

RB Series Adapter

User Manual

DECOWELL Industrial Intelligence makes reliable partners



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Preface

■ Document Overview

Thank you for purchasing the DECOWELL RB series card-type I/O modules!

The RB Series Card-type I/O Modules are distributed expansion modules developed by DECOWELL. The series consists of an adapter, I/O modules, power modules, and terminal modules. The adapter supports a variety of communication buses, such as PROFINET, EtherCAT, CC-Link, and Modbus TCP. The I/O modules include digital input modules, digital output modules, analog input modules, analog output modules, and functional modules, which can be flexibly combined according to actual application requirements.

The RB-1120 is an EtherNet/IP bus adapter, and each module can be expanded to support up to 32 input/output modules.

This manual describes the specifications, features, and operation of this module. Please read this manual carefully before use to ensure correct and safe operation of the product.

Due to continuous product and technical updates and improvements, the content in this document may not fully correspond to the actual product. Please understand. In case of any discrepancies, the actual product shall prevail. Content changes resulting from product upgrades are subject to change without prior notice.

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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 Overview

RB-1120 (hereinafter referred to as the product) is DECOWELL's next-generation EtherNet/IP bus adapter module, designed to function as an EtherNet/IP slave for integration into EtherNet/IP networks. Through its local bus, the product allows flexible expansion of digital, analog, and temperature measurement modules, enabling control and acquisition of signals from various actuators and sensors. The product is compatible with EtherNet/IP master devices and is widely used in industries such as environmental protection, photovoltaics, lithium battery manufacturing, and logistics.

Key Advantages:

- Space-saving: Ultra-thin 12 mm design significantly reduces cabinet space.
- Fast Wiring: Large-aperture terminals allow tool-free installation and wiring.
- Stable & Reliable: Enhanced diagnostics, three-part modular design, and support for hot-swapping to enable maintenance without system shutdown.

1.2 Product Naming and Nameplate

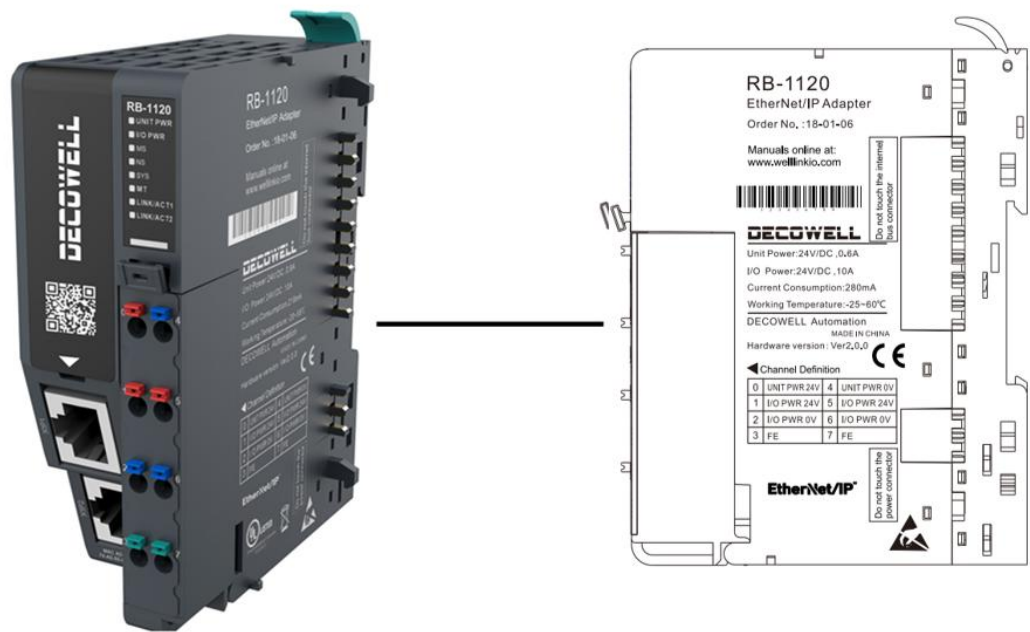
RB-1120

①

②

No.	Name	Definition
①	RB series	Card-based I/O
②	Bus adapter	EtherNet/IP bus adapter

Supported Models: The RB-1120 can be expanded with RB Series digital, analog, and functional modules.



1.3 Component Description



Component Description Diagram

1	Status Indicators
2	Communication Interface
3	Power Supply Channel
4	Operator Compartment

1.3.1 Status Indicator Definition

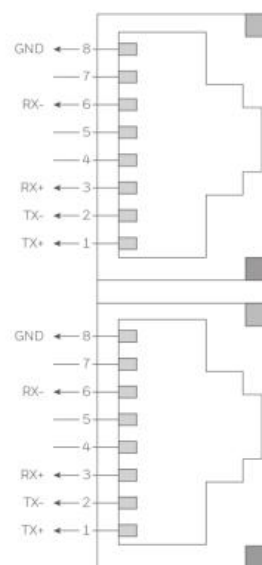
Name	Describe	State	Function Definition
UNIT PWR	System power indicator	ON (green)	System power supply normal
		OFF	Power off
		ON (red)	System power failure
IO PWR	IO power indicator	ON (green)	IO power supply normal
		ON (red)	IO power supply not connected or faulty
MS	Module status indicator	ON (green)	Device operation: Communication normal
		1Hz Flashing (green)	Standby state: Module not configured
		1Hz Flashing(green-red)	Self-test: Module power-on self-test status
		1Hz Flashing (red)	Minor fault: The device detected a recoverable minor fault.
		ON (red)	Major fault: The equipment detected an unrecoverable major fault error.
		OFF	Power off
NS	Network status indicator	ON (green)	Connection established: IP address configuration complete, at least one CIP connection established, main site connection not timed out.
		1Hz Flashing (green)	Connection not established: IP address configuration complete, CIP connection not established, main site connection not timed out.
		1Hz Flashing(green-red)	Self-test: Module power-on self-test status
		1Hz Flashing(red)	Connection timeout: IP address configuration complete, main site connection timed out.
		ON (red)	Duplicate IP address: The IP address has already been used.
		OFF	Power off, no IP address
SYS	System	1Hz Flashing (green)	Communication is normal

	indicator	5Hz Flashing (green)	IO slave station lost or detected factory reset button signal
		2 blink + 1 off(green)	Configuration failed
MT	Maintenance indicator	OFF	Working normally
		ON (blue)	Factory reset
		Fast Flash (blue)	Module upgrade
LINK	Network port indicator	ON (green)	Network connection is normal
		OFF	Network not connected or abnormal

1.3.2 Communication Interface Definition

The communication I/O port uses a standard RJ45 8-pin Ethernet connector. The pin assignments are as follows:

Pin	Definition
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

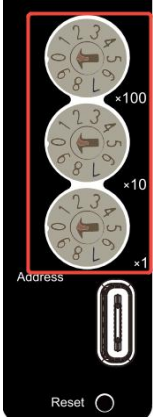


1.3.3 Power Channel Definition

0	24V	Adapter power+	4	0V	Adapter power -
1	24V	IO power 1+	5	24V	IO power 2+
2	0V	IO power 1-	6	0V	IO power 2-
3	FE	Functional Earth	7	FE	Functional Earth
Notice		Only one pin pair (1/2 or 5/6) is required to supply the 24 V power input.			

1.3.4 DIP switch definitions and USB and reset button descriptions

1.3.4.1 DIP switch definition

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 RB-1120 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.

1.3.4.2 USB Description



Type-C port, used for PLC class setting, bus error output behavior configuration, IP address configuration, etc. For details, refer to “Module Functions”.

Note: Do not use the USB port for any other purpose to avoid potential damage.

1.3.4.3 Reset Button Description



The module can be restored to factory settings using the Reset button.

Press and hold the Reset button for 5 seconds, then release it. The device will restore factory settings and reboot automatically.

1.4 Technical Specifications

Basic parameters	
Dimensions	100×77×34mm
Protection Rating	IP20
Wiring specifications	0.2~1.5mm ²
Wiring method	Straight-through spring connector
Weight	Approx. 140g
Power parameters	
System-side power input	24VDC (±25%)
System terminal rated current	Max: 0.6A
I/O port-side power input	24VDC (±25%)
I/O port-side output current	10A (Max) 5A at High Temperature
Current consumption	Max: 290mA
System-side electrical isolation	500VAC
Power protection	Overcurrent protection, overvoltage protection, reverse polarity protection
Software parameters	
Communication Protocol	EtherNet/IP
Diagnostic function	Supports module diagnostic functions
Address assignment	Assigned by master
Expanding I/O count	32
Maximum input/output data size	Input: 504 Byte/Output: 504 Byte
Communication rate	100Mbps
Transmission distance	100m (distance between stations)

Note: The system-side power supply (US) powers the control adapter, communication, and the overall rack system, while the I/O port-side power supply (UA) provides power to external field devices such as sensors.

1.5 Environmental Specifications

Environmental parameters	
Operating temperature	-25~60℃
Operating humidity	95% non-condensing
Atmosphere	≥ 795 hPa (altitude ≤ 2000 m) as per IEC 61131-2
Storage temperature	-40~85℃
Overvoltage category	I

1.6 Usage Process

step	refer to
Preparation	1.3 Component Description 1.4 Technical Specifications 1.5 Environmental Specifications 2.1 Understanding before installation 4. Grounding cable and field wiring instructions
Wiring installation	2.2 Installation Method 3.1 Cable Selection 3.2 Terminal wiring
Configuration debugging	6. Adapter Configuration Case



Caution

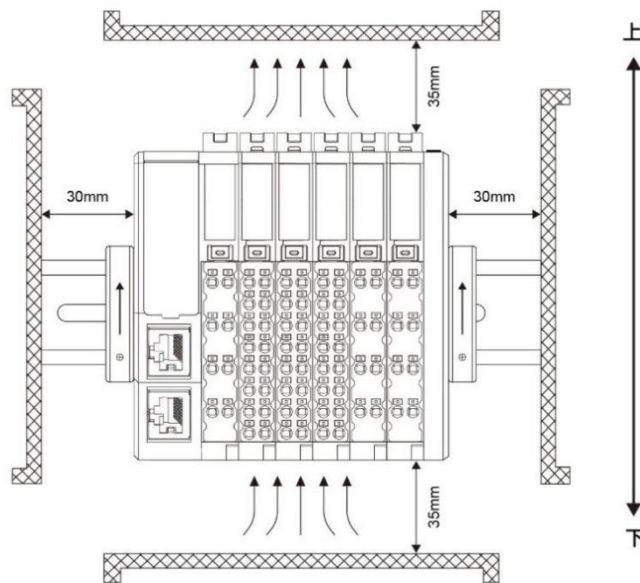
- When the controller is connected to the RB-1120 through a switch, it is recommended to use a standard industrial Ethernet switch to avoid device abnormalities caused by network issues related to non-industrial switches.
- Some switches provide BSP and QoS functions, which can mitigate certain network interferences in specific environments. If multiple switches are cascaded on site, the BSP function must be enabled.

2. Mechanical installation

2.1 Understanding before installation

2.1.1 Installation Method

This product supports horizontal DIN rail mounting. To ensure proper ventilation and heat dissipation, as well as sufficient wiring space, the minimum installation clearance around the product must be maintained as shown in the figure below.



Note: Do not install this product directly above high-temperature heat sources (such as heaters, transformers, or high-power resistors). In other installation positions, a minimum clearance of 100 mm must be maintained from any high-temperature heat source.

2.1.2 Installation Precautions

To ensure the reliability and functional integrity of this product, please comply with the following installation requirements:

Do not install this product in environments with:

- Ambient temperatures outside the range of -25°C to $+60^{\circ}\text{C}$
- Relative humidity exceeding 95%RH
- Altitudes exceeding 2000 m (795 hPa)
- Rapid temperature fluctuations that may cause condensation

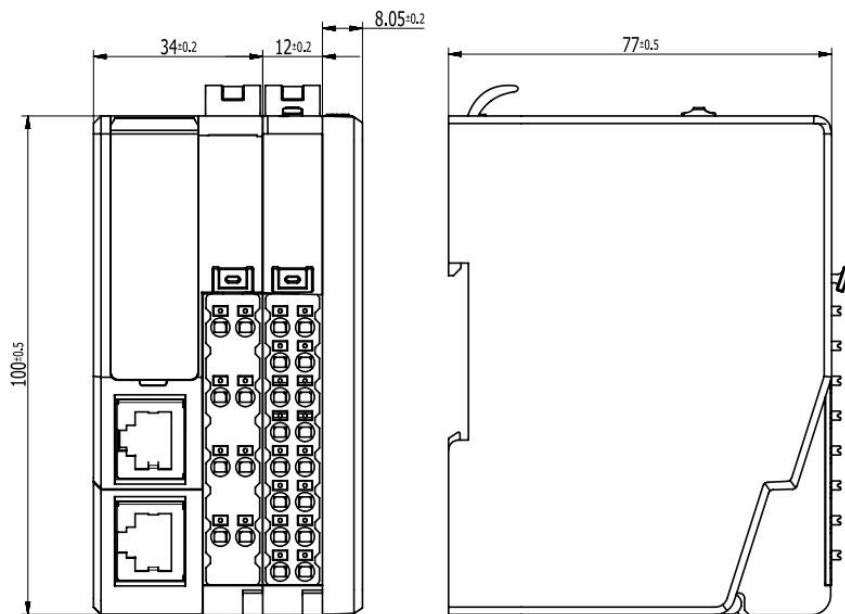
- Corrosive or flammable gases
- Excessive dust, conductive particles (e.g., iron powder), moisture, oil mist, salt, or organic solvents
- Direct exposure to sunlight
- Strong vibration or repetitive mechanical shock

If installation is required in the following environments, appropriate and sufficient isolation measures must be implemented:

- Areas affected by static electricity or other types of electrical noise
- Areas exposed to strong electromagnetic fields
- Environments where radioactive exposure may occur
- Locations in close proximity to power lines

2.1.3 Installation space

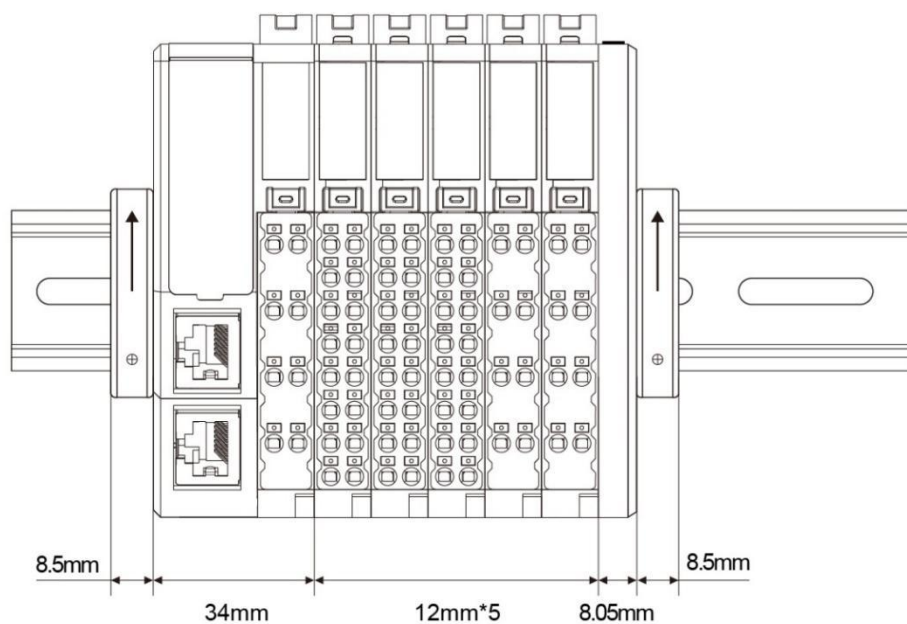
The installation dimensions of this product are in millimeters (mm), as shown in the figure below.



Installation Width Calculation Example

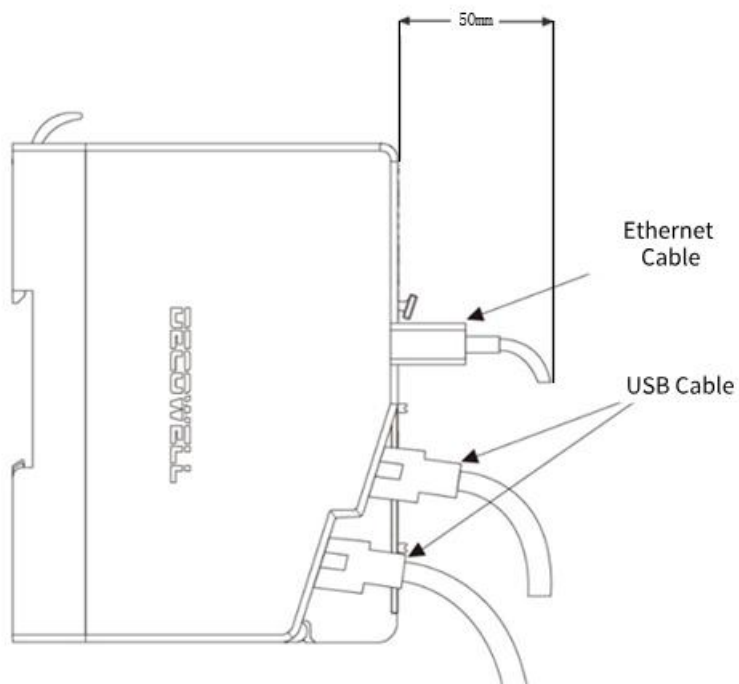
As an example, when using 1 RB-1120 module + 5 expansion modules + 1 terminal module, the installation width is calculated as shown in the figure below (unit: mm).

The total installation width is: $34 + 12 \times 5 + 8.05 + 8.5 \times 2 = 119.05 \text{ mm}$



Cable space reserved:

Please allow at least 50mm of space for USB, RJ45 and other connecting cables.



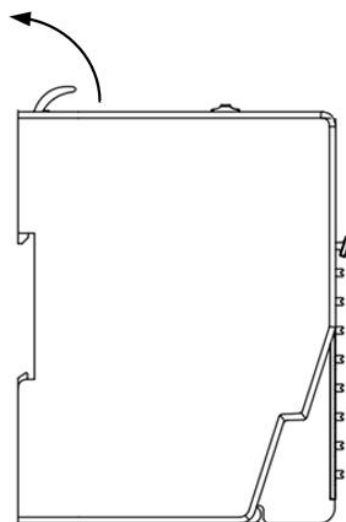
2.2 Installation Method

2.2.1 Module-to-Module Installation

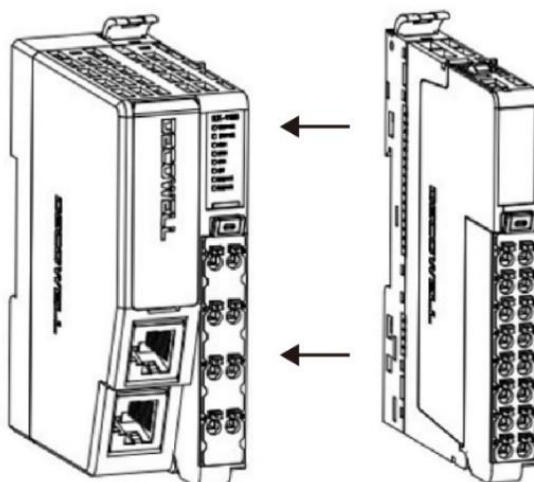
The RB series modules adopt a three-section design, consisting of the terminal block, module body, and module base, and support hot swapping. This allows pre-wiring before installation to improve installation efficiency, and enables one-step replacement during maintenance to reduce downtime.

Module Assembly:

Module installation is performed through the locking lever located on the top of the module. Before installation, lift the locking lever upward to the unlocked position, as shown in the figure below.

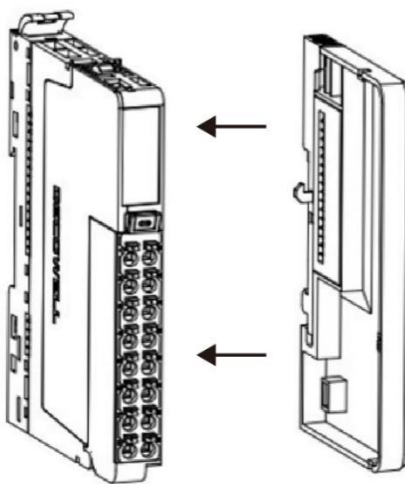


After unlocking the locking levers on both modules to be assembled, align the modules in the direction shown below and press them together. Once the modules are fully seated, an audible click will confirm proper engagement. Then press all locking levers downward to lock the modules in place. Installation is now complete.

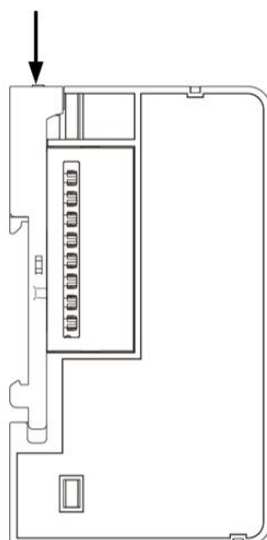


Module-to-Module Removal: Before removal, lift the locking levers on the top of the modules to the unlocked position, same as during installation. After unlocking the levers, pull the modules apart to detach them.

Terminal module installation: Align the end module with the last expansion module, then press in the direction of the arrow until fully engaged. An audible click will confirm that the module is properly installed, as shown in the figure below.



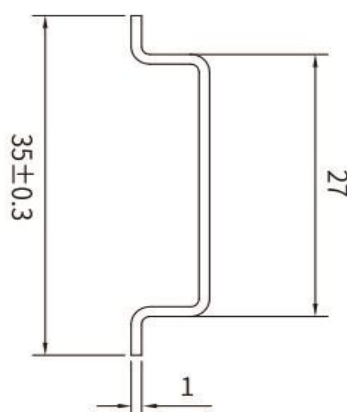
Terminal Module Removal: Press the PUSH button on the end module downward as shown in the figure. After fully pressing it to the bottom, separate the end module from the other modules.



The module adopts DIN rail mounting.

The DIN rail must comply with the IEC 60715 standard (35 mm width, 1 mm thickness).

The dimensional information is shown in the figure below.



Note: When installing the module on DIN rails other than the recommended DIN-35 type, the rail locking latch may fail to lock properly. Before installation, make sure to unlock the top locking lever of the module, and then proceed with the installation steps.



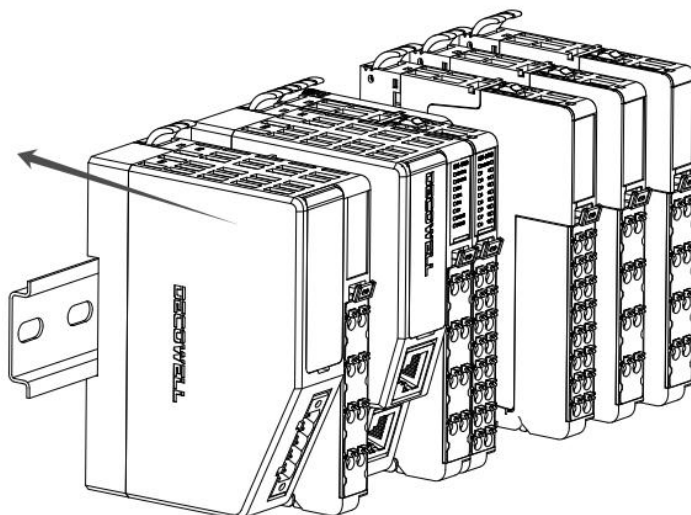
Caution

- When this product is installed on DIN rails other than the recommended types (especially DIN rails with a thickness ≤ 1.0 mm), the DIN rail locking latch may fail. This may result in improper mounting and prevent the product from functioning correctly.

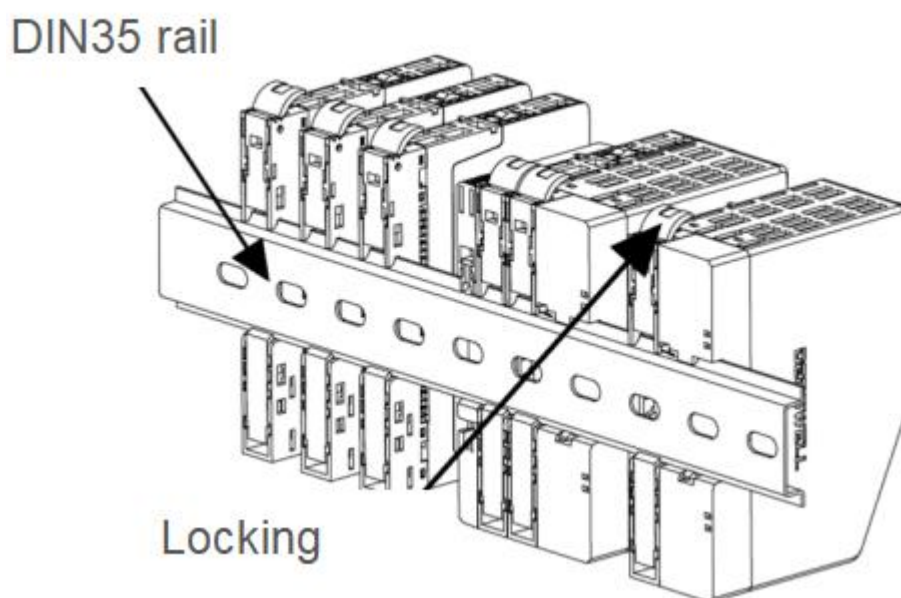
2.2.2 DIN Rail Mounting

Installation

Align the module with the DIN35 rail and press it in the direction indicated by the arrow to hook the module onto the rail, as shown below.



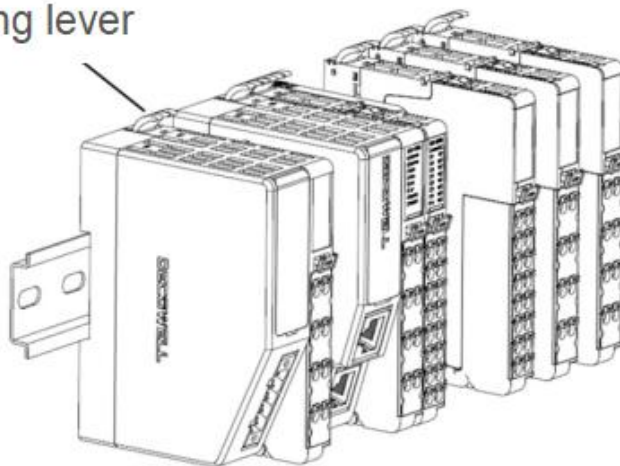
After the module is placed on the rail, press the locking lever downward to secure the module onto the rail and ensure proper installation, as shown below.



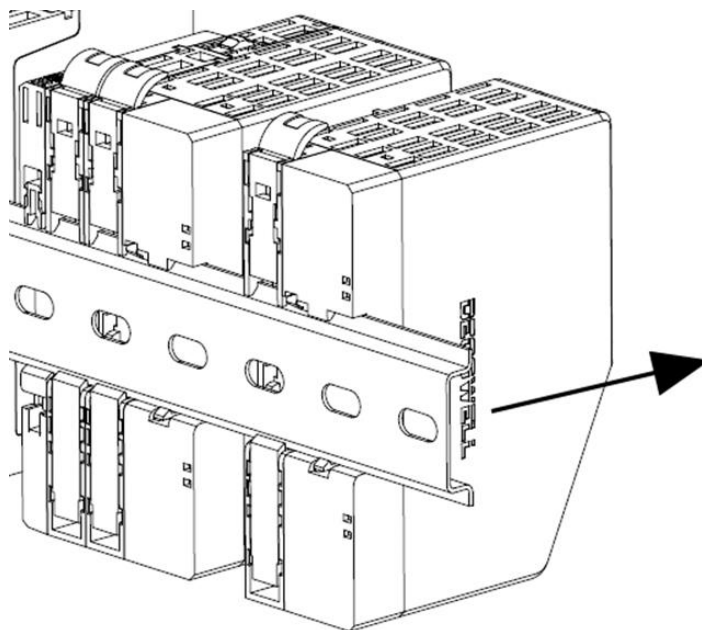
Removal:

To remove the module, push the locking lever upward to unlock the module, as shown below.

Lift the locking lever



After unlocking the lever, pull the module away from the DIN35 rail in the direction indicated, as shown below, and the removal is completed.



3. Electrical installation

3.1 Cable Selection

EtherNet/IP bus communication uses shielded Ethernet cables for network data transmission. Short circuits, incorrect wiring, and poor contact must be avoided. Category 5e or higher shielded twisted-pair cables with molded iron-shell connectors are required. The shielded cable specifications are listed below.

Name	Function Definition
Cable type	Flexible crossover cable, double-shielded (S/FTP), Category 5e or above
Double Shielding	Braided shielding (coverage $\geq 85\%$), aluminum foil shielding (coverage 100%)
Applicable Standards	EIA/TIA 568A, EN50173, ISO/IEC 11801 EIA/TIA bulletin TSB, EIA/TIA SB40-A & TSB36
Conductor Cross-section	AWG26 or larger
Conductor Type	Twisted pair
Number of Pairs	4
Environment	Resistant to industrial oil, acid and alkali corrosion; Operating temperature: $-30^{\circ}\text{C} \sim 60^{\circ}\text{C}$
Notes: 1. The cable length between devices shall not exceed 100 m. Exceeding this length will cause signal attenuation and affect normal communication. 2. If the operating temperature exceeds the normal operating temperature (60°C), please use high-temperature resistant network cables.	

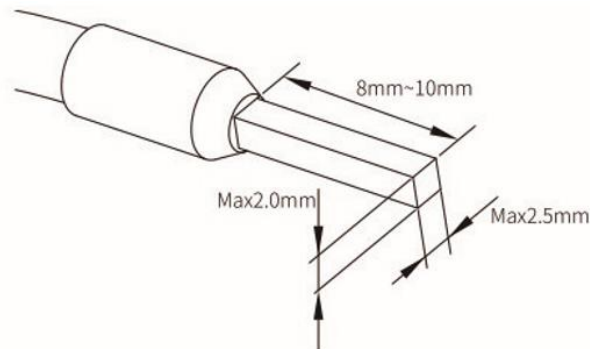
Power-related cables: the wire lug diameters listed in the table below are for reference only. Please perform appropriate calculations based on actual application conditions and adjust accordingly.

Name	Compatible wire diameter		KST	
Ring Lug	GB/mm ²	American Standard/AWG	Model	Wire crimping pliers
	0.25	24	E0208	KST2000L
	0.5	20	E0510	
	0.75	18	E7510	

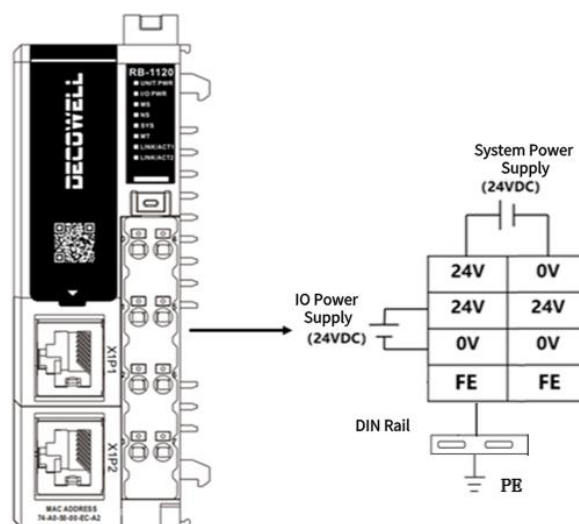
	1.0	18	E1010	
	1.5	16	E1510	

Stripping length: 8-10mm

The shape and size requirements for the crimped terminals are shown in the following figure:



3.2 Terminal wiring



Caution

- The grounding terminal of the adapter module must be directly grounded to prevent interference to the I/O module signals.
- The power supply for the RB series adapter is divided into system power and I/O power. To avoid interference to the system, it is recommended to route two independent 24 VDC power lines from the same power supply module to the adapter's system power and I/O power, respectively.

4. Grounding Cables and Field Wiring Instructions

4.1 Introduction

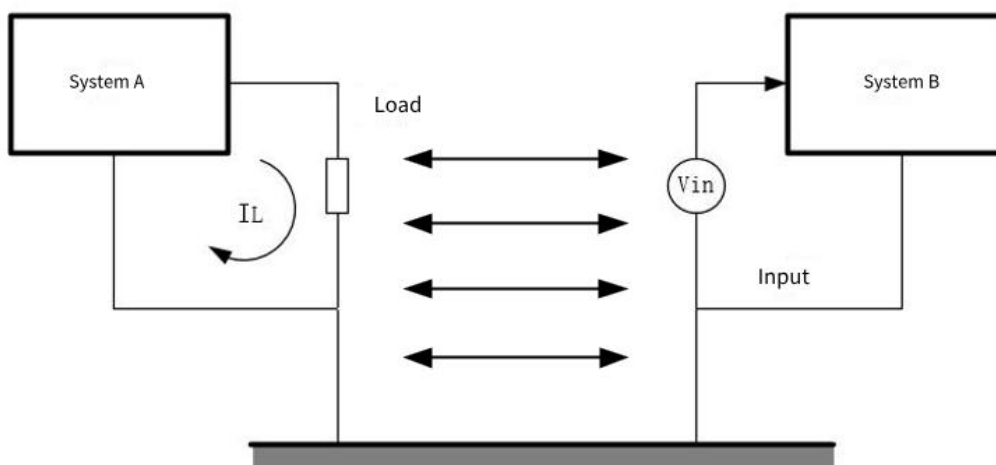
The primary purpose of standardized wiring and shielding in industrial environments is to ensure personnel safety, followed by maintaining system operational stability, and preserving electromagnetic compatibility (EMC) of equipment to ensure reliable system performance and data integrity in industrial control applications.

4.2 Core Suppression Mechanisms of Grounding Systems Against Electromagnetic Interference (EMI)

① Common Impedance Coupling:

When multiple devices share the same grounding path, the impedance of the ground line may cause variations in current, generating potential differences that interfere with sensitive circuits.

Mitigation: Adopt a star-point single grounding approach: all module PE terminals should be connected to a unified grounding copper bar in the control cabinet. The copper bar must establish a low-impedance connection with the cabinet's metal frame (paint must be removed at the contact surface).



② Capacitive Coupling:

Occurs due to electric field interference between parallel cables.

Mitigation: Use shielded twisted pair (STP) cables with single-ended grounding.

③ Inductive Coupling:

A changing current flowing through a cable generates surrounding magnetic and electric fields. Sensitive circuits within these fields may induce unwanted voltages or currents, affecting circuit performance.

Mitigation: Maintain a minimum spacing of ≥ 30 cm between power (high-voltage/current) and signal (low-level) cables. If crossing is required, maintain a 90° angle.

4.3 EMC Optimized Cabling Specifications

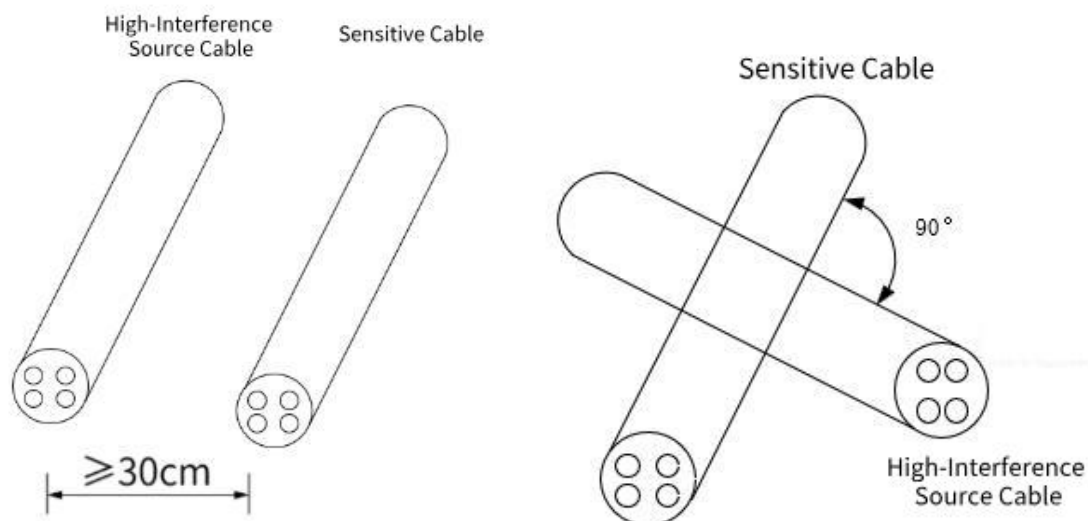
Cable routing requirements

Cable Type	Installation Requirements	Example Cables
Power cable	Routed in a separate metal duct (distance > 20 cm from signal ducts)	(distance > 20 cm from signal ducts) VFD output cables, brake resistor cables
Analog/Communication cable	Routed in a shielded duct with partitions; twisted pair pitch ≤ 5 cm	AI 4-20mA, EtherNet/IP bus
Digital I/O cable	Grouped and bundled in a non-shielded duct	DI sensor, DO control cable

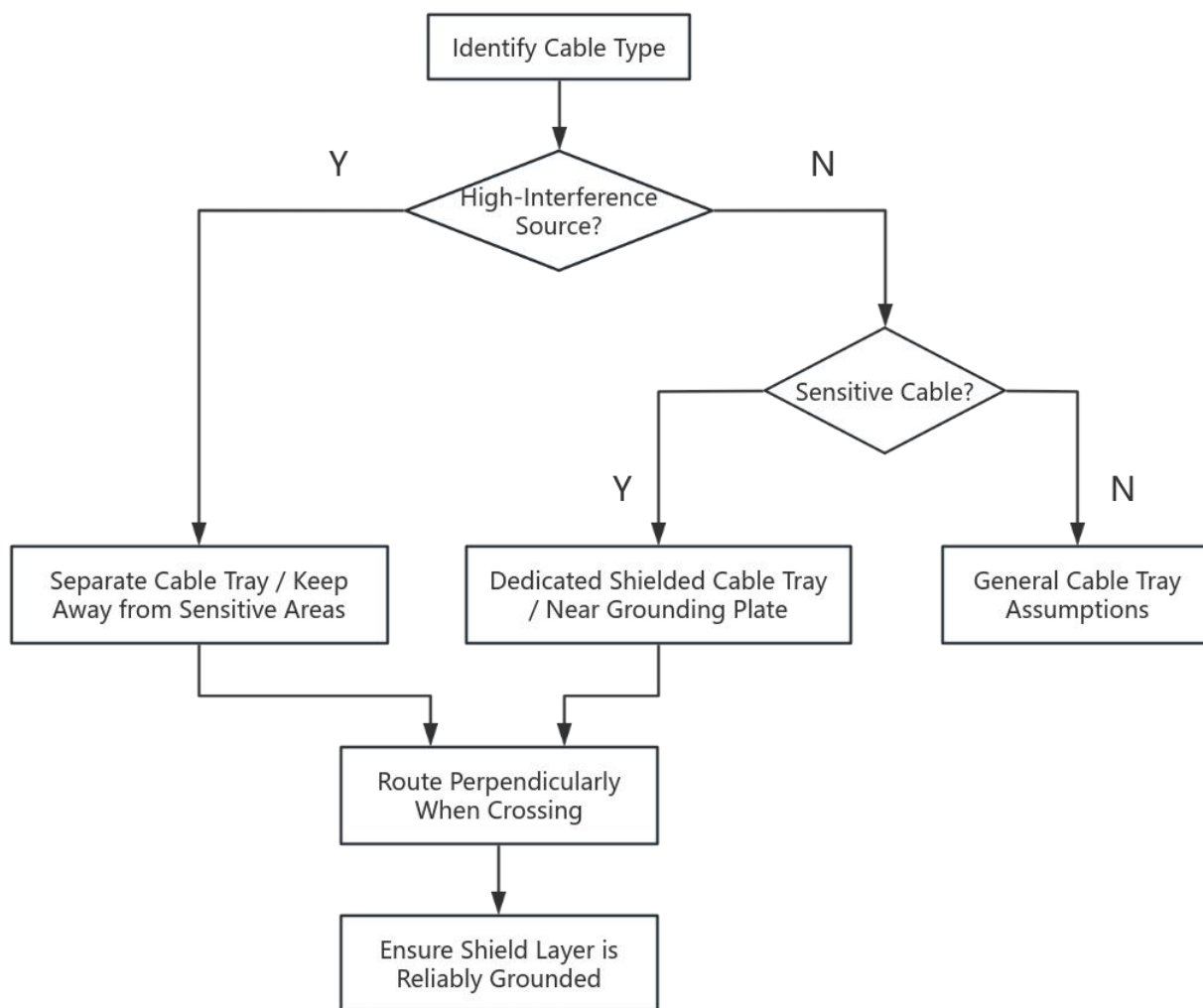
Wiring Recommendation:

To prevent communication interruptions or signal distortion caused by high-interference sources, maintain a minimum spacing of ≥ 30 cm or use shielded cables with both ends grounded. Sensitive cables (such as sensor or communication lines) must be strictly separated from high-interference cables (such as VFD or power lines) and must not be routed in parallel.

If the required spacing cannot be maintained, sensitive cables should be shielded with both ends grounded and installed to cross high-interference cables at a 90° angle.



For wiring, please refer to the following process:



Key Points

Cable Length: It is recommended to keep cable lengths as short as possible to minimize the risk of common-mode interference caused by coupling through the grounding path.

Spare Conductors: In multi-core cables, any spare conductors must be shorted to the PE bus. Leaving spare conductors floating is strictly prohibited.

Duct Connections: Conductive gaskets should be used at duct joints to ensure electromagnetic continuity. Shielded cables can effectively reduce interference from magnetic fields, electric fields, or electromagnetic fields by transferring interference currents from the shield to ground.

Shielded Cable Grounding: Shielded cables shorter than 1 meter should have their shield connected to the nearest PE terminal. Over-stripped cores can easily pick up interference. For modules without dedicated PE terminals, the shield may be connected to an external PE terminal.

Note on Safety Voltage Circuits (SELV / PELV)

According to international standards (IEC 61140), two types of safety extra-low voltage circuits are defined:

SELV (Safety Extra-Low Voltage Circuits): Safety is achieved through protective isolation, not relying on grounding.

PELV (Protective Extra-Low Voltage Circuits): Safety is achieved through grounding protection + voltage limitation, and relies on proper grounding.

Industrial control PLCs are categorized according to their power circuits: most PLC control circuits are SELV, while certain grounded power circuits may fall under PELV. Currently, all PLC and I/O products of our company belong to SELV.

Functional Grounding (FE) vs Protective Grounding (PE)

For SELV circuits, grounding is performed as functional grounding (FE) to meet equipment or system operational requirements. It establishes a stable reference potential to ensure proper device operation, accurate signal transmission, and suppression of electromagnetic interference. FE is not intended for personnel safety, but to maintain

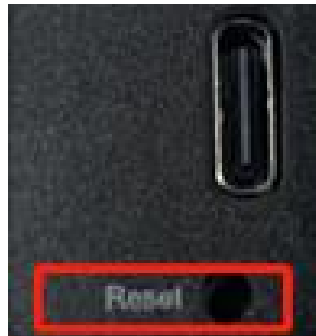
equipment performance (e.g., prevent signal drift, reduce noise, ensure correct logic operation).

PE grounding ensures personnel safety by connecting exposed conductive parts (such as metal enclosures or frames) to earth. In case of leakage (e.g., live wire contacting the enclosure), the leakage current is quickly diverted to ground, preventing electric shock. PE is mandatory under safety regulations, with strict impedance requirements (typically $\leq 4 \Omega$), and is directly related to shock protection.

5. Module Functions

5.1 Reset and Upgrade Functions

5.1.1 Reset Function



Press and hold the Reset button for 5 seconds, then release the button to restore the device to factory settings and restart.

5.1.2 Upgrade Functionality

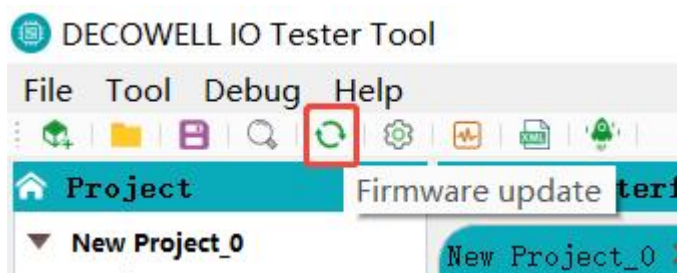
Connect the computer to the adapter's Type-C port.



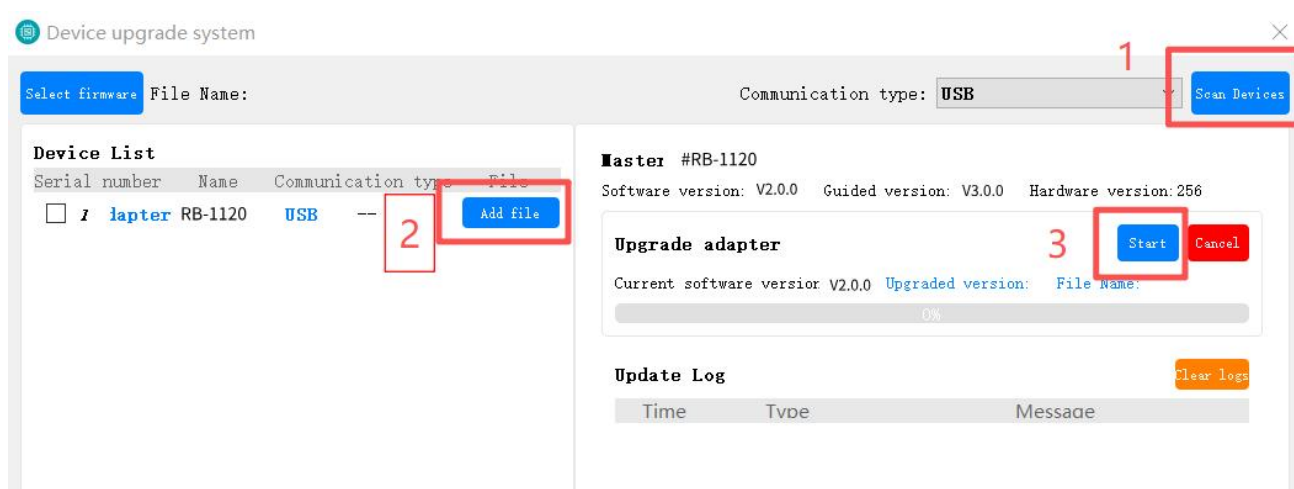
Open the IO Tester Tool software.



Click "Firmware Update" in the IO Tester Tool.



Click "Scan Device," and after the module is scanned, select the corresponding upgrade file. Check the module and click "Start"



5.2 IP Address Settings

① IP Configuration Instructions

DIP switch value (DEC)	IP address
000	Configure via BOOTP.
001-254	The lower byte of the IP address is set by rotating the switch.
>254	When the IP address exceeds the valid range, the module status indicator (MS) flashes red.

At factory shipment, the rotary switch is set to "000", and no IP address is assigned.

IP Address Configuration via Rotary Switch:

When configuring the IP address via the rotary switch from factory default state, the IP address becomes: 192.168.0.X (X = rotary switch setting from 1 to 254)

For example: If the switch is set to 1, the module IP address becomes 192.168.0.1.

When setting the IP address via the rotary switch after the IP address has already been assigned through BOOTP:

The IP address retains the upper 3 bytes assigned by BOOTP, while the lower 1 byte is determined by the rotary switch value.

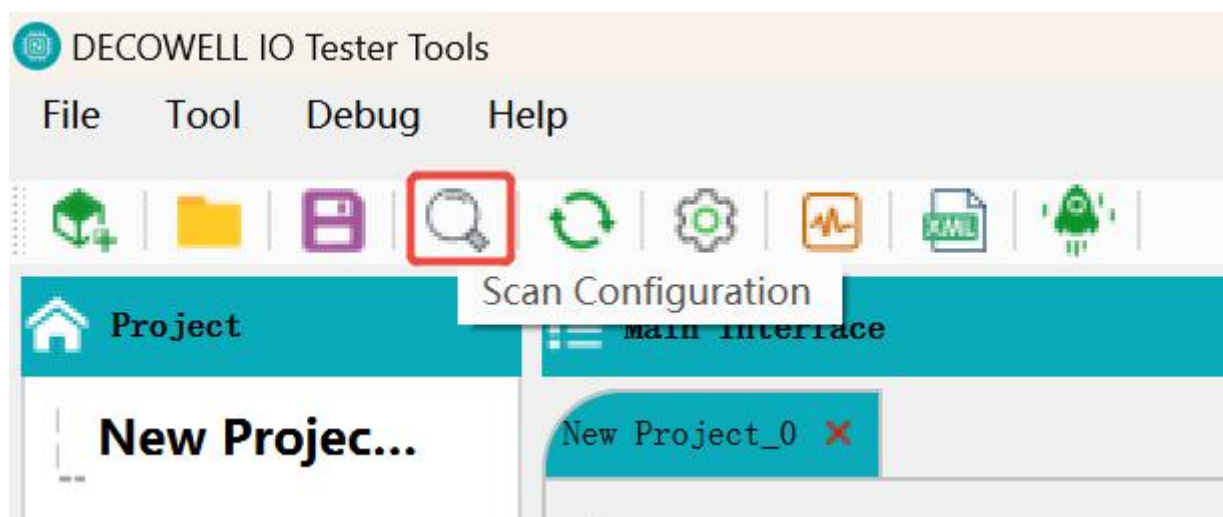
For example: If the IP address is set to **192.168.3.18** through BOOTP, and the rotary switch setting is then changed, the resulting IP address will be: **192.168.0.X** (X= rotary switch setting from **1 to 254**)

② Configure IP address via software

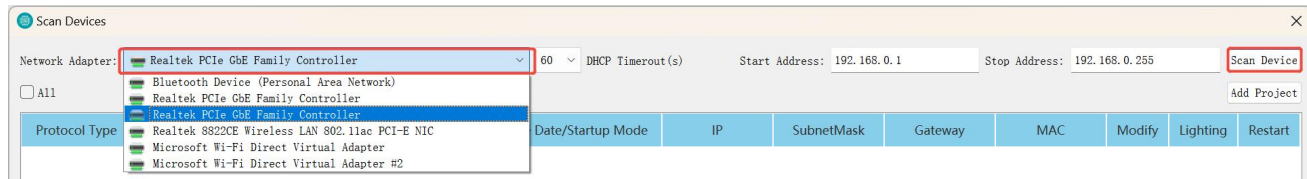
Set the DIP switch to 0, connect the module to the computer using an Ethernet cable, and open the Decowell IOTesterTool software.(If the DIP switch is not set to 0, the IP address set will be overwritten by the address configured via the DIP switch after power off and restart.)



Click "Scan Configuration".

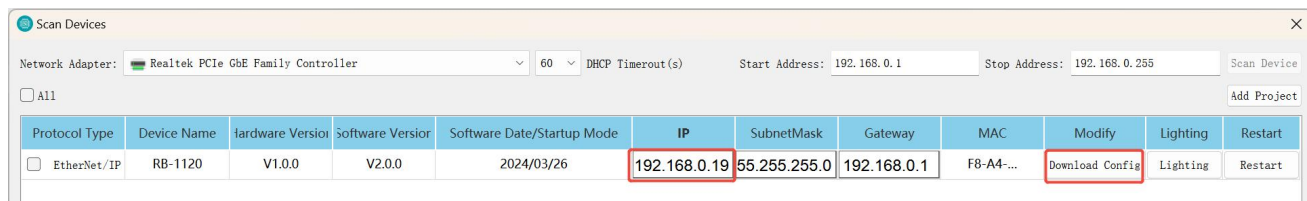


In the pop-up device scanning window, select the corresponding network adapter information and module address range, then click Search Device.



After a successful scan, modify the module's IP address. Once modified, click Download Configuration to write the configuration parameters to the module. The settings will take effect after a power cycle.

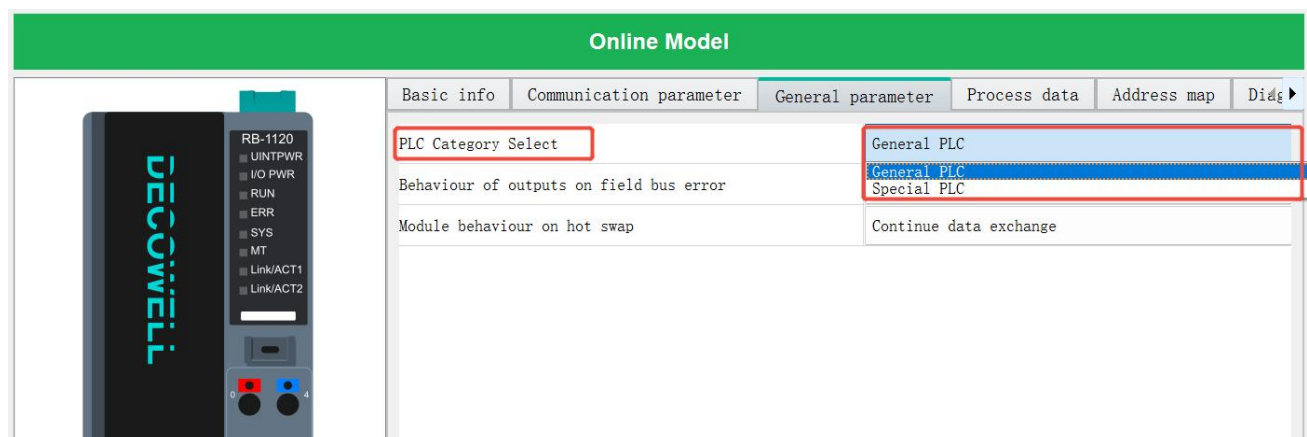
Note: Changes to the DIP switch will only take effect after power off and restart.



IP address setup completed.

5.3 PLC Category Setting

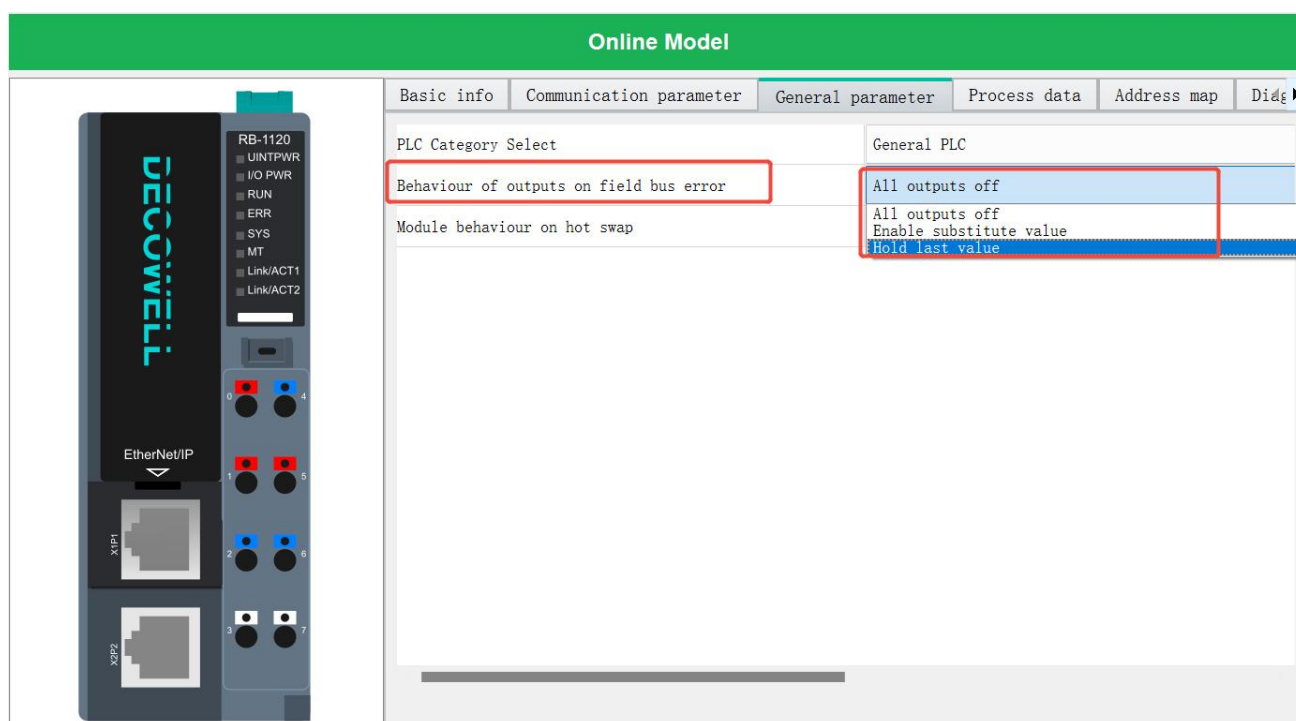
The adapter supports two PLC modes: General PLC mode and Special PLC mode (Keyence mode), which can be set in PLC Category Select.



Value	Describe
General PLC	Ordinary PLC mode
Special PLC	Special PLC Mode (Available only with Keyence PLCs)

5.4 Abnormal Bus Output Behavior

The adapter supports three bus error behaviors: zeroing, replacing the value, and retaining the last value. This function is configured through the "Behaviour of outputs on field bus error" parameter in the IO Tester Tool software.



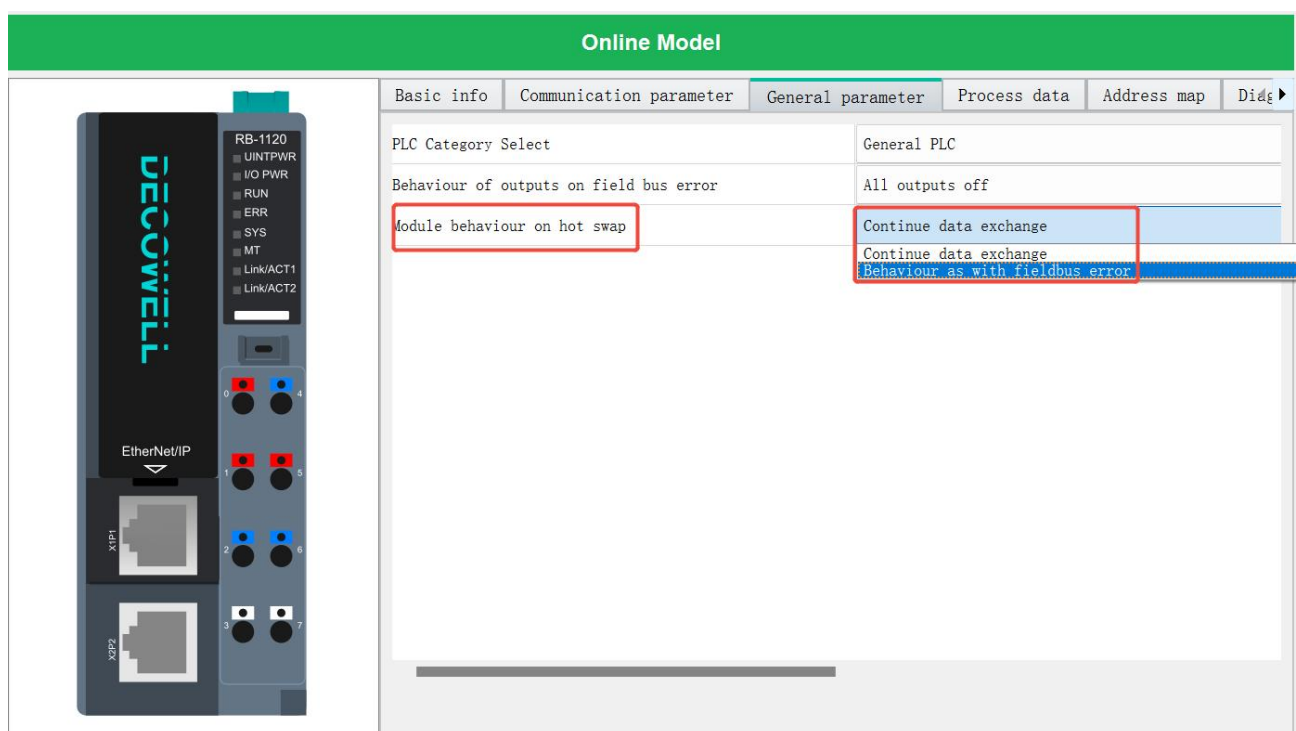
Value	Describe
All outputs off	Clear output module status data
Enable substitute value	Startup Alternative Value
Hold last value	Keep the last value

5.5 Hot-plug behavior

The adapter supports two hot-swap behaviors: Continue Data Exchange and Same as Bus Error Behavior.

This function is configured via the Module behaviour on hot swap parameter in the IOTesterTool software.

- When set to Continue Data Exchange, other I/O modules will continue data exchange during a hot-swap event.
- When set to Behaviour as with fieldbus error, other I/O modules will act according to the parameters defined under the bus error behavior.

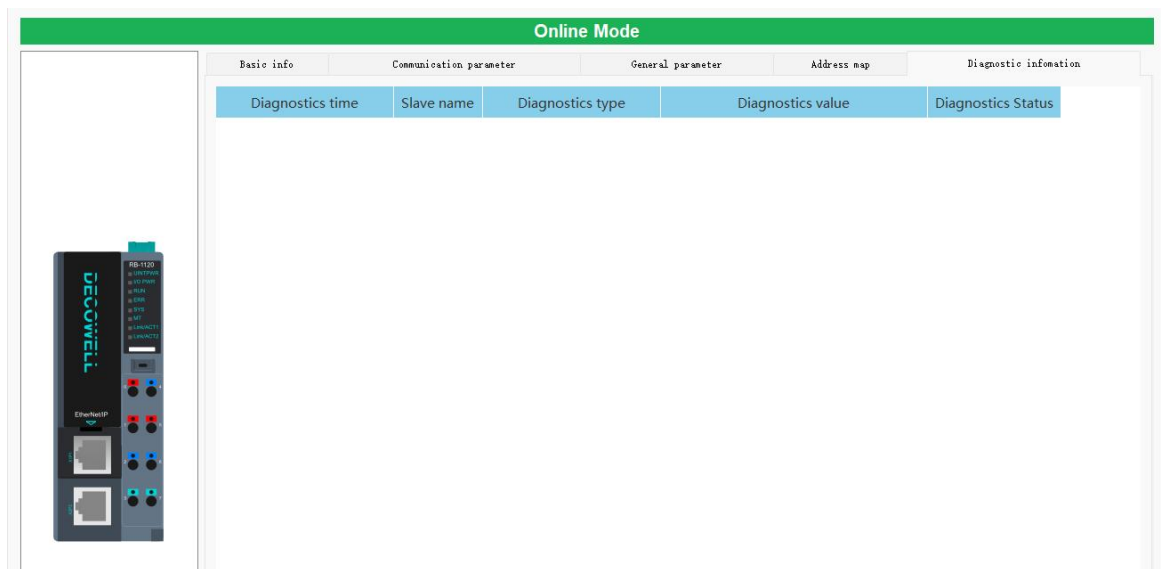


Value	Describe
Continue data exchange (default)	Continuous interaction
Behavior as with fieldbus error	Inherited bus exception handling method

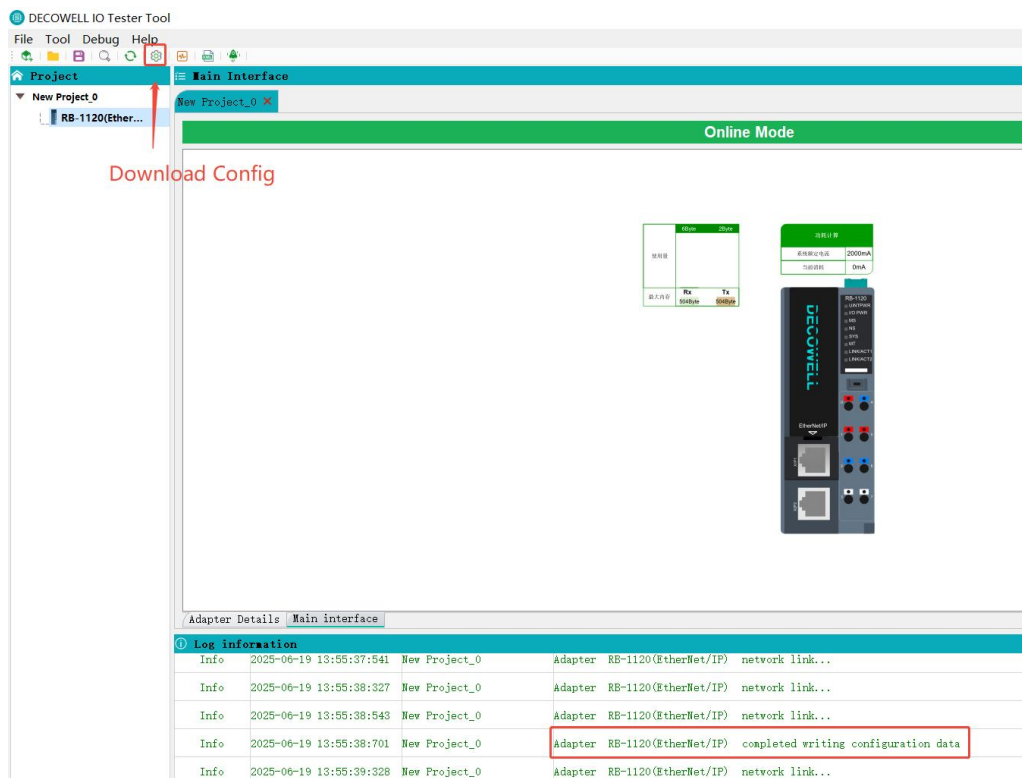
5.6 Module Diagnostics

The module includes diagnostic functions and supports module-level diagnostics.

Currently, diagnostics can be viewed in the IOTesterTool configuration software, and only diagnostic events generated within IOTesterTool are supported for viewing.



Note: The above parameter changes must be downloaded to the module to take effect.



6. Adapter Configuration Case

6.1 Machine Expert and RB-1120 Connection and Configuration

Notice:

① The factory default IP network segment is 192.168.0.X.

The network segment can be modified via IO Tester Tool, and the IP address is set using the adapter DIP switches.

② I/O module configuration on the right side of RB-1120 and EtherNet/IP communication I/O byte length settings

If no I/O modules are installed on the right side of RB-1120, the adapter itself is configured with 6 bytes for Input (T→O) and 2 bytes for Output (O→T).

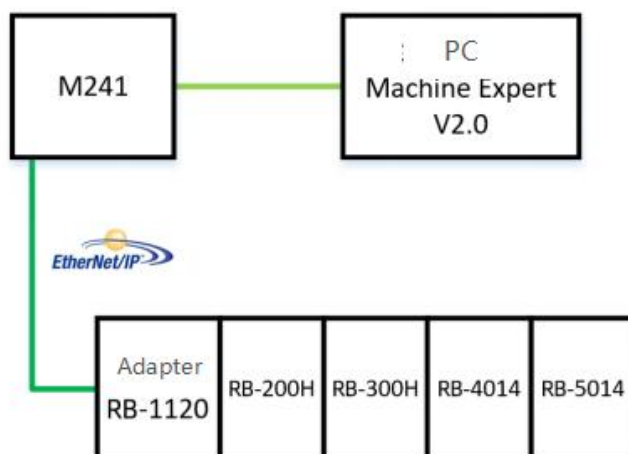
When additional I/O modules are added, their byte length must be added on top of the base 6 bytes (T→O) and 2 bytes (O→T).

③ The RB-1120 adapter supports two PLC class modes: Normal PLC and Special PLC.

Special PLC refers specifically to KEYENCE PLC, while Normal PLC refers to PLCs from other manufacturers. The default setting is Normal PLC mode.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
RB-1120	6	2
RB-1120 RB-200H	8	2
RB-1120 RB-300H	6	4
RB-1120 RB-200H RB-300H	8	8

6.1.1 Communication Connection Diagram



Communication connection diagram

6.1.2 Hardware Configuration

Hardware Configuration Table

Hardware	Quantity	Remark
PC	1	Install Machine Expert V2.0
PLC	1	M241
RB-1120	1	EtherNet/IP adapter
RB-200H	1	Digital input module
RB-300H	1	Digital output module
RB-4014	1	Analog input module
RB-5014	1	Analog output module

6.1.3 IP Address Settings

In this example, the Schneider M241 PLC has an IP address of 192.168.1.39, while the RB-1120 adapter's default network segment is 192.168.0.X.

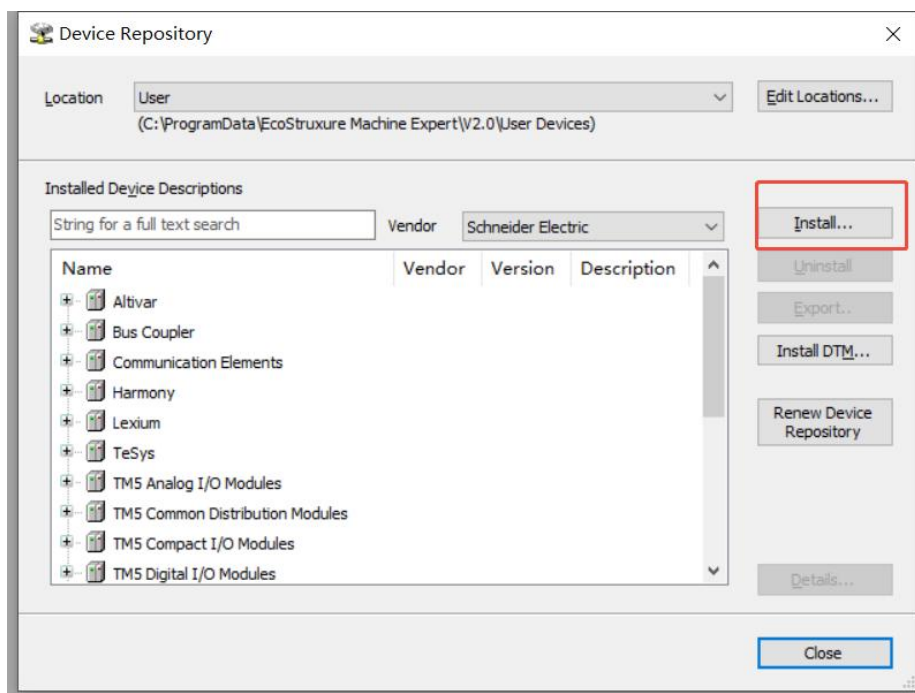
- ① Use the IP Config Tool or IO Tester Tool to change the network segment to match the PLC.
- ② Set the adapter IP address to 192.168.1.33 using the DIP switches on the adapter.

6.1.4 Installing EDS files

Open the Machine Expert V2.0 programming software.

From the menu bar, select Tools > Device Repository.

In the Device Repository window, select Install, then choose RB-1120_V1.1 from the Generic Version folder under the EDS directory, and confirm the installation.

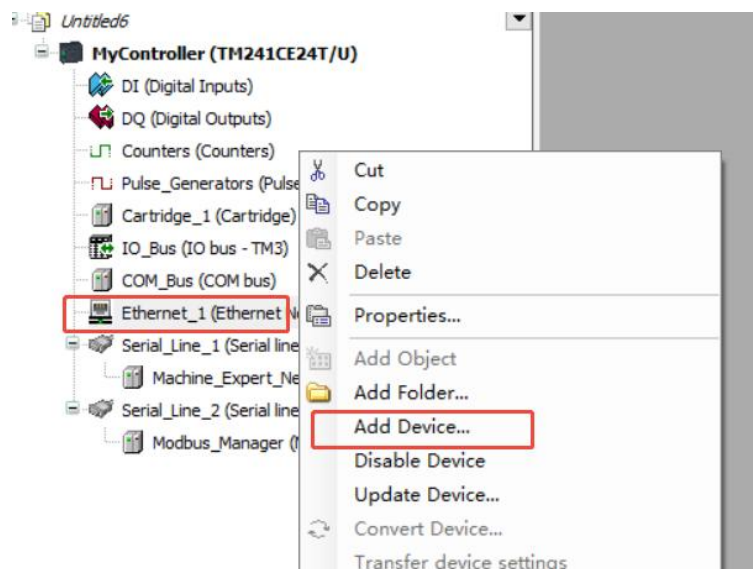


Install EDS file

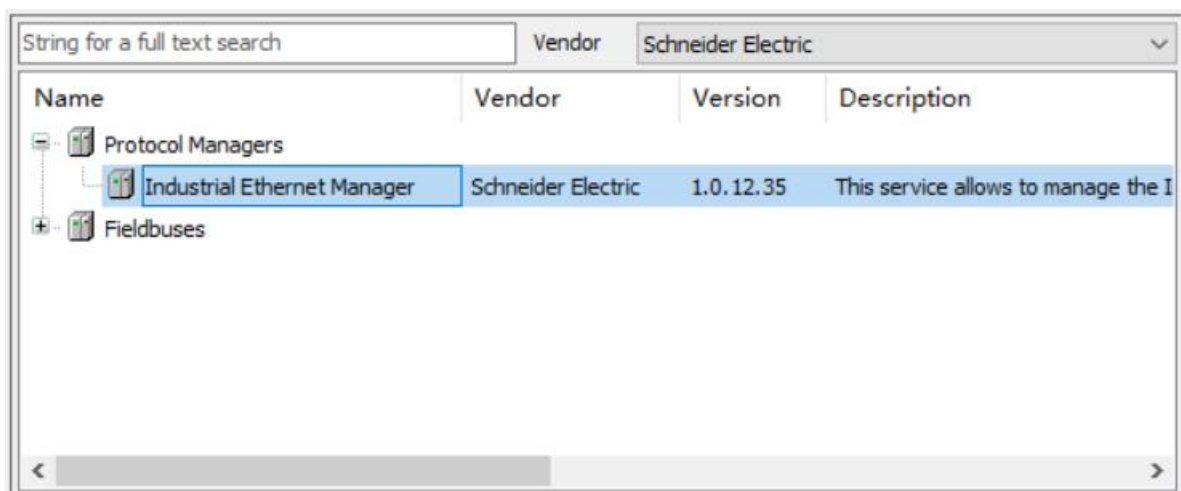
6.1.5 Configuration of New Construction Projects and Equipment

Open Machine Expert V2.0, create a project, and right-click "Ethernet_1" in the device tree and select "Add Device", as shown in the figure.

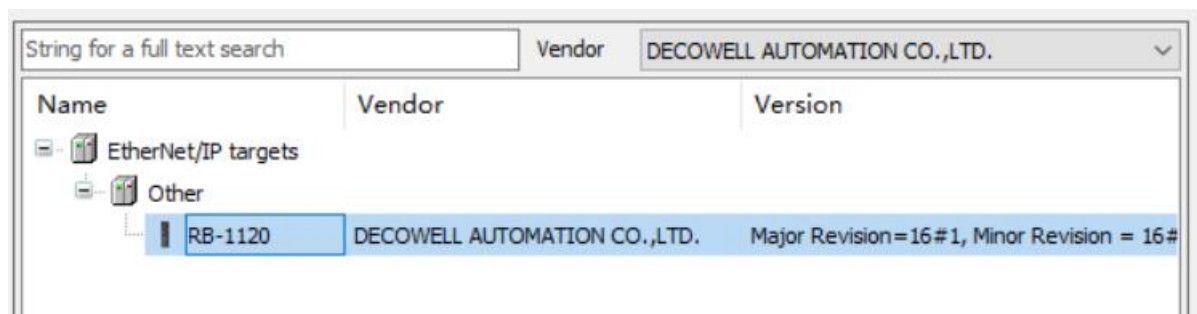
In the Add Device window, select "Protocol Managers" > "Industrial Ethernet Manager", right-click "_ (Industrial Ethernet Manager)" under the device tree > "Add Device", in the device window, select "DECOWELL AUTOMATION CO.,LTD" as the vendor, and select "RB-1120" in the device catalog, as shown in the figure.



Add device

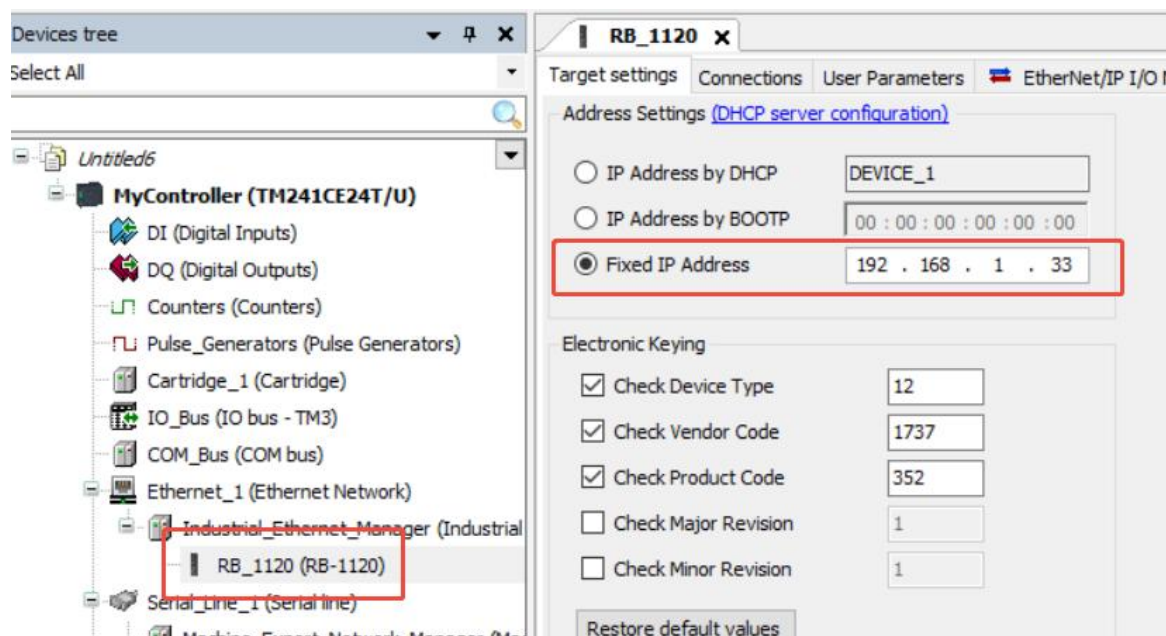


Add Industrial Ethernet Manager



Add RB-1120

Configure RB-1120 parameters: Double-click "RB-1120" in the device tree, and configure the IP address to a static IP address, as shown in the figure below.



Configure IP address

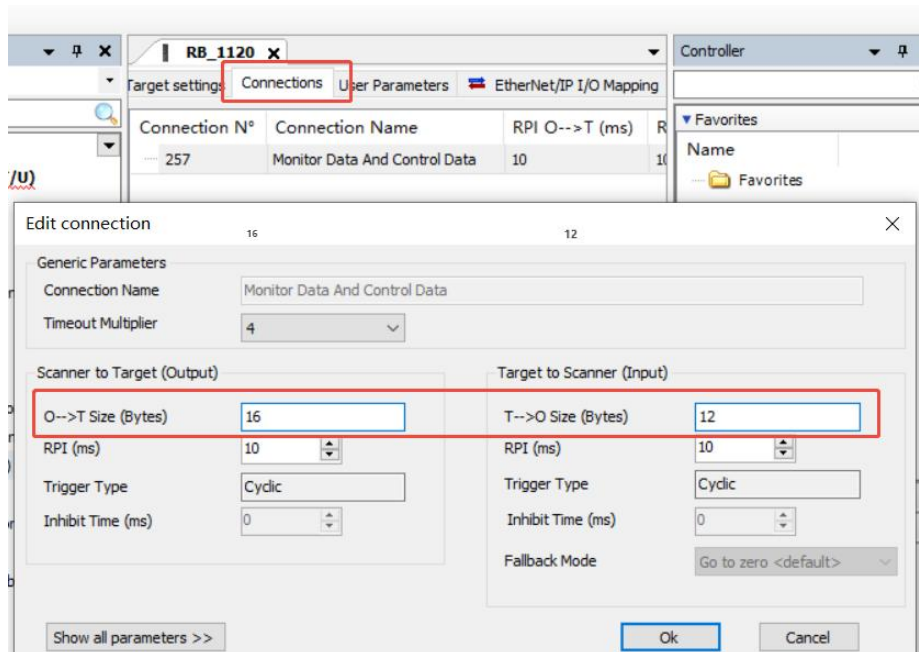
Number of bytes occupied by the calculation module:

Module model	Quantity	Input/output types	Number of bytes occupied
RB-1120	1	Input (T-->O)	6
		Output (O-->T)	2
RB-2xx8	1	Input (T-->O)	2
RB-2xxH	1	Input (T-->O)	2
RB-2xxS	1	Input (T-->O)	4
RB-3xx4	1	Output (O-->T)	2
RB-3xx8	1	Output (O-->T)	2
RB-3xxH	1	Output (O-->T)	2
RB-3xxS	1	Output (O-->T)	4
RB-4xx4	1	Input (T-->O)	8
RB-4xx8	1	Input (T-->O)	16
RB-5xx4	1	Output (O-->T)	8
RB-5xx8	1	Output (O-->T)	16
RB-6002	1	Input (T-->O)	22
		Output (O-->T)	24
RB-6022	1	Input (T-->O)	22
		Output (O-->T)	24
RB-6032	1	Input (T-->O)	20
		Output (O-->T)	4
RB-6102	1	Input (T-->O)	28
		Output (O-->T)	32
RB-6212	1	Input (T-->O)	12
		Output (O-->T)	20
RB-6301	1	Input (T-->O)	66
		Output (O-->T)	66
RB-6311	1	Input (T-->O)	66

Configure the connection parameters by double-clicking the default connection.

In the Edit Connection window, set the size to 16 bytes for Output (O→T) and 12 bytes for Input (T→O).

Then check the I/O address mapping, as shown in the figure.



Configure input/output byte size

The screenshot shows the 'EtherNet/IP I/O Mapping' window. The 'Find' tab is selected. The table below shows the mapping of variables to addresses and types.

Variable	Mapping	Channel	Address	Type
		Input Monitor Data And Control Data	%IW7	ARRAY [0..5] 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
		Input Monitor Data And Control Data[5]	%IW12	WORD
		Output Monitor Data And Control Data	%QW2	ARRAY [0..7] 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
		Output Monitor Data And Control Data[5]	%QW7	WORD
		Output Monitor Data And Control Data[6]	%QW8	WORD
		Output Monitor Data And Control Data[7]	%QW9	WORD

IO address mapping

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

Note: In actual hardware, even if the RB-1120 adapter has the same number and model of I/O modules as configured, differences in the module arrangement order will result in different physical address assignments, as shown in the figure.

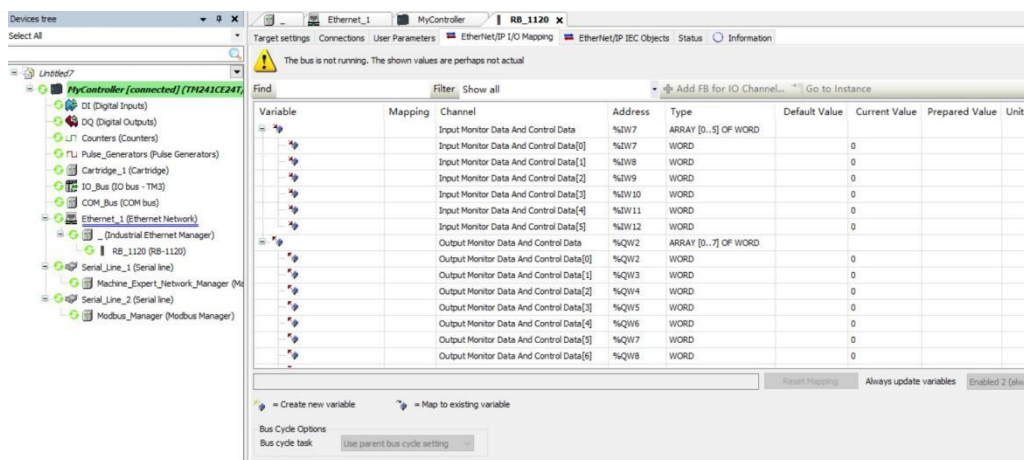
RB-1120	RB-200H	RB-300H	RB-4014	RB-5014
IW0	IW7	QW2	IW8	QW3
QW0			IW9	QW4
			IW10	QW5
			IW11	QW6

I/O Ordering and Address Allocation #1 (Application in a Case Study)

RB-1120	RB-4014	RB-5014	RB-200H	RB-300H
IW0	IW7	QW2	IW11	QW3
QW0	IW8	QW3		
	IW9	QW4		
	IW10	QW5		

I/O sorting and address allocation #2

In the EtherNet/IP I/O mapping, set “Always-updated Variable” to “Enable 2 (always in bus cycle task)”. Download the program to the PLC and monitor the PLC operating status and I/O mapping addresses, as shown in the figure.



Download and monitor the program

6.2 CODESYS and RB-1120 Connection and Configuration

Notice:

① The factory default IP network segment is 192.168.0.X.

The network segment can be modified via IO Tester Tool, and the IP address is set using the adapter DIP switches.

② I/O module configuration on the right side of RB-1120 and EtherNet/IP communication I/O byte length settings

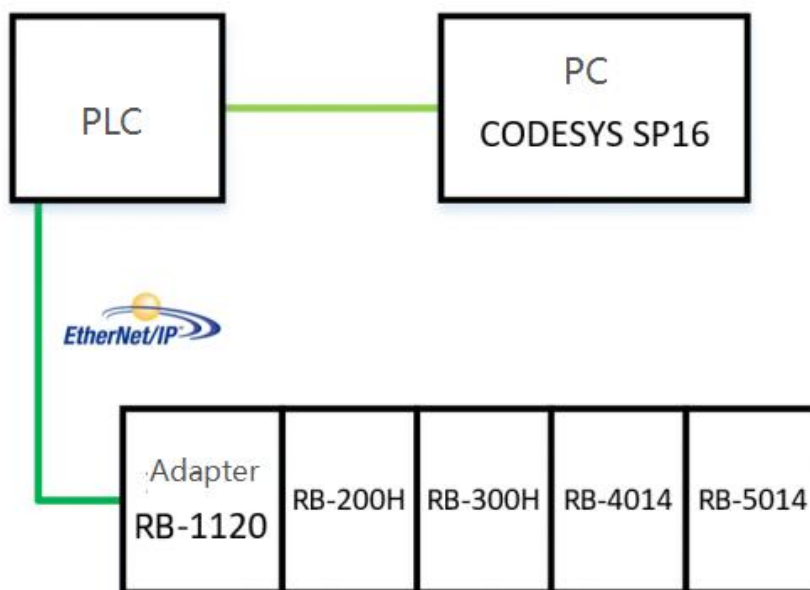
If no I/O modules are installed on the right side of RB-1120, the adapter itself is configured with 6 bytes for Input (T→O) and 2 bytes for Output (O→T).

When additional I/O modules are added, their byte length must be added on top of the base 6 bytes (T→O) and 2 bytes (O→T).

③ The RB-1120 adapter supports two PLC class modes: Normal PLC and Special PLC. Special PLC refers specifically to KEYENCE PLC, while Normal PLC refers to PLCs from other manufacturers. The default setting is Normal PLC mode.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
RB-1120	6	2
RB-1120 RB-200H	8	2
RB-1120 RB-300H	6	4
RB-1120 RB-200H RB-300H	8	4

6.2.1 Communication Connection Diagram



Communication connection diagram

6.2.2 Hardware Configuration

Hardware Configuration Table

Hardware	Quantity	Remark
PC	1	Install CODESYS SP16
controller	1	
RB-1120	1	EtherNet/IP adapter
RB-200H	1	Digital input module
RB-300H	1	Digital output module
RB-4014	1	Analog input module
RB-5014	1	Analog output module

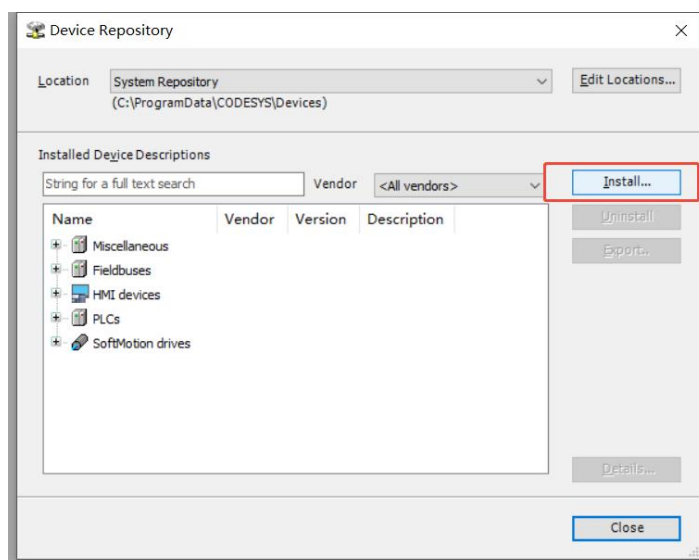
6.2.3 IP Address Settings

In this example, the CODESYS controller has an IP address of 192.168.1.198, while the RB-1120 adapter's default network segment is 192.168.0.X.

- ① Use the IP Config Tool or IO Tester Tool to change the network segment to match the PLC.
- ② Set the adapter IP address to 192.168.1.33 using the DIP switches on the adapter.

6.2.4 Installing EDS files

Open the CODESYS SP16 programming software, select "Tools" > "Device Repository" in the menu bar, select "Install" in the Device Repository window, as shown in the figure, select "General Version" > "RB-1120_V1.1" under the EDS folder and confirm the installation.

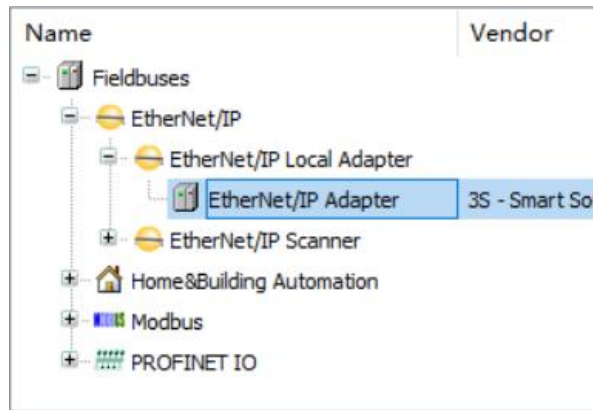


Install EDS file

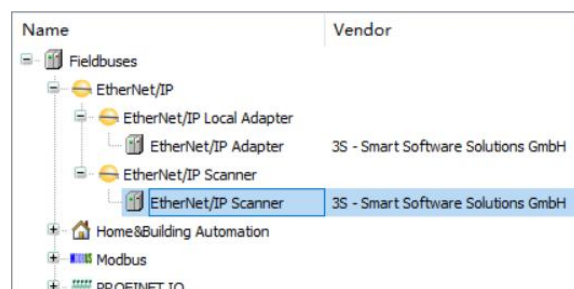
6.2.5 Configuration of New Projects and Equipment

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", as shown in the figure.

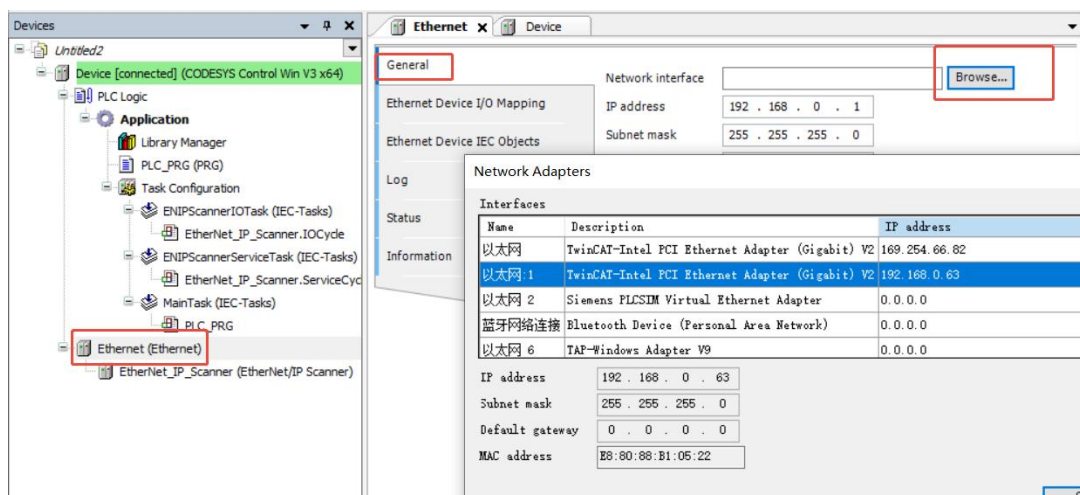


Add Ethernet adapter



Add Ethernet IP scanner

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



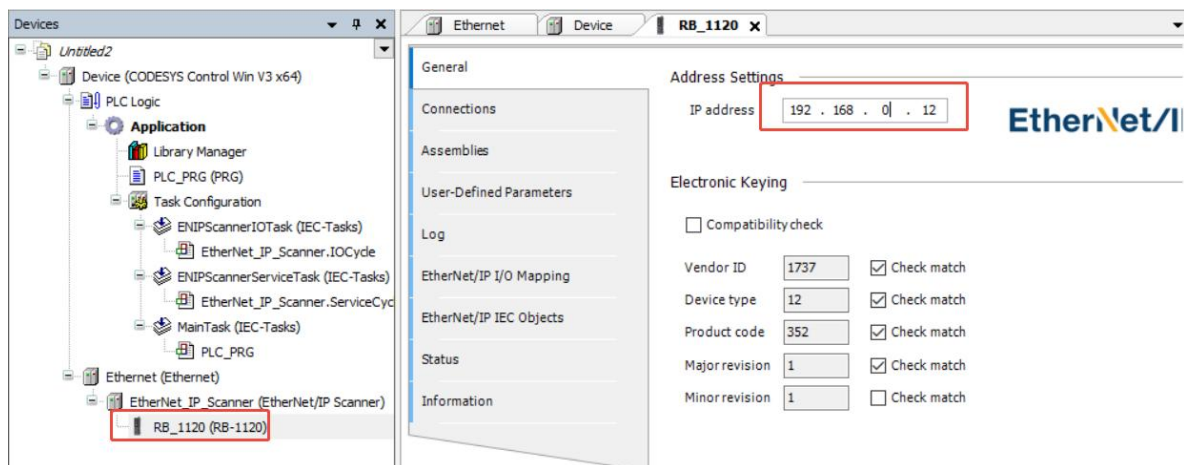
Network card with Ethernet adapter configured

Right-click "EtherNet_IP_Scanner" in the device tree and select "Add Device". In the Add Device window, select "RB-1120", as shown in the figure below.

Name	Vendor	Version
EtherNet/IP		
EtherNet/IP Remote Adapter		
EtherNet/IP Adapter	3S - Smart Software Solutions GmbH	Major Revision=16#1, Mino
EV-EI-01	DECOWELL AUTOMATION CO.,LTD.	Major Revision=16#1, Mino
EV-EI-01	DECOWELL AUTOMATION CO.,LTD.	Major Revision=16#2, Mino
EX-1120	DECOWELL AUTOMATION CO.,LTD.	Major Revision=16#1, Mino
Generic EtherNet/IP device	3S - Smart Software Solutions GmbH	4.1.0.0
MTC-1120	DECOWELL AUTOMATION CO.,LTD.	Major Revision=16#1, Mino
MTC-EI-01	DECOWELL AUTOMATION CO.,LTD.	Major Revision=16#1, Mino
RB-1120	DECOWELL AUTOMATION CO.,LTD.	Major Revision=16#1, Mino
SM112108	Systeme Electric referenc	Major Revision=16#1, Mino

Add RB-1120 adapter

Configure the IP address of the RB-1120 adapter. Double-click "RB_1120" in the device tree and enter the IP address (the IP address here must be consistent with the actual module setting), as shown in the figure.

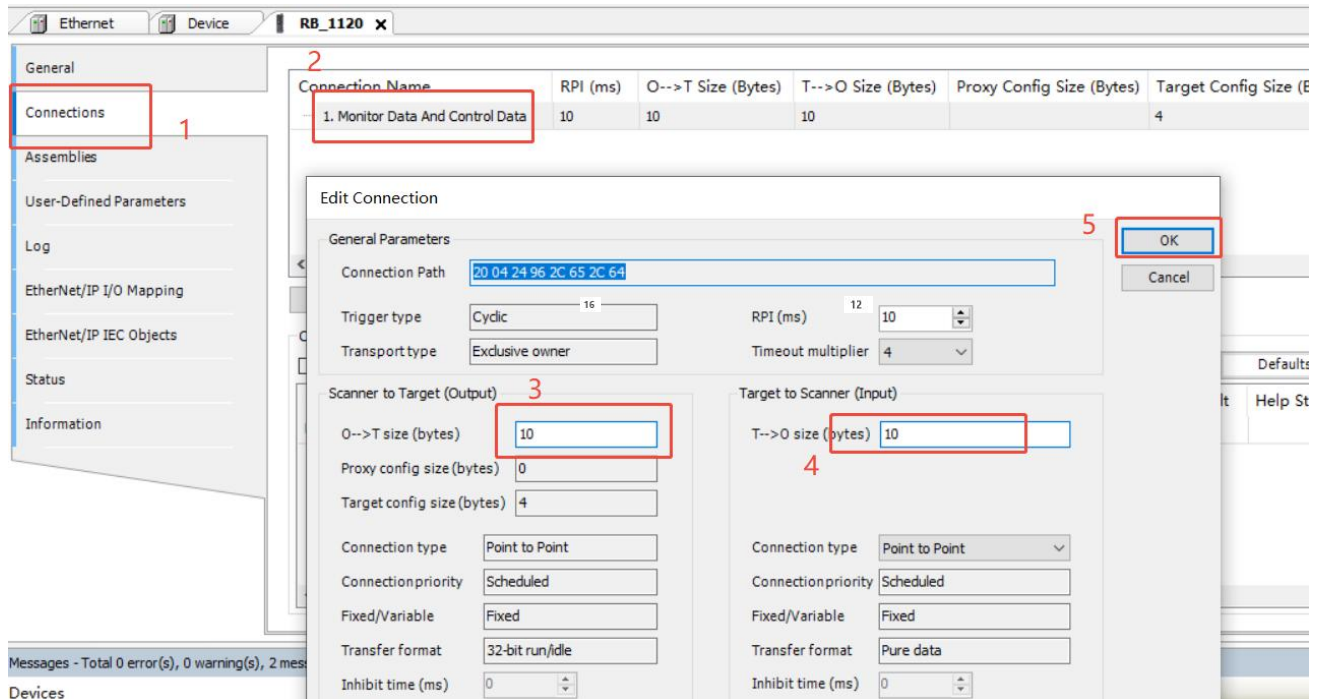


Configure RB-1120 adapter IP address

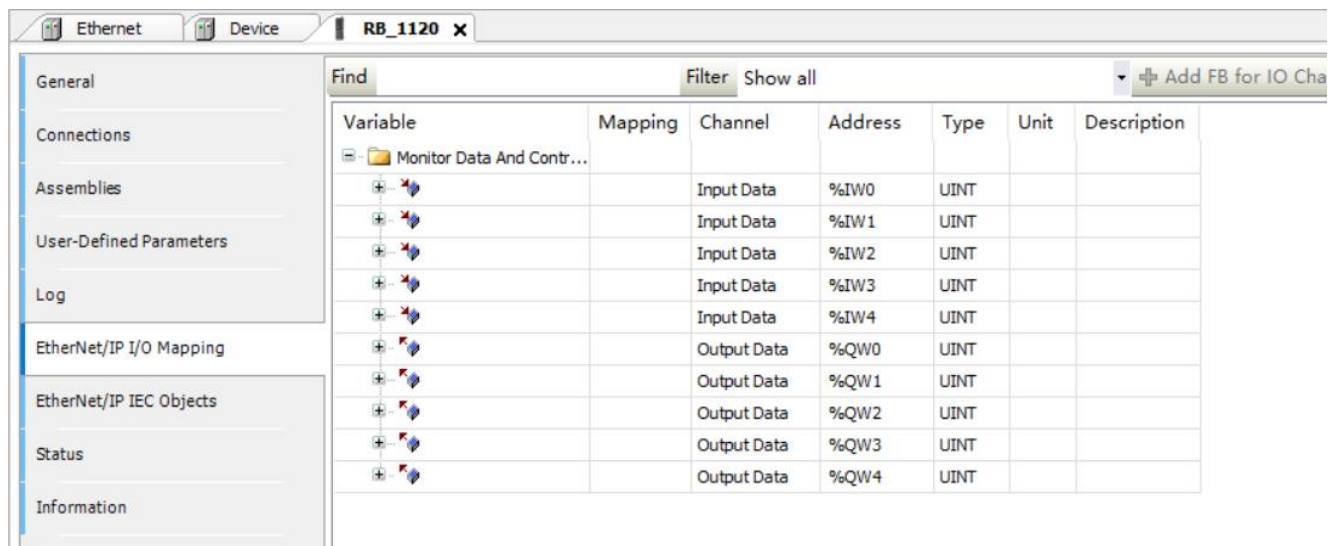
Number of bytes occupied by the calculation module:

Module model	Quantity	Input/output types	Number of bytes occupied
RB-1120	1	Input (T-->O)	6
		Output (O-->T)	2
RB-2xx8	1	Input (T-->O)	2
RB-2xxH	1	Input (T-->O)	2
RB-2xxS	1	Input (T-->O)	4
RB-3xx4	1	Output (O-->T)	2
RB-3xx8	1	Output (O-->T)	2
RB-3xxH	1	Output (O-->T)	2
RB-3xxS	1	Output (O-->T)	4
RB-4xx4	1	Input (T-->O)	8
RB-4xx8	1	Input (T-->O)	16
RB-5xx4	1	Output (O-->T)	8
RB-5xx8	1	Output (O-->T)	16
RB-6002	1	Input (T-->O)	22
		Output (O-->T)	24
RB-6022	1	Input (T-->O)	22
		Output (O-->T)	24
RB-6032	1	Input (T-->O)	20
		Output (O-->T)	4
RB-6102	1	Input (T-->O)	28
		Output (O-->T)	32
RB-6212	1	Input (T-->O)	12
		Output (O-->T)	20
RB-6301	1	Input (T-->O)	66
		Output (O-->T)	66
RB-6311	1	Input (T-->O)	66

Configure the input and output byte sizes for the I/O modules connected to the RB-1120 adapter (these must match the actual number of I/O modules; otherwise communication will fail). Then check the EtherNet/IP I/O mapping, as shown in the figure.



Configure input/output byte size



IO address mapping

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

Notice:In actual hardware, the RB-1120 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, as shown in the figure below.

RB-1120	RB-200H	RB-300H	RB-4014	RB-5014
IW0	IW0	QW0	IW1	QW1
QW0			IW2	QW2
			IW3	QW3
			IW4	QW4

I/O Ordering and Address Allocation #1 (Application in a Case Study)

RB-1120	RB-4014	RB-5014	RB-200H	RB-300H
IW0	IW0	QW0	IW4	QW4
QW0	IW1	QW1		
	IW2	QW2		
	IW3	QW3		

I/O sorting and address allocation #2

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, as shown in the figure.



Download and monitor the program

6.3 Sysmac Studio and RB-1120 Connection and Configuration

Notice:

① The factory default IP network segment is 192.168.0.X.

The network segment can be modified via IO Tester Tool, and the IP address is set using the adapter DIP switches.

② I/O module configuration on the right side of RB-1120 and EtherNet/IP communication I/O byte length settings

If no I/O modules are installed on the right side of RB-1120, the adapter itself is configured with 6 bytes for Input (T→O) and 2 bytes for Output (O→T).

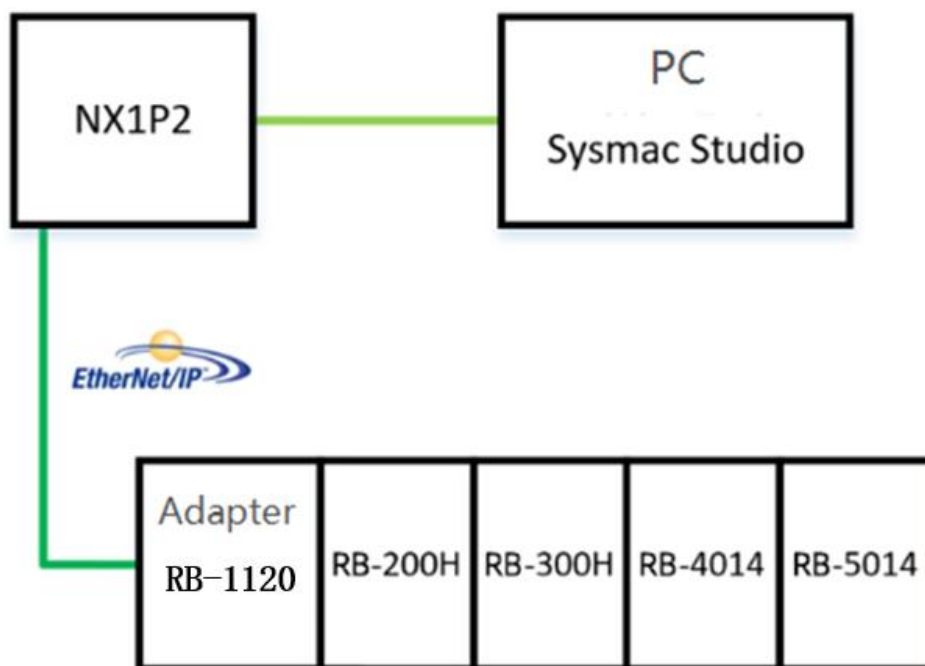
When additional I/O modules are added, their byte length must be added on top of the base 6 bytes (T→O) and 2 bytes (O→T).

③ The RB-1120 adapter supports two PLC class modes: Normal PLC and Special PLC.

Special PLC refers specifically to KEYENCE PLC, while Normal PLC refers to PLCs from other manufacturers. The default setting is Normal PLC mode.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
RB-1120	6	2
RB-1120 RB-200H	8	2
RB-1120 RB-300H	6	4
RB-1120 RB-200H RB-300H	8	4

6.3.1 Communication Connection Diagram



Communication connection diagram

6.3.2 Hardware Configuration

Hardware Configuration Table

Hardware	Quantity	Remark
PC	1	Install Sysmac Studio
Controller	1	NX1P2
RB-1120	1	EtherNet/IP adapter
RB-200H	1	Digital input module
RB-300H	1	Digital output module
RB-4014	1	Analog input module
RB-5014	1	Analog output module

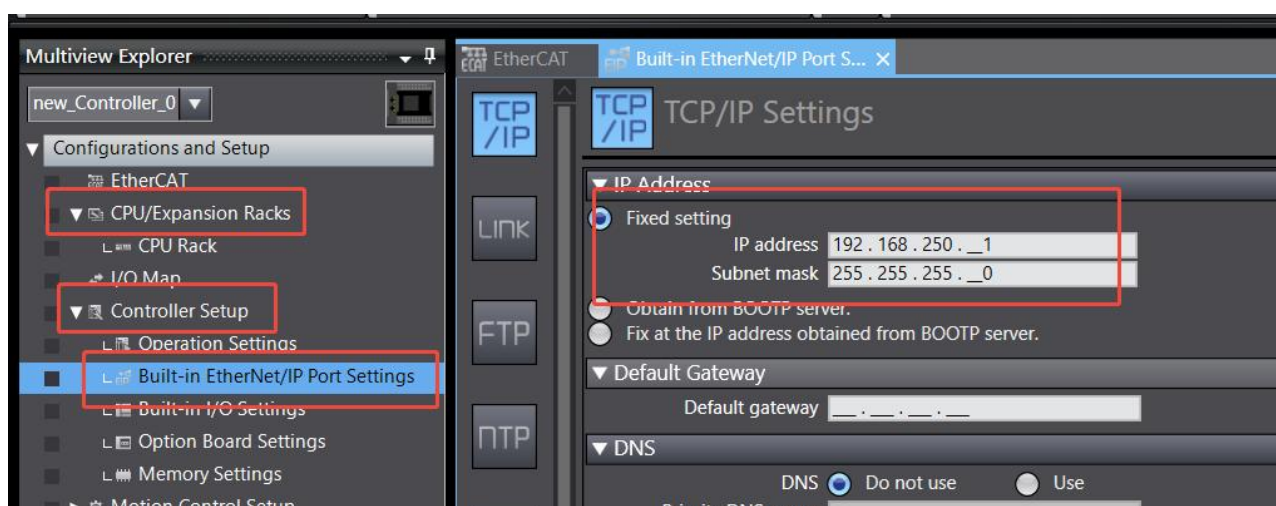
6.3.3 IP Address Settings

In this example, the OMRON NX1P2 PLC has an IP address of 192.168.1.39, while the RB-1120 adapter's default network segment is 192.168.0.X.

- ① Use the IP Config Tool or IO Tester Tool to change the network segment to match the PLC.
- ② Set the adapter IP address to 192.168.1.33 using the DIP switches on the adapter.

6.3.4 Configuration of New 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), as shown in the figure.

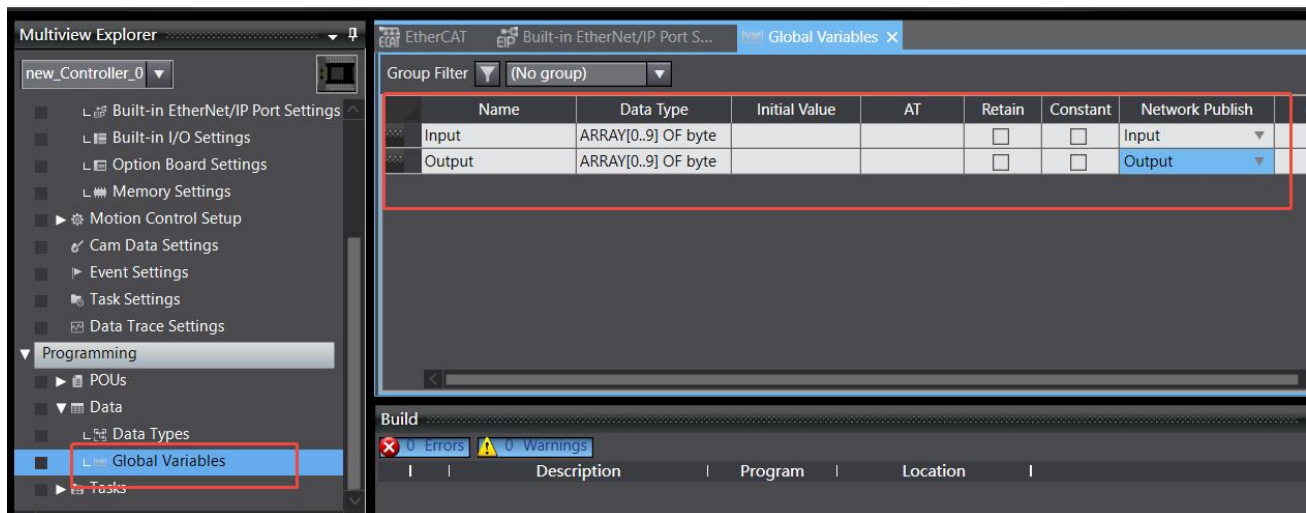


EtherNet/IP port settings

Create a global variable, and then create input and output variables within the global variable. The length of the variables needs to be consistent with the length of the input and output bytes in the actual module, as shown in the figure.

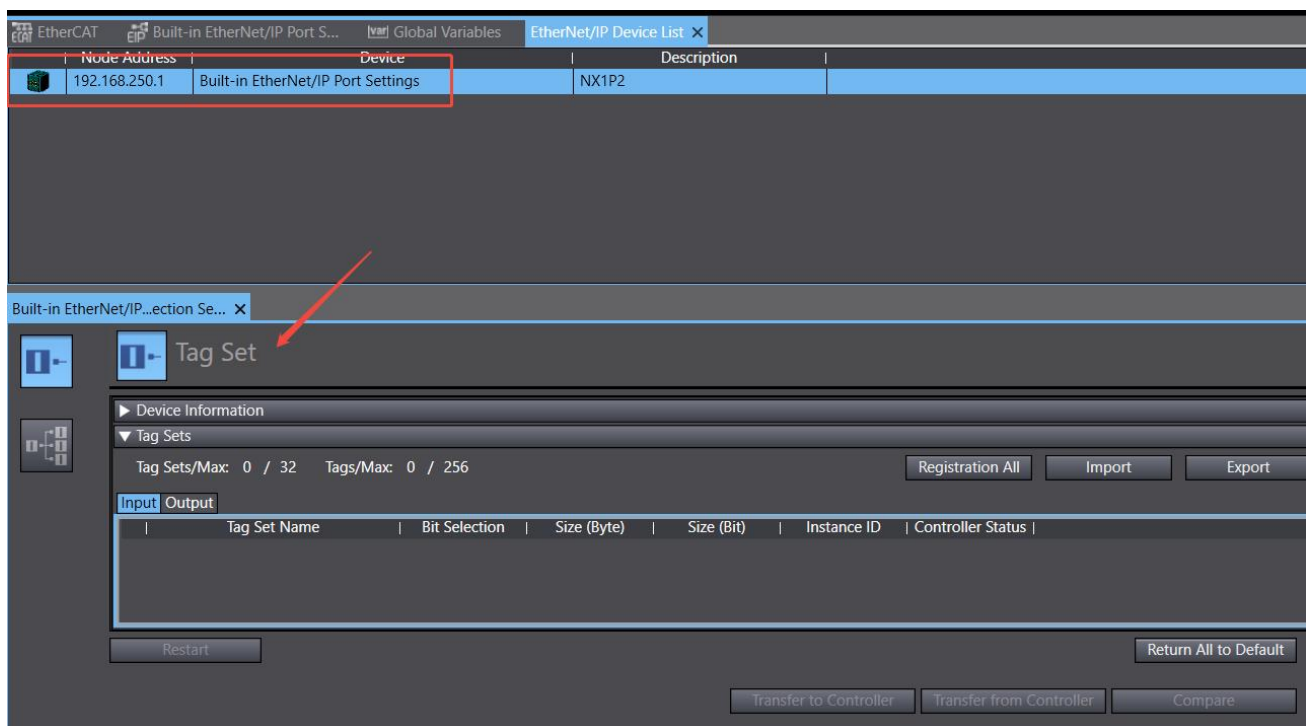
Number of bytes occupied by the calculation module:

Module model	Quantity	Input/output types	Number of bytes occupied
RB-1120	1	Input (T-->O)	6
		Output (O-->T)	2
RB-2xx8	1	Input (T-->O)	2
RB-2xxH	1	Input (T-->O)	2
RB-2xxS	1	Input (T-->O)	4
RB-3xx4	1	Output (O-->T)	2
RB-3xx8	1	Output (O-->T)	2
RB-3xxH	1	Output (O-->T)	2
RB-3xxS	1	Output (O-->T)	4
RB-4xx4	1	Input (T-->O)	8
RB-4xx8	1	Input (T-->O)	16
RB-5xx4	1	Output (O-->T)	8
RB-5xx8	1	Output (O-->T)	16
RB-6002	1	Input (T-->O)	22
		Output (O-->T)	24
RB-6022	1	Input (T-->O)	22
		Output (O-->T)	24
RB-6032	1	Input (T-->O)	20
		Output (O-->T)	4
RB-6102	1	Input (T-->O)	28
		Output (O-->T)	32
RB-6212	1	Input (T-->O)	12
		Output (O-->T)	20
RB-6301	1	Input (T-->O)	66
		Output (O-->T)	66
RB-6311	1	Input (T-->O)	66



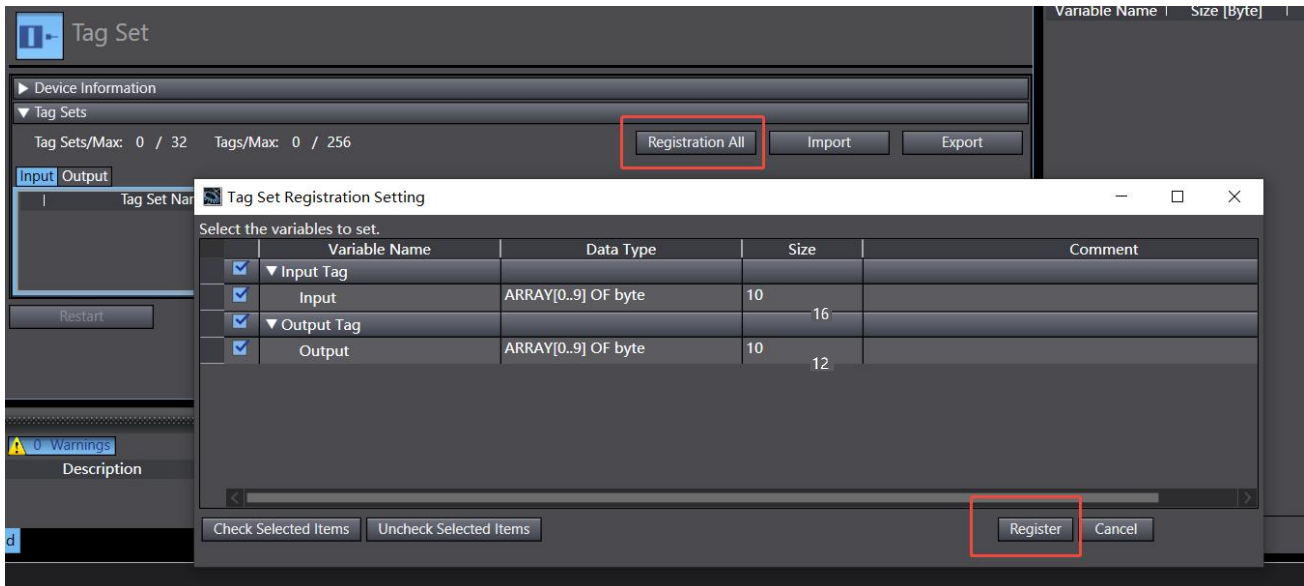
Create global variables

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, as shown in the figure below.



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

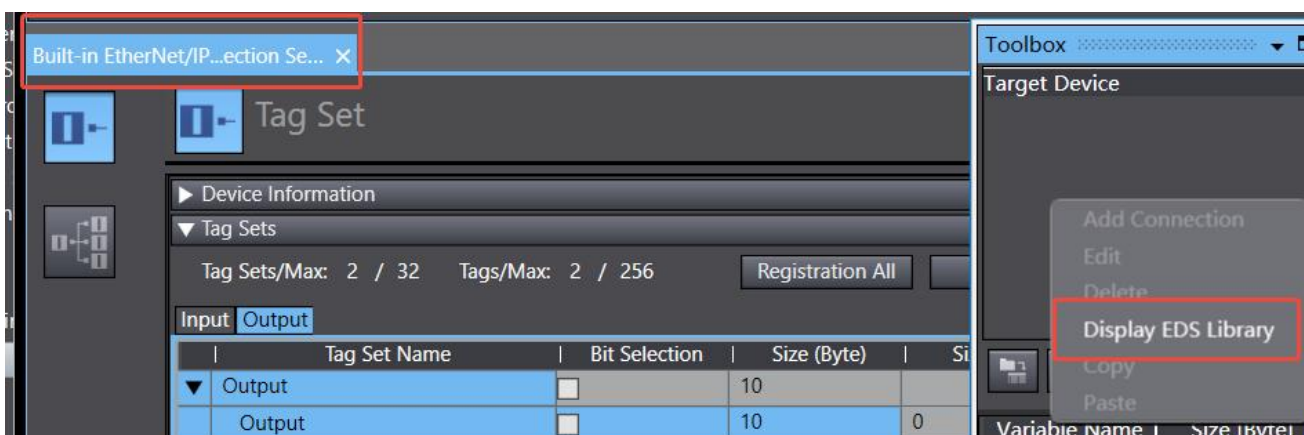
To register the variable, in the built-in EtherNet/IP port settings connection settings window, select the "Label Group" window, click "Register All," and register the newly created global variable, as shown in the figure.



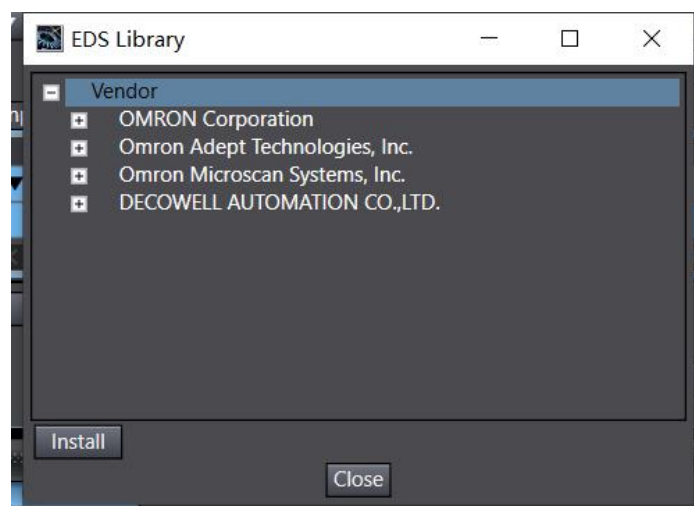
Register variables

Install the EDS file. In the Built-in EtherNet/IP Port Connection Settings window, right-click the blank area of the toolbox on the right and select "Show EDS Library".

In the EDS Library window, select "Install" and open the EDS file to be installed, as shown in the figure.

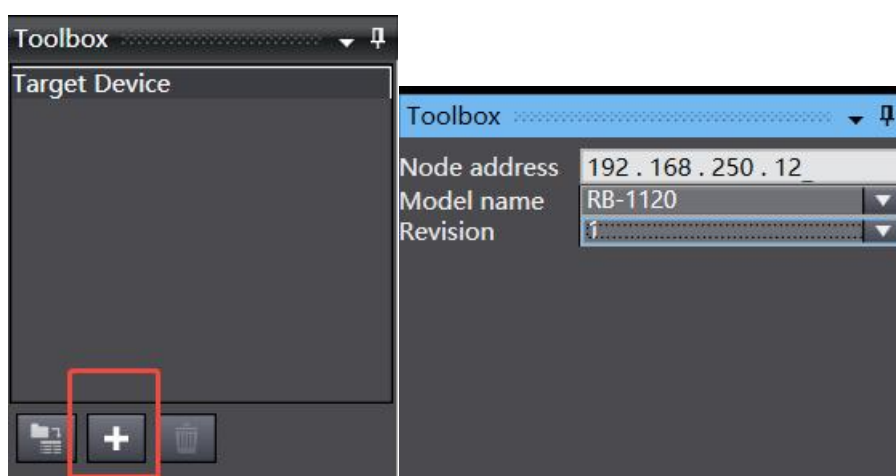


Display EDS library



Install EDS file

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.

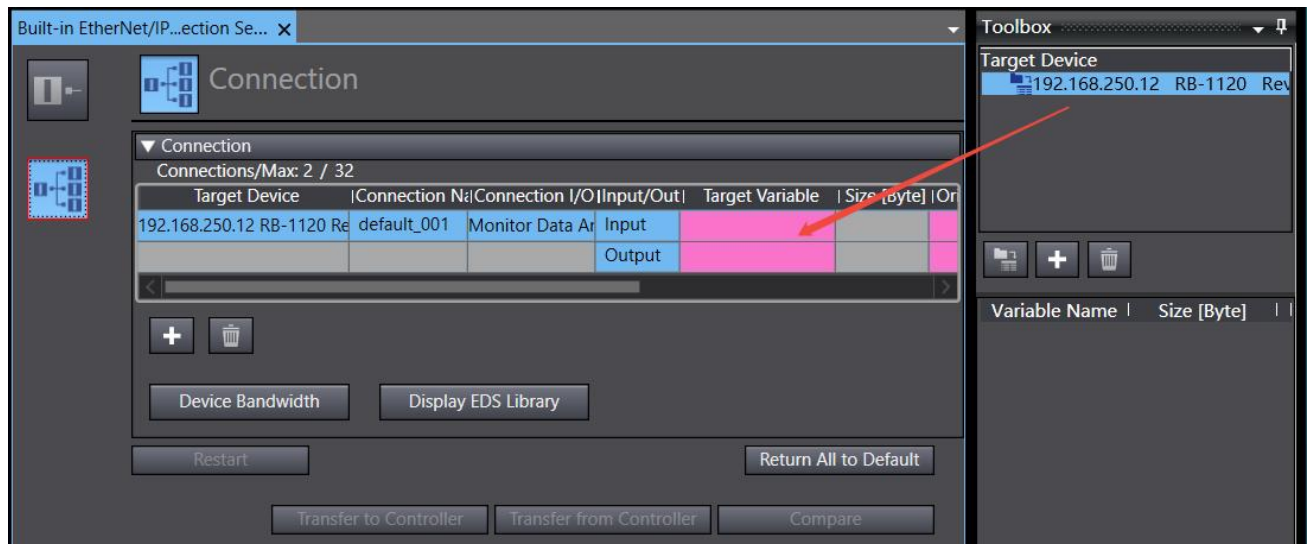


Drag the target device "192.168.1.33 RB-1120 Version 1" from the toolbox into the connection area.

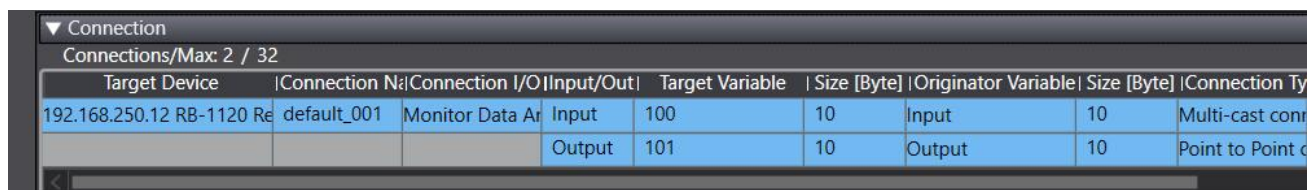
Configure the target device parameters: set the RB-1120 Input Target Variable to 100, Output Target Variable to 101, set both Input and Output byte sizes to 10, and select the previously registered global variables as the start variables.

Set the PLC Online, switch the PLC to Program Mode, and then select “Transfer to Controller”.

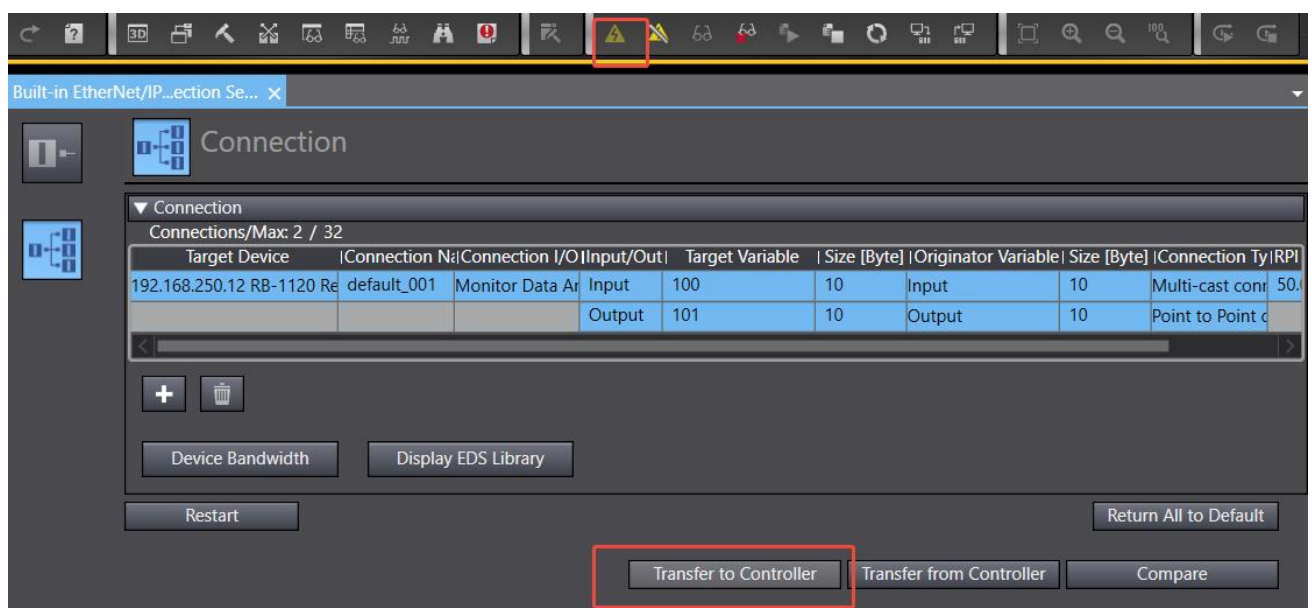
Keep the PLC Online and download the program to the PLC. The I/O module order corresponds to the actual physical addresses, as shown in the figure.



Add connected devices



Configure target device parameters



Transmit EtherNet/IP configuration to the controller

6.4 KV STUDIO and RB-1120 Connection and Configuration

Notice:

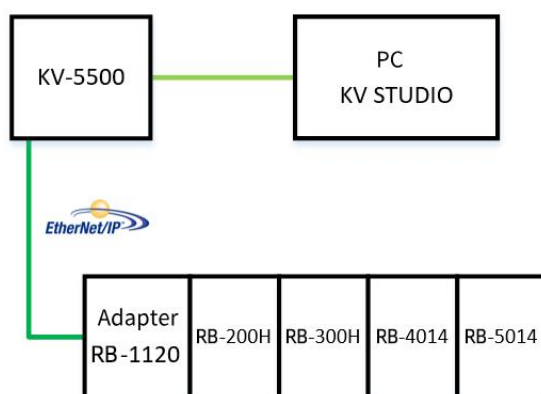
① The factory default IP network segment is 192.168.0.X.

The network segment can be modified via IO Tester Tool, and the IP address is set using the adapter DIP switches.

② The RB-1120 adapter supports two PLC class modes: Normal PLC and Special PLC.

Special PLC refers specifically to KEYENCE PLC, while Normal PLC refers to PLCs from other manufacturers. The default setting is Normal PLC mode.

6.4.1 Communication Connection Diagram



Communication connection diagram

6.4.2 Hardware Configuration

Hardware	Quantity	Remark
PC	1	Install CODESYS SP16
PLC	1	KV-5500
RB-1120	1	EtherNet/IP adapter
RB-200H	1	Digital input module
RB-300H	1	Digital output module
RB-4014	1	Analog input module
RB-5014	1	Analog output module

6.4.3 IP Address Settings

In this case, the IP address of the KV-5500 PLC is 192.168.1.31, and the default network segment of the RB-1120 adapter is 192.168.0.X.

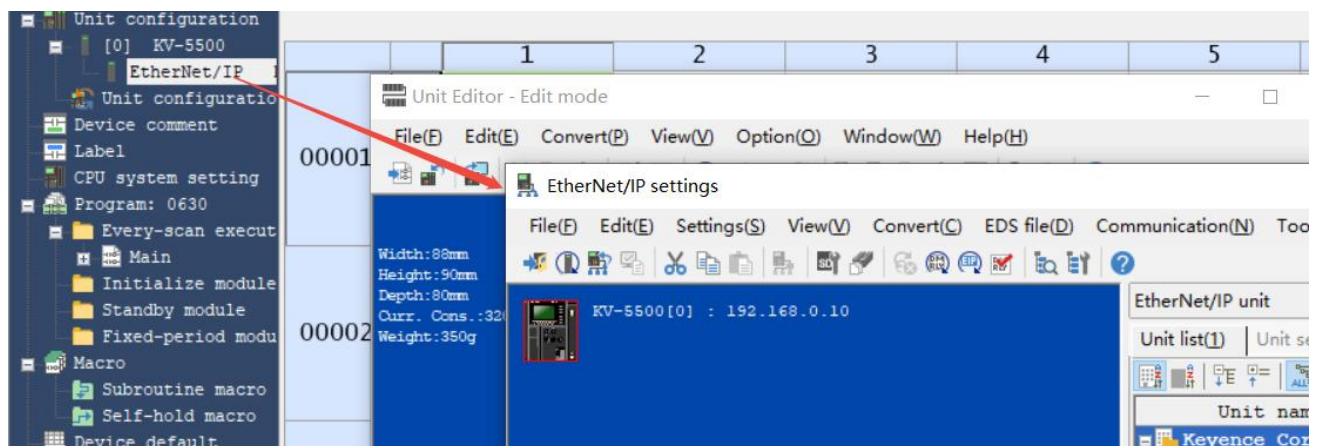
- ① Use software such as IP Config Tool or IO Tester Tool to modify the network segment to be consistent with the PLC;
- ② via adapter DIP switch Set the IP address to 192.168.1.33.

6.4.4 Copying XML files

Copy all files from the "Keyence Version" folder to the KV STUDIO software folder:
 "C:\ProgramData\KEYENCE\KVS11G_Trial\KVS\EIP_Eds"

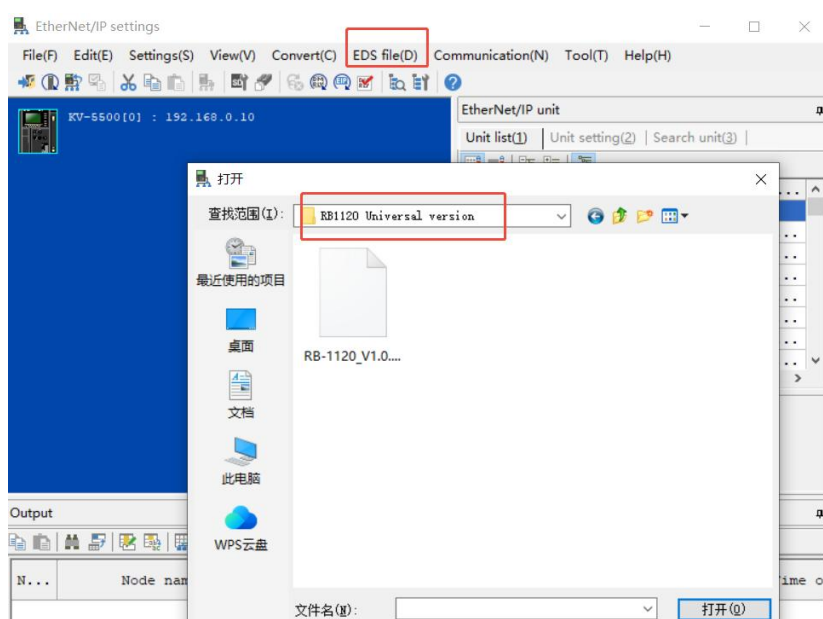
6.4.5 Configuration of New Engineering Projects and Equipment

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, as shown in the figure.



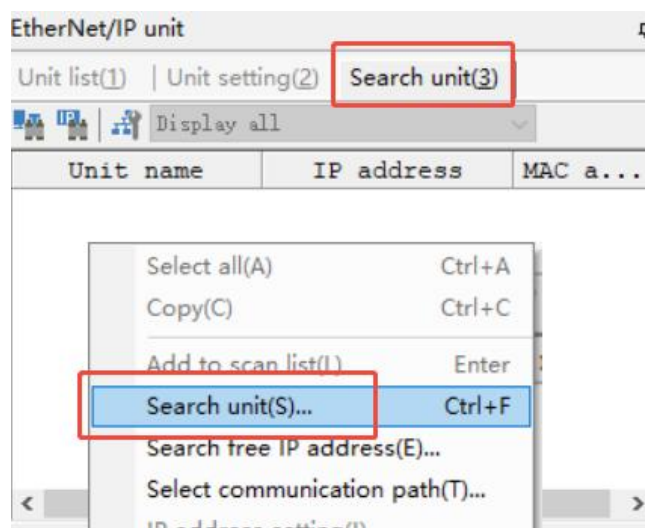
Open the EtherNet/IP settings window

To install the EDS file, in the EtherNet/IP settings window, select "EDS File" > "Login" from the menu bar, and open the "General Version" > "RB-1120" folder in the EDS folder, as shown in the figure.



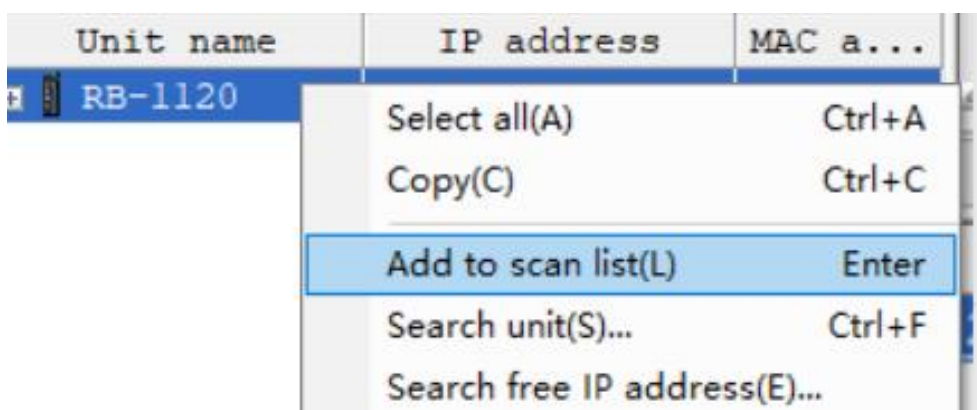
Install EDS file

Configure the RB-1120 adapter mode to special PLC mode (the factory default is normal mode). In the device search options on the right, right-click on the blank area and select "Device Search".



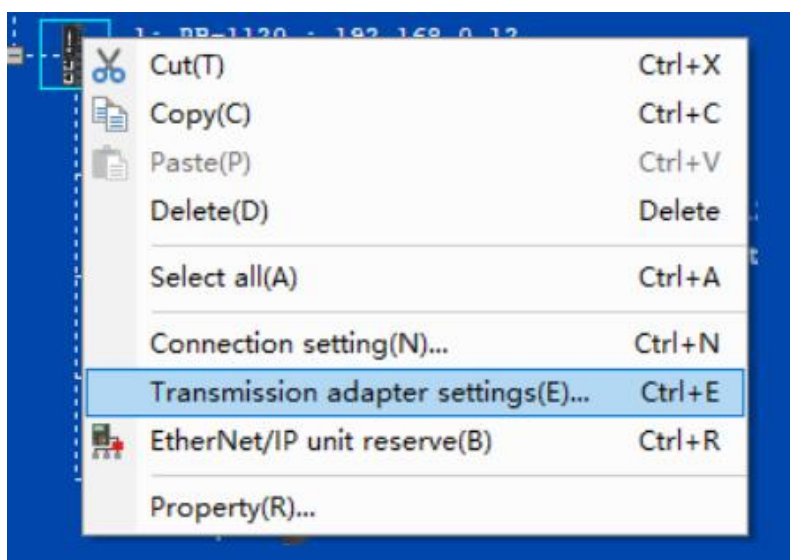
Device search

Add the scanned devices to the scan list by right-clicking the device you want to add and selecting "Add to Scan List".



Add device to scan list

To configure the transmission adapter, right-click "RB-1120" in the device list and select "Transmission Adapter Settings".



Adapter transmission settings

In the transmission adapter settings window, change the adapter No.100 setting value to "1: Special PLC" and write it to the adapter. After writing, you must power off and restart the RB-1120.

Parameter setting product name: RB-1120 [1.1]

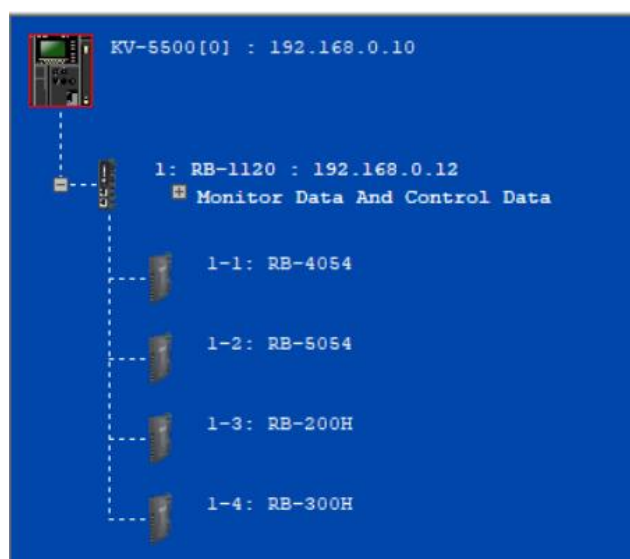
No.	Res...	Parameter	Set value	Type	Attribute
100	-	☒ PLC Category Select	1 : Special...	INT	R/W
101	-	☒ outputs Behaviour on bus e...	0 : General PLC		R/W
102	-	☒ Module behaviour on hot s...	1 : Special PLC		R/W

Description For example,KEYENCE PLC belongs to special PLC,and other PLC belongs to general PLC.
 Default value 0
 Range 0 to 1
 Current set value
 Remarks

No.	Parameter	Verification sou...	Verification destination
-----	-----------	---------------------	--------------------------

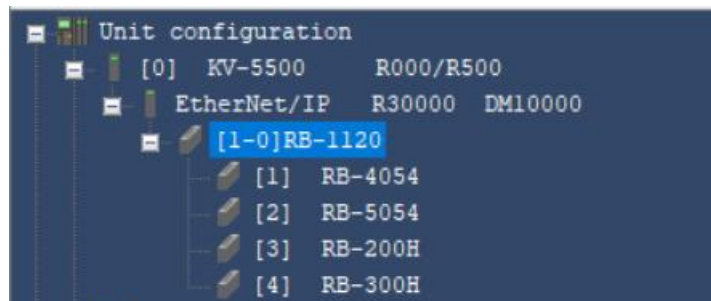
Write to adapter

In the EtherNet/IP settings window, select KV-5500, right-click and select "Auto Configuration" to reload RB-1120, as shown in the figure below.



Reread RB-1120

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 to monitor the communication status between the PLC and RB-1120.



Monitor the communication status between the PLC and RB-1120

6.5 GX Works3 and RB-1120 Connection and Configuration

Notice:

① The factory default IP network segment is 192.168.0.X.

The network segment can be modified via IO Tester Tool, and the IP address is set using the adapter DIP switches.

② I/O module configuration on the right side of RB-1120 and EtherNet/IP communication I/O byte length settings

If no I/O modules are installed on the right side of RB-1120, the adapter itself is configured with 6 bytes for Input (T→O) and 2 bytes for Output (O→T).

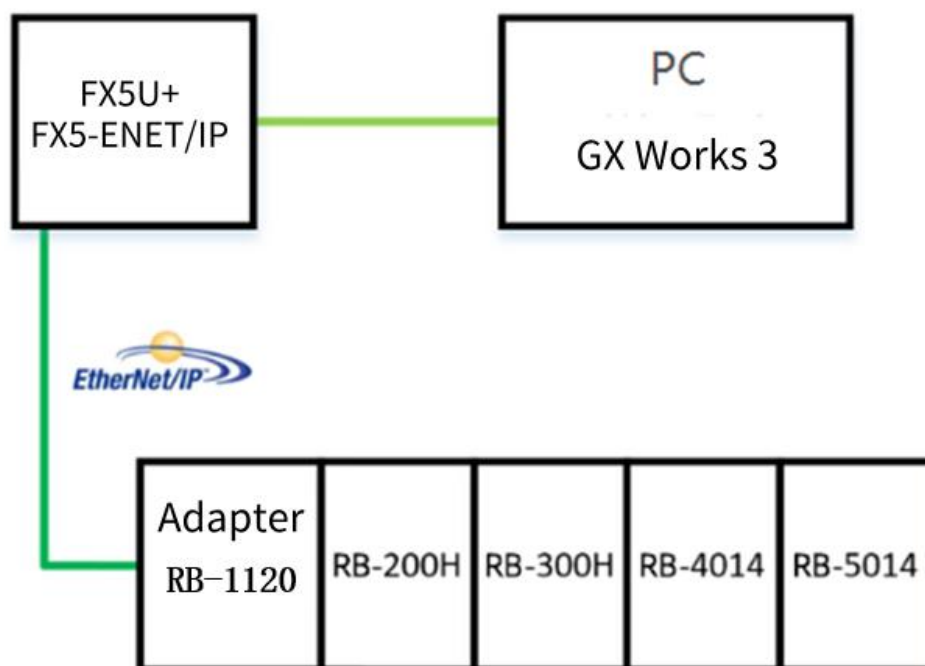
When additional I/O modules are added, their byte length must be added on top of the base 6 bytes (T→O) and 2 bytes (O→T).

③ The RB-1120 adapter supports two PLC class modes: Normal PLC and Special PLC.

Special PLC refers specifically to KEYENCE PLC, while Normal PLC refers to PLCs from other manufacturers. The default setting is Normal PLC mode.

Hardware configuration	Input (T→O) byte length	Output (O→T) byte length
RB-1120	6	2
RB-1120 RB-200H	8	2
RB-1120 RB-300H	6	4
RB-1120 RB-200H RB-300H	8	4

6.5.1 Communication Connection Diagram



6.5.2 Hardware Configuration

Hardware	Quantity	Remark
PC	1	Install GX Works3
FX5U+FX5-ENET/IP	1	
RB-1120	1	EtherNet/IP adapter
RB-200H	1	Digital input module
RB-300H	1	Digital output module
RB-4014	1	Analog input module
RB-5014	1	Analog output module

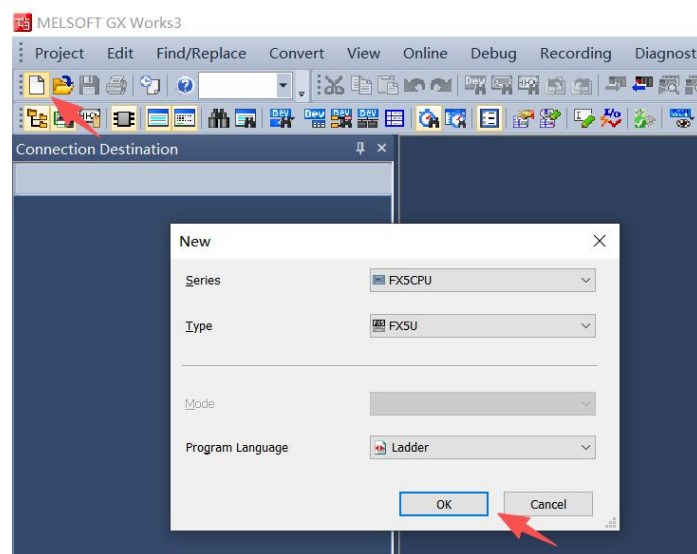
6.5.3 IP Address Settings

In this example, the FX5U CPU IP address: 192.168.3.250, FX5-ENET/IP module IP address: 192.168.3.100, while the RB-1120 adapter's default network segment is 192.168.0.X.

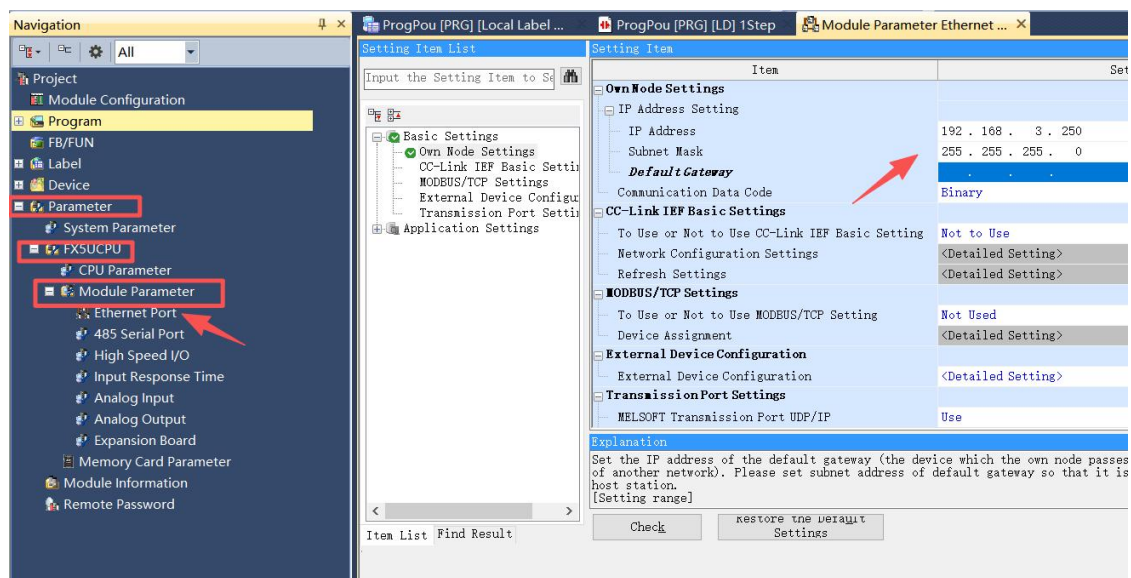
- ① Use the IO Tester Tool to change the network segment to match the PLC.
- ② Set the adapter IP address to 192.168.3.10.

6.5.4 Configuration of New Projects and Equipment

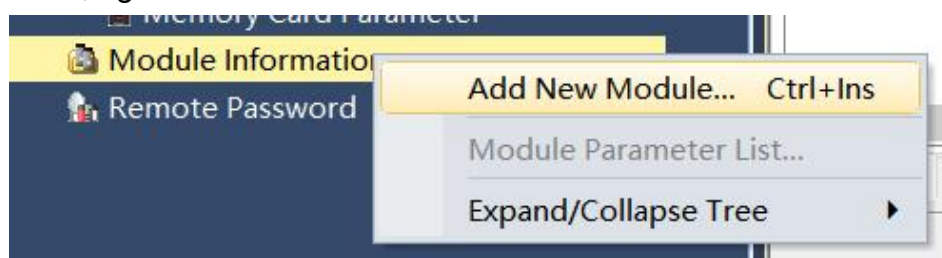
Open GX Works3 and create a new project.



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.

Add New Module

FIND FIND

Module Selection

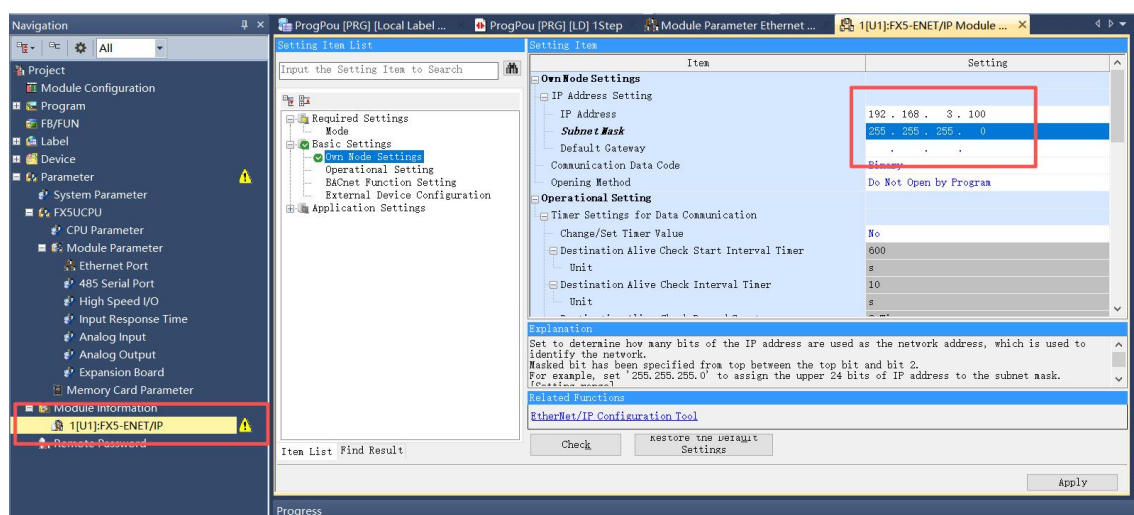
Module Type	 Information Module
Model Name	FX5-ENET/IP
Type	

Advanced Settings

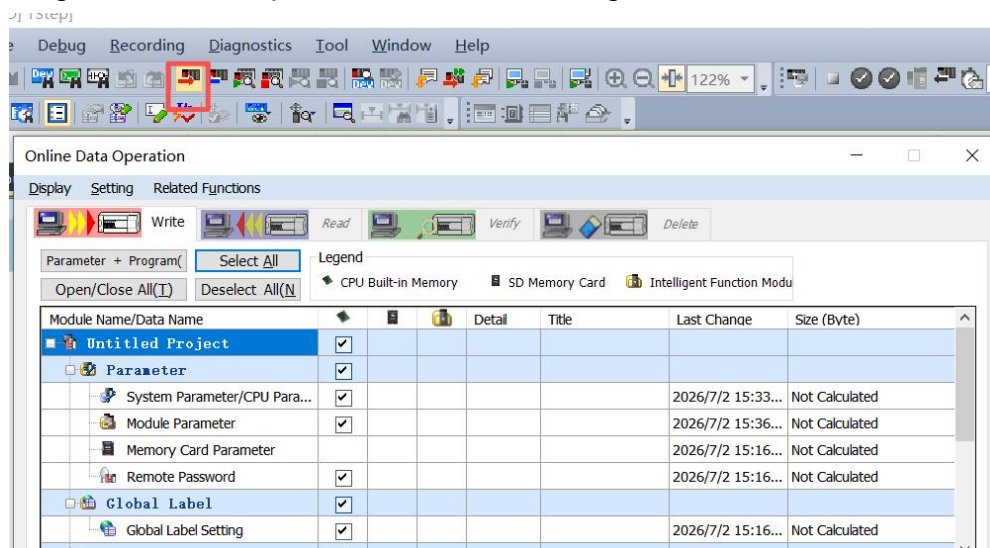
Mounting Position

Mounting Position No.	1
Intelligent Module No.	01 H
Serial Communication ch	-
Number of Input Points	-
Number of Output Points	-

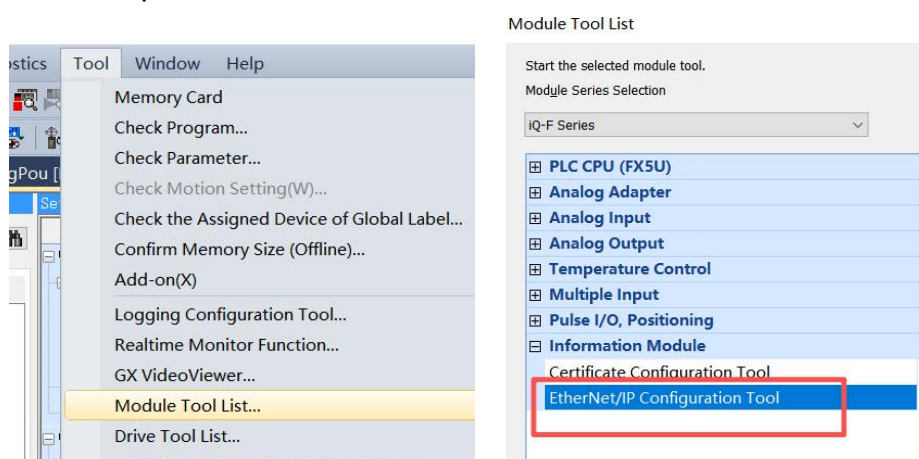
After adding the module, double-click it to open the configuration window, and then set the IP address. Then click Apply.



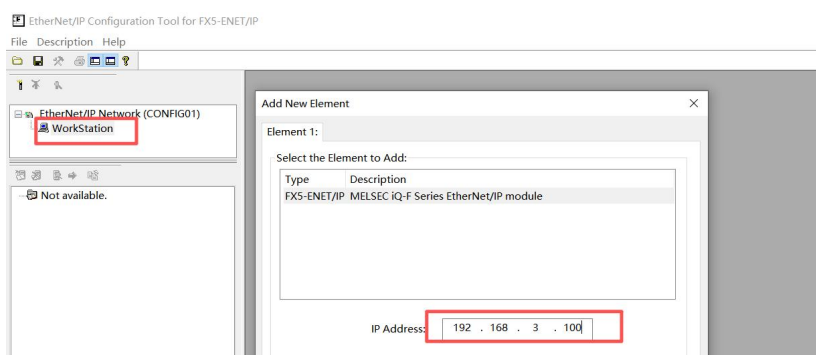
After the configuration is complete, transfer the settings to the PLC.



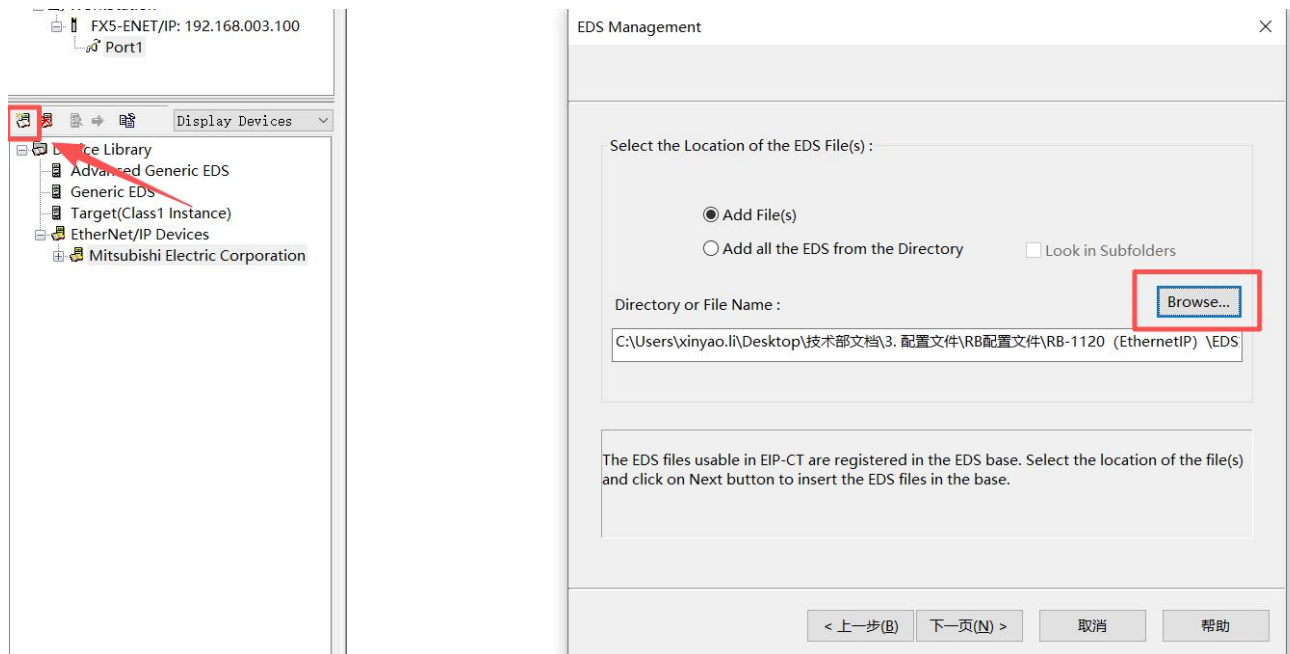
From the menu bar, select Tools > Module Tool List, then double-click EtherNet/IP Configuration Tool to open it.



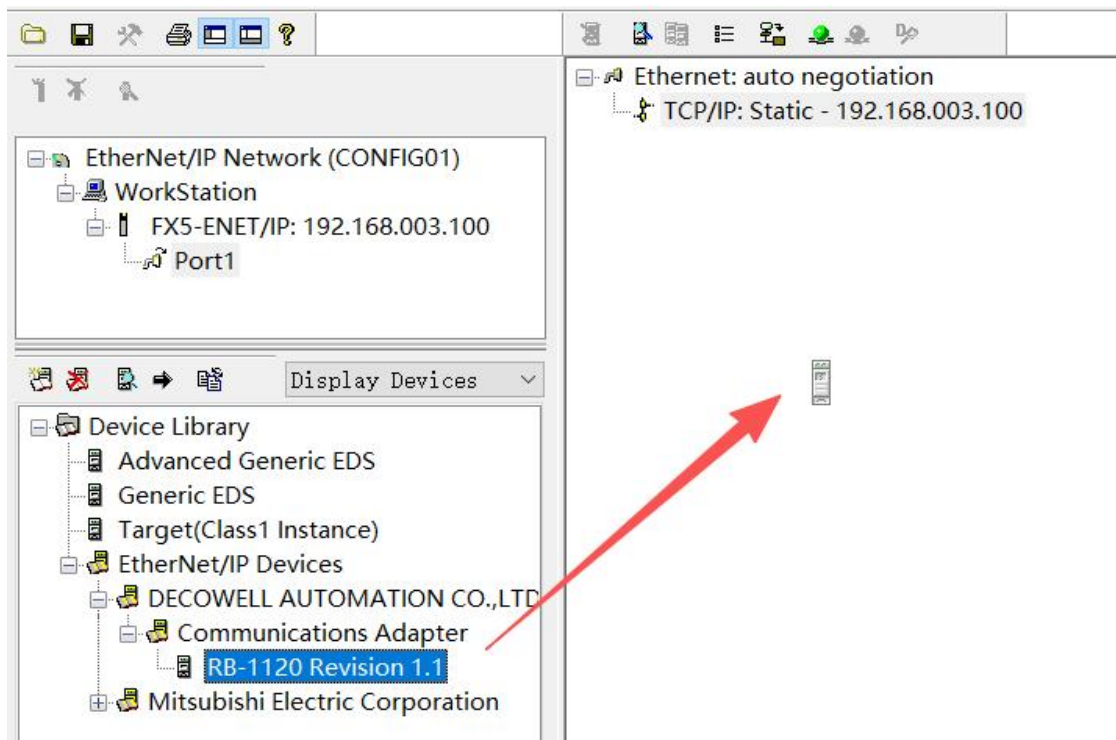
After opening the configuration tool, set the workstation IP address to match the IP address configured for the EtherNet/IP module in the previous step.



Click the Add icon, then import the RB-1120 EDS file to add the module.



Drag the RB-1120 to the workspace on the right. The configuration window will then appear.



Configure the IP address of the RB-1120 module. In this example, 192.168.3.10 is used.

RB-1120 Revision 1.1

General Connections Online Parameters Port Configuration EDS File

Device Designation

Device Name : Active Configuration

Number : ☐ Link Parameters

Comment

Network Properties

Name	Value	Unit
IP Address	192 . 168 . 003 . 010	

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

RB-1120 Revision 1.1

General **Connections** Online Parameters Port Configuration EDS File

Configured Connections

RB-1120 Revision 1.1

Monitor Data And Control Data

General ☒ Check Device Identity ☐ Configuration Setting

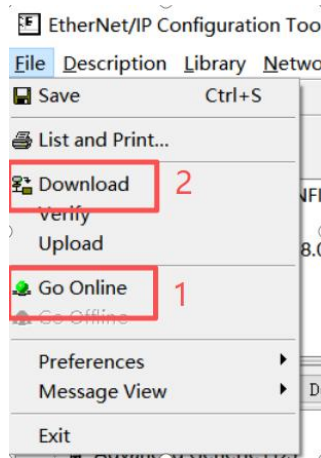
Connections Parameters :

Name	Value	Unit
Connection No.	1	
Time-out Multiplier	x16	
Input - T->O		
Input Size	16	bytes
Input Mode	Multicast	
Input Type	Fixed	
Priority	Scheduled	
Trigger Type	Cyclic	
Request Packet Interval (RPI)	5	ms
Output - O->T		
Output Size	12	bytes
Output Mode	Point to Point	
Output Type	Fixed	
Priority	Scheduled	
Request Packet Interval (RPI)	100	ms

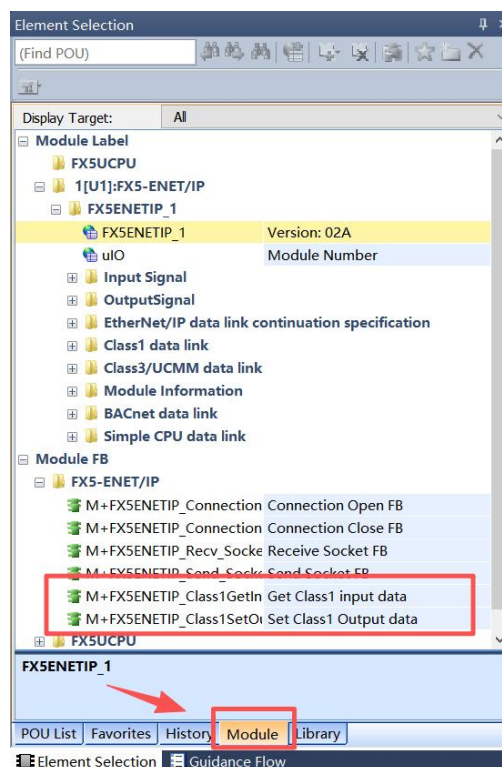
Number of bytes occupied by the calculation module:

Module model	Quantity	Input/output types	Number of bytes occupied
RB-1120	1	Input (T-->O)	6
		Output (O-->T)	2
RB-2xx8	1	Input (T-->O)	2
RB-2xxH	1	Input (T-->O)	2
RB-2xxS	1	Input (T-->O)	4
RB-3xx4	1	Output (O-->T)	2
RB-3xx8	1	Output (O-->T)	2
RB-3xxH	1	Output (O-->T)	2
RB-3xxS	1	Output (O-->T)	4
RB-4xx4	1	Input (T-->O)	8
RB-4xx8	1	Input (T-->O)	16
RB-5xx4	1	Output (O-->T)	8
RB-5xx8	1	Output (O-->T)	16
RB-6002	1	Input (T-->O)	22
		Output (O-->T)	24
RB-6022	1	Input (T-->O)	22
		Output (O-->T)	24
RB-6032	1	Input (T-->O)	20
		Output (O-->T)	4
RB-6102	1	Input (T-->O)	28
		Output (O-->T)	32
RB-6212	1	Input (T-->O)	12
		Output (O-->T)	20
RB-6301	1	Input (T-->O)	66
		Output (O-->T)	66
RB-6311	1	Input (T-->O)	66

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



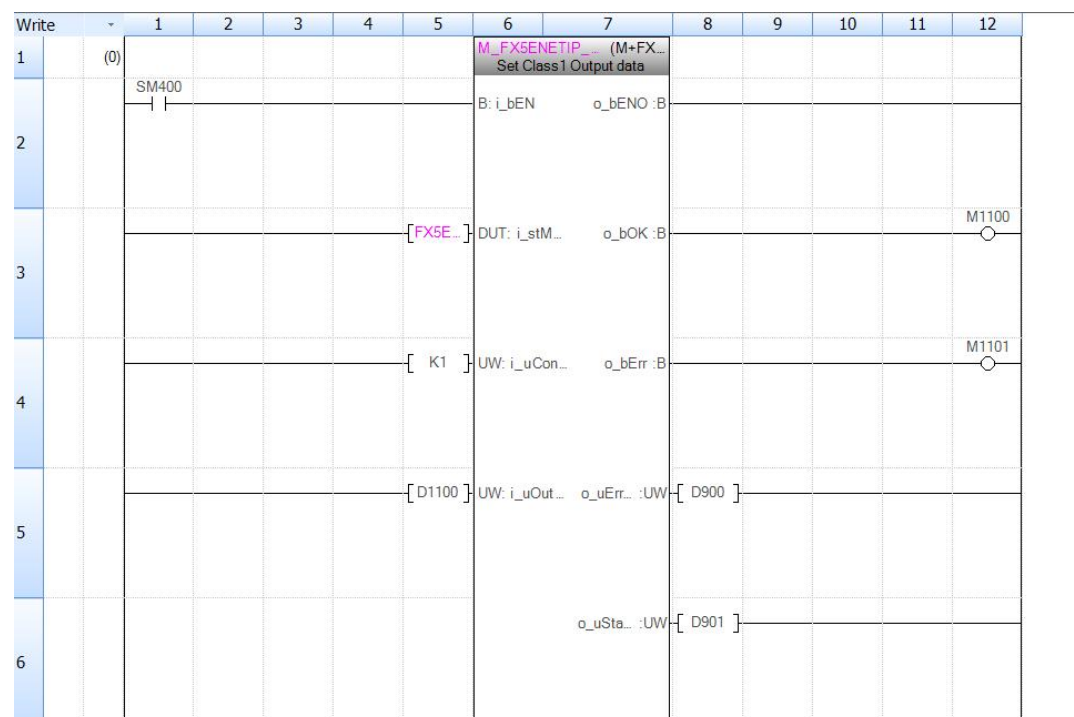
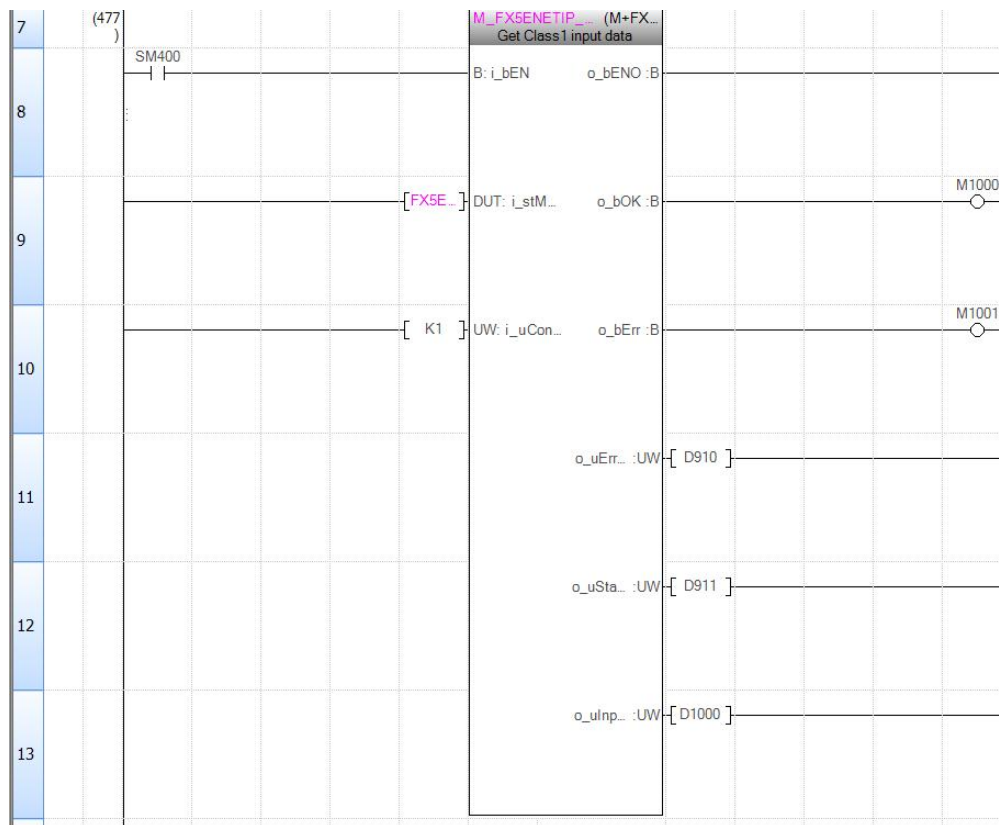
After the Download Successful message appears, you can close the configuration tool. Return to GX Works3, and create the main program. Use the following two FB (Function Block) modules to create the read and write instructions.



sample program is shown below. In this example,

Input start address: D1000

Output start address: D1100



7. FAQ

7.1 DO Failure

1. DO Failure -- Description of DO Failure: The DO channel indicator is normal, but there is no output from the DO channel.

Troubleshooting Steps:

- 1) Check the Load: Ensure that the load current is within the module's rated range, and confirm there is no short circuit or overload.
- 2) Wiring Test: Measure the DO terminal output to verify normal operation and rule out wiring disconnection or poor contact.
- 3) Configuration Check: Verify the channel parameters (e.g., forced status, output mode) are not misconfigured or locked.
- 4) Hardware Replacement: Replace the DO module or channel to determine if the issue is caused by hardware failure.

2. DO Failure -- Description of DO Failure: The DO channel indicator is off, the corresponding DO channel is not set to 1 in the software, but the DO channel actually has output.

Troubleshooting Steps:

- 1) Backfeed Check: Verify whether external power backfeed or a short circuit is causing forced output on the DO channel.
- 2) Forced Mode Inspection: Confirm that the module or software has not been mistakenly set to forced output or configured with a latching function.
- 3) Hardware Fault Detection: Measure the channel voltage; if abnormal, replace the module to check for internal relay or circuit damage.

3. DO Failure -- Description of DO Failure: The DO channel directly controls the load, but the output DO signal cannot drive the load, while the channel indicator is normal.

Troubleshooting Steps:

- 1) Load Matching Check: Verify whether the load current/voltage exceeds the rated capacity of the module's DO channel.
- 2) Line Impedance Test: Measure the continuity and impedance of the line from the output to the load to rule out disconnection or poor contact.
- 3) Output Type Verification: Check whether the module's output type (relay/transistor) matches the load characteristics (e.g., inductive load).
- 4) Short-Circuit Protection Check: Inspect whether a short circuit triggers module protection; reset or replace the module to verify.

4. Relay Module Abnormality -- Description: The upper-level system or PLC communicates normally with the module, but the module cannot drive the load properly.

Troubleshooting Steps:

- 1) Load Status Check: Confirm whether the load is open-circuited, short-circuited, or the current exceeds the module's rated value.
- 2) Relay Power Check: Measure the supply voltage of the relay coil (e.g., 24V) to ensure it is normal.
- 3) Contact Function Test: Use a multimeter to check the relay contact continuity and rule out sticking or damage.
- 4) Software Diagnosis: Use PLC diagnostic tools to check the output channel status (e.g., forced output to verify hardware action).
- 5) Module Replacement Verification: Replace the module with the same model to determine whether it is a hardware failure.

7.2 DI Failure

1. DI Failure -- Description: The PLC or upper-level system communicates normally with the module. A signal is applied to the DI channel, but the software cannot detect the signal, and the DI channel indicator is off.

Troubleshooting Steps:

- 1) Check Signal Source and Wiring: Ensure the DI signal source outputs correctly (e.g., 24V). Use a multimeter to verify the signal reaches the module terminal, ruling out wiring disconnection or poor contact.
- 2) Verify Module Power Supply: Ensure the module's independent 24VDC supply (not backplane power) is normal. An unlit indicator may be caused by a missing power supply.
- 3) Check Channel Status: Verify that the DI channel address in the software matches the hardware to avoid address conflicts or interference from forced assignments.
- 4) Interference Check: Inspect grounding and shielding measures to eliminate electromagnetic interference causing abnormal signals.
- 5) Hardware Diagnosis: If the signal and power supply are normal but the indicator still does not light, the optocoupler in the channel or the module may be damaged; replace the module or test the channel.

2. DI Failure -- Description: The PLC or upper-level system communicates normally with the module. After a signal is applied and then removed from the DI channel, the software monitoring value remains triggered, while the DI channel indicator is normal.

Troubleshooting Steps:

- 1) Measure Residual Voltage: After removing the signal, measure the DI channel voltage. If it does not return to zero, there may be line leakage or interference.
- 2) Check Channel Parameters: Verify whether the filter time configured in the module is too long, causing software response delay.
- 3) Verify Hardware Status: Replace the DI channel or module to rule out contact sticking or internal circuit faults.
- 4) Firmware Version Check: Verify the module firmware version to fix any logic errors that may cause signal latching.

Note: When the indicator is normal but the software value is latched, common causes include hardware contact sticking, incorrect filter parameter settings, or firmware defects.

3. DI Failure -- Description: The PLC or upper-level system communicates normally with the module. A signal is applied to the DI channel, the software can detect the signal, but the DI channel indicator is off.

Troubleshooting Steps:

- 1) Indicator Fault: Check whether the LED is damaged or has poor contact; replace and test if necessary.
- 2) Driver Circuit Abnormality: Measure the power supply and driver components of the indicator (e.g., resistors, transistors).
- 3) Configuration/Firmware Issue: Ensure the module parameters have not disabled the indicator function; upgrade firmware if necessary.
- 4) Input Signal at Threshold: Verify whether the input voltage/current meets the specifications (e.g., 24VDC, $\geq 3\text{mA}$).

4. DI Failure -- Description: The PLC or upper-level system communicates normally with the module. A sensor is connected to the DI channel, but the sensor is not triggered, while the software still detects a signal.

Troubleshooting Steps:

- 1) Sensor Issue: The sensor may be directly conducting, causing the module to detect an input signal.
- 2) Leakage Current Issue: The sensor may be affected by interference, generating leakage current that drives the module input.

7.3 AI Failure

1. AI Value Abnormality -- Description: In a 16-bit current acquisition module, the collected value displays as a negative number.

Troubleshooting Steps:

- 1) Data Format Mismatch: Check the value range of the current module. Each channel is monitored in the software as a 16-bit word, with data types such as INT: -32767 to 32767,

UINT: 0 to 65535, etc. If a channel value exceeds 32767, check the data type of the corresponding channel address. If it is INT, change it to UINT.

- 2) Module Sampling Range Check: Ensure that the module's sampling range parameters (unipolar/bipolar) match the sensor output.
- 3) Measure Actual Input Current: Use a multimeter to verify that the input current is within the configured range (e.g., 4–20mA).
- 4) Calibration Value Check: If the calibration value is not saved successfully, recalibrate the channel by connecting a standard current source and writing the correct calibration value.
- 5) Signal Line Polarity Check: Ensure that the input current polarity is correct and consistent with the module definition.

2. AI Failure -- Description: The PLC or upper-level system communicates normally with the module. An AI signal is applied to the AI channel, but the software cannot monitor the value, and the AI channel indicator is off.

Troubleshooting Steps:

- 1) Power Supply Check: Verify that the module's backplane power and external 24V supply are normal. The indicator is powered by the backplane, but the module itself requires independent power.
- 2) Signal Input Verification: Use a multimeter or oscilloscope to measure the AI channel voltage/current to ensure it is normal, ruling out sensor or wiring faults.
- 3) Configuration Matching: Check that the AI range setting in the software (e.g., 0–5V or 4–20mA) matches the actual signal. Incorrect range configuration can result in no measurable value.
- 4) Channel Hardware Check: If a single channel is abnormal, inspect the terminal connections for looseness, or try replacing the channel to confirm whether the hardware is faulty.
- 5) Module Replacement Test: If all the above are normal but there is still no output, replace the module with the same model to verify whether it is a hardware failure.

3. AI Value Abnormality -- Description: The PLC or upper-level system communicates normally with the module. The AI channel receives the AI signal, but the signal fluctuates.

Troubleshooting Steps:

- 1) Power Stability Check: Ensure the module supply voltage is stable to eliminate power ripple interference.
- 2) Signal Line Shielding and Grounding: Confirm that the AI signal uses twisted-pair shielded cable, with the shield grounded at one end, and routed away from high-voltage lines.
- 3) Sensor/Transmitter Test: Disconnect the field signal and connect a standard signal source (e.g., 4–20mA generator). If the fluctuation disappears, inspect the sensor or external interference.
- 4) Module Filter Settings: Enable digital filtering for the AI channel (e.g., adjust filter time constants in the PLC program or configuration software).
- 5) Common Ground Check: Ensure proper grounding between the module and sensor to avoid noise from ground potential differences.
- 6) Channel Hardware Inspection: Replace the channel or module to verify whether the issue is caused by hardware (e.g., ADC malfunction).

Quick Handling: Prioritize checking grounding and shielding, and temporarily short the signal input to rule out external interference.

4. AI Failure -- Description: The AI module collects a signal, but the value remains fixed and does not change, while the channel indicator is normal.

Troubleshooting Steps:

- 1) Signal Source Check: Disconnect the field signal and connect a standard signal source (e.g., 4–20mA generator) to determine whether the sensor/transmitter is faulty or the output is stuck.
- 2) Line Continuity Check: Measure the signal line for open circuits or poor contact (e.g., loose terminals or broken wires).

- 3) Module Configuration Verification: Check whether the AI channel range and filter parameters match the signal type (e.g., current/voltage mode).
- 4) Forced Input Test: Force a fixed value via configuration software to verify whether the module responds correctly, ruling out software logic issues.
- 5) Channel Hardware Replacement: Replace the channel or module to determine whether the AD converter or signal conditioning circuit is faulty.

Quick Handling: Short the signal input (e.g., short a 4–20mA loop to 0 Ω). If the display shows the lower limit value, the wiring is normal; otherwise, inspect the wiring or module hardware.

5. AI Failure -- Description: The module value does not match the sensor signal strength in the field.

Troubleshooting Steps:

- 1) Sensor Signal Verification: Check whether the sensor signal matches the required parameters (e.g., the customer expects 5 V, but the sensor outputs 6 V).
- 2) Range Selection Check: Ensure the module range matches the sensor output (e.g., field sensor 0–5 V, module range 0–10 V).
- 3) Data Format Consistency: Verify that the module data format matches the monitoring system format (e.g., module value in S7 format vs. customer using Omron format).

6. AI Failure -- Description: Module configuration is normal, but the PLC reports an error and the module STA indicator is red.

Troubleshooting Steps:

- 1) Sensor Range Check: Determine whether the sensor output exceeds the module measurement range. Signals outside the configured range will trigger an over-range alarm.

7.4 AO Failure

1. AO Failure -- Description: The PLC or upper-level system communicates normally with the module. The AO channel indicator is normal, but the channel cannot drive the load.

Troubleshooting Steps:

- 1) Load and Power Check: Ensure the load impedance matches the module's driving capability, and the power supply voltage/current meets the load requirements.
- 2) Output Line Inspection: Measure the AO channel output terminal voltage/current to verify that there is no open circuit, short circuit, or poor contact.
- 3) Forced Output Test: Force a fixed output value via configuration software to confirm whether the module can output correctly.
- 4) Load Replacement Test: Disconnect the original load and connect a simulated load (e.g., resistor box) to rule out load failure or overload.
- 5) Module Hardware Check: Replace the AO channel or module to determine whether the output circuitry (e.g., operational amplifier, driver chip) is faulty.

Quick Handling: Short the AO output terminal and measure the current/voltage. If there is no output, inspect module hardware or power supply; if there is output, check the load or wiring.

2. AO Output Abnormality -- Description: The PLC or upper-level system communicates normally with the module. When commanding the AO channel to output 5 V (voltage mode) or 10 mA (current mode), the actual signal at the load exceeds 5 V or 10 mA.

Troubleshooting Steps:

- 1) Load Impedance Check: Verify that the load impedance is not too low (voltage mode) or open-circuited (current mode), ensuring it is within the module's output capability.
- 2) Module Output Measurement: Measure the AO channel output voltage/current directly to rule out line interference or superimposed external power.
- 3) Output Mode and Range Verification: Confirm that the module is configured for the correct output mode (voltage/current) and that the range (e.g., 0–10 V / 4–20 mA) matches the set value.

- 4) External Interference Check: Inspect the signal line for interference from external power sources (e.g., strong coupling). Ensure shielded cables are grounded at one end.
- 5) Module Hardware Check: Replace the channel or module to determine whether the output circuitry (e.g., DAC, operational amplifier) is drifting or damaged.
- 6) Output Range Selection: Verify the module output range matches the actual requirement (e.g., field requires 0–5 V but the module is set to 0–10 V).
- 7) Module Value Type Check: Ensure the module code value type matches the control system. For example, using an S7 data range to output while the module uses Beckhoff's range may cause mismatches.

Quick Handling: Disconnect the load and measure the module output. If it still exceeds the limit, the issue is likely hardware; if normal, check the load impedance or external interference.

3. AO Failure -- Description: The PLC or upper-level system communicates normally with the module. The AO channel indicator is abnormal, but the channel can still drive the load.

Troubleshooting Steps:

- 1) Indicator Status Check: Inspect other channel indicators on the module to rule out overall module failure.
- 2) Module Configuration Check: Verify that the AO channel range and output mode (voltage/current) match the actual requirements.
- 3) Forced Output Test: Force a specific value via software and observe the load response and indicator behavior.
- 4) Power and Grounding Check: Measure the module supply voltage stability and ensure reliable grounding to avoid interference from voltage fluctuations.
- 5) Hardware Replacement Verification: Replace the module or channel to determine whether the issue is caused by the indicator circuit (e.g., LED driver) or internal module communication fault.

Quick Handling: If the load operates normally during forced output but the indicator is abnormal, focus on inspecting module hardware or firmware version compatibility.

4. AO Failure -- Description: The PLC or upper-level system communicates normally with the module. The AO channel indicator is abnormal, and the channel cannot drive the load.

Troubleshooting Steps:

- 1) Indicator and Configuration Check: Verify that the AO channel configuration (range/mode) is correct. Compare the indicator status with other channels when the AO indicator is abnormal.
- 2) Forced Output Verification: Force a fixed value via software and measure the module terminal to check for signal output, ruling out logic or communication issues.
- 3) Load and Line Inspection: Disconnect the load and measure the AO output voltage/current. Check for short circuits, open circuits, and ensure load impedance matches the module's capability.
- 4) Power and Grounding Check: Ensure stable module power supply and reliable grounding to prevent common-ground interference.
- 5) Hardware Replacement Test: Replace the AO channel or module to determine whether the driver circuit (e.g., operational amplifier, isolation chip) is faulty.

Key Point: If the terminal has no output and the indicator is abnormal, prioritize checking module hardware or firmware compatibility.

7.5 Communication Module Failure

1. RS232 Module Abnormality -- Description: The PLC or upper-level system communicates normally with the module. The RS232 module cannot read or write, and the indicator is abnormal.

Troubleshooting Steps:

- 1) Physical Connection Check: Ensure the RS232 cable is intact with no breaks or looseness. Verify that TX/RX lines are correctly crossed or matched.
- 2) Parameter Configuration Verification: Confirm that the baud rate, data bits, parity, and other settings match the connected device. Disable flow control.

- 3) Direct Serial Tool Test: Use a serial debugging tool to send and receive data directly to rule out interference from PLC or upper-level software.
- 4) Power and Interference Check: Measure the module supply voltage, ensure proper grounding, and keep it away from strong electromagnetic sources.
- 5) Hardware Replacement Verification: Replace the RS232 module or adapter to determine whether the chip (e.g., MAX232) or port is faulty.

Key Point: If the indicator does not flash or there is no response, prioritize checking the cable and configuration. If data transmission fails but the indicator is normal, check the protocol or possible interference.

2. RS485 Module Abnormality (Indicator Normal) -- Description: The PLC or upper-level system communicates normally with the module. The RS485 module cannot read or write, but the indicator is normal.

Troubleshooting Steps:

- 1) A/B Line Polarity Check: Ensure A+/B- wiring is correct and the termination resistor ($120\ \Omega$) is installed.
- 2) Parameter Configuration Verification: Confirm that the baud rate, data bits, parity, and slave address match the master station and there are no address conflicts.
- 3) Interference Check: Ground the shield at one end, keep the bus away from high-voltage lines, and measure the differential bus voltage ($\pm 5\text{ V}$ is normal).
- 4) Hardware Replacement Test: Replace the module or RS485 converter to rule out chip or port faults.

Key Point: If wiring and parameters are correct but there is still no response, check for bus interference or module damage.

3. RS485 Module Abnormality (Indicator Abnormal)

Description: The PLC or upper-level system communicates normally with the module. The RS485 module cannot read or write, and the indicator is abnormal.

Troubleshooting Steps:

- 1) **Power and Wiring Check:** Ensure stable module power, correct A/B wiring without reverse connection or short circuit, and proper 120 Ω termination resistor installation.
- 2) **Indicator Logic Analysis:** A red LED constantly on or flashing may indicate communication failure; if the green LED is off, check power supply or chip status.
- 3) **Bus Voltage Measurement:** Measure the differential voltage between A and B (± 5 V is normal) to rule out signal attenuation or interference.
- 4) **Hardware Replacement Verification:** Replace the module or RS485 converter to determine whether the chip or port is faulty.

Key Point: If power and wiring are correct but the indicator is abnormal, prioritize checking module hardware or firmware compatibility.

7.6 Encoder Module Failure

1. **Encoder Module Function Abnormality** -- Description: The Z-phase output signal of the encoder cannot perform Z-phase reset.

Troubleshooting Steps:

- 1) **Hardware Check:** Ensure correct Z-phase wiring, intact cables, and stable power supply (24 VDC $\pm 25\%$). Add resistors if necessary.
- 2) **Signal Detection:** Use an oscilloscope to check Z-phase pulse signals. Ensure pulse width > 1 ms and adjust the IO module's trigger conditions and filter time.
- 3) **Software Inspection:** Verify Z-phase address mapping and reset logic in the PLC program. Ensure no program conflicts and monitor input status online.
- 4) **Encoder Test:** Replace the encoder or test another input channel. Check mechanical installation synchronization.
- 5) **Interference Mitigation:** Use shielded cables, separate signal lines from power lines, and add ferrite rings or filters if necessary.
- 6) **Other Checks:** Verify firmware version and compatibility. For long-distance signal transmission, ensure signal strength is sufficient.

Summary: If all above checks are normal, investigate the module's hardware or software faults.

2. Encoder Module Failure -- Description: The PLC or upper-level system communicates normally with the module. The module cannot acquire pulse signals. Wiring is correct, but the indicator is abnormal.

Troubleshooting Steps:

- 1) Signal Source Check: Use an oscilloscope to verify pulse amplitude and frequency meet requirements. Check the signal source's load capacity.
- 2) Module Configuration: Confirm the channel is set to pulse input mode. Adjust the filter time and ensure the signal frequency is within the module's supported range.
- 3) Wiring Review: Verify signal and power lines are secure, polarity is correct, use shielded cables, and ground the shield at one end.
- 4) Power and Indicator Check: Measure supply voltage stability (24 VDC $\pm 25\%$) and use the indicator status to diagnose power or channel faults.
- 5) Replacement Test: Connect the signal to another channel or replace the module to rule out hardware faults.
- 6) Software and Interference: Check PLC program address mapping, update firmware, and use ferrite rings or filters for interference mitigation.

Summary: If all above checks are normal, investigate the module's hardware or software faults.

7.7 Bus module failure

1. EIP Module Configuration Error -- Description: The EIP module is configured in Normal Mode in the KEYENCE software, but communication fails after configuration.
 - 1) Configuration Check
 - Verify that the IP addresses of the KEYENCE PLC and the I/O module are in the same network segment and without conflicts.
 - Confirm that the module model and channel count in the software match the actual hardware.

2) Mode & Parameter Settings

- Check that the adapter mode is set to Normal Mode and that EtherNet/IP cyclic communication is enabled.
- Verify the data cycle time and Endian format are consistent with the KEYENCE software settings.

3) Wiring & Interference Inspection

- Check the grounding reliability of the shielded cable to avoid electromagnetic interference.
- Inspect network cables section-by-section for disconnection or loose connections (focus on branching nodes).

4) Fault Localization

- Use KV Studio to read PLC error codes and identify the fault type.
- Replace with a spare module or update firmware to verify hardware status.

Summary: If all above checks are correct, proceed to inspect the internal hardware or firmware of the module.

7.8 Temperature Module Failure

1. RTD Temperature Module Abnormality -- Description: The PLC or upper-level system communicates normally with the module, but the module cannot correctly detect temperature. The temperature value is not displayed in software.

Troubleshooting Steps:

1) Sensor Check:

- Verify RTD wiring (e.g., PT100) is correct, ensure 3-wire line lengths are equal, and there are no open circuits or poor contacts.
- Measure the sensor resistance with a multimeter to rule out component damage or out-of-range values.

2) Module Configuration Verification:

- Confirm that the sensor type (RTD), range, and filter parameters in software match the hardware.
- Check the module data address mapping to ensure it aligns with the PLC/upper-level program.

3) Signal Line Diagnostics:

- Test that the shield of signal lines is grounded at one end to avoid EMI-induced signal errors.
- Inspect module terminal blocks for oxidation or poor contact. Use a signal isolator if necessary.

4) Hardware Status Check:

- Measure module 24 V power supply stability to ensure it is within rated range.
- Replace the module or RTD sensor with a spare to verify whether it is a hardware fault.

Tip: Use PLC diagnostic tools (e.g., TIA Portal) to read the module channel status word for errors such as broken wires or out-of-range values.

Summary: If all checks above are normal, investigate the module's hardware or software faults.

2. TC Temperature Module Abnormality -- Description: The PLC or upper-level system communicates normally with the module, but the module cannot correctly detect temperature. The temperature value is not displayed in software.

Troubleshooting Steps:

1) Sensor and Wiring Check:

- Verify thermocouple polarity is correct. Ensure compensation wires have no breaks or shorts, and check that cold junction compensation resistors are correctly connected.
- Measure thermocouple output (mV) with a multimeter. If the signal is abnormal or unchanging, the sensor may be damaged or the wiring faulty.

2) Module Configuration Verification:

- Check that the thermocouple type (e.g., K-type, J-type) and range match the sensor. Ensure cold junction compensation is enabled.
- Verify the channel is activated and PDO mapping matches the PLC parameters.

3) Interference and Grounding Check:

- Use shielded cables with single-end grounding. Check line-to-ground insulation resistance ($\geq 100 \text{ M}\Omega$) to avoid common-mode voltage interference.
- If the module and sensor power grounds are separate, connect a common ground wire to eliminate potential differences.

4) Module Diagnostics and Replacement Test:

- Observe module indicators (e.g., SF LED flashing may indicate input over-range or broken wire). Test unused channels by shorting them.
- Replace the module or channel with a spare to determine whether it is a hardware fault.

Summary: If all checks above are normal, investigate the module's hardware or software faults.

7.9 Power Supply Module Failure

1. Power Supply Module Abnormality -- Description: The PLC or upper-level system communicates normally with the module, but the IO modules powered by the supply exhibit abnormal input/output behavior.

Troubleshooting Steps:

- 1) Power Output Check: Measure the module's output voltage to ensure stability and that it is within the rated range (e.g., $24 \text{ VDC} \pm 25\%$).
- 2) Load Capacity Verification: Confirm that the power supply can meet the demand of all connected IO modules to prevent overload.
- 3) Wiring and Terminal Inspection: Check for loose or oxidized power terminals and ensure reliable grounding.

- 4) **Module Replacement Test:** Test the faulty IO modules individually to determine if abnormal power caused hardware damage.
- 5) **Configuration Parameter Verification:** Check that power module parameters (e.g., voltage thresholds) match the system configuration.

Summary: If all checks above are normal, investigate the module's hardware or software faults.

7.10 Ethernet Port Failure

1. **Ethernet Port Abnormality -- Description:** During operation, the device experiences disconnections. The Ethernet port indicator is off when the fault occurs.

Troubleshooting Steps:

- 1) **Check Cable Connections:** Inspect both ends of the network cable for looseness, especially in environments with vibration, which may cause the port to become loose.
- 2) **Direct Connection Test:** Connect directly and attempt to PING the device.
- 3) **Cable Termination Check:** Examine the network cable connectors for cold solder joints or partially detached pins.

Troubleshooting Procedure: If step 1 identifies no issues, proceed with steps 2 and 3. If direct PING fails, inspect the solder joints of the Ethernet port.

8. Appendix

model	RB-1120
Adapter power consumption	Max: 280mA
Order number	18-01-06
Maximum number of I/O	32 pieces
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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