GW6L-A0(L256)

EtherCAT Protocol Gateway Module

User Manual

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1 Product Overview

1.1 Product Introduction

GW6L-A0(L256) is a plug-in EtherCAT protocol conversion gateway module. As a slave module, GW6L-A0(L256) can form a gateway kit with other gateway slave modules. Different gateway kit combinations can transmit 256 bytes of IO data bidirectionally between two master stations , such as EtherCAT , PROFINET, EtherNet/IP , CC-Link, PROFIBUS- DP , DeviceNet master , etc. It has the advantages of high real-time performance, optimized system configuration, simplified field wiring, and improved system reliability, realizing the communication needs of connecting different networks quickly and efficiently.

1.2 Product Features

- Supports conversion between multiple types of protocols
  EtherCAT, PROFINET, EtherNet/IP , CC-Link, PROFIBUS- DP , and DeviceNet are arranged and combined in pairs.
- Supports bidirectional transmission of IO data between two protocols
  The data exchange length supports 256 bytes .
- Small size
  Compact structure and small space occupation.
- Easy diagnosis
  The innovative channel indicator light design is close to the channel, so the channel status is clear at a glance and detection and maintenance are convenient.
- Easy configuration
  The configuration is simple and supports mainstream master stations such as EtherCAT , PROFINET and EtherNet/IP .
- Easy to install
  DIN 35 mm standard rail installation
  It uses spring-type terminal blocks and standard RJ45 network interface , making wiring quick and easy.

2 Designation Rules

2.1 Gateway Designation Rules

GW 6 L - A 0 (L256)
(1) (2)(3) (4)(5) (6)

Number	Meaning	Description
(1)	Gateway Abbreviation	GW: Gateway
(2)	Product series	6 : Plug-in
(3)	Gateway Version	L: Limited length version U: Universal version E： Extended
(4)	Bus protocol	A: EtherCAT B : PROFINET C : EtherNet/IP D: CC-Link E: DeviceNet F: PROFIBUS-DP G : Modbus TCP H : CANopen I : CC-Link IE Field Basic J： MECHATROLINK
(5)	Module Type	0 : Slave module 1: Master module

(6)	Annotation Table	L 256 : Data exchange length 256 bytes

2.2 Gateway Kit Designation Rules

GW 6 L - A 0 B 0 (L256)
(1) (2)(3) (4)(5)(6)(7) (8)

Number	Meaning	Value Description
(1)	Gateway Abbreviation	GW: Gateway
(2)	Product range	6 : Insert type
(3)	Gateway Version	L: Limited length version U: Universal version E: Extended
(4)	Bus protocol	A: EtherCAT B : PROFINET C : EtherNet/IP D: CC-Link E: DeviceNet F: PROFIBUS-DP G : Modbus TCP H : CANopen I : CC-Link IE Field Basic J: MECHATROLINK
(5)	Module Type	0 : Slave module 1: Master module
(6)	Bus protocol	A: EtherCAT B : PROFINET C : EtherNet/IP D: CC - Link E: DeviceNet F: PROFIBUS-DP G : Modbus TCP H : CANopen I : CC - Link IE Field Basic J: MECHATROLINK
(7)	Module Type	0 : Slave module 1: Master module

(8)	Annotation Table	L 256 : Data exchange length 256 bytes

2.3 List of frequently used modules /kits

Model	**Product Description**
GW6L-A0(L256)	Plug- in gateway EtherCAT slave module (fixed length 256 bytes)
GW6L-B0(L256)	Plug- in gateway PROFINET slave module (fixed length 256 bytes)
GW6L-C0(L256)	Plug-in gateway EtherNet/IP slave module (fixed length 256 bytes)
GW6L- D0 (L256)	Plug-in gateway CC - Link slave module (fixed length 256 bytes)
GW6-P20HM	Plug-in gateway power module
GW6-CVR	Plug-in gateway end cap
GW6L-A0A0(L256)	Plug-in gateway EtherCAT slave to EtherCAT slave kit (fixed length 256 bytes)
GW6L-A0B0(L256)	Plug-in gateway EtherCAT slave to PROFINET slave kit (fixed length 256 bytes)
GW6L-A0C0(L256)	Plug-in gateway EtherCAT slave to EtherNet/IP slave kit (fixed length 256 bytes)
GW6L-A0D0(L256)	Plug-in gateway EtherCAT slave to CC - Link slave kit (fixed length 256 bytes)

Note: The gateway kit includes gateway power module × 1, gateway module × 2 , and gateway end cap × 1.

3 Product Parameters

3.1 General parameters

General technical parameters		
Specifications and dimensions	Power module GW6-P20HM	106 × 61 × 22 mm
	Gateway module GW6L-A0(L256)	106 × 61 × 2 5 . 7 mm
	end cap GW6-CVR	106 × 6 1 × 7 .7 mm
Weight	Power module GW6-P20HM	110 g
	Gateway module GW6L-A0(L256)	80 g
	End cap GW6-CVR	20 g
Operating temperature	-10 ℃~ + 60 ℃	
Storage temperature	-20 ℃~ + 75 ℃	
Relative humidity	95 %, non- condensing	
Protection level	IP20	
Installation	DIN 35 mm standard rail installation	

3.2 Power parameters

Power parameters		
Power module GW6-P20HM	Working power supply	24 VDC (18V~30V)
	Output voltage	5 VDC
	Output Current	2 A
Gateway module GW6L-A0(L256)	Working power supply	5 VDC

	Working current	400mA
	power	2 W

3.3 Interface parameters

EtherCAT Interface Parameters	
Product Model	GW6L-A0(L256)
Bus protocol	EtherCAT
Data transmission medium	Ethernet/EtherCAT CAT5 Cables
Transmission distance	≤ 100 m (distance between stations)
Transmission rate	100 Mbps
Bus interface	2 × RJ45
Process data volume: Downstream	256 Bytes
Process data volume: upstream	256 Bytes

4 panel

4.1 Product Structure

Product Parts Name

4.2 Application

Gateway kit (power module + gateway module 1 + gateway module 2 + end cap)

Taking the GW6L-A0B0(L256) gateway kit as an example, the application method is shown in the figure below.

4.3 Indicator light function

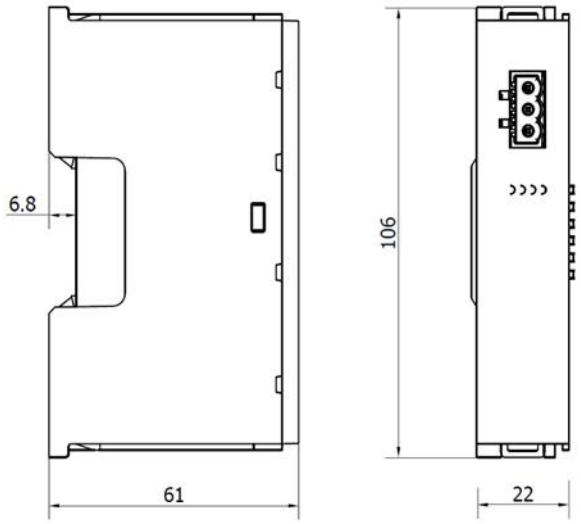
Power module identification and indicator lights				
Name	**Logo**	**Color**	**Status**	**Status description**
5V power indicator	P	GREEN	ON	Working power is normal
			Flashing	Overload 80 % , cut off the power supply to the subsequent load
			OFF	The product is not powered or the power supply is abnormal
Load indicator light	O	RED	OFF	Not overloaded
			ON	Load reaches 90 %
			Flashing	Overload 80 % , cut off the power supply to the subsequent load

Gateway module identification and indicator lights				
Name	**Logo**	**Color**	**Status**	**Status description**
Power indicator	P	GREEN	ON	Working power is normal
			OFF	The product is not powered or the power supply is abnormal
System indicator	L	GREEN	ON	Data conversion interaction is normal
			OFF	Data conversion interaction is abnormal
Warning indicator	E	RED	ON	The gateway module is in an abnormal state
			OFF	Initialization state, no power or no error
Operation status indicator	R	GREEN	ON	EtherCAT OP Status
			Flashing 5 Hz	EtherCAT PreOP Status
			Flashing regularly (OFF for 1 s , ON for 200 ms)	EtherCAT SafeOP Status
			OFF	Initialization state or no power on EtherCAT Init state
Network port indicator	IN	ORANGE	Flashing	The connection is established and data is exchanged
			OFF	No data interaction or exception
		GREEN	ON	Establishing a network connection
			OFF	No network connection established or abnormal
	OUT	ORANGE	Flashing	The connection is established and data is exchanged
			OFF	No data interaction or exception
		GREEN	ON	Establishing a network connection
			OFF	No network connection established or abnormal

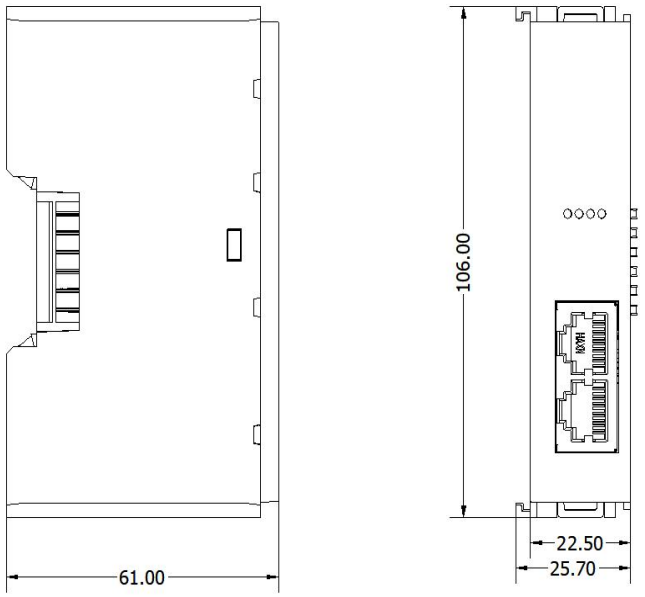
5 Installation and uninstall

5.1 Dimensions

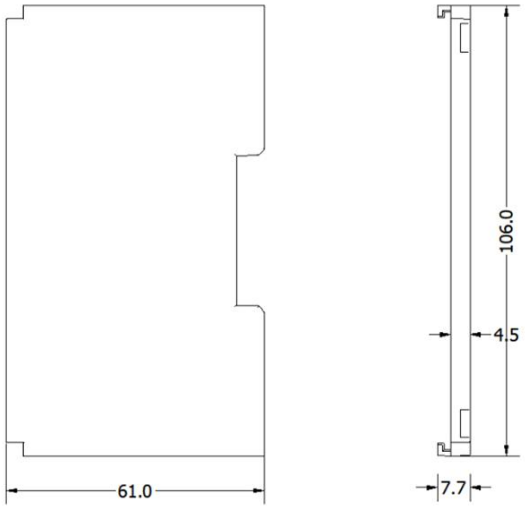
Power module dimensions (unit: mm)



Gateway module dimensions (unit: mm)



End cap dimensions (unit: mm)



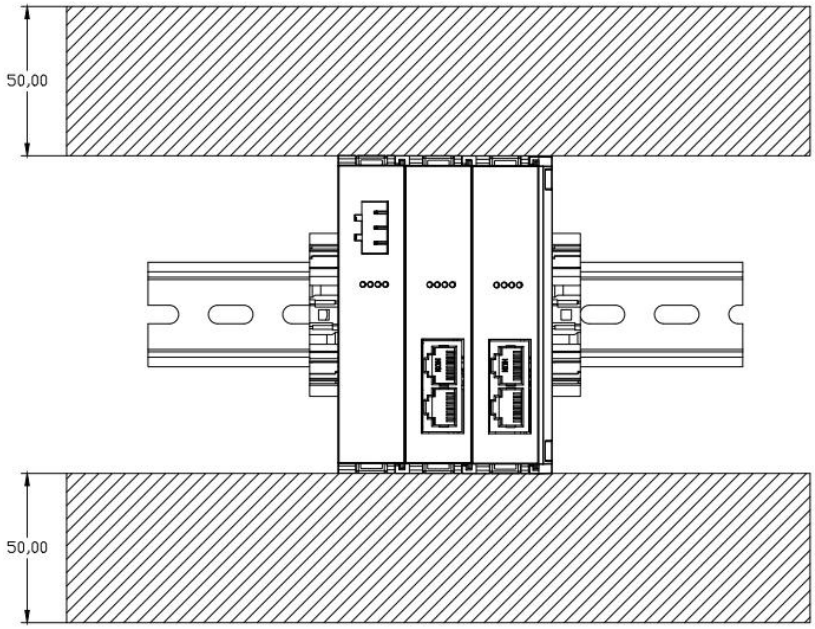
Note: All are installed using DIN 35 mm standard rails , DIN rail specifications are 35*7.5*1.0, 35*15*1.0 (unit: mm).

5.2 Installation Guide

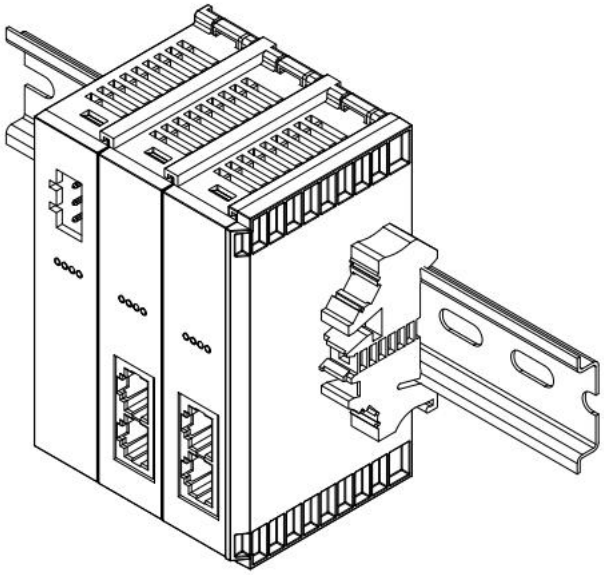
Installation \uninstall precautions

- Ensure that the cabinet has good ventilation measures (such as installing an exhaust fan in the cabinet).
- Do not install this device near or over any equipment that may cause overheating.
- Be sure to install the module vertically and maintain air circulation around it (there should be at least 50 mm of air circulation space above and below the module) .
- After the module is installed, be sure to install the guide rail fixings at both ends to secure the module.
- Installation and uninstall must be operated with the power turned off.

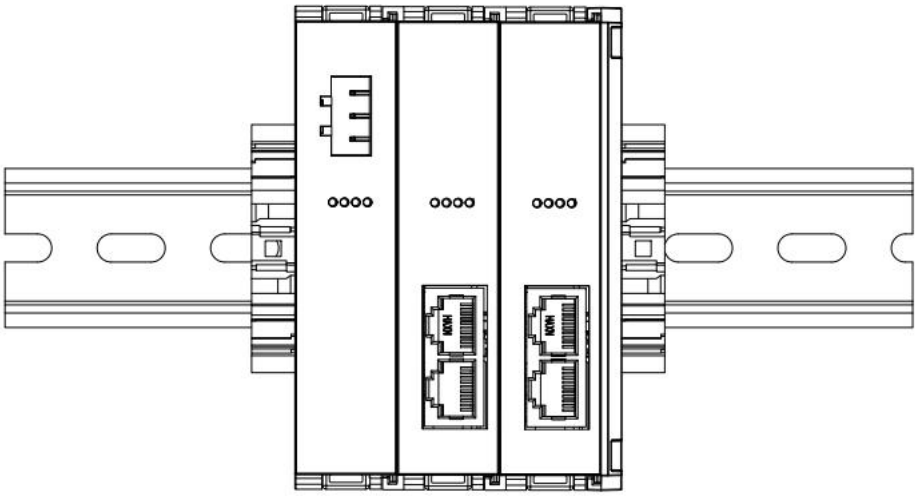
Minimum gap for module installation (≥ 50mm)



Ensure the module is installed vertically



Be sure to install the rail fixings

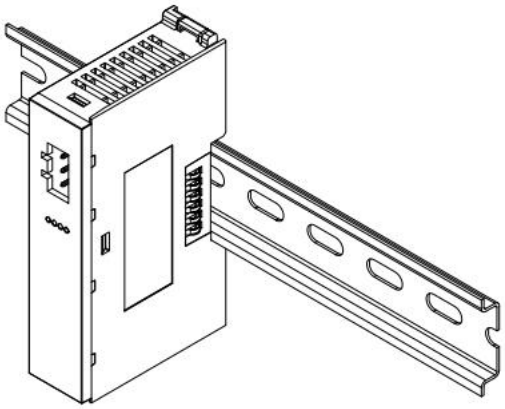


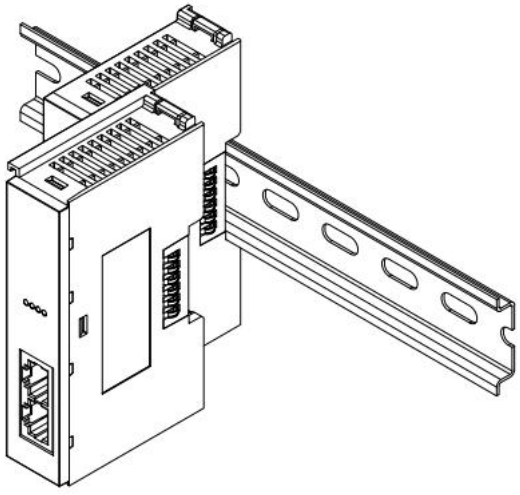
5.3 Installation and removal steps

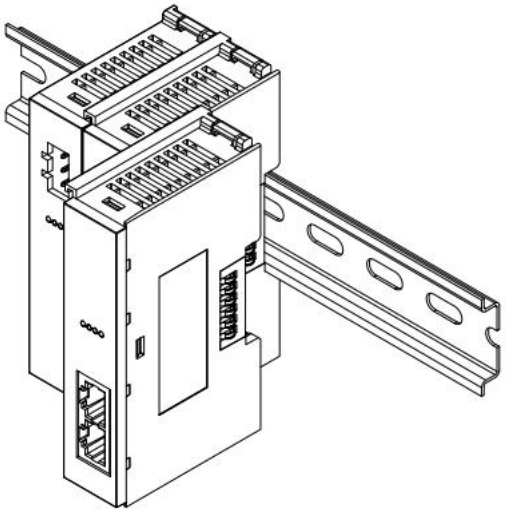
Module installation and removal	
Module installation steps	1. Install the power module on the fixed rail first.
	2. Install the gateway modules on the right side of the power module.
	3. After installing all gateway modules, install the end caps to complete the module installation.
	4. Install the guide rail fixings at both ends of the power module and end cap to fix the module.
Module uninstall steps	1. Loosen the guide rail fixings at both ends of the module.
	2. Use a flat-blade screwdriver to pry open the module buckle.

	3. Pull out the uninstalled module.

5.4 Installation Diagram

Power module installation	**Step**
 ①	Place the power module into the guide slot, align the guide vertically, press the power module firmly, and when you hear a "click" sound, the module is installed in place, as shown in the left figure ①.

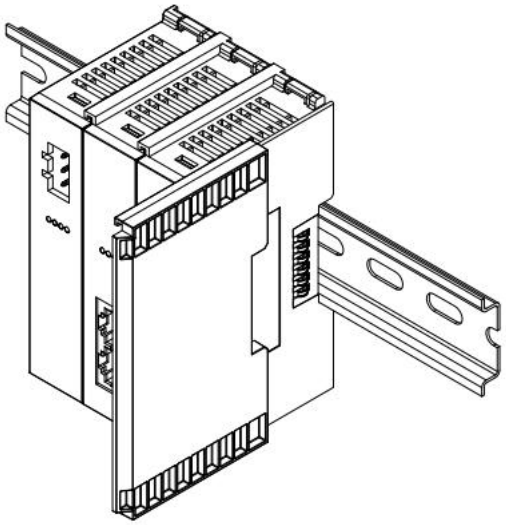
Gateway module installation	**Step**
 ②	Align the gateway module guide slot with the right side of the power module and push it in as shown in the left figure ②. Press the gateway module hard until you hear a "click" sound, and the module is installed in place.



③

Follow the steps of installing the gateway module in the previous step to install the second gateway module , as shown in Figure ③ on the left.

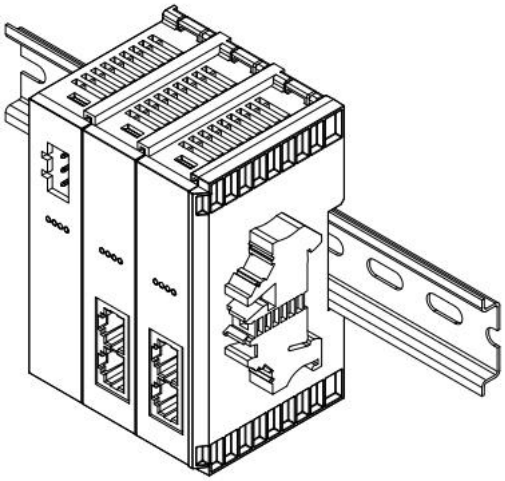
End cap installation	Step



④

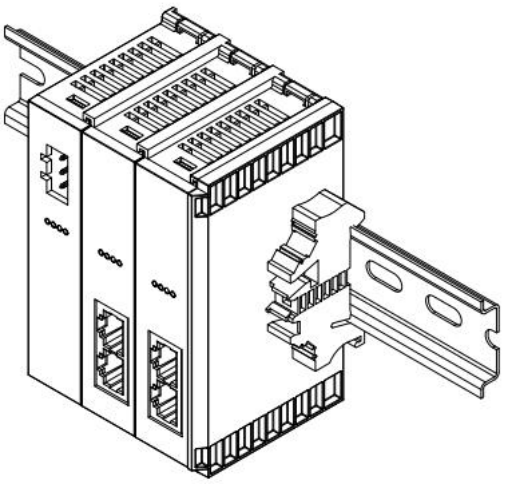
Install the end cap on the right side of the last module, as shown in Figure ④ on the left. For installation methods, refer to the installation method of the gateway module.

Rail fixing installation	Step



⑤

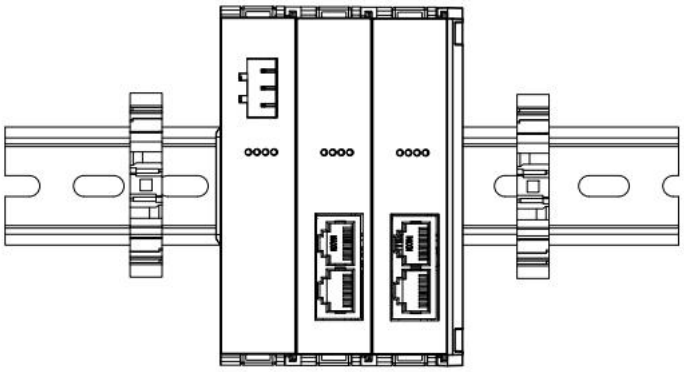
Install the guide rail fixings close to the left side of the power module and the right side of the end cap module, as shown in Figure ⑤ on the left.



⑥

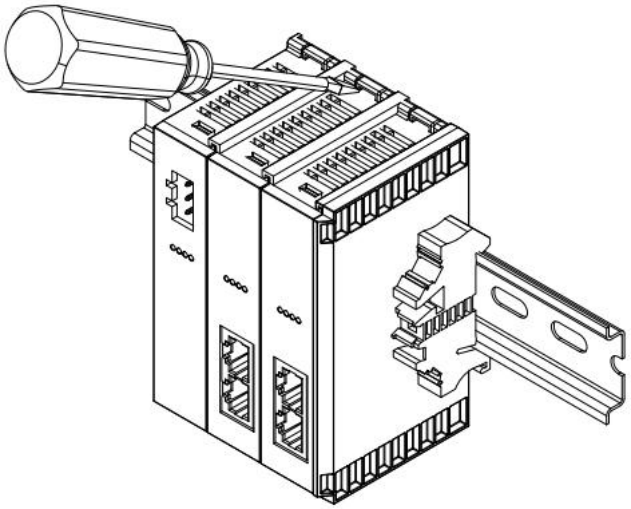
Push the guide rail fixings towards the gateway module to ensure that the module is installed firmly, and tighten the guide rail fixings with a screwdriver, as shown in Figure ⑥ on the left.

Uninstall	Step



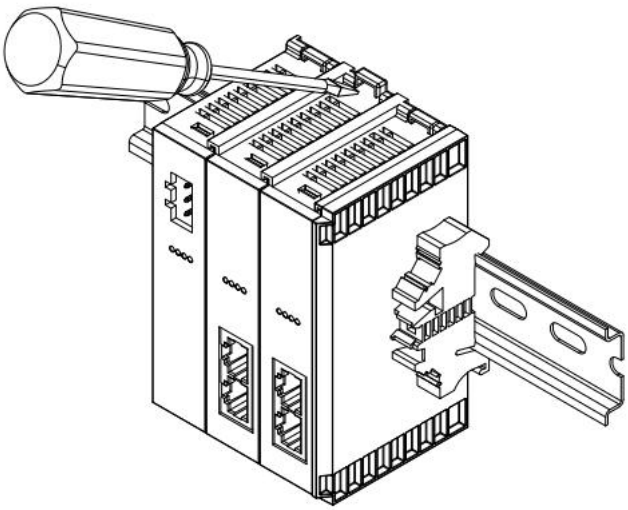
⑦

Use a screwdriver to loosen the guide rail fixing at one end of the module and move it to one side to ensure that there is a gap between the module and the guide rail fixing, as shown in Figure ⑦ on the left.

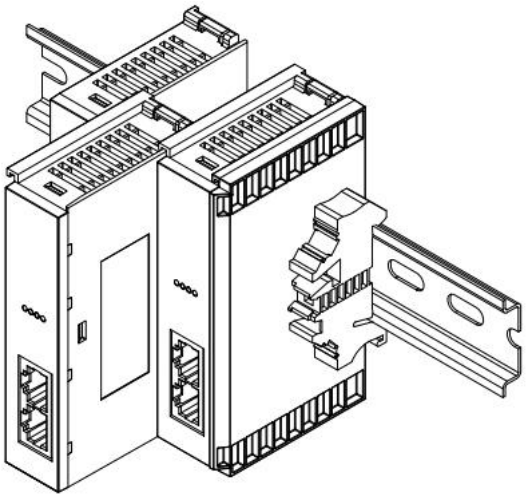


⑧

Insert a flat-head screwdriver into the buckle of the module to be removed, and apply force sideways toward the module (until you hear a sound), as shown in Figures ⑧ and ⑨ on the left.
Note: Each module has a buckle on the top and bottom, and the same method should be used for all modules.



⑨



⑩

Follow the opposite steps of installing the module to remove the module, as shown in the left figure ⑩.

6 Wiring

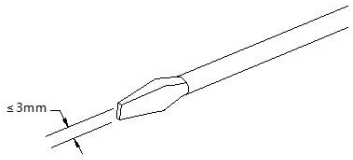
6.1 Terminal Blocks

Terminal Blocks		
Power Terminals	Number of poles	3P
	Wire diameter	22 ~ 16 AWG 0.3 ~1.5 mm²
Bus interface	2× RJ45	Category 5 or above U TP or S TP (STP is recommended)

6.2 Wiring Instructions and Requirements

Wiring tool requirements

The power terminal adopts a screw-free design, and the cable can be installed and removed using a flat-blade screwdriver (specification: ≤3mm) .



Stripping length requirements

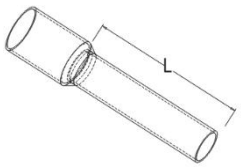
Recommended cable stripping length for the power terminal is 10 mm .

Power module wiring method

For single-strand rigid wire, after stripping the wire to the corresponding length, press the button and insert the single-strand wire at the same time.

For multi-strand flexible wires, after stripping the wires to the corresponding length, you can directly connect them or use the corresponding standard specifications of cold-pressed terminals (tubular insulated terminals, reference specifications are shown in the following table) to insert the wires while pressing the button.

The power terminal specifications are shown in the following table:

Specifications of tubular insulation terminals		
Specifications	Model	Conductor cross-sectional area mm²
 the tubular insulated terminal L is 10 mm	E0310	0.3
	E0510	0.5
	E7510	0.75
	E1010	1.0
	E1510	1.5

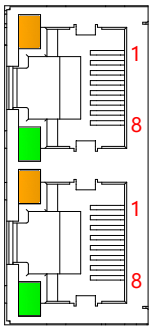
Power Wiring Precautions

- PE must be grounded reliably.

Bus wiring method

It uses standard R J45 network interface and standard Registered jack, and the pin assignment is shown in the following table.

Pin Number	Signal
1	T D+
2	T D-
3	R D+
4	one
5	one
6	R D-
7	one



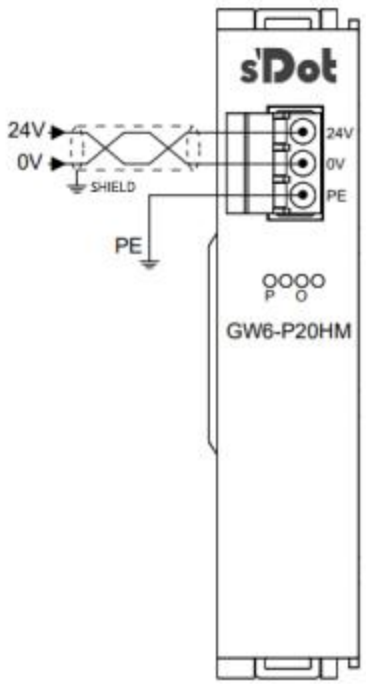
8	one

☛ Precautions

- Double-shielded (braided mesh + aluminum foil) STP cables of category 5 or higher are recommended as communication cables.
- The length of the cable between devices must not exceed 100 m .

Power connection: Power module 3P terminal

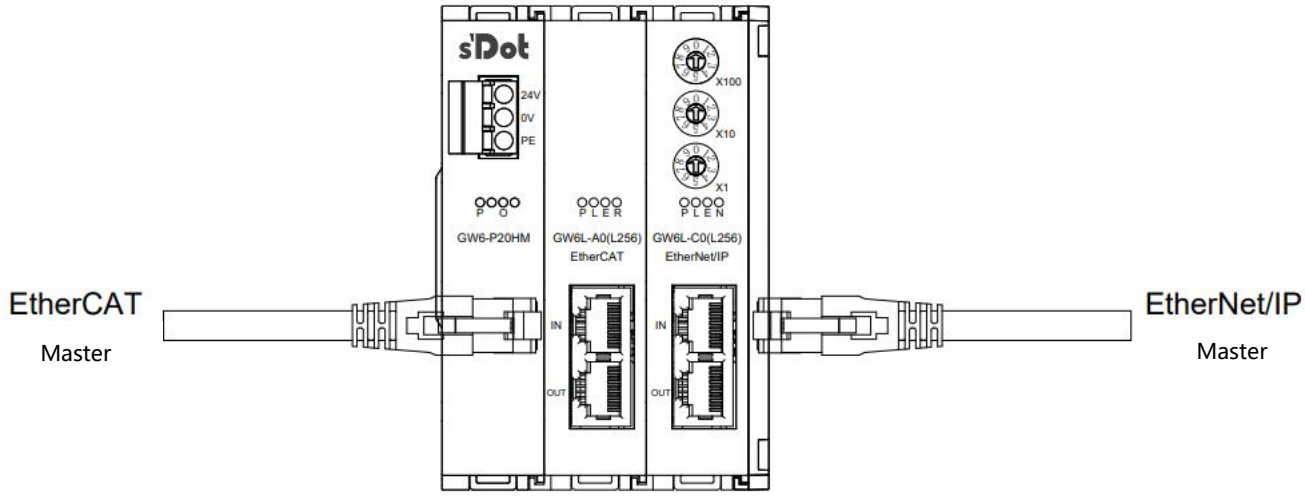
Use a DC24V power module and refer to the wiring method. Connect the power supply according to the circuit shown in the figure below, and ground the PE reliably (twisted pair cable is recommended for the power cable).



※It is recommended to use two-core shielded twisted pair cables for power wiring and ensure reliable grounding.

6.3 Wiring Diagram

Taking GW6L-A0C0(L256) as an example, the topology connection method is shown in the figure below.



7 Operation

7.1 Process data description

upstream data (2 56 bytes)		
Function	**Meaning**	**Address range**
Input Data	The input data of gateway module 1 in the kit corresponds to the output data of gateway module 2	First 255 bytes
	The input data of gateway module 2 in the kit corresponds to the output data of gateway module 1	
Status Bits	0x00 (Hex): No data exchange between gateways	The last byte
	0x01 (Hex): Data exchange between gateways	
	0x02 (Hex): Gateway power-off status	
downstream data (256 bytes)		
Function	**Meaning**	**Address range**
Output Data	Output data of the gateway module	First 255 bytes
Reserve	NULL	The last byte

7.2 Module Configuration Description

7.2.1 Application of GW6L-A0B0(L256) in TwinCAT3 and TIA Portal V17 software

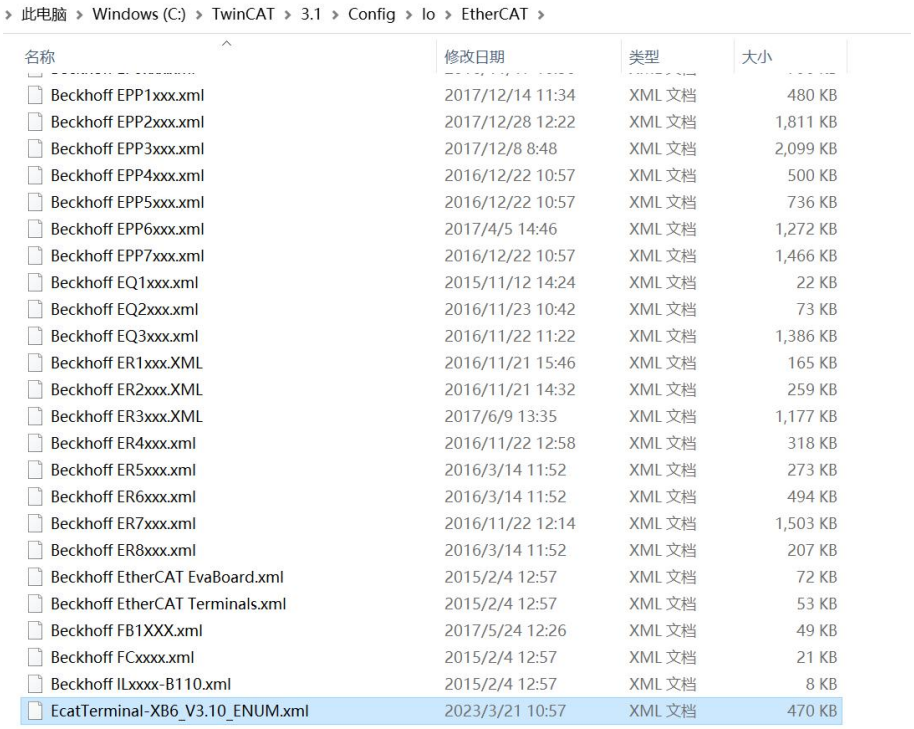
7.2.1.1 Preparation

- **Hardware Environment**
  - **Module Preparation**
    This description takes the GW6L-A0B0 (L256) gateway kit as an example
  - **Two computers, one pre-installed with Twin CAT3 software, one pre-installed with TIA Portal V17 software**
  - **Shielded cable for EtherCAT**
  - **Shielded cable for PROFINET**
  - **A Siemens PLC**
    This description takes Siemens S7-1200 CPU 1214C DC/DC/DC as an example
  - **Two switching power supplies**
  - **Module installation rails and rail fixings**
  - **Device Profile**
    Configuration file acquisition address: https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**
  Please follow the instructions in " 5 Installation and uninstall " and " 6 Wiring "

7.2.1.2 Communication connections in TwinCAT 3 software

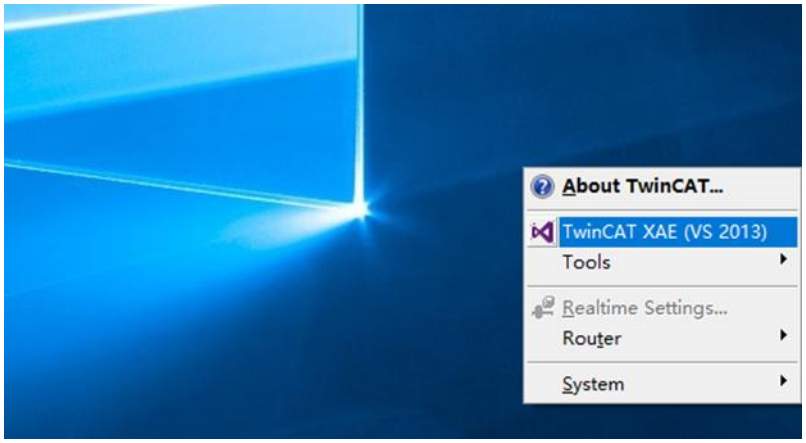
1、 Preset GW6L-A0(L256) configuration file

a. Place the ESI configuration file (EcatTerminal-XB6_V3.10_ENUM.xml) in the TwinCAT installation directory " C:\TwinCAT\3.1\Config\Io\EtherCAT " , as shown in the figure below .

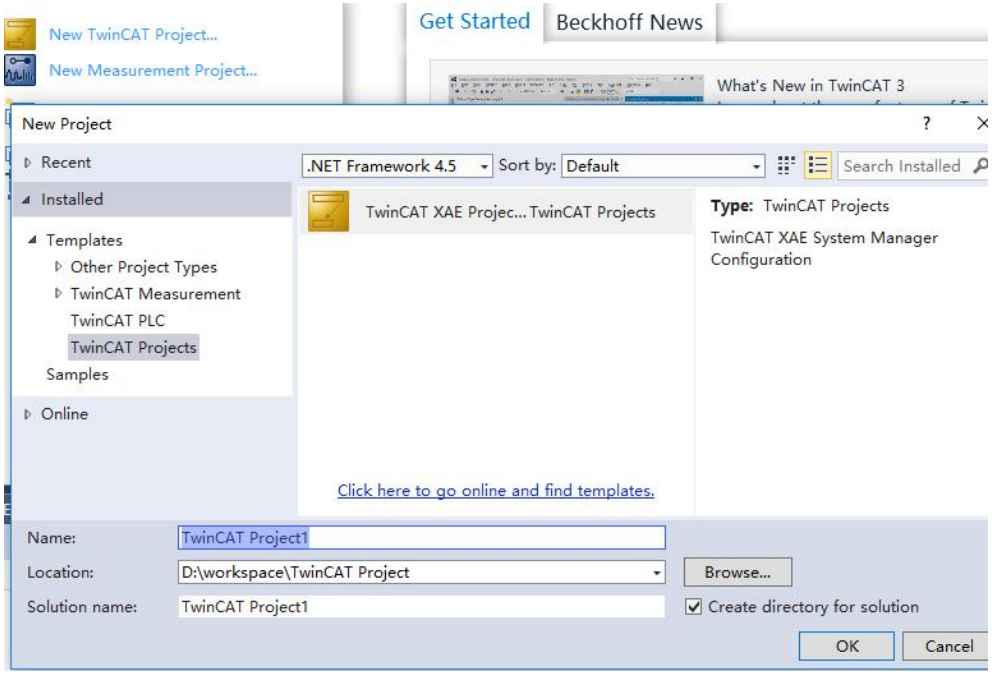


2、 Create a project

a. Click the TwinCAT icon in the lower right corner of the desktop and select "TwinCAT XAE (VS xxxx)" to open the TwinCAT3 software, as shown in the figure below.

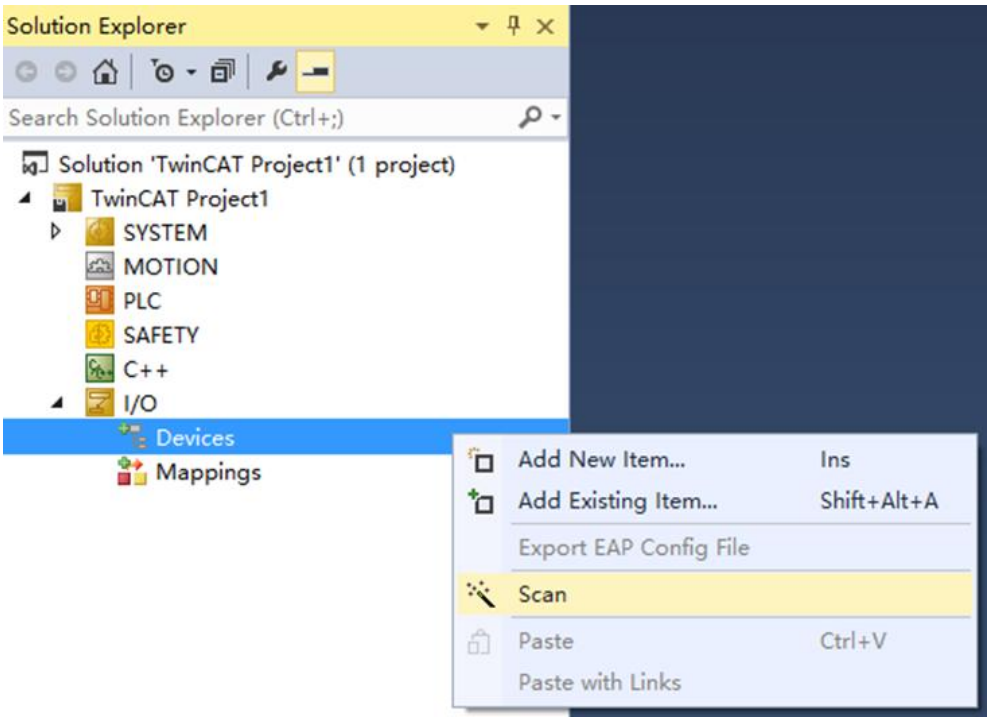


b. Click " New TwinCAT Project". In the pop-up window, "Name" and "Solution name" correspond to the project name and solution name respectively, and "Location" corresponds to the project path. You can select the default for these three items. Click "OK" and the project is created successfully , as shown in the figure below.



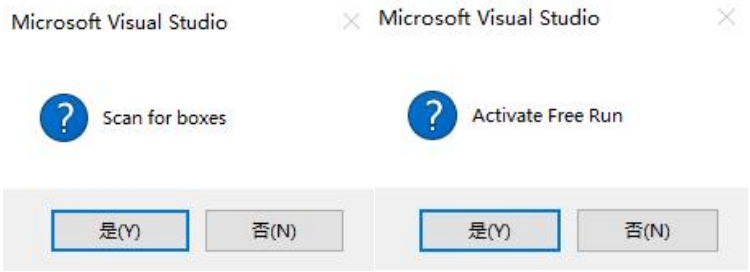
3、Scan Devices

a. After creating the project, right-click the "Scan" option under " I/O - > Devices" to scan the slave devices , as shown in the figure below.

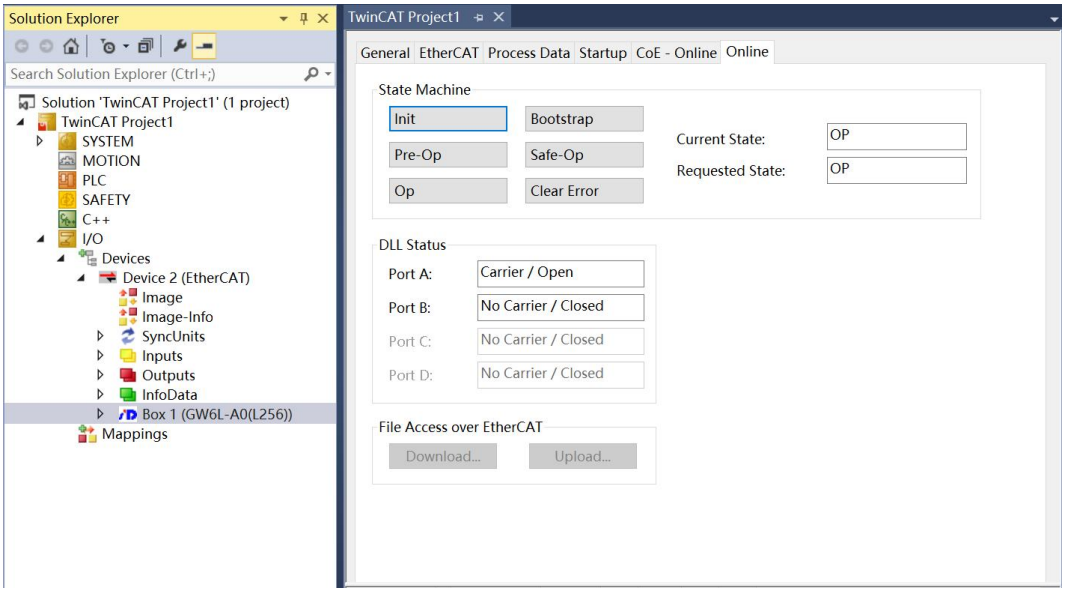


b. Check the "Local Area Connection " network card, as shown in the figure below.

c. A pop-up window "Scan for boxes " appears, click and select "Yes"; a pop-up window "Activate Free Run " click and select "Yes", as shown in the following figure.

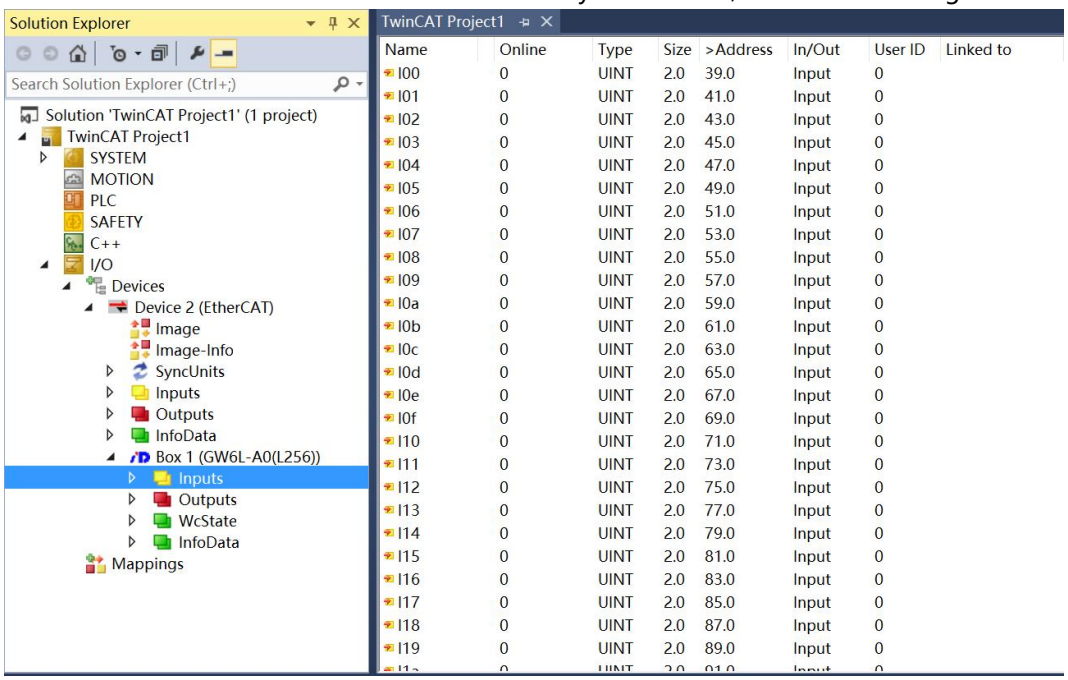


d. After scanning the device, you can see Box 1 (GW6L-A0(L256)) in the left navigation tree. Under " Online " , you can see that TwinCAT is in "OP" state. You can also observe that the RUN light of the slave device is ON , as shown in the figure below.

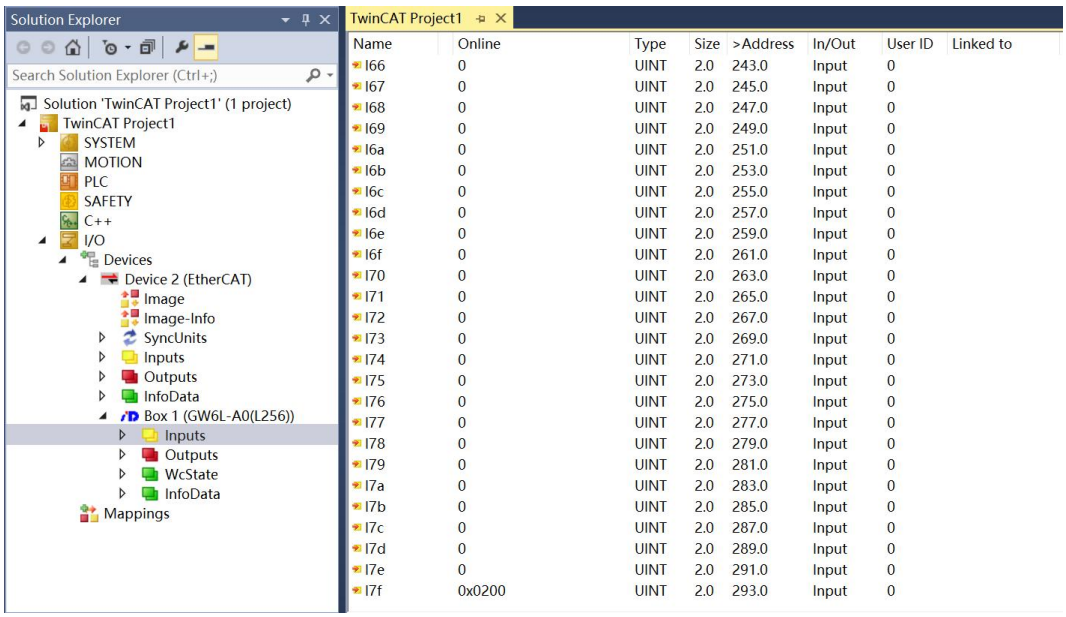


4、View upstream and downstream data

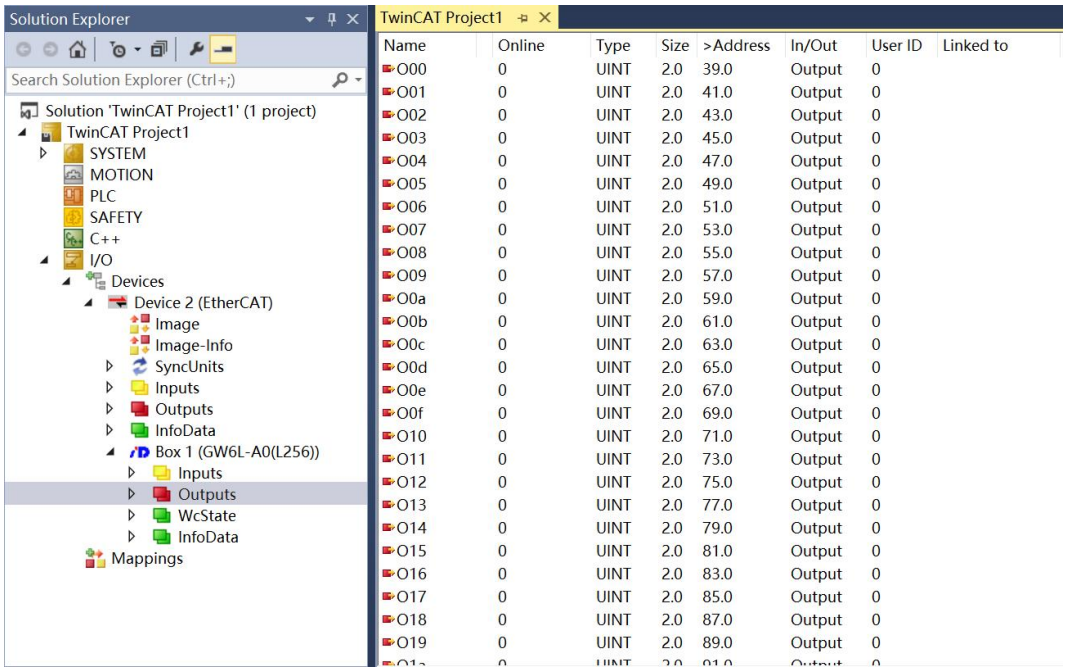
a. The left navigation tree "Box 1 - > "Inputs" displays the upstream data of the gateway module, which is used to check whether the data is correctly transmitted, as shown in the figure below.



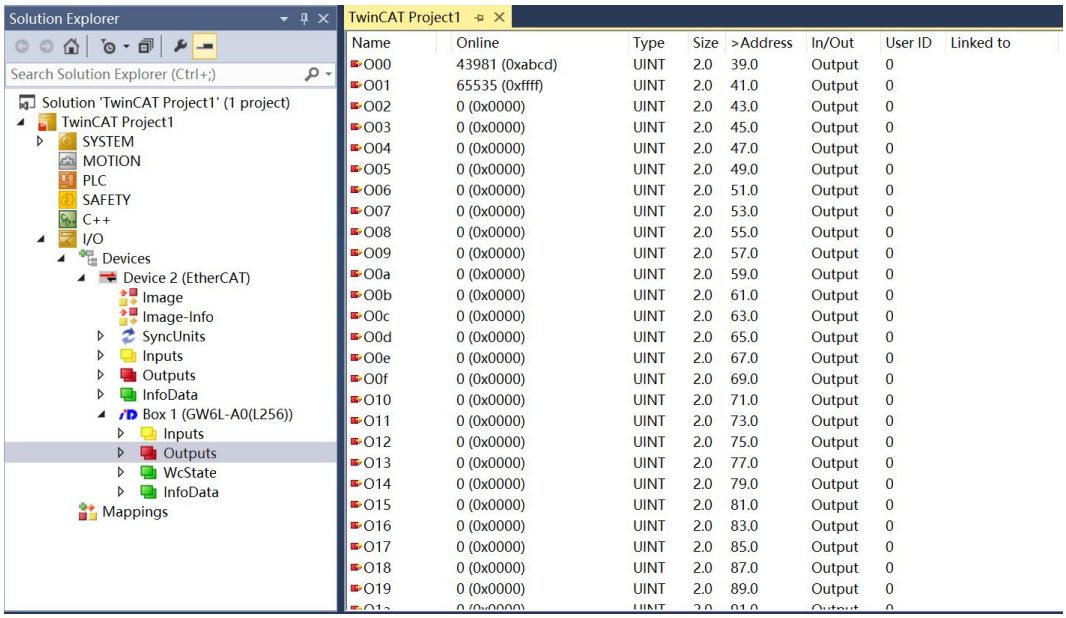
b. In this example, the 39~293 byte range of the upstream data is input data, totaling 255 bytes ; the 294th byte , which is the last byte, is the state bit, as shown in the following figure.



c. The left navigation tree "Box 1 - > Outputs " displays the downstream data of the gateway module and is used to force output data, as shown in the figure below.



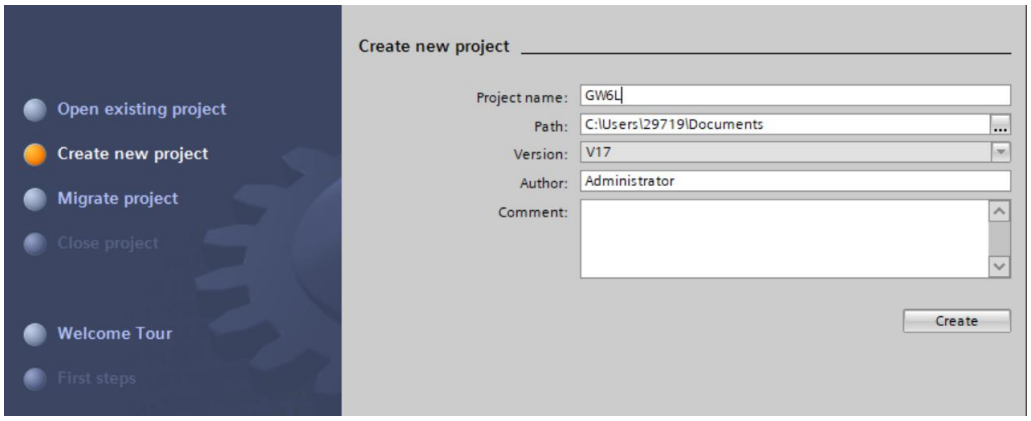
d. Right-click any double byte, such as "O00 ", and select "Display Mode" can set the data display format to hexadecimal/decimal, select "Online After the value is written into the "Write" line, the figure below is shown.



7.2.1.3 Communication connections in TIA Portal V17 software

1、New Construction

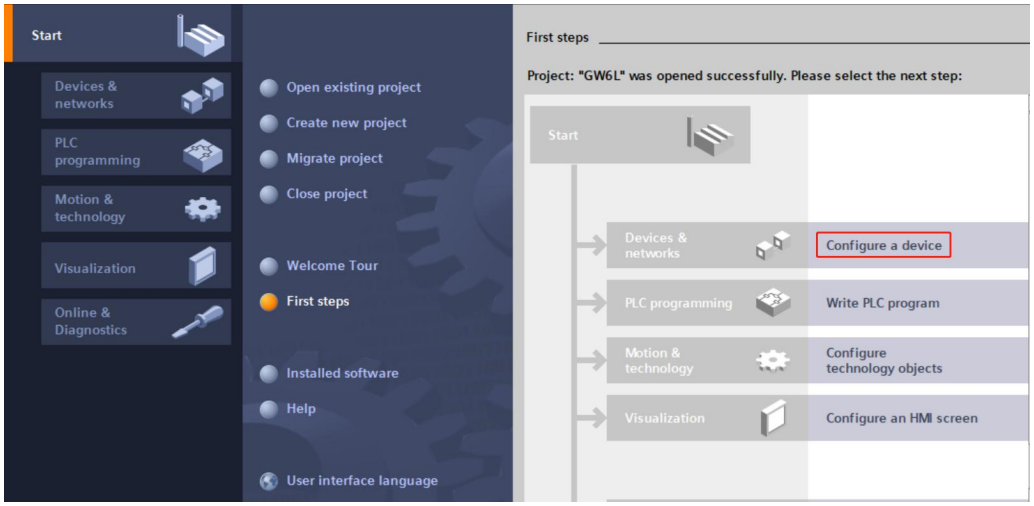
a. Open the TIA Portal V17 software and click "Create New Project".



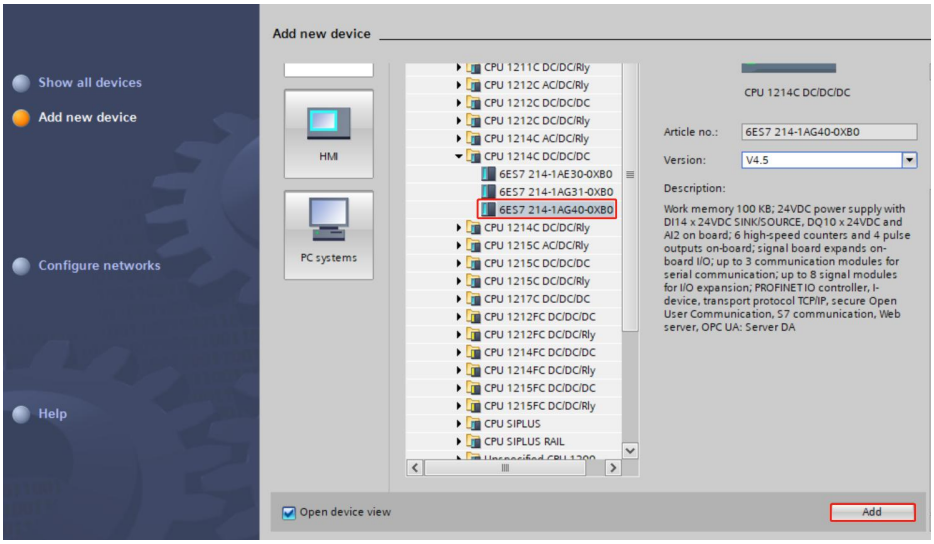
- Project name: Custom, you can keep the default.
- Path: The project path can be kept as default.
- Version: You can keep the default value.
- Author: You can keep the default value.
- Note: Customized, optional.

2、Add a PLC controller

a. Click "Configure Device", as shown in the following figure.

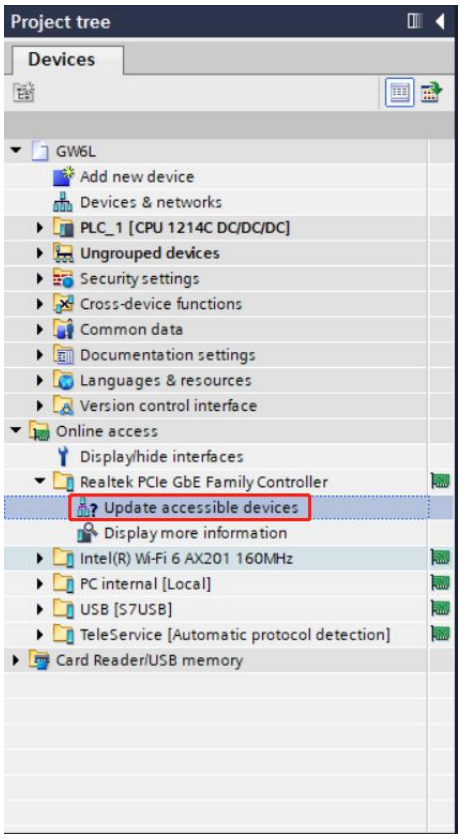


b. Click "Add New Device", select the PLC model currently used , and click "Add", as shown in the figure below. After adding, you can see that the PLC has been added to the device navigation tree.

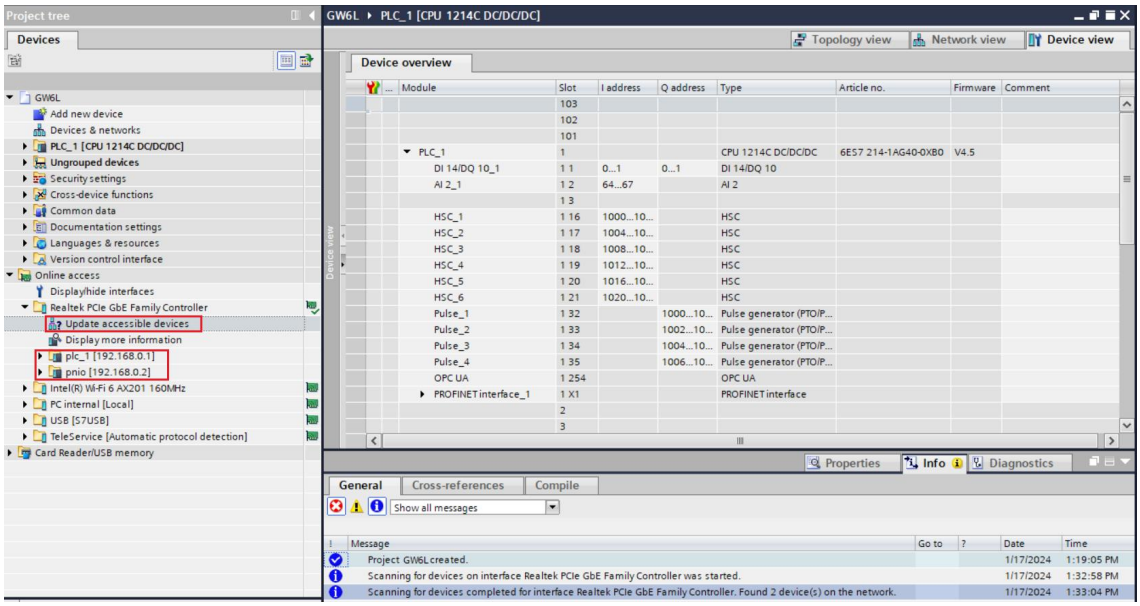


3、Scan for connected devices

a. Click “Online Access -> Update Accessible Devices” in the left navigation tree as shown below.



b. After the update is completed, the connected slave devices are displayed, as shown in the figure below.



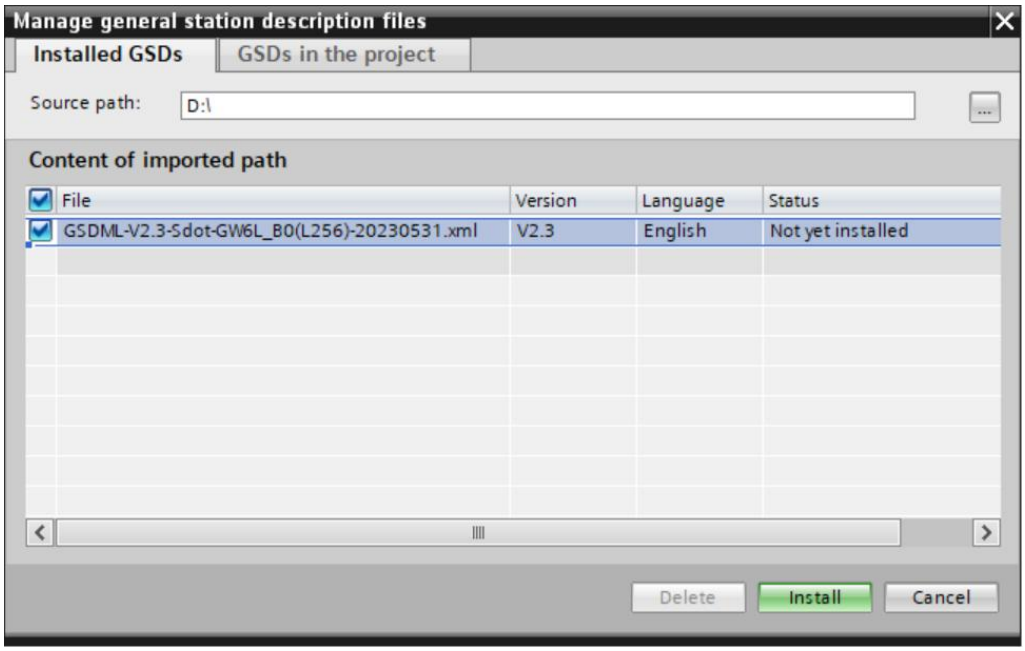
The computer's IP address must be in the same network segment as the PLC. If not, change the computer's IP address and repeat the above steps.

4、Adding a GSD file

a. In the menu bar, select "Options -> Manage General Station Description Files (GSDML) (D)".

b. Click “Source Path” to select the file.

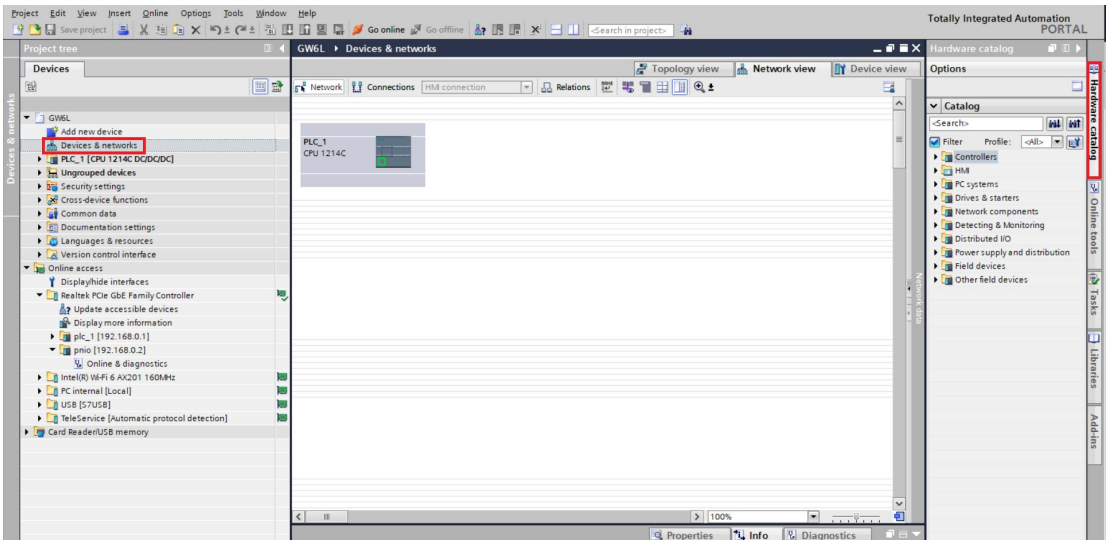
c. Check whether the status of the GSD file to be added is "Not Installed" . If not installed, click "Install" . If already installed, click "Cancel" to skip the installation step.



5、Adding a slave device

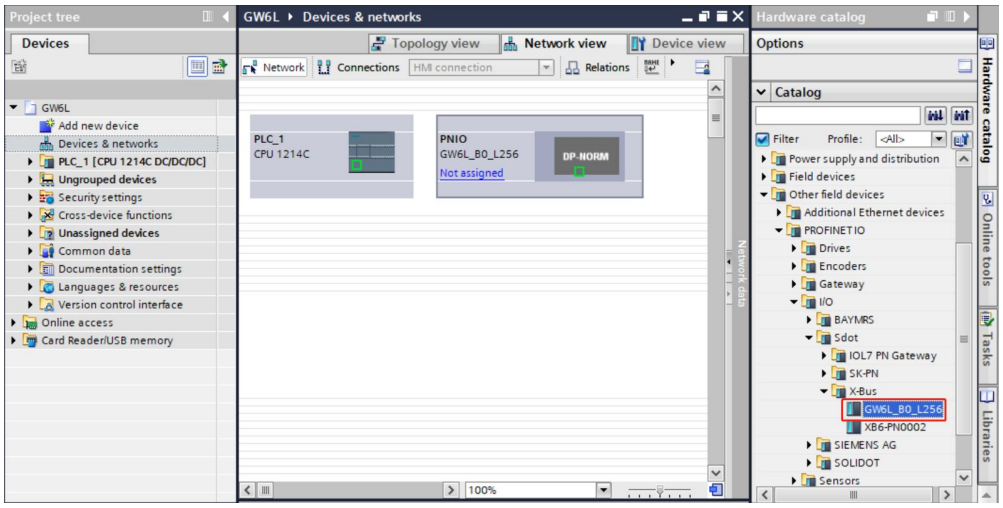
a. Double click on “Devices&Networks” in the left navigation tree.

b. Click the vertical button of "Hardware Catalog" on the right, and the catalog will be displayed as shown in the figure below.

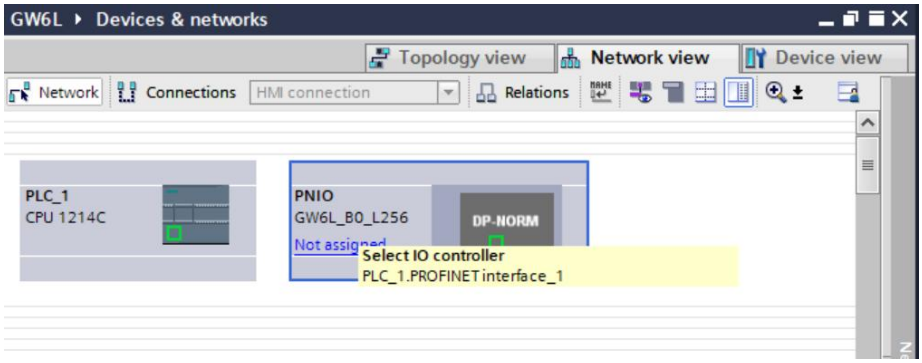


c. Select "Other field devices -> PROFINET IO -> Gateway -> Sdot -> X-Bus -> GW6L-B0(L256)".

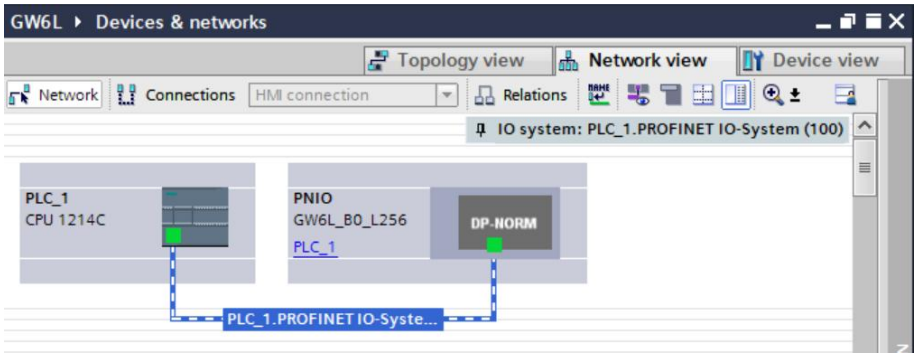
d. Drag or double-click "GW6L-B0(L256)" to the "Network View", as shown in the figure below .



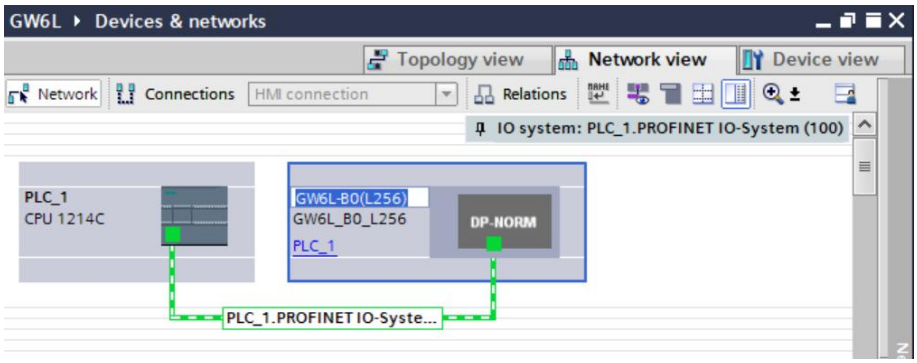
e. Click "Not assigned (blue font)" on the slave device and select "PLC_1.PROFINET Interface_1", as shown in the following figure.



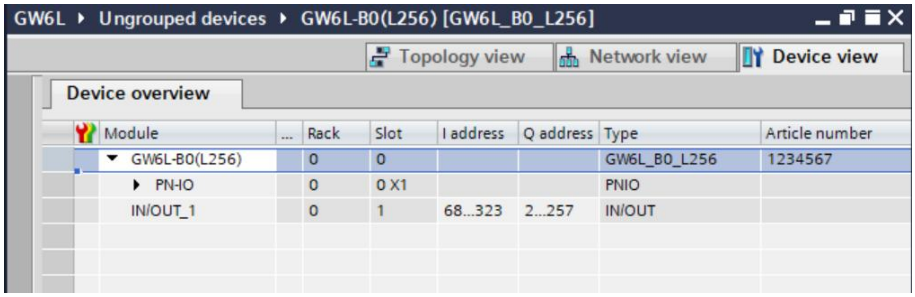
f. After the connection is completed, it will be as shown in the figure below.



g. Click the device name to rename the device, as shown in the following figure.

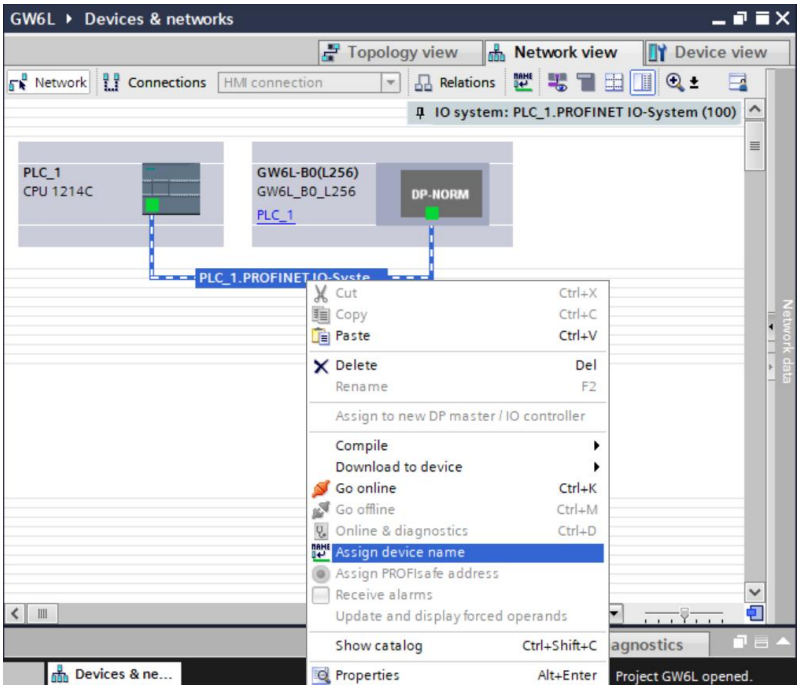


h. Click "Device View" to enter the device overview, where you can see the topology configuration information, including the I/O addresses automatically assigned by the system. The I/O addresses can be changed by yourself, as shown in the figure below.

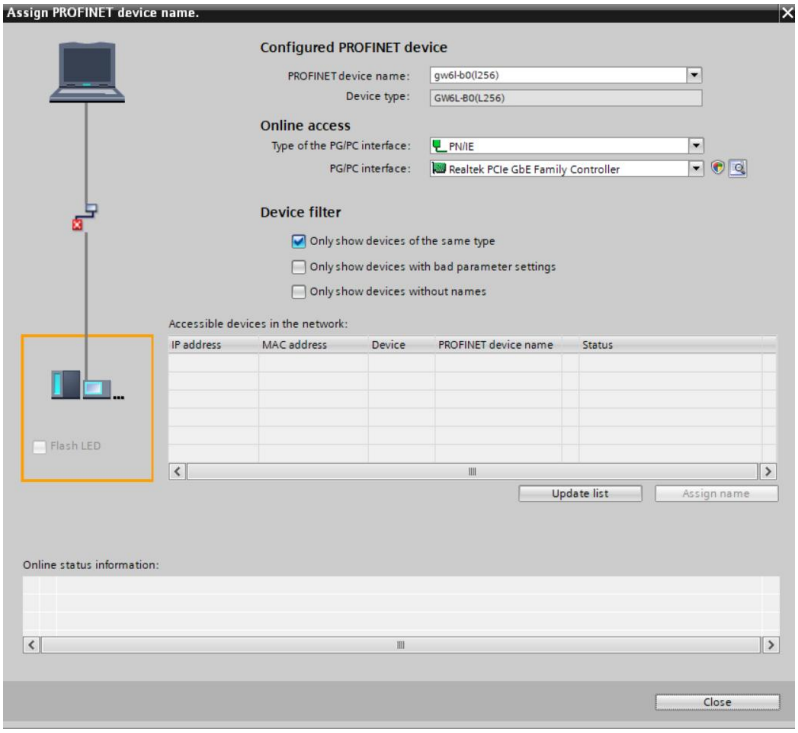


6、Assigning a Device Name

a. Switch to "Network View", right-click the connection line between PLC and GW6L-B0(L256) and select "Assign Device Name".



b. "Assign PROFINET Device Name" window pops up, as shown below.

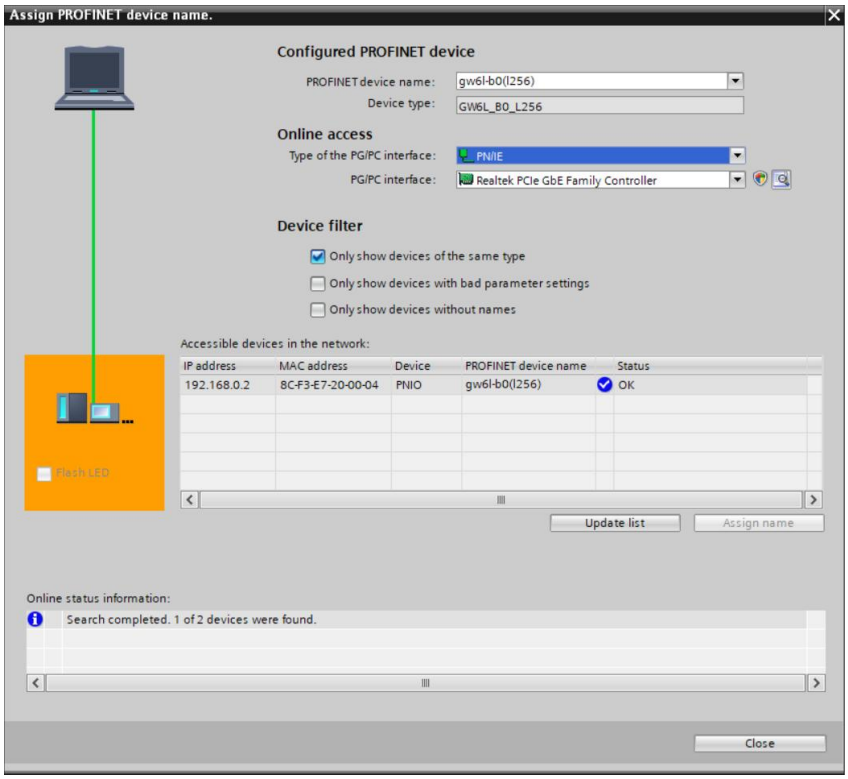


Check whether the MAC address on the module silkscreen is the same as the MAC address of the assigned device name.

- PROFINET device name: The name set in "Assign IP address and device name to slave".

- Type of PG/PC interface: PN/IE.
- PG/PC interface: The network adapter actually used.

c. Select the slave devices one by one, click "Update List", and then click "Assign Name". Check whether the node status in "Accessible Nodes in Network" is "OK", as shown in the following figure.



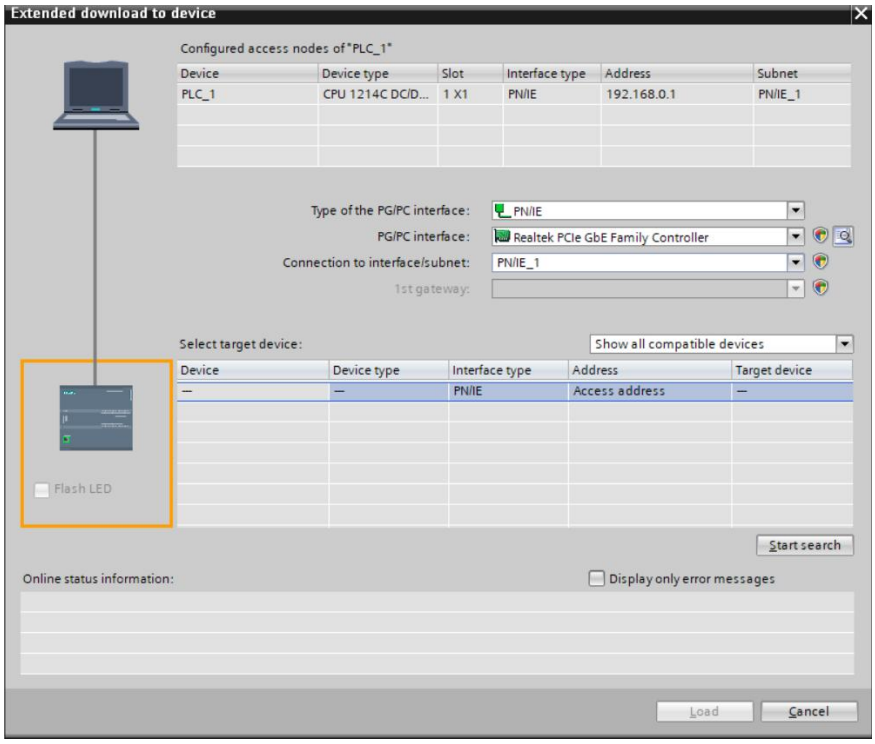
d. Click "Close".

7、Downloading the configuration structure

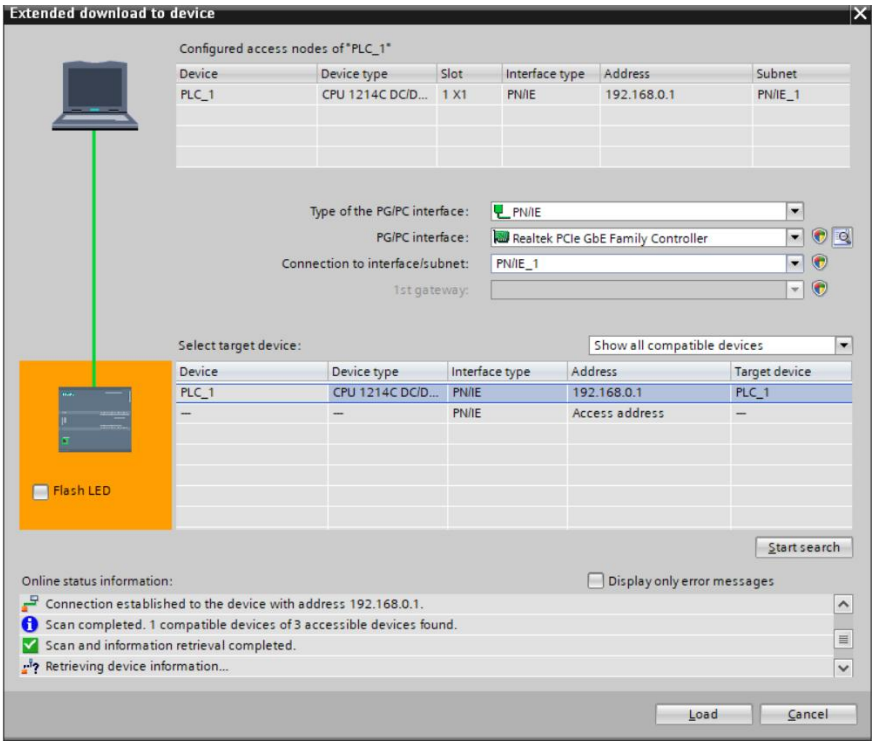
a. In the “Network View”, select the PLC.

b. Click the button in the menu bar to download the current configuration to the PLC.

c. In the pop-up "Extended Download to Device" interface, configure as shown below.

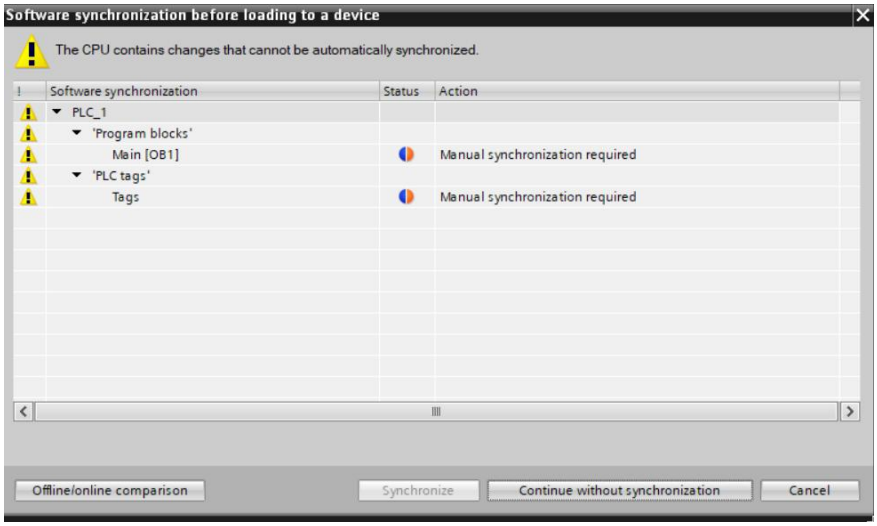


d. Click the “Start Search” button as shown in the following figure.

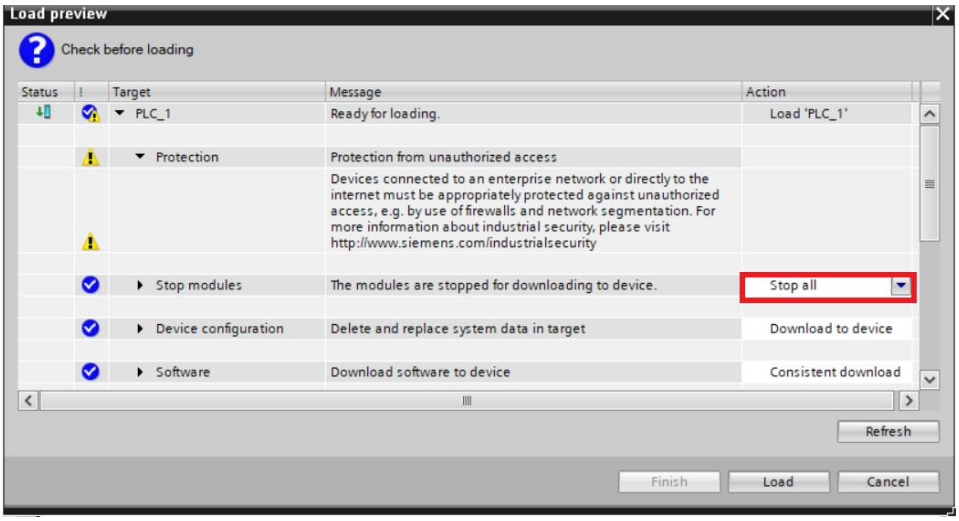


e. Click “Download”.

f. Select “Continue without synchronization”, as shown in the following figure.



g. Select “Stop All”.



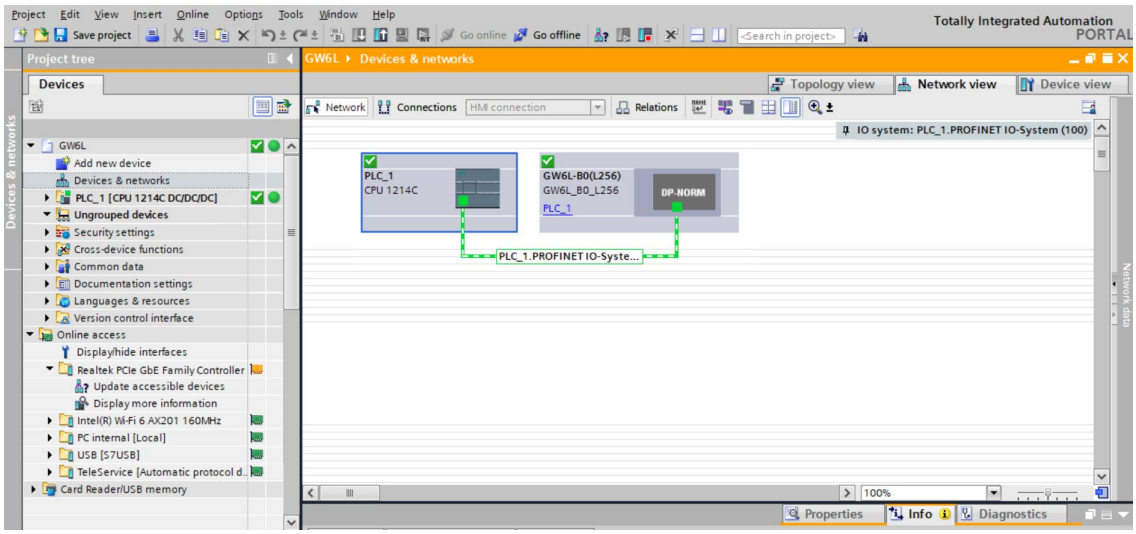
h. Click “Install”.

i. Click “Finish”.

j. Power on the device again.

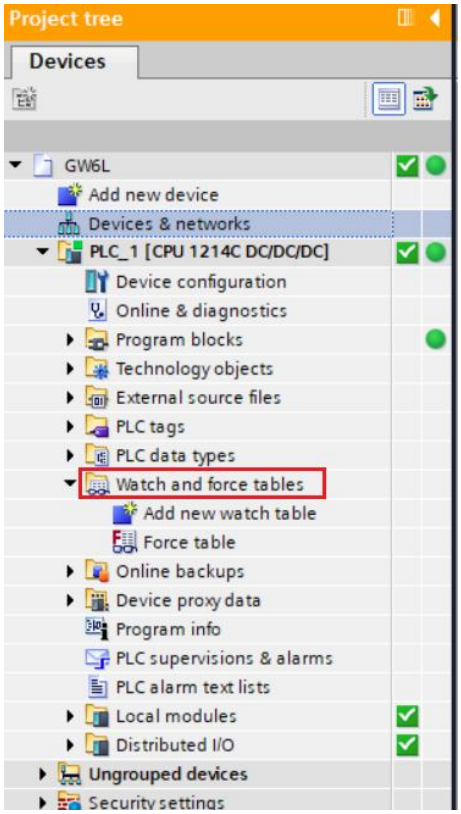
8、Communication connection

a. Click  button, then click the "Go Online" button, and the connection is successful, as shown in the figure below.

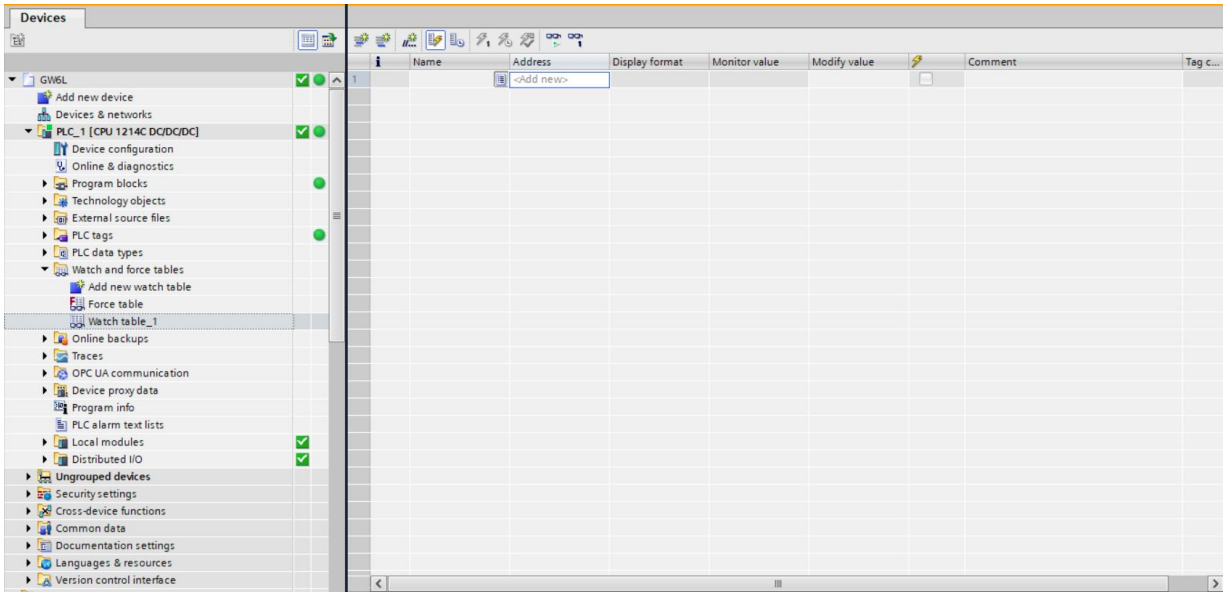


9、View upstream and downstream data

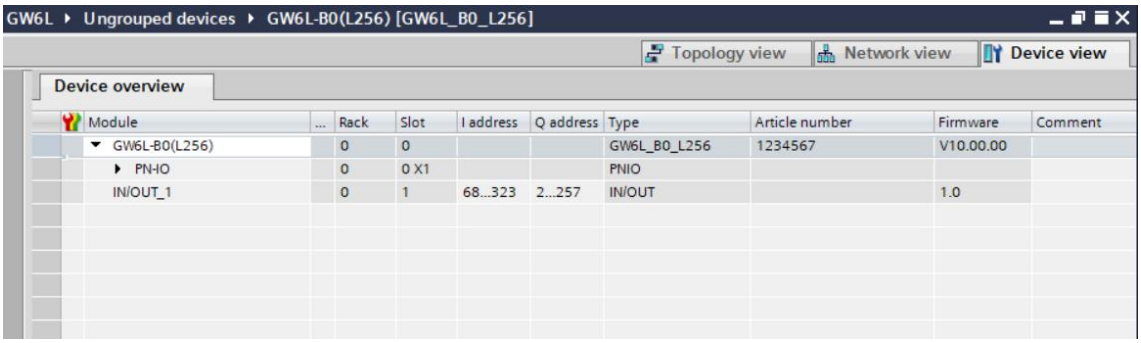
a. Expand the project navigation on the left and select "Watch and force tables", as shown in the figure below.



b. Double-click "Add new watch table" and the system will add a new watch table, as shown in the figure below.



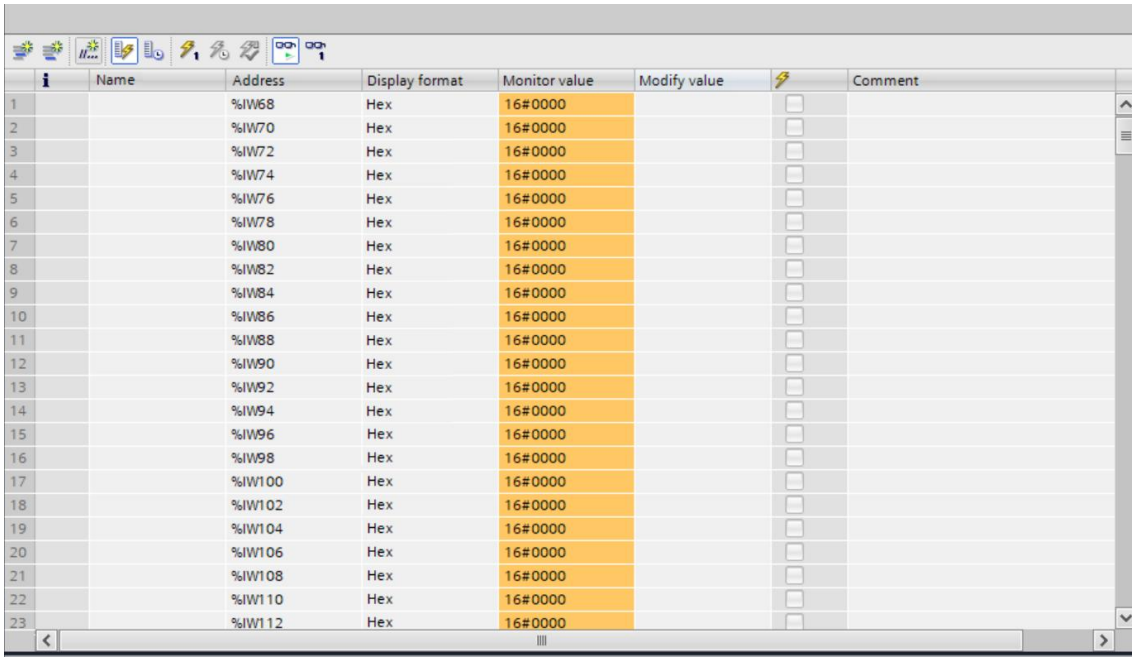
c. Open the "Device overview" and check the channel Q address (channel address of output signal) or I address (channel address of input signal) of the module GW6L-B0(L256) in the device overview .
For example, the "Q address" of the GW6L-B0 (L256) module is 2 to 257, and the "I address " is 68 to 323 , as shown in the figure below.



Module	...	Rack	Slot	I address	Q address	Type	Article number	Firmware	Comment
GW6L-B0(L256)		0	0			GW6L_B0_L256	1234567	V10.00.00	
PN-IO		0	0 X1			PNIO			
IN/OUT_1		0	1	68...323	2...257	IN/OUT		1.0	

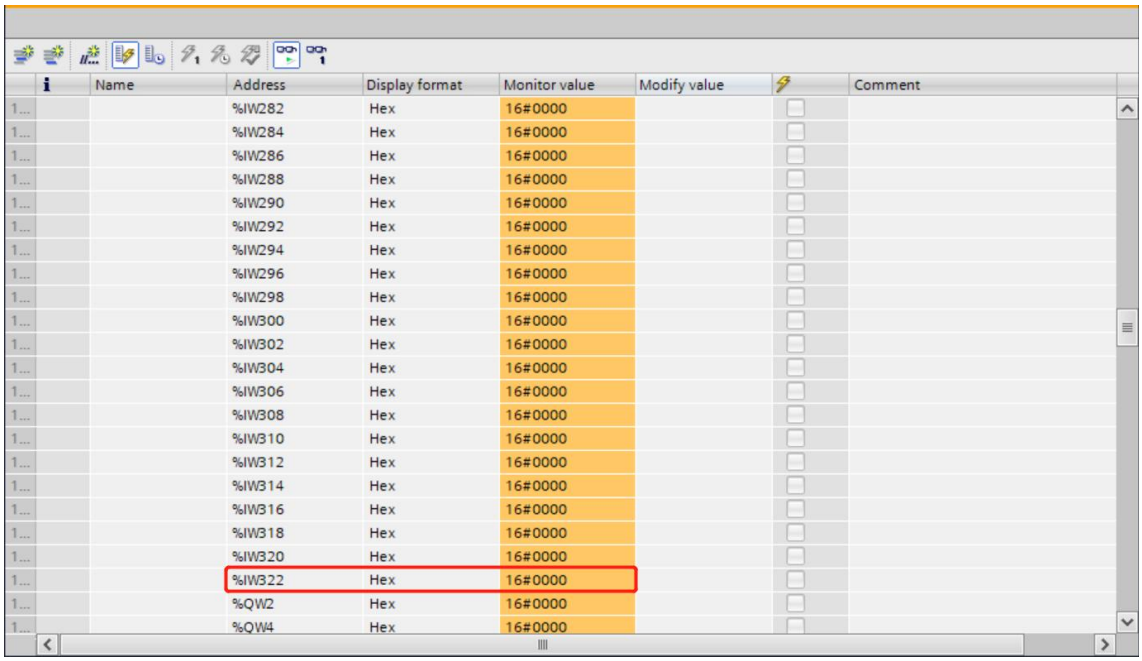
d. Enter the upstream and downstream addresses, data types and comments in the watch table address cells for easy watch. You can refer to the upstream and downstream process data definitions, enter the data items in sequence, press the "Enter" key, and after all are filled in, click the  button to watch the data.

e. The module's upstream data is shown in the watch table as shown below, which is used to check whether the data is transmitted correctly.



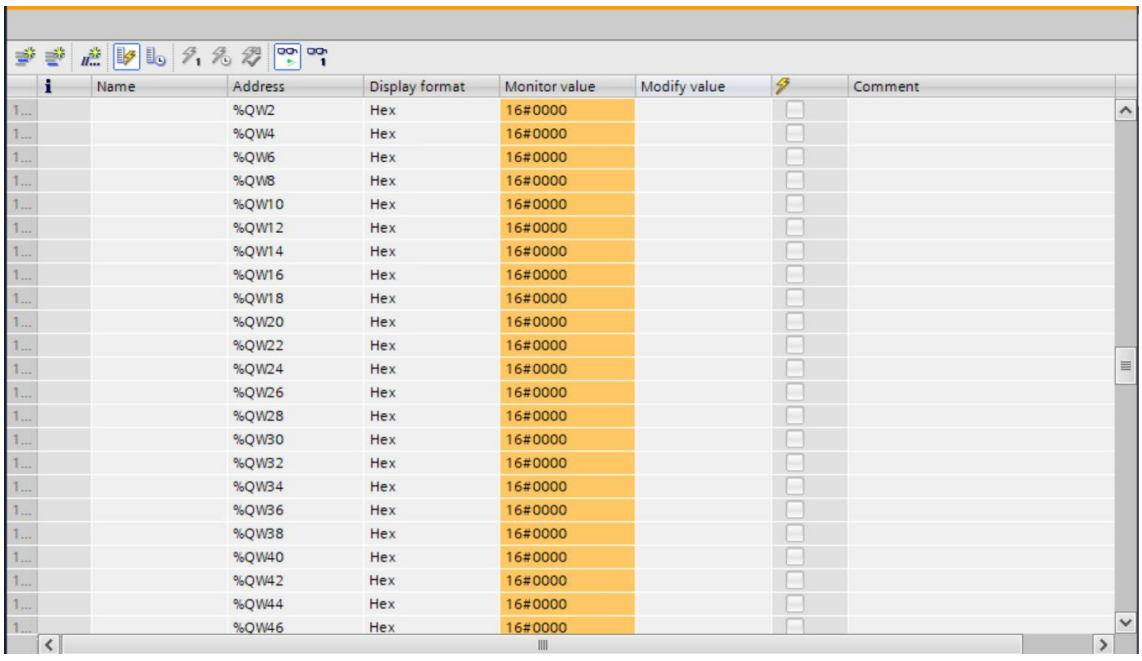
	Name	Address	Display format	Monitor value	Modify value	Comment
1		%IW68	Hex	16#0000		
2		%IW70	Hex	16#0000		
3		%IW72	Hex	16#0000		
4		%IW74	Hex	16#0000		
5		%IW76	Hex	16#0000		
6		%IW78	Hex	16#0000		
7		%IW80	Hex	16#0000		
8		%IW82	Hex	16#0000		
9		%IW84	Hex	16#0000		
10		%IW86	Hex	16#0000		
11		%IW88	Hex	16#0000		
12		%IW90	Hex	16#0000		
13		%IW92	Hex	16#0000		
14		%IW94	Hex	16#0000		
15		%IW96	Hex	16#0000		
16		%IW98	Hex	16#0000		
17		%IW100	Hex	16#0000		
18		%IW102	Hex	16#0000		
19		%IW104	Hex	16#0000		
20		%IW106	Hex	16#0000		
21		%IW108	Hex	16#0000		
22		%IW110	Hex	16#0000		
23		%IW112	Hex	16#0000		

f. In this example, the 68th to 322th byte range of the upstream data is the input data, a total of 255 bytes ; the 323rd byte , which is the last byte, is the state bit, as shown in the following figure.



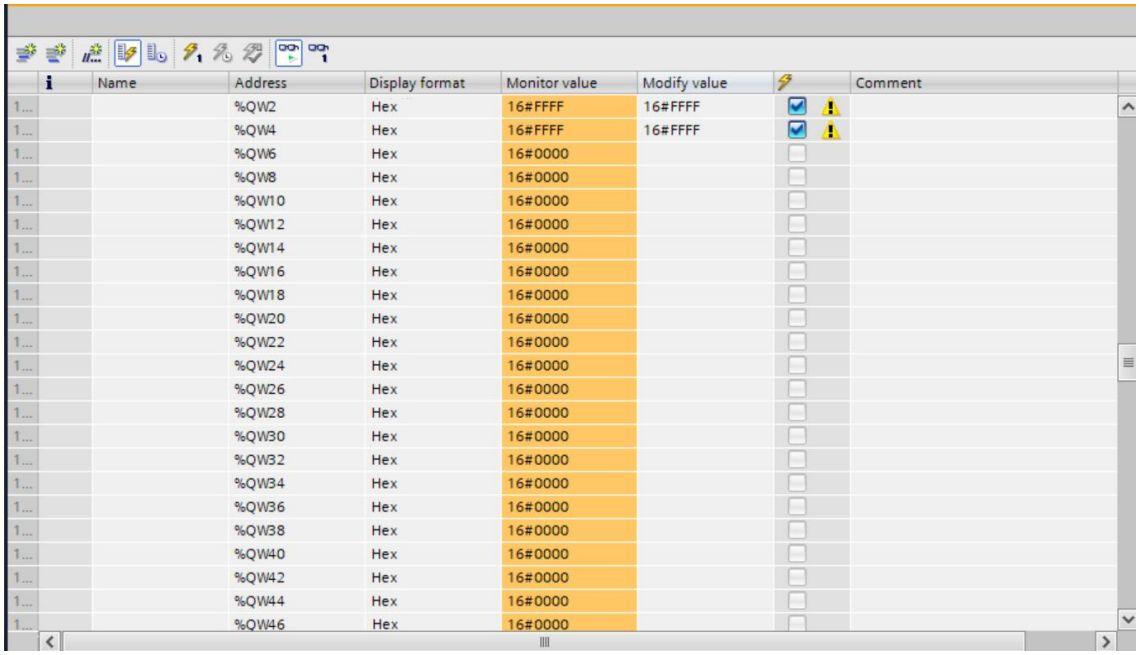
	Name	Address	Display format	Monitor value	Modify value	Comment
1		%IW282	Hex	16#0000		
1		%IW284	Hex	16#0000		
1		%IW286	Hex	16#0000		
1		%IW288	Hex	16#0000		
1		%IW290	Hex	16#0000		
1		%IW292	Hex	16#0000		
1		%IW294	Hex	16#0000		
1		%IW296	Hex	16#0000		
1		%IW298	Hex	16#0000		
1		%IW300	Hex	16#0000		
1		%IW302	Hex	16#0000		
1		%IW304	Hex	16#0000		
1		%IW306	Hex	16#0000		
1		%IW308	Hex	16#0000		
1		%IW310	Hex	16#0000		
1		%IW312	Hex	16#0000		
1		%IW314	Hex	16#0000		
1		%IW316	Hex	16#0000		
1		%IW318	Hex	16#0000		
1		%IW320	Hex	16#0000		
1		%IW322	Hex	16#0000		
1		%QW2	Hex	16#0000		
1		%QW4	Hex	16#0000		

g. The module' s downstream data is shown in the watch table as shown below, which is used to force output data, as shown below.



	Name	Address	Display format	Monitor value	Modify value	Comment
1		%QW2	Hex	16#0000		
1		%QW4	Hex	16#0000		
1		%QW6	Hex	16#0000		
1		%QW8	Hex	16#0000		
1		%QW10	Hex	16#0000		
1		%QW12	Hex	16#0000		
1		%QW14	Hex	16#0000		
1		%QW16	Hex	16#0000		
1		%QW18	Hex	16#0000		
1		%QW20	Hex	16#0000		
1		%QW22	Hex	16#0000		
1		%QW24	Hex	16#0000		
1		%QW26	Hex	16#0000		
1		%QW28	Hex	16#0000		
1		%QW30	Hex	16#0000		
1		%QW32	Hex	16#0000		
1		%QW34	Hex	16#0000		
1		%QW36	Hex	16#0000		
1		%QW38	Hex	16#0000		
1		%QW40	Hex	16#0000		
1		%QW42	Hex	16#0000		
1		%QW44	Hex	16#0000		
1		%QW46	Hex	16#0000		

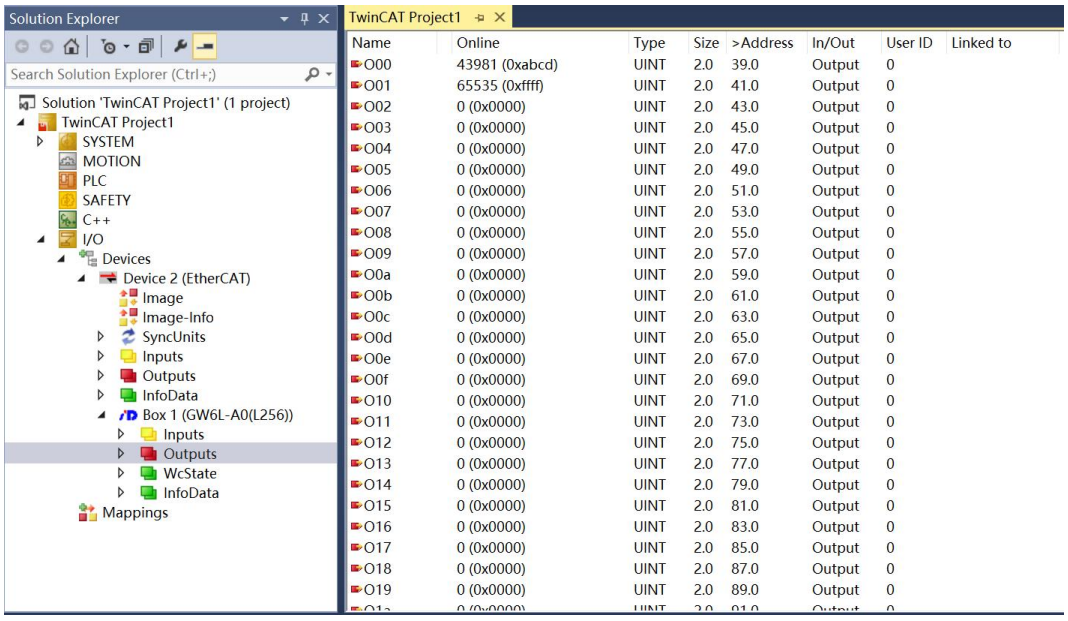
h. Enter a value in the "Modify Value" cell and click the button to write it in. After the value is written, it will appear as shown in the figure below.



	Name	Address	Display format	Monitor value	Modify value		Comment
1...		%QW2	Hex	16#FFFF	16#FFFF	☑ ⚠	
1...		%QW4	Hex	16#FFFF	16#FFFF	☑ ⚠	
1...		%QW6	Hex	16#0000		☐	
1...		%QW8	Hex	16#0000		☐	
1...		%QW10	Hex	16#0000		☐	
1...		%QW12	Hex	16#0000		☐	
1...		%QW14	Hex	16#0000		☐	
1...		%QW16	Hex	16#0000		☐	
1...		%QW18	Hex	16#0000		☐	
1...		%QW20	Hex	16#0000		☐	
1...		%QW22	Hex	16#0000		☐	
1...		%QW24	Hex	16#0000		☐	
1...		%QW26	Hex	16#0000		☐	
1...		%QW28	Hex	16#0000		☐	
1...		%QW30	Hex	16#0000		☐	
1...		%QW32	Hex	16#0000		☐	
1...		%QW34	Hex	16#0000		☐	
1...		%QW36	Hex	16#0000		☐	
1...		%QW38	Hex	16#0000		☐	
1...		%QW40	Hex	16#0000		☐	
1...		%QW42	Hex	16#0000		☐	
1...		%QW44	Hex	16#0000		☐	
1...		%QW46	Hex	16#0000		☐	

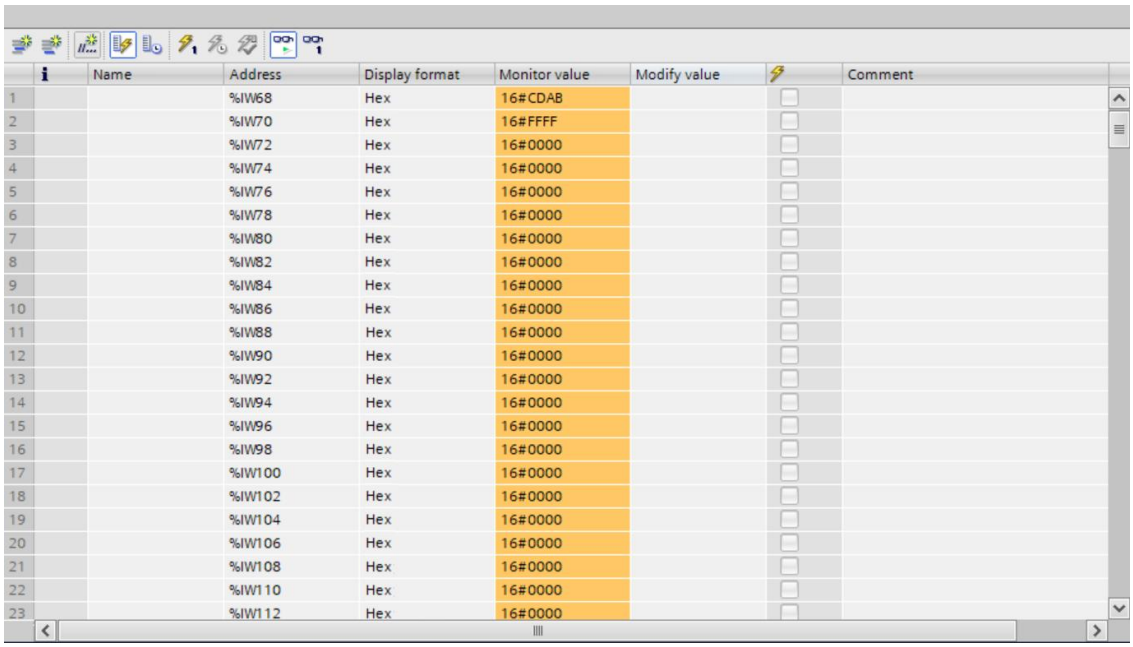
7.2.1.4 Data Interaction

a. After establishing the communication connection, write the value in the downstream data of the TwinCAT3 software, and the output data is shown in the figure below.



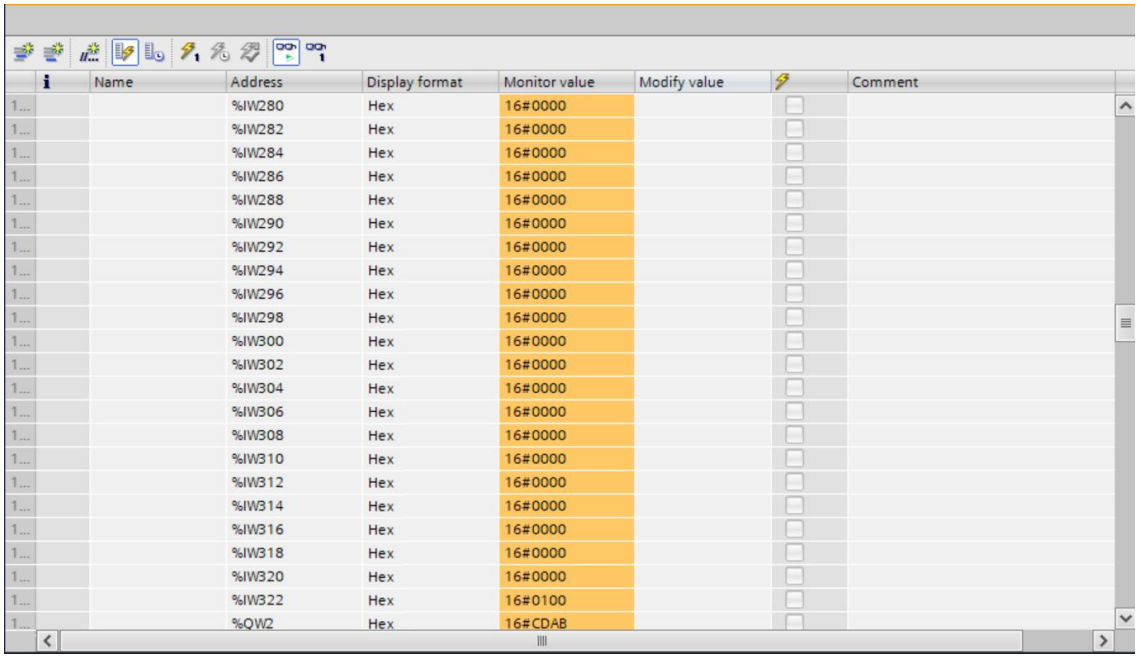
Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
O00	43981 (0xabcd)	UINT	2.0	39.0	Output	0	
O01	65535 (0xffff)	UINT	2.0	41.0	Output	0	
O02	0 (0x0000)	UINT	2.0	43.0	Output	0	
O03	0 (0x0000)	UINT	2.0	45.0	Output	0	
O04	0 (0x0000)	UINT	2.0	47.0	Output	0	
O05	0 (0x0000)	UINT	2.0	49.0	Output	0	
O06	0 (0x0000)	UINT	2.0	51.0	Output	0	
O07	0 (0x0000)	UINT	2.0	53.0	Output	0	
O08	0 (0x0000)	UINT	2.0	55.0	Output	0	
O09	0 (0x0000)	UINT	2.0	57.0	Output	0	
O0a	0 (0x0000)	UINT	2.0	59.0	Output	0	
O0b	0 (0x0000)	UINT	2.0	61.0	Output	0	
O0c	0 (0x0000)	UINT	2.0	63.0	Output	0	
O0d	0 (0x0000)	UINT	2.0	65.0	Output	0	
O0e	0 (0x0000)	UINT	2.0	67.0	Output	0	
O0f	0 (0x0000)	UINT	2.0	69.0	Output	0	
O10	0 (0x0000)	UINT	2.0	71.0	Output	0	
O11	0 (0x0000)	UINT	2.0	73.0	Output	0	
O12	0 (0x0000)	UINT	2.0	75.0	Output	0	
O13	0 (0x0000)	UINT	2.0	77.0	Output	0	
O14	0 (0x0000)	UINT	2.0	79.0	Output	0	
O15	0 (0x0000)	UINT	2.0	81.0	Output	0	
O16	0 (0x0000)	UINT	2.0	83.0	Output	0	
O17	0 (0x0000)	UINT	2.0	85.0	Output	0	
O18	0 (0x0000)	UINT	2.0	87.0	Output	0	
O19	0 (0x0000)	UINT	2.0	89.0	Output	0	

b. In the watch table of TIA Portal V17 software , check the upstream data to confirm whether the data is input to the gateway module. As shown in the following figure, the data has been transmitted .



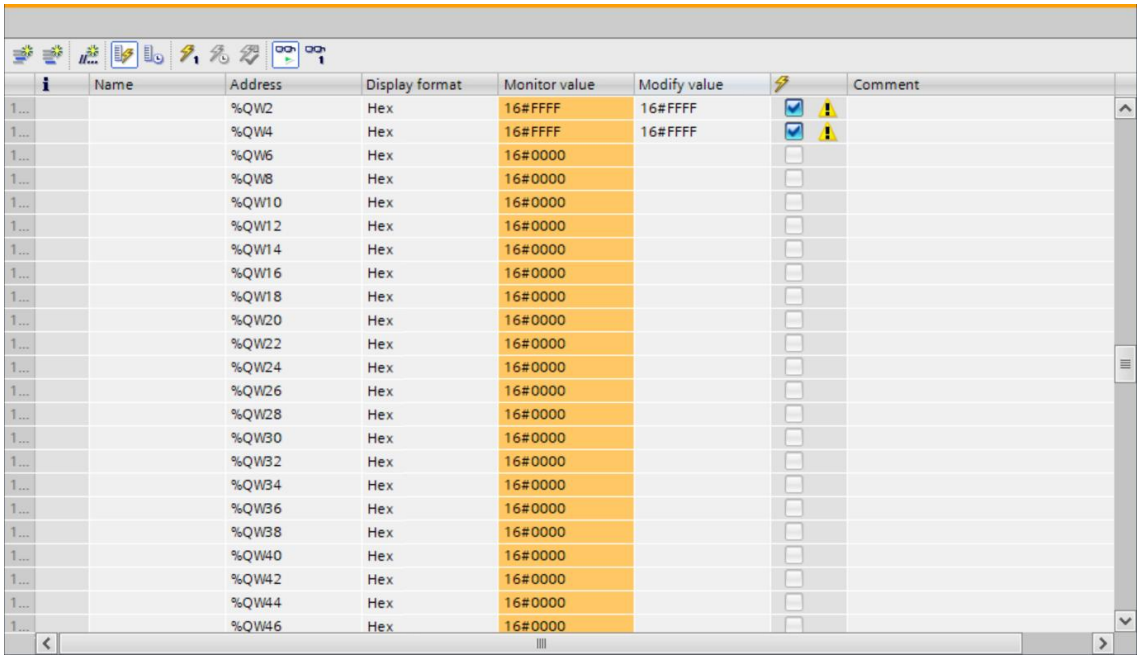
	Name	Address	Display format	Monitor value	Modify value	Comment
1		%IW68	Hex	16#CDAB		
2		%IW70	Hex	16#FFFF		
3		%IW72	Hex	16#0000		
4		%IW74	Hex	16#0000		
5		%IW76	Hex	16#0000		
6		%IW78	Hex	16#0000		
7		%IW80	Hex	16#0000		
8		%IW82	Hex	16#0000		
9		%IW84	Hex	16#0000		
10		%IW86	Hex	16#0000		
11		%IW88	Hex	16#0000		
12		%IW90	Hex	16#0000		
13		%IW92	Hex	16#0000		
14		%IW94	Hex	16#0000		
15		%IW96	Hex	16#0000		
16		%IW98	Hex	16#0000		
17		%IW100	Hex	16#0000		
18		%IW102	Hex	16#0000		
19		%IW104	Hex	16#0000		
20		%IW106	Hex	16#0000		
21		%IW108	Hex	16#0000		
22		%IW110	Hex	16#0000		
23		%IW112	Hex	16#0000		

c. At this time, the last state bit byte of the upstream data of the TIA Portal V17 software is 16#01, indicating that there is data interaction between the gateways , as shown in the following figure.



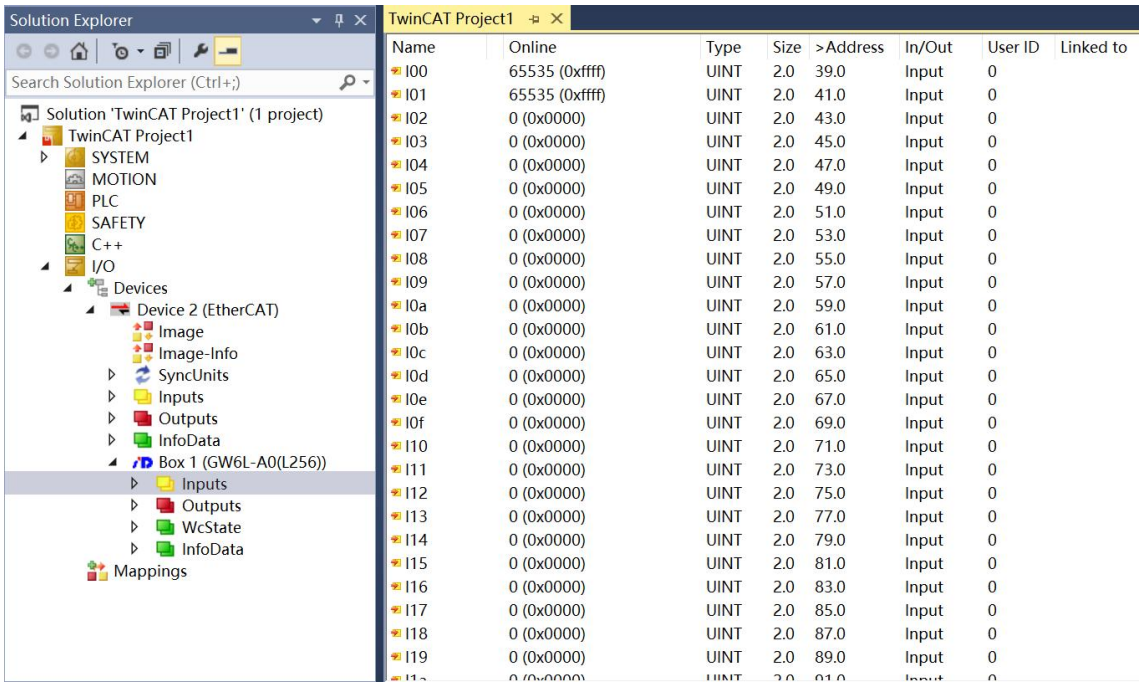
	Name	Address	Display format	Monitor value	Modify value	Comment
1...		%IW280	Hex	16#0000		
1...		%IW282	Hex	16#0000		
1...		%IW284	Hex	16#0000		
1...		%IW286	Hex	16#0000		
1...		%IW288	Hex	16#0000		
1...		%IW290	Hex	16#0000		
1...		%IW292	Hex	16#0000		
1...		%IW294	Hex	16#0000		
1...		%IW296	Hex	16#0000		
1...		%IW298	Hex	16#0000		
1...		%IW300	Hex	16#0000		
1...		%IW302	Hex	16#0000		
1...		%IW304	Hex	16#0000		
1...		%IW306	Hex	16#0000		
1...		%IW308	Hex	16#0000		
1...		%IW310	Hex	16#0000		
1...		%IW312	Hex	16#0000		
1...		%IW314	Hex	16#0000		
1...		%IW316	Hex	16#0000		
1...		%IW318	Hex	16#0000		
1...		%IW320	Hex	16#0000		
1...		%IW322	Hex	16#0100		
1...		%QW2	Hex	16#CDAB		

d. In the watch table of TIA Portal V17 software , write the downstream data as shown in the following figure.



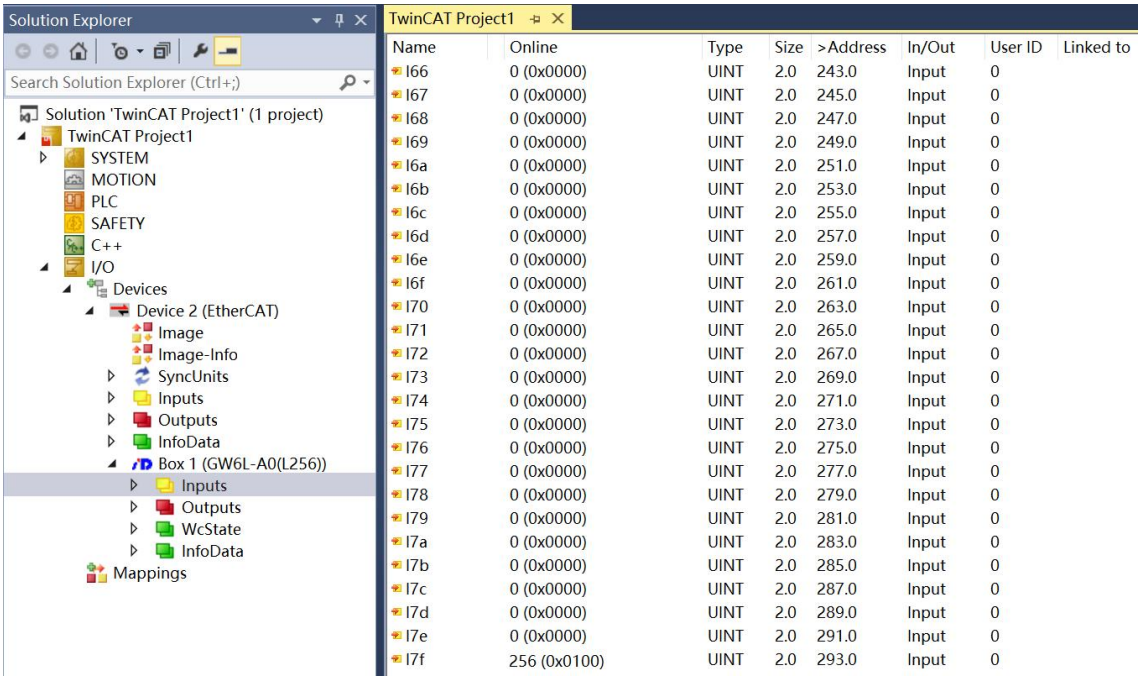
	Name	Address	Display format	Monitor value	Modify value	Comment
1		%QW2	Hex	16#FFFF	16#FFFF	
2		%QW4	Hex	16#FFFF	16#FFFF	
3		%QW6	Hex	16#0000		
4		%QW8	Hex	16#0000		
5		%QW10	Hex	16#0000		
6		%QW12	Hex	16#0000		
7		%QW14	Hex	16#0000		
8		%QW16	Hex	16#0000		
9		%QW18	Hex	16#0000		
10		%QW20	Hex	16#0000		
11		%QW22	Hex	16#0000		
12		%QW24	Hex	16#0000		
13		%QW26	Hex	16#0000		
14		%QW28	Hex	16#0000		
15		%QW30	Hex	16#0000		
16		%QW32	Hex	16#0000		
17		%QW34	Hex	16#0000		
18		%QW36	Hex	16#0000		
19		%QW38	Hex	16#0000		
20		%QW40	Hex	16#0000		
21		%QW42	Hex	16#0000		
22		%QW44	Hex	16#0000		
23		%QW46	Hex	16#0000		

e. Check the upstream data in the TwinCAT3 software to confirm whether the data has been input into the gateway module. As shown in the figure below, the data has been transmitted .



Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
I00	65535 (0xffff)	UINT	2.0	39.0	Input	0	
I01	65535 (0xffff)	UINT	2.0	41.0	Input	0	
I02	0 (0x0000)	UINT	2.0	43.0	Input	0	
I03	0 (0x0000)	UINT	2.0	45.0	Input	0	
I04	0 (0x0000)	UINT	2.0	47.0	Input	0	
I05	0 (0x0000)	UINT	2.0	49.0	Input	0	
I06	0 (0x0000)	UINT	2.0	51.0	Input	0	
I07	0 (0x0000)	UINT	2.0	53.0	Input	0	
I08	0 (0x0000)	UINT	2.0	55.0	Input	0	
I09	0 (0x0000)	UINT	2.0	57.0	Input	0	
I0a	0 (0x0000)	UINT	2.0	59.0	Input	0	
I0b	0 (0x0000)	UINT	2.0	61.0	Input	0	
I0c	0 (0x0000)	UINT	2.0	63.0	Input	0	
I0d	0 (0x0000)	UINT	2.0	65.0	Input	0	
I0e	0 (0x0000)	UINT	2.0	67.0	Input	0	
I0f	0 (0x0000)	UINT	2.0	69.0	Input	0	
I10	0 (0x0000)	UINT	2.0	71.0	Input	0	
I11	0 (0x0000)	UINT	2.0	73.0	Input	0	
I12	0 (0x0000)	UINT	2.0	75.0	Input	0	
I13	0 (0x0000)	UINT	2.0	77.0	Input	0	
I14	0 (0x0000)	UINT	2.0	79.0	Input	0	
I15	0 (0x0000)	UINT	2.0	81.0	Input	0	
I16	0 (0x0000)	UINT	2.0	83.0	Input	0	
I17	0 (0x0000)	UINT	2.0	85.0	Input	0	
I18	0 (0x0000)	UINT	2.0	87.0	Input	0	
I19	0 (0x0000)	UINT	2.0	89.0	Input	0	

f. At this time, the last state bit byte of the TwinCAT3 software upstream data is 0 x 01 (Hex), indicating that there is data interaction between gateways , as shown in the following figure.



Name	Online	Type	Size	>Address	In/Out	User ID	Linked to
I66	0 (0x0000)	UINT	2.0	243.0	Input	0	
I67	0 (0x0000)	UINT	2.0	245.0	Input	0	
I68	0 (0x0000)	UINT	2.0	247.0	Input	0	
I69	0 (0x0000)	UINT	2.0	249.0	Input	0	
I6a	0 (0x0000)	UINT	2.0	251.0	Input	0	
I6b	0 (0x0000)	UINT	2.0	253.0	Input	0	
I6c	0 (0x0000)	UINT	2.0	255.0	Input	0	
I6d	0 (0x0000)	UINT	2.0	257.0	Input	0	
I6e	0 (0x0000)	UINT	2.0	259.0	Input	0	
I6f	0 (0x0000)	UINT	2.0	261.0	Input	0	
I70	0 (0x0000)	UINT	2.0	263.0	Input	0	
I71	0 (0x0000)	UINT	2.0	265.0	Input	0	
I72	0 (0x0000)	UINT	2.0	267.0	Input	0	
I73	0 (0x0000)	UINT	2.0	269.0	Input	0	
I74	0 (0x0000)	UINT	2.0	271.0	Input	0	
I75	0 (0x0000)	UINT	2.0	273.0	Input	0	
I76	0 (0x0000)	UINT	2.0	275.0	Input	0	
I77	0 (0x0000)	UINT	2.0	277.0	Input	0	
I78	0 (0x0000)	UINT	2.0	279.0	Input	0	
I79	0 (0x0000)	UINT	2.0	281.0	Input	0	
I7a	0 (0x0000)	UINT	2.0	283.0	Input	0	
I7b	0 (0x0000)	UINT	2.0	285.0	Input	0	
I7c	0 (0x0000)	UINT	2.0	287.0	Input	0	
I7d	0 (0x0000)	UINT	2.0	289.0	Input	0	
I7e	0 (0x0000)	UINT	2.0	291.0	Input	0	
I7f	256 (0x0100)	UINT	2.0	293.0	Input	0	

7.2.2 GW6L-A0 D 0 (L256) in Sysmac Studio and GX Application in Works 2 Software

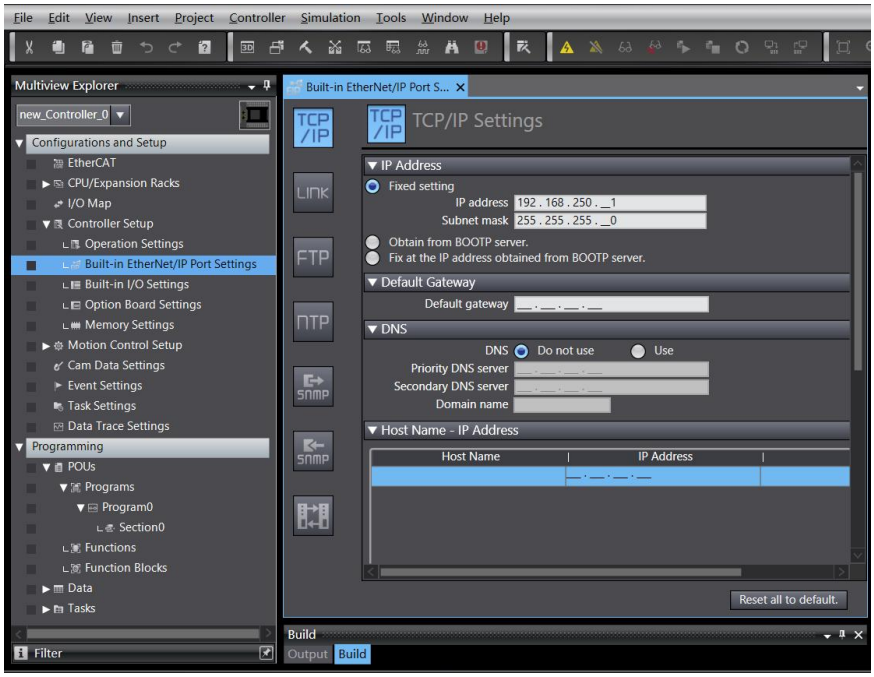
7.2.2.1 Preparation

- **Hardware Environment**
  - **Module Preparation**
    This description takes the GW6L-A0D0 (L256) gateway kit as an example
  - **Two computers, one pre-installed with Sysmac Studio software, and one pre-installed with GX Works2 software**
  - **EtherCAT dedicated shielded cable**
  - **CC-Link dedicated cable**
  - **One Omron PLC**
    This description takes the Omron NX1P2-9024DT model as an example
  - **One Mitsubishi PLC**
    This description takes Mitsubishi Q series Q00U J CPU model as an example.
  - **Two switching power supplies**
  - **Module mounting rails and rail fixings**
  - **Device Profile**
    Configuration file acquisition address: https://www.solidotech.com/documents/configfile
- **Hardware configuration and wiring**
  Please follow the instructions in " 5 Installation and uninstall " and " 6 Wiring "

7.2.2.2 Communication connection in Sysmac Studio software

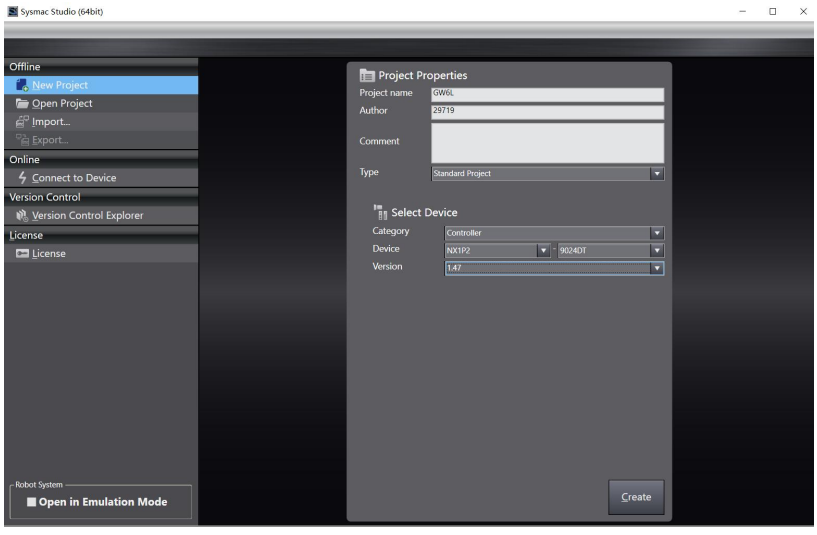
1、Setting IP

a. Set the IP address of the computer and the IP address of the PLC to make sure they are on the same network segment.If the IP of PLC is unknown, you can check it in "Configuration and Setup -> Controller Setup -> Built-in EtherNet/IP Port Settings" after creating the project, as shown in the following figure.



2、New Construction

a. Open the Sysmac Studio software and click the "New Project" button , as shown in the figure below.



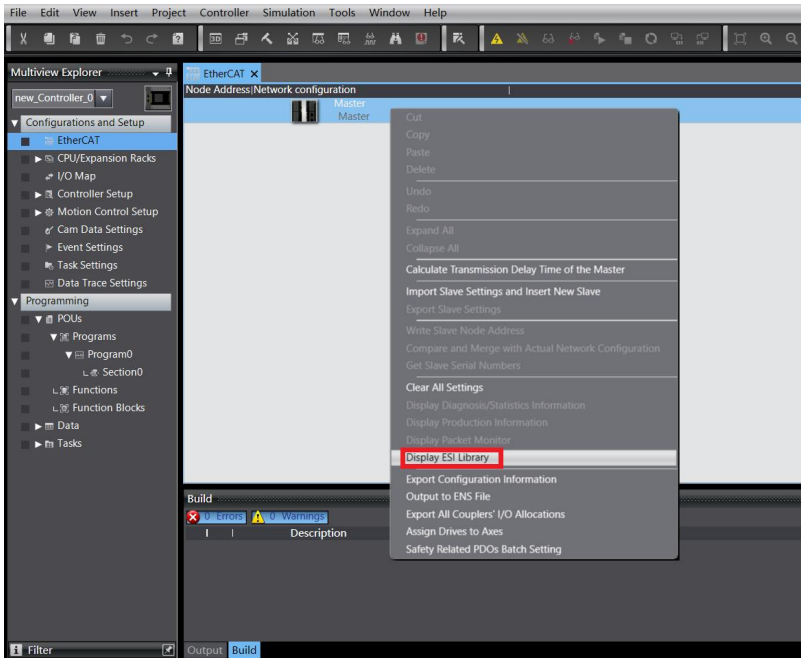
- Project name: Customization.

- Select device: Select the corresponding PLC model in "Device" and V 1.40 and above in "Version" .

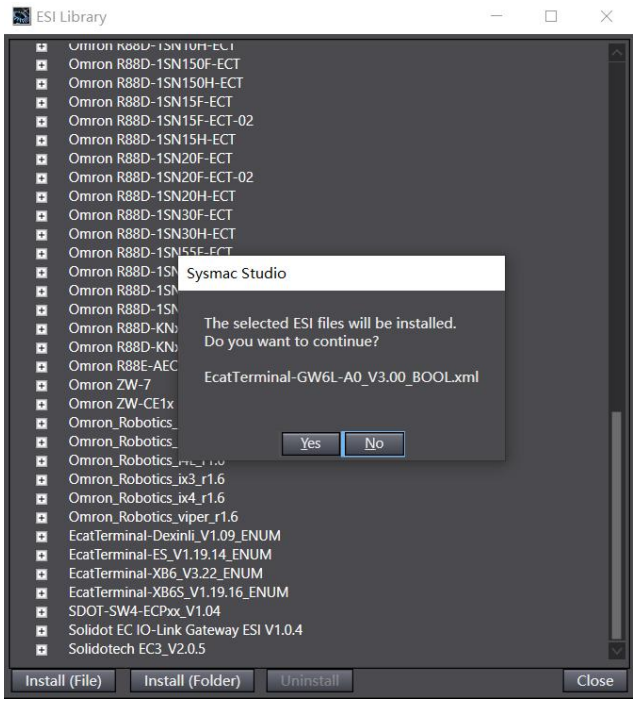
b. After entering the project properties, click “Create” .

3、Installation XML File

a. In the left navigation tree , expand "Configuration and Setup", double-click "EtherCAT" , right-click "Master", and select "Display ESI Library", as shown in the figure below.

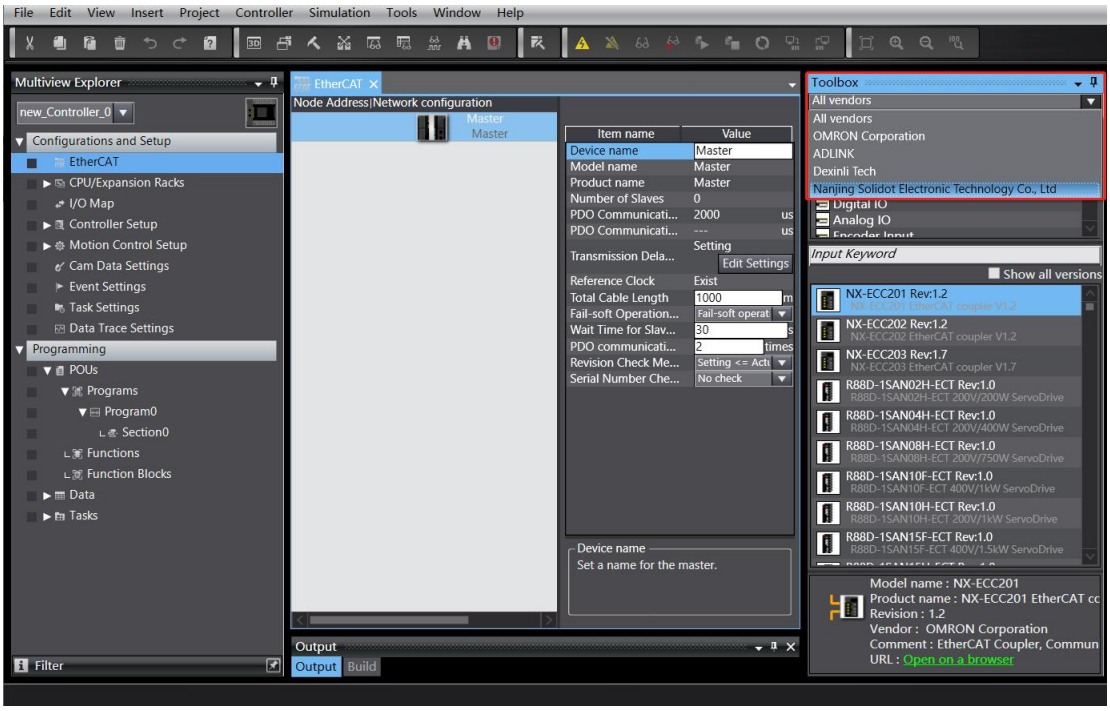


b. In the pop-up "ESI Library" window, click the "Install (File)" button, select the XML file path , and click the "Yes" button to complete the installation, as shown in the figure below .

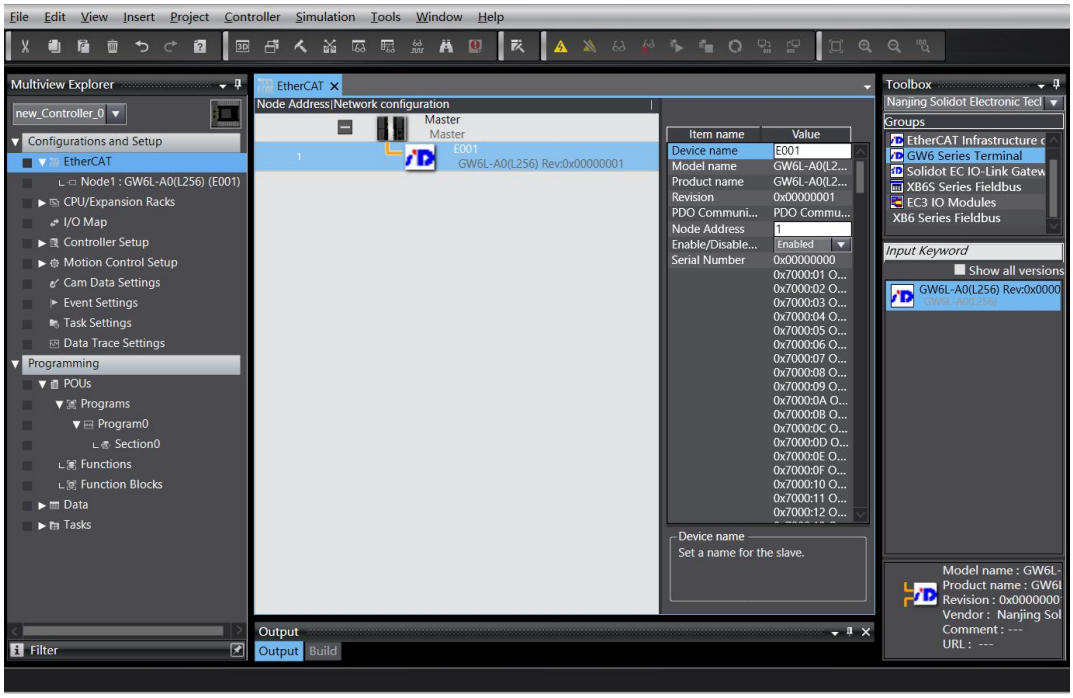


4、Add a slave device

a. Under the " Toolbox" column on the right, click to expand all suppliers and select "Nanjing Solidot Electronic Technology Co., Ltd." as shown in the figure below .

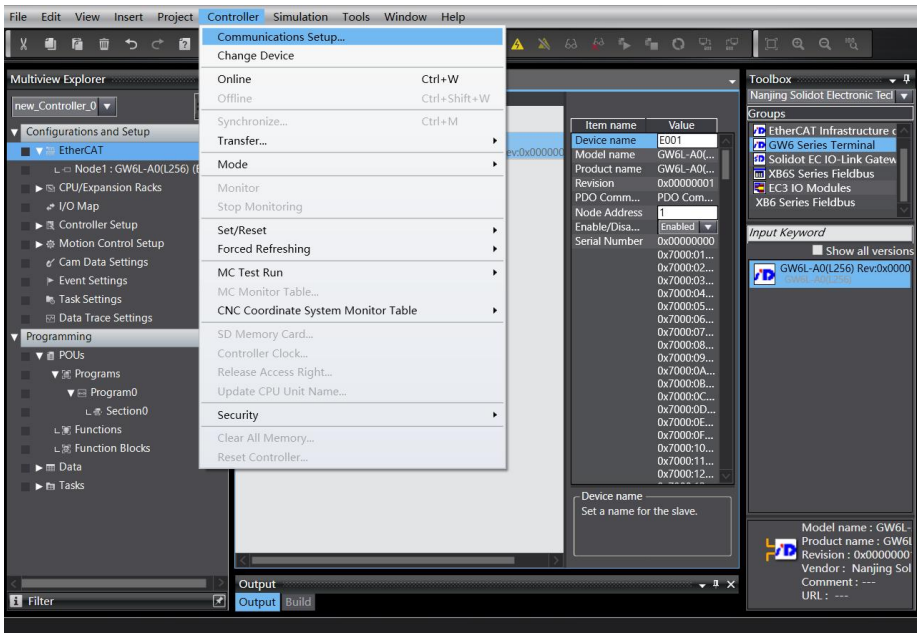


b. Click " GW6 Series Terminal " to select the product series, select the product model below, double-click "GW 6 L - A0 (L256) " , and add a slave device, as shown in the figure below.

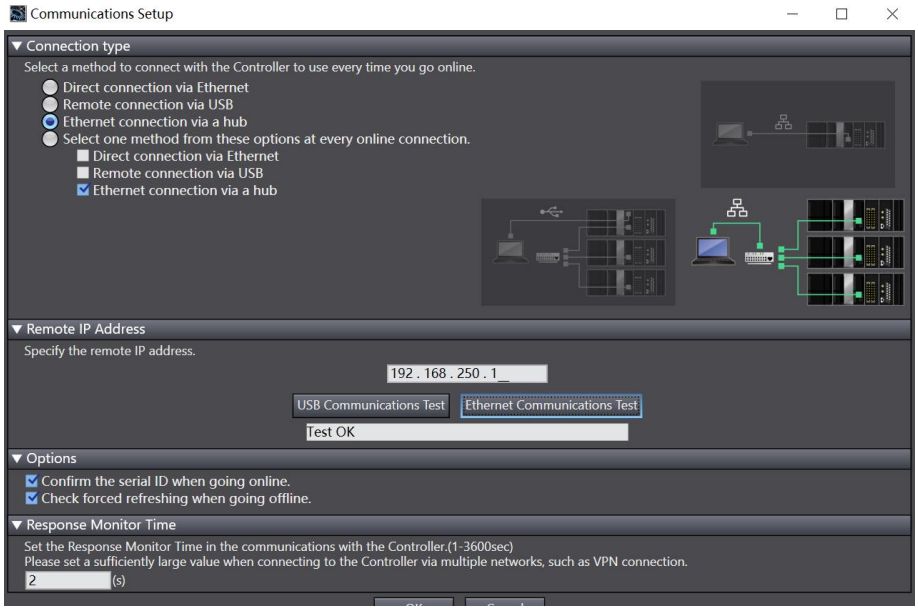


5、Communications Setup

a. Click "Controller- >Communication Setup" in the menu bar, and the Communication Setup window will pop up, as shown in the figure below.

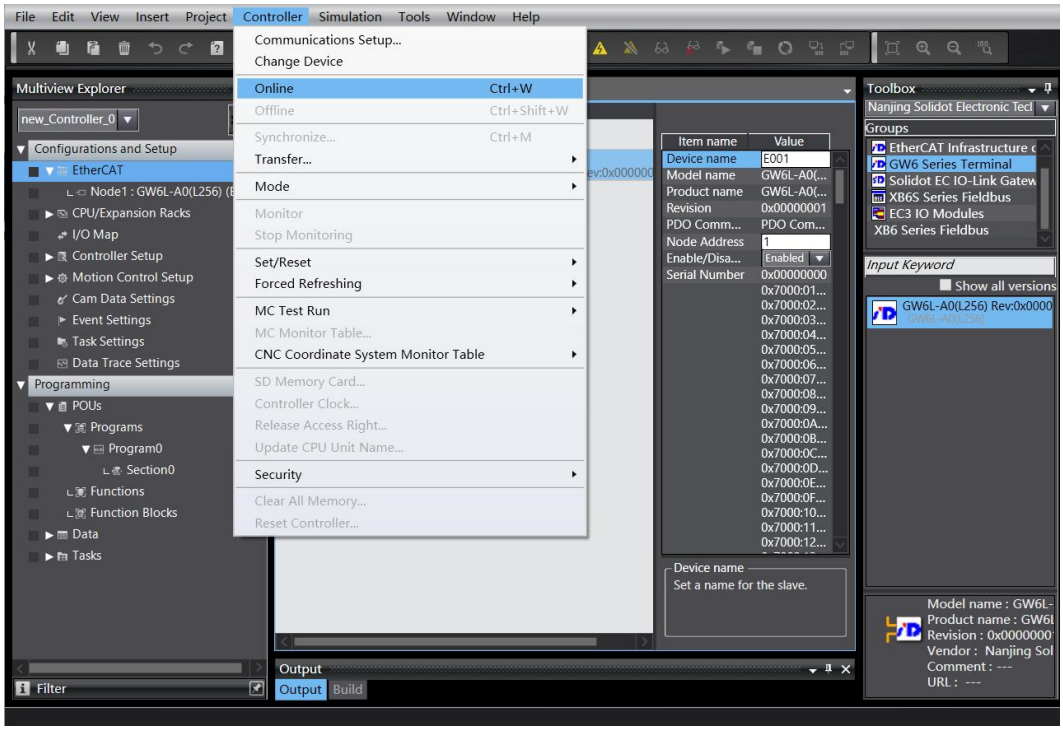


b. In the communications setup window, select " Ethernet-Hub connection" for the connection type, select " Ethernet connection via a hub" for the method used every time you connect to the controller when online, fill in the IP address of the corresponding PLC in the remote IP address, click "Ethernet communications test", if the communication is normal , " Test successful" will be displayed in the box below . Confirm that the communication is normal and click the "OK" button, as shown in the figure below.

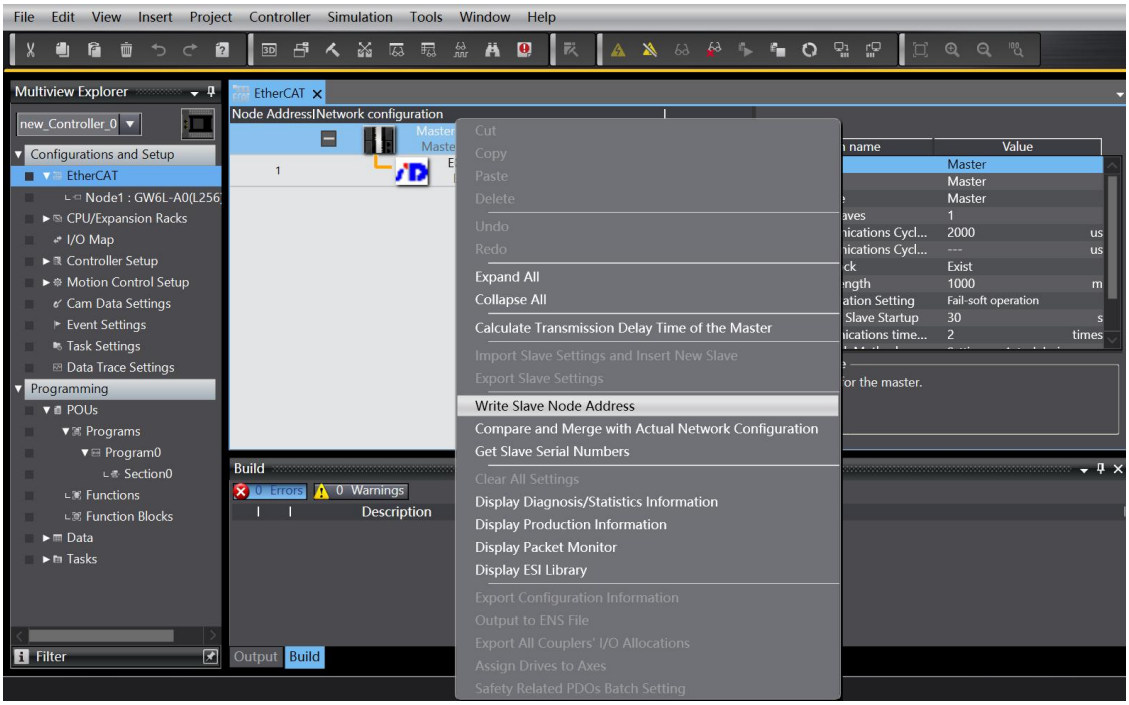


6、Set the node address

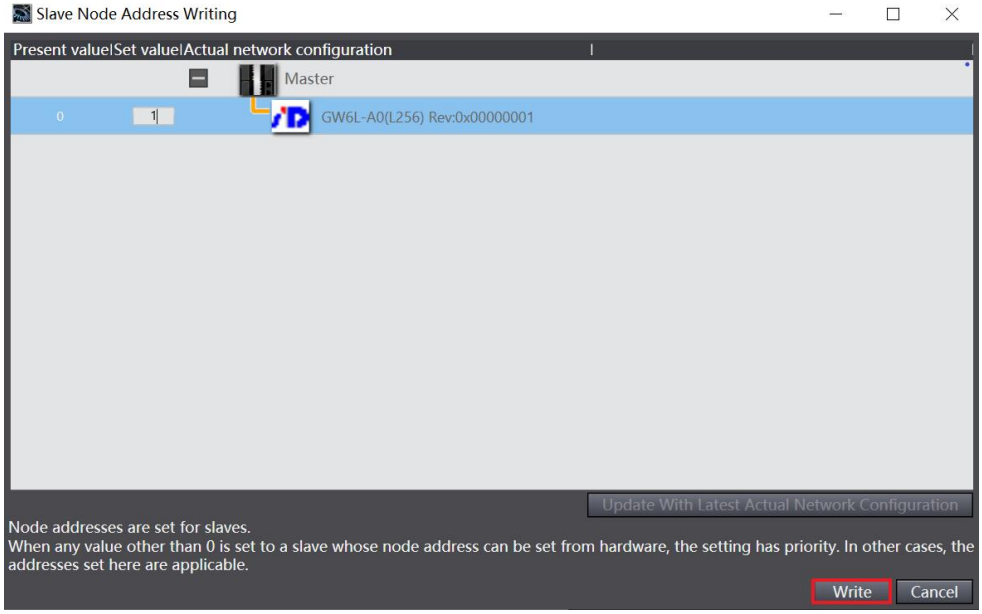
a. Click on the menu bar " Controller- > Online" to switch the controller to online status, as shown in the figure below.



b. Right-click the master device and click “ Write Slave Node Address ”, as shown in the figure below.



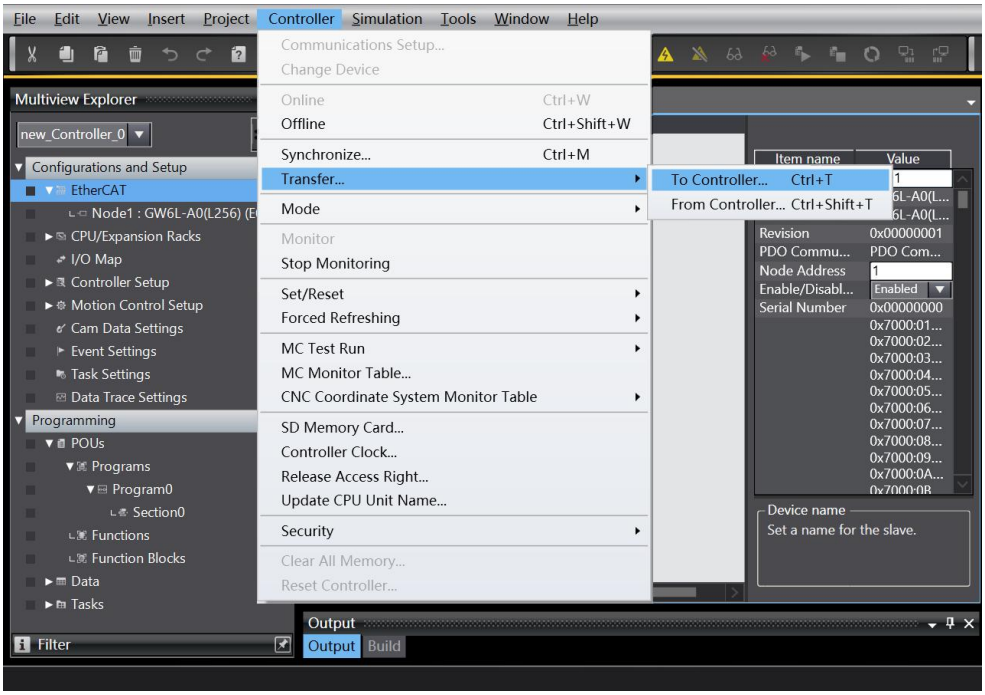
c. In the window for setting the node address, click the value under Setting Value, enter the node address, and click the "Write" button to change the slave device node address, as shown in the figure below.



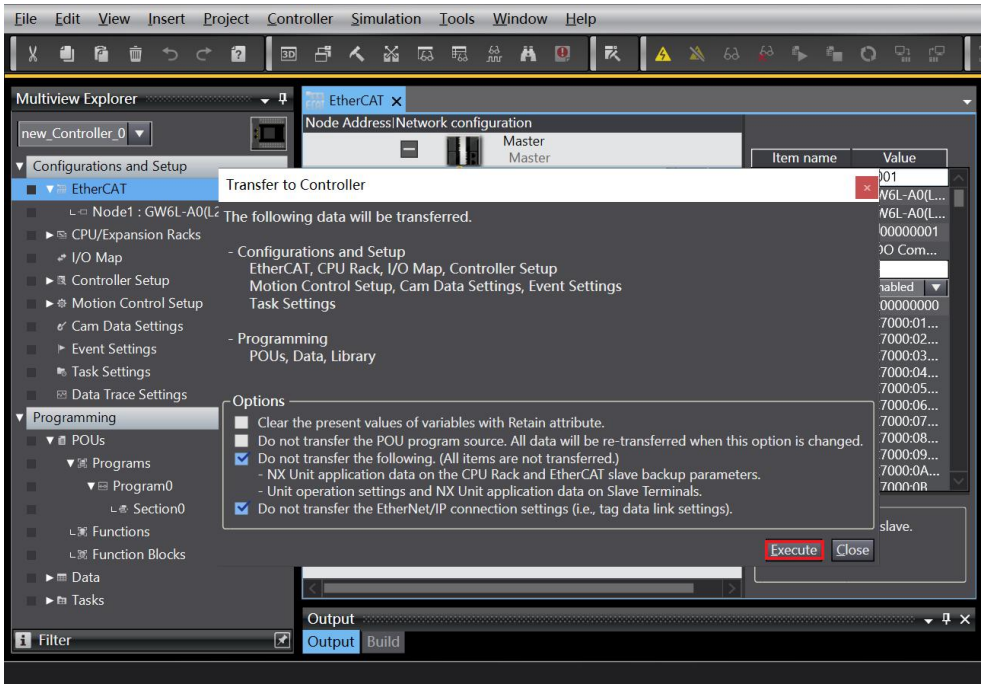
d. After the node address is written successfully, the device will be powered off and restarted according to the prompts.

7、Download the configuration to the PLC

a. Click the "Controller -> Transferring (A) -> To Controller (T)" button in the menu bar to transfer the configuration to the controller , as shown in the figure below.

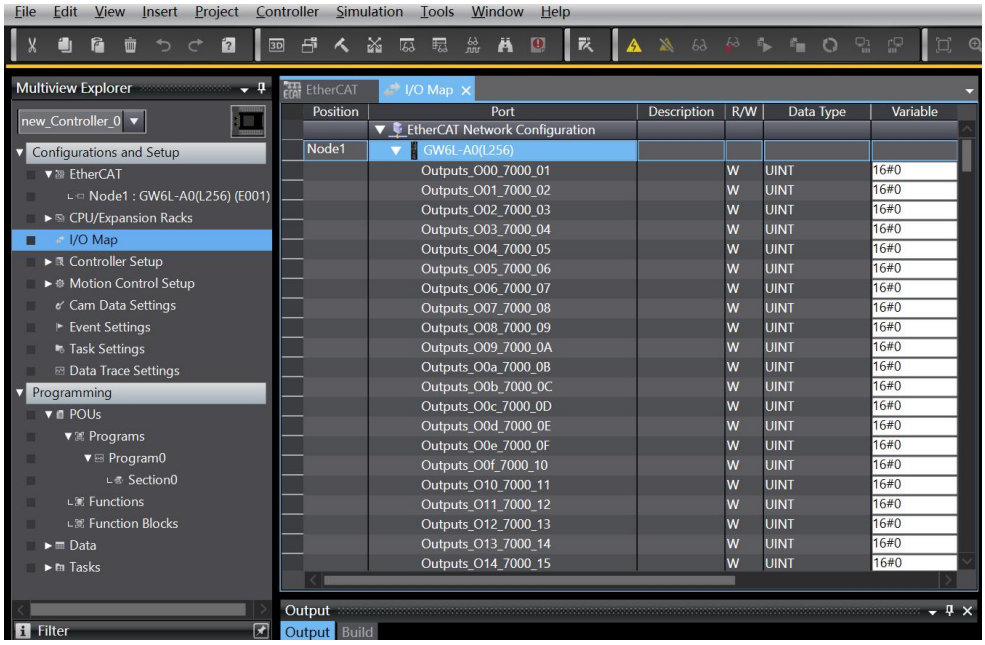


b. A transfer confirmation window pops up. Click the "Execute" button. In the subsequent pop-up windows, click "Yes/OK" in sequence, as shown in the figure below. After the download is complete, you need to restart the power.

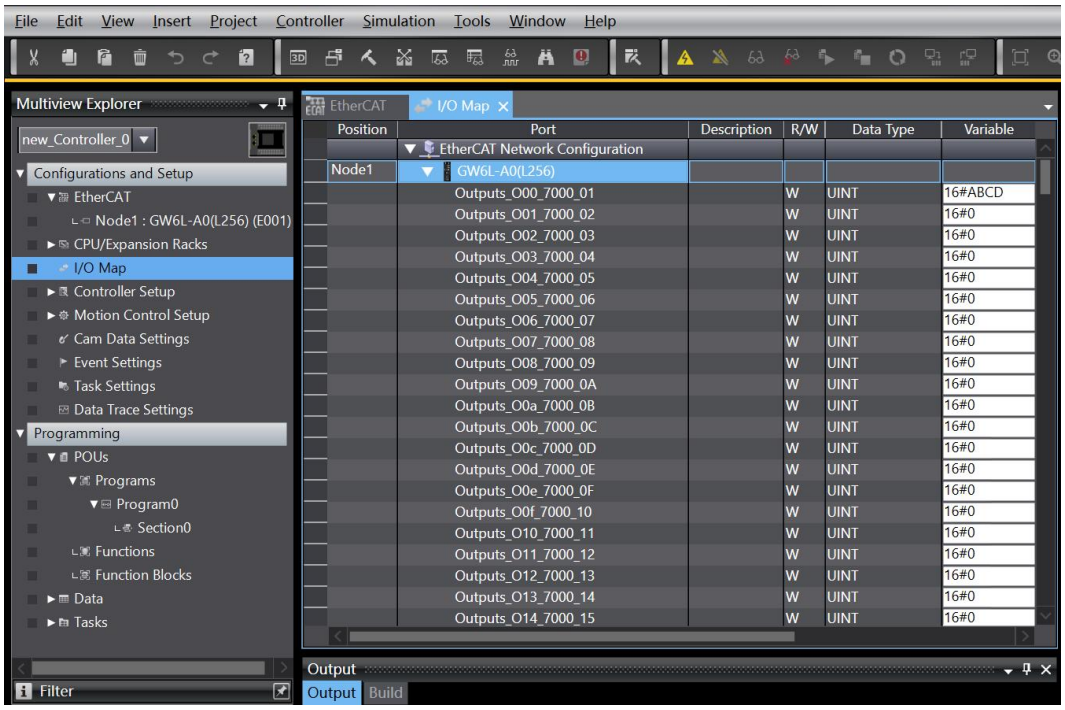


8、View module features

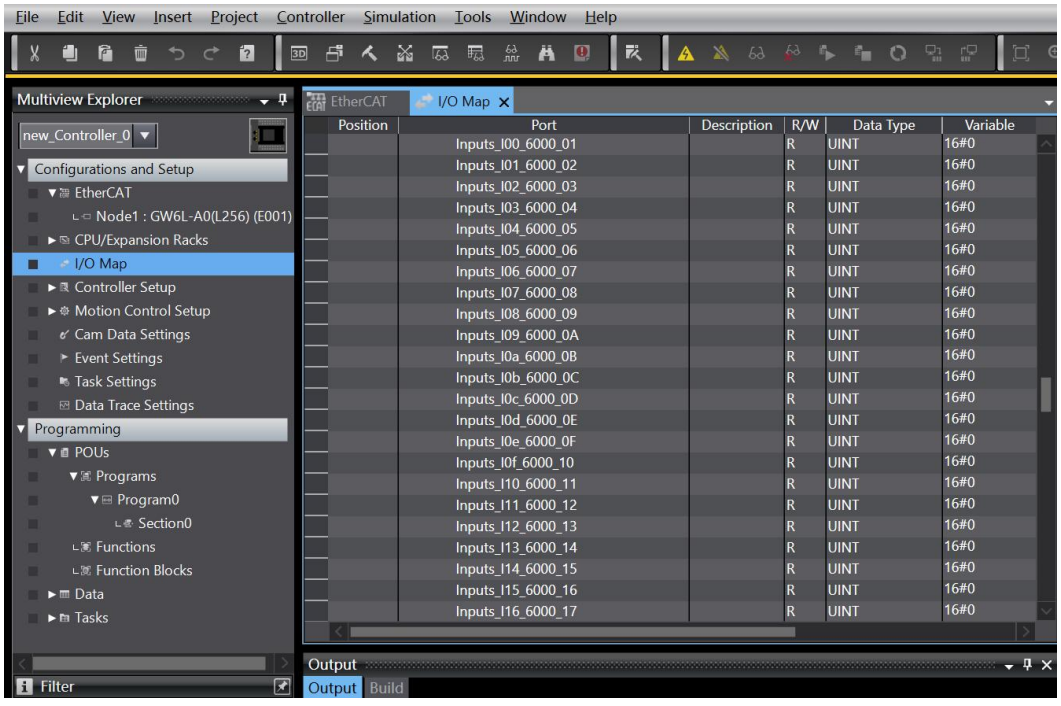
a. Double-click the "I/O Map" in the left navigation tree, you can see the device name: GW6-A0(L256) under the corresponding port in the node 1 of the right main page, click the expand icon in front of the device name, you can see the module's input/output signal watch page, and you can set ans view the output value according to the actual need. The output data is shown in the following figure.



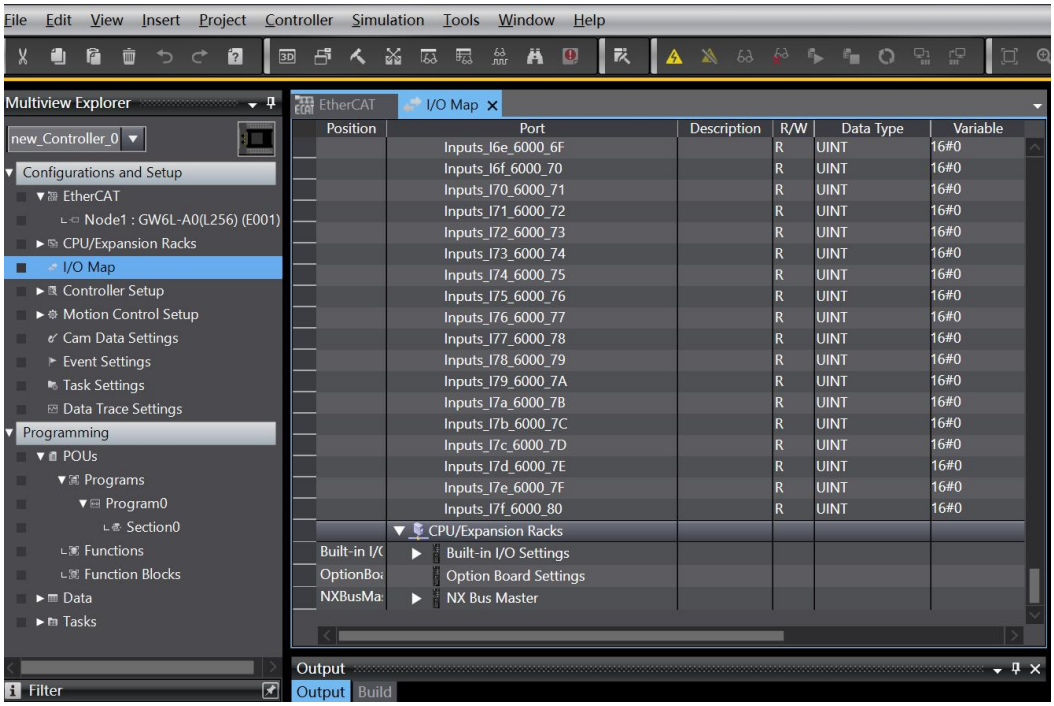
b. Enter a numerical value in the value cell corresponding to the output data to write the data, as shown in the figure below.



c. Inputs of the gateway module are shown in the figure below.



d. In this example, the first byte range of I 00 ~ I 7 f in the upstream data is the input data, totaling 255 bytes; the last byte after I7f is the state bit, as shown in the following figure.



7.2.2.3 Communication connection in GX Works2 software

1、GW6L -D0 (L256) module settings

- **Configuring the transfer rate**

Each slave module is set with a default transmission rate when it leaves the factory. Usually, the default transmission rate is 0, i.e. 156Kbps. The DIP switch corresponds to the transmission rate as follows:

0: 156 Kbps, 1: 625 Kbps, 2: 2.5 Mbps, 3: 5 Mbps, 4: 10 Mbps

The module and PLC transmission rates need to be consistent.

- **Set the station number**

Each slave module is set with a default station number when it leaves the factory, usually the default station number is "0" . Users can set the station number according to their needs, and the station number setting range is (1~64).

- **Module power on**

After checking that the wiring is correct, power on the GW6L- D0 (L256) module and the PLC.

2、 Create a project

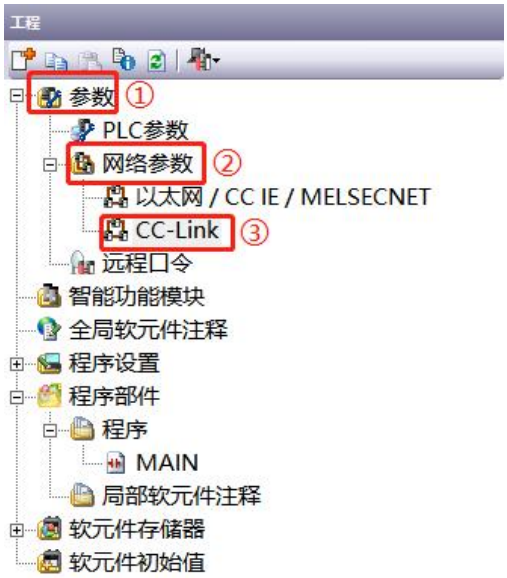
a. Open GX Works2 software, click "Project" in the menu bar, and click "New Project ".

b. The New Project dialog box pops up. Select Simple Project as the project type, "QCPU (Q mode)" as the PLC series, "Q00U J " as the PLC type, and the default ladder diagram as the program language .

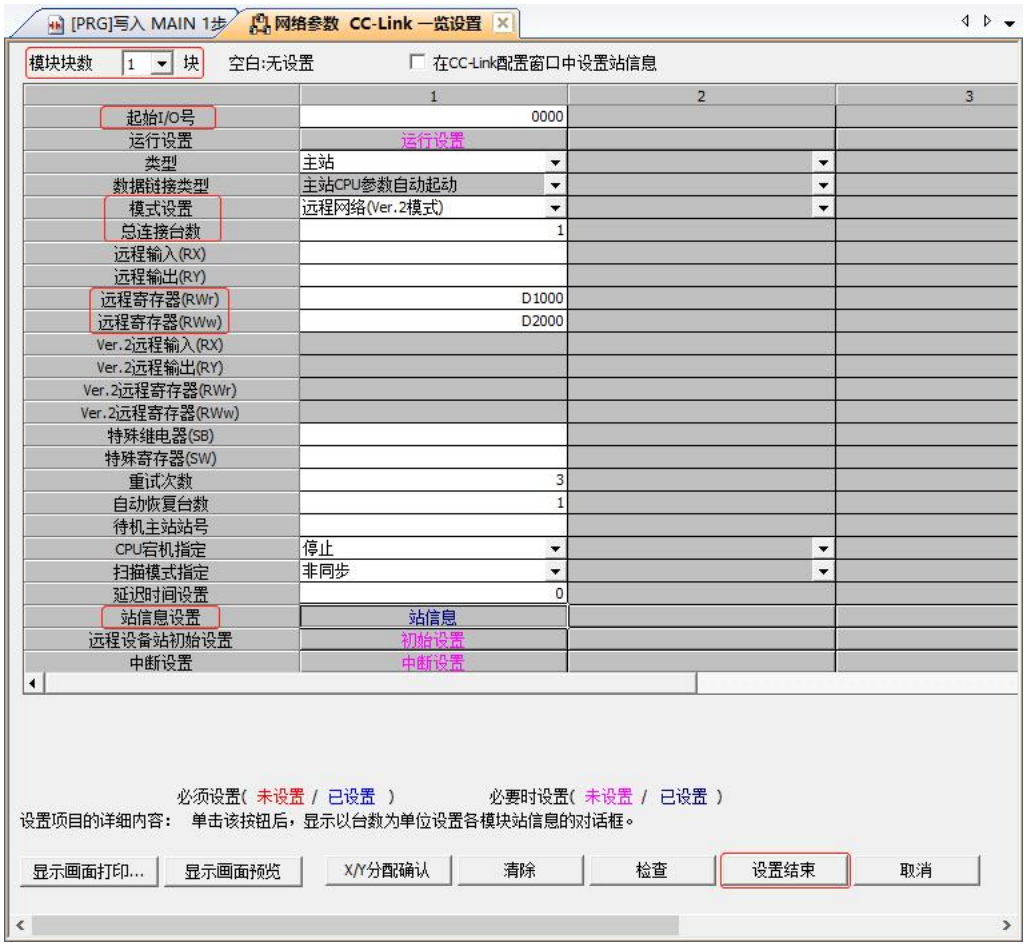
c. Click OK, as shown in the following figure.

3、 Network parameter settings

a. On the left engineering interface, select " Parameters- > Network Parameters" menu, double-click "CC-Link" to open the "Network Parameters CC-Link Overview Settings" interface.



b. In the "Network Parameters CC-Link Overview Settings" interface, configure the relevant parameters as shown in the figure below.



Configuration instructions:

Number of modules: 1

Starting I/O number: 0

Mode setting: Remote network (Ver.2 mode)

Total number of connected devices: 1

Remote register (RWr): D1000

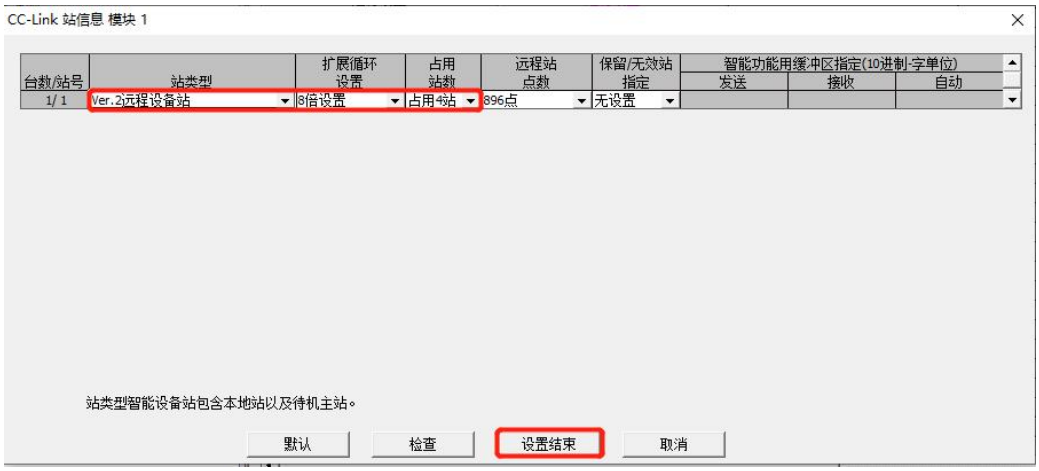
Remote register (RWw): D2000

Select the default for the rest of the settings. For “Station Information Settings”, please refer to step 4 below .

c. Click Finish Setup .

4、Station Information Settings

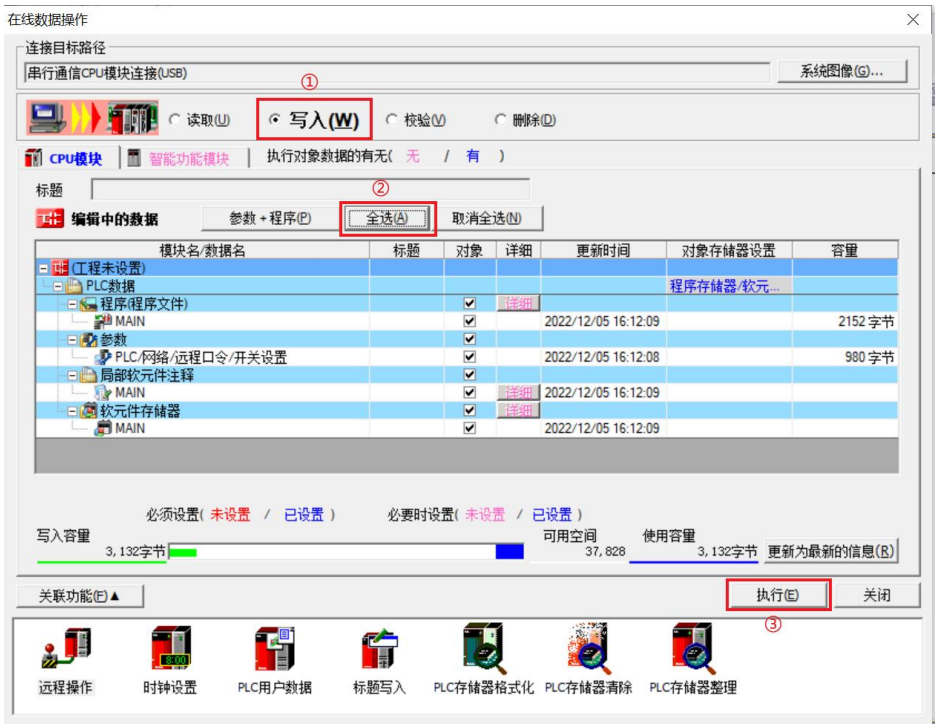
a. Click "Station Information". In this example, the gateway module is a Ver.2 remote device station .
b. Select " Ver.2 Remote Device Station " for the station type, "8x setting" for the extended cycle setting, and " Occupied 4 stations" for the number of occupied stations.
c. Click Finish Settings, as shown in the following figure.



After the station information setting is completed, you need to click "Finish Setting" and then perform the PLC write operation, otherwise the parameters will not be applicable .

5、PLC Write

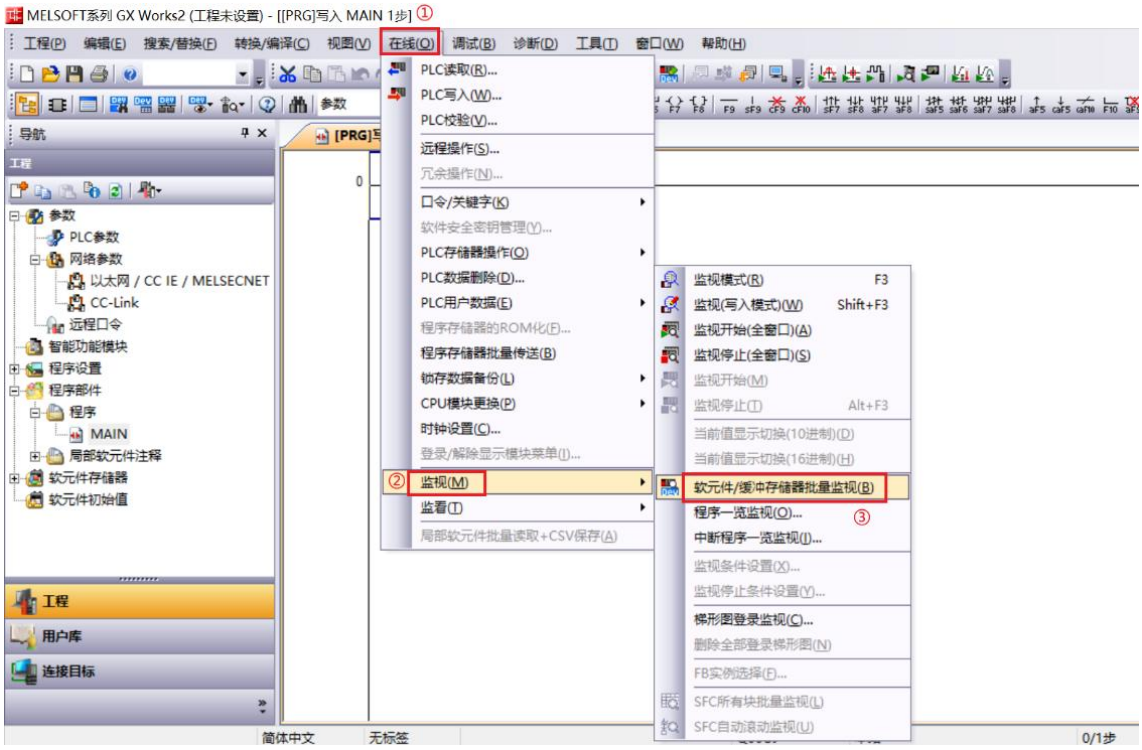
a. Select "Online- > PLC Write ".
b. The "Online Data Operation" dialog box pops up. Select "Write" and select "Select All" for the data being edited, as shown in the figure below.



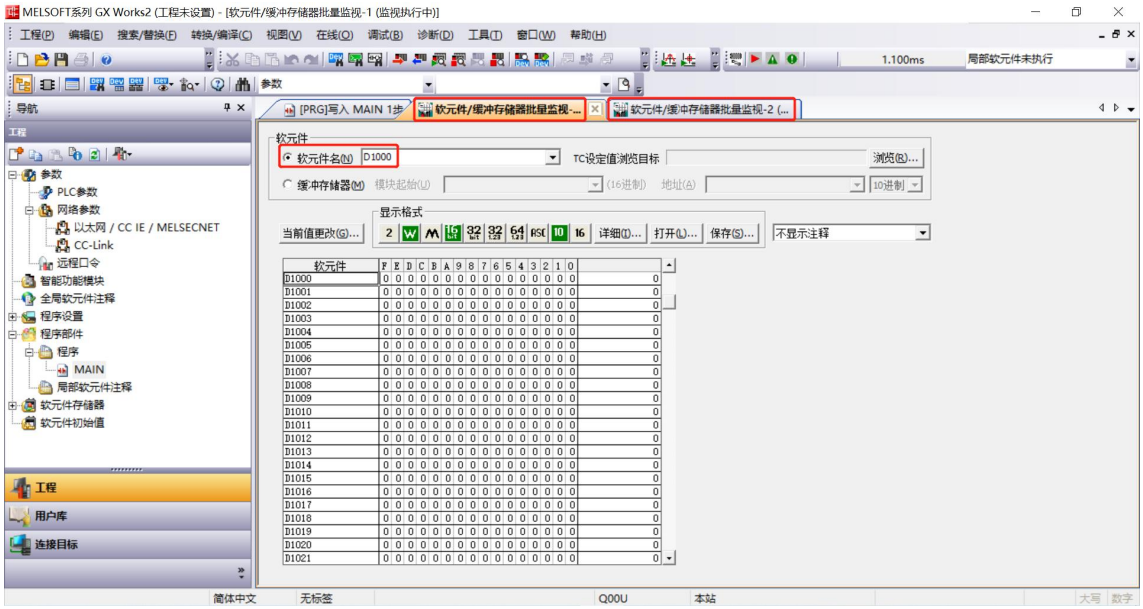
c. Click “Execute”.
d. A prompt box pops up asking "Do you want to write to PLC after executing remote STOP?" Select "Yes".
e. A lower-level prompt box pops up: "Parameters already exist, do you want to overwrite?" Select "Yes to All".
f. A lower-level prompt box pops up: "There is no data in the soft component comment (COMMENT). No data is written." Click "OK".
g. The prompt "PLC writing is completed" is displayed.
h. A prompt box pops up saying "PLC is in STOP state. Do you want to execute remote RUN?" Select "Yes".
i. A dialog box pops up saying "Completed". Click OK.
j. At this point, the PLC write operation is complete, click Close.
k. Disconnect the power to the gateway module and PLC and then power them back on.

6、Monitoring Settings

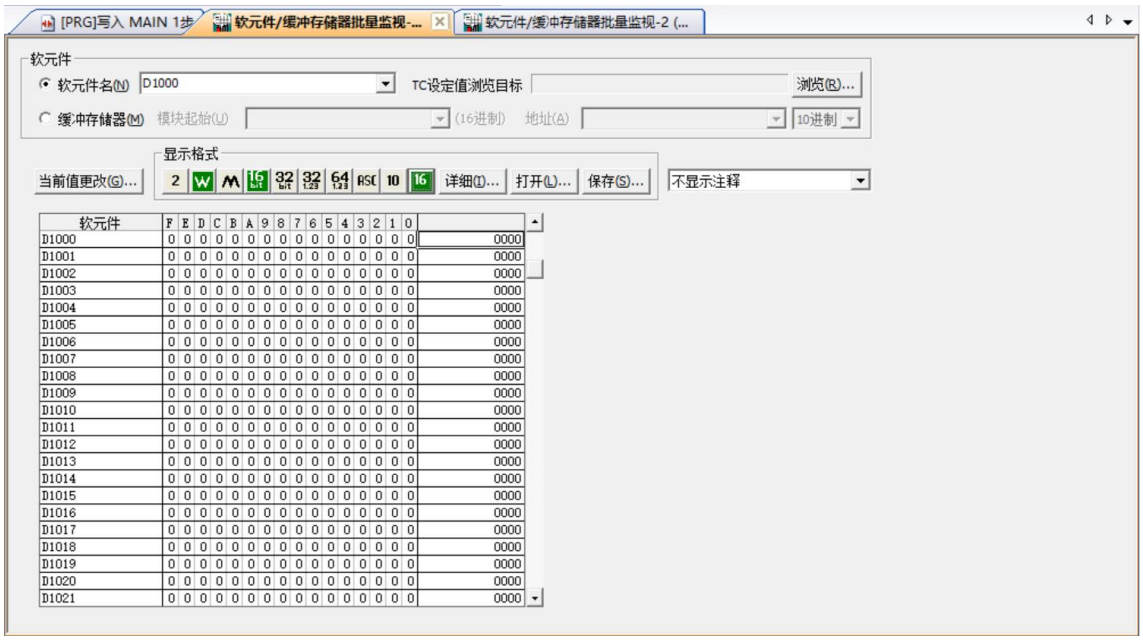
a. Select " Online- > Monitor- > Device/buffer memory batch monitoring".



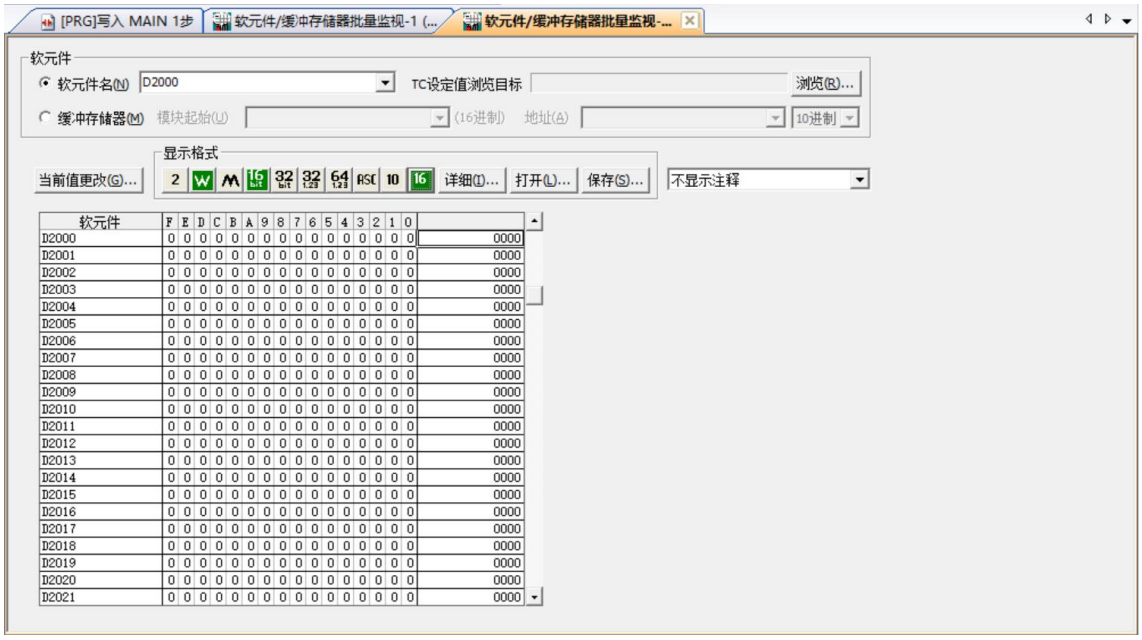
b. Repeat the above operation to establish two monitoring interfaces. In the "Soft Component Name" of the two monitoring interfaces, enter the parameters of "Remote Register (RWr)" and "Remote Register (RWw)" set in the network parameter setting interface, that is, "D1000" and "D2000". The monitoring setting is completed , as shown in the figure below .



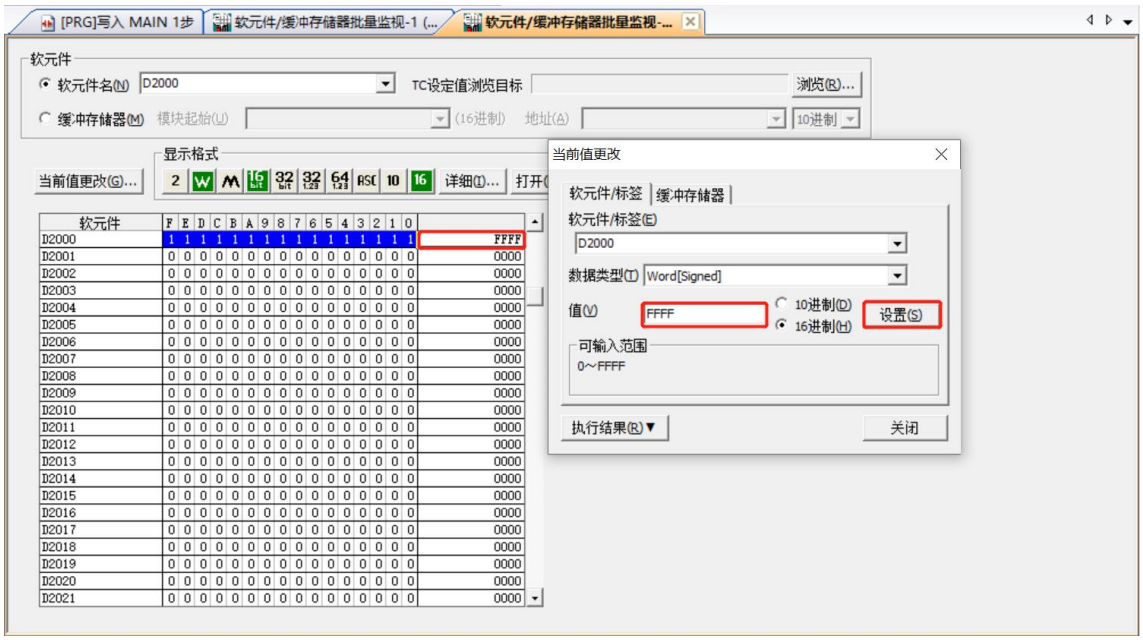
c. Monitoring interface 1 is the upstream data of the gateway module, that is, the input data monitoring page. D1000 (0 ~F)~ D1127 (0~7) is the input data, a total of 255 bytes; D1127 (8 ~ F) is the last byte is the state bit, and the display format is switched to hexadecimal , as shown in the figure below.



d. Monitoring interface 2 is the downstream data of the gateway module, which is used to force output of data. The display format is switched to hexadecimal , as shown in the figure below.

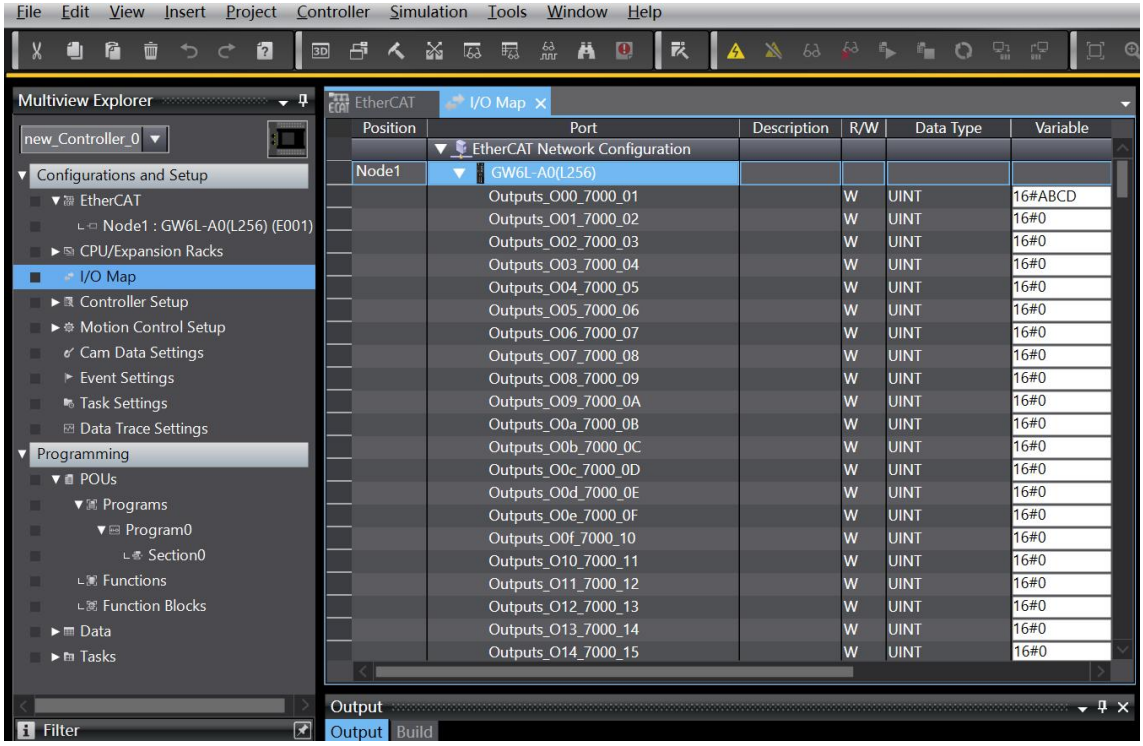


e. Double-click the current value of D 2000 , a current value change window pops up, write "FFFF", click "Set", and the data can be output, as shown in the figure below.

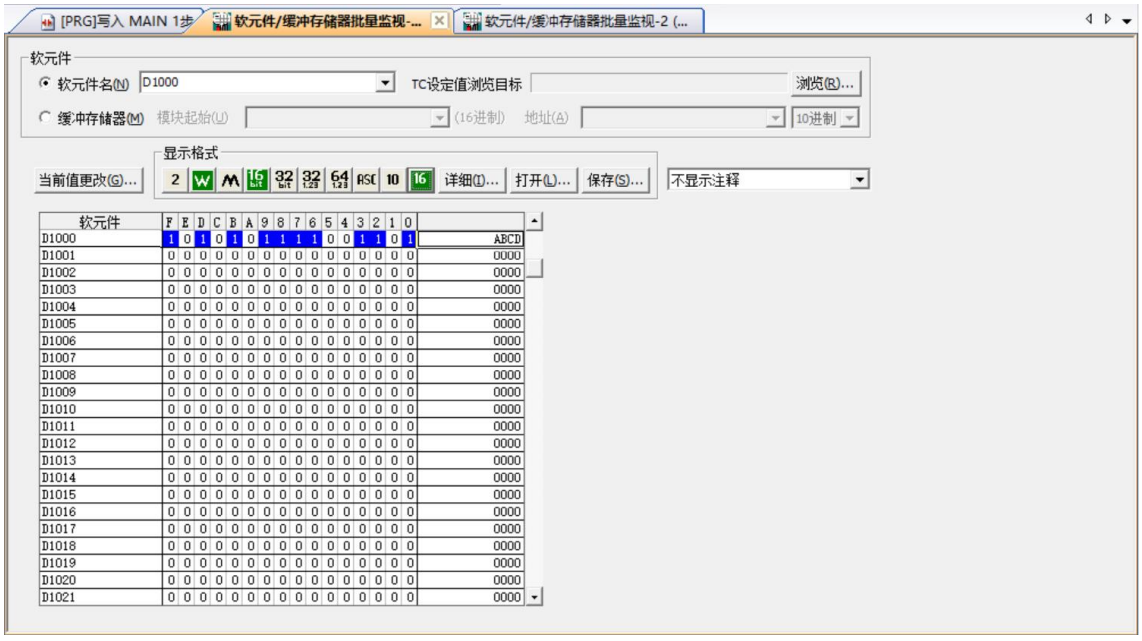


7.2.2.4 Data Interaction

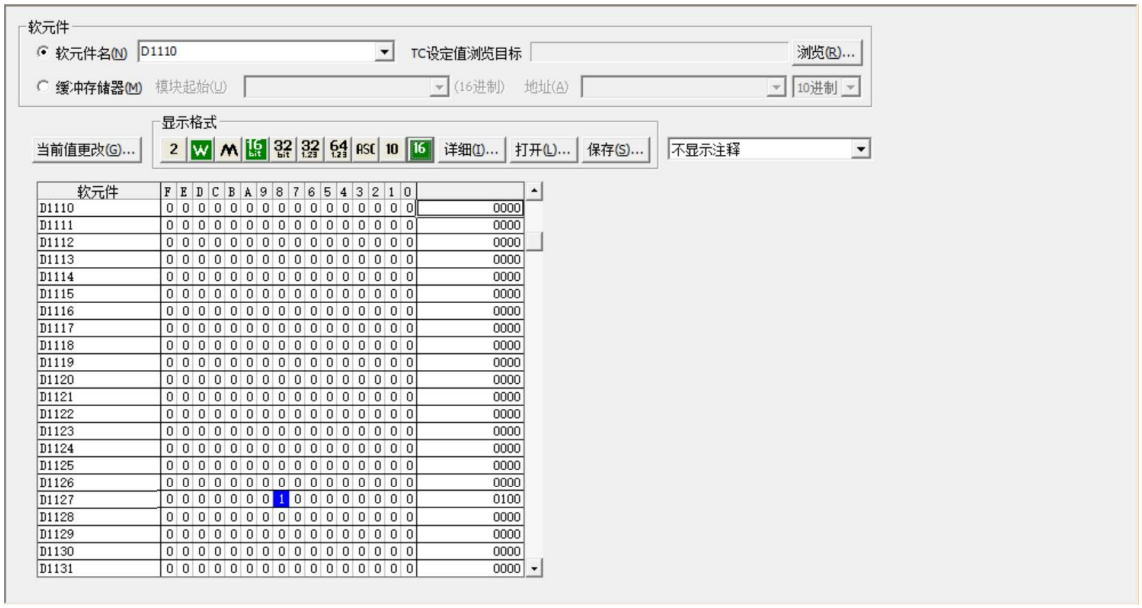
a. After establishing the communication connection, write the value in the downstream data of Sysmac Studio software, and the output data will be as shown in the figure below.



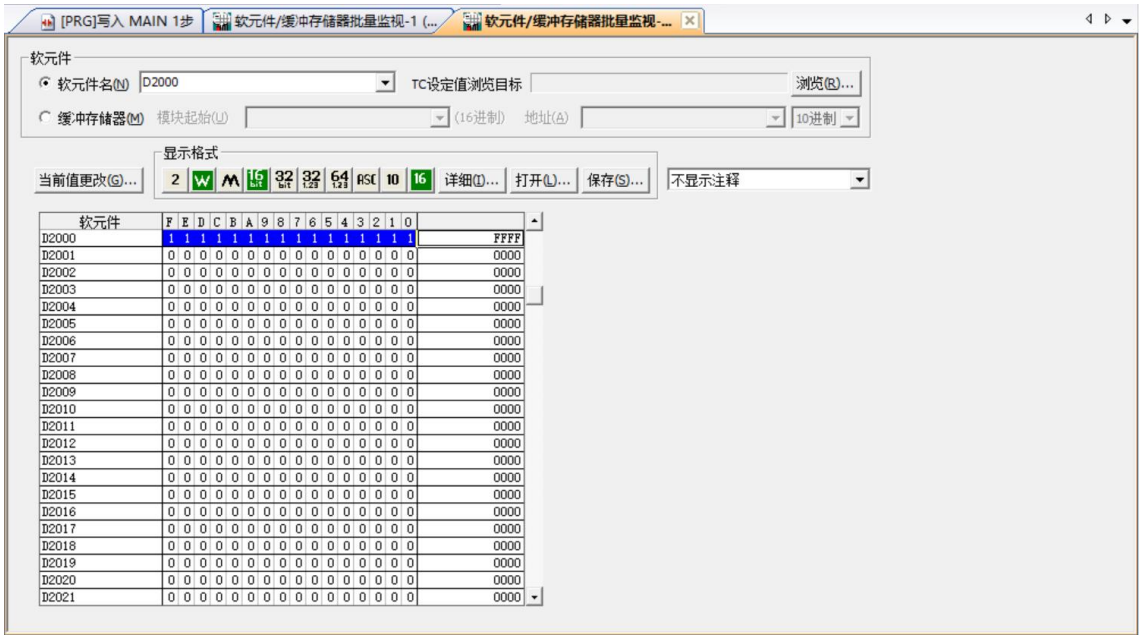
b. In the monitoring interface 1 of the GX Works2 software , check the upstream data to confirm whether the data is input to the gateway module. As shown in the figure below, the data has been transmitted .



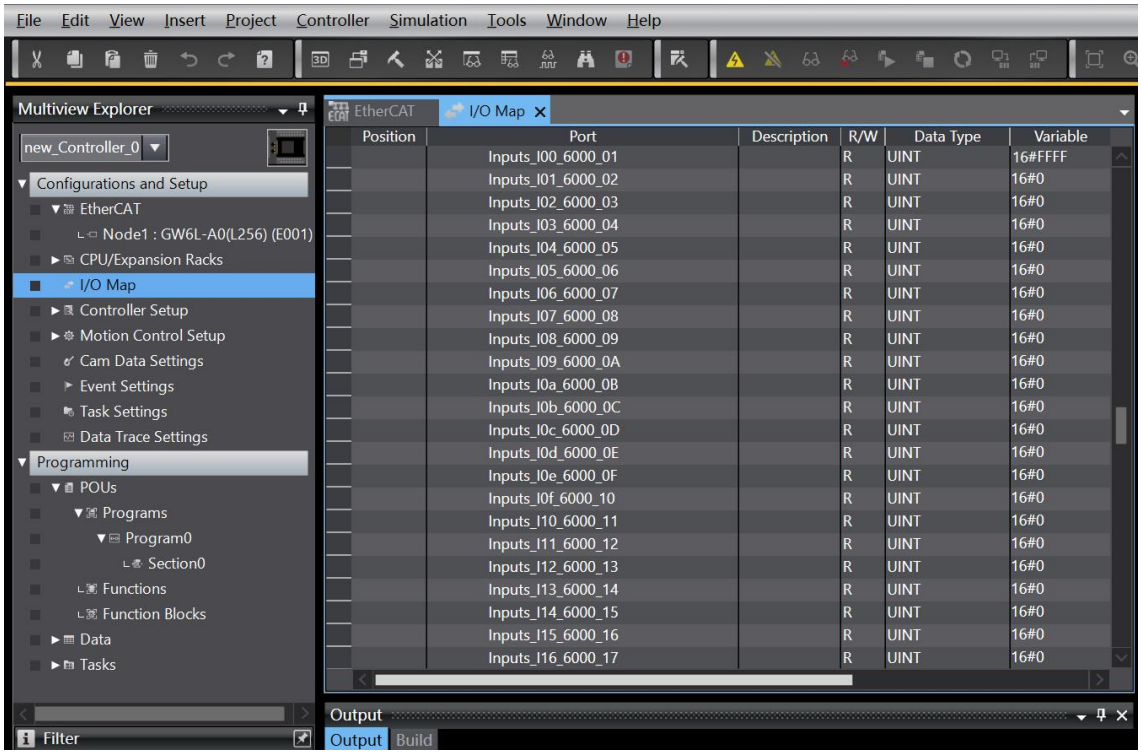
c. At this time, the last state bit byte of the upstream data of the GX Works2 software is 16#01, indicating that there is data exchange between the gateways , as shown in the following figure.



d. In the monitoring interface 2 of the GX Works2 software , write the downstream data as shown in the figure below.



e. in the Sysmac Studio software to confirm whether the data has been input to the gateway module. As shown in the figure below, the data has been input .



f. At this time, the last state bit byte of the Sysmac Studio software upstream data is 1 6#01, indicating that there is data interaction between the gateways , as shown in the following figure.