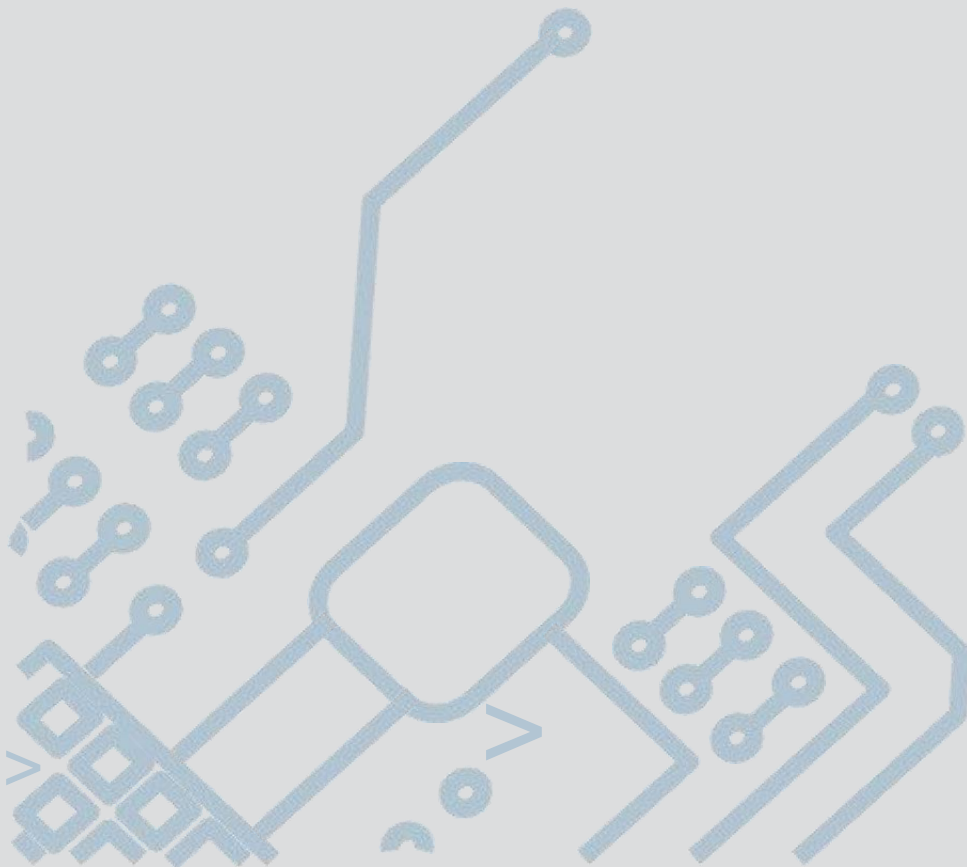


S66UFH-lite

**Multi constellation multi frequency high
precision GNSS Receiver**



Revision History

Revised Edition	Revision History	Date
R1.0	Initial Release	2022-11-7

Statement

Please read carefully:

Thank you very much for purchasing our product. For instructions on how to use this product, please be sure to read the user manual.

This user manual is for your receiver only. If your receiver does not match the situation in the user manual, the actual situation of the receiver shall prevail.

The information in this document is subject to change without notice; We reserve the right to change or improve its products as well the content without any obligation to notify individual or organization of such changes or improvements. For any questions, please contact the customer service center or contact our authorized dealer.

Customer safety is important. Please carefully read the precautions and instructions in the user manual. To avoid accidental damage, use only original supplied parts. If you do not use the system or connect incompatible accessories in accordance with the correct procedures, it may cause damage to the equipment and may even endanger others and your safety. In this regard, the company does not assume any responsibility.

Applicable Readers

This manual is intended for use by technicians who have some knowledge of GNSS devices. It is not intended for general reader.

1. S66UGH-lite at a Glance

S66UGH-lite is a cost-effective miniaturized GNSS receiver designed for the construction of Beidou ground augmentation system. It has a built-in Linux operating system and is fully developed with independent intellectual property rights. It has a variety of interface types, various communication modes and supports large- capacity data storage, making it the best choice for the construction of Beidou ground augmentation system.

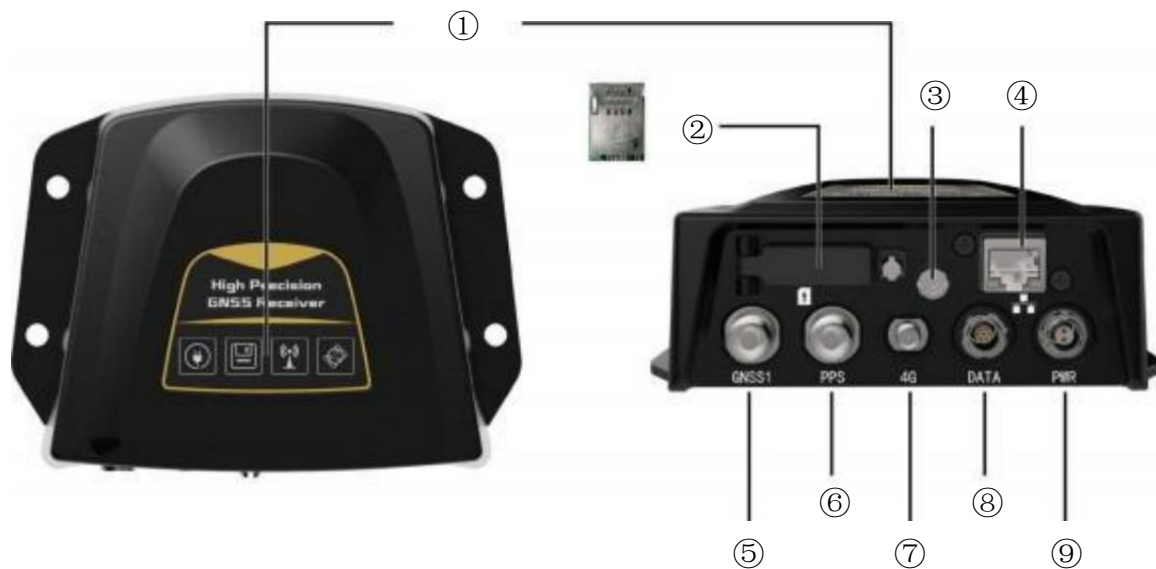
S66UGH-lite are available in two models:





S66UGH-lite (single antenna):connect to one antenna, with PPS function.

S66UFH-lite (dual antenna): Two antennas can be connected.

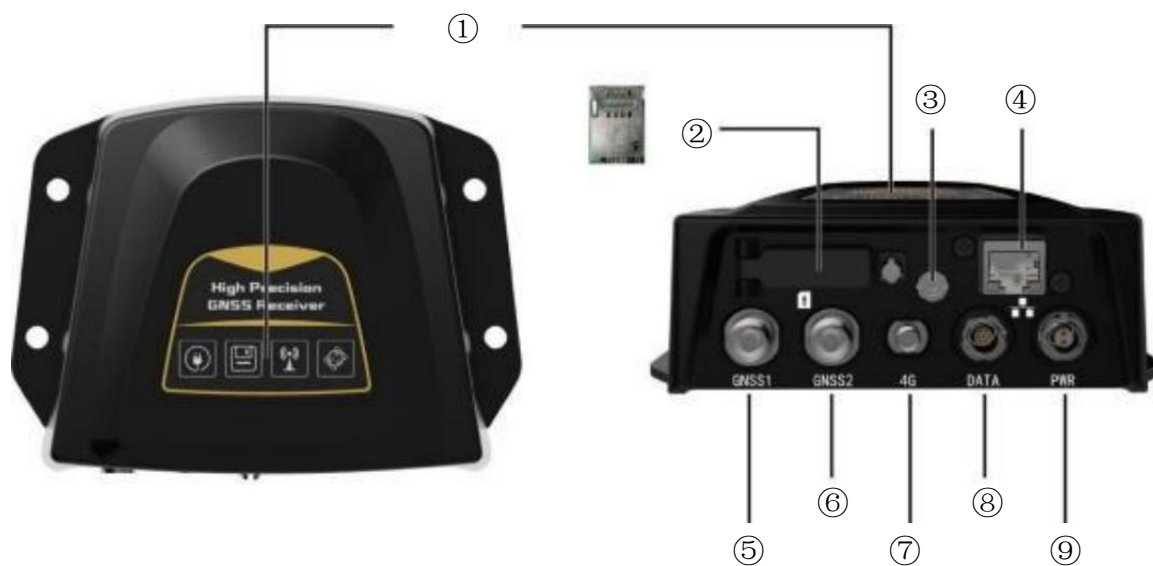
S66UGH-lite device provides a variety of communication interfaces for users to use in different application scenarios. The functions of each communication interface are as follows:





S66UGH-lite:



Serial	Name	Function
①	Indicator light	 Power light.The light is always on when the power is running.
		 Storage light. flashing when the data is stored.
		Diff Light.  Rover mode: Blink when receiving differential data . Base mode: Blink when sending differential data.
		 Satallite Light.Flashing in the positioning state.
②	SIM	SIM card slot
③	Waterproof permeable valve	Waterproof and breathable
④	RJ45	Adaptive 10/100M Ethernet interface
⑤	GNSS1	GNSS1 external receiving antenna interface
⑥	PPS	Pulse Per Second
⑦	4G	4G antenna interface
⑧	DATA	Seven-core head, RS232 interface, support positioning original data and differential data output
⑨	PWR	Device power supply interface, two-core head, device power supply interface, 9~24V (Typical 12V)

S66UFH-lite:



Serial	Name	Function
①	Indicator light	 Power light. The light is always on when the power is running.
		 Storage light. flashing when the data is stored.
		Date Chain Indicator Light.  Rover mode: Blink when receiving differential data . Base mode: Blink when sending differential data.
		 Satellite Indicator Light. Flashing in the positioning state.
②	SIM	SIM card slot
③	Waterproof permeable valve	Waterproof and breathable
④	RJ45	Adaptive 10/100M Ethernet interface
⑤	GNSS1	GNSS1 external receiving antenna interface

Serial	Name	Function
⑥	GNSS2	GNSS2 external receiving antenna interface
⑦	4G	4G antenna interface
⑧	DATA	Seven-core head, RS232 interface, support positioning original data and differential data output
⑨	PWR	Device power supply interface, two-core head, device power supply interface, 9~24V (Typical 12V)

2. Basic Operation

2.1 Boot

The host does not have internal battery. To run the device, the external power supply is needed.

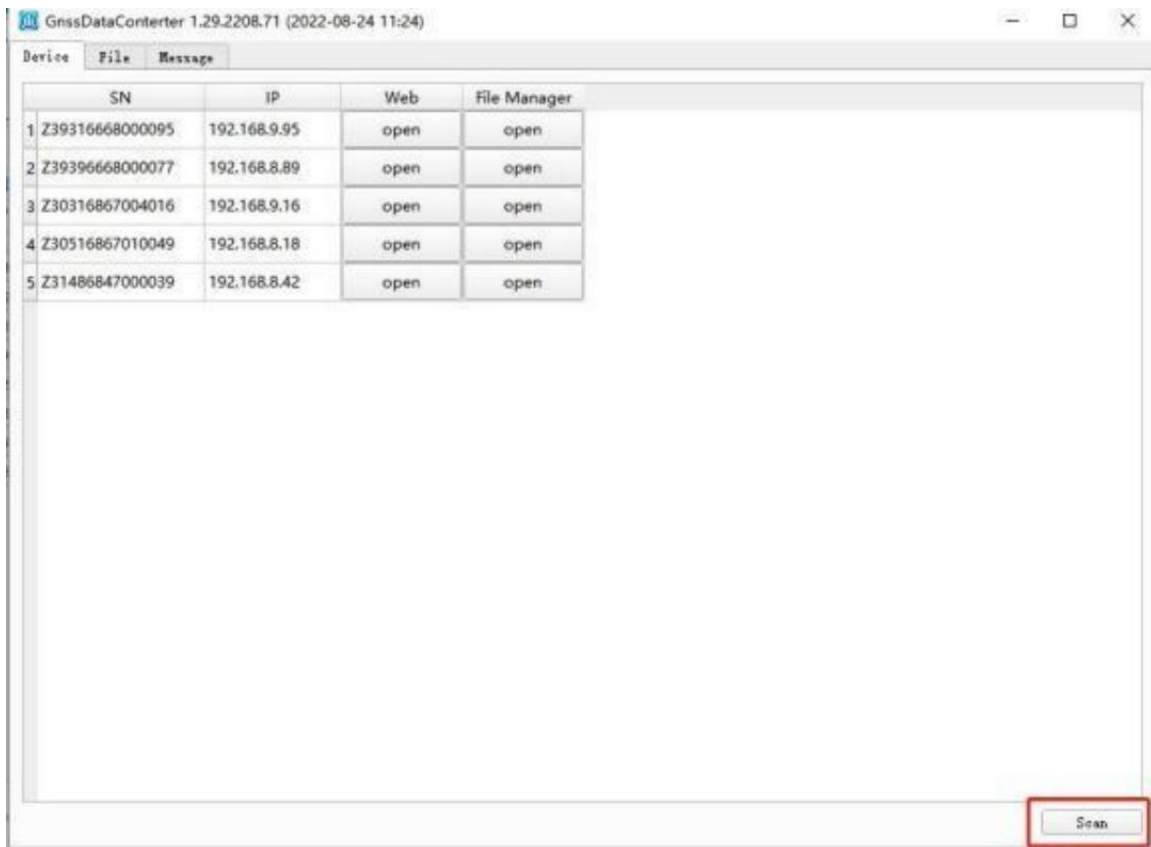
Please use the original adapter to avoid any danger. Once device is connected to the 2-pin power cable, it will automatically power on.

2.2 Shutdown

Unplug the external power supply, the device shuts down.

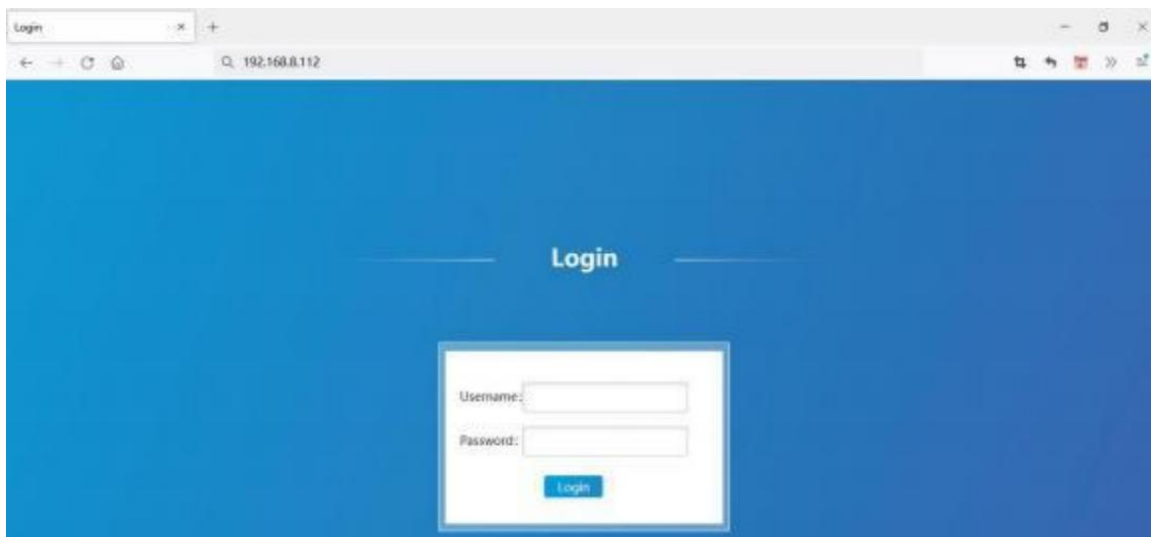
2.3 Login

The receiver supports Web access to the built-in management page to view the receiver's working status in real time or download management static storage data. The method is to power on the receiver, access the switch or router through the straight-through line, keep the PC/laptop accessing the receiver in the same LAN as the receiver, open **GnssDataConverter** software, and query the host IP address. Enter the username and password in the browser (the default username and password are **admin~abc123456**). If you cannot scan the IP address, check that the PC and the host are in the same LAN.



Scan IP

Note: In order to enhance security, the maximum timeout time for the client browser to access the device is 10 minutes. If the browser does not operate for more than 10 minutes, it will automatically log out and re-enter the login interface.



Login

After the verification information is successfully logged in, enter the web interface of the S66UGH-lite, the home page content is the device status, as shown below:



The screenshot shows a web browser window with the address bar displaying '192.168.8.112'. The page title is 'Z32386362000025'. The user is logged in as 'admin' and the language is set to 'English'. The left sidebar contains a menu with the following items: General, User, GNSS Status, GNSS Config, Network, Storage, Data Port, and Platform. The main content area is titled 'Device Status' and displays a table with the following data:

Time	2022-10-20 17:49:55
Uptime	03:47:01
GNSS Quality	Fixed Position
CPU	7.9%
RAM	88.1%
Storage	23.385565GB/24.000000GB
Exception	None

Status

Note: The display effect of different browsers will be slightly different, it is recommended to use the Firefox browser.

The web interface of the S66UGH-lite device is mainly divided into 8 parts, and each part is divided into multiple display information and function setting selection. The details will be introduced in the next chapters.

3. WebUI Introduction

3.1 General

3.1.1 Device Status

Provides the physical status of the device, such as UTC Time, GNSS Quality, Temperature, Voltage, Battery Info, Ethernet, CPU, and Exception. As shown below:


The screenshot shows a web browser window with the address bar displaying '192.168.8.25'. The page title is '1732396361000287'. The user is logged in as 'admin' and the language is set to 'English'. The left sidebar contains a menu with options: General, Device Status, Device Info, Command, Marker Info, Service, Local, Power, Log, Firmware, User, GNSS Status, GNSS Config, Network, Storage, and Data Port. The 'Device Status' option is selected. The main content area displays a table with the following data:

Time	2022-11-25 14:19:05
Uptime	21:31:56
GNSS Quality	RTK Fixed
CPU	4.0%
RAM	90.7%
Storage	22.314896GB/24,000,000GB
Exception	None

Device Status

3.1.2 Device Info

Provides the basic information of the device, such as SN, Expired Date, Feature Function, firmware and other information. As shown below:

Device Info	
SN	Z32246369000008
	
Product Date	2022-06-16
Board1 SN	6900000000
Board2 SN	00.09.0000133.01.01
Register Code	1079933400920DF7
Expired Date	2022-09-15
Functionality	0x0000
Feature	
Firmware	1.0.2206.9

Device Info

3.1.3 Command

Provides the System, Config, Operation, Power, Feature Code and Register Code of the device commands. As shown below:

The registration code is a valid time code for authorizing the device location function. When it is found that the registration code is expired and the device location function is unavailable, we can obtain a new registration code for the supplier by providing the device SN, and enter it on this page and click [Register] to register.

Reset Config: To restore the host to the factory settings state.

Featruce code: input the customization code, restart the host, you can increase the corresponding function of the customization code.

Command

System

[Reboot](#)

Config and Data

[Clean Storage](#) [Reset Config](#) [Export Config](#) [Import Config](#)

GNSS Operation

[Reset](#) [Fixes](#)

Register Code

[Register](#)

sn=Z32246369000008, date=2025-01-13

Feature Code

[Write](#)

Command

3.1.4 Marker Info

Provides Measure Info such as the Marker Name, Marker Number, Marker Type and Antenna Info such as the SN, Setup ID.

After modifying the Marker Name, Marker Number, the file name is changed when the data is stored.

The screenshot shows the 'Marker Info' page of a web application. The top navigation bar includes a user profile 'admin', a language dropdown set to 'English', and a '[Logout]' link. The left sidebar contains a menu with items: General, Device Status, Device Info, Command, Marker Info (highlighted), Local, Power, Log, Firmware, User, GNSS Status, GNSS Config, Network, Storage, and Data Port. The main content area is titled 'Marker Info' and contains two sections: 'Measure Info' and 'Antenna Info'. The 'Measure Info' section has input fields for 'Marker Name' (Z32246369000008), 'Marker Number' (0008), 'Marker Type' (Earth-fixed high-precision monomer), 'Observer', 'Agency', and 'Remark'. The 'Antenna Info' section has an 'SN' field. Each field has a small text label indicating the allowed characters (e.g., 'letters or digits', '4 digits', 'letters, digits or space', 'Can read without login').

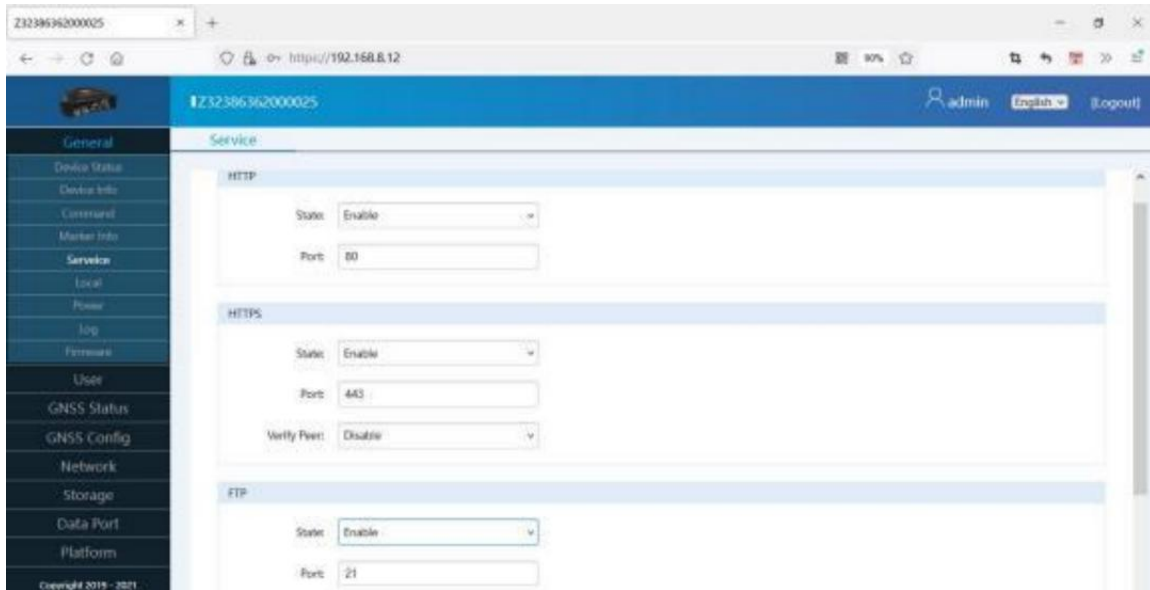
Marker Info

The screenshot shows the 'Channel Config' page of the same web application. The top navigation bar and left sidebar are identical to the previous screenshot. The main content area is titled 'Channel Config' and contains a 'Name' field with a dropdown menu. The dropdown menu is open, showing a list of file name formats. The selected format is 'SITE-CH-yyyyMMdd-HH:mm:ss'. The dropdown menu also shows 'Format', 'Scheme Begin', 'Scheme End', 'Authentication', and 'Password'. The 'Authentication' field is set to 'SITECH000000'. The 'Password' field is empty. The 'Apply' button is visible at the bottom right. Below the form, there is a note: '1. The time in the name and scheme is converted from GPS time directly. Assume GPS time offset is 18, Time Zone offset is +08:00, Then 08:00:18 means 08:00:00 of local time. 2. Key words in the name: yyyy => year, MM => month, 01-12, dd => day, 01-31, hh => hour, 00-23, mm => minute, 00-59, ss => second, 00-59, OOH => day of week, 000-360, Y => leap, at is 0 when not the per day, at => leap year. 3. SITE => Marker Name, 0000 => Marker Number'. The 'SITE' and '0000' are highlighted with red boxes.

File name

3.1.5 Service

Provides service configuration options, configure HTTP, HTTPS, FTP and other related ports. The default configured port is commonly used. You don't need to fill in the login address. If you modify the port, fill in the port behind the address.

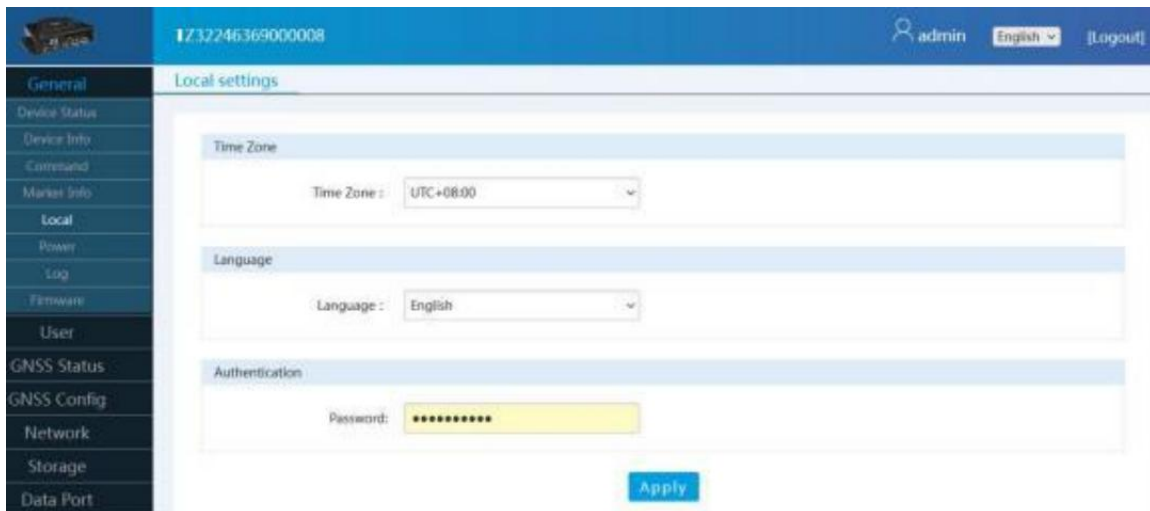


The screenshot shows the 'Service' configuration page in a web browser. The browser's address bar displays 'https://192.168.8.12'. The page has a blue header with the device ID 'Z32386362000025', a user profile for 'admin', and language and logout options. A left sidebar contains a menu with items like General, Device Status, Device Info, Command, Market Info, Service (selected), Local, Power, Log, Firmware, User, GNSS Status, GNSS Config, Network, Storage, Data Port, and Platform. The main content area is titled 'Service' and contains three sections: HTTP, HTTPS, and FTP. Each section has a 'State' dropdown menu set to 'Enable' and a 'Port' text input field. For HTTP, the port is '80'. For HTTPS, the port is '443' and there is an additional 'Verify Peer' dropdown set to 'Disable'. For FTP, the port is '21'. At the bottom left of the page, it says 'Copyright © 2016 - 2021'.

Service

3.1.6 Local

Provides time zone settings and language settings of the device. The time zone time is used to display the time in your current city. For example, if you are in Beijing, choose UTC+08:00. As shown below:

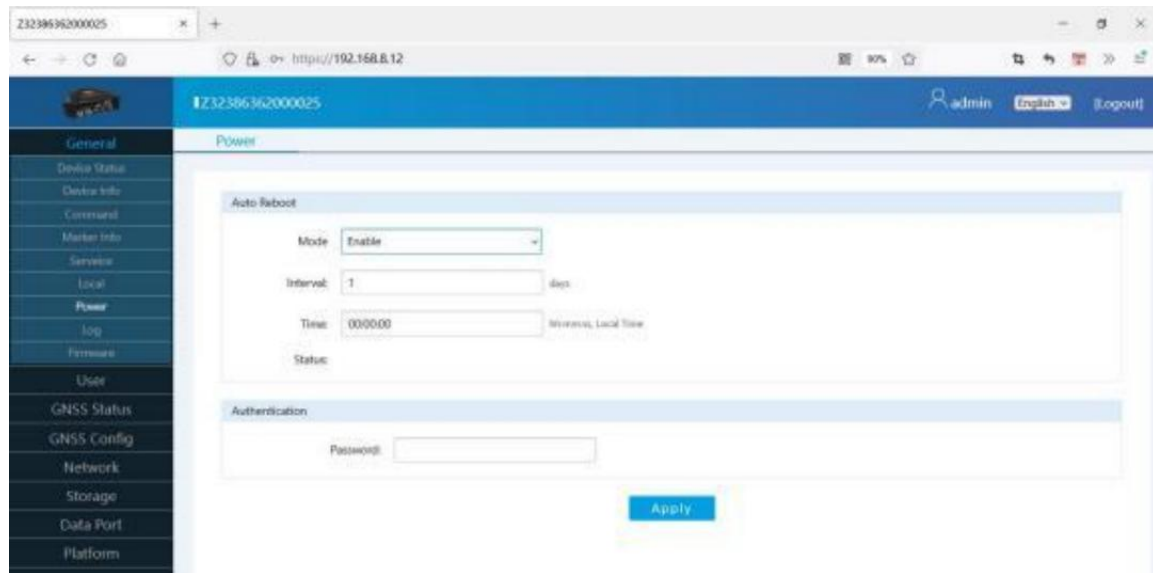


The screenshot shows the 'Local settings' page in the same web browser. The header and sidebar are identical to the previous page. The main content area is titled 'Local settings' and contains three sections: Time Zone, Language, and Authentication. The 'Time Zone' section has a 'Time Zone' dropdown menu set to 'UTC+08:00'. The 'Language' section has a 'Language' dropdown menu set to 'English'. The 'Authentication' section has a 'Password' field with a masked password '*****'. An 'Apply' button is located at the bottom right of the page.

Local

3.1.7 Power

Provides the Auto Reboot of the device. If the customer wants to get the relocation data every while, they can set it up. As shown below:



The screenshot shows a web browser window with the URL <http://192.168.8.12>. The page title is "Z32386362000025". The left sidebar contains a menu with items: General, Device Status, Device Info, Command, Marker Info, Service, Local, Power (highlighted), Log, Firmware, User, GNSS Status, GNSS Config, Network, Storage, Data Port, and Platform. The main content area is titled "Power" and contains two sections: "Auto Reboot" and "Authentication". The "Auto Reboot" section has a "Mode" dropdown set to "Enable", an "Interval" input set to "1" with "days" next to it, a "Time" input set to "00:00:00" with "minutes, Local Time" next to it, and a "Status" label. The "Authentication" section has a "Password" input field. An "Apply" button is located at the bottom right of the "Authentication" section.

Power

3.1.8 Log

Each time the device is powered on, a system log file will be generated to record the various states of the device, so that it is convenient to investigate the cause of the device exception when an exception occurs. You can download the log generated at the corresponding time here to the supplier for troubleshooting. As shown below:



Z32246369000008

 admin

English

[Logout]

General

Device Status

Device Info

Command

Marker Info

Local

Power

Log

Firmware

User

GNSS Status

GNSS Config

Network

Storage

Data Port

Log

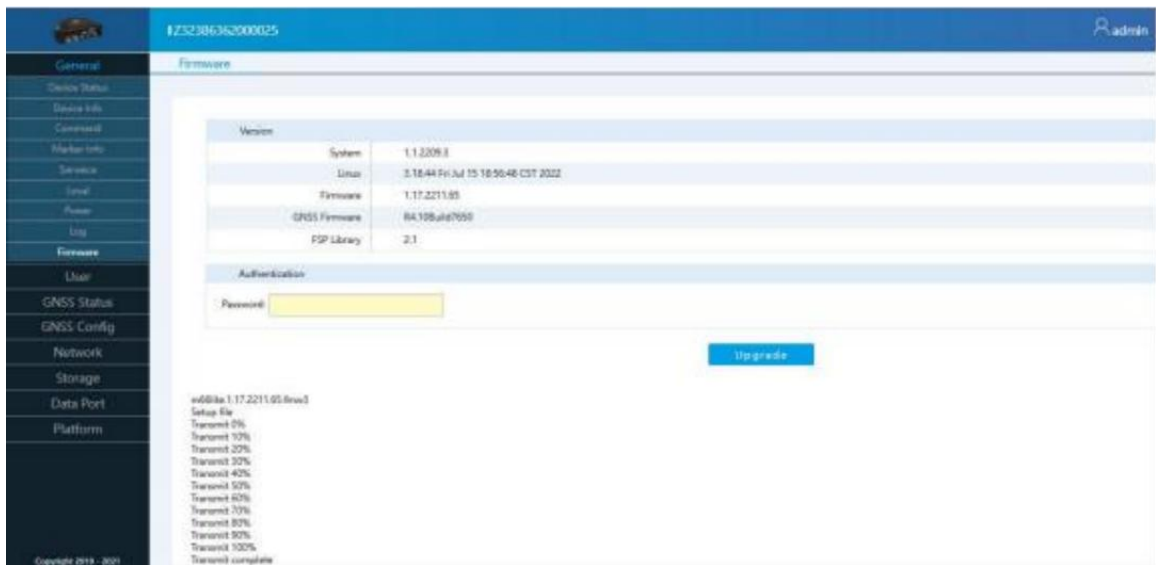
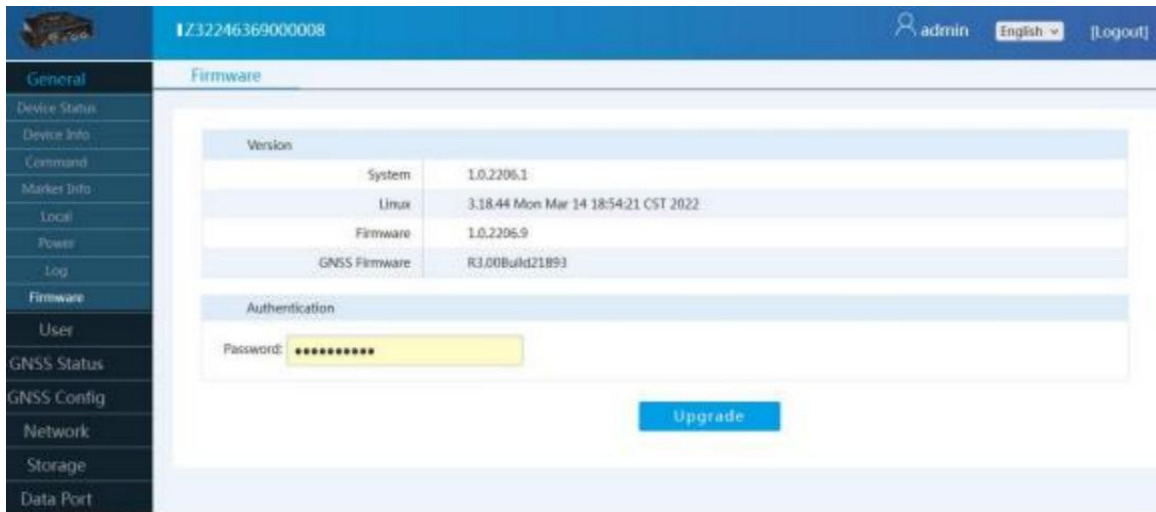
File Name	Size	Time Modified	Operation
Z32246369000008-0022.zlog	176.10kB	2022-08-19 19:45:57	Download
Z32246369000008-0021.zlog	275.15kB	2022-06-20 20:22:03	Download
Z32246369000008-0020.zlog	148.79kB	2022-06-20 19:49:22	Download
Z32246369000008-0019.zlog	62.94kB	1980-01-06 08:37:12	Download
Z32246369000008-0018.zlog	41.90kB	1980-01-06 11:17:16	Download
Z32246369000008-0017.zlog	76.59kB	1980-01-06 11:16:17	Download
Z32246369000008-0016.zlog	42.49kB	1980-01-06 11:15:47	Download
Z32246369000008-0015.zlog	45.93kB	1980-01-06 11:12:46	Download
Z32246369000008-0014.zlog	44.38kB	1980-01-06 11:11:03	Download
Z32246369000008-0013.zlog	44.57kB	1980-01-06 11:09:34	Download
Z32246369000008-0012.zlog	83.79kB	2022-06-20 17:54:09	Download
Z32246369000008-0011.zlog	123.87kB	2022-06-20 17:34:41	Download

Log

3.1.9 Firmware

Provides the current device's device system, linux, firmware, GNSS firmware and other version information, as well as version upgrade operations. Click below to upgrade the firmware, you can automatically identify and upgrade GNSS firmware, and device firmware. There will be a prompt below during the upgrade, and the device will restart after the upgrade is complete. The operation steps are as follows:

1. Click [Upgrade Firmware];
2. Select the correct firmware or GNSS firmware in the pop-up window, flash the firmware and wait for the device to restart;
3. After the restart is complete, the firmware upgrade is completed;
4. Enter the webui, and check whether the firmware has been upgraded successfully.



Upgrade firmware

3.2 User

3.2.1 List User

Provides the current device user list, admin is the administrator, has the highest authority, and can add or decrease other users, configure password settings and permissions. When creating a new user, the user has no password by default, and can only be used after setting a password. As shown below:



I232246369000008

 admin

English 

[Logout]

General

User

List User

Add User

Password

Audit

GNSS Status

GNSS Config

Network

Storage

Data Port

Platform


User List

Number	Username	Role	Password	Information	Remark
1	admin	Administrator			

List User

3.2.2 Add User

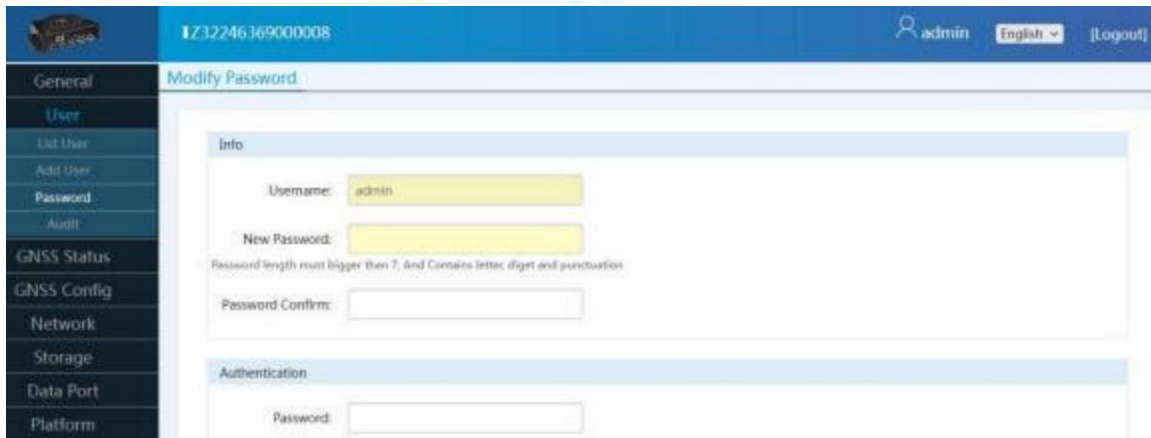
Set new user information, role permissions and add operations. As shown below:

<div>  </div> <div> General User List User Add User Password Audit GNSS Status GNSS Config Network Storage Data Port Platform </div>	<div> <div>I232246369000008</div> <div> admin English [Logout] </div> </div> <div> <div>Add User</div> <div> <div>Info</div> <div> <div>Username: admin</div> <div>Role: System</div> <div>Password:</div> <div> <small>Password length must bigger than 7, And Contains letter, digit and punctuation</small> </div> <div>Password Confirm:</div> </div> <div> <div>Authentication</div> <div> <div>Password:</div> </div> </div> </div> </div>
---	---

Add User

3.2.3 Password

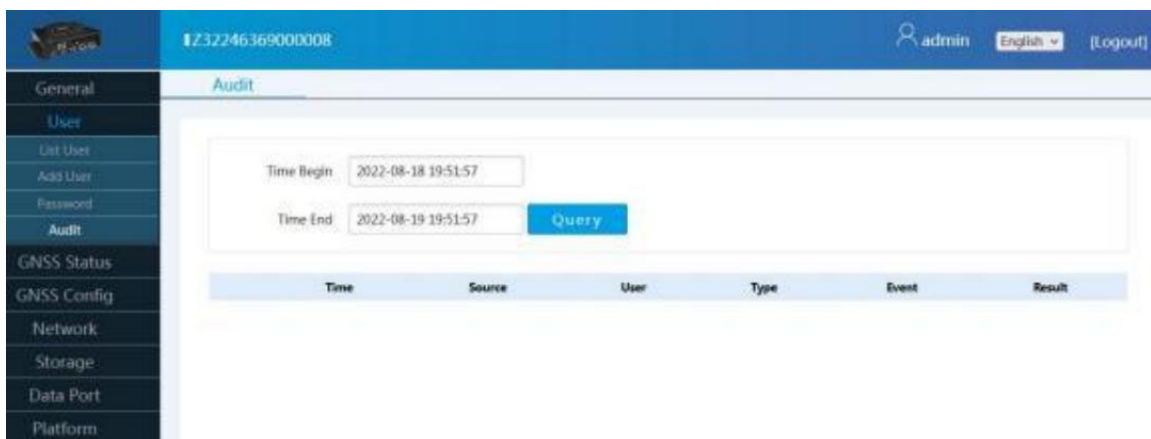
It is used to modify the password of the currently logged-in user. The current user password needs to be filled in at the authentication place. As shown below:



Password

3.2.4 Audit

Users with audit privileges can query audit records. As shown below:



Audit

3.3 GNSS Status

3.3.1 Status

Used to display the Time, UTC, Quality, Used/Tracked, Differential Age, PDOP, Latitude, Longitude, and Point Height. Note that the Point Height is the height of the phase center of the antenna to the surface of the WGS84 ellipsoid. As shown below:

Time	2022-11-25 14:19:24
UTC	2022-11-25 06:19:24
Position quality	RTK fixed, narrow, fix
Used/Tracked	43/47
Differential Age	1
PDOP	1.33
HDOP	0.70
Point Latitude	23.16500313 * $\sigma = 0.006$ m
Point Longitude	113.43141875 * $\sigma = 0.008$ m
Point Height	-6.7220+13.2182+0.0000=-6.4962 m $\sigma = 0.017$ m
Phase ECEF	-2332999.239, 5383142.374, 2493532.242 m

Status

3.3.2 C/No

There are two display modes: table and chart. Click the corresponding satellite system icon to view the satellite signal-to-noise ratio information of the system. As shown below:

Note: The number of carrier-to-noise ratio frequency points is related to the receiving environment. For example, the number of frequency points displayed indoors and outdoors will be different.

The 3 behind the load noise value represents the tracking status of the satellite, which some customers will use.

	B1(f)	B2(f)	B3(f)
C01	39.56 3	44.27 3	42.38 3
C02	39.84 3	45.05 3	42.56 3
C03	44.26 3	44.85 3	43.13 3
C04	38.77 3	42.43 3	40.33 3
C05	37.79 3	39.58 3	37.95 3
C06	42.98 3	44.44 3	42.40 3
C07	37.74 3	42.45 3	41.30 3

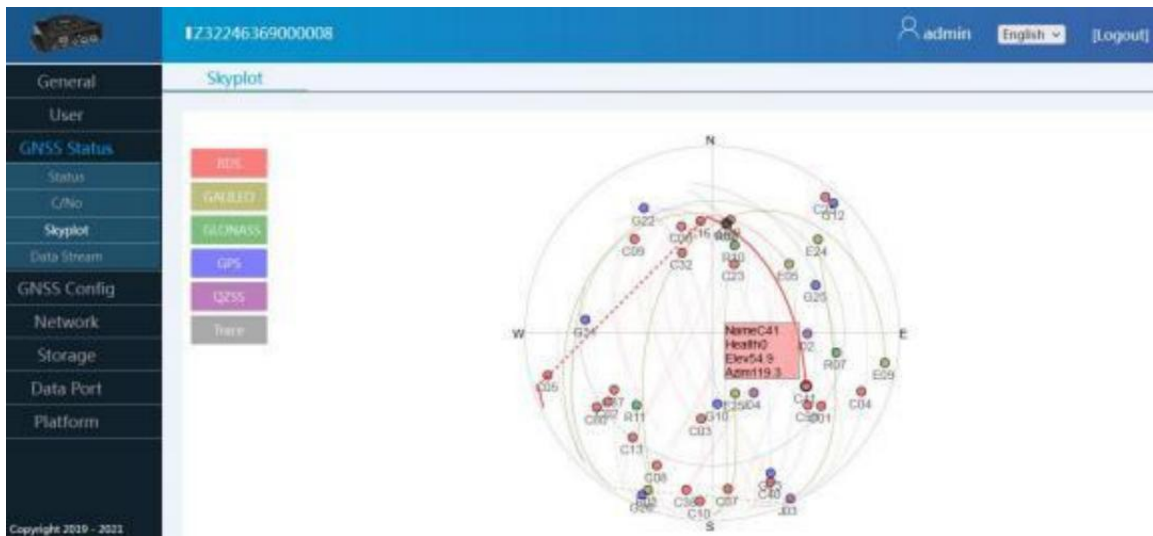
Table



Chart

3.3.3 Skyplot

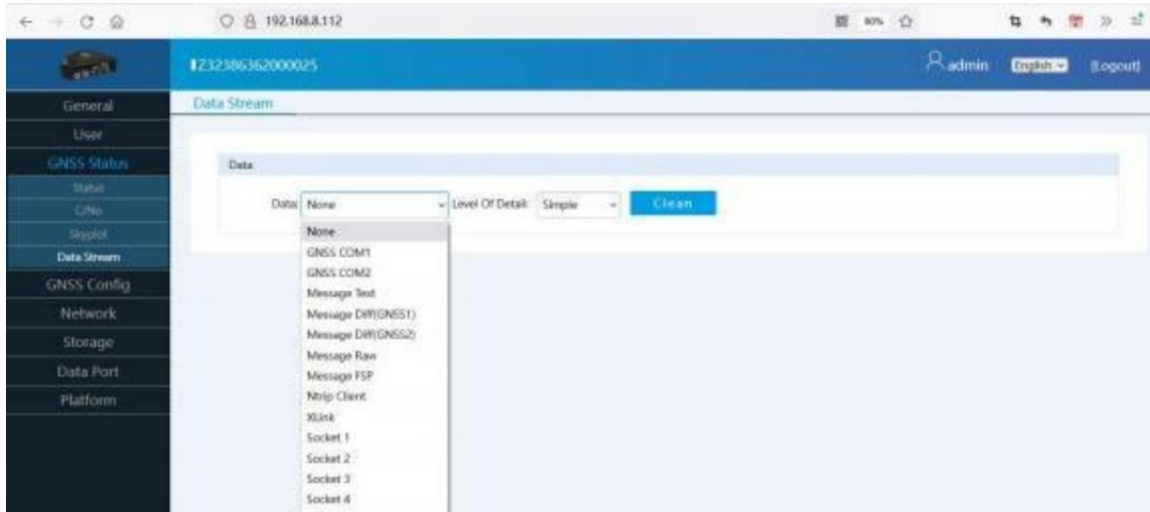
Display the distribution of the satellites tracked by the current device, check [Trace] to draw the running track diagram of the satellites tracked by the device in the monitoring time period. As shown below:



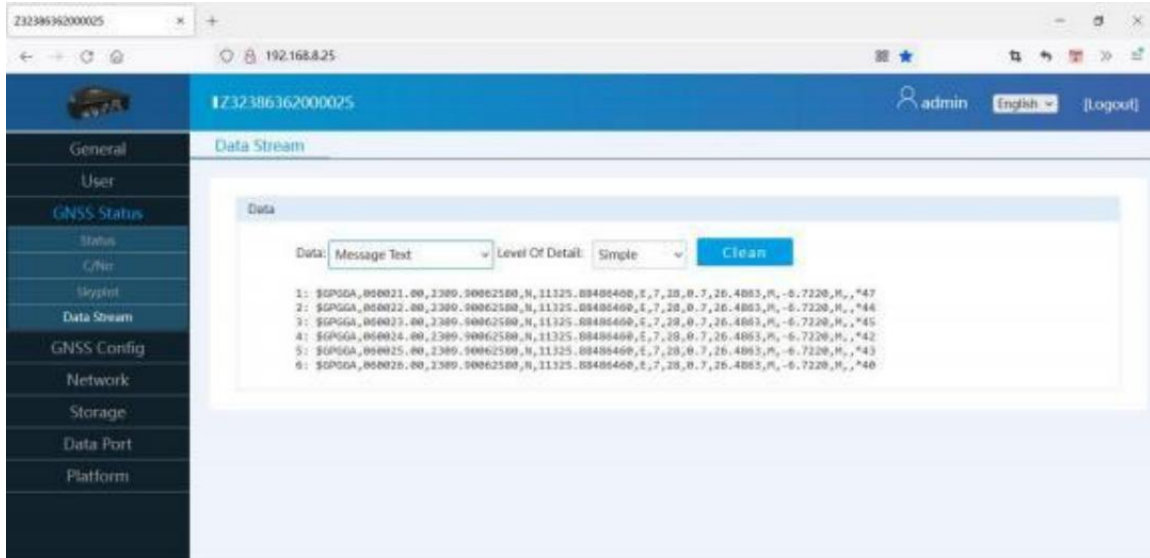
Skyplot

3.3.4 Data Stream

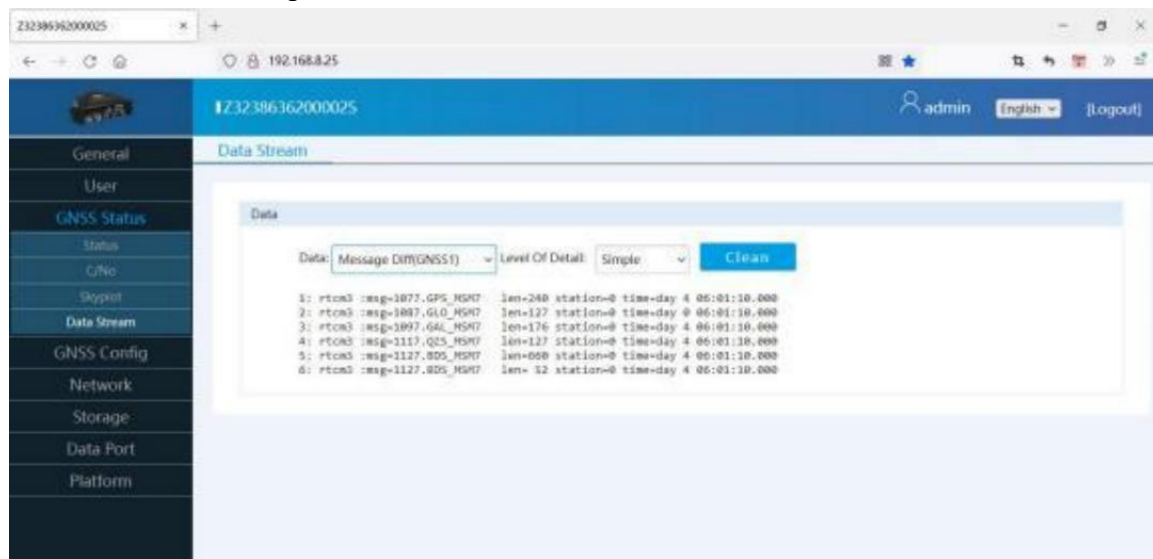
Select the data source in the data drop-down menu, you can directly view the real-time data of the corresponding data source on the web side. This can be used to determine whether the host outputs data. Such as Message Text, Message Diff (or whether it receives data. Such as, ntrip client. As shown below:



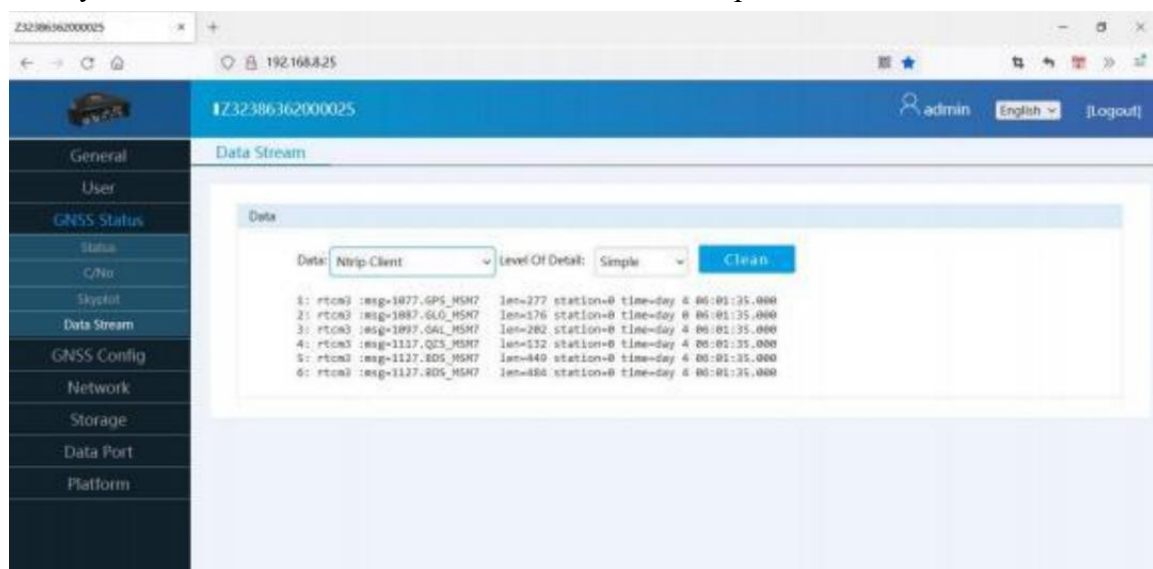
Message Text:



Message Diff: when the device is the base station, you can check whether there is differential data output here.



Ntrip client: When the device is a rover station and uses Ntrip Client to obtain differential data, you can check whether there is differential data output here.



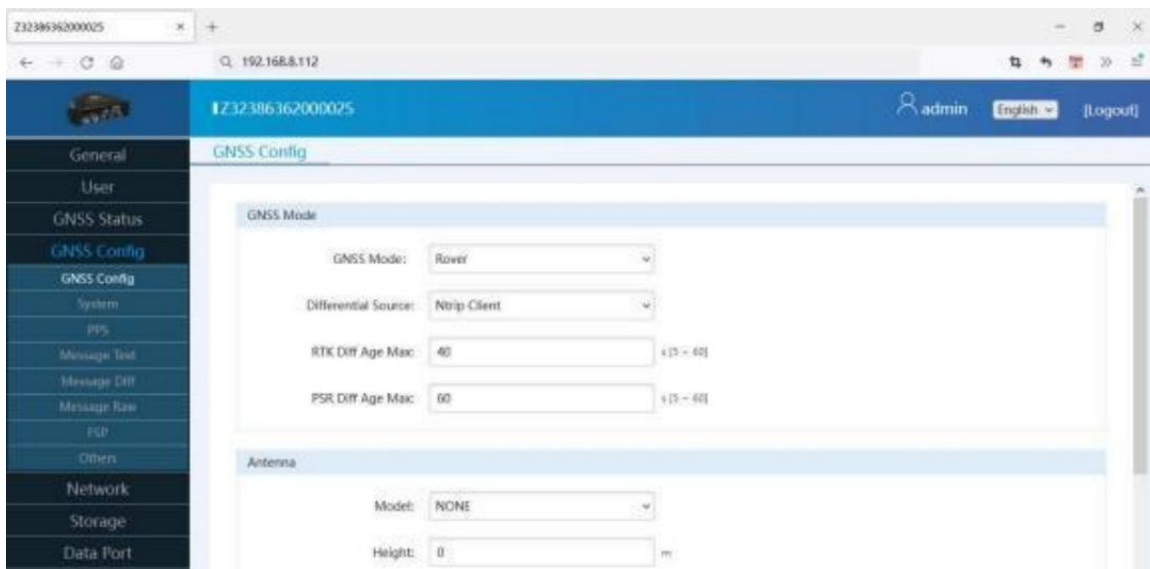
Data Stream

3.4 GNSS Config

3.4.1 GNSS Config

It is used to configure the working mode of the device (base station, rover station), whether to supply power to the antenna and the selection of the level surface. Check [Get Coordinate] to obtain the real-time coordinate value of the current device after the successful positioning.

As a rover mode, you can select [Differential Source]. As shown below:

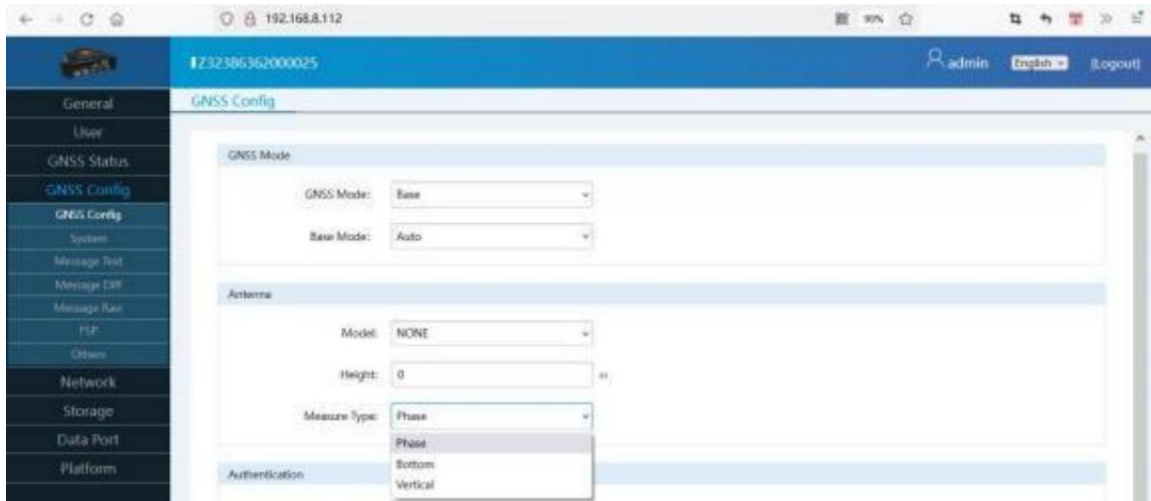


The screenshot shows a web browser window with the URL 192.168.1.112. The page title is "GNSS Config" and the user is logged in as "admin". The left sidebar contains a menu with options: General, User, GNSS Status, GNSS Config (selected), System, PPS, Message Test, Message Diff, Message Raw, FSP, Other, Network, Storage, and Data Port. The main content area is titled "GNSS Config" and contains two sections: "GNSS Mode" and "Antenna". In the "GNSS Mode" section, the "GNSS Mode" dropdown is set to "Rover", the "Differential Source" dropdown is set to "Ntrip Client", the "RTK Diff Age Max" is set to 40 (with a range of 5 to 60), and the "PSR Diff Age Max" is set to 60 (with a range of 5 to 60). In the "Antenna" section, the "Model" dropdown is set to "NONE" and the "Height" is set to 0 meters.

Rover Mode

When used as the base station, auto coordinate start and repeat coordinate start can be selected.

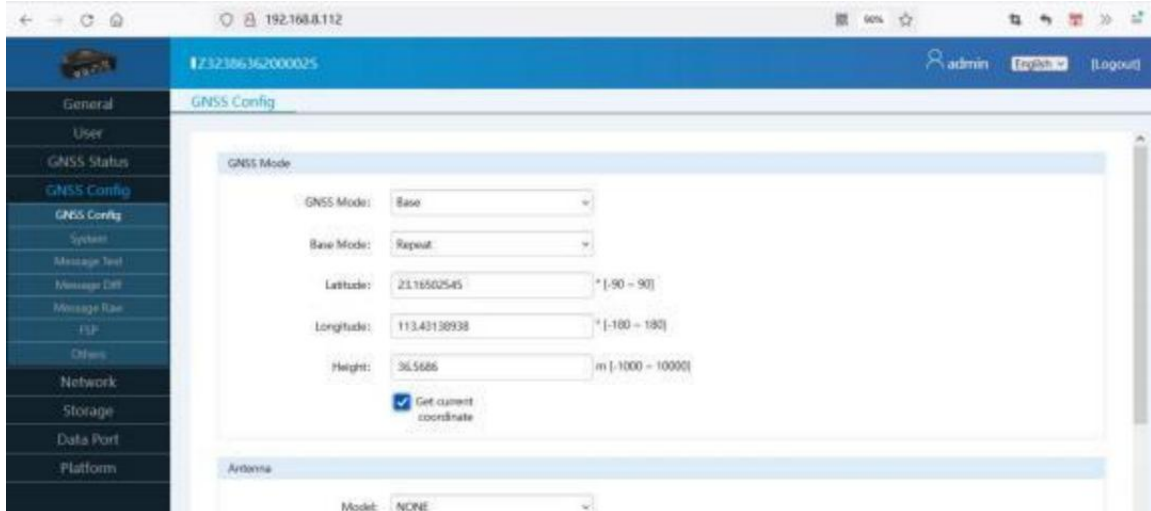
When auto coordinates are started, the device automatically matches a base station start coordinate according to the current single-point positioning data to start the base station. As shown below:



Base Station Mode - Auto

There are three ways to measure the antenna height: [Phase], [Bottom] and [Vertical].

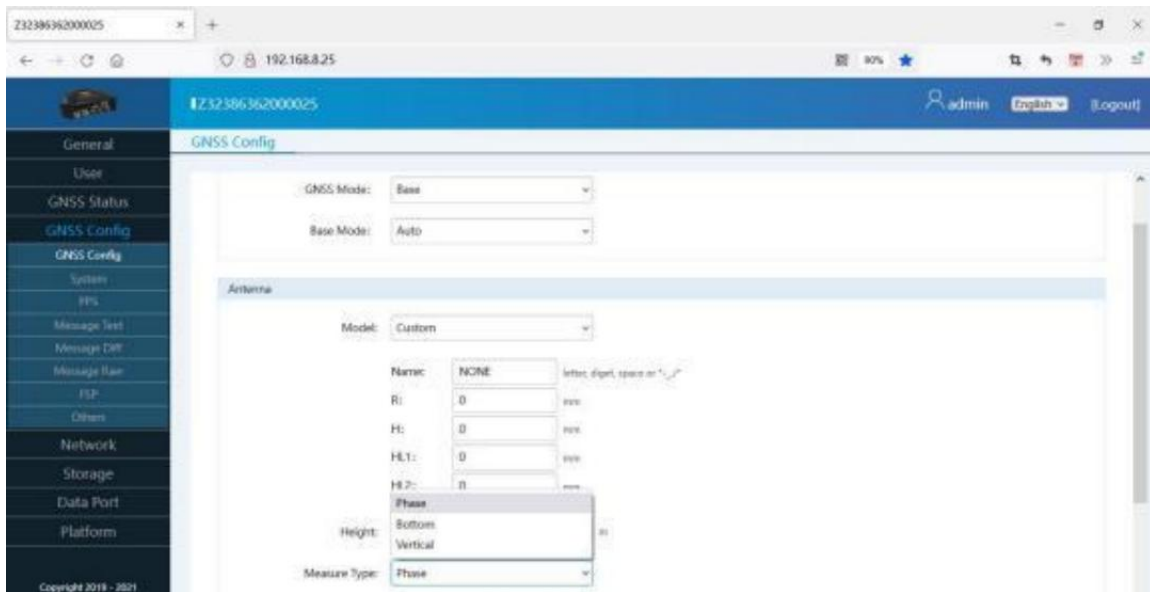
When starting with repeat coordinates, you can manually input the coordinates of the location of the antenna to start the base station, or you can check " **Get current coordinates**" to obtain the current single point coordinates of the device to start the base station. As shown below:



Base Station Mode - Repeat

According to the command RTCM1006 in the requirement document, the "ah" (the antenna height is actually the bottom height) is the result of the conversion of the antenna information parameters filled in the "Positioning Configuration" page, and its value range is 0.0000-6.5535. If the converted value is not within this range, the page will prompt "parameter invalid" during application. The conversion methods for the three antenna

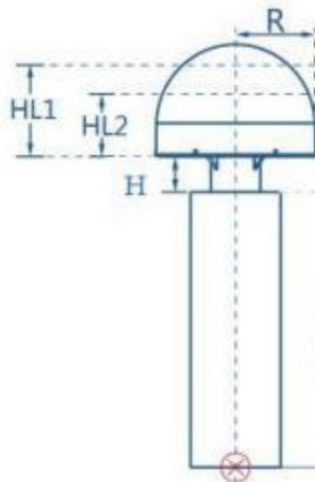
height acquisition methods are as follows:



1) The conversion formula when the phase center height is selected: **Bottom height = Phase center height - HL1**

2) Conversion formula when selecting straight height: **Bottom height = Straight height - H**

3) The conversion formula when bottom height is selected: **Bottom height = Bottom height**



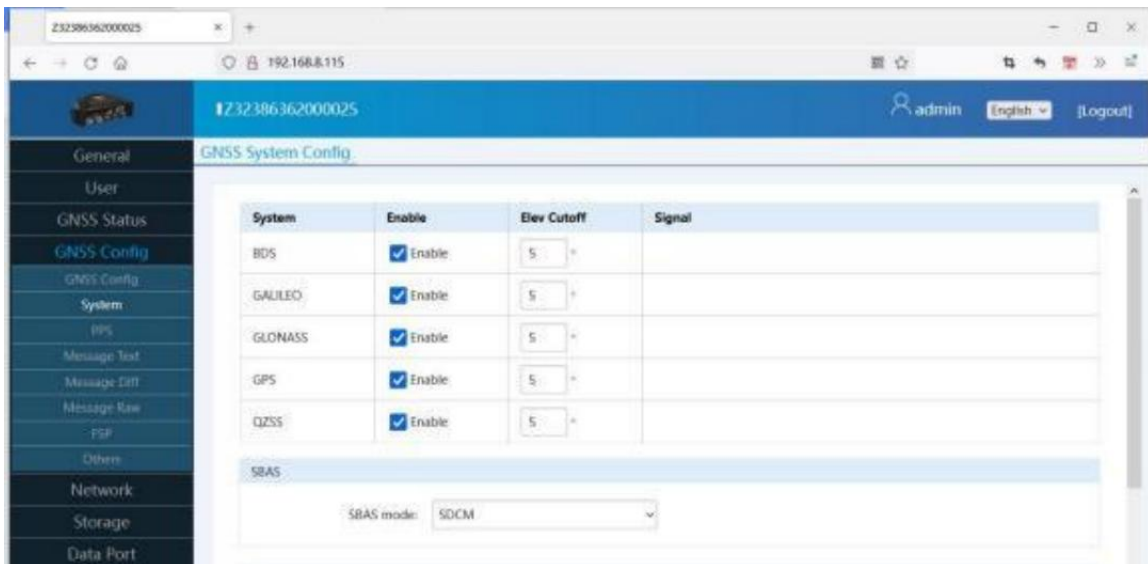
3.4.2 System

It is used for device satellite system selection, cut-off angle setting and frequency signal selection.

If it is found that the device receives fewer satellites under normal environment, you can enter this page to check whether all satellite systems have been turned on.

Elev Cutoff refers to the shelter height Angle set in the GPS measurement to block the occlusion objects (such as buildings, trees, etc.) and the influence of the multi-path effect, and the satellites lower than this Angle visual airspace will not be tracked.

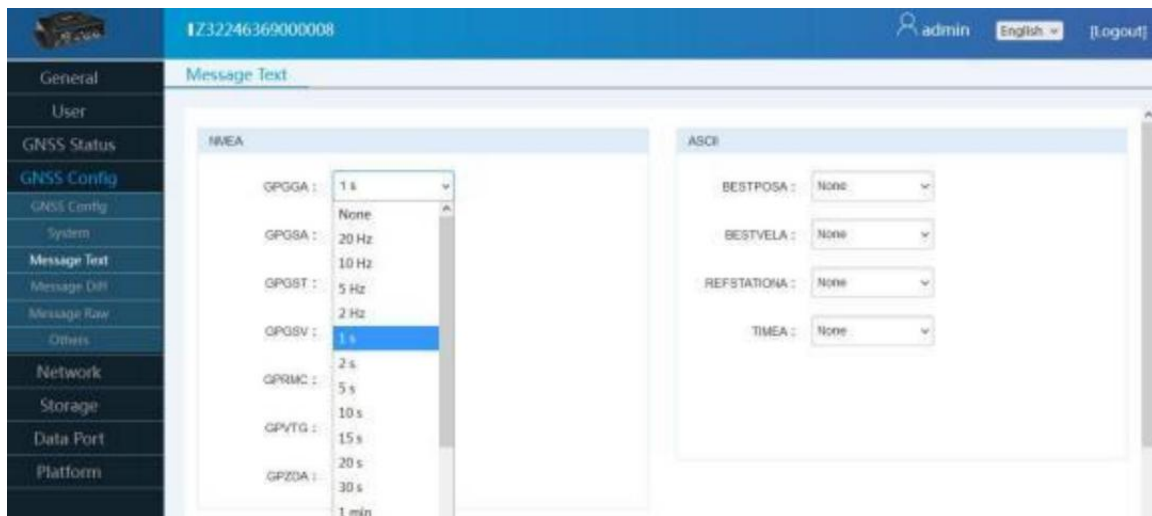
When these low-angle satellites interfere with your measurements, you can't get a fixed solution. The common problem is that the RTK is always float solution. When you adjust the cut height angle (15 ° or 20 °) to block those interfering low-angle satellites, you can increase the probability of getting a fixed solution.



System

3.4.3 Message Text

Used to configure the device text data output type and output rate, as shown below:



Message Text

The following are the formats of several common message text:

GPGLA	\$GPGLA,<1>,<2>,<3>,<4>,<5>,<6>,<7>,<8>,<9>,M,<10>,M,<11>,<12>*hh
<1>	UTC time, hhmmss (hour minute second) format, 8 hours different from Beijing time
<2>	Latitude ddmm.mmmm (degrees and minutes) format (the previous 0 will also be transmitted)
<3>	Latitude Hemisphere N (Northern Hemisphere) or S (Southern Hemisphere)
<4>	Longitude dddmm.mmmm (degrees and minutes) format (the previous 0 will also be transmitted)
<5>	Longitude Hemisphere E (East Longitude) or W (West Longitude)
<6>	GPS status: 0=no positioning, 1=single point positioning, 2=SBAS differential positioning, 4=RTK fixed solution, 5=RTK floating point solution, 6=inertial navigation positioning
<7>	The number of satellites (00~ 12) using the solution position (the previous 0 will also be transmitted)
<8>	HDOP horizontal precision factor (0.5~99.9)
<9>	Altitude (- 9999.9~99999.9)
<10>	Height of earth ellipsoid relative to geoid
<11>	Differential time (the number of seconds since the last differential signal was received. If it is not differential positioning, it will be null)
<12>	Differential station ID No. 0000~4095 (the previous 0 will also be transmitted, otherwise it will be null)

GPGSA	\$GPGSA,<1>,<2>,<3>,<3>,<3>,<3>,<3>,<3>,<3>,<3>,<4>,<5>,<6>*hh
<1>	Mode, M=manual, A=automatic
<2>	Positioning type, 1=no positioning, 2=2D positioning, 3=3D positioning
<3>	PRN code (pseudo-random noise code), the satellite number (01~32, the previous 0 will also be transmitted) being used to calculate the position.
<4>	PDOP position precision factor (0.5~99.9). The spatial geometric intensity factor of satellite distribution. Generally, the better the satellite distribution is, the smaller the PDOP value is, which is generally less than 3.
<5>	HDOP horizontal precision factor (0.5~99.9)
<6>	VDOP vertical precision factor (0.5~99.9)

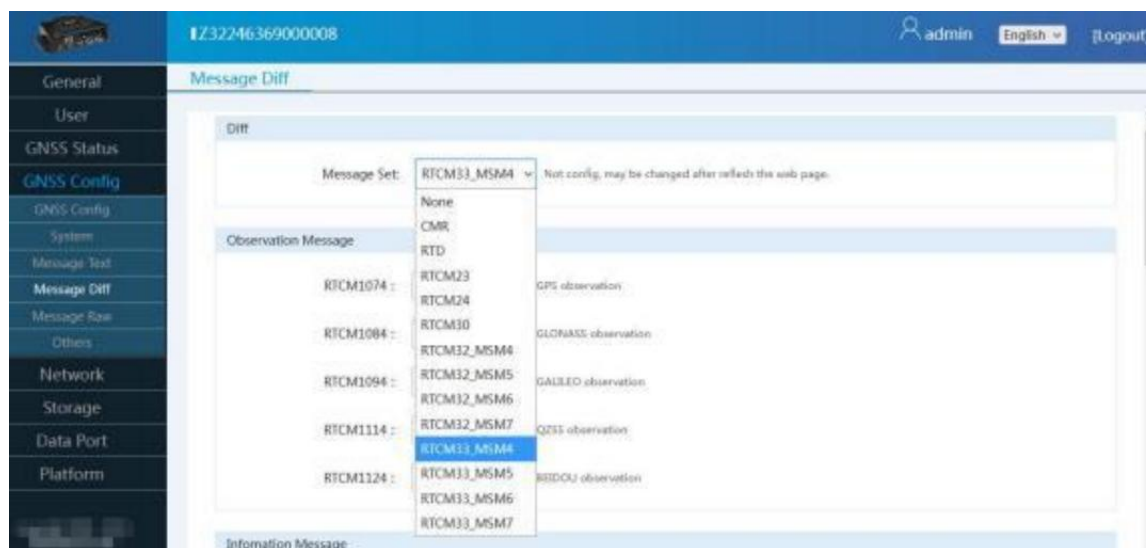
GPGSV	\$GPGSV,<1>,<2>,<3>,<4>,<5>,<6>,<7>, ...<4>,<5>,<6>,<7>*hh
<1>	Total number of GSV statements
<2>	Number of GSV in this sentence
<3>	Total number of visible satellites (00~12, the previous 0 will also be transmitted)
<4>	PRN code (pseudo-random noise code) (01~32, the previous 0 will also be transmitted), which can be understood as satellite number.
<5>	Satellite elevation (00~90 degrees, the front 0 will also be transmitted)
<6>	Satellite azimuth (000~359 degrees, the front 0 will also be transmitted)
<7>	Signal to noise ratio (00~99dB, empty when no satellite is tracked, and the previous 0 will also be transmitted), 50 is better.
<p>Note:<4>,<5>,<6>,<7>information will be displayed circularly according to each satellite, and each GSV statement can display information of up to 4 satellites. Other satellite information will be output in the next sequence of NMEA0183 statements.</p>	

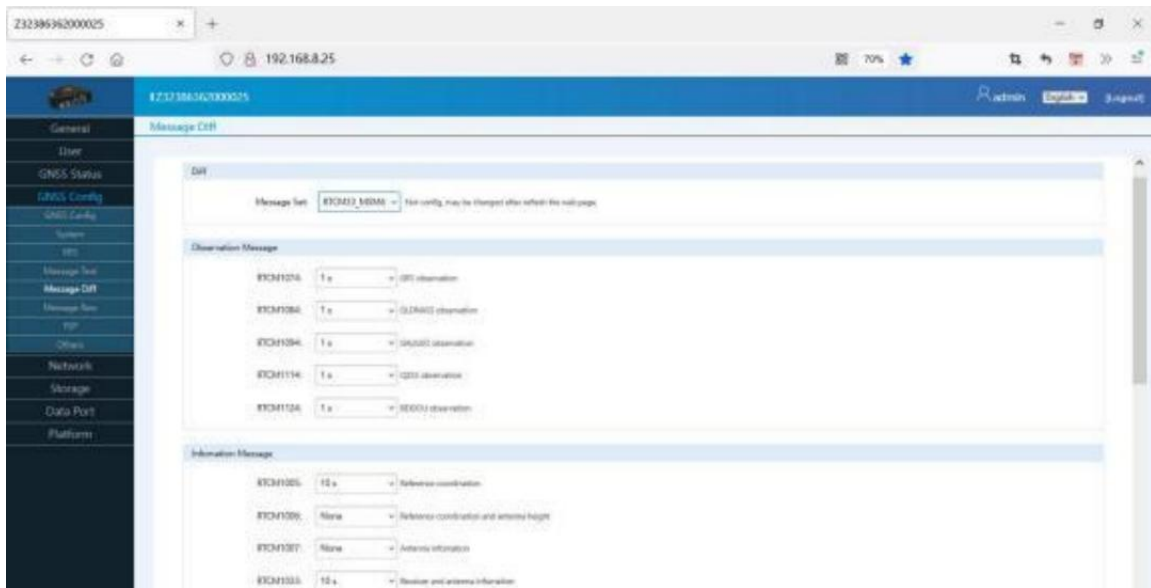
GPRMC	\$GPRMC,<1>,<2>,<3>,<4>,<5>,<6>,<7>,<8>,<9>,<10>,<11>,<12>*hh
<1>	UTC time, hhmmss (hour minute second) format, 8 hours different from Beijing time
<2>	Positioning status, A=valid positioning, V=invalid positioning. This flag is used to determine whether the current positioning is valid.

<3>	Latitude ddmm.mmmm (degrees and minutes) format (the previous 0 will also be transmitted)
<4>	Latitude Hemisphere N (Northern Hemisphere) or S (Southern Hemisphere)
<5>	Longitude dddmm.mmmm (degrees and minutes) format (the previous 0 will also be transmitted)
<6>	Longitude Hemisphere E (East Longitude) or W (West Longitude)
<7>	Ground speed (000.0~999.9 knots, the previous 0 will also be transmitted)
<8>	Ground heading (000.0~359.9 degrees, with true north as reference, the previous 0 will also be transmitted)
<9>	UTC date, ddmmyy (day month year) format
<10>	Magnetic declination (000.0~ 180.0 degrees, the previous 0 will also be transmitted)
<11>	Magnetic declination direction, E (east) or W (west)
<12>	Mode indication (A=autonomous positioning, D=differential, E=estimation, N=invalid data)

3.4.4 Message Diff

It is used to configure the format of the device differential message, the observation message, the information message, the ephemeris message, the ID of the base station and the output frequency. Usually follow the default configuration is OK. As shown below:

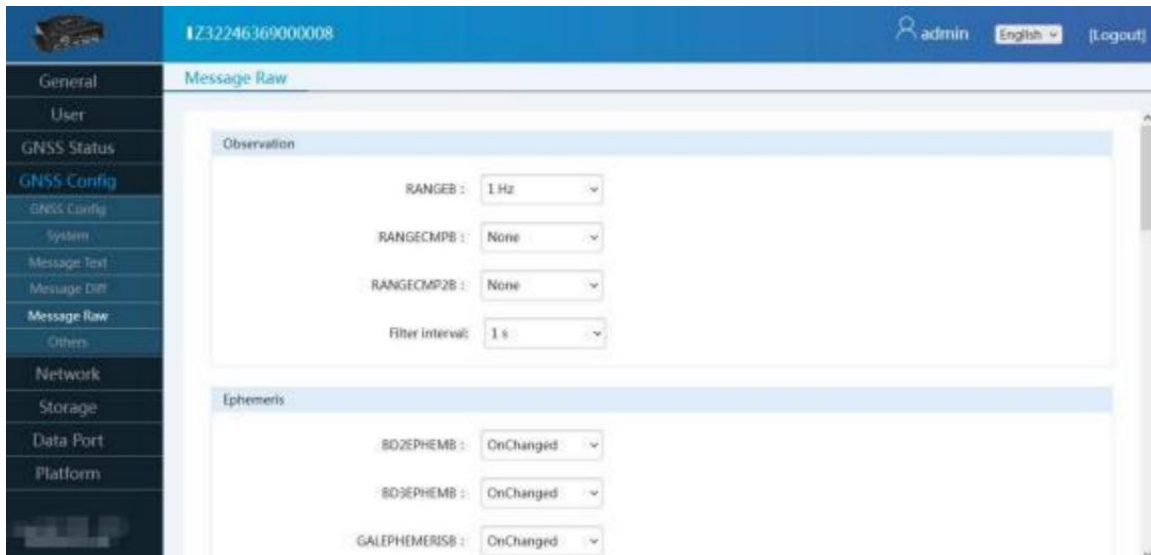




Message Diff

3.4.5 Message Raw

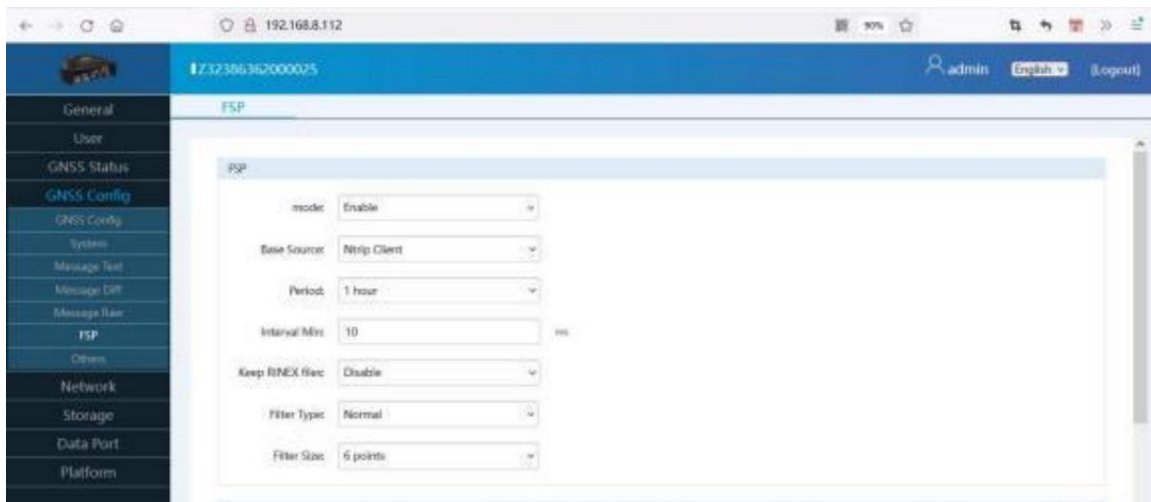
It is used to configure the raw data output rate of the device, including observation data, ephemeris, ionospheric parameters, navigation messages, other messages, etc., and provides observation data filters. Compared with range, rangecmpb and rangecmp2b are compressed, with less data volume and more space-saving when storing data. As shown below:



Message Raw

3.4.6 FSP

Settings used to configure static solution parameters. Such as base station data source, solution period, Filter Type, Filter Size, whether to save Renix file.



FSP

3.4.7 Others

It is used to select the Undulation, and send user-defined commands to the GNSS board.

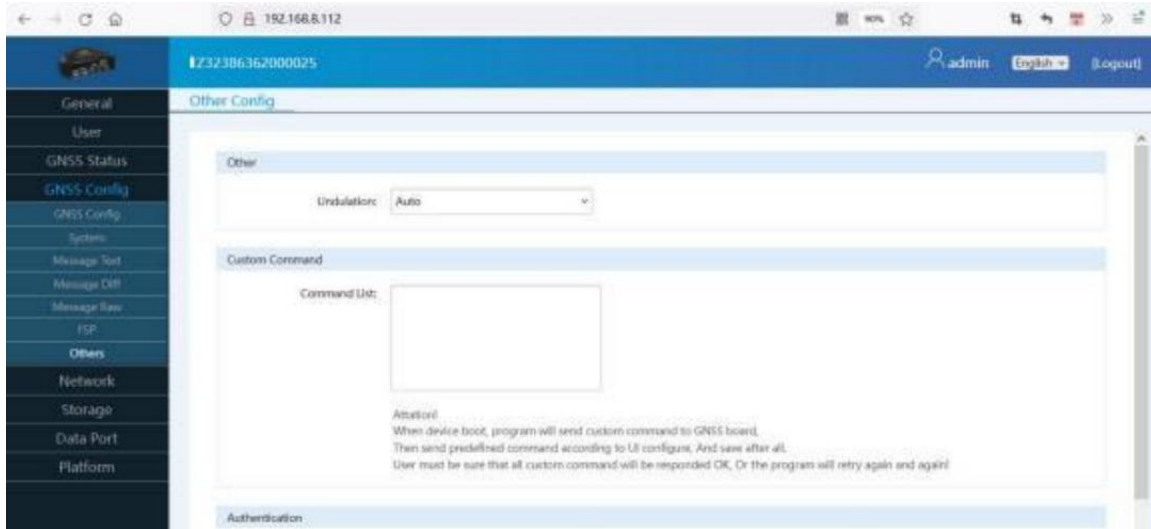
When the customer wants to send a corresponding message directly to the GNSS board, it can enter in the box.

Attation:

When device boot, program will send custom command to GNSS board,

Then send predefined command according to UI configure, And save after all.

User must be sure that all custom command will be responded OK, Or the program will retry again and again!



Others

3.5 Network

3.5.1 Status

Displays the Ethernet, and Mobile network enabling status of the current device. As shown below:

Network Status		
Ethernet		
State	Connected	
Rx Flow	315M6040708 1x167B/s	
Tx Flow	150M54962178 3x548B/s	
Mode	DHCP Client	
Address	192.168.8.112	
Netmask	255.255.240.0	
Gateway	192.168.8.1	
DNS	192.168.8.1	
Mobile		
State	mobileutata.SimTest	
Rx Flow		
Tx Flow		
Software Version	LLAE301.1.1_M006	
INNER Version	LLAE301_0125_3.1.2_FF22_EF51.2	

Status

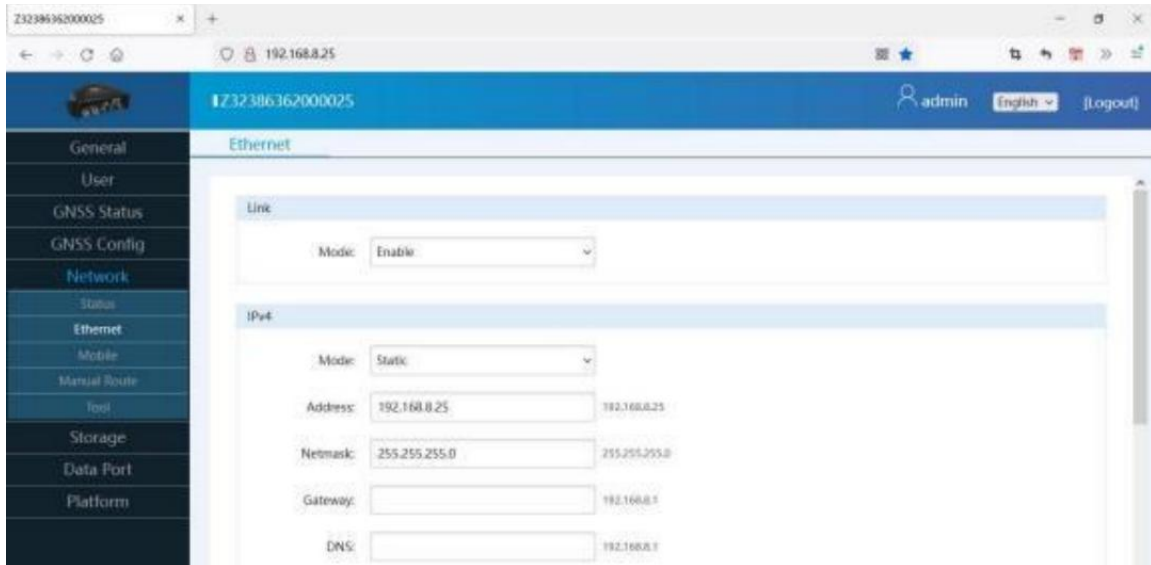
3.5.2 Ethernet

Information for configuring the device ethernet network. In static address mode, IP, mask, gateway and DNS need to be entered manually, as shown below:

Ethernet	
Link	Mode: Enable
IPv4	Mode: None
IPv6	Mode: Static

Ethernet

When a cable network cannot access it, a 4G card is needed to access it. This need to set to static mode, set the Gateway and DNS to empty.

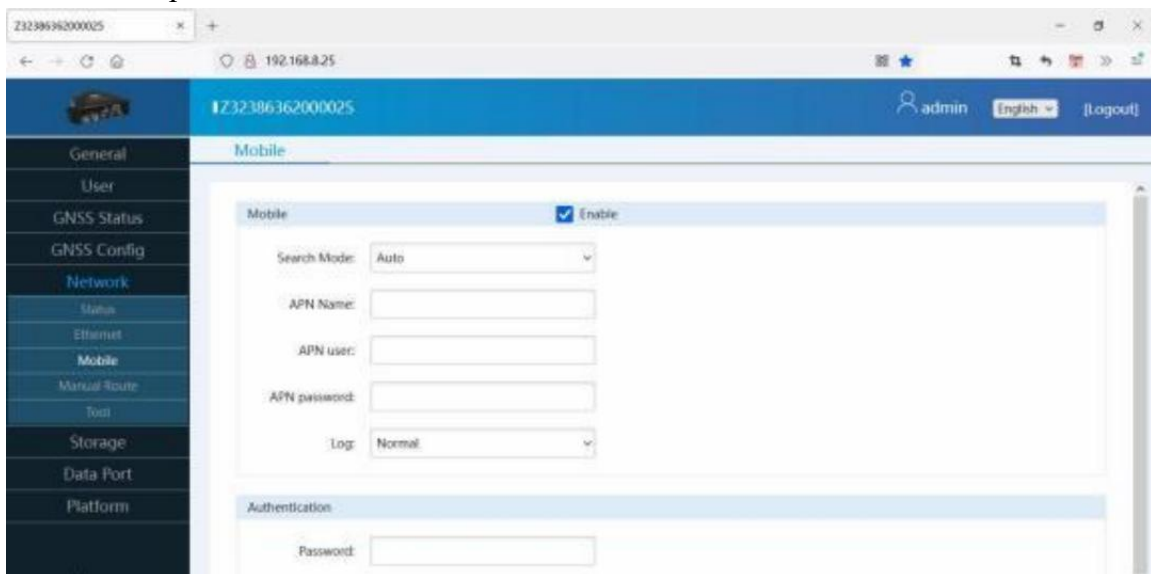


static mode

3.5.3 Mobile

Used to set the APN parameter settings in the mobile network mode (mobile phone card to access the Internet). As shown below:

Note: some 4G cards are private network cards, this card needs to fill in the APN Name, APN password can surf the Internet, if it is a common card, do not need to fill in.



3 Mobile

3.5.4 Manual Route

Used to configure protocols, targets, gateways, etc., as shown below:

The screenshot shows the 'Manual Route' configuration page. On the left is a sidebar menu with options: General, User, GNSS Status, GNSS Config, Network (highlighted), Status, Ethernet, Mobile, Manual Route, Tool, Storage, and Data Port. The main content area has a table with the following data:

Number	Protocol	Target	Gateway	Iface	Metric
1	IPv4	10.1.4.0/24		zxvpn1	
2	IPv4	192.168.0.0/20		eth0	710
3	IPv4	default	192.168.8.1	eth0	810
4	IPv6	FF12::8886		eth0	0

Below the table is a form to add a new rule with fields for Protocol (dropdown), Target, Gateway, Iface, and Metric, followed by a 'Delete' button. At the bottom right are 'Clear Rules' and 'New Rule' buttons.

Manual Route

3.5.5 Tool

The device provides three network tools: Ping, Traceroute and Telnet, which are used to test the network connection status of the device online, as shown below:

When you find that you cannot get the data from the server or cannot send the data to the server, you can use the ping function, fill in the server IP, click on the ping, and see if the server is successful.

The screenshot shows the 'Network Tool' page. The sidebar menu is the same as in the previous image. The main content area has three sections: Ping, Traceroute, and Telnet. Each section has an input field for a target IP and a corresponding button. The Ping section shows a successful test with the following output:

```
PING 120.77.83.81 (120.77.83.81) 56(84) bytes of data:
64 bytes from 120.77.83.81: icmp_seq=1 ttl=117 time=6.13 ms
64 bytes from 120.77.83.81: icmp_seq=2 ttl=117 time=6.53 ms
64 bytes from 120.77.83.81: icmp_seq=3 ttl=117 time=6.53 ms
64 bytes from 120.77.83.81: icmp_seq=4 ttl=117 time=6.72 ms

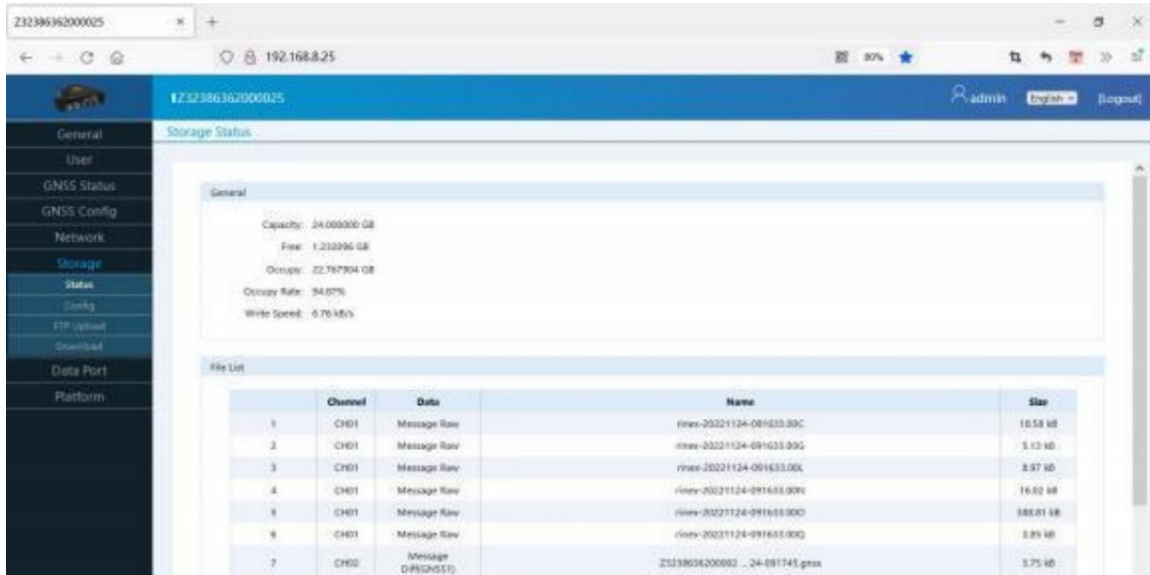
--- 120.77.83.81 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3008ms
rtt min/avg/max/mdev = 5.932/6.226/6.726/0.468 ms
```

Tool

3.6 Storage

3.6.1 Status

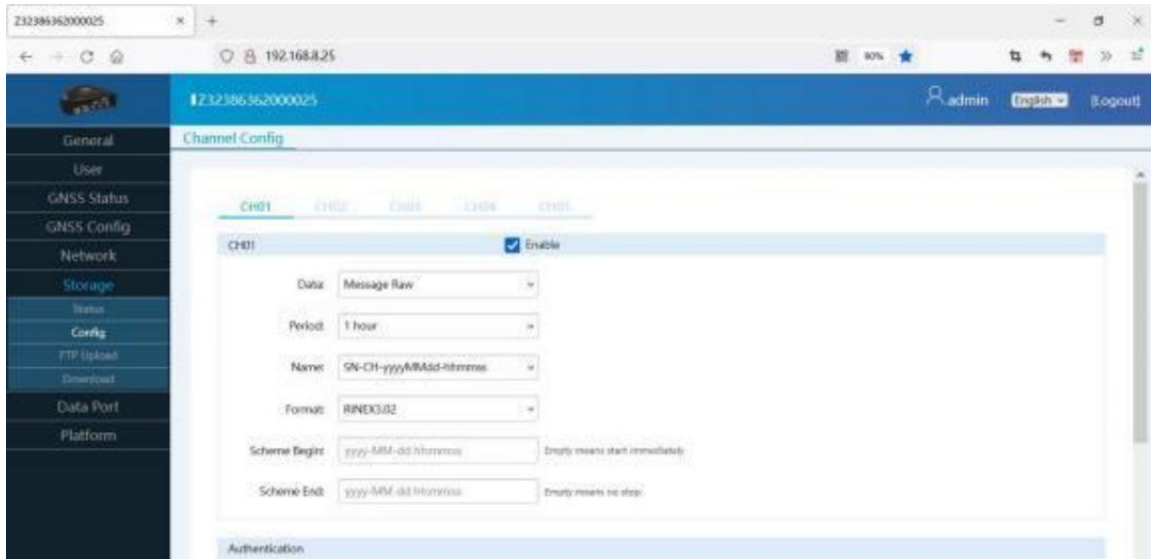
Displays the overall storage status of the device, the files currently being stored, and the writing speed, as shown below:



Status

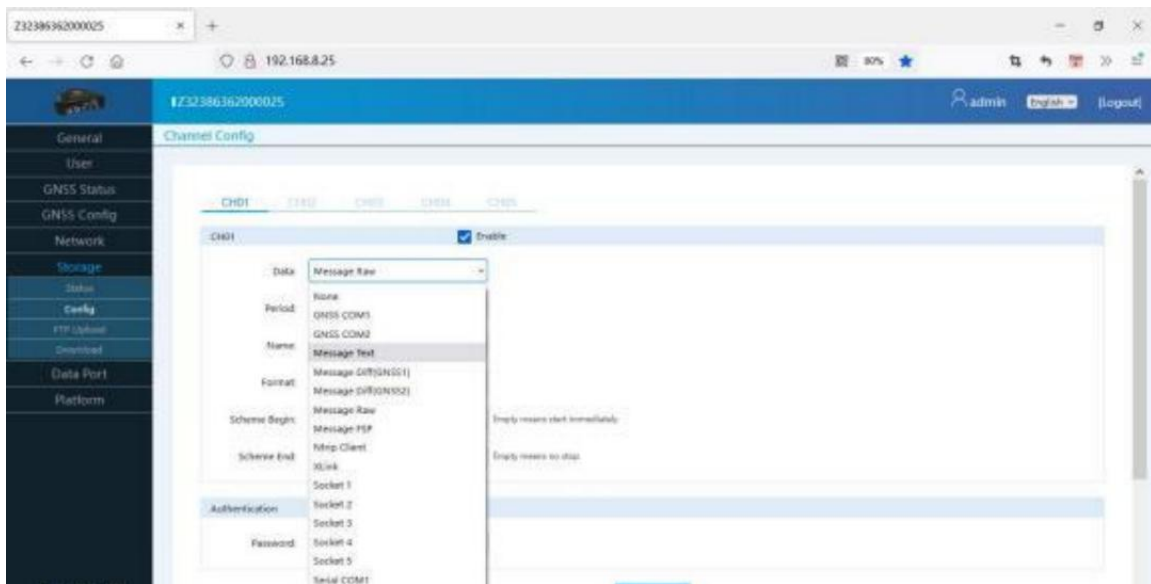
3.6.2 Config

It is used to configure the storage type, format and duration of data. The device provides 5 storage channels for users to set. The duration of data stored in a single file is 1 day (in natural days), and it can also be stored according to a time plan. If configured If it is not empty, it is considered to be stored in the whole time period by default. After you configure the stored data, you can see if the data is being stored in subsection 3.6.1.



Config

Select the type of data that will be stored:



Data

File name naming rules :

1.The time in file name is converted from GPS time directly.

2.Key words in file name

yyyy => year

Assume GPS leap second is 18, Time Zone offset is +08:00, Then 00:00:18 means 08:00:00 of local time.

MM	=> month , 01~ 12
dd	=> day , 01~31
hh	=> hour , 00~23
mm	=> minute , 00~59
ss	=> second , 00~59
DOY	=> day ofyear , 000~366
X	=> hour, a~x, 0 when one file per day
SN	=> SN
SITE	=> Marker Name
SSSS	=> Marker Number

3.6.3 FTP Upload

The device provides FTP remote storage function for 5 storage channels. The running user stores the corresponding channel data to the remote device through FTP, as shown below: (Note: Not real-time uploading, uploading will only be performed after the corresponding channel file recording is completed)

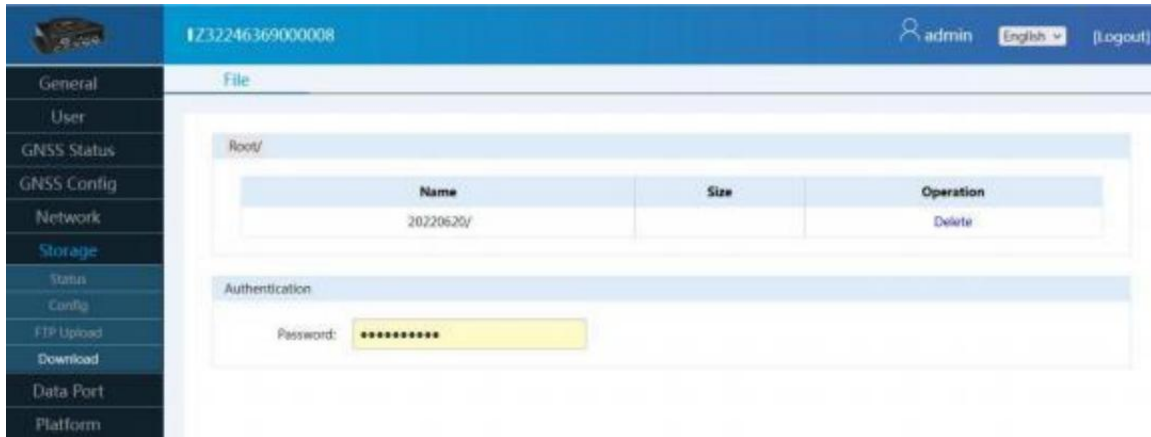
Enable	Channel	Path	Username	Password
<input checked="" type="checkbox"/> Enable	CH01			*****
<input checked="" type="checkbox"/> Enable	CH02			*****
<input checked="" type="checkbox"/> Enable	CH03			*****
<input checked="" type="checkbox"/> Enable	CH04			*****
<input checked="" type="checkbox"/> Enable	CH05			*****

Path format: ftp://host:port/directory/

FTP Upload

3.6.4 Download

Enter the file download page, the first page displays the folder named by the date, click the folder to enter the folder named after the storage channel, click the corresponding channel, the data stored in the corresponding channel, click the download interface, download the corresponding channel file, as shown below:



Download

3.7 Data Port

3.7.1 Status

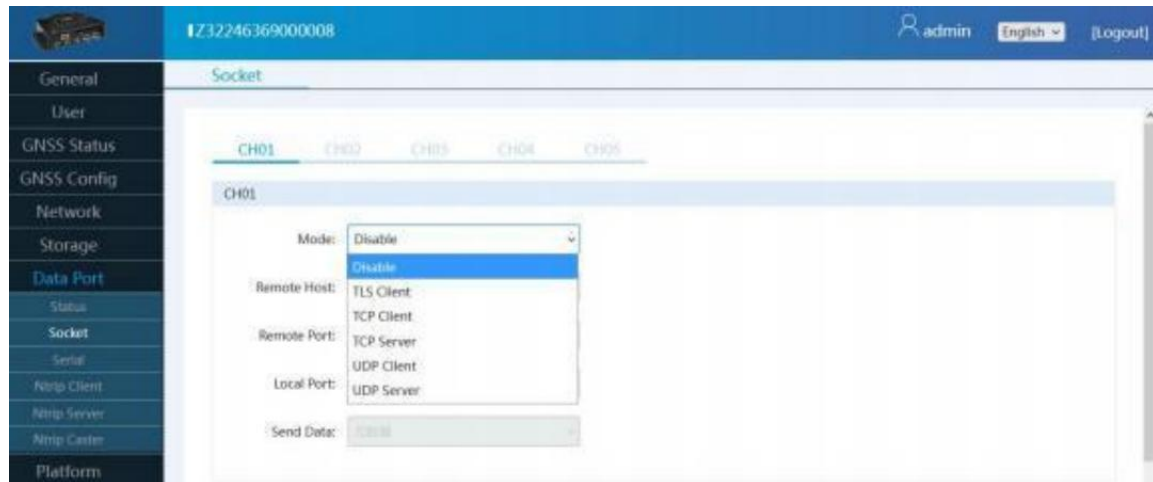
It is used to view the status information of each port of the device, as shown below:



Status

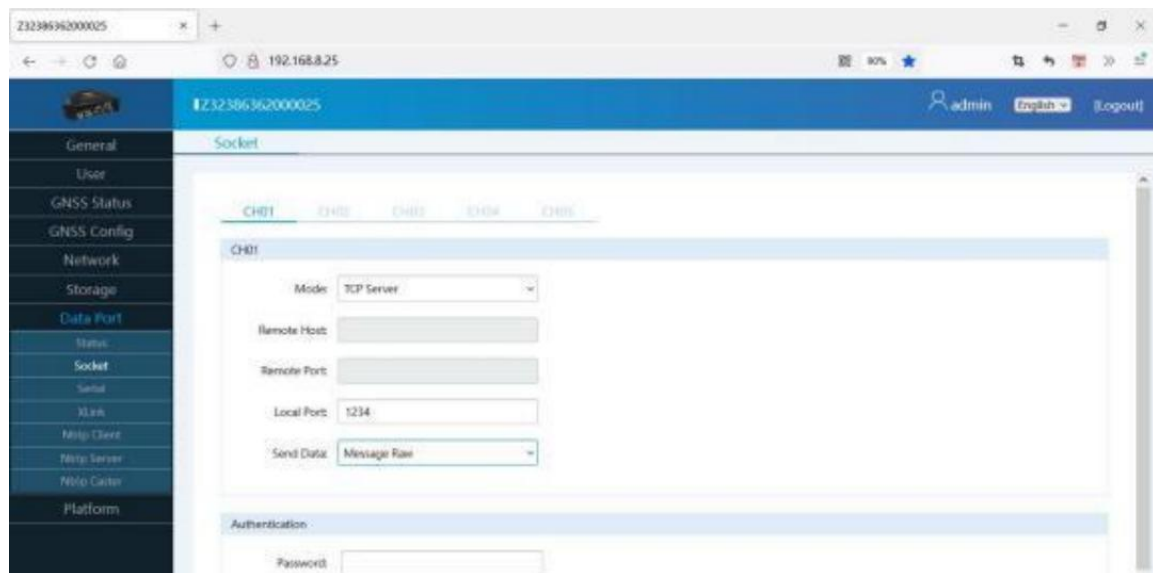
3.7.2 Socket

The device provides 5-way network connections (supports TCP, UDP server and client modes), as shown below:



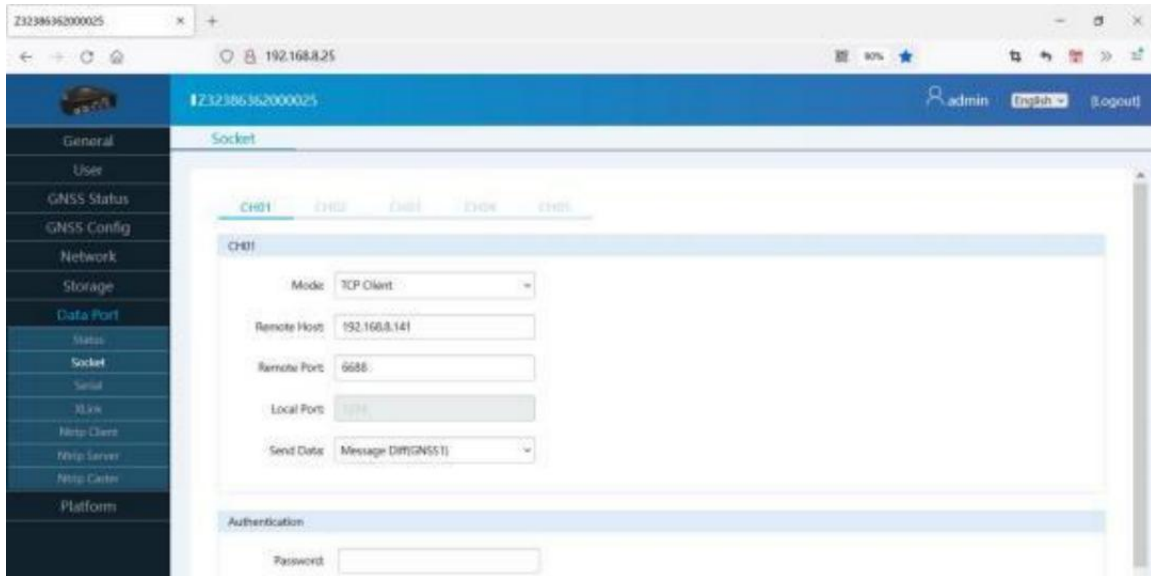
Socket

For example, S66UGH-lite is used as the base station. When using TCP to transmit data, the TCP server should be selected, as shown below:



Base Station - TCP Server

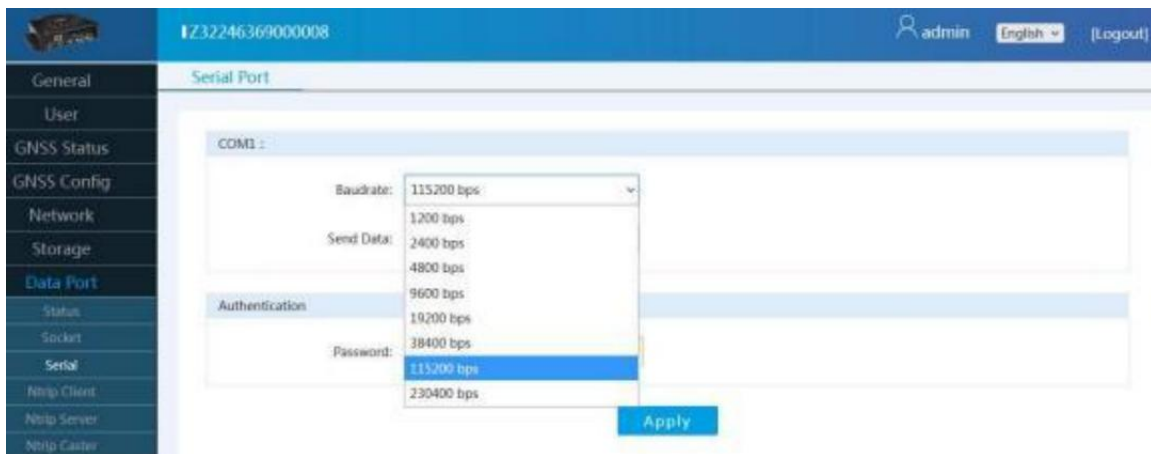
For example, S66UGH-lite is used as a rover station. When using TCP to receive data, a TCP client should be selected, as shown below:

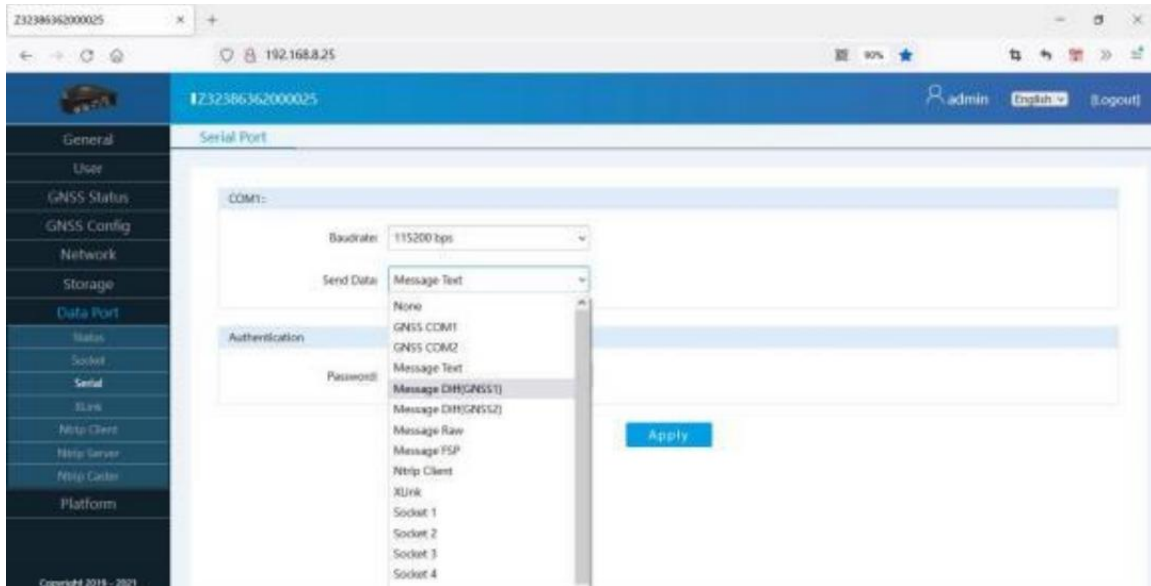


Rover - TCP Client

3.7.3 Serial

The device provides external serial communication function. The baud rate of COM1 and COM2 can support the minimum 1200bps and the maximum support 921600bps, as shown below:

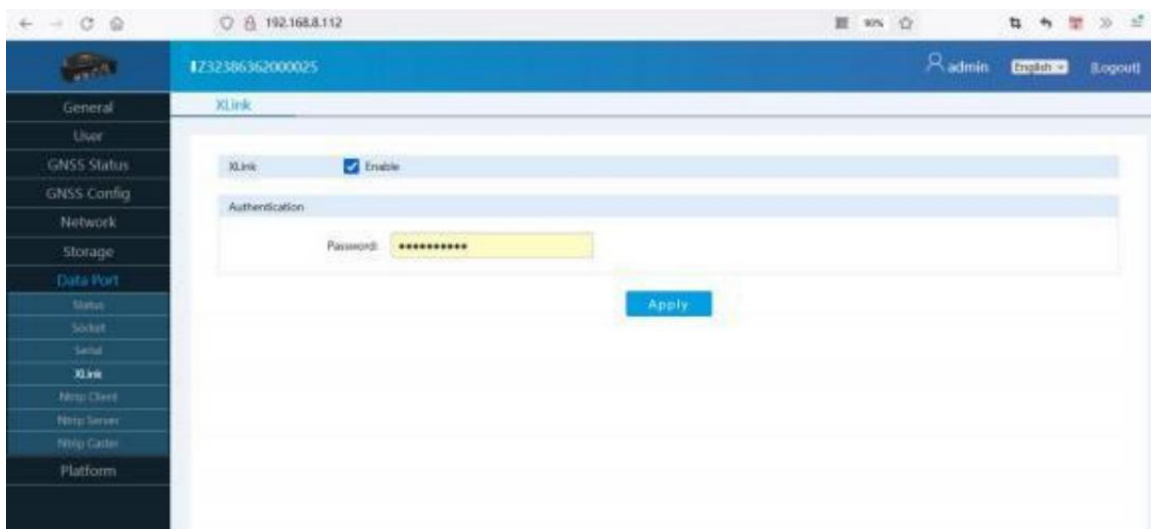




Serial

3.7.4 XLink

XLink is a differential forwarding system built by us for the CORS network used in China. If this function is enabled, the host only needs to connect to the Internet, it can directly reach the fixed state without filling in the CORS account.



Serial

3.7.5 Ntrip Client

The parameter configuration when the device is used as the Ntrip Client is used for the device to obtain the difference from the server, as shown below:

The screenshot shows the 'Ntrip Client' configuration page. The 'Ntrip Client' checkbox is checked. The fields are filled with the following values:

Field	Value
Host	ndevicent.com
Port	6000
Username	*
Password	*
Mount Point	Z32203660000077

A 'List' button is located below the Mount Point field.

Ntrip Client

After filling in the CORS account, go to the Data Stream page to see whether the differential data is received.

The screenshot shows the 'Data Stream' page. The 'Data' dropdown is set to 'Ntrip Client' and the 'Level Of Detail' is set to 'Simple'. A 'Clean' button is visible. The table below shows the received data:

Data	Level Of Detail	Clean
25: rtcn3 :msg=1077.GPS_RSN7	len=277 station=0 time=day 4 09:53:25.000	
26: rtcn3 :msg=1087.GC_O_RSN7	len=191 station=0 time=day 4 09:53:25.000	
27: rtcn3 :msg=1097.GAI_RSN7	len=387 station=0 time=day 4 09:53:25.000	
28: rtcn3 :msg=1117.QZS_RSN7	len=167 station=0 time=day 4 09:53:25.000	
29: rtcn3 :msg=1127.BDS_RSN7	len=469 station=0 time=day 4 09:53:25.000	
30: rtcn3 :msg=1127.BDS_RSN7	len=439 station=0 time=day 4 09:53:25.000	

Data Stream

3.7.6 Ntrip Server

The parameter configuration when the device is used as the Ntrip Server is used for the device to send data to the server, as shown below:

The screenshot shows the 'Ntrip Server' configuration page. The left sidebar contains a menu with options: General, User, GNSS Status, GNSS Config, Network, Storage, Data Port, Status, Socket, Serial, XLink, Ntrip Client, Ntrip Server (selected), Ntrip Center, and Platform. The main content area is titled 'Ntrip Server' and has tabs for CH01, CH02, CH03, CH04, and CH05. The 'CH01' tab is active, showing a configuration form with the following fields: 'Enable' (checked), 'Version' (Ntrip/1.0), 'Host' (base.devicewant.com), 'Port' (8080), 'Mount Point' (Z32386362000025), 'Username' (*), 'Password' (*), 'Data' (Message (DH/GNSS)), and 'Heartbeat' (Disable).

Ntrip Server

After filling in the parameters of the upload difference score to the server, go to the status page to see whether the data is sent normally.

The screenshot shows the 'Status' page. The left sidebar is the same as in the previous image. The main content area is titled 'Status' and displays a table with the following data:

Port	Status	Transmit	Receive
Socket01	Disable		
Socket02	Disable		
Socket03	Disable		
Socket04	Disable		
Socket05	Disable		
XLink	Disable		
NtripClient	Disable		
NtripServer01	Running	1.32 KB/s	
NtripServer02	Disable		
NtripServer03	Disable		
NtripServer04	Disable		
NtripServer05	Disable		

Status

3.7.7 Ntrip Caster

The parameter configuration when the device is used as the Ntrip distributor. It is used for the device to provide data externally as Ntrip Caster. If other devices or clients want to use the device Caster service, the corresponding user must have the NtripCaster permission, as shown below:



The screenshot shows a web interface for configuring the Ntrip Caster service. The top navigation bar includes a device icon, the ID '1232246369000008', a user profile for 'admin', a language dropdown set to 'English', and a '[Logout]' link. A left sidebar contains a menu with options: General, User, GNSS Status, GNSS Config, Network, Storage, Data Port, Status, Socket, Serial, Ntrip Client, Ntrip Server, and Ntrip Caster. The 'Ntrip Caster' option is selected, and the main content area displays the configuration for this service. The 'Ntrip Caster' section has an 'Enable' checkbox that is checked. Below this, the 'Check User' checkbox is also checked. The 'Port' is set to '2101', the 'Mount Point' is 'ntrip', and the 'Data' dropdown is set to '定位差分数据'. An 'Authentication' section at the bottom shows a 'Password' field with masked characters '*****'.

Ntrip Caster

3.8 Platform

3.8.1 ZXVPN

ZXVPN can provide a virtual local area network, connect the receiver to the server, and perform WebUI access in the background to provide corresponding remote technical support and services.

Make sure that the device is connected to network , select [Enable], fill in the following VPN configuration information, and click [Apply].

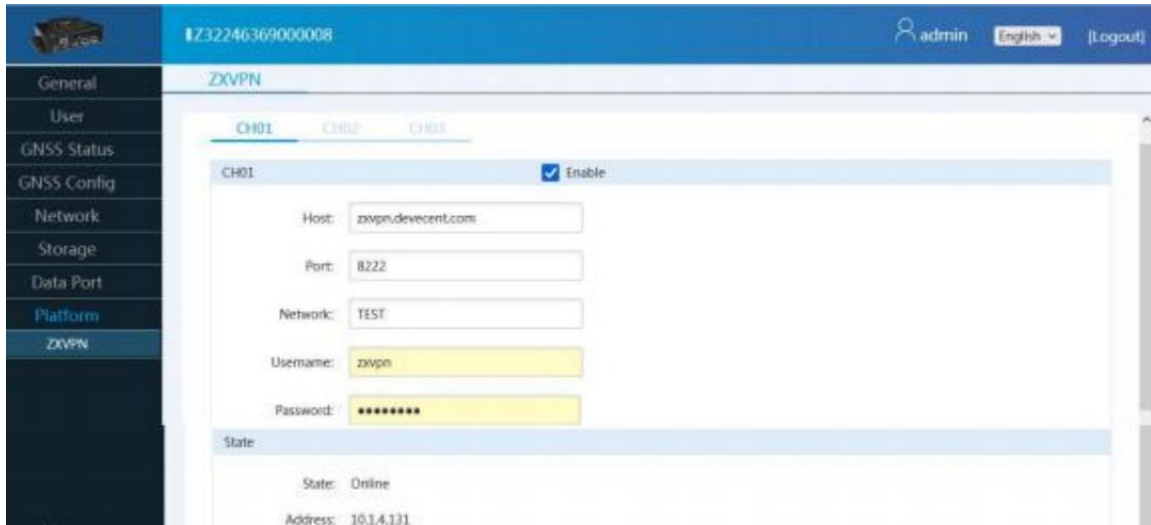
Host: zxvpn.devecent.com

Port: 8222

Network: TEST

User: zxvpn

Password: zxvpn



ZXVPN

Note: After the configuration as shown above is completed, please confirm that the state is online and IP at the bottom of the WebUI

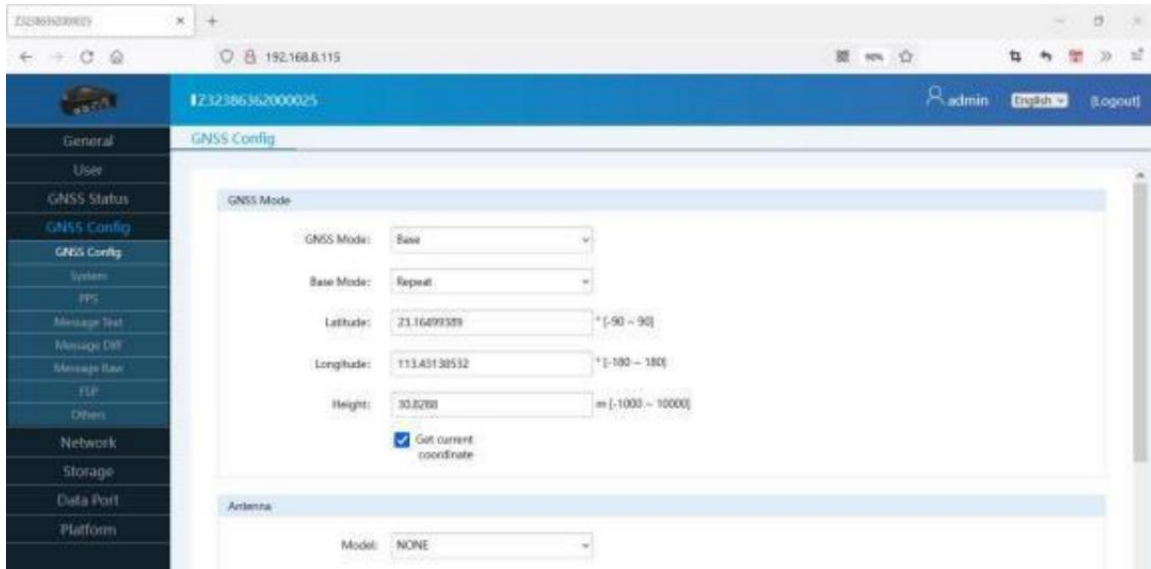
4. Configuration examples

In order to make it easier for users to understand the use and configuration of the S66UGH-lite receiver, we have specially selected four commonly used working modes as an example to illustrate the corresponding configuration mode and process.

4.1 Example 1

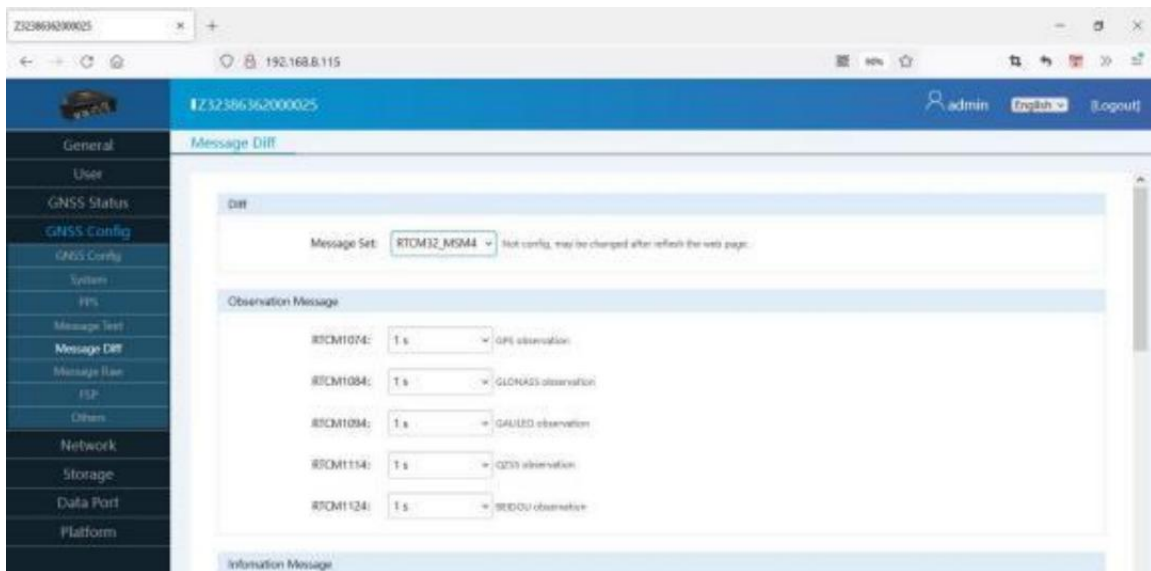
The receiver acts as the base station, starts with fixed coordinates, the differential output is RTCM33, and TCP1 acts as the server, sends the RTCM33 difference, the raw data is output in 1 second, and stores the raw data in rinex3.02 format, configured as follows:

1. Set the receiver as the base station and start with fixed coordinates, as follows:



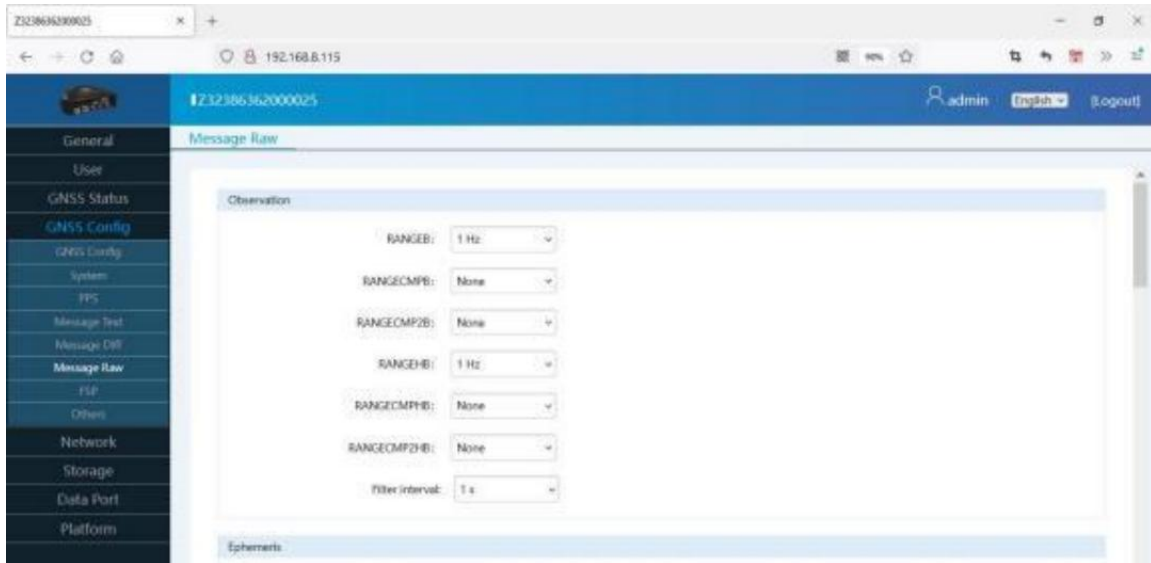
Allocation of the base station

2. Set the differential output to RTCM33, displayed as follows:



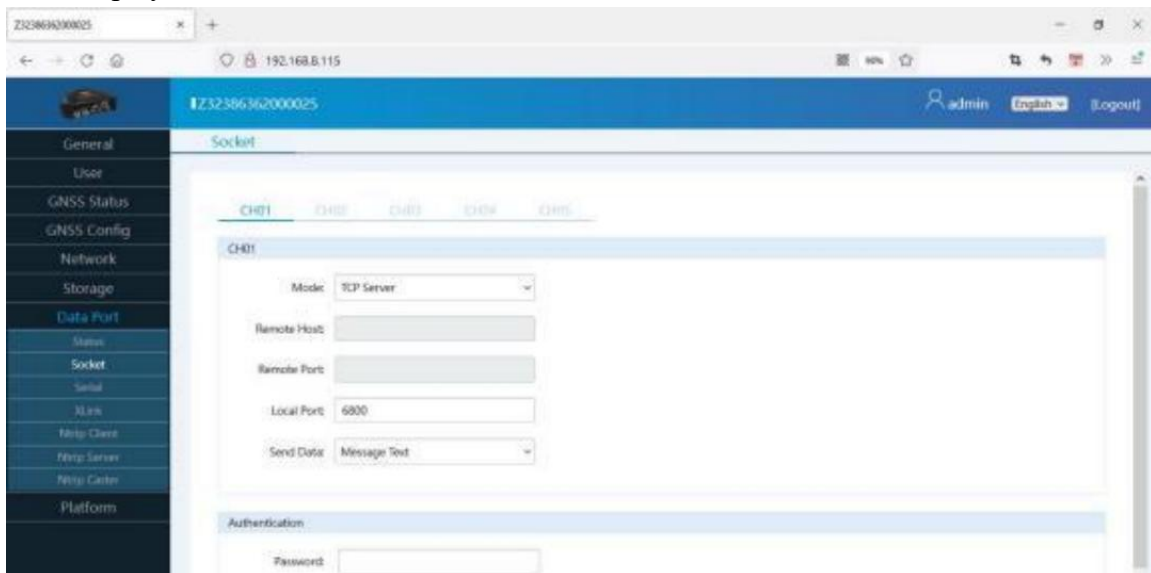
Differential Output configuration

3. Set the raw data output for 1 second, displayed as follows:



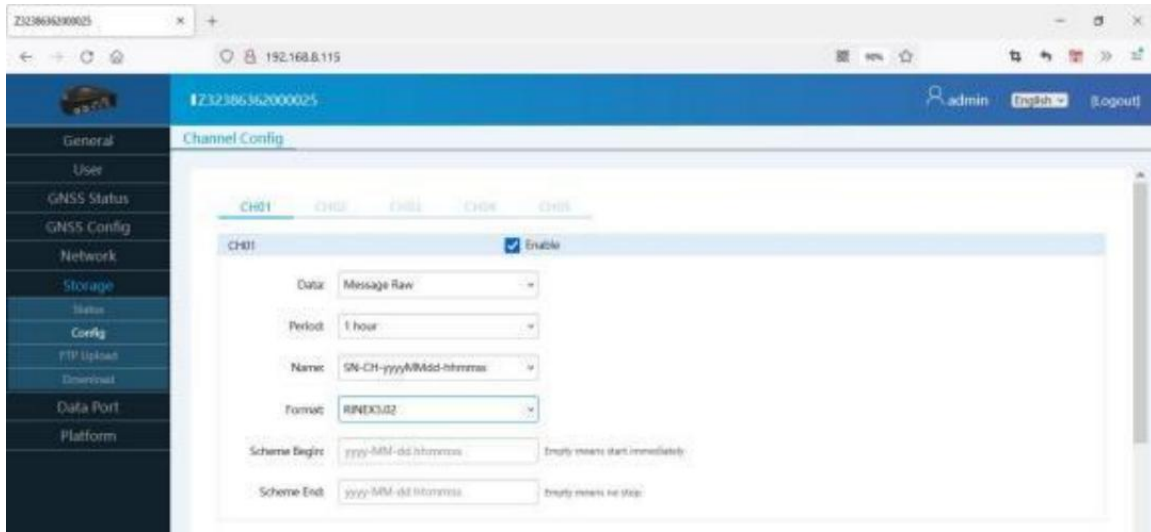
Original output configuration

4. Set TCP Connection 1 as a server, and the data source selects location differential data, displayed as follows:



Network Connection Configuration

5. Set up the storage raw data in rinex3.02 format, displayed as follows:

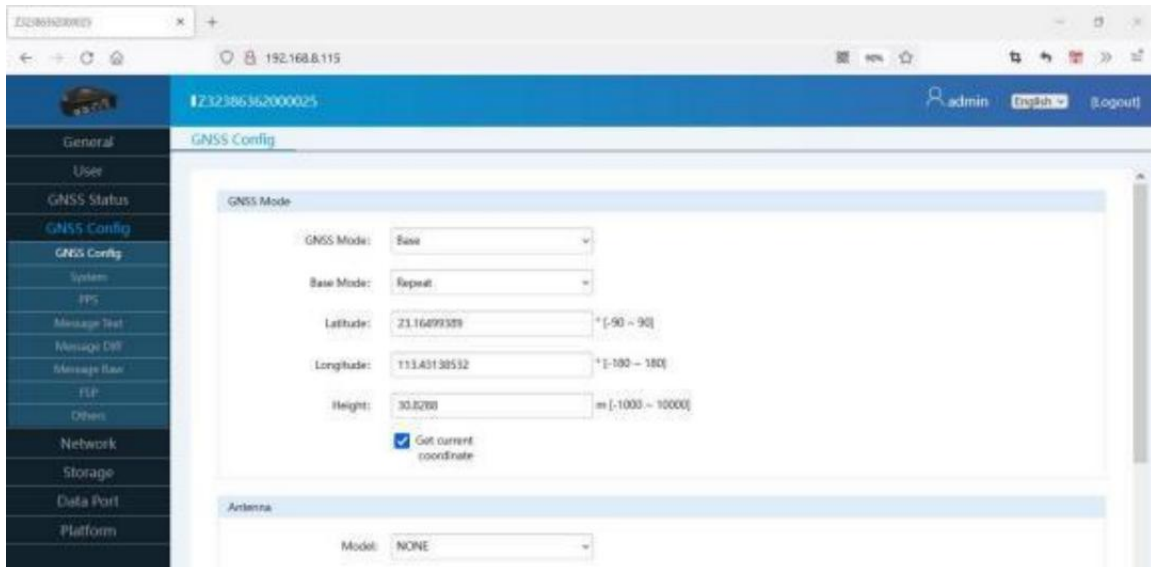


Storage configuration

4.2 Example 2

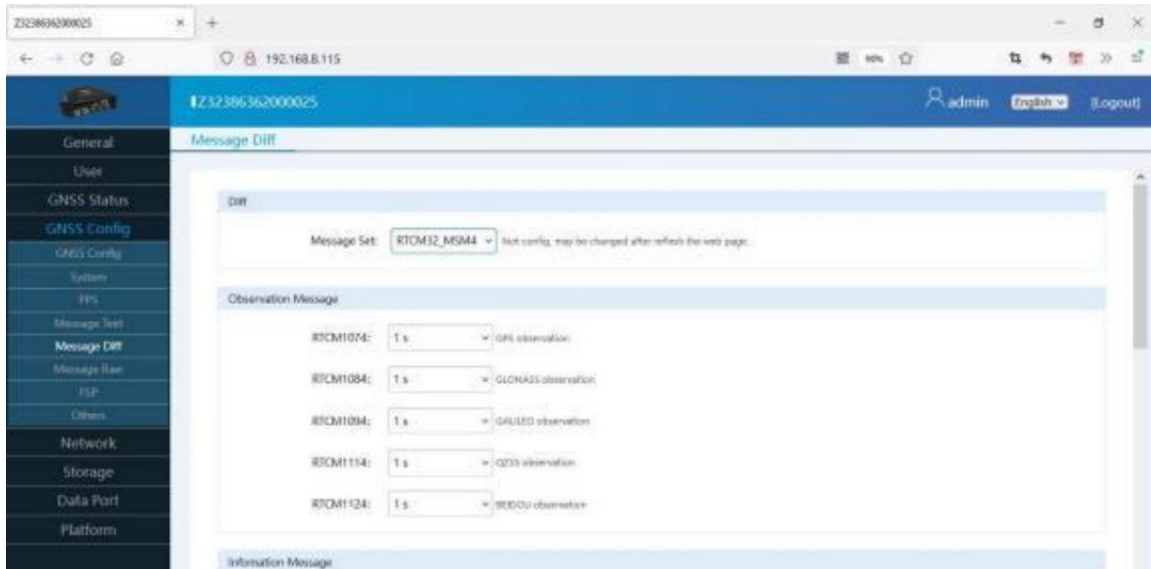
The receiver acts as the base station, starts with fixed coordinates, differential output RTCM33, ntrip server1 transmits RTCM33 to a CORS server with 1.0 protocol, the raw data is output in 1 second, and stores the raw data in rinex3.02 format, configured as follows:

1. Set the receiver as the base station and start with fixed coordinates, as follows:



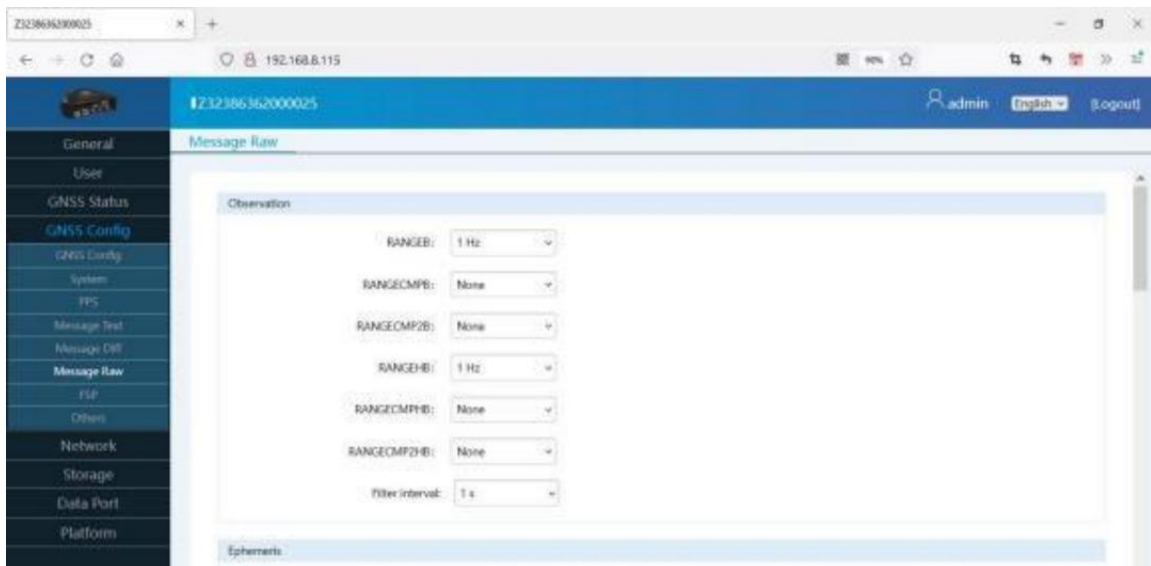
Allocation of the base station

2. Set the differential output to RTCM33, displayed as follows:



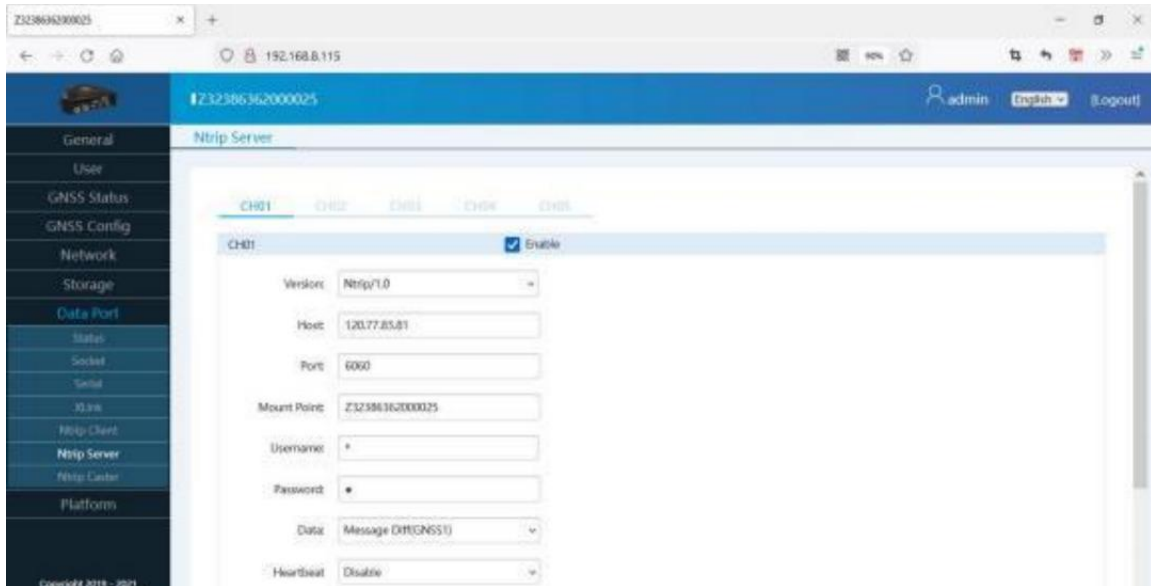
Differential output configuration

3.Set the raw data output for 1 second, displayed as follows:



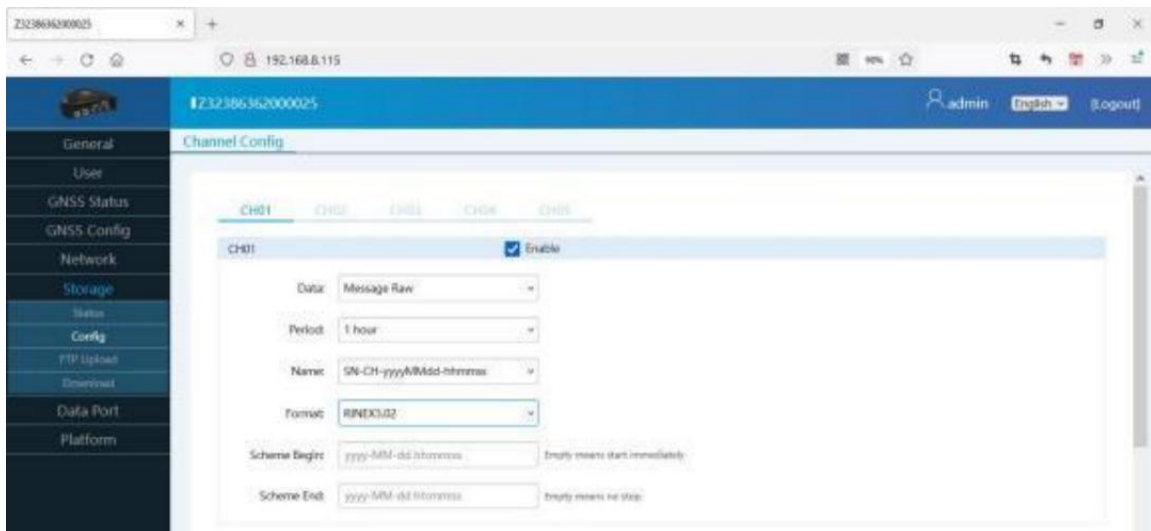
Original output configuration

4.Set ntrip server Connection 1 to transfer RTCM33 to a CORS server with Ntrip / 1.0 protocol, and the data source selection and location differential data, displayed as follows:



NtripServer configuration

5.Set up the storage raw data in rinex3.02 format, displayed as follows:

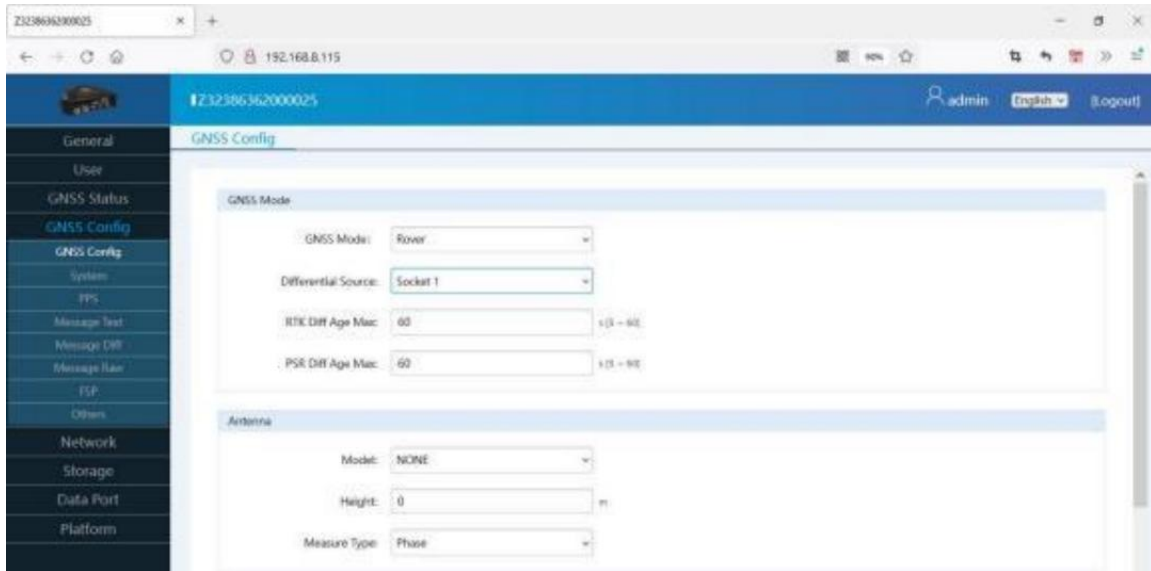


Storage configuration

4.3 Example 3

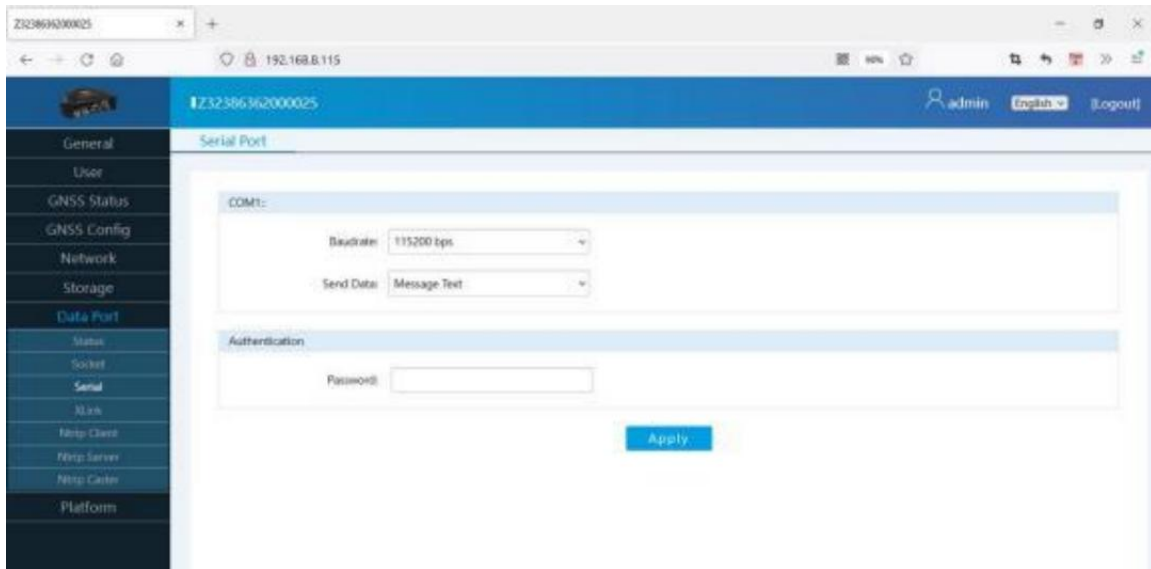
The receiver acts as the rover station, takes the TCP connection 1 as the client difference source, and the COM port outputs GPGLGA and BESTPOSA, configured as follows:

1.Set the receiver as a rover station and select connection 1 as the differential source of the rover station, displayed as follows:



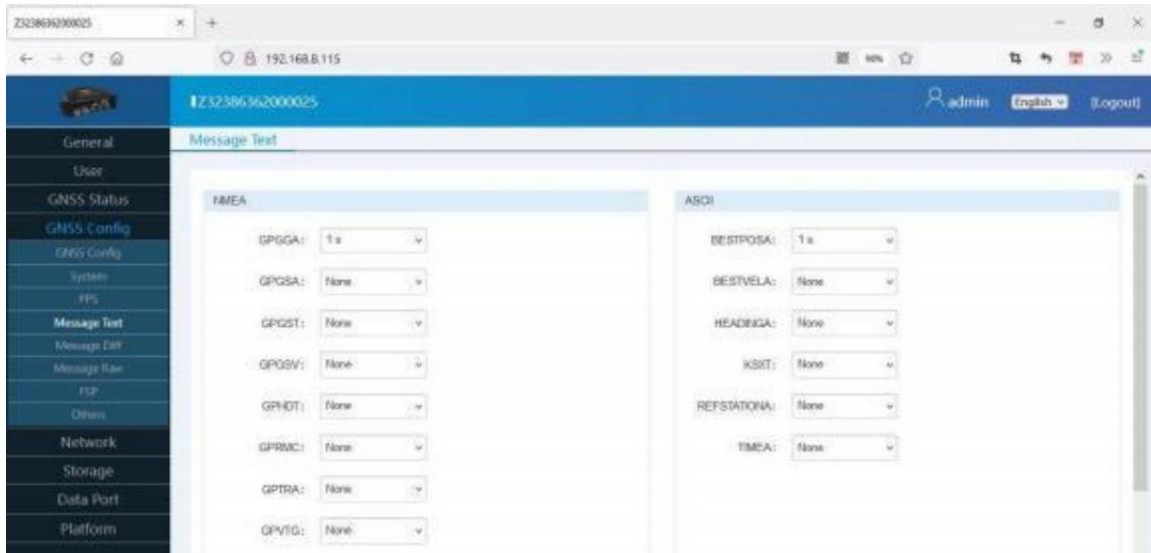
rover station Configuration

2.Set the serial port COM1 output positioning text data, displayed as follows:



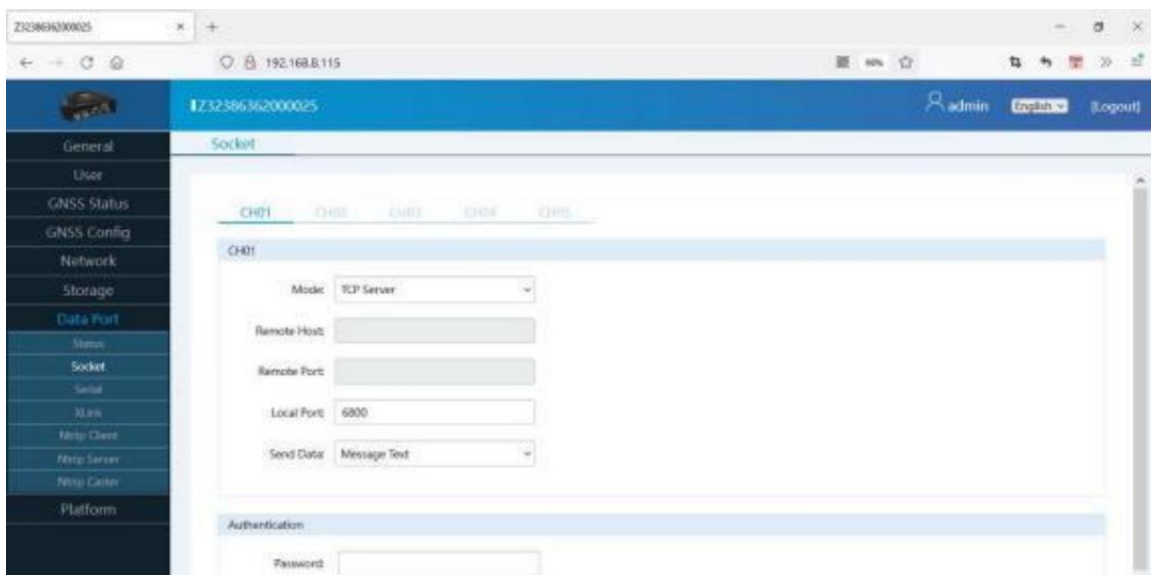
Serial port configuration

3.Set the output frequency of text output GPGGA and BESTPOSA, displayed as follows:



Text output configuration

4.The network connection CH01 is set as the receiving difference of the TCP client, as shown as follows:



Network Connection Configuration

4.4 Example 4

The receiver acts as the rover station, with ntrip client as the differential source, and the COM port outputs GPBGA and BESTPOSA, configured as follows:

1.Set the receiver as a rover station, input the differential source to select ntrip client, display as follows:

The screenshot shows the 'GNSS Config' page of a web interface. The left sidebar contains a menu with options: General, User, GNSS Status, GNSS Config (selected), GNSS Config, System, PPS, Message Test, Message Diff, Message Raw, PTP, Others, Network, Storage, Data Port, and Platform. The main content area is titled 'GNSS Config' and contains two sections: 'GNSS Mode' and 'Antenna'. In the 'GNSS Mode' section, 'GNSS Mode' is set to 'Rover', 'Differential Source' is 'Ntrip Client', 'RTK Diff Age Max' is 60, and 'PSR Diff Age Max' is 60. In the 'Antenna' section, 'Model' is 'NONE', 'Height' is 0, and 'Measure Type' is 'Phase'.

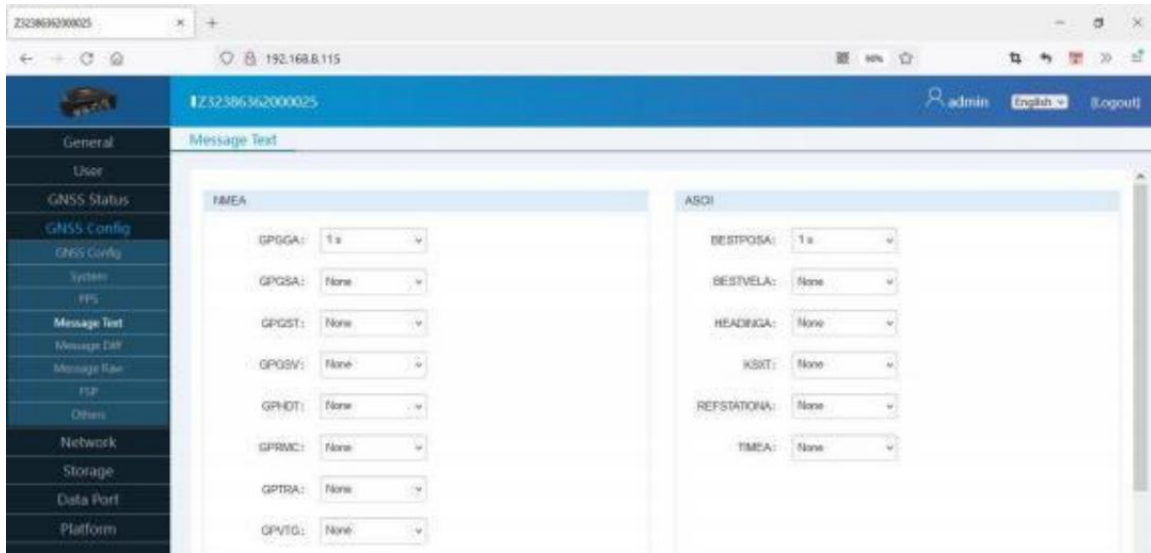
rover station configuration

2.Set the serial port COM1 to send location text data, displayed as follows:

The screenshot shows the 'Serial Port' page of the same web interface. The left sidebar menu is the same as in the previous screenshot. The main content area is titled 'Serial Port' and contains two sections: 'COM1:' and 'Authentication'. In the 'COM1:' section, 'Baudrate' is set to '115200 bps' and 'Send Data' is 'Message Text'. In the 'Authentication' section, there is a 'Password' field. An 'Apply' button is located at the bottom right of the page.

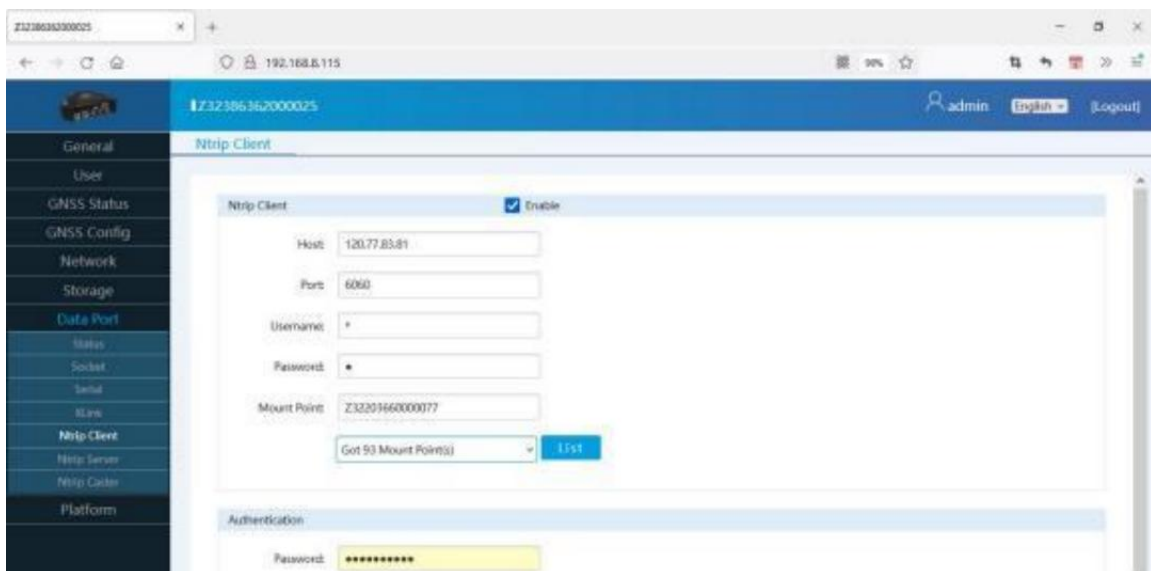
Serial port configuration

3.Set the output frequency of text output GPGGA and BESTPOSA, displayed as follows:



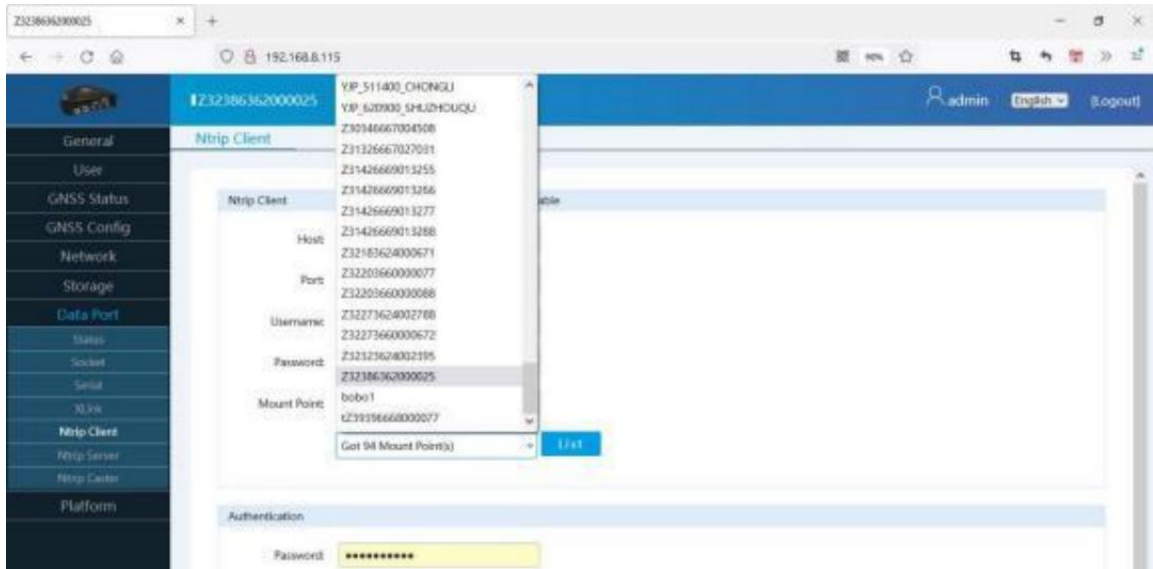
Text output configuration

4.Set ntrip client to get differential data from a CORS server as follows:



NtripClient configuration

5.Get the access point, select the access point uploaded to the server, and click the application to take the differential data from the server, displayed as follows:



NtripClient configuration