USER MANUAL

Transmitting Heading Device THD (GNSS method)

GNSS EQUIPMENT

NGC-3000

NGC-3000 UM.E 20260110-08

NOTICE TO USERS

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- Please read this manual carefully to ensure proper use before installation and use of the product.

- Please keep the manual for your future reference.

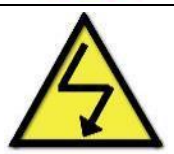
MODIFY RECORD

No	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2020/04/02		01	First edition
2	Q/A	2021/09/30	All	02	General modification
3	Q/A	2022/07/20	All	03	General modification
4	Q/A	2024/10/15	All	04	General modification
5	Q/A	2025/03/04	All	05	Some modification
6	Q/A	2025/07/05	6, Appendix II	06	Compass safe distance modification
7	Q/A	2025/08/29	6.4, Appendix IV	07	Drawings modification
8	Q/A	2026/01/10	All	08	Some modification

VERSION COMPARISON TABLE

Manual Version	Program Version	Remarks
20250829_07	NGC-3000 v1.33, 2024/12/23	
20260110_08	NGC-3000 v2.02, 2025/12/25	

SAFETY INSTRUCTIONS FOR THE OPERATOR

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

SAFETY INSTRUCTIONS FOR THE INSTALLER

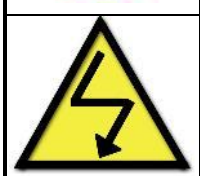
	**Warning** Connect the earthing cord to ship's body. Observe the compass safe distance to prevent deviation of an onboard magnetic compass.
	**Prohibited** Don't open the equipment unless you have fully understood the structure and circuits of the equipment. Only qualified personnel should work inside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

TABLE OF CONTENTS

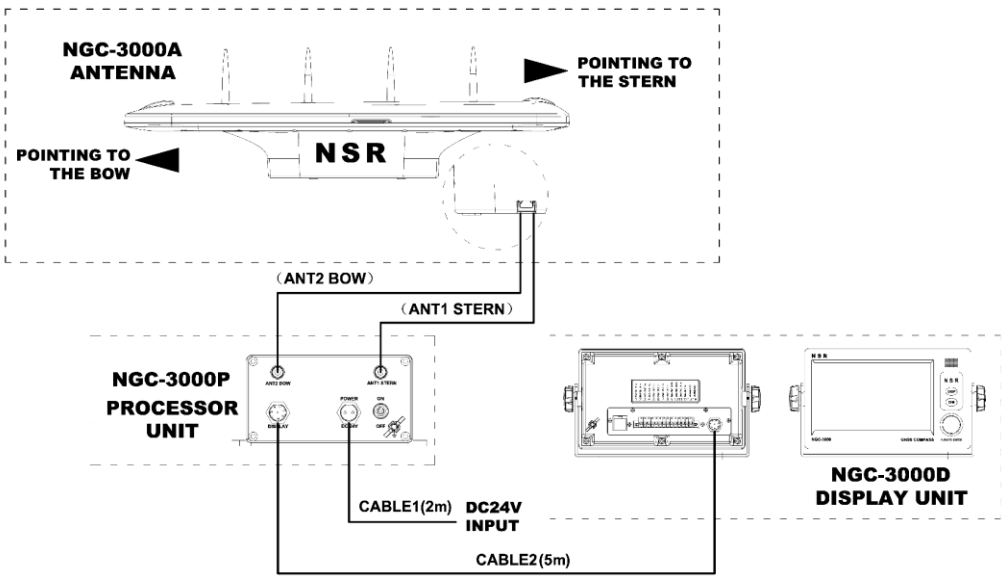
1. PRODUCT FEATURES

NGC-3000 THD (GNSS) uses signals from GNSS satellites to determine the heading of a ship and the position, course, and speed of the ship.

The main features of NGC-3000 are:
- Highly accurate heading of 0.4 °RMS.
- Full GNSS with GPS, BDS, GLONASS, GALILEO, QZSS.
- Both THD (transmitting heading device) and GNSS (GPS).
- Large LCD, 7-inch/color, touch screen operation.
- Highly accurate SOG, COG, ROT and position.
- Multi outputs of RS422.
- Data interface to BAM System/INS.
- Up to five display modes available.
- Maintenance-free design.

The product is compliant with IMO MSC.116 (73) for THD (transmitting head device), and IMO MSC.112 (73) for GNSS (GPS) receiver.

NGC-3000 consists of a processor unit, a display unit and an antenna unit.
The system diagram is as follows:



EQUIPMENT LIST:

No.	Name	Q'ty	Part No.	Description
1	NGC-3000P / Processor Unit	1	N992730	
2	NGC-3000D / Display Unit	1		
3	NGC-3000A / Antenna Unit	1		
4	Installation Materials			
4.1	Insulation Tape	1		
4.2	Waterproof Tape	1		
4.3	Mounting Brackets for Antenna Unit（A&B）	1		
4.4	Clamp for Antenna Unit	2		
4.5	M4*10 Combination Screw (for Mounting Bracket)	4		
4.6	Grounding Copper Braided Line 1m (for Processor Unit & Display Unit)	2		
4.7	SYV50-5 Cable 20m	2		
4.8	Power Cable 2m (Processor Unit)	1		
4.9	Connection Cable 5m (Display Unit & Processor Unit)	1		
4.10	Self-tapping Screws (for Processor Unit and Display Unit)	8		
5	Options			
5.1	NFB700A / Flush Mount Bracket for Display Unit	1	N561070	

2. BASIC OPERATION

2.1 Power on the Equipment

Both the processor unit and display unit can be powered on or off with the power switch on the rear panel of the processor unit.

2.2 Indicators on Processor Unit Panel

- **PWR**: The red light will be on when the processor unit is powered on.
- **TX**: The green light will flash when the processor unit transmits data. Normally, it flashes always.
- **RX**: The green light will flash when data is received from the display unit. It flashes only when the setting is being done at the display unit.

2.3 Display Unit Description

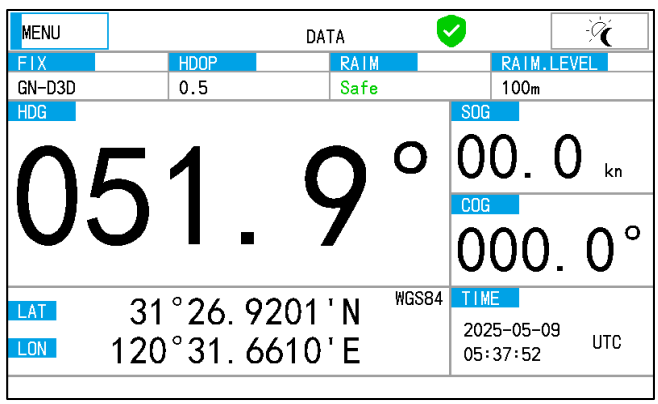
NGC-3000D display unit can be operated with key & knob on the panel or the touch-screen.

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

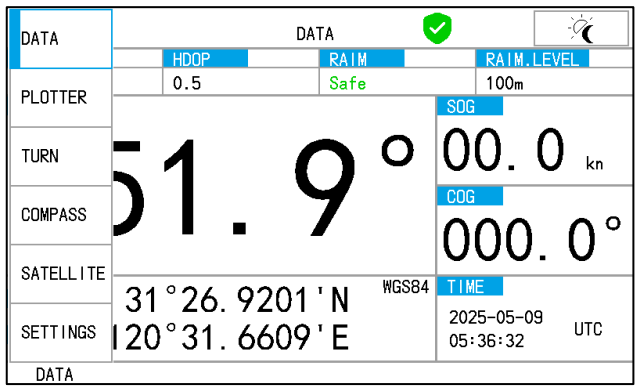
Panel Button	Description
PUSH TO ENTER	Turn to select an item. Press to confirm the selection or input.
PWR	Press and hold: turn off/on the display unit. Press shortly: back to the display screen from the setting menu.
DIM	Press to change the LCD brightness.
Touch-screen Button	**Description**
MENU	Enter to display different modes.
	Change day/night mode.

2.4 Basic Menu Operation

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



1) Click **MENU** to display the modes and settings.



2) Turn **PUSH TO ENTER** knob and press the knob to confirm the selection or click directly to select an item on the screen.

2.5 Display Modes

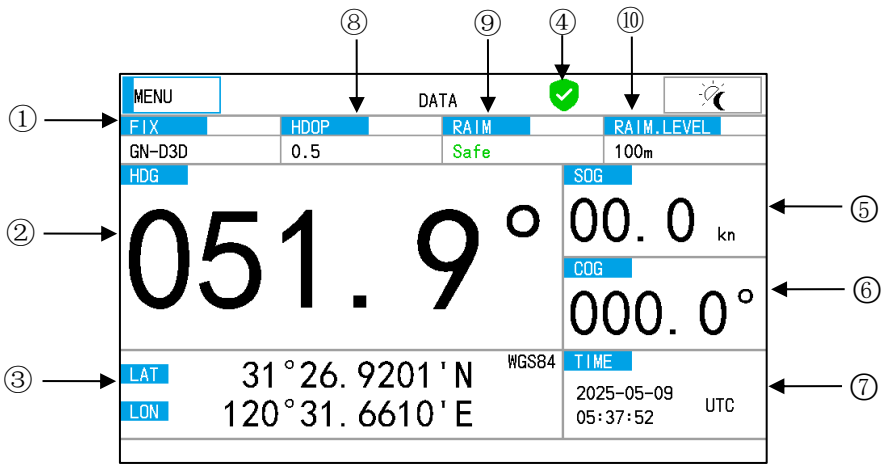
There are five display modes: Data, Plotter, Turn, Compass, and Satellite.

Click **MENU** button on the screen to select a display mode.

Press **PWR** button shortly to return to the display mode when you are in the setting menu.

2.5.1 Data Display

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



No	Item	Symbol	Remark
①	Fix Mode	GN- 3D/GP-D3D…	GN: All modes GP: GPS only mode BD: BDS only mode
②	heading	HDG	
③	Position in LAT & LON		
④	Alarm Icon		Display the highest priority alarm icon, refer to Section 4.3
⑤	Speed over Ground	SOG	
⑥	Course over ground	COG	
⑦	Time	UTC/LMT	GNSS Time
⑧	Horizontal Dilution of Precision	HDOP	
⑨	Receiver Autonomous Integrity Monitoring	RAIM	Safe/unsafe/caution
⑩	Accuracy Level for RAIM		10-100m

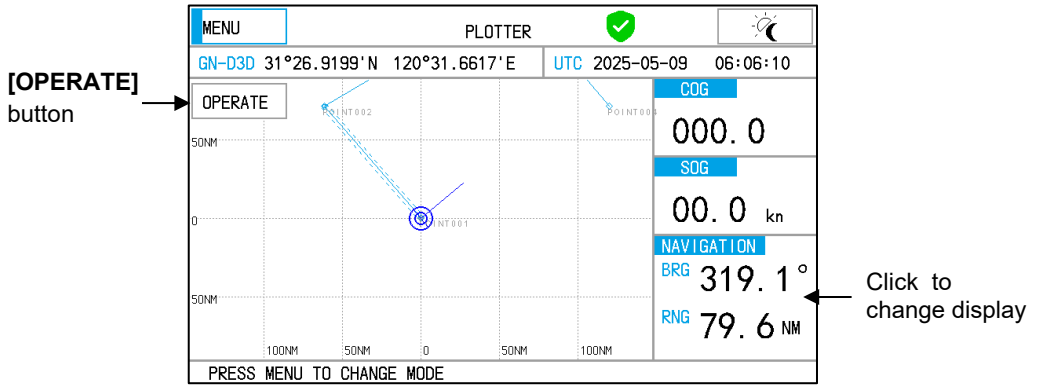
Basic data will be displayed in this mode, including heading, position in latitude and longitude, COG, SOG, date and time.

NGC-3000 takes about 60 seconds to fix heading at a cold start. After fixing, the accurate heading appears on the display. If heading could not be found, “loss of heading” will be generated.

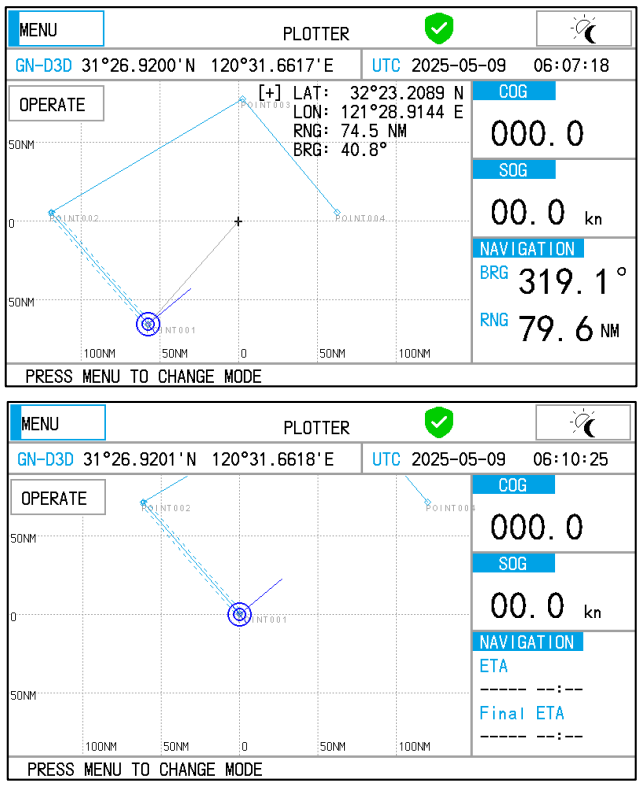
Note: *You can click HDG box to zoom out the heading info, click the position box to exchange the display of heading and position.*

2.5.2 Plotter Display

The Plotter display traces own ship’s track, shows position, heading, speed, and set display range.



Click any point to view the coordinates.

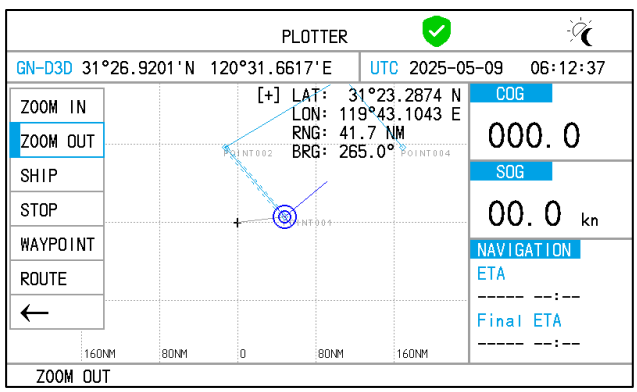


You may increase or decrease the display range on the Plotter display. The range in the Plotter display is available among 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 40, 80, 160 and 320 nautical miles.

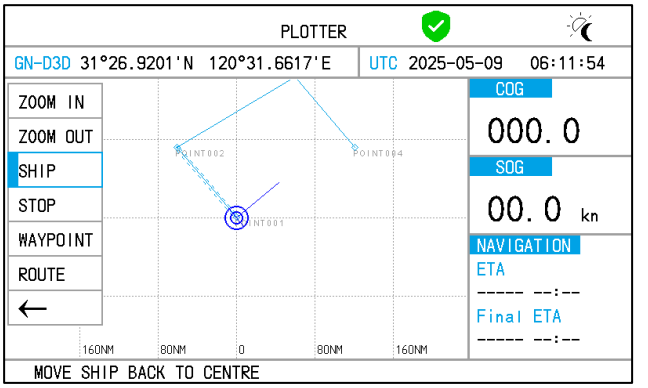
1) Click **[OPERATE]** button. The pop-up menu appears.

2) Click **[ZOOM IN]** or **[ZOOM OUT]** to select the range desired.

3) Click on any blank space to finish.

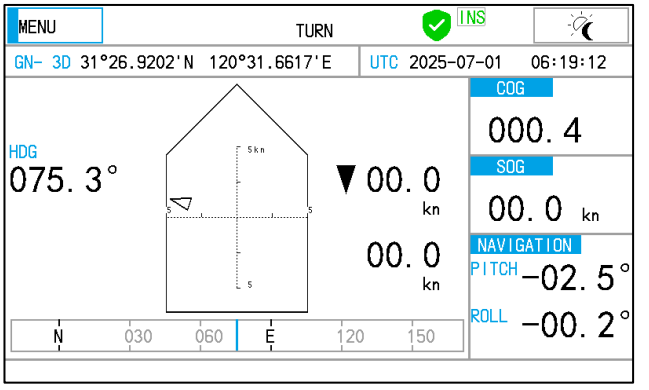


Click **[SHIP]** to keep the ship in the center.



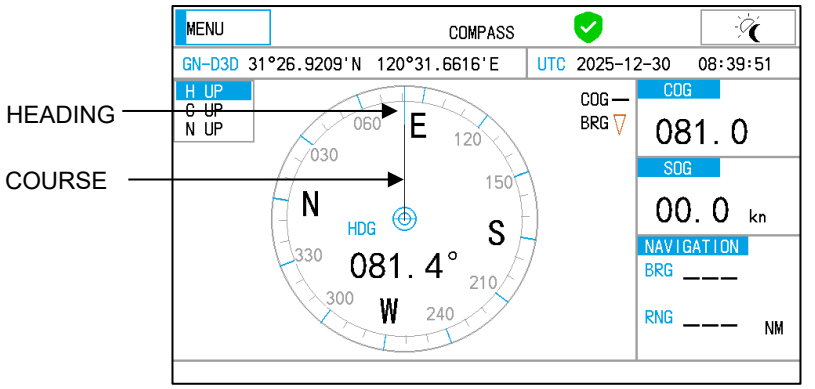
2.5.3 Turn Display

The turning display mainly shows longitudinal and transverse speed.



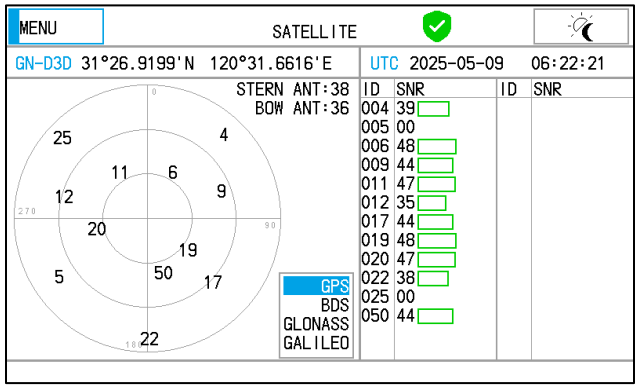
2.5.4 Compass Display

The compass display mainly shows the navigation direction of the ship, and you can see the heading (blue line) and course (gray line) of the ship. Choose heading up, COG up, and North up by clicking the box in the upper left corner.



2.5.5 Satellite Display

The Satellite display shows satellites currently tracked, together with the SNR of receiving signals. SNR greater than 40 is good.



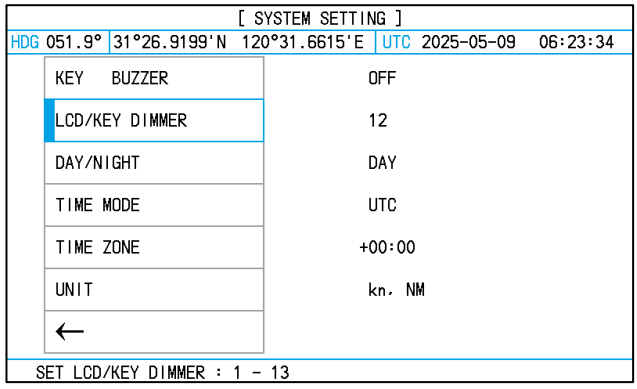
Click 

to switch among different systems.

2.6 Adjust Brightness

There are two ways to adjust the brightness.

- Press **DIM** button to adjust the brightness by 13 steps.
- Click **MENU** button on the screen, choose **[SETTINGS]**, and adjust the brightness in **[SYSTEM SETTING]** by clicking **[LCD/KEY DIMMER]**.



Note:

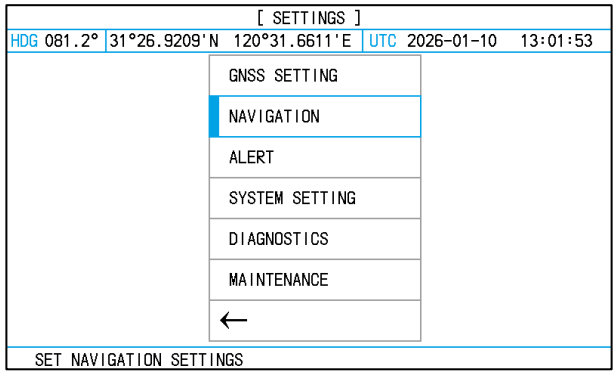
When the power is turned off, the last status of brightness is stored. Therefore, when the power is turned on next time, the screen will display with the last brightness before powered off.

3. NAVIGATION PLANNING

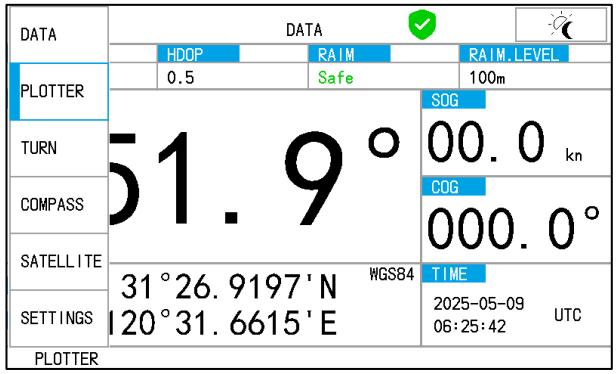
Often a trip from one place to another involves several course changes, requiring a series of waypoints that you navigate to, one after another. The sequence of waypoints leading to the ultimate destination is called a route. NGC-3000 can automatically advance to the next waypoint on a route, so you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

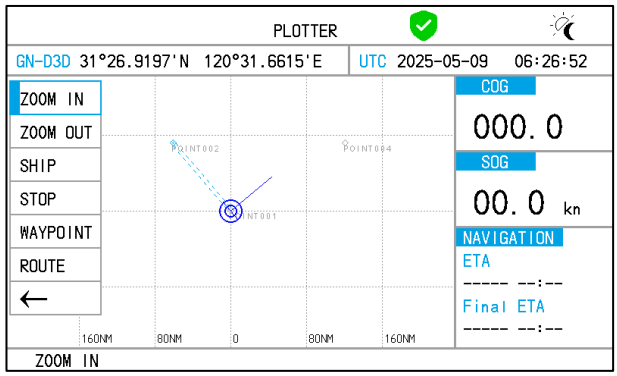
There are two ways to enter **Waypoint and Route**.

(1) Click **[NAVIGATION]** in **[SETTINGS]** to open the menu.



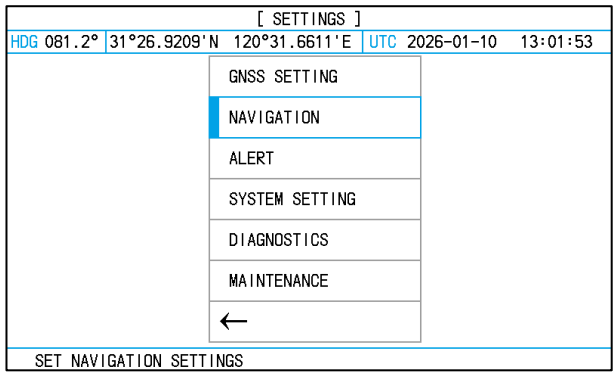
(2) Or, click [**PLOTTER]** in [**MENU]**, then click **[WAYPOINT]/[ROUTE]** in **[OPERATE]** to open the menu.



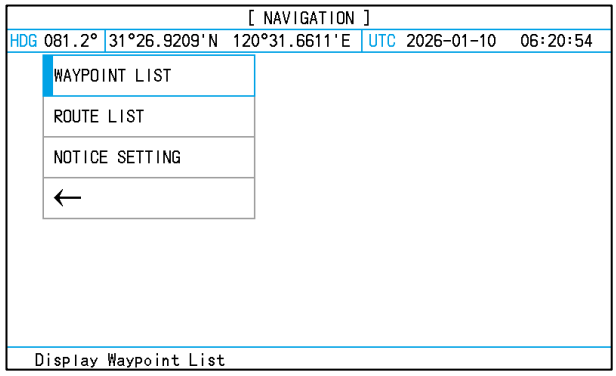


3.1 Register Waypoints

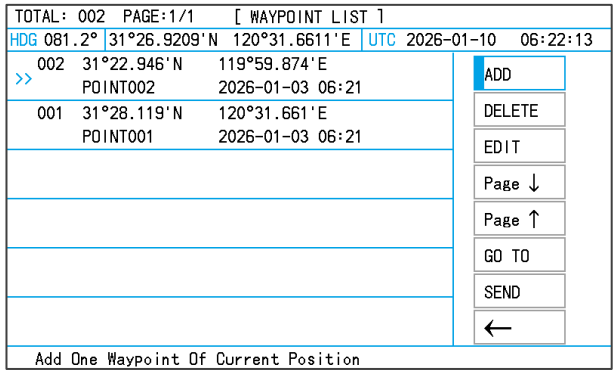
1) Click **[NAVIGATION]** in **[SETTINGS]** to open **[NAVIGATION]** menu.



2) Click **[WAYPOINT LIST]** to open the list and select the desired waypoint.



3) Select **[ADD]**, **[DELETE]** or **[EDIT]** desired.



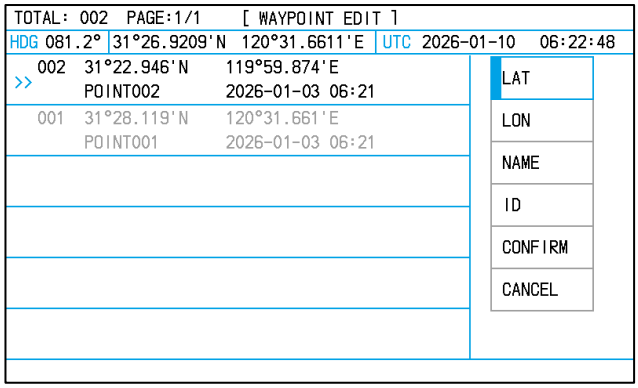
3.1.1 Add a New Waypoint

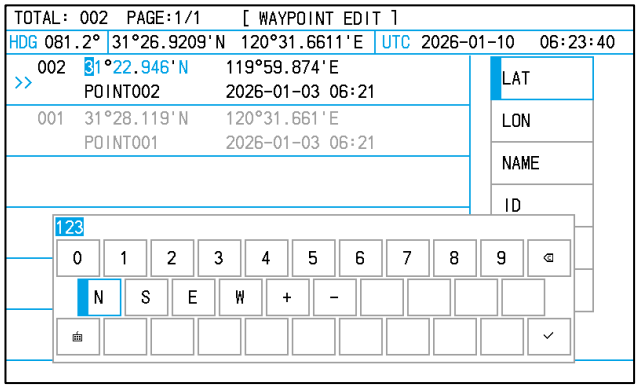
Click **[ADD]** to create a new waypoint with the position of the center in the plotter. The new waypoint will be inserted before the waypoint that is selected by the current cursor.

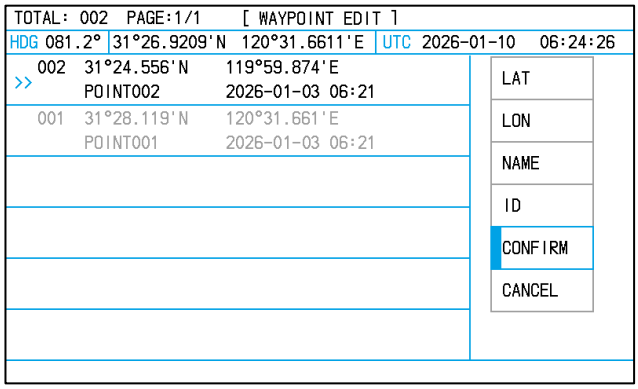
3.1.2 Edit a Waypoint

Edit the selected waypoint.

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

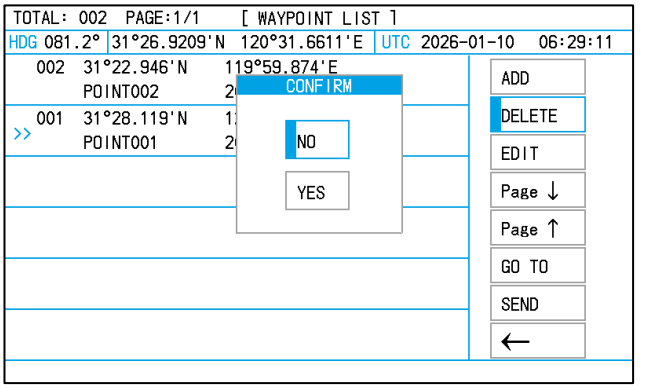






3.1.3 Delete a Waypoint

Click **[DELETE]** to delete the selected waypoint.
Click **[YES]** to confirm the deletion.



3.1.4 Goto Waypoint

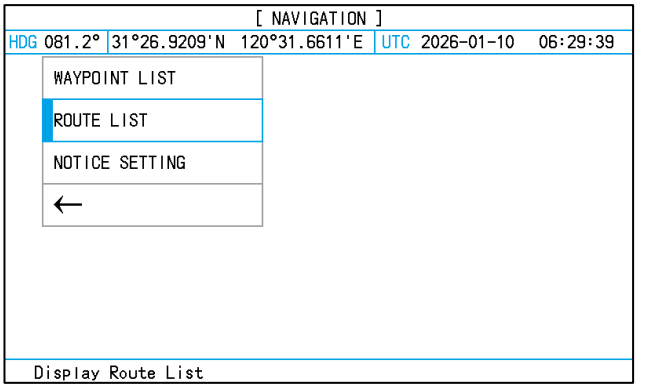
Click **[GOTO]** to navigate to the selected waypoint.

3.1.5 Send Waypoint

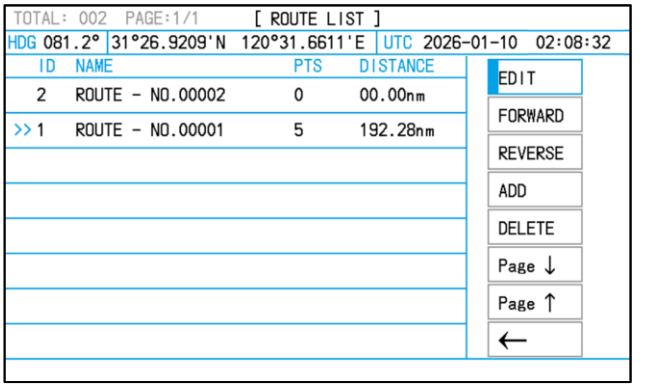
Click **[SEND]** to output the selected waypoint.

3.2 Route Planning

1) Click **[ROUTE LIST]** to select the route desired.

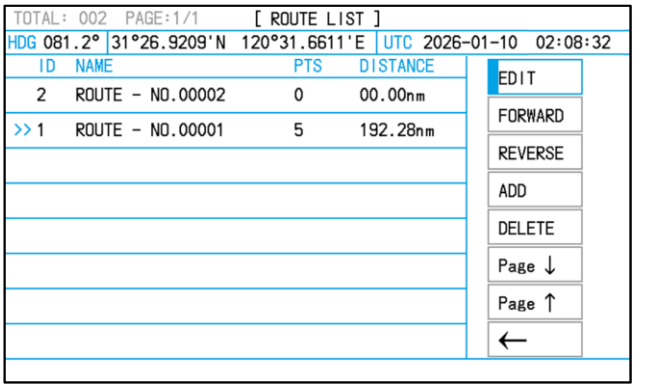


2) Click **[EDIT]**, **[FORWARD]**, **[REVERSE]**, **[ADD]**, **[DELETE]**, **[PAGE ↓]** or **[PAGE ↑]** desired.

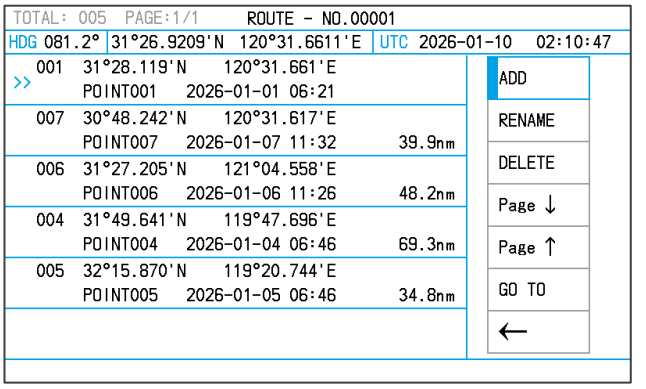


3.2.1 Edit a Route

1) Click to select a route in **[ROUTE LIST]** desired.
2) Click **[EDIT]** to edit the route.

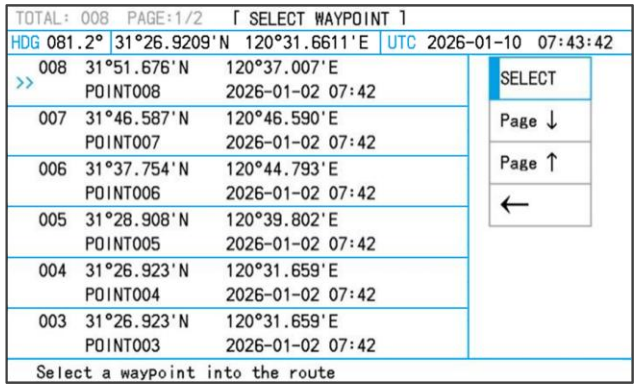


3) Select **[ADD]**, **[RENAME]**, **[DELETE]**, **[PAGE ↓]** or **[PAGE ↑]** to add, rename, or delete a waypoint in the route.



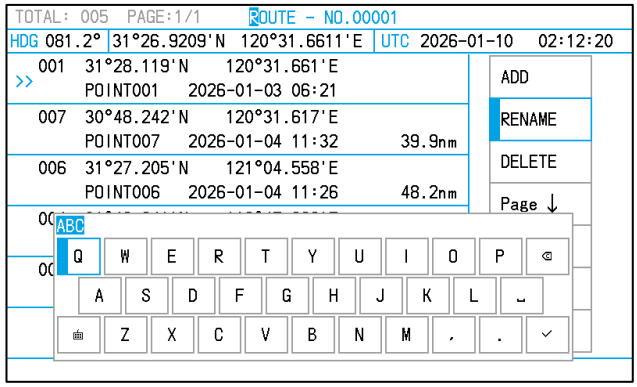
- **ADD a waypoint**

Click **[ADD]** to open **[SELECT WAYPOINT]** screen. Then select the waypoint as a new waypoint to the route.



- **RENAME the route**

1) Choose the route desired to rename and click **[RENAME]**, then the pop-up menu appears.

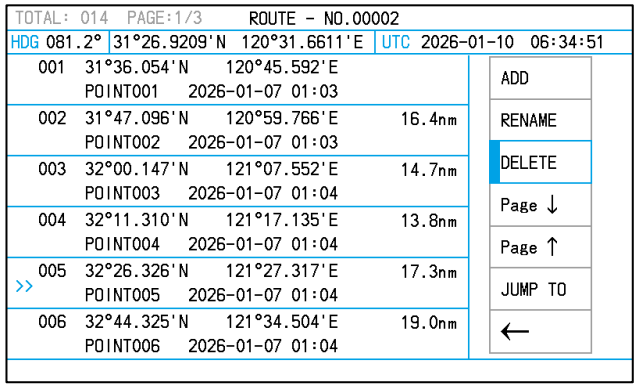


2） Click the character among **A-Z**, **0-9** desired. The route name can be made of up to 17 characters.

3） Click **[√]** to finish.

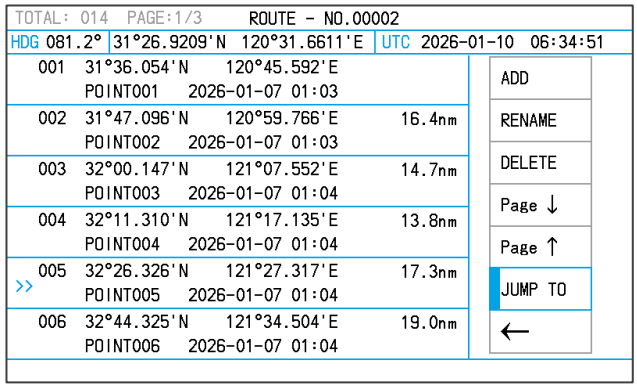
- **DELETE a waypoint**

Click **[DELETE]** to delete the selected waypoint from the route.



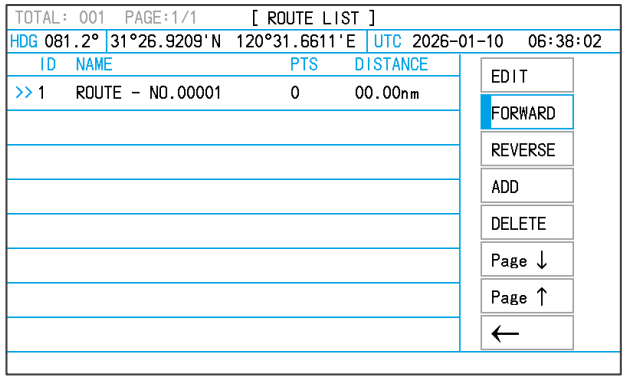
- **JUMP TO a waypoint**

Click **[JUMP TO]** to jump to the waypoint selected.



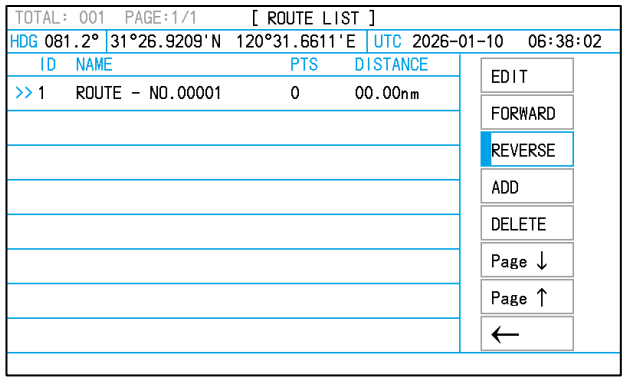
3.2.2 Forward Navigation

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



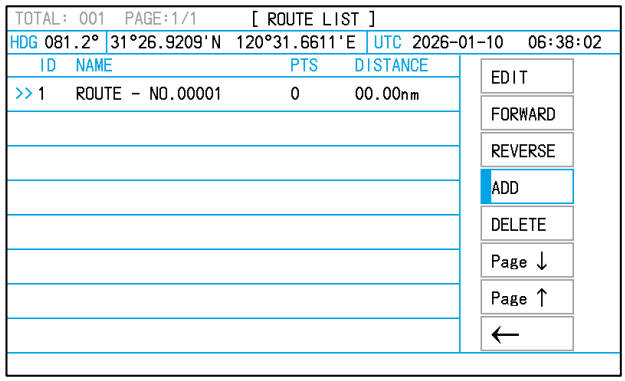
3.2.3 Reverse Navigation

Click **[REVERSE]** to start navigation in reverse. The screen will switch to the plotter page.



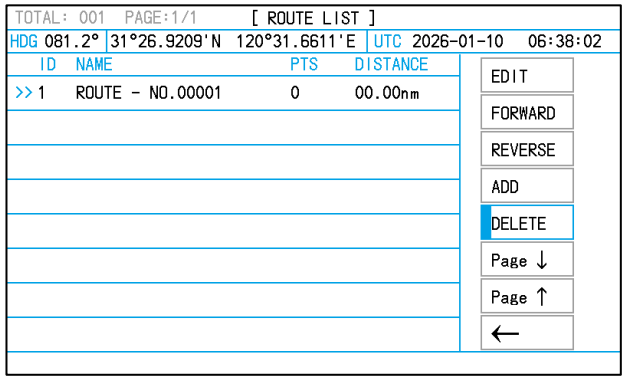
3.2.4 Create a New Route

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



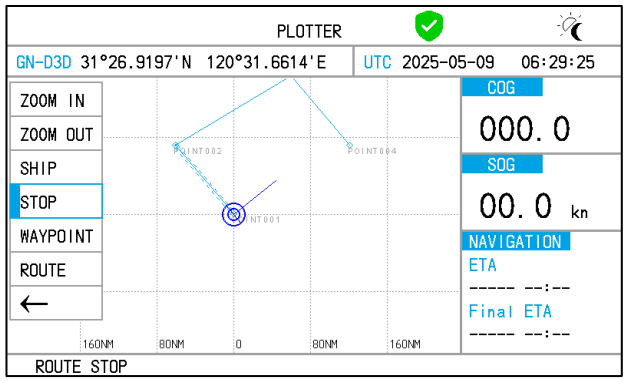
3.2.5 Delete a Route

Click **[DELETE]** to delete the selected route from the route list.



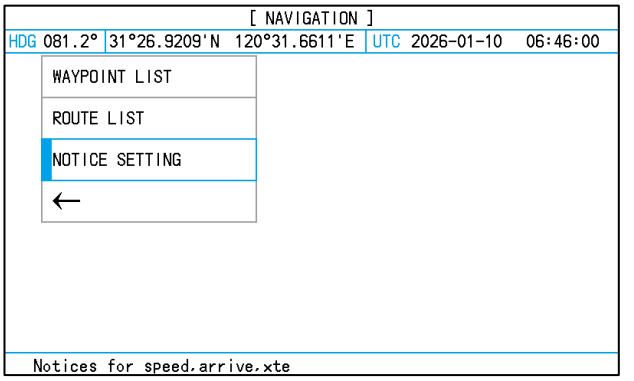
3.2.6 Stop the Navigation by the Current Route

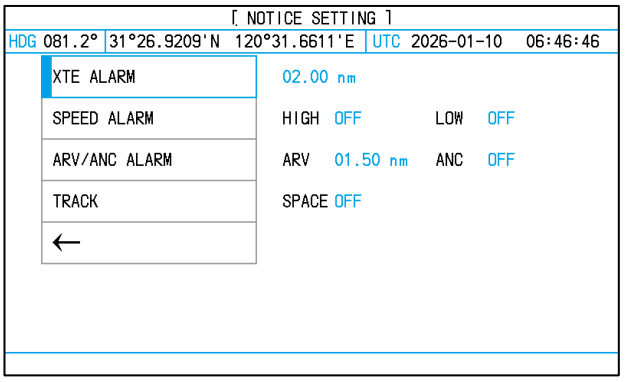
Click **[STOP]** to stop the current navigation. The route will be cleared on the Plotter display.



3.3 Notice in Navigation

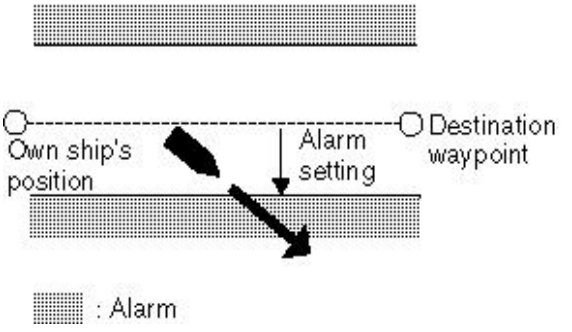
Select **[NOTICE SETTING]** in **[NAVIGATION]** to open the menu.

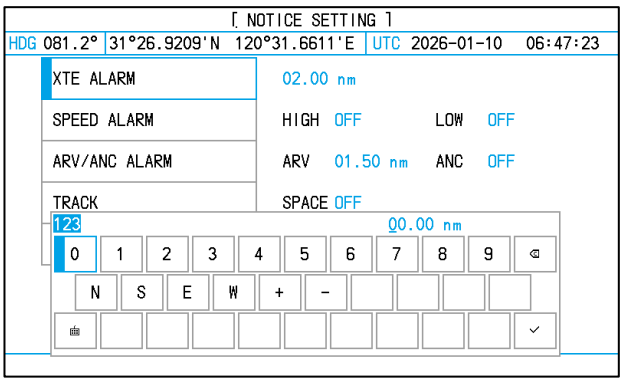




3.3.1 XTE (Cross Track Error) Alarm

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



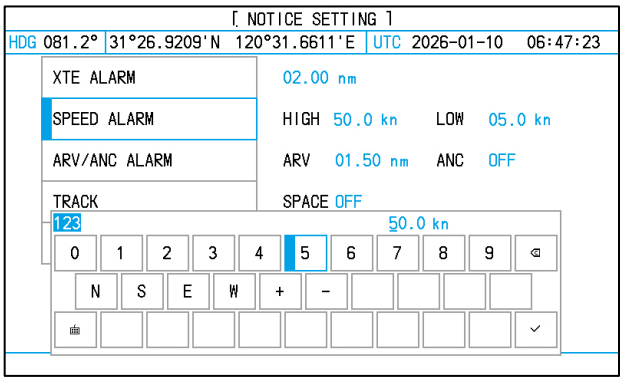


1) Click the blue value field to edit.
2) Click the digits among 0-9 desired until the desired digit is got.
3) When the value is set to 0, XTE alarm will close.

3.3.2 Speed Alarm

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

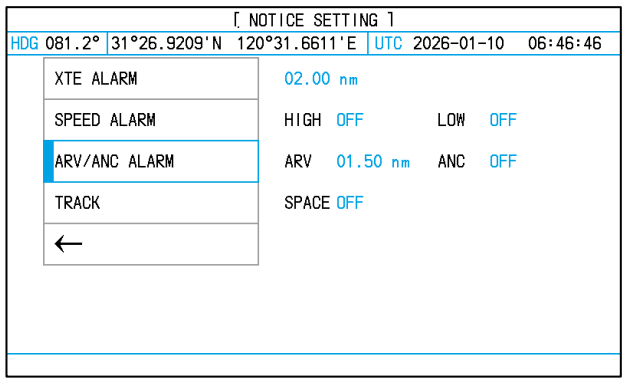
HIGH: Alarm is activated when the speed is higher than the speed set.
LOW: Alarm is activated when the speed is lower than the speed set.



1) Click **[SPEED]** value to edit.
2) Click the digits among 0-9 until the desired digit is got.
3) When the value is set to 0, the alarm will be closed.

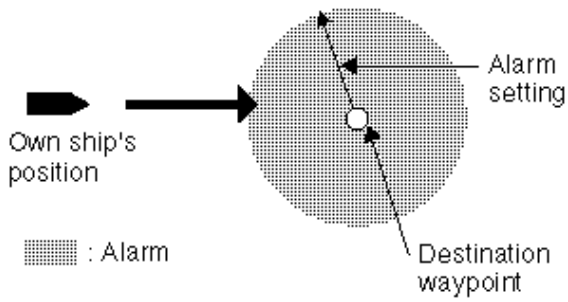
3.3.3 Arrival Alarm and Anchor Watch Alarm

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.

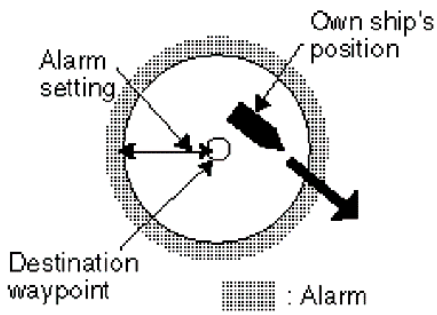


1) Select **[ARV]** (arrival) from **ARV/ANC/OFF**.
2) Click the ALARM value to edit.
3) Click the digits among 0-9 until the desired digit is got.
4) Turn the knob to move the cursor to the next digit to edit.

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 the current position as the destination.

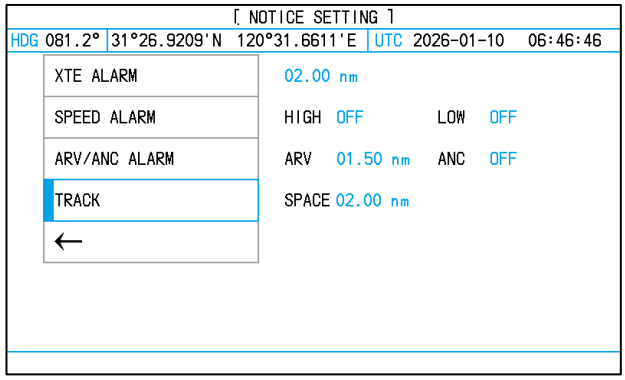
1) Select **[ANC]** (anchor) from **ARV**/**ANC**/**OFF**.
2) Click the ALARM value to edit.
3) Click the digits among 0-9 until the desired digit is got.
4) Turn the knob to move the cursor to the next digit to edit.

The alarm range is (0.01-99.99 nm).

NOTE:
The 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.

3.3.4 Track Record

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



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

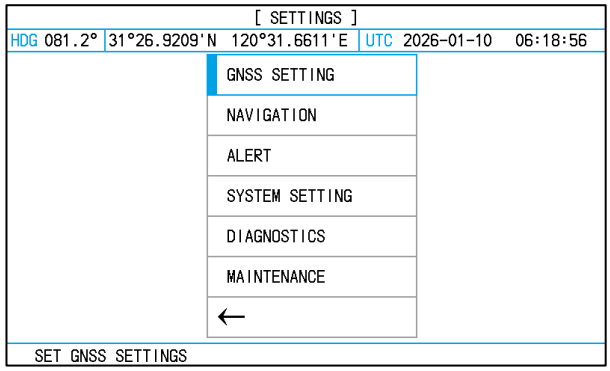
If **SPACE** is selected, the track will be recorded every a certain distance which can be configured.

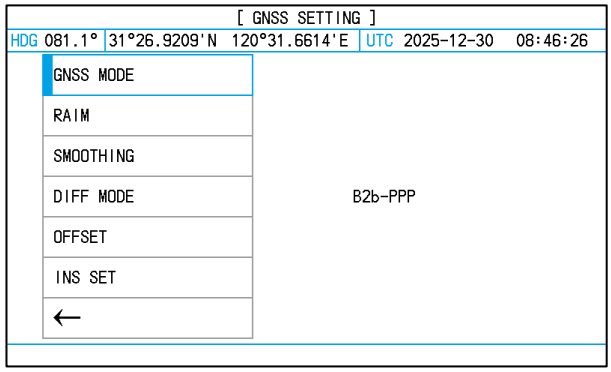
If **AUTO** is selected, the track will be recorded every minute or every certain distance which can be configured, whichever is reached first.

4. MENU SETTING

4.1 GNSS Setting

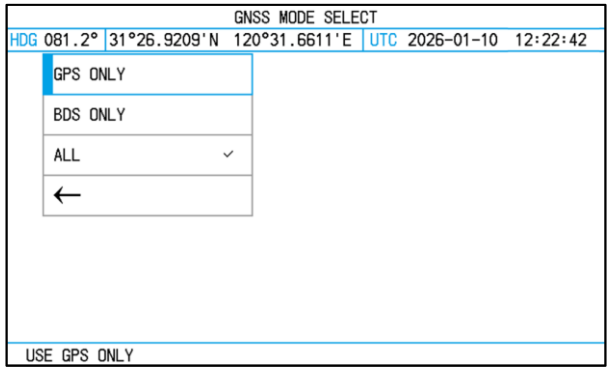
Click **MENU** button on the screen, and choose **[GNSS SETTING]** in **[SETTINGS]** to open the [GNSS SETTING] menu. It includes GNSS MODE, RAIM, SMOOTHING, DIFF MODE, OFFSET and INS SET items.





4.1.1 GNSS MODE

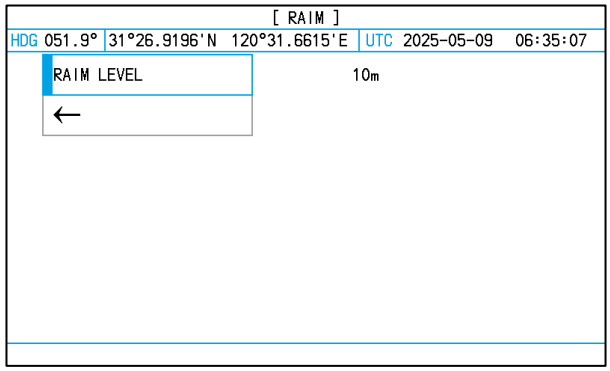
Click **[GNSS MODE]** to select the GNSS MODE, [GPS ONLY], [BDS ONLY] and [ALL] (Default) can be selected. [ALL] contains GPS, BDS, GLONASS, GALILEO and QZSS.



When equipment is used as GNSS equipment, [GPS ONLY] should be selected.
When equipment is used as THD, [ALL] should be selected.

4.1.2 RAIM

Click **[RAIM]** to open **[RAIM]** menu. And **RAIM LEVEL** (Receiver Autonomous Integrity Monitoring Level) can be set in the range from 10 to 100m.



RAIM will display SAFE, UNSAFE or CAUTION in the following conditions:

- **Conditions for the "safe" state**
  The result of the 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 %.

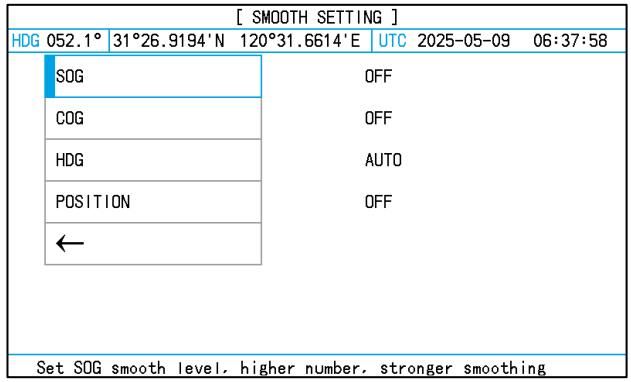
  Those conditions may occur if an insufficient number of satellites are available, for example, 4 or 5 with 2 satellites "close" together in azimuth and elevation, causing the geometry to degrade to the point that the RAIM calculation becomes unreliable. Note that the resulting accuracy based on 4 or 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.

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

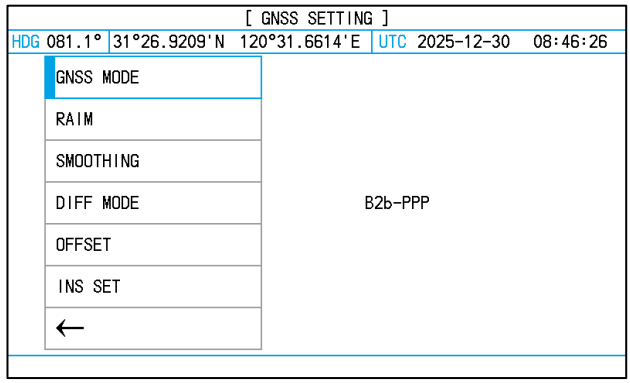
4.1.3 Smoothing

Set the smooth level of SOG, COG, HDG and position.



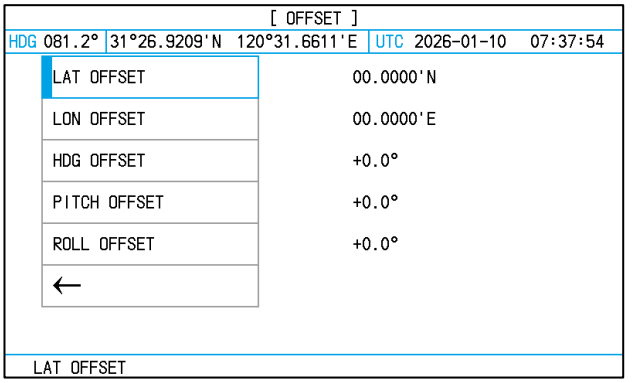
4.1.4 Diff Mode

Diff Mode: When the system is configured in BEACON mode, it may use the differential signal of the DGPS Beacon, which connects to the BEACON IN port. The system will raise an alert “DGNSS Lost” if the condition of loss of differential signal occurs.
Click **[DIFF MODE]** directly to set [B2b-PPP], [BEACON] or [OFF].



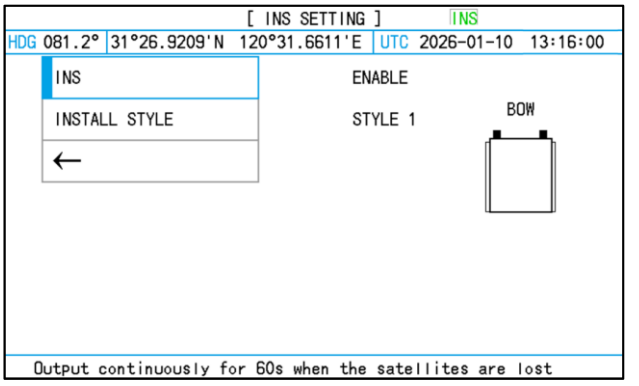
4.1.5 Offset

Change the offsets of latitude (LAT), longitude (LON), HDG, PITCH and ROLL.



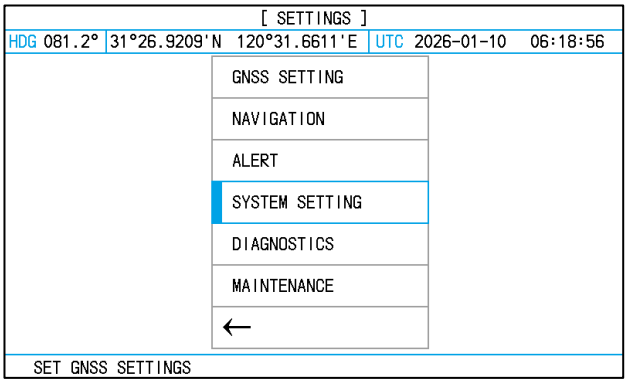
4.1.6 INS Set

[INS] function can be set to [ENABLE] and [DISABLE]. Refer to the schematic diagram to set the installation style. Please note that excessive deviations in the installation angle setting will lead to large errors in heading, pitch and roll data.



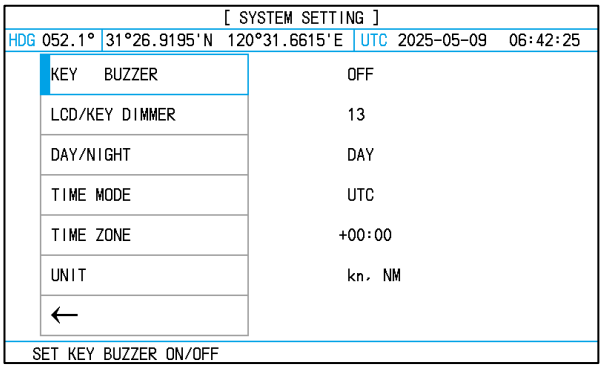
4.2 System Setting

Click **MENU** button on the screen, and choose **[SYSTEM SETTING]** in **[SETTINGS]** to open [**SYSTEM SETTING**] menu. It includes KEY BUZZER, LCD/KEY DIMMER, DAY/NIGHT, TIME MODE, TIME ZONE and UNIT items.



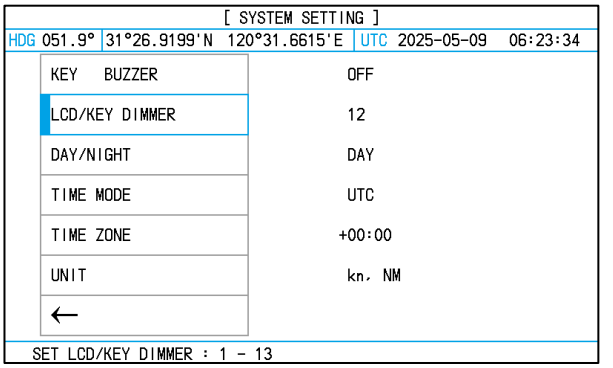
4.2.1 Key Buzzer

The buzzer can be muted so that the operation is not heard.



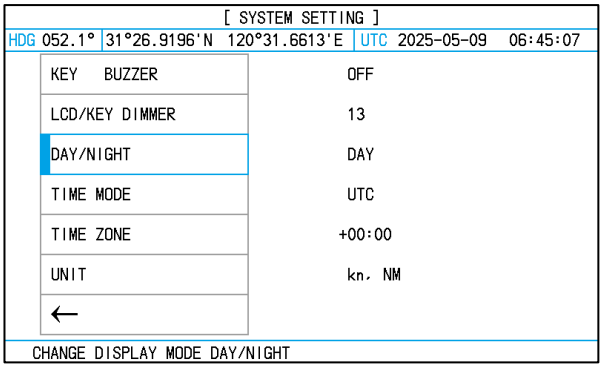
4.2.2 LCD/Key Dimmer

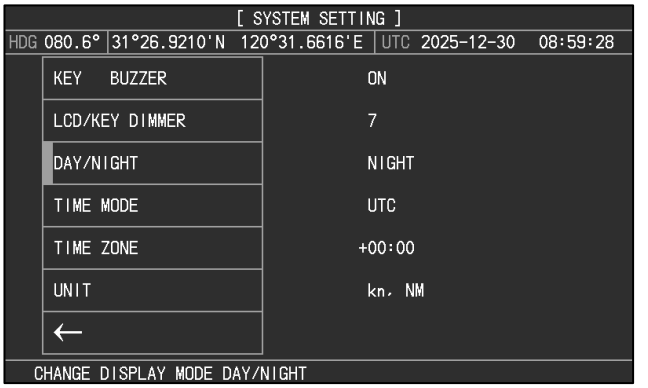
Dimmer can be adjusted either by **DIM** button or set in the menu.



4.2.3 Day/Night

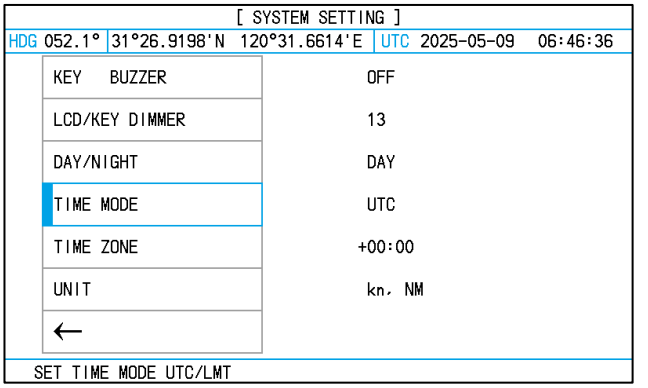
Click **[DAY/NIGHT]** or the icon at the upper right corner to change the display between day mode and night mode.





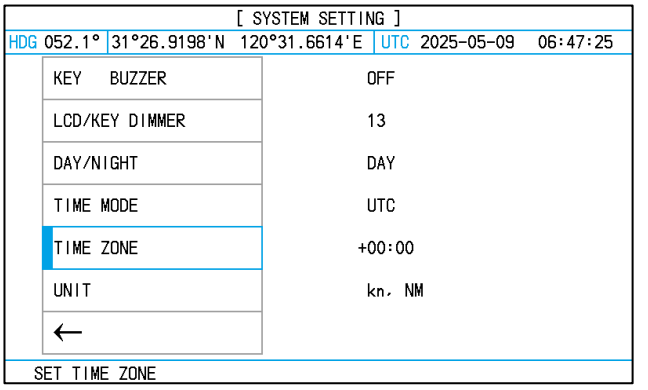
4.2.4 Time Mode

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



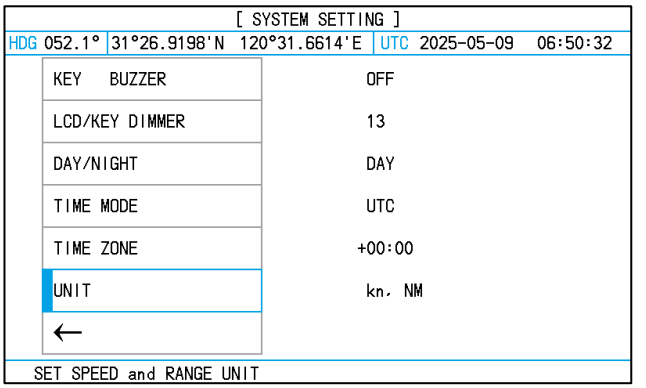
4.2.5 Time Zone

Time zone can be set by clicking from -13:00 to +13:00. Each click will increase it by 30 minutes.



4.2.6 Unit

Unit can be set as kn, NM or km/h, km.



4.3 Alert Setting

When an error occurs, an alert will display on the current screen. The meanings of the alerts are stated at the bottom of the screen.
When one of the following conditions is detected, an alert will be generated, caution will not generate an audible signal:

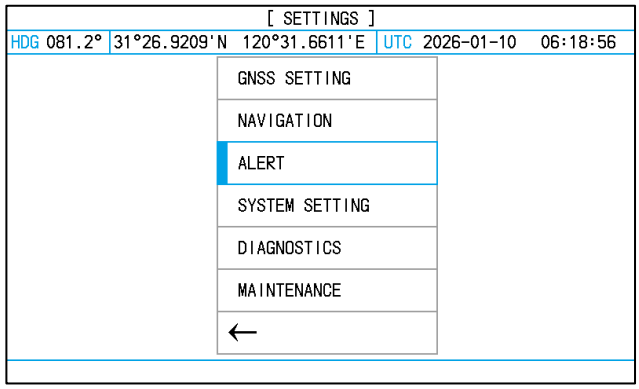
ID	Ins	Cat	Prio	Escal	Resp	Alert Title	Alert description
3056	1	B	C	/	/	HDOP exceeded	HDOP > 4.0 check antenna
3015	2	B	W	W	Yes	Loss of position	Loss of position check antenna
3055	3	B	W	W	Yes	DGNSS Lost	Loss of differential signal
3055	4	B	W	W	Yes	DGNSS off	Differential corrections not applied
3012	5	B	W	W	Yes	Integrity status	Accuracy is unsafe check antenna
3015	6	B	W	W	Yes	Loss of heading	Loss of heading check antenna
3062	7	B	W	W	Yes	System fault	Loss communication with process unit

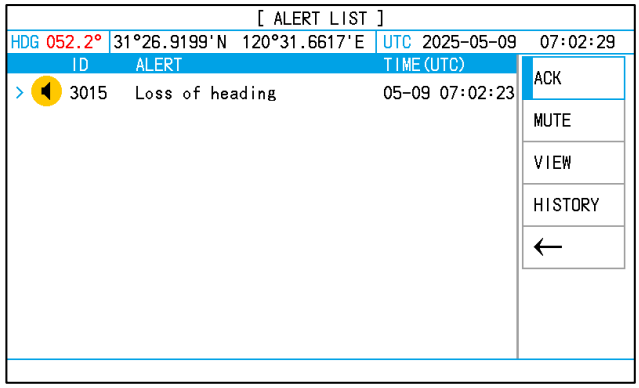
Ins: Instance of an alert;
Prio: Alert priority (W – Warning, C – Caution);
Cat: Alert category;
Escal: W – An unacknowledged warning will be repeated as a warning after 4 minutes;
Resp: Transfer responsibility: If CAM sends a Valid HBT and Responsibility transfer command ACN, O, and changes status to Responsibility transferred.
Cancel Responsibility transfer: If HBT is not received or an invalid HBT is received.
Timeout from last valid HBT for Responsibility transfer: 60 seconds

Alert mark description:

MARK	PRIORITY	STATE
	WARNING	ACTIVE-UNACKNOWLEDGED
		ACTIVE-SILENCED
		ACTIVE-ACKNOWLEDGED
		ACTIVE-RESPONSIBILITY TRANSFERRED
		RECTIFIED-UNACKNOWLEDGED
	CAUTION	ACTIVE

Click **MENU** button on the screen, choose **[ALART]** in **[SETTINGS]** to open the [**ALART SETTING**] menu. It displays the alerts for the current system. Time is synchronized when GNSS is fixed, and not synchronized when GNSS is not fixed.



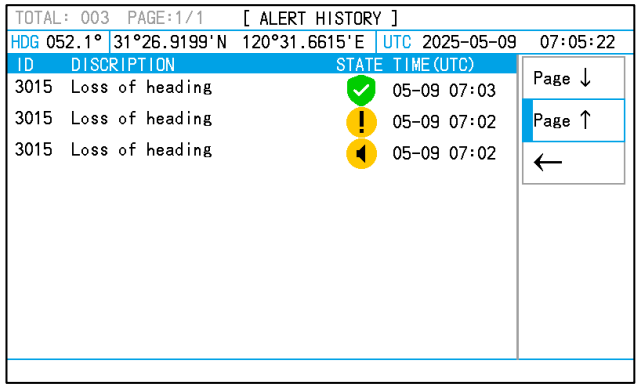


ACK: Acknowledge the alert selected.

MUTE: Make all alerts silent for 30 seconds.

VIEW: View the details of the alert selected.

HISTORY: Check the history of alerts.


TOTAL: 003 PAGE:1/1 [ALERT HISTORY]
HDG 052.1° 31°26.9199'N 120°31.6615'E UTC 2025-05-09 07:05:22
ID DISCRIPTION STATE TIME(UTC)
3015 Loss of heading 05-09 07:03
3015 Loss of heading 05-09 07:02
3015 Loss of heading 05-09 07:02
Page ↓
Page ↑
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5. MAINTENANCE & DIAGNOSTICS

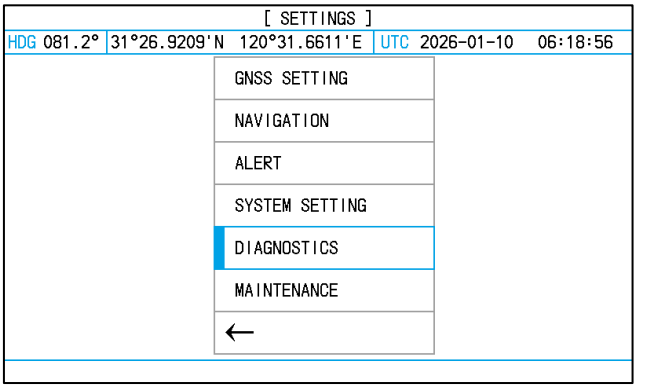
5.1 Regular Maintenance

Check the following points regularly to maintain performance:

- Check that connectors on the rear panel are firmly tightened and free of rust.
- Check that the ground system is free of rust and the ground wire is tightly fastened.
- Check the antenna. Replace it if damaged.
- Dust and dirt on the keyboard and display screen may be removed with a soft cloth. Do not use chemical cleaners to clean the equipment. Paint and markings could be removed.

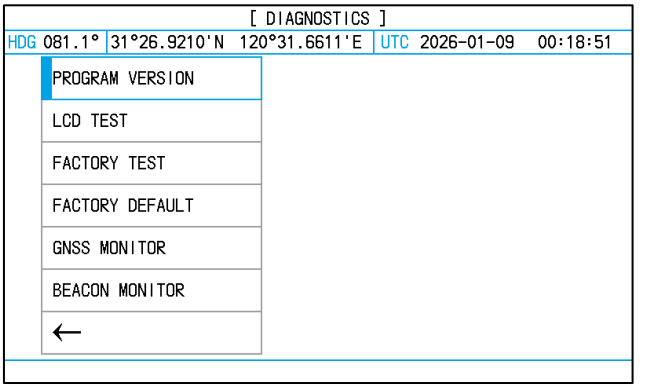
5.2 Diagnostic Test

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



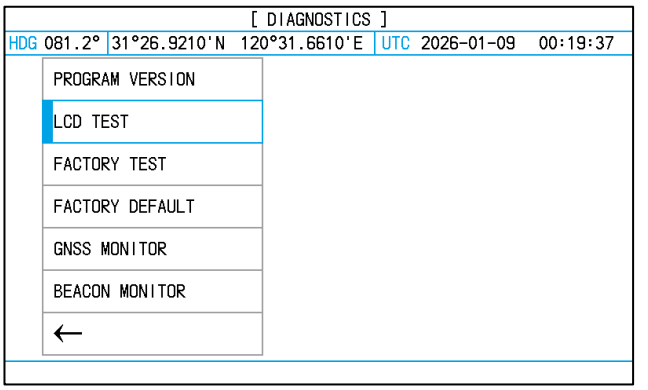
5.2.1 Software Version

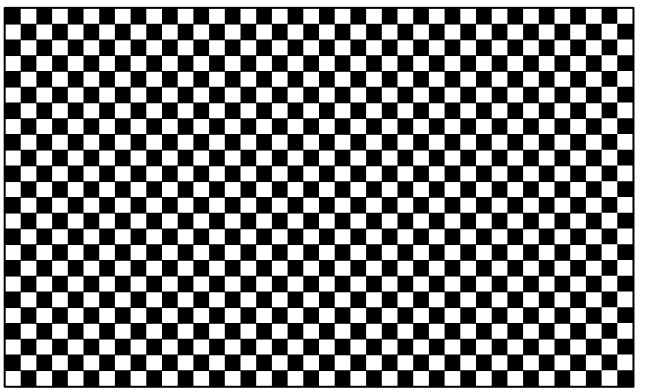
Select **[PROGRAM VERSION]** to check the software version.



5.2.2 LCD Test

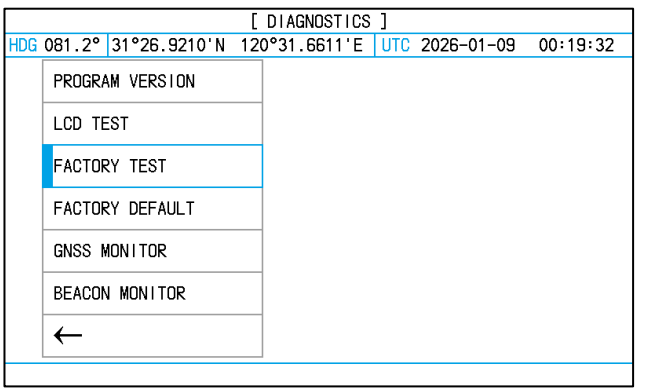
LCD Test is used for testing the screen.

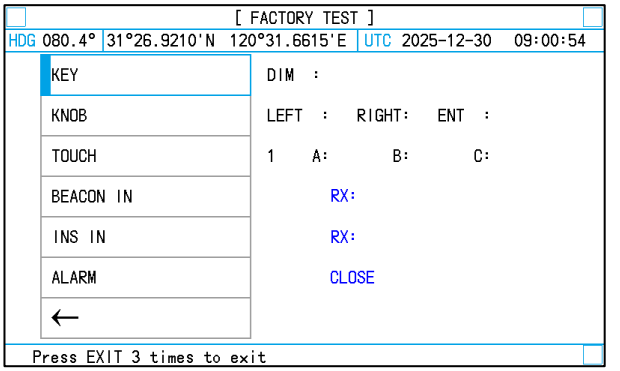




5.2.3 Factory Test

It is to test the buttons/keys on the panel and Beacon in, INS in, etc.

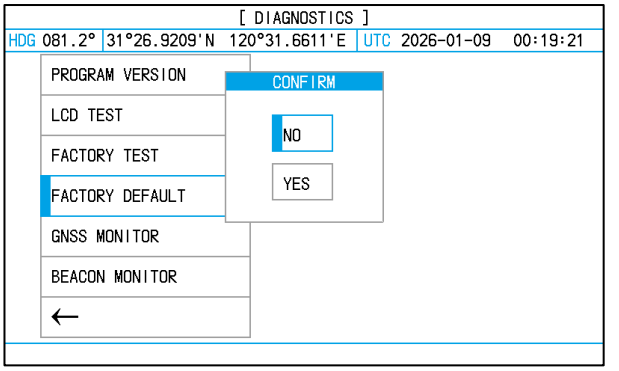




5.2.4 Factory Default

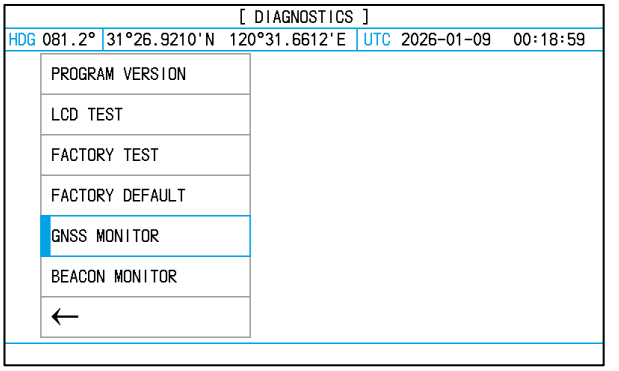
FACTORY DEFAULT is to return the system to the factory default setting.
Select **[FACTORY DEFAULT]** in **[DIAGNOSTICS]** menu, then click **[YES]** to confirm the operation.

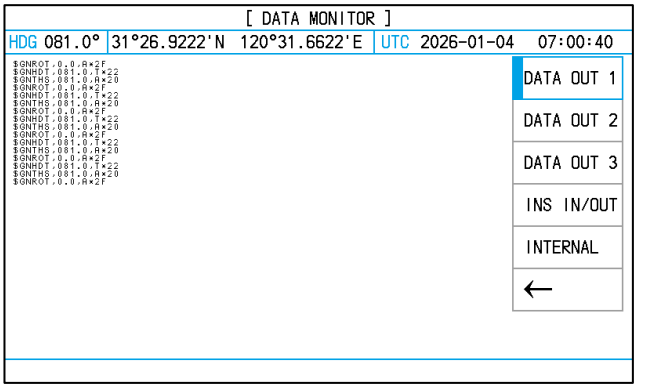
NOTE:
The navigation settings and GNSS settings will restore to factory default while the waypoints and routes registered remain unchanged.



5.2.5 GNSS Monitoring

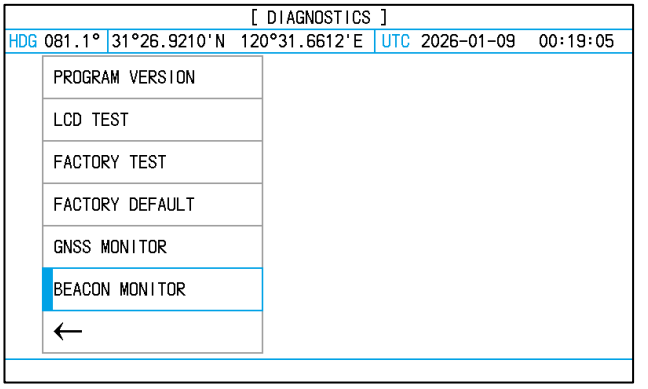
It's to check the GNSS data appearing on output ports.

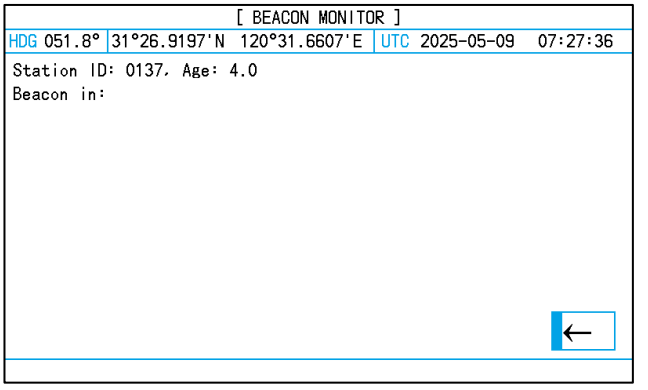




5.2.6 Beacon Monitor

It's to check the differential GNSS data from BEACON IN. Only RTCM23 type 16 (special message) will be displayed.





6. INSTALLATION

6.1 Installation of Display Unit

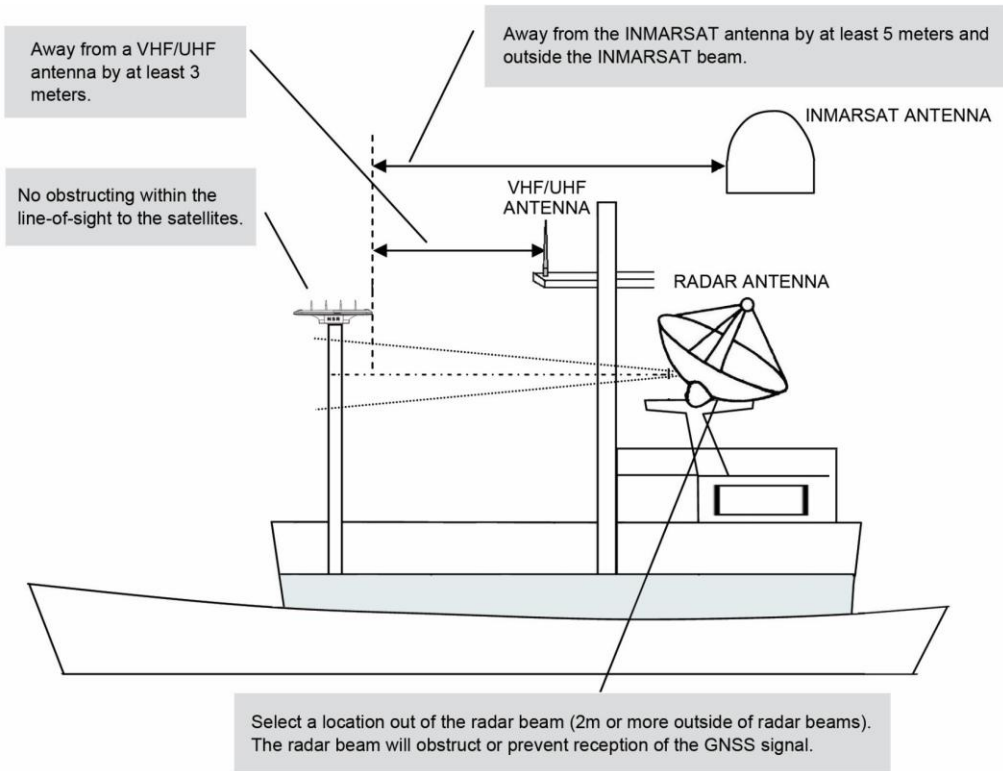
The display unit can be installed on a table-top, on the overhead, or in a panel (optional flush mounting brackets required). Refer to the outline drawings at the end of this manual for installation instructions. When selecting a mounting location, keep in mind the following points:

- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well-ventilated.
- Mount the unit where shock and vibration are minimal.
- Locate the unit away from equipment that 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 compass safe distances to prevent deviation of a magnetic compass.

6.2 Installation of Antenna Unit

Install the antenna unit by referring to the antenna installation diagram 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 by at least 3 meters. GNSS equipment is interfered with by a harmonic wave of a VHF/ UHF antenna.
- Away from the INMARSAT antenna by at least 5 meters and outside the INMARSAT beam.
- There should be no obstruction 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 the reception of the GNSS satellite signal if the water freezes.
- If the antenna cable is to be passed through a hole that is not large enough to pass the connector, you may unfasten the connector. Refasten it after running the cable through the hole.



6.3 Installation of Processor Unit

Four screws are supplied to mount the processor unit. It's recommended that the processor unit be installed horizontally on the table.
Please observe the compass safe distances to prevent deviation of a magnetic compass.

Note:
Care must be taken when mounting the processor unit to ensure that there is sufficient space for cables and connectors. Especially, sharp bending of the cable must be avoided.

6.4 Cabling

6.4.1 Power Connection

PIN NO	DESCRIPTION
1	PWR (+ 24V)
2	PWR (0V)

The power cable with a rated capacity of 3A should be used. The pin definition for the connector is shown above.
Suggest using the 3A DC Power Supply Unit (DC 24V output).

6.4.2 Antenna Connection

There are two Antenna cables, both connected to the processing unit. Pay attention to the bow and stern.

6.4.3 Internal Connection Cable

The internal connection cable is used to connect the processing unit and the display unit. Pay attention to the label and distinguish between the two ends.

6.4.4 Heading and GNSS Output

NGC-3000D has a 14-pin terminal block for input and output.
There are three outputs for heading and GNSS data: DATA OUT1, DATA OUT2, DATA OUT3.

PIN NO.	DESCRIPTION	TYPE
3	DATA OUT1+	IEC 61162-1/ IEC 61162-2
4	DATA OUT1-	
5	DATA OUT2+	IEC 61162-1/ IEC 61162-2
6	DATA OUT2-	
7	DATA OUT3+	IEC 61162-1/ IEC 61162-2
8	DATA OUT3-	

The default Baud rate is 4800 bps. It can be changed to 9600 / 19200 / 38400 bps.

6.4.5 Alert Interface

There is one alert interface (IEC 61162-1/ IEC 61162-2) and a normally closed contact for BAM.

PIN NO.	DESCRIPTION	TYPE
9	BAM/INS OUT+	IEC 61162-1/ IEC 61162-2
10	BAM/INS OUT-	
11	BAM/INS IN+	IEC 61162-1/ IEC 61162-2
12	BAM/INS IN-	
13	ALARM (COM)	Normally closed contact
14	ALARM (N.C)	

Pin no. 13 – ALARM (COM) and Pin no. 14 – ALARM (N.C.) are used to indicate the total power failure, closed is normal and open is active.

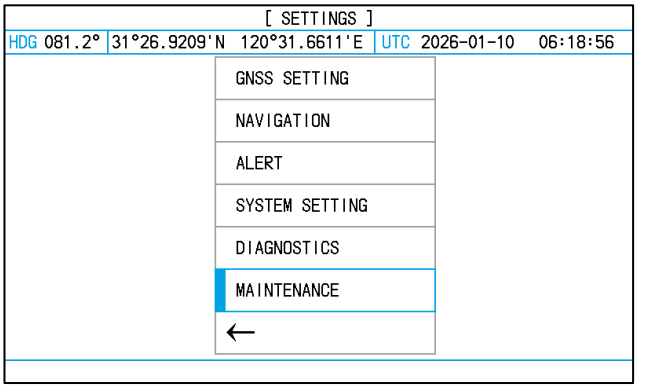
6.4.6 Grounding

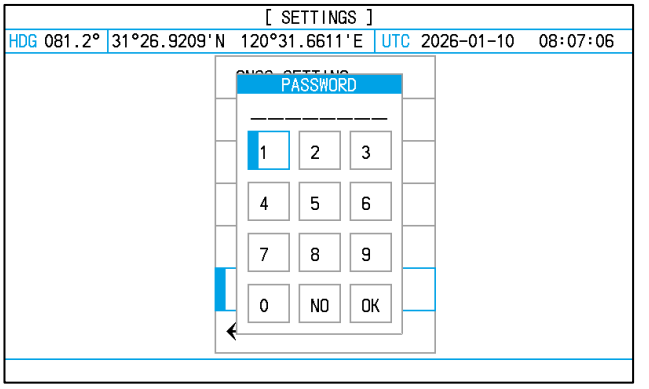
The display unit contains a CPU. While operating, it radiates noise, which can interfere with radio equipment. Ground the unit as follows to prevent interference:

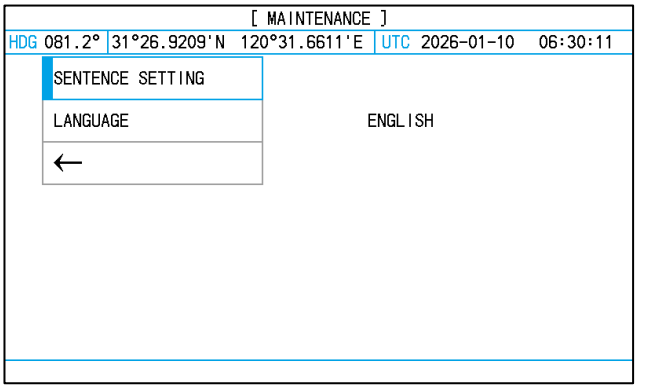
- The ground wire/cord should be 1.25mm^2 or larger.
- The ground wire/cord should be as short as possible.

6.5 Initial Settings

Click **MENU** button on the screen, choose **[MAINTENANCE]** in **[SETTINGS]** and enter the password to open [**MAINTENANCE**] menu. It includes SENTENCE SETTING and LANGUAGE items.







6.5.1 Sentence Setting

This equipment can output navigation data to external equipment, in NMEA 0183 format. For example, it can output heading to other equipment. There are three normal data outputs, and one INS/BAM (Bridge Alert Management) output/input. The following items can be configured for each normal data output.

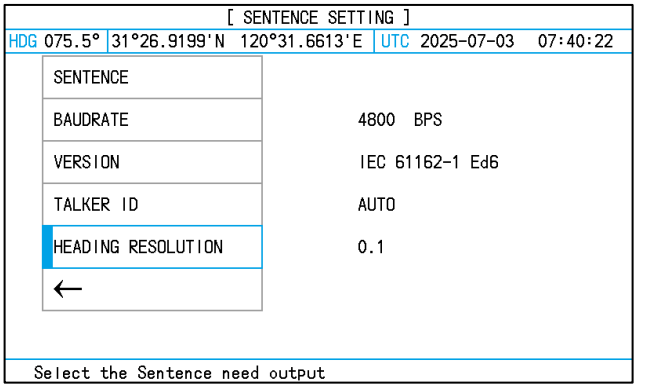
- **Data sentences:**
  Up to 21 kinds of sentences are available but not more than 100% load rate.
  The interval of HDT, THS, ROT, HDG, HDM, HRC, Custom A, Custom T, Custom Y can be set to 20ms - 400ms.
  The interval of other sentences can be set to 1s - 20s.

- **Baud rate**
  The baud rate can be set to 4800 (default), 9600, 19200, 38400 bps.

- **NMEA version**
  Up to six versions can be selected: NMEA1.5, NMEA2.0, NMEA2.3, IEC 61162-1 Ed4, IEC 61162-1 Ed5, IEC 61162-1 Ed6.

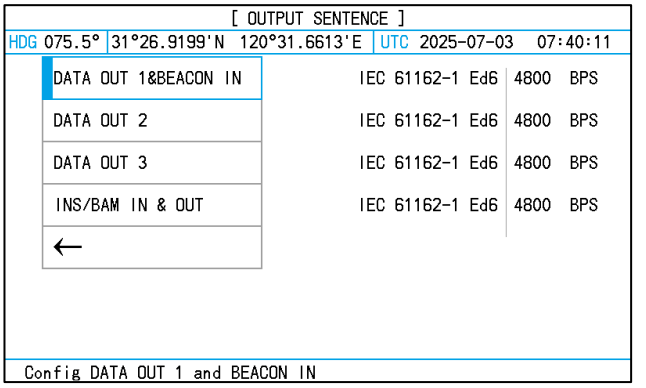
- **Talker ID**
  The talker ID can be set to AUTO, HE, HC, GN, GP, GB.

- **Heading Resolution**
  The Heading Resolution can be set to 0.1 ~ 0.0001 for sentence containing heading.

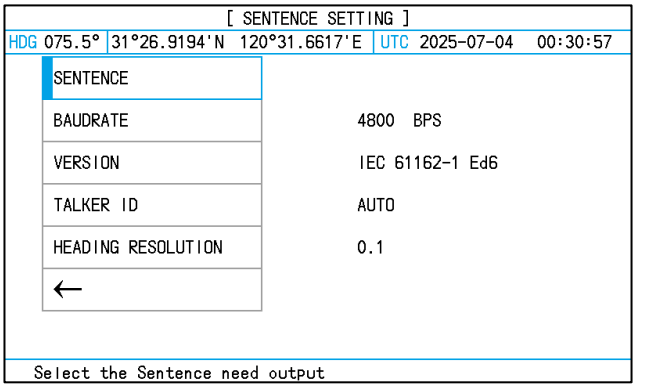


6.5.1.1 Output Sentence

Click [**MAINTENANCE**] - **[SENTENCE SETTING]**, open [**OUTPUT SENTECE**] menu. There are three DATA OUT and one INS/BAM IN & OUT port.

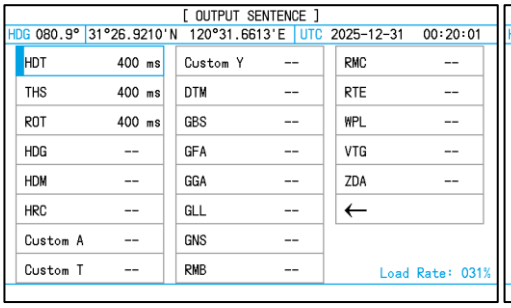


Click the ports to set the sentence. For example:

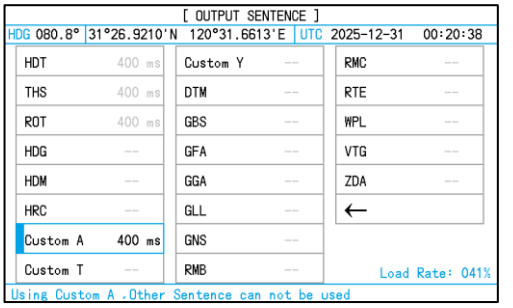


Click each sentence continuously to modify the sentence transmission frequency. “--” means no output. Open Custom A sentence will not output other sentences.

Normal output:



Custom A open:



Data sentence description

HDT: Heading true.

THS: True heading and status.

ROT: Rate of turn and direction of turn.

HDG: Heading, deviation and variation.

HDM: Heading Magnetic Compass.

DTM: Datum reference.

GBS: GNSS satellite fault detection.

GFA: GNSS fix accuracy and integrity.

GGA: GPS position fixing condition (time of fix, latitude, longitude, receiving condition, number of satellites used, DOP).

GLL: Geographic position – Latitude/longitude.

GNS: GNSS fix data.

RMB: Recommended minimum navigation information.

RMC: Generic navigational information (UTC time, latitude, longitude, ground speed, true course, day, month, year).

RTE: Routes.

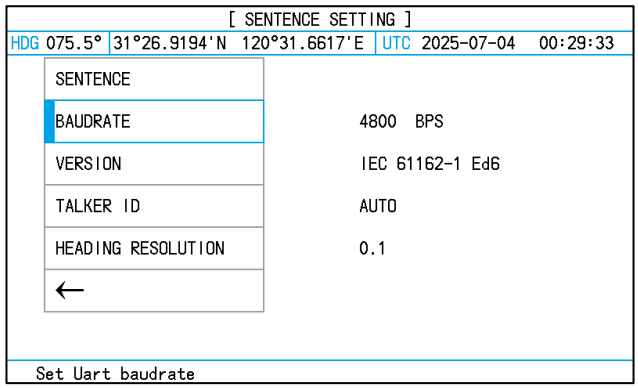
WPL: Waypoint location.

VTG: Actual track and ground speeds.

ZDA: UTC time (day, month, year).

NOTE: *By default, HDT, THS, ROT are selected.*

6.5.1.2 Baud Rate



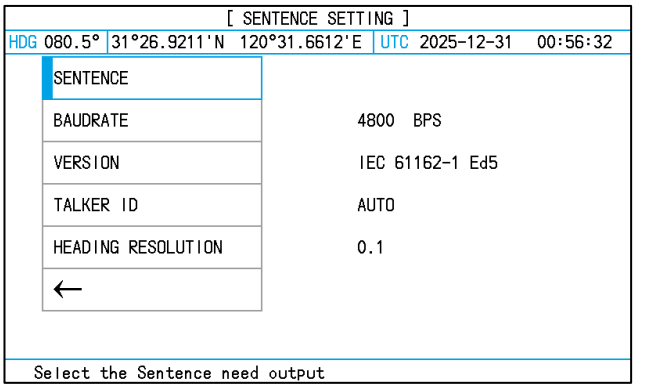
Select each of the four outputs to configure the baud rate.

The default baud rate of all ports is 4800bps.

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

The baud rate can be selected among 4800/ 9600/ 19200/ 38400 bps.

6.5.1.3 Version



Select each of the five outputs to configure the sentence version. The default is IEC 61162-1 Ed5.

Click **[VERSION]** continuously until a desired rate is shown.

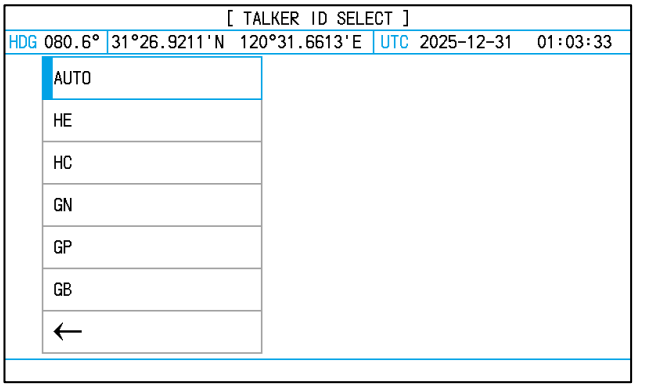
Up to five versions can be selected: NMEA1.5, NMEA2.0, NMEA2.3, IEC 61162-1 Ed4, IEC 61162-1 Ed5, IEC 61162-1 Ed6.

6.5.1.4 Talker ID

Select each of the five outputs to configure the sentence talker ID. The default is AUTO.

Click **[TALKER ID]** to select a talker ID in [TALKER ID SELECT] menu.

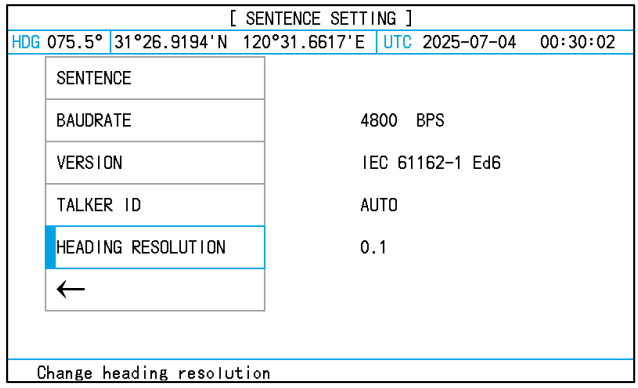
The talker ID can be set to AUTO, HE, HC, GN, GP, GB.



Note: *Some sentences have a fixed talker ID and cannot be modified.*

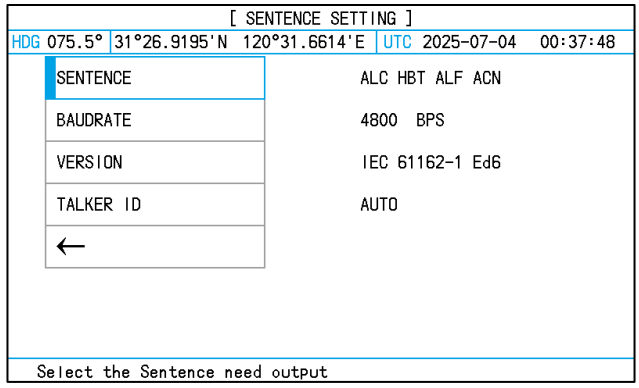
6.5.1.5 Heading Resolution

Click **[HEADING RESOLUTION]** to change from 0.1 to 0.0001.



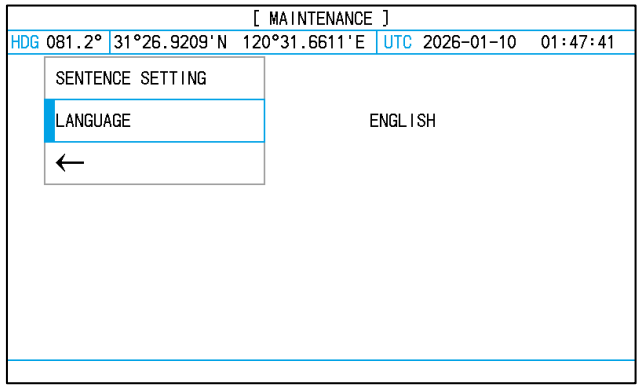
6.5.1.6 INS/BAM In & Out

[INS/BAM IN & OUT] sentence setting screen is as follows:

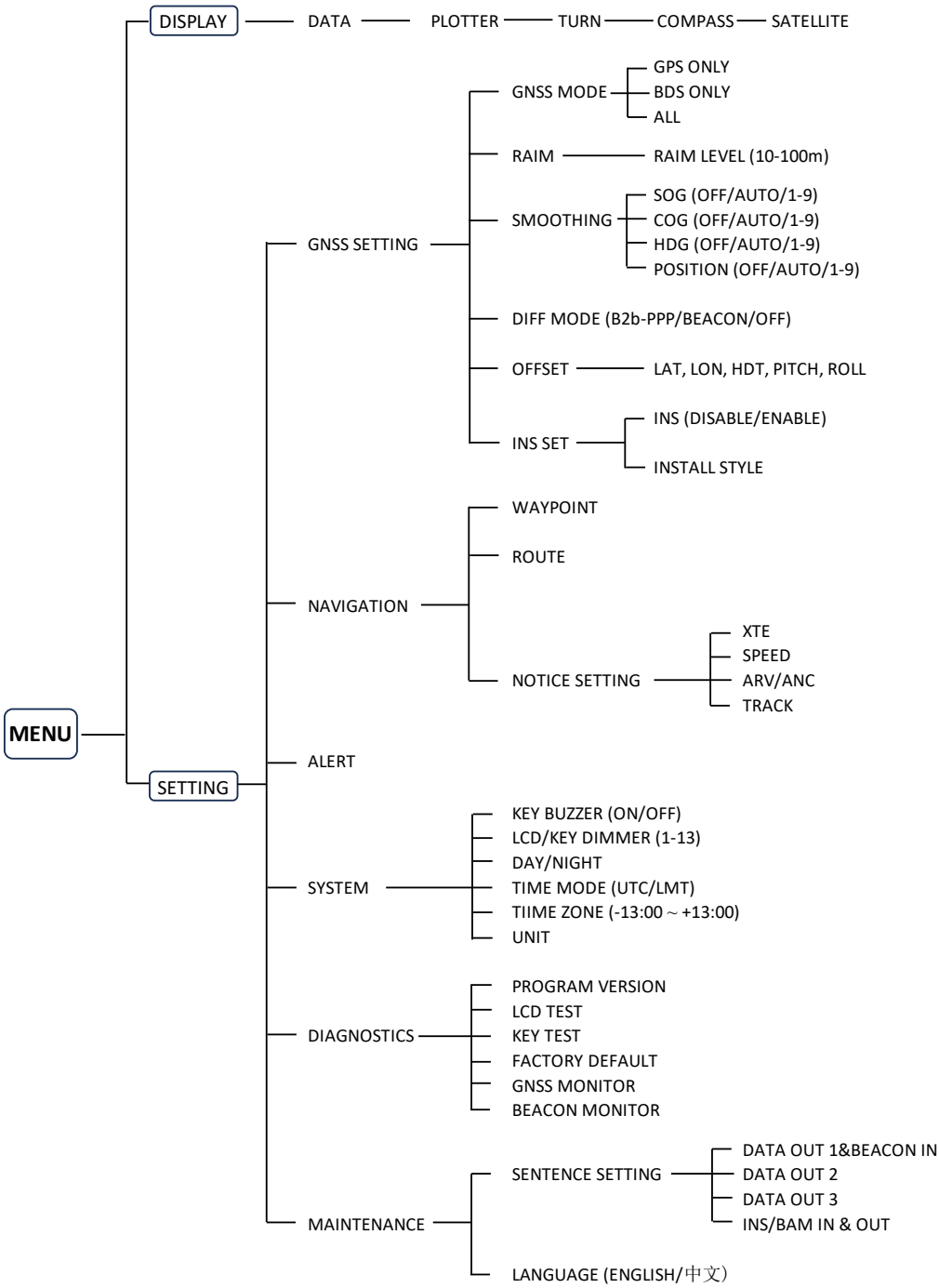


6.5.2 Language Setting

NGC-3000 supports two languages: English and Chinese. Click **[LANGUAGE]** to switch between **CHINESE** and **ENGLISH**.



APPENDIX I MENU TREE



APPENDIX II TECHNICAL SPECIFICATIONS

● GENERAL

No.	Item	Description
1	Receiving Frequency	GPS L1/L2/L5, BDS B1/B2/B3, GLONASS L1/L2 /L3, GALLIEO E1/E5/E6, QZSS
2	Heading Accuracy	0.4º RMS
3	Heading Resolution	0.1° ~ 0.0001°
4	Tracking Rate of Turn	45º /sec
5	Pitch/Roll Angle	±60°
6	Position Accuracy	less than 2m
7	Speed Accuracy	<0.1m/s
8	Heading-fixing Time	Cold start: 60 seconds
9	Heading Update Interval	≥20ms
10	Position Update Interval	≥1 sec
11	RAIM Indicators	Safe, Unsafe, Caution
12	Route	Up to 30
13	Waypoint	Up to 999
14	Data Output Rate	Max 50Hz

● DISPLAY SECTION

No.	Item	Description
1	Display	7 inch, color LCD, touch screen operation 154 (W) × 87 (H) mm
2	Resolution	800 × 480 dots
3	Nominal viewing distance	0.6m
4	Fix Mode	GNSS (ALL)/GPS/BDS
5	Display Modes	Data, Plotter, Turning, Compass, Satellite
6	Plotter Display	0.02 to 320nm, 14 steps
7	Navigation Alarm	Arrival and Anchor Watch, XTE, Speed
8	Satellite Information	Satellite number, Elevation, Signal level

INPUT/OUTPUT DATA

No.	Item	Description
1	DATA Output	NMEA0183, total 3 ports, baud rate 4800 / 9600 / 19200 / 38400 bps
	Version	NMEA1.5, NMEA2.0, NMEA2.3, IEC61162 Ed4, IEC61162 Ed5, IEC61162 Ed6
	Sentences	HDT, THS, ROT, DTM, GBS, GFA, GGA, GLL, GNS, RMC, VTG, ZDA, etc.
2	Beacon In	DGPS RTCM 10402.3
3	BAM/INS In	ACN
4	BAM/INS Out	ALC, ALF, HBT
5	Alarm	System status, Alarm: open, Normal: close

POWER SUPPLY

24V DC (range 12~36 V), 0.5-0.7A

ENVIRONMENT CONDITION

No.	Item	Description
1	Ambient Temperature	-20°C to +55° operational -30°C to +70°C storage (Antenna Unit)
2	Relative Humidity	95% at 40°C
3	IP Grade	Antenna Unit: IEC60529 IP66 Display Unit: IEC60529 IP22 Processor Unit: IEC60529 IP22
4	Compass Safe Distance	**Display Unit:** Standard compass: 0.4m, Steering compass: 0.25m **Processor Unit:** Standard compass: 0.25m, Steering compass: 0.15m

OTHERS

No.	Item	Description
1	Size	174 (W) × 81 (H) × 160 (D) mm (Processor unit) 264 (W) × 145 (H) × 83 (D) mm (Display unit) 808.2 (W) × 240.1 (H) × 244.4 (D) mm (Antenna unit)
2	Weight	abt 1.5kg (Processor unit) abt 1.3kg (Display unit) abt 2.5kg (Antenna unit)

APPENDIX III ABBREVIATIONS

Items	Description	Items	Description
ACK	Acknowledge	LAT	Latitude
ALARM	Alarm	LMT	Local Time
ANT	Antenna	LON	Longitude
AUTO	Automatic	MENU	Menu
BRG	Bearing	MUTE	Mute
COG	Course Over the Ground	N UP	North Up
C UP	Course Up	OFF	Off
GPS	Global Positioning System	ON	On
H UP	Head Up	RAIM	Receiver Autonomous Integrity Monitoring
HDG	Heading	RNG	Range
HDOP	Horizontal Dilution Of Precision	SNR	Signal to Noise Ratio
ID	Identification	SOG	Speed Over the Ground
INS	Integrated Navigation System	UTC	Coordinated Universal Time

APPENDIX III SENTENCE DESCRIPTION

HDT – Heading true

```
$--HDT,x.x,T*hh<CR><LF>
          |  |
          +--+----------------1
```

1. Heading, degrees true

THS – True heading and status

```
$--THS,x.x,a*hh<CR><LF>
          |  |
          |  +-------------------2
          +----------------1
```

1. Heading, degrees true
2. Mode indicator

ROT – Rate of turn

```
$--ROT,x.x,A*hh<CR><LF>
          |   |
          |   +-------------------2
          +----------------1
```

1. Rate of turn
2. Status

HDG – Heading, deviation and variation

```
$--HDG,x.x,x.x,a,x.x,a*hh<CR><LF>
          |  |   |  |  |
          |  |   |  +---+------------------------ 3
          |  +---+---------------------- 2
          +-------------------- 1
```

1. Magnetic sensor heading
2. Magnetic deviation, degrees E/W
3. Magnetic variation, degrees E/W

HDM - Heading, Magnetic

```
$--HDM,x.x,M*hh<CR><LF>
         |
         +---------------1
```

1. Heading, degrees Magnetic

DTM - Datum reference

```
$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>
           |  |  |   |  |  |  |    |
           |  |  |   |  |  |  |   +---------------------- 6
           |  |  |   |  |  |  +---------------------- 5
           |  |  |   |  +--+---------------------- 4
           |  |  +---+------------------------ 3
           |  +----------------------------- 2
           +----------------------------- 1
```

1. Local datum WGS84 = W84
   WGS72 = W72
   SGS85 = S85
   PE90 = P90
   BDCS = C00
   User defined = 999
   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 WGS84 = W84
   WGS72 = W72
   SGS85 = S85
   PE90 = P90
   BDCS = C00

HBT – Heartbeat supervision sentence

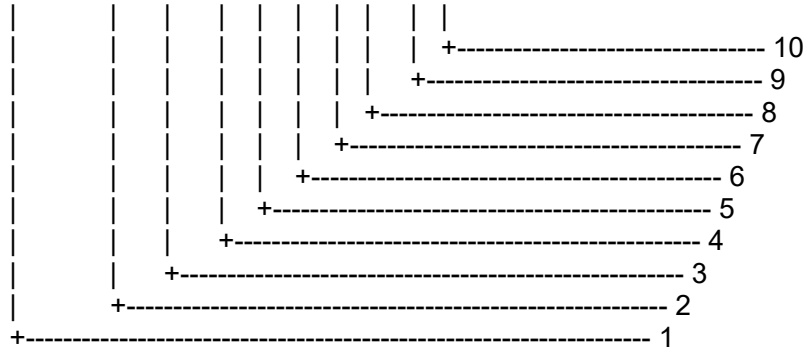
```
$--HBT,x.x,A,x*hh<cr><lf>
         |   |  |
         |   |  +----------------------- 3
         |   +-------------------- 2
         +------------------- 1
```

1. Configured repeat interval

2. Equipment status
3. Sequential sentence identifier

GBS- GNSS satellite fault detection

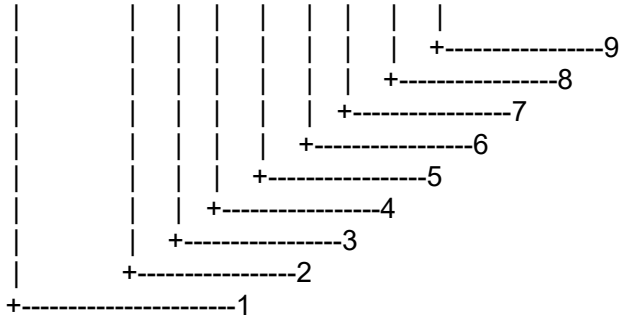
$-- GBS,hhmmss.ss,x.x,x.x,x.x,xx,x.x,x.x,x.x,h,h*hh<CR><LF>



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

GFA - GNSS fix accuracy and integrity

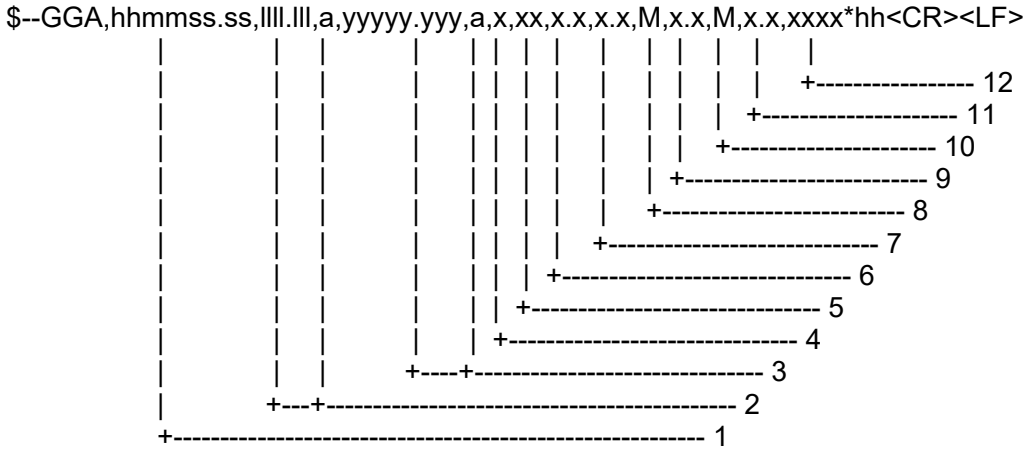
$--GFA,hhmmss.ss,x.x,x.x,x.x,x.x,x.x,x.x,x.x,c--c*hh



1. UTC time of GNS fix associated with this sentence
2. Horizontal protection level (m)
3. Vertical protection level (m)

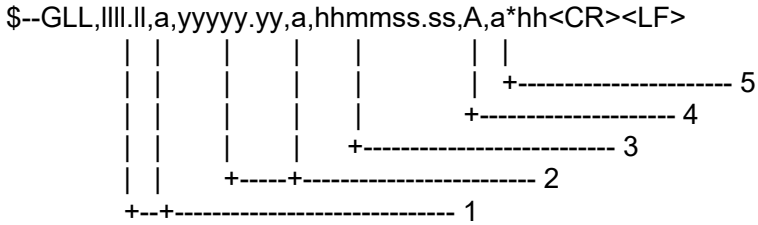
4. Standard deviation of semi-major axis of error ellipse (m)
5. Standard deviation of semi-minor axis of error ellipse (m)
6. Orientation of semi-major axis of error ellipse (deg)
7. Standard deviation of altitude (m)

GGA -Global positioning system (GPS) fix data



1. UTC of position
2. Latitude, N/S
3. Longitude, E/W
4. GPS quality indicator
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
8. Unit of Antenna altitude, m
9. Geoidal separation
10. Unit of geoidal separation, m
11. Age of differential GPS data
12. Differential reference station ID, 0000-1023

GLL – Geographic position – Latitude/longitude

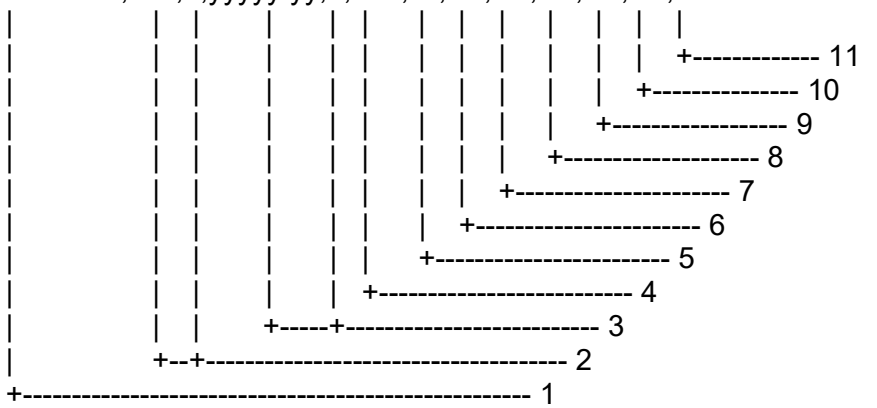


1. Latitude, N/S

2. Longitude, E/W
3. UTC of position
4. Status A=data valid V=data invalid
5. Mode indicator

GNS - GNSS fix data

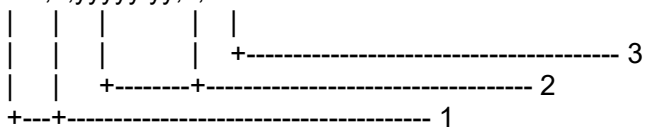
$-- GNS,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c,xx,x.x,x.x,x.x,x.x,x.x,a*hh<CR><LF>



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
7. Antenna altitude, m, re: mean-sea-level (geoid)
8. Geoidal separation, m
9. Age of differential data
10. Differential reference station ID
11. Navigational status indicator

WPL – Waypoint location

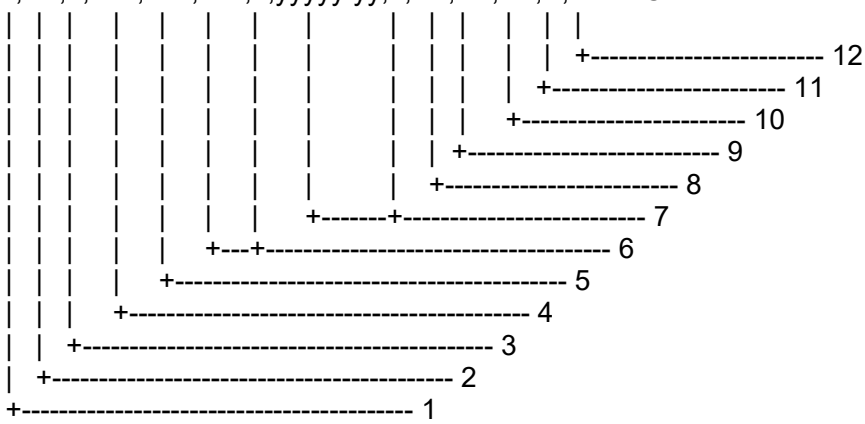
$--WPL,llll.ll,a,yyyyy.yy,a,c--c*hh<CR><LF>



1. Waypoint latitude, N/S
2. Waypoint longitude, E/W
3. Waypoint identifier

RMB – Recommended minimum navigation information

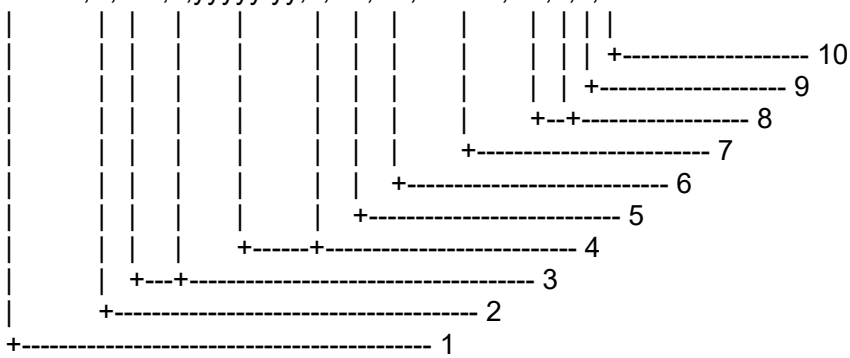
$--RMB,A,x.x,a,c--c,c--c,llll.ll,a,yyyyy.yy,a,x.x,x.x,x.x,A,a*hh<CR><LF>



1. Status, A = data valid, V = navigation receiver warning
2. Cross track error, nautical miles
3. Direction to steer L/R
4. Origin waypoint ID
5. Destination waypoint ID
6. Destination waypoint latitude, N/S
7. Destination waypoint longitude, E/W
8. Range to destination, nautical miles
9. Bearing to destination, degrees true
10. Destination closing velocity, knots
11. Arrival status A = arrival circle, entered or perpendicular passed
12. Mode indicator

RMC- Recommended minimum specific GNSS data

$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a,a*hh<CR><LF>



1. UTC of position fix

2. Status: 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
9. Mode indicator
10. Navigational status

RTE - Routes

```
$--RTE,x.x,x.x,a,c--c,c--c,.....c--c*hh<CR><LF>
       |   |   |   |   |   |   |   |
       |   |   |   |   |   |   |   +---------------------------------------- 7
       |   |   |   |   |   |   +---+------------------------------------------ 6
       |   |   |   |   +---------------------------------------------------- 5
       |   |   |   +-------------------------------------------------------- 4
       |   |   +------------------------------------------------------------ 3
       |   +---------------------------------------------------------------- 2
       +-------------------------------------------------------------------- 1
```

1. Total number of sentences being transmitted
2. Sentence number
3. Message mode: c = complete route, all waypoints w = working route, first listed waypoint is "FROM", second is "TO" and remaining are rest of route
4. Route identifier
5. Waypoint identifier
6. Additional waypoint identifiers
7. Waypoint "n" identifier

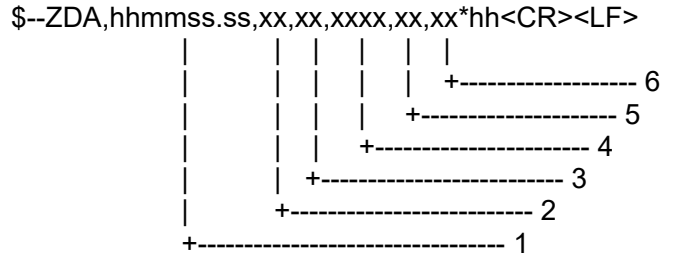
VTG - Course over ground and ground speed

```
$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>
       |   |   |   |   |   |   |   |   |
       |   |   |   |   |   |   |   |   +---------------- 5
       |   |   |   |   |   |   +---+-------------------- 4
       |   |   |   |   +---+---------------------------- 3
       |   |   +---+-------------------------------------- 2
       +---+------------------------------------------------ 1
```

1. Course over ground, degrees true
2. Course over ground, degrees magnetic
3. Speed over ground, knots

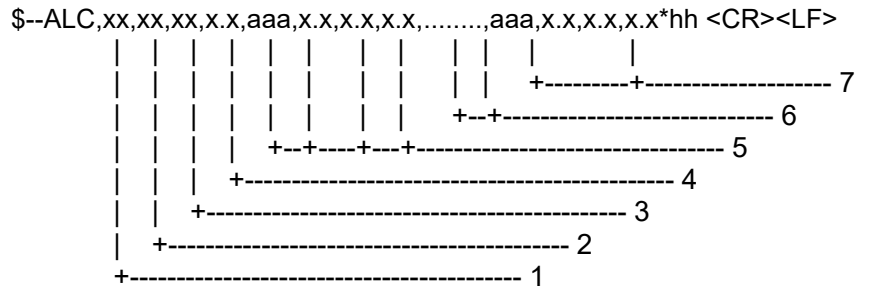
4. Speed over ground, km/h
5. Mode indicator

ZDA - Time and date



1. UTC
2. Day, 01 to 31 (UTC)
3. Month, 01 to 12 (UTC)
4. Year (UTC)
5. Local zone hours, 00h to ±14h
6. Local zone minutes, 00 to +59

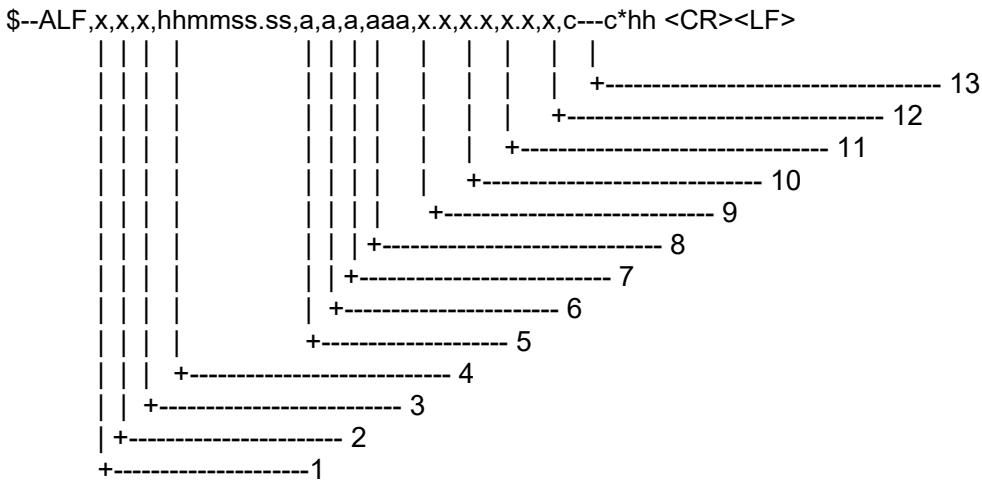
ALC - Cyclic alert list



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

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

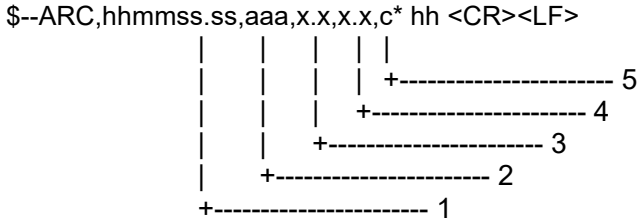
ALF - Alert sentence



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

NOTE A: If the system time is not synchronized, this filed is NULL.

ARC-Alert command refused



1. Time see NOTE A
2. Manufacturer's mnemonic code

3. Alert identifier
4. Alert instance, 1 to 999999
5. Refused alert command, A, Q, O or S

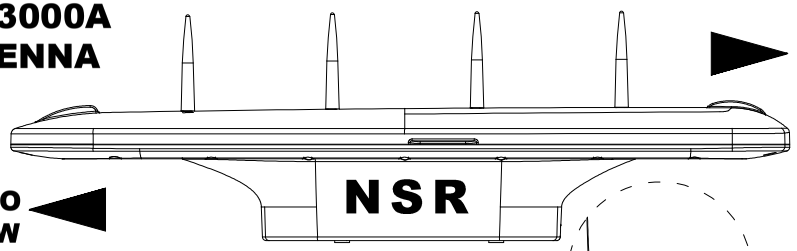
NOTE A: If the system time is not synchronized, this filed is NULL.

APPENDIX IV INSTALLATION DRAWINGS

Drawing No.	Description
NGC3000-ID-001	NGC-3000 SYSTEM DIAGRAM
NGC3000-ID-002	NGC-3000 PROCESSOR UNIT SIZE DRAWING
NGC3000-ID-003	NGC-3000 PROCESSOR UNIT MOUNTING DRAWING
NGC3000-ID-004	NGC-3000 DISPLAY UNIT SIZE DRAWING
NGC3000-ID-005	NGC-3000 DISPLAY UNIT MOUNTING DRAWING (TABLE TYPE)
NGC3000-ID-006	NGC-3000 DISPLAY UNIT MOUNTING DRAWING (FLUSH TYPE)
NGC3000-ID-007	NGC-3000 ANTENNA SIZE DRAWING
NGC3000-ID-008	NGC-3000 ANTENNA MOUNTING DRAWING (ON PIPE)
NGC3000-ID-009	NGC-3000 ANTENNA MOUNTING DRAWING (ON PLATFORM)

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
1			

NGC-3000A ANTENNA



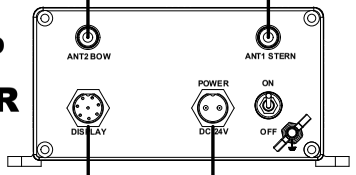
POINTING TO THE STERN

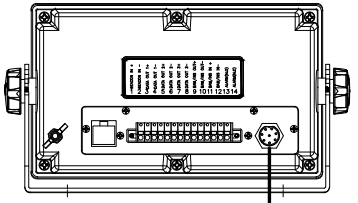
POINTING TO THE BOW

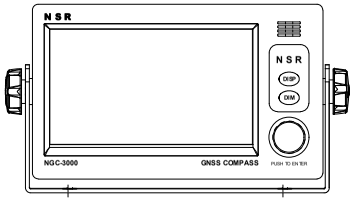
（ANT2 BOW）

（ANT1 STERN）

NGC-3000P PROCESSOR UNIT







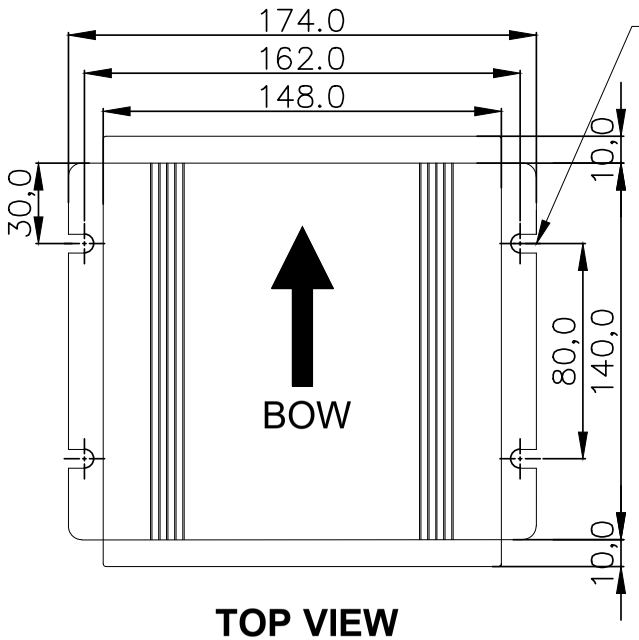
NGC-3000D DISPLAY UNIT

CABLE1(2M) **DC24V INPUT**

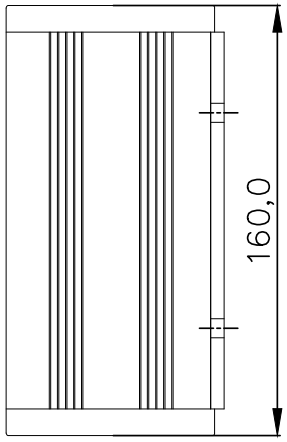
CABLE2(5M)

APPLICATION	NGC-3000 SYSTEM DIAGRAM		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT	
CHECKED			
DRAWING			
DWG. NO.	NGC3000-ID-001	NSR marine	NEW SUNRISE CO., LTD.

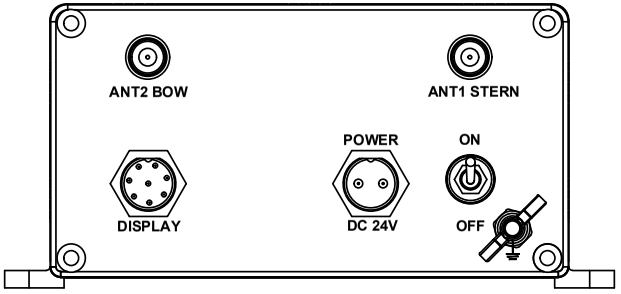
NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
1			



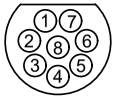
TOP VIEW



SIDE VIEW

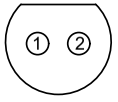


DISPLAY

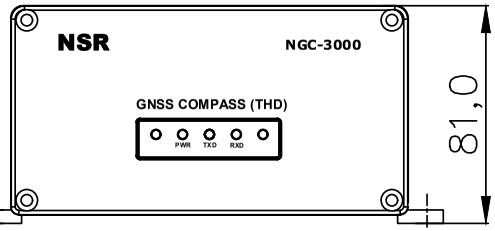


1.DC 12V
2.DC 12V
3.TXD
4.RXD
5.GND
6.GND
7.NC
8.NC

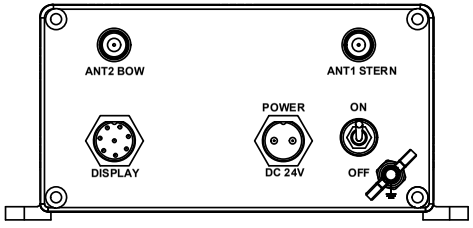
POWER



1.DC 24V+
2.DC 0V



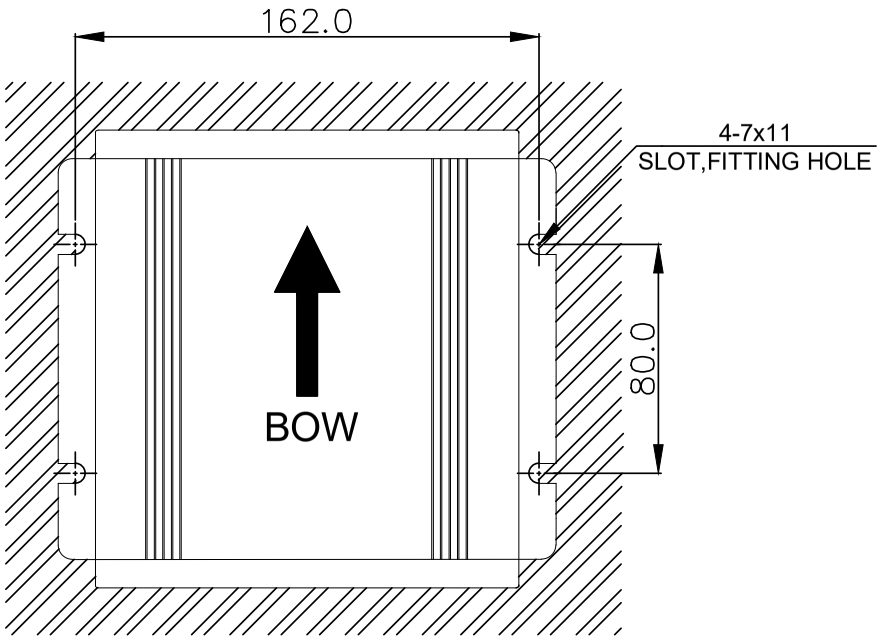
FRONT VIEW

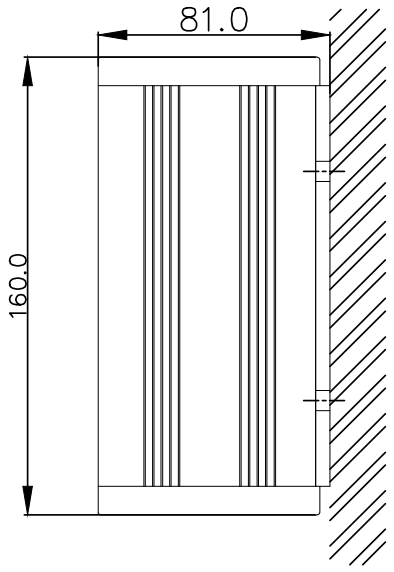


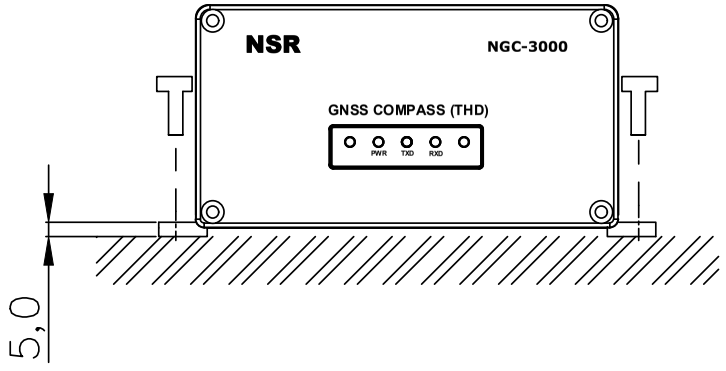
REAR VIEW

APPLICATION	NGC-3000 PROCESSOR UNIT SIZE DRAWING		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT	
CHECKED			
DRAWING		NSR marine	NEW SUNRISE CO., LTD.
DWG. NO.	NGC3000-ID-002		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
1			SIGNATURE	

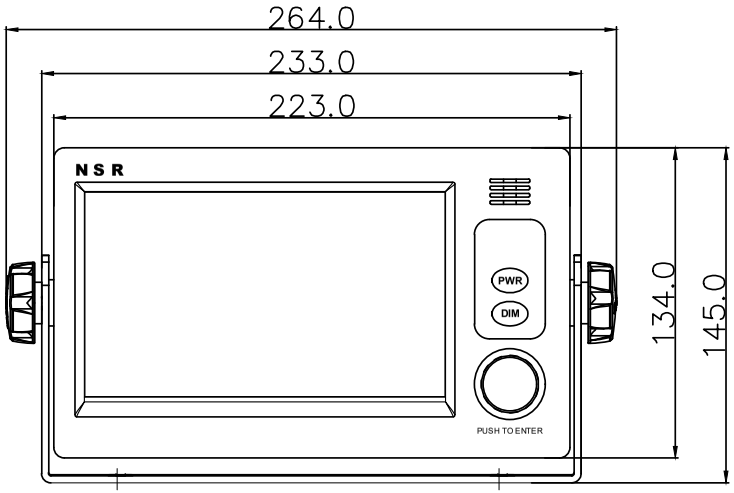




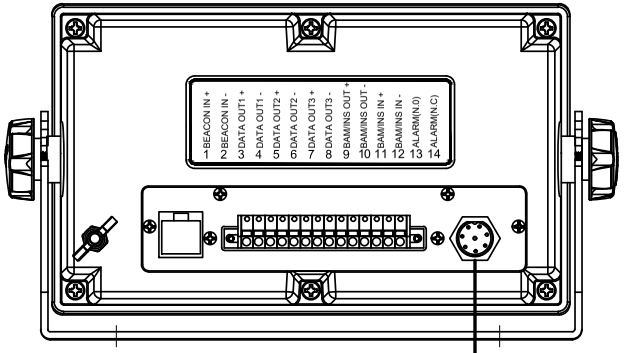


APPLICATION	NGC-3000 PROCESSOR UNIT MOUNTING DRAWING		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	
CHECKED			NEW SUNRISE CO., LTD.
DRAWING	NGC3000-ID-003		
DWG. NO.			

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
1			SIGNATURE	



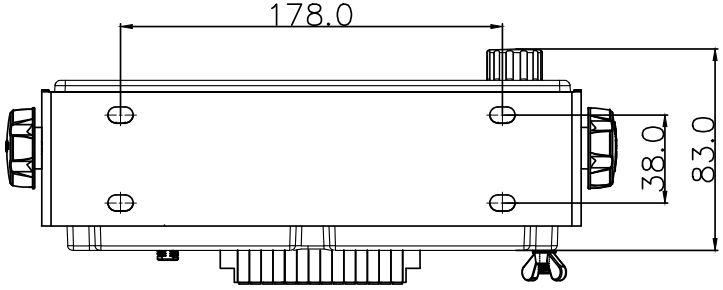
FRONT VIEW



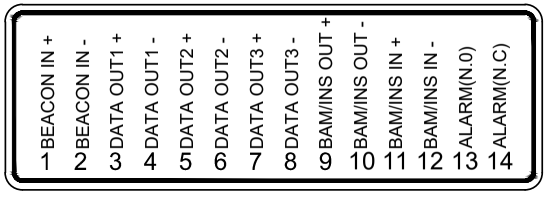
REAR VIEW

TO PROCESSOR UNIT

1	DC 12V
2	DC 12V
3	TXD
4	RXD
5	GND
6	GND
7	NC
8	NC

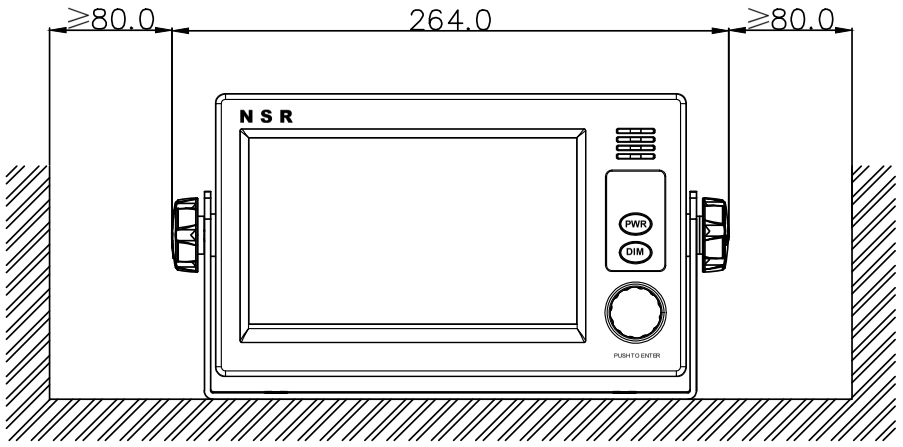


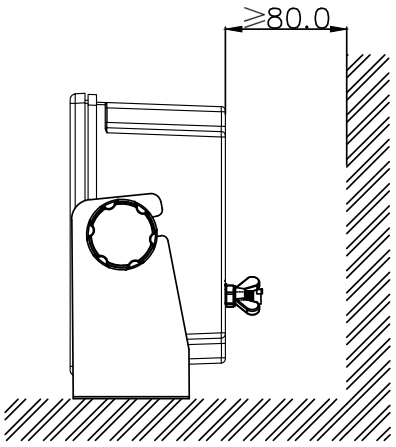
BOTTOM VIEW

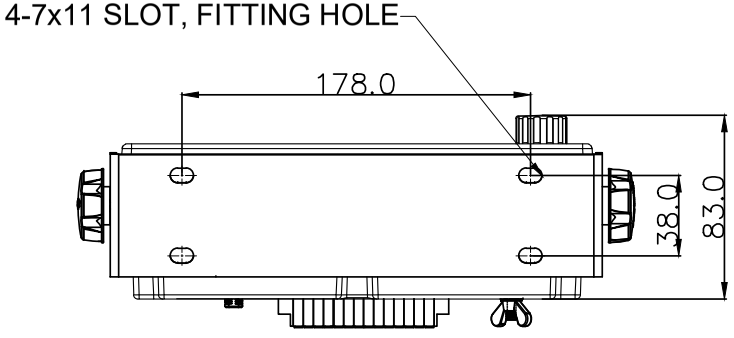


APPLICATION	NGC-3000 DISPLAY UNIT SIZE DRAWING		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT	
CHECKED			
DRAWING		NSR marine	NEW SUNRISE CO., LTD.
DWG. NO.	NGC3000-ID-004		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
1			







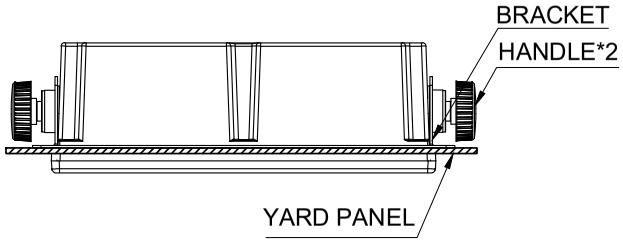
NOTE: TABLE TYPE

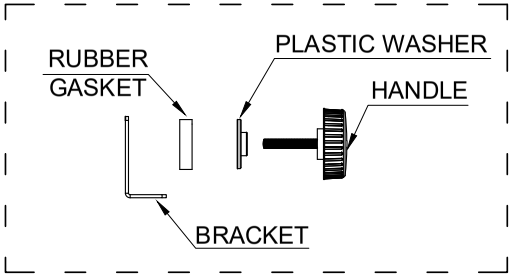
1.USE SELF-TAPPING SCREWS M5X20 FOR FIXING THE UNIT.

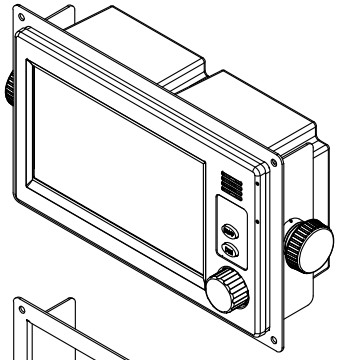
2.80MM IS MINIMUM SPACE FOR OPERATION AND CABLING.

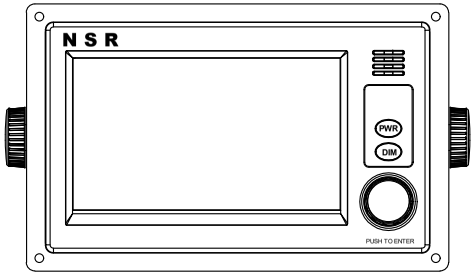
APPLICATION	NGC-3000 DISPLAY UNIT MOUNTING DRAWING (TABLE TYPE)			
DATE		ITEM		SIZE A4
APPROVAL		SCALE N/S	UNIT	
CHECKED				
DRAWING		NSR marine	NEW SUNRISE CO., LTD.	
DWG. NO.	NGC3000-ID-005			

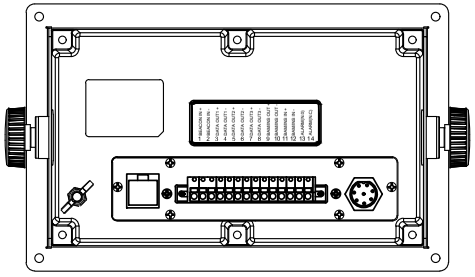
NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
1			SIGNATURE	

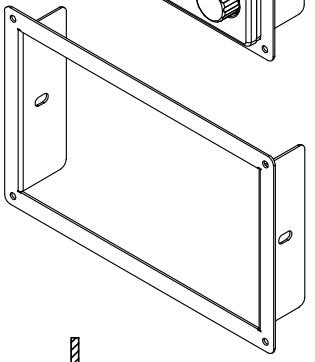


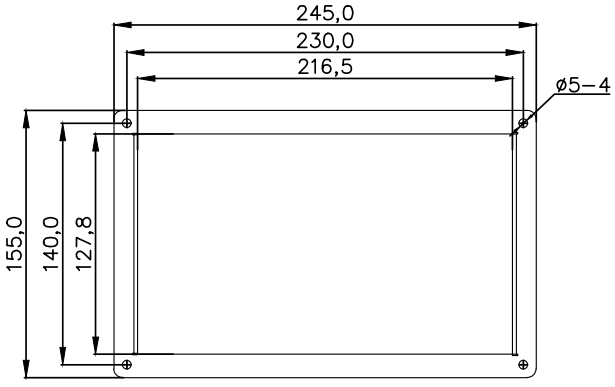




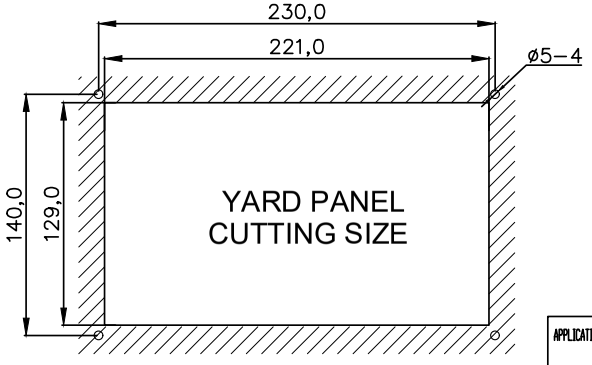


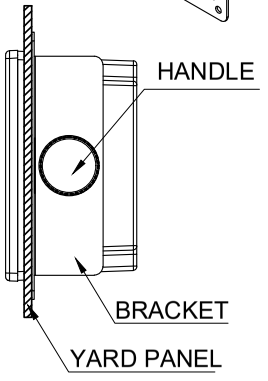






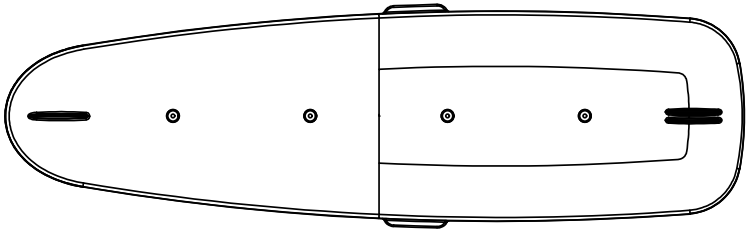
MOUNTING BRACKET SIZE

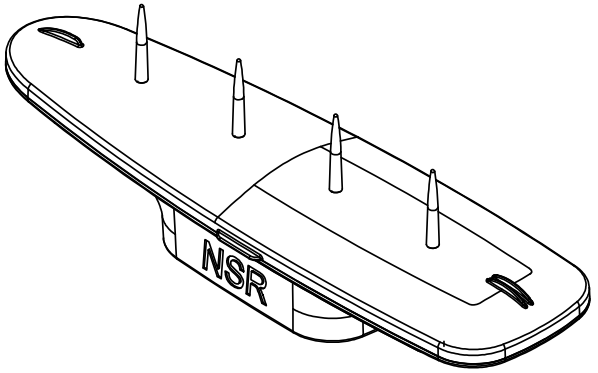


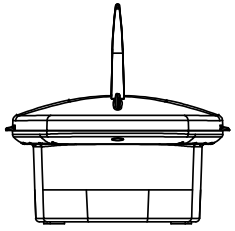


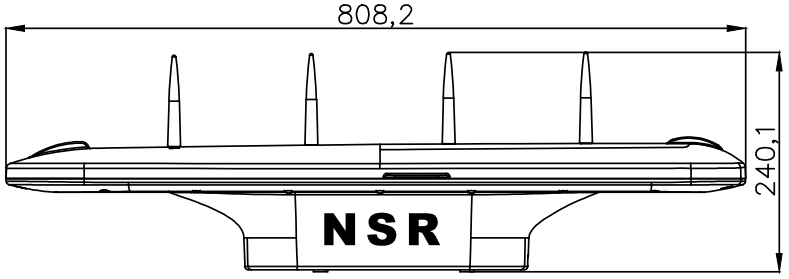
APPLICATION	NGC-3000 DISPLAY UNIT MOUNTING DRAWING (FLUSH TYPE)		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT	
CHECKED			
DRAWING		NSR marine	NEW SUNRISE CO., LTD.
DWG. NO.	NGC3000-ID-006		

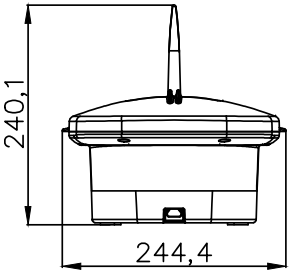
NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
1			

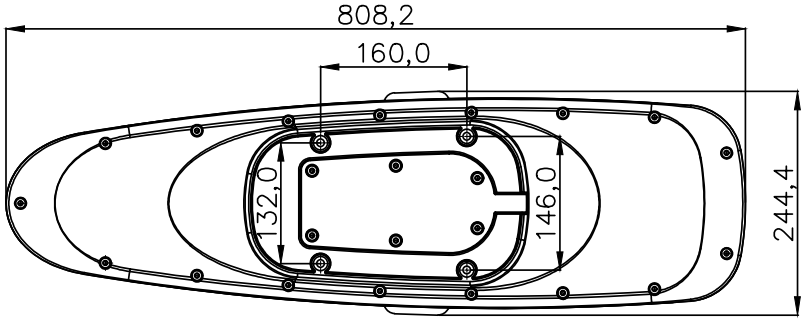








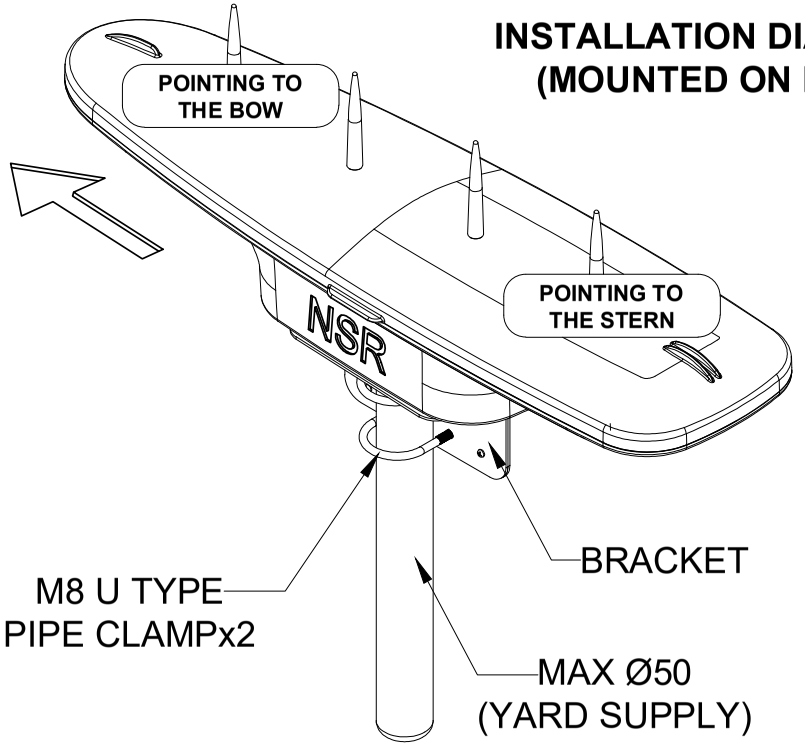


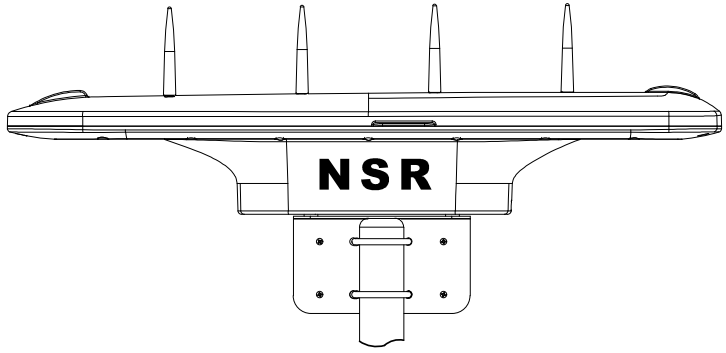


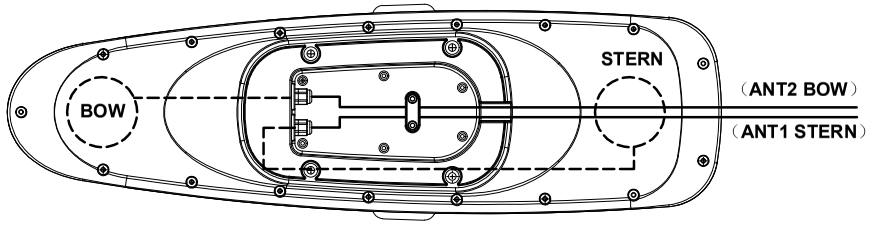
APPLICATION	NGC-3000 ANTENNA SIZE DRAWING				
DATE		ITEM		SIZE	A4
APPROVAL		SCALE	N/S	UNIT	
CHECKED					
DRAWING		NSR marine	NEW SUNRISE CO., LTD.		
DWG. NO.	NGC3000-ID-007				

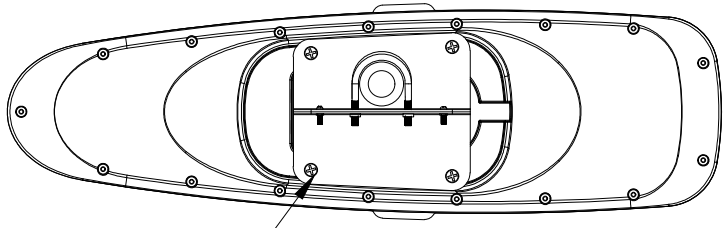
NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
1			SIGNATURE	

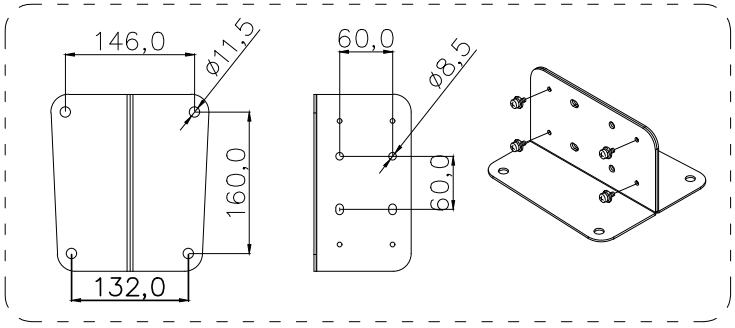
INSTALLATION DIAGRAM (MOUNTED ON PIPE)











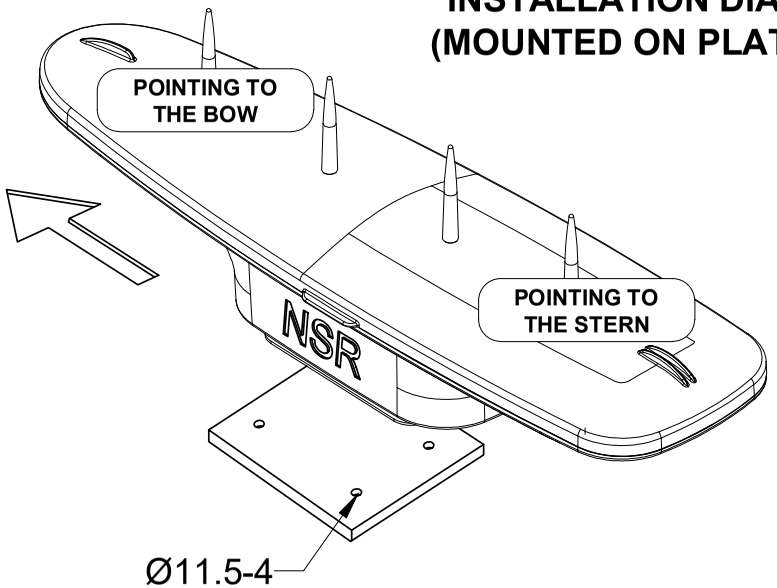
MOUNTING BRACKET SIZE DRAWING

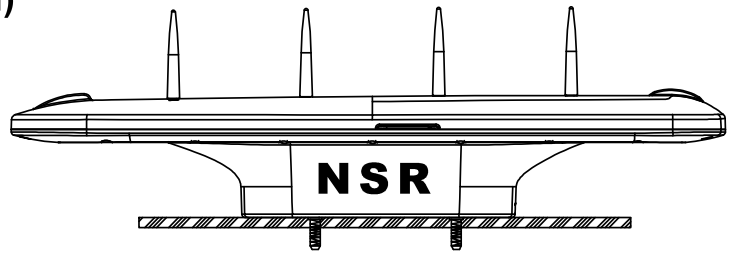
APPLICATION	NGC-3000 ANTENNA MOUNTING DRAWING
DATE	
APPROVAL	
CHECKED	
DRAWING	
DWG. NO.	NGC3000-ID-008
ITEM	
SCALE	N/S
UNIT	
SIZE	A4

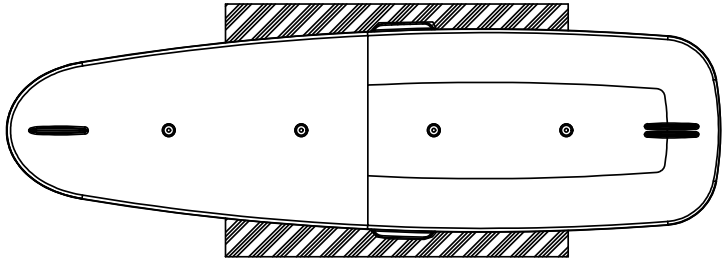
NSR marine NEW SUNRISE CO., LTD.

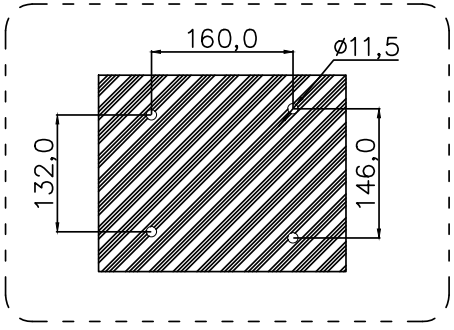
NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE
1			

INSTALLATION DIAGRAM (MOUNTED ON PLATFORM)

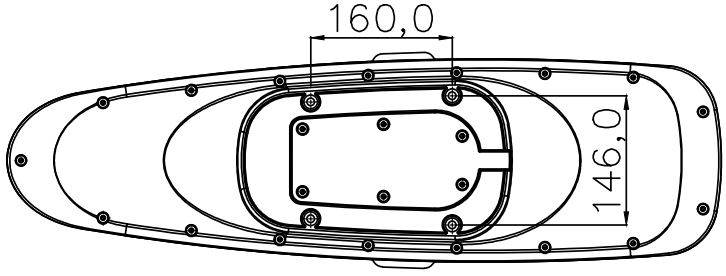








HOLE SIZE



APPLICATION	NGC-3000 ANTENNA MOUNTING DRAWING		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT	
CHECKED			
DRAWING			NEW SUNRISE CO., LTD.
DWG. NO.	NGC3000-ID-009		

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January, 2026