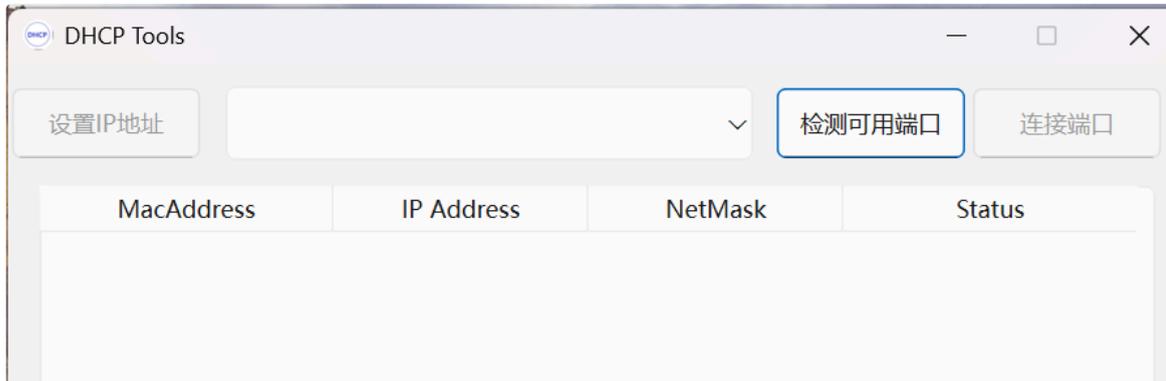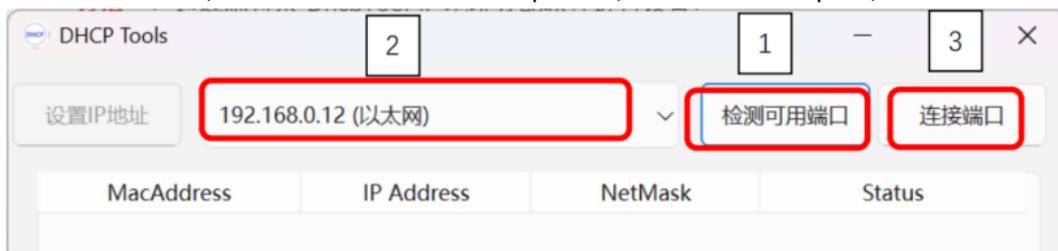1.Set the IP address of the Sentinel Modbus TCP IO–LINK master module.

Method 1： Set the IP address via Sentinel "DhcpTool" IP assignment software：
① First, download "DhcpTool V1.2" from the Sentinel official website and install it (Windows 10 or above only). Then open the software.

② Connect the Sentinel Modbus TCP IO–LINK master module to the PC. Then set the module IP rotary switches to "0XFF" (set ADDR_H = F and ADDR_L = F on the right side; refer to the manual), which means: DHCP mode — after power–on, the module keeps waiting for IP assignment.
After setting the switches, power–cycle the module. At this time, the module BUS red LED will flash.
In the software, click "Detect available ports", find the local port, then click "Connect port".


③ The scanned Sentinel Modbus TCP IO–LINK master module will appear in the lower area; the front field corresponds to the MAC address.
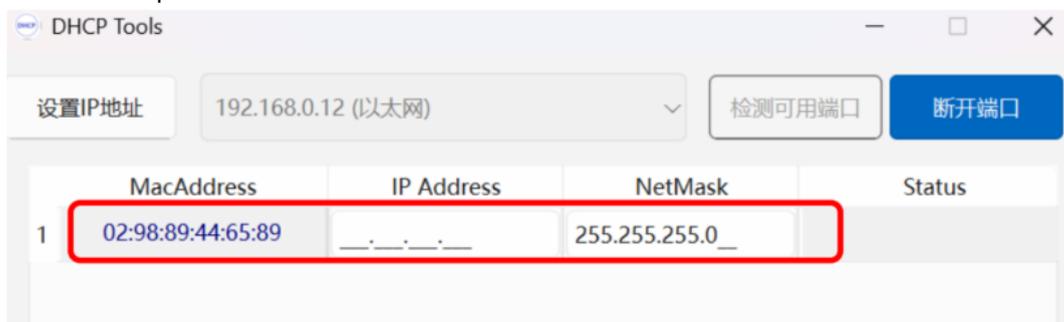
④ Enter the IP address under "IP Address", e.g. "192.168.0.20", then click "Set IP Address" at the upper left. After the setting is completed, a green IP address will be displayed under "Status" for that module, indicating the IP has been successfully configured. You can then close the software.
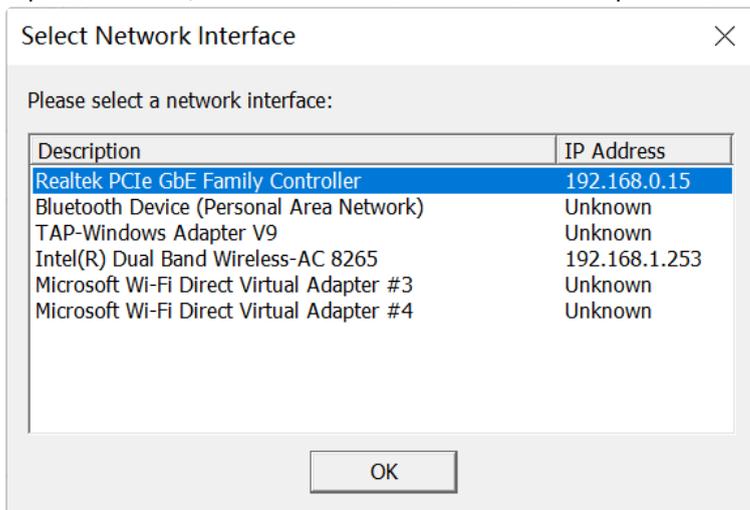After the IP is set, the module BUS red LED will stop flashing.

- You can set the IP rotary switches to 0X00, meaning: Run using the last DHCP–assigned IP address. Then every time the module is powered off/on, it will use the previously assigned address (i.e. 192.168.0.20).

- Alternatively, the rotary switches can be set to 0x01 — 0xFE. In this case, the first three octets follow the DHCP-assigned subnet, and the fourth octet follows the rotary switch value (for example, set ADDR_H = 1 and ADDR_L = 4, then the module IP address will also be 192.168.0.20).
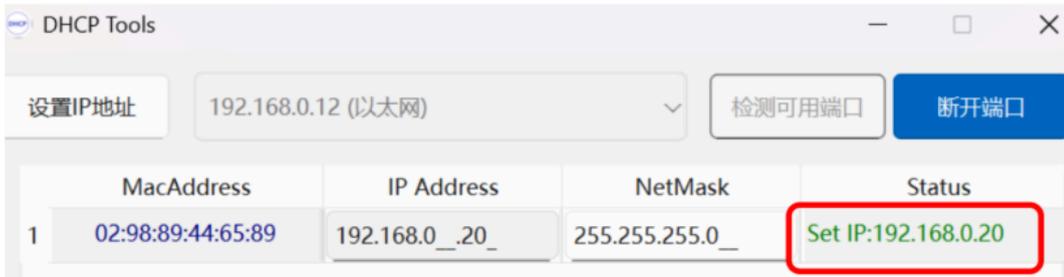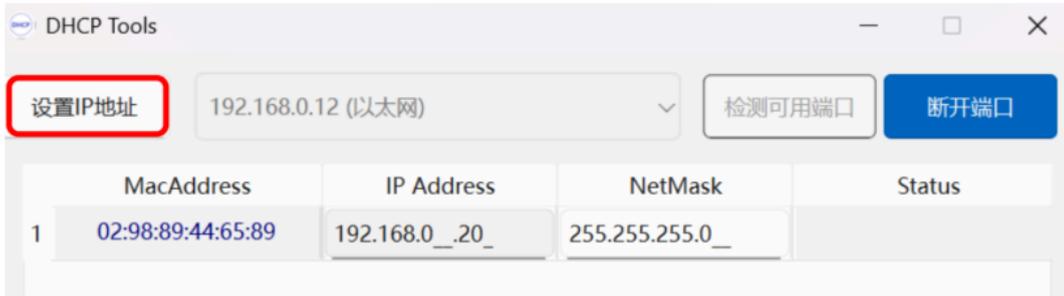
Method 2：Set the IP address via third-party configuration software：

① In this example, AB "Bootp-DHCP Tool" is used. Before setting, set the module IP rotary switches (ADDR_H and ADDR_L on the right side; refer to the manual) to 0XFF, meaning: DHCP mode — after power-on, the module keeps waiting for IP assignment.

After setting the switches, power-cycle the module. At this time, the module BUS red LED will flash.

Open the tool, select the correct network adapter on the PC, then click "OK".

② Double-click the scanned module, enter the IP address you want to set (the IP must be in the same subnet as the PC IP), then click "OK". After configuration, the module BUS red LED will stop flashing.

You can set the IP rotary switches to 0X00 to run with the last DHCP-assigned IP after each power cycle. Alternatively, set them to 0x01 — 0xFE, where the first three octets follow the DHCP-assigned subnet, and the fourth octet follows the rotary switch value.

BootP DHCP EtherNet/IP Commissioning Tool

File Tools Help

Add Relation   Discovery History   Clear History

Ethernet Address (MAC)	Type	(hr:min:sec)	#	IP Address	Hostname
02:98:89:44:55:89	DHCP	11:22:08	4		

Entered Relations

Ethernet Address (MAC)	Type	IP Address	Hostname	Description

Errors and warnings

Unable to service DHCP request from 02:98:89:44:55:89.

Relations
0 of 256

Add Relation   Discovery History

Ethernet Address (MAC)	Type	(hr:min:sec)	#	IP Address	Hostname
02:98:89:44:55:89					

New Entry

Server IP Address: 192.168.0.15

Client Address (MAC): 02:98:89:44:55:89

Client IP Address: 0 . 0 . 0 . 0

Hostname:

Description:

OK   Cancel

Ethernet Address (MAC

New Entry

Server IP Address:	192.168.0.15
Client Address (MAC):	02:98:89:44:55:89
Client IP Address	192 . 168 . 0 . 10
Hostname:	
Description:	

OK   Cancel

BootP DHCP EtherNet/IP Commissioning Tool

File Tools Help

Add Relation   Discovery History   Clear History

Ethernet Address (MAC)	Type	(hr:min:sec)	#	IP Address	Hostname
02:98:89:44:55:89	DHCP	11:38:06	5	192.168.0.10	

Entered Relations

Ethernet Address (MAC)	Type	IP Address	Hostname	Description
02:98:89:44:55:89	DHCP	192.168.0.10		

Errors and warnings
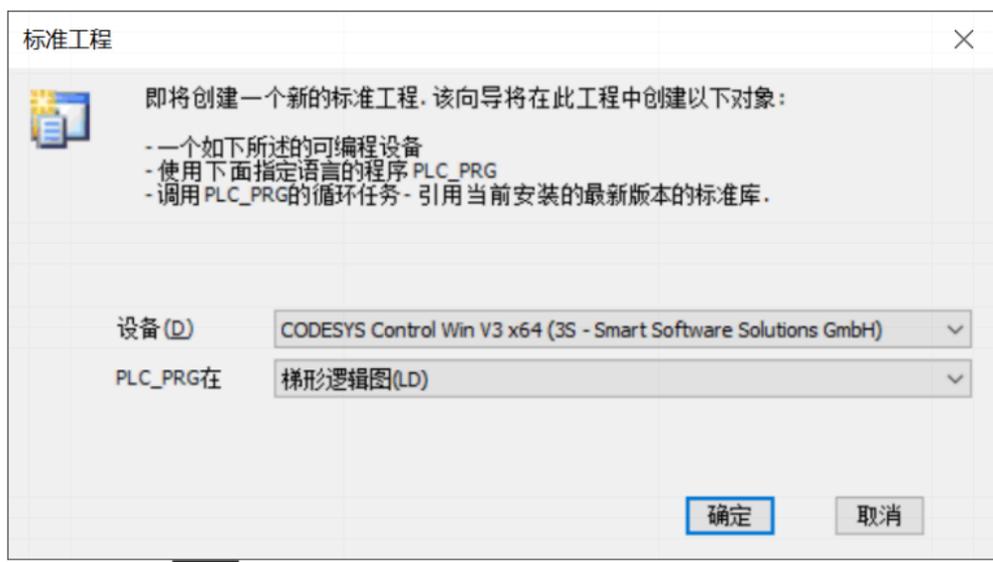Sent 192.168.0.10 to Ethernet address 02:98:89:44:55:89

Relations
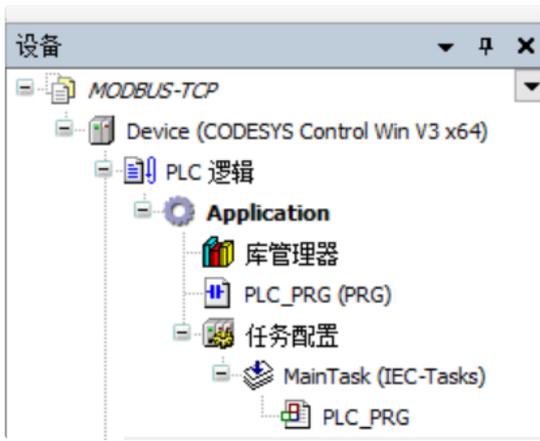1 of 256

2.Open CODESYS and Create a Standard Project

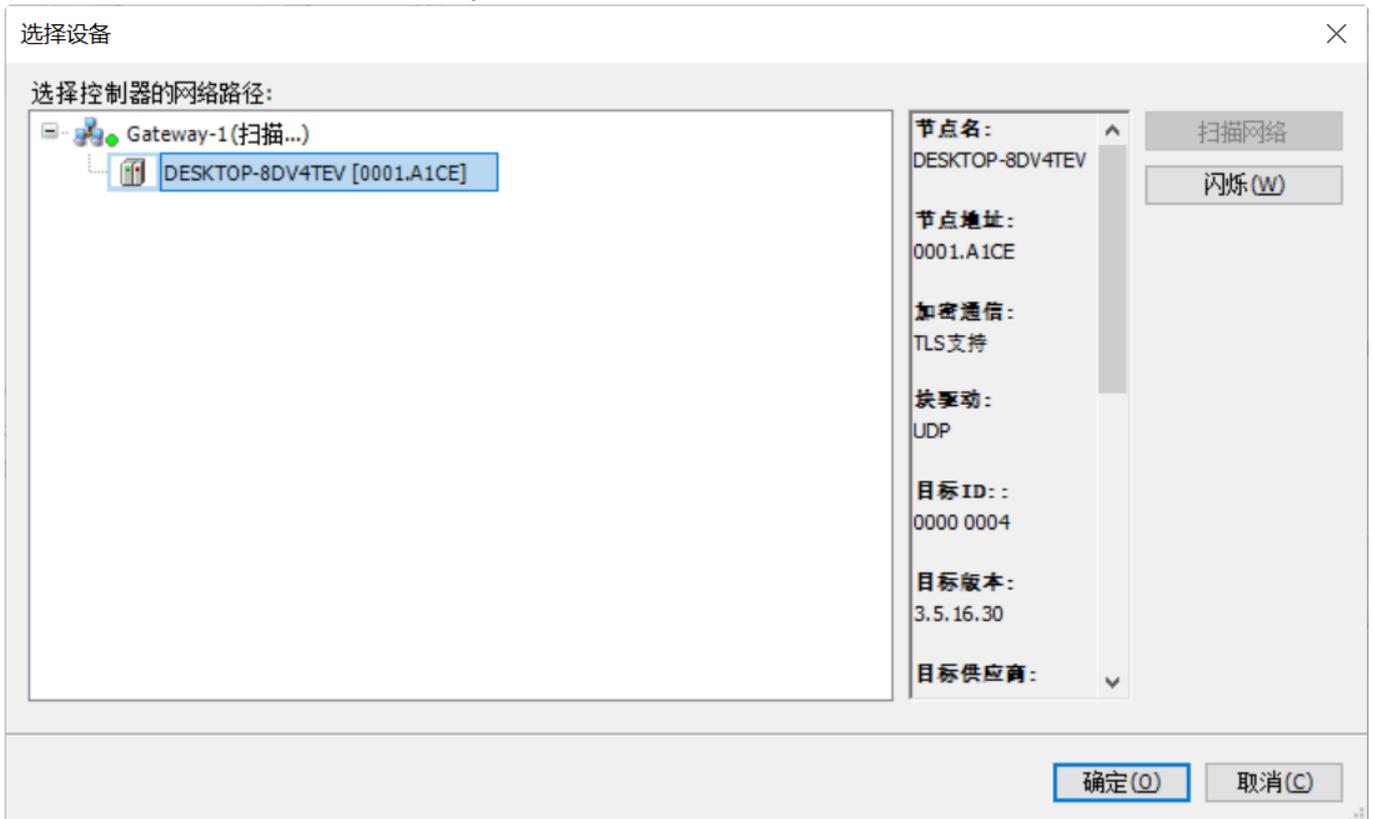Create a standard project, enter a custom project name, and click "OK".
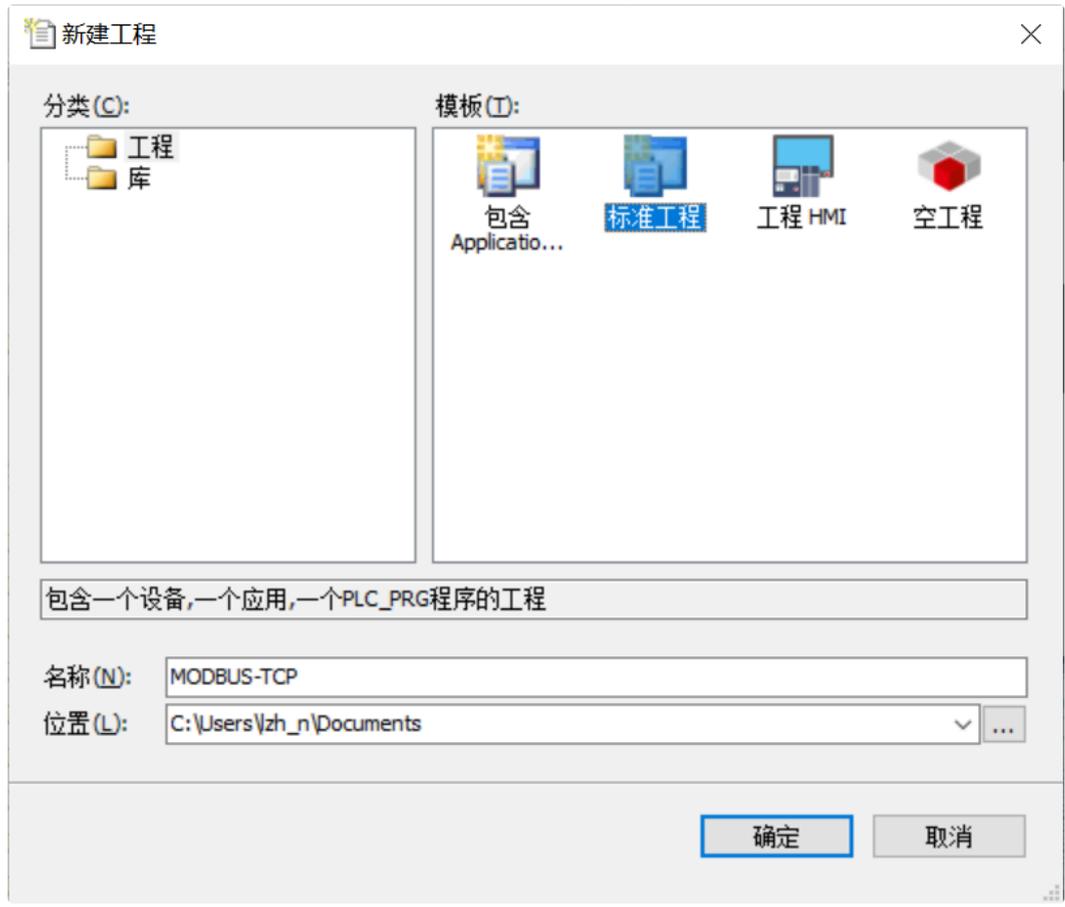
3.Select the Device

In this example, select "CODESYS Control Win V3 x64" and click "OK".

4.Scan the Network and Go Online

Double-click "Device" (CODESYS Control Win V3 x64).Click "Scan network" on the right, select the corresponding network path, and click "OK".


选择设备

选择控制器的网络路径:

Gateway-1(扫描...)
  DESKTOP-8DV4TEV [0001.A1CE]

| 节点名: |
| DESKTOP-8DV4TEV |
| 节点地址: |
| 0001.A1CE |
| 加密通信: |
| TLS支持 |
| 块驱动: |
| UDP |
| 目标ID:: |
| 0000 0004 |
| 目标版本: |
| 3.5.16.30 |
| 目标供应商: |

扫描网络

闪烁(W)

确定(O)   取消(C)

Note: If no network path is found, check whether the gateway and controller at the bottom-right of the menu are started. Make sure both the gateway and the controller are running (red when started,

gray when not started).
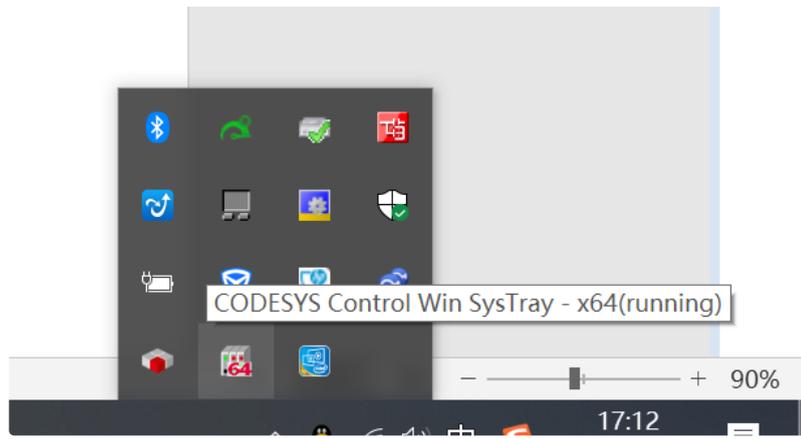
5.Confirm Gateway and Controller Status

- The green indicator in the middle means the gateway is running normally.
- The green indicator on the right means the controller has been scanned and the online connection is normal.
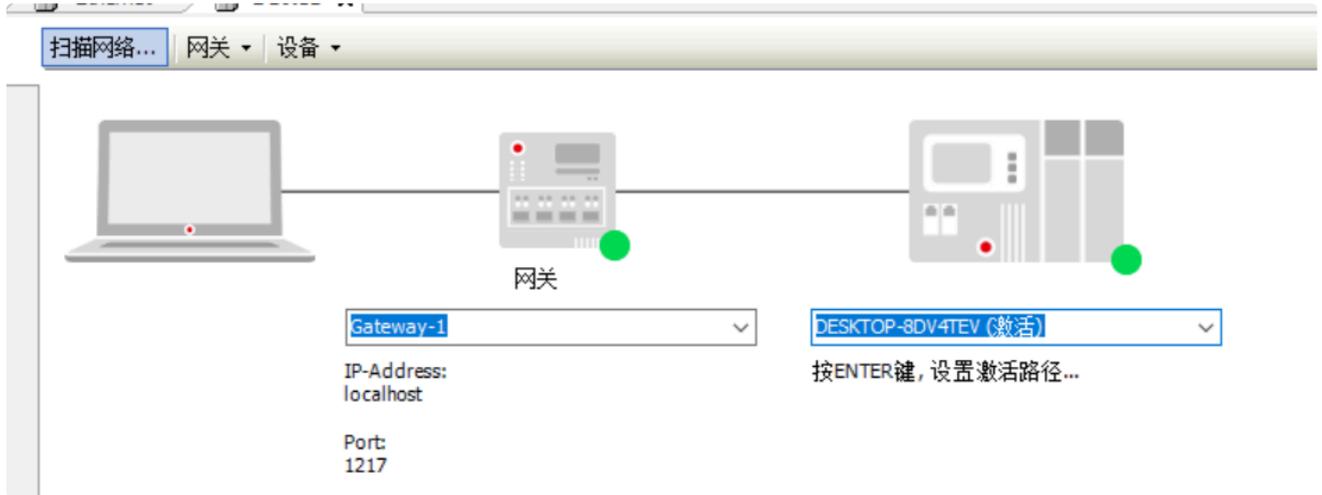
6.Add an Ethernet Master

Right–click "Device CODESYS Control Win V3 x64" → "Add device" → select the Ethernet adapter "Ethernet" → "Add device".
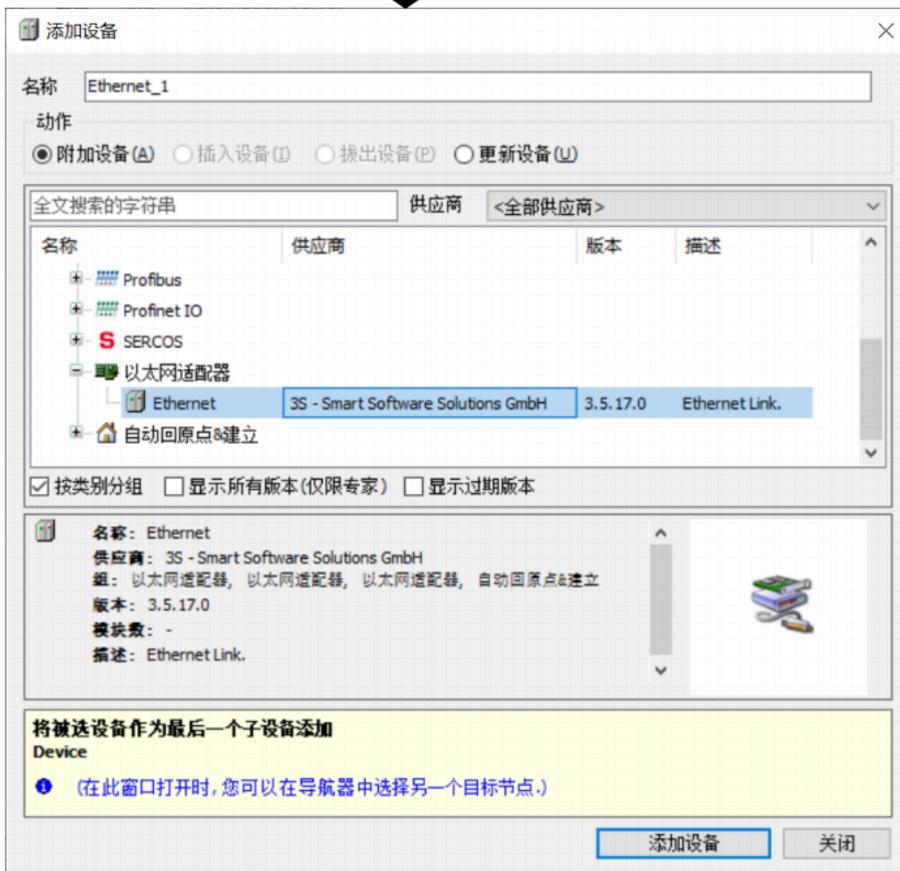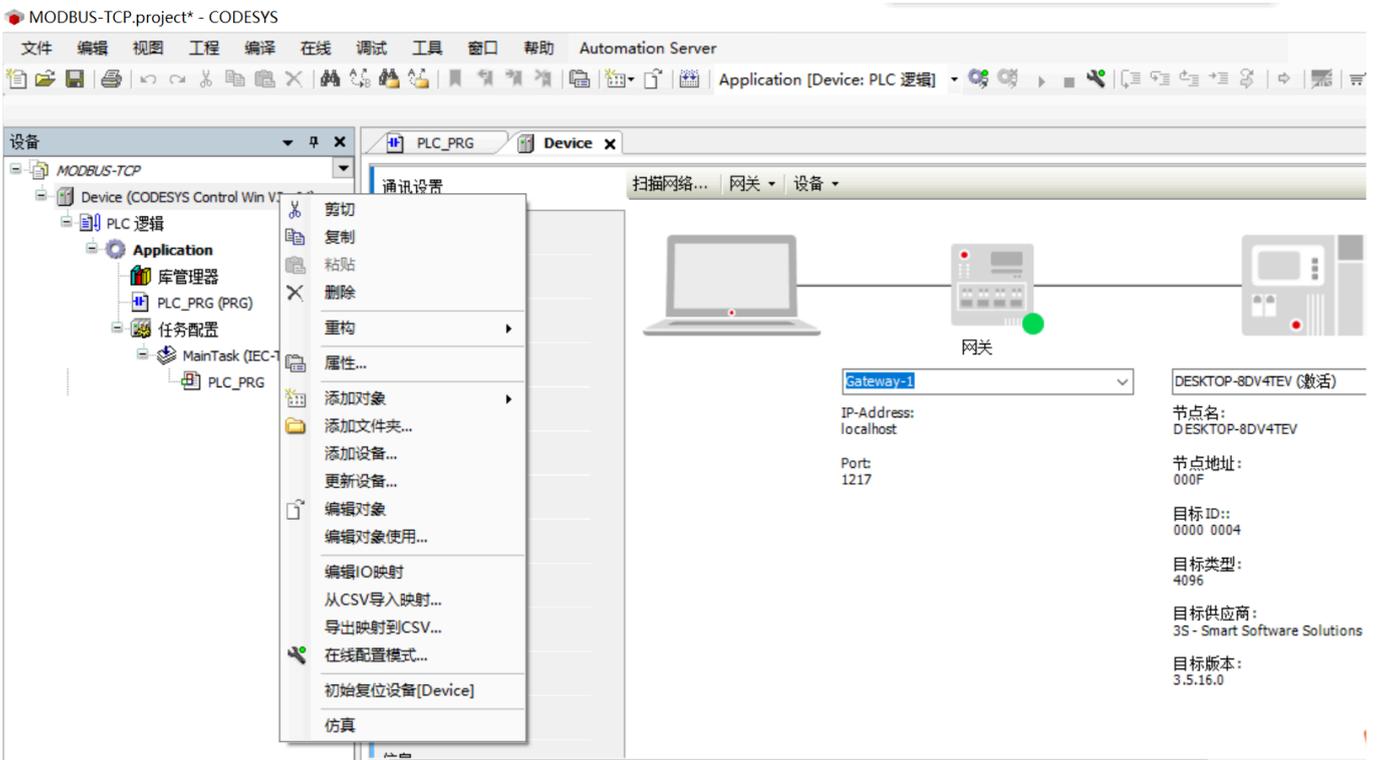
7.Configure the Ethernet Interface

Double–click "Ethernet (Ethernet)" and set the IP address, subnet mask, and gateway.
The CODESYS master IP must be in the same subnet as the slave module IP.

8.Add Modbus TCP Master and Modbus TCP Slave.Right–click "Ethernet (Ethernet)" → "Add device".Under Modbus TCP master, select "Modbus TCP Master" (in some versions it may appear as "Modbus TCP Client"), then click "Add device".
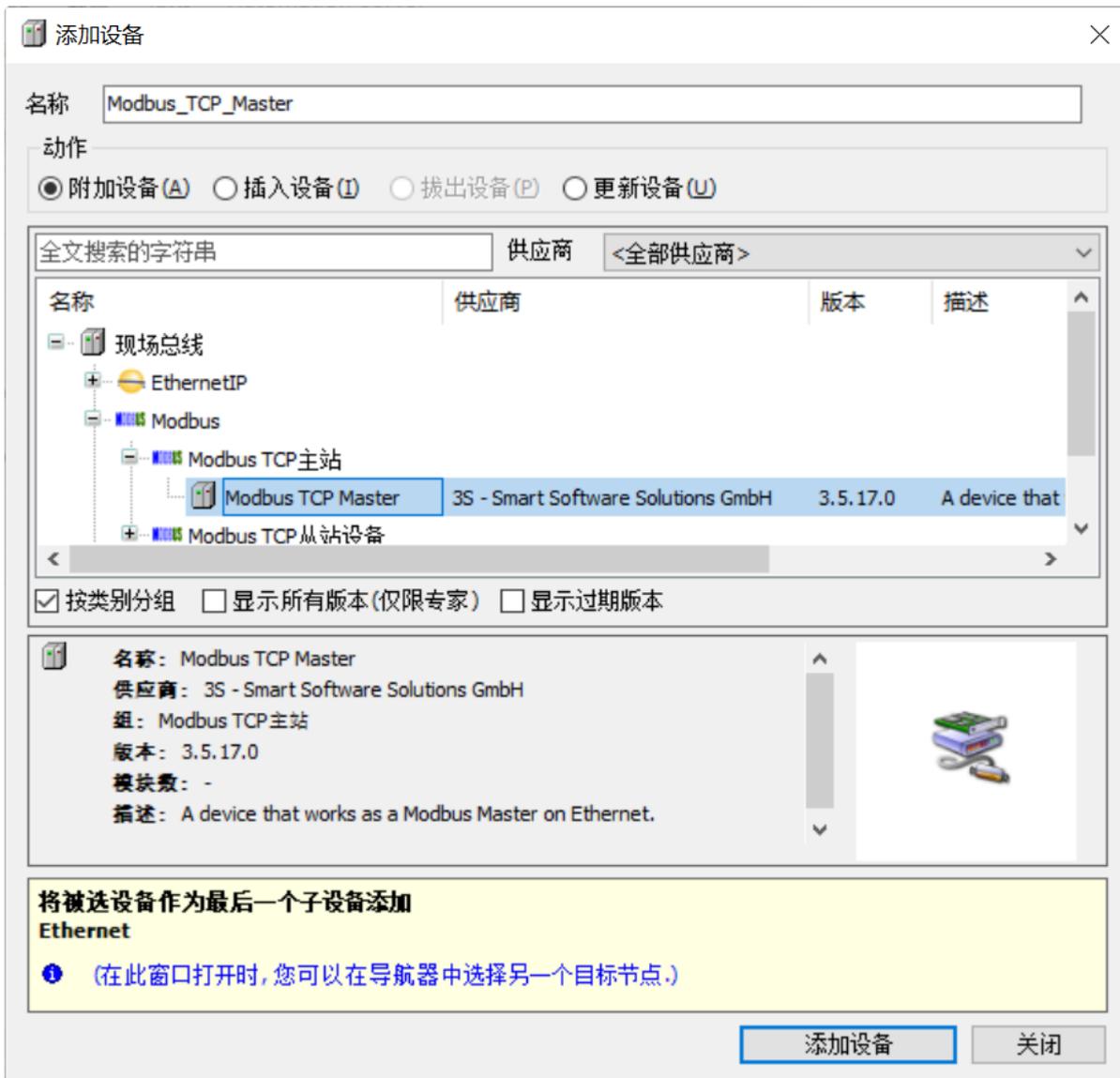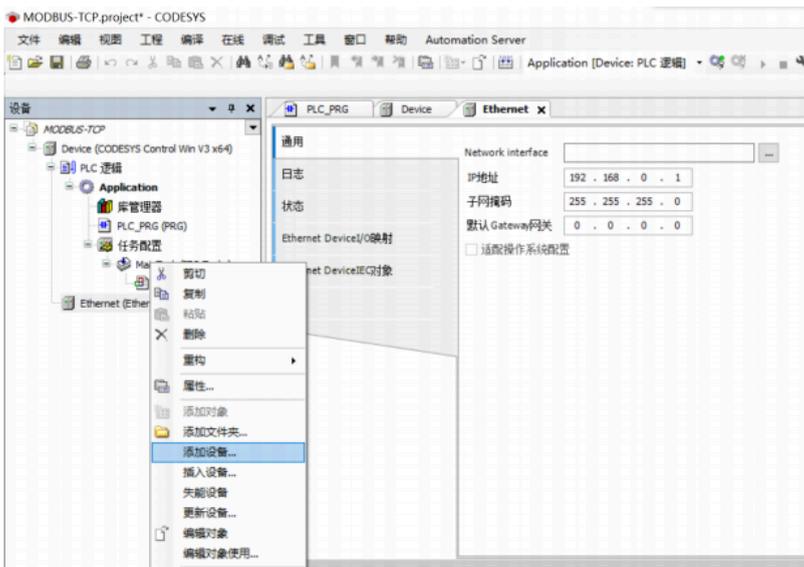
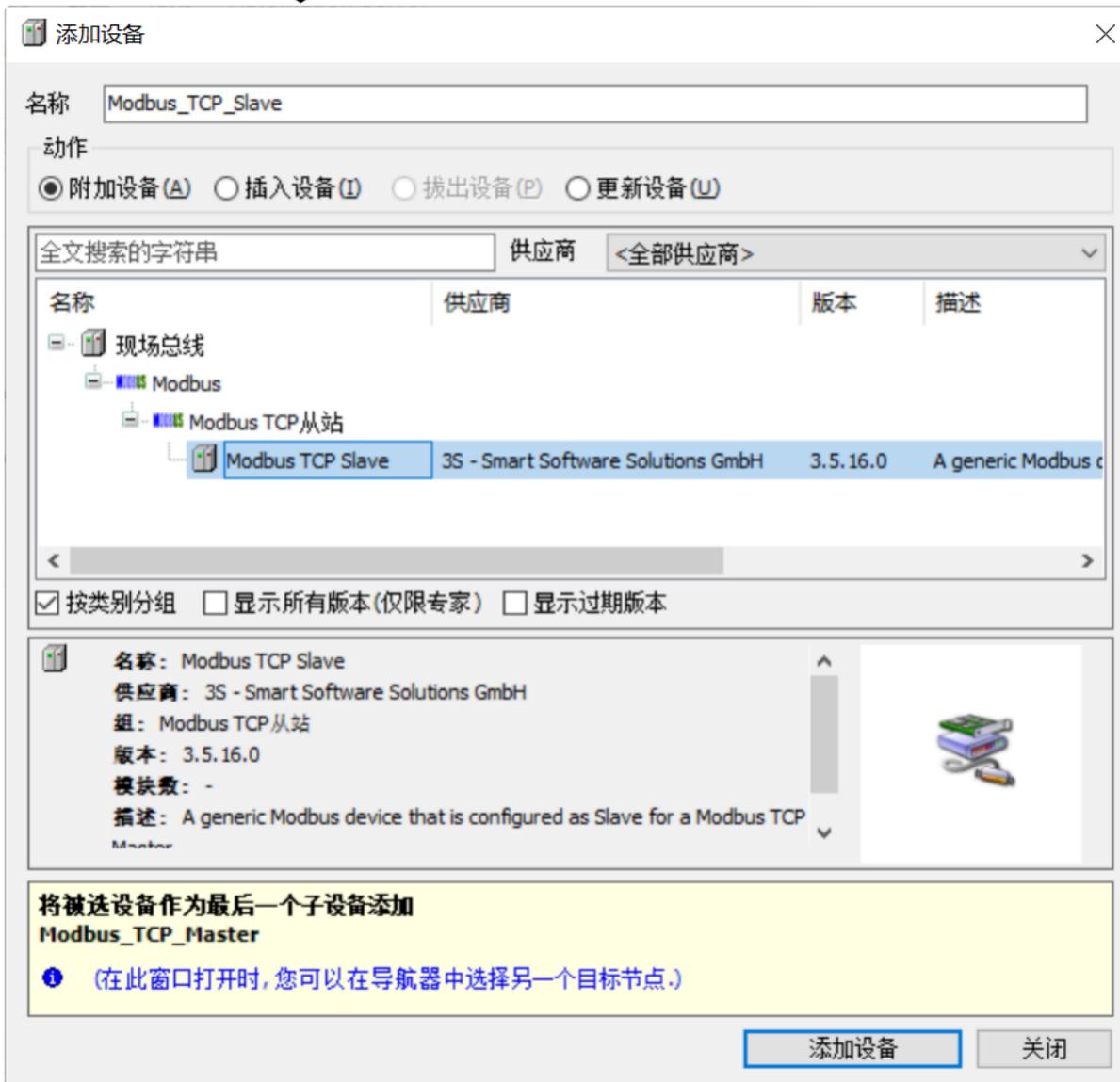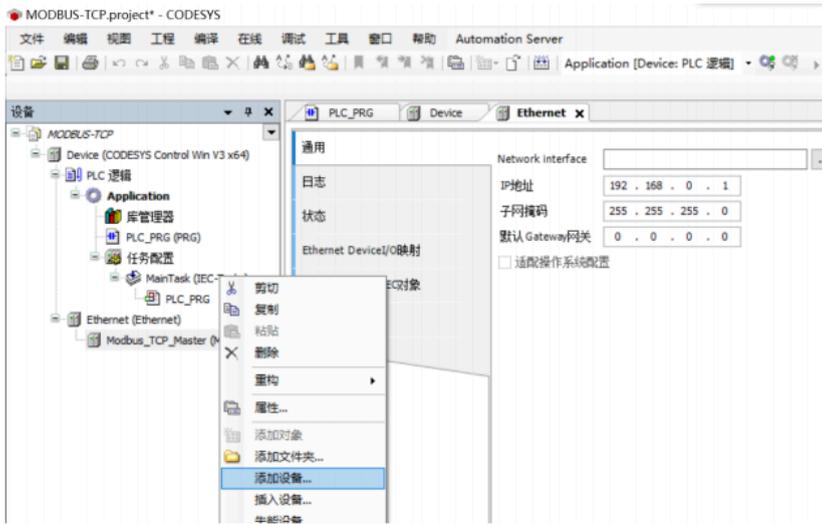9.Set Modbus TCP Master Parameters

Double-click "Modbus TCP Master" in the device tree. On the right, open "General" and set the

通用	Modbus TCP
ModbusTCPMasterI/O映射	响应超时时间(ms) 1000
ModbusTCPMasterIEC对象	Socket超时时间(ms) 10
ModbusTCPMaster参数	☐ 自动重新连接
日志	

Master parameters.

10.Add Modbus TCP Slave

Right-click "Modbus TCP Master" in the device tree → "Add device" → under Modbus TCP slave, select "Modbus TCP Slave" → "Add device".

11.Set Modbus TCP Slave Parameters

Double–click "Modbus TCP Slave". On the right under "General", set:

- Slave IP address: 192.168.0.10

- Response time: 1000
- Port: 502

12.Add a Channel to Read Input Data(Channel 0)

- Click "Modbus slave channels" → "Add channel".
- Display name: channel 0
- Access input data:
  - Function code: 04
    - Offset: 0 (start reading from the 1st word)
    - Length: 16 (read 16 words, maximum 125)

13.Add a Channel to Write Output Data (Channel 1)

- Click "Add channel" again.
- Display name: channel 1
- Access output data:
  - Function code: 16
  - Offset: 0 (start writing from the 1st word)
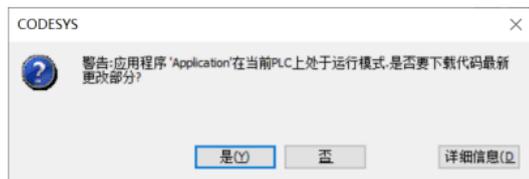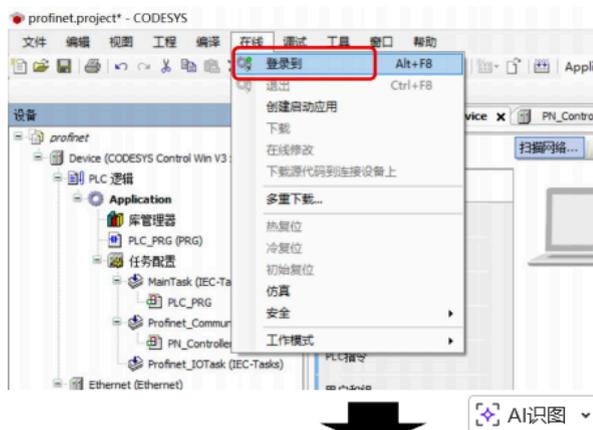

- Length: 16 (write 16 words, maximum 123)
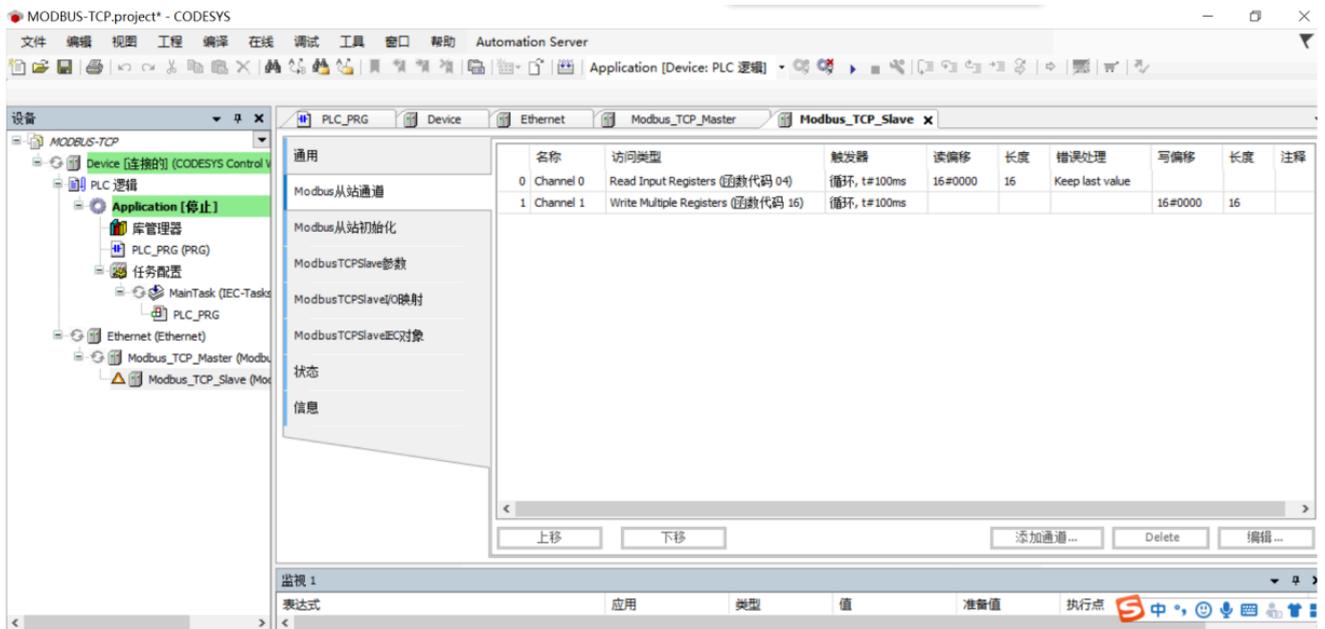
14.I/O Mapping Settings

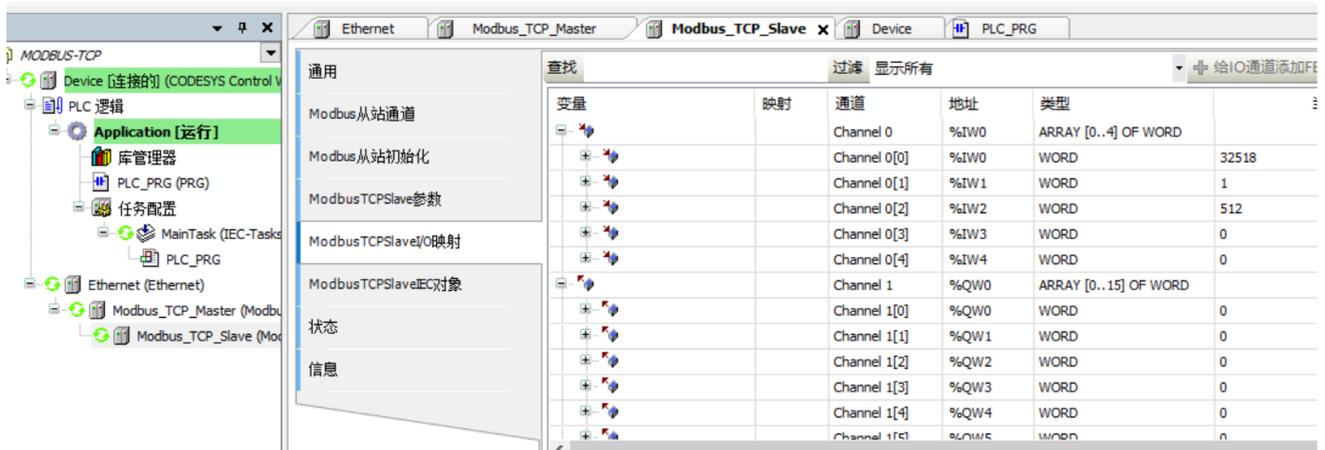Click "Modbus TCP Server I/O Mapping", then select (bottom-right):
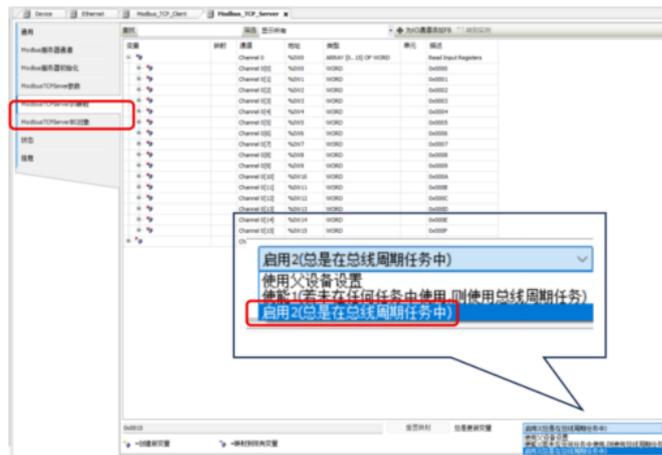
- Enable 2 (Always in the bus cycle task)

15.Log In to the Controller,Click "Online" → "Login".
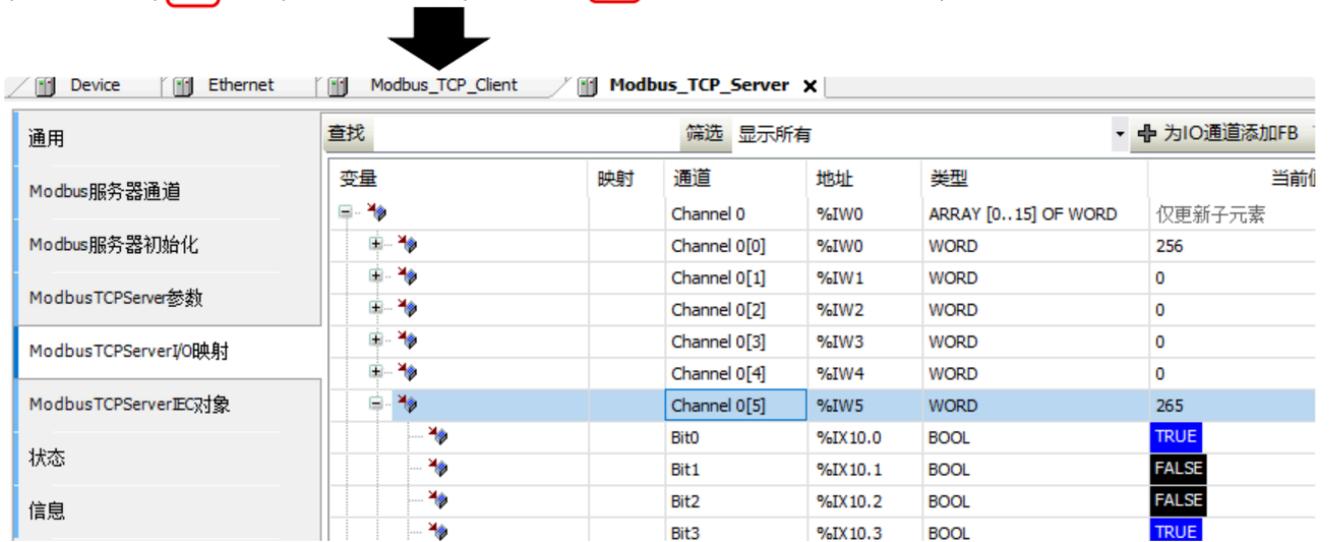
16.Start Debugging,Click "Debug" → "Start".

17.Example: Read Port Process Input Data (Temperature Transmitter),Assume port 1 is connected to a Sentinel temperature transmitter (uses 2 bytes of input process data).

1. Use the "IO–Link port control" rotary switch setting to enable or disable IO–Link:
   - Set PORT_H = 0 and PORT_L = 1: only enables IO–Link on master port 1, all other ports are disabled.
2. Check the manual/appendix for the IO–Link process data input word mapping:
   - Port 1 process data starts from word 5.
   - The transmitter uses 2 bytes (i.e., 1 word).
   - Channel0[5] is the 5th word of process input data.
3. Therefore, %IW5 is the temperature transmitter process input (example value: 265).

- Because the process data equals actual temperature multiplied by 10, the actual temperature is 26.5°C.

4. Full Input Reading and Output Writing: Recommended Segmented Channels

18.For the Sentinel Modbus TCP IO–Link Master:

- Input area: Word[0] to Word[132], total 133 words (max length for reading input registers is 125, so one channel cannot read everything).
- Output area: Word[0] to Word[127], total 128 words (max length for writing holding registers in one channel is 123, so one channel cannot write everything).

Therefore, it is recommended to split reading/writing into two segments (see appendix for detailed mapping), for example:

Read Inputs (F04)

- Channel0: function code F04, offset 0, length 117 (reads all input data before port 8)
- Channel1: function code F04, offset 117, length 16 (reads input data for port 8)

Channel0 + Channel1 can read all master input data.

Write Outputs (F16)

- Channel2: function code F16, offset 0, length 112 (writes all output data before port 8)
- Channel3: function code F16, offset 112, length 16 (writes output data for port 8)

	名称	访问类型	触发器	读偏移	长度	错误处理	写偏移	长度
0	Channel 0	Read Input Registers (函数代码 04)	循环, t#100ms	16#0000	117	Keep last value		
1	Channel 1	Read Input Registers (函数代码 04)	循环, t#100ms	16#0075	16	Keep last value		
2	Channel 2	Write Multiple Registers (函数代码 16)	循环, t#100ms				16#0000	112
3	Channel 3	Write Multiple Registers (函数代码 16)	循环, t#100ms				16#0070	16

Left panel:
通用
Modbus从站通道
Modbus从站初始化
ModbusTCPSlave参数
ModbusTCPSlaveI/O映射
ModbusTCPSlaveIEC对象
状态
信息

Tabs: Ethernet | Modbus_TCP_Master | **Modbus_TCP_Slave** × | Device | PLC_PRG

Appendix

1. IO–Link Process Data Input (133 Words)

Supported function code: F04 (Read Input Registers)

Modbus引用编号 WORD	Modbus数据地址 WORD	IO-LINK字节 BYTE	描述
30001	0	Byte0	8位代表8个端口当前IO-LINK状态: 1正常通信, 0未通信 — 位 7 6 5 4 3 2 1 0 / 端口 C8 C7 C6 C5 C4 C3 C2 C1
		Byte1	8位代表8个端口IO-LINK断线记录: 1有过断线, 0未有过断线 — 位 7 6 5 4 3 2 1 0 / 端口 C8 C7 C6 C5 C4 C3 C2 C1
30002	1	Byte2	C1端口断线次数
		Byte3	C2端口断线次数
30003	2	Byte4	C3端口断线次数
		Byte5	C4端口断线次数
30004	3	Byte6	C5端口断线次数
		Byte7	C6端口断线次数
30005	4	Byte8	C7端口断线次数
		Byte9	C8端口断线次数
30006 - 30021	5 - 20	Byte10 - Byte41	C1端口过程输入数据（32Byte）
30022 - 30037	21 - 36	Byte42 - Byte73	C2端口过程输入数据（32Byte）
30038 - 30053	37 - 52	Byte74 - Byte105	C3端口过程输入数据（32Byte）
30054 - 30069	53 - 68	Byte106 - Byte137	C4端口过程输入数据（32Byte）
30070 - 30085	69 - 84	Byte138 - Byte169	C5端口过程输入数据（32Byte）
30086 - 30101	85 - 100	Byte170 - Byte201	C6端口过程输入数据（32Byte）
30102 - 30117	101 - 116	Byte202 - Byte233	C7端口过程输入数据（32Byte）
30118 - 30133	117 - 132	Byte234 - Byte265	C8端口过程输入数据（32Byte）

2. IO–Link Process Data Output (128 Words)

Supported function codes: F03 (Read Holding Registers), F16 (Write Holding Registers), F23 (Read/Write Holding Registers)

Modbus引用编号 WORD	Modbus数据地址 WORD	IO-LINK字节 BYTE	描述
40001 - 40016	0 - 15	Byte0 - Byte31	C1端口过程输出数据（32Byte）
40017 - 40032	16 - 31	Byte32 - Byte63	C2端口过程输出数据（32Byte）
40033 - 40048	32 - 47	Byte64 - Byte95	C3端口过程输出数据（32Byte）
40049 - 40064	48 - 63	Byte96 - Byte127	C4端口过程输出数据（32Byte）
40065 - 40080	64 - 79	Byte128 - Byte159	C5端口过程输出数据（32Byte）
40081 - 40096	80 - 95	Byte160 - Byte191	C6端口过程输出数据（32Byte）
40097 - 40112	96 - 111	Byte192 - Byte223	C7端口过程输出数据（32Byte）
40113 - 40128	112 - 127	Byte224 - Byte255	C8端口过程输出数据（32Byte）