EBYTE

Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



Profinet Gateway

PN1-D11PM

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Chapter1 Product Overview

1.1 Product Introduction



The PN1-D11PM is a Profinet to Modbus RTU gateway used to map Modbus data to Profinet. Using GSD files for integration, code-free reading and writing of Modbus devices allows for quick data setup and transfer to PLCs. The gateway provides one RS485 interface supporting 32 command nodes . All Modbus commands are loaded as modules , and the memory mapping between Profinet and Modbus is intuitive and can be viewed in STEP. 7 or query in the TIA Portal software. You can load the status byte to query the connection status of the Modbus device and monitor the device status in real time .

RS485 and power supply are fully isolated, providing excellent electromagnetic compatibility, outstanding performance and high reliability, and complying with CE certification standards.

1.2 Features

- Adopting standard Profinet protocol communication, it can be networked with PLC, configuration, host computer, etc.
- Supports Siemens PLC 200/300/1200/1500 full series
- Support Botu/SETP 7 host computer configuration
- Adopts standard Modbus RTU protocol and can be used as Modbus RTU slave or Modbus RTU master
- Profinet and Modbus RTU protocol conversion
- Support RS485 serial port
- 10/100M adaptive network port
- Supports 8~28V wide voltage input and has power reverse connection protection
- With multiple protections such as static electricity, surge, and electric fast pulse group
- Easy configuration, no host computer required, directly provide GSD file
- The device has built-in software and hardware watchdogs to ensure stable operation of the device and reliable data transmission
- Industrial-grade hardware design, small size and compact structure
- Support standard 35mm rail installation
- Widely used for acquisition and control of Modbus RTU devices in industrial sites
- Complies with CE certification standards

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Chapter2 Technical Parameters

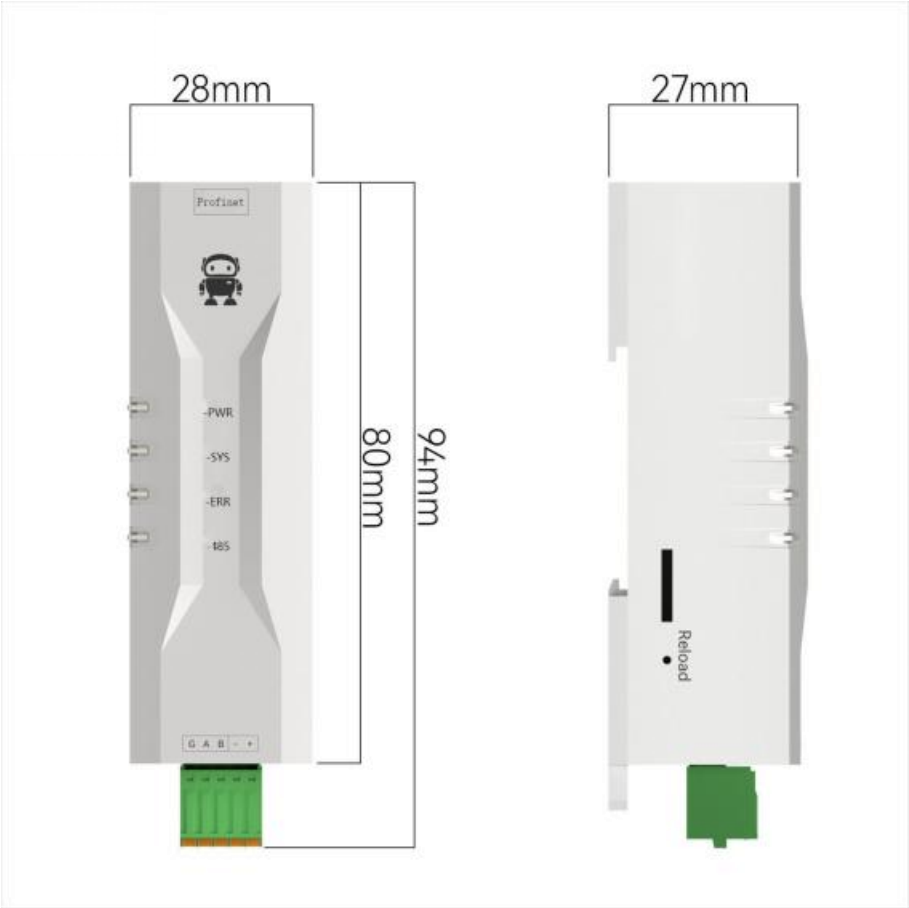
2.1 Specifications

category	name	parameter
power supply	Operating voltage	DC 8 ~ 28 V ; with reverse polarity protection
	Power indicator	PWR red LED indicator
	Power consumption	20,000~30,000
Network port parameters	Interface Type	RJ45
	Communication Protocol	Standard Profinet protocol (RT)
	Maximum communication cycle	4ms
	Communication bandwidth	10/100M adaptive
RS485 serial port parameters	Interface Type	RS485 (2.54mm spring terminal block)
	Communication Protocol	Standard Modbus RTU protocol
	Baud rate	1200 ~ 3.9M bps
	Communication Format	Data bits: 7/8 Bits (default 8) Stop bits: 1/2 Bits (default 1) Checksum: None/Odd/Even (default None)
Work Environment	Working temperature and humidity	-40 ~ +85℃, 5% ~ 95%RH (non-condensing)
	Storage temperature and humidity	-40 ~ +105℃, 5% ~ 95% RH (non-condensing)
other	Product size	94 mm * 28 mm * 27 mm (length * width * height)
	Product weight	40 ±5 g
	Installation	Standard industrial-grade 35mm rail installation

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2.2 Dimensional Drawing

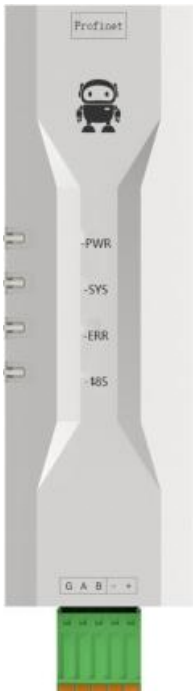


94*28*27 (length*width*height)

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2.3 Indicator Light Description



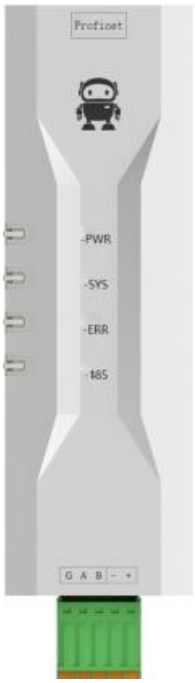
Label	name	illustrate
PWR	Power indicator	Red LED light; on: system power supply is normal; off: system power supply is abnormal
SYS	System (Profinet connection) indicator	Blue LED light; on: Profinet connection established, off: Profinet connection not established; when the software controls the flashing indicator light, it flashes at the same time as ERR
ERR	(modbus) communication error indicator	Red LED light; on: Moodbus communication abnormal; off: Moodbus communication normal; when the software controls the flashing indicator light, it flashes at the same time as SYS
485	Serial port receiving and sending data indicator light	Red/green dual-color LED light; Sending receipt: red light flashes quickly; receiving data: green light flashes quickly

Indicator Light Description During Firmware Upgrade	
SYS	Enter upgrade mode and keep flashing at 5hz frequency
ERR	When the upgrade fails, the 3hz signal keeps flashing.
485	During the upgrade process, 1hz flashes

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2.4 Port and button description





Label	name	illustrate
Profinet	PN interface	Standard RJ45 network cable interface
G	RS485 GND interface	Serial port RS485 GND interface, 2.54mm terminal
A	RS485 A interface	Serial port RS485 A interface, 2.54mm terminal
B	RS485 B interface	Serial port RS485 B interface, 2.54mm terminal
-	DC power supply negative pole	DC (8-28V) power supply negative terminal interface, 2.54mm terminal
+	DC power supply positive pole	DC (8-28V) power supply positive terminal interface, 2.54mm terminal
Reload	button	Restore to factory settings: Press and hold for 5 to 10 seconds and then release the power button; Device restart: Release the power button for less than 2 seconds when the device is powered on; Firmware upgrade: Press and hold the button in the power-off state, then power on, the device will enter the upgrade mode;

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Chapter3 Product Features

3.1 PN1-D11PM Function Overview

This module supports up to 32 Modbus RTU commands, divided into master and slave commands, with configurable command type and length for each. When using the Modbus RTU master function, the write function call must be at least twice the polling period, otherwise a frame of write function data may not be refreshed. For example, if a Modbus RTU master has five command nodes and a 10ms polling interval, it will take 50ms to complete the polling of all command nodes. Therefore, the minimum data change period is 50ms * 2 = 100ms.

3.2 Modify IP address

The IP address of this module can be modified through software such as Portal/STEP 7. For detailed setting methods, please refer to the usage section.

3.3 Upgraded Features

Supports firmware upgrade function. For detailed instructions on firmware upgrade, please refer to the firmware upgrade instruction manual.

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Chapter4 Device alarm information description

When an error occurs on the PN1-D11PM gateway, it sends the specific error information to the PLC through the Profinet alarm mechanism. The gateway's ERR light will flash three times continuously, and the indicator light on the PLC will also flash. When the error disappears, the corresponding alarm information will be removed. The specific error information can be viewed on the PLC's corresponding host computer.

The specific error information is explained below:

error message	Description
Illegal Fun Code	Slave replies modbus standard error: Requested function not recognized or supported by slave device
Illegal Data Address	The slave responds with a modbus standard error: The data address is not within the accessible range of the device.
Illegal Data Value	The slave responds with a modbus standard error: The requested operation attempted to set an invalid or illegal value.
Slave Device Failure	Slave replies modbus standard error: Slave device failure, unknown device failure
Frame Length Error	The length of the message received by the master is incorrect ; it is too long, too short, or does not match the correct length of the slave's reply data.
CRC Check Error	CRC check error of the message received by the master station
Register Number Error	The master station receives an error in the number of message registers.
SLave Address Error	The slave address of the message received by the master is wrong
MASTER WATING RSP TIMEOUT	Master station receiving timeout
Function Code Different	The function code in the message received by the master station is inconsistent with the request
Register Address Error	The register address of the message received by the master station is wrong
Unknown Error	Unknown error

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Chapter5 Tutorial on loading devices using Botu

5.1 Preparation before connection

1. Prepare the required XML files as follows:
2. GSDML-V2.3-EBYTE-PN1-D11PM-20250821
3. Connect the DC 24V external power supply to the module and power it on. Before powering on, check that the positive and negative poles of the power supply are connected correctly.
4. Use a network cable to connect the module to the Profinet interface of the PLC controller. (In the same network segment)

5.2 Add GSDML file to Botu

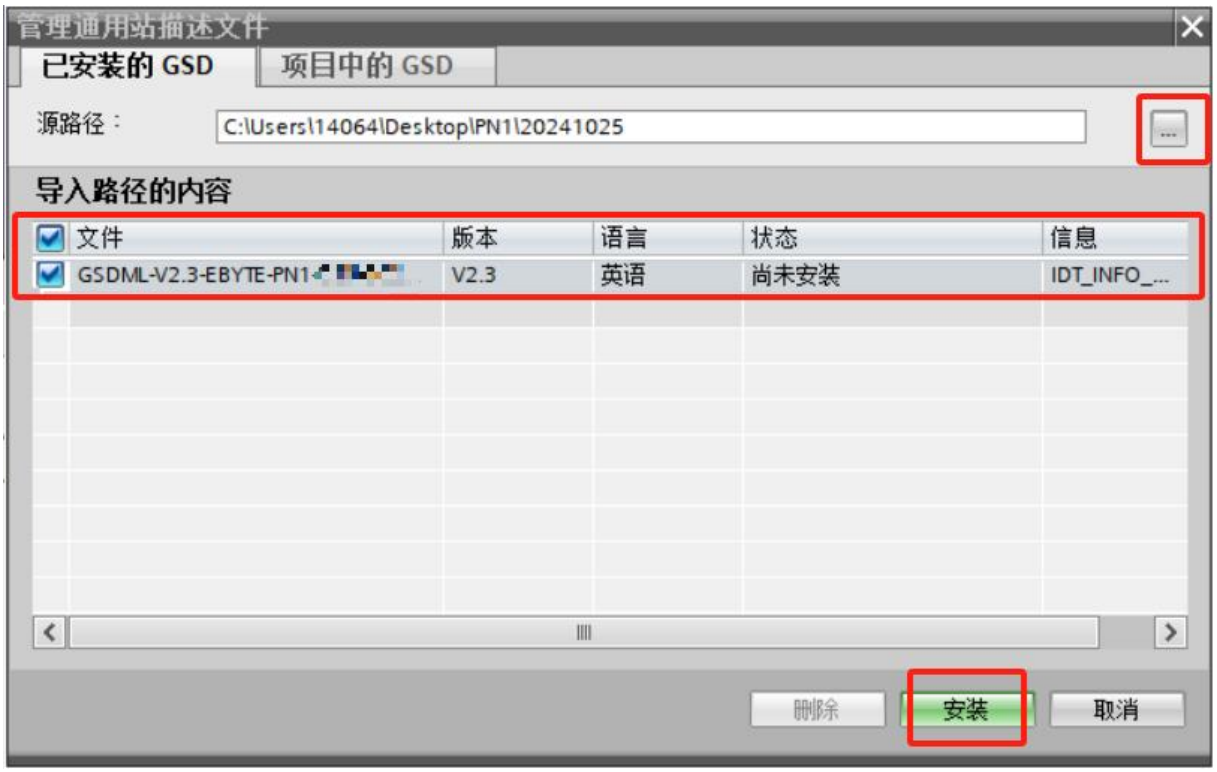
1. Open Botu, click Options, and manage general site files (gsd)



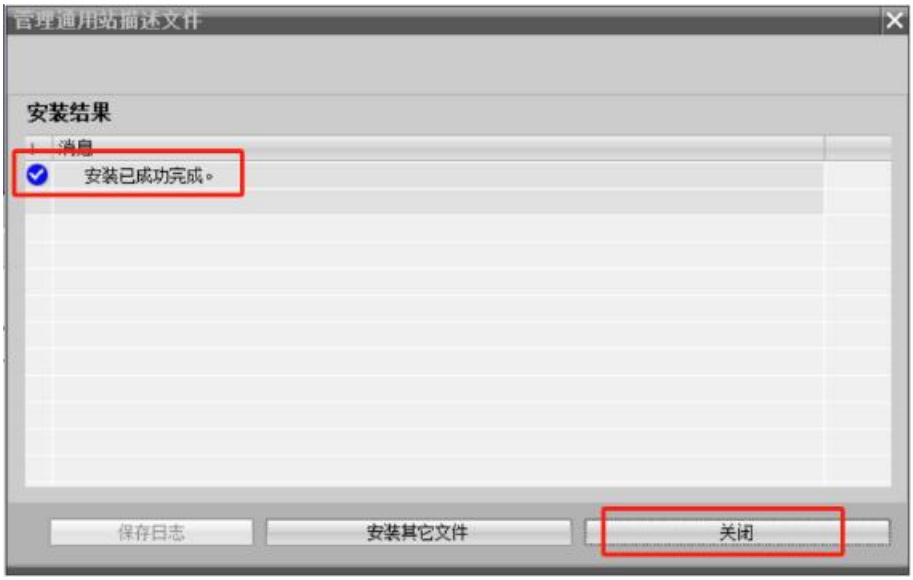
2. Add the GSDML file, find the folder where the GSD is stored, select the folder, and then the software will scan the GSD file by itself, then check the GSD file, and finally click Install.

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3. After the installation is complete, click Close and you can then configure the device.

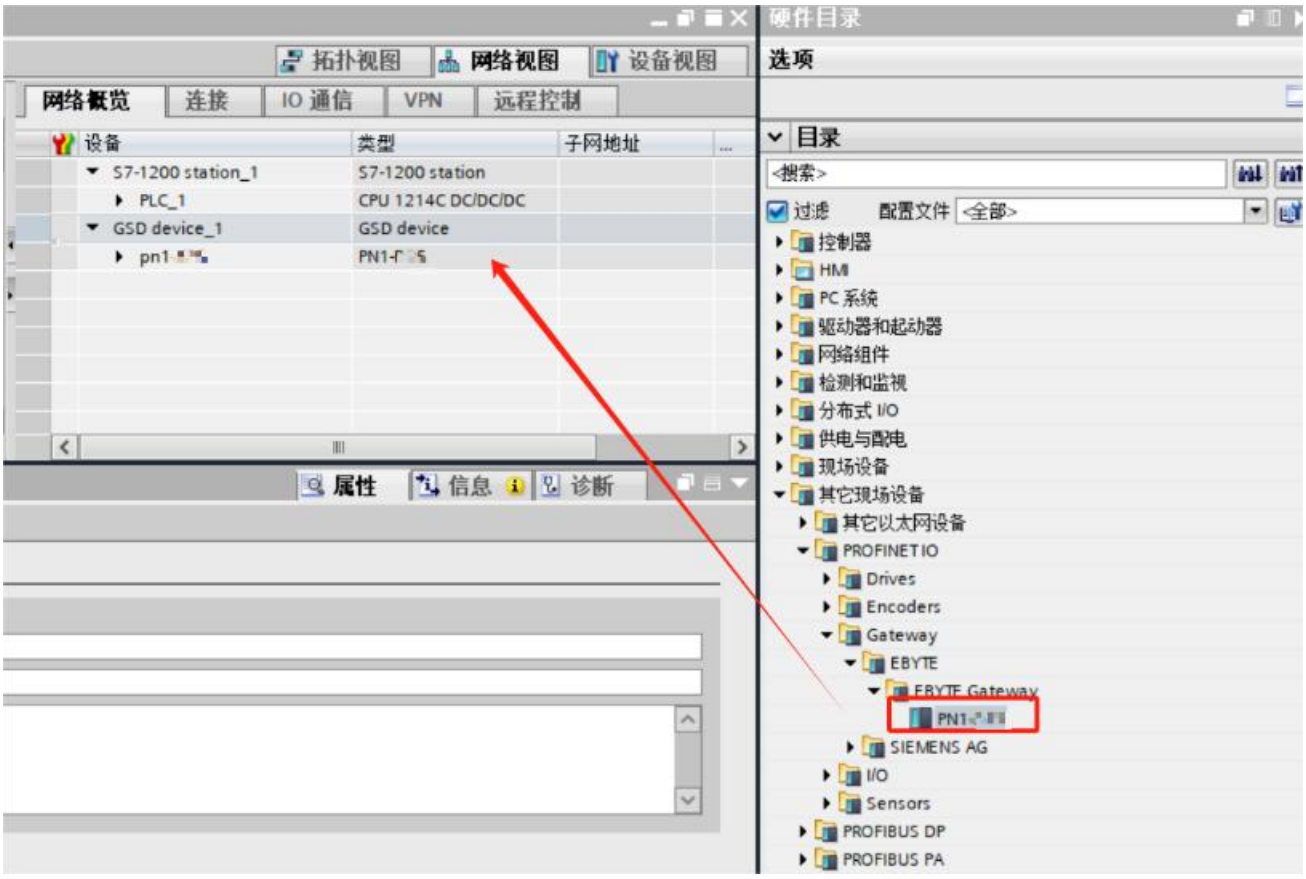


5.3 Adding Profinet devices to the project

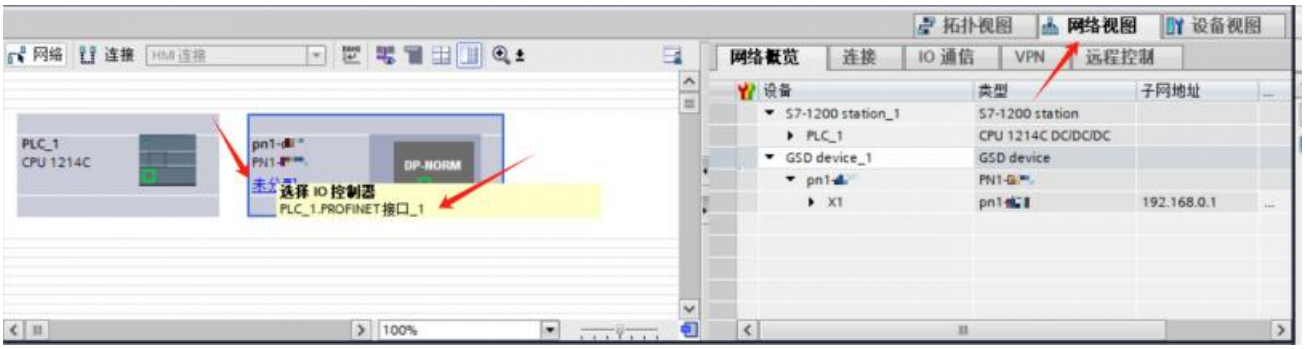
1. Create or open a new project. If it is a new project, first add the controller device, then go to the device configuration interface, add the corresponding IO module, and double-click the module to add it successfully, as shown in the figure:

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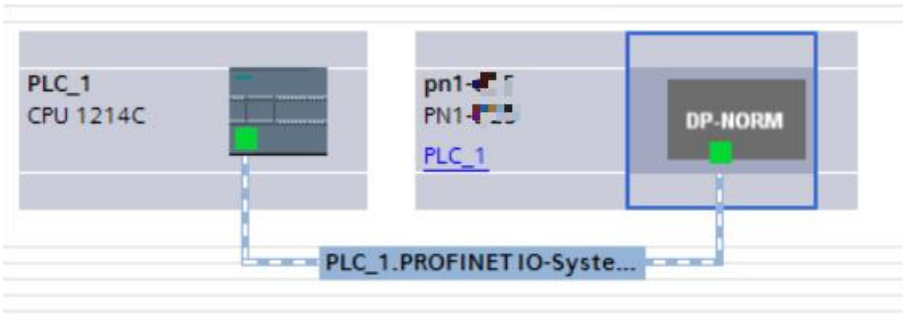
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2. In the network view, configure the device



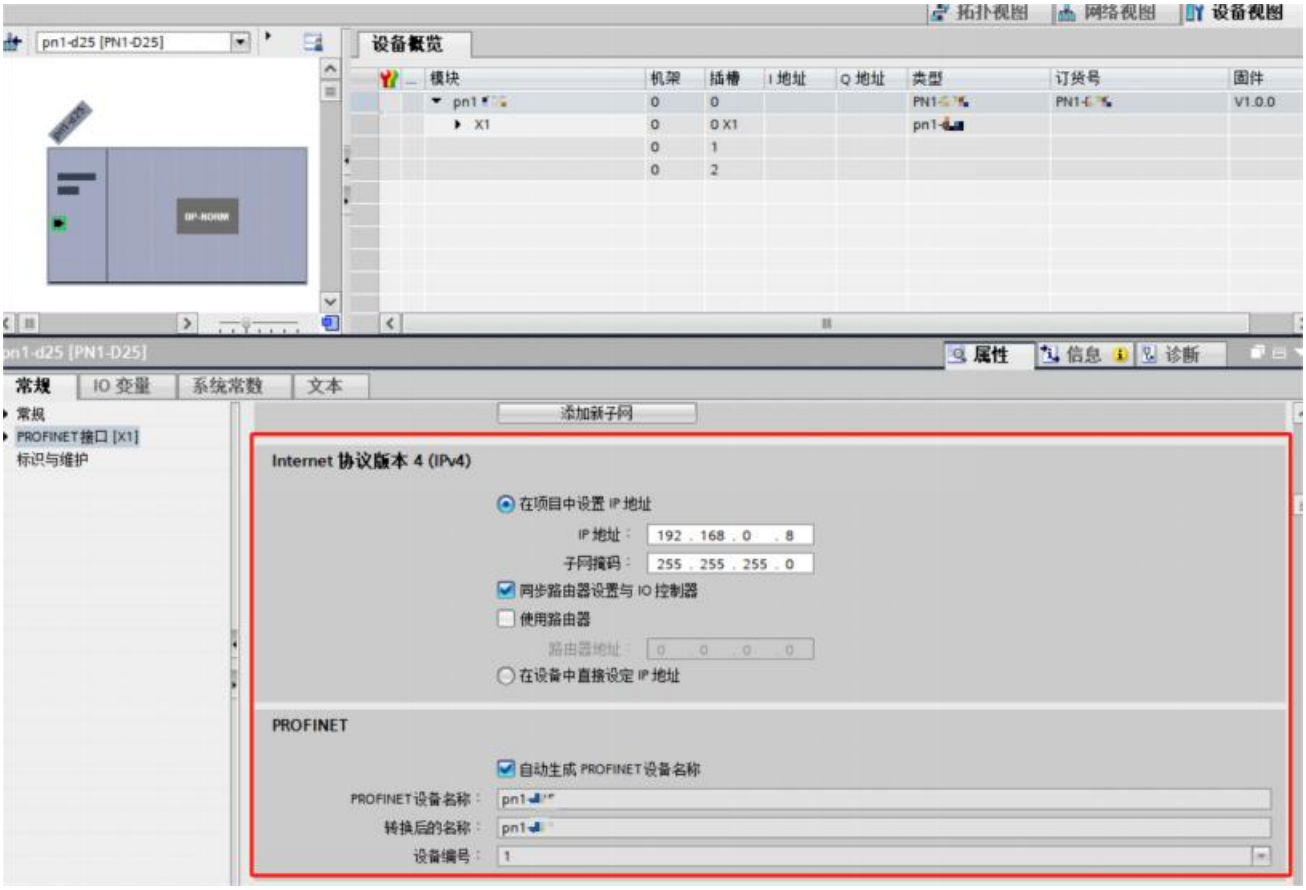
After completion, as shown in the figure:



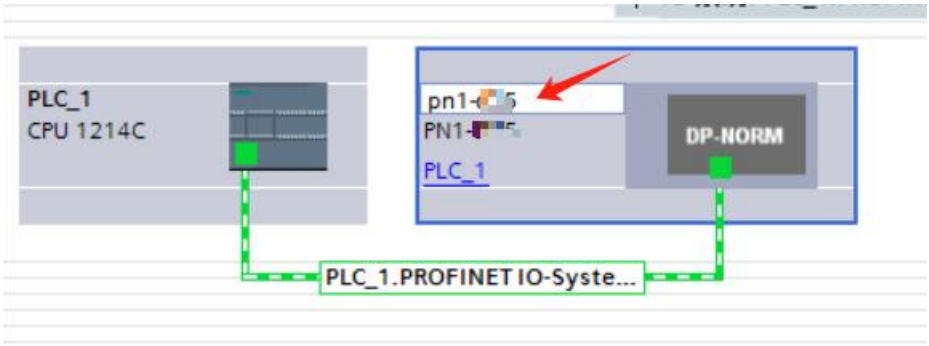
3. In the Devices view, first locate and select the newly added device, then double-click the module in the image. Next, in the General Configuration interface, modify the IP address and device name, ensuring they match the module itself. Alternatively, you can set the IP address directly on the device.

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Click here to modify the device name directly



5.4 Configure Modbus communication parameters

After completing the relevant settings, click to enter the device view interface. In the device overview area, the system provides two slots for configuring the serial port function module. Each slot can accommodate 32 subslots for configuring the Modbus command submodule. Specifically, subslot 1 corresponds to the device's serial port status word and serial port control word (applicable to PNMB Master/PNMB Slave configurations). The status word allows the PLC to obtain the operating status of the PN1-D11PM device; the control word allows the PLC to control the PN1-D11PM device.

To adjust the Modbus interface parameters for serial port 1 or 2 on the PN1-D11PM device, first select the target slot (i.e., slot 1 or 2) and then select "Properties." During this process, you must preselect the serial port's

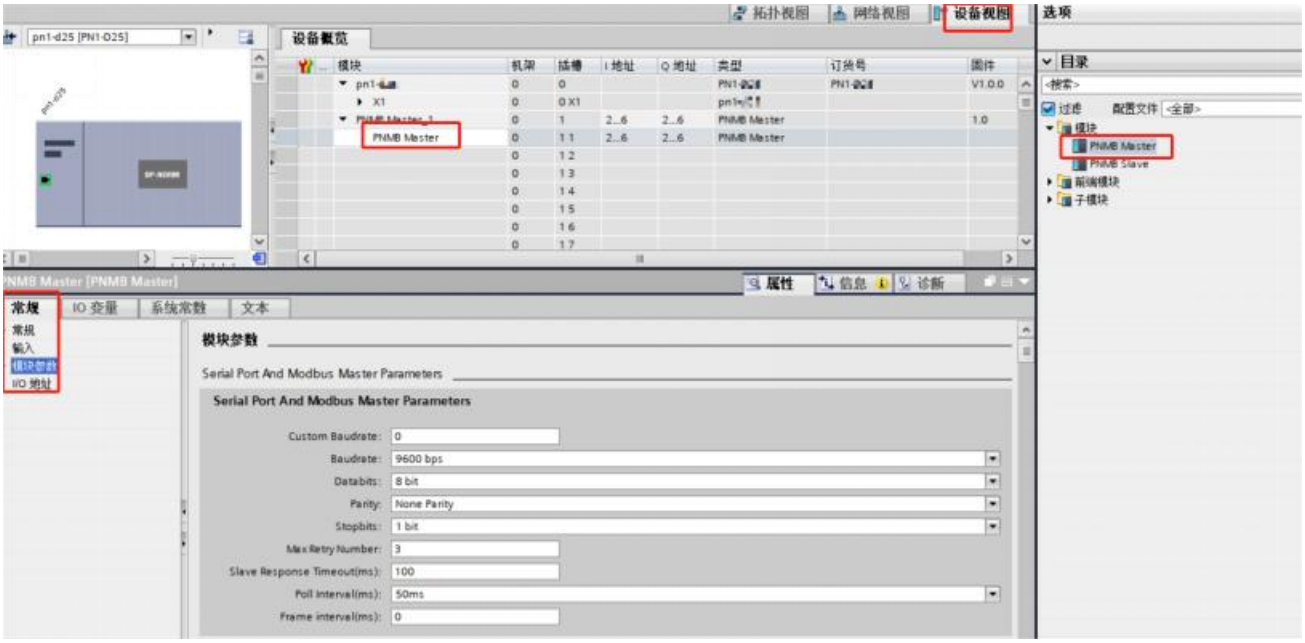
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operating mode (PNMB Master/PNMB Slave)—Modbus RTU Master or Slave. It's important to note that the PN1-D11PM gateway is compatible with both Modbus RTU Master and Slave modes.

PN1-D11PM device module Modbus communication interface parameters:

PNMB Master



Custom Baudrate:

When the serial port is configured in slave mode and a custom baud rate is required, the default setting is 0. This means that the custom baud rate is not enabled. To enable a custom baud rate, set a value between 1200 and 3900000. In this case, the "Baudrate" option will not take effect.

Baudrate:

Standard baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 bps, default: 9600.

Databits:

Data bits: 7, 8bit, default: 8.

Parity:

Data check: None Parity (no check), Odd Parity (odd check), Even Parity (even check), default: None Parity (no check).

Stopbit:

Data stop bit : 1 , 2 bit , default: 1 .

Max R etry N umber:

The number of error retries when the serial port is used as a master station, 0-255, 0 does not resend, 255 resends infinitely, 1-254 resends according to the number of times , default: 3 .

Slave Response Timeout (ms) :

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the serial port is acting as a master, the module waits for a response from the Modbus device after sending a Modbus message. If the Modbus device does not respond within the set response time, the module stops waiting and continues to send the next Modbus message or resends it. The selection range is 0 - 65535 ms , and the default is 100ms .

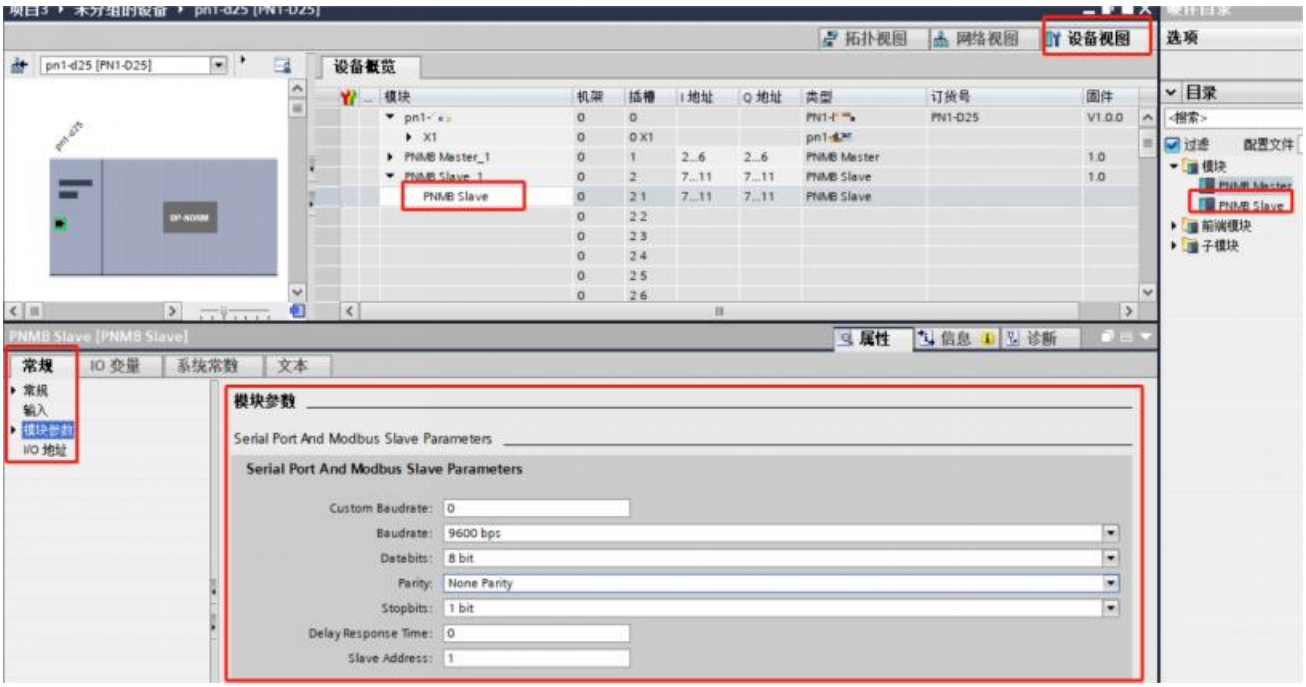
Poll Interval(ms):

the serial port functions as a master, the bus conversion module delays sending Modbus master messages after receiving a correct reply from a Modbus slave. If a Modbus slave device responds slowly to master messages, communication problems may occur if the bus conversion module sends Modbus messages too quickly. You can increase the message interval appropriately. Select from 10 , 20, 30, 40, 50, 60, 70, 80, 90, 100, 200, 500 , 1000ms, or No Delay. The default value is 50ms .

Frame interval (ms):

Data frame break time: 0-65535ms, 0 means automatic frame break, default: 0.

PNMB Slave



Custom Baudrate:

When the serial port is configured in slave mode and a custom baud rate is required, the default setting is 0. This means that the custom baud rate is not enabled. To enable a custom baud rate, set a value between 1200 and 3900000. In this case, the "Baudrate" option will not take effect.

Baudrate:

Standard baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 bps, default: 9600.

Databits:

Data bits: 7, 8bit, default: 8.

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Parity:
Data check: None Parity (no check), Odd Parity (odd check), Even Parity (even check), default: None Parity (no check).

Stopbit:
Data stop bit : 1 , 2 bit , default: 1 .

Delay Response Time.
the serial port is acting as a slave, how long to delay responding after receiving a polling command from the master. Range: 0 to 65535 , where 0 indicates an immediate response. Unit: milliseconds . Default: 0 .

Slave Address:
The station address when the serial port is used as a slave. Range: 1 to 247 , default : 1 .

Note: The configuration of serial port 2 is the same as that of serial port 1.

5.5 Configure Modbus message (function code)

two slots in the device overview . These two slots are used to configure serial port information and master/slave station selection. The status word and control word are already occupied , leaving 64 sub -slots (32 sub -slots for each serial port command) for configuring MODBUS messages (commands).

Click the module in the hardware directory on the right to provide the master and slave station selection for the serial port, which are PNMB Master (the status word and control word are already occupied and the serial port related parameters need to be configured) and PNMB Slave (the status word and control word are already occupied and the serial port related parameters need to be configured); click the submodule to select the corresponding Modbus RTU command. Simply double-click the message in the hardware directory to configure the message into the MODBUS message queue according to the order of the blank slots.

Modbus RTU Master Commands

Each Modbus RTU master command has five attributes:

Slave Address (1 ~ 247): Indicates the address of the Modbus RTU slave device. The selectable range is 1-247.

Function Code: The function code of the Modbus RTU master station. The function code is automatically generated according to the MODBUS command inserted into the slot and cannot be changed.

Start Address: The starting address for Modbus RTU slave data operations. Non-register PLC address , no prefix. Range 0-65535.

XX Quantity : Indicates the number of coils or registers to be read or written. The MODBUS command is automatically generated when the data is inserted into the slot , and the quantity can be changed within the range .

Transmission Type: Provides the following four transmission types.

Disable: Indicates that the command is not executed.

Poll trigger: After the master station corresponding to Modbus RTU is enabled, the message will be sent in the order of slot numbers from small to large.

Level ltrigger (Level Send): When the control send flag corresponding to the slot number changes from 0 to 1: For a read command, the message will be sent. For a write command, it will only be sent if the data has changed. When the control send flag corresponding to the slot number changes from 1 to 0, both read and write messages

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will stop sending. (For example, in the previous section, PLC address QB2-QB5 is the send trigger control bit)

Rising Trigger (send on rising edge): When the trigger control bit corresponding to the slot number changes from 0 to 1, the message will be sent once. (For example, in the previous section, PLC address QB2-QB5 is the send trigger control bit)

Modbus RTU Slave Commands

Each Modbus RTU slave command is prefixed with " Input" or "Output." "Input" indicates data input into the PLC, meaning the master writes data to the slave, which then passes the data to the PLC. This corresponds to a write-type command. "Output" indicates data output from the PLC, meaning the PLC passes data to the slave, which then is read by the master. This corresponds to a read-type command. More specifically, each slave command ends with the supported function codes.

Function code	Function	Operation address area (non-register PLC address)	Operation Type
01H	Read multiple coil output states	0XXXX	read
02H	Read multiple input coil states	1xxXX	read
03H	Read multiple holding registers	4xxXX	read
04H	Read input register	3XXXX	read
05H	Force a single coil	0XXXX	Write
06H	Presetting a Single Holding Register	4XXXX	Write
OFH	Forced multi-coil	0xXXX	Write
10H	Preset multiple holding registers	4XXXX	Write

5.5.1. Routines

Set the device serial port 1 as the master station to write 8-bit coils.

Step 1: Drag PNMB Master into slot 1



Step 2: Select the command in the submodule MBRTU Master Coils 0xxxx

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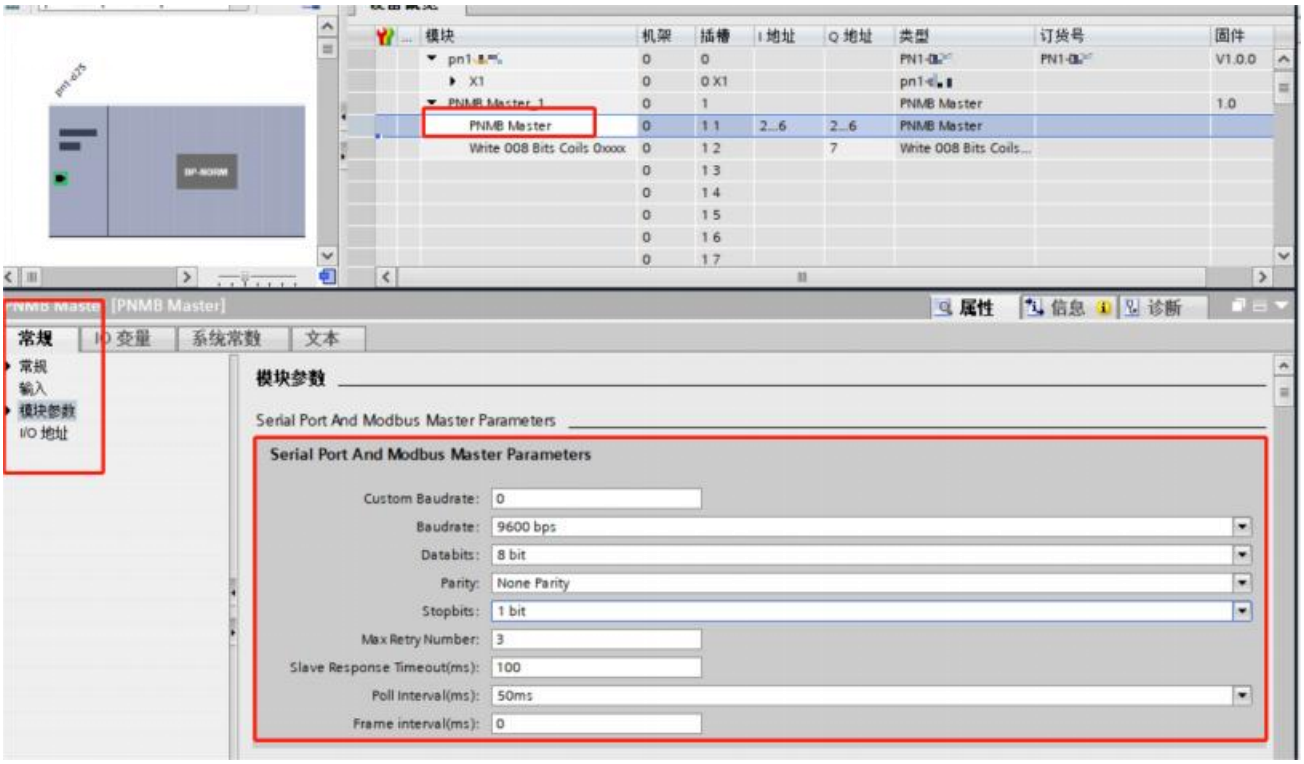
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Step 3: Select MBRTU Write 008 bits 0xxxx



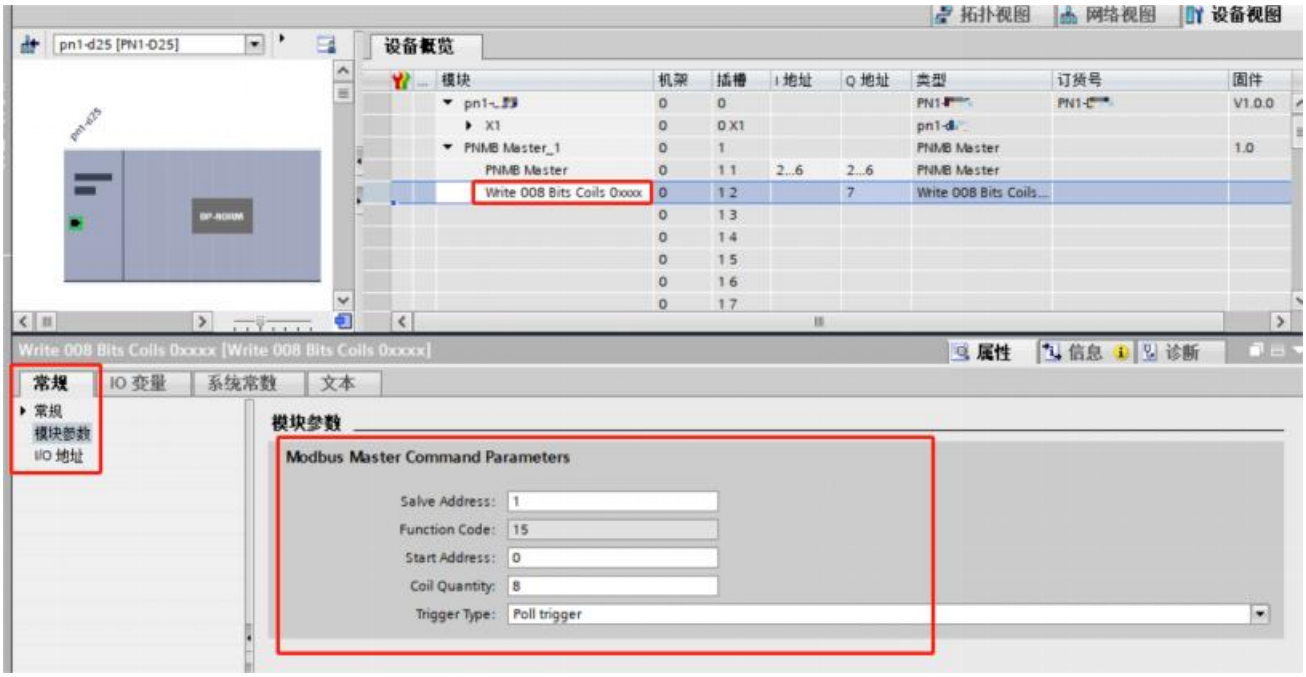
Step 4: Configure the working parameters of the gateway serial port. Select the host module (PNMB Master) just added. Here you need to configure the serial port parameters of the gateway according to the serial port parameters of the RTU.



Configuration register information for communication between Profinet gateway and RTU;

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5.6 Configure status word and control word

From the device overview configuration, you can see slot 1, which can only be used to select PNMB Master/ PNMB Slave. The I Address column corresponds to the Profinet input addresses IB2-6, which are the communication status monitoring bits. The Q Address column corresponds to the Profinet output addresses QB2-6. QB2 is the communication control word (control) for this bus conversion module, and QB3-6 are the control bits for each message sent.

Communication status monitoring:

1st byte: The slot number of serial port 1 where the error occurred

Byte 2: Serial port 1 error code

The other bytes are reserved.

Error Code	describe
1	Slave replies modbus standard error: ILLEGAL FUNCTION
2	The slave responds with a modbus standard error: ILLEGAL DATA ADDRESS
3	The slave responds with a modbus standard error: ILLEGAL DATA VALUE
4	The slave responds with a modbus standard error: SLAVE DEVICE FAILURE
10	The length of the message received by the master is incorrect , too long, too short, or inconsistent with the correct length of the slave's reply data.
11	The CRC check of the message received by the master station is wrong
12	The master station receives an error in the number of message registers.
13	The slave address of the message received by the master is wrong
14	Master station receiving timeout
15	The function code in the message received by the master station is inconsistent with the request

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16	The register address of the message received by the master station is wrong
17	Unknown error

Communication control bits:

Bit 0: Whether the Modbus serial port is enabled, 1 = enabled, 0 = disabled;

Bit 1: Clear fault code. When a rising edge (0→1) is detected, the communication status monitoring is cleared.

Other bits are reserved.

Bytes 2 to 5:

Each slot's message corresponds to one bit. The corresponding format is shown in the following table.

When the message is configured as rising edge triggered, when this bit changes from 0 to 1, the message is enabled to be sent once.

When the message is configured as level-triggered, setting this bit to 1 enables cyclic transmission of the message, and setting it to 0 stops cyclic transmission of the message.

Byte 2							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Subslot 9	Subslot 8	Subslot 7	Subslot 6	Subslot 5	Subslot 4	Subslot 3	Subslot 2
Byte 3							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Subslot 17	Subslot 16	Subslot 15	Subslot 14	Subslot 13	Subslot 12	Subslot 11	Subslot 10
Byte 4							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Subslot 25	Subslot 24	Subslot 23	Subslot 22	Subslot 21	Subslot 20	Subslot 19	Subslot 18
Byte 5							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Subslot 33	Subslot 32	Subslot 31	Subslot 30	Subslot 29	Subslot 28	Subslot 27	Subslot 26

The status word and control word configuration of slot 2 are the same as those of slot 1.

5.6.1. Routines

Program segment 1 is used to open the gateway's channel 1 serial port, and program segment 2 uses the PLC's built-in input to control the extended coil.

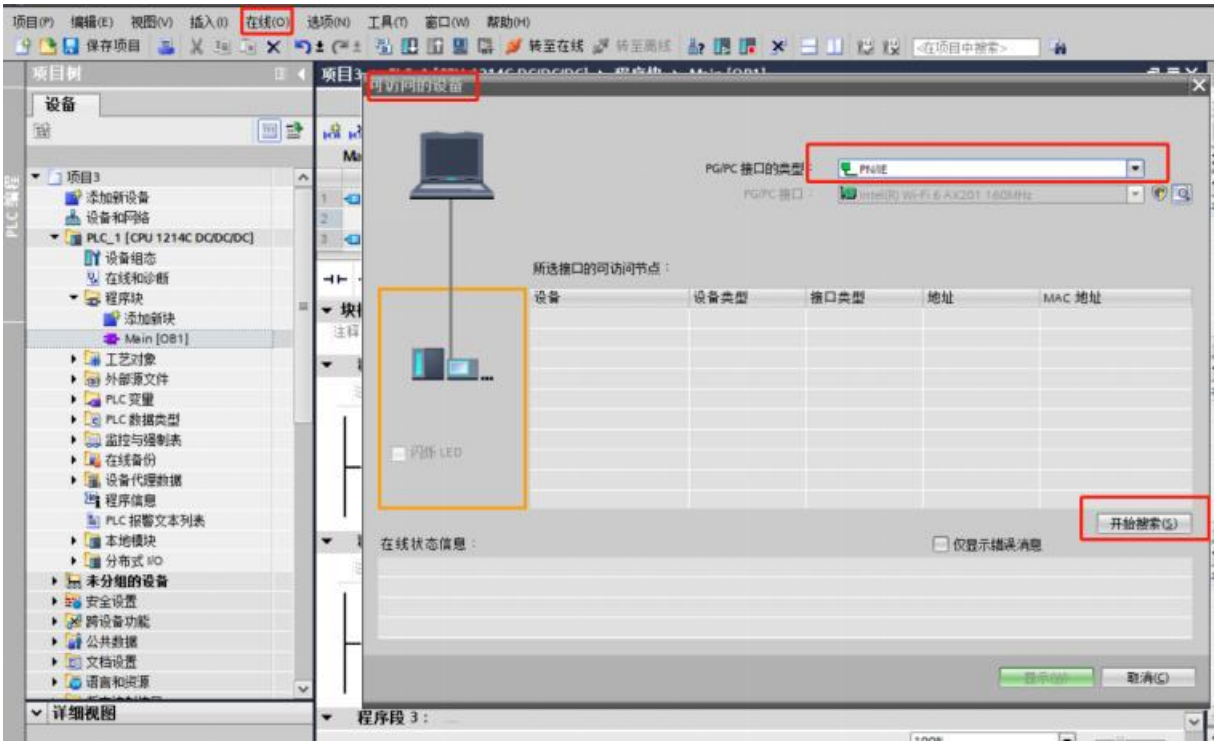
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5.7 Use Botu to modify the module name and query the IP address

Open the Botu software and click the "Online" option in the menu bar.
In the online access interface that opens, find and select Accessible Devices.
Perform a device search. Once the search is complete, all accessible devices will be listed.
Select the target device whose IP address and name need to be modified from the list.
Modify the IP address and name of the selected device.



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Chapter6 Tutorial on loading devices using STEP 7

6.1 Preparation before connection

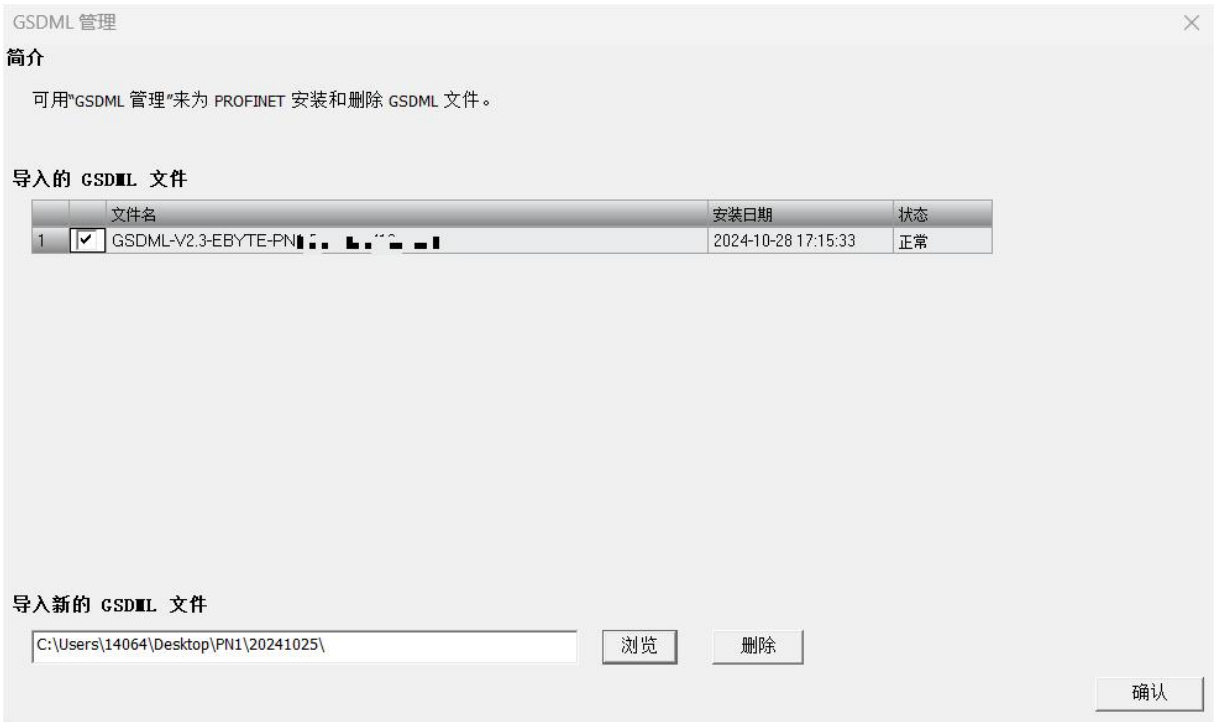
1. Prepare the required XML files as follows:
   GSDML-V2.3-EBYTE-PN1-D11PM-20250821
2. Connect the DC 24V external power supply to the module and power it on. Before powering on, check that the positive and negative poles of the power supply are connected correctly.
3. Use a network cable to connect the module to the Profinet interface of the PLC controller. (In the same network segment)

6.2 Adding GSDML files in STEP 7

1. Under the File menu, enter GSDML Management



2. Adding a GSDML file



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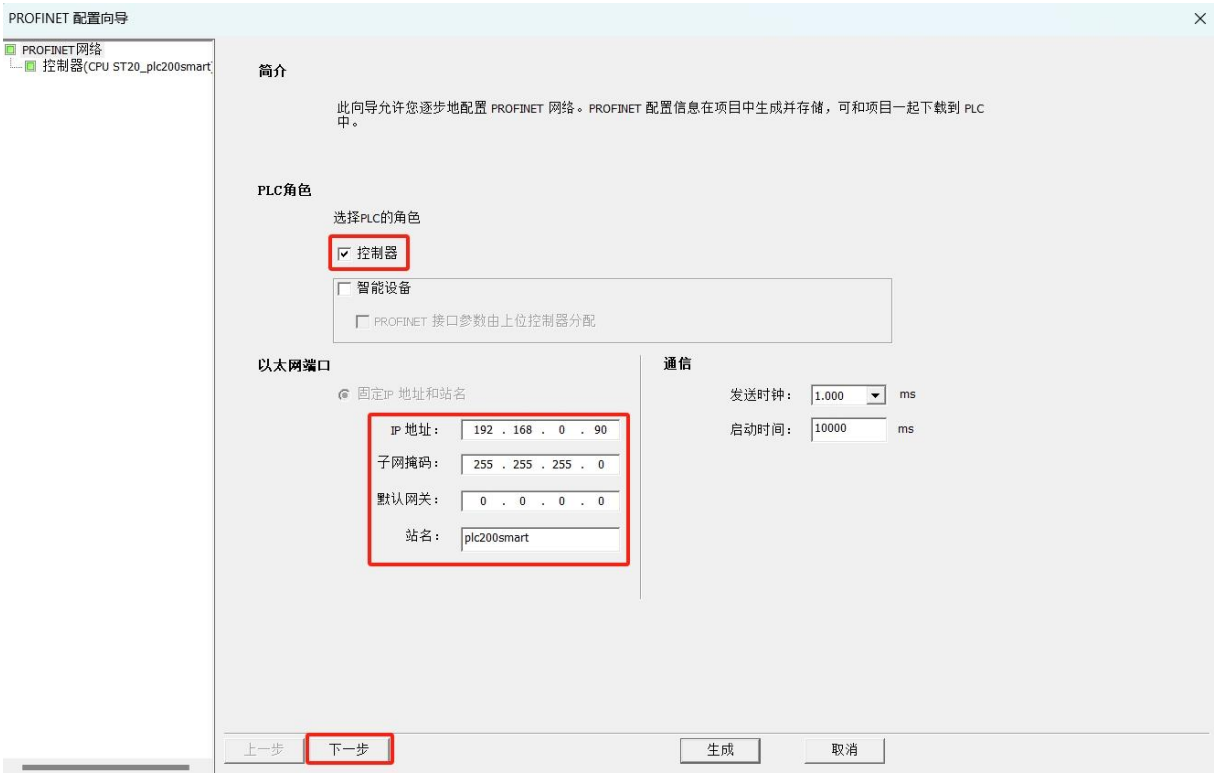
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6.3 Adding Profinet devices to the project

1. Select the PROFINET command under the Tools menu



2. Select the PLC role as PLC controller and set the corresponding PLC controller IP and other related parameters. Click Next when completed.



In the right column , select PROFINET-IO → Gateway → EBYTE → TION → EBYTE Gateway → PN1-D11PMV1.0.0, then hold down the left mouse button and drag it into the table on the left.

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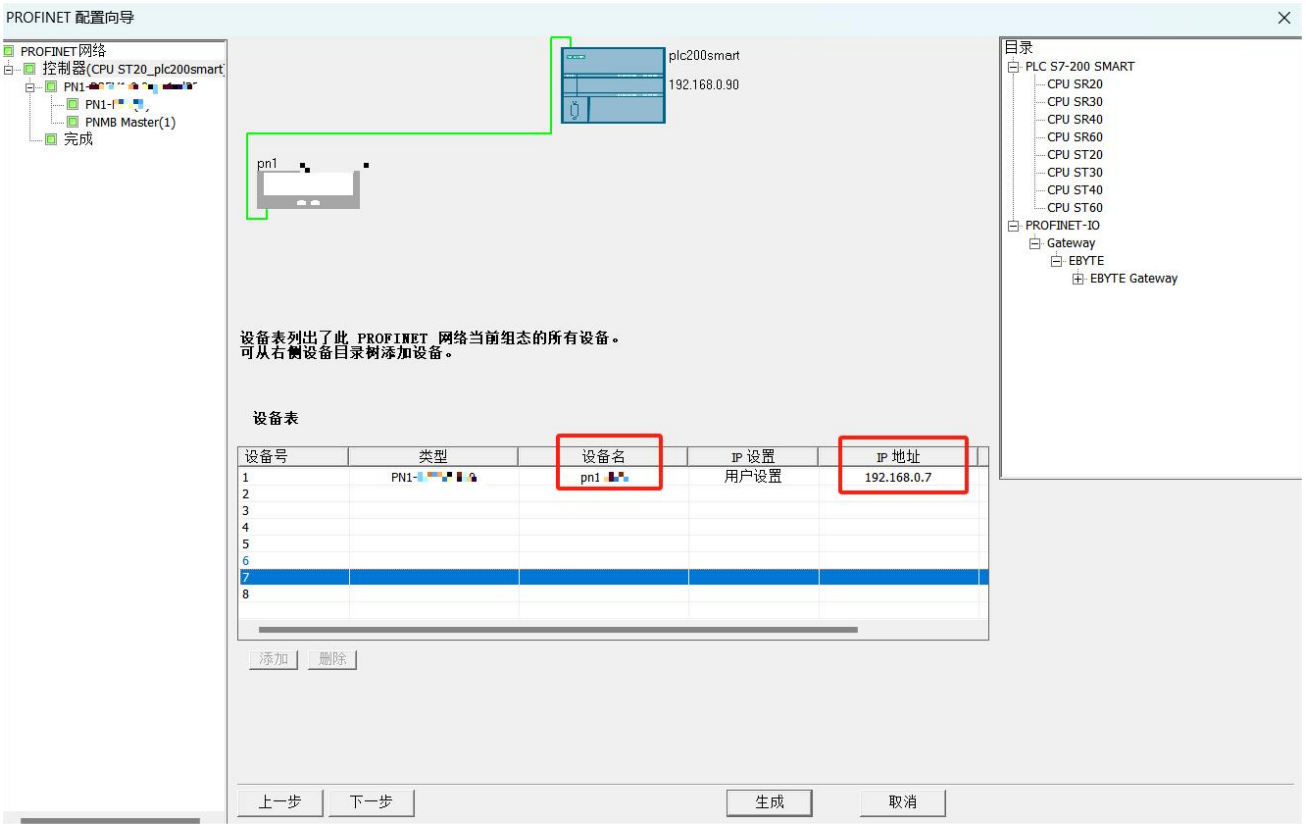


Double-click the device name column and fill in the corresponding device name. The same device name cannot exist in the same project. Similarly, set the IP address and keep it in the same network segment as the PLC controller. Finally, click Generate .

Note: The device name you set here must be consistent with the device. If you are unsure of the device name, you can set it arbitrarily first and then change the module's device name to match. The IP address you set here will be used for modules with the same device name during configuration . For device name modification, refer to the "STEP 7 Modifying Module Names and Querying Module IP Addresses" section .

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6.4 Configure Modbus communication parameters

After completing the relevant settings, click to enter the device view interface. In the device overview area, the system provides two slots for configuring the serial port function module. Each slot can accommodate 32 subslots for configuring the Modbus command submodule. Specifically, subslot 1 corresponds to the device's serial port status word and serial port control word (applicable to PNMB Master/PNMB Slave configurations). The status word allows the PLC to obtain the operating status of the PN1-D11PM device; the control word allows the PLC to control the PN1-D11PM device.

To adjust the Modbus interface parameters for serial port 1 or 2 on the PN1-D11PM device, first select the target slot (i.e., slot 1 or 2) and then select "Properties." During this process, you must preselect the serial port's operating mode (PNMB Master/PNMB Slave)—Modbus RTU Master or Slave. It's important to note that the PN1-D11PM gateway is compatible with both Modbus RTU Master and Slave modes.

PN1-D11PM device module Modbus communication interface parameters:

PNMB Master

Custom Baudrate:

When the serial port is configured in slave mode and a custom baud rate is required, the default setting is 0. This means that the custom baud rate is not enabled. To enable a custom baud rate, set a value between 1200 and 3900000. In this case, the "Baudrate" option will not take effect.

Baudrate:

Standard baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 bps, default: 9600.

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Databits:
Data bits: 7, 8bit, default: 8.

Parity:
Data check: None Parity (no check), Odd Parity (odd check), Even Parity (even check), default: None Parity (no check).

Stopbit:
Data stop bit : 1 , 2 bit , default: 1 .

Max Retry N umber:
The number of error retries when the serial port is used as a master station, 0-255, 0 does not resend, 255 resends infinitely, 1-254 resends according to the number of times , default: 3 .

Slave Response Timeout (ms) :
the serial port is acting as a master, the module waits for a response from the Modbus device after sending a Modbus message. If the Modbus device does not respond within the set response time, the module stops waiting and continues to send the next Modbus message or resends it. The selection range is 0 - 65535 ms , and the default is 100ms .

Poll Interval(ms):
the serial port functions as a master, the bus conversion module delays sending Modbus master messages after receiving a correct reply from a Modbus slave. If a Modbus slave device responds slowly to master messages, communication problems may occur if the bus conversion module sends Modbus messages too quickly. You can increase the message interval appropriately. Select from 10 , 20, 30, 40, 50, 60, 70, 80, 90, 100, 200, 500 , 1000ms, or No Delay. The default value is 50ms .

Frame interval (ms):
Data frame break time: 0-65535ms, 0 means automatic frame break, default: 0.

PNMB Slave
Custom Baudrate:
When the serial port is configured in slave mode and a custom baud rate is required, the default setting is 0. This means that the custom baud rate is not enabled. To enable a custom baud rate, set a value between 1200 and 3900000. In this case, the "Baudrate" option will not take effect.

Baudrate:
Standard baud rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800 bps, default: 9600.

Databits:
Data bits: 7, 8bit, default: 8.

Parity:

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Data check: None Parity (no check), Odd Parity (odd check), Even Parity (even check), default: None Parity (no check).

Stopbit:
Data stop bit : 1 , 2 bit , default: 1 .

Delay Response Time.
the serial port is acting as a slave, how long to delay responding after receiving a polling command from the master. Range: 0 to 65535 , where 0 indicates an immediate response. Unit: milliseconds . Default: 0 .

Slave Address:
The station address when the serial port is used as a slave. Range: 1 to 247 , default : 1 .

Note: The configuration of serial port 2 is the same as that of serial port 1.

6.5 Configure Modbus message (function code)

two slots in the device overview . These two slots are used to configure serial port information and master/slave station selection. The status word and control word are already occupied , leaving 64 sub -slots (32 sub -slots for each serial port command) for configuring MODBUS messages (commands).

Click the module in the hardware directory on the right to provide the master and slave station selection for the serial port, which are PNMB Master (the status word and control word are already occupied and the serial port related parameters need to be configured) and PNMB Slave (the status word and control word are already occupied and the serial port related parameters need to be configured); click the submodule to select the corresponding Modbus RTU command. Simply double-click the message in the hardware directory to configure the message into the MODBUS message queue according to the order of the blank slots.

Modbus RTU Master Commands

Each Modbus RTU master command has five attributes:

Slave Address (1 ~ 247): Indicates the address of the Modbus RTU slave device. The selectable range is 1-247.

Function Code: The function code of the Modbus RTU master station. The function code is automatically generated according to the MODBUS command inserted into the slot and cannot be changed.

Start Address: The starting address for Modbus RTU slave data operations. Non-register PLC address , no prefix. Range 0-65535.

XX Quantity : Indicates the number of coils or registers to be read or written. The MODBUS command is automatically generated when the data is inserted into the slot , and the quantity can be changed within the range .

Transmission Type: Provides the following four transmission types.

Disable: Indicates that the command is not executed.

Poll trigger: After the master station corresponding to Modbus RTU is enabled, the message will be sent in the order of slot numbers from small to large.

Level ltrigger (Level Send): When the control send flag corresponding to the slot number changes from 0 to 1: For a read command, the message will be sent. For a write command, it will only be sent if the data has changed. When the control send flag corresponding to the slot number changes from 1 to 0, both read and write messages will stop sending. (For example, in the previous section, PLC address QB2-QB5 is the send trigger control bit)

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Rising Trigger (send on rising edge): When the trigger control bit corresponding to the slot number changes from 0 to 1, the message will be sent once. (For example, in the previous section, PLC address QB2-QB5 is the send trigger control bit)

Modbus RTU Slave Commands

Each Modbus RTU slave command is prefixed with " Input" or "Output." "Input" indicates data input into the PLC, meaning the master writes data to the slave, which then passes the data to the PLC. This corresponds to a write-type command. "Output" indicates data output from the PLC, meaning the PLC passes data to the slave, which then is read by the master. This corresponds to a read-type command. More specifically, each slave command ends with the supported function codes.

Function code	Function	Operation address area (non-register PLC address)	Operation Type
01H	Read multiple coil output states	0XXXX	read
02H	Read multiple input coil states	1xxXX	read
03H	Read multiple holding registers	4xxXX	read
04H	Read input register	3XXXX	read
05H	Force a single coil	0XXXX	Write
06H	Presetting a Single Holding Register	4XXXX	Write
OFH	Forced multi-coil	0xXXX	Write
10H	Preset multiple holding registers	4XXXX	Write

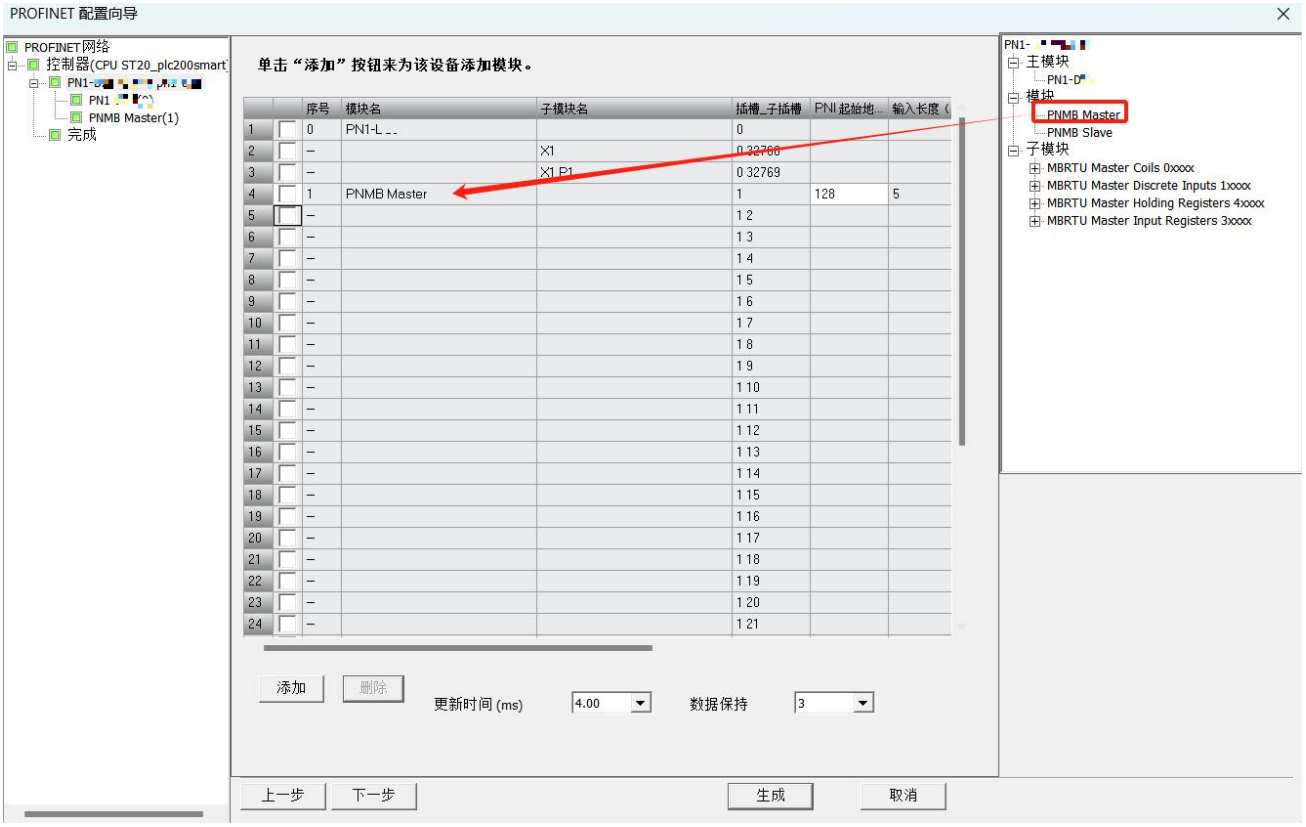
6.5.1. Routines

Set the device serial port 1 as the master station to write 8-bit coils.

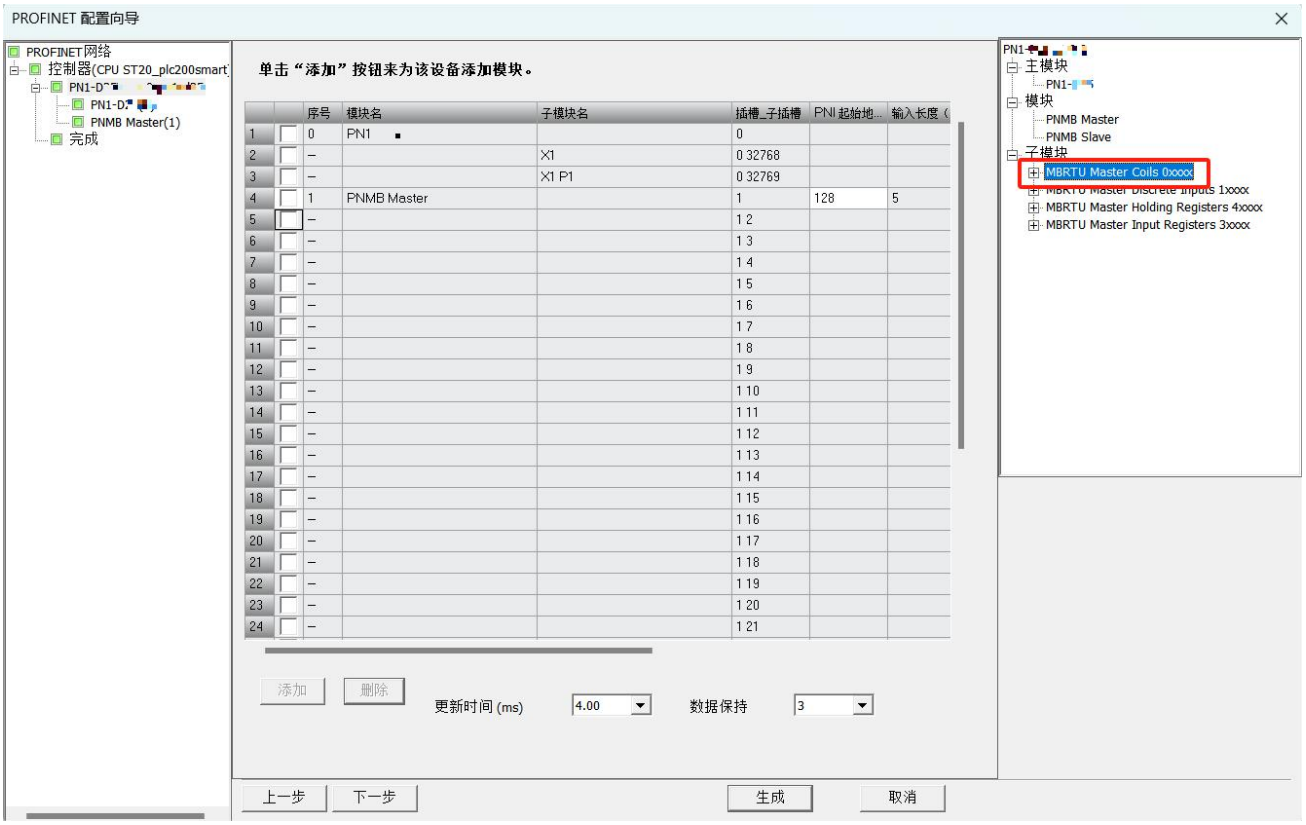
Step 1: Drag PNMB Master into slot 1,

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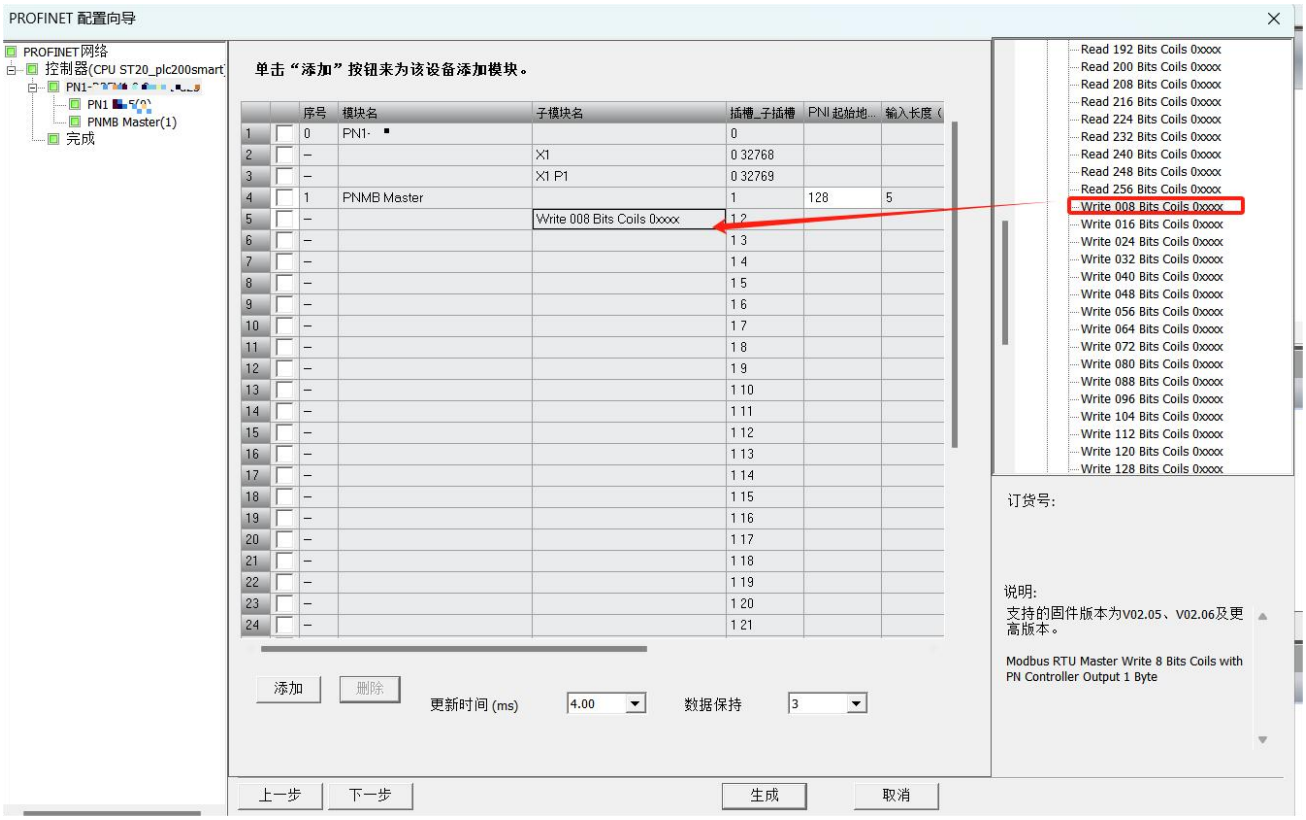
Step 2: Select the command in the submodule MBRTU Master Coils 0xxxx



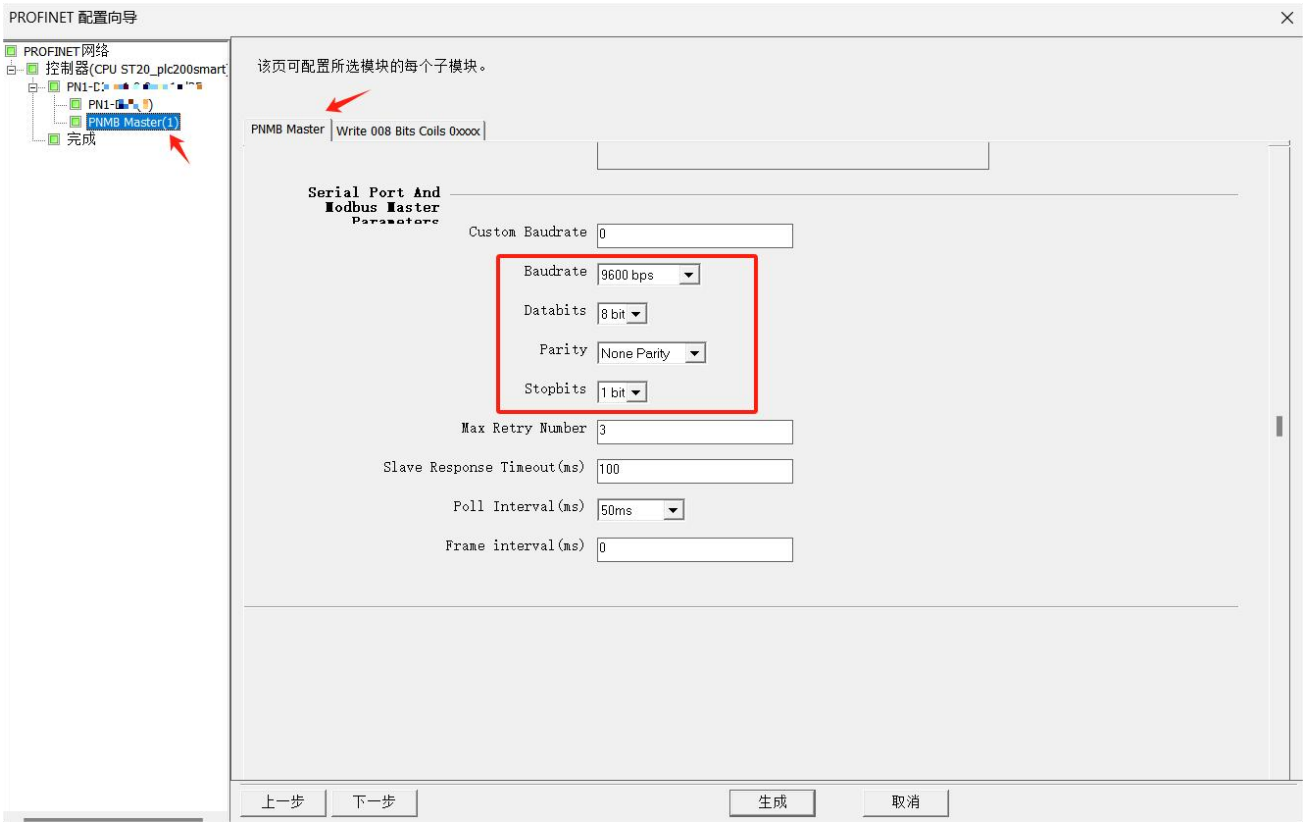
Step 3: Select MBRTU Write 008 bits 0xxxx

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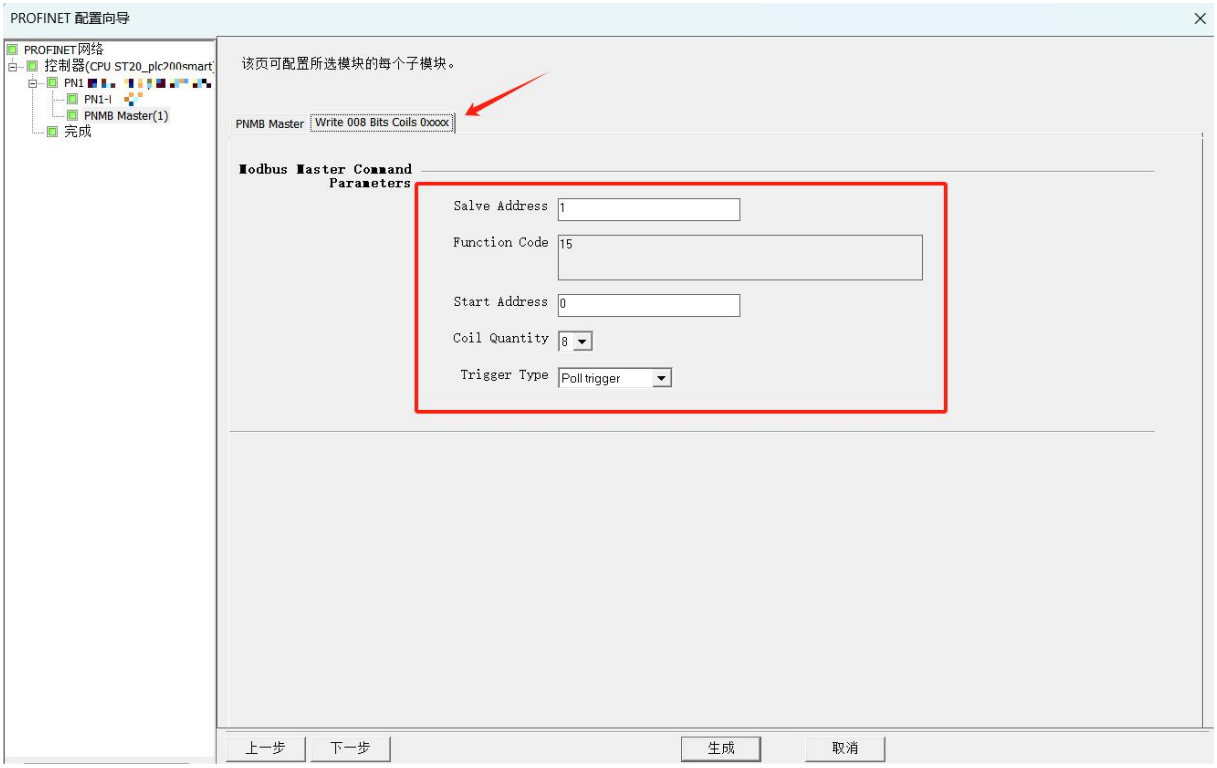
Step 4: Configure the working parameters of the gateway serial port. Select the host module (PNMB Master) just added. Here you need to configure the serial port parameters of the gateway according to the serial port parameters of the RTU.



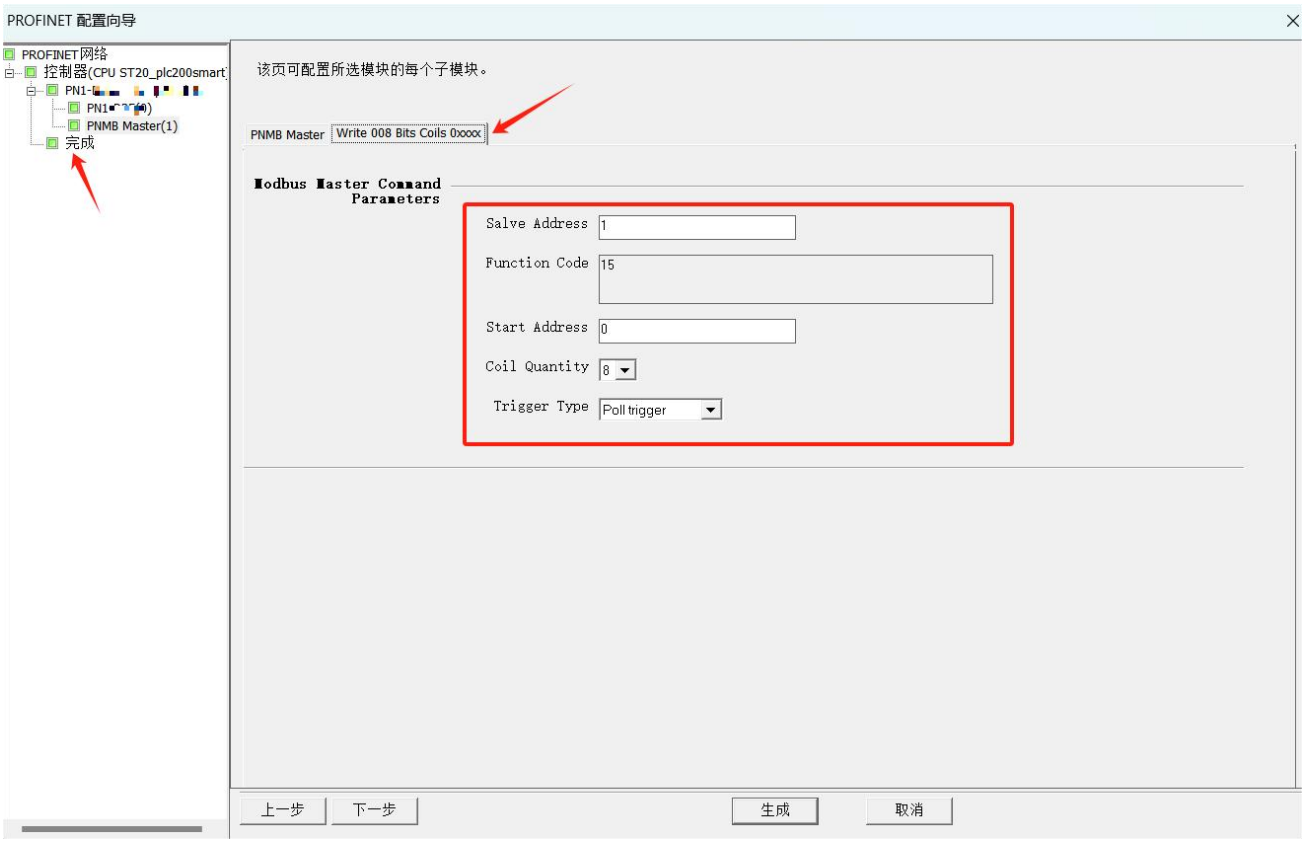
Configuration register information for communication between Profinet gateway and RTU;

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Then click Finish, check the address corresponding to the device, and finally click Generate



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6.6 Configure status word and control word

From the device overview configuration, you can see slot 1, which is only used to select PNMB Master/ PNMB Slave. The I Address column corresponds to the Profinet input addresses IB128-132, which are the communication status monitoring bits. The Q Address column corresponds to the Profinet output addresses QB128-132. QB128 is the communication control word (control) for this bus conversion module, and QB129-132 are the control bits for each message sent.

Communication status monitoring:

1st byte: The slot number of serial port 1 where the error occurred

Byte 2: Serial port 1 error code

The other bytes are reserved.

Error Code	describe
1	Slave replies modbus standard error: ILLEGAL FUNCTION
2	The slave responds with a modbus standard error: ILLEGAL DATA ADDRESS
3	The slave responds with a modbus standard error: ILLEGAL DATA VALUE
4	The slave responds with a modbus standard error: SLAVE DEVICE FAILURE
10	The length of the message received by the master is incorrect , too long, too short, or inconsistent with the correct length of the slave's reply data.
11	The CRC check of the message received by the master station is wrong
12	The master station receives an error in the number of message registers.
13	The slave address of the message received by the master is wrong
14	Master station receiving timeout
15	The function code in the message received by the master station is inconsistent with the request
16	The register address of the message received by the master station is wrong
17	Unknown error

Communication control bits:

Bit 0: Whether the Modbus serial port is enabled, 1 = enabled, 0 = disabled;

Bit 1: Clear fault code. When a rising edge (0→1) is detected, the communication status monitoring is cleared.

Other bits are reserved.

Bytes 2 to 5:

Each slot's message corresponds to one bit. The corresponding format is shown in the following table.

When the message is configured as rising edge triggered, when this bit changes from 0 to 1, the message is enabled to be sent once.

When the message is configured as level-triggered, setting this bit to 1 enables cyclic transmission of the message, and setting it to 0 stops cyclic transmission of the message.

Byte 2							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Subslot 9	Subslot 8	Subslot 7	Subslot 6	Subslot 5	Subslot 4	Subslot 3	Subslot 2

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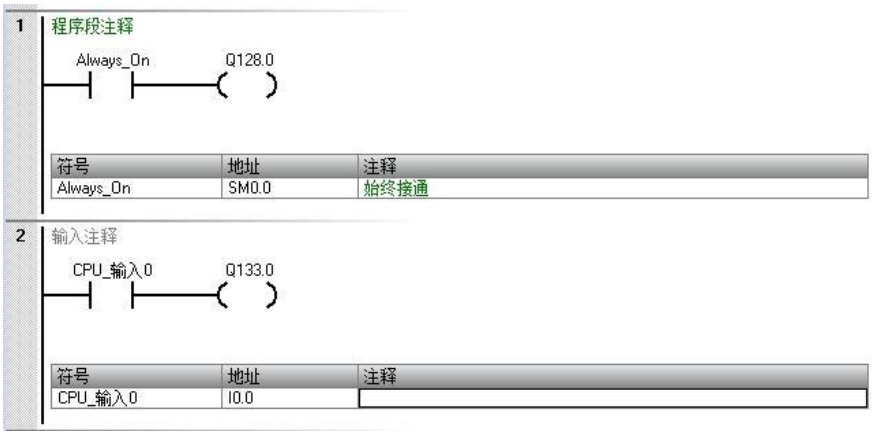
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Byte 3							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Subslot 17	Subslot 16	Subslot 15	Subslot 14	Subslot 13	Subslot 12	Subslot 11	Subslot 10
Byte 4							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Subslot 25	Subslot 24	Subslot 23	Subslot 22	Subslot 21	Subslot 20	Subslot 19	Subslot 18
Byte 5							
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Subslot 33	Subslot 32	Subslot 31	Subslot 30	Subslot 29	Subslot 28	Subslot 27	Subslot 26

The status word and control word configuration of slot 2 are the same as those of slot 1.

6.6.1. Routines

Program segment 1 is used to open the gateway's channel 1 serial port, and program segment 2 uses the PLC's built-in input to control the extended coil.



6.7 Use STEP 7 to modify the module name and query the IP address

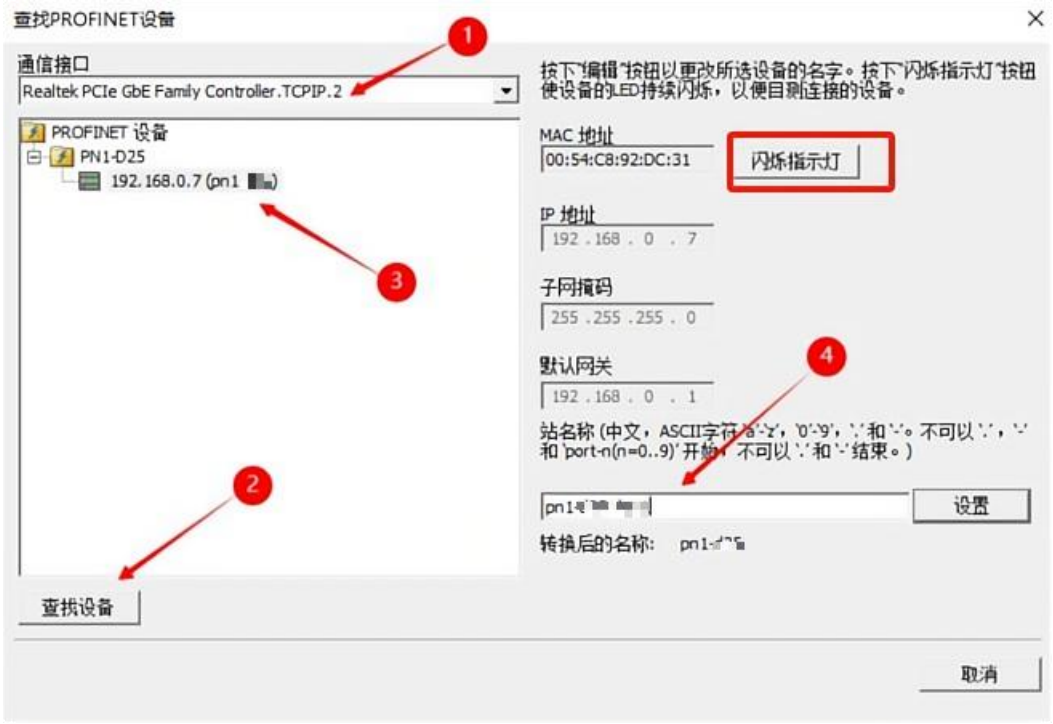
Search for the gateway device using the Profinet tool in STEP 7-MicroWIN SMART and configure a unique working "station name" for the gateway for communication between the PLC and the corresponding gateway;



Open the tool and select the computer network card connected to the gateway. Select the gateway configuration "station name". If there are multiple modules, you can locate the gateway device that needs to be configured by the flashing indicator light.

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Revision History

Version	Revision Date	Revision Notes	Maintainer
1.0	202 5 - 9 - 11	Initial version	LT

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