



PS00014402A00

# GL20-RTU-EIP Communication Interface Module User Guide

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# Preface

## ■ Introduction

This guide describes the product information, technical data, mechanical installation, electrical installation, configuration, commissioning, and troubleshooting of the product.

## ■ Standards Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive		Standard
CE Certification	EMC Directive	2014/30/EU	<b>24 VDC products</b> EN 61131-2 <b>220 VAC products</b> EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS Directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-
EAC Certification	-		-

Certification	Directive		Standard
UKCA Certification	Safety Regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC Regulations	Electromagnetic Compatibility Regulations 2016	<b>24 VDC products</b> EN 61131-2 <b>220 VAC products</b> EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS Regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

## ■ Revision History

Date	Version	Description
April 2024	A00	Initial release

## ■ How to Obtain

This guide is not delivered with the product. You can obtain the PDF version by the following methods:

- Do keyword search under Service and Support at <http://www.inovance.com>.
- Scan the QR code on the product with your smart phone.
- Scan the QR code below to install the app, where you can search for and download manuals.





## ■ **Warranty Disclaimer**

Inovance provides warranty service within the warranty period (as specified in your order) for faults or damage that occur during normal operation. Maintenance will be charged after the warranty expires.

Within the warranty period, maintenance fee will be charged for the following damage:

- Damage caused by operations not following the instructions in the user guide
- The product is damaged due to fire, flood, and abnormal voltage.
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

The maintenance is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see Product Warranty Card.

# Fundamental Safety Instructions

## ■ Safety Precautions

1. Before installing, using, and maintaining this equipment, read the safety information and precautions thoroughly, and comply with them during operations.
2. To ensure personal and equipment safety, observe the notes indicated on the product labels and all the safety instructions in the user guide.
3. "CAUTION", "WARNING", and "DANGER" in the user guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
4. Use this equipment according to the designated environment requirements.  
Damage caused by improper use is not covered by warranty.
5. Inovance shall take no responsibility for any personal injury or property damage caused by improper use.

## ■ Safety Levels and Definitions



"DANGER" indicates that failure to comply with the notice can result in severe personal injury or even death.



"WARNING" indicates that failure to comply with the notice may result in death or severe personal injury.



"CAUTION" indicates that failure to comply with the notice may result in minor or moderate personal injury or equipment damage. Keep this manual properly for future use and deliver it to the end user.

### Control System Design



- Provide a safety circuit outside the PLC so that the control system can still work safely once external power failure or PLC fault occurs.
- Add a fuse or circuit breaker because the module may smoke or catch fire due to long-time overcurrent caused by operation above rated current or load short-circuit.

### 警告

- An emergency stop circuit, a protection circuit, a forward/reverse operation interlocked circuit, and a upper position limit and lower position limit interlocked circuit must be set in the external circuits of PLC to prevent damage to the machine.
- To ensure safe operation, for the output signals that may cause critical accidents, please design external protection circuit and safety mechanism.
- Once the CPU of the PLC detects an exception in the system, all outputs may be closed; however, when a fault occurs in the controller circuit, the output may not be under control. Therefore, it is necessary to design an appropriate external control circuit to ensure normal operation.
- If the PLC output units such as relays or transistors are damaged, the output may fail to switch between ON and OFF states according to the commands.
- The PLC is designed to be used in an indoor electrical environment (overvoltage category II). The power supply must have a system-level surge protector, assuring that overvoltage due to lightning shock can't be applied to the PLC's power supply input terminals, signal input terminals and output terminals, to prevent damage to the equipment.

## Installation

### 警告

- Installation must be carried out by specialists who have received the necessary electrical training and understood enough electrical knowledge.
- Disconnect all external power supplies of the system before removing/installing the module. Failure to do so may result in electric shock, module fault or malfunction.
- Do not use the PLC where there are dust, oil smoke, conductive dust, corrosive or combustible gases, or exposed to high temperature, condensation, wind & rain, or subject to vibration and impact. Electric shock, fire and malfunction may also result in damage or deterioration to the product.
- The PLC is open-type equipment that must be installed in a control cabinet with lock (cabinet housing protection > IP20). Only the personnel who have received the necessary electrical training and understood enough electrical knowledge can open the cabinet.

### 注意

- Prevent metal filings and wire ends from dropping into ventilation holes of the PLC during installation. Failure to comply may result in fire, fault and malfunction.
- Ensure there are no foreign matters on ventilation surface. Failure to comply may result in poor ventilation, which may cause fire, fault and malfunction.
- Ensure the module is connected to the respective connector securely and hook the module firmly. Improper installation may result in malfunction, fault or fall-off.

### Wiring



- Wiring must be carried out by personnel who have received the necessary electrical training and understood enough electrical knowledge.
- Disconnect all external power supplies of the system before wiring. Failure to comply may result in electric shock, module fault or malfunction.
- Perform good insulation on terminals so that insulation distance between cables will not reduce after cables are connected to terminals. Failure to comply may result in electric shock or damage to the equipment.



- To avoid electric shock, cut off the power supply before connecting the product to the power supply.
- The input power of the product must meet the specifications listed in this guide. If the power input does not meet the specifications, the equipment may be damaged. Thus, check regularly that the DC power provided by the switching-mode power supply unit is stable.

### Operation and Maintenance



- Maintenance & inspection must be carried out by personnel who have the necessary electrical training and experience.
- Do not touch the terminals while the power is on. Failure to comply may result in electric shock or malfunction.
- Disconnect all external power supplies of the system before cleaning the module. Failure to comply may result in electric shock.
- Disconnect all external power supplies of the system before removing the module or connecting/removing the communication wirings. Failure to comply may result in electric shock or malfunction.

## Safety Recommendations

- In the position where the operator directly contacts the machinery part, for example, where a machinery tool is loaded/unloaded, or where a machine runs automatically, the onsite manual operating devices and any other alternative means must be carefully arranged and designed so that they are independent of the programmable controller and can start or terminate the automatic running of the system.
- If you need to modify the program while the system is running, use the lock function or other protective measures. Ensure that only authorized personnel can make the necessary modifications.

## Disposal



注意

- Dispose of retired batteries as industrial waste according to local laws and regulations.
- Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

# 1 Product Information

## 1.1 Product Introduction

### ■ Overview

GL20-RTU-EIP communication interface module connects to the EtherNet/IP network as an EtherNet/IP slave. With this module, you can expand the system with Inovance local modules such as GL20 series digital modules, analog modules, and temperature detection modules ( ["1.6 Release Notes" on page 14](#)). It can be used together with Inovance or third-party EtherNet/IP master devices.

### ■ Bus Current Consumption Calculation

The GL20-RTU-EIP module supports up to 16 GL20 series expansion modules, including the GL20-PS2 module. The number of expansion modules supported depends on the total bus current consumption.

When the total bus current consumption of the expansion modules ( ["1.6 Release Notes" on page 14](#)) exceeds the bus supply current of the GL20-RTU-EIP module, that is, 2 A, it is necessary to add an GL20-PS2 module to supply power to the expansion modules.

The formula for calculating the total bus current consumed by the expansion modules is as follows:

Total bus current consumption of expansion modules = Bus consumption current of expansion module #1 + Bus consumption current of expansion module #2 + ... + Bus consumption current of expansion module #n

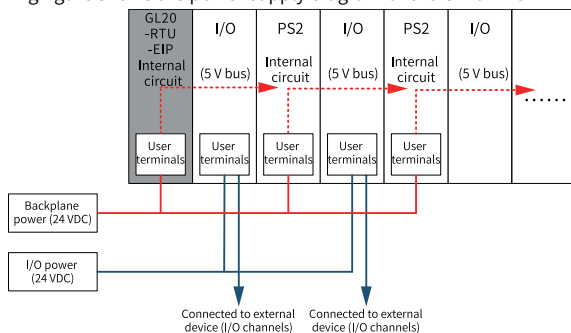
- When a GL20-PS2 module is not provided, it is required that the total bus current consumption of the expansion modules must not exceed 2 A.  
For example, the GL20-RTU-EIP module can support up to 8 GL20-3232ETN-M modules each with a bus current consumption of 250 mA ( $2\text{ A}/250\text{ mA}=8$ ), or up to 16 GL20-0008ETP modules each with a bus current consumption of 85 mA ( $16 \times 85\text{ mA}=1360\text{ mA}\leq 2\text{ A}$ ).
- When a GL20-PS2 module is provided because the total current consumption of the expansion modules that are directly powered by the GL20-RTU-EIP module exceeds 2 A, the excessive expansion modules are powered by the GL20-PS2 module. The number of expansion modules supported by the GL20-PS2 module is determined based on the total bus current consumption of the expansion modules, similar to the above calculation method of the GL20-RTU-EIP module. It

should be noted that if one GL20-PS2 module is provided, then its bus current consumption must be included in the total supply current of the GL20-RTU-EIP module. If multiple GL20-PS2 modules are provided, the bus current consumption of a certain GL20-PS2 module must be included in the total supply current of the immediately previous GL20-PS2 module.

For example, given that 8 GL20-3232ETN-M modules are already added to the GL20-RTU-EIP module. If you want to add more expansion modules, a GL20-PS2 module is required for additional power supply. In this case, you need to remove at least one GL20-3232ETN-M module to reserve the bus supply current margin of the GL20-RTU-EIP module to supply power to the GL20-PS2 module. The GL20-PS2 module consumes a bus current consumption of 60 mA and provides a bus current of 2 A.

Here we take one GL20-RTU-EIP module (2 A power supply) + one GL20-PS2 (2 A power supply) + several GL20-3232ETN-M modules as an example, then at least 15 GL20-3232ETN-M can be supported ( $15 \times 250 \text{ mA} = 3750 \text{ mA}$ ).

The following figure shows the power supply diagram of the GL20-RTU-EIP module.



## Caution

- The GL20-PS2 module and the GL20-RTU-EIP module must be powered on simultaneously, otherwise addressing may fail.
- Do not place the GL20-PS2 module in the last slot of the configuration.

## 1.2 Model Number and Nameplate

# GL 20 - RTU - EIP

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③

④

### ① Product Information

GL: General local module

### ③ I/O Type

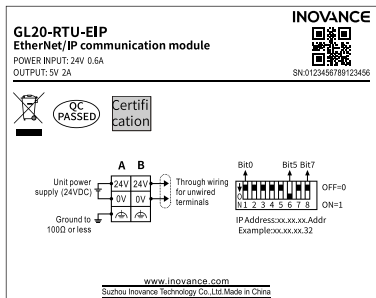
RTU: Remote terminal unit

### ② Series Number

20: 20 series module

### ④ Module Type

EIP: EtherNet/IP

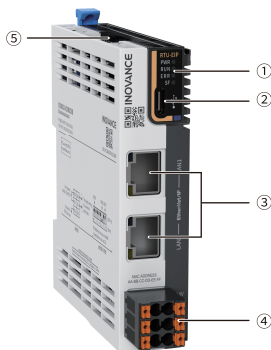


The data for ordering the product is shown below.

Model	Description	Product Code	Applicable Model
GL20-RTU-EIP	GL20 series EtherNet/IP communication module	01440511	Ethernet/IP master: PLC



## 1.3 Components



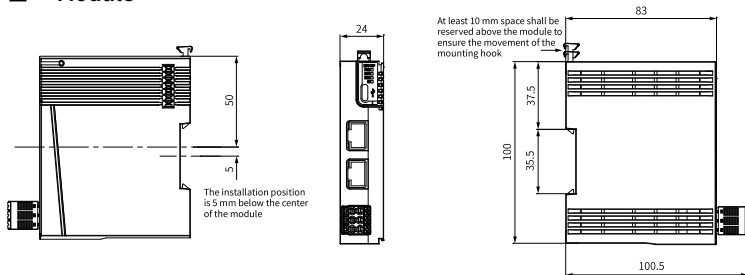
No.	Interface	Description			
①	Signal indicator	PWR	Power indicator	ON	Power supply normal
				OFF	Power supply abnormal
		RUN	Running state indicator	Blinking	EIP connection not established
				Steady ON	EIP connection established
		ERR	Communi- cation error indicator	Blinking	Blinking red at an interval of 1s, indicating that a recoverable fault such as RPI timeout occurs.
				Steady ON	An unrecoverable fault such as Ethernet hardware initialization failure occurs.
		SF	Applica- tion fault indicator	OFF	The module has no fault.
				Blinking	The module has a minor hardware fault, such as disconnection.
				Steady ON	The module has a serious hardware fault (such as module hardware error, channel fault, overlimit, etc.)
②	Type-C interface	Used for software upgrade of the board			

No.	Interface	Description
③	EtherNet/IP interface	Ethernet port
④	24 V power supply	For power supply input
⑤	DIP switch	Configure the IP.

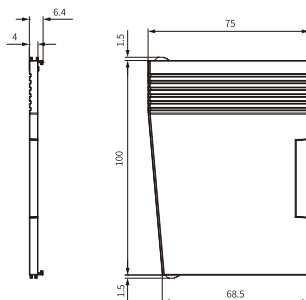
## 1.4 Product Dimensions

The mounting dimensions (in mm) are shown in the figure below.

### ■ Module



### ■ End Cover



## 1.5 Spare Parts and Options

### ■ Communication Cable

EtherNet/IP bus communication adopts shielded Ethernet cables for data transmission, without short circuit, misalignment and poor contact. The length of cables between devices cannot exceed 100m; otherwise, signal attenuation will occur and affect normal communication. It is recommended to use cables specified as follows.

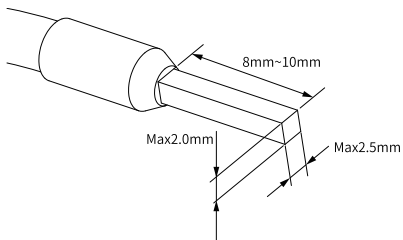
Item	Specification
Cable type	Elastic crossover cable, S-FTP, Cat5
Standard	EIA/TIA568A, EN50173, ISO/IEC11801 EIA/TI Abulletin TSB, EIA/TIA SB40-A&TSB36
Cross sectional area	26AWG
Conductor type	Twisted pair
Number of pairs	4

### ■ Power Supply Wiring

The cable lug and cable diameter described in the following table are only for reference.

Material Name	Cable Diameter		KST		Suzhou Yuanli	
	mm <sup>2</sup>	AWG	Model	Crimping Tool	Model	Crimping Tool
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	
	1.5	16	E1508		1508	

If you use other types of tubular lug, crimp the lug to the cables according to the shape and dimension requirements shown in the figure below.



## External Interface Specifications

Type	Interface	Cable Type/ Maximum Length	Description	User terminals	Performance
EtherNet/IP interface	EtherNet/IP	Cat5e shielded cable, 100 m	EtherNet/IP communica- tion interface	2x RJ45	100 Mbps (100Base-TX)
Power supply	24 V input	3-core unshielded cable, 20 m	24 V power input	6-pin pluggable terminal block	24 V/1 A

## 1.6 Release Notes

The following describes the released firmware version, the matching expansion modules, and the matching EDS file version.

### First release: 1.1.6.0 firmware (MCU)

- Matching expansion modules

Product Code	Module Name	Description	Firmware Version	Bus Current Consumption	Input/Output Size
01440293	GL20-0016ETN	16-channel DO module (NPN transistor)	Logic software: 0.1.2.0 and later	100 mA	Input: 0 byte Output: 2 bytes
01440292	GL20-0016ETP	16-channel DO module (PNP transistor)	Logic software: 0.1.2.0 and later	85 mA	Input: 0 byte Output: 2 bytes
01440291	GL20-1600END	16-channel DI module	Logic software: 0.1.2.0 and later	100 mA	Input: 2 bytes Output: 0 byte
01440287	GL20-4DA	4-channel DA module, supporting voltage/current output	Board software: 1.1.5.0 and later	100 mA	Input: 0 byte Output: 8 bytes
01440288	GL20-4AD	4-channel AD module, supporting voltage/current output	Board software: 1.1.5.0 and later	100 mA	Input: 8 bytes Output: 0 byte
01440489	GL20-8ADI	8-channel AD module, supporting current output	Board software: 1.1.0.5 and later	100 mA	Input: 16 bytes Output: 0 byte
01440482	GL20-8ADV	8-channel AD module, supporting voltage output	Board software: 1.1.0.5 and later	100 mA	Input: 16 bytes Output: 0 byte

Product Code	Module Name	Description	Firmware Version	Bus Current Consumption	Input/Output Size
01440334	GL20-0008ER	8-channel relay DO module	Logic software: 0.1.2.0 and later	85 mA	Input: 0 byte Output: 1 byte
01440381	GL20-0800END	8-channel digital input module	Logic software: 0.1.2.0 and later	100 mA	Input: 1 byte Output: 0 byte
01440379	GL20-0008ETN	8-channel DO module (NPN transistor)	Logic software: 0.1.2.0 and later	100 mA	Input: 0 byte Output: 1 byte
01440380	GL20-0008ETP	8-channel DO module (PNP transistor)	Logic software: 0.1.2.0 and later	85 mA	Input: 0 byte Output: 1 byte
01440339	GL20-0808ETN	8-channel DI/DO module	Logic software: 0.1.2.0 and later	85 mA	Input: 1 byte Output: 1 byte
01440290	GL20-3232ETN-M	32-channel DI/DO module (ejector header)	Board software: 3.0.4.0 and later	250 mA	Input: 4 bytes Output: 4 bytes
01440378	GL20-3200END-M	32-channel DI module (ejector header)	Board software: 3.0.4.0 and later	125 mA	Input: 4 bytes Output: 0 byte
01440377	GL20-0032ETN-M	32-channel DO module (ejector header)	Board software: 3.0.4.0 and later	125 mA	Input: 0 byte Output: 4 bytes

Product Code	Module Name	Description	Firmware Version	Bus Current Consumption	Input/Output Size
01440466	GL20-3200END	32-channel DI module (push-in terminal)	Logic software: 0.1.2.0 and later	85 mA	Input: 4 bytes Output: 0 byte
01440467	GL20-0032ETN	32-channel DO module (push-in terminal)	Logic software: 0.1.2.0 and later	125 mA	Input: 0 byte Output: 4 bytes
01440337	GL20-4PT	4-channel input thermal resistor temperature detection module	Board software: 2.0.5.0 and later	100 mA	Input: 16 bytes Output: 0 byte
01440338	GL20-4TC	4-channel input thermocouple temperature detection module	Board software: 2.0.5.0 and later	85 mA	Input: 16 bytes Output: 0 byte
01440351	GL20-PS2	2A power module	Board software: 0.1.2.0 and later	2000 mA	Input: 0 byte Output: 0 byte

- **Matching EDS file version:** 00.01

## 2 Product Specifications

### 2.1 Electrical Specifications

Item	Specification
Rated terminal input voltage	24 VDC (20.4 VDC to 28.8 VDC)
Rated terminal input current	0.6 A (typical@24 V)
Rated bus output voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated bus output current	2 A (typical@5 V)
Power output derating	80% derating at 55°C (the output current does not exceed 1.6 A), or 10°C derating when output current is 2 A

### 2.2 Technical Specifications

#### ■ General specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	24 mm x 100 mm x 83 mm
Weight	Approx. 123 g

#### ■ Software specifications

Item	Specification
IP setting method	<ul style="list-style-type: none"><li>• USB software tool</li><li>• BOOTP/DHCP</li><li>• DIP switch</li></ul>
Network topology	Linear, star, tree, and DLR (only supported as managed)
Max. number of supported I/O modules	16
Max. data length	Input: 504 bytes, Output: 504 bytes
Transmission distance	100 m
RPI	1 ms to 50,000 ms
Max. number of CIP connections	8



Item	Specification
Network interface	2x RJ45 with interactive function
Connection rate	100M

## ■ Environmental Specifications

Item	Specification
Operating environment	No corrosive and flammable gas and no excessive conductive dust
Altitude	≤2,000 m
Pollution degree	2
Noise immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	<ul style="list-style-type: none"> <li>● Operating: Tested according to IEC 60068-2-6. 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 200 Hz, 1 g, 10 cycles each in X, Y and Z directions.</li> <li>● Transport: Tested according to IEC 60068-2-64. 5 Hz to 100 Hz, 0.01 g<sup>2</sup>/Hz; 200 Hz, 0.001 g<sup>2</sup>/Hz, 1.14 g, 30 min each in X, Y and Z directions.</li> </ul>
Shock resistance	<ul style="list-style-type: none"> <li>● Operating: Tested according to IEC 60068-2-27. 15 g, 11 ms, 18 shocks.</li> <li>● Transport: Tested according to IEC 60068-2-27. 15 g, 11 ms, 18 shocks.</li> </ul>
Operating temperature/humidity	<ul style="list-style-type: none"> <li>● Temperature: -20°C to +55°C</li> <li>● Relative humidity: 10% to 90% RH, non-condensing</li> </ul>
Storage temperature/humidity	<ul style="list-style-type: none"> <li>● Temperature: -40°C to +70°C</li> <li>● Relative humidity: &lt;90% RH, non-condensing</li> </ul>

## 3 Mechanical Installation

### 3.1 Installation Precautions

- Before installing or removing the module, ensure that the module is powered off.



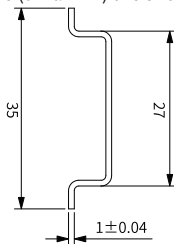
#### Caution

Do not hot swap the modules. Otherwise, the modules may be damaged by overcurrent or overvoltage, and the PLC may be subject to restart, user data loss or corruption.

- Prevent the enclosure or terminals of the module from dropping or suffering from impact or shock.

### 3.2 Installation Method

The module is mounted onto a DIN rail in conformity with IEC 60715 (width: 35 mm, thickness: 1 mm). The dimensions (unit: mm) are shown below.

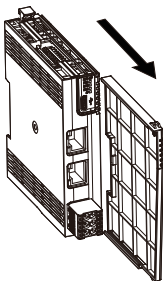


#### Caution

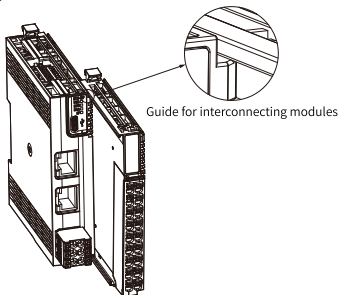
If the module is not installed on the recommended DIN rail (especially when the DIN rail thickness is not 1.0 mm), DIN rail buckles may not be locked. In this case, the module cannot be installed in place and will fail to work properly.

## ■ Installing the modules to each other

1. Remove the end cover in the direction indicated by the arrow, as shown below.

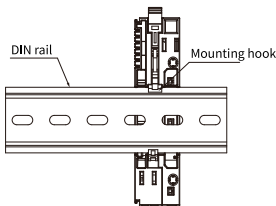
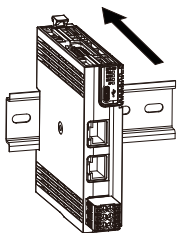


You can install multiple modules to each other with the help of top and bottom guides on the modules, as shown below.

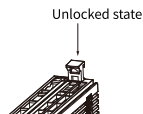
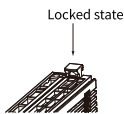
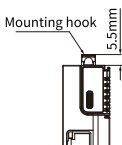


## ■ Installing the module onto DIN rail

1. Align the module with the DIN rail and push the module in the direction indicated by the arrow until you hear a clicking sound, as shown below.



2. Make sure the DIN rail mounting hook of the module is locked. The locked and unlocked states of the mounting hook are shown below.



- If the mounting hook is pressed down, it is locked.
- If the mounting hook is lifted up, it is unlocked.

Press down the mounting hook to lock the module to the DIN rail.

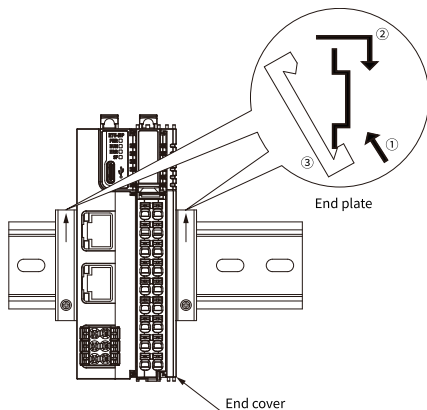


**Caution**

When the module is not installed on the DIN rail, keep the rail buckles in locked state. If the rail buckles remain in unlocked state for a long period of time, they will be invalidated.

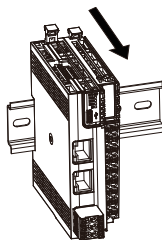
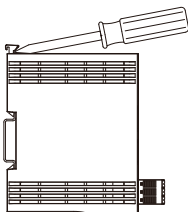
3. Mount an end plate on either side of the PLC or the module.

To mount the end plate, hook the bottom of it to the bottom of the DIN rail, rotate the end plate to hook the top of it to the top of the DIN rail, and then tighten the screw to lock the end plate in place.



## ■ Removing the module

Pry the DIN rail mounting hook upwards with a tool such as slotted screwdriver, hold the protrusions and pull the module out straight forward, and then press down the top of the DIN rail mounting hook.



## 4 Electrical Installation

### 4.1 Cable Connection

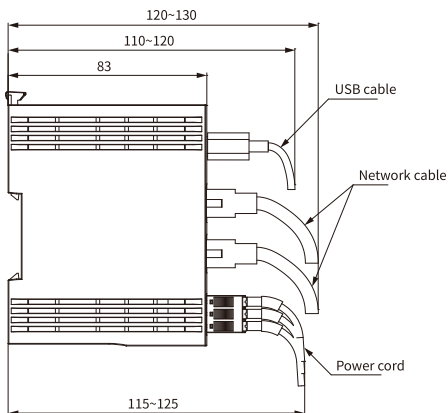


Figure 4-1 Cable connection diagram (in mm)

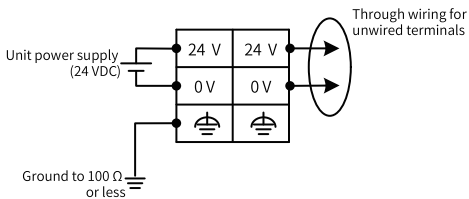
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### **Note**

To ensure the reliability, it is recommended to use different power supply modules for the 24 V input of the communication interface module and the 24 V input of other modules.

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## 4.2 Electrical Wiring Diagram



# 5 Programming Examples

## 5.1 IP Address Definition and Configuration

### ■ Configuring the IP address via DIP switch

The DIP switch of the GL20-RTU-EIP module provides eight bits, which are defined as follows:

- When the DIP switch value is 0x00, the module uses the software-configured IP. The software-configured IP can be configured using the USB configuration tool (Note: The module comes with a factory default IP 192.168.1.66).
- When the DIP switch value is 0xFF, the module is in DHCP mode by default. In this mode, the BOOTP tool must be used to assign IP every time the module is powered on.
- When the DIP switch value is in the range 0x01 to 0xFE, the DIP switch value represents the last byte of the IP address. The first three bytes can be configured by the software or use the default (192.168.1). By default, the mask is 255.255.255.0 and the gateway is 192.168.1.1.

After modifying the IP address, it is necessary to restart the GL20-RTU-EIP module.

Positions of DIP switch (ON: 1, OFF: 0)								Key value	IP address
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0	0x00	Software configuration mode (Configuration via USB)
1	0	0	0	0	0	0	0	0x01	x.x.x.1
0	1	0	0	0	0	0	0	0x02	x.x.x.2
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
0	1	1	1	1	1	1	1	0xFE	x.x.x.254
1	1	1	1	1	1	1	1	0xFF	DHCP mode

### ■ Software configuration mode

When all switches are 0, you can configure the IP address via software.



In the software configuration mode, you can configure the IP address through a USB connection.

Connect to the Type-C port of the GL20-RTU-EIP module through a USB cable, open the USB tool, and enter the IP address, subnet mask, and gateway address. Click **IP and Mask Gateway Configuration** to send the IP address to the module.



Figure 5-1 Configuring IP address via the USB tool

## 5.2 Configuration of Mounted Modules

The modules mounted to the GL20-RTU-EIP communication interface module can be configured either through the USB configuration tool or through the attribute of custom UCMM object.

### 5.2.1 Configuration via USB Configuration Tool

#### ■ Prerequisite

The USB configuration tool has been successfully installed.

#### ■ Steps

1. Check the configuration of modules mounted to the communication interface module.

Connect to the communication interface module via the USB cable, open the USB configuration tool, and click **Connect Device**. Upon successful connection, click **Upload Topology** to view the configuration of the modules mounted to the communication interface module. Right-click the communication interface module

and select **PDO Parameters** to view the periodic data type and data length of input and output of each module, and total data size of all modules.

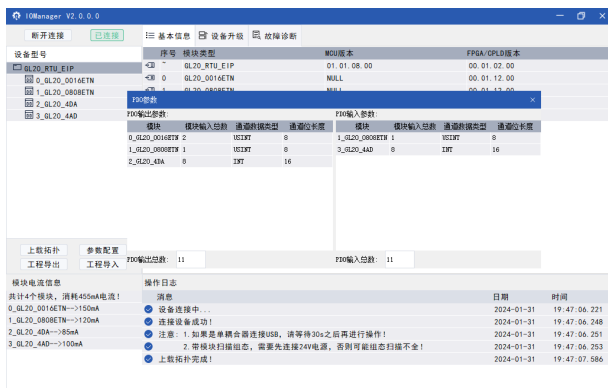


Figure 5-2 Viewing the configuration of the modules mounted to the communication interface module

## 2. Configure the module.

Click a corresponding module in the module list, and then click the **Parameter Configuration** tab. After configuring the configuration data of the module, click **Parameter Configuration** in the lower left corner to send the module configuration parameters to the communication interface module.

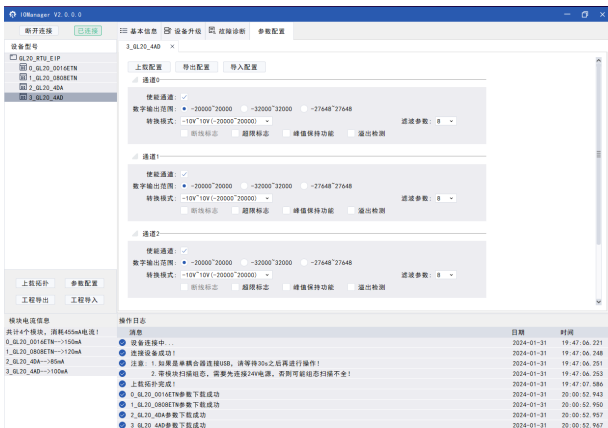


Figure 5-3 Configuring the module

## 5.2.2 Configuration via UCMM Programming

The module supports UCMM (Unconnected Message Manager). You can obtain configuration information, version number, diagnostic information, as well as issue module configuration data by reading and writing custom UCMM objects.

### Configuration Flowchart

The following figure shows the process of issuing configuration data through the attributes of custom UCMM objects. First, read the attribute 0x00000064 of instance 0x00000000 of object 0x0381 of the communication interface module to obtain the number of modules mounted to the EIP communication interface module and the ID of each module. Then perform match according to the module type returned. After the configuration interface is generated, generate the configuration data according to the protocol format and allocate the configuration data to the corresponding slot.

## Note

The diagnostic data can be read selectively based on actual requirements or read by default.

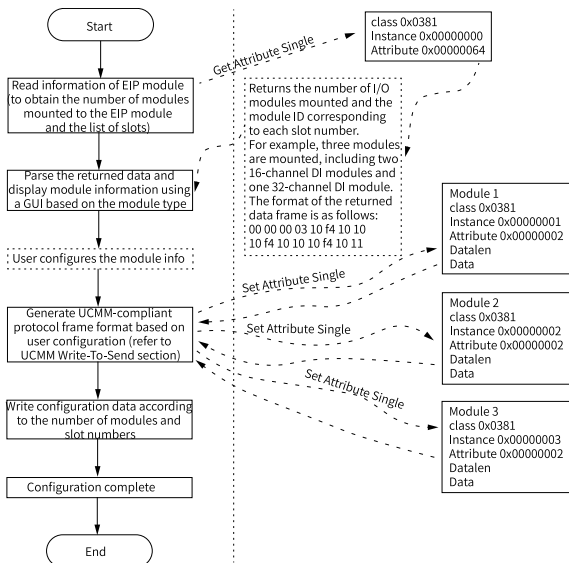


Figure 5-4 Configuration flowchart

## ■ Definition of UCMM communication protocol

- UCMM read/write definition:

Class ID	Instance	Attribute	Notes
0x0381	0x00000000	0x00000064	Communication interface module information, including the number of modules mounted and module ID
	0x00000001	0x00000001	Module ID, module version
		0x00000002	Configuration information
		0x00000003	Diagnostic information
	0x00000002	0x00000001	Module ID, module version
		0x00000002	Configuration information
		0x00000003	Diagnostic information
	0x00000003	0x00000001	Module ID, module version
		0x00000002	Configuration information
		0x00000003	Diagnostic information
	0x00000004	0x00000001	Module ID, module version
		0x00000002	Configuration information
		0x00000003	Diagnostic information
	.....	.....	.....
	0x00000010	0x00000001	Module ID, module version
		0x00000002	Configuration information
		0x00000003	Diagnostic information

- Definition of returned data for UCMM read:

Class ID	Instance	Attribute	length	data	Notes
0x0381	0x00000000	0x00000064	Total length of the data area	Refer to table 5-1	Communication interface module information, including the number of modules mounted and module ID
	0x00000001	0x00000001	-	Refer to table 5-2	Module ID, module version
		0x00000002	-	Refer to module configuration data	Configuration information
		0x00000003	-	Refer to module diagnostic data	Diagnostic information

Class ID	Instance	Attribute	length	data	Notes
0x0381	0x00000002	0x00000001	-	Refer to table 5-2	Module ID, module version
		0x00000002	-	Refer to module configuration data	Configuration information
		0x00000003	-	Refer to module diagnostic data	Diagnostic information
	0x00000003	0x00000001	-	Refer to table 5-2	Module ID, module version
		0x00000002	-	Refer to module configuration data	Configuration information
		0x00000003	-	Refer to module diagnostic data	Diagnostic information
	0x00000004	0x00000001	-	Refer to table 5-2	Module ID, module version
		0x00000002	-	Refer to module configuration data	Configuration information
		0x00000003	-	Refer to module diagnostic data	Diagnostic information
	.....	.....	.....	.....	.....
	0x00000010	0x00000001	-	Refer to table 5-2	Module ID, module version
		0x00000002	-	Refer to module configuration data	Configuration information
		0x00000003	-	Refer to module diagnostic data	Diagnostic information

Table 5-1 Communication interface module information list

length	data							
data Total length (2byte)	Communi- cation interface module ID (4byte)	Communi- cation interface module version (4byte)	FPGA Version (4byte)	Number of slots mounted to the communi- cation interface module (4byte)	Slot 1 Module ID (4byte)	Slot 2 Module ID (4byte)	.....	Slot x Module ID (4byte)
0xXXXX	0xXXXX- XXXX	0xXXXX- XXXX	0xXXXX- XXXX	0XXXXXXXX- XX	0xXXXX- XXXX	0xXXXX- XXXX	.....	0XXXXXXXX- XXX

Table 5-2 Information list of local modules

length	data		-
Total data length (2byte)	MCU version (4byte)	Module ID	CPLD version (4byte)
0xXXXX	0XXXXXXXXX	0XXXXXXXXX	0XXXXXXXXX

- Definition of UCMM RX/TX data:



Class ID	Instance	Attribute	data	Notes
0x0381	0x00000000	0x00000064	-	Not allowed to write
		0x00000065	Tooling-related functions	-
	0x00000001	0x00000001	-	Not allowed to write
		0x00000002	Refer to module configuration data	Configuration information
		0x00000003	-	Not allowed to write
	0x00000002	0x00000001	-	Not allowed to write
		0x00000002	Refer to module configuration data	Configuration information
		0x00000003	-	Not allowed to write
	0x00000003	0x00000001	-	Not allowed to write
		0x00000002	Refer to module configuration data	Configuration information
		0x00000003	-	Not allowed to write
	0x00000004	0x00000001	-	Not allowed to write
		0x00000002	Refer to module configuration data	Configuration information
		0x00000003	-	Not allowed to write
	.....	.....	.....	.....
	0x00000010	0x00000001	-	-
		0x00000002	Refer to module configuration data	Configuration information
		0x00000003	-	Not allowed to write

- Definition of returned data for UCMM write: Same with the standard format of the returned data for UCMM write.

## 5.3 Definition of Process Data

### ■ Process data mapping

The network adapter reads and writes the I/O process data of the I/O module in real time through the internal bus. The data mapping model is shown in the following figure.

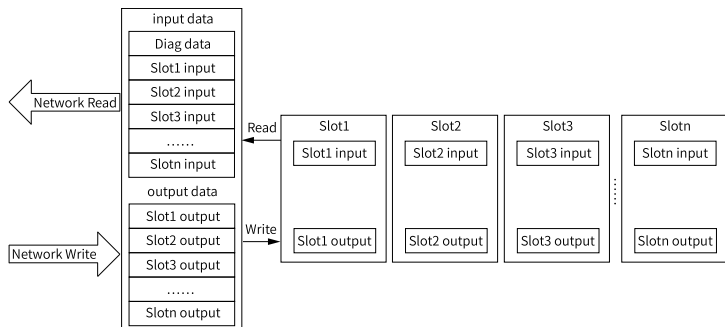


Figure 5-5 Diagram of data mapping model

For the mapping of the input data for a specific cycle, you can view related parameters in the USB software. The maximum input bytes and output bytes of the EtherNet/IP network adapter are 504 bytes respectively.

## ■ Diagnostic Definition of Process Data

The GL20-RTU-EIP communication interface module itself outputs process data. The first two bytes of the input process data are diagnostic data, such as Diag data on [“Figure 5-5” on page 36](#).

bit	Name	Meaning	Remarks
0	EIP diagnosis	Indicates the EIP diagnostic information	1: Diagnostic information present
1	GL-LINK diagnosis	Indicates the GL-LINK diagnostic information	1: Diagnostic information present
2	MODULE diagnosis	Indicates the MODULE diagnostic information	1: Diagnostic information present
3	EIP STATUS	EIP connection status	1: Connected, 0: Disconnected
4 to 7	GL-LINK STATUS	Status of local bus	See below
8 to 15	MODULE Address	Address of the module that has diagnostic information.	If multiple modules have diagnostic information, then it is the address of the last module.

When the module has diagnostic information, bit2 is set to 1 and bit8 to bit15 displays the address of the module with diagnostic information. When multiple modules have diagnostic information, bit2 displays the address of the module with diagnostic information. It is the address of the last module with diagnostic information.

Local bus status: 0: Error; 1: Initialization; 2: Pre-running; 3: Safe-operational; 4: Running

For detailed diagnostic fault codes of the module, see "*Fault Diagnosis*" on page 61.

## 5.4 Programming Examples

### 5.4.1 Programming with Inovance InoProShop

#### ■ Prerequisite

Inovance InoProShop software has been installed successfully and the EDS file is ready. You can get the InoProShop software and the EDS file at <https://www.inovance.com>.

#### ■ Steps

1. Add a device.
    - a. Add EDS file of the GL20-RTU-EIP communication interface module.
- 

## Note

If the EDS file is not installed successfully, the GL20-RTU-EIP device cannot be scanned.

---

- 1). In the menu bar, select **Tools > Device Repository**. The **Device Repository** dialog opens, as shown below.

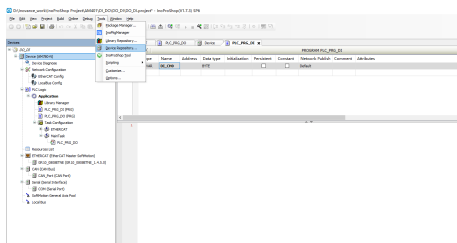


Figure 5-6 Opening the device repository

- 2). In the menu bar, select **Tools > Device Repository**. The **Device Repository** dialog opens, as shown below.
- 3). In the pop up dialog, open the EDS file of the GL20-RTU-EIP communication interface module to be installed, as shown below.

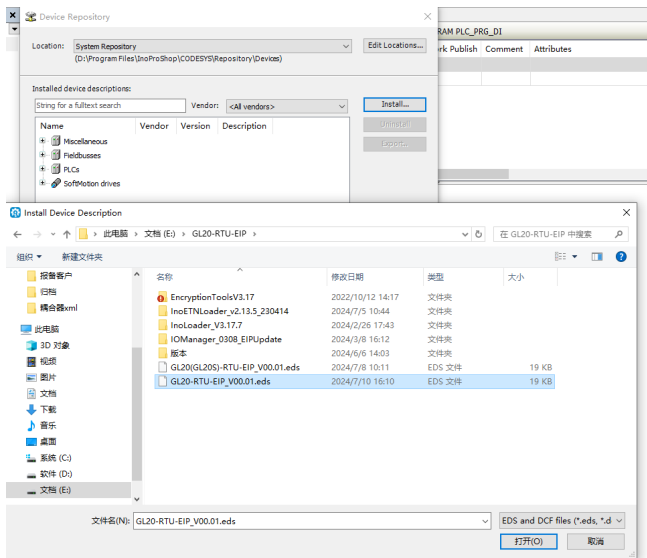


Figure 5-7 Installing the EDS file

b. Add the GL20-RTU-EIP communication interface module.

- 1). Double-click **Network Configuration** and select "EtherNet/IP Master", as shown below.

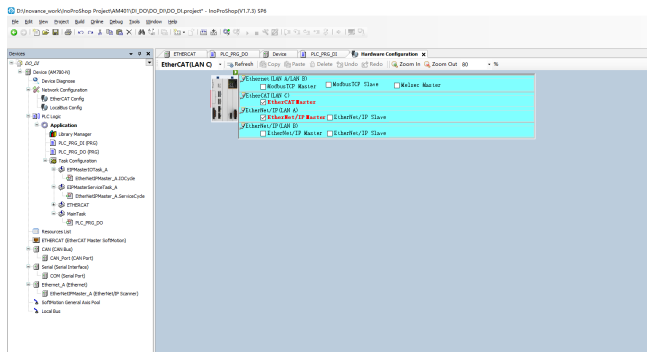


Figure 5-8 Adding EtherNet/IP master

- 2). Add the GL20-RTU-EIP communication interface module through automatic scanning or manual addition, as shown below.

- Automatic scanning

- i. In the **Devices** pane, right-click "EtherNetIPMaster\_A (EtherNet/IP Scanner)" and select **Scan for Devices**.

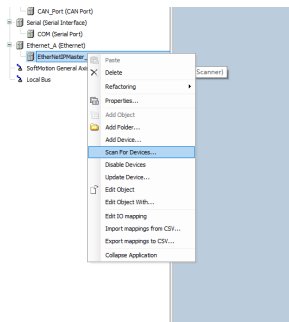


Figure 5-9 Scanning for device

- ii. Click **Scan Devices**, select the scanned device, and click **Copy all to project** to finish adding the GL20-RTU-EIP communication interface module (Currently, the modules that are mounted to the communication interface module cannot be added through scanning.)

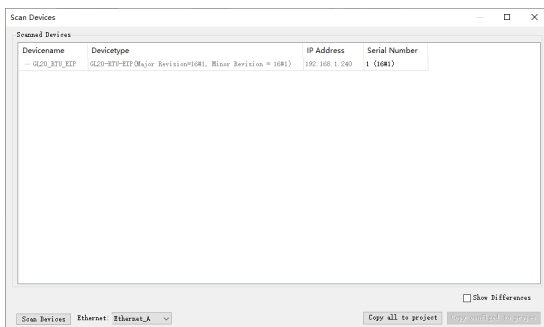


Figure 5-10 Selecting the scanned device

- Adding the module manually
  - i. Right-click "EtherNet/IPMaster\_A (EtherNet/IP Scanner)" and select **Add Device**.

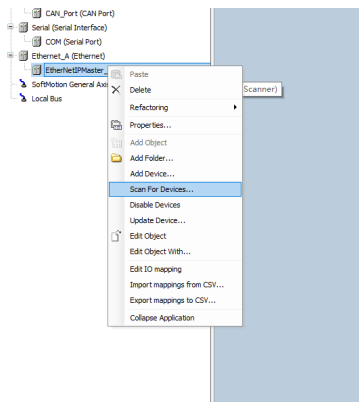


Figure 5-11 Adding device

- ii. Click **Add Device**. In the pop up dialog, select the GL20-RTU-EIP communication interface module.

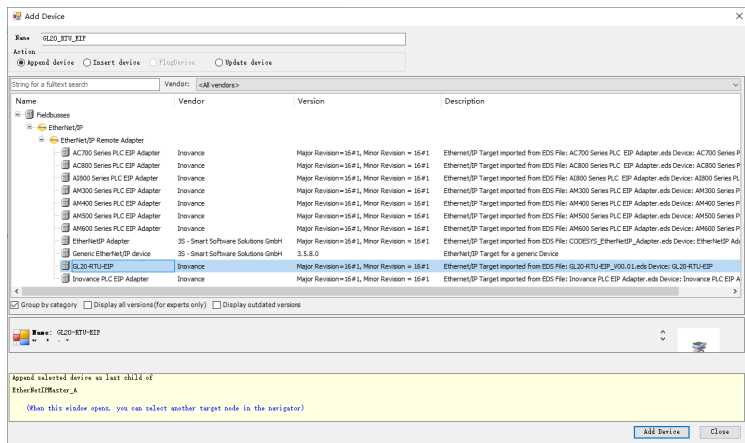


Figure 5-12 Adding GL20-RTU-EIP communication interface module

## 2. Configure the EtherNet/IP network adapter.

In the **Devices** pane, double-click "EtherNet\_A (EtherNet)". In the pop up page, select the **General** tab and then click **Interface** to select the network adapter with the same IP as the communication interface module.

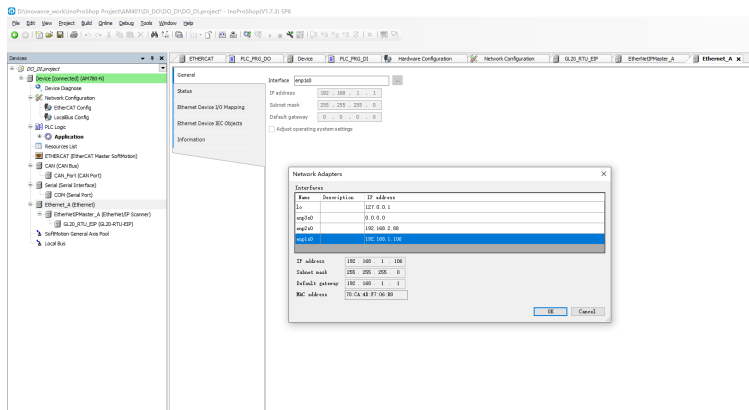


Figure 5-13 Configuring EtherNet/IP

## 3. Configure the GL20-RTU-EIP communication interface module.

- Configure the general information of the GL20-RTU-EIP communication interface module.

In the **Devices** pane, select GL20\_RTU\_EIP (GL20-RTU-EIP) > General. Check whether the IP address of the module is the IP address configured. If not, modify the IP address.



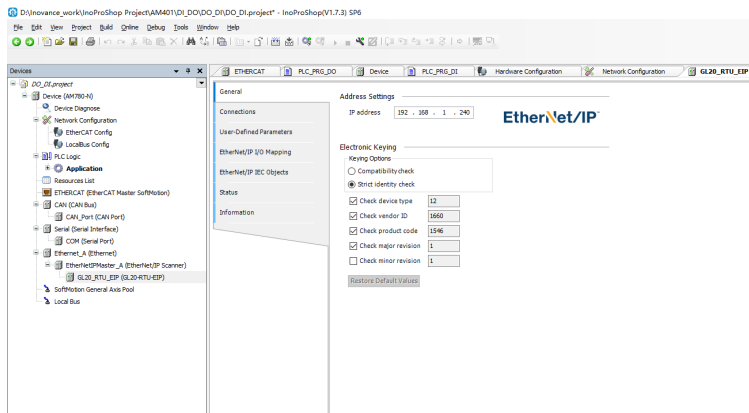


Figure 5-14 Configuring the GL20-RTU-EIP communication interface module

b. View modules connected to the GL20-RTU-EIP communication interface module.

Connect to the communication interface module via the USB cable, open the USB software, and click **Connect Device**. Upon successful connection, click **Upload Topology** to view the configuration of the mounted communication interface module. Right-click the communication interface module and select **PDO Parameters** to view the periodic data type and data length of input and output of each module, and total data size of all modules.

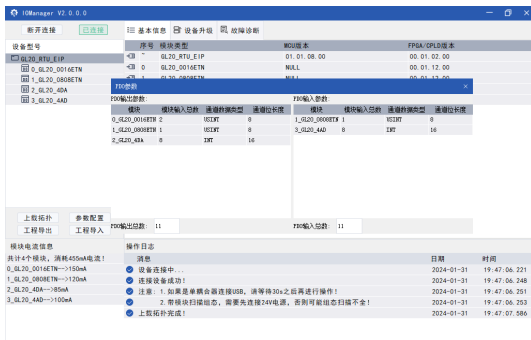


Figure 5-15 Viewing modules connected to the GL20-RTU-EIP communication interface module

- c. Configure the connection information of the GL20-RTU-EIP communication interface module.

I/O data statistics are available in the host controller. For details, see ["5.2.1 Configuration via USB Configuration Tool" on page 27](#). You can configure the connection parameters of the GL20-RTU-EIP communication interface module through I/O data statistics.

The OUT and IN byte statistics are known. In the **Devices** pane, go to **GL20\_RTU\_EIP (GL20-RTU-EIP) > Connections**. Configure the input/output assembly based on the type and channels of the module. For example, configure "O→T Size" to 11 bytes and "T→O Size" to 11 bytes, as shown below.

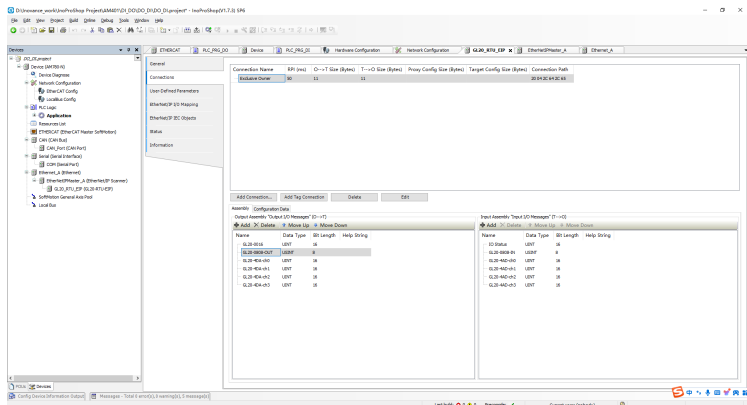


Figure 5-16 Configuring the connection of the GL20-RTU-EIP communication interface module

d. Log in to and operate the GL20-RTU-EIP communication interface module.

Log in to InoProShop. In the **Devices** pane, select **GL20-RTU-EIP** > **EtherNet/IP I/O Mapping**, as shown below. You can operate the data of the module.

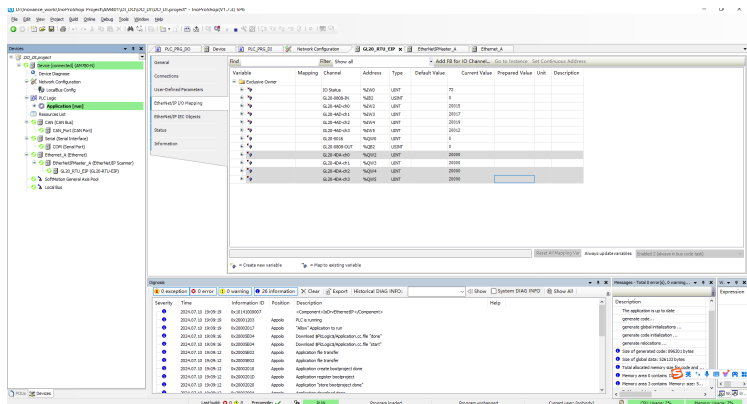


Figure 5-17 Logging in to and operating the GL20-RTU-EIP communication interface module

## Note

The bytes occupied by OUT and IN of each module are stored in sequence according to the module ID, and can be displayed in the order of the dataset after the dataset is established.

## 5.4.2 Programming with Omron Sysmac Studio

### ■ Prerequisite

The Omron Sysmac Studio software has been installed successfully.

### ■ Steps

1. Create a project.

- Open the Sysmac Studio software, click **New Project**. In the **Project Properties** dialog, select the device and click **Create**.

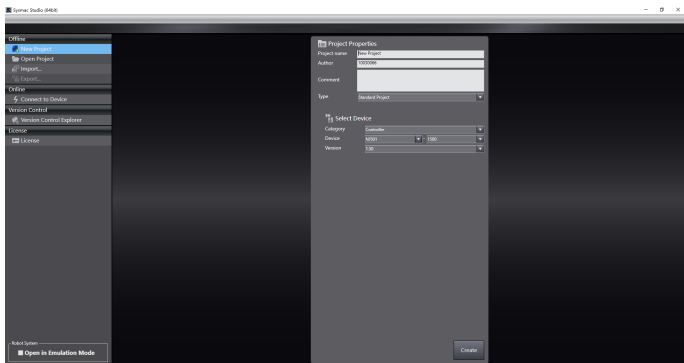


Figure 5-18 Creating a project

- b. In the left navigation pane, select **Configurations and Setup > Controller Setup > Built-in EtherNet/IP Port Settings** to view the fixed IP address.

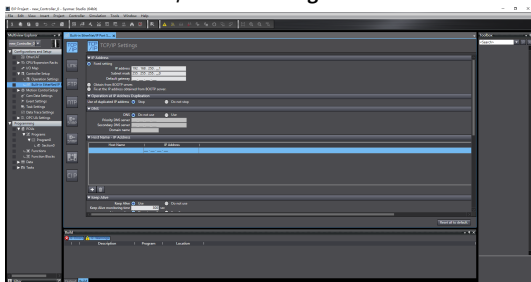


Figure 5-19 Viewing the fixed IP address

- c. View the network segment of the PC.

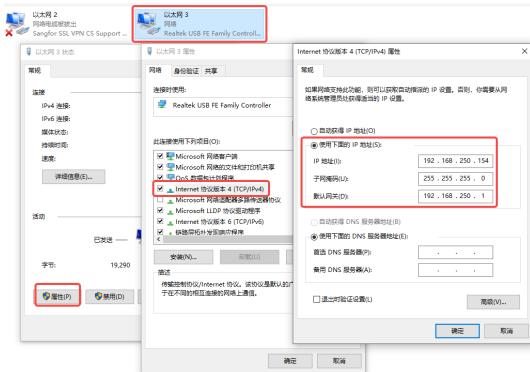




Figure 5-20 Viewing the network segment of the PC

- d. After you set the PC to be on the same network segment as the PLC, click . Then you can monitor the connection status and run mode. To switch the PLC to the offline status, click .

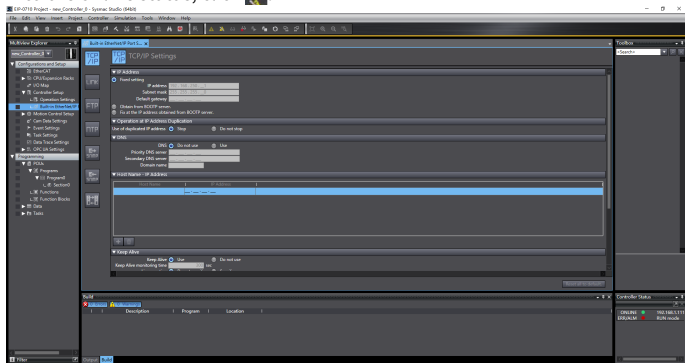


Figure 5-21 Viewing the network segment of the PC

## 2. Configure the project.

- a. Before carrying out EtherNet/IP communication, determine the input/output data area size. You can configure the connection parameters of the GL20-RTU-

EIP communication interface module by configuring "PDO Parameters" in IOManger software.



Figure 5-22 Viewing the data statistics

b. Based on the input/output data area size of the I/O module, click **Global Variables** to create an input variable (ARRAY[0..10] OF byte) and an output variable (ARRAY[0..10] OF byte). Select "Input" and "Output" respectively in the **Network Public** column.

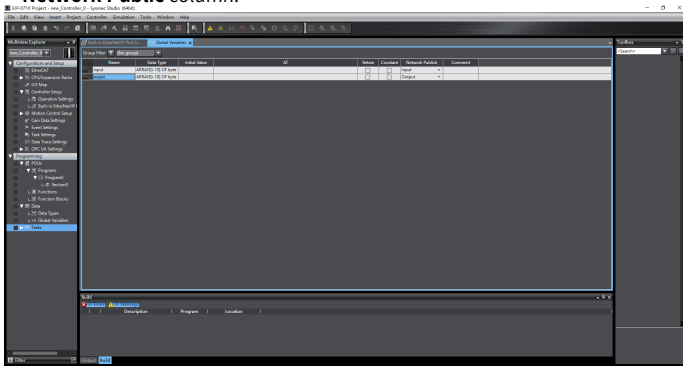


Figure 5-23 Creating an input/output variable

- c. In the menu bar, select **Tools > EtherNet/IP Connection Settings**. In the pop up dialog, double-click the PLC to open the **Built-in EtherNet/IP Port Settings - Connection Settings** interface.

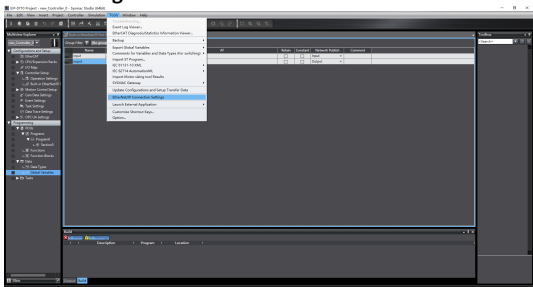


Figure 5-24 Built-in EtherNet/IP port settings - Connection settings

- d. Click **Register All**, select the input/output variable defined by the global variable, and click **Register** to complete the registration of the new variable.

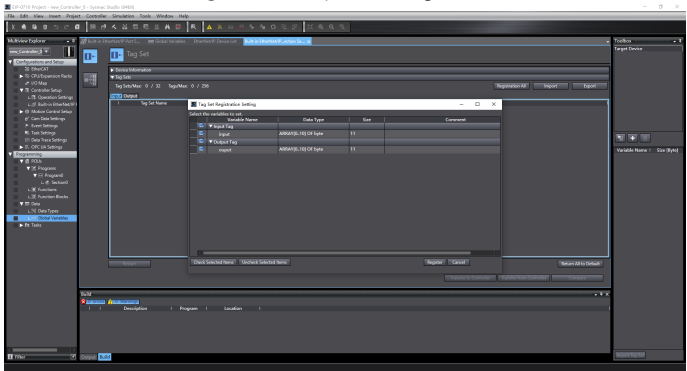


Figure 5-25 Registering the variable

### 3. Import the EDS file

- a. In the right **Toolbox** pane, right-click the space and select **Display EDS Library** to open the EDS library.



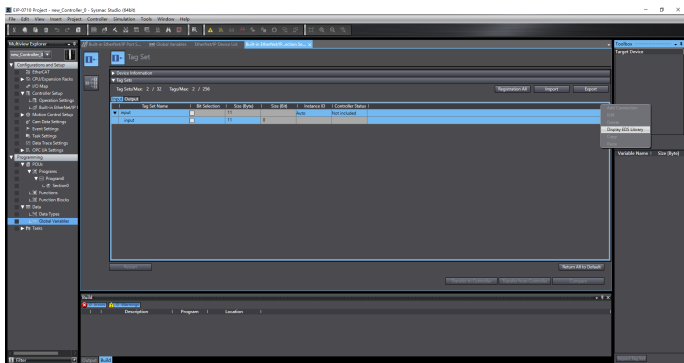


Figure 5-26 Displaying the EDS library

- b. In the pop up window, click **Install**. Then in the pop up dialog, open the EDS file of the GL20-RTU-EIP communication interface module to be installed. After successful installation, the EDS library displays the Inovance logo.

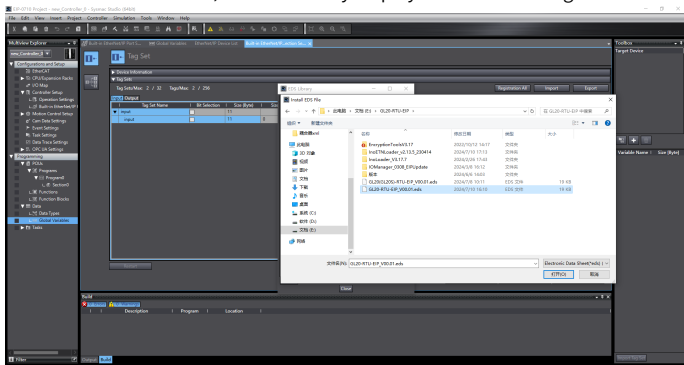


Figure 5-27 Installing the EDS file

4. Add a configuration module.

- a. In the right **Toolbox** pane, select **Target Device** and then click + to add a GL20-RTU-EIP network configuration module.



Figure 5-28 Adding a configuration module

- b. In the right **Toolbox** pane, modify the node address to the IP address of the communication interface module.

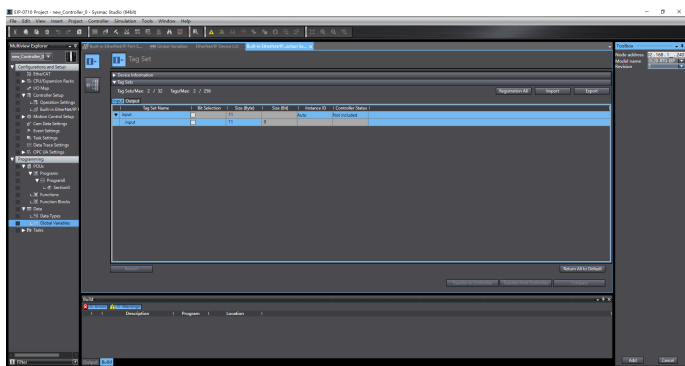




Figure 5-29 Modifying the node address

- c. Click  , and select "192.168.250.20 GL20-RTU-EIP" for **Target Device**. Set **Originator Variable** to "input" or "output". Set **Target Variable** to "101" for input and "100" for output. Ensure that the target variable and originator variable have the same size (byte).

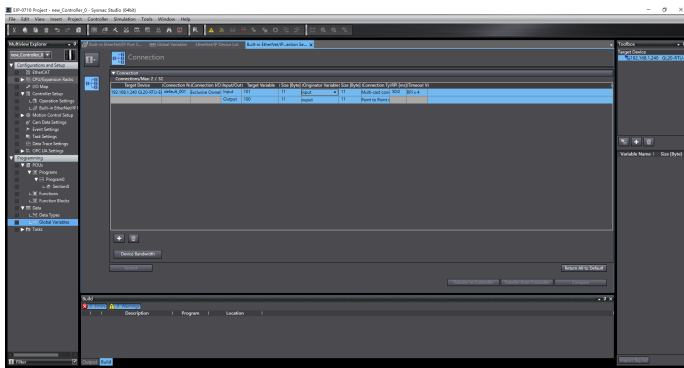




Figure 5-30 Connection diagram

- d. Select  >  in the function bar or select **Controller > Transfer > To Controller > Execute** in the menu bar to complete the transfer.

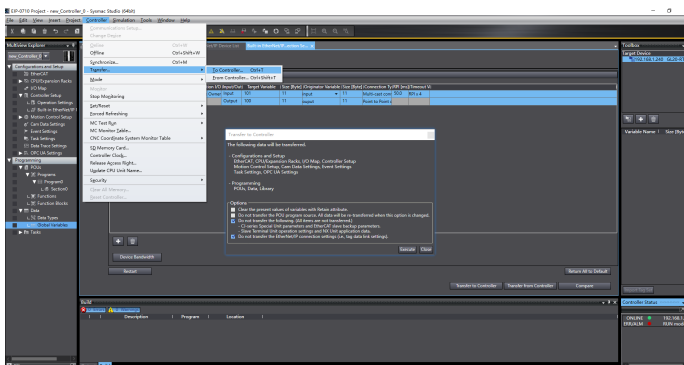


Figure 5-31 Transfer diagram

- e. In the menu bar, select **View > Watch Tab Page** to open the watch tab page.

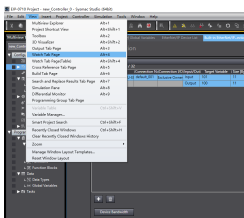


Figure 5-32 Opening the watch tab page

f. Add input/output variables in the watch tab page for data monitoring.

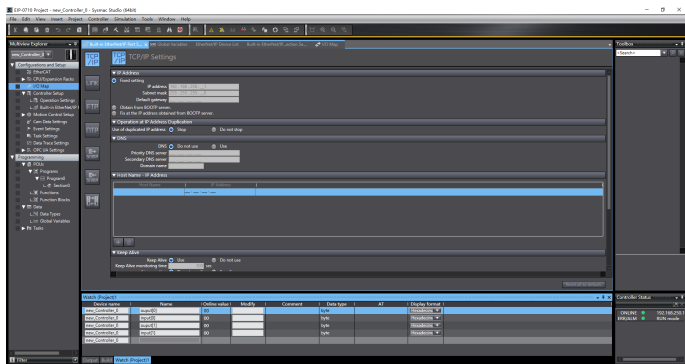


Figure 5-33 Data monitoring diagram

## 5.4.3 Configuration with Rockwell Studio5000

### ■ Prerequisite

The Rockwell Studio5000 software has been installed successfully.

### ■ Steps

#### 1. Import the EDS file

Open the Studio5000 software, click **TOOLS**, and then import the EDS file of the communication interface module.

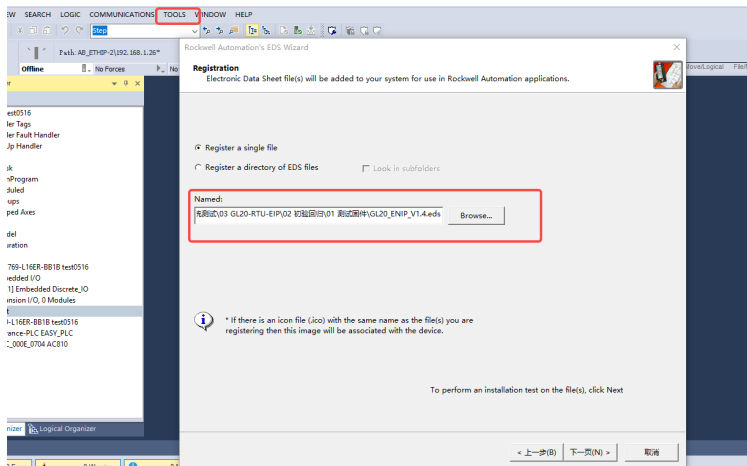


Figure 5-34 Importing the file

## 2. Configure the device.

In the left project tree, right-click **Ethernet** to add the configuration. In the pop up dialog, search for GL20. The configuration description file of GL20 is displayed. Click **Create** to create the configuration.

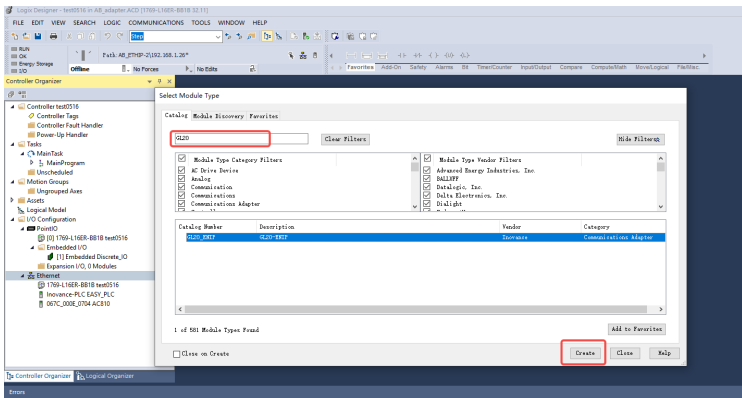


Figure 5-35 Creating the configuration

### 3. Modify the configuration parameters.

- In the left project tree, click the configuration to modify the input/output parameters of the communication interface module.
- Modify the configuration parameters based on the actual input/output byte size of the communication interface module. With the correct IP address setting, you can download the modifications to the PLC.

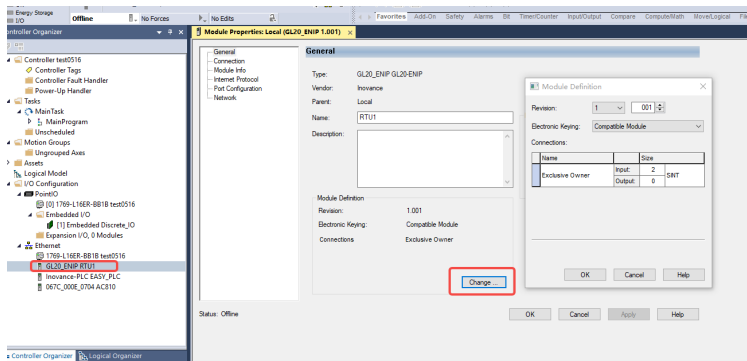


Figure 5-36 Modifying the parameters

## 5.4.4 Configuration with Keyence KV STUDIO

### ■ Prerequisite

The Keyence KV STUDIO software has been installed successfully.

### ■ Steps

#### 1. Import the EDS file

After creating the project, double-click to enter the EIP configuration interface and click **EDS file** to import the EDS file of the communication interface module.

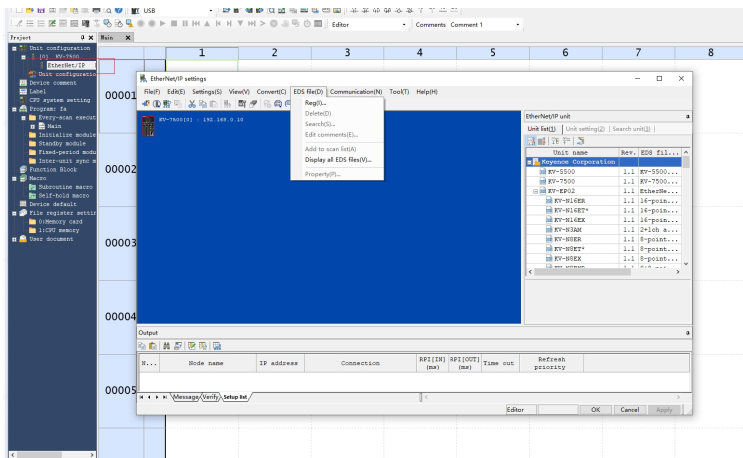


Figure 5-37 Importing the file

## 2. Configure the device.

Double-click the EDS file of the communication interface module to create the configuration.



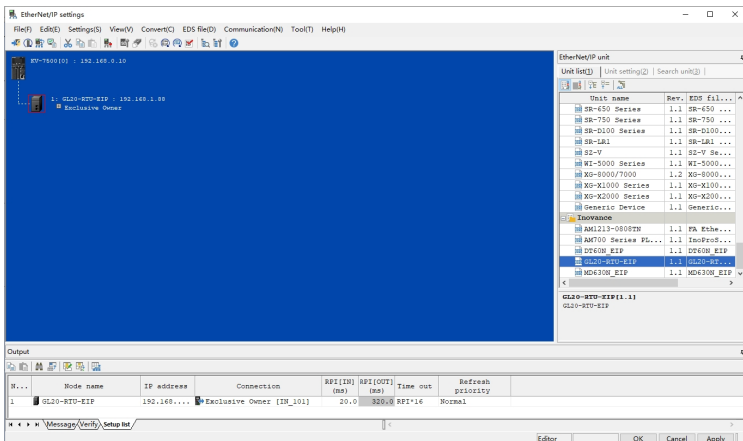


Figure 5-38 Creating the configuration

### 3. Modify the configuration parameters.

- Double-click "Exclusive Owner" of the connection to enter the configuration and modify the input/output parameters of the communication interface module.
- Modify the configuration parameters based on the actual input/output byte size of the communication interface module. With the correct IP address setting, you can download the modifications to the PLC.

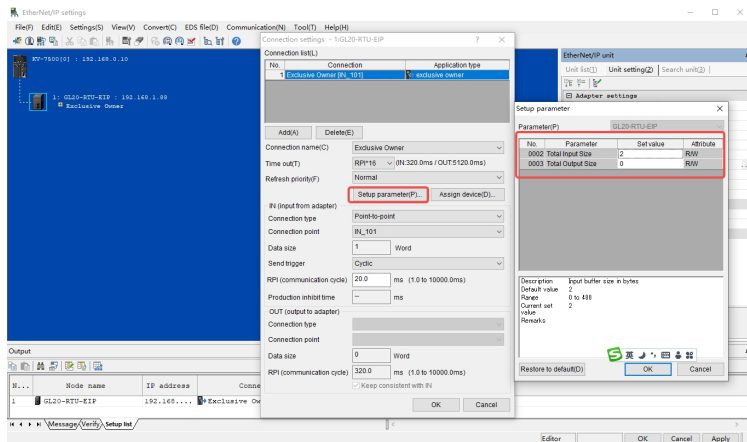


Figure 5-39 Modifying the parameters

## 6 Fault Diagnosis

LED indicator		Meaning	Solution
RUN	Blinking	EIP connection not established	<ul style="list-style-type: none"><li>• Check that the network parameters (IP address, subnet mask, and gateway) are configured correctly.</li><li>• Check the configured input/output data size and the configuration parameters sent down to the module.</li><li>• Check that the length and other specifications of the network cable are as specified.</li></ul>
BF	Blinking	A recoverable fault such as RPI timeout occurs.	<ul style="list-style-type: none"><li>• Check that the cable connector is inserted correctly.</li><li>• Check that the network connection is stable.</li></ul>
	Steady ON	An unrecoverable fault such as Ethernet hardware initialization failure occurs.	<ul style="list-style-type: none"><li>• Check that the cable connector is inserted correctly.</li><li>• Check that the network cable is intact.</li><li>• Re-power on.</li></ul>
SF	Blinking	Module error	Troubleshoot the error.

### Note

The fault code information of the communication interface module needs to be read through UCMM. For details about the parameters read, see ["5.2.2 Configuration via UCMM Programming" on page 29](#). The following table describes the specific fault codes, causes, and solutions.

Fault code	Cause	Solution
0x1000	<ul style="list-style-type: none"> <li>Expansion module does not exist</li> <li>No expansion module was scanned due to local bus communication failure.</li> </ul>	<ul style="list-style-type: none"> <li>Check that the module is installed properly and supplied with power.</li> <li>Check the contact of the communication interface of the expansion module or restart the rack.</li> </ul>
0x1001	<ul style="list-style-type: none"> <li>The actual slot of the expansion module is inconsistent with the configuration.</li> <li>Local bus communication failure, resulting in that the module scanned is inconsistent with the configuration.</li> </ul>	<ul style="list-style-type: none"> <li>Check the number and installation sequence of expansion modules.</li> <li>Check the contact of the communication interface of the expansion module or restart the rack.</li> </ul>
0x1002		
0x1003		
0x1004	The local bus communication failure causes an error when the master module interacts with the expansion module.	Check the contact of the communication interface of the expansion module or restart the rack.
0x1005		
0x1006	<ul style="list-style-type: none"> <li>I/O module was powered off or removed.</li> <li>Error was caused by high frame loss rate of local bus communication.</li> </ul>	<ul style="list-style-type: none"> <li>Check whether the module in the corresponding slot is powered off or removed.</li> <li>Check the contact of the communication interface of the expansion module or restart the rack.</li> </ul>
0x5001	Unstable power supply to the module or power failure	Check the power supply of the module
0x5002		
0x5003		
0x5011	DAC device temperature is too high.	<ul style="list-style-type: none"> <li>Check whether the module hardware is faulty.</li> <li>Replace the Module.</li> </ul>
0x5021	ADC device failure	
0x5022	DAC device failure	
0x5023	ADC reference voltage error	

Fault code	Cause	Solution
0x5031	TC module cold end sampling channel failure	<ul style="list-style-type: none"> <li>Check the TC module cold end channel hardware.</li> <li>Replace the module.</li> </ul>
0x6001	Analog channel wiring disconnected	<ul style="list-style-type: none"> <li>Check the external wiring of the module channel.</li> <li>If external wiring is correct, it is recommended to check the internal hardware of the module or replace the module.</li> </ul>
0x6002	Analog channel wiring shorted	
0x6003	Channel data is abnormal and out of normal range.	Check that the external input signal of module is normal.
0x6004		
0x6005		
0x6006		
0x6050	For any channel that is outputting, the chip detects that the output current exceeds the current limit of the chip (2.4 A to 3.2 A, typical value 2.8 A).	Check whether the load is short-circuited.
0x6051	For any channel that is not outputting, the chip detects that the DO is not connected to a load.	Check the load status.
0x6052	For any channel that is outputting, the chip detects that the DO is not connected to a load.	
0x6053	For any channel that is not outputting, the chip detects a short circuit between the DO and VDD.	Check the DO wiring.
0x6054	<p>When the output current is too large but the overcurrent protection value is not reached, the power consumption of the chip's output channel increases and the temperature increases.</p> <p>When the junction temperature reaches 165°C, an overload error (high current module) occurs.</p>	Check the load status.

# 7 Appendix: Firmware Upgrade

You can upgrade the MCU firmware through the Ethernet interface.

## ■ Prerequisite

- Get the InoEtnLoader software and the MCU firmware upgrade package.
- The InoEtnloader software has been successfully installed on the local PC.
- The local PC is connected to the communication interface module through a network cable.
- Ensure that the IP address of the local PC and the IP address of the communication interface module are on the same network segment.

## ■ Steps

1. Open the InoEtnLoader software.

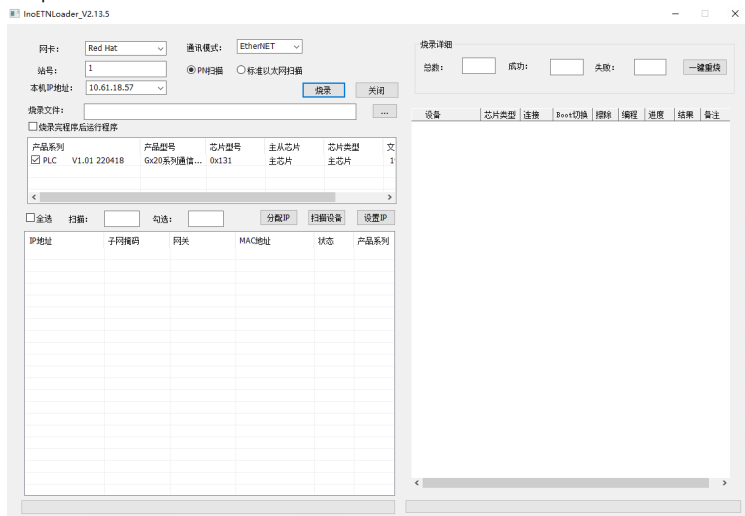


Figure 7-1 Opening the software

2. Burn the upgrade firmware.

- a. In the software, select "Network card", "Local IP address", "Communication Mode". Configure "Station Number" and select "Standard Ethernet Scan", select the file to be burned, click **Scan Device**, and then click **Burn** after the device is scanned.

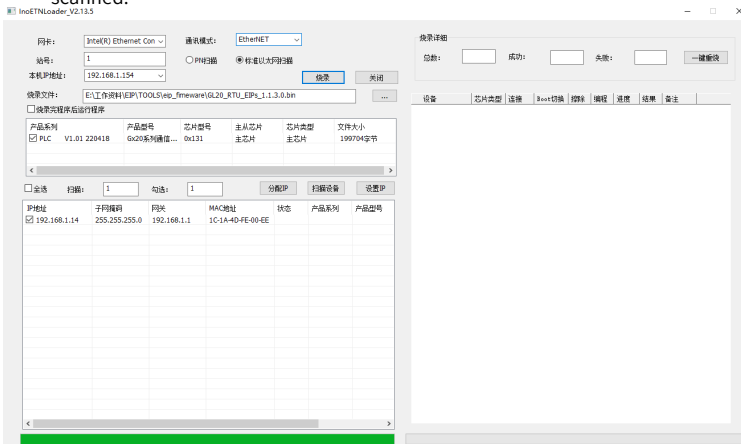


Figure 7-2 Programming

The burning is successful.

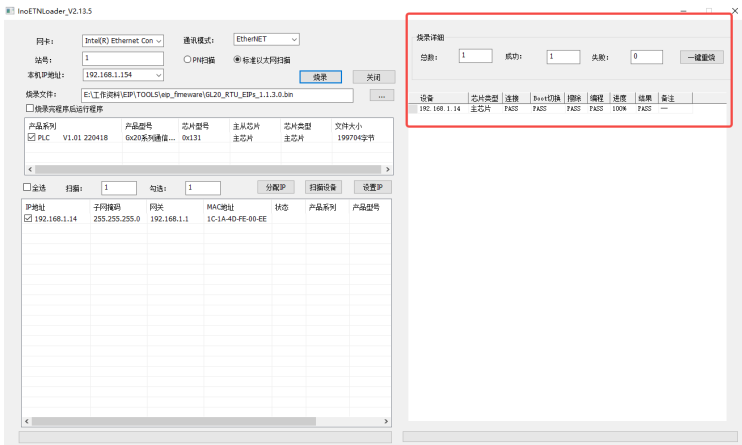


Figure 7-3 Programming succeeded

b. Turn off the communication interface module, then turn it on again.