EdgelO





BL200 Series User Manual

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Shenzhen Beilai Technology Co.,Ltd

Website: https://www.bliiot.com



Preface

Thanks for choosing BLIIoT Distributed I/O. These operating instructions contain all the information you need for operation of BL200 series products.

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Disclaimer

This document is designed for assisting user to better understand the device. As the described device is under continuous improvement, this manual may be updated or revised from time to time without prior notice. Please follow the instructions in the manual. Any damages caused by wrong operation will be beyond warranty.

Revision History

| Update Date | Version | Description |
|-------------|---------|-------------------------------|
| 2021-10-13 | V1.0 | First Edition |
| | | Add Profinet, EtherCAT |
| 2022-07-01 | V1.1 | protocol, add platform, logic |
| | | control functions |
| 2023-07-27 | V1.1 | Change Model name |



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1 Product Introduction

1.1 Overview

BL200 series product is distributed I/O system for data acquisition and industrial control.

The I/O controller is built around a powerful 32-bit microprocessor, it adopts Linux operating system, supports Modbus, MQTT, OPC UA, Profinet, EtherCAT, Ethernet/IP, BACnet/IP and other protocols, and can be connected to PLC, DCS, PAS, MES, Ignition, SCADA and ERP systems, as well as AWS, Thingsboard, Huawei Cloud, Alibaba Cloud and other cloud platforms.

The I/O system supports programmable logic control, edge computing, and customized applications, it is widely applicable to a variety of IIoT and industrial automation solutions.

The BL200 distributed I/O system consists of 3 parts: Controller, I/O modules and terminal modules.



The communication between the node and the field devices (eg PLC) takes place via the Ethernet interface of the fieldbus coupler, and the communication between the fieldbus coupler and the I/O modules takes place via the local bus. The two Ethernet interfaces are internally integrated with a switch function, which can establish a linear topology without the need for additional switches or hubs.



The system needs to use the power module to provide 24VDC system voltage and 24VDC field voltage. Since two independent power supplies are used, the field voltage input interface and system voltage input interface of BL200 series couplers are electrically isolated from each other.

When assembling fieldbus node modules, each I/O module can be arranged in any combination, and it is not required to be grouped by module type.

A terminal module must be plugged into the end of a fieldbus node to ensure correct data transmission.

1.2 **Typical Application**

High reliability, easy expansion, easy setting, and convenient network wiring, these capabilities let users efficiently adapt the BL200 I/O system to a variety of complex industrial solutions.

The I/O system is widely applicable to a variety of industrial solutions, such as Internet of Things, smart factories, smart cities, smart medical care, smart homes, smart transportation, data center power environment monitoring, electric power, oil monitoring, automobiles, warehousing and logistics and other industries.





1.3 Features

- > Each I/O system can have a maximum of I/O 32 modules.
- Support Modbus, MQTT, OPC UA, Profinet, EtherCAT, Ethernet/IP, BACnet/IP protocols.
- Support Alibaba Cloud, Huawei Cloud, AWS Cloud, Thingsboard, Ignition, etc.
- Support programmable logic control, edge computing, and customized



applications.

- > The field side, the system side and the bus side are electrically isolated from each other.
- Support 2 X RJ45 interface, integrated switch function, can establish line topology, without the need for additional switches or hubs.
- > Convenient wiring connection technology, screw-free installation.

1.4 Model List

| Description | Model | Channel | Туре | |
|------------------------------|----------|---------|----------|---------|
| Modbus-TCP I/O Coupler | BL200 | / | / | Finish |
| Profinet I/O Coupler | BL201 | 1 | / | Finish |
| EtherCAT I/O Coupler | BL202 | / | / | Finish |
| Ethernet/IP I/O Coupler | BL203 | / | / | Finish |
| OPC UA EdgelO Controller | BL205 | 1 | / | Finish |
| MQTT EdgelO Controller | BL206 | 1 | / | Finish |
| MQTT+OPC UA+Modbus TCP | BL206Pro | 1 | / | Finish |
| BACnet/IP I/O Coupler | BL207 | / | / | Ongoing |
| 8CH DI, PNP | M1081 | 8 | PNP | Finish |
| 8CH DI, NPN | M1082 | 8 | NPN | Finish |
| 16CH DI, PNP | M1161 | 16 | PNP | Finish |
| 16CH DI, NPN | M1162 | 16 | NPN | Finish |
| 4CH DO, Relay | M2044 | 4 | Relay | Finish |
| 8CH DO, PNP | M2081 | 8 | PNP | Finish |
| 8CH DO, NPN | M2082 | 8 | NPN | Finish |
| 16CH DO, PNP | M2161 | 16 | PNP | Finish |
| 16CH DO, NPN | M2162 | 16 | NPN | Finish |
| 4CH AI 0/4-20mA Single-Ended | M3041 | 4 | Current | Finish |
| 4CH AI 0-5/10V Single-Ended | M3043 | 4 | Voltage | Finish |
| 4CH AI 0-5/10V Differential | M3044 | 4 | Voltage | Finish |
| 4CH AI ±5/±10V Differential | M3046 | 4 | Voltage | Finish |
| 4CH AO 0/4-20mA Single-Ended | M4041 | 4 | Current | Finish |
| 4CH AO 0-5/10V Single-Ended | M4043 | 4 | Voltage | Finish |
| 2CH 3Wire PT100 | M5021 | 2 | Resistor | Ongoing |
| 2CH 3Wire PT1000 | M5022 | 2 | Resistor | Ongoing |
| 2CH 4Wire PT100 | M5023 | 2 | Resistor | Ongoing |
| 2CH 4Wire PT1000 | M5024 | 2 | Resistor | Ongoing |



| 4CH TC | M5048 | 4 | ТС | Ongoing |
|----------------------|-------|---|---------|---------|
| 2CH RS485 | M6021 | 2 | RS485 | Finish |
| 2CH RS232 | M6022 | 2 | RS232 | Finish |
| 1CH RS485, 1CH RS232 | M6023 | 2 | / | Finish |
| Power module | M7011 | / | / | Finish |
| Terminal module | M8011 | / | / | Finish |
| 2CH SSI encoder | M9024 | 2 | Encoder | Ongoing |

2 Hardware

2.1 I/O Controller



2.2 **Dimension**

Unit:mm



2.3 Data Contacts/Internal Bus

The communication between the fieldbus coupler/controller and the I/O modules, as well as the system power supply of the I/O modules are realized via the internal bus. The internal bus is made up of 6 data contacts, these gold-plated contacts are self-cleaning when connected.





2.4 Power Jumper Contacts

The power module included with the coupler has two self-cleaning power jumper contacts for powering the field side. This power supply has a maximum current of 10A across the contacts, current exceeding the maximum will damage the contacts. When configuring the system, it must be ensured that the above-mentioned maximum current is not exceeded. If it exceeds, a power expansion module needs to be inserted.



| No. | Туре | Description |
|-----|----------------|------------------------------|
| 1 | Spring contact | Supply 24V to the field side |
| 2 | Spring contact | Supply 0V to the field side |



2.5 Terminal Point



| Name | Description |
|------|---------------------------------|
| 24V | System Power 24VDC |
| 0V | System Power 0VDC |
| + | Connections Field Supply 24 VDC |
| + | Connections Field Supply 24 VDC |
| - | Connections Field Supply 0 VDC |
| - | Connections Field Supply 0VDC |
| PE | Grounding |
| PE | Grounding |

2.6 Factory Reset

This reset button is used to restore the device configuration parameters to the factory state.

Operation steps:

1. When the device is running, open the flip cover;

2.Press and hold the button for more than 5 seconds, until all the LED lights go off, indicates reset successful, and then the device will automatically restart.





2.7 Electrical Schematic



3 Installation

3.1 Installation Sequence

All distributed couplers/controller and I/O modules from Beilai Technology must be mounted on a standard DIN 35 rail.

Starting from the coupler, the I/O modules are assembled from left to right, and the modules are installed next to each other. All I/O modules have grooves and power jumper contacts on the right side, to avoid assembly errors, I/O modules must be inserted from the right and top to avoid damage to the modules.

Utilizes a tongue and groove system to form a secure fit and connection. With the automatic locking function, the individual components are securely fixed on the rail



after installation.

Don't forget to install the terminal module! Always plug a terminal module (eg TERM) into the end of the I/O module to ensure correct data transmission.

3.2 Install Coupler

1. Snap the coupler onto the DIN rail first;

2.Use a tool such as a screwdriver to turn the locking cam until the locking cam engages the DIN rail.



3.3 Remove Controller

1.Use a screwdriver to turn the locking disc cam until the locking cam no longer engages the rail.



2.Pull the release tab to remove the coupler from the assembly





Data or power contacts are electrically disconnected from adjacent I/O modules when the coupler/controller is removed.

3.4 Insert I/O Modules

1. When inserting the module, make sure the tabs on the module line up with the grooves of the coupler or other I/O module to which it is attached.



2.Press the I/O module into the assembly position until the I/O module snaps into the rail.





After the I/O module is installed, the electrical connection to the coupler (or the previous I/O module) and the following I/O module is established via the data contacts and the power jumper contacts.

3.5 Remove I/O Modules



Pull up on the latch to remove the I/O module from the assembly.

When the I/O module is removed, the electrical connection to the data or power jumper contacts is disconnection.

4 Device Connection

4.1 Wiring

CAGE CLAMP connection is suitable for solid, stranded and fine-stranded conductors. Only one wire can be connected to each CAGE CLAMP. If there is more than one wire, ¹⁹ Shenzhen Beilai Technology Co., Ltd V1.1



it must be merged into a point before being connected.

- 1. Open the CAGE CLAMP by inserting the tool into the opening above the junction.
- 2. Insert the wire into the corresponding open connection terminal.

3. Once the tool is removed, the CAGE CLAMP closes and the wire is clamped firmly by the spring.



4.2 Power Supply

System and field voltages are supplied by power supply modules. The power supply module of the BL200 series coupler supplies power for the internal electronics of the coupler and the I/O modules. If necessary (there are many I/O modules and the current is relatively high), it can also be provided through an independent power supply module.

The fieldbus interface (Ethernet interface), system and field are galvanically isolated from each other.

4.2.1 System Power

BL200 series couplers require 24V DC system power, which is connected from the terminal of the power supply module. The 5V bus voltage required inside the system is converted from the 24V system voltage.

The power supply module only has proper fuse protection, please provide proper overcurrent protection externally.

Please pay attention to matching the output power of the power supply module and the load power to avoid excessive load current.





4.2.2 On-site Power Supply

The power supply module supplies 24 VDC on the field side to power the sensors and actuators.

Field power supply only has proper fuse protection. Without overcurrent protection, electronic equipment can be damaged.



Field-side power is automatically output from the power jumper contact when the I/O module is connected. The continuous load current across the contacts of the power supply must not exceed 10 A.

The problem of excessive load power on the system side or on the field side can be

solved by plugging in additional power supply modules. After plugging in an additional power supply module, a new voltage potential may appear on the field side. In the case where electrical isolation is not required, the field power supply and the system power supply can use the same power supply.

4.2.3 Grounding

When installing the enclosure cabinet, the cabinet must be grounded, and the rail is electrically connected to the cabinet through screws to ensure that the rail is properly grounded. Grounding can increase resistance to electromagnetic interference. Some components in the I/O system have rail contacts that dissipate EMI onto the rail.



5 BL200 Series Coupler/Controller

5.1 BL200 Modbus TCP Coupler

5.1.1 BL200 Coupler Overview

The Modbus TCP coupler supports standard Modbus TCP server communication, and the Ethernet supports the dual network port switch cascading function. The device



supports simultaneous access by 15 clients, supports function code 01/02/03/04/05/06/15/16, and supports 32 extended I/O modules.

5.1.2 Technical Parameters

| Name | Parameter | Description | |
|------------------|--|--|--|
| | Input voltage(system) | 24 VDC | |
| | Input current(system) | MAX 500 mA@24VDC | |
| | Power Efficiency | 84% | |
| Systen power | Internal bus voltage | 5VDC | |
| | Coupler consumption current | MAX 300mA@5VDC | |
| | I/O consumption current | MAX 1700mA@5VDC | |
| | Isolation protection | 500 V system/supply | |
| | Input voltage (field) | 24 VDC | |
| Field power | Power supply current across contacts (MAX) | 10 ADC | |
| | Number | 2 X RJ45 | |
| | Transmission medium | Twisted Pair STP 100 Ω Cat 5 | |
| Ethernet | MAX cable length | 100m | |
| Luemer | Baud rate | 10/100 Mbit/s | |
| | Isolation protection | ESD contact: 8KV, Surge: | |
| | | 4KV(10/1000us) | |
| | Operating system | Linux | |
| | CPU | 300MHz | |
| | RAM | 64MB | |
| | Flash | 128MB | |
| | I/O Modules | MAX 32 | |
| System | Process mapping (Modbus) | • Bool : 4096 | |
| | data points via serial port | • 16 Bit : 2048 | |
| | module | • 32 Bit : 1024 | |
| | Protocol | Modbus TCP, HTTP, DHCP, DNS | |
| | Maximum number of | 15 Modbus TCP | |
| | connections | | |
| | Method | CAGE CLAMP | |
| Wiring method | Wire diameter | 0.08 mm² ··· 2.5 mm², AWG 28 ··· 14 | |
| | Stripping length | 8 mm - 9 mm / 0.33 in | |



| | Working temperature | 0 55 ° C | |
|--------------|---------------------|------------------------------|--|
| | Storage temperature | -40 ··· 70 ° C | |
| Environment | Relative humidity | 5 ··· 95% no condensation | |
| | Working altitude | 0 ··· 2000 m | |
| | Protection type | IP20 | |
| | Width | 48mm | |
| Dimension | Length | 100mm | |
| | Height | 69mm | |
| | Color | Light gray | |
| Motorial | Shell material | Polycarbonate, Nylon 6.6 | |
| Material | Fire load | 1.239 MJ | |
| | Weight | 180g | |
| Installation | Method | DIN-35 rail | |
| | | EN 55022: 2006/A1: 2007 (CE | |
| | | &RE) Class B | |
| | | IEC 61000-4-2 (ESD) Level 4 | |
| Cortificatoo | EMC. | IEC 61000-4-3 (RS) Level 4 | |
| Certificates | EMC | 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 | |

5.1.3 Hardware Interface

5.1.3.1 LED Indicators

| PWR SYS RUN ERR IO RUN IO ERR | | | | |
|--|-----------------|-------|--------|------------------|
| LED | Description | Color | Status | Meaning |
| | Dewer indicator | Ded | | Power connection |
| PVVR | Power indicator | Rea | | successful |



| | | | | 1 |
|---------|-----------------------------|-------|----------|----------------------------|
| | | | OFF | No power |
| eve | SYS System indicator Gre | | ON | System is abnormal |
| 313 | | | OFF | System is running normally |
| | RUN Running indicator Green | | Flashing | System is running normally |
| RUN | | | OFF | System is abnormal |
| | | | | Northbound protocol |
| ERR | Error indicator | Red | UN | connection error |
| | | | OFF | No errors |
| | | | Flaching | I/O module is working |
| I/O RUN | indicator | Green | газниу | normally |
| | | | OFF | Module not inserted |
| | | | | I/O module communication |
| I/O ERR | I/O Error indicator | Red | | error |
| | | | OFF | No errors |



| LED | Description | Color | Status | Meaning |
|-----|----------------------------|-------|--------|-------------|
| 6 | System 24V power | Croop | ON | Power is OK |
| 5 | indicator | Green | OFF | No power |
| F | Field 241/ nower indicator | Creen | ON | Power is OK |
| | Field 24V power indicator | Green | OFF | No power |

5.1.3.2 Ethernet Port

It is connected to the Ethernet-based fieldbus through the ETH2, and the EHT1 is used to connect other nodes that need to be connected to the Ethernet.





5.1.3.3 IP Address Selection Switch

The 8-bit DIP switch is used to set the IP address. The encoding of DIP switches is done bit by bit, starting from DIP switch 1 with the least significant bit (2^{0}) to DIP switch 8 with the most significant bit (2^{7}), corresponding to decimal values: 0-255.



When the value of the DIP switch is 1111 1111 (decimal 255), the IP address is set according to the web page. The web page setting can specify the IP or set the automatic acquisition. When the web page is not set, the IP address is: 192.168.1.10 When the value of the DIP switch is 0000 0000 – 1111 1110 (decimal 0-254), determine the 3rd byte of the IP address, and the 1st, 2nd and 4th bytes are fixed bytes, namely 192.168.xxx.253

5.1.4 Modbus Register Mapping

The internal register map of BL200 coupler node consists of 2 parts, one part is the data map of digital input and output and analog input and output module, the address range is 1000...9999; the other part is the serial port module, the address range is 10000... 49999

The state of digital and analog I/O modules can be determined or changed through the register map (Address 1000 ... 9999).

| Modbu | us address | Data | Access | Functio | Description |
|-----------|----------------|---------------------|------------|------------|------------------|
| decimal | hex | type | type | n code | Description |
| 1000 1000 | | CF 1 Bit read/write | | 0x01/05/05 | Digital output |
| 10001999 | 0x03 E00x07 CF | | | 0x01/05/0F | DO |
| 20002999 | 0x07 D00x0B B7 | 1 Bit | read | 0x02 | Digital input DI |
| 30003999 | 0x0B B80x0F 9F | 32 Bit Float | read | 0x04 | Analog input Al |
| 40004999 | 0x0F A00X13 87 | 32 Bit Float | read/write | 0x03/06/10 | Analog output |





| | | | | | AO | |
|----------|--------------------|------------------------|------|------------|----------------|--|
| 50008999 | 0x13 880x23 27 | 32 Bit 7 read/write | | 0x03/04/10 | DI count value | |
| | | Unint | | | Di count value | |
| | | | | | Module | |
| 90009999 | 0x23 280x27 0F 1 E | 1 Bit | read | 0x02 | power-on | |
| | | | | | status | |

Determine or change the state of the data mapped from the serial I/O module through address 10000 ... 49999

| Modbus addres | S | Data | Access | Functio | Description | | | | |
|---------------|----------------|------------------|------------|------------|----------------|--|------------|---------------|----|
| decimal | hex | type | type | n code | Description | | | | |
| 10000 10000 | | 1 Dit | road/write | 0x01/05/05 | Digital output | | | | |
| 1000019999 | 0X27 100X4E TF | T Dit Tead/write | | | | | | 0.001/03/06 | DO |
| 20000 20000 | | 1 Bit read | | 0,402 | Digital input | | | | |
| 2000029999 | 0x4E 200x73 2F | I DIL | Teau | 0x02 | DI | | | | |
| 30000 30000 | | 16 Bit | road | 0×04 | Analog input | | | | |
| 3000039999 | 0275 500290 5F | | | 0,04 | AI | | | | |
| 40000 40000 | | | | | | | 0x03/06/10 | Analog output | |
| 4000049999 | 0,90 400AC3 4F | | Teau/WIIle | 0.000/10 | AO | | | | |

5.1.5 Coupler Connection

The BL200 coupler comes with 2 x RJ45 Ethernet interfaces, integrated switch function inside, work in store-and-forward operation mode, each port supports 10/100 Mbit transmission speed and full-duplex and half-duplex transmission mode. The BL200 coupler connect to the router Ethernet network via ETH2 only, while the EHT 1 is for connecting other BL200 field nodes.

The internal integrated switch supports bypass mode, which can automatically start the bypass mode when the controller system fails, and automatically maintain the link between ETH1 and EHT2.

The wiring of these Ethernet interfaces conforms to the 100BaseTX specification, which specifies the use of category 5 twisted pair cable as the connecting cable. Cable types S/UTP (Screened unshielded twisted pair) and STP (shielded twisted pair) can be used up to a length of 100m.





Directly connected to the computer through ETH 2.





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5.1.6 Web Page Configuration

The BL200 coupler's built-in web server is a browser-based configuration utility. When the coupler is connected to your network, you can enter the server's IP address in a web browser to access the web console.

5.1.6.1 Preparation Before Configuration

To successfully access the BL200 coupler, it must be properly installed and connected to the computer. In addition, configure them with correct IP addresses to keep them in the same network segment.

5.1.6.1.1 Connect Computer and Coupler

1.Mount the fieldbus node on a DIN35 rail. Follow the installation instructions in the "Installation" chapter.

2.Connect the 24 V power supply to the system power terminals.

3. The computer and the bus node can be connected in two ways, one is that the two are connected to the switch device of the local area network through the Ethernet interface; the other is that the two are directly connected point-to-point. For detailed steps, follow the instructions in the "Coupler Connection" chapter.

4. Turn on the power supply and start supplying power.

The coupler is initialized after power-up, creates process image according to the I/O modules configuration of the fieldbus node.

5.1.6.1.2 Configure Computer IP Address

There are two ways to configure PC IP address. One is to turn on the automatic IP address option on the PC's local connection to dynamically assign DHCP in the network. The other is to configure a static IP address with the coupler node on the same network segment on the local connection of the PC.

Takes Windows 7 system as an example for configuration. Windows systems are all configured similarly.

1.Click Start > Control Panel > Network and Sharing Center, and click local connection in the window that opens.

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2.In the local connection status window, click Properties.

| Verbinding | Victoria de Carto | | | | |
|----------------|-----------------------|---------------------------|--|--|--|
| IPv4-verbindin | gsmogelijkheden: | Internet | | | |
| IPv6-verbindin | gsmogelijkheden: | Geen internettoegang | | | |
| Status van me | dia: | Ingeschakeld | | | |
| Tijdsduur: | | 00:11:18 | | | |
| Snelheid: | | 100,0 Mbps | | | |
| | | | | | |
| Activiteit | | | | | |
| Activiteit | /erzonden — | — Ontvangen | | | |
| Activiteit | /erzonden — 1,131,653 | Ontvangen 40,190,950 | | | |

3.Double-click "Internet Protocol Version 4 (TCP/IPv4)" on the local connection properties page.



| Verbinding maken via | 9 | |
|-----------------------|--|--|
| Realtek PCIe G | BE Family Controller | |
| Deze verbinding heeft | de volgende onderdel | Configureren |
| | Manner printerdeling voor Mici ocol versie 6 (TCP/IPv icol versie 4 (TCP/IPv pramma van Link-Layer oppology Discovery Res | osoft-netwerken 6) Topology Discovery ponder Eigenschappen |
| Pasabrining | 1 | tocal Het |

- 4. There are two ways to configure the IP address of the PC
- Obtain IP address automatically (system default mode)
 To obtain an IP address automatically from a DHCP server, select "Obtain an IP address automatically";

| figuratie | | | | |
|---------------------------------|--|--|----------|--|
| natisch word unt. Als dit ni | en toege et het ge | wezer | als het | netwerk de |
| geschikte IP- | instelling | en te | vragen. | |
| lres laten toe | ewijzen | | | |
| gebruiken: | _ | | | |
| | | | | |
| | | | | |
| | 4 | 54 | 4 | |
| serveradres | laten toe | wijzen | ě. | |
| eradressen g | gebruiker | : | | |
| | 6 | | | |
| 1 | | 3 | | |
| uiten validere | en | | Geava | nceerd |
| | iguratie matisch word int. Als dit ni res laten toe gebruiken: serveradress eradressen g uiten validern | iguratie int. Als dit niet het ge geschikte IP-instelling gebruiken: | iguratie | iguratie natisch worden toegewezen als het int. Als dit niet het geval is, dient u geschikte IP-instellingen te vragen. res laten toewijzen gebruiken: |

Set a static IP address

Select "Use the following IP address" and set the correct values for the IP address, subnet mask and default gateway.



| gemeen | | | 14 | 12 | | |
|--|--------------|------------------|------|-------|-----------|-----|
| P-Instellingen kunnen automatisch word leze mogelijkheid ondersteunt. Als dit n | iet het ge | vezen /al is, | dier | het n | etwe e | erk |
| ietwerkbeheerder naar de geschikte IP | -instellinge | n te v | rag | en. | | |
| O Automatisch een IP-adres laten to | ewijzen | | | | | |
| Het volgende IP-adres gebruiken: | | | | | - 7 | |
| IP-adres: | 192 . 16 | 3.1 | | 202 | | 1 |
| Subnetmasker: | 255 . 25 | 5.25 | 5. | 0 | Ĩ | |
| Standaardgateway: | 192 . 16 | 3.1 | | 1 | | |
| Automatisch een DNS-serveradres | laten toev | vijzen | | | | |
| De volgende DNS-serveradressen | gebruiken: | | | | | |
| Voorkeurs-DNS-server: | 192 . 16 | 3.1 | | 1 | | |
| Alternatieve DNS-server: | | | | | | |
| Tastallingan tiidang afal itan validar | | | _ | | | |
| Instellingen ujuens arsiuiten valuer | en | | Ge | avan | ceer | d |

5.1.6.1.3 Configure Coupler IP address

There are 2 ways to assign an IP address

- Assignment via built-in web page (static IP or automatic IP assignment)
- Assign via DIP switch (static IP)

| DIP address selector sw | itch definition |
|-------------------------|-----------------|
|-------------------------|-----------------|

| Switch position (ON = 1) | Value | Definition |
|-----------------------------|-------|---|
| | | Enable the DIP selector switch assignment |
| | | function and determine the value of the 3rd |
| 1111 1110 | 0-254 | byte. |
| | | Example: 0010 0110 (22 decimal), the IP |
| | | address is "192.168.22.253". |
| | | Enable the function of specifying IP on the |
| | | web page, or select the function of DHCP |
| 1111 1111 | 255 | automatic allocation. When the IP is not |
| | | allocated through the web, the IP is |
| | | 192.168.1.10. |

5.1.6.1.3.1 Configuration via Web Page

The fieldbus coupler can be set to an IP address via the "Settings > Local Settings"



page after entering the page, or it can be set to be assigned automatically. Select static address, if not set IP address, the IP is 192.168.1.10



5.1.6.1.3.2 Assign IP via DIP Switch

Set the value of the DIP address selector switch to 0000 0000 - 1111 1110 (decimal 0 - 254), and the IP address will be assigned by the DIP switch.

The IP address consists of fixed bytes and variable bytes. The 1st, 2nd and 4th bytes are fixed bytes, the DIP selector switch determines the 3rd byte, namely:

192.168.xxx.253

The fieldbus controller assigns an IP address via a DIP switch, and the IP address set in this way is static.



5.1.6.1.4 Factory Default Settings

Before logging into the web configuration page, it is necessary for you to understand the following default parameters,

Modbus TCP Server Port: 502, Modbus ID: 1

IP: Determined according to the DIP switch, if the DIP switch is 1111 1111, the default IP is 192.168.1.10



| Item | Description |
|----------|-------------|
| Username | admin |
| Password | Empty |

5.1.6.2 Login Configuration Page

1.Open a browser on your computer, such as IE, Chrome, etc.

2.Enter the IP address of the coupler node (192.168.1.10) in the address bar of the browser to enter the user login interface.

| 0 | 新标 | 签页 | | × |
|--------------|---------------|----|---|--------------|
| \leftarrow | \rightarrow | C | 0 | 192.168.1.10 |

3.Enter "Username" and "Password" in the login interface, and then click Login.

| BL200UA | | | | | | |
|------------------|---|---------------|---------------|--------------------|-----------|-------------|
| Authorization Re | quired default is admin) and pass | word(no pas | sword by defa | ault). | | |
| Username | admin | | | | | |
| Password | | | | | | |
| | | | | | | Login Reset |
| | Shenzl | hen Beilai Te | chnology Co | Ltd (v1.0.11) / 20 | 122-02-17 | |

4.After successfully logging in to the web interface, the display is as follows



| BL200UA | Status - | System - | Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout | REFRESHING |
|------------------|----------|----------|-----------------------|---------------------------------|--------------------|--------------|---------------------|--------|------------|
| Status | | | | | | | | | |
| Quatam | | | | | | | | | |
| System | | | | | | | | | |
| Hostname | | | 1 | BL200UA | | | | | |
| Model | | | j | BL200UA-OPCU | A IO Module | | | | |
| Firmware Version | ı | | 3 | Shenzhen Beilai | Technology Co.,Ltd | v1.0.11 | | | |
| Kernel Version | | | | 4.4.194 | | | | | |
| Local Time | | | 3 | 2022 <mark>-</mark> 03-21 06:36 | 5:50 | | | | |
| Uptime | | | ŝ | 3h 23m 36s | | | | | |
| Load Average | | | | 0.20, 0.18, 0.12 | | | | | |
| Memory | | | | | | | | | |
| Total Available | | | | | | 26.17 MB / 5 | 56.59 MB (46%) | | |
| Used | | | | | | 26.39 MB / 5 | 56.59 MB (46%) | | |
| Buffered | | | | | | 3.21 MB / 5 | 56.59 MB (5%) | | |
| Cached | | | | | | 9.78 MB / 5 | 6.59 MB (17%) | | |
| Network | | | | | | | | | |
| Active Connectio | ns | | | | | 23/10 | 6384 (0%) | | |
| | | | | | | | | | |

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5. After configuring the parameters, you need to click the "Save and Apply" button on the page to take effect.



5.1.7 Web Configuration Page Description

5.1.7.1 Status

Users can check overview, system log and kernel log, as well as device parameters and device operating status.

Status > Overview



| BL200UA | Status - | System - | Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout | REFRESHING |
|-----------------------------|----------------------------------|----------------|------------|---------------------------------|--------------------|-------------|---------------------|--------|------------|
| Status _{System} | Overview System I Kernel L | v ∟og og | | | | | | | |
| Hostname | | | E | L200UA | | | | | |
| Model | | | E | L200UA-OPCU | A IO Module | | | | |
| Firmware Versio | n | | S | henzhe <mark>n</mark> Beilai | Technology Co.,Ltd | v1.0.11 | | | |
| Kernel Version | | | 4 | .4.194 | | | | | |
| Local Time | | | 2 | 022-03-21 06:44 | 4:49 | | | | |
| Uptime | | | 3 | h 31m 35s | | | | | |
| Load Average | | | 0 | . 16, 0.11 <mark>, 0</mark> .09 | | | | | |
| Memory | | | | | | | | | |
| Total Available | | | [| | | 26.05 MB / | 56.59 MB (46%) | | |
| Used | | | | | | 26.57 MB / | 56.59 MB (46%) | | |
| Buffered | | | Į | | | 3.21 MB / 5 | 56.59 MB (5%) | | |
| Cached | | | 1 | | | 9.98 MB / 5 | 6.59 MB (17%) | | |
| Network | | | | | | | | | |
| Active Connection | ons | | | | | 22 / 10 | 6384 (0%) | | |
| | | | | | | | | | |

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Status > System Log

| BL200UA | Status - | System - | Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout |
|-------------------|--------------|----------------|---|------------------------|---|----------------------|-----------------------------|-----------------------------------|
| System I | na | | | | | | | |
| Oystern L | Jog | | | | | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] Boo | ting Linux on physical | sical CPU 0x0 | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | [0.000000] L | inux version 4.4.1 | 94 (peng@peng) (gc | c version 5.4.0 (| LEDE GCC 5.4.0 unknown | a)) #0 PREEMPT Sat May 9 15:23 |
| Thu Jan 1 00:00:2 | 6 1970 kem | into kernel: [| 0.000000] CPU | J: ARM926EJ-S [4 | 41069265] revision 5 | (ARMV5TEJ), ci | r=0005317f | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000J CPU | J: VIVI data cach | e, VIVI instruction ca | iche | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel. [| 0.000000j Mac | mine model. Nuvo | non NUC960 101-Ga | levvay version. | 0.1 | |
| Thu Jan 1 00:00:2 | 6 1970 kem | dobug kemol: | 0.0000000000000000000000000000000000000 | nory policy. Data | Lache Whiteback | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | debug kemel: | 0.0000001 fr | ee area init nod | e: node 0, nodat c06 | 57704 node m | m map c3f77000 | |
| Thu Jan 1 00:00:2 | 6 1970 kem | debug kernel: | 0.0000001 | Normal zone: 128 | pages used for men | map | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | debug kernel: | 1000000.0 | Normal zone: 0 p | ages reserved | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | debug kernel: | 1000000.0 | Normal zone: 163 | 84 pages, LIFO batc | h:3 | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | debug kernel: | [0.000000] p | cpu-alloc: s0 r0 d | 32768 u32768 alloc= | 1*32768 | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | debug kernel: | [0.000000] p | cpu-alloc: [0] 0 | | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] Buil | t 1 zonelists in Zo | ne order, mobility gro | uping on. Total | pages: 16256 | |
| Thu Jan 1 00:00:2 | 6 1970 kern. | notice kernel: | [0.000000] K | ernel command li | ne: root=/dev/mtdbloc | k2 console=tty | S0,115200n8 rdinit=/sbin/in | it mem=64M lpj=744448 |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] PID | hash table entries | s: 256 (order: -2, 102- | 4 bytes) | | |
| Thu Jan 1 00:00:2 | 6 1970 kern. | info kernel: [| 0.000000] Den | try cache hash ta | ble entries: 8192 (ord | ler: 3, 32768 byt | tes) | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] Inoc | le-cache hash tab | entries: 4096 (orde | er: 2, 16384 byte | s) | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] Mer | nory: 57756K/655 | 36K available (4538k | kernel code, 3 | 05K rwdata, 1704K rodata, | 188K init, 252K bss, 7780K reserv |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | [0.000000] V | irtual kernel mem | ory layout: | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | 0.0000000 | vector : 0xm000 | 00 - 0xm1000 (4 k | B) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | | tixmap : 0xfic00 | 000 - 0xm00000 (30 | 044 MP) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | | Inveneration inventor | 00000 - 0000000000000000000000000000000 | 944 (VID) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | 0.0000001 | modules : 0xbf0(| 00000 - 0xc0000000 | (16 MB) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | [0.000000] | text 0xc0008 | 000 - 0xc0620f54 (6 | 244 kB) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | [0.000000] | init 0xc06210 | 00 - 0xc0650000 (1 | 88 kB) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | 0.0000001 | .data : 0xc0650 | 000 - 0xc069c784 (| 306 kB) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | notice kernel: | [0000000] | .bss : 0xc069c | 784 - 0xc06db8f8 (1 | 253 kB) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] SLL | B: HWalign=32, 0 | Order=0-3, MinObject | s=0, CPUs=1, M | lodes=1 | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] Pres | emptible hierarchi | cal RCU implementat | tion. | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] | Build-time adjustn | nent of leaf fanout to 3 | 32. | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] NR_ | IRQS:545 | | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000000] cloc | ksource: nuc980- | timer5: mask: 0xffffff i | max_cycles: 0xf | fffff, max_idle_ns: 6221550 | 5635 ns |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000033] sch | ed_clock: 24 bits | at 120kHz, resolution | 8333ns, wraps | every 69905062489ns | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.000741] Con | sole: colour dumr | my device 80x30 | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.186616] con | sole [ttyS0] enable | ed | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | Into kernel: [| 0.190091] Call | brating delay loop | (skipped) preset val | ue 148.88 Bog | OMIPS (IDJ=/44448) | |
| Thu Jan 1 00:00:2 | 6 1970 kem | into kernel. [| 0.1961/4j pld_ | max: default: 32/ | 66 minimum, 301 | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.203133j Mot | int-cache hash ta | sh table entries: 1024 (0rd | (order: 0, 4096 byte | s) hutes) | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.2189161 CPI | I: Testing write bu | ffer coherency: ok | (01001. 0, 4030 | Dyica) | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.2249831 Sett | ing up static ident | ity map for 0x8400 - | 0x843c | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.2715581 cloc | ksource: iiffies: m | ask: 0xffffffff max cvc | les: 0xffffffff, ma | x idle ns: 191126044627 | 50000 ns |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.282316] fute | x hash table entrie | es: 256 (order: -1, 30) | 72 bytes) | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.288874] pinc | trl core: initialized | pinctrl subsystem | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.296433] NET | Registered prote | ocol family 16 | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.303199] DM | A: preallocated 25 | 6 KiB pool for atomic | coherent alloca | tions | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.316783] <dt< th=""><th>> nuc980_dt_dev</th><th>rice_init +</th><th></th><th></th><th></th></dt<> | > nuc980_dt_dev | rice_init + | | | |
| Thu Jan 1 00:00:2 | 6 1970 kem | info kernel: [| 0.348016] <dt< th=""><th>> nuc980_dt_dev</th><th>rice_init -</th><th></th><th></th><th></th></dt<> | > nuc980_dt_dev | rice_init - | | | |

Status > Kernel Log


BL200UA Status - System - Settings - I/O Module - Serial Module - OPC UA -Kernel Log

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5.1.7.2 System

5.1.7.2.1 System

| System | Properties | > General | Settings |
|--------|------------|-----------|----------|
|--------|------------|-----------|----------|

| BL200UA | Status - | System - | Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout | REFRESHING |
|---|---------------------|--|-----------------------------|------------------|--------------------|----------|---------------------|--------|------------|
| System Here you can confi System Prop | gure the ba | System Administra Backup / F Firmware Reboot | ation Flash | ke its hostnam | e or the timezone. | | | | |
| General Settings | Logging | пше оунс | nonization | canguage and \$ | Style | | | | |
| | Local Time | 2022/3/ Sync | 21 下午2:58:5 with browser | 6 Sync with M | NTP-Server | | | | |
| | Hostname | BL200L | JA | | | | | | |
| | Timezone | UTC | | ~ | | | | | |
| | | | 100.00 | | | | Save & Apply | Save | Reset |



| Item | Description | Default | |
|------------|--|---------|--|
| | Displays the current time of the device. You can | | |
| Local time | click the "Sync browser time" or "Sync with NTP | | |
| | server" button to update the device time. | | |
| Lleatnama | The device name can be customized to easily | | |
| Hostname | distinguish between multiple devices. | BL200 | |
| Timerone | The time zone can be selected via the drop down | | |
| Timezone | menu | | |

System Properties > Logging

| BL200UA | Status - | System - Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout | REFRESHING |
|--|-------------------------------------|---------------------------|-----------------------|--------------------------------|----------|---------------------|--------|------------|
| System Here you can config System Prop | gure the ba: <mark>erties</mark> | sic aspects of your devic | e like its hostname (| o <mark>r</mark> the timezone. | | | | |
| General Settings | Logging | Time Synchronization | Language and St | yle | | | | |
| System lo | g buffer size | e 64 @ kiB | | | | | | |
| External system | m log serve | r 0.0.0.0 | | | | | | |
| External system log | g server por | t 514 | | | | | | |
| External system | m log serve protoco | r UDP | ~ | | | | | |
| Write syste | em log to file | /tmp/system.log | | | | | | |
| Log | output leve | Debug | ~ | | | | | |
| Cro | on Log Leve | Debug | ~ | | | | | |
| | | | | | | Save & Apply | Sav | Reset |

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| Item | Description | Default |
|----------------------------|-------------|---------|
| System log buffer size | | 64 |
| External system log server | | |
| External system log server | | |
| port | | |
| External system log server | | |
| protocol | | |
| Write system log to file | | |
| Log output level | | |
| Cron log level | | |



System Properties > Time Synchronization

An NTP server can be set to synchronize time

| BL200UA Status - S | System - Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout | REFRESHING |
|--|-------------------------|---------------------|------------------|----------|---------------------|--------|------------|
| System Here you can configure the basic | c aspects of your devic | e like its hostname | or the timezone. | | | | |
| System Properties | | | | | | | |
| General Settings Logging | Time Synchronization | Language and S | tyle | | | | |
| Enable NTP client | | | | | | | |
| Provide NTP server | | | | | | | |
| Use DHCP advertised servers | | | | | | | |
| NTP server candidates | 0.openwrt.pool.ntp. | org | | | | | |
| | 1.openwrt.pool.ntp. | org × | | | | | |
| | 2.openwrt.pool.ntp. | org × | | | | | |
| | 3.openwrt.pool.ntp. | org | | | | | |
| | | + | | | | | |
| | | | | | Save & Apply | • Save | Reset |

System Properties > Language and Style

| BL200UA | Status - | System - | Settings - | I/O Module - | Serial Module * | OPC UA - | Operation&Control - | Logout | REFRESHING |
|---|--------------|---------------|---------------|-------------------|--------------------------------|----------|---------------------|--------|------------|
| System Here you can confi System Prop | gure the bas | sic aspects o | f your device | like its hostname | or the time <mark>zone.</mark> | | | | |
| General Settings | Logging | Time Synch | nronization | Language and St | tyle | | | | |
| | Language | auto | | ~ | | | | | |
| | Design | Bootstra | ар | ~ | | | | | |
| | | | | | | | Save & Apply | Save | Reset |

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| Item | Description | Default |
|----------|--|-----------|
| Language | Available in auto, English, Chinese | auto |
| Design | Currently only Bootstrap is supported. | Bootstrap |

5.1.7.2.2 Administration

Administration > Router Password



Change the administrator password for accessing the device.

| BL200UA | Status - | System - | Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout |
|------------------|---------------|----------------------|-----------------------|--------------|-----------------|----------|---------------------|--------|
| Router Password | SSH-Key | System Administra | ation | | | | | |
| Router Pa | asswo | Firmware | FidSII | | | | | |
| Changes the admi | nistrator pas | | | vice | | | | |
| | Passwor | d | | * | | | | |
| | Confirmation | n | | * | | | | |
| | | | | | | | | Save |
| | | | | | | | | |

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Administration > SSH Keys

Public keys allow for the passwordless SSH logins with a higher security compared to the use of plain passwords. In order to upload a new key to the device, paste an OpenSSH compatible public key line or drag a .pub file into the input field.

| BL200UA | Status - | System - | Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout |
|---|------------------------------|----------------------------|-----------------|--|---------------------|-----------------|---------------------------|----------------------------------|
| Router Password | SSH-Key | s | | | | | | |
| SSH-Kevs | | | | | | | | |
| Public keys allow fo an OpenSSH comp | r the passw atible public | ordless SSF key line or | l logins with a | a higher security file into the input | compared to the use | e of plain pass | words. In order to upload | I a new key to the device, paste |
| No public keys pres | ent yet. | | | | | | | |
| | | 1363332 | | | | | | |

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5.1.7.2.3 Backup/Flash Firmware

| Flash operation A | vstem Iministration ackup / Flash | |
|--|--|---------------------------|
| F | rmware | |
| Backup Click "Generate archive" to downlo | add a tar archive of the current configuration files. | |
| Download backup | Generate archive | |
| | | |
| Restore | | |
| To restore configuration files, you opposible with squashfs images). | an upload a previously generated backup archive here. To reset the firmware to its initial state, cli | ick "Perform reset" (only |
| Reset to defaults | Perform reset | |
| Restore backup | Upload archive | |
| | Q Custom files (certificates, scripts) may remain on the system. To prevent this, perform a factor | ry-reset first. |
| O serve and disk in the server of the server | | |
| Save mtdblock contents Click "Save mtdblock" to download | s specified mtdblock file. (NOTE: THIS FEATURE IS FOR PROFESSIONALSI) | |
| Choose mtdblock | u-boot 🗸 | |
| Download mtdblock | Save mtdblock | |
| | | |
| Flash new firmware ima | ge | |
| Upload a sysupgrade-compatible in | nade here to replace the running firmware | |
| | | |
| Image | Flash image | |
| Image | Flash image | |
| Image | Flash image Shenzhen Beilai Technology Co.,Ltd (v1.0.11) / 2022-02-17 | |
| Image | Flash image Shenzhen Beilai Technology Co.,Ltd (v1.0.11) / 2022-02-17 Description | Default |
| Image | | Default |
| Image Item Backup | Description Click "Generate archive" to download a tar archive of the current configuration files. | Default |
| Image Item Backup | Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a | Default |
| Image Item Backup | Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a previously generated backup archive here. To | Default |
| Image Item Backup Restore | Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a previously generated backup archive here. To reset the firmware to its initial state, click | Default |
| Item Backup Restore | Flash image Shenzhen Beilai Technology Co.,Ltd (v1.0.11) / 2022-02-17 Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a previously generated backup archive here. To reset the firmware to its initial state, click "Perform reset" (only possible with squashfs | Default |
| Item Backup Restore | Flash image Shenzhen Beilai Technology Co.,Ltd (v1.0.11)/2022-02-17 Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a previously generated backup archive here. To reset the firmware to its initial state, click "Perform reset" (only possible with squashfs images). | Default |
| Item Backup Restore | Flash image Shenzhen Beilai Technology Co.,Ltd (v1.0.11) / 2022-02-17 Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a previously generated backup archive here. To reset the firmware to its initial state, click "Perform reset" (only possible with squashfs images). Click "Save mtdblock" to download specified | Default |
| Item Backup Restore | Tash image Shenzhen Beilai Technology Co.,Ltd (v1.0.11) / 2022-02-17 Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a previously generated backup archive here. To reset the firmware to its initial state, click "Perform reset" (only possible with squashfs images). Click "Save mtdblock" to download specified mtdblock file. (NOTE: THIS EEATURE IS FOR | Default |
| Item Backup Restore Save mtdblcok | Flash image Shenzhen Beilai Technology Co.,Ltd (v1.0.11) / 2022-02-17 Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a previously generated backup archive here. To reset the firmware to its initial state, click "Perform reset" (only possible with squashfs images). Click "Save mtdblock" to download specified mtdblock file. (NOTE: THIS FEATURE IS FOR PROFESSIONAL S) | Default |
| Item Backup Restore Save mtdblcok | Flash image Shenzhen Beilai Technology Co.,Ltd (v1.0.11) / 2022-02-17 Description Click "Generate archive" to download a tar archive of the current configuration files. To restore configuration files, you can upload a previously generated backup archive here. To reset the firmware to its initial state, click "Perform reset" (only possible with squashfs images). Click "Save mtdblock" to download specified mtdblock file. (NOTE: THIS FEATURE IS FOR PROFESSIONALS) | Default |

replace the running firmware.



5.1.7.2.4 Reboot

Click "Perform reboot" will reboot your device



5.1.7.3 Settings

| BL200UA Status - S | System - Settings - | I/O Module - | Serial Module - | OPC UA - | Operation&Control - | Logout |
|-----------------------|---------------------|-------------------|-------------------------------------|-------------------|--------------------------|--------------------------|
| Device settings | | | | | | |
| Modbus Device ID | 1 |), the device ID | in the Modbus comr | nand is ignore | d | |
| Modbus TCP port | 502 | | | | | |
| Dial switch address | 192.168.1.253 | f IP address is c | determin <mark>ed b</mark> y dial s | witch, restart th | ne device and the modifi | ication will take effect |
| IP Address Type | Static Address | ~ | | | | |
| Set device IP address | | | | | | |
| Subnet Mask | 255.255.255.0 | | | | | |
| Gateway address | | | | | | |
| | | | | | Save & Apply | Save Reset |

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| Item | Description | Default |
|--------------------|--|---------|
| Modbus Device ID | Modbus device ID range is 1~247. | 1 |
| Modbus TCP port | Modbus TCP protocol port number, which can | 502 |
| Modbus TCP port | be customized. | 302 |
| DIP switch address | Displays the IP address set by the DIP switch. | |
| ID address type | Select from "Static Address", "Dynamic | |
| IP address type | Address(DHCP)". | |
| Set device ID | The IP address of the device can be set by | |
| Set device IP | yourself, and it needs to be restarted to take | |
| auuress | effect after setting. | |



| Subnet mask | Set IP subnet mask | |
|-----------------|------------------------|--|
| Gateway address | Set IP gateway address | |

5.1.7.4 I/O Modules

After power on, the controller automatically recognizes all I/O modules connected to it and creates an internal local process image based on the module type, data width and the module's position in the node.

If I/O modules are added, changed or removed, a new process image is created and the process data addresses change. When adding an I/O module, the process data of all previous I/O modules must be considered.

The controller can connect up to 32 I/O modules, including digital input and output, analog input and output and special function modules.

| O status | | | | | | | | |
|------------|----------------|----------------|-------------------|-------------------|-----------------------|-----------------|--------------|--------------------|
| IO Slot | Module Name | Module Type | Channel Number | Modbus Address | 24V Address- State | Soft Version | IO Status | Channel Status |
| 1 | M1081 | DI | 8 | 2000-2007 | 9001-Power On | 5 | Normal | Channel Statu s |
| 2 | M2082 | DO | 8 | 1000-1007 | 9002-Power On | 5 | Normal | Channel Statu S |
| ř | M3041 | AJ | 4 | 3000-3006 | 9003-Power On | 5 | Normal | Channel Statu s |
| | M4044 | AO | 4 | 4000-4006 | 9004-Power On | 5 | Normal | Channel Statu s |
| 5 | M6021 | СОМ | 2 | 0-0 | 9005-Power On | 5 | Normal | Channel Statu s |

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| Item | Description |
|-------------|---|
| | The order of IO modules in the slot, the first module card |
| IO slot | position close to the controller is 1, and the following ones are 2 |
| | 3 4 |
| Module name | I/O module model |
| Module type | I/O module function type |
| Channel | Date width of I/O module |
| Number | |
| Modbus | Process man address of the I/O module inside the controller |
| Address | |
| 24V Address | Power supply status on the field side of the IO module, digital, 1 |
| State | bit |
| Software | 1/Q modulo internal firmware version |
| version | |

| IO status | I/O module and controller communication status |
|----------------|--|
| Charmal status | Click to view and set the parameters of different types of I/O |
| Channel status | modules |

5.1.7.4.1 Digital Input Module

The digital input module can provide two types of data, one is the current input state value, Boolean type; the other is the counter value, 32-bit numerical type, which supports the clear function.

| O Slot:1 Module | Type:DI Module Name:M1091 | | | |
|-----------------|---------------------------|-------|-------|--|
| Channels | Modbus Address | | Value | |
| 1 | 2000 | | Open | |
| 2 | 2001 Open | | Open | |
| 3 | 2002 | | Open | |
| 4 | 2003 | | Open | |
| 5 | 2004 | | Open | |
| 6 | 2005 | Open | | |
| 7 | 2006 | Open | | |
| 8 | 2007 | | Open | |
| 01 Count | | | | |
| Channel | Modbus Address | Value | Clear | |
| 1 | 5000 | 0 | Clear | |
| 2 | 5002 | 0 | Clear | |
| 3 | 5004 | 0 | Clear | |
| 4 | 5006 | 0 | Clear | |
| 5 | 5008 | 0 | Clear | |
| 6 | 5010 | 0 | Clear | |
| 7 | 5012 | 0 | Clear | |
| | | | | |

Back to Overview

Save & Apply - Save Reset

| Item | Description | |
|----------|--|------|
| Channels | Channel number of the digital input module | |
| 44 | Shenzhen Beilai Technology Co., Ltd | V1.1 |



| Modbus Address | Process map address of Boolean status data inside the |
|----------------|--|
| Moubus Address | controller |
| Value | Display the current input state, open: logic 0, close: logic 1 |

| Item | Description |
|----------------|--|
| Channels | Channel number of the digital input module |
| Modbus Address | Process map address of the count value inside the controller |
| Value | Display the current input count value, 32-bit unsigned integer |
| Clear | Can clear the current channel counter value |

5.1.7.4.2 Digital Output Module

| O Slot:2,Module Type:DO,Module Name:M2082 | | | | | | |
|---|-------------------------------------|------|------|------------|------------|--|
| Channels | Modbus Address Value PowerOn Status | | | Open/Close | | |
| 1 | 1000 | Open | Open | • | Open/Close | |
| 2 | 1001 | Open | Open | •] | Open/Close | |
| 3 | 1002 | Open | Open | ۲ | Open/Close | |
| 4 | 1003 | Open | Open | ~ | Open/Close | |
| 5 | 1004 | Open | Open | • | Open/Close | |
| 6 | 1005 | Open | Open | • | Open/Close | |
| 7 | 1006 | Open | Open | • | Open/Close | |
| 8 | 1007 | Open | Open | ~ | Open/Close | |

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| Item | Description |
|-----------------|---|
| Channels | Channel number of the digital output module |
| Madhua Addraga | Process map address of the digital output boolean data |
| Modbus Address | inside the controller |
| Value | Display the current output state, open: 0, close: 1 |
| Dever en statue | Set the state of DO after power-on, select from "open", |
| Power-on status | "close", "last" |
| Open/Close | Can control the current channel output state |
| 45 | Shanzhan Bailai Tashnalagu Ca. Itd |



5.1.7.4.3 Analog Input Module

The analog input (AI) type module supports setting parameters through the controller web page, so that the data conversion is automatically realized inside the module, and the actual engineering value corresponding to the sensor can be directly output.

| 5101.5, | Module Type:A | i, ivioaule | Name:M3041 | | | | | |
|----------|----------------|-------------|------------------|------------|-----------|-----------|-------------------|-----------|
| Channels | Modbus Address | Value | Mode | Offset(mA) | Min Value | Max Value | Cal. Input(mA) | Calibrate |
| 1 | 3000 | 0.000000 | Current 4-20mA 👻 | | | | | Calibrate |
| 2 | 3002 | 0.000000 | Current 4-20mA 👻 | | | | | Calibrate |
| 3 | 3004 | 0.000000 | Current 4-20mA 🗸 | | | | | Calibrate |
| 4 | 3006 | 0.000000 | Current 4-20mA 🐱 | | | | | Calibrate |

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| Item | Description |
|---------------------|---|
| Channels | Channel number of the analog input module |
| Madhua Addraga | Process map address of the analog input module inside the |
| Modbus Address | controller |
| Value | Display the actual engineering value input by the current |
| value | channel, 32-bit single-precision floating-point type |
| | Different models of analog input modules have different |
| Mode | options, please refer to the specific analog input I/O module |
| | manual for details. |
| $Offect(m\Lambda)$ | The offset can be used to adjust the acquisition and actual |
| Olisel(IIIA) | error. |
| Min Value | Sensor range minimum |
| Max Value | Sensor range maximum |
| Calibrate Input(mA) | To calibrate the AI, enter the actual current of the AI. |
| Calibrate | Click "Calibrate" to confirm the calibration AI. |

There is a linear relationship between the electrical signal value of the analog input module (usually a sensor) and the actual engineering value. Their formulas are as follows (take 4-20mA as an example):



Actual engineering value = (current value - 4) * ((maximum - minimum) / (20 - 4)) + minimum

Take the 4-20mA type water level sensor to measure the depth of the water tower as an example:

The known water level sensor range is 0-100m, the current data is 5.6mA, and the depth of the water tower is calculated:

Into the formula:

(5.6 - 4) * ((100 - 0) / (20 - 4)) + 0 = 10

The depth of the water tower is 10m

5.1.7.4.4 Analog Output Module

| O Slot:4,N | odule Type:AO,Mo | dule Name:N | 14044 | | | | |
|------------|------------------|-------------|-----------------|-----------|-----------|-----------|-----------|
| Channels | Modbus Address | Value | Mode | Offset(V) | Min Value | Max Value | Set Value |
| 1 | 4000 | 0.000000 | Voltage 0-10V | | | | |
| 2 | 4002 | 0.000000 | Voltage 0-10V 🗸 | | | | |
| 3 | 4004 | 0.000000 | Voltage 0-10V 🗸 | | | | |
| 4 | 4006 | 0.000000 | Voltage 0-10V 🗸 | | | | |

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| Item | Description |
|----------------|--|
| Channels | Channel number of the analog output module |
| Modbus Address | Process map address of the analog output module inside the |
| Modbus Address | controller |
| | Display the actual engineering value output by the current |
| value | channel, 32-bit single-precision floating-point type |
| | Different models of analog output modules have different |
| Mode | options, please refer to the specific analog output I/O module |
| | manual for details. |
| Offset | Adjust the setting and the actual error |
| Min value | Actual engineering value minimum value |



| Max value | Actual engineering value maximum value |
|-----------|--|
| Set value | You can set the actual project value required for the output |

5.1.7.5 Serial Port Module

Various sensors, meters and other devices that support Modbus RTU protocol can be connected to the edge controller through the serial port module. It allows process mapping between external sensor data and the controller via the local bus.

5.1.7.5.1 Serial Port Settings

| Serial Serial S | Settings ettings | | | | | | | | | | |
|--------------------|---------------------|----------|----------|----------|---|--------|------|--------|------|------|-----------------|
| IO Slot | Module Type | COM Type | COM Name | Baudrate | Ð | Data I | oits | Parity | Stop | bits | Modbus Settings |
| 5 | M6021 | RS485 | COM1 | 9600 | ~ | 8 | ~ | None 🗸 | 1 | ~ | Modbus Settings |
| 5 | M6021 | RS485 | COM2 | 9600 | ~ | 8 | ~ | None 🗸 | 1 | ~ | Modbus Settings |

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5.1.7.5.2 Modbus Settings

Modbus settings are used to add Modbus RTU devices to the serial communication I/O module.

| /lodbu | ous I s Mas | Master | ysteni - Gett | ings * i/o mo | | | A - Operatio | | igout. | |
|--------|----------------|--------------------|------------------|------------------|---------------|---------------------------|----------------|--------------------|--------|-------|
| Name | Alias | Slave Interface | Slave Address | Function Code | Data Type | Register Start Address | Data Number | Mapping Address | Enable | Query |
| | | | Add | Τ | his section c | ontains no values yet | | | | |
| | | | | | | | | Save & Apply + | Save | Reset |
| | | | | Shenzhen Be | ilai Technolo | gy Co.,Ltd (v1.0.11) / 20 | 022-02-17 | | | |



Enter the custom data name in the input box and click Add

| /lodbu | is Mas | ter | | | | | | | | |
|--------|--------|--------------------|------------------|------------------|---------------|---------------------------|----------------|--------------------|--------|-------|
| Name | Alias | Slave Interface | Slave Address | Function Code | Data Type | Register Start Address | Data Number | Mapping Address | Enable | Query |
| | | | | TI | his section c | ontains no values yet | | | | |
| | | | Add | | | | | | | |
| | | | | | | | | | | |

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The configuration box pops

| odbus Master - 1 | | | |
|------------------------|-------------------------|---------|--|
| Alias | | | |
| Slave Interface | COM1 | ~ | |
| Slave Address | | | |
| Function Code | 01-Digital Output | ~ | |
| Register Start Address | 0 | | |
| Data Number | | | |
| Mapping address alloc | Auto | ~ | |
| Polling period(s) | | | |
| | If not set, the default | is 0.2s | |
| Response timeout(s) | | | |
| | If not set, the default | is 0.5s | |

Dismiss Save

| Item | Description | | | | | |
|-----------------|---|--|--|--|--|--|
| Alias | Device nickname can be used to distinguish data | | | | | |
| Slave Interface | Select serial channel | | | | | |
| Slave address | Slave device address, range 1-247 | | | | | |
| Eurotion code | Select according to the slave data type, including: "01", | | | | | |
| Function code | "02", "03", "04" | | | | | |
| Register start | Pogistor start address of slave data | | | | | |
| address | Register start address of slave data | | | | | |
| Data number | Number of slave data | | | | | |
| Mapping address | Support distribution method: | | | | | |



| alloc | auto |
|--------------------|---|
| | According to different data types, the system automatically |
| | allocates down the starting address of the mapping, and the |
| | addresses are continuous. |
| | manual |
| | Manual allocation allows mapping addresses to be |
| | allocated across segments |
| Polling period (s) | The interval between two adjacent polling commands |
| | After sending the command to the slave, wait for the |
| Response timeout | maximum time for the slave to return data. If the time |
| (s) | exceeds this time, the slave will be considered to have no |
| | response. |

You can modify, delete, and view data of slave, or you can disable collection.

| BL200 Modk Modbu | DUA DUS I Is Mas | Status - Master | System - | Settings - | I/O Module | e ▼ Serial Mo | dule + OPC | UA ▼ Opera | ation&Contro | l ← Logout |
|------------------------|------------------------|-------------------------------|------------------|------------------|--------------|------------------------------|----------------|-----------------------|--------------|-----------------------|
| Name | Alias | Slave Interface | Slave Address | Function Code | Data Type | Register Start Address | Data Number | Mapping Address | Enable | Query |
| 1 | 1 | COM1 | 1 | 1 | Bool | 0 | 1 | 10000- 10000 | | Q u e r y |
| | | | Add | | | | | | Save & A | ngly - Save Reset |

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5.1.7.6 Operation and Control

5.1.7.6.1 Arithmetic Operation



| BL200P | ro | | | | | | |
|---------------------|----------------|------------------------|----------------------------|----------------------------|--------------------|--------------------------|--------------------------|
| Status - | System + | Settings 👻 I/O Mo | dule - Serial N | lodule + OPC UA | A - Operation | Control - Cloud plat | form ~ Logout |
| Arithmetic | operation Lo | gical operation Co | ndition operation | | | | |
| Arithm | netic op | eration | | | | | |
| Arithme | tic operati | on | | | | | |
| 50000-5001 | 4 addresses ar | re used to save interr | mediate calculatio | n results, which can | be published th | rough mqtt or read throu | ugh MODBUS |
| Name | Input1 | Operation | Input2 | Operation | Input3 | Output Address | Output Value |
| | | | | This section contain | s no values yet | | |
| | | | | | | | |
| | | Add | | | | | |
| | | | | | | Save 8 | & Apply Save Reset |
| | | | Shenzhen B | eilai Technology Co | 1 td (1/1 1 9) / 2 | 023-07-14 | |

| Arithmetic operation - 1 | | |
|--------------------------|---------|---|
| Input1 | REG3000 | ~ |
| Operation | +. | ~ |
| Input2 | REG3000 | ~ |
| Operation | + | ~ |
| Input3 | REG3000 | ~ |
| Output Address | REG4000 | ~ |
| Publish | | |
| | | |

It supports "addition, subtraction, multiplication, and division" operations between AI, AO, or RS485 slave numerical data, and can also perform operations with "addition, subtraction, multiplication, and division" constants, and freely match 1 or 2 conditions to combine the output results. If a 16-bit register address is used as the output result, the output with a decimal is an integer.

5.1.7.6.2 Logical Operation



| BL200 | Pro | | | | | | | |
|---------------------|-------------|-------------------------|-------------------|-------------------------|----------------|---------------------|---------------------|------------------|
| Status - | System - | - Settings - | I/O Module - Ser | ial Module - | OPC UA 🕶 | Operation Control - | Cloud platform - Lo | gout |
| Arithmetic | c operation | Logical operatio | n Condition opera | tion | | | | |
| Logic | al ope | ration | | | | | | |
| Bool L | ogic | | | | | | | |
| Name | Input1 | Condition | Relationship | Input2 | Condition | Output Address | Output Value | Logic Value |
| | | | | This secti | on contains no | values yet | | |
| | | Add | | | | | | |
| | | | | | | | | |
| Numbe | rical Log | JIC | | | | | | |
| Name | Input1 C | Condition Thre | eshold Relations | hip Input2 | 2 Condition | Threshold Output | Address Output V | alue Logic Value |
| | | | | This secti | on contains no | values yet | | |
| | | Add | | | | | | |
| Combi | national | logic | | | | | | |
| Name | Input1 | Condition | Relationship | Input2 | Condition | Output Address | Output Value | Logic Value |
| | | | | This secti | on contains no | values yet | | |
| | | Add | | | | | | |
| | | | | | | | | |
| | | | | | | | Save & Apply 🔹 | Save Reset |
| | | | | | | | | |

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Bool logic configuration



| _ogical operation - 1 | | | | |
|-----------------------|---------------|---|--|---------|
| Input1 | REG1000 | ~ | | |
| Condition | Open | ~ | | |
| Relationship | Logic And | ~ | | |
| Input2 | REG1000 | ~ | | |
| Condition | Open | • | | |
| Output Type | Bool Type | • | | |
| Output Address | Please choose | • | | |
| Bool Value | Open | ~ | | |
| Output Delay(ms) | | | | |
| Set Default | | | | |
| | | | | Dismiss |

Numerical Logic Configuration

| Logical operation - 1 | | | | |
|-----------------------|-----------------|---|--|--------------|
| Input1 | REG3000 | ~ | | |
| Condition | Greater Than(>) | ~ | | |
| Threshold | | | | |
| Relationship | Logic And | ~ | | |
| Input2 | REG3000 | ~ | | |
| Condition | Greater Than(>) | ~ | | |
| Threshold | | | | |
| Output Type | Bool Type | • | | |
| Output Address | Please choose | • | | |
| Bool Value | Open | • | | |
| Output Delay(ms) | | | | |
| Set Default | | | | |
| | | | | Dismiss Save |

Combinational logic configuration



| gical operation - 3 | | |
|---------------------|---------------|---|
| Input1 | 1 | ~ |
| Condition | Is true | ~ |
| Relationship | Logic And | ~ |
| Input2 | 2 | ~ |
| Condition | Is true | ~ |
| Output Type | Bool Type | ~ |
| Output Address | Please choose | • |
| Bool Value | Open | ~ |
| Output Delay(ms) | | |
| Set Default | | |
| | | |

Users can freely set various combination linkages between I/O (digital input and output, analog input and output) or serial port modules (Modbus slave data) according to needs. Whether the built logic is triggered can be judged according to the logic value item of the web page, "0" means not triggered, and "1" means triggered. Logical value items cannot be updated automatically, and the web page must be manually refreshed.

Example:

Logic 1 (And), input condition A and input condition B meet the trigger condition at the same time, output result Y.

Logic 2 (Or), any one of input condition C or input condition D satisfies the trigger condition, and the output result is Y.

Logic 3: Logic 1 + Logic 2 can be combined to form a logic 3 or more combinations.

5.1.7.6.3 Example

♦ Take a simple packing system as an example

Requirements:

(1) After pressing the start button, the conveyor belt B starts to run first, and drags the empty box forward to the designated position. After reaching the designated position, SQ2 sends a signal to stop the conveyor belt B from running.

(2) After the conveyor belt B stops, the conveyor belt A starts to run, and the products



fall into the boxes one by one. The SQ1 sensor detects the products and detects that the products fall into the box. Conveyor belt A stops running, conveyor belt B starts running, and it goes on and on, until the stop button is pressed, and conveyor belts A and B stop at the same time.

To realize such a function in S7-200SMART, the peripheral wiring needs to use DI and DQ as follows:

| | Input | Output | | | | |
|------|--------------------------|--------|-------------------|--|--|--|
| 10.0 | Automatic control button | Q0.1 | Conveyor A output | | | |
| 10.1 | Stop button | Q0.2 | Conveyor B output | | | |
| 10.2 | B conveyor belt moving | | | | | |
| 10.3 | A conveyor belt moving | | | | | |
| 10.4 | SQ2 input | | | | | |
| 10.5 | SQ1 input | | | | | |

Using BL200 calculation and control simulation to achieve such requirements, the DI and DO required for wiring are as follows:

| | Input | Output | | | | |
|-----|--------------------------|--------|-------------------|--|--|--|
| DI1 | A conveyor belt moving | DO1 | Conveyor A output | | | |
| DI2 | B conveyor belt moving | DO2 | Conveyor B output | | | |
| DI3 | Stop button | | | | | |
| DI4 | Automatic control button | | | | | |
| DI5 | Detect empty box sensor, | | | | | |
| | SQ2 input | | | | | |
| DI6 | Detect product SQ1 input | | | | | |

5.1.7.6.3.1 Bool Logic Configuration Instructions



BL200Pro

Status * System * Settings * I/O Module * Serial Module * OPC UA * Operation Control * Cloud platform * Logout

Arithmetic operation Logical operation Condition operation

Logical operation

Bool Logic

| Name | Input1 | Condition | Relationship | Input2 | Condition | Output Address | Output Value | Logic Value | |
|---------------|---------|-----------|--------------|--------|-----------|-----------------|-----------------|----------------|-------------|
| Achuansongdai | REG2000 | close | None | none | none | REG1000 | close | 0 | Edit Delete |
| Bchuansongdai | REG2001 | close | None | none | none | REG1001 | close | 0 | Edit Delete |
| tingzi | REG2002 | close | None | none | none | REG1000,REG1001 | Open | 0 | Edit Delete |
| zidongB | REG2003 | close | None | none | none | REG1001 | close | 0 | Edit Delete |
| kongzixiang | REG2004 | close | None | none | none | REG1000 | close | 0 | Edit Delete |
| Btingzi | REG2004 | close | None | none | none | REG1001 | Open | 0 | Edit Delete |
| changping | REG2005 | close | None | none | none | REG1001 | close | 0 | Edit Delete |
| Atingzi | REG2005 | close | None | none | none | REG1000 | Open | 0 | Edit Delete |

Logical operation - Achuansongdai

Add

| Input1 | REG2000 | |
|------------------|---------------|---|
| | INEO2000 | ~ |
| Condition | Close | ~ |
| Relationship | None | ~ |
| Output Type | Bool Type | ~ |
| Output Address | REG1000 | × |
| | Please choose | • |
| Bool Value | Close | ~ |
| Output Delay(ms) | | |
| Set Default | | |
| | | |

Steps:

- (1) Enter Achuansongdai, click Add, and the configuration box will pop up.
- (2) Enter 1: Select DI1 register REG2000.
- (3) Condition: Select Close.



(4) Relationship: Select "None", because DI1 directly controls the operation of A conveyor belt, so select "None" because there are no other conditions.

(5) Output type: Select Bool type, because DO1 control is Bool.

(6) Output address: REG1000, DI1 only controls one DO1, so only select the DO1 register address, if DI controls multiple registers, you can select multiple registers. As in the third logic "tingzi", press the stop button, both conveyor belts A and B stop.

(7) Bool value: Off, DI1 controls DO1 to close, so choose to close.

(8) Output delay (milliseconds): Since it is a timely response and no delay is required, leave it blank.

(9) Set default: When the selection logic is not established, whether DO1 restores the default state, select according to the requirements.

(10) Click "Save".

(11) Follow the same steps to build other logic.

(12) Click "Save and Apply" to write into the BL200 coupler.

5.1.7.6.3.2 Numerical Logic Configuration Example

The Al1 register REG3000 is connected to the temperature sensor to monitor the temperature of the motor. When the collected temperature is greater than 50, the fan is turned on, and the fan is controlled by the DO3 register REG1002.

| Numbe | umberical Logic | | | | | | | | | | | |
|-------|-----------------|-----------------|-----------|--------------|--------|-----------|-----------|-------------------|-----------------|----------------|------|--------|
| Name | Input1 | Condition | Threshold | Relationship | Input2 | Condition | Threshold | Output Address | Output Value | Logic Value | | |
| wendu | REG3000 | Greater Than | 50 | None | none | none | none | REG1002 | close | 0 | Edit | Delete |
| | | A | dd | | | | | | | | | |

| BLIÌOT | | | EdgelO | BL200 Series | |
|--------------------------|-----------------|---|--------|--------------|------|
| MAKE IIOT EASIER | | | | | |
| | | | | | |
| Logical operation - wend | u | | | | |
| Input1 | REG3000 | ~ | | | |
| Condition | Greater Than(>) | ~ | | | |
| Threshold | 50 | | | | |
| Relationship | None | ~ | | | |
| Output Type | Bool Type | ~ | | | |
| Output Address | REG1002 | × | | | |
| | Please choose | • | | | |
| Bool Value | Close | ~ | | | |
| Output Delay(ms) | | | | | |
| Set Default | | | | | |
| | | | | Dismiss | Save |

Similarly, numerical logic and Bool logic have the same logic principle. Numerical logic only judges that the condition is "greater than", "less than" or "equal to" a certain value as a linkage condition.

5.1.7.6.3.3 Combinational Logic Description

The conveyor belt is not running, the temperature of the motor exceeds 50 degrees, the fan is turned on, and the alarm DO4 register REG1003 is triggered.

| Combi | ombinational logic | | | | | | | | | | |
|-------|--------------------|-----------|--------------|--------|-----------|----------------|--------------|-------------|------|--------|--|
| Name | Input1 | Condition | Relationship | Input2 | Condition | Output Address | Output Value | Logic Value | | | |
| bj | zidongB | ls false | Logic And | wendu | Is true | REG1003 | close | 0 | Edit | Delete | |
| | | | Add | | | | | | | | |



| Logical operation - bj | | |
|------------------------|---------------|---|
| Input1 | zidongB | ~ |
| Condition | Is false | • |
| Relationship | Logic And | • |
| Input2 | wendu | • |
| Condition | Is true | • |
| Output Type | Bool Type | ~ |
| Output Address | REG1003 | × |
| | Please choose | • |
| Bool Value | Close | • |
| Output Delay(ms) | | |
| Set Default | | |



Steps:

(1) In the Combinational Logic item, input the name "bj", click Add, and the configuration box will pop up.

(2) Input 1: Select the logic name "zidongB" built in Bool logic before, you can choose Bool logic or numerical logic according to your demand.

(3) Condition: Select "Is false", according to your demand, whether the logic selected by input 1 is triggered or not as a condition.

(4) Relationship: Select "Logic And" to choose, according to your demand, the logical relationship between condition 1 and condition 2, you can also select "no" condition 2.
(5) Input 2: Select the logic name "wendu", choose Bool logic or numerical logic according to your demand.

(6) Condition: Select "Is true", according to your demand, whether the logic selected by input 2 is triggered or not as a condition.

(7) Output Type: Select "Bool Type", select Bool or numeric data according to "Output Address".

(8) Output address: Select the register address to be operated. DO4 register REG1003.

(9) Bool value: Close, DO4 closed to control the alarm

(10) Output delay (milliseconds): It is a timely response, there is no need for a delay, so do not fill in.

(11) Set default: Choose whether to restore the default state of DO4 when the logic is not valid, according to your demand.



- (12) Click "Save".
- (13) Click "Save and Apply" to write into BL200 coupler.

5.1.7.6.3.4 Arithmetic Operation Configurations

The sensor collects the quantity produced in a day and stores it in register REG40002, and through the arithmetic function it calculates the quantity produced in each hour of an 8-hour day and stores it in register REG40004, and the data in register REG40004 can be sent to your platform or server through MQTT, OPC UA or Modbus.

| ithmetic operation | Logical operat | ion Condition | operation | | | | | |
|--|--|------------------------------------|------------------------------|------------------------------------|------------------------------|---|----------------------------------|-----|
| rithmetic o | operatio | n | | | | | | |
| thmetic oper | ation | | | | | | | |
| | | | | | | | | |
| 000-50014 addresse | es are used to si | ave intermediat | e calculatior | n results, which | can be pub | lished through mqtt or | read through MOD | BUS |
| 00-50014 addresse ame | es are used to sa Input1 | ave intermediat Operation | e calculation | n results, which Operation | can be pub Input3 | lished through mqtt or Output Address | read through MOD Output Value | BUS |
| 00-50014 addresse ame engchanxiaolv | es are used to so Input1 REG4002 | ave intermediate Operation / | e calculation | n results, which Operation + | can be pub Input3 none | lished through mqtt or Output Address REG4004 | read through MOD Output Value 0 | BUS |
| 00-50014 addresse ame nengchanxiaolv | REG4002 | Operation / | e calculatior Input2 8 | n results, which Operation + | can be pub Input3 none | lished through mqtt or Output Address REG4004 | read through MOD Output Value | BUS |

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Arithmetic operation - shengchanxiaolv

| Input1 | REG4002 | ~ |
|----------------|----------|---|
| Operation | 1 | ~ |
| Input2 | Constant | ~ |
| Input2 | 8 | |
| Operation | + | ~ |
| Input3 | None | ~ |
| Output Address | REG4004 | ~ |
| Publish | | |

| Diamica | Cauco |
|-----------|-------|
| DISITIISS | Save |

V1.1

Steps

(1) Enter the name "shengchanxiaolv", click Add, and a configuration box will pop up. Shenzhen Beilai Technology Co., Ltd

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(2) Input 1: Select the yield register REG40002.

(3) Operation: Select "/", you can select "add, subtract, multiply and divide" here according to your demand.

(4) Input 2: Select Constant, you can select other register address according to your demand.

(5) Input 2: Fill in the constant because constant is selected, when select a register, there is no such item.

(6) Operation: According to whether there is also a condition 3 selection, if not, then it doesn't matter.

(7) Input 3: Select "none", because there is no need for this condition option, you can also choose registers, constants, none.

(8) Output Address: Select the register address to store the result of the operation.

(9) Click "Save".

(10) Click "Save and Apply" to write into the BL200 coupler.

5.2 BL205 OPC UA EdgelO Controller

5.2.1 BL205 Overview

The BL205 controller supports the OPC UA Server function and provides data as a server. Conforms to the IEC 62541 industrial automation unified architecture communication standard, and the data can be transmitted by encryption (X.509 certificate) and identity verification. The security policy supports basic128rsa15, basic256, basic256sha256, aes128sha256rsaoaep, can choose signature or signature and encryption. Supports the custom information model, and can fill in up to 5 reference models.

5.2.2 Technical Parameters

| Name | Parameters | Description |
|--------|--------------------------------|------------------|
| | Input voltage(system) | 24 VDC |
| | Input current(system) | MAX 500 mA@24VDC |
| Svotom | Power Efficiency | 84% |
| System | Internal bus voltage | 5VDC |
| power | Controller consumption current | MAX 300mA@5VDC |
| | I/O consumption current | MAX 1700mA@5VDC |



| | Isolation protection | 500 V system/supply | |
|--------------|-----------------------|--|--|
| | Input voltage (field) | 24 VDC | |
| Field power | Power supply current | 10 400 | |
| | across contacts (MAX) | | |
| | Number | 2 X RJ45 | |
| | Transmission medium | Twisted Pair STP 100 Ω Cat 5 | |
| Ethernet | MAX cable length | 100m | |
| Lulemet | Baud rate | 10/100 Mbit/s | |
| | Isolation protection | ESD contact 8KV, Surge | |
| | | 4KV(10/1000us) | |
| | Operating system | Linux | |
| | CPU | 300MHz | |
| Svstem | RAM | 64MB | |
| | Flash | 128MB | |
| | Number of I/O modules | MAX 32 | |
| | Protocols | OPC UA , HTTP, DHCP , DNS | |
| | Method | CAGE CLAMP | |
| Wiring | Wire diameter | 0.08 mm ² ··· 2.5 mm ² , AWG 28 ··· 14 | |
| | Strip length | 8 mm 9 mm / 0.33 in | |
| | Working temperature | 0 ··· 55 °C | |
| | Storage temperature | -40 ··· 70 °C | |
| Environment | Relative humidity | 5 ··· 95% no condensation | |
| | Working altitude | 0 ··· 2000 m | |
| | Protection | IP20 | |
| | Width | 48mm | |
| Dimension | Length | 100mm | |
| | Height | 69mm | |
| | Color | Light gray | |
| Matarial | Shell material | Polycarbonate, Nylon 6.6 | |
| Material | Fire load | 1.239 MJ | |
| | Weight | 180 g | |
| Installation | Method | DIN-35 rial | |
| | | EN 55022: 2006/A1: 2007 (CE &RE) | |
| | | Class B | |
| Certificates | EMC | 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 |

5.2.3 Hardware Interface

5.2.3.1 LED Indicators



| LED | Description | Color | Status | Meaning |
|---------|---------------------|-------------------------|----------|----------------------------|
| | | | | Power connection |
| PWR | Power indicator | Red | ON | successful |
| | | | OFF | No power |
| eve | System indicator | Queters indicator Oncor | | System is abnormal |
| 515 | System indicator | Green | OFF | System is running normally |
| | Pupping indicator | Croop | Flashing | System is running normally |
| RUN | | Green | OFF | System is abnormal |
| | Error indicator | | | Northbound protocol |
| ERR | | Red | UN | connection error |
| | | | OFF | No errors |
| | | | Floobing | I/O module is working |
| I/O RUN | indicator | Green | газниу | normally |
| | | | OFF | Module not inserted |
| | I/O Error indicator | | | I/O module communication |
| I/O ERR | | Red | | error |
| | | | OFF | No errors |





| LED | Description | Color | Status | Meaning |
|-----|----------------------------|-------|--------|-------------|
| 6 | System 24V power | Croop | ON | Power is OK |
| 3 | indicator | Green | OFF | No power |
| F | Field 241/ nower indicator | Green | ON | Power is OK |
| | Field 24V power indicator | | OFF | No power |

5.2.3.2 Ethernet Port

It is connected to the Ethernet-based fieldbus through the ETH2, and the EHT1 is used to connect other nodes that need to be connected to the Ethernet.



5.2.3.3 IP Address Selection Switch

The 8-bit DIP switch is used to set the IP address. The encoding of DIP switches is done bit by bit, starting from DIP switch 1 with the least significant bit (2^0) to DIP switch 8 with the most significant bit (2^7) , corresponding to decimal values: 0-255.

| | IP ADDR |
|----|------------|
| 8 | 00 |
| | |
| | • |
| ON | ₩ |
| | 1 |
| | — က |
| | Z |
| 1 | |

When the value of the DIP switch is 1111 1111 (decimal 255), the IP address is set according to the web page. The web page setting can specify the IP or set the 64 Shenzhen Beilai Technology Co., Ltd V1.1



automatic acquisition. When the web page is not set, the IP address is: 192.168.1.10 When the value of the DIP switch is 0000 0000 – 1111 1110 (decimal 0-254), determine the 3rd byte of the IP address, and the 1st, 2nd and 4th bytes are fixed bytes, namely 192.168.xxx.253

5.2.4 OPC UA Data Point Node Id

The Node Id of OPC UA defaults to NS=1; S=Modbus mapping address of the I/O data point (for example, the first DO module of the first DO module: NS=1; S=1000), custom OPC UA model Node Id can be customized.

5.2.5 Controller Connection

Refer to chapter 5.1.5

5.2.6 Web Page Configuration

Login web page configuration interface refer to chapter 5.1.6. The BL205 controller adds the OPC UA protocol on the basis of the BL200 coupler, so we only introduce the OPC UA configuration interface here, and the functions of other interfaces refer to chapter 5.1.7.



| BL200UA Status - S | system - Settings - I/O M | odule - | Serial Module + | OPC UA - | Operation&Control - | Logout |
|-----------------------|---------------------------|---------|-----------------|----------|---------------------|----------------|
| OPC UA settings | | | | | | |
| OPC UA settings | | | | | | |
| OPC UA Name | | | | | | |
| Port | 4840 | | | | | |
| Security Policy | Aes128Sha256RsaOaep | ~ | | | | |
| Message Security Mode | Sign&Encrypt | • | | | | |
| Certificate | Select file | | | | | |
| Private key | Select file | | | | | |
| Allow Anonymous | | | | | | |
| Username | | | | | | |
| Password | | 3 | * | | | |
| Data select | Information Model | ~ | | | | |
| Model File(.xml) | Select file | | | | | |
| Dependent model files | None | ~ | | | | |
| | | | | | Save & Ap | ply Save Reset |

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| Item | Description | Default |
|------------------|---|---------|
| OPC UA name | OPC UA server name | |
| Port | OPC UA server port number | 4840 |
| | None | |
| | basic128rsa15 | |
| Converter policy | basic256 | None |
| Security policy | basic256sha256 | None |
| | aes128sha256rsaoaep | |
| | All security policies | |
| Message security | Sign | |
| mode | Sign and encrypt | |
| Contificato | OPC UA certificate, click the uploaded | |
| Certificate | certificate to load the configuration page. | |
| | OPC UA private key, click on the uploaded | |
| Private key | certificate to load it into the configuration | |
| | page. | |



| | M/hethente en alle user neme and negotiend | |
|-------------------|---|----------|
| Allow anonymous | whether to enable user name and password | |
| | login | |
| Username | Fill in the username | |
| Password | Fill in password | |
| | All data | |
| Data select | Select data point | All data |
| | Information model | |
| | You can select the data points you want to | |
| Select data point | read. "Data selection" option to select "select | |
| | data point" to have this option | |
| | Upload the information model (.xml) file, | |
| Model file (.xml) | select "Information Model" in the "Data | |
| | Selection" item to have this option | |
| Dependent model | Select the number of information models to | |
| files | reference, up to 5 can be selected. | |
| Dependent Models | Upload the information model (.xml) file to be | |
| 1-5 | referenced | |

Note: For a customized information model, the data point description item must be in the format of REG + Modbus address during modeling. For example, DO1 point description item fills in REG1000, and other items are customized.

5.3 BL206 MQTT EdgelO Controller

5.3.1 BL206 Overview

The BL206 controller supports MQTT protocol, and data can be uploaded to Alibaba Cloud, Huawei Cloud, AWS Cloud, Thingsboard, Ignition, and other platforms.

5.3.2 Technical Parameters

| Name | Parameters | Description | |
|--------|------------------------|------------------|--|
| | Input voltage(system) | 24 VDC | |
| | Input current(system) | MAX 500 mA@24VDC | |
| System | Power Efficiency | 84% | |
| power | Internal bus voltage | 5VDC | |
| | Controller consumption | | |
| | current | MAX SOOMA@SVDC | |



| | I/O consumption current | MAX 1700mA@5VDC | |
|--------------|-------------------------|--|--|
| | Isolation protection | 500 V system/supply | |
| | Input voltage (field) | 24 VDC | |
| Field power | Power supply current | | |
| | across contacts (MAX) | 10 ADC | |
| | Number | 2 X RJ45 | |
| | Transmission medium | Twisted Pair STP 100 Ω Cat 5 | |
| Ethernet | MAX cable length | 100m | |
| Ellienier | Baud rate | 10/100 Mbit/s | |
| | lociation protoction | ESD contact 8KV, Surge | |
| | | 4KV(10/1000us) | |
| | Operating system | Linux | |
| | CPU | 300MHz | |
| System | RAM | 64MB | |
| System | Flash | 128MB | |
| | Number of I/O modules | MAX 32 | |
| | Protocols | MQTT, HTTP,, DHCP, DNS | |
| | Method | CAGE CLAMP | |
| Wiring | Wire diameter | 0.08 mm ² ··· 2.5 mm ² , AWG 28 ··· 14 | |
| | Strip length | 8 mm - 9 mm / 0.33 in | |
| | Working temperature | 0 55 ° C | |
| | Storage temperature | -40 ··· 70 ° C | |
| Environment | Relative humidity | 5 ··· 95% no condensation | |
| | Working altitude | 0 ··· 2000 m | |
| | Protection | IP20 | |
| | Width | 48mm | |
| Dimension | Length | 100mm | |
| | Height | 69mm | |
| | Color | Light gray | |
| Matarial | Shell material | Polycarbonate, Nylon 6.6 | |
| Material | Fire load | 1.239 MJ | |
| | Weight | 180 g | |
| Installation | Method | DIN-35 rail | |
| | | EN 55022: 2006/A1: 2007 (CE &RE) | |
| Cortificated | EMC | Class B | |
| Certificated | | 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 |

5.3.3 Hardware Interface

5.3.3.1 LED Indicators

| PWR SYS RUN ERR IO RUN IO ERR | | | | |
|--|----------------------|-------|----------|---|
| LED | Description | Color | Status | Meaning |
| | Power indicator | Red | ON | Power connection successful |
| | | | OFF | No power |
| | | | ON | System is abnormal |
| SYS | SYS System Indicator | | OFF | System is running normally |
| | Pupping indicator | Croop | Flashing | System is running normally |
| NUN | UN Running indicator | | OFF | System is abnormal |
| ERR | ERR Error indicator | | ON | Northbound protocol connection error |
| | | | OFF | No errors |
| I/O RUN | I/O Running | Green | Flashing | I/O module is working normally |
| | indicator | | OFF | Module not inserted |
| I/O ERR | I/O Error indicator | Red | ON | I/O module communication error |
| | | | OFF | No errors |





| LED | Description | Color | Status | Meaning |
|-----|----------------------------|-------|--------|-------------|
| 6 | System 24V power | Croop | ON | Power is OK |
| 5 | indicator | Green | OFF | No power |
| F | Field 241/ nower indicator | Croop | ON | Power is OK |
| F | Field 24V power indicator | Green | OFF | No power |

5.3.3.2 Ethernet Port

It is connected to the Ethernet-based fieldbus through the ETH2, and the EHT1 is used to connect other nodes that need to be connected to the Ethernet.



5.3.3.3 IP Address Selection Switch

The 8-bit DIP switch is used to set the IP address. The encoding of DIP switches is done bit by bit, starting from DIP switch 1 with the least significant bit (2^0) to DIP switch 8 with the most significant bit (2^7) , corresponding to decimal values: 0-255.

| | IP ADDR | | |
|----|------------|--|--|
| 8 | 00 | | |
| | | | |
| | • | | |
| ON | ₩ | | |
| | 1 | | |
| | — က | | |
| | Z | | |
| 1 | | | |

When the value of the DIP switch is 1111 1111 (decimal 255), the IP address is set according to the web page. The web page setting can specify the IP or set the 70 Shenzhen Beilai Technology Co., Ltd V1.1



automatic acquisition. When the web page is not set, the IP address is: 192.168.1.10 When the value of the DIP switch is 0000 0000 – 1111 1110 (decimal 0-254), determine the 3rd byte of the IP address, and the 1st, 2nd and 4th bytes are fixed bytes, namely 192.168.xxx.253

5.3.4 MQTT Identifiers

The MQTT identifier is REG+Modbus mapping address (such as the first DO module first DO: REG1000)

5.3.5 Controller Connection

The BL206 controller is based on the BL200 coupler and adds the function of the cloud platform, mainly the MQTT protocol. Connection steps refers to chapter 5.1.5.

5.3.6 Web Page Configuration

Login web page configuration interface refer to chapter 5.1.6. The BL206 controller adds the cloud platform function on the basis of the BL200 coupler. For the functions of other interfaces, refer to chapter 5.1.7.

5.3.6.1 Cloud Connection Settings

| BL200P | ro | | | | | | | |
|--|---------------------|-----------------------|--------------|-----------------|-----------------|---------------------|------------------|--------------|
| Status - | System - | Settings - | I/O Module - | Serial Module - | OPC UA - | Operation Control - | Cloud platform - | Logout |
| Cloud Cloud co | conne onnectior | ction s | ettings | | | | | |
| Cloud Na | me | Host IP or | Domain | Port | Publish Per | iod(s) | Connect State | Enable |
| Add | | | | This sectio | n contains no v | alues yet | | |
| | | | | | | | Save & Apply | • Save Reset |
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| Cloud connection setting | Is | | | |
|----------------------------|---------------------------|-----------|---|--------------|
| Cloud platform | Beilai IloT V2 | ~ | | |
| MQTT Client ID | [| | | |
| Publish Period(s) | | | | |
| Data Retransmission Enable | | | | |
| Publish Module Status | | | | |
| | | | | |
| | | | | Dismiss Save |
| | | | | |
| Cloud connection setting | IS | | | |
| Cloud platform | Custom Cloud | ~ | | |
| Cloud Name | | | | |
| Host IP or Domain | 0.0.0.0;host.domain.xxx | | | |
| Port | | | | |
| , or | | _ | | |
| MQ11 Client ID | | | | |
| User Name | | | | |
| Password | | * | * | |
| Encryption | No encryption | ~ | | |
| Publish data format | Default data format | • | | |
| Publish Topic | | | | |
| Subscribe Topic | | | | |
| Publish Period(s) | | | | |
| Publisher QOS | 0-At most once | ~ | | |
| Data Retransmission Enable | | | | |
| Publish Module Status | | | | |
| Data packing | | | | |
| | Send multiple data in one | e message | e | |
| Number of data | 20 | | | |
| Publish only changed data | | | | |
| | | | | Dismiss Save |

| Cloud Connection Settings | | |
|---------------------------|-----------------|--|
| Item | Description | |
| Enable | Check to enable | |
| 70 | | |


| Cloud Name | | BLIIoT V2.0, BLIIoT V3.0 | | |
|----------------------------|-----------------|---|--|--|
| | | 2.0 Modbus RTU: modbus.dtuip.com, | | |
| | | Port 6651; | | |
| | | 2. 0 Modbus TCP: mbtcp.dtuip.com, | | |
| | | Port 6655; | | |
| Host Domain and | Port | 2.0 MQTT: mqtt.dtuip.com, | | |
| | | Port 1883 | | |
| | | 3.0 Modbus RTU: modbusrtu.kpiiot.com | | |
| | | Port 4000 | | |
| Link Protocol | | Modbus RTU, Modbus TCP, MQTT | | |
| | Modbus Device | Default 1, Modbus device ID is set in the | | |
| | ID | serial port settings | | |
| | Register packet | Contact sales if you need to connect | | |
| | | BLIIoT cloud | | |
| | Heartbeat | Heartbeat packet to maintain | | |
| Modbus Protocol | packet | connection | | |
| Parameters | Heartbeat | The server responds with a heartheat | | |
| | response | packet | | |
| | packet | | | |
| | Heartbeat | Heartbeat packet sending cycle | | |
| | period(s) | Theat beat packet sending cycle | | |
| | Host Silence | Silent time for the server to send no | | |
| | time(s) | data, timeout will be reconnected | | |
| | | The client identifier used in the MQTT | | |
| | | connection message. If you want to use | | |
| | | BLIIoT MQTT, you need to contact the | | |
| | | sales to get client ID. | | |
| | Publish period | MOTT data timing publishing interval | | |
| Parameters | (s) | MQ11 data timing publishing interval | | |
| | Data | | | |
| | Retransmission | Check to enable data retransmission | | |
| | Enable | | | |
| Overlage Ol I | Cloud name | User defined (optional) | | |
| Custom Cloud Parameters | Host IP or | | | |
| | domain name | User defined | | |



| | Port | User defined | |
|--|--|---------------------------------------|--|
| | Link protocol | Modbus RTU, Modbus TCP, MQTT | |
| | Modbusdevice | Default 1, device Modbus device ID is | |
| | ID | set in the serial port settings | |
| | Register packet | User defined | |
| | Heartbeat packet, heartbeat response packet, heartbeat | | |
| | cycle, host silent time (as defined above) | | |
| | | | |

5.3.6.2 Ali Cloud

| BL 000D | | | | | | |
|-----------------------------|--------------------|------------------|----------|---------------------|------------------|--------------|
| BL200Pro | | | | | | |
| Status - System - Settin | gs 👻 I/O Module 👻 | Serial Module + | OPC UA - | Operation Control - | Cloud platform + | Logout |
| | - | | | | | |
| All cloud setting | s | | | | | |
| Ali cloud settings | | | | | | |
| Enable | | | | | | |
| Authentication method | Device Serect | ~ | | | | |
| Product Key(ProductKey) | | | | | | |
| Device Name(DeviceName) | | | | | | |
| Device Serect(DeviceSerect) | | | | | | |
| Region ID | East China 2 | • | | | | |
| Publish Period(s) | | | | | | |
| Publish only changed data | | | | | | |
| Data packing | Send multiple date | a in one message | | | | |
| Number of data | 20 | | | | | |
| Connect State | Not connected | | | | | |
| | | | | | Save & App | y Save Reset |

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| Ali Cloud Connection | | |
|----------------------|-----------------------------|--|
| Item | Description | |
| Enable | Check to enable | |
| Authentication | "Device Secret" and "X.509" | |



| Method | | |
|-------------------------------|-------------------------------|--|
| Product Key | ProductKey on Ali Cloud | |
| Device Name | DeviceName on Ali Cloud | |
| Device Serect | DeviceSecret on Ali Cloud | |
| Region ID | Ali cloud region | |
| Publish Period(s) | More than 60s | |
| Certification Authority (root | Select File Upload | |
| certificate) | | |
| Device Certificate | Select File Upload | |
| Device Private Key | Select File Upload | |
| Publish only changed data | Check to enable this function | |

5.3.6.3 AWS



| BL200Pro | | | | | |
|---------------------------|-----------------------------------|----------|---------------------|------------------|--------------|
| Status - System - Settin | gs 🕶 I/O Module 👻 Serial Module 🗝 | OPC UA - | Operation Control - | Cloud platform - | Logout |
| Aws cloud settin | qs | | | | |
| Aws cloud settings | | | | | |
| Enable | | | | | |
| Lindbio | | | | | |
| Host(EndPoint) | | | | | |
| Client ID | | | | | |
| Thing Name | | | | | |
| Certificate authority | Select file | | | | |
| | /etc/mqtt/aws/root.crt | | | | |
| Device certificate | Select file | | | | |
| | /etc/mqtt/aws/local.crt | | | | |
| Device private key | Select file, | | | | |
| | /etc/mqtt/aws/private.key | | | | |
| Publish Topic | | | | | |
| Publish Period(s) | | | | | |
| Publish only changed data | | | | | |
| Shadow Data select | None 🗸 | | | | |
| Data packing | Send multiple data in one message | e | | | |
| Number of data | 20 | | | | |
| Connect State | Not connected | | | | |
| | | | | Save & App | y Save Reset |

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| AWS Connection | | |
|----------------|---|--|
| Item | Description | |
| Enable | Check to enable | |
| Host(EndPoint) | Set the endpoint | |
| | The client identifier used in the MQTT | |
| | connection message, the server uses | |
| Client ID | the client identifier to identify the client, | |
| | and each client connected to the server | |
| | has a unique client identifier. | |
| Thing Name | Set thing name | |



| | The subject name used by MQTT to | |
|-------------------------------|---------------------------------------|--|
| | publish messages. The subject name is | |
| | used to identify which information | |
| Publish Topic | channel the payload data should be | |
| | published to. The subject name in the | |
| | published message cannot contain | |
| | wildcards. | |
| Publish Period(s) | More than 60s | |
| Certification Authority (root | Select File Upload | |
| certificate) | | |
| Device Certificate | Select File Upload | |
| Device Private Key | Select File Upload | |
| Publish only changed data | Check to enable this function | |

5.3.6.4 HUAWEI Cloud

| BL200Pro | | | | | |
|---------------------------|-----------------------------------|----------------------|-----------------------|-----------------------------|---------------|
| Status - System - Settir | ngs ≁ I/O Module ≁ Serial Module | • OPC UA + | Operation Control - | Cloud platform - | Logout |
| Huawei cloud se | ttings | | | | |
| Huawei cloud settings | 3 | | | | |
| Enable | | | | | |
| Authentication method | Device Serect 🗸 | | | | |
| Device ID | Device Serect X509 certificate | | | | |
| Secret key | | * | | | |
| Service ID | |] | | | |
| Region ID | CN North-Beijng4 | | | | |
| Publish Period(s) | | | | | |
| Publish only changed data | | | | | |
| Data packing | Send multiple data in one messa | age | | | |
| Number of data | 20 | | | | |
| Connect State | Not connected | | | | |
| | | | | Save & App | ly Save Reset |
| | Shenzhen Beilai T | echnology Co. 1 td (| (V1 1 9) / 2023-07-14 | | |



| HUAWEI Cloud Connection | | | |
|-------------------------|---|--|--|
| Item | Description | | |
| Enable | Check to enable | | |
| Authentication | "Device Secret" and "X 500" | | |
| Method | Device Secret and X.509 | | |
| Device ID | Huawei Cloud Device ID | | |
| Service ID | Products need to create services to report data | | |
| Region ID | Device region | | |
| Publish Period(s) | More than 60s | | |
| | Password entered when creating the device certificate, | | |
| Secret key | you can refer to the HUAWEI CLOUD help document to | | |
| | create a test certificate | | |
| Certification | | | |
| authority (root | Root certificate provided by Huawei cloud | | |
| certificate) | | | |
| Dovice cortificate | Device certificate deviceCert.pem, upload to /etc/conf | | |
| Device certificate | directory and select the file | | |
| | Device key/deviceCert.key, upload to/etc/conf directory | | |
| | and select the file | | |
| Only publish | Check to enable this function | | |
| changed data | | | |

5.3.6.5 ThingsBoard



| BL200Pro | | | | | |
|--|--|---------------------|---------------------|------------------|--------------|
| Status 🕶 System 👻 Settin | gs + I/O Module + Serial | I Module 👻 OPC UA 👻 | Operation Control + | Cloud platform + | Logout |
| Thingsboard Clo Cloud connection sett | ud settings | | | | |
| Enable setting | | | | | |
| Thingsboard platform | Thingsboard Cloud | ~ | | | |
| MQTT Client ID | Thingsboard Cloud Other Thingsboard Server | | | | |
| User Name | | | | | |
| Password | | * | | | |
| Publish Period(s) | | | | | |
| Data Retransmission Enable | | | | | |
| Data packing | Send multiple data in on | ie message | | | |
| Number of data | 20 | | | | |
| Publish only changed data | | | | | |
| Connect State | Not connected | | | | |
| | | | | Save & Appl | y Save Reset |



| Thingsboa | rd Connection |
|-------------------|---|
| Item | Description |
| Enable | Check to enable |
| Client ID | The client identifier used in the MQTT |
| | connection message, the server uses |
| | the client identifier to identify the client, |
| | and each client connected to the server |
| | has a unique client identifier. |
| User Name | The username used for MQTT |
| | connection messages, which the server |
| | can use for authentication and |
| | authorization. |
| Password | The password used for MQTT |
| | connection messages, which the server |
| | can use for authentication and |
| | authorization. |
| Publish Period(s) | More than 60s |



| Data Retransmission Enable | Check to enable data retransmission | |
|----------------------------|-------------------------------------|--|
| Only publish | Check to enable this function | |
| changed data | | |

5.4 BL206Pro EdgelO Controller

5.4.1 BL206Pro Overview

BL206Pro includes the functions of BL200, BL205, and BL206

5.4.2 Technical Parameters

| Name | Parameter | Description | |
|--------------|-----------------------------|-------------------------------------|--|
| | Input voltage(system) | 24 VDC | |
| | Input current(system) | MAX 500 mA@24VDC | |
| | Power Efficiency | 84% | |
| Systen power | Internal bus voltage | 5VDC | |
| | Coupler consumption current | MAX 300mA@5VDC | |
| | I/O consumption current | MAX 1700mA@5VDC | |
| | Isolation protection | 500 V system/supply | |
| | Input voltage (field) | 24 VDC | |
| Field power | Power supply current across | 10 400 | |
| | contacts (MAX) | TO ADC | |
| | Number | 2 X RJ45 | |
| | Transmission medium | Twisted Pair STP 100 Ω Cat 5 | |
| Ethernet | MAX cable length | 100m | |
| Luiemer | Baud rate | 10/100 Mbit/s | |
| | ladation protoction | ESD contact: 8KV, Surge: | |
| | | 4KV(10/1000us) | |
| | Operating system | Linux | |
| System | CPU | 300MHz | |
| | RAM | 64MB | |
| | Flash | 128MB | |
| | I/O Modules | MAX 32 | |
| | Process mapping (Modbus) | • Bool : 4096 | |



| | data points via serial port | • 16 Bit : 2048 |
|--------------|-----------------------------|---|
| module | | • 32 Bit : 1024 |
| | Protocol | Modbus TCP, MQTT, OPC UA, |
| | | HTTP, DHCP, DNS |
| | Maximum number of | |
| | connections | 15 Modbus TCP |
| | Method | CAGE CLAMP |
| Wiring | Wire diameter | 0.08 mm ² ··· 2.5 mm ² , AWG 28 ··· |
| method | | 14 |
| | Stripping length | 8 mm - 9 mm / 0.33 in |
| | Working temperature | 0 55 ° C |
| | Storage temperature | -40 ··· 70 ° C |
| Environment | Relative humidity | 5 ··· 95% no condensation |
| | Working altitude | 0 ··· 2000 m |
| | Protection type | IP20 |
| | Width | 48mm |
| Dimension | Length | 100mm |
| | Height | 69mm |
| | Color | Light gray |
| Motorial | Shell material | Polycarbonate, Nylon 6.6 |
| Material | Fire load | 1.239 MJ |
| | Weight | 180g |
| Installation | Method | DIN-35 rail |
| | | EN 55022: 2006/A1: 2007 (CE |
| Certificates | | &RE) Class B |
| | | IEC 61000-4-2 (ESD) Level 4 |
| | EMO | 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 |



5.4.3 Hardware Interface

5.4.3.1 LED Indicators

| | PWR | |
|----------|--------|--|
| | SYS | |
| | RUN | |
| | ERR | |
| <u> </u> | | |
| | IO RUN | |
| | IO ERR | |

| LED | Description | Color | Status | Meaning |
|---------|--------------------------|-------|----------|----------------------------|
| PWR | | | | Power connection |
| | Power indicator | Red | | successful |
| | | | OFF | No power |
| eve | System indicator | Groop | ON | System is abnormal |
| 515 | System indicator | Green | OFF | System is running normally |
| RUN | Running indicator | Croop | Flashing | System is running normally |
| | | Green | OFF | System is abnormal |
| | Error indicator | Red | ON | Northbound protocol |
| ERR | | | | connection error |
| | | | OFF | No errors |
| | I/O Running indicator | Green | Flashing | I/O module is working |
| I/O RUN | | | | normally |
| | | | OFF | Module not inserted |
| I/O ERR | | | | I/O module communication |
| | I/O Error indicator | Red | | error |
| | | | OFF | No errors |



| LED | Description | Color | Status | Meaning |
|-----|------------------|-------|--------|-------------|
| S | System 24V power | Green | ON | Power is OK |



| | indicator | | OFF | No power |
|--|-----------------------------|----------|-------------|----------|
| | Oracia | ON | Power is OK | |
| | F Field 24V power indicator | or Green | OFF | No power |

5.4.3.2 Ethernet Port

It is connected to the Ethernet-based fieldbus through the ETH2, and the EHT1 is used to connect other nodes that need to be connected to the Ethernet.



5.4.3.3 IP Address Selection Switch

The 8-bit DIP switch is used to set the IP address. The encoding of DIP switches is done bit by bit, starting from DIP switch 1 with the least significant bit (2^0) to DIP switch 8 with the most significant bit (2^7), corresponding to decimal values: 0-255.

| | IP ADDR | | | |
|----|------------|--|--|--|
| 8 | 00 | | | |
| | | | | |
| | • | | | |
| ON | P- 40 | | | |
| | 1 | | | |
| | — က | | | |
| | Z | | | |
| 1 | | | | |

When the value of the DIP switch is 1111 1111 (decimal 255), the IP address is set according to the web page. The web page setting can specify the IP or set the automatic acquisition. When the web page is not set, the IP address is: 192.168.1.10 When the value of the DIP switch is 0000 0000 – 1111 1110 (decimal 0-254), determine the 3rd byte of the IP address, and the 1st, 2nd and 4th bytes are fixed bytes, namely 192.168.xxx.253



5.4.4 Process Data Definition

The BL206Pro includes the functions of BL200, BL205, and BL206, so the Modbus mapping address, OPC UA data point Node Id, and MQTT identifier are all applicable to BL206Pro.

5.4.5 Controller Connection

Refer to chapter 5.1.5

5.4.6 Web Page Configuration

Login web page configuration interface refer to chapter 5.1.6, BL206Pro coupler includes the functions of BL200, BL205, and BL206, so for the function description of the configuration page, refer to the description chapter of the web page configuration page of BL200, BL205, and BL206.

5.5 BL201 Profinet Coupler

5.5.1 BL201 Coupler Overview

BL201 coupler supports standard Profinet I/O Device communication. Support RT real-time communication, the minimum period of RT real-time communication is 1ms. The coupler supports a maximum input of 1440 bytes, a maximum output of 1440 bytes, and supports 32 extended I/O modules.

5.5.2 Technical Parameters

| Name | Parameter | Description |
|--------------|-----------------------------|---------------------|
| | Input voltage(system) | 24 VDC |
| | Input current(system) | MAX 500 mA@24VDC |
| | Power Efficiency | 84% |
| Systen power | Internal bus voltage | 5VDC |
| | Coupler consumption current | MAX 300mA@5VDC |
| | I/O consumption current | MAX 1700mA@5VDC |
| | Isolation protection | 500 V system/supply |



| | Input voltage (field) | 24 VDC | |
|--------------|-----------------------------|---|--|
| Field power | Power supply current across | 10 400 | |
| | contacts (MAX) | 10 ADC | |
| | Number | 2 X RJ45 | |
| | Transmission medium | Twisted Pair STP 100 Ω Cat 5 | |
| Ethorpot | MAX cable length | 100m | |
| Ellenet | Baud rate | 10/100 Mbit/s | |
| | loolation protoction | ESD contact: 8KV, Surge: | |
| | | 4KV(10/1000us) | |
| | Operating system | Linux | |
| | CPU | 300MHz | |
| | RAM | 64MB | |
| | Flash | 128MB | |
| System | I/O Modules | MAX 32 | |
| | Protocol | Profinet | |
| | Process data area | Input up to 1440 bytes, output up | |
| | FIOCESS Uala alea | to 1440 bytes | |
| | RT | Support, minimum cycle 1ms | |
| | Method | CAGE CLAMP | |
| Wiring | Wire diameter | 0.08 mm ² ··· 2.5 mm ² , AWG 28 ··· | |
| method | | 14 | |
| | Stripping length | 8 mm 9 mm / 0.33 in | |
| | Working temperature | 0 - 55 ° C | |
| | Storage temperature | -40 ··· 70 ° C | |
| Environment | Relative humidity | 5 ··· 95% no condensation | |
| | Working altitude | 0 ··· 2000 m | |
| | Protection type | IP20 | |
| | Width | 48mm | |
| Dimension | Length | 100mm | |
| | Height | 69mm | |
| | Color | Light gray | |
| Material | Shell material | Polycarbonate, Nylon 6.6 | |
| | Fire load | 1.239 MJ | |
| | Weight | 180g | |
| Installation | Method | DIN-35 rail | |
| Cortificator | EMC | EN 55022: 2006/A1: 2007 (CE | |
| Certificates | | &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 |

5.5.3 Hardware Interface

5.5.3.1 LED Indicators

PWR) SYS) RUN ERR

| IO RUN | | | | |
|---------|----------------------|-------|-----------|----------------------------|
| LED | Description | Color | Status | Meaning |
| | | | | Power connection |
| PWR | Power indicator | Red | | successful |
| | | | OFF | No power |
| 975 | SVC System indicator | Green | ON | System is abnormal |
| 515 | System indicator | Green | OFF | System is running normally |
| | Running indicator | Green | Flashing | System is running normally |
| NON | | | OFF | System is abnormal |
| | Error indicator | Red | ON | Profinet protocol |
| ERR | | | | connection error |
| | | | OFF | No errors |
| | | | Flashing | I/O module is working |
| I/O RUN | indicator | Green | riasining | normally |
| | | | OFF | Module not inserted |
| | | | ON | I/O module communication |
| I/O ERR | I/O Error indicator | Red | | error |
| | | | OFF | No errors |





| LED | Description | Color | Status | Meaning |
|-----|----------------------------|-------|--------|-------------|
| 6 | System 24V power | Croop | ON | Power is OK |
| 3 | indicator | Green | OFF | No power |
| F | Field 241/ nower indicator | Croop | ON | Power is OK |
| F | Field 24V power indicator | Green | OFF | No power |

5.5.3.2 Ethernet Port

ETH1 and ETH2 are Profinet communication ports, support switch function, 10M/100M self-adaptive.



5.5.3.3 IP Address Selection Switch

It's not working on BL201 couplers.

5.5.4 Process Data Definition

BL201 does not support the data collected by the serial port module temporarily, the data point address of the I/O module is determined by the Profinet master, and the data of AI and AO are mapped to 0-65535.

AO 0-5V/0-10V output data value

| Voltage(0-5V) | Voltage(0-10V) | Decimal | Hexadecimal |
|---------------|----------------|---------|-------------|
| 5 | 10 | 65535 | 0xFFFF |
| • | • | • | |



| • | - | • | • |
|-----|---|-------|--------|
| 2.5 | 5 | 32767 | 0x7FFF |
| • | | • | |
| • | - | • | |
| 0 | 0 | 0 | 0x0000 |

For example: Requires analog output 3V, the issued value is: When the range is 0-5V, 3*65535/5=39321. When the range is 0-10V, 3*65535/10=19660.5, since AO is an integer, 19660 will be issued.

| Current(0-20mA) | Current(4-20mA) | Decimal | Hexadecimal |
|-----------------|-----------------|---------|-------------|
| 20 | 20 | 65535 | 0xFFFF |
| • | - | • | • |
| | | | • |
| 10 | 12 | 32767 | 0x7FFF |
| • | - | | • |
| • | - | | • |
| 0 | 4 | 0 | 0x0000 |

AI 0-20mA/4-20mA input Data value

For example: The AI value in the master is 56789, then when the range is 0-20mA, the theoretical value of AI is: 56789/65535/20=17.33089mA. When the range is 4-20mA, the theoretical value of AI is: 56789/65535*16+4=17.86471mA.

5.5.5 Coupler Connection

The BL201 coupler is used as a Profinet slave, and both ETH1 and ETH2 network ports can be directly connected to the Profinet master, or connected to the Profinet master through a switch. BL201 coupler does not have a separate web configuration interface.





5.6 BL203 Ethernet/IP Coupler

5.6.1 BL203 Coupler Overview

The BL203 coupler supports standard Ethernet/IP protocol access. The coupler supports a maximum input of 504 bytes and a maximum output of 504 bytes. The number of extended IO modules supported is 32.

5.6.2 Technical Parameters

| Name | Parameter | Description |
|--------------|-----------------------------|---------------------|
| | Input voltage(system) | 24 VDC |
| | Input current(system) | MAX 500 mA@24VDC |
| | Power Efficiency | 84% |
| Systen power | Internal bus voltage | 5VDC |
| | Coupler consumption current | MAX 300mA@5VDC |
| | I/O consumption current | MAX 1700mA@5VDC |
| | Isolation protection | 500 V system/supply |
| Field power | Input voltage (field) | 24 VDC |



| | Power supply current across contacts (MAX) | 10 ADC | |
|-------------|--|---|--|
| | Number | 2 X RJ45 | |
| | Transmission medium | Twisted Pair STP 100 Ω Cat 5 | |
| | MAX cable length | 100m | |
| Ethernet | Baud rate | 10/100 Mbit/s | |
| | | ESD contact: 8KV, Surge: | |
| | Isolation protection | 4KV(10/1000us) | |
| | Operating system | Linux | |
| | CPU | 300MHz | |
| | RAM | 64MB | |
| | Flash | 128MB | |
| | I/O Modules | MAX 32 | |
| | Protocol | Ethernet/IP, HTTP, DHCP, DNS | |
| | | The maximum input length is 504 | |
| System | Process data area | bytes, and the maximum output | |
| | | length is 504 bytes | |
| | Maximum number of explicit | 10 | |
| | message connections | 10 | |
| | Maximum number of implicit | 5 | |
| | message connections | 5 | |
| | Maximum number of CIP | 10 | |
| | connections | 10 | |
| | Method | CAGE CLAMP | |
| Wiring | Wire diameter | 0.08 mm ² ··· 2.5 mm ² , AWG 28 ··· | |
| method | | 14 | |
| | Stripping length | 8 mm 9 mm / 0.33 in | |
| | Working temperature | 0 55 ° C | |
| | Storage temperature | -40 ··· 70 ° C | |
| Environment | Relative humidity | 5 ··· 95% no condensation | |
| | Working altitude | 0 ··· 2000 m | |
| | Protection type | IP20 | |
| | Width | 48mm | |
| Dimension | Length | 100mm | |
| | Height | 69mm | |
| Material | Color | Light gray | |
| Iviaterial | Shell material | Polycarbonate, Nylon 6.6 | |



| | Fire load | 1.239 MJ |
|--------------|-----------|------------------------------|
| | Weight | 180g |
| Installation | Method | DIN-35 rail |
| | | EN 55022: 2006/A1: 2007 (CE |
| | | &RE) Class B |
| | | IEC 61000-4-2 (ESD) Level 4 |
| Contificatoo | FMC | IEC 61000-4-3 (RS) Level 4 |
| Certificates | EMC | 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 |

5.6.3 Hardware Interface

5.6.3.1 LED Indicators



91

Color

Red

Green

Green

Red

Green

Status

ON

OFF

ON

OFF

OFF

ON

OFF

Flashing

Flashing

Meaning

successful

No power

Power connection

System is abnormal

System is abnormal Ethernet/IP protocol

I/O module is working

connection error

No errors

normally

System is running normally

System is running normally



| | | | OFF | Module not inserted |
|---------|---------------------|-----|----------------------------------|--------------------------------|
| I/O ERR | I/O Error indicator | Red | ON I/O module communica error | I/O module communication error |
| | | | OFF | No errors |



| LED | Description | Color | Status | Meaning |
|-----|----------------------------|-------|--------|-------------|
| c | System 24V power | Green | ON | Power is OK |
| 3 | indicator | | OFF | No power |
| г | Field 241/ nower indicator | Croop | ON | Power is OK |
| F | Field 24V power indicator | Green | OFF | No power |

5.6.3.2 Ethernet Port

It is connected to the Ethernet-based field bus through the ETH 1 interface, and ETH2 is used to connect other nodes that need to access the Ethernet.



5.6.3.3 IP Address Selection Switch

It's not working on BL203 couplers.

5.6.4 Process Data Definition

BL203 does not support the data collected by the serial port module temporarily, the data point address of the I/O module is determined by the Ethernet/IP master, and the data of AI and AO are mapped to 0-65535.

AO 0-5V/0-10V output data value

| Voltage(0-5V) | Voltage(0-10V) | Decimal | Hexadecimal |
|---------------|----------------|---------|-------------|
| 5 | 10 | 65535 | 0xFFFF |
| • | - | • | • |
| • | - | | • |
| 2.5 | 5 | 32767 | 0x7FFF |
| • | - | | |
| | - | - | - |
| 0 | 0 | 0 | 0x0000 |

For example: Requires analog output 3V, the issued value is: When the range is 0-5V, 3*65535/5=39321. When the range is 0-10V, 3*65535/10=19660.5, since AO is an integer, 19660 will be issued.

| Current(0-20mA) | Current(4-20mA) | Decimal | Hexadecimal |
|-----------------|-----------------|---------|-------------|
| 20 | 20 | 65535 | 0xFFFF |
| - | - | • | |
| • | - | • | |
| 10 | 12 | 32767 | 0x7FFF |
| • | - | • | • |
| • | - | • | |
| 0 | 4 | 0 | 0x0000 |

AI 0-20mA/4-20mA input data value

For example: The AI value in the master is 56789, then when the range is 0-20mA, the theoretical value of AI is: 56789/65535/20=17.33089mA. When the range is 4-20mA, the theoretical value of AI is: 56789/65535*16+4=17.86471mA.

5.6.5 Coupler Connection

The BL203 coupler is used as a Ethernet/IP slave, and both ETH1 and ETH2 network ports can be directly connected to the Ethernet/IP master, or connected to the Ethernet/IP master through a switch. BL203 coupler does not have a separate web configuration interface.





5.7 BL202 EtherCAT Coupler

5.7.1 BL202 Coupler Overview

The BL202 coupler supports standard EtherCAT protocol access. The coupler supports a maximum input of 1024 bytes, a maximum output of 1024 bytes, and supports 32 extended IO modules.

5.7.2 Technical Parameters

| Name | Parameter | Description |
|--------------|-----------------------------|---------------------|
| | Input voltage(system) | 24 VDC |
| | Input current(system) | MAX 500 mA@24VDC |
| | Power Efficiency | 84% |
| Systen power | Internal bus voltage | 5VDC |
| | Coupler consumption current | MAX 300mA@5VDC |
| | I/O consumption current | MAX 1700mA@5VDC |
| | Isolation protection | 500 V system/supply |
| Field power | Input voltage (field) | 24 VDC |



| | Power supply current across contacts (MAX) | 10 ADC |
|--------------|--|---|
| | Number | 2 X RJ45 |
| | - · · . | Shielded twisted pair S/FTP, |
| | I ransmission medium | F/FTP or SF/FTP; 100 Ω , Cat 6 |
| Ethernet | MAX cable length | 100m |
| | Baud rate | 10/100 Mbit/s |
| | loolation protoction | ESD contact: 8KV, Surge: |
| | | 4KV(10/1000us) |
| | Operating system | Linux |
| | CPU | 300MHz |
| | RAM | 64MB |
| System | Flash | 128MB |
| System | I/O Modules | MAX 32 |
| | Protocol | EtherCAT |
| | Drococo data area | Input up to 1024 bytes, output up |
| | FIOCESS Uala alea | to 1024 bytes |
| | Method | CAGE CLAMP |
| Wiring | Wire diameter | 0.08 mm ² ··· 2.5 mm ² , AWG 28 ··· |
| method | | 14 |
| | Stripping length | 8 mm 9 mm / 0.33 in |
| | Working temperature | 0 - 55 ° C |
| | Storage temperature | -40 ··· 70 ° C |
| Environment | Relative humidity | 5 ··· 95% no condensation |
| | Working altitude | 0 ··· 2000 m |
| | Protection type | IP20 |
| | Width | 48mm |
| Dimension | Length | 100mm |
| | Height | 69mm |
| | Color | Light gray |
| Matarial | Shell material | Polycarbonate, Nylon 6.6 |
| Material | Fire load | 1.239 MJ |
| | Weight | 180g |
| Installation | Method | DIN-35 rail |
| | | EN 55022: 2006/A1: 2007 (CE |
| Certificates | EMC | &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 |

5.7.3 Hardware Interface

5.7.3.1 LED Indicators



| LED | Description | Color | Status | Meaning |
|---------|-------------------|-------|-------------|-------------------------|
| | | | ON | Power connection |
| PWR | Power indicator | Red | ON | successful |
| | | | OFF | No power |
| | | | ON | EtherCAT OP Status |
| | | | Foot Floop | EtherCAT Bootstrap |
| | | | Fast Fiash | Status |
| SYS | System indicator | Green | Slow flash | EtherCAT Pre-OP Status |
| | | | On and off | EtherCAT Safe-OP |
| | | | alternately | Status |
| | | | OFF | EtherCAT Init Status |
| | | | Elaching | System is running |
| RUN | Running indicator | Green | Flashing | normally |
| | | | OFF | System is abnormal |
| EDD | Error indicator | Pod | ON | The coupler is abnormal |
| | | Neu | OFF | No errors |
| | | | Election | I/O module is working |
| I/O RUN | | Green | газниц | normally |
| | Indicator | | OFF | Module not inserted |



| I/O ERR | I/O Error indicator | Red | ON | I/O module communication |
|---------|---------------------|-----|-----|-----------------------------|
| | | | | error |
| | | | OFF | No errors |



| LED | Description | Color | Status | Meaning |
|-----|---------------------------|-------|--------|-------------|
| c | System 24V power | Croop | ON | Power is OK |
| 3 | indicator | Green | OFF | No power |
| E | Field 24V power indicator | Croop | ON | Power is OK |
| | | Green | OFF | No power |

5.7.3.2 Ethernet Port

It is connected to the Ethernet-based field bus through the ETH 1 interface, and ETH2 is used to connect other nodes that need to access the Ethernet.



5.7.3.3 IP Address Selection Switch

It's not working on BL202 couplers.

5.7.4 Process Data Definition

BL202 does not support the data collected by the serial port module temporarily. The data point address of the I/O module is determined by the EtherCAT master, and the data of AI and AO are mapped to 0-65535.

AO 0-5V/0-10V output data value

| Voltage(0-5V) | Voltage(0-10V) | Decimal | Hexadecimal |
|---------------|----------------|---------|-------------|
| 5 | 10 | 65535 | 0xFFFF |
| - | - | | . . |
| | - | | |
| 2.5 | 5 | 32767 | 0x7FFF |
| | - | | |
| | - | - | - |
| 0 | 0 | 0 | 0x0000 |

For example: Requires analog output 3V, the issued value is: When the range is 0-5V, 3*65535/5=39321. When the range is 0-10V, 3*65535/10=19660.5, since AO is an integer, 19660 will be issued.

| Current(0-20mA) | Current(4-20mA) | Decimal | Hexadecimal |
|-----------------|-----------------|---------|-------------|
| 20 | 20 | 65535 | 0xFFFF |
| • | • | • | • |
| • | - | • | |
| 10 | 12 | 32767 | 0x7FFF |
| | - | • | |
| • | • | • | |
| 0 | 4 | 0 | 0x0000 |

AI 0-20mA/4-20mA input data value

For example: The AI value in the master is 56789, then when the range is 0-20mA, the theoretical value of AI is: 56789/65535/20=17.33089mA. When the range is 4-20mA, the theoretical value of AI is: 56789/65535*16+4=17.86471mA.

5.7.5 Coupler Connection

The BL202 coupler is used as an EtherCAT slave, and is connected to the Ethernet-based fieldbus EtherCAT master through the ETH 1 interface. ETH 1 can also be connected to the EtherCAT master through a switch, and ETH2 is used to connect other nodes that need to access Ethernet . The BL202 coupler does not have a separate web configuration interface.





5.8 BL207 BACnet Coupler

6 Fieldbus Communication Example

6.1 BL200 Communication Example

6.1.1 Overview

Modbus is an open, manufacturer-independent fieldbus standard protocol for a variety of applications in manufacturing and process automation.

MODBUS is an application layer messaging protocol at layer 7 of the OSI model that enables client/server communication between devices connected on different types of buses or networks.

Several commonly used networks are as follows:

- TCP/IP over Ethernet
- Asynchronous serial transmission of multiple media (wired: EIA/TIA-232-E, EIA-422, EIA/TIA-485-A; optical fiber, radio, etc.).
- MODBUS PLUS, high-speed token.



MODBUS is a request/response protocol that provides services specified by function codes.

The MODBUS protocol allows easy communication within all types of network architectures.



MODBUS protocol defines a simple protocol data unit (PDU) independent of the underlying communication layer. The mapping of the MODBUS protocol on a specific bus or network can introduce some additional fields on the Application Data Unit (ADU).



6.1.1.1 Modbus TCP

The Modbus TCP protocol is a variant of the Modbus protocol that is optimized for communication over a TCP/IP connection. The protocol is designed for data exchange at the field level (ie for I/O data exchange in the process image). On the server side, all packets are sent over a TCP connection with port number 502. The general Modbus TCP message is as follows:

| byte | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 - n |
|------|---|---|--------|---------|--------|--------|-------------|---|-------|
| 100 | | | Shenzh | en Beil | ai Teo | hnolog | gy Co., Ltd | | V1.1 |



| | | Protocol | | | | |
|------------|----------------------------|------------------------------|-----------------|------------------|-------------------------|------|
| Definition | Transactio n identifier | identifier(Always 00) | Field length | Slave address | Modbus function code | Data |

6.1.1.2 Modbus Data Encoding

Modbus uses "big endian" representation for address and data items. This means that when transferring numbers larger than a single byte, the most significant byte is sent first.

6.1.1.3 Modbus Data Type

| Data type | Object type | Access type | Description |
|------------------|---------------|-------------|----------------|
| Digital input | 1 bit | read | Digital input |
| Coil | 1 bit | read/write | Digital output |
| Input register | 16 bit (word) | read | Analog input |
| Holding register | 16 bit (word) | read/write | Analog output |

The modbus protocol is based on the following basic data types:

For each basic data type, one or more function codes are defined. These function codes allow digital or analog input and output data, as well as internal variables to be set or read directly from the fieldbus node.

6.1.2 Modbus Function Code

The function codes supported by the BL200 fieldbus node are shown in the table below. To perform the required functions, please specify the respective function codes and the address of the selected input or output channel or register.

| Modbus function code | Function | Access type | Description |
|----------------------|-------------------------|-------------|------------------|
| 0x02 | read digital input | read | |
| 0x01 | read coil | read/write | Access by 1 bit |
| 0x05 | write a single coil | read/write | Access by 1 bit |
| 0x0F | write multiple coils | read/write | |
| 0x04 | read input register | read | Access by 16 Bit |
| 0x03 | read multiple registers | read/write | |



| 0x06 | write a single register | read/write |
|------|--------------------------|------------|
| 0x10 | write multiple registers | read/write |

The MODBUS function is performed as follows:

1. The MODBUS TCP master (such as PC) sends a request to the BL200 fieldbus node using a specific function code;

2. The BL200 fieldbus node receives the data message, and then responds to the master with correct data according to the master's request.

If a fieldbus node receives an incorrect request, it sends an error data telegram (exception) to the master.

| Exception code | Description |
|----------------|----------------------|
| 0x01 | illegal function |
| 0x02 | illegal data address |
| 0x03 | illegal data value |
| 0x04 | slave device failure |

The meaning of the exception code contained in the exception is as follows:

6.1.2.1 Function Code 0x02

This function code is used to read the continuous state of single or multiple digital inputs.

1. Request

The request specifies the starting address and the quantity to be read.

| Field Name | Number of bytes | Example | Description |
|---------------------------|-----------------|---------|--|
| Transaction identifier | 2 Byte | 0x00 01 | Identification of Modbus request/response transactions |
| Protocol identifier | 2 Byte | 0x00 00 | 0x00 00: Modbus protocol |
| Message length | 2 Byte | 0x00 06 | The number of bytes of the following data |
| Device address | 1 Byte | 0x01 | Slave address identification |
| Function code | 1 Byte | 0x02 | Read digital input, use function code 0x02 |
| Start address | 2 Byte | 0x07 D0 | The address is detailed in the |



| | | | "Modbus Register Mapping" chapter |
|----------------|--------|------|-----------------------------------|
| Enter quantity | 2 Byte | 0x08 | Read 8 digital inputs |

2. Response

The data field indicates the value of the input state. A binary 1 corresponds to the on state and a 0 corresponds to the off state. The least significant bit (LSB) of the first data byte contains the first bit of the request, the others are in ascending order. If the response data is not a multiple of 8, the remaining bits of the last data byte will be padded with zeros (towards the upper bits of the byte).

| Field Name | Number of bytes | Example | Description | |
|---------------|--------------------|---------|---------------------------------------|--|
| Transaction | 2 Buto | 0x00.01 | Identification of Modbus | |
| identifier | 2 Dyte | 0,00 01 | request/response transactions | |
| Protocol | 2 Buto | 0×00.00 | 0x00.00: Modbus protocol | |
| identifier | 2 Dyte | 0,00,00 | | |
| Message | 2 Buto | 0×00.04 | The number of bytes of the following | |
| length | | 0x00 04 | data | |
| Device | 1 Duto | 0x01 | Slove address identification | |
| address | I Dyte | 0.001 | | |
| Eunction code | 1 Byte | 0x02 | Read digital input, use function code | |
| | 1 Dyte | 0,02 | 0x02 | |
| Data bytes | 1 Byte | 0x01 | Number of bytes of data | |
| Data | 1 Byte | 0x89 | Response data | |

3. Abnormal

| Field Name | Number of bytes | Example | Description |
|---------------|-----------------|---------|-----------------------------|
| | | | |
| Function code | 1 Byte | 0x82 | Modbus function code + 0x80 |
| Abnormal code | 1 Byte | 0x01 | 0x01 or 0x02 |

4. Example

Read the value of 8 digital inputs from address 2000 to 2007.

request

0x00 01 00 00 00 06 01 02 07 D0 00 08

| Byte 1 2 3 4 5 6 7 8 9 10 11 12 |
|---------------------------------|
|---------------------------------|



| Data | 00 01 | 00 00 | 00 06 | 01 | 01 | 07 D0 | 00 08 |
|--------|-------------|------------|---------|---------|----------|---------|-----------|
| illust | Transaction | Protocol | Message | Device | Function | Start | Number of |
| rate | identifier | identifier | length | address | code | address | coils |

response

0x00 01 00 00 00 04 01 02 01 89

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------|---------|--------|---------|-----|---------|----|---------|----------|------------|------|
| Data | 00 | 01 | 00 | 00 | 00 | 04 | 01 | 01 | 01 | 89 |
| illust | Trans | action | Protoc | col | Message | | Device | Function | Data butaa | Dete |
| rate | identif | ier | identif | ier | length | 1 | address | code | Data bytes | Dala |

Status from 2007 to 2000 is displayed as byte value 0x89 or binary 1000 1001. Address 2007 is the most significant bit MSB of the byte, 2000 is the least significant bit LSB, the distribution from high to low is as follows:

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|------------|-------|------|------|------|-------|------|------|-------|
| Address | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 |
| Status | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| illustrate | close | open | open | open | close | open | open | close |

6.1.2.2 Function Code 0x01

This function code is used to read the continuous status of single or multiple coils in the remote device.

1. Request

The request specifies the starting address, which specifies the address of the first coil, and the number of coils.

| Field Name | Number of bytes | Example | illustrate |
|-------------|-----------------|----------|--------------------------------------|
| Transaction | 2 Byte | 0x00.01 | Identification of Modbus |
| identifier | 2 Dyte | 0,000 01 | request/response transactions |
| Protocol | 2 Buto | 0×00.00 | 0x00 00: Modhus protocol |
| identifier | | 00000 | |
| Message | 2 Buto | 0,000.06 | The number of bytes of the following |
| length | 2 Dyte | 0,00,00 | data |
| Device | 1 Byto | 0x01 | Slove address identification |
| address | | | |



| Function code | 1 Byte | 0x01 | Read coil, use function code 0x01 |
|---------------|--------|----------|-----------------------------------|
| Start address | 2 Puto | | The address is detailed in the |
| Start address | 2 Dyle | | "Modbus Register Mapping" chapter |
| Number of | 2 Puto | 0,000.00 | Pood 9 poil states |
| coils | | 00000 | Read o con states |

2. Response

The data field indicates the value of the input state. A binary 1 corresponds to the on state and a 0 corresponds to the off state. The least significant bit (LSB) of the first data byte contains the first bit of the request, the others are in ascending order. If the response data is not a multiple of 8, the remaining bits of the last data byte will be padded with zeros (towards the upper bits of the byte).

| Field Name | Number of bytes | Example | illustrate | |
|---------------|--------------------|----------|--------------------------------------|--|
| Transaction | 2 Byto | 0x00.01 | Identification of Modbus | |
| identifier | 2 Dyte | 0,000 01 | request/response transactions | |
| Protocol | 2 Buto | 0,000.00 | 0x00 00: Madbus protocol | |
| identifier | z Dyte | 0,00,00 | | |
| Message | 2 Buto | 0x00 04 | The number of bytes of the following | |
| length | 2 Dyte | | data | |
| Device | 1 Byto | 0.01 | Slave address identification | |
| address | Т Буїе | 0.001 | | |
| Function code | 1 Byte | 0x01 | Read coil, use function code 0x01 | |
| Data bytes | 1 Byte | 0x01 | Number of bytes of data | |
| Data | 1 Byte | 0x89 | Response data | |

3. Abnormal

| Field Name | Number of bytes | Example | illustrate |
|---------------|-----------------|---------|-----------------------------|
| | | | |
| Function code | 1 Byte | 0x81 | Modbus function code + 0x80 |
| Abnormal code | 1 Byte | 0x01 | 0x01 or 0x02 |

4. Example

Read the status values of 8 coils from addresses 1000 to 1007.

request 0x00 01 00 00 00 06 01 01 03 E8 00 08

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------|-------|----------|-------|-------|--------|-----|---------|----------|---------|----|-------|-------|
| Data | 0 | 0 01 | 00 | 00 | 00 | 06 | 01 | 01 | 03 E8 | | 00 | 08 |
| illustr | Trar | nsactio | Proto | ocol | Messa | age | Device | Function | Initial | | Numb | er of |
| ate | n ide | entifier | ident | ifier | length | l | address | code | address | | coils | |

response

0x00 01 00 00 00 04 01 01 01 89

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------|-------------------------|--------|----------|----|---------|------|------------|----------|------------|------|
| Data | 00 | 01 | 00 | 00 | 00 | 04 | 01 | 01 | 01 | 89 |
| illustr | Tran | sactio | Protocol | | Message | | Device | Function | Data hutaa | Dete |
| ate | n identifier identifier | | length | | address | code | Data bytes | Data | | |

Status from 1007 to 1000 is displayed as byte value 0x89 or binary 1000 1001. Address 1007 is the most significant bit MSB of the byte, 1000 is the least significant bit LSB, the distribution from high to low is as follows:

| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|------------|-------|------|------|------|-------|------|------|-------|
| Address | 1007 | 1006 | 1005 | 1004 | 1003 | 1002 | 1001 | 1000 |
| Status | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| illustrate | close | open | open | open | close | open | open | close |

6.1.2.3 Function Code 0x05

This function will write a single coil status to the slave device.

| 1 | Request |
|---|----------|
| | ricquest |

| Field Name | Number of bytes | Example | illustrate | | | |
|-------------|-----------------|----------|--------------------------------------|--|--|--|
| Transaction | 2 Buto | 0x00.01 | Identification of Modbus | | | |
| identifier | 2 Dyte | 000001 | request/response transactions | | | |
| Protocol | 2 Bute | 0×00.00 | 0x00 00: Modbus protocol | | | |
| identifier | | 0,00,00 | | | | |
| Message | 2 Buto | 0,000.06 | The number of bytes of the following | | | |
| length | 2 Dyte | 00000 | data | | | |
| Device | 1 Buto | 0x01 | Slave address identification | | | |
| address | | | | | | |



| Function code | 1 Duto | 0×05 | To write a single coil, use function code |
|---------------|--------|---------|---|
| Function code | Т Буге | 0x05 | 0x05 |
| Register | 2 Puto | | The address is detailed in the |
| address | | 0X03 E0 | "Modbus Register Mapping" chapter |
| | | | This value is: 0xFF 00 or 0x00 00. 0xFF |
| Data input | 2 Byte | 0xFF 00 | 00 means write 1, 0x00 00 means write |
| | - | | 0. |

2. Response

| Field Name | Number of bytes | Example | illustrate | | | |
|---------------|-----------------|----------|--|--|--|--|
| Transaction | 2 Puto | 0x00.01 | Identification of Modbus | | | |
| identifier | 2 Dyte | 000001 | request/response transactions | | | |
| Protocol | 2 Duto | 0,000.00 | 0x00 00; Modbuo protocol | | | |
| identifier | | | | | | |
| Message | 2 Duto | 0,000.06 | The number of bytes of the following | | | |
| length | | 00000 | data | | | |
| Device | 1 Duto | 0,01 | Slave address identification | | | |
| address | ГБуце | | Slave address identification | | | |
| Function code | 1 Byte | 0x05 | To write a single coil, use function code 0x05 | | | |
| Data bytes | 2 Byte | 0x03 E8 | Write the register address of the coil | | | |
| | | | This value is: 0xFF 00 or 0x00 00. | | | |
| Data input | 2 Byte | 0xFF 00 | 0xFF 00 means write 1, 0x00 00 | | | |
| | | | means write 0. | | | |

3. Abnormal

| Field Name | Number of bytes | Example | illustrate |
|---------------|-----------------|---------|-----------------------------|
| | | | |
| Function code | 1 Byte | 0x85 | Modbus function code + 0x80 |
| Abnormal code | 1 Byte | 0x81 | 0x01 or 0x02 |

4. Example

Write the state value of the coil at address 1000 as 1, that is, the closed state.

request

0x00 01 00 00 00 06 01 05 03 E8 FF 00

|--|



| Data | 00 01 | 00 00 | 00 06 | 01 | 05 | 03 E8 | FF 00 | |
|---------|------------------------|------------|----------------|---------|----------|---------|-------------|--|
| illustr | tr Transactio Protocol | | Message Device | | Function | Coil | \A/rito "1" | |
| ate | n identifier | identifier | length | address | code | address | vvrite "1" | |

response

0x00 01 00 00 00 06 01 05 03 E8 FF 00

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|--------|---------|--------|----------|------------|---------|----|---------|----------|-------|----|-------|-----|
| Data | 00 | 01 | 00 | 00 00 | | 06 | 01 | 05 | 03 E8 | | FF 00 |) |
| illust | Trans | action | Protocol | | Message | | Device | Function | Coil | | Write | "1" |
| rate | identif | ier | identif | identifier | | l | address | code | addre | SS | | |

6.1.2.4 Function Code 0x0F

This function code is used to set multiple consecutive coils to open or close. The on/off state of the request is specified by the content of the request data field. A logical "1" requests the corresponding output to close, and a logical "0" requests it to open. The normal response returns the function code, the starting address and the number of coils executed.

1. Request

| Field Name | number of bytes | Example | illustrate |
|---------------|--------------------|---------|---|
| Transaction | 2 Byte | 0x00 01 | Identification of Modbus |
| identifier | | | request/response transactions |
| Protocol | 2 Byte | 0x00 00 | 0x00 00: Modbus protocol |
| identifier | | | |
| Message | 2 Byte | 0x00 08 | The number of bytes of the following |
| length | | | data |
| Device | 1 Byte | 0x01 | Slave address identification |
| address | | | |
| Function code | 1 Byte | 0x0F | Write multiple coils, use function code |
| | | | 0x0F |
| Start address | 2 Byte | 0x03 E8 | The address is detailed in the |
| | | | "Modbus Register Mapping" chapter |
| Number of | 2 Byte | 0x00 08 | |
| coils | | | |


| Data bytes | 1 Byte | 0x01 | |
|------------|--------|------|--|
| Data | 1 Byte | 0xFF | |

2. Response

| Field Name | number of bytes | Example | illustrate | | | | |
|---------------|--------------------|----------|---|--|--|--|--|
| Transaction | 2 Puto | 0,000.00 | Identification of Modbus | | | | |
| identifier | | 00000 | request/response transactions | | | | |
| Protocol | 2 Buto | 0×00.00 | 0x00 00: Madbus protocol | | | | |
| identifier | 2 Dyte | 0,00,00 | | | | | |
| Message | 2 Buto | 0×00.06 | The number of bytes of the following | | | | |
| length | 2 Dyte | 0,00,00 | data | | | | |
| Device | 1 Byte | 0v01 | Slave address identification | | | | |
| address | T Dyte | 0.01 | Slave address identification | | | | |
| Function code | 1 Byte | 0x0F | Write multiple coils, use function code | | | | |
| | | | 0x0F | | | | |
| Start address | 2 Byte | 0x03 E8 | | | | | |
| Number of | 2 Buto | 0,000.08 | | | | | |
| coils | | | | | | | |

3. Abnormal

| Field Name | number of bytes | Example | illustrate |
|---------------|--------------------|---------|-----------------------------|
| | | | |
| Function code | 1 Byte | 0x8F | Modbus function code + 0x80 |
| Abnormal code | 1 Byte | | 0x01 or 0x02 |

4. Example

Starting from address 1000, close all 8 coils, that is, write the value of 8 coils as 0xFF. request

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|--------|--------|--------|------|--------|---------|---|---------|----------|---------|----|----------|------|-------|-----|
| Data | 00 | 01 | 00 | 00 | 00 08 | | 01 | 0F | 03 E8 | | 00 08 | | 01 | FF |
| illust | Trans | actio | Prot | ocol | Message | | Device | Function | Start | | Num | nber | Data | Dat |
| rate | n iden | tifier | iden | tifier | length | | address | code | address | | of coils | | bytes | а |

0x00 01 00 00 00 08 01 0F 03 E8 00 08 01 FF

response



0x00 01 00 00 00 06 01 0F 03 E8 00 08

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------------|-------------------------|----|--------|---------|---------|--------|----------|-------|-------|------|-------|----|
| Data | 00 | 01 | 00 | 00 | 00 06 | | 01 | 0F | 03 E8 | | 00 | 08 |
| illustrate | Transactio Proto | | ocol | Message | | Device | Function | Start | | Numb | er of | |
| | n identifier identifier | | length | | address | code | addre | SS | coils | | | |

6.1.2.5 Function Code 0x04

This function code is used to read consecutive input registers in multiple remote devices. The request PDU specifies the address of the starting register and the number of registers. The register data in the response message is packed into two bytes per register, and the binary content within each byte is right-aligned.

| 1. | Request |
|----|---------|
|----|---------|

| Field Name | Number of bytes | Example | illustrate | | | | |
|---------------------------|--------------------------|---------|---|--|--|--|--|
| Transaction identifier | 2 Byte | 0x00 01 | Identification of Modbus | | | | |
| Protocol | 2 Byte | 0x00 00 | 0x00 00: Modbus protocol | | | | |
| Message length | 2 Byte | 0x00 06 | The number of bytes of the following data | | | | |
| Device address | 1 Byte | 0x01 | Slave address identification | | | | |
| Function code | 1 Byte | 0x04 | Read input register, use function code 0x04 | | | | |
| Start address | t address 2 Byte 0x0B B8 | | The address is detailed in the "Modbus Register Mapping" chapter | | | | |
| Number of registers | 2 Byte | 0x00 08 | | | | | |

2. Response

| Field Name | Number of | Example | illustrate | | | | |
|-------------|--|----------|--------------------------------------|--|--|--|--|
| | bytes | | | | | | |
| Transaction | 2 Buto | 0,000.00 | Identification of Modbus | | | | |
| identifier | | 0,00,00 | request/response transactions | | | | |
| Protocol | 2 Puto | 0.000.00 | 0x00 00: Modbus protocol | | | | |
| identifier | | | | | | | |
| Message | 2 Byte | 0x00 13 | The number of bytes of the following | | | | |
| 110 | Shenzhen Beilai Technology Co., Ltd V1.1 | | | | | | |



| length | | | data |
|----------------|---------|----------|--|
| Device | 1 Bvte | 0x01 | Slave address identification |
| address | 1 Dyto | 0,01 | |
| Eunction code | 1 Byte | 0×04 | Read input register, use function code |
| T UNCLION CODE | Т Буге | 0704 | 0x04 |
| Data bytes | 1 Byte | 0x10 | |
| | | 0x | |
| | | 3F 8E 38 | |
| | | 86 40 0E | |
| Data | 16 Byte | 38 86 40 | |
| | | 55 54 CA | |
| | | 40 8E 35 | |
| | | 3F | |

3. Abnormal

| Field Name | Number of bytes | Example | illustrate | | | |
|----------------------|-----------------|---------|-----------------------------|--|--|--|
| | | | | | | |
| Function code | 1 Byte | 0x84 | Modbus function code + 0x80 | | | |
| Abnormal code 1 Byte | | 0x01 | 0x01 or 0x02 | | | |

4. Example

Starting at address 3000, read the values of the 4 analog inputs. Since the BL200 controller node register map data type is 32Bit Float, that is, 1 analog input data = 2 registers = 4 bytes, 8 input registers need to be read.

request

0x00 01 00 00 00 06 01 04 0B B8 00 08

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------|------|---------|-------|--------|---------|---|---------|----------|---------|----|-------|--------|
| Data | 0 | 0 01 | 00 | 00 | 00 06 | | 01 | 04 | 0B B8 | | 00 | 08 |
| illustr | Tran | saction | Prote | ocol | Message | | Device | Function | Start | | Numl | per of |
| ate | iden | tifier | ident | tifier | lengtl | n | address | code | address | | regis | sters |

response

0x00 01 00 00 00 13 01 04 10 3F 9D 70 A4 40 15 C2 8F 40 5C CC CD 40 91 EB 85

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1025 |
|---------|-------|--------|--------|-----|---------|----|--------|----------|------------|------|
| Data | 00 | 01 | 00 | 00 | 00 | 13 | 01 | 04 | 10 | xxx |
| illustr | Trans | sactio | Protoc | col | Message | | Device | Function | Data bytes | Data |



| | | | | | | |
|-----|--------------|------------|--------|---------|------|------|
| ate | n identifier | identifier | length | address | code | |

The data part has a total of 16 bytes, which are converted into decimal as follows

| Byte | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|------------|------|--------|------|----|-----|-------|------|----|------|-------|------|----|-----|--------|------|----|
| Data | 3 | F 9D | 70 A | 4 | 4 | 0 15 | C2 8 | F | 40 |) 5C | CC C | D | 4 | 0 91 | EB 8 | 5 |
| Decimal | | 1. | 23 | | | 2.3 | 34 | | | 3. | 45 | | | 4. | 56 | |
| illustrate | Firs | t data | a | | Sec | ond o | data | | Thir | d dat | a | | Fou | rth da | ata | |

6.1.2.6 Function Code 0x03

This function code is used to read continuous holding registers in multiple remote devices. The request PDU specifies the address of the starting register and the number of registers. The register data in the response message is packed into two bytes per register, and the binary content within each byte is right-aligned.

1. Request

| Field Name | number of bytes | Example | illustrate |
|---------------|--------------------|---------|--------------------------------------|
| Transaction | 2 Bvte | 0x00 01 | Identification of Modbus |
| identifier | 2 2 9 10 | | request/response transactions |
| Protocol | 2 Byte | 0×00 00 | 0x00 00: Modbus protocol |
| identifier | 2 Dyte | | |
| Message | 2 Bute | 0×00.06 | The number of bytes of the following |
| length | 2 Dyte | | data |
| Device | 1 Puto | 0x01 | Slave address identification |
| address | I Dyte | | |
| Function code | 1 Byte | 0x03 | Read holding register, use function |
| | | | The address is detailed in the |
| Start address | 2 Byte | 0x0F A0 | "Modbus Register Manning" chapter |
| Niumah an af | | | |
| Number of | 2 Byte | 0x00 08 | Number of holding registers to read |
| registers | | | |

2. Response

| Field Name | Number of bytes | Example | illustrate |
|-------------|--------------------|----------|-------------------------------|
| Transaction | 2 Puto | 0,000.00 | Identification of Modbus |
| identifier | | | request/response transactions |



| Protocol | 2 Duto | 0,000.00 | avec on Madhua protocol |
|---------------|---------|----------|--------------------------------------|
| identifier | | | |
| Message | 2 Duto | 0,00 12 | The number of bytes of the following |
| length | | 000 13 | data |
| Device | 1 Duto | 0,01 | Slave address identification |
| address | ГВуше | | Slave address identification |
| Function code | 1 Byte | 0v03 | Read holding register, use function |
| | T Dyte | 0,00 | code 0x03 |
| Data bytes | 1 Byte | 0x10 | Data bytes |
| | | 0x | |
| | | 3F 9D 70 | |
| | | A4 40 15 | |
| Data | 16 Byte | C2 8F 40 | Response data |
| | | 5C CC CD | |
| | | 40 91 EB | |
| | | 85 | |

3. Abnormal

| Field Name | Number of bytes | Example | illustrate |
|---------------|-----------------|---------|-----------------------------|
| | | | |
| Function code | 1 Byte | 0x83 | Modbus function code + 0x80 |
| Abnormal code | 1 Byte | 0x01 | 0x01 or 0x02 |

4. Example

Starting at address 4000, read the values of the 4 analog outputs (belonging to the holding registers). Since the analog output I/O module register map data type is 32Bit Float, that is, 1 analog output data = 2 registers = 4 bytes, it is necessary to read 8 holding registers.

request

0x00 01 00 00 00 06 01 03 0F A0 00 08

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------|-------|---------|---------|-----|--------|-----|---------|----------|-------|-----|-------|--------|
| Data | 00 | 01 | 00 | 00 | 00 | 06 | 01 | 03 | 0F | A0 | 00 | 08 |
| illustr | Trans | sactio | Protoc | col | Mess | age | Device | Function | Start | | Num | per of |
| ate | n ide | ntifier | identif | ier | lengtl | n | address | code | addre | ess | regis | sters |

response

113



| 0x00 01 00 00 00 13 01 03 10 3F | 9D 70 A4 40 15 C2 8F | ⁻ 40 5C CC CD 40 91 EB 85 |
|---------------------------------|----------------------|--------------------------------------|
|---------------------------------|----------------------|--------------------------------------|

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1025 |
|---------|-------|---------|---------|-----|--------|-----|---------|----------|------------|------|
| Data | 00 | 01 | 00 | 00 | 00 | 13 | 01 | 03 | 10 | ххх |
| illustr | Trans | sactio | Protoc | col | Mess | age | Device | Function | Data hutaa | Dete |
| ate | n ide | ntifier | identif | ier | lengtl | n | address | code | Data bytes | Dala |

The data part has a total of 16 bytes, and the conversion to decimal is as follows:

| Byte | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
|------------|------|--------|------|----|-----|------|------|----|-----|-------|------|----|-----|--------|------|----|
| Data | 31 | F 9D | 70 A | 4 | 4 | 0 15 | C2 8 | ۶F | 40 | 5C | сс с | D | 4 | 0 91 | EB 8 | 85 |
| Decimal | | 1. | 23 | | | 2. | 34 | | | 3. | 45 | | | 4. | 56 | |
| illustrate | Firs | st dat | a | | Sec | cond | data | | Thi | rd da | ita | | Fοι | urth c | lata | |

6.1.2.7 Function Code 0x06

This function code is used to write to holding registers in a single remote device. The request PDU specifies the address of the starting register and the number of registers. The register data in the response message is packed into two bytes per register, and the binary content within each byte is right-aligned.

This function code is only suitable for reading the serial port I/O module register mapping data, the address range: 40000 ... 49999. The data type of the analog input/output I/O module is 32Bit Float format, the complete data cannot be read, and this function cannot be used.

1. Request

| Field Name | Number of bytes | Example | illustrate |
|----------------|--------------------|----------|--------------------------------------|
| Transaction | 2 Buto | 0,00 01 | Identification of Modbus |
| identifier | 2 Dyte | | request/response transactions |
| Protocol | 0 Duto | 0,000.00 | 0x00 00x Madhua protocol |
| identifier | Z Byle | | |
| Magage longth | 0 Duto | 0,00,06 | The number of bytes of the following |
| wessage length | Z Byle | 00000 | data |
| Device address | 1 Byte | 0x01 | Slave address identification |
| Eunction code | 1 Byte | 0x06 | Write a single holding register, use |
| | Т Буїе | 0,00 | function code 0x06 |
| Register | 2 Buto | 0x0C 40 | The address is detailed in the |
| address | | | "Modbus Register Mapping" chapter |



| 2 Byte 0x04 D2 |
|----------------|

2. Response

| Field Name | Number of bytes | Example | illustrate |
|----------------|--------------------|----------|--------------------------------------|
| Transaction | 2 Buto | 0,00,00 | Identification of Modbus |
| identifier | 2 Dyte | 0,00,00 | request/response transactions |
| Protocol | 2 Puto | 0,000.00 | 0x00 00: Madhua protocol |
| identifier | 2 Dyte | 00000 | |
| Mossage longth | 2 Buto | 0×00.06 | The number of bytes of the following |
| wessage length | 2 Dyte | 00000 | data |
| Device address | 1 Byte | 0x01 | Slave address identification |
| Function code | 1 Byte | 0x06 | Write a single holding register, use |
| | Т Вую | 0,00 | function code 0x06 |
| Register | 2 Byte | 0v75 30 | |
| address | | 0713 30 | |
| Data | 2 Byte | 0x04 D2 | |

3. Abnormal

| Field Name | Number of bytes | Example | illustrate |
|---------------|-----------------|---------|-----------------------------|
| | | | |
| Function code | 1 Byte | 0x86 | Modbus function code + 0x80 |
| Abnormal code | 1 Byte | 0x01 | 0x01 or 0x02 |

4. Example

Write the value of register address 40000 to 1234 (0x04 D2).

request

0x00 01 00 00 00 06 01 06 9C 40 04 D2

| Byte | 1 | 2 | 3 | 4 | 5 | 6 7 8 | | 8 | 9 | 10 | 11 | 12 |
|---------|-------|---------|--------|-------|--------|-------|---------|----------|--------|-----|------|----|
| Data | 00 | 01 | 00 | 00 | 00 06 | | 01 | 06 | 9C 40 | | 04 | D2 |
| illustr | Trans | sactio | Proto | col | Messa | age | Device | Function | Regist | ter | Dete | |
| ate | n ide | ntifier | identi | ifier | length | | address | code | addre | SS | Data | |

response



0x00 01 00 00 00 06 01 06 9C 40 04 D2

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 7 8 | | 10 | 11 | 12 |
|---------|------------------------|-----------------------|---------|--------|--------|----------|-------|-------|-------|------|----|----|
| Data | 00 | 01 | 00 | 00 | 00 | 00 06 01 | | 0F | 9C 40 | | 04 | D2 |
| illustr | tr Transactio Protocol | | Message | | Device | Function | Regis | ter | Dete | | | |
| ate | n ide | identifier identifier | | length | l | address | code | addre | SS | Data | | |

6.1.2.8 Function Code 0x10

This function code is used to write to consecutive holding registers in multiple remote devices. The request PDU specifies the address of the starting register and the number of registers. The register data in the response message is packed into two bytes per register, and the binary content within each byte is right-aligned.

| 1. F | Request |
|------|---------|
|------|---------|

| Field Name | Number of bytes | Example | illustrate |
|---------------|-----------------|----------|--|
| Transaction | 2 Byte | 0×00.01 | Identification of Modbus |
| identifier | | 0,00 01 | request/response transactions |
| Protocol | 2 Byte | 0x00.00 | 0x00.00: Modbus protocol |
| identifier | | 0,00,00 | |
| Message | 2 Byte | 0×00 17 | The number of bytes of the following |
| length | | 0,00 17 | data |
| Device | 1 Byte | 0x01 | Slave address identification |
| address | Т Буїе | 0.01 | |
| Function code | 1 Bvte | 0x10 | Write multiple holding registers, use |
| | , | | function code 0x10 |
| Start address | 2 Bvte | 0x0F A0 | The address is detailed in the "Modbus |
| | | | Register Mapping" chapter |
| Number of | 2 Byte | 0x00 08 | |
| registers | 2 0 9 10 | | |
| Data bytes | 1 Byte | 0x10 | |
| | | 0x | |
| | | 3F 9D 70 | |
| | | A4 40 15 | |
| Data | 16 Byte | C2 8F 40 | |
| | | 5C CC | |
| | | CD 40 91 | |
| | | EB 85 | |

2. Response



| Field Name | Number of bytes | Example | illustrate |
|---------------|-----------------|----------|---------------------------------------|
| Transaction | 2 Puto | 0,000.00 | Identification of Modbus |
| identifier | 2 Dyte | 0,00,00 | request/response transactions |
| Protocol | 2 Puto | 0,000.00 | 0x00 00: Madhua protocol |
| identifier | | | |
| Message | 2 Puto | 0,00 12 | The number of bytes of the following |
| length | | 000 13 | data |
| Device | 1 Buto | 0x01 | Slave address identification |
| address | ГБује | 0.001 | |
| Function code | 1 Byte | 0x10 | Write multiple holding registers, use |
| | ТЪую | | function code 0x10 |
| Start address | 2 Byte | 0x0F A0 | |
| Number of | 2 Buto | 0,000.08 | |
| registers | | | |

3. Abnormal

| Field Name | number of bytes | Example | illustrate |
|----------------------|--------------------|---------|-----------------------------|
| | | | |
| Function code | 1 Byte | 0x90 | Modbus function code + 0x80 |
| Abnormal code 1 Byte | | 0x01 | 0x01 or 0x02 |

4. Example

Starting at address 4000, write the values of the 4 analog outputs. Since the BL200 controller node register map data type is 32Bit Float, that is, 1 analog output data = 2 holding registers = 4 bytes, 8 holding registers need to be written.

request

0x00 01 00 00 00 17 01 10 0F A0 00 08 10 3F 9D 70 A4 40 15 C2 8F 40 5C CC CD 40 91 EB 85

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 1423 |
|----------------|---------------------|-----------------|------------------------|----------------|-----------------------|--------------|------------|---------------|--------------|-----------------------|----------------|---------------|---------------|------|
| Data | 00 | 01 | 00 | 00 | 00 17 | 0 | 1 | 10 | 0F | A0 | 00 (| 08 | 10 | ххх |
| illust rate | Tran ion iden | isact tifier | Prot ⁱ iden | ocol tifier | Messa ge length | Devi addr | ce ress | Function code | Star addı | t ⁻ ess | Numb regist | er of ters | Data bytes | Data |

The data part has a total of 16 bytes, and the conversion to decimal is as follows:



| Byte | 14 | | | | | | | | | | | | | | | |
|------------|------|-------|------|---|-----|------|------|---|------|------|------|---|-----|-------|------|---|
| Data | 3 | F 9D | 70 A | 4 | 4 | 0 15 | C2 8 | F | 40 |) 5C | CC C | D | 4 | 0 91 | EB 8 | 5 |
| Decimal | | 1.: | 23 | | | 2.3 | 34 | | | 3.4 | 45 | | | 4. | 56 | |
| illustrate | Firs | t dat | а | | Sec | ond | data | | Thir | d da | ta | | Fou | rth d | ata | |

response

0x00 01 00 00 00 06 01 10 0F A0 00 08

| Byte | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 7 8 | | 10 | 11 | 12 |
|--------|--------------------------|------|---------|---------|-------|--------|----------|-------|-------|------|--------|-------|
| Data | 00 | 01 | 00 | 00 | 00 06 | | 01 | 10 | 0F A0 | | 00 | 08 |
| illust | ust Transaction Protocol | | col | Message | | Device | Function | Start | | Numl | per of | |
| rate | identif | fier | identif | ier | lengt | h | address | code | addre | ess | regis | sters |

6.2 BL205 Communication Example

6.2.1 Communication Between UaExpert and BL205

The BL205 collects DI, DO, and AI modules, selects basic128rsa15 as a security policy, and selects a signature and encryption method. The data format is based on a custom information model. Take an information model as an example. The data can also be uploaded directly according to the format of our company. For the definition of each configuration, please refer to chapter 5.2.6 web page configuration.



6.2.2.1 OPC UA Web Page Configuration

| BL200UA Status - S | ystem - Settings - I/O Module | - Serial Module - | OPC UA - | Operation&Control - | Logout |
|---------------------------|-------------------------------|-------------------|----------|---------------------|---------------|
| OPC UA settings | 8 | | | | |
| OPC UA settings | | | | | |
| OPC UA Name | BL200 OPC UA Server | | | | |
| Port | 4840 |] | | | |
| Security Policy | Basic128Rsa15 | • | | | |
| Message Security Mode | Sign&Encrypt ~ | • | | | |
| Certificate | /etc/opcua/server_cert.der (9 | 88 B) | | | |
| Private key | /etc/opcua/server_key.der (1. | 19 KB) | | | |
| Allow Anonymous | | | | | |
| Username | BL200 |] | | | |
| Password | | * | | | |
| Data select | Information Model | · | | | |
| Model File(.xml) | /etc/opcua/do.xml (9.95 KB) | 1 | | | |
| Dependent model files | One model file | •] | | | |
| Dependent model 1st(.xml) | /etc/opcua/di.xml (9.77 KB) | 1 | | | |
| | | | | Save & Ap | DV Save Reset |
| | | | | Cave a Ap | |
| | | | | | |

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Steps:

(1) Fill in the OPC UA name, which can be customized to facilitate the OPC UA client to search and distinguish different OPC UA servers. For example: fill in "BL200 OPC UA Server".

(2) The port number of the OPC UA server, default: 4840.

(3) Security policy selection. For example, choose basic128rsa15.

(4) Message security mode selection. For example, choose Signing and Encryption.

(5) Upload the certificate and key, click "Select File" > click "Upload File" > select your certificate or key file, click Open > After it is displayed in the file name box, click Upload file > After uploading the file successfully The file you uploaded will be displayed in the box, click the certificate or key file you uploaded > then your certificate or key file will be displayed in the certificate or key item.

(6) Whether to allow anonymity, because of the use of signature and encryption methods, allow anonymity is not checked.

(7) Fill in the username and password. The client needs to fill in the username and password when connecting.



(8) Select the data, because the user-defined information model is used, so choose the "information model".

(9) Upload the information model file. The upload method is the same as uploading the certificate or key file. The uploaded file is an xml file.

(10) Depends on the model file, whether there is a reference model, and how many references are there.

(11) Dependent model: Upload the model you refer to. The upload method is the same as uploading the certificate or key file. The upload is an xml file.

(12) Click "Save and Apply".

6.2.2.2 Send and Receive Data Using UaExpert Client



Open UaExpert (OPC UA client) and enter the OPC UA server IP and port.

Click Search, click the searched OPC UA server, and click basic128rsa15 for Signature and Encryption.

| File View Server Document Set | tings Help | | |
|---|----------------------|--|--------------------------|
| | OX42 BXD | | |
| Project | # × Data Access View | | Attributes 0> |
| ✓ II Project I Servers ✓ II Documents ✓ Data Access View | # Server Node Id | Display Neme Value Dutatype ource Timestam erver Timestam Statuscode | Attribute Value |
| | | Cafiperian Res Revery Aband Edgest Filter: Get Pp Qual Call Reverse Windows Network > 20 Morsoft Finish Series > 20 Morsoft Network Visions Network | |
| | | Web Client Network Web Client Network Web Client Network | < > > |
| | | 🔷 « Double click to Add Reverse Discovery » | References Ø > |
| Address Space | e × | Gustom Discovery | G 🛫 🚠 🍄 Fornard 👻 C |
| | | Construct/10/2014/81.2534400 Construct/10/2014/81.2534400 Marketsubary Marketsubary Marketsubary Marketsubary Marketsubary Marketsubary Marketsubary Marketsubary Marketsubary | Reference Sarget Display |
| | | Paramates Brown | |
| | | Breach and B | < |
| Log 😫 🗐 | | U. Carel | 8) |

Shenzhen Beilai Technology Co., Ltd



Enter the set username and password

| frejest | đ× | Data Access View | | | O Astributes 8 × |
|---|-----|------------------------------------|--------------|--|-------------------------|
| Project Project Project Project Browners Bocuments Data Access View | er | Server Node Id | Display Name | Value Datatype ource Timestam erver Timestam Statuscode | G 🖉 🗞 🗎 🗙 Marbure Value |
| | | | | | < s |
| | | | | Entre uner conductinie 2 × | References # > |
| uldress Space | 8 × | | | | G w A & Forward - C |
| | | | | House ator the way reflectively for the example to the server "2000 CH therew" Formant 1000 Farmed 1000 There is a server of the | Reference Target Displa |

The collected data is as follows:

| Unified Automation UaExpert - The OPC | Unified Arch | itecture Client - Nev | vProject* | | | | | | | | | - | D X |
|--|--------------|--|---|--|---|---|--|--|---|--|--|---|-----|
| File View Server Document Settings | E Help | A D D | - | | | | | | | | | | |
| | × 4 | | -1 | | | | | | | • | | | |
| roject | e x | Data Access View | | | | | | | | V Attributes | | | 8 |
| Project Project Project BL200 OPC UA Server Duta Access View | | Server 1 8200 OPC LL 8200 OPC LL 800 OPC LL 8 | Node Id NS4Numeric. NS4Numeric. NS4Numeric. NS4Numeric. NS4Numeric. NS4Numeric. NS4Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. NS3Numeric. | Display Name 00-1000 00-1001 00-1001 00-1001 00-1003 00-100 00 | Value faise | Datatype Boclean Bocle | ource Timestar 1647:31.061 1647:31.067 1647:31.067 1647:31.071 1647:31.071 1647:31.071 1647:31.071 1647:31.071 1647:31.071 1647:34.755 1647:34.755 1647:34.755 1647:34.753 1657:34.753 1657:34.753 1657:34.753 1657:34.751 1657:34.751 | n erver Timestam 164731.061 164731.067 164731.067 164731.071 164731.071 164731.071 164731.071 164731.079 164734.079 164734.755 164734.755 164734.755 164734.755 164734.765 164734.765 164734.765 164734.765 164734.765 164734.765 | Saturcode Good Good | Y Ambute Model Attribute Nocked NanespaceIndex Identifier NockClass BrouseName DisplayName DisplayName DisplayName DisplayName UserRollePermissions UserRollePermissions UserRollePermissions Saccessbetrificions ' Value | Value ns=4j=6001 4 Numeric 0001 Variable 4, "DO-1000" **, "Resilono" 0 | | |
| | | | | | | | | | | References | | | Ð |
| dåress Space | đ× | | | | | | | | | 😏 🧹 🏯 🏶 Fervard 🔻 | | | (|
| | · ^ | | | | | | | | | Reference Target Di HasTypeDefini BaseData | yalışdır. WariadeType | | |
| 0g | | | | | | | | | | | | | 8 |
| ¥ 🖯 | | | | | | | | | | | | | |
| l'imestamp Source | Server | Message | | | | | | | | | | | |

The description item of the custom information model data point must be

REG+Modbus address, as shown in the description of the DO-1000 point in the figure above.

OPC UA client data delivery

Take the following data point DO-1000 as an example



| 0 5101.2,10100 | dule Type:DO,Module Nam | ne:M2082 | | | |
|----------------|-------------------------|----------|----------------|---|------------|
| Channels | Modbus Address | Value | PowerOn Status | | Open/Close |
| 1 | 1000 | Open | Open | • | Open/Close |
| 2 | 1001 | Open | Open | • | Open/Close |
| 3 | 1002 | Open | Open | • | Open/Close |
| 4 | 1003 | Open | Open | ~ | Open/Close |
| 5 | 1004 | Open | Open | ~ | Open/Close |
| 6 | 1005 | Open | Open | • | Open/Close |
| 7 | 1006 | Open | Open | • | Open/Close |
| 8 | 1007 | Open | Open | • | Open/Close |

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Click the value of the DO-1000 data point, it turned out to be false, there is no $\sqrt{}$ in the square, click once to put $\sqrt{}$, click the left mouse button in the blank space or press the [Enter] key on the keyboard.

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| File View Server Document Settin | ngs <u>H</u> elp | | | | | | | | | | | | |
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| Project | ē × | Data Access View | | | | | | | | O Attributes | | | 5 X |
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| | | 19 BL200 OPC U 20 BL200 OPC U | NS2[Numeric] NS2[Numeric] | AI-3004 AI-3006 | 0.00508751 0.00508751 | Float Float | 16:59:21.978 16:59:22.228 | 16:59:21.978 16:59:22.228 | Good Good | RolePermissions UserRolePermissions AccessRestrictions Value Beferences | Badattributeldinvalid (Xx80350000) BadAttributeldinvalid (Xx80350000) BadAttributeldinvalid (Xx80350000) | | e x |
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| Timestamp Source | Server | Message | | | | | | | | | | | |

The OPC UA client will send a message successfully. Because the server responds quickly, you can see that the value has changed to "true".

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| Project | đ× | Data Access View | | | | | | | | O Attributes | | 8 |
|--|-----|---|--------------|--------------------|------------------|--------------------|------------------------------|------------------------------|------------|------------------------|------------------------------------|---|
| Y 🎵 Project | | # Server | Node Id | Display Name | Value | Datatype | ource Timestan | n erver Timestam | Statuscode | 9 V N 0 | | ¢ |
| Servers BL200 OPC UA Server | | 1 BL200 OPC U 2 BL200 OPC U 2 BL200 OPC U | NS4 Numeric | DO-1000 | true | Boolean Boolean | 16:59:22.729 16:47:31.067 | 16:59:22.729 16:47:31.067 | Good | Attribute | Value | |
| ✓ | | 4 BL200 OPC U | NS4 Numeric | DO-1002 | false | Boolean | 16:47:31.070 | 16:47:31.070 | Good | V Nodeld | ns=4;1=6001 | |
| Data Access View | | 5 BL200 OPC U | NS4 Numeric | DO-1004 DO-1005 | false | Boolean | 16:47:31.071 | 16:47:31.071 | Good | ivamespaceindex | 4 | |
| | | 7 BL200 OPC U | NS4 Numeric | DO-1006 | false | Boolean | 16:47:31.079 | 16:47:31.079 | Good | identifier type | Numeric | |
| | | 9 BL200 OPC U | NS4 Numeric | DI 2000 | false | Boolean | 16:47:34.755 | 16:47:34.755 | Good | Identifier | No. dalate | |
| | | 10 BL200 OPC U | NS3 Numeric | DI 2001 | false | Boolean | 16:47:34.757 | 16:47:34.757 | Good | Nodeclass | vanable | _ |
| | | 12 BL200 OPC U | NS3 Numeric | DI 2003 | false | Boolean | 16:47:34.760 | 16:47:34.760 | Good | Browservame | 4, 00-1000 | |
| | | 13 BL200 OPC U | NS3 Numeric | DI 2004 | false | Boolean | 16:47:34.765 | 16:47:34.765 | Good | DisplayName | , -DO-1000- | |
| | | 15 BL200 OPC U | NS3Numeric | DI 2005 | false | Boolean | 16:47:34.769 | 16:47:34.769 | Good | Description | ", 'REG1000" | |
| | | 16 BL200 OPC U 17 BL200 OPC U | NS3Numeric | DI 2007 | false 7.89072 | Boolean | 16:47:34.770 | 16:47:34.770 | Good | WriteMask | 0 | |
| | | 18 BL200 OPC U | NS2 Numeric | AI-3002 | 0.010175 | Float | 17:00:04.731 | 17:00:04.731 | Good | UserWriteMask | 0 | |
| | | 19 BL200 OPC U 20 BL200 OPC U | NS2INumericI | AI-3004 AI-3006 | 0.010175 | Float | 17:00:04.981 | 17:00:04.981 17:00:05.231 | Good | RolePermissions | BadAttributeIdInvalid (0x80350000) | |
| | | | | | | | | | | UserRolePermissions | BadAttributeIdInvalid (0x80350000) | |
| | | | | | | | | | | AccessRestrictions | BadAttributeIdInvalid (0x80350000) | |
| | | | | | | | | | | ✓ Value | | |
| | | | | | | | | | | References | | 8 |
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Check the DO status in the web configuration of BL200. DO1 is also changed from the original open to close.

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|------------|----------------|----------------|-------------------|-------------------|-----------------------|-----------------|--------------|--------------------|
| IO Slot | Module Name | Module Type | Channel Number | Modbus Address | 24V Address- State | Soft Version | IO Status | Channel Status |
| 1 | M1081 | DI | 8 | 2000-2007 | 9001-Power Off | 5 | Normal | Channel State S |
| 2 | M2082 | DO | 8 | 1000-1007 | 9002-Power Off | 5 | Normal | Channel State |
| 3 | M3041 | AI | 4 | 3000-3006 | 9003-Power Off | 5 | Normal | Channel State |
| 4 | M4044 | AO | 4 | 4000-4006 | 9004-Power Off | 5 | Normal | Channel State |
| 5 | M6021 | COM | 2 | 0-0 | 9005-Power Off | 5 | Normal | Channel State |

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| O Slot:2,Mod | lule Type:DO,Module Nan | ne:M2082 | | | |
|--------------|-------------------------|----------|----------------|---|------------|
| Channels | Modbus Address | Value | PowerOn Status | | Open/Close |
| 1 | 1000 | Close | Open | ~ | Open/Close |
| 2 | 1001 | Open | Open | ~ | Open/Close |
| 3 | 1002 | Open | Open | • | Open/Close |
| 4 | 1003 | Open | Open | • | Open/Close |
| 5 | 1004 | Open | Open | ~ | Open/Close |
| 6 | 1005 | Open | Open | * | Open/Close |
| 7 | 1006 | Open | Open | ~ | Open/Close |
| 8 | 1007 | Open | Open | ~ | Open/Close |

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6.3 BL206 Communication Example

6.4 BL206Pro Communication Example

6.5 BL201 Communication Example

6.5.1 Siemens S7-200SMART and BL201

1. Prepare IO modules: Coupler BL201, digital output module M2082, digital input M1081, analog input module M3401, analog output M4043. Module assembly and wiring refer to 3 Installation, 4 Device connection.

2. BL201, S7-200SMART, and PC need the same LAN. Power on BL201 and S7-200SMART, and open Siemens STEP 7-MicroWIN SMART software. Click GSDML management, in the pop-up window, click Browse to find the GSD file of BL201 and click Open, click Open to complete the installation of the GSD file.



| File Edit View PLC | Project - STEP 7-M | liero/MIN SMART | - □ × |
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3. Click Tools, click Find PROFINET Devices, click Find Devices, find BL201, and the name of the BL201 coupler is bl200pns. (The found coupler name must be consistent with this name during configuration.)

| | _ | Project1 - STEP 7-Micro/WIN SMART | - D X |
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| Row 1, Col 1 | INS Not connected | | |

4. Click Tools, click PROFINET. Select the controller and click Next.



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| Internet Int | NOPER Configuration Ward X Image: | 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
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5. Find BL201 in the hardware catalog, click Add, add it to the device list, modify the name of the coupler to bl200pns (communication key parameters), and assign the IP address of 192.168.5.10 to the coupler. The IP address assigned to the coupler must be in the same LAN as the IP address of the PLC. You can also modify the IP address of the PLC on this interface. After the modification is complete, click Next.

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| Image: Comparison of the | LCOTpre | Proprierto 0 0 Bio El sela El socio Syntem El socio Syntem El socio Syntem |
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| transfer labet transfer labe | 1 B.2009/v/1.0.2 920.568.5.120 | Cottow 12,35 desket 3.25 desket 3.25 desket 3.25 desket Scote 4.2,35 desket 4.20091 3.25 desket 3.25 desket Finnware version V4.2.0.0 V V V V V |
| < | <revious next=""> Generate Canod</revious> | |

6. Configure the IO module connected with the BL201. Click Generate. Add modules in the order of the IO modules hung behind the BL201. Power supply modules, extended power supply modules, and terminal modules do not need to be configured and do not participate in the sorting.



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M2082 corresponds to address QW128, M1081 corresponds to address IW128, M3401 corresponds to address IW129-IW136, and M4043 corresponds to address QW129-QW136.

7. Click PLC, click Download, search for PLC in the pop-up window, and click OK. click to download.

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| 🔽 Data Block | Prompt on STOP to RUN |
| V System Block | Close dialog on success |
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After the download is successful, open the status chart and monitor the channel value of the IO module.

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| E Shift/Rotate | 2 0V/123 Umigned 85555 M4043第十路 | |
| E III Table | 941/252C4/041VI 0 88/261/0 8 | |
| B- PROFINET | | |
| E- Libraries E- Call Subroutines | | |
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| | Write Lands Status Chart | |
| Row 7, Col 4 | INS Connected 192:163.5.16 RUN | 100% 🕤 — 🛡 💮 |

Refer to 5.5.4 Process Data Definition. When the range is 4-20mA, the theoretical value input of AI first channel IW129 is: 22958/65535*16+4=9.60507 mA. When the range is 0-5V, the output of the first AO QW129 is: 65535/65535*5=5V.

6.5.2 Siemens S7-1200 and BL201

1. Prepare IO modules: Coupler BL201, digital output module M2082, digital input M1081, analog input module M3401, analog output M4043. Module assembly and wiring refer to 3 Installation, 4 Device connection.



2. BL201, S7-1200, and PC need to be in the same LAN. Power on BL201 and S7-1200, open Siemens TIA V17 software, and create a new project "BL200PN".

| 75 Siemens | | | | | E # X |
|----------------------|---------------------------|------------------------|------------------------------------|--|---|
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| Orsten b | Open existing project | Project name: Path: | BL200PN G:何远强工作文件/BL200/BL200PN | | |
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| Project view | _ | | | | |

3. Click Devices and Network, click Add New Device, select the controller, select the corresponding CPU of S7-1200, and click Add.

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4. Click "Options" - "Manage General Station Description File GSD", in the pop-up interface, click "Source Path", search for the target folder where the GSD file is stored in the source path, select the file, click "OK", and select the GSD file , click Install, after the installation is complete, the hardware catalog will be updated automatically.



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5. Double-click "Device and Network", in the right directory of the network view, find the product model of the GSD file installed above, the path is as shown in the figure (Other field devices->PROFINETIO->I/O->Beilai- >BL200 IO System->BL200PN), drag or double-click BL200PN to "Network View".

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6. In "Network View", click "Unassigned (blue font)" on the BL200PN coupler and select "PLC_1.PROFINET interface_1".



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| BL201PN > Devices & networks | | |
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| PLC_1 CPU 1214C | bl200pns BL201 PLC_1 | |

7. Double-click the coupler icon to enter the "Device View", add an extended IO module in the "Device Overview", find the corresponding IO module under the right directory - module, double-click the icon, the order of the modules should be in accordance with the order of the IO modules hung behind the BL200PN, the power module , extended power supply module, and terminal module do not need to be configured, and do not participate in the sorting.

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| Ponel view | a bizoupis | | 🔜 🗹 Project BL | 201HV opened. |

8. Click the network port of the coupler, click Properties, select the Ethernet address, and modify the Ethernet parameters of the coupler. The IP address must be in the same network segment as the S7-1200, and the PROFINET device name of the coupler is "bl200pns".

Note: Remove the " $\sqrt{}$ " in front of "Generate PROFINET device name automatically ".

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| | Set IP address in the project | • 📺 Sensors |
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| Portal view E Overview | 🚠 Devices & ne | ™ opened. |

The default name of the BL200PN coupler is "bl200pns". If it is not filled with this name, click on the coupler and right-click to select the assigned name.





Click the drop-down menu behind "PROFINET device name", select the name of the device that has been allocated before, select "PN/IE" for "PG/PC interface type"; select your own network device for "PG/PC interface"; click " Update the list" and wait for the prompt "Search is complete. Select BL200PN coupler, click "Assign Device Name" below to complete the assignment of the coupler name, and click "Close" to close the page.



| | | Configured PROF | FINET devi | ice | | |
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| | Accessible device IP address 92.168.1.220 | es in the network: MAC address 00-02-A7-2E-74-CD | Device BL200PNS | PROFINET device name bl200pns | Status OK | |
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9. In the network view, select the S7-1200 PLC network port, click Properties, select the Ethernet address, and set the network port parameters.



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10. The hardware configuration is completed, save, compile, and download. Click"Go Online". At the same time, a new monitoring table can be added, and the on-siteIO value can be monitored online on the monitoring table.

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Refer to 5.5.4 Process Data Definition. When the range is 4-20mA, the theoretical value input of AI fourth channel IW74 is: 23333/65535*16+4=9.69662 mA. When the range is 0-5V, the first QW64 output of AO is: 65535/65535*5=5V.

6.6 BL203 Communication Example

6.7 BL202 Communication Example

6.7.1 TwinCAT 3 and BL202

1. Prepare IO modules: Coupler BL202, digital output module M2082, digital input M1081, analog input module M3401, analog output M4043. Module assembly and wiring refer to 3 Installation, 4 Device connection.

Connect the network port ETH1 of the BL202 to the network port of the PC. Do not connect the network port of the BL202 wrongly, and power on the BL202 coupler.
 Import the XML file

Copy the XML file (BL200EC-v1.01.xml) to: ...:\TwinCAT\3.1\Config\lo\EtherCAT, and load the XML to TwinCAT as shown in the figure below. Note: When the XML file in this folder is updated, you must re-click to download the device description file.



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4. Open the TwinCAT XAE software, click [FILE] -> [New] -> [Project] in turn, and the interface as shown in the figure below will pop up.





Select [TwinCAT Projects] as shown in the interface and select [TwinCAT XAE Project] in the middle of the interface, and keep the default (name, location, solution name can be modified according to needs), and click the [OK] button.

5. Scanning device

Click [I/O]->[Device]->[Scan], and click on the pop-up interface: OK—OK—Yes—Yes.



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| HINT: Not all types | s of devices can be found | automatically |
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Check the "Local Area Connection" network card

|]Device 2 (EtherCAT Automation Protocol) [????* 12 (Microsoft Wi-Fi Direct Virtu]Device 4 (EtherCAT) [2?? (Bealtek PCIe GhE Family Controller)] | ual Ac OK |
|---|------------|
| Device 1 (RT-Ethernet Protocol) [WLAN 2 (802.11ac Wireless LAN Card)] | Cancel |
| | Select All |
| | Unselect A |
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| TcXaeShell × | TcXaeShell X |
|-------------------------|-------------------|
| ? Scan for boxes | Activate Free Run |
| 是(Y) 否(N) | 是(Y) 否(N) |

Scan to the Box1 (BL202) coupler, and the module information connected to the coupler is below Box1.

| TwinCAT Project1 - TcXaeShell | | | V 🔗 Quick Launch (Ctrl+Q) | × 🗆 – ۹ |
|---|--|------------|----------------------------------|-------------------------|
| <u>File Edit View Project Build Debug</u> TwinCAT Twi | nSAFE PLC Tea <u>m</u> Scope <u>I</u> ools <u>W</u> indow <u>H</u> elp | | | |
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| Solution Explorer + 4 × | Error List Properties + X | | | |
| 00000.000 | Box 1 (BL200EC) BL200EC(Modules/Slots) | | | - |
| Search Solution Explorer (Ctrl+;) | | | | |
| Solution 'TwinCAT Project1' (1 project) | B Misc | | | |
| A TwinCAT Project1 | (Name) | Box 1 (BL2 | 200EC) | |
| 4 🦉 SYSTEM | Disabled | Enabled | | |
| License | ItemType | 5 | | |
| 🔺 🥚 Real-Time | PathName | TIID^Devi | ice 4 (EtherCAT)^Box 1 (BL200EC) | |
| 📑 I/O Idle Task | Persistent | | | |
| 🛅 Tasks | Save in own File | False | | |
| ilis Routes | | | | |
| 🔚 Type System | | | | |
| TcCOM Objects | | | | |
| MOTION | | | | |
| PLC . | | | | |
| 3 SAFETY | | | | |
| 6 C++ | | | | |
| ANALYTICS | | | | |
| 🔺 🛃 I/O | | | | |
| ⁴ ¹ Devices | | | | |
| Device 4 (EtherCAT) | | | | |
| 1 Image | | | | |
| 1 Image-Info | | | | |
| SvncUnits | | | | |
| Inputs | | | | |
| Outputs | | | | |
| InfoData | | | | |
| Box 1 (BL200EC) | | | | |
| Module 1 (M2082-8DO) | | | | |
| Module 2 (M1081-8DI) | | | | |
| Module 3 (M3041-44)) | | | | |
| Module 4 (M4043-44O) | | | | |
| WcState | | | | |
| InfoData | | | | |
| 2. Mappings | | | | |
| | | | | |
| | | | | |
| | Misc | | | |
| | | | | |
| | | | | |
| Ready | | | 🗖 🕈 Ad | d to Source Control 🔶 🔡 |

6. Data interaction

Check whether the BL202 coupler is in the OP state



| WinCAT Project1 - TcXaeShell | AFE DIC Team | - Crana Taola MG | adam - Hala | | | | | √ P Quick Launch (Ctrl+Q) | ρ - | • × |
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| | ease • Twinc | ATKT (X04) • • | Attach * | | | | | | | |
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| Solution Explorer 🔹 म 🗙 | TwinCAT Project1 | + × Error List | Properties | | | | | | <u> </u> | - |
| ○ ○ ☆ # - "o - @ ⊁ - | General Ether | CAT DC Process Dat | ta Pic Slots | Startup Co | E - Online | Online | • | | | ^ |
| Search Solution Explorer (Ctrl+;) | | | | | | _ | | | | |
| g. Solution 'TwinCAT Project1' (1 project) | State Machin | ne | | | | | | | | |
| TwinCAT Project1 | Init | Bootstrap | | | | | | | | |
| A SYSTEM | | 01.0 | Current State: | OP | | | | | | |
| | Pre-Op | Sate-Op | Requested Sta | e: OP | | | | | | |
| Real-Time | Op | Clear Error | | | | | | | | |
| Tasks | | | 1 | | | | | | | |
| ala Routes | | | | | | | | | | |
| Type System | DLL Status | | - | | | | | | | |
| TcCOM Objects | Port A: | Carrier / Open | | | | | | | | |
| MOTION | Dout R | No Carrier / Clored | 1 | | | | | | | |
| PLC . | Port D. | No currer y closed | | | | | | | | |
| SAFETY SAFETY | Port C: | No Carrier / Closed | | | | | | | | |
| C++ | Reat Dr. | No Carrier / Clored | | | | | | | | |
| ANALYTICS | Port D: | No carrier / closed | | | | | | | | |
| 4 ^{eg} Devices | | | | | | | | | | |
| ✓ ➡ Device 4 (EtherCAT) | File Access o | over EtherCAT | | | | | | | | |
| 🚼 Image | Download | d Upload | | | | | | | | |
| 📲 Image-Info | | | | | | | | | | ~ |
| SyncUnits | Name | Online | Type Size | bb≰ | In/Out | User | Linked to | 1 | | ^ |
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| Outputs | Channel 7 | 0 | PIT 0.1 | 20.1 | Input | 0 | | | | |
| P IntoData | Channel 2 | 0 | BIT 0.1 | 20.2 | Input | 0 | | | | |
| Module 1 (M2082-8DO) | Channel 4 | 0 | BIT 0.1 | 30.3 | Input | 0 | | | | |
| Module 2 (M1081-8DI) | Channel 5 | 0 | BIT 0.1 | 20.4 | Input | 0 | | | | |
| Module 3 (M3041-4AI) | Channel 6 | 0 | BIT 0.1 | 39.5 | Input | 0 | | | | |
| Module 4 (M4043-4AO) | Channel 7 | 0 | BIT 0.1 | 39.6 | Input | 0 | | | | |
| WcState | Channel 8 | 0 | BIT 01 | 30.7 | Input | 0 | | | | |
| InfoData | Channel 1 | 0 | INT 20 | 40.0 | Input | 0 | | | | |
| Mappings | 2 Channel 2 | 0 | INT 2.0 | 42.0 | Input | 0 | | | | |
| | Thannel 3 | 0 | INT 2.0 | 44.0 | Input | 0 | | | | |
| | 2 Channel 4 | 0 | INT 2.0 | 46.0 | Input | 0 | | | | |
| | 2 WcState | 0 | BIT 0.1 | 1522.1 | Input | 0 | | | | |
| | 💌 InnutTogale | 0 | BIT 0.1 | 1524.1 | Innut | 0 | | | | ~ |
| Ready | | | | | | | | Add | to Source Conte | rol 🔺 💡 |

Digital output and analog output

Take M2082 as an example: To make channel 1 of the module output, click "Write" in the "Online" window corresponding to the module "Output[1]", and enter the value "1" in the "Dec" column of the dialog box And click "OK", you can see that the channel indicator light corresponding to the module is on, and the software interface can display the written value at the same time. Similarly, the operation method of the analog AO output M4043 module is the same,

| TwinCAT Project1 - TcXaeShell | | 🗸 🎝 Quick Launch (Ctrl+Q) 🛛 🖌 🗖 🗙 |
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| SyncUnits | | |
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| Outputs | | |
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| Box 1 (BL200EC) | Bit Size: | |
| Module 1 (M2082-8DO) | | |
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| 🖙 Channel 4 | | |
| Channel 5 | | |
| Channel 6 | | |
| Channel 7 | | |
| Module 2 (M1081-8DI) | | |
| Module 2 (M1081-801) Module 3 (M3041-4AI) | | |
| Module 4 (M4043-4AO) | | |
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Digital and analog inputs

Take the M1081 module as an example: If the module has a signal input, it can be monitored in the "Inputs" of the module. Similarly, the viewing method of the analog AI input M3041 module is the same, as shown in the figure below:

| TwinCAT Project1 - TcXaeShell File Edit View Project Build Debug TwinCAT Twin | SAFE PLC Team Sco | pe <u>T</u> ools | <u>W</u> indow <u>H</u> elp | | | | | | ₽ = □ > |
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| Search Solution Explorer (Ctrl+;) | Channel 1 | 1 | BIT | 0.1 | 39.0 | Input | | | |
| TrcOM Objects | 🕫 Channel 2 | 0 | BIT | 0.1 | 39.1 | Input | | | |
| MOTION | 🐔 Channel 3 | 0 | BIT | 0.1 | 39.2 | Input | | | |
| PLC | 🕫 Channel 4 | 0 | BIT | 0.1 | 39.3 | Input | | | |
| 2 SAFETY | 🕫 Channel 5 | 0 | BIT | 0.1 | 39.4 | Input | | | |
| 6 C++ | 😴 Channel 6 | 0 | BIT | 0.1 | 39.5 | Input | | | |
| ANALYTICS | 🔊 Channel 7 | 0 | BIT | 0.1 | 39.6 | Input | | | |
| 🔺 🚾 I/O | 😴 Channel 8 | 0 | BIT | 0.1 | 39.7 | Input | | | |
| ⁴¹¹¹² Devices | | | | | | | | | |
| Device 4 (EtherCAT) | | | | | | | | | |
| image 1 | | | | | | | | | |
| image-Info | | | | | | | | | |
| SyncUnits | | | | | | | | | |
| Inputs | | | | | | | | | |
| Outputs | | | | | | | | | |
| InfoData | | | | | | | | | |
| Box 1 (BL200EC) | | | | | | | | | |
| Module 1 (M2082-8DO) | | | | | | | | | |
| Outputs | | | | | | | | | |
| Channel 1 | | | | | | | | | |
| Channel 2 | | | | | | | | | |
| Channel 3 | | | | | | | | | |
| Channel 4 | | | | | | | | | |
| Channel 5 | | | | | | | | | |
| Channel 6 | | | | | | | | | |
| Channel 7 | | | | | | | | | |
| Channel 8 | | | | | | | | | |
| Module 2 (M1081-8DI) | | | | | | | | | |
| Channel 1 | | | | | | | | | |
| Channel 2 | | | | | | | | | |
| ✓ Channel 3 | | | | | | | | | |
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| 🕫 Channel 5 | Command Window | | | | | | | | - 4 X |
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| Channel 7 | | | | | | | | | |
| 🔊 Channel 8 | | | | | | | | | |
| Module 3 (M3041-4AI) | | | | | | | | | > |
| C Peady | | | | | | | 128 | A 44 | In Course Control 4 |



| TwinCAT Project1 - TcXaeShell File Edit View Project Build Debug | TwinCAT TwinS | AFE PLC Team | Scope Tools | Window Help | | | | | V P Quick Launch (Ctrl+0 | <mark>م (</mark> | □ × |
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| Solution Explorer | * # × | TwinCAT Project1 | 👳 🗙 Error List | Properties | | | | | | | - |
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| Search Solution Explorer (Ctrl+;) | .م | 🐔 Channel 1 | 18165 | INT | 2.0 40. | 0 Input | | | | | |
| 4 Box 1 (BI 200EC) | | 🕫 Channel 2 | 0 | INT | 2.0 42. | 0 Input | | | | | |
| Module 1 (M2082-8DO) | | 🕫 Channel 3 | 0 | INT | 2.0 44. | 0 Input | | | | | |
| 🔺 🔚 Outputs | | 📌 Channel 4 | 0 | INT | 2.0 46. | 0 Input | | | | | |
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| Widdule 3 (M3041-441) | | | | | | | | | | | |
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| Channel 2 | | | | | | | | | | | |
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| 2 Channel 4 | | | | | | | | | | | |
| Module 4 (M4043-4AO) | | | | | | | | | | | |
| Outputs | | | | | | | | | | | |
| Channel 1 | | | | | | | | | | | |
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6.7.2 Omron NX1P2 and BL202

1. Port1 of Omron NX1P2 is connected to the network port of the computer, and Port2 is connected to the ETH1 network port of BL202. Omron NX1P2 and BL202 powered up.

2. Open the Sysmac Studio software, create a new project, select NX1P2-9024DT, and click Create.

| 📓 Sysmac Studio (32bit) | | | | i. | - 5 | x i |
|------------------------------------|--------------|------------------|--------|----|-----|-----|
| | _ | | _ | | - | _ |
| 0.481 | | | | | | |
| May Project | 🛅 Project Pr | operties | | | | |
| Open Project | Project name | BL200EC | | | | |
| e Import | Author | Admin | | | | |
| °≧ Export | Comment | | | | | |
| Online | | | | | | |
| 4 <u>C</u> onnect to Device | Туре | Standard Project | | | | |
| Version Control | - | | | | | |
| 🙌 Version Control Explorer | Select I | Device | | | | |
| License | Category | Controller | | | | |
| 🖿 License | Device | NX1P2 • 9024DT | | | | |
| | version | 1.40 | | | | |
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3. Click Configuration and Setup - Controller Setup - Built-in EtherNet/IP Port Setup to 144 Shenzhen Beilai Technology Co., Ltd V1.1


view the fixed IP address.

| BL200EC - new Controller 0 - Sysmac Studio (32bit) | - 🗆 X |
|---|---|
| Eile Edit View Insert Project Controller Simulation Tools Window Help | |
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4. Set the computer IP and PLC in the same network segment.

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| Bluetooth 网络连接 | ♀ Eigenschappen van 本地连接 🛛 🕄 | Eigenschappen van Internet Protocol versie 4 (TCP/IPv4) |
| Bluetooth 设备(个人区域网) | Netwerken Delen | Algemeen |
| ▶ ★ 批连接 | Verbinding maken via: | IP-instellingen kunnen automatisch worden toegewezen als het netwerk |
| 未识别的网络 Realtek PCIe GBE Family Controller | Reatek PCIe GBE Family Controller | deze mogelijkheid ondersteunt. Als dit niet het geval is, dient u de netwerkbeheerder naar de geschikte IP-instellingen te vragen. |
| | Configureren | 🔿 Automatisch een IP-adres laten toewijzen |
| | Deze Verbinding neer de volgende onderdelen nodig. | Het volgende IP-adres gebruiken: |
| | | IP-adres: 192 . 168 . 250 . 168 |
| | TwinCAT Ethernet Protocol for All Network Adapters | Subnetmasker: 255.255.0 |
| | Internet Protocol versie 6 (TCP/IPv6) | |
| | Internet Protocol versie 4 (TCP/IPv4) | Standaardgateway: 192.168.250.1 |
| | Link-Layer Topology Discovery Responder | Automatisch een DNS-serveradres laten toewiizen |
| | * Þ | De volgende DNS-serveradressen gebruiken: |
| | Installeren Verwijderen Eigenschappen | Voorkeurs-DNS-server: 192 , 168 , 250 , 1 |
| | Beschriiving | |
| | Transmission Control Protocol/Internet Protocol. Het | Alternatieve Divs-server: |
| | standaardprotocol voor WAN-netwerken dat communicatie mogelijk maakt met andersoortige, onderling met elkaar verbonden netwerken. | Instellingen tijdens afsluiten valideren Geavanceerd |
| | OK Annuleren | OK Annuler |

5. Double-click EtherCAT, right-click on the main device on the right side to display the ESI library, click the installation file in the pop-up window, find the BL200EC-ESI XML file, click Open, click Continue to install the XML file, and the installation is complete. You can see the newly installed BL202 at the bottom of the ESI library.











| ESI Library | 83 8 | \times |
|---|-----------------|----------|
| ESI Library Omron R88D-1SN011-ECT Omron R88D-1SN02H-ECT Omron R88D-1SN02H-ECT-02 Omron R88D-1SN02H-ECT-02 Omron R88D-1SN04H-ECT Omron R88D-1SN04H-ECT Omron R88D-1SN04H-ECT Omron R88D-1SN04H-ECT Omron R88D-1SN04H-ECT Omron R88D-1SN04H-ECT Omron R88D-1SN08H-ECT Omron R88D-1SN08H-ECT-02 Omron R88D-1SN08H-ECT Omron R88D-1SN10F-ECT Omron R88D-1SN10F-ECT Omron R88D-1SN10F-ECT Omron R88D-1SN150F-ECT Omron R88D-1SN150F-ECT Omron R88D-1SN150F-ECT Omron R88D-1SN15F-ECT Omron R88D-1SN15F-ECT Omron R88D-1SN15F-ECT Omron R88D-1SN20F-ECT Omron R88D-1SN30F-ECT Omron R88D-1SN55H-ECT | | × |
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6. Click Controller—Online, or click the shortcut icon

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| | Change Device | | | | |
| Multiview Explorer 🚽 📮 | Online | Ctrl+W | | • | Toolbox 👻 🖡 |
| new_Controller_0 🔻 | Offline | Ctrl+Shift+W | | | All vendors 🗸 🔻 |
| Configurations and Satur | Synchronize | Ctrl+M | | Item name Value | All groups |
| EtherCAT | Transfer | • | Device na | ame Master | Terminal Coupler |
| V 🗈 CPU/Expansion Racks | Mode | • | Product n | name Master | Servo Drives |
| L === CPU Rack | Monitor | | Number | of Slaves 0 | Digital IO |
| ₩ I/O Map | Stop Monitoring | | PDC Car PDO Corr | nmunications Cycl 2000 us nmunications Cycl us | Analog IO |
| Controller Setup | Set/Reset | | Transmiss | sion Delay Time | Massurament Concor |
| L III Operation Settings | Forced Refreshing | + | Pafaranz | Edit Settings | Input Keyword |
| L Built-in I/O Settings | MC Test Run | | Total Cab | ble Length 1000 m | Show all versions |
| L E Option Board Setting | MC Monitor Table | | Fail-soft | Operation Setting Fail-soft operation | NX-ECC201 Rev:1.2 |
| L ## Memory Settings | CNC Coordinate System Monitor Table | | PDO com | nmunications time 2 times | NX-ECC202 Rev:1.2 |
| ► ⊕ Motion Control Setup | SD Memory Card | | Revision | Check Method Setting <= Actual device 🔻 | NX-ECC202 EtherCAT coupl |
| Cam Data Settings | Controller Clock | | Serial Nu | Imber Check Meth No check | NX-ECC203 EtherCAT coupl |
| Event Settings | Release Access Right | | | | R88D-15AN02H-ECT Rev: |
| Task Settings | Update CPU Unit Name | | | | R88D-1SAN04H-ECT Rev: |
| Programming | Security | • | - Device r | name | R88D-1SAN04H-ECT 200V/ |
| V 🛛 POUs | Clear All Memory | | Set a na | ame for the master. | R88D-1SAN08H-ECT 200V/ |
| ▼ III Programs | Reset Controller | | | | R88D-1SAN10F-ECT Rev-1 |
| ▼ 💀 Program0 | | | · | | R88D-1SAN10H-ECT Rev: |
| L @ SectionU | -11 | | | | B R88D-1SAN10H-ECT 200V/ |
| L S Function Blocks | | | | ÷ i × | R88D-1SAN15F-ECT 400V/1 |
| ► III Data | Description | Program | Location I | | R88D-1SAN15H-ECT Rev. |
| ► En Tasks | | | | | R88D-15AN20F-ECT Rev1 |
| | | | | | Model name : NX-ECC2 |
| | | | | | Product name : NX-ECO Revision : 1.2 |
| | | | | | Vendor : OMRON Corp |
| < | | | | | URL : Open on a brows |
| 🛐 Filter 🗹 📀 | utput Build | | | | |
| | | | | | |

7. Write BL202 node address. After writing successfully, BL202 needs to be powered off and restarted.



| Slave Node Address Writing | <u>199</u> | | × |
|---|-------------|------------|------|
| Present value/Set value/Actual network configuration | | | ļ |
| Master | | | |
| BL200EC Rev:0x00010000 | | | |
| | | | |
| | | | |
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| | | | |
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| | | | |
| | | | |
| | | | |
| Update With Latest Actual N | etwork C | onfigura | tion |
| Node addresses are set for slaves. When any value other than 0 is set to a slave whose node address can be set from hardware, the setting has pri the addresses set here are annicable. | ority. In c | other case | es, |
| | Write | e Cai | ncel |

8. Double-click EtherCAT, right-click the master device, and click Compare and Merge with Physical Network Configuration.

| 📓 BL200EC - new_Controller_0 - Sysmac Studio (32bit) | | | | | | | | |
|---|---|---|---|--|--|--|--|--|
| File Edit View Insert Project Controller Simulation Tools | Window Help | | | | | | | |
| | A 🛛 🗷 🗛 🗛 🖗 🖡 🖕 O 👷 🗗 🔍 | | | | | | | |
| Multiview Explorer ■ Image: Controller_Git ■ Image: Controler | Ciri Copy Paste Delite Heado Expand All Collapse All Collapse All Collapse and Merge with Actual Network Configuration Gest New Settings and Intern New Slave Export Sine Settings Write Slave Note Address Compare and Merge with Actual Network Configuration Gest Slave Settings Display Doduction Information Display Pockets Monitor Display Deckets Monitor | Item name Value V | Toolbox • 3 All windows • 3 All windows • 5 Frougis • Frongial Coupler • Frongial Coupler • Frongiano Investor • Frogunoy Investor • Frogunoy Investor • Show all versions • Not ECCOUP Rev12 • Not ECCOUP | | | | | |
| | Satety Related PDOs Batch Setting | | | | | | | |
| | | | | | | | | |
| E Filter Output Build | | | R. IB | | | | | |
| | | | | | | | | |

9. In the pop-up window for comparing and merging the same physical network configuration, you can see that a BL202 coupler with a node address of "1" is hung under the master device in the node address physical network configuration column, and in the network setting column on the node address Sysmac Studio, under the master device There is no hanging device. Click Apply Physical Network Configuration, click Apply in the pop-up window, and click Close in the pop-up window,



you can see that the network configuration on Sysmac Studio is the same as the actual network configuration.

Note: Before writing the BL202 node address, you must power off and restart, otherwise it will prompt that the node address is invalid, you need to rewrite the node address, and then power off and restart. The BL202 does not have an address, and the window for comparing and merging configurations of the same physical network does not pop up.

Apply actual network configuration
Do you want to apply the actual network configuration to the network configuration on Sysmac Studio?

Apply
Cancel



| BL200EC - new_Controller_0 - | Sysmac Studio (32bit) | - 🗆 X |
|--|---|---|
| File Edit View Insert Proj | set Controller Simulation Tools Window Help | |
| | □ ♂ ∧ 診 扇 頭 波 甚 ◎ 丸 ◎ ☆ ≫ ◎ ♪ ◎ ♪ ◎ ♡ □ ♡ □ □ ◎ ④ ♡ | |
| X de la controllect versions and Setup Multiview Explorer | | Toolbox J All evados Groups Cr |
| < | Output Build | RI |

10. Double-click BL200EC, you can see the IO module behind BL202. You can also add IO modules manually, and manually add the PLC when it is offline.

| BL200EC - new_Controller_0 - Sysmac Studio (32bit) | - 🗆 × |
|--|--|
| <u>File Edit View Insert Project Controller Simulation Tools Window H</u> elp | |
| 大豊富市りた園 守大路同司部会の支 女女ののない | ゴ Q Q ^R |
| Multiview Explorer | Toolbox ************************************ |
| new_Controller_0 Image: Description of the second | Group |
| ▼ Configurations and Setup 0 Terminds MARRE-BCO (M1) ▼ With CAT 1 Terminds MARRE-BCO (M1) ■ MARRE-BCO (M1) 1 Terminds MARRE-BCO (M1) ■ Configurations are described in the market 1 Terminds ■ Configurations Reads 8 Terminds ■ With Configurations Reads 9 Terminds ■ With Configurations Reads 10 Terminds ■ With Configurations Reads 11 Terminds ■ With Configurations 13 Terminds ■ With Configurations 14 Terminds ■ With Configurations 14 Terminds ■ With Configurations 14 Terminds <td>Item name Value Device name E001 Model BL200EC Produkt name BL200EC Number of module: 3 PDO Map Settings </td> | Item name Value Device name E001 Model BL200EC Produkt name BL200EC Number of module: 3 PDO Map Settings |
| 🖏 Task Settings | |
| E Data Trace Settings Build Programming SUBTORS (VUWannes) Development in a Development | - I × Controller Status - I |
| Contraction Contra | ONUNE • 192,168,250.1 ERR/ALM • RUN mode |

11. Click on the menu bar controller - transfer - transfer to the controller. Click Execute in the pop-up window to download the configuration, settings, and program to the PLC. In the pop-up window, click Yes-Yes-OK.



| BL200EC - new_Controller_0 - Sysmac Studio (32bit) | | | - 🗆 × |
|--|--|-------------------------------|--|
| Eile Edit View Insert Project Controller Simulation Tools Windo | w Help | | |
| X 🖷 🛱 🝵 🗢 📬 💁 Change Degice | × & & • • • • • ≈ ₽ [□ @ | 1 Q % | |
| Multiview Explorer ▼ Online reew_Controller_0 ▼ Online ▼ Configurations and Setup Synchronize | Ctrl+W Ctrl+Shift+W Ctrl+M To Controller Ctrl+T From Controller Ctrl+Shift+T | hem name Value Device name | Toolbox • 9 Groups Digital Output Anlasg Output Anlasg Output Anlasg Input RD Input RD Input Input Keyword Imput Keyw |
| L== CPU Rack Eored Ketteshing ♥ /0 Map MC Test Ryin ♥ 3 Controller Schup L 3 Operation Setting C 3 Controller Schup L 3 Dorestion Setting C 4 Stuti-in fiberNey L 5 Determiny Setting L 5 Duit-in (O Settin L 5 Operation Seard Set L 1 Built-in (O Settin L 1 Built-in (O Settin L 1 Built-in (O Settin L 1 Built-in (O Settin L 1 Built-in (O Settin Controller Clock_ L 1 Built-in (O Settin Controller Clock_ L 1 Built-in (O Settin Controller Clock_ L 2 Built-in (O Settin L 1 Built-in (O Settin Controller Clock_ L 2 Determine Memory Settings | | | Bit Charmen Depistol OctpueLN M2161-1600 Tis Charmen Depistol OctpueL3 M2162-1600 Tis Charmen Dapistol OctpueL3 M401-400 M401-4A0 Charmen Dapistol OctpueL3 M4041-4A0 Charmen Dapistol OctpueL3 M4042-4A0 Charmen Dapistol OctpueL4 M4043-4A0 Charmen Dapistol OctpueL4 M4043-4A0 Charmen Dapistol OctpueL4 Charmen Dapistol OctpueL5 Charmen Dapistol OctpueL4 |
| V ⊕ much Control acting L ⊕ Ares Group Settin L ♥ Ares Group Settin V ⊂ An Data Settings P Event Settings Tots Settings Tots Settings Tots | • | Device name | Model : M2081-8DC Product name : 8 Cf Vendor : Shenzhen |
| Not settings ▼ Programming ▼ @ Programming ↓ @ Finderson ♥ @ Description | l Program i Location i | • U X | Controller Status I Controller Status I ONLINE I 192.168.250.1 ERR/ALM RUN mode |



Sysmac Studio







12. Double-click the I/O map, find the DO module M2082, select the channel and right-click Settings/Reset—Setting to set the corresponding channel to 1. Channel 1_7000_01 is set to 1 as shown in the screenshot. Analog output operation is the same as digital output operation.

| BL200EC - new_Controller_0 - Sysmac Studio (32bit) | | | | | | | 1000 | □ × | | | |
|---|---------------|---|------------------|-------------|-------|---------------------|--------------|-------------|-------------|-------------------|---------------|
| File Edit View Insert Project Controller Simulation Tools Window Help | | | | | | | | | | | |
| L A A A A S C A | -1 A | | A X A & - | 09.0 | 1 | 0.0.1% | | | | | |
| | | | | | | | | | | | |
| Multiview Explorer 🚽 🏾 🗸 | EtherCAT | -🖽 Node1 : BL200EC (E001) 👘 I/O Map | × | | | | | | - | Toolbox | - |
| new_Controller_0 🔻 | Position | Port | Description R/V | V Data Type | Value | Variable | Variable Cor | nment | Variable Ty | <search></search> | ▼ P × |
| Configurations and Setup | Node1 | V BL200EC | | - | | | | _ | | | |
| ▼ III EtherCAT | Slot 0 | M2082-8DO | | | | | | | | | |
| ▼ -□ Node1 : BL200EC(E0 | | Outputs_Channel 1_7000_01 | W | BOOL | TRUE | Cut | | | | | |
| L - 0 : M2082-8DO(I | | Outputs_Channel 2_7000_02 | W | BOOL | FALSE | Copy | | | | | |
| ∟ ·□ 1 : M3041-4AI(M | | Outputs Channel 4 7000_05 | w | BOOL | FALSE | | | | | | |
| ∟ -□ 2 : M4043-4AO(I | | Outputs_Channel 5_7000_05 | Ŵ | BOOL | FALSE | | | | | | |
| ▼ Si CPU/Expansion Racks | | Outputs_Channel 6_7000_06 | W | BOOL | FALSE | | | | | | |
| L im CPU Rack | | Outputs_Channel 7_7000_07 | W | BOOL | FALSE | Saarda | | | | | |
| Controller Setup | Slot 1 | Utputs_Channel 8_7000_08 M3041-46I | w | BOOL | PALSE | Expand/Collapse All | | | _ | | |
| L PL Operation Settings | Slot 2 | ► M4043-4AO | | | | Carrie Davis Maria | | | | | |
| L 🎜 Built-in EtherNet/IP i | | CPU/Expansion Racks | | | | | | | | | |
| L 🖩 Built-in I/O Settings | Built-in I/(| Built-in I/O Settings | | | | | | | | | |
| L 🔚 Option Board Setting | OptionBoi | Option Board Settings | | | | | | | | | |
| L 🗰 Memory Settings | NXBusMa | NX Bus Master | | | | | | | | | 22 |
| ● ▼ 恭 Motion Control Setup | | | | | | Set/Reset | | Set | | | |
| L 母 Axis Settings | | | | | | Forced Refreshing | • | Reset | | | |
| L S Axes Group Settings | | | | | | | | | 1 151 | | |
| Event Settings | -Monitor type | Transition carbon composition activities to anti- | | | | | | Bit order — | | | |
| Task Settings | Data type | e 💿 Binary 🌑 Hex 🜑 Signed decimal 🌑 U | Insigned decimal | | | | | MSB-LSE | B 🕘 LSB-MSB | | |
| Data Trace Settings | Build | | | | | | | | • # × | Controller Status | ÷ 4 |
| Programming | O Errors | 1 Warnings | | | | | | | | | × |
| | | Description I Program | m I Location | | | | | | 1 | ONLINE | 192.168.250.1 |
| | | | | | | | | | | ERR/ALM 🔍 | RUN mode |
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| 🖬 Filter 💽 | Output Build | đ | | | | | | | | KI. | |
| | | | | | | | | | | | |

13. View the data of the analog input. Refer to 5.7.4 Process Data Definition for specific values corresponding to AI.



| BL200EC - new_Controller_0 - Sysmac Studio | (32bit) | | | | | | - | n x |
|---|--|---|---|----------|------------------|----------|-------------------|---|
| <u>Eile Edit View Insert Project Controller</u> | <u>Simulation</u> <u>Iools</u> <u>Window</u> <u>Help</u> | | n | | | _ | | _ |
| X 40 60 首うぐ 60 日 人 | a 🖾 🛱 🗯 🗚 😟 🕅 🗚 | 🐴 छ 🖗 🦡 🛍 🤇 | 9 12 12 | ୍ରୁ ପ୍ୟୁ | | | | |
| Multiview Explorer 👻 🕈 🛗 EtherCAT | -🗂 Node1 : BL200EC (E001) | < | | | | ÷ | Toolbox | ÷ 1 |
| new_Controller_0 Position | Port | Description R/W | Data Type Value | Variable | Variable Comment | Variable | <search></search> | |
| ▼ Configurations and Setup Stot 0 V ⇒ EtherCAT Stot 0 L ⇒ 0 : M2082-8D201 L L ⇒ 0 : M403-4A201 L V ⇒ CPU/Expansion Racks L L ⇒ 0 / M204 Stot 1 L ⇒ CPU fack L D ⊂ DU fack L L ⇒ 0 Contales Setup Stot 1 L ⇒ Option Board Setting: Stot 2 L ⇒ 0 Option Board Setting: Stot 2 V ⇒ Mation Control Setup Built-in I/O Setting: L ⇒ Axes Group Settings Stot 2 | | W W W W W W W W W W W W W W W W W W W | BOOL TRUE BOOL FALSS BOOL FALSS BOOL FALSS BOOL FALSS BOOL FALSS BOOL FALSS BOOL FALSS BOOL FALSS UNIT 0 | | | | | |
| é' Cam Data Settings ▶ Event Settings ♥ Task Settings ♥ Data type | 🔹 🕒 Binary 🌒 Hex 🌑 Signed decimal 🌑 Unsi | igned decimal | | | Bit order | LSB-MSB | | |
| El Duta Trace Settings Build Programming Browner Brow | Description i Program | Location | | | | - # X | Controller Status | + ₽ ■ × 192.168.250.1 RUN mode |
| M Pitter (X) Output Built | | | | | | | 0.31 | |

6.8 BL207 Communication Example

7 MQTT Protocol

7.1 Device Communication Settings

1) Connection platform: You can choose BLIIoT Cloud V2.0, or choose other cloud platforms to enter the corresponding IP and port

2) Connection protocol: Select MQTT protocol

3) MQTT client ID: The unique identification of the device, which can be the serial number, device ID, or IMEI code. BLIIoT Cloud V2.0 is the serial number of the cloud platform. Please contact the sales representative for the serial number.

4) Username: The account that the device requests to connect to the proxy server. It is MQTT for BLIIoT Cloud V2.0

5) Password: The account password for the device to request to connect to the proxy server. It is MQTTPW for BLIIoT Cloud V2.0

6) Publish topic: Refers to the topic that the device publishes uplink data to the platform. It is cloud platform serial number for BLIIoT Cloud V2.0

7) Subscription topic: Refers to the topic subscribed when the device receives downlink data. It is cloud platform serial number /+ for BLIIoT Cloud V2.0
8) Publish cycle (seconds): MQTT data release interval cycle, unit second, BLIIoT



Cloud V2.0 cycle needs to be set to 10 seconds or more, if it is less than 10 seconds, the platform will disable the device

9) Publisher QOS: The quality of service level guarantee for application message distribution, 0-at most once, 1-at least once, 2-only once, can be selected according to needs

10) Encryption: You can use encryption to connect to the server as needed, and choose not to encrypt when connecting to BLIIoT Cloud V2.0

11) Enable data retransmission: Check Enable, after enabling it, when reconnecting to the cloud platform, the data during the disconnection period will be retransmitted

12) Data packaging: After check, multiple data will be sent in one message. When not check, one message corresponds to one I/O data point

After the configuration is complete, the client will initiate a connection to the server:

CONNECT: The client sends a CONNECT connection message request to the server;

CONNACK: The server responds with a CONNACK to confirm the connection message, indicating that the connection is successful;

After the client establishes a connection, it is a long connection, and the client can publish or subscribe to the message on the server;

Take the device and the customer's mobile phone as the client as an example:

After the device publishes the topic on the proxy server, the client can view the data by subscribing. That is, the device is the publisher, and the client mobile phone is the subscriber.

Similarly, users can also publish topics through the MQTT server to control devices. That is, users are publishers and devices are subscribers.

7.2 Data Publish Format

If data packaging is checked during configuration, multiple I/O data points will be sent in one message (multiple messages will be sent separately when there are many data points, and each message contains multiple data points), if not checked, the message only corresponds to one I/O data point, and there are some differences between the two publishing formats.

1) The payload data format in the device release message

Publish subject: Serial number (corresponding to the configured publish subject setting item)



| { | | | | | | | | |
|--|---|--|--|--|--|--|--|--|
| C | "sensor[| Datas": | | | | | | |
| | [| | | | | | | |
| | L { | | | | | | | |
| | ć | //switch type | | | | | | |
| | | "switcher":"]". //data type and value | | | | | | |
| | | "flag":" REG 1000" //Read and write identification | | | | | | |
| | }. | <i></i> | | | | | | |
| | { | | | | | | | |
| | , | //Slave switch type | | | | | | |
| | | "switcher":"0", //data type and value | | | | | | |
| | | "flag":"REG10000" //Read and write identification | | | | | | |
| | }, | | | | | | | |
| | | | | | | | | |
| | { | | | | | | | |
| | ~ | //numeric type | | | | | | |
| | | "value":"10.00", | | | | | | |
| | | "flag":" REG 4000" | | | | | | |
| | }, | | | | | | | |
| | { | | | | | | | |
| | | //Slave Numeric type | | | | | | |
| | | "value":"217.5", | | | | | | |
| | | "flag":"REG40001" | | | | | | |
| | }, | | | | | | | |
| | | | | | | | | |
| |], | | | | | | | |
| | "time":" | 1602324850", | | | | | | |
| | //Time stamp, data publish timestamp UTC format | | | | | | | |
| | | | | | | | | |
| | "state":" | 'alarm", | | | | | | |
| //Alarm and recovery identification (This identification is only available for alarm | | | | | | | | |
| | or recovery d | ata, but not for regularly reported data) | | | | | | |
| | | | | | | | | |
| | "retransmit":"enable" | | | | | | | |
| //Retransmission flag, indicating historical data (This flag is only available for | | | | | | | | |
| retransmission historical data, but not for real-time data) | | | | | | | | |
| | } | | | | | | | |

Note:



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

1. Switch type 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-write flag: The character is "flag", followed by "read-write flag representing the I/O data point", as follows:

1. Device I/O data point read and write identification:

| Data name | Read and write identification | Data type | Description |
|--------------|-------------------------------|-----------|-----------------------------|
| DO | REG1000~1999 | Switcher | 0 is open, 1 is close |
| DI | REG2000~2999 | Switcher | 0 is open, 1 is close |
| AI | REG3000~3999 | Value | true value = original value |
| AO | REG4000~4999 | Value | true value = original value |

2. Serial port module slave I/O data point read and write identification:

| Data name | Read and write identification | Data type | Description |
|----------------|-------------------------------|-----------|-------------------------|
| Coil state | REG10000~19999 | Switcher | According to slave data |
| | | | definition |
| Input coil | REG20000~29999 | Switcher | According to slave data |
| | | | definition |
| Holding | REG40000~49999 | Value | According to slave data |
| register | | | definition |
| input register | REG30000~39999 | Value | According to slave data |
| | | | definition |

//Time stamp: The character is "time", followed by "specific reporting time stamp"

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

//Retransmission: The character is "retransmit", followed by "enable"

The data collected during network disconnection will be temporarily stored in the device, and will be republished when the network is restored. It will be marked with the "retransmit" field to indicate historical data. (You need to check Enable data retransmission on the configuration interface)



2) The payload data format in the device publish message (data is not packaged)

Publish subject: Serial number (corresponding to the configured publish subject setting item)

{

}

"switcher": "0", "flag": " REG2000", "time": "1602324850"

When the data is not packed, except for a little difference in the format, everything else is exactly the same. This is an example of DI1. For other data types, please refer to the above description.

7.3 Subscription Data Format

Payload data format in device subscription message

Subscription topic: serial number/+ (corresponding to the configured subscription topic setting item) (The topic used by BLIIoT V2.0 for downlink publishing messages is named "Serial Number/Sensor ID", so the device subscription topic needs to add a wildcard "/+", so



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 does not need to care about this item.



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

 Switch type 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-write flag: the character is "flag", followed by "read-write flag representing the IO data point"

8 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.

9 Technical Support

Shenzhen Beilai Technology Co., Ltd. Website: https://www.bliiot.com