INVT ICA417 Series 4G IoT Data Transmission Terminal Instruction Manual

Contents

INVT ICA417 Series 4G IoT Data Transmission Terminal

Product Information

- **Product Name:** ICA417 Series 4G IoT Data Transmission Terminal
- **Version:** V1.0
- **Release Date:** December 2022

Overview

- **Standard set-up for easy operation**
  - Provide standard RS485 interface for direct connection with serial devices to collect data.
  - Provide standard RJ45 network ports: LAN ports can be directly connected to network devices for data collection. The WAN port can be used for networking.
  - Intelligent data terminal, able to enter the data transmission state upon power-on.
  - Adopt standard rail installation.
  - Powerful industrial Internet platform for easy device management.
  - Easy system configuration and maintenance interface.
- **Powerful functions**
  - Support remote data monitoring.
  - Support VPN pass-through (only in China), able to remotely upload, download, and monitor PLC programs through network ports and VFD remote oscilloscope.
  - Support virtual serial port pass-through, able to remotely upload, download, and monitor PLC programs through serial ports.
  - Support remote upgrade of application programs and policy files.
  - Support 4G routing function to provide a network for other devices.
  - Support exchange function.
  - Support multiple network connection methods.
  - Support APN (operator APN information needs to be provided overseas).
  - Support the upload of the data with changes, achieving the traffic-saving mechanism.

- Supports 4G base station positioning.
- Support high-precision GNSS satellite positioning for real-time accurate acquisition of the device's geographic location (optional).

Safety precautions

Read the safety precautions to ensure safe operation before operating the IoT data transmission terminal.

- The account and password are the authentication credentials of the INVT industrial Internet platform and can be used for device management after login.
- You shall keep your account and password properly and take sufficient precautions to prevent others from stealing them. If the username and password are stolen, significant losses may be caused.
- You shall communicate with the field personnel to ensure safety before using the device for remote operation, otherwise, significant losses may be caused.
- The IoT SIM card is forced to be machine-card binding, SIM cards can only be used in the device which is first powered on and networked. You shall not insert the IoT SIM card into other devices, otherwise, the SIM card will be locked.
- This product is an industrial IoT product, we have taken necessary technical means to ensure data security, but there may be hacker invasion and other network security risks that are not under our control or responsibility.
- If the harm is not caused by the quality defects of our products, we shall not be liable for related losses.

Product Overview

INVT ICA417 series 4G IoT data transmission terminal is an intelligent IoT 4G wireless data terminal, which can conveniently realize remote data collection, remote program upload and download, and remote commissioning, and provide users with wireless long-distance data transmission using a public carrier network. The stability and reliability meet industrial application scenarios. The product supports multiple networking methods and routing & exchange functions, provides RS485 and RJ45 ethernet interfaces, and supports the data cloud of Modbus RTU and Modbus TCP devices. Device monitoring and operation & maintenance management can be performed through INVT industrial Internet platform.

Product Features

1. **Standard set-up for easy operation**
    - Provide standard RS485 interface for direct connection with the serial device to collect data.
    - Provide standard RJ45 network ports: LAN ports can be directly connected to network devices for data collection. The WAN port can be used for networking.
    - Intelligent data terminal, able to enter the data transmission state once upon power-on.
    - Adopt standard rail installation.
    - Powerful industrial Internet platform for easy device management.
    - Easy system configuration and maintenance interface.
2. **Powerful functions**
    - Support remote data monitoring.
    - Support VPN pass-through (only in China), able to remotely upload, download, and monitor PLC programs through network ports and VFD remote oscilloscope.
    - Support virtual serial port pass-through, able to remotely upload, download, and monitor PLC programs

through serial ports.

- Support remote upgrade of application programs and policy files.
- Support 4G routing function to provide a network for other devices.
- Support exchange function.
- Support multiple network connection methods.
- Support APN (operator APN information needs to be provided overseas)
- Support the upload of the data with changes, achieving the traffic-saving mechanism.
- Supports 4G base station positioning.
- Support high-precision GNSS satellite positioning for real-time accurate acquisition of the device’s geographic location (optional).

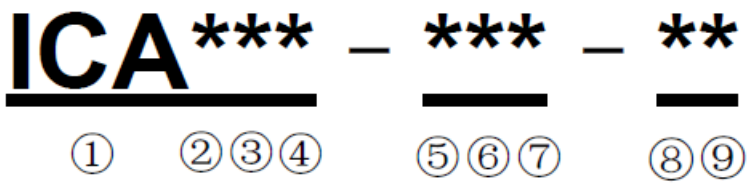
Product specifications

Function	Description
Supported network	l LTE FDD: Band 1/3/5/8 l LTE TDD: Band 34/39/40/41 l WCDMA/HSPA+: Band 1, 8 l TD-SCDMA: Band 34,39 l CDMA/EVDO: BC0 l GSM: 900/1800MHz
Supported interfaces	l 1 RS485 interface l 3 standard RJ45 interfaces (1 WAN port and 2 LAN ports) l 1 USB TYPE-C commissioning port l 1 SMA 4G antenna interface l 1 spring-loaded SIM card socket (large card)
Wire communication distance (unshielded)	l RS485: 50m; LAN connection terminal control device: 10m; WAN: 50m
Indicator	Power indicator, signal indicator, network status indicator, running status indicator
Communication protocol	l MoudbusRTU protocol l MoudbusTCP protocol l MQTT communication protocol l FTP transfer protocol
Theoretical bandwidth	l LTE FDD Rel.9: 150Mbps DL/50Mbps UL l LTE TDD Rel.9: 130Mbps DL/30.5Mbps UL l WCDMA Rel.8: 384 kbps DL/384 kbps UL l TD-SCDMA Rel.4: 4.2Mbps DL/2.2Mbps UL l GPRS: 85.6Kbps DL/85.6Kbps UL
Power supply	DC10–25V
Temperature range	-25–+60ºC

Function	Description
Shell	Sheet metal, ingress protection (IP) rating IP20
Mounting method	Rail/Wall mounting

Model description

Model name illustration of INVT ICA series data transmission terminal:



Symbol	Field description	Contents
①	Product series abbreviation	ICA: Internet Communication Adapter
②	Wireless communication mode	0: Do not support wireless communication 1: WIFI 2: GPRS 3: 3G 4: 4G 5: 5G
③	Wire communication mode	0: Do not support wire communication 1: Ethernet
④	Local data collection mode	0: RS485 1: Ethernet 2: CAN 3: RS485+Ethernet 4: RS485+CAN 5: Ethernet+CAN 6: RS485+Ethernet+CAN 7: RS485+Ethernet+VPN
⑤	SIM card type	0: Plug-in card (Standard, default) 1: Embedded SIM card
⑥	IP rating	0: IP00 (without housing) 1: IP20 (wall-mounted housing) 2: IP20 (rail-mounted housing) 6: IP65 (direct-insert housing)

Symbol	Field description	Contents
⑦	Special function	G: With GPS U: With USB flash disk A: Support audio V: Support video H: Cooperative development N: Built-in antenna P: With display screen This bit is omitted for standard configuration since it does not carry additional functions.
⑧	Voltage type	5: 4.5–6V. The voltage for standard configuration is 10V–30V, so this bit is omitted for standard configuration.
⑨	International version	CN: China version EU: Europe version LA: Latin America version **Note: This bit is omitted for WIFI products.**

Port instruction

Port identifier	Port instruction
24V	Power supply +
GND	Power supply –
485+	485A
485-	485B
TYPE-C	Commissioning port
4G	4G antenna
WAN	WAN port
LAN	LAN port
SIM	SIM card
RESET	Reset key

Indicator instruction

Indicator identifier	Description
NET	4G network indicator Flash slowly: No SIM card/Network registration in progress/Registration failed. Flash quickly: Data link established.

Indicator identifier	Description
RUN	Run indicator Flash quickly: RS485 communication is normal. Flash slowly: RS485 communication is abnormal. On or off: The system works abnormally.
SIG	Signal indicator On: Signal value CSQ ≥ 17, good signal. Flash slowly: 9 ≤ signal value CSQ < 17, average signal. Off: Signal value CSQ < 9, poor signal.
PWR	Power indicator

Installation

Overview
ICA417 series 4G IoT 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: The device must be installed with power-off. Remove the rail clip before performing wall mounting.
Unpacking inspection
Before unpacking, check whether the package is in good condition and its product information is the same as on the order. The packing materials should be well maintained during inspection for future transshipment. If any questions, please contact the supplier.

Table 2-1 Product deliverables

Deliverables	Qty	Remarks
4G data transmission terminal	1	
4G antenna	1	
Screw	3	Used for wall mounting
PIN terminal	1	4PIN terminal

Outline Dimensions
The outline dimension of the IP20 model is as follows (unit: mm)

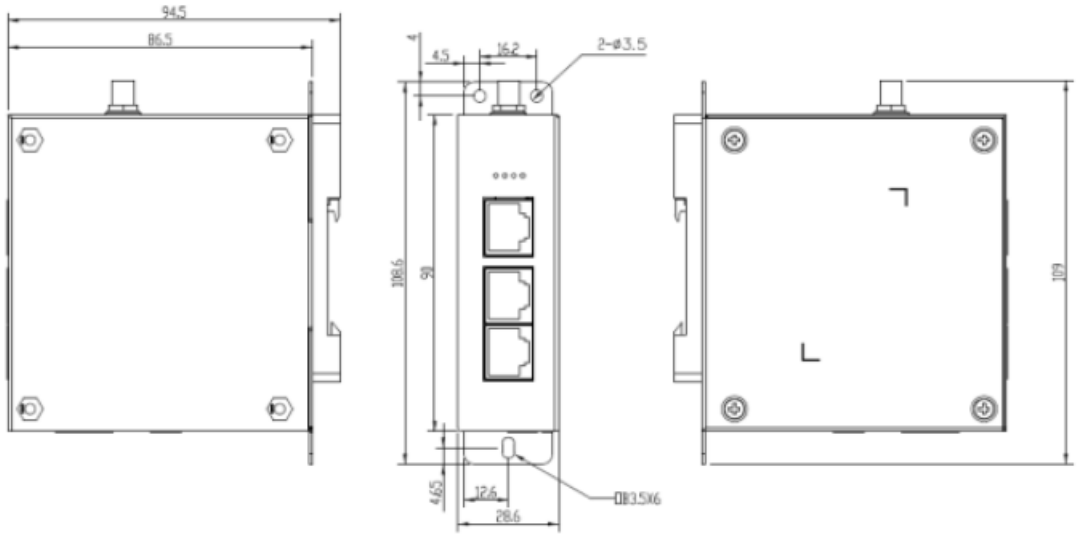


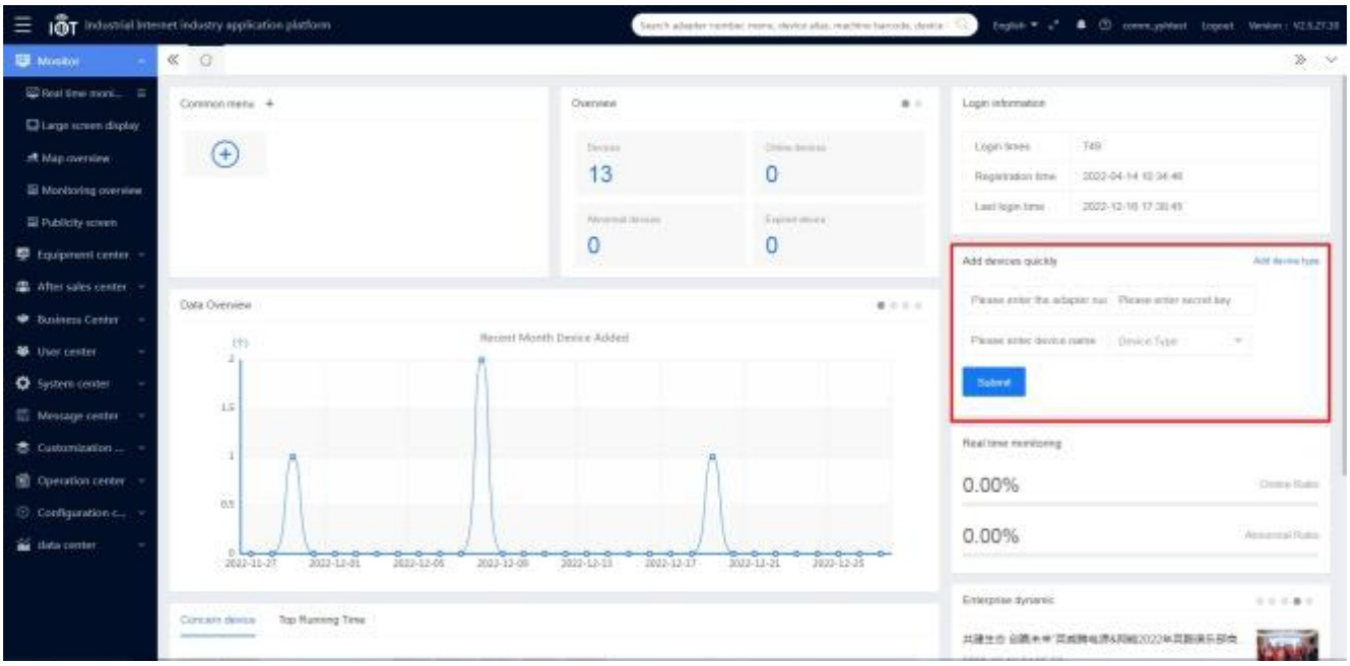
Figure 2-1 Outline dimensions for ICA417 model

Figure 2-1 Outline dimensions for the ICA417 model

Operation guide

IoT module operation description
IoT monitoring platform user login: Enter **https://iot.invt.com/login**. in your browser and press Enter to access the login interface, as shown in the following figure. Enter the account and password to complete the login.
Note: Contact the industry administrator to obtain the account and password.

Add device:
After success login, the home page is shown in the following figure. Enter the adapter number, secret key, and device name sequentially in the “Add devices quickly” bar. Select the device type according to the monitoring type, and click Submit after the information entered is correct.

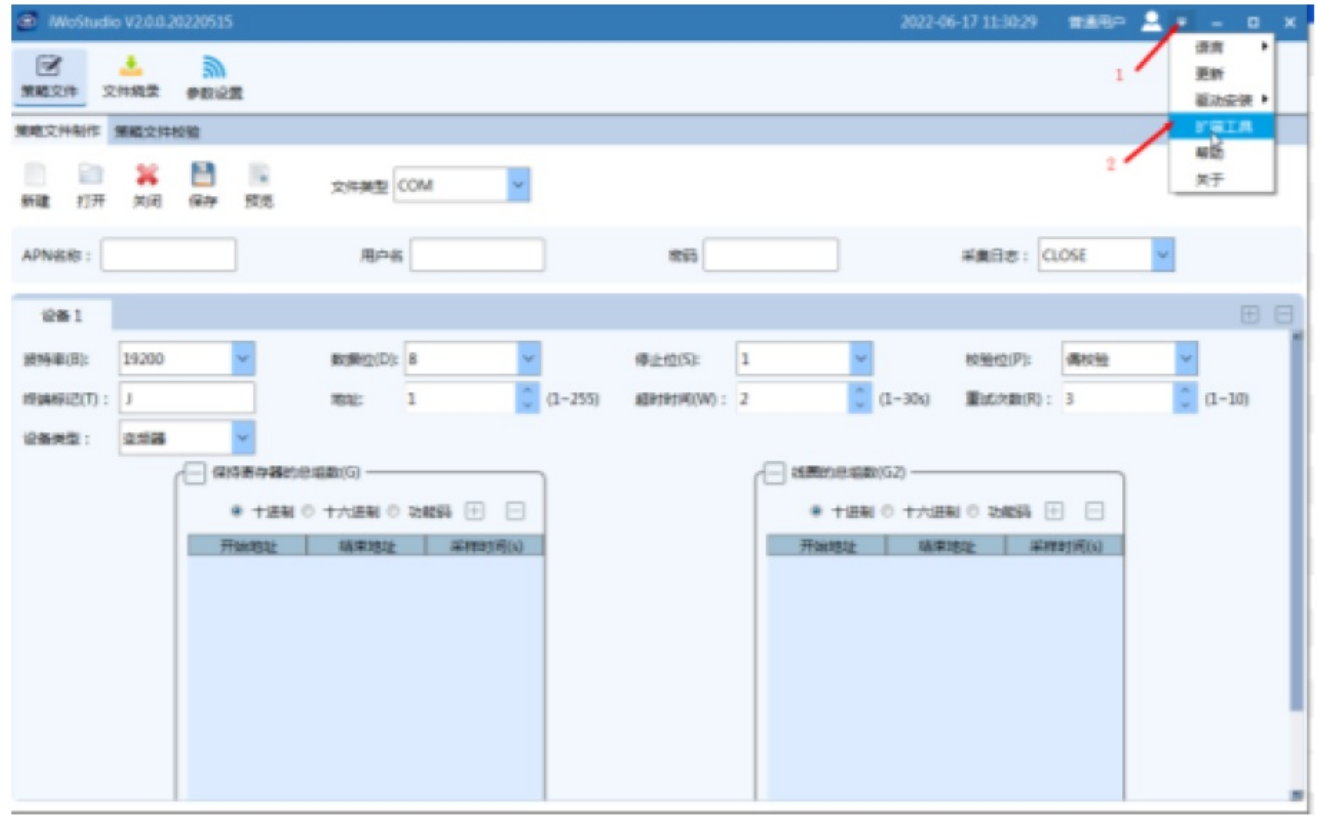


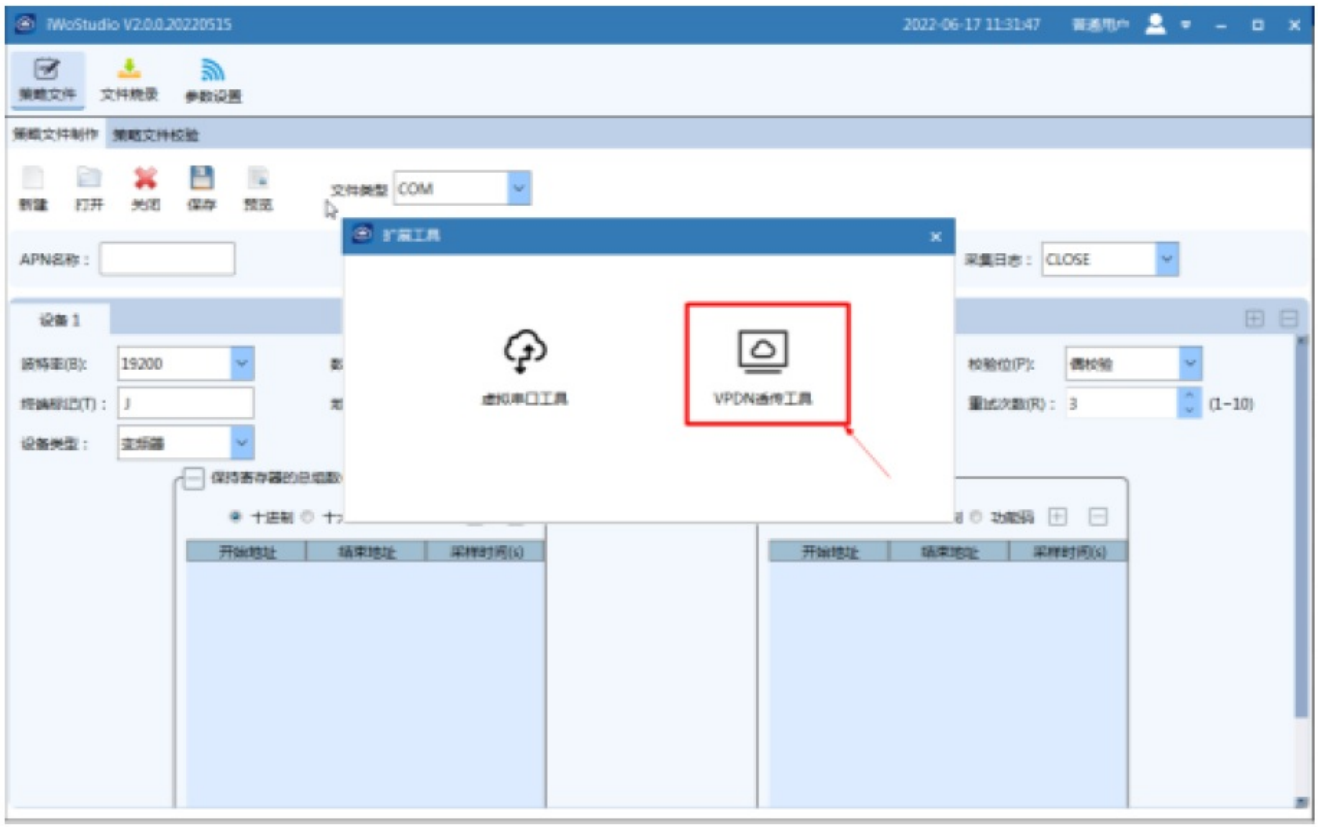
Device installation procedures
Equipment required: Networked computer, 4G data transmission terminal, IoT SIM card.

- **Step 1** Take out of the SIM card socket, and insert the SIM card into the cardholder.
- **Step 2** Record the device ID and 6-digit key from the label and add them to the IoT monitoring system.
- **Step 3** Wire the product based on the port description.
- **Step 4** Connect the 4G antenna.
- **Step 5** Power on and start the 4G data transmission terminal.
- **Step 6** If the NET indicator flashes with an interval of 75ms, the network is ready and the data transmission starts.
- **Step 7** Go to the real-time monitoring interface to review relevant information on the IoT monitoring platform.

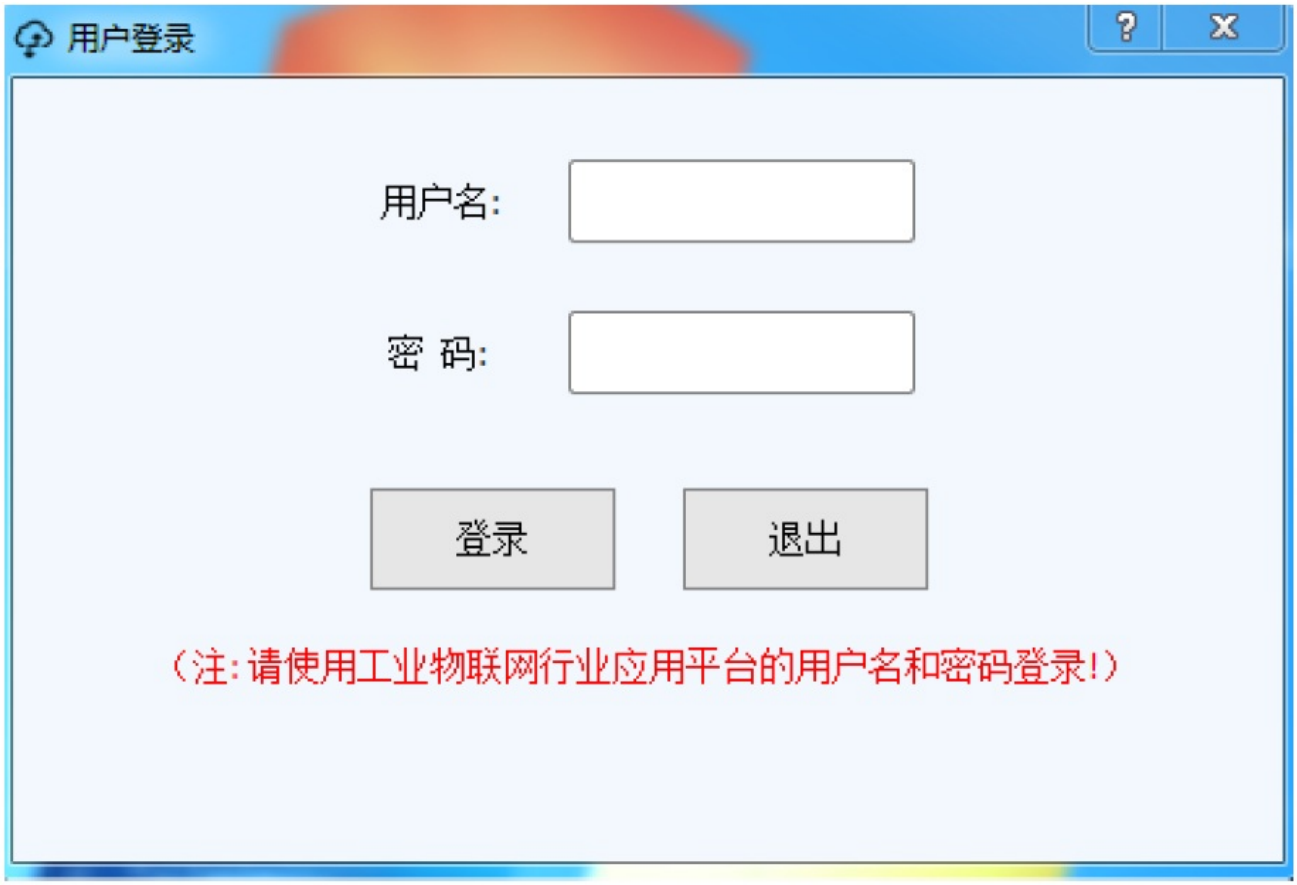
VPN pass-through operation guide
Note: VPN pass-through is only used in China.

1. Enter **www.invt.com**. in your browser to download iWoStudio. After installing iWoStudio, open it and run it.
2. Click the Expansion tool at the upper right corner of the menu, and select the VPDN pass-through tool.

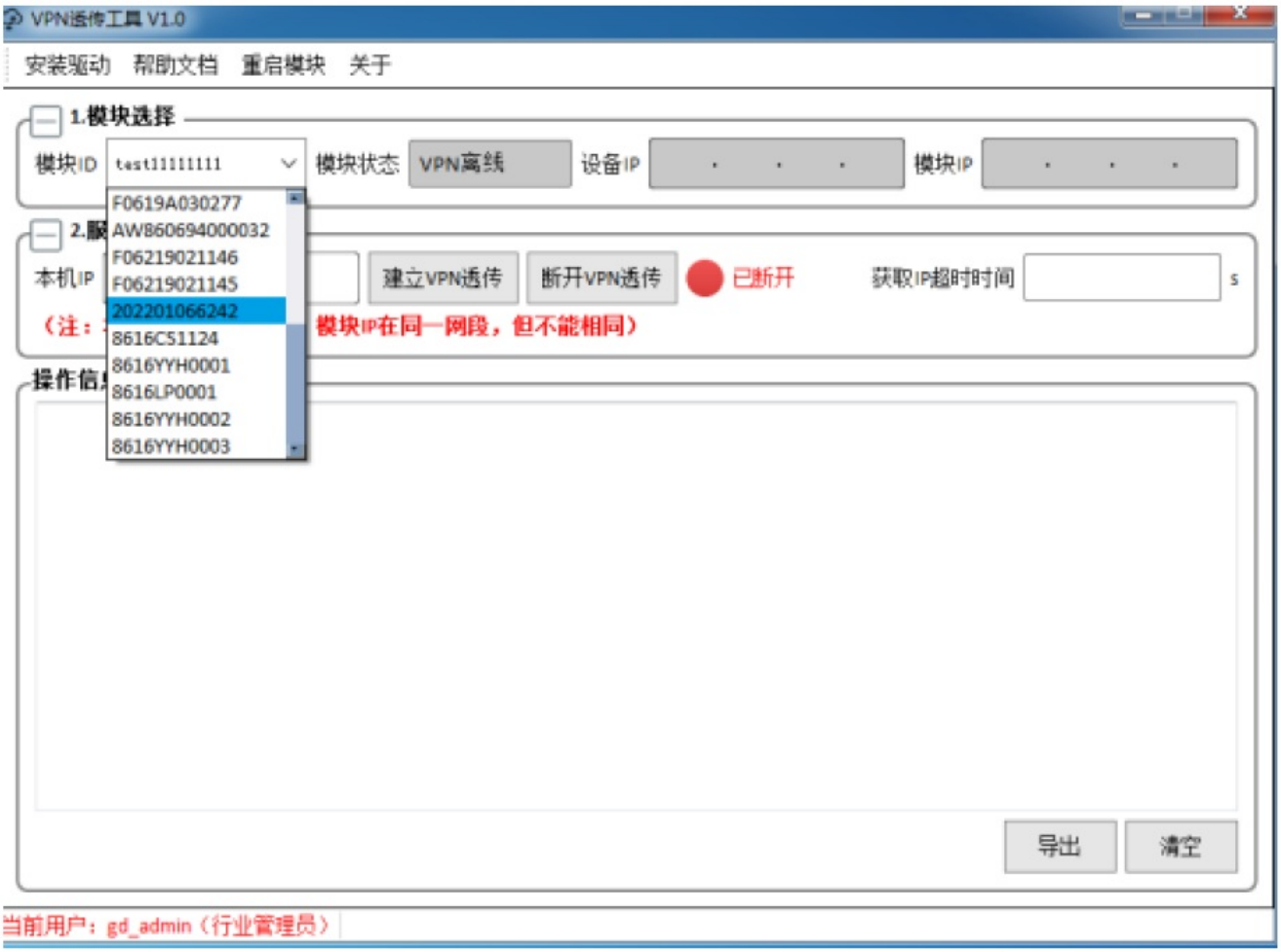




3. Open the VPDN pass-through tool, and enter the platform account and password to log in.

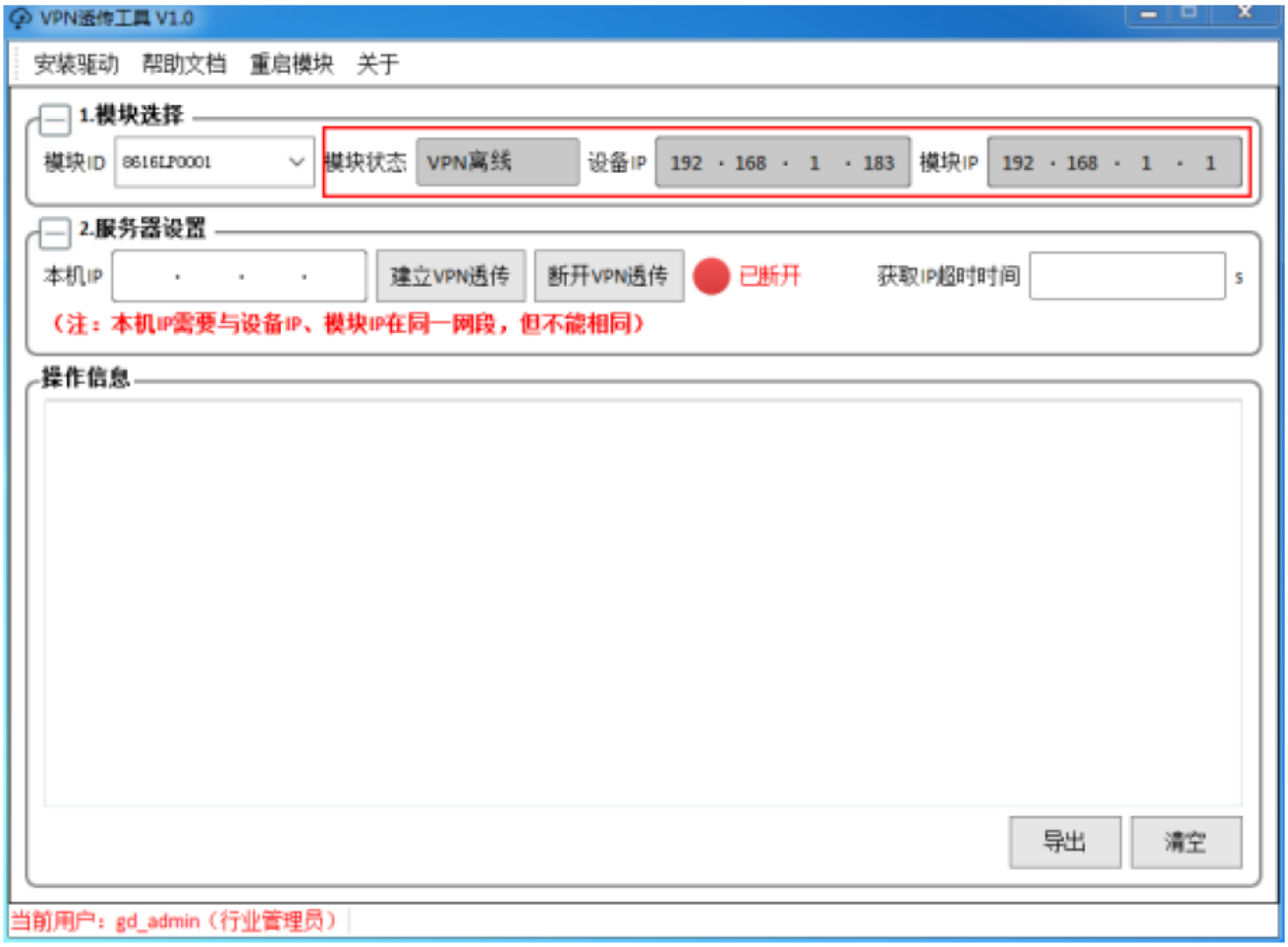


4. After login, you can select or search the module adapter ID that requires VPN pass-through.

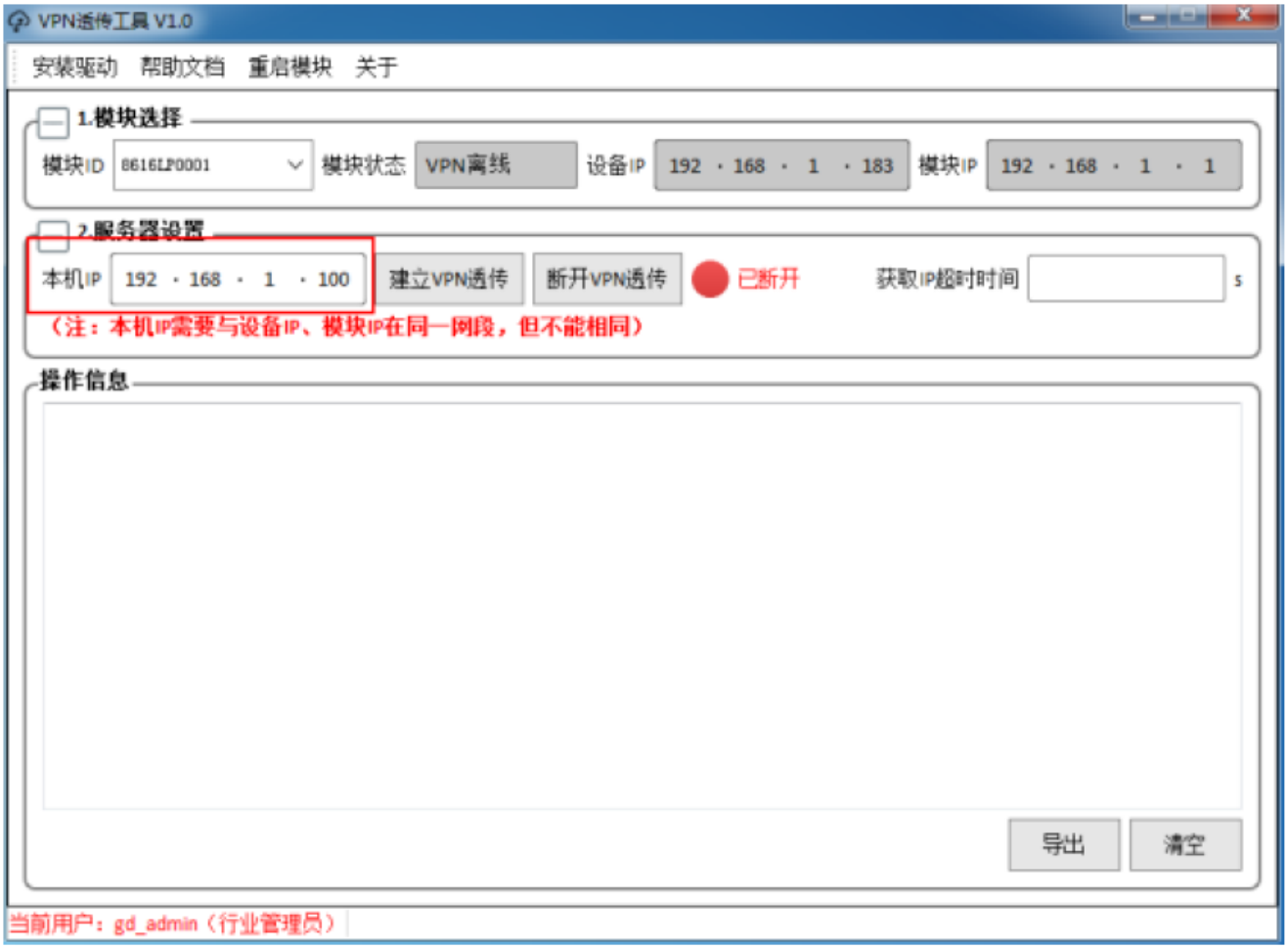


5. After the module ID is selected, the information of the module (including module ID and device VPN online state) will be displayed automatically. Module VPN offline indicates the current module does not use the VFD pass-through function. Module VPN online indicates the current module is performing pass-through and cannot

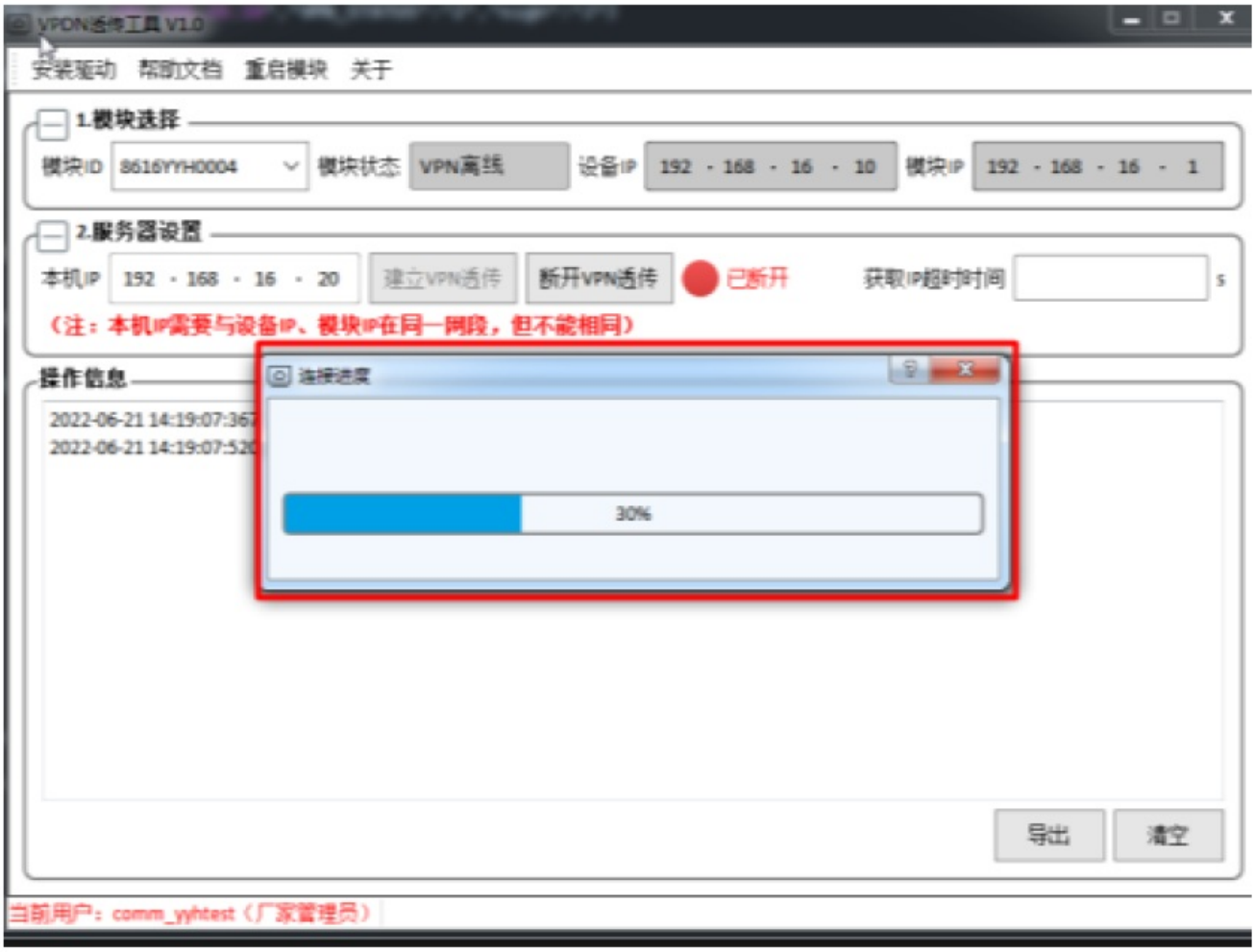
be connected.

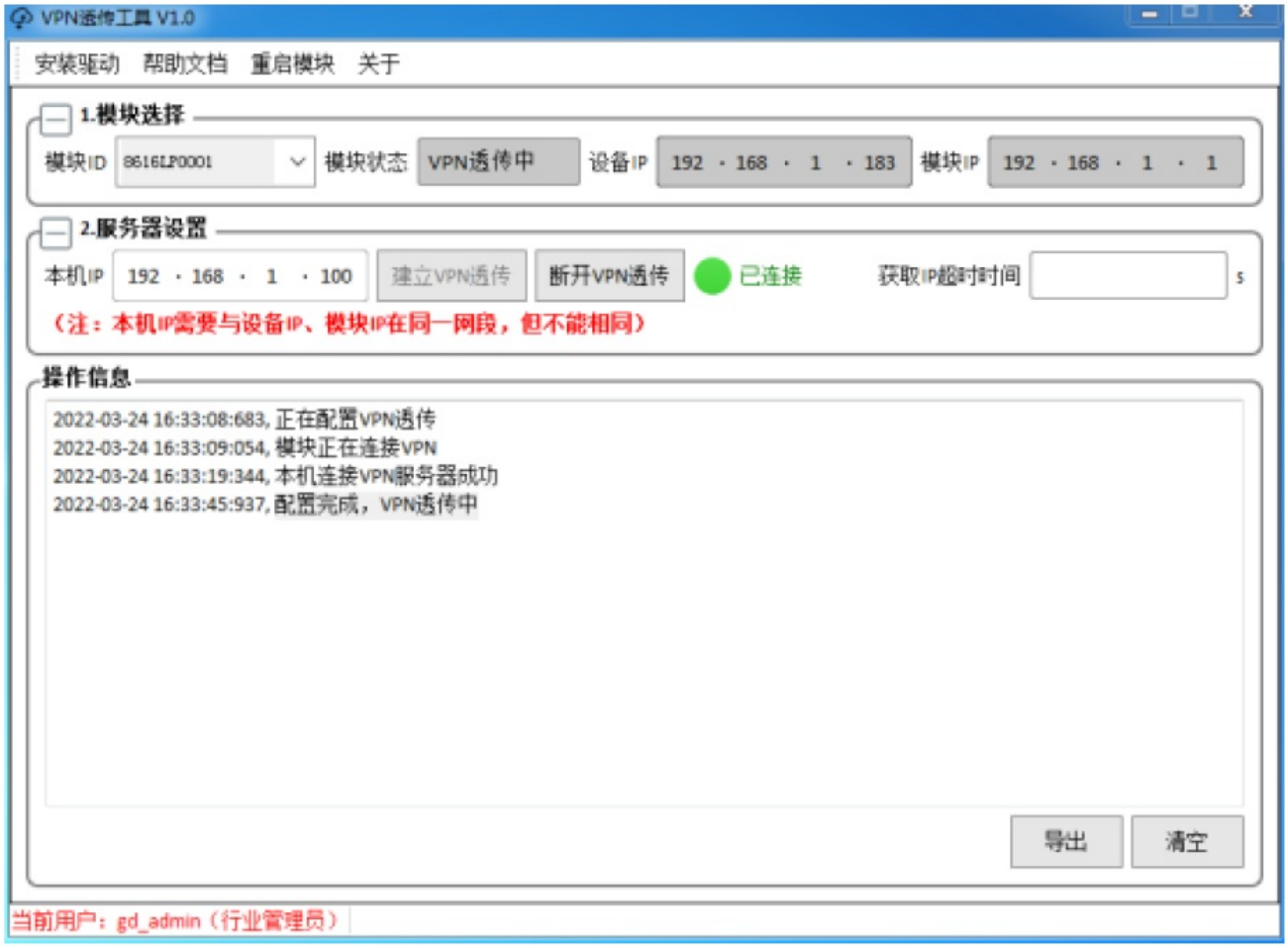


6. Set the local virtual IP. Note that the local IP needs to be in the same network segment with the device IP and module IP of the PLC/VFD but they cannot be the same. Obtain IP timeout time is null by default, and you have no need to set it. Device IP can be set in the module strategy file, which is consistent with IP of the VFD/PLC



7. After the setting is complete, click Establish VPN pass-through, and the connection process will take one to two minutes. When “The configuration is complete, and VFD pass-through is performing” is displayed, it indicates that VPN channel is established successfully and VFD pass-through can be conducted. If you need to exit the VPN passthrough, you can click Disconnect VPN pass-through.

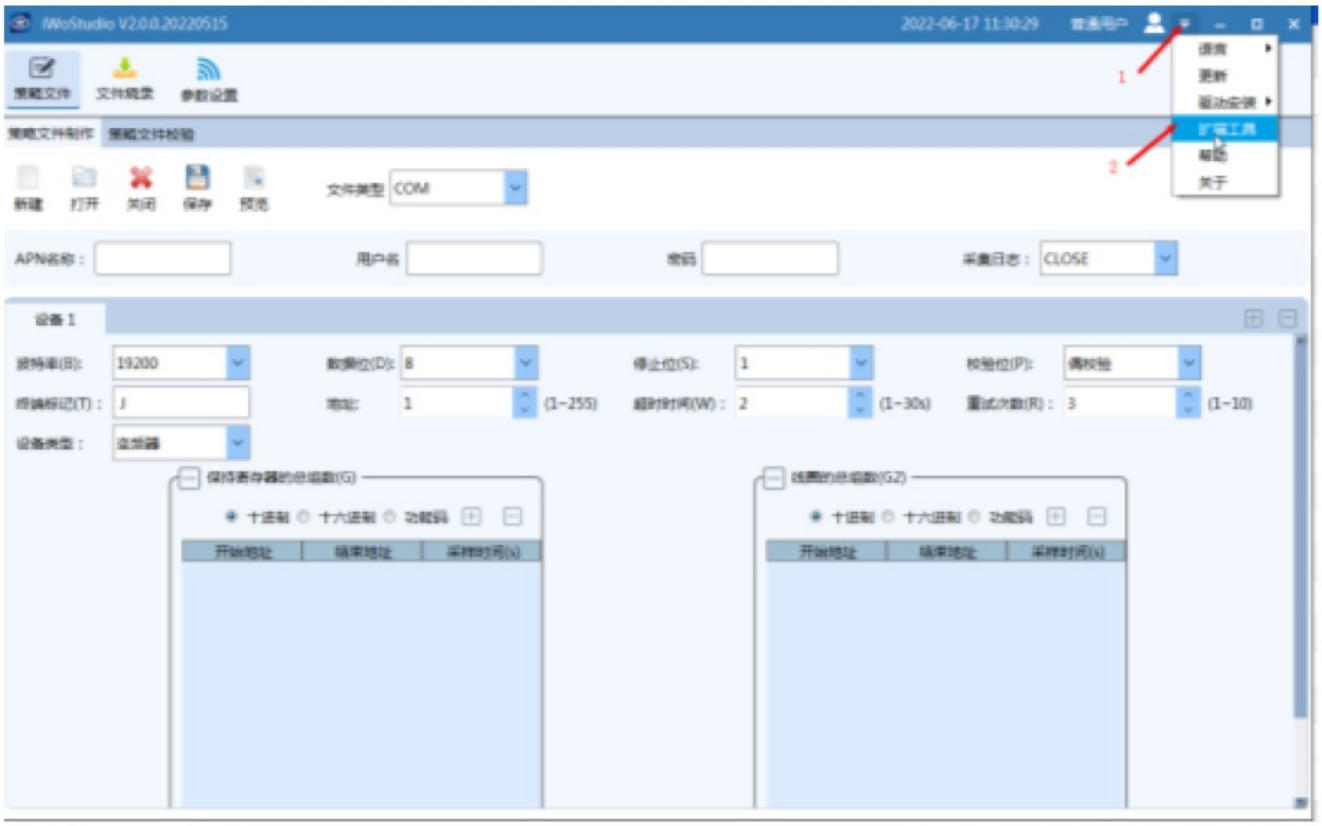


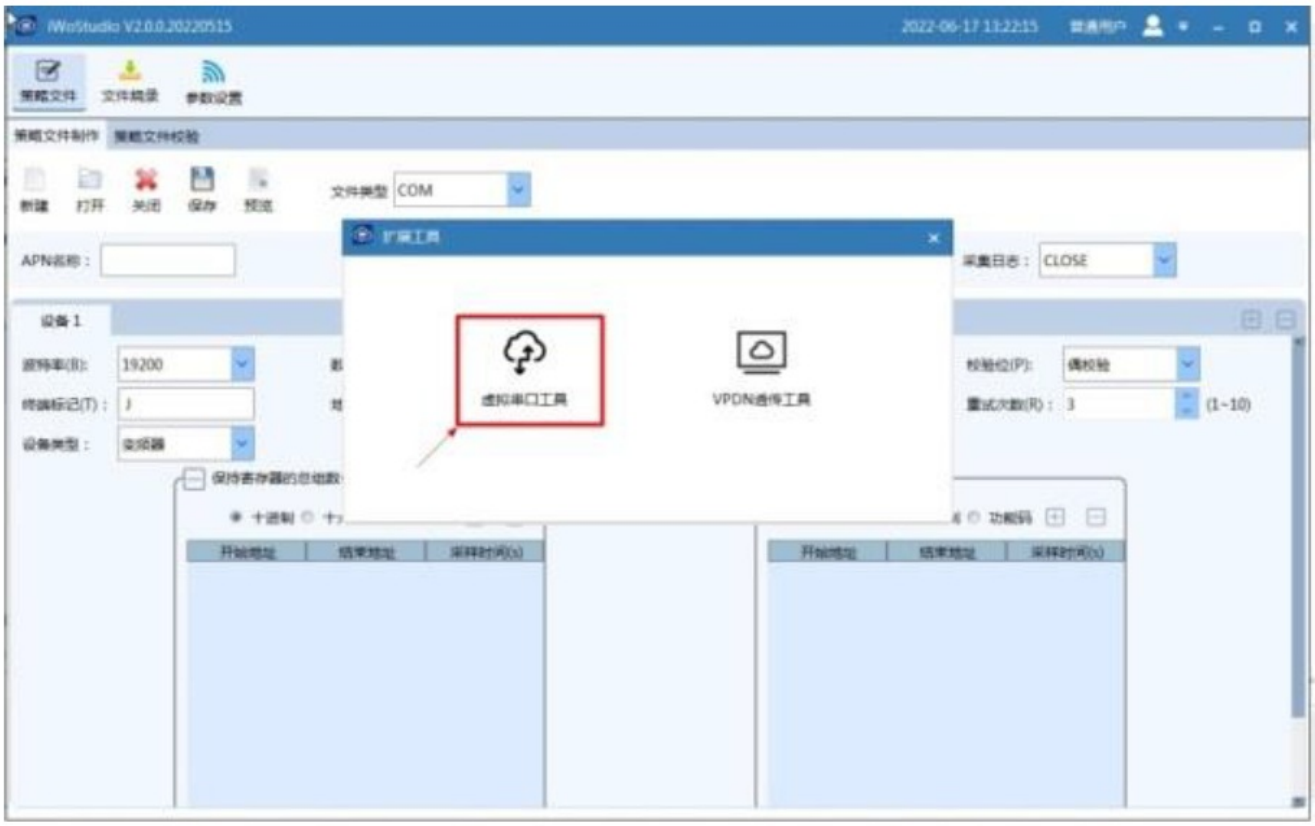


8. Open the VFD/PLC upper computer, and operate the commissioning device as same as the local.

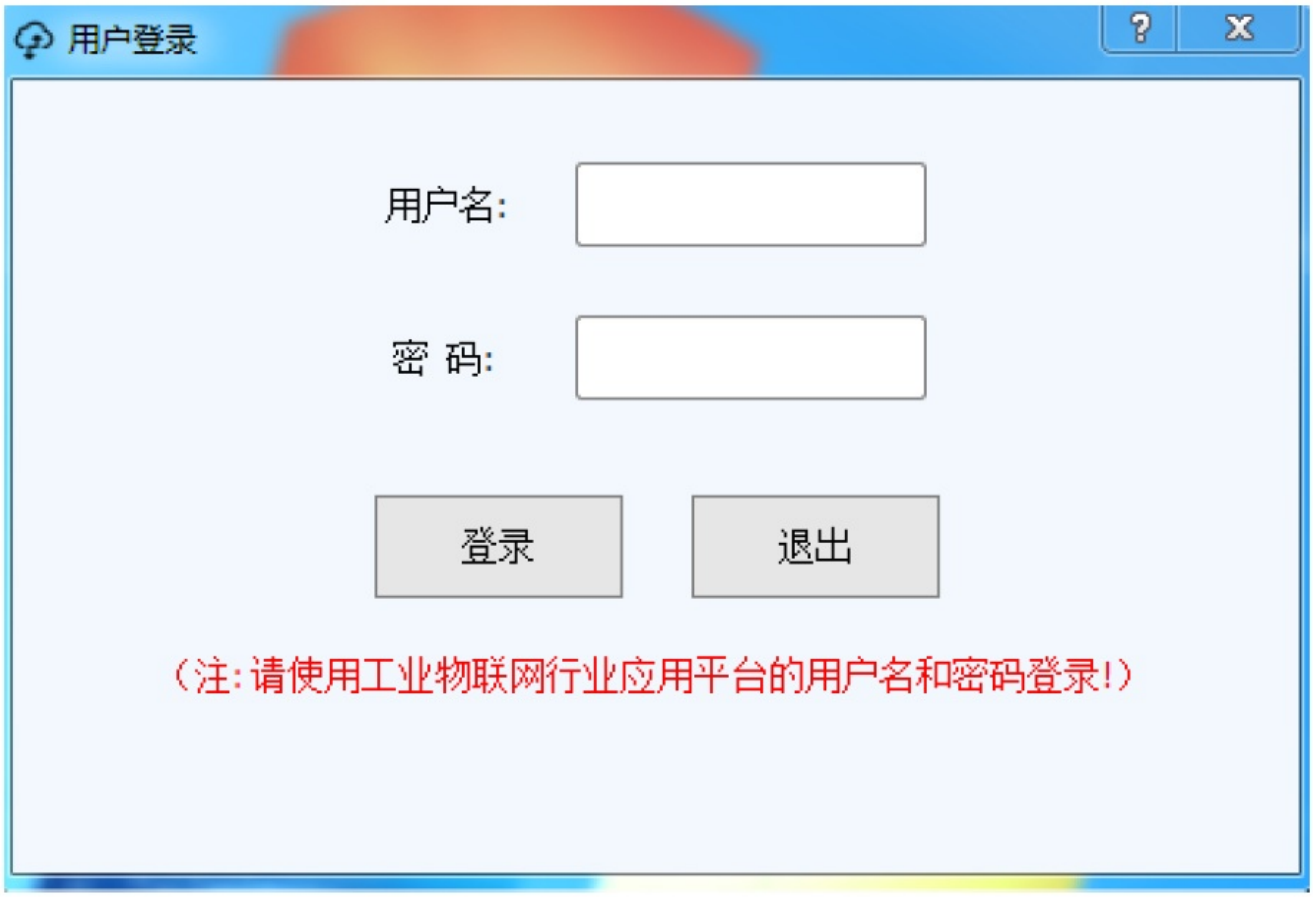
Virtual serial port pass-through operation guide

1. Enter www.invt.com. in your browser to download iWoStudio. After installing iWoStudio, open it and run.
2. Click the Expansion tool at the upper right corner of the menu, and select the Virtual serial port pass-through tool.

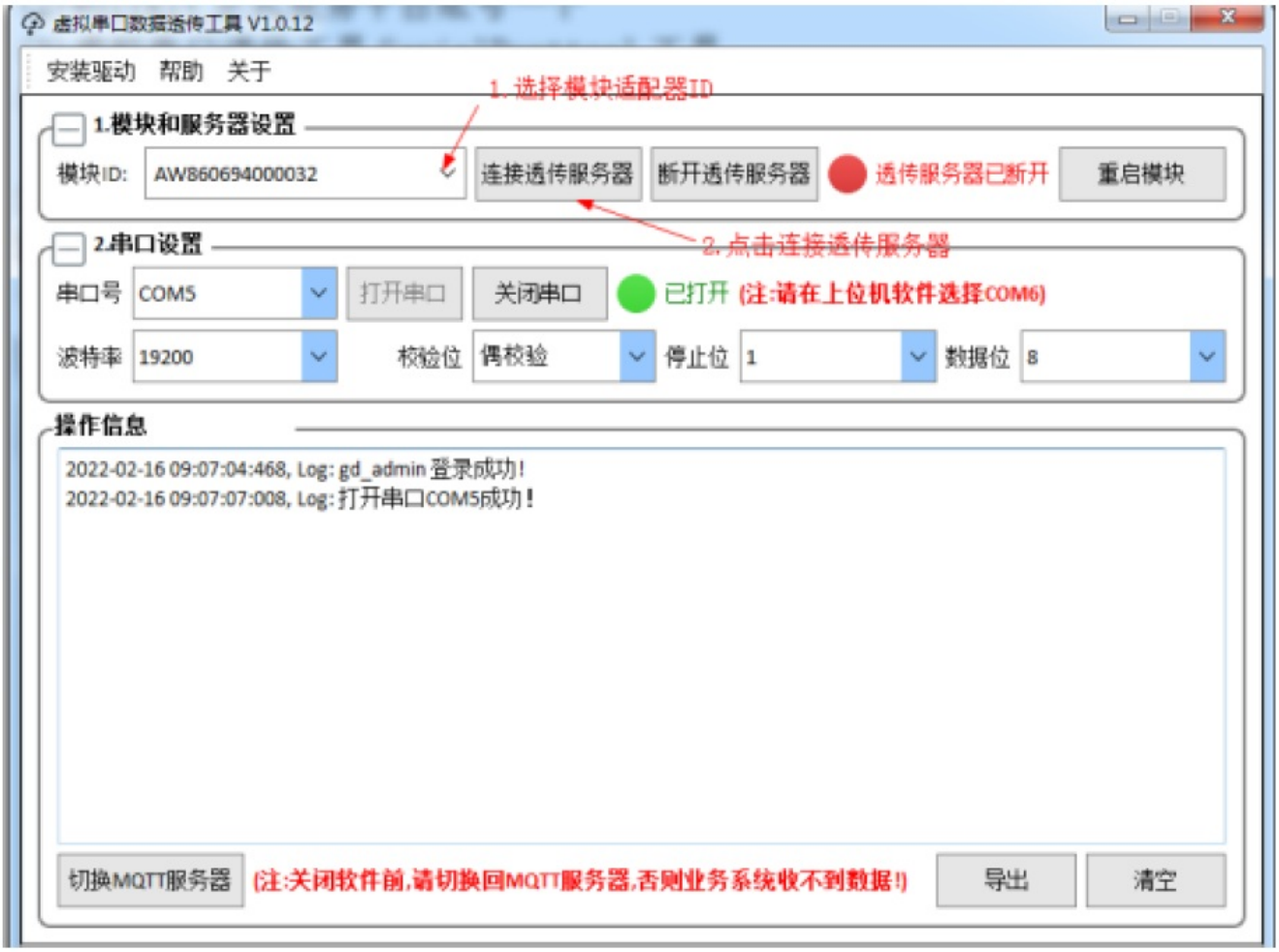




3. Open the Virtual serial port pass-through tool, and enter the platform account and password to log in.



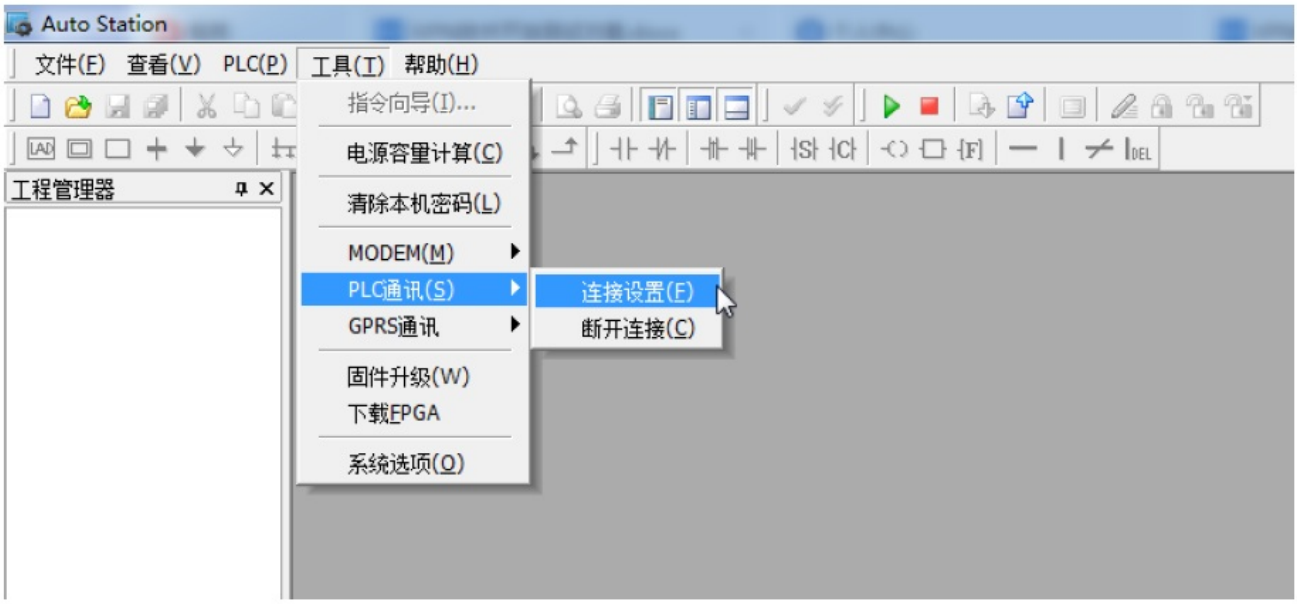
4. After login, the software main interface is displayed. You can select the module ID that requires to be connected with upgraded PLC. Click Connect pass-through server, click OK in the pop-up window, and remember the serial port number.



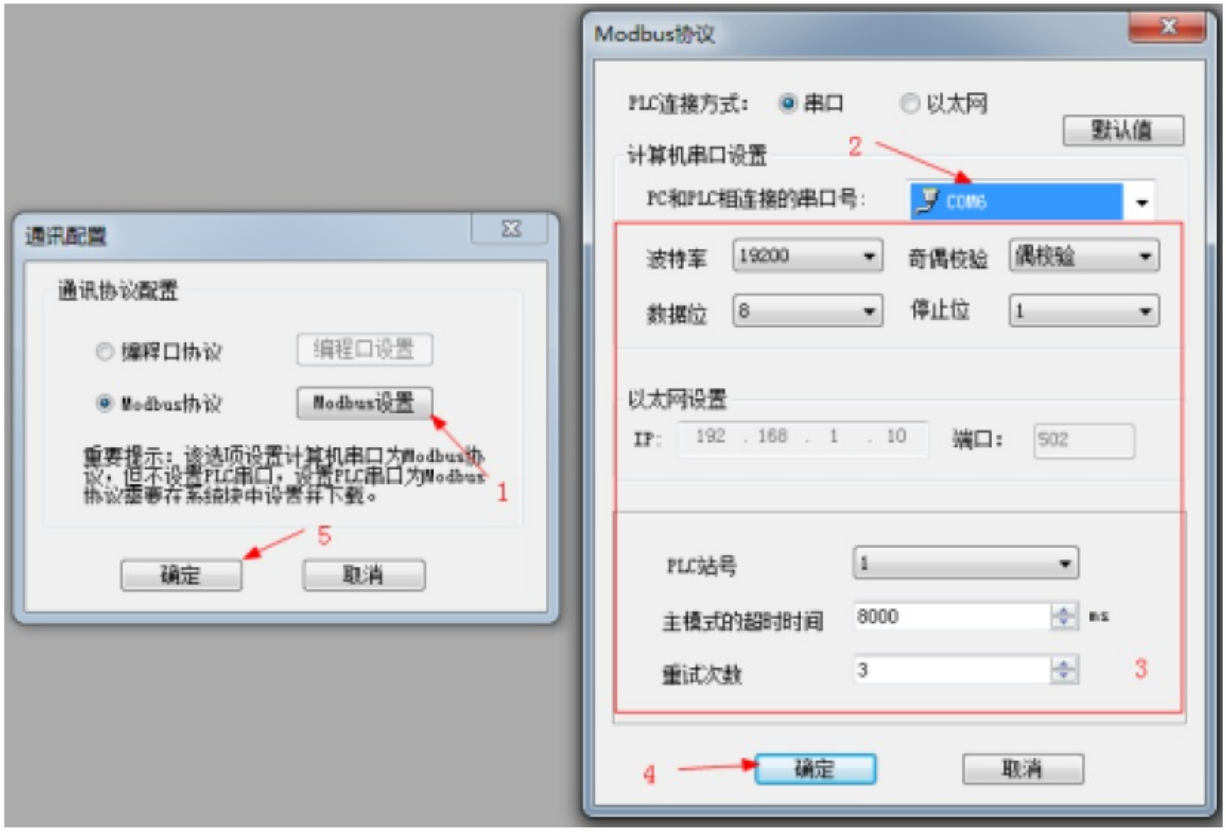
- When “Pass-through server is disconnected” is change to “Pass-through server is connected”, it

indicates the pass-through channel is established and you can conduct the next operation.

5. Open the PLC upper computer software (taking Auto Station as an example), click Tool—>PLC communication —>Connection setting after entering the main interface, then a Commincation configuration window pops up.



- In the Communication configuration window, select Modbus protocol, click Modbus setting, then a Modbus protocol window pops up. The serial port number of connecting PC to PLC to be the serial port number set by the virtual pass-through tool SerialPortTool plus 1 (for example, the serial port number set by the virtual pass-through tool is COM5, the serial port number of connecting PC to PLC is COM6). The serial port communication parameters in the following figure are set according to the PLC, and click OK after the setting is complete.



6. Perform program upload, download, run, stop, and other commissioning operations as same as the local.

FAQs

1. After powering on, the power indicator does not flash or light up.
    - **Answer:** Check if input voltage VIN and GND are consistent with the silk print on the casing.
2. When a 4G network is used, the network status indicator keeps flashing slowly and offline is displayed on the web page.

    Answer:
    - **A.** The SIM card is not installed properly. Power off and re-install it to ensure a good connection.
    - **B.** Move the 4G antenna to a place with a good signal.
    - **C.** Ensure that the SIM card is activated and has a remaining balance.
3. Data uploading doesn’t match the web page display.

    Answer:
    - **A.** Re-power on and upload all data again.
    - **B.** Check whether the policy file and device type are matched, if not, please contact the manufacturer.
4. The 4G network indicator and signal indicator flash normally but the web system displays no data.
    - **Answer:** Check the communication cable between the Modbus terminal device and the IoT transmission terminal is well connected.
5. The web system only displays data content but can’t send commands.
    - **Answer:** Check that the signal-enabling switch of the Modbus terminal device is turned on.
6. The device IP displayed by the VPN pass-through tool is inconsistent with the actual device IP when the VPN pass-through is conducted.
    - **Answer:** The device IP displayed by the VPN pass-through tool is MSIP set in the IoT module strategy file. When the device IP displayed by the VPN pass-through tool is inconsistent with the actual device IP,

you can modify the MSIP in the strategy file to keep consistent with the actual device IP.

7. Enter the VPN pass-through, and programs cannot be downloaded remotely.

   Answer:

   - **A.** VPN pass-through is only applicable to devices whose programs are downloaded through network ports. For devices whose programs are downloaded through serial ports, you need to use virtual serial port pass-through.
   - **B.** Ensure that the laptop computer has only one networking method. If there are other networks, disable other network cards and disconnect the VPN pass-through, then enter the VPN pass-through again.
   - **C.** Ensure that the actual IP of the remote device is in the same network segment as the LAN port gateway of the module.

8. Downloading programs remotely through virtual serial port pass-through failed.
   - **Answer:** Increase the main mode timeout time when setting the upper computer communication. It is recommended to be no less than 8000ms.

The products are owned by Shenzhen INVT Electric Co., Ltd.
Two companies are commissioned to manufacture:
(For product code, refer to the 2nd/3rd place of S/N on the nameplate.)

- Shenzhen INVT Electric Co., Ltd. (origin code: 01)
- **Address:** INVT Guangming Technology Building, Songbai Road,
- Matian, Guangming District, Shenzhen, China
- **Industrial Automation:** HMI
  - Elevator Intelligent Control System
- **Energy & Power:** UPS
  - New Energy Vehicle Powertrain System
  - New Energy Vehicle Motor
- INVT Power Electronics (Suzhou) Co., Ltd. (origin code: 06)
- **Address:** No. 1 Kunlun Mountain Road, Science & Technology
- Town, Gaoxin District, Suzhou, Jiangsu, China
  - PLO
  - VFD
  - Rail Transit Traction System
  - DCIM
  - Solar Inverter
  - New Energy Vehicle Charging System
  - Servo System SVG

- **E-mail:** overseas@invt.com.cn.
- **Website:** www.invt.com.

No.	Change description	Version	Release date
1	First release.	V1.0	December 2022

Documents / Resources

	INVT ICA417 Series 4G IoT Data Transmission Terminal [pdf] Instruction Manual ICA417, ICA417 Series 4G IoT Data Transmission Terminal, 4G IoT Data Transmission Terminal, Data Transmission Terminal, Transmission Terminal

References

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- default page
- INVT industrial IOT monitoring platform