complete, the GP-170 operates as follows, or do the following according the menu item selected at step 4:
- [Backup User Setting]: The message window automatically closes.
- [Load User Setting], [Import GPX (Overwrite)], [Import GPX (Addition)]: The GP-170 restarts.
- [Export GPX]: After the message window shows 100%, press the MENU/ESC key to close the message window.

**Note:** If a USB flash memory is not set, the following message appears.

**Note:** Route no. 100 is reserved for the monitored route sent from an ECDIS. A route imported from a USB flash memory may also be assigned this number when that route becomes the 100th route registered in the GP-170. Whenever a monitored route is received, route no. 100 is written over to import the monitored route.
10.7 How to Clear the Memory

You can clear display setting, GPS memory, marks and routes to start afresh.

1. Press the MENU/ESC key to open the main menu.
2. Select [8 System Setting] then [9 Clear Memory].

3. Select [1 Clear Display Setting], [2 Clear GPS], [3 Clear All] or [4 Clear Mark&Route].
   - [Clear Display Setting]: Clears the display setting.
   - [Clear GPS]: Clears the GPS memory.
   - [Clear All]: Clears both display setting and GPS memory.
   - [Clear Mark&Route]: Clears marks and routes.
   The confirmation message appears.

4. Select [1 Yes]. The equipment restarts.
Note: If setting invalid data in numerical entry, two beeps sound. Reenter the correct data.

1 Display

- **Back Ground** *(White, Black)*
- **Grid** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black, Off)*
- **Lines Color**
  - **XTL Line** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black, Off)*
  - **Heading Line** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black, Off)*
  - **Course Vector** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black, Off)*
  - **Course Vector Time** *(10 min, 20 min, 30 min, 1 H, 2 H, 3 H, 5 H, 6 H, Continuous)*
- **Time Mark** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black, Off)*
- **Mark/WPT Name** *(On (All), On (WPT), Off)*
- **Cursor Size** *(Large, Small)*
- **Manual Calculation** *(Open the setting window)*
- **Set/Drift AVR** *(Off, 10 min, 20 min, 30 min, 1 H, 2 H, 3 H, 5 H, 6 H)*

1\*1: Can not be changed.

**Display Select**
- **Main** *(On)*
- **Integrity** *(On)*
- **Highway** *(On, Off)*
- **Course** *(On, Off)*
- **Data** *(On, Off)*

2 Track/Mark

- **Track REC** *(Time, Distance)*
- **Track Color** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black)*
- **Mark Shape** *( Default)*
- **Mark Color** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black)*
- **Mark Line** *(None, Solid, Dash, Alternate Dash)*
- **Line Color** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black)*
- **Event Mark** *(Same as Mark Shape)*
- **Event Color** *(DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black)*
- **Erase Track**
  - **Erase Track** *(Yes, No)*
  - **Erase Mark** *(Yes, No)*

3 Navigation

- **Mark Registration** *(Open the mark list)*
- **Route Registration** *(Open the route list)*
- **Display ETA/TTG** *(Off, ETA, ETA+TTG)*
- **ECDIS Sync**
  - **Mode** *(Off, On)*
  - **ECDIS IP ADR** *(Open the entry window)*
  - **ECDIS SFI** *(Open the entry window)*
- **Goto** *(Mark Number)*
- **Goto** *(Route Number)*
- **Goto Cancel**

4 Notice Setting

- **Arrival/Anchor** *(Arrival, Anchor, Off)*
- **XTE** *(Off, On)*
- **Ship Speed**
  - **Status** *(Off, In, Out)*
  - **Speed** *(Open the setting window)*

**APPENDIX 1 MENU TREE**
APPENDIX 1 MENU TREE

1 Trip
   - Status (Stop, Start/Restart, Clear)
   - Range (Open the setting window.)

2 Sound
   - Notice Sound (Off, On, Continuous)
   - Key Sound (On, Off)

5 Alert
   - Active Alert (Open the active alert list.)
   - Mode*2 (Alert I/F 1, Alert I/F 2, Legacy)
   - Remote Ack I/F*2 (Ack, BuzzerStop)
   - Alert Log (Open the alert log.)

6 Maintenance
   - Information
     - Main (Open the information for main board.)
     - Panel (Open the information for panel board.)
     - GPS (Open the information for GPS board.)
     - Beacon (Open the information for beacon board.)
     - Database (Open the information for database.)
   - Self Test
     - Memory Test
     - Keyboard Test
     - LCD Test
     - Automatic Test
     - Sound Test*2
   - Backup
     - Backup User Setting (Yes, No)
     - Load User Setting (Yes, No)
     - Import GPX (Overwrite) (Yes, No)
     - Import GPX (Addition) (Yes, No)
     - Export GPX (Yes, No)
   - SW/Database Update*2
     - Chk the available software
       - Main: Application
       - Main: Boot
       - GPS: Application
       - Beacon: Application
       - Beacon: Boot
     - Chk the new data table
       - Datum
       - WMM
   - Exchange*2
   - Service*2
   - Tech Menu*2

7 I/O
   - Output Data 1 to 4
     - Mode (IEC/NMEA, RTCM)
     - Format (IEC 61162-1 Ed.4, IEC 61162-1 Ed.3, NMEA V2.0, NMEA V1.5)
     - Talker (GP, GL*3, GA*3, GN)
     - BPS (4800 bps, 9600 bps, 38400 bps) (38400 bps is default for Output Data 4.)

*2: For serviceman.
*3: Reserved for future use.
*3: Reserved for future use.
Ethernet
- Sentence (Options are same as Output Data1 excluding APA, Rnn and WNR.)
- IP ADR/Port (Open the entry window.)
- MP (Enable, Disable)
  MP IP ADR/Port (Open the entry window.)

Data Source Select
- HDG (Data1, Data2, Data4, Ethernet, User Priority)
- STW (Data1, Data2, Data4, Ethernet, User Priority)
- SST (Data1, Data2, Data4, Ethernet, User Priority)
- DPT (Data1, Data2, Data4, Ethernet, User Priority)

Line Monitor
- Data1 (Open the line monitor for serial data1.)
- Data2 (Open the line monitor for serial data2.)
- Data3 (Open the line monitor for serial data3.)
- Data4 (Open the line monitor for serial data4.)
- GPS Core*2 (No, Yes)  *2: For serviceman.
- Beacon*2 (No, Yes)
- Ethernet Error Counter (Open the Ethernet Error data list.)

Dual (No, Serial (Data2), Ethernet)

8 System Setting

Language (English, 日本語)

Plotter
- Bearing Reference (True, Magnetic)
- Magnetic Variation (Auto, Manual)
- Calculation (RL, GC)
- User Defined
  - Custom 1 (SOG, COG, RNG, BRG, SST, DPT, XTD, Average COG,
    Average SOG, TTG, ETA, TRIP, TRIP TIME, Route Distance, Route TTG,
    ETA (Next), VTD, SET, DRIFT, STW, HDG, Mark/MAX Mark,
    Track/MAX Track, ETA/ETA (Plan))
  - Custom 2 (Same as Custom 1; SOG)
  - Custom 3 (Same as Custom 1; HDG)
  - Custom 4 (Same as Custom 1; COG)
  - Custom 5 (Same as Custom 1; ETA)
  - Custom 6 (Same as Custom 1; Route Distance)
  - Custom 7 (Same as Custom 1; ETA/ETA (Plan))
  - Custom 8 (Same as Custom 1; TTG)

Initial XTL/Arrival/Stay
- XTL (Open the setting window.)
- Arrival Radius (Open the setting window.)
- Stay Time (Open the setting window.)
- SOG (Open the setting window.)
- Departure Time (Open the setting window.)
- Route Color (DeepPink, GreenYellow, Green, Cyan, Purple, Blue, White/Black)

List Number (Keeping, Not Saved)
- List Information (L/L, Range/Bearing)
- Password (Open the setting window.)

Unit Setup
- Unit of Distance (NM, km, SM)
- Unit of Depth (m, ft, fm)
- Unit of Temperature (°C, °F)

Correction, Offset
- Position Offset (Open the setting window.)
- Local Time (Off, Manual Input)
- Ship Size/Antenna Position (Open the setting window.)
- Attitude Gauge (On, Off)
APPENDIX 1 MENU TREE

1. GNSS
   - Method (GPS, GLONASS*3, GALILEO*3, Multi*3)
     - GPS Smoothing
       - Position (Open the setting window.)
       - Speed (Open the setting window.)
       - Speed Average (Open the setting window.)
     - Condition
       - Elevation Mask (Open the setting window.)
       - Not Used GPS (Open the setting window.)
       - Not Used GLONASS*3 (Open the setting window.)
       - Not Used GALILEO*3 (Open the setting window.)
       - Core Filter (No, Yes)
     - RAIM
       - Setting (On, Off)
       - Accuracy Level (Open the setting window.)
     - Datum (WGS84, WGS72, PZ90, CK42, CK95, Other)
     - Init Position (Open the setting window.)
     - Roll Over*2 (Open the setting window.)
     - Source*2 (Inner Receiver, Data1, Data2, Data4)
     - Cycle (1Hz, 5Hz, 10Hz)
     - Anti-Multipath Filter (On, Off)
   - Beacon/SBAS
     - Mode (GNSS, GNSS+SBAS (+QZSS), GNSS+Internal Beacon*4,
       GNSS+Beacon (Data1)*4, GNSS+Beacon (Data2)*4, GNSS+Beacon (Data4)*4, Auto)
     - SBAS Search (Auto, Manual)
     - Beacon Station
       - Auto
         - Set Parameter
           - Frequency (Open the setting window.)
           - Bit Rate (25bps, 50bps, 100bps, 150bps, 200bps)
           - Select Station ID*5 (Open the station list.)
     - Station Database*5 (Open the station list.)
     - Registered Stations*5 (Open the station information list.)
     - Not Used Satellite
       - SBAS (Open the setting window.)
       - QZSS (Open the setting window.)
     - Beacon Reset*2
     - Modem Test*2 (Off, On)
   - Network
     - SNTP Server (On, Off)
     - Ethernet*2
     - Equipment ID (Open the setting window.)
     - SFI*2
   - Demo
     - Parameter (Open the setting window.)
   - Clear Memory
     - Clear Display Setting (Yes, No)
     - Clear GPS (Yes, No)
     - Clear All (Yes, No)
     - Clear Mark&Route (Yes, No)
     - Factory Default*2 (Yes, No)

*3: Reserved for future use.
*4: See the table below.
*5: Requires internal beacon receiver.

Menu item | w/internal beacon receiver | w/o internal beacon receiver
--- | --- | ---
GNSS+Internal Beacon | Available | Not available
GNSS+Beacon (Data1, Data2 or Data4) | Not available | Available

*4
*5

AP-4
APPENDIX 2 LIST OF TERMS/SYMBOLS

The following table shows the terms and symbols used in the GP-170.

Terms

<table>
<thead>
<tr>
<th>Terms</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACK</td>
<td>Acknowledge</td>
</tr>
<tr>
<td>ADR</td>
<td>Automotive Dead Reckoning</td>
</tr>
<tr>
<td>ALARM</td>
<td>Alarm</td>
</tr>
<tr>
<td>ANCH</td>
<td>Anchor Watch</td>
</tr>
<tr>
<td>ANT</td>
<td>Antenna</td>
</tr>
<tr>
<td>APR</td>
<td>April</td>
</tr>
<tr>
<td>AUG</td>
<td>August</td>
</tr>
<tr>
<td>AUTO</td>
<td>Automatic</td>
</tr>
<tr>
<td>AVR</td>
<td>Average</td>
</tr>
<tr>
<td>BRG</td>
<td>North-referenced bearing</td>
</tr>
<tr>
<td>BRILL</td>
<td>Brilliance</td>
</tr>
<tr>
<td>CAL</td>
<td>Calibrate</td>
</tr>
<tr>
<td>CCRP</td>
<td>Consistent Common Reference Point</td>
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<tr>
<td>CLR</td>
<td>Clear</td>
</tr>
<tr>
<td>CNCL</td>
<td>Cancel</td>
</tr>
<tr>
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# APPENDIX 2 LIST OF TERMS/SYMBOLS

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## Symbols

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[Map showing time differences across the world]
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<td>NORTH AMERICAN 1927</td>
<td>Mean Value (Scotland)</td>
</tr>
</tbody>
</table>

Note: The chart list continues with similar entries for different regions and countries.
APPENDIX 5 WHAT IS SBAS?

A satellite based augmentation system, or SBAS (Satellite Based Augmentation System), is an augmentation system that uses additional messages from satellite broadcasts to support regional and wide area augmentation. SBAS provides GPS signal corrections to SBAS users, for even better position accuracy, through the GPS error corrections that are widely broadcasted from the geostationary satellite.

SBAS is used in America, Europe, Japan and India.

- America: WAAS (Wide Area Augmentation System)
- Europe: EGNOS (Euro Geostationary Navigation Overlay Service)
- Japan: MSAS (Multi-Functional Satellite Augmentation System)
- India: GAGAN (GPS And GEO Augmented Navigation)

These four systems have interoperability. The illustration below shows the coverage area for each provider. This manual uses “SBAS” for these four providers generically.

<table>
<thead>
<tr>
<th>Provider</th>
<th>Satellite type</th>
<th>Longitude</th>
<th>Satellite No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAAS</td>
<td>Intelsat Galaxy XV</td>
<td>133°W</td>
<td>135</td>
</tr>
<tr>
<td></td>
<td>TeleSat Anik F1R</td>
<td>107.3°W</td>
<td>138</td>
</tr>
<tr>
<td></td>
<td>Inmarsat-4-F3</td>
<td>98°W</td>
<td>133</td>
</tr>
<tr>
<td>EGNOS</td>
<td>Inmarsat-3-F2/AOR-E</td>
<td>15.5°W</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Artemis</td>
<td>21.5°E</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>Inmarsat-4-F2</td>
<td>25°E</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>SES-5</td>
<td>5°E</td>
<td>136</td>
</tr>
<tr>
<td>MSAS</td>
<td>MTSAT-1R</td>
<td>140°E</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>MTSAT-2</td>
<td>145°E</td>
<td>137</td>
</tr>
<tr>
<td>GAGAN</td>
<td>GSAT-8</td>
<td>55°E</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td>GSAT-10</td>
<td>83°E</td>
<td>128</td>
</tr>
</tbody>
</table>

As of March 6th, 2014
APPENDIX 6 PARTS LIST/LOCATION

Parts list
This equipment contains complex modules in which fault diagnosis and repair down to component level are not practical (IMO A.694(17)/8.3.1). Only some discrete components are used. FURUNO Electric Co., Ltd. Believes identifying these components is of no value for shipboard maintenance; therefore, they are not listed in this manual. Major modules can be located on the parts location photos below.

<table>
<thead>
<tr>
<th>ELECTRICAL PARTS LIST</th>
<th>Unit</th>
<th>Display Unit GP-170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRINTED CIRCUIT BOARD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GR-1700(20P8208), BEACON</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>20P8209, MAIN</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>20P8210, PNL</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>20P8211, GPS</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>20P8220, UFL-ANT</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>LCD</td>
<td>NL6448BC18-01F</td>
<td>—</td>
</tr>
</tbody>
</table>

Parts location

Display unit, cover opened
# SPECIFICATIONS OF GPS NAVIGATOR

GP-170

## 1 GPS RECEIVER

### 1.1 Receiving frequency
- 1575.42 MHz

### 1.2 Tracking code
- C/A code

### 1.3 Number of channel
- GPS: 12 channels parallel, 12 satellites

### 1.4 Accuracy (dependent on ionospheric activity and multipath)
- **GPS**: 10 m approx. (2drms, HDOP<4)
- **DGPS**: 5 m approx. (2drms, HDOP<4)
- **WAAS**: 3 m approx. (2drms, HDOP<4)
- **MSAS**: 7 m approx. (2drms, HDOP<4)

### 1.5 Ship’s speed accuracy
- 0.2 kn (10kn or less), 2 % of ship’s speed (more than 10kn), excluding influence of roll and pitch

### 1.6 Course accuracy
- ±3° (within 1 to 17kn), ±1° (more than 17kn)

### 1.7 Position fixing time
- Cold start: 90 s typical

### 1.8 Tracking velocity
- 1000 kn

### 1.9 Position update Interval
- 1 s (standard), 0.1 s (minimum)
  *: Set the position update interval 0.1 s or 0.2 s for high-speed craft. Set the positioning cycle 5 or 10 Hz according to the position update interval; 5/10 Hz for 0.2s interval, 10 Hz for 0.1s interval.

## 2 DISPLAY SECTION

### 2.1 Display type
- Color LCD 116.16 x 87.12 mm, 640 x 480 dot matrix

### 2.2 Brilliance
- 700 cd/m² typical

### 2.3 Visible distance
- 0.625 m nominal

### 2.4 Display modes
- Plotter, Highway, Course, Data, Integrity

### 2.5 Projection
- Mercator

### 2.6 Track plotter display
- Scale: 0.125 to 1024 NM, 14 steps
- Latitude limits: Between 88° N and 88° S
- Plot interval: By time 0 to 60m00s or by distance 0 to 99.99 NM, sm/km or halt

### 2.7 Memory capacity
- Track: 1,000 points, Mark: 2,000 points
- Waypoints: 1,000 points with 20 characters comment each
- Route: 100 routes (containing 1,000 waypoints each)
  - No. 001 to 099: for registering routes
  - No. 100: for reading from USB flush memory/ synchronizing with ECDIS

### 2.8 Notice
- Arrival and anchor watch, Cross track error, Speed, Trip

### 2.9 Alerts
- Differential positioning interruption, HDOP overshoot, Own ship positioning fail, Own ship position lost, Beacon signal lost, Beacon malfunction, Antenna short-circuit

### 2.10 Satellite information
- Satellite number, Bearing, Elevation, Signal level, DOP, Status
3 DGPS BEACON RECEIVER (for DGPS model)
3.1 Frequency range 283.5 kHz to 325.0 kHz
3.2 Channel separation 500 Hz
3.3 MSK rate 25, 50, 100, 150, 200 bps
3.4 Operation mode Auto or manual

4 INTERFACE
4.1 Number of ports Serial: 4 ports (IEC61162-1 I/O: 2, O: 1, IEC61162-2 I/O: 1), Ethernet (IEC61162-450): 1 port, USB: 1 port
4.2 Data format IEC61162-1 Ed.3/4, NMEA0183 Ver1.5/2.0/4.0, IEC61162-450
4.3 Data port 1, 2 and 4 IEC/NMEA Mode
   IN: ACK, ACN, CRQ, DBT, DPT, HBT, HDG, HDM**, HDT**, MSK, MSS, MTW, THS, TLL, VBW, VHW
   OUT: AAM, ALC, ALF, ALR, APA**, APB, ARC, BOD, BWC, BWR, BWW, DTM, GBS, GGA, GLL, GNS, GRS, GSA, GST, GSV, HBT, MSK*, MSS*, POS, RMB, RMC, Rnn**, RTE, VDR, VTG, WCV, WNC, WNR, WPL, XTE, ZDA
   RTCM Mode
   IN/OUT: MSK, MSS
   DGPS correction data in RTCM SC-104 V2.3

4.4 Data port 3
   IN: MOB from external device (contact closure)
   OUT: AAM, ALC, ALF, ALR, APA**, APB, ARC, BOD, BWC, BWR, BWW, DTM, GBS, GGA, GLL, GNS, GRS, GSA, GST, GSV, HBT, MSK*, MSS*, POS, RMB, RMC, Rnn**, RTE, VDR, VTG, WCV, WNC, WNR, WPL, XTE, ZDA
   RTCM Mode Output MSK, MSS
   DGPS correction data in RTCM SC-104 V2.3

4.5 Proprietary sentences (output only)
   PFEC GPals, GPasc, GPdst, GPmr2, GPmsk, GPrai, GPreq, GPr2, GPtrp, llalr, pidat, rminf

4.6 Ethernet 100Base-TX, RJ45 connector (waterproof)
   IEC61162-450 transmission group
   IN: MISC, SATD, NAVD
   OUT: Arbitrary (default: NAVD)
   Network function (except IEC61162-450)
   SNTP, HTTP, Furuno Management Protocol (FMP)
   Sentences
   IN: ACK, ACN, DBT, DPT, HBT, HDG, HDM**, HDT**, MTW, THS, TLL, VBW, VHW
   OUT: AAM, ALC, ALF, ALR, APB, ARC, BOD, BWC, BWR, BWW, DTM, GBS, GGA, GLL, GNS, GRS, GSA, GST, GSV, HBT, POS, RMB, RMC, RTE, VDR, VTG, WCV, WNC, WPL, XTE, ZDA

*: MSK: Internal/external beacon receiver required, MSS: internal beacon receiver required.
**: not used for SOLAS ships.
5  **POWER SUPPLY**
5.1 Display unit 12-24 VDC: 0.8-0.4 A (w/ internal beacon receiver)
5.2 Rectifier (option)
   PR-240  100-115/220-230 VAC, 1 phase, 50/60Hz
   PR-62  100/110-115/220/230 VAC, 1 phase, 50/60Hz

6  **ENVIRONMENTAL CONDITIONS**
6.1 Ambient temperature
   Antenna unit  -25°C to +70°C
   Display unit  -15°C to +55°C
6.2 Relative humidity  95% or less at +40°C
6.3 Degree of protection
   Antenna unit  IP56
   Display unit  IP25 (USCG CFR-46), IPX0 (USB port cover opened)
6.4 Vibration  IEC 60945 Ed.4

7  **UNIT COLOR**
7.1 Antenna unit  N9.5
7.2 Display unit  N2.5
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Declaration of Conformity

We, FURUNO ELECTRIC CO., LTD.

(Manufacturer)

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

(Address)

declare under our sole responsibility that the product

GPS NAVIGATOR GP-170

(Model name, type number)

to which this declaration relates conforms to the following standard(s) or normative document(s)

IMO Resolution A.694(17) IEC 61108-1 Ed.2.0: 2003
IMO Resolution MSC.112(73) IEC 61108-4 Ed.1.0: 2004
IMO Resolution MSC.114(73) - DGPS IEC 61162-1 Ed.4.0: 2010
IMO Resolution MSC.191(79) IEC 61162-2 Ed.1.0: 1998
2000 HSC Code 13 IEC 61162-450 Ed.1.0: 2011

IEC 62288 Ed.1.0: 2008
IEC 62288 Ed.2.0 CDV: 2013
IEC 60945 Ed.4.0: 2002

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

For assessment, see

- EC type-examination (Module B) certificate No. MED-B-8664 and MED-B-8668 (DGPS) issued by DET NORSKE VERITAS (DNV), Norway.
- Production Quality System (Module D) certificate No. P 112 issued by Telefication, The Netherlands.

This declaration is issued according to the provisions of European Council Directive 96/98/EC on marine equipment amended by Commission Directive 2012/32/EU and 2013/52/EU.

On behalf of Furuno Electric Co., Ltd.

Yoshitaka Shogaki
Manager, QMS Secretariat
Quality Assurance Department

Nishinomiya City, Japan
December 11, 2013

(Place and date of issue)

(name and signature or equivalent marking of authorized person)