



USER MANUAL

GNSS EQUIPMENT

NGR-3000




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	2017/06/14		01	First edition
2	Q/A	2017/08/15		02	Add navigation function
3	Q/A	2017/09/29		03	Generally modification
4	Q/A	2019/03/31	All	04	Software upgrade
5	Q/A	2021/07/16	All	05	Software upgrade
6	Q/A	2022/06/13	All	06	Software upgrade
7	Q/A	2022/08/04	2, 5, Appendix	07	Add DGNSS functions
8	Q/A	2023/02/21	All	08	Generally modification
9	Q/A	2024/03/28	1, Appendix	09	Some modification

SAFETY INSTRUCTIONS FOR THE OPERATOR

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

SAFETY INSTRUCTIONS FOR THE INSTALLER




	<p>Warning Connect the earthing cord to ship's body. Observe the compass safe distance to prevent deviation of an onboard magnetic compass.</p>
	<p>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.</p>
	<p>Dangerous Turn off the power at power distribution board before installation.</p>

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1. PRODUCT FEATURES

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

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-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.
- Possible to be upgraded to DGNSS.

The product meets the requirements of relative IMO and IEC regulation & standards, including IMO MSC.112 (73), MSC.302 (87), IEC 61108-1, IEC 62923-1, IEC 62923-2, IEC 62288 etc.

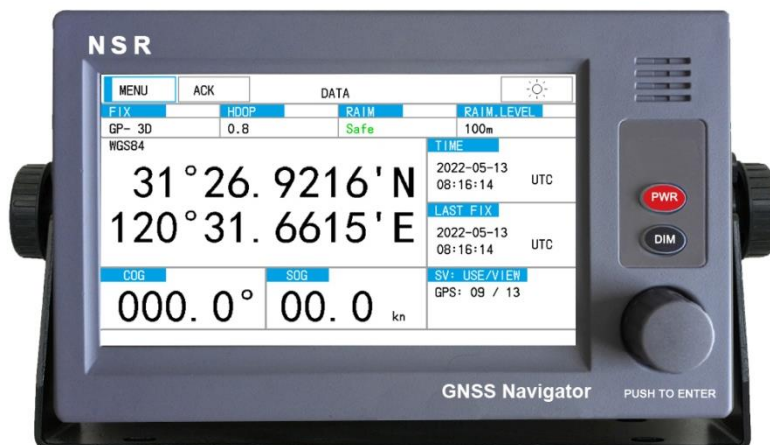
EQUIPMENT LIST:

Scope of Supply					
No.	Name	Type	Q'ty	Part No.	Description
1	Main Unit	NGR-1000	1	N992530	N992531 with NDG-100
2	GNSS Antenna	NGA100	1		Cable length 10m or 20m
3	Installation Materials				
3.1	Antenna Mount Pole		1		
3.2	Steel Tie		2		
3.3	Accessories		1		
4	Options				
4.1	Beacon	NDG-100	1	N502561	Antenna
4.2	Flush Mount Bracket	NFB700A	1	N561070	
4.3	NMEA distributor	NND-100	1	N995710	
4.4	NMEA distributor	NND-200	1	N995720	



2. OPERATIONAL OVERVIEW

2.1 Control Description

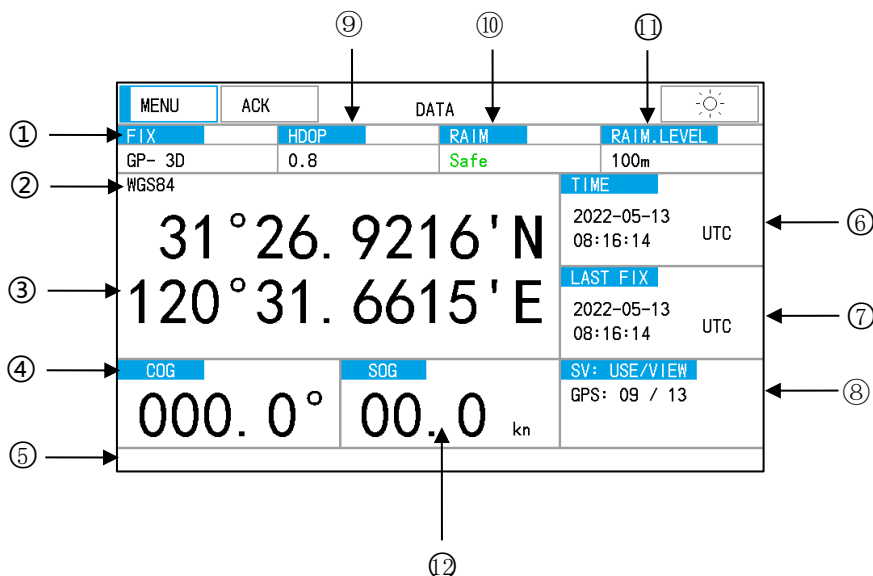
The GNSS equipment can be operated by key & knob on panel or touch-screen.



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. Press to confirm the selection or input.
PWR	Power ON/OFF. To power OFF, press and hold this button more than 3 seconds.
DIM	Press to change the LCD brightness.
Touch-screen Button	Description
MENU	Enter to display different modes.
ACK	Acknowledge current alert.
	Change day/night mode.

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	Alert Column		
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 Power ON/OFF

● 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	Glionass fix
GL-D2D/GL-D3D	Differential Glionass fix
GN-2D/GN-3D	GNSS fix
GN-D2D/GN-D3D	Differential GNSS fix

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

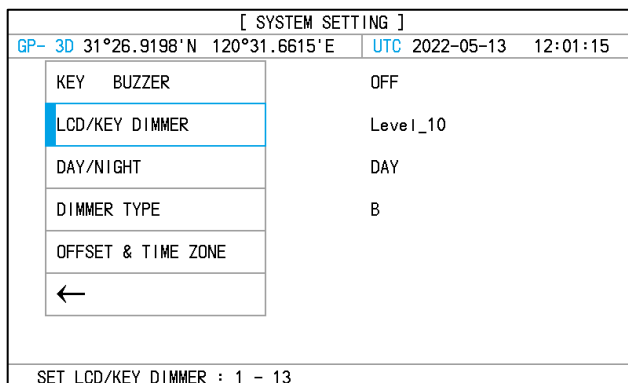
● Turn off the power

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].




- 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	DATA		
		HDOP	RAIM	RAIM LEVEL
	0.8		Green	100m
PLOTTER	<div> <div>° 26. 9213' N</div> <div>° 31. 6617' E</div> </div>			TIME
HIGHWAY				2022-05-13 08:21:09 UTC
COMPASS				LAST FIX
				2022-05-13 08:21:09 UTC
SATELLITE	SOG		SV: USE/VIEW	
SETTINGS	0°	00.0 kn	GPS: 09 / 13	
SOLUTION DATA				

- 1) Click **MENU** button on the main screen 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 following example shows how to rename a route by soft keyboard.

TOTAL: 004		PAGE:1/1		[ROUTE - NO.00002]	
GP- 3D	31°26.9197'N	120°31.6616'E	UTC	2022-05-13	12:00:48
>>	020	31°29.376'N	120°27.973'E		
		POINT020	2022-05-13	08:22	
	021	31°31.929'N	120°31.267'E	47.7 °	
		POINT021	2022-05-13	08:22	3.8 nm
	022	31°33.588'N	120°37.905'E	73.7 °	
		POINT022	2022-05-13	08:22	5.9 nm
	023	31°30.993'N	120°44.444'E	115.0 °	
		POINT023	2022-05-13	08:22	6.2 nm

ADD

RENAME

DELETE

Page ↓

Page ↑

JUMP TO

←

Operate the menus until the above screen is got. (Please refer to **WAYPOINT/ROUTE**)

1) When the first line is selected, click **[EDIT]** to locate the first character to edit.

Click **[RENAME]** to rename the route desired.

TOTAL: 004		PAGE: 1/1		[ROUTE - NO.00002]	
GP- 3D	31°26.9197'N	120°31.6617'E	UTC	2022-05-13	12:00:32
>>	020	31°29.376'N	120°27.973'E		
		POINT020	2022-05-13 08:22		
	021	31°31.929'N	120°31.267'E	47.7 °	
		POINT021	2022-05-13 08:22	3.8 nm	
	022	31°33.588'N	120°37.905'E	73.7 °	
		POINT022	2022-05-13 08:22	5.9 nm	
					ADD
					RENAME
					DELETE
					Page ↓

02 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	.	.	✓

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 **[✓]** to finish.

2.6 Display Modes

There are six display modes: Data, Plotter, Highway, Compass, Satellite and Beacon (which switches with the Satellite display). Click **[MENU]** button on screen to select a display mode.

2.6.1 Data display

The **DATA** display is the default display mode of the equipment.

① →

② →

③ →

MENU		ACK		DATA		☀	
FIX		HDOP		RAIM		RAIM LEVEL	
GP- 3D		0.8		Safe		100m	
WGS84				TIME			
31°26.9216'N 120°31.6615'E				2022-05-13 08:16:14		UTC ← ④	
				LAST FIX 2022-05-13 08:16:14		UTC	
COG		SOG		SV: USE/VIEW			
000.0°		00.0	kn	GPS: 09 / 13 ← ⑤			

Basic data will be displayed in this mode, including position in latitude and longitude, course, speed, date and time.

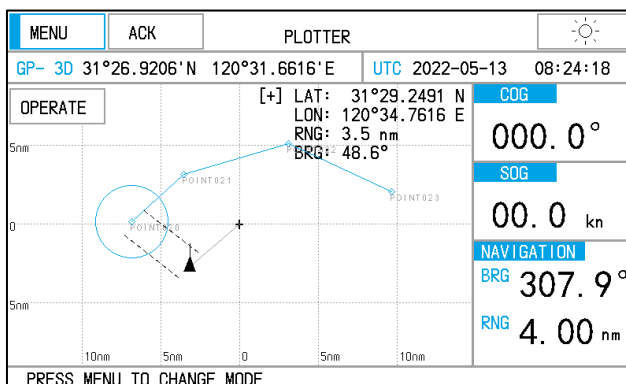
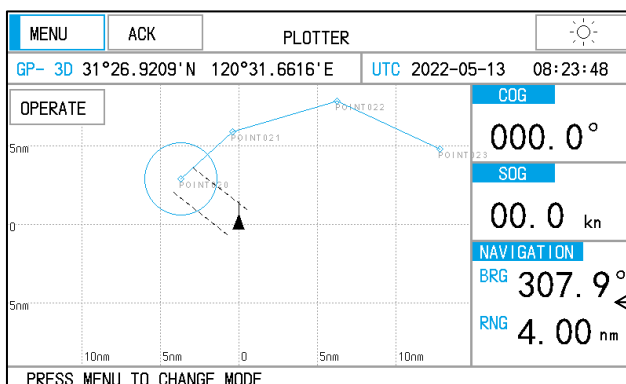
NGR-3000 takes about 40 seconds to find position when turned on for the very first time.

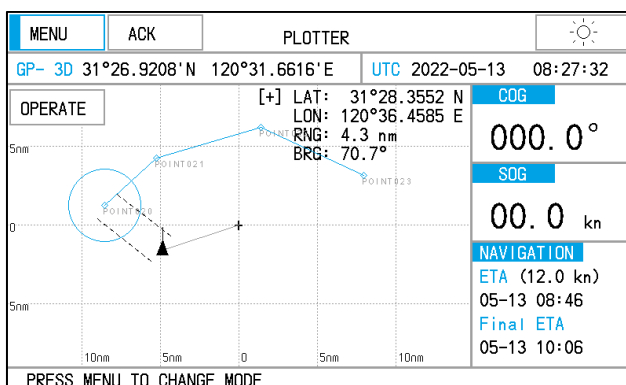
There after it takes about 15 seconds to find position each time the power is turned on.
After fixed, the accurate position (in latitude and longitude) appears on the display. If position could not be found, loss of position will appear at alert column.

NO.	Item	Remark
①	2D/3D	D2D/D3D when in Differential mode
②	Position in LAT & LON	
③	Alert column	Click to enter the alert list when alert exist
④	Time	UTC/LMT
⑤	Number of satellites tracked	

2.6.2 Plotter display

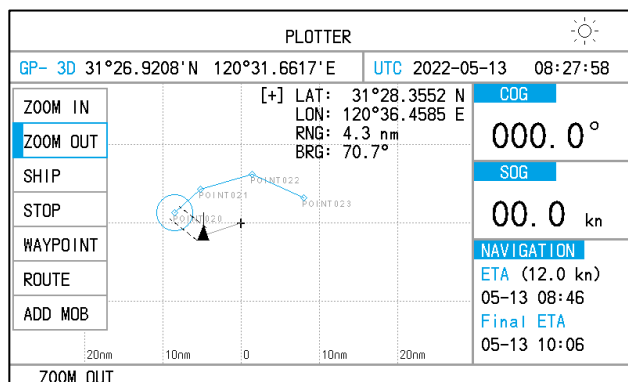
The **PLOTTER** display traces own ship's track, shows position, course, speed, and sets display range.



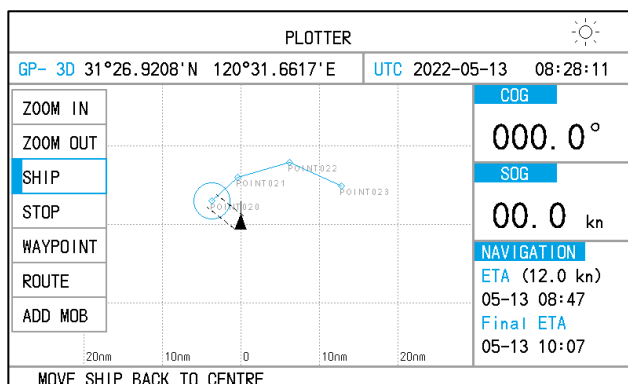


You may increase or decrease the display range on the Plotter display. The range in the Plotter display is available among 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 40, 80, 160 and 320 nautical miles.

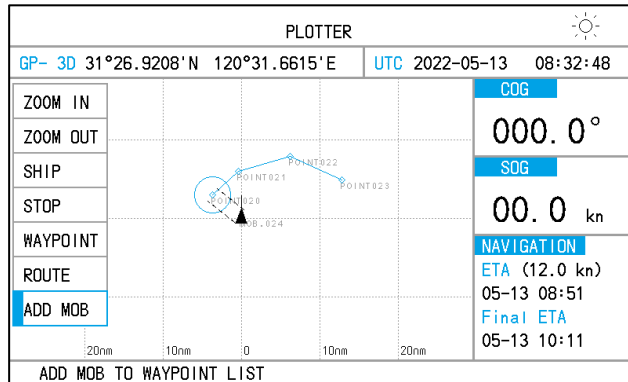
- 1) Click **OPERATE** button. The pop-up menu appears.
- 2) Click **[ZOOM IN]** or **[ZOOM OUT]** to select the desired range.
- 3) Click on any blank space to finish.



Press **[SHIP]** to return.

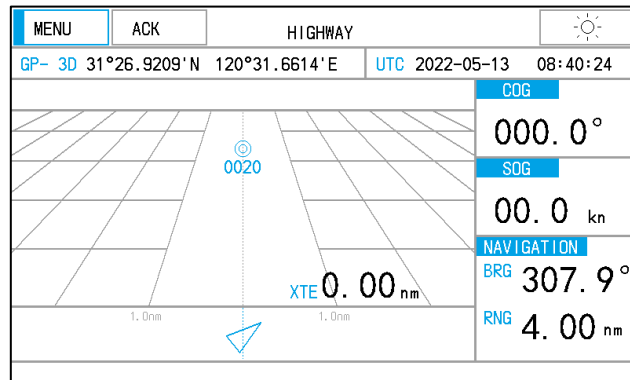


Press **[ADD MOB]** to add a waypoint named “MOB.XXX” based on the ship/cursor location.



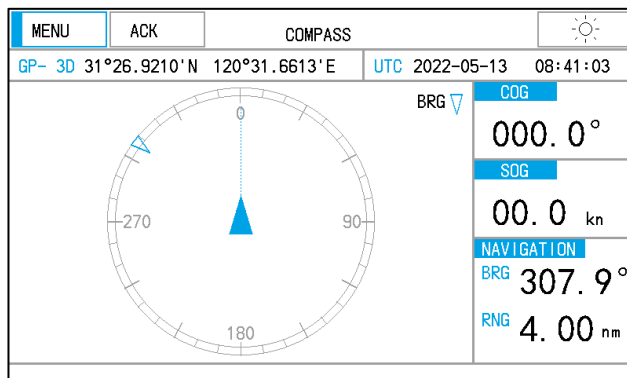
2.6.3 Highway display

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



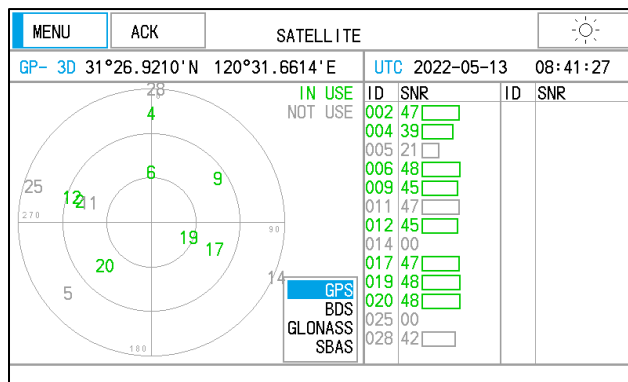
2.6.4 Compass display

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.



2.6.6 Beacon display

Click on the **SATELLITE** display to switch to the **BEACON** display and vice versa.

MENU		ACK ALL		BEACON		DGPS		☀	
GP-D3D		31°26.9211'N		120°31.6588'E		UTC		2022-07-05 06:50:19	
>> RECEIVE		Working Mode : [AUTO]							
NEXT 1		Station Name : Dajishan							
NEXT 2		ID REF1/REF2 : 0624/0625							
		Latitude : 30.82° N							
		Longitude : 122.17° E							
		Health : OK							
		Frequency : 307.5 kHz 200 bps							
		Distance : 92 NM							
		Lock : Yes WER : 0%							
		Lock Time : 0h 1m 0s							
		RSSI : 215							
		<div>RECEIVER</div> <div>TEXT</div> <div>STATION</div> <div>SETTING</div>							

[RECEIVE]: The channel used to calculate location.

[NEXT 1] / [NEXT 2]: Two channels used for duty.

[TEXT]: Check special text message received from station.

[STATION]: Check the nearest 10 stations and all stations stored.

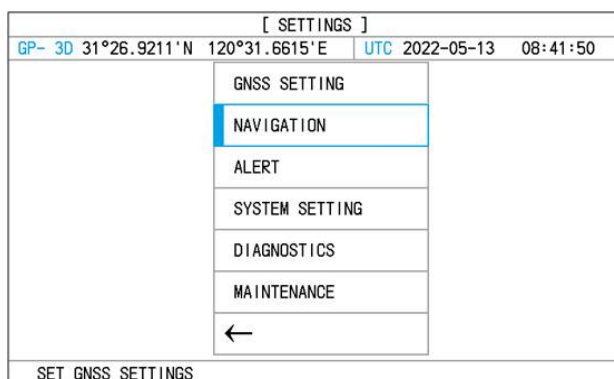
[SETTING]: Set the working mode of BEACON. See Section 5.1.5 for details.

3. NAVIGATION PLANNING

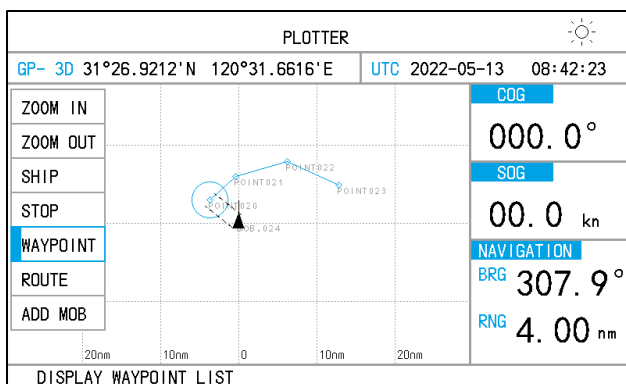
Typically, a trip from one place to another involves several course changes, requiring a series of waypoints which you navigate to, one after another. The sequence of waypoints leading to the ultimate destination is called a route. NGR-3000 can automatically advance to the next waypoint on a route, so you do not have to change the destination waypoint repeatedly. 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 **[MENU]**-**[SETTINGS]**-**[NAVIGATION]** 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]**-**[WAYPOINT LIST]** to open the waypoint list.

[NAVIGATION]					
GP- 3D	31°26.9210'N	120°31.6615'E	UTC	2022-05-13	08:46:47
<div> <div>WAYPOINT LIST</div> <div>ROUTE LIST</div> <div>NOTICE SETTING</div> <div>ASSISTANCE</div> <div>←</div> </div>					
Display Waypoint List					

TOTAL:024 PAGE: 1 / 4 [WAYPOINT LIST]					
GP- 3D	31°26.9210'N	120°31.6615'E	UTC	2022-05-13	08:47:02
>>	024	31°26.920'N	120°31.661'E		
		MOB.024	2022-05-13	08:29	ADD
	023	31°30.993'N	120°44.444'E		DELETE
		POINT023	2022-05-13	08:22	EDIT
	022	31°33.588'N	120°37.905'E		Page ↓
		POINT022	2022-05-13	08:22	Page ↑
	021	31°31.929'N	120°31.267'E		GO TO
		POINT021	2022-05-13	08:22	SEND
	020	31°29.376'N	120°27.973'E		
		POINT020	2022-05-13	08:22	←
	001	33°28.879'N	119°37.660'E		
		WPT. .002	2022-04-21	09:11	
Add One Waypoint Of Current Position					

- 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:024 PAGE: 1 / 4 [WAYPOINT EDIT]					
GP- 3D	31°26.9210'N	120°31.6616'E	UTC	2022-05-13	08:47:27
>>	024	31°26.920'N	120°31.661'E		LAT
		MOB.024	2022-05-13	08:29	LON
	023	31°30.993'N	120°44.444'E		NAME
		POINT023	2022-05-13	08:22	ID
	022	31°33.588'N	120°37.905'E		CONFIRM
		POINT022	2022-05-13	08:22	CANCEL
	021	31°31.929'N	120°31.267'E		
		POINT021	2022-05-13	08:22	
	020	31°29.376'N	120°27.973'E		
		POINT020	2022-05-13	08:22	
	001	33°28.879'N	119°37.660'E		
		WPT. .002	2022-04-21	09:11	

TOTAL:024 PAGE: 1/ 4				[WAYPOINT EDIT]	
GP- 3D	31°26.9210'N	120°31.6615'E	UTC	2022-05-13	08:48:16
024	31°26.920'N	120°31.661'E			LAT
	MOB.024	2022-05-13 08:29			LON
023	31°30.993'N	120°44.444'E			NAME
	POINT023	2022-05-13 08:22			ID
022	31°33.588'N	120°37.905'E			
	POINT022	2022-05-13 08:22			

TOTAL:024 PAGE: 1 / 4 [WAYPOINT EDIT]				
GP- 3D	31°26.9212'N	120°31.6617'E	UTC	2022-05-13 08:48:47
>>	024	31°25.000'N	120°31.661'E	LAT
		MOB.024	2022-05-13 08:29	LON
	023	31°30.993'N	120°44.444'E	NAME
		POINT023	2022-05-13 08:22	ID
	022	31°33.588'N	120°37.905'E	CONFIRM
		POINT022	2022-05-13 08:22	CANCEL
	021	31°31.929'N	120°31.267'E	
	POINT021	2022-05-13 08:22		
020	31°29.376'N	120°27.973'E		
	POINT020	2022-05-13 08:22		
001	33°28.879'N	119°37.660'E		
	WPT. .002	2022-04-21 09:11		

- 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 edition.

3.1.3 Delete a waypoint

Click **[DELETE]** to delete the selected waypoint. Click “YES” to confirm the operation.

TOTAL:024		PAGE: 1 / 4		[WAYPOINT LIST]	
GP- 3D	31°26.9213'N	120°31.6619'E	UTC	2022-05-13	08:49:42
024	31°25.000'N MOB.024	120°31.661'E 2			
023	31°30.993'N POINT023	120°31.661'E 2			
022	31°33.588'N POINT022	120°31.661'E 2			
021	31°31.929'N POINT021	120°31.661'E 2022-05-13 08:22			
020	31°29.376'N POINT020	120°27.973'E 2022-05-13 08:22			
001	33°28.879'N WPT. .002	119°37.660'E 2022-04-21 09:11			

3.2 Route Planning

Click **[NAVIGATION]**-**[ROUTE LIST]** to open the route list.

[NAVIGATION]					
GP- 3D	31°26.9213'N	120°31.6620'E	UTC	2022-05-13	08:50:07
<div> <div>WAYPOINT LIST</div> <div>ROUTE LIST</div> <div>NOTICE SETTING</div> <div>ASSISTANCE</div> <div>←</div> </div>					
Display Route List					

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

TOTAL: 002 PAGE:1/1 [ROUTE LIST]				
GP- 3D	31°26.9213'N	120°31.6620'E	UTC	2022-05-13 08:50:29
ID	NAME	PTS	DISTANCE	
>> 2	ROUTE - NO.00002	4	15.9 nm	EDIT
1	RTU001YHJKJHGVCC	15	1033.8 nm	FORWARD
				REVERSE
				ADD
				DELETE
				Page ↓
				Page ↑
				←

- 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]**.
- 2) Click **[EDIT]** to edit the route.
- 3) Select **[ADD]**, **[DELETE]** to add or delete a waypoint in the route, **[RENAME]** to rename the route.

TOTAL: 004 PAGE:1/1 [ROUTE - NO.00002]					
GP- 3D	31°26.9213' N	120°31.6618' E	UTC	2022-05-13	08:59:24
>>	020	31°29.376' N POINT020	120°27.973' E 2022-05-13 08:22		ADD
	021	31°31.929' N POINT021	120°31.267' E 2022-05-13 08:22	47.7 ° 3.8 nm	RENAME
	022	31°33.588' N POINT022	120°37.905' E 2022-05-13 08:22	73.7 ° 5.9 nm	DELETE
	023	31°30.993' N POINT023	120°44.444' E 2022-05-13 08:22	115.0 ° 6.2 nm	Page ↓
					Page ↑
					JUMP TO
					←

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.

RENAME the route

Click **[RENAME]**, the pop-up menu appears.

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

The operation is as follows:

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

DELETE a waypoint

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

3.2.2 Forward navigation

Click **[FORWARD]** in **[ROUTE LIST]** menu to start navigation forward. The screen will switch to **PLOTTER** page.

TOTAL: 002		PAGE:1/1		[ROUTE LIST]	
GP- 3D	31°26.9211'N	120°31.6620'E	UTC	2022-05-13	09:05:18
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	ROUTE - ND.00002	4	15.9 nm		
1	RTU001YHJKJHGVCC	15	1033.8 nm		

3.2.3 Reverse navigation

Click **[REVERSE]** to start navigation reversely. The screen will switch to **PLOTTER** page.

3.2.4 Create a new route

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

TOTAL: 003		PAGE:1/1		[ROUTE LIST]	
GP- 3D	31°26.9211'N	120°31.6619'E	UTC	2022-05-13	09:10:06
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>	
>> 3	ROUTE - NO.00003	0	0.0 nm		
2	ROUTE - NO.00002	4	15.9 nm		
1	RTU001YHJKJHGVCC	15	1033.8 nm		

3.2.5 Delete a route

Click **[DELETE]** to delete the selected route from route list. Click “YES” to confirm the operation.

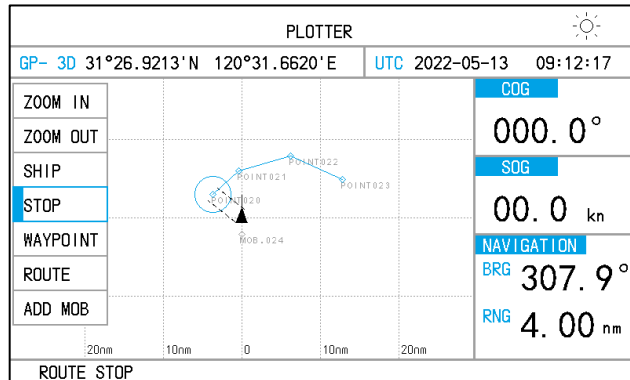
TOTAL: 003		PAGE:1/1		[ROUTE LIST]	
GP- 3D	31°26.9212'N	120°31.6619'E	UTC	2022-05-13	09:10:28
ID	NAME	PTS	DISTANCE	<div>EDIT</div> <div>FORWARD</div> <div>REVERSE</div> <div>ADD</div> <div>DELETE</div> <div>Page ↓</div> <div>Page ↑</div> <div>←</div>	
>> 3	ROUTE - NO.00003		.0 nm		
2	ROUTE - NO.00002		.9 nm		
1	RTU001YHJKJHGVCC		.8 nm		

CONFIRM

NO

YES

3.3 Stop the Navigation by the current Route



Click **[PLOTTER]** in **[MENU]**, then click **[STOP]** to stop the navigation by the current route.

The route is cleared on the **PLOTTER** display.

4. NAVIGATION ALARMS

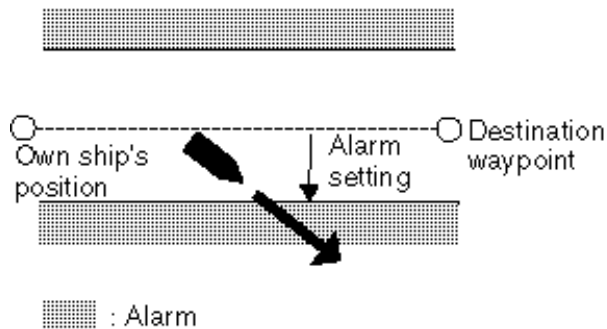
Important Note: All these navigational alarms (XTE, SPEED, ARV, ANC) should be switched off on SOLAS- (or IMO-) compliant ships.

Select [SETTINGS]-[NAVIGATION]-[NOTICE SETTING] to open the menu.

[NAVIGATION]	
GP- 3D	31°26.9212'N 120°31.6619'E UTC 2022-05-13 09:12:54
<div> <div>WAYPOINT LIST</div> <div>ROUTE LIST</div> <div>NOTICE SETTING</div> <div>ASSISTANCE</div> <div>←</div> </div>	
Notices for speed,arrive,xte	

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]	
GN-D3D	31°26.9198'N 120°31.6611'E UTC 2022-06-22 07:43:38
XTE ALARM	01.50 nm
SPEED ALARM	HIGH OFF LOW OFF
ARV/ANC ALARM	ARV 02.00 nm ANC OFF
TRACK	SPACE 02.00 nm
ETA-SOG	10.0 kn
NOTICE AUDIO	ON
←	

[NOTICE SETTING]	
GN-D3D 31°26.9197'N 120°31.6610'E UTC 2022-06-22 07:45:37	
XTE ALARM	01.50 nm
SPEED ALARM	HIGH OFF LOW OFF
ARV/ANC ALARM	ARV 02.00 nm ANC OFF
TRACK	SPACE 02.00 nm
<div>123</div> <div>0 1 2 3 4 5 6 7 8 9</div> <div>N S E W</div> <div> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </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, alarm will be turned off.

4.2 Speed Alarm

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

[NOTICE SETTING]	
GN-D3D 31°26.9198'N 120°31.6612'E UTC 2022-06-22 07:46:06	
XTE ALARM	01.50 nm
SPEED ALARM	HIGH OFF LOW OFF
ARV/ANC ALARM	ARV 02.00 nm ANC OFF
TRACK	SPACE 02.00 nm
<div>123</div> <div>0 1 2 3 4 5 6 7 8 9</div> <div>N S E W</div> <div> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div>	

LOW: Alarm is activated when speed is lower than the speed set in the field.

HIGH: Alarm is activated when speed is higher than the speed set in the field.

- 1) Click the **HIGH/LOW** 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, alarm will be turned off.

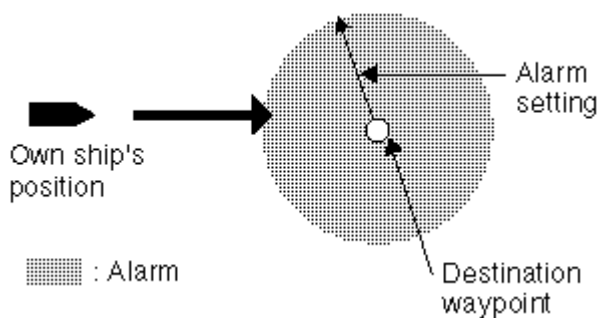
4.3 Arrival Alarm and Anchor Watch Alarm

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

[NOTICE SETTING]	
GN-D3D 31°26.9198'N 120°31.6612'E UTC 2022-06-22 07:46:25	
XTE ALARM	01.50 nm
SPEED ALARM	HIGH OFF LOW OFF
ARV/ANC ALARM	ARV 02.00 nm ANC OFF
TRACK	SPACE 02.00 nm
ETA-SOG	10.0 kn
NOTICE AUDIO	ON
←	

● 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.

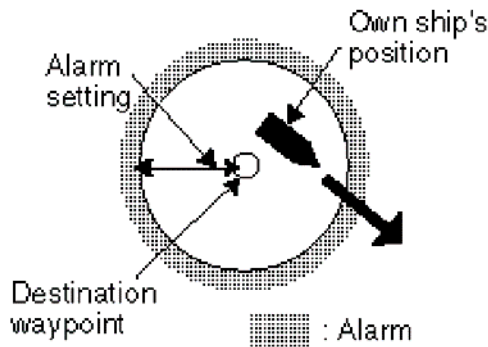


- 1) Click the **ARV** alarm value to edit.
- 2) Click the digits among 0-9 until the desired digit is got.
- 3) Turn the knob to move the cursor to the next digit to edit.
- 4) When the value is set to 0, the alarm will be turned off.

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) Click the **ANC** alarm value to edit.
- 2) Click the digits among 0-9 until the desired digit is got.
- 3) Turn the knob to move the cursor to the next digit to edit.
- 4) When the value is set to 0, alarm will be turned off.

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

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

[NOTICE SETTING]	
GN-D3D 31°26.9199'N 120°31.6612'E UTC 2022-06-22 07:46:48	
XTE ALARM	01.50 nm
SPEED ALARM	HIGH OFF LOW OFF
ARV/ANC ALARM	ARV 02.00 nm ANC OFF
TRACK	SPACE 02.00 nm
ETA-SOG	10.0 kn
NOTICE AUDIO	ON
←	

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.

4.5 ETA-SOG

When forward a route but $SOG < 0.4$ kn, ETA will be calculated according to this SOG.

Default is 10.0 kn

[NOTICE SETTING]			
GN-D3D	31°26.9198'N	120°31.6611'E	UTC 2022-06-22 07:47:08
XTE ALARM	01.50 nm		
SPEED ALARM	HIGH OFF	LOW OFF	
ARV/ANC ALARM	ARV 02.00 nm	ANC OFF	
TRACK	SPACE 02.00 nm		
ETA-SOG	10.0 kn		
NOTICE AUDIO	ON		
←			
Set up a custom SOG for computing ETA when $SOG < 0.4$ kn.			

4.6 Notice Audio

Set whether an audible alarm is required for Notice.

5. MENU SETTING

5.1 GNSS Setting

Click [MENU]-[SETTINGS]-[GNSS SETTING] to open the menu as follows.

[GNSS SETTING]			
GP- 3D	31°26.9196'N	120°31.6615'E	UTC 2022-05-13 11:59:34
GNSS MODE		GPS	
2D / 3D		AUTO	
GEODETIC DATUM		WGS84	
RAIM			
BEACON/SBAS		SBAS	
SMOOTHING			
←			
SET THE GNSS MODE			

It includes **GNSS MODE**, **2D/3D**, **GEODETIC DATUM**, **RAIM**, **BEACON/SBAS** and **SMOOTHING** settings.

5.1.1 GNSS mode

There are five modes can be selected: GPS & BDS, GPS & GLONASS, GPS, BDS and GLONASS.

GNSS MODE SELECT			
GP- 3D	31°26.9201'N	120°31.6616'E	UTC 2022-05-13 11:59:08
GPS&BDS			
GPS&GLONASS			
GPS			
BDS			
GLONASS			
←			

5.1.2 2D/3D

Select 2D or 3D fix mode.

[2D / 3D]	
GP- 3D	31°26.9201'N 120°31.6617'E UTC 2022-05-13 11:58:57
2D	
3D	
AUTO	
←	

5.1.3 Geodetic datum

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

[GEODETIC DATUM]	
GP- 3D	31°26.9201'N 120°31.6617'E UTC 2022-05-13 11:58:45
WGS84	
PZ90	
CGCS2000	
←	

5.1.4 RAIM

5.1.4.1 RAIM

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

When set to **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
←	

5.1.5 Beacon/SBAS

This menu is used to set the differential mode, distance and enter **BEACON SCREEN**.

Click [**BEACON/SBAS**] to change the mode among BEACON, SBAS and AUTO options.

[SBAS] is a differential mode based on satellite. The coverage is wider, but not as accurate as BEACON.

[AUTO]: Use BEACON first, and switch to SBAS when the distance to the nearest base station is greater than [DISTANCE].

[BEACON/SBAS]		LOCK
GP-D3D	31°26.9210'N 120°31.6592'E	UTC 2022-08-15 02:04:04
BEACON/SBAS	AUTO	
DISTANCE	100 nm	
BEACON SCREEN		
←		
Set differential mode [OFF/SBAS/BEACON/AUTO]		

Note: **LOCK** indicates that the differential signal of the base station is locked.

Click [BEACON SCREEN] to open the BEACON window as follows.

MENU		ACK	BEACON	LOCK	☀
GN-D3D	31°26.9199'N 120°31.6597'E	UTC 2022-11-16 02:18:14			
RECEIVE	Working Mode : [AUTO]			RECEIVER	
>> NEXT 1	Station Name : Dajishan			TEXT	
NEXT 2	ID REF1/REF2 : 0624/0625			STATION	
	Latitude : 30.82° N			SETTING	
	Longitude : 122.17° E				
	Health : OK				
	Frequency : 307.5 kHz 200 bps				
	Distance : 92 NM				
	Lock : Yes WER : 0%				
	Lock Time : 0h 2m 22s				
	SNR : 21dB				

5.1.5.1 Set beacon mode

Click [SETTING] in BEACON SCREEN to set BEACON mode. The following menu appears.

SETTING		LOCK
GN-D3D	31°26.9220'N 120°31.6606'E	UTC 2022-08-17 02:35:53
Working Mode	AUTO 307.5 kHz 200 bps	MODE
[Current Receive]		DIAGNOSIS
Station Name	: Dajishan	MONITOR
ID REF1/REF2	: 0624/0625	←
Latitude	: 30.82° N	
Longitude	: 122.17° E	
Health	: OK	
Frequency	: 307.5 kHz	
Bit Rate	: 200 bps	
Lock	: Yes	

Click **[MODE]** to switch directly between **[AUTO]**, **[MANUAL]** and **[SCAN]**.

MODE SETTING		LOCK
GP-D3D	31°26.9212'N 120°31.6589'E	UTC 2022-08-15 02:04:31
Working Mode	: AUTO	<div>MODE</div> <div>FREQ</div> <div>BPS</div> <div>←</div>
Frequency	: 307.5 kHz	
Bit Rate	: 200 bps	
AUTO/MANUAL/SCAN		

[AUTO]: Search the nearest 10 base stations for DGNSS signals.

[MANUAL]: Lock the DGNSS signal according to the set frequency and bit rate.

[SCAN]: Search for DGNSS signals at all frequencies and bit rates.

5.1.5.2 Station list

Click **[STATION]** in **BEACON SCREEN**. The following screen appears.

STATION		LOCK
GP-D3D	31°26.9214'N 120°31.6588'E	UTC 2022-08-15 02:04:55
NO.	RNG	Description
>> 1	69	Station Name : Haozhigang
2	92	ID REF1/REF2 : 0622/0623
3	117	Latitude : 32.02° N
4	186	Longitude : 121.72° E
5	199	Health : NORMAL
6	210	Frequency : 304.0 kHz
7	277	Bit Rate : 200
8	280	
9	308	
10	362	
		<div>NEAR</div> <div>LOCK</div> <div>ALL</div> <div>←</div>

[LOCK]: Manually lock to the selected station.

[ALL]: Check all stored stations.

ALL STATION		LOCK	
GP-D3D	31°26.9213'N 120°31.6591'E	UTC 2022-08-15 02:05:13	
NO.	LAT	LON	
	FREQ	BPS NAME	
>> 1	26.12°N	050.65°E	298.0 200 Bahrain
2	29.12°N	048.14°E	295.0 200 Kuwait
3	25.98°N	056.07°E	292.0 200 Ras Al Khaimah
4	24.10°N	052.93°E	314.0 200 Abu Dhabi
5	20.71°S	116.77°E	304.0 200 Karratha
6	40.32°N	050.60°E	309.5 200 Baku
7	22.16°N	092.05°E	305.0 200 Chittagong
8	23.02°N	089.23°E	295.0 200 Monirampur. Jes
9	24.81°N	090.44°E	300.0 200 Mymensingh
10	51.22°N	002.93°E	312.0 200 Oostende
		<div>VIEW</div> <div>Page ↓</div> <div>Page ↑</div> <div>LOCK</div> <div>RESET</div> <div>←</div>	

5.1.5.3 Beacon self-test

Click [SETTING]-[DIAGNOSIS] in **BEACON SCREEN**. The following menu appears.

DIAGNOSIS				LOCK
NO FIX		31°26.9211'N	120°31.6606'E	UTC 2022-08-15 02:06:11
Working Mode		SELFTEST 307.5 kHz 200 bps		<div>SELFTEST</div> <div>←</div>
[BEACON]				
Version : 20-08-21 V100				
On Time : 220548 s				
	[CH1]	[CH2]	[CH3]	
Freq	307.5 kHz	307.5 kHz	307.5 kHz	
bps	200	200	200	
RSSI	-53	-53	-53	
Receive	03/20	03/20	02/20	
1/1 3056 HDOP exceeded				

Click [SELFTEST] to start self-test.

DIAGNOSIS				LOCK
NO FIX		31°26.9211'N	120°31.6606'E	UTC 2022-08-15 02:06:23
Working Mode		SELFTEST 307.5 kHz 200 bps		<div>SELFTEST</div> <div>←</div>
[BEACON]				
Version : 20-08-21 V100				
On Time : 220561 s				
	[CH1]	[CH2]	[CH3]	
Freq	307.5 kHz	307.5 kHz	307.5 kHz	
bps	200	200	200	
RSSI	-54	-54	-53	
Receive	15/20	15/20	15/20	
1/3 3012 Integrity status				

5.1.6 Smoothing

Change the COG and SOG averages to adjust the smoothness.

[SMOOTH SETTING]				
GP-	3D	31°26.9207'N	120°31.6611'E	UTC 2022-05-13 10:49:29
	SOG	OFF		
	COG	OFF		
	DRIVING MODE	SEA		
	←			
SET SOG SMOOTHING [OFF/AUTO/1-9]				

5.2 System Setting

Click [MENU]-[SETTINGS]-[SYSTEM SETTING] to open the menu as follows.

[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					

It includes **KEY BUZZER**, **LCD/KEY DIMMER**, **DAY/NIGHT**, **DIMMER TYPE** and **OFFSET & TIME ZONE** items.

5.2.1 Key buzzer

Key buzzer can be turned off 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


Change the display mode between **DAY** and **NIGHT**. For example:

[SYSTEM SETTING]

GP- 3D 31°26.9203'N 120°31.6613' E
UTC 2022-05-13 11:32:56


KEY BUZZER	OFF
LCD/KEY DIMMER	Level_10
DAY/NIGHT	NIGHT
DIMMER TYPE	B
OFFSET & TIME ZONE	
←	

CHANGE DISPLAY MODE DAY/NIGHT

MENU
ACK
BEACON
LOCK


GN-D3D 31°26.9193'N 120°31.6611' E
UTC 2022-11-16 02:21:16

RECEIVE	Working Mode : [AUTO] Station Name : Dajishan ID REF1/REF2 : 0624/0625 Latitude : 30.82° N Longitude : 122.17° E Health : OK Frequency : 307.5 kHz 200 bps Distance : 92 NM Lock : Yes WER : 0% Lock Time : 0h 5m 4s SNR : 21dB <div style="width: 100px; height: 10px; background: linear-gradient(to right, black, white);"></div>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">RECEIVER</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">TEXT</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">STATION</div> <div style="border: 1px solid black; padding: 2px;">SETTING</div>
>> NEXT 1 NEXT 2		

You can also click the  icon at upper right corner of main or beacon screen to change the display between day mode and night mode.

5.2.4 Offset & Time zone

[OFFSET & TIME ZONE]

GP- 3D 31°26.9204'N 120°31.6615' E
UTC 2022-05-13 11:34:05

TIME MODE	UTC
TIME ZONE	+00:00
LATITUDE OFFSET	00.0000'N
LONGITUDE OFFSET	00.0000'E
ANT HEIGHT	020 m
←	

SET TIME MODE UTC/LMT

[TIME MODE]: Time can be set as **UTC** or **LMT** in **TIME MODE**.

[TIME ZONE]: Set time zone from **-13:00** to **+13:00**.

[LATITUDE OFFSET]: Set the latitude offset to add to the calculation of the position.

[LONGITUDE OFFSET]: Set the longitude offset to add to the calculation of the position.

[ANT HEIGHT]: Set the height of GNSS antenna.

5.3 Alert

List of all alerts that could be generated:

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
3012	4	B	W	W	Yes	Integrity status	Accuracy is unsafe check antenna

Ins: Instance of an alert;

Prio: Alert priority (W – Warning, C – Caution);


Cat: Alert category;

Escal: W – An unacknowledged warning will be repeated as warning after 4 minutes;







Resp: Transfer responsibility;

*: “DGNSS Lost” takes effect when BEACON is selected.

When an alert occurs, the buzzer sounds (except for a caution) and the title of alert appears at the bottom of display. Click on the bottom to enter the alert list.

MENU	ACK	DATA	
FIX	HDOP	RAIM	RAIM LEVEL
GN- 3D	0.5	Unsafe	100m
WGS84			TIME
			2022-05-13 05:01:28 UTC
31°26.9210'N			LAST FIX
120°31.6619'E			2022-05-13 05:01:28 UTC
COG	SOG		SV: USE/VIEW
000.0°	00.0 kn		GPS: 09 / 11
			BDS: 12 / 18
1/1	3012	Integrity status	

Alert mark description:

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

Click [MENU]-[SETTINGS]-[ALERT] to open the [ALERT] screen, it shows all currently

alerts. Time is synchronized when GNSS is fixed, and not synchronized when GNSS is not fixed.

[ALERT]					
NO FIX	31°26.9207'N	120°31.6616'E	UTC	2022-05-13	05:12:32
ID	ALERT	TIME (UTC)			
> 3055	DGNSS Lost	05-13	05:12	ACK	
3015	Loss of position	05-13	05:12	MUTE	
3012	Integrity status	05-13	05:12	VIEW	
! 3056	HDOP exceeded	05-13	05:12	←	
1/4 3055 DGNSS Lost					

> : Point to the currently selected alert, click the alert to select.

[ACK]: Acknowledge the alert selected.

[MUTE]: Make all alerts silent for 30 seconds.

[VIEW]: View the details of alert selected, it will show as below.

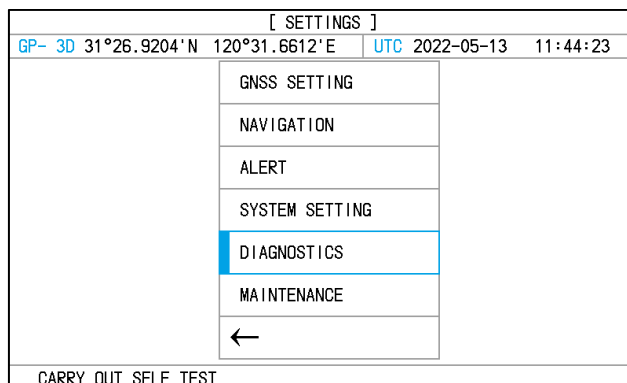
[←]: Back to upper menu.

[PWR]: Short press to return to the main screen.

[ALERT VIEW]					
NO FIX	31°26.9203'N	120°31.6620'E	UTC	2022-05-13	03:18:47
ID	3015 : 2				
CATEGORY	B				
PRIORITY	WARNING				
STATE	ACTIVE-UNACKNOWLEDGED				
DESCRIPTION	Loss of position Loss of position check antenna				
←					
2/4 3015 Loss of position					

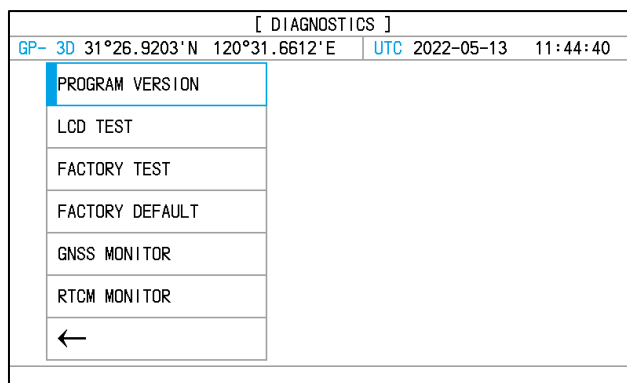
5.4 Diagnostics

Click [MENU]-[SETTINGS]-[DIAGNOSTICS] to check software version, keypad and LCD for proper operation, etc.



5.4.1 Software version

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

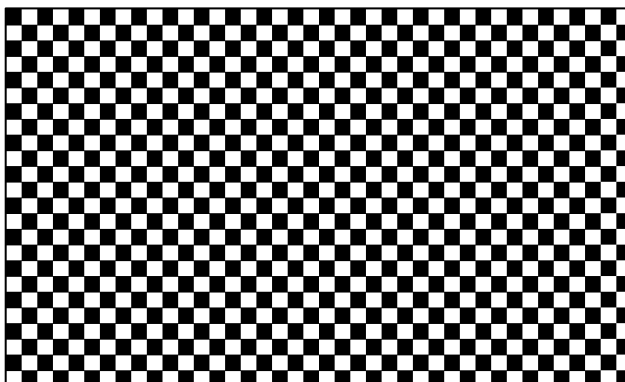


5.4.2 LCD test

LCD TEST is used for testing the screen.

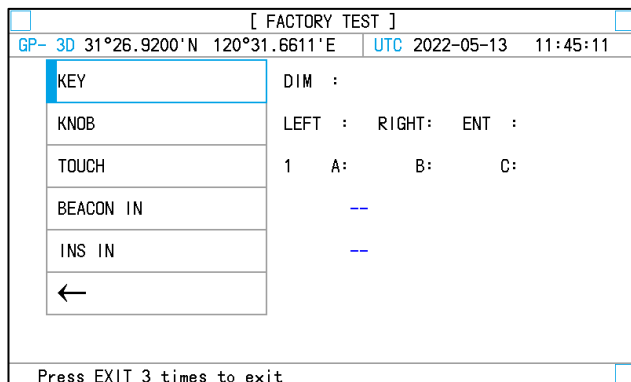
Click [LCD TEST] to enter the test screen, turn knob continuously to test the LCD.

Press the knob to exit.



5.4.3 Factory test

It is designed to test whether the key, knob and touch-screen are working or not, etc.
Click **[FACTORY TEST]** to enter the following view.



The screenshot shows the 'FACTORY TEST' menu. At the top, it displays the title '[FACTORY TEST]' and a status bar with 'GP- 3D 31°26.9200'N 120°31.6611'E UTC 2022-05-13 11:45:11'. The main menu has a list of options on the left: KEY, KNOB, TOUCH, BEACON IN, INS IN, and a back arrow. On the right, there are labels for 'DIM :', 'LEFT :', 'RIGHT:', 'ENT :', and '1 A: B: C:'. Below these, there are two dashed lines. At the bottom, it says 'Press EXIT 3 times to exit'.

KEY test: Press **DIM** key.

KNOB test: Turn the knob to left and right, then press it.

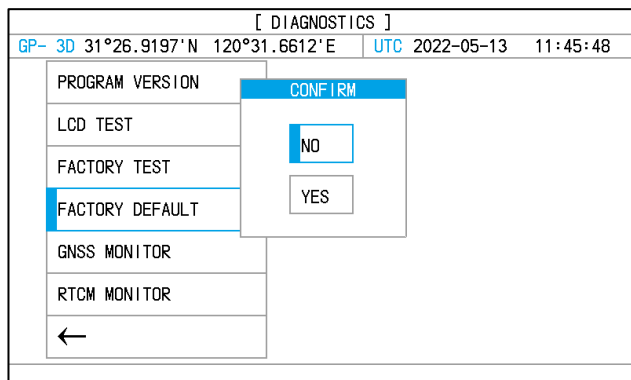
TOUCH test: Touch the corner of the screen. The box corresponding to the item will be filled with blue color.

If everything is good, **OK** icon will appear.

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**” to confirm the operation.



The screenshot shows the 'DIAGNOSTICS' menu. At the top, it displays the title '[DIAGNOSTICS]' and a status bar with 'GP- 3D 31°26.9197'N 120°31.6612'E UTC 2022-05-13 11:45:48'. The main menu has a list of options: PROGRAM VERSION, LCD TEST, FACTORY TEST, FACTORY DEFAULT, GNSS MONITOR, RTCM MONITOR, and a back arrow. A confirmation dialog box is overlaid on the screen with the title 'CONFIRM' and two buttons: 'NO' and 'YES'. The 'FACTORY DEFAULT' option is highlighted in blue.

Note:

The navigation settings and GNSS 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.

[GNSS MONITOR]				
GP- 3D	31°26.9196'N	120°31.6613'E	UTC 2022-05-13	11:46:06
\$GPRMC,114605.00,A,3126.9196,N,12031.6613,E,0.0,0.0,130522,5.7,W,A,S*58 \$GPVTG,0.0,T,M,0.0,N,0.0,K,R*00 \$GPDLL,3126.9196,N,12031.6613,E,114605.00,A,R*6C \$GPGGA,114605.00,3126.9196,N,12031.6613,E,1,12,0.9,19.1,M,7.6,M,0.0,0000 \$GPZDA,114605.00,13,05,2022,00,00*64 \$GPRMWS4,0.00,N,0.00,E,0.0,WS*6F \$GPRMC,114606.00,A,3126.9196,N,12031.6613,E,0.0,0.0,130522,5.7,W,A,S*5B \$GPVTG,0.0,T,M,0.0,N,0.0,K,R*00 \$GPDLL,3126.9196,N,12031.6613,E,114606.00,A,R*6F \$GPGGA,114606.00,3126.9196,N,12031.6613,E,1,12,0.9,19.1,M,7.6,M,0.0,0000 \$GPZDA,114606.00,13,05,2022,00,00*67 \$GPRMWS4,0.00,N,0.00,E,0.0,WS*6F \$GPRMC,114607.00,A,3126.9196,N,12031.6613,E,0.0,0.0,130522,5.7,W,A,S*5A \$GPVTG,0.0,T,M,0.0,N,0.0,K,R*00 \$GPDLL,3126.9196,N,12031.6613,E,114607.00,A,R*6E \$GPGGA,114607.00,3126.9196,N,12031.6613,E,1,12,0.9,19.1,M,7.6,M,0.0,0000 \$GPZDA,114607.00,13,05,2022,00,00*66				GNSS OUT 1
				GNSS OUT 2
				GNSS OUT 3
				INS OUT
				INS IN
				INTERNAL
				←

5.4.6 RTCM monitor

When [BEACON/SBAS] in [GNSS SETTING] is set to **BEACON**, DGPS beacon input will be checked by 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	TYPE
13	PWR (+24V)	DC Power
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 Interfaces

PIN NO.	DESCRIPTION	TYPE
3	GNSS OUT 1+	IEC 61162-1/ IEC 61162-2
4	GNSS OUT 1-	
5	GNSS OUT 2+	IEC 61162-1/ IEC 61162-2
6	GNSS OUT 2-	
7	GNSS OUT 3+	IEC 61162-1/ IEC 61162-2
8	GNSS OUT 3-	
9	BAM OUT+	IEC 61162-1/ IEC 61162-2
10	BAM OUT-	
11	BAM IN+	IEC 61162-1/ IEC 61162-2
12	BAM IN-	
13	PWR (+24V)	DC Power
14	PWR (0V)	

[Beacon IN] is used for receive differential signal from DGPS beacon.

[GNSS OUT] is used for output position data.

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

6.3.3 Alert interface

There is one alert interface (IEC 61162-1/IEC 61162-2) for BAM.

PIN NO.	DESCRIPTION	TYPE
9	BAM OUT+	IEC 61162-1/ IEC 61162-2 ALF,ALC,ARC,HBT
10	BAM OUT-	
11	BAM IN+	IEC 61162-1/ IEC 61162-2 ACN,HBT
12	BAM IN-	

Alert list is described in Section 5.3.

6.3.4 Grounding

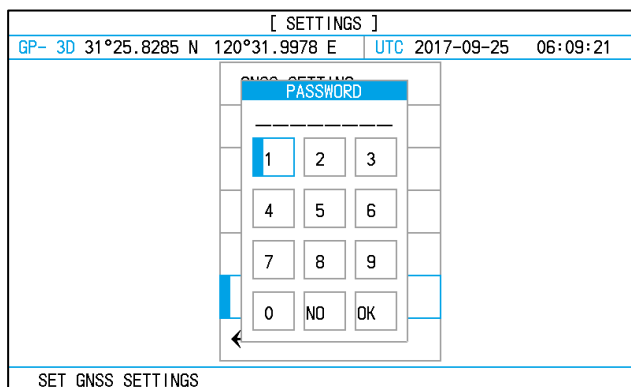
Ground the unit as follows to prevent interference:

- The ground wire should be 1.25mm² or larger.
- The ground wire should be as short as possible.

6.4 Initial Settings

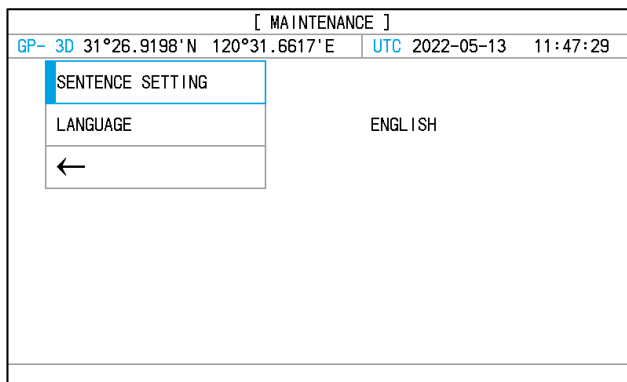
This equipment can output navigation data to external equipment, in NMEA 0183 format. For example, it can output position data to a radar or echo sounder.

Initial settings are done in menu of **[MAINTENANCE]**.



[SETTINGS]					
GP- 3D	31°25.8285' N	120°31.9978' E	UTC	2017-09-25	06:09:21
GNSS SETTINGS					
PASSWORD					
1	2	3			
4	5	6			
7	8	9			
0	NO	OK			
SET GNSS SETTINGS					

Password is required to enter **[MAINTENANCE]**.



[MAINTENANCE]	
GP- 3D	31°26.9198' N 120°31.6617' E UTC 2022-05-13 11:47:29
SENTENCE SETTING	
LANGUAGE	ENGLISH
←	

6.4.1 Language setting

[LANGUAGE]: Change language (ENGLISH/中文/ Español).

6.4.2 Sentence setting

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

- **Data sentences:**

The following sentences are available: GBS, GNS, GGA, DTM, RMC, VTG, ZDA, GSA, XTE, WPL, BOD, RTE, GLL, APB, VLW, GFA, GRS, GST, GSV, RMB, BWC. When selecting sentences, the load rate needs to be kept below 100%. Each sentence can be set to be sent once every 1/2/5/10 seconds.

- **NMEA version**

There are five versions to be selected: NMEA1.5, NMEA2.0, NMEA2.3, IEC61162 Ed4 and IEC61162 Ed5.

- **Baudrate**

It can be 4800/9600/19200/38400bps.

6.4.2.1 Sentence

Click [MAINTENANCE]-[SENTENCE SETTING], the following menu appears.

[OUTPUT SENTENCE]			
GP- 3D	31°26.9196'N 120°31.6616'E	UTC	2022-05-13 11:46:49
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		
←			

Click the ports to set sentence. For example:

[SENTENCE SETTING]	
GP- 3D	31°26.9205'N 120°31.6617'E UTC 2022-05-13 11:53:05
SENTENCE	
BAUDRATE	4800 BPS
VERSION	IEC61162 Ed5
←	
Select the Sentence need output	

Click each sentence continuously to choose 1s/2s/5s/10s. "--" means no output.

[OUTPUT SENTENCE]					
GP- 3D	31°26.9205'N	120°31.6618'E	UTC	2022-05-13	11:53:18
GBS	--	XTE	--	GRS	--
GNS	--	WPL	1 s	GST	--
GGA	1 s	BOD	--	GSV	--
DTM	1 s	RTE	5 s	RMB	--
RMC	1 s	GLL	1 s	BWC	--
VTG	1 s	APB	--	←	
ZDA	1 s	VLW	--		
GSA	--	GFA	--		Load Rate: 78%

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

Note 2: Click [TALKER ID], you can modify the Talker ID of the output sentence.

6.4.2.2 Baud rate

Select each of four outputs to configure the baud rate.

Default baud rate of all ports is 4800bps.

Click BAUDRATE continuously until a desired rate is shown.

[SENTENCE SETTING]			
GP- 3D	31°26.9200'N	120°31.6619'E	UTC 2022-05-13 11:57:36
SENTENCE			
BAUDRATE		4800 BPS	
VERSION		IEC61162 Ed5	
←			
Set baudrate [4800/9600/19200/38400]			

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

6.4.2.3 NMEA version

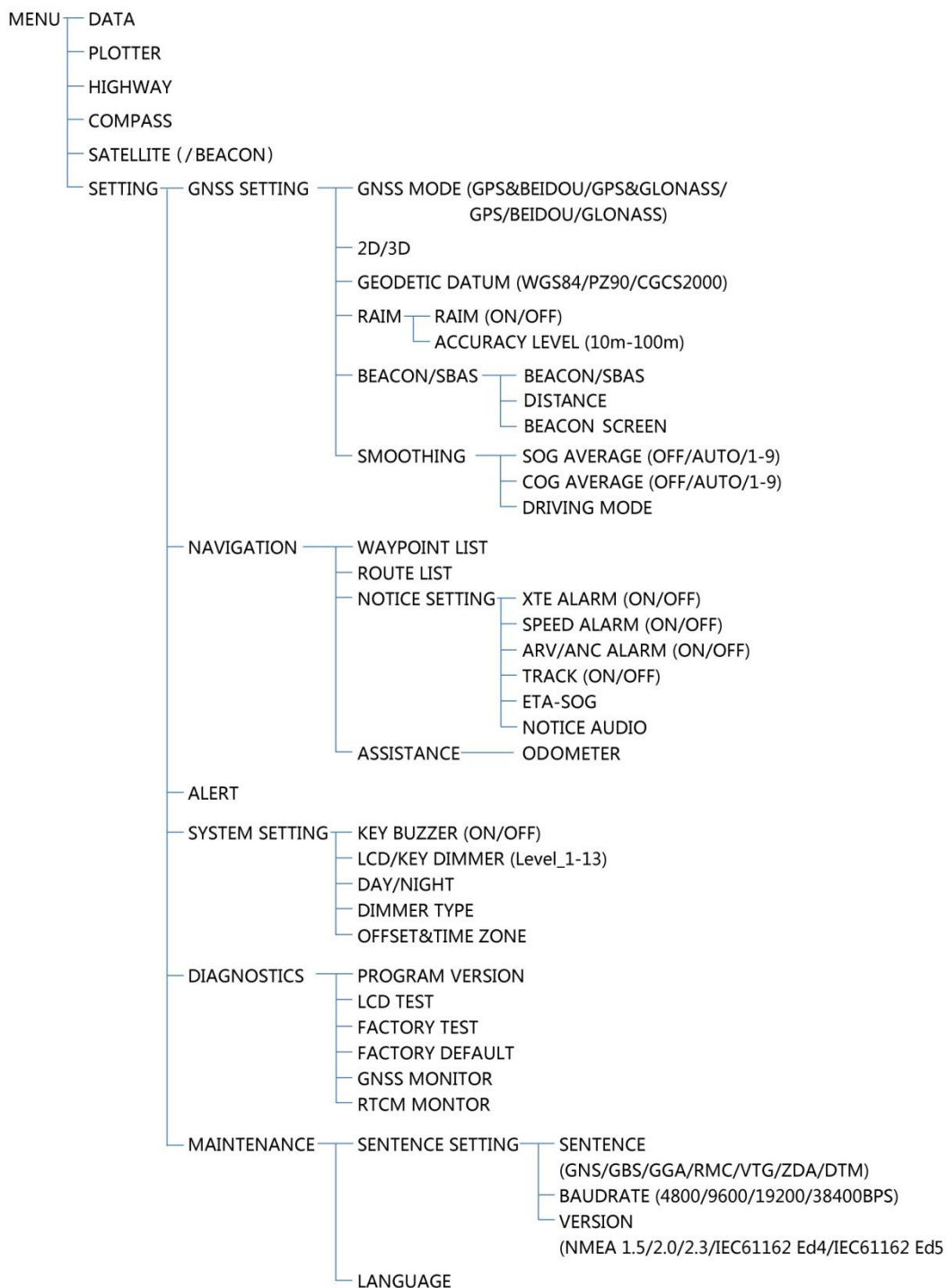
Select each of four outputs to configure the NMEA version.

Click VERSION continuously until a desired one is shown.

[SENTENCE SETTING]			
GP- 3D	31°26.9201'N	120°31.6619'E	UTC 2022-05-13 11:58:07
SENTENCE			
BAUDRATE		4800 BPS	
VERSION		IEC61162 Ed5	
←			
Set output sentence version			

The NMEA version can be selected among NMEA 1.5 / NMEA 2.0 / NMEA 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, SBAS
2	Rx signal and Frequency	GPS L1 C/A (1575.42 MHz) Glonass L1 C/A (1598.0625 ~ 1609.3125 MHz) BeiDou B1I (1561.098 MHz) SBAS L1 (1575.42 MHz)
3	Position Accuracy	less than 10m(GNSS), less than 5m(DGNSS), 95% of the time, horizontal dilution of position (HDOP) ≤ 4
4	Tracking Velocity	999 kts
5	Position-fixing Time	Warm start: 30 seconds, Cold start: 45 seconds
6	Position Update Interval	1 second
7	RAIM Indicators	Safe, Unsafe, Caution, N/A, off
8	Route	Up to 30
9	Waypoint	Up to 999

● 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

● DGNSS BEACON (For DGNSS type) NDG-100

No	Item	Description
1	Frequency	283.5 kHz to 325.0 kHz
2	Frequency separation	500 Hz
3	Bit rate	25, 50, 100, 200 bps
4	Operation mode	Auto, Manual, Scan

● 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 10402.4
3	BAM/Ins In	ACN, HBT
4	BAM/Ins Out	ALC, ALF, HBT, ARC

● POWER SUPPLY

DC 24V (range 12~36V), 0.25~0.5A

● ENVIRONMENT CONDITION

No	Item	Description
1	Ambient Temperature	Antenna Unit(NGA100): -40°C to +55°C Display Unit: -15°C to +55°
2	Relative Humidity	95% at 40°C
3	IP Grade	Antenna Unit(NGA100): IP66 Display Unit: IP22

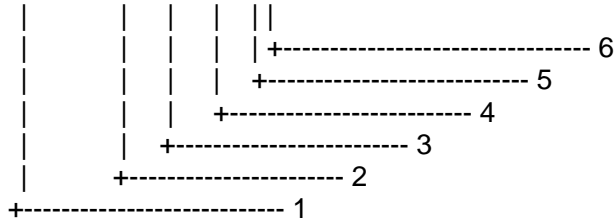
● OTHERS

No	Item	Description
1	Size	145(H) x 264(W) x 83(D) mm
2	Weight	abt 1.25kg (main unit)

APPENDIX III SENTENCE DESCRIPTION

ACN – Alert command

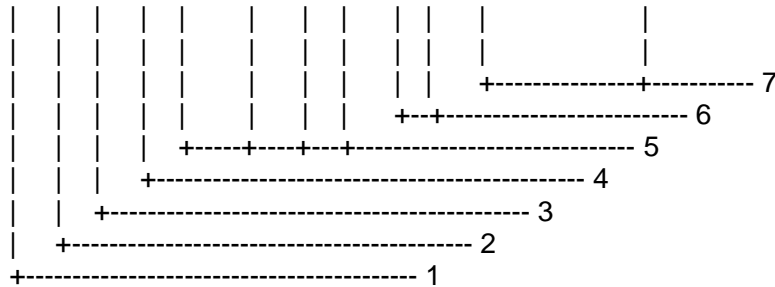
\$--ACN,hhmmss.ss,aaa,x.x,x.x,c,a*hh <CR><LF>



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

ALC - Cyclic alert list

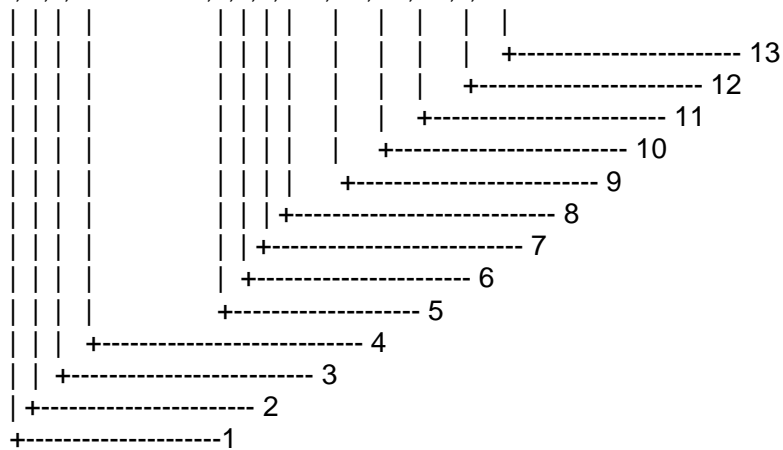
\$--ALC, xx, xx, xx, x.x, aaa, x.x, x.x, x.x,, aaa, x.x, x.x, x.x*hh <CR><LF>



1. Total number of sentences for this message, 01 to 99
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.

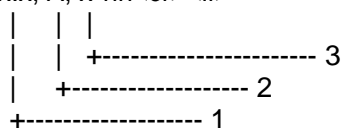
```
$--ALF, x, x,x,hhmmss.ss,a,a,a,aaa,x.x,x.x,x.x,c---c*hh <CR><LF>
```



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 mnemonic code
9. Alert identifier
10. Alert instance, 1 to 999999
11. Revision counter, 1 to 99
12. Escalation counter, 0 to 9
13. Alert text

NOTE A: If the system time is out of sync with valid ZDA sentence, this filed is NULL.

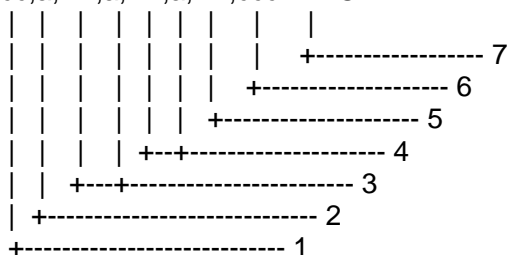
```
$--HBT, x.x, A, x*hh<cr><lf>
```



1. Configured repeat interval
2. Equipment status
3. Sequential sentence identifier

DTM - Datum reference

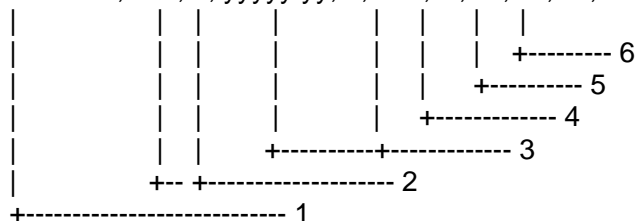
\$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc*hh<CR><LF>



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

GNS - GNSS fix data

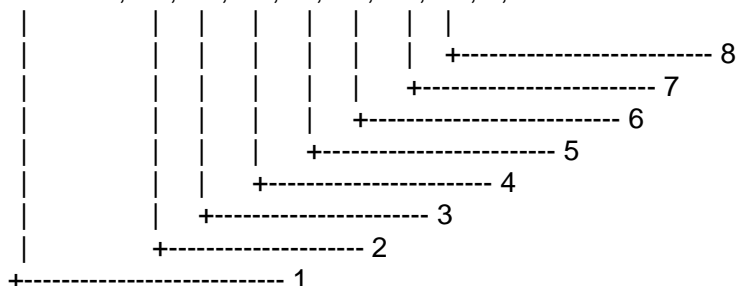
\$-- GNS, hhmmss.ss, llll.ll, a, yyyy.yy, a, c--c,xx,x.x,x.x,x.x,x.x,x.x,a *hh<CR><LF>



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

GBS - GNSS satellite fault detection

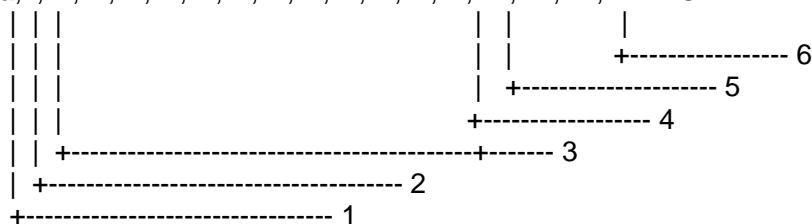
\$--GBS, hhmmss.ss, x.x, x.x, x.x, xx, x.x, x.x, x.x, h, h *hh <CR><LF>



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
8. Standard deviation of bias estimate

GSA - GNSS DOP and active satellites

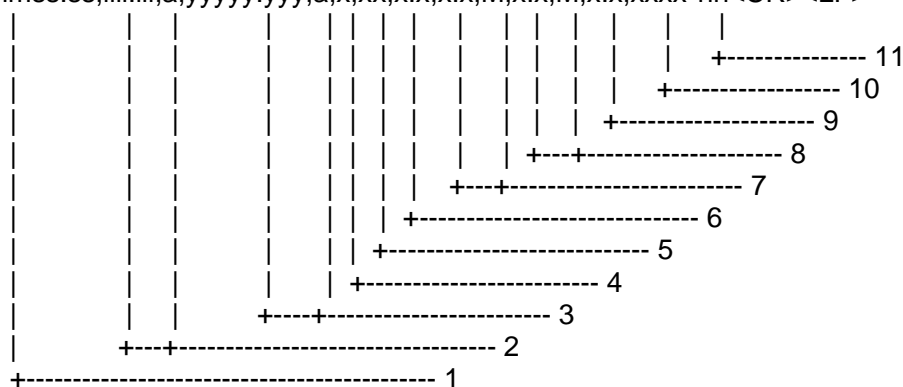
\$--GSA,a,x,xx,xx,xx,xx,xx,xx,xx,xx,xx,xx,x.x,x.x,x.x,h*hh<CR><LF>



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 of satellites used in solution
4. PDOP
5. HDOP
6. VDOP

GGA -Global positioning system fix data

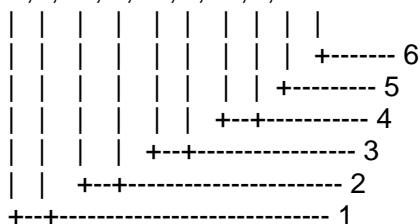
\$--GGA,hhmmss.ss,llll.lll,a,yyyyy.yyy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>



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

VTG - Course over ground and ground speed

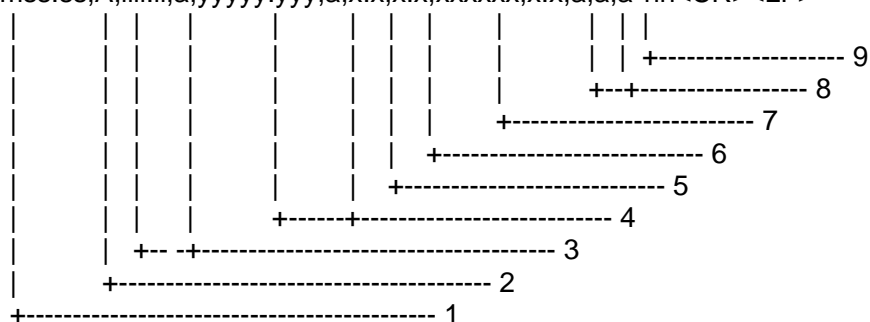
\$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>



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
6. Checksum

RMC- Recommended minimum specific GPS/TRANSIT data

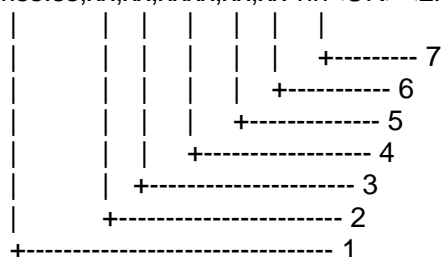
\$--RMC,hhmmss.ss,A,lll.ll,a,yyyyy.yyy,a,x.x,x.x,xxxxxx,x.x,a,a,a*hh<CR><LF>



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

ZDA - Time and date

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

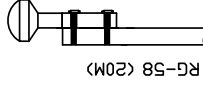


1. UTC
2. Day, 01 to 31 (UTC)
3. Month, 01 to 12 (UTC)
4. Year (UTC)
5. Local zone hours, 00h to +-13h
6. Local zone minutes, 00 to +59 as local hours
7. Checksum

APPENDIX IV INSTALLATION DRAWING

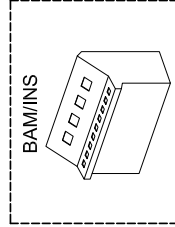
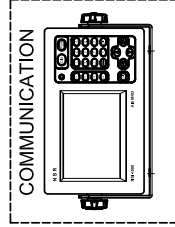
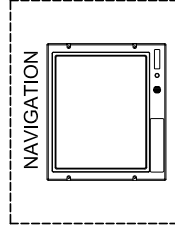
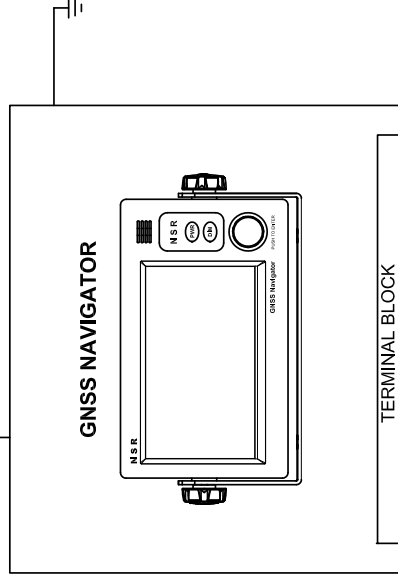
Drawing No.	Description
NGR3000-ID-001	NGR-3000 GNSS NAVIGATOR SYSTEM DIAGRAM
NGR3000-ID-002	NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM
NGR3000-ID-003	NGR-3000 GNSS NAVIGATOR SYSTEM DIAGRAM (DGPS)
NGR3000-ID-004	NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM (DGPS)
NGR3000-ID-005	NGR-3000 MAIN UNIT SIZE DRAWING
NGR3000-ID-006	NGR-3000 MAIN UNIT MOUNT DRAWING (TABLE TYPE)
NGR3000-ID-007	NGR-3000 MAIN UNIT MOUNT DRAWING (FLUSH TYPE)
NGR3000-ID-008	NGA100 GNSS ANTENNA MOUNT DRAWING
NGR3000-ID-009	NDG-100 DGNSS BEACON MOUNT DRAWING

NGA100
GNSS ANTENNA



A, D, E

B, D, E

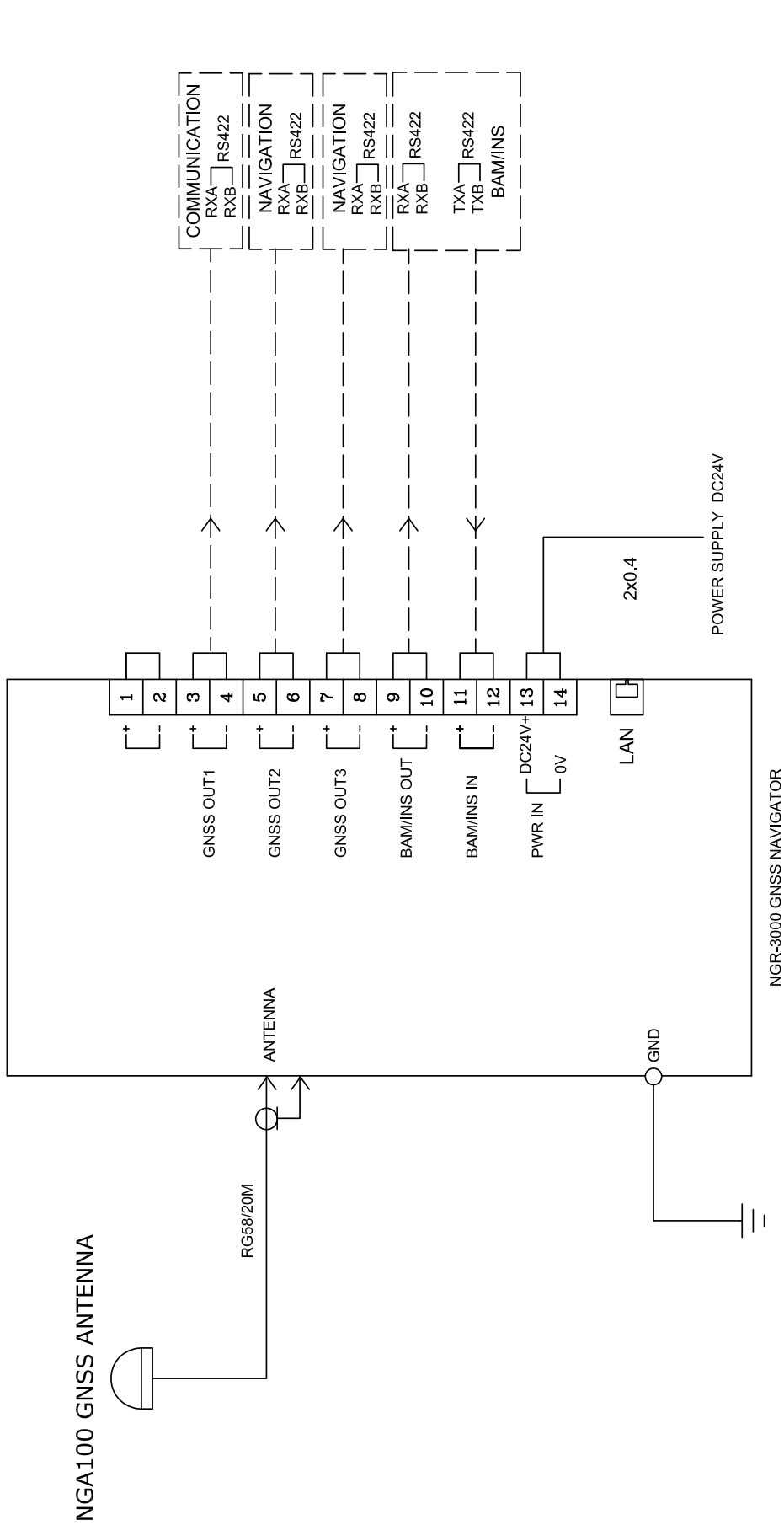


APPLICATION

NGR-3000 GNSS NAVIGATOR SYSTEM DIAGRAM

DATE	ITEM	NGR-3000	SIZE A4
APPROVAL	SCALE	N/S	mm
CHECKED	DRAWING	NEW SUNRISE CO., LTD.	
DWG NO.	NGR-3000-ID-001		

NOTE : GNSS TYPE

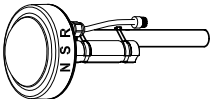


APPLICATION					
NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM					
DATE	ITEM	NGR-3000	SIZE	A4	
APPROVAL	SCALE	N/S	mm	mm	
CHECKED					
DRAWING					
DWG NO.	NGR3000-ID-002				

YARD SUPPLIED OR OPTIONAL

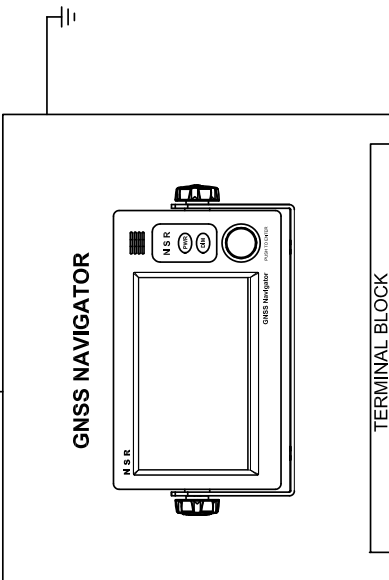
NOTE : GNSS TYPE

NDG-100
(NGA100)



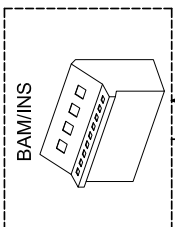
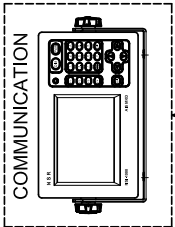
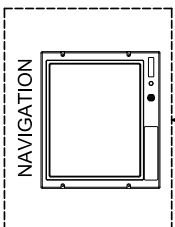
SY-50-3/RG58

A, D, E
B, D, E



Power Supply 24V DC

TERMINAL BLOCK



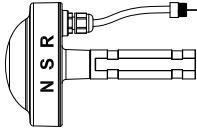
APPLICATION					
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DATE	ITEM	NGR-3000	SIZE	A4	
APPROVAL	SCALE	N/S	UNIT	mm	
CHECKED					
DRAWING					
DWG NO.	NGR-3000-ID-003				



NEW SUNRISE CO., LTD.

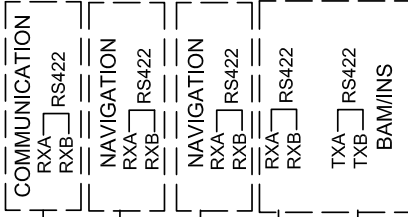
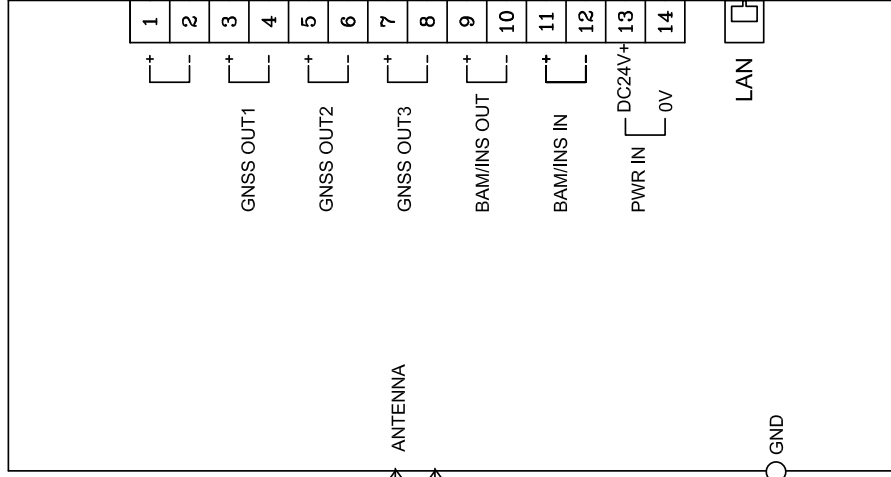
NOTE : DGNSS TYPE

NDG-100(NGA100)



SY-50-3/RG58

ANTENNA



POWER SUPPLY DC24V

NGR-3000 GNSS NAVIGATOR

YARD SUPPLIED OR OPTIONAL

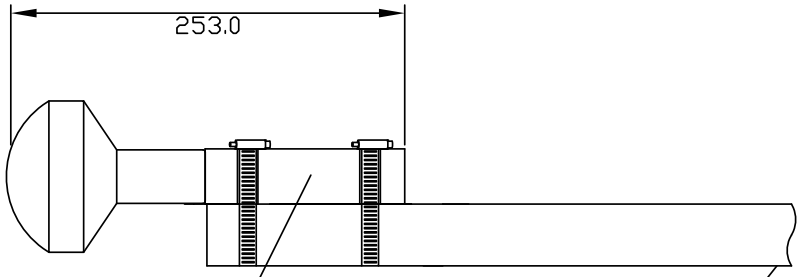
APPLICATION

NGR-3000 GNSS NAVIGATOR WIRING DIAGRAM

DATE	ITEM	NGR-3000	SIZE A4
APPROVAL	SCALE	N/S	1/100
CHECKED	DRAWING	NGR-3000-ID-004	NEW SUNRISE CO., LTD.

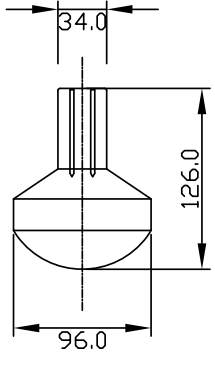
NOTE : DGNSS TYPE

NGA100 GNSS ANTENNA

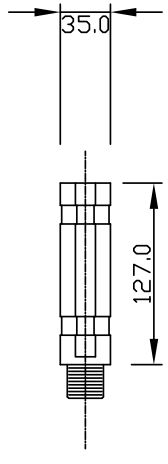


MOUNT POLE


MAX Ø50
(YARD SUPPLY)



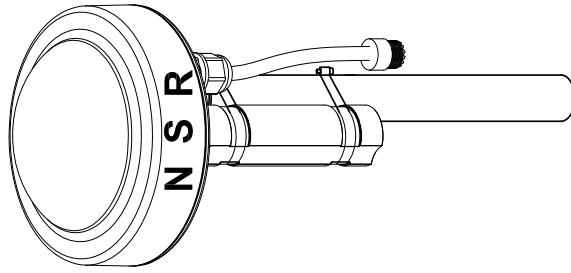
NGA100 GNSS ANTENNA



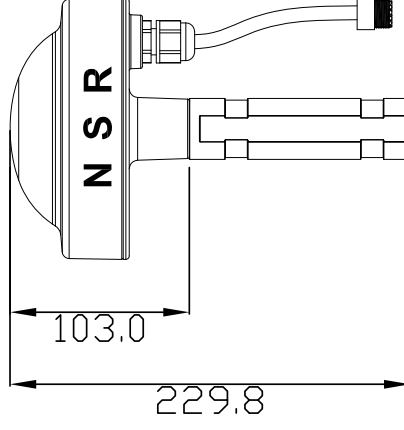
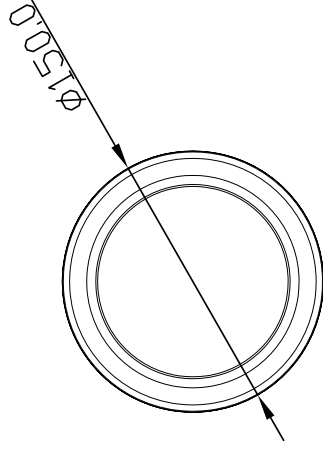
MOUNT POLE

APPLICATION					
NGA100 GNSS ANTENNA MOUNT DRAWING					
DATE	ITEM	NGR-3000		SIZE A4	
APPROVAL	SCALE	N/S	UNIT	mm	mm
CHECKED					
DRAWING					
DWG NO.	NGR3000-ID-008				
<div><div></div><div>NEW SUNRISE CO., LTD.</div></div>					

NDG-100 (NGA100)



MAX Ø50
(YARD SUPPLY)



DIMENSION

INSTALLATION

APPLICATION

NDG-100 DGNSS BEACON MOUNT DRAWING

DATE	ITEM	NGR-3000	SIZE A4
APPROVAL	SCALE	N/S	1:1
CHECKED	DRAWING	NGR-3000-ID-009	NEW SUNRISE CO., LTD.

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info@nsrmarine.com

March, 2024