



AS-C6 EtherCAT switch

User manual

Wuxi Xinje Electric Co., Ltd.

Data No: PA 01 20231124EN 1.0

Basic notes

- ◆ Thank you for purchasing the Xinjie AS-C6 EtherCAT splitter.
- ◆ This manual mainly introduces the hardware characteristics and usage of AS-C6.
- ◆ Before using the product, please read this manual carefully and make the wiring on the premise of fully understanding the content of the manual.
- ◆ Please deliver this manual to the end user.

User instructions

- ◆ Only operators with certain electrical knowledge can perform wiring and other operations on the product. If there is any unclear usage, please consult our company's technical personnel.
- ◆ The examples listed in manuals and other technical materials are for user understanding and reference only, and do not guarantee certain actions.
- ◆ When using this product in combination with other products, please confirm if it complies with relevant specifications, principles, etc.
- ◆ When using this product, please confirm whether it meets the requirements and is safe.
- ◆ Please set up backup and safety functions by yourself to avoid possible machine failure or loss caused by the failure of this product.

Statement of responsibility

- ◆ Although the contents of the manual have been carefully checked, errors are inevitable, and we can't guarantee complete consistency.
- ◆ We will often check the contents of the manual and correct them in subsequent versions. We welcome your valuable comments.
- ◆ Please understand that the contents described in the manual are subject to change without notice.

Contact method

If you have any questions about the use of this product, please contact the agent and office who purchased the product, or directly contact Xinje company.

- ◆ Switchboard: 0510-85134136
- ◆ Telephone: 400-885-0136
- ◆ Fax: 0510-85111290
- ◆ Website: www.xinje.com
- ◆ Post code: 214072
- ◆ Address: 4th floor, building 7, creative industry park, No. 100, Dicui Road, Wuxi, China

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November, 2023

Safety precautions

(Please make sure to read before use)

The potential problems that may arise during the use of the product are basically listed in safety precautions, and are all indicated in two levels: attention and danger. For other unfinished matters, please follow the basic electrical operating procedures.



Note

When used incorrectly, there may be hazards, including moderate or minor injuries, as well as potential property damage.



Danger

When used incorrectly, it may pose a danger, causing personal injury or serious injury, as well as potentially causing serious property damage.

● Confirmation upon receiving the product



Note

1. Damaged controllers, controllers with missing components, or controllers with models that do not meet the requirements, please do not install them.
There is a risk of injury.

● System design of the product



Danger

1. Please design a safety circuit outside the controller to ensure that the entire system can operate safely in case of abnormal controller operation.
There is a risk of causing misoperation and malfunction.



Note

1. Please do not tie the control wiring and power wiring together. In principle, they should be separated by 10cm.
May cause misoperation and product damage.

● Product installation



Danger

1. Before installing the controller, be sure to disconnect all external power sources.
There is a risk of electric shock.



Note

1. Please install and use this product under the environmental conditions specified in the general specifications of the manual.
Do not use in damp, high temperature, dusty, smoke, conductive dust, corrosive gases, flammable gases, as well as places with vibration and impact.
May cause electric shock, fire, misoperation, product damage, etc.
2. Do not directly touch the conductive parts of the product.
May cause misoperation or malfunction.
3. Please use DIN46277 guide rail to fix this product and install it on a flat surface.
Incorrect installation may cause misoperation and product damage.
4. When processing screw holes, please do not allow cutting powder or wire debris to fall into the product casing.
May cause misoperation or malfunction.
5. When connecting the expansion module with an expansion cable, please confirm that the connection is tight and the contact is good.
May lead to poor communication and misoperation.
6. When connecting peripheral devices, expansion devices, batteries, etc., please make sure to power off the operation.
May cause misoperation or malfunction.

● Product wiring



Danger

1. Before wiring the controller, be sure to disconnect all external power sources.
There is a risk of electric shock.
2. Please correctly connect the AC or DC power supply to the dedicated power terminal of the controller.
Connecting the wrong power supply may burn out the controller.
3. Before powering on and running the controller, please cover the cover plate on the terminal block.
There is a risk of electric shock.



Note

1. Do not use an external 24V power supply to connect to the 24V or 0V terminals of the controller or expansion module.
May cause damage to the product.
2. Please use a 2mm² wire to perform the third type of grounding on the grounding terminals of the controller and expansion equipment, and do not connect to the common grounding of the strong current system .
May cause malfunctions, product damage, etc.
3. Do not perform external wiring on empty terminals.
May cause misoperation and product damage.
4. When processing screw holes, please do not allow cutting powder or wire debris to fall into the product casing.
May cause misoperation, malfunction, etc.
5. When using wires to connect terminals, please note that they must be tightened and the conductive parts must

not come into contact with other wires or terminals.

May cause misoperation and product damage.

● Operation and maintenance of products



Danger

1. After powering on the controller, do not touch the terminals.
There is a risk of electric shock.
2. Do not wire or disassemble terminals with electricity.
There is a risk of electric shock.
3. Before making changes to the program in the controller, please make sure to stop it first.
May cause misoperation .



Note

1. Do not disassemble or assemble this product without authorization .
May cause damage to the product.
2. Please plug and unplug the connecting cable in case of power outage.
May cause damage to cables and cause misoperation.
3. Do not perform external wiring on empty terminals.
May cause misoperation and product damage.
4. When disassembling expansion devices, peripheral devices, and batteries, please power off first.
May cause misoperation, malfunction, etc.
5. When the product is discarded, please dispose of it as industrial waste.
6. Before installing the device, please make sure to turn off the power. If the power is not turned off, the device may malfunction or be damaged.
May cause malfunctions, product damage, etc.

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1. Document guide

1.1 Related manuals

1. CPU units

Manual	Content
XDH/XLH/XG2 series PLC motion control manual	Mainly records the communication related registers and motion control related instructions of the main station
XS series PLCopen controller software manual	Introduce the usage methods and techniques of XS Studio programming tool software
XS series PLCopen controller instruction manual	Introduce the usage of XS series PLC instructions

2. Remote IO modules

Manual	Content
L Series Remote IO User Manual	Mainly record the product specifications and usage of LC3-AP and remote modules
LF Series Remote IO User Manual	Mainly record the necessary notes, specifications, functions, etc. for XF-IO units

2. Product overview

2.1 Product overview



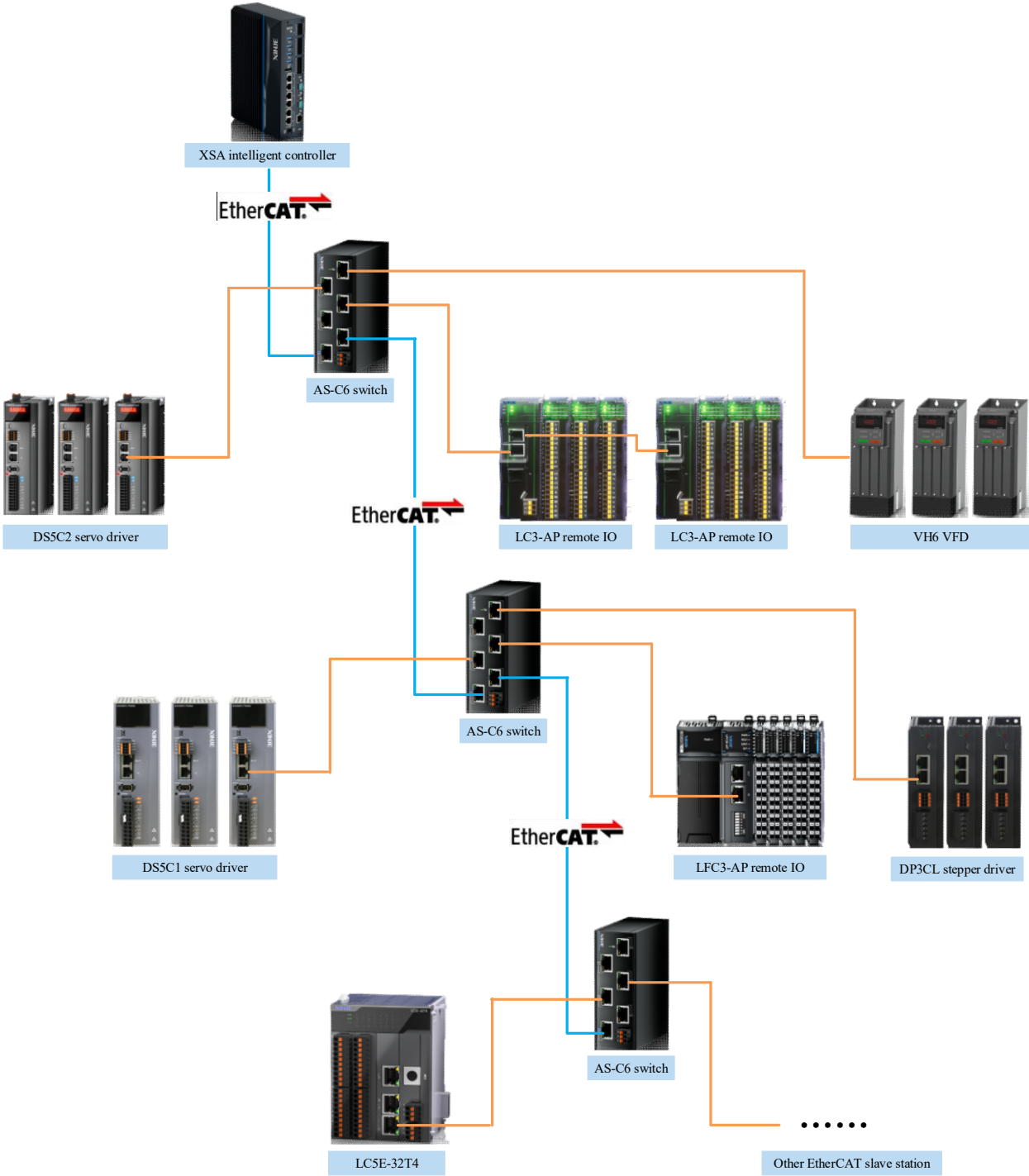
AS-C6 is a 6-port switch module, which has 1 EtherCAT input port and 5 EtherCAT output ports. It is suitable for multi-axis complex equipment and production line networking. It can change the existing simple linear topology structure, arrange the network topology in a star shaped manner, and achieve multi-level topology for complex on-site processes, achieving one in multiple outs effect and stronger network flexibility.

2.2 Naming rule

A S - C 6
① ② ③ ④

①	Series name	A:	Series name
②	Module type	S:	Switch
③	Interface type	C:	EtherCAT bus
④	Ethernet port	6:	6 Ethernet ports

2.3 System structure



2.4 Part description



No.	Interface name	Identification	Description
①	Power indicator light	PWR	Green: Illuminates when power is turned on
②	EtherCAT input port	IN1	Port1, EtherCAT input port, connect to the previous EtherCAT master station
③	EtherCAT output port	OUT2	Port2, EtherCAT output port, connect to the next EtherCAT slave station
④		OUT3	Port3, EtherCAT output port, connect to the next EtherCAT slave station
⑤		OUT4	Port4, EtherCAT output port, connect to the next EtherCAT slave station
⑥		OUT5	Port5, EtherCAT output port, connect to the next EtherCAT slave station
⑦		OUT6	Port6, EtherCAT output port, connect to the next EtherCAT slave station
⑧	24V power supply input	24V, 0V	Module power supply input

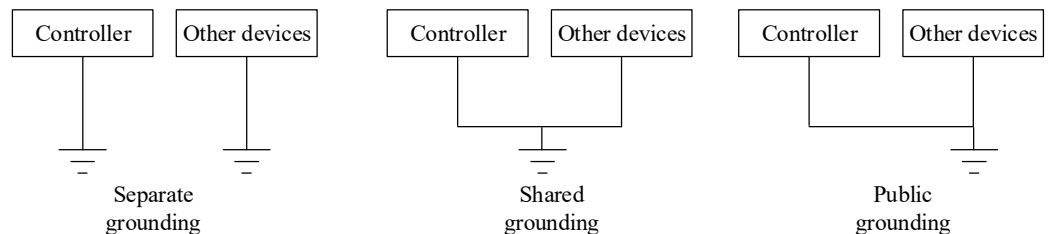
2.5 Product specification

2.5.1 General specification

Item	Specification
Communication protocol	EtherCAT industrial real time bus protocol
EtherCAT channel	1 channel input, 5 channels output
Communication port	6*RJ45 ports
Maximum communication speed	100Mbps
Ethernet port/cable	Standard Ethernet port with Cat5e Ethernet cable, cable length not exceeding 100 meters
Working temperature	-20-65°C
Storage temperature	-30-70°C
Humidity	10~95%, no condensation
Installation	Fix with M35 rail
Grounding (FG)	The third type of grounding (cannot be connected to a common ground with strong electrical system) ^{※1}



※1: Grounding should be done separately or through shared grounding, and public grounding should not be used.



2.5.2 EtherCAT communication specification

Item	Content
Communication protocol	EtherCAT industrial real time bus protocol
Synchronization method	DC- Distributed clock
Duplex mode	Full duplex
Physical layer	100BASE-TX (IEEE802.3)
Maximum communication speed	100 Mbit/s
Topological structure	Star topology structure
Switch cascading	Supported
Network cable identification	Auto MDI/MDIX
Cyclic time (DC communicate cycle)	125,250,500,1000,2000,4000[μ s]

2.5.3 Power supply specification

Item	Content
Rated voltage	DC24V
Voltage allowable range	DC21.6V~26.4V
Rated frequency	120mA DC24V
Allow instant power outage time	10ms DC24V
Impact current	10A DC26.4V
Maximum power consumption	12W

3. Function description

- The AS-C6 switch can seamlessly connect with mainstream PLCs on the market to achieve corresponding functions.
- The AS-C6 switch can achieve a multi-level topology structure, and the connection status on each branch does not interfere with each other. When a branch on the switch fails, it will not affect the working status of other branches.
- The AS-C6 switch supports cascading, and the number of cascading is not related to the function of the branch itself, but only to the maximum number of nodes supported by the master station.
- The port data flow priority of the AS-C6 switch is: OUT2>OUT3>OUT4>OUT5>OUT6, that is, any slave on the OUT2 branch takes priority over all slaves on the OUT3 branch, and is still executed according to this priority during multi-level topology.
- The switches enabled in DC mode by default. If there are special mode requirements, users need to adjust them themselves.
- Each switch occupies two EtherCAT slave station numbers.

4. Alarm and solution

When a module malfunctions, users can check the signal status through LED indicator lights and take corresponding solutions:

LED light		Meaning	Reason	Solution
PWR	Link/Act			
OFF	OFF	Abnormal power supply	① No power supply, power supply not connected; ② Internal circuit failure	① Confirm the power supply and wiring of the power supply; ② Replace the switch
ON	OFF	No connection established	① Communication cables falling off, not connected, or short circuited; ② Switch hardware failure; ③ Master station not started	① Confirm the connection of the communication cable. If there is a disconnection or short circuit, please replace the communication cable; ② Replace the switch; ③ Confirm the status of the master station
ON	ON	Established connection	Established connection data transfer	
ON	Flashing	Established connection	Established connection data transfer	

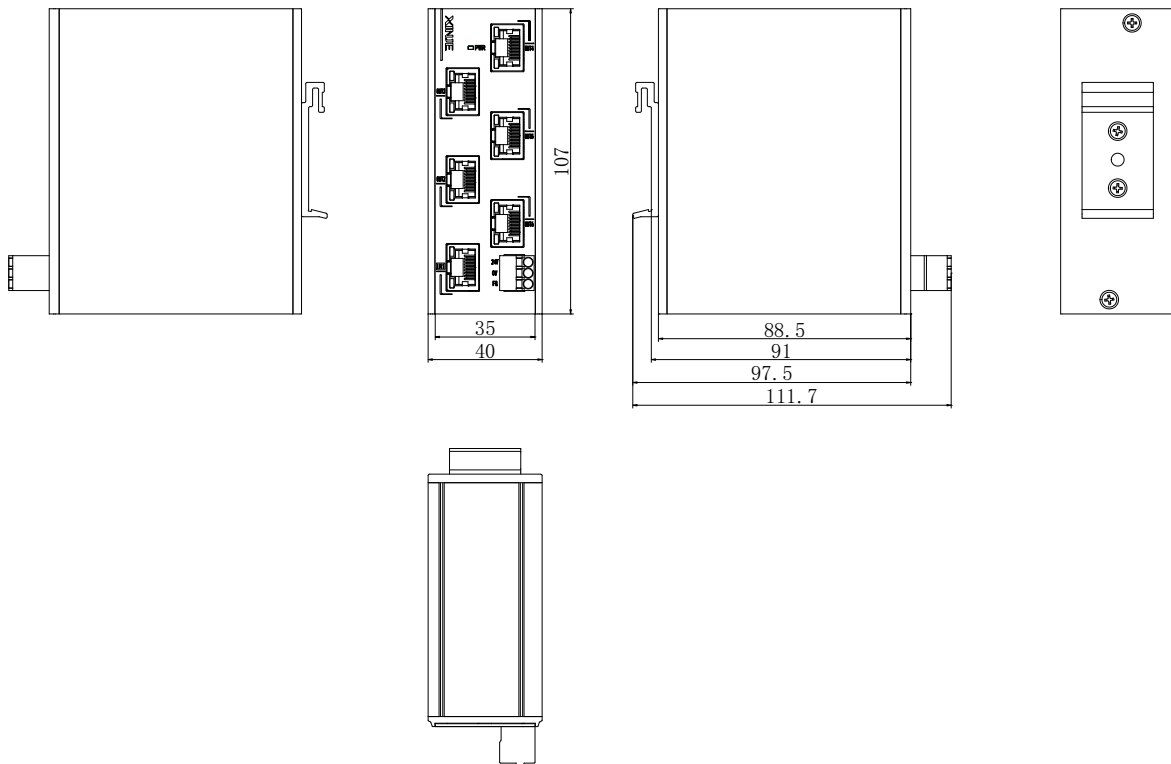


The status of the network port indicator light is consistent with other models, that is, the yellow light is constantly on and the green light is flashing.

5. Installation and wiring

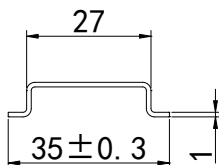
5.1 Dimension

(Unit: mm)



5.2 Installation method

The module is installed using DIN rails, which must comply with the IEC 60715 standard (35mm wide, 1mm thick). The dimension information is shown in the following figure, and the unit is (mm).



Note

When the module is installed on a non recommended DIN rail, the DIN rail latch may not lock properly.

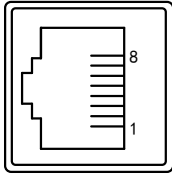
5.3 Wiring

5.3.1 Ethernet cable requirements

To improve the reliability of device communication, Ethernet cables require the use of Category 5 shielded twisted pair cables with iron shell injection molded wires.

- ◆ Connection: Grasp the crystal head with the cable and insert it into the Ethernet port (RJ45 interface) until a "click" sound is heard.
- ◆ Dismantling: Hold down the tail mechanism of the crystal head and pull out the connector horizontally with this product.

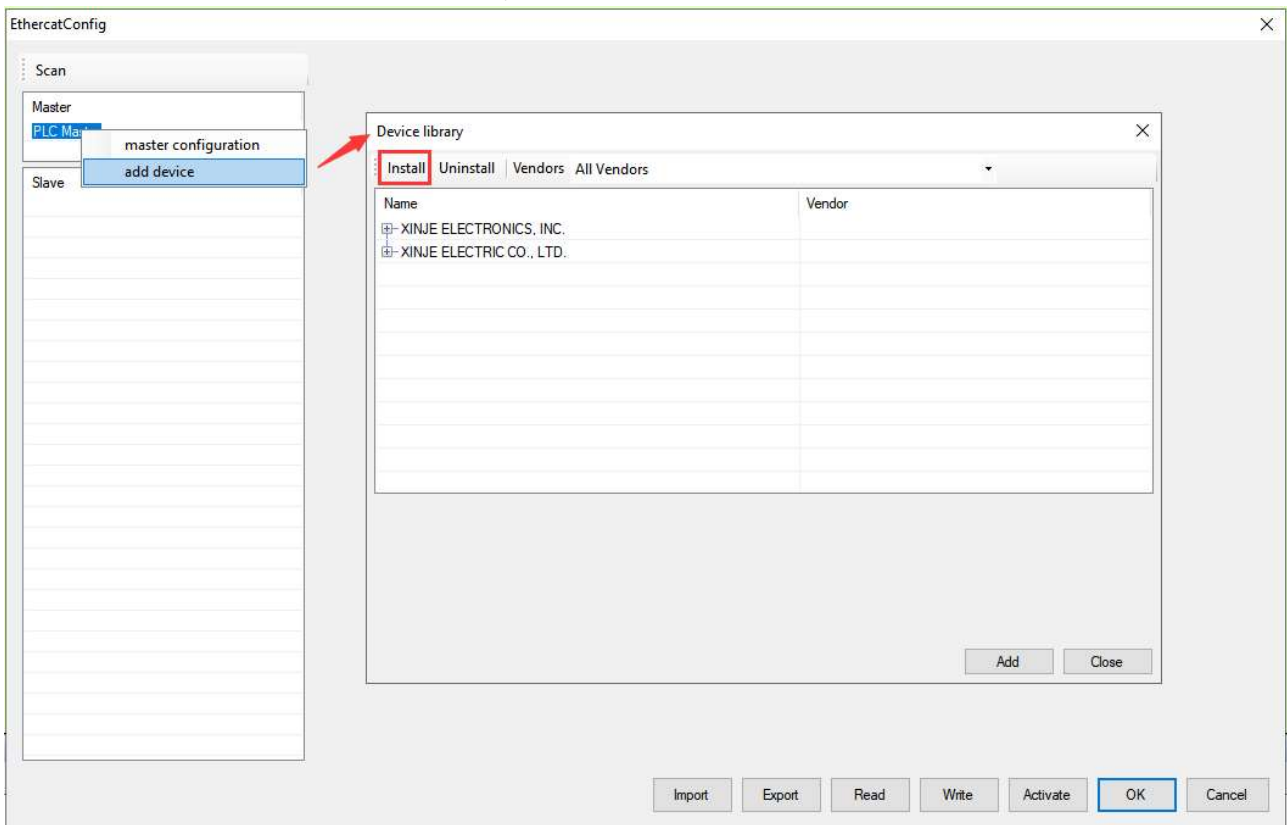
5.3.2 Signal pin allocation

Connector view	Pin	Signal
	1	TD+
	2	TD-
	3	RD+
	4	-
	5	-
	6	RD-
	7	-
	8	-

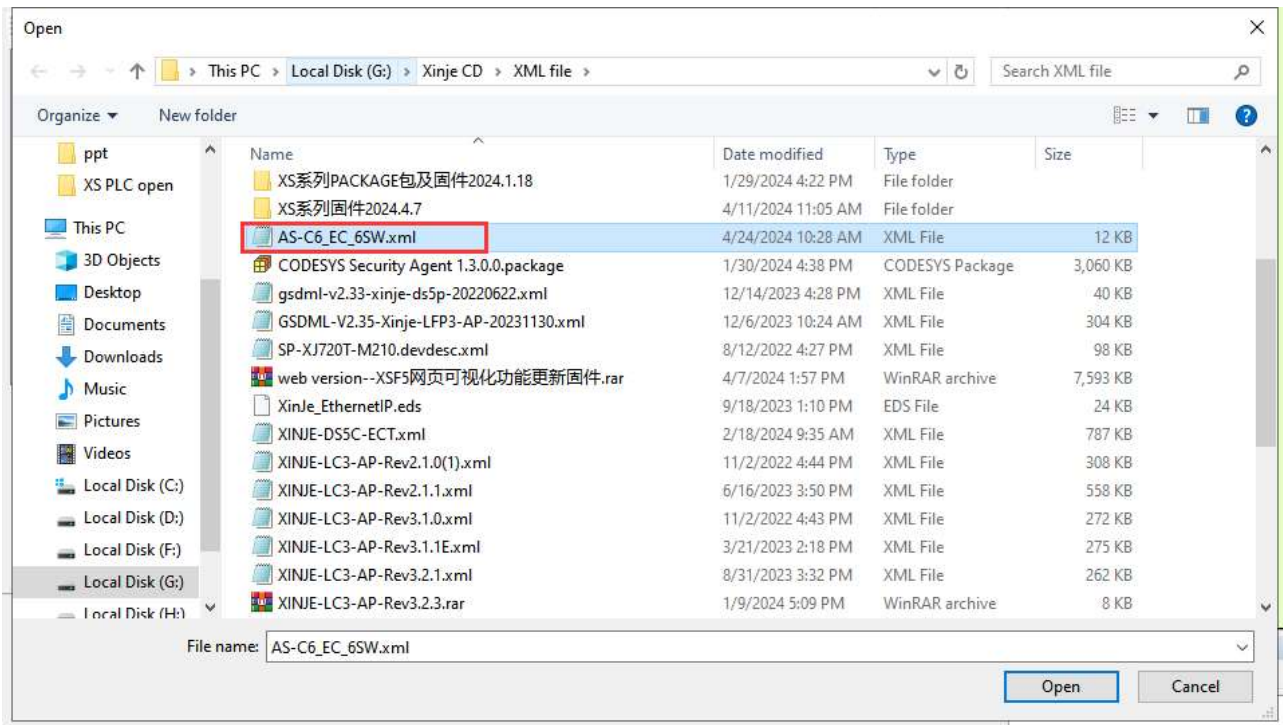
6. Application

6.1 Application of XDH and AS-C6

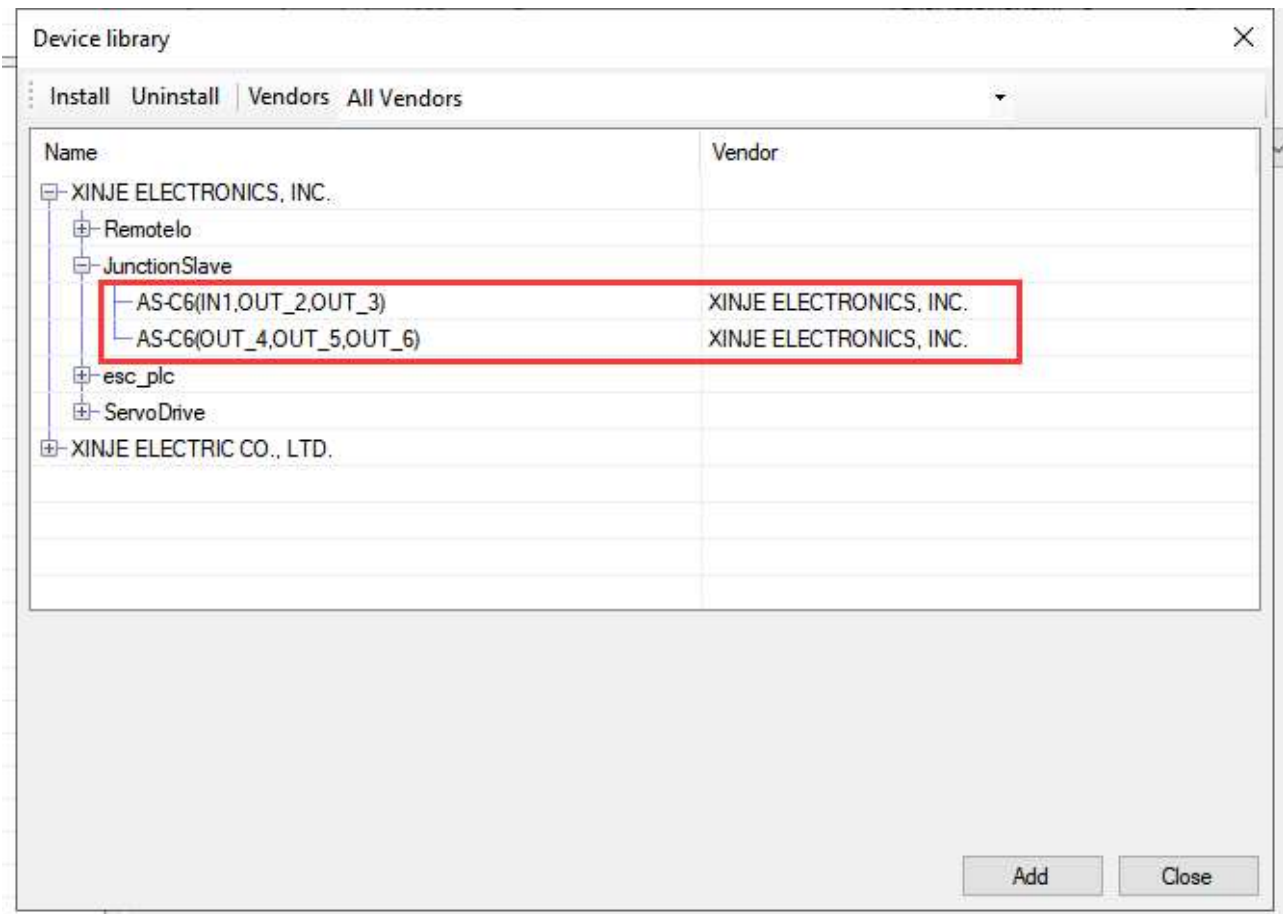
1. Add the XML file of AS-C6. Open XDPpro software, click EthercatMaster, right click “PLC Master”, click add device. Then click install in the device library.



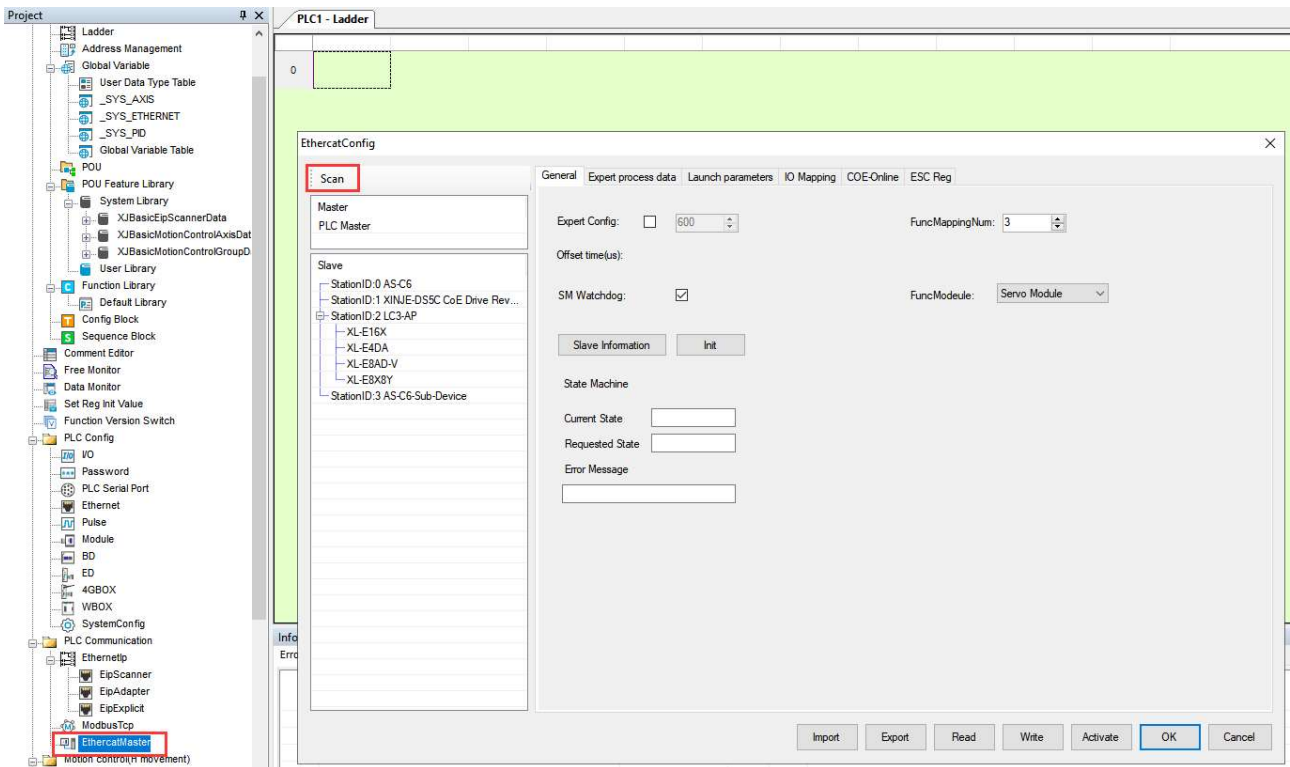
2. Find the directory where the AS-C6 XML file is located, select it, and click "Open" to complete the addition.



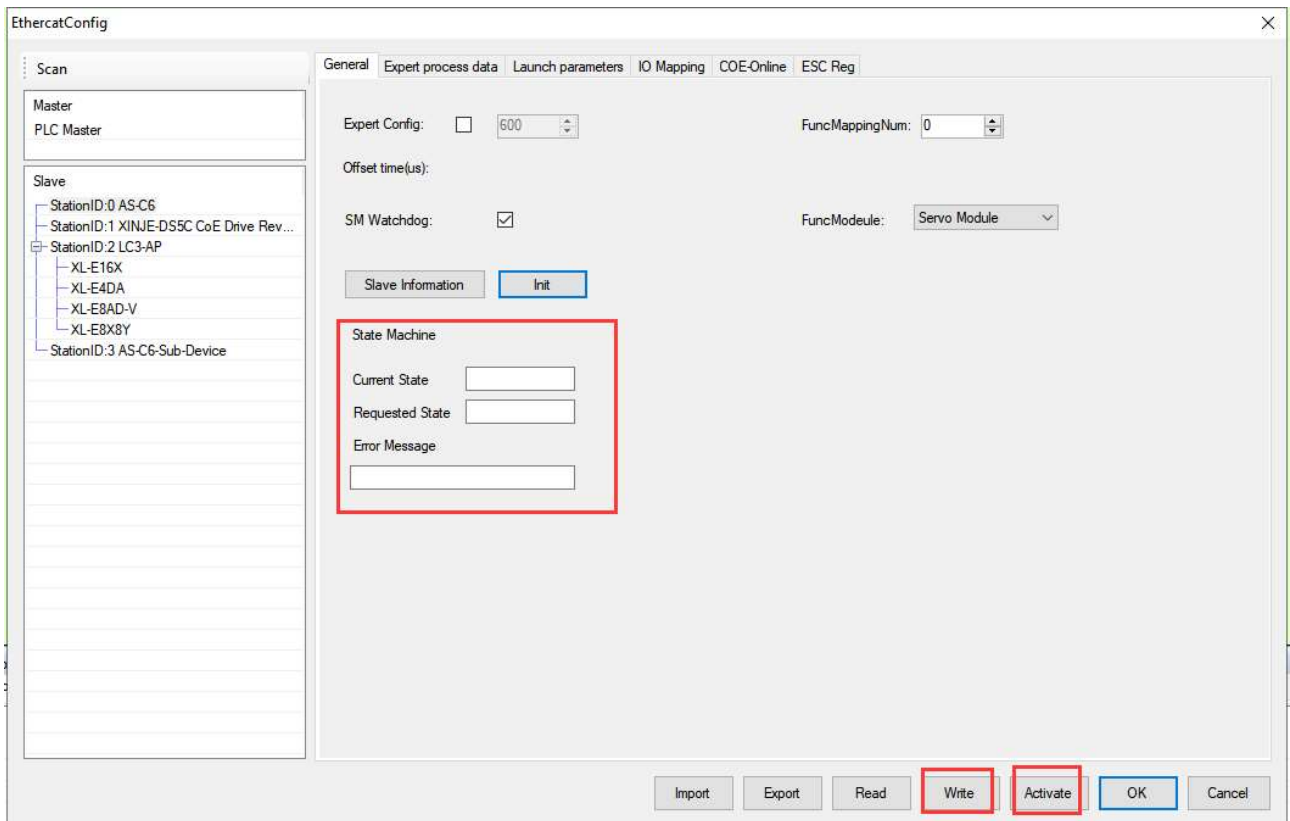
You can query the added XML files in the device library.



4. Physically connect the EtherCAT port of the PLC to the IN port of AS-C6, plug the slave devices to be networked into OUT2~OUT6 (in this case, DS5C1 is plugged into OUT2, LC3-AP is plugged into OUT3), use XDPPro to connect the PLC, click "Scan" in "EthercatMaster", and the PLC will automatically add the following slave stations and modules;



5. Click "Write", after successful writing, click "Activate" to activate the slave station. The slave station status can be viewed in the "Status Machine", and it can be used normally when it is in the "OP" state.





When the slave station is a ServoModule, the switch will occupy the function mapping number of Ethercat, which needs to correspond to the axis configuration.

EthercatConfig

Scan

Master
PLC Master

Slave
StationID:0 AS-C6
StationID:1 XINJE-DSSC CoE Drive Rev...
StationID:2 LC3-AP
XL-E16X
XL-E4DA
XL-E8AD-V
XL-E8X8Y
StationID:3 AS-C6-Sub-Device

General Expert process data Launch parameters IO Mapping COE-Online ESC Reg

Expert Config: 0

Offset time(us):

SM Watchdog:

FuncMappingNum: 1

FuncModule: Servo Module

Slave Information Init

State Machine

Current State

Requested State

Error Message

Import Export Read Write Activate

PLC1 - Ladder Axis configuration

The number of axes shown 1 Read Write System Settings

Name
BMC_Axis000(0)

Basic configuration Unit conversion Mode parameter Probe settings ZRN back to the original HOME Back to the original

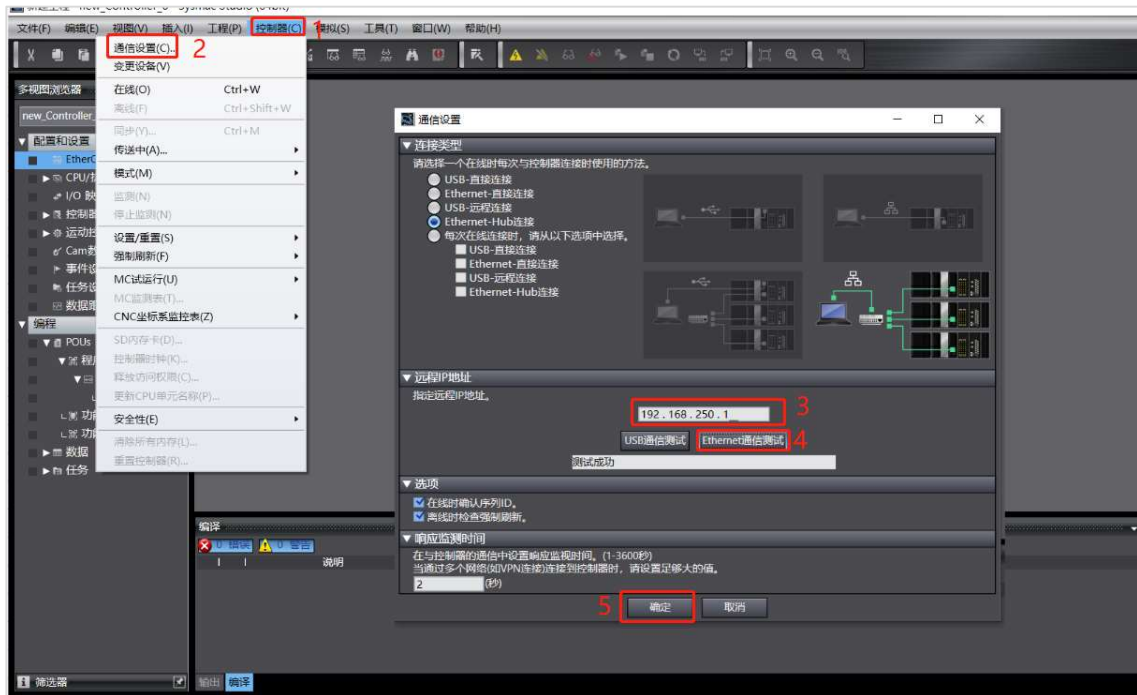
Shaft type Real axis Command channel EtherCAT

From the stand no. 1

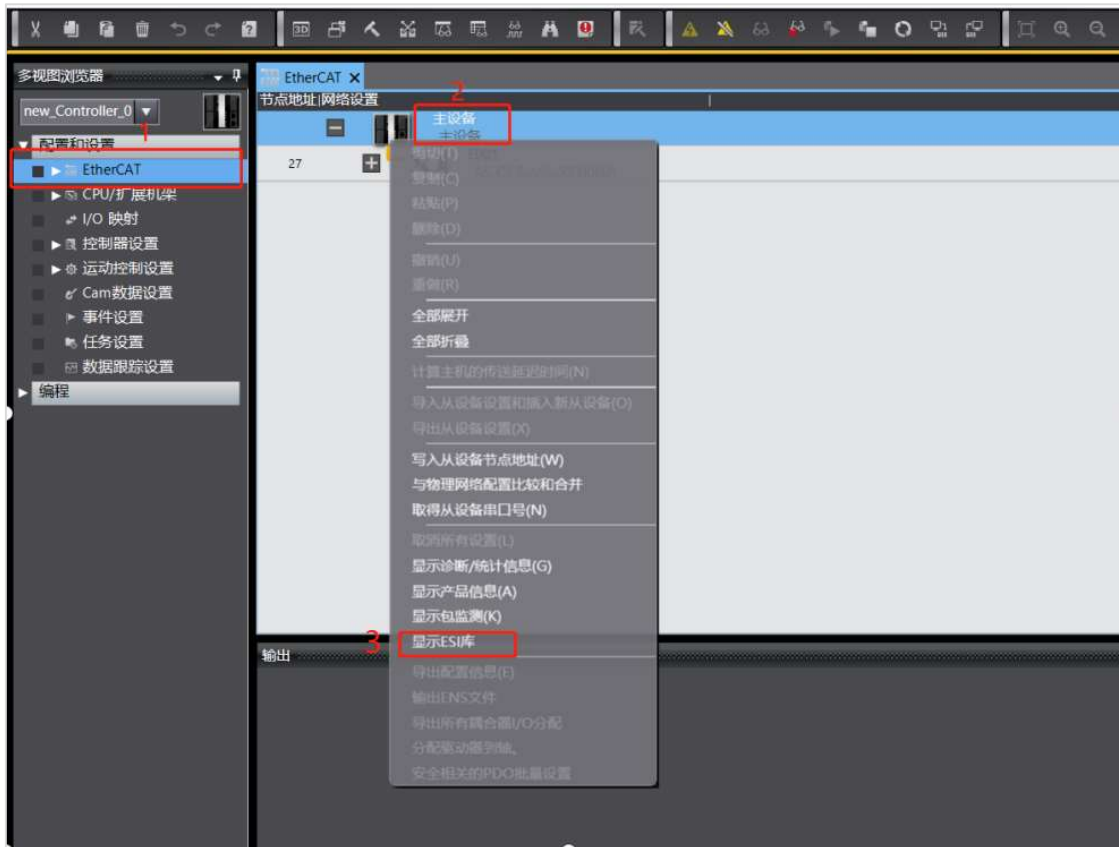
Encoder input port HSC0

6.2 Application of Omron and AS-C6

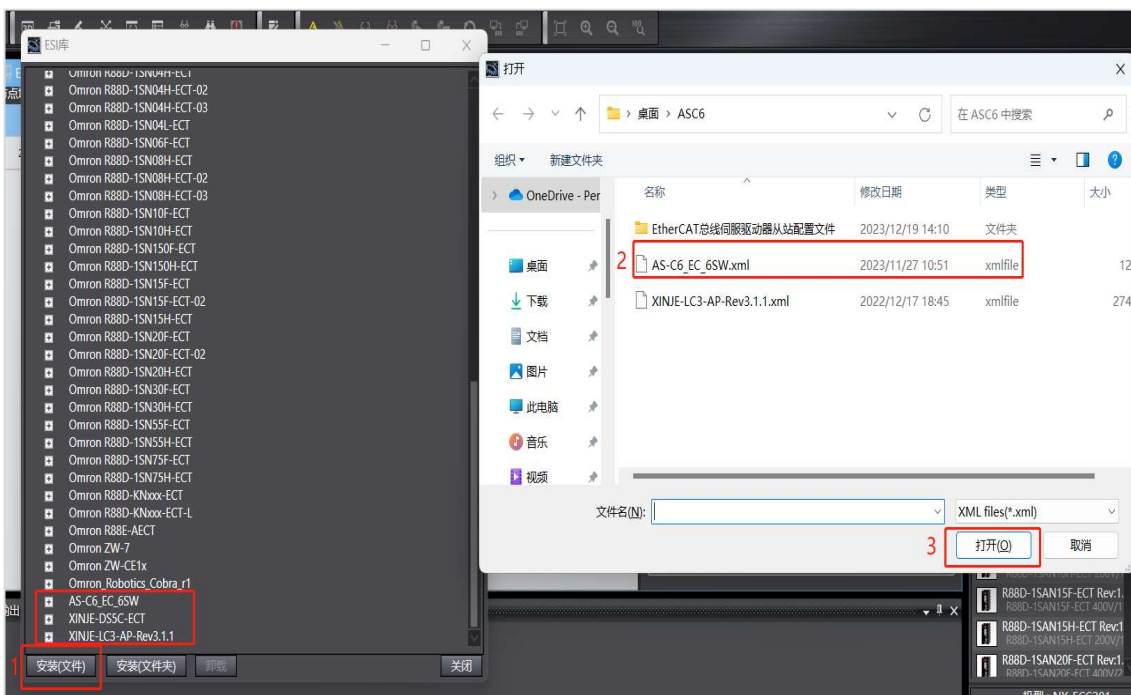
1. Open the Omron "Sysmac Studio" programming software, click on "Controller", select "Communication Settings", fill in the IP address of the PLC to be communicated at the specified remote IP address, click "Ethernet Communication Test", and display "Test Successful" to indicate successful communication between the PC and PLC. Click OK to complete the communication configuration operation.



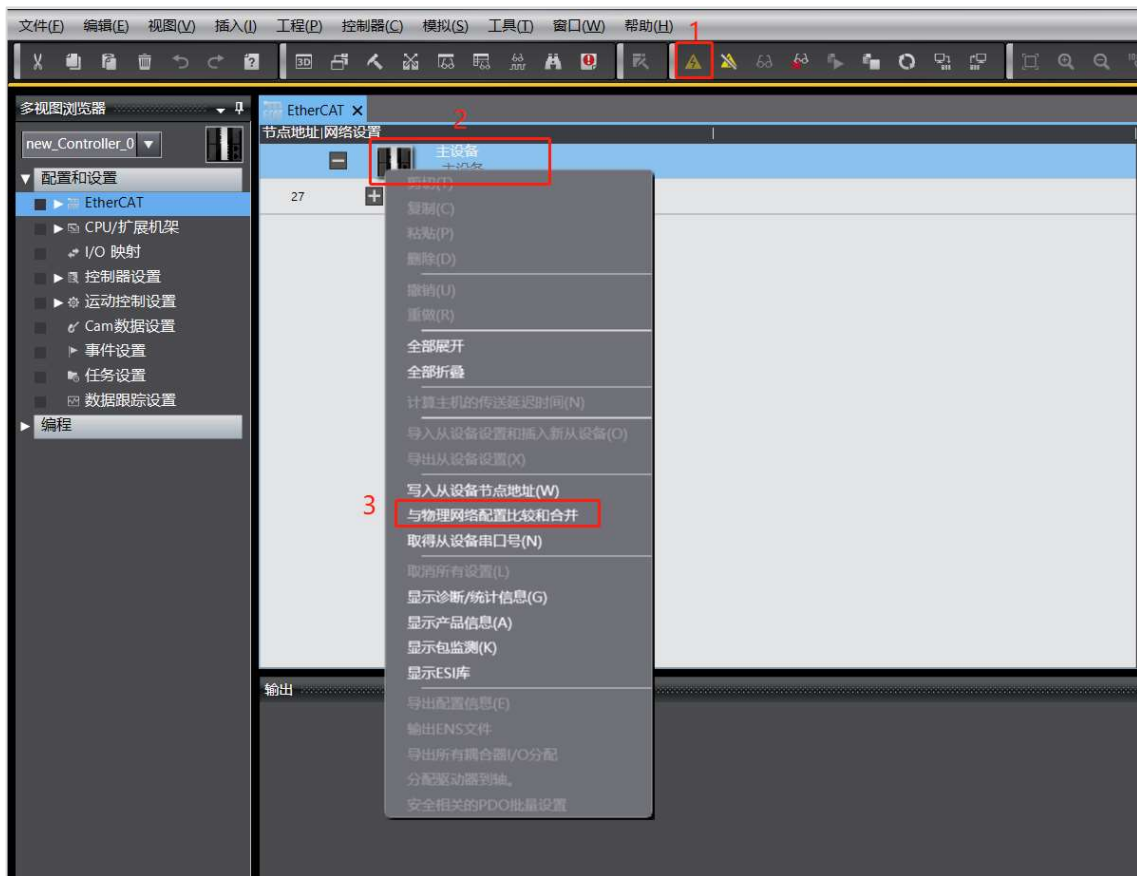
2. Add AS-C6 and the corresponding "xml" file for the slave station (in this example, the XML files for LC3-AP remote IO and DS5C1 servo are added). Double click "EtherCAT", right-click "Main Device", and click "Show ESI Library";



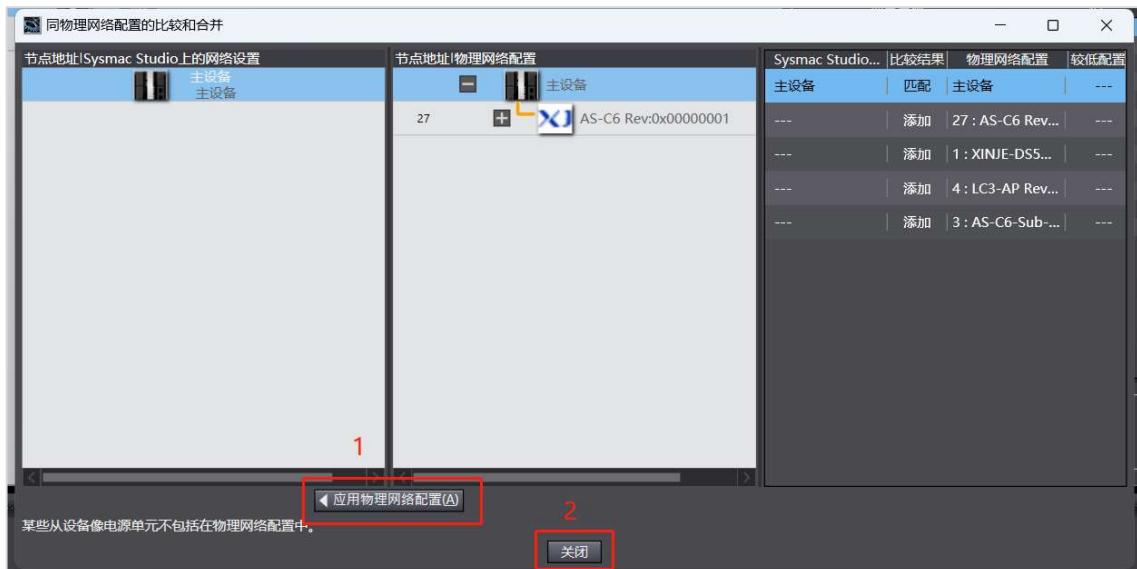
Install the corresponding "xml" file, click "Close" to complete the installation of the file.



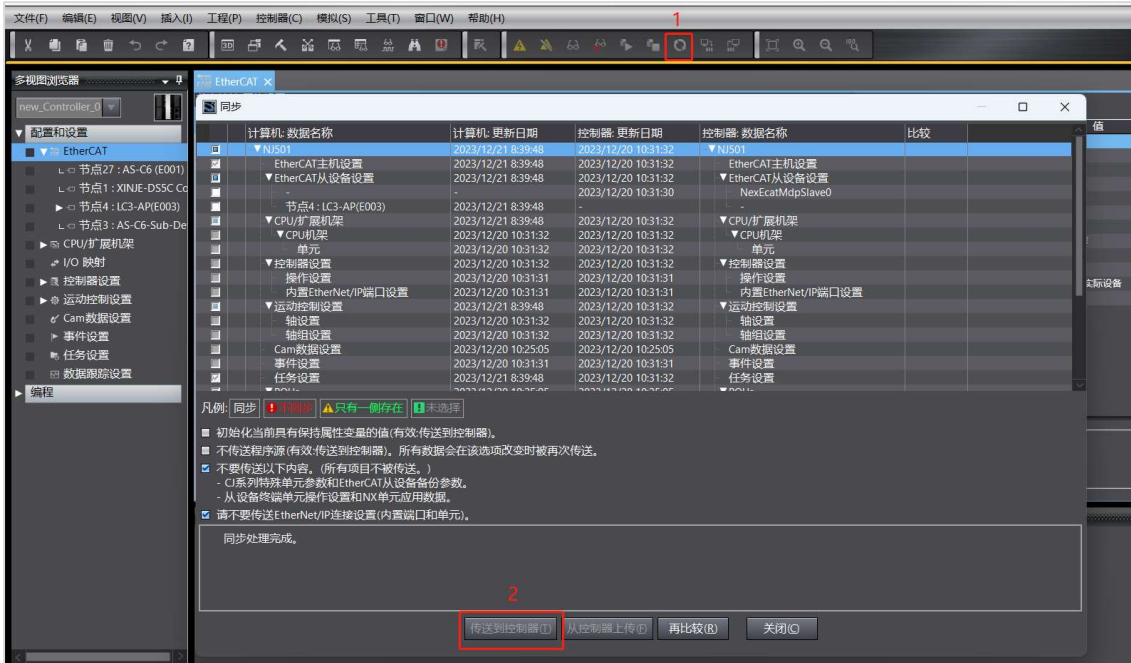
3. Click "Online" to put the PLC in an online state. Right click on "Main Device" and select "Compare and Merge with Physical Network Configuration" to configure AS-C6+DS5C1+LC3-AP.



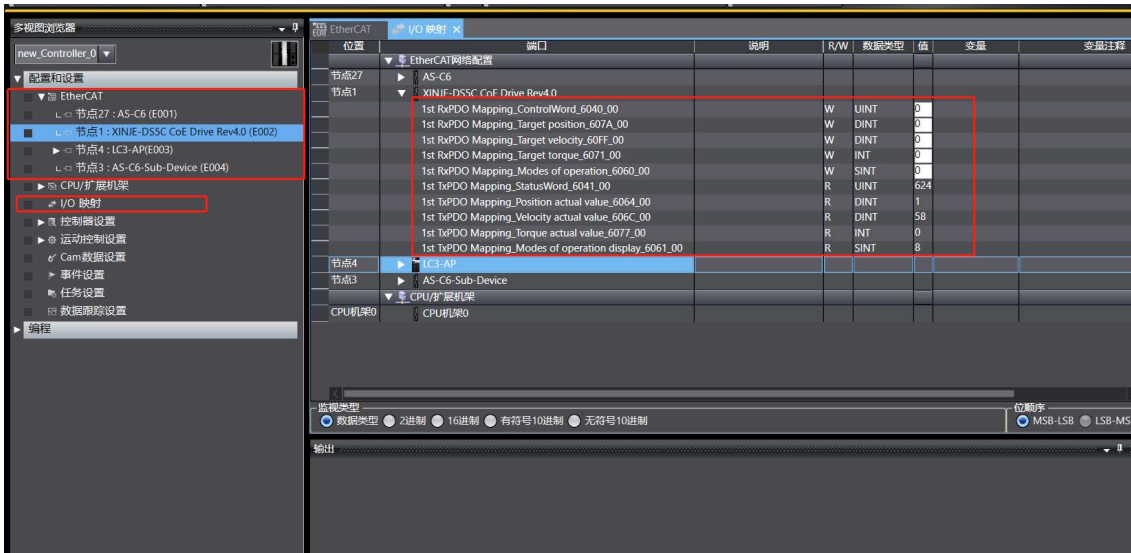
4. On the comparison and merging page of the same physical network configuration, click "Apply Physical Network Configuration (A)" to synchronize the scanned node information of AS-C6 to "Network Configuration on Node Address Sysmac Studio".



5. Click "Sync" on the corresponding synchronization interface and click "Transfer to Controller".

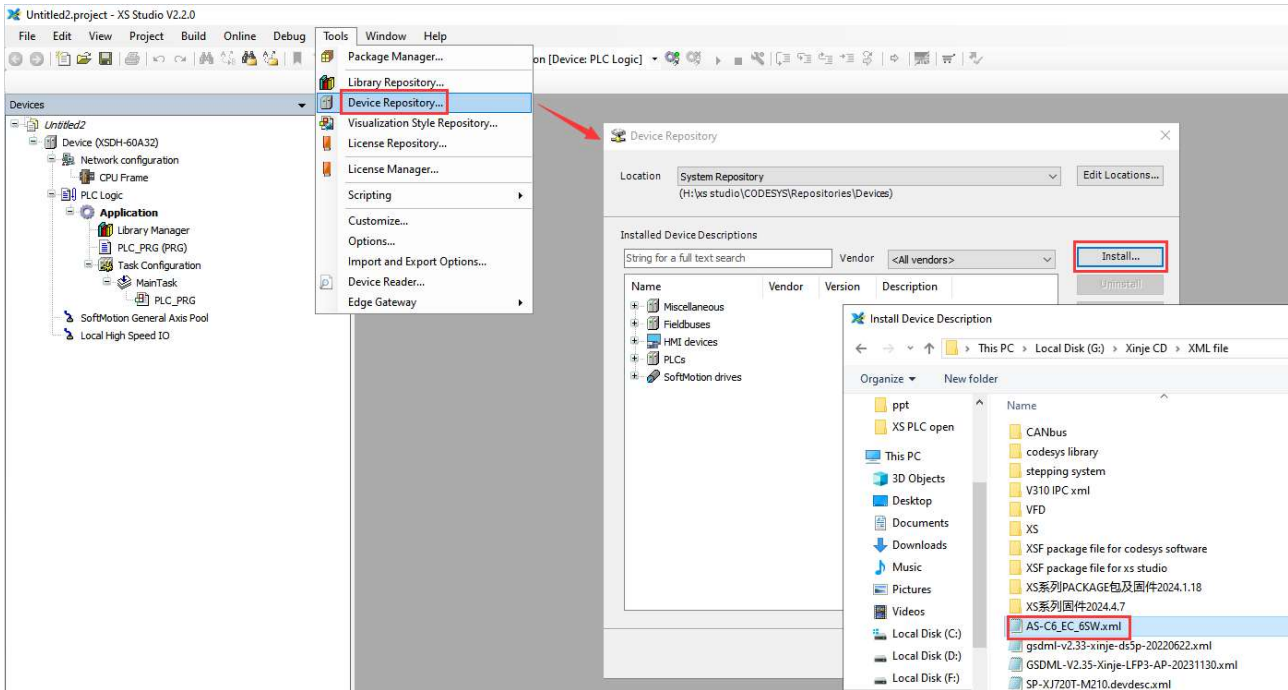


6. View the corresponding node and driver information under the left tree of Ethercat, and verify that the scanned slave station matches the actual configured topology. Click on "IO Mapping" to view or control the corresponding variables, and monitor the current drive status through PDO.

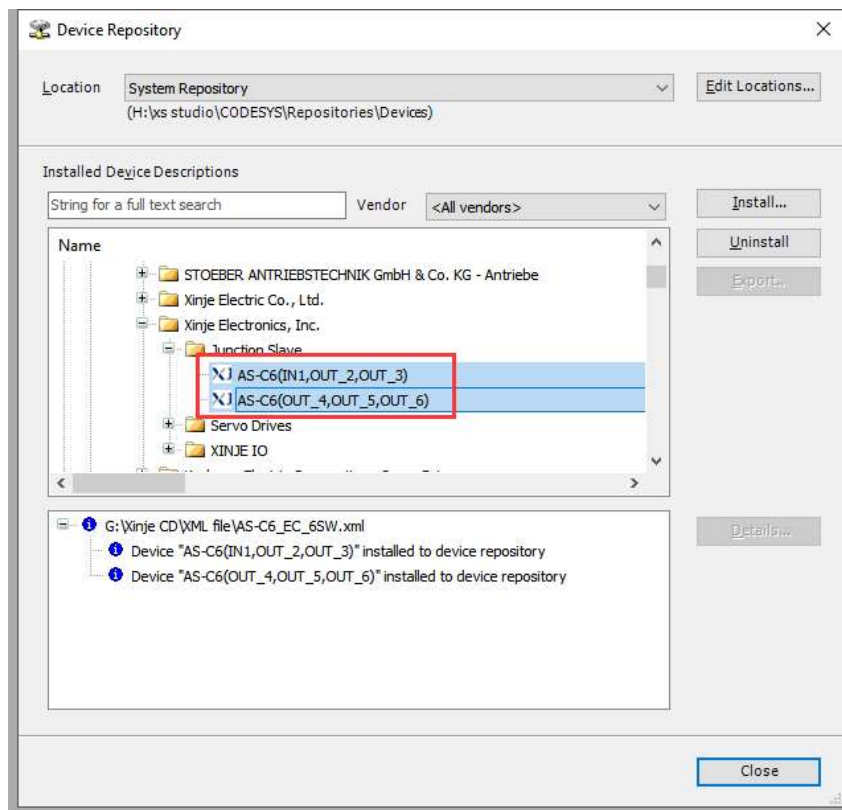


6.3 Application of XSDH and AS-C6

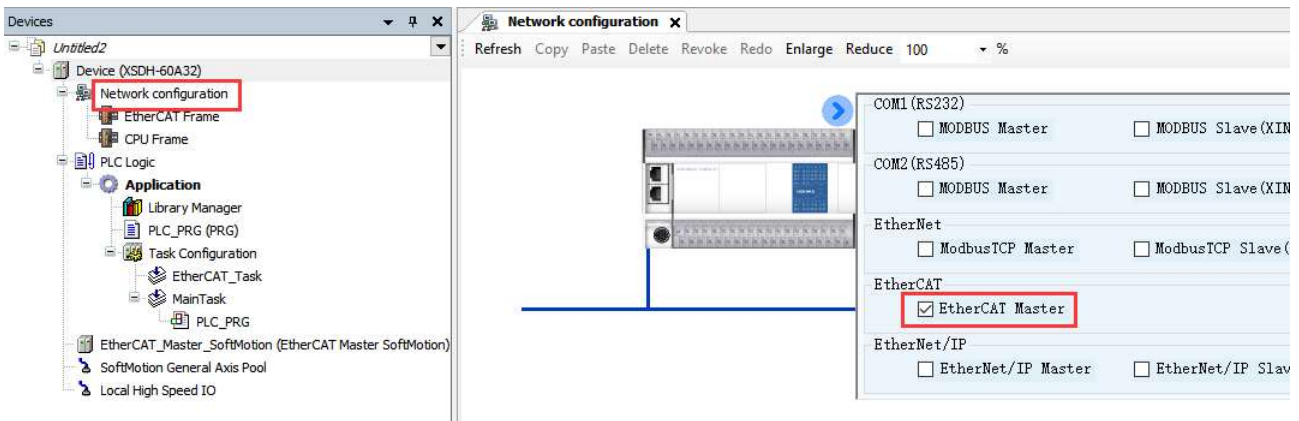
1. Open the tool --device repository using XS Studio software and add the XML file of the slave device. Click "Tools" - "Device repository..." in sequence, click "Install" in the pop-up dialog box, select the path where the XML file is located, find the XML file, select it, and click open.



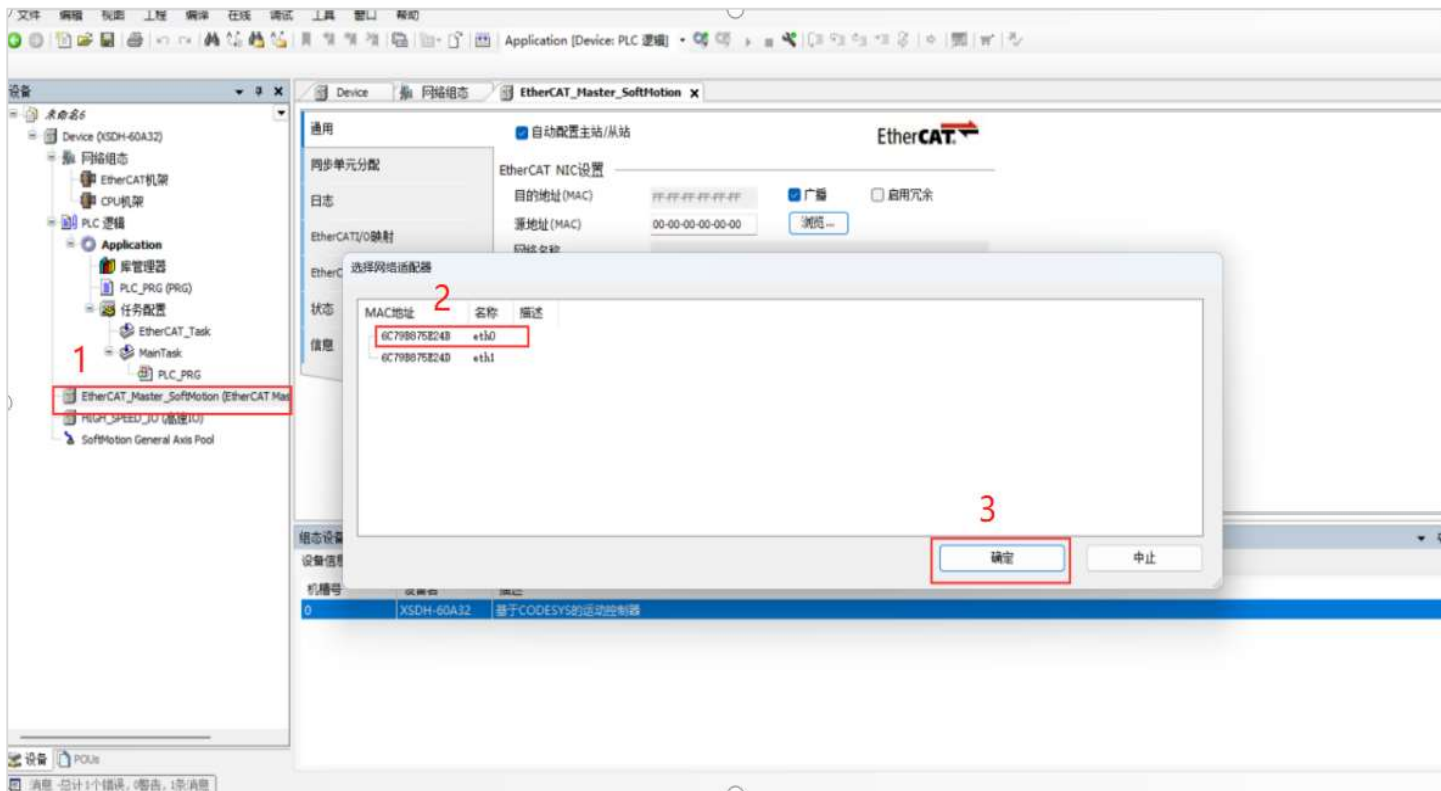
You can query the added XML files in the device repository.



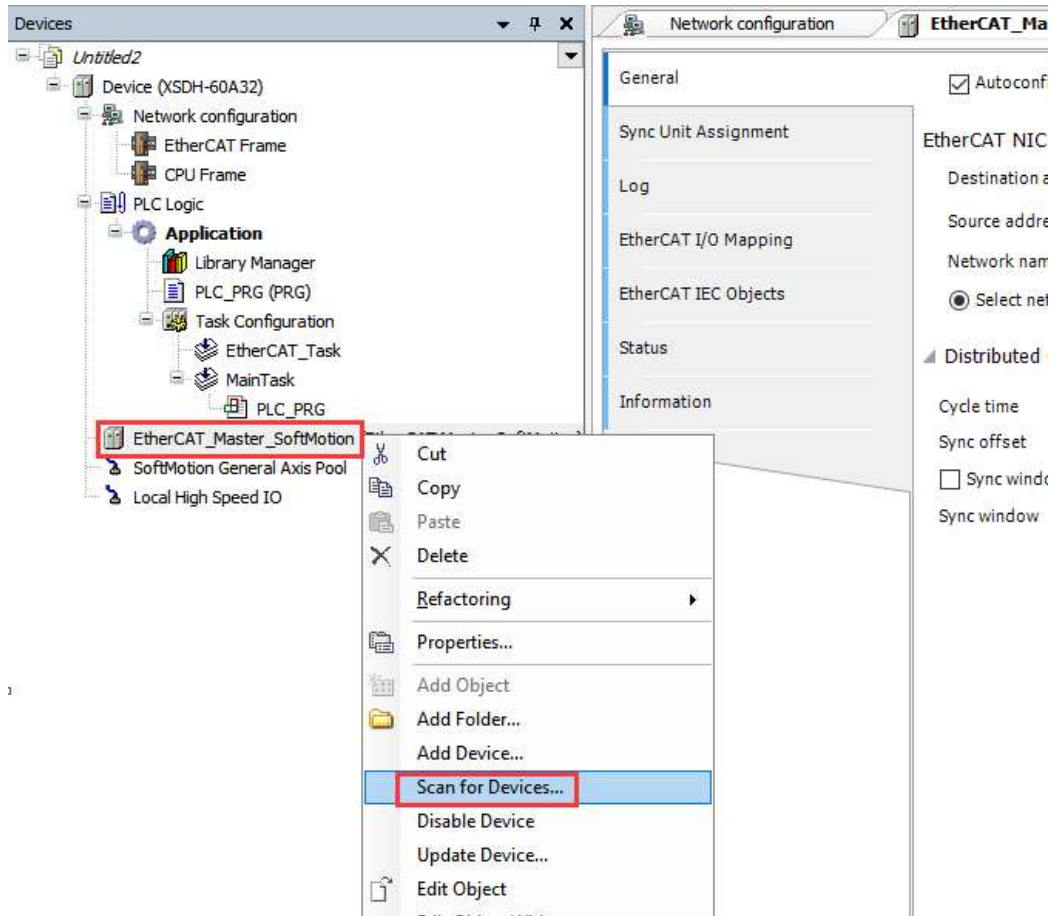
2. Click on the network configuration interface, select "EtherCAT Master Station" to add a master station device, and complete the configuration of the EtherCAT protocol.



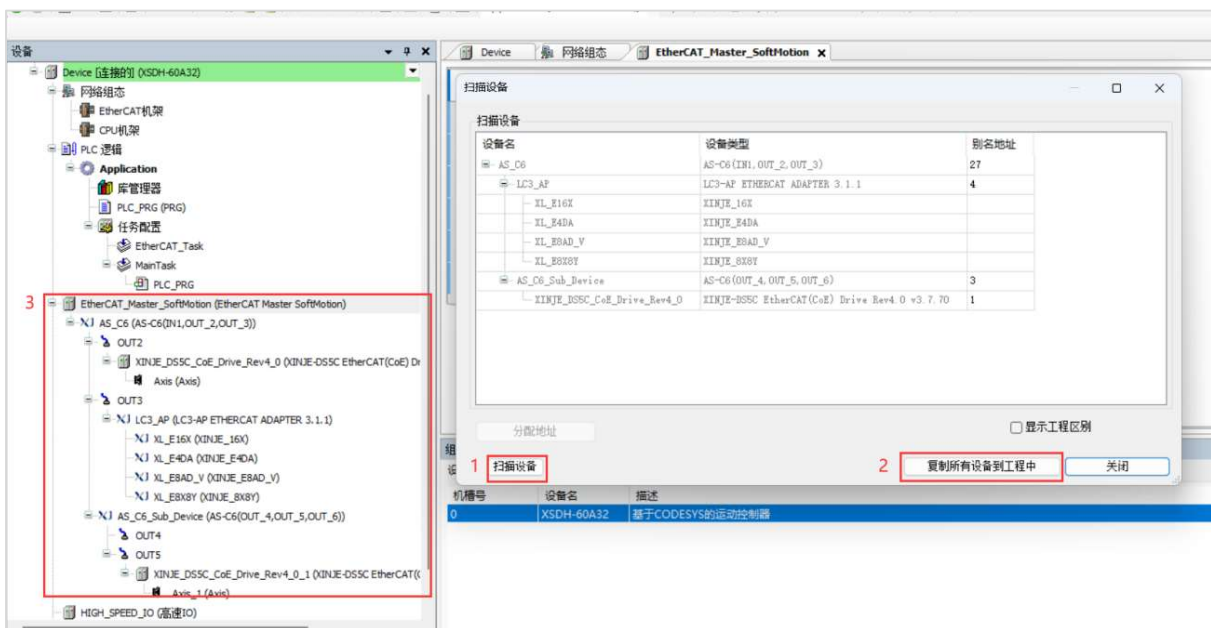
3. Double click "EtherCAT_Master_SoftMotion" to configure the Ethercat source address (MAC).



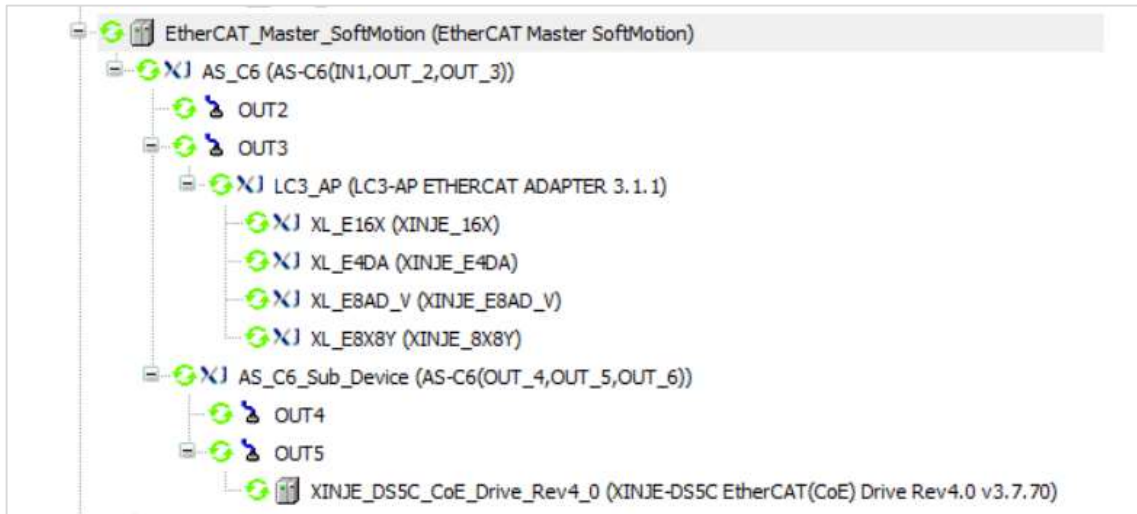
4. Insert the EtherCAT port of the PLC into the IN port of AS-C6, and the device into OUT2~OUT6 (in this example, the remote IO LC3-AP is inserted into OUT2, and the DS5C1 servo driver is inserted into OUT5). In the Device project bar, right-click EtherCAT-Master SoftMotion and click "Scan for Devices" to scan EtherCAT slave devices.



5. After completing the scan, click "Copy all devices to the project" and view the configuration of the scanned slave station under the left tree.



6. Click login to download the corresponding configuration information to the PLC, and view the current running results.





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