

EX Series Adapter

User Manual

DECOWELL Industrial Intelligence makes reliable partners



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Preface

■ Document Overview

Thank you for purchasing the DECOWELL EX Series slice I/O modules.

The EX Series slice I/O modules are distributed expansion modules developed by DECOWELL. This series consists of adapters, I/O modules, power modules, and end modules. The adapters support multiple communication buses, such as PROFINET, EtherCAT, DeviceNet, Modbus RTU, and PROFIBUS-DP. The I/O modules include digital input modules, digital output modules, analog input modules, analog output modules, and function modules. Users can configure these modules according to specific application requirements.

The EX-1121 is an EtherNet/IP bus adapter. Each adapter supports the expansion of up to 32 I/O modules.

This manual mainly describes the specifications, features, and usage methods of this module. Please read it carefully before use to use this product more clearly and safely.

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Safety Precautions

■ Security Statement

1. Before installing, operating, or maintaining the product, please read and comply with these safety precautions.
2. To ensure personal and equipment safety, follow all safety labels on the product and all safety instructions contained in this manual during installation, operation, and maintenance.
3. The “Note”, “Caution”, “Warning”, and “Danger” statements in this manual do not represent all safety precautions that should be observed; they are supplementary to the overall safety requirements.
4. This product must be used under conditions that meet the specified design requirements. Failure to meet these conditions may result in malfunction. Functional abnormalities or component damage caused by non-compliance are not covered by the product warranty.
5. DECOWELL assumes no legal liability for personal injury, property damage, or other losses caused by improper or unauthorized operation of the product.

■ Security level definition



Note

Indicates additional information or explanations that supplement the operating instructions.



Caution

Indicates a hazardous situation that may result in minor to moderate personal injury or equipment damage if not operated as instructed.



Warning

Indicates a hazardous situation that may result in serious personal injury or death if not operated as instructed.

Warning — During Control System Design

01. When applying this system, please be sure to design a safety circuit to ensure that the control system can still operate safely when the external power supply fails or the expansion module malfunctions.
02. If the output circuit experiences prolonged overcurrent due to exceeding the rated load current or a load short circuit, the module may smoke or catch fire. External safety devices such as fuses or circuit breakers should be installed.

Caution — During Control System Design

01. It is essential to install an emergency braking circuit, a protection circuit, an interlock circuit for forward and reverse operation, and upper and lower limit interlock switches to prevent machine damage in the external circuit of the expansion module;
02. To ensure the safe operation of the equipment, please design external protection circuits and safety mechanisms for output signals related to major accidents;
03. When the output units of the expansion module, such as relays and transistors, are damaged, their outputs cannot be controlled to be in the ON or OFF state;

Caution — During Installation

01. During installation, prevent metal shavings and wire ends from falling into the module's ventilation holes, as this may cause fire, malfunction, or misoperation;
02. After installation, ensure that there are no foreign objects on its ventilation surface, otherwise it may cause poor heat dissipation, resulting in fire, malfunction, or misoperation;
03. During installation, ensure that the module is securely connected to its respective connector and that the module connection hooks are firmly locked. Improper module installation may lead to malfunctions, failures, or detachment.

Warning — During Installation

01. Only professional maintenance personnel who have received relevant electrical equipment training and possess sufficient electrical knowledge can install this product;

02. When installing or removing modules, all external power supplies to the system must be completely disconnected before proceeding. Failure to disconnect the power supply may result in electric shock, module malfunction, or accidental operation.

03. Do not use the module in the following locations: places with dust, fumes, conductive dust, corrosive gases, or flammable gases; places exposed to high temperatures, condensation, or wind and rain; places subject to vibration or impact. Electric shock, fire, or misoperation may also cause product damage and deterioration.

1. Product Information

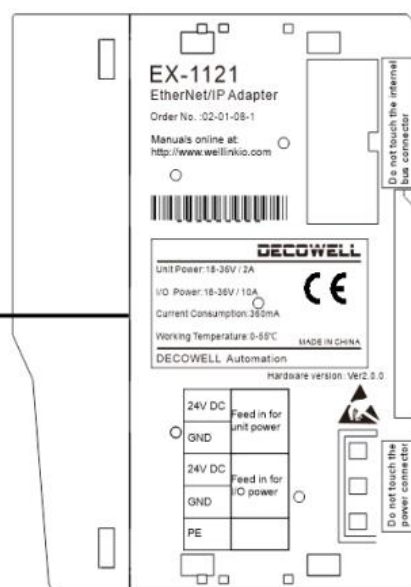
1.1 Product Naming and Nameplate

EX-1121

①

②

NO.	Name	Explanation and definition
①	EX series	Card type IO
②	Bus adapter	EtherNet/IP bus adapter

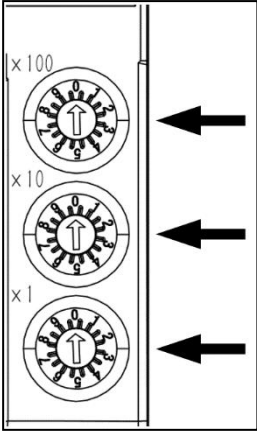


1.2 Component Description



NO.	Function definition			
①	SYS	System indicator lights	1Hz Flashing (green)	Communication Normal
			5Hz Flashing (green)	I/O Slave Lost or Factory Reset Button Detected
			ON	Factory reset completed
	UNIT PW R	System power indicator	ON (green)	System power supply normal
			OFF	System power supply not connected or faulty
	IO PW R	IO power indicator	ON (green)	IO power supply normal
			OFF	IO power supply not connected or faulty
	MS	Module status indicator	ON (green)	Device Running: Communication Normal
			1Hz Flashing (green)	Standby: Module not configured
			1Hz Flashing (green-red-green)	Self-test: Module power-on self-test status
			1Hz Flashing (red)	Minor Fault: A Recoverable Fault Has Been Detected
			ON (red)	Major Fault: An Unrecoverable Fault Has Been Detected
			OFF	No Power: Device Not Powered
	NS	Network	ON (green)	Connection Established: IP Address

	status indicator		Configured, At Least One CIP Connection Established, and No Master Connection Timeout
		1Hz Flashing (green)	Connection Not Established: IP Address Configured, No CIP Connection Established, and No Master Connection Timeout
		1Hz Flashing(green-red-green)	Self-Test: Module Power-On Self-Test in Progress
		1Hz Flashing (red)	Connection Timeout: IP Address Configured, Master Connection Timed Out
		ON (red)	Duplicate IP Address: The IP Address Is Already in Use
		OFF	No Power, No IP Address Assigned
	LINK	Network port indicator light	
		ON (green)	Network connection normal
		OFF(green)	Network not connected or abnormal

②	Communication	Input/output ports allow connection to subsequent slave stations.	
③	DIP switch		×100: Hundreds digits of the IP
			×10: Ten digits of the IP address
			×1: Units digit of the IP address
			Notice: Please refer to section 1.5, EX-1121 Adapter IP Address Settings, for IP address configuration.
④	Power port	Adapter input power (1L+, 1M) / IO module input power (2L+, 2M)	

1.3 Technical Specifications

Basic parameters	
External dimensions	90×67×34mm
Operating temperature	-20-55℃
Storage temperature	-40～85℃
relative humidity	95% non-condensing
Protection level	IP20
Wiring specifications	0.2～1.5mm ²
Wiring method	Straight-through spring connector
Power parameters	
System-side power input	24VDC (±25%)
Current is supplied on the system side	2A(Max)
IOPort-side power input	24VDC (±20%)
IOPort-side output current	10A (Max) 5A at High Temperature
System-side electrical isolation	AC500V
Power protection	Overcurrent protection, overvoltage protection, reverse connection protection
Software parameters	
Minimum communication cycle	5ms
Address settings	Based on the master station
Extended I/O quantity	32
Maximum input/output bytes	Input: 504 Byte/Output: 504 Byte
Communication rate	100Mbps

Transmission distance	100m (distance between stations)
-----------------------	----------------------------------

1.4 Environmental Specifications

Environmental parameters	
Operating temperature	-20~55℃
Operating humidity	95% non-condensing
atmosphere	≥795 hPa (altitude ≤ 2000 m) as per IEC 61131-2
Storage temperature	-40~+85℃
Overvoltage category	I



Notice

- When the controller is connected to the EX-1121 through an Ethernet switch, it is recommended to use a standard industrial Ethernet switch to prevent communication issues caused by the switch or network.
- Some Ethernet switches support BSP and QoS functions, which can help mitigate network interference in certain environments. If Ethernet switches are connected in a cascaded topology, the BSP function must be enabled.

1.5 EX-1121 Adapter IP Address Setting

The EX-1121 adapter DIP switch definitions are as follows:

① Setting the IP Address via BOOTP

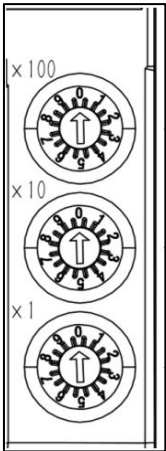
Before powering on the adapter, ensure that all three rotary switches are set to 0.

Open the I/O Tester Tool and click Scan Device to search for the EX-1121 adapter through the Ethernet port. Double-click the EX-1121 adapter that requires IP configuration, enter the desired IP address, and apply the settings. Once the configuration is complete, the software will display a confirmation message indicating that the IP address has been successfully set.

Note: When setting the IP address via BOOTP for the first time, all three rotary switches must be set to 0. Before use, configure the PC's Ethernet adapter with a static IP address in the same subnet as the IP address to be assigned to the EX-1121.

② Setting the IP Address via Switches

To set the IP address using the rotary switches, ensure that the combined value of the first three rotary switches is not 0 (valid range: 1–254) before powering on.

DIP switch		×100: Hundreds digits of the IP address
		×10: Ten digits of the IP address
		×1: Units digit of the IP address
		Note: The default network segment of the EX-1121 is 192.168.0.X. The IP address is set via DIP switches. For example, to configure the IP address as 192.168.0.195, set the hundreds digit to 1, the tens digit to 9, and the units digit to 5. When the combined value exceeds 255, the Module Status (MS) indicator flashes red.

When configured in this mode, the first three octets of the IP address are fixed as

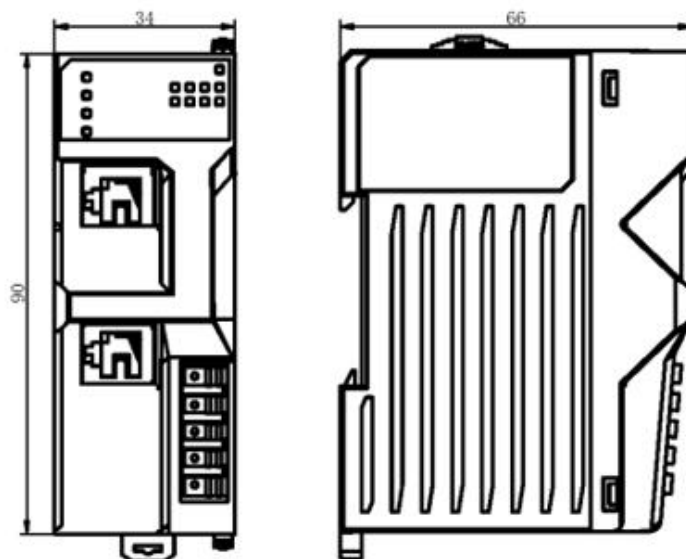
192.168.0.X, and the value set by the rotary switches determines the **last octet** of the IP address.

If an IP address has already been assigned via **BOOTP**, switching to rotary switch mode retains the **upper three bytes** of the BOOTP-assigned IP address, while the **lowest byte** is replaced by the value set on the rotary switches.

2. Mechanical installation

2.1 Installation Dimensions

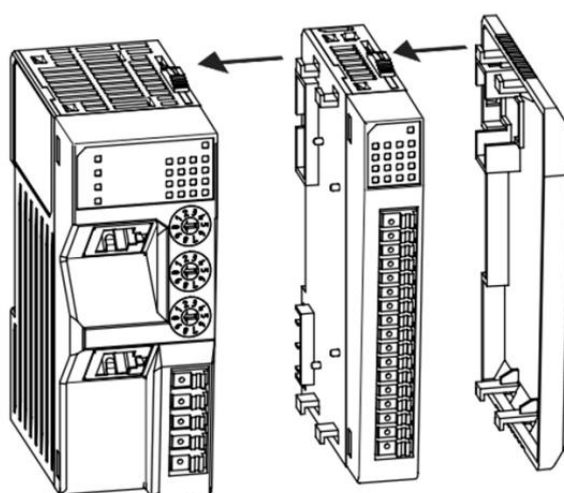
The installation dimensions are shown in the figure below, in meters.m).



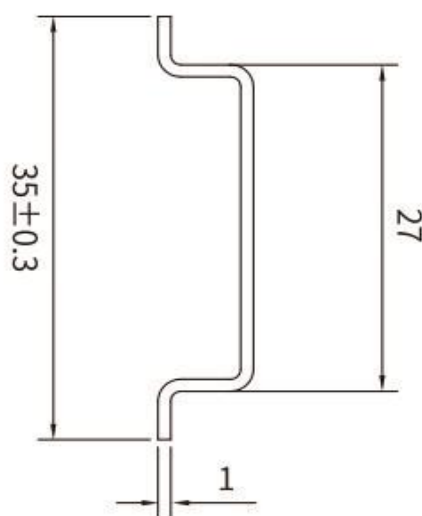
2.2 Installation Method

2.2.1 Installation between modules

Module assembly is achieved through the top and bottom of the modules. Buckle To install, see the image below.



The module is mounted using a DIN rail. The DIN rail must conform to IEC 60715 standard (35mm wide, 1mm thick). Dimension information is required..



Note: When the module is installed on a non-recommended DIN35 rail, the DIN rail latch may not lock properly. Before installing the module, First, open the lower latch of the module. Then proceed to the next step of the installation.

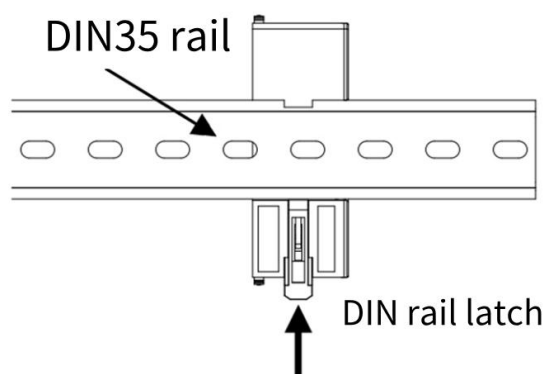
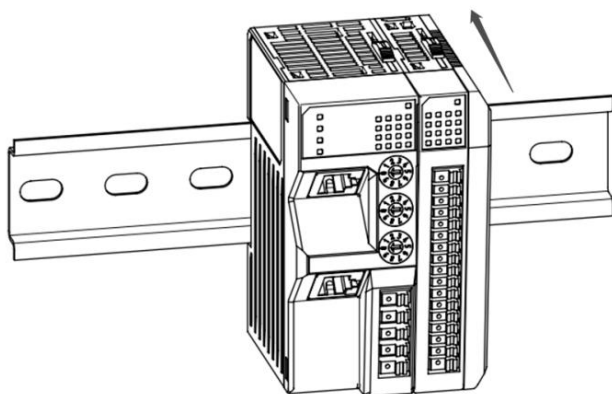


Caution

- Installing this product on a DIN rail other than the recommended type (especially a DIN rail with a thickness of ≤ 1.0 mm) may cause the DIN rail locking mechanism to fail, preventing the product from being securely mounted and resulting in improper operation.

2.2.2 Mounting on the guide rail

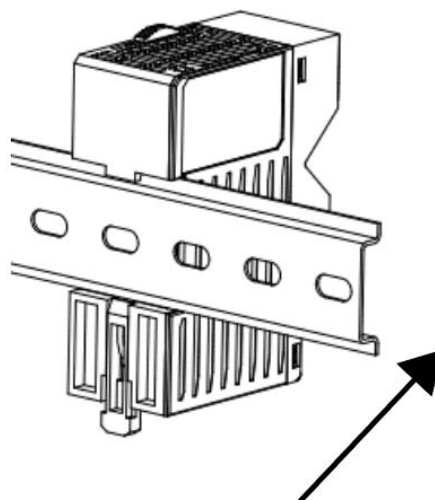
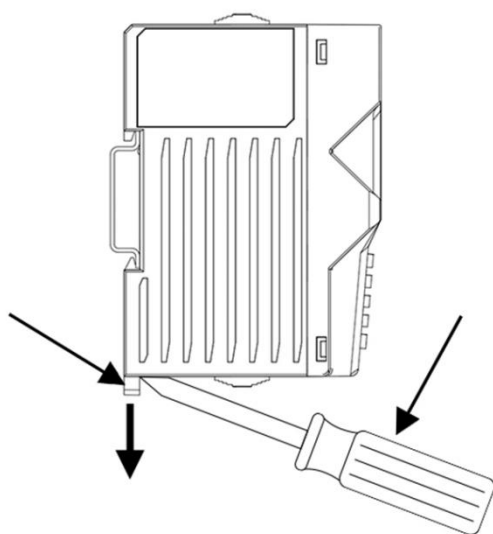
During installation, align the module with the DIN35 guide rail and press the module in the direction shown by the arrow, as shown in the figure below.



Note: After the module is installed, press the top of the DIN rail latch upward by hand to ensure that it is fully engaged and the module is securely mounted.

Removal:

Use a flat-blade screwdriver or a similar tool to pry the DIN rail latch downward, then pull the module away from the 35 mm DIN rail to remove it.



3. Electrical installation

3.1 Cable selection

EtherNet/IP bus communication uses shielded network cables for data transmission, eliminating short circuits, misalignments, and poor connections. The cable length between devices should not exceed 100 meters; exceeding this length will cause signal attenuation and affect normal communication. The following cable specifications are recommended:

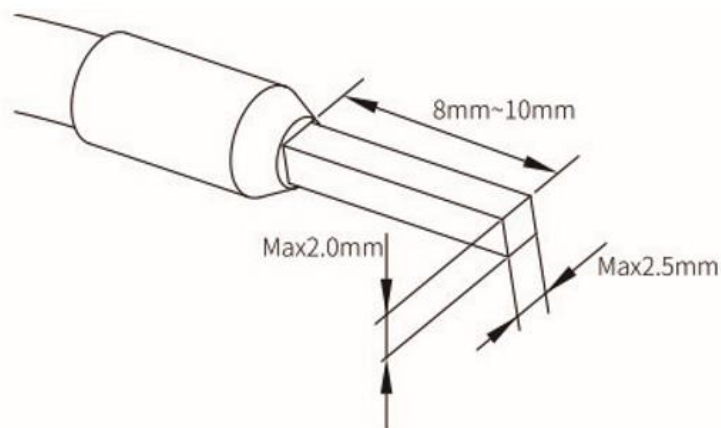
Name	Function definition
Cable type	Flexible crossover cable, S-FTP, 5Class Line
Standards to be met	EIA/TIA568A, EN50173, ISO/IEC11801 EIA/TI A bulletin TSB, EIA/TIA SB40-A&TSB36
conductor cross-section	AWG26
Wire type	Twisted pair
Line Pair	4

Power-related cables The wire diameter in the table below is for reference only.

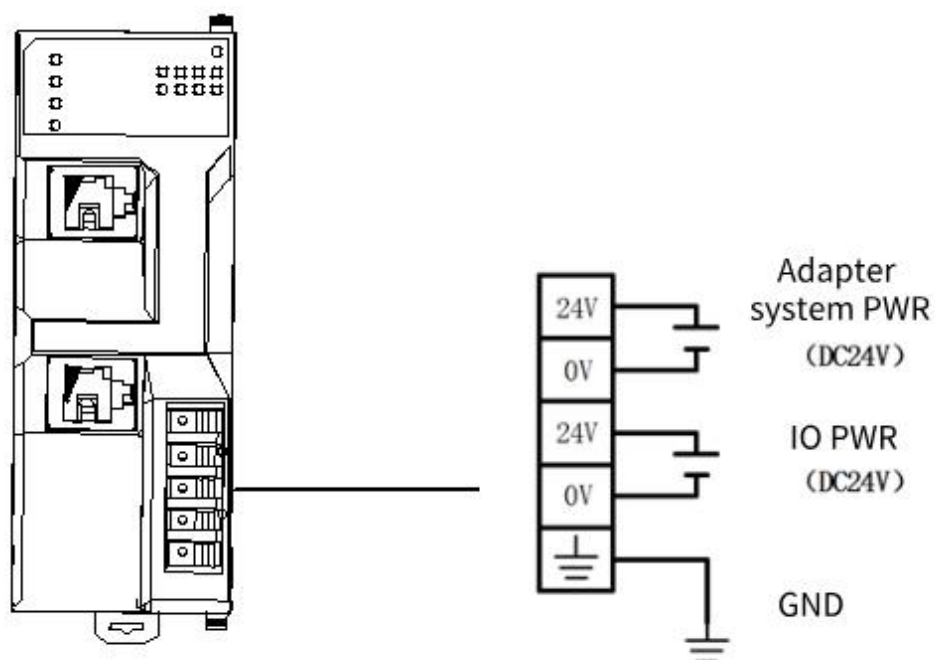
Adjustments should be made based on actual usage and calculations.

Name	Compatible wire diameter	
tubular wire lug	National Standard/mm ²	American Standard/AWG
	0.75	18
	1.0	18
	1.5	16

The required shape and dimensions of the crimp terminal are shown in the figure below.



3.2 Terminal wiring

**Notice**

- The adapter module's grounding terminal needs to be directly grounded to prevent interference with the I/O module signals.
- The EX series power supplies are divided into system power and I/O power. To avoid interference with the system, it is recommended to connect two sets of power lines from the same DC24V power module to the adapter's system power and I/O power respectively.

4. Adapter configuration case

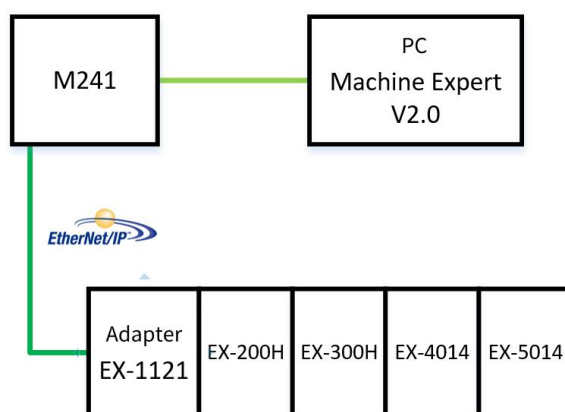
4.1 Machine Expert and EX-1121 Connection and Configuration

Notice:

- ① The EX-1121 supports two operating modes: Special Mode and Normal Mode. Special Mode is intended for use only with KEYENCE CPUs. The factory default is Normal Mode.
- ② The EX-1121 is shipped in BOOTP mode by default and has no IP address assigned. For IP address configuration, refer to Section 1.5, "EX-1121 Adapter IP Address Configuration."
- ③ In Normal Mode, configure the EtherNet/IP input/output byte length according to the I/O modules connected to the right side of the EX-1121:
 - If only input modules are connected, set the Output (O→T) byte length to 1 byte.
 - If only output modules are connected, set the Input (T→O) byte length to 1 byte.
 - If no I/O modules are connected, set both the Input (T→O) and Output (O→T) byte lengths to 1 byte.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
EX-1121	1	1
EX-1121 EX-200H	2	1
EX-1121 EX-300H	1	2
EX-1121 EX-200H EX-300H	2	2

1. Communication Connection Diagram



2. Hardware Configuration

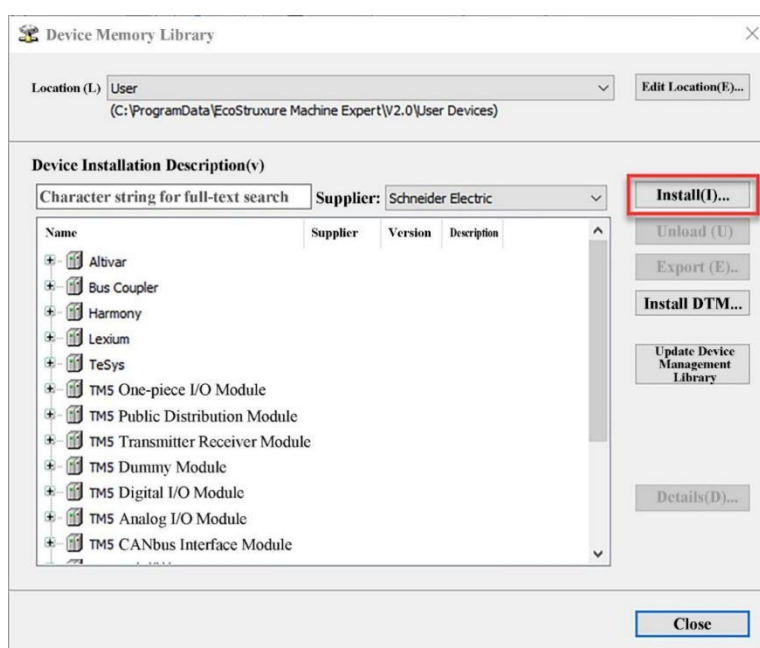
Hardware	Quantity	Remark
PC	1	Install Machine Expert V2.0
PLC	1	M241
EX-1121	1	EtherNet/IP adapter
EX-200H	1	Digital input module
EX-300H	1	Digital output module
EX-4014	1	Analog input module
EX-5014	1	Analog output module

3. IP address settings

Please refer to Section 1.5, EX-1121 Adapter IP Address Settings, for IP address configuration.

4. Install EDS files

Open Machine Expert V2.0 programming software, select "Tools" > "Device Repository" in the menu bar, select "Install" in the Device Repository window, select "EX-1121_V1.1" under the EDS folder and confirm the installation.

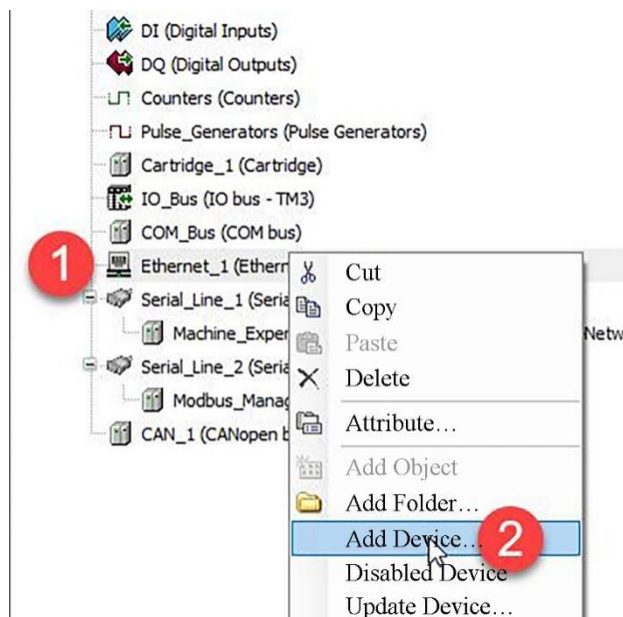


Installing EDS files

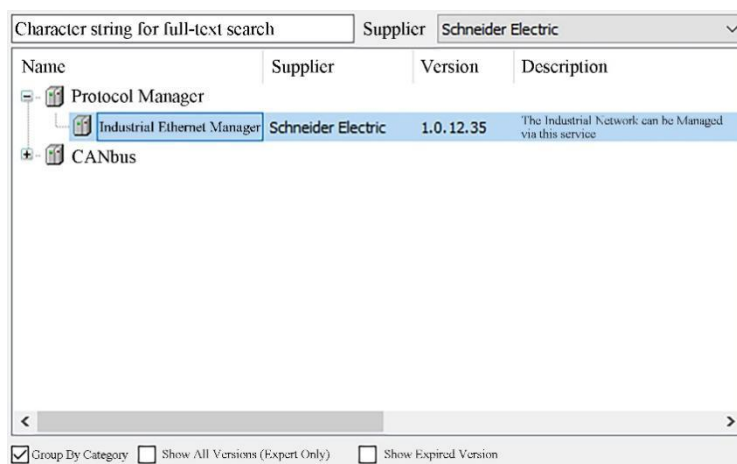
5. Configuration of new construction projects and equipment

Open Machine Expert V2.0, create a project, and right-click "EtherNET_1" in the device tree and select "Add Device".

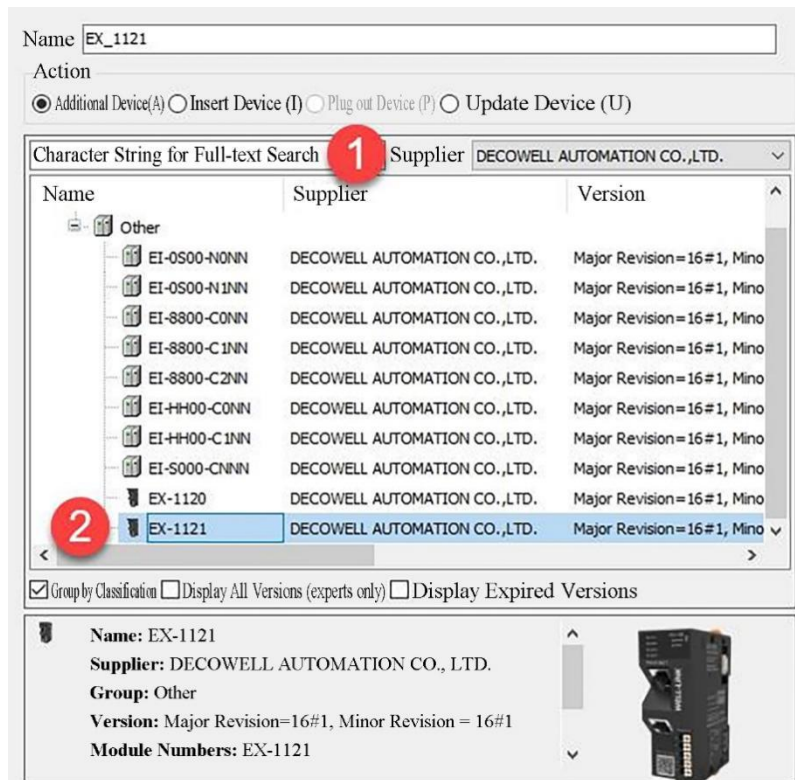
In the Add Device window, select "Protocol Manager" > "Industrial Ethernet Manager", Right-click "_(Industrial Ethernet Manager)" under the device tree > "Add Device". In the device window, select "DECOWELL AUTOMATION CO.,LTD" as the vendor and "EX-1121" as the device catalog.



Adding a device

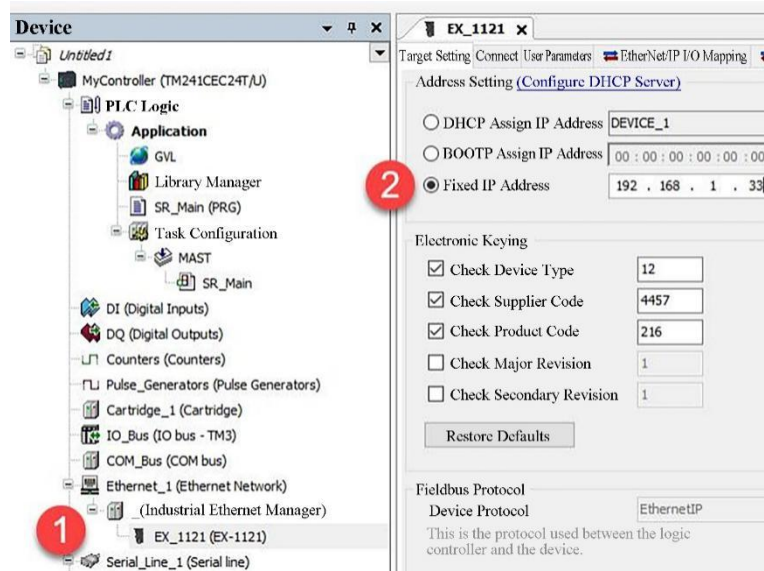


Adding an Industrial Ethernet Manager



Add EX-1121

Configure the EX-1121 parameters by double-clicking "EX-1121" in the device tree and configuring the IP address to a static IP address.

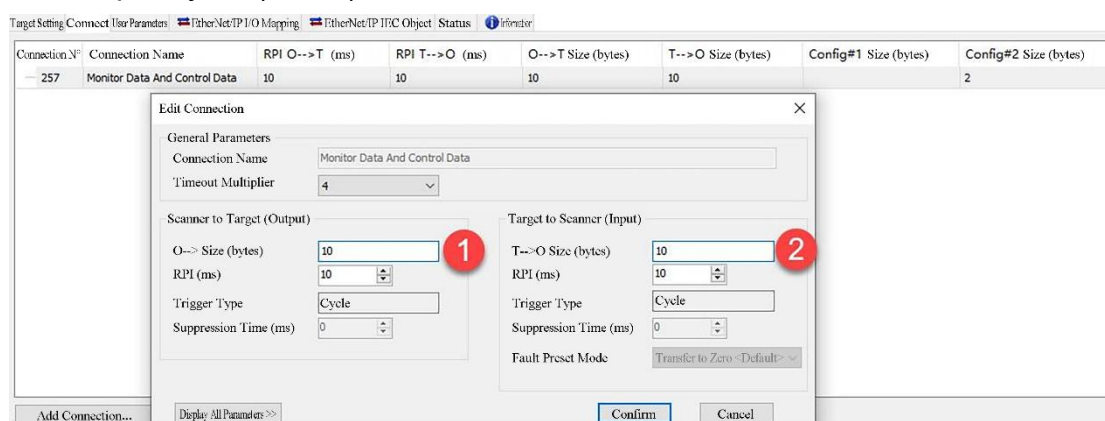


Configuring IP Address

Number of bytes occupied by the calculation module:

Module model	Quantity	Input/output types	Occupied bytes
EX-2xx8	1	Input (T- >O)	2
EX-2xxH	1	Input (T- >O)	2
EX-2xxS	1	Input (T- >O)	4
EX-3xx8	1	Output (O- >T)	2
EX-3xxH	1	Output (O- >T)	2
EX-3xxS	1	Output (O- >T)	4
EX-4xx4	1	Input (T- >O)	8
EX-4xx8	1	Input (T- >O)	16
EX-5xx4	1	Output (O- >T)	8
EX-5xx8	1	Output (O- >T)	16

Configure the connection parameters. Double-click the default connection parameters and configure the size in the edit connection window to 10 bytes for output bytes (O-->T) and 10 bytes for input bytes (T-->O).



Configuring Input/Output Byte Size

View the IO address mapping.

Variable	Mapping	Channel	Address	Type	Default Value	Unit	Description
		Input Monitor Data And Control Data	%IW7	ARRAY [0..4] OF WORD			
		Input Monitor Data And Control Data[0]	%IW7	WORD			
		Input Monitor Data And Control Data[1]	%IW8	WORD			
		Input Monitor Data And Control Data[2]	%IW9	WORD			
		Input Monitor Data And Control Data[3]	%IW10	WORD			
		Input Monitor Data And Control Data[4]	%IW11	WORD			
		Output Monitor Data And Control Data	%QW2	ARRAY [0..4] OF WORD			
		Output Monitor Data And Control Data[0]	%QW2	WORD			
		Output Monitor Data And Control Data[1]	%QW3	WORD			
		Output Monitor Data And Control Data[2]	%QW4	WORD			
		Output Monitor Data And Control Data[3]	%QW5	WORD			
		Output Monitor Data And Control Data[4]	%QW6	WORD			

I/O Address Mapping

The physical address allocation corresponding to the actual module in the case study:

Notice: In actual hardware, the EX-1121 adapter is configured with the same number and model of IO modules, but the order of the modules is different, and the physical address allocation of the modules is also different, the following three layout options are provided for your reference.

Adapter EX-1121	EX-200H	EX-300H	EX-4014	EX-5014
--------------------	---------	---------	---------	---------

IW0 QW0 IW1 QW1
 IW2 QW2
 IW3 QW3
 IW4 QW4

Adapter EX-1121	EX-4014	EX-5014	EX-200H	EX-300H
--------------------	---------	---------	---------	---------

IW0 QW0 IW4 QW4
 IW1 QW1
 IW2 QW2
 IW3 QW3

Adapter EX-1120	EX-4014	EX-5014	EX-2008	EX-3008
--------------------	---------	---------	---------	---------

IW0 QW0 IW4 QW4
 IW1 QW1
 IW2 QW2
 IW3 QW3

Note: An 8-channel digital input/output module occupies one word. The address of the 8-channel module uses the 8 bits corresponding to the low byte of the physical address.

In the EtherNet/IP I/O mapping, select "Enable 2 (Always in Bus Cyclic Task)" for the continuously updating variable, download the program to the PLC, and monitor the PLC's running status and I/O mapping address.

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
Monitor Data And Contr...								
		Input Data	%IW0	UINT	1			
		Bit0	%IX0.0	BOOL	TRUE			
		Bit1	%IX0.1	BOOL	FALSE			
		Bit2	%IX0.2	BOOL	FALSE			
		Bit3	%IX0.3	BOOL	FALSE			
		Bit4	%IX0.4	BOOL	FALSE			
		Bit5	%IX0.5	BOOL	FALSE			
		Bit6	%IX0.6	BOOL	FALSE			
		Bit7	%IX0.7	BOOL	FALSE			
		Bit8	%IX1.0	BOOL	FALSE			
		Bit9	%IX1.1	BOOL	FALSE			

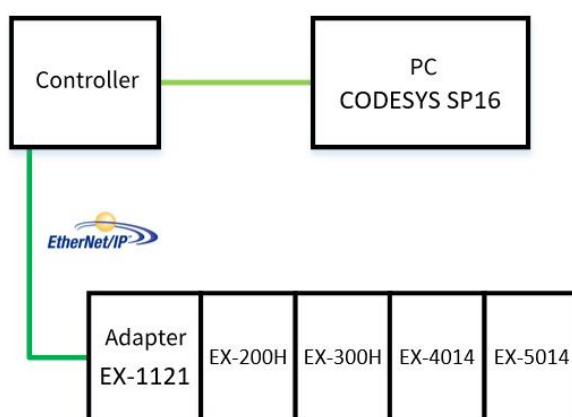
4.2 CODESYS and EX-1121 Connection and Configuration

Notice:

- ① The EX-1121 supports two operating modes: Special Mode and Normal Mode. Special Mode is intended for use only with KEYENCE CPUs. The factory default is Normal Mode.
- ② The EX-1121 is shipped in BOOTP mode by default and has no IP address assigned. For IP address configuration, refer to Section 1.5, "EX-1121 Adapter IP Address Configuration."
- ③ In Normal Mode, configure the EtherNet/IP input/output byte length according to the I/O modules connected to the right side of the EX-1121:
 - If only input modules are connected, set the Output (O→T) byte length to 1 byte.
 - If only output modules are connected, set the Input (T→O) byte length to 1 byte.
 - If no I/O modules are connected, set both the Input (T→O) and Output (O→T) byte lengths to 1 byte.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
EX-1121	1	1
EX-1121 EX-200H	2	1
EX-1121 EX-300H	1	2
EX-1121 EX-200H EX-300H	2	2

1. Communication Connection Diagram



2. Hardware Configuration

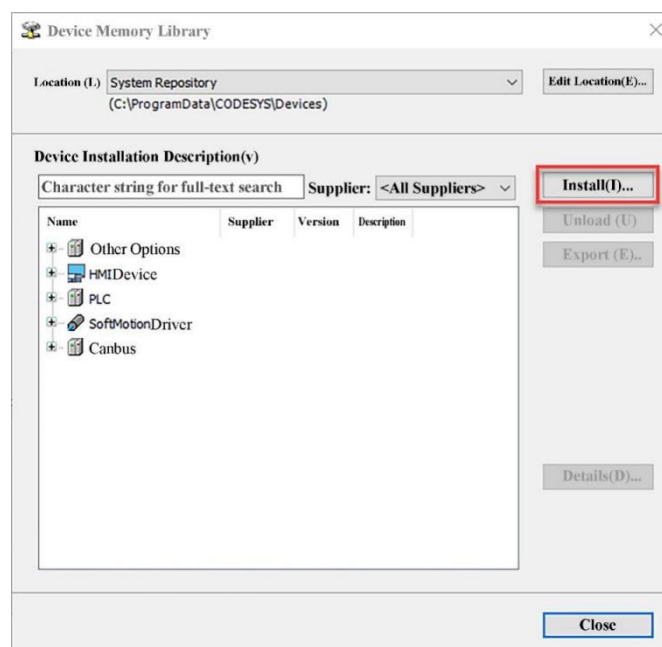
Hardware	Quantity	Remark
PC	1	Install CODESYS SP16
Controller	1	ODESYS Control Win V3 x64
EX-1121	1	EtherNet/IP adapter
EX-200H	1	Digital input module
EX-300H	1	Digital output module
EX-4014	1	Analog input module
EX-5014	1	Analog output module

3. IP address settings

Please refer to Section 1.5, EX-1121 Adapter IP Address Settings, for IP address configuration.

4. Install EDS files

Open the CODESYS SP16 programming software, select "Tools" > "Device Repository" in the menu bar, select "Install" in the Device Repository window, select "EX-1121_V1.1" under the EDS folder and confirm the installation.



Installing EDS files

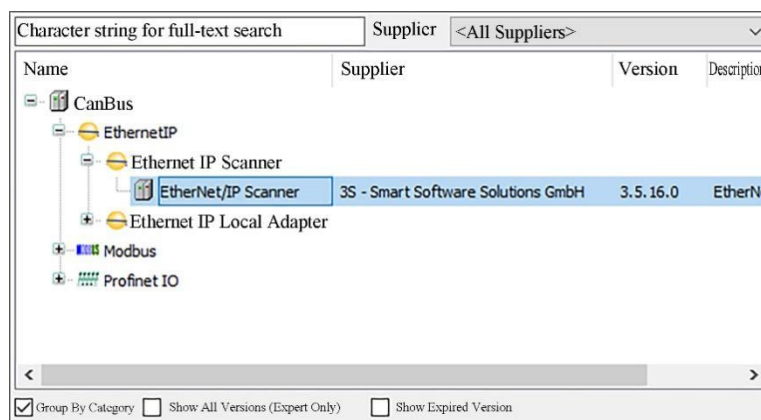
5. Configuration of new construction projects and equipment

Open CODESYS SP16, create a project, and right-click "Device" in the device tree and select "Add Device". In the Add Device window, select "Ethernet".

Right-click in the device tree, select "Ethernet", then select "Add Device". In the Add Device window, select "EtherNet/IP Scanner".

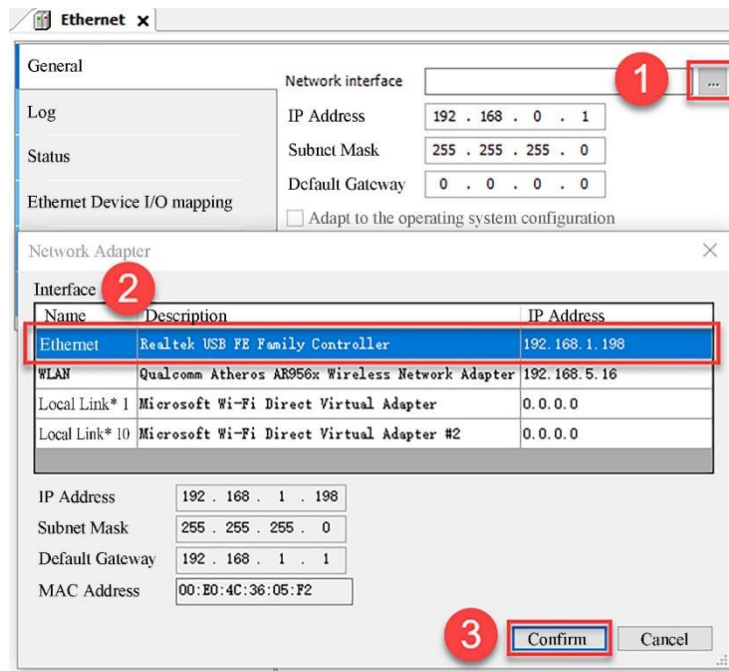


Adding an Ethernet adapter



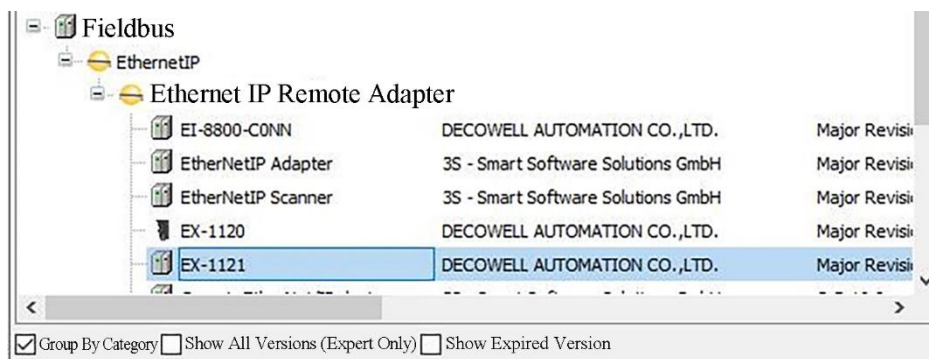
Adding an Ethernet IP Scanner

To configure the network card of the Ethernet adapter, double-click "Ethernet" in the device tree, open the page and select the network card that needs to communicate with the EtherNet/IP slave.



Network interface card with Ethernet adapter configured

Right-click "EtherNet_IP_Scanner" under the device tree and select "Add Device". In the Add Device window, select "EX-1121".



Adding the EX-1121 adapter

Configure the IP address of the EX-1121 adapter. Double-click "EX_1121" in the device tree and enter the IP address (the IP address here must be consistent with the actual module setting).

EX_1120 x

General

Link

Component

User Parameters

Log

EtherNet/IP Parameters

EtherNet/IP I/O Mapping

EtherNet/IP IEC Object

Status

Address Setting

IP Address 192 . 168 . 1 . 33

EtherNet/IP™

Electronic Keying

☐ Compatibility check

Vendor ID 4457 ☒ Check Supplier Code

Device type 12 ☒ Check Device Type

Product code 214 ☒ Check Product Code

Major revision 1 ☒ Check major revisions

Minor revision 1 ☐ Check minor revisions

Configuring the IP Address of the EX-1121 Adapter

Number of bytes occupied by the calculation module:

Module model	Quantity	Input/output types	Occupied bytes
EX-2xx8	1	Input (T- >O)	2
EX-2xxH	1	Input (T- >O)	2
EX-2xxS	1	Input (T- >O)	4
EX-3xx8	1	Output (O- >T)	2
EX-3xxH	1	Output (O- >T)	2
EX-3xxS	1	Output (O- >T)	4
EX-4xx4	1	Input (T- >O)	8
EX-4xx8	1	Input (T- >O)	16
EX-5xx4	1	Output (O- >T)	8
EX-5xx8	1	Output (O- >T)	16

Configure the input/output byte size of the IO module of the EX-1121 adapter (the input/output byte size needs to be configured according to the actual number of IO modules, otherwise communication will not be possible).

EX_1120 x

General

Connect

Component

User Parameters

Log

EtherNet/IP I/O Mapping

EtherNet/IP IEC Object

Status

Information

Connection Name

RPI(ms) 10

O-->T Size(byte) 504

T-->O Size(byte) 504

Agent Configuration... 2

Target Configuration Size (byte) 2

Edit Connection

General Parameters

Connection Path 20 04 24 96 2C 65 2C 64

Trigger Type Circular

RPI(ms) 10

Transmission Type Proprietary Owner

Timeout Multiplication 4

Scanner to Target (Output)

O-->T Size(byte) 10

Agent Configuration Size 0

Target Configuration Size 2

Connection Type Point to Point

Connection Priority Scheduled

Fixed Amount/Variable Fixed

Transfer Format 32 Bit Operating/Idle

Forbidden Time (ms) 0

Heartbeat multiplier 1

Target to Scanner (Input)

O-->T Size(byte) 10

Connection Type

Connection priority Scheduled

Fixed Amount/Variable Fixed

Transfer Format Pure Data

Forbidden Time (ms) 0

Confirm

Cancel

Configuring the size of input and output bytes

Check the I/O mapping of EtherNet/IP communication.

Variable	Mapping	Channel	Address	Type	Unit	Description
+		Input Data	%IW0	UINT		
+		Input Data	%IW1	UINT		
+		Input Data	%IW2	UINT		
+		Input Data	%IW3	UINT		
+		Input Data	%IW4	UINT		
+		Output Data	%QW0	UINT		
+		Output Data	%QW1	UINT		
+		Output Data	%QW2	UINT		
+		Output Data	%QW3	UINT		
+		Output Data	%QW4	UINT		

I/O Address Mapping

The physical address allocation corresponding to the actual module in the case study:

Notice: In actual hardware, the EX-1121 adapter is configured with the same number and model of IO modules, but the order of the modules is different, and the physical address allocation of the modules is also different, the following three layout options are provided for your reference.

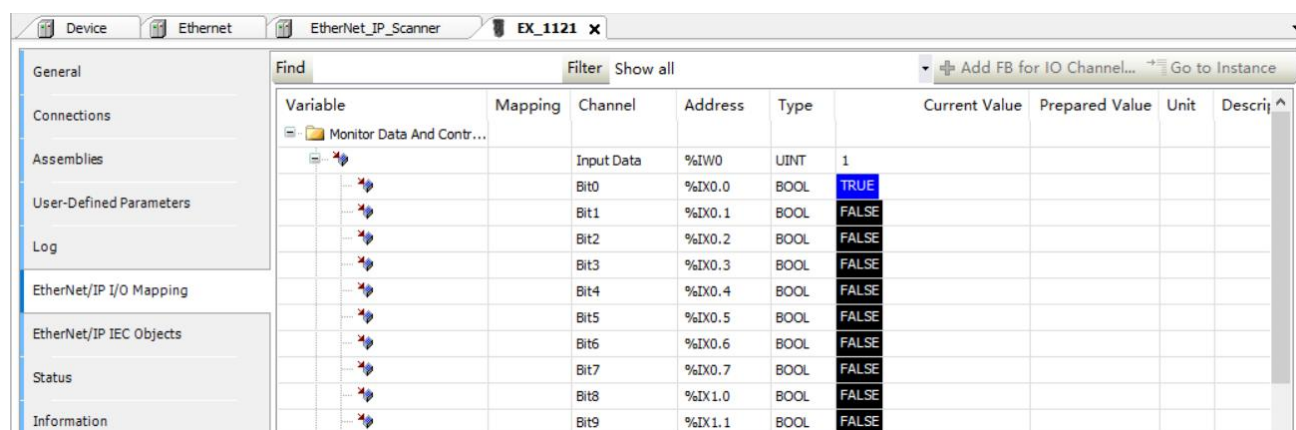
Adapter EX-1121	EX-200H	EX-300H	EX-4014	EX-5014
	IW0	QW0	IW1	QW1
			IW2	QW2
			IW3	QW3
			IW4	QW4

Adapter EX-1121	EX-4014	EX-5014	EX-200H	EX-300H
	IW0	QW0	IW4	QW4
	IW1	QW1		
	IW2	QW2		
	IW3	QW3		

Adapter EX-1120	EX-4014	EX-5014	EX-2008	EX-3008
	IW0	QW0	IW4	QW4
	IW1	QW1		
	IW2	QW2		
	IW3	QW3		

Note: An 8-channel digital input/output module occupies one word. The address of the 8-channel module uses the 8 bits corresponding to the low byte of the physical address.

In the EtherNet/IP I/O mapping, select "Enable 2 (Always in Bus Cyclic Task)" for the continuously updating variable, download the program to the PLC, and monitor the PLC's running status and I/O mapping address.



The screenshot shows the 'EtherNet/IP Scanner' window for device 'EX_1121'. The 'EtherNet/IP I/O Mapping' tab is selected in the left sidebar. The main area displays a table with columns: Variable, Mapping, Channel, Address, Type, Current Value, Prepared Value, Unit, and Description. The table lists 10 input channels (Bit0 to Bit9) with their corresponding addresses and current values.

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
Monitor Data And Contr...		Input Data	%IW0	UINT	1			
		Bit0	%IX0.0	BOOL	TRUE			
		Bit1	%IX0.1	BOOL	FALSE			
		Bit2	%IX0.2	BOOL	FALSE			
		Bit3	%IX0.3	BOOL	FALSE			
		Bit4	%IX0.4	BOOL	FALSE			
		Bit5	%IX0.5	BOOL	FALSE			
		Bit6	%IX0.6	BOOL	FALSE			
		Bit7	%IX0.7	BOOL	FALSE			
		Bit8	%IX1.0	BOOL	FALSE			
		Bit9	%IX1.1	BOOL	FALSE			

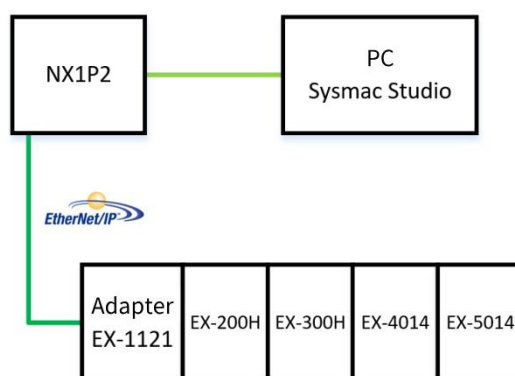
4.3 Sysmac Studio and EX-1121 Connection and Configuration

Notice:

- ① The EX-1121 supports two operating modes: Special Mode and Normal Mode. Special Mode is intended for use only with KEYENCE CPUs. The factory default is Normal Mode.
- ② The EX-1121 is shipped in BOOTP mode by default and has no IP address assigned. For IP address configuration, refer to Section 1.5, "EX-1121 Adapter IP Address Configuration."
- ③ In Normal Mode, configure the EtherNet/IP input/output byte length according to the I/O modules connected to the right side of the EX-1121:
 - If only input modules are connected, set the Output (O→T) byte length to 1 byte.
 - If only output modules are connected, set the Input (T→O) byte length to 1 byte.
 - If no I/O modules are connected, set both the Input (T→O) and Output (O→T) byte lengths to 1 byte.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
EX-1121	1	1
EX-1121 EX-200H	2	1
EX-1121 EX-300H	1	2
EX-1121 EX-200H EX-300H	2	2

1. Communication Connection Diagram



Communication Connection Diagram

2. Hardware Configuration

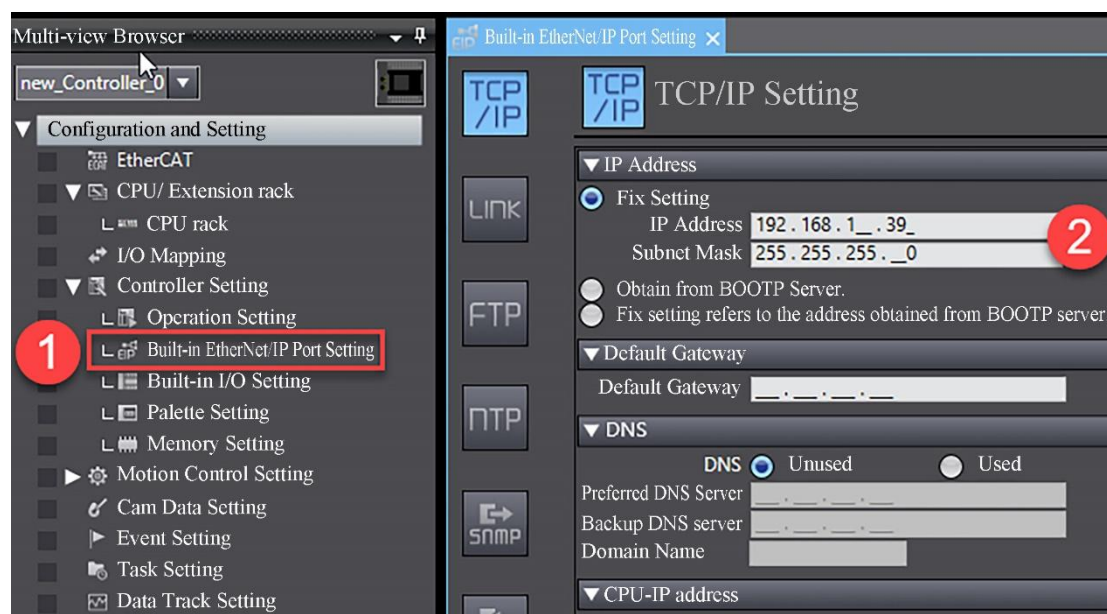
Hardware	Quantity	Remark
Programming	1	Install Sysmac Studio
NX1P2	1	
EX-1121	1	EtherNet/IP adapter
EX-200H	1	Digital input module
EX-300H	1	Digital output module
EX-4014	1	Analog input module
EX-5014	1	Analog output module

3. IP address settings

Please refer to section 1.5, EX-1121 Adapter IP Address Settings, for IP address configuration.

4. Configuration of new construction projects and equipment

Open the Sysmac Studio programming software, create a project, and configure the EtherNet/IP port to a fixed IP address (consistent with the actual PLC port IP).

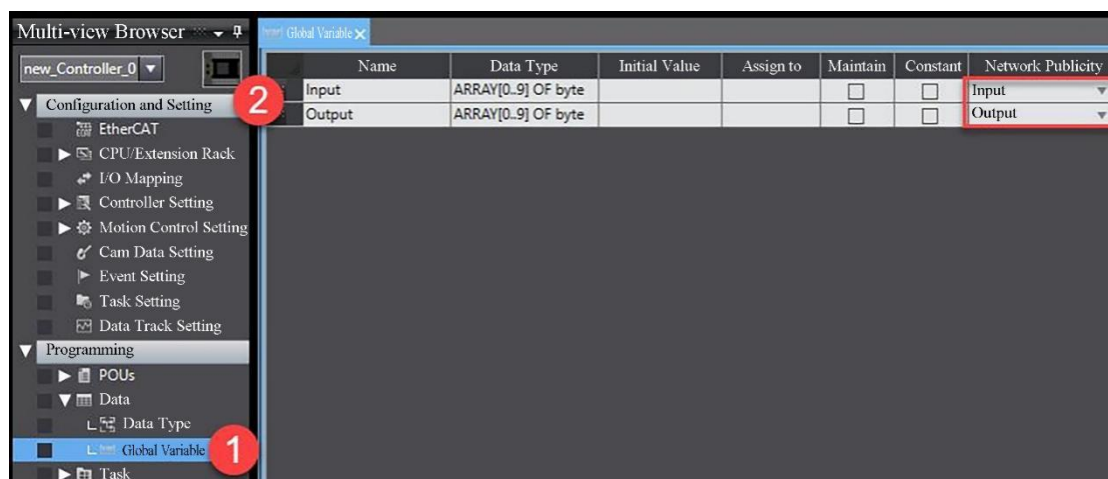


EtherNet/IP Port Settings

Create all variables, and create input and output variables in the global variables. The length of the variables needs to be consistent with the length of the input and output bytes in the actual module.

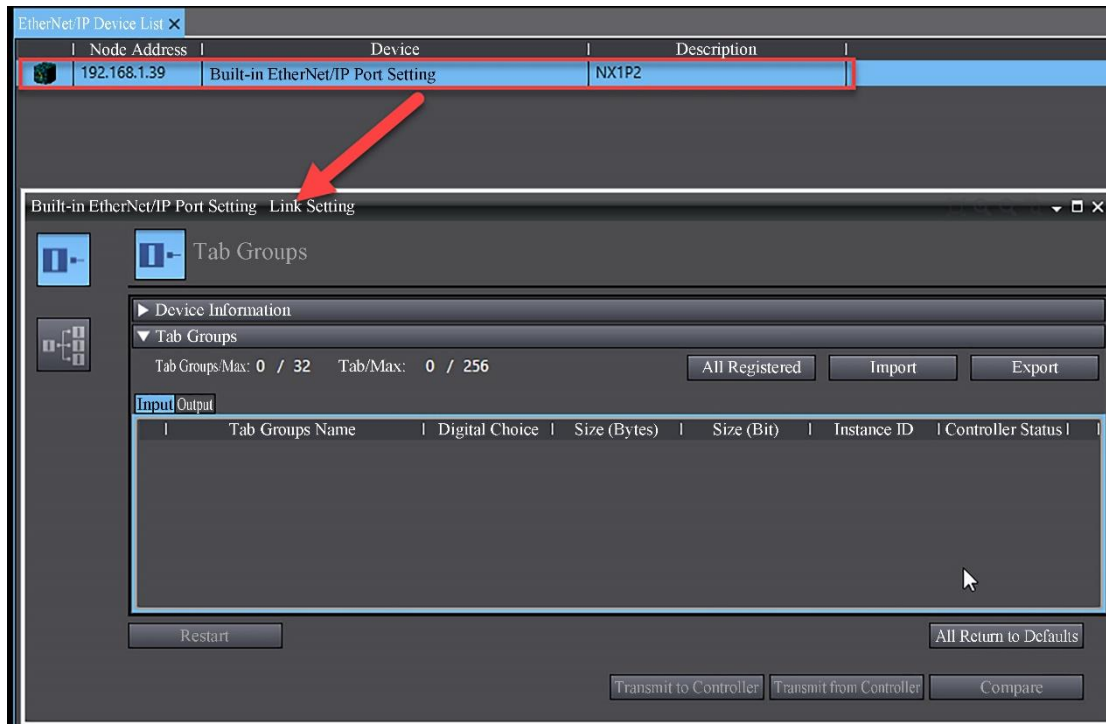
Number of bytes occupied by the calculation module:

Module model	Quantity	Input/output types	Occupied bytes
EX-2xx8	1	Input (T- >O)	2
EX-2xxH	1	Input (T- >O)	2
EX-2xxS	1	Input (T- >O)	4
EX-3xx8	1	Output (O- >T)	2
EX-3xxH	1	Output (O- >T)	2
EX-3xxS	1	Output (O- >T)	4
EX-4xx4	1	Input (T- >O)	8
EX-4xx8	1	Input (T- >O)	16
EX-5xx4	1	Output (O- >T)	8
EX-5xx8	1	Output (O- >T)	16



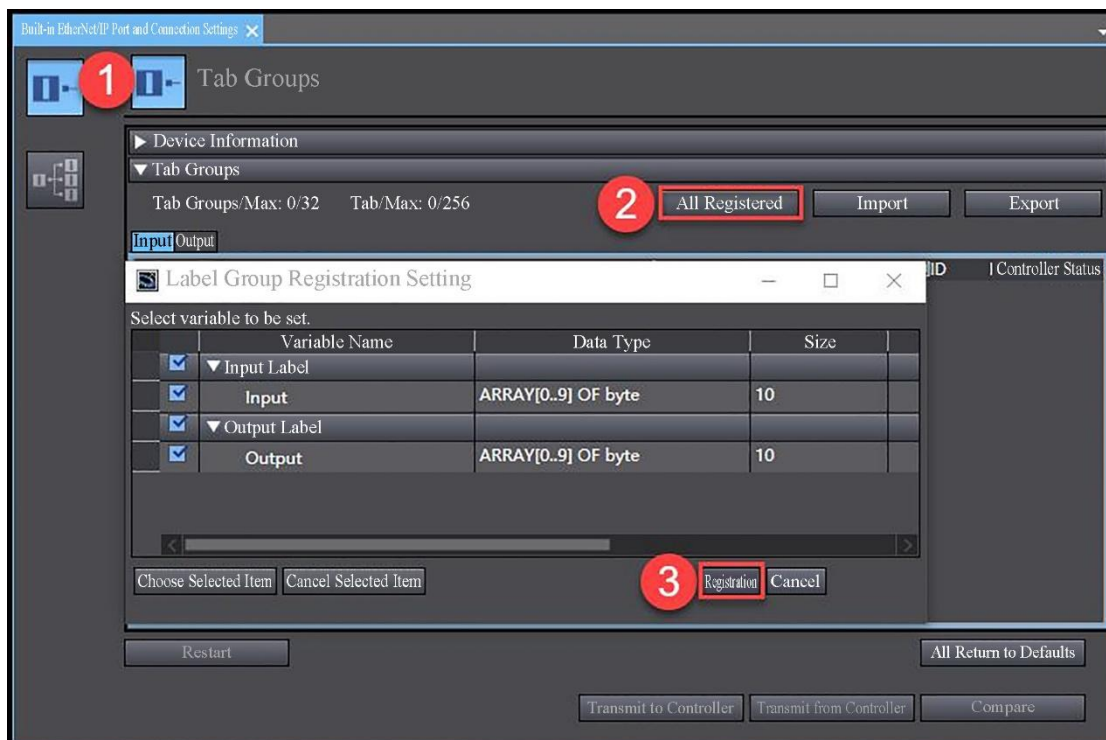
Creating global variables

In the menu bar, select "Tools" > "EtherNet/IP Connection Settings". In the EtherNet/IP list window, double-click the node address to open the EtherNet/IP port settings connection settings window.



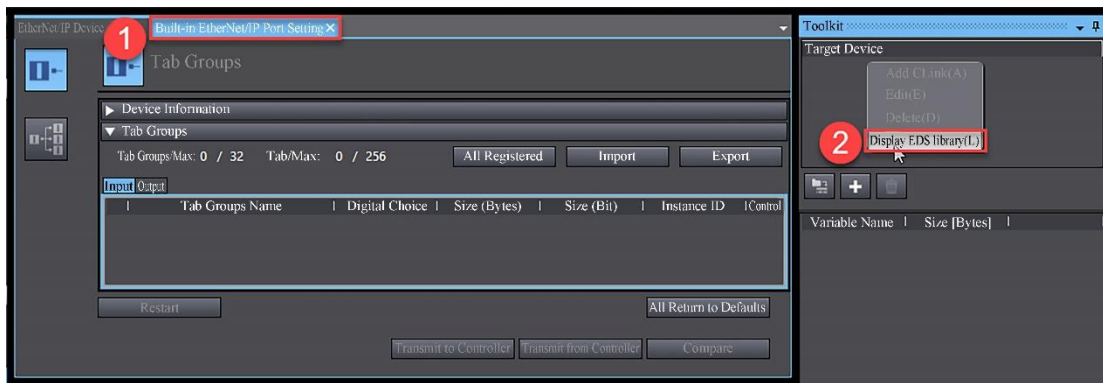
Opening the built-in EtherNet/IP port settings connection settings window

To register the variable, in the built-in EtherNet/IP port settings connection settings window, select the "Label Group" window, click "Register All" to register the newly created global variable.

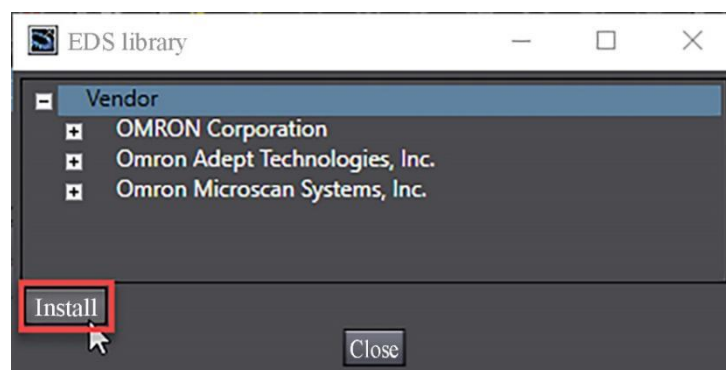


Registered Variables

To install the EDS file, right-click in the blank area of the toolbox on the right side of the opened built-in EtherNet/IP port settings connection settings window and select "Show EDS Library"; in the EDS Library window, select "Install" and open the EDS file to be installed.

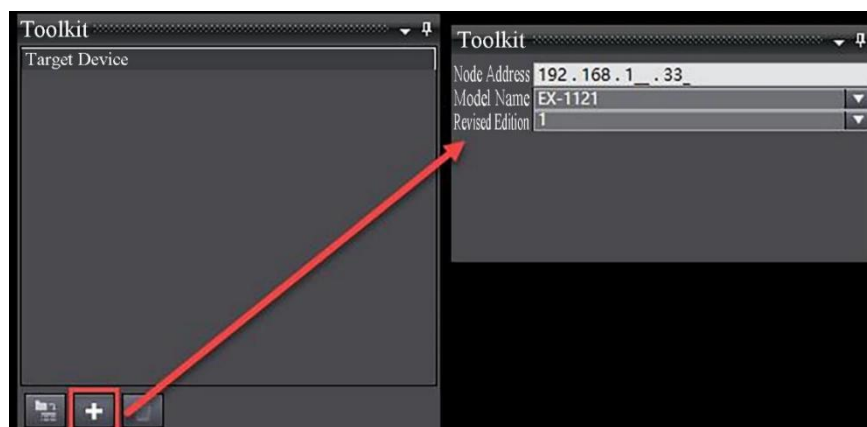


Shows the EDS library.

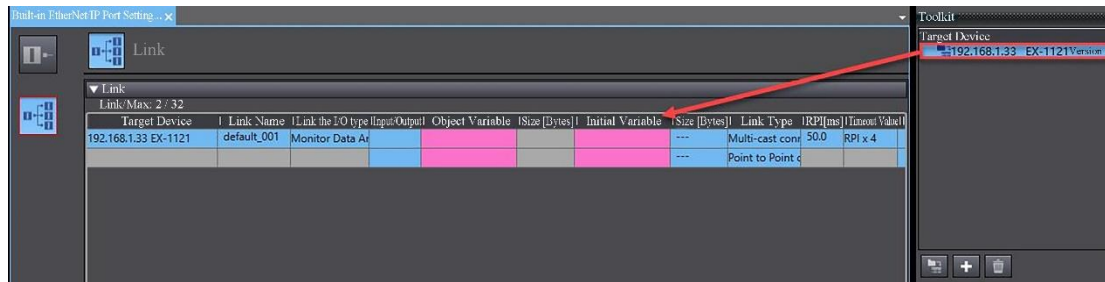


Installing EDS files

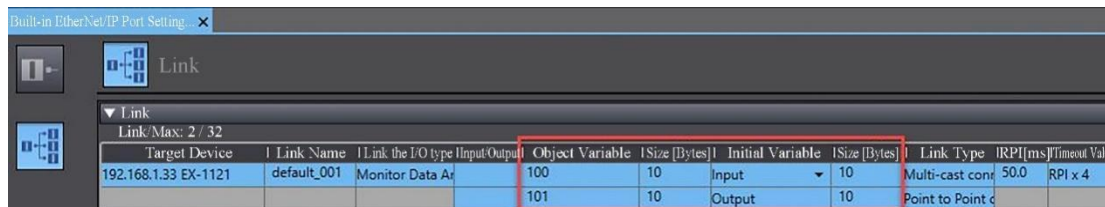
Add the device that needs to communicate and its configuration parameters. Select "Add Target Device" in the toolbox. The user needs to fill in the EtherNet/IP slave IP address, slave model, and revision. After completion, click the "Add" button in the lower left corner of the motor.



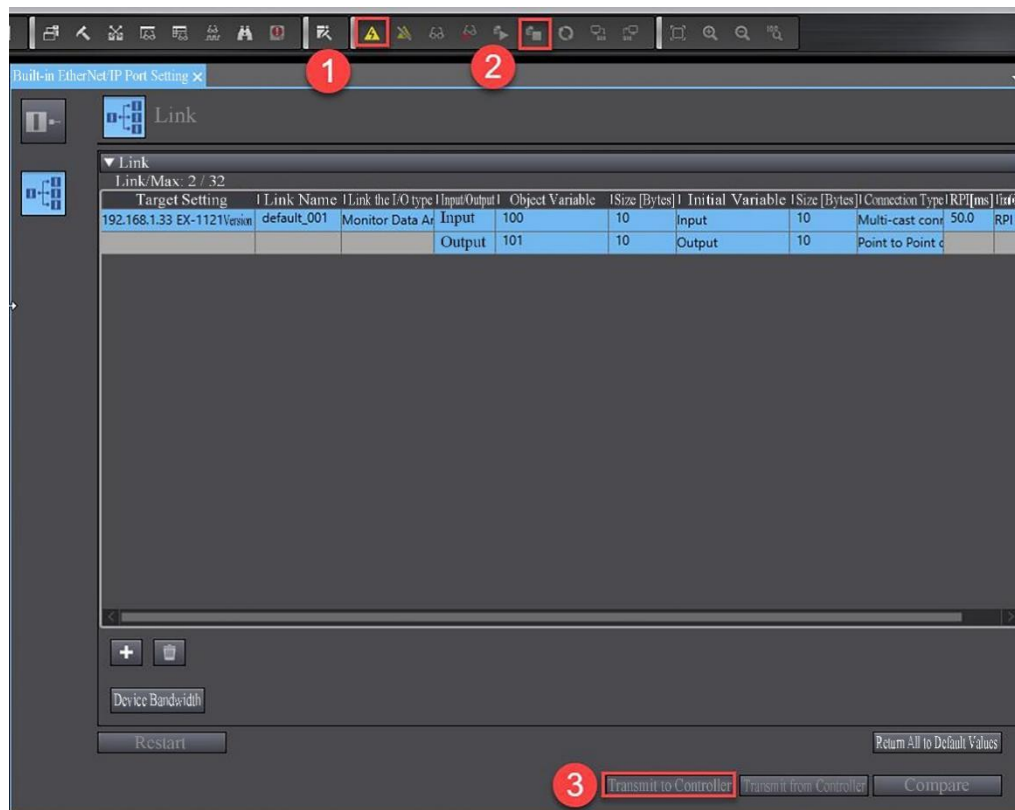
Drag the target device "192.168.1.33 EX-1121 Version 1" from the toolbox to the connection.



Configure the target device parameters. The input target variable for EX-1121 is 100, the output target variable is 101, the input and output byte size is 10, and the starting variable is the registered global variable.



Switch the PLC to online mode and then switch the PLC to programming mode. Then select "Transfer to Controller".



Switch the PLC online, and then download the program to the PLC. The IO module order corresponds to the actual address.

Channel/module	EX-1121	EX-200H	EX-300H	EX-4014	EX-5014
Channel 0	-	Input[0][1]	Output[0][1]	Input[2] [3]	Output [2][3]
Channel 1	-	-	-	Input[4] [5]	Output[4][5]
Channel 2	-	-	-	Input[6][7]	Output[6] [7]
Channel 3	-	-	-	Input[8][9]	Output[8][9]

I/O module order and actual address correspondence (application in a case)

Channel/module	EX-1121	EX-4014	EX-5014	EX-200H	EX-300H
Channel 0	-	Input[0][1]	Output[0][1]	Input[8] [9]	Outputf[8][9]
Channel 1	-	Input[2] [3]	Output[4][5]	-	-
Channel 2	-	Input[4] [5]	Output[6] [7]	-	-
Channel 3	-	Input[6][7]	Output[8][9]	-	-

I/O module order and actual address correspondence

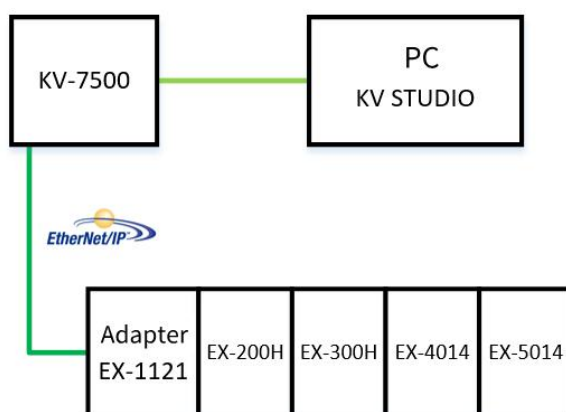
4.4 KV STUDIO and EX-1121 Connection and Configuration (Special Mode)

Notice:

- ① The EX-1121 supports two operating modes: Special Mode and Normal Mode. Special Mode is intended for use only with KEYENCE CPUs. The factory default is Normal Mode.
- ② The EX-1121 is shipped in BOOTP mode by default and has no IP address assigned. For IP address configuration, refer to Section 1.5, "EX-1121 Adapter IP Address Configuration."
- ③ In Normal Mode, configure the EtherNet/IP input/output byte length according to the I/O modules connected to the right side of the EX-1121:
 - If only input modules are connected, set the Output (O→T) byte length to 1 byte.
 - If only output modules are connected, set the Input (T→O) byte length to 1 byte.
 - If no I/O modules are connected, set both the Input (T→O) and Output (O→T) byte lengths to 1 byte.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
EX-1121	1	1
EX-1121 EX-200H	2	1
EX-1121 EX-300H	1	2
EX-1121 EX-200H EX-300H	2	2

1. Communication Connection Diagram



Communication Connection Diagram

2. Hardware Configuration

Table 4-5-1 Hardware Configuration Table

Hardware	Quantity	Remark
Programming	1	Install KV Studio
KV-7500	1	
EX-1121	1	EtherNet/IP adapter
EX-200H	1	Digital input module
EX-300H	1	Digital output module
EX-4014	1	Analog input module
EX-5014	1	Analog output module

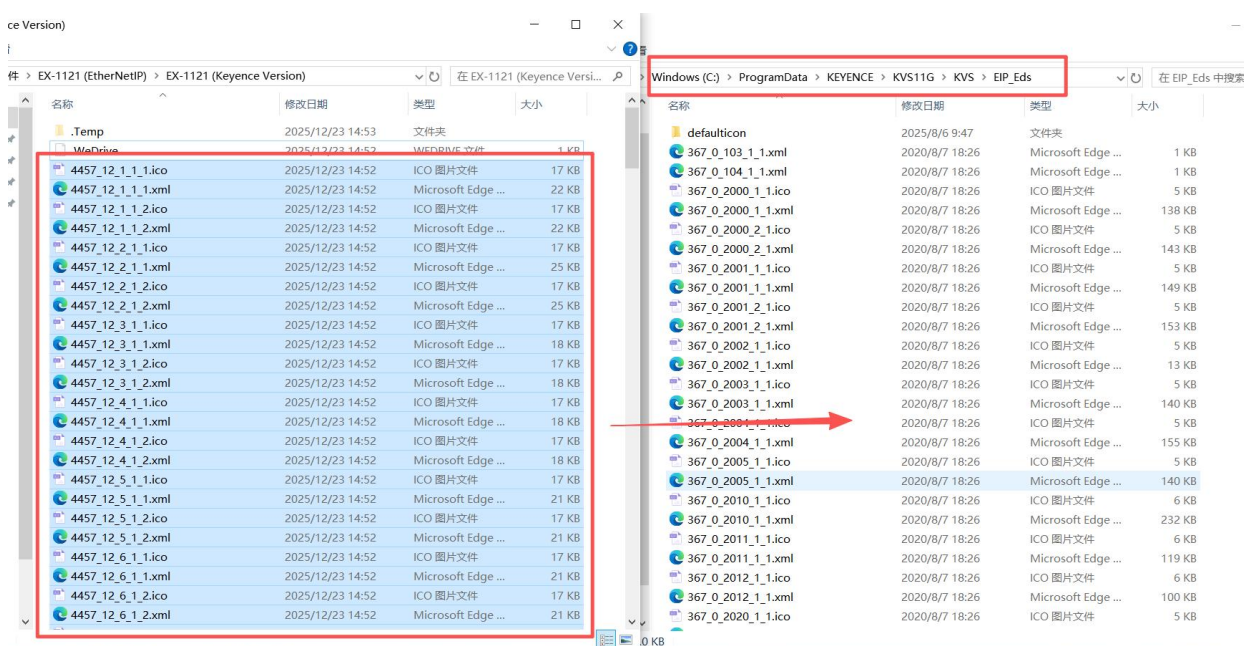
3. IP address settings

Please refer to section 1.5, EX-1121 Adapter IP Address Settings, for IP address configuration.

4. Copying XML files

With KV STUDIO closed, copy all files from the "Keyence Version" folder to the KV STUDIO software folder: "C:\ProgramData\KEYENCE\KVS\EIP_Eds"

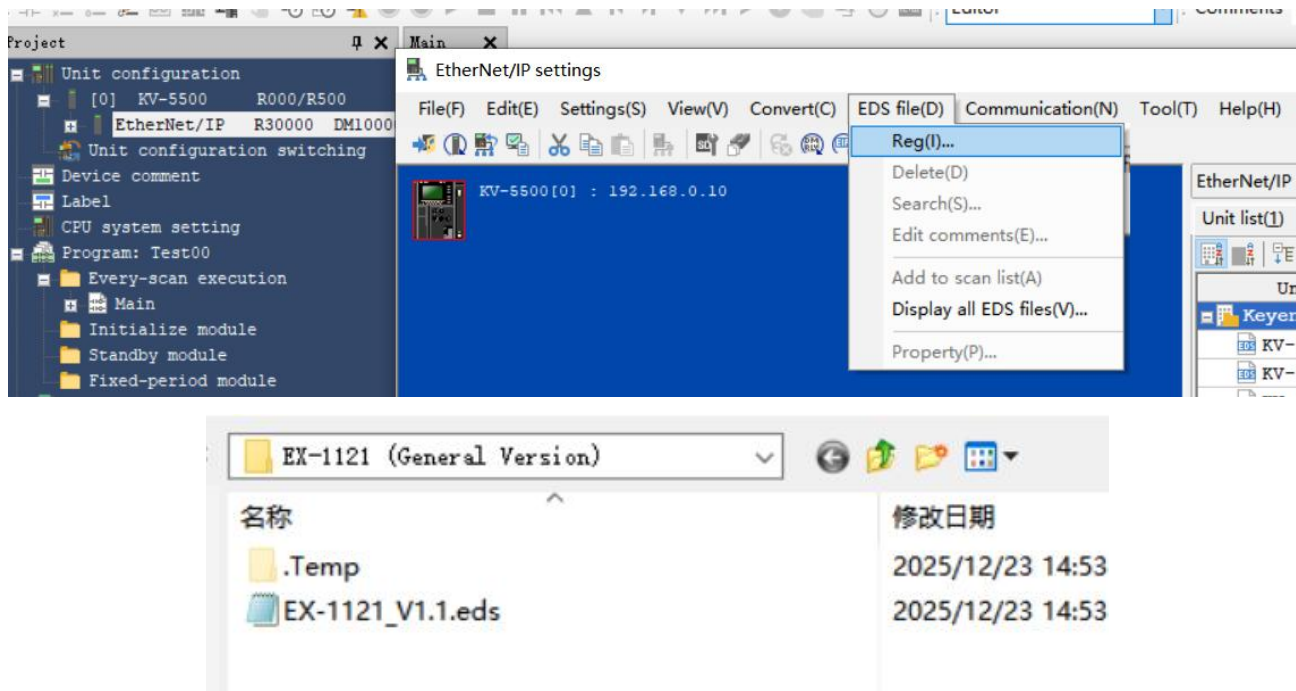
Note: The installation directory may vary depending on the software version. Please locate the EIP_Eds folder according to your actual installation.



5. Configuration of new construction projects and equipment

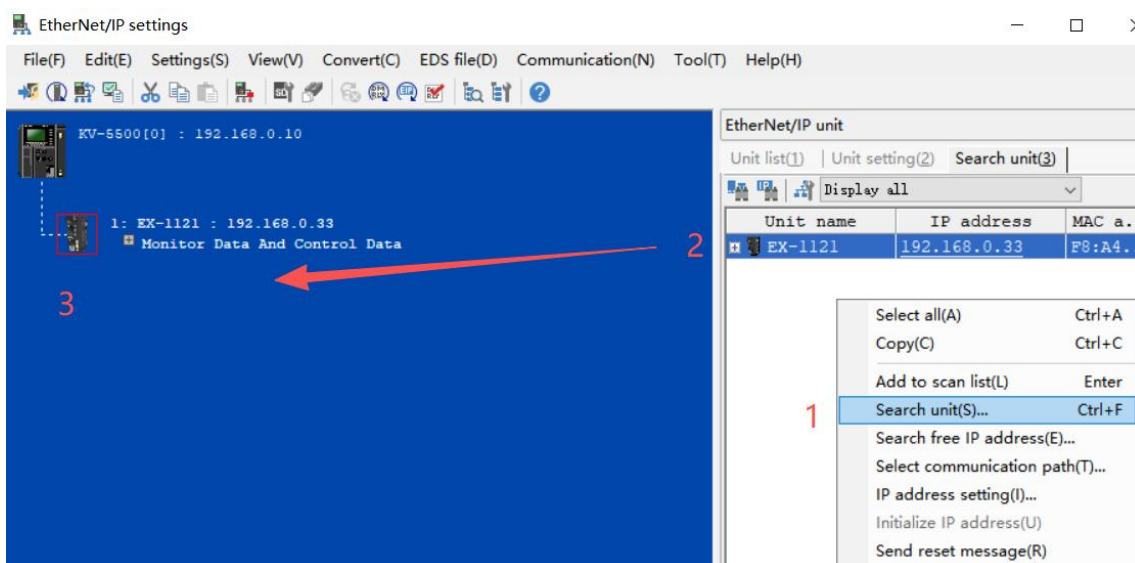
Open the KV STUDIO software, create a new project, and double-click "EtherNet/IP" in the project device tree to open the EtherNet/IP settings window.

Then select "EDS File" > "Reg" from the menu bar, open the "General Version" > "EX-1121" folder in the EDS folder.

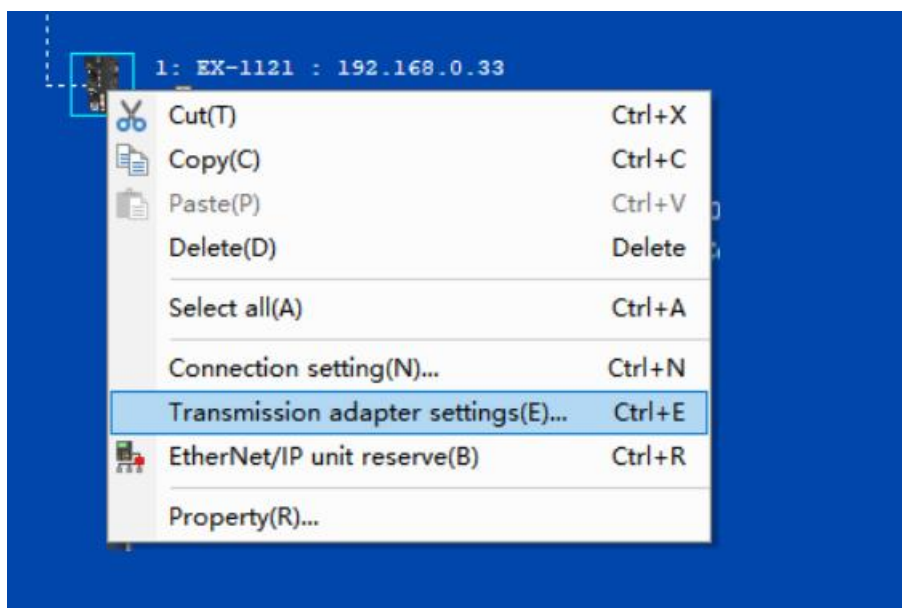


Installing EDS files

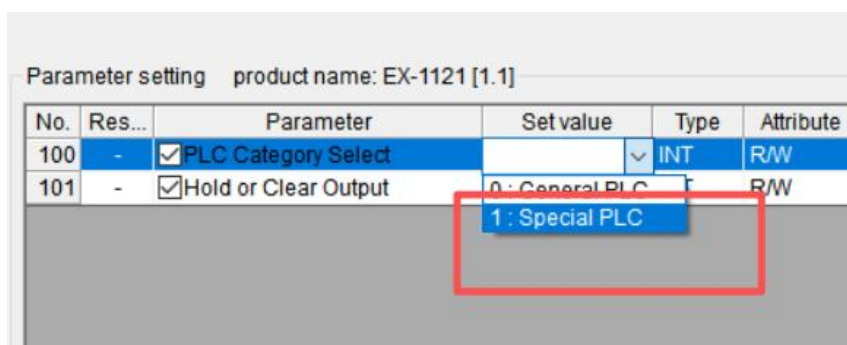
Configure the EX-1121 adapter mode as follows Special PLC mode (the factory default is normal mode). Right-click on the blank area and select "Search unit". Add the scanned devices to the list.



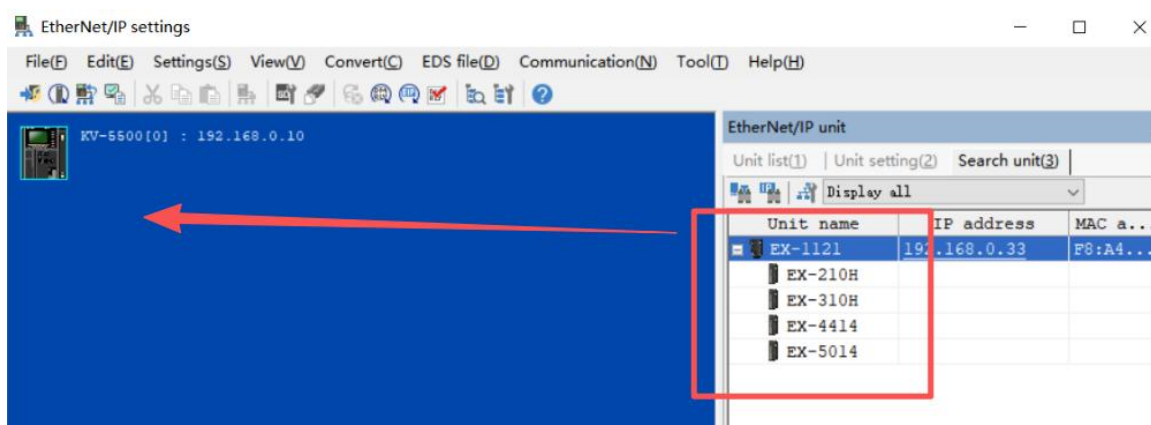
To configure the transmission adapter, right-click "EX-1121" in the device list and select "Transmission Adapter Settings".



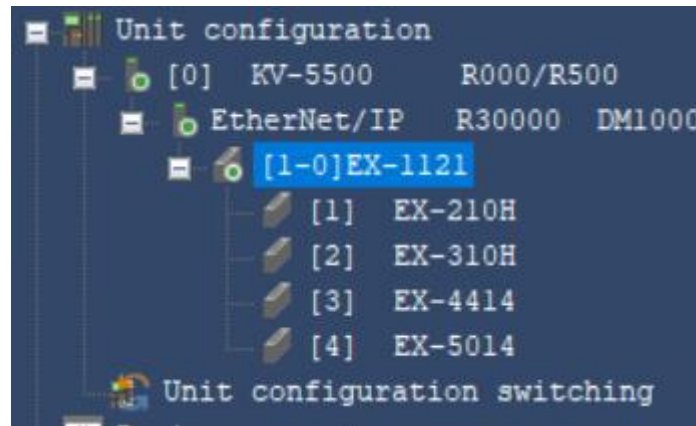
In the transmission adapter settings window, change the setting value to "1: Special PLC" and write it to the adapter. After writing, EX-1121 must be powered off and restarted.



Click "Scan Units" again. The I/O modules will also be detected and displayed in the list. After adding them to the list, click Apply.



Download the program to the PLC. In the menu bar, select "Monitoring/Simulator" > "PLC Transfer". After the download is complete, switch the PLC to monitoring mode and monitor the communication status between the PLC and EX-1121.



Device	Current value	Display format	Comments
B01C		- 1-bit BIN	
B01D		- 1-bit BIN	
B01E		- 1-bit BIN	
B01F		- 1-bit BIN	
B020		* 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 0
B021		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 1
B022		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 2
B023		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 3
B024		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 4
B025		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 5
B026		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 6
B027		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 7
B028		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 8
B029		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI 9
B02A		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI A
B02B		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI B
B02C		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI C
B02D		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI D
B02E		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI E
B02F		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-210H[1].DI F
B030		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 0
B031		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 1
B032		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 2
B033		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 3
B034		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 4
B035		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 5
B036		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 6
B037		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 7
B038		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 8
B039		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO 9
B03A		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO A
B03B		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO B
B03C		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO C
B03D		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO D
B03E		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO E
B03F		- 1-bit BIN	KV-5500[0].EX-1121[1].EX-310H[2].DO F
W00		0 +/-DEC 16BIT	KV-5500[0].EX-1121[1].EX-4414[3].AI CH0 data
W01		0 +/-DEC 16BIT	KV-5500[0].EX-1121[1].EX-4414[3].AI CH1 data
W02		0 +/-DEC 16BIT	KV-5500[0].EX-1121[1].EX-4414[3].AI CH2 data
W03		0 +/-DEC 16BIT	KV-5500[0].EX-1121[1].EX-4414[3].AI CH3 data
W04		0 +/-DEC 16BIT	KV-5500[0].EX-1121[1].EX-5014[4].AO CH0 data
W05		0 +/-DEC 16BIT	KV-5500[0].EX-1121[1].EX-5014[4].AO CH1 data
W06	233	+/-DEC 16BIT	KV-5500[0].EX-1121[1].EX-5014[4].AO CH2 data
W07	455	+/-DEC 16BIT	KV-5500[0].EX-1121[1].EX-5014[4].AO CH3 data

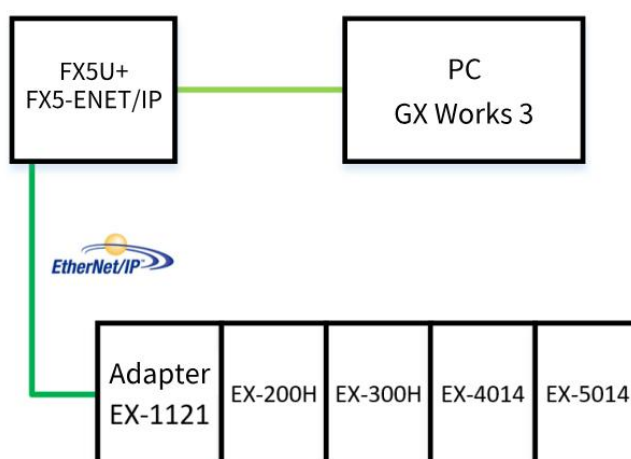
4.4 GX Works3 and EX-1121 Connection and Configuration

Notice:

- ① The EX-1121 supports two operating modes: Special Mode and Normal Mode. Special Mode is intended for use only with KEYENCE CPUs. The factory default is Normal Mode.
- ② The EX-1121 is shipped in BOOTP mode by default and has no IP address assigned. For IP address configuration, refer to Section 1.5, "EX-1121 Adapter IP Address Configuration."
- ③ In Normal Mode, configure the EtherNet/IP input/output byte length according to the I/O modules connected to the right side of the EX-1121:
 - If only input modules are connected, set the Output (O→T) byte length to 1 byte.
 - If only output modules are connected, set the Input (T→O) byte length to 1 byte.
 - If no I/O modules are connected, set both the Input (T→O) and Output (O→T) byte lengths to 1 byte.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
EX-1121	1	1
EX-1121 EX-200H	2	1
EX-1121 EX-300H	1	2
EX-1121 EX-200H EX-300H	2	2

1. Communication Connection Diagram



2. Hardware Configuration

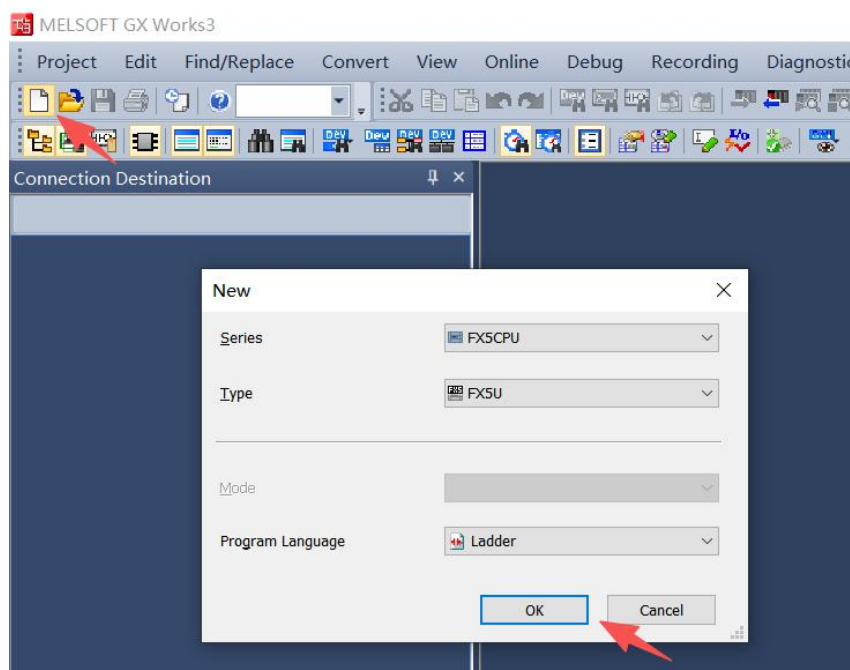
Hardware	Quantity	Remark
PC	1	Install GX Works3
FX5U+FX5-ENET/IP	1	
EX-1121	1	EtherNet/IP adapter
EX-200H	1	Digital input module
EX-300H	1	Digital output module
EX-4014	1	Analog input module
EX-5014	1	Analog output module

3. IP address settings

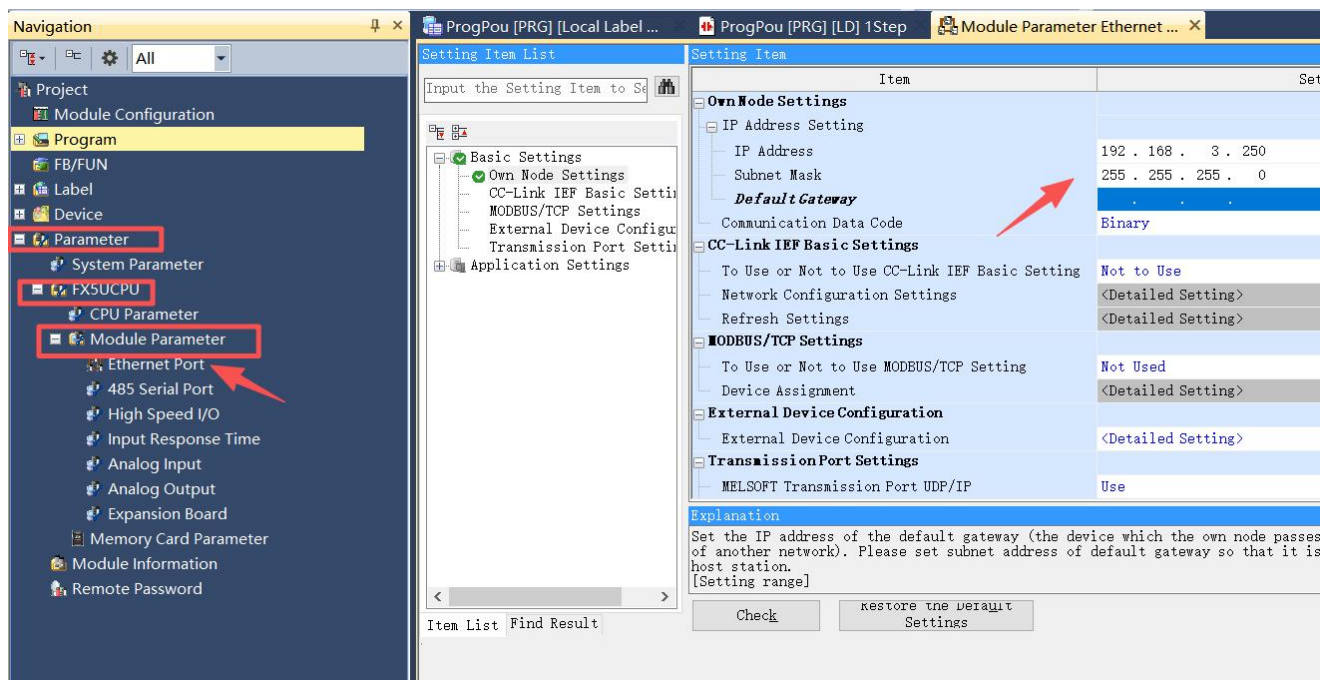
Please refer to section 1.5, EX-1121 Adapter IP Address Settings, for IP address configuration.

4. Configuration of new construction projects and equipment

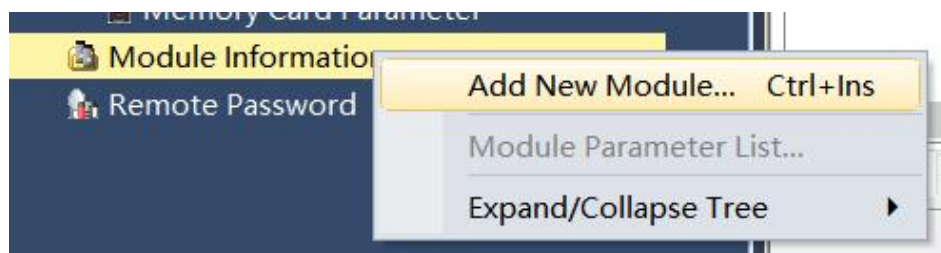
Open GX Works3 and create a new project.



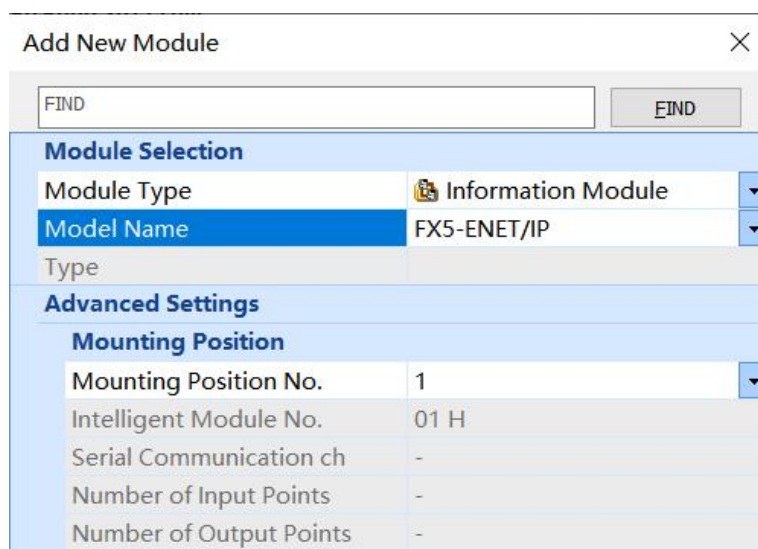
Click FX5U CPU → Module Parameters → Ethernet Port, and configure the PLC's IP address.



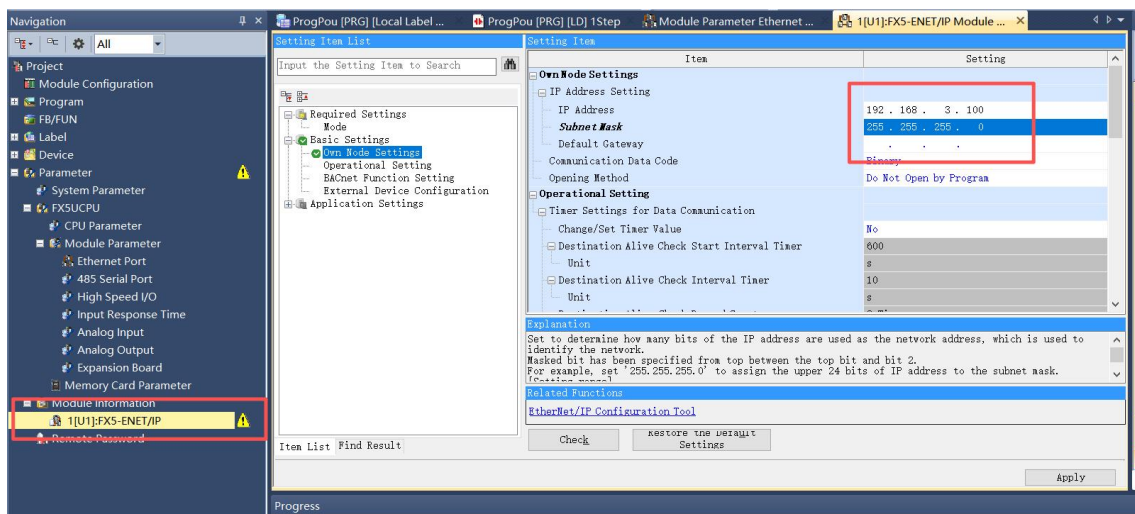
In the project tree, right-click "Module Information" and select "Add New Module."



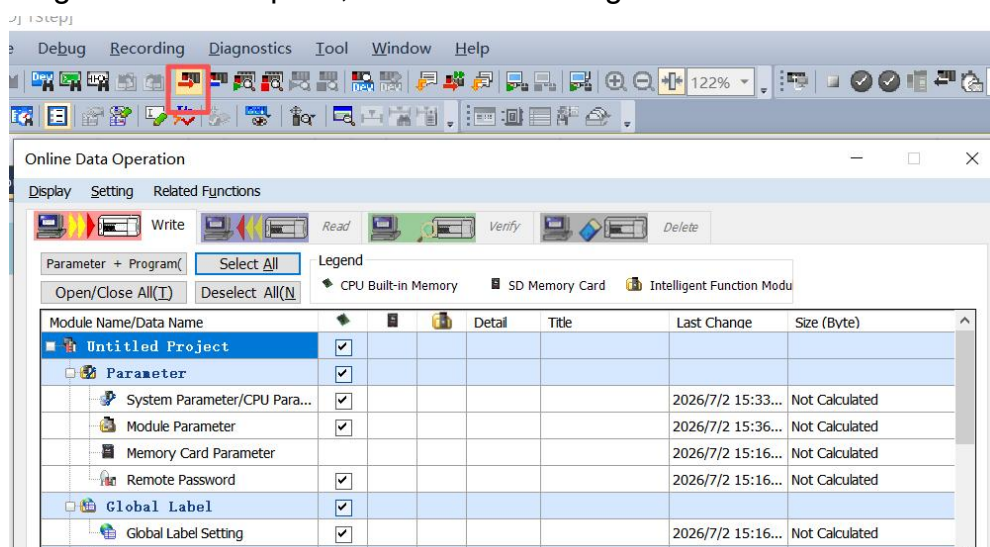
Select Information Module as the module type, and then add the FX5-ENET/IP module.



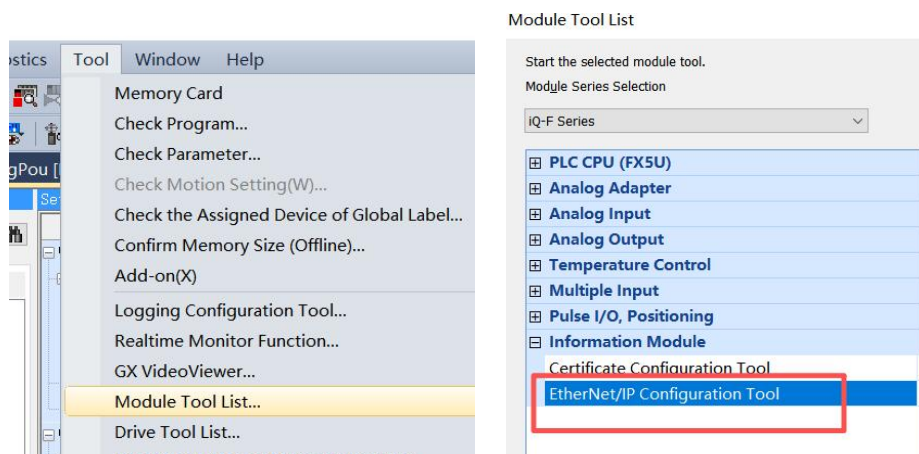
After adding the module, double-click it to open the configuration window, and then set the IP address. Then click Apply.



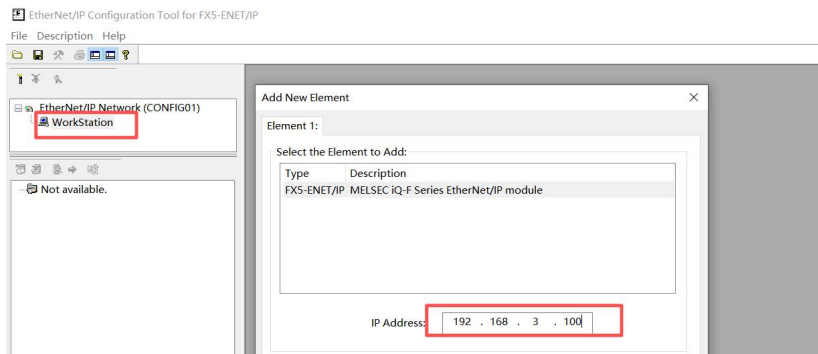
After the configuration is complete, transfer the settings to the PLC.



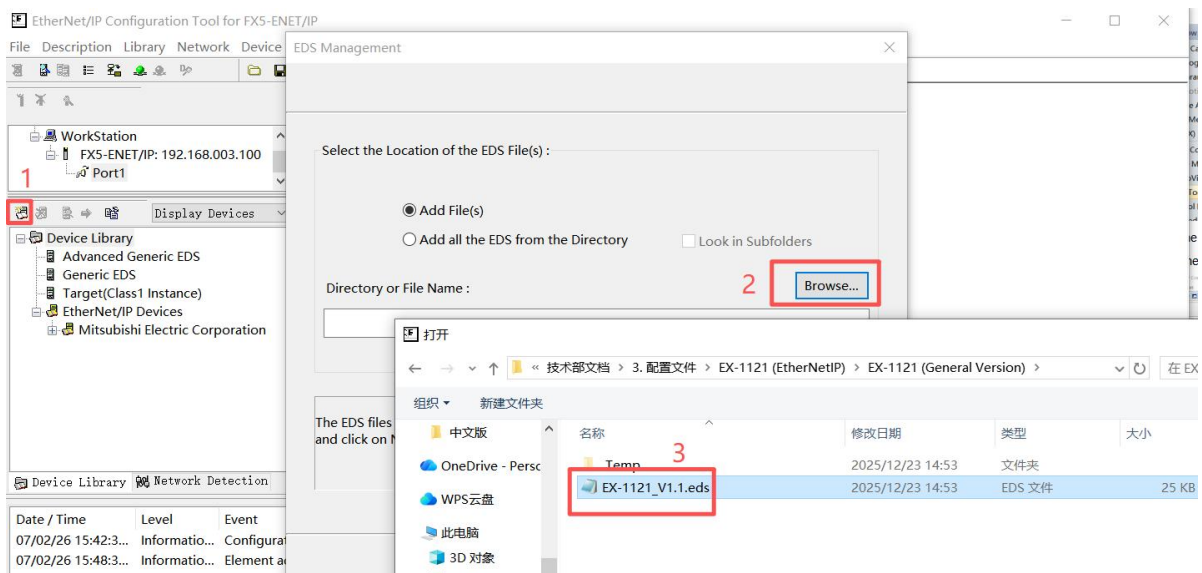
From the menu bar, select Tools > Module Tool List, then double-click EtherNet/IP Configuration Tool to open it.



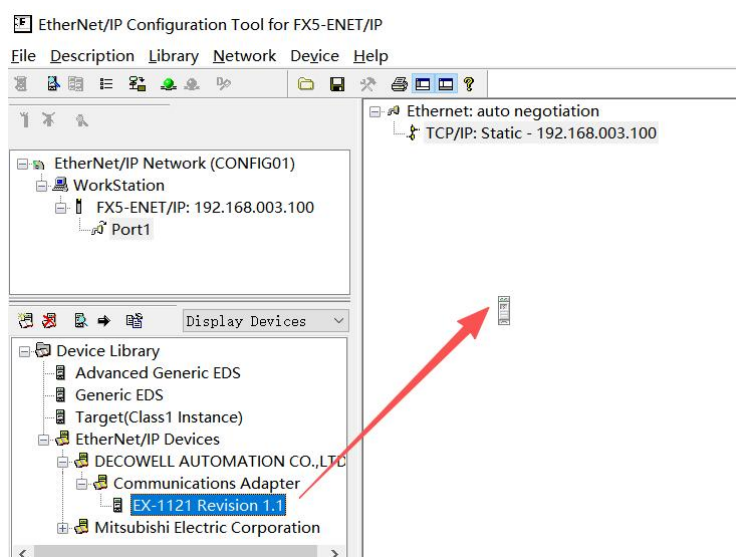
After opening the configuration tool, set the workstation IP address to match the IP address configured for the EtherNet/IP module in the previous step.



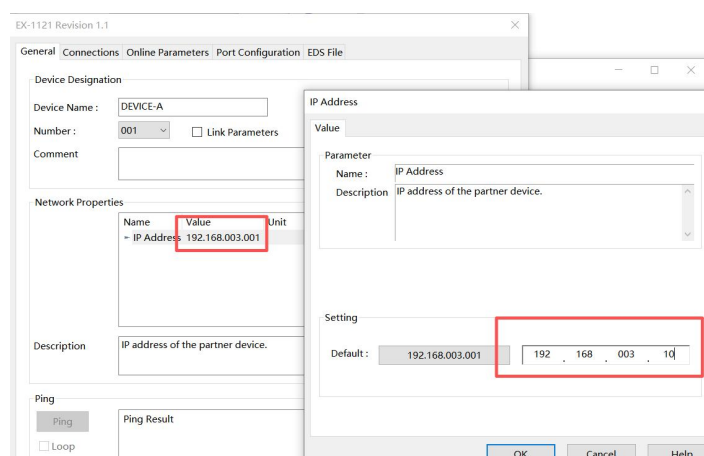
Click the Add icon, then import the EX-1121 EDS file to add the module.



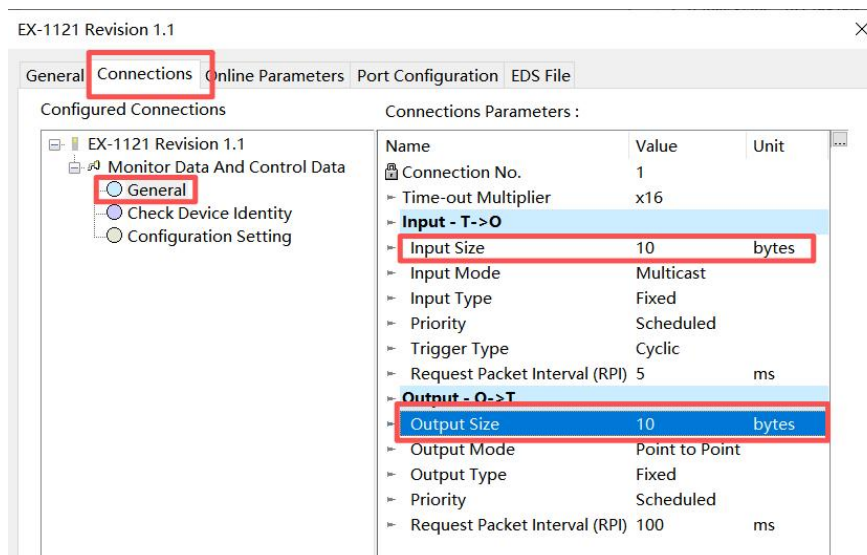
Drag the EX-1121 to the workspace on the right. The configuration window will then appear.



Configure the IP address of the EX-1121 module. In this example, 192.168.3.10 is used.



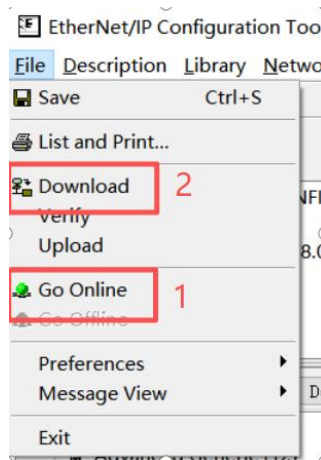
Click Connection → General, and configure the input and output byte sizes of the I/O modules according to the actual hardware configuration.



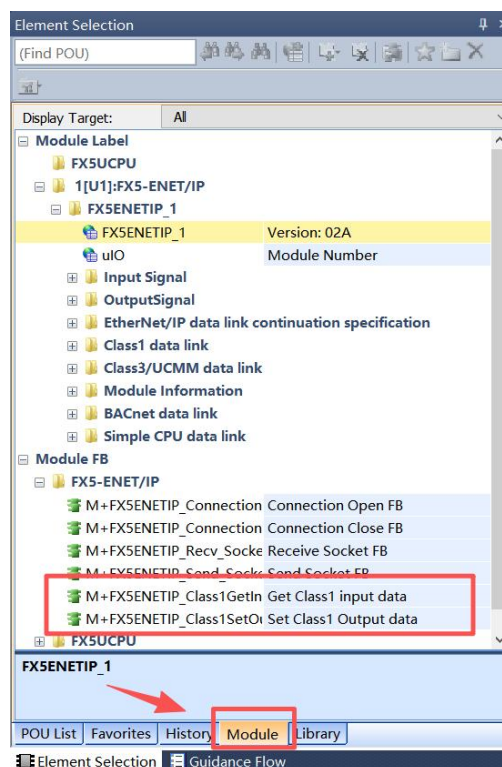
Number of bytes occupied by the calculation module:

Module model	Quantity	Input/output types	Occupied bytes
EX-2xx8	1	Input (T- >O)	2
EX-2xxH	1	Input (T- >O)	2
EX-2xxS	1	Input (T- >O)	4
EX-3xx8	1	Output (O- >T)	2
EX-3xxH	1	Output (O- >T)	2
EX-3xxS	1	Output (O- >T)	4
EX-4xx4	1	Input (T- >O)	8
EX-4xx8	1	Input (T- >O)	16
EX-5xx4	1	Output (O- >T)	8
EX-5xx8	1	Output (O- >T)	16

After completing the configuration, first click Online to enter online mode, then click Download.



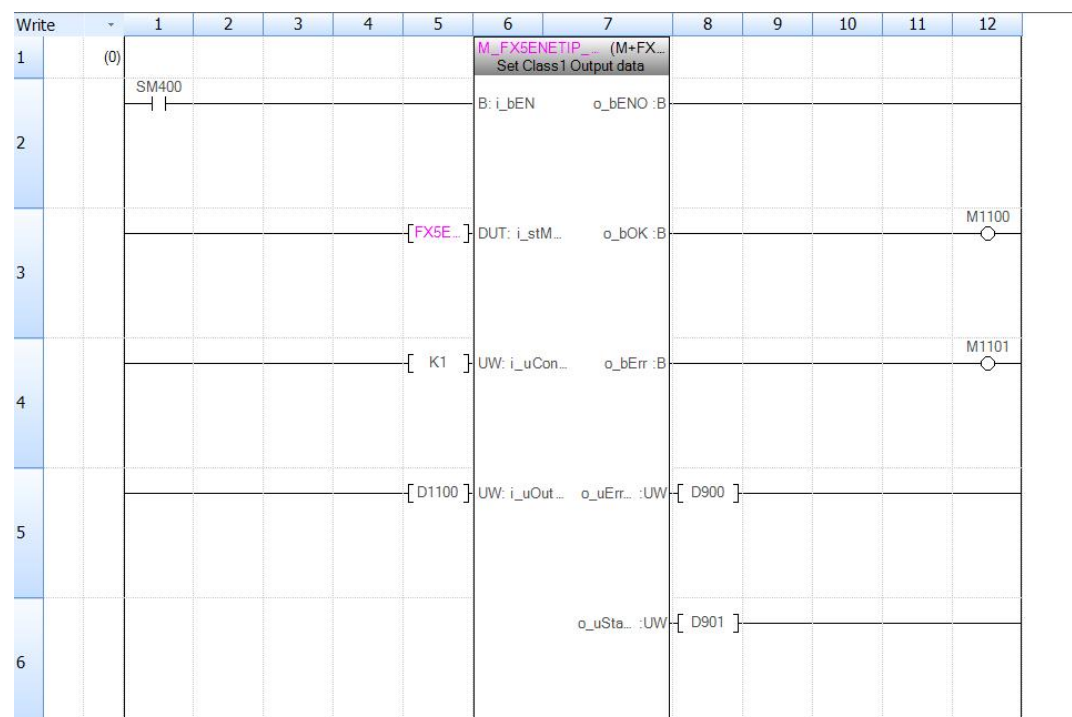
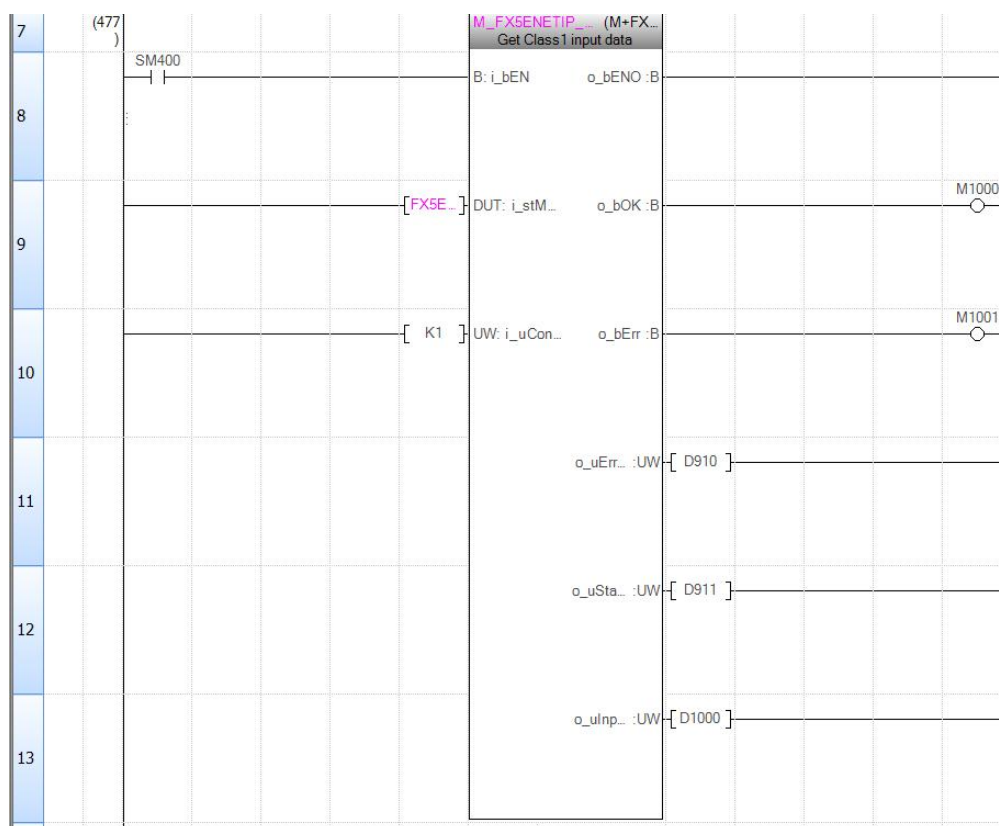
After the Download Successful message appears, you can close the configuration tool. Return to GX Works3, and create the main program. Use the following two FB (Function Block) modules to create the read and write instructions.



sample program is shown below. In this example,

Input start address: D1000

Output start address: D1100



5. Appendix

model	EX-1121
Adapter power consumption	363mA
Order number	02-01-08-1
Maximum number of I/Os	32/piece
Maximum number of input bytes	504
Maximum number of output bytes	504
Does it support digital modules?	yes
Does it support analog input modules?	yes
Does it support functional modules?	Yes (≤ 6 pieces)
Does it support a communication module?	Yes (≤ 6 pieces)



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