

Industrial IoT Gateway

BL101 BL103



BL101 BL103

User Manual

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Shenzhen Beilai Technology Co.,Ltd

Website: <https://www.bliiot.com>

Foreword

We appreciate your use of BACnet IoT Gateway BL103 from Beilai Technology Co., Ltd. You can rapidly understand how to use and operate this product by reading this user manual.

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Disclaimers

This document is only intended to help the reader use this product. The products and texts described in this document are constantly being developed and improved, and our company reserves the right to make updates and revisions to the product specifications at any time and without notice. This product is primarily used for data transmission in industrial Ethernet networks and data transmission in 4G networks. Please use the product in accordance with the parameters and technical specifications specified in the manual, as well as the precautions that should be taken when using it, and Beilai Technology will not be liable for property or personal injury caused by abnormal or improper use of the product.

Revision History

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Difference Between BL101 and BL103

BL103 BACnet IoT gateway add BACnet protocol compare to BL101 Modbus IoT gateway, the hardware of these two models is the same.

BL101 downlink support: Modbus RTU Master, Modbus TCP Master, DL/T645, etc.

BL101 uplink support: Modbus TCP, MQTT, OPC UA, Huawei Cloud IoT, Ali Cloud IoT, AWS IoT, ThingsBoard, Sparkplug B, King Pigeon Cloud and other protocols.

BL103 downlink add BACnet/IP and BACnet MS/TP protocols compare to BL101

BL103 uplink protocol add BACnet/IP protocol compare to BL101

1 Product Introduction

1.1 Overview

BL103 BACnet gateway is an economical IoT gateway for building automation and HVAC control systems that converts protocols such as Modbus RTU , Modbus TCP, DL/T645, BACnet IP, BACnet MS/TP to Modbus TCP, OPC UA, MQTT, BACnet IP, Huawei Cloud, Amazon Cloud, Alibaba Cloud, ThingsBoard, King Pigeon Cloud and other protocols.

BL103 Downlink Support: Modbus RTU Master, Modbus TCP Master, DL/T645, BACnet IP, BACnet MS/TP, and other protocols.

BL103 Uplink Support: Modbus TCP, MQTT, OPC UA, BACnet IP, Huawei Cloud, AWS Cloud, Alibaba Cloud, ThingsBoard, Sparkplug B, King Pigeon Cloud and other protocols.

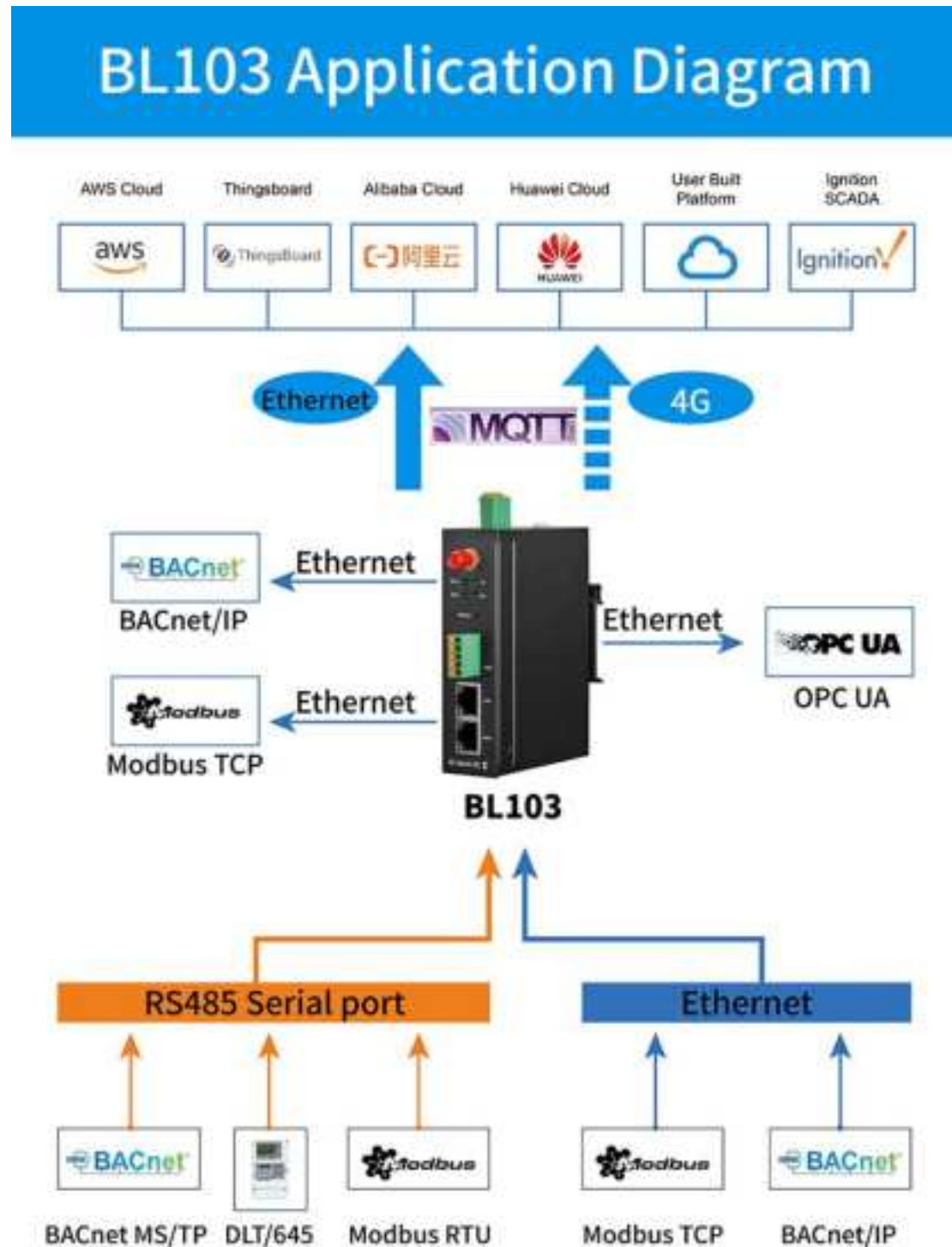
BL103 uses an embedded ARM MCU, and it is built on a stable Linux OS system. It has one RS485 (optional RS232) serial port input, two power inputs, one power output, two Ethernet ports (WAN and LAN), and two USB ports, support SIM and SD cards. Internet access via 4G network or Ethernet, with high speed and low latency.

BL103 has a powerful protocol conversion function that allows it to acquire multiple protocols at the same time, including BACnet MS/TP, BACnet/IP, Modbus RTU, Modbus TCP, and DL/T645. Uplink support BACnet/IP, Modbus TCP, MQTT, OPC UA protocols. Cloud drivers such as Huawei Cloud, Ali Cloud, King Pigeon Cloud, Amazon Cloud, Thingsboard Cloud, Sparkplug B, and others can connect directly to popular cloud platforms. Multiple platforms and master computer systems can be online at the same time.

BL103 supports TSL\SSL encryption for data security.

BL103 supports remote gateway management or configuration through OpenVPN channel. BL103 supports routing function as well as cascade switch data acquisition to acquire data from more industrial equipment, with fully functional software covering most application scenarios. Users only need to go through a simple setup to use the user-friendly configuration interface adhered to by BLIIoT, such remote configuration, remote firmware upgrade, etc. BL103 features a fastening structure, a redundant power supply, and standard DIN35 rail mounting.

1.2 Application Diagram



Note: BL101 downlink can not acquire data from BACnet devices, uplink do not support BACnet/IP protocol.

1.3 Packing List

Before installing and using BL103 gateway, please confirm that the following materials are in the box. Please contact sales representative if any of the items missing or damaged.

The following pictures are for reference only, the actual product may be different from the picture because of the updating, please refer to the actual product.

- 1x Gateway



- 1x 4PIN 3.5mm wiring terminal for power input



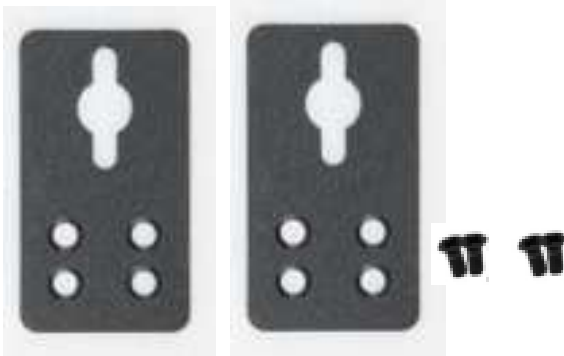
- 1x 5PIN 3.5mm wiring terminal for power output



- 1 x 4G SMA Cellular Network Antenna



- 2 x Wall-Mounting Clip Kit(Optional, Please noted if you need)



- 1 x Din Rail Mounting Clip Kit(Optional)



- 1 x User Manual(PDF)

Note: Please scan the card QR code on the card to download it

- 1 x SIM card eject pin



- 1 x Product Qualification Certificate



- 1 x Warranty Card



1.4 Features

- Downlink support: Modbus RTU Master, Modbus TCP Master, DL/T645, BACnet/IP, BACnet MS/TP, and other protocols.
- Uplink support: Modbus TCP, MQTT, OPC UA, BACnet/IP, HUAWEI Cloud, Alibaba Cloud, AWS, ThingsBoard, Sparkplug B, King Pigeon Cloud, and others.
- 9-36V DC power supply with terminal wiring, and 2 power input interfaces protected against reverse connection, either interface can be used.
- 1 Power Output, output voltage is equal to the input voltage
- 1 RS485(RS232 is optional)
- Serial port baud rate support 1200bps-115200bps; Stop bit support 1, 2; Data bit support 7, 8; Parity bit support None, Odd, Even
- 2 RJ45 Ethernet Ports, 1LAN and 1WAN, WAN and LAN ports can acquire data from devices directly or via cascade switches, with link and data indicators. Built-in isolation transformers for network ports, with electromagnetic isolation up to 2KV.
- Support POE PD(optional function), save wiring cost.
- Support TLS\SSL encryption to protect data security
- Support routing function
- Support 4G network with APN setting; Ethernet access is the priority method when connect to external network, it will switch to 4G automatically if Ethernet disconnected
- Support remote management or configuration through OpenVPN channel
- Support sending configuration files remotely via MQTT to change the configuration
- Support Modbus RTU to Modbus TCP, transparent transmission
- RESET button to restore the factory settings (long press RESET in the power-on state until the RUN indicator goes off) to prevent parameter setting errors
- Support software watchdog with high reliability
- Support gateway timed restart
- Metal case with IP30 protection, safely isolated from inner system, especially suitable for industrial control applications
- Dimension: 30mm*83mm*110mm, support wall-mounting and DIN Rail mounting.

1.5 Technical Parameters

Category	Parameters	Description
System	Processor	Main frequency 300Mhz
	Storage	128MB(can be extended to 1G)
	Memory	64MB
Power Supply	Input Voltage	DC 9~36V
	Power Consumption	Normal: 85mA@12V, Max: 117mA@12V
	Wiring	Support reverse wiring prevention protection
Ethernet Port	Specification	2 x RJ45, 10/100Mbps, Adaptive MDI/MDIX。
	Protection	ESD $\pm 16\text{kV}$ (Contact), $\pm 18\text{kV}$ (Air) EFT 40A (5/50ns) ; Thunder strike 6A (8/20 μs)
Serial Port	Quantity	1 x RS485(RS232 is optional)
	Baud Rate	1200bps-115200bps
	Data Bit	7, 8
	Parity Bit	None, Even, Odd
	Stop Bit	1, 2
	Protection	ESD $\pm 8\text{kV}$ (Contact), $\pm 15\text{kV}$ (Air); EFT 2KV, 40A (5/50ns) 。
Power Output	Output Voltage	1 x 9~36 V DC(equal to the input voltage)
SIM Card Slot	Quantity	1
	Specification	Drawer Type, Support 1.8V/3V SIM/UIM card (NANO)
	Protection	Built-in 15KV ESD Protection
SD Card		Reserved for future development
USB Port	Quantity	1xDownload program, 1xProgram debugging
	Specification	Micro USB OTG
	Protection	Over current protection
4G (Optional)	Antenna Quantity	1
	Antenna Type	SMA Hole
	L-E	GSM/EDGE:900,1800MHz WCDMA:B1,B5,B8 FDD-LTE:B1,B3,B5,B7,B8,B20 TDD-LTE:B38,B40,B41
	L-CE	GSM/EDGE:900,1800MHz WCDMA:B1,B8 TD-SCDMA:B34,B39 FDD-LTE:B1,B3,B8 TDD-LTE:B38,B39,B40,B41
	L-A	WCDMA:B2,B4,B5

		FDD-LTE:B2,B4,B12
	L-AU	GSM/EDGE:850,900,1800MHz WCDMA:B1,B2,B5,B8 FDD-LTE:B1,B3,B4,B5,B7,B8,B28 TDD-LTE:B40
	L-AF	WCDMA:B2,B4,B5 FDD-LTE:B2,B4,B5,B12,B13,B14,B66,B71
	CAT-1	GSM:900,1800 FDD-LTE:B1,B3,B5,B8 TDD-LTE:B34,B38,B39,B40,B41
Indicator	RUN	Always on when powered on, flickering when the system is running, and goes off when the system is not running.
	NET	Flickering when communicating with Ethernet, always on when communicating with 4G, and goes off when unable to communicate.
	TXD	Flickering when sending data, otherwise goes off.
	RXD	Flickering when receiving data, otherwise goes off.
Software	Internet Protocol	IPV4, TCP/UDP, DHCP, DNS, etc.
	IP Retrieving	Static IP/DHCP
	Data	Support transparent transmission
	DNS	Support Domain Name resolution
	Configuration	PC software configuration, Support WIN XP, WIN 7, WIN 8 and WIN 10
	Network Cache	Transmitting: 8Kbyte; Receiving: 8Kbyte
	Login Package	Support custom login package
	Heartbeat Package	Support custom heartbeat package
Safety	MTBF	≥100,000 hours
	EMC	EN 55022: 2006/A1: 2007 (CE &RE) Class B
		IEC 61000-4-2 (ESD) Level 4
		IEC 61000-4-3 (RS) Level 4
		IEC 61000-4-4 (EFT) Level 4
		IEC 61000-4-5 (Surge)Level 3
		IEC 61000-4-6 (CS)Level 4
		IEC 61000-4-8 (M/S) Level 4
	Others	CE, FCC
Environment	Working	-40~80℃, 5~95% RH
	Storage	-40~85℃, 5~95% RH
Others	Case	Metal Case
	Dimension	30mm×83mm×110mm(L*W*H)
	Protection	IP30
	Net Weight	291.2g
	Mounting	DIN Rail Mounting/Wall-mounting

1.6 Model List

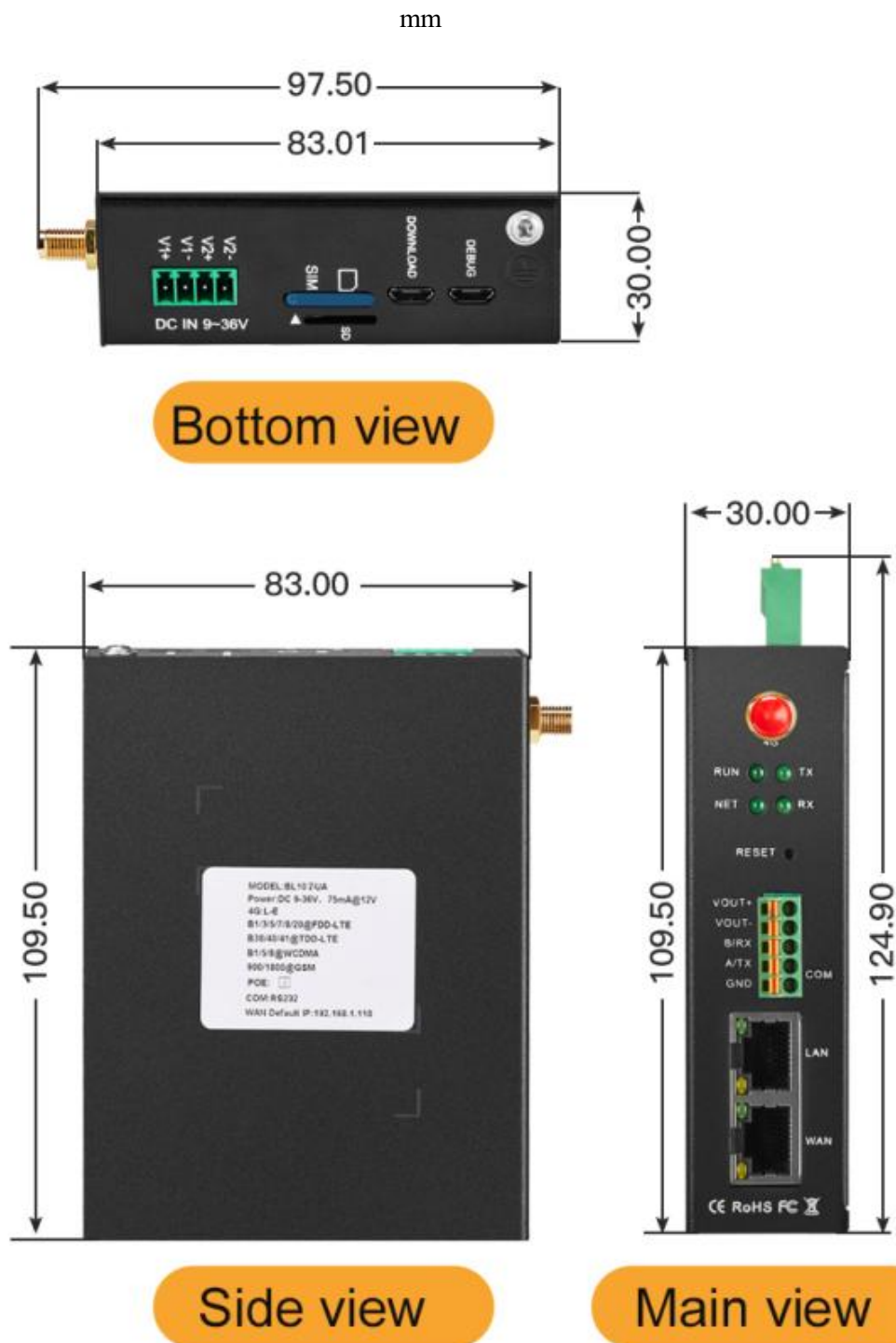
Model	WAN	LAN	COM (Default RS485) (RS232 is an option)	OPC-UA	4G	Open VPN	POE PD
BL101 BL103	√	√	√	×	√	×	Optional
BL101E BL103E	√	√	√	×	×	×	Optional
BL101UA BL103UA	√	√	√	√	×	×	Optional
BL101Pro BL103Pro	√	√	√	√	√	√	Optional

Note: Difference Between BL101 and BL103

BL103 BACnet IoT gateway add BACnet protocol compare to BL101 Modbus IoT gateway, the hardware of these two models is the same.

2 Hardware Description

2.1 Outline Dimension



2.2 Power Supply Interface



2 Channels 9-36V DC power input with reverse connection protection

2.3 SIM and SD Card Slot



Make sure the device is powered off when inserting or removing the SIM card, then put the card eject pin into the card slot hole, and press slightly to push the card slot out.

Make sure device is placed flatly like above picture when inserting or removing SIM card

2.4 Debug and Firmware Upgrade Interface



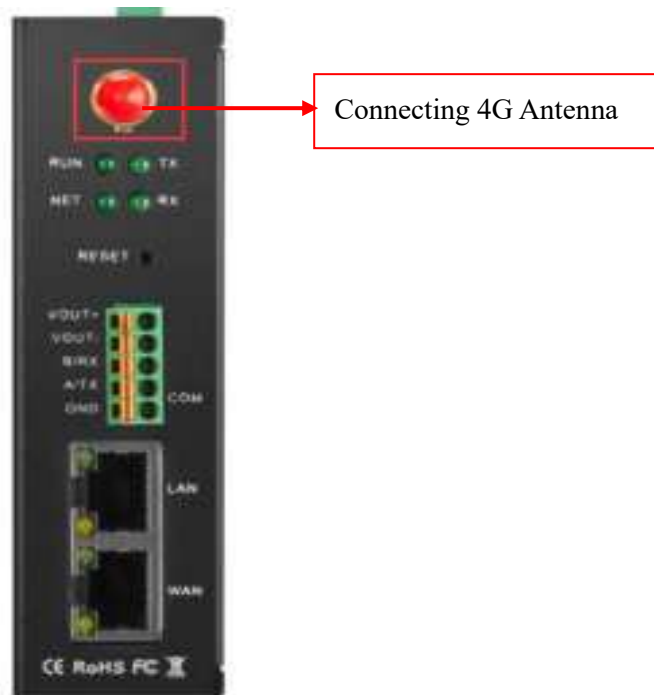
DEBUG is program debugging port, DOWNLOAD is firmware upgrading interface

2.5 Gateway Grounding



Make sure gateway grounded with grounding screw to prevent electromagnetic interference before connecting gateway

2.6 4G Antenna Connection Port



2.7 LED Indicator Light



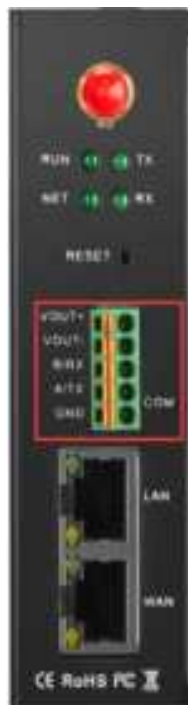
LED Indicator Introduction			
Item		Status	Description
RUN	Running	Flickering	Running Normally
		Off	Equipment Failure
NET	Ethernet /4G	Flickering	Ethernet working
		Always on	4G network working
		Off	No network
TX	Data transmit	Flickering	Data is transmitting through serial Port
		Off	No data transmitting
RX	Data Receive	Flickering	Data is receiving through serial port
		Off	No data receiving
Note: RUN indicator always on once it's powered on, please check whether there is a issue with power or it's reversely connected when the light goes off			

2.8 Reset Button

When the gateway is running normally, use the card eject pin to continuously press the Reset reset button for about 10 seconds until the RUN indicator goes off, the gateway reboots to restore the factory default settings.



2.9 COM Port and Power Output Interface



RS485(or RS232) and Power Output	
Item	Description
VOUT+	Power supply output positive
VOUT-	Power supply output negative
B/RX	RS485 Data-(B)/Receiving Data
A/TX	RS485 Data+(A)/Transmitting Data
GND	Grounding
Note: Output voltage is equal to the input voltage Range: DC 9~36V	

2.10 WAN and LAN

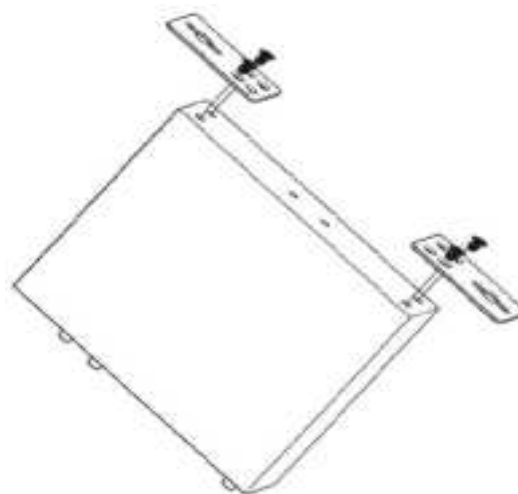


Ethernet Port			
Indicator	Color	Status	Description
Network Speed	Green	Always on	100Mbps mode
		Off	10Mbps mode
Network Link	Yellow	Always on	Network Connected
		Flickering	Data is transmitting
		Off	Network Disconnected

3 Installation

Gateway can be placed on flat surface, mounted on the wall, and DIN Rail Mounted

3.1 Wall-Mounting(Optional)



Wall-Mounting

3.2 DIN Rail Mounting(Optional)



DIN Rail Mounting



Installation Finished

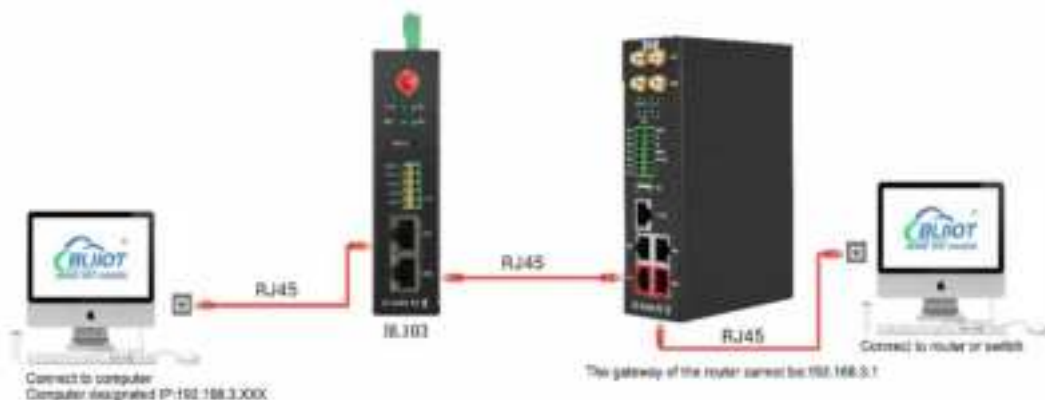
4 Configuration Software Instructions

4.1 Login to Configuration Software


Connect BL103 to the router or switch through WAN port with a standard cross or direct connection network cable. The IP of router or switch cannot be the same as gateway IP 192.168.3.1, WAN and LAN of gateway cannot in the same local area network, and make sure BL103 gateway and PC in the same local area network.

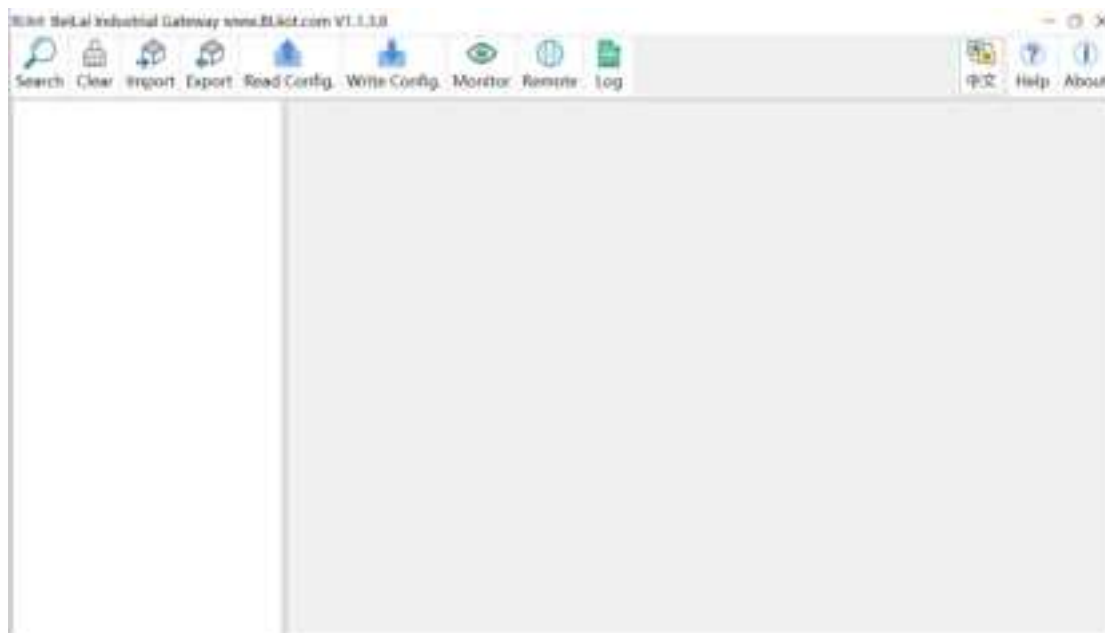
If you want to connect the gateway to PC directly, then use a standard cross network cable to connect through BL103 gateway LAN port (When gateway connect to PC directly, the IP of PC should be set to specified IP, the IP should be the network segment 192.168.3.1, because the factory default IP of the LAN port is 192.168.3.1; IP address, subnet mask, MAC and DNS need to be set when PC is assigned an IP.)

Note: WAN port IP is retrieved automatically, LAN port IP is 192.168.3.1 from factory setting
Wiring of Connecting BL103 gateway to Router, Switch and PC:



4.1.1 Open Configuration Software

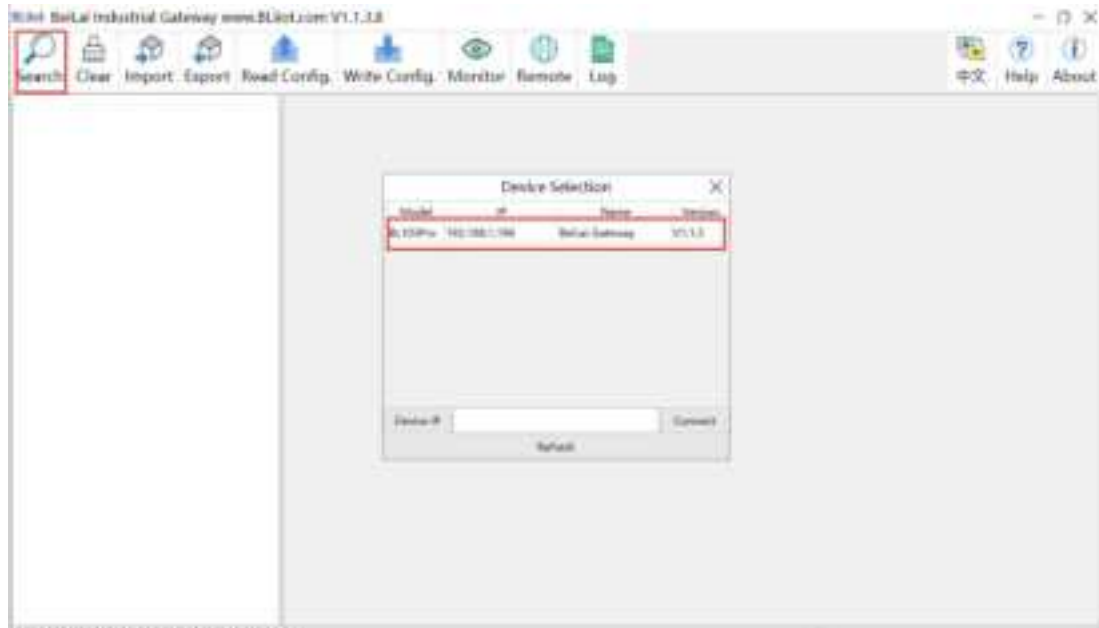
Double click “  BL10x_ConfigurationTool_V1.1.3.8.exe ” to execute BL103 configuration software, Shown as below:



4.1.2 Search for Gateway

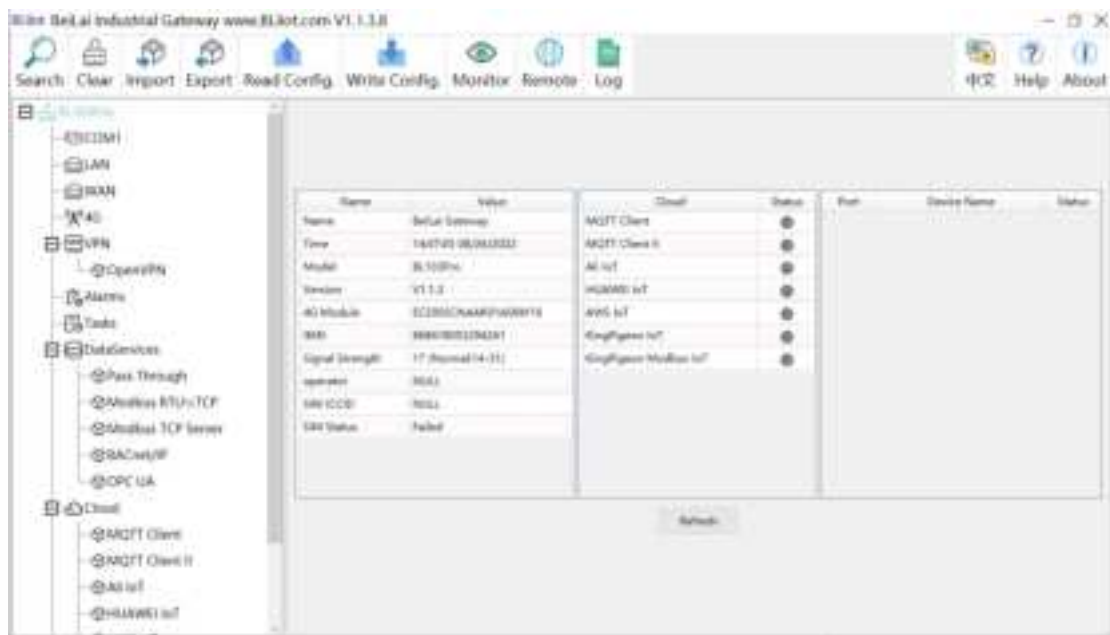
Click "Search" and all devices in the same local area network with the PC will appear. For example, WAN port is connected to the switch, PC and gateway are in the same local area network, and the gateway whose IP is 192.168.1.196 will be found. If there is no device found, please make sure gateway and computer is in the same local area network, and the computer UDP broadcast is normal. If the device cannot be found because of the computer network environment issues, you can enter the IP in the "IP" bar, click connect, login.

Note: You should close the configuration software and reopen it when the computer changes IP or gateway.



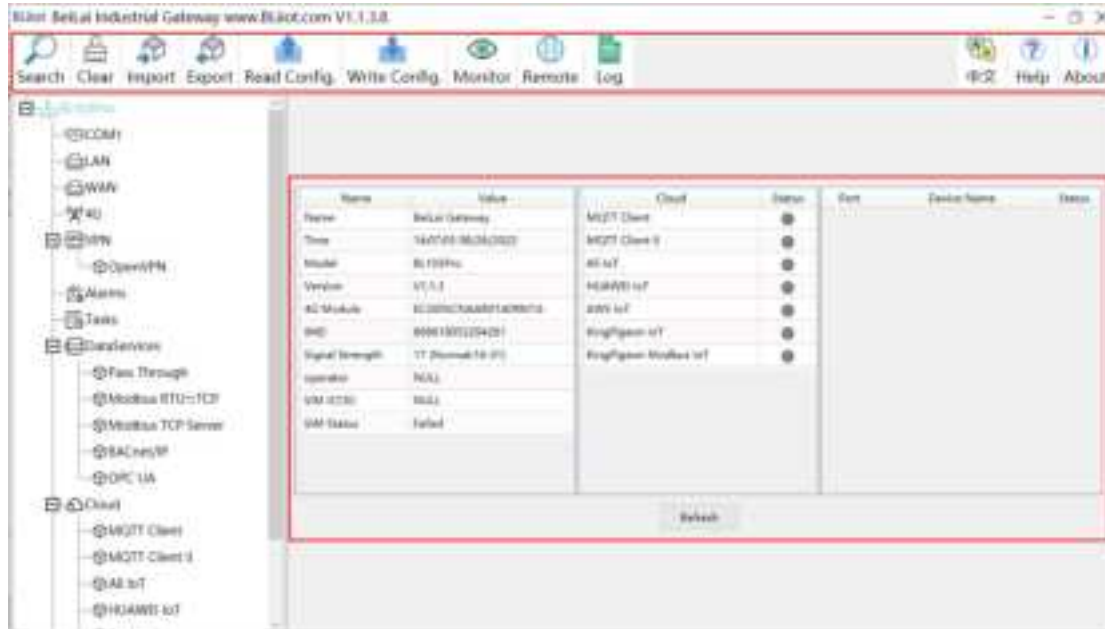
4.1.3 Connecting Gateway

Choose the gateway device you want to configure, and double-click it (For example: double-click the gateway device whose IP is: 192.168.1.196) to enter the gateway device configuration interface. You can enter the IP and directly connect to log in if there is no display device because of the network environment.



4.2 Configuration Instructions

4.2.1 System Features



System Function	
Item	Description
Search	Search for all BL103 gateways in the same local area network
Clear	Open a new default configuration file
Import	Import gateway configuration file
Export	Export gateway configuration file
Read configuration	Read logged in BL103 gateway configuration parameters
Write configuration	Save all configuration parameters by click "write configuration". Make sure to click "write configuration" every time after modifying the configuration. The setting will be valid after device restarts automatically.
Monitor	Monitor the value of the data point of the currently connected device, and the data in the "Value" item of the display data point page. If it is numeric data, it is the value after multiplying the coefficient.
Log	System log. If there is a issue with the gateway device, you can click to save the log file and send the file to the mailbox indicated in it.
English	Change language to English

Help	Under development
About	Software version, Issue date, Firmware upgrade information

Basic Information of BL103 Gateway	
Item	Description
Name	BeiLai Gateway. Can be customized
Time	Local time when reading the gateway
Model	Gateway device model
Version	Gateway device version
4G module	Model of 4G module. If it's null, it means no 4G module
IMEI	Device IMEI Code
Signal strength	The signal value of 4G module, if the signal value is lower than 14, it means that the signal is extremely poor, and 31 is a full signal.
Operator	SIM card service provider
SIM ICCID	Read SIM card ICCID
SIM status	"OK" means the SIM card is successfully registered, "Failed" means it is not registered
MQTT Client	Green light means MQTT Client is connected, gray means MQTT Client is not connected.
MQTT Client II	Green light means MQTT Client II is connected, gray means MQTT Client II is not connected.
Ali IoT	Green light means Alibaba cloud is connected, gray means Alibaba is not connected.
HUAWEI IoT	Green light means HUAWEI cloud is connected, gray means HUAWEI not connected.
AWS IoT	Green light means AWS is connected, gray means AWS is not connected.
King Pigeon IoT	Green light means King Pigeon MQTT Client is connected, gray means King Pigeon MQTT Client is not connected.
King Pigeon Modbus IoT	Green light means King Pigeon Modbus cloud is connected, gray means King Pigeon Modbus cloud is not connected.
Device online prompt box	Green light indicates gateway can communicate with the slave device, gray indicates the communication fails.
Refresh	Refresh the basic information of gateway

4.2.2 Advanced Settings

The private network setting is to allow the dedicated Ethernet or dedicated 4G network to set the IP that can be used or the server that can be connected. If it is an ordinary Ethernet or 4G network, no settings are required.

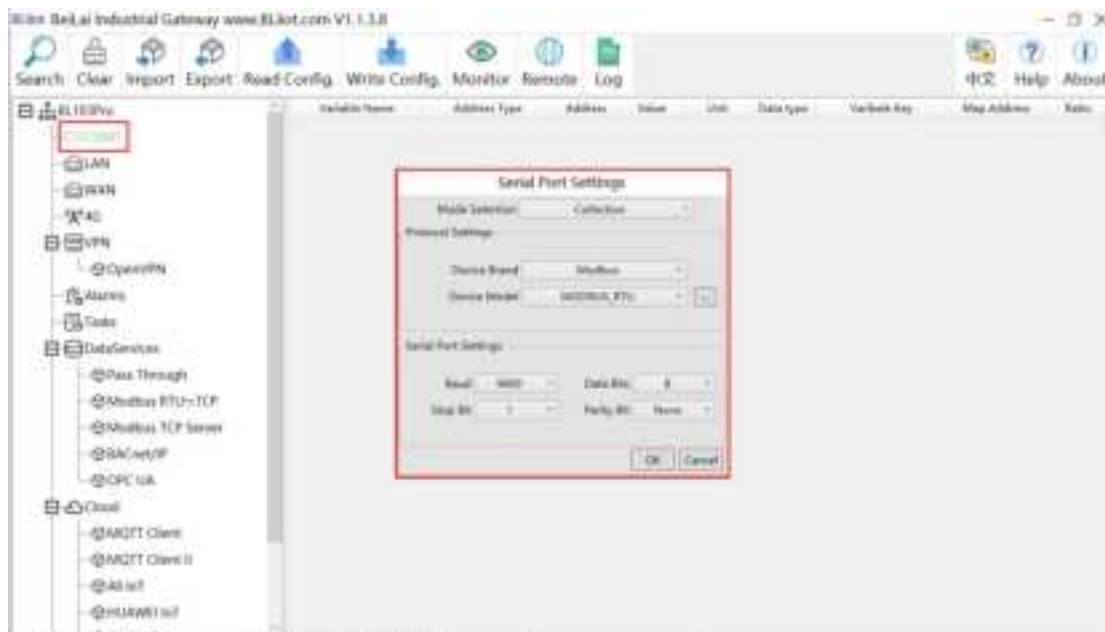


Advanced Setting		
Item		Description
Private network	Private network	Choose from "WAN" and "4G" according to your needs, and only configure it with a dedicated network.
	Keepalive IP	Dedicated IP that can be used
	NTP Server	Dedicated connected NTP server
Network Diagnosis	Ping	Network diagnosis, such as: Ping the gateway IP connected to the network port, you can judge whether the LAN connected to the BL103 gateway network port is normal, enter the gateway IP, click the Ping button, green means normal.

4.2.3 COM Port Introduction

4.2.3.1 COM Port Attribute Configuration

Double click COM1 to enter COM Port Attribute configuration box.



Serial Port Properties			
Item		Description	Default
Mode Selection		Select from "Collection", "Pass through", "Modbus RTU to TCP"	Collection
Protocol Settings	Device Brand	Select from "Modbus", "BACnet"(No BACnet option for BL101)	Modbus
	Device Model	Select slave device according to selected brand	Modbus RTU
	Polling Interval And Time out	To set the device command interval time and device return timeout time, click the button next to the device model to set it.	Polling Interval : 20ms Timed out: 200ms
Serial Port Settings	Baud	Select from 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200	9600
	Stop Bit	Select from 1Bit, 2Bit	1Bit
	Data Bit	Select from 7Bit, 8Bit	8Bit

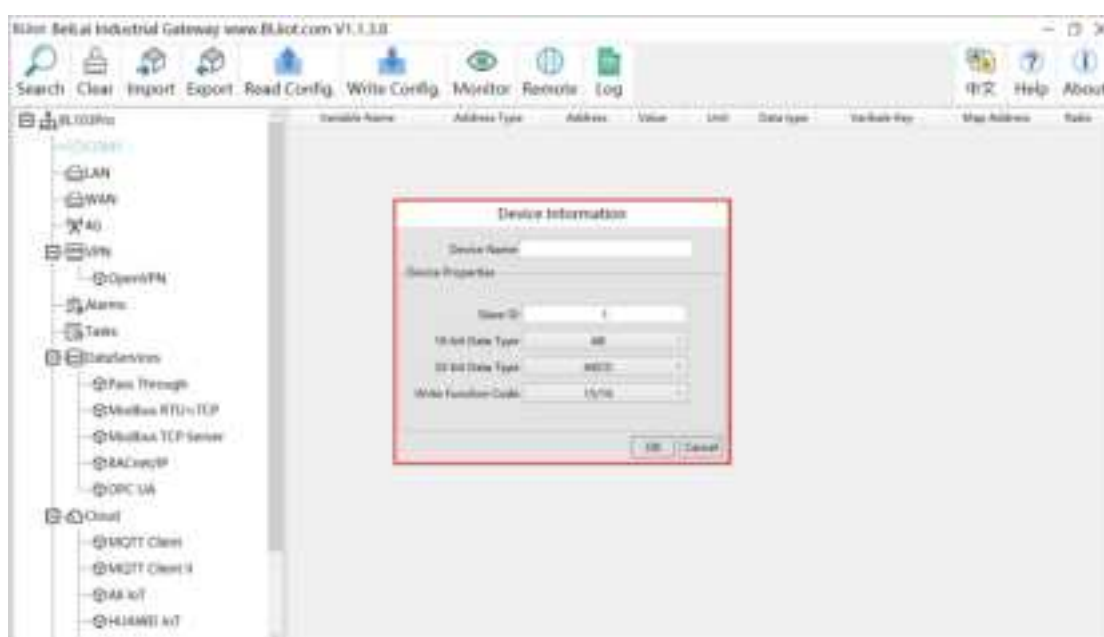
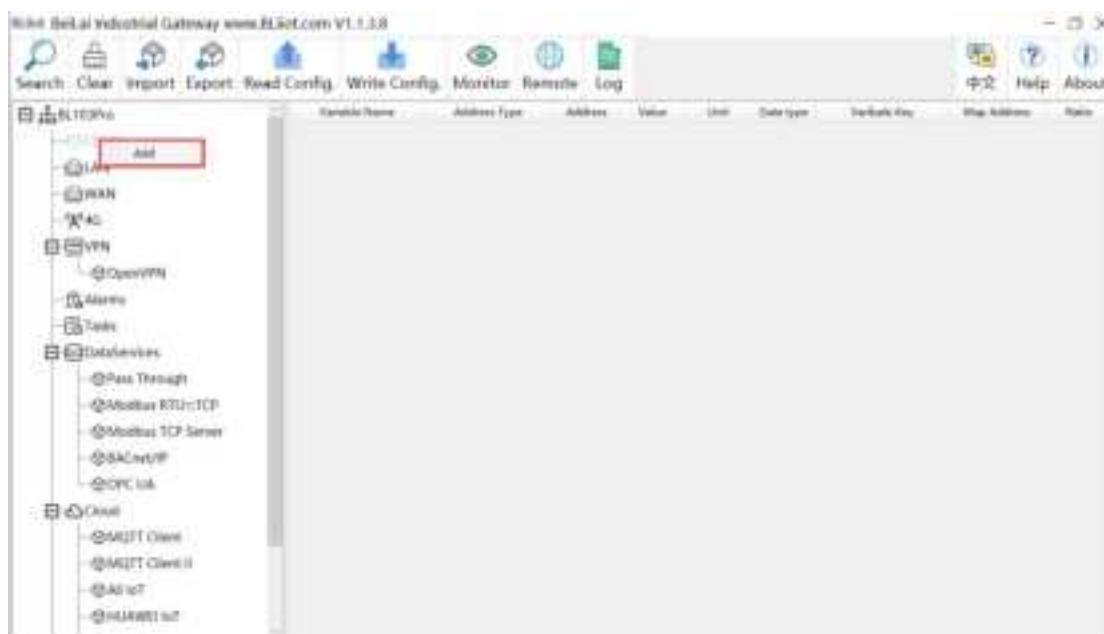
	Parity Bit	Select from None, Even, Odd	None
OK		Confirm COM configuration	
Cancel		Cancel COM configuration	

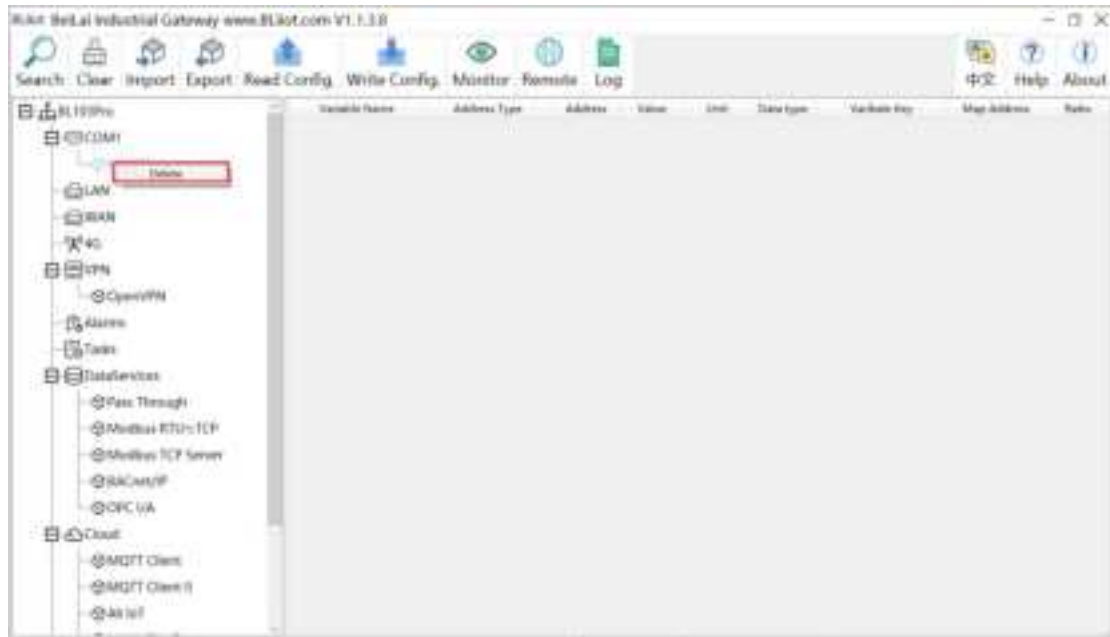
4.2.3.2 Add COM Port Devices

Right click COM1 and click Add to enter device configuration box. Double click it to show added device configuration information. Right click to delete device.

The byte order of the configuration data points is also set here

Note: Total 50 Modbus RTU devices can be connected through the COM ports.





Note: Device attributes are set according to the selected protocol. For example, device brand is Modbus, set attributes as below table.

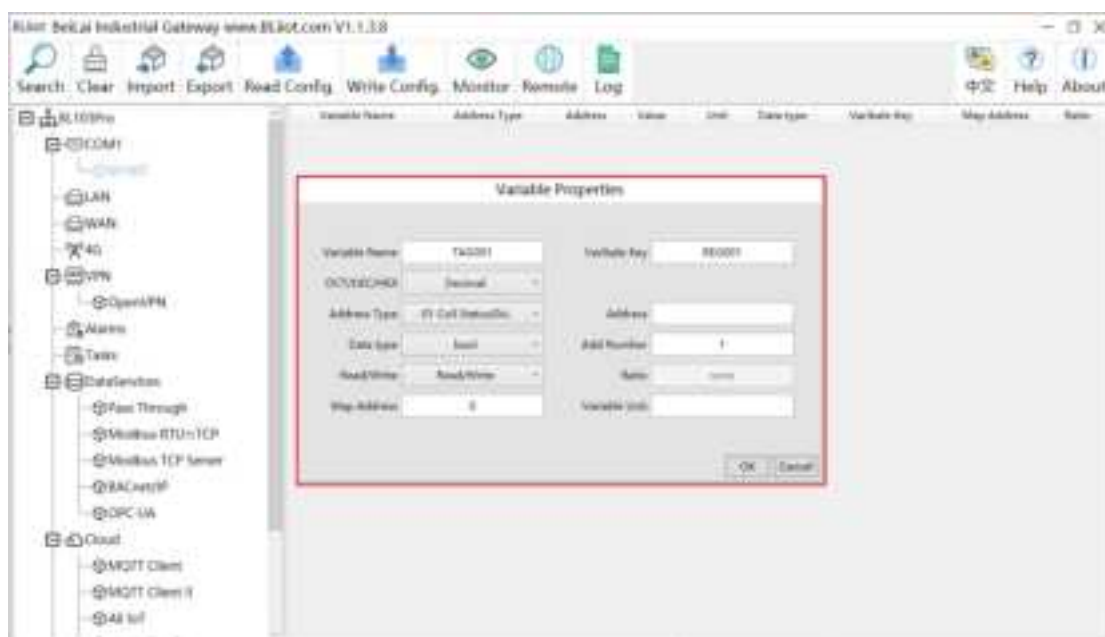
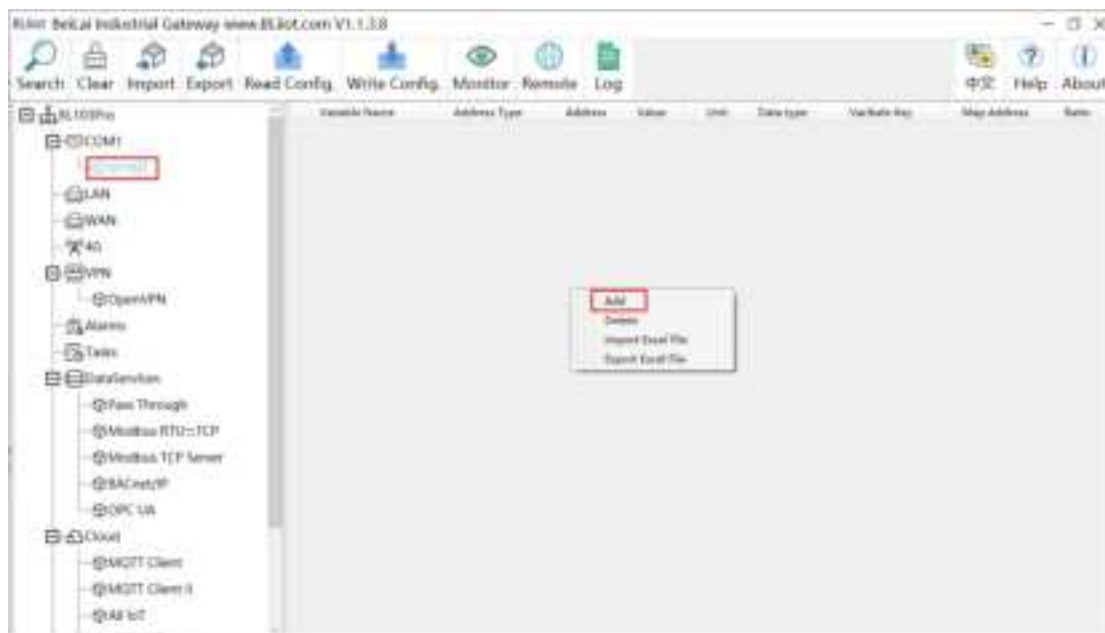
Device Information			
Item		Description	Default
Device Name		Name the data collecting device	
Device Properties	Slave ID	Data Collecting Device Modbus Communication Address	
	16 bit data type	Select from AB, BA	AB
	32 bit data type	Select from ABCD, DCBA, BADC, CDAB	ABCD
	Write function code	Select from 05/06, 15/16	15/16
OK		Confirm device configuration	
Cancel		Cancel device configuration	

4.2.3.3 Add COM Port Device Data Point

Click device name and then right click the box on the right, click Add to enter data point configuration box.

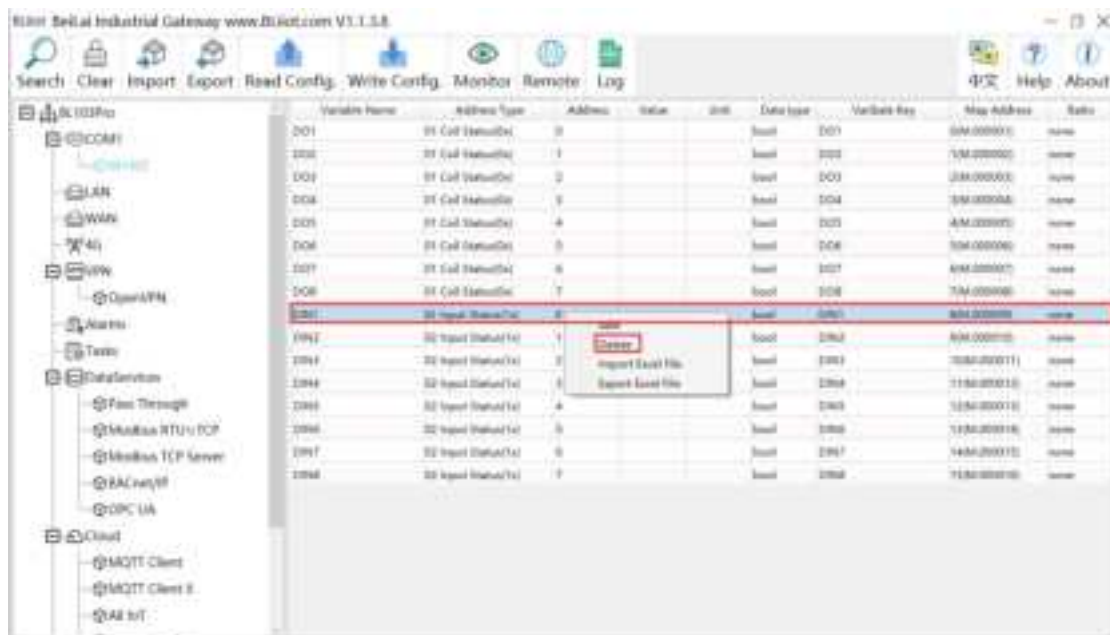
The outside of the mapping address on the configuration software represents the Modbus address, and M.XXX in the brackets represents the PLC Modbus address.

Right click "Add" to add the next data point. You can also right click to delete the data, or double click the data point to edit the data.



Variable Properties	
Item	Description
Variable Name	Name the Added Data point
Variable Key	The MQTT identifier of the data point, can be filled in arbitrarily.
OCT/DEC/HEX	Select from "decimal", "octal", "hexadecimal" according to the collection address
Address Type	Select the register type of the device, different protocols display differently. For example: Modbus protocol, select from "01 Coil

	Status", "02 Input Status", "03 Holding Registers", "04 Input Registers".
Address	Address of the collected data point
Data Type	Select "Boolean" for Boolean, numeric type selected from "16-bit unsigned integer", "16-bit signed integer", "32-bit unsigned integer", "32-bit signed integer", "32-bit single-precision floating point".
Add Number	Quantity of collection
Read/Write	Select from "Read Only", "Read and Write".
Ratio	Only numeric type data can be set, enlarged or reduced how many times to upload to the platform
Map address	Data point is stored in the address of the gateway device. Boolean 0~2000. Numerical: 0~2000. A register address space is a word.
Variable unit	The unit of the data point, fill in as needed, not required.
OK	Confirm data point setting
Cancel	Cancel data point setting



Right click the data point to delete the data, and double-click to modify the configuration.

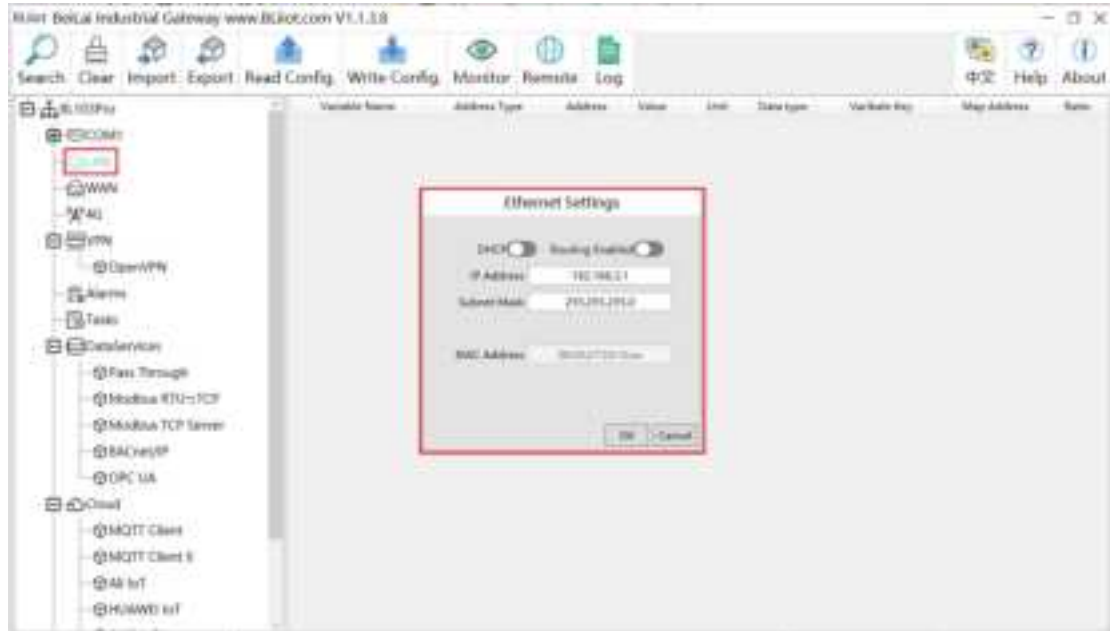
4.2.4 LAN Port Introduction

4.2.4.1 LAN Port Attribute Configuration

Double-click the LAN port to enter property box. LAN port default IP is 192.168.3.1, and the

automatically assign IP addresses and routing functions are disabled by default.

Note: If the LAN port is connected to the switch, the switch cannot be connected to the network cable of other network segments.

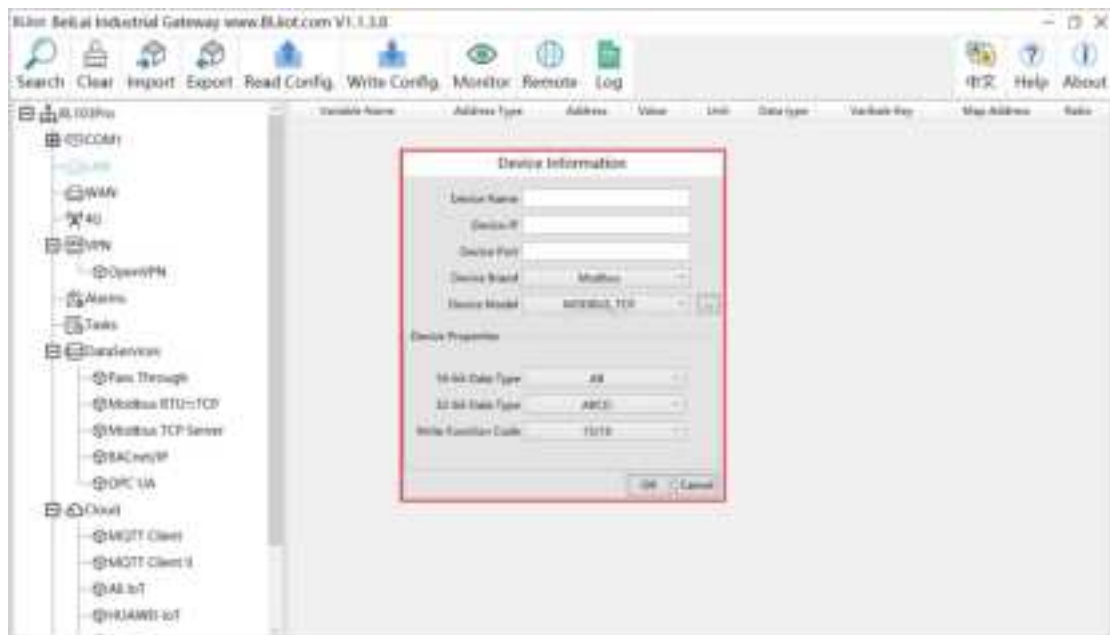
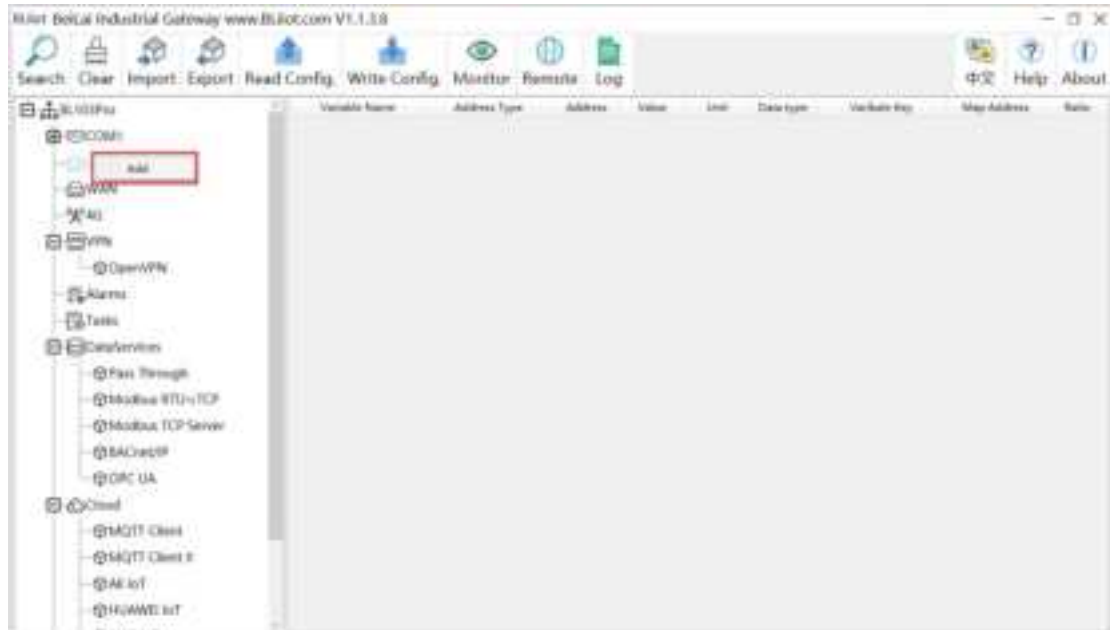


Ethernet Settings	
Item	Description
DHCP	Green: Automatically assign IP addresses Enabled Gray: Automatically assign IP addresses Disable
Routing Enabled	Green: Routing function Enabled Gray: Routing function Disable
IP Address	LAN Port IP address
Subnet mask	LAN Port subnet mask
MAC Address	LAN Port MAC
OK	Confirm LAN port Setting
Cancel	Cancel LAN port Setting

4.2.4.2 Add LAN Port Device

Right-click LAN, click "Add", to enter configuration box. The LAN port can be connected to the device, or it can be connected to the switch to collect from devices on the switch.

Note: 50 devices can be collected through LAN and WAN.



Device Information	
Item	Description
Device Name	Name LAN Port Device Name
Device IP	Set IP address of LAN port device. Device IP address and gateway set by the LAN should be in the same local area network. If they are inconsistent, change the IP address of the device or change the gateway setting of the LAN port, change the property configuration of the LAN port. It will take effect after power off and restarting.
Device Port	Set the port number of the device on the LAN port
Device Brand	Select from "Modbus", "BACnet", (BL101 has no "BACnet")

	selection).
Device Model	Select model of selected device brand
Polling interval And Time out	Set command interval time and device return timeout time, click the button next to the device model to set it.
Device address	Only available when the device brand is "BACnet"
16-bit Data Type	Select from "AB", "BA", only available when the device brand is "Modbus".
32-bit Data Type	Select from "ABCD", "DCBA", "BADC", "CDAB", only when the device brand is "Modbus".
Write function code	Select from "05/06", "15/16"
OK	Confirm LAN port device setting
Cancel	Cancel LAN port device setting

4.2.4.3 Add LAN Port Device Data Point

Procedure to add LAN Port device data point is the same as that of adding COM port device data point. ID of the Modbus TCP device is configured in the data point configuration box.

[Add COM Port Device Data Point](#)



4.2.5 WAN Port Introduction

4.2.5.1 WAN Port Attribute Configuration

Double click WAN to enter WAN Port Attribute configuration box.

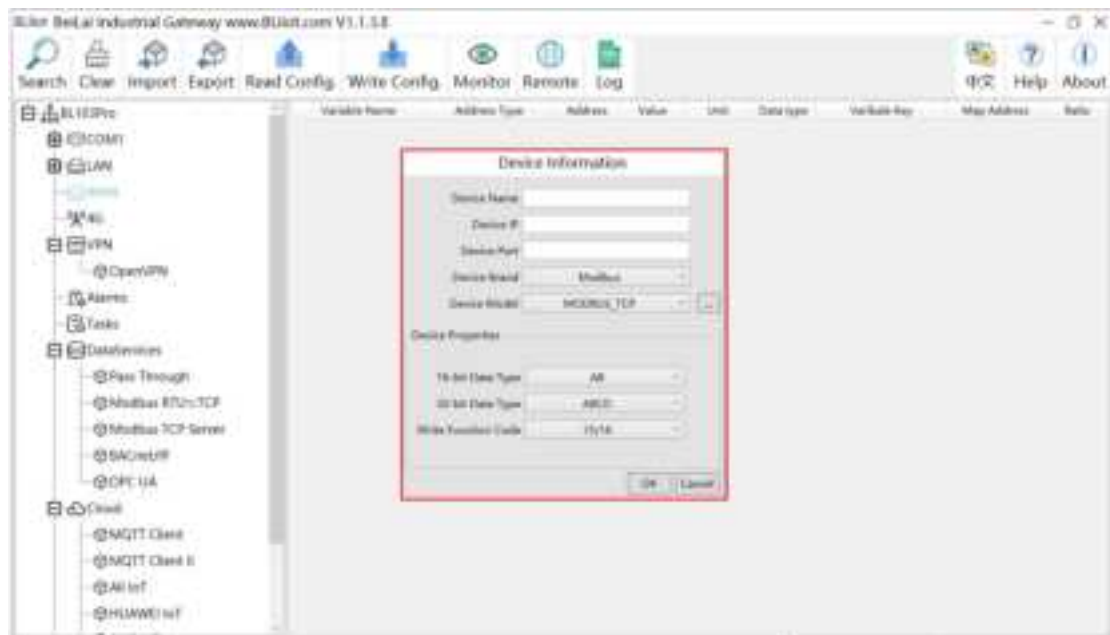
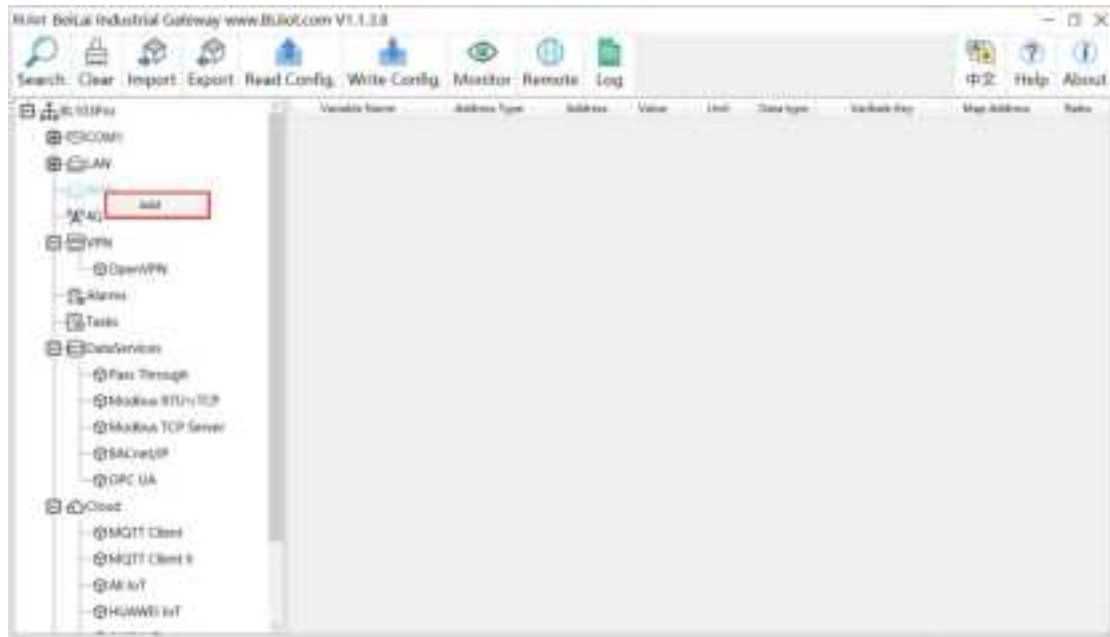


Ethernet Settings	
Item	Description
Auto IP	Green: Auto retrieving IP Gray: Specified IP
IP Address	WAN Port Current IP Address
Subnet Mask	WAN Port Current Subnet Mask
Gateway	WAN Port Current Gateway Address
MAC Address	WAN Port MAC Address
DNS	WAN Port Current DNS Server
OK	Confirm WAN port setting
Cancel	Cancel WAN port setting

4.2.5.2 Add WAN Port Devices

Right-click WAN, click "Add" to enter configuration box. Wan Port connected to the switch to collect from devices on the switch.

Note: 50 devices can be collected through LAN and WAN.



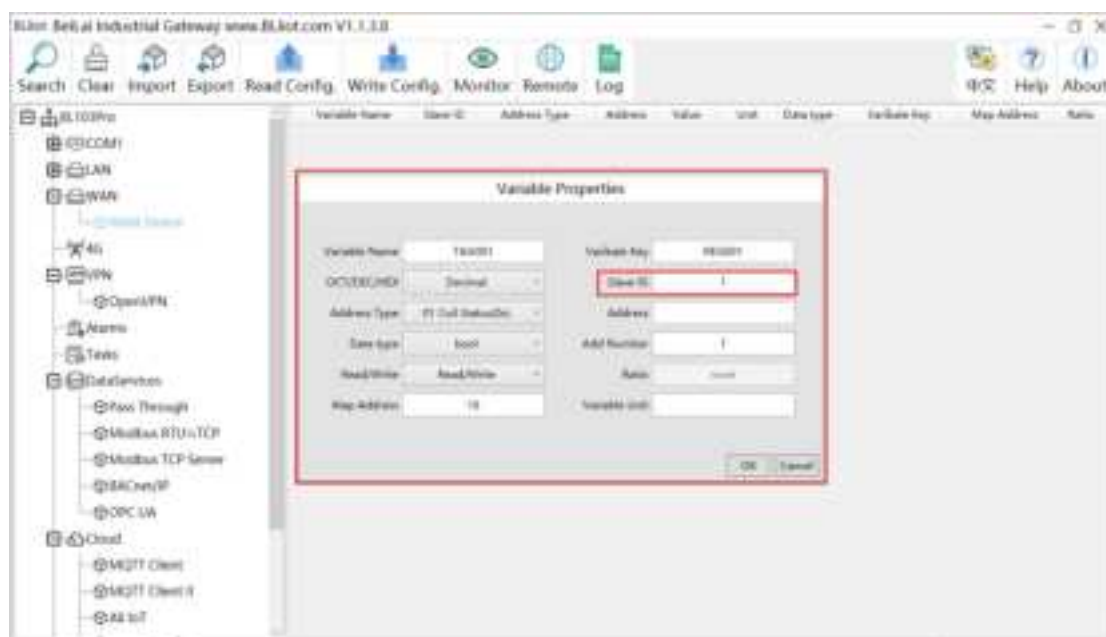
Device Information	
Item	Description
Device Name	Name WAN Port Device
Device IP	IP address of the device in the same local area network as the WAN port
Device Port	Set device WAN port number
Device Brand	Select from "Modbus", "BACnet", (No "BACnet" for BL101).
Device Model	Select model according to the selected device brand
Polling interval Time out	Set command interval time and device return timeout time, click the button next to the device model to set it.

Device address	Only available when the device brand is "BACnet".
16-bit Data Type	Select from "AB", "BA", only available when the device brand is "Modbus".
32-bit Data Type	Select from "ABCD", "DCBA", "BADC", "CDAB", only when the device brand is "Modbus".
Write function code	Select from "05/06", "15/16"
OK	Confirm WAN port device setting
Cancel	Cancel WAN port device setting

4.2.5.3 Add WAN Port Device Data Point

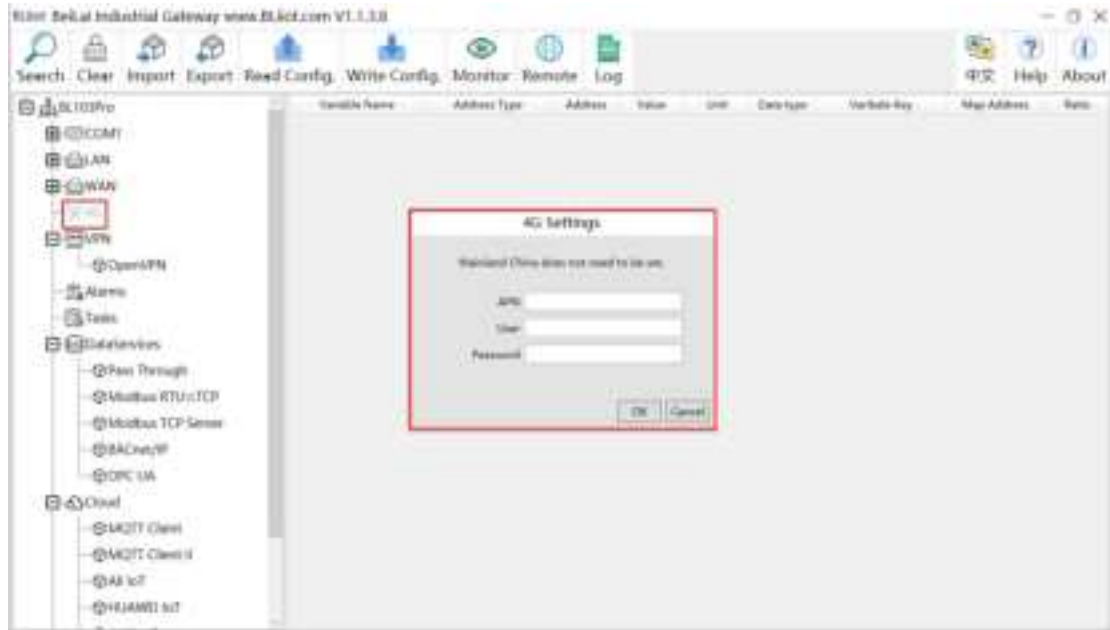
Procedure is the same as that of adding COM port device data point. ID of the Modbus TCP device is configured in the data point configuration box.

[Add COM Port Device Data Point](#)



4.2.6 4G Introduction

Double click 4G to enter APN setting box. Note: It's not necessary to set APN for China mainland 4G network, or if there is no 4G module in the device.



4G Setting	
Item	Description
APN	Access Point Name of SIM card
User	User Name of SIM card
Password	Password of SIM card

4.2.7 OpenVPN Introduction

Only BL101Pro and BL103Pro have the OpenVPN function, and the gateway device is the client. According to the IP assigned by the OpenVPN server to the gateway device client, you can directly enter the gateway client IP in the "Device IP" item of the configuration software login interface, and click Connect to log in to the gateway device.



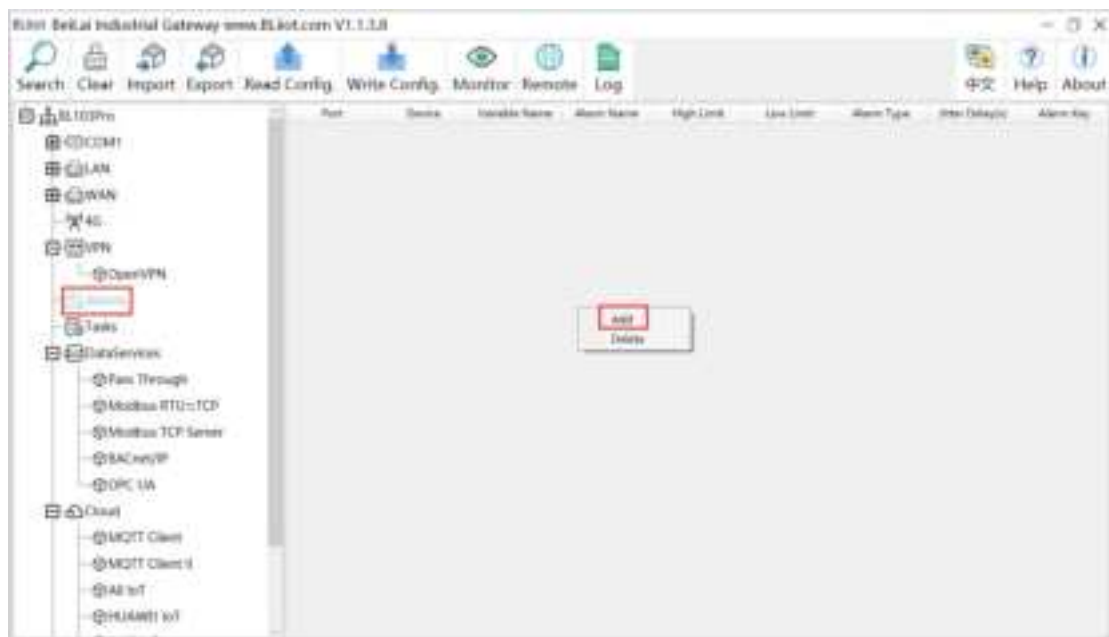
OpenVPN	
Item	Description
Client/Server	Gateway device as client "Client"
IP/domain name	The address of the server with which the client establishes an OpenVPN connection
Port	The TCP/UDP port provided by the server for establishing a connection, the default is 1194.
TCP/UDP	The protocol used in the communication between the client and the server, and the connection method is selected according to the server.
TUN/TAP	In TUN mode, 3 Layer tunnel is established to realize point-to-point transmission. In TAP mode, 2 Layer tunnel is established to implement transparent transmission of IP packets. Select the connection method according to the server.
Authentication Mode	Select from "Password Only", "Certificate Only", "Password and Certificate" as required
User name	Username of the client, not required for "certificate only" mode.
Password	Client user name password, not required for "certificate only" mode.
Encryption Algorithm	Select the data encryption algorithm, and select the connection encryption algorithm according to the server.
CA File	Select File Upload, the root certificate provided by the OpenVPN server.
Client Certificate File	Select File Upload, the client certificate generated by the user based on the root certificate.

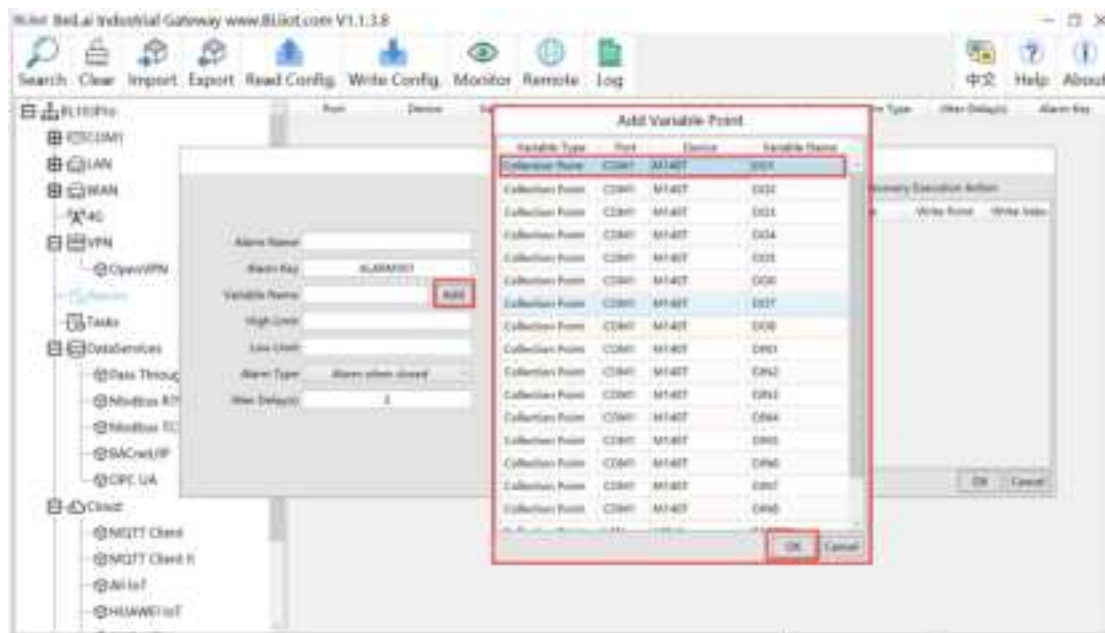
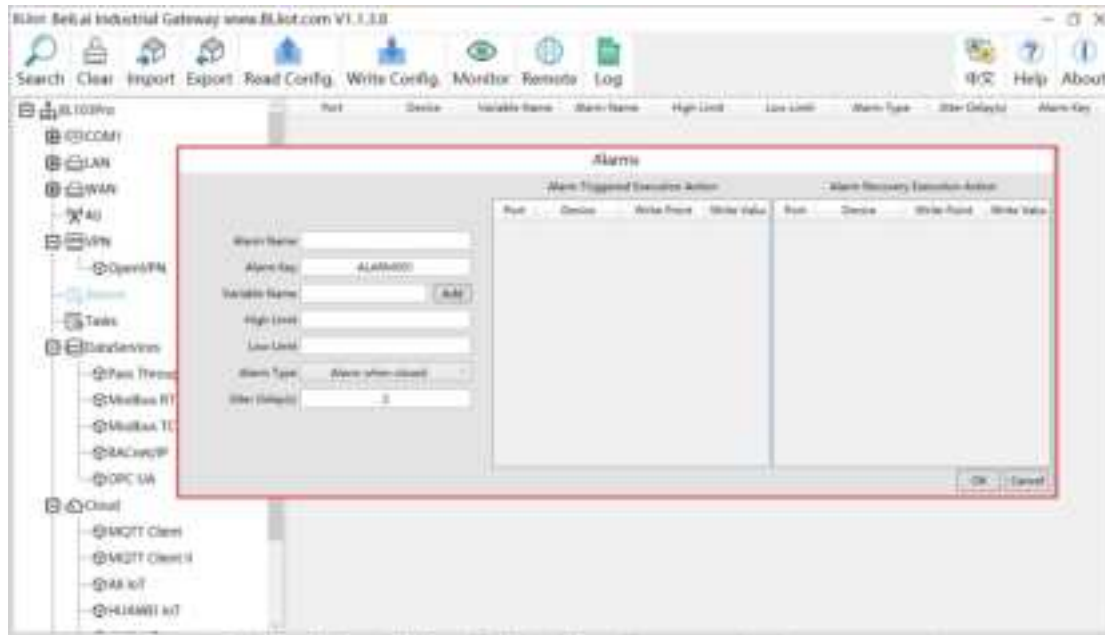
Client Key File	Select File Upload, the key corresponding to the client certificate.
Compression Algorithm	Select from "LZO" and "LZ4" according to the OpenVPN server selection.
OK	Confirm OpenVPN configuration
Cancel	Cancel OpenVPN configuration

4.2.8 Alarm and Event Configuration

Click "Alarms", move the mouse to the right box, right click, click "Add", to enter "Alarm and Event" setting box. You can configure the data points, action and the action to be performed for alarm recovery.

4.2.8.1 Alarm Points Configuration



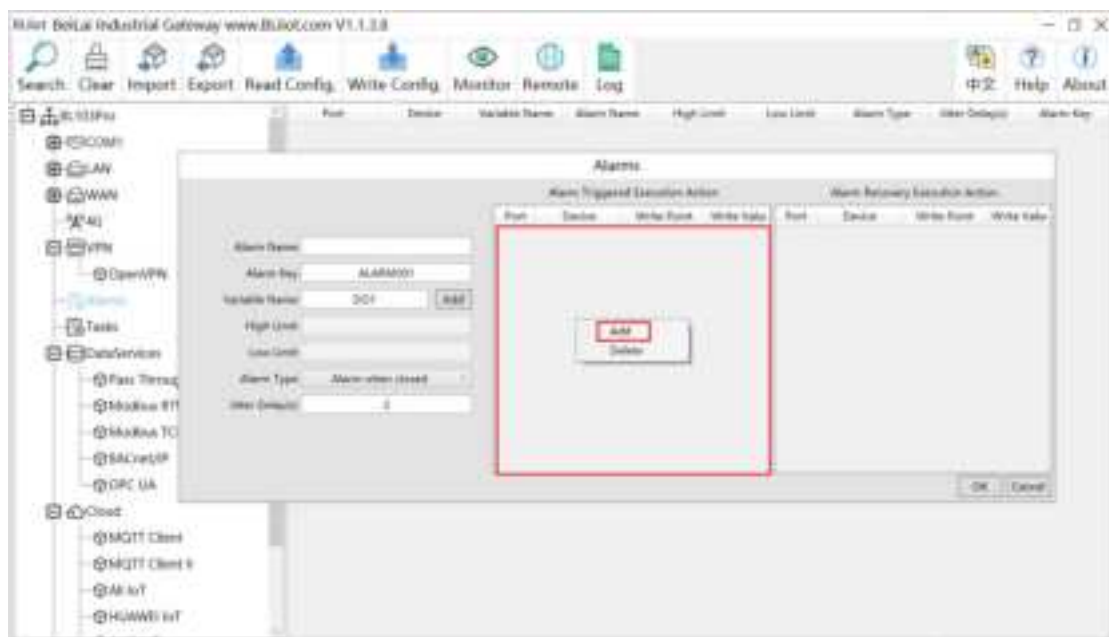


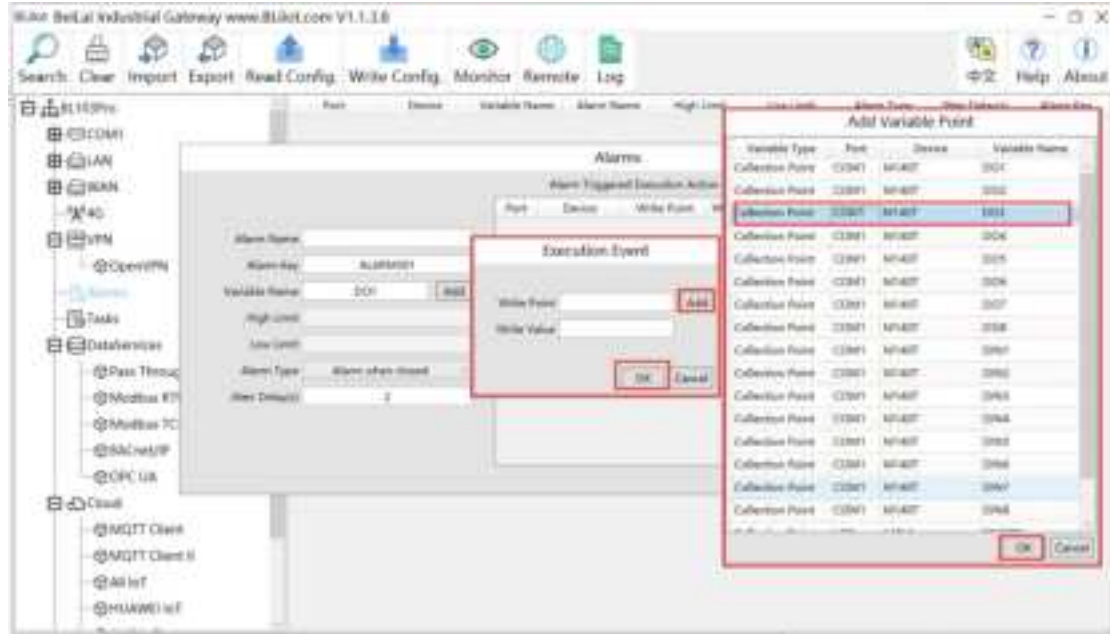
Alarms	
Item	Description
Alarm Name	Name of Alarm Point
Alarm Key	The MQTT identifier of the alarm point, can be filled in arbitrarily
Variable Name	Select the data point. Click "Add" to pop up the data point, click the data point to set the alarm, and click "OK".
High Limit	High Limit alarm value of numeric data points
Low Limit	Low limit alarm value of numeric data points
Alarm Type	Select from Alarmed when closed/opened

Jitter Delay	Within alarm acknowledge time, if data recovered, then no alarm will be triggered.
OK	Confirm alarms setting
Cancel	Cancel alarms setting

4.2.8.2 Alarm Event Configuration

Put mouse in "Alarm triggered execution action", right click the prompt box, click "Add" to enter event configuration box, and set the operation to be performed when the alarm is triggered. In the same way, put mouse on "Alarm recovery execution action", set operations when the alarm release.

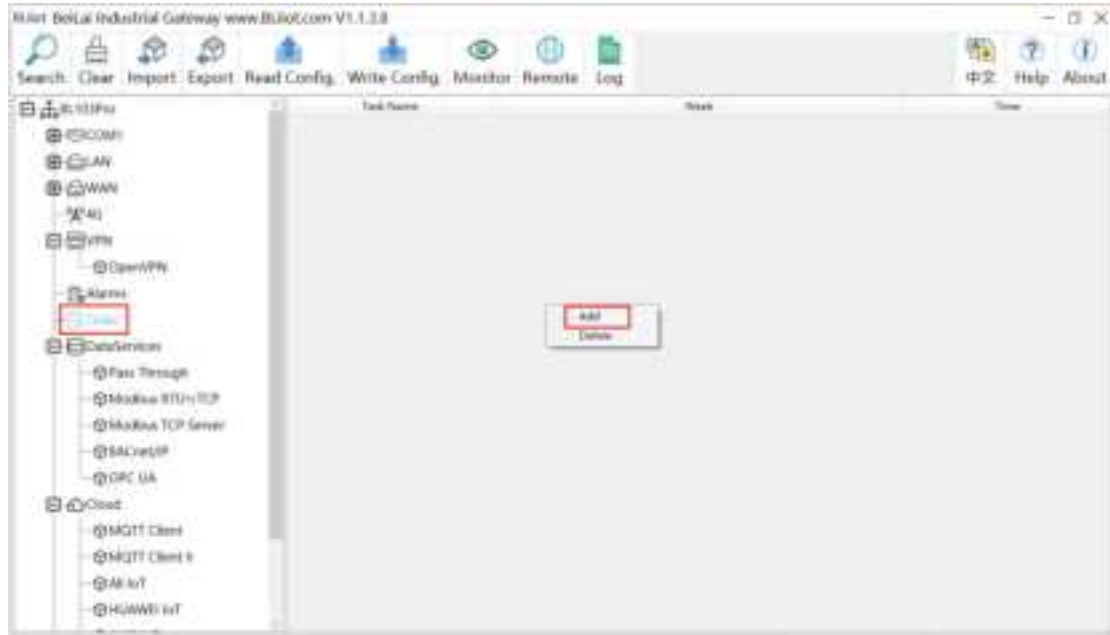


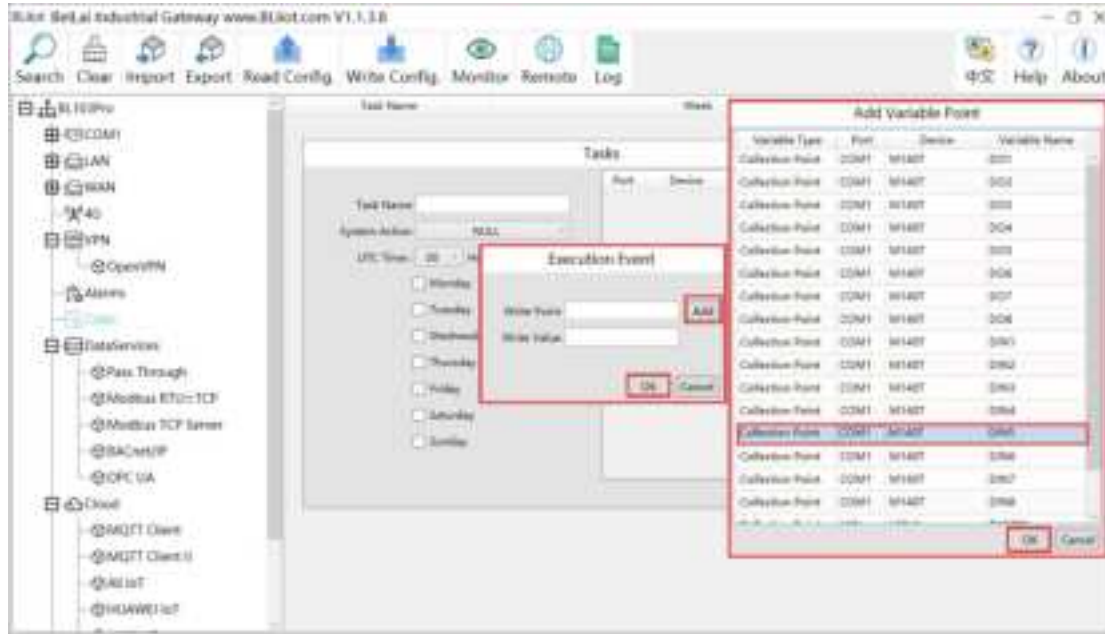


Alarms	
Item	Description
Write Name	Generate the point name according to the selected data point, click "Add" to select the data point to be operated. Click on the data point and click OK
Write Value	Write the value of the data point to be operated, write "1" or "0" for Boolean, "0" means open, "1" means close.

4.2.9 Task Schedule Configuration

Left click on "Task", move the mouse to the right box, click the right mouse, "Add" will pop up, click "Add", to enter task schedule setting box, put the mouse in the box, and right click to enter the operation box, click "Add", to enter Execution Event box.



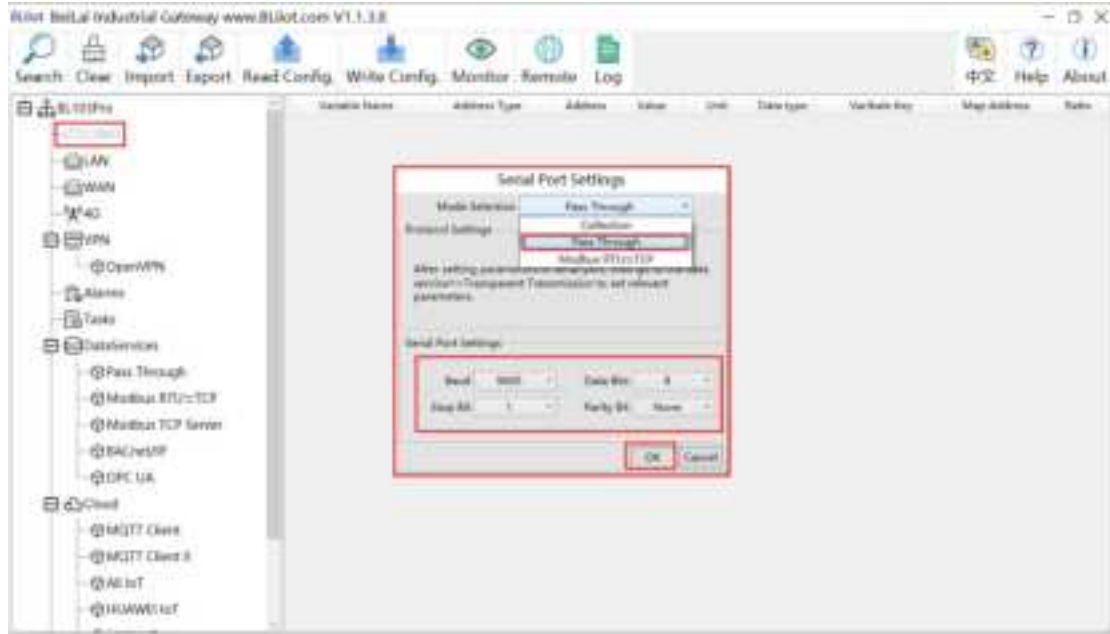


Tasks	
Item	Description
Task Name	Name of Task Schedule
System Action	Can set to restart the gateway device regularly. If it is to schedule other actions, select "NULL" for this item.
UTC Time	Set the time for task scheduling, this time is UTC time.
Week	Set the week of the task schedule
Write Point Name	Generate the point name according to the selected data point, click "Add" to select the data point to be operated. Click on the data point and click OK
Write Point Value	Write the value of the data point to be operated, write "1" or "0" for Boolean, "0" means open, "1" means close.
OK	Confirm Task Configuration
Cancel	Cancel Task Configuration

4.2.10 Data Services

4.2.10.1 Transparent Transmission

At first, set the COM mode to "Pass Through", then set the COM parameters, at last go to "Pass Through" of "Data Services" to configure it.



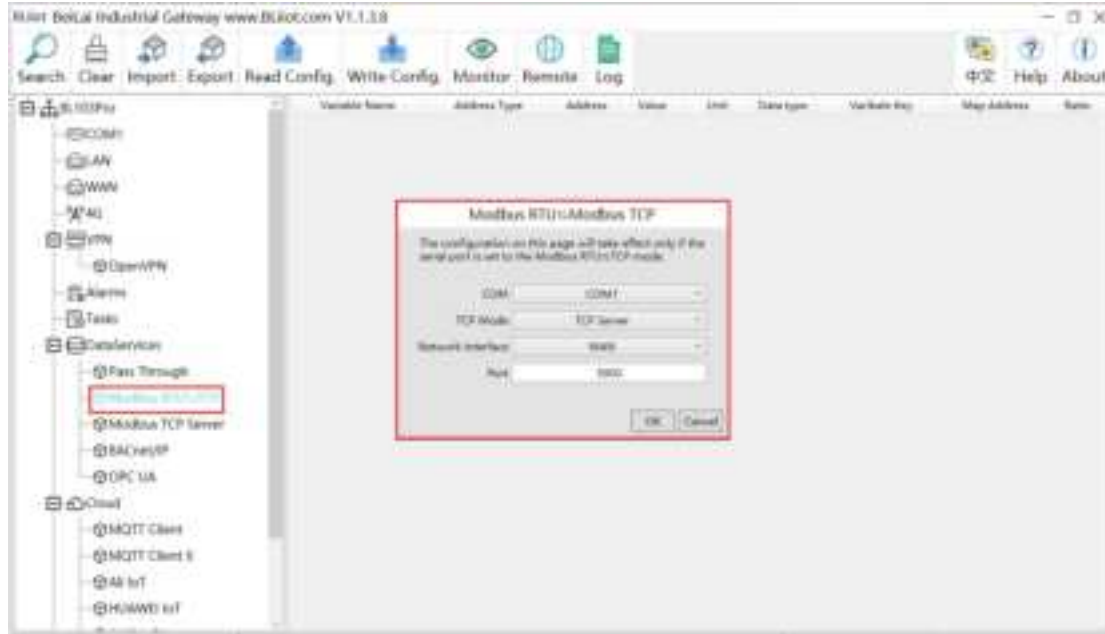
Pass Through	
Item	Description
COM	COM1
TCP Mode	Select gateway device as "TCP Server" or "TCP Client"
Network Interface	It can only be configured when the gateway device is used as the server. Select from "WAN", "LAN".
IP /Domain Name	Gateway device used as server, it cannot be configured, and the selected "WAN" or "LAN" IP will be displayed automatically. Gateway device used as client, fill in the IP/domain name that

	is transparently transmitted to the server.
Port	Gateway device used as server, it is shown as monitoring port, must be filled in. Gateway device used as client, it is shown as server port, must be filled in.
Login Message	Data package of register connecting server, which can only be filled in when the gateway device acts as a client.
Login ACK Message	Data packet of server responds to the register, which can only be filled in when the gateway device acts as a client.
Heartbeat Message	The heartbeat data packet for maintaining the connection can only be filled in when the gateway device acts as a client.
Heartbeat ACK Message	The server responds to the heartbeat data packet, which can only be filled in when the gateway device acts as a client.
Heartbeat Interval	Cycle time of sending heartbeat package. Default is 60s, which can only be filled in when the gateway device acts as a client.
OK	Confirm Transparent Transmission Configuration
Cancel	Cancel Transparent Transmission Configuration

4.2.10.2 Modbus RTU to Modbus TCP

First set the COM mode to "Modbus RTU to TCP", and set the COM parameters, and then go to "Modbus RTU to TCP" in "Data Services" to configure.

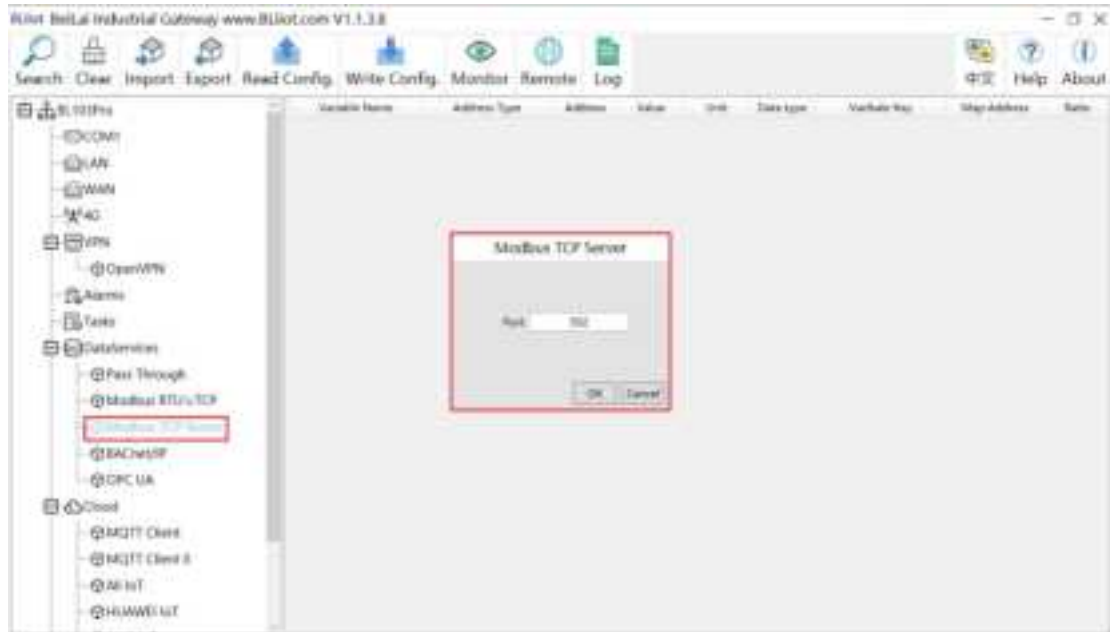




Modbus RTU to Modbus TCP Configuration	
Item	Description
COM	COM1
TCP Mode	TCP Server, Gateway can only be TCP Server
Network Interface	Select from "WAN" or "LAN"
Port	Fill in the port that monitor the device. Must be filled in.
OK	Confirm Modbus RTU to Modbus TCP configuration
Cancel	Cancel Modbus RTU to Modbus TCP configuration

4.2.10.3 Modbus TCP Server

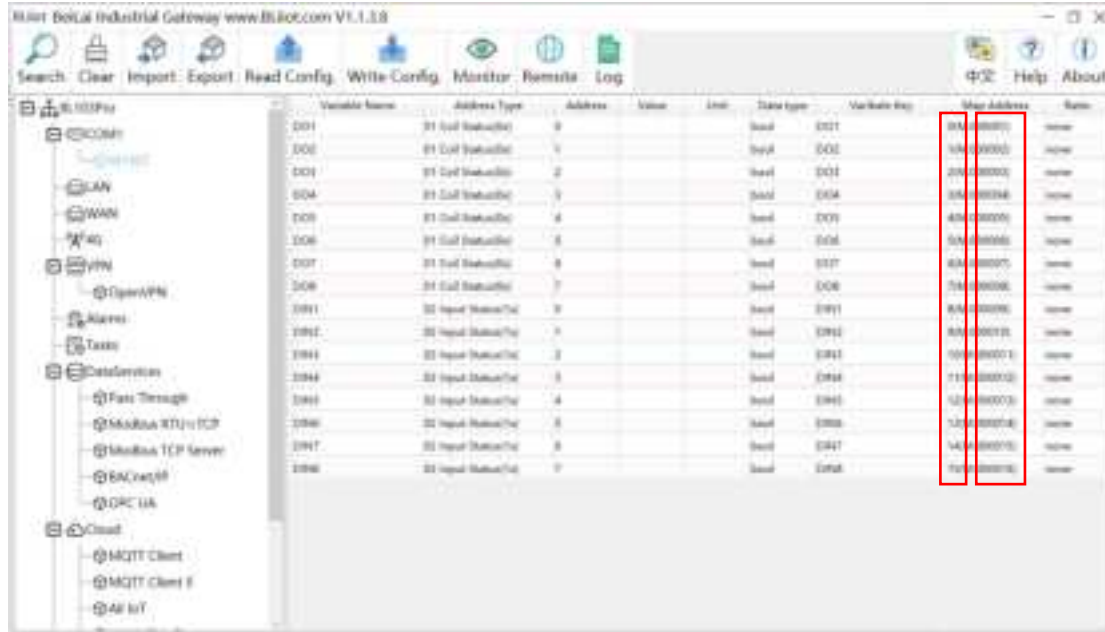
BL103 gateway supports the Modbus TCP protocol and provides external data through the Modbus TCP server. Modbus TCP Server is always enabled, just configure the monitoring port of the device. The IP address of the Modbus TCP server can be selected according to the requirements of WAN or LAN. Click "WAN" and "LAN" to view the IP address of WAN and LAN.



Modbus TCP Server Configuration

Item	Description
Port	Fill in the monitoring port, the port must be filled in.
OK	Confirm Modbus TCP Server setting
Cancel	Cancel Modbus TCP Server setting

Modbus TCP host computer is used as the client, and the function codes supported are: Boolean value supports "01", "05", and numerical value supports "03", "06". The 16-bit byte sequence is AB and the 32-bit byte sequence is ABCD. Follow master computer to put Modbus address or the PLC Modbus address (the outside of the mapped address on the configuration software indicates the Modbus address, and M.XXX indicates the PLC Modbus address). For the specific address, see the data point page as shown below, and the host computer configuration You can refer to: [5.4.2 View and send command by KingView](#)



4.2.10.4 BACnet/IP

Note: BL101 does not support BACnet/IP.

BACnet standard is designed for heating, ventilation, air conditioning, and refrigeration control equipment, and also provides a basic principle for the integration of other building control systems (such as lighting, security, fire protection, etc.).

BL103 gateway acts as a BACnet/IP server to provide data. Because the data attributes of various protocols are different, the two object attributes of AV and BV are unified to provide data for the current value. The example is the Modbus address of the data point page map address item on the configuration software.



BACnet/IP configuration	
Item	Description
Enable	Disabled by default, click the button to enable. Gray: Not enabled, Green: Enabled.
Network Interface	Select from "WAN" and "LAN"
Port	Fill in the server port, the port must be filled in. Default: 47808.
Vendor name	Default "BeiLai", can be filled in arbitrarily.
Vendor Identifier	Default "555", can be filled in arbitrarily.
Device name	Default "BeiLai Gateway", can be filled in arbitrarily.
Device ID	Default is "555", the device object instance, if there is also a BACnet device in the downlink, be careful not to conflict.
Object Description	Default "BACnet Server", can be filled in arbitrarily.
Location	Default "CN", can be filled in arbitrarily.
OK	Confirm BACnet/IP configuration
Cancel	Cancel BACnet/IP configuration

Note: The choice of WAN or LAN not only stipulates that the network port of the BACnet/IP service port is provided for the uplink, but also downlink collection of BACnet/IP.

BACnet/IP host computer data acquisition configuration, please refer to: [5.4.4 View and send Command by KEPServerEX 6](#)

BACnet/IP data points can be extracted from the gateway and automatically generated, do not need to be filled in.

4.2.10.5 OPC UA

BL110 supports OPC UA and provides data as OPC UA server.

The IP address of the OPC UA server can be selected according to the requirements of WAN or LAN. Click "WAN" and "LAN" to view the IP address of WAN and LAN.



OPC UA Configuration	
Item	Description
Enable	Disabled by default, click the button to enable. Gray: Disabled, Green: Enabled.
Port	Fill in the server port, the port must be filled in. Default: 4840
Anonymous	Disable by default. Gray: Enabled, Green: Disabled.
User	Fill in the user name
Password	User password
Security strategy	Choose from "none", "basic256", "basic128rsa15", "basic256sha256".
Certificate	OPC UA certificate, select File Upload.
PrivateKey	OPC UA key, select File Upload.
OK	Confirm OPC UA Configuration
Cancel	Cancel OPC UA Configuration

OPC UA Client data acquisition configuration, please refer to: [5.4.6 View and send Command by UaExpert](#)

OPC UA Client data points can be directly extracted from the gateway and automatically generated, and do not need to be filled in. The name of the data point is composed of the device name on the configuration software and the variable name, and the Node id is

composed of the device name on the configuration software and the data point label of the device.

4.2.11 Cloud Platform

BL103 gateway supports multiple platforms online at the same time

4.2.11.1 MQTT Client

MQTT Client can be connected to cloud with certificate or without certificate.

MQTT Client data format only supports JSON data format of "KingPigeon", "thingsboard", and "sparkplug b". MQTT data format can be customized. More JSON data format and customized JSON data format will be supported in the future.

Connect to the ThingsBoard platform, select JSON data format of "thingsboard-telemetry-gateway". ThingsBoard platform domain name is thingsboard.cloud. Connect to a platform that supports Sparkplug B, such as the ignition, select the JSON data format of "sparkplug b", click the button next to the data template item, configure the group ID and edge node ID in the configuration box.

MQTT Client supports multiple publishing topics, click "Add" in the publishing topic item to fill in the publishing topic, and you can view the publishing topic name in the drop-down box of the publishing topic item. Select the release topic name and click "Delete" to delete the release topic to be deleted.

MQTT Client also supports the selection of different data points for each publishing topic to publish. Put the mouse cursor in the right box, click the right button, a prompt box will pop up, click "Add", a data point box will pop up, click the data point to be published, Click "OK".

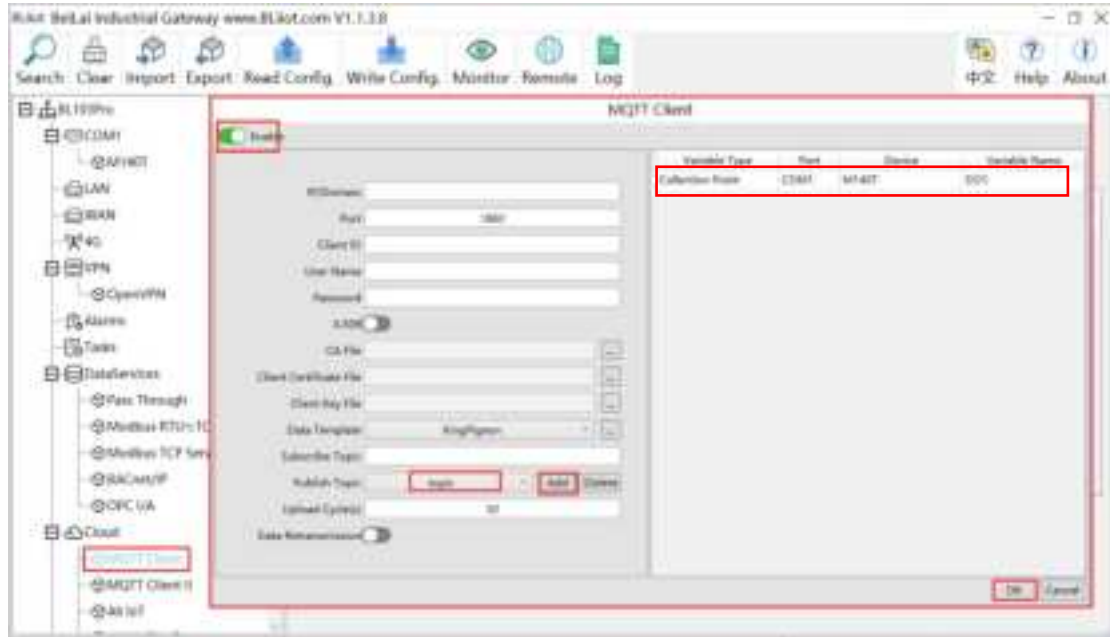
Double-click a data point to view the properties. As shown in the figure below: The publishing topic "topic" only publishes the data point "DO1" of the "M140T" device of "COM1", and other data points are not published.

The "KingPigeon" JSON data format of MQTT Client and MQTT Client II is the same as that of KingPigeon MQTT. Refer to: [5.4.19 King Pigeon MQTT Data Format](#).

"thingsboard-telemetry-gateway" JSON data format, publish and subscribe topic format refer to the thingsboard official website documentation.

"sparkplug b" JSON data format, publish and subscribe topic format refer to Sparkplug specification

Note: The data point box is blank by default, if no data point is selected, all data points are published. If there are multiple publishing topics, only one publishing topic can be blank, and other topics must select the published data points, and cannot be left blank.



MQTT Client Configuration	
Item	Description
Enable	Green indicates MQTT Client is enabled Gray indicates MQTT Client is disabled
IP/Domain Name	Fill in the IP/domain name to connect to the MQTT server
Port	Fill in the port to connect to the server, default is 1883, the port must be filled in.
Client ID	The client identifier used in the MQTT connection message, and the server uses the client identifier to identify the client.
User Name	The username used in the MQTT connection message, the server can use it for authentication and authorization.
Password	The password used by the MQTT connection message, the server can use it for authentication and authorization.
X.509	Click the button to enable. Gray: Disabled, Green: enabled.
CA File	Select File Upload(Select Certificate Connection to fill in)
Client certificate file	Select File Upload(Select Certificate Connection to fill in)
Client Key file	Select File Upload(Select Certificate Connection to fill in)
Data template	Json data format selection, choose from "KingPigeon", "thingsboard-telemetry-gateway", "sparkplug b", "yundee", "dl". Default: KingPigeon. Some data templates have special configuration, click the button next to it to configure, such as the group ID and edge node ID of the "sparkplug b" template.
Subscribe Topic	Topic of MQTT subscription message. After subscription, the server can send a publish message to the client for control.

Publish Topic	Topic of MQTT publishing message. It's used for MQTT to identify message channel of sending valid load data. Wildcard can't be included in publishing message topic name. Click Add to add more public topics. Click Delete to delete Public Topic
Uploading Cycle	Cycle time of MQTT data sending. Default is 30s
Data Retransmission	Green indicates offline data will be transmitted once network recovers; Gray indicates retransmission disable. Max 100,000 data points can be re-transmitted. The previous ones will be deleted if data point more than that.
Selection of published data points	Default is blank, means all data uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.
OK	Confirm MQTT Client setting
Cancel	Cancel MQTT Client setting

4.2.11.2 MQTT Client II

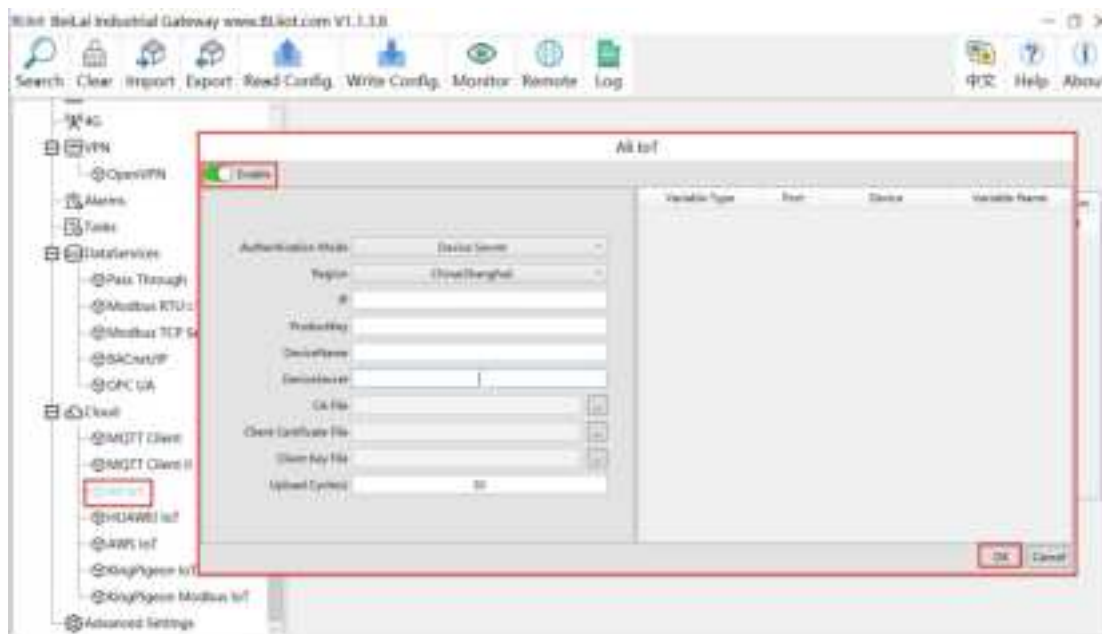
MQTT Client II Configuration is the same as MQTT Client

MQTT Client II configuration refer to [4.2.11.1MQTT Client](#)

MQTT Client II subscribe topic will not be working. MQTT Client Two is used for view data but not control data from cloud.

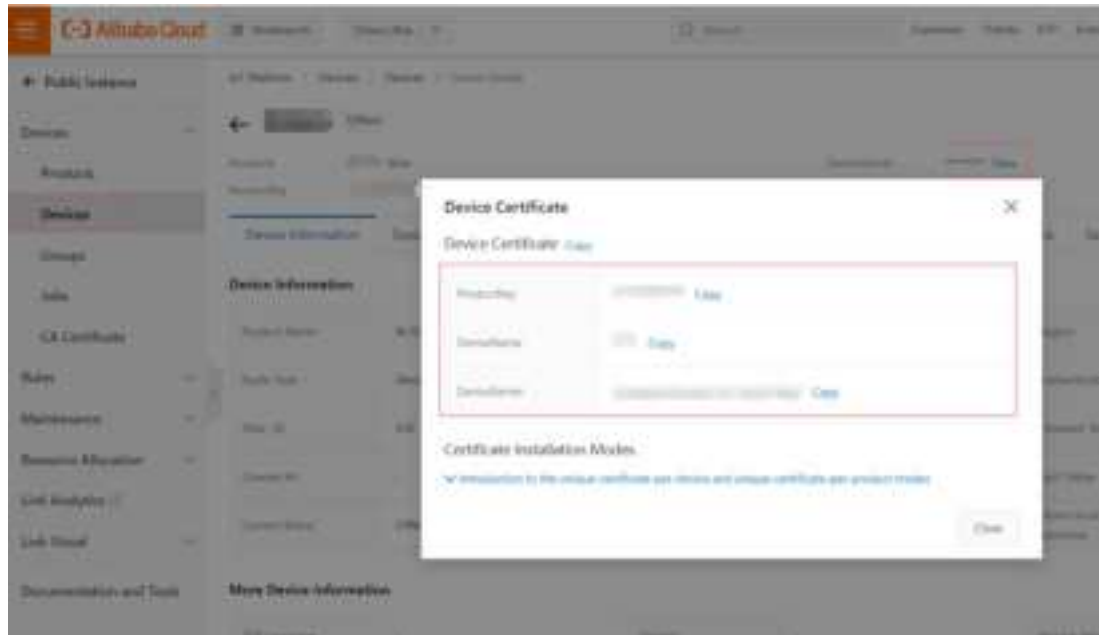
MQTT Client II and MQTT Client“KingPigeon”JSON data format is the same as that of King Pigeon MQTT. Refer to [5.4.19 King Pigeon MQTT Data Format](#)

4.2.11.3 Alibaba Cloud

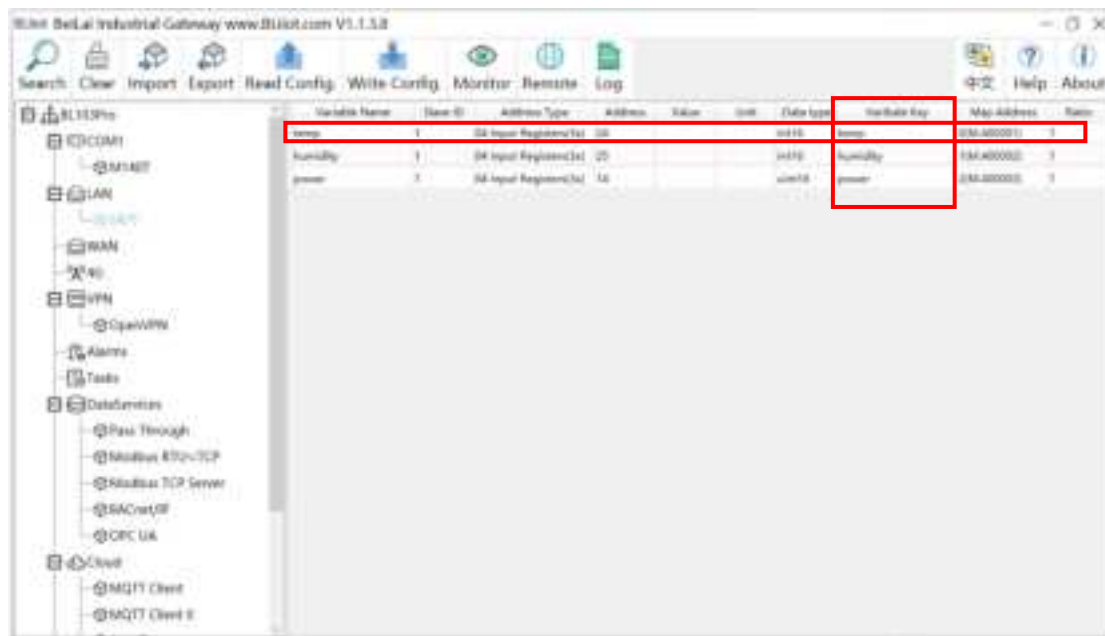
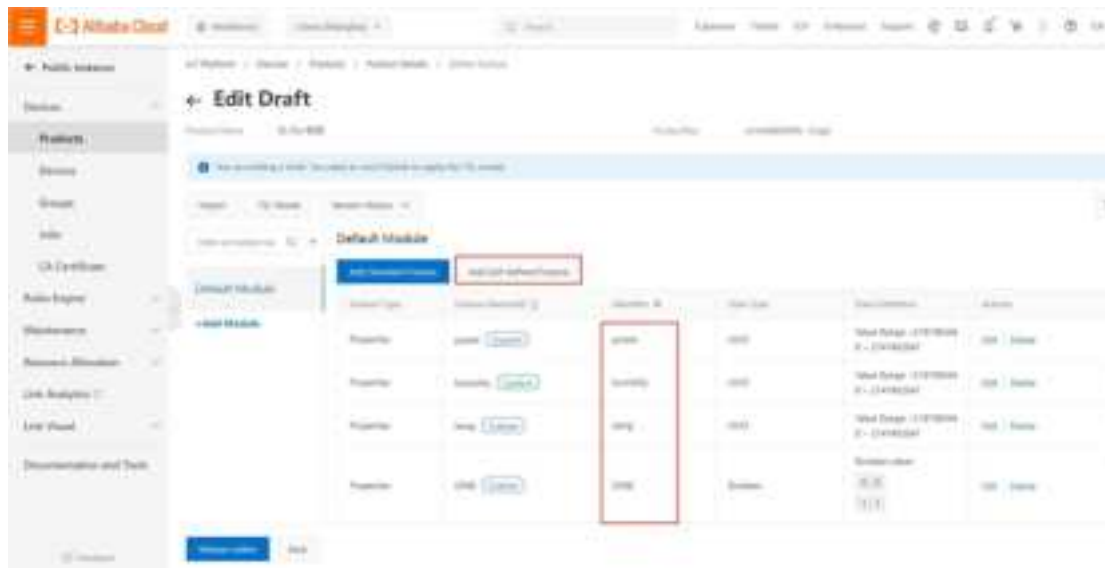


Alibaba Cloud Configuration	
Item	Description
Enable	Green indicates Ali Cloud is enabled Gray indicates Ali cloud is disabled
Authentication Mode	Default is key connection. Select the key or certificate according to your needs, and choose from "Device Secret" and "X.509".
Region	Select Alibaba Cloud Region, default is China(Shanghai)
IP	The IP address of Alibaba Cloud Enterprise Edition, not required for the public edition.
ProductKey	Set the same ProductKey as the one in Ali Cloud. See below image (Device-Click DeviceSecret to view it)
DeviceName	Set the same DeviceName as the one in Ali Cloud See below image (Device-Click DeviceSecret to view it)
DeviceSecret	Set the same DeviceSecret as the one in Ali Cloud See below image (Device-Click DeviceSecret to view it)
CA File	Select File Upload(Select Certificate Connection to fill in)
Client certificate file	Select File Upload(Select Certificate Connection to fill in)
Client key file	Select File Upload(Select Certificate Connection to fill in)
Uploading cycle	Cycle time of data sending. Default is 30s
	Default is blank, means all data uploaded. In the box on the right,

Selection of published data points	click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.
OK	Confirm Alibaba Cloud setting
Cancel	Cancel Alibaba Cloud setting



Alibaba Cloud platform model is under development, so data points need to be added one by one. Adding data points is as shown in the figure below: Only the identifier of the Alibaba Cloud platform needs to be consistent with the variable label on the configuration software. For example, if the S475 data point temp is collected, and the configured variable label is "temp", the identifier of the data point added on the Alibaba Cloud platform must be "temp", and the function name and the variable name on the configuration software can be different.



Note: Alibaba Cloud devices shadow is not supported, send command through online debugging.

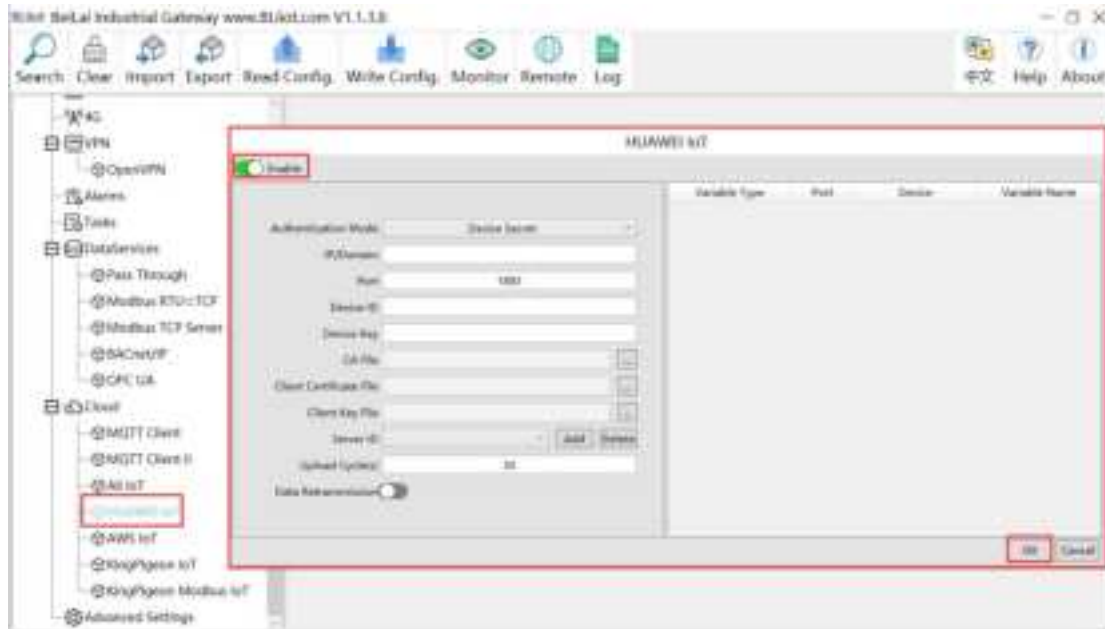
4.2.11.4 HUAWEI Cloud


HUAWEI Cloud can be connected with or without Certificate.


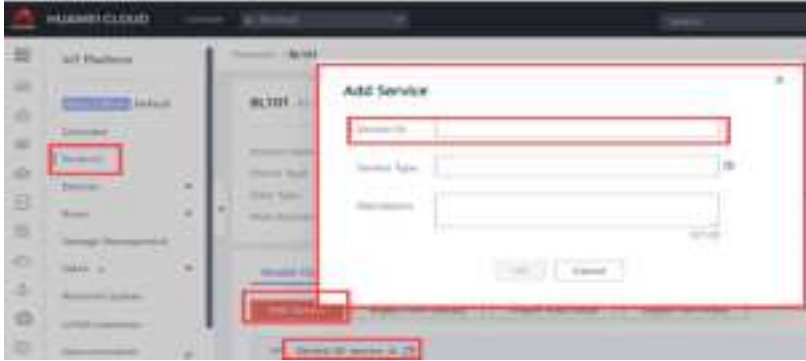
It supports multiple service IDs. Click Add to set Service ID. ID can be viewed from the drop-down list. Click Delete to delete service ID. HUAWEI Cloud supports uploading certain datapoints of each Service ID. Right click the box and click Add to enter datapoint dialog box. Select the datapoint to upload and click OK to confirm it.

Note: 1. Datapoint box is blank by default which means all datapoints will be uploaded. If there' re multiple Service IDs, only one Service ID datapoint box can be blank. Datapoints for uploading must be selected for other Service IDs.

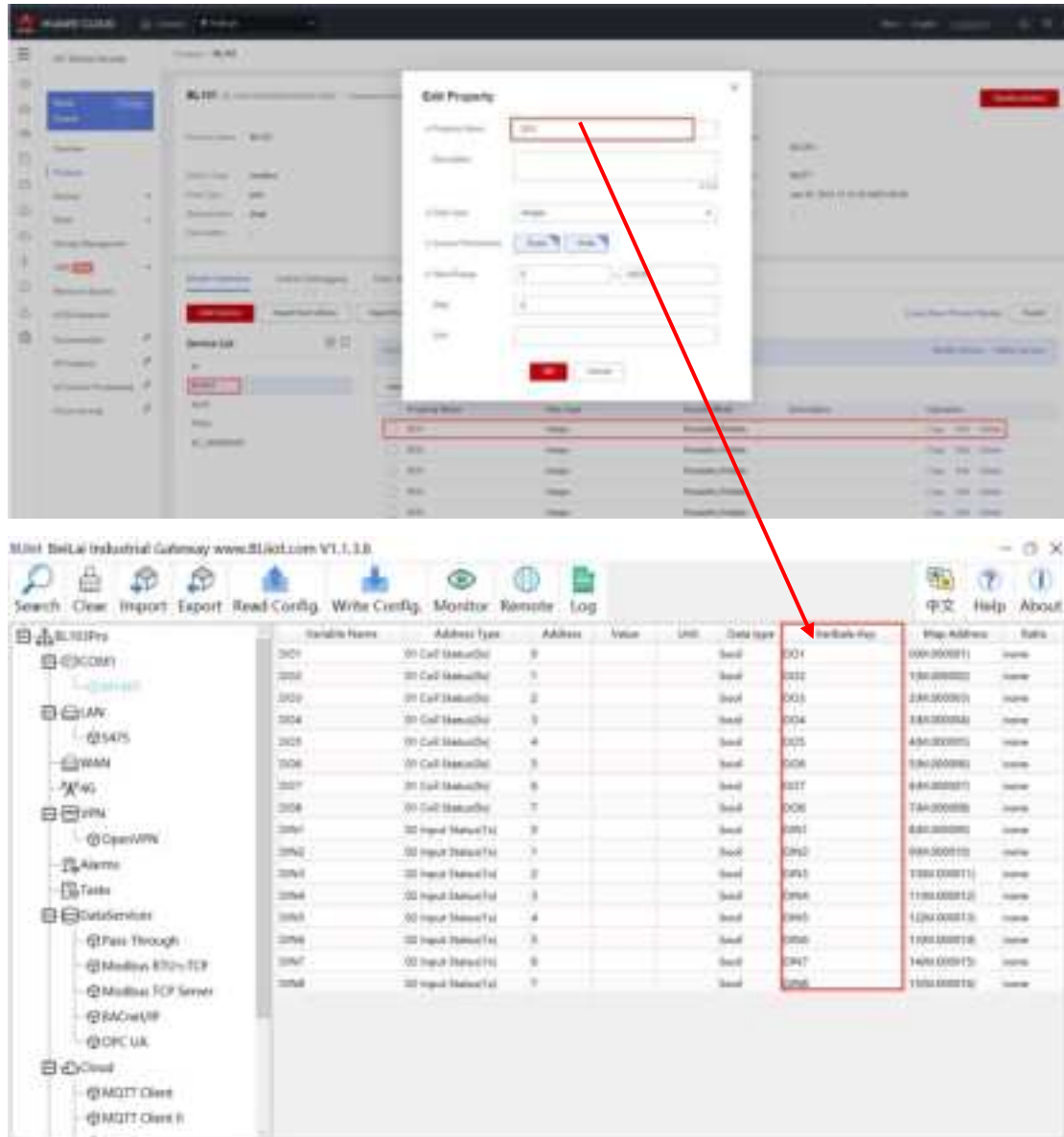
2, HUAWEI Cloud devices shadow is not supported, send command through synchronization command.



HUAWEI Cloud Configuration	
Item	Description
Enable	Default is not enable, Green indicates HUAWEI Cloud is enabled Gray indicates HUAWEI cloud is not enabled
Authentication mode	Default is key connection. Select the key or certificate according to your needs, and choose from "Device Secret" and "X.509".
IP/Domain Name	Select connecting to HUAWEI Cloud via MQTT to enter console. Click Overview to get server IP address of device connection 
Port	Default is 1883, fill in 1883 for connecting with Secret Key, fill in 8883 for connecting with Certificate (Required)

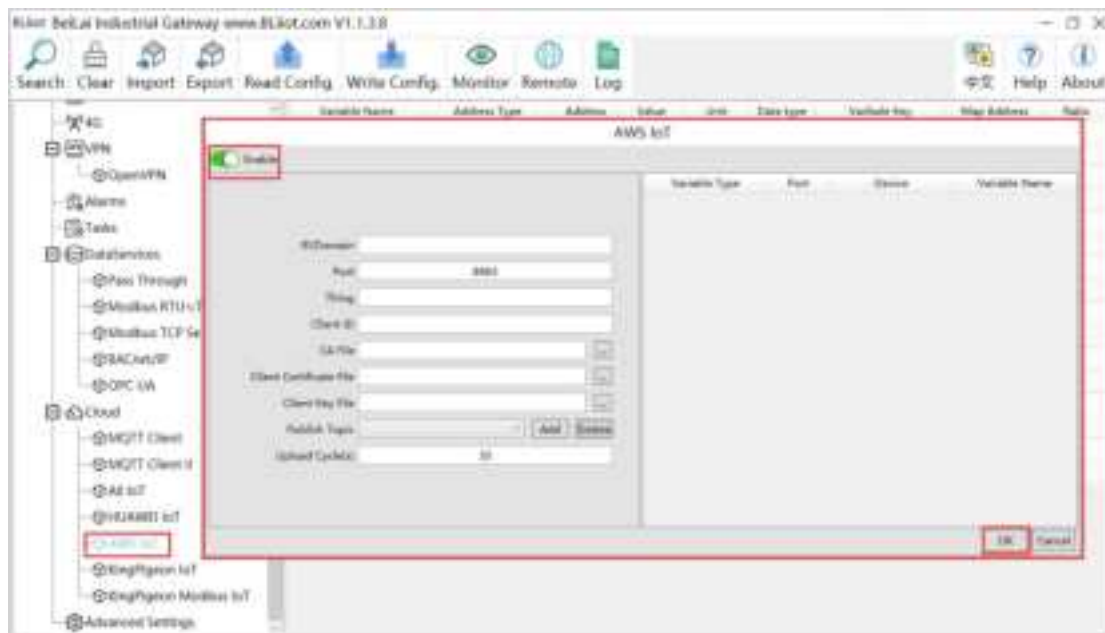
Device ID	<p>Set the same ID as the one in HUAWEI Cloud(Device-Device ID)</p> 
Device Key	<p>Set the same Device Secret Key as the one in HUAWEI Cloud when creating device in HUAWEI Cloud. It can be reset in device authentication if forgot. (Not necessary if connecting with certificate is selected)</p>
CA File	Select File Upload(Select Certificate Connection to fill in)
Client certificate file	Select File Upload(Select Certificate Connection to fill in)
Client key file	Select File Upload(Select Certificate Connection to fill in)
Server ID	<p>Set the same Service ID as the one in HUAWEI Cloud. (IOT Platform-Products-Add Service-Service ID)</p>  <p>支持添加多个服务 ID。</p>
Upload cycle	Cycle time of data uploading. Default is 30s
Data Retransmission	Green indicates offline data will be transmitted once network recovers; Gray means retransmission disable. Max 100,000 data points can be re-transmitted. The previous data will be deleted If more than that.
Selection of published data points	Default is blank, means all data uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.
OK	Confirm HUAWEI Cloud setting
Cancel	Cancel HUAWEI Cloud setting


HUAWEI CLOUD platform data point settings are as follows: If multiple service IDs are set on the configuration software, and each service ID has different data points, the HUAWEI CLOUD platform needs to add attributes to the corresponding service IDs. The attribute name is filled with the variable label of the corresponding data point on the configuration software. For example, if the M140T data point DO1 is collected, and the variable label on the configuration software is "DO1", the attribute name of the attribute added on HUAWEI CLOUD should be "DO1".

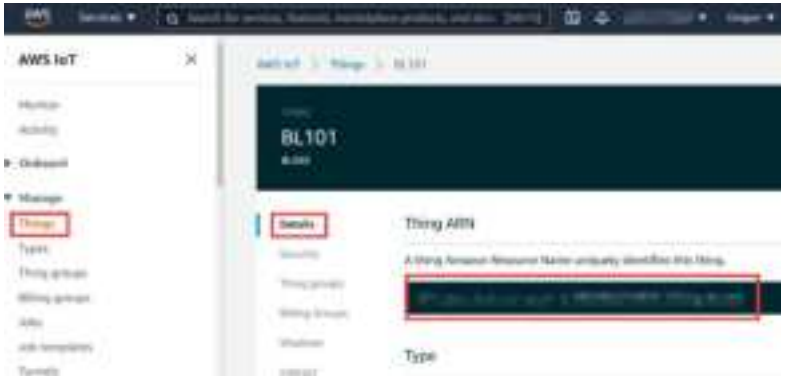




4.2.11.5 AWS(Amazon Web Service)

Note: 1. Data point box is blank in default which means all data points will be published. If multiple topics are published, only one topic data point box can be blank. For other topics, data points for publishing must be selected. 2. AWS Cloud shadow function is not supported.



AWS Configuration	
Item	Description
Enable	Default is disable. Green indicates AWS is enabled Gray indicates AWS is disabled
IP/Domain Name	Fill in the terminal node, enter the console, and click "Things" - "Interact". 
Port	8883(Required)
Thing	Fill in the ARN

	
Client ID	<p>Fill in AWS account ID</p> 
CA File	Select File Upload
Client certificate file	Select File Upload
Client key file	Select File Upload
Publish Topic	<p>Topic created when creating a rule, topic name used by MQTT to publish messages, click "Add" to fill in the published topic name. Click Add to create more Publish Topics. Select Publish Topic and click Delete to delete it.</p> 
Uploading cycle	Cycle time of data uploading. Default is 30s
Selection of published data points	Default is blank, means all data is uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.
OK	Confirm AWS setting
Cancel	Cancel AWS setting

4.2.11.6 King Pigeon Cloud via MQTT

King Pigeon MQTT Data Format refer to: [5.4.19 King Pigeon MQTT Data Format](#)

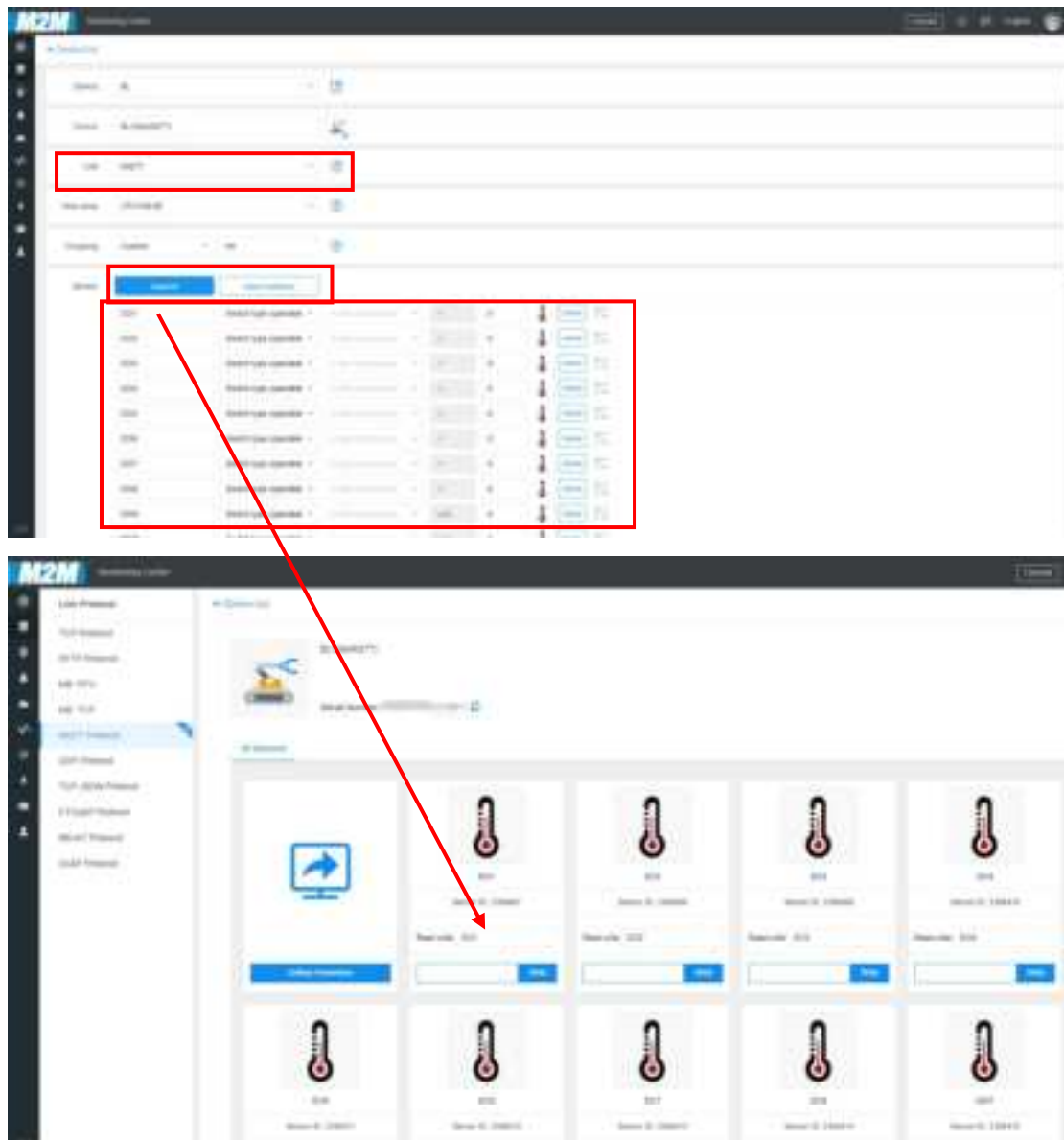
Configure it as below

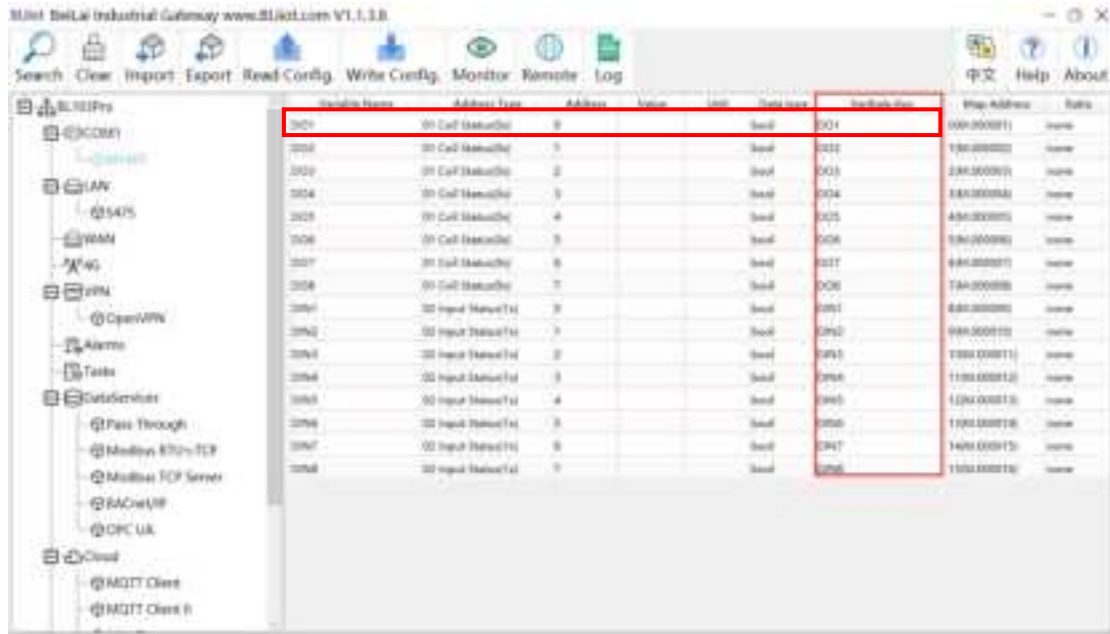


King Pigeon IoT Configuration	
Item	Description
Enable	Green indicates King Pigeon cloud via MQTT is enabled, Gray indicates disabled
IP/Domain Name	1883.dtuip.com
Port	Default 1883, must be filled in
Client ID	Fill in device serial number issued by King Pigeon (Contact King Pigeon sales to get the serial number if required to connect to King Pigeon cloud)
User Name	MQTT
Password	MQTTPW
Subscribe Topic	King Pigeon Device Serial Number/+
Publish Topic	King Pigeon Device Serial Number
Uploading Cycle	Cycle time of MQTT data uploading. Default is 30s
Data Retransmission	Green indicates offline data will be transmitted once network recovers; Gray indicates retransmission disable. Max 100,000 data points can be re-transmitted. The previous data will be deleted if more than that.

Selection of published data points	Default is blank, means all data is uploaded. In the box on the right, click the right mouse button, click "Add", the data point box will pop up, click the data point, and click OK.
OK	Confirm King Pigeon MQTT setting
Cancel	Cancel King Pigeon MQTT setting

King Pigeon MQTT data points configuration. First, add data points, and then go to the setting link protocol item to configure the data point identifier. The identifier of the data point is the same as the variable label on the configuration software. For example: collecting M140T data point DO1, the variable label on the configuration software is "DO1", then the read and write identification on the King Pigeon Cloud should be "DO1". The names of the sensors on the platform can be configured inconsistently in the software.





4.2.11.7 King Pigeon Cloud via Modbus

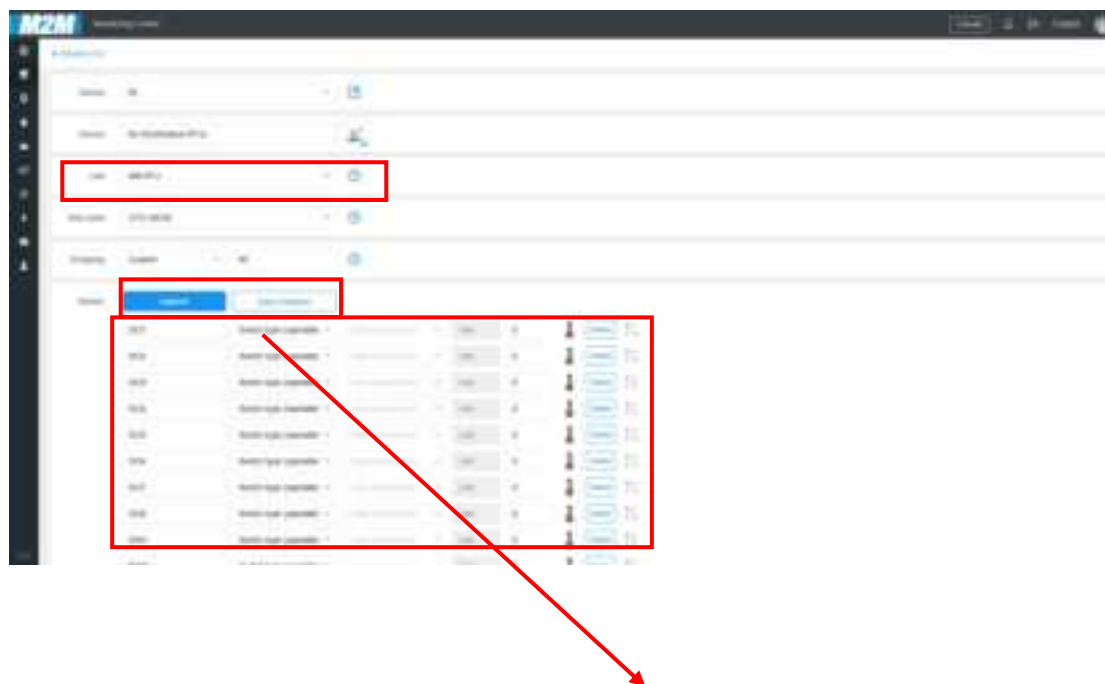
Both King Pigeon Cloud and custom Modbus cloud can be connected via Modbus RTU protocol. BL103 supports function code 01, 05 of Boolean data and function codes 03, 06 of numerical data. 16-bit byte sequence is AB and 32-bit byte sequence is ABCD.

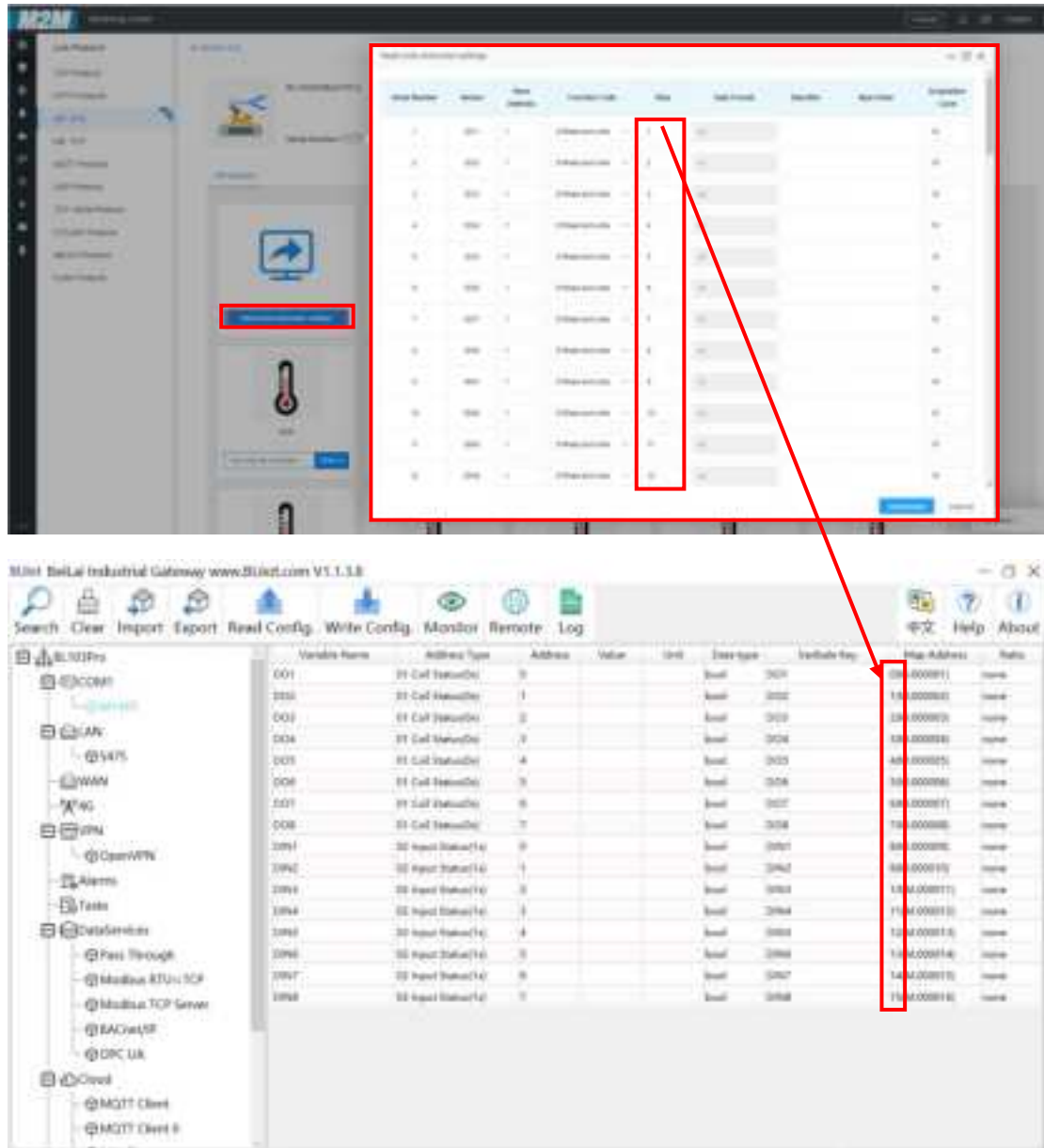


King Pigeon Modbus IoT	
Item	Description
Enable	Green indicates King Pigeon Cloud via Modbus is enabled

	Gray indicates disable
IP/Domain Name	modbus.dtuip.com
Port	Default is 6651, must be filled in
Modbus Station	Set Modbus communication address of this Gateway device
Login Message	Data package of register connect server. Contact King Pigeon sales for serial number if you need.
Login ACK Message	Not required for King Pigeon Cloud, data packet of the server responds to the registered.
Heartbeat message	Q, Heartbeat packets to maintain the connection.
Heartbeat ACK message	A, The server responds with heartbeat packets.
Heartbeat Interval	Cycle time of sending Heartbeat messages, default is 60s
OK	Confirm King Pigeon Cloud via Modbus setting
Cancel	Cancel King Pigeon Cloud via Modbus setting

Configure datapoint in King Pigeon Cloud as below picture. First create datapoint, then configure Modbus ID, function code, address, data format, byte sequence and data collection cycle. Modbus address in King Pigeon cloud and configuration software is deviated by 1. For example: to collect M140T data point DO1, the Modbus mapping address on the configuration software is "0", then fill in "1" for the King Pigeon cloud bias. The names of the sensors on the platform can be configured inconsistently in the software.



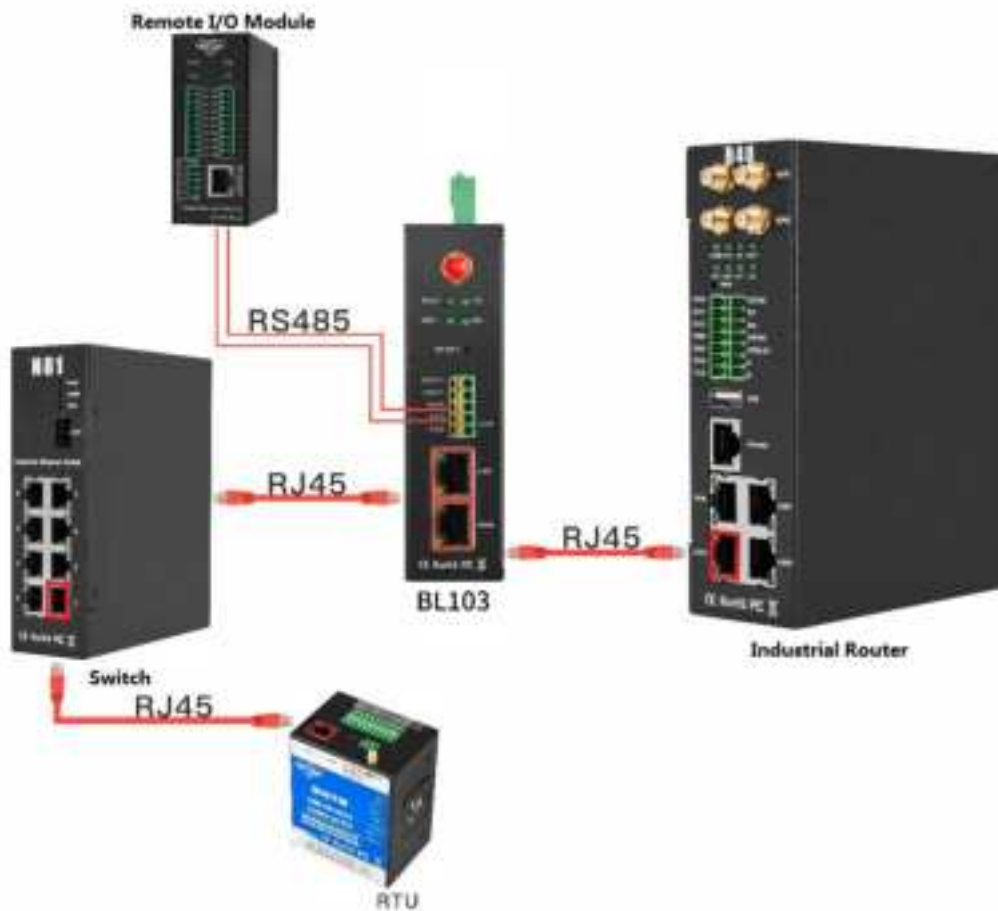


5 BL103 Gateway Application Example

5.1 Modbus Protocol Devices Data Acquisition

Take the COM port to collect the DI and DO data of the remote I/O module M140T, and the LAN port to collect the data of the RTU S475 as an example. The COM port is collected through the Modbus RTU protocol, and the LAN port is collected through the Modbus TCP protocol. The WAN port of the BL103 is connected to the LAN port of the R40 router, and the R40 router provides the network to the BL103 gateway.

5.1.1 M140T and S475 Connect to BL103

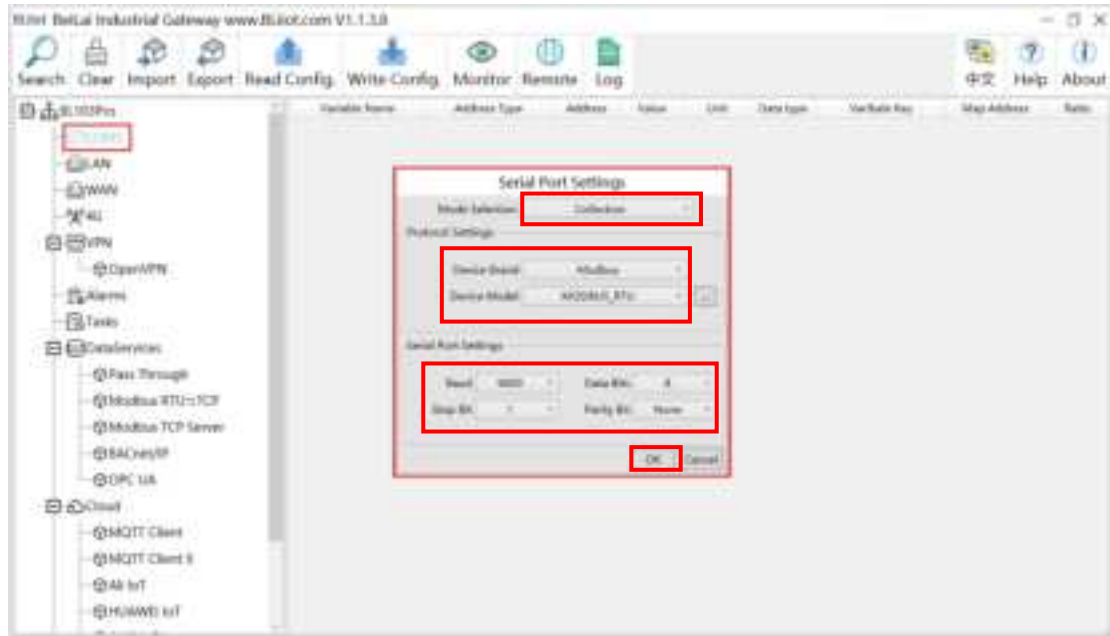


The LAN port of the BL103 gateway is connected to the switch, the S475 is connected to the switch, and the LAN port is used to collect the S475 data through the Modbus TCP protocol. When the LAN port is connected to a switch, the LAN port cannot be connected to network cables from other network segments. Use the COM port to collect the data of the M140T through the Modbus RTU protocol, connect the collected data to the 4G router R40 through the WAN port, and use the routing function of the R40 to upload the data to cloud platform. Note: Both the WAN port and the LAN port can collect data from equipment. The example is to introduce the LAN port collection. The configuration of the WAN collection equipment is the same as the configuration of the LAN.

5.1.2 COM Port Configuration for Data Acquisition

5.1.2.1 COM Port Configuration

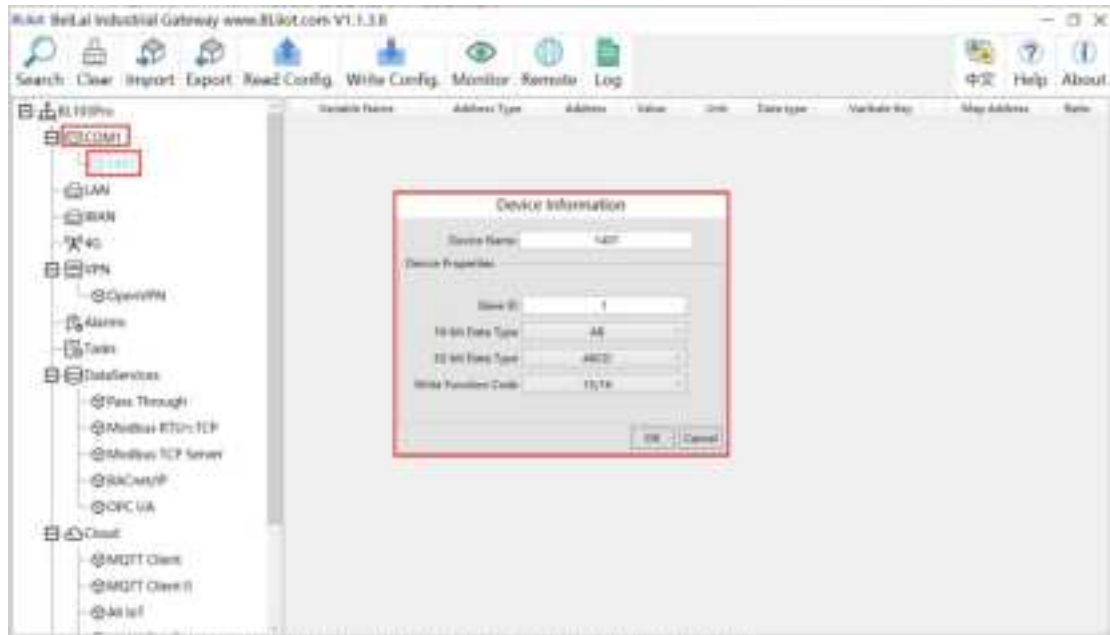
COM collects M140T data through Modbus RTU. The COM port configuration is as follows:



(1) Double-click "COM1" (2) Mode selection: Collection. (3) Because the M140T device is collected through the RS485 COM port, use Modbus RTU protocol, the device brand: Modbus, and the device model: Modbus RTU. The polling interval and timeout are set by default and set according to requirements. (4) The baud rate, stop bit, data bit, and parity bit are configured according to the parameters of the M140T RS485 port, which are consistent with them. (5) Click "OK".

Note: Click "Write Configuration", the gateway device will restart automatically, and the configuration of the COM port will take effect after restarting.

5.1.2.2 Add COM Port Device M140T



1) Click "COM1", right-click, and click "Add" to enter the configuration box. (2) Fill in the device name, such as: M140T. (3) The slave ID is filled in according to the Modbus ID of the acquisition device. For example, the Modbus ID of the M140T is "1", therefore, fill in "1". (4) Select the data type according to the data to be collected. The example is to collect the DI and DO of the M140T, both of which are Boolean type, not numeric type register, select as default. (5) Write function code: As default, M140T supports writing multiple registers. (6) Click "OK" to add the M140T device.

Note: After clicking OK, the added devices will be displayed under COM1, as shown in the figure above. If you want to add multiple devices, repeat steps (1)-(6).

Note: Click "Write Configuration" to restart the gateway device automatically. After restarting, the M140T device with the COM port added will be added successfully.

5.1.2.3 Add M140T Data Point



(1) Click "M140T", right click the box on the right, and click "Add" to enter data point setting box. (2) Variable name: Name the data point, such as: DO1. (3) Variable key, which can be filled in arbitrarily. The identifier cannot be repeated, for example, the MQTT identifier of the DO1 data point is filled in as DO1. (4) Select the acquisition address and choose data format according to the requirements, OCT/DEC/HEX are octal/decimal/hexadecimal respectively. The collected Modbus protocol address is input in decimal, so the example selects decimal. (5) Address type: Select according to the function codes supported by the collected data points. For example, the DO of the collected M140T supports the "01" function code, so select "01 Coil Status", and DI supports the "02" function code, so select "02 Input Status" (6) Address: the register address of the data point, such as: data point DO1 is "0" register address in the M140T, so fill in "0". (7) Data type: Select according to the data point, such as: DI and DO of M140T are both coil types, so select "bool". (8) Add number: If it is collecting continuous addresses, the same function code can be collected multiple times. (9) Read/Write: select automatic identification according to the option of "Address Type". (10) Map address: fill in the address where the collected data points are stored to the BL103 gateway device, which can be filled in at will. Mapped addresses cannot be duplicated. Range: 0-2000. For example, the data collected from DO1 is stored in the "0" register address of the BL103 gateway. The outside of the mapping address on the configuration software represents the Modbus address, and M.XXX represents the PLC Modbus address. (11) Variable unit: fill in as required. (12) Click "OK".

Note: After clicking "OK", the data points will be displayed as shown in the figure above. If you want to continue adding data points, right-click on the box and click "Add" to enter data

point configuration box, repeat (2)--(12) Steps.

Note: Clicking "Write Configuration" will restart the gateway automatically, and the data points added by the M140T will take effect only after the restart.

5.1.3 Ethernet Port Configuration for Data Acquisition

Both the WAN port and the LAN port can collect data from devices, and the configuration principles are the same.

5.1.3.1 LAN Port Configuration

Below is the example of configuring LAN port to connect S475.

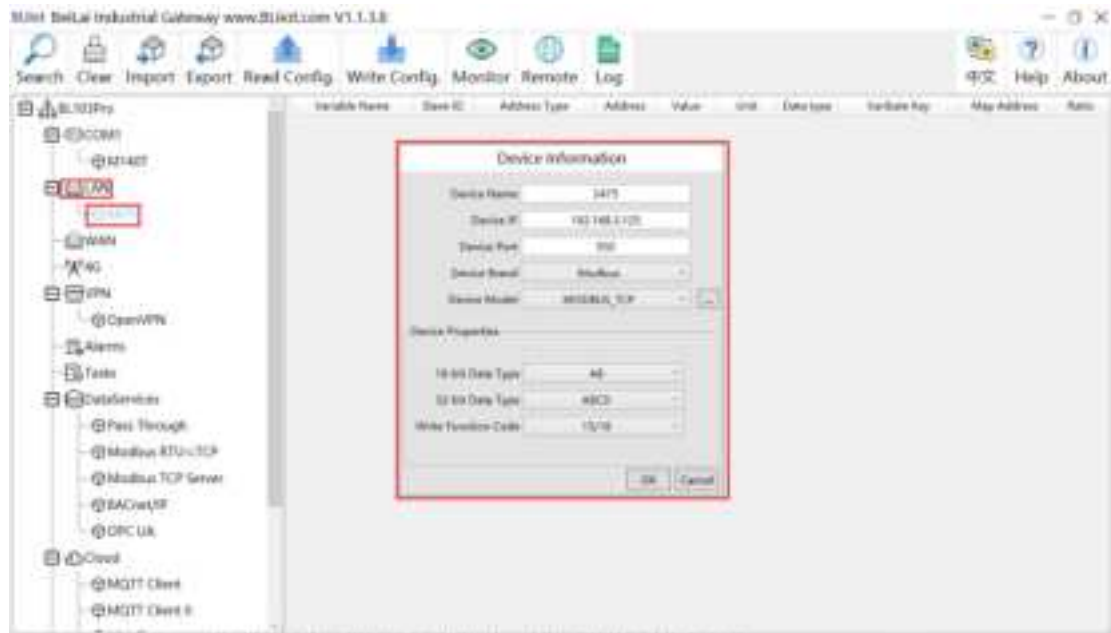


(1) Double-click "LAN" to enter LAN port configuration box. (2) DHCP: It is disabled by default, set according to the needs, such as: S475 is set to automatically obtain IP, so the LAN port DHCP should be enabled. (3) Routing enable: It is turned off by default and can be set according to requirements, such as: only collecting data from the S475 device, so the S475 does not need connect to Internet, so don't need routing function. (4) IP address: Default is 192.168.3.1, and the IP address assigned to the LAN device can only be the address of this network segment. It can be modified. For example: S475 is set to automatically obtain IP, which does not specify network segment of the IP, so no need to modified. (5) Subnet mask, the subnet mask of the LAN port gateway. (6) MAC address: the MAC address of the LAN port. (7) Click "OK".

Note: Clicking "Write Configuration" will restart the gateway automatically, and the configuration of the LAN port will not be changed until the power is turned off and restarted.

Note: The IP address of the LAN port is the IP address that specifies which network segment the LAN port device is. If the IP address of the LAN port device is not the network segment IP set by the LAN, the LAN port cannot collect. It is necessary to change the LAN port IP or change the LAN port device IP. After changing the IP address of the gateway, it must be written into the configuration, and it will take effect after power off and restart.

5.1.3.2 Add LAN Port Device S475

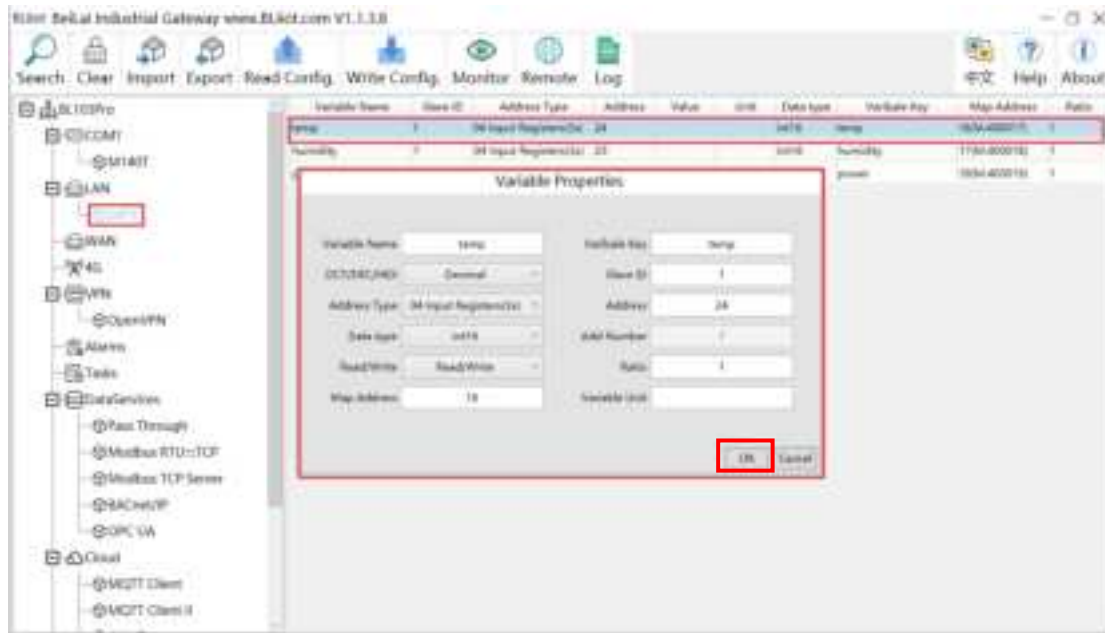


(1) Click "LAN", click the right mouse, click "Add" to enter device configuration box. (2) Device name: Name the device, for example: S475. (3) Device IP: S475 obtains the IP automatically, open the configuration software of the S475 and check the IP of the S475. Because the IP of S475 is: 192.168.3.125, therefore, fill in 192.168.3.125. Note: If the IP of the LAN port is changed, and the LAN device also obtains the IP automatically, click "Write Configuration", after power off and restart, IP of the LAN port device will become the IP address of the changed network segment. (4) Device Port: fill in the port number of the LAN port device, such as: the Modbus TCP port number of S475 is: 502, therefore, fill in "502". (5) The BL103 gateway collects S475 devices through the LAN port, which is a Modbus TCP protocol. Therefore, the device brand: Modbus, and the device model: Modbus TCP. (6) The polling interval and timeout in the button can be defaulted and filled in according to requirements. (7) Select the type of data point. For example, the power supply, temperature and humidity of the S475 are all 16-bit AB-arranged data types, and 32-bit data are not collected. Therefore, the 16-bit data type is AB, and the 32-bit data type is the default. (8) Write function code: choose 15/16, and choose according to the function code supported by the device. (9) Click "OK"

Note: After clicking OK, the added LAN port devices S475 will be displayed, as shown in the figure above. If you want to add multiple devices, repeat steps (1)-(9).

Note: Click "Write Configuration" and the gateway will restart automatically. After restarting, the S475 device added by the LAN port will be added successfully.

5.1.3.3 Add S475 Data Point



(1) Click "S475", right-click the box on the right, and click "Add" to enter data point setting box. (2) Variable name: Name of the data point, such as: temp. (3) Variable key, which can be filled in arbitrarily. The identifier cannot be repeated. For example, the MQTT identifier of the temperature data point is filled in as temp. (4) Select the acquisition address and choose data format according to the requirements. OCT/DEC/HEX are octal/decimal/hexadecimal respectively. The collected Modbus protocol address is input in decimal, so the example selects decimal. (5) Slave ID: The Modbus ID of the S475 device is "1", so fill in "1". (6) Address type: Select according to the function codes supported by the collected data points. For example, the temperature of the collected S475 supports the "04" function code, so select "04 Input Registers". (7) Address: The register address of the data point, such as: the temperature of the data point is the "24" register address in S475, so fill in "24". (8) Data type: according to the data point selection, such as: the temperature and humidity of S475 is a 16-bit signed value type, so select "int16". (9) Add Number: If it is to collect continuous addresses, the same function code can be collected multiple times. (10) Read/Write: support read and write selection according to the collected data. (11) Ratio: Enlarge or shrink how many times to upload to the platform, fill in according to the needs. (12) Map address: fill in the address where the collected data points are stored to the BL103 gateway device, which

can be filled in at will. Mapped addresses cannot be duplicated. Range: 0-2000. For example, the data collected from the temperature of S475 is stored in the “16” register address of the BL103 gateway. The outside of the mapping address on the configuration software represents the Modbus address, and M.XXX in the brackets represents the PLC Modbus address. (13) Variable unit: fill in according to requirements, or not fill in. (14) Click "OK".

Note: After clicking "OK", the data points will be displayed as shown in the figure above. If you want to continue adding data points, right-click on the box and click "Add" to enter data point configuration box, repeat (2)--(14) Steps.

Note: Clicking "Write Configuration" will restart the gateway automatically, and the data points collected from S475 will take effect only after restarting.

5.1.4 Data Upload to Various Platform

No matter what protocol data is collected by the BL103 gateway, the configuration for transmitting the data to each platform is the same. Therefore, this chapter takes the configuration of collecting Modbus protocol data and transferring it to each platform as an example. Refer to [5.4 Data Upload to Various Platform](#)

5.2 Electricity Meter Data Acquisition

5.2.1 COM Configuration for Electricity Meter Data Acquisition

The COM port only supports the collection of DL/T645-2007 protocol electricity meters.

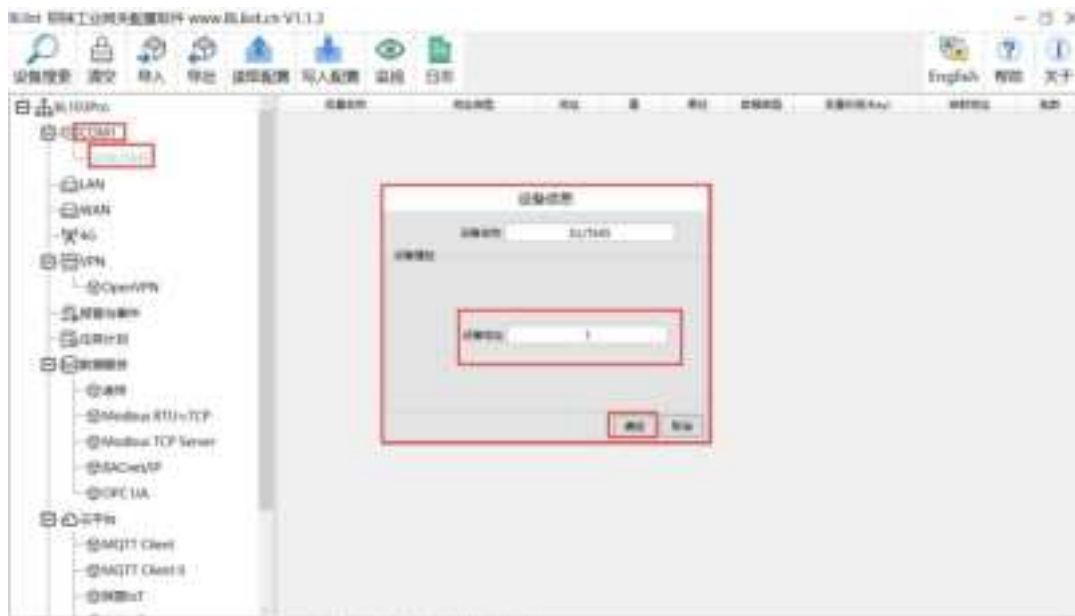
5.2.1.1 COM Port Configuration

Take the COM collects the DL/T645-2007 protocol electricity meter as an example.

Note: DL/T645-2007 only used in China



5.2.1.2 Add COM Port Electricity Meter



5.2.1.3 Add Electricity Meter Data Point



5.2.2 Ethernet Port Configuration for Electricity Meter Data Acquisition

Under development (electric meter IEC101, IEC104 protocol)

5.2.3 Data Upload to Various Platform

No matter what protocol data is collected by the BL103 gateway, the configuration for transmitting the data to each platform is the same. Therefore, this chapter takes the configuration of collecting Modbus protocol data and transferring it to each platform as an example. Refer to [5.4 Data Upload to Various Platform](#)

5.3 BACnet Devices Data Acquisition

BL101 does not support BACnet, only BL103 BACnet IoT gateway supports it.

The BL103 gateway supports the collection of nine objects: AI, AO, AV, BI, BO, BV, MSI, MSO, and MSV. The collected value is the current value attribute of these nine objects.

5.3.1 COM Configuration for BACnet MS/TP Devices Data Acquisition

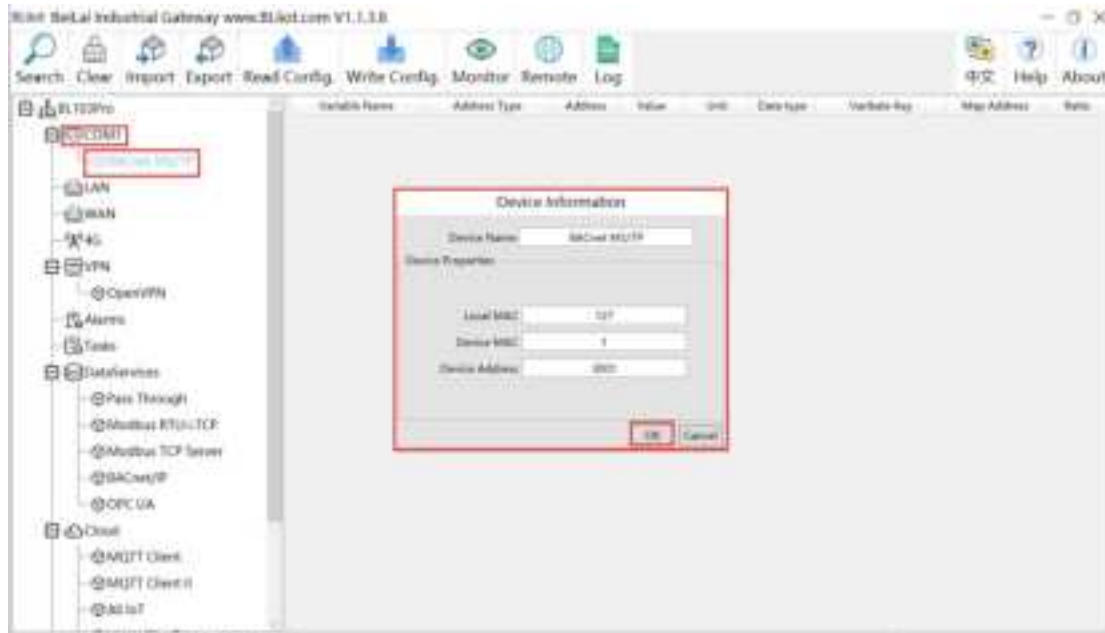
5.3.1.1 COM Configuration

Take the BACnet MS/TP device collected by the COM port as an example, the COM port 485 ports A+ and B- correspond to the A+ and B- ports of the 485 port of the BACnet MS/TP device respectively.



(1) Double-click "COM1" to enter COM property configuration box. (2) Mode selection: Collection. (3) Since it is a BACnet MS/TP device, device brand: select "BACnet", device model: BACnet MS/TP. The polling interval and timeout are set according to requirements. (4) The baud rate, stop bit, data bit, and parity bit are configured according to the parameters of the serial port of the BACnet MS/TP device, and are consistent with them. (5) Click "OK".
Note: Click "Write Configuration" and the gateway device will restart automatically, and the configuration of the COM port will take effect after restarting.

5.3.1.2 Add COM Port BACnet MS/TP Device



(1) Click "COM1", right-click, and click "Add" to enter device configuration box. (2) Fill in the device name arbitrarily, such as: BACnet MS/TP. (3) Local MAC: Fill in as required, default is 127. (4) Device MAC: MAC of BACnet MS/TP device, fill in according to the device. (5) Device address: fill in the instance of the BACnet MS/TP device. (6) Click "OK"

Note: After clicking OK, the added devices(BACnet MS/TP) will be displayed under COM1, as shown in the figure above. If you want to add multiple devices, repeat steps (1)-(6).

Note: Click "Write Configuration" to restart the gateway device automatically. After restarting, the BACnet MS/TP device with COM1 port is added successfully.

5.3.1.3 Add BACnet MS/TP Device Data Points

Collection of analog input objects as an example and the configuration refer to:



- (1) Click "BACnet MS/TP", right-click the box on the right, and click "Add" to enter data point setting box.
- (2) Variable name: Name the data point, such as: collecting data of "analog input 1", it can be filled in as: analog input.
- (3) Variable key, which can be filled in arbitrarily. The identifier cannot be repeated, for example, the identifier of the collected "analog input 1" data point is filled in as "REG001".
- (4) Select the acquisition address and choose data format according to the requirements. OCT/DEC/HEX are octal/decimal/hexadecimal respectively. BACnet MS/TP data points choose Decimal.
- (5) Address type: Select according to the BACnet MS/TP objects type. For example, to collect the data of "analog input 1", select "analog input".
- (6) Address: the object instance number, such as: collecting the data of "analog input 1", the object instance number is: 1.
- (7) Data type: Select according to the attribute selection of the current value for BACnet MS/TP device object.
- (8) Add Number: If it is to collect continuous addresses, the same register can be collected multiple times.
- (9) Read/Write type: choose from "read only", "read and write".
- (10) Ratio: how many times to enlarge or shrink to upload to the platform, fill in according to the needs.
- (11) Map address: fill in the address where the collected data points are stored to the BL103 gateway device, which can be filled in at will. Mapped addresses cannot be duplicated. Range: 0-2000. For example, the mapping address for collecting "analog input 1" is "20". The outside of the mapping address on the configuration software represents the Modbus address, and M.XXX in the brackets represents the PLC Modbus address.
- (12) Variable unit: Fill in arbitrarily according to requirements, you can leave it blank.
- (13) Click "OK".

Note: After clicking "OK", the data points will be displayed in the box as shown in the figure above. If you want to continue adding data points, right-click on the box and click "Add" to enter data point configuration box, repeat (2)--(13) Steps.

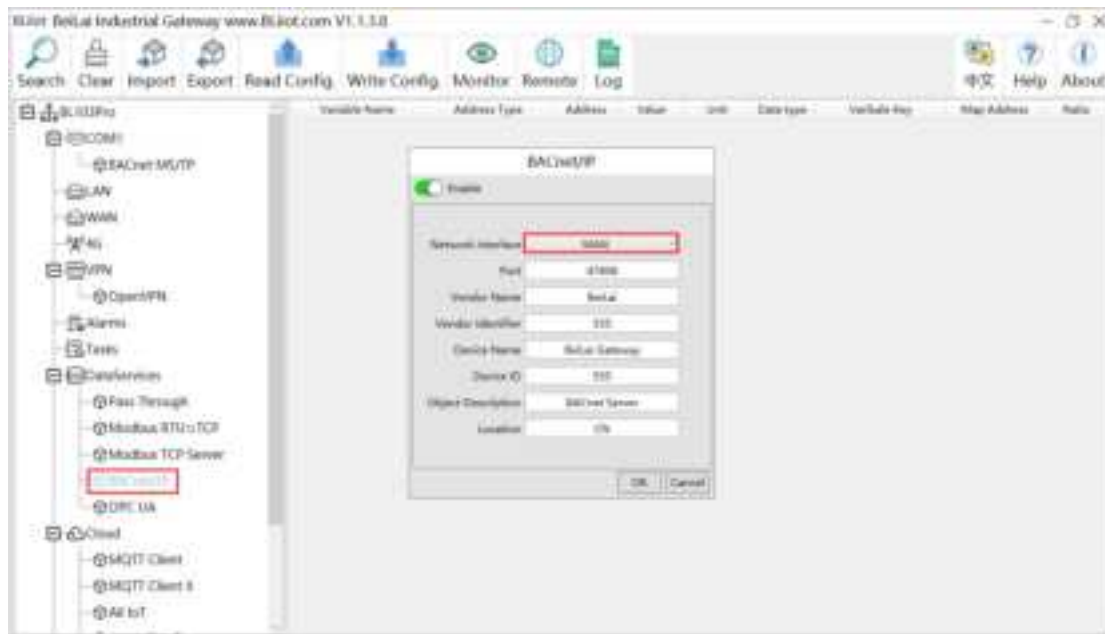
Note: Clicking "Write Configuration" will restart the gateway automatically, and the data points collected from BACnet MS/TP will take effect only after restarting.

5.3.2 Ethernet Configuration for BACnet MS/TP Devices

Data Acquisition

Both the WAN port and the LAN port can collect BACnet/IP devices, which can be directly connected to BACnet/IP devices or collected through switches.

It is the network port selection setting of the data service "BACnet/IP" item to specify whether it is WAN port collection or LAN port collection.



5.3.2.1 WAN Port Configuration

This example is WAN port collects BACnet/IP through the switch, and the switch is connected to the external network. The configuration is as follows:

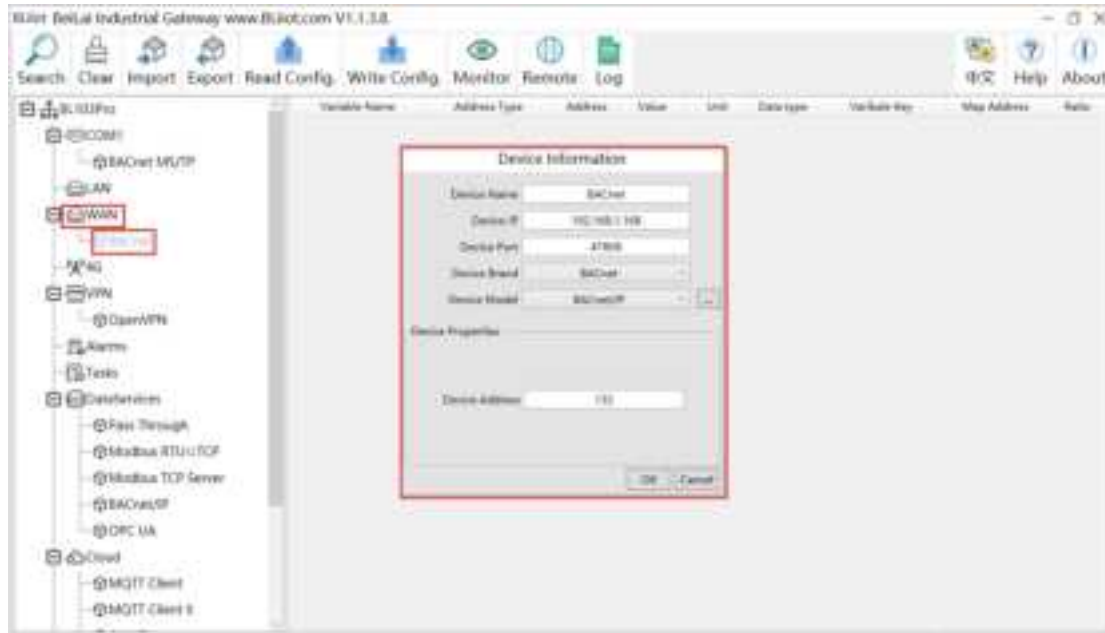


(1) Double-click "WAN" to enter WAN port configuration box. (2) Obtain IP automatically: It is enabled by default, and can be set as required. In this example, in this example, it is connected to a router, and the route is enabled to automatically assign IP, so keep it enabled. (3) IP address: The gateway obtains the IP address from the router. If it is designated IP, set it according to the requirements, the PLC and the gateway should be in the same local area network. (4) Subnet mask, the subnet mask of the WAN port gateway, if it is a designated IP, set it according to the requirements. (5) Gateway: The gateway address obtained from the router. If it is designated IP, set it according to your needs. (6) MAC address: the MAC address of the gateway. (7) DNS: The DNS obtained by the gateway from the router, if it is designated IP, set it according to the requirements. (7) Click "OK".

Note: Click "Write Configuration" to restart the gateway automatically, and the configuration of the WAN port will not be changed until it restart.

Note: The IP address of the WAN port is the IP address that specifies which network segment the WAN port device is. If the IP address of the WAN port device is not the IP of the network segment set by the WAN, the WAN port cannot collect. It is necessary to change the WAN port IP or change the WAN port device's IP according to the needs. After changing the IP address of the gateway, it must be written into the configuration, and it will take effect after power off and restart.

5.3.2.2 Add WAN Port BACnet/IP Devices



(1) Click "WAN", right click, click "Add" to enter device configuration box. (2) Device name: Name the device, such as: BACnet (3) Device IP: Fill in the BACnet/IP device IP. Note that the IP of the BACnet/IP device must be in the same network segment as the IP of the WAN port. (4) Device port: UDP port, default 47808. (5) Because it is collection of BACnet/IP equipment, device brand: select BACnet, and the device model: BACnet/IP. The polling interval and timeout can be defaulted or filled in according to requirements. (6) Device address: Fill in as required. (7) Click "OK"

Note: After clicking OK, the added devices(BACnet) will be displayed under the WAN port, as shown in the figure above. If you want to add multiple devices, repeat steps (1)-(7).

Note: Clicking "Write Configuration" will restart the gateway automatically, and the BACnet device added by the WAN port will be added successfully after the restart.

5.3.2.3 Add BACnet/IP Devices Data Points

Collection of binary input objects as an example, and the configuration is as follows:



(1) Click "BACnet", right-click the box on the right, and click "Add" to enter data point setting box. (2) Variable name: Name the data point, such as: collecting the data of "binaryinput 3", it can be filled in as: binaryinput. (3) Variable key can be filled in arbitrarily. The identifier cannot be repeated, for example, the identifier of the "binaryinput 3" data point is filled in as "REG003". (4) Select the acquisition address and choose data format fill in the input gateway according to the requirements. OCT/DEC/HEX are octal/decimal/hexadecimal respectively. Choose Decimal for BACnet/IP data points. (5) Address type: Select according to the collected BACnet/IP object type. For example, to collect the data of "binaryinput 3", select "binaryinput". (6) Address: the object instance number, such as: collecting the data of "binaryinput 3", the object instance number is: 3. (7) Data type: Select according to the attribute selection to collect the current value of the BACnet/IP device object. (8) Add Number: If it is to collect continuous addresses, the same register can be collected multiple times. (9) Read/Write: Choose from "read only", "read and write". (10) Map address: fill in the address where the collected data points are stored to the BL103 gateway device, which can be filled in at will. Mapping addresses cannot be duplicated. Range: 0-2000. For example, the mapping address for collecting "binaryinput 3" is "11". The outside of the mapping address on the configuration software represents the Modbus address, and M.XXX in the brackets represents the PLC Modbus address. (11) Variable unit: fill in arbitrarily according to requirements, or not fill in. (12) Click "OK".

Note: After clicking "OK", the data points will be displayed in the box as shown in the figure above. If you want to continue adding data points, right-click on the box and click "Add" to enter data point configuration box, repeat (2)--(12) Steps.

Note: Clicking "Write Configuration" will restart the gateway automatically, and the data points collected from BACnet will take effect only after restarting.

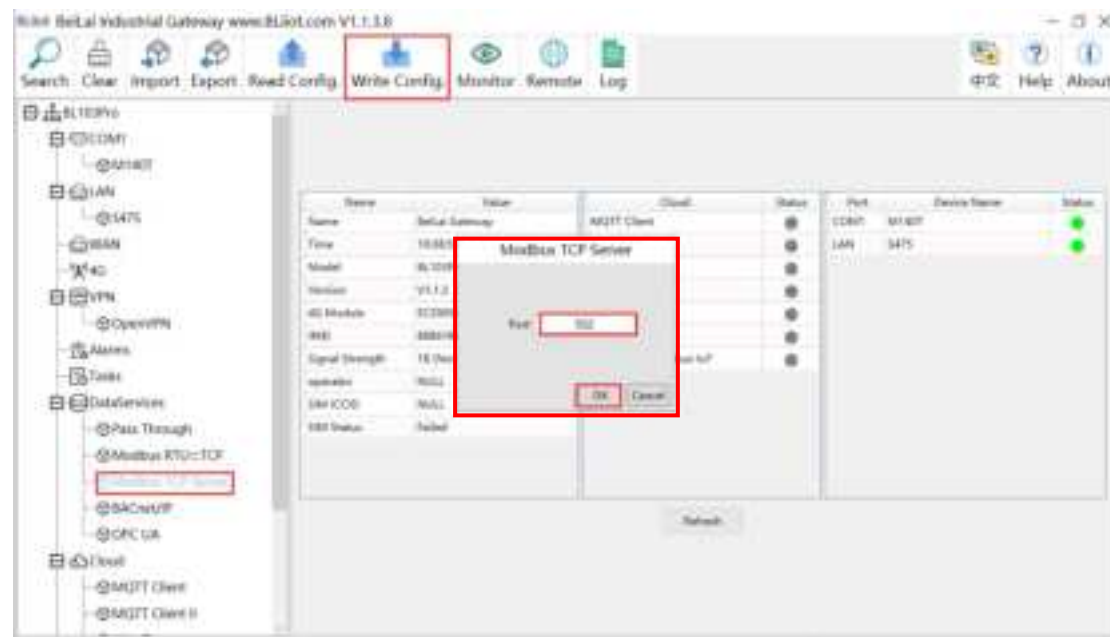
5.3.3 Data Upload to Various Platform

No matter what protocol data is collected by the BL103 gateway, the configuration for transmitting the data to each platform is the same. Therefore, this chapter takes the configuration of collecting Modbus protocol data and transferring it to each platform as an example. Refer to: [5.4 Data Upload to Various Platform](#)

5.4 Data Upload to Various Platform

This example introduces the configuration of the data collected by the BL103 gateway device from the M140T and S475 and uploaded to each platform at the same time.

5.4.1 Modbus TCP Server Configuration

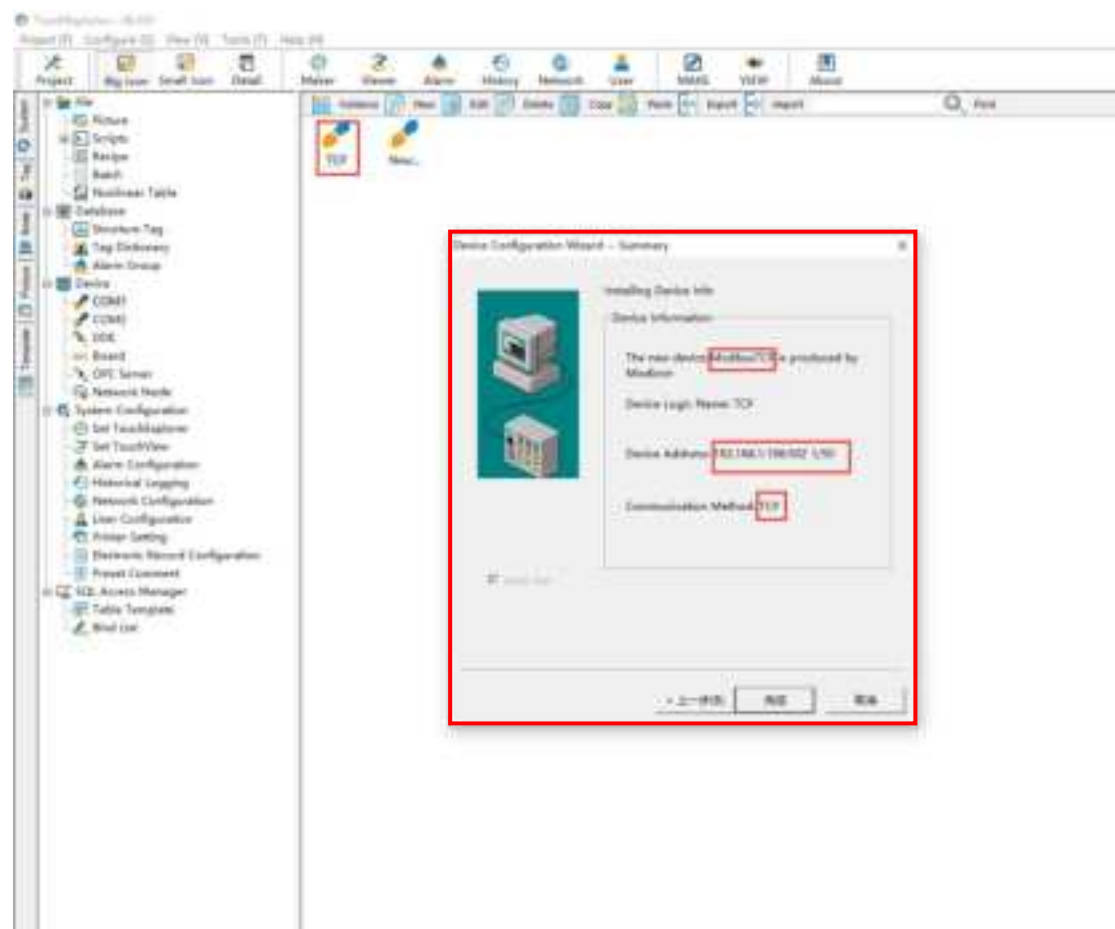


Operation steps: (1) Double-click "Modbus TCP Server" to enter configuration box. (2) Port: This gateway device is used as the listening port of Modbus TCP Server, fill in arbitrarily, range: 1-65535, for example: fill in "502". (3) Click "OK" to confirm the configuration of Modbus TCP Server. (4) Click "Write Configuration", the configuration modified by Modbus TCP Server will take effect after the gateway device restarts.

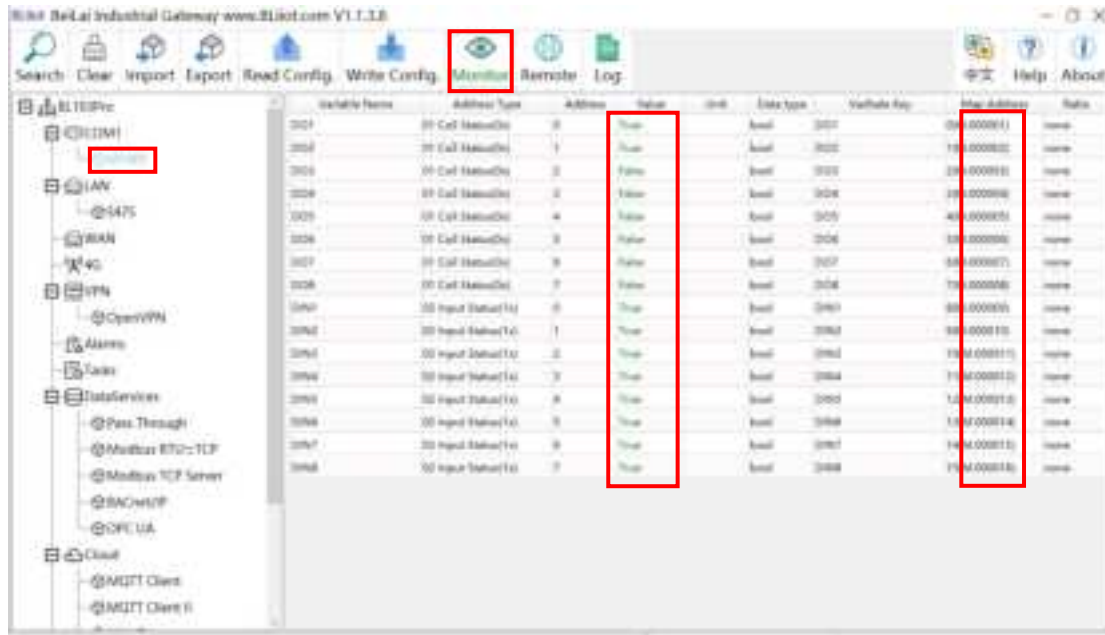
Note: Modbus TCP Server enabled port "502" by default, which can be directly connected to the host computer acquire from gateway through WAN or LAN. If the parameters of the port are not modified, no operation is required.

5.4.2 View and Send Command by KingView

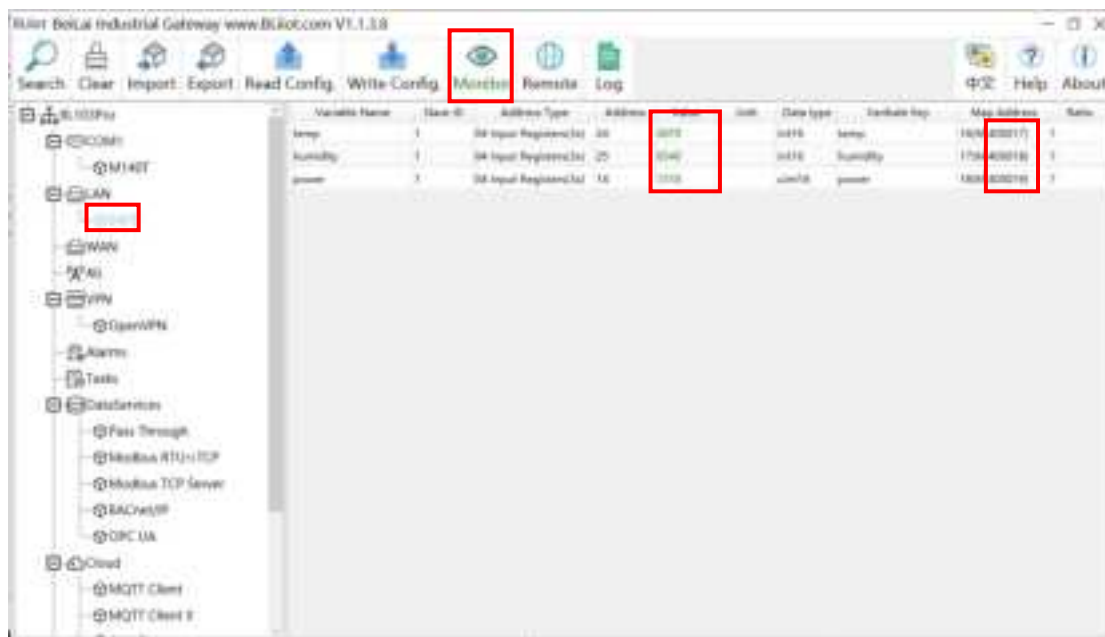
Modbus TCP Server is a Modbus TCP server that provides data to external. Collect BL103 gateway data through Modbus TCP host computer, such as SCADA, MES and other host computers. The function codes supported by the gateway: Boolean supports "01", "05", and numerical supports "03" and "06". In this example, KingView is used to simulate the host computer to access the BL103 gateway data, as shown in the figure below: IP of WAN port: 192.168.1.196, port of Modbus TCP Server: 502.



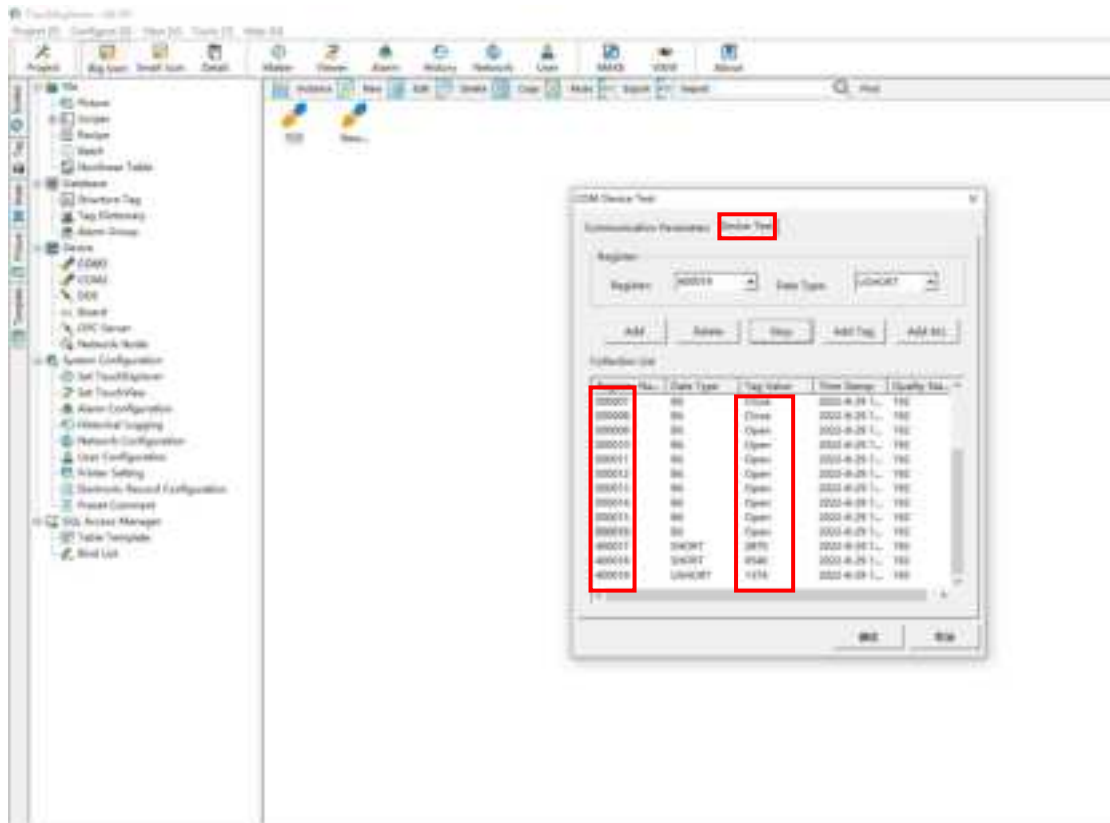
The value and mapping address of the M140T data point, Kingview uses the PLC Modbus address.



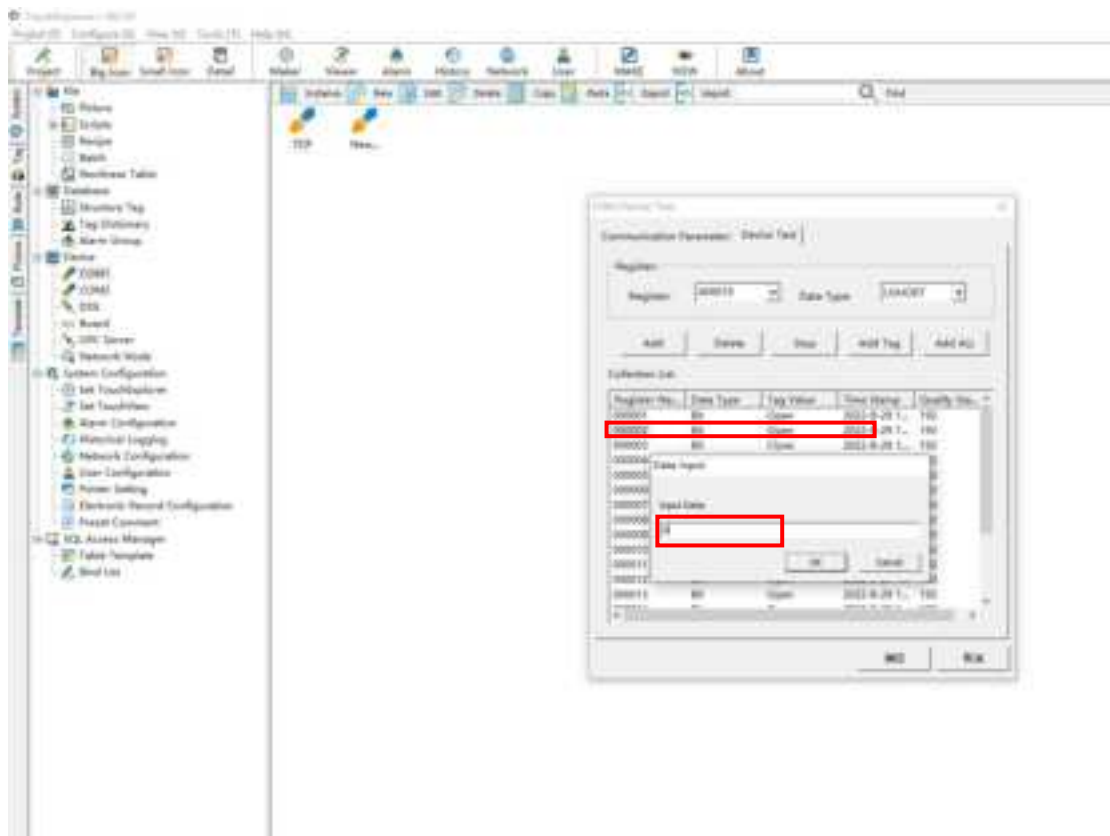
S475 data point value and mapping address, Kingview uses PLC Modbus address.

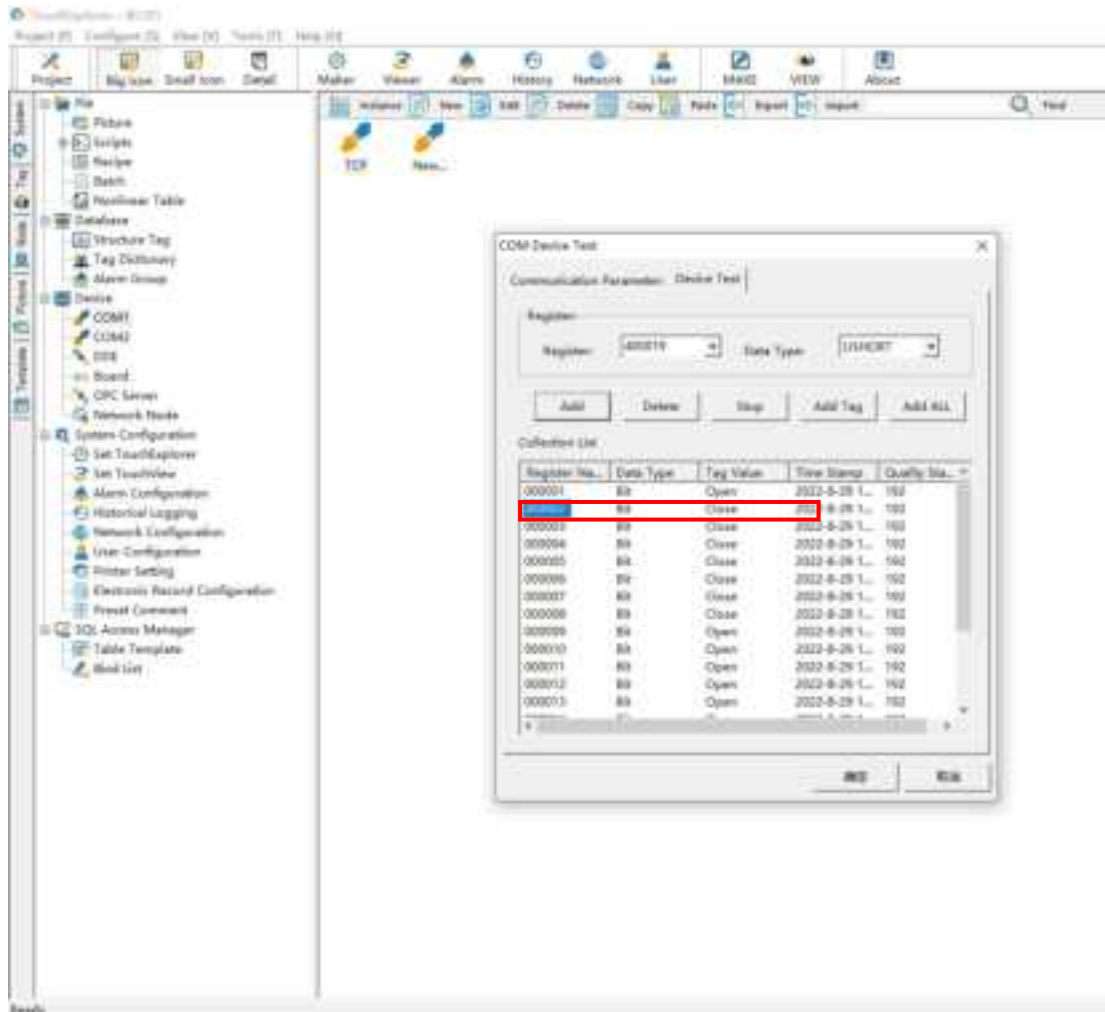


The value of the data point read by Kingview, the value of Boolean value on Kingview, "0" is closed, "1" is open.



Kingview sends command, the value of Boolean on Kingview, "0" is closed, "1" is open. For example: the register 000002 is DO2, and the relay is disconnected by sending "0".





5.4.3 BACnet/IP Configuration

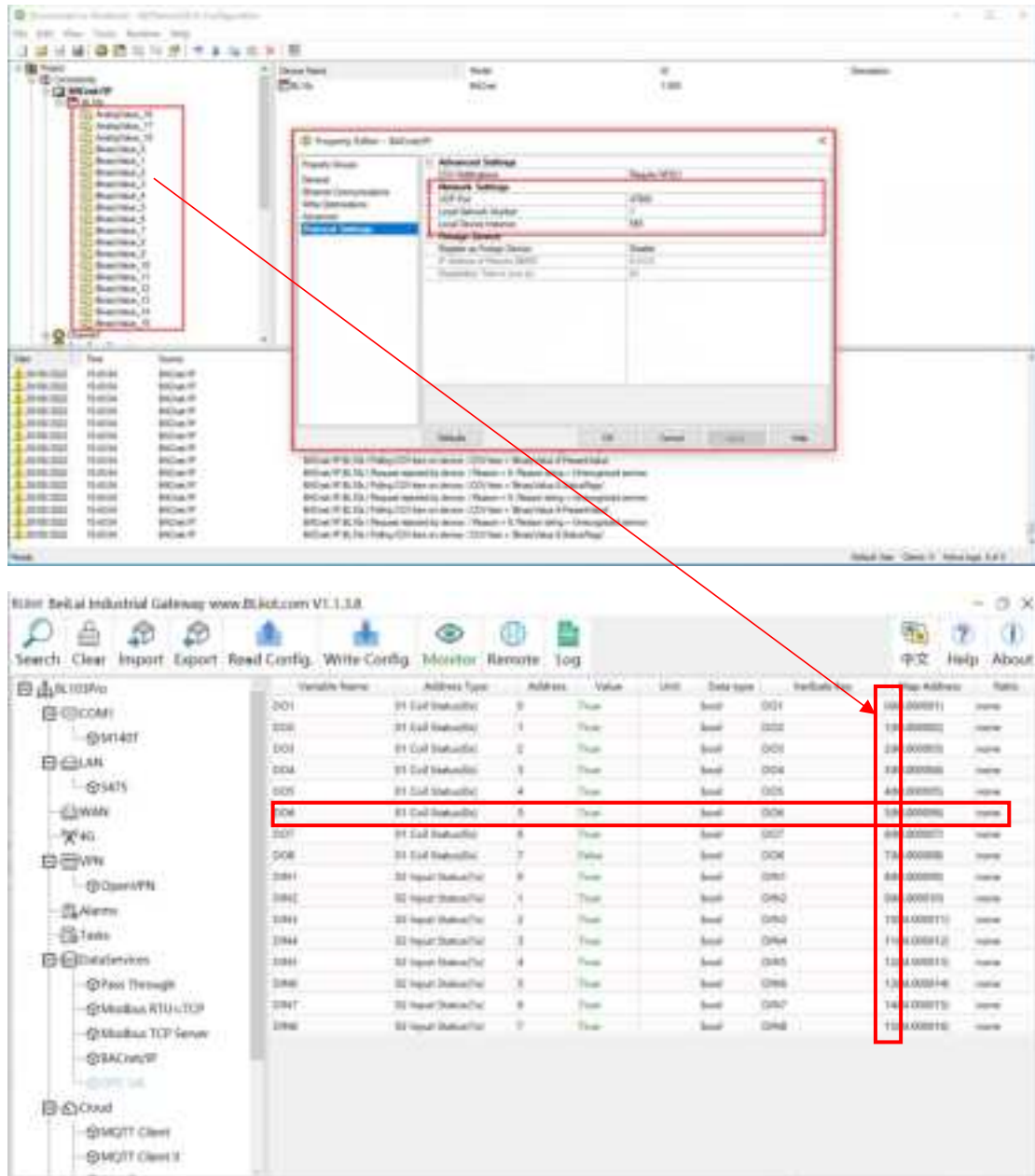
Note: BL101 Modbus Gateway does not support BACnet/IP.



Operation steps: (1) Double-click "BACnet/IP" to enter BACnet/IP configuration box. (2) Click the Enable button to enable BACnet/IP. Default: off. Gray: Disabled, Green: enabled. (3) Network Interface: select "WAN" port. Click "WAN" to check that the IP address of the WAN port is: 192.168.1.196. (4) Port: BACnet/IP UDP port, default: 47808. (5) Vendor name: can be filled in arbitrarily. (6) Vendor ID: can be filled in arbitrarily. (7) Device name: the name of the BACnet/IP server, which can be filled in arbitrarily. (8) Device ID: Can be filled in arbitrarily. (9) Device Description: Gateway description, which can be filled in arbitrarily. (10) Location: Gateway location, default "CN". (11) Click "OK" to confirm the BACnet/IP configuration. (12) Click "Write Configuration", BACnet/IP will be enabled only after the gateway device restarts.

5.4.4 View and Send Command by KEPServerEX 6

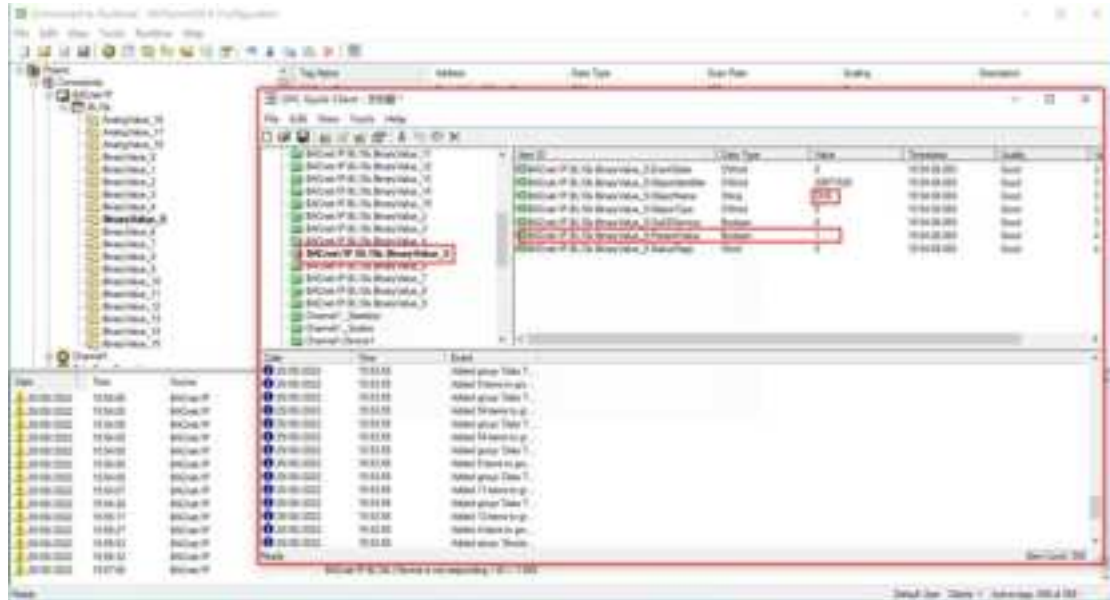
Fill in the UDP port and local instance according to the port and device ID on the configuration software. After it is built, you can add devices by searching devices, or you can add devices yourself. The tags can be automatically imported or created by yourself. The data is unified in AV and BV objects, properties provide external data for the current value. The object instance is the Modbus address of the data point page mapping address item on the configuration software.



The screenshot shows the KEPServerEX 6.1.3.8 interface. The 'Advanced Settings' dialog box is open, showing the 'Network Settings' tab. The 'UDP Port' is set to 4750 and the 'Local Device Instance' is set to 101. A red box highlights the 'Advanced Settings' dialog box. A red arrow points from the 'Advanced Settings' dialog box to the 'Variable Name' column in the 'Monitor' tab of the BL101Pro configuration software.

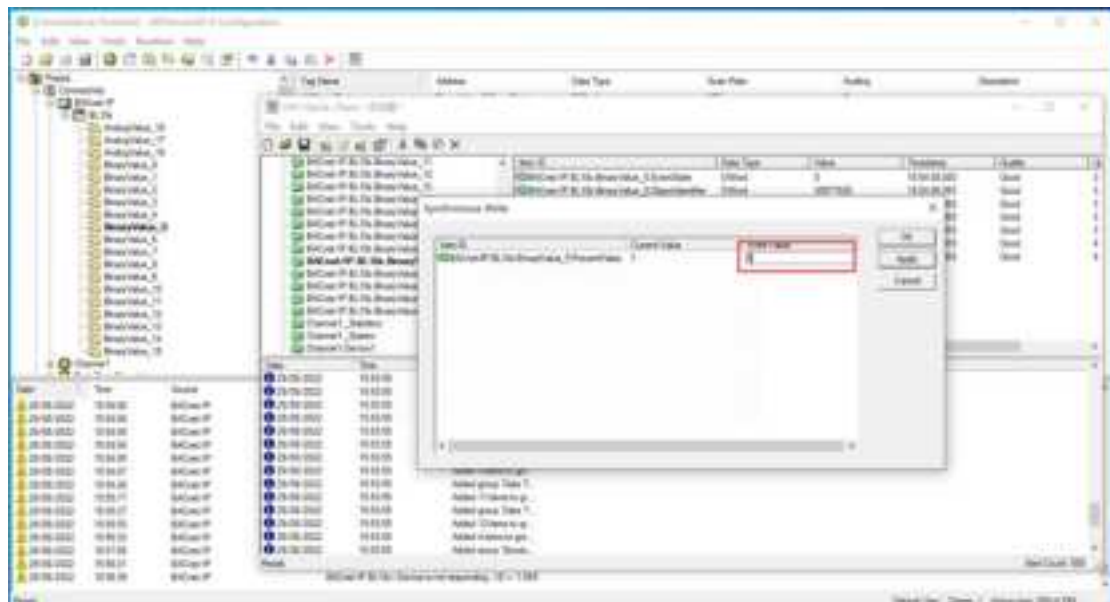
Variable Name	Address Type	Address	Value	Last	Data type	Verify Data	Map Address	Units
D01	DI Coil Status/Bit	0	True		Bool	D01	00.000011	name
D02	DI Coil Status/Bit	1	True		Bool	D02	10.000002	name
D03	DI Coil Status/Bit	2	True		Bool	D03	20.000003	name
D04	DI Coil Status/Bit	3	True		Bool	D04	30.000004	name
D05	DI Coil Status/Bit	4	True		Bool	D05	40.000005	name
D06	DI Coil Status/Bit	5	True		Bool	D06	50.000006	name
D07	DI Coil Status/Bit	6	True		Bool	D07	60.000007	name
D08	DI Coil Status/Bit	7	True		Bool	D08	70.000008	name
D09	DI Input Status/Bit	8	True		Bool	D09	80.000009	name
D10	DI Input Status/Bit	9	True		Bool	D10	90.000010	name
D11	DI Input Status/Bit	1	True		Bool	D11	10.000011	name
D12	DI Input Status/Bit	2	True		Bool	D12	20.000012	name
D13	DI Input Status/Bit	3	True		Bool	D13	30.000013	name
D14	DI Input Status/Bit	4	True		Bool	D14	40.000014	name
D15	DI Input Status/Bit	5	True		Bool	D15	50.000015	name
D16	DI Input Status/Bit	6	True		Bool	D16	60.000016	name
D17	DI Input Status/Bit	7	True		Bool	D17	70.000017	name
D18	DI Input Status/Bit	8	True		Bool	D18	80.000018	name
D19	DI Input Status/Bit	9	True		Bool	D19	90.000019	name
D20	DI Input Status/Bit	10	True		Bool	D20	10.000020	name

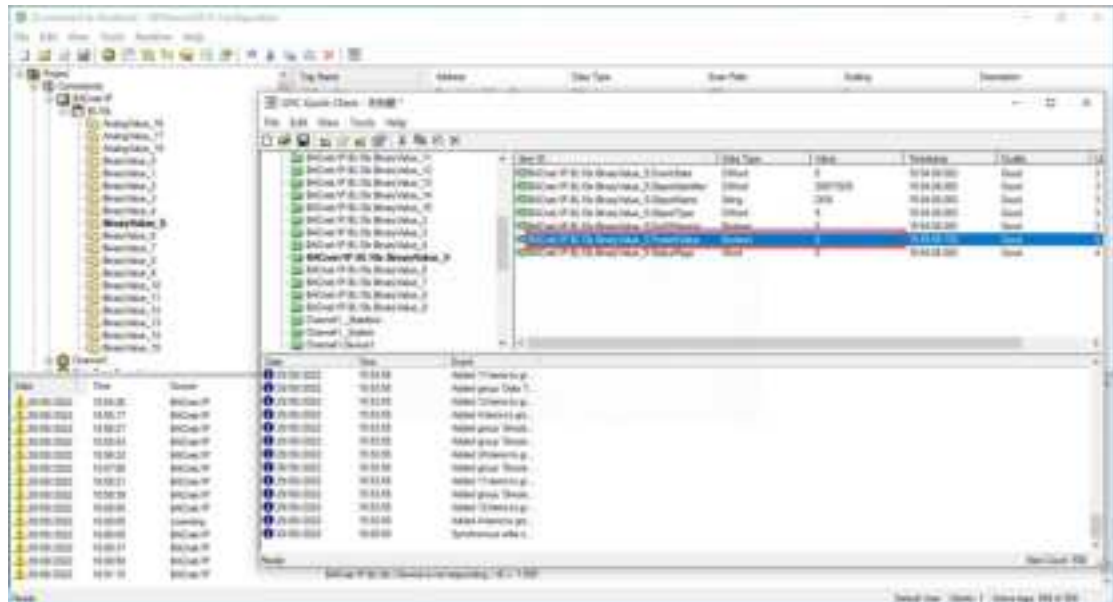
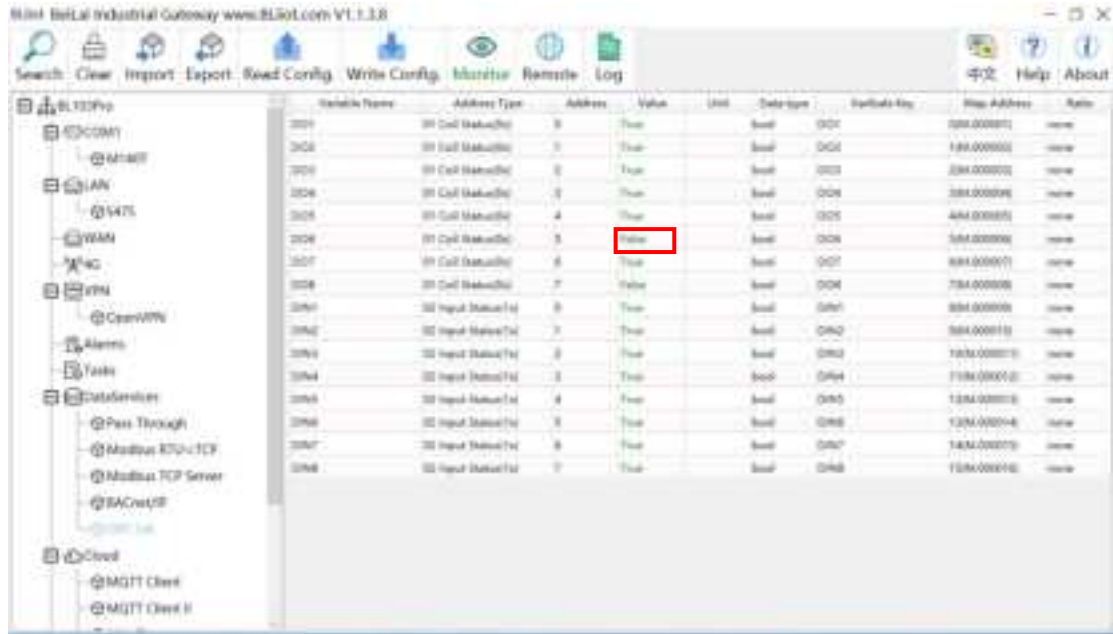
Taking the data point of M140T DO6 as an example, the collected data is "1" when viewed on the configuration software, and the address of the data point of DO6 on BACnet/IP is: BinaryValue.5.PresentValue



Send Command:

Take the value "0" issued by DO6 as an example





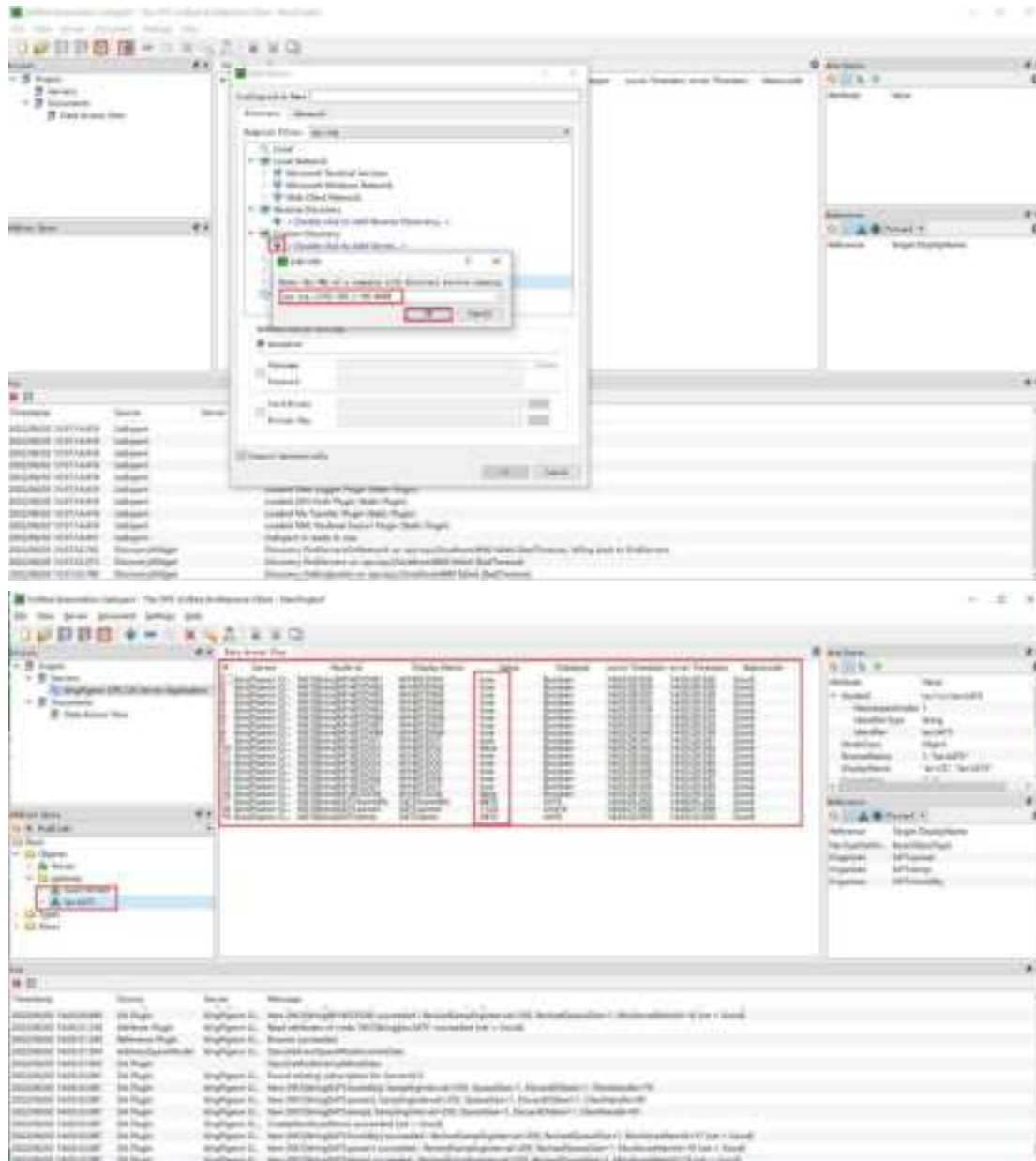
5.4.5 OPC UA Configuration



Operation steps: (1) Double-click "OPC UA" to enter OPC UA configuration box. (2) Click the Enable button to enable OPC UA. Default: off. Gray: Disabled, green: enabled. (3) Port: OPC UA port, default: 4840. (4) Anonymous: Enabled, indicating that the user name is not used to connect. (5) User, Password: user name and user password, because anonymous is enable, so do not need to fill in. (6) Security Strategy: Select whether encrypt OPC UA connection . This example selects an unencrypted connection. (7) Certificate, PrivateKey: OPC UA certificate and key, because the unencrypted connection is selected, there is no need to upload the certificate and key. (8) Click "OK" to confirm the OPC UA configuration. (9) Click "Write Configuration", and OPC UA will be enabled only after the gateway device restarts.

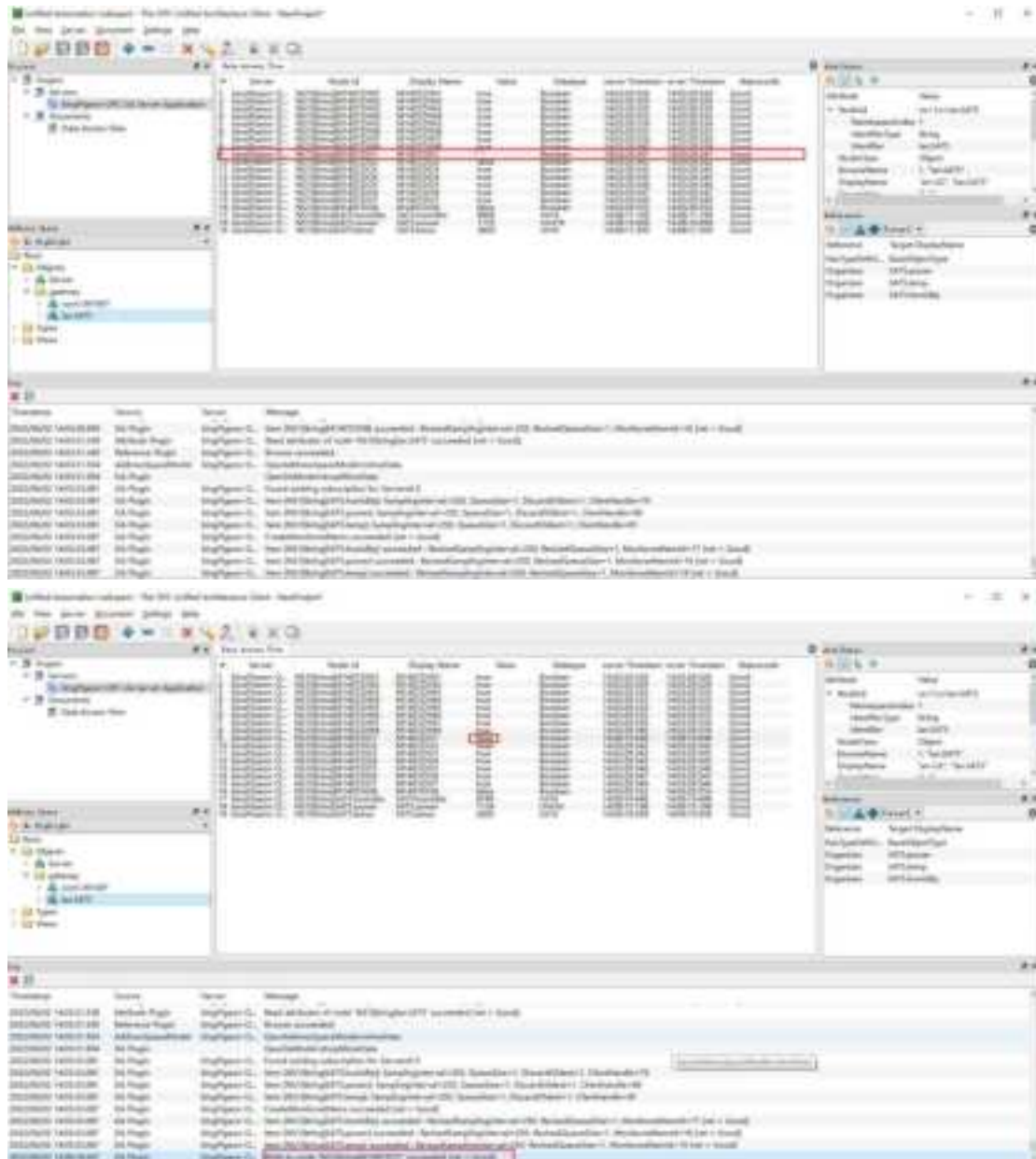
5.4.6 View and Send Command by UaExpert

BL103 gateway provides data externally through OPC UA server. The data collected by UaExpert (OPC UA Client) is shown in the figure below: UaExpert connects to the BL103 gateway OPC UA server to automatically generate data points. The name of the data point consists of the device name on the configuration software and the variable name of the device data point. Node id Consists of the device name on the configuration software and the device's data point label.



Send Command

Double-click the value of the data point directly to enter the value and press "Enter" to confirm.



5.4.7 MQTT Client Configuration

The "KingPigeon" JSON data format of MQTT Client and MQTT Client II is the same as King Pigeon MQTT. Refer to: [5.4.19 King Pigeon MQTT Data Format](#)

Connect to the ThingsBoard platform, select the JSON data format in the "thingsboard-telemetry-gateway" format. The ThingsBoard platform domain name is thingsboard.cloud.

Connect to a platform that supports Sparkplug B, such as the ignition platform, select the

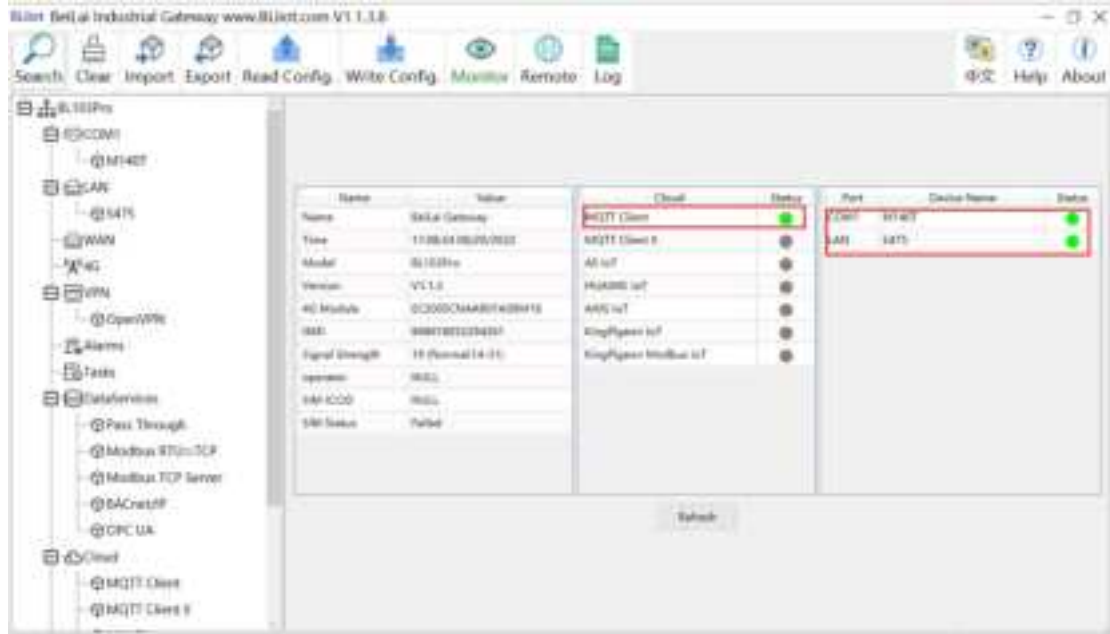
JSON data format in the "sparkplug b" format, click the button next to the data template item, enter configuration box to configure the group ID and edge node ID.

The difference between MQTT Client and MQTT Client II is that the subscription topic of MQTT Client II does not work. The purpose of MQTT Client II is that the platform can view the data but cannot control the data. Therefore, MQTT Client II connection is not introduced. The configuration of MQTT Client is as follows: Connection without certificate and the JSON data format in KingPigeon format as an example.

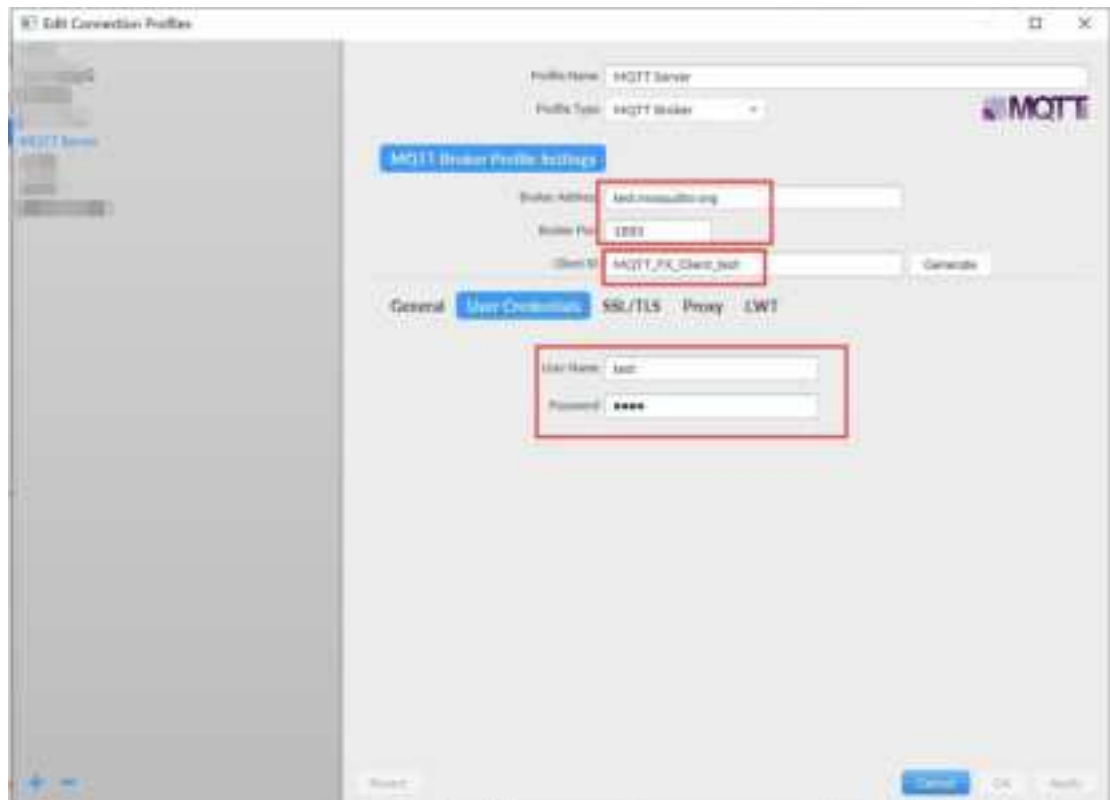


- (1) Double-click "MQTT Client" to enter configuration box.
- (2) Click the Enable button to enable MQTT Client. Default: off. Gray: Disabled, Green: enabled.
- (3) IP/domain: fill in the IP/domain name of the MQTT server.
- (4) Port: Fill in the MQTT server port, Default: 1883.
- (5) Client ID: The client identifier used in the MQTT connection message, and the server uses the client identifier to identify the client.
- (6) Username: The username used in the MQTT connection message, the server can use it for authentication and authorization.
- (7) Password: The password used in the MQTT connection message, which can be used by the server for authentication and authorization.
- (8) Data template: Select according to the JSON data format supported by the MQTT server, default is "KingPigeon".
- (9) Subscribe topic: The topic name used by the MQTT subscription message. After subscription, the server can send a publish message to the client for control.
- (10) Publish topic: The topic name used by MQTT to publish the message. The topic name is used to identify which information channel the payload data should be published to.
- (11) Upload cycle: The interval for regular data release, default is 30S.
- (12) Data retransmission: whether to enable data retransmission, Gray: disabled, Green: enabled.
- (13) Select data point upload: select the data point to be uploaded in the box on the right side of the configuration box, the default is blank means all upload.
- (14) Click "OK" to confirm the configuration of King Pigeon MQTT.
- (15) Click "Write

Configuration", the MQTT Client will not be enabled until the gateway device restarts. Re-open the configuration software to log in to the device, and you can see on the basic information page that the prompt light of "MQTT Client Online Status" is green, indicating that the MQTT Client is connected. The rightmost shows the online status of the slave device.



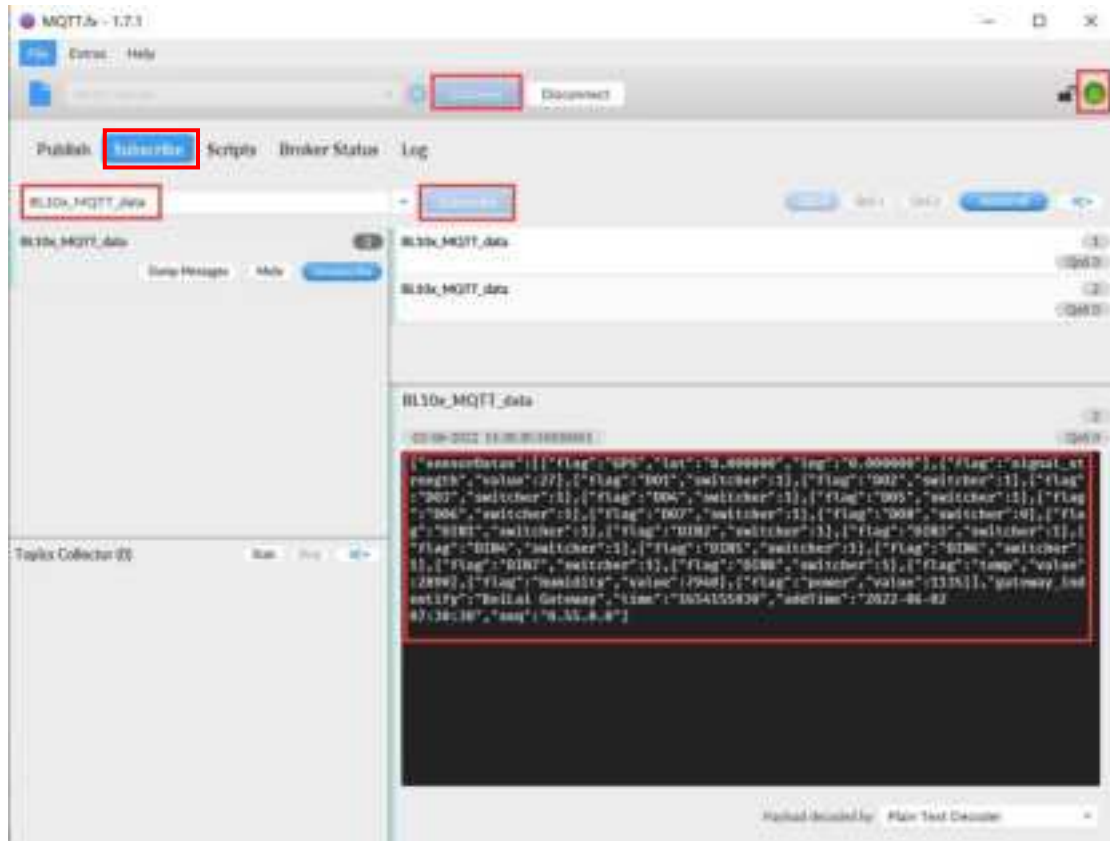
5.4.8 View and Send Command by MQTT.fx

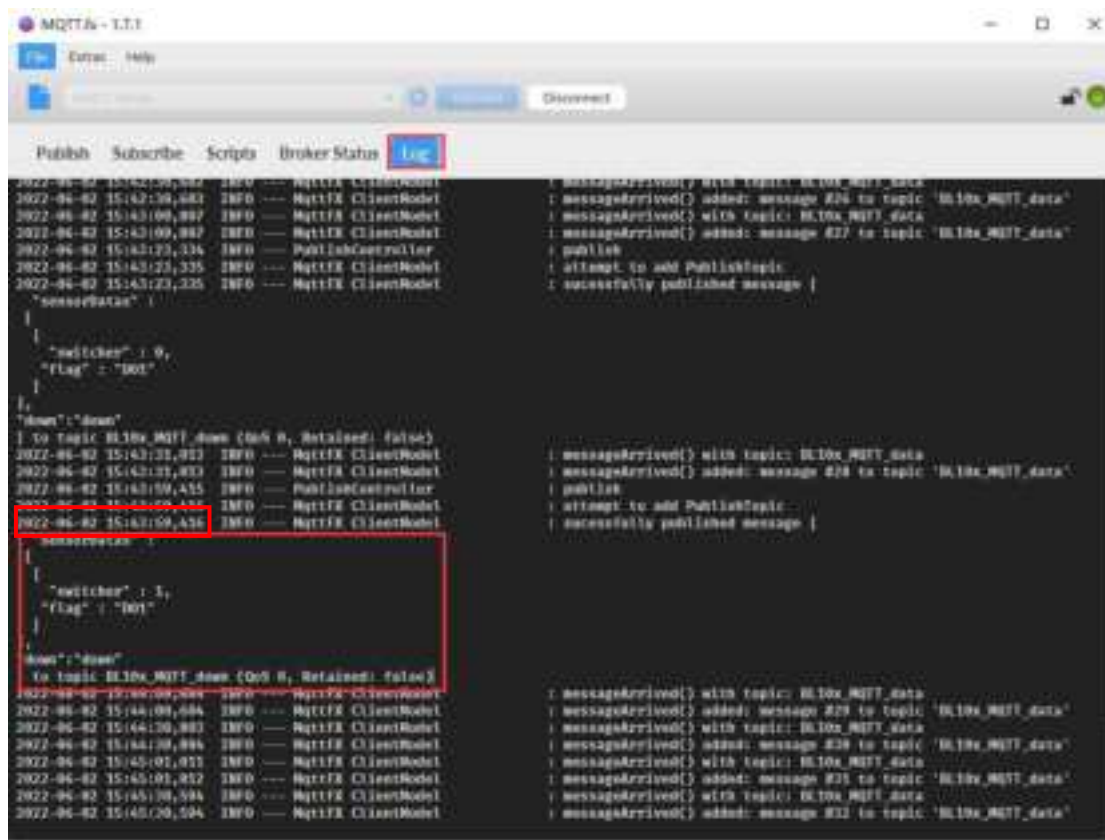
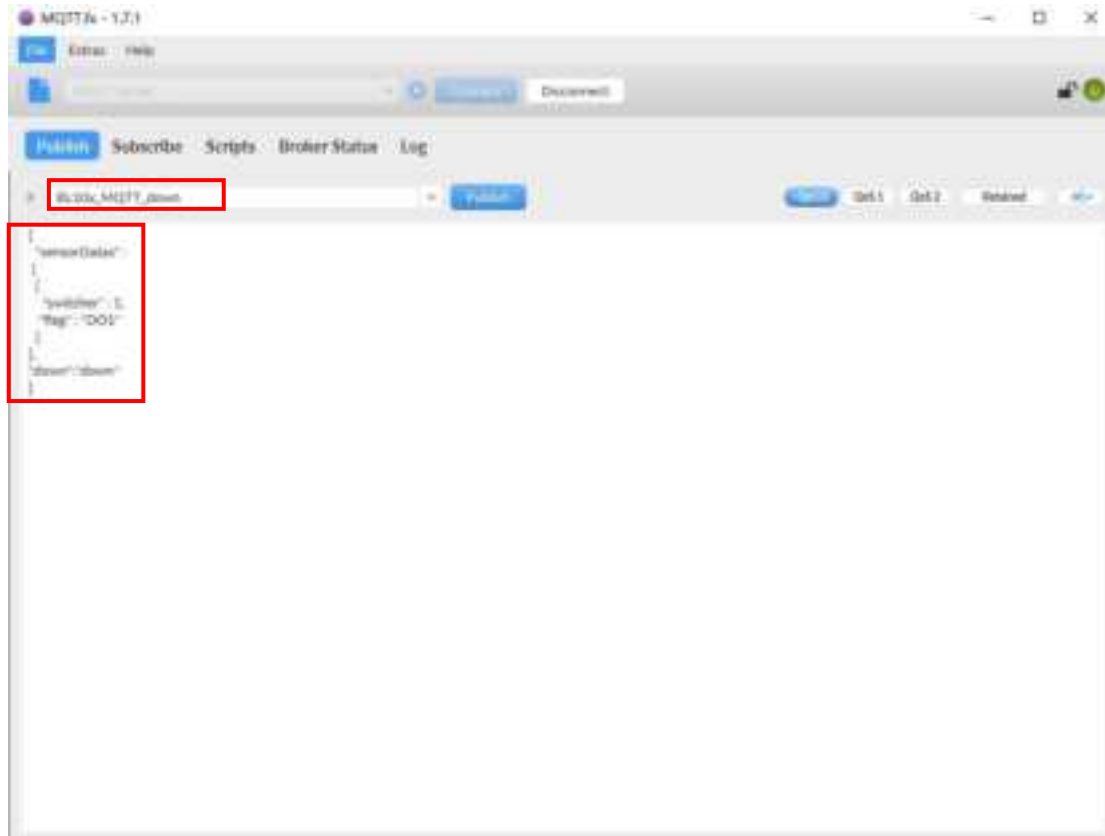


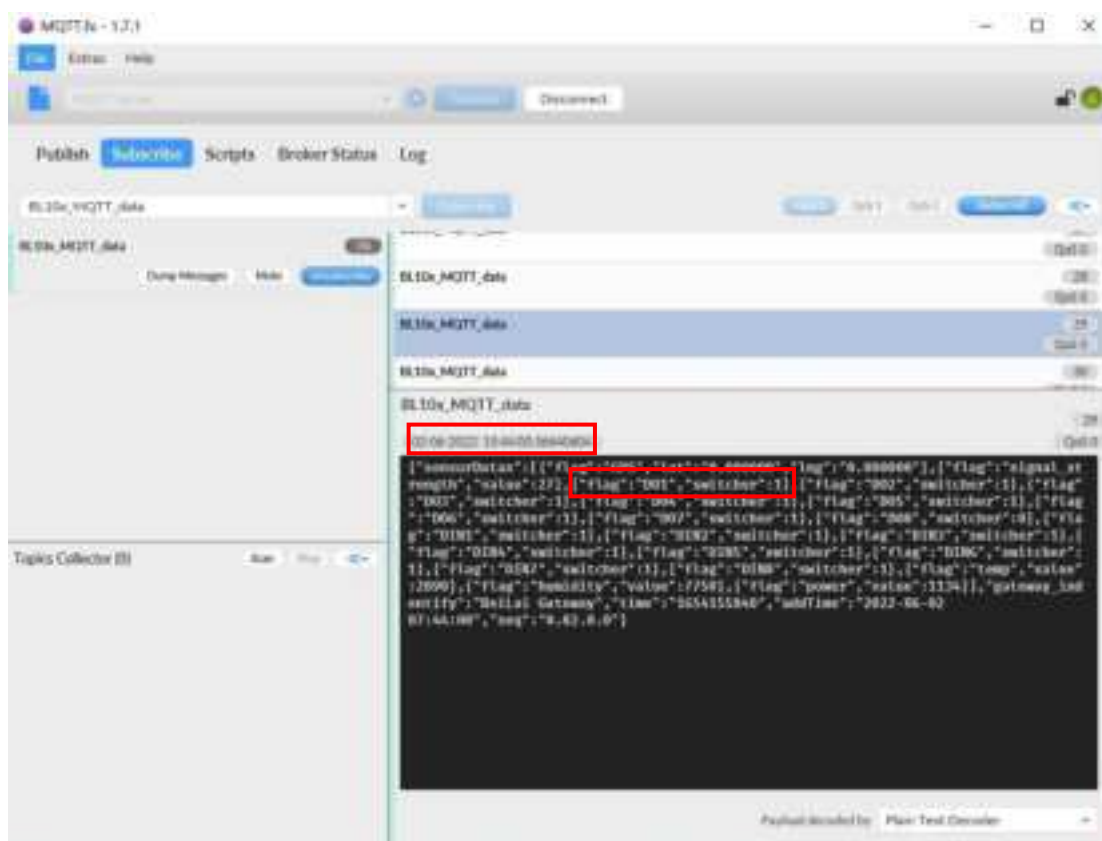
Note: The Client ID cannot be the same as the Client ID filled in the configuration software.

Message received on MQTT.fx

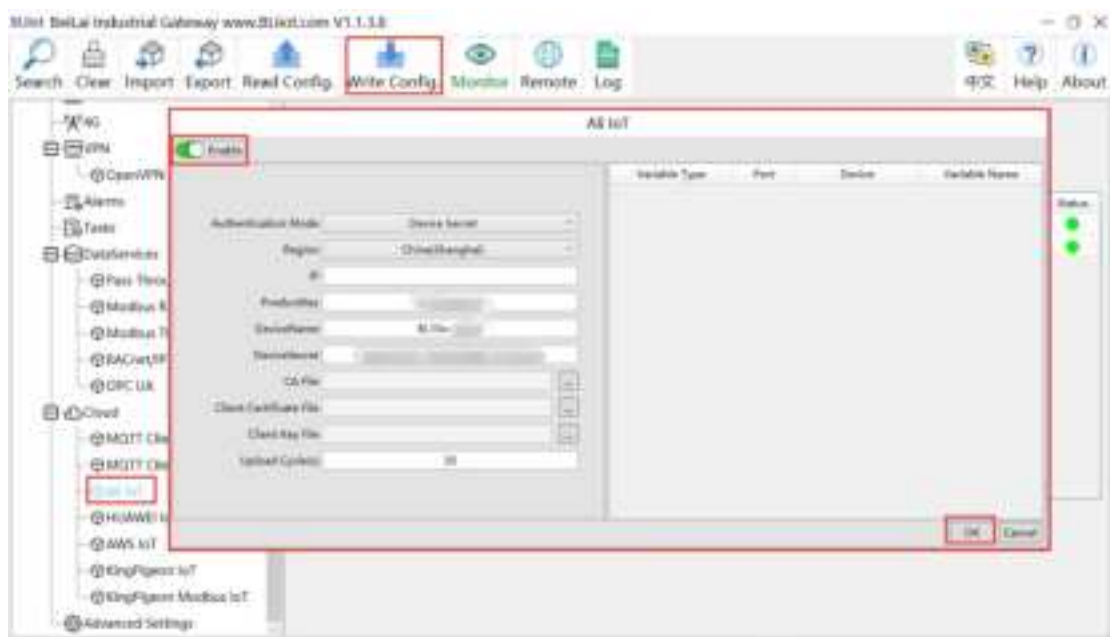
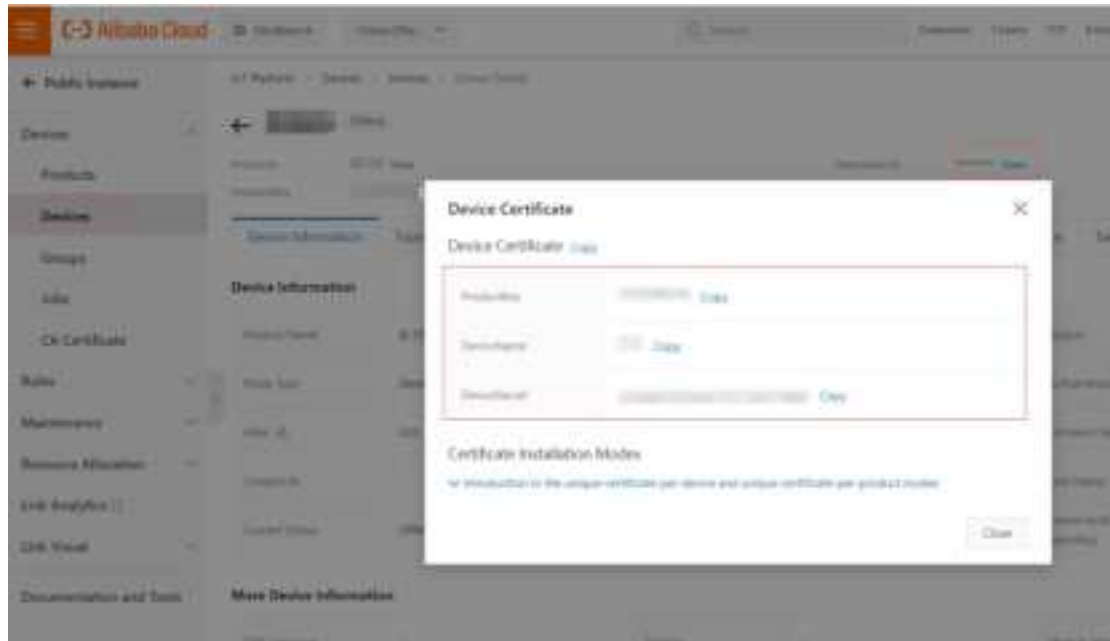
The subscription topic on MQTT.fx is the publish topic configured on the MQTT Client





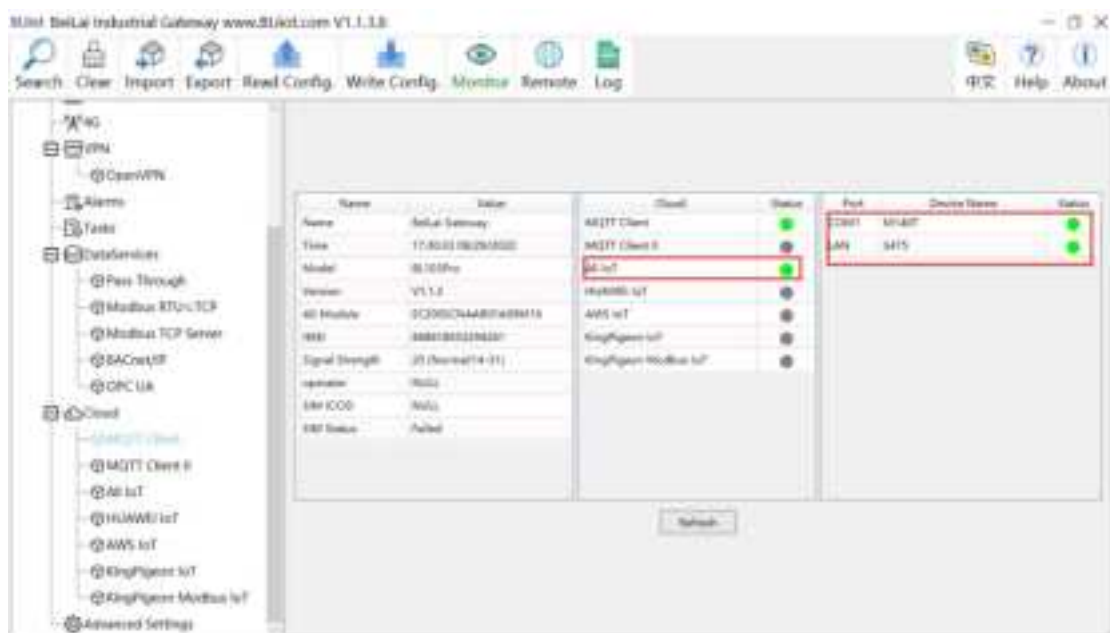


5.4.9 Alibaba Cloud Configuration



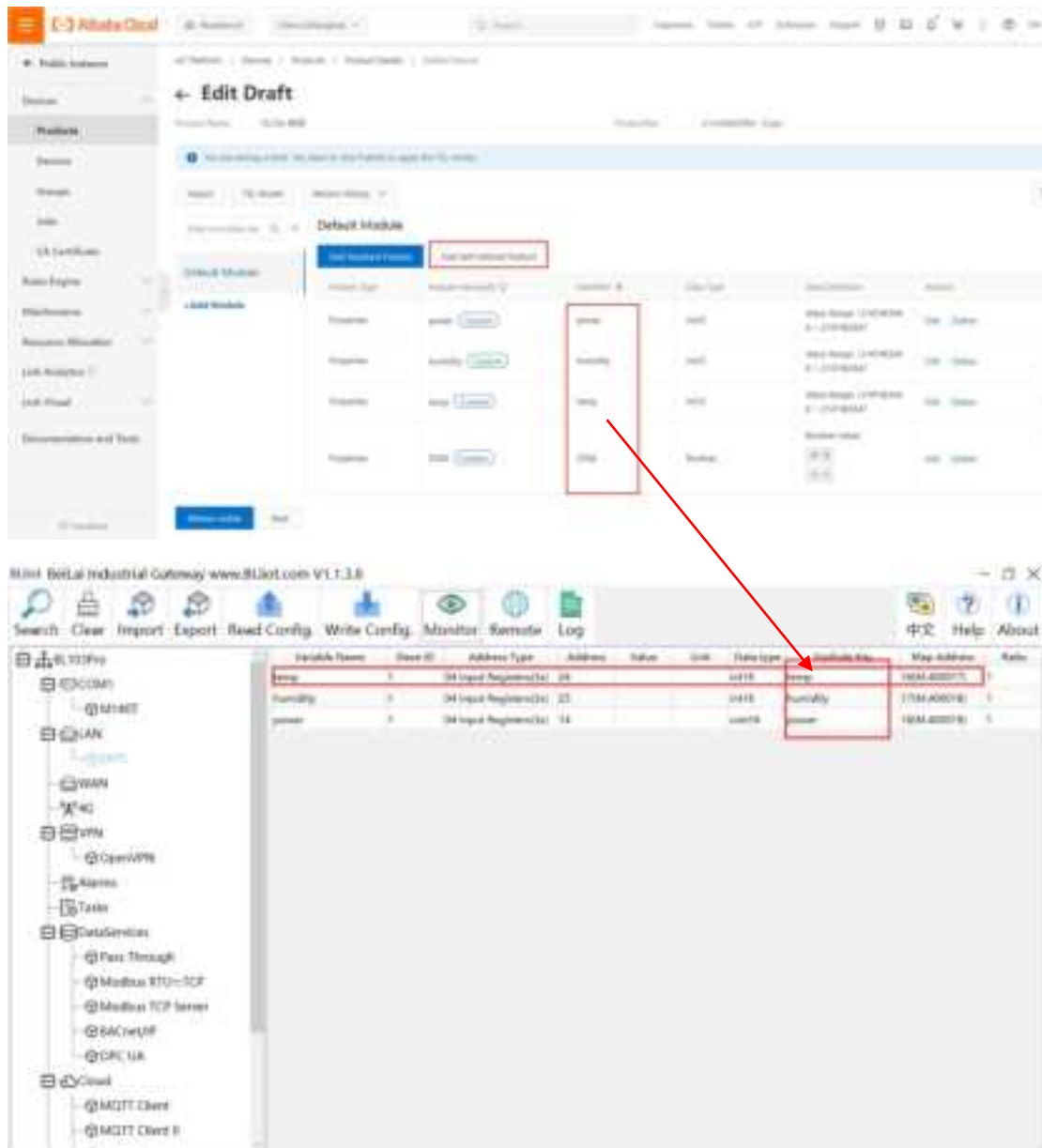
(1) Double-click "Alibaba Cloud IoT" to enter configuration box. (2) Click the Enable button to enable Alibaba Cloud. Default: off. Gray: Disabled, Green: enabled. (3) Authentication mode: Choose whether to use a key connection or a certificate connection. The default is key connection. (4) Region: Select the Alibaba Cloud region, default is China (Shanghai). (5) IP: The IP address of Alibaba Cloud for the enterprise version, don't need to filled in for the public version. (6) ProductKey: The same as the ProductKey in the Alibaba Cloud device. (7) DeviceName: The same as the DeviceName in the Alibaba Cloud device. (8) DeviceSecret: The same as the DeviceSecret in the Alibaba Cloud device. (9) CA file: When enabling

certificate connection, select the root certificate file to upload. (10) Client certificate file: When enabling certificate connection, select the client certificate file to upload. (11) Client key file: When enabling certificate connection, select the client key file to upload. (12) Upload cycle: The interval for regular data release, the default is 30S. (13) Select data point upload: select the data point to be uploaded in the box on the right side of the configuration box, the default is blank means all upload. (14) Click "OK" to confirm (15) Click "Write Configuration", and Alibaba Cloud will not be enabled until the gateway device restarts. Re-open the configuration software to log in to the device, and you can see that the "Alibaba Cloud Online Status" indicator light is green on the basic information page, indicating that Alibaba Cloud is connected. The rightmost shows the online status of the slave device.

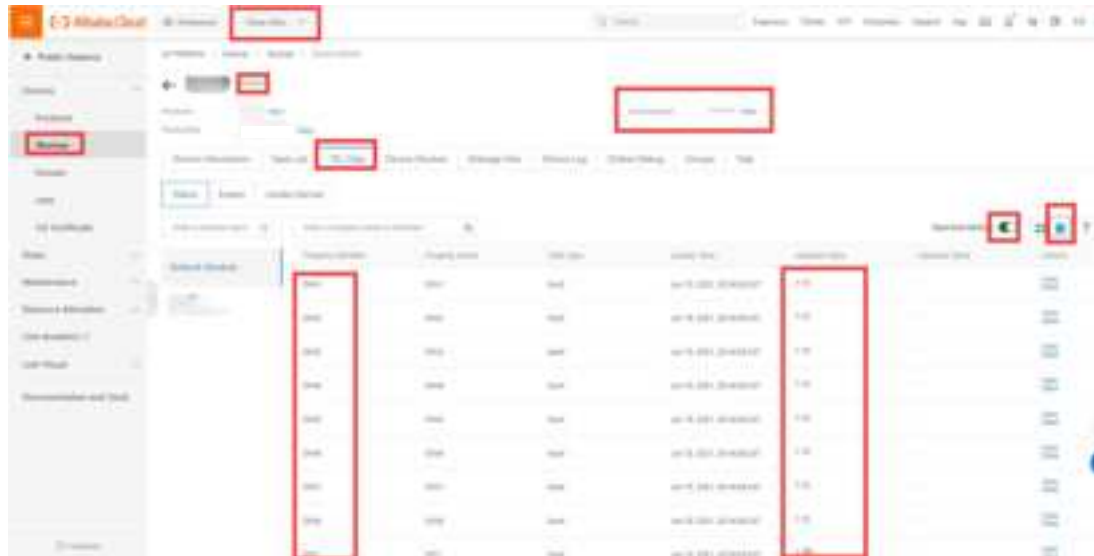


5.4.10 View and Send Command by Alibaba Cloud

Alibaba Cloud platform adds data points as shown in the figure below: Only the identifier of the Alibaba Cloud platform needs to be consistent with the variable label on the configuration software. For example, if the S475 data point temp is collected, and the configured variable label is "temp", the identifier of the data point added on the Alibaba Cloud platform must be "temp", and the function name and the variable name on the configuration software can be different.

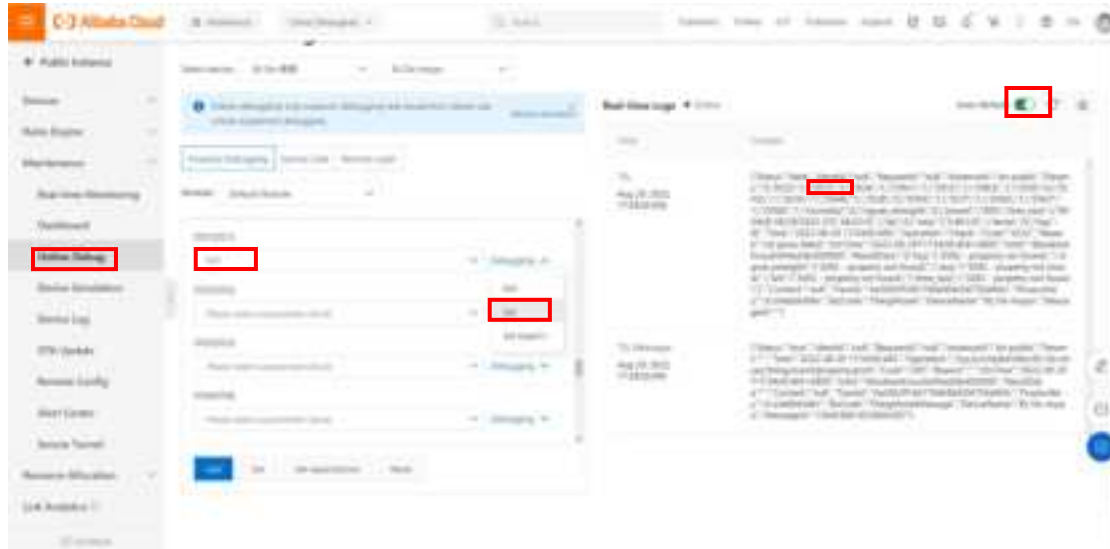


The data received by Alibaba Cloud is as follows:

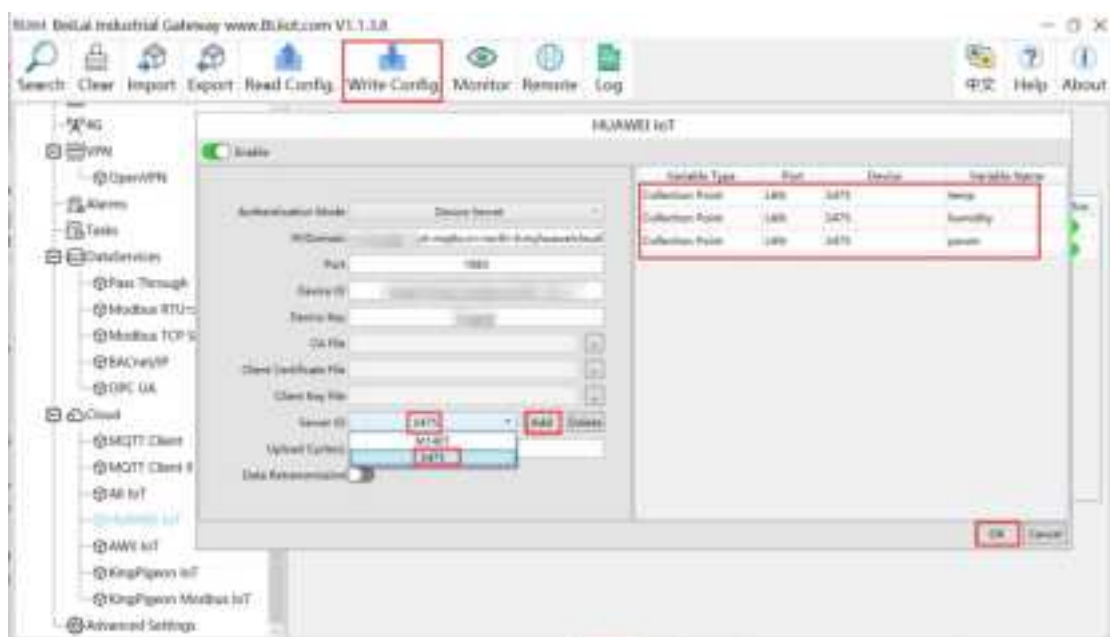
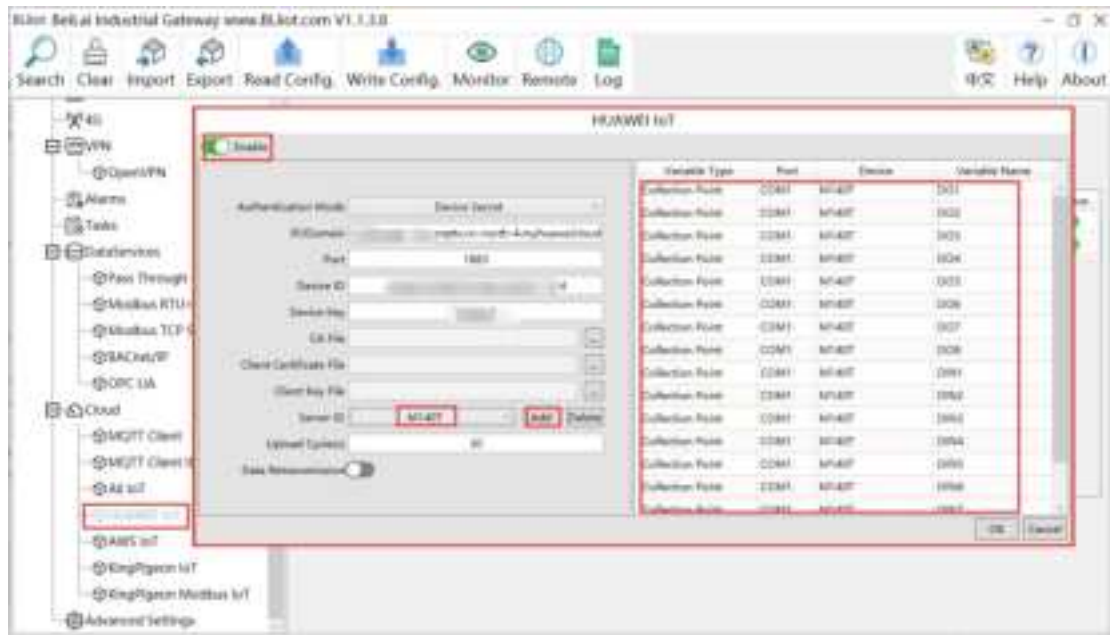


Alibaba Cloud Platform Send Command

Note: The shadow function of Alibaba Cloud devices is not supported, and the command must be sent through online debugging.

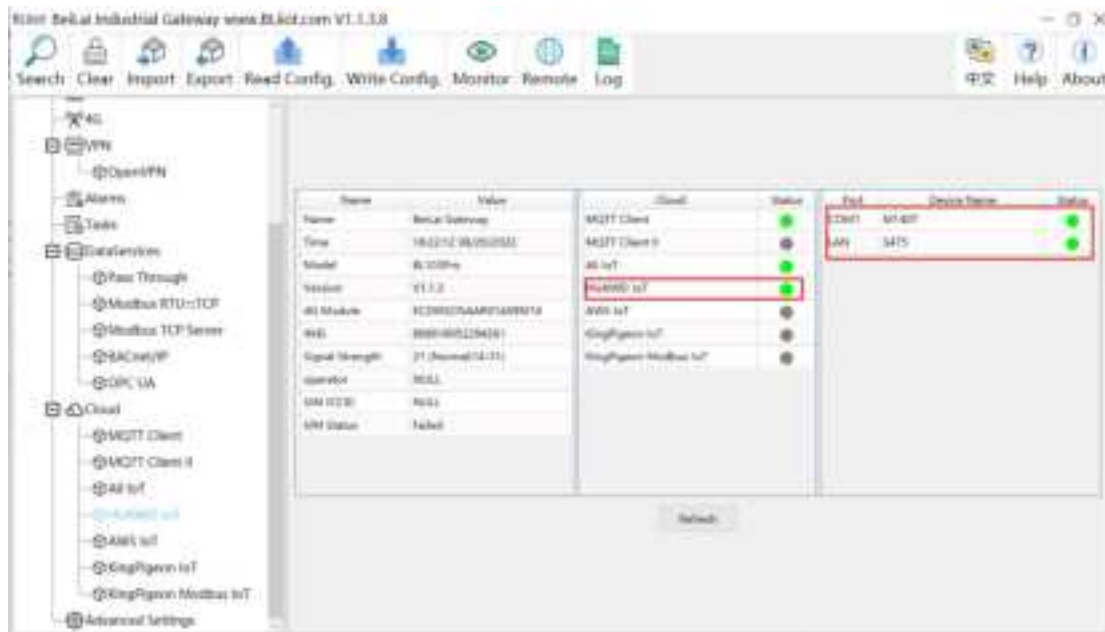


5.4.11 HUAWEI Cloud Configuration



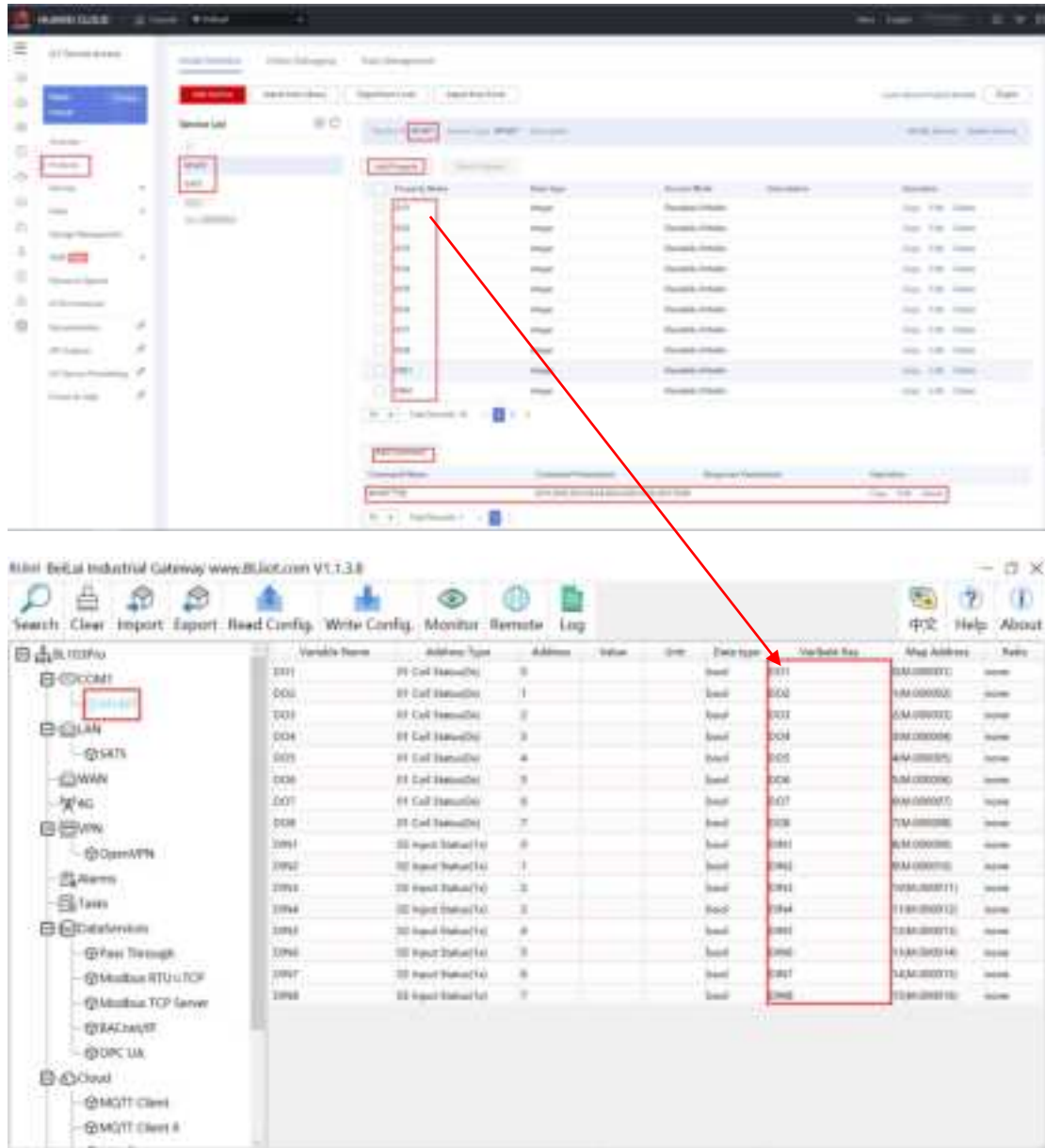
(1) Double-click "HUAWEI CLOUD IoT" to enter configuration box. (2) Click the Enable button to enable HUAWEI CLOUD. Default: off. Gray: Disabled, Green: Enabled. (3) Authentication mode: Choose whether to use a key connection or a certificate connection. Default is key connection. (4) IP/domain: Connect to the address of HUAWEI CLOUD, enter the console, click Overview, and the platform access address of the device access service console, you can view the server address. (5) Port: 1883 by default, 1883 for key connection, and 8883 for certificate connection. (6) Device ID: Set the same as the device ID on HUAWEI CLOUD. (7) Device key: Set the same key as the key on HUAWEI CLOUD, and

enter the key when creating a device. (8) CA file: When enabling certificate connection, select the root certificate file to upload. (9) Client certificate file: When enabling certificate connection, select the client certificate file to upload. (10) Client key file: When enabling certificate connection, select the client key file upload. (11) Server ID: Set the same as the service ID on HUAWEI CLOUD, the service ID set when creating the product. One service ID or multiple service IDs can be set. This example introduces multiple service ID applications, adding "M140T" and "S475" service IDs. (12) Upload cycle: The interval for regular data release, the default is 30S. (13) Data retransmission: whether to enable data retransmission, click the button to enable. Gray: disabled, Green: enabled. (14) Select data point upload: select the data point to be uploaded in the box to the right of the configuration box, the default is blank means all upload. In this example, the service ID "M140T" selects the data point of M140T to upload, the service ID item selects "M140T", right-clicks the mouse in the right box, the data point box pops up, and selects the data point of "M140T", for example: click the data point of M140T DO1, click and hold the left mouse button, move the mouse down to the data point to be uploaded, click "OK", and the data point you selected will be displayed in the box. Select the service ID "S475", right-click in the box, the data point box will pop up, select the data point, and click "OK". (15) Click "OK" to confirm the configuration of HUAWEI CLOUD. (16) Click "Write Configuration", HUAWEI CLOUD will be enabled after the gateway device restarts. Re-open the configuration software to log in to the device. On the basic information page, you can see that the "HUAWEI CLOUD online status" indicator light is green, indicating that HUAWEI CLOUD is connected. The rightmost shows the online status of the slave device.



5.4.12 View and Send Command by HUAWEI Cloud

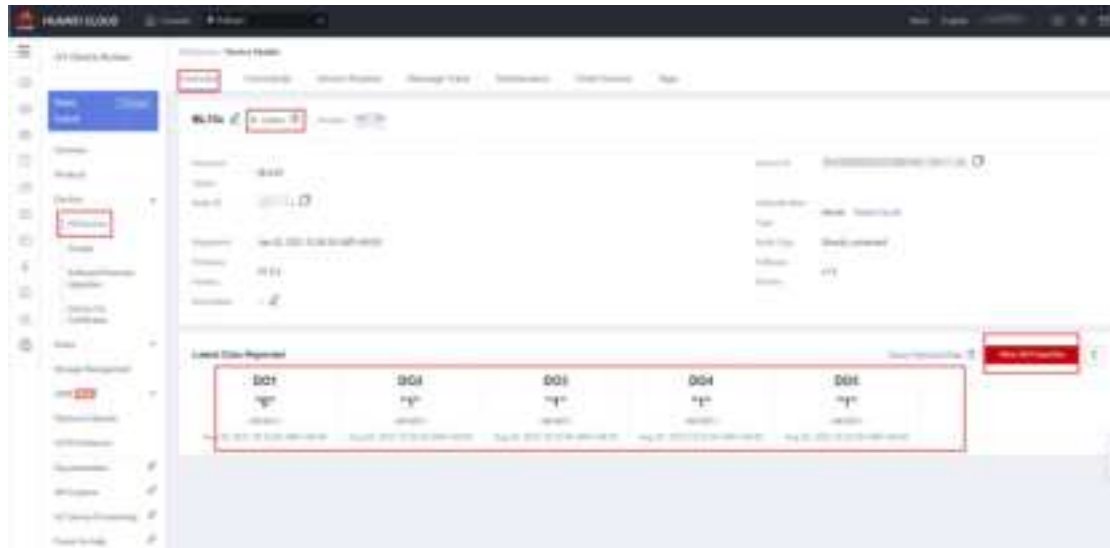
The property name is the variable label identifier on the configuration software



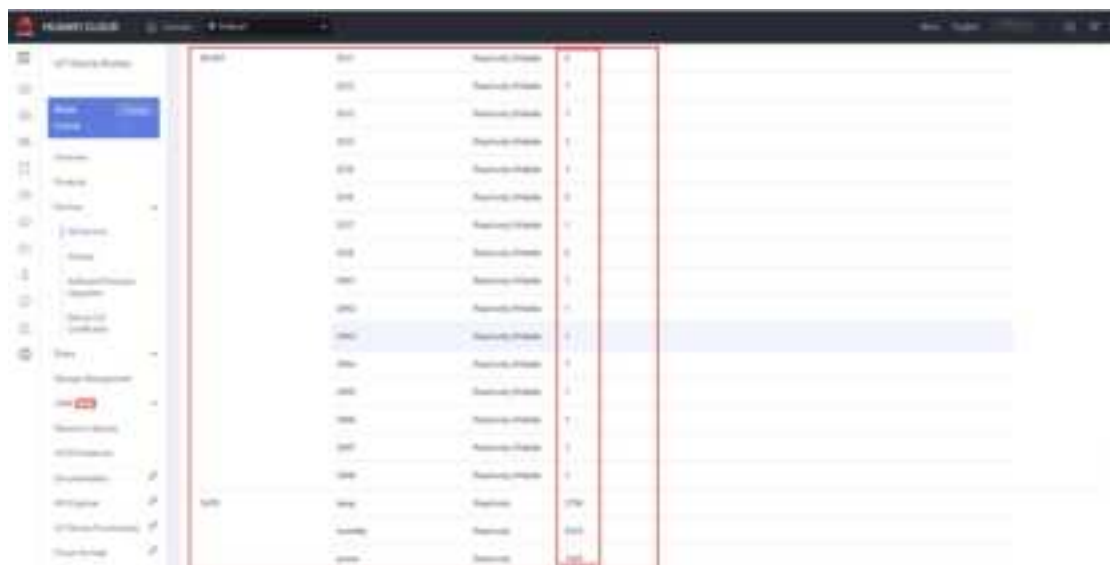
The top screenshot shows the 'Property Name' column in a table, with a red box highlighting the 'Property Name' header and a red arrow pointing to the 'Variable Name' column in the bottom screenshot. The bottom screenshot shows the 'Variable Name' column in a table, with a red box highlighting the 'Variable Name' header and a red arrow pointing to the 'Variable Name' column in the bottom screenshot.

Variable Name	Address	Type	Value	Unit	Data type	Variable Size	Mod Address	Notes
DI01	DI-01	DI-01	0		Bool	1	0x00000001	DI01
DI02	DI-02	DI-02	1		Bool	1	0x00000002	DI02
DI03	DI-03	DI-03	2		Bool	1	0x00000003	DI03
DI04	DI-04	DI-04	3		Bool	1	0x00000004	DI04
DI05	DI-05	DI-05	4		Bool	1	0x00000005	DI05
DI06	DI-06	DI-06	5		Bool	1	0x00000006	DI06
DI07	DI-07	DI-07	6		Bool	1	0x00000007	DI07
DI08	DI-08	DI-08	7		Bool	1	0x00000008	DI08
DO01	DO-01	DO-01	0		Bool	1	0x00000009	DO01
DO02	DO-02	DO-02	1		Bool	1	0x0000000A	DO02
DO03	DO-03	DO-03	2		Bool	1	0x0000000B	DO03
DO04	DO-04	DO-04	3		Bool	1	0x0000000C	DO04
DO05	DO-05	DO-05	4		Bool	1	0x0000000D	DO05
DO06	DO-06	DO-06	5		Bool	1	0x0000000E	DO06
DO07	DO-07	DO-07	6		Bool	1	0x0000000F	DO07
DO08	DO-08	DO-08	7		Bool	1	0x00000010	DO08

Data received by the HUAWEI CLOUD IoT platform:

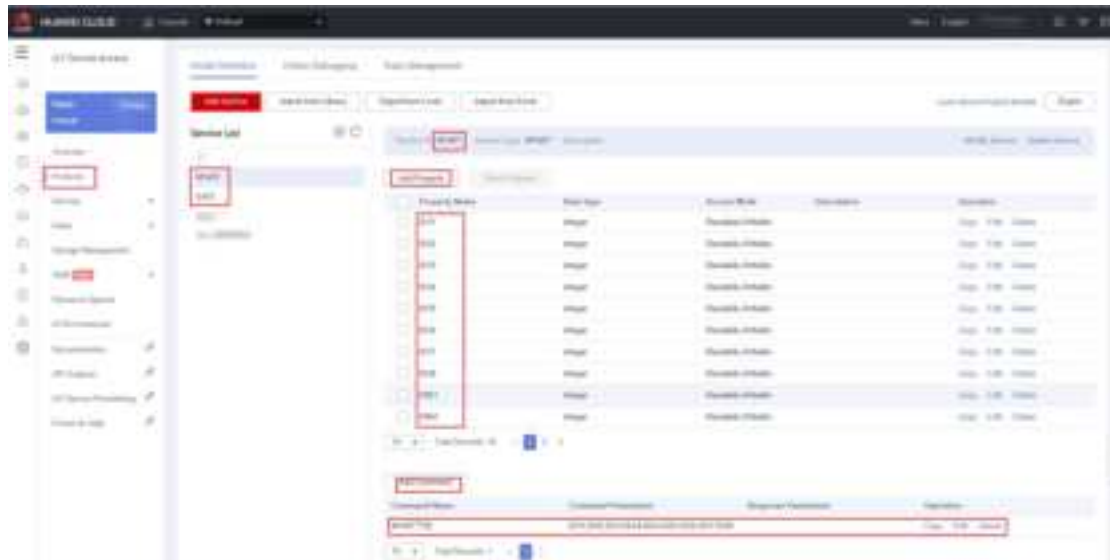


Click "View All Properties" or click "Device Shadow" to view all data as follows:



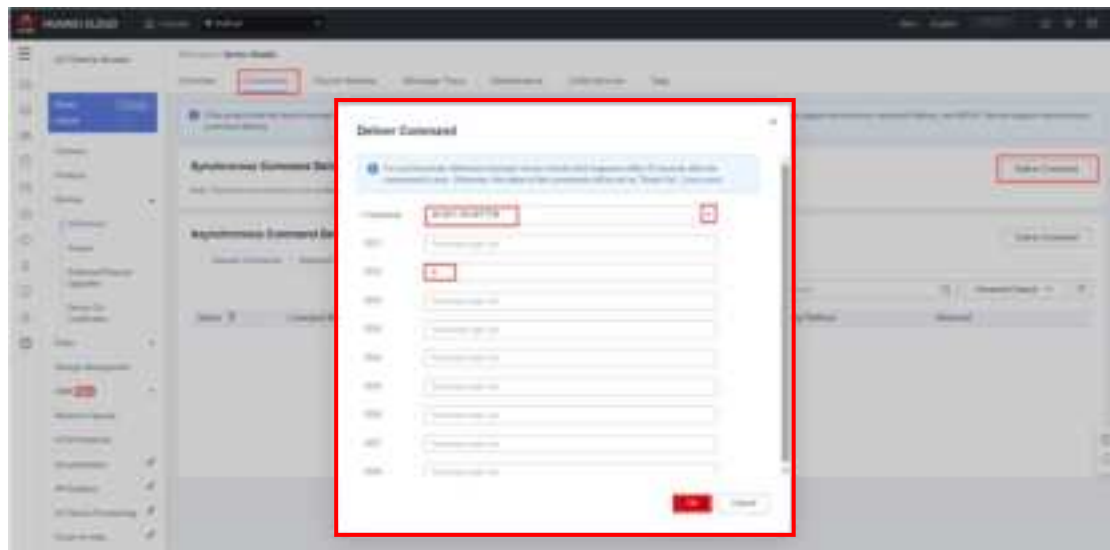
Send command by HUAWEI CLOUD

Add command

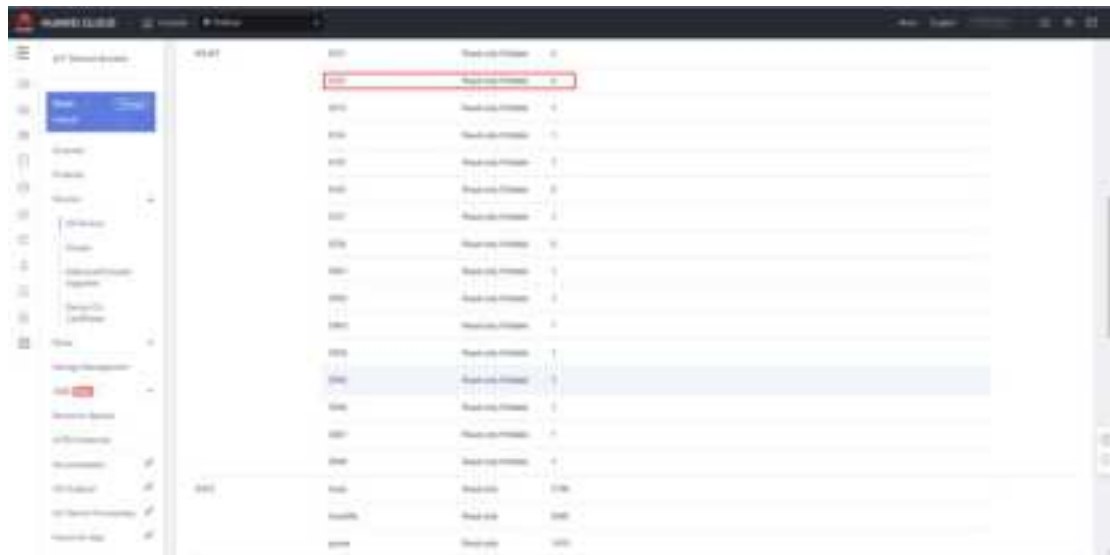


Command to send data

Take the DO2 of M140T as an example

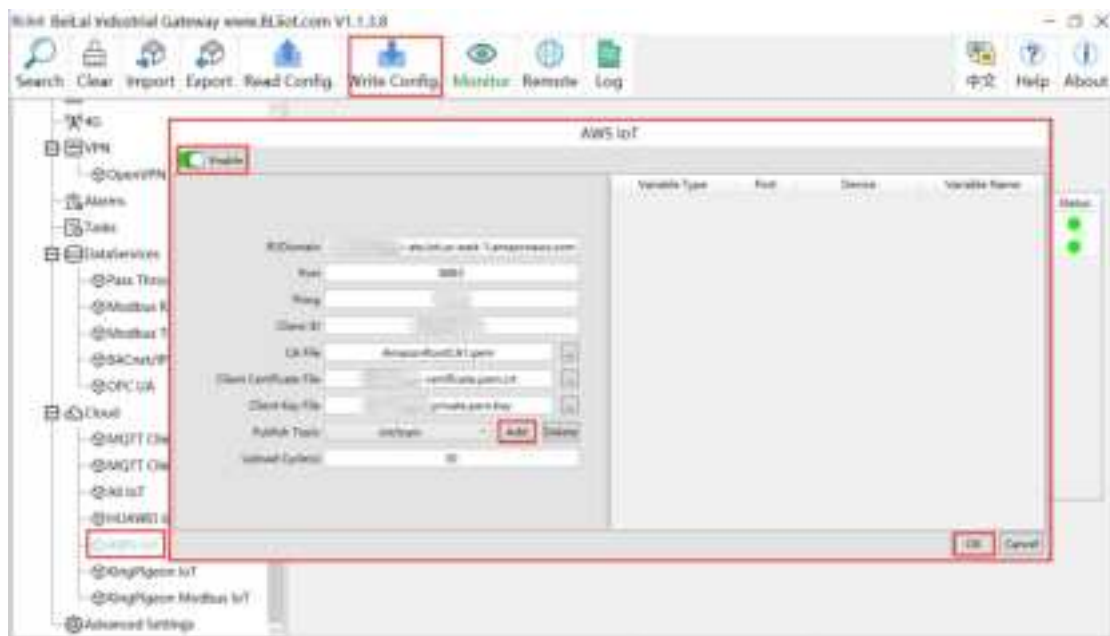


Check whether the DO2 data has changed in the device shadow, from the original "1" to "0".



5.4.13 AWS(Amazon Web Service) Configuration

Amazon Cloud supports multiple release topics, and the configuration is the same as HUAWEI CLOUD's. This only introduces the configuration of single topic, and the data points are all uploaded.



- (1) Double-click "Amazon IoT" to enter configuration box.
- (2) Click the Enable button to enable Amazon Cloud. Default: off. Gray: disabled Green: enabled.
- (3) IP/domain: Fill in the terminal node, enter the console, and click "Interaction" of "Thing" to view.
- (4) Port: 8883.
- (5)

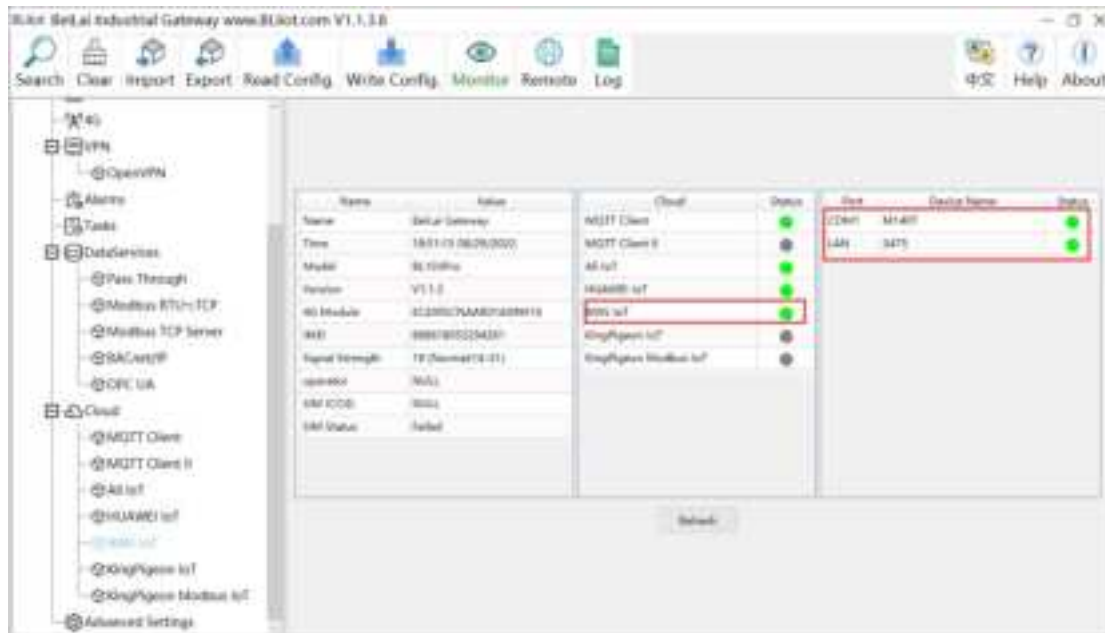
Thing: Fill in the ARN, and click "Details" of "Thing" to view the ARN. (6) Client ID: fill in the account ID and view it in the user information. (7) CA file: Select the root certificate file to upload. (8) Client certificate file: Select the client certificate file to upload. (9) Client key file: Select the client key file to upload. (10) Publish topic: the topic created when creating the rule, the topic name used by MQTT to publish the message, click "Add" to fill in the publishing topic name. You can fill in multiple publishing topics, select a publishing topic, and click "Delete" to delete the selected topic. For example: the topic viewed in the "rule" of "action" is "iot/topic", so fill in "iot/topic".

Rule query statement

The source of the messages you want to process with this rule.

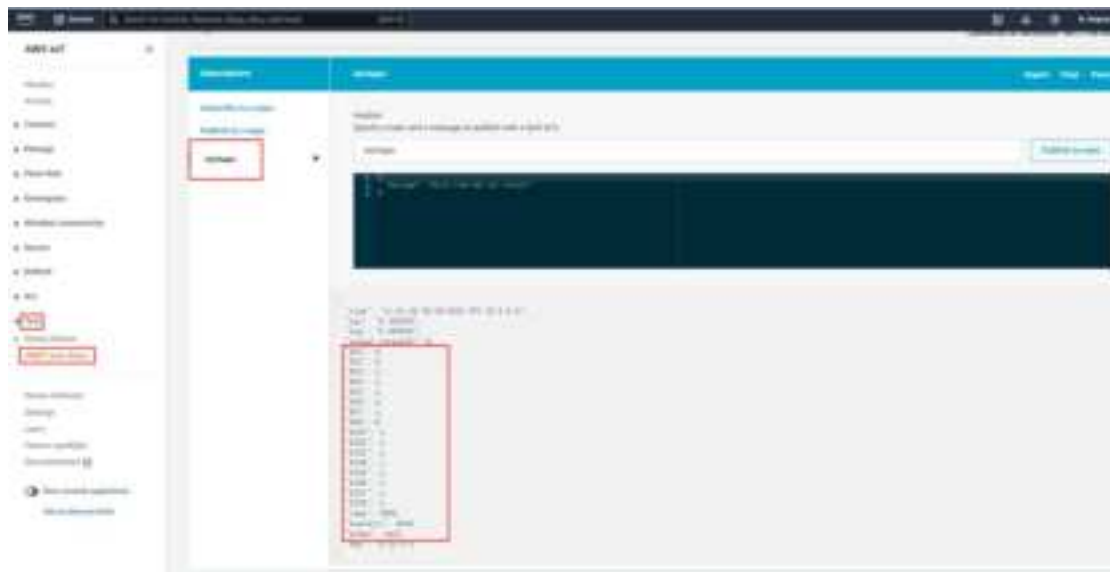
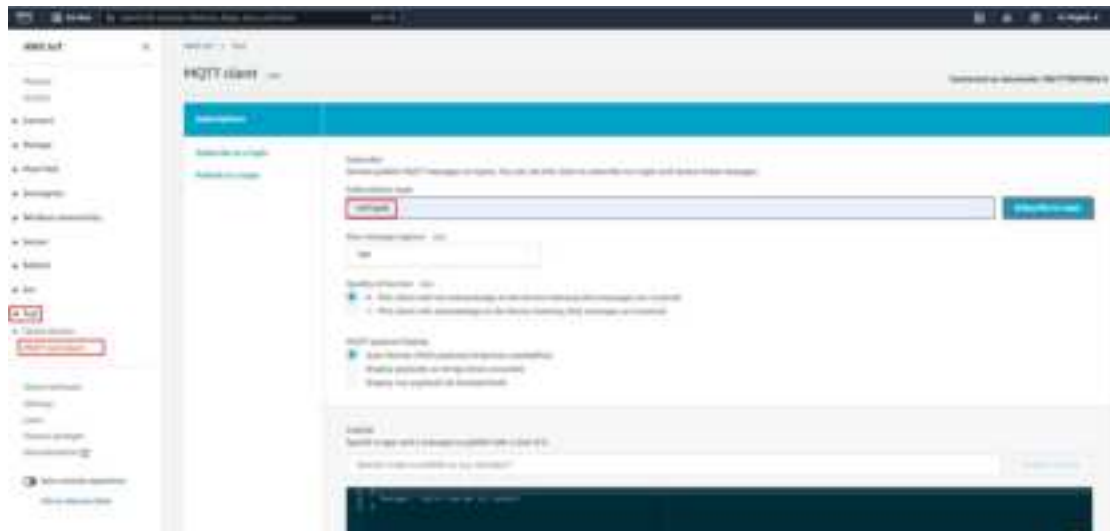
```
SELECT * FROM 'iot/topic'
```

(11) Upload cycle: The interval for regular data release, the default is 30S. (12) Select data point upload: select the data point to be uploaded in the box on the right side of the configuration box, the default is blank means all upload. (13) Click "OK" to confirm the configuration of Amazon Cloud. (14) Click "Write Configuration", and Amazon Cloud will be enabled after the gateway device restarts. Re-open the configuration software to log in to the device, and on the basic information page, you can see that the “Amazon Cloud Online Status” indicator light is green, indicating that the Amazon cloud is connected. The rightmost shows the online status of the slave device.



5.4.14 View and Send Command by AWS

Subscribe to the topic "iot/topic" in "Test" - "MQTT Test Client", and you can view the messages published by the BL103 gateway.



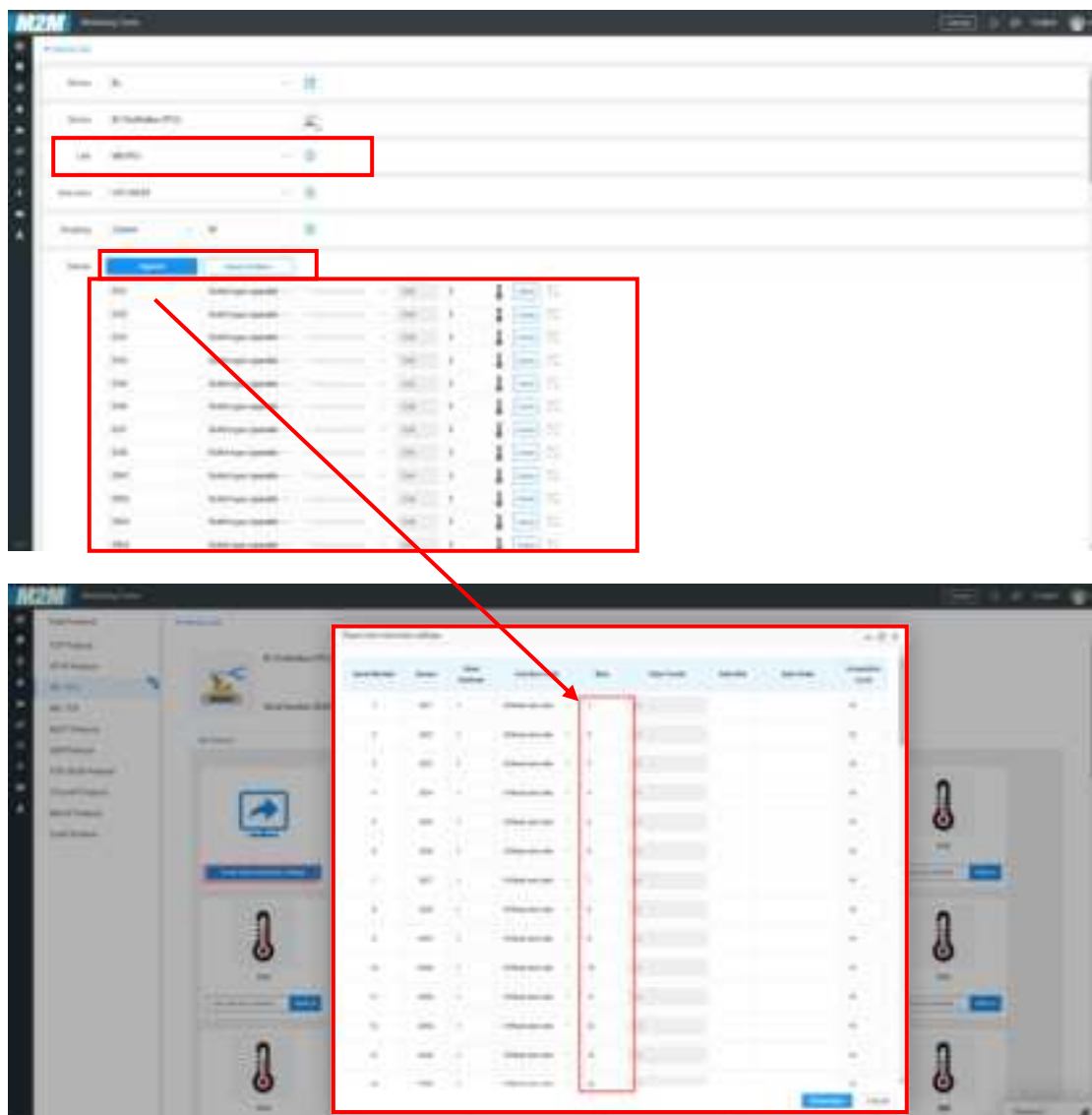
5.4.15 King Pigeon Modbus Cloud Configuration



(1) Double-click "King Pigeon Modbus IoT" to enter configuration box. (2) Click the Enable button to enable King Pigeon Modbus. Default: off. Gray: disabled, Green: enabled. (3) IP/domain: modbus.dtuip.com, filled in by default, no need to fill in. (4) Port: 6651, filled in by default, no need to fill in. (5) Modbus station: Modbus communication address, set the Modbus communication address of this gateway device. (6) Login Message: data package of register connecting server, fill in the serial number of the King pigeon cloud platform, need to contact the sales to provide the serial number. (7) Login ACK Message: King Pigeon Cloud does not need to fill in, the server responds to the registered data package. (8) Heartbeat Message: Heartbeat packets to maintain the connection. King Pigeon Cloud fills in: Q, filled in by default, no need to fill in. (9) Heartbeat ACK Message: The server responds to the heartbeat packet. King Pigeon Cloud fills in: A, filled in by default, no need to fill in. (10) Heartbeat Interval: The heartbeat packet sending cycle, the default is 60 seconds. (11) Click "OK" to confirm the configuration of King Pigeon Modbus. (12) Click "Write Configuration", the King Pigeon Modbus will be enabled only after the gateway device restarts. Re-open the configuration software to log in to the device, and on the basic information page, you can see that the prompt light of "King Pigeon Modbus Online Status" is green, indicating that the King Pigeon Modbus is connected. The rightmost shows the online status of the slave device.

5.4.16 View and Send Commands by King Pigeon Cloud

The data point configuration of the King Pigeon Modbus platform is as shown in the figure below. First build the data point, and then go to the read and write instructions of the link protocol item to set the configuration data point Modbus ID, function code, address, data format, byte order, and collection cycle. The Modbus address filled in by King Pigeon Cloud is one bit offset from the Modbus mapping address on the configuration software. For example: to collect M140T data point DO1, the Modbus mapping address on the configuration software is "0", then fill in "1" for the King pigeon cloud bias. The names of the sensors on the platform can be configured inconsistently in the software.



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Search Clear Import Export Read Config Write Config Monitor Remote Log

中文 Help About

Variable Name	Address Type	Address	Value	Unit	Data type	Variable Map	Map Address	Units
DO1	DI Call Status	0			Bool	DO1	0x00000001	Bool
DO2	DI Call Status	1			Bool	DO2	0x00000002	Bool
DO3	DI Call Status	2			Bool	DO3	0x00000003	Bool
DO4	DI Call Status	3			Bool	DO4	0x00000004	Bool
DO5	DI Call Status	4			Bool	DO5	0x00000005	Bool
DO6	DI Call Status	5			Bool	DO6	0x00000006	Bool
DO7	DI Call Status	6			Bool	DO7	0x00000007	Bool
DO8	DI Call Status	7			Bool	DO8	0x00000008	Bool
DI01	DI Input Status	9			Bool	DI01	0x00000009	Bool
DI02	DI Input Status	10			Bool	DI02	0x00000010	Bool
DI03	DI Input Status	11			Bool	DI03	0x00000011	Bool
DI04	DI Input Status	12			Bool	DI04	0x00000012	Bool
DI05	DI Input Status	13			Bool	DI05	0x00000013	Bool
DI06	DI Input Status	14			Bool	DI06	0x00000014	Bool
DI07	DI Input Status	15			Bool	DI07	0x00000015	Bool
DI08	DI Input Status	16			Bool	DI08	0x00000016	Bool

The values of the collected data points are as follows:

M2M

Device Management

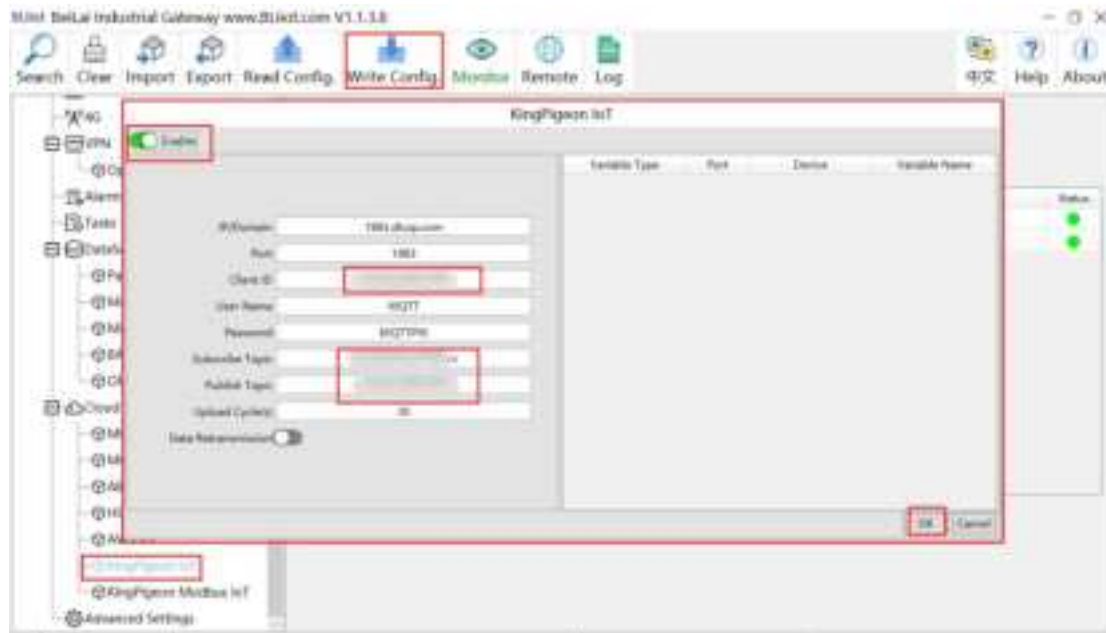
ID	Name	Model	Version	Status	Location	Remark
001	001-001	001-001	001-001	Online	001-001	001-001
002	002-001	002-001	002-001	Online	002-001	002-001
003	003-001	003-001	003-001	Online	003-001	003-001
004	004-001	004-001	004-001	Online	004-001	004-001
005	005-001	005-001	005-001	Online	005-001	005-001
006	006-001	006-001	006-001	Online	006-001	006-001
007	007-001	007-001	007-001	Online	007-001	007-001
008	008-001	008-001	008-001	Online	008-001	008-001
009	009-001	009-001	009-001	Online	009-001	009-001
010	010-001	010-001	010-001	Online	010-001	010-001



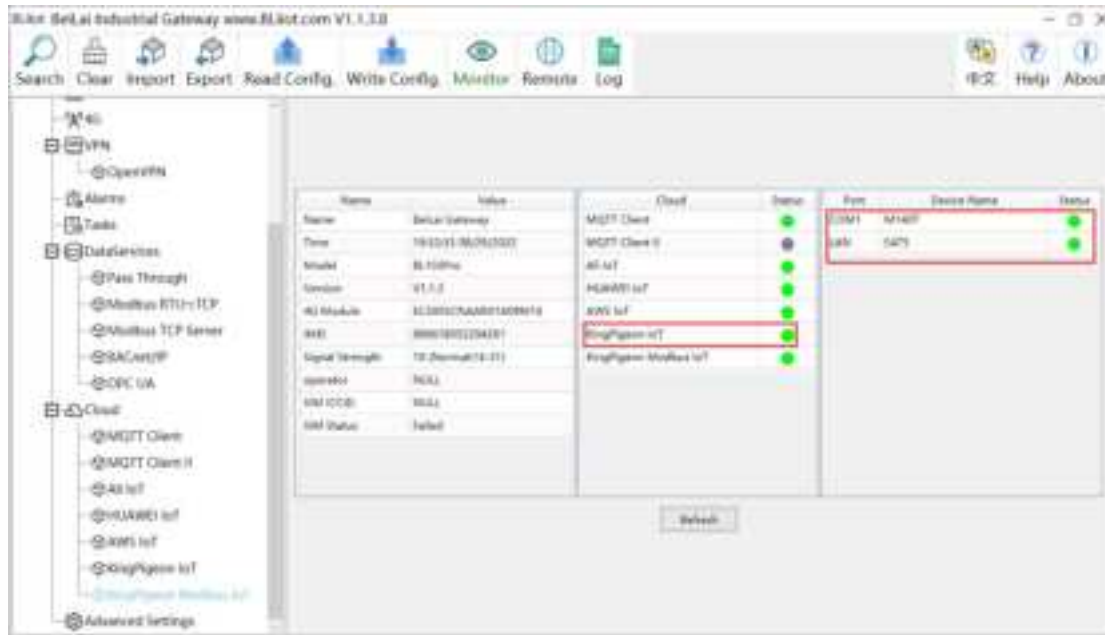
Send command by the platform



5.4.17 King Pigeon MQTT Cloud Configuration

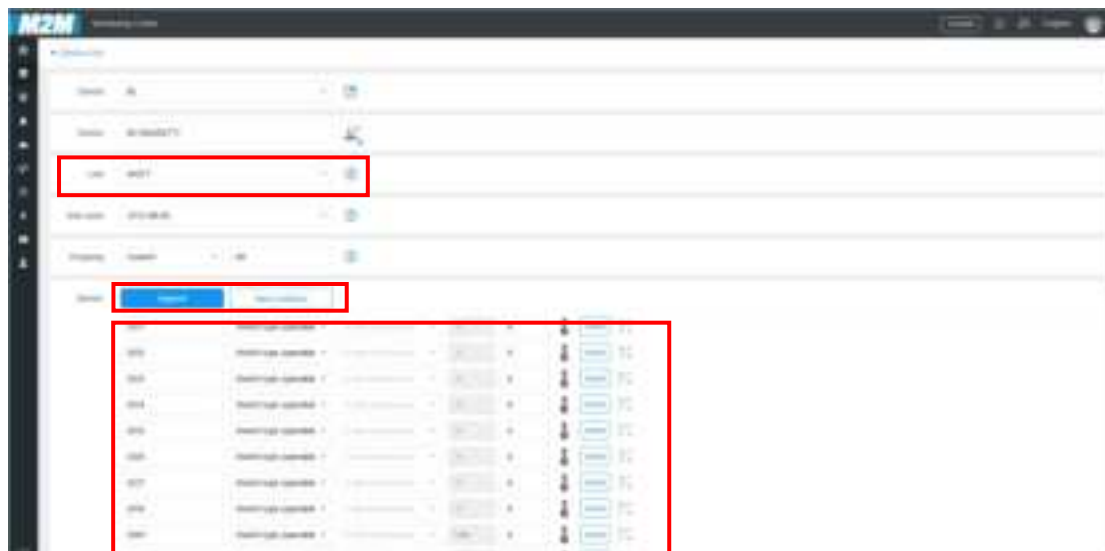


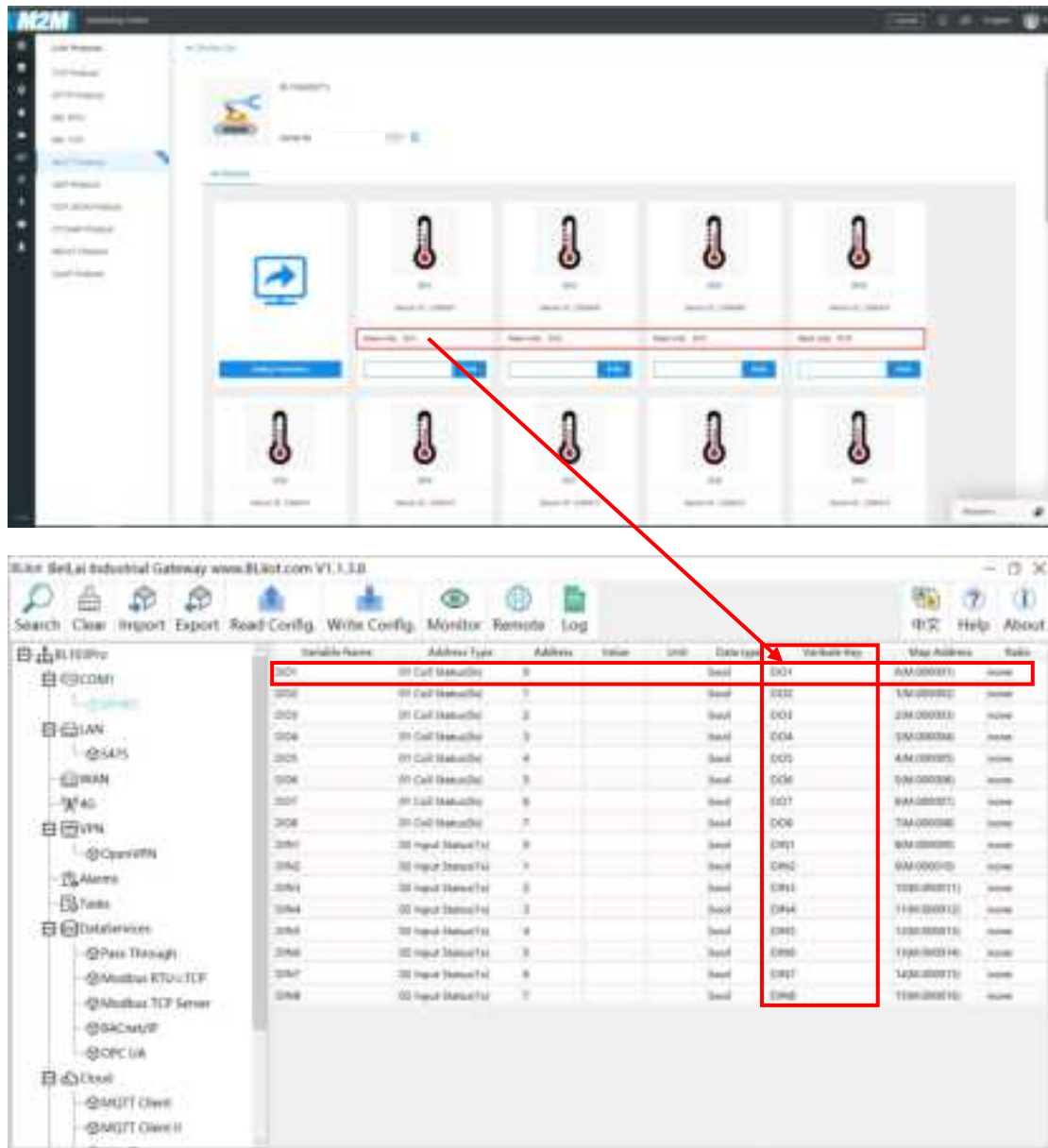
(1) Double-click "King Pigeon IoT" to enter configuration box. (2) Click the Enable button to enable King Pigeon MQTT. Default: off. Gray: disabled, Green: enabled. (3) IP/domain name: 1883.dtuip.com, filled in by default, no need to fill in. (4) Port: 1883, filled in by default, no need to fill in. (5) Client ID: fill in the serial number of the King Pigeon platform, need to contact the sales to have serial number. (6) Username: MQTT, filled in by default, no need to fill in. (7) Password: MQTTPW, filled in by default, no need to fill in. (8) Subscribe topic: Fill in the format: the serial number of the King Pigeon platform / +, need to contact the sales to have serial number. (9) Publish topic: fill in the serial number of the King Pigeon platform, need to contact the sales to have the serial number. (10) Upload cycle: The interval for regular data release, the default is 30S. (11) Data retransmission: Click the button to enable. Gray: disabled, Green: enabled. (12) Select data point upload: select the data point to be uploaded in the box on the right side of the configuration box, the default is blank means all upload. (13) Click "OK" to confirm the configuration of King Pigeon MQTT. (14) Click "Write Configuration", the King Pigeon MQTT will not be enabled until the gateway device restarts. Re-open the configuration software to log in to the device, and on the basic information page, you can see that the prompt light of "King Pigeon MQTT Online Status" is green, indicating that Golden Pigeon MQTT is connected. The rightmost shows the online status of the slave device.



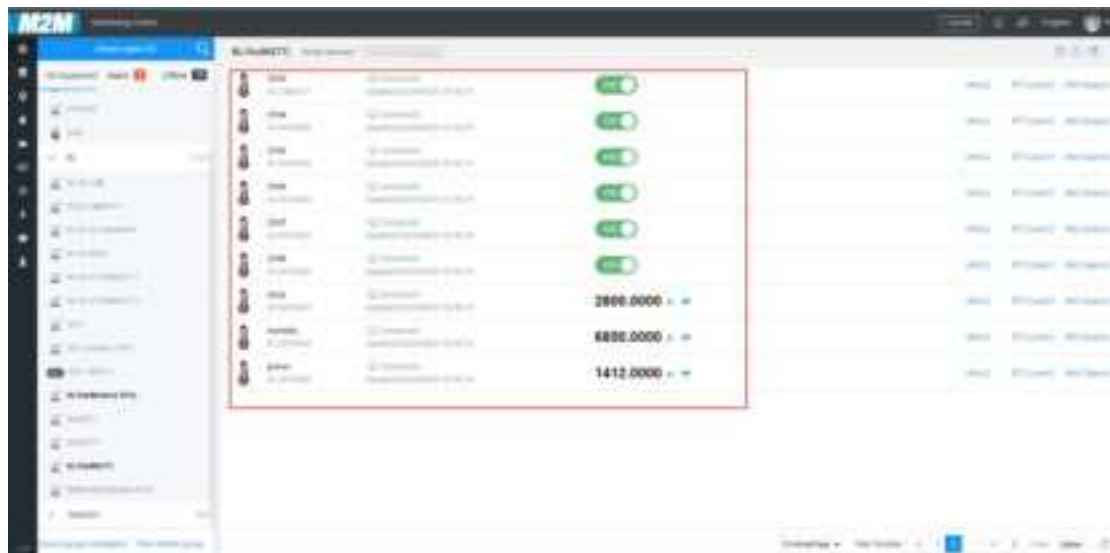
5.4.18 View and Send Command by King Pigeon Cloud

First, add data points, and then go to the setting link protocol item to configure the data point identifier. The identifier of the data point is consistent with the variable label on the configuration software. For example: collecting M140T data point DO1, the variable label on the configuration software is "DO1", then the read and write identification on the King Pigeon Cloud should be "DO1". The names of the sensors on the platform can be configured inconsistently in the software.





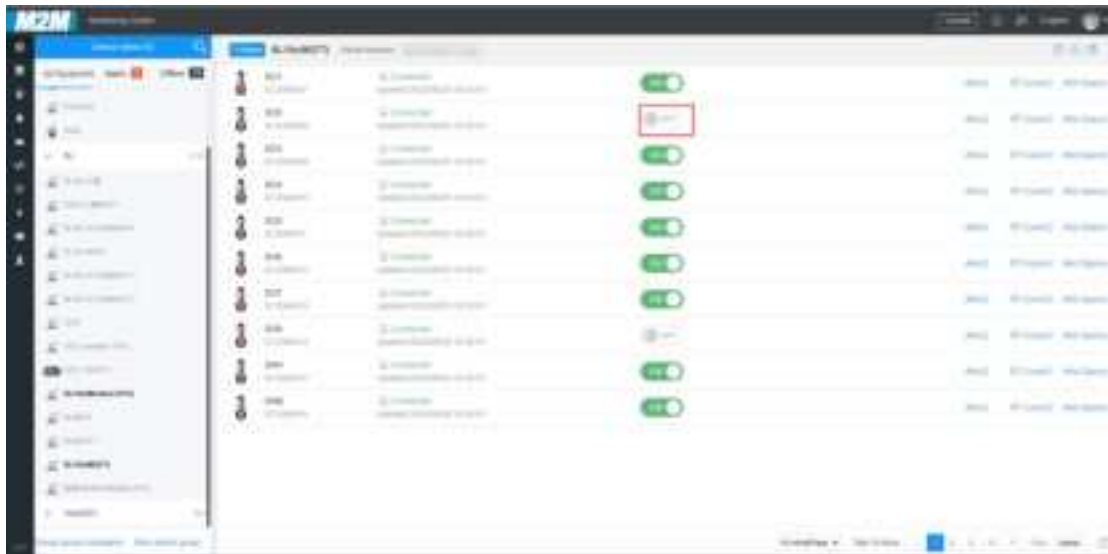
The values of the collected data points are as follows:



Send commands

Take control of DO2 of M140T as an example





5.4.19 King Pigeon MQTT Data Format

The "KingPigeon" JSON data format of MQTT Client and MQTT Client II is the same as that of King Pigeon MQTT. The details are as follows

1) The payload data format in the device publish message

Release topic: serial number (corresponding to the configured release topic setting item)

```
{
  "sensorDatas": [
    {
      //Boolean
      "flag": "REG001", //Read and write identification
      "switcher": 0 //data type and value
    },
    {
      //Numerical
      "flag": "REG005", //Read and write identification
      "value": 3 //data type and value
    },
    {
      //4G Module signal value
      "flag": "signal_strength", //Read and write identifiers, fixed and cannot
be modified
      "value": 28 //data type and value
    }
  ]
}
```

```

    }
  ],
  "state": "alarm", //Alarm identifier (the configuration software "Alarm and Event" is
                    //configured with an alarm event, which is only available when an alarm is triggered, but
                    //not in the regularly reported data)
  "state": "recovery", //Alarm recovery identifier (this identifier is only available when the
                      //alarm is recovered, and the data reported regularly does not have this identifier)
  "gateway_identify": "Beilai" //Gateway name identifier, upload gateway name
  "time": "1622700769", //Time Identifier, the timestamp of when the data was published
  "addTime": "2021-06-03 06:12:49" //Time identifier, time of uploading to the gateway
  "retransmit": "enable" //Retransmission identifier, which represents MQTT historical
                        //data (this identifier is only available when there is retransmission historical data, and
                        //there is no such identifier for regularly reported data)
}

```

Note:

//Read and write identification: The character is "flag", followed by "MQTT identifier of data point", the MQTT identifier filled in when adding data points can be defined independently.



//Data type and value: According to the type, it is divided into:

1. Boolean: the character is "switcher", followed by "0" or "1" (0 means open, 1 means close).
2. Numerical: the character is "value", followed by "specific value".

//Alarm, recovery identification: the character is "state", followed by "alarm" or "recovery" (alarm represents alarm data, recovery represents alarm recovery data).

//Gateway name identification: the character is "gateway_identify", followed by "gateway name".

//Time identification: the character is "time", followed by "specific reporting timestamp".

//Time stamp: the character is "addtime", followed by "gateway time".

//Retransmission identifier: the character is "retransmit", followed by "enable"

The data collected during the network disconnection period will be temporarily stored on the device and republished when the network is restored. It is identified by the "retransmit" field to represent historical data. (Need to enable data retransmission on the configuration interface)

2) The payload data format in the device subscription message

Subscription topic: serial number/+ (corresponding to the configured subscription topic setting item)

(The topic name used by King Pigeon 2.0 to publish messages downstream is "serial number/sensor ID", so the device subscription topic needs to add the wildcard "+", so as to receive the data sent by the platform for control)

```
{
  "sensorDatas":[
    {
      //Send Boolean
      "sensorsId": 211267,//Platform Sensor ID
      "switcher":1, //data type and value
      "flag":"DO1" //Read and write identification
    },
    {
      //Send Numerical
      "sensorsId": 160239, //Platform Sensor ID
      "value":"10", //data type and value
      "flag":"REG001" //Read and write identification
    }
  ],
  "down":"down" //Platform downlink message identifier
}
```

Note:

//Platform sensor ID: the character is "sensorsID", followed by the ID number (the ID is automatically generated by the platform), and the self-built platform no need.

//Data type and value: According to the type, it is divided into:

1. Switch data: the character is "switcher", followed by "0" or "1" (0 means open, 1

means closed)

2. Numerical data: the character is "value", followed by "specific value"

//Read and write flag: the character is "flag", followed by "MQTT flag representing the data point"

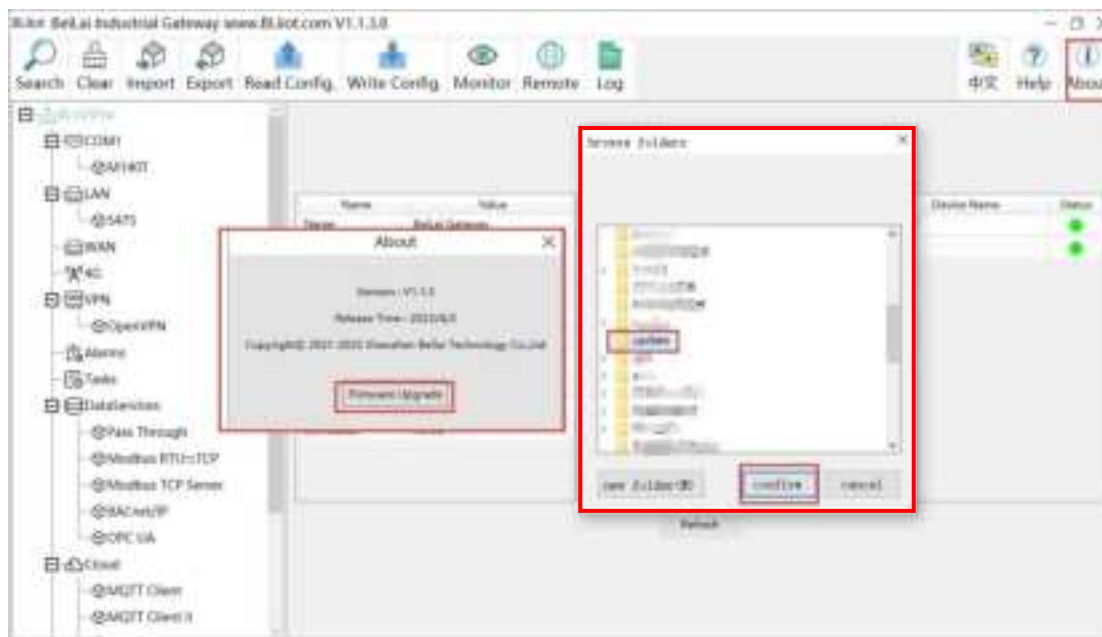
//Platform downlink message identification: The character is "down", followed by "down", which means this is the platform downlink data.

Note: Boolean values are delivered without double quotes, and numeric values are delivered with double quotes.

6 Firmware Upgrade

Please contact us if you need to upgrade the firmware.

This gateway supports upgrading through the configuration software, click the configuration software "About", click "Firmware Upgrade" to select the "update" folder, click confirm, there will be a prompt box when the upgrade is completed, click OK. Contact after sales for update folder.



7 Warranty

- 1) This equipment will be repaired free of charge for any material or quality problems within one year from the date of purchase.
- 2) This one-year warranty does not cover any product failure caused by man-made damage, improper operation, etc.

8 Technical Support

Shenzhen Beilai Technology Co., Ltd.

Website: <https://www.bliiot.com>