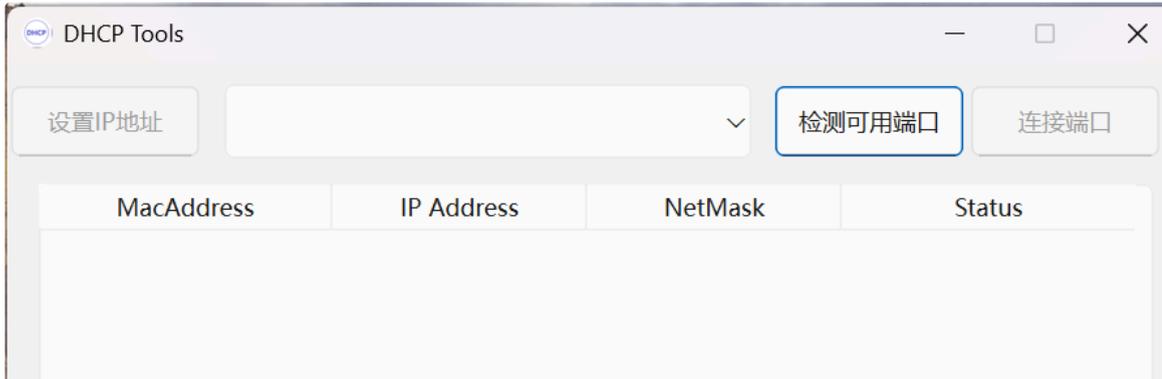


1) Set the IP Address of the Sentinel Modbus/TCP IO-LINK Master Module

Method 1: Using Sentinel “DhcpTool” IP Assignment Software

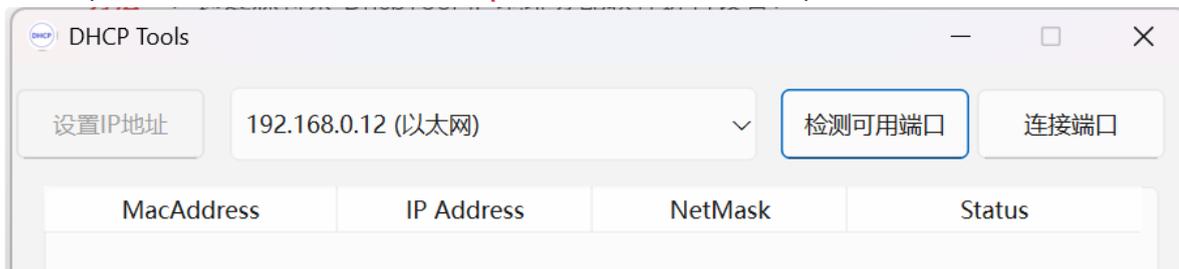
① Download and install “DhcpTool V1.2” from the Sentinel official website (**Windows 10 or later only**). Launch the software.



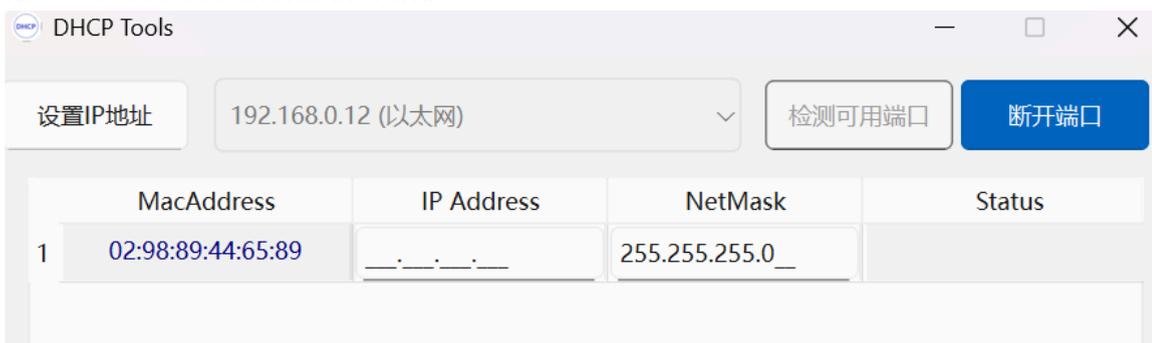
② Connect the Sentinel Modbus/TCP IO-LINK master module to the PC. Then set the module’s IP address rotary switches to “0xFF” (on the **right side** of the window: set **ADDR_H = F** and **ADDR_L = F**; refer to the manual). This means: **“DHCP mode: the device keeps waiting for IP assignment after power-up.”**

After changing the switches, **power-cycle** the module. The **BUS red LED** will start flashing.

In DhcpTool, click **“Detect available ports”**, select the local port, and then click **“Connect port.”**



③ The scanned Sentinel Modbus/TCP IO-LINK master module will appear in the list below, with its **MAC address** shown in front.



④ Enter the desired IP address under **“IP Address”** (e.g. **192.168.0.20**), then click **“Set IP Address”** (top left). After the setting is successful, a **green IP address** will appear under **“Status”** for that module, indicating the IP has been set. You may then close the software. After the setting is complete, the **BUS red LED will stop flashing**.

Then you may set the IP rotary switches to:

- **0x00**: Run using the last DHCP–assigned IP address, meaning after each power cycle the module will use the previously assigned IP (e.g. **192.168.0.20**).
- **0x01 – 0xFE**: The **first three octets** follow the DHCP–assigned network segment, and the **4th octet** follows the rotary switch value.
Example: if **ADDR_H = 1** and **ADDR_L = 4**, then the module IP will also be **192.168.0.20**.

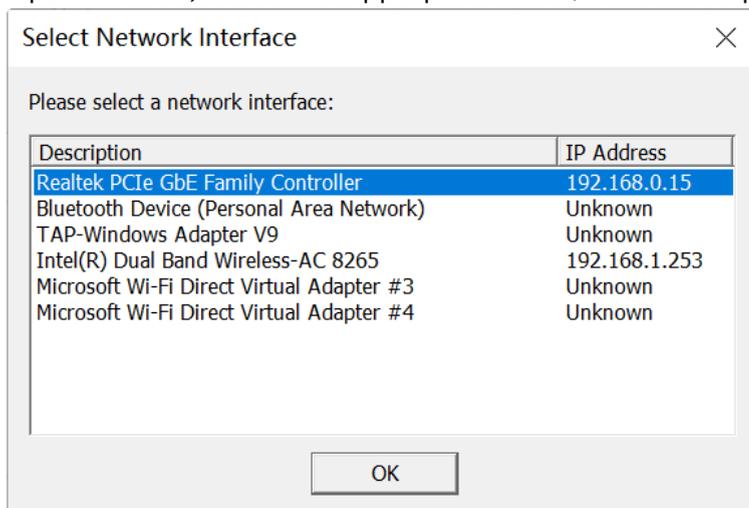


Method 2: Using Third–Party IP Assignment Software

① In this example, the AB “**Bootp–DHCP Tool**” is used. Before setting the IP, first set the module IP rotary switches (right side window **ADDR_H / ADDR_L**, refer to the manual) to **0xFF**, i.e. “**DHCP mode: always waits for IP assignment after power–up.**”

After changing the switches, **power–cycle** the module. The **BUS red LED** will flash.

Open the tool, select the appropriate NIC (network adapter) on your PC, and click “**OK.**”



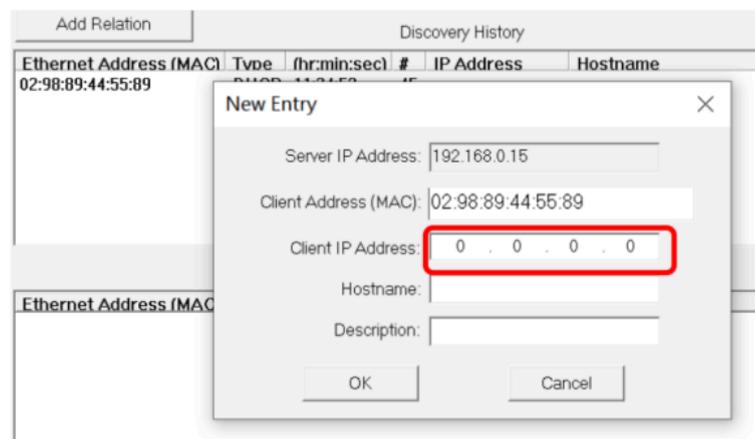
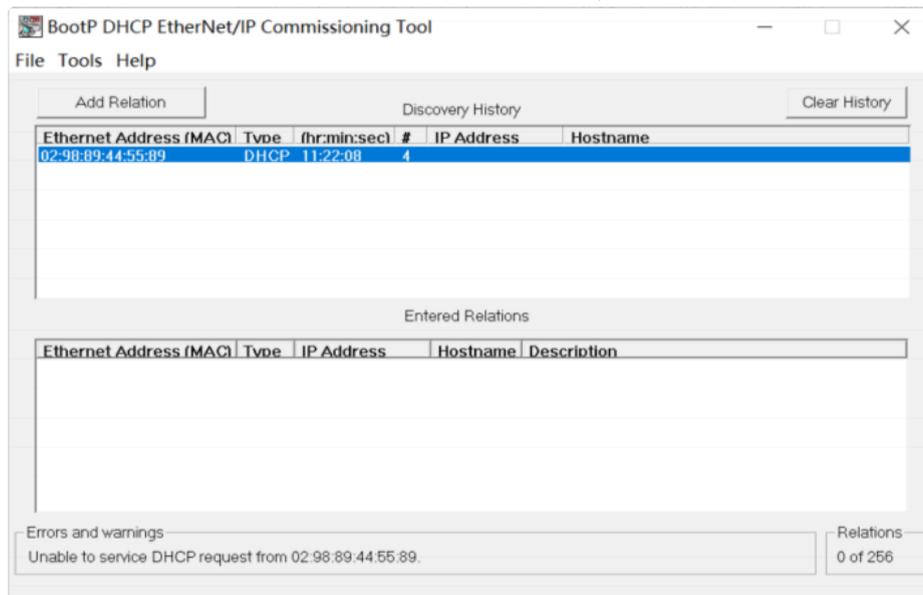
② Double–click the scanned module, enter the IP address you want to assign (**the module IP must be in the same subnet as the PC IP**), then click “**OK.**”

After successful assignment, the **BUS red LED will stop flashing.**

You may then set the IP rotary switches to:

- **0x00**: run using the last DHCP–assigned IP address

- **0x01 – 0xFE**: first three octets follow DHCP; fourth octet follows the rotary switch value



New Entry [X]

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 [Min] [Max] [Close]

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

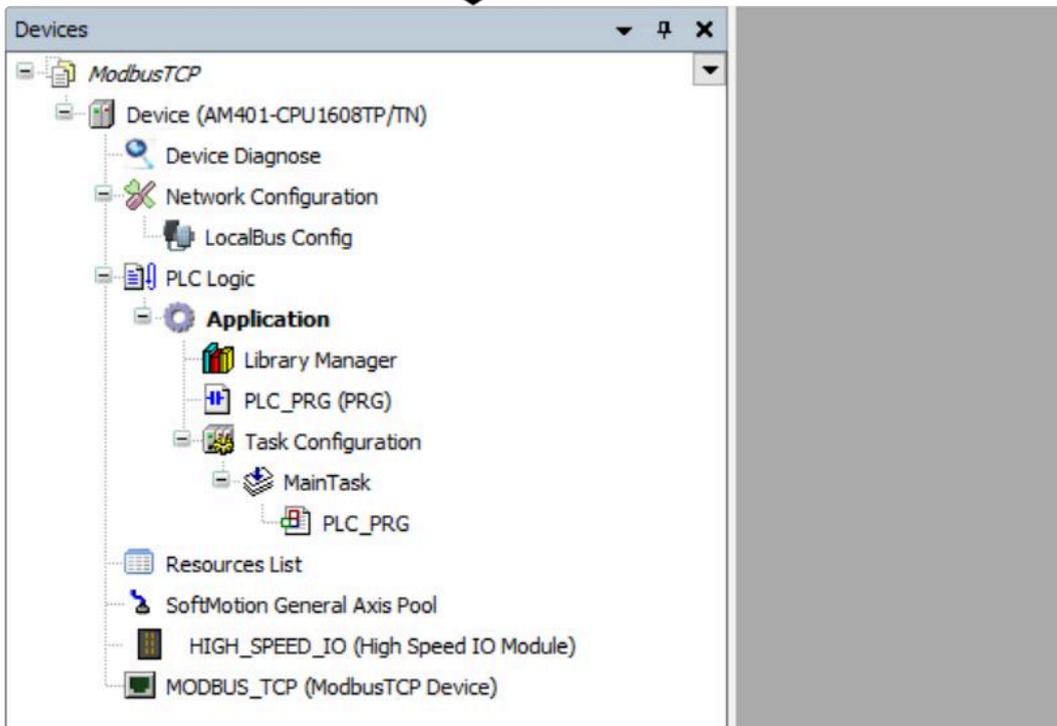
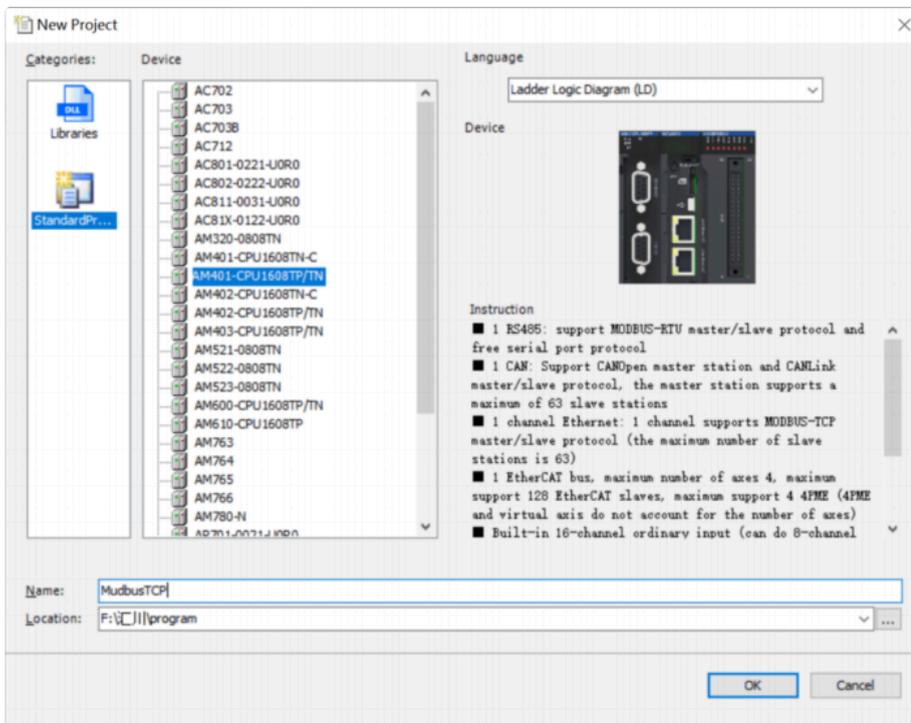
Ethernet Address (MAC)	Type	IP Address	Hostname	Description
02:98:89:44:55:89	DHCP	192.168.0.10		

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

Relations: 1 of 256

2) Create a Project in InoProShop

Open **InoProShop** (version **V1.8.1.1** in this example), create a **Standard Project**, select the corresponding PLC, and define a custom **Name**. Click **“OK.”**

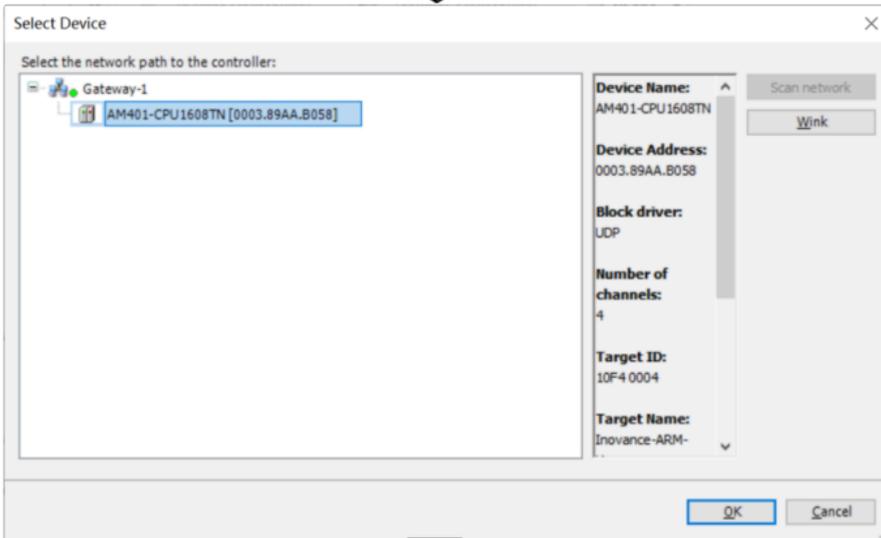
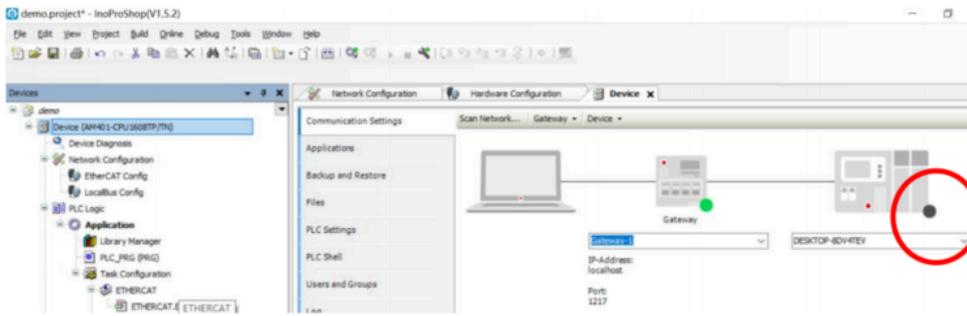


3) Go Online with the Controller

Double-click “**Device (AM401-CPU1608TP/TN)**”. On the far right, if the PLC icon shows a **black dot**, it means the controller is **offline**.

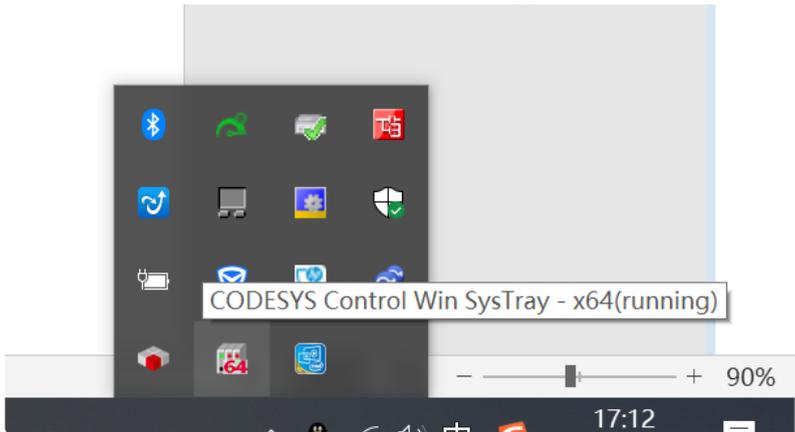
Click “**Scan Network...**”, select “**AM401-CPU1608TN [0003.89AA.B058]**” in the dialog, then click “**OK.**”

The black dot will turn **green**, indicating the online connection is normal.



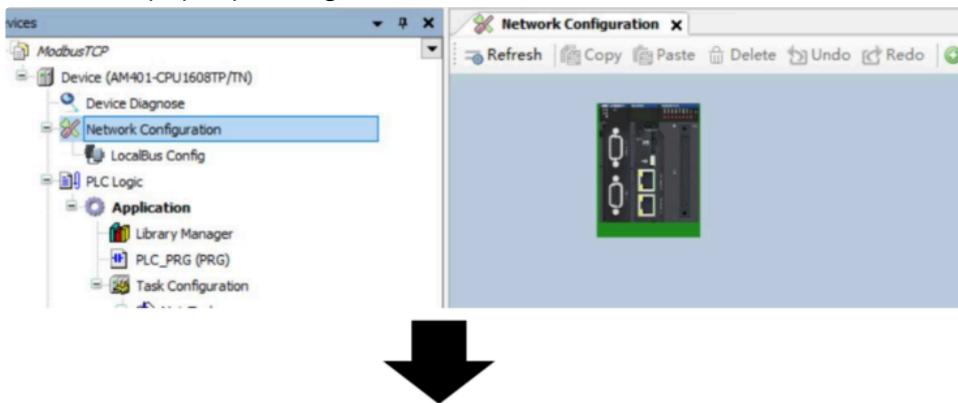
Note: If no network path can be scanned, first confirm that the PLC and PC are in the **same subnet**. Then check whether the **Gateway** and **Controller** at the lower-right corner of the menu are

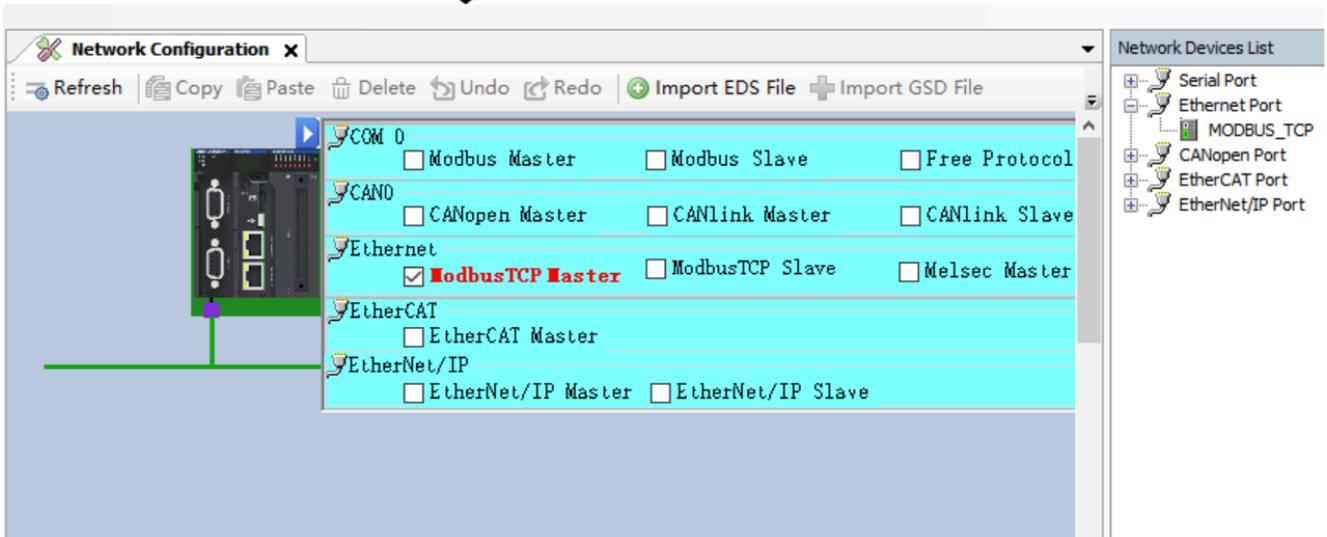
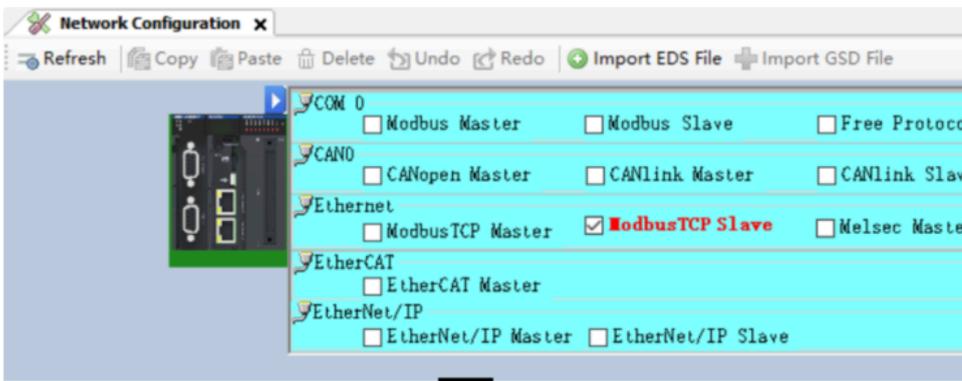
started. Please ensure both are **running** (red = started, gray = not started).



4) Enable Modbus TCP Master

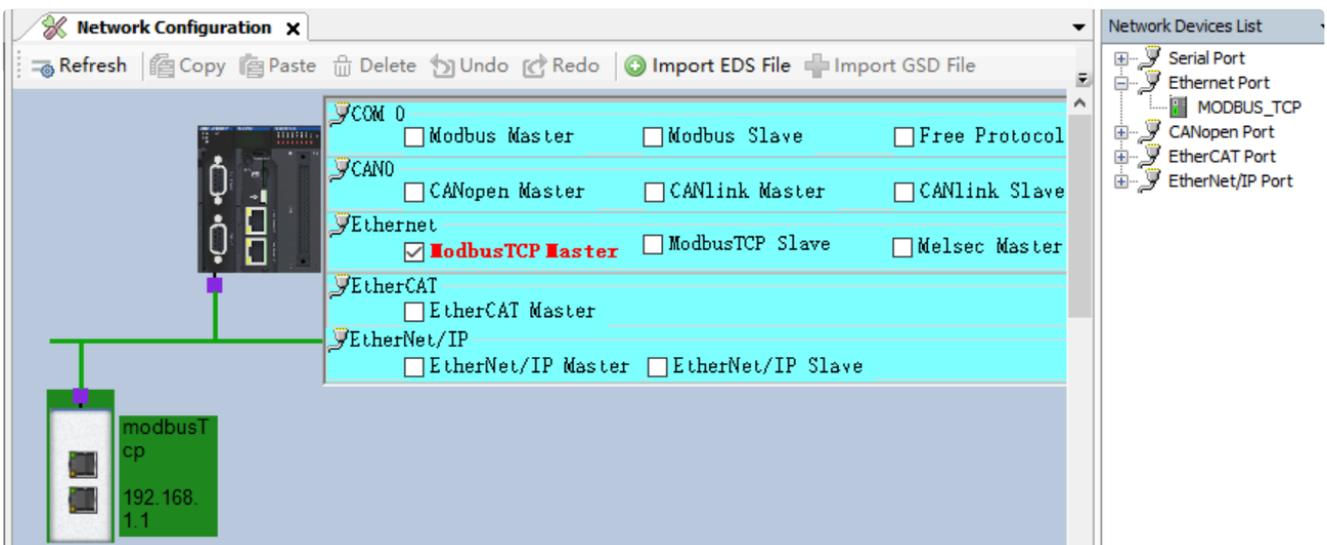
Double-click **“Network Configuration”** on the left. On the right side, click the PLC Ethernet port, and in the pop-up dialog check **“Modbus TCP Master.”**





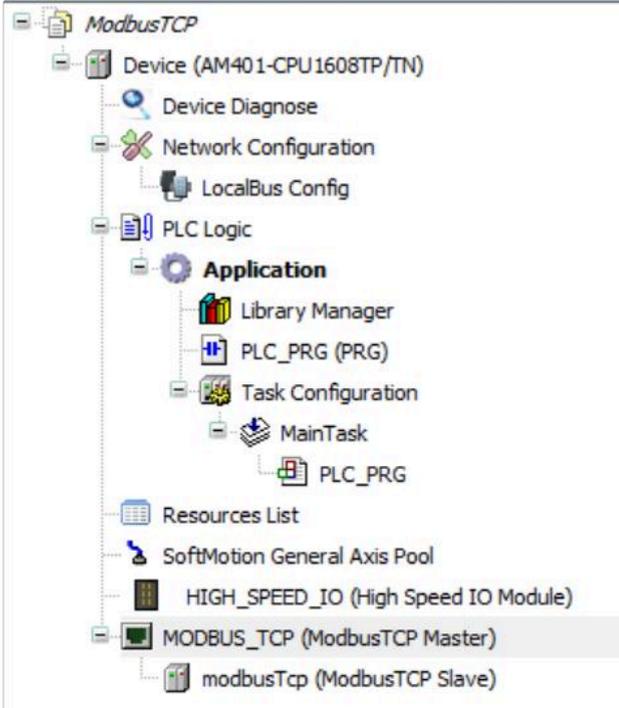
5) Add the Slave Device

From the **Network Device List** on the right, double-click “**MODBUS_TCP**” to add the slave device into the network.



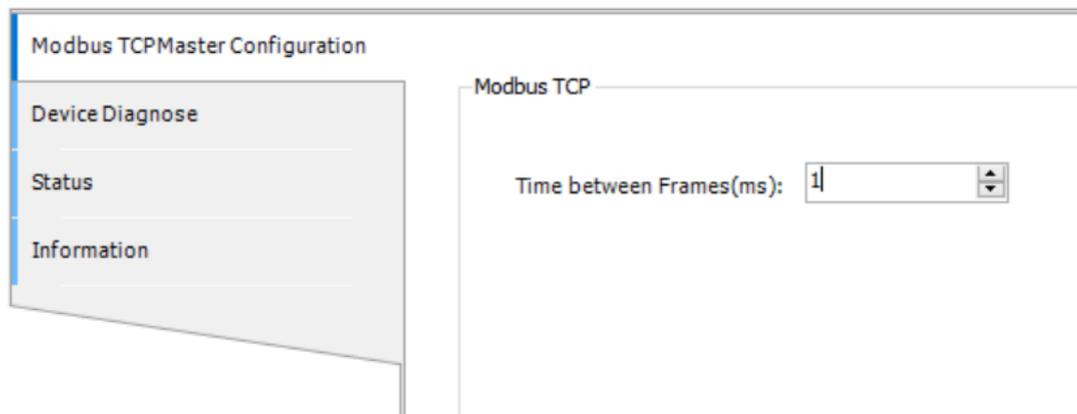
6) Verify the Modbus TCP Device Tree

A Modbus TCP configuration device tree will appear on the left, as shown below.



7) Configure the Master Frame Interval

Double-click **“modbusTCP (ModbusTCP Master)”**. In the right panel, **“Time between Frames”** is the inter-frame delay: the waiting time between receiving the previous response frame and sending the next request frame. This parameter can be used to adjust the data exchange rate.



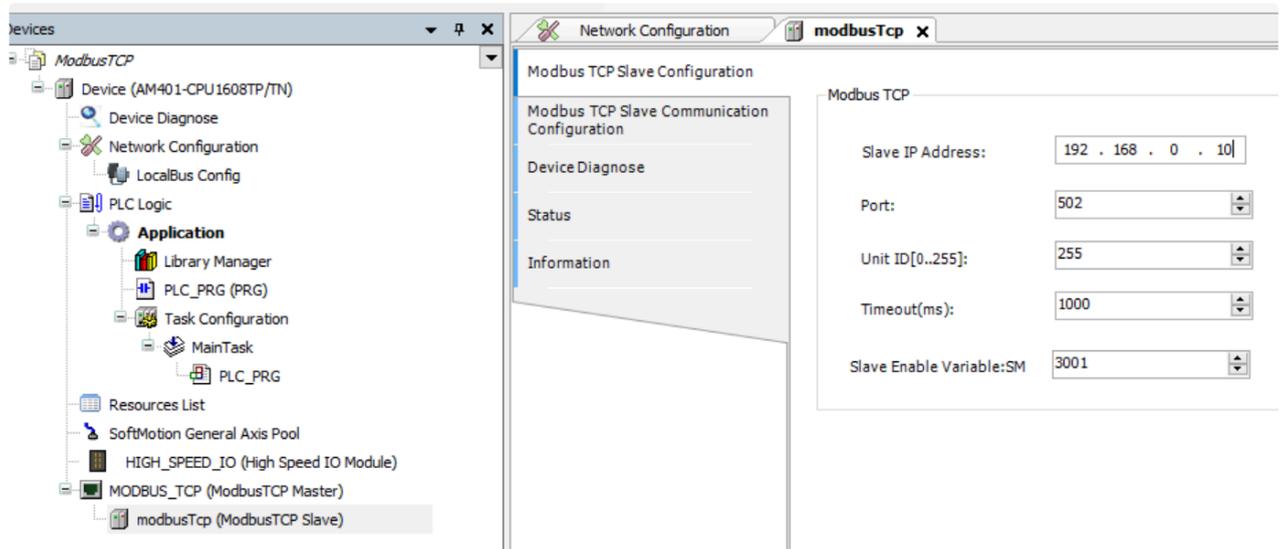
8) Configure the Modbus TCP Slave

Double-click **“modbusTCP (ModbusTCP Slave)”**. In the right panel, click **“Modbus TCP Slave Configuration”** to configure the slave.

According to the parameter description below, enter:

- Slave IP: **192.168.0.10**
- Port: **502**
- Slave address: **255**
- Timeout: **1000**

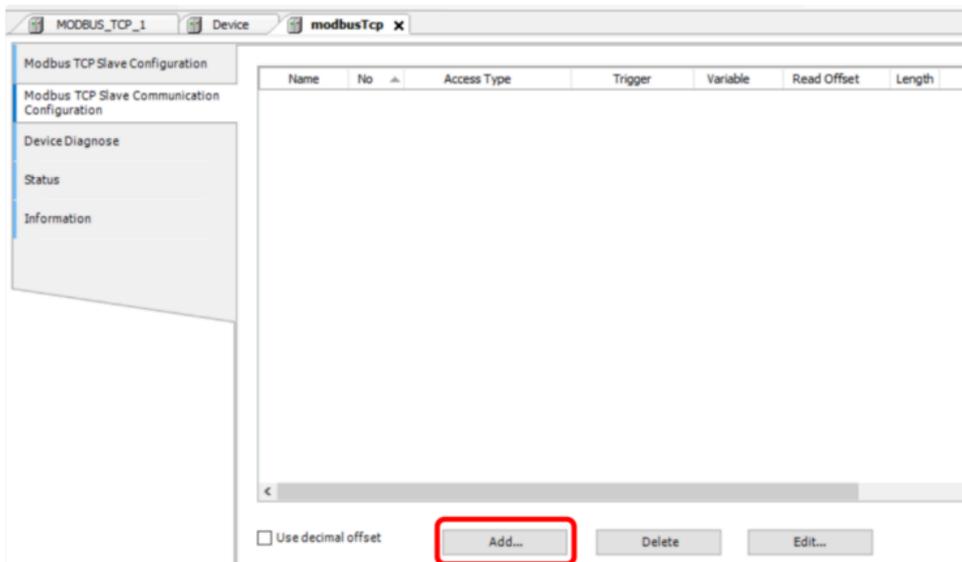
- Slave enable variable: **SM3001**



配置项	功能
从站 IP 地址	主站连接 Modbus TCP 从站的 IP 地址
端口	主站连接 Modbus TCP 从站的 TCP 端口号
从站地址	主站连接 Modbus TCP 从站的协议站地址
超时时间	启动超时功能并指定一个用毫秒表示的超时时长
从站使能变量	SM 元件控制向该从站发起通信

9) Configure Slave Communication Channels

Click **“Modbus TCP Slave Communication Configuration”**, then click **“Add...”** to add channels. Each channel represents an independent Modbus TCP request.



Modbus Channel Set

Channel

Name: Channel 01

Access Type: Read Input Registers (Function Code 04)

Trigger: Cyclic Cycle Time(ms): 5

Repeated: 1

Comment:

Read Register

Offset: 0

Length(WORD): 117

Error Handling: Keep Last Value

Write Register

Offset: 0

Length(WORD): 1

OK Cancel

10) Split Read/Write into Two Segments (Due to Length Limits)

For the Sentinel Modbus TCP IO-LINK master:

- **Input data** occupies **Word[0]–Word[132]** (total **133 words**). Since the maximum read length is **125**, one channel cannot read all inputs.
- **Output data** occupies **Word[0]–Word[127]** (total **128 words**). Since the maximum channel length is **123**, one channel cannot write all outputs.

Therefore, to fully read inputs and write outputs, split them into two segments (see the Appendix for the exact word mapping):

Read Inputs

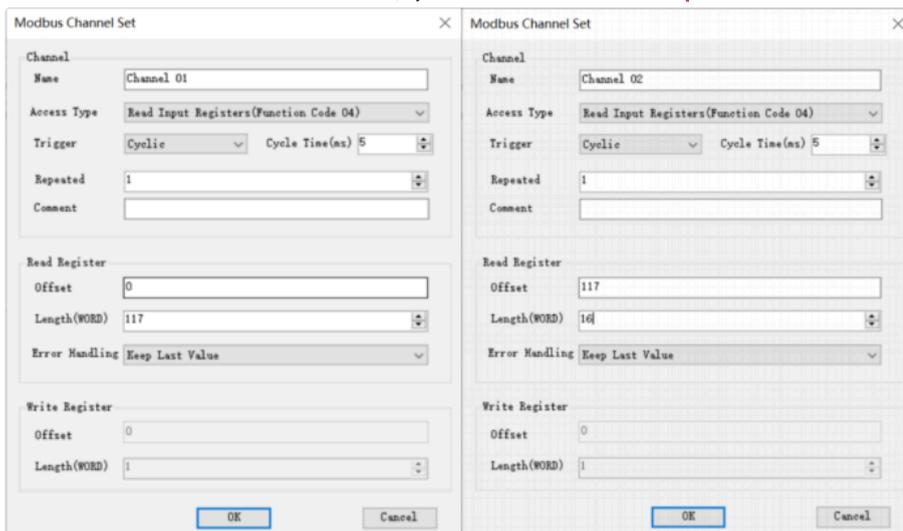
- **Channel01**: Function **F04**, **Offset = 0**, **Length = 117**
(reads all input data before Port 8)
- **Channel02**: Function **F04**, **Offset = 117**, **Length = 16**
(reads Port 8 input data)

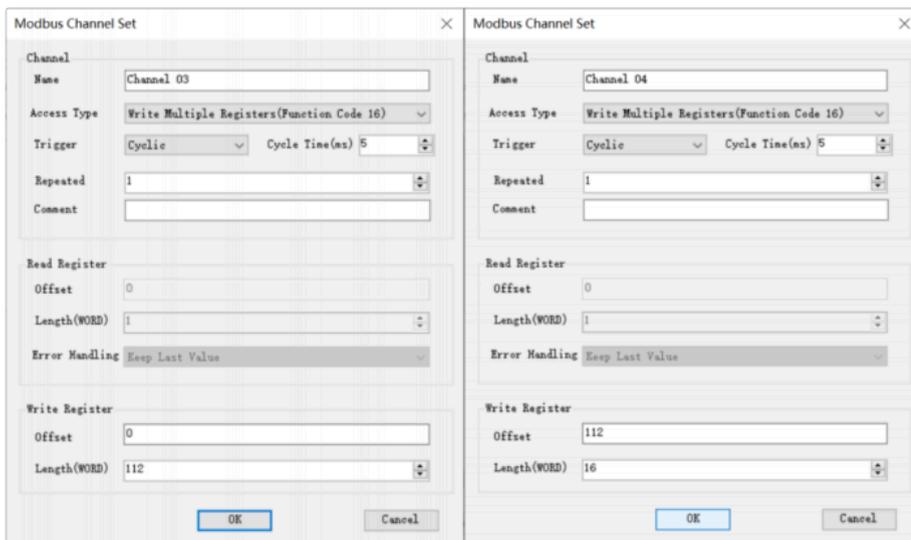
With Channel01 + Channel02, you can read **all input data** of the IO-LINK master.

Write Outputs

- **Channel03**: Function **F16**, **Offset = 0**, **Length = 112**
(writes all output data before Port 8)
- **Channel04**: Function **F16**, **Offset = 112**, **Length = 16**
(writes Port 8 output data)

With Channel03 + Channel04, you can write **all output data** of the IO-LINK master.

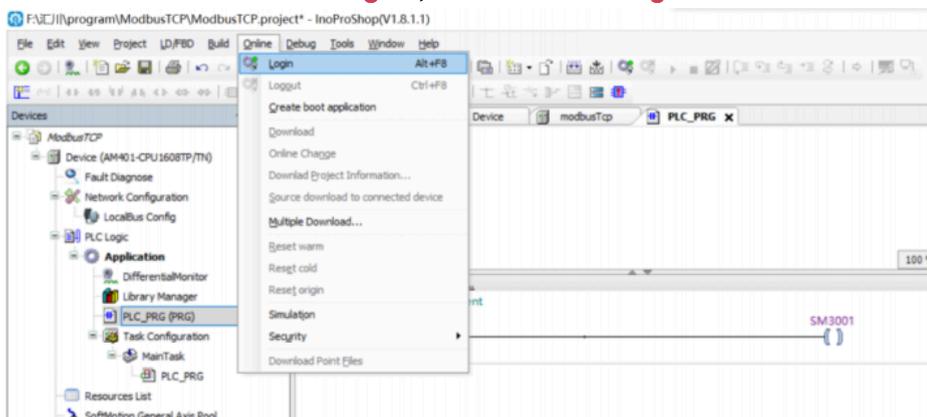


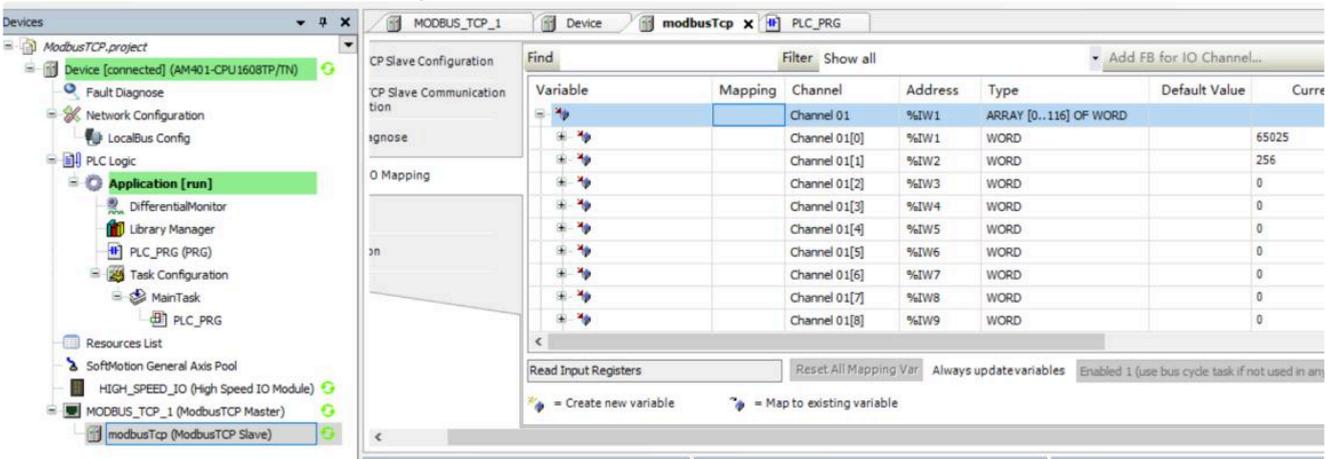
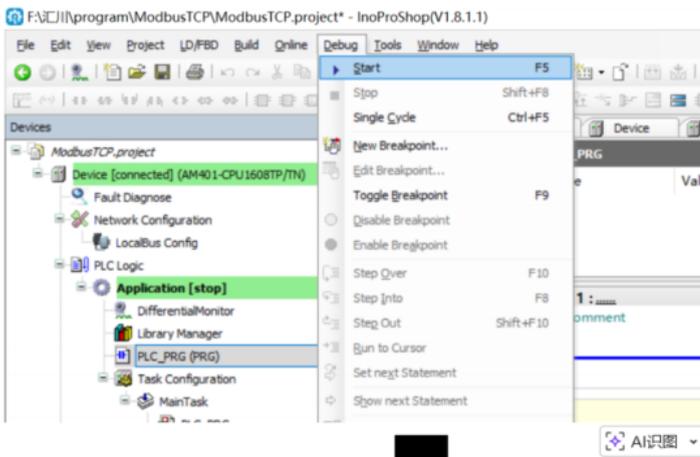


Name	No	Access Type	Trigger	Variable	Read Offset	Length	Error Handling	Write Offset
Channel 01	1	Read Input Registers(Func...	Cyclic, t#5ms		0	117	Keep Last Value	
Channel 02	2	Read Input Registers(Func...	Cyclic, t#5ms		117	16	Keep Last Value	
Channel 03	3	Write Multiple Registers(Fu...	Cyclic, t#5ms					0
Channel 04	4	Write Multiple Registers(Fu...	Cyclic, t#5ms					112

11) Go Online and Start Debugging

Set the slave enable variable **SM3001 = 1** (can be set in the program).
Then click **“Online”** → **“Login”**, and click **“Debug”** → **“Start.”**





Appendix

1) IO-LINK Process Data Input (133 Words)

Supports 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 <table border="1"> <tr><th>位</th><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr> <tr><th>端口</th><td>C8</td><td>C7</td><td>C6</td><td>C5</td><td>C4</td><td>C3</td><td>C2</td><td>C1</td></tr> </table>	位	7	6	5	4	3	2	1	0	端口	C8	C7	C6	C5	C4	C3	C2	C1
		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 <table border="1"> <tr><th>位</th><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr> <tr><th>端口</th><td>C8</td><td>C7</td><td>C6</td><td>C5</td><td>C4</td><td>C3</td><td>C2</td><td>C1</td></tr> </table>	位	7	6	5	4	3	2	1	0	端口	C8	C7	C6	C5	C4	C3	C2	C1		
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)

Supports function codes:

- **F03** (Read Holding Registers)
- **F16** (Write Multiple Holding Registers)
- **F23** (Read/Write Multiple Holding 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 <table border="1"> <tr> <td>位</td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td>端口</td> <td>C8</td> <td>C7</td> <td>C6</td> <td>C5</td> <td>C4</td> <td>C3</td> <td>C2</td> <td>C1</td> </tr> </table>	位	7	6	5	4	3	2	1	0	端口	C8	C7	C6	C5	C4	C3	C2	C1
		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 <table border="1"> <tr> <td>位</td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td>0</td> </tr> <tr> <td>端口</td> <td>C8</td> <td>C7</td> <td>C6</td> <td>C5</td> <td>C4</td> <td>C3</td> <td>C2</td> <td>C1</td> </tr> </table>	位	7	6	5	4	3	2	1	0	端口	C8	C7	C6	C5	C4	C3	C2	C1
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)																		