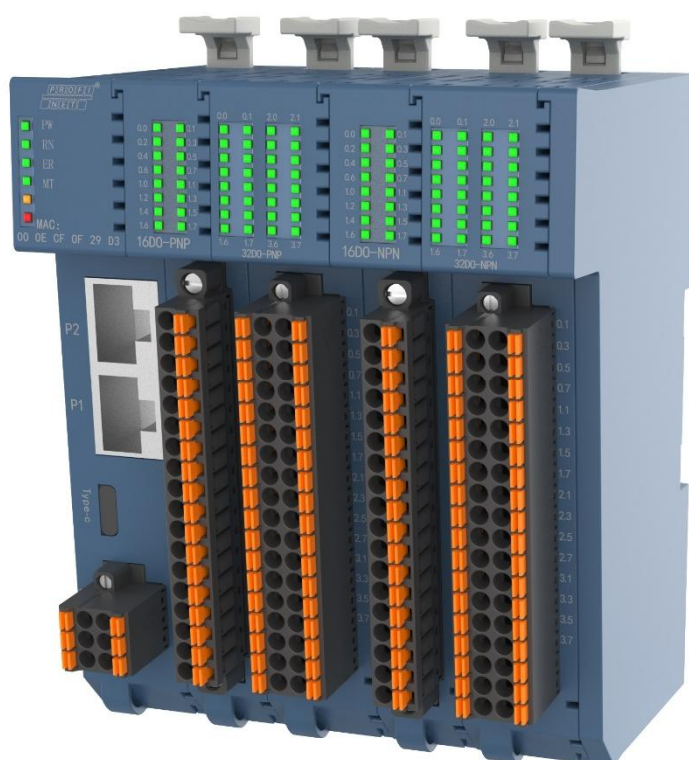




Chongqing Longway Control System Co.,Ltd.



LW Series Sliced (Modular) I/O Module User Manual V1.0

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Loway literature

Version History

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Disclaimer

The contents of this document have been reviewed and are believed to accurately reflect the described software and hardware. Nevertheless, minor discrepancies may occur, and thus complete accuracy cannot be warranted. This documentation is regularly reviewed and updated in later editions. We welcome your comments and suggestions for improvement.

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Safety Information

This manual contains safety instructions that must be observed during operation to ensure personal safety and to protect the product and connected equipment from damage. These instructions are highlighted by a triangular warning symbol preceding the text. They are classified into the following categories according to the degree of hazard:



DANGER:

Indicates an imminently hazardous situation. Failure to avoid will result in death, serious personal injury, or major property damage.



WARNING:

Indicates a potentially hazardous situation. Failure to avoid could result in death, serious personal injury, or major property damage.



CAUTION:

Used in conjunction with the safety alert symbol, indicates a potentially hazardous situation. Failure to avoid could result in minor or moderate personal injury or property damage.

NOTICE:

Used without the safety alert symbol, indicates a potentially hazardous situation. Failure to avoid could result in property damage.

NOTE:

Indicates important information related to the product or content that requires special attention within the document.

Qualified Personnel

Only qualified personnel are permitted to install, commission, and operate the system. In the context of this manual, "qualified personnel" refers to individuals who are authorized and, based on the relevant safety regulations and requirements, are competent to perform installation, commissioning, grounding, and labeling of equipment, systems, and circuits.

Scope of Application Please note the following:



WARNING:

This device shall be used exclusively in the applications specified in the catalog or technical documentation. It may be used in conjunction with equipment, components, and devices manufactured by other companies only upon the recommendation or with the express permission of our company.

To ensure product safety and reliability, the product must be transported, stored, and installed in accordance with the applicable requirements, and must be operated with due care and maintained thoroughly.

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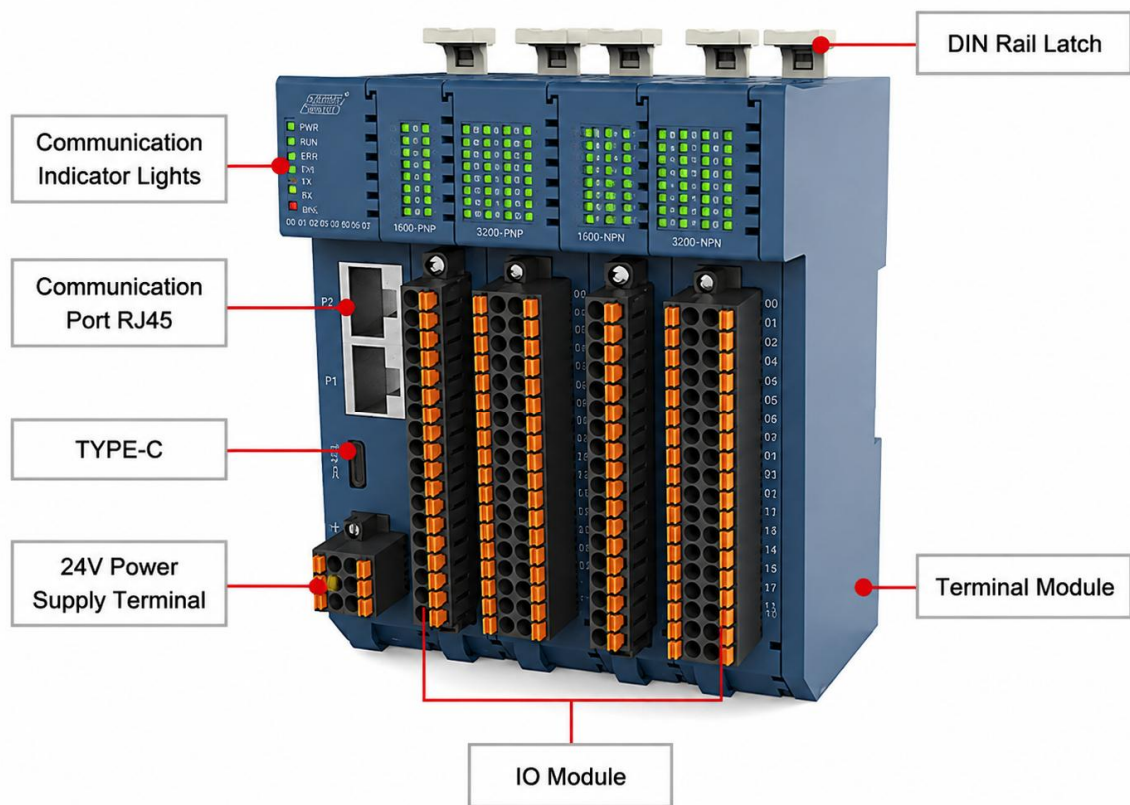
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1 System Overview

The LW Series Sliced I/O Module is a TBUS-based general-purpose remote I/O module independently developed by Chongqing Longway Networked Intelligent Control System Co., Ltd. It is designed to reduce costs, simplify wiring, and improve system reliability for users. Suitable for both cabinet and field-side installation with PLC I/O modules, the LW Series currently offers a wide variety of adapters and I/O types, supporting mainstream fieldbus and industrial Ethernet protocols, with a comprehensive range of I/O modules.

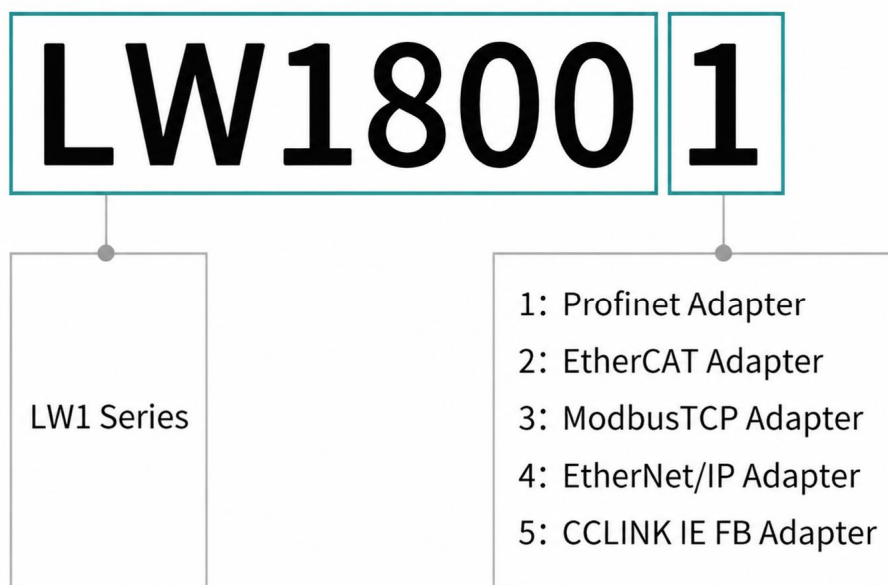
1.1 Product Composition

The LW Series Sliced Remote I/O Module product composition is as follows:

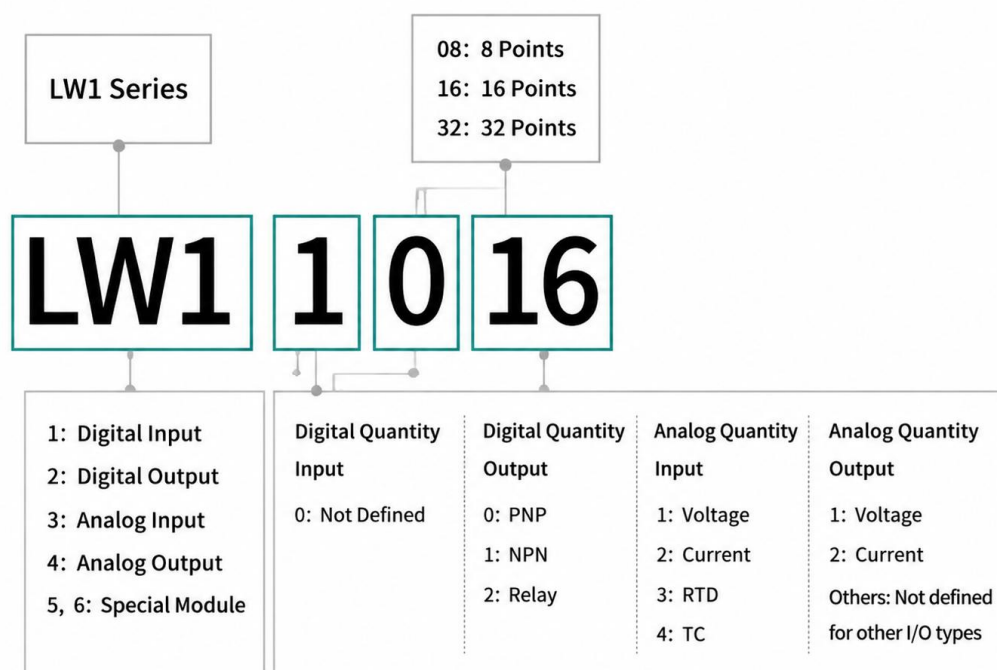


1.1.1 Module Naming Convention

Adapter Naming Convention:



I/O Module Naming Convention:



1.1.2 Module Ordering Codes

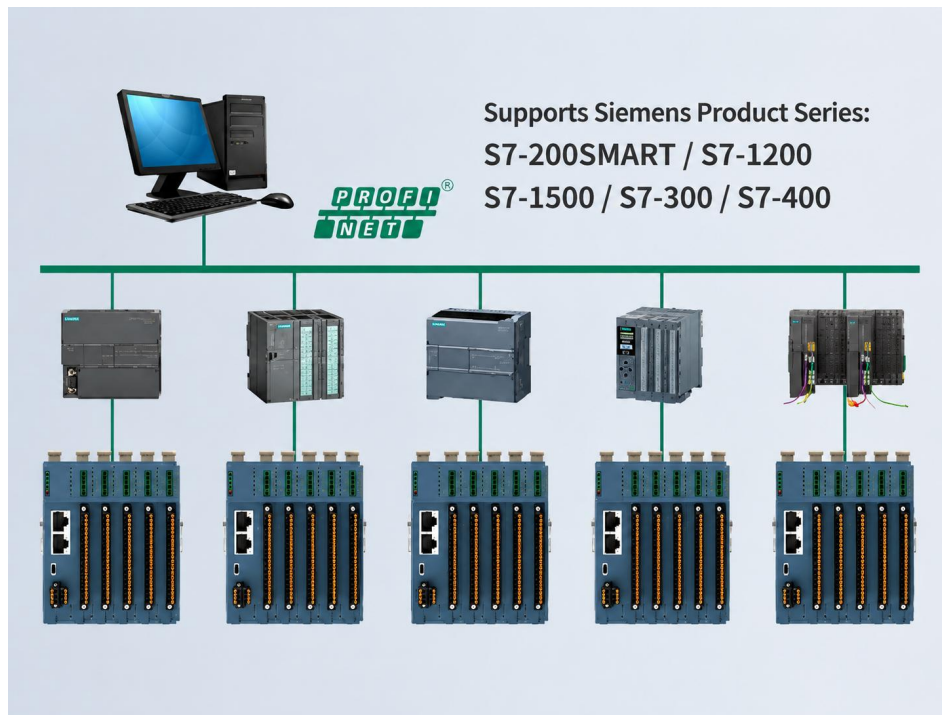
No.	Model	Description
1	LW18001	PROFINET Adapter
2	LW18002	EtherCAT Adapter
3	LW18003	Modbus TCP Adapter
4	LW11016	16DI, PNP & NPN Compatible
5	LW11032	32DI, PNP & NPN Compatible
6	LW12208	8DO, Relay Output
7	LW12016	16DO, PNP
8	LW12032	32DO, PNP
9	LW12116	16DO, NPN
10	LW12132	32DO, NPN
11	LW13008	8AI, Voltage Input 0–10V & ±10V
12	LW13016	16AI, Voltage Input 0–10V & ±10V
13	LW13108	8AI, Current Input 0/4–20mA
14	LW13116	16AI, Current Input 0/4–20mA
15	LW13308	8AI, RTD

16	LW13416	16AI, TC
17	LW14008	8AO, Voltage Output 0–10V & $\pm 10V$
18	LW14016	16AO, Voltage Output 0–10V & $\pm 10V$
19	LW14108	8AO, Current Output 0/4–20mA, 16-bit
20	LW14116	16AO, Current Output 0/4–20mA, 16-bit
21	LW15001	Power Feed Module
22	LW15016	External Power Output Module
23	LW16001	End Terminal Module

1.2 System Architecture

1.2.1 PROFINET Bus System Architecture

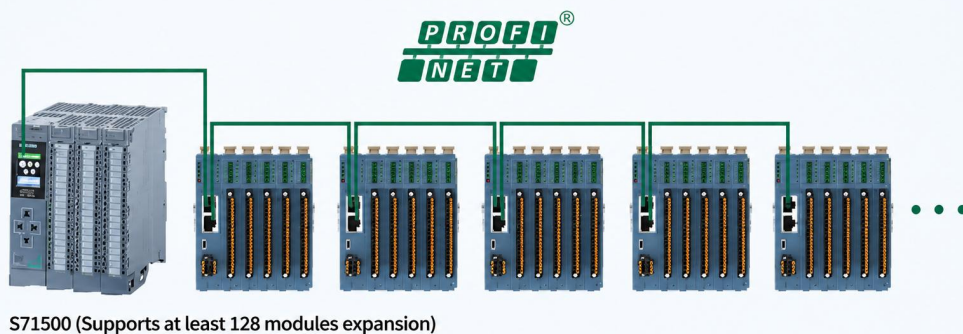
The LW Series Sliced I/O Modules support the PROFINET industrial bus and are compatible with Siemens PLC application architectures. The system architecture is illustrated in the figure below:



The communication bus protocol adopts the standard PROFINET bus, enabling seamless connectivity with corresponding controllers. The communication interface features two RJ45 100 Mbps Ethernet ports with an integrated internal switch function, eliminating the need for an external switch and allowing easy daisy-chaining of multiple slave stations.

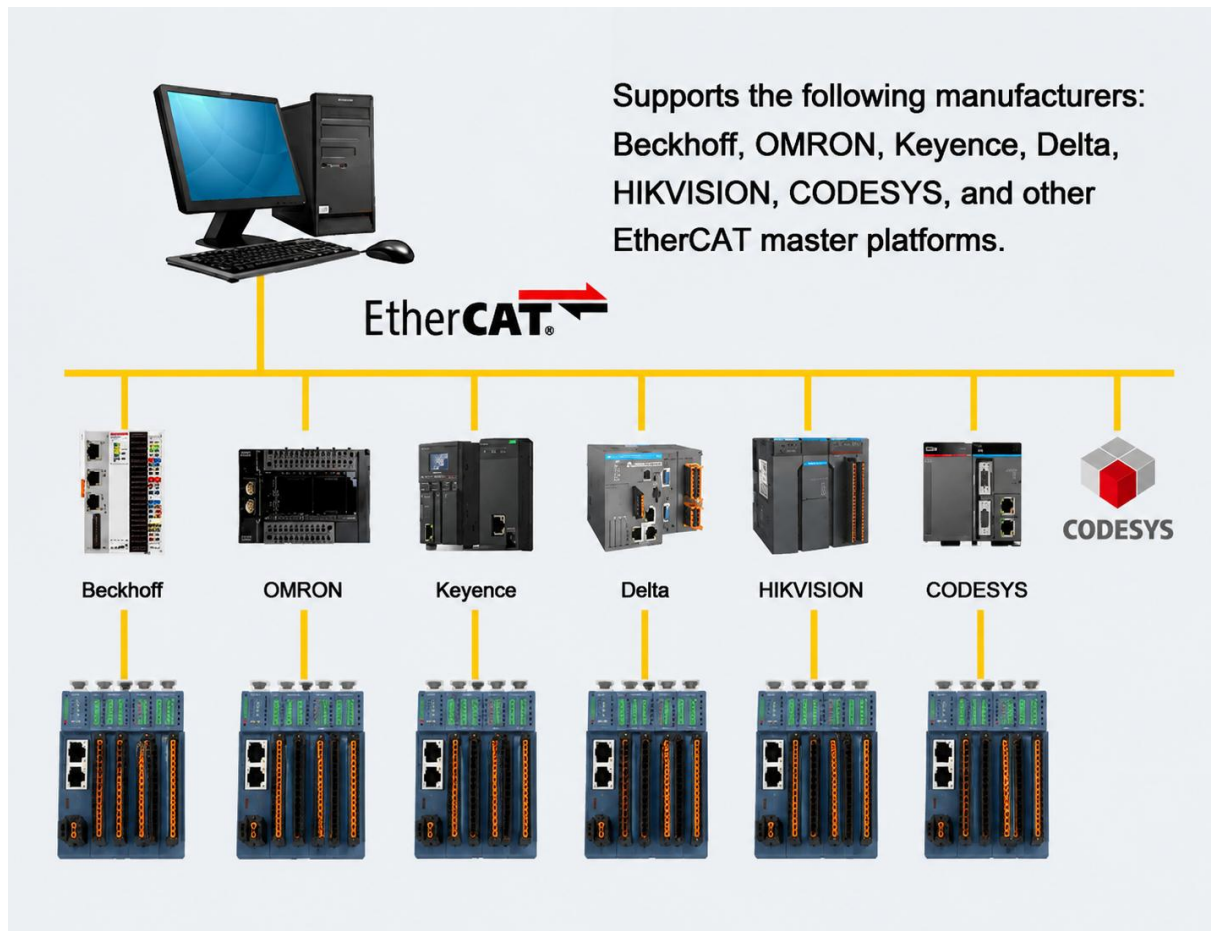
Module with Dual Ethernet Ports, Enabling Advanced Networking Functions

The module is equipped with 2 RJ45 ports, enabling advanced networking functions. Different stations can be expanded with different numbers of modules. For specific module parameters, please refer to the module specifications.



The modules can also communicate with the master controller via a switch.

1.2.2 EtherCAT Bus System Architecture



1.3 Wiring

1.3.1 Wiring to the Controller

For communication between the PROFINET slave I/O and the master station, it is recommended to use Longway Networked's PROFINET/EtherCAT dedicated connectors and cables. Standard RJ45 Ethernet cables may also be used. The module is equipped with two Ethernet ports with built-in switch functionality. Simply insert one end of the Ethernet cable into the CPU and the other end into either Ethernet port on the I/O module. The wiring method for Modbus TCP is similar to that of PROFINET. The specific wiring diagram is shown below:



The EtherCAT bus must be connected in a daisy-chain configuration. For details, refer to Section 1.2.2 EtherCAT Bus System Architecture. If a switch-based connection is required, a dedicated EtherCAT switch must be used. The specific wiring diagram is shown below:



1.3.2 Signal Wiring

The terminal blocks of the LW Series Sliced I/O Modules feature a tool-less (spring-cage) connection design. Operation requires only a flat-blade screwdriver. Cables of 14 AWG are recommended. To terminate a wire, first strip the insulation to an appropriate length, then press down the orange actuating lever with the screwdriver, insert the stripped wire into the opened round hole, and release the screwdriver. The wire will be automatically clamped by the spring contact.

Signal wires should not be overly thick; it is recommended to use wires with a cross-section of 0.75 mm² or less.

The recommended stripping length is 10 mm. A stripping length of less than 9 mm may result in the signal wire being too short to be properly clamped.

NOTE: Ensure that the polarity of the power supply is not reversed, as doing so may cause the module to malfunction or become damaged. Do not insert or remove modules or signal wires while

the system is powered on.

2 Installation, Removal and Dimensions

The LW Series Sliced Remote I/O Modules feature a DIN-rail mounting design and can be easily installed onto a standard 35 mm DIN rail. The terminal blocks are designed with tool-less (spring-cage) connection technology, which significantly reduces installation and wiring effort while improving connection reliability. All terminal blocks are pluggable, allowing modules to be replaced without rewiring—simply detach the terminal block and reattach it to the replacement module.

2.1 Module Installation

Hang the module onto the upper edge of the DIN rail and position it properly on the rail. Then press firmly on the lower section of the module to snap it securely onto the DIN rail. The rail retaining clip must be in the locked position to complete the installation.

As shown in Figure 1 below, use a small screwdriver to push the retaining clip backward. Then, as shown in Figure 2, the module is securely installed.

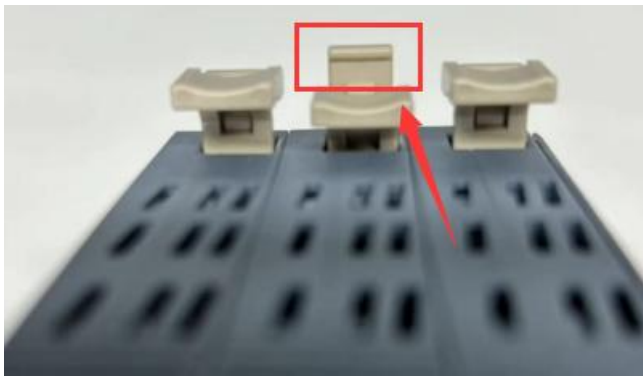


Figure 1

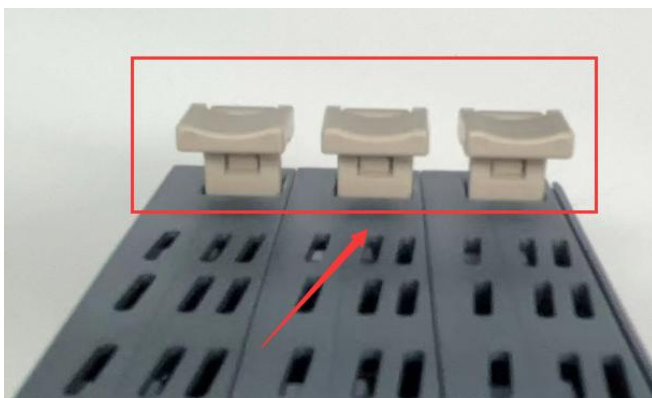
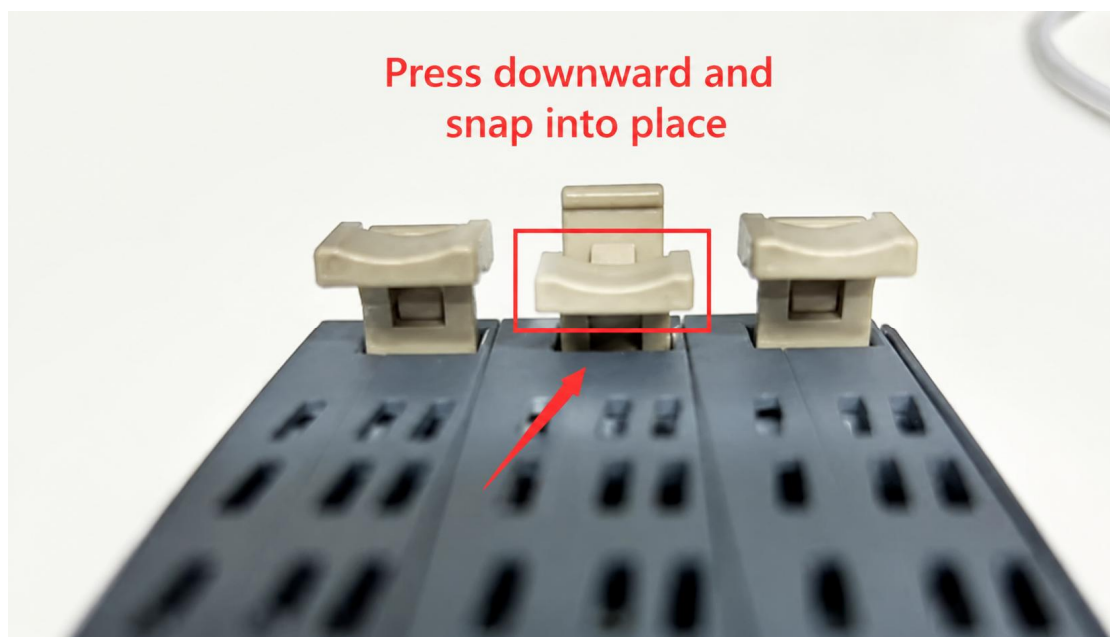


Figure 2

2.2 Removal

First, unplug all terminal blocks from the module. Then, press the DIN-rail retaining clip with a screwdriver at the position shown in the figure below, and pull the module upward to remove it.



The module features pluggable terminal blocks. If only the module needs to be replaced, simply unplug the terminal blocks and replace the module.

3 Module Description

3.1 Adapter Module Parameter Specifications

3.1.1 LW18001 Parameters

Name	PROFINET Slave Adapter
Interface Parameters	
Supported Slave Stations	Depends on the master station (Siemens SMART 200 supports up to 8 extensions, S7-1200 supports up to 16 extensions, S7-1500 supports up to 128 extensions)
Slaves per Adapter	32
Data Transmission Medium	Ethernet CAT5 cable
Connection Method	2 × RJ45
Transmission Rate	100 Mb/s
Transmission Distance	100 m (station-to-station distance)
Electrical Isolation	Yes
Technical Parameters	
Rated Voltage	24 VDC

Ring Network Redundancy	Supported
Scan Cycle	< 3 ms
Number of PN Ports	2
PN Port Function	Ethernet switch
Network Failure	3 s
Connection Method	TBUS spring- clamp connection
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 20 × 75 mm (W × H × D)
Weight	Approx. 79 g
Protection Rating	IP20
Operating Temperature	–10 to 70 °C
Storage Temperature	–20 to 80 °C
Relative Humidity	95 %, non- condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

3.1.2 LW18002 Parameter Specifications

Name	EtherCAT Slave Adapter
Interface Parameters	
Supported Slave Stations	Depends on the master station
Submodules per Slave	32
Data Transmission Medium	Ethernet CAT5 cable
Connection Method	2 × RJ45
Transmission Rate	100 Mb/s
Transmission Distance	100 m (station- to- station distance)
Electrical Isolation	Yes
Technical Parameters	
Rated Voltage	24 VDC
Scan Cycle	< 3 ms
Number of Ethernet Ports	2
Network Failure	3 s
Connection Method	TBUS spring- clamp connection

Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 20 × 75 mm (W × H × D)
Weight	Approx. 79 g
Protection Rating	IP20
Operating Temperature	–10 to 70 °C
Storage Temperature	–20 to 80 °C
Relative Humidity	95 %, non- condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

3.1.3 LW18003 Parameter Specifications

Name	Modbus TCP Slave Adapter
Interface Parameters	
Supported Slave Stations	Depends on the master station
Submodules per Slave	32
Data Transmission Medium	Modbus TCP cable
Connection Method	2 × RJ45
Transmission Rate	100 Mb/s
Transmission Distance	100 m (station- to- station distance)
Electrical Isolation	Yes
Technical Parameters	
Rated Voltage	24 VDC
Scan Cycle	< 3 ms
Number of Ethernet Ports	2
Network Failure	3 s
Connection Method	TBUS spring- clamp connection
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 20 × 75 mm (W × H × D)
Weight	Approx. 79 g
Protection Rating	IP20
Operating Temperature	–10 to 70 °C
Storage Temperature	–20 to 80 °C
Relative Humidity	95 %, non- condensing

Mounting	Standard 35 mm DIN rail
Certification	CE

3.1.4 Status LEDs

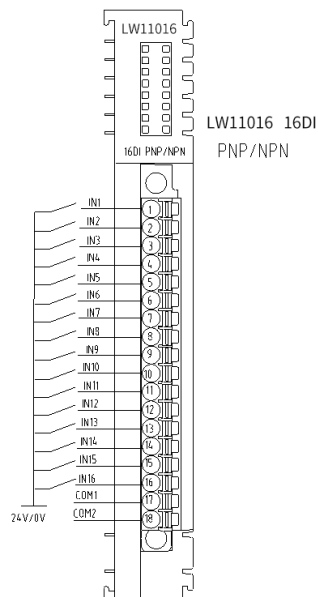
No.	LED	Color	Description	Operating Status
1	PW	Green	System power	Steady on
2	RN	Green	Run indicator	Steady on
3	ER	Red	Error indicator	Off
4	MT	Green	System maintenance	Off

3.2 Digital Input Module

3.2.1LW11016 Parameter Specifications

Model	LW11016	
Name	Digital Input Module (PNP/NPN Compatible)	
Channels	16	
Input Signal Type	PNP	NPN
Rated Input Voltage	24V DC (±20%)	0V DC (±3V)
Logic "1" Signal	15–30V	0–3V
Logic "0" Signal	0–3V	15–30V
Input Current	3mA	
Isolation Withstand	500V	
Isolation Method	Optocoupler isolation	
Channel Status Indicator	Green LED	
Dimensions	Approx. 120 × 17 × 78 mm (W × H × D)	
Weight	Approx. 70 g	
Protection Rating	IP20	
Operating Temperature	–10 to 70 °C	
Storage Temperature	–20 to 80 °C	
Relative Humidity	95 %, non-condensing	
Mounting	Standard 35 mm DIN rail	
Certification	CE	

Module Wiring Diagram:

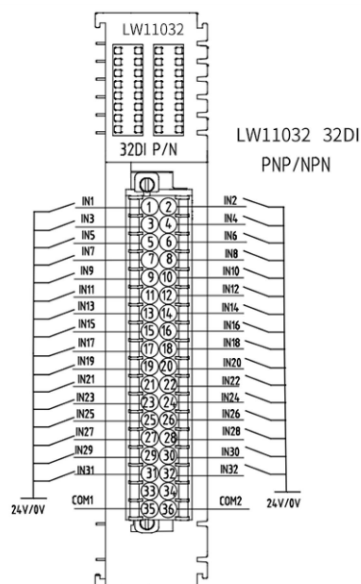


注：PNP 模式接24V，COM1 接0V，COM2 不接
NPN 模式接0V，COM2 接24V，COM1 不接

3.2.2 LW11032 Parameter Specifications

Model	LW11032	
Name	Digital Input Module (PNP/NPN Compatible)	
Number of Channels	32	
Input Signal Type	PNP	NPN
Rated Input Voltage	24V DC ($\pm 20\%$)	0V DC ($\pm 3V$)
Logic "1" Signal	15–30V	0–3V
Logic "0" Signal	0–3V	15–30V
Input Current	3mA	
Isolation Withstand Voltage	500V	
Isolation Method	Optocoupler isolation	
Channel Status Indicator	Green LED	
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)	
Weight	Approx. 90 g	
Protection Rating	IP20	
Operating Temperature	–10 to 70 °C	
Storage Temperature	–20 to 80 °C	
Relative Humidity	95 %, non-condensing	
Mounting	Standard 35 mm DIN rail	
Certification	CE	

Module Wiring Diagram:

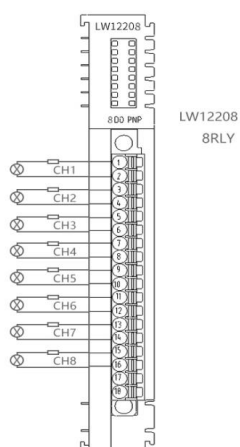


注：PNP 模式接24V，COM1接0V，COM2不接
NPN 模式接0V，COM2接24V，COM1不接

3.3 Digital Output Module

3.3.1LW12208 Parameter Specifications

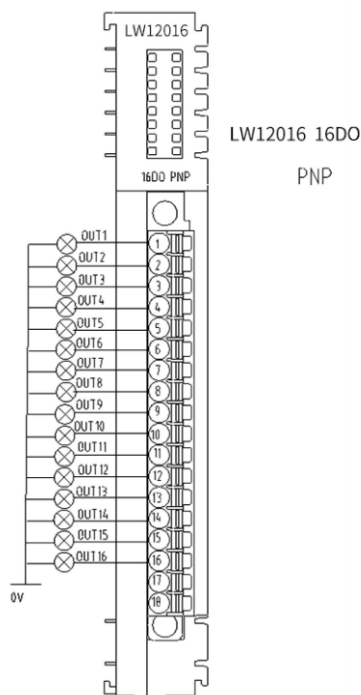
Model	LW12208
Name	Relay Output Module
Number of Channels	8
Output Signal Type	Relay
Contact Form	1H (SPST-NO)
Contact Resistance	$\leq 100 \text{ m}\Omega$ (at 1A 6VDC)
Contact Material	AgSnO ₂ , AgNi
Contact Load (Resistive)	5A 250VAC / 30VDC
Max. Switching Voltage	250VAC / 125VDC (at 0.3A)
Max. Switching Current	5A
Max. Switching Power	1250VA / 150W
Minimum Load	5VDC 10mA
Mechanical Endurance	2×10^7 operations
Electrical Endurance	1×10^5 operations (AgNi, 3A 250VAC/30VDC, resistive load, 85°C, 1s ON / 9s OFF) 5×10^4 operations (AgNi, 5A 250VAC/30VDC, resistive load, room temperature, 1s ON / 9s OFF)
Load Type	Resistive load, inductive load, lamp load
Isolation Withstand Voltage	500V
Isolation Method	Optocoupler isolation



3.3.2 LW12016 Parameter Specifications

Model	LW12016
Name	Digital Output Module
Number of Channels	16
Output Signal Type	PNP
Rated Output Voltage	24V DC ($\pm 20\%$)
Drive Current	500mA
Fault Protection	Short-circuit protection, short-circuit alarm, over-temperature protection
Load Type	Resistive load, inductive load
Isolation Withstand Voltage	500V
Isolation Method	Optocoupler isolation
Channel Status Indicator	Green LED
Dimensions	Approx. $120 \times 17 \times 78$ mm (W $\times$ H $\times$ D)
Weight	Approx. 70 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

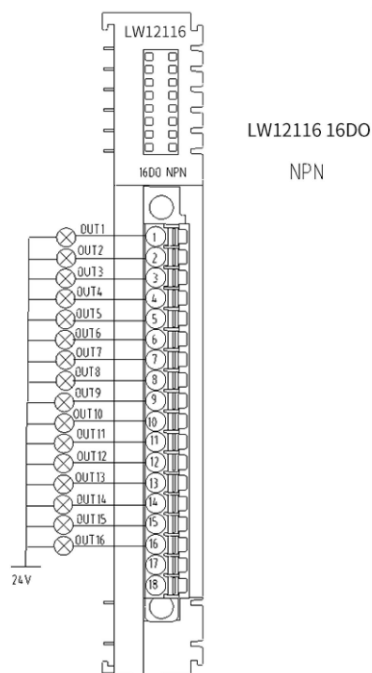
Module Wiring Diagram:



3.3.3 LW12116 Parameter Specifications

Model	LW12116
Name	Digital Output Module
Number of Channels	16
Output Signal Type	NPN
Rated Output Voltage	0V DC ($\pm 3V$)
Drive Current	0.5A
Fault Protection	Short-circuit protection, short-circuit alarm, over-temperature protection
Load Type	Resistive load, inductive load
Isolation Withstand Voltage	500V
Isolation Method	Optocoupler isolation
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 17 × 78 mm (W × H × D)
Weight	Approx. 70 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non- condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

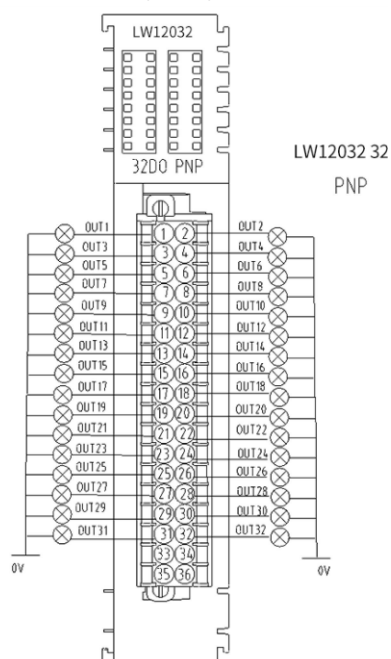
Module Wiring Diagram:



3.3.4LW12032 Parameter Specifications

Model	LW12032
Name	Digital Output Module
Number of Channels	32
Output Signal Type	PNP
Rated Output Voltage	24V DC ($\pm 20\%$)
Drive Current	0.5A
Fault Protection	Short-circuit protection, short-circuit alarm, over-temperature protection
Load Type	Resistive load, inductive load
Isolation Withstand Voltage	500V
Isolation Method	Optocoupler isolation
Channel Status Indicator	Green LED
Dimensions	Approx. $120 \times 22 \times 78$ mm (W $\times$ H $\times$ D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

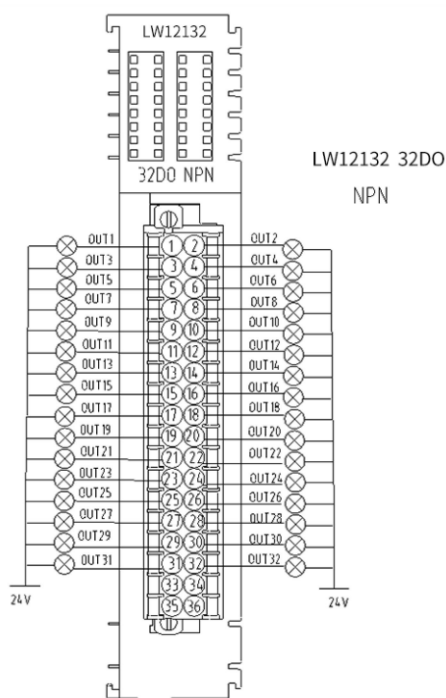
Module Wiring Diagram:



3.3.5LW12132 Parameter Specifications

Model	LW12132
Name	Digital Output Module
Number of Channels	32
Output Signal Type	NPN
Rated Output Voltage	0V DC ($\pm 3V$)
Drive Current	0.5A
Fault Protection	Short-circuit protection, short-circuit alarm, over-temperature protection
Load Type	Resistive load, inductive load
Isolation Withstand Voltage	500V
Isolation Method	Optocoupler isolation
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

Module Wiring Diagram:

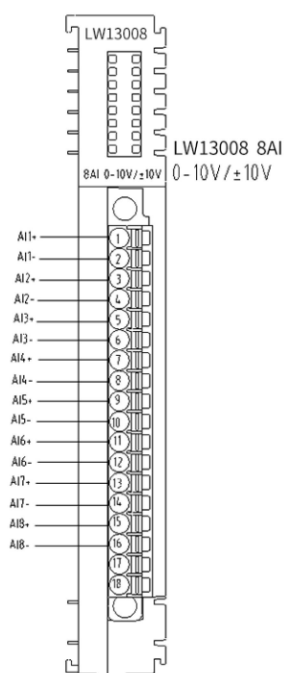


3. 4 Analog Input Module

3.4.1LW13008 Parameter Specifications

Model	LW13008
Name	Voltage Input Module
Number of Channels	8
Input Type	0-10V / $\pm 10V$
Resolution	16-bit
Conversion Time	1 ms
Full-Scale Range (Data Word)	Profinet protocol: -27648~+27648
	EtherCAT protocol: -32768~+32767
	ModbusTCP protocol: -27648~+27648
Input Signal Accuracy	$\pm 0.1\%$
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 17 × 78 mm (W × H × D)
Weight	Approx. 70 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non- condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

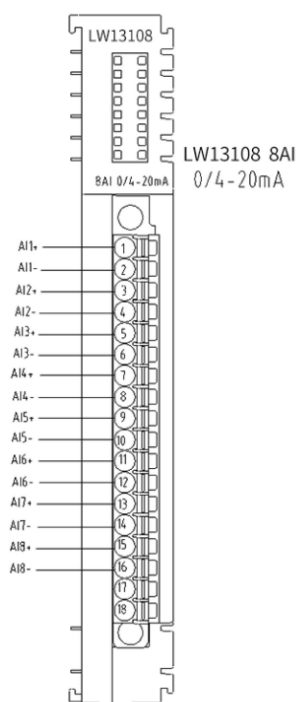
Module Wiring Diagram:



3.4.2 LW13108 Parameter Specifications

Model	LW13108
Name	Current Input Module
Number of Channels	8
Input Type	0/4-20mA
Resolution	16-bit
Conversion Time	1 ms
Full-Scale Range (Data Word)	Profinet protocol 0~27648
	EtherCAT protocol 0~32767
	ModbusTCP protocol 0~27648
Input Signal Accuracy	±0.1%
Sensor Connection	Supports 4-wire transmitters; (2-wire transmitters are also
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 17 × 78 mm (W × H × D)
Weight	Approx. 70 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

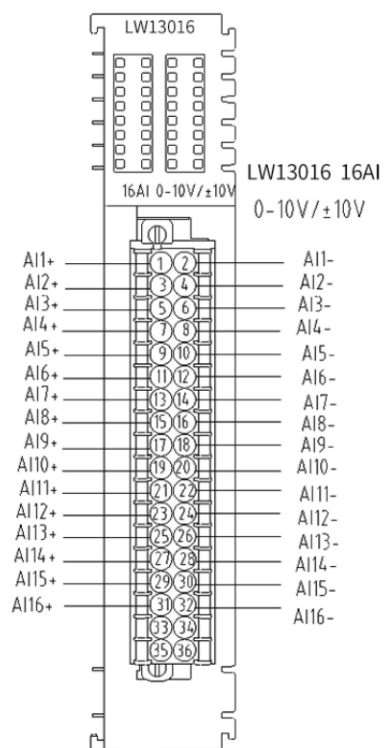
Module Wiring Diagram:



3.4.3 LW13016 Parameter Specifications

Model	LW13016
Name	Voltage Input Module
Number of Channels	16
Input Type	0–10V / ± 10 V
Resolution	16-bit
Conversion Time	1 ms
Full-Scale Range (Data Word)	Profinet Protocol-27648 $\sim$ +27648
	EtherCAT Protocol-32768 $\sim$ +32767
	ModbusTCP Protocol-27648 $\sim$ +27648
Input Signal Accuracy	$\pm 0.1\%$
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	–10 to 70 °C
Storage Temperature	–20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

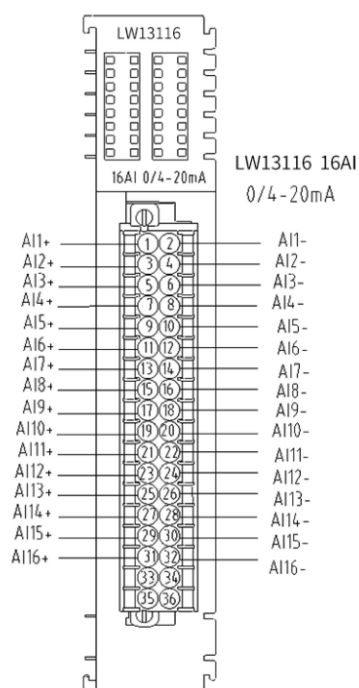
Module Wiring Diagram:



3.4.4 LW13116 Parameter Specifications

Model	LW13116
Name	Current Input Module
Number of Channels	16
Input Type	0/4-20mA
Resolution	16-bit
Conversion Time	1 ms
Full-Scale Range (Data Word)	Profine Protocol 0~27648
	EtherCAT Protocol 0~32767
	ModbusTCP Protocol 0~27648
Input Signal Accuracy	±0.1%
Sensor Connection	Supports 4-wire transmitters; (2-wire transmitters are also
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

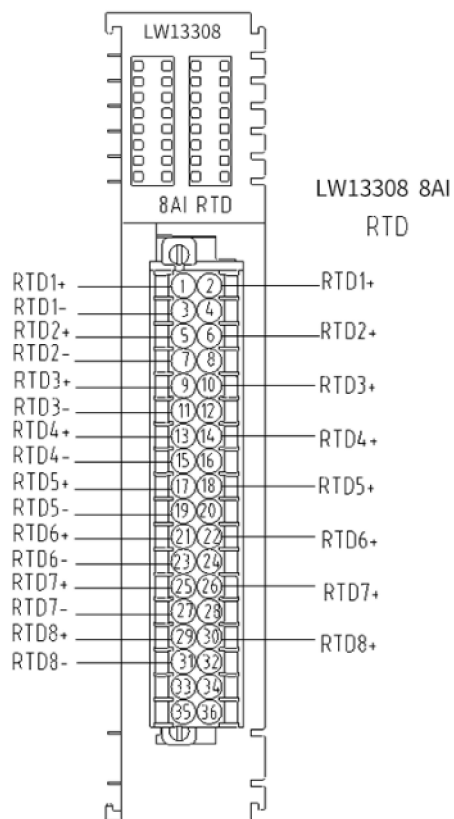
Module Wiring Diagram:



3.4.5LW13308 Parameter Specifications

Model	LW13308
Name	RTD Input Module
Number of Channels	8
Input Type	Cu50, Pt100, etc., or 0–1k Ω signal
Resolution	16-bit
Conversion Time	250 ms
Input Signal Accuracy	$\pm 0.1\%$
Sensor Connection	3-wire
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	–10 to 70 °C
Storage Temperature	–20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

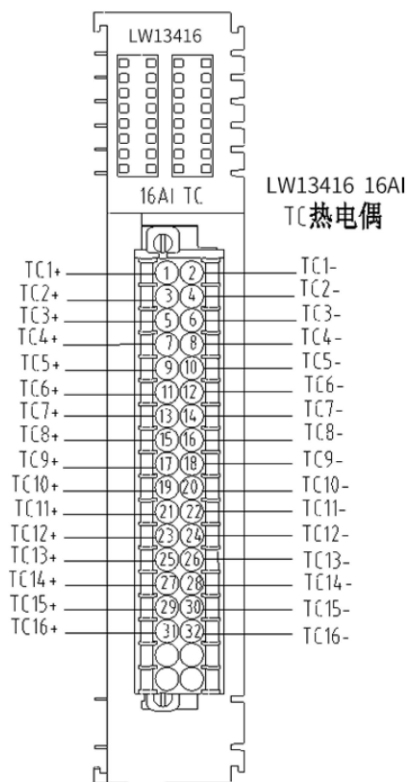
Module Wiring Diagram:



3.4.6LW13416 Parameter Specifications

Model	LW13416
Name	Thermocouple Input Module (TC)
Number of Channels	16
Input Type	K, J, T, E, N, S, R, B
Resolution	16-bit
Conversion Time	250 ms
Input Signal Accuracy	±0.1%
Sensor Connection	2-wire
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	−10 to 70 °C
Storage Temperature	−20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

Module Wiring Diagram:

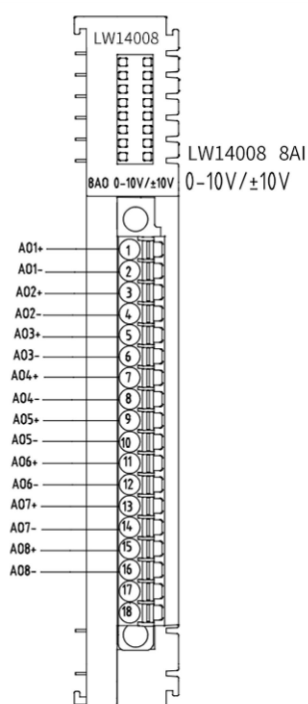


3. 5 Analog Output Module

3.5.1LW14008 Parameter Specifications

Model	LW14008
Name	Voltage Output Module
Number of Channels	8
Output Type	0–10V / $\pm 10V$
Resolution	16-bit
Conversion Time	1 ms
Full-Scale Range (Data Word)	Profinet Protocol -27648~+27648
	EtherCAT Protocol-32768~+32767
	ModbusTCP Prptobol-27648~+27648
Output Signal Accuracy	$\pm 0.1\%$
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 17 × 78 mm (W × H × D)
Weight	Approx. 70 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non- condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

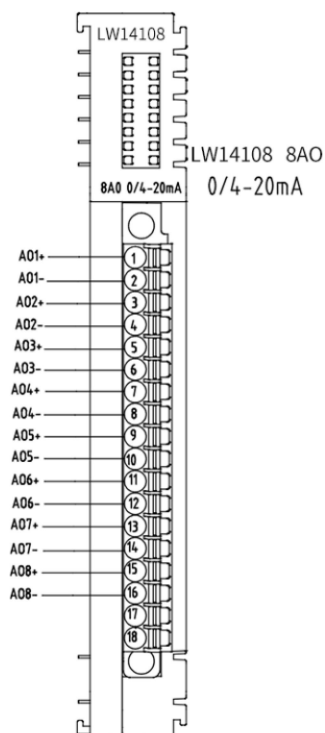
Module Wiring Diagram:



3.5.2LW14108 Parameter Specifications

Model	LW14108
Name	Current Output Module
Number of Channels	8
Output Type	0/4-20mA
Resolution	16-bit
Conversion Time	1 ms
Full-Scale Range (Data Word)	Profinet protocol 0~27648
	EtherCAT protocol 0~32767
	ModbusTCP protocol 0~27648
Output Signal Accuracy	±0.1%
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 17 × 78 mm (W × H × D)
Weight	Approx. 70 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

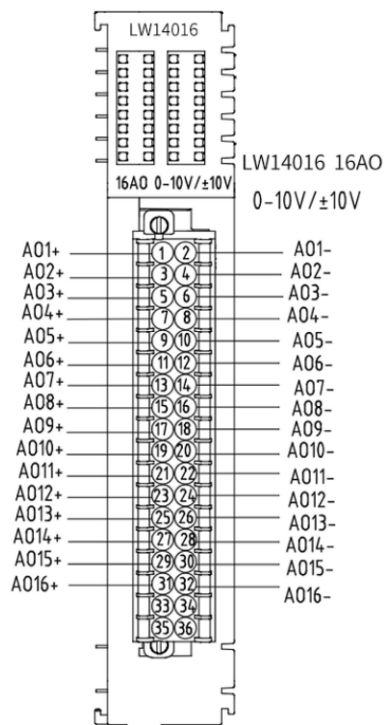
Module Wiring Diagram:



3.5.3LW14016 Parameter Specifications

Model	LW14016
Name	Voltage Output Module
Number of Channels	16
Output Type	0-10V / $\pm 10V$
Resolution	16-bit
Conversion Time	1 ms
Full-Scale Range (Data Word)	Profinet protocol-27648 $\sim$ +27648
	EtherCAT protocol-32768 $\sim$ +32767
	ModbusTCP protocol-27648 $\sim$ +27648
Output Signal Accuracy	$\pm 0.1\%$
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

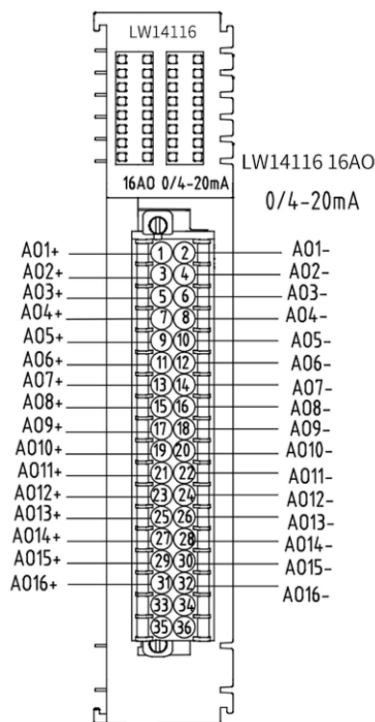
Module Wiring Diagram:



3.5.4 LW14116 Parameter Specifications

Model	LW14116
Name	Current Output Module
Number of Channels	16
Output Type	0/4-20mA
Resolution	16-bit
Conversion Time	1 ms
Full-Scale Range (Data Word)	PROFINET protocol: 0 to 27648
	EtherCAT protocol: 0 to 32767
	Modbus TCP protocol: 0 to 27648
Output Signal Accuracy	$\pm 0.1\%$
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	-10 to 70 °C
Storage Temperature	-20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

Module Wiring Diagram:

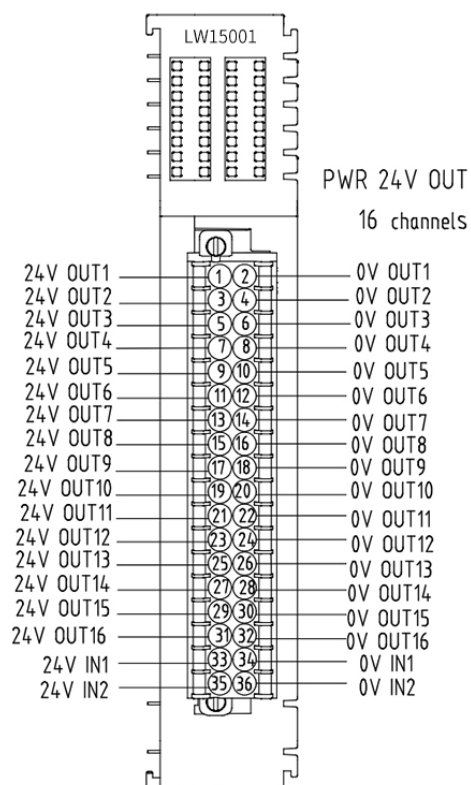


3.6 Function Modules

3.6.1 LW15001 Parameter Specifications

Model	LW15001
Name	24V Power Feed Module
Number of Channels	16
Input Power Type	24V DC
Output Power Type	24V DC
Channel Status Indicator	Green LED
Dimensions	Approx. 120 × 22 × 78 mm (W × H × D)
Weight	Approx. 90 g
Protection Rating	IP20
Operating Temperature	−10 to 70 °C
Storage Temperature	−20 to 80 °C
Relative Humidity	95 %, non-condensing
Mounting	Standard 35 mm DIN rail
Certification	CE

Module Wiring Diagram:



4 Application of LW18001 as a PROFINET Slave in Programming Software

4.1 Application of LW18001 in Siemens S7 Series PLC Programming Software

Preliminary Preparations:

Please refer to the module wiring instructions in the relevant section to correctly connect the module to the system. Set the IP address of the computer to the same subnet as the PLC's IP address. Prepare a GSDML configuration file for the corresponding module, as shown in the figure below:



4.1.1 Application of LW18001 in TIA Portal V19

Place the configuration file and the device icon in the same directory.

: Hardware Configuration:

One Siemens S7-1200 series CPU, one LW18001 PROFINET adapter module, one LW11032 32DI module, one LW12016 16DO module, one LW14108 8AO module, and one LW16001 end terminal module, as shown in the figure below:



(1) Creating a New Project:

Click "Create new project", enter the "Project name", select the "Path", and click "Create" to complete the project creation.

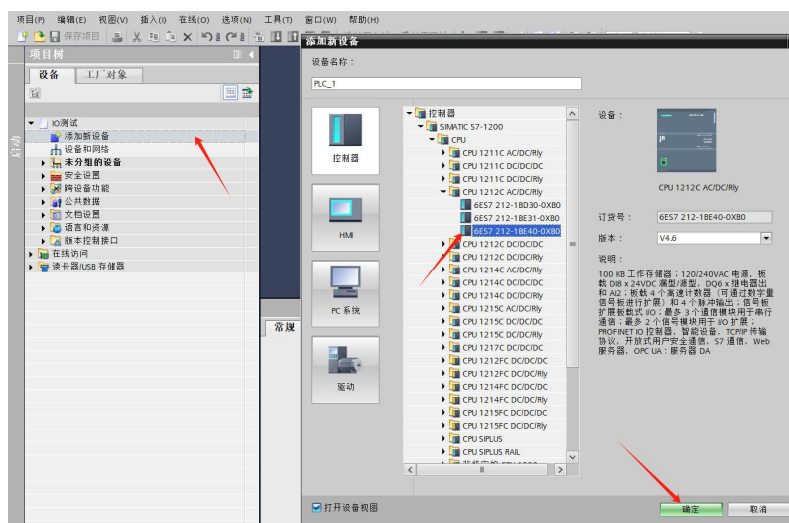


(2) Adding the PLC Controller

In the "Devices & Networks" section under "First Steps", select "Configure a device".



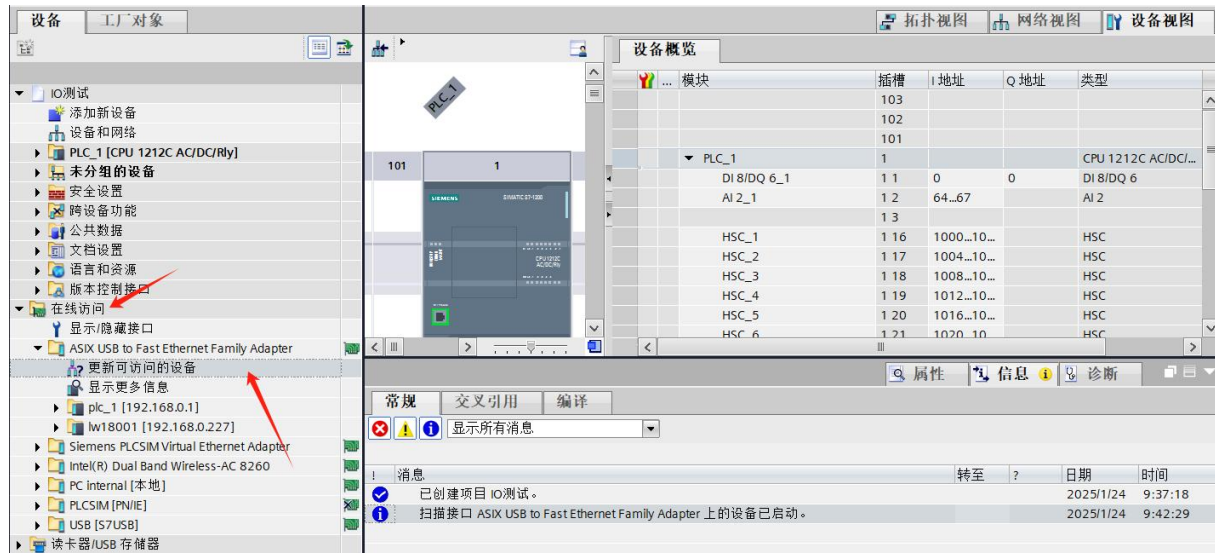
(3) In the "Devices & Networks" window, click "Add new device", select "Controller", choose the PLC model currently in use, and click "Add" to complete the controller addition.



(4) Scanning for Connected Devices

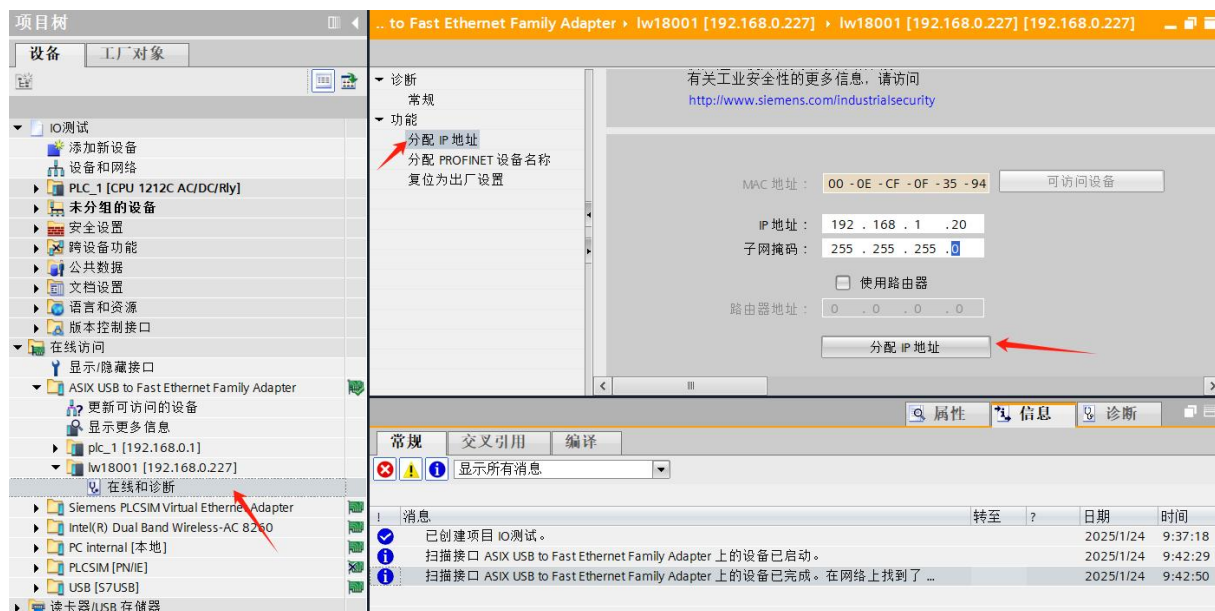
In the "Online access" folder, double-click the network adapter being used, and then double-click "Update accessible devices" under the network adapter. Wait for the update to complete; the slave devices connected

via the Ethernet cable will be automatically added. (Generally, the first device is the PLC controller. The IP addresses of the PLC and the computer must be in the same subnet. If they are not in the same subnet, close the project, modify the computer's IP address, and repeat the above steps.)

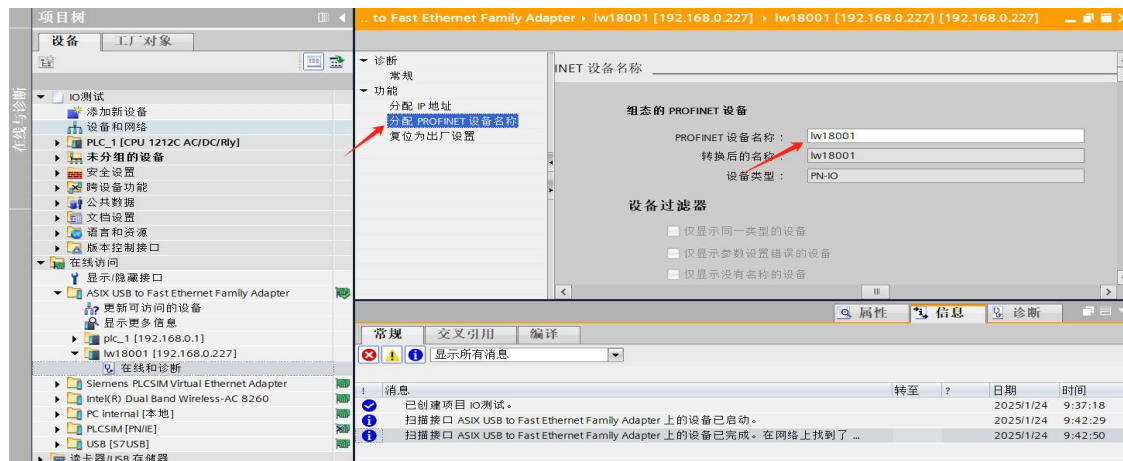


(5) Assigning IP Address and Device Name to the Slave Station

Double-click "Online & Diagnostics" under the slave device. Under the "Functions" menu, you can assign the IP address and device name to the current slave station. Double-click "Assign IP Address", first enter the "Subnet Mask", then enter the "IP Address", and click "Assign IP Address" to complete the IP address assignment.

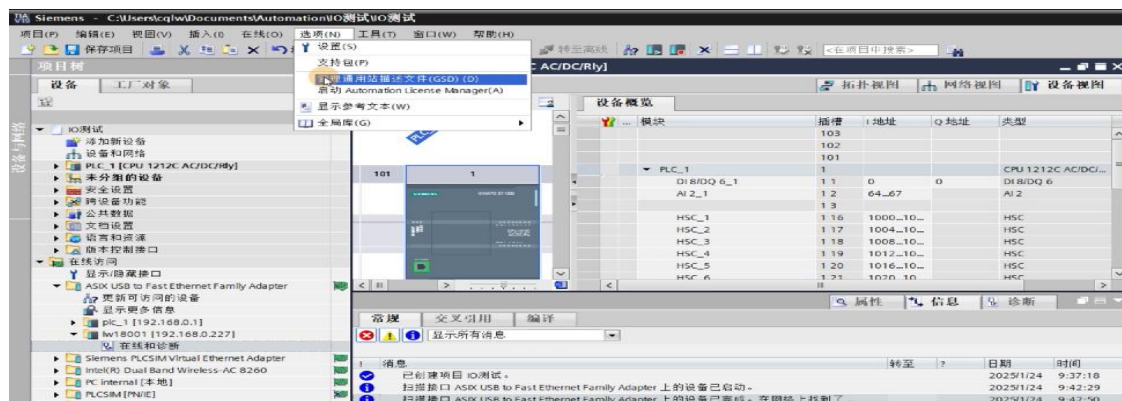


Double-click "Assign PROFINET Device Name", enter the "PROFINET Device Name", and click "Assign Name".

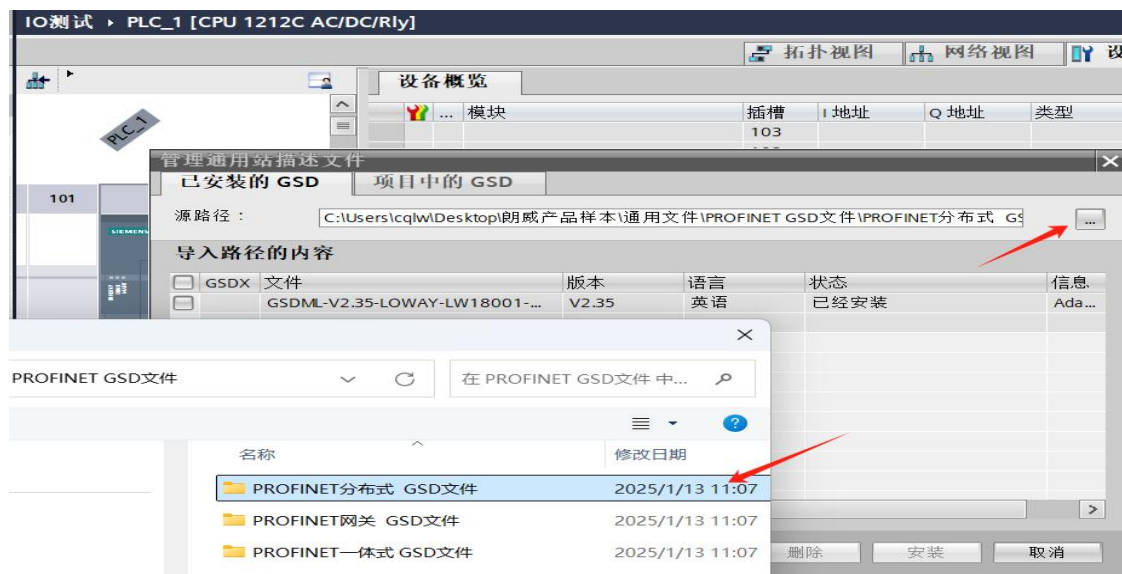


(6) Adding the GSD Configuration File

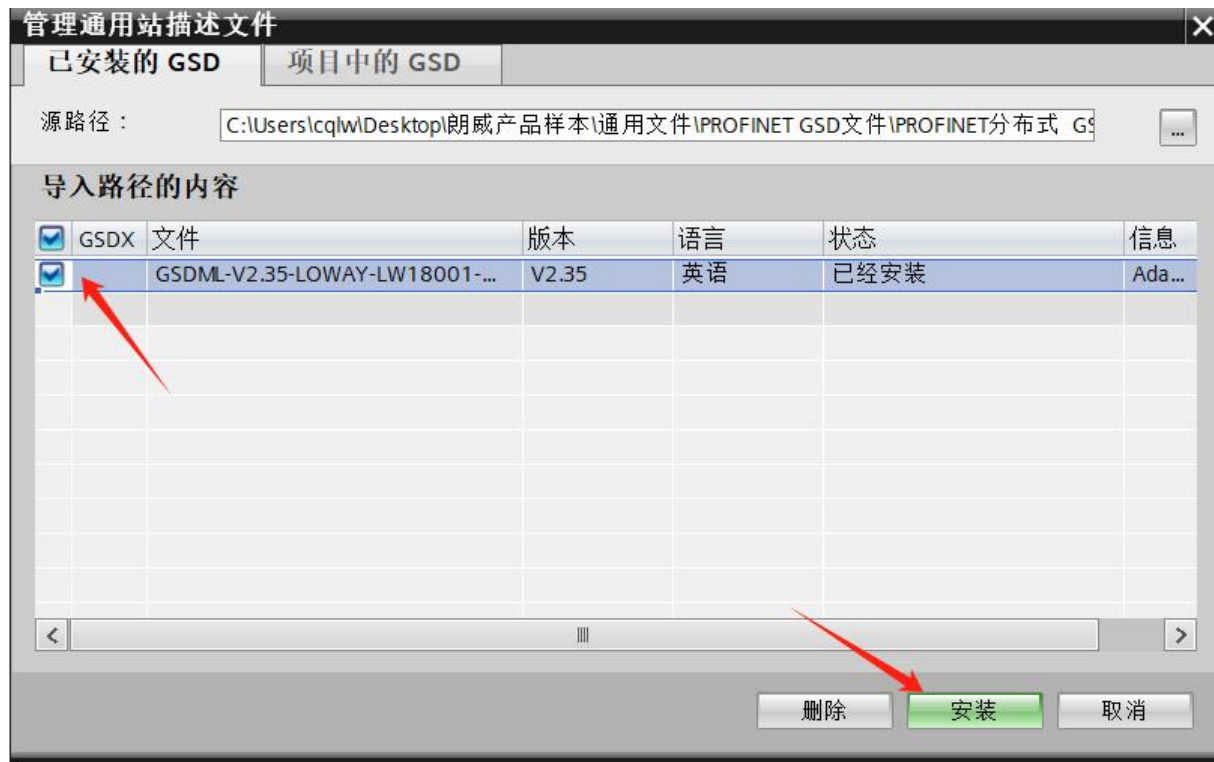
In the menu bar, click "Options" and select "Manage general station description files (GSD)".



Click the three dots at the end of the "Source path" field, select the folder where the prepared GSD file is stored, and click "OK".

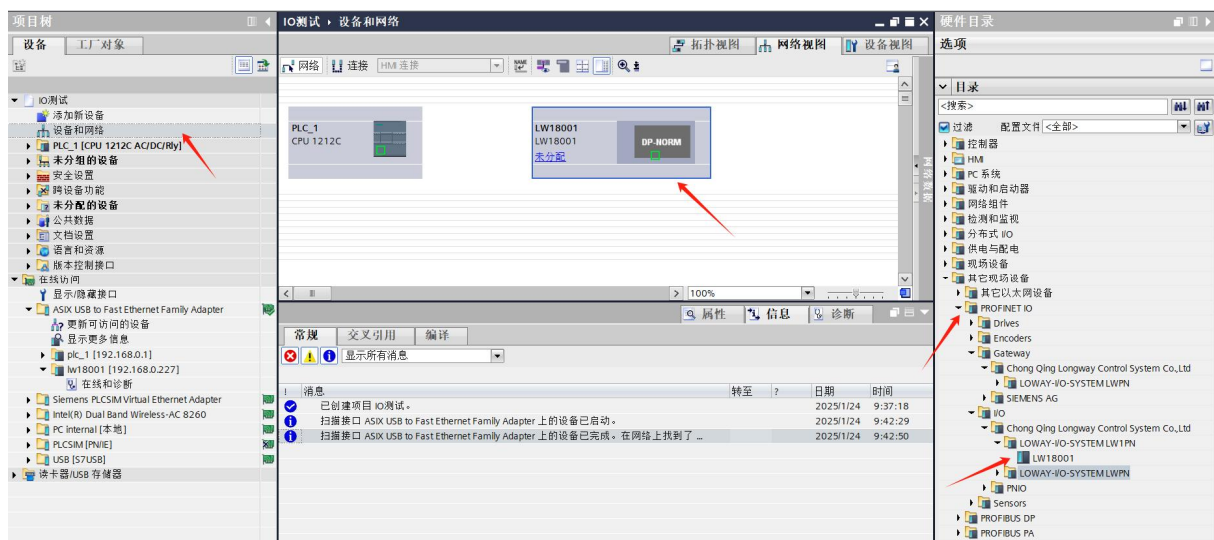


Check the status of the GSD file to be added to see if it is "Not yet installed". If it is not yet installed, select the checkbox in front of the GSD file and click "Install". If it is already installed, click "Cancel" to skip the installation step and proceed to the next operation.

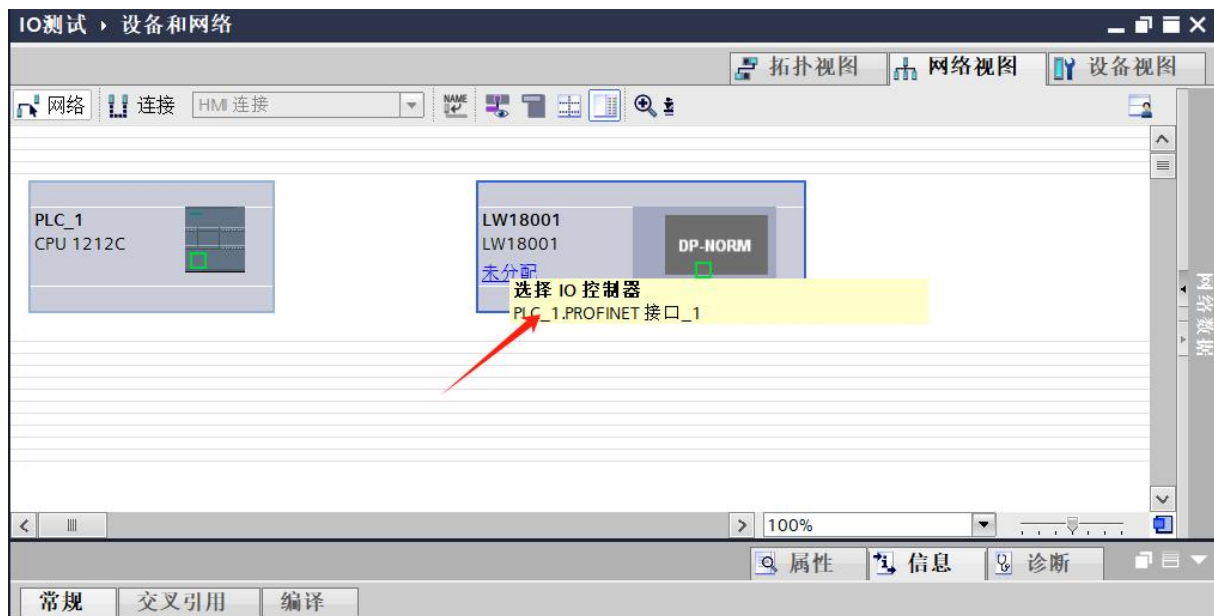


(7) Adding the PROFINET Sliced I/O Module

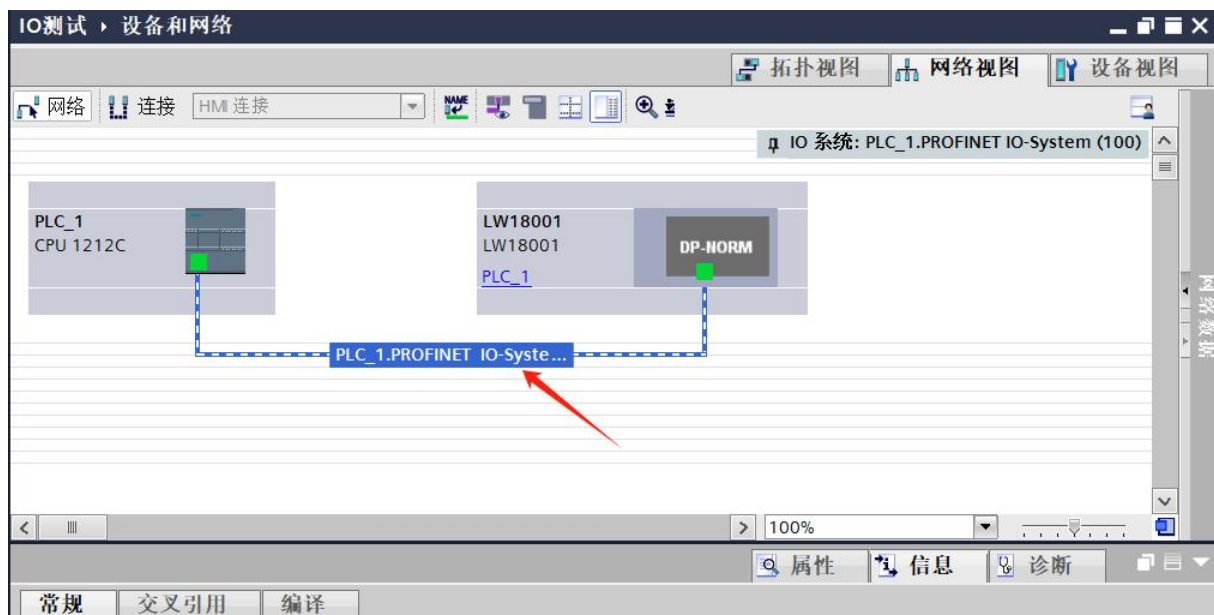
Double-click "Devices & Networks". In the hardware catalog on the far right, locate the product model for which the GSD was installed above. The specific file path is as follows: Other field devices → PROFINET IO → I/O → LOWAY-IO-SYSTEM LWIPN → LW18001. Drag or double-click LW18001 to add it to the "Network view".



In the "Network view", click "Not assigned" (in blue font) on the slave device, then click "PLC_1.PROFINET interface_1" (the actual name may vary) below "Select IO controller" to complete the assignment.

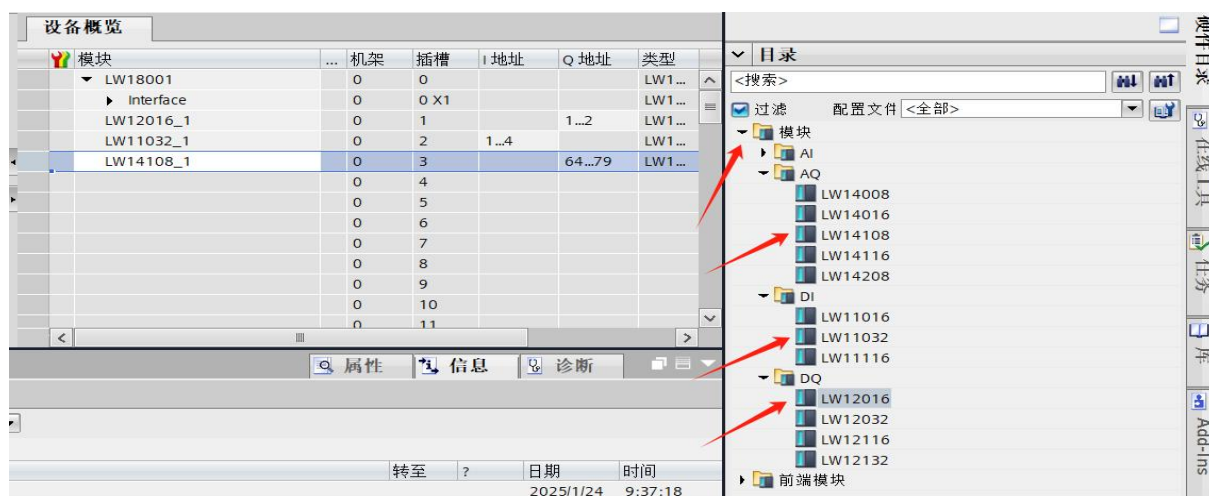


Once connected, the PLC and the LW18001 are linked by a blue-and-white striped line, as shown in the figure below.



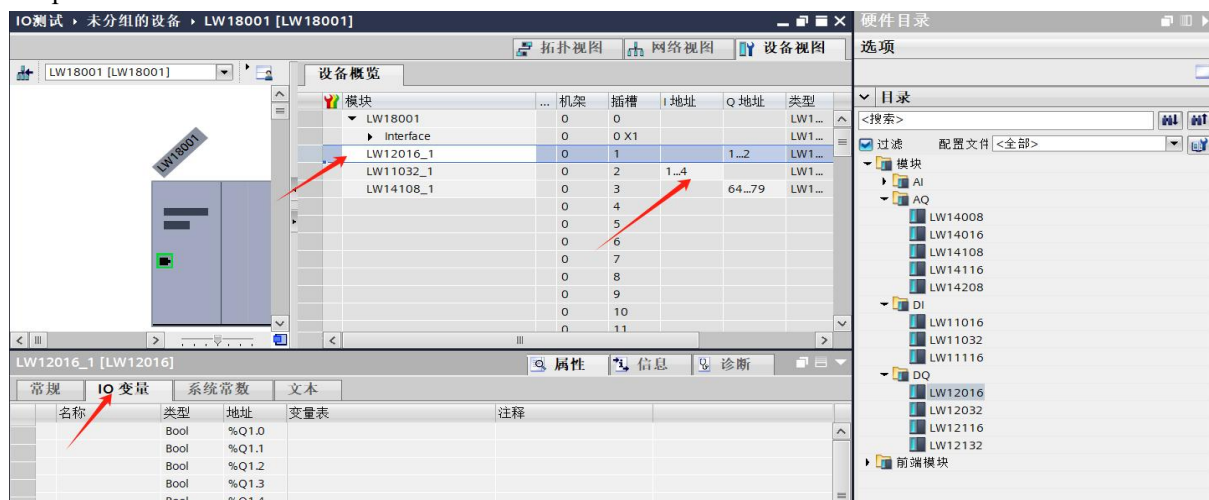
(8) Adding LW Series Slave I/O Modules

Double-click "LW18001" in the "Network view". Under "Catalog / Modules" on the far right, select the module models to be connected behind the LW18001 (the order must be consistent, otherwise communication will fail). In this example, one LW12016, one LW11032, and one LW14108 are added (up to 32 modules can be added, so a maximum of 32 I/O modules can be connected behind the LW18001). The "I address" listed after each module is the storage address for input monitoring data, and the "Q address" is the storage address for output control data.

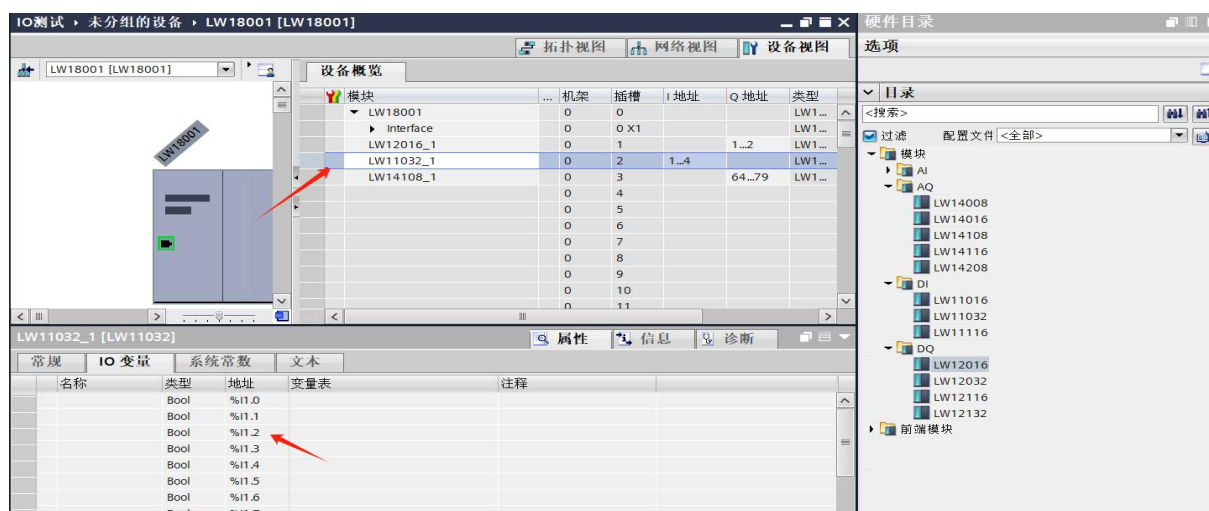


Click "I/O variables" to view the detailed addresses of the module.

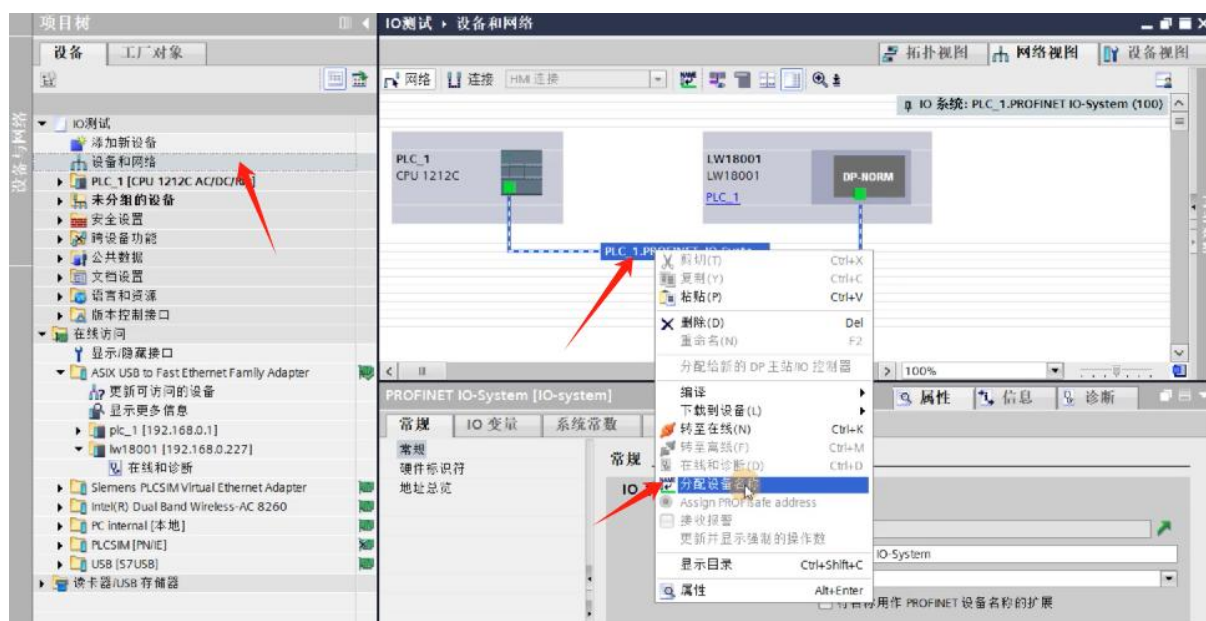
Output Module Variable Addresses:



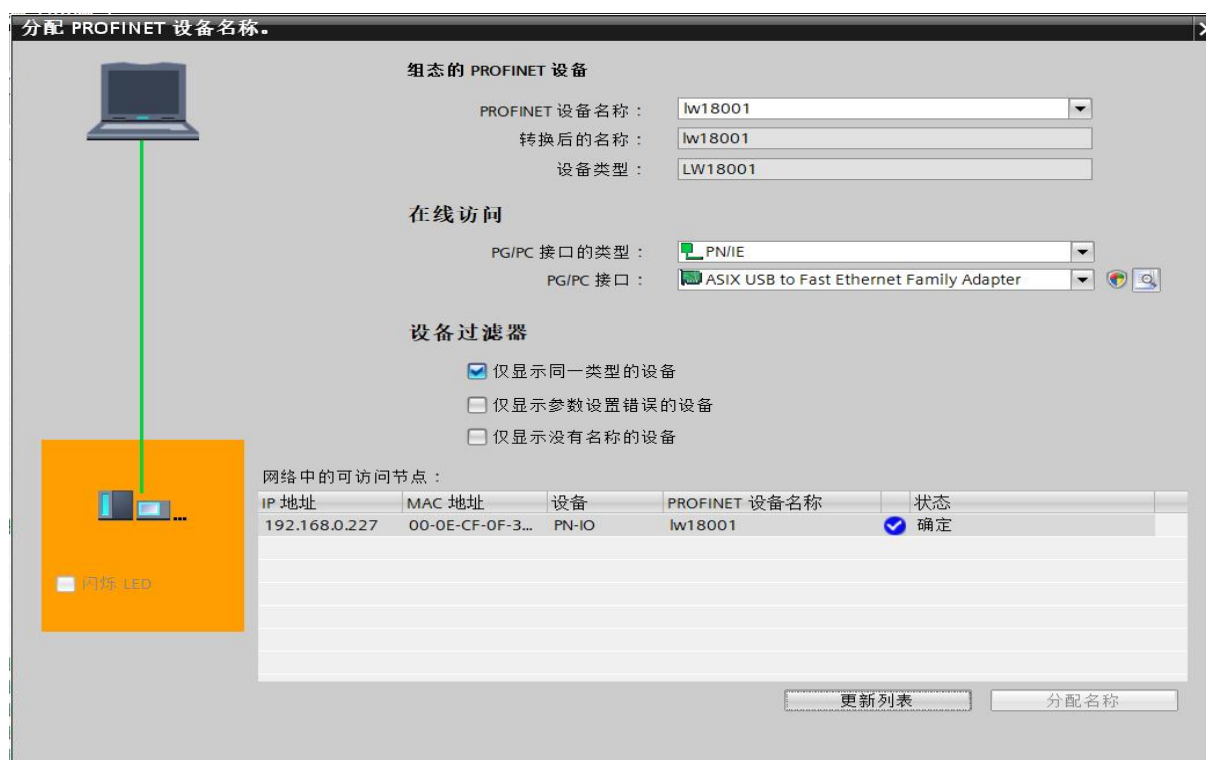
Input Module Variable Addresses:



(9) Assigning the Device Name to the Configured Device (for PLC to Identify the Slave Device)
Right-click the connection line between the PLC and the LW18001, and select "Assign device name".

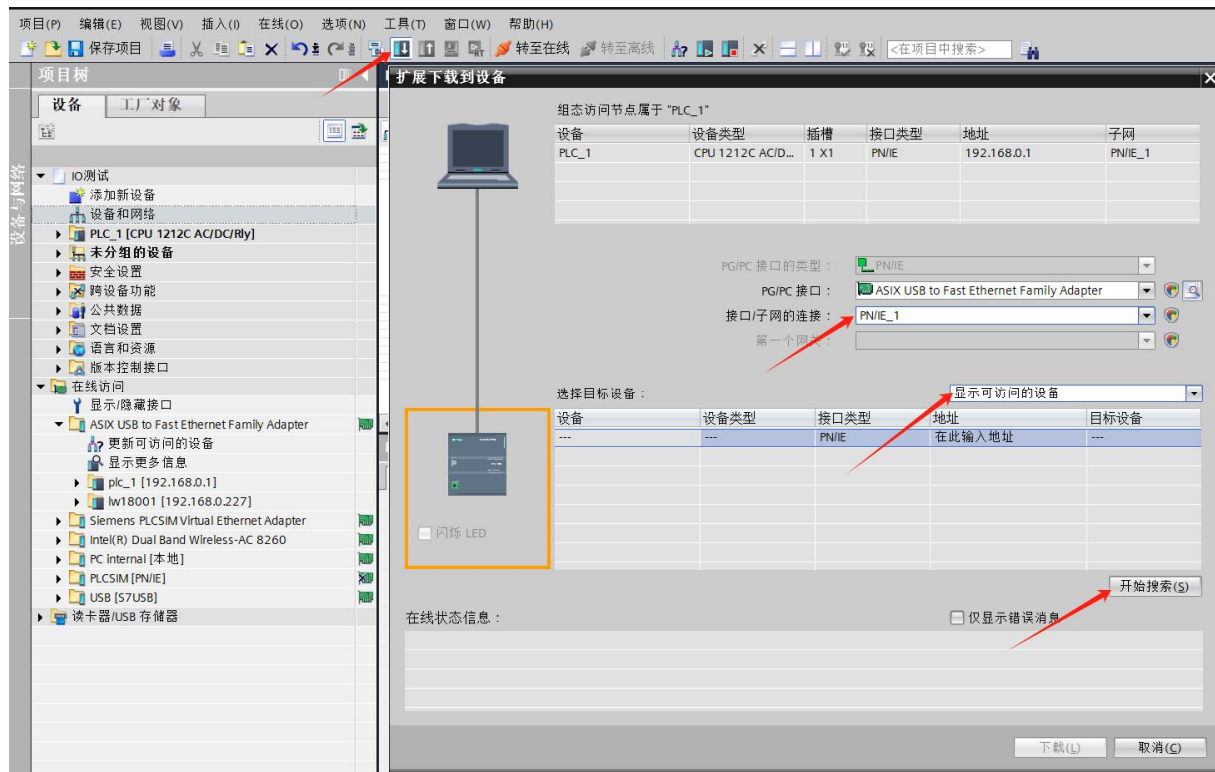


Click the dropdown menu next to "PROFINET device name" and select the name previously assigned to the device. For "Type of the PG/PC interface", select "PN/IE"; for "PG/PC interface", select your network adapter. Click "Update list" and check whether the status of the node in "Accessible nodes in the network" is "OK". If not, select the node and click "Assign name" below to complete the device name assignment. Then click "Close" to close the window.



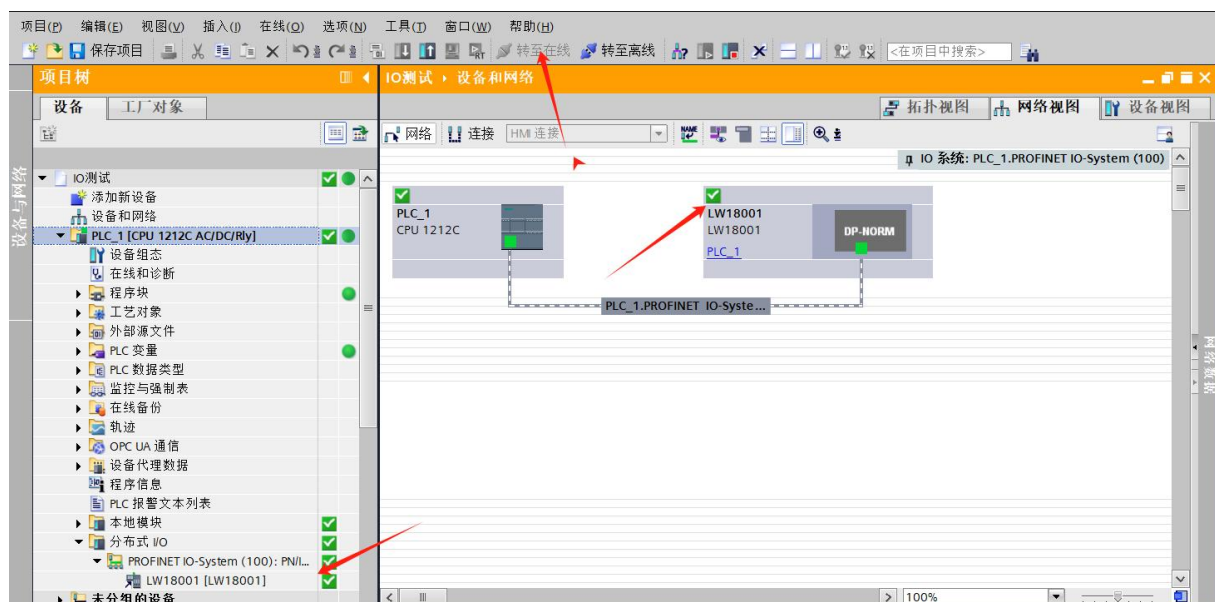
(10) Downloading the Configuration to the Device

Double-click "Devices & Networks" to return to the "Network view". Select the PLC, and then click the "Download to device" button in the menu bar to download the current configuration to the PLC.



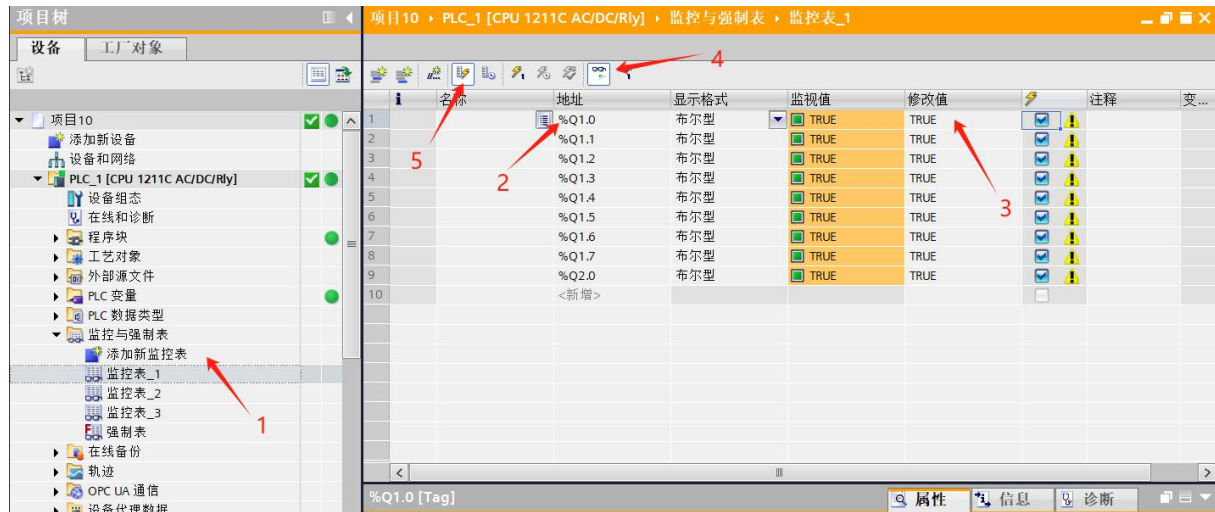
(11) Communication Connection

Select the PLC and click "Go online" in the menu bar. As shown in the figure below, when all indicators are green, the connection is established successfully.



(12) Data Exchange

Click "Monitor and force table" and enter the output module address into the "Address" field.

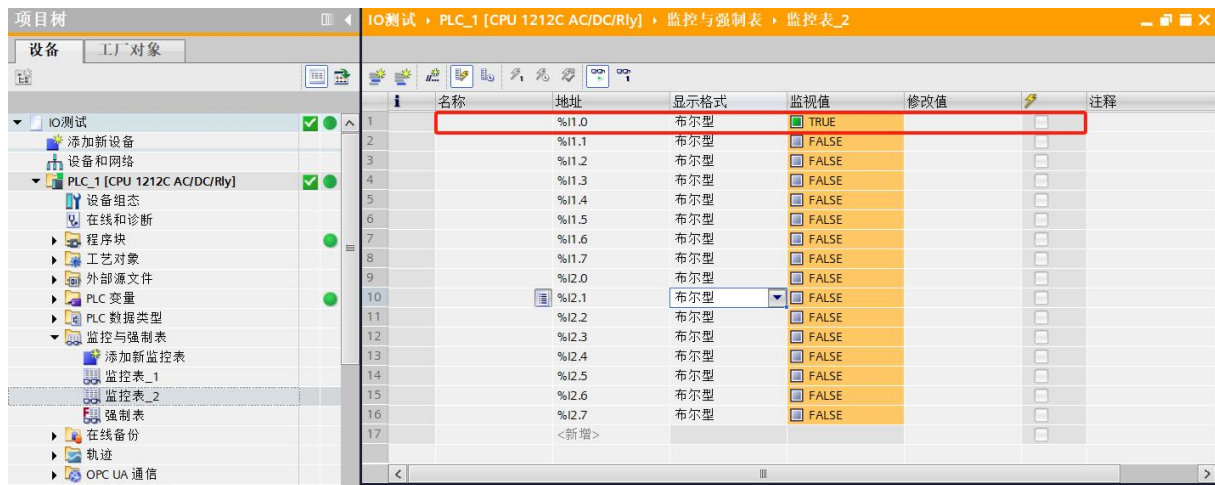


- 1、Locate "Monitor and force table" and add a new monitor table.
- 2、Enter the output start address.
- 3、Set the setpoint value.
- 4、Select "Monitor all".
- 5、Force-write the setpoint value.

The physical view of the module is shown in the figure below, with all output LEDs illuminated.



Double-click "Add new monitor table", then double-click the newly added "Monitor table_2" and enter the input module address into the "Address" field.



The physical view of the module is shown in the figure below, with terminal 1 illuminated.



At this point, the S7-1200 is ready for programming. The procedure for the Siemens S7-1500 is similar.

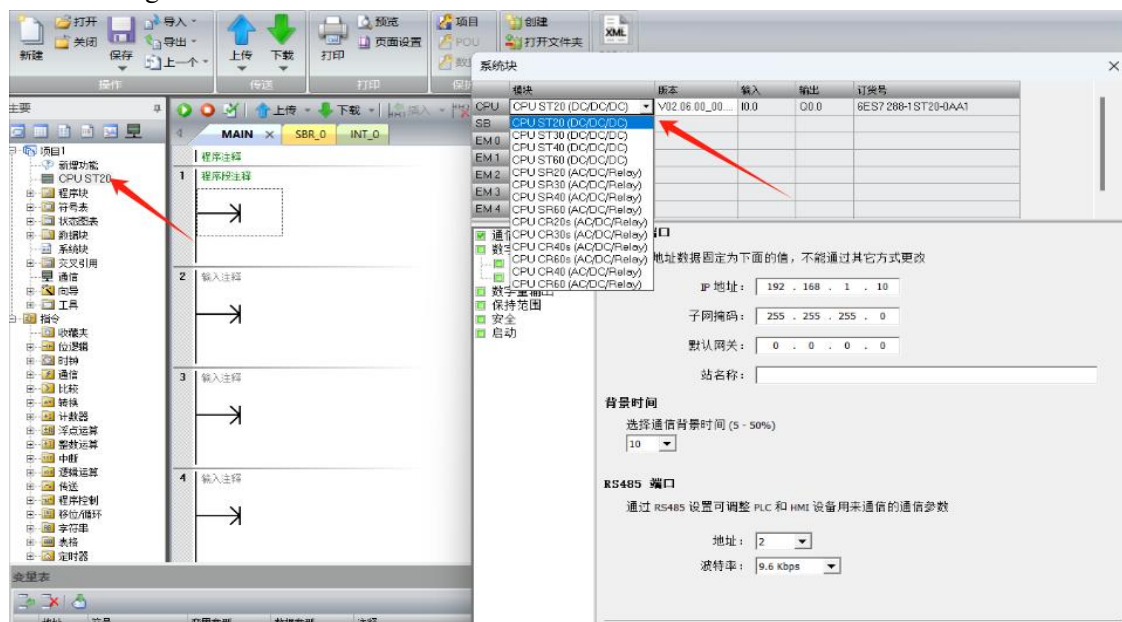
4.1.2 Application of LW18001 in STEP 7-Micro/WIN SMART Software

Preparations:

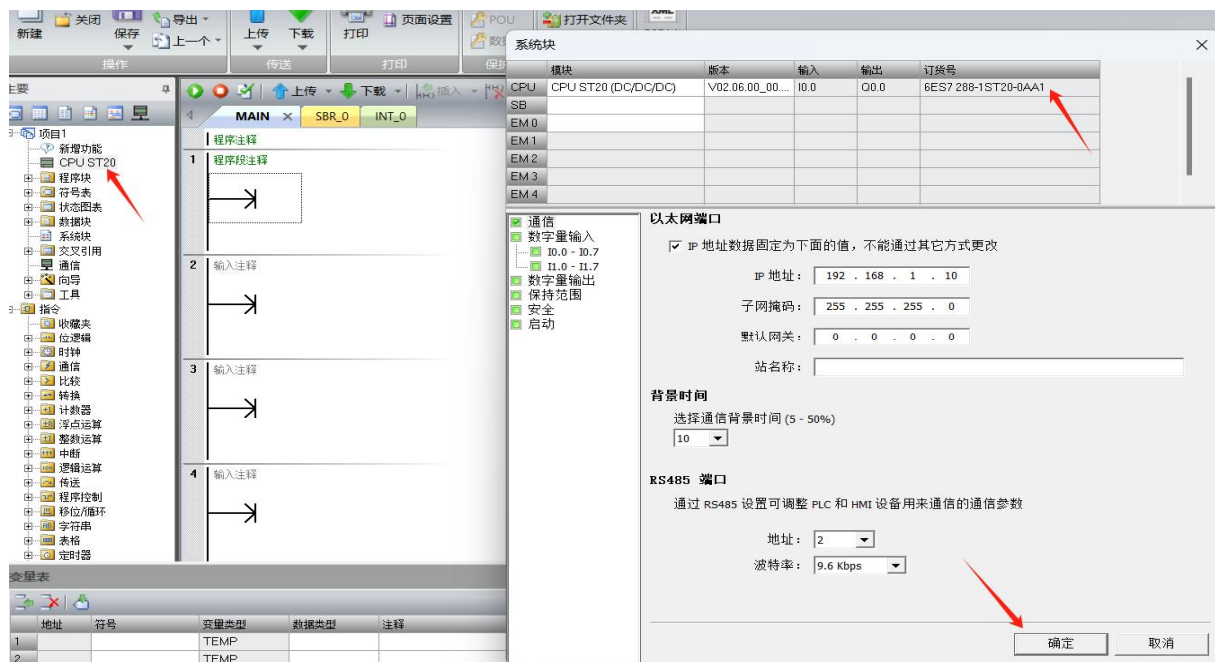
One SIMATIC S7-200 SMART CPU, one LW18001 PROFINET adapter module, one LW11032 32DI module, one LW12016 16DO module, one LW14108 8AO module, and one LW16001 end terminal module, as shown in the figure below:



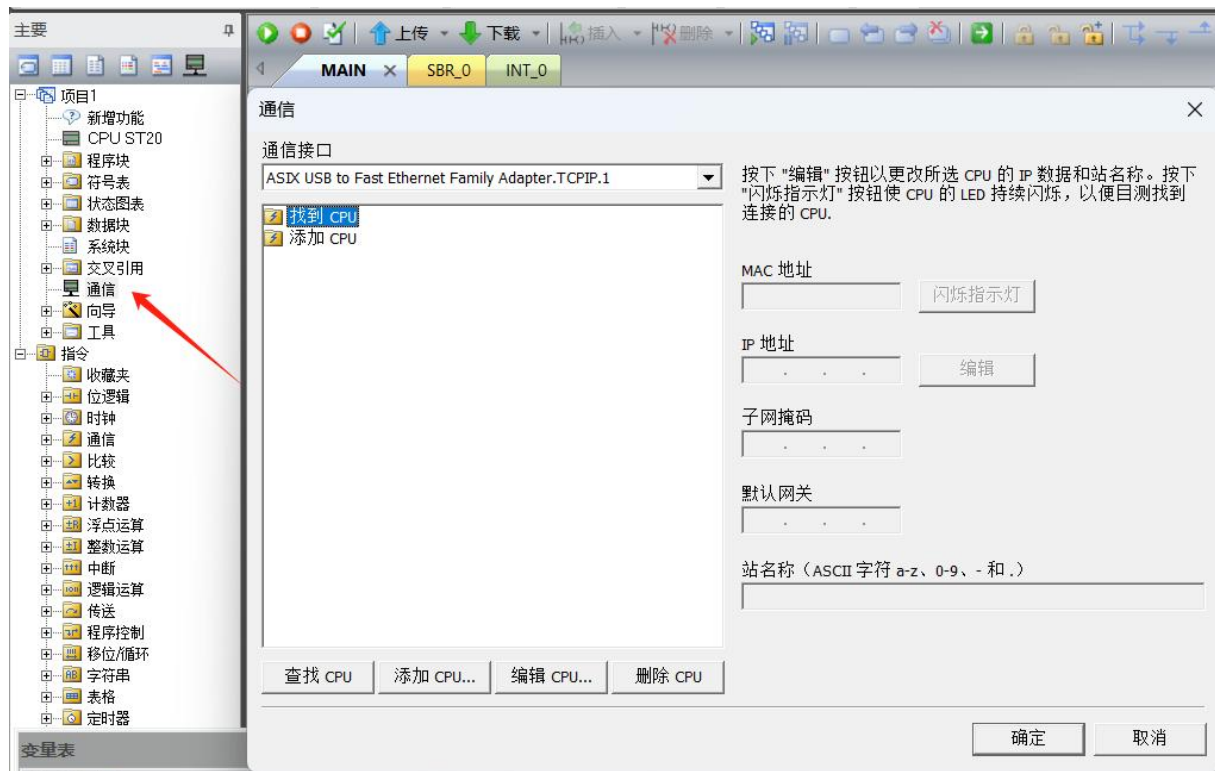
(1) Setting the CPU Model



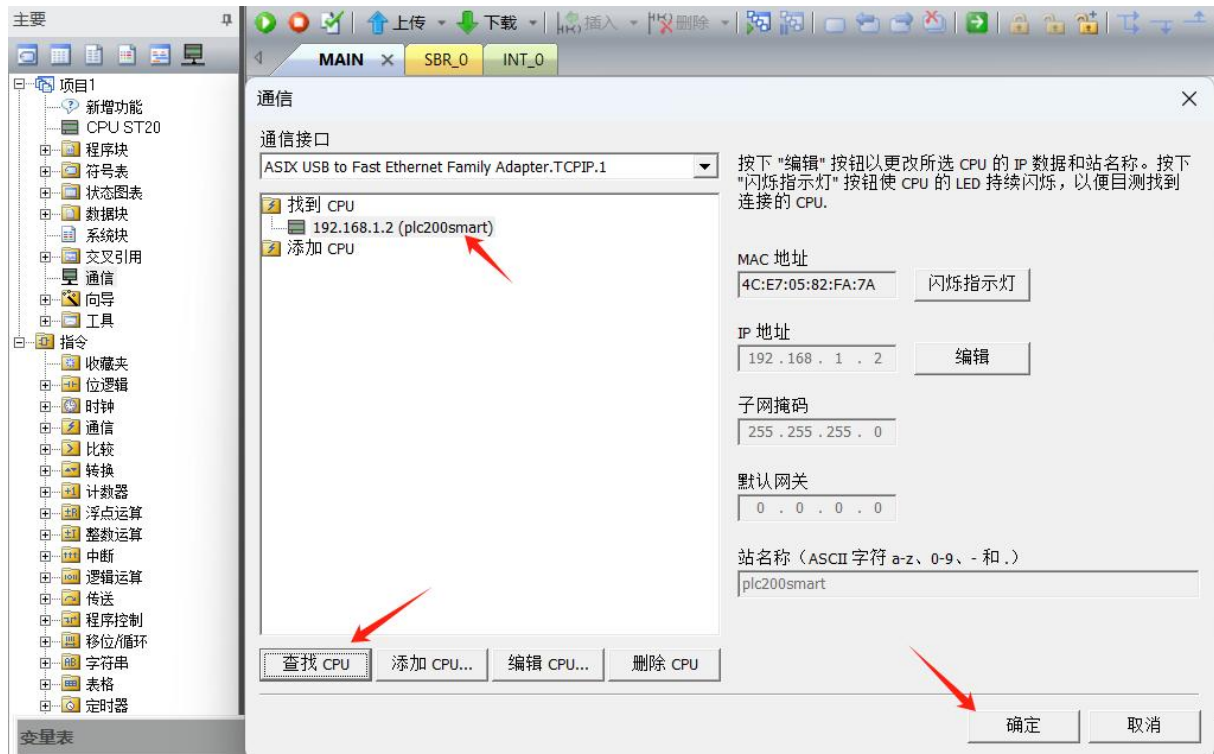
Double-click the tree directory, as shown in the figure above. Select the CPU model: SIMATIC S7-200 SMART \ CPU ST20.



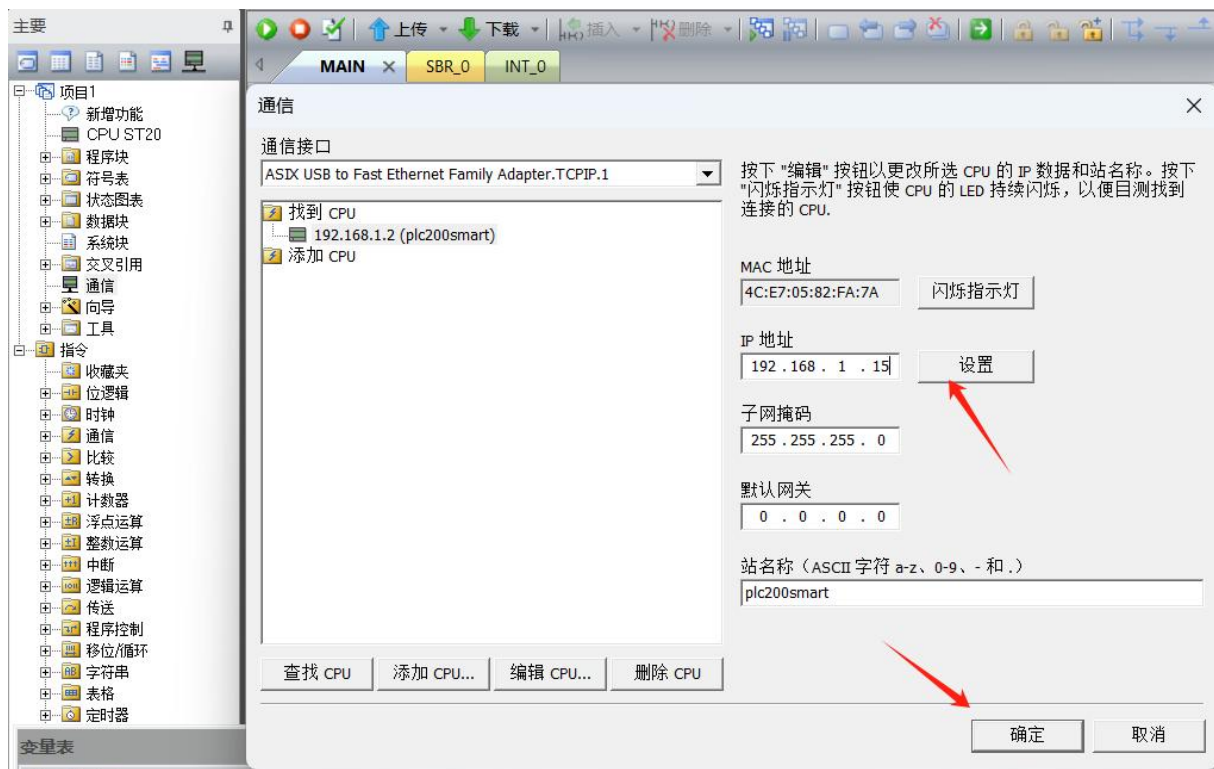
(2) Finding, Adding, and Removing the CPU



Double-click the Communication button, as shown in the figure below.



(3) Assigning the CPU IP Address



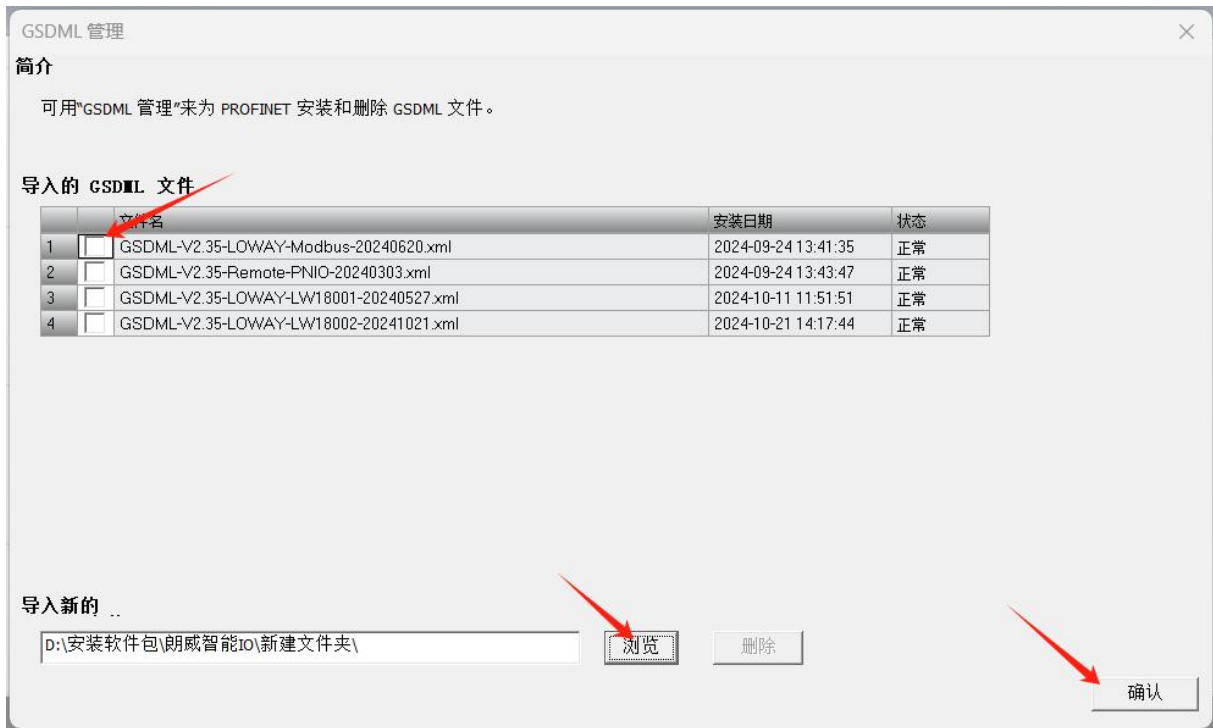
Click the "Set" button. The IP address field becomes active, allowing you to modify the IP address and station name. After making the changes, click the "Set" button again.

NOTE: The IP address of the computer must be set to the same subnet as the PLC IP address.

(4) Adding the GSD File



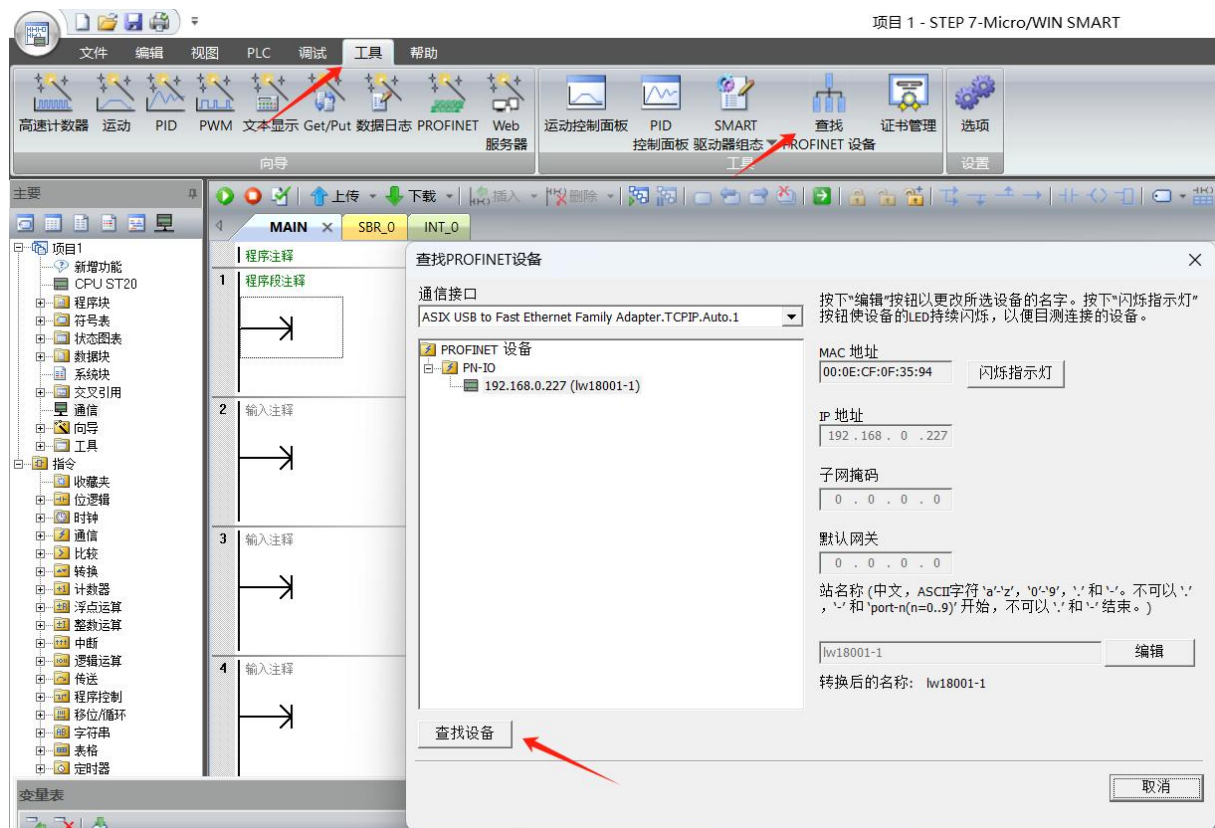
Click "GSDML Management" in the navigation bar, select the GSDML file to be imported, click "OK", and the GSDML file import will be completed.



(5) Device Naming



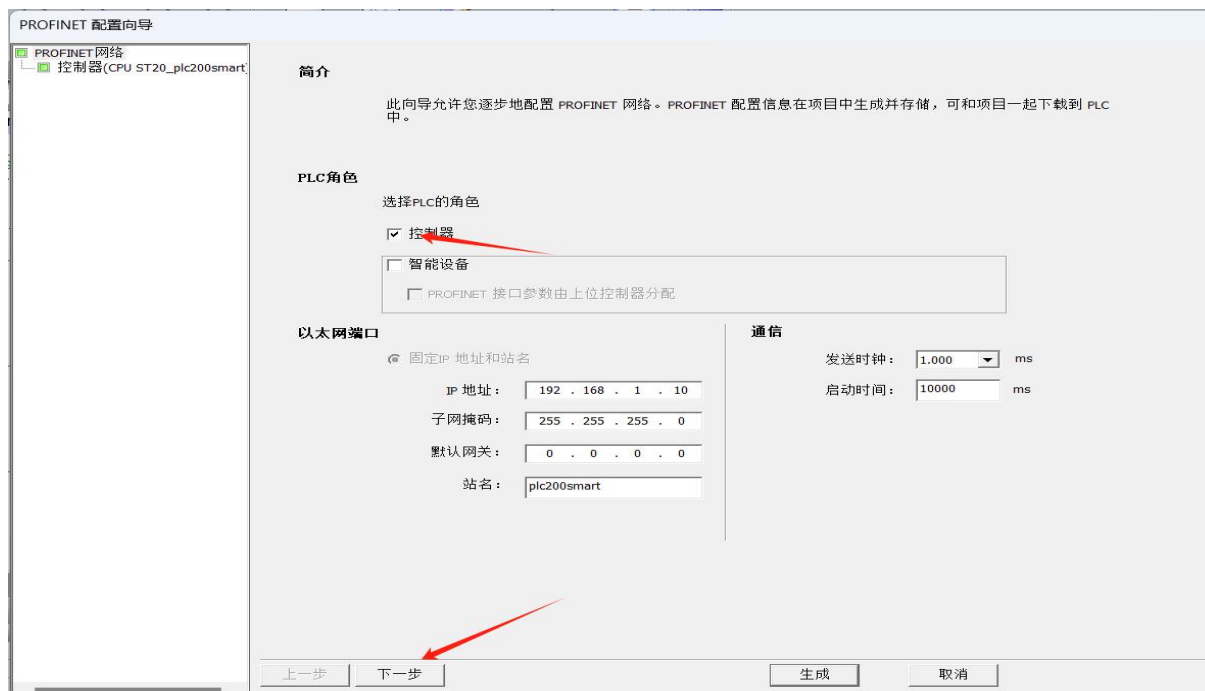
All PROFINET devices must have a device name and an IP address. Use STEP 7-Micro/WIN SMART to define the device name. The device name is assigned via the PROFINET DCP (Discovery and Configuration Protocol). The PROFINET device and the PC must be located in the same subnet. Click the "Find PROFINET Devices" button in the "Tools" area of the "Tools" menu ribbon.



Click "Find Devices" to display the device name, then click "Edit" to modify the device name.

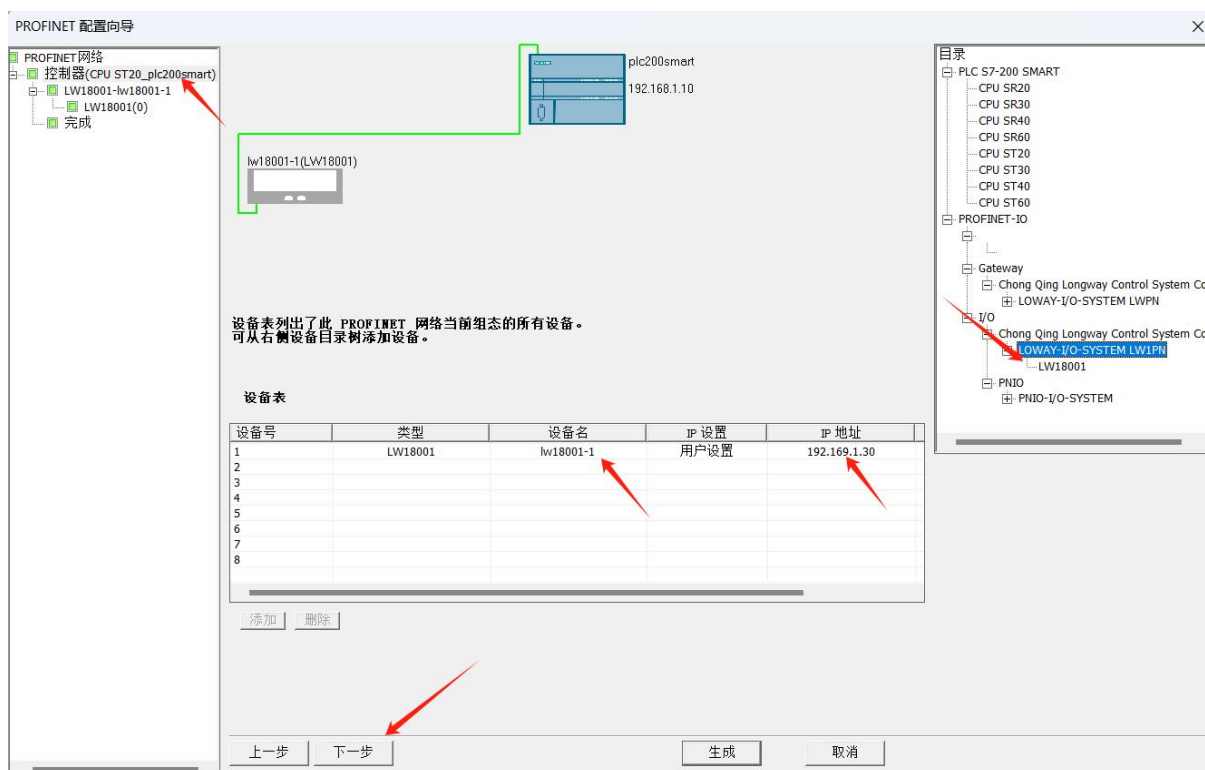


(6) Configuring the PROFINET Network

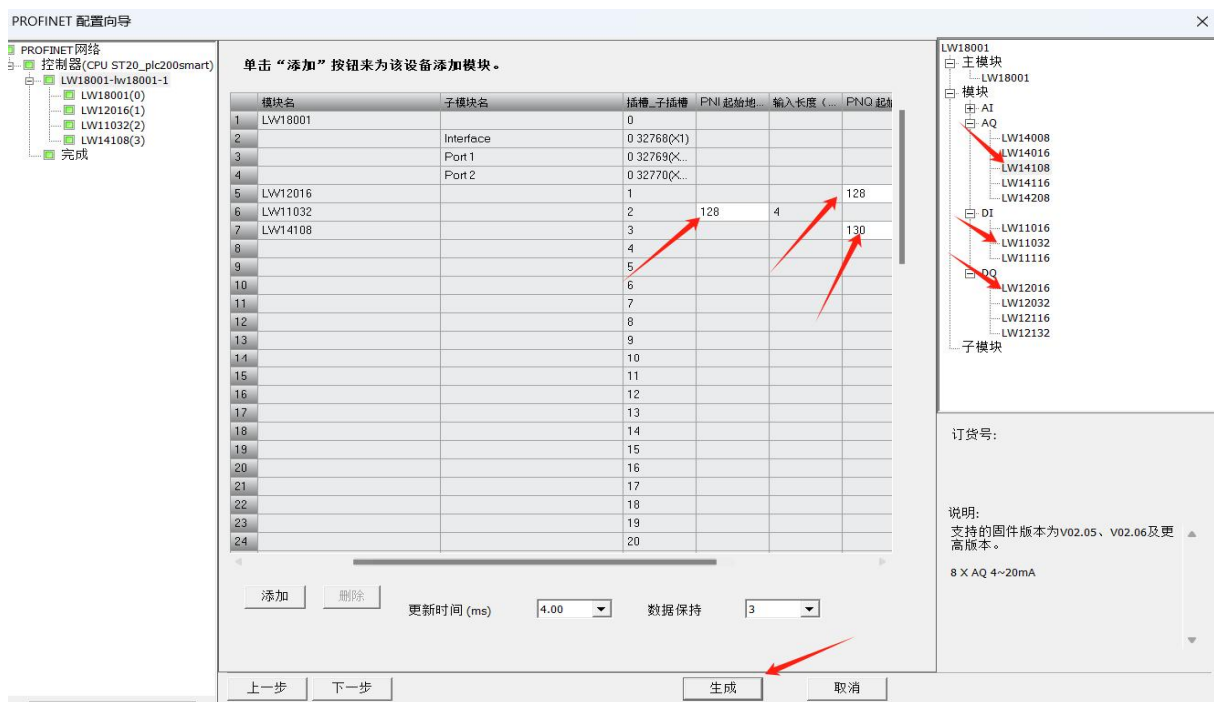


Click the PROFINET button in the Tools menu bar. Select the PLC role as Controller.

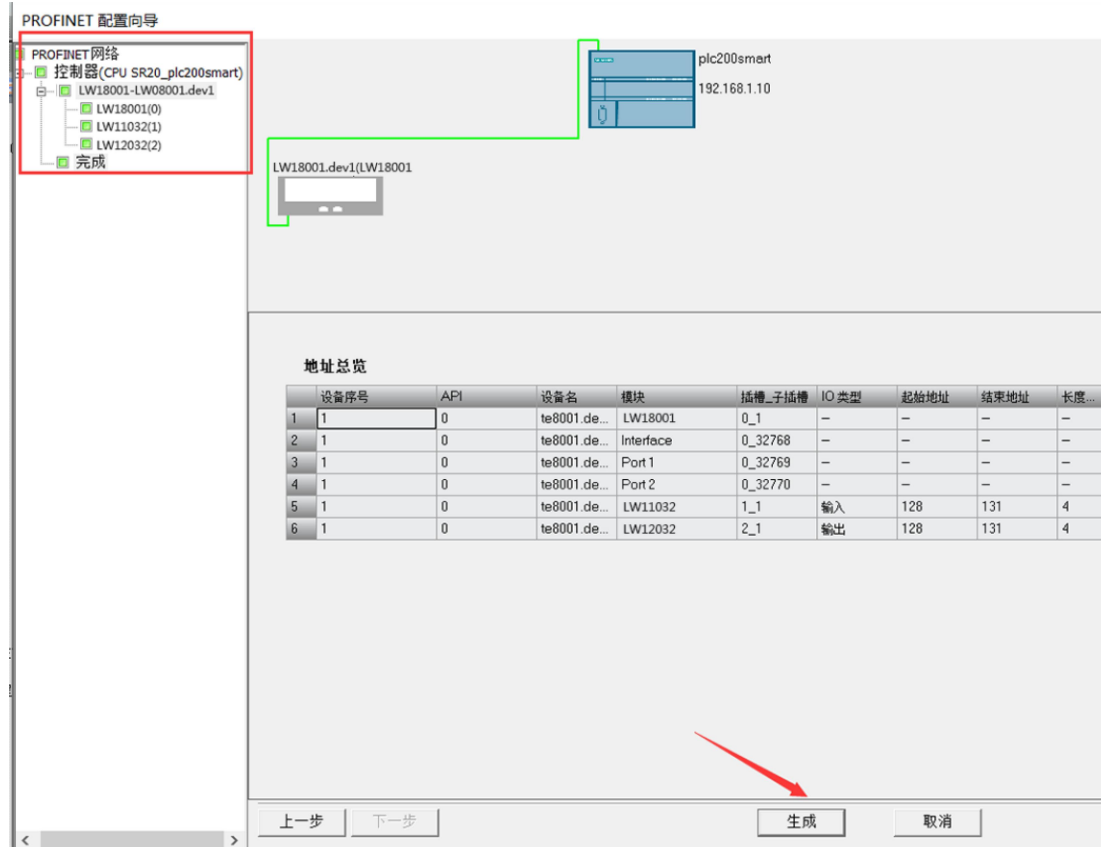
Click the "+" sign in front to expand the list, select the LW18001 module, and modify the device name and configure the IP address.



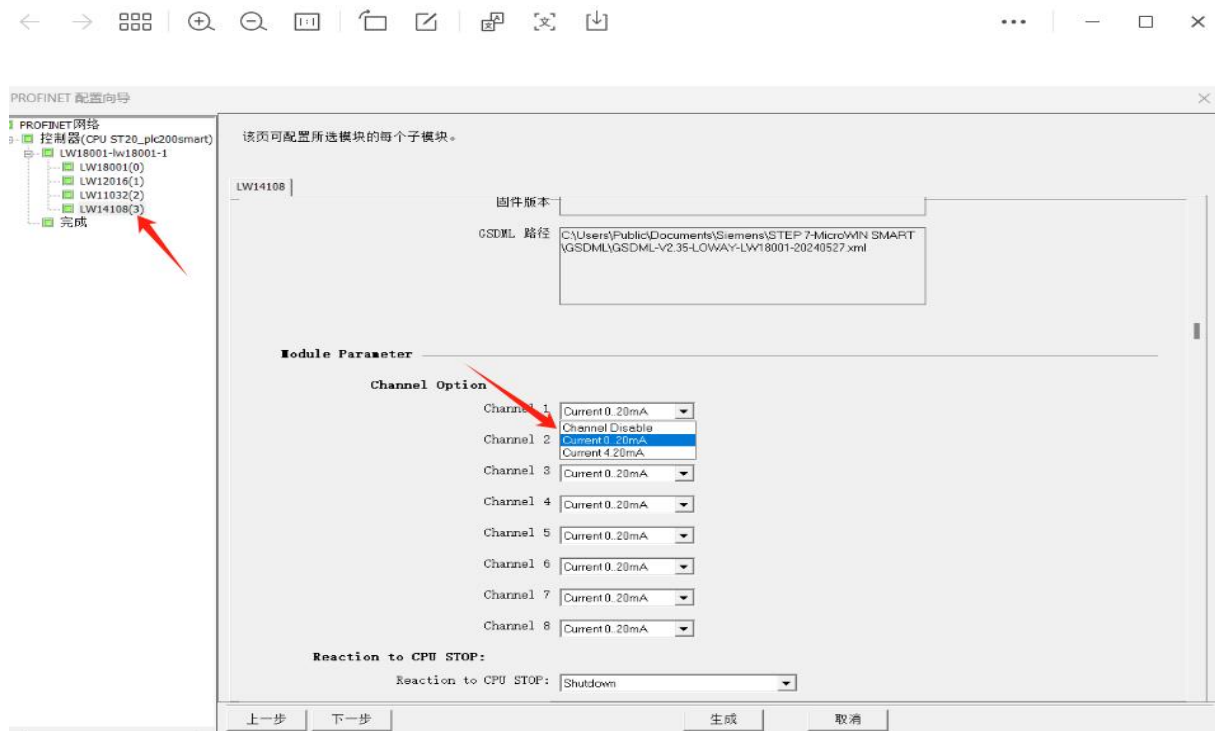
Add the required I/O modules and click "Next".



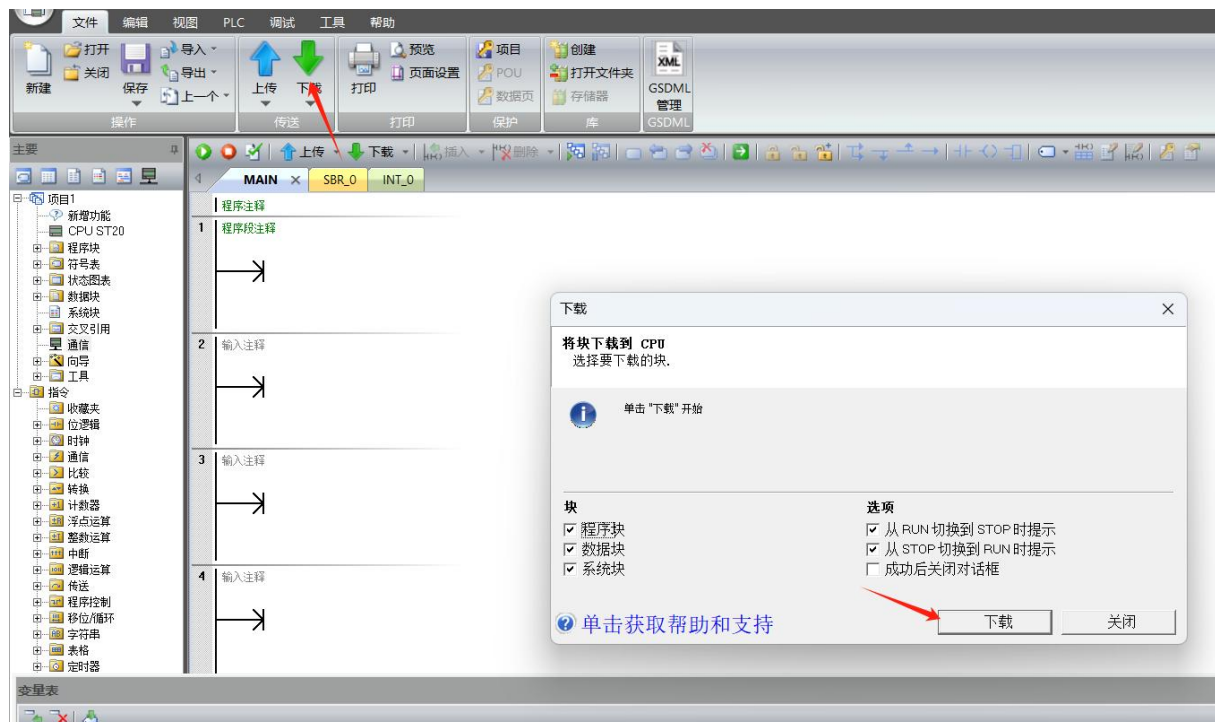
Record the start address of the module, and finally click the "Generate" button.



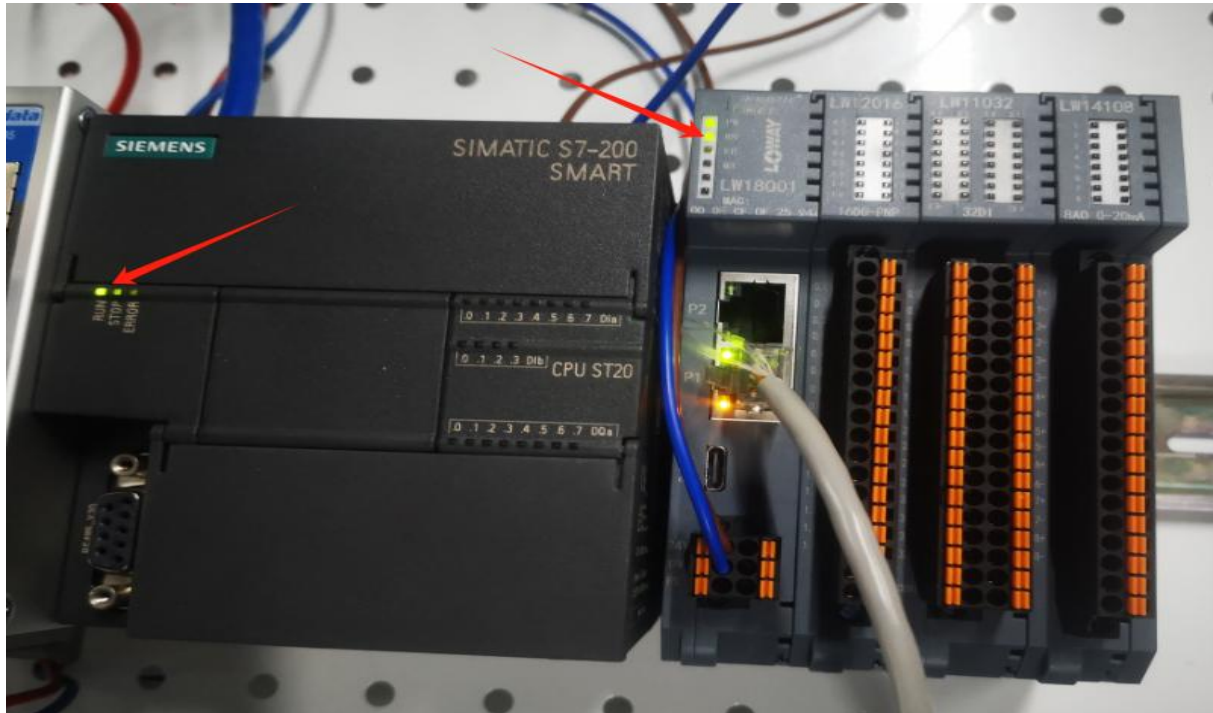
If the analog output range needs to be modified to 0/4-20mA.



(7) Downloading to the PLC

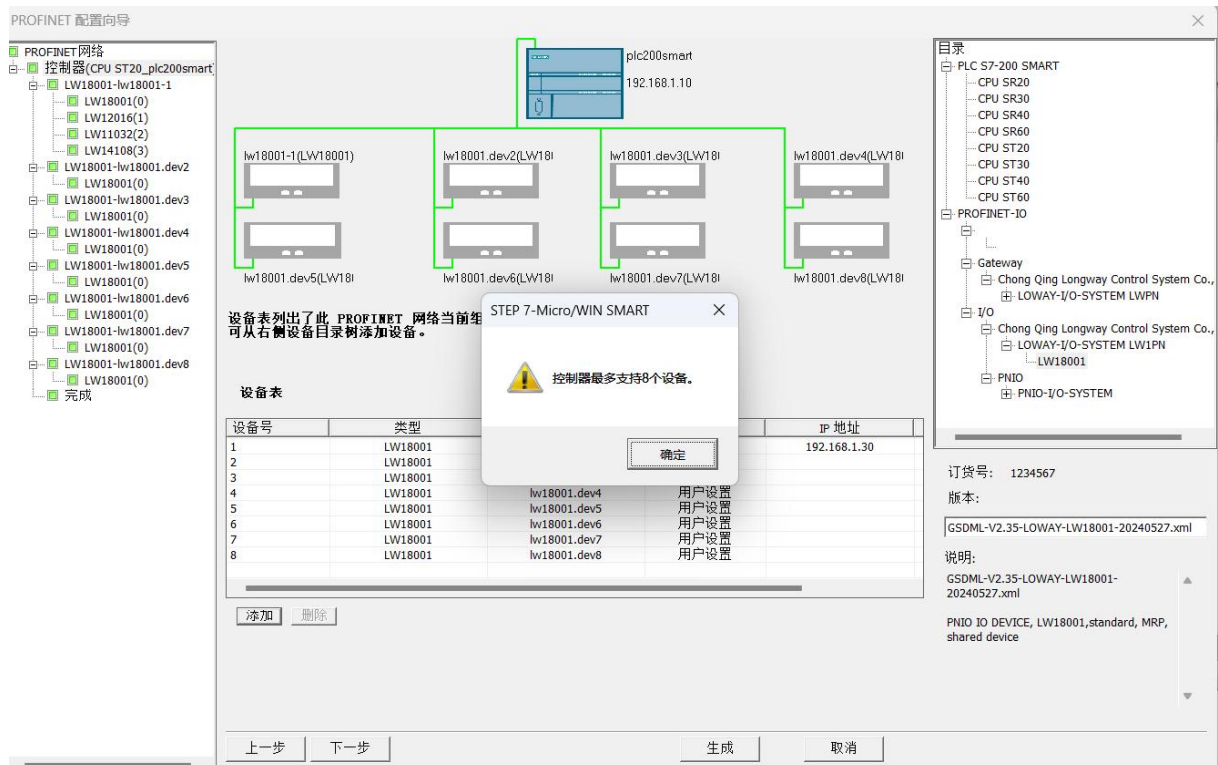


Download completed; close the dialog box. At this point, the I/O module is in RN mode, indicating that a connection has been established between the I/O module and the CPU.



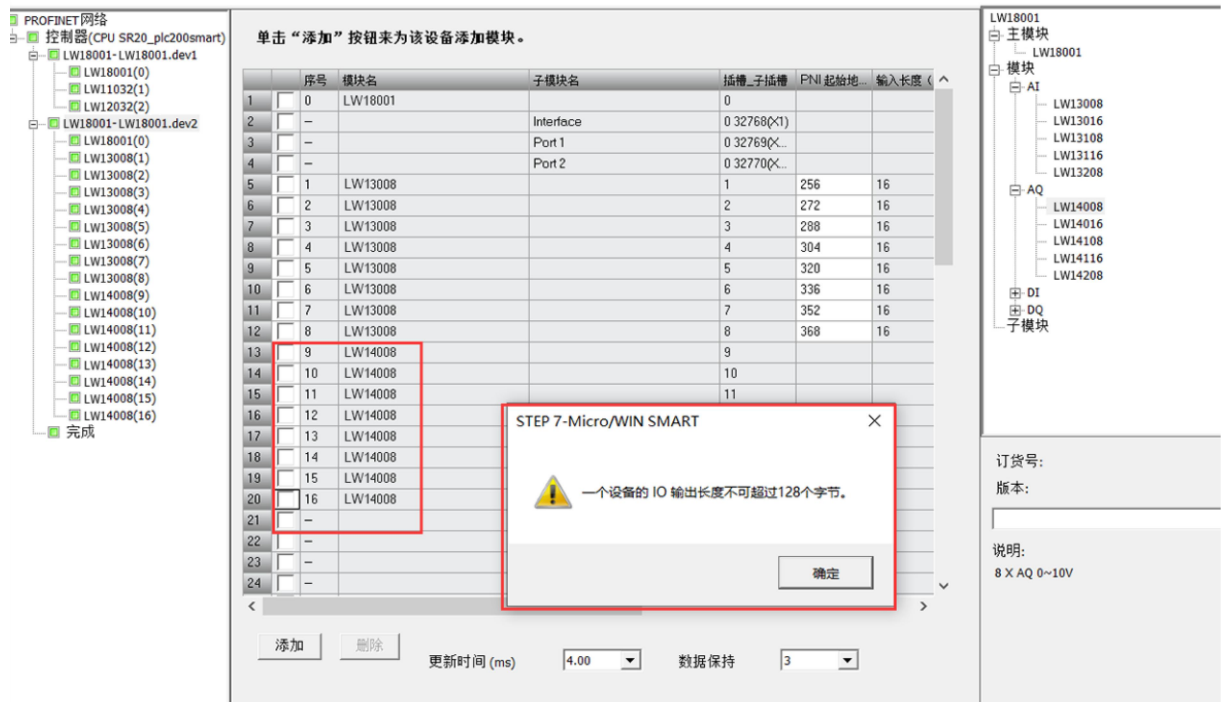
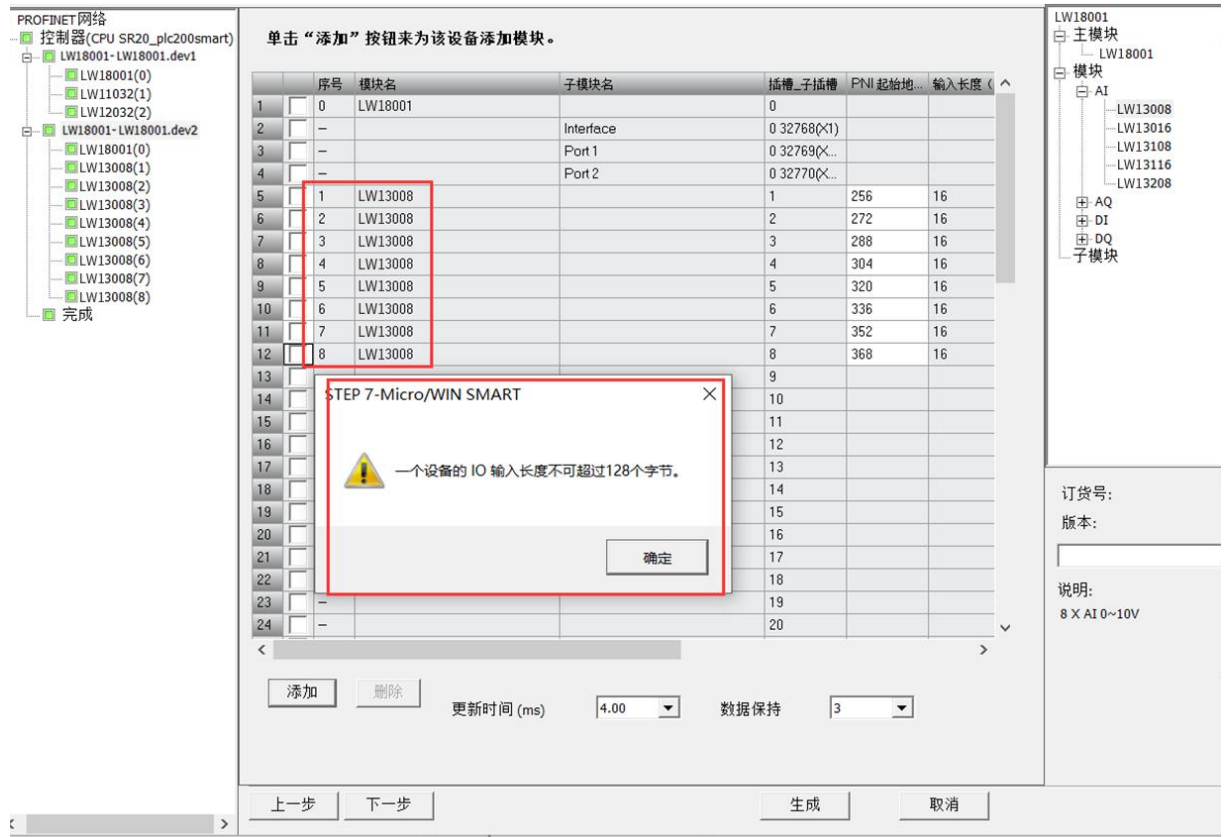
Important Notes for Using PROFINET Distributed I/O as a Slave Station for S7-200 SMART Series PLCs:

- 1、 The S7-200 SMART supports a maximum of 8 PROFINET slave stations. Therefore, a maximum of 8 LW18001 modules can be connected.

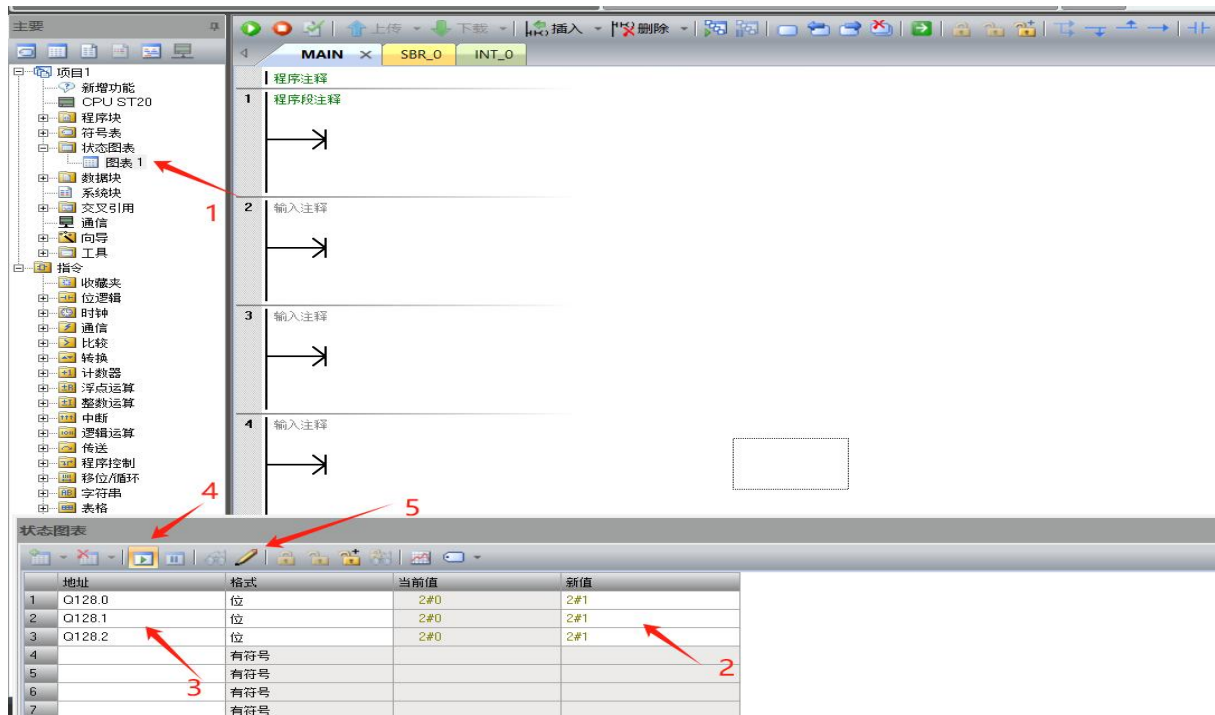


- 2、 Regarding the number of I/O modules that can be expanded per adapter: Each adapter supports a maximum of 128 bytes of input and 128 bytes of output. Therefore, for a single slave station, a maximum of 64 analog input channels and a maximum of 64 analog output channels can be

connected.



(8) Data Exchange



Open the Status Chart, enter the output module addresses 1–3 into the "Address" field, and click "Write All". The physical view of the module is shown in the figure below: terminals 1–3 are all illuminated.



At this point, the S7-200 SMART PLC is ready for programming.

5 Application of LW18002 as an EtherCAT Slave in Programming Software

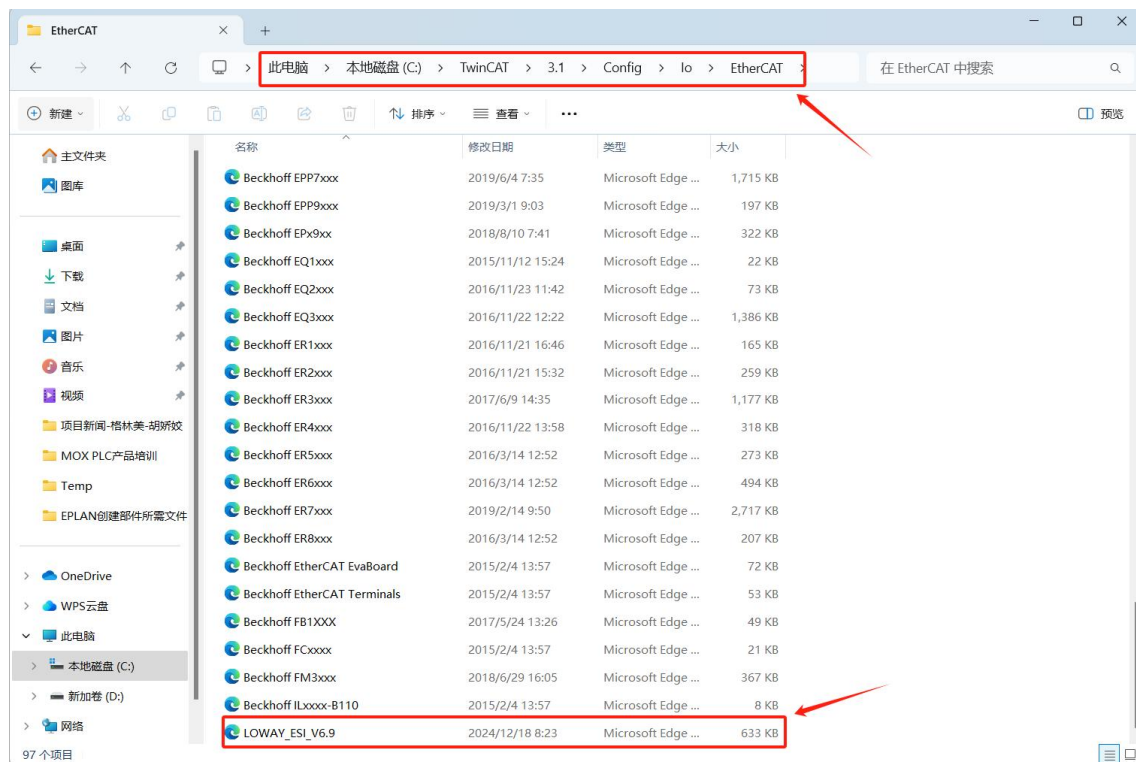
5.1 Application of LW18002 in Beckhoff TwinCAT3 Software Environment

Preparations:

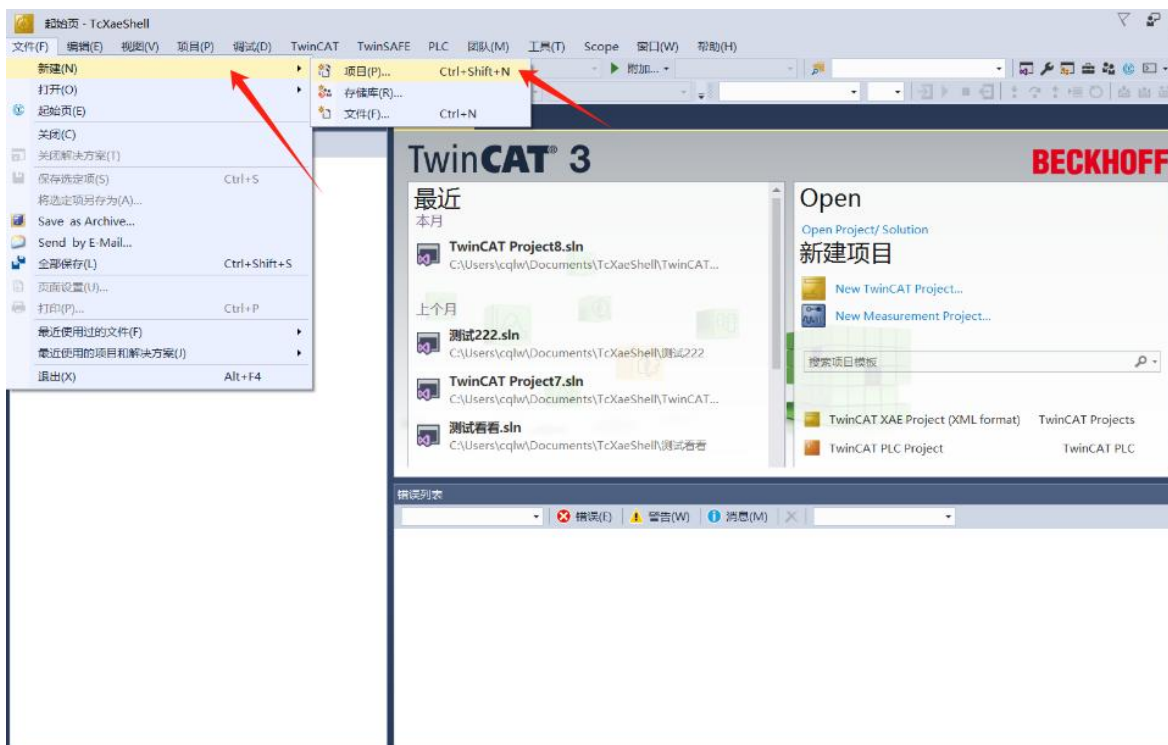
A computer with TwinCAT3 software installed, one LW18002 EtherCAT adapter module, one LW12016 16DO module, one LW11032 32DI module, one LW14108 8AO module, and one LW16001 end terminal module, as shown in the figure below:



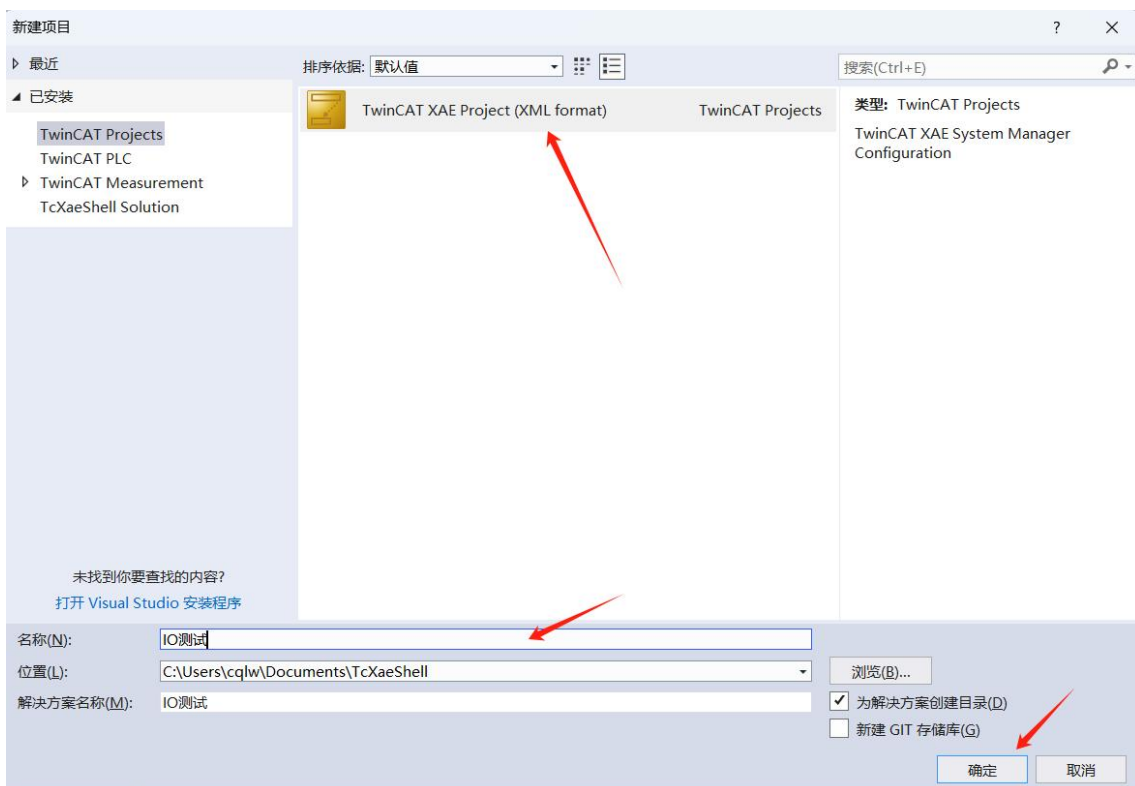
Copy the XML file to the corresponding folder on the computer.



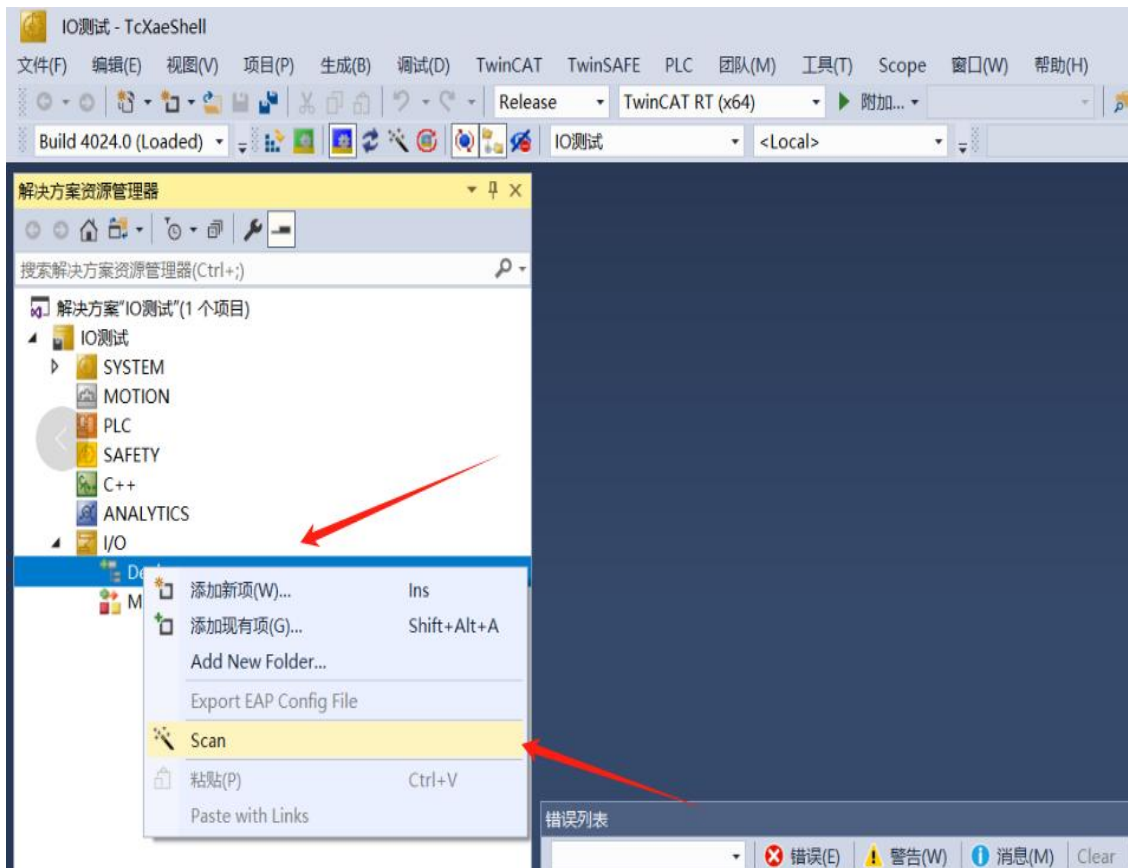
(1) Click File → New → Project in sequence.



(2) Click TwinCAT Projects, select TwinCAT XAE Project (XML format), enter the project name, and click OK.



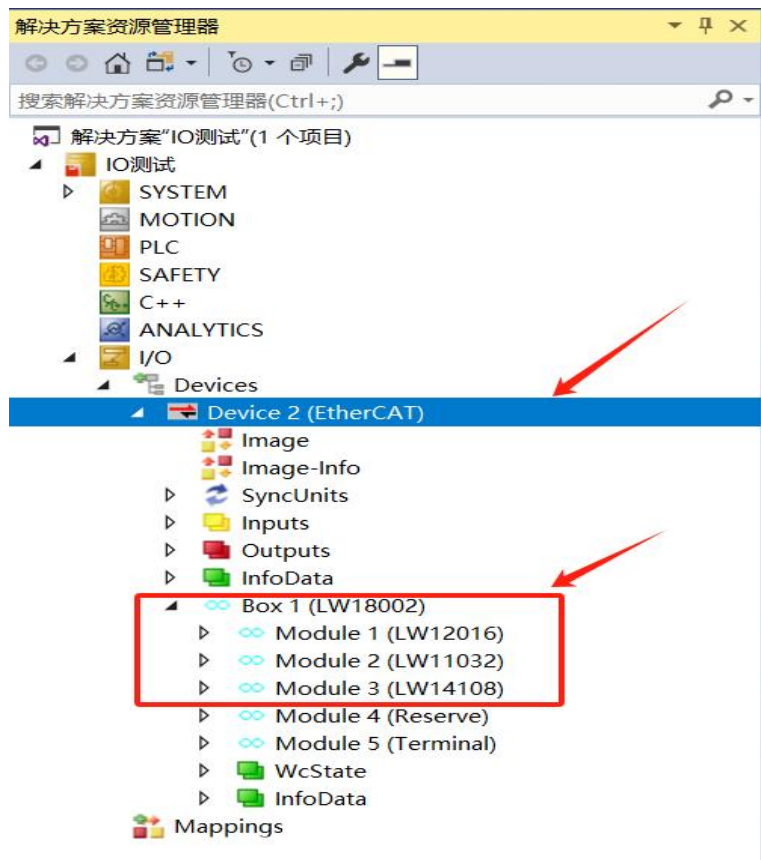
(3) Click IO, then Devices, and right-click to select Scan.



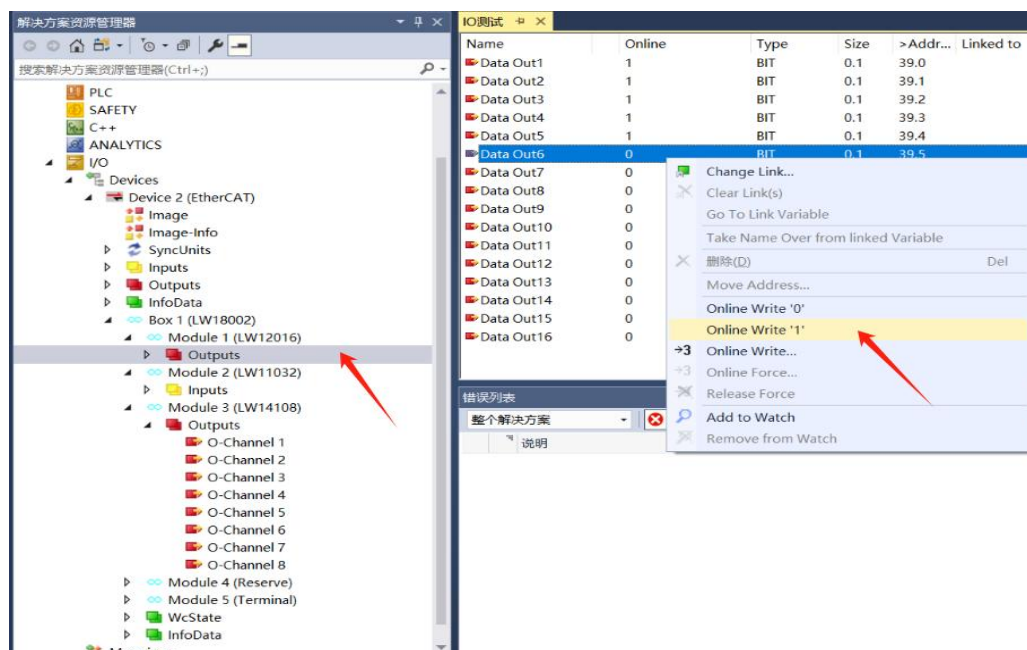
(4) Select Device2 and click OK.



(5) As shown in the figure below, the LW18002 adapter and the I/O modules have been successfully scanned.



(6) Click Outputs, expand the DaLW Out1 channel, right-click and select Online Write 1. The first output LED on the LW12016 module is illuminated.



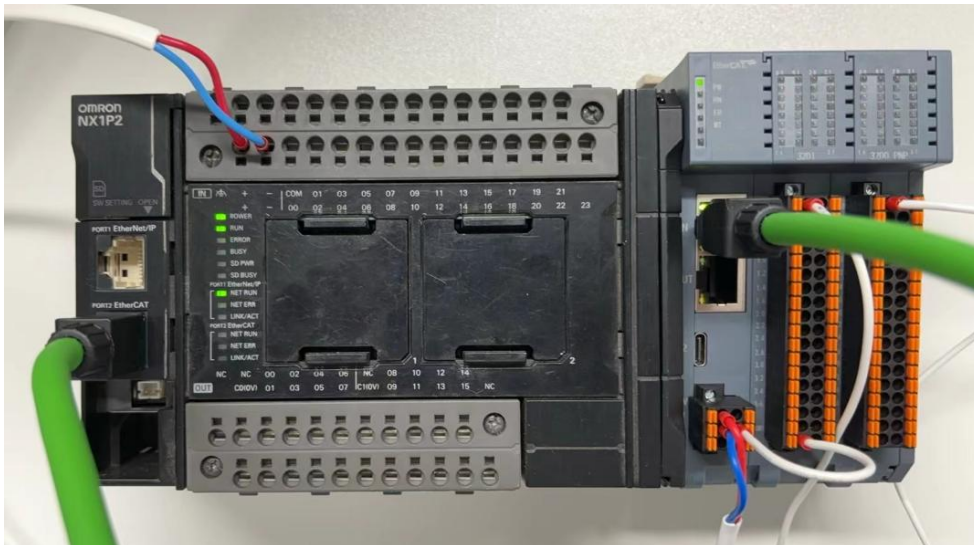
Connect the first terminal of the input module to the first terminal of the output module. The LED on the LW12016 is illuminated. At this point, the module is ready for programming.



5.2 Application of LW18002 in Omron Sysmac Studio Programming Software

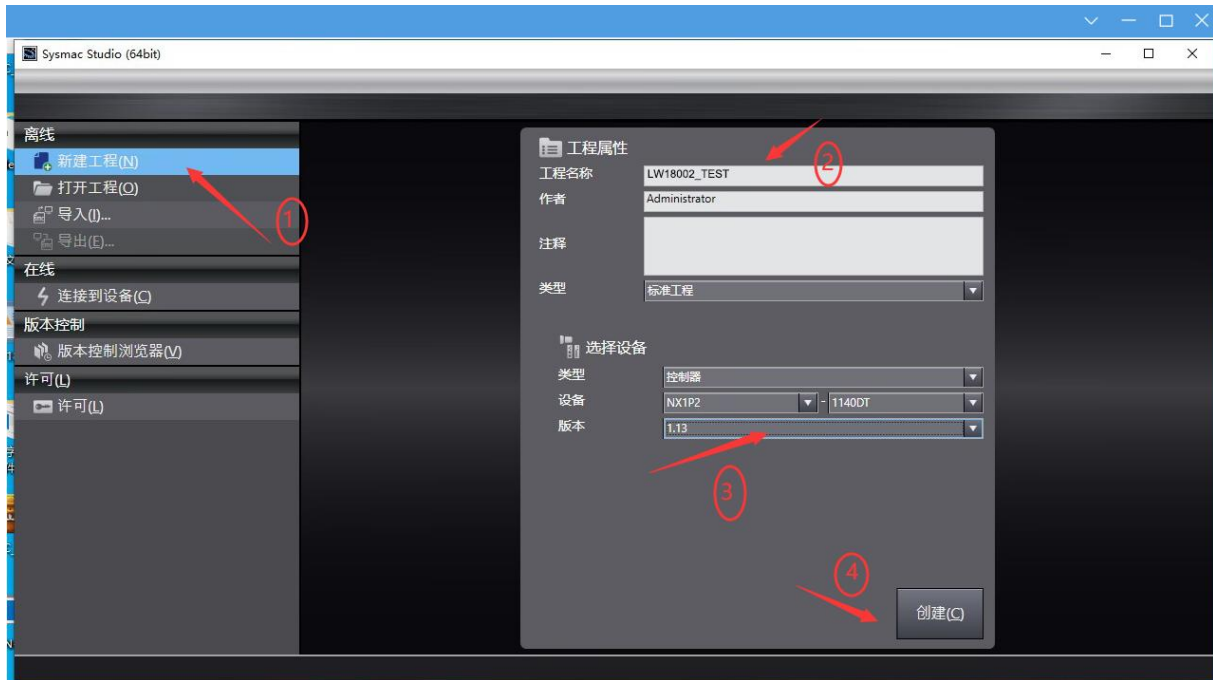
Preparations:

One Omron NX1P2 series CPU, one LW18002 EtherCAT adapter module, one LW11032 32DI module, one LW12032 32DO module, and one LW16001 end terminal module, as shown in the figure below:

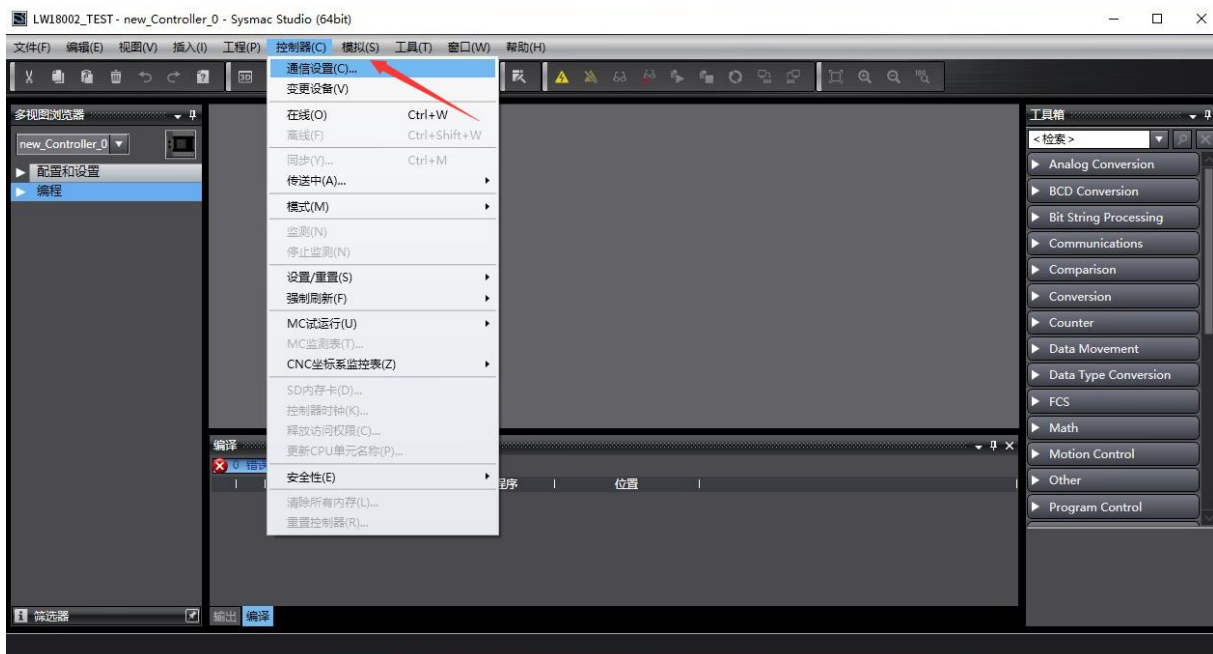


Copy the XML file to the computer desktop.

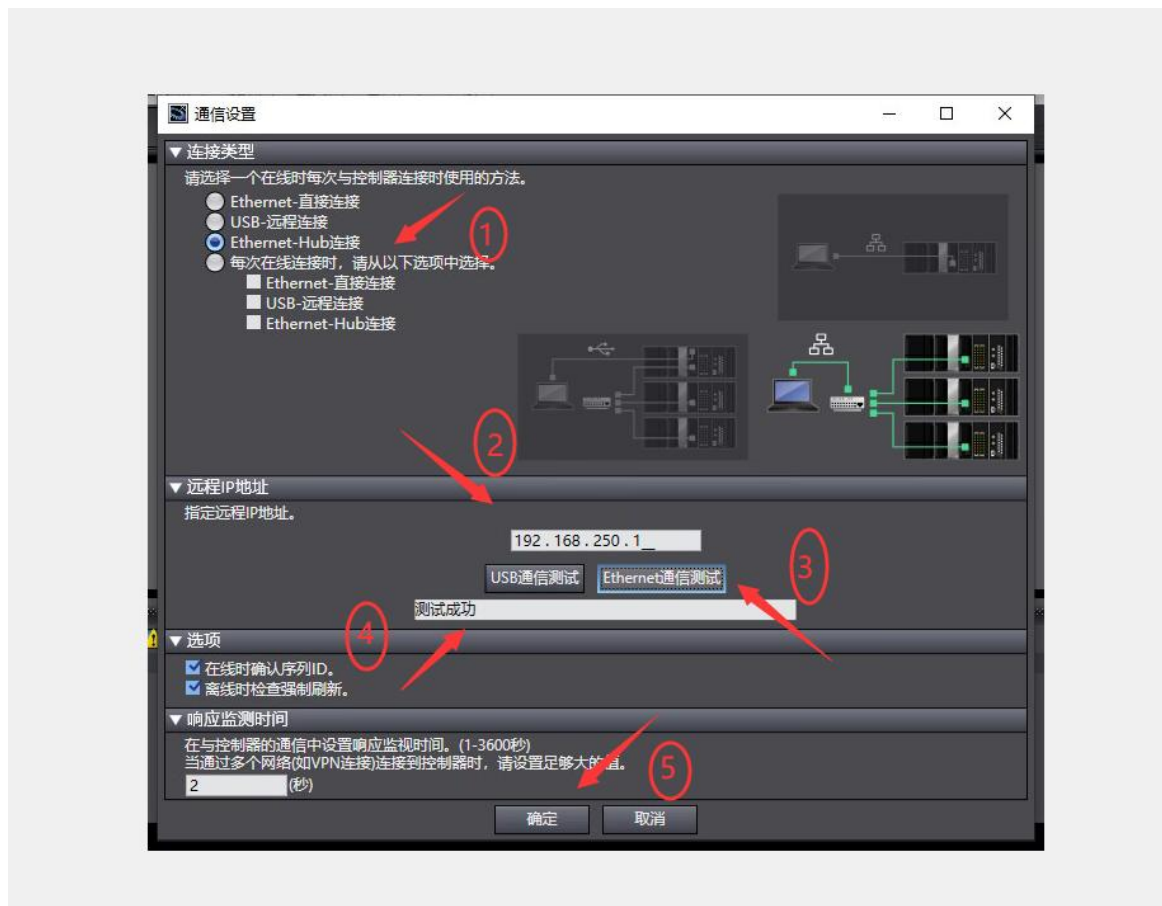
(1) Create a new project. Enter the project name, select the corresponding device, and click Create.



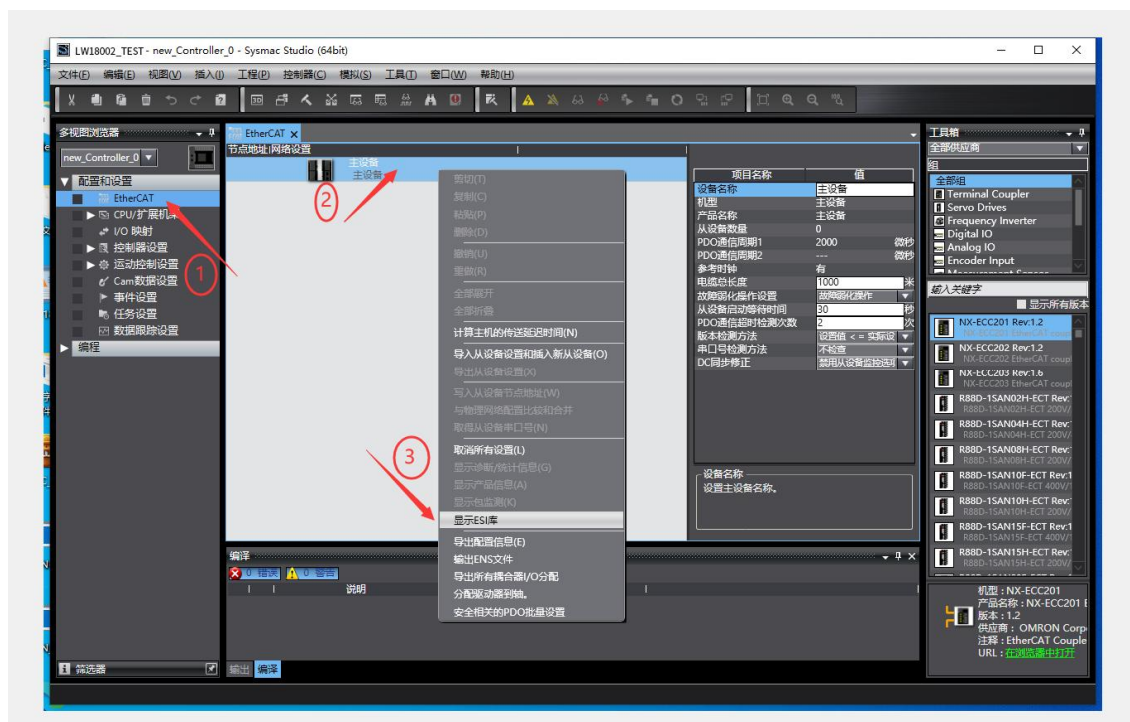
(2) Click Controller, then Communication Settings.



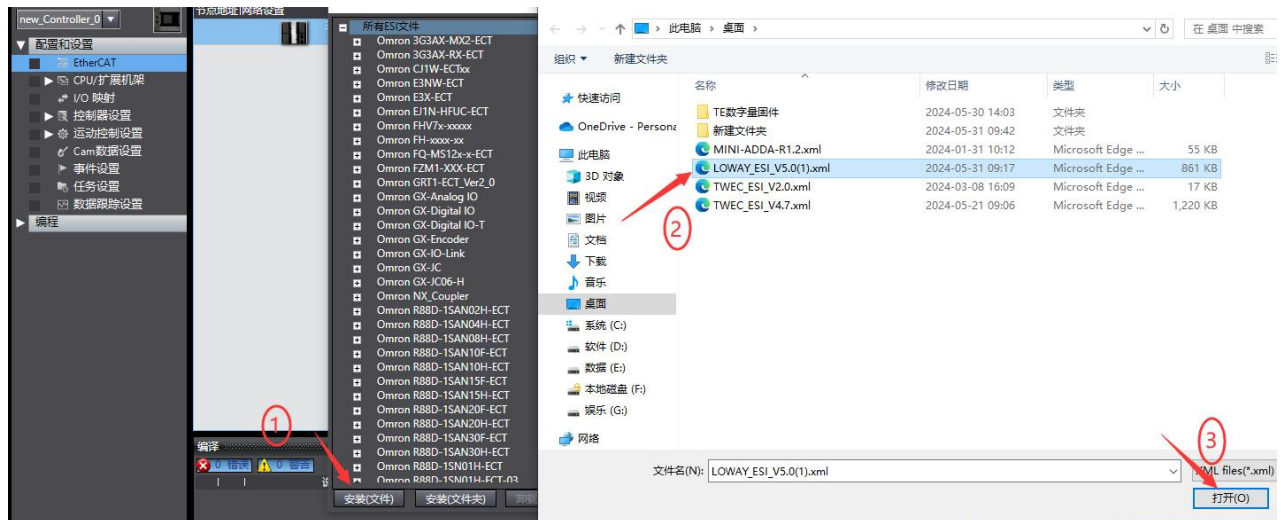
(3) In the Communication Settings, select Ethernet-Hub Connection, then set the IP address. This IP address is the module's IP address. After setting the IP address, click Ethernet Communication Test. If "4" is displayed, the test is successful. Click OK to proceed to the next step.



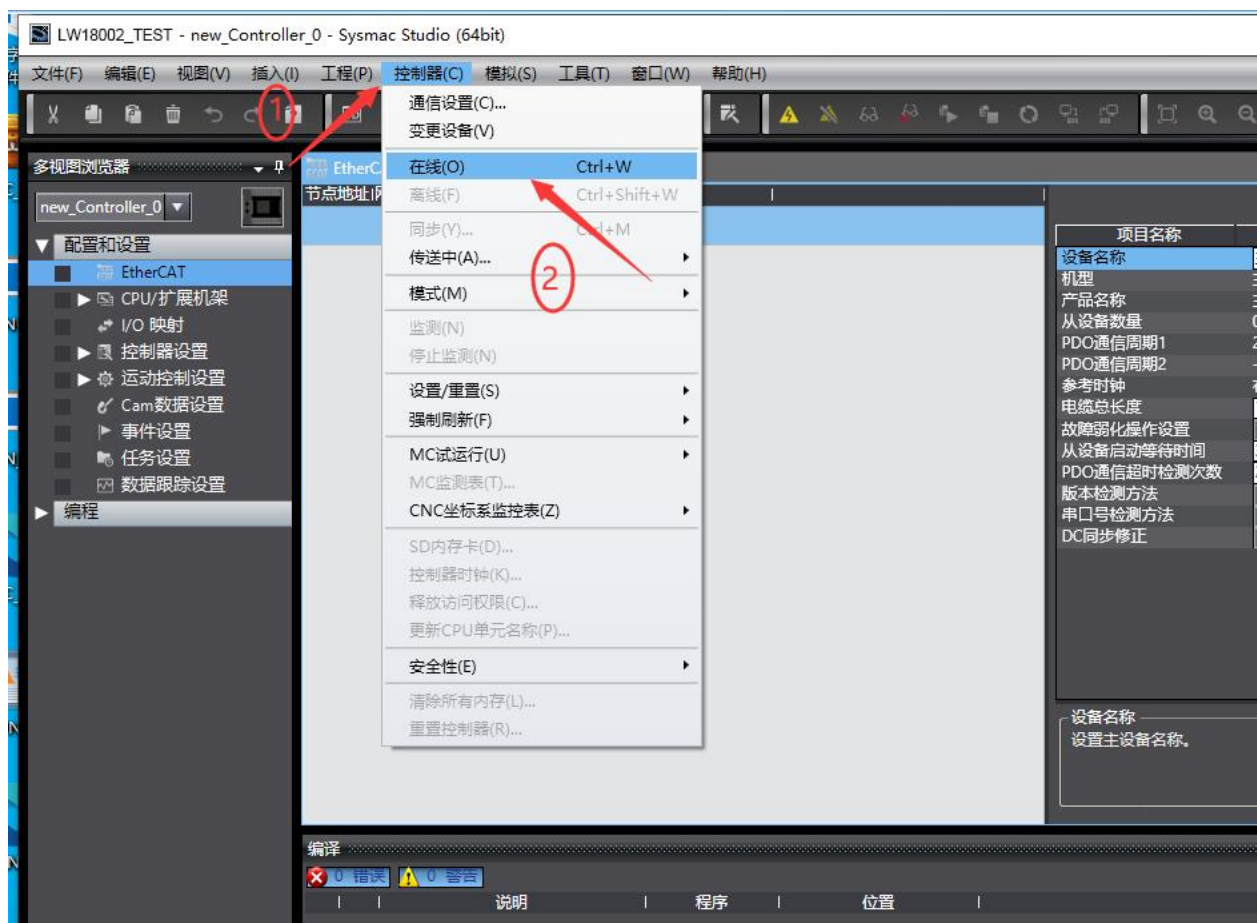
(5) Select EtherCAT, right-click the master device, and click "Display ESI Library" to proceed to the next step.



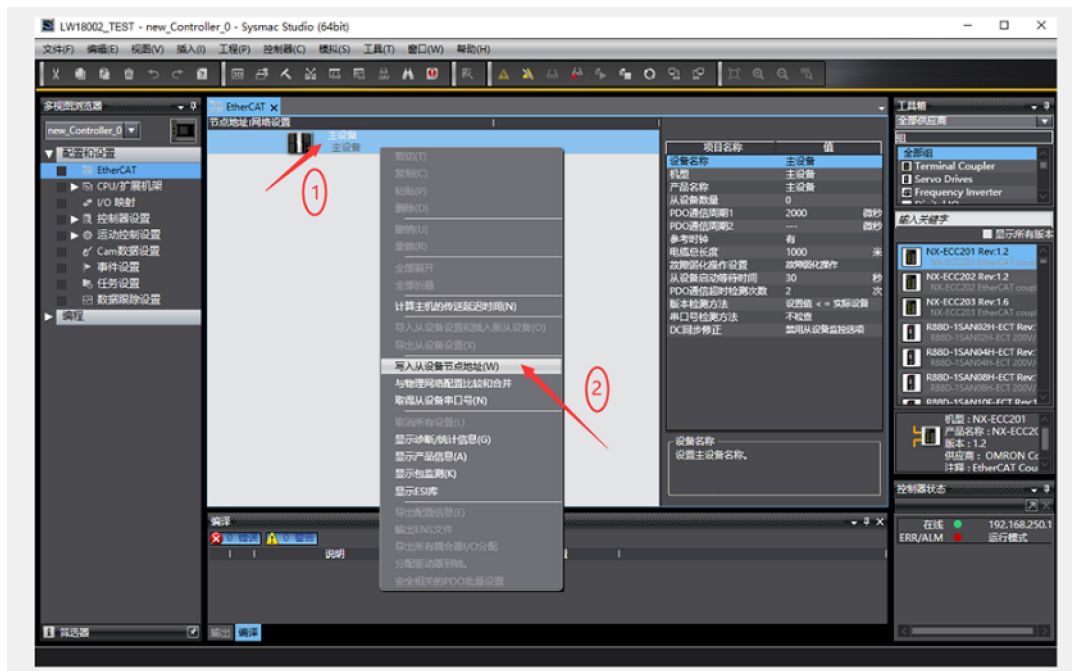
(6) Click "Install (File)", select the corresponding XML file, click "Open", and proceed to the next step.



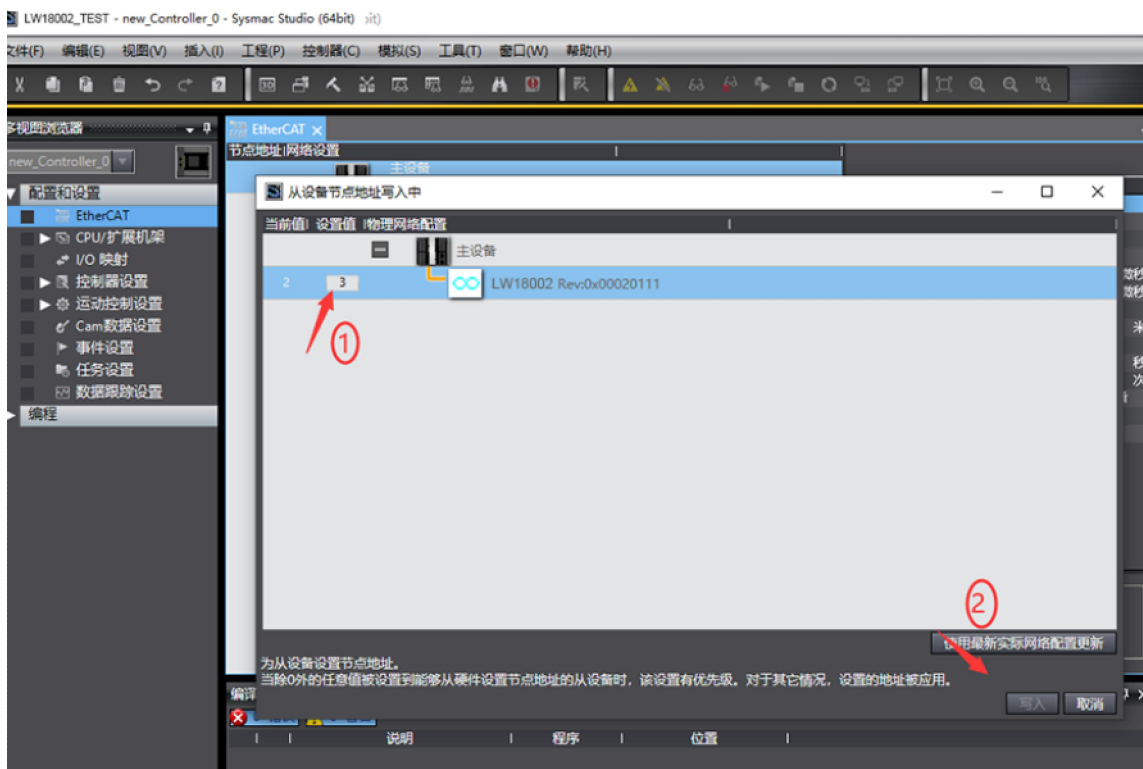
(7) Click Controller, then Online.



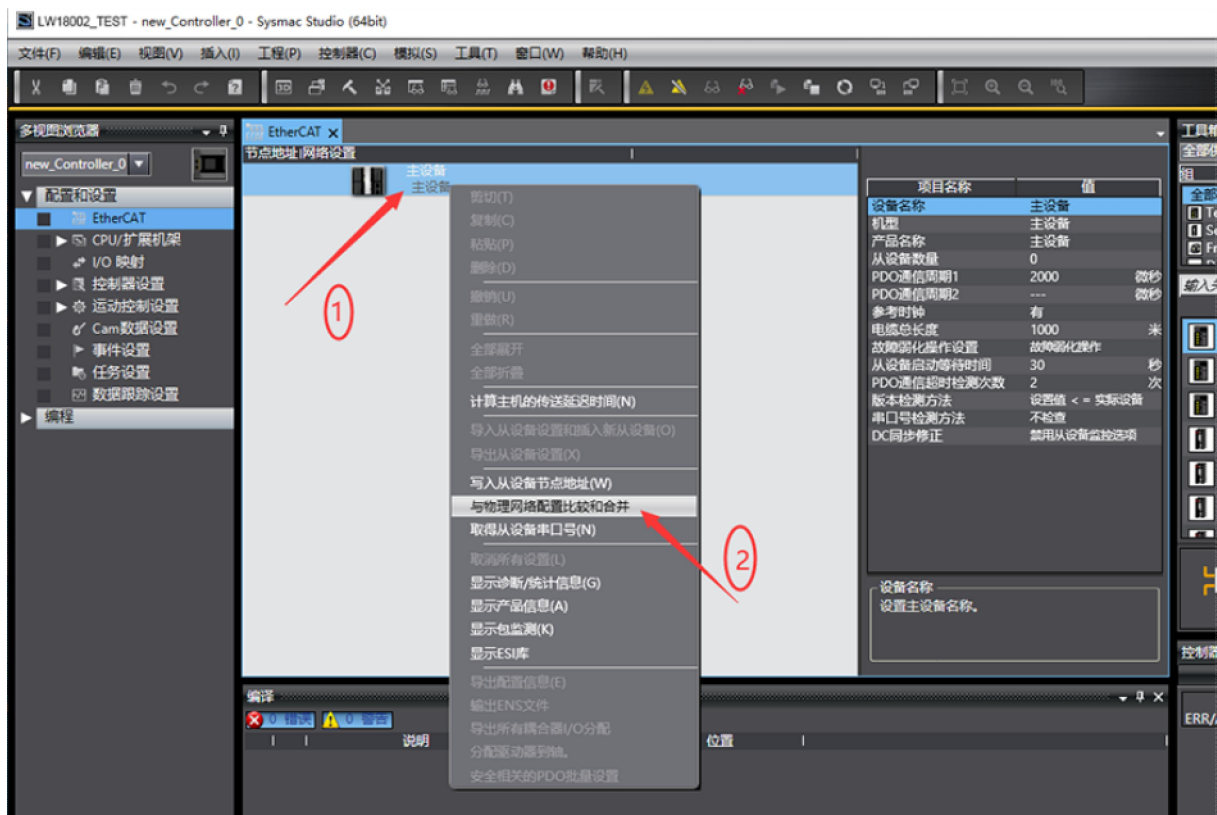
(8) Right-click the master device, and then click "Write Slave Node Address".



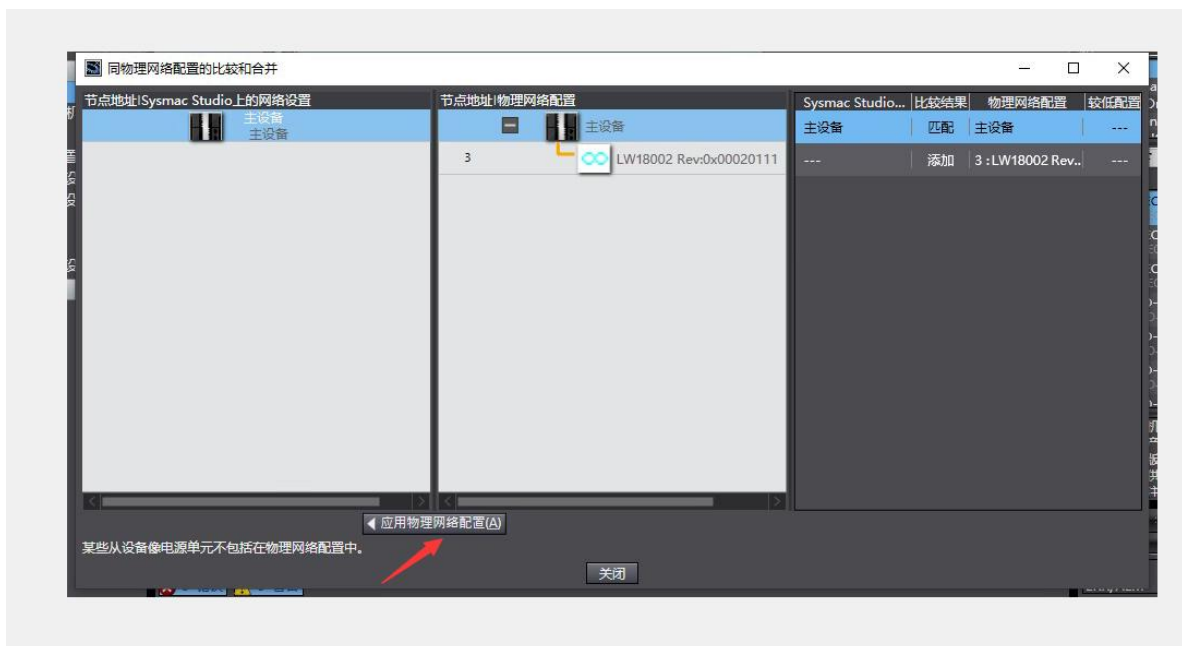
(9) Enter the corresponding address in the setting field, then click "Write" and power cycle the LW18002 module.



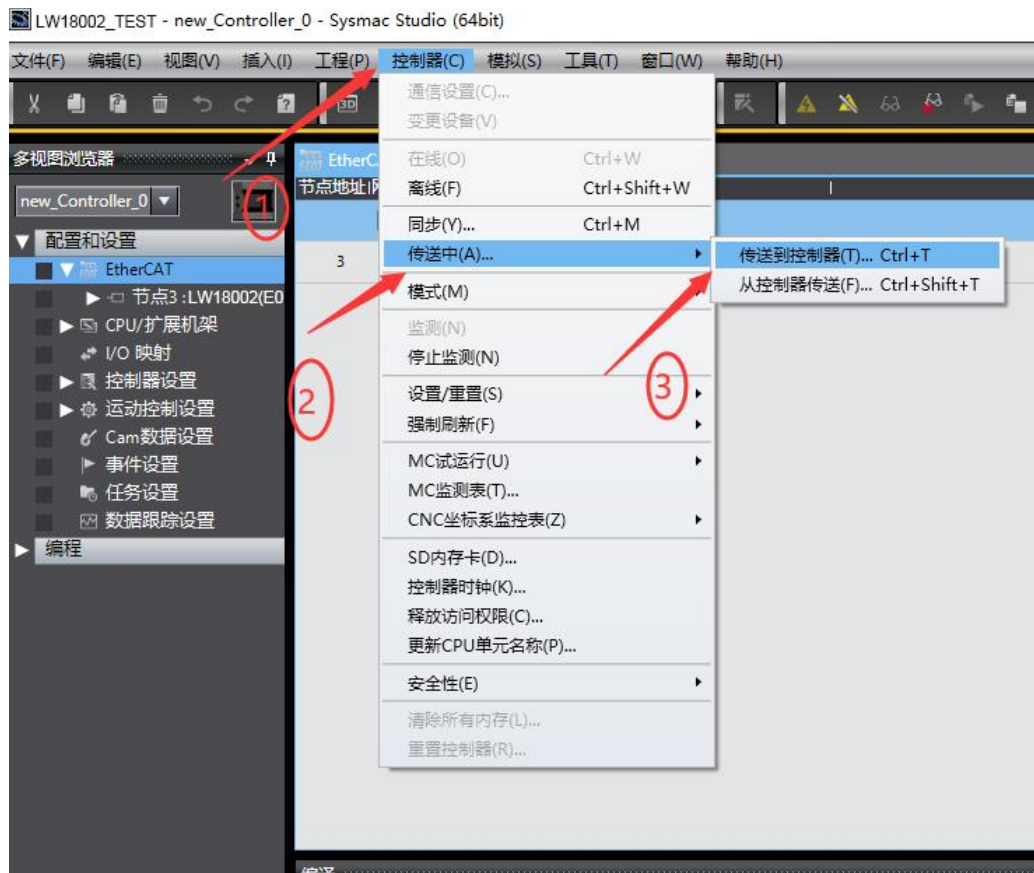
(10) Right-click the master device and click "Compare and Merge with Physical Network Configuration".



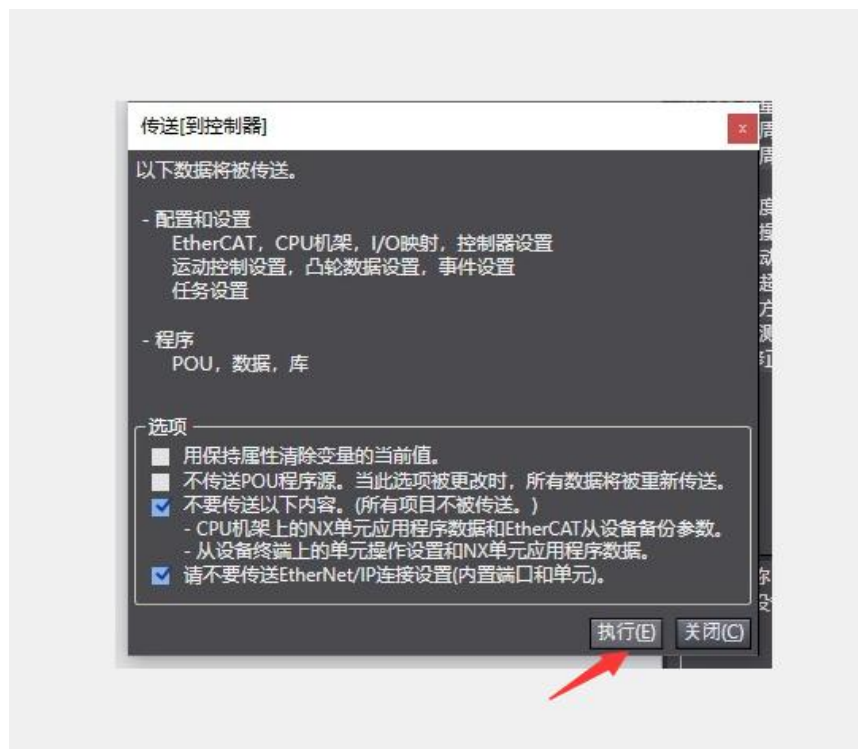
(11) Click "Apply Physical Network Configuration".



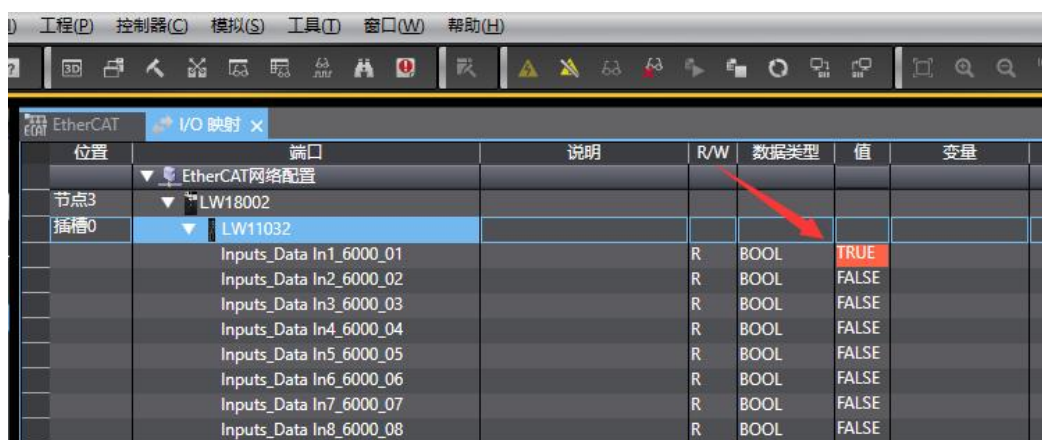
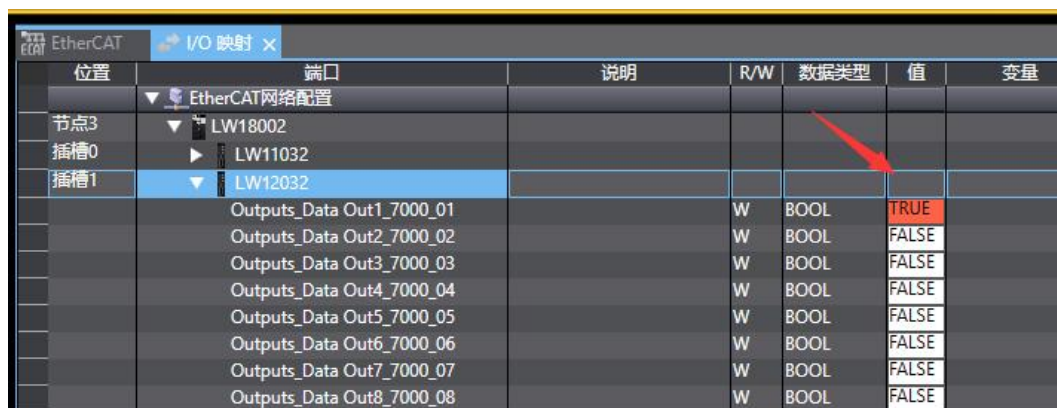
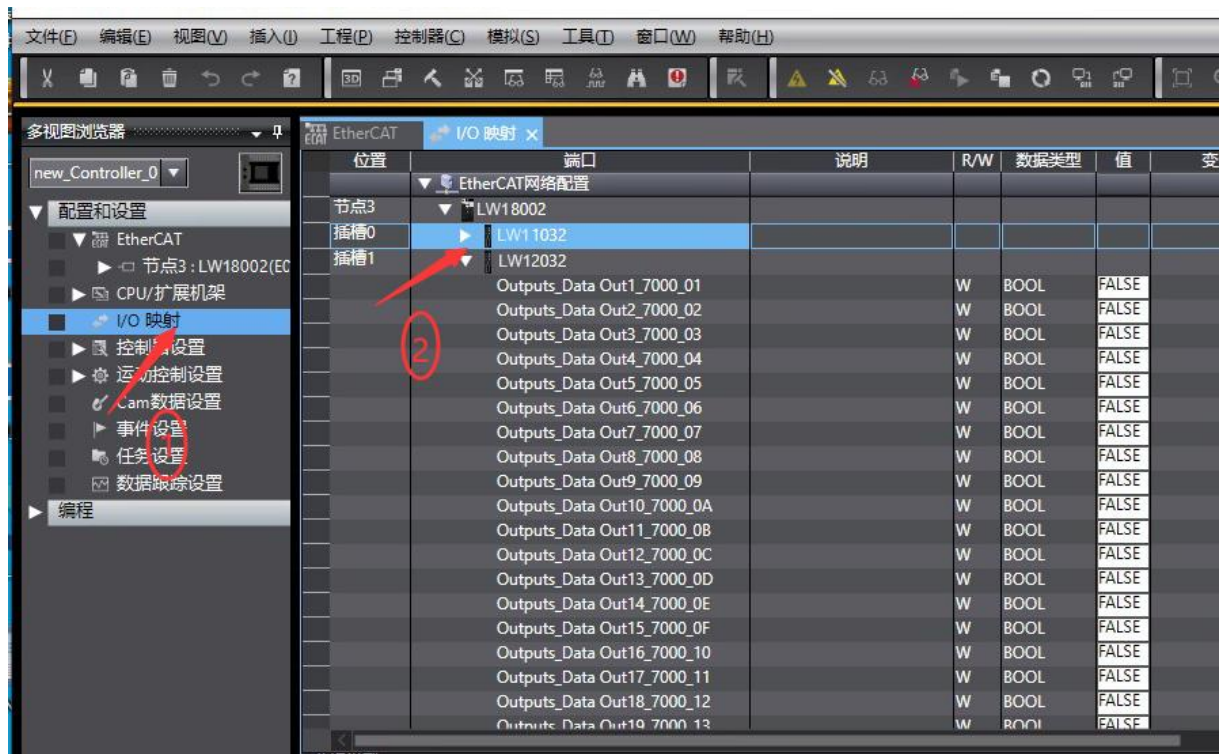
(12) Click Controller, then Transfer, and select Transfer to Controller.



(13) Click "Execute".



(14) Click "I/O Map". As shown in the figure on the right, the module input and output addresses are displayed.





Connect the first terminal of the input module to the first terminal of the output module. The LED on the LW11032 is illuminated. At this point, the module is ready for programming.

5.3 Application of LW18002 in CODESYS Programming Software

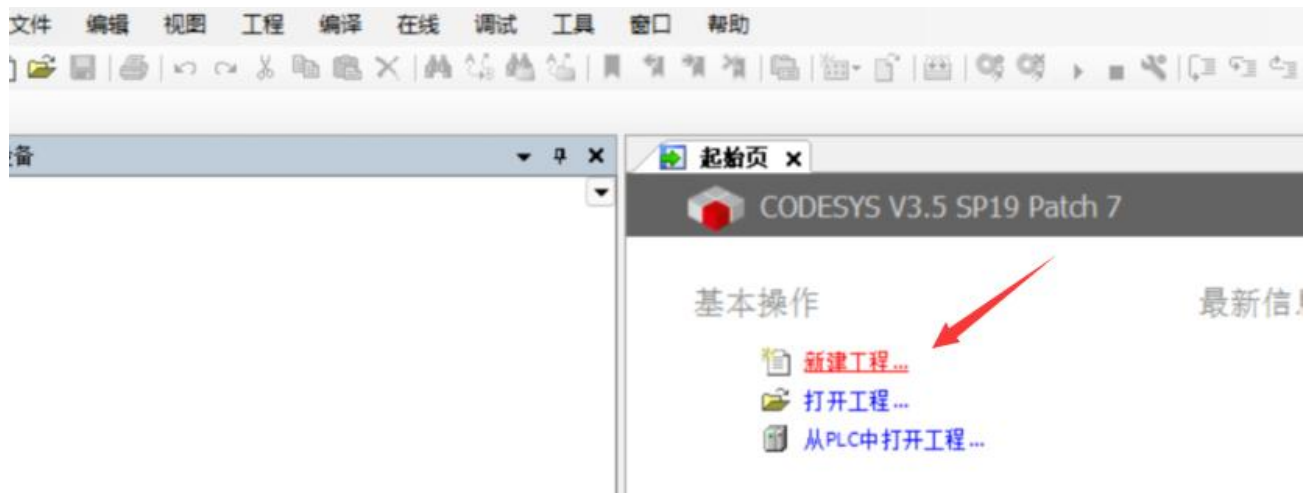
Preparations:

A computer with CODESYS software installed, one LW18002 EtherCAT adapter module, one LW11032 32DI module, one LW12032 32DO module, and one LW16001 end terminal module, as shown in the figure below:

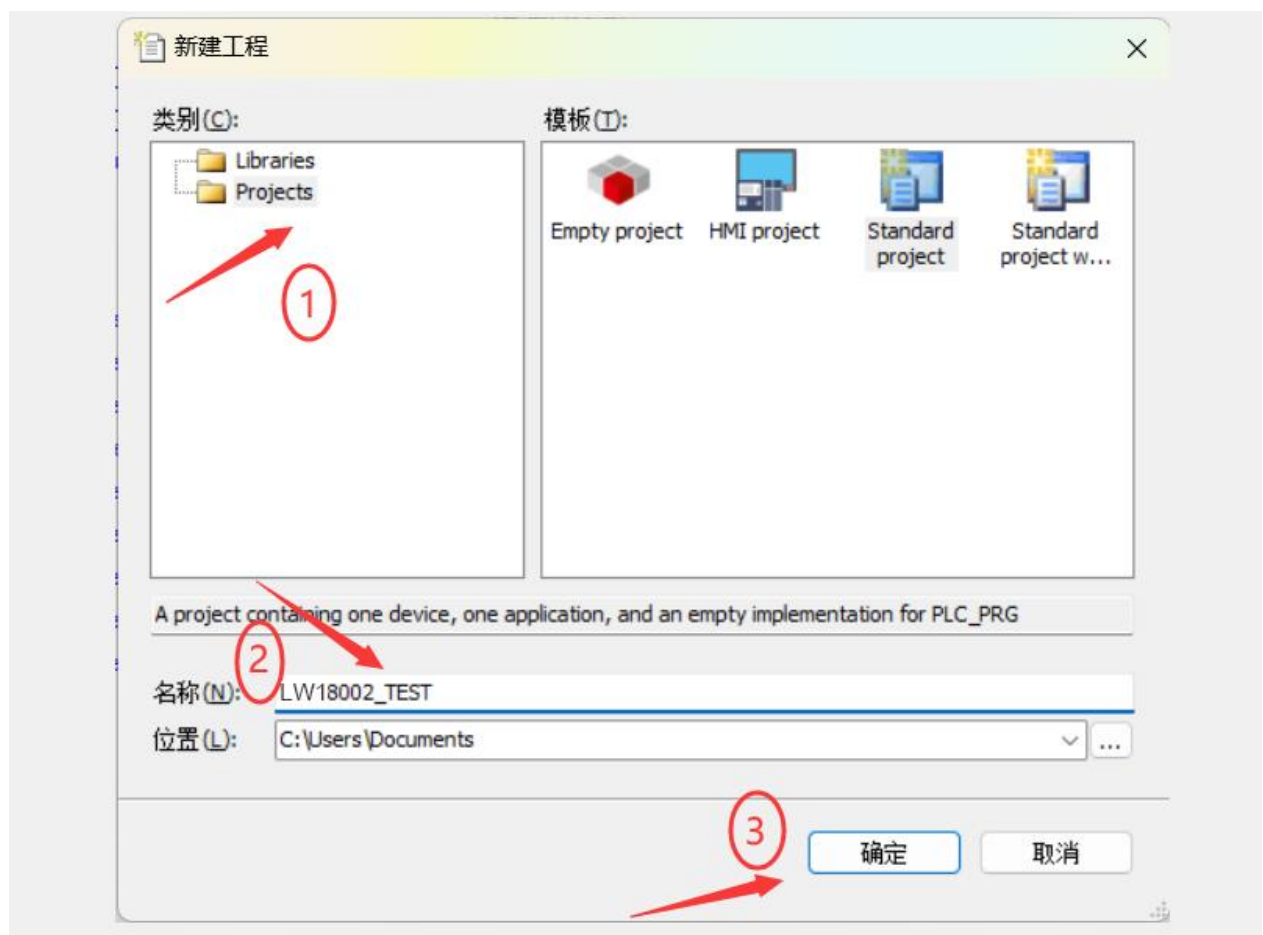


Prepare the XML file and save it to the computer desktop.

(1) Click "New Project".



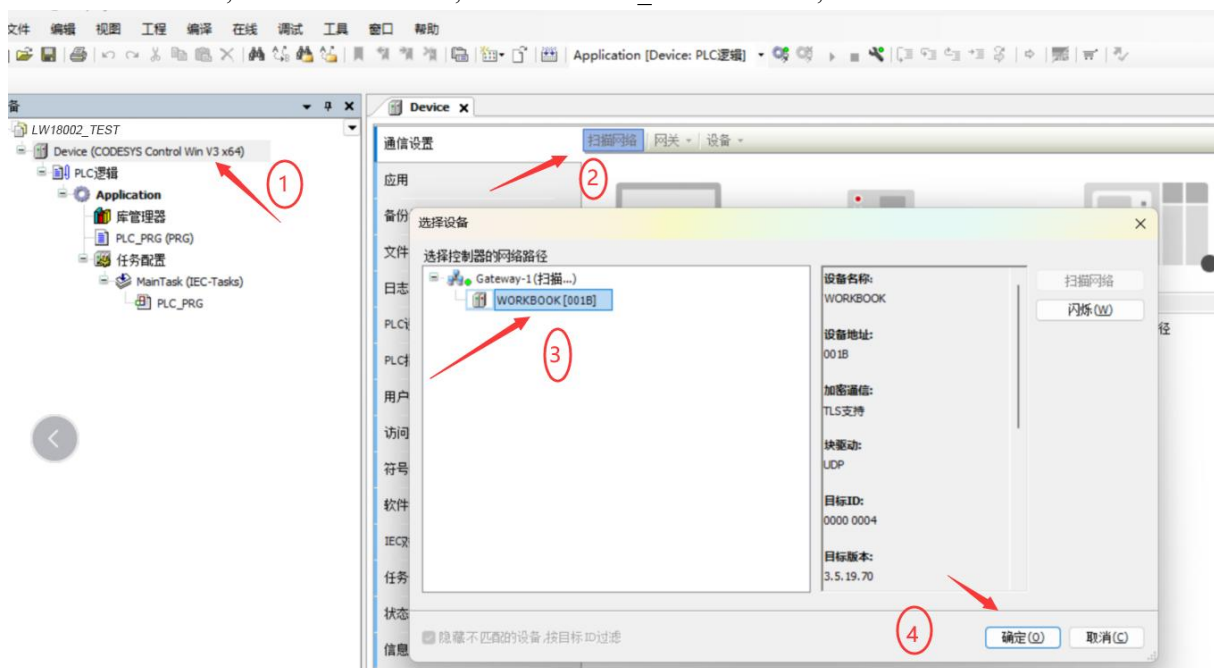
(2) Create a new project and click "OK".



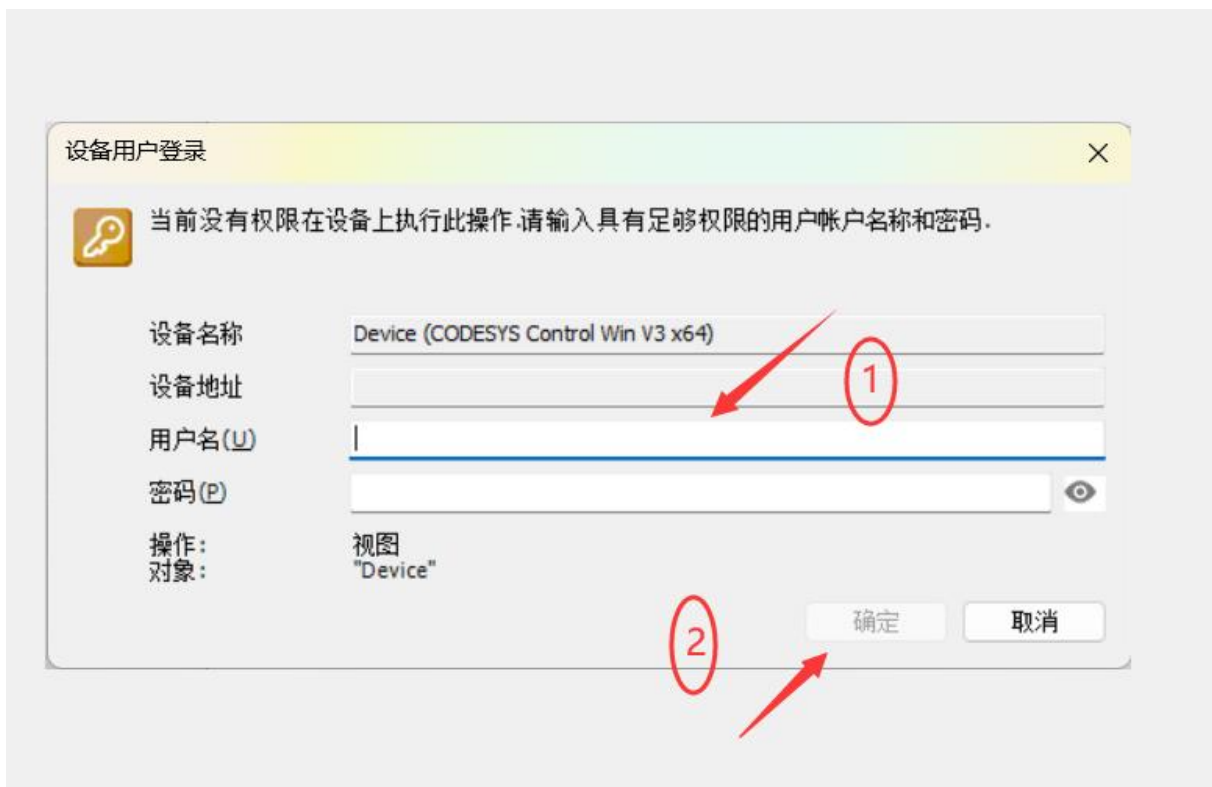
(3) Select the corresponding system.



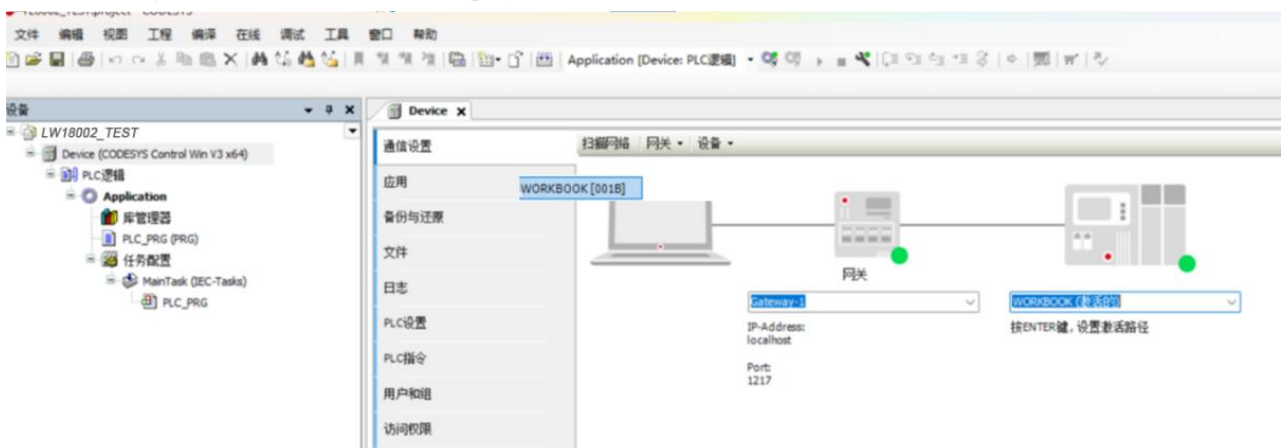
(4) Click Device, then Scan Network, select LOWAY_WORKBOOK, and click OK.



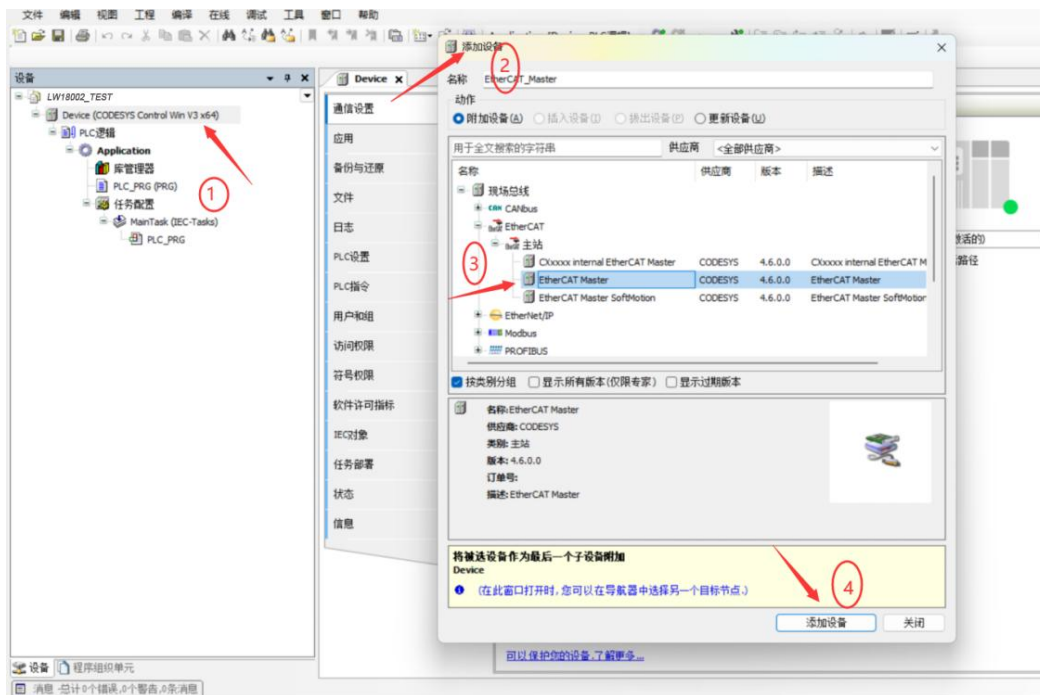
(5) Log in with your own username and password.



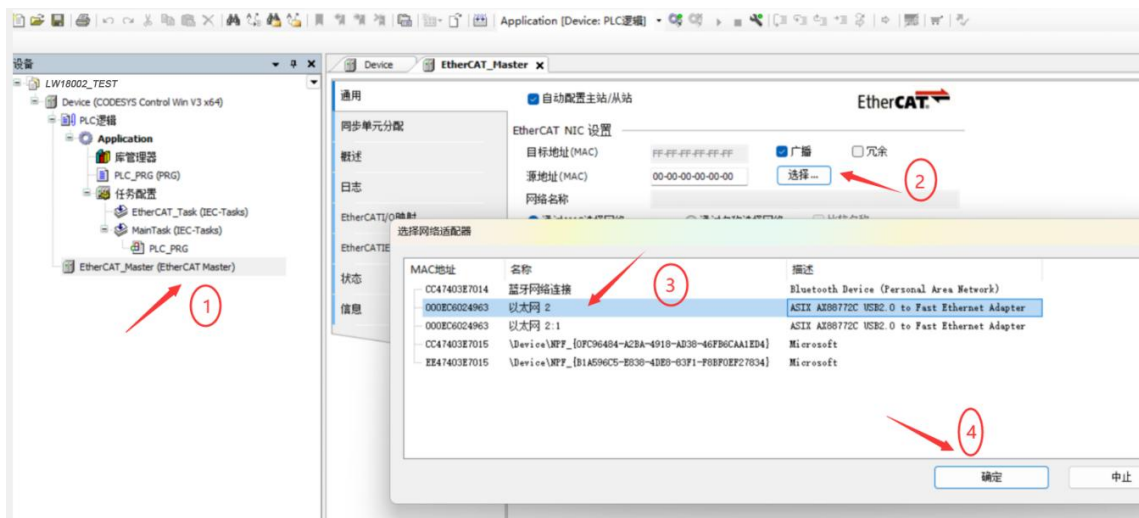
After clicking OK, the online status is displayed as shown below.



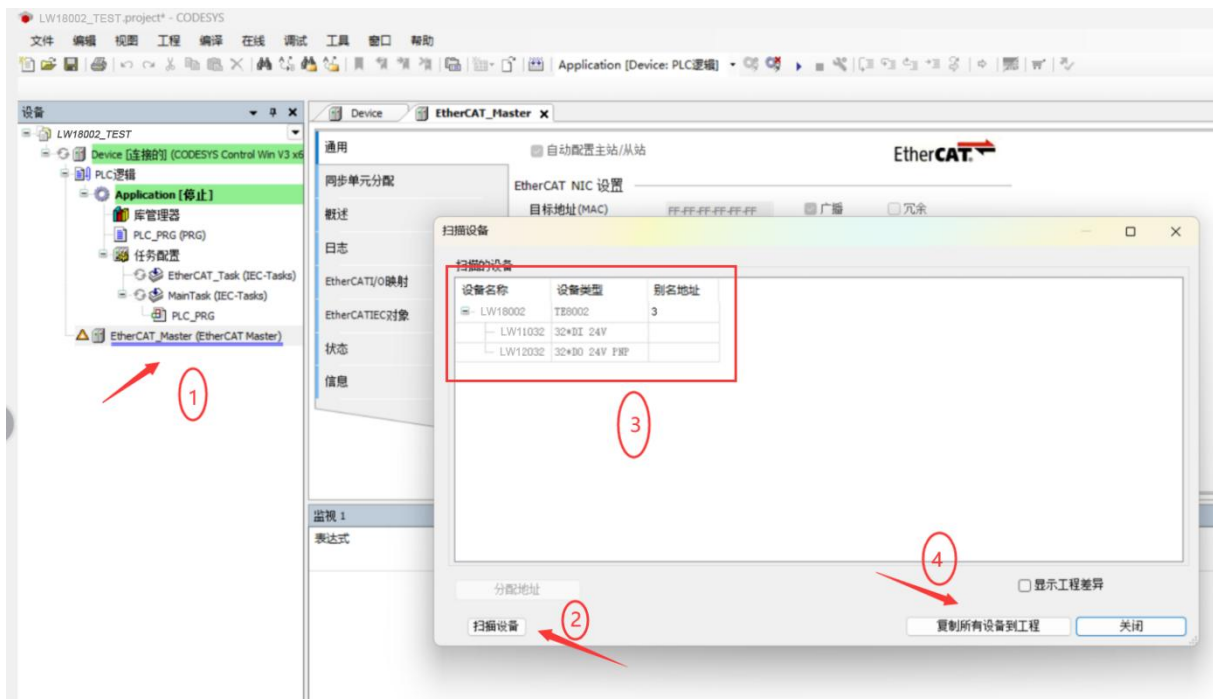
(6) Right-click Device, then click Add Device, select EtherCAT Master, and click Add Device.



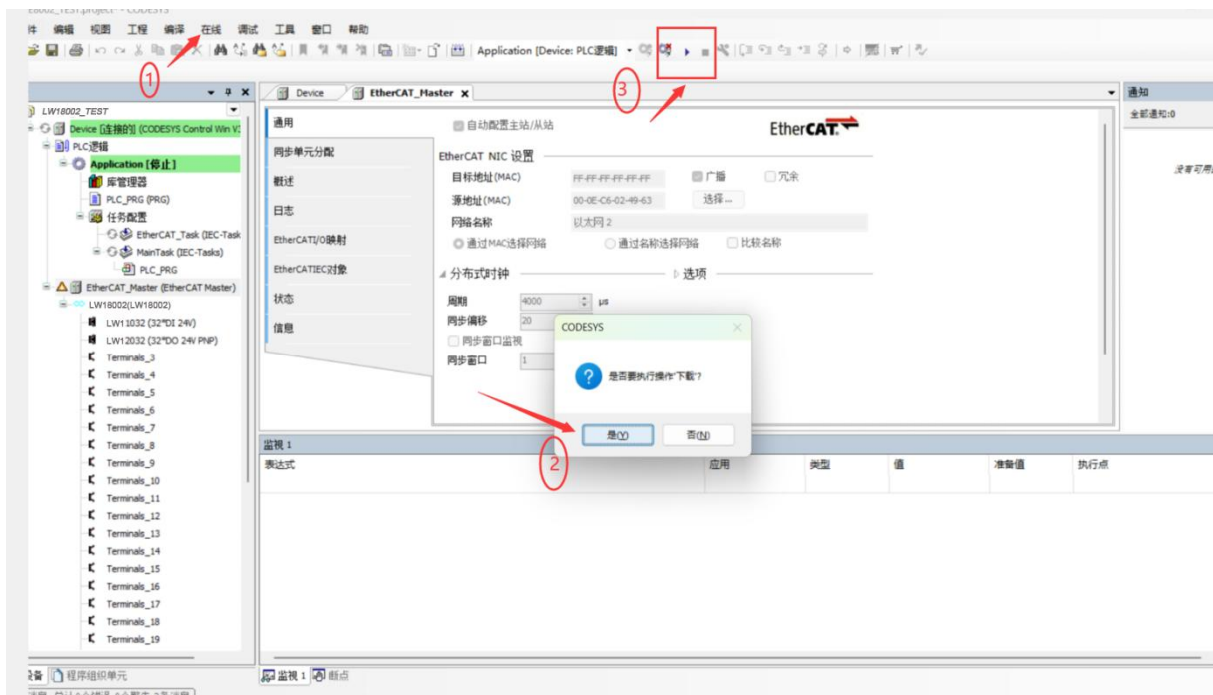
(7) Double-click EtherCAT Master, click Select, choose the corresponding network adapter, and click OK.



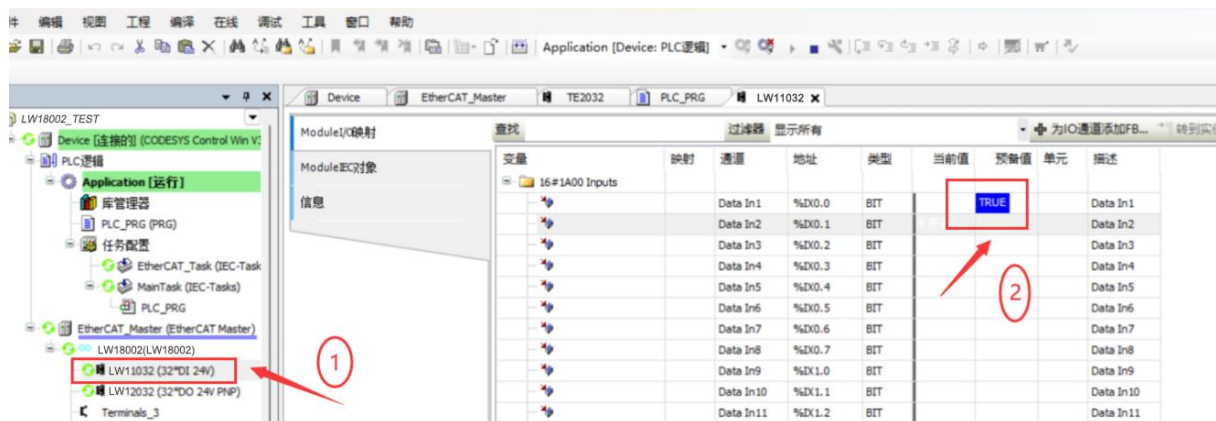
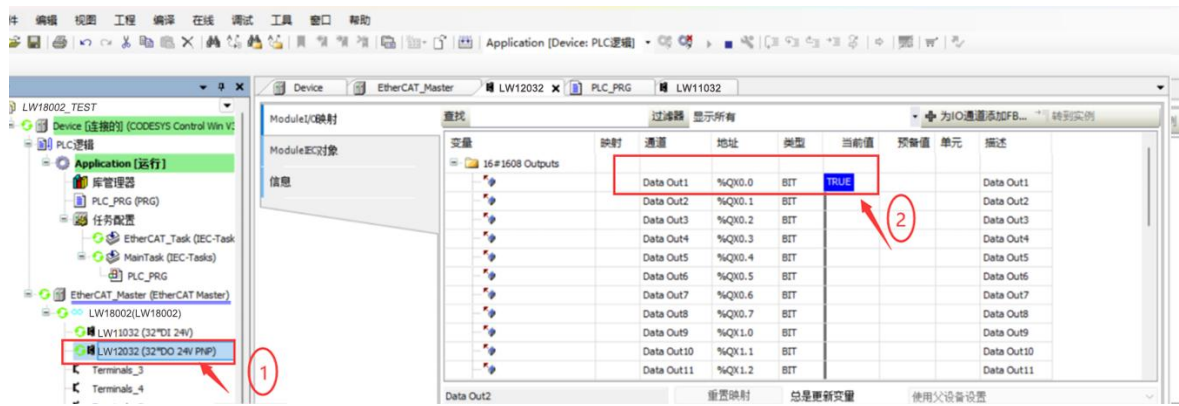
(8) Right-click EtherCAT Master, select Scan Devices. As shown in label 3, click "Copy all devices to project".



(9) Click Online, then click the Download button.



(10) As shown in the figure below, the input and output module addresses are displayed.



Connect the first terminal of the input module to the first terminal of the output module. The LED on the LW11032 is illuminated. At this point, the module is ready for programming.

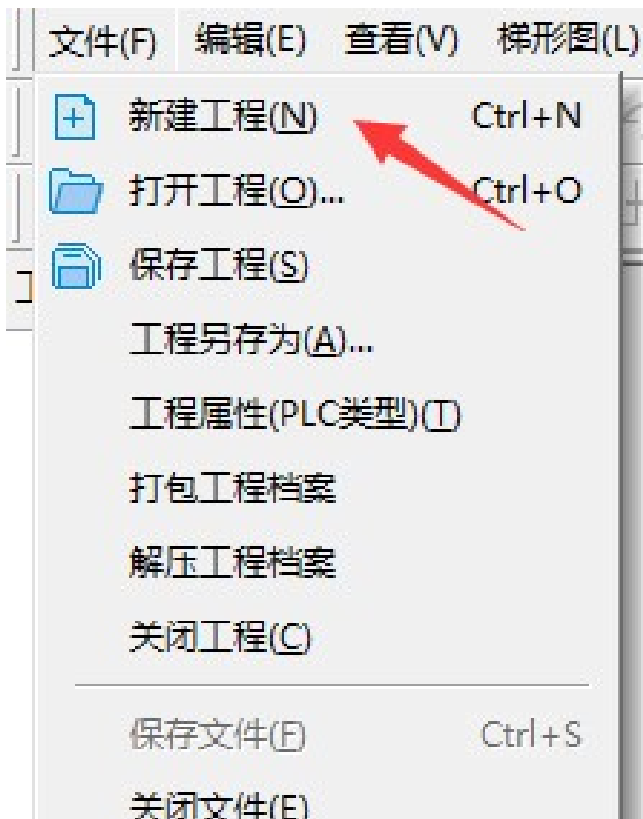


5.4 Application of LW18002 in Inovance Programming Software Preparations:

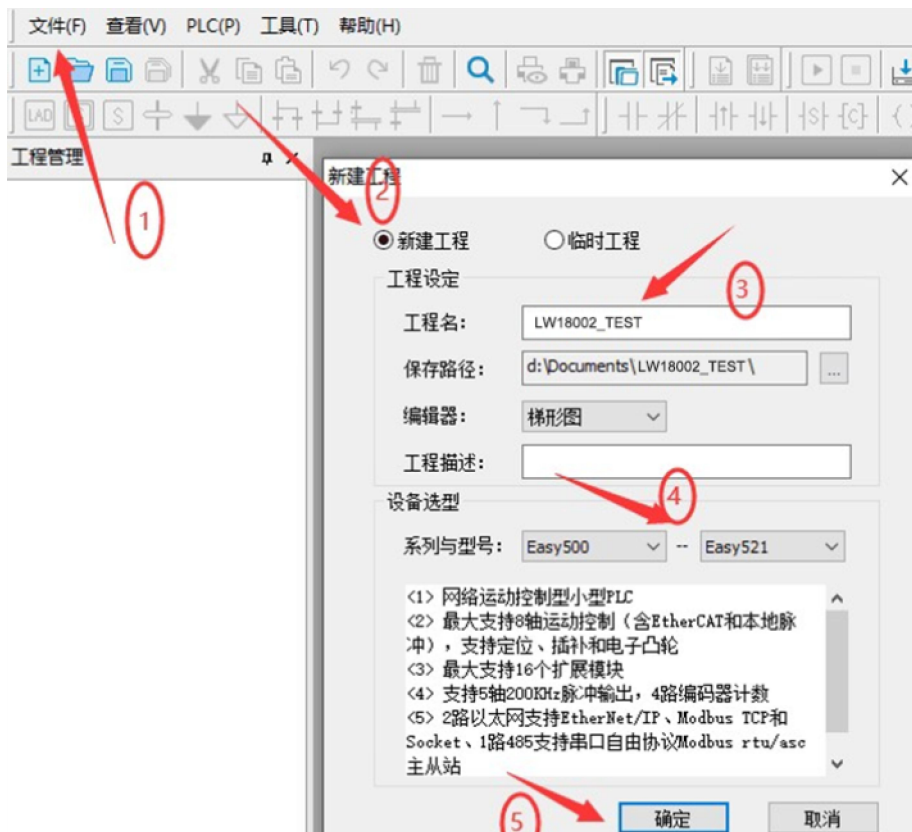
One Inovance Easy521 series CPU, one LW18002 EtherCAT adapter module, one LW11032 32DI module, one LW12032 32DO module, and one LW16001 end terminal module, as shown in the figure below:



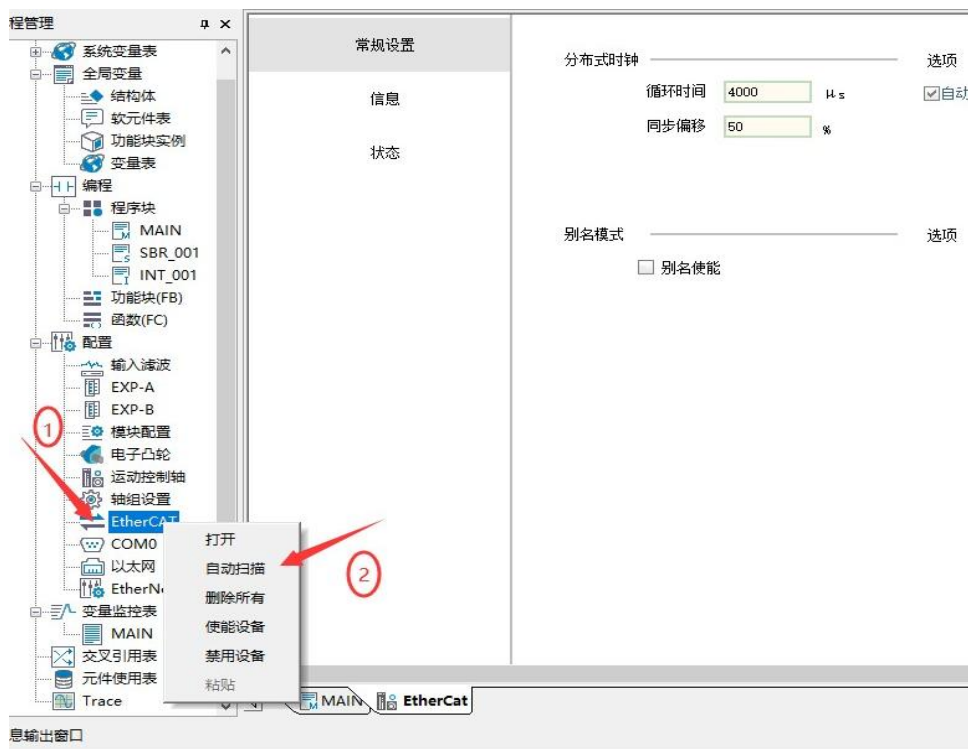
(1) Open the Inovance AutoShop programming software.
Click File, then New Project.



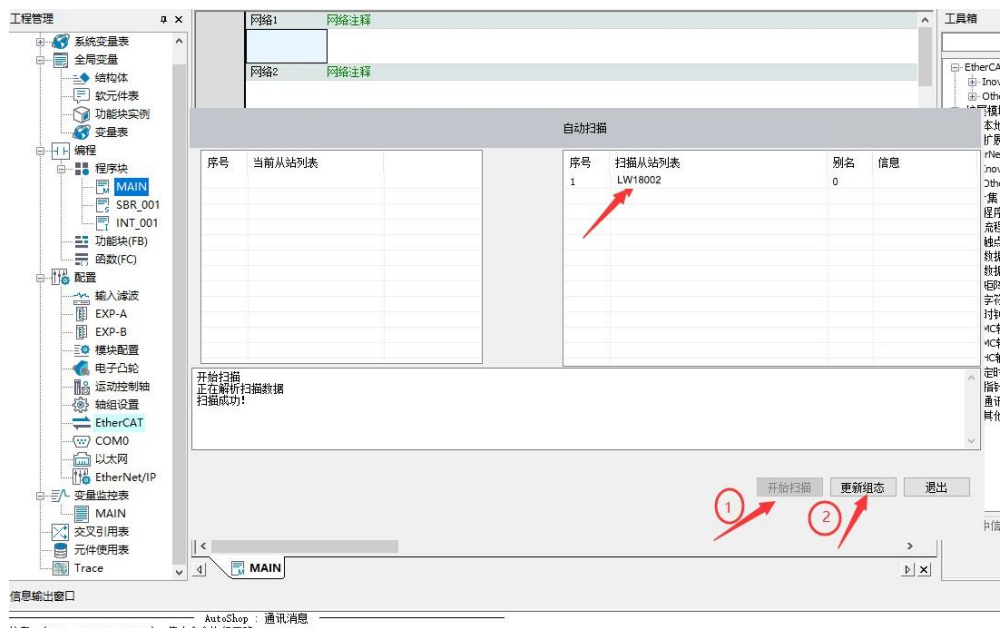
(2) Follow the sequence below to enter the project name, select the PLC series and model, and then click OK.



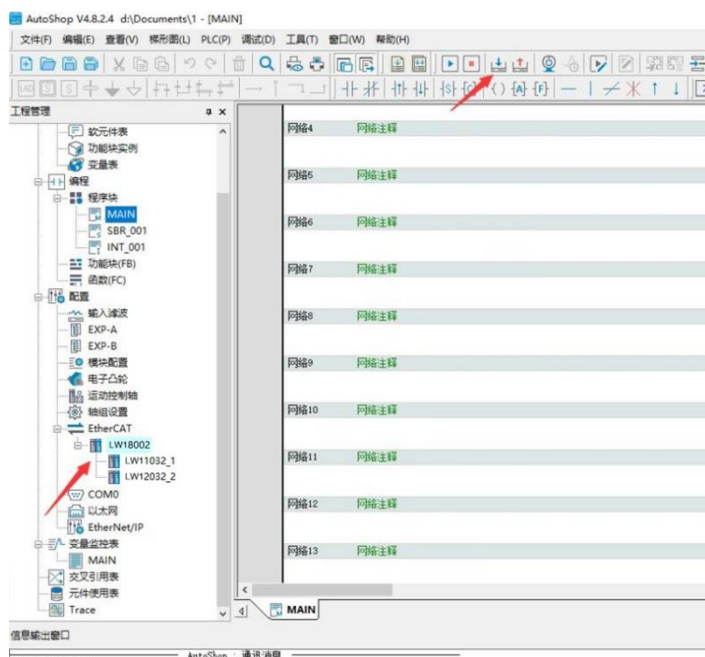
(3) Right-click EtherCAT and click "Auto Scan".



(4) Start scanning. As indicated by the arrows above, the LW18002 slave model is scanned. Then click "Update Configuration".



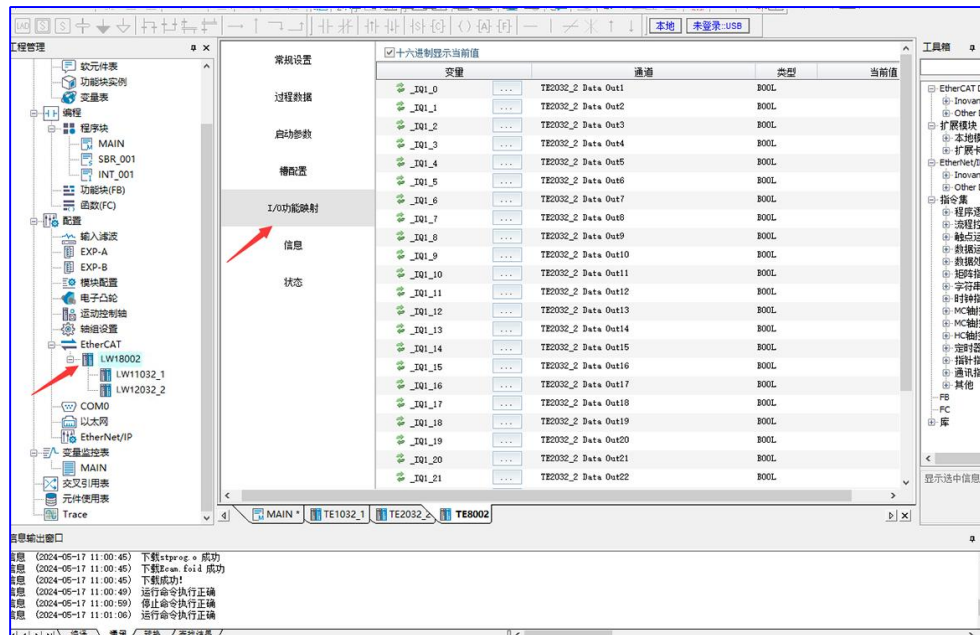
(5) As shown in the figure, the LW18002 slave module has been successfully configured under the EtherCAT tree directory on the left. Then click the Download button.



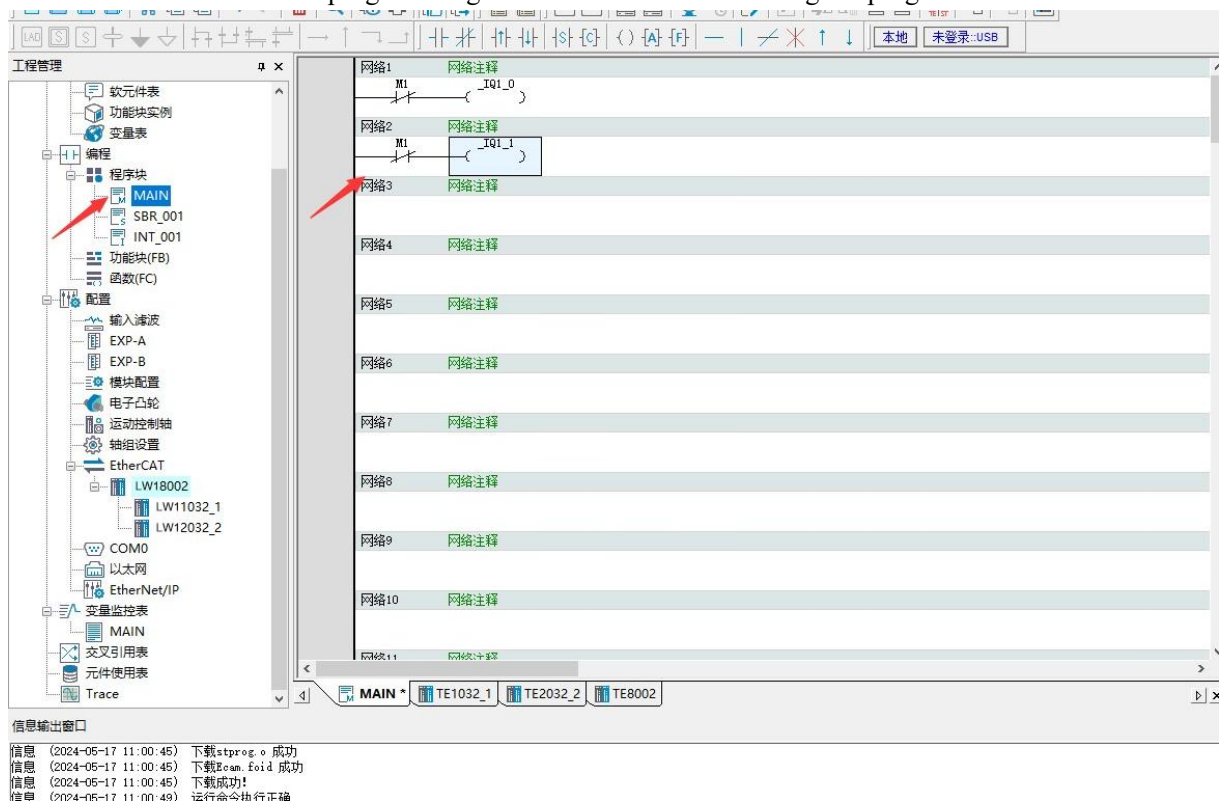
If the RN LED on the LW18002 is flashing after the download, click the Start button in the programming software to make the RN LED steady on.



(6) Click LW18002, locate the I/O Function Mapping section, and proceed with programming.



(7) Locate MAIN in the programming environment and start writing the program.



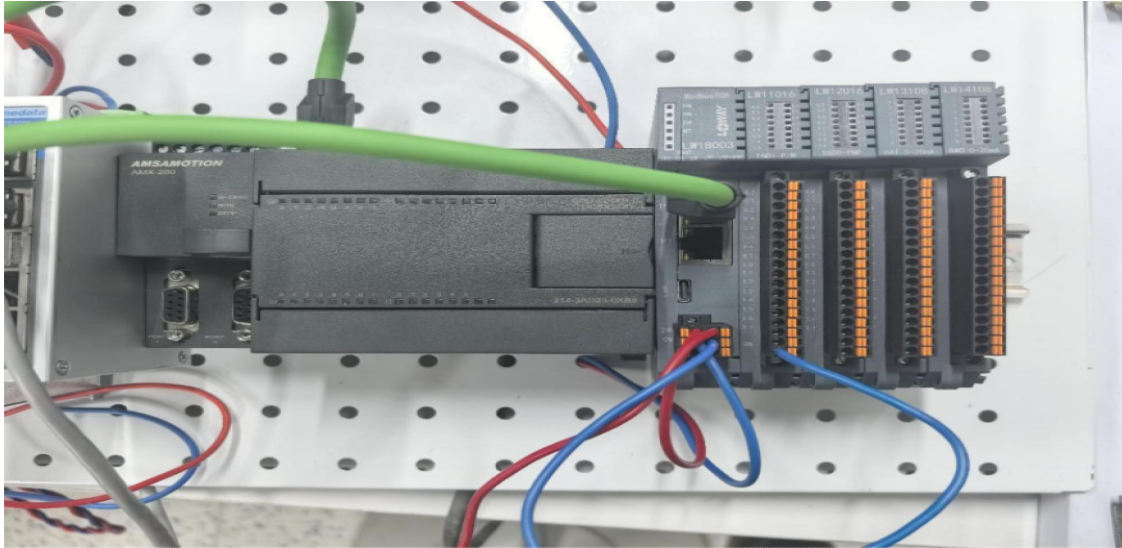
(8) As shown in the figure below, LEDs 2 and 3 on the LW12032 are illuminated. The LED 1 on the LW11032 is connected to the LED 1 on the LW12032, and the LED 1 on the LW11032 is illuminated. At this point, programming of the LW18002 module can proceed.



5.5 Register Address Description for the LW18003 Adapter I/O Module

Preparations:

One Aimoxun series CPU, one LW18003 Modbus TCP adapter module, one LW11016 16DI module, one LW12016 16DO module, one LW13108 8AI module, one LW14108 8AO module, and one LW16001 end terminal module, as shown in the figure below:



5.5.1 LW18003 Module IP Address Modification Instructions

(1) Open the Modbus TCP tool, enter the module's default IP address 192.168.1.11, click Connect, then click Read Device. Wait for the read to complete.



(2) In the adapter configuration section, enter the new IP address in the Set IP field, then click Send Configuration. Power cycle the module. Open the Modbus TCP configuration tool, enter the new IP address, click Connect, then click Read Device to confirm that the modification was successful.

5.5.2 LW18003 Module I/O Module Register Address Description

(1) Open the Modbus TCP configuration tool, select the corresponding module model, and click to view the corresponding register address offset values, as shown in the figure below:



(2) The LW1016 DI register start address is 10009 with no offset value. For all other modules, the register start addresses must be calculated by adding the respective offset value. As shown in the figure above:

LW2016 DO write-only register start address: 40002 (40001 + offset 1)

Read/write register start address: 44098 (40001 + offset 4097)

LW13108 AI read-only register start address: 40003 (40001 + offset 2)

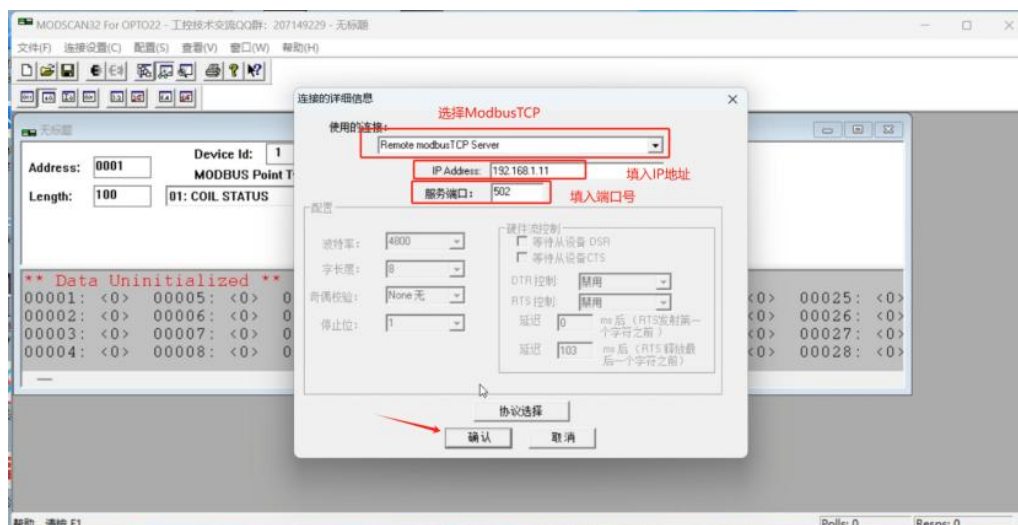
LW14108 AO write-only register start address: 40003 (40001 + offset 2)

Read/write register start address: 44098

Now let us verify this.

(3) The default IP address of the LW18003 adapter is 192.168.1.11.

Open the ModScan debugging tool, click Connect, fill in the corresponding parameters as shown in the figure below, and click OK.

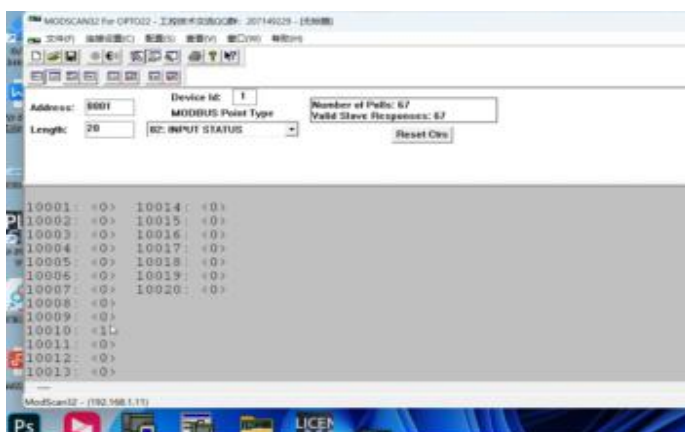


At this point, the RN LED on the LW18003 adapter is steady on, indicating that communication is established successfully.

(4) Now let us test the I/O modules one by one.

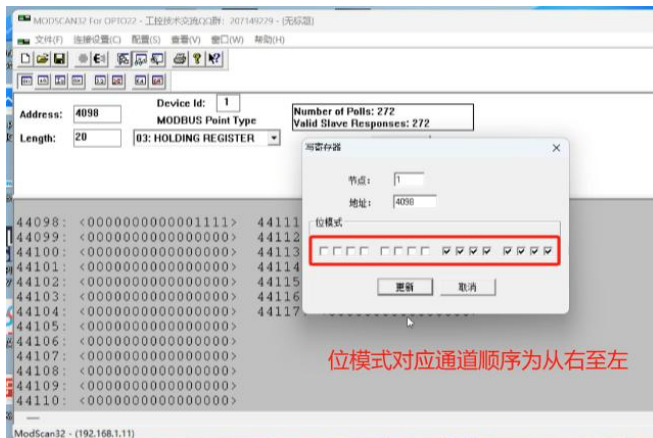
LW11016 16DI Module

The DI register start address is 10009. Let us test it. As shown in the figure below, the value at address 10010 is 1, and the second channel LED is illuminated, confirming that the start address is correct. (Display in decimal.)



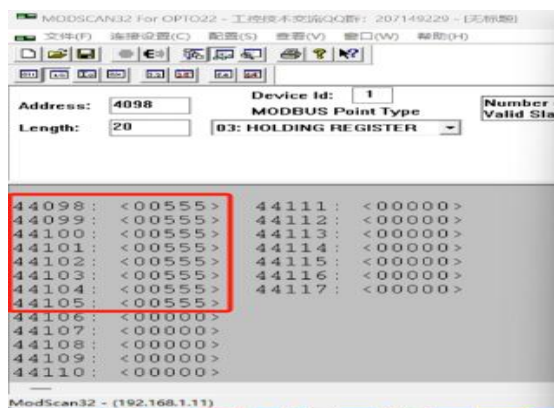
LW12016 16DO Module

The DO write-only register start address is 40002 (40001 + offset 1), and the read/write register start address is 44098 (40001 + offset 4097). Testing in binary display, the corresponding eight channel LEDs are illuminated, as shown in the figure below:



LW14108 8AO Module

The write-only register start address is 40003 ($40001 + \text{offset } 2$), and the read/write register start address is 44098. Display in decimal. We set the value to 555, and all channel LEDs are illuminated:



Contact Information:

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Technical Support: 18883272388

Email: sale@cqlwsys.com

Website: <https://lowayinstrument.com/>

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