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	April 2024

Contents

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.
- The IoT SIM card has been forcibly bound to the machine and can only be used on the device where the card is first used to power up and network for the first time. Please do not insert the IoT SIM card into other devices, otherwise, the SIM card 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 intelligent IoT 4G wireless data terminal, which can easily achieve remote data collection, remote program loading and unloading, and remote commissioning. It uses public carrier networks to provide wireless long-distance data transmission. The stability and reliability meet industrial application scenarios.

The product supports multiple networking methods and network routing, remote upgrade, and remot operation functions, provides RS485 and RJ45 ethernet interfaces, and supports data cloud of Modbus RTU and Modbus TCP devices. Device monitoring and operation & maintenance management can be performed through INVT industrial Internet platform.

1.1 Product features

1. Standard set-up for easy operation

- Provides standard RS485 interfaces for direct connection to serial devices for data acquisition.
- Provides standard RJ45 network ports: WAN and LAN ports can be switched through the switch. LAN port can be directly connected to network devices for data collection. WAN port can be used for networking.
- Intelligent data terminal, able to enter the data transmission state once upon power-on.
- Adopts standard rail installation.
- Powerful industrial Internet platform for easy device management.
- Easy system configuration and maintenance interface.

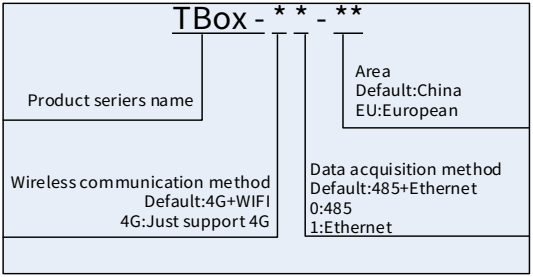
2. Powerful functions

- Supports remote data monitoring.
- Supports remote upgrade of application programs and policy files.
- Supports 4G, Wi-Fi routing function to provide network for other devices.
- Supports 4G, Wi-Fi, Ethernet, and other networking methods.
- Support APN (operator APN information is required for overseas).
- Able to upload only the data with changes, achieving the traffic saving mechanism.
- Supports 4G base station positioning.
- Free to access third-party platforms and provide data in JSON format.

1.2 Product specifications

Function	Description
Supported network	LTE FDD: Band 1/3/5/8 LTE TDD: Band 34/38/39/40/41
Supported interfaces	One RS485 interface One standard RJ45 interface (shared by WAN/LAN, switched through a switch.) One SMA 4G antenna interface One SMA Wi-Fi antenna interface 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 protocol Modbus TCP protocol MQTT communication protocol FTP transfer protocol
Theoretical bandwidth	LTE FDD: Send (824MHz–1980MHz) Receive (925MHz–2170MHz) LTE TDD: Send (1880MHz–2675MHz) Receive (1880MHz–2675MHz)
Power supply	10–25VDC
Temperature range	-25 – +55℃
Shell	Injection molded, ingress protection (IP) rating IP20
Mounting method	Rail-mounted

1.3 Model instruction



Model	Description
TBox-EU	European area,support 4G and wifi wireless communication,support 485 and enthernet data acquisiton

1.4 Port instruction

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

1.5 Indicator instruction

Indicator identifier	Description
NET	4G network indicator Flash (ON: 200ms and OFF: 1800ms): Network searching state Flash (ON: 1800ms; OFF: 200ms): Standby state Flash (ON: 125ms; OFF: 125ms): Data transmission mode
RUN	Run indicator Flash (ON: 100ms; OFF: 100ms): RS485 communication is normal

Indicator identifier	Description
	Flash (ON: 1s; OFF: 1s): RS485 communication is abnormal ON or OFF: System exceptions happened.
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: Do not conduct installation with the power on.

2.2 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 question, please contact the supplier.

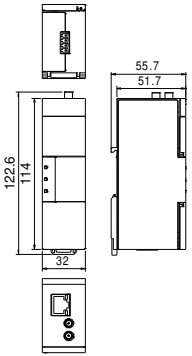
Table 2-1 Standard accessories

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

2.3 Outline dimensions

The outline dimensions of the IP20 model are as shown in Figure 2-1 (unit: mm).

Figure 2-1 Outline dimensions of TBox



3 Operation guide

3.1 IoT module instructions

3.1.1 Login of IoT monitoring platform

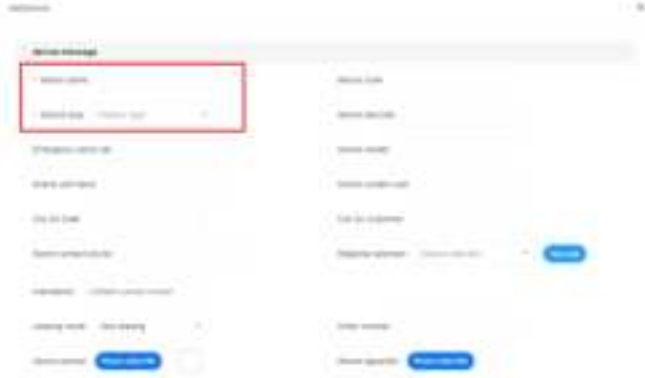
Enter the website iot.invt.com in the address bar of Google Chrome to go to the login page of the INVT industrial IoT application platform. Enter your account and password on the page in the following figure to log in to the platform.

Note: To obtain an account and password, please contact your industry administrator.

3.1.2 Adding devices

Step 1 On the home page, click **Monitor** > **Real time monitor** > **equipment** > **Add device**.

Step 2 In the pop-up dialog box, enter the device information according to the actual situation (**device name** and **Device type** are required.)



Step 3 Scroll the page down to enter the adapter information according to the ID corresponding to the barcode affixed on the surface of the IoT module as well as the password. There are three ways to add the adapter based on the data acquisition mode.

- When RS485 is used for data acquisition, enter **Adapter code** and **Adapter key**, and set **Adapter Type** to **TBox** and **485**.

- When a network port is used for data acquisition, enter **Adapter code** and **Adapter key**, and set **Adapter Type** to **TBox** and **LAN**.

- When RS485 and network port are used for data acquisition simultaneously, set **Add the number of satellite adapters** to 1, and select **485** and **LAN** as device types for two adapters respectively.

Step 4 Once added, the device can be searched by ID in the device management interface.

3.1.3 Policy file making and burning

The data terminal comes with a default policy file. If you have special needs for the acquisition policy, you need to customize the policy file and burn it.

Step 1 Download iWostudio.

Download it from INVT Download Center. Keep clicking **Next** during installation until the installation is complete.

Step 2 Open iWoStudio, and create a policy file based on actual device communication parameters and addresses (for details, see the COM&TCP policy file creation method in the iWoStudio help document).

Step 3 After creation, connect the PC and the module with a network cable, power on the data terminal, open the file burning interface on iWoStudio, select the local area network card and policy file, and click **Start** (Chinese characters are not allowed in the burning file path).

3.1.4 Device installation and wiring

Step 1 Equipment required: Networked computer, 4G data transmission terminal, IoT SIM card.

Step 2 Check if there is a SIM card in the card socket. By default, the SIM card is inserted in the socket. (The product of oversea version does not come 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 flashed rapidly, the network is ready; when the RUN indicator flashes rapidly, data is being collected.

Step 7 Go to real-time monitoring interface to review relevant information in IoT monitoring platform.

3.2 Wi-Fi configuration instructions

Step 1 Switch the data transmission terminal switch to LAN and connect the terminal to the network port of the computer with a network cable.

Step 2 Power on the data transmission terminal and wait about 1min to ensure that the terminal is fully started.

Step 3 Open the browser on the computer and enter the data terminal IP address set in the policy file in the address bar (default is 192.168.1.1).

Step 4 Enter the user name and password to log in.

- Username:user
- Password:user

Step 5 After login, go to the Wi-Fi configuration interface.

Step 6 Click **Open** to turn on the Wi-Fi.

Step 7 Select a Wi-Fi from the drop-down list. If the required Wi-Fi is not found in the list, click **Scan** to search. Enter the Wi-Fi password.

Step 8 Click **Save&Apply** to connect and save the Wi-Fi.

Step 9 The interface for successful connection is as follows.

3.3 FAQs

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

Answer: Check if input voltage VIN and GND are in consistent with the silkprint on the casing.

2. When 4G network is used, the network status indicator keeps flashing slowly, and the status offline is displayed on the web page.

Answer: The SIM card is not installed properly. Power off and re-install it for a good connection.Move the 4G antenna to a place with good signal.Ensure that the SIM card is activated and has remaining balance.

3. Data uploading doesn't match the web page display.

Answer: Re-power on and upload all data again.Check whether the policy file and device type match. 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 Internet transmission terminal is well connected.

5. The web system only displays data content but can't send command.

Answer: Check that the signal enabling switch of the Modbus terminal device is turned on.

Your Trusted Industry Automation Solution Provider

Shenzhen INVT Electric Co., Ltd.
Address: INVT Guangming Technology Building, Songbai Road, Matian, Guangming District, Shenzhen, China

INVT Power Electronics (Suzhou) Co., Ltd.
Address: No. 1 Kunlun Mountain Road, Science & Technology Town, Gaoxin District, Suzhou, Jiangsu, China

Website: www.invt.com

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