

SAFETY GUIDANCE



Electronic navigational chart implemented by the chart plotter is precise and dependable, however it does not replace the official navigational chart including all the important information on your own safe navigation. This is to encourage and remind you to use the officially approved navigational chart and to carry out the navigation.

We recommend you to read this manual before operating our equipment. And when you have enquiries, you must contact the service center, dealers around your city or SAMYUNG ENC. Exposure to extreme heat or power has been connected with reversed anode, may cause a severe damage to the chart plotter. Damage caused by these reasons may not be covered by our warranty.

You shall not disassemble our chart plotter as it is enclosed with high-tension circuit that can be only handled by skilled technician. LCD's life may be shortened if you expose the screen to UV beam. These suggestions result from the current techniques of LCD display. Avoid overheating the equipment by extreme adjustment of brightness unless the screen is extremely dark. Problem caused by overheating does not recover even after the temperature has gone down.

If you need technical assistance, please visit our SAMYUNG ENC office or our website www.samyungenc.com.

1 Overview	
1-1 Outline	6
1-2 Characteristics.....	7
1-3 Specifications	8
1-5 Components	9
1-6 Option Components	9
2 Installation	
2-1 Unpacking and check	10
2-2 Selecting where to install	10
2-3 Connecting the power supply	11
2-4 Connecting the external data	11
2-4-1 RS-422	11
2-4-2 RTCM	11
2-5 Installing Antenna	12
2-6 Installing DGNSS.....	12
2-7 Connection to equipment cable.....	14
3 Function	
3-1 Position Description of display	16
3-2 High Way	18
3-3 Data	18
3-4 Satellite information	19
4 Menu	
4-1 Setup Output Data	20
4-2 SETUP I/O PORT.....	24
4-3 PORT MONITORING.....	24
4-4 CONFIGURATION.....	25
5 Diagram	
5-1 External diagram	27
5-2 GLONASS antenna diagram	28

1 Overview

1-1 Outline

Thank you for purchasing our product SGN-500. Before using the product, please read carefully over this manual so that the product functions fully for its intention, and also keep this manual in a safe place after reading this. The information of circuit on the software and hardware of this product is only owned by our company. This technology is permitted to the user under the temporary agreement and permits, therefore please use the product for its agreed use. Please be aware that it is against the law to copy it illegally. This GLONASS EQUIPMENT is the most developed marine navigational equipment above all the other ones. However competent navigational officer should not only judge the important situation which could cause a life or property loss, based on the equipment's information. SAMYUNG ENC promise honest sales and descent After Service.

1-2 Characteristics

1. Meets the IMO and MSC international standard.
2. Meets the standard of national Wireless Telegraphy Act (WTA) and its law.
3. The range of voltage use is wide and it is easy to install with its small size.
4. With the GRAPHIC LCD which allows wide viewing angle, it is easy to read and operate wherever the equipment is installed.
5. No initial setup is required and fast initial satellite tracking.
6. You can adjust the BACK-LIGHT for LCD and operational switch, which does not disturb the night watch.
7. You can output the DATA (NMEA-0183) with other equipment, which allows more convenient use.
8. The user may choose the screen to meet the relevant use with different screen modes.

1-3 Specifications

[SGN-500]

General Specifications	
	Details
Size	150 mm(W) x 242 mm(H) x 61 mm(D)
LCD	5.6 inch, TFT color, 640 x 480 pixel
Voltage	10 ~ 36 V DC
Current	24V 400 mA - Minimum brightness of LCD 560 mA - Maximum brightness of LCD
Operation temperature	-15° ~ 55°C
GNSS NAVIGATION	
Receive Frequency	L1 1590 MHz +/- 20MHz
Number of channels	24 GNSS System available
Card	SD card
Geodetic System	5 Geodetic System (WGS-84, WGS-72, EARTH-90, PULKOVO1942, PULKOVO1995)
Communication	
NMEA	NMEA 0183 Speed : 4800, 9600, 38400,
NMEA 0183 output	DTM, GBS, GGA, GLL, GNS, RMC, VTG, ZDA

1-5 Components

Contents	Part number
Display	SGN-500-R
Bracket	SGN-500-DB
Power cable	CVV SB 0.75 SQMM x 2C(3Meter)
Bracket mounting bolt	SGN-500-BP
GLONASS antenna GLONASS antenna holder	GLONASS-50
User manual in English	SGN-500-ME
25P data connector	HDBB25S

1-6 Option Component

model	contents
GLONASS antenna stand holder	GLONASS antenna stand holder
Power supply(10A)	SP-5AD
DGNSS Antenna	DGNSS-500R

2 Installation

2-1 Unpacking and check

When unpacking the products, you must match with the components with what you have ordered and handle them carefully. Especially you must check if the equipment has been damaged while being transported. If you discover any damage, you must manage it before installing it. If it is not possible to fix it by your own, you must contact our company and we will give an appropriate solution.

This equipment has been designed to fit the vessels, therefore you do not need special techniques to install, however you must follow the basic standard of installation as listed below to maintain the function of the equipment.

2-2 Selecting where to install

Select where to install by following the below steps.

1. Allow enough space for operating, maintaining and repairing the equipment and allow enough ventilation when choosing where to install.
2. The equipment must avoid a contact with rain or sea water. Electronic devices are best to be installed in a dried place.
3. Avoid installing it where exposed to the sun, and avoid the heating element.
4. Install it where there is minimum vibration.
5. Install it where it does not interfere with different electronic devices.

2-3 Connecting the power supply

1. 3P connector located at the back of the equipment is the power supply, and number 1 is (+) and 3 is (-). You may connect the DC power between 10V-36V to it.
 2. Connect the 3P plug which fits the connector for power supply to the 3P cable, and be aware of the (+) and (-) when connecting.
- * Power supply cables supplied with the equipment are in White (+)/Black (-).

2-4 Connecting the external DATA

2-4-1 RS-422

This is a connector to connect the DATA with other equipment in order to output the location information.

- 1) 25P connector is located at the back of the equipment. The functions for each pin numbers are as below.

Number	Pin name	function
7	data RX+(422)	For connecting to the external equipment DATA RX+(RS-422 input)
18	data TX+(422)	For connecting to the external equipment DATA TX+(RS-422 output)
20	Data RX-(422)	For connecting to the external equipment DATA RX-(RS-422 input)
6	data TX-(422)	For connecting to the external equipment DATA TX-(RS-422 output)

2-4-2 RTCM

Connector for receiving the satellite information from the DGNSS

- 1) 25P connector is located at the back of the equipment. The functions for each pin numbers are as below.

Number	Pin name	function
4	RTCM RX	For connecting to the external equipment DATA RX (RS-232 input)
3	RTCM TX	For connecting to the external equipment DATA TX (RS-232 output)
15,19	RTCM_GND	For connecting to the external equipment DATA GND (232)

2-5 Installing antenna

GNSS Antenna's function gets highly affected by where it is installed at. Therefore avoid any obstacles around it, and keep 1m distance between other antennas. You must waterproof the parts that are exposed to the outside.

1. You must turn OFF the equipment when connecting antenna. Press the KEY for 2 seconds to shut down.
2. Antenna must be installed at a higher level if possible, and no obstacles should be around at its level of surface. If this cannot be followed, install it where you can see the most of the sky.
3. You must install it as far away from the wireless transmitter's antenna. And especially avoid an exposure to the high capacity of radar antenna's transmitting power (install it at a different level of surface). Also install it where the effect of VHF or UHF transmitting antenna is minimum (the level of surface has large affect). The transmitter's effect may cause the damage to the antenna and its main unit.
4. The installation process for DGNSS antenna is same as GNSS antenna as above.

2-6 Installing DGNSS

DGNSS antenna must be installed when using DGNSS.

1. DGNSS antenna: Refer to the "2-5 Installing antenna" when installing.

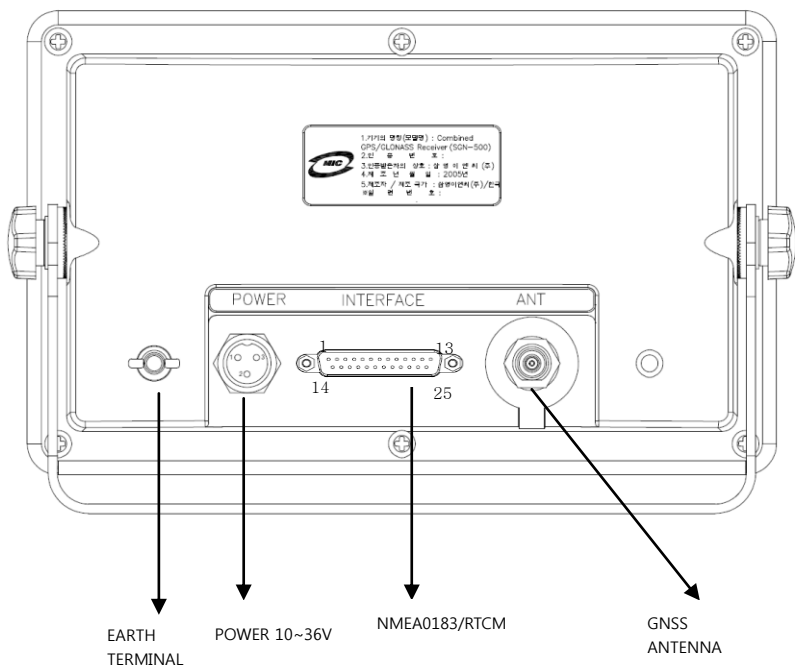
*. The DGNSS antenna of main unit's connector is as below.

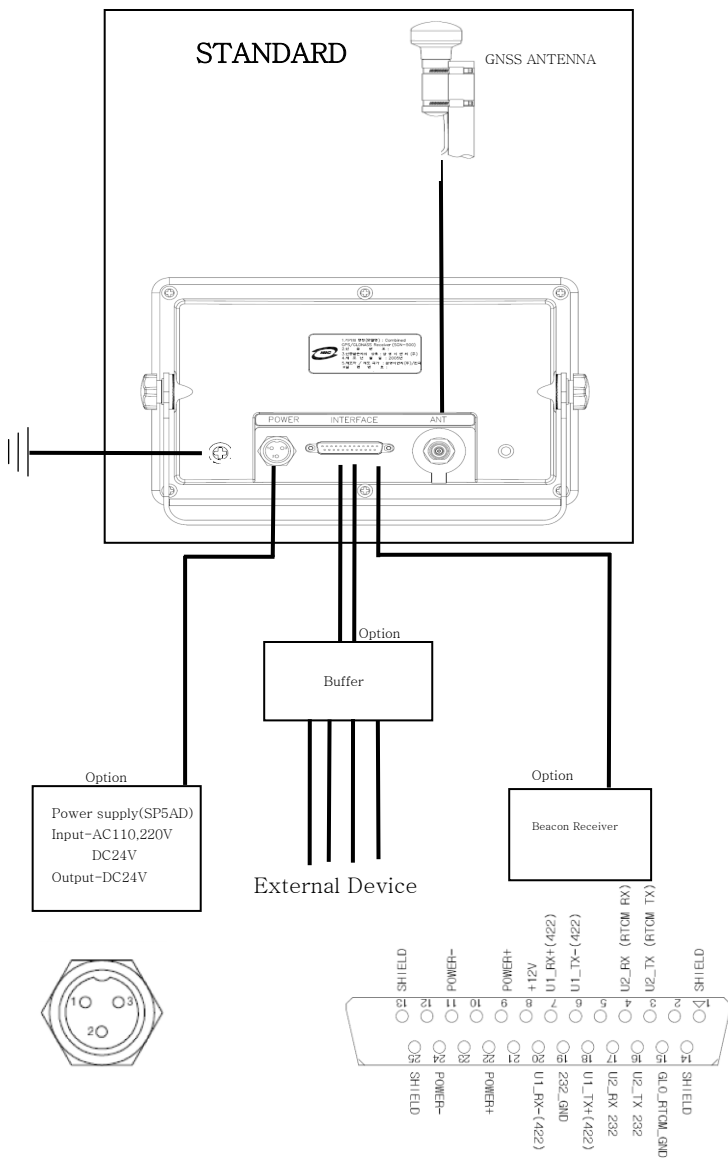
Number	Pin name	function
8	POWER+	positive Power input 12V DC
1,13,14,25	POWER-	Negative(There is no need to connect all the pins. Two pins would work)
3	TRANSMIT	RS-232 OUT
4	RECEIVE	RS-232 IN
15,19	GROUND	SIGNAL GROUND COMMON TO RECEIVE AND TRANSMIT (Only one pin is needed.)

2-7 Connection to equipment cable

Please refer to the external connection diagram for connection between mutual equipment, to install it at the most convenient place.

1. When wiring the power, if it is DC wire, you must use the CABLE supplied by us or CABLE with enough capacity of current.
2. You must lock the navigation equipment antenna's connector, power supply connector, DATA OUT, connector firmly.



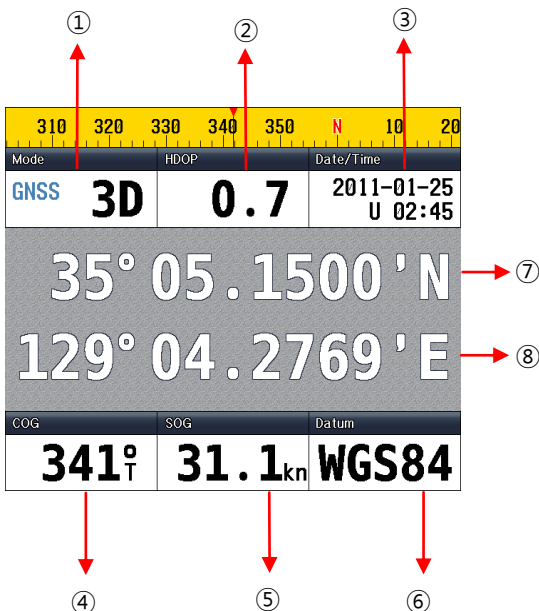


3 Function

3-1 Position Description of Display

Position displays when you press F1.

It displays the current position in latitude and longitude.



① Mode

GLONASS Receiving status: (" " / "DR" / "2D" / "3D" / "WAAS" / "DGLONASS" / "GLONASS" / "SIM")

"3D" on the top left changes to "DR" when satellite has not been selected, and when satellite has been selected and positioning is 2 dimensional, it will display "2D", and 3D when it is 3 dimensional. "GNSS" is displayed at external input, and when DGNSS is getting received, "DGNSS" is displayed.

*"SIM" gets displayed and it blinks when it is under SIMULATOR mode.

* "WAAS" gets displayed when WASS signal is received.

② HDOP(Horizontal Dilution of Precision)

This shows the precision of the horizontal direction (longitude and latitude). The less value means less error.

③ Date/Time

Date represents the present Year, Month and date

Time represents the time in 24 hours (10:07)

UTC Time is displayed as "U", and "L" is displayed for Local time.

④ COG

Course of vessel: This displays the bearing of the vessel when moving. (Direction of vessel which is a relative bearing to site)

⑤ SOG

Speed of vessel: Displays the current speed of vessel (speed of vessel which is a relative bearing to site).

⑥ Datum

Geodetic System: Displays the Geodetic system in use.

⑦ Latitude

The vessel's location: This displays the latitude of vessel (The present location, Location of GNSS antenna).

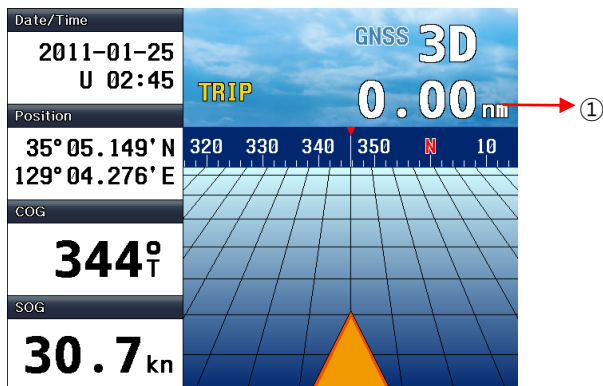
⑧ Longitude

The vessel's location: This displays the longitude of vessel (The present location, location of GNSS antenna).

3-2 High Way

Press F2 to display High Way

High way shows in 3D when vessel is sailing to the destination.



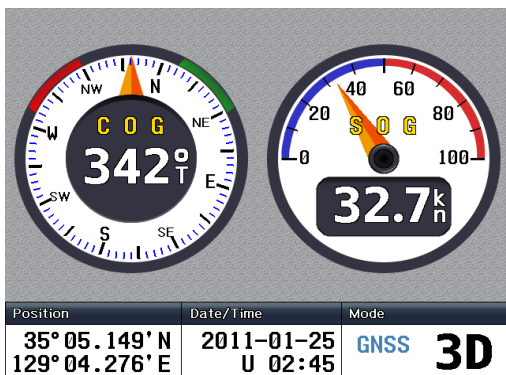
① TRIP

It shows the distance travelled after the equipment has been turned on.

3-3 DATA

DATA displays when you press F3

It shows COG and SOG of vessel in gauge

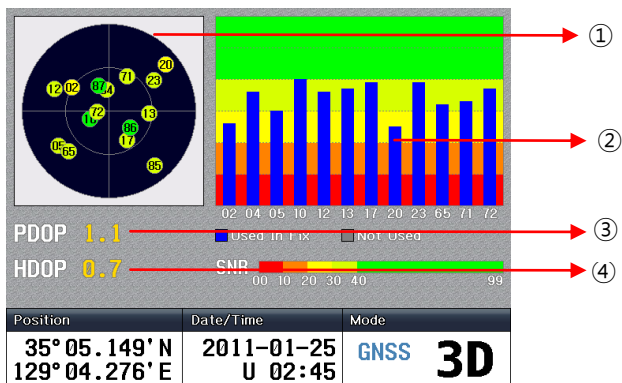


3-4 Satellite Information

Satellite information displays when you press F4.

Equipment needs some time to receive GNSS signal when first turned on.

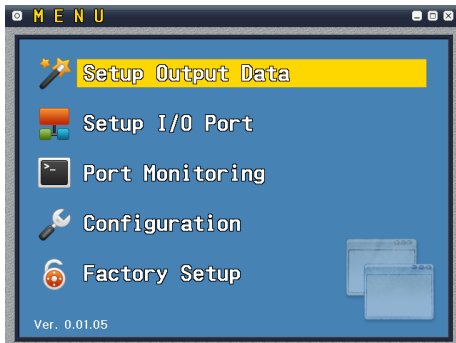
Satellite information displays GNSS gain and GNSS location as below.



- ① Location of GNSS satellite
- ② The strength of GNSS signal in graph
- ③ Precision of spotting in 3D.
- ④ Precision of horizontal way (longitude and latitude)

4 Menu

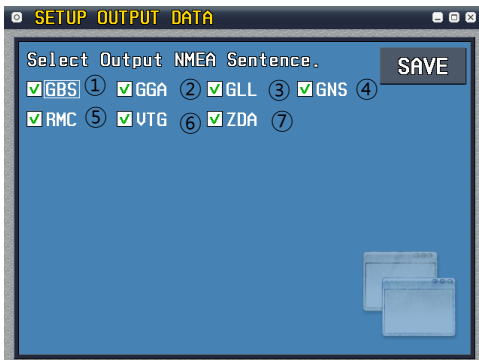
 When this key is pressed, MENU displays



4-1 Setup Output Data

By using NMEA0183, you may select the data to transmit when you are communicating with other equipment.

Select which data you wish to transmit and press SAVE.



① GBS

GNSS Satellite Fault Detection

```

      1      2 3 4 5 6 7 8
      |      | | | | | |
$--GBS,hhmmss.ss,x.x,x.x,x.x,xx,x.x,x.x,x.x*hh
  
```

- 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 in meters on most likely failed satellite
- 8) Standard deviation of bias estimate

② RMC

Recommended Minimum Navigation Information

```

      1      2      3      4 5 6 7      8 9
      |      |      | | | | |      | |
$--RMC,hhmmss.ss,A,llll.ll,a,yyyy.yy,a,x.x,x.x,xxxxxx,x.x,a,a*hh
  
```

- 1) UTC of position fix
- 2) Status, V=Navigation receiver warning, A=Data valid
- 3) Latitude, N/S
- 4) Longitude, E/W
- 5) Speed over ground, knots
- 6) Course Over Ground, degrees True
- 7) Date : ddmmyy
- 8) Magnetic Variation, degrees E/W
- 9) Mode Indicator

③ GNS

GNSS Fix Data

```

      1      2      3 4 5 6 7 8 9 10
      |      | | | | | | | |
$--GNS,hhmmss.ss,llll.ll,a,yyyy.yy,a,c--C,xx,x.x,x.x,x.x,x.x,x.x*hh
  
```

- 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, meters, re: mean-sea-level(geoid)
- 8) Geoidal separation, meters
- 9) Age of differential reference station ID
- 10) Differential reference station ID

④VTG

Course Over Ground and Ground Speed

$$\begin{array}{cccccc} & 1 & & 2 & & 3 & & 4 & & 5 \\ & \boxed{} & & \boxed{} & & \boxed{} & & \boxed{} & & | \\ \$--VTG, & x.x, & T, & x.x, & M, & x.x, & N, & x.x, & K, & a^*hh \end{array}$$

- 1) Courses over ground, degrees True
- 2) Courses over ground, degrees Magnetic
- 3) Speed over ground, Knots
- 4) Speed over ground, Km/hr
- 5) Mode Indicator

⑤GGA

Global Positioning System Fix Data

$$\begin{array}{cccccccccccc} & 1 & & & 2 & & & 3 & & 4 & 5 & & 6 & & 7 & & 8 & & 9 & & 10 \\ & | & & & \boxed{} & & & \boxed{} & & | & | & & | & & \boxed{} & & \boxed{} & & | & & | \\ \$--GGA, & hhmmss.ss, & llll.ll, & a, & yyyyy, & .yy, & a, & x, & xx, & x.x, & x.x, & M, & x.x, & M, & x.x, & xxx^*hh \end{array}$$

- 1) UTC of position
- 2) Latitude-N/S
- 3) Longitude-E/W
- 4) GPS Quality indicator
- 5) Number of satellites in use, 00-12, may be different from the number in view
- 6) Horizontal Dilution of precision
- 7) Altitude re:mean-sea-level(geoid), meters
- 8) Geoidal separation, meters
- 9) Age of Differential GPS data
- 10) Differential reference station ID, 0000-1023

⑥ZDA

Time & Data-UTC, Day ,Month, Year and Local Time Zone

$$\begin{array}{cccccc} & 1 & & 2 & 3 & 4 & 5 & 6 \\ & | & & | & | & | & | & | \\ \$--ZDA, & hhmmss.ss, & xx, & xx, & xxxx, & xx, & xx^*hh \end{array}$$

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

⑦DTM

DTM Datum Reference

1	2	3	4	5	6
		□	□		

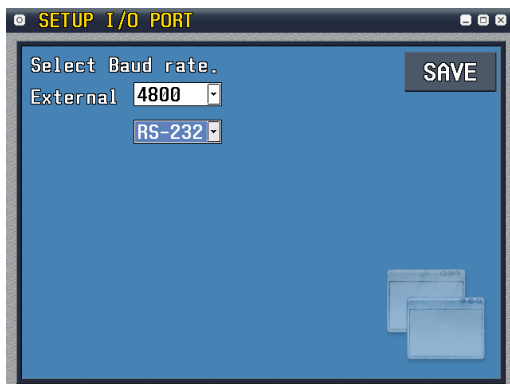
§--DTM, ccc, a, x. x, a, x. x, a, x. x, ccc*hh

- 1) Local datum code - WGS84=W84, WGS72=W72, SGS85=S85, PE90=P90, User defined=999, IHO datum code
- 2) Local datum subdivision code
- 3) Lat offset, minutes, N/S
- 4) Lon offset, minutes, E/W
- 5) Altitude offset, meters
- 6) Reference datum code – WGS84=W84, WGS72=W72, SGS85=S85, PE90=P90

4-2 SETUP I/O PORT

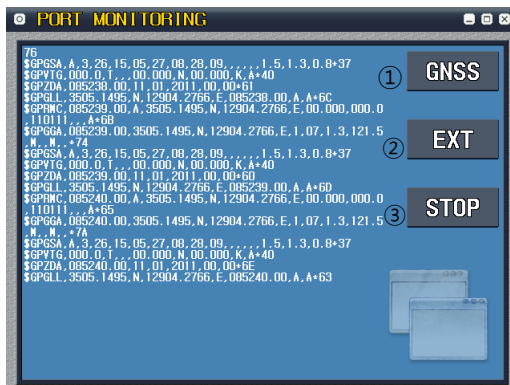
Set the speed same with the equipment you are communicating with.

Set the speed then press SAVE.



4-3 PORT MONITORING

The details of transmission gets displayed

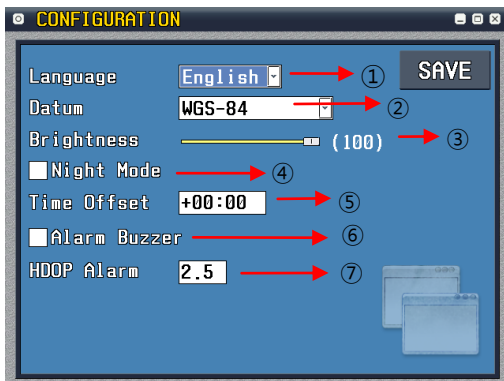


- ① When you press GNSS Button (F1), NMEA0183 data gets displayed which is created from the internal GNSS module.
- ② It displays the data received from the external data port when you press EXT (F2).
- ③ When you press STOP (F3), screen freezes, and it will only display the details received until then. Press RESUME (F3) in order to display the data received.

4-4 CONFIGURATION

General setting and brightness adjustment is possible

Select SAVE after setup.



- ① Select the language you wish to use. (English/Russian)
- ② Select geodetic system. (WGS-84/WGS-72/Earth-90/Pulkovo1942/Pulkovo1995)
- ③ Select the screen brightness.
- ④ Tick the box to switch to Night Mode.
- ⑤ Based on UTC(Universal time coordinated), add or subtract the present time.
- ⑥ You may turn on and off the alarm.
- ⑦ You may designate the HDOP value, and if it exceeds, alarm is triggered.

 **SAMYUNG ENC** Warranty – 1year

Thank you for purchasing Samyung ENC's product. This product has gone through strict and precise quality control before being released. When the user has followed the instructions to use the equipment but if equipment becomes defective within 1 year of warranty, then our company will repair it for free of charge. The repair can be done at SAMYUNG ENC or our agencies.

When you require service, please send the product to SAMYUNG ENC's A/S center or the official agency. We will repair them for you.

The repairing of the product will be charged even if the product is within the warranty in the following cases.

1. When fuse or spare parts of consumables have ended their lives.
2. In case of transducer, you will be charged for the spare parts or any other extra costs incurred apart from repairing transducer itself.
3. When consumer intentionally broke equipment, handled it carelessly, fault (dropped, impacted, damaged, submerged), installed and used it wrongly, or other external causes have damaged the product.
4. When equipment became defective by the 3rd person other than the manufacturer, or authorized person by manufacturer.
5. When there's no serial number or number have changed.

