



CTL Distributed IO User Manual

V1.00



深圳市合信自动化技术有限公司
COTRUST TECHNOLOGIES CO., LTD.

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Preface

Thank you for purchasing the COTRUST CTL series PLC products from Shenzhen Hexin Automation Technology Co., Ltd.!

Before using our company's COTRUST CTL series PLC products, please read this manual carefully so that you can more clearly understand the characteristics of the product, apply it more safely, and make full use of the rich functions of this product.

Safety precautions

Personnel responsible for product installation and operation must undergo rigorous training, comply with relevant industry safety regulations, strictly follow the relevant equipment precautions and special safety instructions provided in this manual, and perform various equipment operations in accordance with correct operating methods.

In order to prevent personal injury or equipment damage, the following are instructions for matters that must be followed. For the hazards and damages that may be caused by incorrect use of this product, please refer to the relevant symbol instructions.

	Warning Warning indicates a hazard that may result in personal injury or death if the operation is not performed as required.
	Caution indicates dangers that may result in minor or moderate personal injury and equipment damage due to failure to follow the instructions.
	Tips indicate necessary supplements or explanations to the description of an operation.

Version History

issue date	Version	Revisions
July 2023	V1.0	yFirst version released

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Product Overview



This chapter mainly provides an overview of the functions and features of the COTRUST CTL series products.

1.1	Product Overview
1.2	Product Appearance

1.1 Product Overview

COTRUST CTL series PLC expansion modules are a series of distributed IO products created by Hexin, consisting of PN slave modules, ECT slave modules, Compared with other small PLCs of Hexin, CTL series PLC takes up less space.

CTL PN supports Profinet slave function and can realize Profinet communication with master equipment.

CTL ECT supports EtherCAT slave function and can realize EtherCAT communication with master device.

Table 1-1 CTL series expansion module information

category	Order Number
EtherCAT Slave Module	CTL ECT
PROFINET Slave Module	CTL PN
16-point digital input expansion module	CTL DIT16
16-point digital output expansion module (transistor)	CTL DQT16
16-point digital output expansion module (relay)	CTL DQR16

1.2 Product Appearance

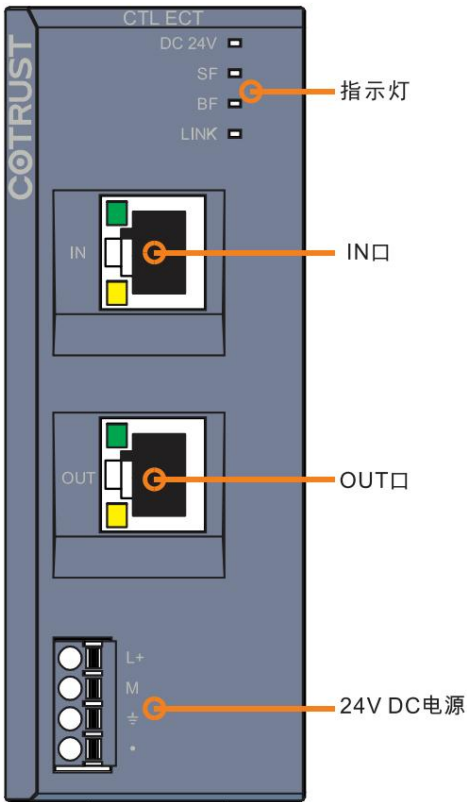


Figure 1-1 Physical picture of CTL ECT module

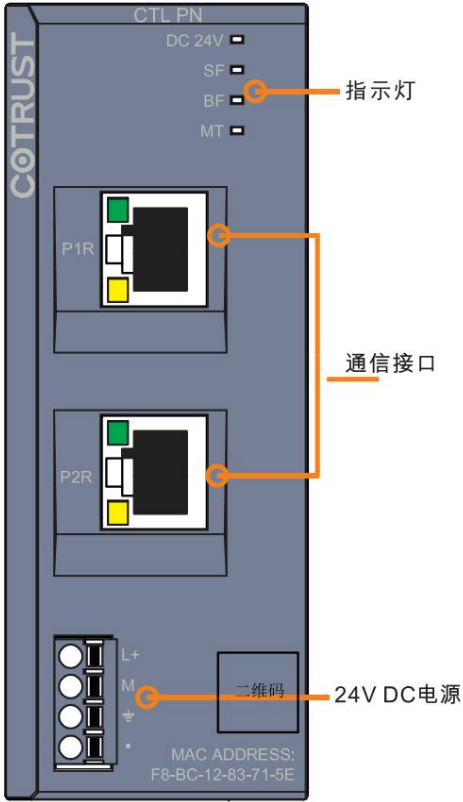


Figure 1-2 CTL PN module physical picture

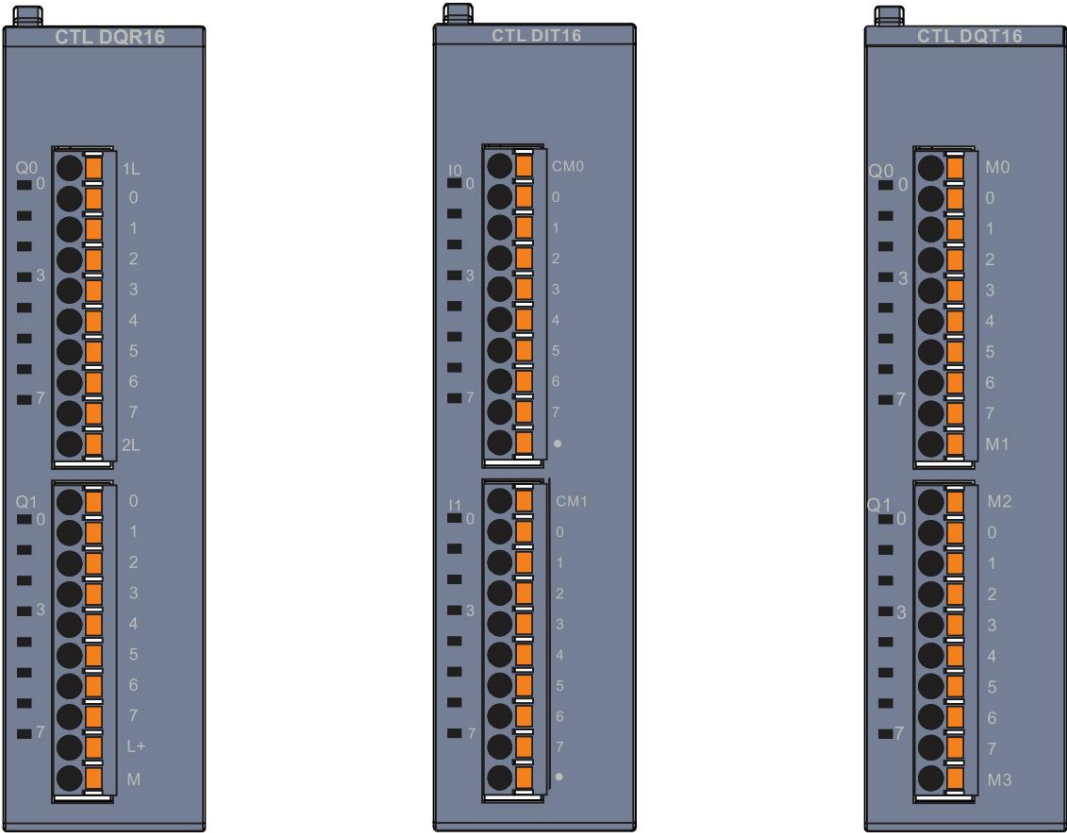


Figure 1-3 Appearance of a digital expansion module

Product Specifications

2

This chapter mainly introduces the technical specifications of CTL series products.

2.1	Working Environment
2.2	CTL PN Module
2.3	CTL ECT module
2.4	Digital expansion module

2.1 Working Environment

Table 2-1 Environmental specifications

Environmental conditions - transport and storage	
temperature	-25℃~+70℃
Atmospheric pressure	1080 hPa~660 hPa (corresponding to altitude of -1000m~+3500m)
Relative humidity	10%~95%, non-condensing
fall	1m, 5 times, transport packaging
Air flow	There is air flow within 50.8 mm above and below the device
Environmental conditions - working	
Temperature Horizontal mounting position Vertical mounting position	0℃~55℃ 0℃~45℃
Atmospheric pressure	1080 hPa~795 hPa (corresponding to altitude of -1000m~+2000m)
Relative humidity	10%~95%, non-condensing
Concentration of pollutants in harsh environments	Low salt fog, humidity, dust and fog environment SO ₂ < 0.5ppm, relative humidity < 60%, non-condensing H ₂ S < 0.1ppm, relative humidity < 60%, non-condensing
Electromagnetic compatibility - immunity	
Electrostatic Discharge IEC61000-4-2	Contact discharge: ±4kV (Class A) Air discharge: ±8kV (Class A)
Electrical Fast Transient Burst IEC61000-4-4	Power line: 2kV, 5kHz (Class A) Signal line: 2kV, 5kHz (I/O coupling clamp) (Class A) 1kV, 5kHz (communication coupling clamp) (Class A)
surge IEC61000-4-5	Power line: 2kV (asymmetric), 1kV (symmetric) (Class B) I/O: 1kV (symmetrical)
Radio frequency electromagnetic field radiation IEC61000-4-3	80MHz~1GHz, 10V/m, 80%AM (1kHz) (Class A)
RF field induced conducted interference IEC61000-4-6	0.15MHz~80MHz, 10V/m, 80%AM (1kHz) (Class A)
Short interruptions and voltage variations at the AC power input port IEC61000-4-29	Short interruption: 10ms Voltage change: 80%~120%, 100ms
Environmental Testing	
High temperature operation IEC60068-2 Low temperature operation IEC60068-2	60℃ 16 hours -10℃ 16 hours
High temperature start IEC60068-2 Low temperature start IEC60068-2	60℃ 2 hours -10℃ 2 hours

High and low temperature cycle operation IEC60068-2	-10y~60y, dwell time 3 hours, temperature rise rate 1y/min, 2 cycles
High temperature storage IEC60068-2 Low temperature storage IEC60068-2	70y 72 hours -40y 72 hours
Thermal shock IEC60068-2	-40y~70y, dwell time 3 hours, temperature change time <1min, 5 cycles
High temperature and high humidity IEC60068-2	40y 48 hours
Cyclic damp heat IEC60068-2	25y~55y 95% 2 cycles
Sinusoidal vibration (bare metal) IEC60068-2	5~150Hz, 0.05G2 /Hz 150Hz~500Hz -3dB/oct, 1 hour/axis, X, Y, Z total 3 axes
Shock (bare metal) IEC60068-2	15G, 11ms pulse, 3 times/direction

2.2 CTL PN module

Table 2-2 Functional characteristics

Functional category	Function items	describe
Communication function	Bus interface	Provide expansion module interface
	PROFINET interface provides PROFINET	communication interface
Extended functionality	Extended functionality	Allows expansion of 16 CTL series I/O modules
Isolation function	Power Isolation	Isolation between external power supply and system power supply
	Interface Isolation	PROFINET communication interface isolation
Protection function	Power protection	The power supply terminal provides reverse connection protection and surge absorption function

Table 2-3 Basic characteristics

Physical properties	
Dimensions (W x H x D)	38×90×100 mm
Power loss	
Rated input voltage	24V DC
Input voltage range	20.4V~28.8V DC
Input Current	600mA
Reverse polarity protection	have
Bus supply voltage	+24V DC
Bus power supply current	500mA
LED indicator features	
24V power indicator light (green)	ON = 24VDC power supply is normal
	OFF = No 24VDC power supply
SF indicator light (red)	ON = Expansion I/O bus fault or PROFINET module fault
	OFF = No error

BF indicator light (red)	ON = PROFINET bus communication fault (switch not connected, network not detected)
	Flashing = Configuration is inconsistent
	OFF = No error
MT indicator light (yellow) (Maintenance indicator light)	ON = Loss of sync
	OFF = No error
RJ45 port indicator light (green)	ON = There is a connection to the switch/PN master
	OFF = No connection to switch/PN master
RJ45 port indicator light (yellow)	ON = Data is being sent or received to the switch/PN master
	OFF = No data is sent or received to the switch/PN master

Table 2-4 Communication port characteristics

Expanded I/O Capabilities		
Each slave station supports a maximum of 16 modules		
Protocol Type		CTL series PLC custom 8MHz bus protocol
Each slave IO can be configured with a maximum of 256 DI/256 DQ digital IO		
PROFINET communication port		
Communication interface		2 single RJ45 ports
Data transfer rate	Ethernet service transmission rate: 100 Mbps	
	PROFINET transmission rate: 100 Mbps, full duplex	
Supported Ethernet Services		ping, arp, network diagnostics (SNMP)/MIB-2, LLDP
Real-time	RT	Support, minimum cycle 1ms
	IRT	Not supported
Third-party main site		Support third-party PROFINET master
The maximum communication distance between slave stations is 100m (100BASE-TX)		
Topology		Support star, tree, and line topologies
isolation		Communication port isolation
Hardware configuration function		
Imported file types		PROFINET GDS file, XML format
Third-party PN master station	Added CTL-PN module supports 16 slots expansion	
	Expansion modules can add CTL series I/O modules	

Table 2-5 External power interface definition

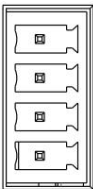
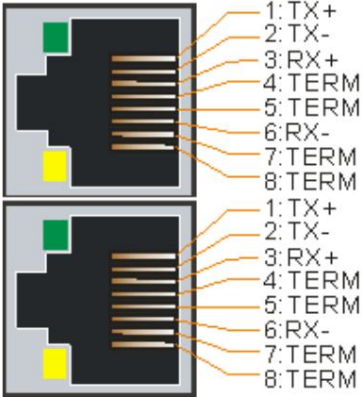
4 -position removable non-locking screw terminal	symbol	Signal Definition
	L+	24V power supply positive
	M	24V power supply negative
		Earth
	--	--

Table 2-6 Communication port definition

RJ45 network port	Position No.	Signal	Signal Definition
	1	TX+	Data transmission positive terminal
	2	TX-	Data transmission negative terminal
	3	RX+	Data receiving positive terminal
	4	--	--
	5	--	--
	6	RX-	Data receiving negative terminal
	7	--	--
	8	--	--
	Connector shell PE		Chassis grounding

2.3 CTL ECT module

Table 2-7 Functional characteristics

Functional category	Function items	describe
Communication function	Bus interface	Provide expansion module interface
	EtherCAT interface provides EtherCAT communication interface	
Extended functionality	Extended functionality	Provides expansion capability for 16 CTL series I/O modules
Isolation function	Power Isolation	Isolation between external power supply and system power supply
	Interface Isolation	EtherCAT communication interface isolation
Protection function	Power protection	The power supply terminal provides reverse connection protection and surge absorption function

Table 2-8 Basic characteristics

Physical properties	
Dimensions (W x H x D)	38×90×100 mm
Power loss	
Rated input voltage	24V DC
Input voltage range	20.4V~28.8V DC
Input Current	550mA
Reverse polarity protection	have
Bus supply voltage	+24V DC
Bus power supply current	500mA
LED indicator features	
24V power indicator light (green)	ON = 24VDC power supply is normal
	OFF = No 24VDC power supply

SF indicator light (red)	ON = Expansion I/O bus fault or EtherCAT module fault, hardware configuration inconsistent
	OFF = No error
BF indicator light (red)	ON = EtherCAT bus communication fault
	OFF = No error
LINK indicator (green) (slave status indicator)	OFF = No connection (0), Initialization (1)
	Flashing = Pre-operation (2), safe operation (4) (Note 1)
	ON = Operation (8)
RJ45 port indicator light (green)	ON = Connect to other EtherCAT interfaces
	Flashing = communicating with other EtherCAT interfaces
	OFF = No connection to other EtherCAT interfaces

Note 1: When there is no output type module on the slave expansion bus, the communication between the slave and the master is disconnected and the slave will not switch to safe operation.

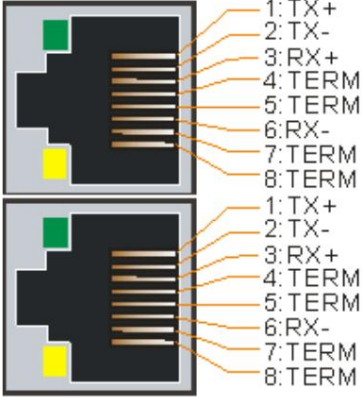
Table 2-9 Communication port characteristics

Expanded I/O Capabilities	
Each slave station supports a maximum of 16 modules	
Protocol Type	CTL series PLC custom 8MHz bus protocol
The maximum configuration of digital IO per slave IO is up to 256DI/256DQ	
EtherCAT communication port	
Communication interface	2 single RJ45 ports
Baud rate	100Mbps
Protocol Type	CANopen over EtherCAT (CoE)
	Support PDO service
	Support for SDO services
	Support EtherCAT state machine commands
	Support third-party EtherCAT masters
The maximum communication distance between slave stations is 100m (100BASE-TX)	
isolation	Communication port isolation
Hardware configuration function	
Imported file types	EtherCAT XML format file
Third-party ECT master station	Added CTL-ECT module supports 16 slots expansion
	Expansion modules can add CTL series I/O modules

Table 2-10 External power interface definition

4 -position removable non-locking screw terminal	symbol	Signal Definition
	L+	24V power supply positive
	M	24V power supply negative
		Earth

Table 2-11 RJ45 port definition

RJ45 network port	Position No.	Signal	Signal Definition
	1	TX+	Data transmission positive terminal
	2	TX-	Data transmission negative terminal
	3	RX+	Data receiving positive terminal
	4	--	--
	5	--	--
	6	RX-	Data receiving negative terminal
	7	--	--
	8	--	--
	Connector housing	PE	Chassis grounding

2.4 Digital Expansion Module

Table 2-12 CTL series 16-point transistor input module specifications

Specifications	CTL DIT16
Input number	16 DI
Input Type	Source/Sink
Signal input voltage	24V DC±10%
Logic 1 signal (minimum)	>4.5mA
Logic 0 signal (maximum)	<1.5mA
isolation	500V AC, 1min
Isolation (field and logic)	500V AC, 1 min
Maximum input delay	<=12.8ms
8 inputs that can be switched on simultaneously	
Maximum cable length	Shielded 500 meters
	Unshielded 300 meters

Table 2-13 CTL series 16-point transistor output module, 16-point relay output module specifications

Specifications	CTL DQT16	CTL DQR16
Number of outputs	16DO transistor	16DO Relay
Output Type	Solid-state MOSFET (drain type)	Relay, dry contact
Rated voltage	24V DC	--
External voltage	20.4~28.8V DC	--
Logic 1 signal (minimum) External	voltage -1.2V	--

Logic 0 signal (maximum) 0.1V DC, 10K Ω load		--
Rated current per point	0.5A	2A
Leakage current per point	10 μ A max	--
Surge current (max) 4A, 100ms		5A, 4s@10% duty cycle
Lamp load (max)	5W	30W DC/200W AC
On-resistance (contact) 0.15 Ω typical	0.32 Ω maximum	0.2 Ω
Isolation (field to logic) 500V AC, 1 minute		--
Each isolation group has 16 output points		
Delay	Disconnect to connect less than 200us	--
	The time from connection to disconnection is less than 200us	--
Overload protection	none	none
All output points can be switched on simultaneously		
Two outputs in parallel	Yes, only when outputting the same group	Not supported
Switching delay	--	15ms
Maximum cable length	Shielded 500 meters	
	Unshielded 300 meters	

The following is a schematic diagram of the internal wiring of the digital module:

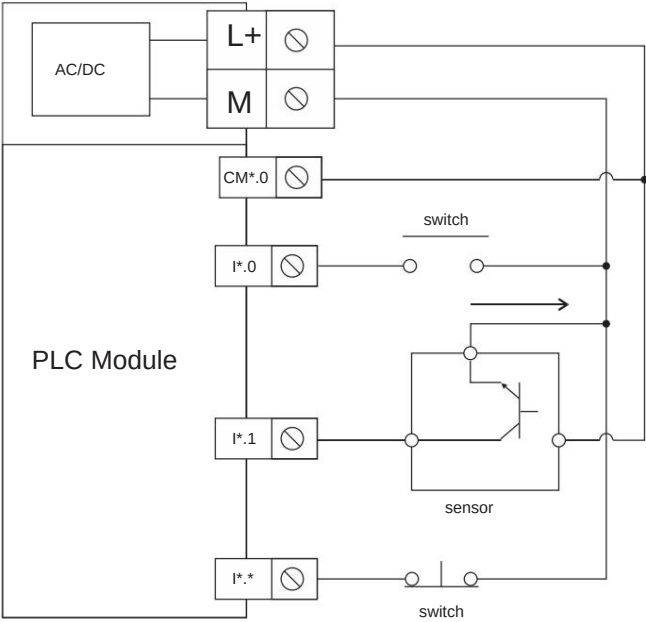


Figure 2-1 Transistor source input (PLC optocoupler common anode) wiring diagram

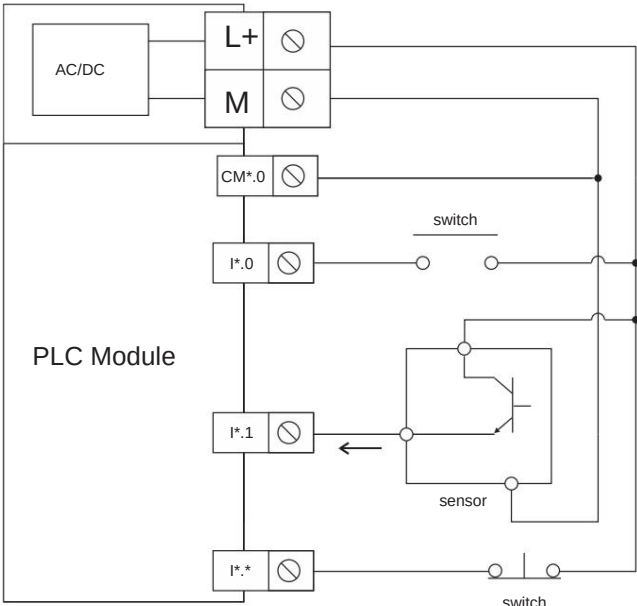


Figure 2-2 Transistor sink input (PLC input optocoupler common cathode) wiring diagram

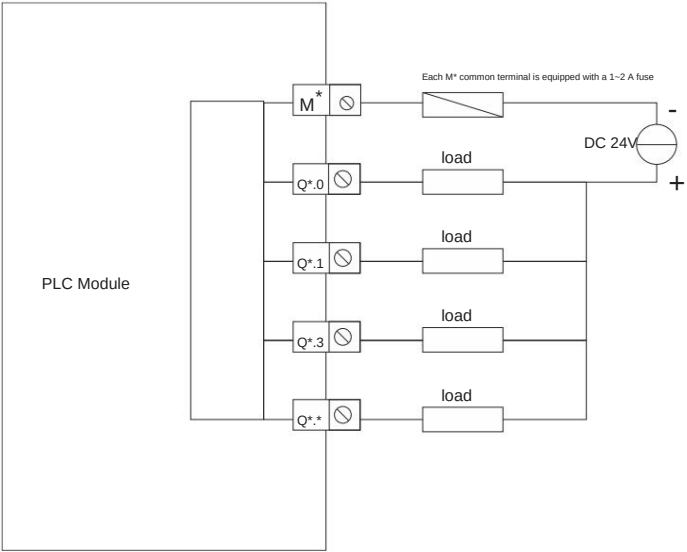


Figure 2-3 Transistor output terminal wiring diagram

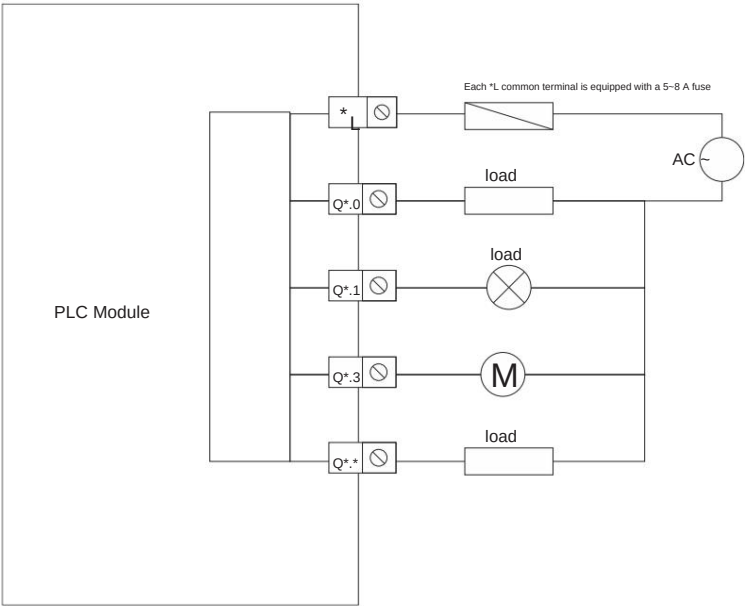


Figure 2-4 Relay output terminal wiring diagram

- The common terminal of input terminals I0.0~I0.7 is CM0; the common terminal of input terminals I1.0~I1.7 is CM1;
- The common terminals of transistor output terminals Q0.0~Q1.7 are M0/M1/M2/M3;
- The common terminal of relay output terminals Q0.0~Q0.7 is 1L, and the common terminal of Q1.0~Q1.7 is 2L;
- Relay output terminals L+, M are 24V DC input.

External wiring diagram

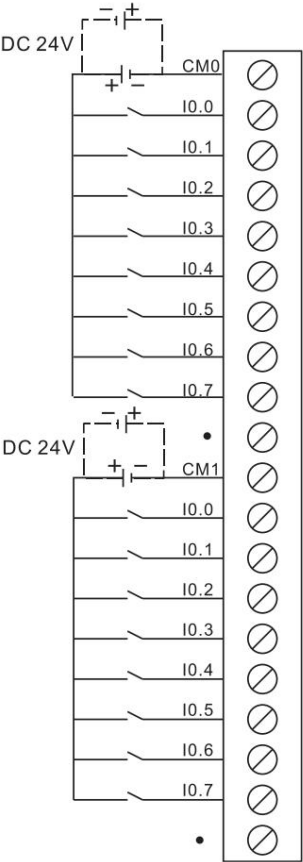


Figure 2-5 CTL DIT

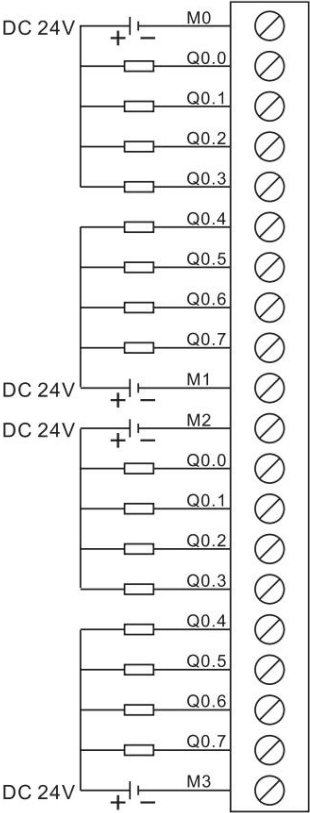


Figure 2-5 CTL DQT

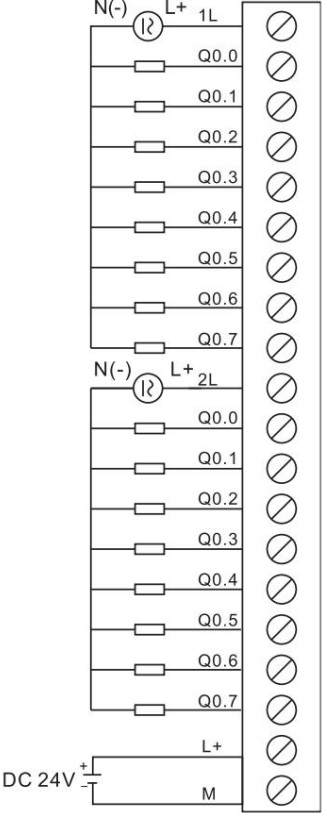


Figure 2-5 CTL DQR

Introduction

3

This chapter mainly introduces the basic usage of CTL series products and master stations and host computer software of multiple brands.

- | | |
|-----|---|
| 3.1 | CTL PN and 1500 for PROFINET communication |
| 3.2 | CTL PN and SMART PROFINET communication |
| 3.3 | CTL ECT communicates with Hexin H36-02 via EtherCAT |
| 3.4 | CTL ECT EtherCAT communication with CODESYS SP11 |
| 3.5 | CTL ECT EtherCAT communication with Beckhoff TwinCAT3 |
| 3.6 | CTL ECT EtherCAT communication with Beckhoff TwinCAT2 |
| 3.7 | CTL ECT communicates with Omron PLC via EtherCAT |

3.1 CTL PN and 1500 for PROFINET communication

This section introduces how to use the CTL PN slave module with the Siemens PLC master to implement Profinet communication functions and form a Profinet network. It also uses a sample project to illustrate how to use this product to implement Profinet communication.

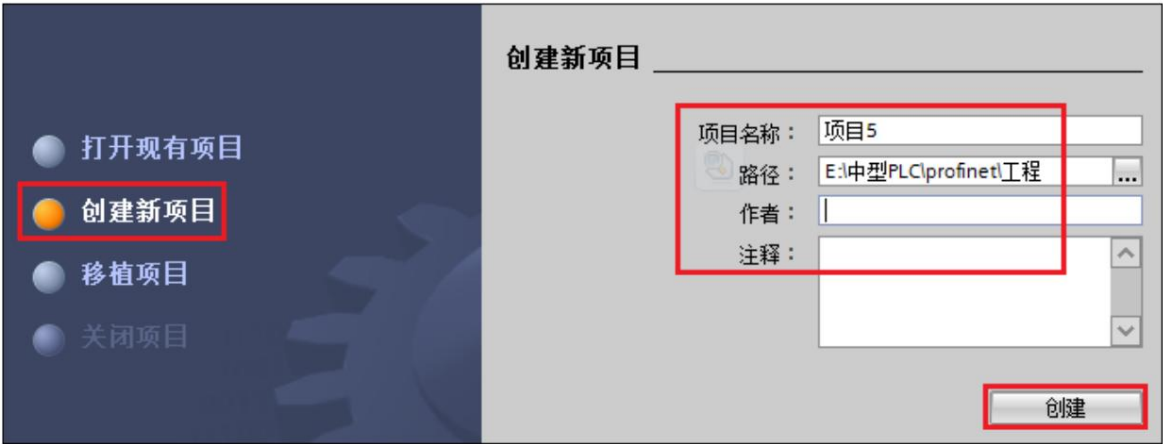
Application example: Siemens **S7-1511-1PN** is used as the master station, Hexin **CTL PN** module is used as the slave station, **8 CTL** digital input modules and **8 digital** output modules are connected behind **CTL PN**, the digital input modules are connected to the digital output modules, and the PLC assigns the value of the digital output module to the digital input module through program control.

<Remarks> When configuring the Botu, it is recommended to use the settings of PN cycle 1ms, watchdog 12ms; PN cycle 4ms, watchdog 12ms.

software	TIA Portal V16
Master station S7-1511-1 PN master station device name: PLC_1; IP address: 192.168.0.10.	
Slave CTL PN module slave device name: CTL-PN; IP address: 192.168.0.20.	

3.1.1 Step 1: Create a new project and add the CTL PN description file to the Botu

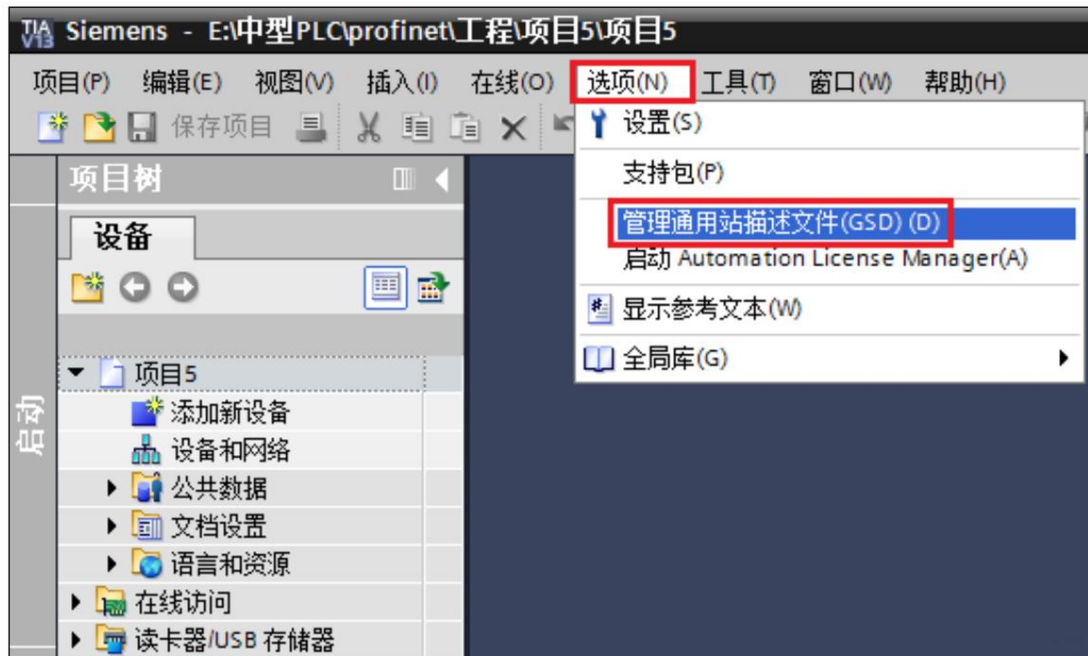
1. Open the TIA 16 project interface and create a new project



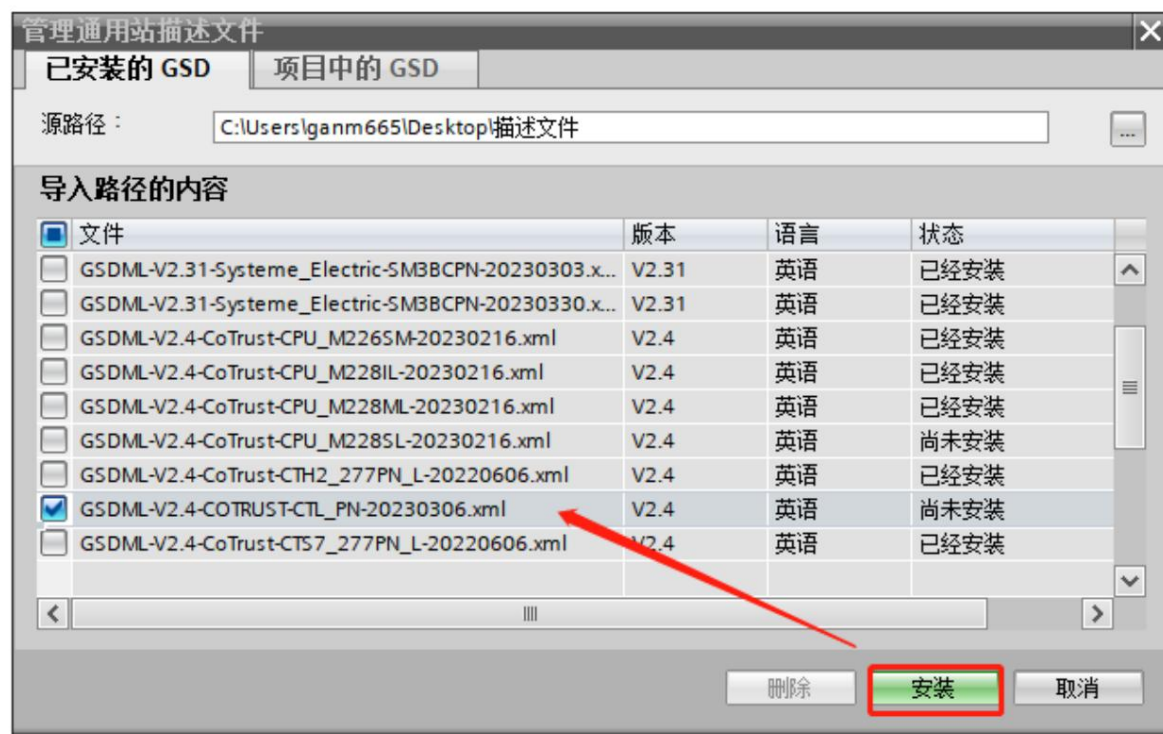
On the page that opens, select [Open Project View] to enter the project view page.



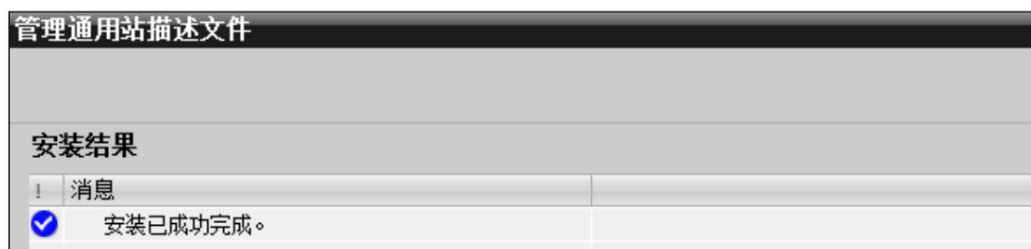
2. Add the GSDML file of the CTL PN module so that you can configure the CTL PN module in the diagram.



Find the file directory where the CTL PN file is located, check it and click [Install]:



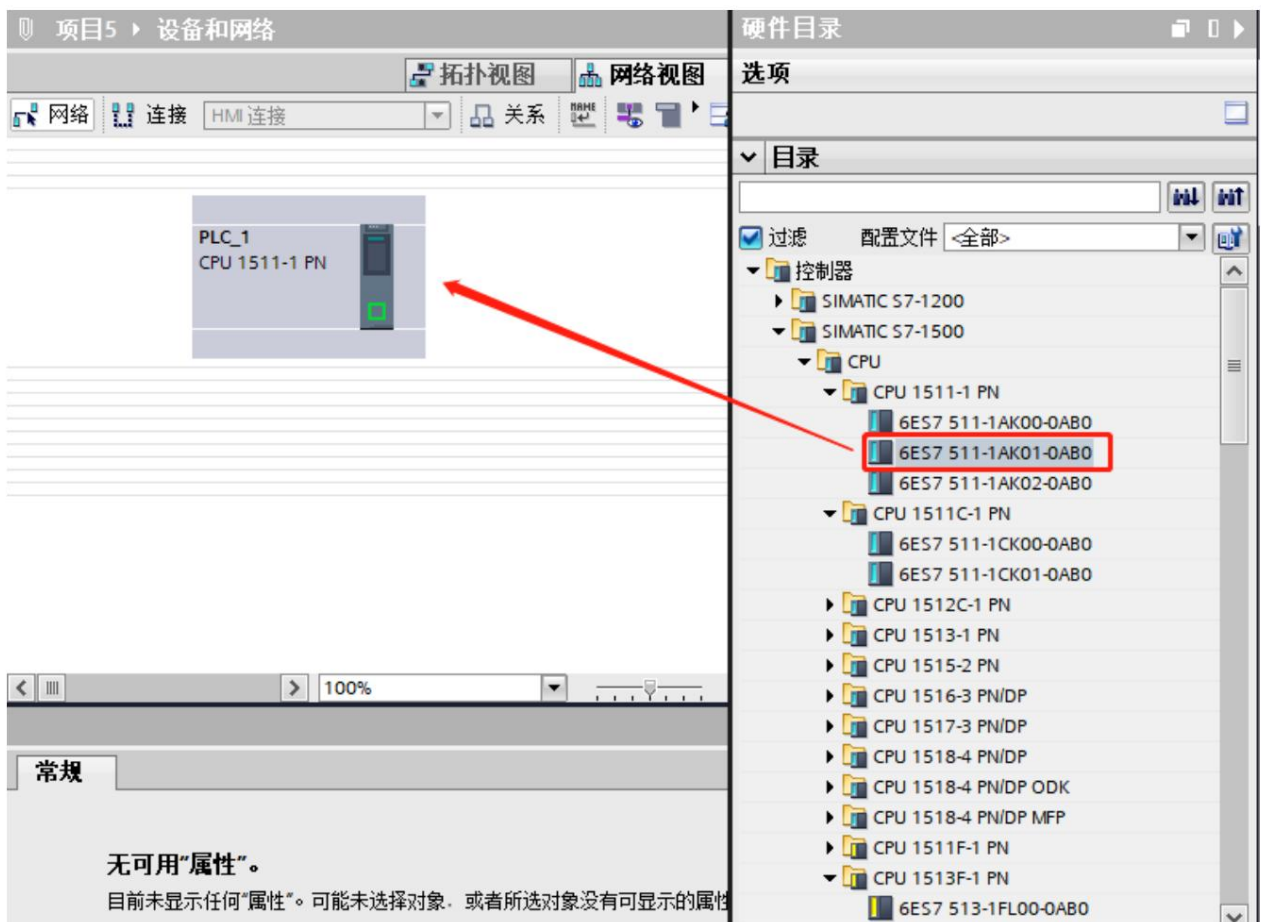
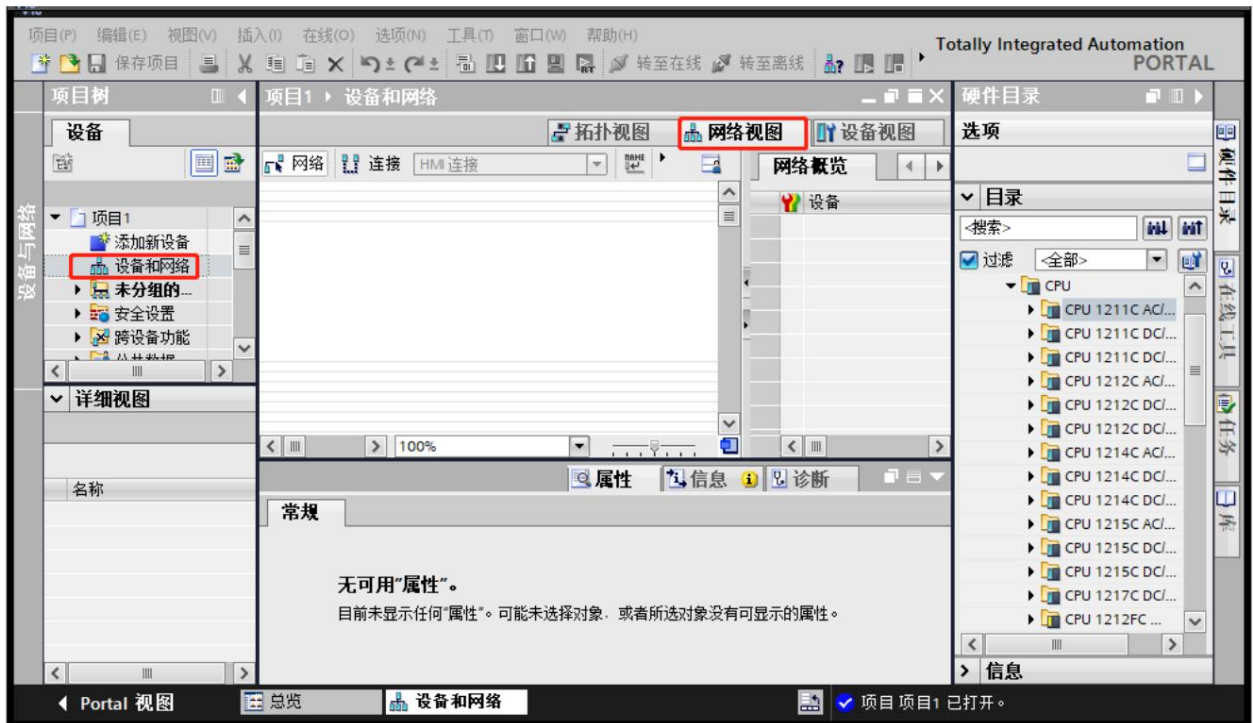
When the installation is successful, the system prompts that the installation is complete:



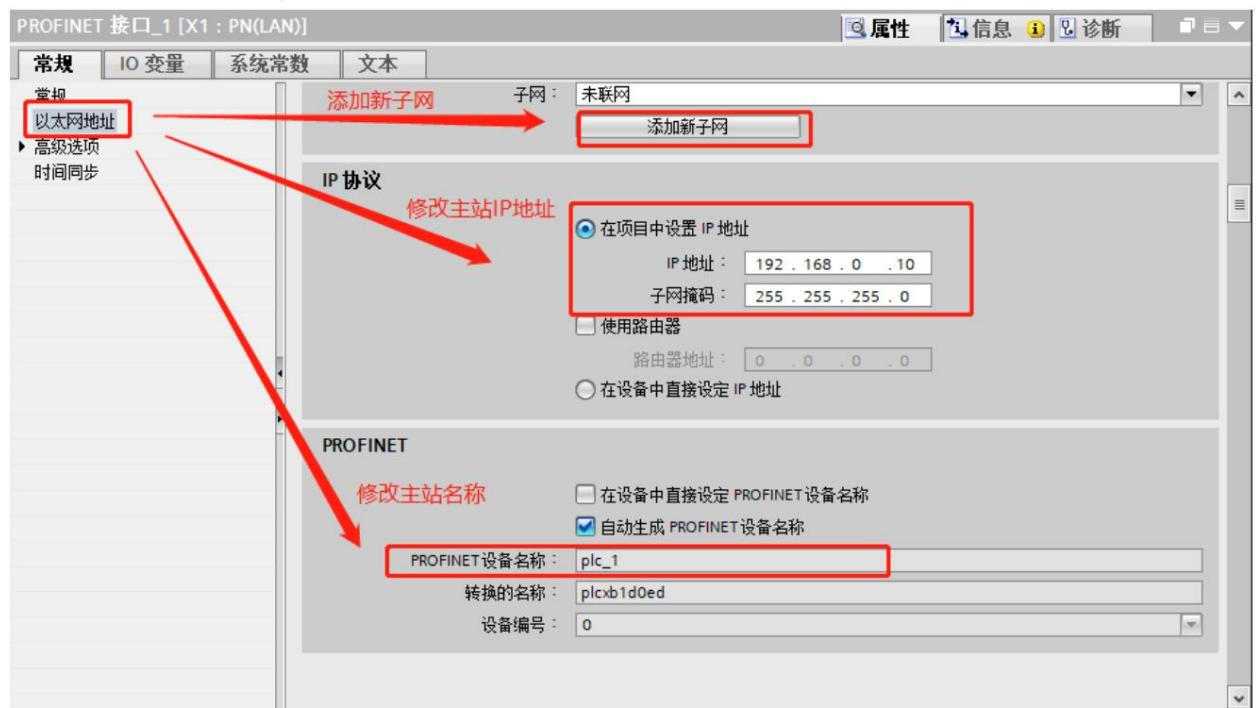
3.1.2 Step 2: Configure the Profinet master in the network view

1. Click [Device and Network > Network View] and add the master station to the network view.

Select a CPU that is consistent with the model of the actual connected master station, and the version number of the software configured master station must also be consistent with the actual master station.

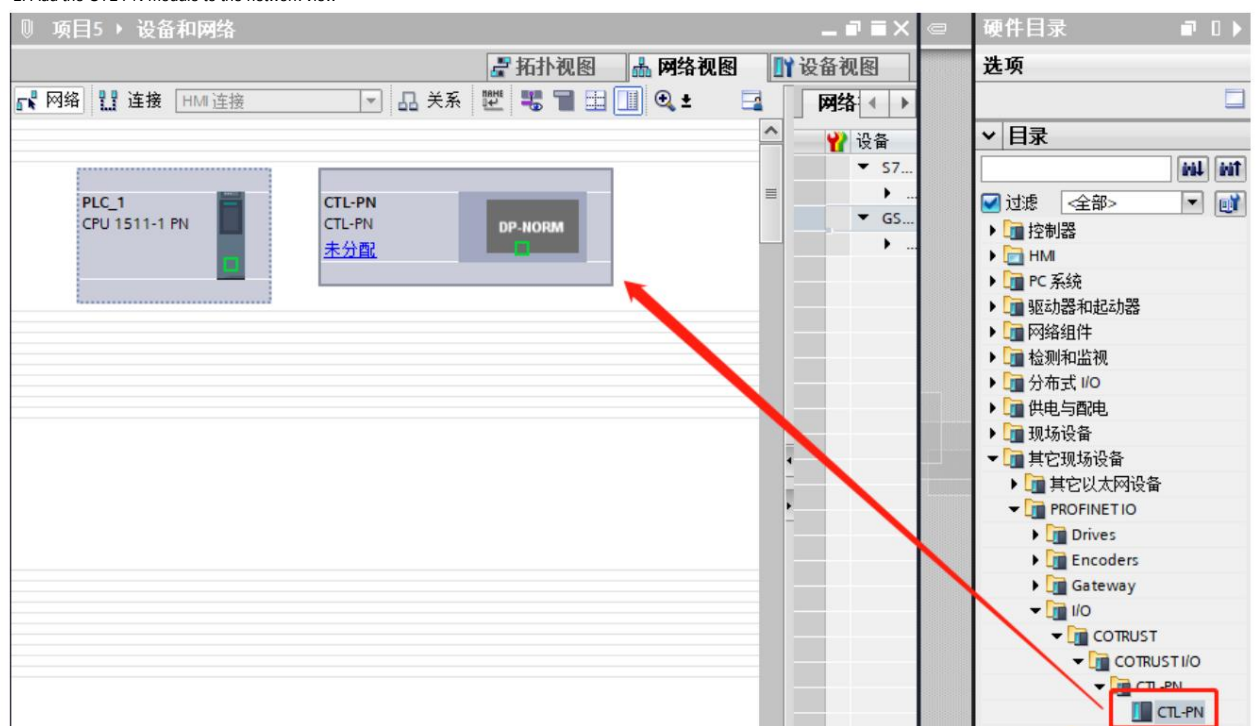


2. In the device view, click the network port of the master device, enter the Ethernet address and add a new subnet, set the master IP address and device name.

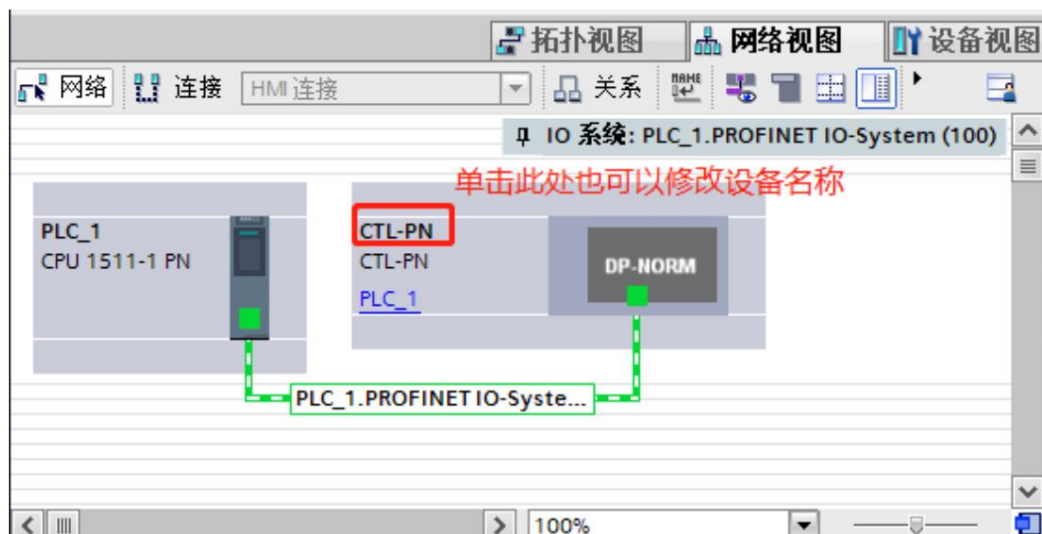


3.1.3 Step 3: Configure the CTL PN slave in the network view, and connect the slave device to the master.

1. Add the CTL PN module to the network view



2. Click [Unassigned] directly and select the PROFINET interface of the controller for network connection.



3. Modify the IP address of CTL PN. The network segment of CTL PN must be consistent with that of the master station S7-1500. The online name of CTL PN must also be consistent with the configured name.

1、单击网口

2

以太网地址

以太网地址

子网：PN/IE_1

添加新子网

IP 协议

IP 地址：192 . 168 . 0 . 20

子网掩码：255 . 255 . 255 . 0

☒ 同步路由器设置与 IO 控制器

☐ 使用路由器

路由器地址：0 . 0 . 0 . 0

PROFINET

☐ 自动生成 PROFINET 设备名称

PROFINET 设备名称：ctl-pn

转换的名称：ctl-pn

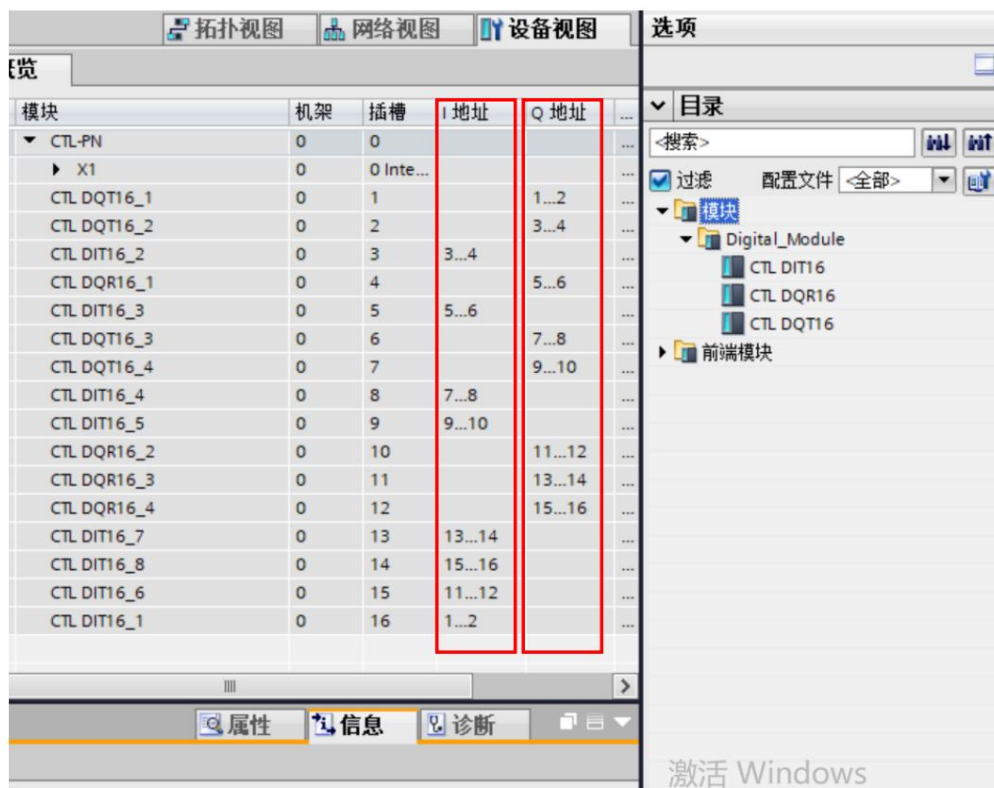
设备编号：1

3、此处可修改CTL PN 模块的IP地址

此处可修改设备名称



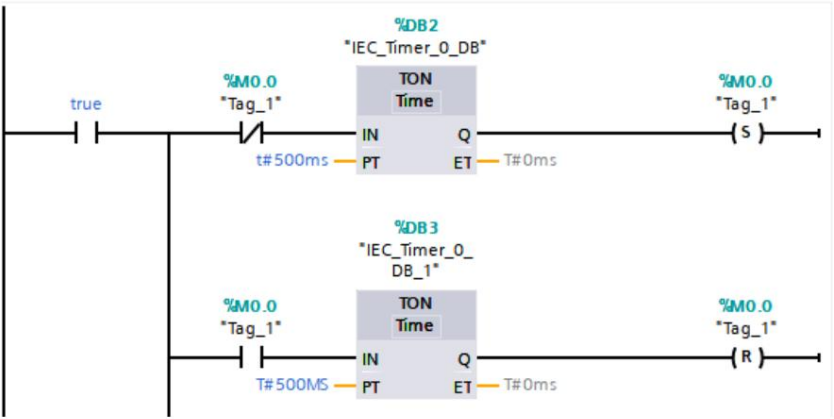
4. Double-click the CTL PN module to enter the device view. Expand the hardware directory to see the CTL series digital modules. Add 8 digital input modules and 8 digital output modules to CTL PN. Select any empty column in [Device Overview], and then click the digital module in the hardware directory to add it. When adding modules, the addresses will be automatically assigned to each module.



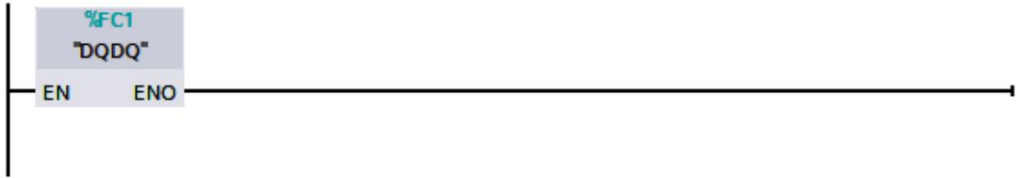
3.1.4 Step 4: Programming

To achieve S7-1500 control of 8 CTL series digital input modules and 8 digital output modules through CTL PN module, the following program can realize that the input or output of the digital module is on at intervals of 500 milliseconds and off at intervals of 500 milliseconds.

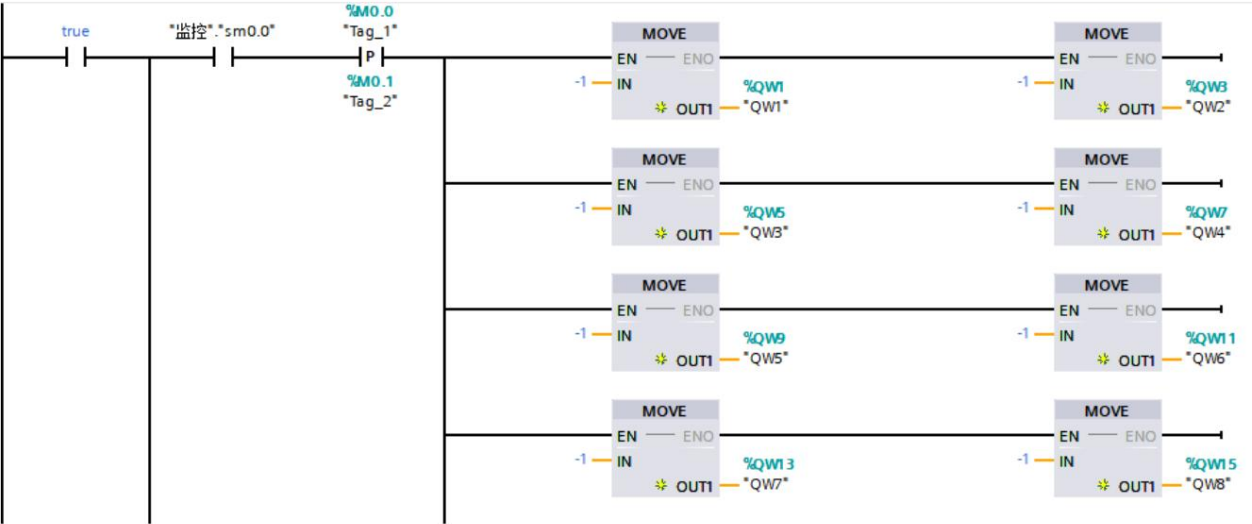
Network 1, main program, set the timer to light up for 500 milliseconds and turn off for 500 milliseconds

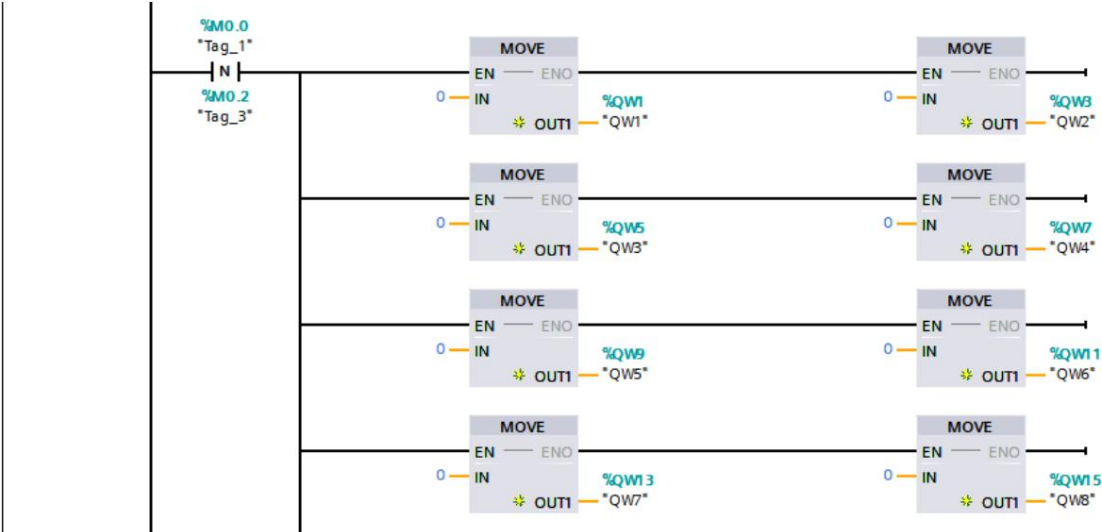


Network 2, calling subroutine



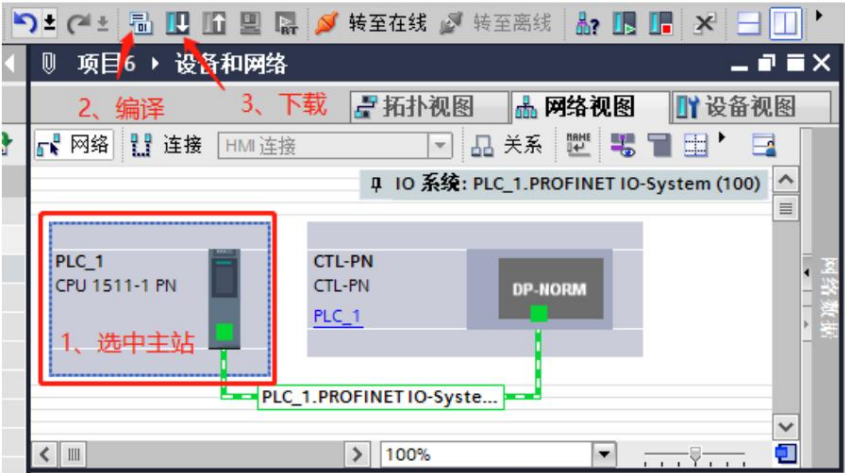
Network 3, subroutines



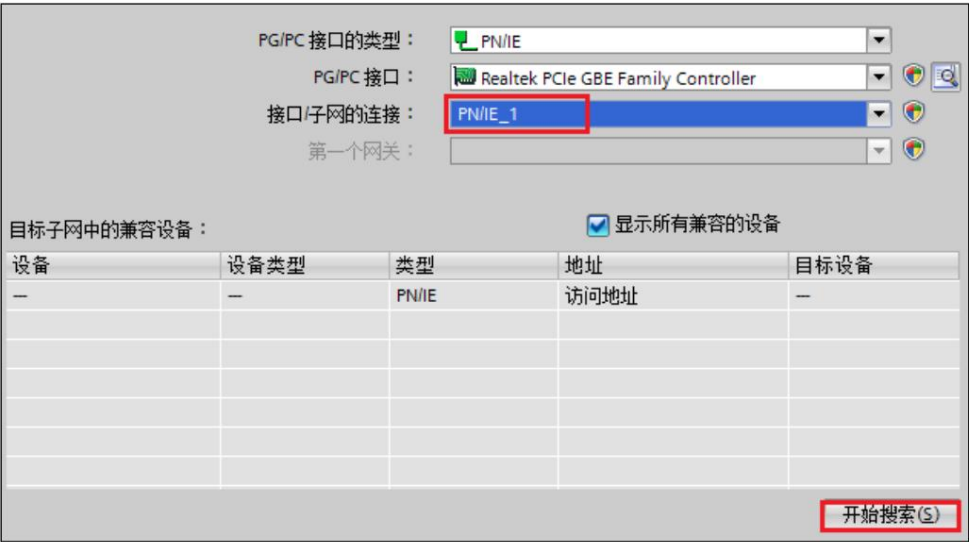


3.1.5 Step 5: Download and monitor

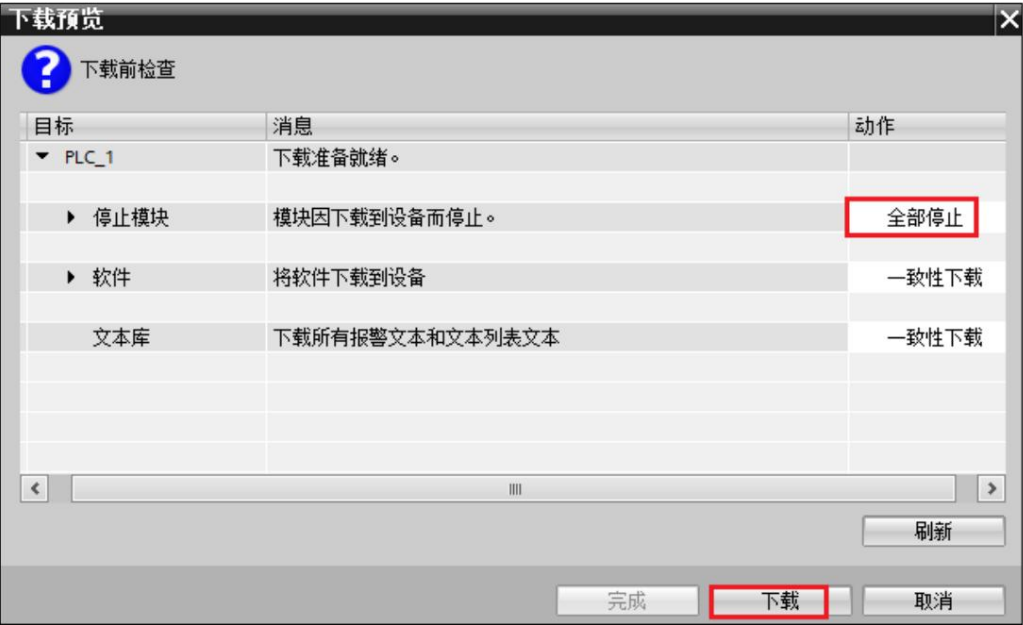
- 1. After completing the entire project configuration, you need to download the project configuration information to the CPU. First, click [Save Project] to save the entire project.
- 2. Select the master station in the device view, compile the program, and then click the [Download] button, as shown below:



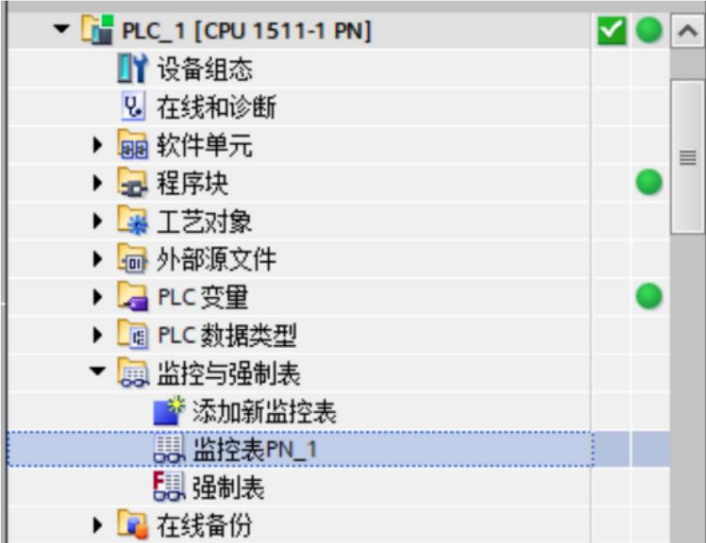
- 3. After clicking Download, the following interface appears. Select [PN/IE_1] in [Interface/Subnet Connection] and click Search, as shown below:



4. After searching for the PLC device, select the PLC to be downloaded and click [Download]. Then select [Stop All] in the drop-down list in the [Action] column, and then click [Download]. This will download the project to the CPU.



5. After downloading is complete, you can monitor the module channel values in the monitoring table.



	i	名称	地址	显示格式	监视值	修改值	
39		"QW1"	%QW1	十六进制	16#FFFF		☐
40		"QW2"	%QW3	十六进制	16#FFFF		☐
41		"QW3"	%QW5	十六进制	16#FFFF		☐
42		"QW4"	%QW7	十六进制	16#FFFF		☐
43		"QW5"	%QW9	十六进制	16#FFFF		☐
44		"QW6"	%QW11	十六进制	16#FFFF		☐
45		"QW7"	%QW13	十六进制	16#FFFF		☐
46		"QW8"	%QW15	十六进制	16#FFFF		☐
47							☐
48		"IW1"	%IW1	十六进制	16#FFFF		☐
49		"IW2"	%IW3	十六进制	16#FFFF		☐
50		"IW3"	%IW5	十六进制	16#FFFF		☐
51		"IW4"	%IW7	十六进制	16#FFFF		☐
52		"IW5"	%IW9	十六进制	16#FFFF		☐
53		"IW6"	%IW11	十六进制	16#FFFF		☐
54		"IW7"	%IW13	十六进制	16#FFFF		☐
55		"IW8"	%IW15	十六进制	16#FFFF		☐

3.2 CTL PN and SMART PROFINET communication

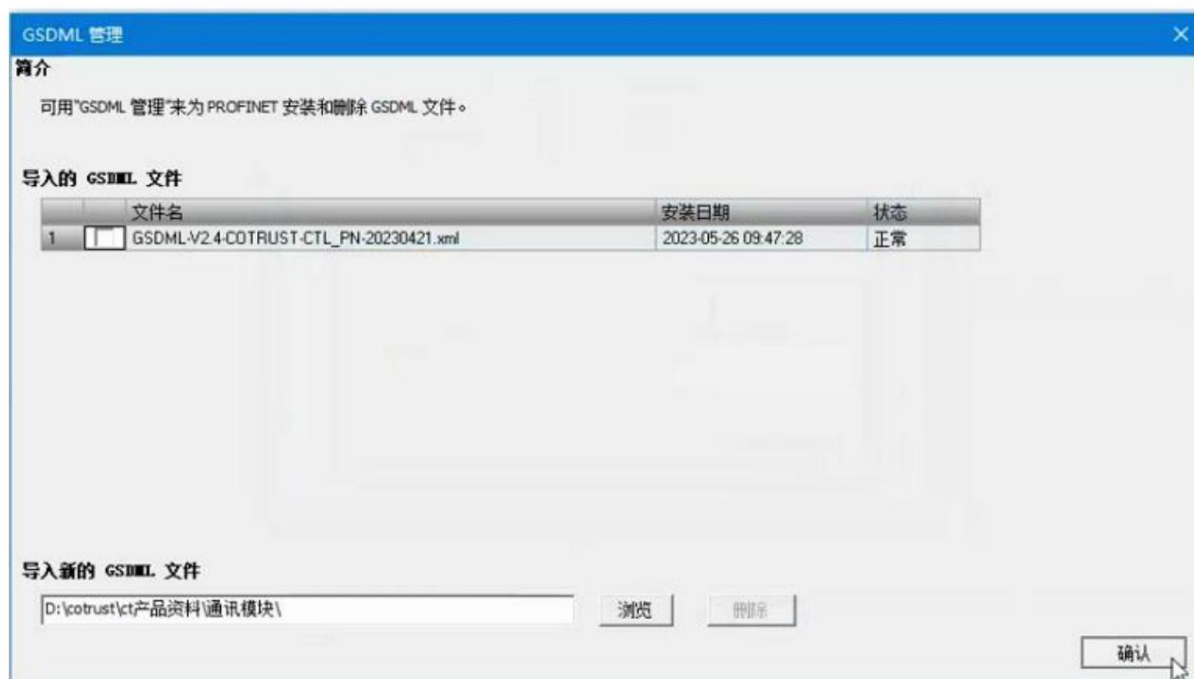
This chapter briefly introduces the configuration steps of CTL PN and digital modules in SMART.

Equipment: ST60 is used as the master station, Hexin CTL PN module is used as the slave station, and a digital output module is connected behind the CTL PN.

<Note> When using SMART programming software V2.04, the PN cycle must be set to 4ms to enable normal communication and output control. Due to software limitations, it is recommended to connect less than 10 modules in V 2.07.

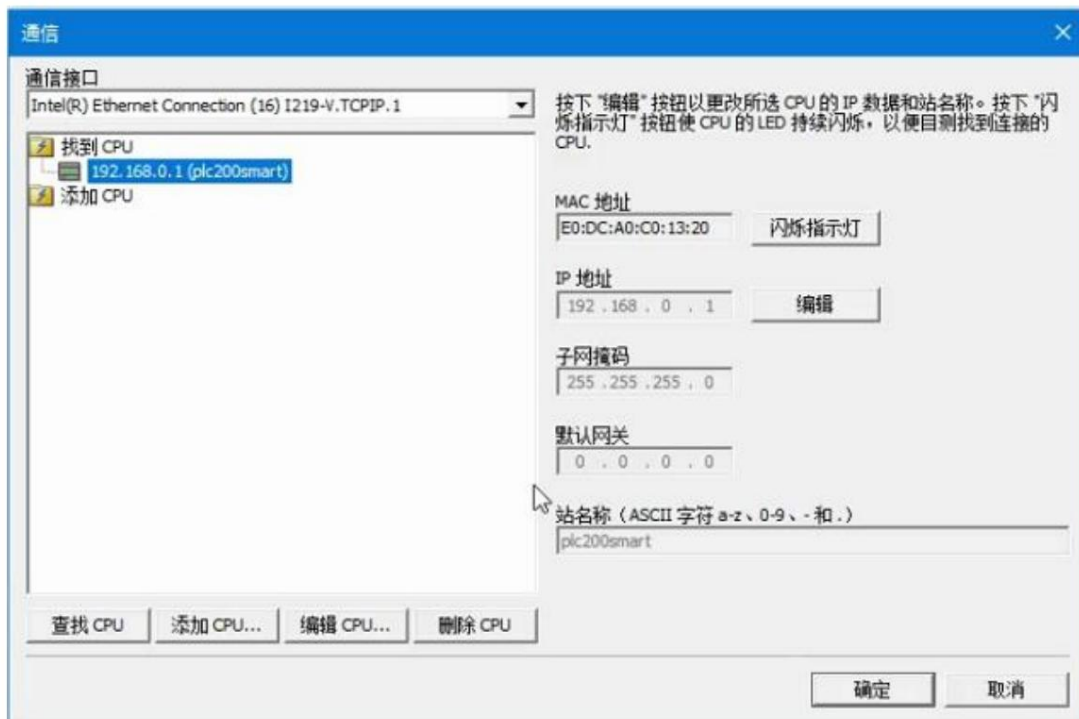
3.2.1 Step 1: Add CTL PN description file to SMART

1. Open the project and click [File] y [GSDML Management], find the path where the CTL PN description file is located, and add the description file to SMART.



2. Search for SMART ST60 in communication, select [Communication] y [Find CPU], select the found CPU and confirm.



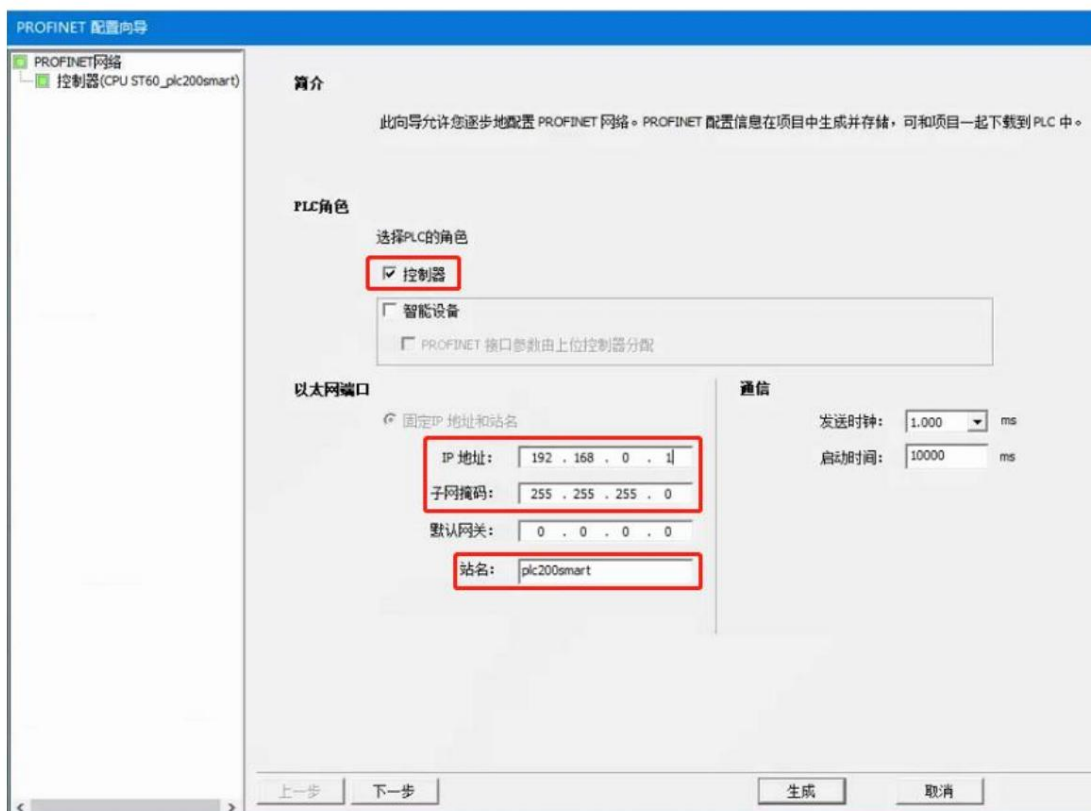


3.2.2 Step 2: Configure PROFINET in the PROFINET Wizard, set IP, configure modules, and configure addresses

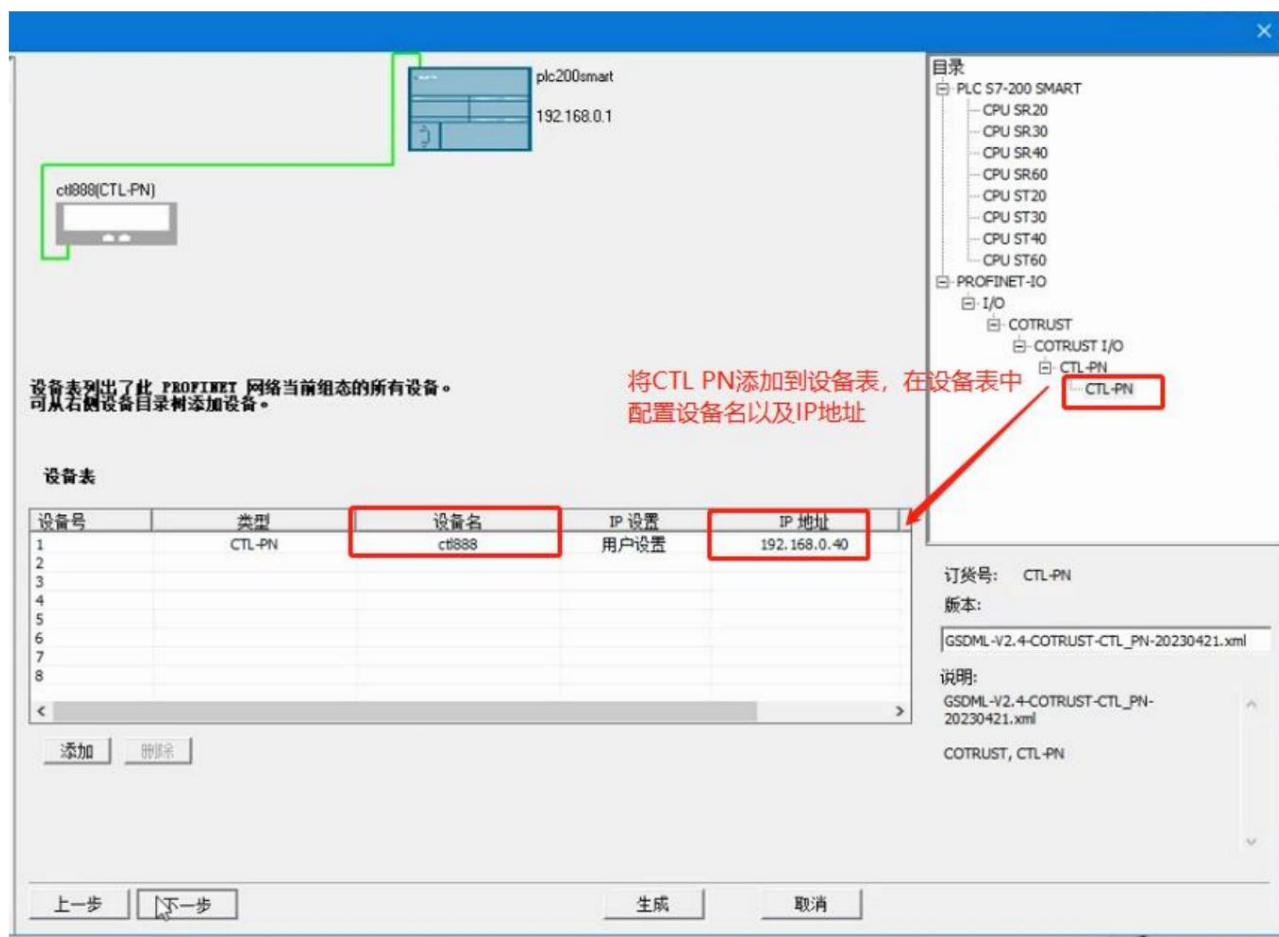
1. Click [Tools] → [PROFINET] to enter the PROFINET wizard.



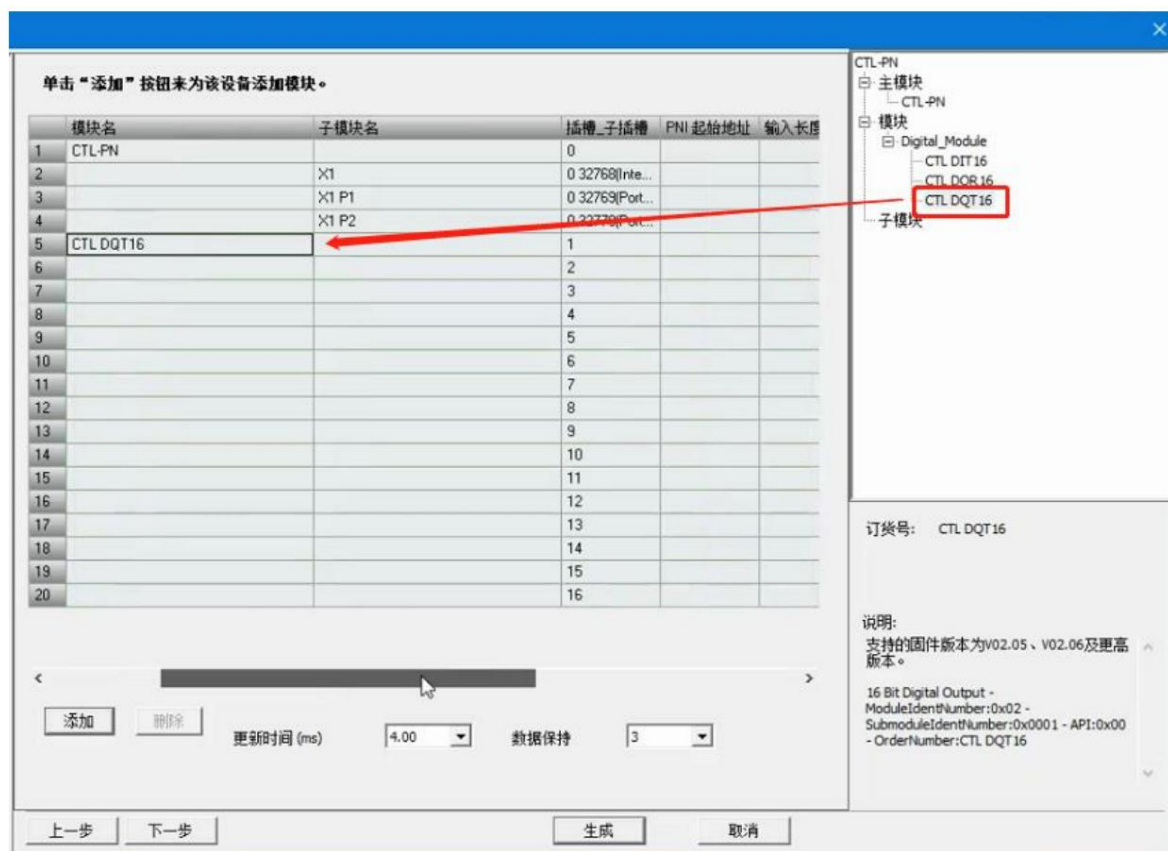
2. Configure the master station IP and name



3. Add CTL PN to the device table, and configure the slave IP address and device name in the device table. The slave IP address and the master IP address must be in the same network segment, and the device name must be consistent with the name searched for online access.



4. Add the digital quantity module CTL DQT, and connect the digital quantity behind CTL PN.



5. Set the starting address of the digital output module CTL DQT. The PNQ starting address is the starting address of the output module.

单击“添加”按钮来为该设备添加模块。

插槽_子插槽	PNQ 起始地址	输入长度 (...)	PNQ 起始地址	输出长度 (...)	固件版本
1	0				
2	0 32768(Inte...				
3	0 32769(Port...				
4	0 32770(Port...				
5	1		128	2	
6	2				
7	3				
8	4				
9	5				
10	6				
11	7				
12	8				
13	9				
14	10				
15	11				
16	12				
17	13				
18	14				
19	15				
20	16				

更新时间 (ms) 4.00 数据保持 3

添加 删除

上一步 下一步 生成 取消

CTL-PN
主模块
CTL-PN
模块
Digital_Module
CTL DIT 16
CTL DQR 16
CTL DQT 16
子模块

订货号: CTL DQT 16

说明:
支持的固件版本为V02.05、V02.06及更高版本。
16 Bit Digital Output -
ModuleIdentifier:0x02 -
SubmoduleIdentifier:0x0001 - API:0x00
- OrderNumber:CTL DQT 16

6. Set the status of the output channel when the digital output module fails. After the configuration is completed, click [Generate] to complete the PROFINET configuration.

该页可配置所选模块的每个子模块。

CTL DQT 16

Output when CPU disconnect

Chance0 Clear output
Freeze output in last state
Clear output

Chance1 Clear output
Clear output

Chance2 Clear output

Chance3 Clear output

Chance4 Clear output

Chance5 Clear output

Chance6 Clear output

Chance7 Clear output

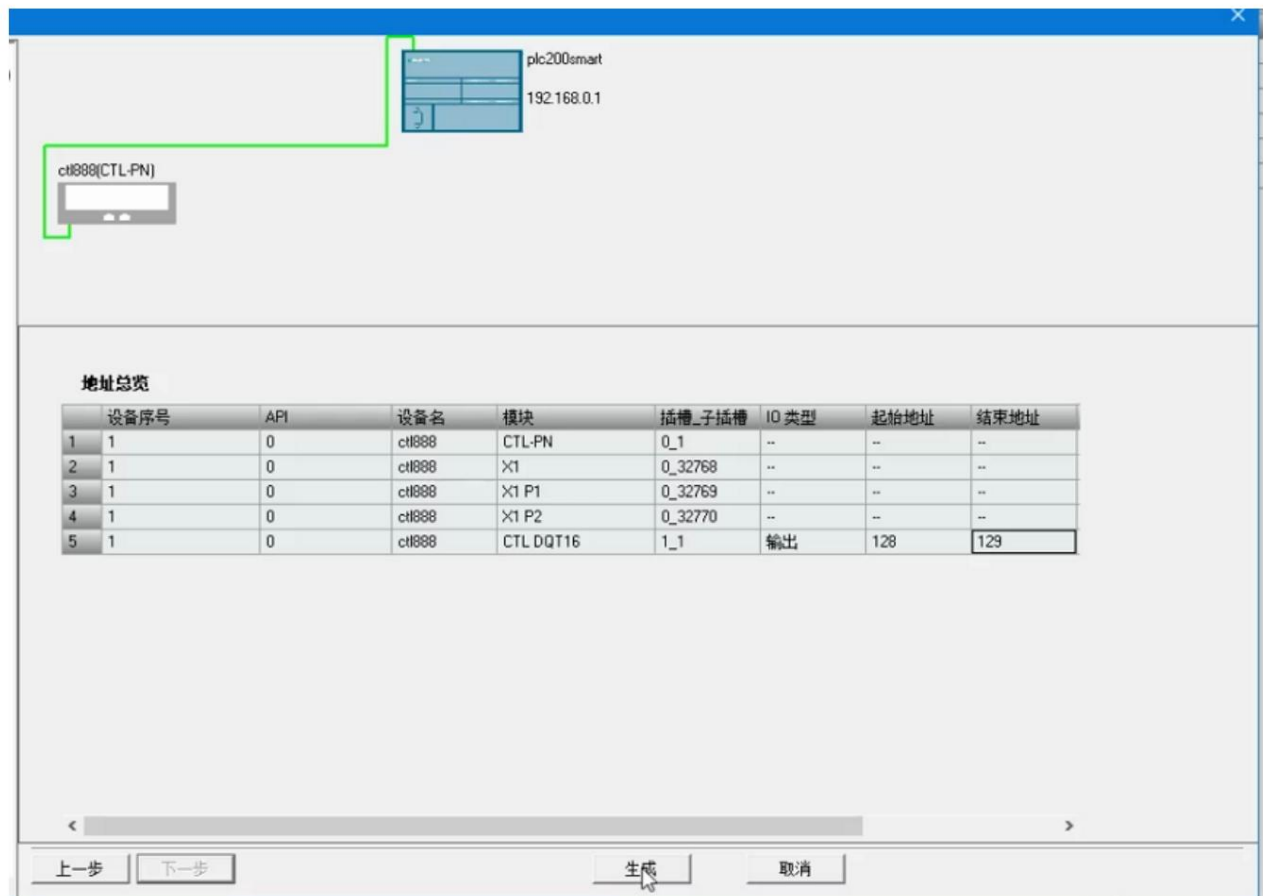
Chance8 Clear output

Chance9 Clear output

Chance10 Clear output

Chance11 Clear output

上一步 下一步 生成 取消



3.2.3 Step 3: Download, run, and monitor

1. Click [PROFINET Device] y [Find Device]



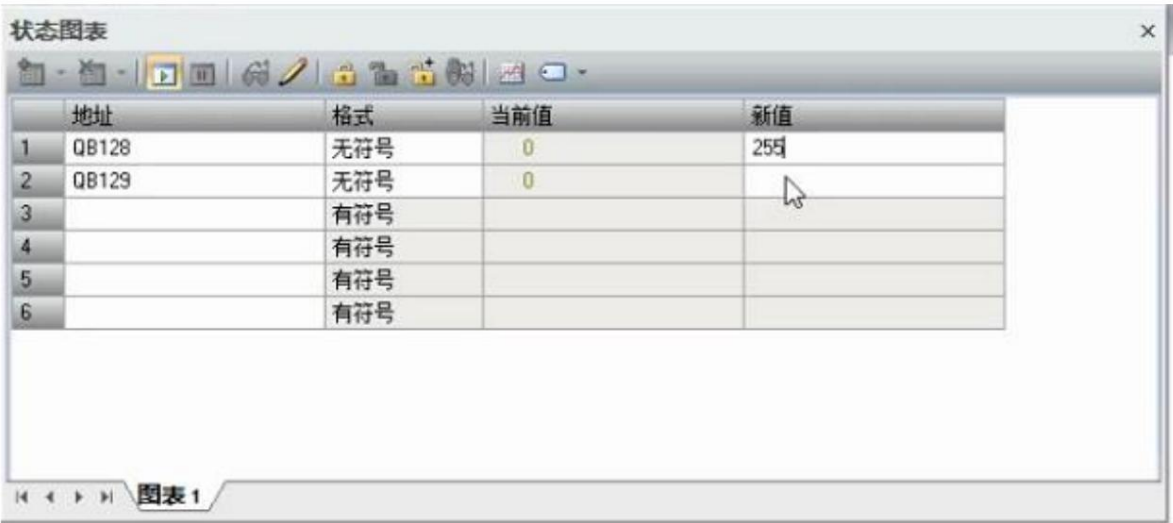
2. If the CTL PN device name found is different from the device name in the PROFINET wizard, modify the device name directly on this page to make it consistent with the name set in the wizard.

3. Click Download to download the project to the PLC. After clicking Download on the download page, you will be prompted to [whether to put the CPU into STOP mode].

Select [Yes]. After downloading is complete, you will be prompted to [Switch the CPU to RUN mode]. Select [Yes].



4. Assign module addresses in the status chart to control module output status.



3.3 CTL ECT and Hexin H36-02 communicate via EtherCAT

This chapter introduces how to use the CTL ECT module with the CTH300-H series PLC to achieve EtherCAT communication.

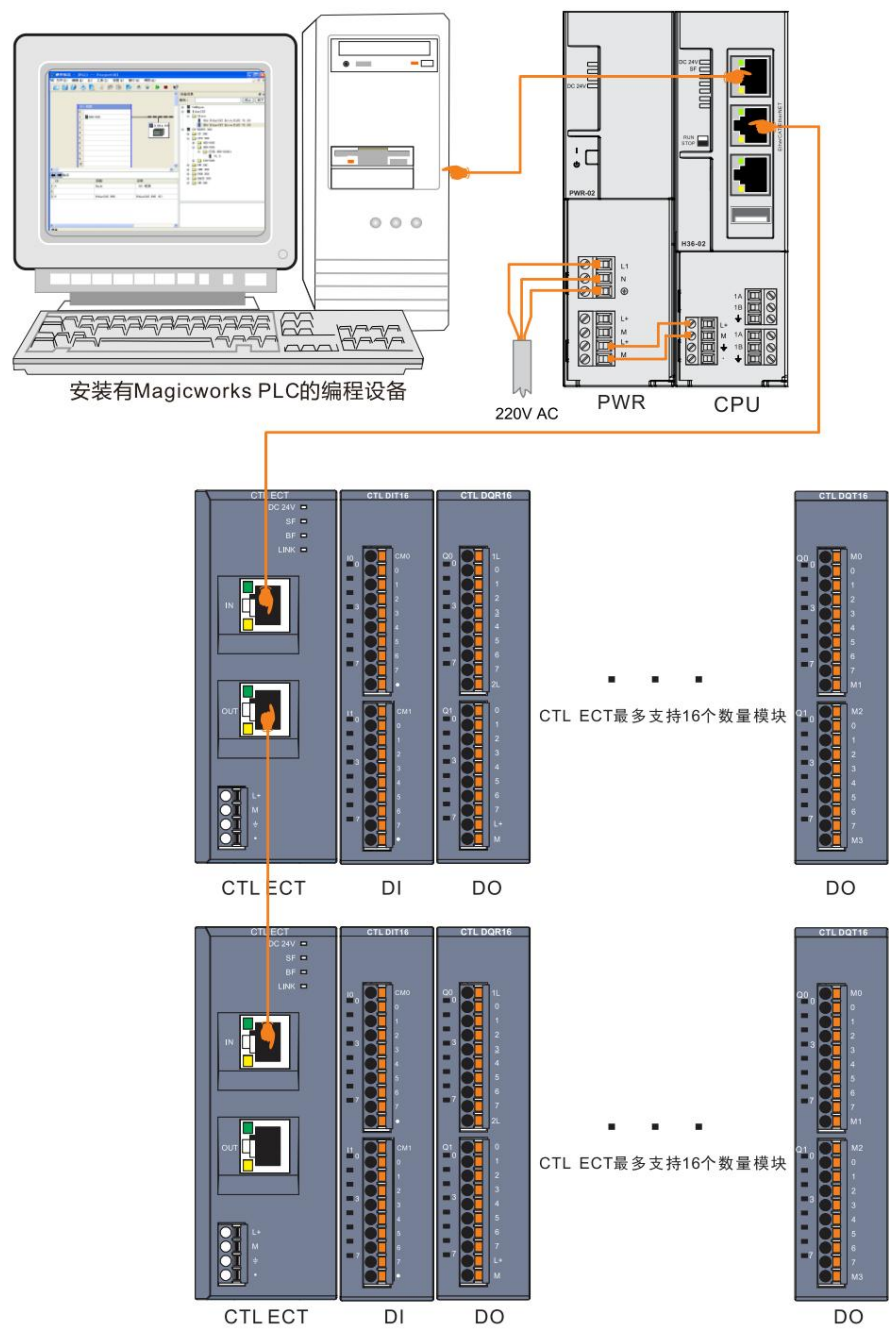
Table 3-1 List of used devices

PLC Model	Order Number	Configuration software	illustrate
H32-01	CTH3 H32-001S2	MagicWorks PLC V2.27 and above	The PLCs listed in the table can be used as EtherCAT masters
H36-01	CTH3 H36-001S2		
H36-02	CTH3 H36-002S2		
H52-10	CTH3 H52-100S2		
H56-10	CTH3 H56-100S2		
--	CTL ECT		ECT Slave Module

--	CTL DIT		Digital Input Modules
--	CTL DQR		Digital output module, relay type
--	CTL DQT		Digital output modules, transistor type

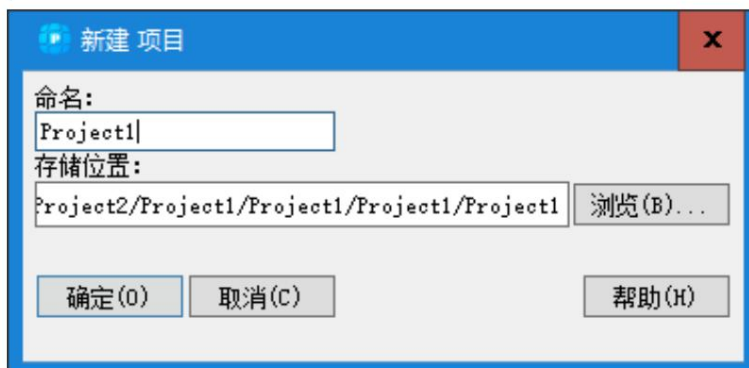
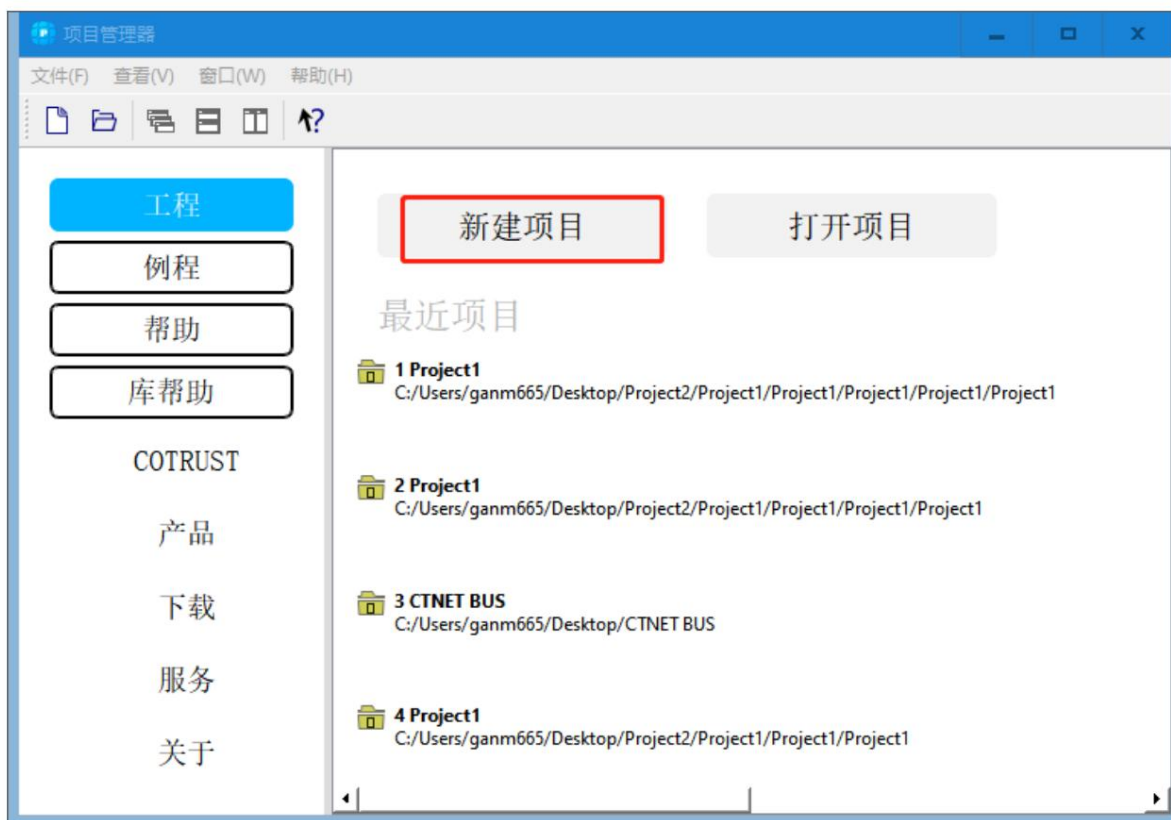
The network architecture is as follows:

- Use a standard network cable to connect the RJ45 IN port of the EtherCAT slave module to the EtherCAT communication port of the CPU;
- Use a standard network cable to connect the RJ45 OUT port of the EtherCAT slave module to the RJ45 IN port of other EtherCAT slave modules;
- CTL ECT A maximum of 16 expansion modules can be connected to the slave module (no distinction is made between transistor and relay digital modules).

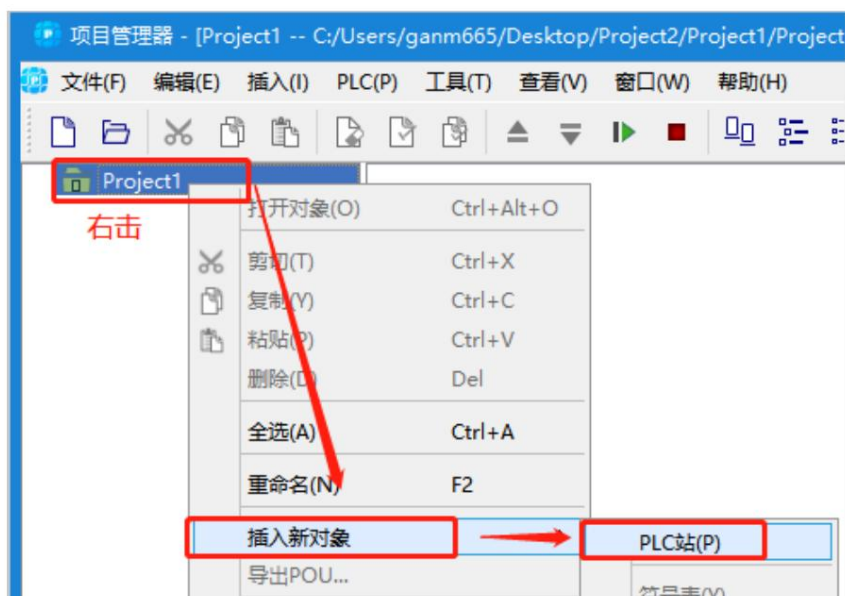


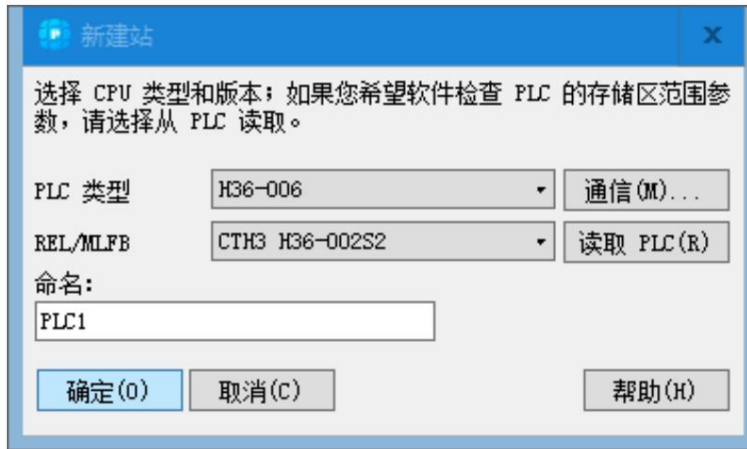
3.3.1 Step 1: Create a new project, the main station is H36-02

1. Open MagicWorks PLC V2.27, create a new project, and customize the project name and save path.



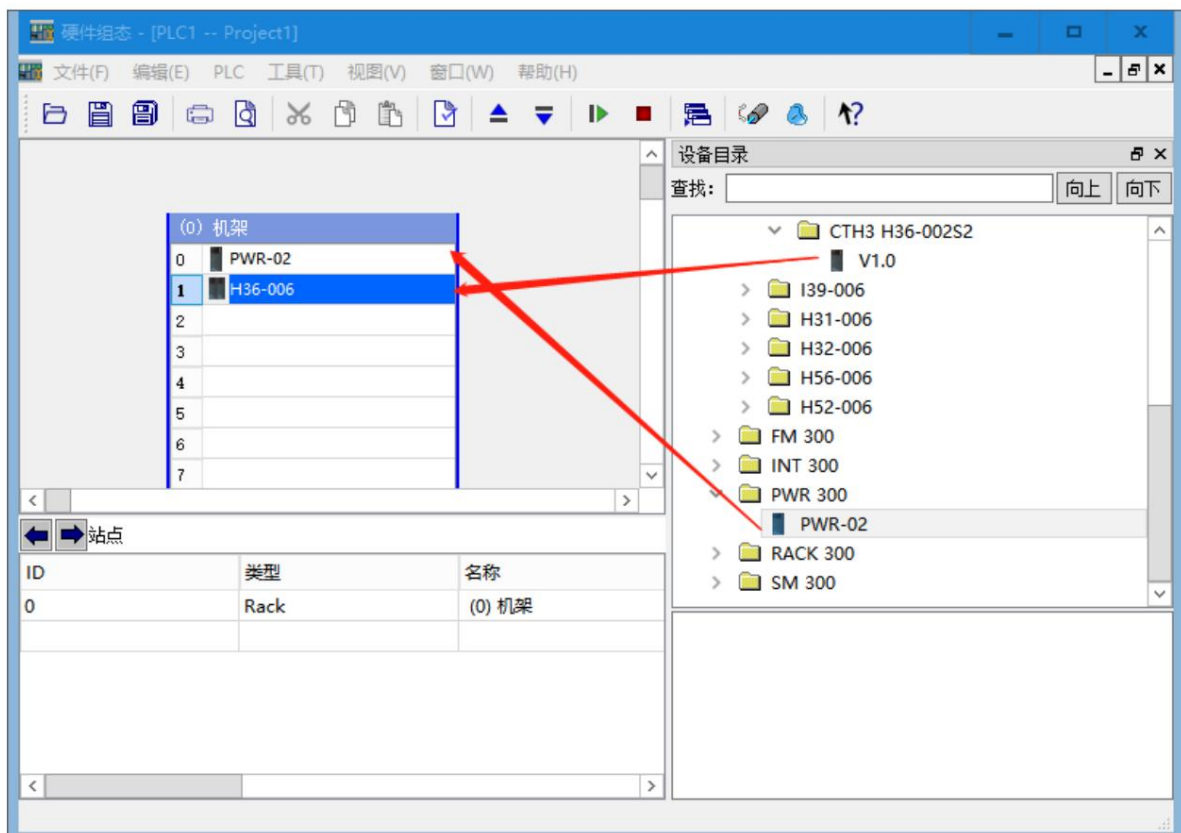
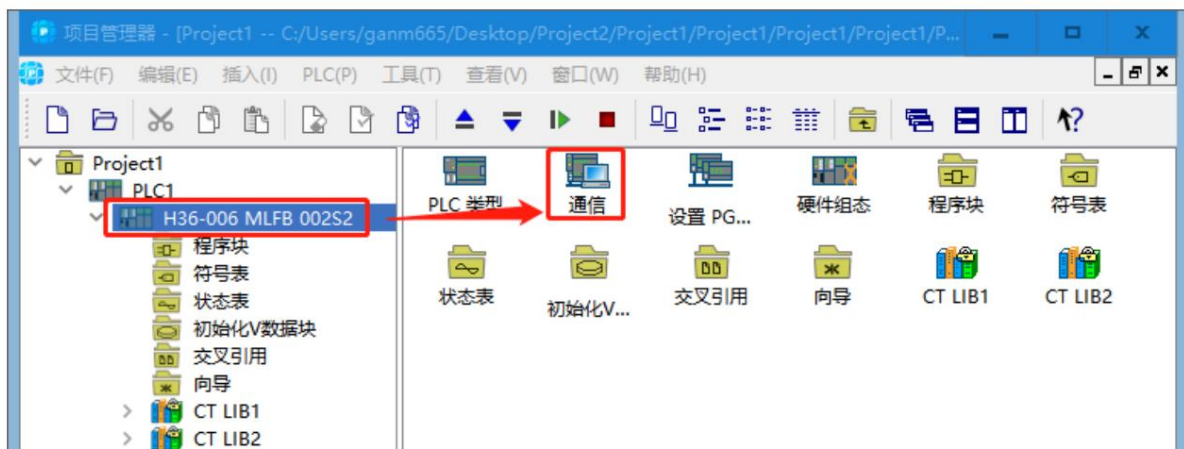
2. Insert a PLC station that supports CTL ECT module. This example takes H36-02 as an example.



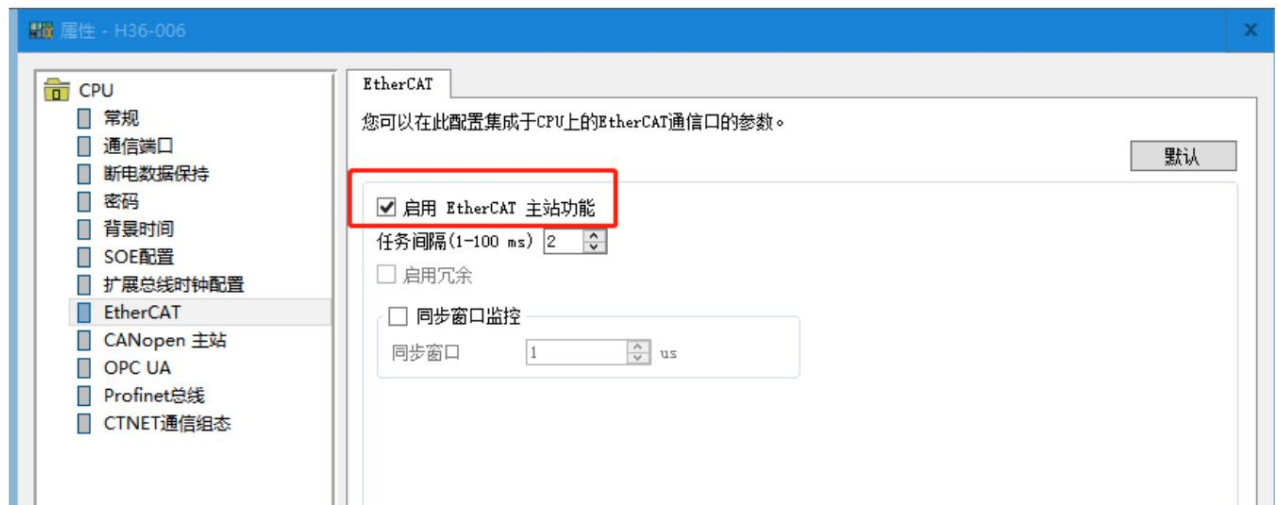


3.3.2 Step 2: Enter the hardware configuration interface to configure the master station

1. In the MagicWorks PLC project view, click to select the H36-02 station, then double-click the hardware configuration icon in the right working window to enter the hardware configuration interface. Place H36-02 in slot 1 of the rack and the power module in slot 0.

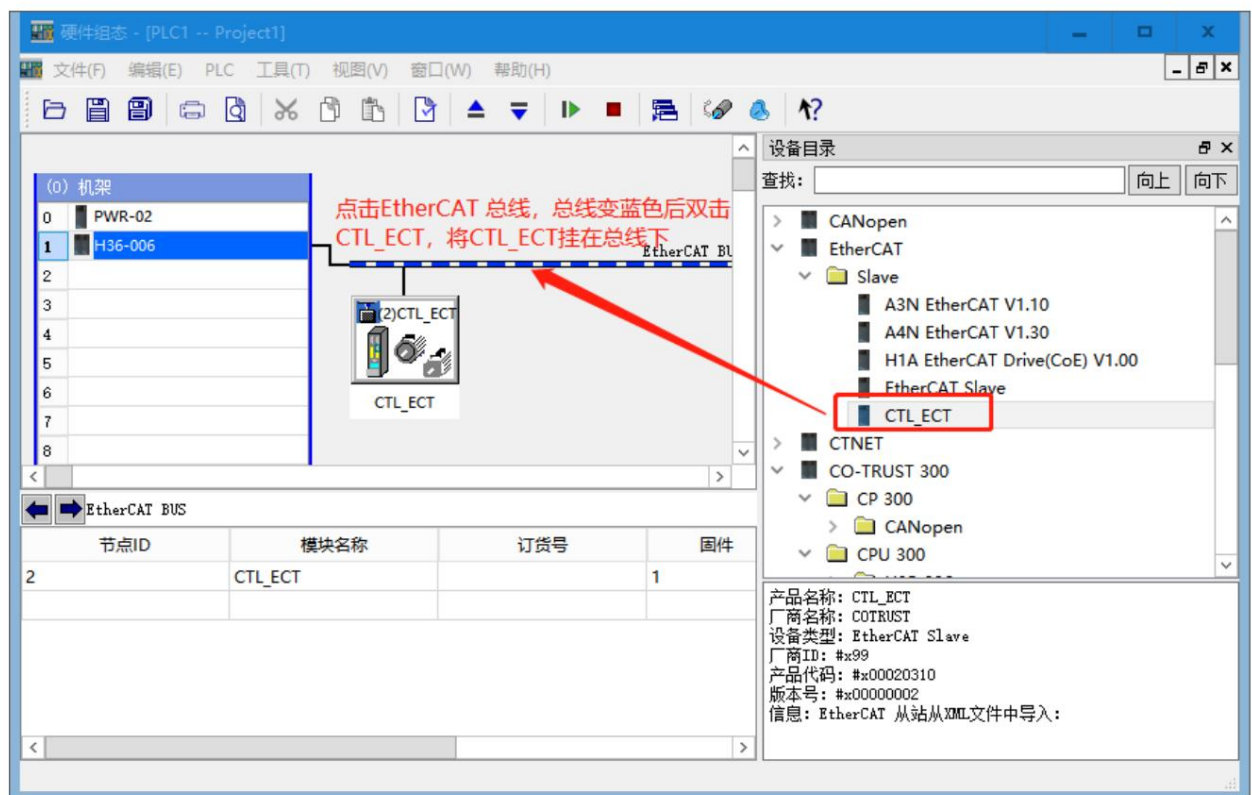


2. Double-click the CPU on the rack to enter the CPU properties interface and enable the EtherCAT master function.

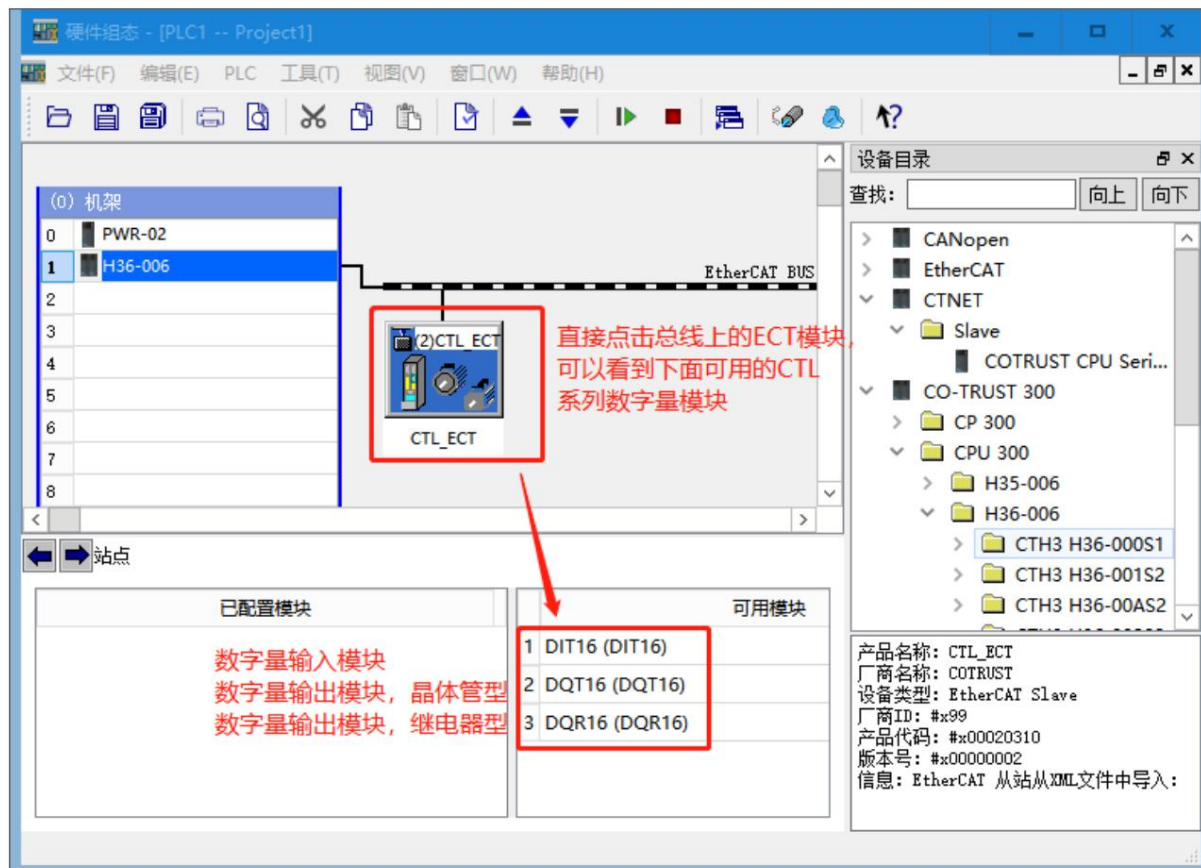


3.3.3 Step 3: Configure slave stations and digital modules

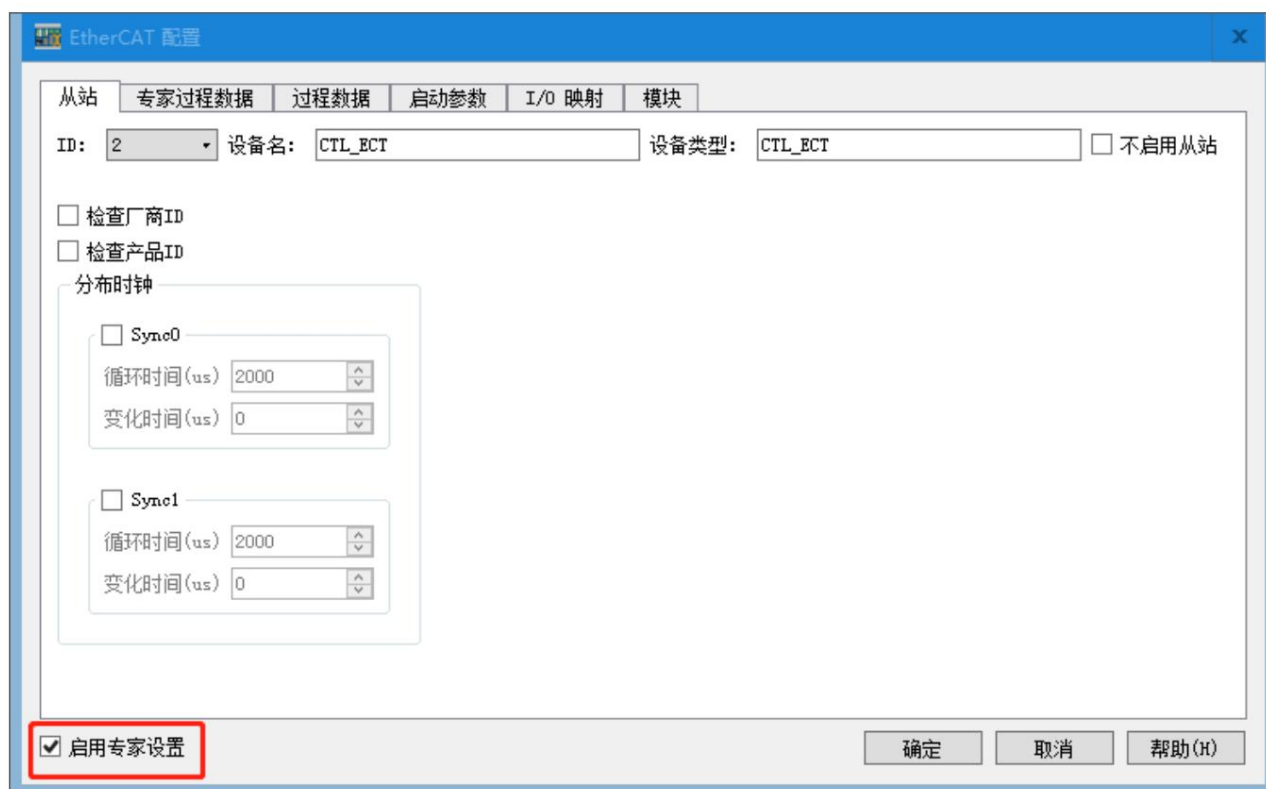
1. Expand the EtherCAT node in the device tree, open the slave node Slave, select CTTL ECT and add it to the EtherCAT bus.



2. Right-click and select [Add] or double-click the digital module to add it to the CTL ECT slave module (up to 16 digital modules can be added). After adding, it will be displayed in the [Configured Modules] directory on the left.

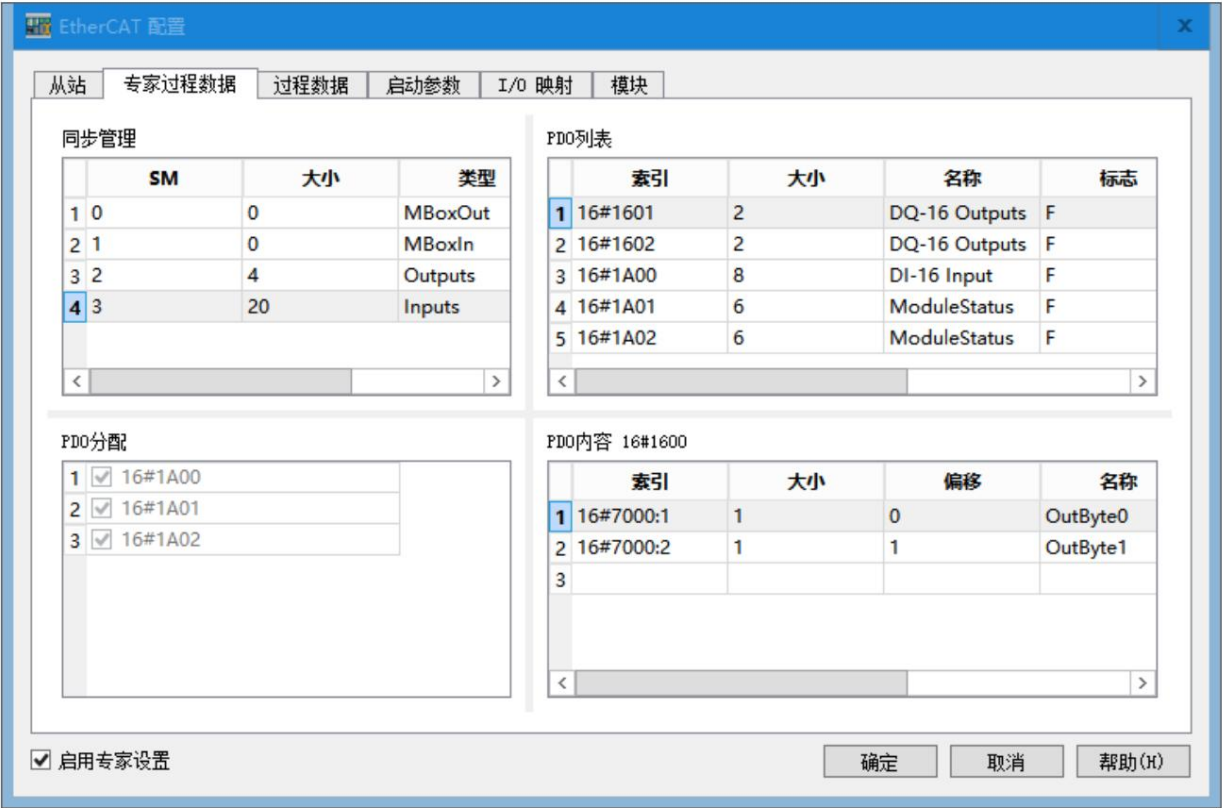


3. Double-click the CTL ECT slave icon on the EtherCAT bus, and the EtherCAT configuration dialog box shown in the figure below will pop up. For specific parameter configuration, refer to the following description. In the EtherCAT configuration page, check [Enable expert settings] to configure expert process data.



yExpert process data

After the expansion module is selected, the PDO cannot be changed. [PDO List] lists the groups corresponding to all the modules that can be mounted, [Synchronous Management] lists the input/output of the selected module, [PDO Assignment] has fixed input/output groups, and [PDO Content] lists the storage parameters corresponding to the specified group.



I/O Mapping

The successfully configured I/O parameters will be displayed in the I/O map. Double-click the address column to edit its address.

Start monitoring the configured parameters, then enter the parameter value in the [New Value] column, and finally click the Write button to successfully write the new value.

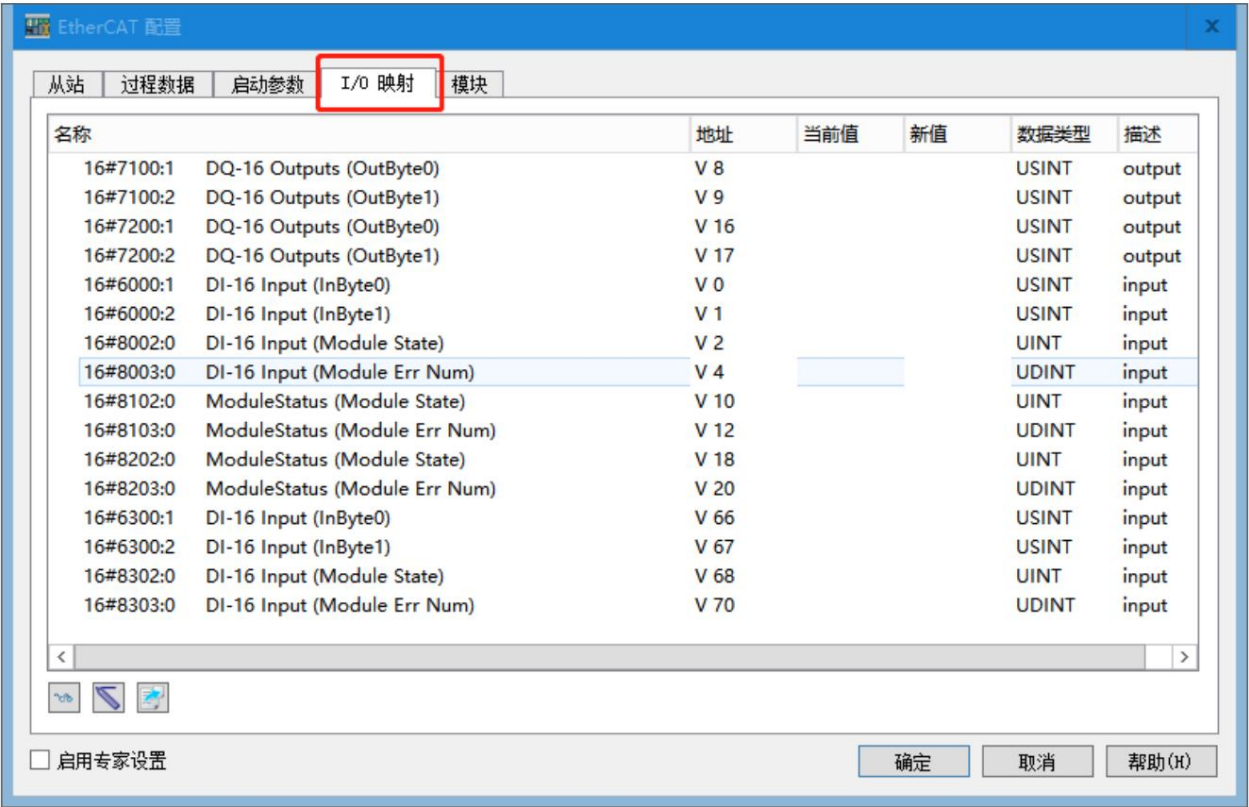


Table 3-2 Parameter information related to I/O mapping

name	illustrate
DI-16 Input (InByte0) DI-16 Input (InByte1)	Digital input channel value (16#6x00) InByte0 represents the module's input channel byte 0 InByte1 represents the module's input channel byte
DQ-16 Ouput (OutByte0) DQ-16 Ouput (OutByte1)	1 digital output channel value (16#7x00) OutByte0 represents the output channel byte 0 of the module OutByte1 represents the module's output channel byte
Module State	1 Module status (16#8X02) 0x00: No error 0x01: Module busy 0x02: No response due to timeout 0x03: Module type match 0x04: Module version mismatch 0x05: Software error 0x06: Waiting for flag timeout 0x07: Bus response error 0x08: Bus CRC check error 0x0E: Address not configured 0x10: Memory offset out of range 0x11: Module not ready 0x12: Module configuration error 0x13: Module does not support this instruction 0x15: Module internal diagnosis 0x16: Module has no power 0X17: Verification error
Module Err Num	Module error count (16#8X03)

yStartup parametersy

The startup parameters include some basic configuration parameters required when starting the slave. You can insert startup parameters in this tab. When the device starts, it will perform operations with the values set in the [Startup Parameters].

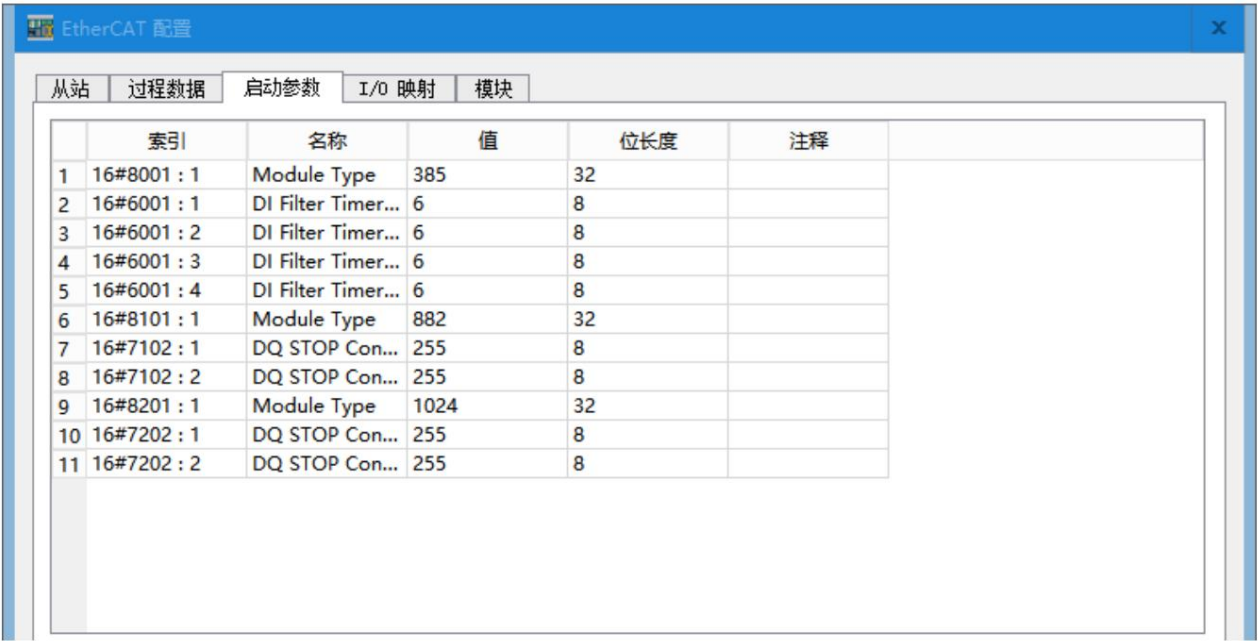


Table 3-3 Startup parameter information

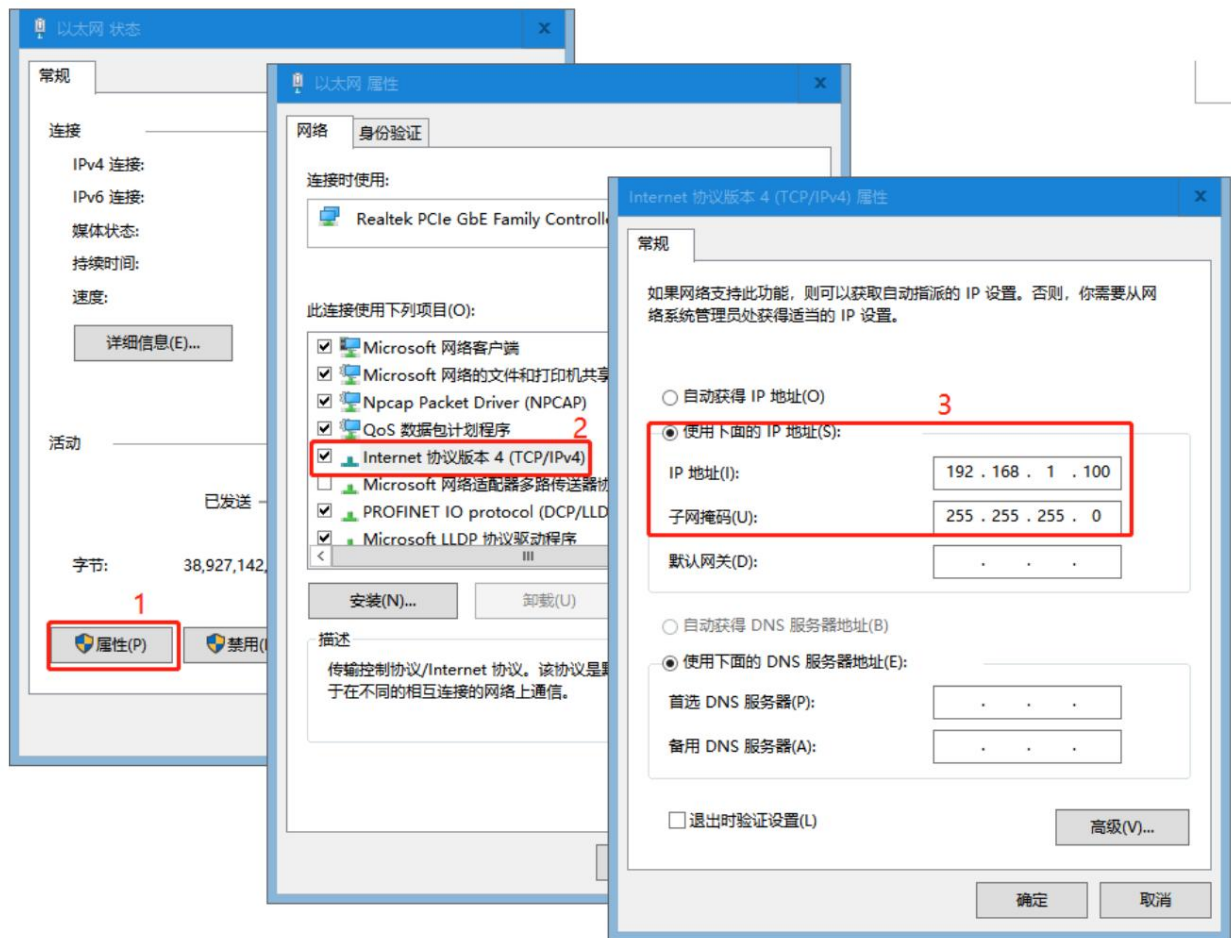
name	illustrate																																																
Module Type	Module type (16#8x01) 385: DIT16 (digital input module) 882: DQT (digital output module, transistor type) 1024: DQR (digital output module, relay type)																																																
DI Filter Timer bit0~3 DI Filter Timer bit4~7 DI Filter Timer bit8~11 DI Filter Timer bit12~15	Digital input filter configuration (16#8x01) <table><tr><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th>Bit 0</th></tr><tr><td>reserve</td><td colspan="3">Channel 0-3 filter time</td></tr><tr><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th></tr><tr><td>reserve</td><td colspan="3">Channel 4-7 filter time</td></tr><tr><th>Bit 11</th><th>Bit 10</th><th>Bit 9</th><th>Bit 8</th></tr><tr><td>reserve</td><td colspan="3">Channel 8-11 filter time</td></tr><tr><th>Bit 15</th><th>Bit 14</th><th>Bit 13</th><th>Bit 12</th></tr><tr><td>reserve</td><td colspan="3">Channel 12-15 filter time</td></tr></table> Filter time: 3-1.60ms; 5-3.20ms; 6-6.40ms; 7-12.8ms; default value: 6-6.40ms Channel control byte default value: 16#6666	Bit 3	Bit 2	Bit 1	Bit 0	reserve	Channel 0-3 filter time			Bit 7	Bit 6	Bit 5	Bit 4	reserve	Channel 4-7 filter time			Bit 11	Bit 10	Bit 9	Bit 8	reserve	Channel 8-11 filter time			Bit 15	Bit 14	Bit 13	Bit 12	reserve	Channel 12-15 filter time																		
Bit 3	Bit 2	Bit 1	Bit 0																																														
reserve	Channel 0-3 filter time																																																
Bit 7	Bit 6	Bit 5	Bit 4																																														
reserve	Channel 4-7 filter time																																																
Bit 11	Bit 10	Bit 9	Bit 8																																														
reserve	Channel 8-11 filter time																																																
Bit 15	Bit 14	Bit 13	Bit 12																																														
reserve	Channel 12-15 filter time																																																
DQ STOP Config Data	Digital output shutdown configuration (16#7X02) subIndex1: represents the shutdown output configuration byte 0 of the module subIndex2: represents the shutdown output configuration byte 1 of the module Each bit configures a channel (0: keep output; 1: clear to 0) <table><tr><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th></th><th></th><th></th><th></th><th>Bit 0</th></tr><tr><td colspan="11">reserve</td><td></td></tr><tr><th>Bit 15</th><th>Bit 14</th><th>Bit 13</th><th>Bit 12</th><th>Bit 11</th><th>Bit 10</th><th>Bit 9</th><th>Bit 8</th><th></th><th></th><th></th><th></th></tr><tr><td colspan="11">reserve</td><td></td></tr></table>	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1					Bit 0	reserve												Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8					reserve											
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1					Bit 0																																						
reserve																																																	
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8																																										
reserve																																																	

3.3.4 Step 4: Communication Settings

1. Set the IP of the programming device to the same network segment as H36-02.

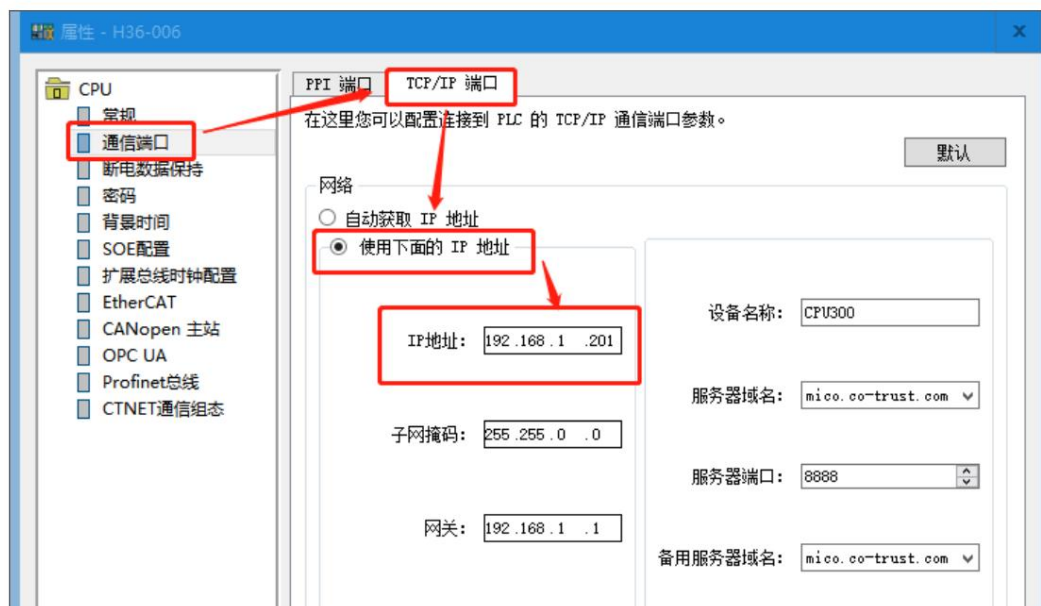
Before setting up communication, you need to set the IP of the programming device PG/PC to the same network segment as H36-02 (IP: 192.168.1.x). Setting method:

Open the local connection properties of the PC, double-click the TCP/IP protocol, change [Automatically obtain an IP address] to [Use the following IP address], and then Then fill in [192.168.1.X] in the IP address.



2. How to modify the IP address of PLC

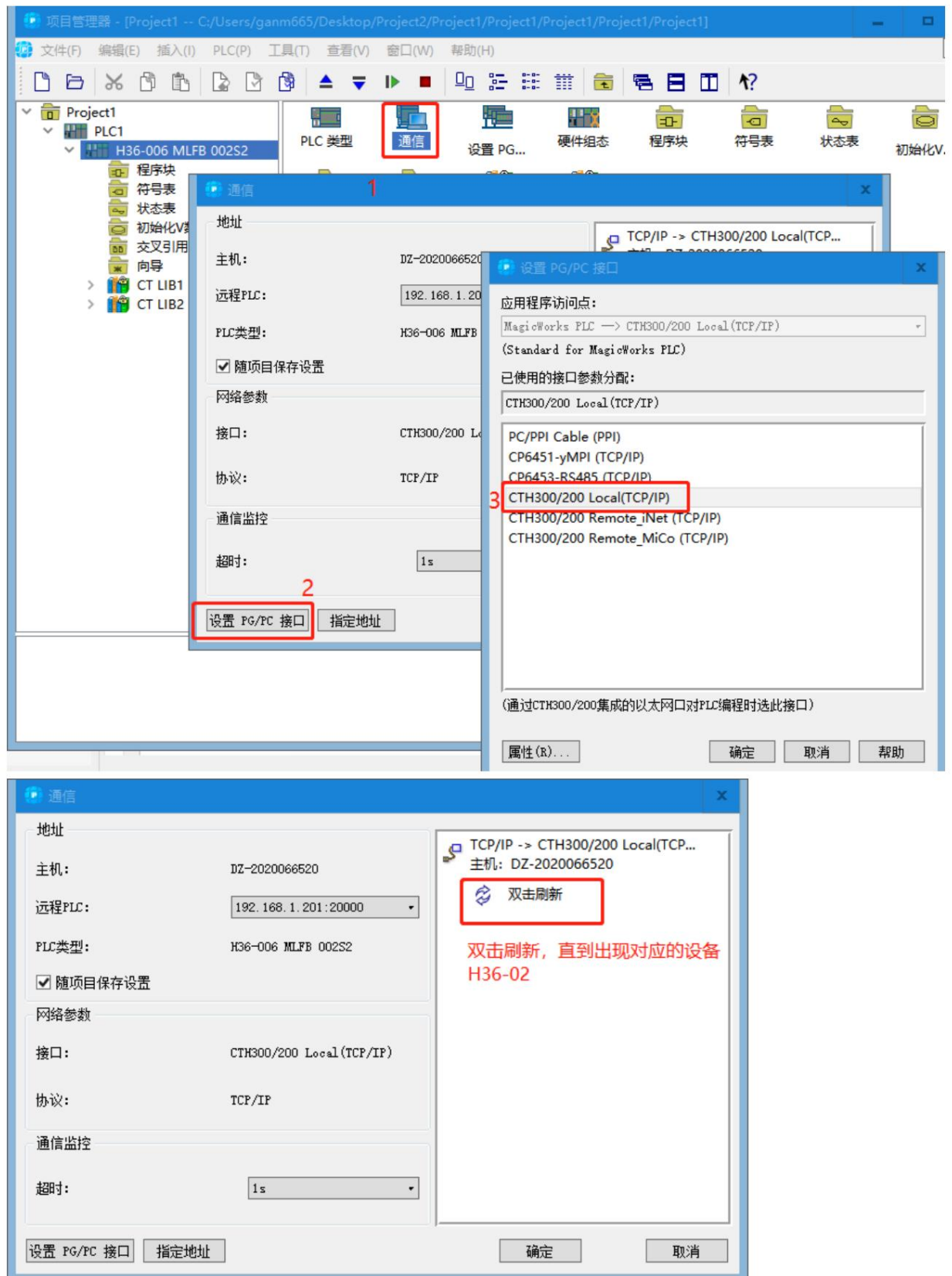
If you need to modify the IP address of PLC, you can modify the IP in the hardware configuration. Double-click the CPU on the rack to enter its property interface. The operation is as follows:

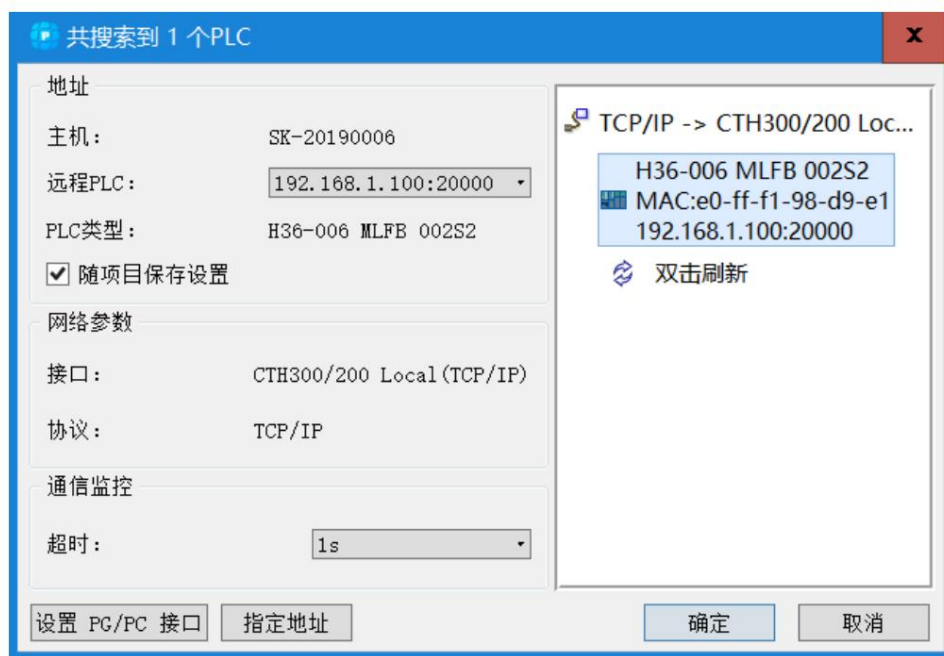


3. Set up the communication of **H36-02** to connect **PLC** with programming device

Setting the PG/PC interface

In the [Set PG/PC Interface] interface, select the interface [CTH300/200 Local (TCP/IP) -> Realtek PCIe GBE Family Controller] to use, and then click the [OK] button to complete the PG/PC interface settings.



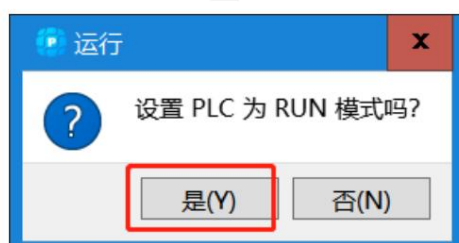


3.3.5 Step 5: Download configuration and monitor

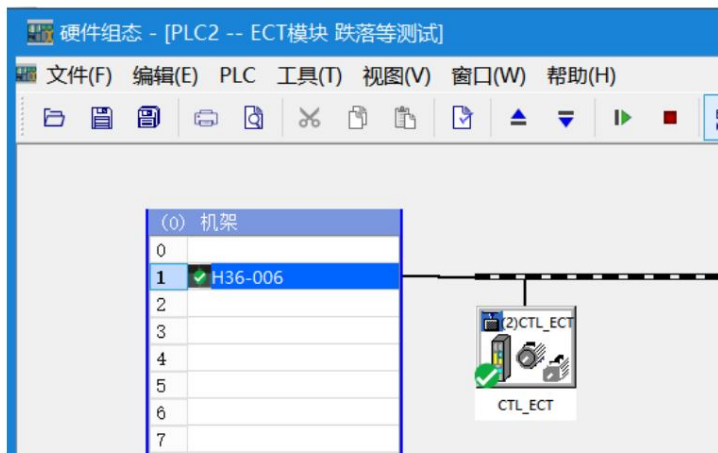
1. Click to download the configuration to the device.



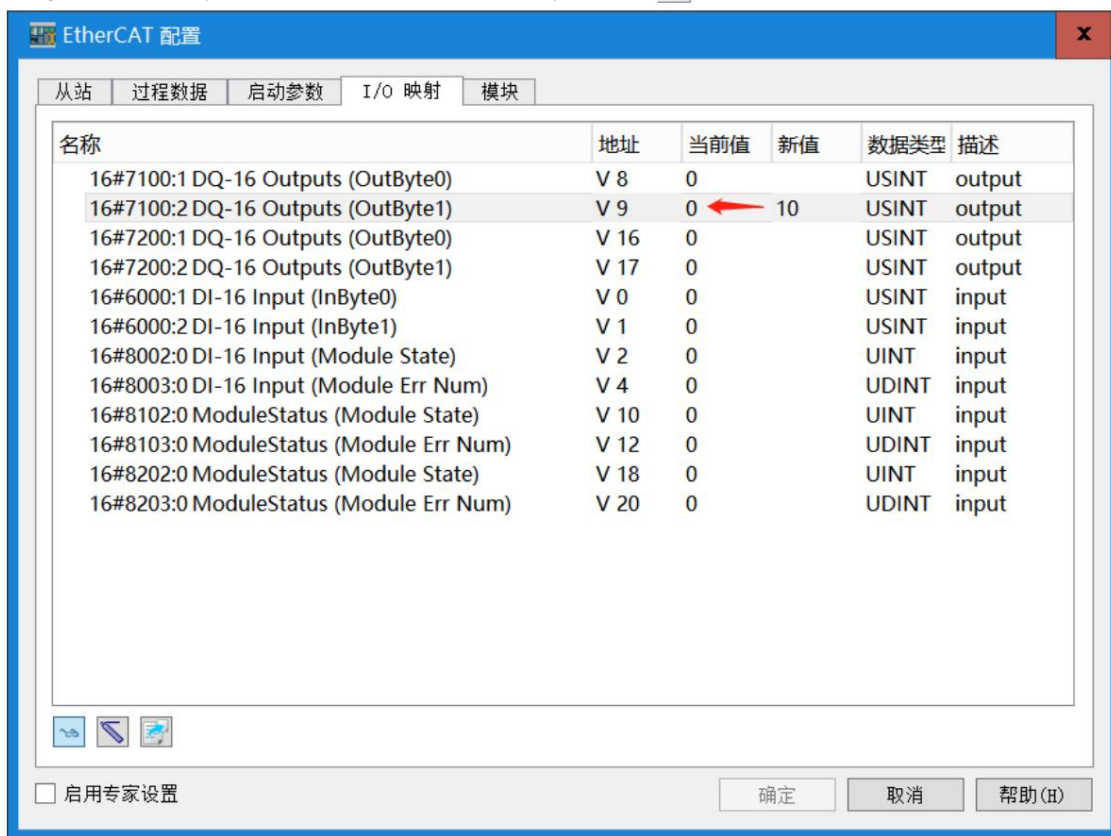
2. Click the run icon to run the project.



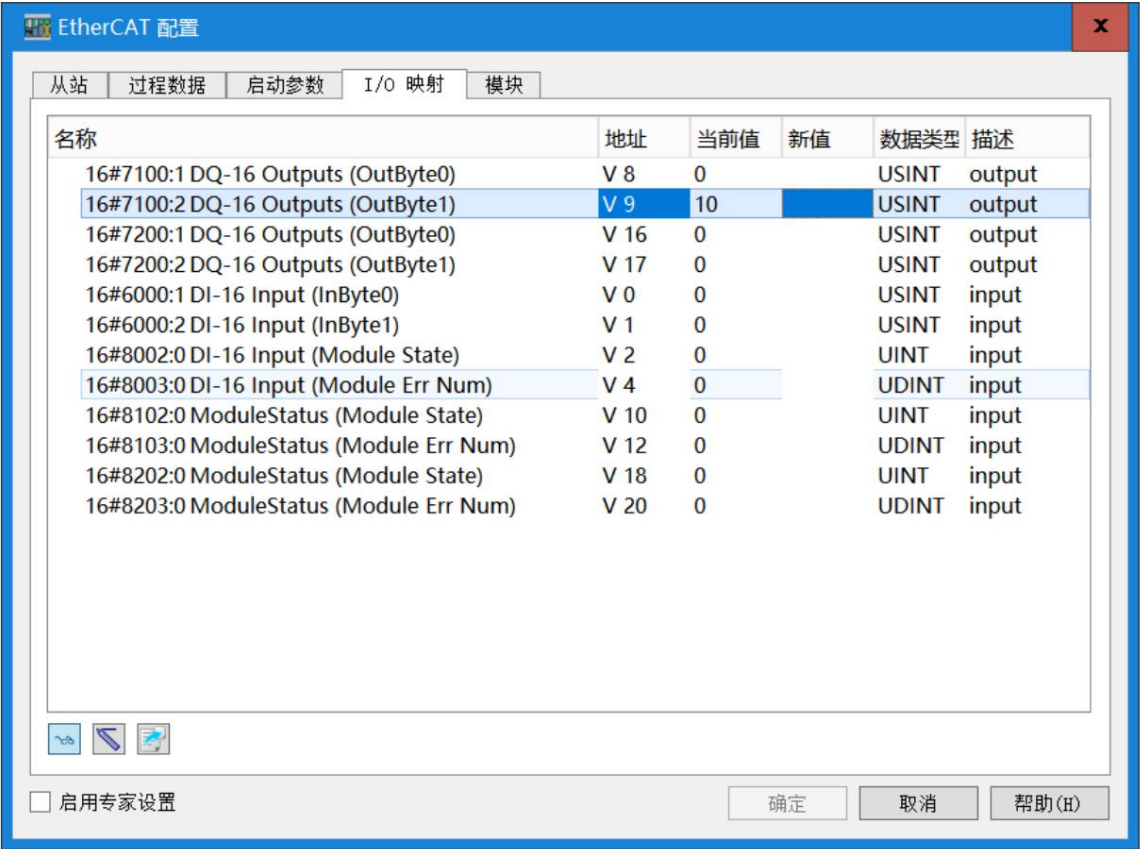
3. The following figure shows that the devices have successfully communicated with each other.



4. Click the CTL ECT module on the EtherCAT bus, click Monitor in the I/O Mapping to start monitoring the configured parameters, then enter the parameter value in the [New Value] column. In this example, write 10. Click the Write button to successfully write the new value.



5. After writing successfully, you can see that the current value is 10. At this time, check that the Q0.1 and Q0.3 indicators of the digital output module DQT are on.



3.3.6 Fault diagnosis

When a system failure occurs, please first check whether the following conditions are met:

- 1) Check whether the CTH300-H series main control module and expansion module are powered normally.
- 2) Check whether the screws and connectors of the I/O terminals of the CTH300-H series main control module and expansion module are loose.
- 3) Check the connection of the communication cable to ensure it is correct.
- 4) If the PLC cannot be searched, please check the communication settings, such as changing the baud rate, connecting the serial port or IP, and search again.

In addition to the above methods, you can also read diagnostic information through MagicWorks PLC, or check the PLC's LED status.

Check whether there are any abnormalities on the body and exterior.

Diagnostic information reading method: Open MagicWorks PLC software → double-click to open the hardware configuration interface → select menu item [PLC] → [Get Diagnostic Information] → [Diagnosis Information] to open the diagnosis window

Table 3-4 Diagnostic Information Window Description

Column Name	significance	Remark
Date	The date when the diagnostic event occurred, in the format of: year.month.day	--
Time	The time when the diagnostic event occurred, in the format of: hours: minutes: seconds: milliseconds	--
Type	Category of diagnostic event	--
Process variables	When an SOE event occurs, the value of the process variable (only available for SOE events) Process variables)	Up to 16 SOE events can be configured; class of process variables The type and display format can be found in CPU [Properties] → [SOE [Configuration] in [Configuration].

Table 3-5 CTH300-H series PLC EtherCAT register SMB400~SMB409 diagnosis

SMB	Error description
Number of EtherCAT	slaves found by SMB400
SMB401	EtherCAT Error: 0: No error 1: Configuration parameter error 2: No slave found 3: Status switching error 4: An error occurred while writing the configuration 5: The number of slave stations is wrong 6: Slave mismatch
SMB402	Status of the first slave: 0: No connection 1: Initialization state 2: Pre-operation state 4: Safe Operation 8: Operation status 16#80: Product ID does not match 16#81: Manufacturer ID does not match 16#82: SDO write error Other: Error status
SMB403~SMB409	Slave 2 status~Slave 8 status

3.4 CTL ECT and CODESYS SP11 for EtherCAT communication

Table 3-6 Applicable equipment list

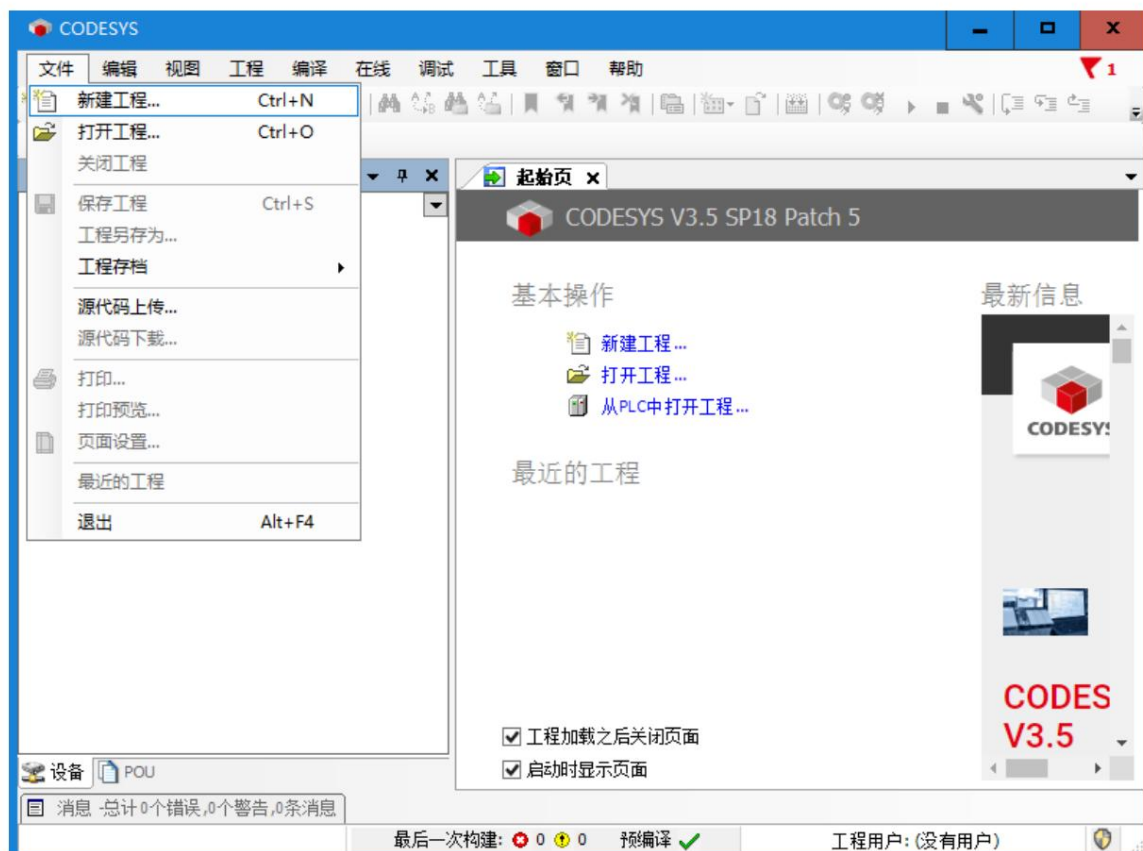
PLC Model	Order Number	Configuration software	illustrate
C35-02	CTH3 C35-002S2	CODESYS SP11	The PLCs listed in the table can be used as EtherCAT masters
C36-02	CTH3 C36-002S2		
C37-02	CTH3 C37-002S2		
C56-10	CTH3 C56-102S2		
C57-10	CTH3 C57-102S2		
C35-03	CTH3-C35-003S2	CODESYS SP18	
C57-A3	CTH3-C57-103S2		
--	CTL ECT	Follow the main site to use the software Version	ECT Slave Module
--	CTL DIT		Digital Input Modules
--	CTL DQR		Digital output module, relay type
--	CTL DQT		Digital output modules, transistor type

The device models used in this example are: C57-10 master station, CTL ECT slave station, and digital output expansion module DQT16.

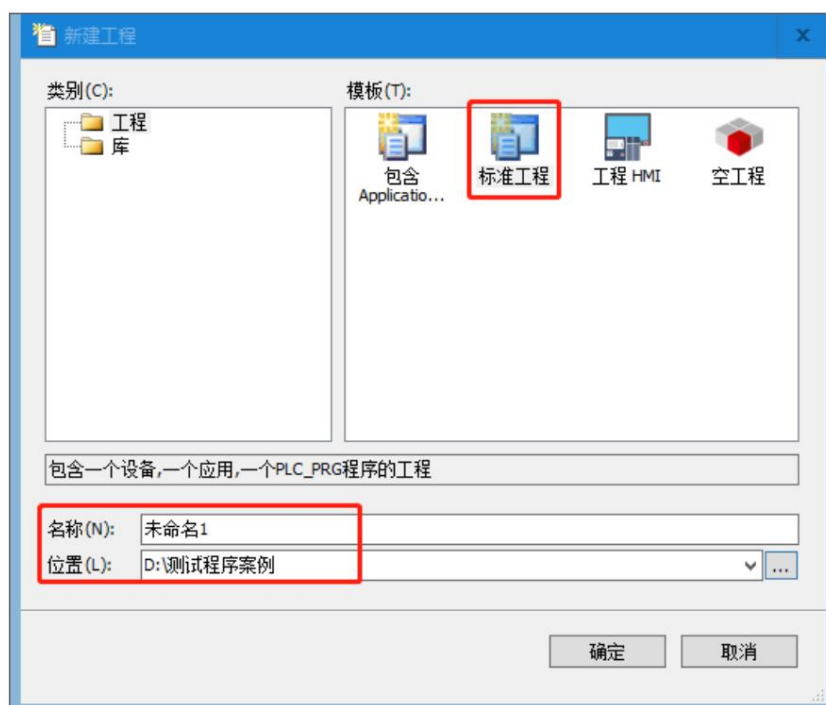
Functions implemented: By configuring the above devices in CODESYS, C57-10 is connected to the CTL ECT slave station, and DQT16 is attached to the back of the CTL ECT slave station, so that the master station can control the digital output module DQT16. The example uses the control of the two output points Q0.2 and Q0.3 of the digital output module DQT16 as an example.

3.4.1 Step 1: Create a new project

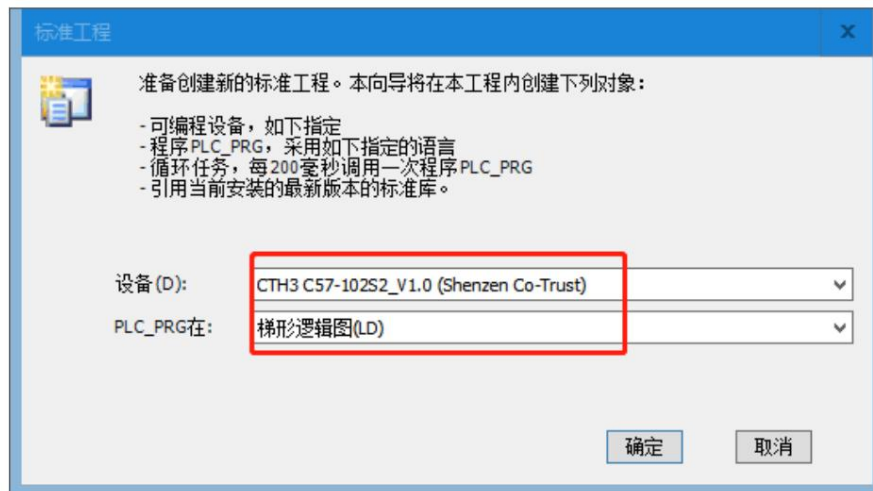
1. This example uses C57-10 as the main station. Start CODESYS SP11. The starting interface is as follows. Click New Project.



2. Create a new standard project and set the project name and project save path.



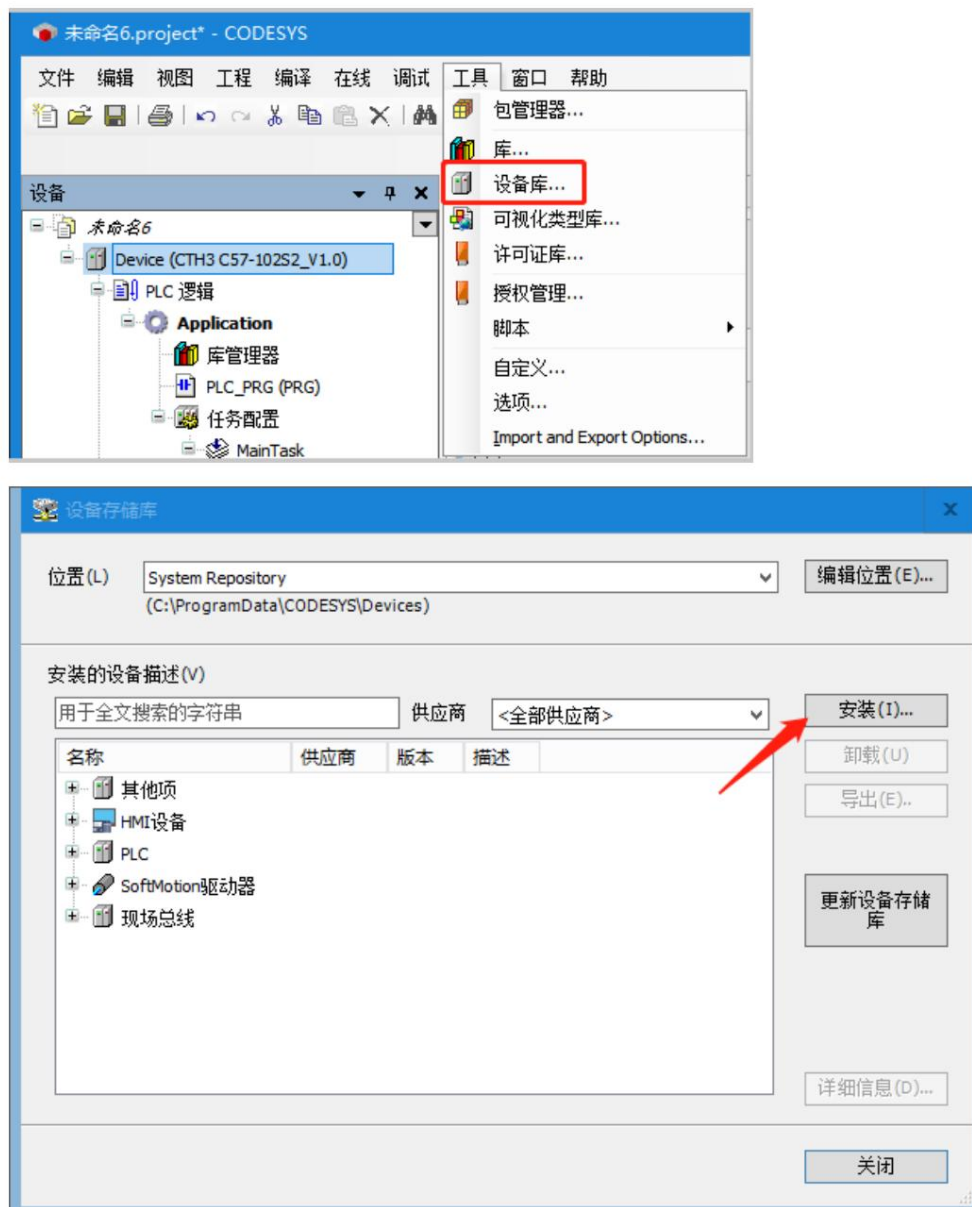
3. Select the device and programming language



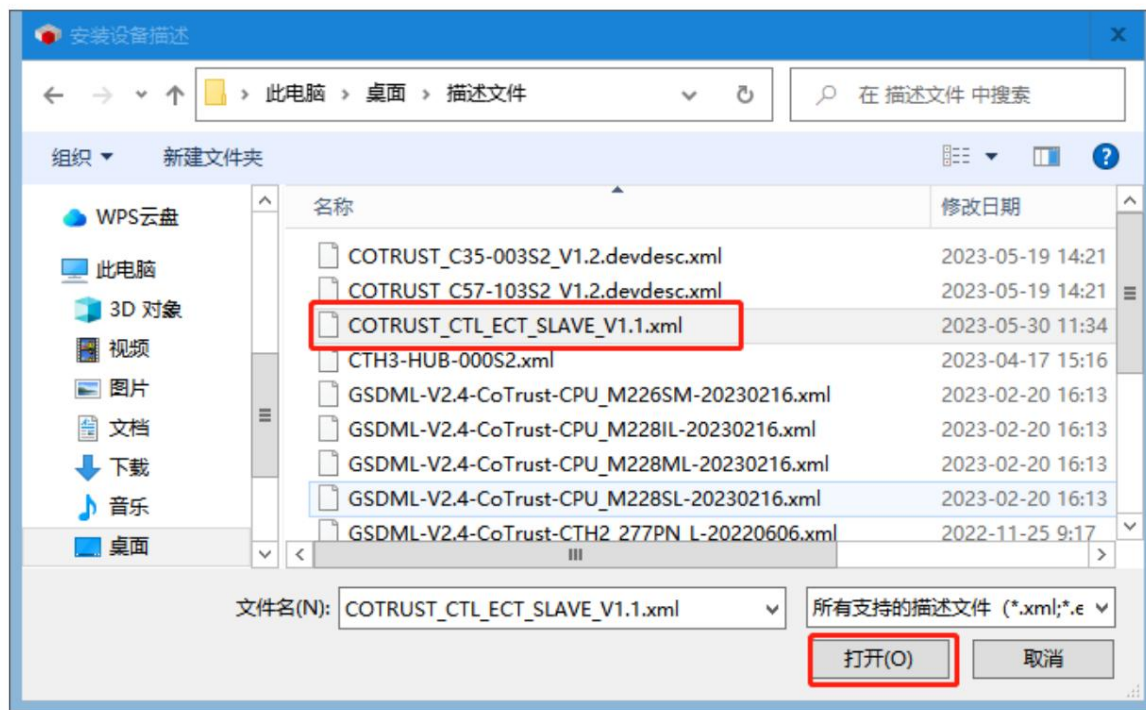
3.4.2 Step 2: Install CTL ECT description file

CODESYS software itself does not have our equipment, so if you want to configure COTRUST's PLC equipment in CODESYS, you must add the corresponding device description file. The specific steps are as follows:

1. Select the menu item [Tools] > [Device Library], and then click [Install].



2. After finding the path where the description file is located, you can select the file type according to the device you want to install, and then install it directly after selecting the device.

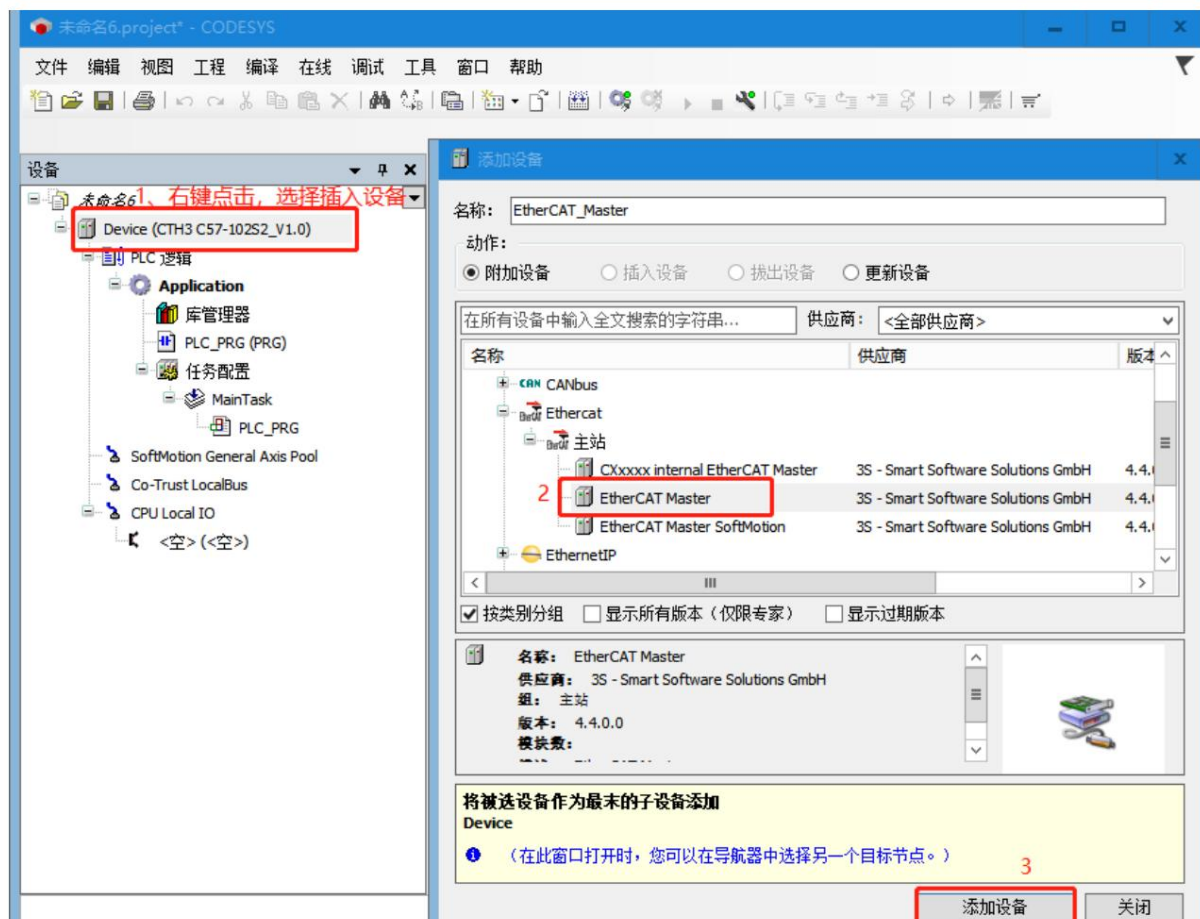


The device description file can be downloaded directly from the Co-Trust official website: <https://www.co-trust.com>.

3.4.3 Step 3: Configuration in CODESYS

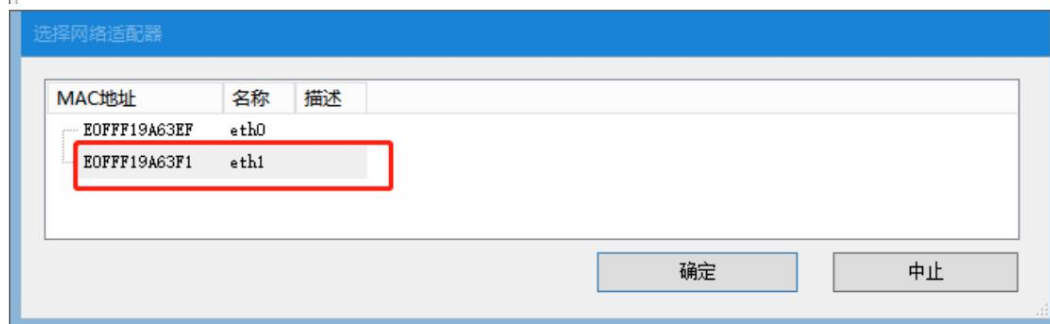
1. Add the master station device to the project

In the open project, right-click [Device] in the device view and select [Add Device]. In the pop-up dialog box, choose to add an EtherCAT master: select [All Vendors] for the vendor and [EtherCAT] for the fieldbus.
y [Master] y [EtherCAT Master] for the fieldbus.



2. Configure the master station and set the source address

Set the source address (MAC) in the [Master] tab: Click the [Browse] button to the right of [Source Address (MAC)], and then select the corresponding MAC address in the pop-up dialog box. Note: eth0 cannot be selected as the MAC address.

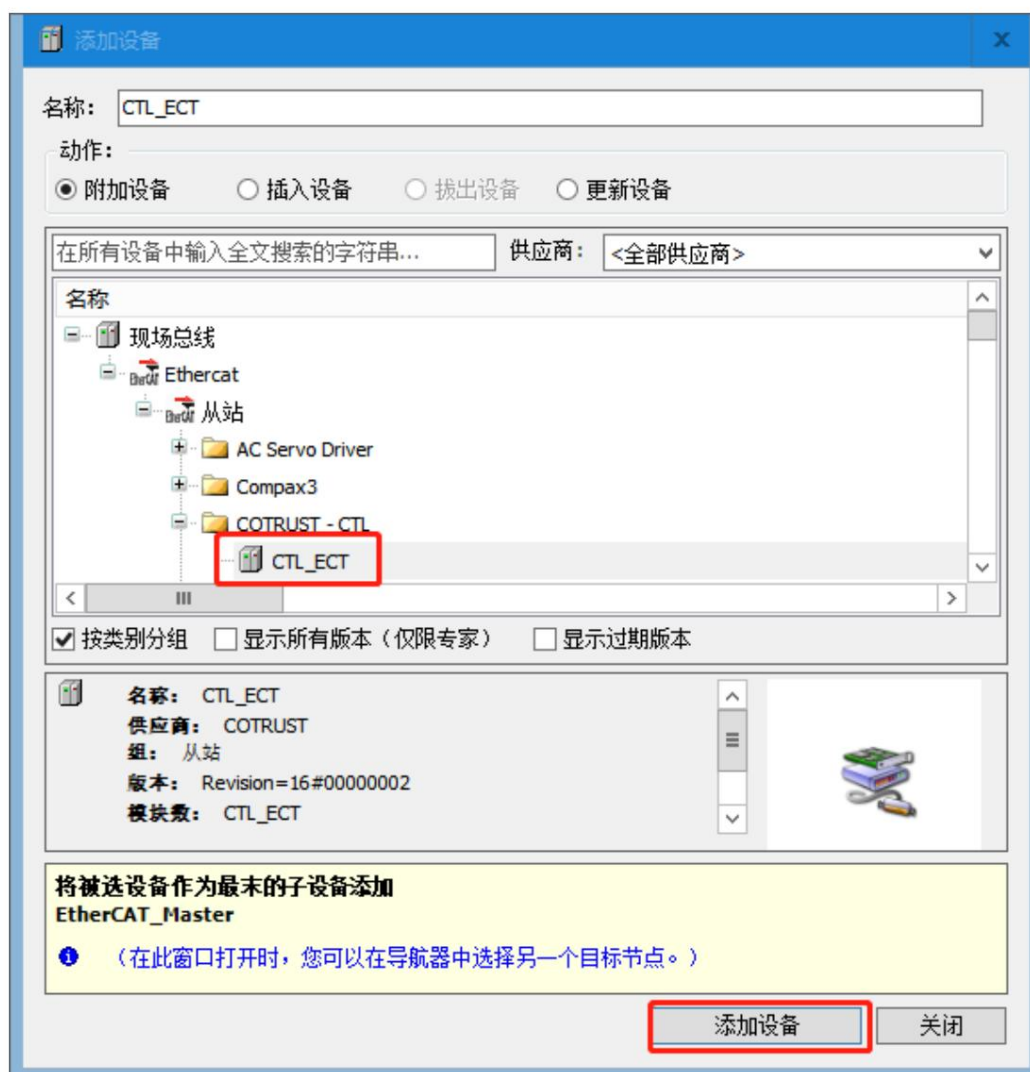
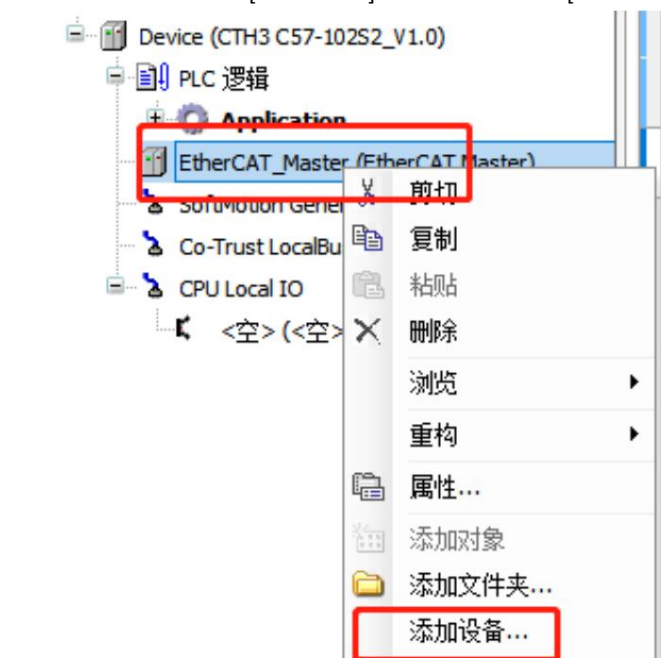


Or select a network by name



3. Add CTL ECT slave device

Select the EtherCAT master in the device view, right-click and select [Add Device]. In the pop-up dialog box, select Add EtherCAT Slave: Select [All Vendors] for the vendor and [EtherCAT] y [Slave] y [CTL ECT] for the fieldbus.

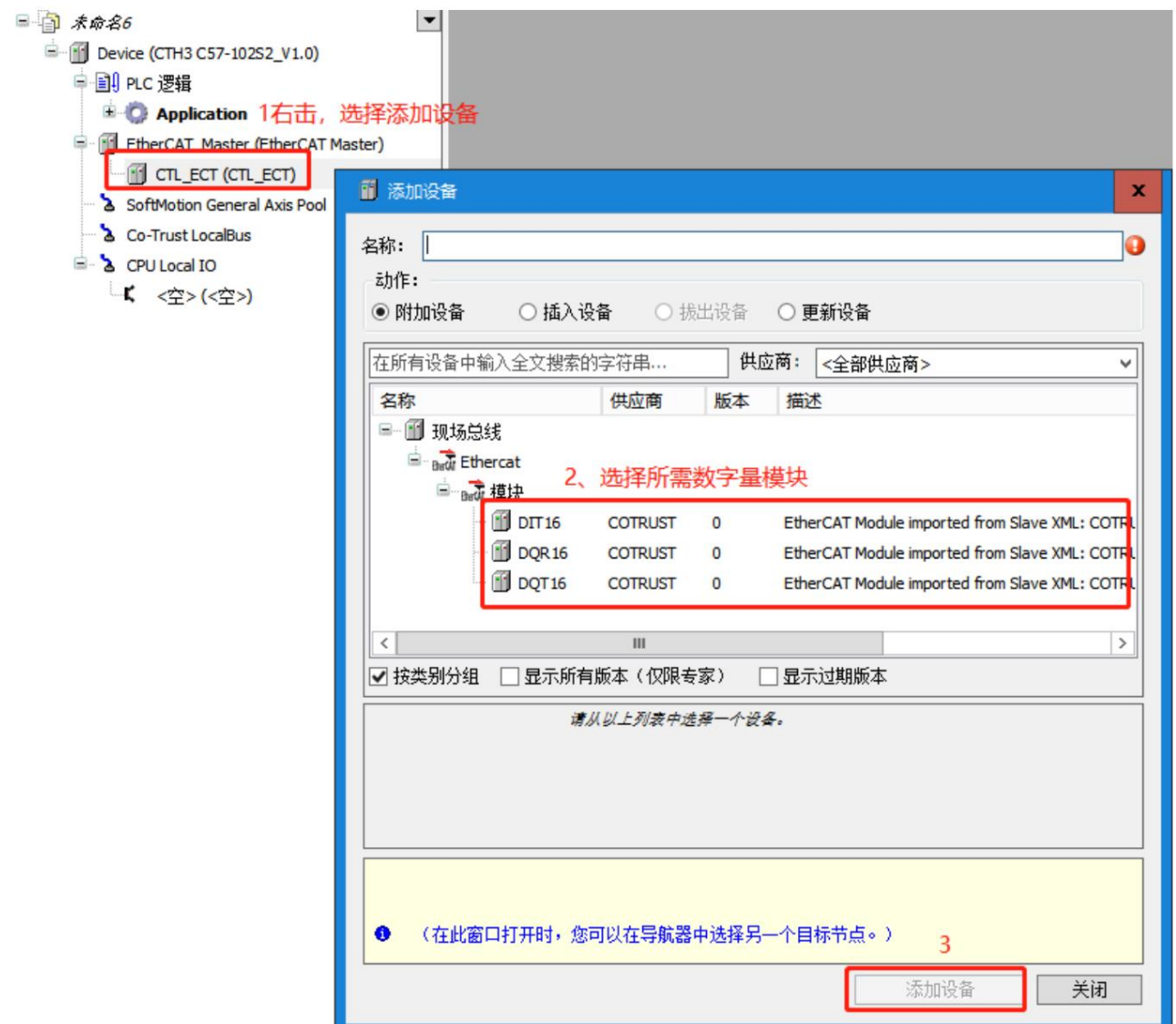


4. Configure CTL ECT slave

In the Slave tab, check Enable Expert Settings and select DC SM-Synchron for distributed clock.



Add the required digital modules. In this example, the DQT16 module is used for illustration.



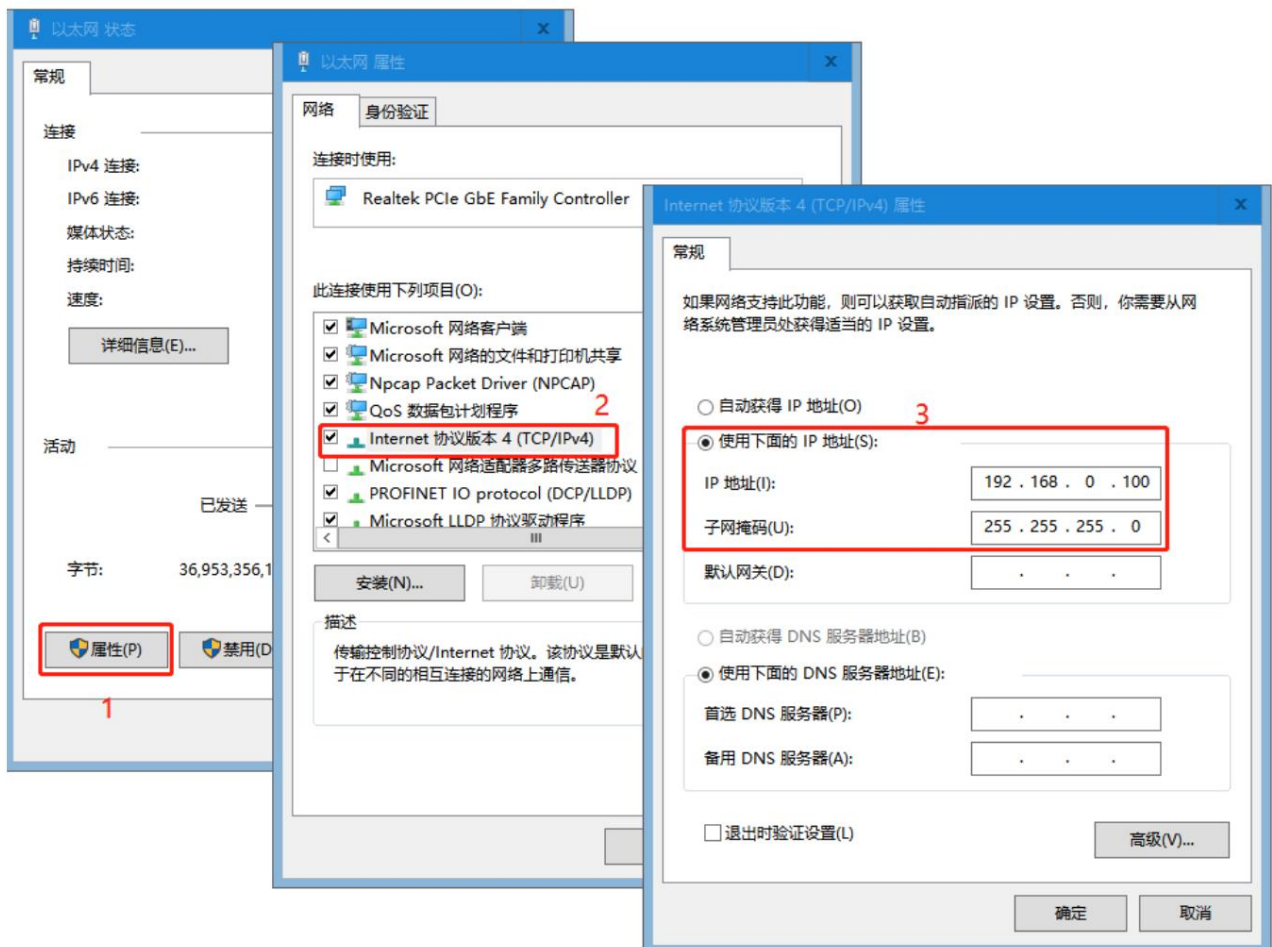
3.4.4 Step 4: Set up communication

1. Set the IP of the programming device to the same network segment as the PLC

Before setting up communication, you need to set the IP of the programming PC to the same network segment as the PLC (IP: 192.168.0.x).

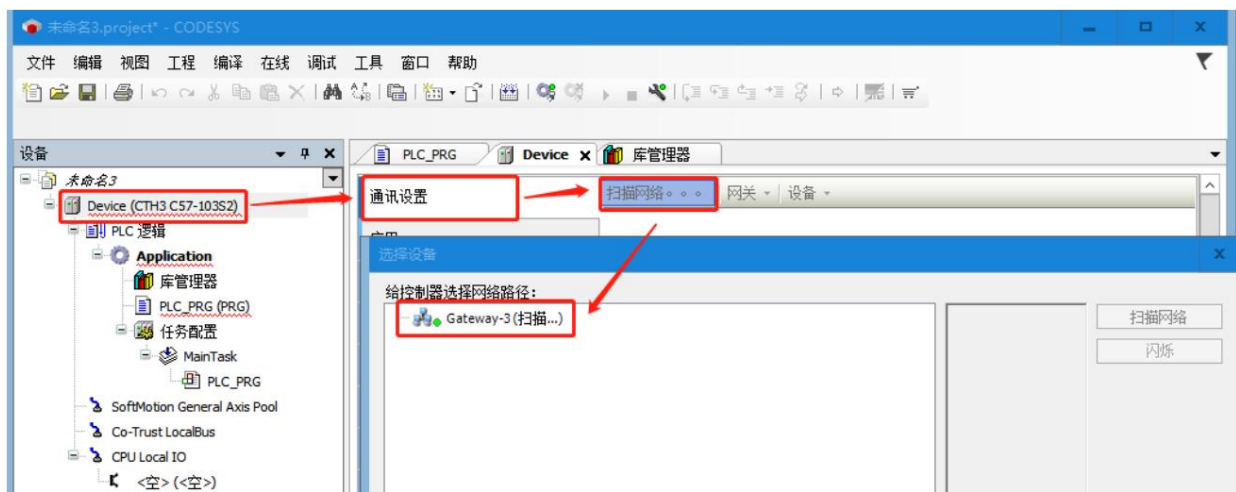
How to set it up:

- 1) Open the Ethernet properties of the PC.
- 2) Double-click Internet TCP/IP Protocol,
- 3) Change [Automatically obtain an IP address] to [Use the following IP address], and then fill in [192.168.0.X] in the IP address.

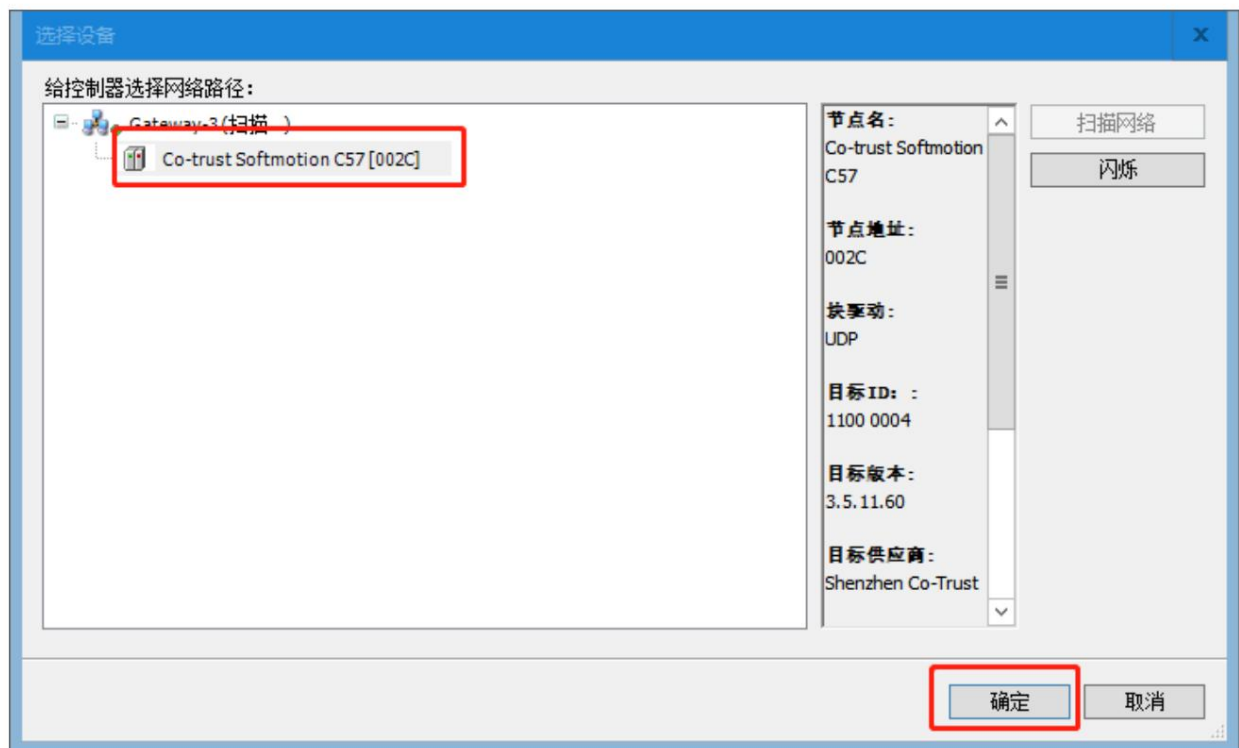


2. Execute [Communication Settings] in CODESYS Device View

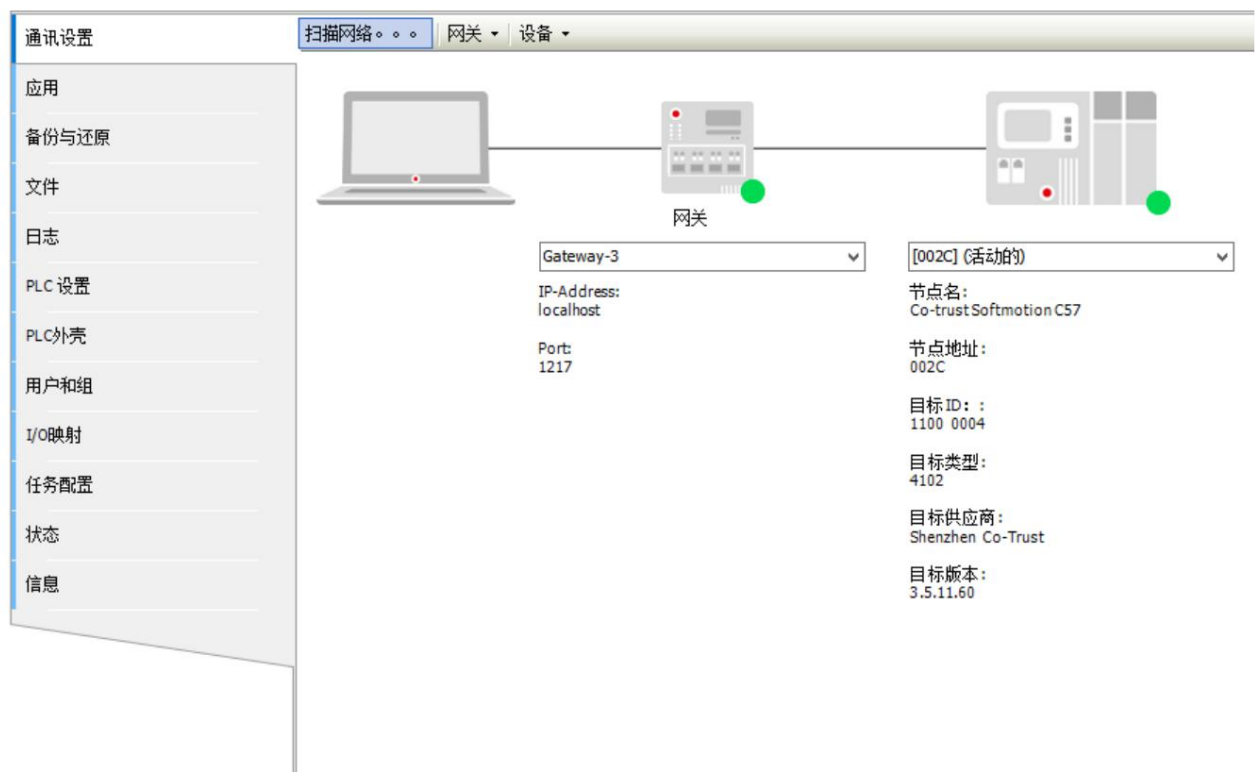
Double-click [Device] in the device view, and then click [Scan Network] in the [Communication Settings] tab.



Select the scanned device and confirm, and the device information will be displayed on the right.

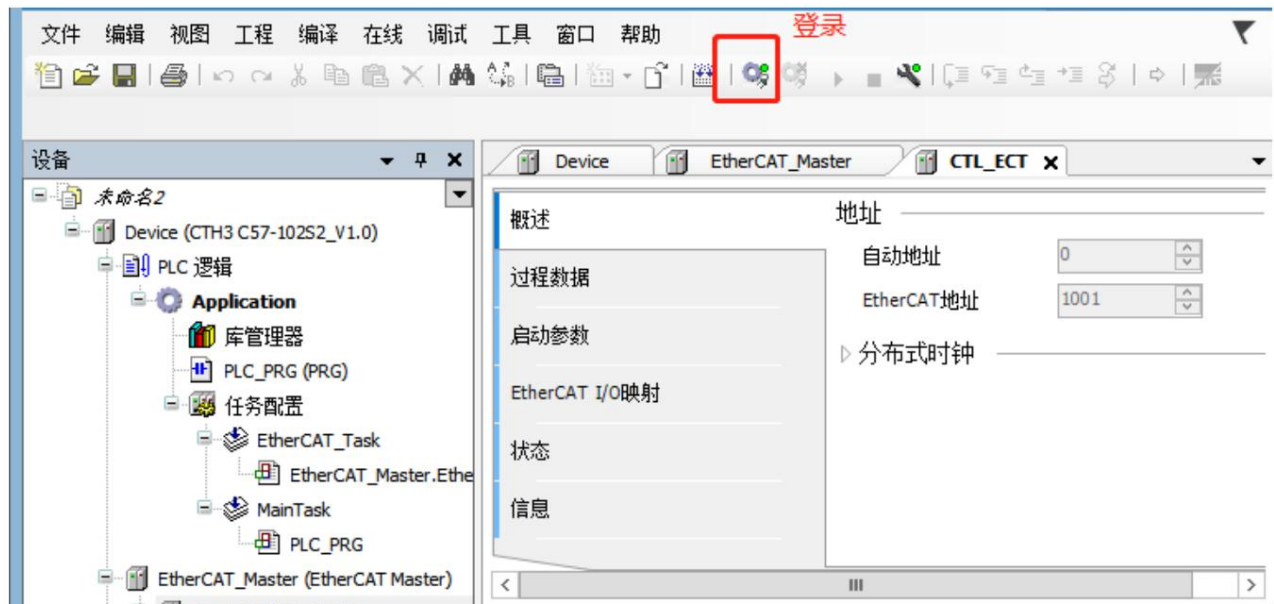


Return to the communication settings interface and you can see two green indicators, indicating that the communication channel is activated, that is, all communication-related operations are associated with this channel, and the device communicates successfully.

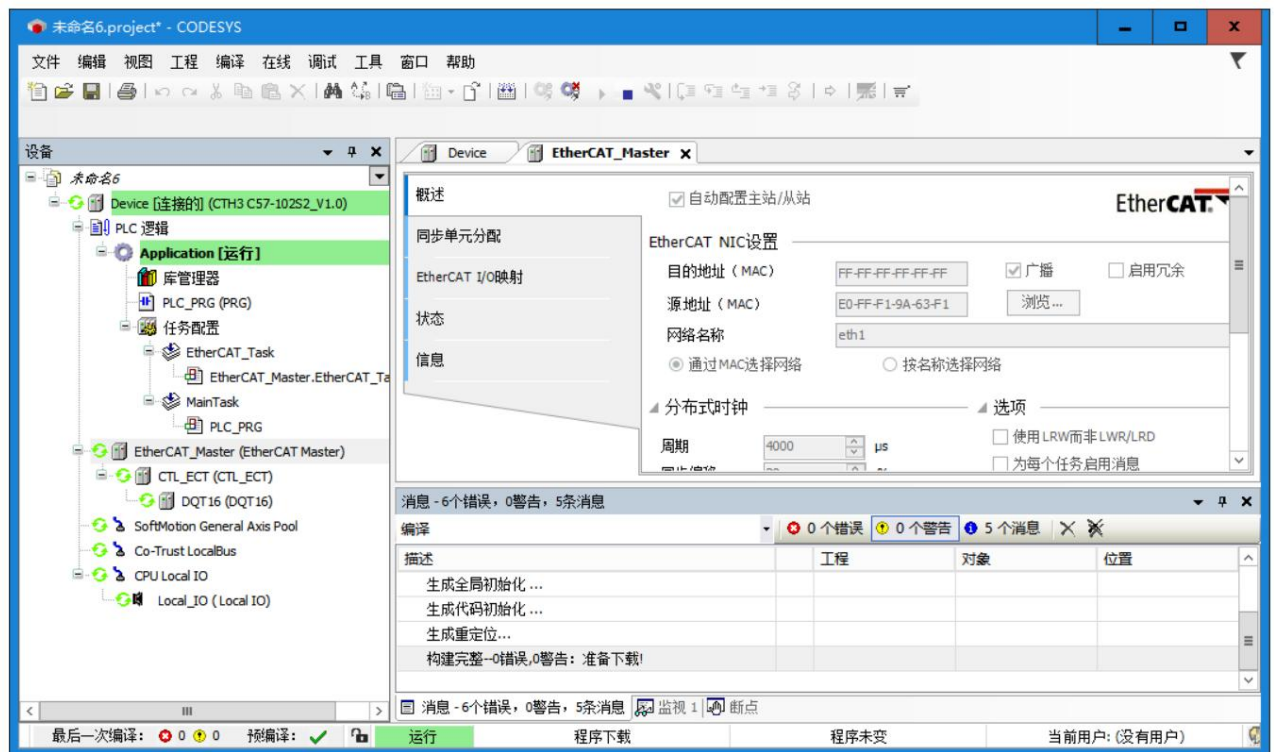


3.4.5 Step 5: Download, run and debug

1. Select the menu item [Online] y [Login...] or directly click the login icon to establish a connection between the application and C57-10 and enter the online state.

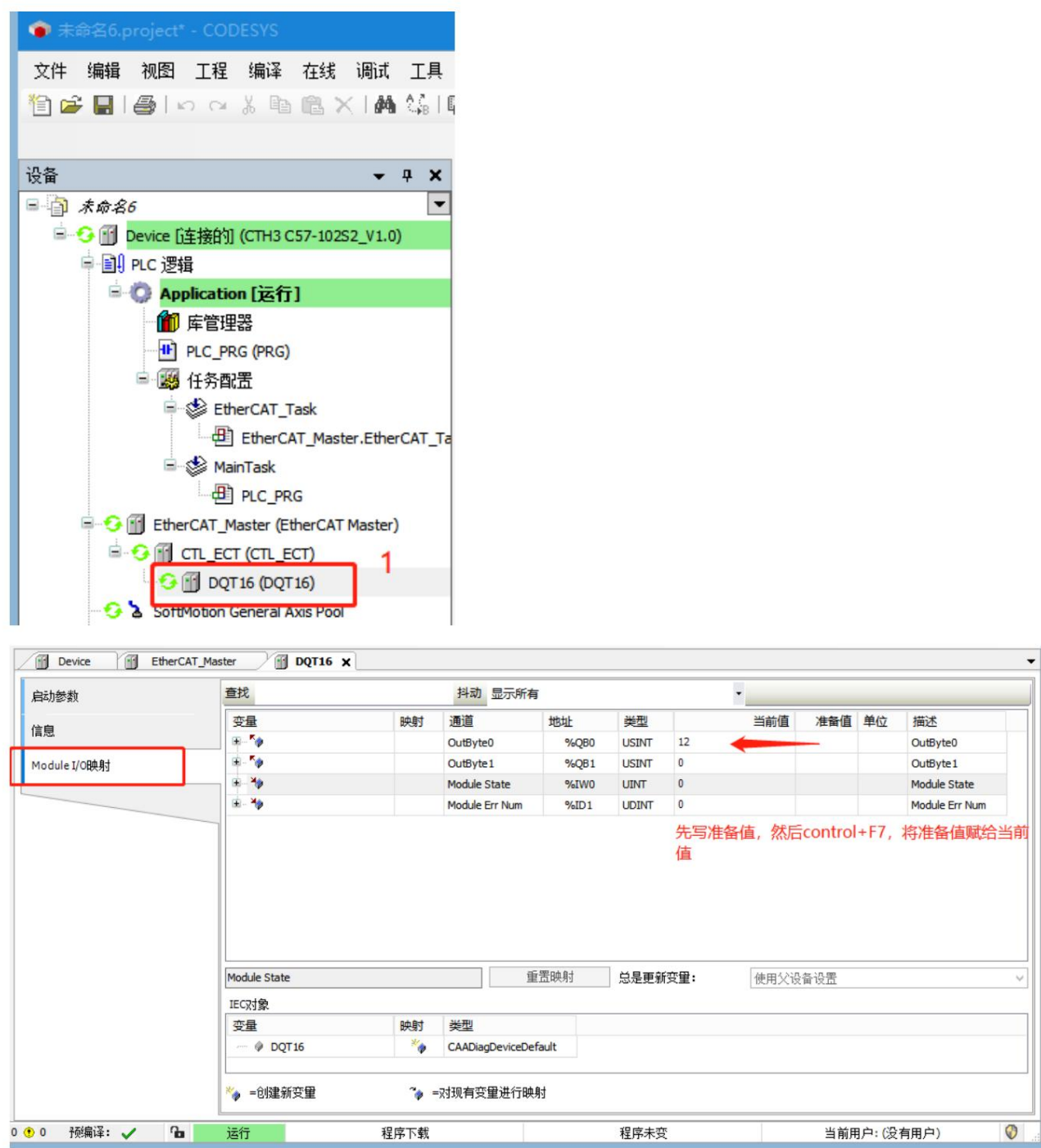


Then, select the menu item [Debug] y [Start] or directly click the run icon on the toolbar to start running the application in C57-10.



2. Monitor and debug the current project

In the digital output module DQT16 tab [Module I/O Mapping], assign values to the outputs and light up the output points Q0.2 and Q0.3. The operations are as follows:



A digital output module has 16 outputs. In the figure above, [Channel OutByte0] represents Q0.0~Q0.7, [Channel OutByte1] represents Q1.0~Q1.7. Therefore, to light up the output points Q0.2 and Q0.3, you only need to write 12 to the channel OutByte0.

Table 3-7 Parameter information related to I/O mapping

name	illustrate
DI-16 Input (InByte0) DI-16 Input (InByte1)	Digital input channel value (16#6x00) InByte0 represents the module's input channel byte 0 InByte1 represents the module's input channel byte
DQ-16 Ouput (OutByte0) DQ-16 Ouput (OutByte1)	1 digital output channel value (16#7x00) OutByte0 represents the output channel byte 0 of the module OutByte1 represents the module's output channel byte
Module State	1 Module status (16#8X02) 0x00: No error 0x01: Module busy

	0x02: No response due to timeout 0x03: Module type match 0x04: Module version mismatch 0x05: Software error 0x06: Waiting for flag timeout 0x07: Bus response error 0x08: Bus CRC check error 0x0E: Address not configured 0x10: Memory offset out of range 0x11: Module not ready 0x12: Module configuration error 0x13: Module does not support this instruction 0x15: Module internal diagnosis 0x16: Module has no power 0x17: Verification error
Module Err Num	Module error count (16#8X03)

3.5 CTL ECT and Beckhoff TwinCAT3 EtherCAT communication

This example uses TwinCAT3+CTL ECT+CTL DQT16 configuration to implement EtherCAT communication.

3.5.1 Step 1: Add CTL ECT description file to TwinCAT3

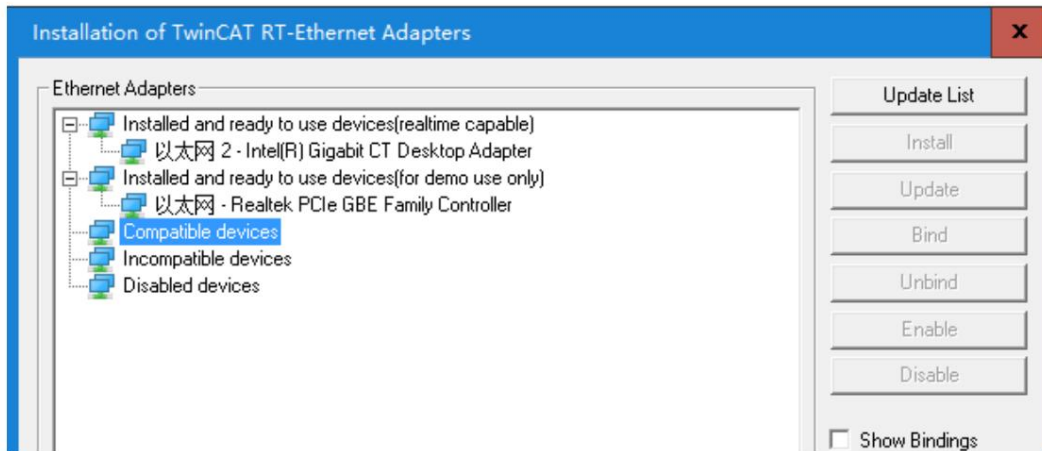
Simply copy the slave description file to the EtherCAT folder corresponding to the software installation directory to add the description file to TwinCAT3.

3.5.2 Step 2: EtherCAT Configuration

1. Check whether the network card driver is installed.



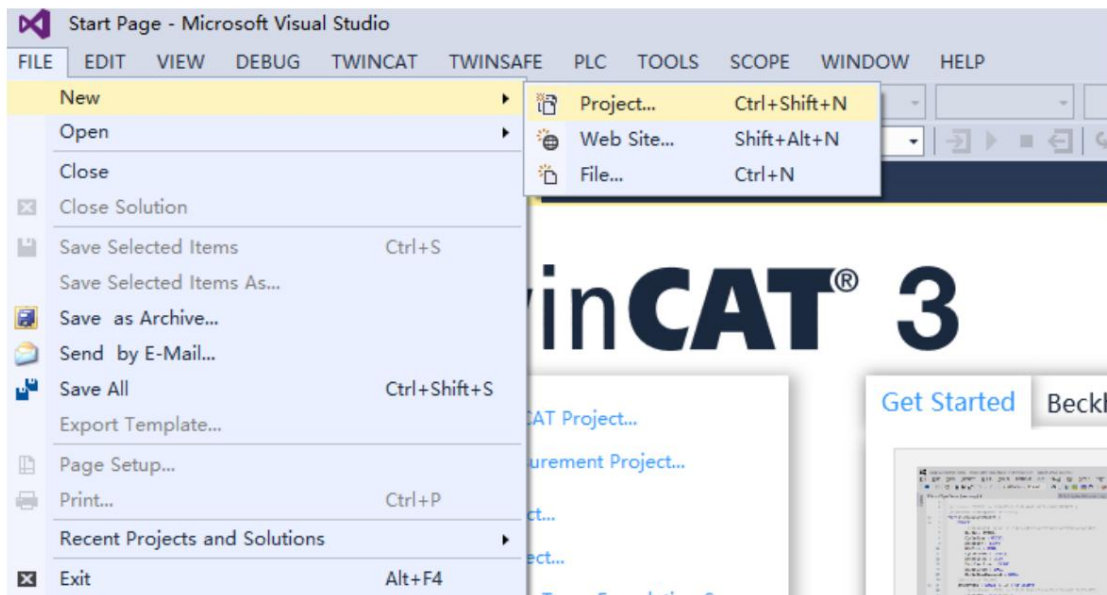
2. The following shows that the network card driver has been added.



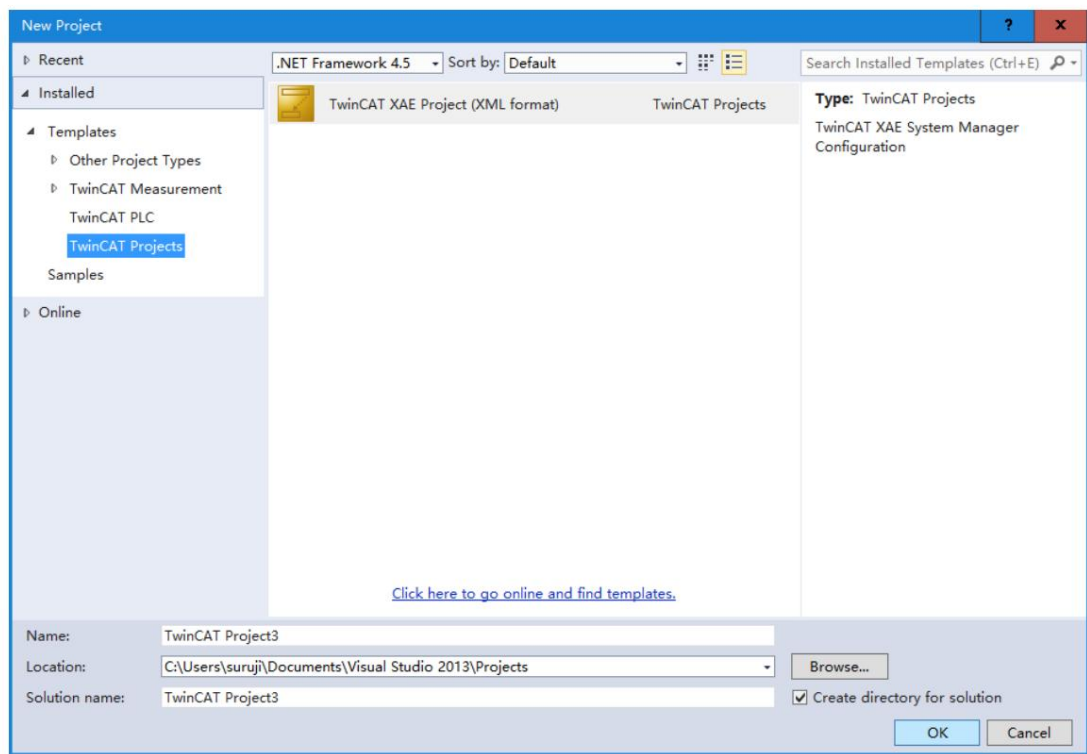
3. If there is no available network card under Install and ready to use devices, select the network card and click Install until the corresponding network card appears under Install and ready to use devices.

<Note>: The network card and the local computer network must be in the same network segment.

4. Create a new project in TwinCAT3, FLIEyNewyProject.

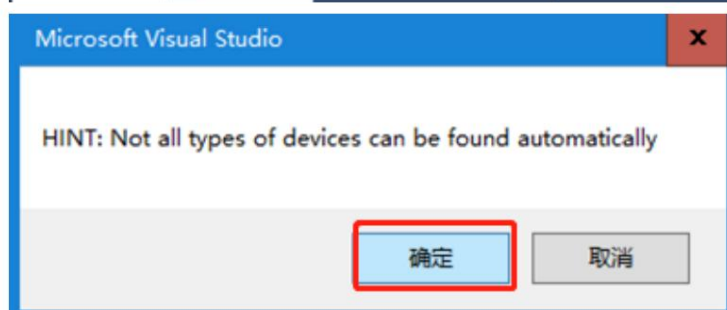
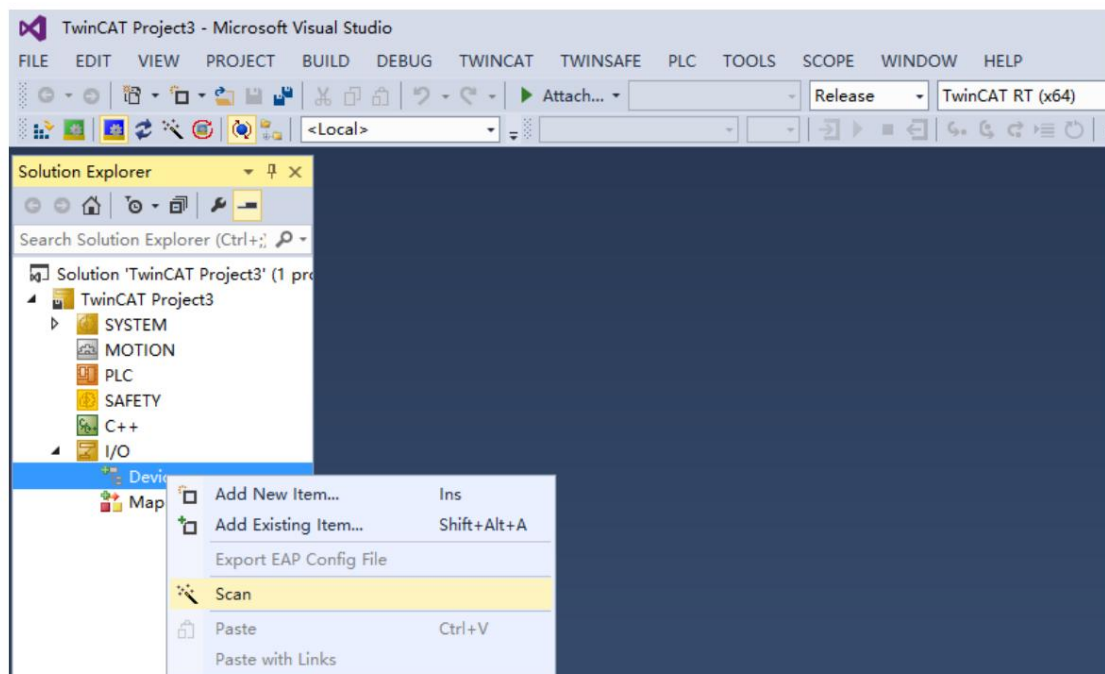


5. Select TwinCAT Projects OK

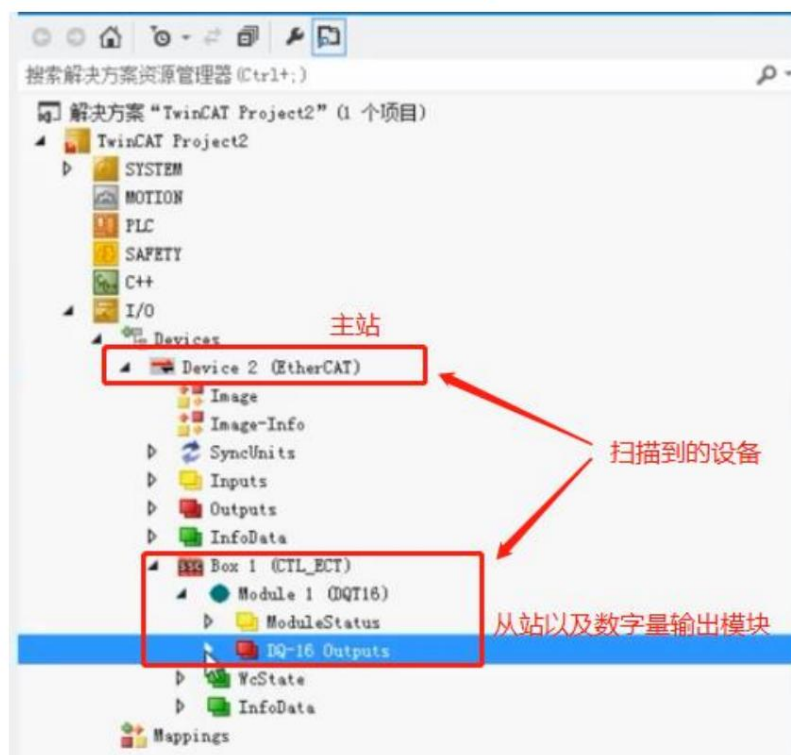
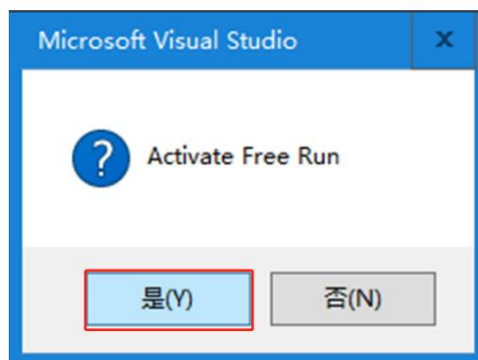
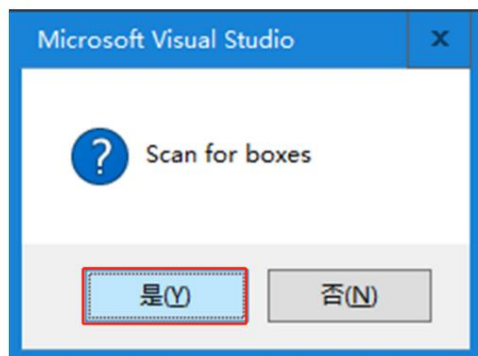
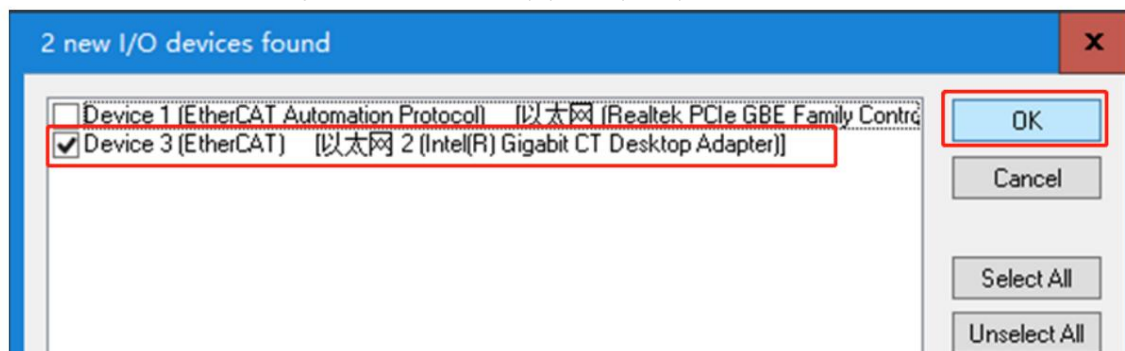


6. Perform hardware configuration. There are two ways to configure the hardware. One is to automatically identify the hardware by scanning the hardware and generate hardware IO; the other is to manually add and configure the hardware.

7 The following is the automatic hardware identification of scanning hardware. Before scanning the device, you need to connect the relevant hardware, otherwise the device cannot be scanned.

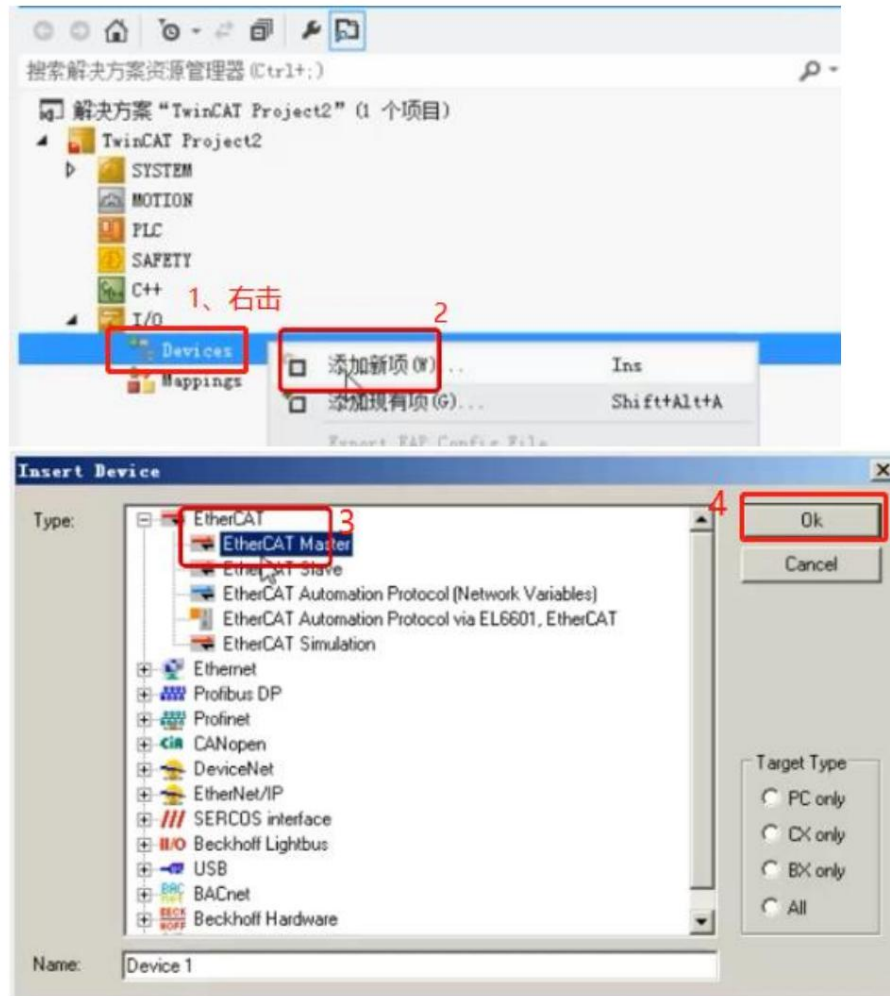


Select the scanned network card and configure the scanned device into the project. The specific operations are as follows:

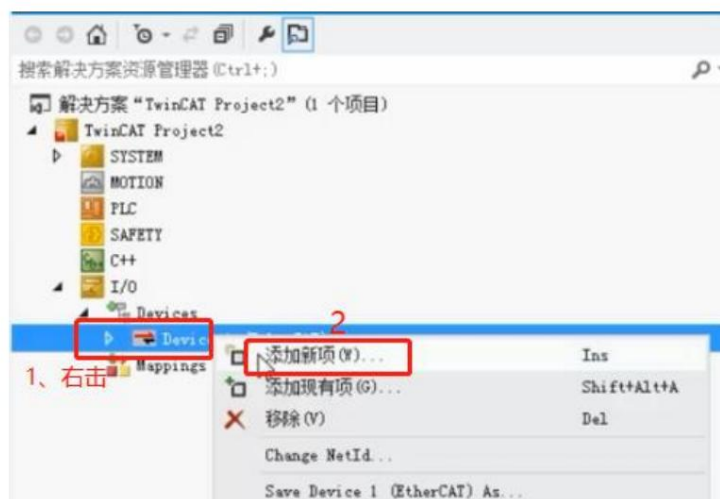


Manually add master-slave modules and digital output modules

Add a master site



Add CTL ECT slave



Adding a digital output module

The first screenshot shows the 'TwinCAT Project2' window with the 'Slots' tab selected. A red box labeled '1' highlights the 'Box 1 (CTL_ECT)' under 'I/O' in the left sidebar. A red box labeled '2' highlights the 'Slots' tab in the top menu. A red box labeled '3' highlights the 'Node' in the 'Slot' list.

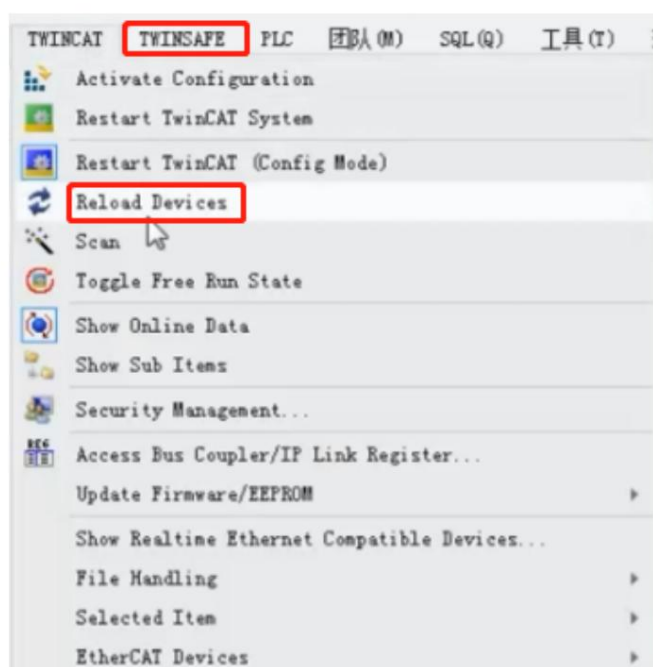
The second screenshot shows the 'Module' list with a red box labeled '4' highlighting the 'DQT16 0x00000003 DQT16' module.

The third screenshot shows the 'Slots' tab with a red box highlighting the 'Node' and 'Module' columns, showing 'DQT16' and '0x00000003' respectively.

添加完毕的数字量模块

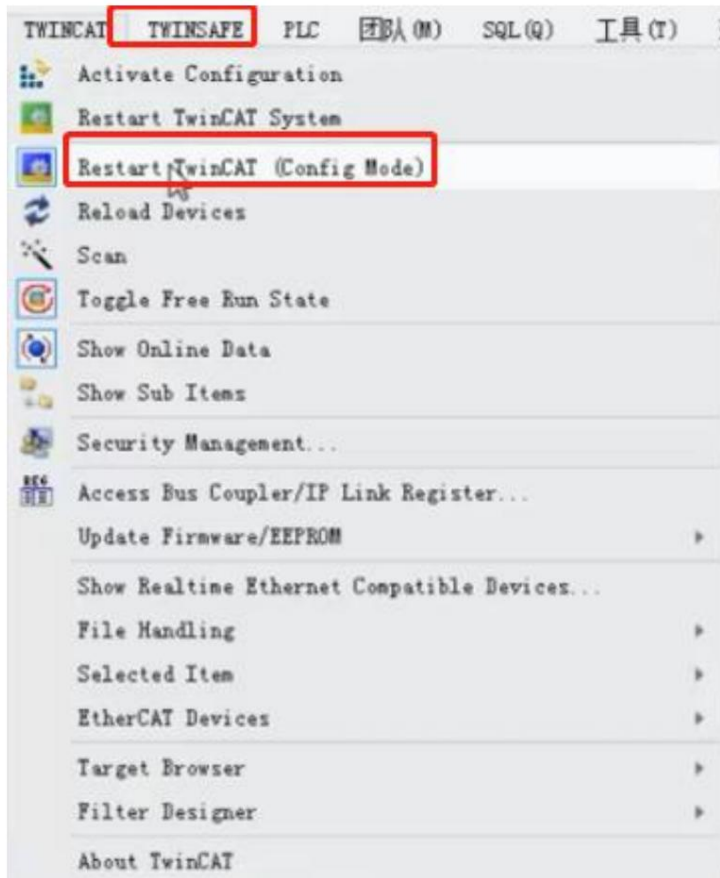
3.5.3 Step 3: Download and run

1. Download the project to PLC

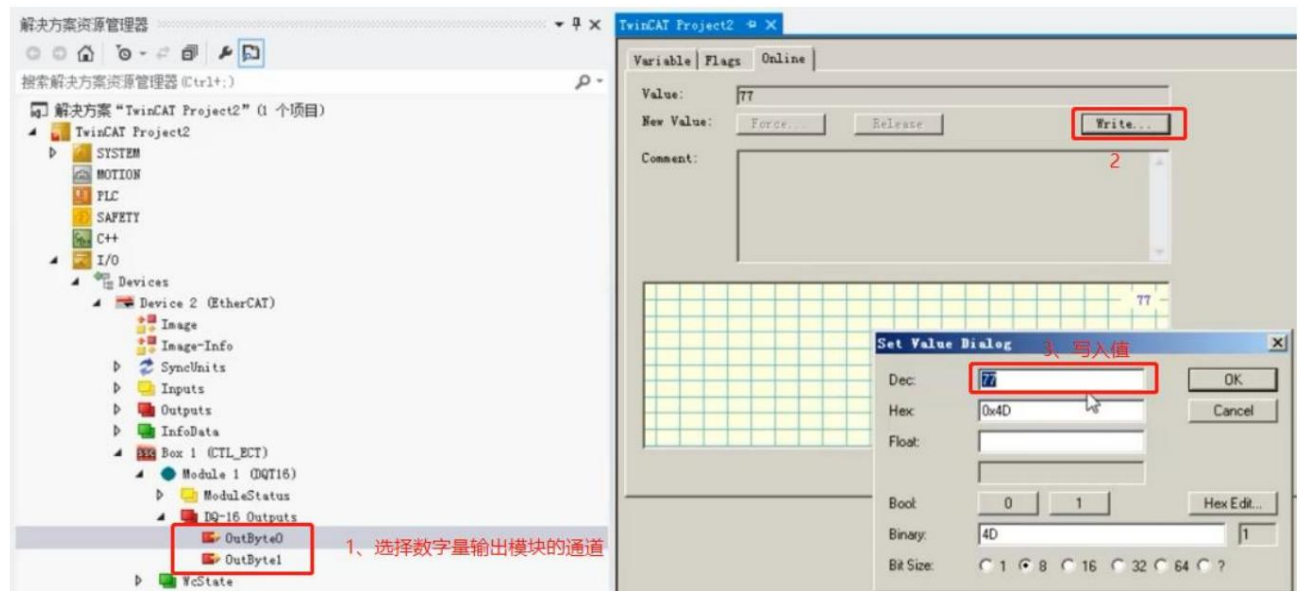




2. Run PLC



3. Change the channel value of the corresponding module online.



3.6 CTL ECT and Beckhoff TwinCAT2 for EtherCAT communication

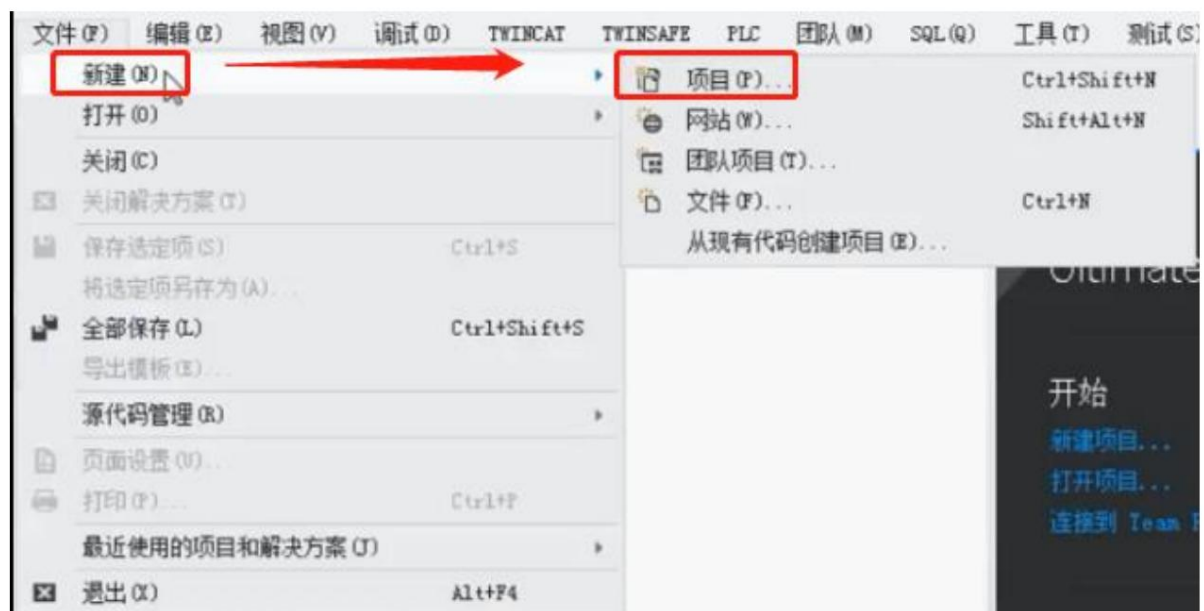
This example uses TwinCAT2+CTL ECT+CTL DQT16 configuration to implement EtherCAT communication.

3.6.1 Step 1: Add CTL ECT description file to TwinCAT2

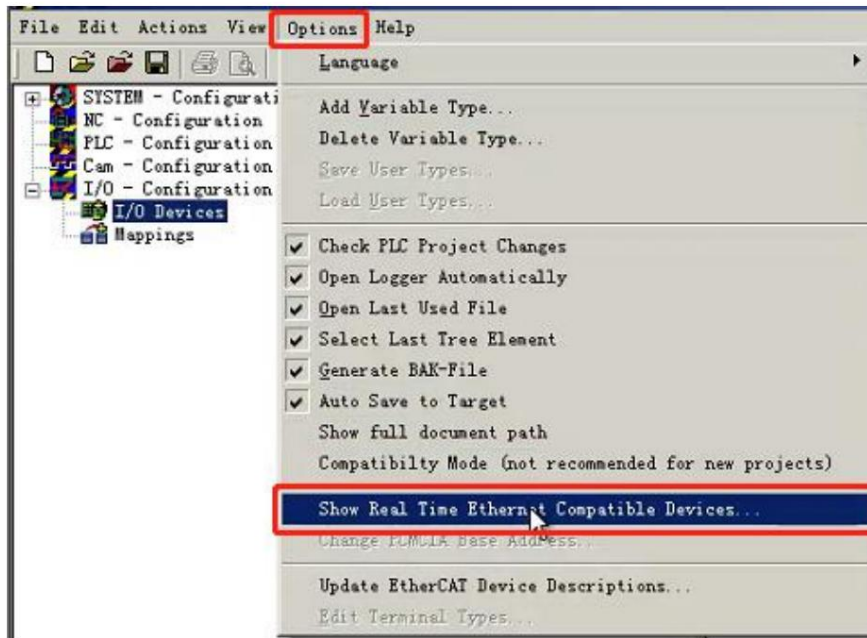
Simply copy the slave description file to the EtherCAT folder corresponding to the software installation directory to add the description file to TwinCAT2.

3.6.2 Step 2: EtherCAT Configuration

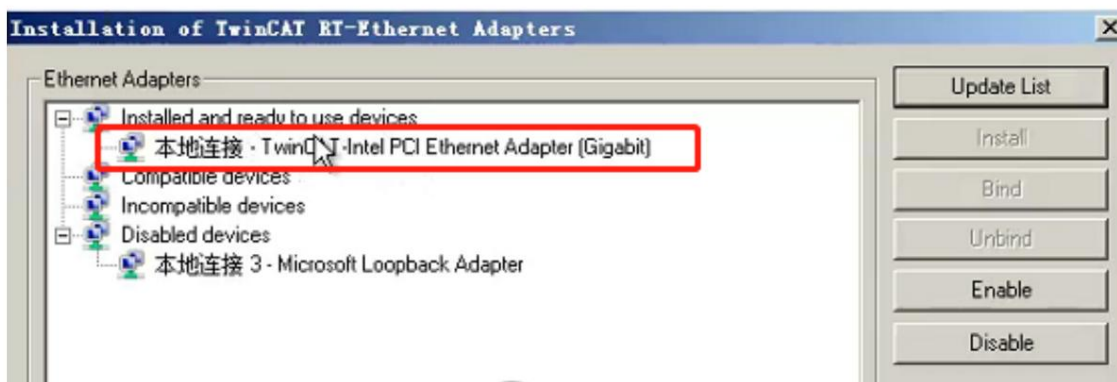
1. Create a new project in TwinCAT2



2. Check whether the network card driver is installed.



The following shows that the network card driver has been added.



3. If there is no available network card under Install and ready to use devices, select the network card and click Install until the corresponding network card appears under Install and ready to use devices.

<Note>: The network card and the local computer network must be in the same network segment.

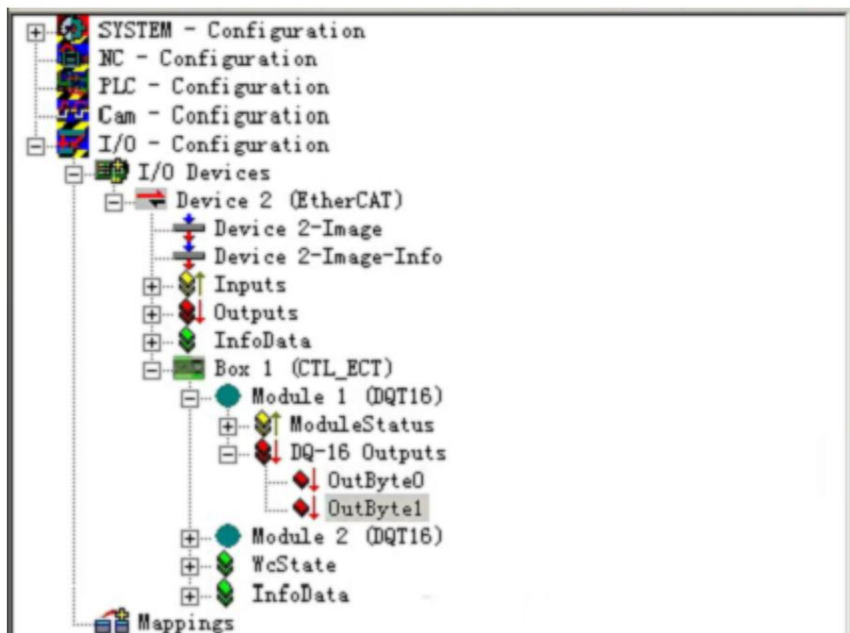
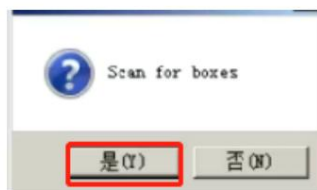
4. Perform hardware configuration. There are two ways to configure the hardware. One is to automatically identify the hardware by scanning the hardware and generate hardware IO; the other is to manually add and configure the hardware.

The following is the automatic hardware identification of scanning hardware. Before scanning the device, you need to connect the relevant hardware, otherwise the device cannot be scanned.



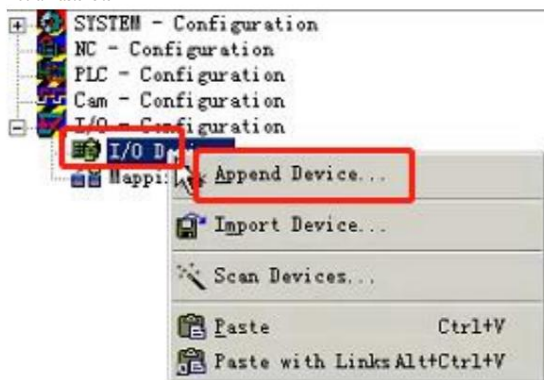


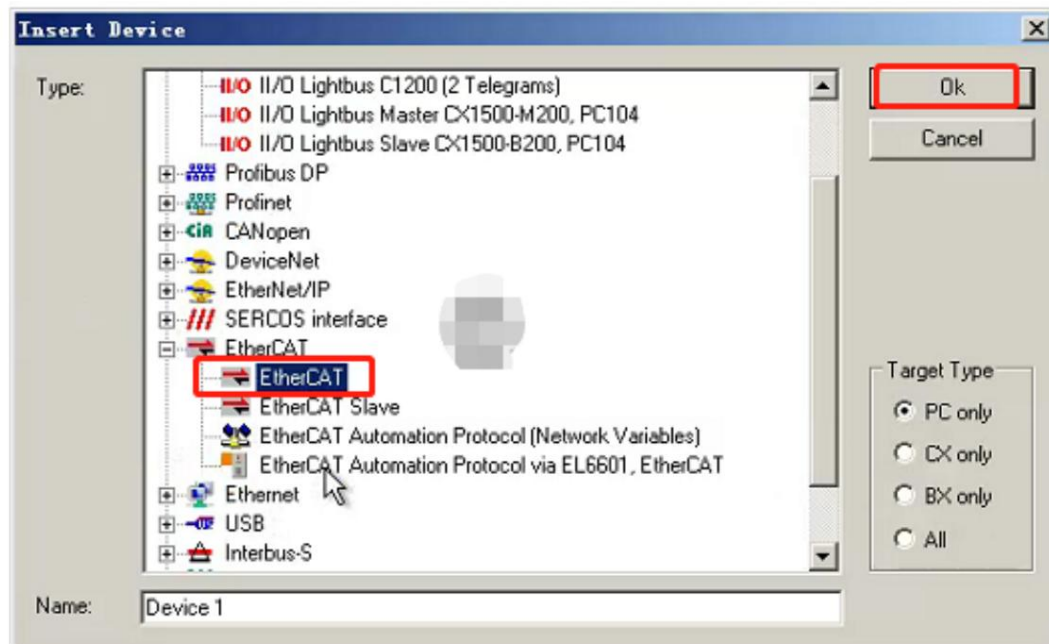
Select the scanned network card and configure the scanned device into the project. The specific operations are as follows:



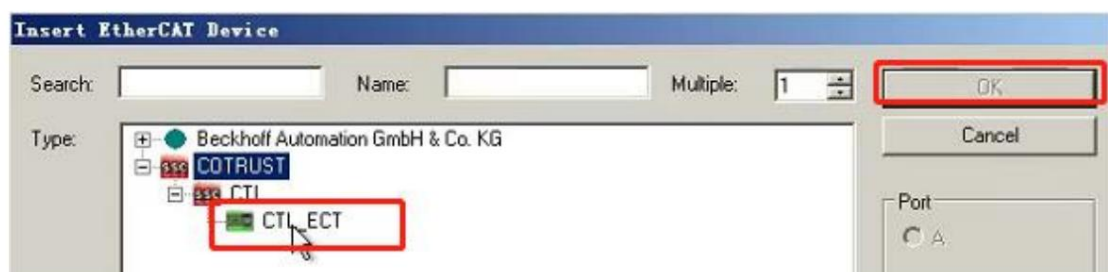
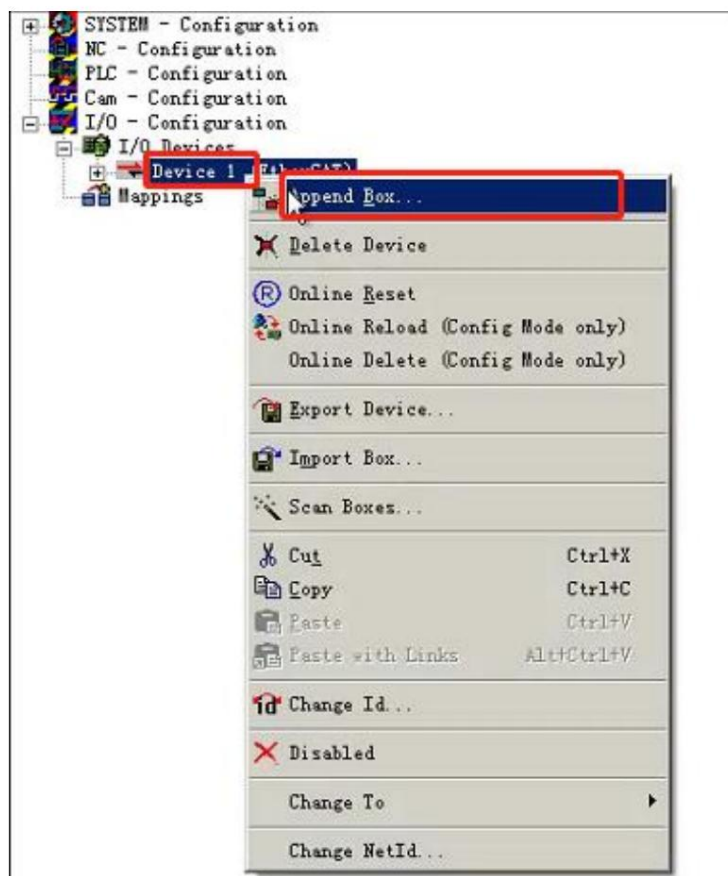
Manual configuration of master and slave modules and digital output modules

Add a master site

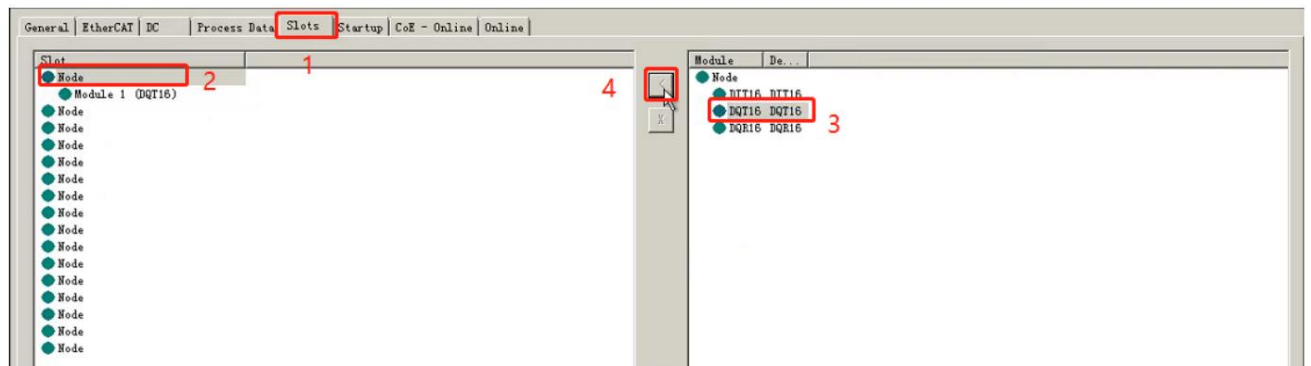




Add CTL ECT slave



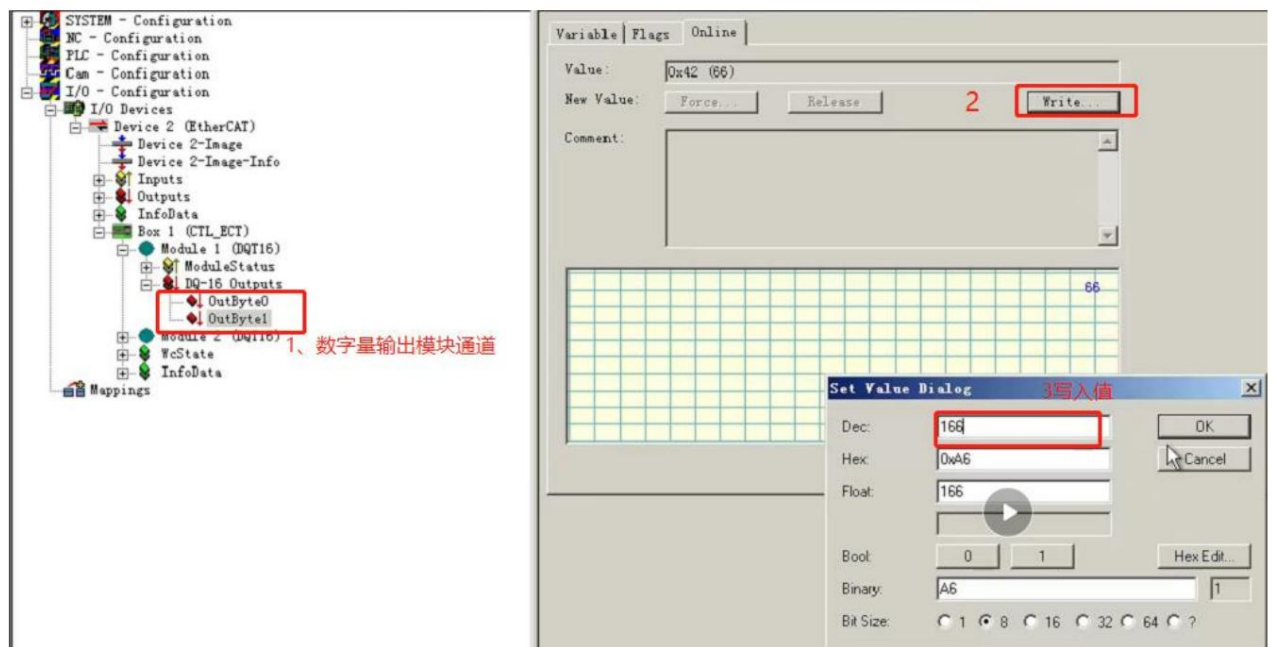
Adding a digital output module



3.6.3 Step 3: Download and run

1. Click the download icon to download the configuration to the PLC. Select OK for all the options that appear during the download process.

2. Change the channel value of the corresponding module online.

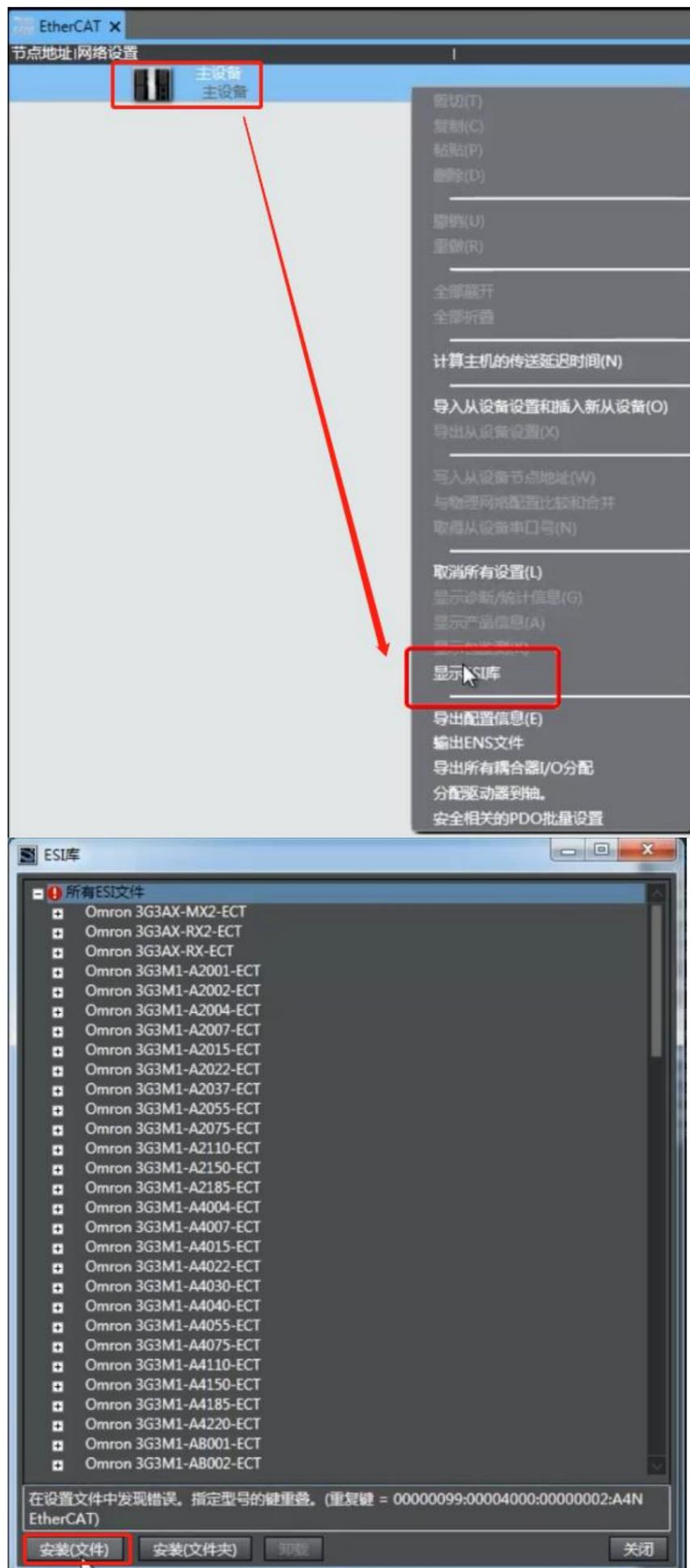


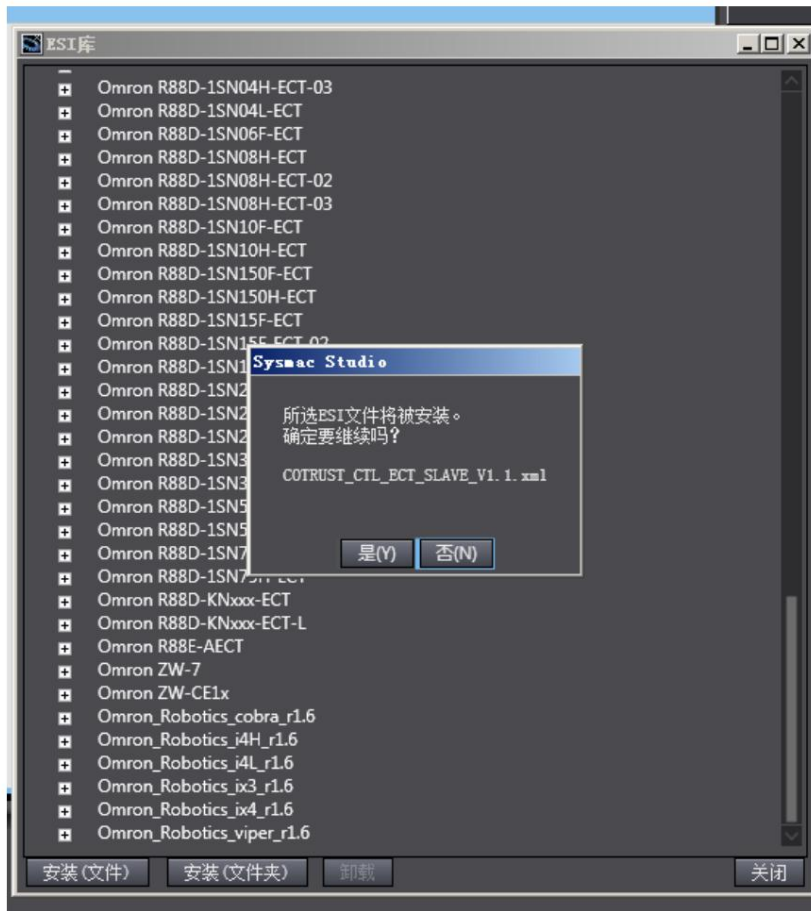
3.7 CTL ECT and Omron PLC communicate via EtherCAT

In this example, NX1P2-1140DT+CT ECT+CTL DQT is used to implement EtherCAT communication.

3.7.1 Step 1: Add CTL ECT description file

1. Enter the EtherCAT configuration interface, right-click [Master Device], click [Show ESI\Install (File)], find the description file and directly add the EtherCAT slave description file.





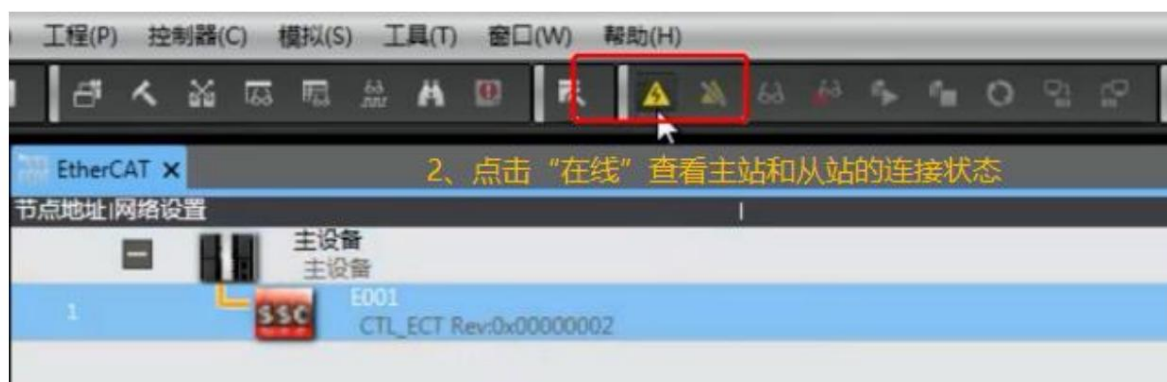
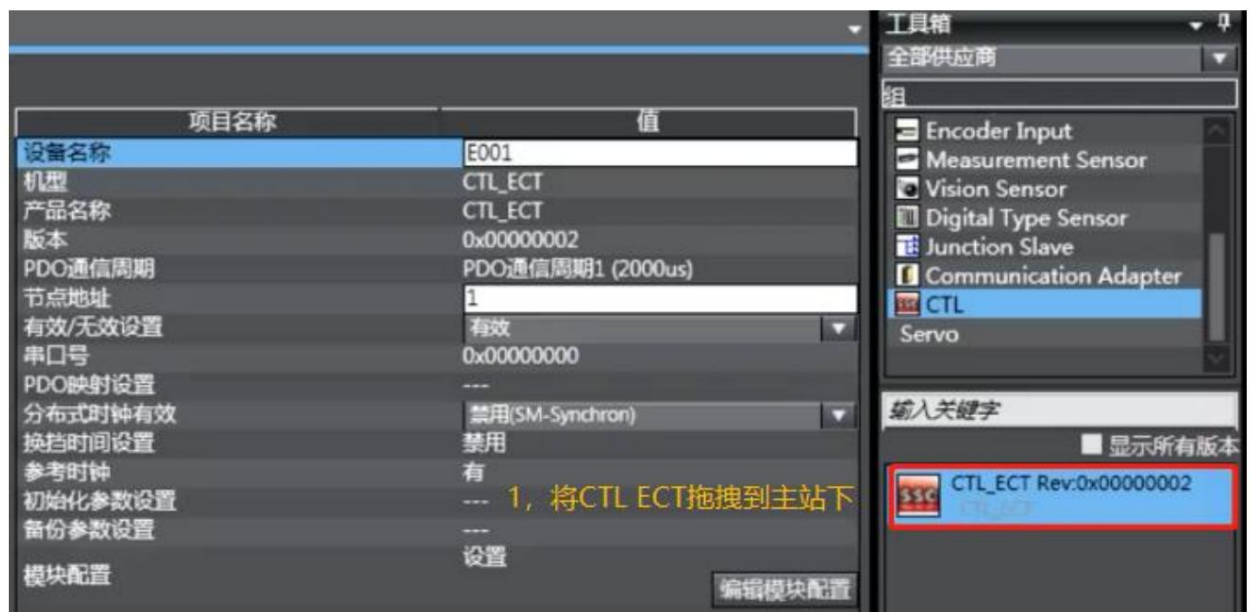
2. After the description file is installed, you can see the CTL ECT device in the toolbox. Note:

The version detection method should be set to: Do not check.



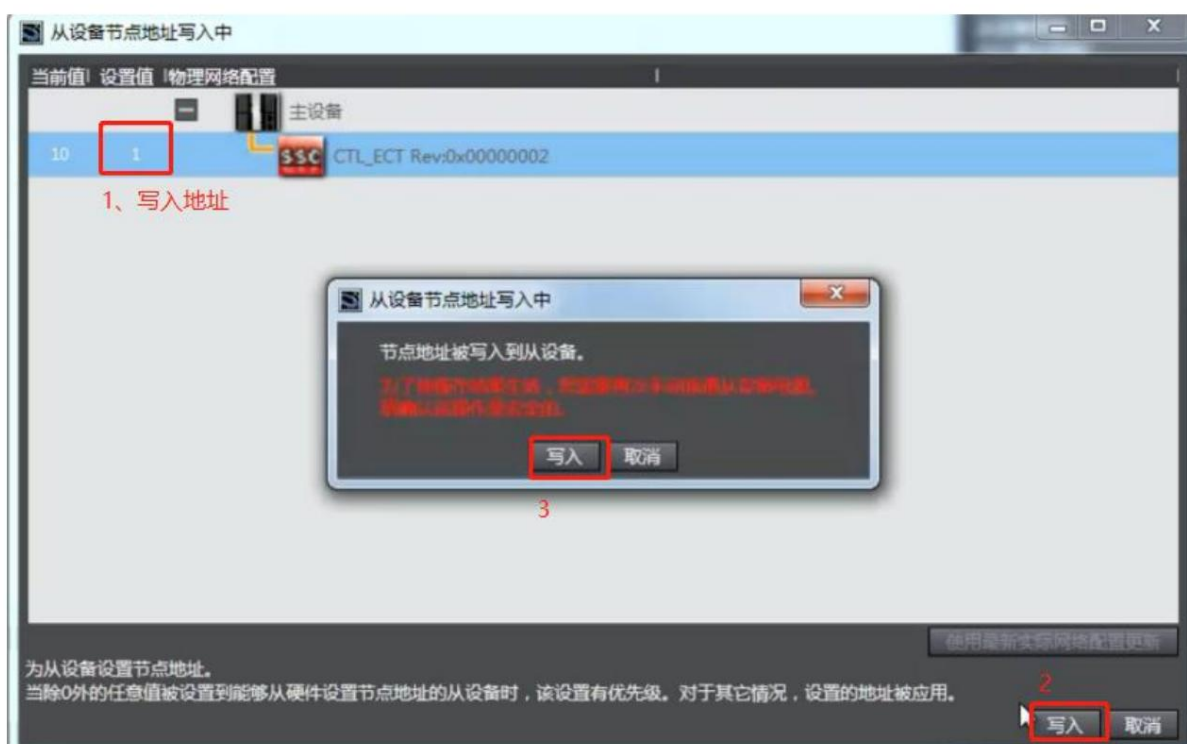
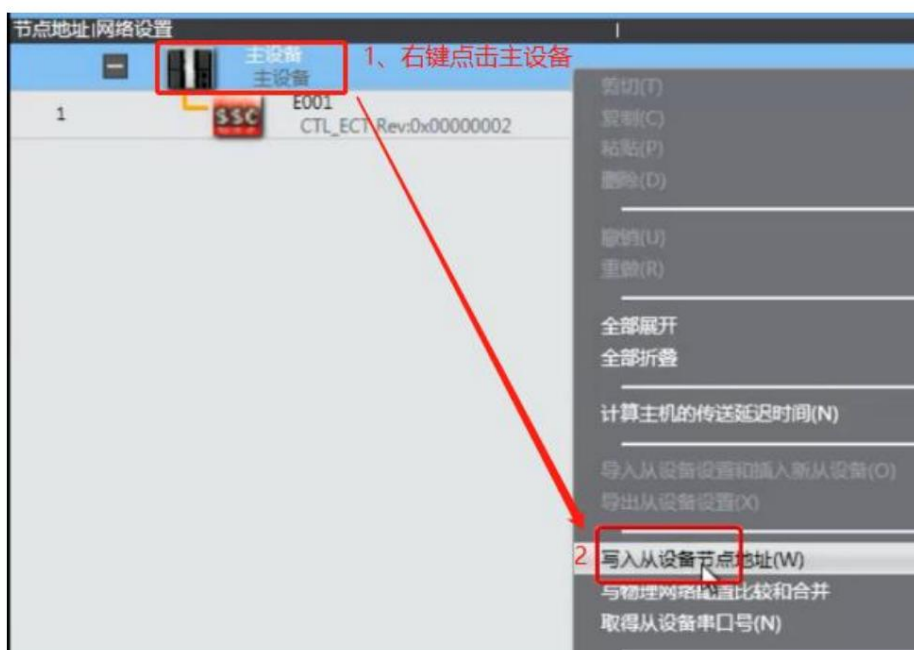
3.7.2 Step 2: Synchronize actual hardware connections for configuration

1. Configure the EtherCAT slave station CTL ECT and the digital output expansion module DQT in the EtherCAT configuration interface.



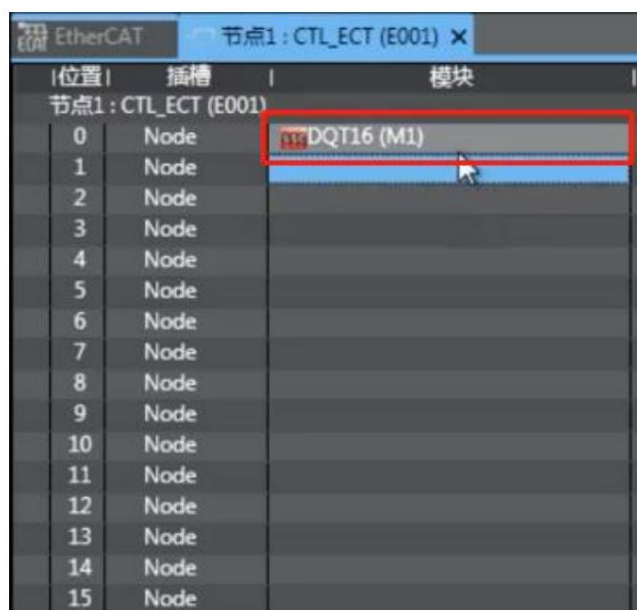
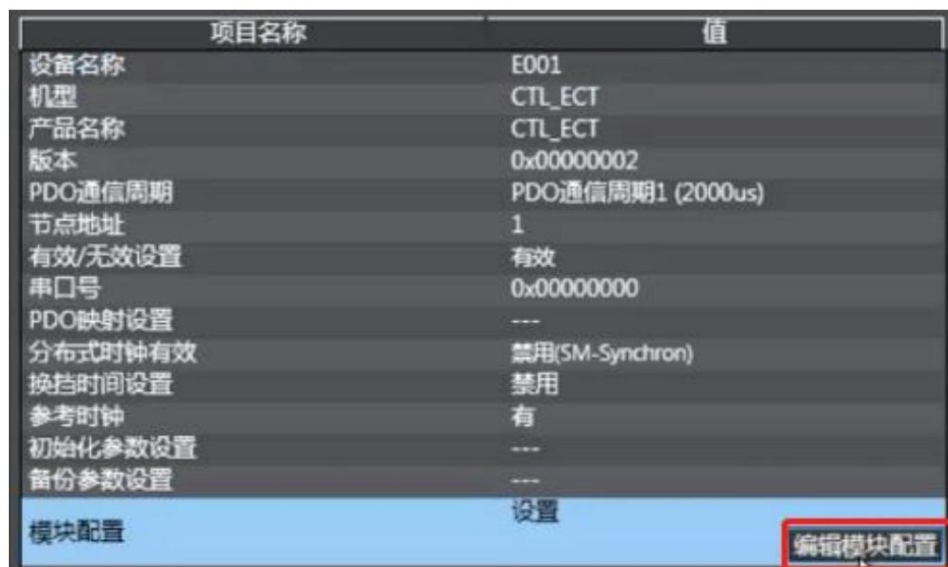
2. If communication fails, check whether the actual address of the module is consistent with the configured node address. If the addresses are inconsistent, modify the module address.

项目名称	值
设备名称	E001
机型	CTL_ECT
产品名称	CTL_ECT
版本	0x00000002
PDO通信周期	PDO通信周期1 (2000us)
节点地址	1
有效/无效设置	有效
串口号	0x00000000
PDO映射设置	---
分布式时钟有效	禁用(SM-Synchron)
换挡时间设置	禁用
参考时钟	有
初始化参数设置	---
备份参数设置	---
模块配置	设置



3. Restart the slave station so that the written address will take effect.

4. Click CTRL ECT in the EtherCAT configuration interface, add the digital output expansion module DQT and edit the configuration.



5. Click IO Mapping to assign digital output module addresses.



3.7.3 Step 3: Download, run and monitor

1. Download the configured project to the main control module



2. Write a value to the output channel and you can see that the indicator light on the digital output module will light up.

EtherCAT 节点1: CTL_ECT (E001) I/O 映射							
位置	端口	说明	R/W	数据类型	值	变量	
节点1 插槽0	EtherCAT网络配置						
	CTL_ECT						
	DQT16						
	ModuleStatus_Module State_8002_		R	UINT	0		
	ModuleStatus_Module Err Num_80		R	UDINT	0		
	DQ-16 Outputs_OutByte0_7000_01		W	USINT	255		O10
	DQ-16 Outputs_OutByte1_7000_02		W	USINT	56		O20
	CPU/扩展机架						
Built-in I/O	内置I/O设置						
OptionBoard	选项板设置						
NXBusMaster	NX总线主机						

Installation

This chapter mainly introduces the installation of CTL series products, including the installation instructions and installation dimensions of the products.

4.1	Installation Environment Requirements
4.2	Installation dimensions
4.3	Installation Method

4.1 Installation Environment Requirements

Installation environment requirements:

Isolate PLC from heating devices, high voltages and electronic noise

When installing equipment components, separate equipment that generates high voltage and high electronic noise from the CTL series PLC.

When arranging the CTL series PLC on the back panel of the control cabinet, you should consider arranging the electronic components in the lower temperature area of the control cabinet, because long-term operation of electronic components in a high temperature environment will shorten their trouble-free time.

The backplane wiring of the control cabinet should be considered, and try to avoid designing AC power lines, high-energy, high-switching frequency DC signal lines, low-voltage signal lines, and communication cables in the same cable duct.

Leave adequate space for heat dissipation and wiring

The design of CTL series PLC adopts natural convection cooling. There must be at least 30mm of space above and below the module to facilitate normal heat dissipation. The distance between the front panel and the back panel should also be kept at least 80mm.

4.2 Installation dimensions

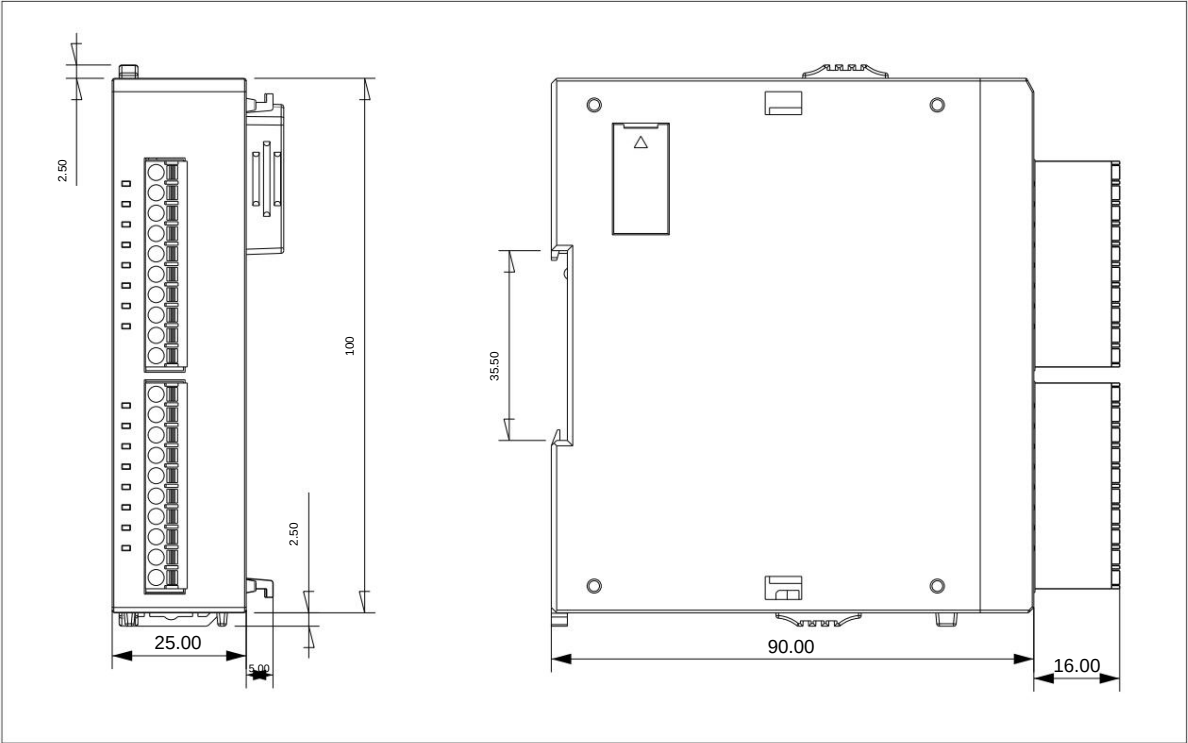


Figure 1-1 Dimensions of digital expansion module, unit: mm

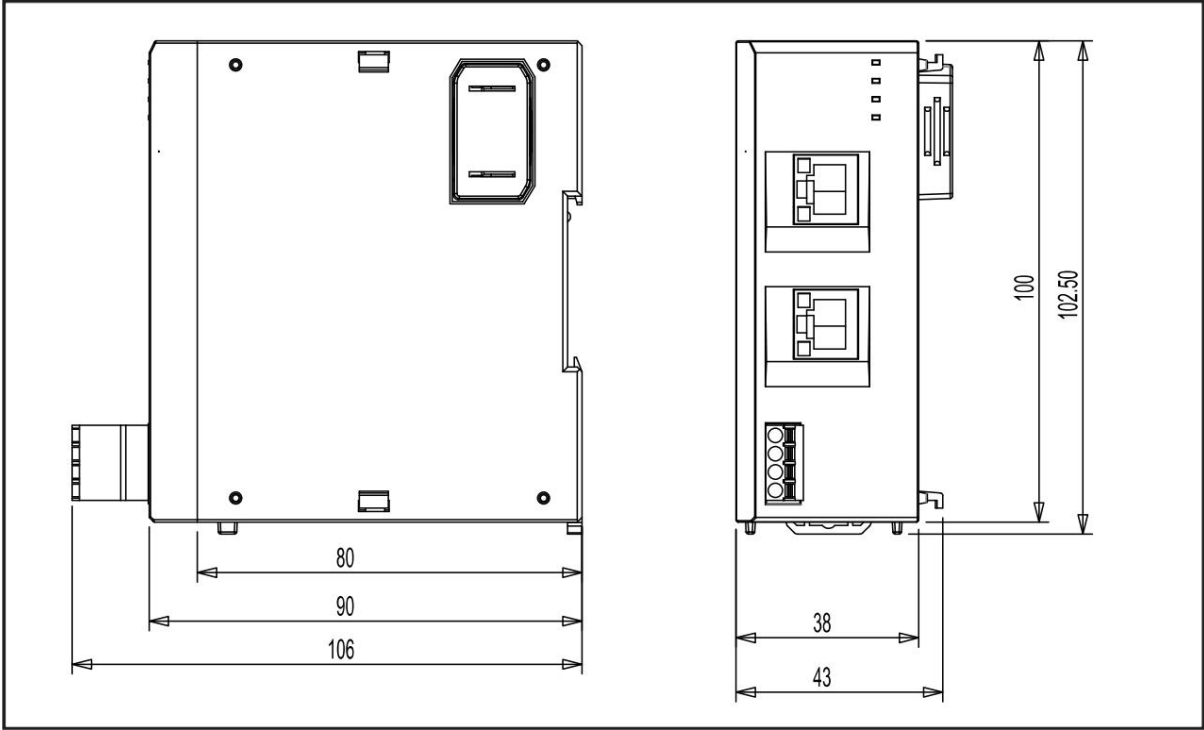


Figure 1-2 PN, ECT expansion module, unit: mm

4.3 Installation Method

Installation Notes

Before installing or removing the PLC and its related equipment, make sure that the power supply to the PLC and its connected equipment has been cut off.



Warning
If power supplies are not cut off and PLC and related equipment are installed or removed while power is on, electric shock or equipment malfunction may occur, resulting in equipment damage or serious personal injury or even death.

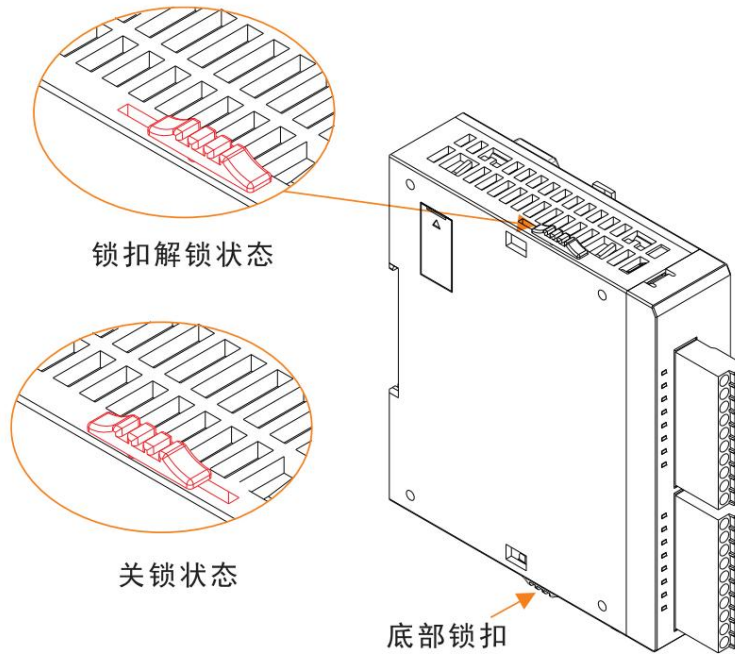
When replacing or installing a PLC, make sure you use the correct or equivalent module. When replacing, in addition to using the same module, make sure the orientation and location of the installation are correct.



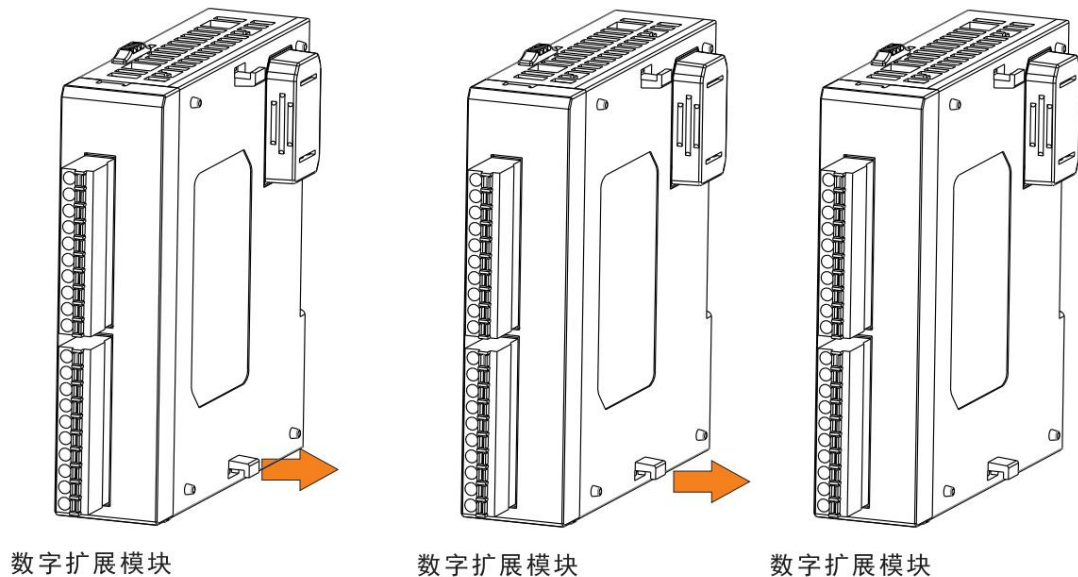
Note If you install an incorrect module, the PLC program may not function correctly.

Installation Steps

Step 1: Unlock the module head and bottom locks



Step 2: Align and connect the buckles on each module



Step 3: Fix the rail to the back panel, open the DIN clip at the bottom of the module, and clip the back of the module onto the DIN rail.

Step 4: Close the DIN clip

Step 5: Lock all the locks of each module.

Step 6: Check whether the DIN clip on the module fits tightly with the DIN rail.

Dismantle each module

Step 1: Make sure all modules are powered off.

Step 2: Remove all connections and cables from the module.

Step 3: Unlock the module, open the DIN clip, and remove the module.

Appendix

5.1	Ordering information
5.2	Power Budget
5.2	After-sales maintenance

5.1 Ordering information

Table 5-1 Product ordering information list

Order Number	Specifications
CTL ECT	CTL series EtherCAT slave module, can be expanded to 16 CTL series I/O modules at most
CTL PN	CTL series Profinet slave module, can be expanded to 16 CTL series I/O modules at most
CTL DIT16	CTL series digital input module, 16 input points, 24V DC.
CTL DQT16	CTL series digital output module, 16-point transistor sink output, 24V DC, 0.5A.
CTL DQR16	CTL series digital output module, 16-point relay output, 24V DC, 2A.

5.2 Power Budget

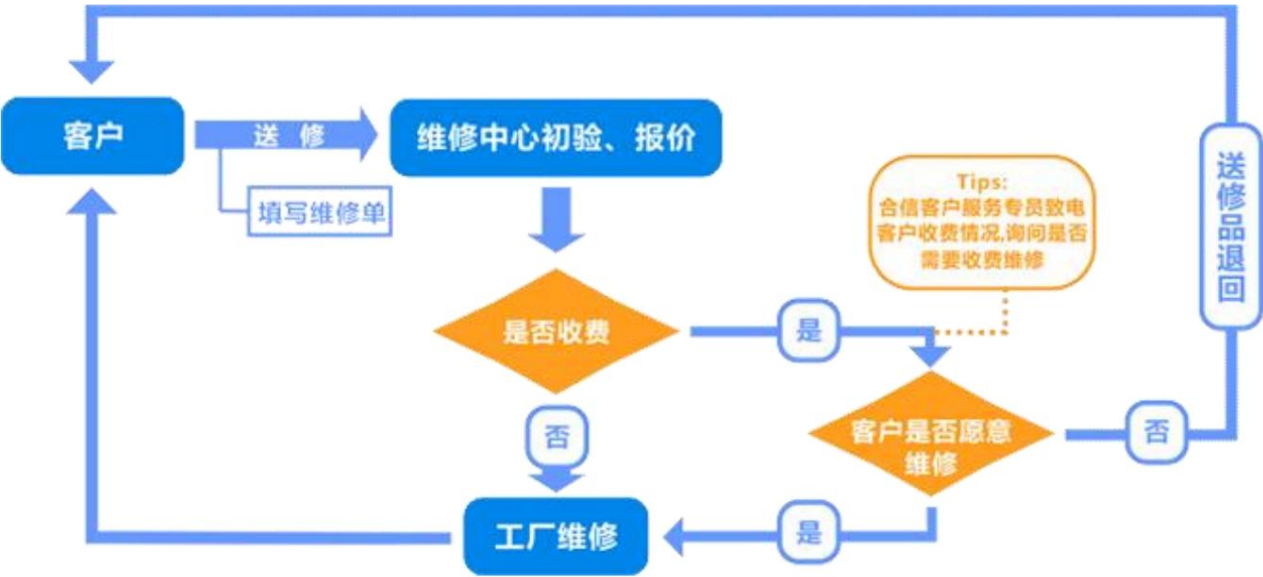
Table 5-2 Bus current consumption

Modules	24V DC expansion bus current consumption	24V DC bus supply current
CTL DIT16	25mA	--
CTL DQT16	25mA	--
CTL DQR16	15mA	--
CTL ECT	--	500mA
CTL PN	--	500mA

Module current consumption (with 16 modules): 400mA

5.3 After-sales maintenance

After-sales maintenance process



Maintenance precautions:

- 1) Please be sure to attach a repair list with the product you are sending for repair;
- 2) Before shipping the product, please back up and save the product program parameters yourself. Repair will clear all product data;
- 3) Please be sure to send the returned product and repair order directly to our after-sales maintenance center. The shipping fee will be borne by the customer.
- 4) To ensure the integrity of the product, please pack the product well when sending it for repair, and ensure that it can withstand the adverse effects caused by long-distance transportation;
- 5) Our repair center will provide initial inspection feedback within 3 working days of receiving the repair parts. If you do not receive initial inspection feedback one week after the repair product is sent out, please call us to inquire to avoid delays in your work due to product mailing, fax confirmation, etc.

Warranty Statement

Shenzhen Hexin sincerely provides all customers with comprehensive after-sales service guarantees, including:

- 1) Provide 24 months of free warranty service for PLC products from the date of leaving the factory;
- 2) Provide 24 months of free warranty service for building control products from the date of leaving the factory;
- 3) Provide 18 months of free warranty service for servo drive products from the date of leaving the factory;
- 4) Provide 18 months of free warranty service for servo motor products from the date of leaving the factory;
- 5) Provide 18 months of free warranty service for HMI products from the date of leaving the factory;
- 6) Provide paid repair services for man-made damage and out-of-warranty products.

For detailed after-sales maintenance services, please call: 0755-86226822-6601 (Ms. Liu), or call the service hotline 400-700-4858.

Repair List

Repair company: _____

Repair address: _____

Repair person: _____ Telephone: _____ fax: _____

Serial number	model	Serial Number	Fault phenomenon	Remark
1				ÿGeneral repairÿInspectionÿUpgrade
2				ÿGeneral repairÿInspectionÿUpgrade
3				ÿ General repair ÿ Inspection ÿ Upgrade class
4				ÿGeneral repairÿInspectionÿUpgrade
5				ÿGeneral repairÿInspectionÿUpgrade
6				ÿGeneral repairÿInspectionÿUpgrade
7				ÿGeneral repairÿInspectionÿUpgrade
8				ÿGeneral repairÿInspectionÿUpgrade
9				ÿGeneral repairÿInspectionÿUpgrade
10				ÿGeneral repairÿInspectionÿUpgrade
11				ÿGeneral repairÿInspectionÿUpgrade
12				ÿGeneral repairÿInspectionÿUpgrade

Agent's seal:

(Stamp is valid)



邮寄地址

收件地址：广东省东莞市大朗镇杨涌村杨新路240号
收件人：售后维修部
联系电话：0769-82220668-7015
邮编：523770



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Release date: 7/2023

Document number: CTM 1-LE202 3

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