

TBox Series Industrial Internet Data Transmission Terminal

User Manual



SHENZHEN INVT ELECTRIC CO., LTD.

No.	Change description	Version	Release date
1	First release.	V1.0	February 2024
2	- Updated the description of the Support Networks function, and added three function descriptions (antenna gain, power consumption and heat dissipation method) in section 1.2 Product specifications. - Added European and Latin American version product models and descriptions in section 1.3 Model description. - Added product weight data in section 2.3 Outline dimensions and weight. - Updated all operation descriptions and interface diagrams in chapter 3 Quick startup.	V1.1	September 2024
3	- Added the mainstream industrial protocols supported in chapter 1 Product overview. - Added support for S7, PPI, MC-3E, SLMP, and FINS communication protocols in section 1.2 Product specifications. - Updated operation steps in section 3.1.2.1 Monitoring devices via the IWOSTUDIO. - Updated operation steps in section 3.1.2.2 Monitoring devices via the web portal. - Updated operation steps in section 3.3 VPN pass-through configuration.	V1.2	June 2025
4	- Updated the 4G network connection function from 4G to 4G LTE Cat.1bis. - Updated the Wi-Fi network connection function from Wi-Fi to Wi-Fi 2.4 GHz. - Updated section 1.2 Product specifications and change frequency bands.	V1.3	November 2025
5	- Changed the 4G networking function from 4G LTE Cat.1bis to 4G LTE Cat.1. - Revised the description of the running indicator. - Updated the operation steps in section 3.1.2.1	V1.4	May 2026

No.	Change description	Version	Release date
	Monitoring devices via the IWOSTUDIO. ● Updated the operation steps in section 3.1.2.2 Monitoring devices via the web portal. ● Updated section 3.5 FAQs.		

Contents

1 Product overview	1
1.1 Product features	1
1.2 Product specifications	2
1.3 Model description	3
1.4 Port description	3
1.5 Indicator description	3
2 Installation.....	5
2.1 Overview	5
2.2 Unpacking inspection	5
2.3 Outline dimensions and weight	6
3 Quick startup	7
3.1 IoT module use instructions.....	7
3.1.1 Installation instructions	7
3.1.2 Monitoring platform operation instructions	7
3.1.3 Monitoring platform account	25
3.2 Network configuration on the app.....	26
3.3 VPN pass-through configuration.....	29
3.4 Virtual serial port pass-through configuration.....	31
3.5 FAQs	34



Safety precautions

Before you operate the Internet data transmission terminal, read the safety precautions described in this manual carefully to ensure safe operation.

- The account and password are the authentication credentials of the platform, which can be used for device management after logging in. Users should keep them properly and take sufficient measures to prevent others from stealing. If the account and password are stolen, it may cause significant losses.
- Before using the device for remote operation, users should communicate with the site to ensure that it is safe to operate remotely; otherwise, it may cause significant damage.
- An IoT SIM card is forced to machine-card binding, and it can only be applied to the device where it is powered up and networked for the first time. Do not insert it into another device; otherwise, it will be locked.
- The product is an industrial Internet product, and although we have taken the necessary technical measures to ensure data security, there may still be network security risks such as hacking that are beyond our control or responsibility. We will not be liable for damages if the harm is not caused by quality defects of the product itself.

1 Product overview

INVT TBox series industrial Internet data transmission terminal is an industrial-grade wireless data transmission device based on carrier 4G networks. It provides stable and reliable remote data collection, program upload/download, and commissioning functions to meet the long-distance data transmission requirements of demanding industrial environments.

The product integrates multi-network access capabilities, including 4G LTE Cat.1bis, Ethernet, and Wi-Fi 2.4GHz. It provides routing and switching, VPN pass-through, and virtual serial port pass-through functions. Equipped with RS485 and RJ45 dual interfaces, it supports mainstream industrial protocols such as Modbus RTU, Modbus TCP, S7, PPI, MC, and FINS. Through the INVT Industrial Internet Platform, it enables cloud-based device data access, remote monitoring, and intelligent operation and maintenance management.

1.1 Product features

1. Standard set-up for easy operation
 - Provides standard RS485 interfaces for direct connection to serial devices for data collection.
 - Provides standard RJ45 network ports: WAN and LAN ports can be switched through the switch. LAN ports can be directly connected to network devices for data collection. The WAN port can be connected to the upstream network.
 - The intelligent data terminal enters data transmission mode immediately after power-on.
 - Adopts standard rail installation.
 - Powerful industrial Internet platform for easy device management.
 - Easy system configuration and maintenance interface.
2. Powerful functions
 - Supports remote data monitoring.
 - Supports VPN pass-through (available only in China), able to remotely upload, download, and monitor PLC programs through network ports and VFD remote oscilloscope.
 - Supports virtual serial port pass-through, able to remotely upload, download, and monitor PLC programs through serial ports.
 - Supports remote upgrade of application programs and policy files.
 - Supports 4G LTE Cat.1bis and Wi-Fi 2.4GHz routing functions, providing

network access for other devices (Wi-Fi routing is only supported in Wi-Fi version).

- Supports multiple network access methods such as 4G LTE Cat.1bis, Wi-Fi 2.4GHz, and Ethernet (Wi-Fi only supported in Wi-Fi version).
- Supports APN (operator APN information is required for overseas).
- Supports Bluetooth configuration. Through Bluetooth, it can connect to Wi-Fi and configure parameters such as APN.
- Supports uploading changed data only, reducing data traffic.
- Supports 4G base station positioning.
- Supports access to third-party platforms and provides data in JSON format.

1.2 Product specifications

Function	Description
Supported network	LTE FDD (CN version): Band 1/3/5/8 LTE TDD (CN version): Band 34/38/39/40/41 LTE FDD (EU version): Band 1/3/7/8/20/28 LTE FDD (LA version): Band 2/3/4/5/7/8/28/66
Supported interfaces	One RS485 interface One standard RJ45 interface (for both WAN and LAN, which are switchable through a switch) One SMA 4G antenna interface One SMA Wi-Fi antenna interface (only supported in the Wi-Fi version) One spring-loaded SIM card socket (micro card)
Wired communication distance (unshielded)	RS485: 5m Network cable: 30m
Indicator	Power indicator, network status indicator, running status indicator
Communication protocol	Modbus RTU, Modbus TCP, S7, PPI, MC-3E, SLMP, FINS and other mainstream protocols MQTT communication protocol FTP transfer protocol
Theoretical bandwidth	LTE FDD: Downlink 10Mbps, uplink 5Mbps LTE TDD: Downlink 8.96Mbps, uplink 3.1Mbps
Antenna gain	2.2dBi
Power supply	10–25VDC
Power consumption	Average power: 55mA@24V, maximum power: 500mA@24V.
Temperature range	-25–+55°C

Function	Description
Shell	Injection molded, ingress protection (IP) rating IP20
Mounting method	Rail-mounted
Heat dissipation method	Natural heat dissipation

1.3 Model description

Model	Description
TBox	Chinese version, supporting 4G LTE Cat.1bis and Wi-Fi 2.4GHz wireless communication, RS485 and network port data collection.
TBox-4G	Chinese version, supporting only 4G LTE Cat.1bis wireless communication, and RS485 and network port data collection.
TBox-EU	European version, supporting 4G LTE Cat.1bis and Wi-Fi 2.4GHz wireless communication, RS485 and network port data collection.
TBox-LA	Latin American version, supporting 4G LTE Cat.1bis and Wi-Fi 2.4GHz wireless communication, RS485 and network port data collection.

 **Note:** Only product models with Wi-Fi come with Wi-Fi related functions and accessories.

1.4 Port description

Port identifier	Description
24V	Power supply +
GND	Power supply -
485+	485A
485-	485B
4G	4G antenna
Wi-Fi	Wi-Fi antenna (optional)
Ethernet	Ethernet port
SIM	SIM card
WAN<->LAN	WAN/LAN port switched through a switch

1.5 Indicator description

Indicator identifier	Description
NET	4G network indicator Flash slowly (ON: 200ms and OFF: 1800ms): Network searching state

Indicator identifier	Description
	Flash slowly (ON: 1800ms; OFF: 200ms): Standby state Flash quickly (ON: 125ms; OFF: 125ms): Data transmission mode
RUN	Run indicator Flash quickly (ON: 100ms; OFF: 100ms): Data collection is normal Flash slowly (ON: 1s; OFF: 1s): Data collection is abnormal ON or OFF: System exception
PWR	Power supply indicator

2 Installation

2.1 Overview

TBox series industrial Internet data transmission terminal must be installed properly to achieve the designed function. Generally, the installation must be done under the guidance of our certified and qualified engineers.

 **Note:** Disconnect the power supply before installation.

2.2 Unpacking inspection

Before unpacking, check whether the product information on the package is consistent with the order and whether the package is intact. The packing materials should be well maintained during inspection for future transshipment. If you have any questions, contact the supplier.

Table 2-1 Standard accessories

Standard accessories	Qty	Remarks
4G data transmission terminal	1	-
4G antenna	1	-
PIN port	1	One 4-pin port

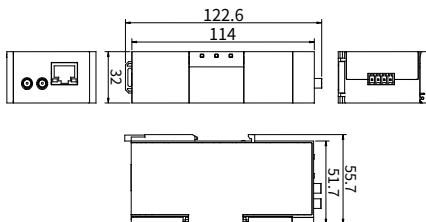
Table 2-2 Optional accessories

Optional accessories	Qty	Remarks
Wi-Fi antenna	1	Only included in products that support Wi-Fi.
SIM card	1	Only included in the CN version products.

2.3 Outline dimensions and weight

The outline dimension example of the IP20 model is as shown in Figure 2-1.

Figure 2-1 Outline dimensions of TBox (Unit: mm)



Model	Length (mm)	Width (mm)	Height (mm)	Net weight (g)	Gross weight (g)
TBox(-4G)	32	55.7	122.6	96.3	263.1
TBox-EU					
TBox-LA					

3 Quick startup

3.1 IoT module use instructions

3.1.1 Installation instructions

- Step 1 Prepare the required devices: a network-connected computer, a 4G data transmission terminal, and an IoT SIM card.
- Step 2 Check whether a SIM card is installed in the SIM card slot. A SIM card is inserted before delivery by default (The overseas version is not supplied with a SIM card).
- Step 3 Connect the power cable, RS485 communication cable, and network cable based on the port description.
- Step 4 Connect the 4G antenna and Wi-Fi antenna.
- Step 5 Power on and start the 4G data transmission terminal.
- Step 6 When the NET indicator flashes rapidly, the network is ready; when the RUN indicator flashes rapidly, data is being collected.
- Step 7 Go to the real-time monitoring interface to review relevant information on the IoT monitoring platform.

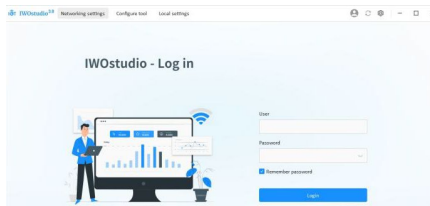
3.1.2 Monitoring platform operation instructions

You can monitor relevant devices through the following three methods. For information on how to obtain the account and password, please refer to section 3.1.3 Monitoring platform account.

- Host controller software: IWOSTUDIO
- Web: IWOSCENE industrial IoT application platform
- Mobile: INVT IOT app

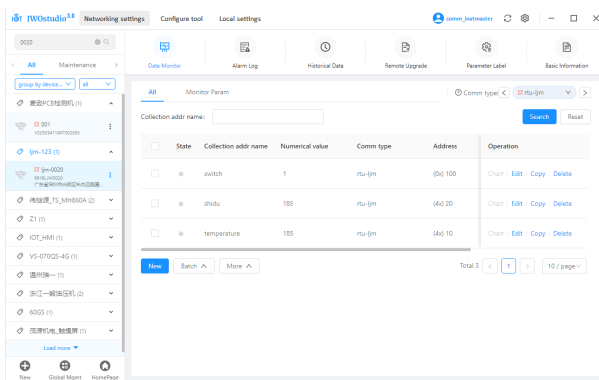
3.1.2.1 Monitoring devices via the IWOSTUDIO

- Step 1 Download IWOSTUDIO from the official website (www.invt.com), install it, and then open it.

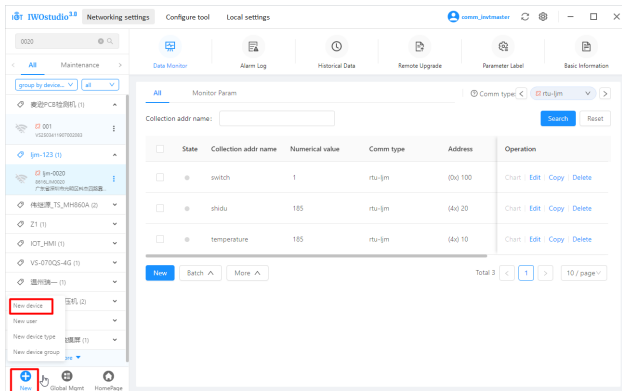


Step2 Enter the account and password to log in and enter the network configuration interface.

 **Note:** For account information, refer to section 3.1.3 Monitoring platform account.



Step3 Choose **New** > **New device** at the bottom left corner.

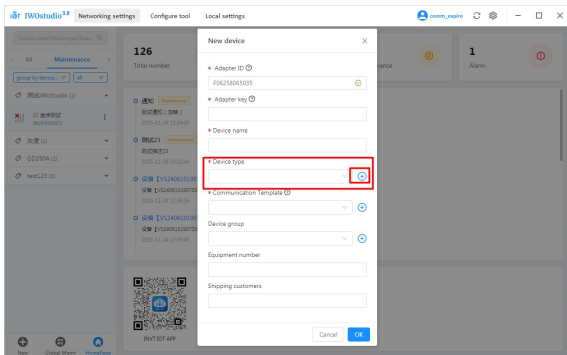


Step 4 Enter **Adapter ID**, **Adapter key**, **Device name**, select **Device type** and **Communication Template**, and then click **OK** to complete the process.

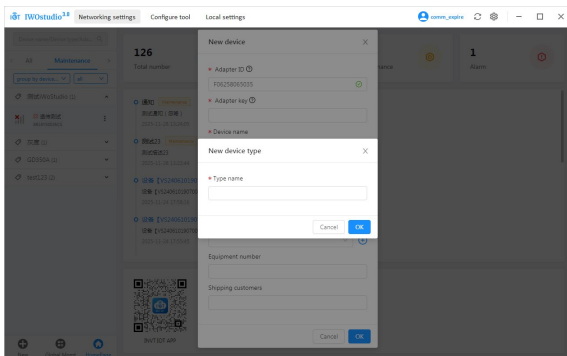
Note: **Adapter ID** is the S/N code of the IoT terminal, and **Adapter key** is the six-digit number under the QR code next to the S/N code.

When adding a device for the first time, you need to add the device type and communication template first.

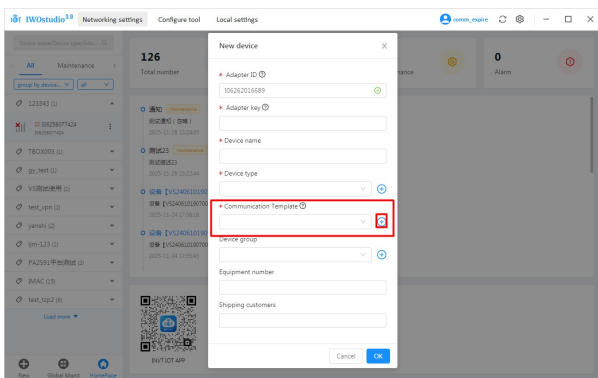
To add a **Device type**, click .



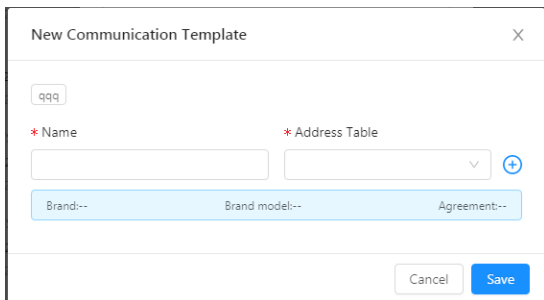
Enter **Type name**, and click **OK** to complete adding the device type.



To add a communication template, click .

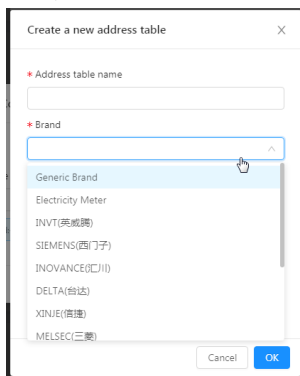


Create a new communication template: Enter **Name**, and select an **Address Table**. If no address table is available, click  next to **Address Table** to create a new one.



The dialog box titled "New Communication Template" contains a text input field with "qqq" and a label "* Name". To the right is a dropdown menu labeled "* Address Table" with a plus icon to its right. Below these is a light blue bar with three labels: "Brand:--", "Brand model:--", and "Agreement:--". At the bottom right are "Cancel" and "Save" buttons.

Create a new address table: Enter any name in **Address table name**, select a brand (such as INVT, Inovance, Siemens, Delta, Xinjie, Mitsubishi, and Omron) from **Brand**, select a model from **Brand and model**, choose the desired protocol from **Agreement**, and click **OK**.



The dialog box titled "Create a new address table" has a text input field for "* Address table name". Below it is a dropdown menu for "* Brand" which is open, showing a list of brands: "Generic Brand", "Electricity Meter", "INVT(英威腾)", "SIEMENS(西门子)", "INOVANCE(汇川)", "DELTA(台达)", "XINJE(信捷)", and "MELSEC(三菱)". A mouse cursor is pointing at the "Generic Brand" option. At the bottom right are "Cancel" and "OK" buttons.

The corresponding parameters are automatically displayed on the **New Communication Type** page. Set the communication parameters, and click **Save** after completing the settings to complete the addition.

For subsequent use, the same device type or communication template can be selected directly.

- Step 5 Select the communication template and click **OK** to complete the addition. Then, start adding collection addresses: select the corresponding device and click **New**.

State	Collection addr name	Numerical value	Comm type	Address	Operation
☐	2	190	ljm-100	(4d) 1	Chart Edit Copy Delete
☐	temperature	190°C	ljm-100	(4d) 200	Chart Edit Copy Delete
☐	kaiguan	1	ljm-100	(0d) 10	Chart Edit Copy Delete
☐	shidu	250	ljm-100	(4d) 20	Chart Edit Copy Delete
☐	wendu	170°C	ljm-100	(4d) 10	Chart Edit Copy Delete

New Batch More

Total 5 1 10 / page

Set the address parameters: Fill in **Collection addr name** freely, select the address table you just created from **Address Table**, and select an option from **Data Type**, **Address Type**, and **Address** based on actual needs. Other parameters such as **Unit**, **Base value**, **Scale factor**, and **Decimal places** have

default values and can be left unchanged or modified as needed. After completing the setting, click **Save**.

Please choose the address format

Single address Combination address

* Collection addr name: temperature

* Address Table: test-ljm-100

* Data type: 16-bit unsigned integer

* Address type: 4x

* Address: 200

Unit: °C

Base value: 0

Scale factor: 1

Decimal places: 0

R&W methods: Read-only

Chart display: No

Size end: Small end

Upload method: Change upload

Upload cycle(s): 30

Numerical process: Numerical value

Address label:

Remarks:

Cancel Save and Incremental Sync Save

The added address is displayed on the monitoring interface.

All 1 Monitor Param Comm type: ljm-100

Collection addr name: Search Reset

☐	State	Collection addr name	Numerical value	Comm type	Address	Operation
☐	⊗	2	190	ljm-100	(4x) 1	Chart Edit Copy Delete
☐	⊗	temperature	190°C	ljm-100	(4x) 200	Chart Edit Copy Delete
☐	⊗	kaiguan	1	ljm-100	(0x) 10	Chart Edit Copy Delete
☐	⊗	shidu	250	ljm-100	(4x) 20	Chart Edit Copy Delete
☐	⊗	wendu	170°C	ljm-100	(4x) 10	Chart Edit Copy Delete

New Batch ^ More ^ Total 5 1 10 / page v

Click **New** to add other collection addresses.

☐	⊗	shidu	250	ljm-100	(4x) 20	Chart Edit Copy Delete
☐	⊗	wendu	170°C	ljm-100	(4x) 10	Chart Edit Copy Delete

New Batch ^ More ^ Total 5 1 10 /

After all the addresses have been added, click **More**, and then click **Sync collection addr** to send all the addresses to the module.

Collection addr name: Search Reset

☐	State	Collection addr name	Numerical value	Comm type	Address	Operation
☐	●	2	190	ljm-100	(4x) 1	Chart Edit Copy Delete
☐	●	temperature	190°C	ljm-100	(4x) 200	Chart Edit Copy Delete
☐	●	kaiguan	1	ljm-100	(0x) 10	Chart Edit Copy Delete
☐	●	shidu	250	ljm-100	(4x) 20	Chart Edit Copy Delete
☐	●	Sync collection addr	170°C	ljm-100	(4x) 10	Chart Edit Copy Delete

Comm type mgmt

New Batch More Total 5 < 1 > 10 / page

Step 6 Check data monitoring.

After receiving the address configuration, the TBox collects and uploads the data, which is then displayed on the monitoring interface, as shown in the figure below.

All 1 Monitor Param Comm type: ljm-100 Search Reset

Collection addr name:

☐	State	Collection addr name	Numerical value	Comm type	Address	Operation
☐	●	2	8	ljm-100	(4x) 1	Chart Edit Copy Delete
☐	●	temperature	8°C	ljm-100	(4x) 200	Chart Edit Copy Delete
☐	●	kaiguan	0	ljm-100	(0x) 10	Chart Edit Copy Delete
☐	●	shidu	8	ljm-100	(4x) 20	Chart Edit Copy Delete
☐	●	wendu	8°C	ljm-100	(4x) 10	Chart Edit Copy Delete

To modify a collection address, select the desired address and click **Edit**. After making the necessary changes, click **Save and Incremental Sync** to complete the modification.

To add a new collection address, click **New**, enter the necessary information for the new address, and then click **Save and Incremental Sync** to complete the addition.

Add collection address

Please choose the address format

Single address Combination address

Collection addr name: kaiguan

Address Table: test-ijm-100

Data type: Boolean

Address type: Or

Address: 10

Unit: 0

Base value: 0

Scale factor: 1

Decimal places: 0

R/W methods: Read-only

Chart display: No

Size end: Small end

Upload method: Change upload

Upload cycle(s): 30

Numerical process: Numerical value

Address label:

Remarks:

Cancel Save and Incremental Sync Save

3.1.2.2 Monitoring devices via the web portal

Step 1 Enter **iot.invt.com** in the address bar of Google Chrome and press **Enter** to visit the login page of the industrial IoT application platform. As shown in the following figure, enter the user name and password to complete the login.

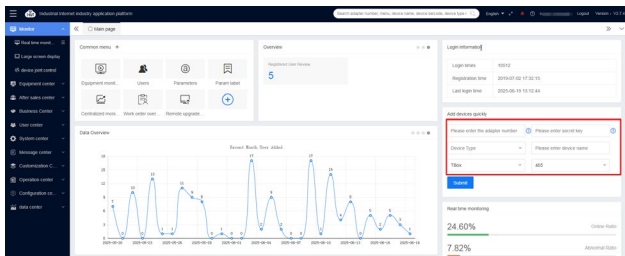
Note: For account information, refer to section 3.1.3 Monitoring platform account.



Step 2 After successful login, the homepage appears as shown below. Under **Add devices quickly**, enter the adapter number, secret key and device name; select the device type and the communication template; then click **Submit** after confirming the input is correct.

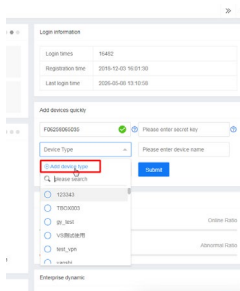
When adding a device for the first time, you need to add the device type and communication template first. If this is not the first time, proceed directly to the next step.

 **Note:** If the device has already been added via the IWOstudio or the app, this step can be skipped.

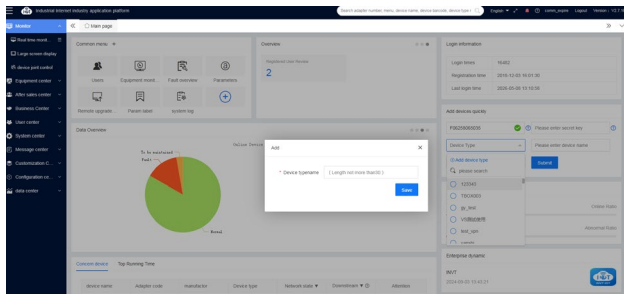


When adding a device for the first time, you need to add the device type and communication template first.

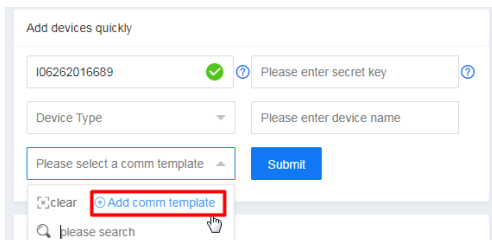
To add a device type, click **Add device type**.



Enter the **Device type name** and click **Save** to complete the addition.



To add a communication template, click **Add comm template**.



On the **Add** page, enter the name and select the address table. If this is the first time you add one, create an address table first by clicking **Click Add**.

Add

* name Please enter the

* Address table please select

* Brand please select

* Brand model please select

* Protocol please select

Click Add

Save Cancel

After entering the **address table management** interface, click **Add**.

address table management

Address table name	Brand	Brand model	Agreement	Founder	Create time	Operation
demo	INVT	General	Modbus_RTU	INV/TOT	2026-05-07 11:01:32	...
通用协议地址表	通用品牌	General	Modbus_TCP	INV/TOT	2026-05-07 12:39:37	...
GD3000	通用品牌	General	Modbus_RTU	INV/TOT	2026-05-23 11:10:55	...

Enter the name, select the brand, brand model, and protocol, and click **Save** to complete adding the address table.

Add

* Address table name Please enter the

* Brand INVT

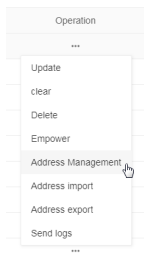
* Brand model General

* Agreement Modbus_RTU

Remark

Save Cancel

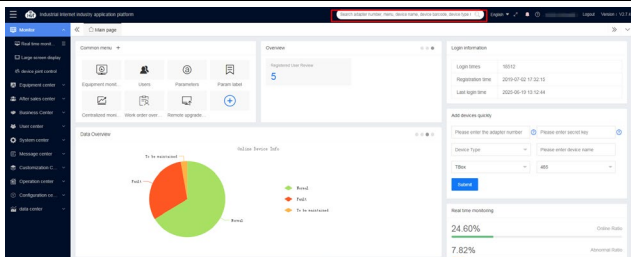
You can add addresses in **Address Management** on the left-side operation bar of the address table management page.



After adding the address table, select it, fill in the communication parameters for communicating with the device, and click **Save** to complete adding the communication template.

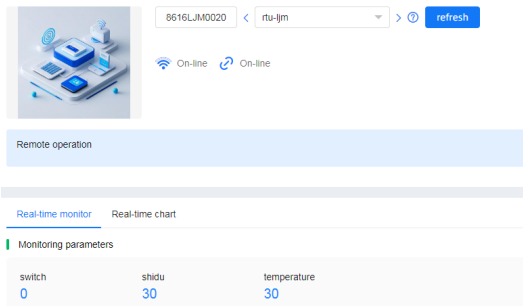
A screenshot of a dialog box titled 'Add' with a close button (X) in the top right corner. The dialog contains several configuration fields for a communication template. On the left side, there are fields for 'name' (with a placeholder 'Please enter the'), 'Brand' (with a dropdown menu showing '通用品牌'), 'Protocol' (with a dropdown menu showing 'Modbus_RTU'), 'Slave Station Number' (with a text input '1'), 'Baud rate' (with a dropdown menu showing '19200'), and 'Stop Bits' (with a dropdown menu showing '1'). On the right side, there are fields for 'Address table' (with a dropdown menu showing 'MODBUS RTU' and a 'Click Add' button), 'Brand model' (with a dropdown menu showing 'General'), 'Serial port' (with a dropdown menu showing 'COM1'), 'Data Bits' (with a dropdown menu showing '8'), and 'Check Bits' (with a dropdown menu showing 'Even parity check'). At the bottom right, there are two buttons: 'Save' (in blue) and 'Cancel'.

Step 3 Enter the adapter number in the search box on the homepage. Select the desired adapter to view its monitoring state.

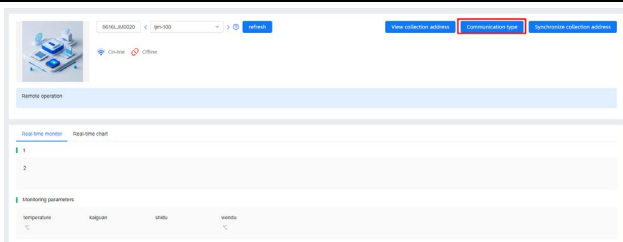


8616LJM0020	Search
Type	Content
Adapter	8616LJM0020_item0020

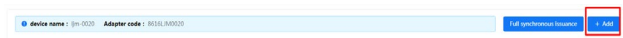
Step 4 If the device is online, the communication parameters are correct, and addresses have been added, go to the device page to view the monitoring parameters. You can directly view the collected and uploaded data on the monitoring interface.



Step 5 If you need to change or add communication parameters, or if the device was added while offline, after the device comes online, click **Communication type** in the upper-right corner to add or modify the communication type.



After entering the **Communication type** page, click **+Add** or directly modify the existing communication type.



For the adding procedure, refer to the procedure for adding a device type in Step 2.

Return to the communication type configuration page, select the address table added just now, fill in the communication parameters as required, and click **Save and distribute** after completing the settings.

Communication type name: * Address table:

* Brand: * Brand model:

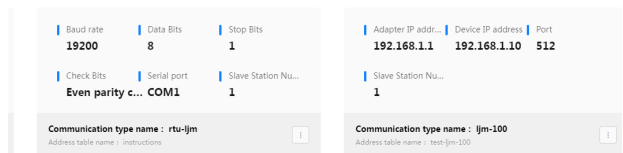
* Protocol:

* Slave Station Number: * Serial port:

* Baud rate: * Data Bits:

* Stop Bits: * Check Bits:

The newly added communication type will appear on the **Communication type** page.

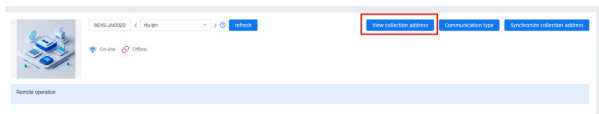


Step 6 Add the data collection address. The collection address needs to be added for the first time.

Go back to the device data monitoring interface, select the communication type you just added from the red drop-down list box shown below, and click **refresh**. Since no monitoring data is displayed, you need to add the data collection address before monitoring the data.



Click **View collection address**.



Click **+Add** on the collection address management interface.

Collection address name

☒ Single address ☐ Combination address

* name

* data type

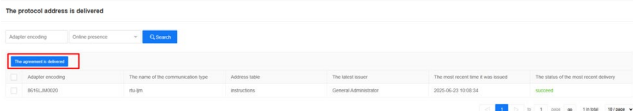
* address

[more](#)

Repeat the address adding process until all the addresses have been added. Then click **Synchronize collection address**.

Collect address labels	Collection address na...	data type	Reading and writing m...	Unit	Founder	Create time	Operation
switch_3	switch	bool	Read only		通信管理員	2025-06-11 16:05:21	---
snr01_2	snr01	16bit unsigned integer	Read only		通信管理員	2025-06-11 16:05:05	---
temperature_1	temperature	16bit unsigned integer	Read only		通信管理員	2025-06-11 16:04:55	---

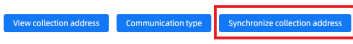
On the collection address synchronization interface, select the target adapter, and click **The agreement is delivered**.



If the distribution is successful, the distribution status becomes **succeeded**.



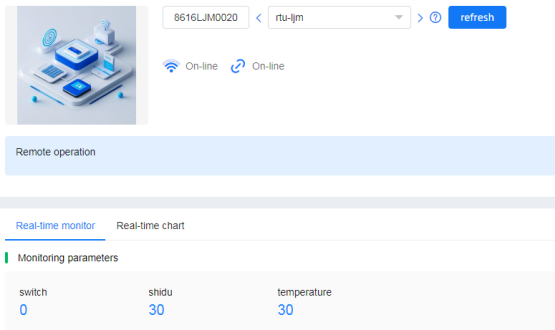
Alternatively, return to the monitoring page and click **Synchronize collection address**. A message will be displayed indicating that the distribution is successful.



The collection address configuration is completed.

Step 7 View the monitoring data.

Go back to the monitoring interface to view the collection address data that has just been configured.



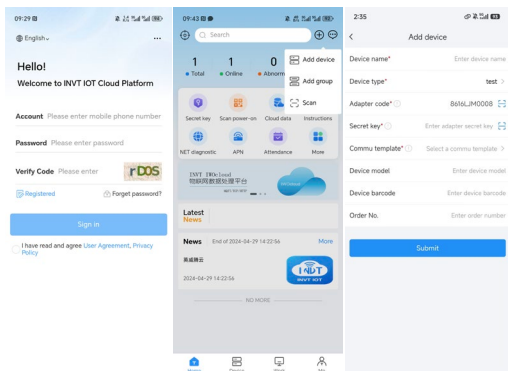
3.1.2.3 Monitoring devices via the app

Step 1 Download and install the INVT IOT app on your mobile device.

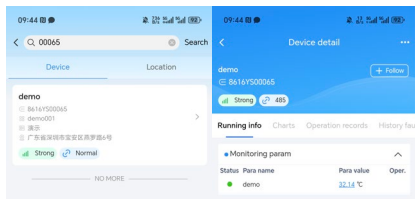
 **Note:** In Android, search the app store or Google Play for INVT IOT to download; in iOS, search the App Store for INVT IOT to download.

Step 2 Open the **INVT IOT** app, enter the account and password to log in. On the homepage, tap the **+** icon at the top right corner; enter the **Device name** **Adapter code**, and **Secret key**; select **Device type** and **Commu template**; and then tap **Submit** to complete the device addition.

 **Note:** For account information, refer to section 3.1.3 Monitoring platform account.



Step 3 Enter the adapter number in the search box. Select the desired adapter to view its monitoring state.



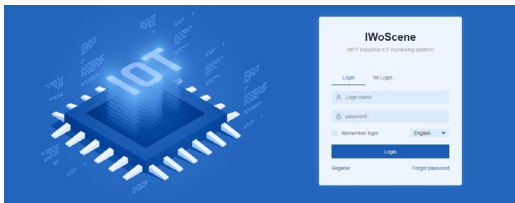
3.1.3 Monitoring platform account

You can register a monitoring platform account via the web portal or app, and the same account and password can be used on all three monitoring platforms.

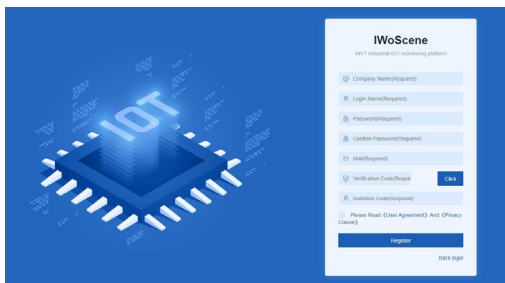
3.1.3.1 Registration via the web portal

Step 1 Enter **iot.invt.com** in the address bar of Google Chrome and press **Enter** to visit the login page of the industrial IoT application platform.

Step 2 Click **Register**.



Step 3 Fill in the **Company name**, **User name**, **Password**, and confirm the password again. Enter your email address, click the button to obtain a verification code, fill in the verification code received via email, and enter the invitation code. Invitation code: You can obtain it through the higher-level user account. If there is no higher-level one, you can fill in **dbf20a** (INVT administrator invitation code). Review and check the **User Agreement** and **Privacy Clause**, click **Register**, and wait for review. You will receive a notification via email once approved.



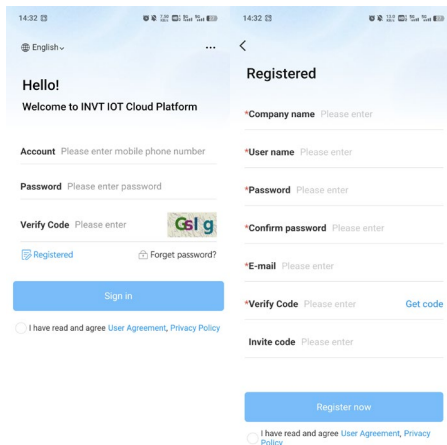
3.1.3.2 Registration via the app

Step 1 Download and install the INVT IOT app on your mobile device.

 **Note:** In Android, search the app store or Google Play for INVT IOT to download; in iOS, search the App Store for INVT IOT to download.

Step 2 Open the INVT IOT app, and click **Registered**.

Step 3 Fill in the **Company name**, **User name**, **Password**, and confirm the password again. Enter your email address, click **Get code**, fill in the verification code received via email, and enter the invitation code. Invitation code: You can obtain it through the higher-level user account. If there is no higher-level one, you can fill in **dbf20a** (INVT administrator invitation code), review and check the **User Agreement** and **Privacy Policy**, click **Register**, and wait for review. You will receive a notification via email once approved.

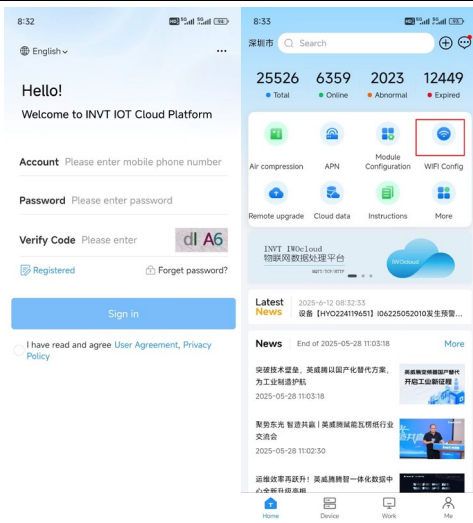


3.2 Network configuration on the app

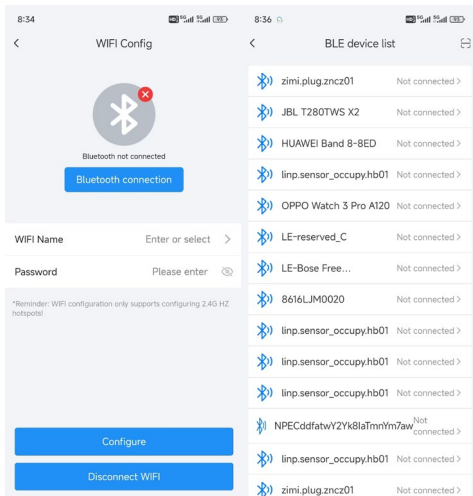
Step 1 Set the DIP switch of the IoT terminal to LAN.

Step 2 Power on the data transmission terminal, and wait for about 1 minute to ensure the terminal has started successfully.

Step 3 Open the INVT IOT app, log in with your account, password, and verification code. Review and check the **User Agreement** and **Privacy Policy** to access the homepage. Then tap **WIFI Config**.



Step 4 First, connect to Bluetooth. Tap the Bluetooth icon at the top right corner, tap the corresponding Bluetooth name (the Bluetooth name is the S/N code of the IoT terminal) for connection. If you cannot find the corresponding name, you can scan the barcode on the IoT terminal label for identification.



Step 5 After connecting, enter the Wi-Fi name and password, and tap **Configure**. The Wi-Fi configuration is completed when you receive a message indicating success.

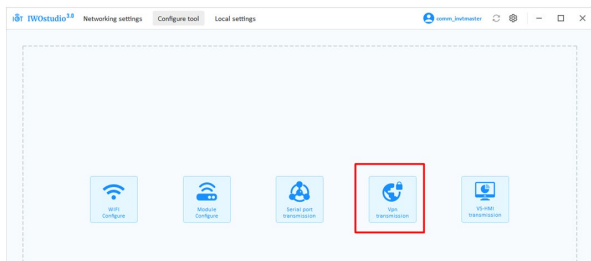
 **Note:** When Wi-Fi is available, the IoT terminal will prioritize using it.

3.3 VPN pass-through configuration

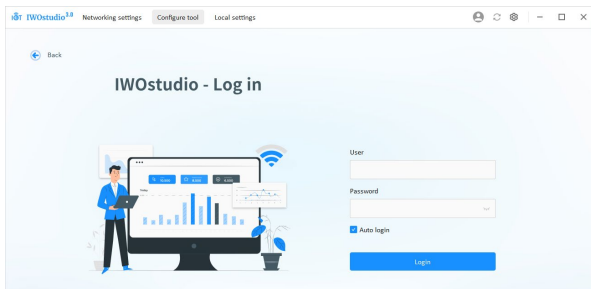
 **Note:** At present, VPN pass-through is only used in China.

Step 1 Open the host controller software IWOSTudio.

Step 2 Click **Configure tool** in the menu, then click **VPN transmission**.

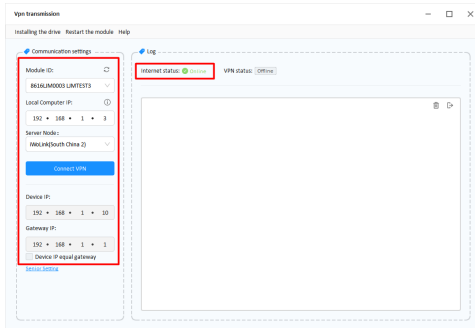


Step 3 Enter the user name and password to log in.

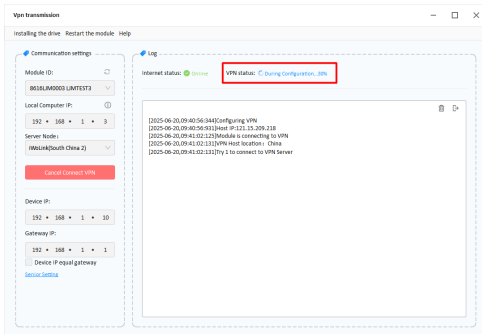


Step 4 On the main interface, select the corresponding adapter ID, and select the server node. Once the device is connected successfully, the device IP and gateway IP will be automatically read.

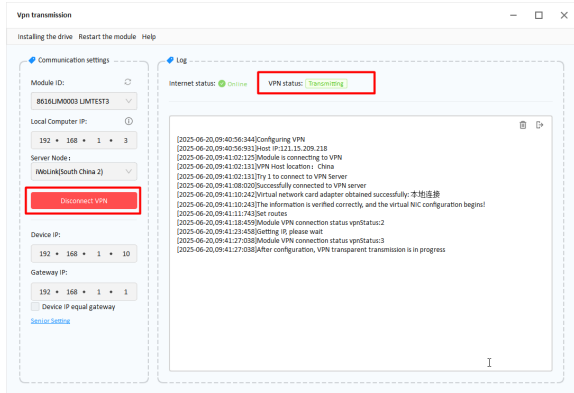
If the detected device IP does not match the actual IP, you must manually set it according to the actual device IP. The gateway IP is the IP (default is 192.168.1.1) of the collection terminal (TBox) while the device IP is the IP (default is 192.168.1.10) of the device (such as VFD, PLC) connected to the collection terminal. As long as the local IP is in the same network segment as the gateway IP, it can be set arbitrarily.



Step 5 After the settings are complete, click **Connect VPN**. The connection process will take one to two minutes.



Step 6 The VPN status is **Transmitting**, indicating that the VPN channel has been successfully established and the connection is successful. If you need to exit VPN pass-through, you need to click **Disconnect VPN**.

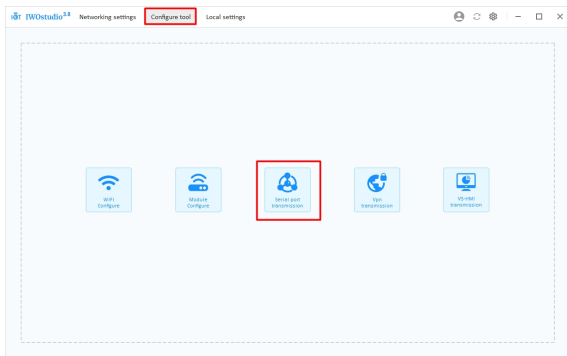


Step 7 Open the VFD/PLC host software, and operate and commission the device as a locally connected device.

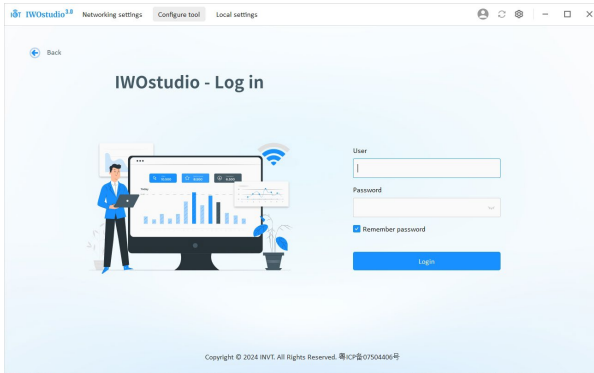
3.4 Virtual serial port pass-through configuration

Step 1 Run the host controller software: IWOSTUDIO.

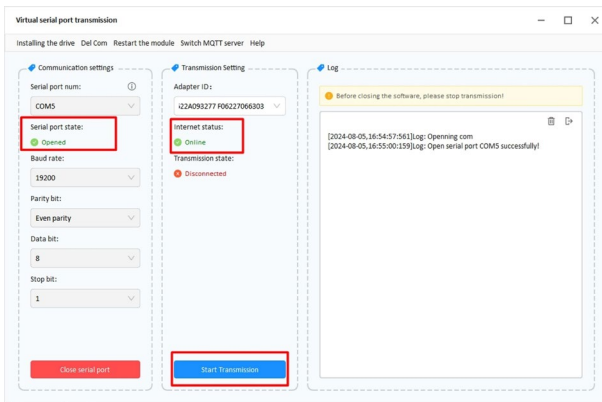
Step 2 Click **Configure tool** in the menu, and click **Serial port transmission**.

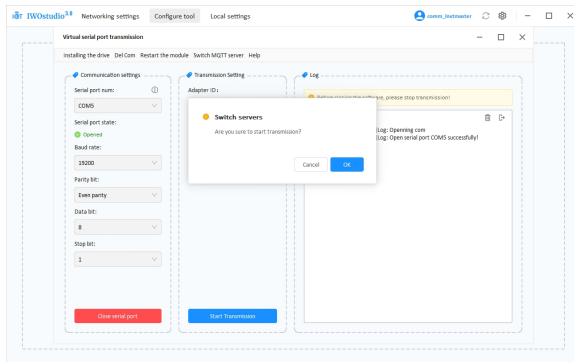


Step 3 Enter the account and password to log in.

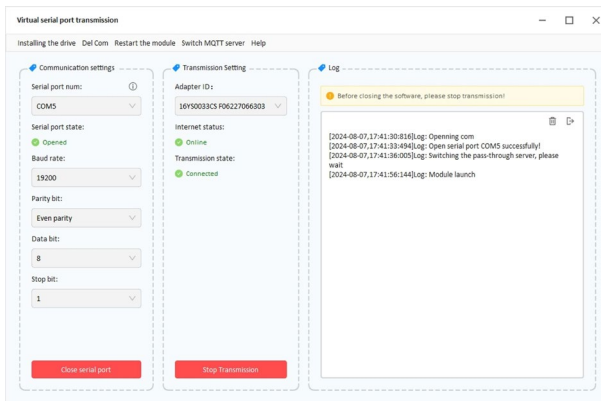


Step 4 After logging in, enter the main interface of the software, and select the adapter ID connected to the PLC to be upgraded. Click **Start Transmission**, click **OK** in the pop-up window, and remember the serial port number at this time.

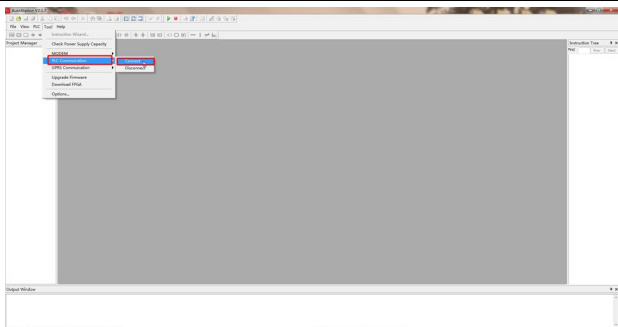




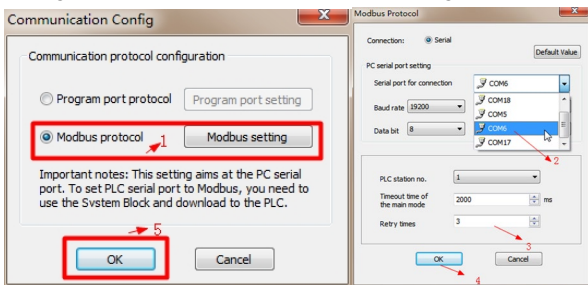
Step 5 When the message **Transmission status disconnected** changes to **Transmission status connected**, it indicates that the transmission channel has been established and the next operation can be carried out.



Step 6 Open the PLC host controller software (using Auto Station as an example). On the main interface, choose **Tool > PLC Communication > Connect**. A communication configuration window pops up.



Step 7 In the **Communication Config** window, choose **Modbus protocol**, and click **Modbus setting**. In the **Modbus Protocol** window that displays, for **Serial port for connection**, select the serial port number set in the virtual pass-through tool SerialPortTool plus 1. (For example, if the serial port number set in the virtual pass-through tool is COM5, set the serial port number here to COM6.) Set the serial communication parameters below according to the PLC, and click **OK** to complete the settings.



Step 8 Perform program upload, download, run, stop, and other commissioning operations in the same way as for a locally connected device.

3.5 FAQs

1. After power-on, the power indicator does not flash or light up.

Answer: Check whether the power supply polarity is reversed, and whether the 24V input and GND are connected according to the silkscreen markings on the circuit

board.

2. When using the 4G network, the network status indicator keeps flashing slowly, and the web page shows that the device is offline.

Answer:

- 1) The SIM card is not installed properly. Power off the device and reinstall the SIM card to ensure good contact.
 - 2) Move the 4G antenna to a location with good signal reception.
 - 3) Check whether the SIM card has been activated and whether it has sufficient balance.
3. The uploaded data does not match the data displayed on the web page.

Answer:

- 1) Check that the register addresses configured for the web monitoring parameters are consistent with the register addresses of the device.
 - 2) Re-issue the address parameters.
4. The 4G network indicator is normal, but the running indicator is abnormal, and the device connection fails.

Answer: Check whether the web communication parameters are consistent with the device communication parameters. Check whether the wiring between the device and the module is normal, and re-issue the communication parameters.

5. The 4G network indicator and running indicator flash normally, but no data is displayed in the web system.

Answer: Refresh the web monitoring parameters interface.

6. In the web system, data is displayed, but commands cannot be issued.

Answer: Check whether the enable signal switch of the Modbus terminal device is turned on.

7. During VPN pass-through, a message is displayed indicating that the device IP address and computer IP address are not on the same network segment.

Answer:

- 1) You can set the module IP address and device IP address in the advanced settings below, or change the computer IP address to the same network segment.
 - 2) Ensure that the computer IP address, gateway IP address, and device IP address are all on the same network segment.
8. Prompt: VPN certificate has expired.

Answer: Click **Confirm** to upgrade the VPN certificate. Otherwise, VPN pass-through cannot be established properly.

9. Prompt: Failed to connect to VPN server.

Answer: Ensure that the computer network is normal. Try connecting the computer to a Wi-Fi hotspot, as the company's internal network may be blocked by the firewall.

10. After VPN pass-through is established, programs cannot be downloaded remotely.

Answer:

- 1) Ensure that the computer IP address, device IP address, and gateway IP address are on the same network segment.
- 2) Ensure that the local device and the module are properly connected through an Ethernet cable.
- 3) Ensure that the device can be accessed properly through the Ethernet cable.
- 4) You can switch the server node and reconnect.
- 5) Check whether the current host controller software version needs to be updated, and update it to the latest version.

11. During virtual serial port pass-through, the remote download fails.

Answer: In the communication settings of the host controller, increase the timeout period in master mode. It is recommended to set it to ≥ 8000 ms.

12. During virtual serial port pass-through, the host controller software fails to connect to the device.

Answer: Check whether the RS485 communication parameters of the module are consistent with the device parameters, and whether data can be collected properly.

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