



# USER MANUAL

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GNSS equipment

NGR-1000/NGR-3000

## NOTICE TO USERS

- Thanks for your purchasing this product NGR-1000/NGR-3000 GNSS equipment.
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- Software version in your product may be some different from that described as in this manual. Such difference will not affect the performance of the product. NSR reserves the right of continuous improvement on products both in software and in hardware without any prior notice.
- NSR will assume no responsibility for the damage caused by improper use or modification of the product or claims of loss of profit by a third party.
- Please read this manual carefully to ensure proper use before installation and use of the product.
- Please keep the manual for your future reference.

## Modify Record

| No. | Modify by | Date       | Paragraph | Version | Reason                  |
|-----|-----------|------------|-----------|---------|-------------------------|
| 1   | Q/A       | 2017/06/14 |           | 01      | First edition           |
| 2   | Q/A       | 2017/08/15 |           | 02      | Add navigation function |
| 3   | Q/A       | 2017/09/29 |           | 03      | Generally modified      |
| 4   | Q/A       | 2019/03/31 | All       | 04      | Software update         |
| 5   | Q/A       | 2021/07/16 | All       | 05      | Software update         |

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## SAFETY INSTRUCTIONS FOR THE OPERATOR

|                                                                                   |                                                                                                                                                              |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Warning</b><br>Keep away from heat source or direct sunshine.                                                                                             |
|  | <b>Prohibition</b><br>Don't open the equipment. Only qualified personnel should work inside the equipment. Don't disassemble or try to modify the equipment. |
|  | <b>Dangerous</b><br>Turn off the power immediately when smoke or fire is emitted.                                                                            |

## SAFETY INSTRUCTIONS FOR THE INSTALLER

|                                                                                     |                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Warning</b><br>Connect the earthing cord to ship's body.<br>Observe the compass safe distance to prevent deviation of an onboard magnetic compass.                                                                                    |
|  | <b>Prohibited</b><br>Don't open the equipment unless you have fully understood the structure and circuits of the equipment. Only qualified personnel should work inside the equipment. Don't disassemble or try to modify the equipment. |
|  | <b>Dangerous</b><br>Turn off the power at power distribution board before installation.                                                                                                                                                  |

# TABLE OF CONTENTS

|                                                    |           |
|----------------------------------------------------|-----------|
| <b>1. PRODUCT FEATURES .....</b>                   | <b>1</b>  |
| <b>2. OPERATIONAL OVERVIEW .....</b>               | <b>2</b>  |
| 2.1 CONTROL DESCRIPTION .....                      | 2         |
| 2.2 TURN ON AND OFF THE POWER.....                 | 4         |
| 2.3 ADJUST DIMMER AND CONTRAST .....               | 4         |
| 2.4 BASIC MENU OPERATION.....                      | 5         |
| 2.5 HOW TO ENTER CHARACTER DATA.....               | 5         |
| 2.6 DISPLAY MODES .....                            | 6         |
| 2.6.1 <i>Data display</i> .....                    | 6         |
| 2.6.2 <i>Plotter display</i> .....                 | 7         |
| 2.6.3 <i>Highway display</i> .....                 | 9         |
| 2.6.4 <i>Compass display</i> .....                 | 9         |
| 2.6.5 <i>Satellite display</i> .....               | 9         |
| <b>3. NAVIGATION PLANNING .....</b>                | <b>10</b> |
| 3.1 REGISTER WAYPOINTS.....                        | 11        |
| 3.1.1 <i>Insert a new Waypoint</i> .....           | 12        |
| 3.1.2 <i>Edit a Waypoint</i> .....                 | 12        |
| 3.1.3 <i>Delete a Waypoint</i> .....               | 13        |
| 3.2 ROUTE PLANNING .....                           | 13        |
| 3.2.1 <i>Edit a Route</i> .....                    | 14        |
| 3.2.2 <i>Forward navigation</i> .....              | 15        |
| 3.2.3 <i>Reverse navigation</i> .....              | 15        |
| 3.2.4 <i>Create a New Route</i> .....              | 15        |
| 3.2.5 <i>Delete a Route</i> .....                  | 16        |
| 3.3 STOP THE NAVIGATION BY THE CURRENT ROUTE ..... | 16        |
| <b>4. ALARM .....</b>                              | <b>16</b> |
| 4.1 XTE (CROSS TRACK ERROR) ALARM .....            | 17        |
| 4.2 SPEED ALARM .....                              | 17        |
| 4.3 ARRIVAL ALARM AND ANCHOR WATCH ALARM .....     | 18        |
| 4.4 TRACK RECORD .....                             | 20        |
| <b>5. MENU SETTING .....</b>                       | <b>20</b> |
| 5.1 GNSS SETTING .....                             | 20        |
| 5.1.1 <i>GNSS Mode</i> .....                       | 21        |
| 5.1.2 <i>2D/3D</i> .....                           | 21        |
| 5.1.3 <i>Geodetic Datum</i> .....                  | 21        |
| 5.1.4 <i>RAIM</i> .....                            | 22        |
| 5.1.4.1 <i>RAIM</i> .....                          | 22        |

|                                                   |           |
|---------------------------------------------------|-----------|
| 5.1.4.2 RAIM Level.....                           | 22        |
| 5.1.5 Beacon/SBAS.....                            | 23        |
| 5.1.6 SMOOTHING.....                              | 23        |
| 5.2 SYSTEM SETTING.....                           | 24        |
| 5.2.1 Key Buzzer .....                            | 24        |
| 5.2.2 LCD/KEY Dimmer.....                         | 24        |
| 5.3 ALERT .....                                   | 26        |
| 5.3.1 Alert List.....                             | 26        |
| 5.3.2 Alarm Period.....                           | 27        |
| 5.3.3 Alert History .....                         | 27        |
| 5.3.4 Alarm Buzzer.....                           | 27        |
| 5.4 DIAGNOSTICS.....                              | 27        |
| 5.4.1 Software Version .....                      | 28        |
| 5.4.2 LCD Test.....                               | 28        |
| 5.4.3 Key Test.....                               | 28        |
| 5.4.4 Factory Default .....                       | 29        |
| 5.4.5 GNSS Monitoring.....                        | 29        |
| 5.4.6 RTCM Monitor .....                          | 29        |
| <b>6. INSTALLATION .....</b>                      | <b>30</b> |
| 6.1 INSTALLATION OF MAIN UNIT.....                | 30        |
| 6.2 INSTALLATION OF ANTENNA UNIT .....            | 30        |
| 6.3 CABLING .....                                 | 31        |
| 6.3.1 Power Connection .....                      | 31        |
| 6.3.2 GNSS Data Output.....                       | 31        |
| 6.3.3 Grounding.....                              | 31        |
| 6.4 INITIAL SETTINGS .....                        | 31        |
| 6.4.1 Sentence Setting .....                      | 32        |
| 6.4.2 Baud Rate Setting .....                     | 34        |
| <b>APPENDIX I MENU TREE .....</b>                 | <b>36</b> |
| <b>APPENDIX II TECHNICAL SPECIFICATIONS .....</b> | <b>38</b> |
| <b>APPENDIX III SENTENCE DISCRIPTION.....</b>     | <b>40</b> |
| <b>APPENDIX IV INSTALLATION DRAWINGS.....</b>     | <b>56</b> |
| <b>APPENDIX V DOC.....</b>                        | <b>62</b> |

## 1. PRODUCT FEATURES

NGR-1000/NGR-3000 is an IMO GNSS equipment of NSR' new generation, compatible with GPS, Beidou and Glonass system.

NGR-1000/NGR-3000 GNSS equipment consists of a display unit and an antenna unit. The high sensitive GNSS equipment tracks up to 50 satellites simultaneously. It ensures optimum accuracy in determination of vessel position, course and speed.

The main features of NGR-1000/NGR-3000 are:

- Comprehensive navigation data displays.
- Alarms: Loss of Position, loss of differential signal, HDOP Exceeded.
- Menu-driven operation.
- 7 inch, color LCD, touch screen operation with adjustable brightness.
- 3 GNSS data outputs, BAM/INS input/output.
- A DGNSS beacon receiver (external) may be connected to NGR-1000/NGR-3000 to add DGNSS function.

The product meets the requirements of relative IMO and IEC regulation & standards, including IMO MSC.112 (73), MSC.302(87) , IEC61108-1, etc.

### EQUIPMENT LIST:

| Scope of Supply |                            |          |                         |
|-----------------|----------------------------|----------|-------------------------|
| No.             | Name                       | Quantity | Description             |
| 1               | NGR-1000/NGR-3000 Main     | 1        |                         |
| 2               | NGA100 GNSS Antenna        | 1        | Cable length 10m or 20m |
| 3               | Installation Materials     |          |                         |
| 3.1             | Mount Pole                 | 1        |                         |
| 3.2             | Steel Tie                  | 2        |                         |
| 3.3             | Accessories                | 1        |                         |
| 4               | Options                    |          |                         |
| 4.1             | NDG-100 DGNSS Beacon       |          |                         |
| 4.2             | FB700 Flush Mount Brackets |          |                         |
| 4.3             | NND-100 NMEA distributor   |          |                         |
| 4.4             | NND-200 NMEA distributor   |          |                         |

## 2. OPERATIONAL OVERVIEW

### 2.1 Control Description

The GNSS equipment can be operated by key & knob on panel or touch-screen.



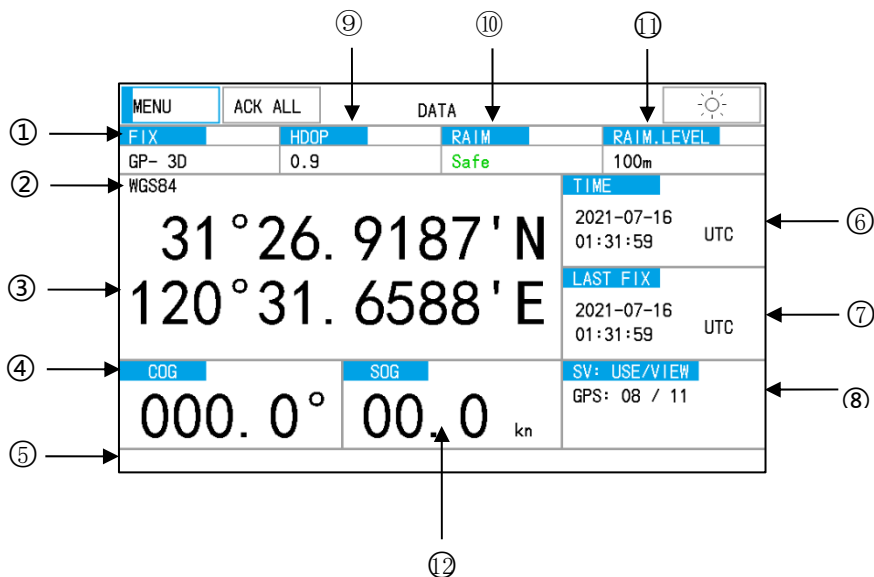
When operated with knob, turn the knob to select an item on screen and press the knob to confirm the selection.

| Panel Button                                                                        | Description                                                                    |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
|  | Turn to select an item.<br>Press to confirm the selection or input.            |
| <b>PWR</b>                                                                          | Power ON/OFF.<br>To power OFF, press and hold this button more than 3 seconds. |
| <b>DIM</b>                                                                          | Press to change the LCD brightness.                                            |
| Touch-screen Button                                                                 | Description                                                                    |
| <b>MENU</b>                                                                         | Enter to display different modes                                               |
| <b>ACK ALL</b>                                                                      | Acknowledge Alarm.                                                             |
|  | Change day/night mode.                                                         |

NGR-1000/NGR-3000 takes about 120 seconds to find position when turned on for the very first time.

Thereafter, it takes about 15 seconds to find position each time the power is turned on.

After fixed, the accurate position (in latitude and longitude) appears on the display.



| No. | Item                                     | Symbol     | Remark                                   |
|-----|------------------------------------------|------------|------------------------------------------|
| ①   | Fix Mode                                 | GP-D3D     | See2.2                                   |
| ②   | Datum                                    | WGS84/PZ90 |                                          |
| ③   | Position in LAT & LON                    |            |                                          |
| ④   | Course over Ground                       | COG        |                                          |
| ⑤   | Alarm Column                             |            | Warning in orange and alarm in red color |
| ⑥   | Time                                     | UTC/LMT    | GNSS Time                                |
| ⑦   | Final Fixing Time                        | LAST FIX   |                                          |
| ⑧   | Quantity of Satellites Being Tracked     | SATELLITE  |                                          |
| ⑨   | Horizontal Dilution Of Precision         | HDOP       |                                          |
| ⑩   | Receiver Autonomous Integrity Monitoring | RAIM       | Safe/unsafe/caution/off                  |
| ⑪   | Accuracy Level for RAIM                  |            | 10-100m                                  |
| ⑫   | Speed over Ground                        | SOG        |                                          |

## 2.2 Turn on and off the power

### ● Turn on the power

Press the **PWR** button to turn on the power. Usually it will take about 2 minutes to find its position when turned on for the very first time.

The equipment shows receiver status at the bottom of the screen.

| Indication    | Meaning                  |
|---------------|--------------------------|
| GP-2D/ GP-3D  | GPS fix                  |
| GP-D2D/GP-D3D | Differential GPS fix     |
| GB-2D/GB-3D   | BDS fix                  |
| GB-D2D/GB-D3D | Differential BDS fix     |
| GL-2D/ GL-3D  | Glomass fix              |
| GL-D2D/GL-D3D | Differential Glomass fix |
| GN-2D/GN-3D   | GNSS fix                 |
| GN-D2D/GN-D3D | Differential GNSS fix    |

**Note:** GP-GPS, GB-BDS, GL-Glomass, GN-GNSS.

### ● Turn off the power

Press and hold down the **PWR** button for 3s until the screen goes blank.

## 2.3 Adjust Dimmer and Contrast

There are two ways to adjust the brightness and contrast of the LCD.

- Adjust the brightness in the [SYSTEM SETTING] by clicking [LCD/KEY DIMMER].

| [ SYSTEM SETTING ]    |                            |                         |
|-----------------------|----------------------------|-------------------------|
| GP-D3D                | 31°26.9275 N 120°31.6230 E | UTC 2019-03-21 06:07:50 |
| KEY BUZZER            | OFF                        |                         |
| LCD/KEY DIMMER        | Level_10                   |                         |
| DAY/NIGHT             | DAY                        |                         |
| DIMMER TYPE           | A                          |                         |
| OFFSET & TIME ZONE    |                            |                         |
| ←                     |                            |                         |
| SET KEY BUZZER ON/OFF |                            |                         |

- Press the **DIM** button to adjust the brightness.

### Note:

When the power is turned off, the last status of brightness is stored. Therefore, when the power is turned on next time, the screen will display with the last brightness before powered off.

## 2.4 Basic Menu Operation

Most operations of your unit are carried out through the menu. If you get lost in operation, press the [PWR] button to return to the MAIN menu. Please refer to complete MENU TREE in the Appendix.

|               |               |      |                                                                                   |
|---------------|---------------|------|-----------------------------------------------------------------------------------|
| DATA          | ACK ALL       | DATA |  |
|               | HDOF          | RAIM | RAIM LEVEL                                                                        |
|               | 0.9           | Safe | 100m                                                                              |
| PLOTTER       |               |      | TIME                                                                              |
| HIGHWAY       | ° 26. 9192' N |      | 2021-07-16<br>01:36:43 UTC                                                        |
| COMPASS       | ° 31. 6614' E |      | LAST FIX<br>2021-07-16<br>01:36:43 UTC                                            |
| SATELLITE     |               |      |                                                                                   |
| SETTINGS      | SOG           |      | SV: USE/VIEW<br>GPS: 09 / 12                                                      |
| . 0° 00. 0 kn |               |      |                                                                                   |
| SOLUTION DATA |               |      |                                                                                   |

- 1) Click the [MENU] to display the modes and settings.
- 2) Turn the knob and press the knob to confirm the selection or click directly to select an item on screen.

## 2.5 How to enter character data

In some instances, it is necessary to enter character data. The below example shows how to rename a route by soft keyboard.

|            |               |                |                  |                  |          |
|------------|---------------|----------------|------------------|------------------|----------|
| TOTAL: 006 |               | PAGE: 1/1      |                  | ROUTE - NO.00002 |          |
| GP-D3D     | 31°26.9188' N | 120°31.6625' E | UTC              | 2021-07-16       | 01:39:25 |
| >>         | 003           | 31°35.544' N   | 127°25.474' E    |                  | ADD      |
|            |               | POINT003       | 2021-07-14 05:19 |                  |          |
|            | 001           | 29°26.220' N   | 125°51.243' E    | 153.0nm          | RENAME   |
|            |               | POINT001       | 2021-07-14 05:19 |                  |          |
|            | 004           | 32°17.389' N   | 122°32.400' E    | 242.1nm          | DELETE   |
|            |               | POINT004       | 2021-07-16 01:38 |                  |          |
|            | 005           | 32°17.389' N   | 124°48.755' E    | 115.5nm          | Page ↓   |
|            |               | POINT005       | 2021-07-16 01:38 |                  |          |
|            | 006           | 31°29.419' N   | 125°48.847' E    | 70.2nm           | Page ↑   |
|            |               | POINT006       | 2021-07-16 01:38 |                  |          |
|            | 007           | 30°37.772' N   | 126°49.538' E    | 73.4nm           | JUMP TO  |
|            |               | POINT007       | 2021-07-16 01:38 |                  | ←        |

- 1) When the first line is selected, click EDIT to locate the first character to edit. Click RENAME to rename the route desired.

|            |                            |          |            |                  |  |
|------------|----------------------------|----------|------------|------------------|--|
| TOTAL: 006 |                            | PAGE:1/1 |            | ROUTE - NO.00002 |  |
| GP-D3D     | 31°26.9191'N 120°31.6618'E | UTC      | 2021-07-16 | 01:40:16         |  |
| >> 003     | 31°35.544'N 127°25.474'E   |          |            | ADD              |  |
|            | POINT003 2021-07-14 05:19  |          |            | RENAME           |  |
| 001        | 29°26.220'N 125°51.243'E   | 153.0nm  |            |                  |  |
|            | POINT001 2021-07-14 05:19  |          |            |                  |  |
| 004        | 32°17.389'N 122°32.400'E   | 242.1nm  |            |                  |  |
|            | POINT004 2021-07-16 01:38  |          |            |                  |  |
| 00         | ABC                        |          | Page ↓     |                  |  |
| 00         | Q W E R T Y U I O P ⌨      |          |            |                  |  |
| 00         | A S D F G H J K L _        |          |            |                  |  |
| 00         | ⌨ Z X C V B N M , . ✓      |          |            |                  |  |

- 2) Click the character among A-Z desired,
- 3) Click [abc] to change to digit input, then click the number 0-9 desired.
- 4) Click the [✓] to finish.

There are five display modes: Data, Plotter, Highway, Compass, and Satellite. Click the [MENU] button on screen to select a display mode.

The Data display is the default display mode of the equipment.

The figure shows a GPS screen with various data fields. Numbered callouts point to specific features:

- ①: MENU button
- ②: WGS84 datum indicator
- ③: COG (Course Over Ground) and SOG (Speed Over Ground) fields
- ④: TIME and LAST FIX fields
- ⑤: SV: USE/VIEW field

| MENU                          |  | ACK ALL |  | DATA |  | [Sun Icon]              |  |
|-------------------------------|--|---------|--|------|--|-------------------------|--|
| FIX                           |  | HDOP    |  | RAIM |  | RAIM LEVEL              |  |
| GP- 3D                        |  | 0.9     |  | Safe |  | 100m                    |  |
| WGS84                         |  |         |  |      |  | TIME                    |  |
| 31°26.9187'N<br>120°31.6588'E |  |         |  |      |  | 2021-07-16 01:31:59 UTC |  |
|                               |  |         |  |      |  | LAST FIX                |  |
| 000.0° 00.0 kn                |  |         |  |      |  | 2021-07-16 01:31:59 UTC |  |
|                               |  |         |  |      |  | SV: USE/VIEW            |  |
|                               |  |         |  |      |  | GPS: 08 / 11            |  |

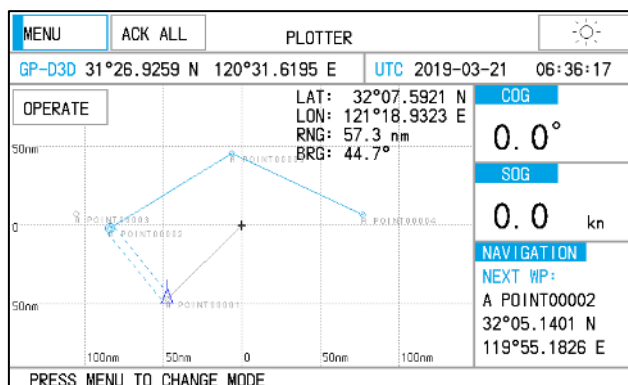
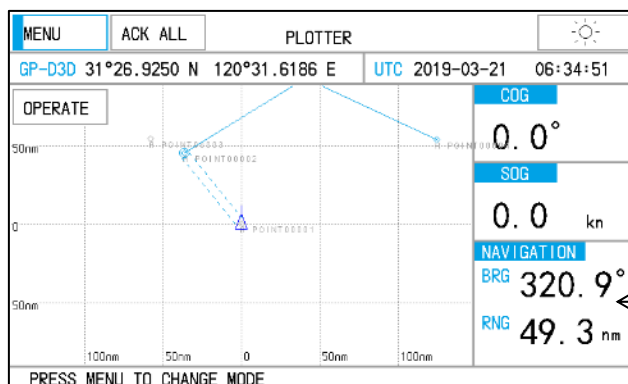
Basic data will be displayed in this mode, including position in latitude and longitude, course, speed, date and time.  
NGR-1000/NGR-3000 takes about 120 seconds to find position when turned on for the very first time.

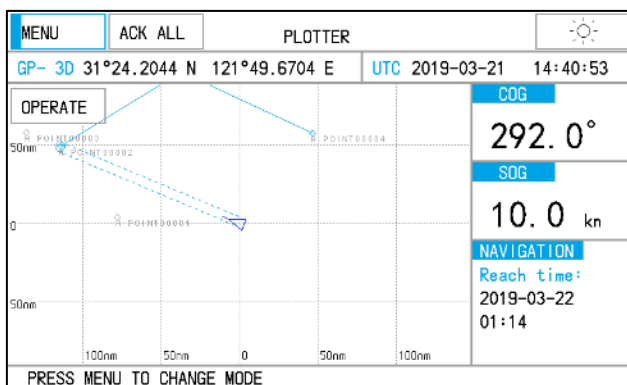
Thereafter it takes about 15 seconds to find position each time the power is turned on. After fixed, the accurate position (in latitude and longitude) appears on the display. If position could not be found, loss of position will appear at alarm column.

| NO. | Item                         | Remark                                   |
|-----|------------------------------|------------------------------------------|
| ①   | 2D/3D                        | D2D/D3D when in Differential mode        |
| ②   | Position in LAT & LON        |                                          |
| ③   | Alarm Information            | Warning in orange and alarm in red color |
| ④   | Time                         | UTC/LMT                                  |
| ⑤   | Number of satellites tracked |                                          |

## 2.6.2 Plotter display

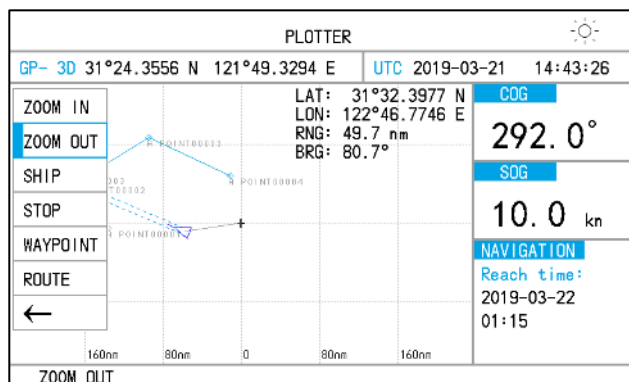
The Plotter display traces own ship's track, shows position, course, speed, and sets display range.



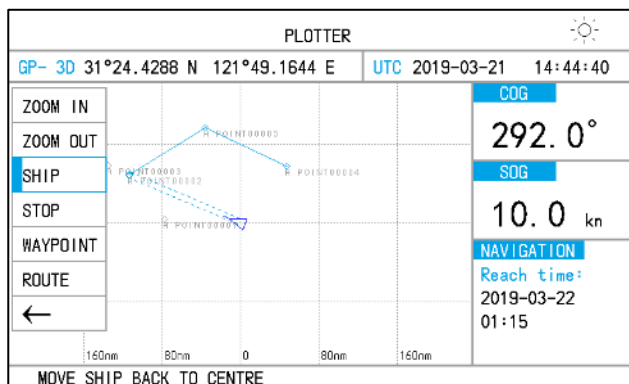


You may increase or decrease the display range on the Plotter display. The range in the Plotter display is available among 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 40, 80, 160 and 320 nautical miles.

- 1) Click the [OPERATE] button. The pop-up menu appears.
- 2) Click “ZOOM IN” or “ZOOM OUT” to select range desired.
- 3) Click on any blank space to finish.

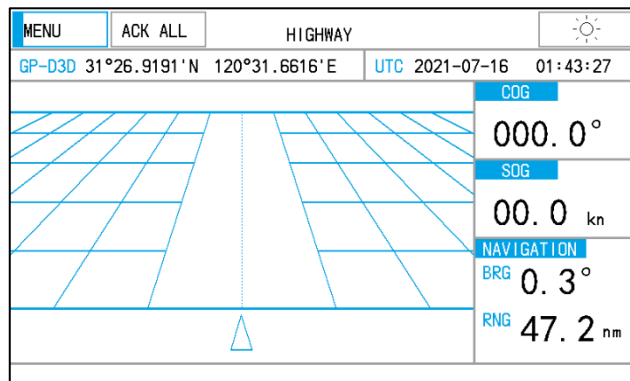


Press [SHIP] to return.



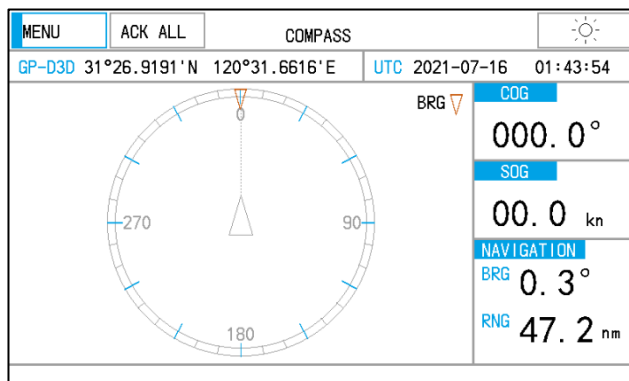
### 2.6.3 Highway display

The Highway display provides a 3-D view of own ship's route toward destination. Navigation data is also shown.



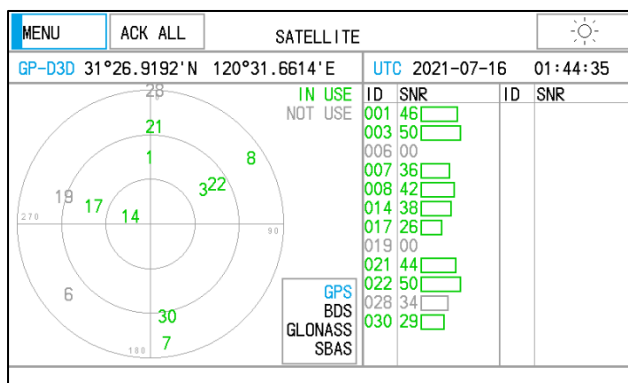
### 2.6.4 Compass display

The Compass display provides course with ship's speed, and position.



### 2.6.5 Satellite display

The Satellite display shows satellites currently tracked, together with the strength of receiving signals.

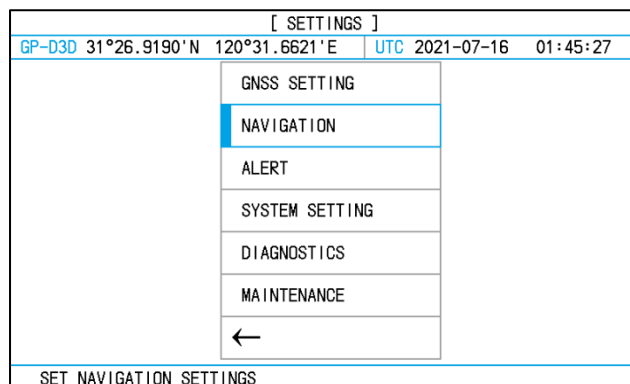


### 3. NAVIGATION PLANNING

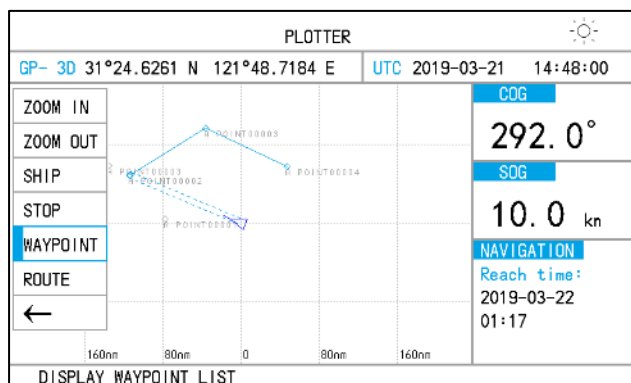
Often a trip from one place to another involves several course changes, requiring a series of waypoints which you navigate to, one after another. The sequence of waypoints leading to the ultimate destination is called a route. NGR-1000/NGR-3000 can automatically advance to the next waypoint on a route, so you do not have to change the destination waypoint repeatedly. NGR-1000/NGR-3000 can store 30 routes and each route may include up to 100 waypoints.

There are two ways to enter Waypoint and Route.

- (1) Click NAVIGATION in SETTINGS to open the menu.

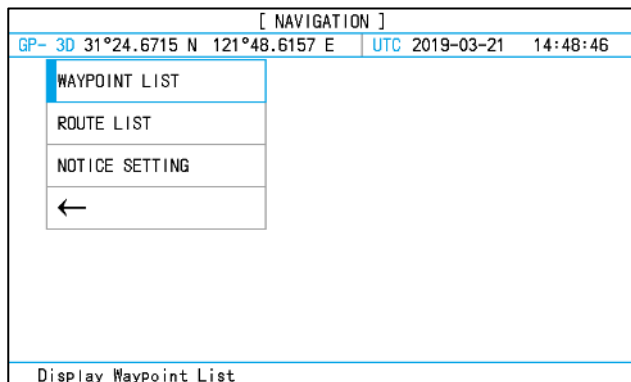


- (2) Click PLOTTER in MENU, then click WAYPOINT/ROUTE in OPERATE to open the menu.



### 3.1 Register Waypoints

Click NAVIGATION in SETTINGS to open the list.



[ NAVIGATION ]

GP- 3D 31°24.6715 N 121°48.6157 E UTC 2019-03-21 14:48:46

WAYPOINT LIST  
ROUTE LIST  
NOTICE SETTING  
←

Display Waypoint List

|                     |     |                  |                  |                                                           |         |
|---------------------|-----|------------------|------------------|-----------------------------------------------------------|---------|
| TOTAL: 006 PAGE:1/1 |     | ROUTE - NO.00002 |                  | GP-D3D 31°26.9188'N 120°31.6625'E UTC 2021-07-16 01:39:25 |         |
| >>                  | 003 | 31°35.544'N      | 127°25.474'E     |                                                           | ADD     |
|                     |     | POINT003         | 2021-07-14 05:19 |                                                           | RENAME  |
|                     | 001 | 29°26.220'N      | 125°51.243'E     | 153.0nm                                                   | DELETE  |
|                     |     | POINT001         | 2021-07-14 05:19 |                                                           | Page ↓  |
|                     | 004 | 32°17.389'N      | 122°32.400'E     | 242.1nm                                                   | Page ↑  |
|                     |     | POINT004         | 2021-07-16 01:38 |                                                           | JUMP TO |
|                     | 005 | 32°17.389'N      | 124°48.755'E     | 115.5nm                                                   | ←       |
|                     |     | POINT005         | 2021-07-16 01:38 |                                                           |         |
|                     | 006 | 31°29.419'N      | 125°48.847'E     | 70.2nm                                                    |         |
|                     |     | POINT006         | 2021-07-16 01:38 |                                                           |         |
|                     | 007 | 30°37.772'N      | 126°49.538'E     | 73.4nm                                                    |         |
|                     |     | POINT007         | 2021-07-16 01:38 |                                                           |         |

- 1) Click to select the waypoint desired.
- 2) Select ADD,DELETE or EDIT desired.

### 3.1.1 Insert a new Waypoint

Create a new waypoint with the position as own ship's current position. The new waypoint will be inserted before the waypoint which is selected by the current cursor.

### 3.1.2 Edit a Waypoint

Edit the selected waypoint.

| TOTAL: 007 PAGE:1/2 [ WAYPOINT EDIT ] |              |               |                  |            |          |
|---------------------------------------|--------------|---------------|------------------|------------|----------|
| GP- 3D                                | 31°24.8612 N | 121°48.1866 E | UTC              | 2019-03-21 | 14:51:58 |
| >>                                    | 005          | 31°24.782'N   | 121°48.363'E     | LAT        |          |
|                                       |              | A POINT00005  | 2019-03-21 14:50 |            |          |
|                                       | 004          | 32°12.661'N   | 122°36.293'E     | LON        |          |
|                                       |              | A POINT00004  | 2019-03-21 06:13 |            |          |
|                                       | 003          | 32°45.500'N   | 121°12.943'E     | NAME       |          |
|                                       |              | A POINT00003  | 2019-03-21 06:11 |            |          |
|                                       | 983          | 32°12.999'N   | 119°34.020'E     | ID         |          |
|                                       |              | A POINT00003  | 2019-03-21 00:38 |            |          |
|                                       | 002          | 32°05.140'N   | 119°55.182'E     | CONFIRM    |          |
|                                       |              | A POINT00002  | 2019-03-21 00:38 |            |          |
|                                       | 006          | 31°24.788'N   | 121°48.352'E     | CANCEL     |          |
|                                       |              | A POINT00006  | 2019-03-21 14:50 |            |          |

| TOTAL: 007 PAGE:1/2 [ WAYPOINT EDIT ] |              |               |                  |            |          |
|---------------------------------------|--------------|---------------|------------------|------------|----------|
| GP- 3D                                | 31°24.9561 N | 121°47.9725 E | UTC              | 2019-03-21 | 14:53:33 |
| >>                                    | 005          | 31°24.782'N   | 121°48.363'E     | LAT        |          |
|                                       |              | A POINT00005  | 2019-03-21 14:50 |            |          |
|                                       | 004          | 32°12.661'N   | 122°36.293'E     | LON        |          |
|                                       |              | A POINT00004  | 2019-03-21 06:13 |            |          |
|                                       | 003          | 32°45.500'N   | 121°12.943'E     | NAME       |          |
|                                       |              | A POINT00003  | 2019-03-21 06:11 |            |          |
|                                       | 983          | 32°12.999'N   | 119°34.020'E     | ID         |          |
|                                       |              | A POINT00003  | 2019-03-21 00:38 |            |          |
|                                       | 002          | 32°05.140'N   | 119°55.182'E     |            |          |
|                                       |              | A POINT00002  | 2019-03-21 00:38 |            |          |
|                                       | 006          | 31°24.788'N   | 121°48.352'E     |            |          |
|                                       |              | A POINT00006  | 2019-03-21 14:50 |            |          |

123
0 1 2 3 4 5 6 7 8 9

N S E W

✓

| TOTAL: 007 PAGE:1/2 [ WAYPOINT EDIT ] |              |               |                  |            |          |
|---------------------------------------|--------------|---------------|------------------|------------|----------|
| GP- 3D                                | 31°25.1077 N | 121°47.6309 E | UTC              | 2019-03-21 | 14:56:06 |
| >>                                    | 666          | 31°24.782'N   | 121°48.363'E     | LAT        |          |
|                                       |              | A POINT00005  | 2019-03-21 14:50 |            |          |
|                                       | 004          | 32°12.661'N   | 122°36.293'E     | LON        |          |
|                                       |              | A POINT00004  | 2019-03-21 06:13 |            |          |
|                                       | 003          | 32°45.500'N   | 121°12.943'E     | NAME       |          |
|                                       |              | A POINT00003  | 2019-03-21 06:11 |            |          |
|                                       | 983          | 32°12.999'N   | 119°34.020'E     | ID         |          |
|                                       |              | A POINT00003  | 2019-03-21 00:38 |            |          |
|                                       | 002          | 32°05.140'N   | 119°55.182'E     | CONFIRM    |          |
|                                       |              | A POINT00002  | 2019-03-21 00:38 |            |          |
|                                       | 006          | 31°24.788'N   | 121°48.352'E     | CANCEL     |          |
|                                       |              | A POINT00006  | 2019-03-21 14:50 |            |          |

- 1) Click EDIT to edit the contents of the waypoint.
- 2) Click LAT or LON to locate the first character to edit and click the character desired.

- 3) Click the [√] key.
- 4) Click CONFIRM to finish the waypoint.

### 3.1.3 Delete a Waypoint

Delete the selected waypoint.

| TOTAL:008 PAGE: 1 / 2 [ WAYPOINT LIST ] |                                                    |
|-----------------------------------------|----------------------------------------------------|
| GP-D3D                                  | 31°26.9194'N 120°31.6602'E UTC 2021-07-16 01:47:57 |
| >> 008                                  | 32°14.013'N 120°32.016'E                           |
| POINT008                                | 2                                                  |
| 007                                     | 30°37.772'N 120°32.016'E                           |
| POINT007                                | 2                                                  |
| 006                                     | 31°29.419'N 120°32.016'E                           |
| POINT006                                | 2                                                  |
| 005                                     | 32°17.389'N 120°32.016'E                           |
| POINT005                                | 2021-07-16 01:38                                   |
| 004                                     | 32°17.389'N 122°32.400'E                           |
| POINT004                                | 2021-07-16 01:38                                   |
| 002                                     | 31°49.641'N 120°54.775'E                           |
| POINT002                                | 2021-07-16 01:38                                   |

CONFIRM  
 NO  
 YES

ADD  
 DELETE  
 EDIT  
 Page ↓  
 Page ↑  
 GO TO  
 SEND  
 ←

## 3.2 Route Planning

| [ NAVIGATION ]                                     |                                                    |
|----------------------------------------------------|----------------------------------------------------|
| GP- 3D                                             | 31°25.2804 N 121°47.2402 E UTC 2019-03-21 14:59:01 |
| WAYPOINT LIST<br>ROUTE LIST<br>NOTICE SETTING<br>← |                                                    |
| Display Route List                                 |                                                    |

- 1) Click to select route desired.

| TOTAL: 002 PAGE:1/1 [ ROUTE LIST ]                                   |                                                    |
|----------------------------------------------------------------------|----------------------------------------------------|
| GP-D3D                                                               | 31°26.9188'N 120°31.6617'E UTC 2021-07-16 01:50:01 |
| ID                                                                   | NAME                                               |
| >> 2                                                                 | SH TO BJ                                           |
| 1                                                                    | ROUTE - NO.00001                                   |
| PTS                                                                  | DISTANCE                                           |
| 5                                                                    | 501.17nm                                           |
| 0                                                                    | 00.00nm                                            |
| EDIT<br>FORWARD<br>REVERSE<br>ADD<br>DELETE<br>Page ↓<br>Page ↑<br>← |                                                    |

- 2) Click EDIT, FORWARD, REVERSE, ADD, DELETE, PAGE ↓ or PAGE ↑ desired.

### 3.2.1 Edit a Route

- 1) Click to select a route in ROUTE LIST desired.
- 2) Click the EDIT to edit the route.
- 3) Select ADD, RENAME, DELETE, NEXT or PREV to add, rename, or delete a waypoint in the route.

#### ADD a waypoint

Add a waypoint to route from route list.

Click ADD to add the current position as a new waypoint to the route.

The screen will change to WAYPOINT LIST display.

|                                                           |          |                                  |         |
|-----------------------------------------------------------|----------|----------------------------------|---------|
| TOTAL: 005 PAGE:1/1 SH TO BJ                              |          |                                  |         |
| GP-D3D 31°26.9187'N 120°31.6616'E UTC 2021-07-16 01:50:39 |          |                                  |         |
| >>                                                        | 001      | 29°26.220'N 125°51.243'E         | ADD     |
|                                                           | POINT001 | 2021-07-14 05:19                 |         |
|                                                           | 004      | 32°17.389'N 122°32.400'E 242.1nm | RENAME  |
|                                                           | POINT004 | 2021-07-16 01:38                 | DELETE  |
|                                                           | 005      | 32°17.389'N 124°48.755'E 115.5nm | Page ↓  |
|                                                           | POINT005 | 2021-07-16 01:38                 | Page ↑  |
|                                                           | 006      | 31°29.419'N 125°48.847'E 70.2nm  | JUMP TO |
|                                                           | POINT006 | 2021-07-16 01:38                 | ←       |
|                                                           | 007      | 30°37.772'N 126°49.538'E 73.4nm  |         |
|                                                           | POINT007 | 2021-07-16 01:38                 |         |

#### RENAME the route

Click the RENAME , the pop-up menu appears.

|                                                           |          |                                  |        |
|-----------------------------------------------------------|----------|----------------------------------|--------|
| TOTAL: 005 PAGE:1/1 SH TO BJ                              |          |                                  |        |
| GP-D3D 31°26.9187'N 120°31.6619'E UTC 2021-07-16 01:51:07 |          |                                  |        |
| >>                                                        | 001      | 29°26.220'N 125°51.243'E         | ADD    |
|                                                           | POINT001 | 2021-07-14 05:19                 |        |
|                                                           | 004      | 32°17.389'N 122°32.400'E 242.1nm | RENAME |
|                                                           | POINT004 | 2021-07-16 01:38                 | DELETE |
|                                                           | 005      | 32°17.389'N 124°48.755'E 115.5nm | Page ↓ |
|                                                           | POINT005 | 2021-07-16 01:38                 |        |

00 ABC

Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M , . ✓

The route name can be made of up to 17 characters.

- 1) Click RENAME to rename the route desired.
- 2) Click the character among A-Z , 0-9 desired.
- 3) Click the [ ✓ ] to finish.

#### DELETE a waypoint

Click the DELETE to delete the selected waypoint from the route.

### 3.2.2 Forward navigation

Click the FORWARD in MENU to start navigation forward. The screen will switch to plotter page.

| TOTAL: 002 |                  | PAGE:1/1                   |          | [ ROUTE LIST ]                                                                                                                          |  |
|------------|------------------|----------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------|--|
| GP-D3D     |                  | 31°26.9189'N 120°31.6615'E |          | UTC 2021-07-16 01:51:54                                                                                                                 |  |
| ID         | NAME             | PTS                        | DISTANCE | <div>EDIT</div> <div>FORWARD</div> <div>REVERSE</div> <div>ADD</div> <div>DELETE</div> <div>Page ↓</div> <div>Page ↑</div> <div>←</div> |  |
| >> 2       | SH TO BJ         | 5                          | 501.17nm |                                                                                                                                         |  |
| 1          | ROUTE - NO.00001 | 0                          | 00.00nm  |                                                                                                                                         |  |
|            |                  |                            |          |                                                                                                                                         |  |
|            |                  |                            |          |                                                                                                                                         |  |

### 3.2.3 Reverse navigation

Click the REVERSE to start navigation reversely. The screen will switch to plotter page.

| TOTAL: 002 |                  | PAGE:1/1                   |          | [ ROUTE LIST ]                                                                                                                          |  |
|------------|------------------|----------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------|--|
| GP-D3D     |                  | 31°26.9190'N 120°31.6611'E |          | UTC 2021-07-16 01:52:17                                                                                                                 |  |
| ID         | NAME             | PTS                        | DISTANCE | <div>EDIT</div> <div>FORWARD</div> <div>REVERSE</div> <div>ADD</div> <div>DELETE</div> <div>Page ↓</div> <div>Page ↑</div> <div>←</div> |  |
| >> 2       | SH TO BJ         | 5                          | 501.17nm |                                                                                                                                         |  |
| 1          | ROUTE - NO.00001 | 0                          | 00.00nm  |                                                                                                                                         |  |
|            |                  |                            |          |                                                                                                                                         |  |
|            |                  |                            |          |                                                                                                                                         |  |

### 3.2.4 Create a New Route

Click the ADD to add a new route just after the current route.

| TOTAL: 006 |                  | PAGE:1/1                   |          | [ ROUTE LIST ]                                                                                                                          |  |
|------------|------------------|----------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------|--|
| GP- 3D     |                  | 31°26.2717 N 121°44.9997 E |          | UTC 2019-03-21 15:15:43                                                                                                                 |  |
| ID         | NAME             | PTS                        | DISTANCE | <div>EDIT</div> <div>FORWARD</div> <div>REVERSE</div> <div>ADD</div> <div>DELETE</div> <div>Page ↓</div> <div>Page ↑</div> <div>←</div> |  |
| >> 6       | ROUTE - NO.00006 | 0                          | 00.00nm  |                                                                                                                                         |  |
| 5          | ROUTE - NO.00005 | 0                          | 00.00nm  |                                                                                                                                         |  |
| 4          | ROUTE - NO.00004 | 0                          | 00.00nm  |                                                                                                                                         |  |
| 3          | FROM SH TO BJ    | Fwd 3                      | 154.93nm |                                                                                                                                         |  |
| 2          | ROUTE - NO.00002 | 0                          | 00.00nm  |                                                                                                                                         |  |
| 1          | ROUTE - NO.00001 | 0                          | 00.00nm  |                                                                                                                                         |  |

Click the DELETE to delete the selected route from route list.

### 3.3 Stop the Navigation by the current Route

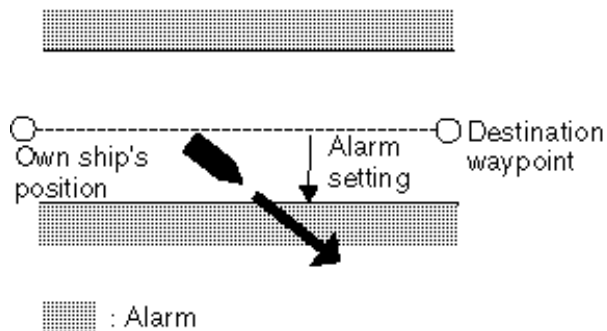
Click STOP to stop the navigation by the current route.  
The route is cleared on the Plotter display.

Select [NOTICE SETTING] in [NAVIGATION] to open the menu.

|                                                                                                    |              |               |                         |
|----------------------------------------------------------------------------------------------------|--------------|---------------|-------------------------|
| [ NAVIGATION ]                                                                                     |              |               |                         |
| GP- 3D                                                                                             | 31°26.3961 N | 121°44.7186 E | UTC 2019-03-21 15:17:49 |
| <div> <div>WAYPOINT LIST</div> <div>ROUTE LIST</div> <div>NOTICE SETTING</div> <div>←</div> </div> |              |               |                         |

## 4.1 XTE (Cross Track Error) Alarm

The XTE alarm warns you by an internal buzzer when own ship is off its intended route.



| [ NOTICE SETTING ] |              |               |                         |
|--------------------|--------------|---------------|-------------------------|
| GP- 3D             | 31°26.4401 N | 121°44.6194 E | UTC 2019-03-21 15:18:33 |
| XTE ALARM          | 03.00 nm     |               |                         |
| SPEED ALARM        | HIGH OFF     | LOW OFF       |                         |
| ARV/ANC ALARM      | ARV 03.00 nm | ANC OFF       |                         |
| TRACK              | OFF OFF      |               |                         |
| ←                  |              |               |                         |

| [ NOTICE SETTING ]                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |               |                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|-------------------------|
| GP- 3D                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 31°26.5004 N | 121°44.4838 E | UTC 2019-03-21 15:19:34 |
| XTE ALARM                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 03.00 nm     |               |                         |
| SPEED ALARM                                                                                                                                                                                                                                                                                                                                                                                                                                                     | HIGH OFF     | LOW OFF       |                         |
| ARV/ANC ALARM                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ARV 03.00 nm | ANC OFF       |                         |
| TRACK                                                                                                                                                                                                                                                                                                                                                                                                                                                           | OFF OFF      |               |                         |
| <div> <div>123</div> <div>00.00 nm</div> </div> <div> <div>0</div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div><div>9</div><div>⏏</div> </div> <div> <div>N</div><div>S</div><div>E</div><div>W</div><div></div><div></div><div></div><div></div><div></div><div></div> </div> <div> <div>⏏</div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div>✓</div> </div> |              |               |                         |

- 1) Click the value field to edit.
- 2) Click the digits among 0-9 desired until the desired digit is got.
- 3) When the value is set to 0, XTE alarm will close.

## 4.2 Speed Alarm

The speed alarm is activated when ship's speed is higher (or lower) than the set value.

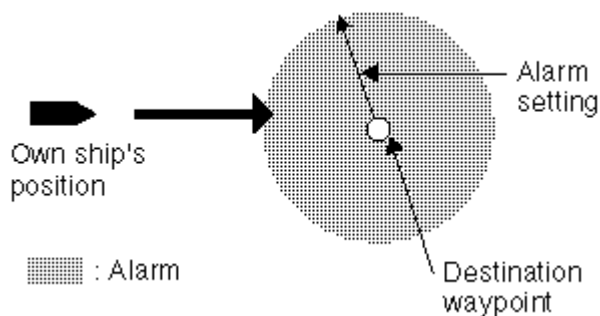
**LOW:** Alarm is activated when speed is lower than the speed set.  
**HIGH:** Alarm is activated when speed is higher than the speed set.

- 1) Click the SPEED value to edit.
- 2) Click the digits among 0-9 until the desired digit is got.

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

- **Arrival Alarm**

The arrival alarm informs you that own ship is approaching a destination waypoint. The area that defines an arrival zone is that of a circle which you approach from the outside of the circle. The alarm will be activated if own ship enters the circle.

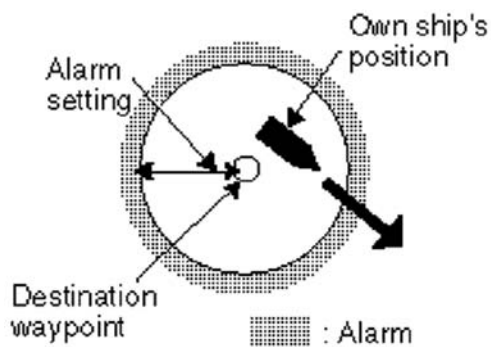


- 1) Select ARV(arrival) from ARV/ANC/OFF.
- 2) Click the ALARM value to edit.
- 3) Click the digits among 0-9 until the desired digit is got.
- 4) Turn the knob to move the cursor to the next digit to edit.

The alarm range is (0.01-99.99 nm).

### ● Anchor Watch Alarm

The anchor watch alarm sounds to warn you that own ship is moving beyond the set area.



Before setting the anchor watch alarm, set current position as destination.

- 1) Select ANC (anchor) from ARV/ANC/OFF.
- 2) Click the ALARM value to edit.
- 3) Click the digits among 0-9 until the desired digit is got.
- 4) Turn the knob to move the cursor to the next digit to edit.

The alarm range is (0.01-99.99 nm).

#### **NOTE:**

Anchor watch alarm and arrival alarm are combined to serve a route. After a route is finished while the destination is arrived at, keep the navigation on the route while setting ANC. The anchor watch starts.

## 4.4 Track record

TRACK is to set the interval of every two recorded dots.

| [ NOTICE SETTING ] |                          |               |                         |
|--------------------|--------------------------|---------------|-------------------------|
| GP- 3D             | 31°27.2306 N             | 121°42.8391 E | UTC 2019-03-21 15:31:53 |
| XTE ALARM          | 03.00 nm                 |               |                         |
| SPEED ALARM        | HIGH 50.0 kn LOW 05.0 kn |               |                         |
| ARV/ANC ALARM      | ARV 03.00 nm ANC OFF     |               |                         |
| TRACK              | SPACE 02.00 nm           |               |                         |
| ←                  |                          |               |                         |

If OFF is selected, the track will not be recorded.

If SPACE is selected, the track will be recorded every certain distance which can be configured.

If AUTO is selected, the track will be recorded every minute or every certain distance which can be configured, whichever is reached first.

## 5. MENU SETTING

### 5.1 GNSS Setting

| [ GNSS SETTING ]  |                                                    |
|-------------------|----------------------------------------------------|
| GP- 3D            | 31°26.9316 N 120°31.6377 E UTC 2019-04-01 07:43:55 |
| GNSS MODE         | GPS                                                |
| 2D / 3D           | AUTO                                               |
| GEODETTIC DATUM   | WGS84                                              |
| RAIM              |                                                    |
| BEACON/SBAS       | SBAS                                               |
| SMOOTHING         |                                                    |
| ←                 |                                                    |
| SET THE GNSS mode |                                                    |

### 5.1.1 GNSS Mode

| GNSS MODE SELECT                                                                                                             |              |               |     |            |          |
|------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|-----|------------|----------|
| GP-D3D                                                                                                                       | 31°26.9191'N | 120°31.6613'E | UTC | 2021-07-16 | 01:56:06 |
| <div> <div>GPS&amp;BDS</div> <div>GPS&amp;GLONASS</div> <div>GPS</div> <div>BDS</div> <div>GLONASS</div> <div>←</div> </div> |              |               |     |            |          |

Total five modes can be selected: GPS & BDS, GPS & GLONASS, GPS, BDS, GLONASS.

### 5.1.2 2D/3D

Select 2D or 3D fix mode.

| [ 2D / 3D ]                                                           |              |               |     |            |          |
|-----------------------------------------------------------------------|--------------|---------------|-----|------------|----------|
| GP-D3D                                                                | 31°26.9293 N | 120°31.6344 E | UTC | 2019-04-01 | 07:46:16 |
| <div> <div>2D</div> <div>3D</div> <div>AUTO</div> <div>←</div> </div> |              |               |     |            |          |

### 5.1.3 Geodetic Datum

Totally there are three systems to be selected: WGS84, PZ-90, CGCS2000.

| [ GEODETIC DATUM ]                                                             |              |               |     |            |          |
|--------------------------------------------------------------------------------|--------------|---------------|-----|------------|----------|
| GP- 3D                                                                         | 31°27.3119 N | 121°42.6556 E | UTC | 2019-03-21 | 15:33:15 |
| <div> <div>WGS84</div> <div>PZ90</div> <div>CGCS2000</div> <div>←</div> </div> |              |               |     |            |          |

## 5.1.4 RAIM

### 5.1.4.1 RAIM

RAIM (Receiver Autonomous Integrity Monitoring) can be set ON or OFF.

When set ON, RAIM will display SAFE, UNSAFE or CAUTION in below conditions:

- **Conditions for the "safe" state**

The result of integrity calculation by means of RAIM will be stated as "safe", if the integrity calculation can be performed with a confidence level above 95 % for the selected accuracy level and RAIM calculates the probable position error to be within the selected accuracy level.

This generally requires at least 5 "healthy" satellites available and in a robust geometry, i.e. the worst 4 satellite geometry is still suitable for navigation.

- **Conditions for the "caution" state**

The "caution" status will be used to indicate:

- insufficient information to reliably calculate with a confidence level above 95 % for the selected accuracy level, or
- the probability of false alarms >5 %, or
- the probability of not detecting an error condition >5 %.

Those conditions may occur if an insufficient number of satellites are available, for example 4 or 5 with 2 satellites "close" together in azimuth and elevation, causing the geometry to degrade to the point that the RAIM calculation becomes unreliable. Note that the resulting accuracy based on 4 or 5 satellites in use may be within the selected accuracy level, but the RAIM algorithm cannot verify it.

- **Conditions for the "unsafe" state**

The "unsafe" status will be used if the integrity calculation is performed with a confidence level above 95 % for the selected accuracy level, and RAIM calculates the probable position error exceeding the selected accuracy level. Note that also here a robust geometry is required to reach this confidence level. The "unsafe" state can be reached when satellite range errors degrade the navigation solution, causing the resulting accuracy to be outside the selected accuracy level.

### 5.1.4.2 RAIM Level

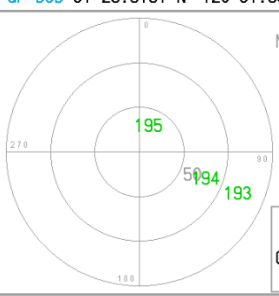
RAIM level can be set between 10-100m.

| [ RAIM ]                          |                         |
|-----------------------------------|-------------------------|
| GP- 3D 31°28.5212 N 121°39.9341 E | UTC 2019-03-21 15:53:41 |
| RAIM                              | ON                      |
| RAIM LEVEL                        | 100m                    |
| ←                                 |                         |

Accuracy level is not of the indication of position accuracy while it is only the calculation reference for RAIM.

### 5.1.5 Beacon/SBAS

The system will alarm if the condition of loss of differential signal occurs.

| MENU                                                                               |                            | ACK ALL                 |  | SATELLITE |     |    |     |
|------------------------------------------------------------------------------------|----------------------------|-------------------------|--|-----------|-----|----|-----|
| GP-D3D                                                                             | 31°26.9191'N 120°31.6610'E | UTC 2021-07-16 01:57:06 |  |           |     |    |     |
|  |                            | IN USE                  |  | ID        | SNR | ID | SNR |
|                                                                                    |                            | NOT USE                 |  | 050       | 41  |    |     |
|                                                                                    |                            |                         |  | 193       | 45  |    |     |
|                                                                                    |                            |                         |  | 194       | 46  |    |     |
|                                                                                    |                            |                         |  | 195       | 43  |    |     |

### 5.1.6 SMOOTHING

Change the COG and SOG averages to adjust the smoothness.

| [ SMOOTH SETTING ]                |                         |
|-----------------------------------|-------------------------|
| GP-D3D 31°26.9189'N 120°31.6609'E | UTC 2021-07-16 01:57:38 |
| SOG AVERAGE                       | 1                       |
| COG AVERAGE                       | 1                       |
| DRIVING MODE                      | AUTO                    |
| ←                                 |                         |
| SET SOG AVERAGE TIME              |                         |

## 5.2 System Setting

### 5.2.1 Key Buzzer

Buzzer can be muted so that operation is not heard.

### 5.2.2 LCD/KEY Dimmer

Dimmer can be adjusted either by **DIM** button or set in menu.

| [ SYSTEM SETTING ]                |                         |
|-----------------------------------|-------------------------|
| GP- 3D 31°29.1010 N 121°38.6277 E | UTC 2019-03-21 16:03:28 |
| KEY BUZZER                        | OFF                     |
| LCD/KEY DIMMER                    | Level_10                |
| DAY/NIGHT                         | DAY                     |
| DIMMER TYPE                       | A                       |
| OFFSET & TIME ZONE                |                         |
| ←                                 |                         |
| SET LCD/KEY DIMMER : 1 - 13       |                         |

### 5.2.3 Day/Night

Click the icon at upper right corner to change the display between day mode and night mode.

| [ SYSTEM SETTING ]                |                         |
|-----------------------------------|-------------------------|
| GP- 3D 31°29.1579 N 121°38.4994 E | UTC 2019-03-21 16:04:26 |
| KEY BUZZER                        | OFF                     |
| LCD/KEY DIMMER                    | Level_10                |
| DAY/NIGHT                         | DAY                     |
| DIMMER TYPE                       | A                       |
| OFFSET & TIME ZONE                |                         |
| ←                                 |                         |
| CHANGE DISPLAY MODE DAY/NIGHT     |                         |

## 5.2.4 Time Mode

| [ OFFSET & TIME ZONE ]            |                         |
|-----------------------------------|-------------------------|
| GP- 3D 31°29.2000 N 121°38.4043 E | UTC 2019-03-21 16:05:09 |
| TIME MODE                         | UTC                     |
| TIME ZONE                         | +00:00                  |
| LATITUDE OFFSET                   | 00.0000'N               |
| LONGITUDE OFFSET                  | 00.0000'E               |
| ←                                 |                         |
| SET TIME MODE UTC/LMT             |                         |

Time can be set as UTC or LMT in TIME MODE.

## 5.2.5 Time Zone

| [ OFFSET & TIME ZONE ]            |                         |
|-----------------------------------|-------------------------|
| GP- 3D 31°29.5274 N 121°37.6675 E | UTC 2019-03-21 16:10:40 |
| TIME MODE                         | UTC                     |
| TIME ZONE                         | +00:00                  |
| LATITUDE OFFSET                   | 00.0000'N               |
| LONGITUDE OFFSET                  | 00.0000'E               |
| ←                                 |                         |
| SET TIME ZONE                     |                         |

## 5.2.6 Position Offset

| [ OFFSET & TIME ZONE ]            |                         |
|-----------------------------------|-------------------------|
| GP-D3D 31°26.9243 N 120°31.6194 E | UTC 2019-03-21 09:02:14 |
| TIME MODE                         | UTC                     |
| TIME ZONE                         | +00:00                  |
| LATITUDE OFFSET                   | 00.0000'N               |
| LONGITUDE OFFSET                  | 00.0000'E               |
| ←                                 |                         |
| SET TIME MODE UTC/LMT             |                         |

Position may be offset with latitude and longitude.

## 5.3 Alert

When an error occurs, an alert will display on the current screen. The meanings of the alert are stated as below:

| NO. | ID   | Category | Priority | Alert                       | Cause                                                                                                 |
|-----|------|----------|----------|-----------------------------|-------------------------------------------------------------------------------------------------------|
| 1   | 3056 | B        | CAUTION  | HDOP exceeded               | HDOP > 4.0, check antenna                                                                             |
| 2   | 3015 | B        | WARNING  | Loss of position            | No Fix, check antenna                                                                                 |
| 3   | 3055 | B        | WARNING  | Loss of differential signal | DGPS input not detected, Check DGPS Beacon, if No DGPS Beacon, change setting from Beacon to OFF/SBAS |
| 4   | 3012 | B        | WARNING  | Integrity status            | RAIM warning, The positioning accuracy exceeds the RAIM level. Check antenna.                         |

[ ALERT SETTING ] D

GP- 3D 31°32.7225' N 121°30.4227' E
UTC 2019-03-21 17:04:47

ALERT LIST

ALARM PERIOD

ALERT HISTORY

ALARM BUZZER

←

5 min

ON

### 5.3.1 Alert List

It's to check current alert events.

[ ALERT LIST ] D

NO FIX 31°26.9174' N 120°31.6599' E
UTC 2021-07-15 06:52:50

| ID   | DISCRIPTION                 | STATE | TIME(UTC)   |
|------|-----------------------------|-------|-------------|
| 3015 | Loss of position            | V     | 07-15 06:51 |
| 3056 | HDOP exceeded               | A     | 07-15 06:51 |
| 3012 | Integrity status            | V     | 07-15 06:51 |
| 3055 | Loss of differential signal | V     | 07-15 06:51 |

ACK ALL

MUTE

←

### 5.3.2 Alarm Period

Alarm period can be set between 1-5 minutes.

When an alert occurs, a warning will be displayed at the bottom of screen and can be heard as a warning tone.

If a warning lasts for above set period, it will become an alarm at the bottom of screen and can be heard as an alarm tone.

Either a warning tone or an alarm tone can be acked by clicking the alert on screen or being set in menu.

### 5.3.3 Alert History

All history alerts will be displayed here.

| TOTAL: 007 PAGE:1/1 [ ALERT HISTORY ] D                   |                             |       |             |                                                  |  |
|-----------------------------------------------------------|-----------------------------|-------|-------------|--------------------------------------------------|--|
| NO FIX 31°26.9156'N 120°31.6609'E UTC 2021-07-15 06:58:40 |                             |       |             |                                                  |  |
| ID                                                        | DISCRPTION                  | STATE | TIME(UTC)   | <div>Page ↓</div> <div>Page ↑</div> <div>←</div> |  |
| 3012                                                      | Integrity status            | A     | 07-15 06:58 |                                                  |  |
| 3055                                                      | Loss of differential signal | A     | 07-15 06:58 |                                                  |  |
| 3015                                                      | Loss of position            | A     | 07-15 06:58 |                                                  |  |
| 3055                                                      | Loss of differential signal | V     | 07-15 06:57 |                                                  |  |
| 3056                                                      | HDDP exceeded               | A     | 07-15 06:56 |                                                  |  |
| 3015                                                      | Loss of position            | V     | 07-15 06:56 |                                                  |  |
| 3012                                                      | Integrity status            | V     | 07-15 06:56 |                                                  |  |

### 5.3.4 Alarm Buzzer

Alarm buzzer can be set by clicking [ON] and [OFF]. It controls the sound of alarms.

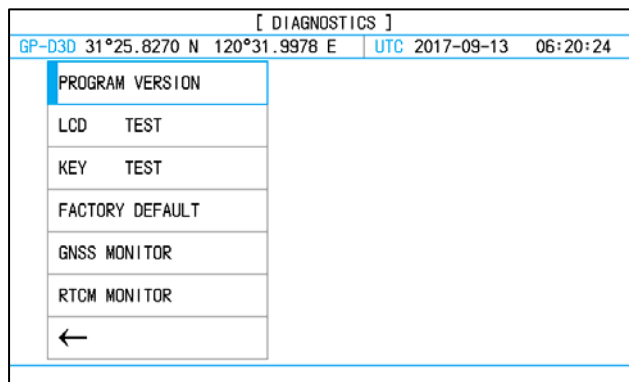
## 5.4 Diagnostics

The diagnostic test is to check software version, keypad and LCD for proper operation.

|                                                           |  |  |  |  |  |
|-----------------------------------------------------------|--|--|--|--|--|
| [ SETTINGS ]                                              |  |  |  |  |  |
| GP-D3D 31°25.8274 N 120°31.9984 E UTC 2017-09-13 06:19:32 |  |  |  |  |  |
| GNSS SETTING                                              |  |  |  |  |  |
| NAVIGATION                                                |  |  |  |  |  |
| ALERT                                                     |  |  |  |  |  |
| SYSTEM SETTING                                            |  |  |  |  |  |
| DIAGNOSTICS                                               |  |  |  |  |  |
| MAINTENANCE                                               |  |  |  |  |  |
| ←                                                         |  |  |  |  |  |
| CARRY OUT SELF TEST                                       |  |  |  |  |  |

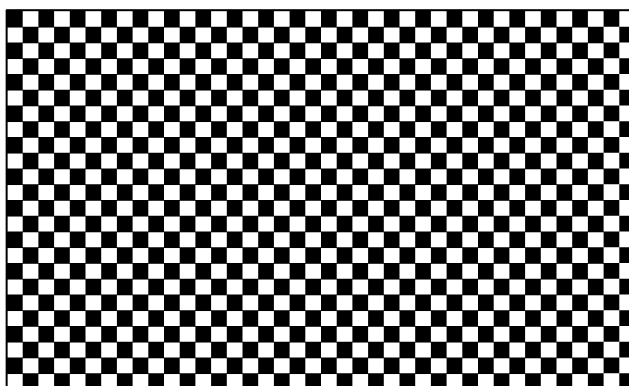
### 5.4.1 Software Version

Select [PROGRAM VERSION] item to check the software version.



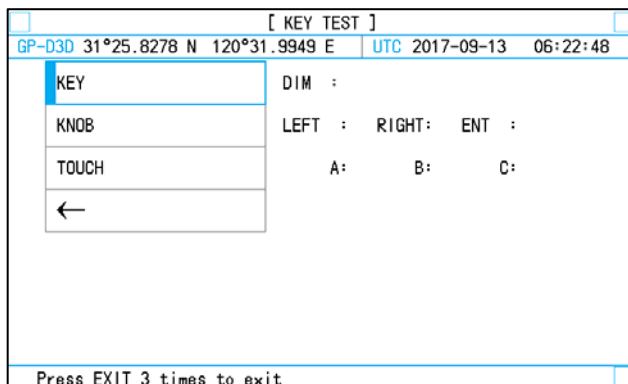
### 5.4.2 LCD Test

LCD Test is used for testing the screen.



### 5.4.3 Key Test

It is to test the buttons/keys on panel.

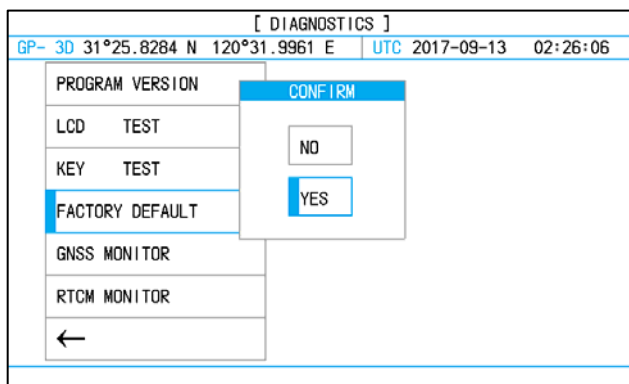


### 5.4.4 Factory Default

FACTORY DEFAULT is to return the system to factory default setting.  
Select FACTORY DEFAULT item in DIAGNOSTICS menu, then click [YES].

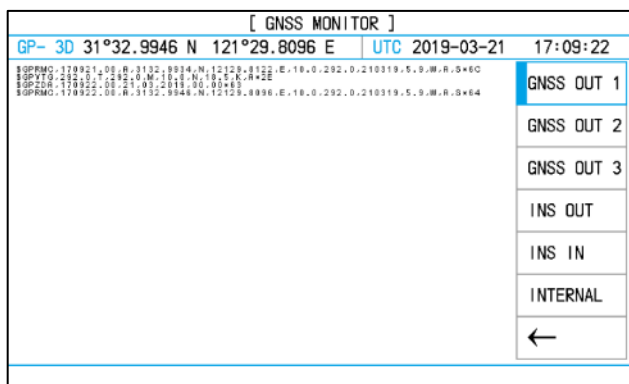
**NOTE:**

*The navigation settings and GPS settings will restore to factory default while the waypoints and routes registered remain unchanged.*



### 5.4.5 GNSS Monitoring

It's to check the GNSS data appearing on output ports.



### 5.4.6 RTCM Monitor

BEACON/SBAS can be set to BEACON. When set BEACON, DGPS beacon input will be checked by NGR-1000/NGR-3000.

## 6. INSTALLATION

### 6.1 Installation of Main Unit

The main unit can be installed on a table-top, on the overhead, or in a panel (optional flush mounting brackets required). Refer to the drawings at the end of this manual for installation instructions. When selecting a mounting location, keep in mind the following points:

- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Locate the unit away from equipment which generates electromagnetic fields such as a motor or generator.
- Allow sufficient maintenance space at the sides and rear of the unit and leave sufficient slack in cables, to facilitate maintenance and servicing.
- Observe the following compass safe distances to prevent deviation of a magnetic compass. Standard compass, 0.5 m, Steering compass, 0.3 m.

### 6.2 Installation of Antenna Unit

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

- Do not cut the antenna cable.
- Select a location out of the radar beam. The radar beam will obstruct or prevent reception of the GNSS signal.
- The location should be well away from a VHF/UHF antenna. A GNSS equipment is interfered by a harmonic wave of a VHF/ UHF antenna.
- There should be no obstruct within the line-of-sight to the satellites. Objects within line-of-sight to a satellite, for example, a mast, may block reception or prolong acquisition time.
- Mounting the antenna unit as high as possible keeps it free from interfering objects and water spray, which can interrupt reception of GNSS satellite signal if the water freezes.
- If the antenna cable is to be passed through a hole which is not large enough to pass the connector, you may unfasten the connector. Refasten it after running the cable through the hole.

## 6.3 Cabling

### 6.3.1 Power Connection

| PIN NO | DESCRIPTION |
|--------|-------------|
| 13     | PWR (+ 24V) |
| 14     | PWR (0V)    |

The power cable with a rated capacity of 3A should be used. Pin definition for the connector is showed above.

Suggest using the 3A Power Supply Unit (DC 24V output).

### 6.3.2 GNSS Data Output

There are totally three RS422 GNSS data ports. The output data format is NMEA0183, as IEC61162-1 standard.

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | BEACON IN+  |
| 2       | BEACON IN   |
| 3       | GNSS OUT 1+ |
| 4       | GNSS OUT 1- |
| 5       | GNSS OUT 2+ |
| 6       | GNSS OUT 2- |
| 7       | GNSS OUT 3+ |
| 8       | GNSS OUT 3- |
| 9       | BAM/INS OUT |
| 10      | BAM/INS OUT |
| 11      | BAM/INS IN  |
| 12      | BAM/INS IN  |
| 13      | PWR(+24V)   |
| 14      | PWR(0V)     |

The default baud rate is 4800 bps, which can also be changed among 4809 / 9600 / 19200 / 38400 bps.

### 6.3.3 Grounding

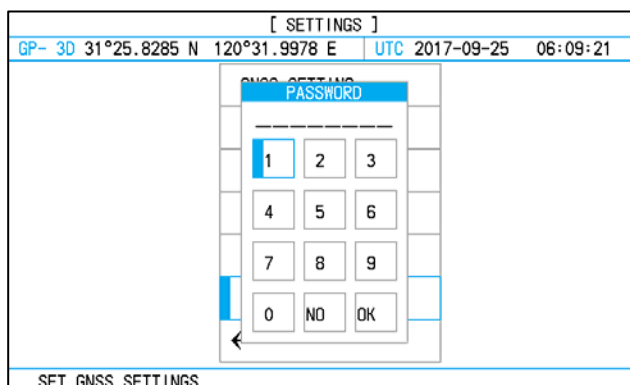
Ground the unit as follows to prevent interference:

- The ground wire should be 1.25mm<sup>2</sup> or larger.
- The ground wire should be as short as possible.

## 6.4 Initial Settings

This equipment can output navigation data to external equipment, in NMEA 0183 format. For

example, it can output position data to a radar or echo sounder.  
Initial settings are done in menu of MAINTENANCE.

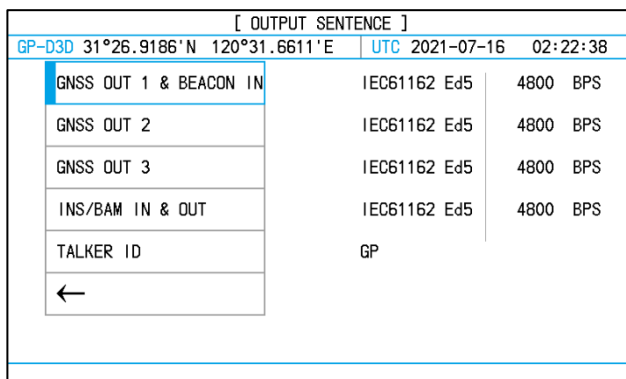


Password is required to enter “Maintenance”.

For each GPS data output, following items can be configured.

- Data sentences:**  
Up to five sentences may be selected for each port. If the selected sentences exceed 7 items, OVERFLOW will be indicated in the relative column. In this case, OUTPUT ERROR will also be shown in displayed screens.
- NMEA version**  
There are total five versions to be selected: NMEA1.5, NMEA2.0, NMEA2.3, IEC61162 Ed4, IEC61162 Ed5.
- Baudrate**  
It can be 4800, 9600, 19200, 38400bps.

### 6.4.1 Sentence Setting



| Sentence               | NMEA Version | Baud Rate |
|------------------------|--------------|-----------|
| GNSS OUT 1 & BEACON IN | IEC61162 Ed5 | 4800 BPS  |
| GNSS OUT 2             | IEC61162 Ed5 | 4800 BPS  |
| GNSS OUT 3             | IEC61162 Ed5 | 4800 BPS  |
| INS/BAM IN & OUT       | IEC61162 Ed5 | 4800 BPS  |
| TALKER ID              | GP           |           |

| [ MAINTENANCE ]                   |                         |
|-----------------------------------|-------------------------|
| GP-D3D 31°26.9189'N 120°31.6609'E | UTC 2021-07-16 02:23:14 |
| SENTENCE SETTING                  |                         |
| EXTERNAL GNSS                     | OFF                     |
| LANGUAGE                          | ENGLISH                 |
| ←                                 |                         |

EXTERNAL GNSS: It is only for service.

| [ SENTENCE SETTING ]              |                         |
|-----------------------------------|-------------------------|
| GP-D3D 31°26.9191'N 120°31.6607'E | UTC 2021-07-16 02:23:50 |
| SENTENCE                          |                         |
| BAUDRATE                          | 4800 BPS                |
| VERSION                           | IEC61162 Ed5            |
| ←                                 |                         |
| Select the Sentence need output   |                         |

| [ OUTPUT SENTENCE ]               |                         |     |    |
|-----------------------------------|-------------------------|-----|----|
| GP-D3D 31°26.9192'N 120°31.6607'E | UTC 2021-07-16 02:24:09 |     |    |
| GBS                               | 1 s                     | BWC | -- |
| GNS                               | 1 s                     | XTE | -- |
| GGA                               | 1 s                     | RMB | -- |
| DTM                               | 1 s                     | WPL | -- |
| RMC                               | 1 s                     | BOD | -- |
| VTG                               | 1 s                     | RTE | -- |
| ZDA                               | 1 s                     | GLL | -- |
| GSA                               | --                      | APB | -- |
|                                   |                         | VLW | -- |
|                                   |                         | ←   |    |
| Load Rate: 080%                   |                         |     |    |

### Data sentence description

ACN: Equipment is operating normally, or for supervision of a connection between two units.

ALC: Cyclic alert list. The cyclic alert list transmission shall never stop. When all alerts are in normal state the cyclic alert list is empty i.e. number of alert entries is 0.

ALF: Report an alert condition and the alert state of a device. An ALF message shall be

- published for an alert each time the alert information in this sentence changes and on alert request (see ALC – Cyclic alert list).
- GNS: Fix data for GPS, GLONASS.
- GBS: Support Receiver Autonomous Integrity Monitoring (RAIM).
- GGA: GPS position fixing condition (time of fix, latitude, longitude, receiving condition, number of satellites used, DOP).
- HBT: The sentence is transmitted at regular intervals specified in the corresponding equipment standard. The repeat interval may be used by the receiving unit to set the time-out value for the connection supervision.
- RMC: Generic navigational information (UTC time, latitude, longitude, ground speed, true course, day, month, year).
- VTG: Actual track and ground speeds.
- ZDA: UTC time (day, month, year).
- DTM: Datum reference.
- GSA: GNSS receiver operating mode, satellites used in the navigation solution reported by the GGA 2148 or GNS sentences, and DOP values.
- RTE: Waypoint identifiers, listed in order with starting waypoint first, for the identified route.
- BWC: Bearing and distance to waypoint – Great circle
- RMB: Recommended minimum navigation information
- XTE: Cross-track error, measured
- WPL: Latitude and longitude of specified waypoint.

**NOTE:** As default, GNS, GBS, GGA, RMC, VTG, ZDA and DTM are selected.

## 6.4.2 Baud Rate Setting

Select each of three outputs to configure the baud rate.

Default baud rate of all ports is 4800bps.

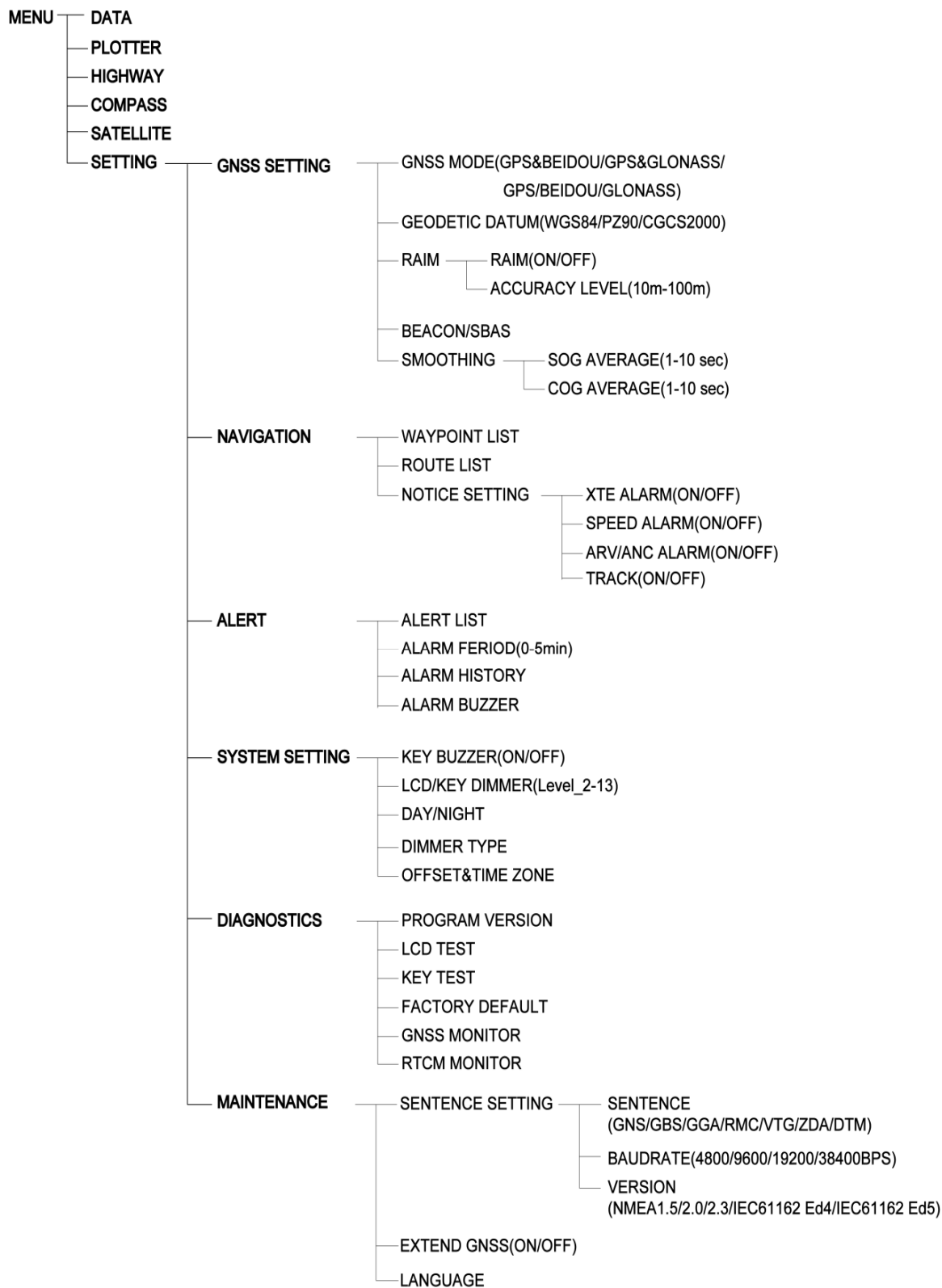
Move the cursor to the output and click it continuously until a desired rate is shown.

| [ SENTENCE SETTING ] |                                                    |
|----------------------|----------------------------------------------------|
| GP-D3D               | 31°26.9188'N 120°31.6628'E UTC 2021-07-16 02:35:04 |
| SENTENCE             |                                                    |
| BAUDRATE             | 4800 BPS                                           |
| VERSION              | IEC61162 Ed5                                       |
| ←                    |                                                    |
| Set Uart baudrate    |                                                    |

| [ SENTENCE SETTING ]              |                         |
|-----------------------------------|-------------------------|
| GP-D3D 31°26.9189'N 120°31.6634'E | UTC 2021-07-16 02:40:55 |
| SENTENCE                          |                         |
| BAUDRATE                          | 4800 BPS                |
| VERSION                           | IEC61162 Ed5            |
| ←                                 |                         |
| Set output sentence version       |                         |

- 1) The baud rate can be selected among 4800/ 9600/ 19200/ 38400bps.
- 2) The NMEA Version can be selected among 1.5/ 2.0/ 2.3/IEC61162 Ed4/IEC61162 Ed5.

## **APPENDIX I MENU TREE**



## APPENDIX II TECHNICAL SPECIFICATIONS

### ● GNSS equipment

| No. | Item                     | Description                                                                                      |
|-----|--------------------------|--------------------------------------------------------------------------------------------------|
| 1   | Receiving System         | GPS, BDS, Glonass                                                                                |
| 2   | Rx Frequency             | 1575.42 MHz(GPS)                                                                                 |
| 3   | Rx Code                  | C/A code                                                                                         |
| 4   | Position Accuracy        | less than 10m (GPS), less than 5m(DGPS), 95% of the time, horizontal dilution of position (HDOP) |
| 5   | Tracking Velocity        | 999 kts                                                                                          |
| 6   | Position-fixing Time     | Cold start: 120 seconds                                                                          |
| 7   | Position Update Interval | 1 second                                                                                         |
| 8   | RAIM Indicators          | Safe, Unsafe, Caution, N/A, off                                                                  |
| 9   | Route                    | Up to 30                                                                                         |
| 10  | Waypoint                 | Up to 3000                                                                                       |

### ● DISPLAY SECTION

| No. | Item                  | Description                                         |
|-----|-----------------------|-----------------------------------------------------|
| 1   | Display               | 7 inch, color LCD, touch screen operation           |
| 2   | Fix Mode              | GPS, Glonass, BDS or combined                       |
| 3   | Alerts                | Loss of position and differential signals, HDOP > 4 |
| 4   | Display Modes         | Data, Plotter, Highway, Compass, Satellite          |
| 5   | Track Plotter Display | 0.02 to 320nm, 14 steps                             |
| 6   | Navigation Alarm      | Arrival and Anchor Watch XTE, Speed                 |
| 7   | Satellite Information | Satellite number, Elevation, Signal level           |

## ● INPUT/OUTPUT DATA

| No. | Item        | Description                                                    |
|-----|-------------|----------------------------------------------------------------|
| 1   | GNSS Output | NMEA0183, totally 3 ports, baud rate 4800/9600/19200/38400 bps |
|     | Version     | NMEA1.5, NMEA2.0, NMEA2.3, IEC61162 Ed4, IEC61162 Ed5          |
|     | Sentences   | ALF, DTM, GBS, GNS, GGA, GSA, RMC, VTG, ZDA, etc.              |
| 2   | Beacon In   | DGPS RTCM 10402.3                                              |
| 3   | Ins In      | ACN                                                            |
| 4   | Ins Out     | ALC, ALF, HBT                                                  |

## ● POWER SUPPLY

24V DC: 0.25-0.5A

## ● ENVIRONMENT CONDITION

| No. | Item                | Description                                                 |
|-----|---------------------|-------------------------------------------------------------|
| 1   | Ambient Temperature | Antenna Unit: -25°C to +70°C<br>Display Unit: -15°C to +55° |
| 2   | Relative Humidity   | 95% at 40°C                                                 |
| 3   | Water Proofing      | Antenna Unit: IEC60529 IPX6<br>Display Unit: IEC60529 IPX5  |

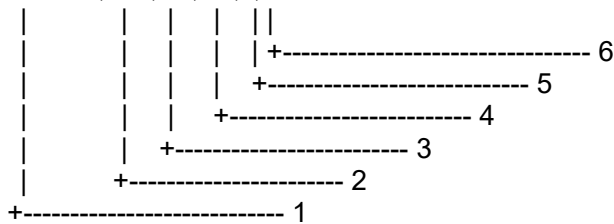
## ● OTHERS

| No. | Item   | Description                |
|-----|--------|----------------------------|
| 1   | Size   | 145(H) x 264(W) x 80(D) mm |
| 2   | Weight | abt 1.25kg (main unit)     |

## **APPENDIX III SENTENCE DISCRIPTION**

## ACN – Alert command

\$--ACN,hhmmss.ss,aaa,x.x,x.x,c,a\*hh <CR><LF>



1. Time (see Note 1)
2. Manufacturer mnemonic code (see Note 2)
3. Alert Identifier (see Note 3)
4. Alert Instance, 1 to 999999 (see Note 4)
5. Alert command, A, Q, O or S (see Note 5)
6. Sentence status flag (see Note 6)

**NOTE 1:** Release time of the alert command. (e.g. for VDR purposes), optional can be a null field. Sender is allowed to use all alternatives defined in Table 5 Field type summary. Receiver is allowed to ignore content of this field. If receiver does not ignore this field it should support all alternatives defined in Table 5 Field type summary.

**NOTE 2:** Used for proprietary alerts defined by the manufacturer. For standardized alerts this should be a null field.

**NOTE 3:** The alert identifier is unique within a single alert source. The alert identifier is a variable length integer field of maximum 7-digit integer. It identifies the type of the alert e.g. a “lost target” alert. Standardized alerts use unique alert identifiers described in equipment standards. Number range 10000-9999999 is reserved for proprietary alerts. Alert Identifier examples: “001”, “2456789”, “245” .

**NOTE 4:** The alert instance identifies the current instance of an alert to distinguish alerts of the same type (Alert identifier) and from the same source (e.g. dangerous target). Alert instance is maximum 6-digit integer from 1 to 999999. The number of alert instance can be freely defined by the manufacturer as long as it is unique for one type of alert (alert identifier). It is not permitted to modify the alert instance within a life cycle of a distributed alert (from ‘active & unacknowledged’ state until ‘normal’ state is reached). It can be also a null field, when there is only one alert of that type.

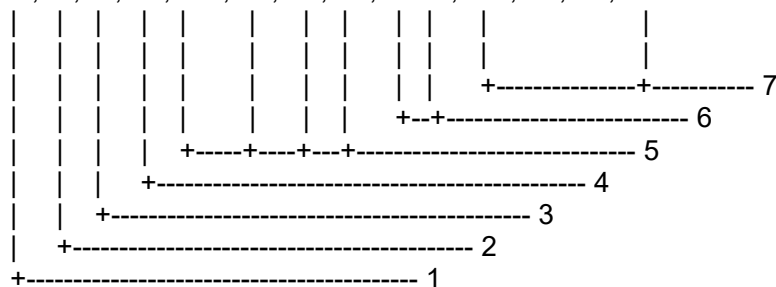
**NOTE 5:** This should not be null field

|                                |   |
|--------------------------------|---|
| acknowledge :                  | A |
| request / repeat information : | Q |
| responsibility transfer:       | O |
| silence :                      | S |

**NOTE 6:** This field should be “C” and should not be null field. This field indicates a command. A sentence without “C” is not a command.

## ALC - Cyclic alert list

\$--ALC, xx, xx, xx, x.x, aaa, x.x, x.x, x.x, ....., aaa, x.x, x.x, x.x\*hh <CR><LF>



1. Total number of sentences for this message, 01 to 99 (see Note 1)
2. Sentence number, 01 to 99 (see Note 1)
3. Sequential message identifier, 00 to 99 (see Note 2)
4. Number of alert entries (see Note 3)
5. Alert entry 1
6. Additional Alert entries (see Note 4)
7. Alert entry n (see Note 4)

**NOTE 1:** The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1, These cannot be null fields.

**NOTE 2:** The sequential message identifier relates all sentences that belong to a group of multiple sentences (i.e. message). Multiple sentences (see Note 1) with the same sequential message identifier, make up one message.

**NOTE 3:** Contains the number of alert entries transported within this sentence.

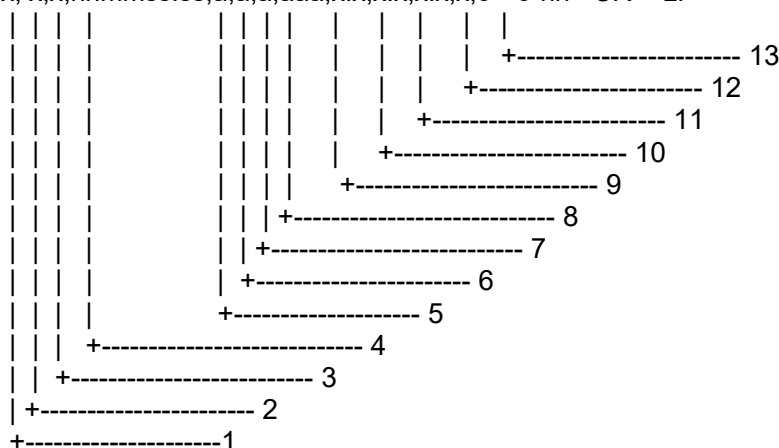
**NOTE 4:** Alert entry 0 – n: Each alert entry consists of four fields:

- Manufacturer Identifier (see ALF Manufacturer Identifier)
- Alert Identifier (see ALF Alert Identifier)
- Alert instance (see ALF Alert instance)
- Revision Counter (see ALF Revision Counter)

Each entry identifies a certain alert with a certain state. It is not allowed that an alert entry is split between two ALC sentences.

## ALF - Alert sentence

\$--ALF, x, x,x,hhmmss.ss,a,a,a,aaa,x.x,x.x,x.x,x,c---c\*hh <CR><LF>



1. Total number of ALF sentences for this message, 1 to 2 (see Note 1)
2. Sentence number, 1 to 2 (see Note 1)
3. Sequential message identifier, 0 to 9 (see Note 2)
4. Time of last change (see Note 3)
5. Alert category, A, B or C (see Note 4)
6. Alert priority, E, A, W or C (see Note 5)
7. Alert state, A, S, R, O, U or D (see Note 6)
8. Manufacturer mnemonic code (see Note 7)
9. Alert identifier (see Note 8)
10. Alert instance, 1 to 999999 (see Note 9)
11. Revision counter, 1 to 99 (see Note 10)
12. Escalation counter, 0 to 9 (see Note 11)
13. Alert text (see Note 12)

**NOTE 1:** The first field specifies the total number of sentences used for a message, minimum value 1. The second field identifies the order of this sentence in the message, minimum value 1, These cannot be null fields. When the sentence number is 2, the following Alert category, Alert priority and Alert state can be null fields.

**NOTE 2:** The sequential message identifier relates all sentences that belong to a group of multiple sentences (i.e. message). Multiple sentences (see Note 1) with the same sequential message identifier, make up one message.

**NOTE 3:** Time should represent the last time the data within the alert message has changed. For example changing the alert text by in-/decrementing a contained counter or count down should cause a revision of alert message and a new time. Time is an optional field. The time-field is additional information about when this happened and not used for decision making. There is no mandatory requirement for time synchronization between the equipment. It should be either a null field (if not used) or UTC (if used). Sender is allowed to use all alternatives defined in Table 5 Field type summary. Receiver is allowed to ignore content of this field. If the receiver

does not ignore this field it should support all alternatives defined in Table 5 Field type summary.

**NOTE 4:** The alert category is in compliance with the category definition as described in INS Performance Standard (MSC.252(83)) and Bridge Alert Management Performance Standard (MSC.302(87)):

A, Category A: Alerts where information at operator unit directly assigned to the function generating the alert is necessary, as decision support for the evaluation of the alert-related condition, e.g. graphical information of danger of collision or graphical information of danger of grounding.

B, Category B: Alerts where no additional information for decision support is necessary besides the information which can be presented using alert source and alert description text.

C, Category C: Alerts that cannot be acknowledged on the bridge but for which information is required about the status and treatment of the alerts, e.g., certain alerts from the engine.

**NOTE 5:** Alert priority:   Emergency Alarm:   E, for use with Bridge alert management  
                                   Alarm:                    A  
                                   Warning:           W  
                                   Caution:           C

**NOTE 6:** The alert state transition is defined in Annex J

active – unacknowledged: V  
 active – silenced: S  
 active – acknowledged or active: A  
 active – responsibility transferred: O  
 rectified – unacknowledged: U  
 normal: N

**NOTE 7:** Used for proprietary alerts defined by the manufacturer. For standardized alerts this should be a null field.

**NOTE 8:** The alert identifier is unique within a single alert source. The alert identifier is a variable length integer field of maximum 7-digit integer. It identifies the type of the alert e.g. a “lost target” alert. Standardized alerts use unique alert identifiers described in equipment standards. Number range 10000-9999999 is reserved for proprietary alerts. Alert Identifier examples: “001”, “2456789”, “245” .

**NOTE 9:** The alert instance identifies the current instance of an alert to distinguish alerts of the same type (Alert identifier) and from the same source (e.g. dangerous target). Alert instance is maximum 6-digit integer from 1 to 999999. The number of alert instance can be freely defined by the manufacturer as long as it is unique for one type of alert (alert identifier). It is not permitted to modify the alert instance within a life cycle of a distributed alert (from ‘active & unacknowledged’ state until

‘normal’ state is reached). It can be also a null field, when there is only one alert of that type.

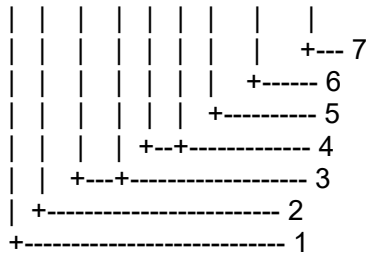
**NOTE 10:** The revision counter is the main method to follow up-to-date status. Revision counter is also unique for each instance of alert. Revision counter starts with 1 and the step for increment is 1. The count resets to 1 after 99 is used. Revision counter increments on each change of content of any field of the alert.

**NOTE 11:** The escalation counter is presenting the number of alert escalations after time expiration during the state active-unacknowledged. The escalation counter starts with 0 and the step for increment is 1. The count resets to 1 after 9 is used. The alert escalation can be the escalation from warning into warning (activation of audible signal only), the escalation from warning to alarm or the escalation from alarm to alarm with activation of back-up navigator alarm

**NOTE 12:** This field is used for Alert title which is mandatory and for additional alert description which is optional.

## DTM - Datum reference

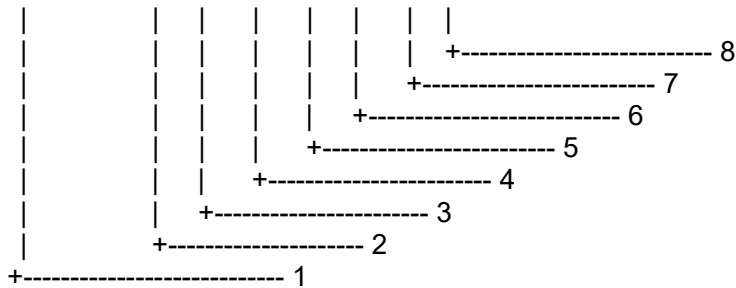
\$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc\*hh<CR><LF>



1. Local datum W84 - WGS84  
W72 - WGS72  
S85 - SGS85  
P90 - PE90  
999 - User defined  
IHO datum code
2. Local datum subdivision code
3. Lat offset, min, N/S
4. Lon offset, min, E/W
5. Altitude offset, m
6. Reference datum W84 - WGS84  
W72 - WGS72  
S85 - SGS85  
P90 - PE90
7. Checksum

## GBS – GNSS satellite fault detection

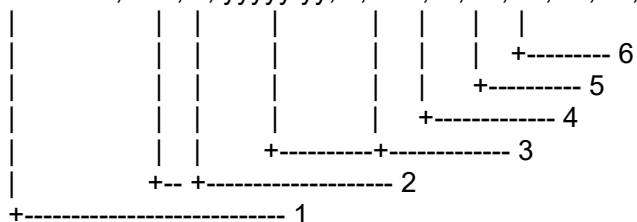
\$--GBS, hhmmss.ss, x.x, x.x, x.x, xx, x.x, x.x, x.x, h, h \*hh <CR><LF>



1. UTC time of the GGA or GNS fix associated with this sentence
2. Expected error in latitude (see Note 1)
3. Expected error in longitude
4. Expected error in altitude
5. ID number (see Note 2) of most likely failed satellite
6. Probability of missed detection for most likely failed satellite
7. Estimate of bias on most likely failed satellite
8. Standard deviation of bias estimate

## GNS - GNSS fix data

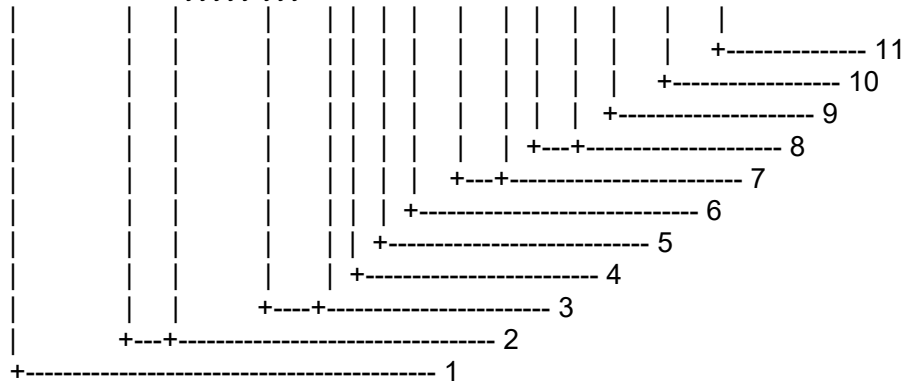
\$-- GNS, hhmmss.ss, llll.ll, a, yyyyy.yy, a, c--c,xx,x.x,x.x,x.x,x.x,x.x,x.x,a \*hh<CR><LF>



1. UTC of position
2. Latitude, N/S
3. Longitude, E/W
4. Mode indicator
5. Total number of satellites in use, 00-99
6. HDOP

## GGA -Global positioning system fix data

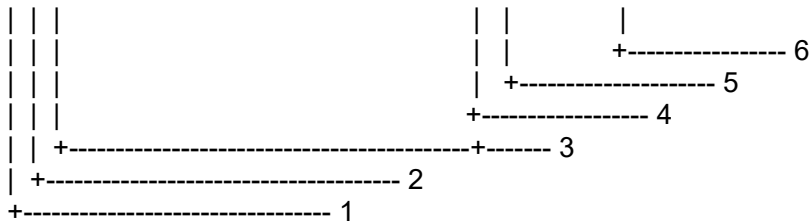
\$--GGA,hhmmss.ss,llll.lll,a,yyyyy.yyy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx\*hh<CR><LF>



1. UTC of position
2. Latitude, N/S
3. Longitude, E/W
4. GPS quality indicator (0: No fix, 1: GPS, 2: Differential, 8: Demo mode)
5. Number of satellite in use,00-12, may be different from the number in view
6. Horizontal dilution of precision
7. Antenna altitude above/below mean sea level, m
8. Geoidal separation, m
9. Age of differential GPS data
10. Differential reference station ID, 0000-1023
11. Checksum

## GSA - GNSS DOP and active satellites

\$--GSA,a,x,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,x.x,x.x,x.x,h\*hh<CR><LF>



1. M = manual, forced to operate in 2D or 3D mode 2165  
A = automatic, allowed to automatically switch 2D/3D
2. 1 = fix not available, 2 = 2D, 3 = 3D
3. ID numbers (see Note 1) of satellites used in solution
4. PDOP
5. HDOP
6. VDOP

**NOTE 1:** Satellite ID numbers. To avoid possible confusion caused by repetition of satellite ID numbers when using multiple satellite systems, the following convention has been adopted.

- a) GPS satellites are identified by their PRN numbers, which range from 1 to 32.
- b) The numbers 33 to 64 are reserved for WAAS satellites. The WAAS system PRN numbers are 120 to 138. 2171 The offset from WAAS SV ID to WAAS PRN number is 87. A WAAS PRN number of 120 minus 87 yields 2172 the SV ID of 33.  
The addition of 87 to the SV ID yields the WAAS PRN number.
- c) The numbers 65 to 96 are reserved for GLONASS satellites. GLONASS satellites are identified by 64+ satellite slot numbers. The slot numbers are 1 through 24 for the full GLONASS constellation of 24 satellites, thus giving a range of 65 through 88. The numbers 89 through 96 are available if slot numbers above 24 are allocated to on-orbit spares.

**NOTE 2:** GNSS System ID identifies the GNSS System ID according to the Table below.

## HBT – Heartbeat supervision sentence

\$--HBT, x.x, A, x\*hh<cr><lf>

```

|   |   |
|   |   | +----- 3
|   |   | +----- 2
|   |   | +----- 1

```

1. Configured repeat interval (see Note 1)
2. Equipment status (see Note 2)
3. Sequential sentence identifier (see Note 3)

**NOTE 1:** Configured autonomous repeat interval in seconds. This field should be set to NULL in response to a query if this feature is supported.

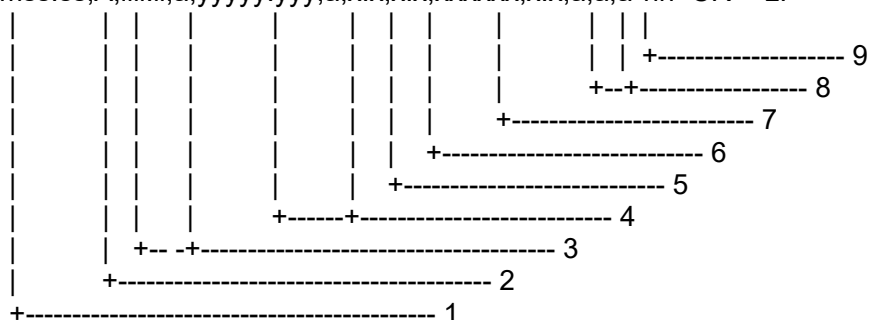
**NOTE 2:** Equipment in normal operation A = yes, V = no

This field can be used can be used to indicate the current equipment status. This could be the result of an built-in integrity testing function.

**NOTE 3:** The sequential sentence identifier provides a message identification number from 0 to 9 that is sequentially assigned and is incremented for each new sentence. The count resets to 0 after 9 is used.

## RMC- Recommended minimum specific GPS/TRANSIT data

\$--RMC,hhmmss.ss,A,IIII.II,a,yyyyy.yyy,a,x.x,x.x,xxxxxx,x.x,a,a,a\*hh<CR><LF>



1. UTC of position fix
2. Status(see Note 3 ): A=data valid, V=navigation receiver warning
3. Latitude, N/S
4. Longitude, E/W
5. Speed over ground, knots
6. Course over ground, degrees true
7. Date: dd/mm/yy
8. magnetic variation, degrees E/W(see Note 1)
9. Mode indicator (see Notes 2 and 3 )

**NOTE 1:** E = Easterly variation subtracts from True course  
W = Westerly variation adds to True course

### NOTE 2: Positioning system mode Indicator

A = Autonomous. Satellite system used in non-differential mode in position fix;

D = Differential. Satellite system used in differential mode in position fix;

E = Estimated (dead reckoning) mode;

F = Float RTK. Satellite system used in real time kinematic mode with floating integers;

M = Manual input mode;

N =No fix. Satellite system not used in position fix, or fix not valid;

P = Precise. Satellite system used in precision mode. Precision mode is defined as: no deliberate degradation (such as selective availability) and higher resolution code (P-code) is used to compute position fix. P is also used for satellite system used in multi-frequency, SBAS or Precise Point Positioning (PPP) mode;

R = Real time kinematic. Satellite system used in RTK mode with fixed integers;

S = Simulator mode.

**NOTE 3 :** The positioning system mode indicator field supplements the positioning system status field. The status field should be set to V = Invalid for all values of the mode indicator except for A= Autonomous, D = Differential, F = Float RTK, P = Precise and R = Real time kinematic. The positioning system mode indicator and status fields should not be null fields.

**NOTE 4** :The navigational status indicator is according to IEC 61108 requirements on ‘Navigational (or Failure) warnings and status indications’. This field should not be a NULL field and the character should take one of the following values:

S = Safe. when the estimated positioning accuracy (95 % confidence) is within the selected accuracy level corresponding to the actual navigation mode, and/or integrity is available and within the requirements for the actual navigation mode, and/or a new valid position has been calculated within 1 s for a conventional craft and 0,5 s for a high speed craft.

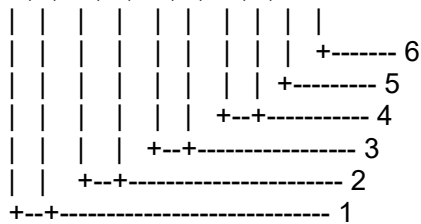
C = Caution when integrity is not available.

U = Unsafe when the estimated positioning accuracy (95 % confidence) is less than the selected accuracy level corresponding to the actual navigation mode, and/or integrity is available but exceeds the requirements for the actual navigation mode, and/or a new valid position has not been calculated within 1 s for a conventional craft and 0,5 s for a high speed craft.

V = Navigational status not valid, equipment is not providing navigational status indication.

## VTG - Course over ground and ground speed

\$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a\*hh<CR><LF>



1. Course over ground, degrees true
2. Course over ground, degrees magnetic
3. Speed over ground, knots
4. Speed over ground, km/h
5. Mode indicator(see note)
6. Checksum

**NOTE** : Positioning system Mode indicator:

A = Autonomous

D = Differential

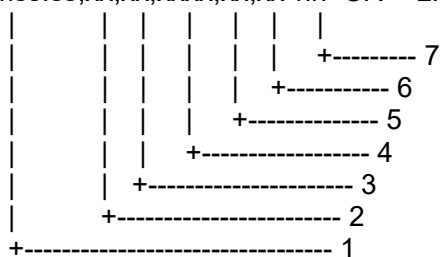
S = Simulator

N = Data not valid

The positioning system Mode indicator field shall not be a null field.

## ZDA - Time and date

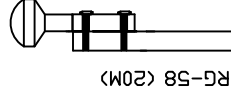
\$--ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx\*hh<CR><LF>



1. UTC
2. Day, 01 to 31 (UTC)
3. Month, 01 to 12 (UTC)
4. Year (UTC)
5. Local zone hours, 00h to +-13h
6. Local zone minutes, 00 to +59 as local hours
7. Checksum

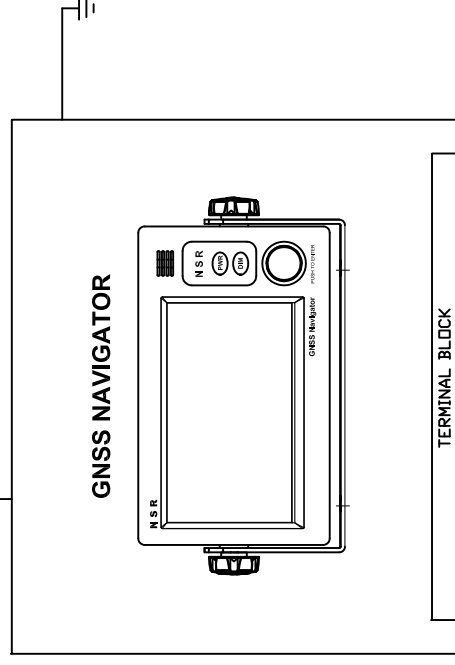
## **APPENDIX IV INSTALLATION DRAWINGS**

NGA100 GNSS ANTENNA

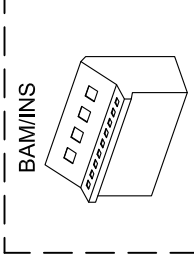


A, D, E

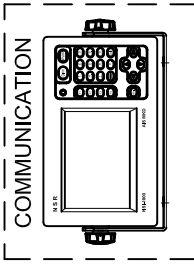
B, D, E



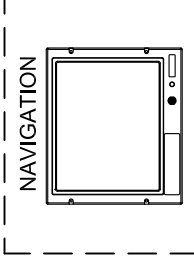
GNSS NAVIGATOR



BAMINS



COMMUNICATION



NAVIGATION



DGPS BEACON

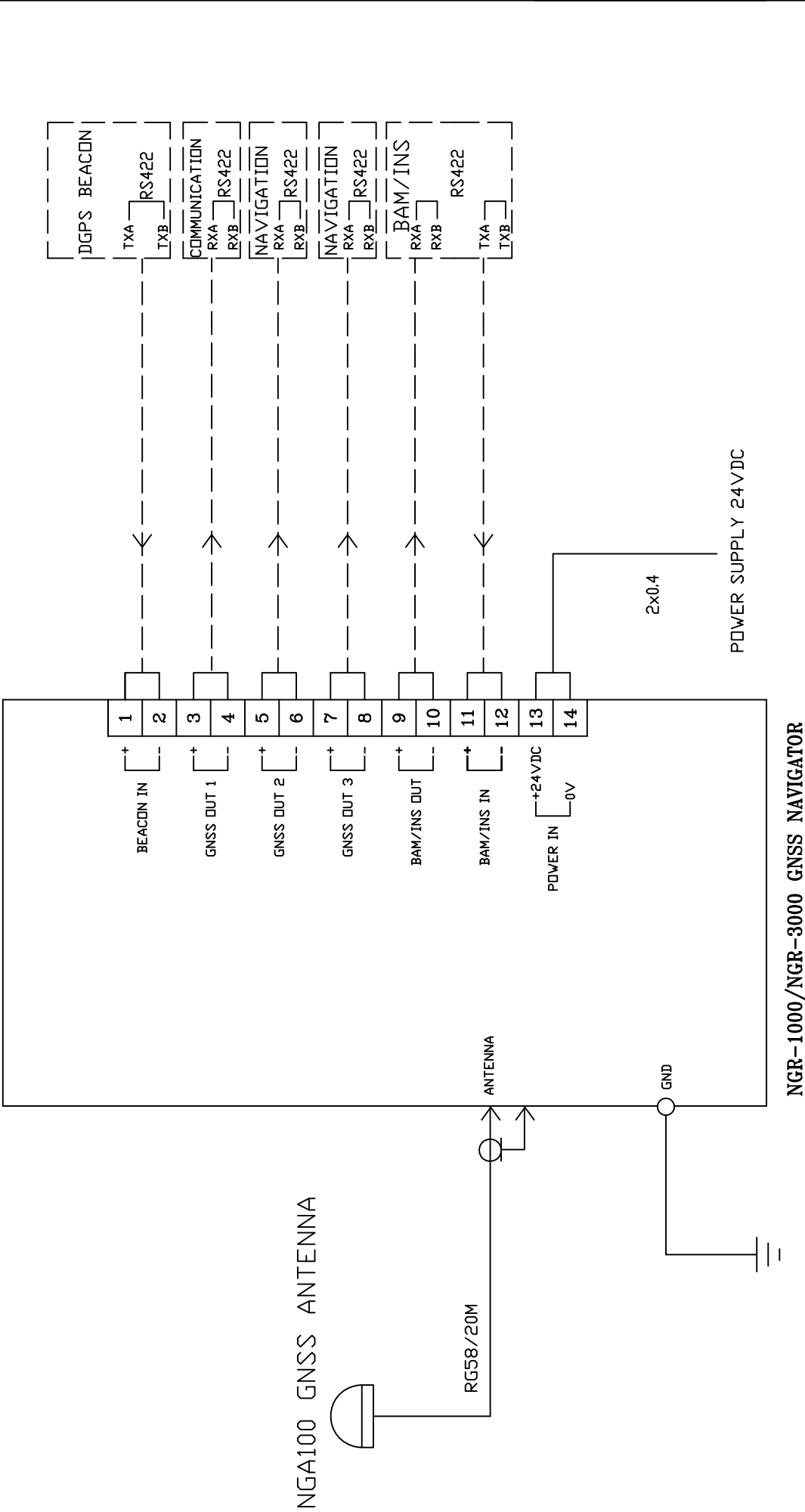
TERMINAL BLOCK

Power Supply 24V DC

APPLICATION  
NGR-1000/NGR-3000 GNSS NAVIGATOR SYSTEM DIAGRAM

|          |                |          |               |         |
|----------|----------------|----------|---------------|---------|
| DATE     | ITEM           | NGR-3000 | GPS NAVIGATOR | SIZE A4 |
| APPROVAL | SCALE          | N/S      | UNIT mm       | mm      |
| CHECKED  |                |          |               | mm      |
| DRAWING  |                |          |               | mm      |
| DWG NO.  | NGR3000-ID-001 |          |               |         |

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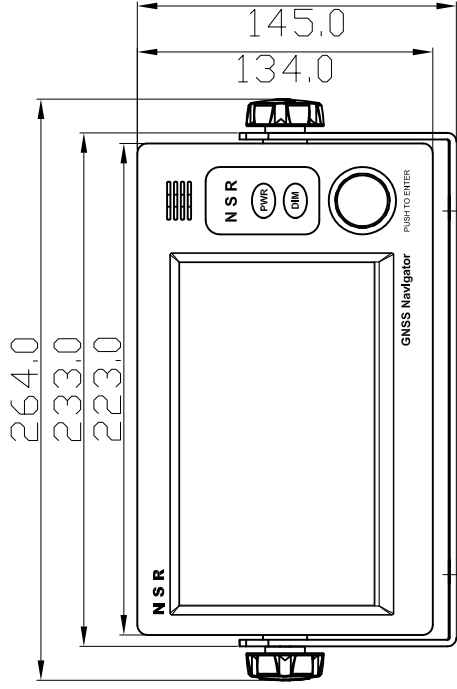


APPLICATION  
NGR-1000/NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM

|          |                |          |         |            |         |
|----------|----------------|----------|---------|------------|---------|
| DATE     | ITEM           | NGR-3000 | GPS     | NAVIGATION | SIZE A4 |
| APPROVAL | SCALE          | N/S      | UNIT mm | mm         | mm      |
| CHECKED  |                |          |         |            |         |
| DRAWING  |                |          |         |            |         |
| DWG NO.  | NGR3000-ID-002 |          |         |            |         |

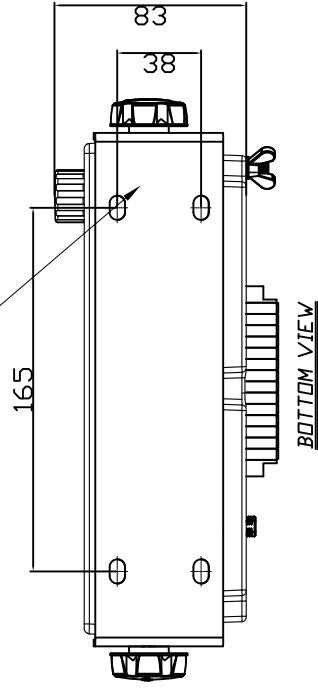
**NSR** **NEW SUNRISE CO., LTD.**  
marine

-----  
YARD SUPPLIED OR OPTIONAL

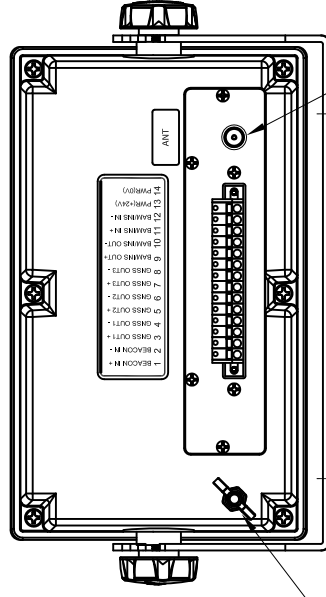
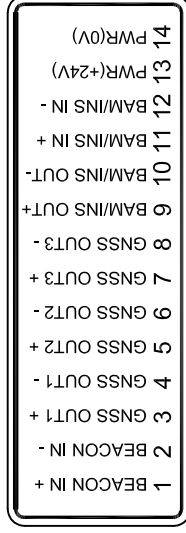


FRONT VIEW

4-7x11 SLOT, FITTING HOLE



BOTTOM VIEW



REAR VIEW

NOTE

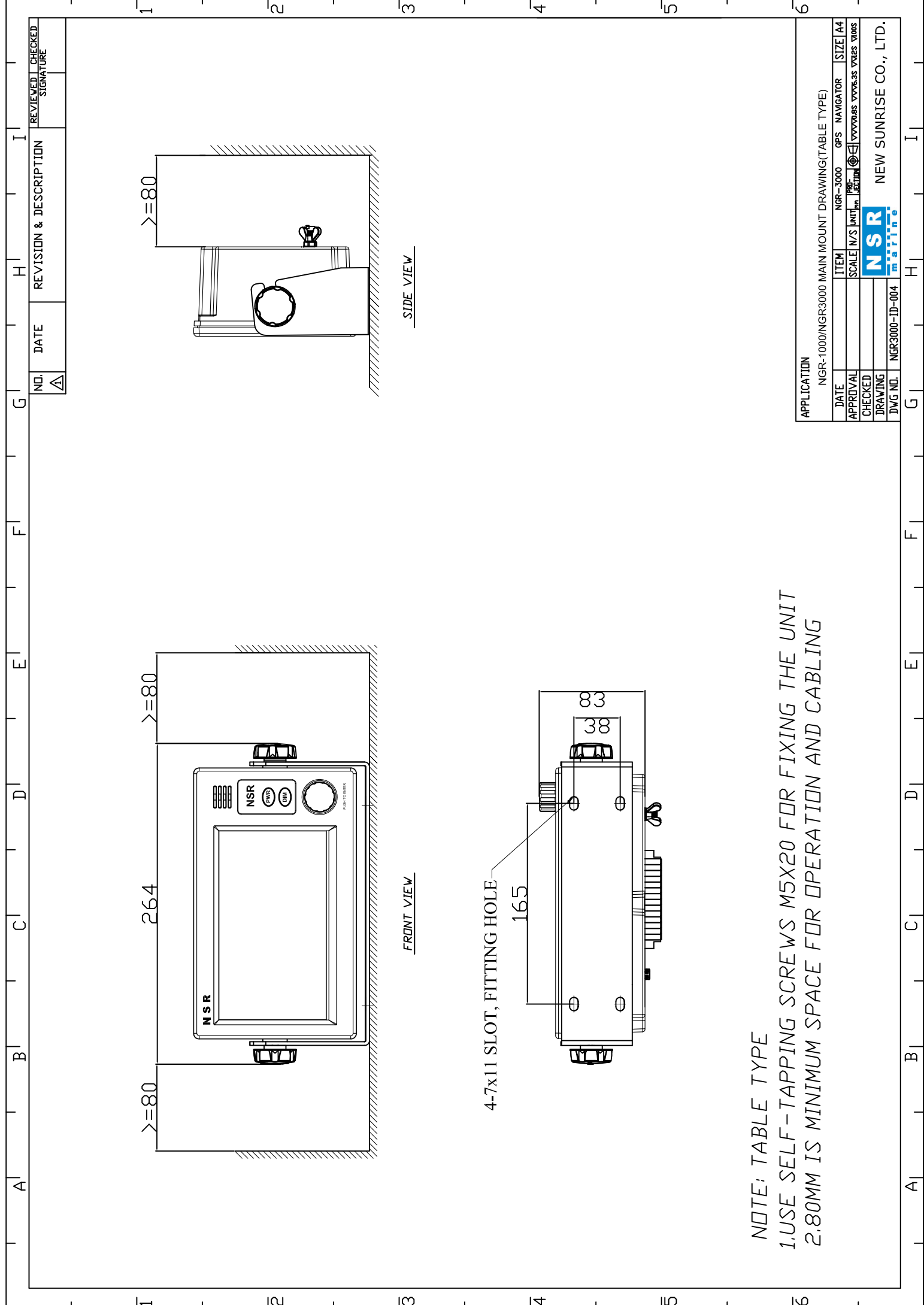
1. FITTING HOLE SIZE= 165\*38-7φ SLOT HOLE

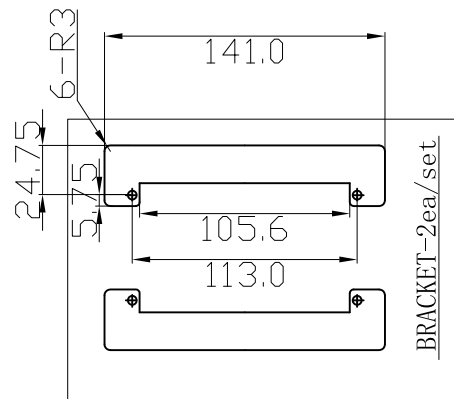
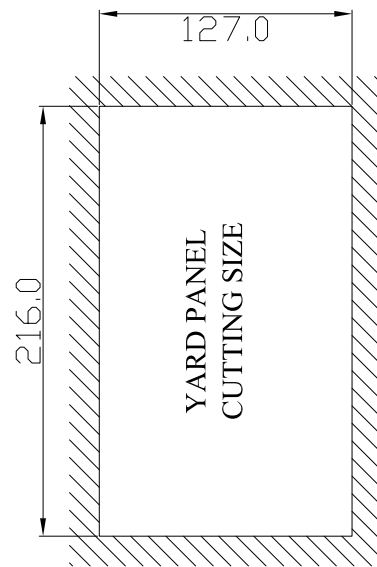
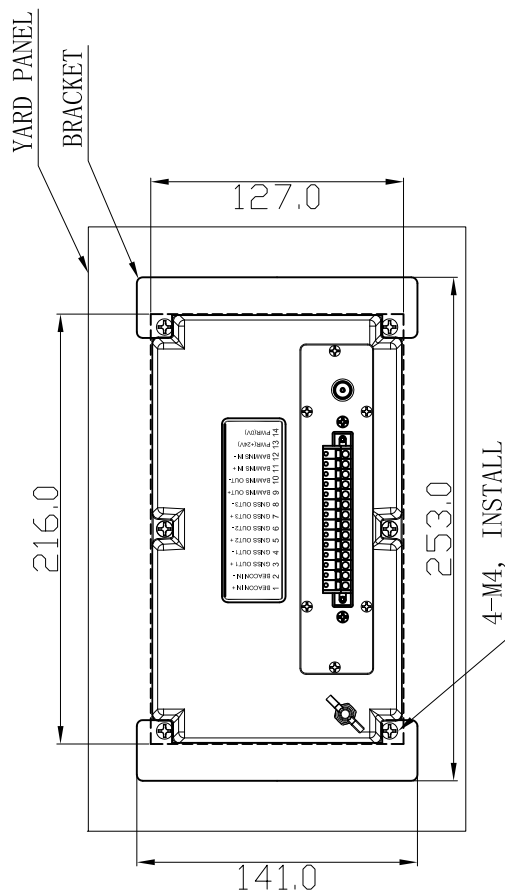
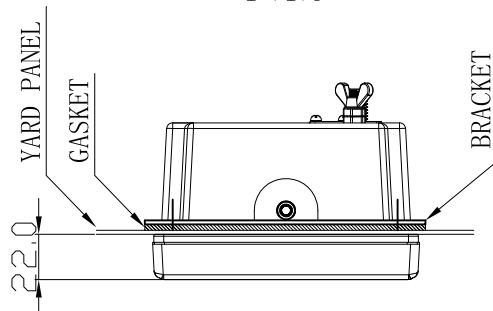
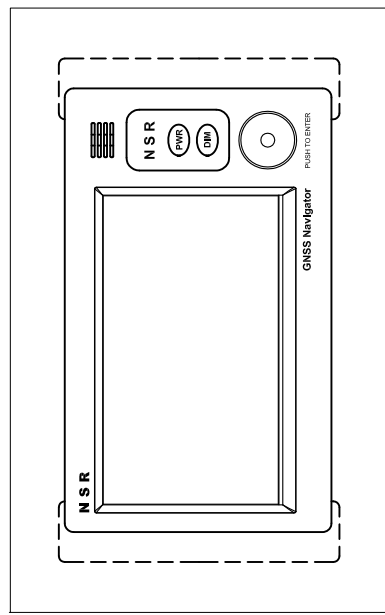
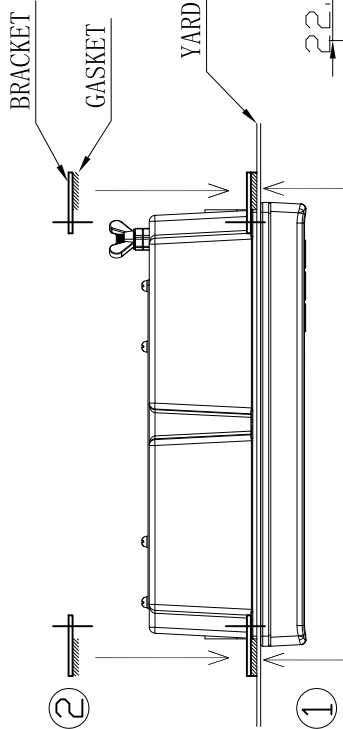
APPLICATION

NGR-1000/NGR-3000 MAIN UNIT DIMENSION DRAWING

| DATE     | ITEM           | NGR-3000 | GPS  | NAVIGATION | SIZE | A4 |
|----------|----------------|----------|------|------------|------|----|
| APPROVAL | SCALE          | N/S      | UNIT | mm         | mm   | mm |
| CHECKED  |                |          |      |            |      |    |
| DRAWING  |                |          |      |            |      |    |
| DWG NO.  | NGR3000-ID-003 |          |      |            |      |    |

**NSR**  
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NOTE:  
FLUSH MOUNT TYPE

#### APPLICATION

NGR-1000/NGR-3000 MAIN UNIT MOUNT DRAWING (FLUSH TYPE)

| DATE     | ITEM           | NGR-3000 | GPS  | NAVIGATOR | SIZE | A4 |
|----------|----------------|----------|------|-----------|------|----|
| APPROVAL | SCALE          | N/S      | UNIT | mm        | mm   | mm |
| CHECKED  |                |          |      |           |      |    |
| DRAWING  |                |          |      |           |      |    |
| DWG NO.  | NGR3000-ID-005 |          |      |           |      |    |

NSR

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|             |                |                                                                                     |          |        |         |
|-------------|----------------|-------------------------------------------------------------------------------------|----------|--------|---------|
| APPLICATION |                | NGR-1000/NGR-3000 GNSS ANTENNA MOUNT DRAWING                                        |          |        |         |
| DATE        |                | ITEM                                                                                | NGR-3000 | GPS    | SIZE A4 |
| APPROVAL    |                | SCALE                                                                               | N/S      | 1:1000 |         |
| CHECKED     |                |  |          |        |         |
| DRAWING     |                | NEW SUNRISE CO., LTD.                                                               |          |        |         |
| DWG NO.     | NGR3000-ID-006 |                                                                                     |          |        |         |

## **APPENDIX V    DOC**



## NEW SUNRISE CO., LTD.

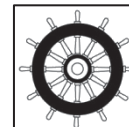
No.79, Chunlan Road, Huangdai High-tech Park, Xiangcheng District, Suzhou, China

Tel:+86 512 66733733

Web: www.nsrmarine.com

Fax:+86 512 66730261

# Declaration of Conformity



0098/2021

We

**NEW SUNRISE CO., LTD.**

(Manufactory)

No.79, Chunlan Road, Huangdai High-tech Park, Xiangcheng District, Suzhou, China 215143

(Address)

hereby declare under our sole responsibility that the product

**NGR-3000**  
**GPS equipment**

(Product)

Item No.: MED/4.14.

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

Regulations

Testing standards

SOLAS 74 as amended,

Regulations V/18, V/19 & X/3,

IMO Res. A.694(17),

IMO Res. MSC.36(63),

IMO Res. MSC.97(73),

IMO Res. MSC.112(73),

IMO Res. MSC.191(79),

IMO Res. MSC.302(87)

IEC 60945 (2002) incl. IEC 60945 Corr. 1 (2008),

IEC 61108-1 Ed. 2.0 (2003),

IEC 61162-1 ed5.0 (2016-08), IEC 61162-2 ed1.0 (1998-09),

IEC 61162-3 ed1.2 Consol. with am1 ed. 1.0 (2010-11) and am2

ed. 1.0 (2014-07),

IEC 61162-450 ed1.0 (2011-06),

IEC 62288 Ed. 2.0 (2014-07)

IEC 62923-1 (2018), IEC 62923-2 (2018)

(Regulations)

For assessment, see

Type-Examination (Module B) certificate

**No. MEDB000033R**

issued by

**DNV&GL**

Type-Examination (Module D) certificate

**No. MEDD000021U**

Issued by

**DNV&GL**

We hereby declare that the product complies with the Directive 2014/90/EU and regulation (EU) 2020/1170.

On behalf of NEW SUNRISE Co., Ltd.



Place

Suzhou, China

Name

Wang Zhi Ping

Date

July 16, 2021

Position

QA Manager

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[info@nsrmarine.com](mailto:info@nsrmarine.com)

July, 2021