

Wenlian Technology

Profinet to EtherCAT Gateway User Manual

WL-PN-ECATM



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1. Introduction

1.1 About Us

This manual describes the parameters, usage methods, and precautions for the EtherCAT Master to PROFINET Slave (ECATM-PN) gateway stable connection technology, for the convenience of engineering personnel. Please read this manual carefully before using the gateway.

1.2 Copyright Notice

Product-related data and usage examples mentioned in this manual may not be copied or cited without authorization.

1.3 Terminology

PROFINET: Introduced by the International PROFIBUS Organization, It Is a New Generation of Automation Bus Standard Based on Industrial Ethernet Technology.

EtherCAT: A high-performance, low-cost, easy-to-use, and flexible industrial Ethernet technology that can be used for ultra-high-speed I/O networks in industrial fields.

2 Product Overview

2.1 Product Functions

This product realizes the interconnection between PROFINET and EtherCAT networks. This gateway can realize bidirectional data exchange, enabling data interaction between EtherCAT devices and PROFINET controllers.

2.2 Product Features

- Wide range of applications: Supports servo drives, couplers, instruments, PLCs, DCS, FCS, etc. with EtherCAT interfaces.
- Simple configuration: Users do not need to understand the details of the EtherCAT and PROFINET protocols. They only need to refer to the manual and configure the gateway according to their requirements. No complex programming is required, and the connection function can be realized in a short time.

2.3 Technical Specifications

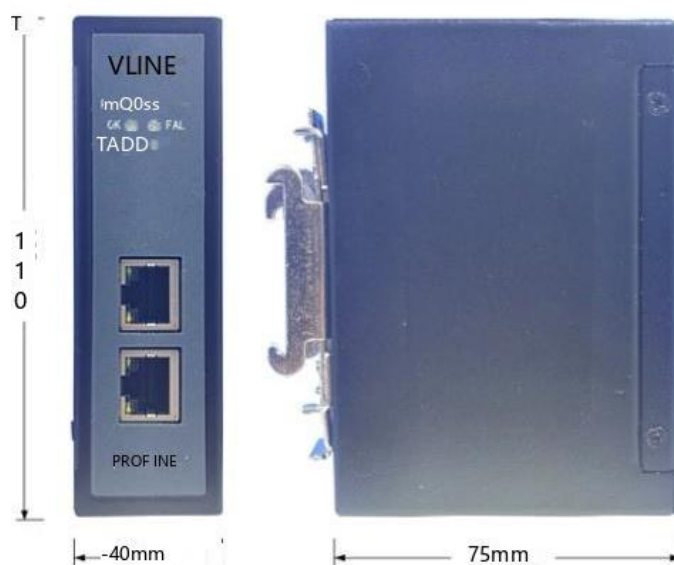
- ECATM-PN is a PROFINET slave on the PROFINET side and an EtherCAT master on the EtherCAT side;
- Supports the standard PROFINET I/O protocol
- PROFINET supports a maximum of 16 slots, with a maximum input byte count of 1440 bytes and a maximum output byte count of 1440 bytes. The length of the input and output bytes is set by the TIA Portal.
- Supported Module Types

➤ 001 byte Input	001 word Input	001 Dword Input
➤ 002 Dword Input	004 Dword Input	008 Dword Input
➤ 016 Dword Input	032 Dword Input	064 Dword Input
➤ 128 Dword Input		
➤ 001 byte Output	001 word Output	001 Dword Output
➤ 002 Dword Output	004 Dword Output	008 Dword Output
➤ 016 Dword Output	032 Dword Output	064 Dword Output
➤ 128 Dword Output		
- EtherCAT Specification V1.0.3.2;
- Supports CANopen over EtherCAT (CoE) protocol: SDO upload and download, SDO information service (access to the CANopen object dictionary), emergency request; supports Ethernet over EtherCAT (EoE) protocol (virtual switch); supports Transfer over EtherCAT (FoE) protocol;
- Supports DC-Synchronous and SM-Synchronous modes.
- Supports Topology Viewer, Diagnostic Detection, and Automatic Scanning
- Power supply: 24VDC ($\pm 5\%$), maximum power 3.5W.
- Operating Ambient Temperature: $-25\sim 55^{\circ}\text{C}$, Humidity $\leq 95\%$

- Dimensions: 34mm (W) × 110mm (H) × 70mm (D).
- Mounting method: 35mm DIN Rail
- Protection Rating: IP20

3 Product Appearance

3.1 Product Appearance



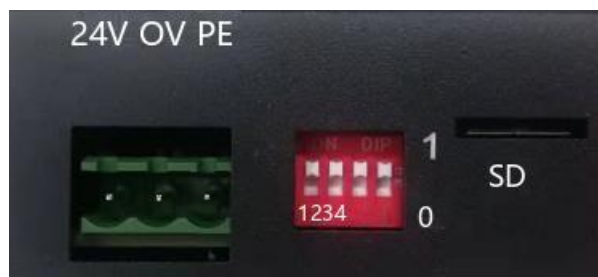
3.2 Indicator Light Definitions

Indicator Light Definitions:

Status Lights	PWR	RUN	PN	P.err	ECT	E.err
On	Power On	ENI Valid	PROFINET Network Communication Normal	PROFINET Network Communication Abnormal	All EtherCAT Network Slaves in OP State	—
Off	Power Failure	ENI Invalid	PROFINET Network Communication error	PROFINET Network Communication Normal	—	EtherCAT Network Normal
Flashing	—	—	—	—	Several Slaves in Non-OP State	Several slave communication errors

3.3 Communication Ports

3.3.1 Power Ports



Pin	Function
1	24V+, DC 24V power supply positive, range 9-30V
2	0V, DC 24V power supply negative
3	PE, Ground

DIP switch

Key4	Key3	Key2	Key1	Description
-	-	0	0	Erase Configuration Information (ENI File) on SD Card
-	-	0	1	Reserved
-	-	1	0	Supports Booting from Web Download and Software Download ENI File
-	-	1	1	Booting from SD Card ENI File

4 Usage Methods

4.1 Configuration Modules

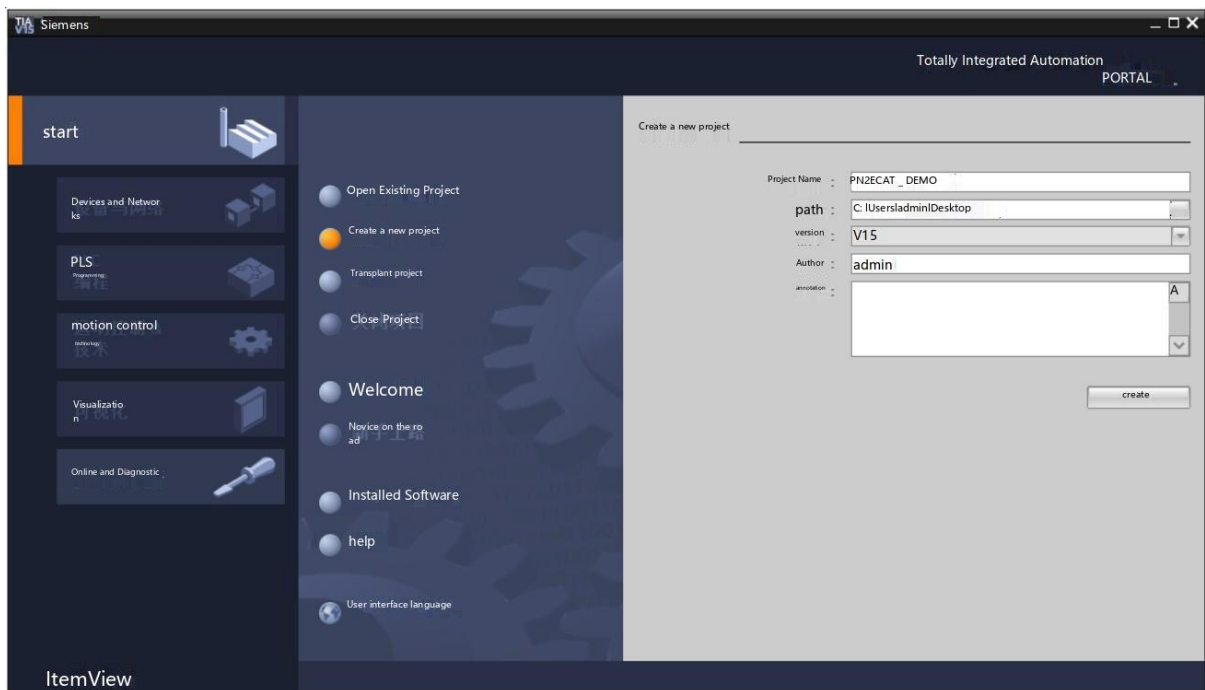
1. Connect Power Correctly, Connect ECATM-PN to PC via PROFINET Network Port, and Power on ECATM-PN;
2. Open Configuration Software, Configure as Needed (Read ECSP-EtherCAT Software for Details);
3. Click "Action - Run" in the main menu to download the configuration to ECATM-PN;
4. Configure the Corresponding Configuration in TIA Portal, including the Configurable Module, Target Device IP Address, and Device Name;

5. Download the TIA Portal configuration to the PLC;
6. After establishing a connection between the ECATM-PN and the PLC master station, the PN indicator light will be constantly on.
7. After establishing a connection between the ECATM-PN and the EtherCAT slave device and entering OP state, the ECT indicator light will be constantly on.

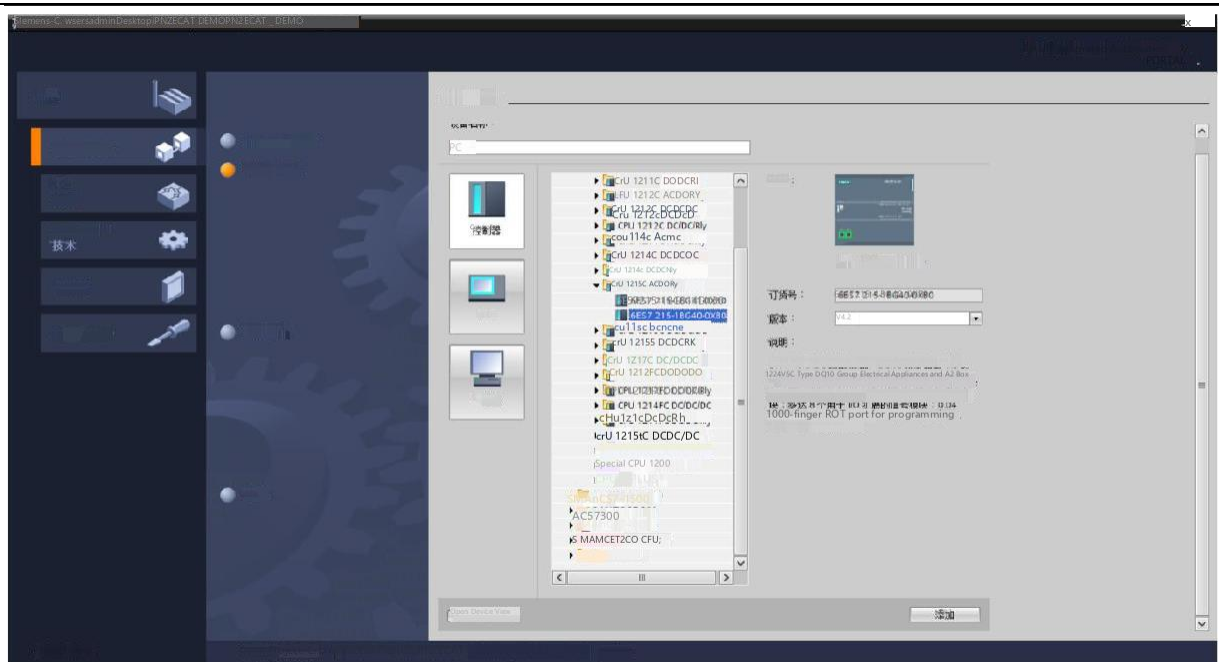
4.2 PLC Module Parameter Setting Steps

4.2.1 Creating a Project

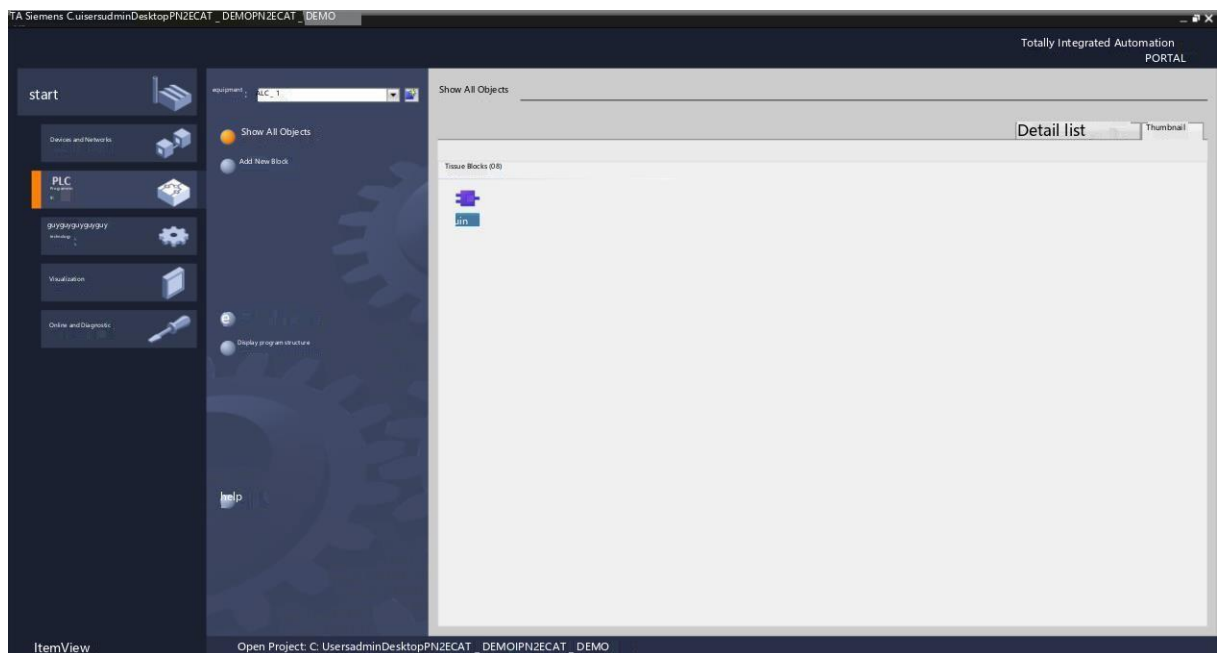
Open TIA Portal, select Create New Project, enter the project name, select the path, and click Create, as shown in the figure below.

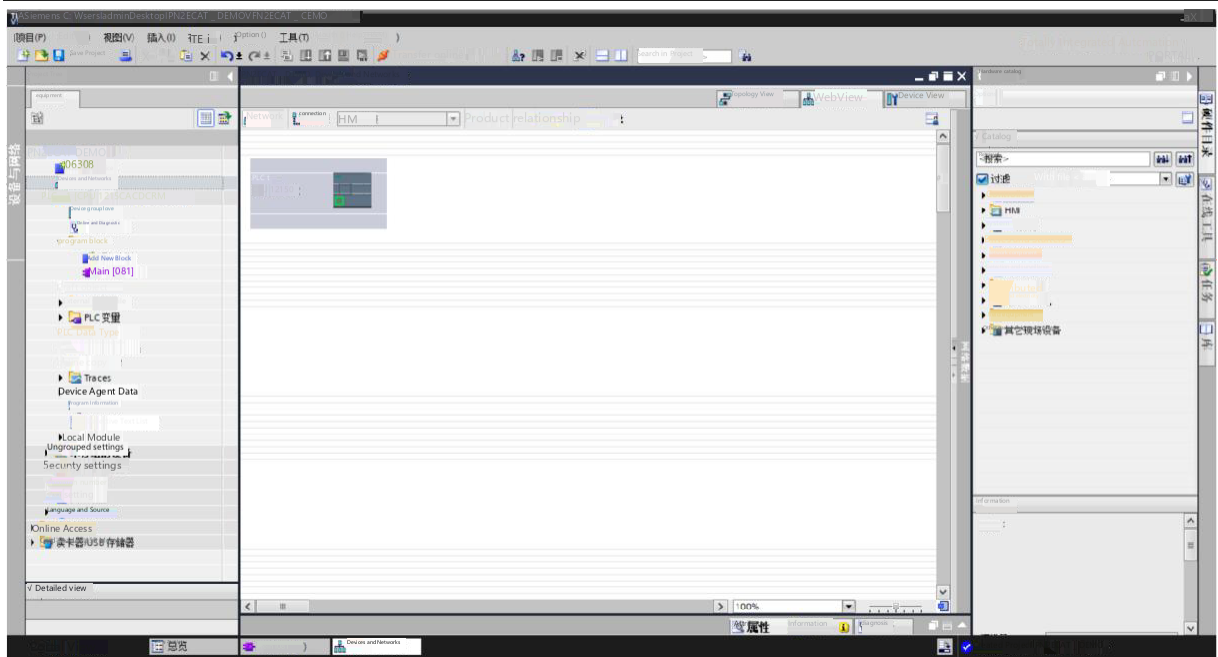


Insert the CPU into the project through the Portal view or the view of the created project.



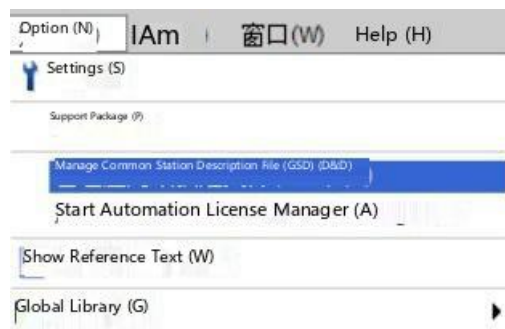
In the view, select "Device and Network" and click "Add New Device" (or double-click "Add New Device" under the project name in the project view), as shown in the "Add New Device" dialog box. Add a controller that supports the PROFINET interface, such as 6ES7 25-1BG40-0XB0.



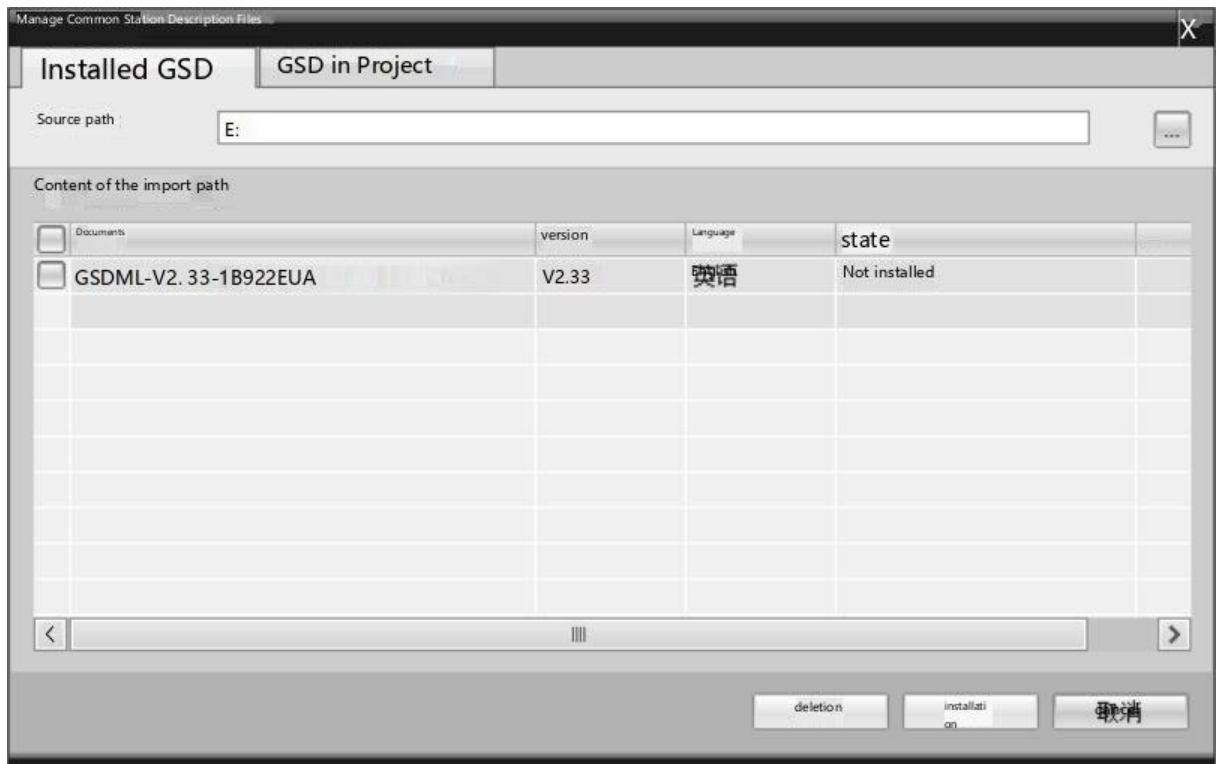


4.2.2 GSD Installation

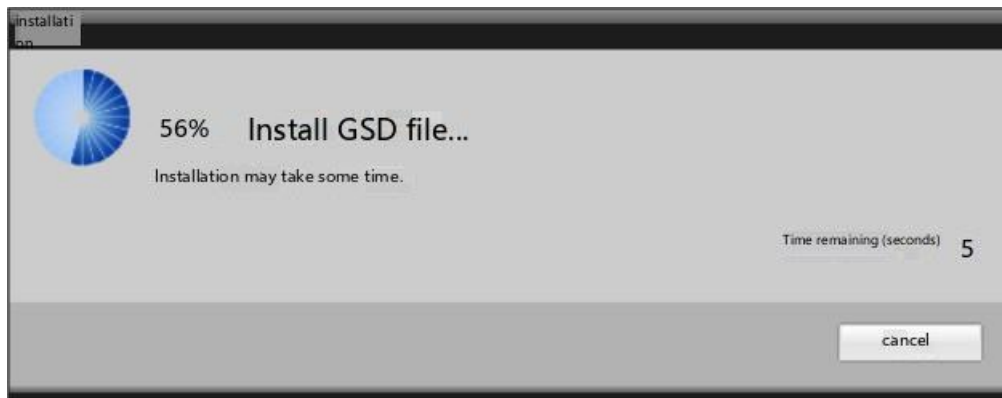
In the TIA Portal menu bar, click "Options" > "Manage General Station Description Files", as shown in the figure:



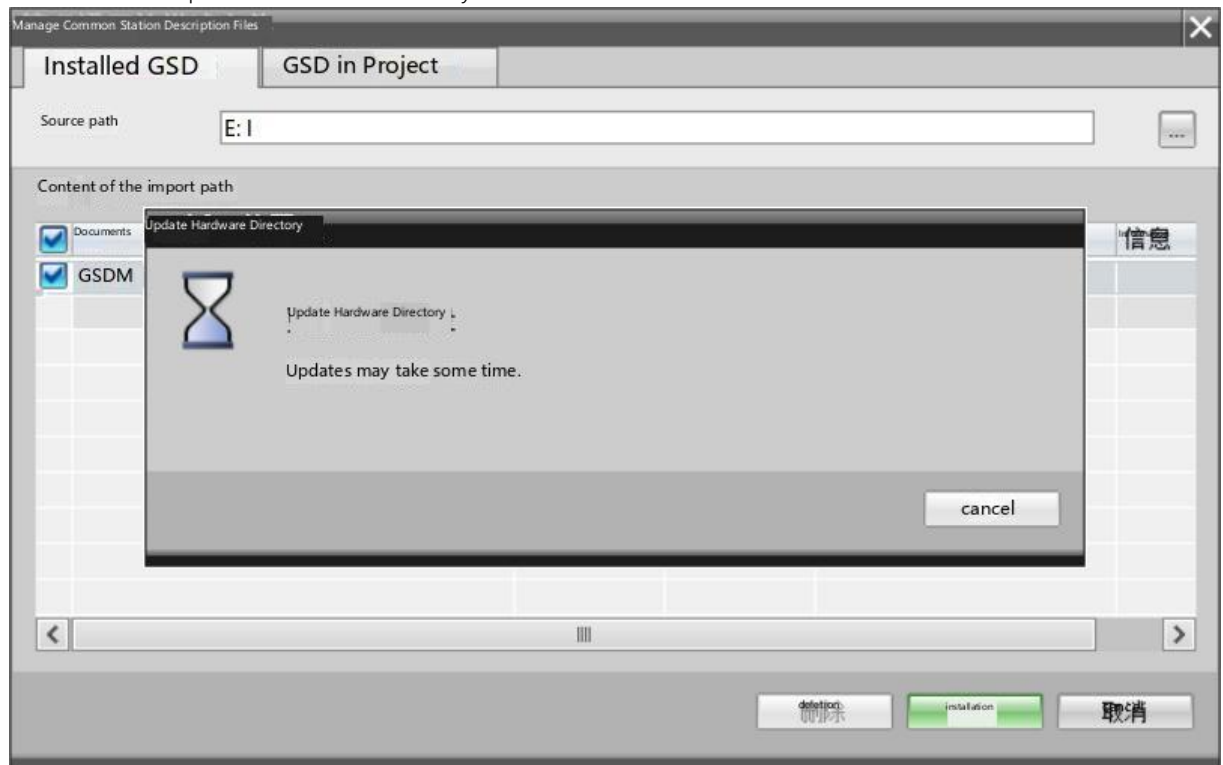
In the pop-up dialog box, select the "Installed GSD" tab, click the source path selection button, and in the pop-up folder browse dialog box, locate and select the folder path where the GSD file "GSDML-V2.33--20210807" is located, then click OK.



Select the imported GSD file, click Install, and continue until the installation is complete.



The software will update the hardware directory.

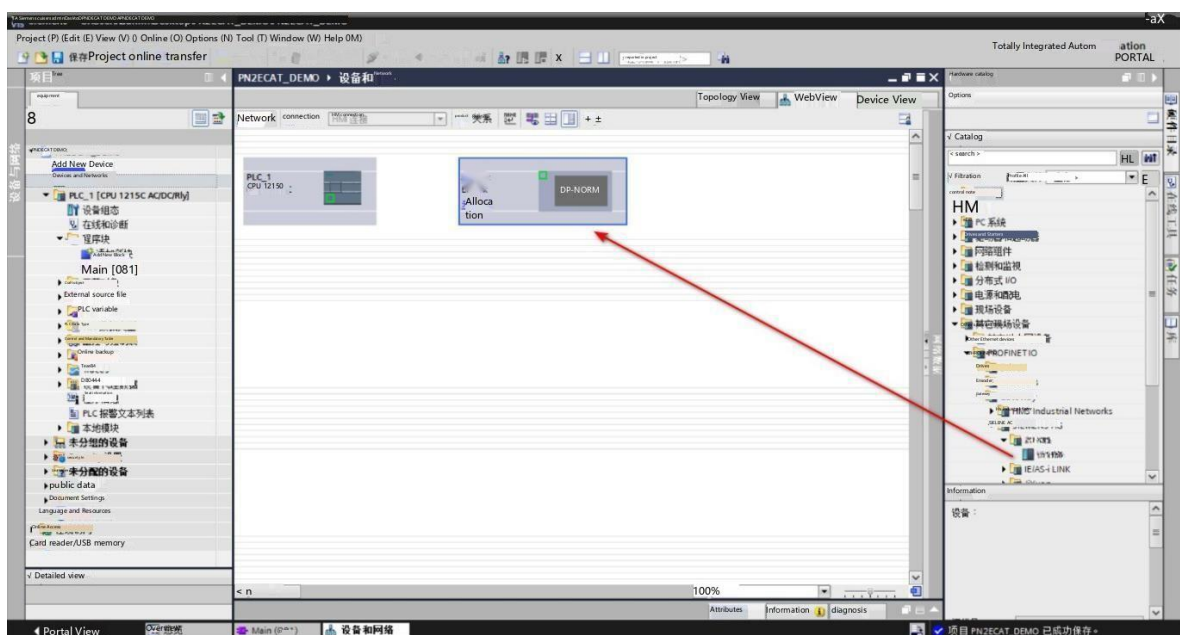


4.2.3 Equipment Configuration

Double-click Devices and Networks, add the ECATM-PN device module, in Hardware Catalog > Other Field Devices > PROFINET IO > Gateway > SIEMENS AG, as shown in the following figure:

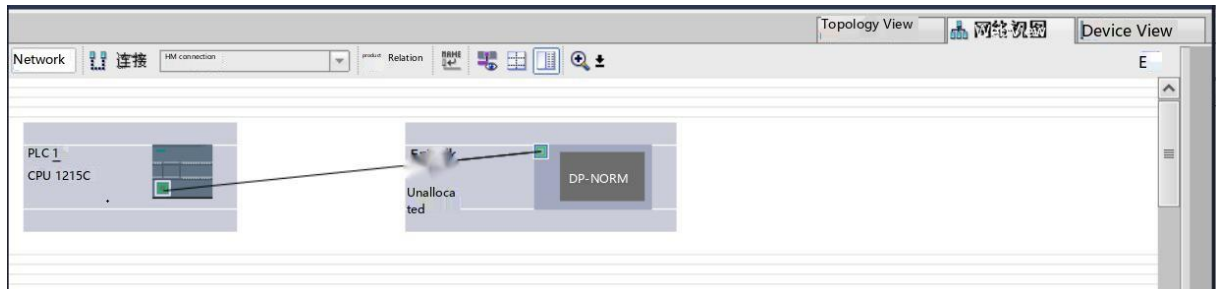


After adding the device module, as shown in the following figure

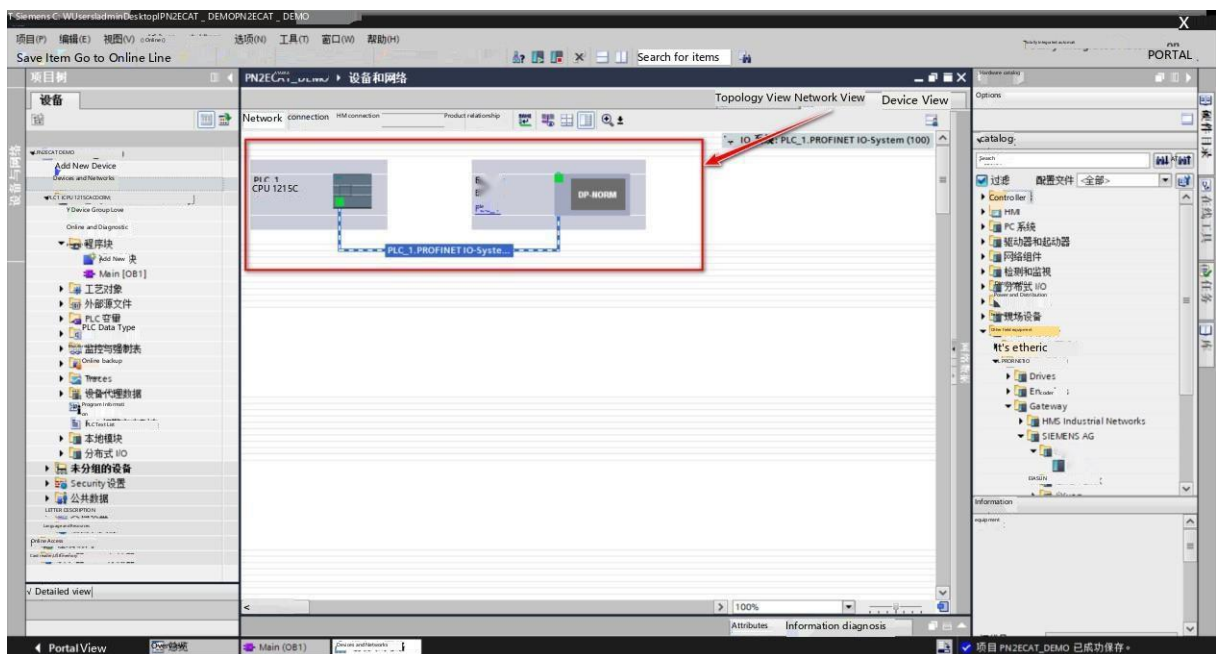


Create network connections between devices in the project using the "Network View" of device configuration. After creating a network connection, use the "Properties" tab of the patrol window to configure the parameters of the network.

Select "Network View" to display the devices to be connected. Select the PROFINET port of the gateway, and then drag the connection to the PROFINET port of PLC_1 module
release the mouse button to create the network connection.

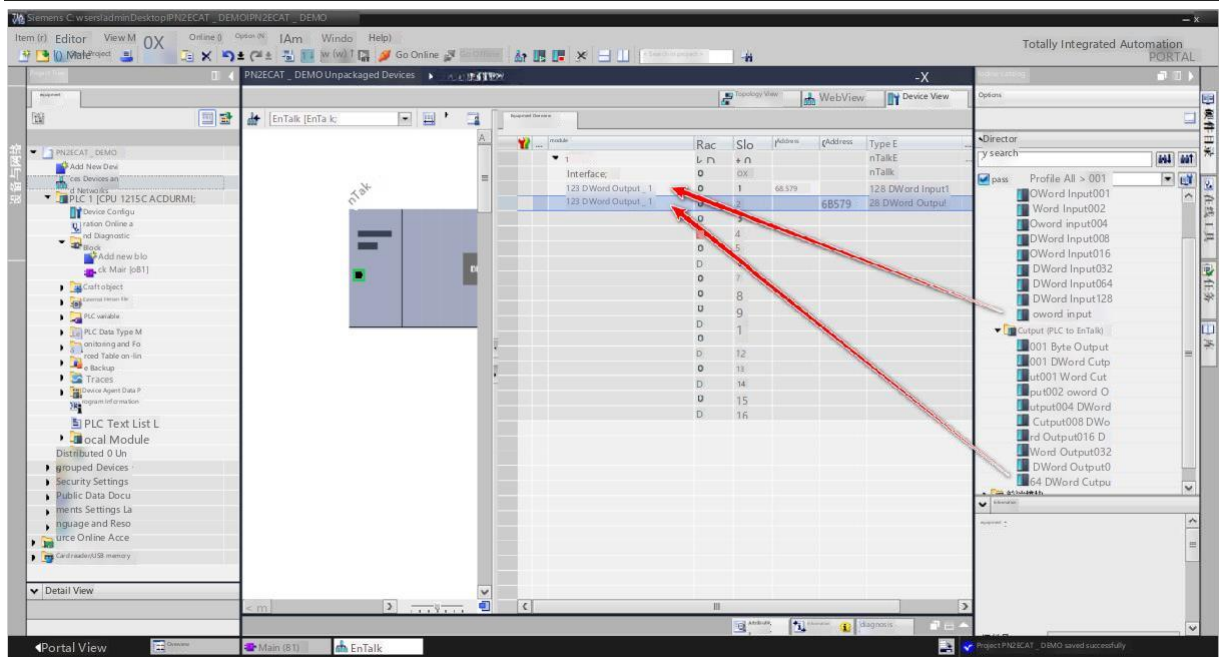


The PROFINET network is created successfully, as shown in the following figure:



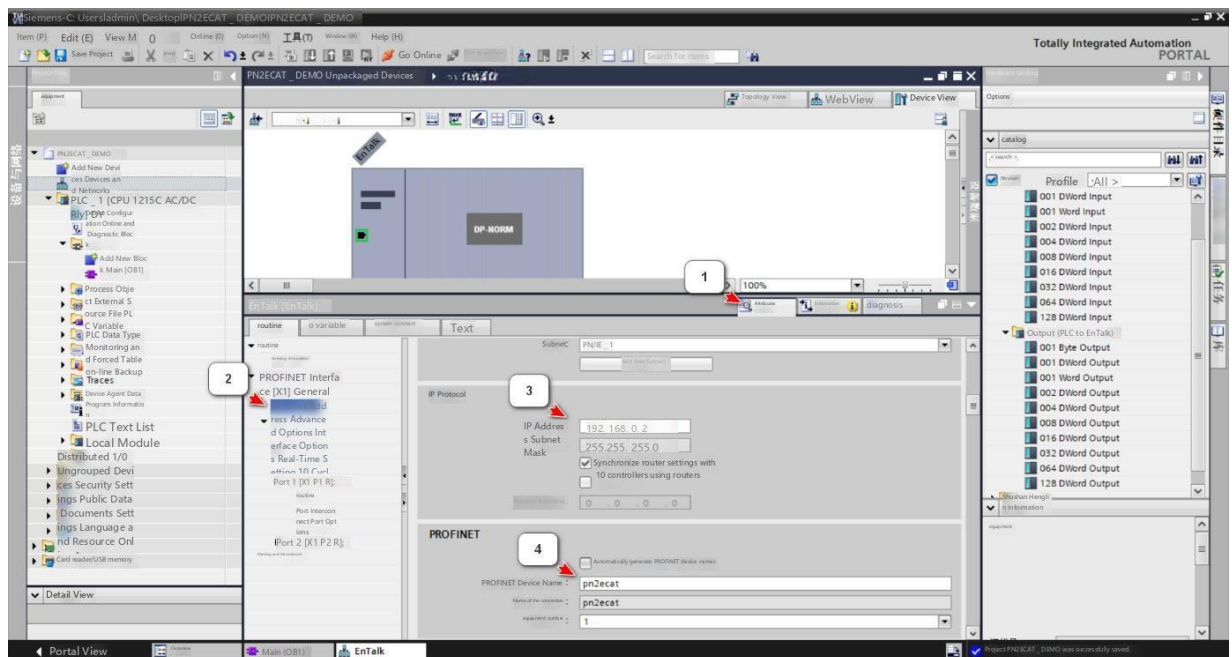
Double click on the stable connection technology equipment and configure the submodule:

- In the hardware directory, expand the "Modules" container.
- Double-click or drag the module type under Input (Stable Link Technology to PLC) / Output (PLC to Stable Link Technology). As shown in the following figure:



Configure the PROFINET interface of the gateway, select the green PROFINET box on the device. The "Properties" tab in the inspection window will display the PROFINET port. In the inspection window, select "Ethernet Address" in "Properties > PROFINET Interface", and set the IP address and PROFINET device name in the IP protocol as shown in the following figure;

Select the gateway in the "Device View", right-click and select "Assign Device Name";



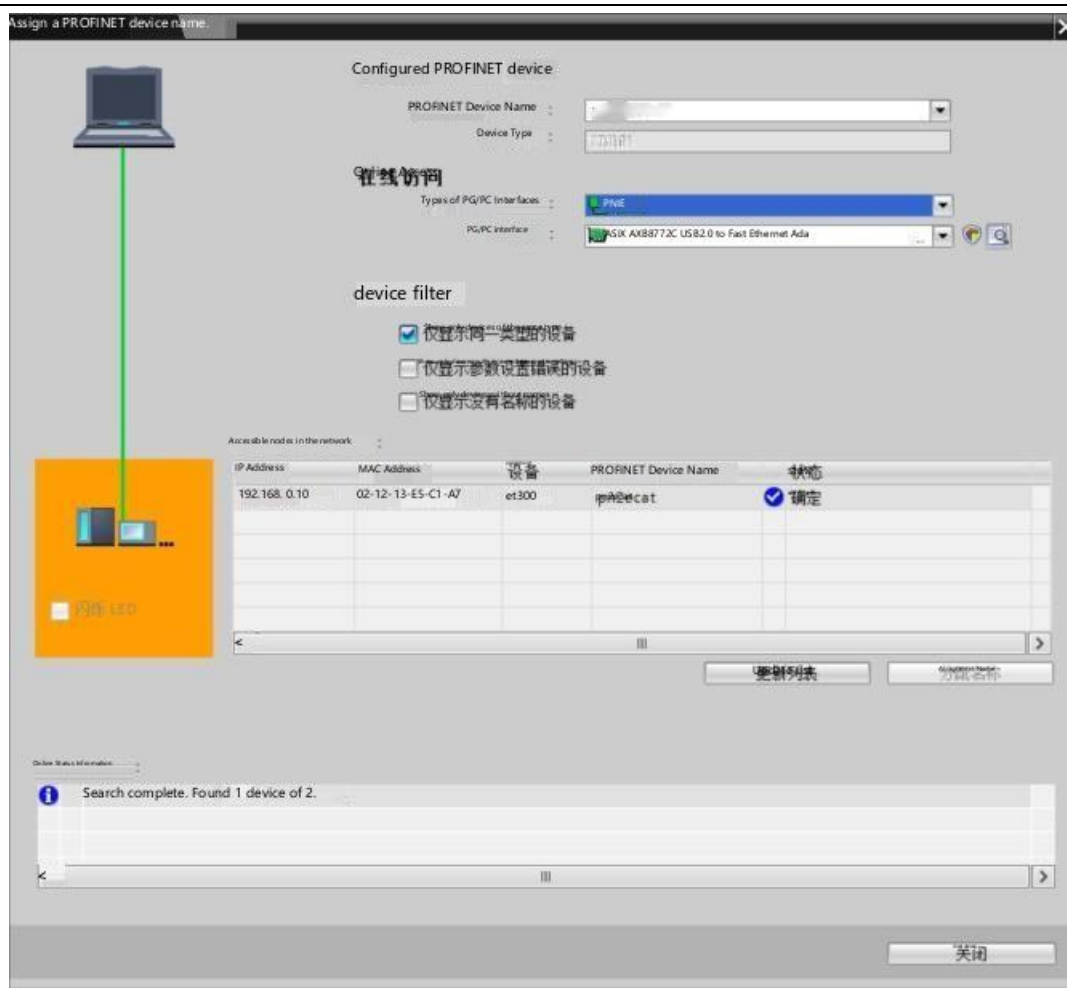


Pop up the "Assign PROFINET Device Name" dialog box, and click on the update list under "Access Nodes in the Network" (Gateway Master Device)

By connecting to the network, one can access various nodes in the PROFINET network; Select the node in the update list and click on 'Assign Name'

Write the configured PROFINET device name: pn2ecat into the network node; after successful writing, the PROFINET device name will be updated to

"pn2ecat", and the status will be "Correct"; close the dialog box; the device name will be effective after restarting the gateway.

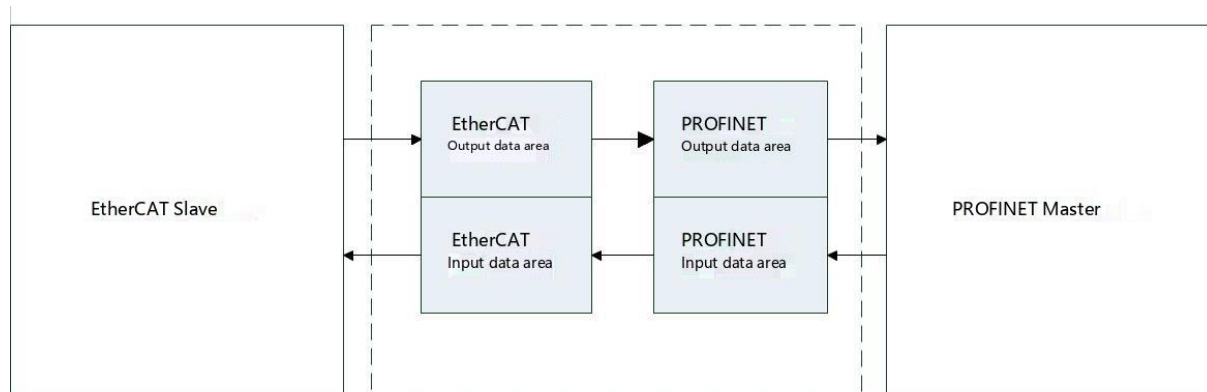


5 data exchange

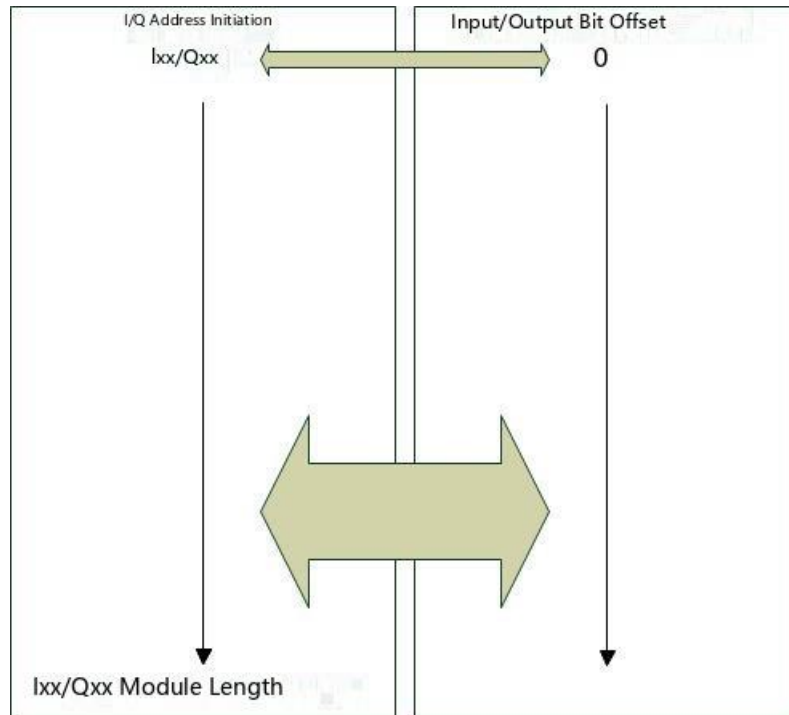
5.1 protocol conversion principles

Data conversion between the ECATM-PN's PROFINET network and EtherCAT network is established through a "mapping" relationship.

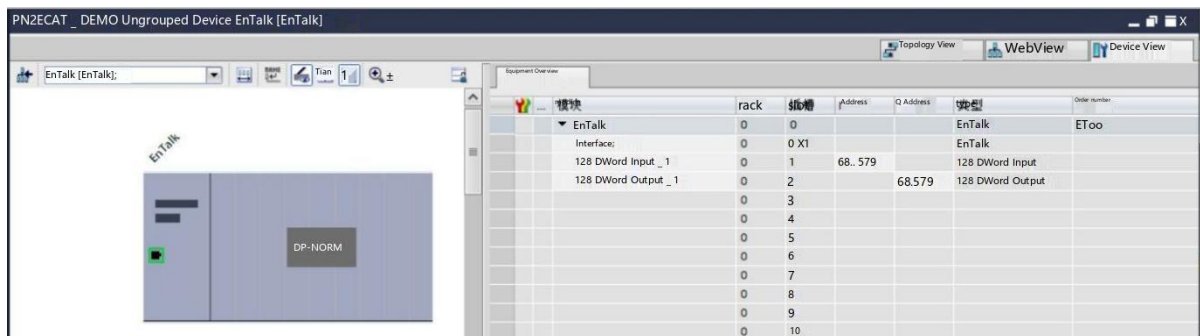
The ECATM-PN has two data buffers: one is the input buffer (1500 bytes), with an address range of 0x000-0x5DB; the other is the output buffer (1500 bytes), with an address range of 0x5DC-0xBB7.



5.2 Memory Mapping Relationship



Taking ECATM-PN as an example, adding a submodule with 128 input and output DWORDs each, the TIA software automatically assigns I/Q addresses starting at 68, that is, input I 68.0 and output Q 68.0 starting, as shown in the figure below:



Configure the RxPDO parameters of the slave device in the ECSP-EtherCAT configuration software. The bit offsets of the PDO mapping data start at 0 and 168 respectively, as shown in the red box on the "Process Image" option page of the master station in the figure below;

e190DrivesCtrl			
	Name	数据类型	Address
1	1stAXO_ControlWord_U16_6040	Word;	% QW68
2	1stAXO_TargetPosition_132_607A	DWord	% QD70
3	1stAXO_ModeOfOperation_18_6060	Byte	% QB74
4	1stAXO_HomeOffset_132_607C	DWord	% QD75
5	1stAXO_PositionOffset_132_6080	DWord	% QD79
6	1stAXO_TargetVelocity_132_60FF	DWord	% QD83
7	1stAXO_StatusWord_U16_6041	Word;	% IW68
8	1stAXO_ActualPosition_132_6064	DWord	% ID70
9			
10	2ndAXO_ControlWord_U16_6040	Word;	% QW89
11	2ndAXO_TargetPosition_132_607A	DWord	% QD91
12	2ndAXO_ModeOfOperation_18_6060	Byte	% QB95
13	2ndAXO_HomeOffset_132_607C	DWord	% QD96
14	2ndAXO_PositionOffset_132_6080	DWord	% QD100
15	2ndAXO_TargetVelocity_132_60FF	DWord	% QD104
16	2ndAXO_StatusWord_U041	Word;	% IW76
17	2ndAXO_ActualPosition_132_6064	DWord	% ID78

Master Process I...				
PDO Index				
A03E8-MicroFlex e190				
1600-Outputs	600 0D	AXO_ControlWord_U16	16	0
1600-Outputs	607A 00	AXO_TargetPosition_132	32	16
1600-Outputs	6060 00	AXO_ModesOfOperation_18	8	48
1600-Outputs	607C 00	AXO_HomeOffset_132	32	56
1600-Outputs	6080 00	AXO_PositionOffset_132	32	88
1600-Outputs	60FF 00	AXO_TargetVelocity_132	32	120
03E8-EL2809				
03E8-MicroFlex e190				
1600-Outputs	6040 00	AXO_ControlWord_U16	16	168
1600-Outputs	607A 00	AXO_TargetPosition_132	32	184
1600-Outputs	6060 00	AXO_ModesOfOperation_18	8	216
1600-Outputs	607C 00	AXO_HomeOffset_132	32	224
1600-Outputs	6080 00	AXO_PositionOffset_132	32	256
1600-Outputs	60FF 00	AXO_TargetVelocity_132	32	288

TxPDO also exchanges data using the same mapping method;

6 Configuration Studio Pro-EtherCAT Workspace

How to use the ECATM-PN configuration software Configuration Studio Pro-EtherCAT (hereinafter referred to as ECSP-EtherCAT). ECSP-EtherCAT simplifies engineering projects, and the new programming is more user-friendly. ECSP-EtherCAT integrates modular thinking and its flexible software architecture into the entire configuration platform.

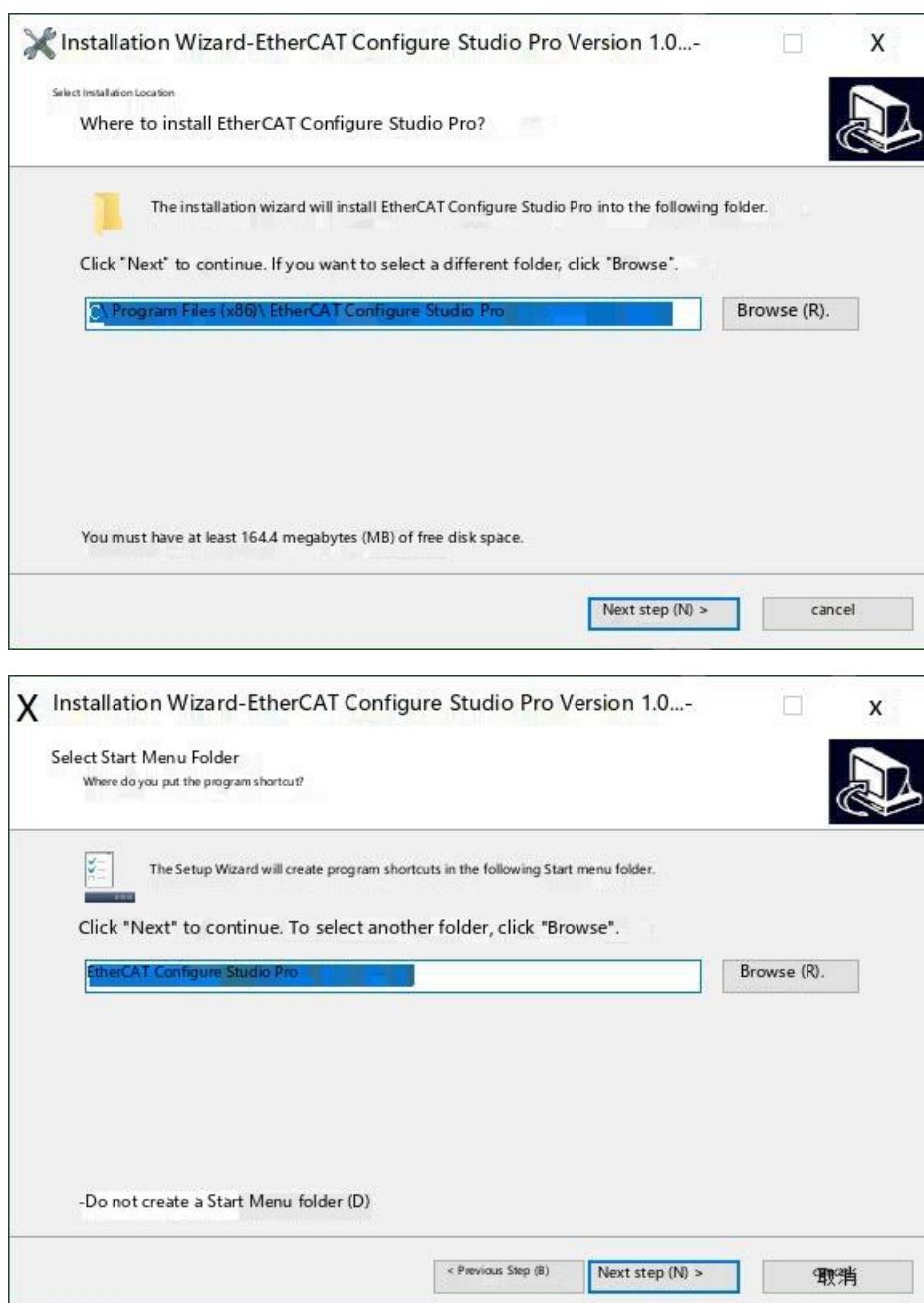
Configured via Ethernet, it supports parsing ESI files and generating ENI files;

6.1 Software Installation

The main steps for installing the ECSP-EtherCAT software are as follows.

Step 1: Start the installation wizard

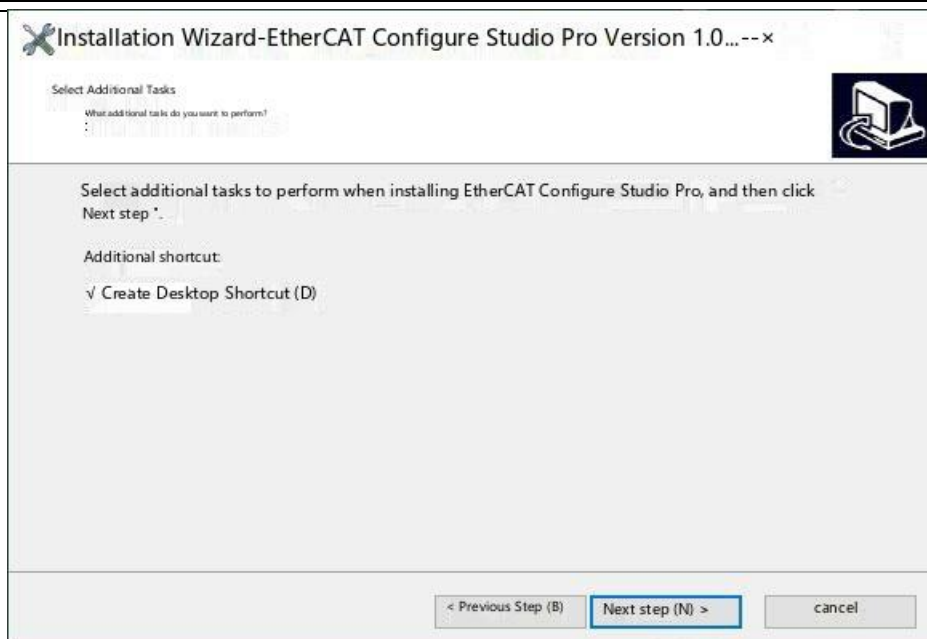
Double click the installation package, as shown in the figure below, select the installation location, and click "Next (N)":



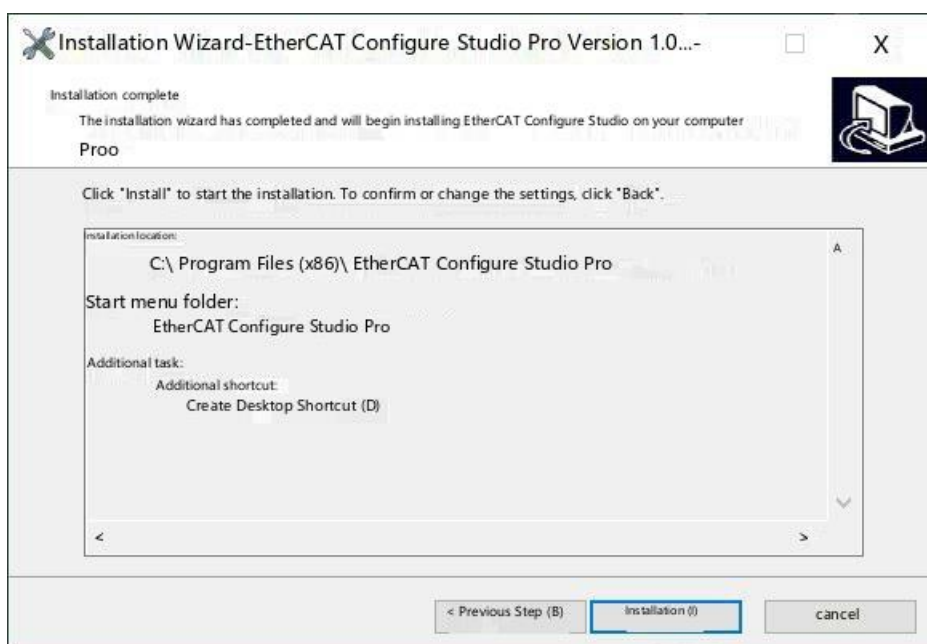
Step 2: Select additional tasks

Pop up the "Select Additional Tasks" window, choose whether to "Create Table Name Shortcut", and then left click "Next (N)" as shown in the picture

Show.



Then left-click "Install (I)", as shown in the figure.



Step 3 Installation Complete Prompt

After installation, the "ECSP-EtherCAT Installation Complete Wizard" window will pop up. Left-click "Finish (F)" to run ECSP-EtherCAT immediately, as shown in the figure.



6.2 Abbreviations

SM: Sync Manager, responsible for reading and writing communication data memory;

FMMUs: Fieldbus Memory Management Units, responsible for mapping logical addresses to physical addresses;

PDO: Process Data Object; SDO: Service Data Object;

CoE: (CANopen over EtherCAT) Accesses the CANopen object dictionary and its objects, CANopen emergency events, and event-driven PDO messages;

EOE: Ethernet over EtherCAT, standard Ethernet transmission via EtherCAT; FOE: Filetransfer over

EtherCAT, downloading and uploading firmware and other files; ESI: EtherCAT Slave Information,

i.e., XML device description; ENI: EtherCAT Network Information;

6.3 Configuration Steps

Step 1: Hardware System Setup

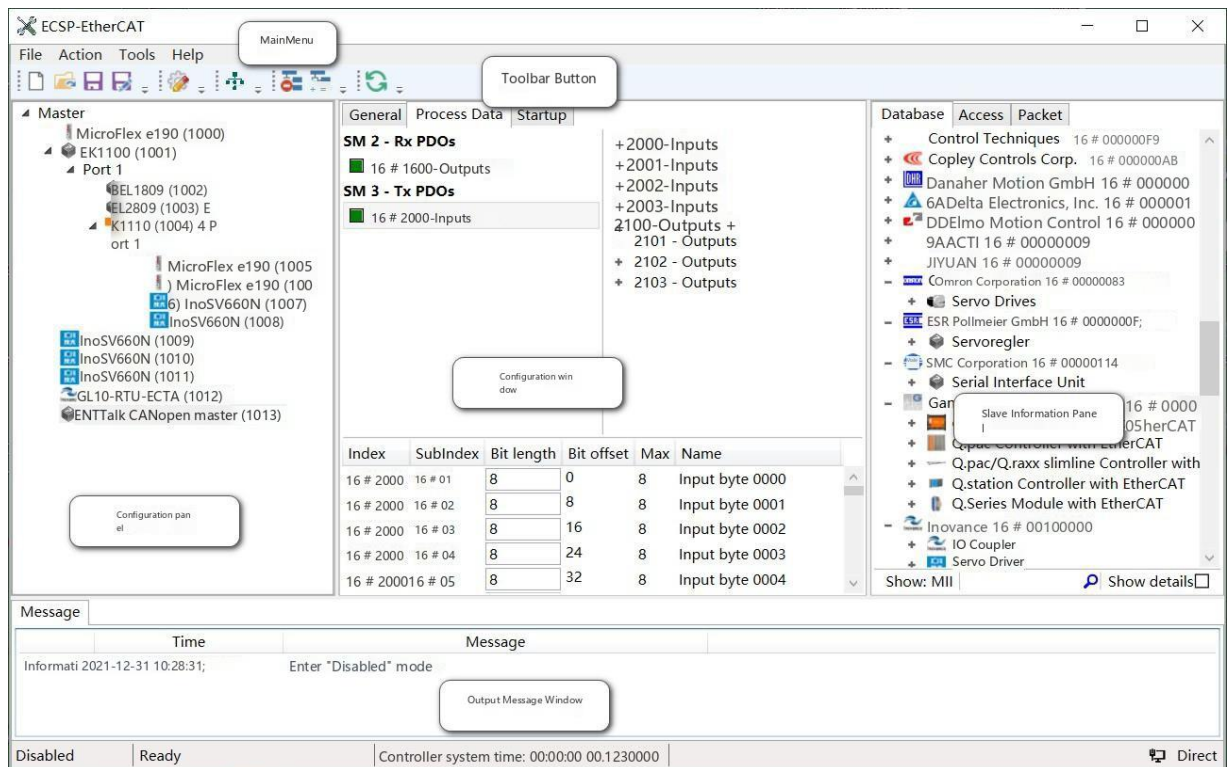
Step Two: Installing the Slave Device ESI Files

Step 3: Add / Scan Slave Stations and Configure Master/Slave Station Parameters

Step 4: Download and Run

6.4 Configure Workspace

The configuration module requires configuration software, which users can obtain and install from a CD or website. Users can easily complete the configuration of ECATM-PN using the gateway configuration software. The main window is divided into main menu, toolbar buttons, configuration panel, configuration window, slave information panel, and output message window to complete the configuration information of both Master and Slave, as shown in the figure below:

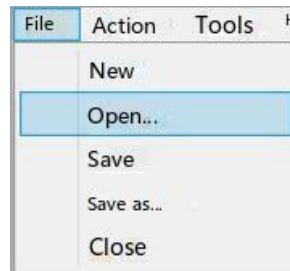


6.4.1 Main Menu

File Action Tools Help

6.4.1.1 File

- 1) The "File" menu contains the following subdirectories:



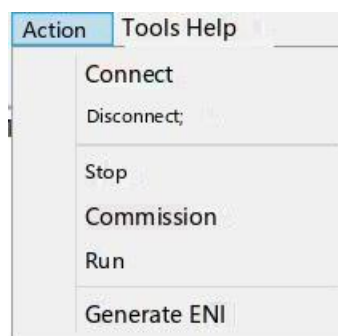
- New – Create a new project
- Open... – Open an existing project file, named .gz file
- Save – Save changes in the current project
- Save as... – Save the currently open project with a different name
- Close – You can also quickly perform the above action by closing the ECSP-EtherCAT configuration software using the toolbar button.

6.4.1.2 Action The Action menu

contains the following subdirectories: 1)

Connect – Connect

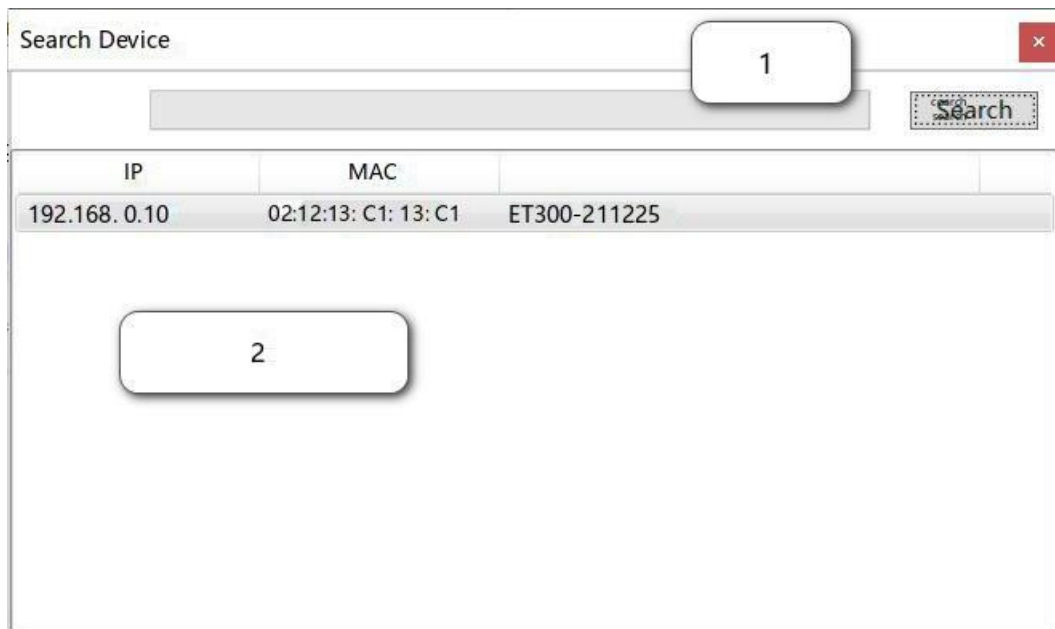
Execute "Action" (Connect) to establish a connection between the configuration software and the ECATM-PN gateway;



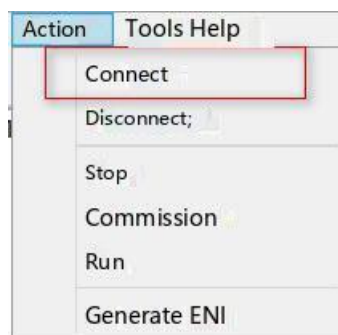
After selecting "Connect" in the "Action" tab, the "ConnectDialog" dialog box will pop up. If the IP address of the ECATM-PN gateway device is known, you can enter the correct IP address in the IP blank box and click "OK" to complete the connection;



You can also scan for slave devices using the "Search" button below. Clicking the "Search" button will bring up the "Search Device" dialog box. First, click "Search," and wait for the scan to complete. The successfully scanned ECATM-PN gateway devices will be displayed in the blank space below, including their IP, MAC, and firmware version information. Double-click the displayed information to return to the "ConnectDialog" interface and click the "OK" button, as shown in the following figure:



After a successful connection, the "Connect" option under "Action" will be grayed out and unavailable, indicating a successful connection to the ECATM-PN. See the image below:



At this point, a "Discovery" dialog box pops up, prompting you to scan for slave devices in the EtherCAT network.

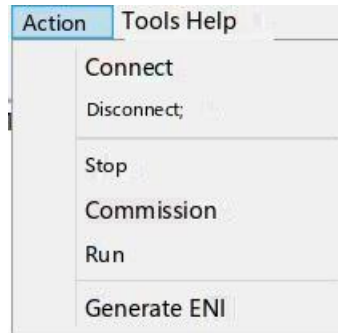


Clicking "Yes (Y)" will scan the entire EtherCAT network slave devices; after the scan is complete, the EtherCAT network slave device information will be displayed in the "Access" tab of the slave information panel, as shown in the figure below. For details, please refer to the "Access" tab function introduction.

Database Access Packet									
#	Name	Address	Alias	Links	Vendor ID	Product Code	Revision Number	State	Status Code
0	MicroFlex e190	1000	0	2	16 # 000000B7	16 # 000002C1	16 # 170F0003	PREOP	No error (0x0000)
1	EK1100	1001	0	2	16 # 00000002	16 # 044C2C52	16 # 00120000	PREOP	No error (0x0000)
2	EL1809	1002	0	2	16 # 00000002	16 # 07113052	16 # 00120000	PREOP	No error (0x0000)
3	EL2809	1003	0	2	16 # 00000002	16 # 0AF93052	16 # 00120000	PREOP	No error (0x0000)
4	EK1110	1004	0	1	16 # 00000002	16 # 04562C52	16 # 00110000	PREOP	No error (0x0000)

2) Disconnect - Enable/Disconnect

Executing "Disconnect" under "Action" will disconnect the configuration software from the ECATM-PN gateway;



Both the output list and the status bar at the bottom of the window display as 'Disconnect '

Error List		
	Time	Message
Information	2021-12-29 19:30:17	Enter "Disabled" mode
Disabled	Ready	Controller system time: 00:00:00.1230000

3) Stop - Stop

Stop execution under "Action" mode. This sets the ECATM-PN gateway's Action execution mode to "Disable". After the partial operation of "Action" is completed, the execution status can be displayed in the output list (Information List). The list content includes "Time" and "Message".

Under "Action", execute "Commission" to switch the EtherCAT network slave connection of the ECATM-PN gateway to

Error List		
	Time	Message
Information	2021-12-29 17:20:21	Enter "Disabled" mode

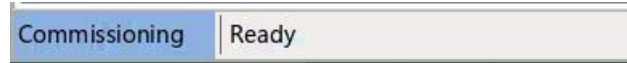
4) Commission – Toggle Status

Pre-operation state: The EtherCAT Slave completes other states and transitions to PREOP (INIT to PREOP/OP to PREOP...);

Database		Access	Packet							State	Status Code
#	Name	Address	Alias	Links	Vendor ID	Product Code	Revision Number				
0	MicroFlex e190	1000	0	2	16 # 000000B716 # 000002C116 # 170F0003			PREOP	No error (0x0000)		
1	EK1100	1001	0	2	16 # 0000000216 # 044C2C5216 # 00120000			PREOP	No error (0x0000)		
2	EL1809	1002	0	2	16 # 0000000216 # 0711305216 # 00120000			PREOP	No error (0x0000)		
3	EL2809	1003	0	2	16 # 0000000216 # 0AF9305216 # 00120000			PREOP	No error (0x0000)		
4	EK1110	1004	0	1	16 # 0000000216 # 04562C5216 # 00110000			PREOP	No error (0x0000)		

In addition to displaying the execution status messages in the output list, the Action status is also displayed in the status bar at the bottom of the configuration software window, as shown in the following figure:

5) Run - Run the main station



Under "Action", execute "Run" to download the configuration information to the ECATM-PN gateway device SD card.

At the same time, it displays the completion of the EtherCAT network master and slave connection process (in Pre-Operation state or higher): INIT → PREOP → SAFEOP → OP state switch; during this process, the ECATM-PN gateway

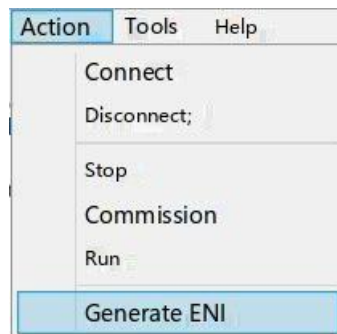
Database	Access	Packet							
#	Name	Address	Alias	Links	Vendor ID	Product Code	Revision Number	State	Status Code
 0	MicroFlex e190	1000	0	2	16 # 000000B7	16 # 000002C1	16 # 170F0003	OP	No error (0x0000)
 1	EK1100	1001	0	2	16 # 00000002	16 # 044C2C52	16 # 00120000	OP	No error (0x0000)
 2	EL1809	1002	0	2	16 # 00000002	16 # 07113052	16 # 00120000	O ☆	No error (0x0000)
 3	EL2809	1003	0	2	16 # 00000002	16 # 0AF93052	16 # 00120000	O ☆	No error (0x0000)
 4	EK1110	1004	0	1	16 # 00000002	16 # 04562C52	16 # 00110000	O ☆	No error (0x0000)

The output list and the status bar at the bottom of the window both display "Running".

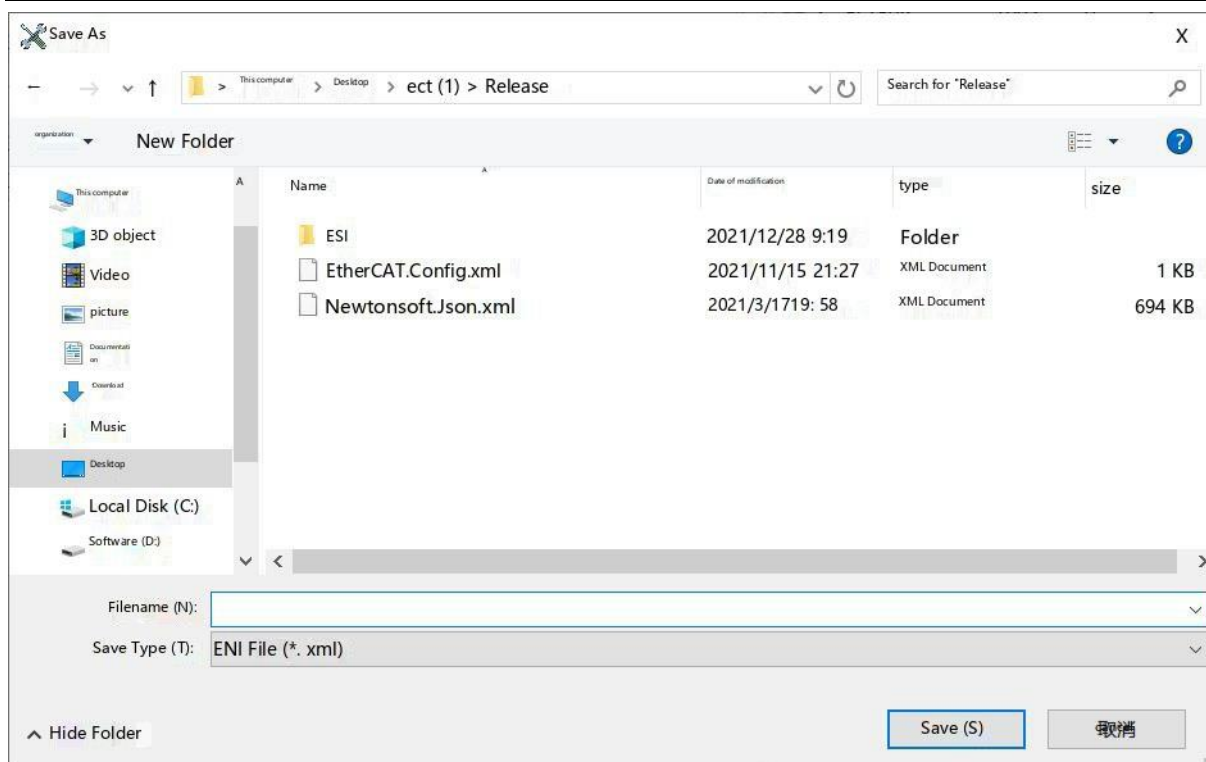
Error List		
	Time	Message
Information	2021-12-29 19:39:40	Enter "Running" mode
Running	Ready	Controller system time: 00:00:00.1230000

ECT indicator light will flash slowly until it turns solid green.

6) Under "Action", execute "Generate ENI" to generate a .xml file, which will then be used to update the configuration file on the webpage.



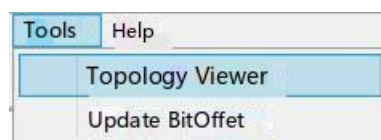
Save to the specified path; for detailed webpage updates, refer to the webpage configuration section;



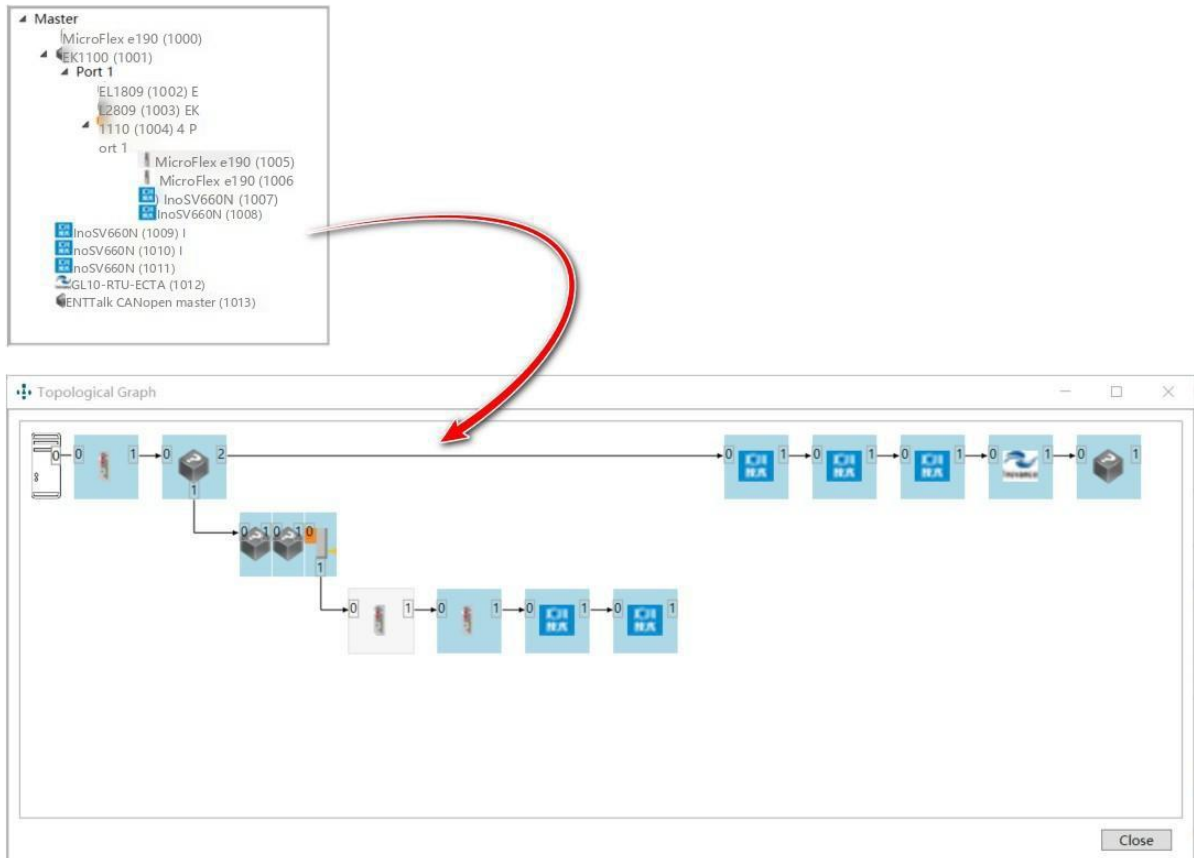
6.4.1.3 Tools

1) Topology Viewer

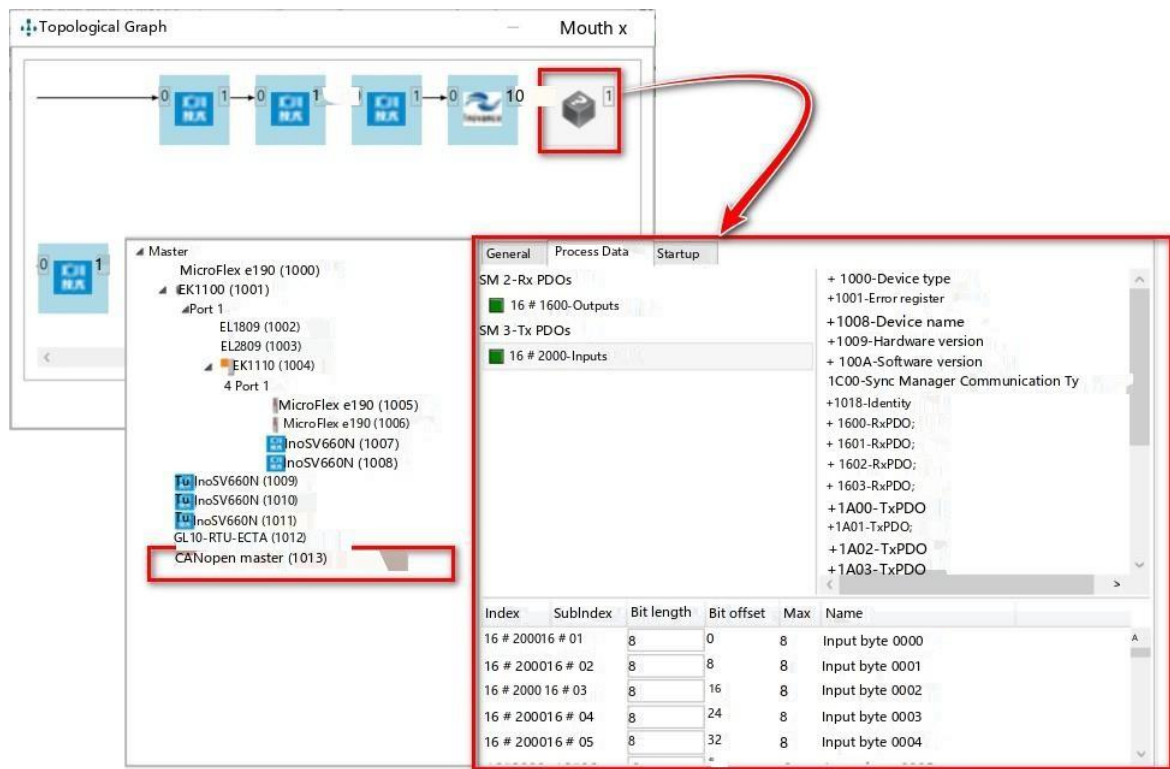
The "Tools" menu leads to the "Topology Viewer," which displays the network topology in the "Topological Graph" dialog box.



The topology structure displays the network structure of the configuration tree in the project configuration panel, as shown in the following figure:



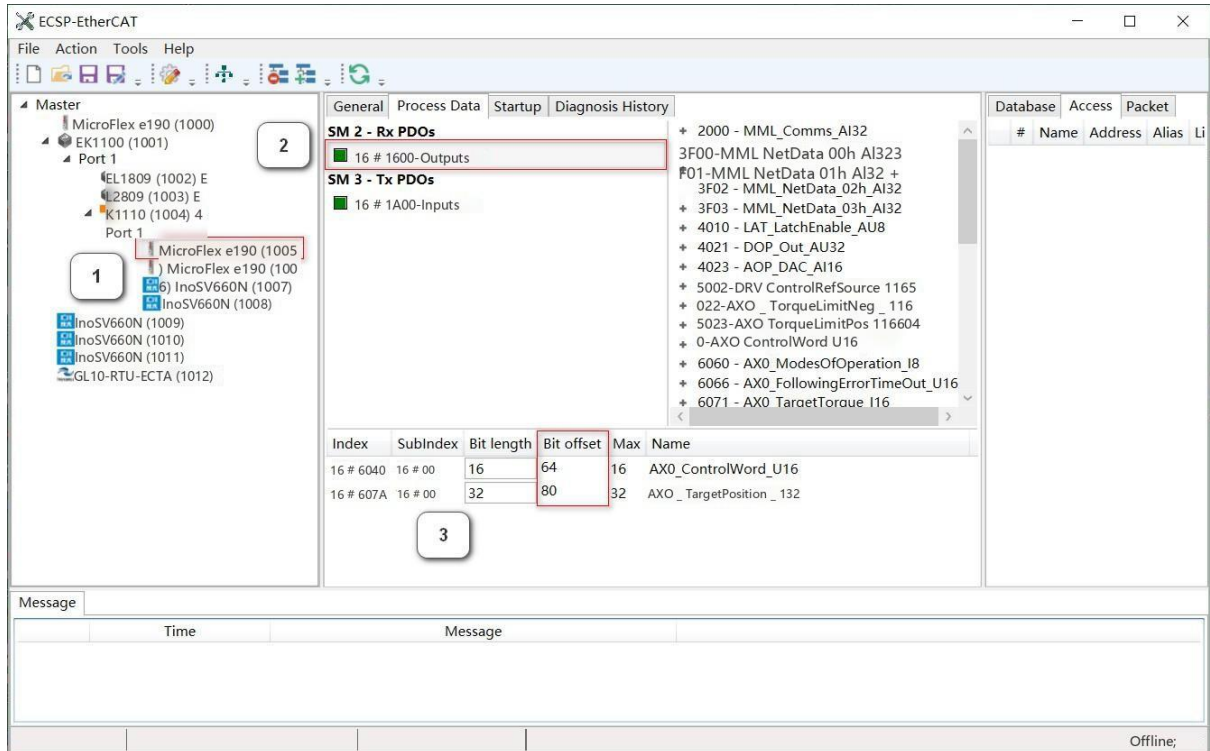
Double-clicking the slave in the topology viewer will display the slave's configuration information in the configuration panel and configuration window, as shown in the following figure:



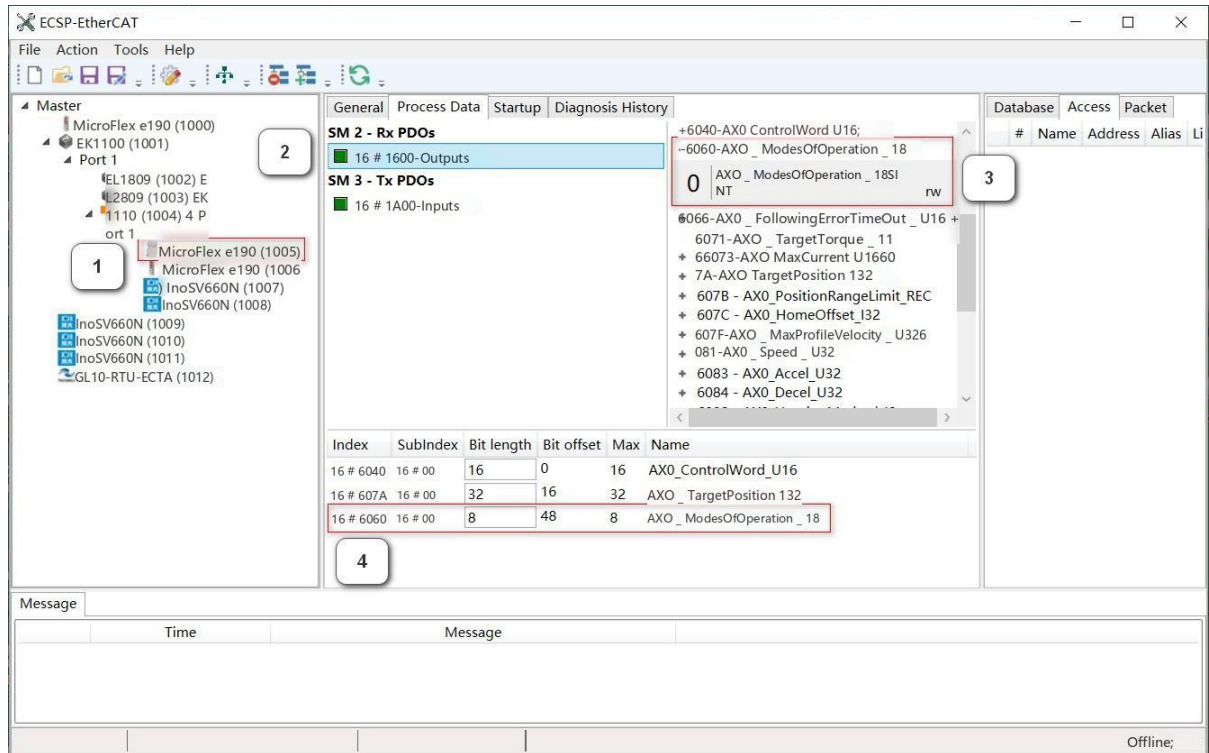
2) Update BitOffset – Update the offset



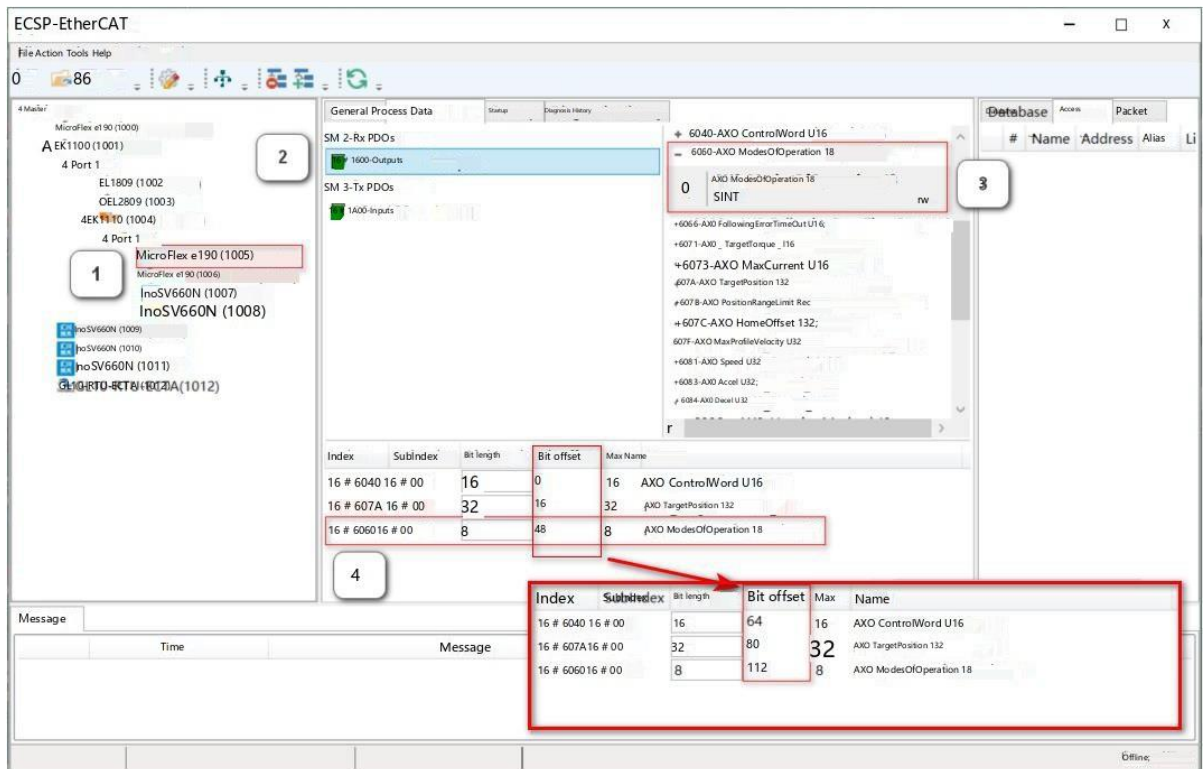
The "Tools" tool executes "Update BitOffset," which updates the bit offset of the "Process Data" field in the EtherCAT network slave device.



When PDO parameters are added or removed, for example, adding new process mapping data 16#6060 under the SM2 - Rx PDOs communication object dictionary 16#1600 – Outputs under the process data ("Process Data") of the slave device in the above figure; object dictionary index 16#6060 will be added to Rx PDO. At this time, all object dictionary indexes under Rx PDO will start at offset 0, as shown in the figure below:



Clicking "Tools" → "Update BitOffset" will update the offset of the entire project's slave process data, i.e., the address of the variable in memory mapping. PROFINET network data for the ECATM-PN gateway device is also read from the corresponding memory mapping area. For details, please refer to the data exchange section, as shown in the following figure:



6.4.1.4 Help



About - Display product name and version



6.4.2 Toolbar Buttons

The button toolbar provides quick access to frequently used functions;



Create a new project



Open an existing project file, named .gz file



Save changes in the current project



Save the currently opened project with a



different name Generate ENI file



Open the topology viewer to display the network topology structure



Delete the selected project (slave) in the configuration panel

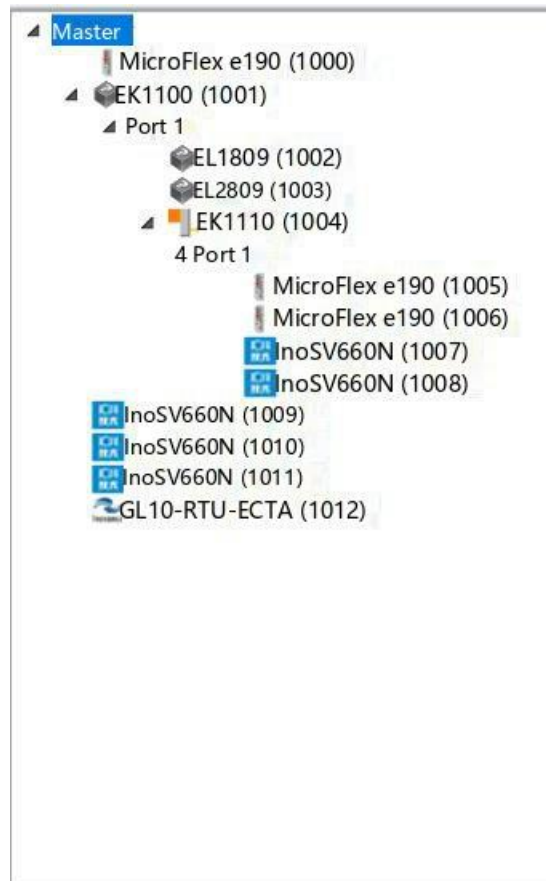
"Configuration" tree.  adds a new slave station to the network,

defaulting to adding the last added slave station.  refreshes the slave station file library, i.e., the XML file.

6.4.3 Configuration Panel

The configuration tree window displays the current project configuration as a tree with all PDO entries. That is, the entire EtherCAT network device; the slave device's displayed name includes the slave device's Device Name and EtherCAT Address;

Create a new project, configure the software to automatically load the Master, and expand and collapse the EtherCAT network branches using the "▲" icon;



By clicking on each item in the configuration tree, its properties are displayed in the configuration window.

6.4.4 Configuration Window

The configuration window is used to display and edit the properties of the following master station objects and slave station information panel objects. The view of this window changes depending on the selected object;

6.4.4.1 Master

The screenshot shows a software interface for configuring a Master station. It has two tabs: 'Master' and 'Process Image'. The 'Master' tab is selected. Inside, there are two expandable sections: 'Address' and 'Device'. The 'Address' section is expanded, showing three input fields: 'IP' with the value '192.168.0.10', 'Gateway' with '192.168.0.1', and 'Mask' with '255.255.255.0'. The 'Device' section is also expanded, showing a 'Device Name' field with the value 'pn2ecat'. The interface has a light gray background and a standard Windows-style window border.

Master station settings are divided into the following tabs:

1) Master – ECATM-PN module PROFINET network address "Address" and device information "Device":

Address – Address list

- IP – PROFINET Slave IP address: 192.168.0.10
- Gateway - PROFINET Slave default gateway: 192.168.0.1
- Mask - PROFINET Slave subnet mask: 255.255.255.0

Device list

- Device Name - Device name of PROFINET Slave: pn2ecat

Image

The "Process Image" tab displays all input/output variable process mappings in memory. This tab allows you to view the memory location, type, length, and offset of variables.

Master

Process Image

Output

PDO

	Index	SubIndex	Name	Bit Length	Bit Offset
⬆ 03E8-MicroFlex e190					
1600-Outputs	6040	00	AXO ControlWord U16	16	0
1600-Outputs	507A	00	AXO _ TargetPosition _ 132	32	16
⬇ 03EB-EL2809					
⬇ 03ED-MicroFlex e190					
⬇ 03EE-MicroFlex e190					
⬇ 03EF-InoSV660N					
⬇ 03F0-InoSV660N					
⬇ 03F1-InoSV660N					
⬇ 03F2-InoSV660N					
⬇ 03F3-InoSV660N					
⬇ 03F4 GL10 RTU ECTA					
⬇ 03F5-ENTTalk CANopen master					

Input

PDO

	Index	SubIndex	Name	Bit Length	Bit Offset
⬆ 03E8-MicroFlex e190					
1A00-Inputs	6041	00	AXO StatusWord U16	16	0
1A00-Inputs	6064	00	AXO ActualPosition 132	32	16
⬇ 03EA-EL1809					
⬇ 03ED-MicroFlex e190					
⬇ 03EE-MicroFlex e190					
⬇ 03EF-InoSV660N					
⬇ 03F0-InoSV660N					

As shown in the image above, the input and output variable memory mappings are displayed in different drop-down lists, with the following attributes:

·PDO - Process Data Communication Object Dictionary: 03E8 – MicroFlex e190

·Index - Index:16#6040

·Subindex - Subindex:16#00

·Name - Variable Name:AX0_ControlWord_U16

·Bit Length - Variable data length, in bits: 16

·Bit Offset - Variable's location in memory: 0

Clicking any attribute tab will sort the slaves according to the corresponding attribute. By default, it is sorted in ascending or descending order by bit offset. When a certain attribute is selected,

When the attribute name is displayed, the ascending and descending sorting identifiers are automatically shown above it, namely "▲" and "▼";

For example, clicking "Bit Length" will sort the PDO communication objects according to the size of the bits occupied by the variable. Other attributes are similar;

PDO	Index	SubIndex	Name	Bit Length	Bit Offset
03E8-MicroFlex e190					
1600-Outputs	6040	00	AXO ControlWord U16	16	0
1600-Outputs	607A	00	AXO _ TargetPosition _ 132	32	16
03EB-EL2809					
1600-Channel 1	7000	01	Output	1	48
1601-Channel 2	7010	01	Output	1	49
1602-Channel 3	7020	01	Output	1	50
1603-Channel 4	7030	01	Output	1	51
1604-Channel 5	7040	01	Output	1	52
1605-Channel 6	7050	01	Output	1	53
1606-Channel 7	7060	01	Output	1	54
1607-Channel 8	7070	01	Output	1	55
1608-Channel 9	7080	01	Output	1	56
1609-Channel 10	7090	01	Output	1	57
160A-Channel 11	70A0	01	Output	1	58
160B-Channel 12	70B0	01	Output	1	59
160C-Channel 13	70C0	01	Output	1	60
160D-Channel 14	70D0	01	Output	1	61
160E-Channel 15	70E0	01	Output	1	62
160F-Channel 16	70F0	01	Output	1	63
03ED-MicroFlex e190					
03EE-MicroFlex e190					
03EF-InoSV660N					

6.4.4.2 Slave

Selecting a slave in the configuration tree of the configuration panel will display the slave's configuration information in the configuration window.

General
Process Data
Startup
Diagnosis History

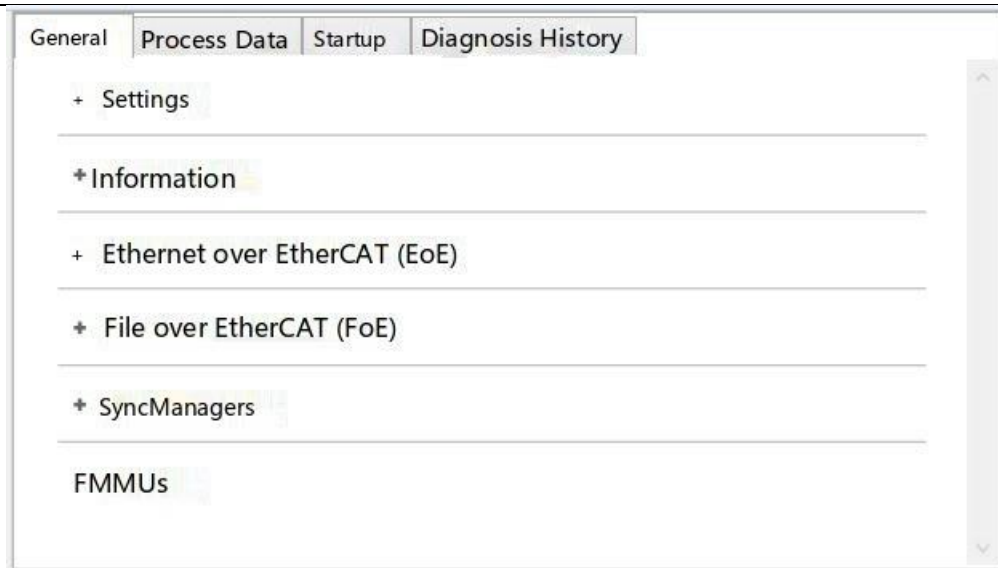
SM 2-Rx PDOs
16 # 1600-Outputs
SM 3-Tx PDOs
16 # 1A00-Inputs

+ 2000-MML _ Comms _ AI32
+ 3F00-MML NetData 00h AI32;
3F01-MML NetData 01h AI32
+ 3F02-MML _ NetData _ 02h _ AI32
+ 3F03-MML NetData 03h AI32
+ 4010-LAT _ LatchEnable _ AU8
+ 4021-DOP Out AU32
+ 4023-AOP DAC AI16
+ 5002-DRV ControlRefSource 116
+ 5022-AXO _ TorqueLimitNeg _ 116
+ 5023-AXO TorqueLimitPos 116
+ 6040-AXO ControlWord U16
+ 6060-AXO ModesOfOperation 18

Index	SubIndex	Bit length	Bit offset	Max	Name
16 # 6040	16 # 00	16	0	16	AXO ControlWord U16
16 # 607A	16 # 00	32	16	32	AXO _ TargetPosition _ 132

Slave settings are divided into the following tabs:

- 1) General – Routine



2) Process Data

Process Data Object (PDO) - The basic unit of data exchange. A PDO is a structure consisting of one or more objects. If the device supports PDO, it is configured according to the PDO communication parameters and PDO mapping table entries. Some slave devices support PDO allocation (process data object allocation). PDO allocation means that this PDO is assigned to the synchronization manager, that is, these objects are allocated in the memory limited by the synchronization manager.

General
Process Data
Startup

SM 2-Rx PDOs

☐ 16 # 1701-Outputs
☒ 16 # 1702-Outputs
☐ 16 # 1703-Outputs
☐ 16 # 1704-Outputs
☐ 16 # 1705-Outputs
☐ 16 # 1706-Outputs
☐ 16 # 1707-Outputs
☐ 16 # 1708-Outputs

SM 3-Tx PDOs

☐ 16 # 1B01-Inputs
☐ 16 # 1B03-Inputs
☐ 16 # 1B04-Inputs
☒ 16 # 1B05-Inputs
☐ 16 # 1B06-Inputs
☐ 16 # 1B07-Innits

+1002-Manufacturer Status Register
+ 2022-Position Data for the Position Mode
+ 2051-Konfiguration fur Schwellenregister +
2052-Positionsschwellenregister absolute +
2053-Positionsschwellenregister relative +
2060-Digital Speed or Current Offset20
70-Actual Values
2080-Statusinformationen
2081-Inkrementelle Istposition
2082-Latch 32/24 Bit positiv
2083-Latch 32/24 Bit negativ2
084-Latch 16 Bit position
2085-Latch 16 Bit negativ20
86-Positionstriggerwort3100
-ASCII-Transfer
6040-Controlwor
d6041-Statuswor
6060-Modes of operation
6061-Modes of operation display
6063-Position actual value in increments606A Dncit
y actual valo in ucor nite

Index	SubIndex	Bit length	Bit offset	Ma x	Name
16 # 6064	16 # 00	32	0	32	Position actual value
16 # 6077	16 # 00	16	32	16	Torque actual value
16 # 60F4	16 # 00	32	48	32	Following error
16 # 604116 # 00		16	80	16	rStatus word

The selected PDOs are involved in process data communication. If a PDO is not selected, it will be excluded from the current PDO assignment. PDOs can be exclusive, that is, the memory size is limited to allocate all process data objects. For example, in the PDO mapping parameters in the above figure, SM2 – Rx PDOs and SM3 – Tx PDOs consist of multiple communication object dictionaries. SM2 – Rx PDOs can select any object dictionary index from 16#1701 to 16#1708 to complete the device process data communication. Selecting different object dictionaries can be viewed in the PDO input/output process data allocation list below, showing the already selected process mapping data.

The green checkbox " " for object dictionary names indicates PDOs participating in process data communication, such as 16#1707 - Output, as shown in the figure below; if you select other object dictionary indices, first click the left mouse button to cancel the current green checkbox option to a blank checkbox " " before clicking to select other indices;

SM 2-Rx PDOs

- ☒ 16 # 1701-Outputs
- ☐ 16 # 1702-Outputs
- ☐ 16 # 1703-Outputs
- ☐ 16 # 1704-Outputs
- ☐ 16 # 1705-Outputs
- ☐ 16 # 1706-Outputs
- ☒ 16 # 1707-Outputs
- ☐ 16 # 1708-Outputs

This tab allows reading PDOs from the slave and adding new PDOs, and then editing unassigned PDOs (added by the user);

Index	SubIndex	Bit length	Bit offset	Max	Name
16 # 6040	16 # 00	16	128	16	AXO ControlWord U16
16 # 607A	16 # 00	32	144	32	AXO _ TargetPosition _ 132

The PDOs configuration pane displays all allowed slave PDOs assigned to the synchronization manager, including the following:

- Index - Index of the PDO in the object dictionary: 16#6040
- Subindex - Subindex of the PDO in the object dictionary: 16#00
- Bit Length - Bit data length: 16
- Bit offset - Data offset: 128
- Name - PDO name: AX0_ControlWord_U16

The following describes how to configure circular data exchange between the Slave and Master. I. Drives, using MicroFlex e190 as an example

1. Select the slave to configure in the configuration tree pane, such as MicroFlex e190(1000).



2. Select the "Process Data" tab in the slave configuration window

General Process Data Startup Diagnosis History

3. Displays operable PDO mapping parameters

General Process Data Startup Diagnosis History

SM 2-Rx PDOs

16 # 1600-Outputs

SM 3-Tx PDOs

16 # 1A00-Inputs

4. Left-click to select the "16#1600 - Output" communication area object dictionary index under "SM2 – Rx PDOs". The right side refreshes the list of supported PDO data, and the PDO input/output process data allocation list below displays the selected output process data communication parameters. See below:

Index	SubIndex	Bit length	Bit offset	Max	Name
16 # 6040	16 # 00	16	128	16	AXO ControlWord U16
16 # 607A	16 # 00	32	144	32	AXO _ TargetPosition _ 132

5. To manage the PDO assignment list, you need to add PDOs supported by PDOs. The content displayed varies depending on the slave; some parameters that cannot be edited or deleted are read from the ESI file;
- Add a new index under this Drive: 16#6060 – AXO_ModesOfOperation_I8. Find the location of this index using the drop-down list;

603F-AXO ErrorCode _ U16

+ 6040-AXO _ ControlWord _ U16

+ 6041-AXO _ StatusWord _ U16

+ 605A-AXO _ QuickStopOptionCode _ 116

+ 605B-AXO ShutdownOptionCode 116

+ 605C-AXO _ DisableOperationOptionCode _ 116

+ 605D-AXO HaltOptionCode 116

+ 605E-AXO _ FaultReactionActiveOptionCode _ 11

+ 6060-AXO ModesOfOperation 18

+ 6061-AXO _ ModesOfOperationDisplay _ 18

+ 6062-AXO PositionDemandValue 132

+ 6064-AXO ActualPosition 132

+ 6065-AXO _ FolErrorFatal _ U32

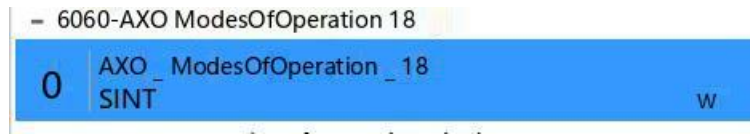
+ 6066-AXO _ FollowingErrorTimeOut _ U16

+ 6067-AXO _ IdlePos _ U32

+ 6068-AXO IdleTime U16

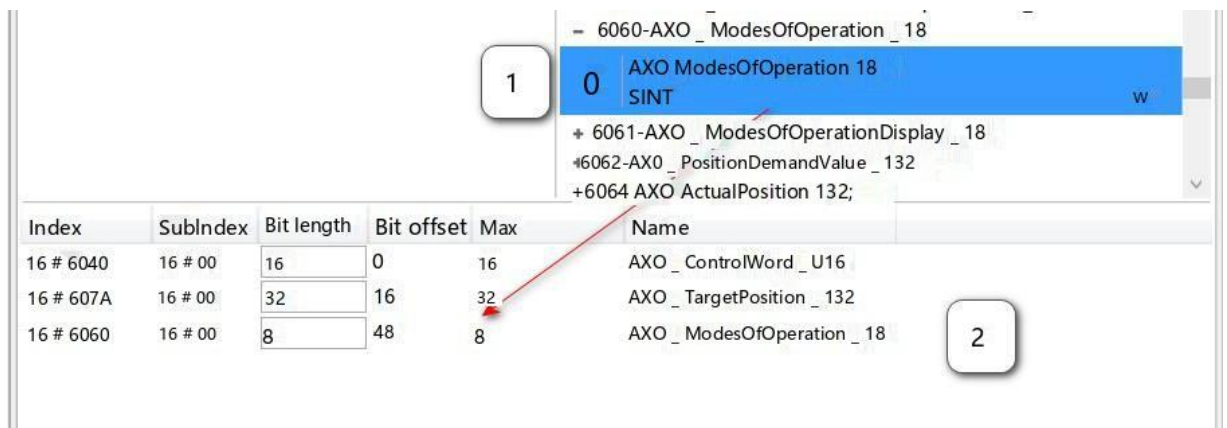
< >

- Expand the contents of 6#6060 – AX0_ModesOfOperation_I8 by clicking the “+” symbol, which includes the sub-index (SubIndex : 0), name (Name : AX0_ModesOfOperation_I8), data type (Type: SINT), and read/write attribute (Attribute: rw);

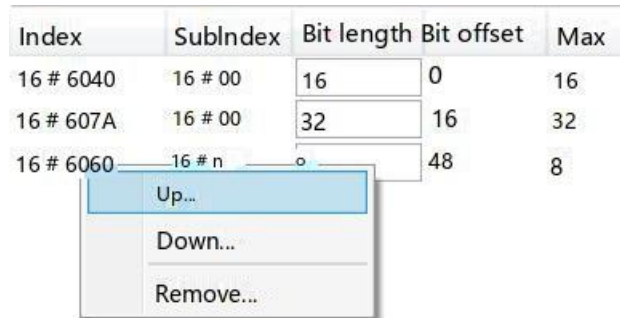


- Double-click the above parameters to automatically add them to the PDO assignment list; or drag and drop them. Select and hold the left mouse button, then drag them to a blank area of the PDO input/output process data

assignment list. If " " is displayed, release the mouse. If " " is displayed, it is an illegal placement; the following figure shows the result after successful addition:



- To change the position of an index parameter, right-click the parameter and select "Up..." or "Down...";



- To delete an index parameter, right-click the parameter and select "Remove...". Once the delete button is clicked, the entry will be.

D

delete immediately; the application will not request any confirmation.

Index	SubIndex	Bit length	Bit offset	Max
16 # 6040	16 # 00	16	0	16
16 # 607A	16 # 00	32	16	32
16 # 6060	16 # ^ ^	8	AQ	8

Up...
 Down...
 Remove...

10. The PDO parameters after configuration are shown in the following figure:

General Process Data Startup

SM 2-Rx PDOs

16 # 1600-Outputs

SM 3-Tx PDOs

16 # 1A00-Inputs

- + 2000 - MML_Comms_AI32
- + 3F00 - MML_NetData_00h_AI32
- + 3F01 - MML_NetData_01h_AI32
- + 3F02 - MML_NetData_02h_AI32
- + 3F03 - MML_NetData_03h_AI32
- + 4010 - LAT_LatchEnable_AU8
- + 4021 - DOP_Out_AU32
- + 4023 - AOP_DAC_AI16
- +5002-DRV ControlRefSource 11650
- +22-AXO_TorqueLimitNeg_116502
- +3-AXO TorqueLimitPos 1166040-AX
- _0_ControlWord_U16
- 0 AX0_ControlWord_U16
UINT rw
- 6060 - AX0_ModesOfOperation_I8
- 0 AXO_ModesOfOperation 18SIN
T rw
- +6066-AX0_FollowingErrorTimeOut_U16
- +6071-AX0_TargetTorque_I16
- + 6073 - AX0_MaxCurrent_U16
- 607A - AX0_TargetPosition_I32
- 0 AX0_TargetPosition_I32
DINT rw
- + 607B - AX0_PositionRangeLimit_REC
- 607C - AX0_HomeOffset_I32
- 0 AX0_HomeOffset_I32
DINT rw
- +607F-AX0_MaxProfileVelocity_U32+6
- 081-AX0_Speed_U32
- 6083-AXO Accel U32+60
- 84-AX0_Decel_U32
- +6098-AX0_HomingMethod_I8
- +6099-AX0_HomingSpeeds_AU32
- 60B0-AXO PositionOffset 132
- 0 AX0_PositionOffset_I32
DINT rw
- +60B1-AX0_VelocityOffset_I32 +
- 60B2-AX0_TorqueOffset_I16
- +60B8-AX0_TouchProbeFunction_U166
- 0C5-AXO MaxAcceleration U32
- + 60C6 - AX0_MaxDeceleration_U32
- 60E0-AXO_TorqueLimitNegAbs_U16
- 60E1-AXO TorqueLimitPosAbs U1660FE
- AXO_DigitalOutputs_AU32
- 60FF-AXO_TargetVelocity_I32
- 0 AXO_TargetVelocity_I32DI
NT rw

Index	SubIndex	Bit length	Bit offset	Max	Name
16 # 6040	16 # 00	16	0	16	AX0_ControlWord_U16
16 # 607A	16 # 00	32	16	32	AXO_TargetPosition_I32
16 # 6060	16 # 00	8	48	8	AXO_ModesOfOperation
16 # 607C	16 # 00	32	56	32	_18AXO HomeOffset 132
16 # 60B0	16 # 00	32	88	32	AXO PositionOffset 132A
16 # 60FF	16 # 00	32	120	32	XO_TargetVelocity_I32

In addition, the selected PDO will be displayed in the "Process Image" tab of the "Master" configuration window in the configuration tree, as shown in the following figure:

Master	Process Image					
Output						
PDO	Index	SubIndex	Name	Bit Length	Bit Offset	
^ 03E8-MicroFlex e190						
1600-Outputs	6040	00	AXO ControlWord U16	16	0	
1600-Outputs	607A	00	AXO _ TargetPosition _ 132	32	16	
1600-Outputs	6060	00	AXO _ ModesOfOperation _ 18	8	48	
1600-Outputs	607C	00	AXO HomeOffset 132	32	56	
1600-Outputs	60B0	00	AXO PositionOffset 132	32	88	
1600-Outputs	60FF	00	AXO _ TargetVelocity _ 132	32	120	

11. Manage the "16#1A00 - Input" index under "SM3 – Tx PDOs" using the same operation as above;

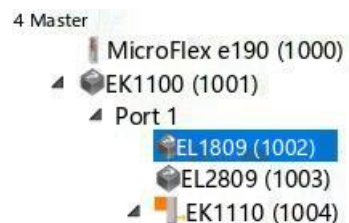
2、EtherCAT coupler

1) Taking the EK1100 coupler with the EL1809 expansion module as an example

EL1809 is a DI module, configured on the EK1100 coupler. After scanning the coupler, the DIDO module mounted on the coupler

The block is directly displayed under the coupler;

i) Select EK1100 in the configuration tree, expand the coupler and select the DI module EL1809;



ii) Under the "Process Data" tab of EL1809, it shows that the Tx PDOs configuration has been completed, including all channel mappings

The object dictionary, process mapping parameters, and "Drives" configuration are slightly different, as shown in the following figure

GeneralProcess DataStartup

SM 0-Tx PDOs

16 # 1A00-Channel1

16 # 1A01-Channel2

16 # 1A02-Channel3

16 # 1A03-Channel4

16 # 1A04-Channel 5

16 # 1A05-Channel 6

16 # 1A06-Channel7

16 # 1A07-Channel 8

16#1A08 - Channel 9

16 # 1A09-Channel 10

16 # 1A0A-Channel 11

16 # 1A0B Channel 12

16 # 1A0C-Channel 13

16 # 1A0D-Channel 14

16 # 1A0E - Channel 15

16 # 1A0F Channel 16

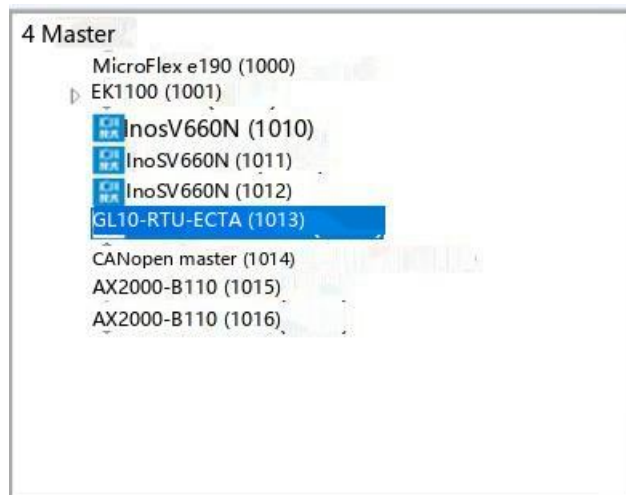
Index	SubIndex	Bit length	Bit offset	Max	Name
16 # 600016 # 01		1	48	1	Input

2) Taking the GL10-RTU-ECAT coupler as an example

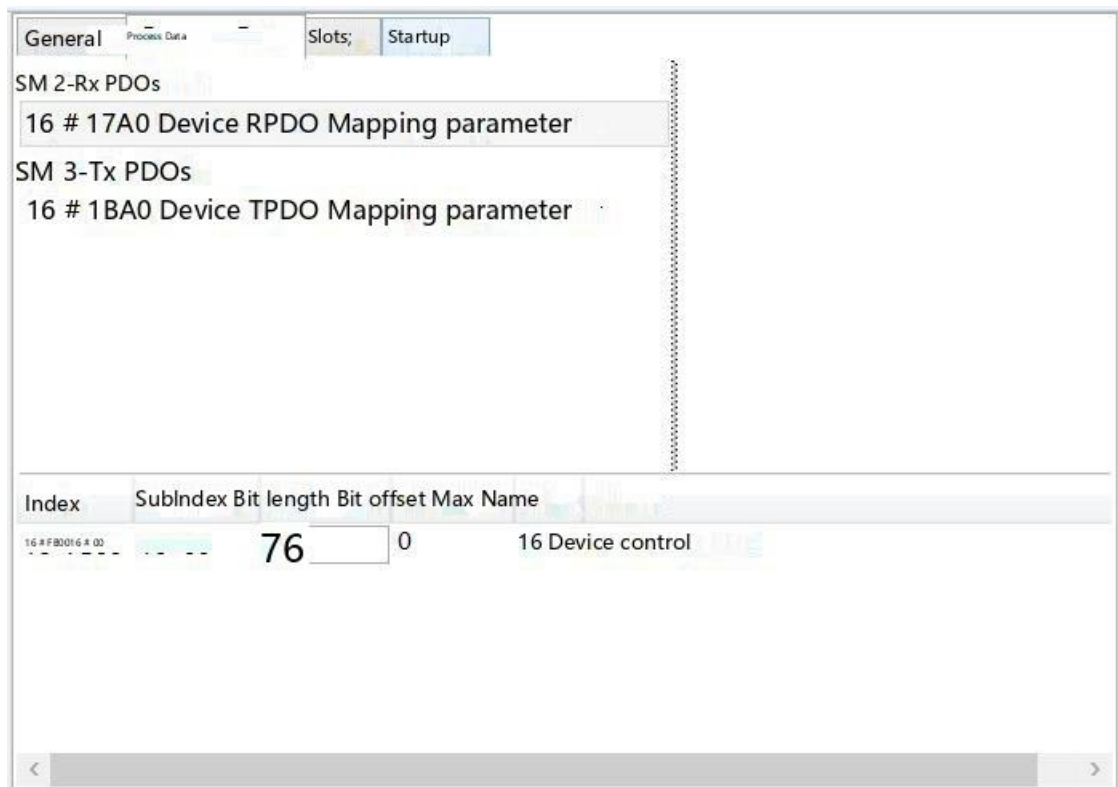
The GL10-RTU-ECAT coupler changes the "Process Data" tab by adding different extension modules based on the "Slots" tab.

View;

- i) Select the slave GL10-RTU-ECAT in the configuration tree;



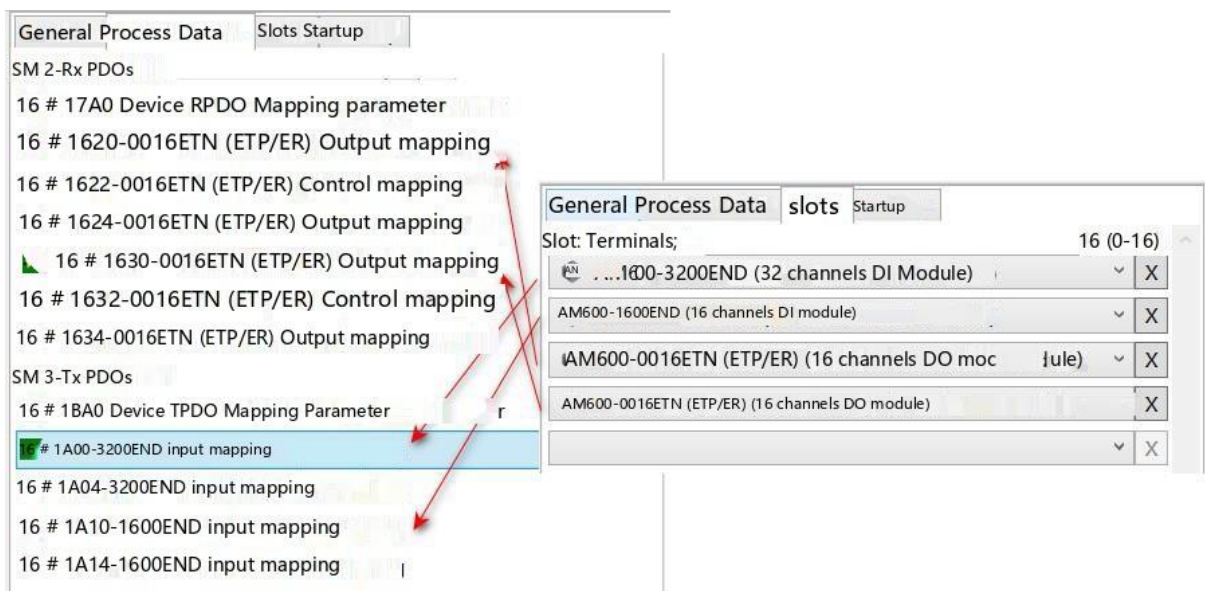
- ii) In the configuration window, select the "Process Data" tab. "SM2 – Rx PDOs" and "SM3 – Rx PDOs" are used to map the process data of the extension module.



- iii) In the configuration window, select the "Slots" tab, which supports 16 slots. Add the extension module as shown in the figure below:



- iv) The way the index references of the module object dictionary are dynamically allocated depends on the location of the module.



- v) After selecting "Tools" → "Update Offset", you can view the memory addresses of the input/output process data under the PDO mapping. For example, the input process data of the 32-channel DI module AM600-3200ETN is displayed in the allocation list below: CH1

8-channel PDO mapping index: 0x1A00, sub-index: 0x01, object dictionary value: 0x60010108; offset bit size: 1328;

SM 3-Tx PDOs

16 # 1BA0 Device TPDO Mapping parameter

16 # 1A00-3200END input mapping

16 # 1A04-3200END input mapping

16 # 1A10-1600END input mapping

16 # 1A14-1600END input mapping

Index	SubIndex	Bit length	Bit offset	Max	Name
16 # 600116 # 01	8	1328	8	Digital input CH1-8bit	
16 # 600116 # 02	8	1336	8	Digital input CH2-8bit	
16 # 600116 # 03	8	1344	8	Digital input CH3-8bit	
16 # 600116 # 04	8	1352	8	Digital input CH4-8bit	

III. Example of Gateway: EtherCAT Slave to Modbus RTU Master

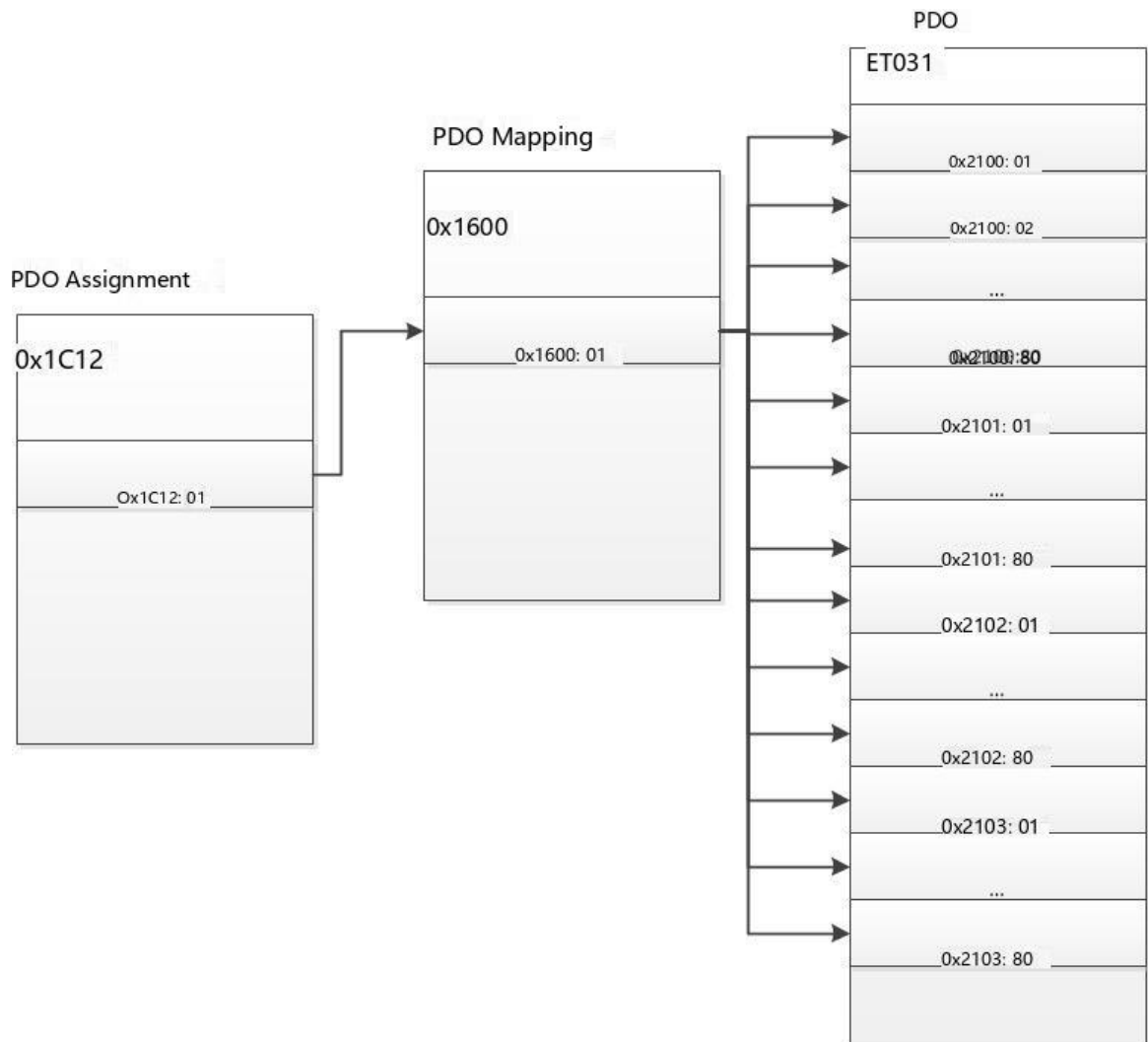
- i) Select Modbus master as the slave station stable connection technology in the configuration tree; vi)



In the configuration window, select the "Process Data" tab. "SM2 – Rx PDOs" and "SM3 – Rx PDOs" are used to map the process data in memory.

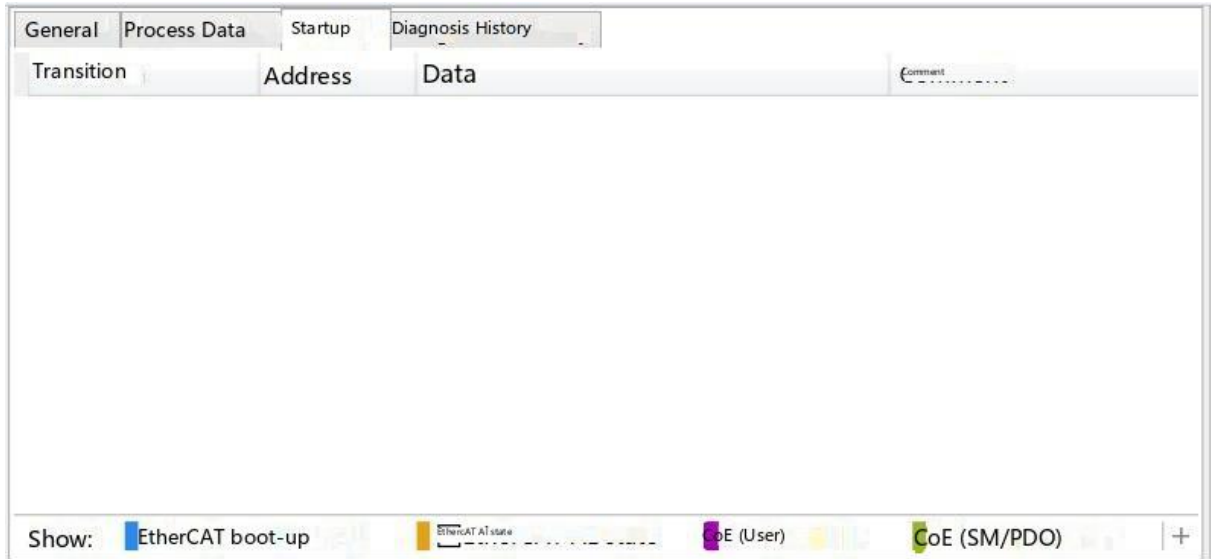
General Process Data Startup				
SM 2-Rx PDOS				
-16 # 1600-Outputs				
SM 3-Tx PDOS				
-16 # 2000-Inputs				
Index	Subindex	Bit length	Bit offset	Max Name
16 # 210016 # 01		8	0	8 Output byte 0000
16 # 210016 # 02		8	8	8 Output byte 0001
16 # 210016 # 03		8	16	8 Output byte 0002
16 # 210016 # 04		8	24	8 Output byte 0003
16 # 210016 # 05		8	32	8 Output byte 0004
16 # 210016 # 06		8	40	8 Output byte 0005
16 # 210016 # 07		8	48	8 Output byte 0006
16 # 210016 # 08		8	56	8 Output byte 0007

The complete mapping table in the example above is shown below:

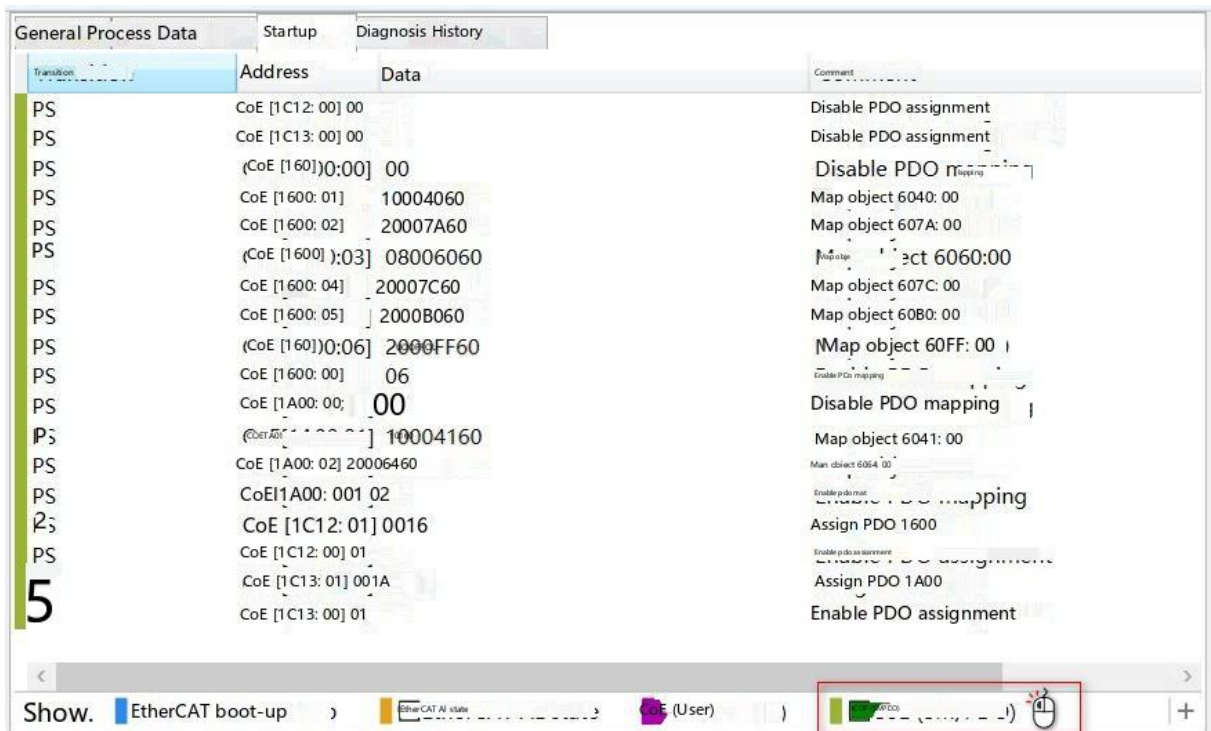


3) Startup – Startup

The "Startup" tab displays four items: "EtherCAT boot-up", "EtherCAT AL state", "CoE (User)", and "CoE (SM/PDO)", each distinguished by a different color.



"■" is displayed / "□" does not display related parameters



The list contains the following attributes:

- Transition – Transmission, the slave sends the specified parameters when the state transitions.

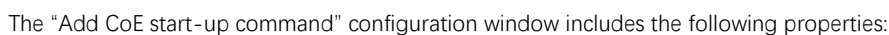
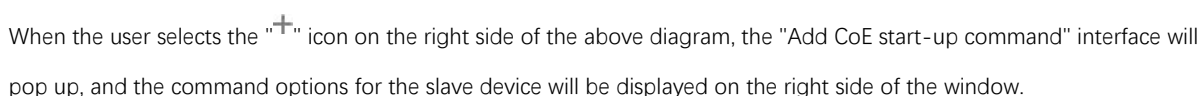
IP	Init → Pre-Operational
PS	Pre-Operational → Safe-Operational
PI	Pre-Operational → Init
SP	Safe-Operational → Pre-Operational
SO	Safe-Operational → Operational
SI	Safe-Operational → Init
OS	Operational → Safe-Operational
OP	Operational → Pre-Operational
OI	Operational → Init
IB	Init → Bootstrap
BI	Bootstrap → Init
II	Init → Init
PP	Pre-Operational → Pre-Operational
SS	Safe-Operational → Safe-Operational

- Address – Object dictionary parameters, composed of index:sub-index.
- Data – The object dictionary data value will be transmitted.
- Comment – Comment parameters

The parameters displayed in "CoE(SM/PDO)" are the process mapping data configured in the "Process Data" tab:

The screenshot displays the 'General Process Data Startup Diagnosis History' window. It contains a table with columns: Transition Address, Data, and Comment. The table lists various transitions (PS, Pe, P, PS, PS, PS, PS, a, PS, PS, PS, PS, PS, PS, PS, PS) and their corresponding data values and comments. Two red arrows point to specific entries in the table.

Below the table, there are two tabs: 'General Process Data' and 'General Process Data Startup Diagnosis History'. The 'General Process Data' tab is active, showing 'SM 2-Rx PDOs' and 'SM 3-Tx PDOs'. The 'SM 3-Tx PDOs' section shows a list of PDOs with their Index, Subindex, Bit length, Bit offset, and Max Name. The 'General Process Data Startup Diagnosis History' tab is also visible, showing a similar table for the startup diagnosis history.



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· Value - Parameter value, decimal

· Data - Displays Value, hexadecimal

Comment:	Set AX0 PositionOffset 132
Index:	16 # 60B0
Sub-Index:	16 # 00
Data Type:	DINT
Value:	10
Data:	0A000000

On the right, select when to transfer the added command when switching states

☐ Init -> PreOp
☒ PreOp -> SafeOp
☐ SafeOp -> PreOp
☐ SafeOp -> Op
☐ Op -> SafeOp

Click "Add" Adding is complete by clicking on a letter symbol; you can also click on a transmission command in the display window, right-click and select the "Append" command to add it;

The screenshot shows the 'Startup Diagnosis History' tab. The main table has columns: Transition, Address, Data, and Comment. The first row shows a transition from 'PS' to 'PS' with address 'CoE[60B0:00]' and data '0A000000'. The comment is 'Set AX0_PositionOffset_132'. A circled '5' is next to the data field. On the right, a list of parameters is shown, with '609A-AXO HomeAccel U32' highlighted. A circled '1' is next to it. Below the table, there's a form to add a new command. The form has fields for Comment, Index, Sub-Index, Data Type, Value, and Data. The 'Index' field is circled '2'. To the right of the form, there's a legend for the 'Show' section with four items: 'EtherCAT boot-up', 'EtherCAT start', 'CoE (Basic)', and 'CoE (SM/PDO)'. A circled '4' is next to the legend. A circled '3' is next to the 'Add' button.

Clicking on a command in the display window will execute "Append...";

"Up..." "Down..." "Remove..."

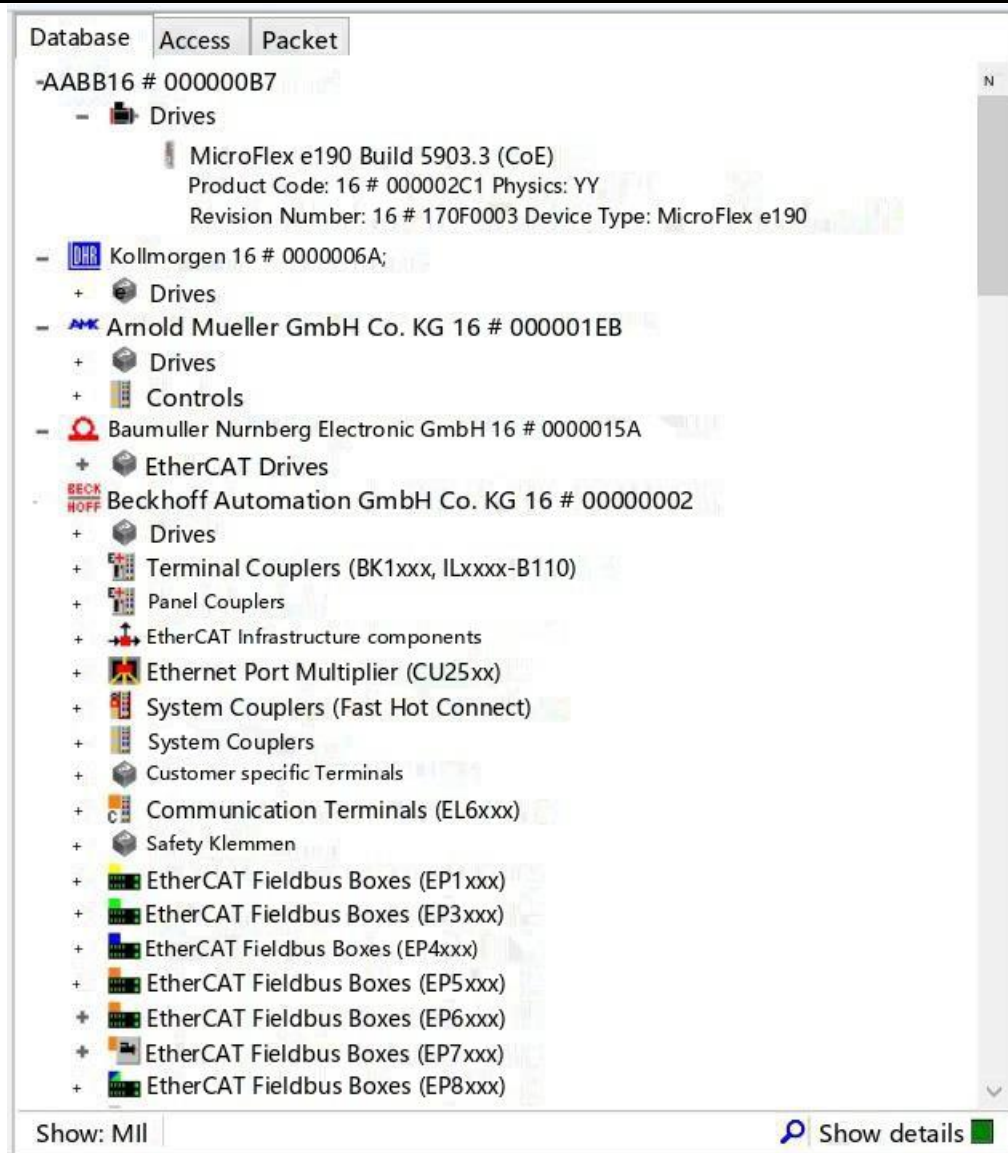
General Process Data Startup Diagnosis History			
Transition	Address	Data	Comment
PS	CoE [5002:00]	0100	Give EtherCAT Control
PS	CoE6060: 00]	08	ModesOfOperation 8 (Cyclic Synchronous Posit)
PS	[6000: 00]	0A000	Offset 132

Append...
Up...
Down...
Remove...

4) Diagnosis History – Diagnosis history

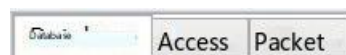
6.4.5 Slave Information Panel

The slave information panel mainly consists of a tool option bar, a display window, a search box, and function options;



6.4.5.1 Tool Option Bar

Includes "Database", "Access", and "Packet" options;



- 1) The "Database" section displays a list of available ESI files used to build the project configuration.



Right-clicking on a slave in the pane will open the xml file;

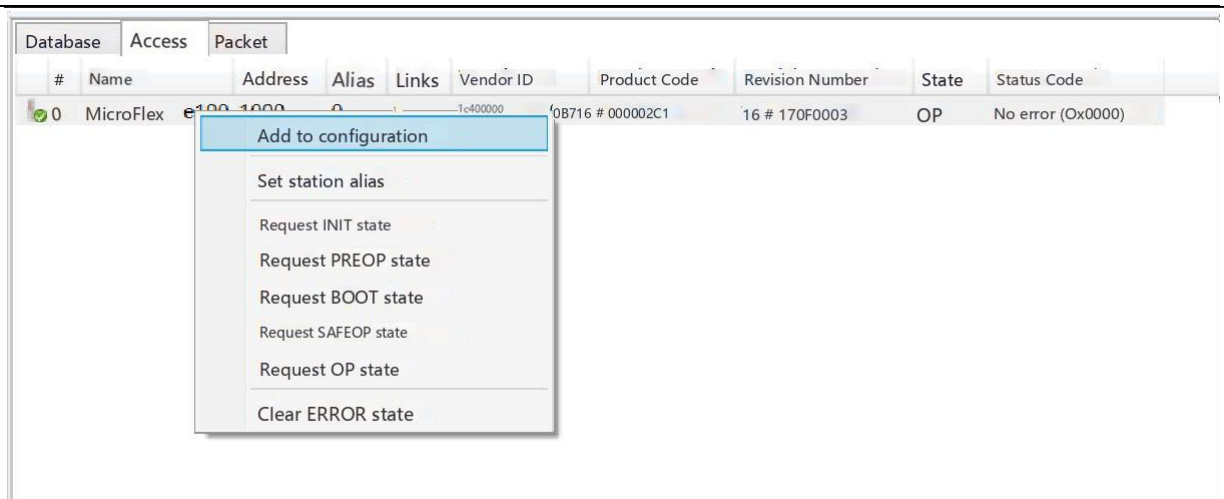


2) Access "displays the information of the slave stations that have completed scanning.

Database	Access	Packet								
#	Name	Address	Alias	Links	Vendor ID	Product Code	Revision Number	State	Status Code	
1	EK1100	1001	0	2	16 # 0000000216 # 044C2C5216 # 00120000	16 # 0000000216 # 07113052	16 # 00120000	OP	No error (0x0000)	
2	EL1809	1002	0	2	16 # 0000000216 # 0AF9305216 # 00120000	16 # 00110000	OP	No error (0x0000)		
3	EL2809	1003	0	2	16 # 0000000216 # 04562C52	16 # 00110000	OP	No error (0x0000)		
4	EK1110	1004	0	1	16 # 0000000216 # 04562C52	16 # 00110000	OP	No error (0x0000)		

- Name - The current name of the slave station. It can be changed
- Address - The EtherCAT address of the current slave station
- Vendor ID - The identifier of the slave vendor
- Product Code - Subsite Product Code;
- Revision Number – Slave Version Number
- State - The current state of the slave station, which corresponds to the state of the master station
- State Code – Slave status code

Right-clicking the mouse in the display window will bring up the following dialog box:

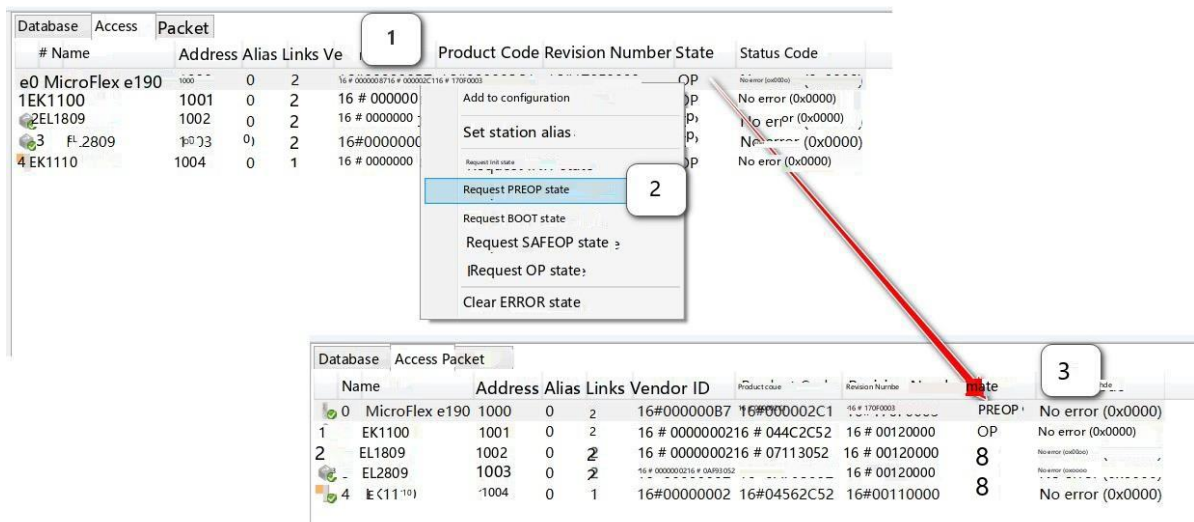


- Add to configuration - Current slave name. It can be changed.
- Set station alias - the EtherCAT address of the current slave station
- Request - Request status, displaying the information required for the slave user's status

The requested state can be changed using buttons, each button requests its own state;

For example, in the "Running" state, select slave station 1 to request OP → PREOP state switch;

6.4.5.2 Search Box



- Clear ERROR state – Clear error messages in the slave user state

Find the specified slave in the slave information tree. Enter the specified slave name in the search window;



6.4.5.3 Function Options

Selecting "Show details" will display detailed information about the slave device, including Product Code, Revision Number, etc.



6.4.5.4 Adding an ESI File

How to add a new ESI file to the slave information panel:

- 1) Open the ESI folder under the installation path: C:\Program Files (x86)\EtherCAT\Configure Studio\ProESI; 2) Copy and paste the ESI files into the folder, then close the folder;
- 3) Click the "Refresh Database" button "🔄" in the toolbar. The added ESI file will appear in the "Database" pane and can be used for configuration.

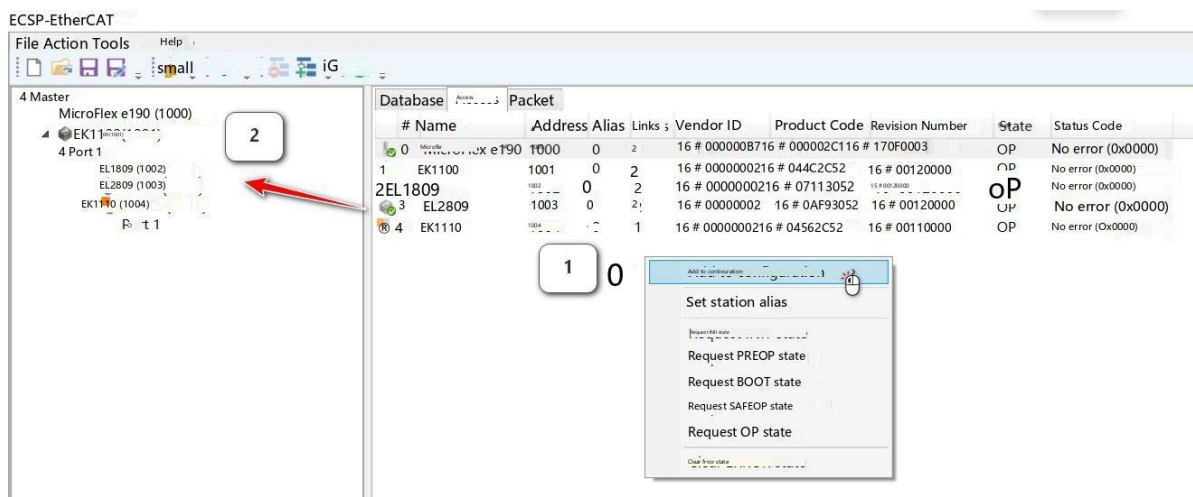
Set Master.

6.4.5.5 Add a Slave to the Configuration Panel

This can be achieved in two

ways; 1) Automatic addition

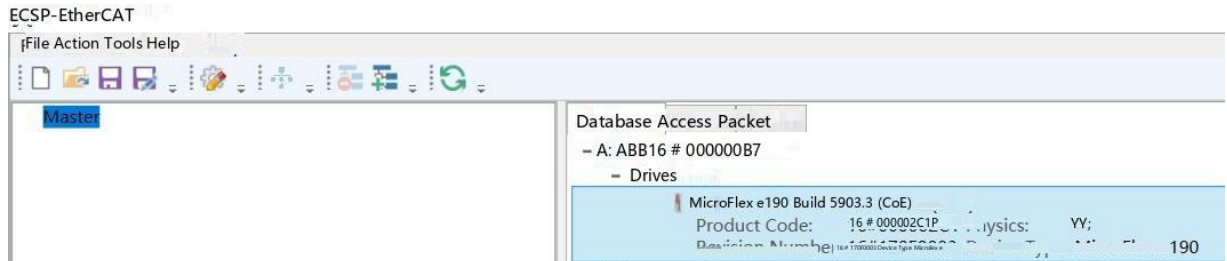
Right-click in the display window to bring up the dialog box, select "Add to configuration", and the scanned slave module will be directly added to the configuration panel, as shown in the figure below:



2) Manually Add

Select the slave's ESI file in the slave information panel, hold down the left mouse button and drag it to the configuration panel. When it is close to a releaseable slave, the insertable interface will be marked with a blue

background and display "  ". You can release the mouse. If it displays "  ", it is an illegal placement;



6.4.6 Output Message Window

The message window displays messages from the ECSP-EtherCAT configuration software.

Message			
	Time	Message	
Information	2022-01-04 17:17:59	Enter "Disabled" mode	
Information	2022-01-04 17:17:02	Mode changed to "Running"	
Error	2022-01-04 17:16:26	Disable communication failed	
Error	2022-01-04 17:16:25	Lost connection to controller	
Error	2022-01-04 17:16:09	Start running mode failed	

The message types displayed in the tabs are as follows:

- Error - Fault occurrence and its description;
- Information - Any type of information or prompts provided to the user. The tab contains the following message information:
 - Time - the time when the message appears;
 - Message - Message text.

You can perform the same operation by clicking the Clear command on the shortcut menu.

Message		
	Time	Message
Information	2022-01-04 17:17:59	Enter "Disabled" mode
Information	2022-01-04 17:17:02	Mode chanaed to "Running"
Error	2022-01-04 17:16:26	Clear ion failed
Error	2022-01-04 17:16:25	Lost connection to controller
Error	2022-01-04 17:16:09	Start running mode failed
Error	7027 n1 04 17 1 E 0	ctatin md failod

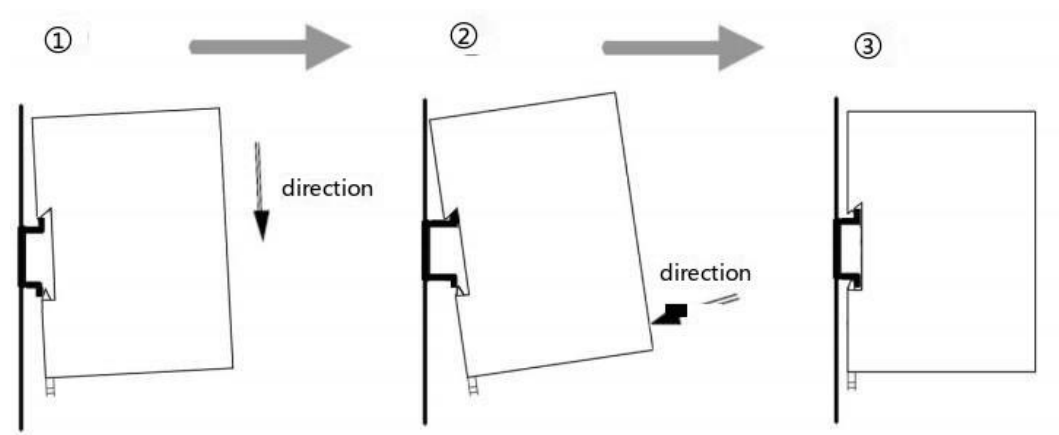
7 Installation

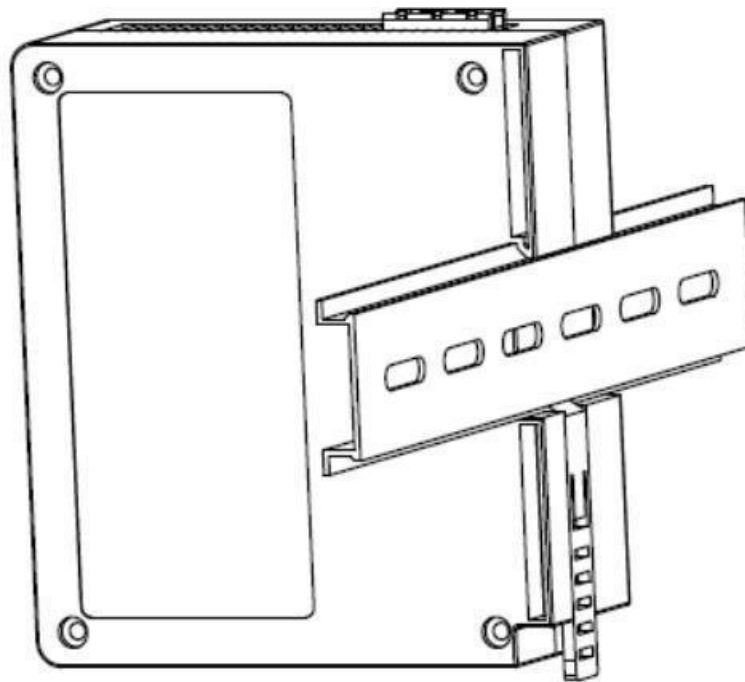
7.1 Mechanical Dimensions

Dimensions: 40mm (width) × 110mm (height) × 74mm (depth)

7.2 Installation Method

35mm DIN rail mounting





8 Operation, Maintenance and Precautions

- The module must be protected from heavy pressure to prevent damage;
 - The module must be protected from heavy impact to prevent damage to components;
 - The power supply voltage must be controlled within the range required by the instruction manual to prevent internal components from burning out;
 - The module must be protected from water to prevent damage to internal components;
 - Please check the wiring before powering on to prevent incorrect connection and damage to the module.
-