Gateway: Data Workstation

Enertrek_G30

User Manual

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1 Overview

1.1 Function Overview

Enertrek G30 is an Ethernet gateway that connects all Enertrek sub-devices or RS485 bus devices, also known as a data workstation. It is the access point of the entire Enertrek system and integrates a web server for configuring network parameters and managing the addition, deletion, and modification of devices.

As the core device of the system, Enertrek G30 provides multiple functions such as data acquisition, processing, analysis and visualization, supports device management, fault diagnosis, work order management and artificial intelligence optimization control, and helps the system run efficiently.

Main Functions

Data Management

- Data acquisition: Supports multi-protocol data acquisition and protocol conversion.
- Data cleaning: Real-time alarm and historical database management.
- Data normalization and aggregation: Unified and standardized processing to ensure data consistency.

Data Analysis and Storage

- Fault monitoring and diagnosis: Real-time monitoring of device status and accurate fault location.
- Data storage: Support long-term storage of large amounts of data.
- Data analysis and forecasting: Provide planning forecasts and smart control optimization based on historical data.

Data Display and Control

- Data visualization: Provide clear and intuitive charts and interface displays.
- Data reports: Generate comprehensive statistical reports.
- Remote control: Support remote device operation and management.

Smart Optimization and Diagnosis

• Energy-saving diagnosis: Optimize system energy efficiency and provide energy-saving solutions.

• Fault alarm: Real-time alarm notification and quick response to abnormalities.

System Integration and Interface

• API data interface: Support data connection with third-party platforms to improve system integration.

With its high performance and multi-functional features, Enertrek G30 meets the needs of industrial and commercial systems for data management and optimization, providing strong support for the smart management.

1.2 Main Features

Features	Description
Enertrek Bus	• Can be connected to Enertrek series sub-devices to build an integrated system.
RS485 communication interface	• Supports connection to other third-party devices based on the Modbus protocol to achieve compatibility expansion.
Ethernet interface	• Used to establish data connection with the platform and realize real-time data interaction. • Support access to built-in Web Server for device and network management
Supported protocol	• Northbound communication protocol: MQTT, used to send data to the upper-layer platform. • Southbound communication protocol: Modbus, used for communication with devices and data acquisition.
Web Server	• Manage devices: support device addition, deletion, modification, query and status monitoring. • Manage network parameters: configure and adjust network-related settings.

2 Function

The gateway data workstation can connect the platform to Modbus serial line devices via Ethernet/WiFi or Ethernet/WiFi/4G. Through the gateway, the platform can remotely access the information of serial slave devices and perform control, data acquisition and other operations.

Main Functions

Data Management

- Data acquisition: Real-time acquisition of data from serial slave devices.
- Data processing and analysis: Clean, standardize and analyze the collected data.
- Data reporting and presentation: Generate statistical reports and present data in a visual way.

System Platform Functions

- Device management: Support adding, deleting, modifying and checking device and monitoring its operation status.
- Fault diagnosis: Real-time monitoring of device operation, rapid fault location and alarm.
- Smart optimization control: Combine analysis data to provide optimization suggestions or perform automated control.

The gateway data workstation is an important bridge for remote management and optimization of serial devices on the platform side. It can be widely used in industry, energy, construction and other fields to help realize system intelligence and efficiency.

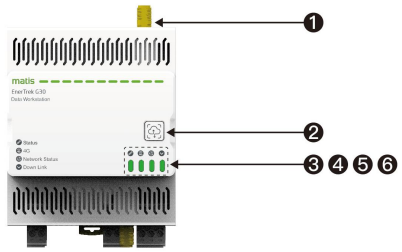
2.1 Functions and Advantages

Functions	Advantages
Plug and Play	• Directly connect Enertrek devices or RS485 serial devices to the Ethernet gateway for rapid deployment. • Support safe extra-low voltage 12 VDC power supply to ensure safe use.
WebServer	• Device configuration: Device and network parameters can be configured through the

	embedded Web Server. •Browser access: Based on browser operation, compatible with all operating systems, convenient user experience.
Protocol conversion	• Convert ModBus protocol data to MQTT protocol, encapsulate it into JSON format and upload it to the platform for direct display and use.
Data conversion	• Support configuration of multiple data types and data format conversion to adapt to different application requirements.
Remote monitoring	• Support remote monitoring and control of devices on the platform to realize data reading and writing operations.
Offline data storage	• When the network is interrupted, the gateway temporarily stores the data internally and automatically retransmits it after the network is restored to ensure data integrity.

3 Diagram

3.1 Gateway: Data Workstation Enertrek_G30



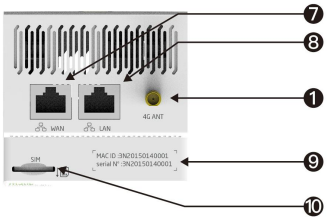
1.Antenna_4G

3. Gateway status LED

4. 4G status LED

5. Network status LED

6. Downlink status LED

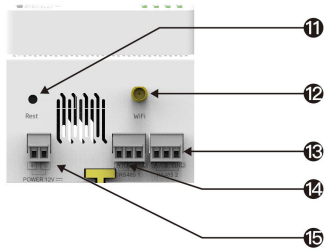


7. Network port 1: Ethernet1 network communication port

8. Network port 2: Ethernet2 communication configuration port

9. Device name label

10. 4G SIM card slot



11. Reset button

12. Antenna_WiFi

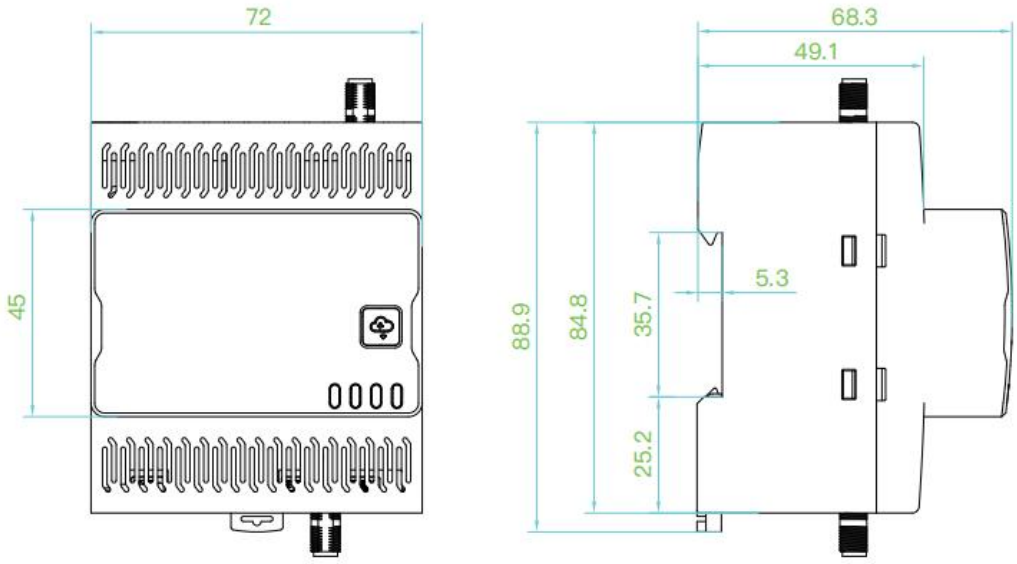
13. RS485 port 1

14. RS485 port 2

15. 12 Vdc power terminal block

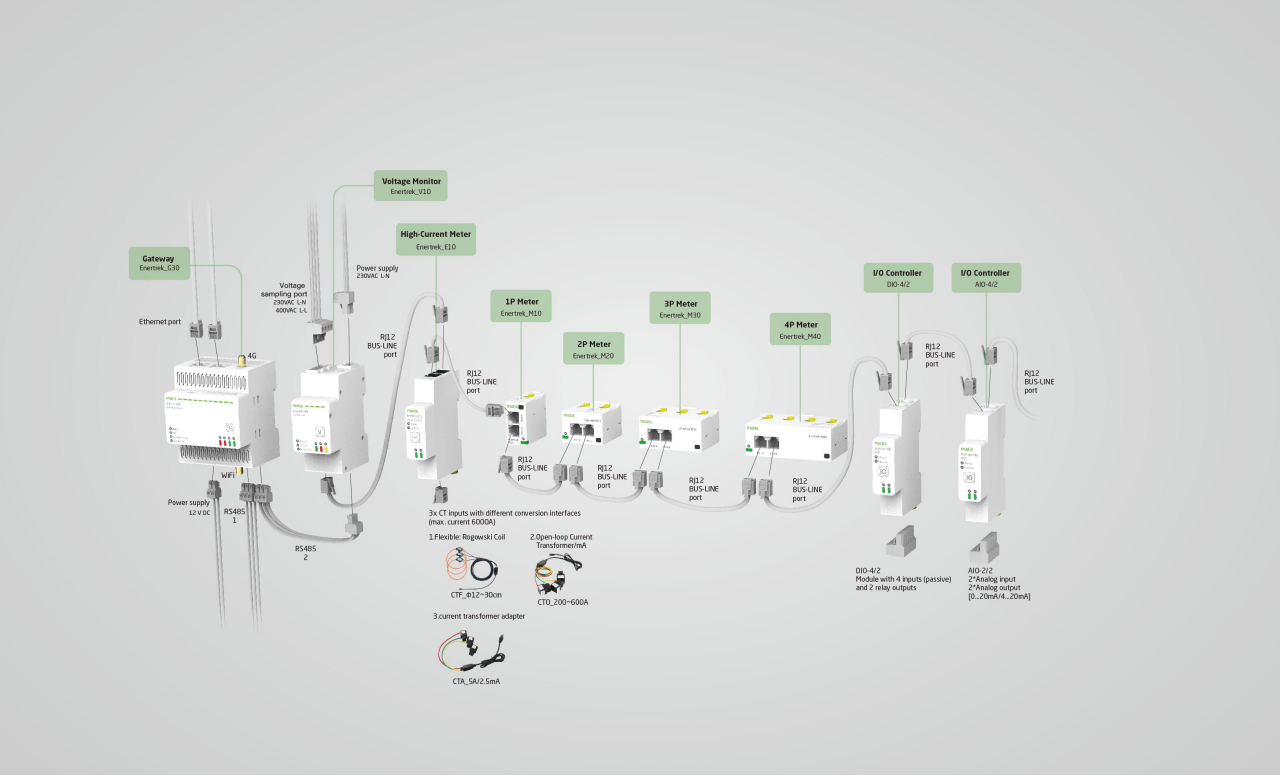
4 Hardware and Installation

4.1 Enertrek_G30 Dimensions (mm)



5 Wiring

5.1 Enertrek_G30 Wiring Diagram



6 LED Status Indication

6.1 Gateway Status LED

Indicates the status of the gateway.

Name	Color	Status	Description
Running indicator (red, green)	Green	Initialization/Operation	The device is running normally
	Green light flashes (2 flashes/second)	Reset (Level 1)	Confirm the reset button (long press for 5 to 10 seconds) and the IP settings will be reconfigured to DHCP mode.
	Red light flashes quickly (2 flashes/second)	Reset (Level 2)	Press the reset button for 15 to 20 seconds, and the red light flashes quickly (2 flashes/second).

	Red light flashes (1 flash/second):	Repeat downlink address	Red light flashes (1 flash/second): The system detects a duplicate downlink device address. Check and replace the downlink device address.
	Red light: Not running or hardware fault	Fault	Red light: Not running or hardware fault
	The red and green lights flash alternately (2 flashes/second)	Device firmware is being upgraded	

6.2 4G status LED

Indicates the status of the gateway 4G module.

Name	LED Indication	Status Indication	Description
Network status indicator (green)	Always on	The 4G module is working normally	
	Off	4G module is not working	

6.3 Network Status LED

The Network Status LED indicates the network status of the Gateway.

Name	LED Indication	Status Indication	Description
Network status indicator (blue, orange)	Steady blue	The device WiFi/ Ethernet/ 4G data communication is normal	Steady blue light indicates that the device is connected to the platform
	Steady orange	The WiFi, Ethernet, or 4G data communication is abnormal	Steady orange light indicates a network anomaly and the device is not connected to the platform.

6.4 RS485 Flow Status LED

The blue LED indicates the RS485 serial line flow: it flashes when the gateway is transmitting or receiving data on the RS485 network and is off when no messages are

being transmitted or received.

Name	LED Indication	Status
Network status indicator (blue)	Flashing blue (normal)	Serial data transmission or reception
	Blue light off	No data transmission or reception

6.5 Ethernet Communication LED

Ethernet bi-color LED indicates the communication status of Ethernet ports ETH1 and ETH2.

LED Indication	Status
Yellow	110Mbps link
Yellow light flashes	10Mbps active
Green	100Mbps link
Green light flashes	100bps active

7 Function Button

7.1 Configuration Button

- Activate WiFi hotspot: Long press the configuration button for 3-5 seconds to start the gateway's WiFi hotspot and access the built-in web page through a host computer or mobile phone to configure and manage the device.
- Soft restart the gateway: Long press the configuration button for 10-15 seconds and the gateway will perform a soft restart.

7.2 Reset Button

- Reset network settings: Long press the reset pin for 5-10 seconds and the gateway's network configuration will be restored to factory defaults:
  - The WAN port is set to DHCP mode;
  - The LAN port IP address is restored to 192.168.120.200;

- The web connection password is restored to the default value.
- Restore factory settings: Long press the reset pin for 15-20 seconds, the device will be restored to factory settings and all user-defined configurations will be cleared.

8 Web Page Configuration

The gateway has built-in web configuration software, which can be accessed through the LAN or LAN interface. The host computer completes the gateway parameter setting, RS485 device input and networking debugging through the built-in web page, supporting fast configuration.

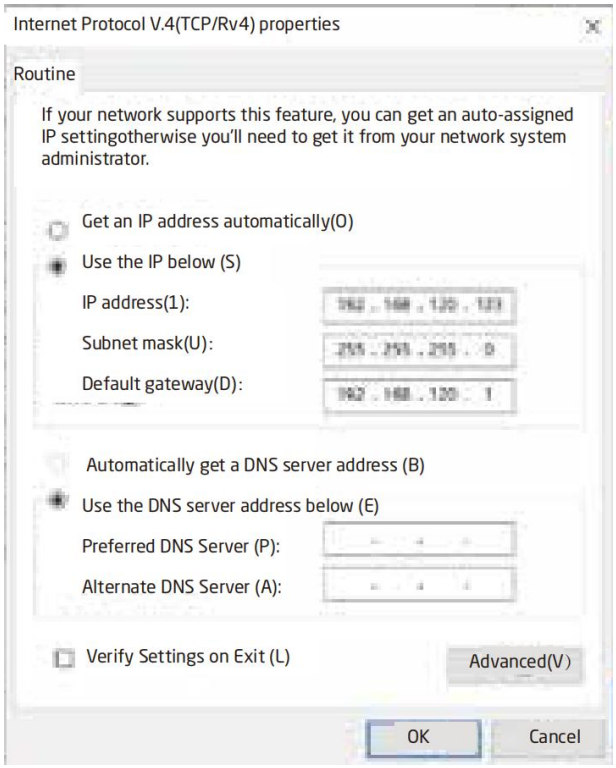
8.1 Web Page Connection

8.1.1 Accessing the Gateway Webserver via LAN

1. **Set the host computer IP (static) and the gateway LAN port to be in the same network segment;**

The default IP address of the gateway LAN port is 192.168.120.200. This manual takes accessing the "Enertrek Gateway" via the LAN port as an example. You need to set the PC's wired network card (IPv4) IP address to the same network segment as the gateway (for example, 192.168.120.3) in order to access the gateway's web configuration software normally. The setting example is shown in the figure below:

PC settings, use a fixed IP address



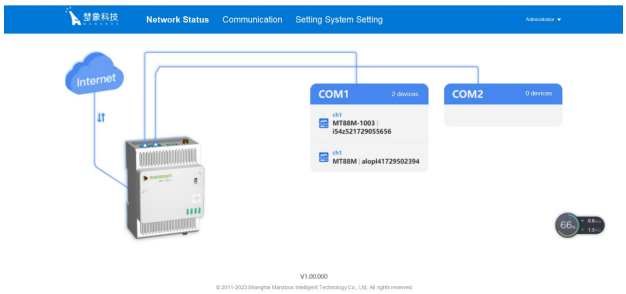
2.Access the gateway LAN port IP via the browser; 192.168.120.200

Enter the IP address of the gateway LAN port in the browser and enter the password to log in.

The default password of the device is 123456.

3.Successfully logged into the Webserver;

After a successful login, you will see the web page interface as shown below.

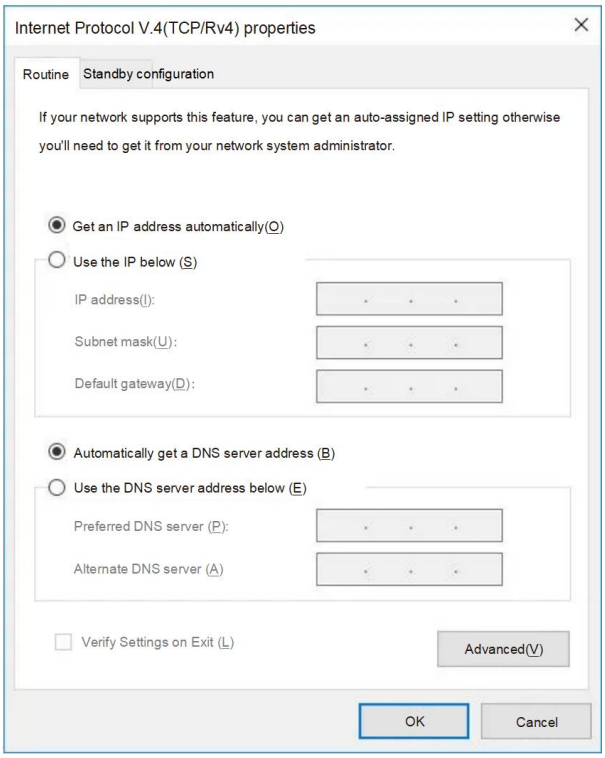


8.1.2 Access Gateway Webserver via WAN

1. Set the host computer IP (DHCP) and the gateway WAN port to be in the same LAN;

The gateway WAN port uses DHCP mode by default. After connecting the network cable to the WAN port, you need to set the host computer's network to be in the same network segment as the gateway WAN port, that is, in the same LAN.

PC settings, it is recommended to automatically obtain the IP address



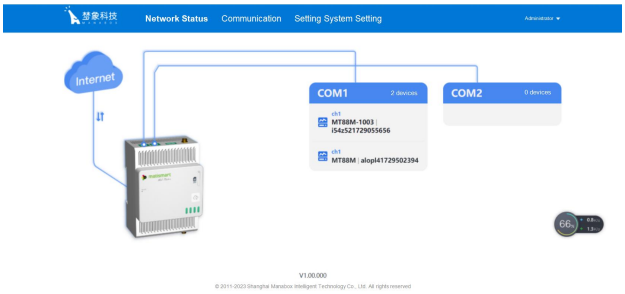
2. Access the gateway WAN port IP through a browser;

Enter the IP address of the gateway WAN port in the browser (dynamically assigned by the LAN, contact the administrator to obtain the specific IP of the gateway), and then enter the login username and password to access.

The default password of the device is 123456.

3. Successfully logged into the Webserver;

After a successful login, you will see the web page as shown below.



8.2 Network Parameter Configuration

8.2.1 Network Method

The G30 gateway supports multiple network access methods to meet the communication needs of different application scenarios.

- Ethernet port (LAN): Required to ensure stable and reliable basic network access.
- 4G cellular network (optional): Used in combination with the Ethernet port to achieve dual protection of wired and cellular networks.
- Wi-Fi wireless network (optional): Used in combination with the Ethernet port to facilitate flexible access to existing wireless networks.

Users can choose the appropriate combination according to site requirements:

- Ethernet access
- Ethernet + 4G
- Ethernet + Wi-Fi

Through this design, the G30 gateway can provide wireless communication expansion and backup while ensuring the stability of the wired network, improving the flexibility and reliability of the entire system.

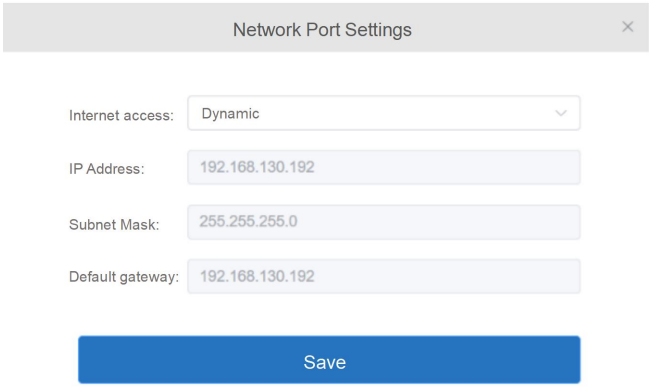
8.2.2 Configuring Ethernet to Connect to the Internet

1. Connect to Ethernet

- Connect port 1 to Ethernet.

2. Configure the IP Address of Network Port 1

- Go to the configuration page and set the IP address, subnet mask and other parameters of network port 1 according to the network type and on-site network conditions (applicable to static IP mode).
- After completing the settings, click to save the configuration.



8.2.3 Configuring 4G Dial-up Internet Connection

Users can choose 4G as the Internet access method according to their needs.

8.2.3.1 Insert the SIM card into the card slot

1. Precautions for Inserting and Removing SIM Card

• Always disconnect the device from the power supply before inserting or removing the SIM card to avoid data loss or device damage.

2. Connecting the 4G LTE Antenna

• After inserting the SIM card, connect the 4G LTE antenna to the ANT interface of the gateway.

3. Power on and Auto Dial

• After the gateway is powered on, the device will automatically make a 4G dial-up connection.

• You can check the connection status through the network indicator:

If the indicator is on, the connection is successful.

• If the connection fails, manually configure the SIM PIN and APN.

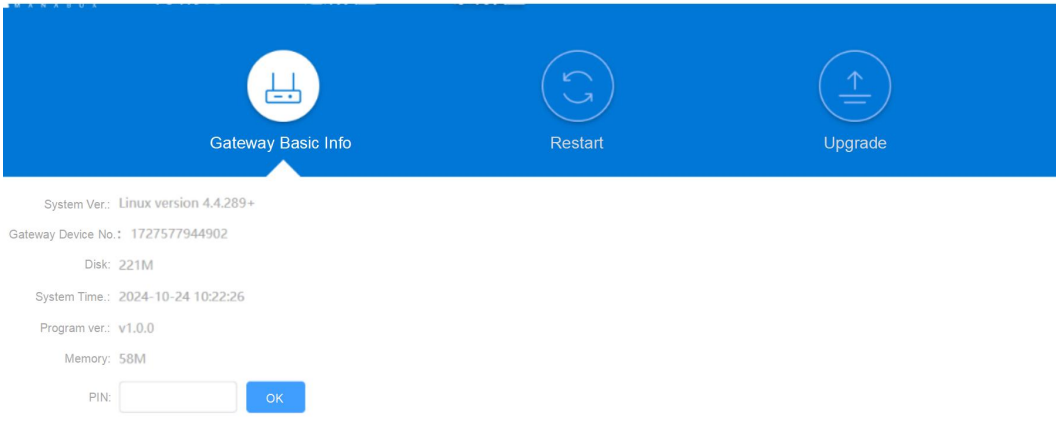
4. PIN and APN Configuration

• PIN configuration: It is usually not required in China, but may be required in some foreign regions.

• APN configuration: The gateway has preconfigured APNs for most countries and regions, and usually no manual adjustment is required.

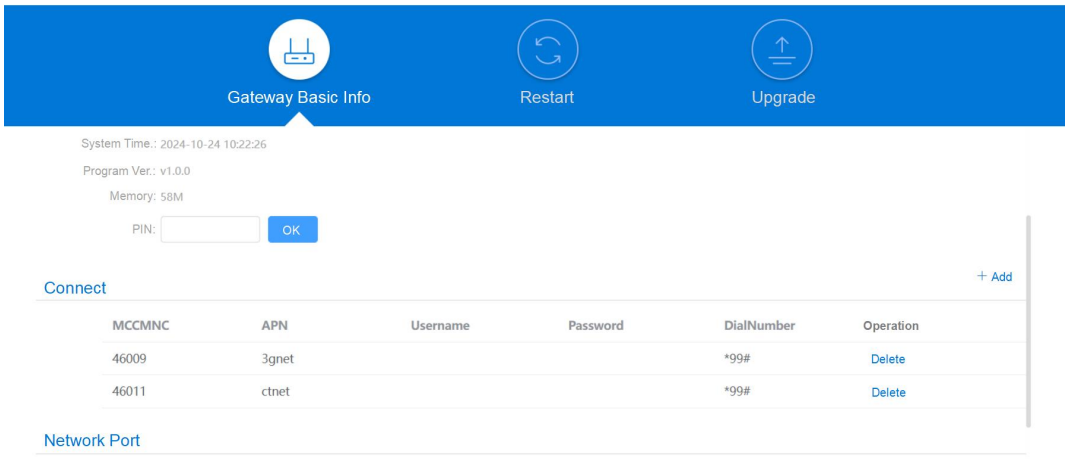
8.2.3.2 Configuring the SIM PIN of the 4G Card

Go to System Setting - Gateway Basic Info- Connect device, enter PIN, click OK button.

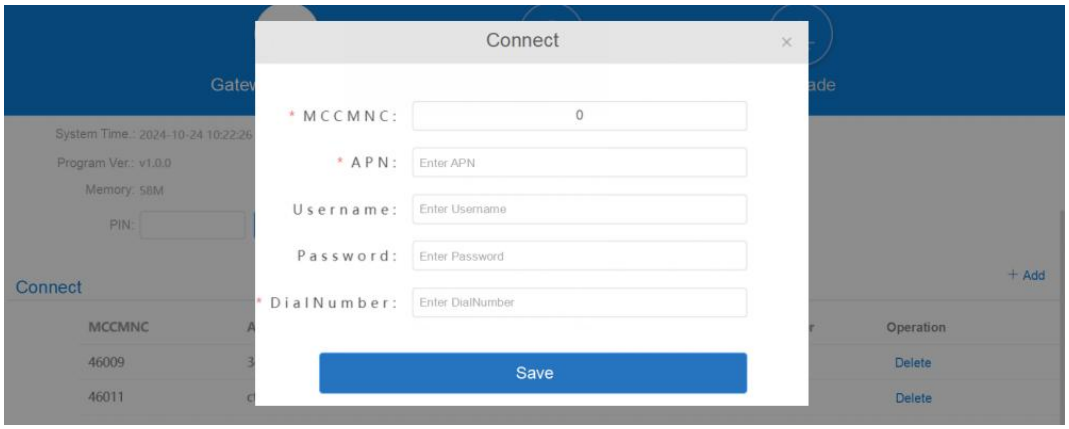


8.2.3.3 Configure the APN of the 4G Card

1. Go to System Setting > Gateway Basic Info > Connect device and click the Add button.



2. In the pop-up box, enter the APN information of the corresponding SIM card.



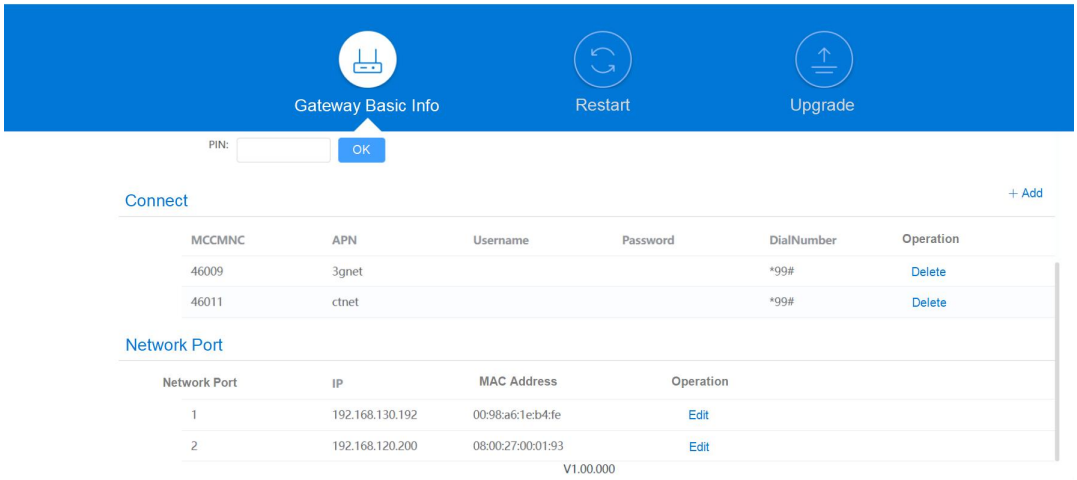
8.2.4 Configuring WiFi to Connect to the Internet

- Users can choose Wi-Fi as the Internet access method according to their needs.
- Enter the Wi-Fi account and Wi-Fi password on the configuration page and click Submit to complete the setup.
- After successful configuration, users can access the gateway through the local area network, and the gateway will establish a data connection with the platform via Wi-Fi.

8.2.5 Network Preferred Functions

1. Network Port Configuration

- Log in to the Web Server interface and go to System Settings > Gateway Basic Info > Network Port for configuration.



2. Network Port Function

- Network port 1: support both static IP and dynamic IP modes.
- Network port 2: support static IP only, used to access the Web Server.
- Static IP: used for the gateway and PC to directly access the Web Server via a network cable.
- Dynamic IP: used to access the Web Server within the LAN or connect to the Internet.

3. Gateway Version

- Version 1: WAN (LAN).
- Version 2: WAN (LAN) + 4G.

4. Network Preference Rules

- Priority 1: WAN.
- Priority 2: WAN > 4G: When Ethernet1 and 4G are used at the same time, the system will give priority to Ethernet1.

8.3 Device Cloud Platform Parameter Configuration

The device cloud platform supports the following functions:

- Monitor gateway status
- Remote maintenance of the devices
- Send gateway configurations in batches
- Upgrade gateways in batches

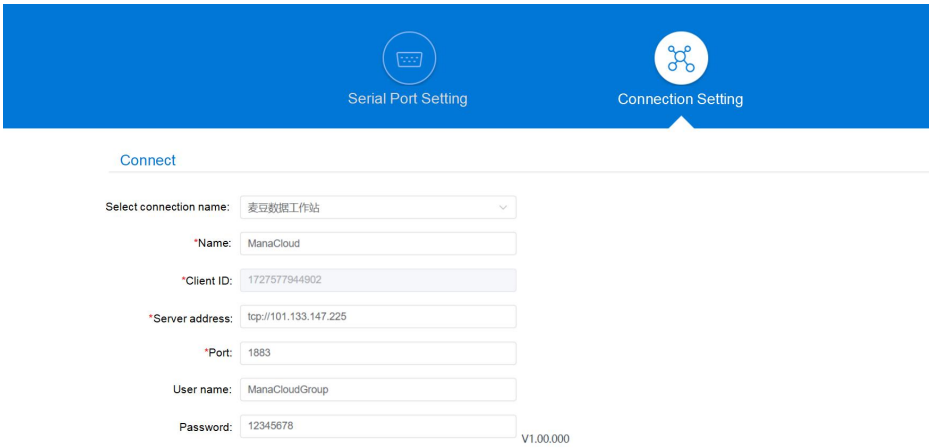
The platform helps users manage gateways and field devices efficiently and

conveniently.

Steps for Connecting the Gateway to the Cloud Platform

1.Connect to Cloud Platform

- Log in to the Web Server interface and go to Communication Setting > Connection Setting.
- The default configuration is the MQTT settings of the Matis Cloud platform.



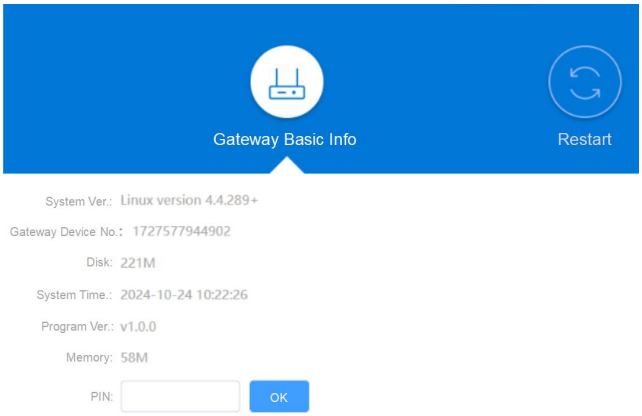
2.Modify MQTT Configuration

- Users can modify the MQTT configuration to their own cloud platform parameters as needed.
- This operation requires that the user platform and the gateway protocol have been connected and support normal communication.

8.4 Device Management Configuration

8.4.1 View Basic Gateway Information

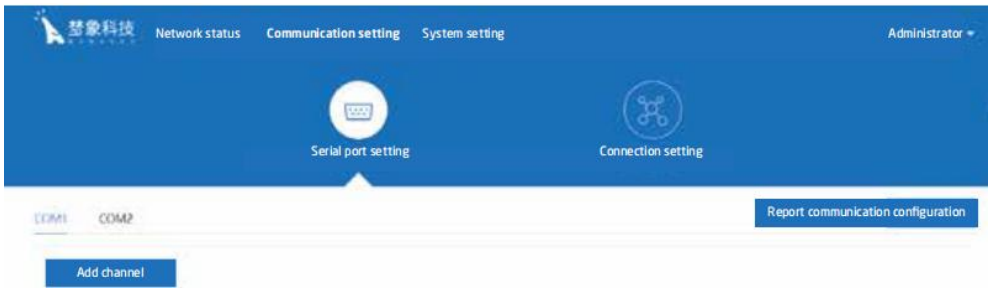
Log in to the Web Server and go to System Setting > Gateway Basic Info to view the basic information of the gateway.



8.4.2 Serial Port Channel Configuration

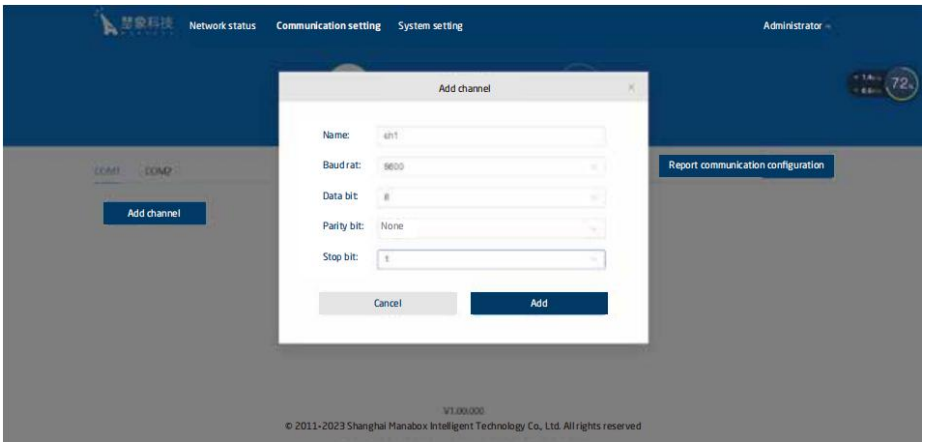
1. Add Channel

- Log in to the Web Server and go to Communication Setting > Serial Port Setting > Communication Configuration > Serial Port Configuration.
- Click the Add Channel button.



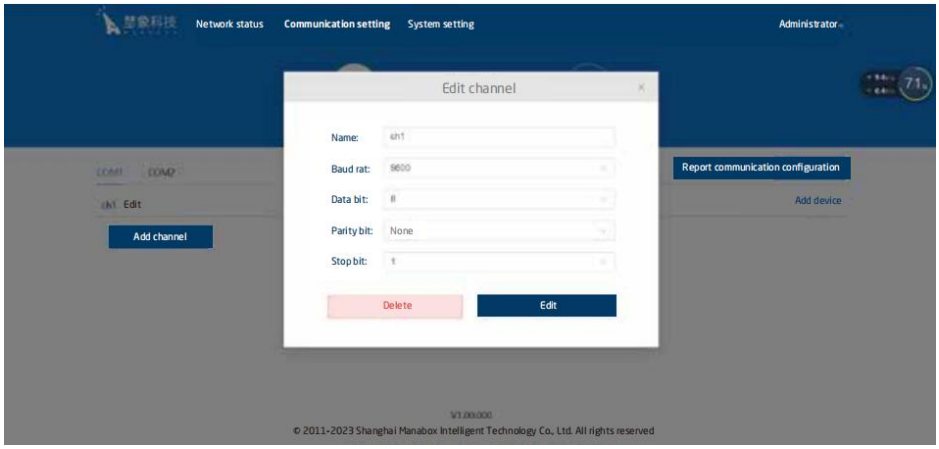
2. Configure Channel Parameters

- Enter the following parameters:
- Channel name
- Baud rate
- Data bit
- Check bit
- Stop bit
- Click the Add button to complete the channel configuration.



3. Manage Channel

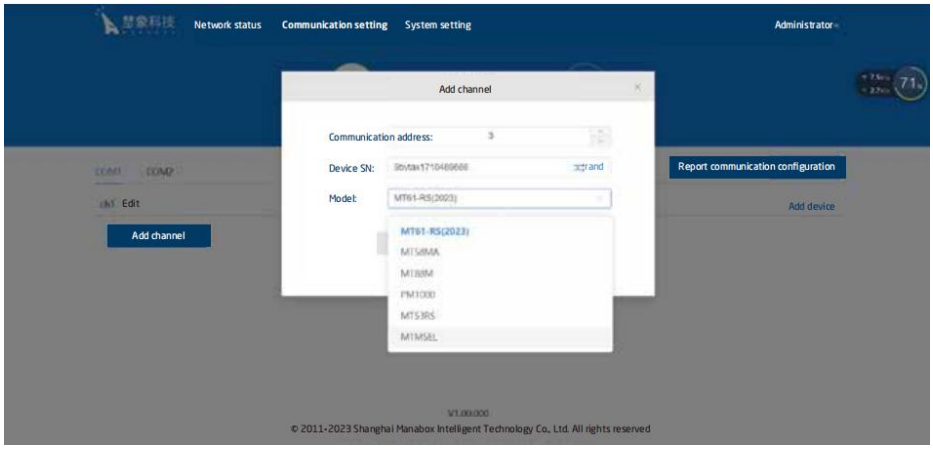
- After the channel is added successfully, you can click the Edit button to modify or delete the channel.



8.4.3 Add and Manage Devices

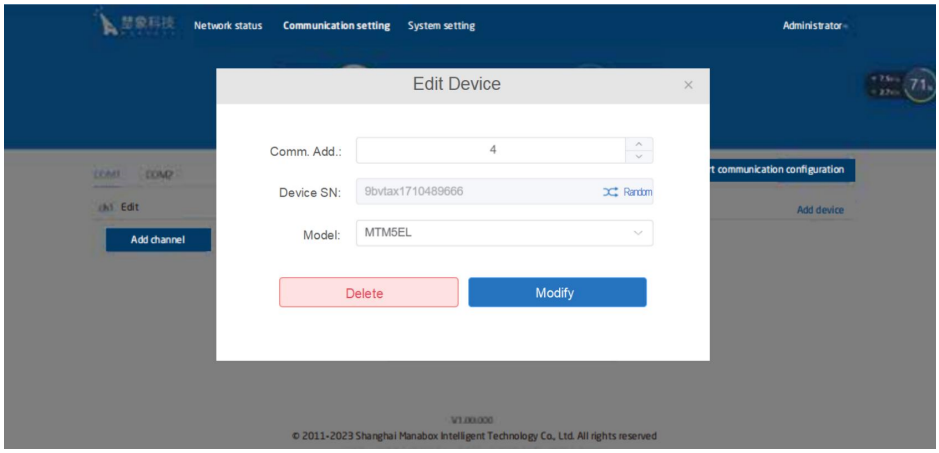
1. Add a Device

- Click the Add Device button after the channel to enter the Add Device page.
- Fill in the communication address and SN (device model) of the device to complete the device addition.
- After adding, the gateway will automatically read the electrical parameter data of the device and report it to the platform.



2. Edit Device

- Click the Edit button behind the device row to modify the device information.



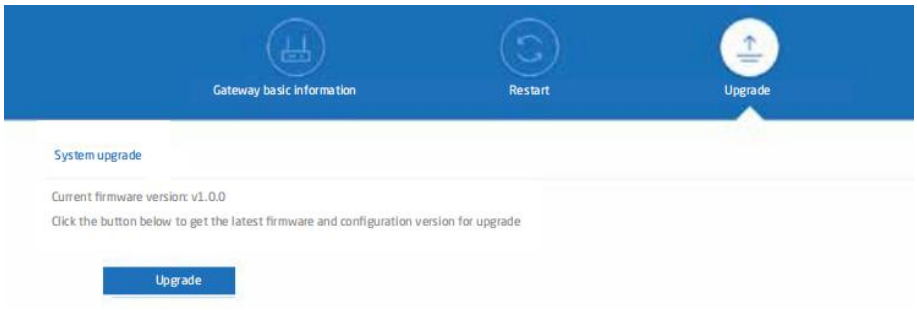
3. Synchronize Configuration to Platform

- After completing all addition, deletion and modification operations, ensure that the gateway is connected to the Internet normally.
- Click the Report Communication Configuration button to synchronize the current configuration information to the platform.
- Note: If you do not click the Sync button, the changes you make will not be updated to the platform.

8.5 System Management

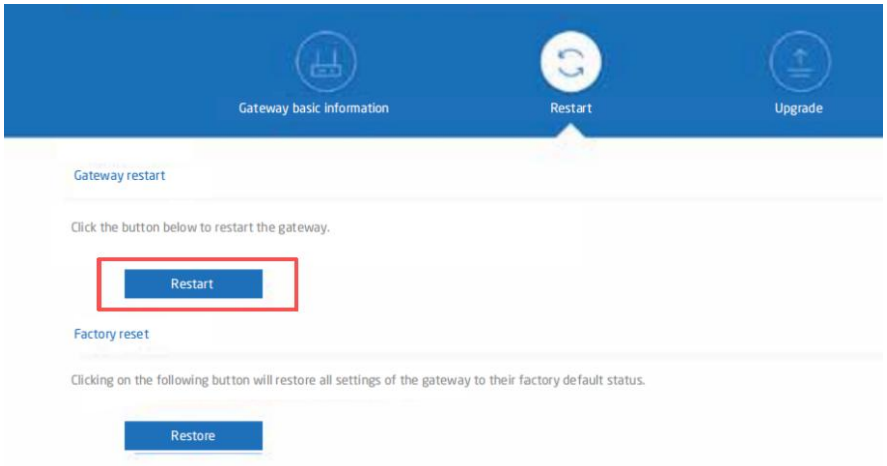
8.5.1 Firmware Upgrade

Go to the Webserver System Setting-Upgrade interface and click the Upgrade button



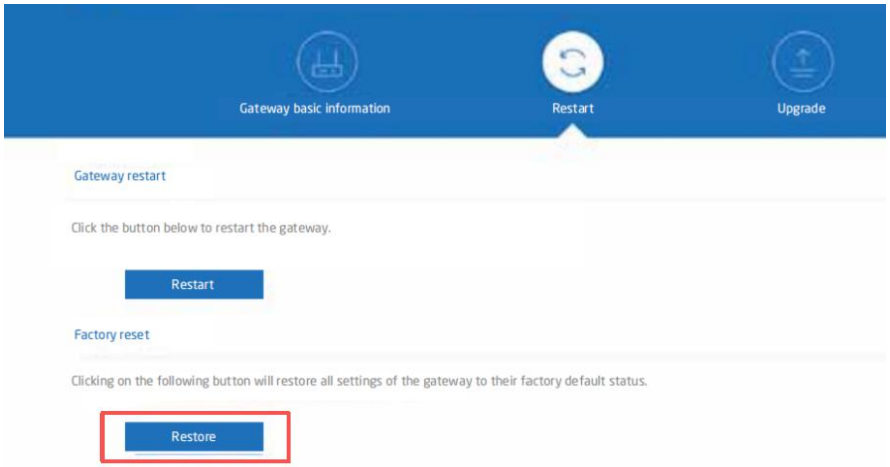
8.5.2 Restart

Go to the Webserver System Setting-Restart interface and click the Restart button.



8.5.3 Restore Factory Settings

Go to the Webserver System Setting-Restart interface and click the Restore button.



9 MQTT Protocol

See MQTT protocol for details

10 API Protocol

See API interface protocol for details

11 Technical Parameters

11.1 Specifications

Characteristics	**Value**
Processor	ARM926EJ-S core
RAM	Maximum running speed 300 MHz
DDR	Built-in 64 MB DDR II memory
eMMC	GB
USB 2.0	USB Host / Device
Encryption and decryption engine	• ECC-256 • AES-256 • RSA-2048 • SHA-512 • HMAC • Random Number Generator
Operating system	Deep customization based on Linux

11.2 Electrical Characteristics

Characteristics	**Value**
Power supply	12V dc
Power consumption	≤5W

11.3 Mechanical Characteristics

Characteristics	Value
Indicator	Gateway status \ 4G module status \ Uplink communication \ Downlink communication
Installation	DIN rail
Protection grade	IP40 (front protruding part)
Size	72 x 105 x 71 mm

11.4 Environmental Characteristics

Characteristics	Value
Operating temperature	-10 ~ 55 ℃
Storage temperature	-25 ~ 70 ℃
Relative humidity	5 ... 95% (non-condensing)
Altitude	Below 2000 meters above sea level

11.5 Serial Communication

Characteristics	Valid Value	Default value
Baud rate	9600	9600
	19200	
	38400	
Data bit	5, 6, 7, 8	8
Check mode	Odd	No check
	Even	
	No check	
Stop bit	1, 2	1

11.6 Ethernet Interface

Characteristics	Value
Number of ports	2 way

Port speed	1*10/100Mbit/s adaptive WAN port, can be configured as Ethernet LAN port 1*10/100Mbit/s adaptive Ethernet LAN port, can access the embedded Webserver
LAN protocol	Ethernet LAN protocol
WAN protocol	Support static IP, DHCP protocol
Configuration mode	Web-based, centralized configuration management software

11.7 4G Wireless Communication

Characteristics	**Value**
4G	FDD-LTE：B1/B3/B5/B8 TDD-LTE：B34/B38/B39/B40/B41
SIM/UIM interface	Support 1.8V/3V SIM/UIM card