



GL20-RTU-ECT32-INT Series Communication Interface Module User Guide



Industrial
Automation



Intelligent
Elevator



New Energy
Vehicle



Industrial
Robot



Rail
Transit



Data code 19012880A00

Preface

Introduction

This guide covers all usage scenarios for the product, including product introduction, EtherCAT bus, power system design, product functions, installation, wiring, configuration and commissioning, troubleshooting, maintenance, frequently asked questions (FAQs), and appendices.

Target Audience

This manual is primarily intended for the following engineers:

- Expansion/service engineers of Inovance
- Sourcing/end-user chief engineers
- Sourcing/end-user mechanical engineers
- Sourcing/end-user electrical engineers
- Sourcing/end-user software engineers
- Sourcing/end-user maintenance/service engineers

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	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD Directive	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS Directive	2011/65/EU Amended by (EU) 2015/863	EN IEC 63000

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

More Data

Name	Code	Description
GL20-RTU-ECT32-INT Series Communication Interface Module User Guide (This guide)	19012622	This guide introduces product introduction, EtherCAT bus, power system design, product functions, installation, wiring, configuration and commissioning, troubleshooting, maintenance, FAQs, and appendices.

Revision History

Date	Version	Revision
January 2025	A00	First release after document restructuring.

Access to the Guide

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

- **Inovance official website:** Do keyword search under Service and Support at www.inovance.com.
- **QR code:** Scan the QR code on the product with your smart phone.
- **My Inovance APP:** Scan the QR code below to install the app, where you can search for and download user guides.



Warranty Disclaimer

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. Maintenance will be charged after the warranty period 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
- Damage caused by fire, flood, or unusual 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.

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1 Fundamental Safety Instructions

Safety Disclaimer

- Read and follow the safety instructions when installing, operating, and maintaining the equipment.
- To ensure personal and equipment safety, observe the notes indicated on the product labels and all the safety instructions in the user guide during installation, operation, and maintenance.
- "CAUTION", "WARNING", and "DANGER" items in this guide do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.
- Use this product according to the designated environment requirements. Damage caused by improper usage is not covered by the warranty.
- 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 will result in death or severe personal injuries.



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

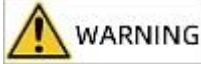


: "CAUTION" indicates that failure to comply with the notice may result in minor personal injury or damage to the equipment. Keep this user guide properly for future use and deliver it to the end user.

Control System Design



- Provide a safety circuit outside the PLC so that the control system can still work safely once external power failure or controller 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.



- Set an emergency stop circuit, a protection circuit, a forward/reverse operation interlocked circuit, and an upper/lower position limit interlocked circuit in the external circuits of PLC to prevent damage to the module.
- To ensure safe operation, for the output signals that may cause critical accidents, use 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 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 compliant with overvoltage category II. The power supply must have a system-level surge protector to ensure that overvoltage caused by lightning shock cannot be applied to power supply input terminals, signal input terminals, and control output terminals of the PLC, therefore preventing damage to the product.

Installation



- Installation must be carried out by skilled personal who have undergone specialized electrical training and possess comprehensive electrical expertise.
- 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 in environments with dust, greasy smoke, conductive dust, corrosive or combustible gases, exposed to high temperature, condensation, wind & rain, or subject to vibration and shock. 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 skilled personnel who have undergone specialized electrical training and possess comprehensive electrical expertise can open the cabinet.



- 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 unwanted 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 skilled personnel who have undergone specialized electrical training and possess comprehensive electrical expertise.
- Disconnect all external power supplies of the system before wiring. Failure to comply may result in electric shock, module fault, or malfunction.
- Insulate the cable terminals properly to ensure the insulation distance between cables will not be shortened after cables are connected to the terminal block. 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 equipment 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



- Operation and maintenance must be carried out by skilled personnel who have undergone specialized electrical training and possess comprehensive electrical expertise.
- 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 assembling/disassembling the module or connecting/removing the communication cables. Failure to comply may result in electric shock or malfunction.

Safety Recommendations

- In the position where the operator directly touches the machinery part, for example, where a machinery tool is loaded/unloaded, or where a machine runs automatically, the on-site manual operating devices and any other alternative means must be carefully arranged and designed so that they are independent of the PLC and can start or terminate the automatic running of the system.
- If modification on the program is needed during system operation, use the lock function or other protective measures. Ensure that only authorized personnel can make the necessary modifications.

Disposal

 **NOTICE**

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

2 Product Introduction

2.1 Product Overview

GL20-RTU-ECT32-INT (hereafter referred to as this product) is Inovance's new generation EtherCAT communication interface module. It serves as an EtherCAT slave to connect to the EtherCAT network. This product can flexibly expand digital, analog, and temperature detection modules via the local bus, enabling control and acquisition of signals from various actuating and sensing devices. It is compatible with Inovance or third-party EtherCAT master devices.

This product is widely used in printing and packaging, food and beverage, automotive, mobile phones, 3C, semiconductors, display, crystalline silicon, lithium battery, wind power, and other fields.

It has the following advantages:

- Leading performance with microsecond-level response speed
- Compact design with tool-free installation and wiring
 - 24 mm ultra-thin design, significantly saving cabinet space
 - Easy wiring with PUSH IN terminals
 - Quick module replacement with removable terminal design
- More stable and reliable design
 - D-BUS design for connectors, offering better stability than traditional surface mount design
 - Gold-plated connectors, resistant to sweat corrosion
 - EMC design exceeding industry standards, adaptable to complex industrial control environments

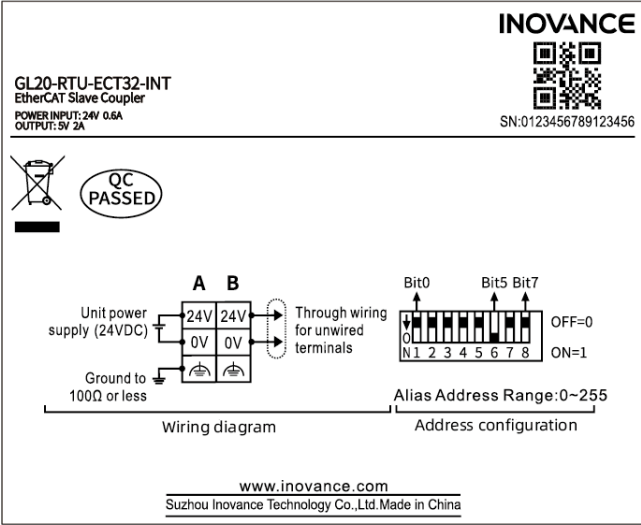
2.2 Model and Nameplate

Model descriptions are shown in the figure and table below.

GL 20 - RTU - ECT 32 - INT
 ① ② ③ ④ ⑤ ⑥

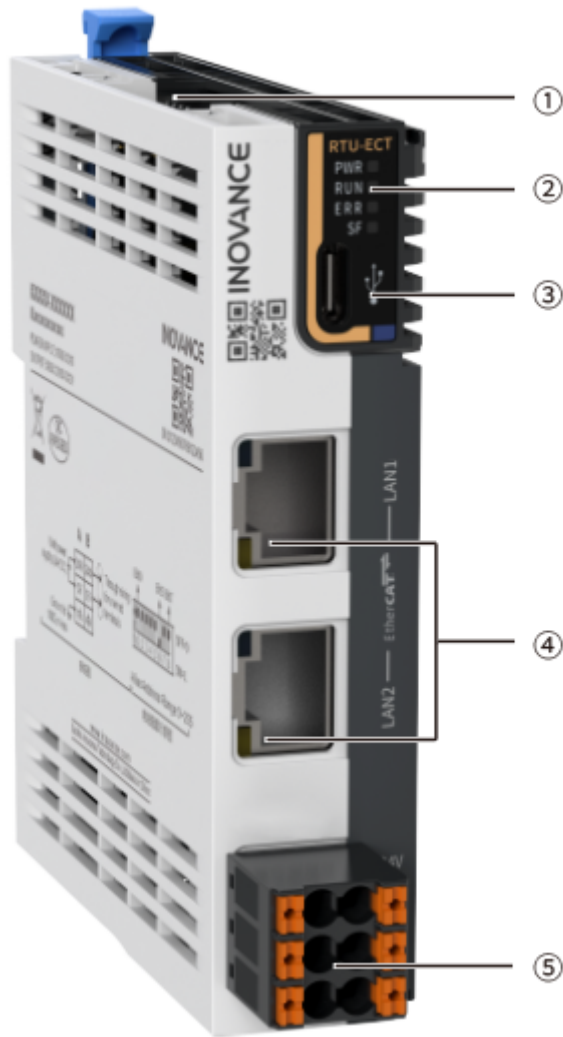
① Product Information GL: Inovance general local module	④ Module Type ECT: EtherCAT PN: PROFINET EIP: EtherNet/IP
② Serial Number 20: 20 series module	⑤ Number of Expansion Modules 32: Supports 32 expansion modules Null: Supports 16 expansion modules
③ I/O Type RTU: Communication interface module	⑥ Version INT: Global version Null: Domestic version

The nameplate is as shown below.



2.3 Components

The components are described in the figure and table below.



No.	Interface	Description
①	DIP switch	<p>Sets the slave address (value range: 0 to 255). Switch positions set to ON are effective bits. All switches set to ON represent the value 255, which sets the slave address alias to 255. Conversely, all switches set to OFF represent the value 0. For specific settings, see the “6.3.7 EtherCAT Slave Addressing” section.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>NOTE</p> <p>Among the alias setting methods, the DIP switch setting method has the highest priority.</p> </div>
②	Signal indicator	For details, see the "Signal Indicator Function Definitions" section in "Troubleshooting with Indicator Lights" .
③	Type-C interface	USB2.0, used for configuration, debugging, firmware upgrade, and fault diagnosis.
④	EtherCAT interface	<p>Communication connector for EtherCAT communication</p> <ul style="list-style-type: none"> RJ45x2 (shielded)

No.	Interface	Description
		<ul style="list-style-type: none"> IN: EtherCAT input interface, used to connect to the EtherCAT master or the output interface of the previous EtherCAT slave; OUT: EtherCAT output interface, used to connect to the input interface of the next EtherCAT slave.
⑤	24 V power supply	For details, see " 5.3.3 Terminal Definitions ".


2.4 Technical Specifications

2.4.1 Electrical Specification

Item	Specification
Rated voltage of terminal input power supply	24 VDC (20.4 VDC to 28.8 VDC, SELV input)
Rated current of terminal input power supply	0.6 A (typical @24 V)
Rated voltage of bus output power supply	5 VDC (4.75 VDC to 5.25 VDC)
Rated current of bus output power supply	2 A (typical @5 V)
Power output derating	<ul style="list-style-type: none"> When the operating ambient temperature is 45°C or below, the module operates without derating, with an output current of less than 2 A. When the operating ambient temperature rises to 55°C, the module operates at 85% of full load, with an output current of less than 1.7A.
Electrical isolation	<ul style="list-style-type: none"> Not isolated between the interface power supply and the core circuit (bus) Isolated between the network cable port and the interface power supply, core circuit (bus).
Power supply protection	Overcurrent protection (short circuit protection), anti-reverse connection protection, and surge absorption

2.4.2 Software Specifications

Item	Specification
Number of expansion modules	Max. 32

Item	Specification
EtherCAT alias access	<p>Supports setting station aliases via DIP switches (range: 1 to 255) and programming software (range: 1 to 65535).</p> <div style="border: 1px solid black; padding: 5px;">  NOTE The method of setting aliases via DIP switches has the highest priority. The connected expansion modules do not support alias access or setting. </div>
Max. address space for each expansion module	120 bytes for input/output
Max. address space for each communication interface module	1024 bytes for input/output
Refresh method	Synchronous (less than 1ms) / Asynchronous refresh
Hot swap	Not supported
Received PDO size	Max. 1024 bytes
Sent PDO size	Max. 1024 bytes
Input mailbox data size	256 bytes
Output mailbox data size	256 bytes

2.4.3 EtherCAT Specifications

Item	Specification
Number of network ports	2
Communication protocol	EtherCAT protocol
Supported services	FoE, CoE (PDO, SDO)
Synchronization mode	<ul style="list-style-type: none"> • SM (Sync Manager) synchronization • DC (Distributed Clock) synchronization • User-defined DC synchronization
Physical layer	100Base-TX

Item	Specification
Baud rate	100 Mbps
Duplex mode	Full duplex
Topology	<ul style="list-style-type: none"> • Bus topology • Star topology • Ring topology
Transmission medium	Flexible crossover cable, double-layer shielded (SFTP or SFTPP), Cat5e or above
Transmission Distance	Less than 100 m between two nodes
EtherCAT frame length	44 bytes to 1498 bytes
Process data	Max 1,486 bytes per Ethernet frame
Ring network	Supported
Automatic scanning	Supported
EtherCAT conformance certification	Certified


2.4.4 Mechanical Specifications

Item	Specification
Flame retardant rating	V-0
Dimensions (W x H x D)	24 mm x 100 mm x 75 mm
Weight	About 91 g

2.5 Environmental Specifications

The environmental specifications are listed in the following table.

Installation method	<p>The product supports five installation methods. It is recommended to install the product on a horizontal rail. See “Installation Methods” for the installation diagrams.</p> <ul style="list-style-type: none"> • Installation on a horizontal rail • Installation on a vertical rail (With the communication interface module located at the bottom) • Installation on a vertical rail (With the communication interface module located on top) • Suspending installation on the top of the cabinet • Installation at the bottom of the cabinet
Installation/Operating environment	Free from conductive dust, conductive fibers, explosive dust, flammable gases, water mist/greasy dirt, corrosive dust/gases, strong vibration, and repetitive shock.
Max. altitude	≤2000 m
IP rating	IP20
Pollution degree	2
Immunity	2 kV on power supply line (IEC61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Grounding Mode	Ground to 100Ω or less
ESD protection level	Contact discharge +/-6 kV, air discharge +/-8 kV
Vibration resistance	<ul style="list-style-type: none"> • Application scenario: Tested according to IEC60068-2-6, 3.5 mm amplitude at 5 Hz to 8.4 Hz; 1 g gravitational acceleration at 8.4 Hz to 200 Hz; 10 cycles per axial direction • Transportation scenario: Tested according to IEC60068-2-64, 0.01 g²/Hz power spectral density at 5 Hz to 100 Hz; 0.001 g²/Hz power spectral density at 200 Hz; 1.14 g Grms
Shock resistance	Application/Transportation scenario: Tested according to IEC60068-2-27; 15 g peak acceleration, 11 ms pulse width, 18 cycles in total in X, Y and Z axial directions

Operating temperature/ humidity	<ul style="list-style-type: none"> • Temperature: <ul style="list-style-type: none"> ◦ Installation on a horizontal rail: -20°C to +55°C ◦ Non-installation on a horizontal rail: -20°C to +45°C <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">  NOTE When the operating ambient temperature exceeds 55°C, a fan or air conditioner is required. </div> <ul style="list-style-type: none"> • Humidity: < 95% RH (30°C), without condensation
Storage temperature/ humidity	<ul style="list-style-type: none"> • Temperature: -20°C to +60°C • Humidity: < 95% RH (30°C), without condensation
Transportation temperature /humidity	<ul style="list-style-type: none"> • Temperature: -40°C to +70°C • Humidity: < 95% RH (40°C), without condensation

2.6 Usage Process

The usage process of this product is show below.

Step	Reference
1. Preparation	2.3 Components 2.4 Technical Specifications 2.5 Environmental Specifications 3 Power Supply System Design 4.1 Knowledge Before Installation 5.1 Knowledge Before Wiring
2. Installation and Wiring	4.2 Preparation Before Installation 4.3 Installation Procedure 4.4 Inspection After Installation 5.2 EtherCAT Network Cable Connection 5.3 Power Supply and Grounding Wire Connection 5.4 USB Cable Connection
3. Configuration and Commissioning	7 Configuration and Commissioning
4. Troubleshooting	9 Troubleshooting

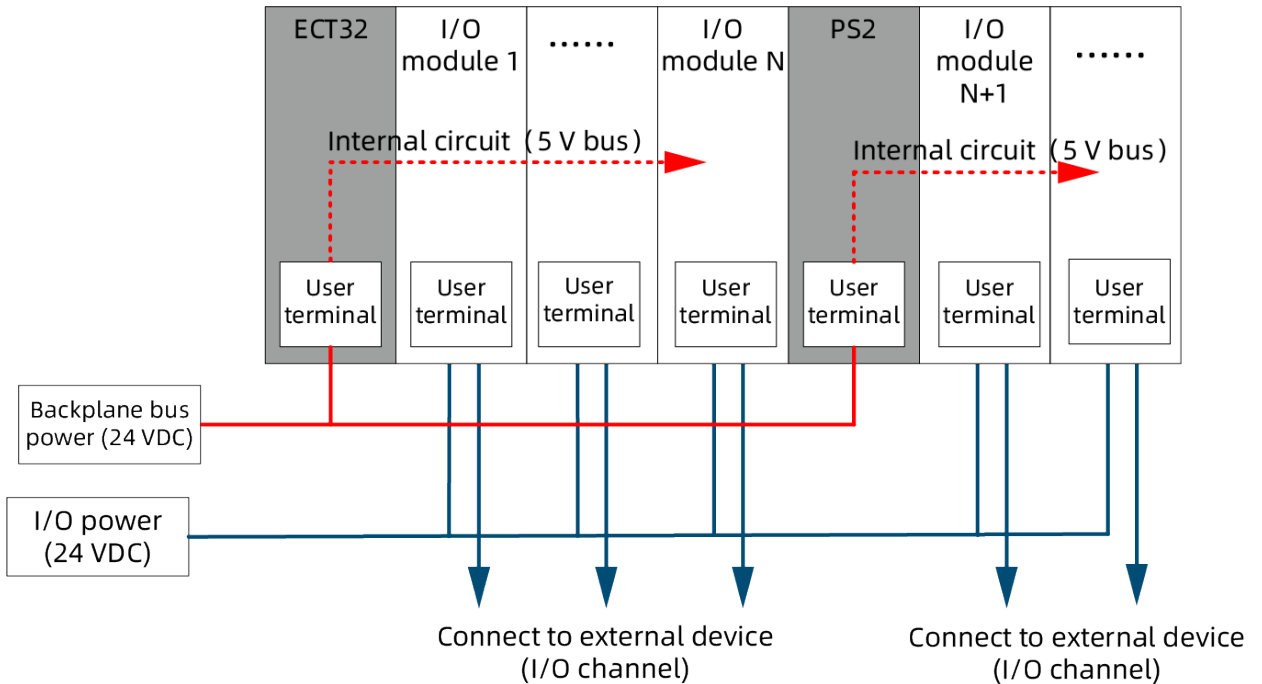
3 Power Supply System Design

3.1 Introduction to Power Supply System

3.1.1 Power Supply System and Type

Power Supply System


The following figure shows the power supply system configuration for this product and the I/O expansion modules.



Power Supply Type

There are two types of power supply: backplane bus power and I/O power, as shown below.

Power Supply Type	Description
Backplane bus power (24 VDC)	Connects to the 24 V power terminal of the product and the GL20-PS2 relay power module, powering the system
I/O power supply	Connects to the 24 V power terminal of the I/O module, powering the internal circuits of the I/O module and the external loads on the field.

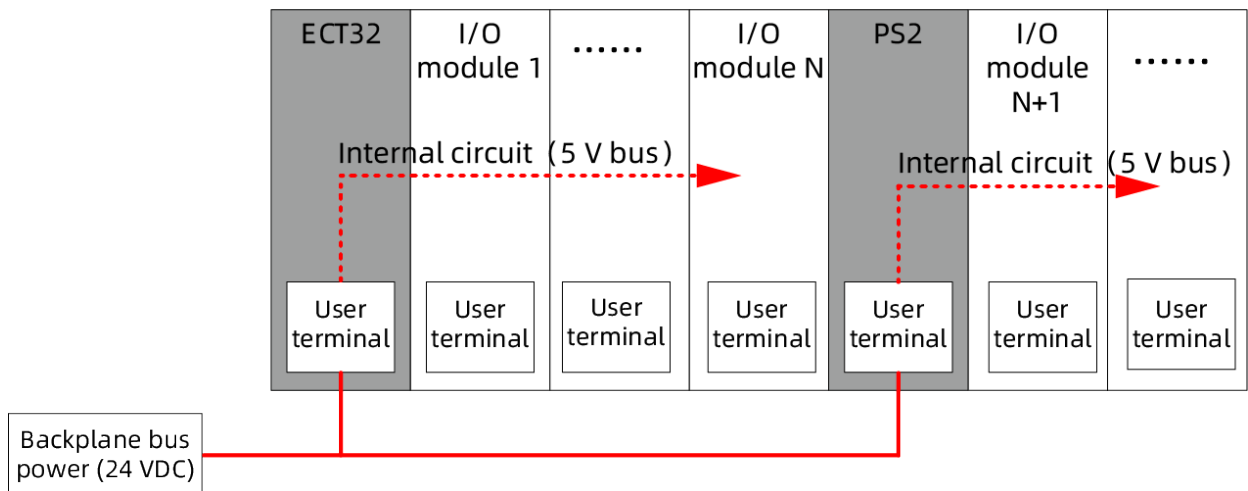


NOTICE

Use separate power supplies for the backplane bus power and the I/O power. Using the same power supply for both may result in system failures due to noise.

3.1.2 GL20-PS2 Relay Power Module

This product provides a 5 V bus power supply for connected expansion modules, with a maximum bus current of 2 A. If a higher bus current is required, use the GL20-PS2 relay power module (hereafter referred to as the GL20-PS2 module). The GL20-PS2 module is also required when the number of connected expansion modules exceeds 16. The GL20-PS2 module consumes a bus current consumption of 55 mA and provides a bus current of 2 A.



NOTICE

- The number of GL20-PS2 modules used must also be counted within the total number of expansion modules of this product.
- Do not place the GL20-PS2 module in the last slot of the configuration.
- This module and the GL20-PS2 module must be powered on simultaneously (with a maximum allowable delay of 2 seconds for the GL20-PS2 module to be powered on after this module), otherwise addressing may fail.

3.2 Backplane Bus Power System Design

3.2.1 Procedure

1. Calculate the total power consumption of the expansion modules for this product. For the specific power consumption of each module, see "[12.5 Appendix 5: Version Matching Information](#)".
Calculation formula: 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
2. If the total bus current consumption of the expansion modules exceeds the bus power supply current of this product (2 A), or if the number of expansion modules exceeds 16, an additional GL20-PS2 module must be added to the right of the corresponding module before the limit is exceeded.
3. Determine the configuration and form of the bus power supply based on the above two steps.



- The bus power supply current of the GL20-PS2 module is 2 A. If the total power consumption of the modules on the right exceeds 2 A, an additional GL20-PS2 module must be added before the limit is exceeded.
- The bus current consumption of the GL20-PS2 module is 55 mA, which needs to be calculated within the current capacity of the bus power supply of this product or the upstream GL20-PS2 module.
- During use, pay attention to the limitations on bus output current imposed by the ambient temperature.

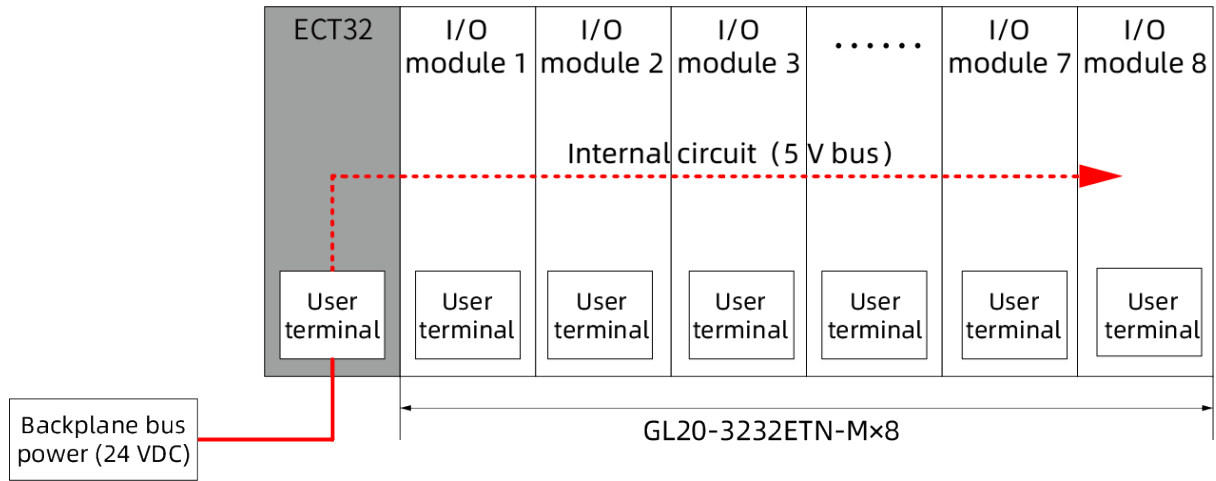
Module	Derating of Bus Output Power Supply
GL20-RTU-ECT32-INT	The module operates at full load when the ambient temperature is 45°C or below (output current ≤ 2 A). It operates at 85% of full load when the ambient temperature rises to 55°C (output current ≤ 1.7 A).
GL20-PS2	The module operates at full load when the ambient temperature is 45°C or below (output current ≤ 2 A). It operates at 85% of full load when the ambient temperature rises to 55°C (output current ≤ 1.7 A).

3.2.2 Design Example

3.2.2.1 Example 1: 8 GL20-3232ETN-M Modules

Expansion Module	Model	Number	Power Consumption/mA
Digital input and output	GL20-3232ETN-M	8	250

1. Calculate the total power consumption of the 5 V bus for the expansion module.
 $250 \text{ mA} * 8 = 2000 \text{ mA}$
2. Determine whether the power consumption and the number of expansion modules exceed the limit.
 The current bus power consumption is 2000 mA, not exceeding the communication interface module's power supply capacity of 2 A. The current number of expansion modules is 8, not exceeding 16.
3. Confirm the configuration.
 In summary, the communication interface module can support the above configuration without the need to add a GL20-PS2 module.
 Based on the above expansion unit conditions, the system configuration is shown below.



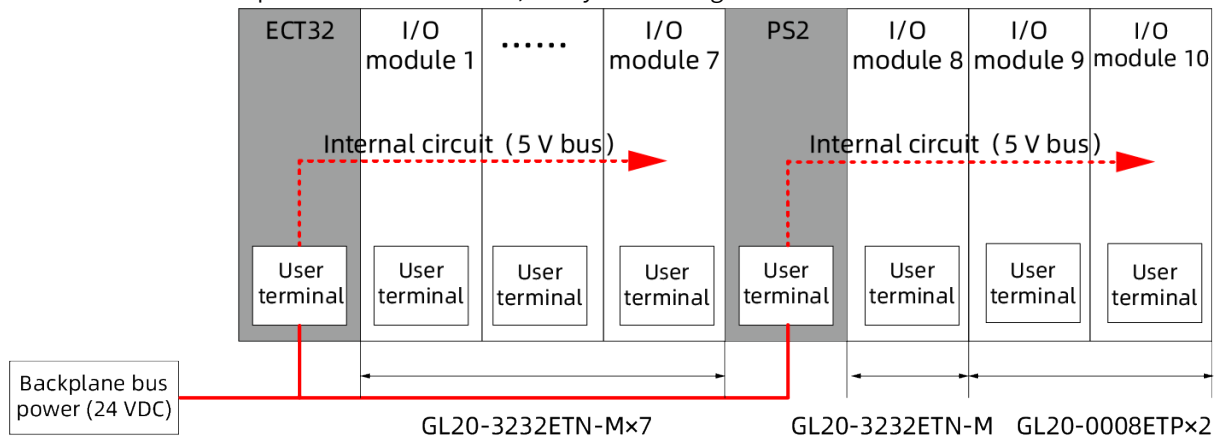
3.2.2.2 Example 2: 8 GL20-3232ETN-M Modules + 2 GL20-0008ETP Modules

Expansion Module	Model	Number	Power consumption/mA
Digital input and output	GL20-3232ETN-M	8	250
Digital output	GL20-0008ETP	2	80

1. Calculate the total power consumption of the 5 V bus for the expansion module.
 $250\text{ mA} * 8 + 80\text{ mA} * 2 = 2160\text{ mA} > 2\text{ A}$
2. Determine whether the power consumption and the number of expansion modules exceed the limit.
 The current bus power consumption is 2160 mA, exceeding the product's power supply capacity of 2 A. The current number of expansion modules is 10, not exceeding 16.
3. Confirm the configuration.

In summary, this product does not support the above configuration. It is necessary to add a GL20-PS2 module.

Based on the above expansion unit conditions, the system configuration is shown below.



NOTE

- With the addition of a GL20-PS2 module, the number of expansion modules for this product is 11.
- The bus consumption current of the GL20-PS2 module is 55 mA, which needs to be calculated within the capacity of this product. With the current configuration, this product cannot have eight GL20-3232ETN-M modules installed in a row. A power supply margin must be reserved for the GL20-PS2 module.

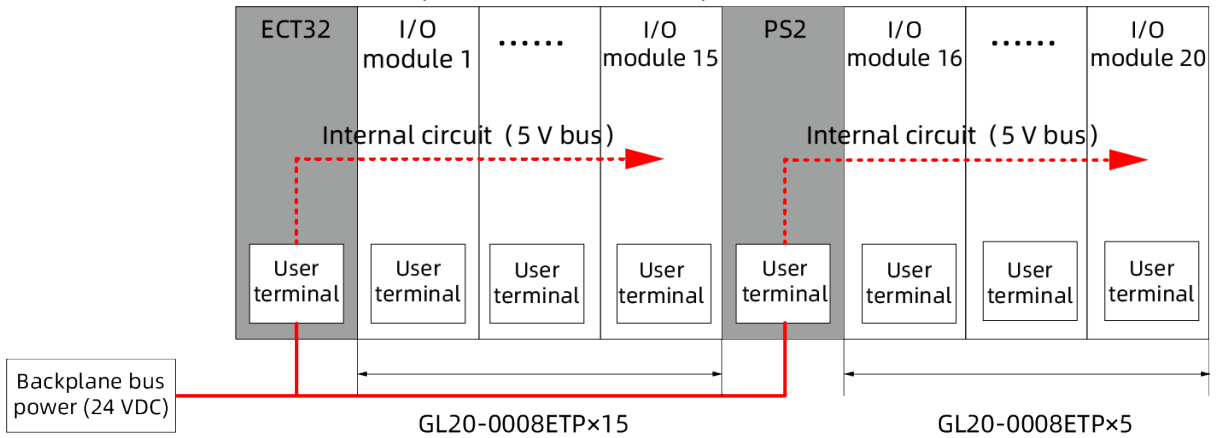
3.2.2.3 Example 3: 20 GL20-0008ETP Modules

Expansion Module	Model	Number	Power consumption/mA
Digital output	GL20-0008ETP	20	80

1. Calculate the total power consumption of the 5 V bus for the expansion module.
 $80 \text{ mA} * 20 = 1600 \text{ mA} < 2 \text{ A}$
2. Determine whether the power consumption and the number of expansion modules exceed the limit.
 The current bus power consumption is 1600 mA, not exceeding the product's power supply capacity of 2 A.
 The current number of expansion modules is 20, exceeding 16.

3. Confirm the configuration.

In summary, the bus power consumption does not exceed the power supply capacity of this product, but the number of modules exceeds 16. It is necessary to add a GL20-PS2 module.
 Based on the above expansion unit conditions, the system configuration is shown below. With the addition of a GL20-PS2 module, the number of expansion modules for this product is 21.



3.2.2.4 Example 4: 15 GL20-0008ETP Modules + 7 GL20-3232ETN-M Modules

Expansion Module	Model	Number	Power Consumption/mA
Digital output	GL20-0008ETP	15	80
Digital input and output	GL20-3232ETN-M	7	250

1. Calculate the total power consumption of the 5 V bus for the expansion module.
 $80 \text{ mA} * 15 + 250 \text{ mA} * 7 = 2950 \text{ mA} > 2 \text{ A}$

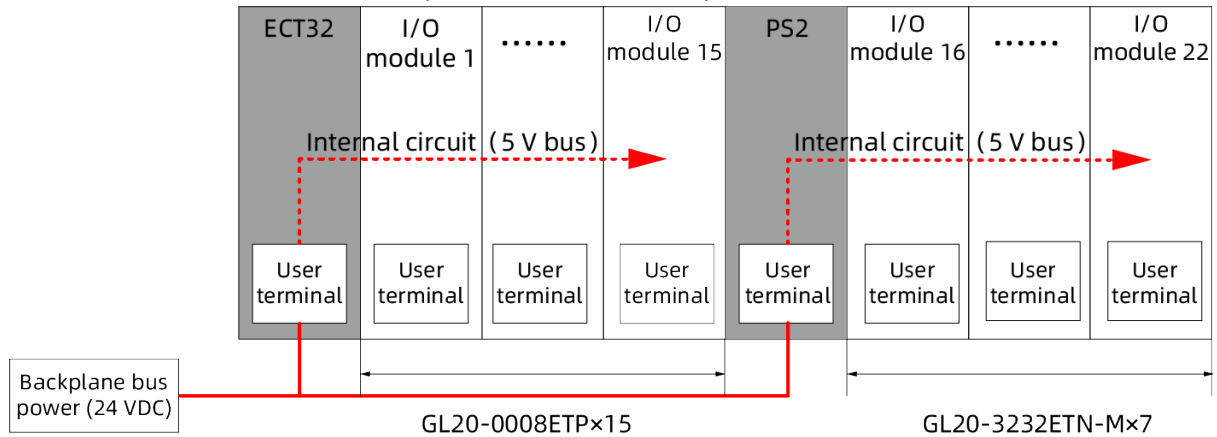
2. Check whether the power consumption and the number of expansion modules exceed limits:

The total bus power consumption is 2950 mA, exceeding the 2A supply capacity of the communication interface module. The number of expansion modules is 22, exceeding the limit of 16.

3. Confirm the configuration:

In summary, the bus power consumption exceeds the power supply capacity of this product, and the number of modules exceeds 16. It is necessary to add a GL20-PS2 module.

Based on the above expansion unit conditions, the system configuration is shown below. With the addition of a GL20-PS2 module, the number of expansion modules for this product is 23.



3.3 I/O Power Supply System Design

Unlike the backplane bus power system design, there is no need to consider the GL20-PS2 module, and there is no specific design method for the I/O power supply system.

Calculate the total current consumption of the I/O power supply based on the actual power consumption of the field devices connected to the I/O modules, to select the appropriate I/O power supply specification.

3.4 External Power Supply and Protective Device Selection

3.4.1 Backplane Bus Power Supply Selection

Power Supply Specifications

The backplane bus power supply must support:

- Overcurrent protection
- Double or reinforced insulation between the input and output
- An output voltage of 24 VDC (20.4 VDC to 28.8 VDC)

Power Capacity Calculation

Select a backplane bus power supply with a proper capacity based on the number of communication interface modules and GL20-PS2 relay power modules in the field configuration, as well as the power consumption of each module.

The rated current of module terminal input power supply is shown below.

Backplane Bus Power Load Module	Rated Current of Terminal Input Power Supply
GL20-RTU-ECT32-INT	0.6 A (typical @24 V)
GL20-PS2	0.5 A (typical @24 V)

Calculation example:

The number of communication interface modules and relay power supply modules in the field configuration is shown below.

Module	Model	Number
EtherCAT communication interface module	GL20-RTU-ECT32-INT	1
Relay power supply module	GL20-PS2	2

When a typical 24 VDC power supply is used as the backplane bus power supply:

The required output current of the backplane bus power supply is: $0.6 \text{ A} * 1 + 0.5 \text{ A} * 2 = 1.6 \text{ A}$

To achieve an output current capacity of more than 1.6 A, a 24 VDC/2 A power supply can be selected as the backplane bus power supply.

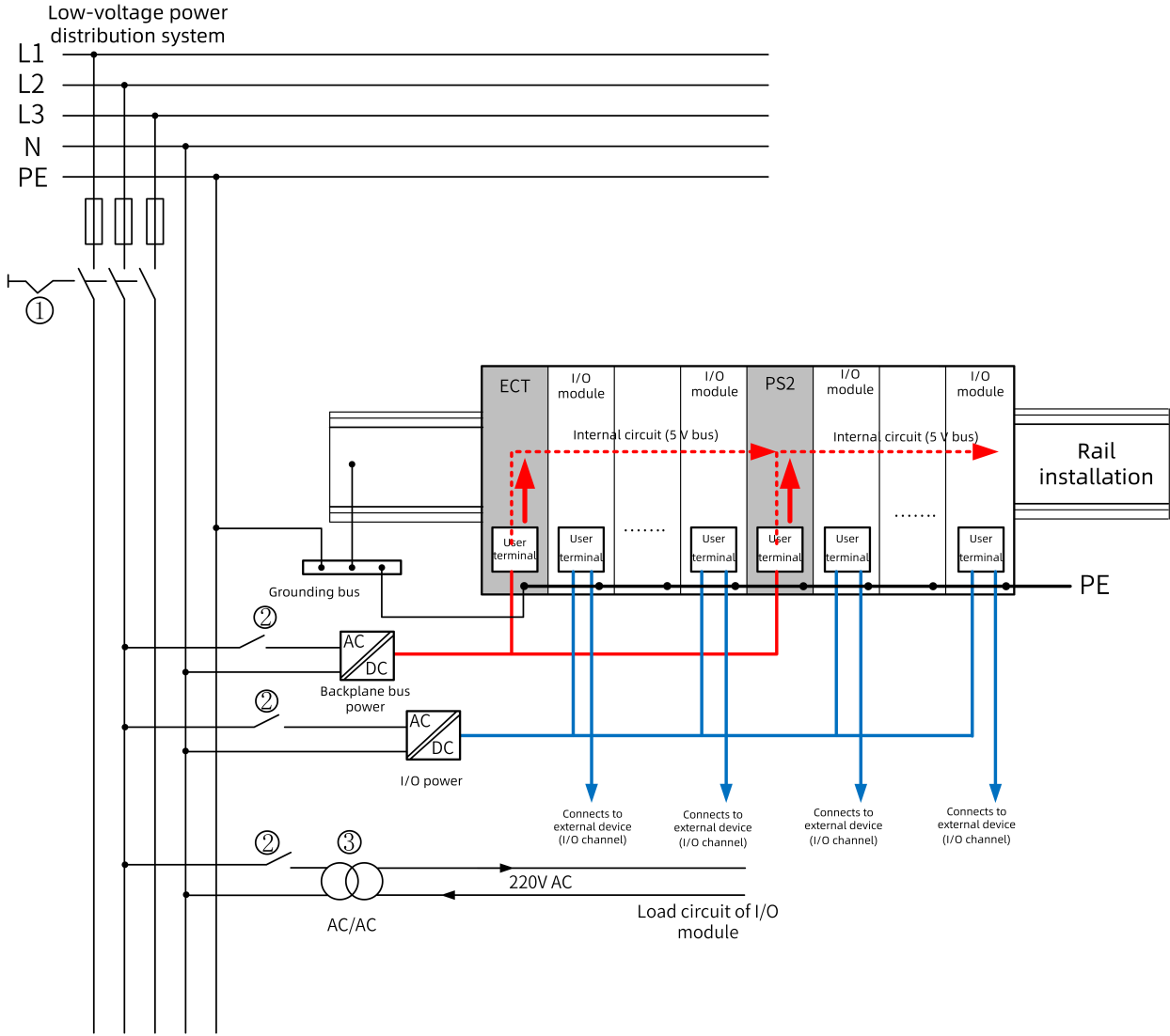
3.4.2 I/O Power Supply Selection

For I/O power supply, the following conditions must be met:

- Supports overcurrent protection.
- Supports double or reinforced insulation between the input and output.
- For the selection of output voltage, see the power supply specifications in the user guide of each I/O module product.

3.4.3 Protective Device Protection

To ensure stable system operation and user safety, appropriate protective devices must be selected to provide overload, short-circuit, and electrical isolation protection. The following figure illustrates the electrical connections between the low-voltage power distribution system and the expansion module configuration, and shows the types and installation locations of protective devices.



Type	Description
① Power distribution system switch	Circuit breaker, used to disconnect the controller, sensors, and actuators.
② Short-circuit/overload protection device	Short-circuit and overload protection measures are necessary during system installation. The specific requirements for protective devices depend on the control system configuration and the actual power consumption of the connected field devices.
③ Electrical Isolation	It is recommended to use a transformer for electrical isolation.

4 Installation

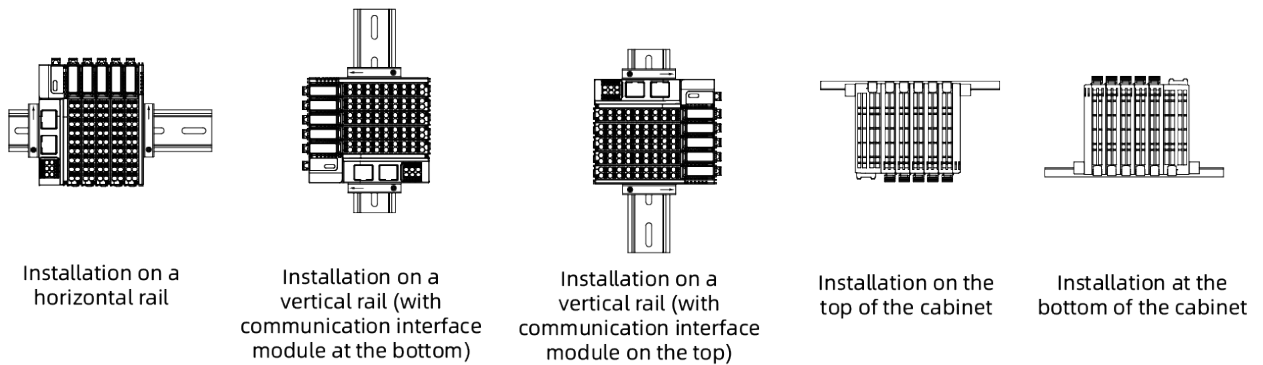
4.1 Knowledge Before Installation

4.1.1 Introduction

Although this product has been designed to strict standards, the following installation requirements, such as installation method, installation space, and installation precautions, must still be met to ensure stable operation of the product.

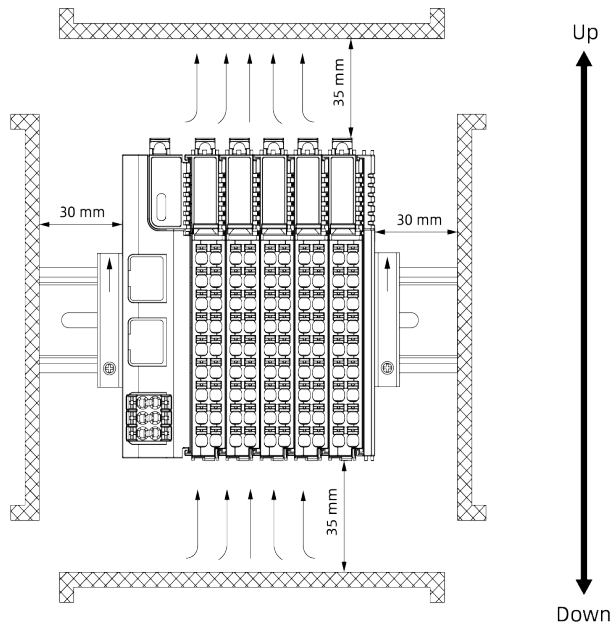
4.1.2 Installation Method

This product supports the following five installation methods. The horizontal DIN rail installation is recommended for better ventilation and heat dissipation.



For vertical DIN rail installation (with the communication interface module on top), the cabinet must be equipped with a fan to ensure a wind speed around the module of no less than 1 m/s.

To ensure proper ventilation and cooling and to reserve sufficient wiring space, a minimum installation clearance must be maintained around the product, as shown below (take horizontal installation as an example).



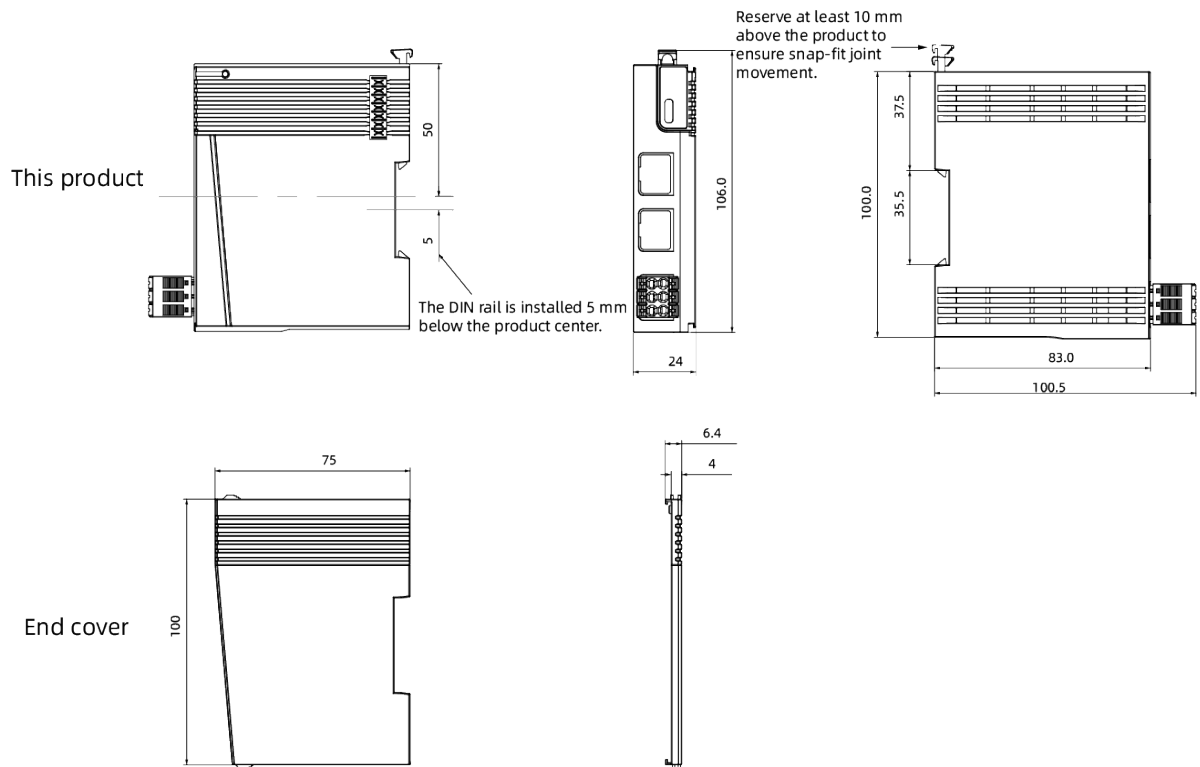
NOTICE

Do not install this product directly above high-temperature heat sources (such as heaters, transformers, and large resistors). Ensure at least a 100 mm gap between the product and other high-temperature heat sources.

4.1.3 Installation Space

Installation Dimensions

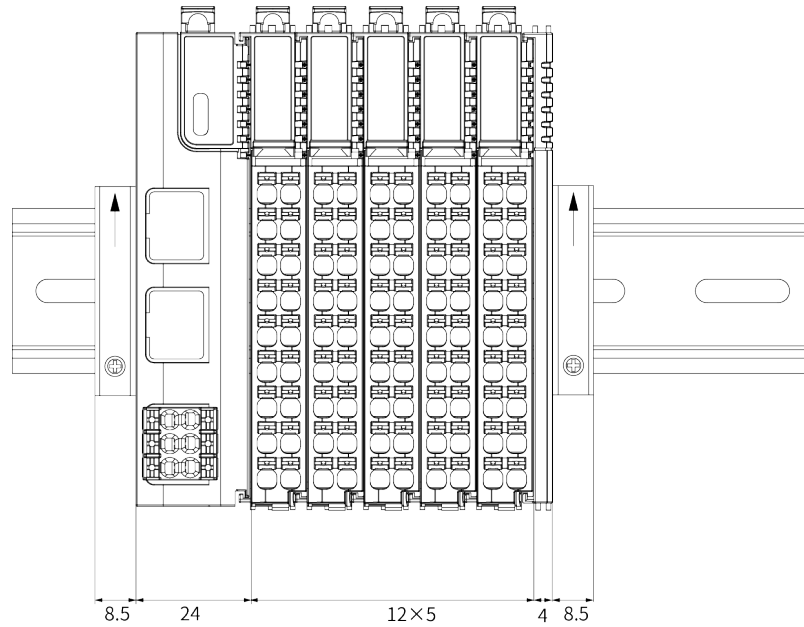
The installation dimensions of this product and the end cover (in mm) are shown below.



Installation Width Calculation Example

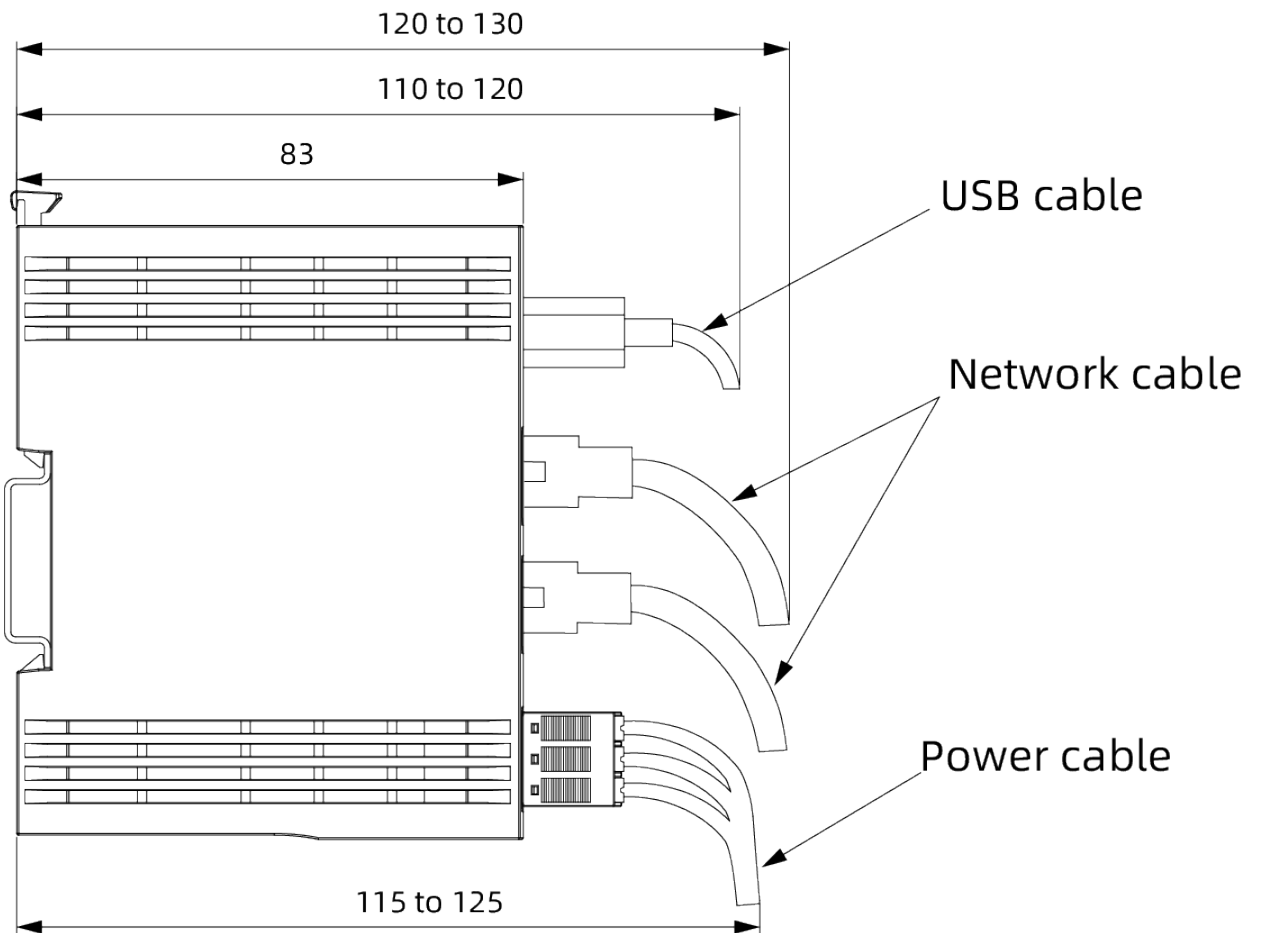
For example, when using 1 GL20-RTU-ECT32-INT module + 5 expansion modules + 1 end cover + 2 end plates, the installation width is shown below in mm).

$$\text{Total installation width} = 24 \text{ mm} + (12 \times 5) \text{ mm} + 4 \text{ mm} + (2 \times 8.5) \text{ mm}$$



Reserved Space for Cables

When installing this product, allow space for connection cables, with installation dimensions (in mm) as shown below.



4.1.4 Installation Precautions

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

Do not install this product in environments with the following conditions:

- A temperature exceeding the range of -20°C to +55°C
- A humidity exceeding 95% RH
- An altitude exceeding 2000 m (79.5kPa)
- Drastic temperature changes and condensation
- Corrosive or flammable gas
- Conductive powders (such as dust and iron powder), water, oil mist, salt, or organic solvents
- Direct sunlight
- Severe vibrations or repetitive impact to the product

Appropriate isolation measures shall be taken when installing this product in environments with the following conditions:

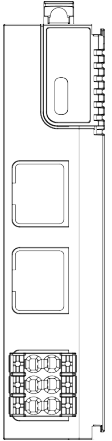
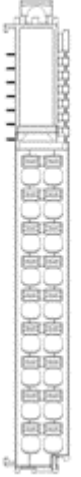
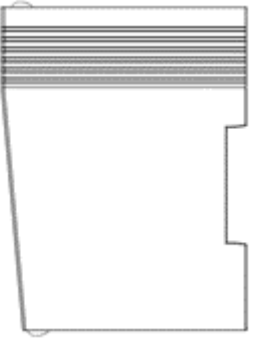

- Static electricity or other forms of noise
- Strong electromagnetic fields
- Potential expose to radiation
- Close to power cables




Precautions for installing this product:

- It is recommended to separate 2 high-power modules (with 1.7 W and above, including bus power consumption + user-side power consumption + thermal loss) from 1 low-power module (with less than 1.7 W) either by a physical barrier or by spacing them apart.
- For vertical installation, install high-power modules at the top and communication interface modules at the bottom.
- For multi-layer configurations, insert high-power modules on the side so that waste heat can rise to the top unobstructed.
- Before installation, ensure that the product has been powered off.
- To avoid damage to the product, do not drop or strike on the product enclosure, terminal block, or connector.
- Do not disassemble this product, as it may result in severe damage.
- Do not tighten screws with excessive torque (for torque requirements, see "[Installation Process](#)") to avoid damage to the product.
- After installation, remove the dust-proof label on the top of the product to ensure the ventilation holes are unobstructed.

4.2 Preparation Before Installation

The equipment and related tools required before installation are listed in the table below.

Name	Quantity	Remark	Diagram
EtherCAT communication interface module	1	-	
Expansion module	Several	-	
End Cover	1	-	
DIN rail	1	<ul style="list-style-type: none"> The DIN rail must comply with IEC 60715 standard (35 mm wide, 1.0 mm thick). For detailed dimensions, see "12.1 Appendix 1: Dimensional Diagram". The DIN rail length should be selected based on the actual installation width of the product. For calculation of the installation width, see "4.1.3 Installation Space". 	
End plate	2	For use together with the DIN rail, at least 1 pair (2 pieces) required, not included	

Name	Quantity	Remark	Diagram
			
Phillips screwdriver	1	φ5 mm	
Straight screwdriver	1	φ2.5 mm	

4.3 Installation Procedure

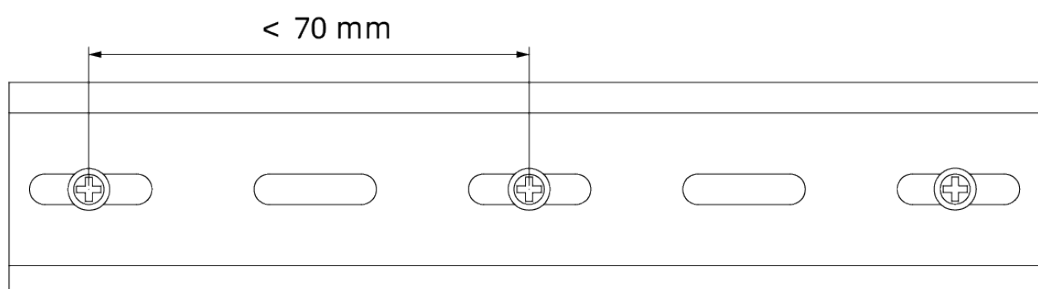
4.3.1 Guide Rail Installation



If the thickness of the DIN rail is not as required, the product cannot fit in or function properly as the DIN rail snap-fit joints do not work.

Procedure

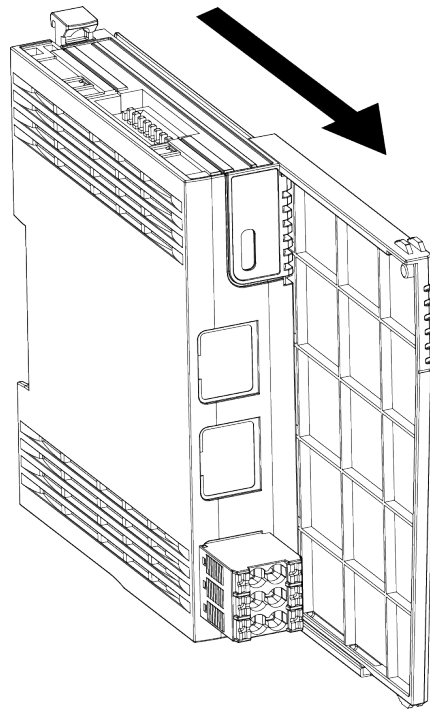
Use a Phillips screwdriver to tighten the screws on the DIN rail. Fix the DIN rail using M4 screws with an interval of 70 mm or less and a tightening torque of 12 kgf.cm.



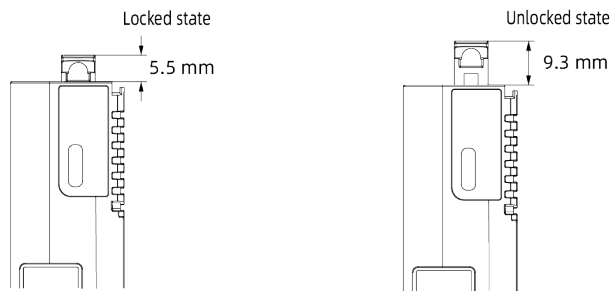
4.3.2 Product Installation

Procedure

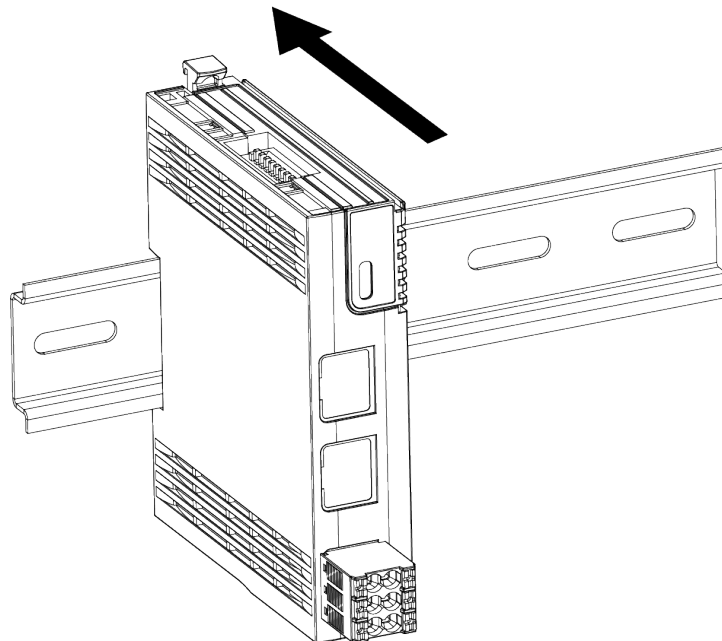
1. Remove the rear cover in the direction indicated by the arrow, as shown below.



2. Ensure that the snap-fit joint of the DIN rail is locked, as shown below.



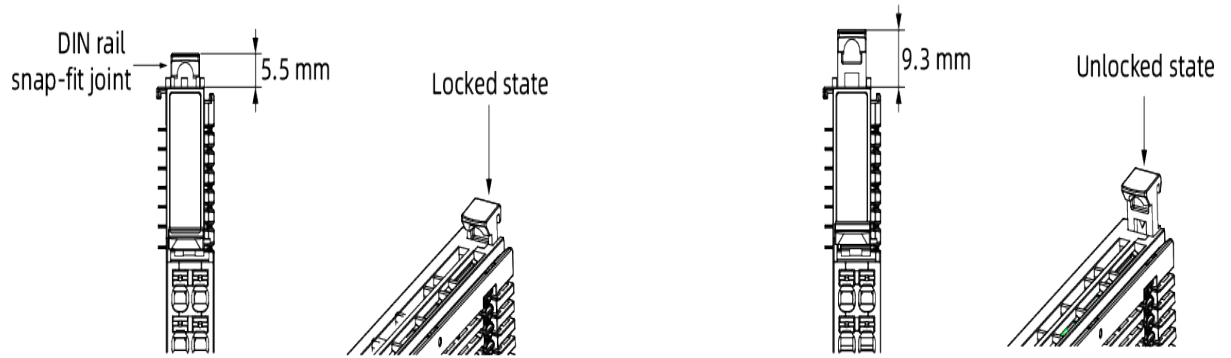
3. Align the module with the DIN rail and push the module in the direction indicated by the arrow until you hear a click, as shown below.



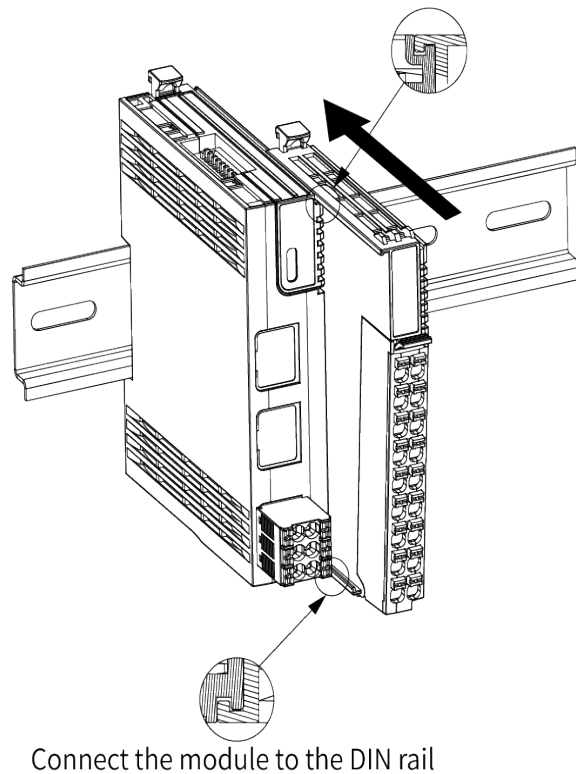
4.3.3 Expansion Module Installation

Procedure

1. Ensure that the snap-fit joint of the DIN rail is locked, as shown below.



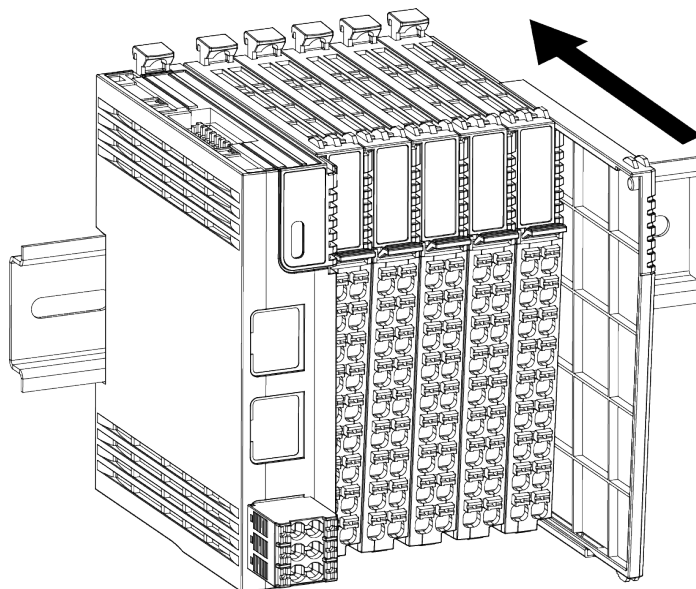
- Align the top and bottom guide rails of the expansion module and the communication interface module. Push the expansion module in the direction indicated by the arrow until you hear a click, as shown below. Connect the module to the DIN rail



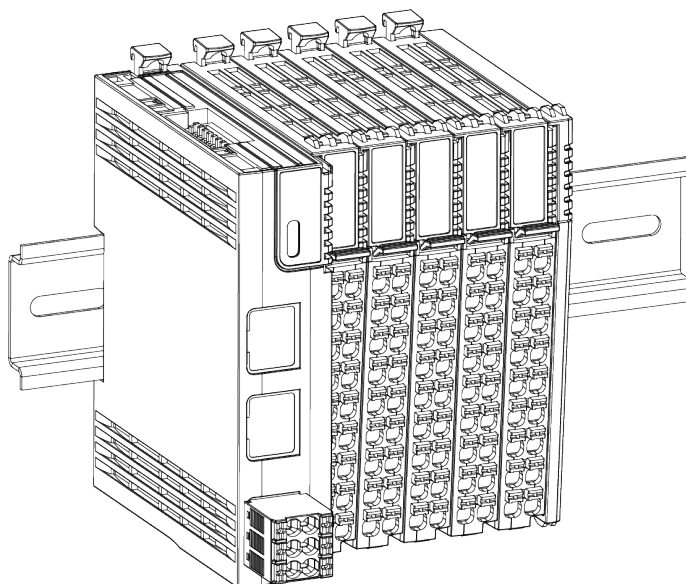
4.3.4 End Cover Installation

Procedure

- Align the end cover with the guide rail of the last expansion module. Slide the end cover in the direction indicated by the arrow.



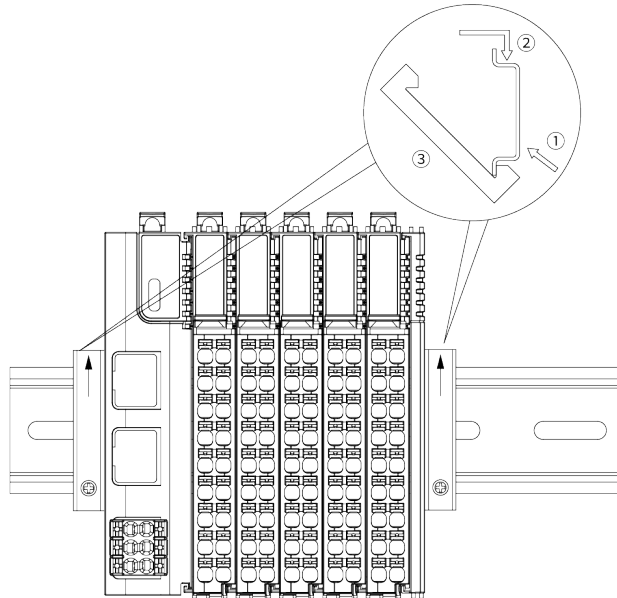
2. Ensure the end cover is flush with the end of the expansion module to prevent the metal pins from being exposed, as shown below.



4.3.5 End Plate Installation

Procedure

To install the end plate, hook the bottom of it to the bottom of the DIN rail, rotate the end plate to hook the its top to the top of the DIN rail, and then tighten the screws on the DIN rail using a Phillips screwdriver to lock the end plate in place, as shown below.



4.4 Inspection After Installation

No.	Item	Compliance
1	The DIN rail mounting hooks of the communication interface module and expansion module are locked.	
2	Ensure that the end plates on both sides are securely locked.	
3	After installation, ensure that there are no foreign objects on the ventilation surfaces.	
4	Ensure that the installation environment meets the environmental requirements mentioned in the precautions.	

5 Wiring

5.1 Knowledge Before Wiring

5.1.1 Introduction

The purpose of standard wiring practices in industrial environments is to reduce electromagnetic interference (EMI) effects on equipment and systems, ensuring the stable operation of industrial control systems and the accuracy of data. Although Inovance has designed industrial products to meet harsh environments, proper external wiring and cable routing should still be considered during use.

5.1.2 Basic EMC Information

Interference occurs when electromagnetic sources affect sensitive devices. The three elements that constitute interference are: interference source, transmission path, and sensitive devices.

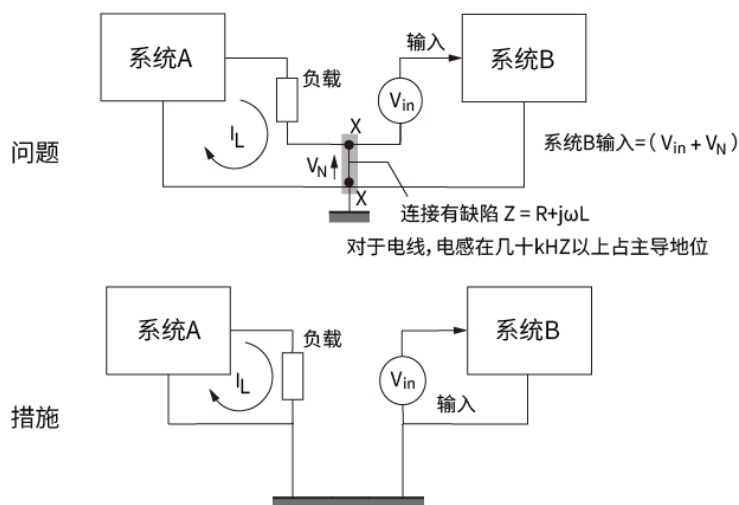


EMC (Electro Magnetic Compatibility) issues are system-related. This section primarily addresses how to reduce interference by adjusting the transmission path. Common solutions include shielding, isolation, and proper wiring.

The interference causes of different coupling methods vary, requiring different anti-interference solutions.

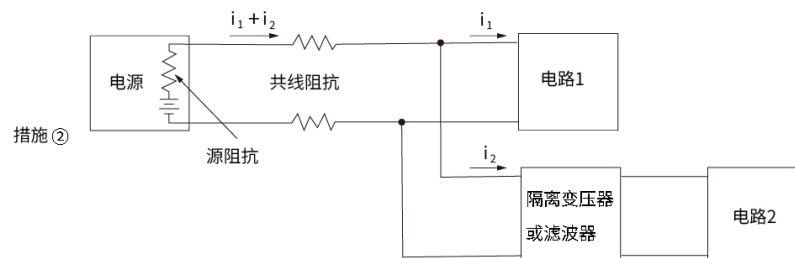
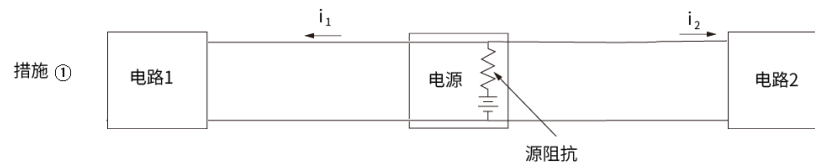
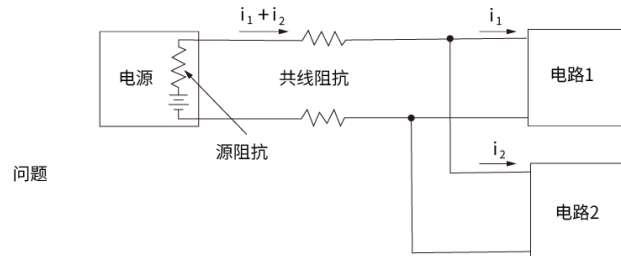
Common Impedance Coupling

- Cause: Grounding cables serve as one of the signal circuit paths. Due to its impedance (approximately several hundred nH/m), the interference in System A can result in a voltage difference in grounding wires, affecting System B.
- Solution: Separate single-point grounding



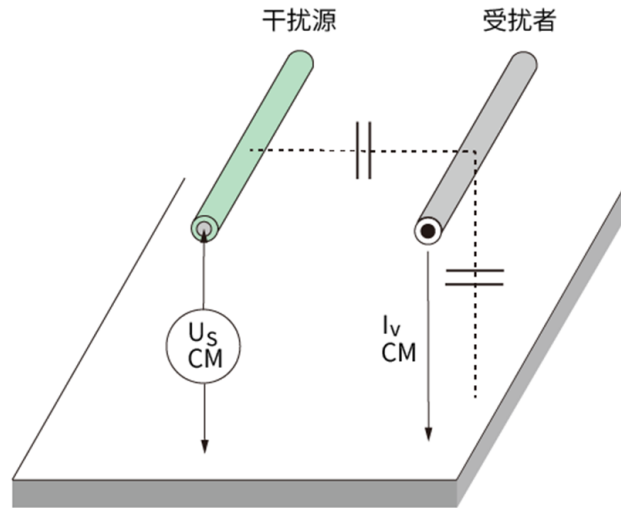
Common Power Coupling

- Cause: Any change in the power current required by Circuit 2 will affect Circuit 1, making it easy for interference from Circuit 2 to affect Circuit 1.
- Solution:
 - ① Connect Circuit 2 directly to the power supply output terminal.
 - ② Use an isolation transformer or a filter.



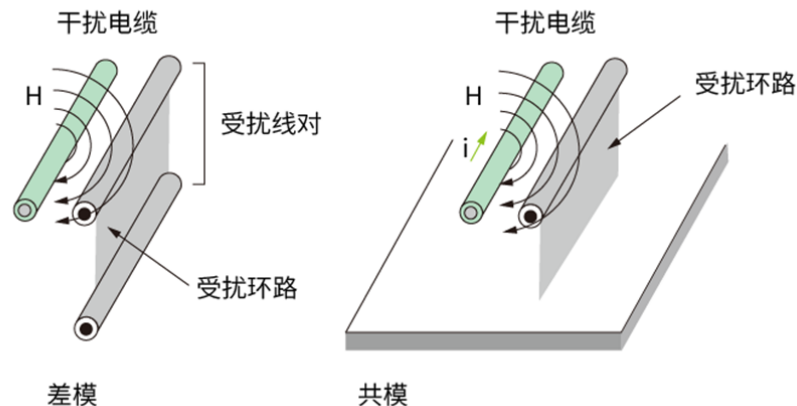
Receptive Coupling

- Cause: A capacitor consists of two conductors separated by a dielectric material. When different signal cables are in parallel with air as the dielectric, interference can occur between signals, causing capacitive coupling.
- Solution: Shield the signals and increase the distance between signal cables.



Inductive Coupling

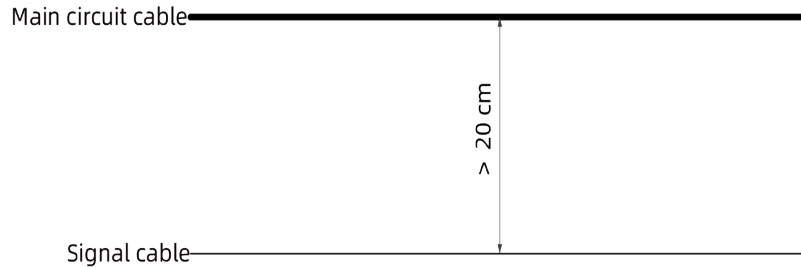
- Cause: Cables act as inductors. When varying current flows through the cable, a magnetic field and electric field are generated around it. These fields can induce voltages and currents in sensitive circuits, affecting their operation.
- Solution: Increase the spacing to reduce mutual inductance and ground both ends of the shielded cables.



5.1.3 Wiring Requirements

Requirements

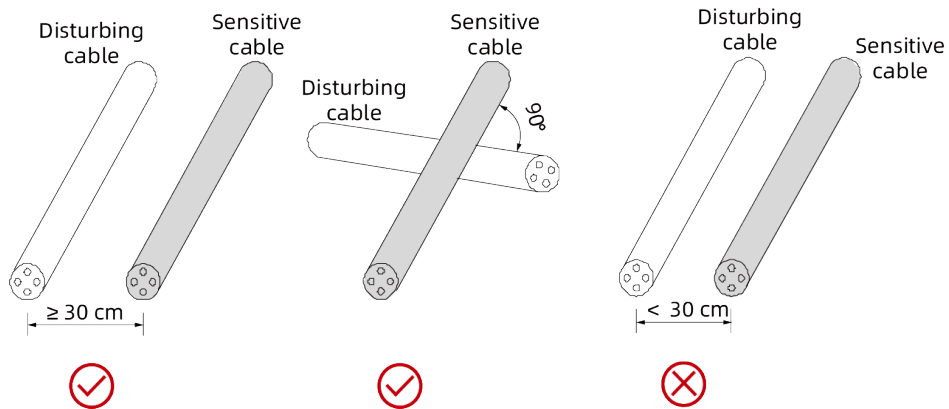
- Main circuit wiring requirements
The power supply input cable of the main circuit and the motor cable can generate strong electromagnetic interference. To avoid electromagnetic interference caused by long-distance parallel coupling between the strong disturbing cable and control circuit cable, ensure a distance longer than 30 cm between main circuit cables and signal cables when cabling. Main circuit cables include the input R/S/T cable, output U/V/W cable, DC bus, and braking cable. Signal cables include the I/O signal cable and communication cable. Cable slots must be properly connected and grounded. Aluminum slots can ensure equipotential between devices. Properly connect the PLC and I/O module to the system (machines or devices). Protect all connections with spray coating and ensure full contact with the conductive metal.



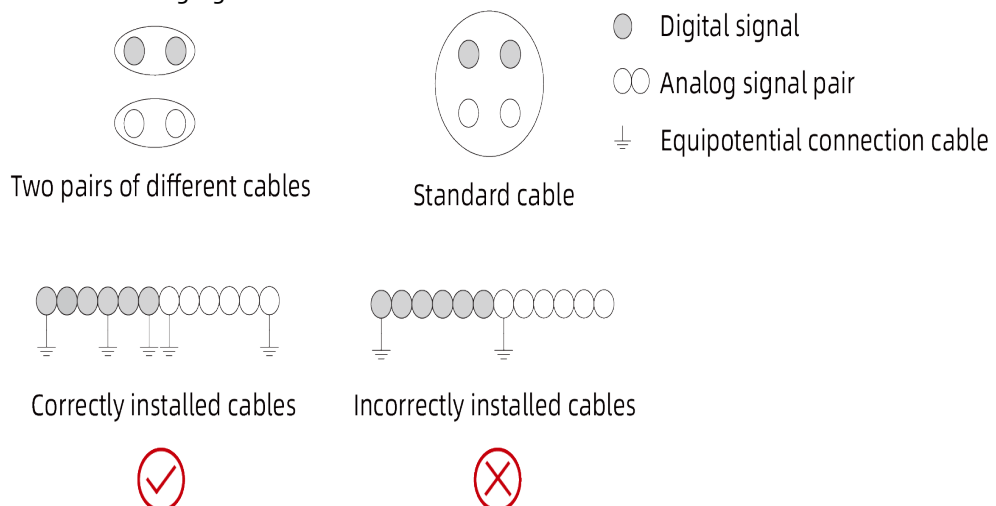
- I/O signal cable wiring requirements
I/O signals include analog input (AI) signals, analog output (AO) signals, digital input (DI) signals, digital output (DO) signals, and relay output signals. To avoid interference to I/O signals, separate the I/O signal cables at least 30 cm from the main circuit cables (R/S/T cables and U/V/W cables) and other power cables or power supply cables.

Recommendations

- Wiring for disturbing cables and sensitive cables
Route cables that transmit different types of signals through different routes. Separate the disturbing cables from sensitive cables by a distance of at least 30 cm. When two types of cables must be intersected, the intersection angle must be 90 degrees to avoid interference, as shown in the following figure.



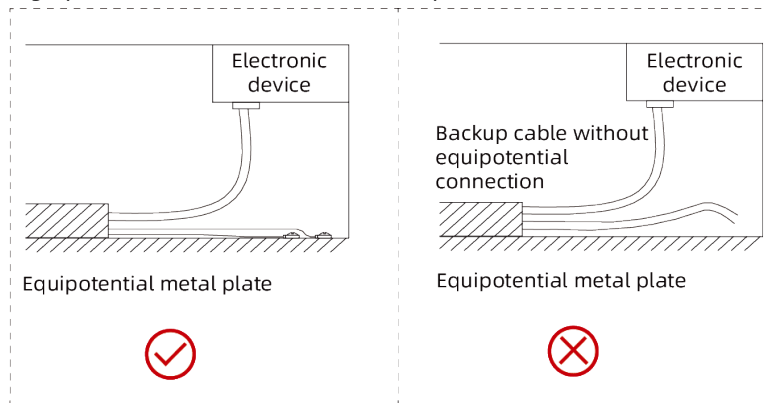
- Wiring for different types of signal cables
It is recommended to separate different types of signal cables and use equipotential signals to isolate between them. When routing cables that transmit the same type of signals, lay equipotential signal cables to the outer layers and lay equipotential bondings as many as possible in the middle if possible, as shown in the following figure.



- Wiring for multi-conductor cables
It is recommended that one cable transmits one type of signals. If one cable is used to transmit different

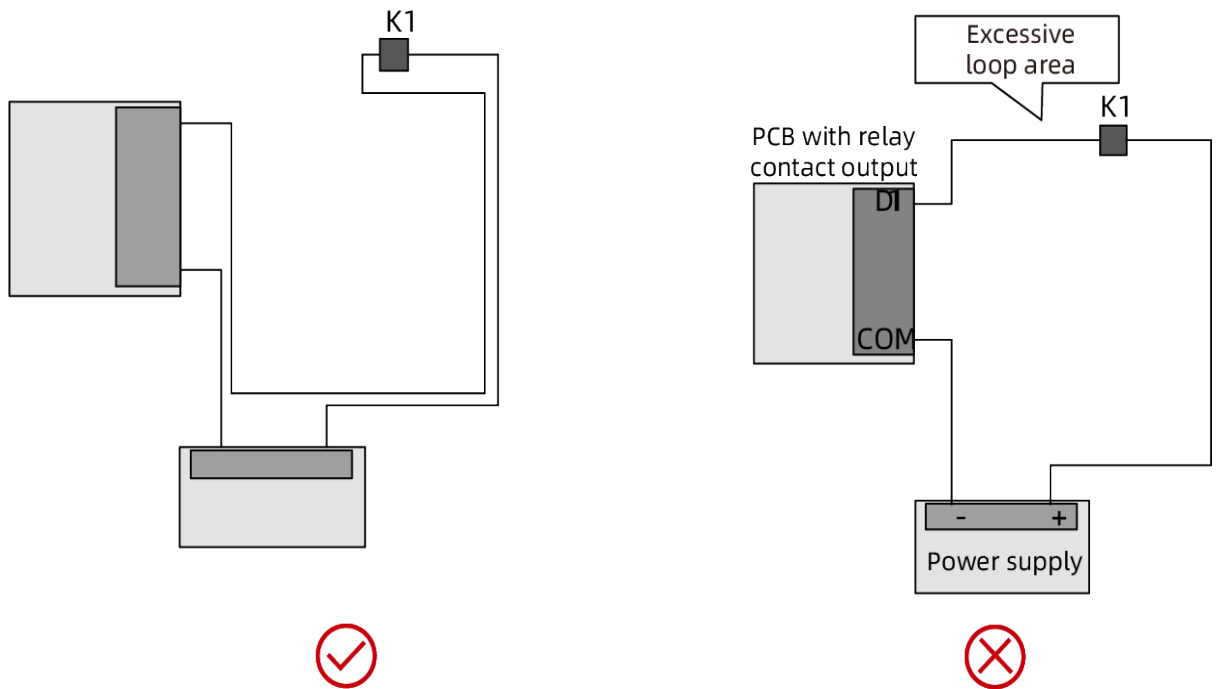
types of signals, use the cable with conductors shielded, as shown in the following figure.

If certain conductors in a multi-conductor cable are reserved or unused, connect these conductors to the equipotential bondings (do not leave them unconnected), as shown below.



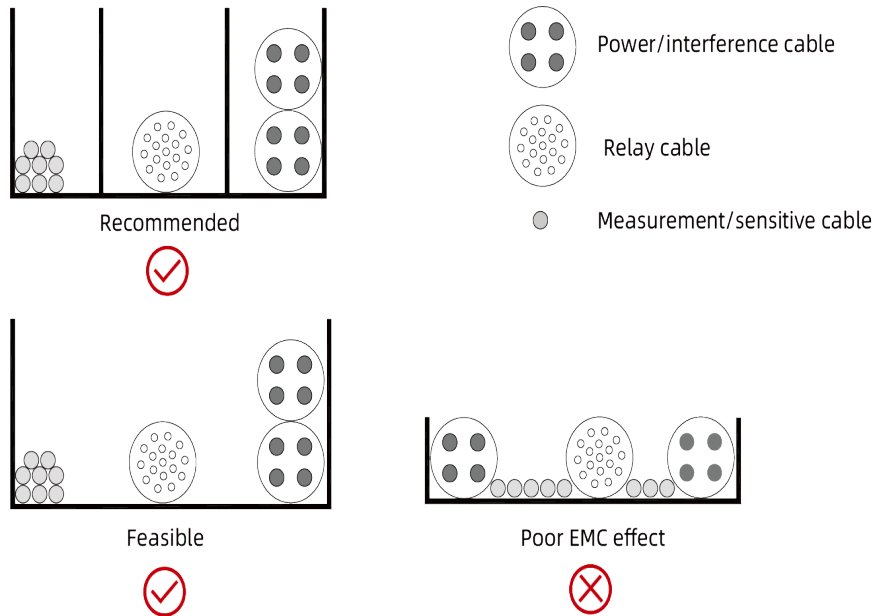
- Avoid loop area

For cables that transmit low-level sensor signals and shared cables that transmit relay signals, lay them close to each other to avoid the large loop area. Use twisted pair cables for analog signals. Lay digital signal cables close to each other.



- Wiring for different types of cables

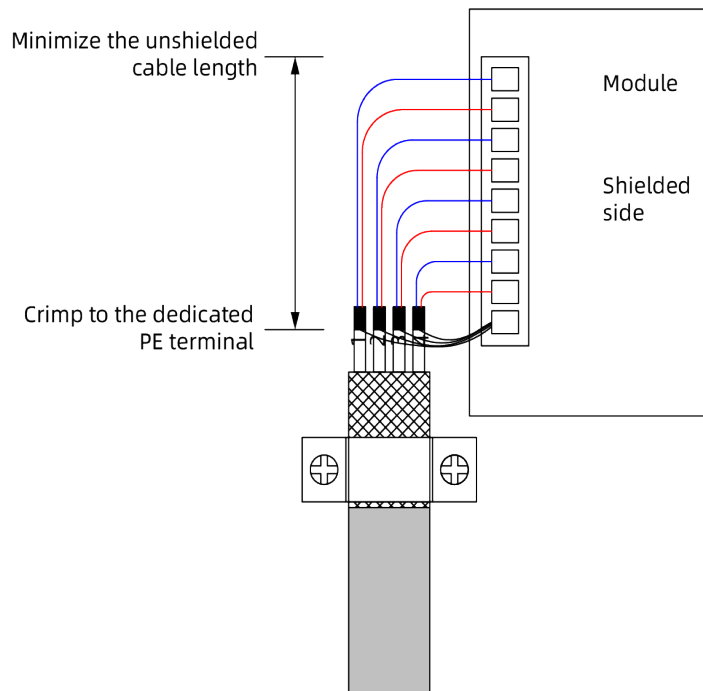
Route the cables along the equipotential metal plate. To enhance the internal EMC performance, separate different types of cables or separate cables with metal separators (recommended) in the same metal (zinc-iron or stainless steel) duct.



5.1.4 Grounding Requirements for Shielded Cables

Shielded cables can reduce interference from magnetic fields, electric fields, or electromagnetic fields by diverting interference currents from the shielding layer to ground.

Minimize the length of the unshielded part of a shielded cable, and connect the shield to the nearest PE terminal. If the unshielded part is too long, the cable conductor is prone to signal interference. For modules without a dedicated PE terminal, connect the shield to an external PE terminal, as shown below.



5.1.5 Equipotential Grounding Requirements

Equipotential grounding connects the electrical equipment body and external conductive parts to the same or nearly the same potential. This not only prevents electric shock but also meets EMC requirements.

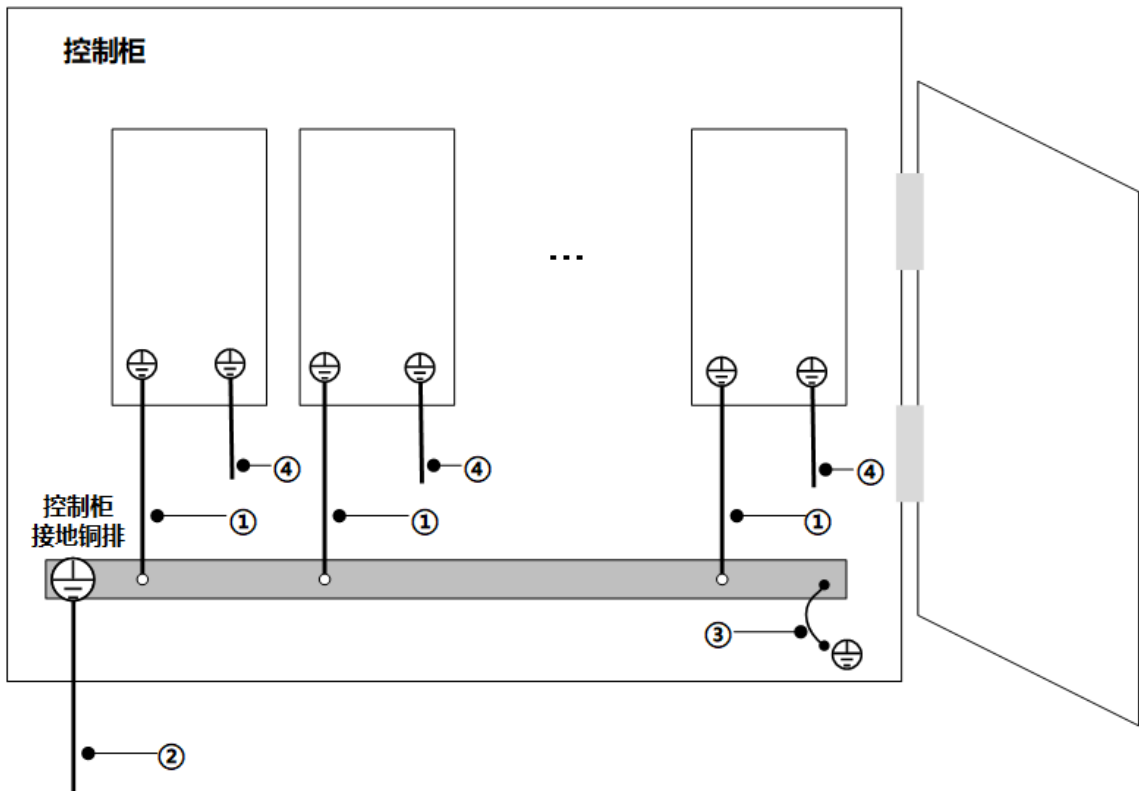
General grounding requirements

To ensure proper grounding of the product, be sure to comply with the following requirements.

- Ensure that the grounding terminal is properly grounded in accordance with the relevant electrical regulations of the country or region. The grounding terminal must be reliably grounded to prevent abnormal operation or damage to the equipment. The grounding terminal must not be used as the neutral (N) terminal of the power supply.
- Ensure that the protective earth conductor meets the technical specifications and local safety standards. Keep the grounding wire as short as possible. The protective earth conductor must be made of yellow-green copper cable and must not be connected in series with circuit breakers or other switching devices.
- Observe the grounding requirements of all the devices as improper grounding can lead to malfunction.
- Install the device on a conductive metal mounting surface. Ensure that the whole conductive bottom of the device is attached properly to the mounting surface.

Grounding requirements for multiple devices

Multiple devices are connected to a common ground as shown below. The details are provided in the table below.

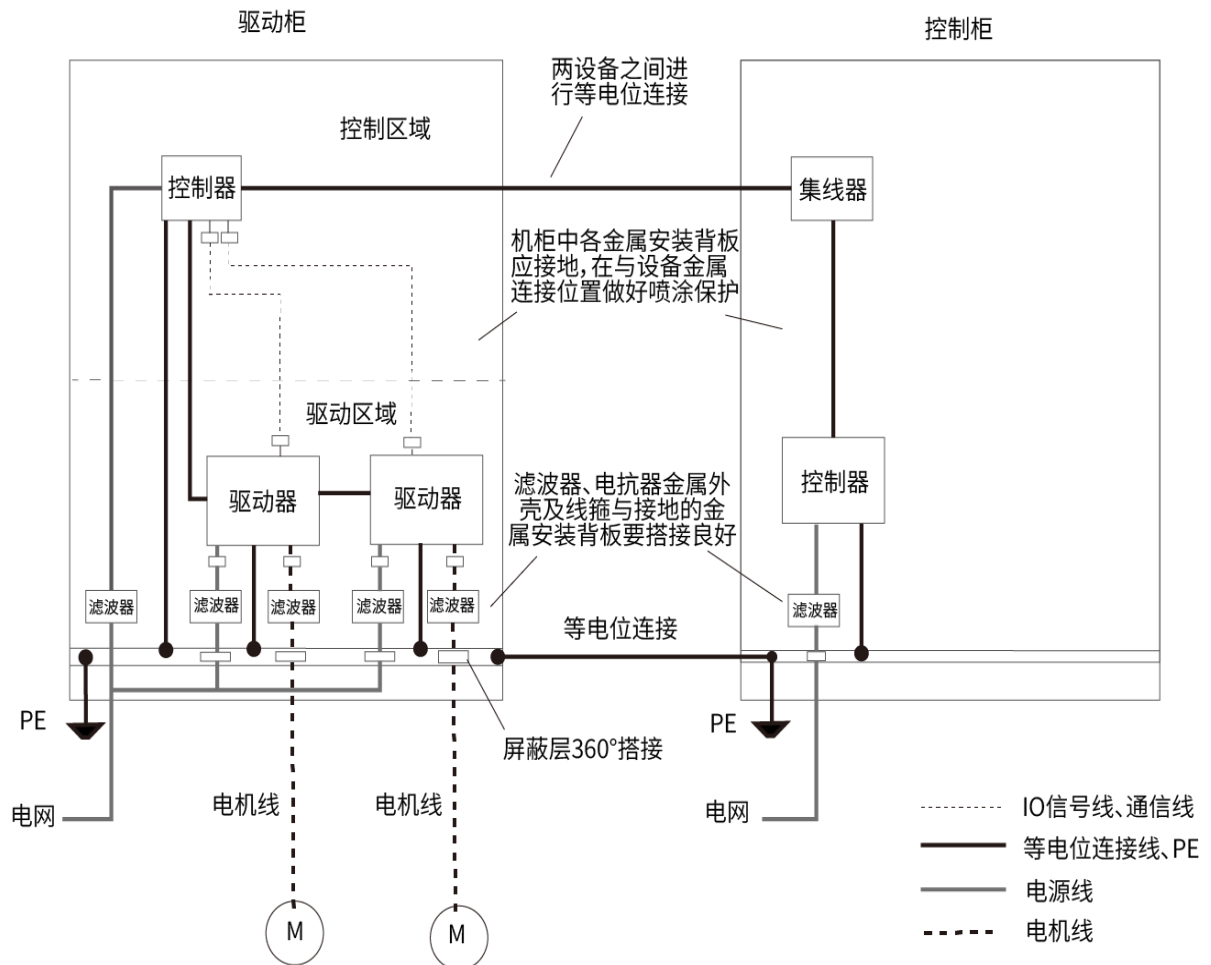


No.	Description
①	Connect the main circuit input PE terminal to the grounding copper busbar of the control cabinet through the protective grounding conductor.
②	Connect the PE cable on the input power supply end to the grounding copper busbar of the control cabinet.
③	Connect the grounding copper busbar of the control cabinet to the metal enclosure of the control cabinet through the protective grounding conductor.

No.	Description
④	Connect the motor output cable shield to the output PE terminal of the drive.

Requirements of cabinet grounding

To suppress interference in the cabinet properly, isolate the interference source from the equipment that may be disturbed during installation. Divide the cabinet into multiple EMC compartments or use multiple cabinets based on the intensity of interference sources, and install each device in accordance with the following wiring principles.



No.	Grounding rules
①	Install the control devices and drive devices into two separate cabinets.
②	Use grounding cables with a cross-sectional area of at least 16 mm ² to connect different cabinets, therefore realizing equipotential between the cabinets.
③	Place the devices in different areas in the cabinet according to the device signal strength.
④	Carry out equipotential bonding for the devices in different areas of the cabinet.
⑤	Shield all communication (for example, RS485) and signal cables that routed out from the cabinet.
⑥	Install the power supply input filter close to the cabinet input interface.

No.	Grounding rules
⑦	Coat all grounding points in the cabinet for protection.

5.1.6 Lightning and Overvoltage Protection

The surge protection device (SPD) is installed on the input side of the I/O module to ensure that electrical systems and important electrical and electronic equipment are protected from damage caused by lightning overvoltage. The SPD is mainly used to limit transient overvoltage and operating overvoltage caused by lightning in power supply and signal systems. Lightning surges can be transmitted to the I/O module through the power supply or signal cable. When a lightning strike occurs, the ground potential increases, which may damage the drive. The induced voltage can be produced in the cable and loop when a pulse electromagnetic field is generated by a lightning strike on the building or in the vicinity. External lightning protection measures, such as lightning rods, grounding wires, and grounding devices, cannot prevent the conduction of lightning induction surge along the cable and secondary lightning strike. Therefore, it is also necessary to install an SPD.

5.2 EtherCAT Network Cable Connection

5.2.1 Wiring Precautions

When connecting EtherCAT network cables, note the following:

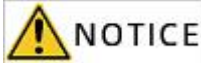
- Use recommended cables and adapter boards for connection. It is recommended that shielded cables be used as expansion cables to enhance anti-interference capacity.
- When connecting the cable to the EtherCAT port of this product, insert it firmly into the port until it locks into place.
- Route communication cables separately from power cables (with high voltage and current) that produce strong interference signals, and avoid parallel routing.
- Do not place communication cables near noise-generating equipment. If unavoidable, take measures to mitigate noise, such as placing the equipment in a metal enclosure.
- Do not place communication cables in environments with high temperatures or high humidity.
- Do not place communication cables in environments with excessive dust, oil mist, or other harmful factors.
- There are restrictions on the bending radius of communication cables. Check the bending radius according to the communication cable specifications.

5.2.2 Preparation Before Wiring

Cable requirements

The EtherCAT bus adopts standard RJ45 network port and standard registered jack. Use Cat5e shielded twisted pairs and injection cables with iron housing. EtherCAT bus communication uses shielded cables for network data transmission, with no short circuits, miswires, or poor connections. The specifications for shielded cables are shown in the table below.

Item	Specification
Cable type	Flexible crossover cable, double-layer shielded (SFTP or SFTPP), Cat5e or above (100BASE-TX)
Double-shielded	Braided shield (coverage: 85%), aluminum foil shield (coverage: 100%)
Standards compliance	EIA/TIA568A, EN50173, ISO/IEC11801 EIA/TI Abulletin TSB, EIA/TIA SB40-A&TSB36
Cross sectional area	AWG26 and above
Conductor type	Twisted pair
Number of pairs	4
Certification	UL
Environment	<ul style="list-style-type: none"> Resistant to industrial oil, corrosive acid and alkali Operating environment temperature: -30°C to +60°C



The cable length between devices cannot exceed 100 m. Failure to comply can lead to signal attenuation, affecting the communication performance.

Recommended cables

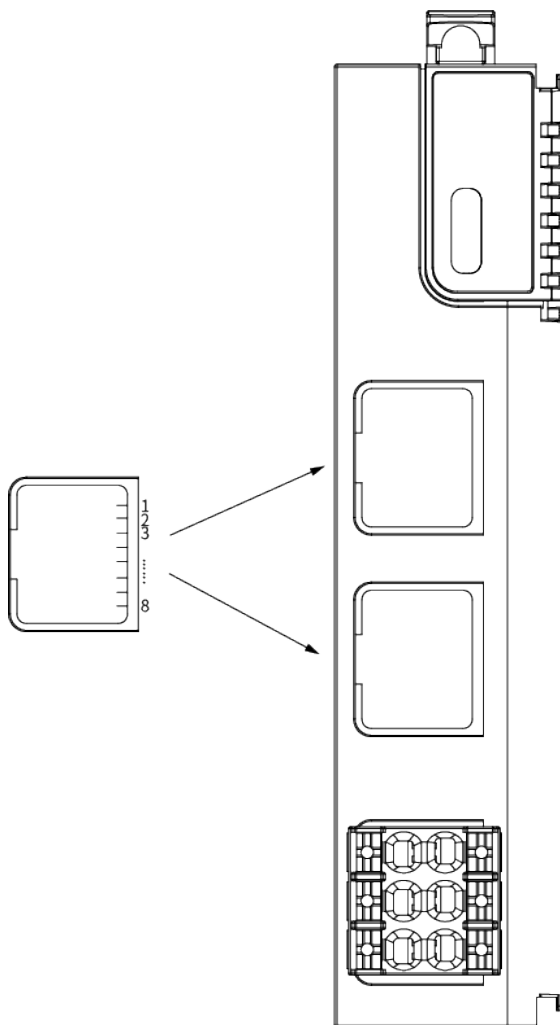
Recommended network cables are as follows.

No.	Code	Name	Specification
1	15040261	Complete cable set - S6-L-T04-0.3-100M network communication cable - 0.3m (RoHS)	CAT.5e SFTP 26AWG
2	15040262	Complete cable set - S6-L-T04-3.0-100M network communication cable - 3m (RoHS)	CAT.5e SFTP 26AWG
3	15041960	Complete cable set - S6-L-T04-0.2-100M network communication cable - 0.2m (RoHS)	CAT.5e SFTP 26AWG
4	15041961	Complete cable set - S6-L-T04-0.5-100M network communication cable - 0.5m (RoHS)	CAT.5e SFTP 26AWG
5	15041962	Complete cable set - S6-L-T04-1.0-100M network communication cable - 1.0m (RoHS)	CAT.5e SFTP 26AWG
6	15041963	Complete cable set - S6-L-T04 - 2.0m - 100M network communication cable - 2.0m (RoHS)	CAT.5e SFTP 26AWG
7	15041964	Complete cable set - S6-L-T04-5.0-100M network communication cable - 5.0m (RoHS)	CAT.5e SFTP 26AWG
8	15041965		CAT.5e SFTP 26AWG

No.	Code	Name	Specification
		Complete cable set - S6-L-T04-10.0-100M network communication cable - 10.0m (RoHS)	
9	1504A819	Complete cable set - S6-L-T04-1.5-100M network communication cable - 1.5m (RoHS)	CAT.5e SFTP 26AWG

5.2.3 Terminal Definitions

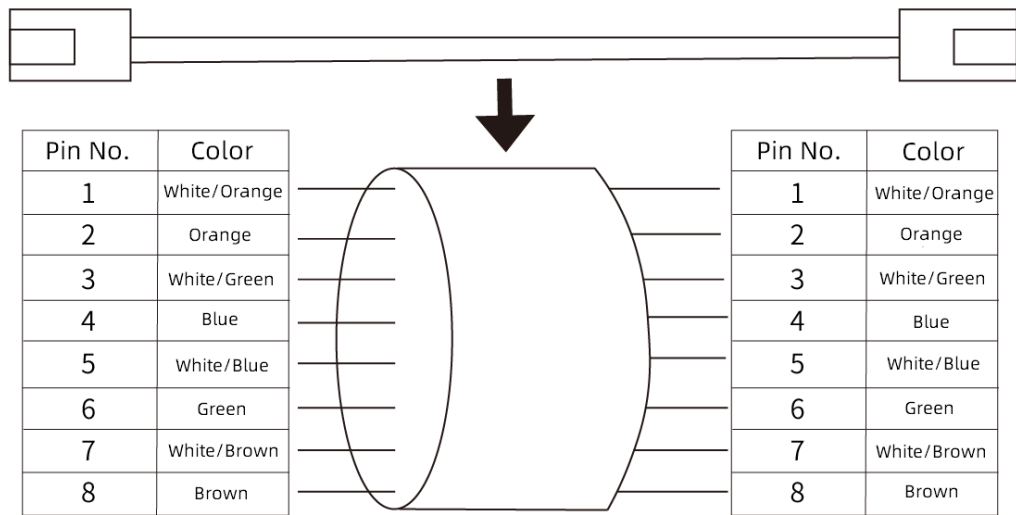
The pinout of the EtherCAT port is shown in the figure below, and the pin signals are listed in the table below.



Pin No.	Signal name	Signal meaning
1	TX+	Transmitting data+
2	TX-	Transmitting data-
3	RX+	Receiving data+
4	N/C	Reserved
5	N/C	Reserved
6	RX-	Receiving data-

Pin No.	Signal name	Signal meaning
7	N/C	Reserved
8	N/C	Reserved

The communication cable and connector use a straight-through connection, as shown in the following figure. The communication cable connection methods typically include the T568A and T568B standards, each representing a different color code. The following figure shows the T568B standard.

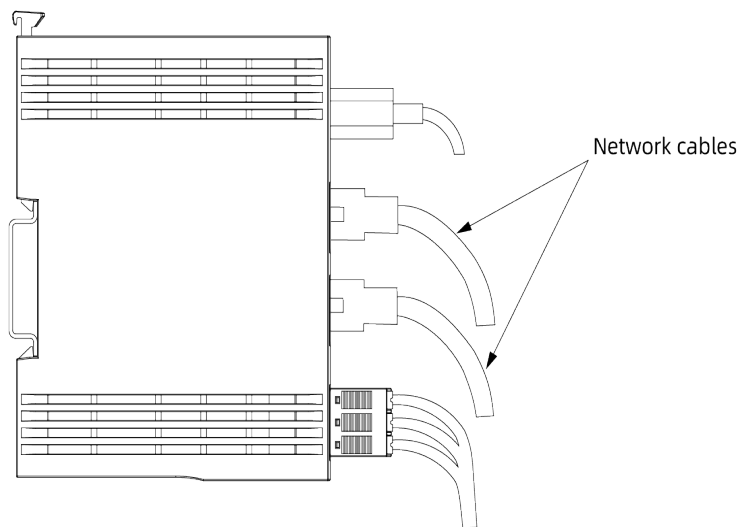


Picture5-2-3-1 Schematic diagram of communication cable

5.2.4 Cable Connection and Disconnection

Cable Connection

Hold the connector of the network cable and insert the cable into the port until you hear a click, as shown below.





When connecting cables, ensure that the EtherCAT output port of the previous device is connected to the EtherCAT input port of the next device. Incorrect connection will prevent proper communication.

Cable Disconnection

To remove the network cable, press and hold the clip of the cable and pull it out along the direction parallel with the module.

5.3 Power Supply and Grounding Wire Connection

This section covers the wiring requirements, terminal definitions, wiring diagrams, and block diagrams for the connection of 24 VDC power supply and GND terminals, as well as cable connection and disconnection.

5.3.1 Wiring Precautions

When connecting power cables, note the following:

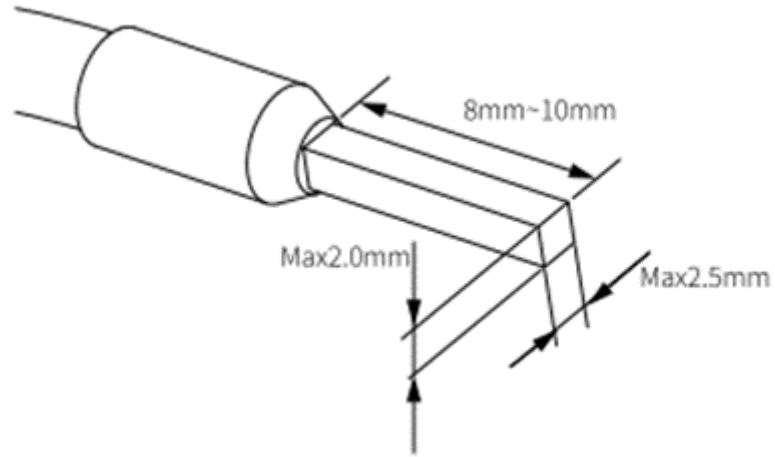
- Before wiring, ensure that the external power supply is disconnected.
- Route extension cables separately from high-voltage and high-current power cables that produce strong interference signals, and avoid parallel routing.

5.3.2 Preparation Before Wiring

Use power cables with the cable lug and cable diameter specified in the following table. Adjustments can be made based on actual usage. It is recommended to use a 3-core unshielded cable with a maximum length of 20 m.

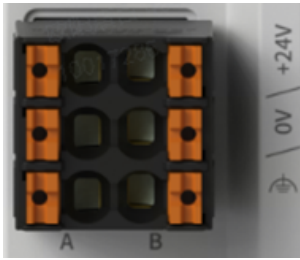

Material Name	Applicable Diameter		KST		Suzhou Yuanli	
	mm ²	AWG	Model	Crimping tool	Model	Crimping tool
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	
	1.5	16	E1508		1508	

To use other types of tubular lugs, crimp the lug to the cables according to the shape and dimension requirements shown below.



5.3.3 Terminal Definitions

The signal names and descriptions for the power terminals are listed in the table below.

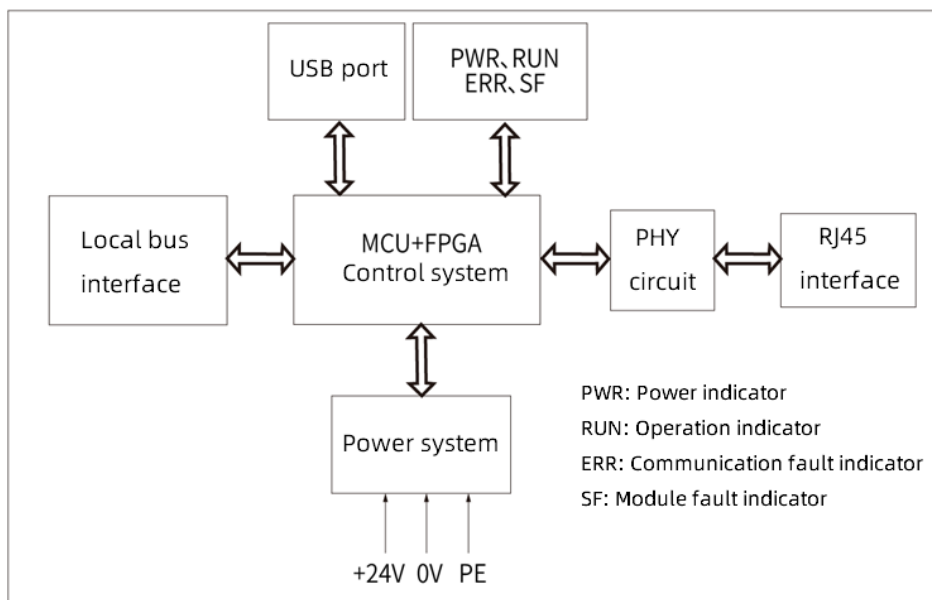
Terminal Mark	Terminal Name	Description
	+24V	Connects to +24 VDC power supply
	0V	Connects to 0 V power supply
		Functional grounding terminal

 **NOTICE**

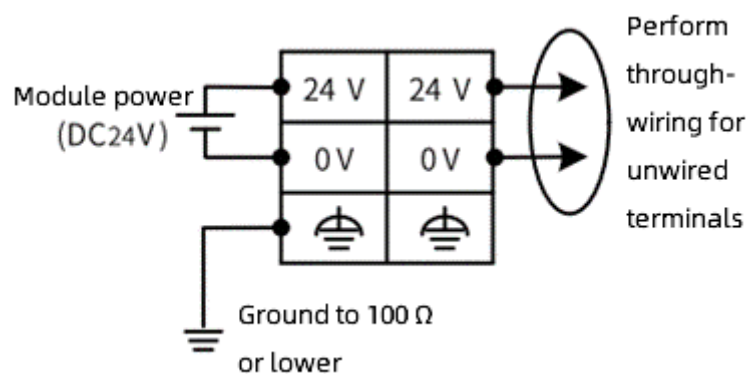
- Terminals with the same mark are internally connected. You can connect to any of them as needed. For example, the two +24V terminals are internally connected, so connecting to either one will work.
- The power supply connected to the terminal must meet the voltage and current specifications of the equipment. Refer to "[2.4 Technical Specifications](#)" for power specifications.

5.3.4 Wiring Diagram and Block Diagram

The circuit block diagram of the GL20-RTU-ECT32-INT module is shown in the figure below.



The wiring diagram for the module's external power supply terminals is shown below.



NOTE

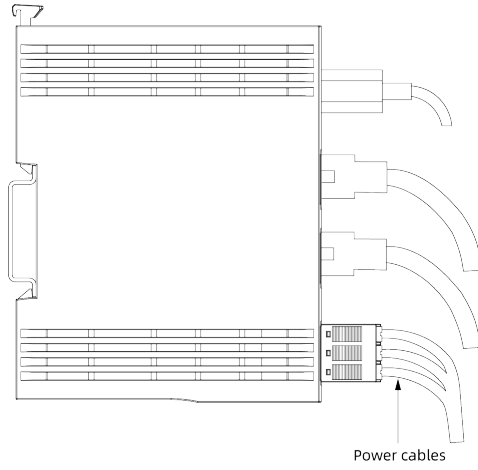
Unwired terminals refer to the terminals of the GL20-PS2 module. The I/O expansion module requires a separate power supply. For more information, see "[Power System and Power Types](#)".

5.3.5 Cable Connection and Disconnection

The power terminal uses a push-in design.

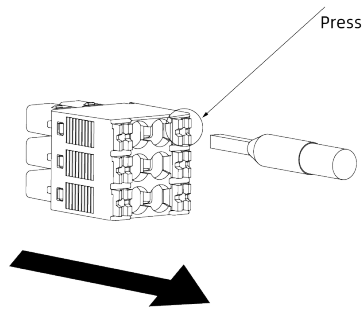
Cable Connection

Insert the cable into the power terminal.

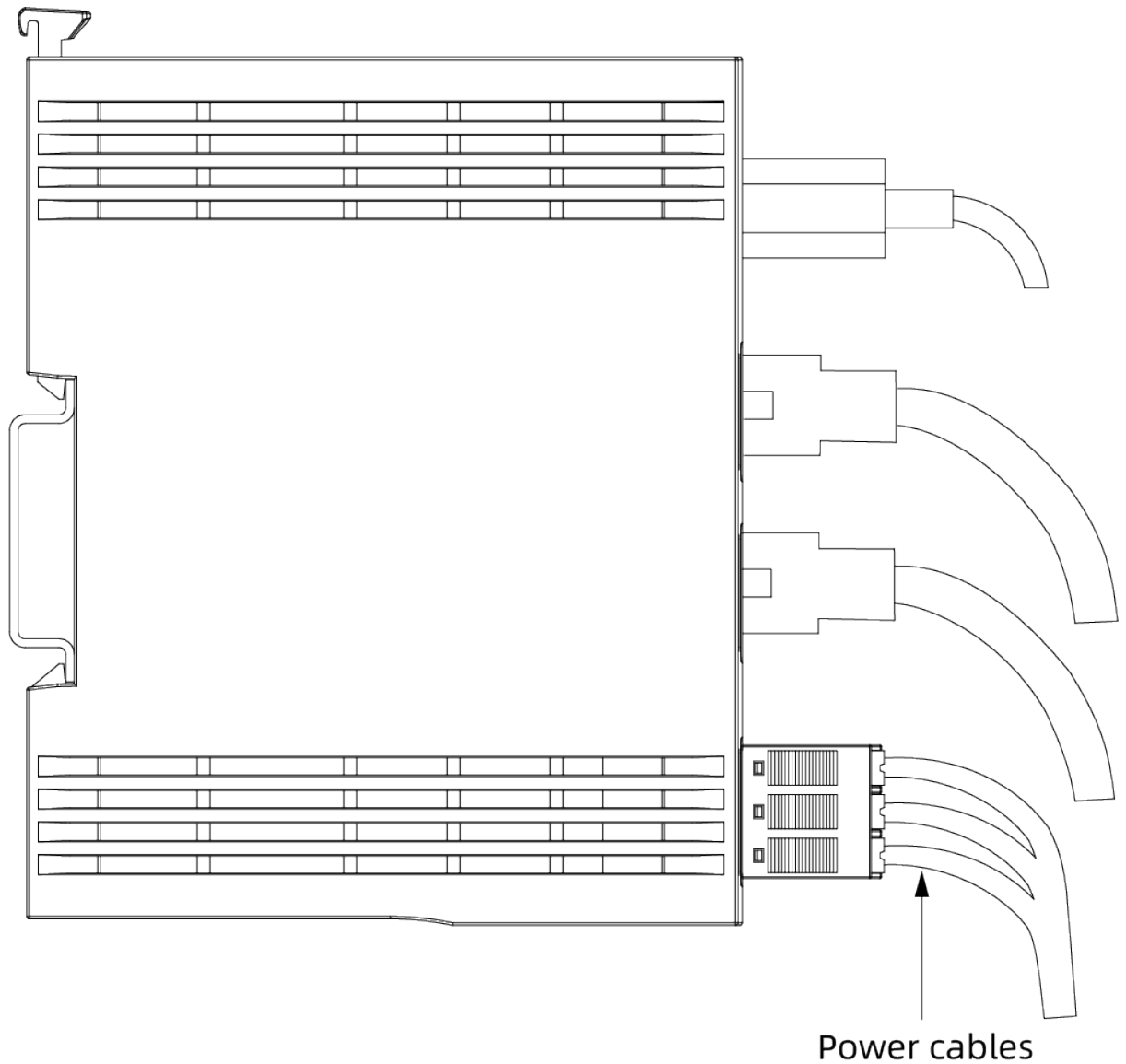


Cable Disconnection

1. Press the terminal release component with a flat screwdriver, as shown below.



2. Remove the cable from the power terminal.



5.4 USB Cable Connection

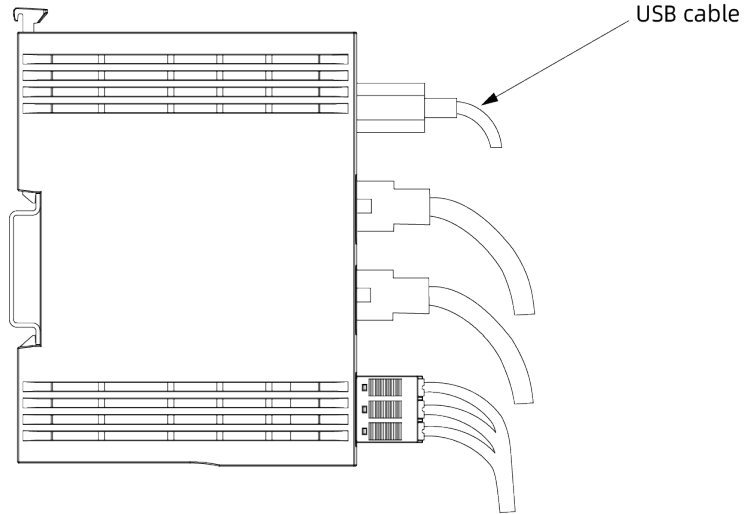
This product can be directly connected to a PC with the programming software or IOManager configuration tool installed via a USB cable for firmware upgrade.

Prerequisites

A USB cable and a PC

Procedure

Insert one end of the USB cable into the Type-C port of the product, and the other end into the PC.



i NOTE

To disconnect the cable, simply pull the USB cable outwards.

6 EtherCAT Bus

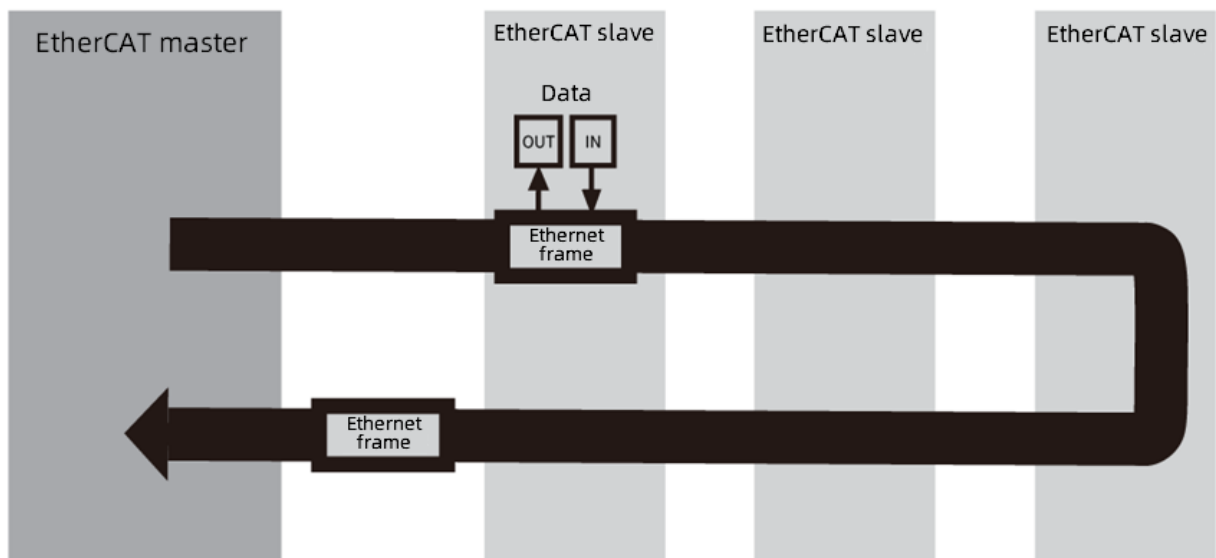
6.1 Introduction to EtherCAT

6.1.1 EtherCAT Operating Principle

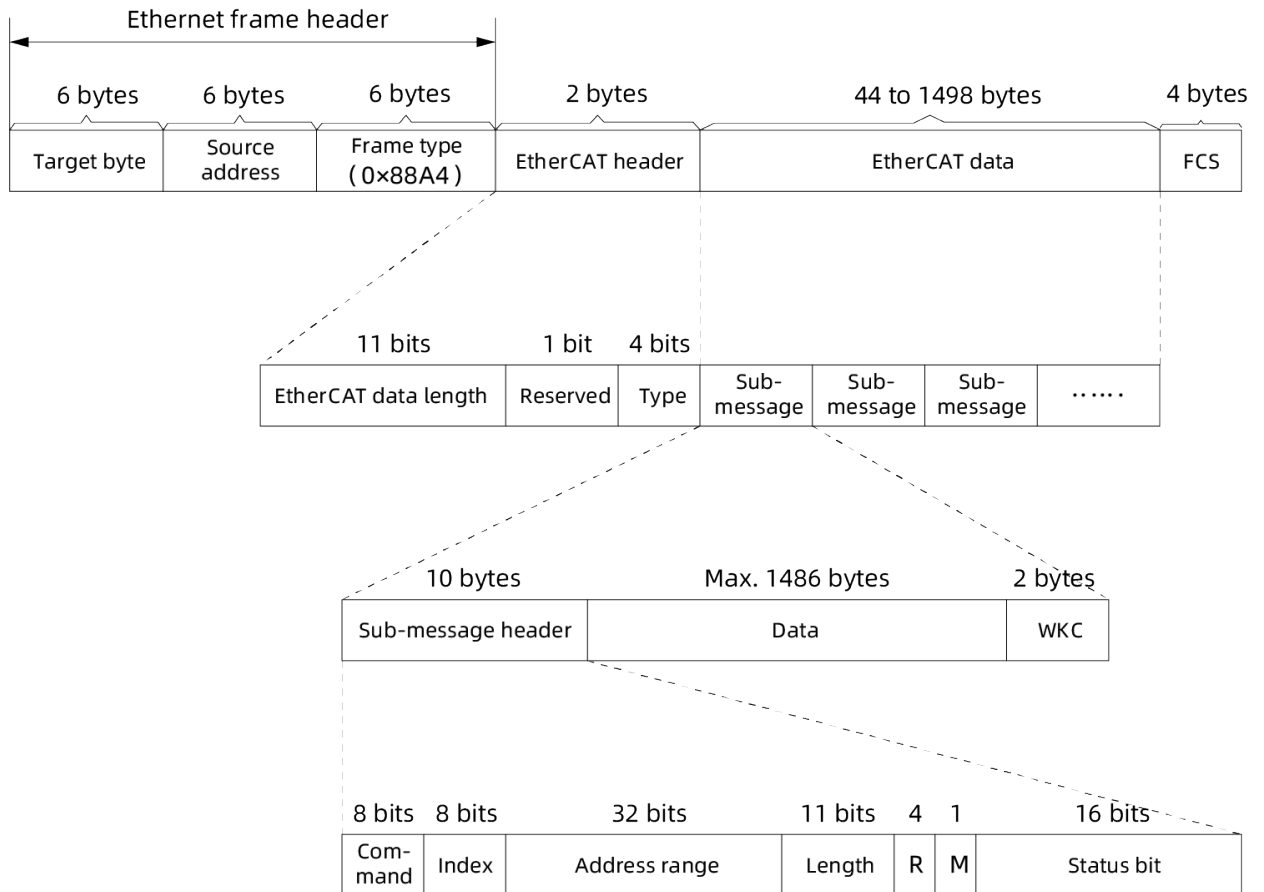
EtherCAT is an Ethernet-based fieldbus system primarily used for data transmission in industrial automation. Its unique communication method overcomes the system limitations of other Ethernet solutions, making data transmission more efficient. In an EtherCAT network, data is transmitted through a ring or linear network structure. Each slave reads and writes data, and then immediately passes the data packet to the next slave. The last slave in the network segment sends the fully processed data frame back to the master as a response frame.

EtherCAT adopts a master-slave communication mode, where one EtherCAT master communicates with multiple EtherCAT slaves. The master is responsible for sending data frames and receiving responses from slaves, while the slaves are responsible for receiving data frames from the master, executing corresponding operations, and then writing the result back into the frames to return to the master. This transmission method enables data communication within one cycle, significantly improving bandwidth utilization.

EtherCAT features real-time performance, flexibility, and efficiency. It supports various device connection topologies, such as ring and linear structures. Slave nodes use dedicated control chips, which offer low latency and precise synchronization, making it very suitable for industrial automation applications.



EtherCAT data is transmitted directly using Ethernet data frames, with the frame type 0x88A4. The EtherCAT data message consists of a header (EtherCAT header) of two bytes and EtherCAT data of 44 to 1498 bytes. The data area consists of one or more EtherCAT sub-messages, each corresponding to the memory space of an independent device or slave. The master uses different addressing methods to exchange data with slaves through EtherCAT sub-messages.



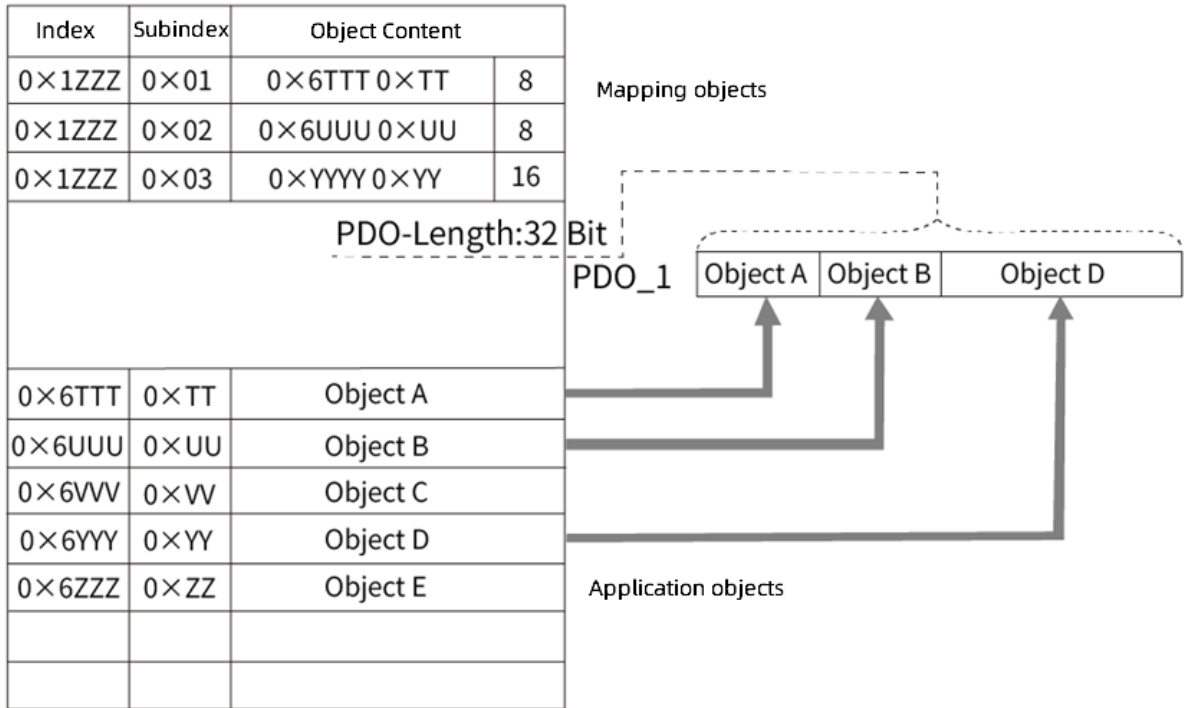
6.1.2 EtherCAT Communication Types

EtherCAT communication types primarily include process data objects (PDO) and service data objects (SDO). PDO is used for periodic data exchange, while SDO is used for aperiodic data exchange.

PDO Communication

PDO communication refers to the periodic data exchange between the master and slaves in the EtherCAT bus network. It is primarily used for periodic data reading and control with fast speeds. When the master and slaves exchange data via PDO, the receiving party does not need to respond after the sending party transmits data. The PDO list can be regarded as an array space, where each array element stores different parameters. These parameters are used to perform corresponding operations in a cycle.

Object dictionary



SDO Communication

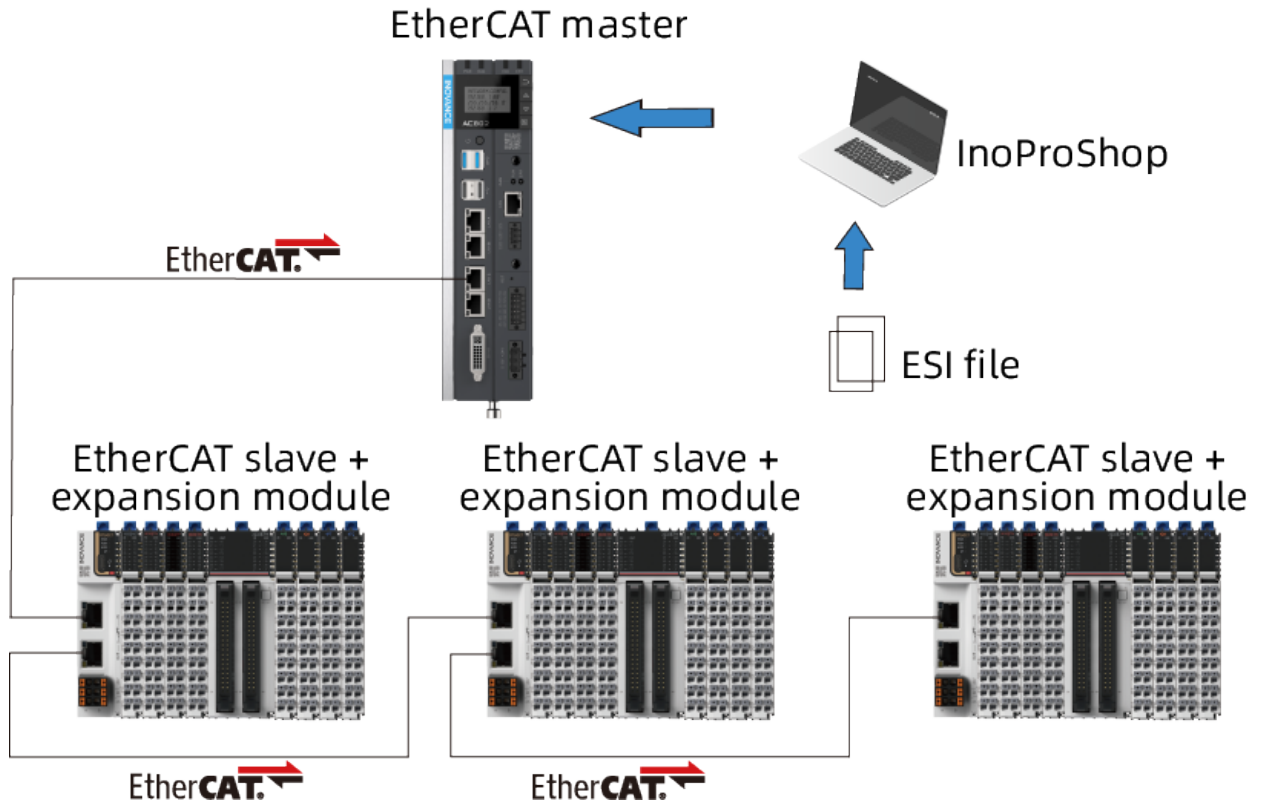
SDO communication is a request-response data exchange method, also known as mailbox communication. It is used for aperiodic data configuration and status information reading. When aperiodic data exchange is required, the master sends a request via SDO, and the slave responds to this request and returns data. SDO is primarily used for data exchanges that require a response, such as device configuration and diagnosis.

6.2 EtherCAT Network Configuration

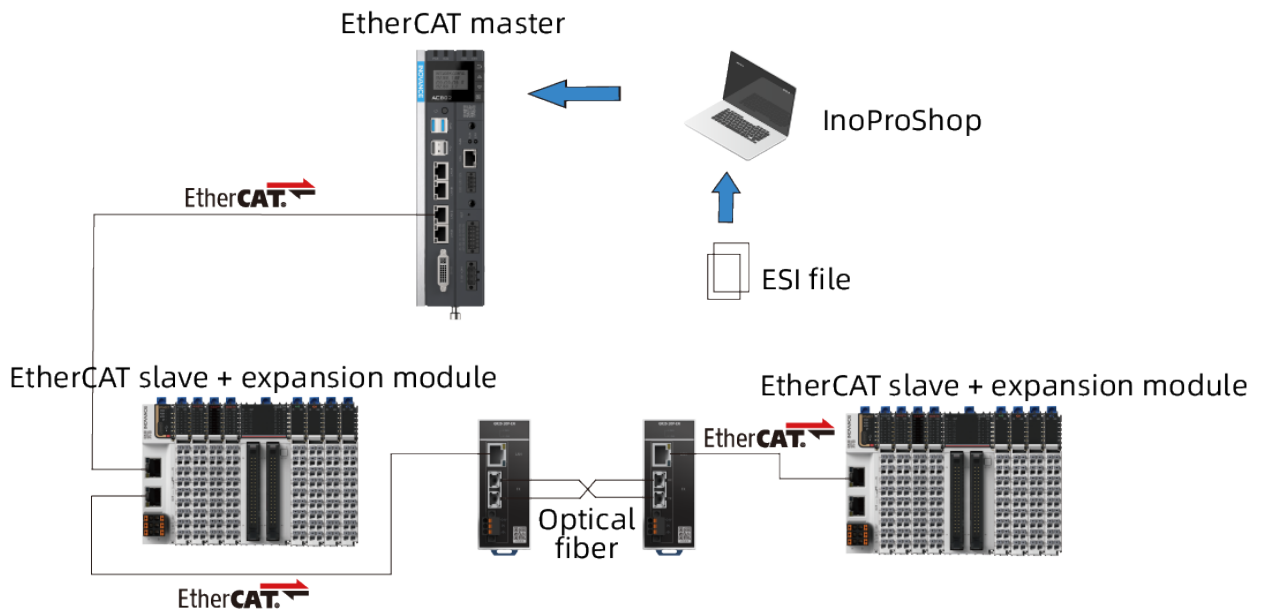
6.2.1 Network Configuration Example

This section introduces typical EtherCAT network configuration examples, including linear, star, and ring topologies. The linear topology supports short-distance direct communication and long-distance communication via optical fiber modules. The following figures illustrate these topologies using the AC802 EtherCAT master as an example.

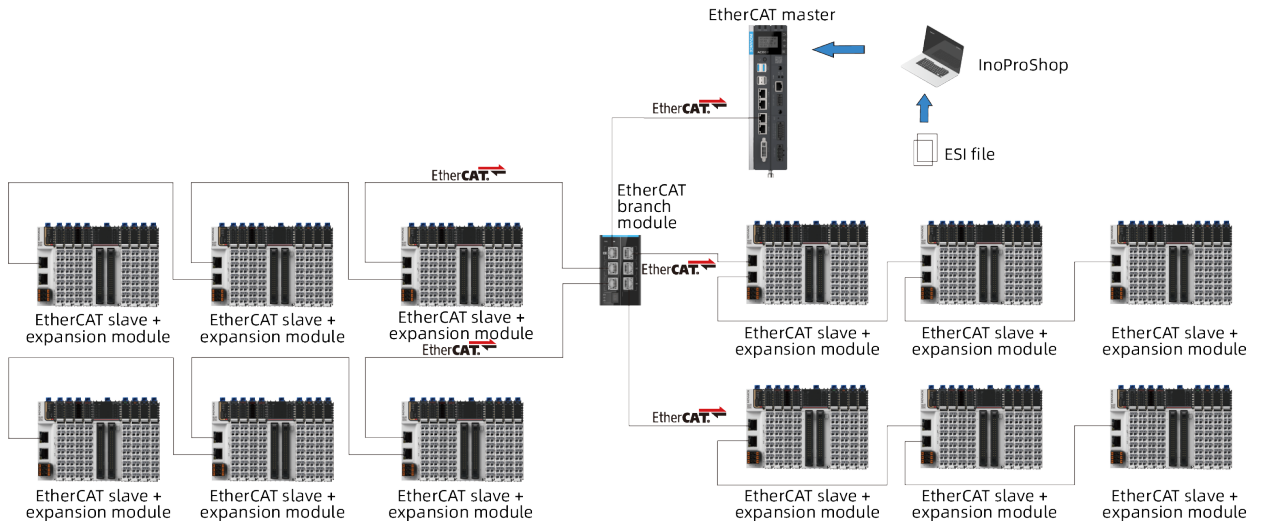
Linear topology (for short-distance direct communication)



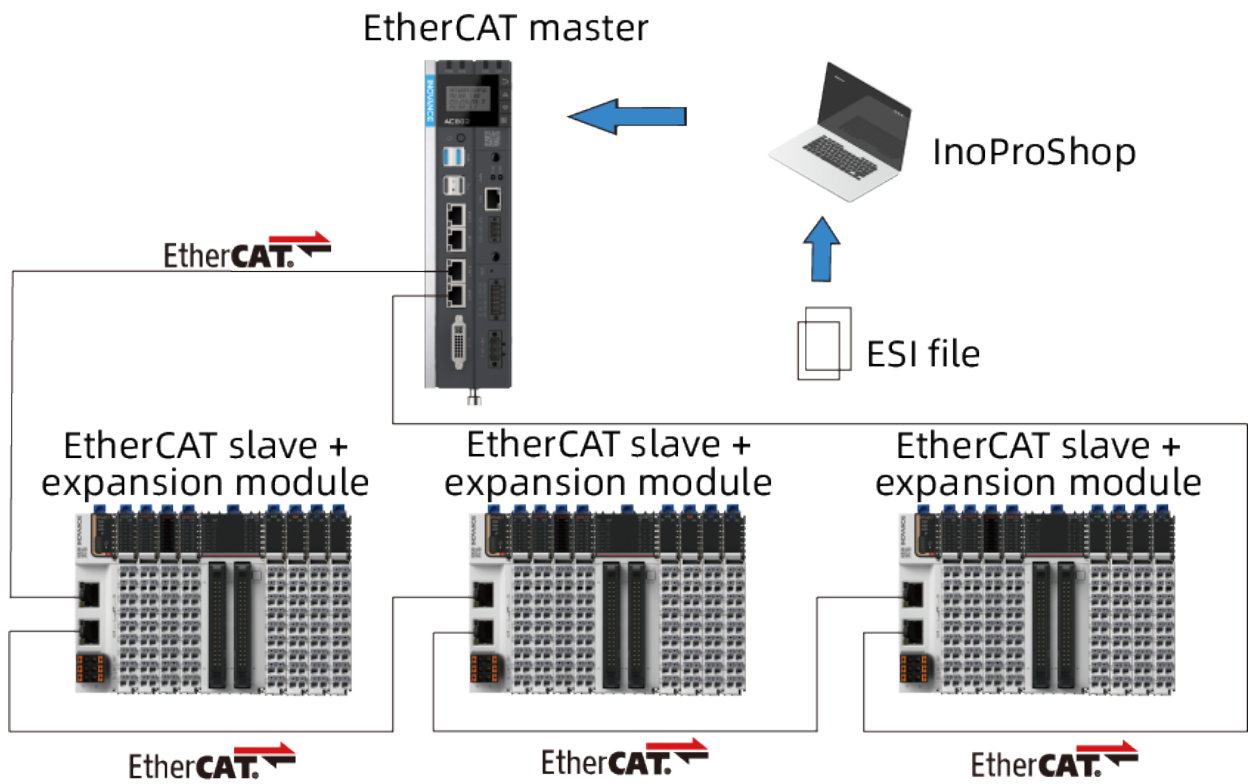
Linear topology (for long-distance communication via optical fiber modules)



Star topology



Ring topology



6.2.2 Introduction to Network Devices

The network devices are briefly introduced in the following table.

Network Device/File Name	Description
EtherCAT master	The manager in the EtherCAT network, responsible for initiating data in the network.
EtherCAT slave	The executor in the EtherCAT network, responsible for real-time data exchange and the implementation of control logic.
Expansion module	A function module that can be mounted on a communication interface module or a master, responsible for executing control commands issued by the master and refreshing I/O.

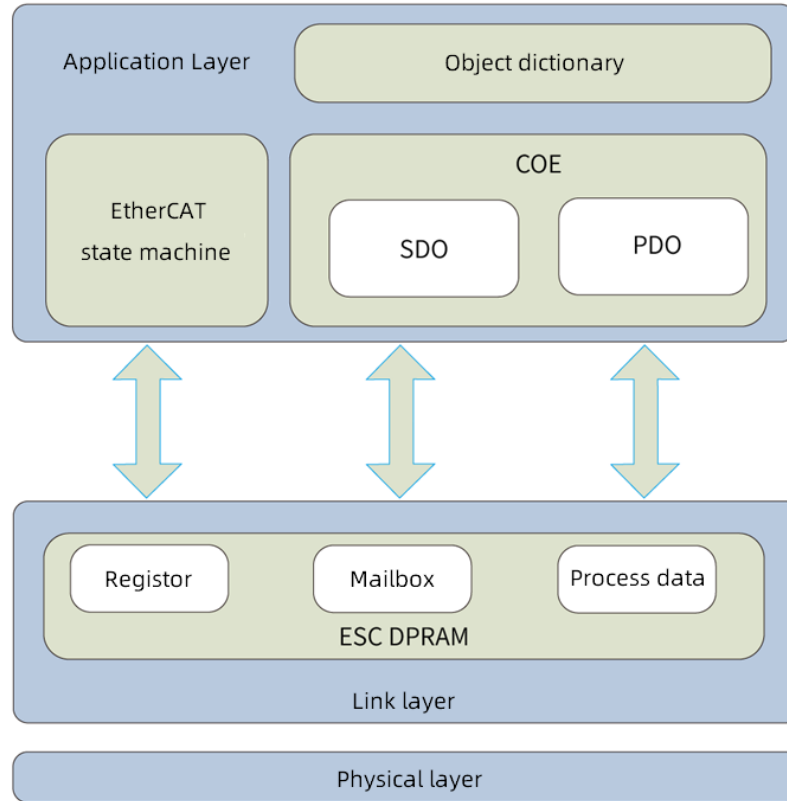
Network Device/File Name	Description
EtherCAT slave information (ESI) file	An XML configuration file that contains the functions and properties provided by the slave. This file is used for the master to initialize the slave.
InoProShop software	An industrial host controller software running on a PC. It is used for configuring the EtherCAT network, masters, and slaves, as well as PLC software programming, status monitoring, and troubleshooting.
EtherCAT communication cable	Used for transmitting EtherCAT data frames. It adopts shielded twisted pair Ethernet cables of Cat5e (100Base-TX) or higher and requires straight-through wiring.
EtherCAT branch module	Used for building star topology networks in multi-axis complex equipment and production line networking (ring topology is not supported).
GR20-10P-EN optical fiber module	Used for conversion between Ethernet and optical fiber, enabling long-distance communication via the EtherCAT bus. This module can be used to extend communication distance when the network cable exceeds 100 m.
Optical fiber	Used for long-distance data transmission between optical fiber modules.

6.3 EtherCAT Communication

6.3.1 CAN Application Protocol Structure Based on EtherCAT (CoE)

The object dictionary in the application layer includes communication parameters, application process data and PDO mapping data. The PDO process data object, which contains real-time data during the operation of the device, periodically performs read and write operations. In the SDO mailbox communication, the communication objects and PDO objects are being accessed and modified aperiodically. The CAN application protocol structure based on EtherCAT (CoE) features the following:

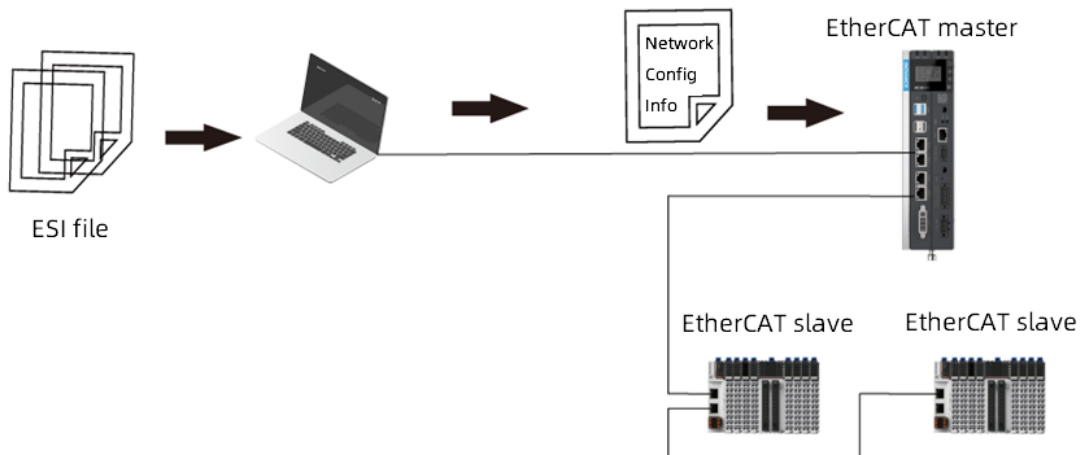
- Inherits the object dictionary concept from CANopen, facilitating unified management of device parameters.
- Supports SDO and PDO communication.
- Commonly used for real-time data exchange and configuration of devices such as sensors and actuators.



6.3.2 EtherCAT Device Description File (ESI File)

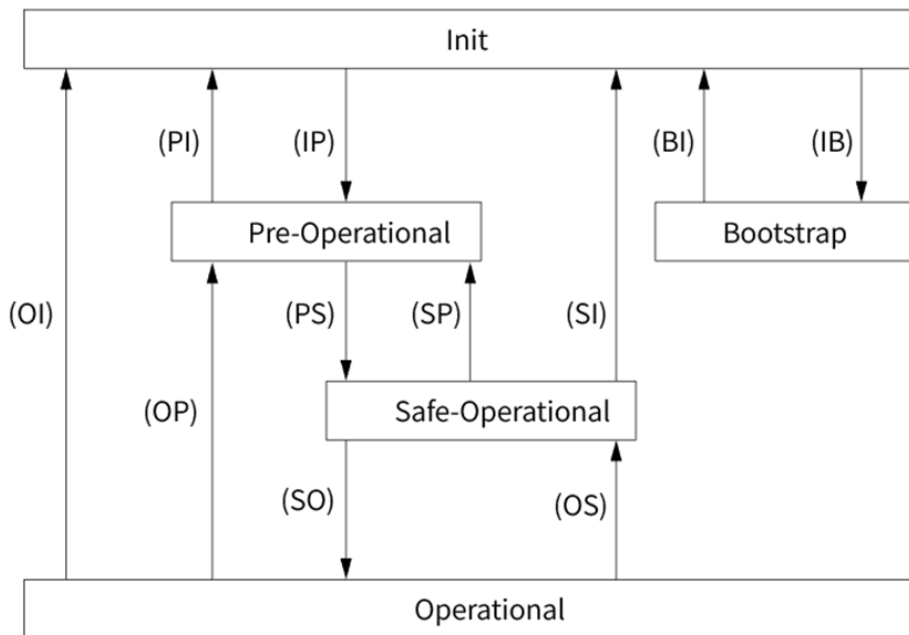
In EtherCAT, the ESI device description file is an XML file used to describe the configuration and functions of a slave. It includes the hardware and software parameters of the slave, as well as the communication rules with other slaves.

This file can be used to configure and identify the slaves in an EtherCAT network, ensuring that all devices in the network can properly exchange data and work in coordination.



6.3.3 EtherCAT Communication State Transition

The following figure shows the state transition diagram of EtherCAT.



The EtherCAT device must support four states and coordinate the state relation between the master and slave applications during initialization and operation.

- Init: Initialization, shortened as I.
- Pre-Operational: Pre-Operational, shortened as P.
- Safe-Operational: Safe-operational, shortened as S.
- Operational: Operational, shortened as O.

Transition from Init state to Operational state must be in the sequence of Init → Pre-Operational → Safe-Operational → Operational. Skipping any step is not allowed. When returning from the Operational state to a lower-level state, skipping steps is allowed. The following table describes the state transition and the initialization process.

State and Transition	Operation
Init (I)	No communication available in the application layer, EtherCAT slave controller (ESC) register can only be read/written by the master.
IP	<ul style="list-style-type: none"> • The master configures the slave addresses. • The master configures the mailboxes. • The master configures the distributed clocks (DCs). • The master requests the Pre-Operational state.
Pre-Operational (P)	Mailbox communications in the application layer (SDO)
PS	<ul style="list-style-type: none"> • The master initializes PDO mapping through mailbox communication. • The master configures the Sync Manager channel used during process data communication. • The master configures the FMMU. • The master requests the Safe-Operational state.
Safe-Operational (S)	

State and Transition	Operation
	Process data communication is available, but the system allows only input and inhibits output (SDO, TPDO).
SO	The master sends valid output data to make a request for the Operational state.
Operational (O)	All inputs and outputs are valid, and mailbox communication (SDO, TPDO, RPDO) is still available.
IB	Enters the Boot state
Boot state (B)	Supports FOE communication, providing file transfer services and firmware updates.
BI	Restarts the device.

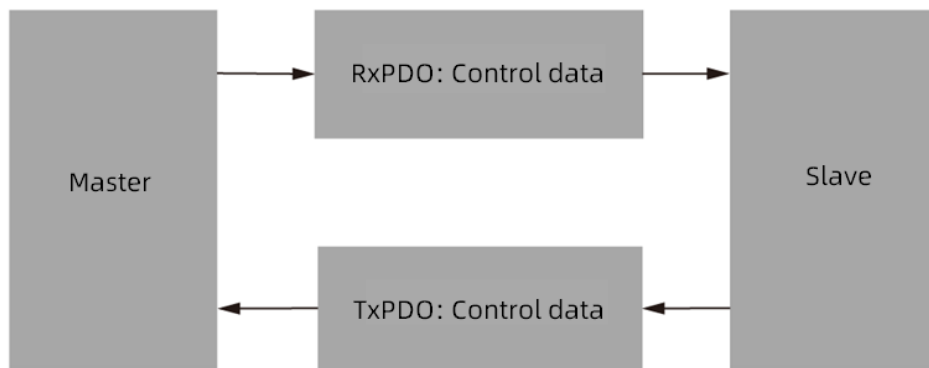
6.3.4 Process Data Object (PDO)

Introduction

Process data objects (PDOs) are used for periodic data exchange between the master and slave.

Input process data objects (TxPDOs): Used by slaves to feed back their status to the master.

Output process data objects (RxPDOs): Used by slaves to receive commands from the master.



PDO Mapping

PDO mapping is used to map the process data object dictionary required for communication. The mapping types are divided into RxPDO mapping (index range: 0x1600-0x17FF) and TxPDO mapping (index range: 0x1A00-0x1BFF).

The object dictionary for PDO mapping contains the indices, subindices, and lengths of the process data objects required for PDO communication. Its basic structure is as follows:

Bit	31	.....	16	15	.....	8	7	.....	0
Descriptor	Index			Subindex			Object length		

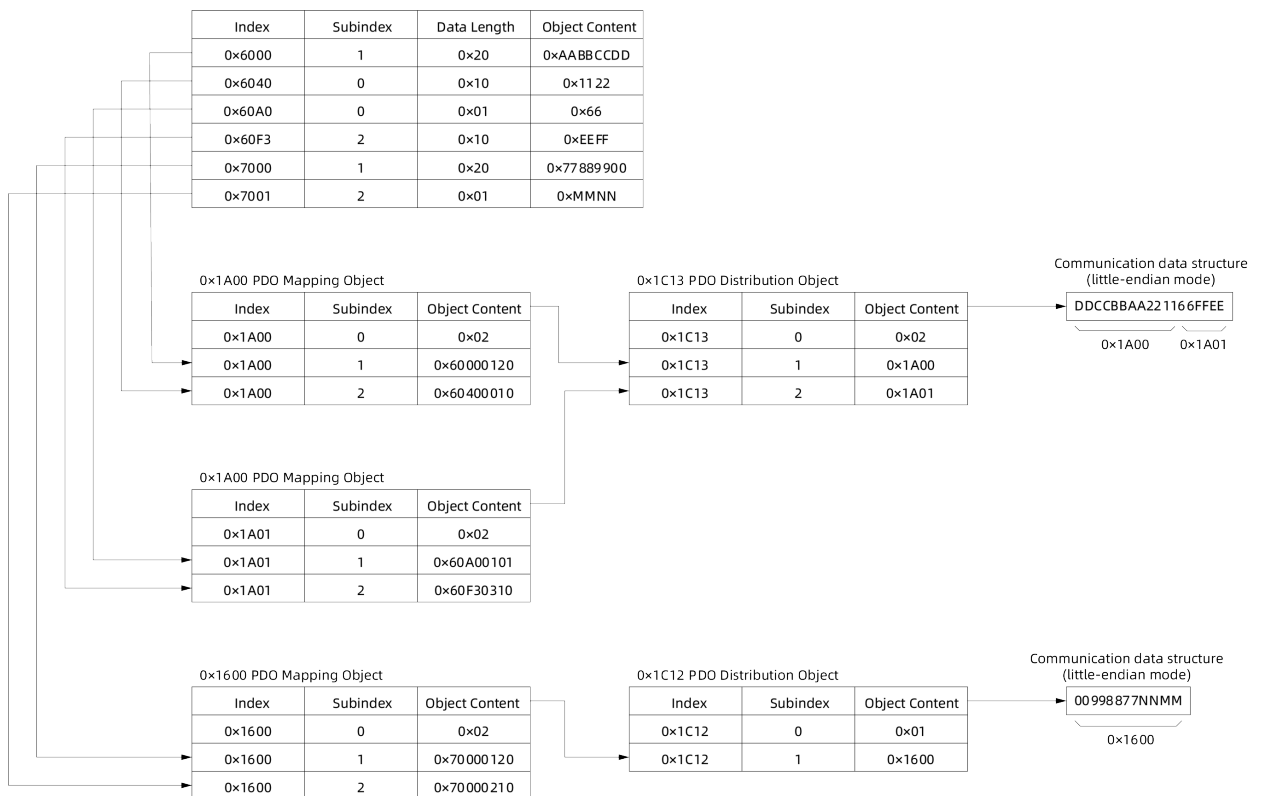
The index and subindex together define the position of an object in the object dictionary. The object length indicates the bit length of the object in hexadecimal, as shown below.

Bit Length	Object length
8 bits	08h
16 bits	10h
32 bits	20h

PDO Assignment

PDO assignment is used to configure the PDO mapping. It consists of two object dictionaries: RxPDO assignment (object dictionary: 0x1C12) and TxPDO assignment (object dictionary: 0x1C13).

The complete process of object dictionary mapping and assignment is shown below.



6.3.5 Service Data Object (SDO)

In an EtherCAT network, a service data object (SDO) is a data structure used for exchanging slave configuration, status information, and application layer data between the EtherCAT master and slaves. SDO can be used to transmit configuration parameters of slaves in an EtherCAT network, such as hardware configuration and operating parameters.

For the abort codes of SDO communication fault, see ["9.6.3 SDO Communication Fault Code"](#).

6.3.6 Communication Between EtherCAT Master and Slave

In an EtherCAT network, time synchronization between the master and slaves is a critical issue. EtherCAT provides three synchronization modes.

Free Run mode: In this mode, the control cycle of the slave station is generated by the local timer. Since the start times of each slave station in the EtherCAT network are different, each slave station refreshes its I/O

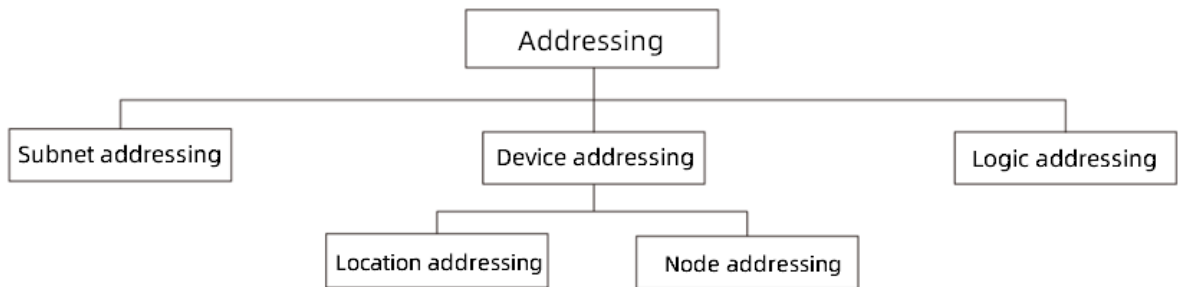
according to its own operating cycle, which is considered asynchronous operation.

SM (Sync Manager) mode: In this mode, data is synchronized through SM channels. When the data frame from the master station reaches the slave station, it triggers a Sync Manager event. Upon receiving this signal, the slave station immediately enters the interrupt service routine to execute data exchange and I/O refresh. Due to data frames arriving at each slave station at different times, there is a time difference in when each slave station receives the data. The more slave stations there are, and the more complex the system configuration, the poorer the synchronization effect will be.

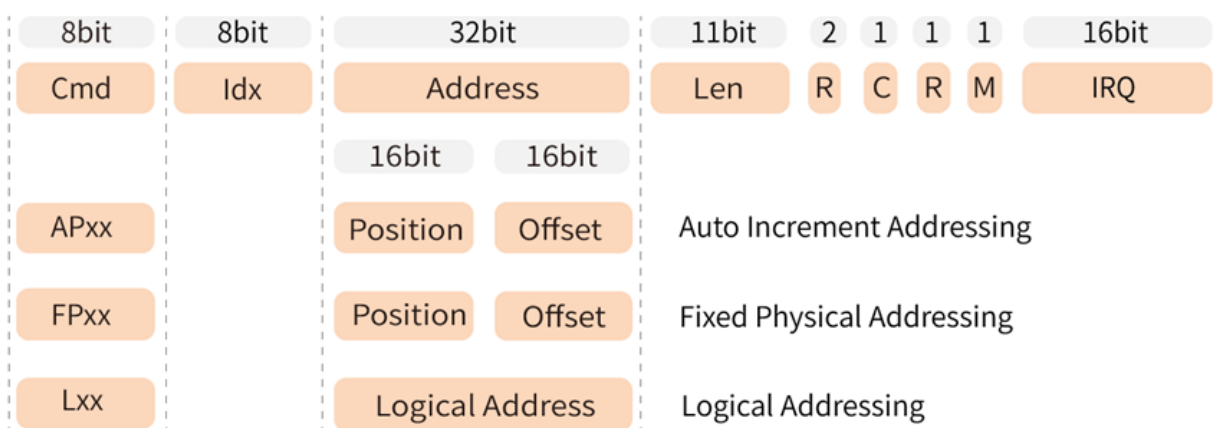
DC (Distributed Clock) synchronization mode: In this mode, the master periodically reads the local clock of the DC synchronization-capable slave stations (usually the first DC synchronization-capable slave station in the network), then uses this clock as the system clock and periodically sends it to other slaves. Upon receiving the system clock, the other slaves compare it with their own clocks and adjust their clocks dynamically based on the time deviation. The slaves generate precise synchronization signals and trigger interrupts through SYNC0, thereby controlling the synchronized execution of tasks across devices.

6.3.7 EtherCAT Slave Addressing

EtherCAT slave devices support different addressing modes. A 32-bit address in the frame header of the EtherCAT data frame is used for either physical node addressing or logical addressing.



An EtherCAT segment is equivalent to an Ethernet device. EtherCAT data is transmitted via Ethernet frames. The master station addresses the EtherCAT segment through the MAC destination address in the Ethernet frame header. This process is known as segment addressing.



During device addressing, the 32-bit address within the EtherCAT sub-message is divided into a 16-bit slave device address and a 16-bit address for the internal physical memory space of the slave device (slave memory offset address). The 16-bit slave device address can address up to 65,535 slave devices, with each device having up to 64K bytes of internal storage. During device addressing, each sub-message addresses only one unique slave device.

During logical addressing, the 32-bit address within the sub-telegram is an entity representing a logical address. The device data exchange area addresses across the entire EtherCAT segment are mapped to logical addresses

through FMMU. During data communication, the master station does not distinguish between specific device addresses but treats the entire EtherCAT segment as a single data storage space for access. This method does not require complex memory mapping, allowing direct data transfer within the segment, significantly improving data transmission speed. The logical addressing method is particularly suitable for periodic data exchange.

Positional addressing determines the address of a slave station based on its connection position within the network segment. During the network initialization phase, the master station sends a message with a negative address. As the message passes through each slave station, its position address is incremented by 1. When the address reaches 0, it indicates that the message is addressed to the particular station. This addressing method is also known as auto increment addressing. The master station uses positional addressing to set the station addresses of the slave stations, for example, 1001, 1002, etc. Subsequently, the master station can use station addresses that are independent of the physical location to address the slave stations.

When addressing a node, the address of the slave station is independent of its connection position. The master station addresses a specific device through the station address or station address alias, and then accesses the data based on the offset address within the device. Node addressing is also known as setup addressing.

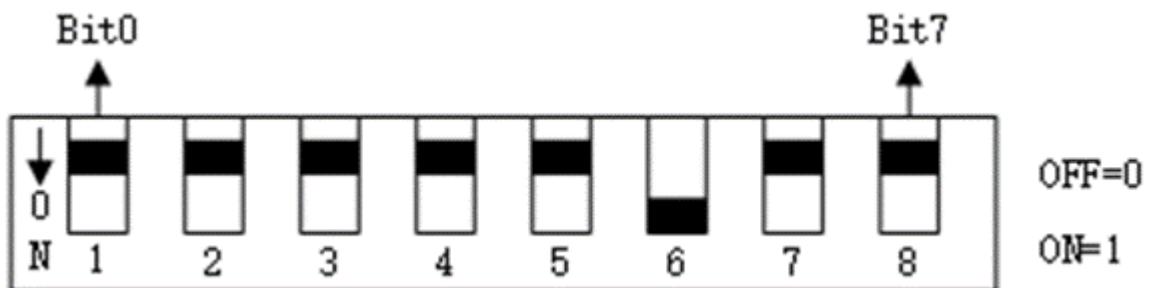
The EtherCAT communication interface module supports the station address alias function. The station address is automatically set by the master station to the slave station through positional addressing during network startup. The station address alias is configured and enabled on the host computer, with priority over the station address. The master station can choose which address to use for node addressing, defaulting to the station address.

The GL20-RTU-ECT32-INT can set the station address alias through the following two methods, with the DIP switch method having the highest priority.

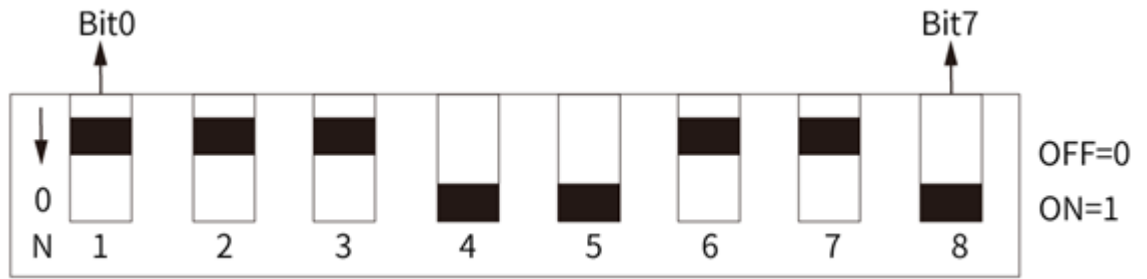
- The station address alias can be set via the host computer.
- The station address alias can be set using the DIP switches on the communication interface module. The alias can be set in the range of 0 to 255.

Each DIP switch corresponds to a bit in a binary number, and moving the switch sets the value of the bit.

- Example 1: Set the station address alias to 64, which is the binary number 2#00100000, which means bit 5 is 1, and all other bits are 0.



- Example 2: Set the station address alias to 152, the binary number is 2#10011000, which means bit 3, bit 4, and bit 7 are 1, and all other bits are 0.



7 Configuration and Commissioning

7.1 Compatibility with Inovance Small-Sized PLC

This section takes the configuration of Easy521 PLC, GL20-RTU-ECT32-INT communication interface module, and two expansion modules (GL20-1600END and GL20-0016ETN) as an example. GL20-RTU-ECT32-INT is displayed as "GL20-RTU-ECT32" in the programming software.

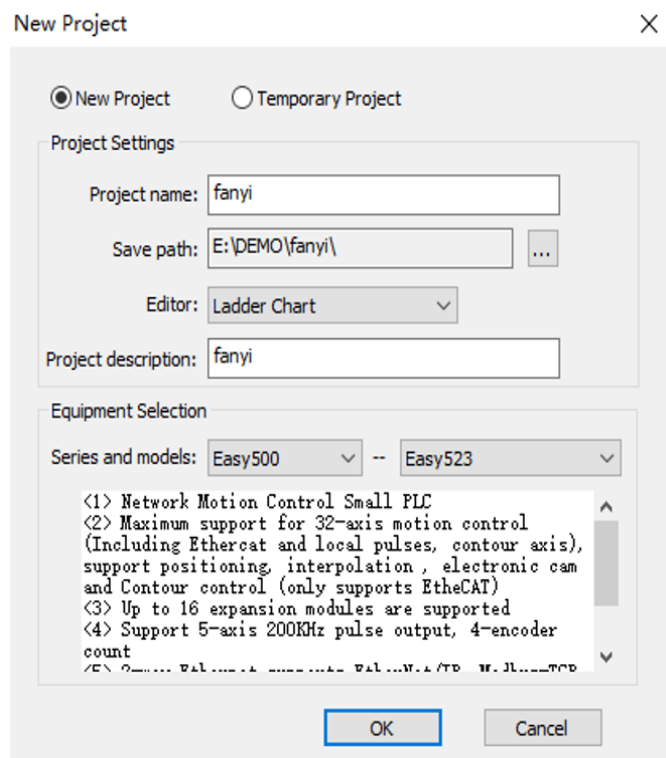
7.1.1 Configuration

Prerequisites

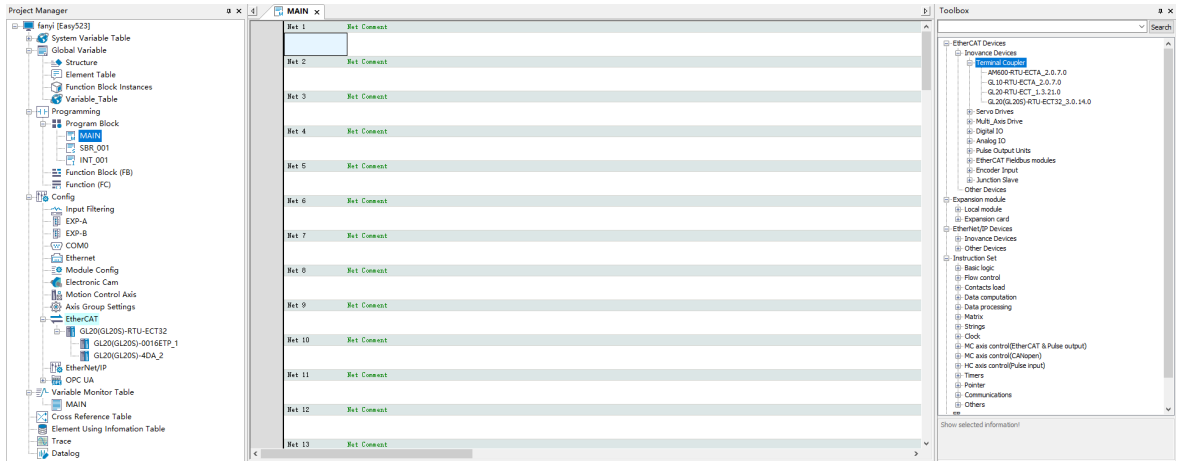
- The installation and wiring of the required hardware are completed.
- All products are powered on and running.
- The PC equipped with AutoShop programming software is connected to the Easy521 via a network cable.
- The compatible expansion modules for this product, and the version matching information between product firmware and the AutoShop software are fully understood. For details, see "[Appendix 5: Version Information](#)". For module firmware versions, see "[How to Check Module Firmware Version](#)". For product firmware upgrade, see "[10.3 Firmware Upgrade](#)".

Procedure

1. Create a project.
 - a. Double-click the AutoShop shortcut icon on the PC desktop to open the AutoShop programming software.
 - b. Select "File" > "New Project" in the menu bar to open the "New Project" dialog box.

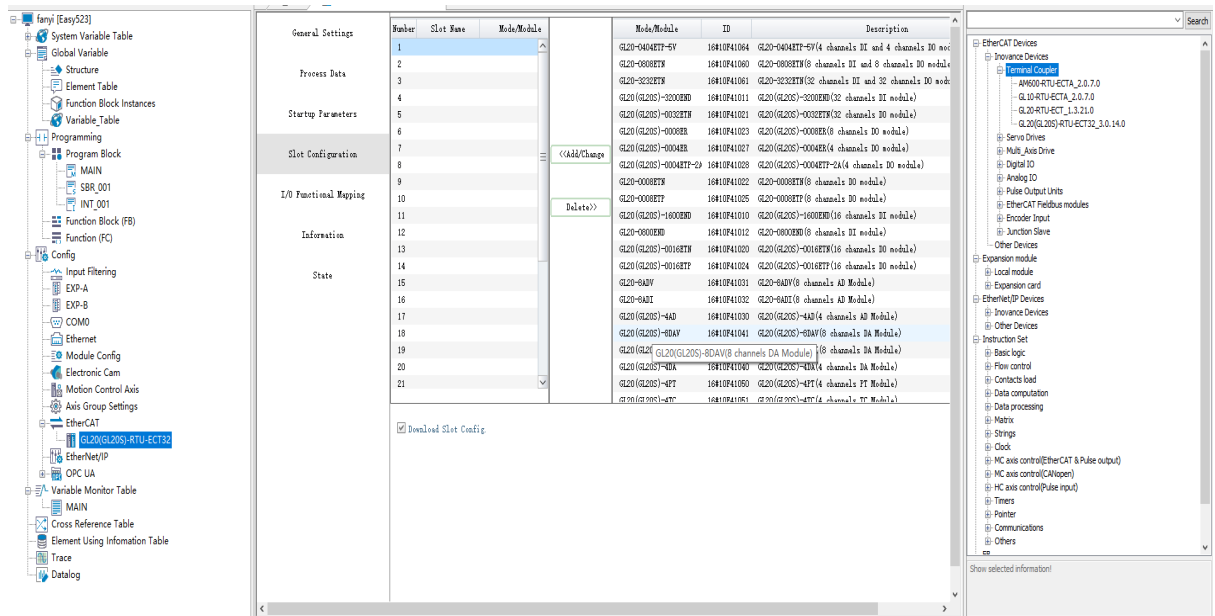


- c. Set the name, save path, programming language, and description of the project. Select "Easy500 - Easy521" for "Series and models", and click "OK".



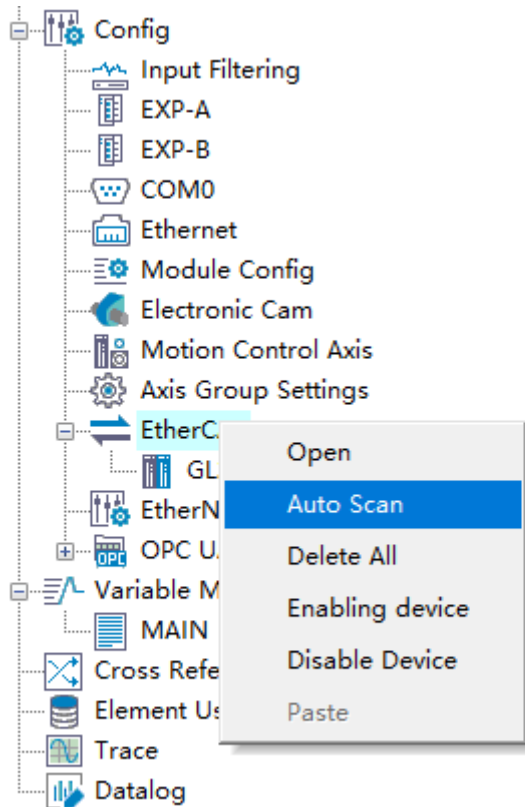
2. Add the GL20-RTU-ECT32-INT module.

In the "Toolbox" on the right, select "EtherCAT Devices" > "Inovance Devices" > "Terminal Coupler", and double-click "GL20-RTU-ECT32" to add a "GL20-RTU-ECT32" slave node under the "EtherCAT" node.



3. Add the GL20 series expansion modules.

- Method 1: Auto scan
 - a. In the "Project Manager" navigation tree on the left, right-click "EtherCAT" and select "Auto Scan".



b. In the opened dialog box, click "Start Scan" to display the actually connected GL20 series expansion modules.

Auto Scan

NO.	Current slave list	NO.	Scan slave list	Automatic inc...	Alias	Set slave alias	Info
1	GL20(GL20S)-RTU-ECT32 GL20(GL20S)-0016ETP_1 GL20(GL20S)-4DA_2	1	GL20(GL20S)-RTU-ECT32_3... GL20(GL20S)-0016ETP GL20(GL20S)-4DA	0	1		

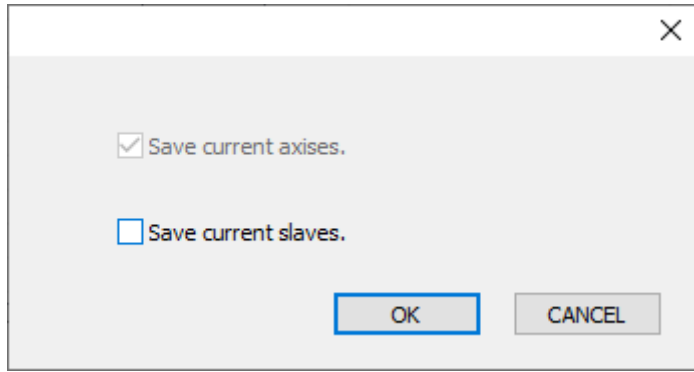
Start scanning
Parsing scanned data
Scan succeeded!

Set Alias
Start Scan
Update Config
Exit

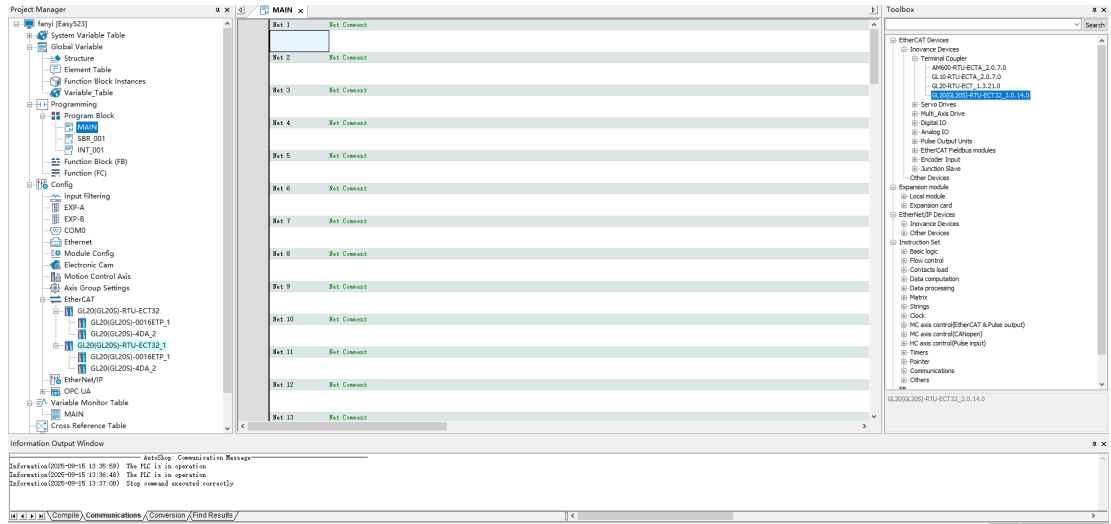
NOTE

AutoShop V4.10.1.0 and later support module power consumption detection. If the total power consumption of the scanned modules exceeds the maximum power, the configuration can still be updated normally, but an alarm will be displayed during compilation.

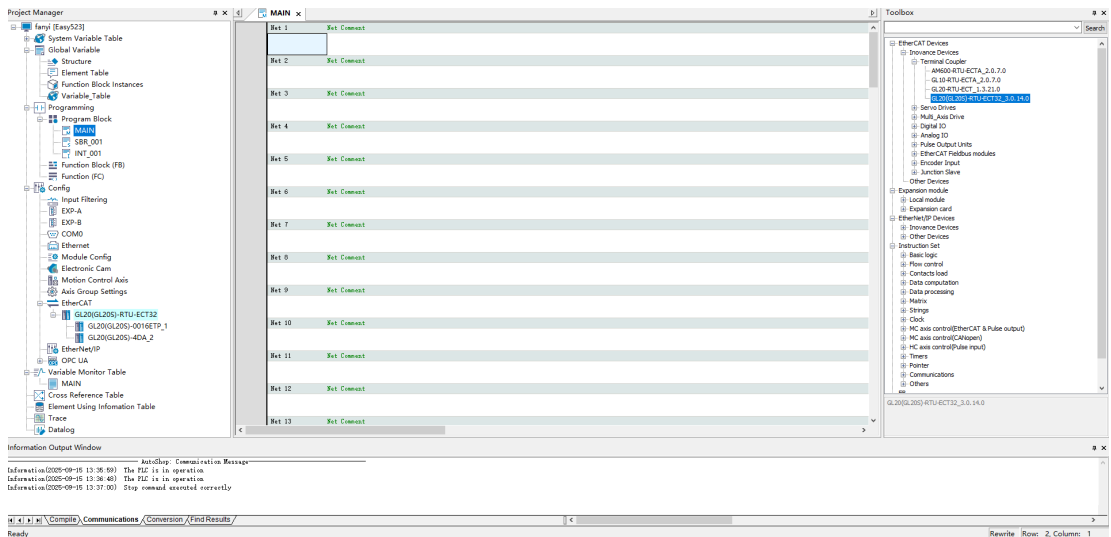
c. Click "Update Config" to update the current configuration. In the opened dialog box, determine whether to save the existing slaves, as shown below.



- If users choose to save the existing slaves, the scanned slaves will be added to the existing slaves, allowing for multiple scans to add multiple slaves.



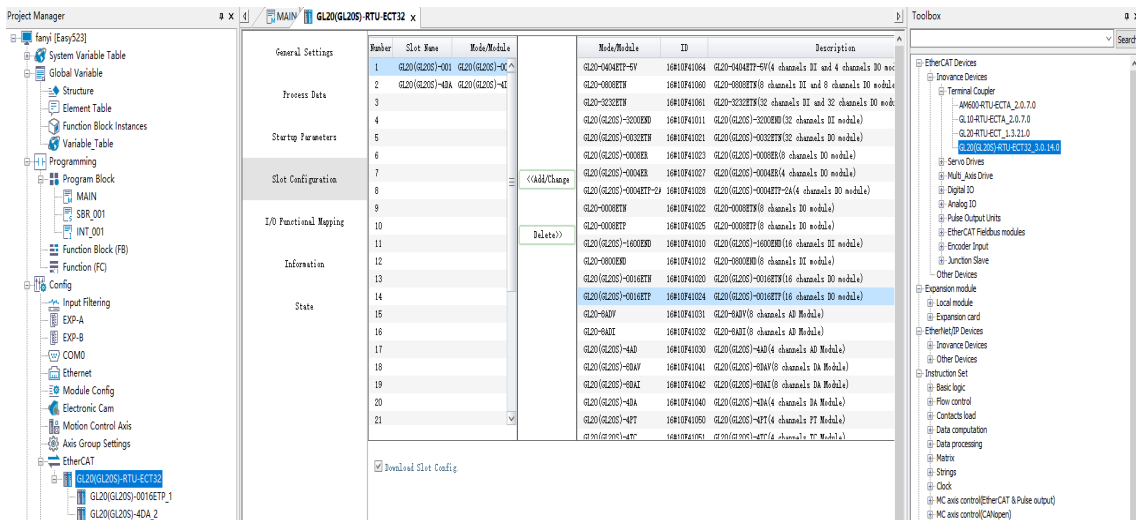
- If users choose not to save the existing slaves, the existing slaves will be deleted and the scanned slaves will then be added. The result of manual addition and scanned addition is consistent.



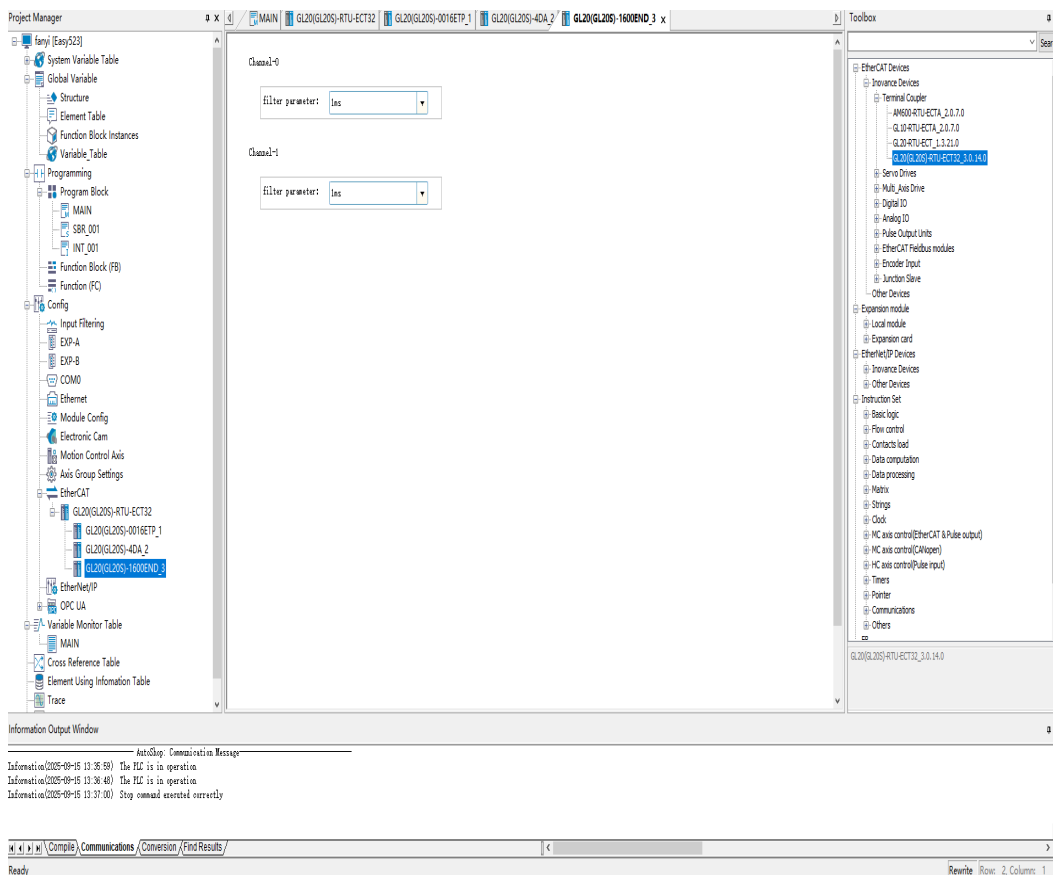
- Method 2: Manual addition
 - a. In the "Project Manager" navigation tree on the left, double-click "GL20-RTU-ECT32" and click "Slot Configuration".
 - b. Select the GL20-1600END and GL20-0016ETN modules on the right of the interface, and click "Add/Change".

NOTE

- AutoShop V4.10.1.0 and later support module power consumption detection. When the total power consumption of the added modules exceeds the maximum power, a pop-up alarm will be displayed.
- To delete the added module, select the module on the left of the interface and click "Delete".



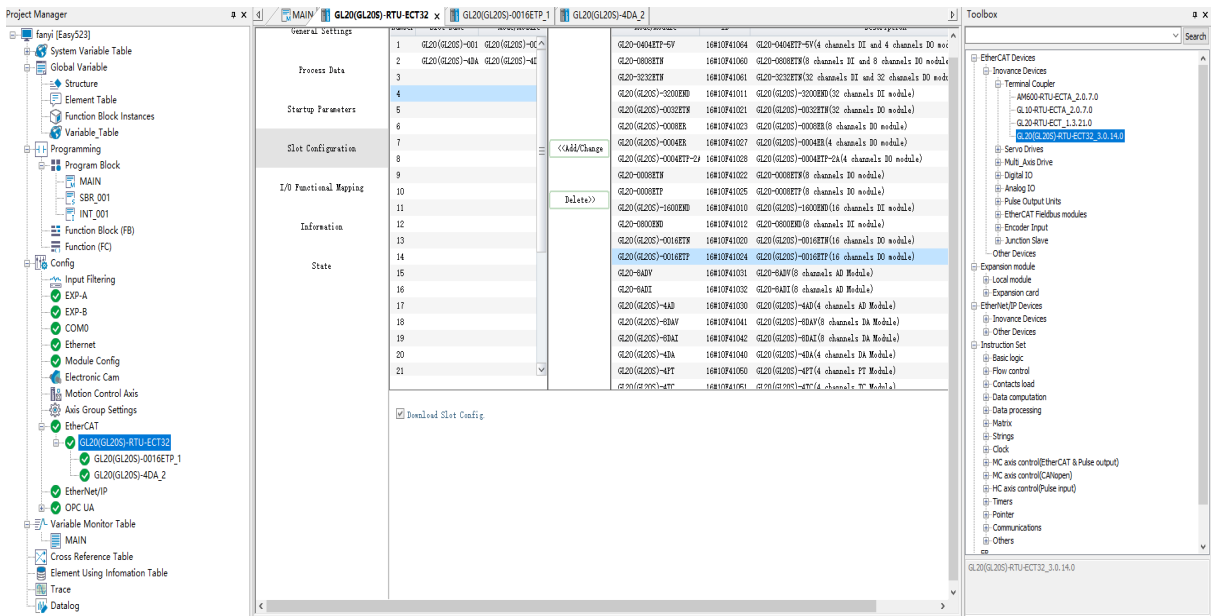
4. In the "Project Manager" navigation tree on the left, double-click "GL20-RTU-ECT32" under the "EtherCAT" directory to open the configuration interface. Configure the module parameters as described in the table below.



Module	Parameter Name	Description	Configuration
GL20-1600 END	Filter parameter	Input filter time	Select from the drop-down options:

Module	Parameter Name	Description	Configuration
			No Filter, 0.25ms, 0.5ms, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 64ms, 128ms Default: 1ms
GL20-0016 ETN	Out Status after stop or disconnection	<ul style="list-style-type: none"> Output last value /Output preset value 	Check "Output last value" or "Output preset value".
	ON/OFF	Output preset value: <ul style="list-style-type: none"> ON: Outputs 1 OFF: Outputs 0 	Check "ON" or "OFF".

- Click the download button on the toolbar to download the program to the PLC. After the download is complete, click the run button to start the program.
- Click the monitor button on the toolbar. In the opened interface, if the EtherCAT nodes and GL20-RTU-ECT32 nodes are displayed with green icons, and the PLC shows no faults, it indicates that the GL20-RTU-ECT32-INT communication interface module is operating normally.

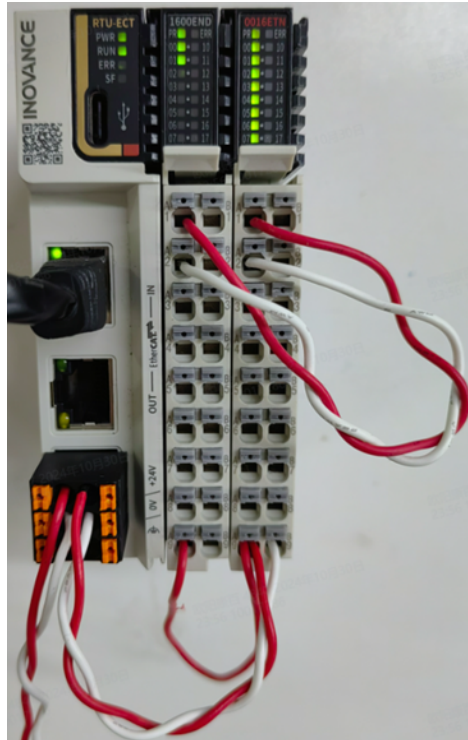


7.1.2 Commissioning

After successfully configuring and downloading this product and the expansion modules, a simple commissioning is required to ensure normal functioning.

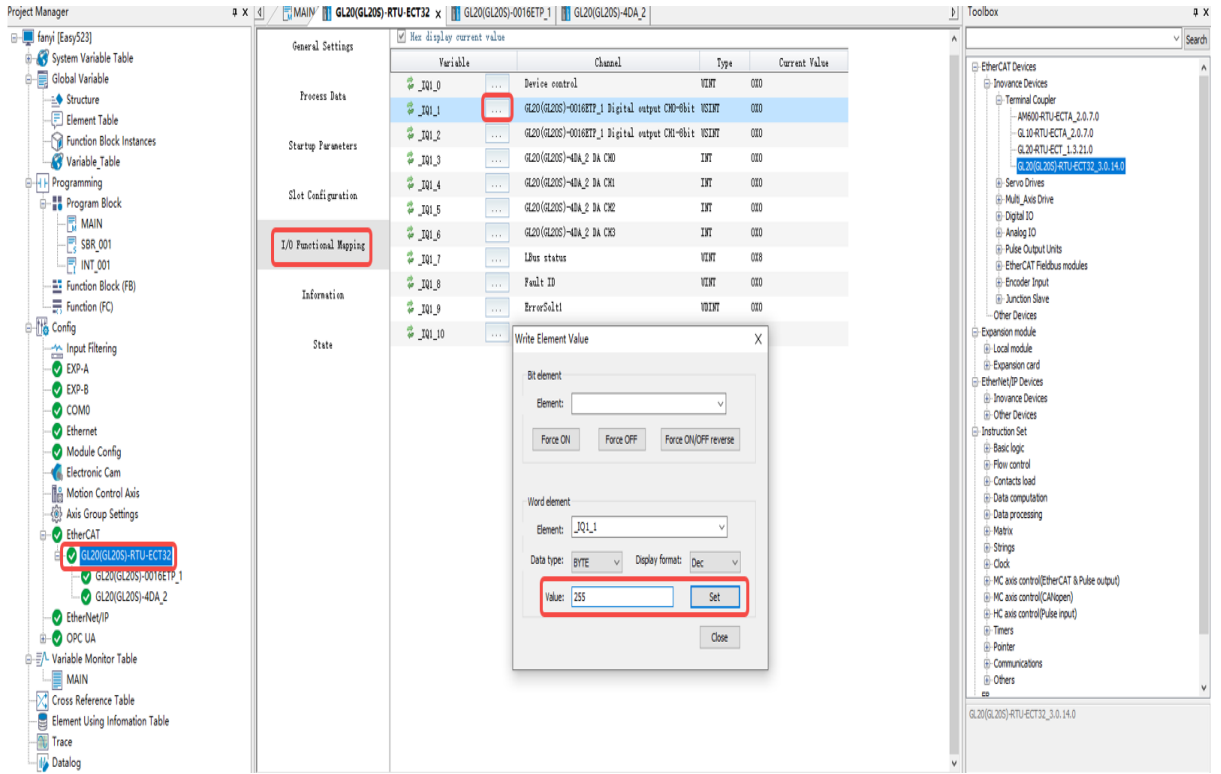
Prerequisites

Connect the output terminals DO0 and DO1 of the GL20-0016ETN module to the input terminals DI0 and DI1 of the GL20-1600END module, respectively.



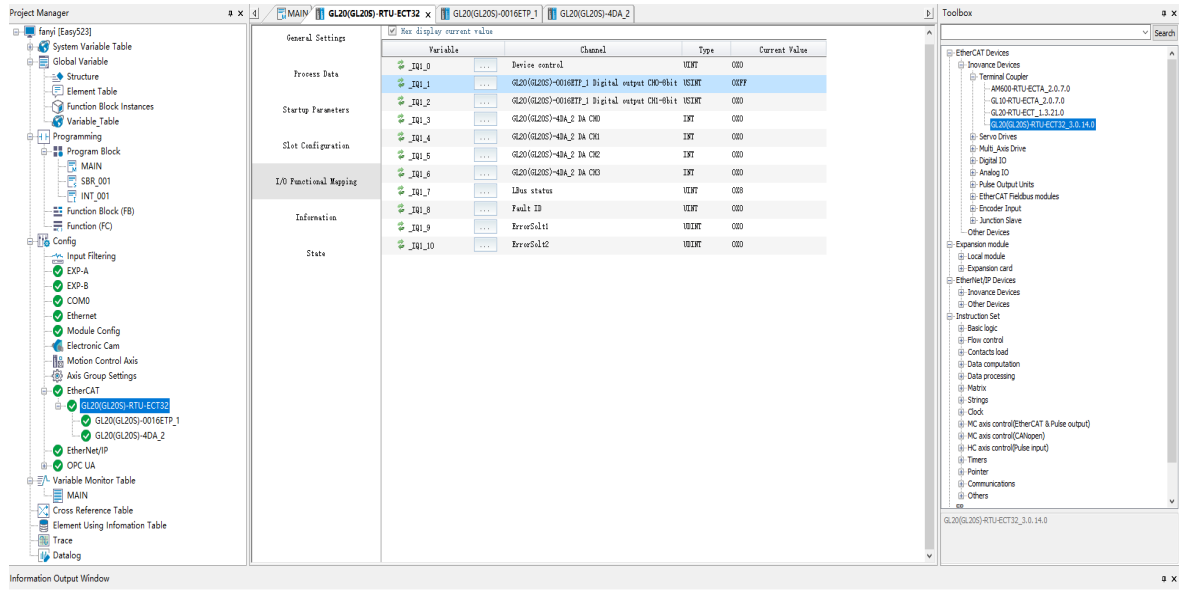
Procedure

1. Determine the status of the communication interface module and expansion modules through the signal indicators. For details on the signal indicators of the communication interface module, see "[Troubleshooting by Indicators](#)". For details on the signal indicators of the expansion modules, see the user guide of each module.
 - If the signal indicator status is normal, proceed to step 2.
 - If the signal indicator status is abnormal, determine the cause according to the signal indicator status and resolve the fault.
 - If the fault is resolved, proceed to step 2.
 - If the fault remains unresolved, use the programming software for troubleshooting. For details, see "[9.2.2.1 Compatibility with Inovance Small-Sized PLC](#)".
2. In the navigation tree of "Project Manager" on the left, double-click "GL20-RTU-ECT32" to open the configuration window. Click "I/O Mapping", and then double-click the row of "GL20-0016ETN_2 Digital output CH0-8bit". In the pop-up dialog box, enter "255" in the value field of "Word element", click "Set," and then click "Close".

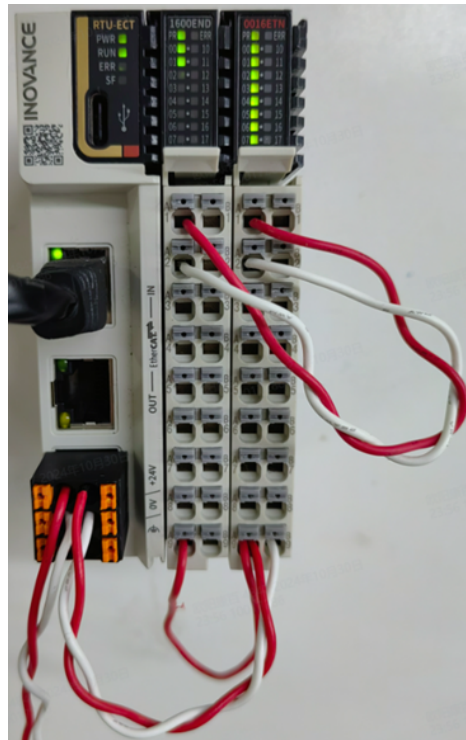


3. Check whether the output and input channels of the GL20-0016ETN and GL20-1600END modules function normally.

- In the "I/O Mapping" interface, if the current value of "GL20-1600END_1 Digital input CH0-8bit" is "0X3", it indicates that the DI0 and DI1 input channels of this module are functioning normally.



- If the signal indicators (00-07) of the GL20-0016ETN module and the signal indicators (00-01) of the GL20-1600END module are solid on, it indicates that the input and output channels of both modules are functioning normally.



7.2 Compatibility with Inovance Medium-Sized PLC

7.2.1 Configuration

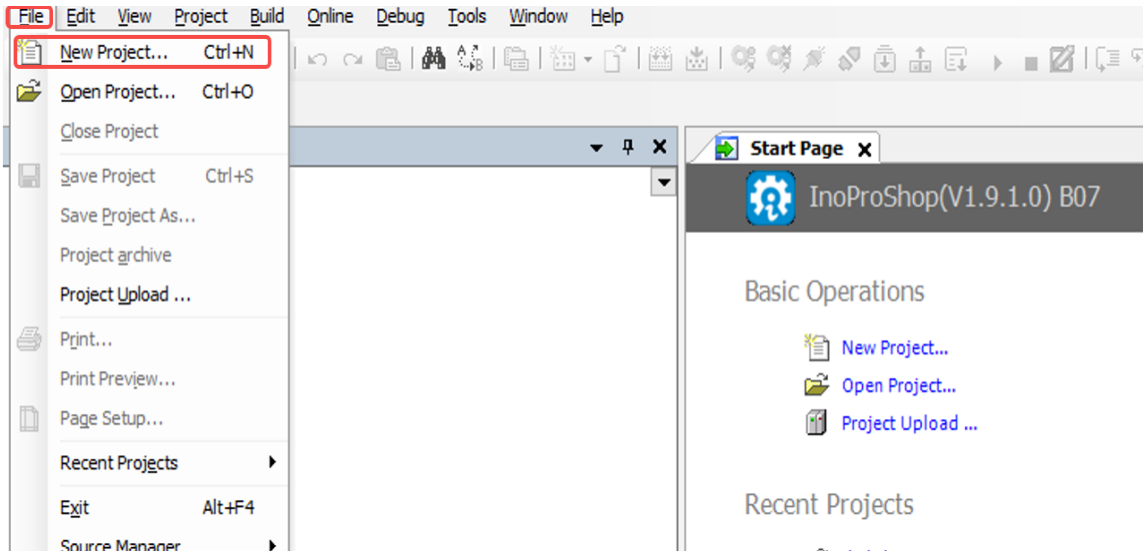
This section takes the configuration of AC802 PLC, GL20-RTU-ECT32-INT communication interface module, and two expansion modules (GL20-1600END and GL20-0016ETN) as an example. GL20-RTU-ECT32-INT is displayed as "GL20-RTU-ECT32" in the programming software.

Prerequisites

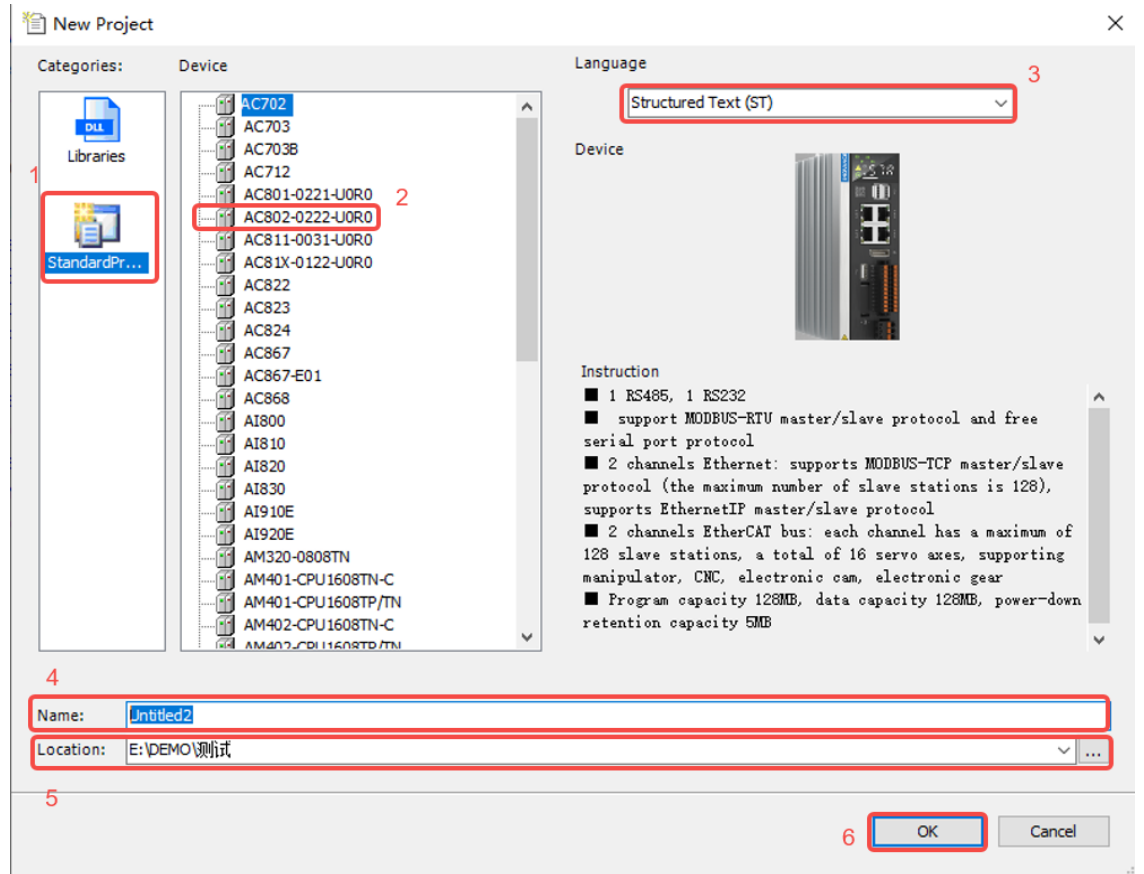
- The installation and wiring of the required hardware are completed.
- All products are powered on and running.
- The PC equipped with InoProShop programming software is connected to the AC802 via a network cable.
- The IP address of the local PC and that of the AC802 are set to the same subnet.
- It is necessary to understand the compatible expansion modules of this product and the compatibility between the firmware version of this product and the InoProShop programming software version. For details, see "[Appendix 5: Version Information](#)". To upgrade the firmware of this product, see "[10.3 Firmware Upgrade](#)".

Procedure

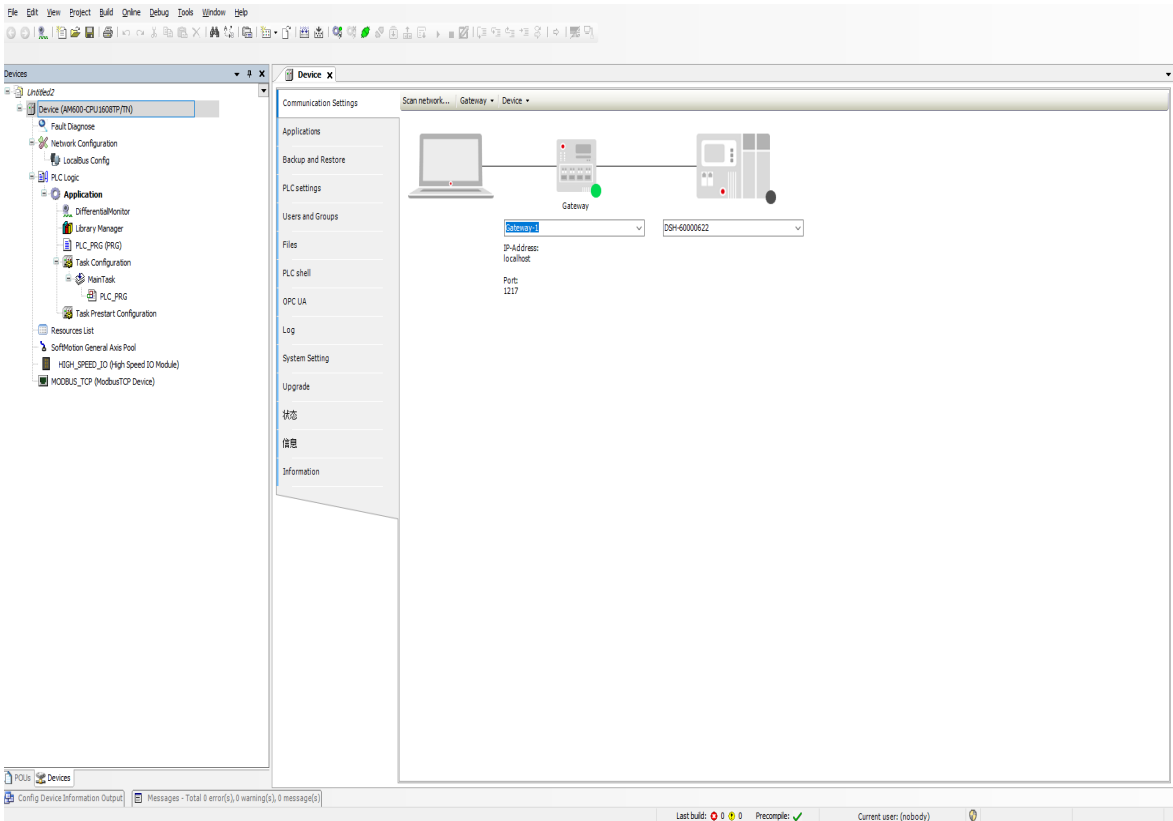
1. Create a project.
 - a. Double-click the InoProShop shortcut icon on the PC desktop to open the InoProShop programming software.
 - b. On the start page, click "New Project", or select "File > New Project" from the menu bar, as shown below.



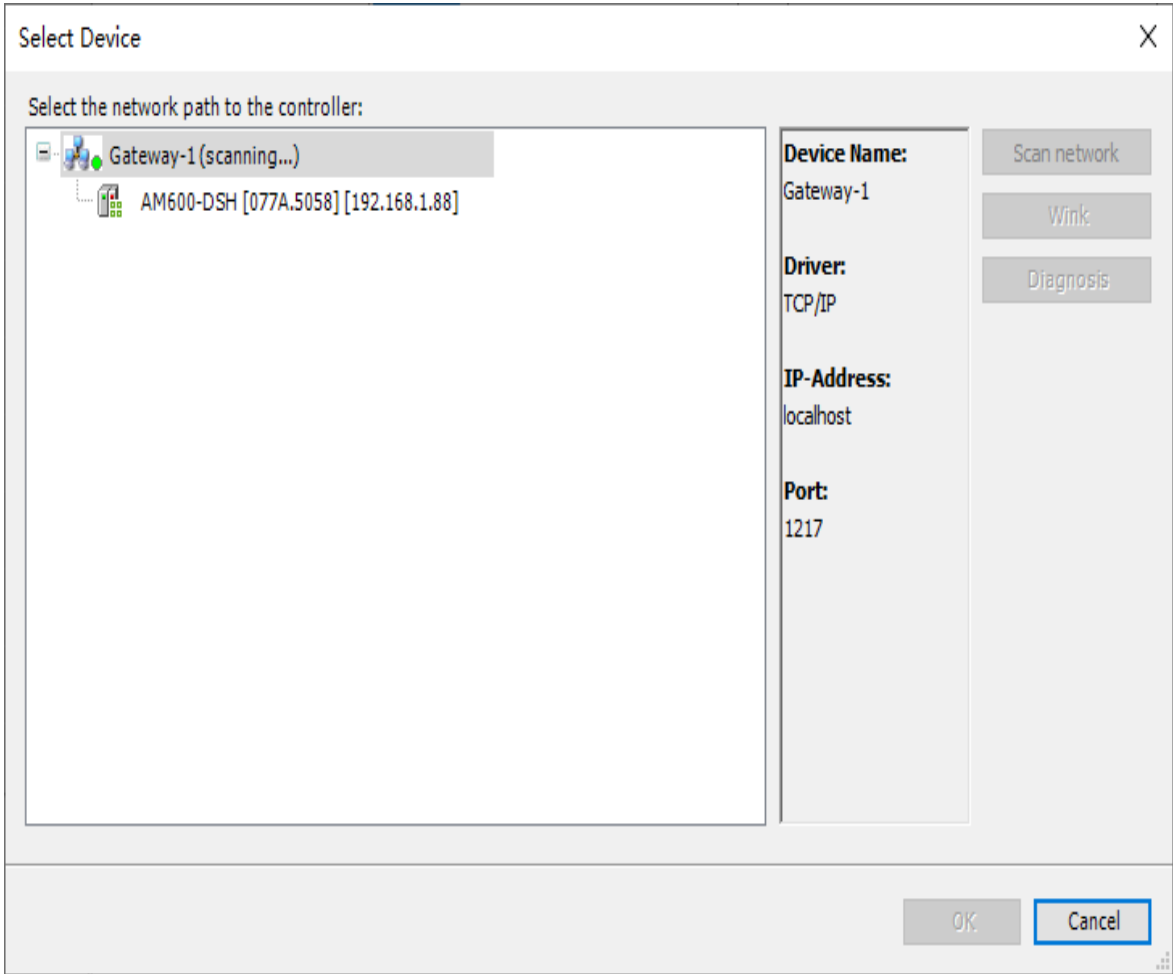
- c. In the opened dialog box, select "Standard Project" under "Categories" (1), and "AC802-0222-U0R0" under "Device" (2). Select the "Language" based on actual needs (3), enter the "Name" (4) and "Location" (5), and click "OK" (6).



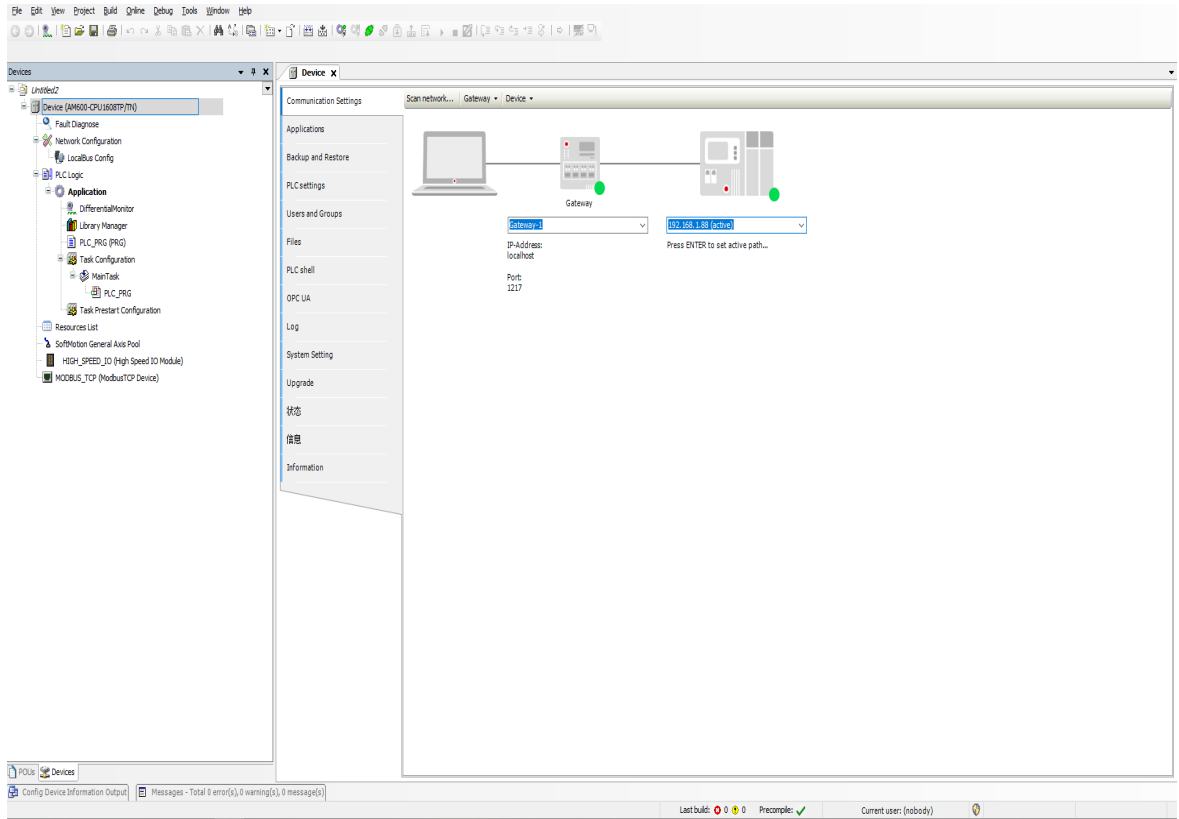
2. Scan and connect to the AC802 host.
- a. In the "Devices" navigation tree on the left, double-click "Device". In the opened interface, click "Scan network...", as shown below.



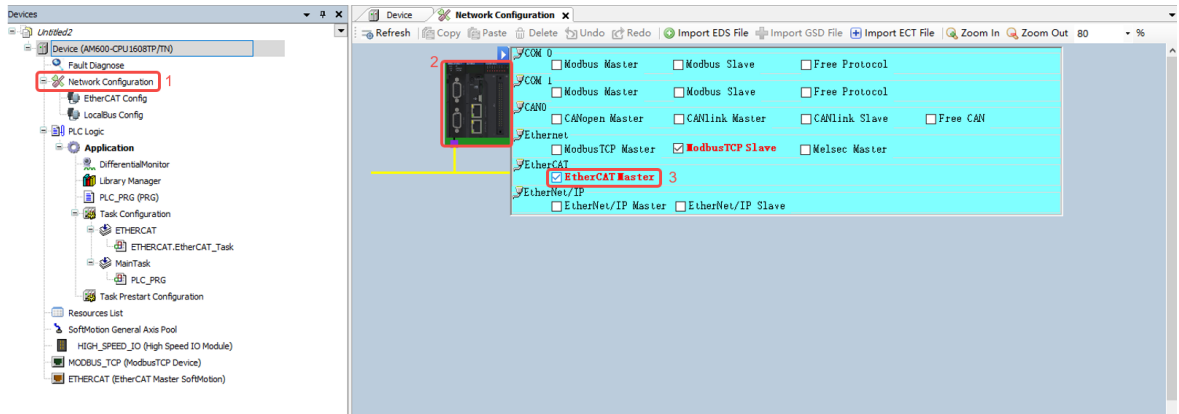
b. In the opened dialog box, click "Scan network", select the controller to connect, and click "OK".



When the icon in the lower right corner of the connected controller turns green, the connection is successful.

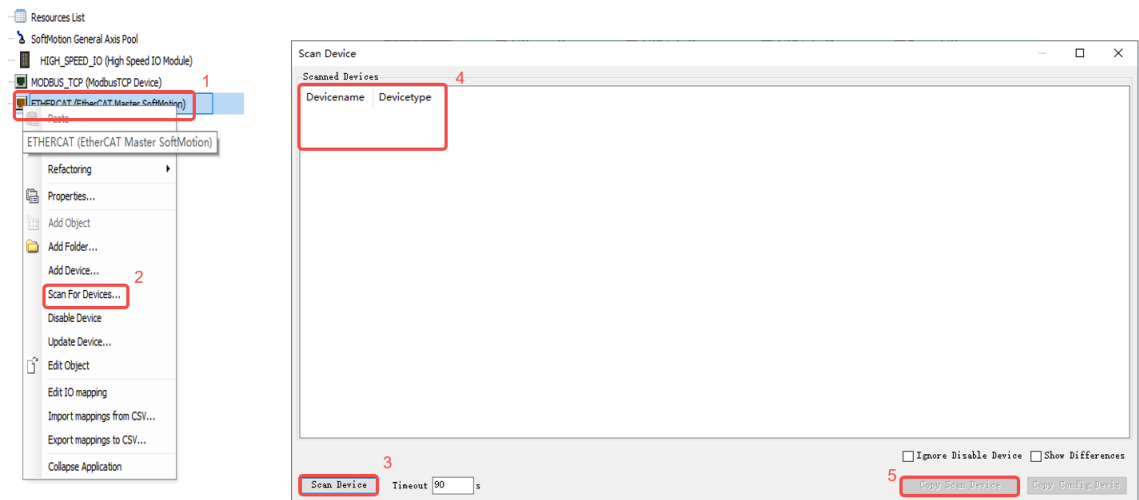


3. Enable the AC802 PLC as the EtherCAT master and add the GL20-RTU-ECT32-INT module.
 - a. In the "Devices" navigation tree on the left, double-click "Network Configuration". In the opened interface, click the AC802 image and check the "EtherCAT Master" corresponding to the actual physical network port of the host connected to the GL20-RTU-ECT32-INT communication interface module to enable the EtherCAT master.

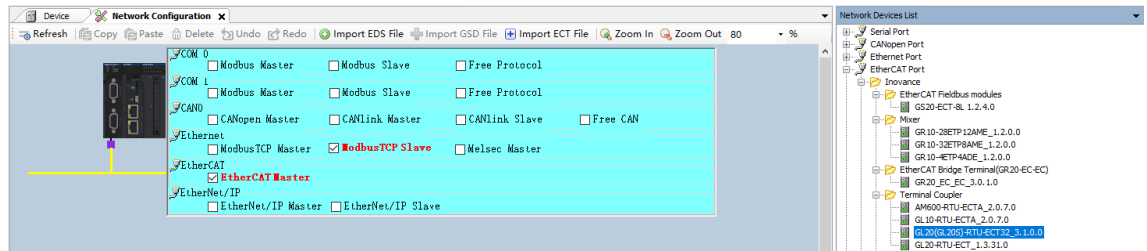


b. Add the GL20-RTU-ECT32-INT communication interface module.

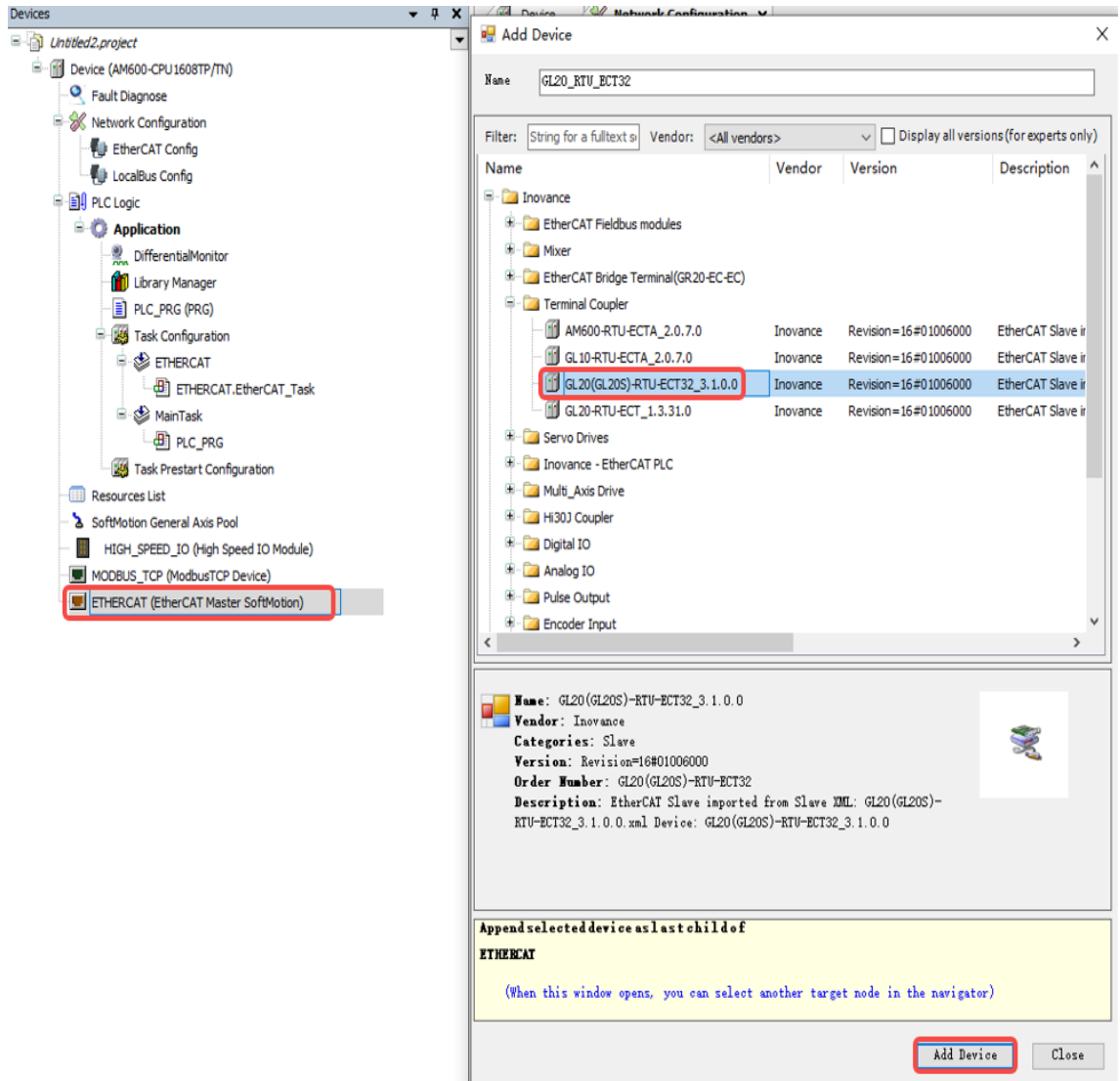
- Method 1: In the "Devices" navigation tree on the left, right-click "ETHERCAT" and select "Scan For Devices". Click "Scan Device", select the GL20-RTU-ECT32-INT module, and click "Copy Scan Device".



- Method 2: In the "Network Devices List" on the right, double-click "GL20(GL20S)-RTU-ECT32x.x.x.x" to add the GL20-RTU-ECT32-INT communication interface module.

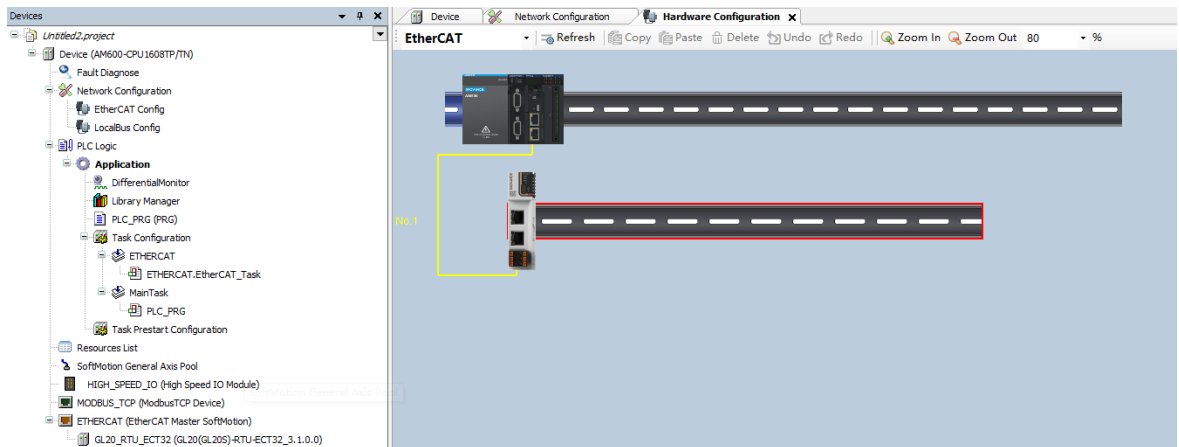


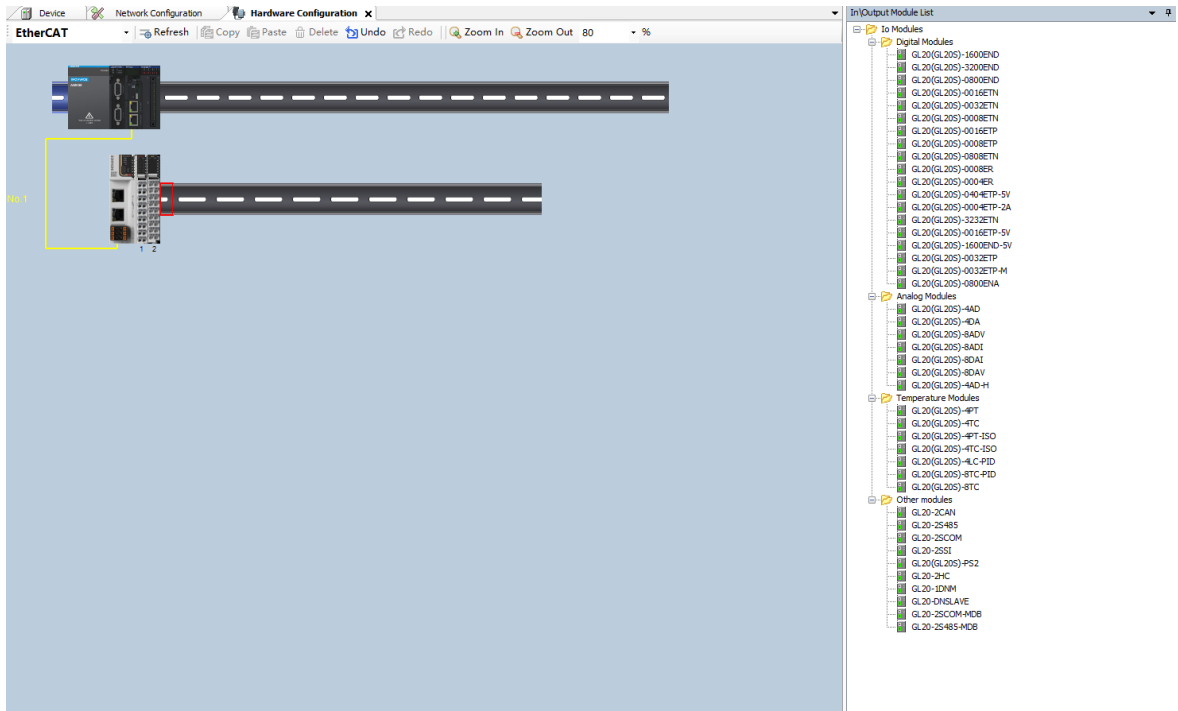
- Method 3: In the "Devices" navigation tree on the left, right-click "ETHERCAT_C" and click "Add Device". In the opened interface, click "GL20(GL20S)-RTU-ECT32x.x.x.x" under "Inovance > Terminal Coupler", and click "Add Device" to add the GL20-RTU-ECT32-INT communication interface module.



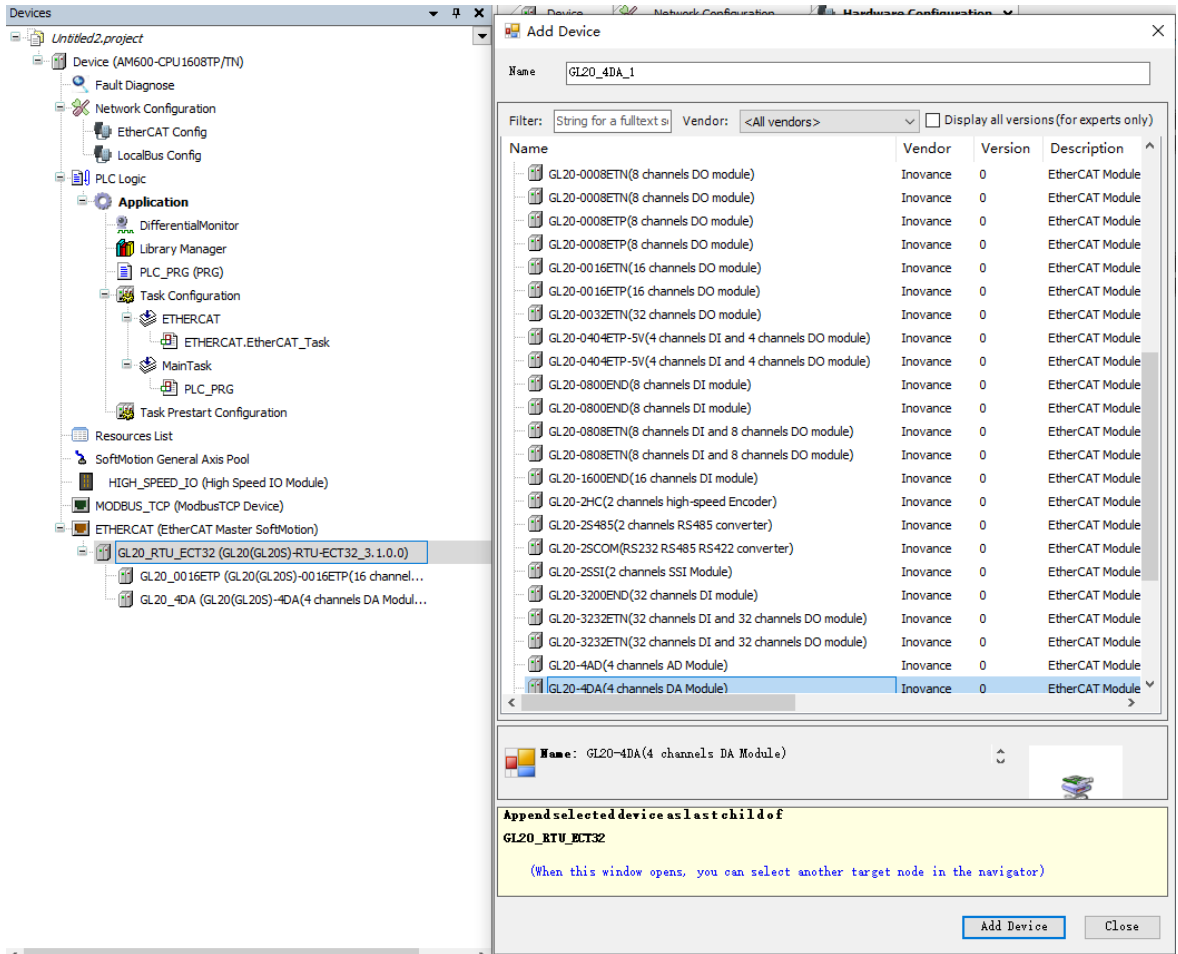
4. Add an expansion module to the GL20-RTU-ECT32 module.

- Method 1: In the "Devices" navigation tree on the left, double-click "EtherCAT Config" or double-click the GL20-RTU-ECT32-INT figure in the "Network Configuration" interface to open the "Hardware Configuration" interface. In the module list on the right, double-click the "GL20(GL20S)-1600END" / "GL20(GL20S)-0016ETN" module, or drag the module to the GL20-RTU-ECT32-INT figure to add the module, as shown below.



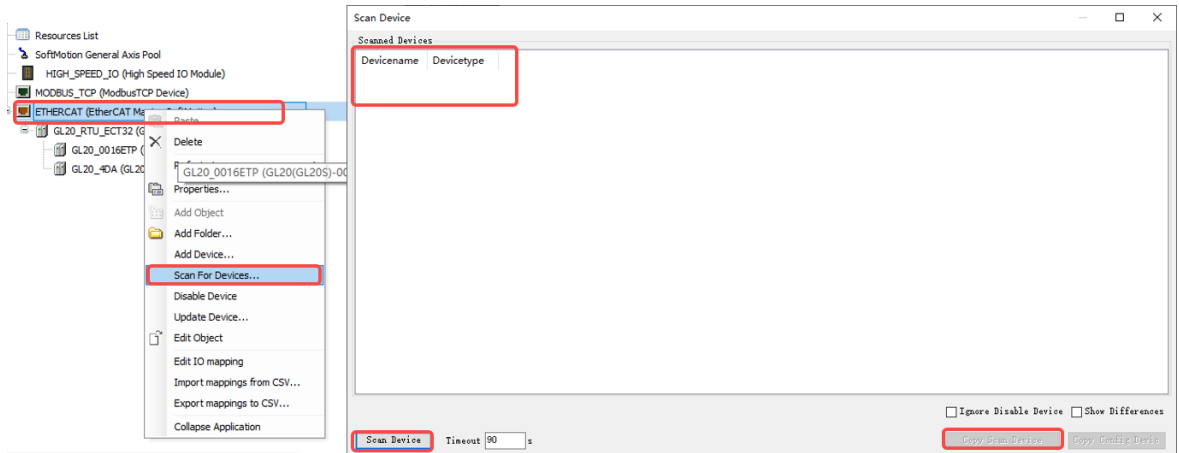


- Method 2: In the "Devices" navigation tree on the left, right-click "GL20-RTU-ECT32" under the "ETHERCAT (EtherCAT Master SoftMotion)" and select "Add Device". In the opened interface, choose the "GL20(GL20S)-1600END" / "GL20(GL20S)-0016ETN" module, and click "Add Device".

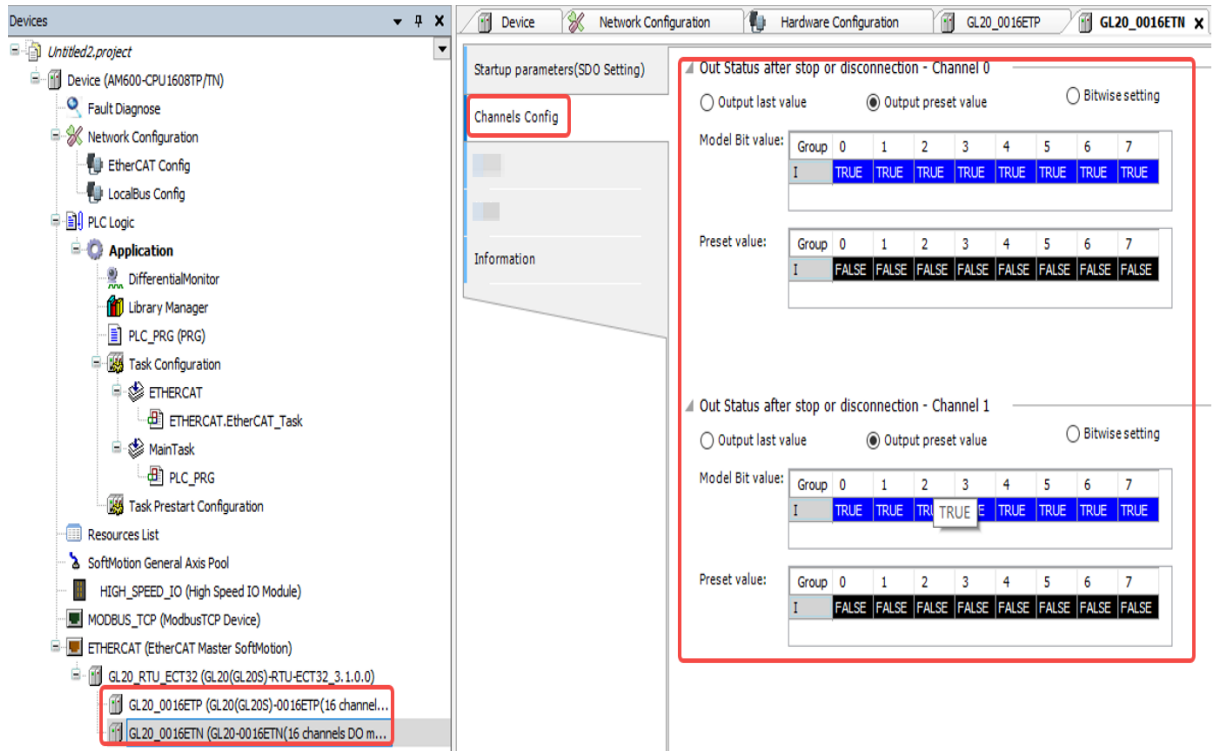


- Method 3: In the "Devices" navigation tree on the left, right-click "ETHERCAT_C" and select "Scan For Devices". In the opened interface, click "Scan Device", select the "GL20(GL20S)-1600END" or

"GL20(GL20S)-0016ETN" module, and click "Copy Scan Device".



5. In the "Devices" navigation tree on the left, double-click the "GL20(GL20S)-1600END" / "GL20(GL20S)-0016ETN" module. In the opened interface, click "Channels Config" and configure the module channel parameters. The parameter descriptions are shown in the table below.



Module	Parameter Name	Description	Configuration
GL20-1600 END	Filter time	Input filter time	Select from the drop-down options: No filter, 0.25ms, 0.5ms, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms Default: 1ms
GL20-0016 ETN	Out Status after stop or disconnection	Output last value	Maintain the current output status Check "Output last value".

Module	Parameter Name	Description	Configuration
	Output preset value	Output according to the preset value	Check "Output preset value" and set the preset value for each bit to "TRUE" or "FALSE".
	Bitwise setting	Output values set in bits	Check "Bitwise setting" and set each bit to "TRUE" or "FALSE".

6. On the toolbar, click the program check button, compile button, login button, and run button in order to download and run the program, as shown below.

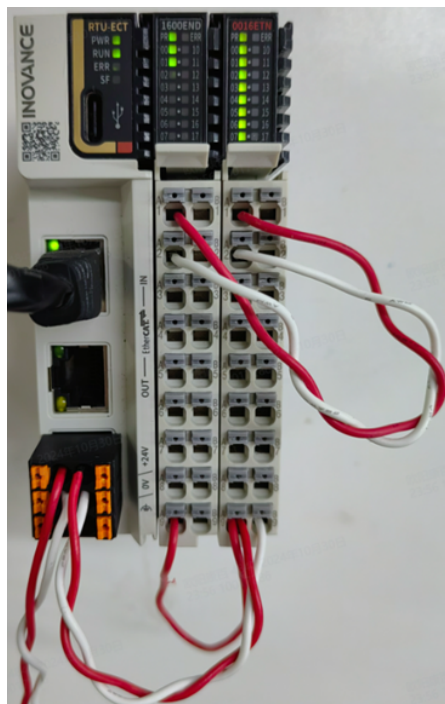


7.2.2 Commissioning

After successfully configuring and downloading this product and the expansion modules, a simple commissioning is required to ensure normal functioning.

Prerequisites

Connect the output terminals DO0 and DO1 of the GL20-0016ETN module to the input terminals DI0 and DI1 of the GL20-1600END module, respectively.

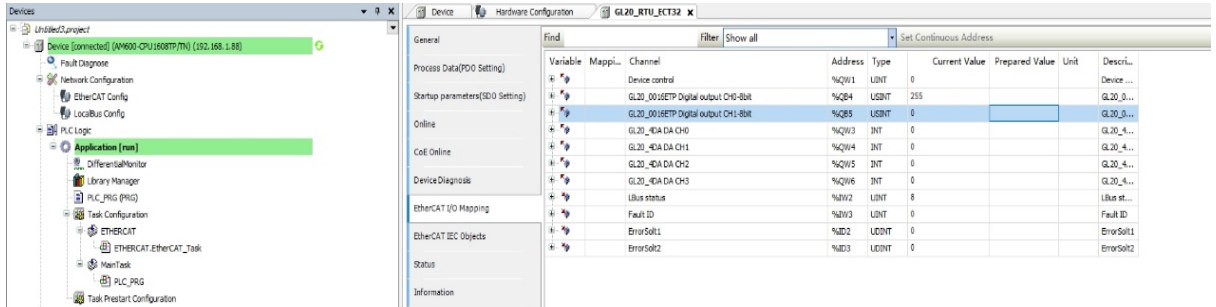


Procedure

1. Determine the status of the communication interface module and expansion modules through the signal indicators. For details on the signal indicators of the communication interface module, see "[Troubleshooting by Indicators](#)". For details on the signal indicators of the expansion modules, see the user guide of each module.
 - If the signal indicator status is normal, proceed to step 2.

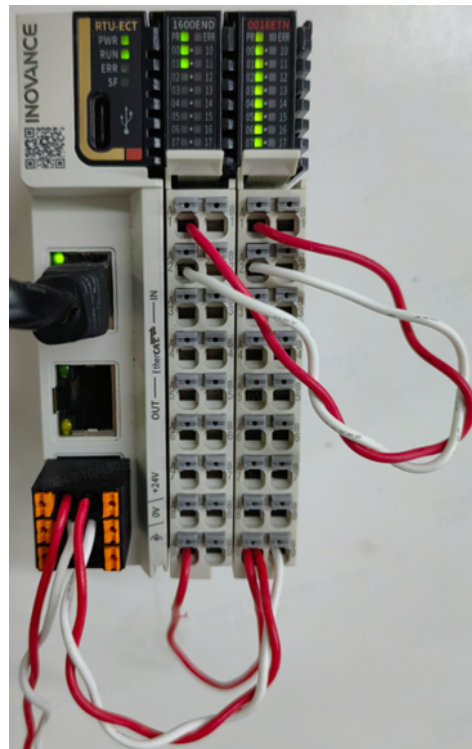
- If the signal indicator status is abnormal, determine the cause according to the signal indicator status and resolve the fault.
 - If the fault is resolved, proceed to step 2.
 - If the fault remains unresolved, use the programming software for troubleshooting. For details, see "[9.2.2.2 Compatibility with Inovance Medium-Sized PLC](#)".

2. In the "Devices" navigation tree on the left, double-click "GL20_GL20S_RTU_ECT32" to open the configuration window. Click "I/O Mapping", and enter "255" in the "Prepared Value" field of "GL20-0016ETN_2 Digital output CH0-8bit". Then, click "Ctrl + F7" to write the value to the "Current Value".



3. Check whether the output and input channels of the GL20-0016ETN and GL20-1600END modules function normally.

- In the "I/O Mapping" interface, if the current value of "GL20_1600END Digital input CH0-8bit" is "3", it indicates that the DI0 and DI1 input channels of this module are normal.
- If the signal indicators (00-07) of the GL20-0016ETN module and the signal indicators (00-01) of the GL20-1600END module are solid on, it indicates that the input and output channels of both modules are functioning normally.



7.3 Compatibility with Omron PLC

This section takes the configuration of NJ501-1500 PLC, GL20-RTU-ECT32-INT communication interface module, and two expansion modules (GL20-1600END and GL20-0016ETN) as an example. GL20-RTU-ECT32-INT is displayed as "GL20-RTU-ECT32" in the programming software.

7.3.1 Configuration

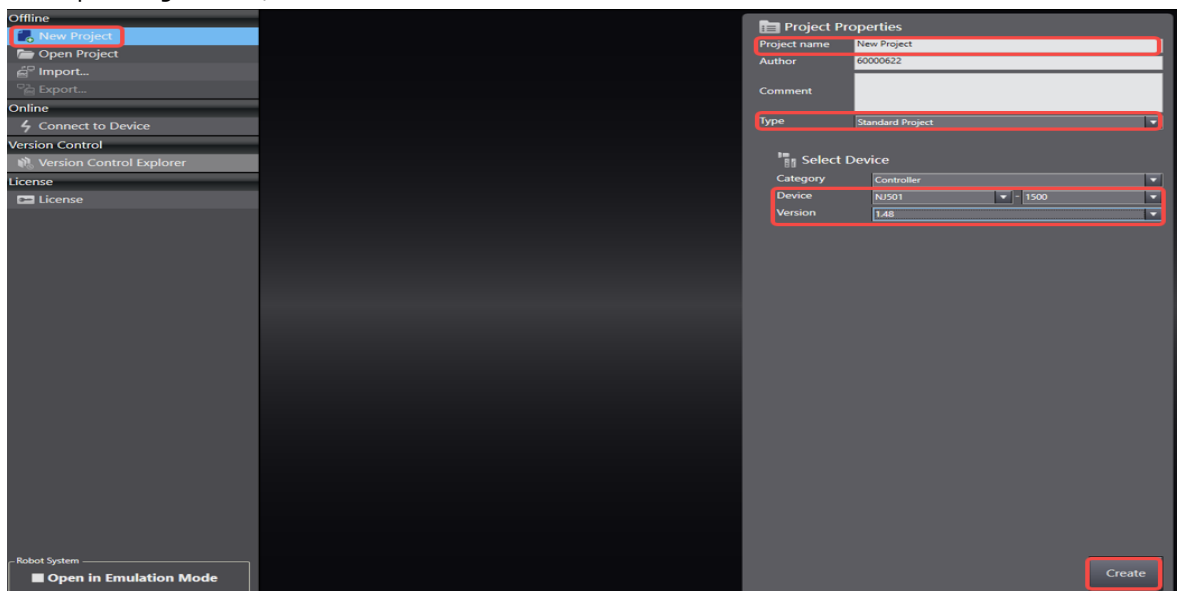
Prerequisites

- The installation and wiring of the required hardware are completed.
- All products are powered on and running.
- The PC equipped with Sysmac Studio programming software is connected to the NJ501-1500 via a network cable (no specific requirements for PLC model, PLC firmware version, or programming software version).
- The EtherCAT configuration file "INOVANCE-GL20(GL20S)-RTU-ECT32-3.0.11.0.xml" is obtained from the Inovance official website (www.inovance.com).

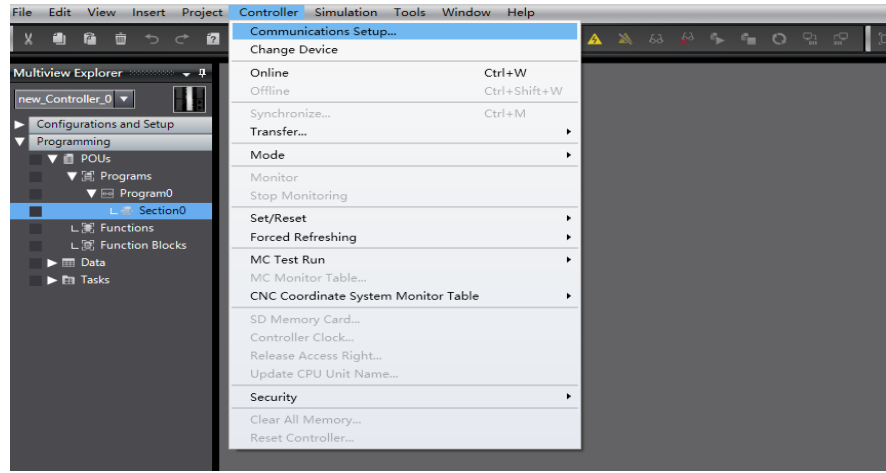
Procedure

1. Connect to the target PLC.

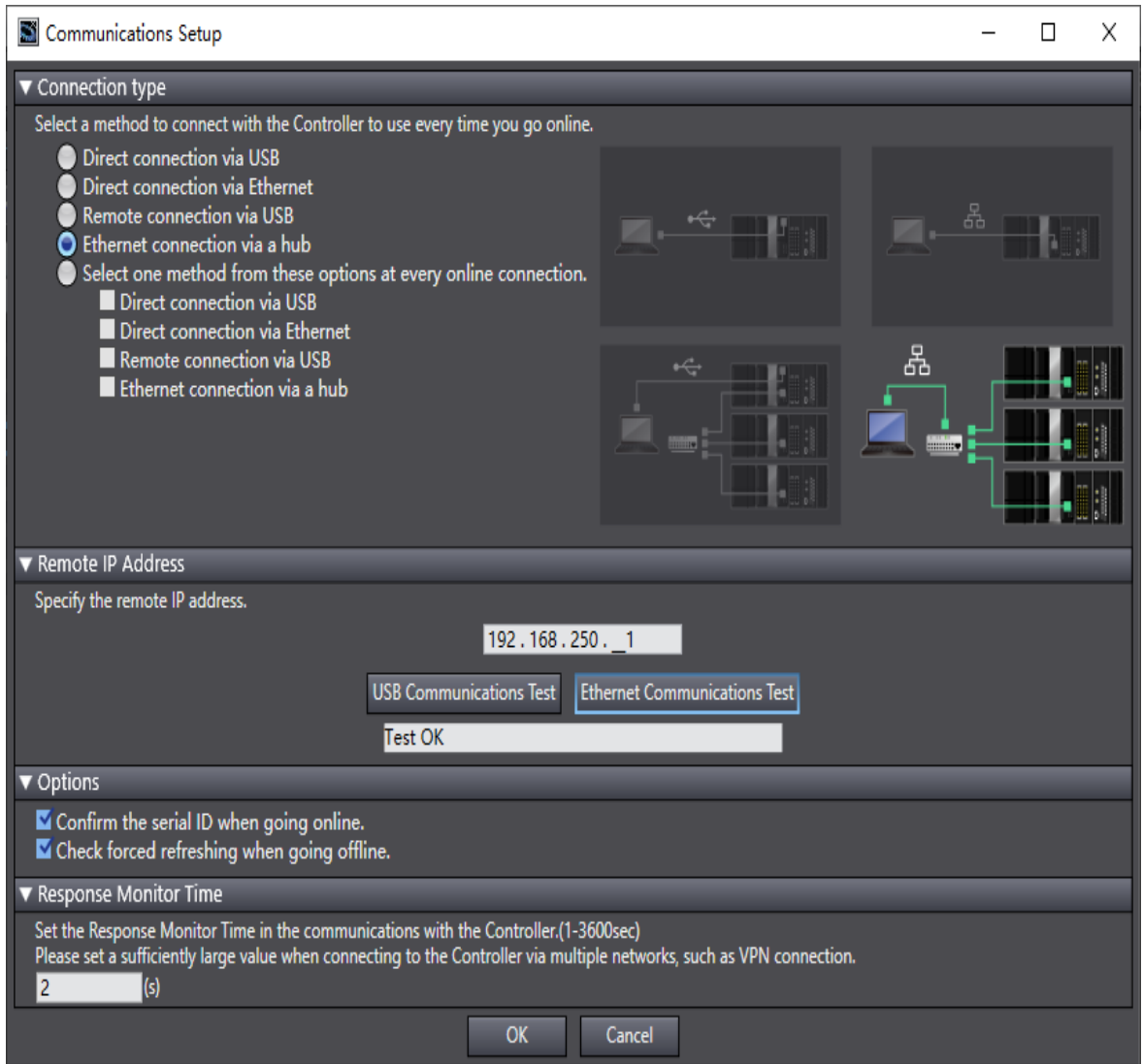
- Open the Sysmac Studio software and click "New Project". In the "Project Property" window, set the project name, select "Standard Project" for "Type", "NJ501-1500" for "Device" and select the corresponding version, then click "Create".



- Select "Controller > Communication Setup" from the menu bar.

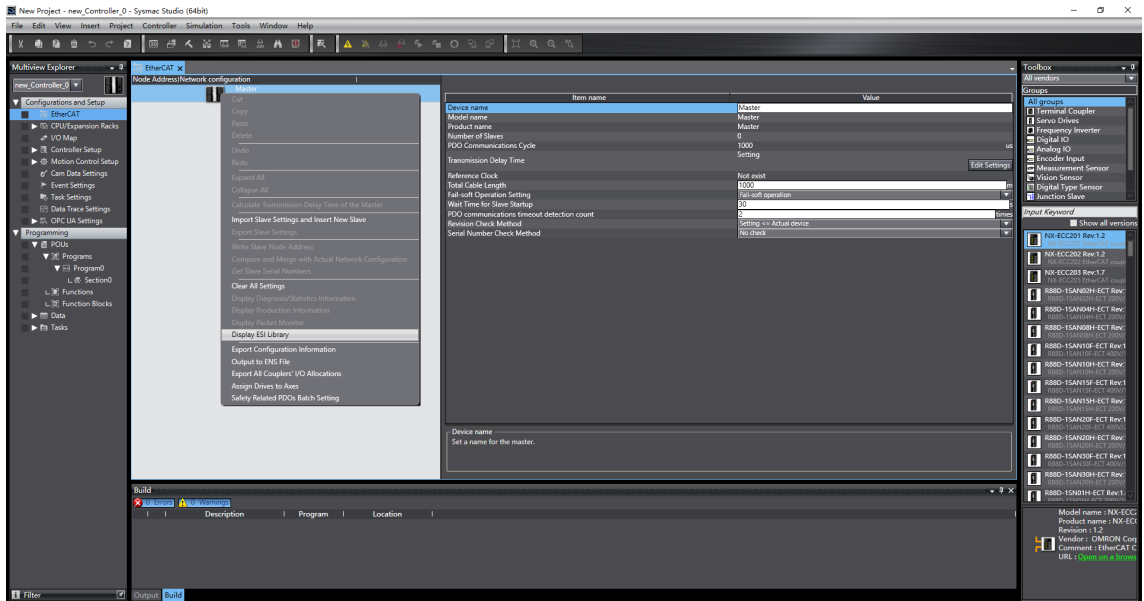


c. In the "Communication Setup" window, set the connection type. As an example of direct connection to the controller, click "Ethernet connection via a hub", enter the IP address of the Omron PLC, and click "Ethernet Communication Test". If a successful prompt is displayed, it indicates successful communication with the Omron PLC.

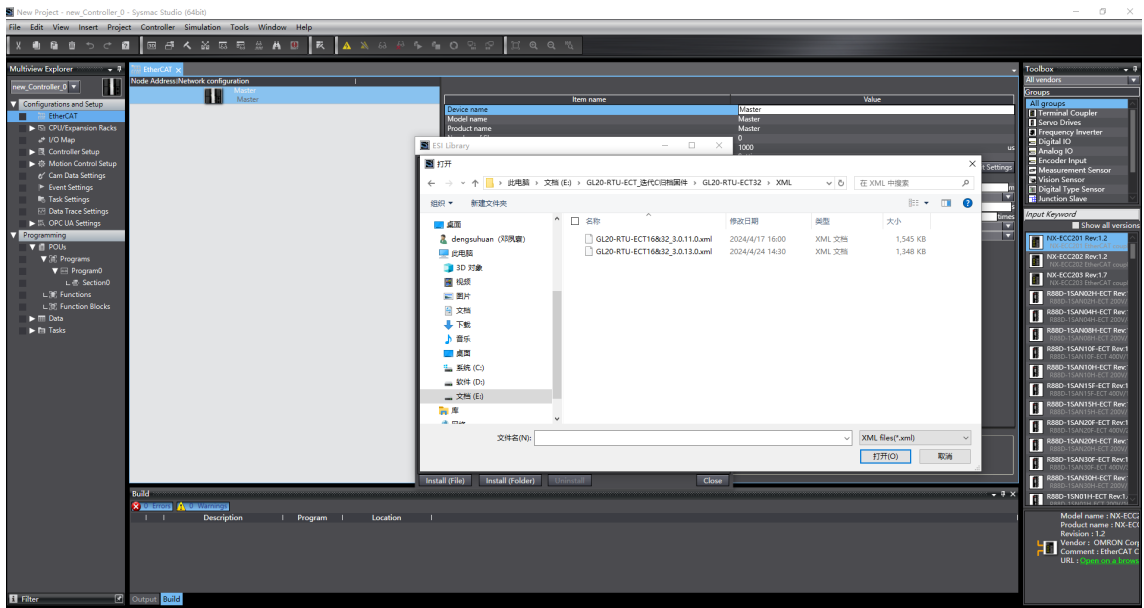


2. Import the XML file.

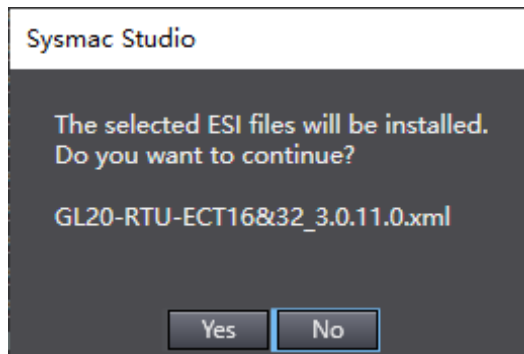
- Method 1:
 - a. In the "MultiView Explorer" navigation tree on the left, double-click "EtherCAT" under "Configuration and Setup". In the opened interface, right-click the master device and select "Display ESI Library".



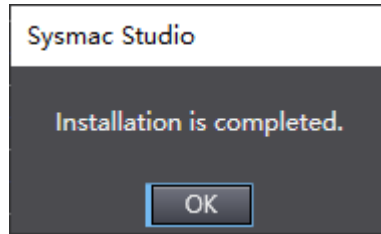
- b. Click "Install (File)", select the target XML file on the local PC, and click "Open".



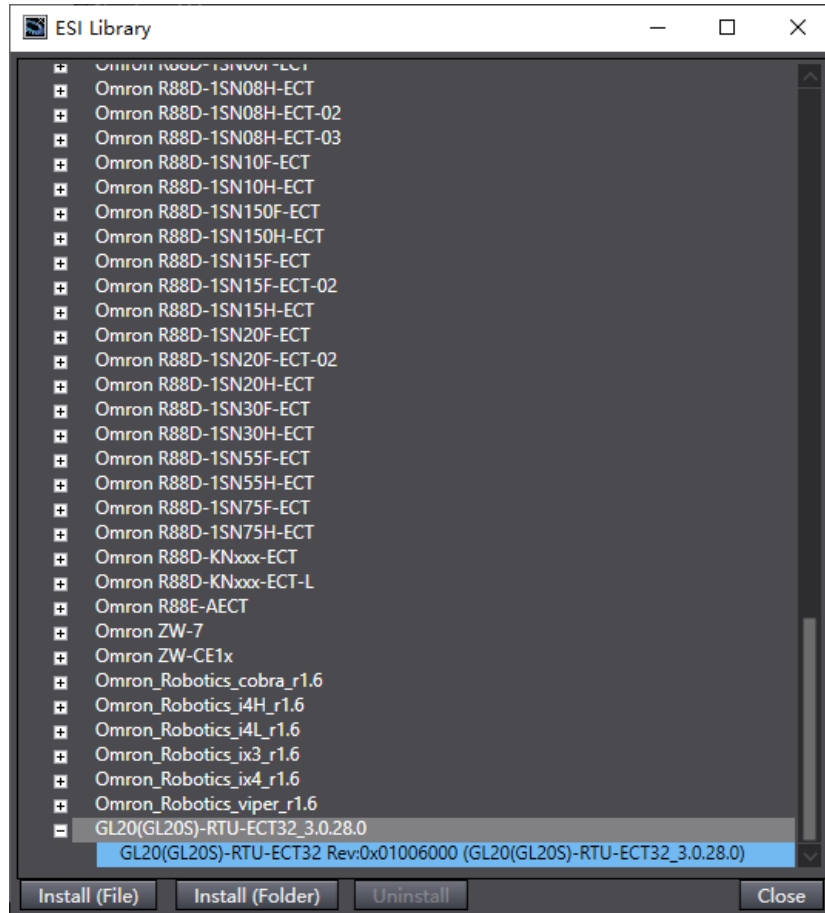
- c. Click "Yes" to continue the installation.



- d. After the installation is completed, click "OK".



e. Browse the ESI library to view the installed XML file.



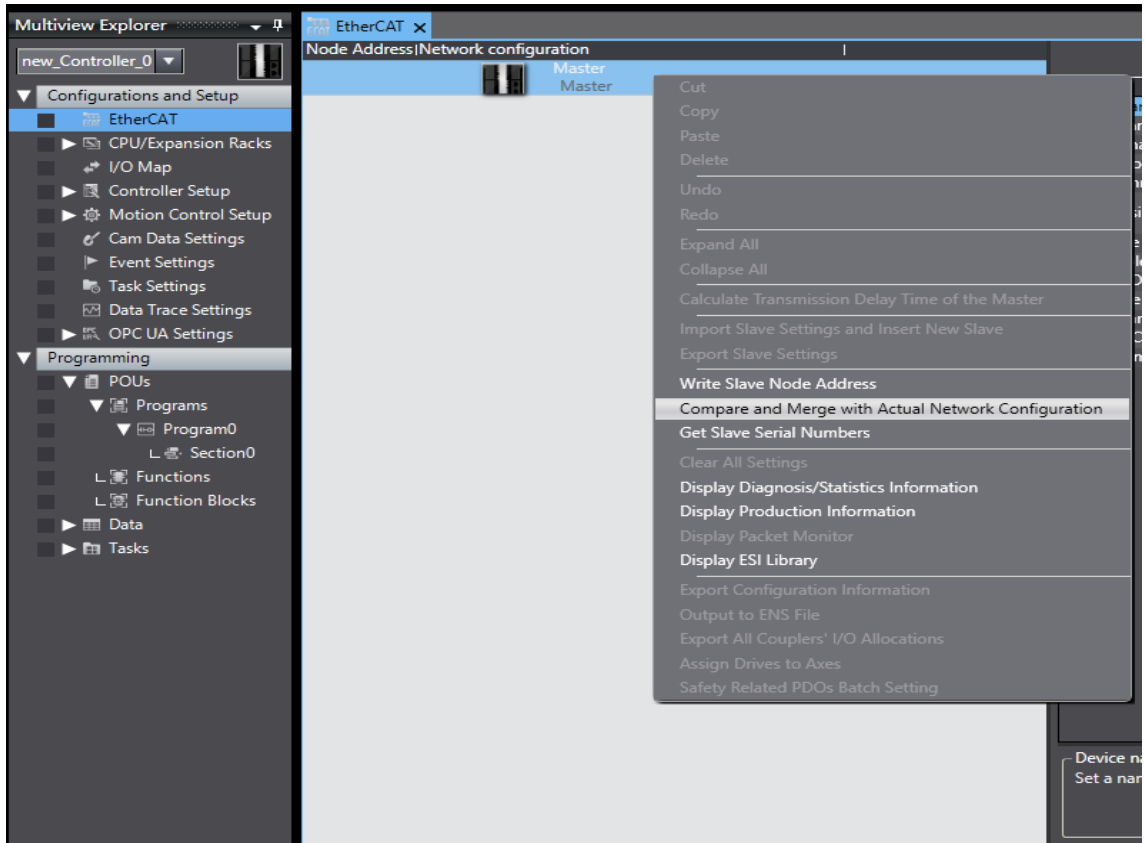
- Method 2:
Place the XML file in the installation directory "`\program file\Sysmac Studio\IODeviceProfiles\EsiFiles\UserEsiFile`", then restart the software.

3. Add the I/O module.

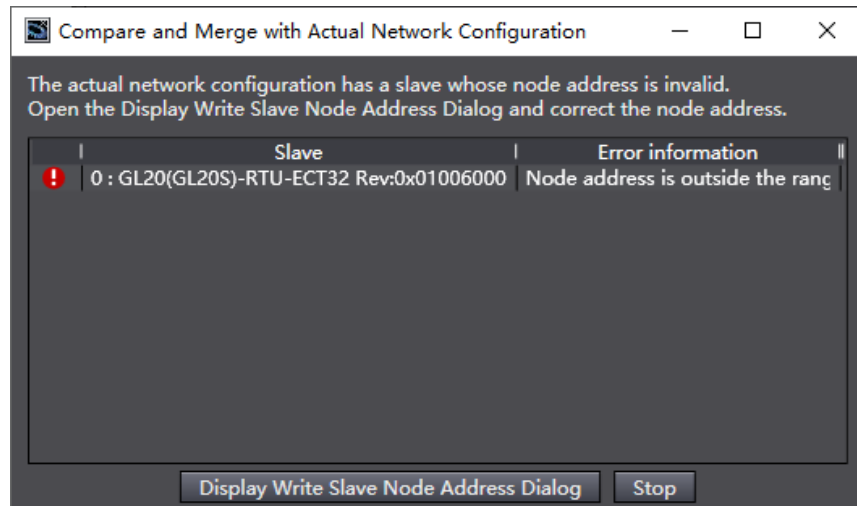
- Method 1: Online scan
 - a. Click the online button on the toolbar, as shown below.



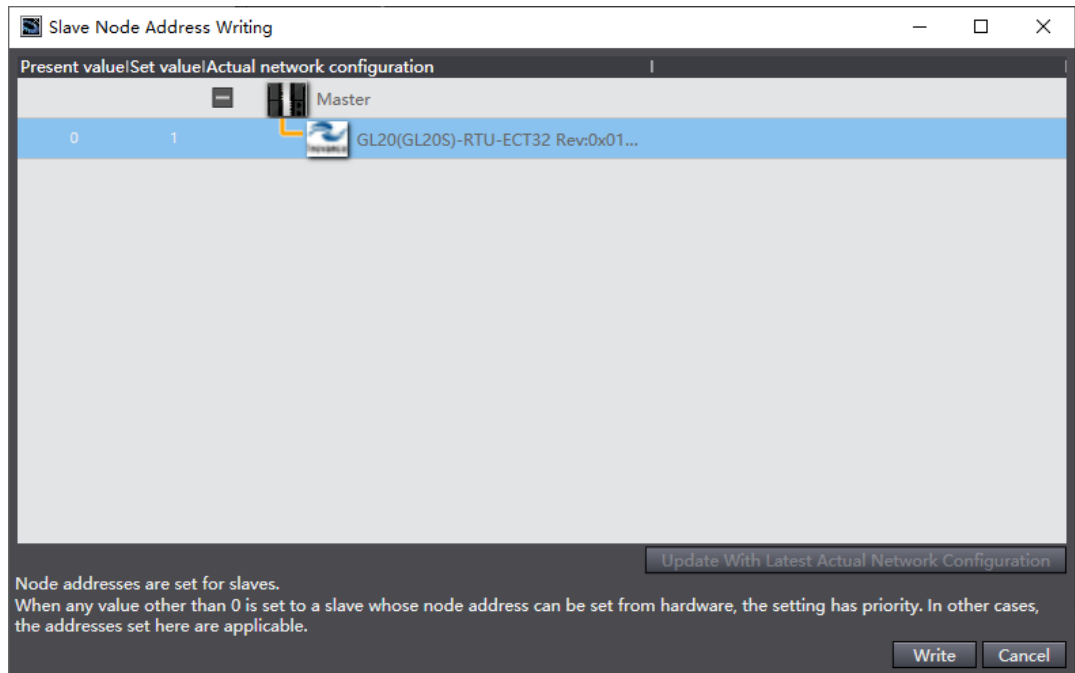
- b. In the "MultiView Explorer" navigation tree on the left, double-click "EtherCAT". In the opened interface, right-click the master device and select "Compare and Merge with Actual Network Configuration".



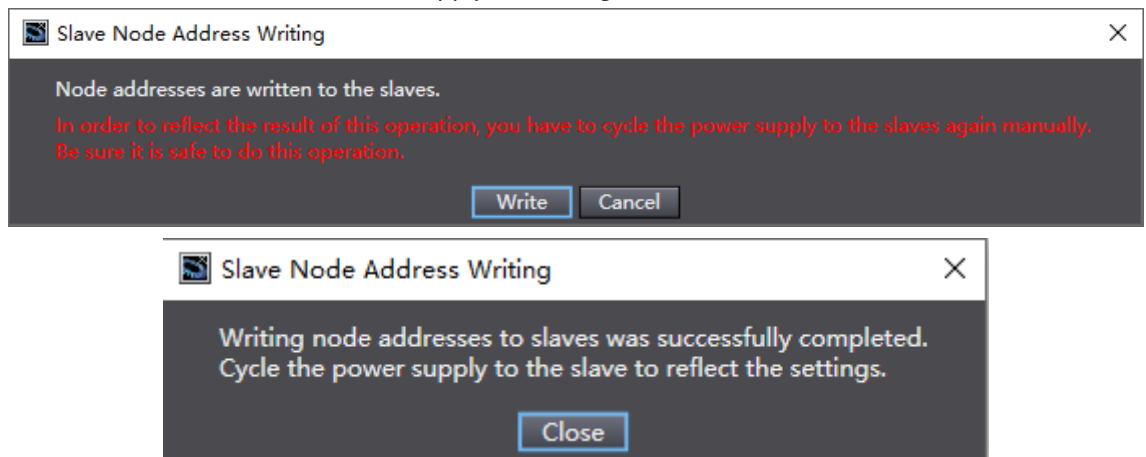
- c. (Optional) If the node address of the GL20-RTU-ECT32-INT communication interface module is out of range, it is necessary to modify the node address. Click "Display Write Slave Node Address Dialog".



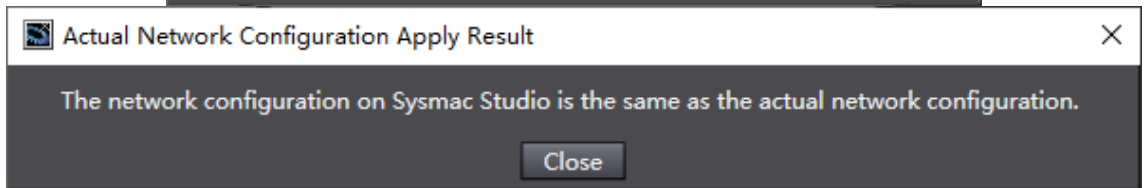
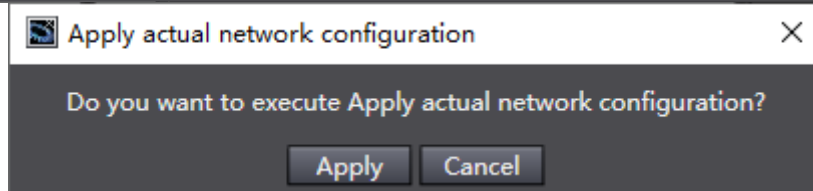
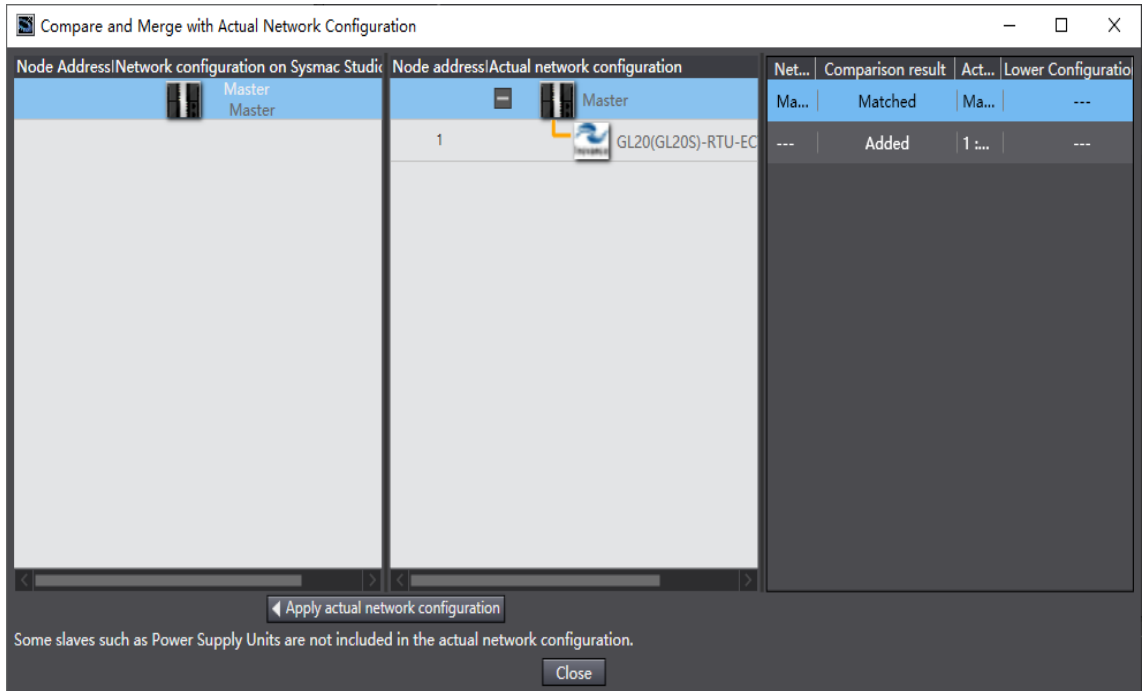
- d. (Optional) Modify the "Set value" to the slave node address, set the node address to a value between 0 and 192, and click "Write".



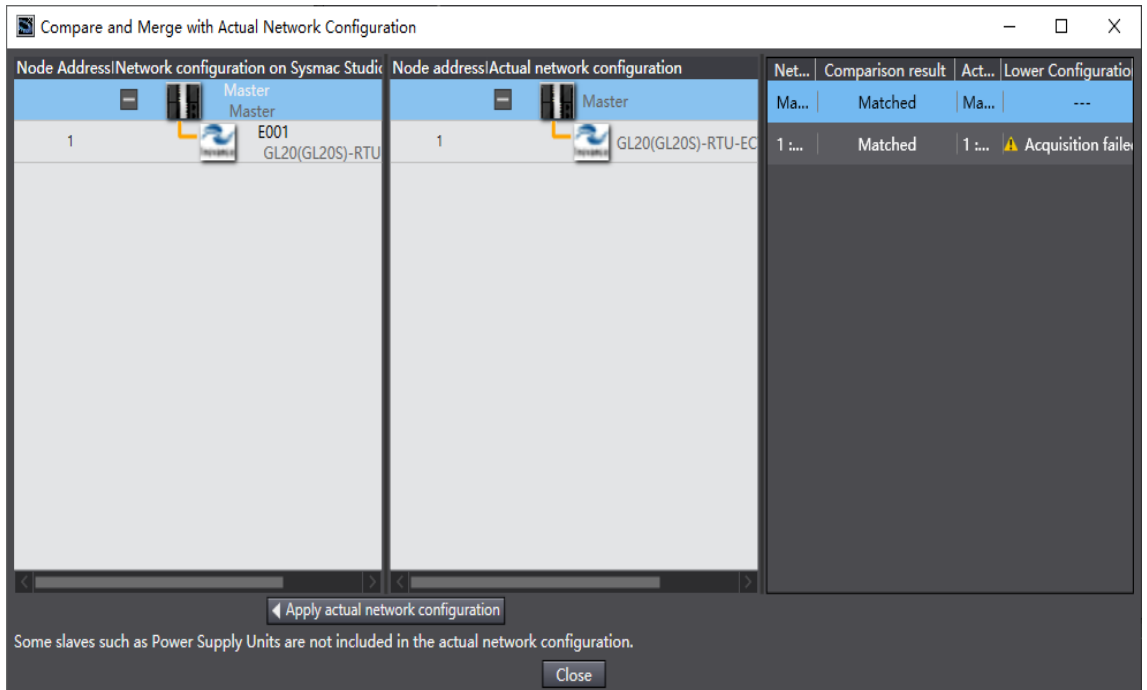
- e. After successfully writing the slave node address, power off and on the GL20-RTU-ECT32-INT communication interface module to apply the settings.



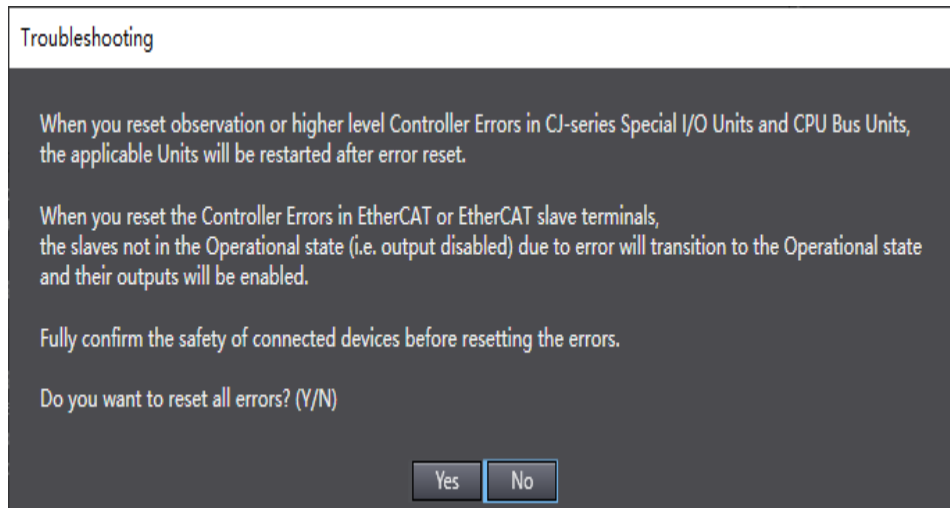
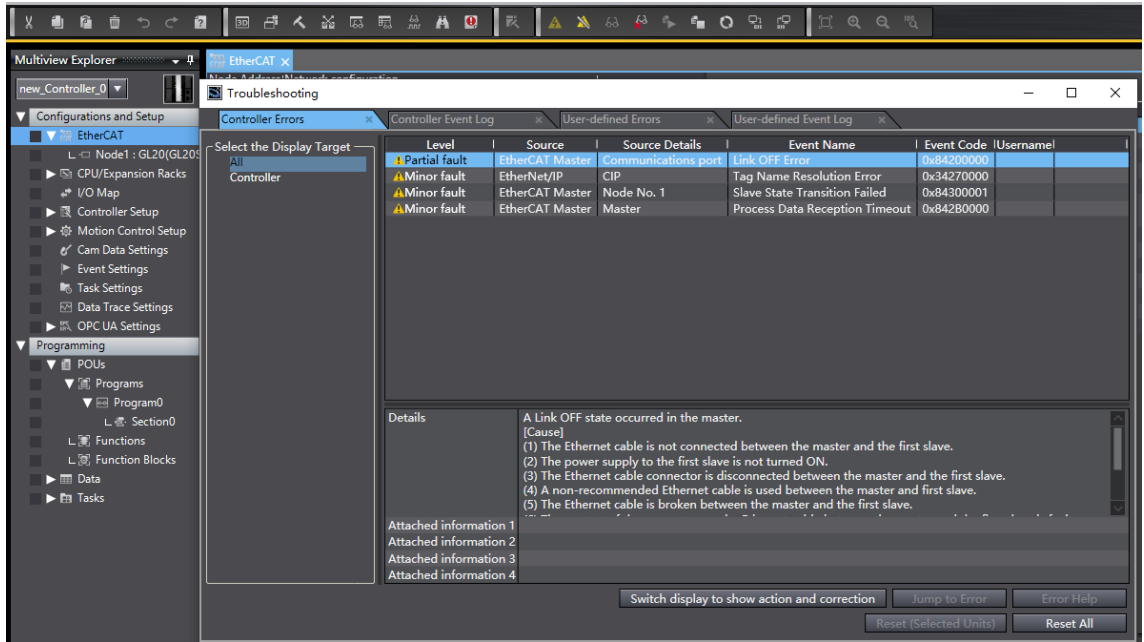
- f. Repeat step b and click "Apply actual network configuration". In the pop-up window, click "Apply". In the pop-up "Actual Network Configuration Apply Result" window, click "Close".



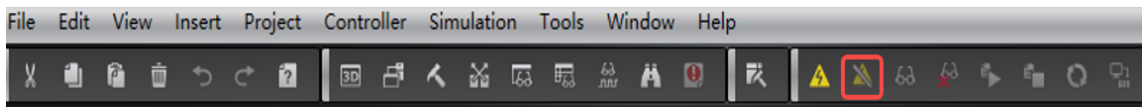
g. (Optional) If "Acquisition failed" is displayed in the "Lower Configuration" field, it indicates scan failure for modules connected after the GL20-RTU-ECT32-INT communication interface module.



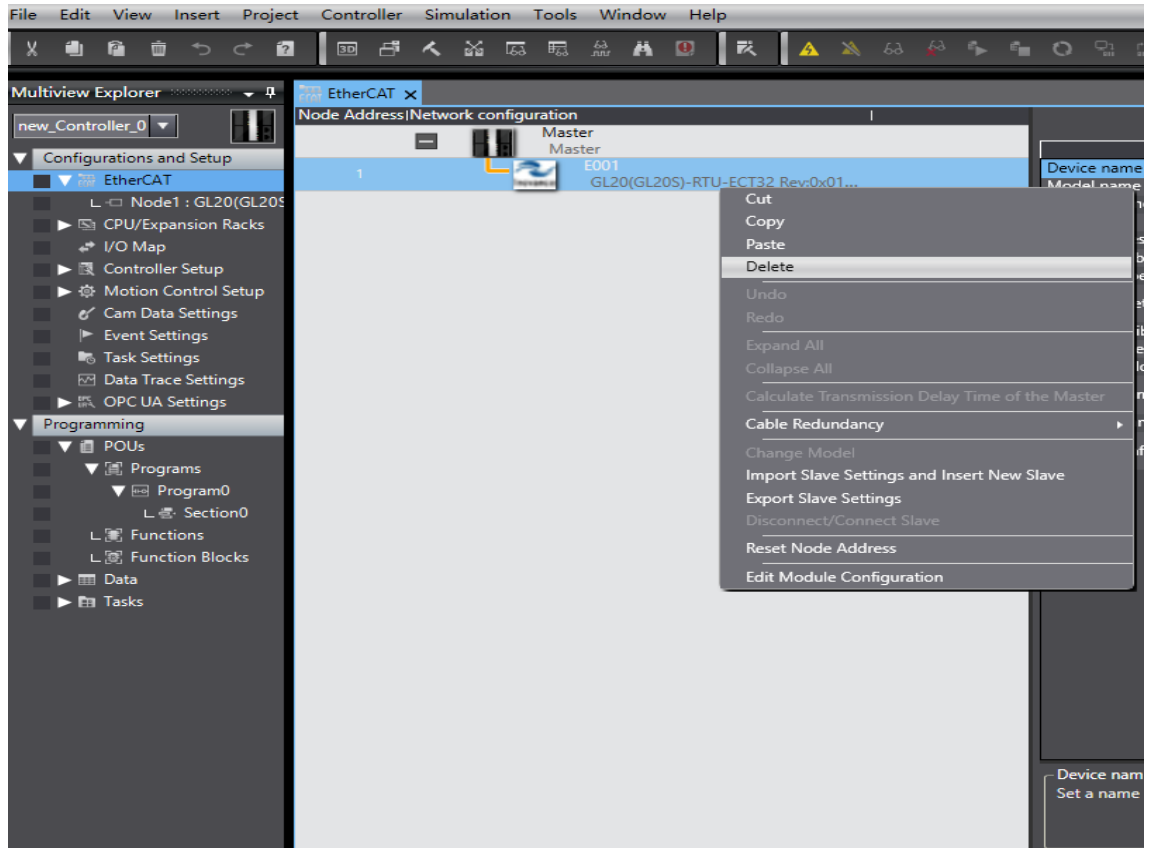
- h. Click the troubleshooting button on the toolbar, as shown below. In the pop-up "Troubleshooting" window, select "All" for the display target and click "Yes" in the pop-up window to reset all faults.



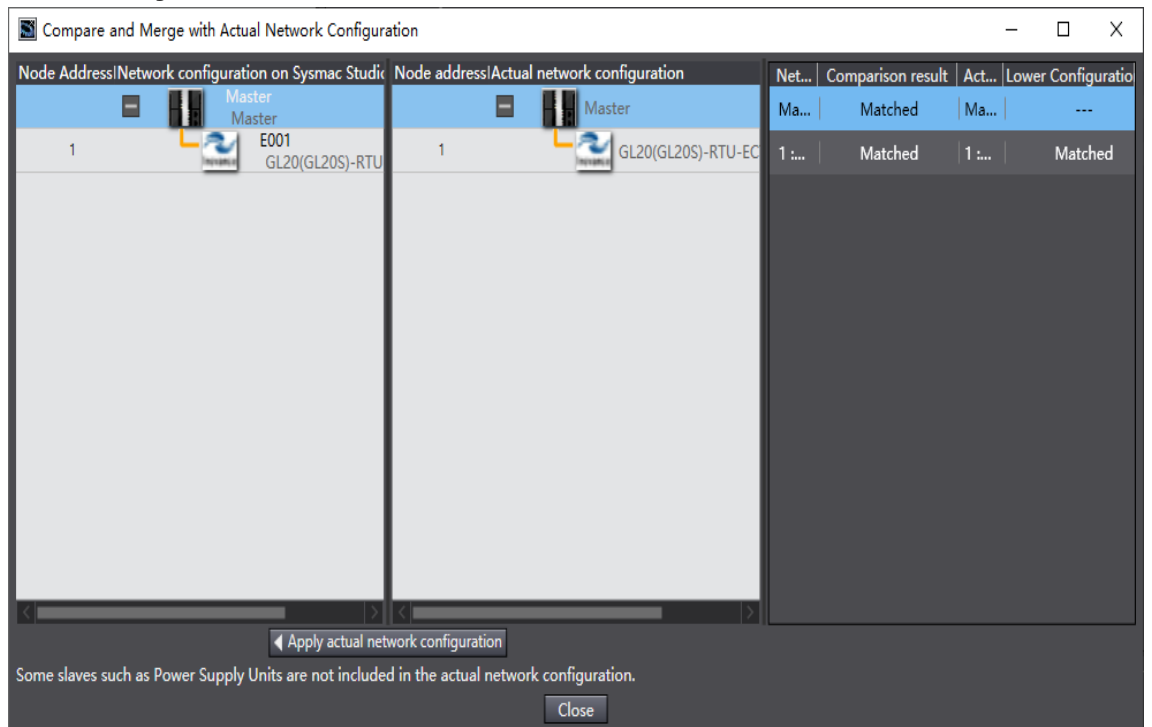
- i. Click the offline button on the toolbar, as shown below.



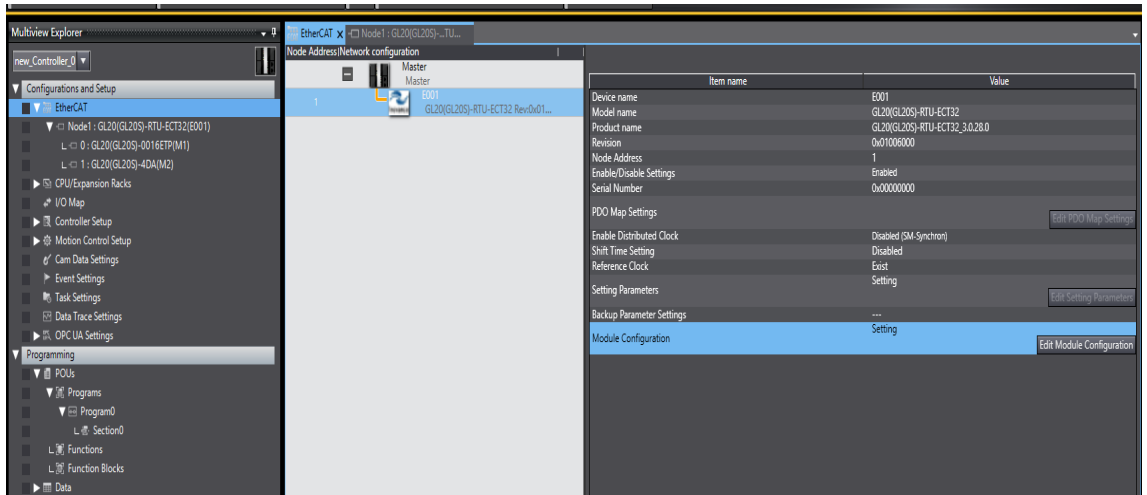
- j. In the "MultiView Explorer" navigation tree on the left, double-click "EtherCAT". In the opened interface, right-click "GL20-RTU-ECT32-INT" and select "Delete".



- k. Click the online button on the toolbar and repeat step b. If both the "Comparison Result" and "Lower Configuration" show "Matched", the I/O device scan is successful.

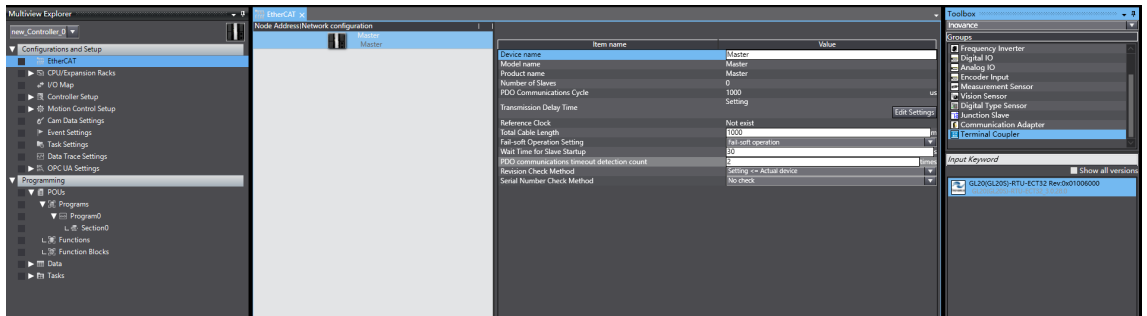


The scan result is shown in the figure below.

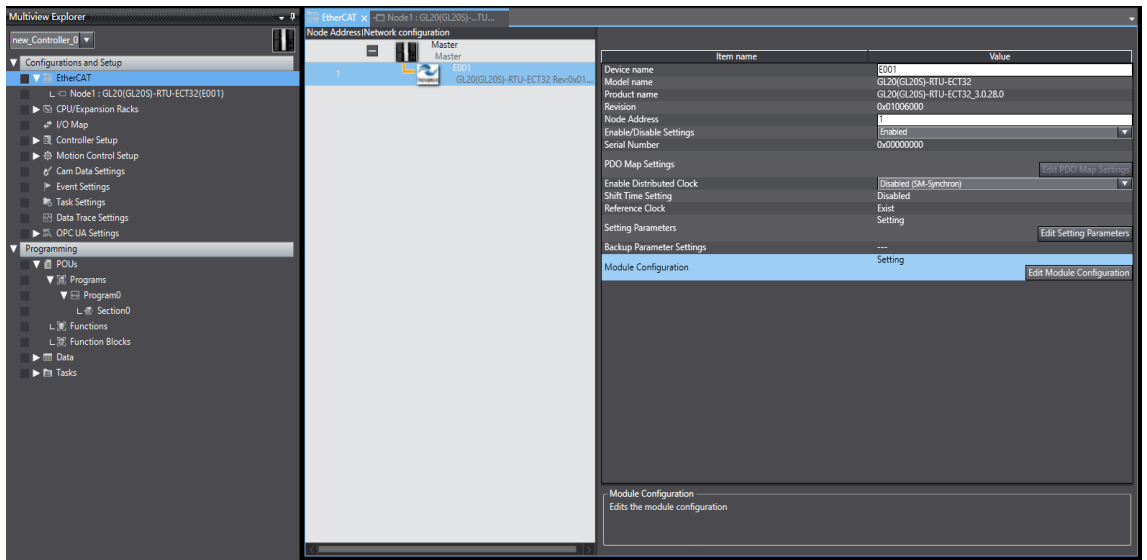


- Method 2: Manual configuration

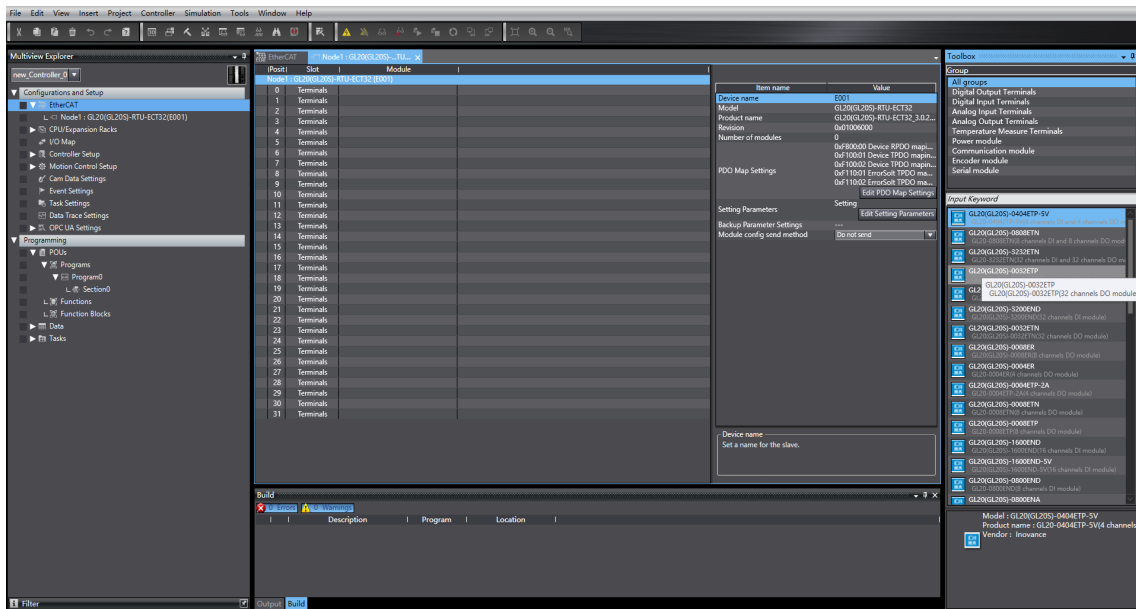
a. In the "MultiView Explorer" navigation tree on the left, double-click "EtherCAT". In the opened interface, select "Inovance" for "Toolbox", "Terminal Coupler" for "Groups", and "GL20-RTU-ECT32-INT" for "Input Keyword".



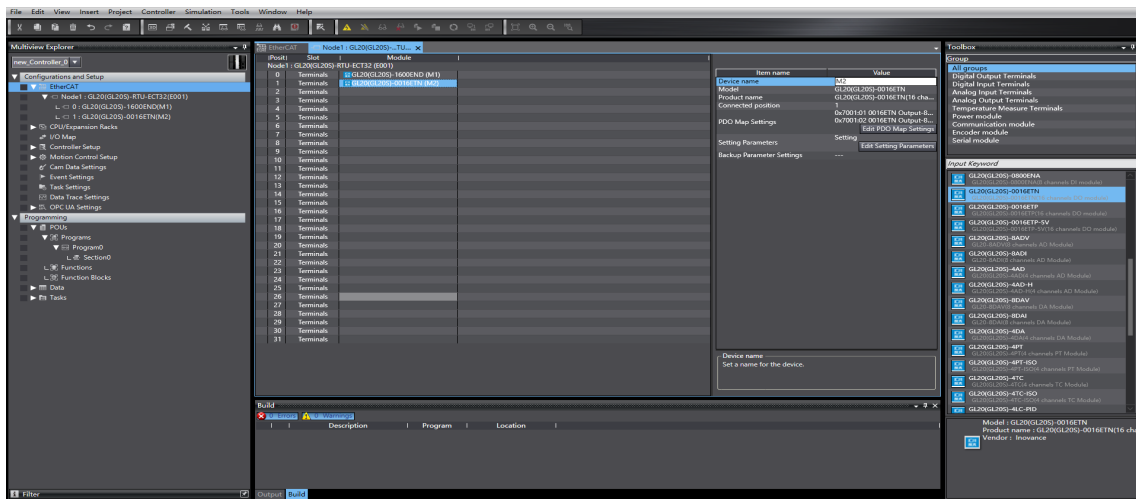
b. Click "Edit Module Configuration" to configure the I/O module.



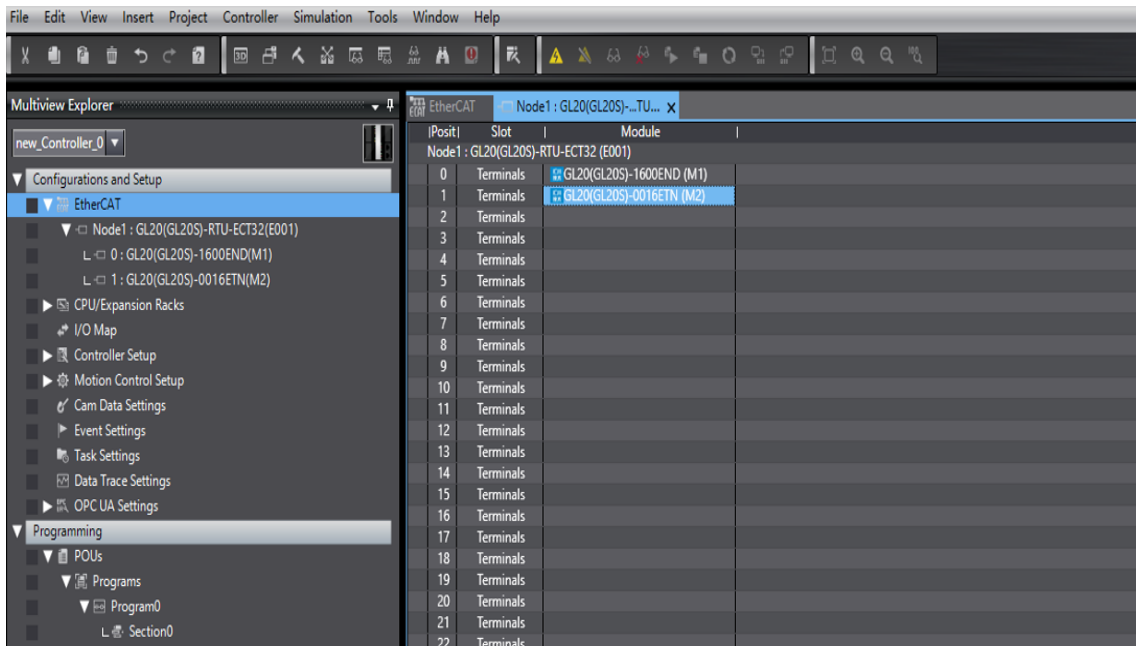
c. Click the expansion slot of the interface communication module. In the "Toolbox", double-click the corresponding GL20 series module to add it to the slot.



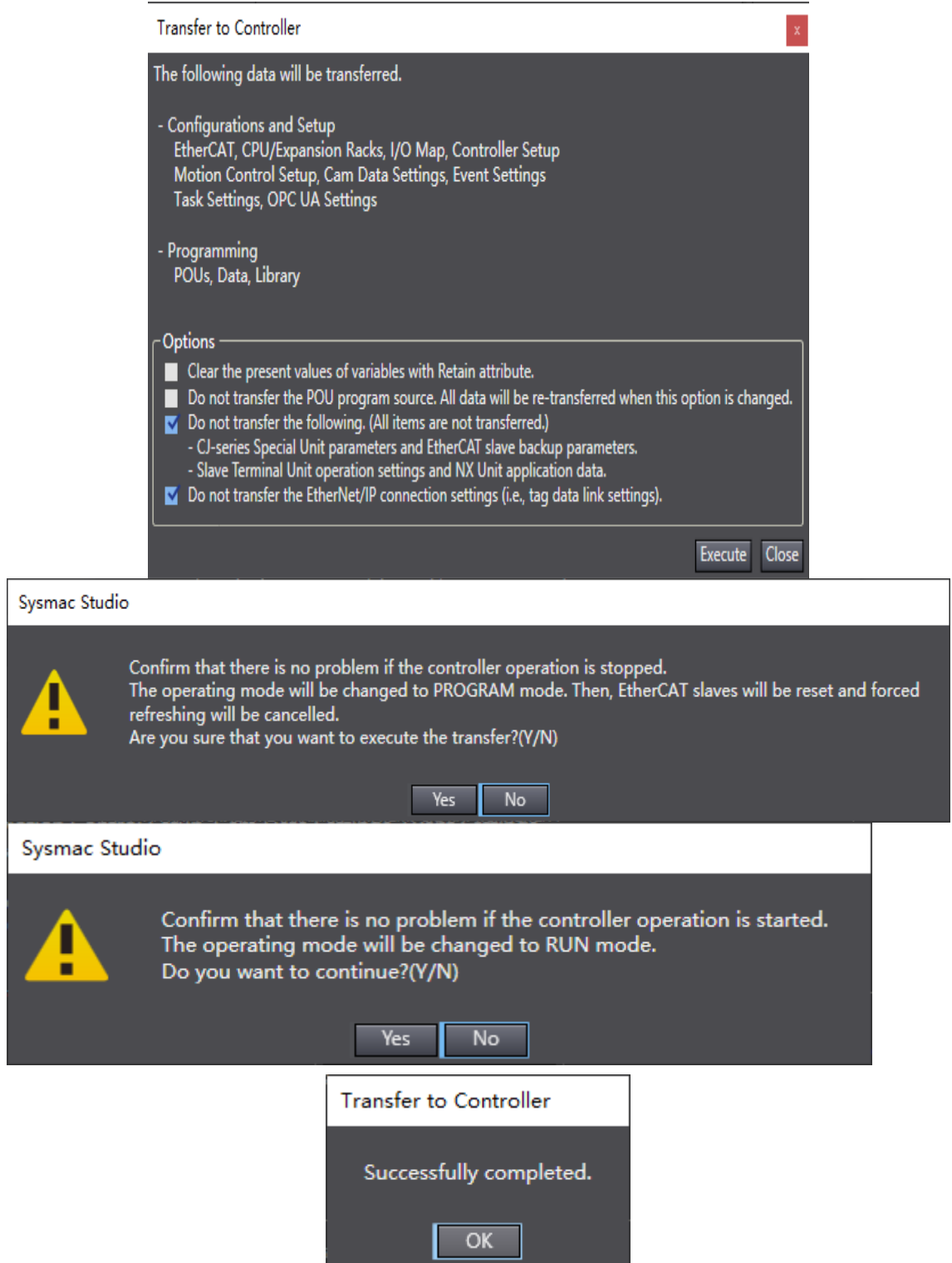
The interface after manual addition is shown below.



d. After configuration, click the download button on the toolbar to download the program to the controller, as shown below.

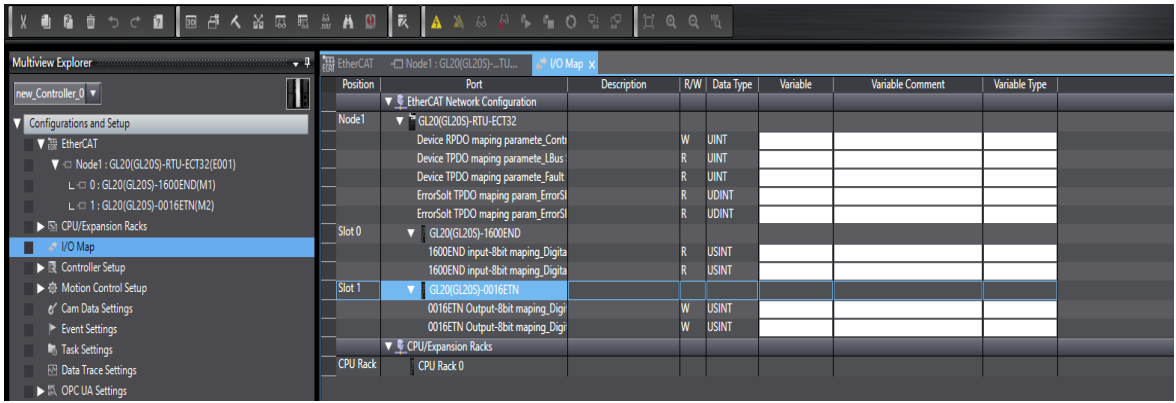


- e. In the opened "Transfer to Controller" dialog box, click "Execute", then click "Yes" and "OK" as prompted to complete the program download.



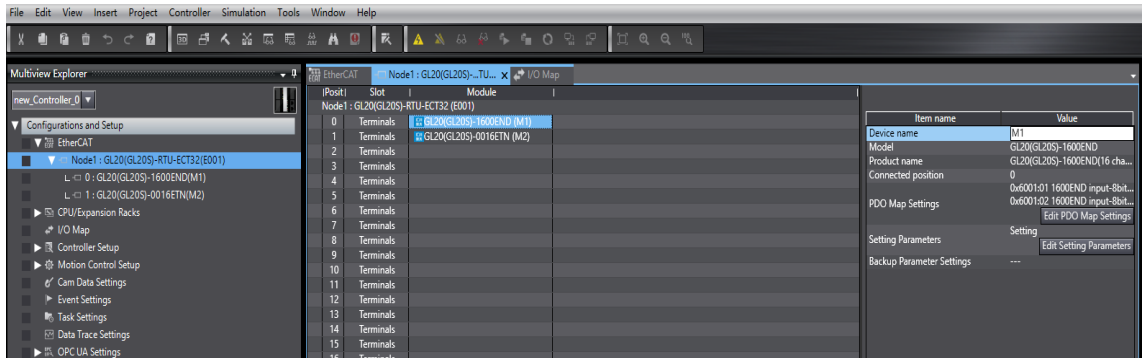
4. Perform I/O mapping.

- a. In the "MultiView Explorer" navigation tree on the left, double-click "I/O Map" to view the process data information of the communication interface module and the GL20 module. You can perform I/O mapping directly in this interface or by binding variables.



b. For example, for digital modules, there are three addressing methods: by bit, 8-bit, and 16-bit. The following introduces how to modify the PDO settings by using the GL20(GL20S)-1600END module as an example.

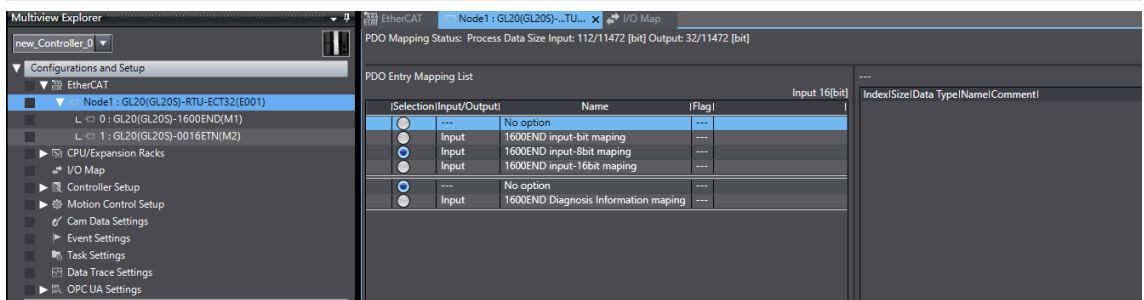
- i. Double-click "Node 1: GL20(GL20S)-RTU-ECT32". In the opened interface, select the "GL20(GL20S)-1600END" module, and click "Edit PDO Map Settings".



- ii. Select one of the three addressing methods based on actual needs, and click "OK" to complete the PDO mapping settings.

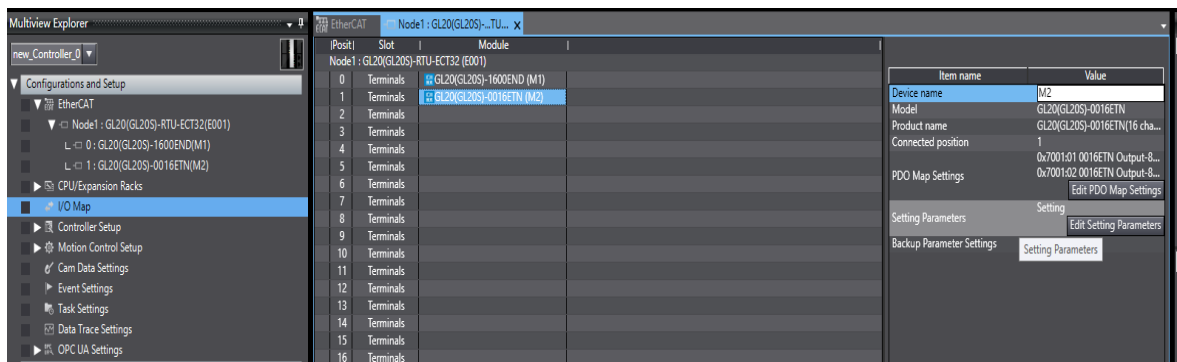
NOTE

After completing the PDO mapping settings, the project must be re-transmitted to the controller for the settings to take effect.



5. Configure the startup parameters of the module. The following takes the GL20(GL20S)-0016ETN module as an example.

- a. Double-click "Node 1: GL20(GL20S)-RTU-ECT32". In the opened interface, select the "GL20(GL20S)-0016ETN" module, and click "Edit Setting Parameters".



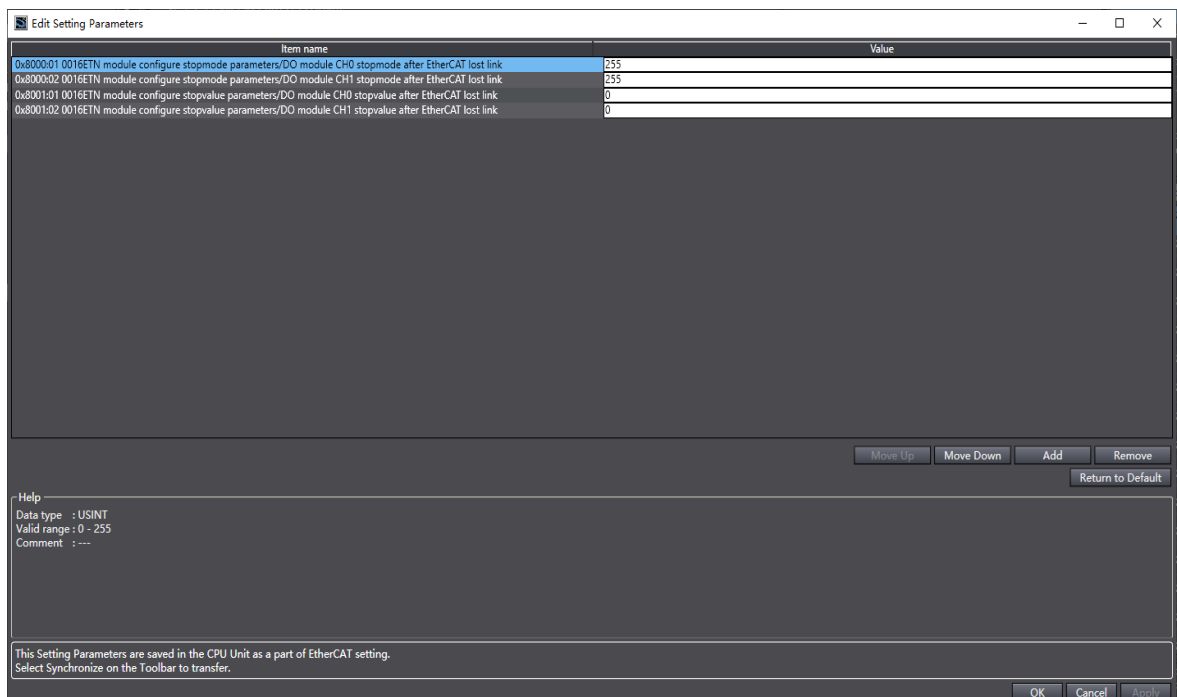
NOTE

If the controller is NX701, the "Edit Setting Parameters" approach is unavailable and users need to use IOManager for parameter configuration.

- b. In the opened "Edit Setting Parameters" interface, the startup parameters can be modified. Click "OK" to complete the modification. For the specific meanings of the startup parameters for the expansion module, see the configuration data definitions in "[Appendix 4: Expansion Module Object Dictionary Definitions](#)".

NOTE

- After modification, the project must be re-transmitted to the controller for the modifications to take effect.
- If no modifications are made to this interface, the module will operate with default parameters.

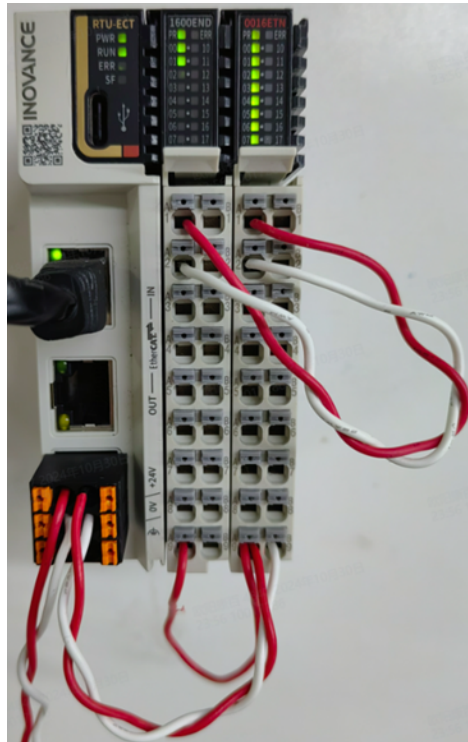


7.3.2 Commissioning

After successfully configuring and downloading this product and the expansion modules, a simple commissioning is required to ensure normal functioning.

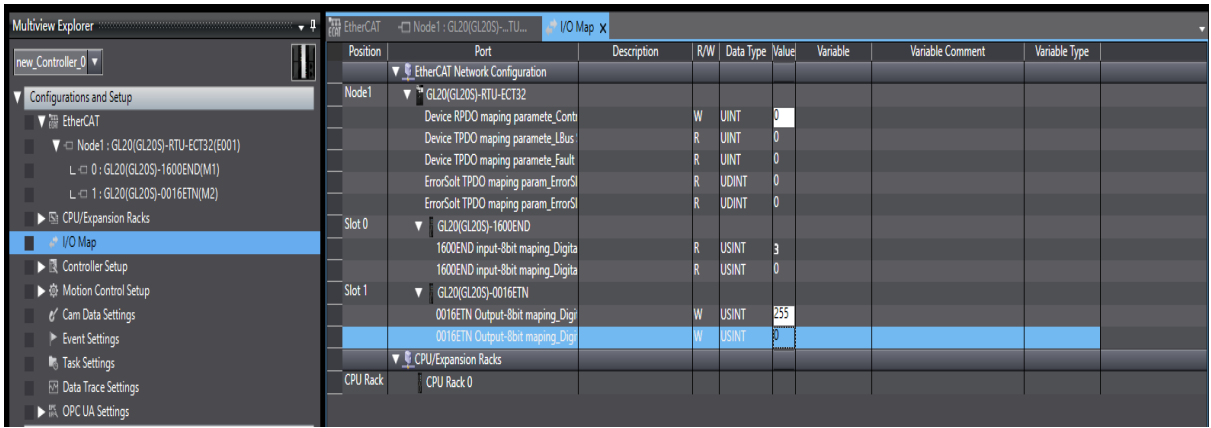
Prerequisites

Connect the output terminals DO0 and DO1 of the GL20-0016ETN module to the input terminals DI0 and DI1 of the GL20-1600END module, respectively.



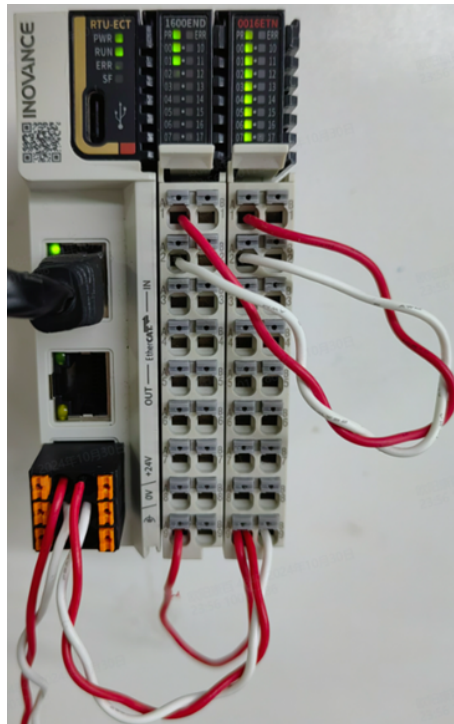
Procedure

1. Determine the status of the communication interface module and expansion modules through the signal indicators. For details on the signal indicators of the communication interface module, see "[Troubleshooting by Indicators](#)". For details on the signal indicators of the expansion modules, see the user guide of each module.
 - If the signal indicator status is normal, proceed to step 2.
 - If the signal indicator status is abnormal, determine the cause according to the signal indicator status and resolve the fault.
 - If the fault is resolved, proceed to step 2.
 - If the fault remains unresolved, use the programming software for troubleshooting. For details, see "[9.2.2.3 Compatibility with Omron PLC](#)".
2. In the "MultiView Explorer" navigation tree on the left, double-click "I/O Map". In the opened interface, expand slot 1 "GL20(GL20S)-0016ETN", enter "255" in the "Value" field for "xx_Digital output CH0-8bit_xx", and press "Enter" to confirm. Then, expand slot 0 "GL20(GL20S)-1600END" and the online value for "Digital input CH0-8bit" is 3.



3. Check whether the output and input channels of the GL20-0016ETN and GL20-1600END modules function normally.

- In the "I/O Map" interface, expand slot 0 "GL20(GL20S)-1600END" and check whether the value for "xx_Diagital input CH0-8bit_xx" is "3". This indicates that the DI0 and DI1 input channels of the module are functioning normally.
- If the signal indicators (00-07) of the GL20-0016ETN module and the signal indicators (00-01) of the GL20-1600END module are solid on, it indicates that the input and output channels of both modules are functioning normally.



7.4 Compatibility with Beckhoff PLC

This section takes the configuration of CX-6B69C4 PLC, GL20-RTU-ECT32-INT communication interface module, and two expansion modules (GL20-1600END and GL20-0016ETN) as an example. GL20-RTU-ECT32-INT is displayed as "GL20-RTU-ECT32" in the programming software.

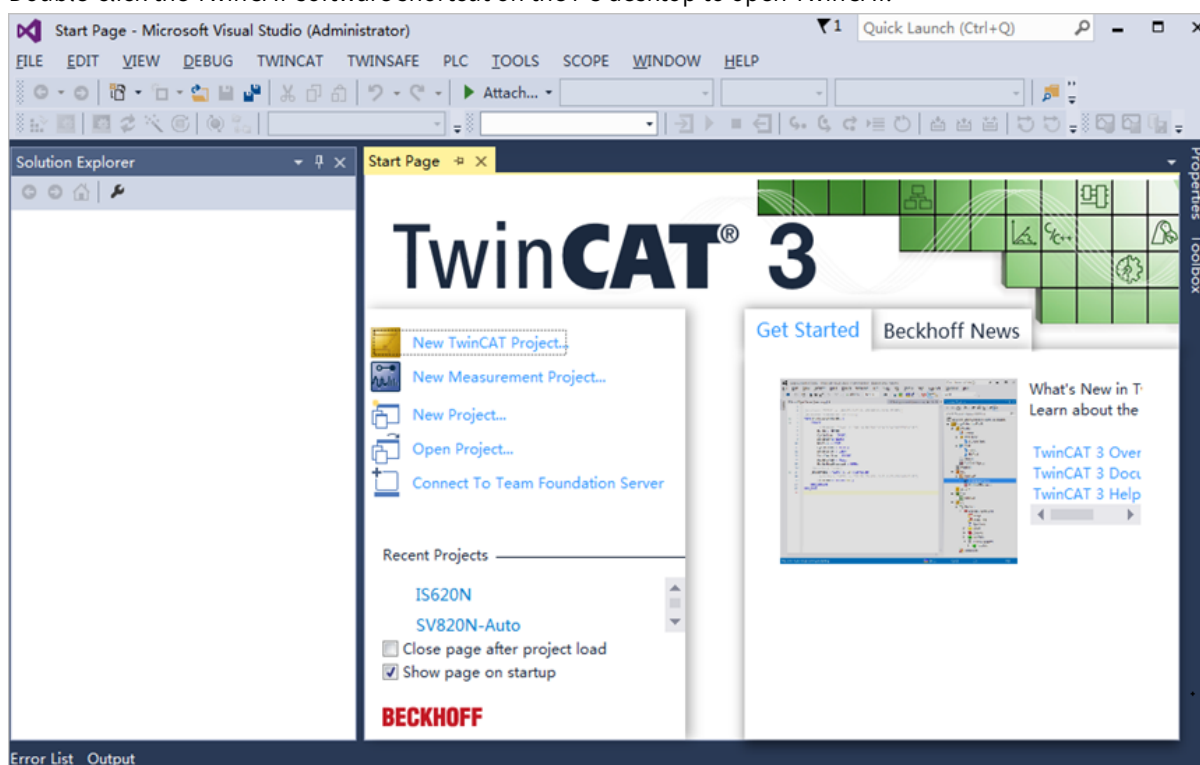
7.4.1 Configuration

Prerequisites

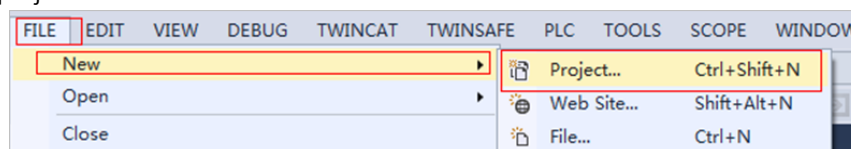
- The PC is equipped with TwinCAT software (TwinCAT V3.1.4024.25 is recommended).
- This product is connected to the PC and the PLC host via a network cable (no requirements for PLC model, PLC firmware version, or programming software version).
- This product is powered on.
- The EtherCAT configuration file "INOVANCE-GL20(GL20S)-RTU-ECT32-3.0.11.0.xml" is obtained from the Inovance official website (www.inovance.com).

Procedure

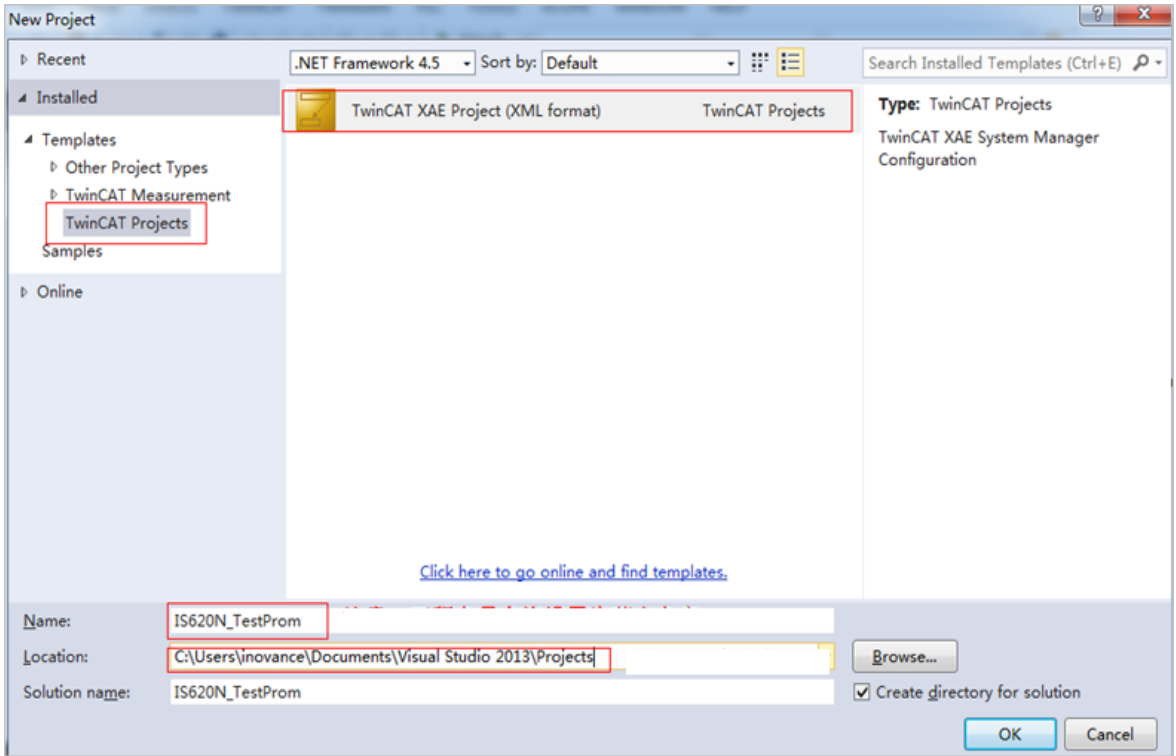
1. Copy the EtherCAT configuration file (.xml) to "C:\TwinCAT\3.1\Config\Io\EtherCAT".
2. Double-click the TwinCAT software shortcut on the PC desktop to open TwinCAT.



3. Create a project.
 - a. On the startup page, click "New TwinCAT Project", or select "FILE > New > Project..." from the menu bar to create a new project.

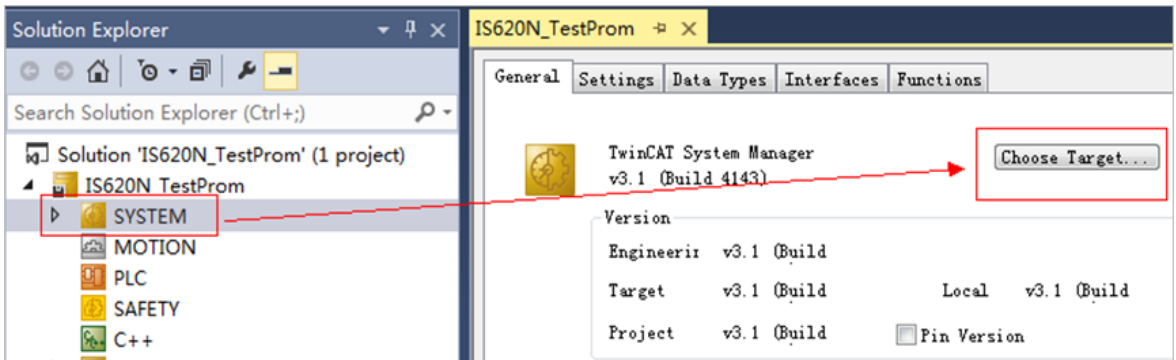


- b. In the opened dialog box, click "TwinCAT Projects" and select "TwinCAT XAE Project (XML format)". Enter the project name in "Name" (Chinese characters are not allowed), save path in "Location", and click "OK".

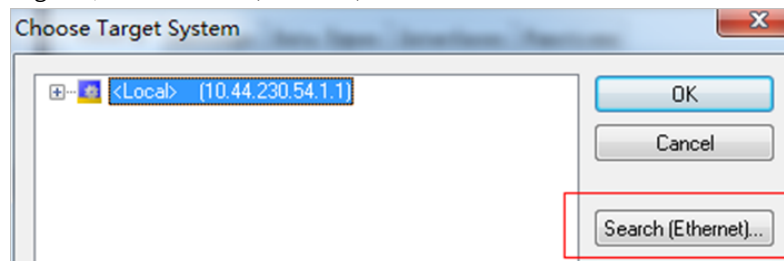


4. Connect to the target controller.

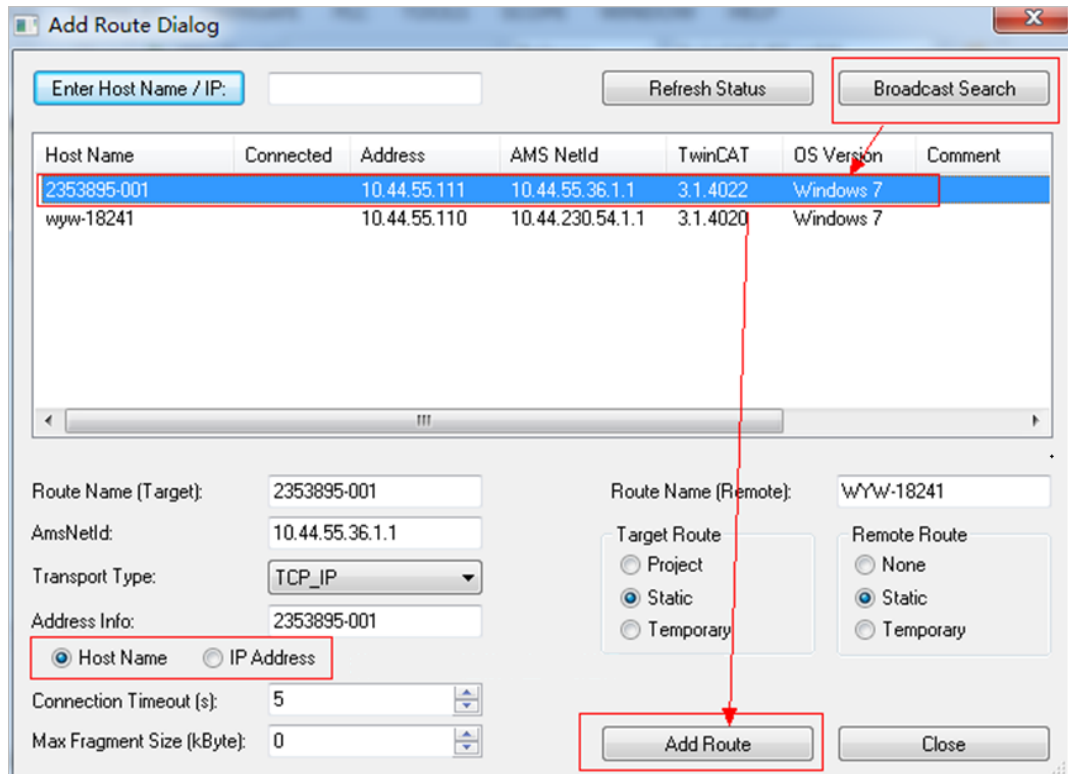
a. In the "Solution Explorer" navigation tree on the left, double-click "SYSTEM". In the opened interface, click "Choose Target...".



b. In the opened dialog box, click "Search (Ethernet)...".

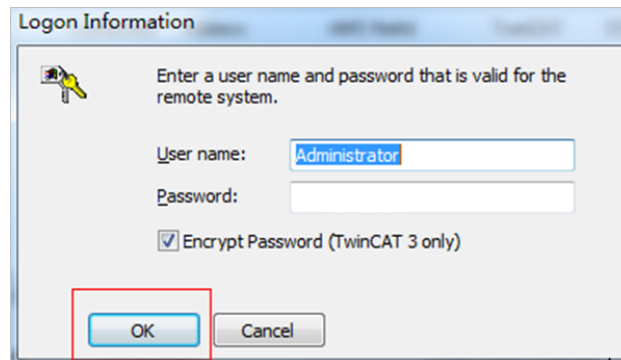


c. In the opened dialog box, click "Broadcast Search". In the search result list, click the target controller, and click "Add Route".

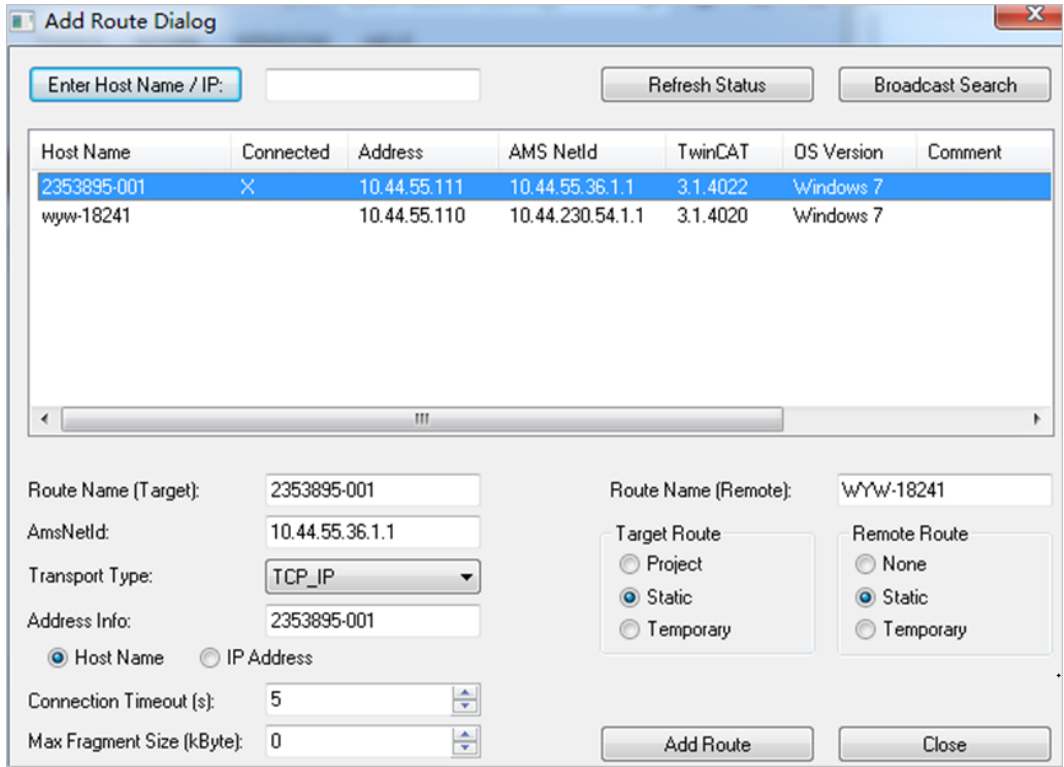


d. In the opened dialog box, enter the username and password, then click "OK".

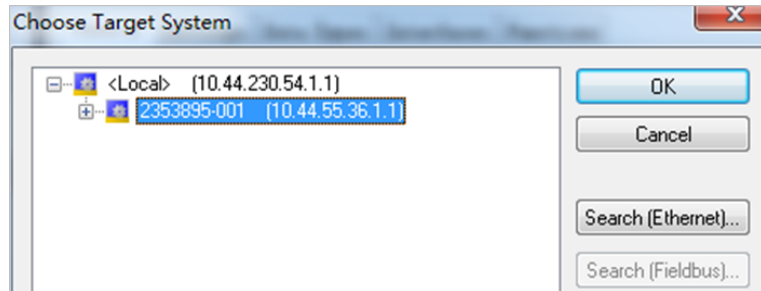
- For Windows 7 operating system, the username is set to the default value "Administrator", and the password is "1".
- For Windows CE operating system, the username is set to the default value "Administrator", and the password is left blank.



e. After successfully adding the Route, the "Connected" column displays an "X" mark.



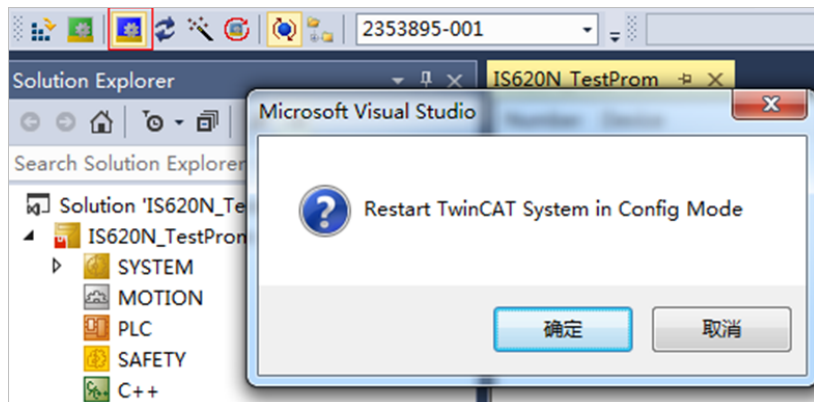
- f. In the "Choose Target System" dialog box, select the target controller, and click "OK" to complete the connection to the target controller.



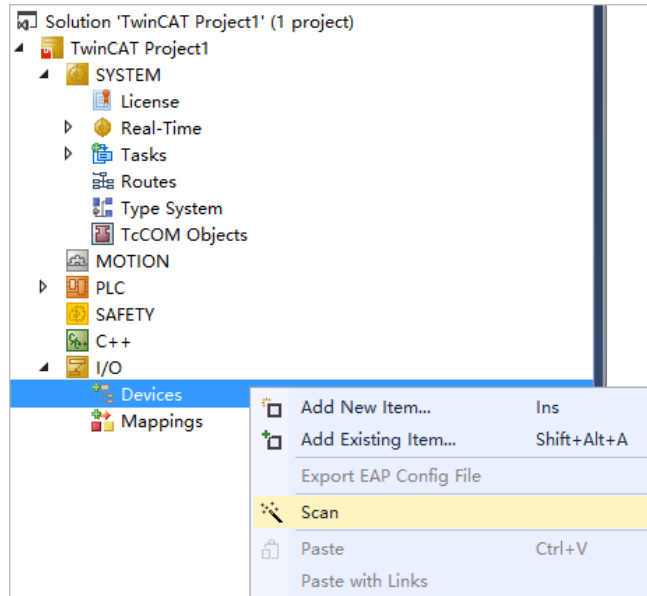
View the controller name on the toolbar. If it is the name of the added target controller, it indicates that the connection is successful.

5. Scan I/O.

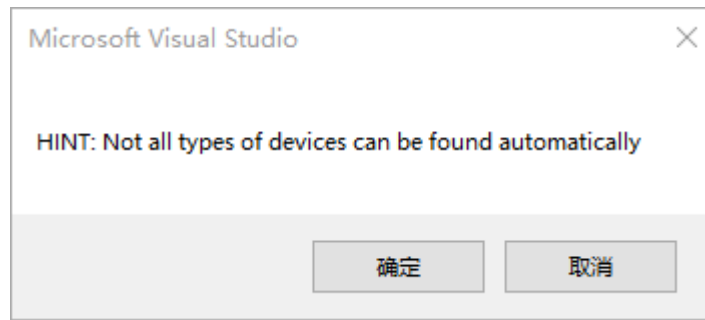
- a. Click the button in the red box on the toolbar, then click "OK" in the opened dialog box to switch to the configuration mode.



- b. In the "Solution Explorer" navigation tree on the left, right-click "Devices" and select "Scan" to scan I/O devices.

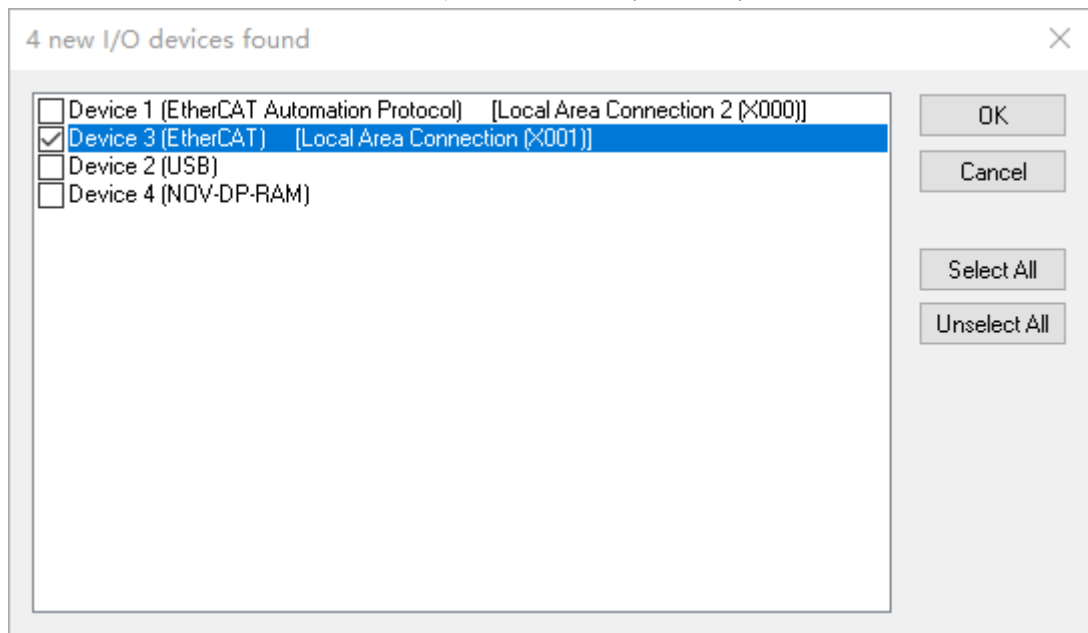


c. Click "OK".

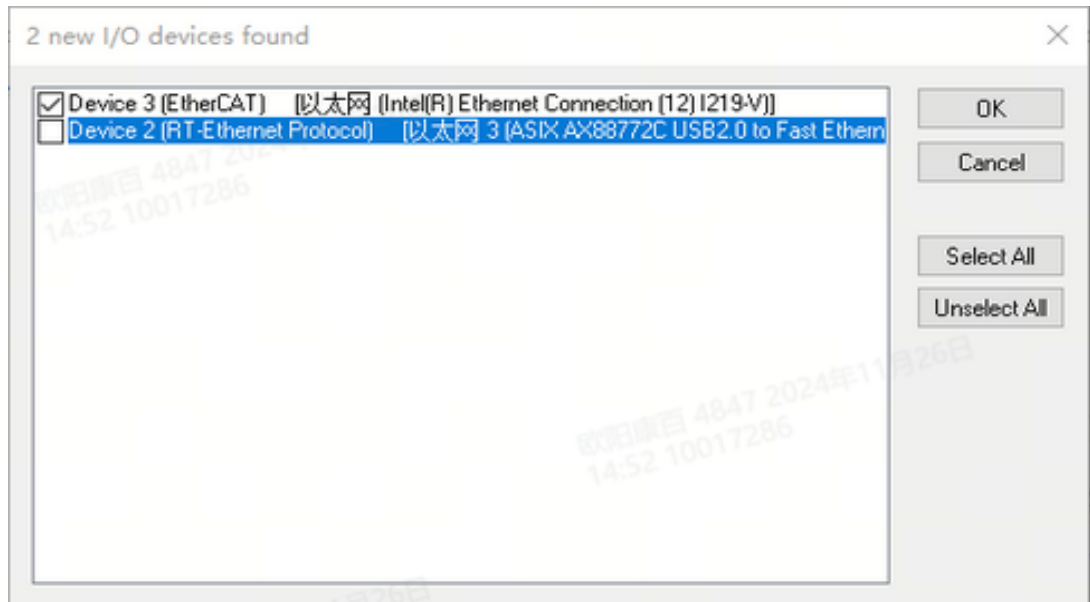


d. Select the scanned I/O devices and click "OK".

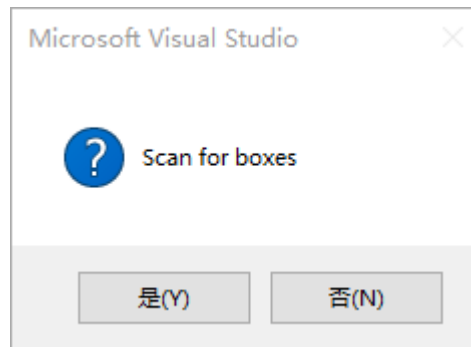
- If the PC is connected to a Beckhoff PLC, select "Device3 (EtherCAT)".



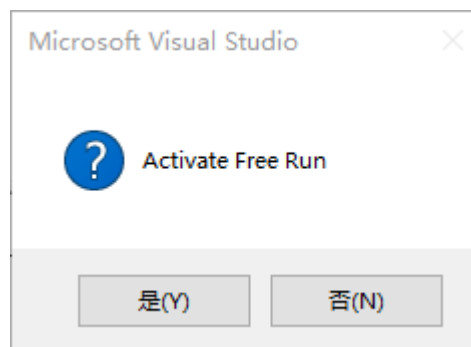
- If the PC is directly connected to this product, select the appropriate device based on the actual connected network port, such as "Device3 (EtherCAT)".



e. In the opened dialog box, click "Yes" to scan the device.



f. In the opened dialog box, click "Yes" to enter the Free Run mode.



The scanning results are as follows.

The screenshot displays the TwinCAT software interface. On the left, the 'Solution Explorer' shows a project structure for 'TwinCAT Project1'. The 'PLC' folder is expanded, and 'Device 3 (EtherCAT)' is selected. On the right, the 'EtherCAT' configuration window is open, showing the 'EtherCAT' tab. The 'Netid' is set to 5.107.105.196.4.1. Below the configuration options, there is a table of data points:

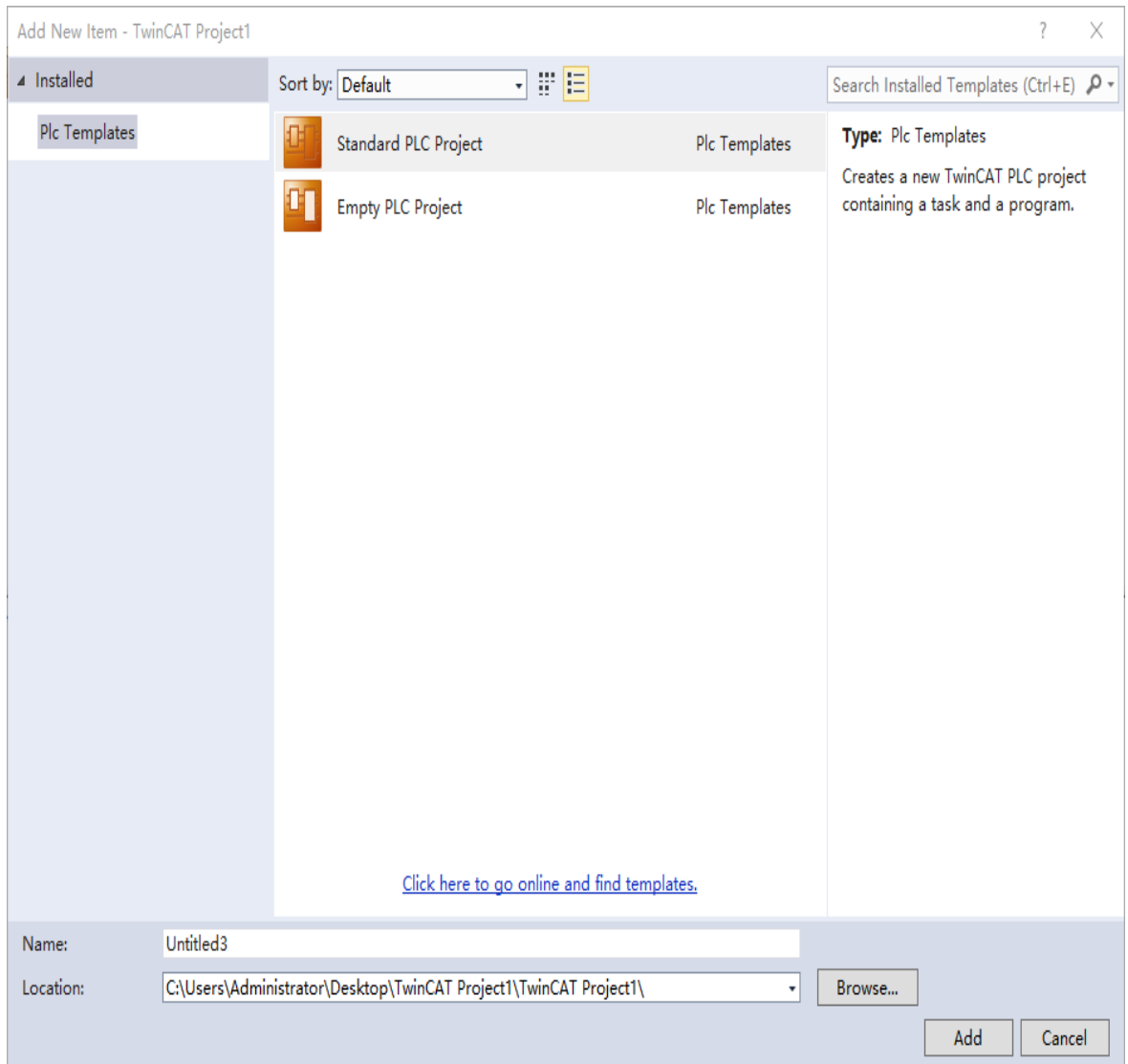
Fra...	Cmd	Addr	Len	WC	Sync Unit	Cycle (...)	Utilization (...)	Size / Duration...	Map Id
0	LRW	0x01000000	14	3	<default>	4,000			
0	BRD	0x0000 0x0...	2	1		4,000	0.17	56 / 6.72	0
							0.17		

Below the table, there is another table with columns: Number, Box Name, Address, Type, In Size, Out Size, E-Bus (...). The data row shows:

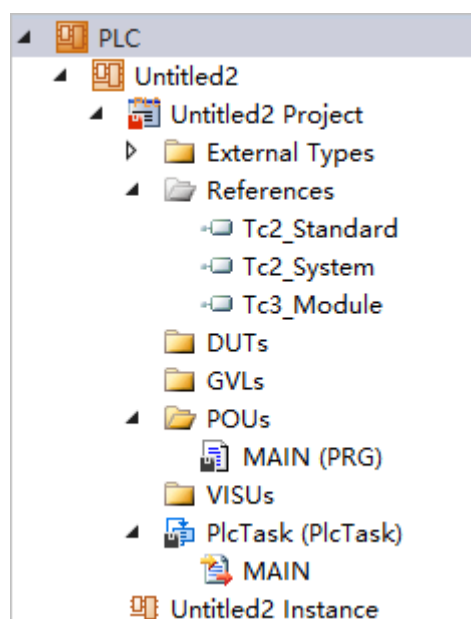
Number	Box Name	Address	Type	In Size	Out Size	E-Bus (...)
1	Box 1 (GL20(GL20S)-R...	1001	GL20(GL20S)-RT...	14.0	4.0	

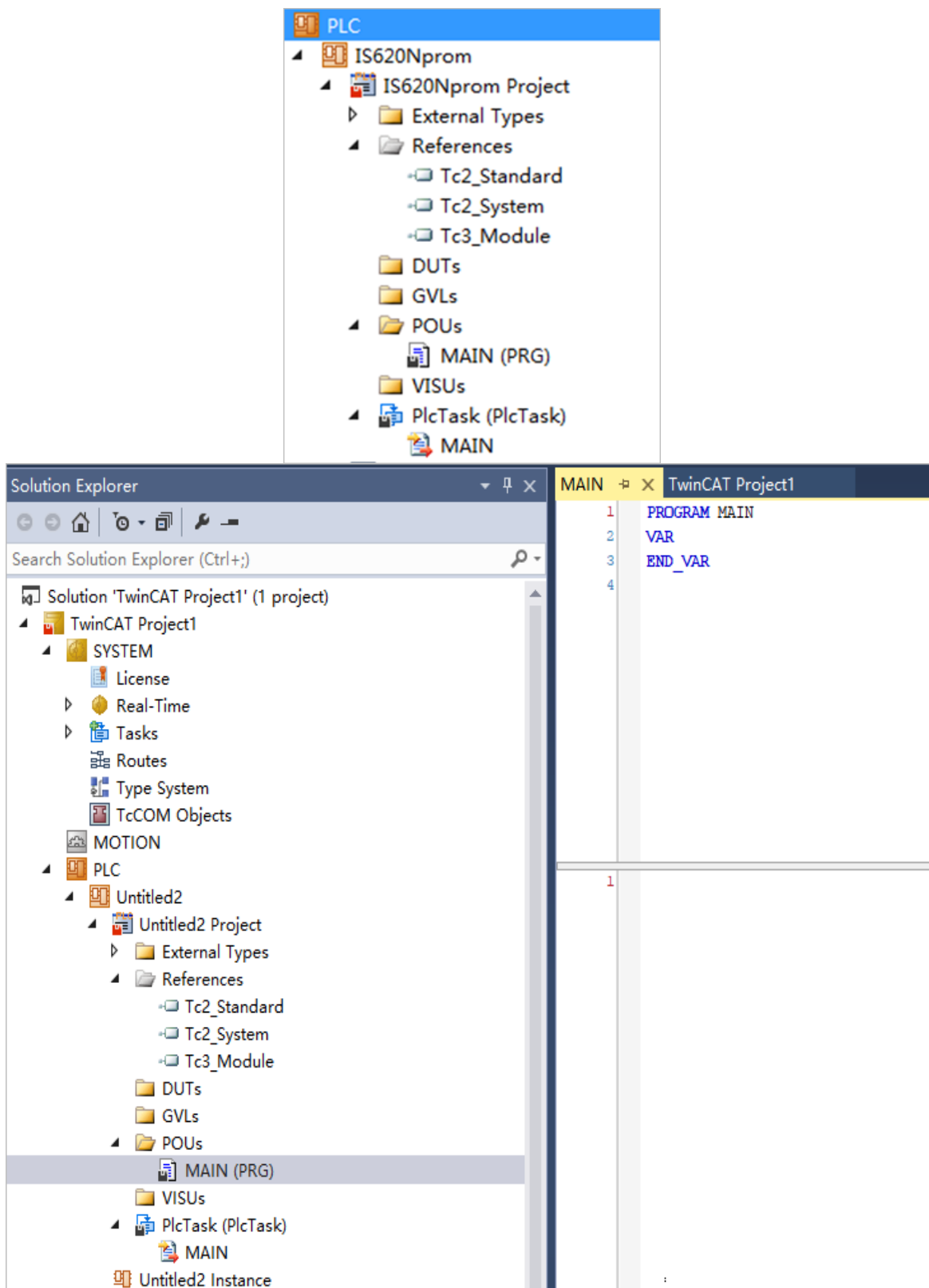
6. Create a PLC project and bind I/O mapped variables.

- a. In the "Solution Explorer" navigation tree on the left, right-click "PLC" and select "Add New Item".
- b. In the opened dialog box, click "Plc Templates". Select "Standard PLC Project", enter the PLC project name in "Name" (Chinese characters are not allowed), and click "Add" to create the PLC project.

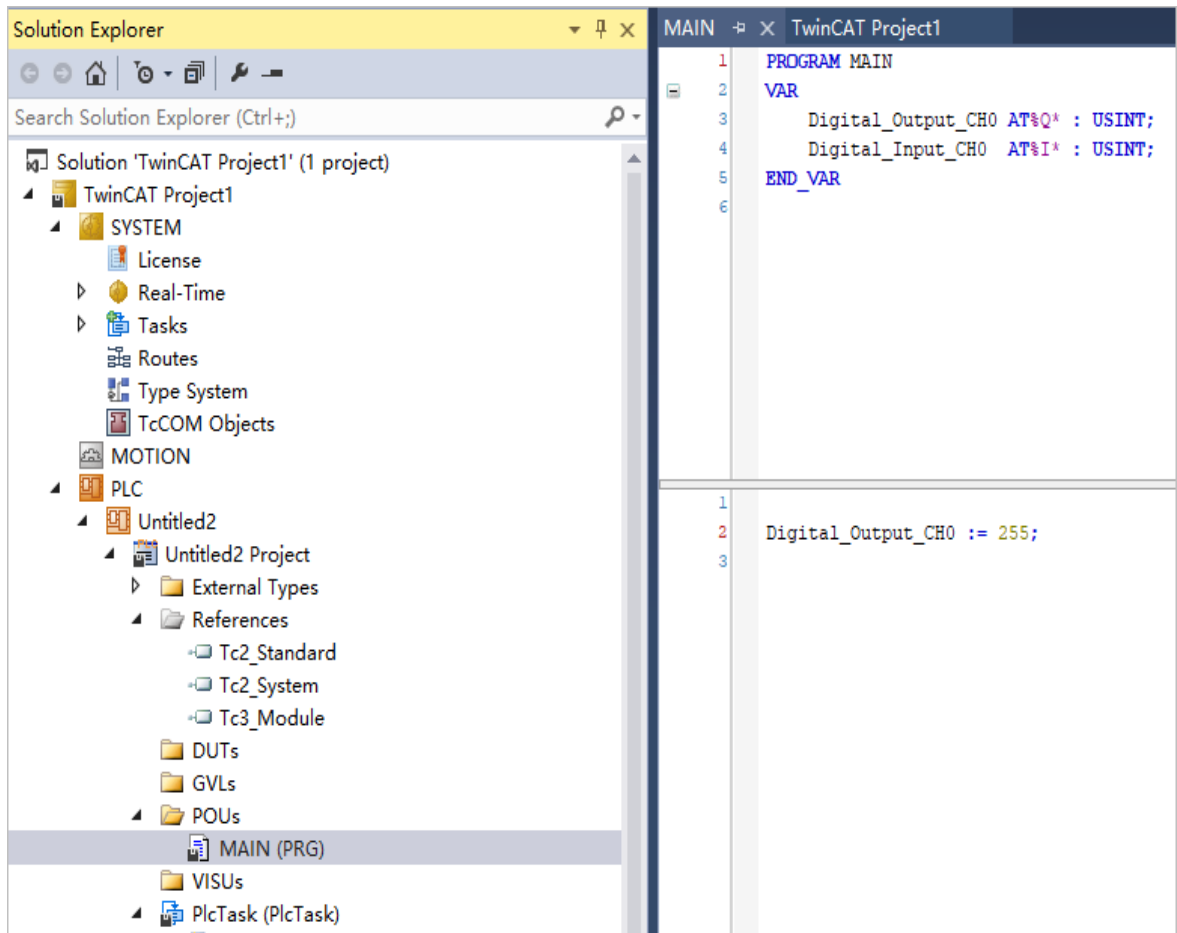


- c. After creating the PLC project, double-click "MAIN(PRG)" under "PLC > POU's" node to start programming, as shown below.

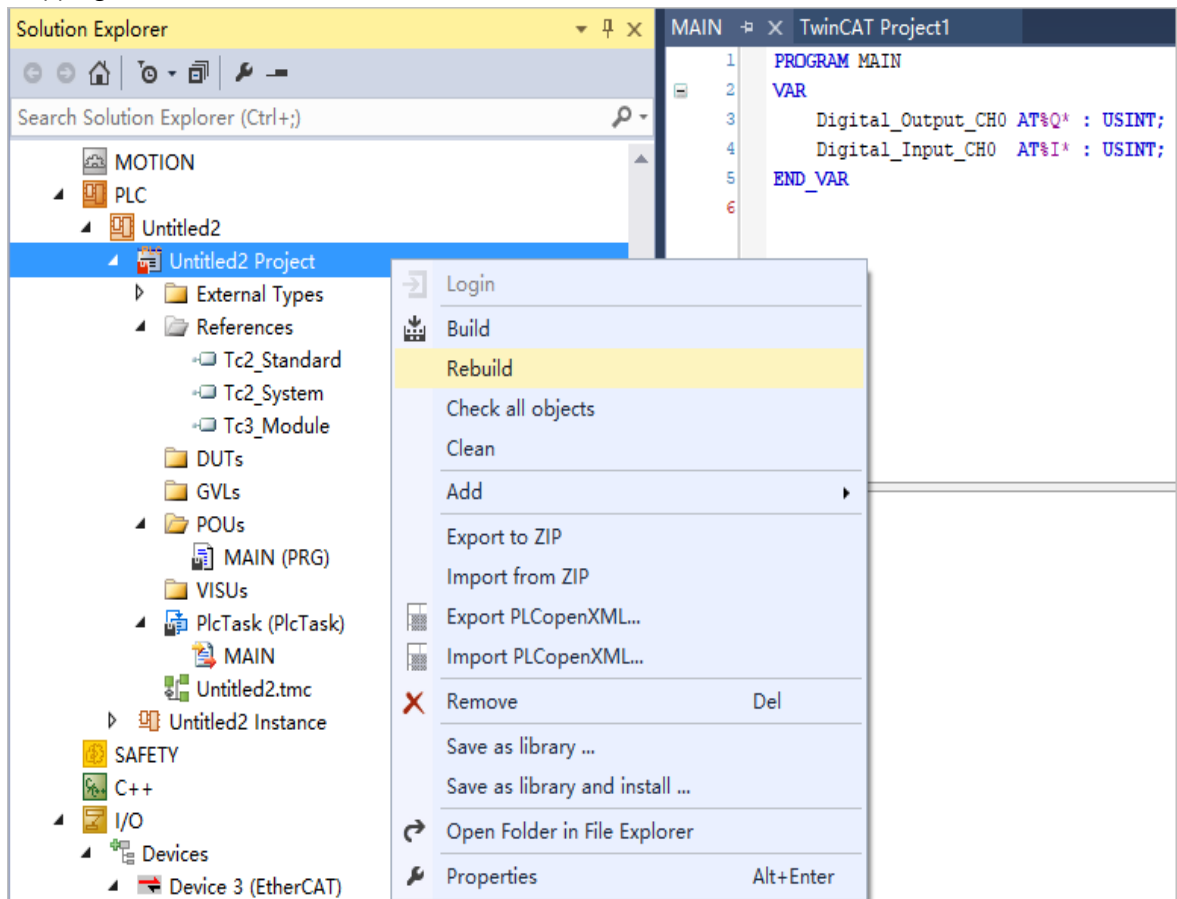




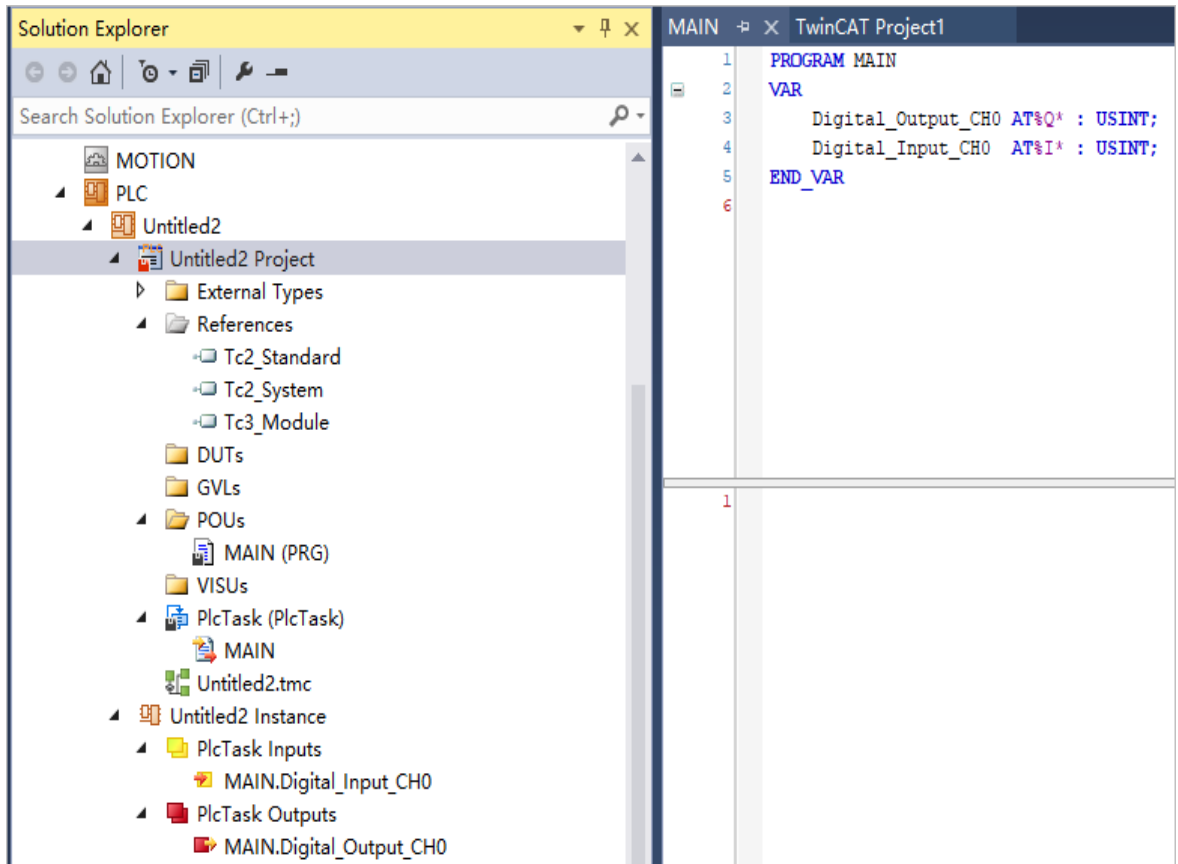
- d. Define a CH0 output variable for the GL20-0016ETN module and a CH0 input variable for the GL20-1600END module.



- e. Right-click "Untitled2 Project" under "PLC > Untitled2" node, and select "Rebuild" to generate the mapping variables.

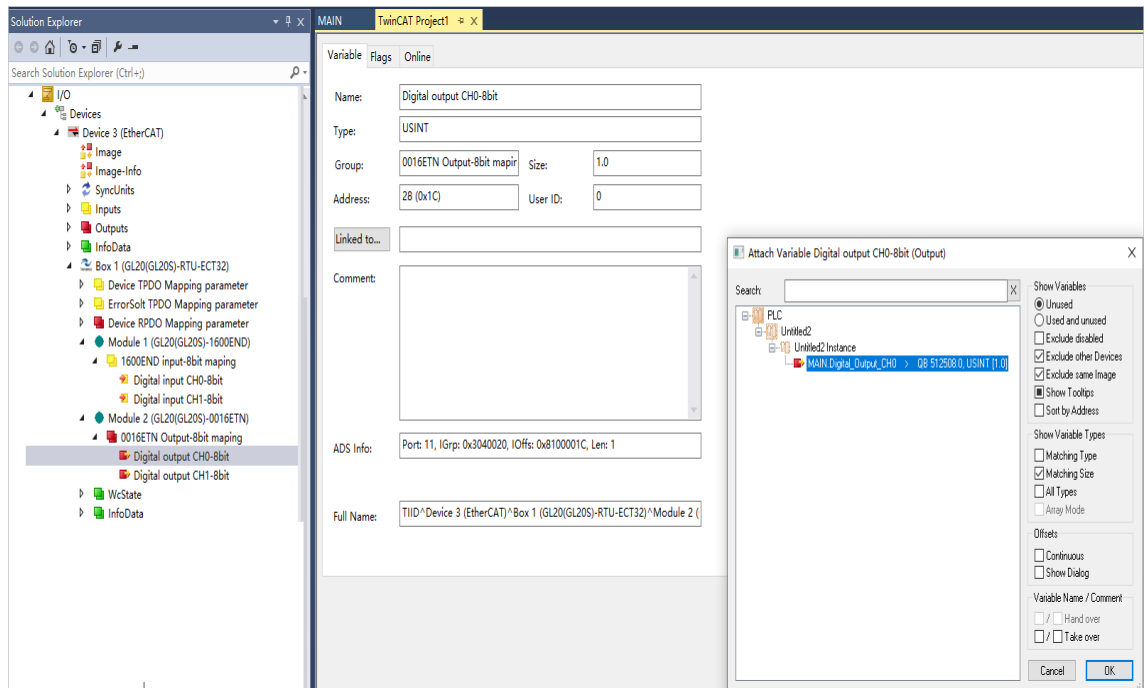


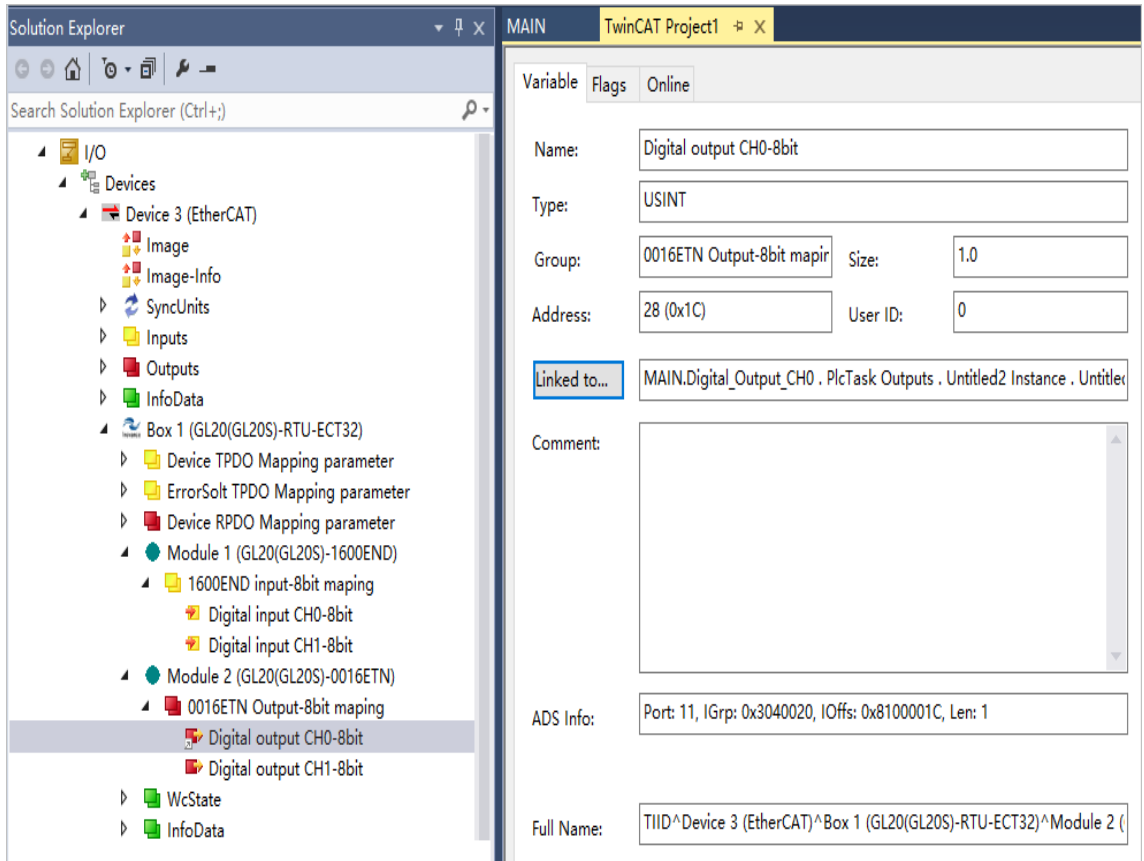
f. The generated mapping variables can be viewed in the "Untitled2 Instance" under the "PLC > Untitled2 > Untitled2 Project" node.



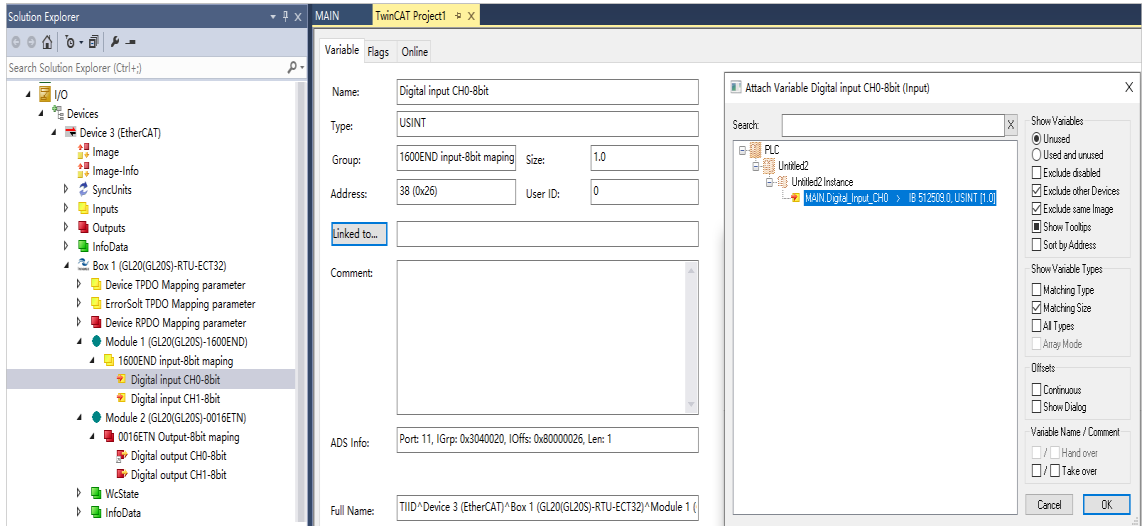
g. Bind the corresponding variable.

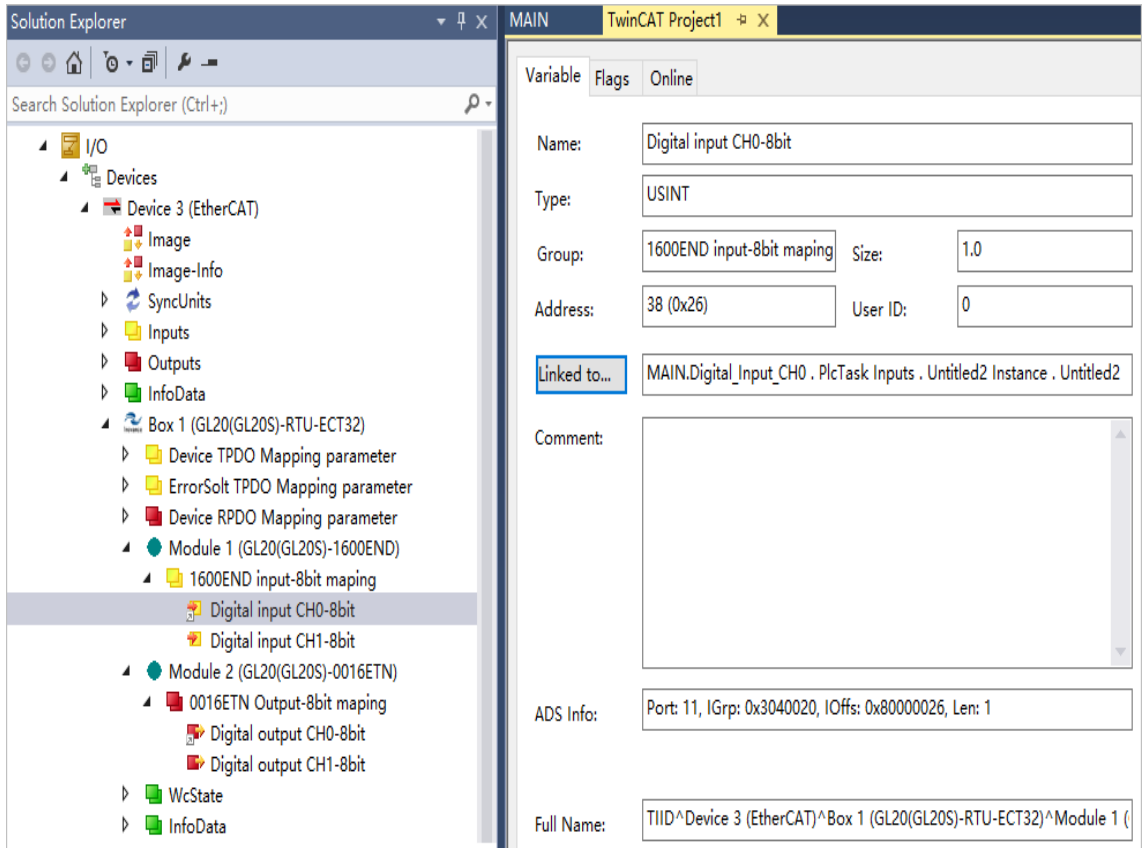
- Double-click "Digital output CH0-8bit" under "I/O > Devices > Devices3 (EtherCAT) > Box 1 (GL20(GL20S)-RTU-ECT32) > Module 2 (GL20(GL20S)-0016ETN) > 0016ETN Output-8bit mapping". In the opened interface, click "Linked to...", select "MAIN.Digital_Output_CH0" in the pop-up dialog box, and click "OK".





- Double-click "Digital input CH0-8bit" under "I/O > Devices > Devices3 (EtherCAT) > Box 1 (GL20(GL20S)-RTU-ECT32) > Module 2 (GL20(GL20S)-1600END) > 1600END Input-8bit mapping". In the opened interface, click "Linked to...", select "MAIN.Digital_Input_CH0" in the pop-up dialog box, and click "OK".



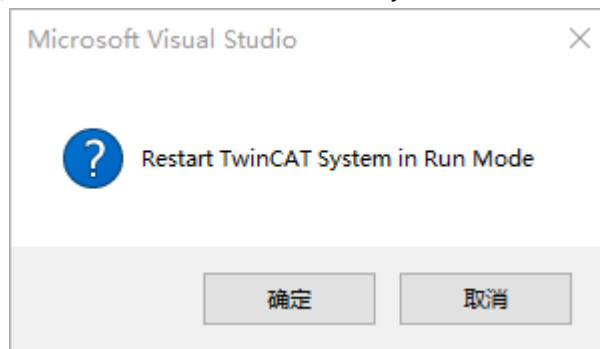


7. Run the program.

a. Click "Activate Configuration".



b. In the opened dialog box, click "Yes" to restart the TwinCAT system in run mode.



c. Click the login button to log in to the system, as shown below.



d. Click the start button and the system begins to run, as shown below.



e. The online value of "Digital output CH0-8bit" for the GL20-0016ETN module is "255", and that of "Digital input CH0-8bit" for the GL20-1600END module is "3" (the DO0 and DO1 of the 0016ETN module are connected to the DI0 and DI1 of the 1600END module, respectively).

The top screenshot shows the Solution Explorer with 'Module 2 (GL20(GL20S)-0016ETN)' selected. The I/O table on the right lists two digital output channels:


Name	Online	Type	Size	>Add...	In/Out	User...	Linked to
Digital output CH0-8bit	X 255	USINT	1.0	28.0	Outp...	0	MAIN.Digital_Output_...
Digital output CH1-8bit	0	USINT	1.0	29.0	Outp...	0	

The bottom screenshot shows the Solution Explorer with 'Module 1 (GL20(GL20S)-1600END)' selected. The I/O table on the right lists two digital input channels:

Name	Online	Type	Size	>Add...	In/Out	User...	Linked to
Digital input CH0-8bit	X 3	USINT	1.0	38.0	Input	0	MAIN.Digital_Input_C...
Digital input CH1-8bit	0	USINT	1.0	39.0	Input	0	

8. Configure the module startup parameters (SDO).

Click "Box 1 (GL20(GL20S)-RTU-ECT32)". In the opened interface, select "Startup" and configure the expansion module functions through SDO startup parameters that begin with "0x8nnn".

 **NOTE**

For details on the startup parameters, see "[Appendix 4: Expansion Module Object Dictionary Definitions](#)".

The screenshot shows a software interface with a project tree on the left and a configuration table on the right. The project tree includes folders like 'References', 'DUTs', 'GVLs', 'POUs', 'MAIN (PRG)', 'VISUs', 'PlcTask (PlcTask)', 'MAIN', 'Untitled2.tmc', 'Untitled2 Instance', 'SAFETY', 'C++', 'I/O', and 'Devices'. Under 'Devices', there is a folder 'Device 3 (EtherCAT)' containing 'Image', 'Image-Info', 'SyncUnits', 'Inputs', 'Outputs', 'InfoData', and 'Box 1 (GL20(GL20S)-RTU-ECT32)'. Under 'Box 1', there are 'Device TPDO Mapping parameter', 'ErrorSolt TPDO Mapping parameter', 'Device RPDO Mapping parameter', 'Module 1 (GL20(GL20S)-1600END)', 'Module 2 (GL20(GL20S)-0016ETN)', 'WcState', and 'InfoData'. The 'Module 1' folder is expanded to show '1600END input-8bit mapping' and '0016ETN Output-8bit mapping'. The '1600END input-8bit mapping' folder is further expanded to show 'Digital input CH0-8bit' and 'Digital input CH1-8bit'. The '0016ETN Output-8bit mapping' folder is expanded to show 'Digital output CH0-8bit' and 'Digital output CH1-8bit'. The configuration table on the right has tabs for 'General', 'EtherCAT', 'DC', 'Process Data', 'Slots', 'Startup', 'CoE - Online', and 'Online'. The 'Startup' tab is selected, showing a table with columns 'Transiti...', 'Protocol', 'Index', 'Data', and 'Comment'. The table contains 15 rows of configuration data. Below the table are 'Move Up' and 'Move Down' buttons. At the bottom of the interface, there is another table with columns 'Name', 'Online', 'Type', 'Size', '>Add...', 'In/Out', 'User...', and 'Linked to'. This table contains 12 rows of data, including 'LBus status', 'Fault ID', 'ErrorSolt1', 'ErrorSolt2', 'Digital input C...', 'WcState', 'InputToggle', 'State', 'AdsAddr', 'Device control', 'Digital output ...', and 'Digital output ...'.

Transiti...	Protocol	Index	Data	Comment
<PS>	CoE	0xF030:01	0x10F41010 (2844303...	download slot cfg 0xF030 entry
<PS>	CoE	0xF030:02	0x10F41020 (2844303...	download slot cfg 0xF030 entry
<PS>	CoE	0xF030:00	0x02 (2)	download slot cfg 0xF030 entry count
PS	CoE	0xF800:01	0x00 (0)	Configuration Error run state
PS	CoE	0xF800:02	0x00 (0)	Slave and module Error run state
PS	CoE	0xF800:03	0x01 (1)	EtherCAT Commucation error mode
PS	CoE	0xF800:04	0x00 (0)	ESC error counter behavior
PS	CoE	0x5000:01	0x0000 (0)	Disable Slot Control Ch0
PS	CoE	0x5000:02	0x0000 (0)	Disable Slot Control Ch1
PS	CoE	0x5000:03	0x0000 (0)	Disable Slot Control Ch2
PS	CoE	0x5000:04	0x0000 (0)	Disable Slot Control Ch3
PS	CoE	0x5001:00	0x0000 (0)	Disable Function Control
PS	CoE	0x8000:01	0x0004 (4)	DI module CH0 filter time
PS	CoE	0x8000:02	0x0004 (4)	DI module CH1 filter time
PS	CoE	0x8040:01	0xFF (255)	DO module CH0 stopmode after EtherCAT lost link
PS	CoE	0x8040:02	0xFF (255)	DO module CH1 stopmode after EtherCAT lost link
PS	CoE	0x8041:01	0x00 (0)	DO module CH0 stopvalue after EtherCAT lost link
PS	CoE	0x8041:02	0x00 (0)	DO module CH1 stopvalue after EtherCAT lost link

Name	Online	Type	Size	>Add...	In/Out	User...	Linked to
LBus status	8	UINT	2.0	26.0	Input	0	
Fault ID	0	UINT	2.0	28.0	Input	0	
ErrorSolt1	0	UDINT	4.0	30.0	Input	0	
ErrorSolt2	0	UDINT	4.0	34.0	Input	0	
Digital input C...	X 3	USINT	1.0	38.0	Input	0	MAIN.Digital_Input_C...
Digital input C...	0	USINT	1.0	39.0	Input	0	
WcState	0	BIT	0.1	1522.0	Input	0	
InputToggle	0	BIT	0.1	1524.0	Input	0	
State	8	UINT	2.0	1548.0	Input	0	
AdsAddr	5.107.105.196.4.1...	AMSADDR	8.0	1550.0	Input	0	
Device control	0	UINT	2.0	26.0	Outp...	0	
Digital output ...	X 255	USINT	1.0	28.0	Outp...	0	MAIN.Digital_Output_...
Digital output ...	0	USINT	1.0	29.0	Outp...	0	

Example: The default filter parameter for channel 0 of the GL20-1600END module is 4, indicating a filter time of 1ms. The following example shows how to modify the filter parameter for channel 0 from 4 to 2 (indicating a filter time of 0.5ms).

- a. Double-click the row containing "0x8000:01 DI module CH0 filter time". In the pop-up window, modify the value of "Data(hexbin)" to "02 00", then click "OK".

The screenshot shows the 'CoE - Online' interface with the following data tables:

Transi...	Protocol	Index	Data	Comment
<PS>	CoE	0xF030:01	0x10F41010 (2844303...	download slot cfg 0xF030 entry
<PS>	CoE	0xF030:02	0x10F41020 (2844303...	download slot cfg 0xF030 entry
<PS>	CoE	0xF030:00	0x02 (2)	download slot cfg 0xF030 entry count
PS	CoE	0xF800:01	0x00 (0)	Configuration Error run state
PS	CoE	0xF800:02	0x00 (0)	Slave and module Error run state
PS	CoE	0xF800:03	0x01 (1)	EtherCAT Communication error mode
PS	CoE	0xF800:04	0x00 (0)	ESC error counter behavior
PS	CoE	0x5000:01	0x0000 (0)	Disable Slot Control CH0
PS	CoE	0x5000:02	0x0000 (0)	Disable Slot Control CH1
PS	CoE	0x5000:03	0x0000 (0)	Disable Slot Control CH2
PS	CoE	0x5000:04	0x0000 (0)	Disable Slot Control CH3
PS	CoE	0x5001:00	0x0000 (0)	Disable Function Control
PS	CoE	0x8000:01	0x0004 (4)	DI module CH0 filter time
PS	CoE	0x8000:02	0x0004 (4)	DI module CH1 filter time
PS	CoE	0x8040:01	0xFF (255)	DO module CH0 stopmode after EtherCAT lost link
PS	CoE	0x8040:02	0xFF (255)	DO module CH1 stopmode after EtherCAT lost link
PS	CoE	0x8041:01	0x00 (0)	DO module CH0 stopvalue after EtherCAT lost link
PS	CoE	0x8041:02	0x00 (0)	DO module CH1 stopvalue after EtherCAT lost link

Name	Online	Type	Size	>Add...	In/Out	User...	Linked to
LBus status	8	UINT	2.0	26.0	Input	0	
Fault ID	0	UINT	2.0	28.0	Input	0	
ErrorSol1	0	UDINT	4.0	30.0	Input	0	
ErrorSol2	0	UDINT	4.0	34.0	Input	0	
Digital input C...	X 3	USINT	1.0	38.0	Input	0	MAIN.Digital_Input_C...
Digital input C...	0	USINT	1.0	39.0	Input	0	
WcState	0	BIT	0.1	1522.0	Input	0	
InputToggle	0	BIT	0.1	1524.0	Input	0	
State	8	UINT	2.0	1548.0	Input	0	
AdsAddr	5.107.105.196.4.1...	AMSADDR	8.0	1550.0	Input	0	
Device control	0	UINT	2.0	26.0	Outp...	0	
Digital output ...	X 255	USINT	1.0	28.0	Outp...	0	MAIN.Digital_Output_...
Digital output ...	0	USINT	1.0	29.0	Outp...	0	

Index	Name	Flags	Value
8000	1600END module configure parameters	RW	> 2 <

b. Click "Activate Configuration" and re-download the project to apply the modified startup parameters. In the "CoE - Online" interface, if the filter parameter for channel 0 of the GL20-1600END module is 2, it indicates that the modification is successful.

The screenshot displays the SIMATIC Manager configuration environment. On the left, the 'Solution Explorer' shows a project tree where 'Box 1 (GL20(GL20S)-RTU-ECT32)' is selected under the 'I/O' section. The right pane is divided into two main areas:

Top Area: Process Data Configuration

- Buttons: Update List, Advanced..., Add to Startup...
- Options: Auto Update, Single Update, Show Offline Data
- Field: Module OD (AoE) with value 0

Middle Area: PDO List Table

Index	Name	Flags	Value	Unit
6000:0	1600END input	RO	> 2 <	
7040:0	0016ETN output	RO	> 2 <	
8000:0	1600END module configure parameters	RW	> 2 <	
8000:01	1600END Digital input Filter time CH0	RW	0x0002 (2)	
8000:02	1600END Digital input Filter time CH1	RW	0x0004 (4)	
8040:0	0016ETN module configure stopmode p...	RW	> 2 <	
8041:0	0016ETN module configure stopvalue pa...	RW	> 2 <	
A000:0	1600END Diagnosis information	RO	> 3 <	
A040:0	0016ETN Diagnosis information	RO	> 3 <	
F000:0	Modular device profile	RO	> 2 <	
F030:0	Configured Module Ident List	RO	> 2 <	
F050:0	Detected Module Ident List	RO	> 2 <	
F100:0	Device Status	RO	> 2 <	
F110:0	Module Error Flag	RO	> 2 <	
F120:0	LBus Count	RO	> 41 <	

Bottom Area: Object Properties Table

Name	Online	Type	Size	>Add...	In/Out	User...	Linked to
LBus status	8	UINT	2.0	26.0	Input	0	
Fault ID	0	UINT	2.0	28.0	Input	0	
ErrorSolt1	0	UDINT	4.0	30.0	Input	0	
ErrorSolt2	0	UDINT	4.0	34.0	Input	0	
Digital input C...	X 3	USINT	1.0	38.0	Input	0	MAIN.Digital_Input_C...
Digital input C...	0	USINT	1.0	39.0	Input	0	
WcState	0	BIT	0.1	1522.0	Input	0	
InputToggle	1	BIT	0.1	1524.0	Input	0	
State	8	UINT	2.0	1548.0	Input	0	
AdsAddr	5.107.105.196.4.1...	AMSADDR	8.0	1550.0	Input	0	
Device control	0	UINT	2.0	26.0	Outp...	0	
Digital output ...	X 255	USINT	1.0	28.0	Outp...	0	MAIN.Digital_Output_...
Digital output ...	0	USINT	1.0	29.0	Outp...	0	

9. Configure the process data objects (PDOs).

- a. Click "Box 1 (GL20(GL20S)-RTU-ECT32)". In the opened interface, select "Process data" to configure process data.

The screenshot displays the SIMATIC Manager configuration environment. On the left, the 'Device Tree' shows the project structure for 'Box 1 (GL20(GL20S)-RTU-ECT32)', including modules like '1600END input-8bit mapping' and '0016ETN Output-8bit mapping'. The main window is in the 'Process Data' tab, showing the 'Sync Manager' with three sync units. Sync Unit 3, 'Inputs' (size 14), is selected. The 'PDO List' shows the configuration for index 0x1A01 as '1600END input-8bit mapping'. The 'PDO Assignment' section has '0x1A01' checked. The 'PDO Content' section lists digital input bits 0 through 5. The bottom table provides a summary of device variables and their properties.

Name	Online	Type	Size	>Address	In/Out	User...	Linked to
LBus status	8	UINT	2.0	26.0	Input	0	
Fault ID	0	UINT	2.0	28.0	Input	0	
ErrorSolt1	0	UDINT	4.0	30.0	Input	0	
ErrorSolt2	0	UDINT	4.0	34.0	Input	0	
Digital input C...	X 3	USINT	1.0	38.0	Input	0	MAIN.Digital_Input_C...
Digital input C...	0	USINT	1.0	39.0	Input	0	
WcState	0	BIT	0.1	1522.0	Input	0	
InputToggle	0	BIT	0.1	1524.0	Input	0	

- b. Take digital modules as an example, there are three addressing methods: by bit, 8-bit, and 16-bit. The following takes the GL20(GL20S)-1600END module as an example, showing how to modify the addressing method from 8-bit addressing (default) to bit addressing.
 - i. In the "Process Data" interface, click "Inputs" under "Sync Manager". "PDO Assignment" is set to "0x1A01" by default. In the "PDO List", the index "0x1A01" is defined as "1600END input-8bit mapping", indicating the default 8-bit addressing method.

The screenshot displays the SIMATIC Manager configuration environment. On the left, the project tree shows a hierarchy from 'Untitled2 Project' down to 'Box 1 (GL20(GL20S)-RTU-ECT32)'. The right pane is divided into several sections:

- Sync Manager:** A table with columns SM, Size, Type, and Flags. It lists four entries: SM 0 (128 MbxOut), SM 1 (128 MbxIn), SM 2 (4 Outputs), and SM 3 (14 Inputs).
- PDO List:** A table with columns Index, Size, Name, Flags, SM, and SU. It lists various PDOs such as 'Device TPDO Mapping parameter', 'ErrorSolt TPDO Mapping parameter', and '1600END input-8bit mapping'.
- PDO Assignment (0x1C13):** A list of checkboxes for PDOs 0x1BA0, 0x1BA1, 0x1A01, 0x1A02, and 0x1A00. 0x1A01 is unchecked, while 0x1A00 is checked.
- PDO Content (0x1A01):** A table with columns Index, Size, Offs, Name, Type, and Default. It shows digital input mappings for CH0-8bit and CH1-8bit.
- Download:** Checkboxes for 'PDO Assignment' and 'PDO Configuration'.
- Table:** A table with columns Name, Online, Type, Size, >Address, In/Out, User..., and Linked to. It lists system variables like 'LBus status', 'Fault ID', 'ErrorSolt1', 'Digital input C...', 'WcState', and 'InputToggle'.

ii. In "PDO Assignment," uncheck "0x1A01", and then check "0x1A00".

The screenshot displays the Siemens SIMATIC Manager interface for configuring process data. The left pane shows the project hierarchy, including 'I/O > Devices > Device 3 (EtherCAT) > Box 1 (GL20(GL20S)-RTU-ECT32) > Module 1 (GL20(GL20S)-1600END)'. The main area shows the 'Process Data' configuration for 'Device 3 (EtherCAT)'. The 'PDO List' table is as follows:

Index	Size	Name	Flags	SM	SU
0x1BA0	4.0	Device TPDO Mapping parameter	F	3	0
0x1BA1	8.0	ErrorSolt TPDO Mapping parameter	F	3	0
0x17A0	2.0	Device RPDO Mapping parameter	F	2	0
0x1A01	2.0	1600END input-8bit mapping	F		0
0x1A02	2.0	1600END input-16bit mapping	F		0
0x1A00	2.0	1600END input-bit mapping	F	3	0
0x1609	2.0	0016ETN Output-8bit mapping	F	2	0
0x160A	2.0	0016ETN Output-16bit mapping	F		0
0x1608	2.0	0016ETN Output-bit mapping	F		0

The 'PDO Content (0x1A01)' table shows the following entries:

Index	Size	Offs	Name	Type	Default (h...
0x6001...	1.0	0.0	Digital input CH0-8bit	USINT	
0x6001...	1.0	1.0	Digital input CH1-8bit	USINT	

The bottom table lists the device's I/O points:

Name	Online	Type	Size	>Address	In/Out	User...	Linked to
LBus status		UINT	2.0	26.0	Input	0	
Fault ID		UINT	2.0	28.0	Input	0	
ErrorSolt1		UDINT	4.0	30.0	Input	0	
ErrorSolt2		UDINT	4.0	34.0	Input	0	
Digital input bit0		BIT	0.1	38.0	Input	0	
Digital input bit1		BIT	0.1	38.1	Input	0	
Digital input bit2		BIT	0.1	38.2	Input	0	
Digital input bit3		BIT	0.1	38.3	Input	0	

iii. Click "Activate Configuration" and re-download the project to apply the modified process data configuration. The modified process data configuration can be viewed in "I/O > Devices > Devices3 (EtherCAT) > Box 1 (GL20(GL20S)-RTU-ECT32) > Module 1 (GL20(GL20S)-1600END) > 1600END input-bit mapping".

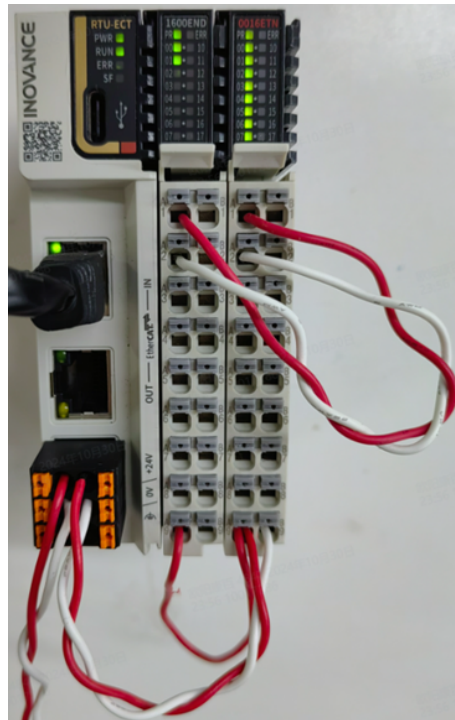
Name	Online	Type	Size	>Add...	In/Out	User...	Linked to
Digital input bit0	1	BIT	0.1	38.0	Input	0	
Digital input bit1	1	BIT	0.1	38.1	Input	0	
Digital input bit2	0	BIT	0.1	38.2	Input	0	
Digital input bit3	0	BIT	0.1	38.3	Input	0	
Digital input bit4	0	BIT	0.1	38.4	Input	0	
Digital input bit5	0	BIT	0.1	38.5	Input	0	
Digital input bit6	0	BIT	0.1	38.6	Input	0	
Digital input bit7	0	BIT	0.1	38.7	Input	0	
Digital input bit8	0	BIT	0.1	39.0	Input	0	
Digital input bit9	0	BIT	0.1	39.1	Input	0	
Digital input bit10	0	BIT	0.1	39.2	Input	0	
Digital input bit11	0	BIT	0.1	39.3	Input	0	
Digital input bit12	0	BIT	0.1	39.4	Input	0	
Digital input bit13	0	BIT	0.1	39.5	Input	0	
Digital input bit14	0	BIT	0.1	39.6	Input	0	
Digital input bit15	0	BIT	0.1	39.7	Input	0	

7.4.2 Commissioning

After successfully configuring and downloading this product and the expansion modules, a simple commissioning is required to ensure normal functioning.

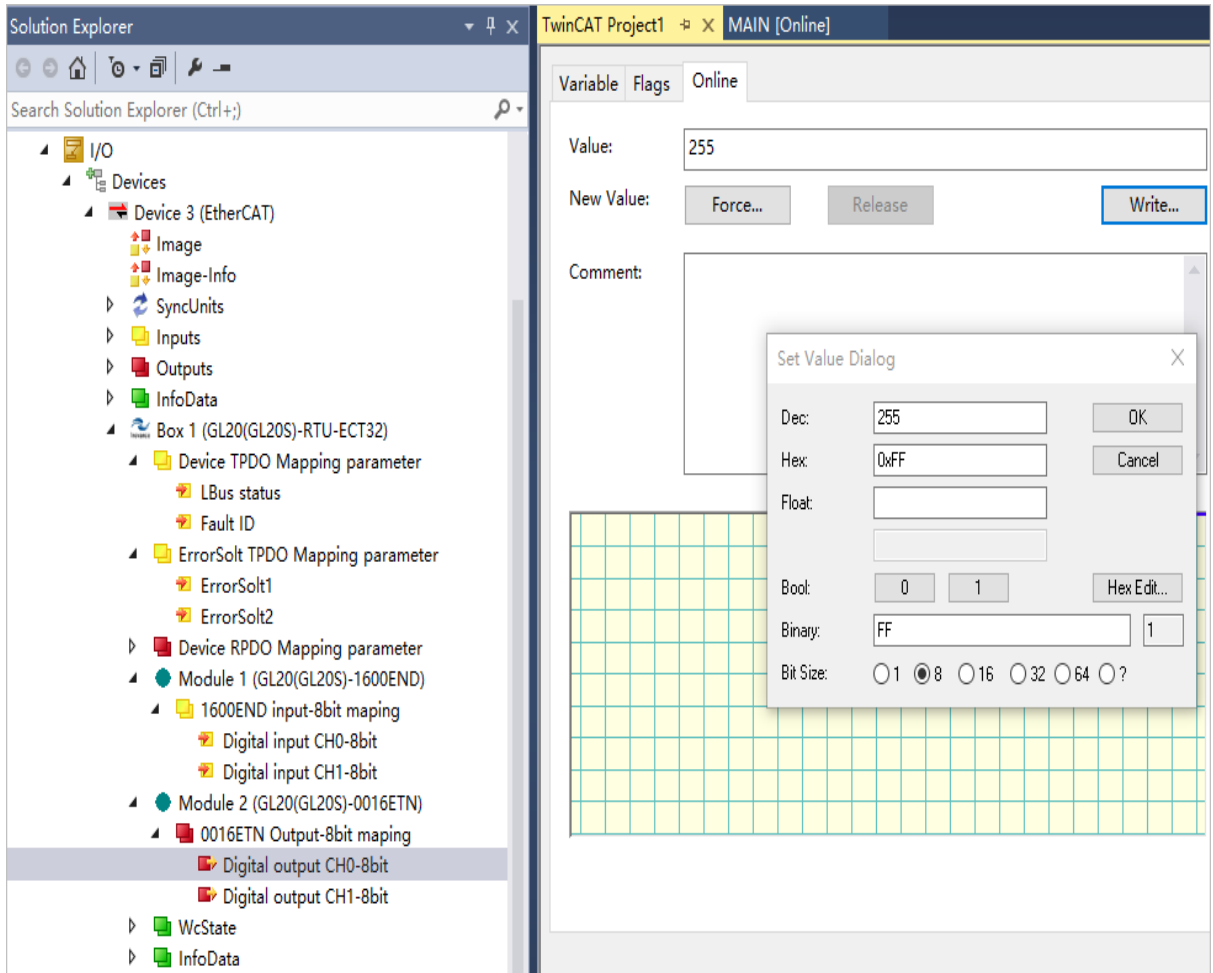
Prerequisites

Connect the output terminals DO0 and DO1 of the GL20-0016ETN module to the input terminals DI0 and DI1 of the GL20-1600END module, respectively.



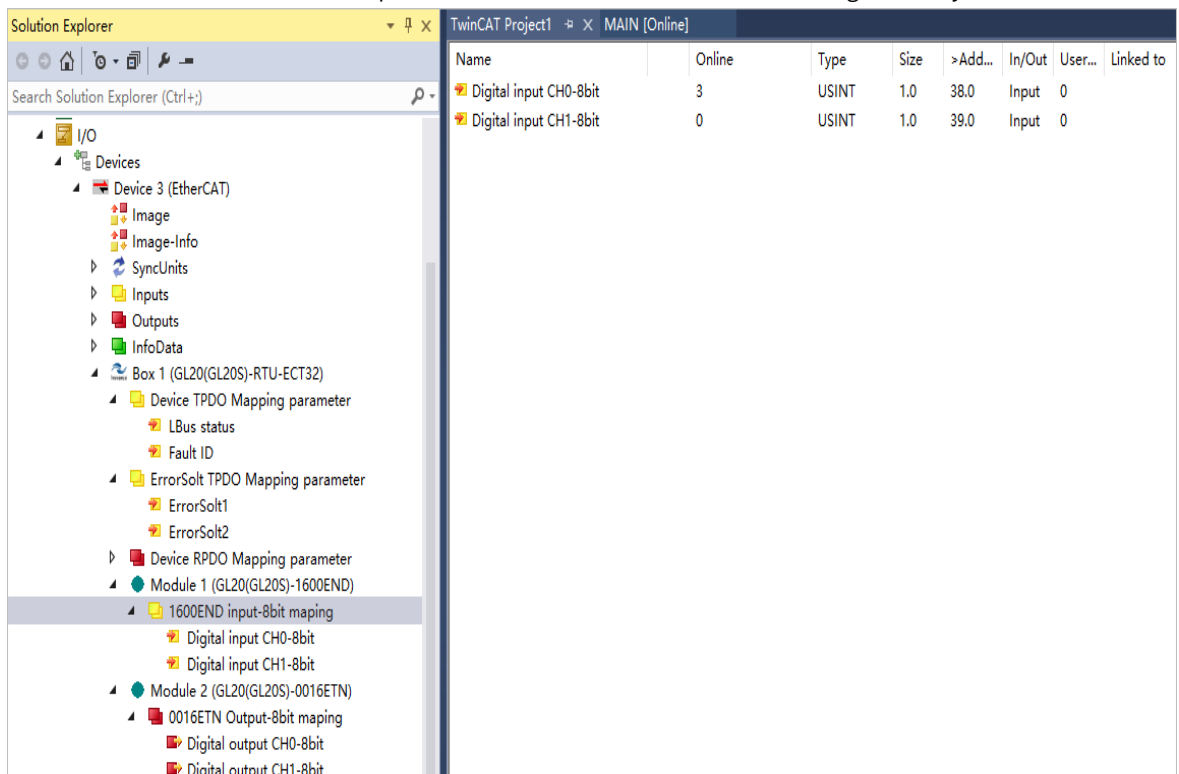
Procedure

1. Determine the status of the communication interface module and expansion modules through the signal indicators. For details on the signal indicators of the communication interface module, see "[Troubleshooting by Indicators](#)". For details on the signal indicators of the expansion modules, see the user guide of each module.
 - If the signal indicator status is normal, proceed to step 2.
 - If the signal indicator status is abnormal, determine the cause according to the signal indicator status and resolve the fault.
 - If the fault is resolved, proceed to step 2.
 - If the fault remains unresolved, use the programming software for troubleshooting. For details, see "[9.2.2.4 Compatibility with Beckhoff PLC](#)".
2. In the "Solution Explorer" navigation tree on the left, click "Digital output CH0-8bit" under "Module 2(GL20(GL20S)-0016ETN) > 0016ETN Output-8bit mapping". In the opened interface, click "Write...". In the pop-up dialog box, enter "255" in the "Dec" field and click "OK," as shown below.

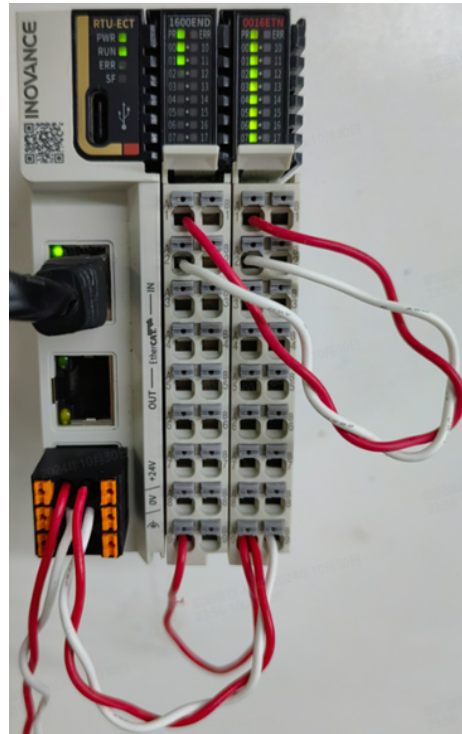


3. Check whether the output and input channels of the GL20-0016ETN and GL20-1600END modules function normally.

- In the "Solution Explorer" navigation tree, double-click "1600END input-8bit mapping" under "Module 1(GL20(GL20S)-1600END)". In the opened interface, if the "Online" value for "Digital input CH0-8bit" is "3", it indicates that the DI0 and DI1 input channels of this module are functioning normally.



- If the signal indicators (00-07) of the GL20-0016ETN module and the signal indicators (00-01) of the GL20-1600END module are solid on, it indicates that the input and output channels of both modules are functioning normally.



8 Product Function

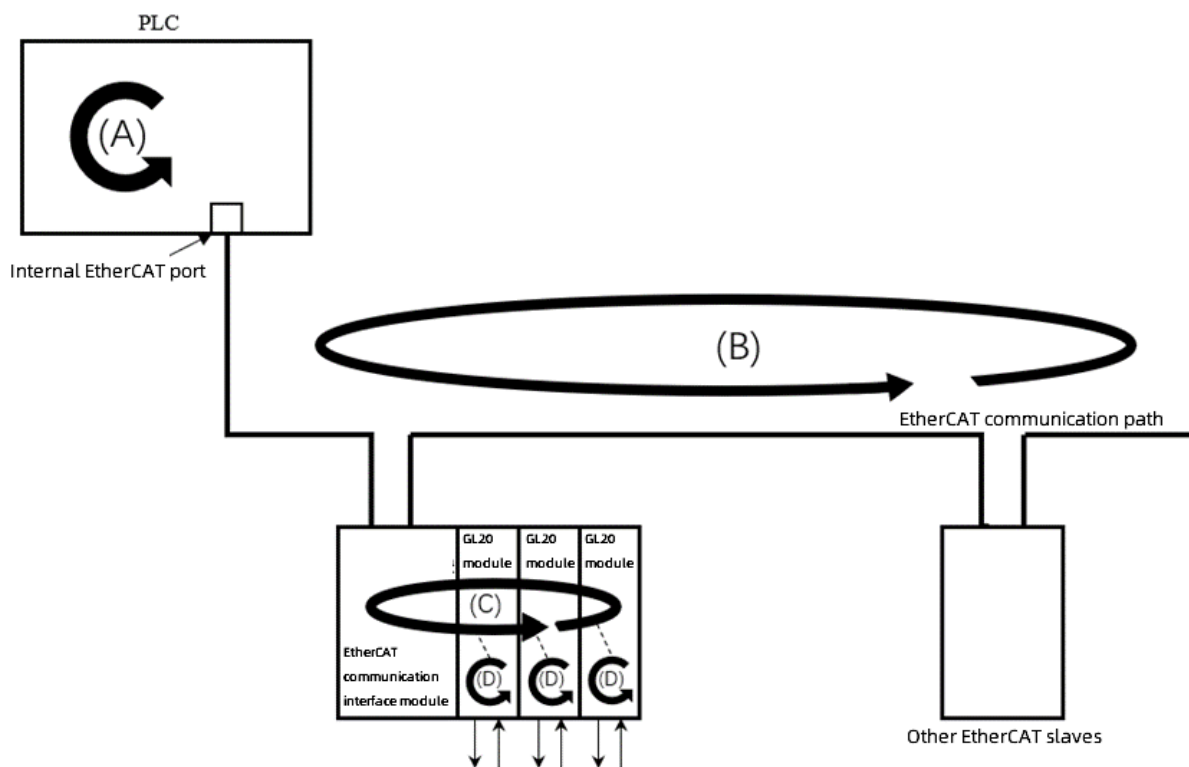
8.1 I/O Refresh

8.1.1 Introduction

This section introduces the I/O refresh between the PLC and the EtherCAT slave (GL20-RTU-ECT32-INT) modules of the GL20 series.

The PLC performs cyclic I/O refresh with the EtherCAT slave modules of the GL20 series through EtherCAT communication and GL-Link local bus. The following four cycles affect the I/O refresh between the PLC and the EtherCAT slave modules of the GL20 series.

- (A) Cycle of periodic tasks in the PLC
- (B) Communication cycle of process data
- (C) Refresh cycle of GL-Link local bus
- (D) Refresh cycle of each GL20 module



I/O refresh is performed between the EtherCAT master (PLC) and the EtherCAT slave (EtherCAT communication interface module), as well as between the EtherCAT communication interface module and the GL20 series modules. The refresh range is shown below.

Refresh Range	I/O Refresh Type	
	Synchronous	Asynchronous
Refresh between EtherCAT master and EtherCAT slave	DC synchronization Sync Manager (SM) event synchronization	Free Run mode

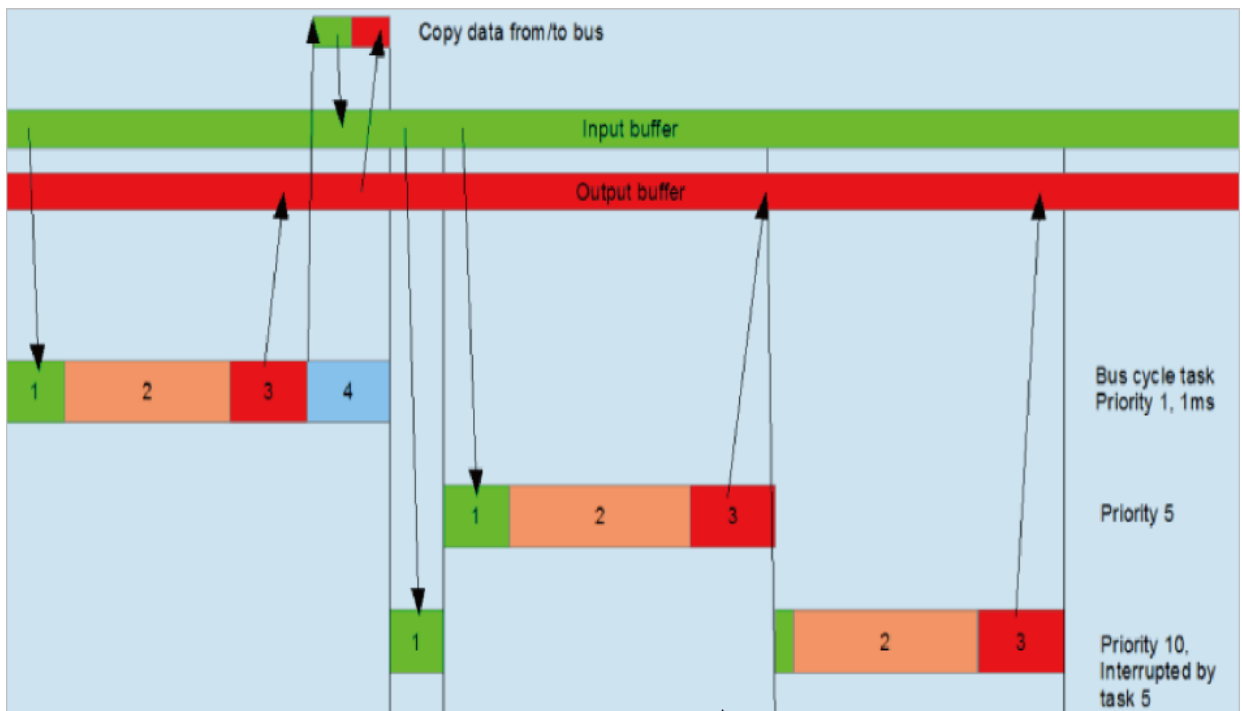
Refresh Range	I/O Refresh Type	
	Synchronous	Asynchronous
Refresh between the EtherCAT communication interface module and the GL20 series modules	When the EtherCAT cycle is shorter than 1ms, the scheduling of the GL-Link local bus follows the EtherCAT cycle for data refresh.	When the EtherCAT cycle is 1ms or longer, the GL-Link local bus refreshes data at a 1ms cycle.

8.1.2 Refresh Between EtherCAT Master and EtherCAT Slave

This section introduces the I/O refresh between the EtherCAT master (PLC with a built-in EtherCAT port) and the EtherCAT slave. The EtherCAT master can perform I/O refresh simultaneously for EtherCAT slaves operating in DC mode and those operating in Free Run mode. I/O refresh involves the operation mechanism of the EtherCAT bus, and the configuration of the EtherCAT master and slave.

EtherCAT Bus Task

All IEC bus tasks of the PLC are cyclically scanned and executed in strict accordance with the same logical sequence, which can be divided into four steps: (1) refresh inputs, (2) execute IEC tasks, (3) refresh outputs, and (4) execute bus cycle, as shown in the following figure.



The following table introduces the details of each step.

No.	Step	Color	Description
1	Refresh inputs	Green	Before the IEC task starts, read the data from the bus input buffer and copy the data to the input variables related to the task.
2	Execute IEC tasks	Orange	Scan and execute the POU's under the bus task.

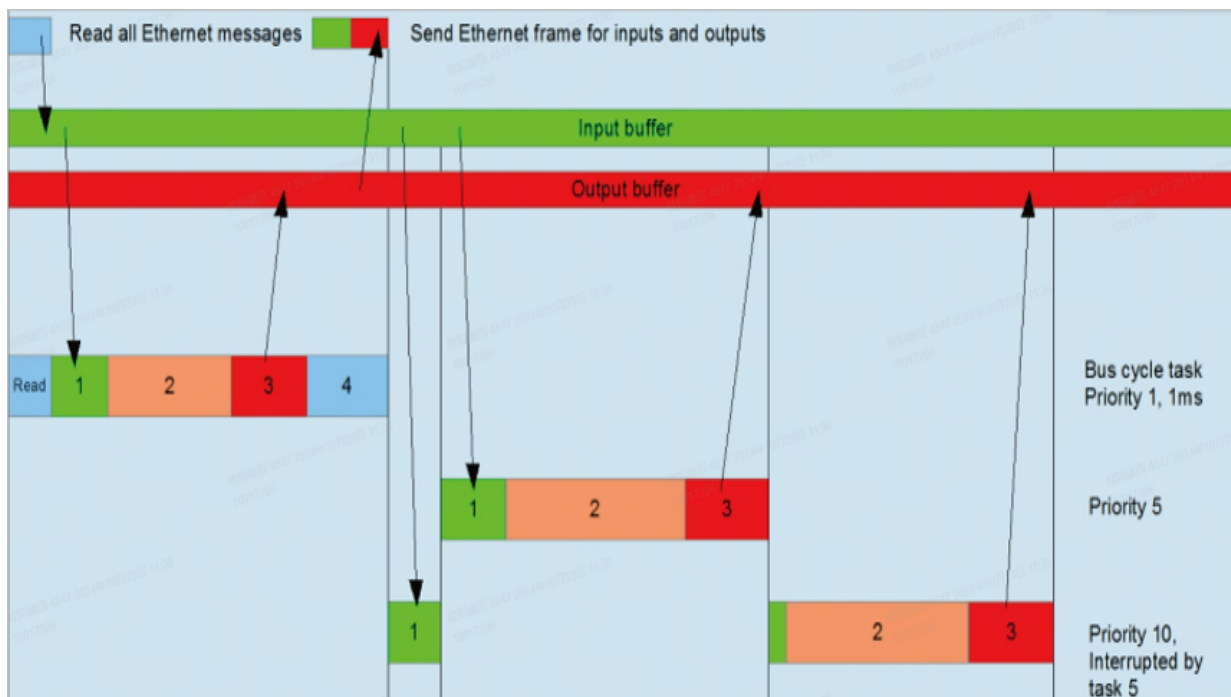
No.	Step	Color	Description
3	Refresh outputs	Red	Before the IEC task ends, copy the output variables related to the bus to the bus output data buffer.
4	Execute bus cycle	Blue	The execution of the bus communication program is mainly implemented by the underlying I/O driver, which includes two functions: transmitting the data from the bus output buffer to the receiving buffer of the remote slave, and reading data from the sending buffer of the remote slave to the bus input buffer.

NOTE

- If an output variable is used by multiple tasks, its value is indeterminate (since it may be modified or overwritten by other tasks).
- When a task is interrupted by a higher priority task, the high priority task reads data from the input buffer and synchronizes the data to the input variables of the current task, which may result in inconsistent input variable values within the same scan cycle. This can be avoided by copying the input variable values at the start of the task and using the copied input variables when the task is called.

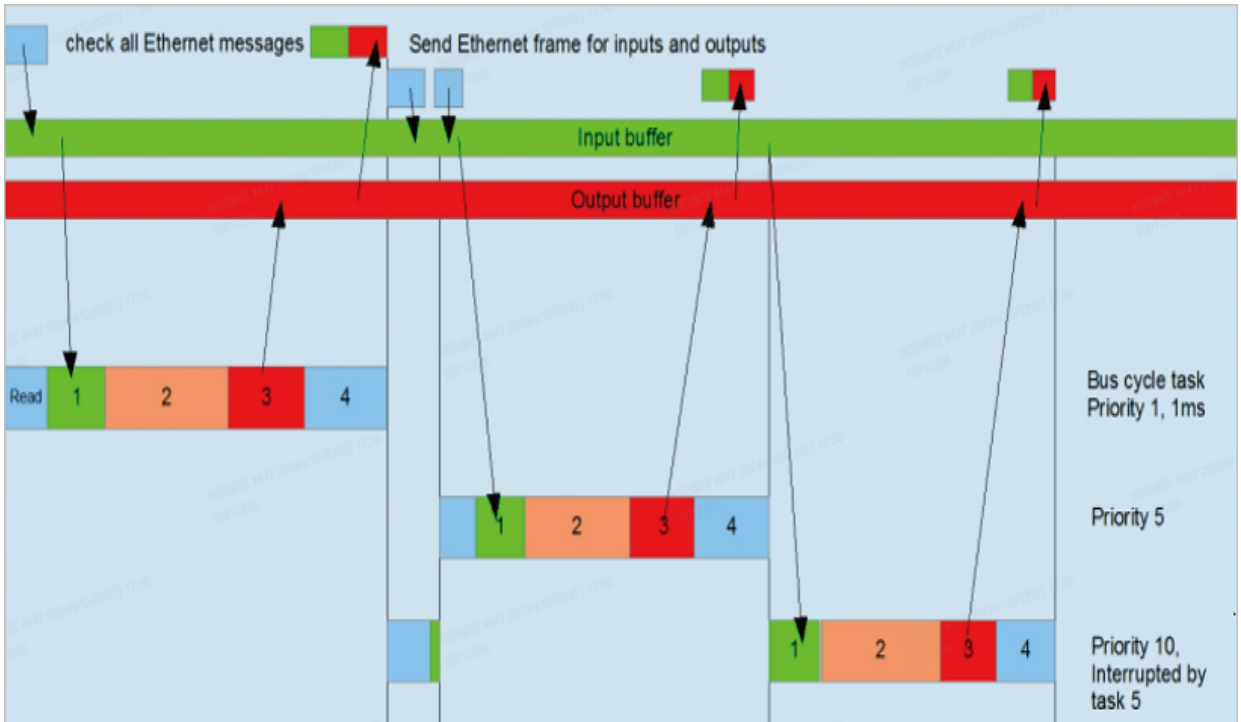
Special Bus Cycle for EtherCAT

The EtherCAT bus data from the previous cycle will be copied before the IEC task input, as shown in the following figure.



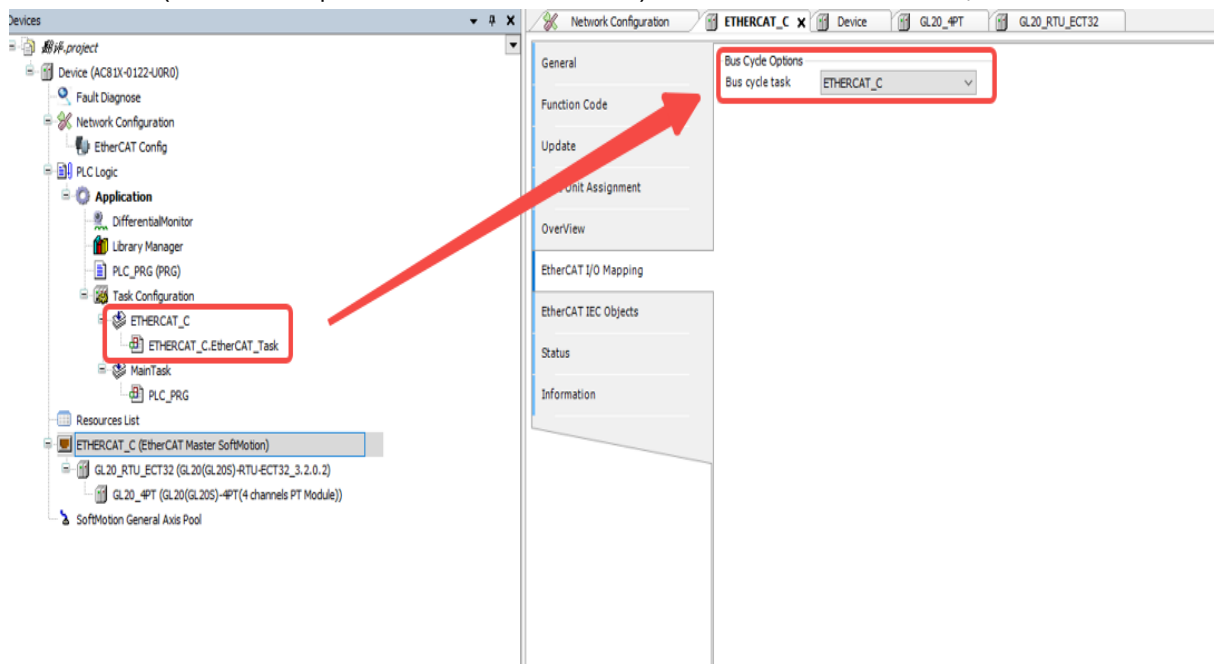
In the EtherCAT master settings, messages on each task can be activated so that the additional information for each task will be sent to the device. Therefore, EtherCAT bus communication can be executed under multiple tasks and can reduce the load on the EtherCAT bus.

The EtherCAT bus cycle is shown in the following figure.



Note:

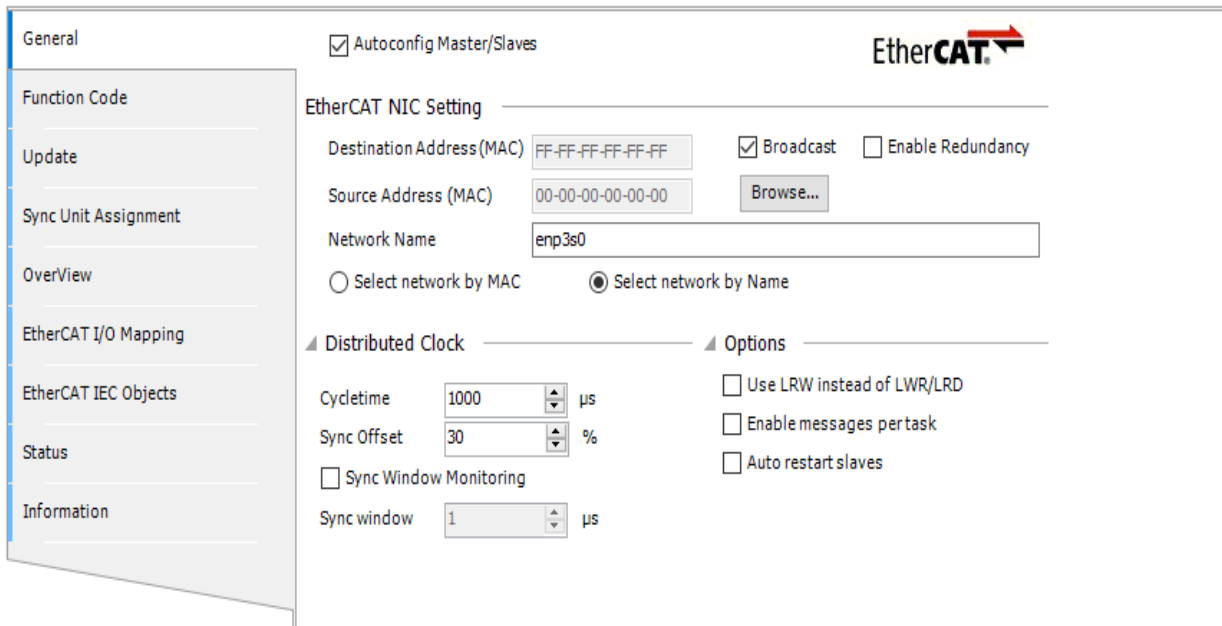
- After the EtherCAT master is automatically added, the "EtherCAT_****" task is also automatically added to the task configuration of the current application.
- The bus cycle task of the EtherCAT master must be executed in the same task as EtherCAT_***.EtherCAT_Task.
- The input and output of the EtherCAT master are executed in the same task as EtherCAT_***.EtherCAT_Task. For the bus cycle task in the I/O mapping of the EtherCAT master, the corresponding EtherCAT task must be configured. Therefore, it is recommended that the control program of the device (such as PLCOpen axis control instructions) be executed under this task, as shown below.



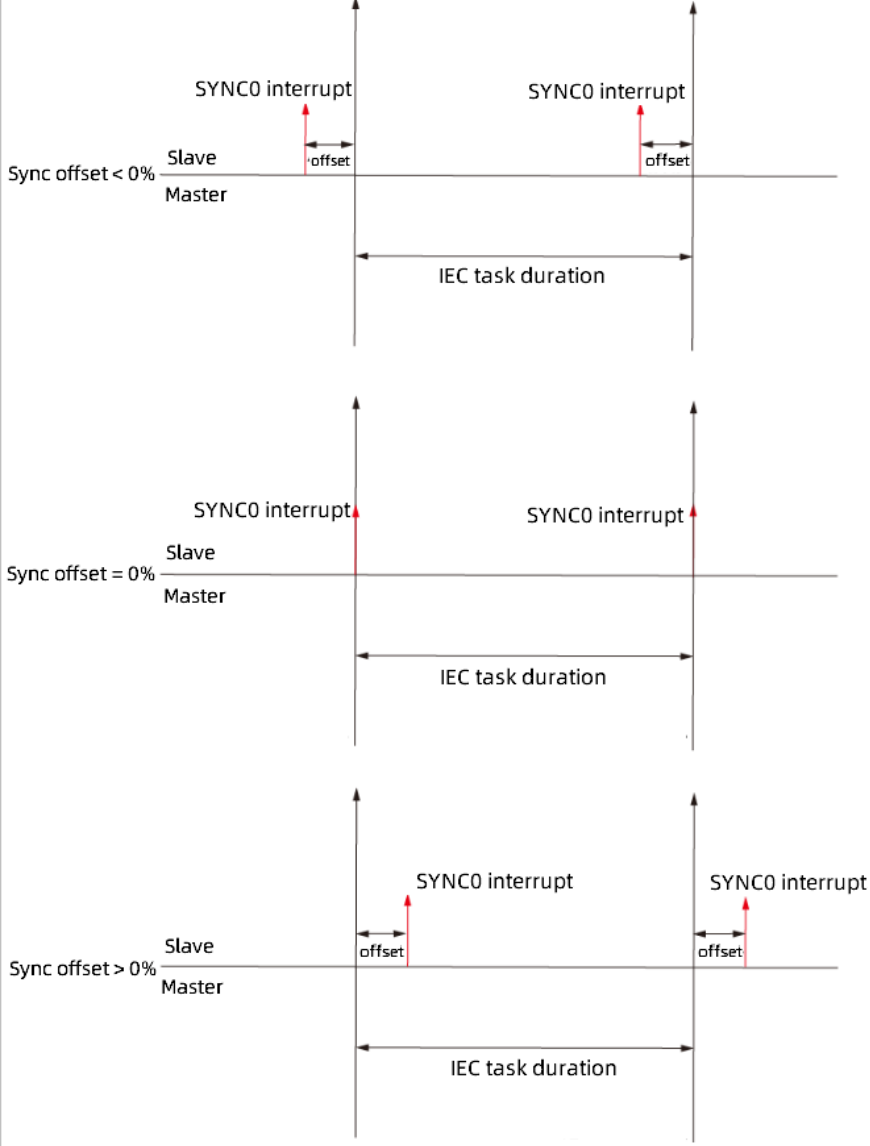
EtherCAT Master Configuration

This section introduces the configuration information for the EtherCAT master.

The EtherCAT master configuration interface provides basic settings for the master, as shown below. The descriptions of each parameter are listed in the table below.



Parameter Name		Parameter Description
Distributed clock	Cycle time [μs]	Indicates the cycle time for executing the EtherCAT master functions. It must be the same as the cycle time of the IEC task bound to the EtherCAT master. If the distributed clock function of the EtherCAT slave is activated, the cycle time of the master will be synchronized to the cycle time of the slave.
	Synchronization offset [%]	Indicates the cycle time offset ratio of the EtherCAT master's IEC task (PLC task) relative to the reference distributed clock (normally the SYNC0 synchronization interrupt). This parameter ranges from -50% to +50%, with a default value of 30%. Synchronization offset [%] = (SYNC0 interrupt time - PLC task cycle time) / PLC task cycle time, as shown below.

Parameter Name	Parameter Description
	 <p>The diagrams illustrate the timing of SYNC0 interrupts relative to the IEC task duration for three different synchronization offset scenarios:</p> <ul style="list-style-type: none"> Sync offset < 0%: The Slave's SYNC0 interrupt occurs before the Master's SYNC0 interrupt. The IEC task duration is shown as a horizontal bar between two vertical lines. The Slave's interrupt is offset to the left of the Master's interrupt. Sync offset = 0%: The Slave's and Master's SYNC0 interrupts occur at the same time. The IEC task duration is shown between two vertical lines. Sync offset > 0%: The Slave's SYNC0 interrupt occurs after the Master's SYNC0 interrupt. The IEC task duration is shown between two vertical lines. The Slave's interrupt is offset to the right of the Master's interrupt.
	<p>NOTE</p> <ul style="list-style-type: none"> • By default, the PLC task cycle time is equal to the cycle time of the distributed clock of the slave. • In actual configuration, the following factors must be considered: master clock jitter of the controller (system real-time performance), PLC task execution time, PLC task cycle time, and number of slaves. • Starting with InoProShop V1.5.0, the EtherCAT master type for newly created projects is "EtherCAT Master SoftMotion" (different from the "EtherCAT Master" type in previous versions). The default synchronization offset for the master is 30%. Do not change this default value unless there is a special requirement; otherwise, EtherCAT data synchronization faults may occur.

This section introduces the configuration information for the EtherCAT slave.

The EtherCAT slave configuration interface provides basic settings for the slave, as shown below. The descriptions of each parameter are listed in the table below.

Address

AutoIncAddress


EtherCAT Address

Additional

Enable Expert Settings

Optional

Enable can be set in the "Overview" interface of the master station



▲ Distributed Clock

Select DC

enable Sync Unit Cycle (µs)

Sync0:

Enable Sync 0

Sync Unit Cycle Cycle Time (µs)

User Defined Shift Time (µs)

Sync1:

Enable Sync 1

Sync Unit Cycle Cycle Time (µs)

User Defined Shift Time (µs)

▲ Startup checking

Check Vendor ID

Check Product ID

Check Revision Number

▲ Timeouts

SDO Access ms

I -> P ms

P -> S / S -> O ms

▲ DC cyclic unit control: assign to local µC

Cyclic Unit Latch Unit 0 Latch Unit 1

▲ Watchdog

Set multiplier (Reg. 16#400)

Set PDI watchdog (Reg. 16#410) = ms

Set SM watchdog (Reg. 16#420) = ms

Identification (Alias can be set through the "Overview" interface of the master station)

Disabled

Configured Station Alias (ADO 0x0012)

Parameter Name		Parameter Description
Distributed clock	Select DC	<ul style="list-style-type: none"> This drop-down menu provides all settings related to distributed clocks in the device description file. It normally includes Free Run mode, SM event synchronization mode, and DC synchronization mode. The functions of each setting are as follows. Free Run mode: In this mode, the local control cycle is generated by a local timer interrupt. The cycle time can be set by the master. This is an optional function for the slave. SM event synchronization mode: In this mode, a local cycle is triggered when a data input or output event occurs. The master can write the

Parameter Name		Parameter Description
		<p>transmission cycle of the process data frame to the slave. The slave can then check whether the cycle time is supported or perform local optimization of the cycle time. This is an optional function for the slave. Synchronization typically occurs with the data output event. If a slave has only input data, synchronization occurs with the data input event.</p> <ul style="list-style-type: none"> • DC synchronization mode: In this mode, a local cycle is triggered by the SYNC event. The master must complete the transmission of the data frame before the SYNC event. Therefore, the master clock must also be synchronized to the reference clock. • Sync0/Sync1: Slave synchronization signal 0/1. The distributed clock control unit of the slave (an internal function of the EtherCAT-specific communication chip) can generate two synchronization signals, Sync0 and Sync1. These signals provide interrupt flags to the application layer of the slave or directly trigger the update of output data. • Enable Sync0/Sync1: Check to enable the Sync0/Sync1 synchronization signal. <ul style="list-style-type: none"> ◦ "Sync Unit Cycle": If this option is selected, slave synchronization cycle time = master cycle time × selected coefficient. ◦ "Cycle Time (μs)": Slave cycle time.
	Enable	Check to enable the distributed clock function.
	Sync Unit Cycle (μs)	If the distributed clock function is enabled, the synchronization unit cycle value will be the same as the cycle time value of the EtherCAT master.
Syncx	User Defined	If this option is selected, a user-defined synchronization cycle time at the microsecond level can be entered in the "Cycle Time (μs)" field.

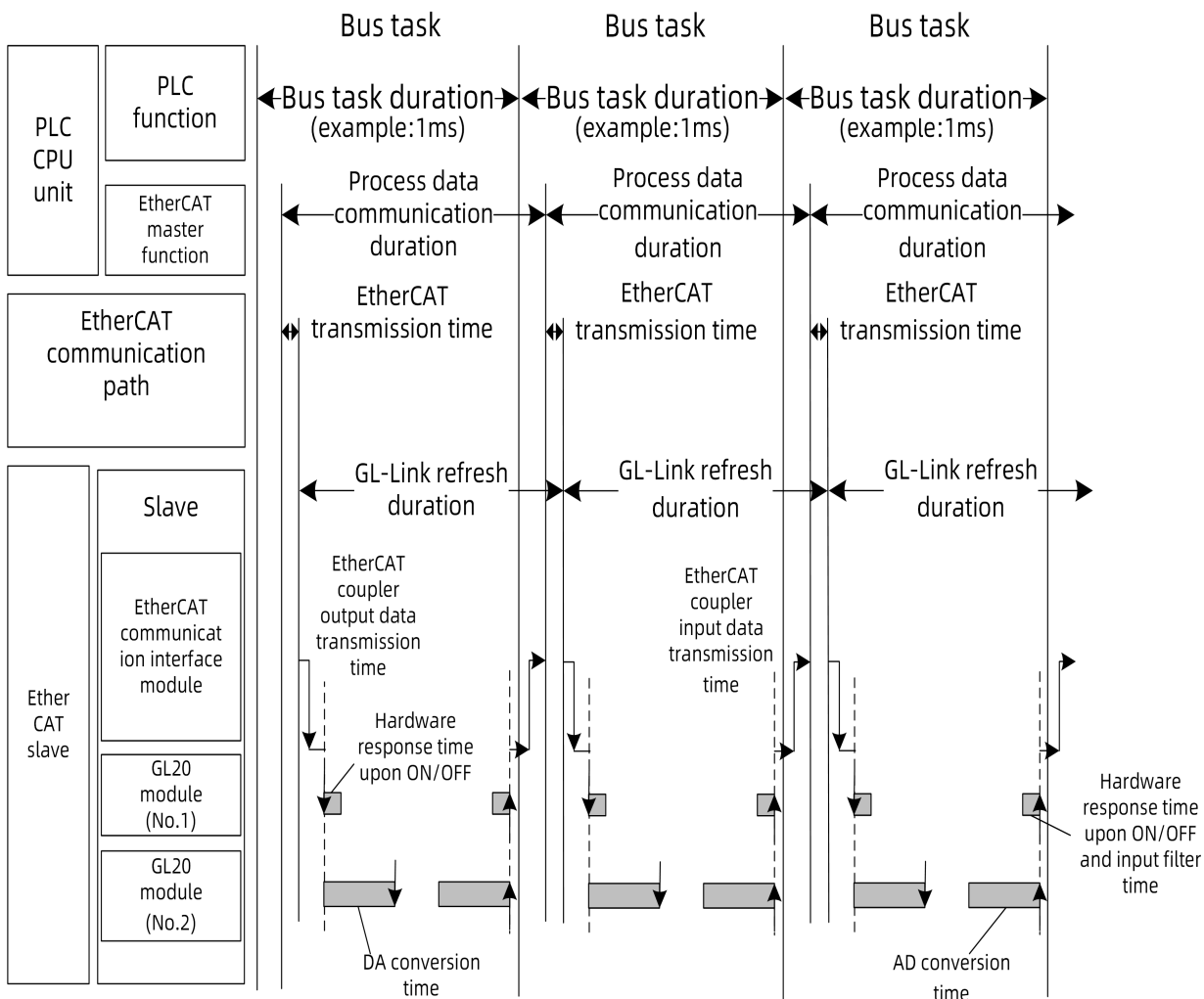
8.1.3 Refresh Between the EtherCAT Communication Interface Module and the GL20 Series Modules

Data interaction between the EtherCAT communication interface module and the GL20 series modules occurs in two modes: synchronous and asynchronous.

- When the EtherCAT scan cycle is shorter than 1ms, the local bus operates in synchronous refresh mode, and its scheduling follows the EtherCAT scan cycle. For example, if the EtherCAT scan cycle is 125μs, the local bus will refresh data at a 125μs cycle.
- When the EtherCAT scan cycle is 1ms or longer, the local bus operates in asynchronous refresh mode, refreshing data at a 1ms cycle. For example, if the EtherCAT scan cycle is 2ms, the local bus still performs data interaction with the connected I/O modules at a 1ms cycle.

8.1.4 I/O Refresh Example

The following figure illustrates an example where the PLC performs cyclic I/O refresh with the EtherCAT slave modules of the GL20 series through EtherCAT communication and GL-Link local bus.




The configuration of the EtherCAT master and slave is introduced as follows.

1. Set the cycle time for the EtherCAT master. The default master synchronization offset is 30%. Do not change the default value unless there is a specific requirement.

NOTE

- The interval must be a multiple of the system timing of $LTIME\#250\mu s$.
- For the meanings of the cycle time and synchronization offset parameters, see "[EtherCAT Master Configuration](#)".



Autoconfig Master/Slaves

EtherCAT NIC Setting

Destination Address (MAC) Broadcast Enable Redundancy

Source Address (MAC)

Network Name

Select network by MAC Select network by Name

Redundancy EtherCAT NIC Setting

Destination Address (MAC) Broadcast

Source Address (MAC)

Network Name

Select network by MAC Select network by Name

▲ Distributed Clock

Cycletime μ s

Sync Offset %

Sync Window Monitoring

Sync window μ s

▲ Options

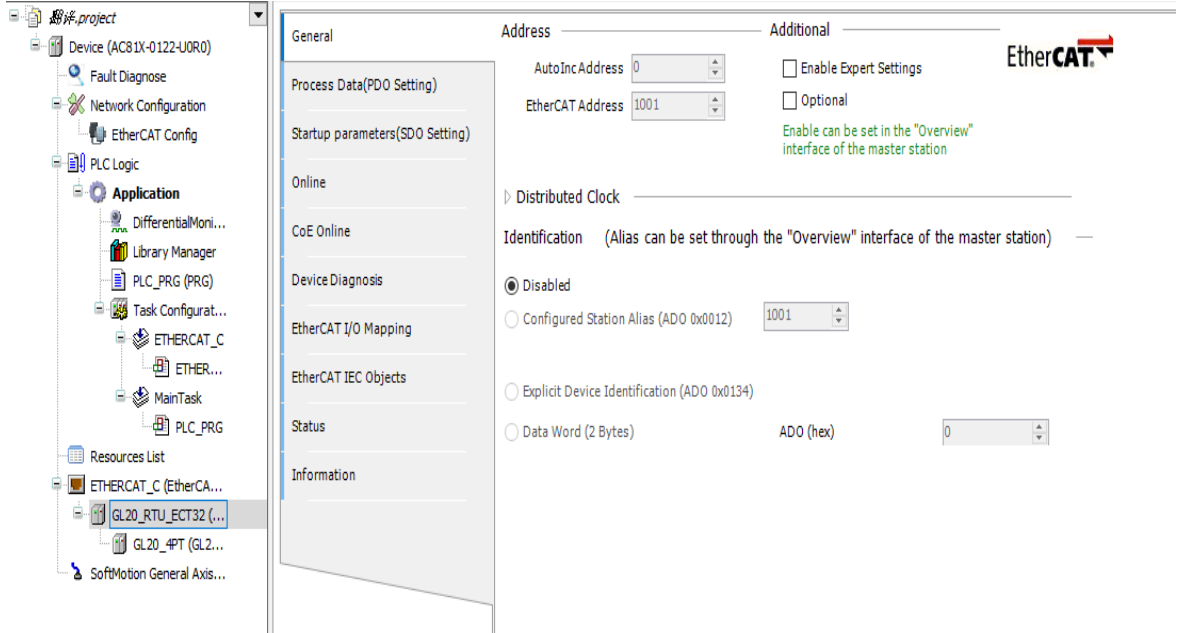
Use LRW instead of LWR/LRD

Enable messages per task

Auto restart slaves

2. Set EtherCAT slave configuration.

- If the refresh mode between the EtherCAT master and EtherCAT slave is set to Free Run mode, there is no need to check "Enable Expert Settings" or configure distributed clocks.



The screenshot shows the configuration interface for an EtherCAT slave. The left sidebar displays a project tree with the following structure:

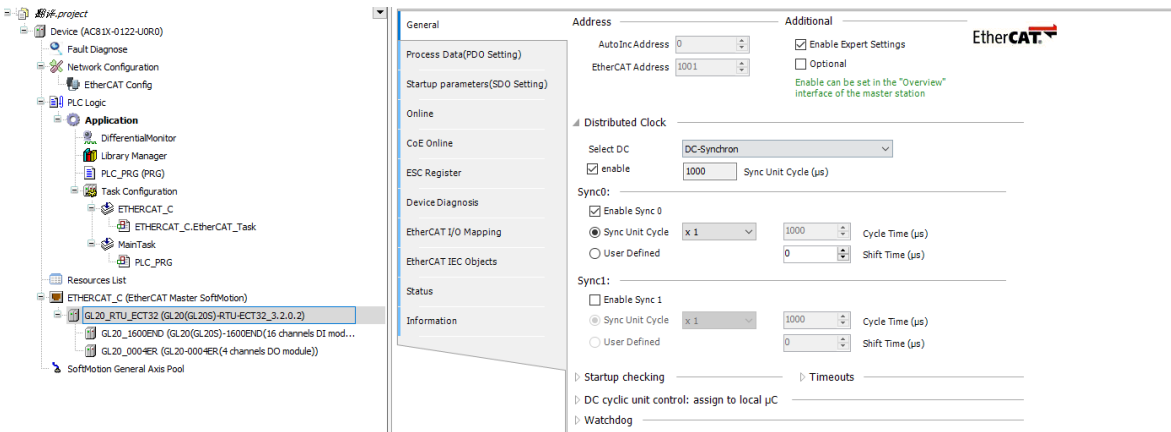
- project
 - Device (AC81X-0122-U0R0)
 - Fault Diagnose
 - Network Configuration
 - EtherCAT Config
 - PLC Logic
 - Application
 - DifferentialMoni...
 - Library Manager
 - PLC_PRG (PRG)
 - Task Configurat...
 - ETHERCAT_C
 - ETHER...
 - MainTask
 - PLC_PRG
 - Resources List
 - ETHERCAT_C (EtherCA...
 - GL20_RTU_ECT32 (...)
 - GL20_4PT (GL2...
 - SoftMotion General Axis...

The main configuration window shows the following settings:

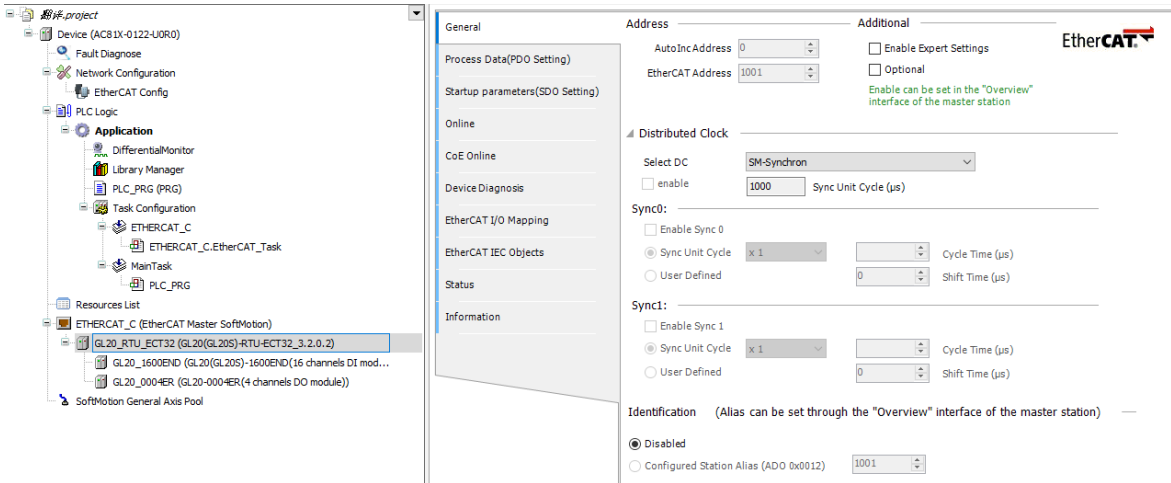
- General:** Process Data (PDO Setting), Startup parameters (SDO Setting), Online, CoE Online, Device Diagnosis, EtherCAT I/O Mapping, EtherCAT IEC Objects, Status, Information.
- Address:** AutoInc Address: 0, EtherCAT Address: 1001.
- Additional:** Enable Expert Settings (unchecked), Optional (unchecked). Note: "Enable can be set in the 'Overview' interface of the master station".
- Distributed Clock:** Identification (Alias can be set through the "Overview" interface of the master station)
 - Disabled
 - Configured Station Alias (ADO 0x0012): 1001
 - Explicit Device Identification (ADO 0x0134)
 - Data Word (2 Bytes): ADO (hex) 0

- If the refresh mode between the EtherCAT master and EtherCAT slave is set to DC synchronization mode, "Enable Expert Settings" must be checked; otherwise, the expansion items of the "Distributed Clock" cannot be configured.

NOTE
 For the meaning of the expansion items of the "Distributed Clock", see "[EtherCAT Slave Configuration](#)".



- If the refresh mode between the EtherCAT master and EtherCAT slave is set to SM event synchronization mode, select "SM-Synchron" for the "Select DC" drop-down box.



8.2 Restart

8.2.1 Introduction

The restart function is used to automatically restart an EtherCAT slave when it reconnects to the network, without the need for a power cycle.

8.2.2 Procedure

This section introduces the configuration of the slave auto restart function in AutoShop and InoProShop programming software.

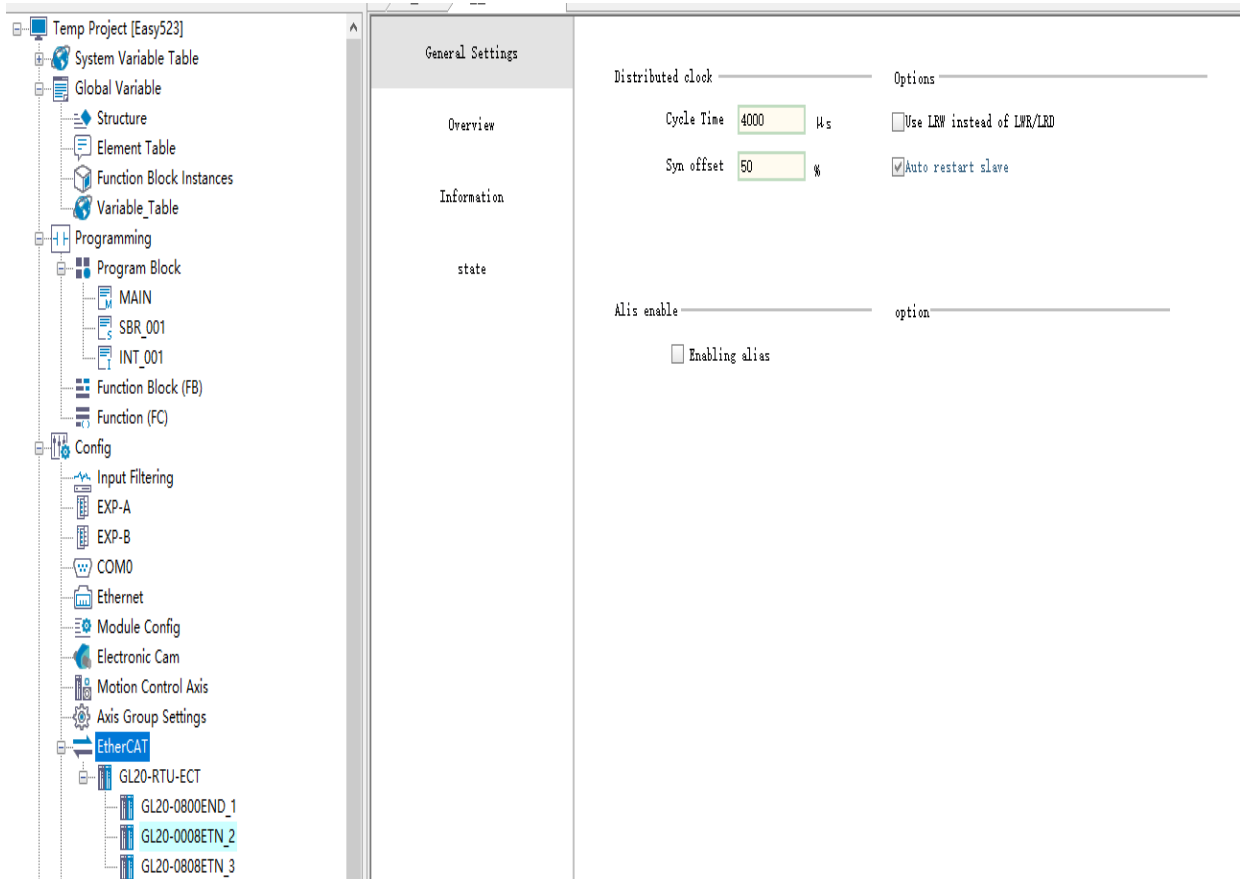
AutoShop Programming Software

NOTICE

- For AutoShop 4.0.0.0 compatible with PLC firmware versions prior to 3.0.0.0, the auto restart function of a single EtherCAT slave is not supported; only restart of the entire EtherCAT bus is supported.
- For AutoShop 4.0.0.0 compatible with PLC firmware versions 3.0.0.0 and later, the auto restart function of a single EtherCAT slave is supported.

In the navigation tree of "Project Manager" on the left, double-click "EtherCAT." In the opened interface, enable "Auto restart slave", as shown below.

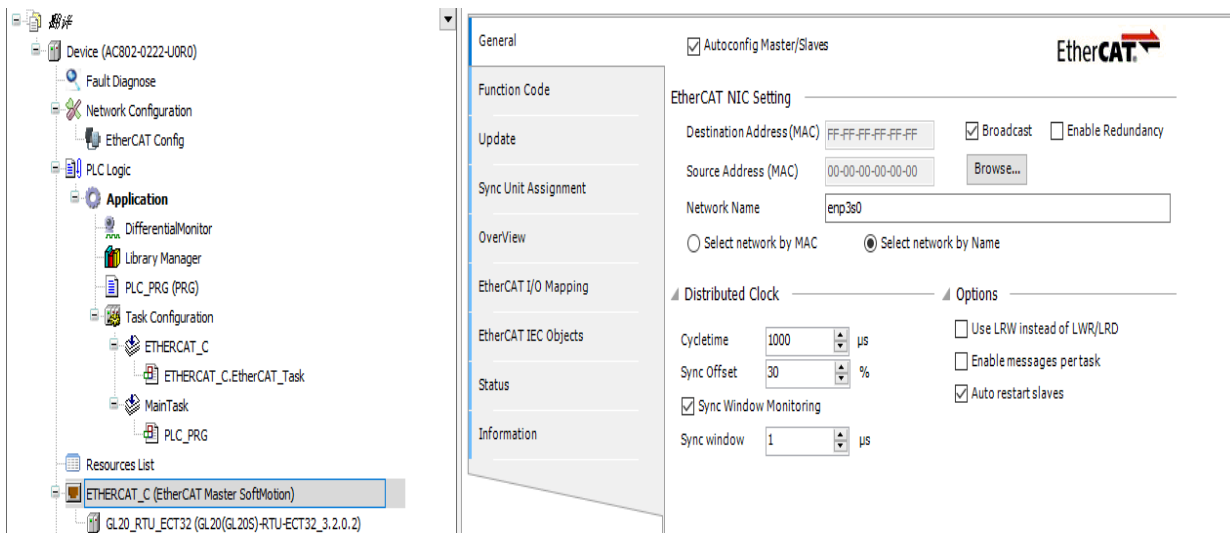
When an EtherCAT slave is disconnected, the EtherCAT master will automatically attempt to restart the slave.



InoProShop Programming Software

In the navigation tree of "Devices" on the left, double-click "ETHERCAT_C". In the opened interface, enable "Auto restart slave", as shown below.

When an EtherCAT slave is disconnected, the EtherCAT master will automatically attempt to restart the slave.



8.3 Configuration

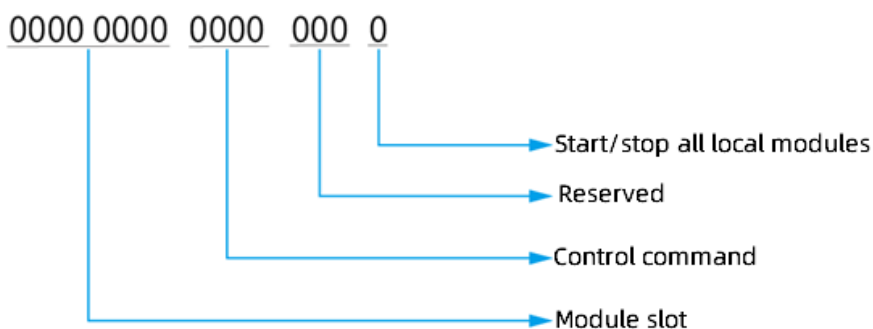
8.3.1 Configuration Settings

For configuration settings, see "[Configuration Debugging](#)".

8.3.2 Runtime Configuration

8.3.2.1 Introduction

The runtime configuration function is controlled via the object dictionary 0XFB00. The function of bits of the FB00 field are described in the figure below. Bit 0 is used to turn on or off all local modules. Bits 4 to 7 are used to set the module to different operating modes. Bits 8 to 15 are used to control the slot position of the module. The value 0000 0001 corresponds to slot #1, and 0000 1001 corresponds to slot #5. Only one slot position can be set at a time.



Bit	Description
Bit 0	<ul style="list-style-type: none"> 0: Run all local modules 1: Force stop all local modules
Bit 1 to 3	Reserved
Bit 4 to 7	<ul style="list-style-type: none"> 1: Module configuration command 2: Module stop command 4: Module operation command

Bit	Description
Bit 8 to 15	Module slot

NOTICE

When modifying SDO data, ensure that the local module is in the operational state. This means setting bit 0 of 0XFB00 to 0, or Lbus state to 0x0008.

8.3.2.2 Configuration Process

Take the configuration of AC702 + GL20-RTU-ECT32-INT + GL20-4AD + GL20-4DA as an example to introduce the runtime configuration process.

Background

The default conversion mode for each channel of the GL20-4AD module is "-10V ~ +10V (-20000 ~ 20000)". The corresponding SDO value is 128 (0x80 in hexadecimal), as shown below.

Line	Index/Subindex	Name	Value	Bitlength	IsDownload	Abort if error	Jump to line if error	Next line	Comment
1	16#8000:16#01	4AD module CH0 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH0 transform mode
2	16#8000:16#02	4AD module CH1 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH1 transform mode
3	16#8000:16#03	4AD module CH2 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH2 transform mode
4	16#8000:16#04	4AD module CH3 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH3 transform mode
5	16#8001:16#01	4AD module CH0 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH0 Filter
6	16#8001:16#02	4AD module CH1 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH1 Filter
7	16#8001:16#03	4AD module CH2 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH2 Filter
8	16#8001:16#04	4AD module CH3 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH3 Filter
9	16#8002:16#01	4AD module CH0 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH0 Detect
10	16#8002:16#02	4AD module CH1 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH1 Detect
11	16#8002:16#03	4AD module CH2 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH2 Detect
12	16#8002:16#04	4AD module CH3 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH3 Detect
13	16#4000:16#01	Module Config Information	0	192	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	Module Config Information
14	16#4001:16#01	Module Data Information	0	96	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	Module Data Information

Set the conversion mode of channel 0 of the GL20-4AD module to "-10V ~ +10V (-32000 ~ 32000)". The corresponding SDO value is 160 (0xA0 in hexadecimal), as shown below.

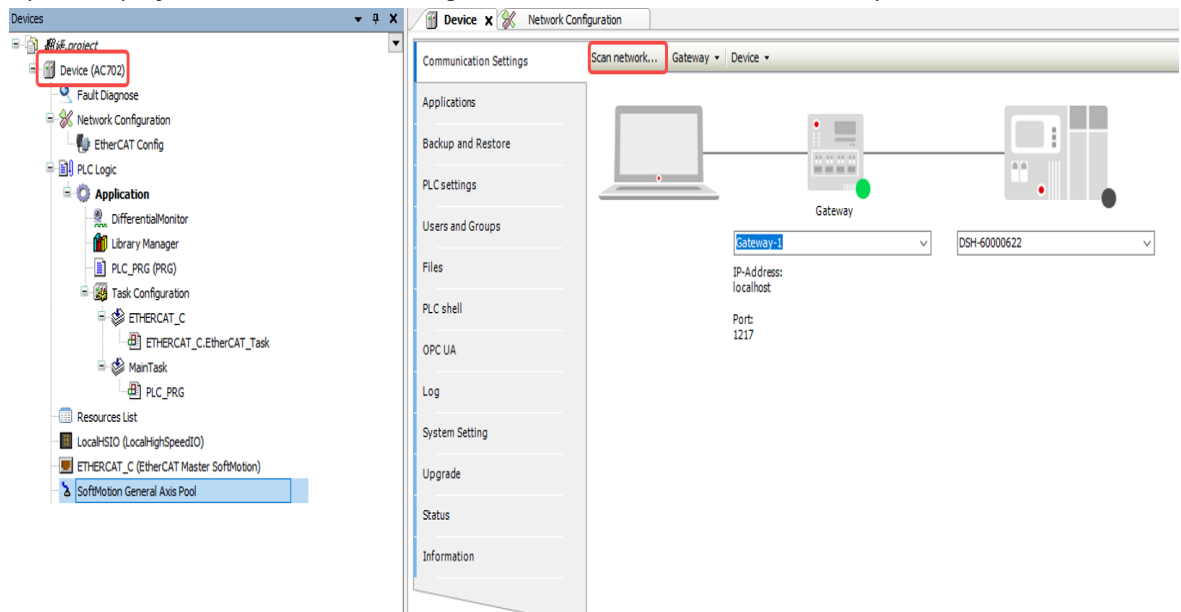
Line	Index/Subindex	Name	Value	Bitlength	IsDownload	Abort if error	Jump to line if err...	Next line	Comment
1	16#8000:16#01	4AD module CH0 transform mode	160	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH0 transform mode
2	16#8000:16#02	4AD module CH1 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH1 transform mode
3	16#8000:16#03	4AD module CH2 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH2 transform mode
4	16#8000:16#04	4AD module CH3 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH3 transform mode
5	16#8001:16#01	4AD module CH0 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH0 Filter
6	16#8001:16#02	4AD module CH1 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH1 Filter
7	16#8001:16#03	4AD module CH2 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH2 Filter
8	16#8001:16#04	4AD module CH3 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH3 Filter
9	16#8002:16#01	4AD module CH0 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH0 Detect
10	16#8002:16#02	4AD module CH1 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH1 Detect
11	16#8002:16#03	4AD module CH2 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH2 Detect
12	16#8002:16#04	4AD module CH3 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD module CH3 Detect
13	16#4000:16#01	Module Config Information	0	192	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	Module Config Information
14	16#4001:16#01	Module Data Information	0	96	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	Module Data Information

Prerequisites

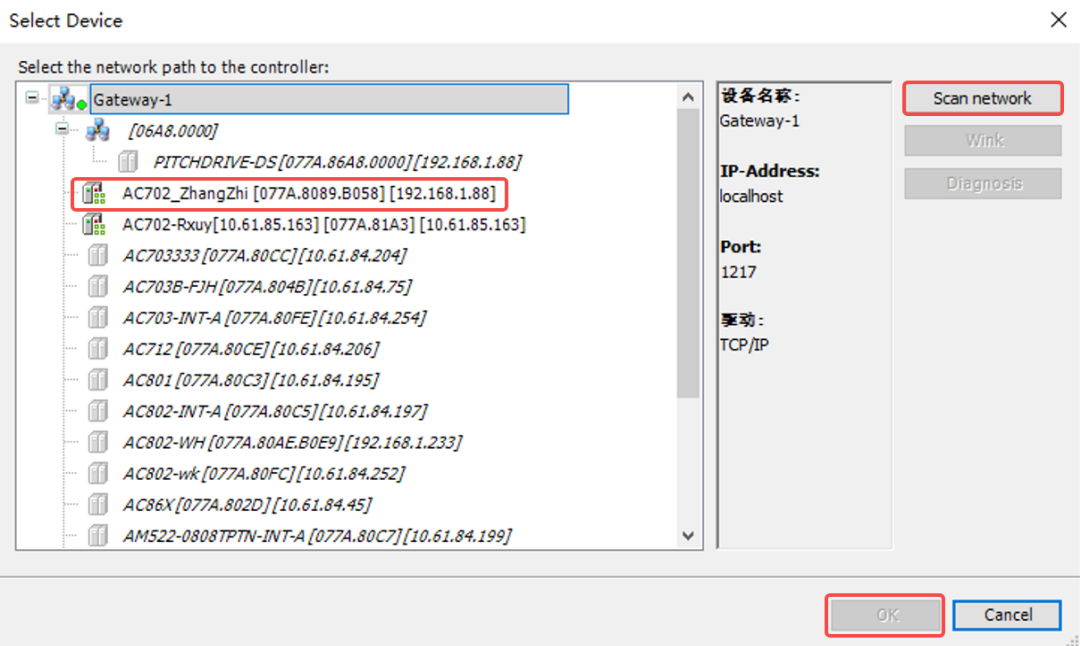
Connect the output channel 0 cable of the GL20-4DA module to the input channel 0 of the GL20-4AD module.

Procedure

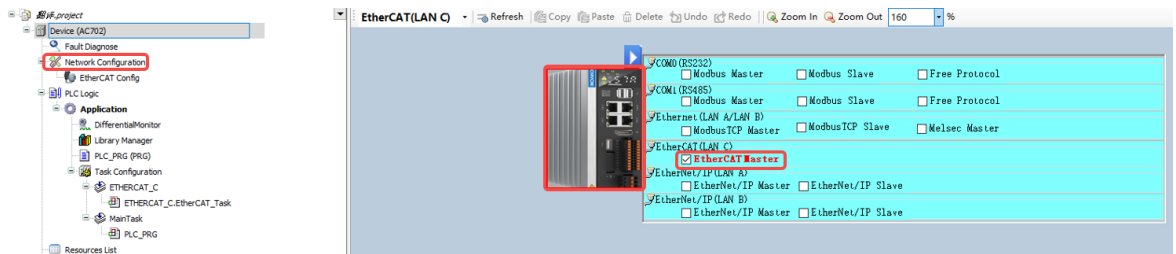
1. Scan the configuration module, download the program, and run it.
 - a. Open the project. In the "Devices" navigation tree, double-click "Device" to open the "Device" interface.



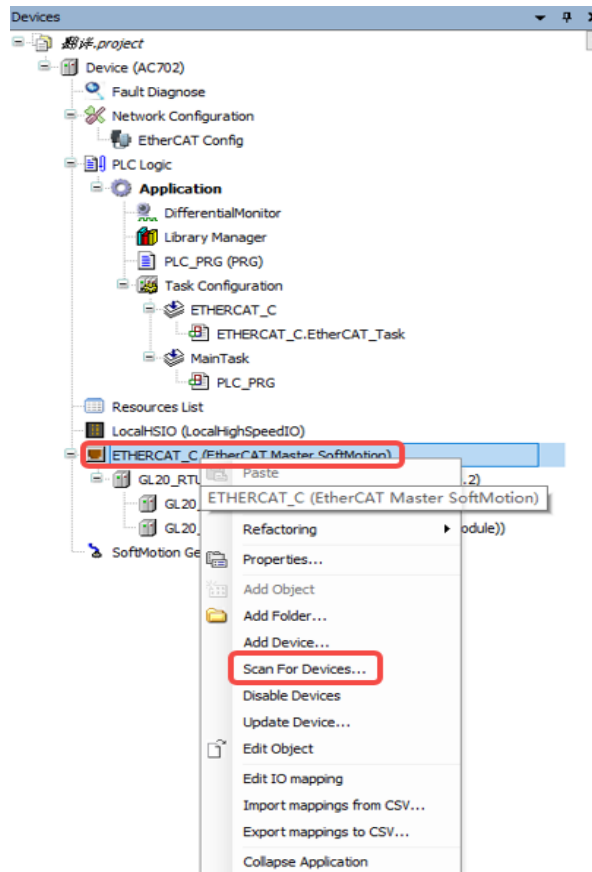
- b. Click "Scan network" to open the "Select Device" window. Click "Scan network", select the IP of the connected device, and click "OK".



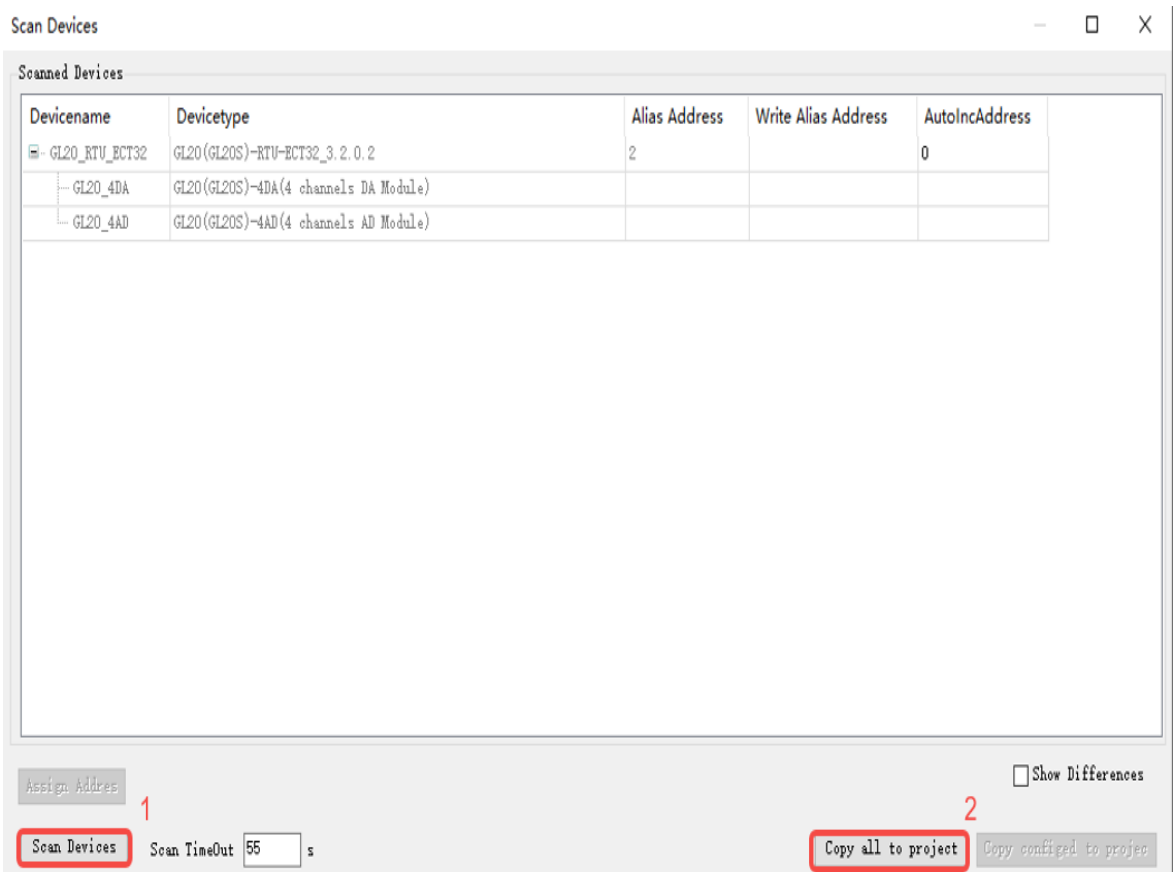
- c. In the "Device" navigation tree, double-click "Network Configuration". Click the PLC image, and check "EtherCAT Master".



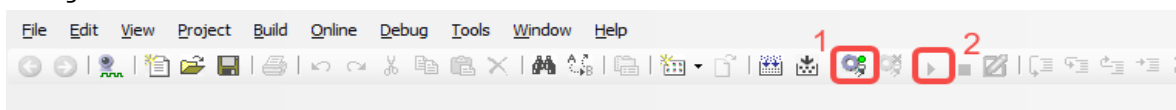
d. Right-click "ETHERCAT_x" and select "Scan for Devices".



e. In the opened "Scan Device" window, click "Scan Device" (1) to display the current EtherCAT communication interface module and the locally connected modules. Then, click "Copy Scan Device" (2) to add the scanned devices under the ETHERCAT list.



- f. Click the login button (1), then click the start button (2). The PLC program begins running, as shown in the figure below.



- g. Double-click "GL20_RTU_ECT32". In the opened interface, click "CoE Online", check "Auto Upload", and wait for the data upload to complete, as shown below.

In the "CoE Online" interface, locate the SDO data of the module to be modified. For example, to modify the "4AD module transform mode" configuration and the 0XFB00 object dictionary of the GL20-4AD module, set the display mode of "CoE Online" to hexadecimal.

Index/Subindex	Name	Flags	Type	Value
* 16#1C00:16#00	Sync manager type	RO	USINT	16#04
* 16#1C12:16#00	RxPDO assign	RO	USINT	16#02
* 16#1C13:16#00	TxPDO assign	RO	USINT	16#03
* 16#1C32:16#00	SM output parameter	RO	USINT	16#20
* 16#1C33:16#00	SM input parameter	RO	USINT	16#20
* 16#3010:16#00	Port 0 error counter	RO	USINT	16#04
* 16#3011:16#00	Port 1 error counter	RO	USINT	16#04
* 16#3012:16#00	ESC error counter	RO	USINT	16#04
* 16#3016:16#00	Station address	RO	USINT	16#04
* 16#3020:16#00	Fpga soft version	RO	UDINT	16#00010405
* 16#3021:16#00	Module software version	RO	USINT	16#04
* 16#5000:16#00	Disable Slot Control	RW	USINT	16#04
* 16#5001:16#00	Disable Function Control	RW	UINT	16#0000
* 16#6040:16#00	4AD input	RO	USINT	16#04
* 16#7000:16#00	4DA output	RO	USINT	16#04
* 16#8000:16#00	4DA module transform mode	RW	USINT	16#04
* 16#8001:16#00	4DA module Stopmode	RW	USINT	16#04
* 16#8002:16#00	4DA module Stopvalue	RW	USINT	16#04
* 16#8040:16#00	4AD module transform mode	RW	USINT	16#04
* 16#8041:16#00	4AD module Filter	RW	USINT	16#04
* 16#8042:16#00	4AD module Detect	RW	USINT	16#04
* 16#A000:16#00	4DA module Diagnosis information	RO	USINT	16#05
* 16#A040:16#00	4AD module Diagnosis information	RO	USINT	16#05
* 16#F000:16#00	Modular device profile	RO	USINT	16#02
* 16#F030:16#00	Configured Module Ident List	RO	USINT	16#02
* 16#F050:16#00	Detected Module Ident List	RO	USINT	16#02
* 16#F100:16#00	Device Status	RO	USINT	16#02
* 16#F110:16#00	Module Error Flag	RO	USINT	16#02
* 16#F120:16#00	LBus Count	RO	USINT	16#29
* 16#F800:16#00	Device configuration data	RO	USINT	16#04
* 16#FB00:16#00	Control word	RW	UINT	16#0000

NOTE

Configuration data is stored in the object dictionary starting at address 0x8000. The object dictionary address increases by 0x40 with each additional slot.

2. In the "Device" navigation tree, double-click "GL20_RTU_ECT32". In the "EtherCAT I/O Mapping" interface, the channel 0 of the GL20-4AD module is "20000", corresponding to a 10V sampled voltage. The channel mode for the GL20-4DA module is "-10V ~ +10V (-20000 ~ 20000)", as shown below.

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
		Device control	%QW1	UINT	0			Device control
		GL20_4DA DA CH0	%QW2	DINT	20000			GL20_4DA DA CH0
		GL20_4DA DA CH1	%QW3	DINT	0			GL20_4DA DA CH1
		GL20_4DA DA CH2	%QW4	DINT	0			GL20_4DA DA CH2
		GL20_4DA DA CH3	%QW5	DINT	0			GL20_4DA DA CH3
		LBus status	%IW1	UINT	8			LBus status
		Fault ID	%IW2	UINT	0			Fault ID
		ErrorSol1	%ID2	UDINT	0			ErrorSol1
		ErrorSol2	%ID3	UDINT	0			ErrorSol2
		GL20_4AD AD CH0	%IWB	DINT	20019			GL20_4AD AD CH0
		GL20_4AD AD CH1	%IWB9	DINT	-13			GL20_4AD AD CH1
		GL20_4AD AD CH2	%IWB10	DINT	-44			GL20_4AD AD CH2
		GL20_4AD AD CH3	%IWB11	DINT	-51			GL20_4AD AD CH3

3. In the "CoE Online" interface, enter the configuration data "16#A0" ("160" in decimal) in the channel 0 input of the GL20-4AD module, and press the "Enter" key.

Index:Subindex	Name	Flags	Type	Value
* 16#1C33:16#00	SM input parameter	RO	USINT	16#20
* 16#3010:16#00	Port 0 error counter	RO	USINT	16#04
* 16#3011:16#00	Port 1 error counter	RO	USINT	16#04
* 16#3012:16#00	ESC error counter	RO	USINT	16#04
* 16#3016:16#00	Station address	RO	USINT	16#04
16#3020:16#00	Fpga soft version	RO	UDINT	16#00010405
* 16#3021:16#00	Module software version	RO	USINT	16#04
* 16#5000:16#00	Disable Slot Control	RW	USINT	16#04
16#5001:16#00	Disable Function Control	RW	UINT	16#0000
* 16#6040:16#00	4AD input	RO	USINT	16#04
* 16#7000:16#00	4DA output	RO	USINT	16#04
* 16#8000:16#00	4DA module transform mode	RW	USINT	16#04
* 16#8001:16#00	4DA module Stopmode	RW	USINT	16#04
* 16#8002:16#00	4DA module Stopvalue	RW	USINT	16#04
16#8040:16#00	4AD module transform mode	RW	USINT	16#04
:16#01	4AD module CH0 transform mode	RW	USINT	16#A0
:16#02	4AD module CH1 transform mode	RW	USINT	16#80
:16#03	4AD module CH2 transform mode	RW	USINT	16#80
:16#04	4AD module CH3 transform mode	RW	USINT	16#80
* 16#8041:16#00	4AD module Filter	RW	USINT	16#04
* 16#8042:16#00	4AD module Detect	RW	USINT	16#04
* 16#A000:16#00	4DA module Diagnosis information	RO	USINT	16#05
* 16#A040:16#00	4AD module Diagnosis information	RO	USINT	16#05
* 16#F000:16#00	Modular device profile	RO	USINT	16#02
* 16#F030:16#00	Configured Module Ident List	RO	USINT	16#02
* 16#F050:16#00	Detected Module Ident List	RO	USINT	16#02
* 16#F100:16#00	Device Status	RO	USINT	16#02
* 16#F110:16#00	Module Error Flag	RO	USINT	16#02
* 16#F120:16#00	LBus Count	RO	USINT	16#29
* 16#F800:16#00	Device configuration data	RO	USINT	16#04
16#F800:16#00	Control word	RW	UINT	16#0210

4. Write "16#0110" to the FB00 object dictionary (from left to right: the first "1" indicates that the GL20-4AD module is in the first slot, the second "1" indicates the command to start module configuration, and the last "0" indicates that the module is running normally), then press the "Enter" key.

NOTE

When writing configuration data online, ensure that the local module is in the running state, that is, bit 0 of 0XFB00 is set to 0.

5. In the "EtherCAT I/O Mapping" interface, the code value for the 10V voltage of the GL20-4AD module is 32000, indicating that the channel 0 of the module has been successfully changed from "-10V ~ +10V (-20000 ~ 20000)" to "-10V ~ +10V (-32000 ~ 32000)". This indicates a successful runtime configuration.

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
+ Device control		Device control	%QW1	UINT	0			Device control
+ GL20_4DA DA CH0		GL20_4DA DA CH0	%QW2	INT	20000			GL20_4DA DA CH0
+ GL20_4DA DA CH1		GL20_4DA DA CH1	%QW3	INT	0			GL20_4DA DA CH1
+ GL20_4DA DA CH2		GL20_4DA DA CH2	%QW4	INT	0			GL20_4DA DA CH2
+ GL20_4DA DA CH3		GL20_4DA DA CH3	%QW5	INT	0			GL20_4DA DA CH3
+ LBus status		LBus status	%IW1	UINT	8			LBus status
+ Fault ID		Fault ID	%IW2	UINT	0			Fault ID
+ ErrorSol1		ErrorSol1	%ID2	UDINT	0			ErrorSol1
+ ErrorSol2		ErrorSol2	%ID3	UDINT	0			ErrorSol2
+ GL20_4AD AD CH0		GL20_4AD AD CH0	%IW8	INT	32000			GL20_4AD AD CH0
+ GL20_4AD AD CH1		GL20_4AD AD CH1	%IW9	INT	-12			GL20_4AD AD CH1
+ GL20_4AD AD CH2		GL20_4AD AD CH2	%IW10	INT	-42			GL20_4AD AD CH2
+ GL20_4AD AD CH3		GL20_4AD AD CH3	%IW11	INT	-48			GL20_4AD AD CH3

8.4 IOManager Management

8.4.1 Introduction

IOManager serves as the configuration tool for the GL20 series I/O modules. It connects to the Type-C port of the GL20-RTU-ECT32-INT communication interface module via a Type-C cable, enabling the following functions for all modules in the configuration:

- Quickly obtain module configuration information, including the current MCU version and FPGA version of the communication interface module and expansion modules.
- Upgrade the MCU version and FPGA version of the communication interface module and expansion modules.
- Configure module parameters and download them to the modules. Verify parameters by uploading them.
- Obtain real-time diagnostic information of the module.

8.5 Disabling/Enabling

8.5.1 Introduction

For the product and expansion modules to function properly, the modules identified by the programming software must match the actual configured modules.

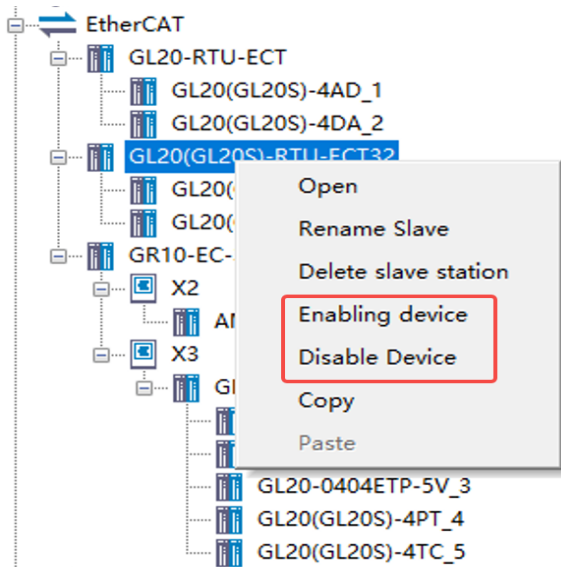
When the actual module configuration changes and the programming software lacks module scanning function, you can align the software module configuration with the actual module configuration through the expansion module enable/disable function, without altering the software project. In this way, it can ensure the proper operation of the product and the expansion modules.

8.5.2 Procedure

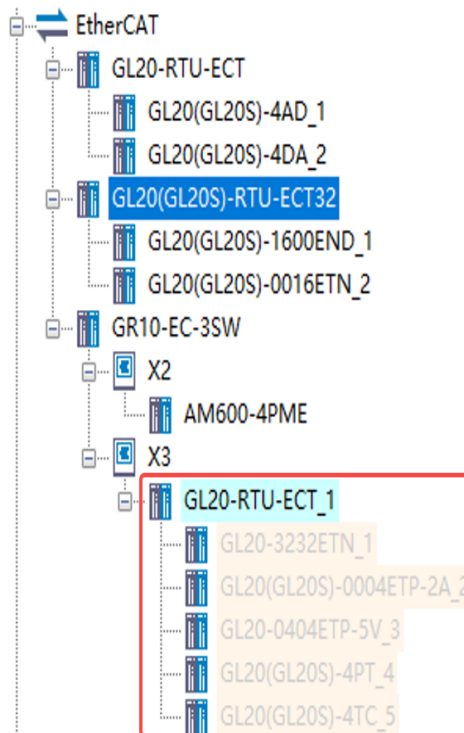
This section introduces how to disable or enable expansion modules using the AutoShop and InoProShop programming software.

AutoShop Programming Software

In the "Project Manager" navigation tree on the left, right-click the target slave, and select "Disable Device" or "Enabling device", as shown below.



In a branched network topology, disabling a branch port will disable all slaves connected to that port, as shown below.



NOTE

A disabled slave must be removed from the actual physical link; otherwise, it will affect the startup of all subsequent slaves.

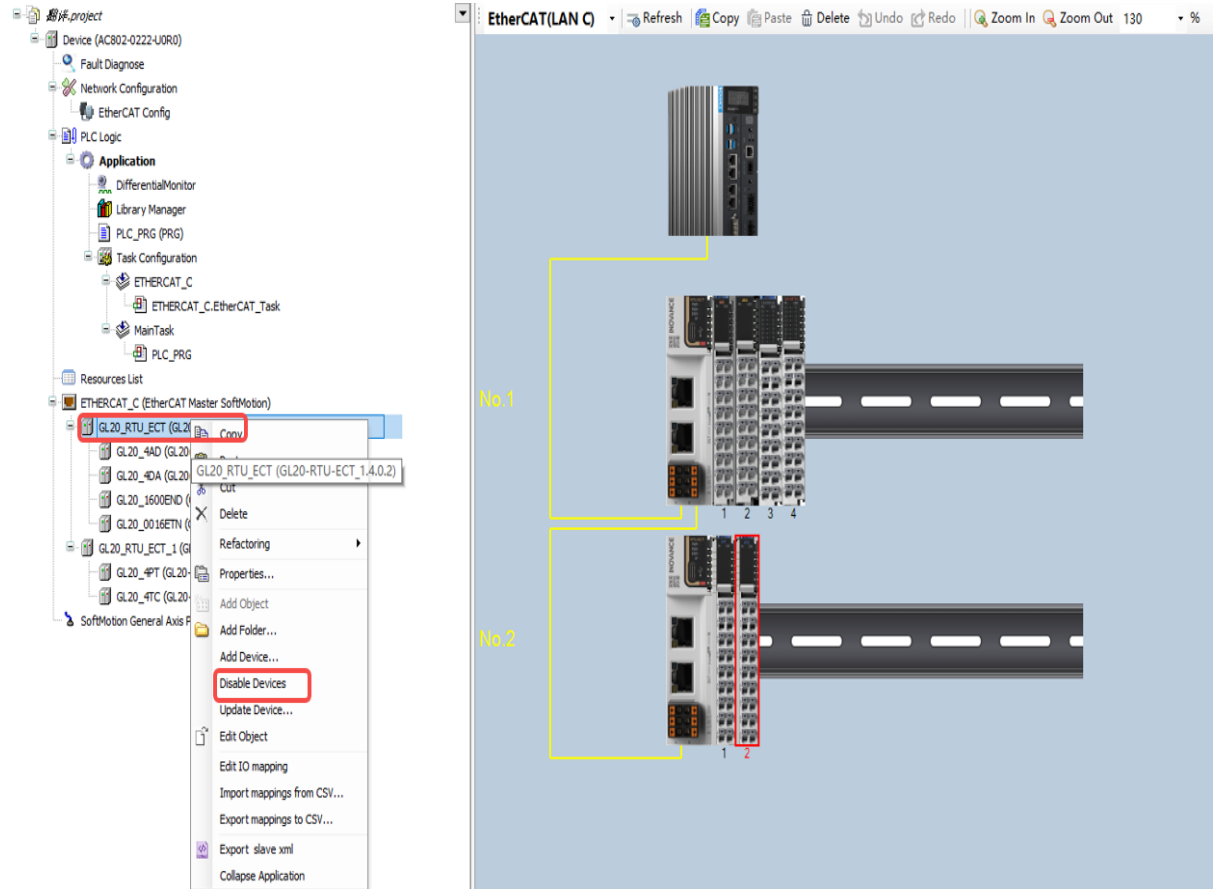
InoProShopProgramming Software

NOTICE

This feature is only supported in InoProShop V1.7.3 SP4 and above.

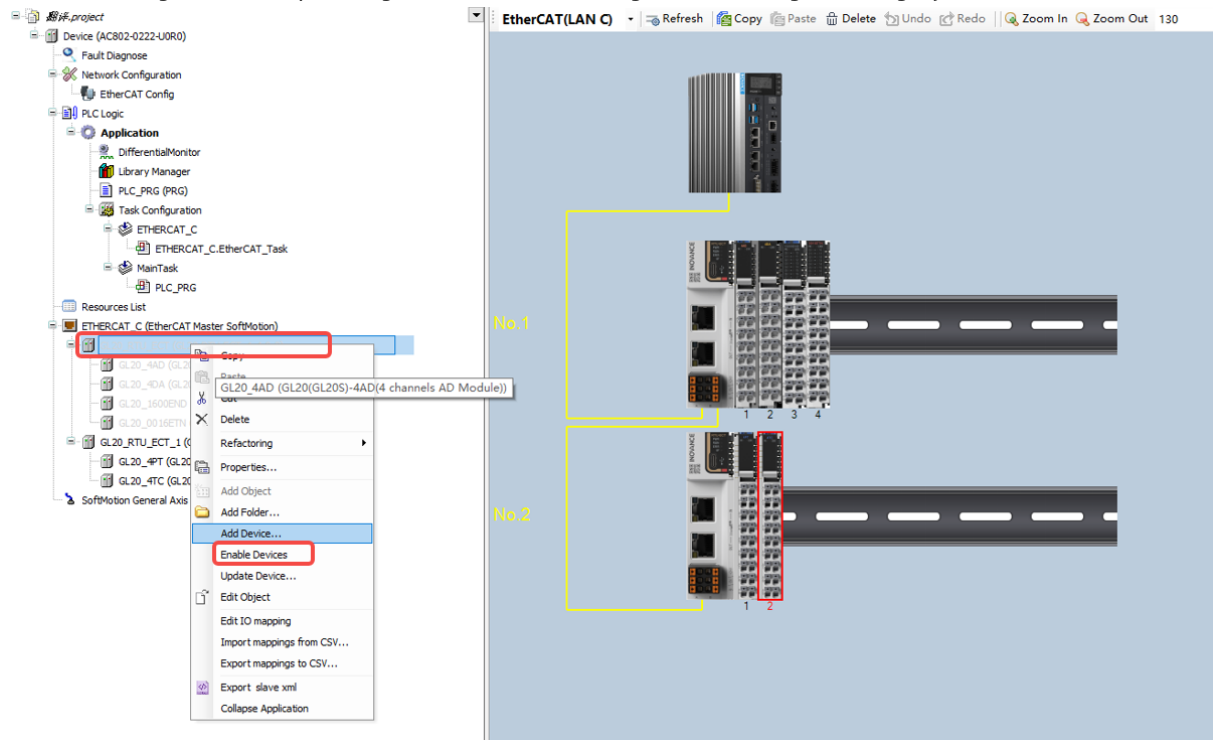
- **Disable Devices:** In the "Devices" navigation tree on the left, right-click the target slave, and select "Disable Devices".

After disabling, the corresponding EtherCAT slave configuration turns gray.



- **Enable Devices:** In the "Devices" navigation tree on the left, right-click the disabled target slave and select "Enable Devices".

After enabling, the corresponding EtherCAT slave configuration changes from gray to black.



9 Troubleshooting

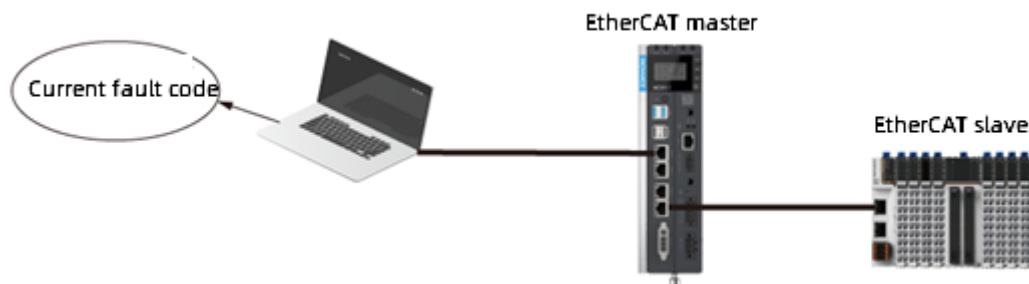
9.1 Overview

Troubleshooting aims to quickly identify faults during the operation of I/O modules and identify the corresponding solutions based on the fault information and status. This product and its expansion modules are integrated with the troubleshooting function, providing detailed diagnostic information for quickly detecting and resolving faults in the system. In industrial applications, using the troubleshooting function can minimize the probability of unexpected incidents.

This section covers troubleshooting methods, fault types, troubleshooting procedure, common fault cases, and a fault code list.

9.2 Troubleshooting Method

Diagnostic information for this product can be obtained mainly through two methods: the fault indicators on the module and the fault codes in the host programming software. This section introduces various troubleshooting methods for the module, which can be used independently.



9.2.1 Troubleshooting via Indicators

The product and the expansion modules are equipped with signal indicators, indicating the module status, including power supply, operation status, communication faults, and module faults.

Signal Indicator Status

The statuses of the signal indicators include: off, flashing, single flashing, double flashing, and solid on. The definitions of the five statuses are shown in the following table.

Status	Illustration
Off	<p>The diagram shows a digital signal line with a constant low level (0) over time. The high level (1) is also indicated for reference.</p>
Flashing	<p>The diagram shows a square wave signal alternating between high (1) and low (0) states. Two arrows point to the width of the high pulses, which is labeled as 200ms.</p>

Status	Illustration
Single flashing	
Double flashing	
Solid on	

Signal Indicator Function

The functions of signal indicators are shown in the following table.

Name	Description
PWR	Indicates the power supply status. It stays on when the module is connected to the 24 V power.
RUN	Indicates the status of EtherCAT communication state machine.
ERR (BF)	Indicates the faults of EtherCAT communication.
SF	Indicates the faults of the module.

- PWR indicator

Status	Description
Off	The 24 V power supply is not connected or faulty.
Solid on in green	The 24 V power supply is connected.

- RUN

Status	Description
Off	The module is in the INIT status.
Flashing in green	The module is in the Pre-Operational status.

Status	Description
Single flashing in green	The module is in the Safe-Operational status.
Solid on in green	The module is in the Operational status.

- ERR (BF) indicator

Status	Description
Off	The EtherCAT communication is normal.
Flashing in red	The EtherCAT communication receives non-executable status transition commands.
Single flashing in red	The ECT communication interface module synchronization is faulty.
Double flashing in red	A watchdog fault occurs in the EtherCAT communication.

- SF indicator

Status	Description
Off	The device is normal.
Flashing	<ul style="list-style-type: none"> ◦ The configuration is faulty. ◦ The EtherCAT port is disconnected. ◦ The expansion module is faulty.

Signal Indicator Troubleshooting

The following table lists the statuses, descriptions, and solutions for the signal indicators.

LED Indicator		Description	Solution
RUN	Off	There is no connection between EtherCAT master and slave.	<ul style="list-style-type: none"> • Check that the configuration and parameter assignment are correct. • Check that the communication address is correct. • Check that the length and other specifications of the network cable are as specified.
	Blinking	The EtherCAT slave is in a non-OP state.	Check slave configuration for any missing, faulty, or unconfigured module.
ERR	Flashing	The EtherCAT master does not exchange data with the EtherCAT slave.	Check that the cable connector is inserted correctly.
		The EtherCAT communication receives non-executable state transition commands.	Check that the network cable is intact.

LED Indicator		Description	Solution
		A synchronization fault occurs in the EtherCAT module.	Restart the power supply.
		A watchdog fault occurs in the EtherCAT communication.	Check that the PDO configuration is correct.
SF	Flashing	The configuration is faulty.	Check that the host controller configuration is consistent with the module configuration.
		The expansion module is faulty.	Check whether the module is interfered with or not connected to the 24V power supply.

9.2.2 Troubleshooting via Programming Software

Host programming software provides specific information, causes, and solutions for relevant faults of the product. For special cases, even more detailed diagnostic information is available. The methods for viewing fault information vary among different host programming software. This section introduces the viewing methods for Inovance small-sized PLCs, Inovance medium-sized PLCs, Omron PLCs, and Beckhoff PLCs.

9.2.2.1 Compatibility with Inovance Small-Sized PLC

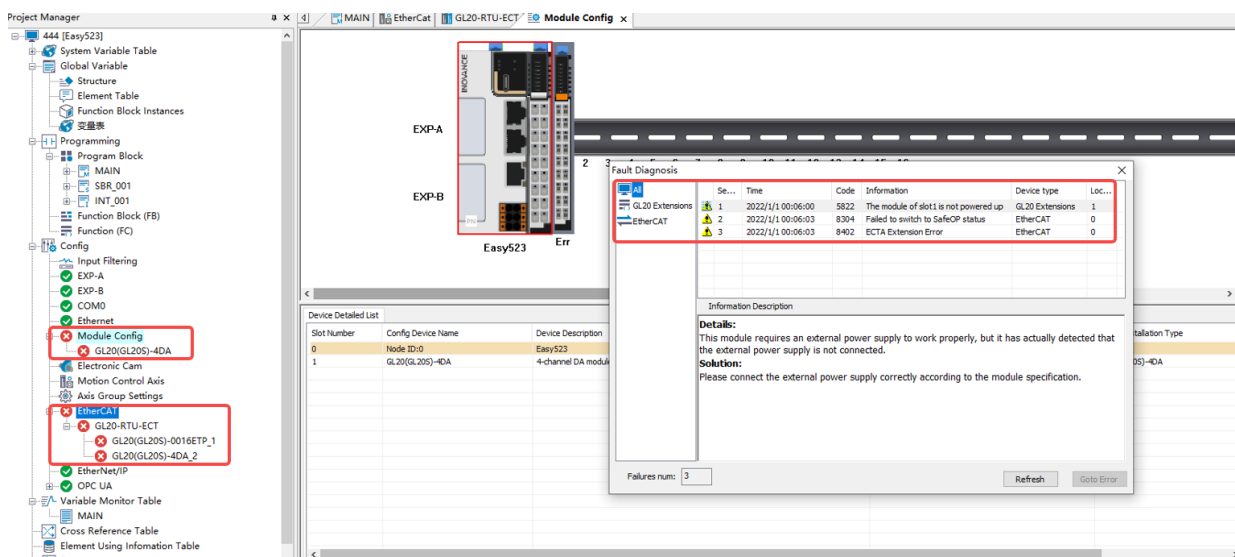
Introduction

NOTICE

- This function is supported in H5U with firmware version 6.2.0.0 and later.
- This function is supported in Easy with firmware version 6.3.0.0 and later.

The fault information of this product and the expansion modules can be viewed through the "Failure status" indicator in the status bar or through "Debug (D) > System Run Log View" in the menu bar.

When this product or the expansion modules are faulty, a red cross icon will appear on the "EtherCAT" node in the "Project Manager" navigation tree on the left, and the "Failure status" indicator in the status bar will display a yellow background, as shown below.

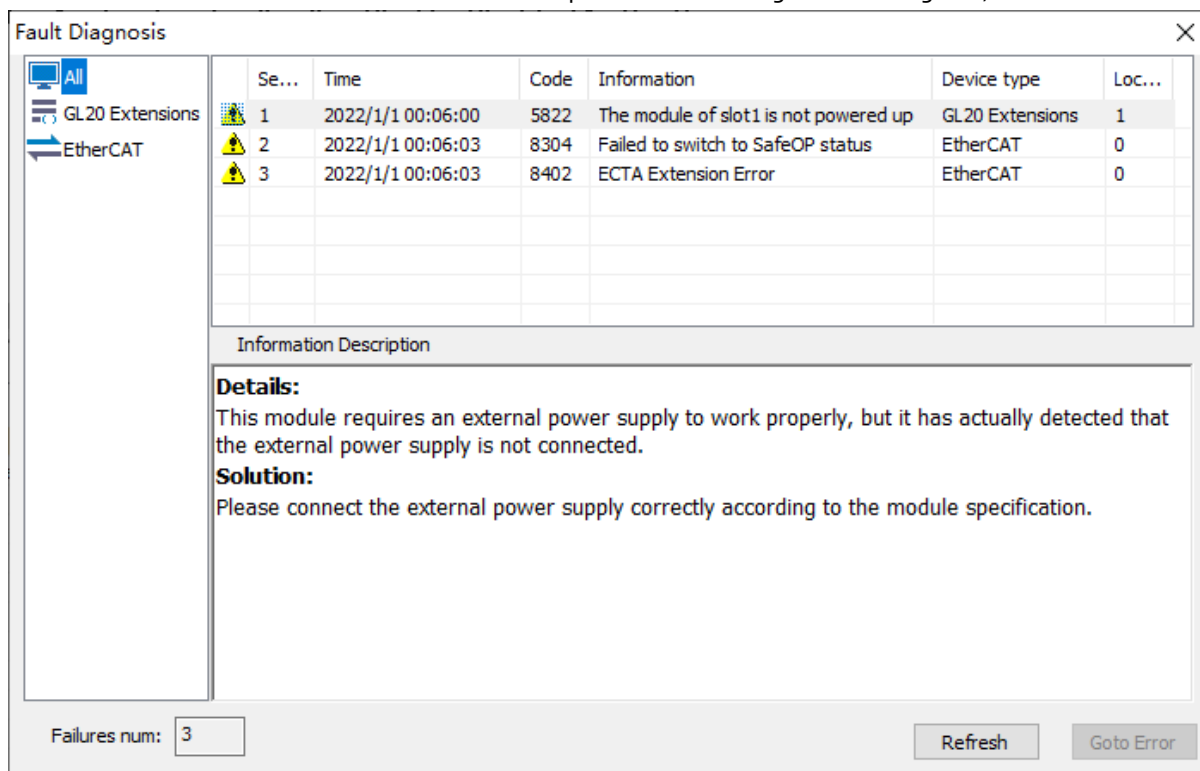


Prerequisites

- This product is connected to a PC equipped with AutoShop programming software and the PLC host via a network cable.
- This product is powered on.

Procedure

1. Double-click "Failure status" in the status bar to open the "Fault Diagnosis" dialog box, as shown below.



2. Click a fault message, and the detailed fault information and solution will be displayed at the bottom of the dialog box. Troubleshoot according to the solution.
3. (Optional) To view more detailed fault information, select "Debug (D) > System Run Log View" in the menu bar to open the "System Run Log" window.

System Run Log

Warning(35)
 Error(0)
 Exception(0)
 Debug(0)
 Info(2204)

Display Time Stamps in PC local Time

Elements: All Refresh Export

NO.	Level	Time	Description	Element
2210	Info	2022/1/1 00:19:34	EtherCAT: Received run command.	EtherCAT
2211	Info	2022/1/1 00:19:34	Hook 1/2: EthIPScanner: Start hook event 1.	EtherNet/IP Scanner
2212	Info	2022/1/1 00:19:34	Hook run 1/4: EthIPScanner: CMP_EVT_RUN	EtherNet/IP Scanner
2213	Info	2022/1/1 00:19:34	Update 1/2: EthIPScanner: update cipudtlist done	EtherNet/IP Scanner
2214	Info	2022/1/1 00:19:34	Update 2/2: EthIPScanner: update cipexplicittag done	EtherNet/IP Scanner
2215	Info	2022/1/1 00:19:34	Hook run 2/4: EthIPScanner: update cip config ret 0	EtherNet/IP Scanner
2216	Info	2022/1/1 00:19:34	EipStackCt 1/2: EthIPScanner: Start create stack	EtherNet/IP Scanner
2217	Info	2022/1/1 00:19:34	ThreadRun 1/2: EthIPScanner: Start eventDeal thread	EtherNet/IP Scanner
2218	Info	2022/1/1 00:19:34	ThreadRun 1/2: EthIPScanner: Start running stack	EtherNet/IP Scanner
2219	Info	2022/1/1 00:19:34	ThreadRun 1/3: EthIPScanner: Start diag thread	EtherNet/IP Scanner
2220	Info	2022/1/1 00:19:34	ThreadRun 2/3: EthIPScanner: diag thread cycle	EtherNet/IP Scanner
2221	Info	2022/1/1 00:19:34	EipStackCt 2/2: EthIPScanner: End create stack	EtherNet/IP Scanner
2222	Info	2022/1/1 00:19:34	Hook run 3/4: EthIPScanner: create stack done	EtherNet/IP Scanner
2223	Info	2022/1/1 00:19:34	Hook run 4/4: EthIPScanner: create thread done	EtherNet/IP Scanner
2224	Info	2022/1/1 00:19:34	Hook 2/2: EthIPScanner: End hook event 1.	EtherNet/IP Scanner
2225	Info	2022/1/1 00:19:34	Hook 1/2: EthIPAdapter: Start hook event 1.	EtherNet/IP Scanner
2226	Info	2022/1/1 00:19:34	Hook 2/2: EthIPAdapter: End hook event 1.	EtherNet/IP Scanner
2227	Info	2022/1/1 00:19:34	Hook 1/2: EthIPScanner: Start hook event 4.	EtherNet/IP Scanner
2228	Info	2022/1/1 00:19:34	Hook 2/2: EthIPScanner: End hook event 4.	EtherNet/IP Scanner
2229	Info	2022/1/1 00:19:34	Hook 1/2: EthIPAdapter: Start hook event 4.	EtherNet/IP Scanner
2230	Info	2022/1/1 00:19:34	Hook 2/2: EthIPAdapter: End hook event 4.	EtherNet/IP Scanner
2231	Info	2022/1/1 00:19:34	EtherCAT: Start to register master.	EtherCAT
2232	Info	2022/1/1 00:19:35	localbus: info - running!	GL20 Extensions
2233	Warning	2022/1/1 00:19:35	Warning 5822 at 65536(0x10000).	GL20 Extensions
2234	Info	2022/1/1 00:19:35	EtherCAT: Start to register slaves.	EtherCAT
2235	Info	2022/1/1 00:19:35	EtherCAT: Register finished.	EtherCAT
2236	Info	2022/1/1 00:19:35	EtherCAT: Start to send sync frames.	EtherCAT
2237	Info	2022/1/1 00:19:36	EtherCAT: Master Active	EtherCAT
2238	Info	2022/1/1 00:19:36	EtherCAT: Slaves ready	EtherCAT
2239	Info	2022/1/1 00:19:37	EtherCAT: Synchronize finished.	EtherCAT

4. Select "EtherCAT" for "Elements" to view EtherCAT component log information.

The log includes fault codes, slave location, fault slot, and diagnostic information. The following figure shows an example of fault information analysis.

- "GL20-ECAT 0" indicates that the faulty module is in the 1st communication interface module, where "0" indicates the position of the communication interface module starting from 0.
 - "0x2" indicates the module in the second slot is faulty. Converting "0x2" to binary yields "10", where each bit corresponds to an expansion module in an inverted order (meaning the last bit represents the 1st expansion module). In the binary representation, "0" indicates no fault and "1" indicates faulty.
 - "Warning 8403 at 0(0x0)" indicates that the expansion module connected to the GL20-RTU-ECT32-INT communication interface module is faulty.
 - "slot 0" indicates that the module in the first slot is faulty, with module positions counted starting from 0.
- I/O expansion module faults can indicate faults in both channels and modules. "Suindex 0x3" indicates a fault in the second channel and "Suindex 0x5" indicates a fault in the fourth channel. Channel positions are generally counted starting from channel 0x2.
- "0x5003" indicates a module fault code, which means an external 24 V power supply failure.

For description and solution, see the "9.6 Fault Code List".

System Run Log

Warning(23)
 Error(0)
 Exception(0)
 Debug(0)
 Info(411)
 Elements: EtherCAT
 Refresh Export

Display Time Stamps in PC local Time

NO.	Level	Time	Description	Element
406	Info	2022/1/1 00:06:03	EtherCAT: The slave(GL20-ECAT) 0 FaultID is 0x1001	EtherCAT
407	Info	2022/1/1 00:06:03	EtherCAT: GL20-ECAT 0 config module is more than linked	EtherCAT
408	Warning	2022/1/1 00:06:03	Warning 8304 at 0(0x0).	EtherCAT
409	Warning	2022/1/1 00:06:03	Warning 8402 at 0(0x0).	EtherCAT
410	Info	2022/1/1 00:19:30	EtherCAT: Received stop command.	EtherCAT
411	Info	2022/1/1 00:19:30	EtherCAT: allowblock_run_cmd_1=0	EtherCAT
412	Info	2022/1/1 00:19:30	ECT_STATE_RUN_2_IDLE 0	EtherCAT
413	Info	2022/1/1 00:19:30	EtherCAT: Stop master	EtherCAT
414	Info	2022/1/1 00:19:30	EtherCAT: releasing master	EtherCAT
415	Info	2022/1/1 00:19:30	EtherCAT: release master done	EtherCAT
416	Info	2022/1/1 00:19:30	Clean current error records.	EtherCAT
417	Info	2022/1/1 00:19:30	EtherCAT: Stop master finished.	EtherCAT
418	Info	2022/1/1 00:19:34	EtherCAT: Start to get config data.	EtherCAT
419	Info	2022/1/1 00:19:34	EtherCAT: Cycle time is 4000 us.	EtherCAT
420	Info	2022/1/1 00:19:34	EtherCAT: There are 1 slave(s) configured.	EtherCAT
421	Info	2022/1/1 00:19:34	EtherCAT: offset time is 0.500000 us.	EtherCAT
422	Info	2022/1/1 00:19:34	EtherCAT: There are 1 slave(s) used.	EtherCAT
423	Info	2022/1/1 00:19:34	EtherCAT: Get config data finished.	EtherCAT
424	Info	2022/1/1 00:19:34	EtherCAT: Received run command.	EtherCAT
425	Info	2022/1/1 00:19:34	EtherCAT: Start to register master.	EtherCAT
426	Info	2022/1/1 00:19:35	EtherCAT: Start to register slaves.	EtherCAT
427	Info	2022/1/1 00:19:35	EtherCAT: Register finished.	EtherCAT
428	Info	2022/1/1 00:19:35	EtherCAT: Start to send sync frames.	EtherCAT
429	Info	2022/1/1 00:19:36	EtherCAT: Master Active	EtherCAT
430	Info	2022/1/1 00:19:36	EtherCAT: Slaves ready	EtherCAT
431	Info	2022/1/1 00:19:37	EtherCAT: Synchronize finished.	EtherCAT
432	Info	2022/1/1 00:21:29	EtherCAT: GL20-ECAT 0 Errslot1 is 0x1	EtherCAT
433	Warning	2022/1/1 00:21:29	Warning 8403 at 0(0x0).	EtherCAT
434	Info	2022/1/1 00:21:29	EtherCAT: The slave(GL20-ECAT)0 slot 0 index 0xa000 diaginfo is 0x5003	EtherCAT

9.2.2.2 Compatibility with Inovance Medium-Sized PLC

Introduction

The fault information of this product and the expansion modules can be viewed through the real-time diagnosis function and through the relevant object dictionary via the online CoE function.

When this product and the expansion modules are faulty, a fault icon appears on the right side of the "Devices" navigation tree. Hovering the mouse over the icon will display the fault information. Double-clicking the fault icon will navigate to the "Realtime Diagnosis" interface and automatically locate the corresponding fault, as shown below.

The screenshot shows the 'Realtime Diagnosis' window with the following details:

- Type:** All
- Search:** [Empty]
- Buttons:** Refresh, Clear, Export
- Realtime Diagnosis Table:**

Type	Info	Reason
ETHERCAT		1. Fault: The 24V external power supply of the module fails
GL20_RTU_ECT	There is 5 fault in the module, Slot no: 1,2,3,4,6	
GL20_0016ETN	For module faults, see Reason for details below	
GL20_4AD	For module faults, see Reason for details below	
GL20_0016ETP	For module faults, see Reason for details below	
GL20_4DA	For module faults, see Reason for details below	
GL20_2SSI	For module faults, see Reason for details below	
- Solution:** [Empty]
- Extend Information:**
 - Slave: GL20_RTU_ECT
 - Slot no: 1
 - Module: GL20_0016ETN

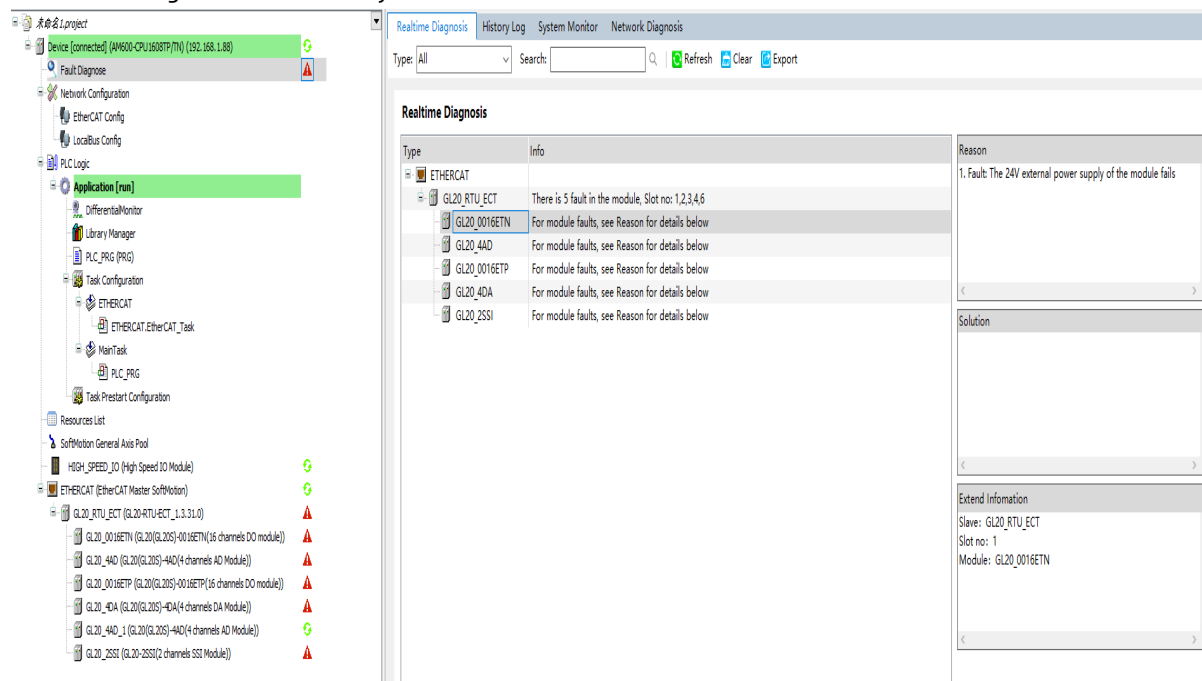
Prerequisites

- This product is connected to a PC equipped with InoProShop programming software and the PLC host via a network cable.
- This product is powered on.

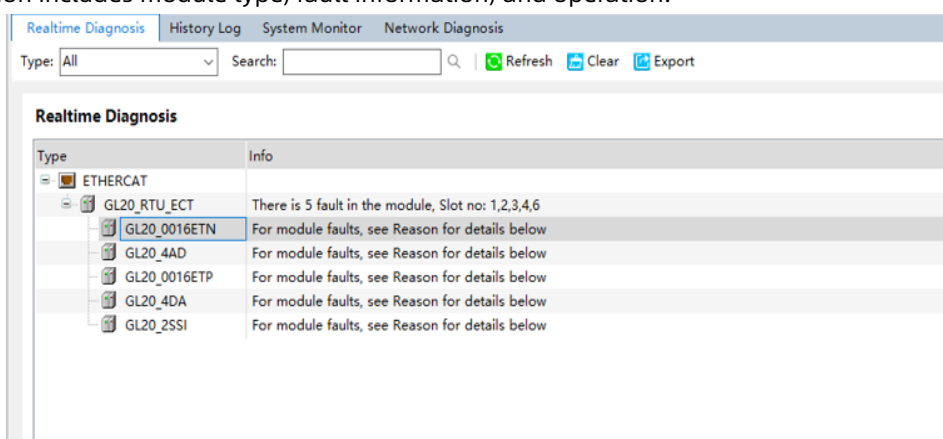
Procedure

Method 1: Through real-time diagnosis function

1. In the "Devices" navigation tree on the left, double-click "Fault Diagnose" or the fault icon to open the "Realtime Diagnosis" interface by default.



2. Filter the modules to display the required fault information.
 - a. Select the fault type in the "Type" drop-down box. Options include all (default), CPU module, Modbus module, ModbusTCP module, local module, and EtherCAT module.
 - b. Enter a keyword for a module name or fault information in the "Search" box, and click the search button on the right.
The fault information list will be displayed based on the module type or filter keyword. Module fault information includes module type, fault information, and operation.



3. Click a record and the corresponding information (including "Reason", "Solution", and "Extend Information") is displayed on the right of the interface. Follow the diagnostic information to troubleshoot the fault.


Reason

1. Fault: The 24V external power supply of the module fails

Solution

Extend Infomation

Slave: GL20_RTU_ECT
 Slot no: 1
 Module: GL20_0016ETN

 **NOTE**

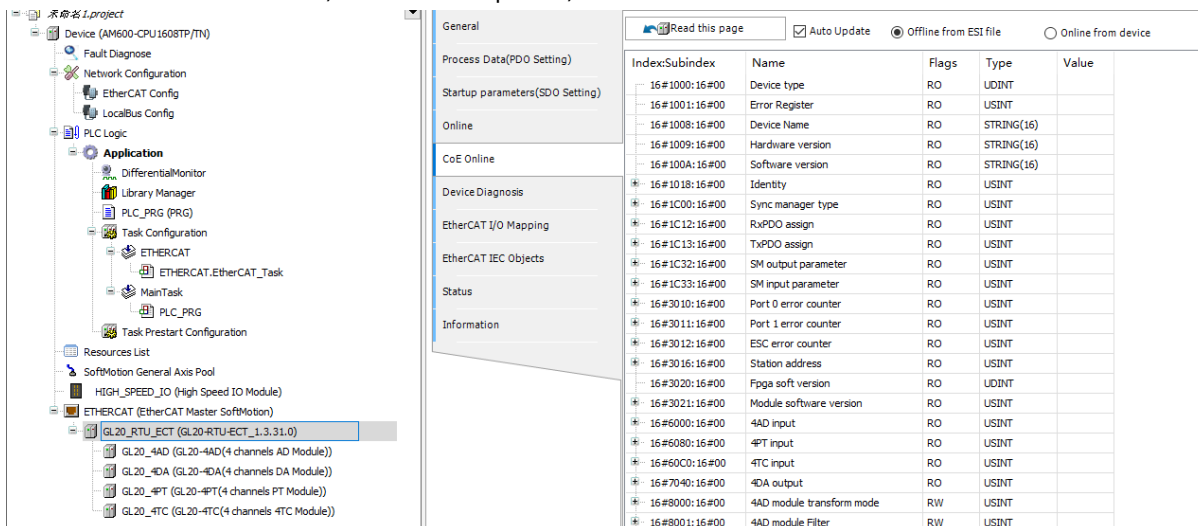
EtherCAT-related faults will trigger an entry to the overview. Click the entry to navigate to the overview page, where you can view the operating status and related faults of all slaves.

Method 2: Through relevant object dictionary via online CoE

1. In the "Devices" navigation tree on the left, double-click "GL20_RTU_ECT32" under the "EtherCAT_C" node to open the configuration interface.

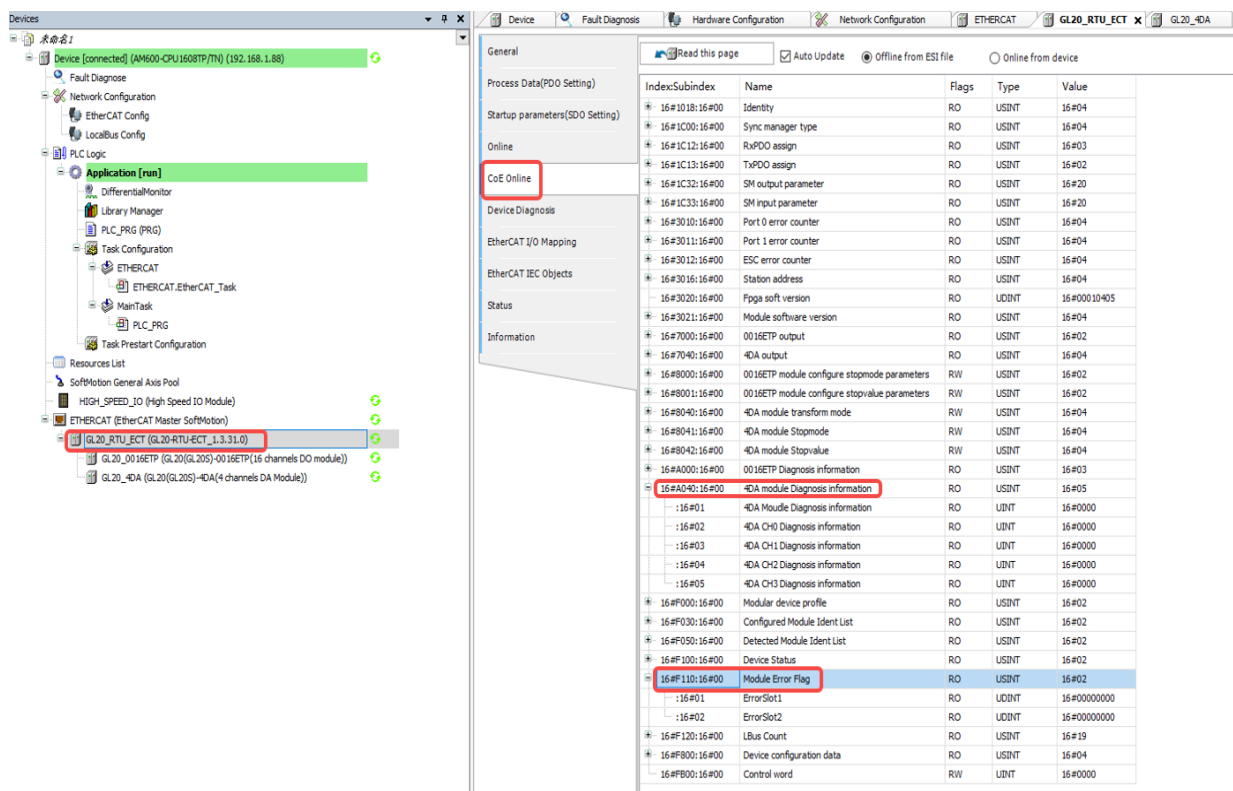
The screenshot shows the SIMATIC Manager configuration environment. On the left, the 'Devices' navigation tree is expanded to show the 'EtherCAT' node, with 'GL20_RTU_ECT (GL20-RTU-ECT-1.3.31.0)' selected. The main window displays the configuration for this module, including fields for 'AutoInc Address' (0) and 'EtherCAT Address' (1001). The 'Identification' section is set to 'Disabled', and the 'ADO (hex)' field is set to '0'. The 'EtherCAT' logo is visible in the top right corner of the configuration area.

2. In the "Online CoE" interface, check "Auto Update", as shown below.



3. View the object dictionary 0xF100, 0xF110 (manufacturer parameter object dictionary), and the diagnostic object dictionary 0xAxxx of the expansion module (Appendix 4: Expansion Module Object Dictionary Definitions) to query the relevant fault information.

For descriptions and solutions of fault codes, see "9.6 Fault Code List".



9.2.2.3 Compatibility with Omron PLC

Introduction

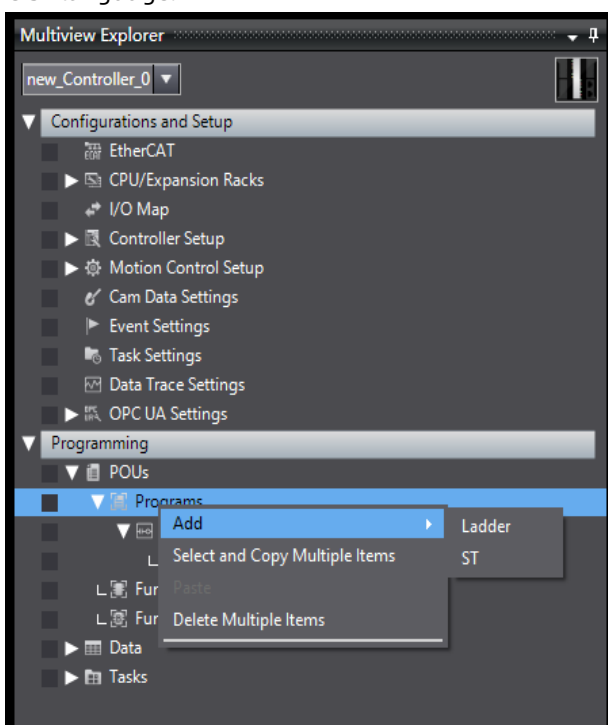
When using Omron PLC to troubleshoot this product, relevant function blocks are required to obtain fault information.

Prerequisites

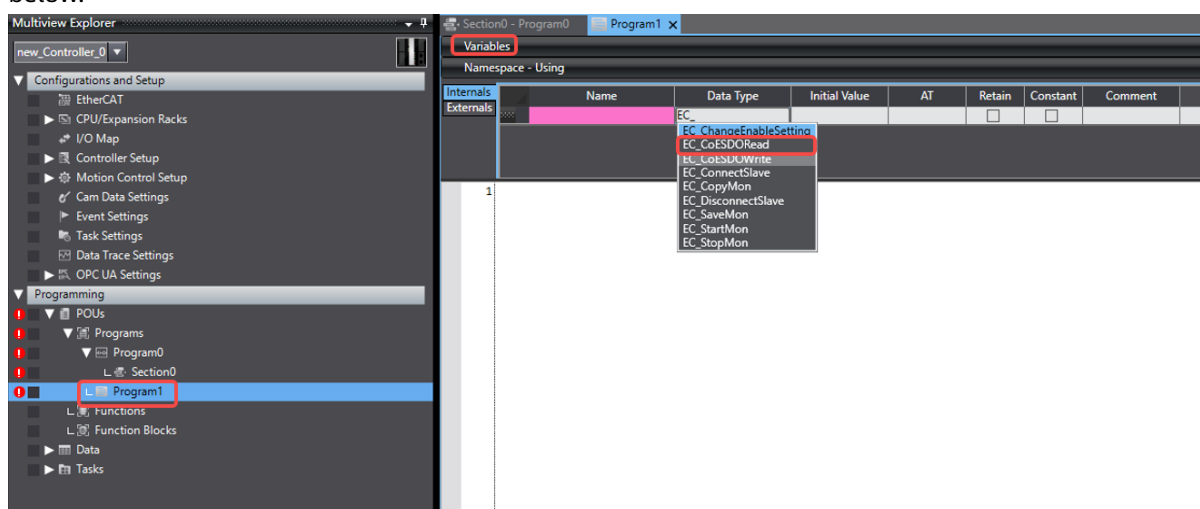
- This product is connected to a PC equipped with Sysmac Studio programming software and the PLC host via a network cable.
- This product is powered on.

Procedure

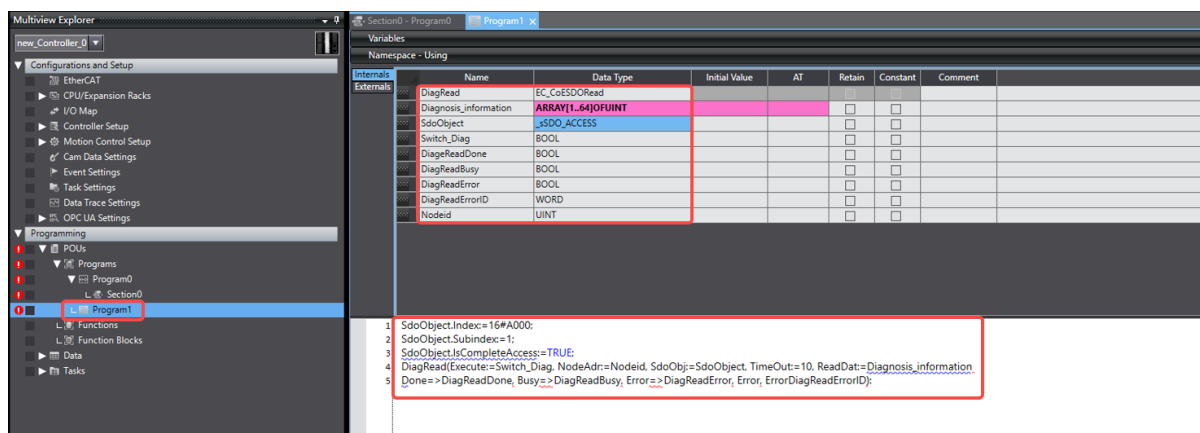
1. In the "Multiview Explorer" navigation tree on the left, click "Programs" under "Programming > POU's" and select "Add > ST" to add the ST language.



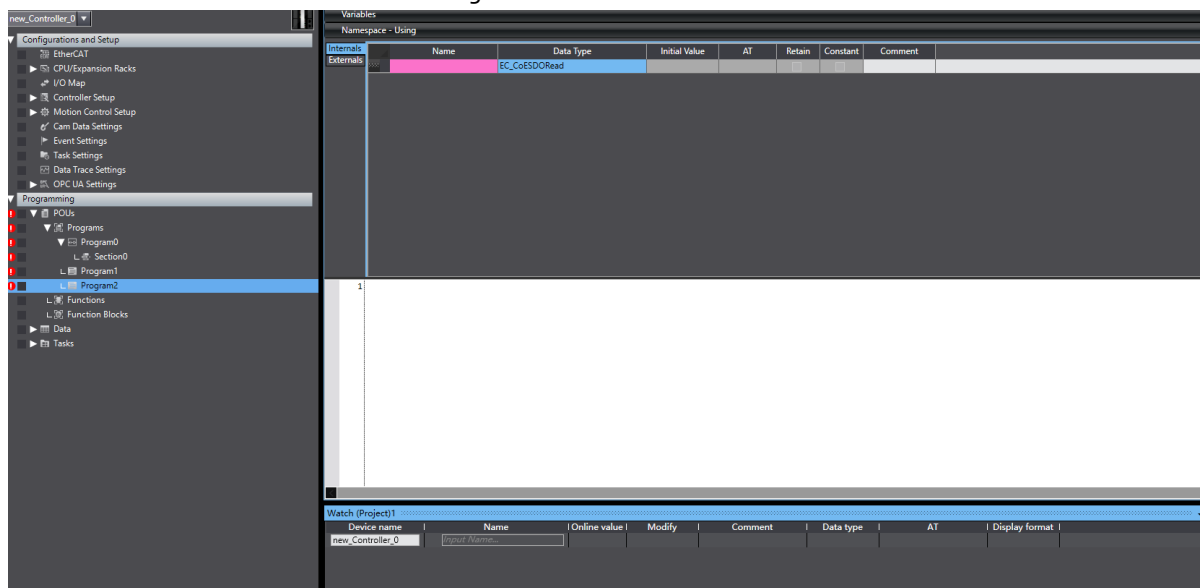
2. Double-click "Program 1", click "Variables", and create a variable of data type "EC_CoESDORed", as shown below.



3. Referring to the variable format in the following figure, create the relevant variables and download to the PLC.



4. Click "Watch (Project)" at the bottom of the interface, and set the value of the "ReadDat" variable as the monitoring target to reflect the fault codes of the currently selected object dictionary. Refer to the initial values of other related variables in the figure above.

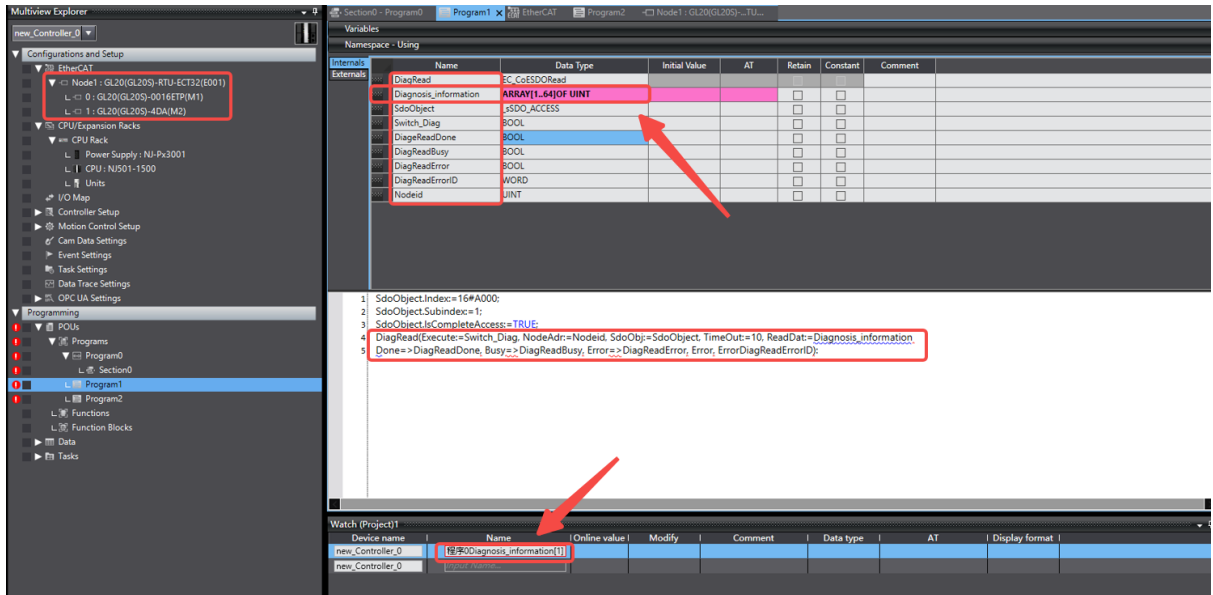


5. Create the relevant function block variables and write to the corresponding object dictionary index and values.

NOTE

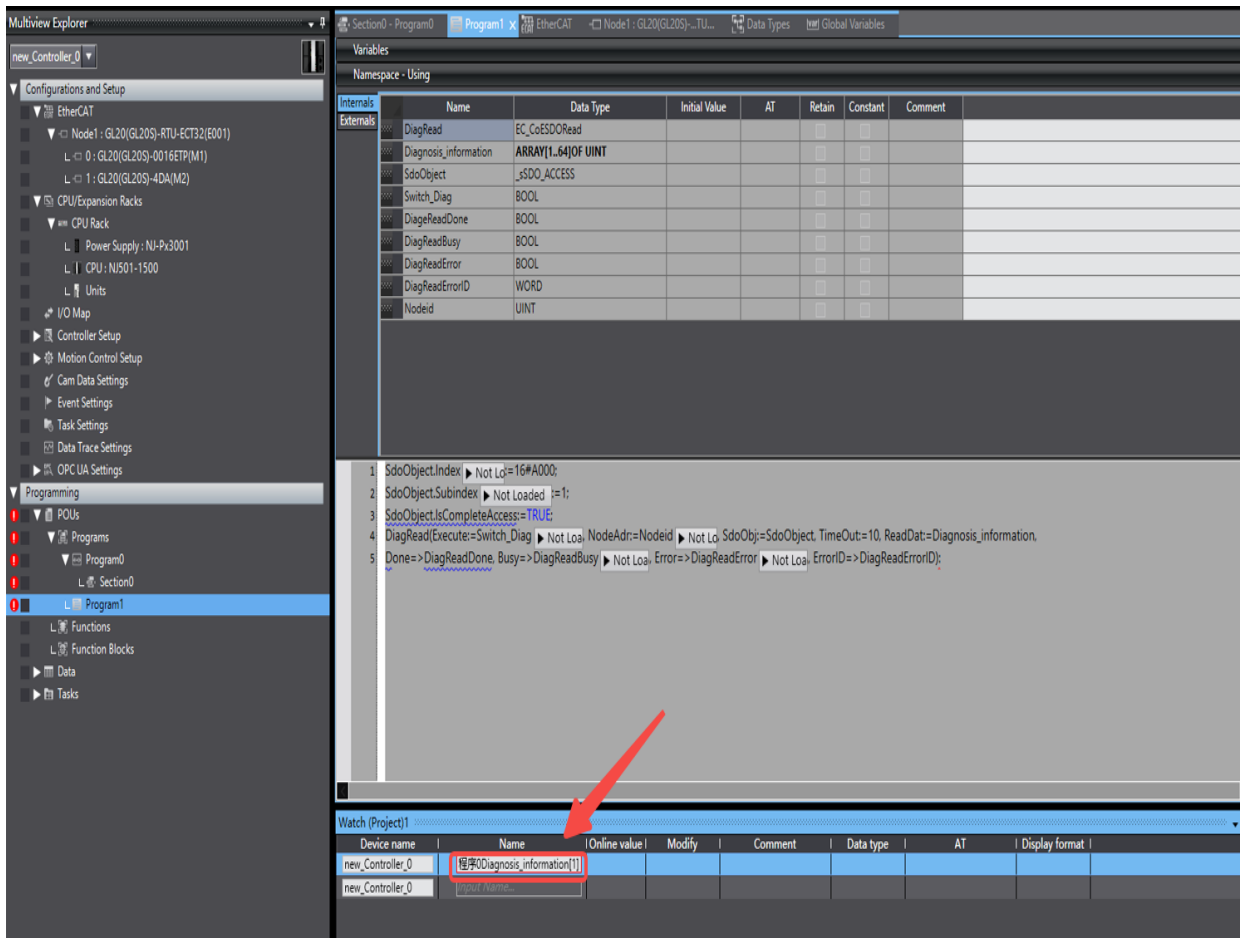
The index value in the object dictionary should be calculated based on the number of modules connected after the current EtherCAT communication interface module. For the specific logic of accumulation, refer to "[Appendix 4: Expansion Module Object Dictionary Definitions](#)".

6. Monitor the array storing diagnostic codes, then download the program to PLC and run it.



7. After the PLC is operating normally, if a module under monitoring is faulty, the relevant fault code will be displayed. For example, the fault code in the figure below is 0x5003.

It indicates a 24 V power supply failure of the monitored module. For details on other fault codes, see "[9.6 Fault Code List](#)".



9.2.2.4 Compatibility with Beckhoff PLC

Introduction

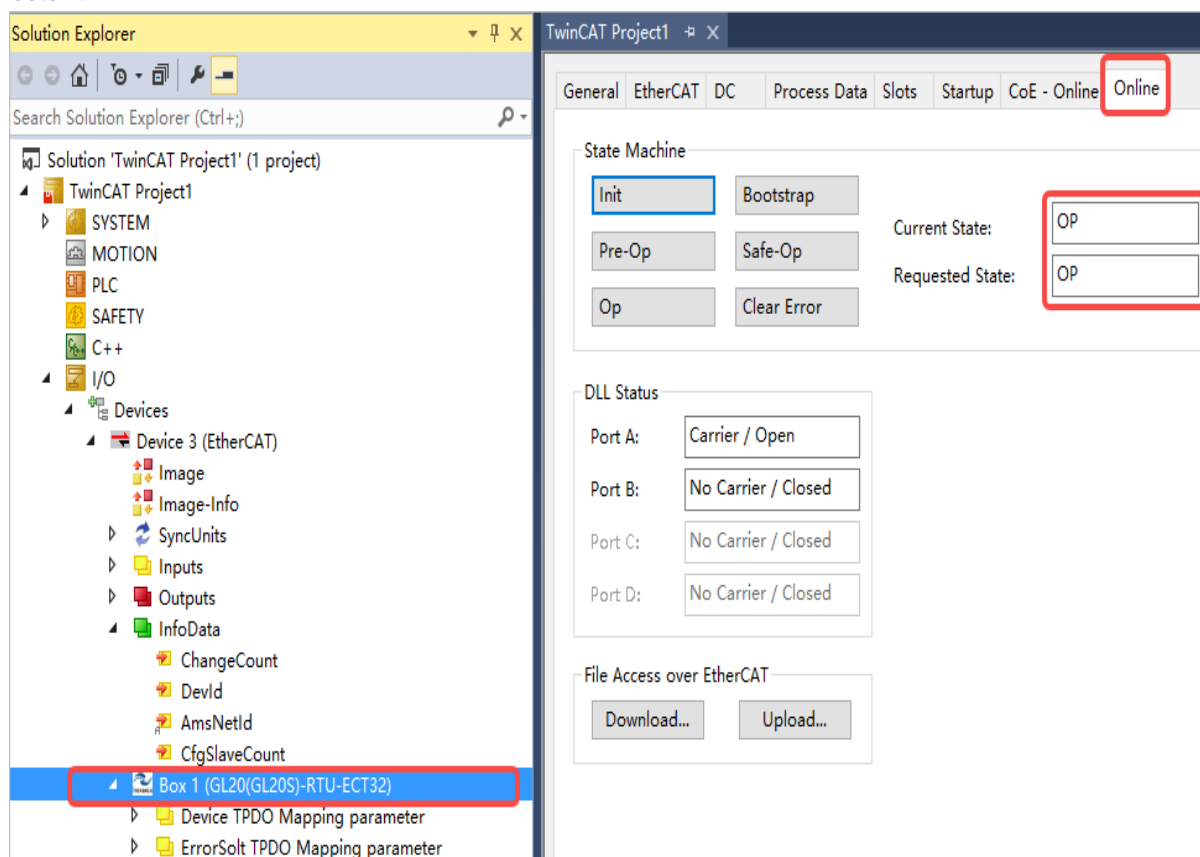
When using Beckhoff PLC to troubleshoot this product, the corresponding module fault codes can be obtained through the online CoE function, with no need to create other variables.

Prerequisites

- This product is connected to the PC equipped with TwinCAT software and the PLC host via a network cable
- This product is powered on.

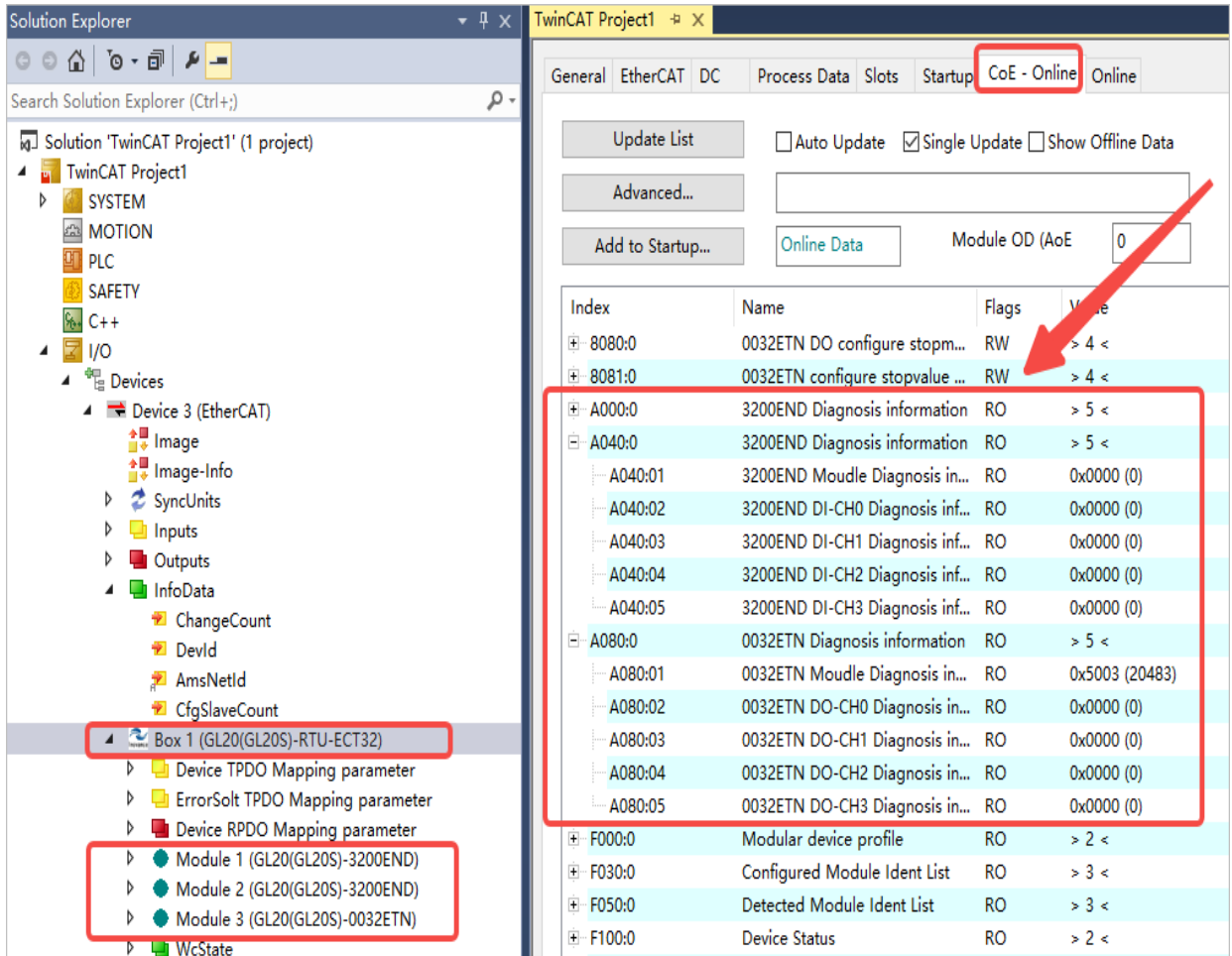
Procedure

1. In the "Solution Explorer" navigation tree on the left, double-click the "GL20-RTU-ECT32" communication interface module. In the "Online" interface, ensure that the module is currently in the "OP" state, as shown below.



2. In the "CoE - Online" interface, view object dictionaries 0xF100, 0xF110, and the diagnostic object dictionary of the expansion modules 0xAnnn..


View the fault codes of the current module. For specific meanings and solutions of fault codes, refer to the "[9.6 Fault Code List](#)".



9.2.3 Troubleshooting via IOManager

Introduction

The IOManager configuration tool can be used to obtain the corresponding fault codes of this product and expansion modules.



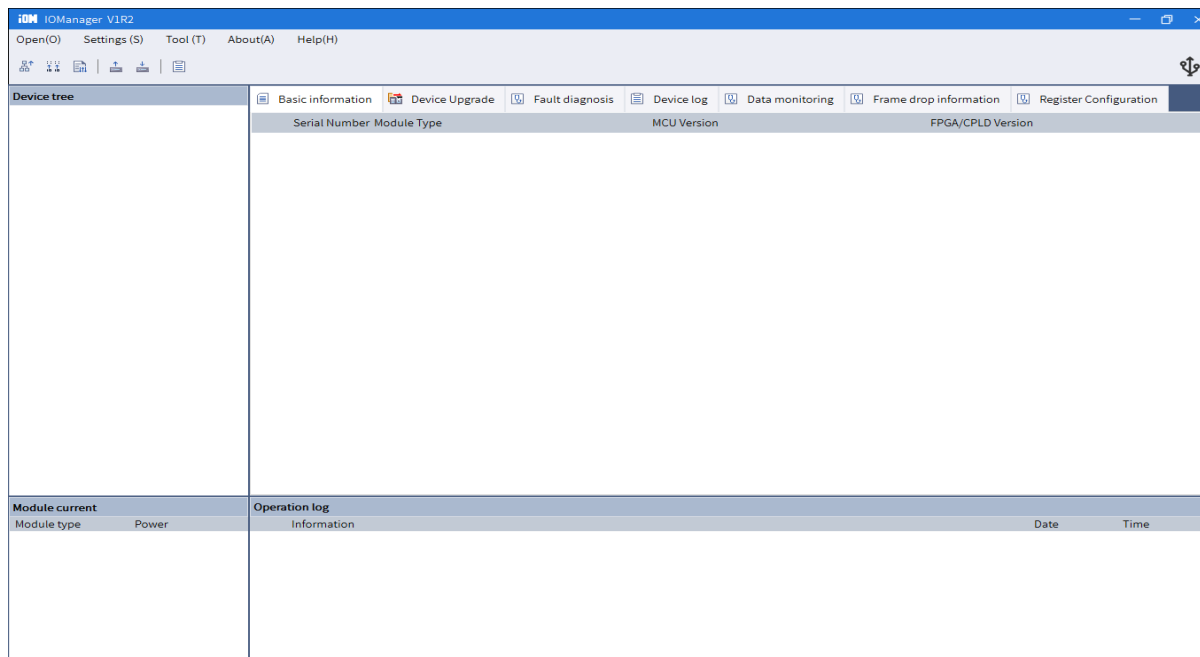
The troubleshooting function of the IOManager serves only as an auxiliary tool. It is necessary to identify the specific faulty module beforehand, then check the corresponding fault code to obtain the specific information.

Prerequisites

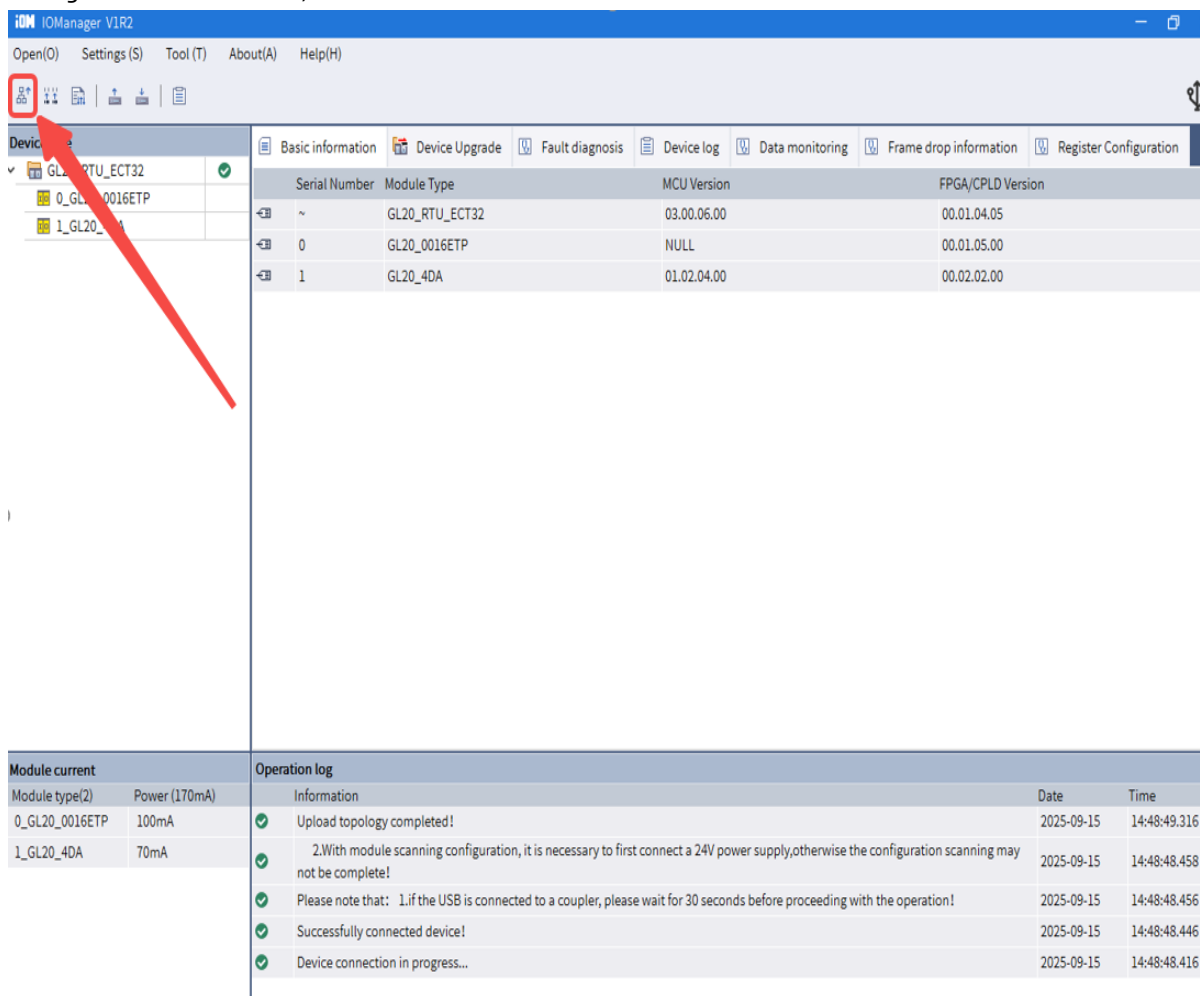
- This product is connected to a PC equipped with the IOManager configuration tool via a USB cable.
- This product is powered on.

Procedure

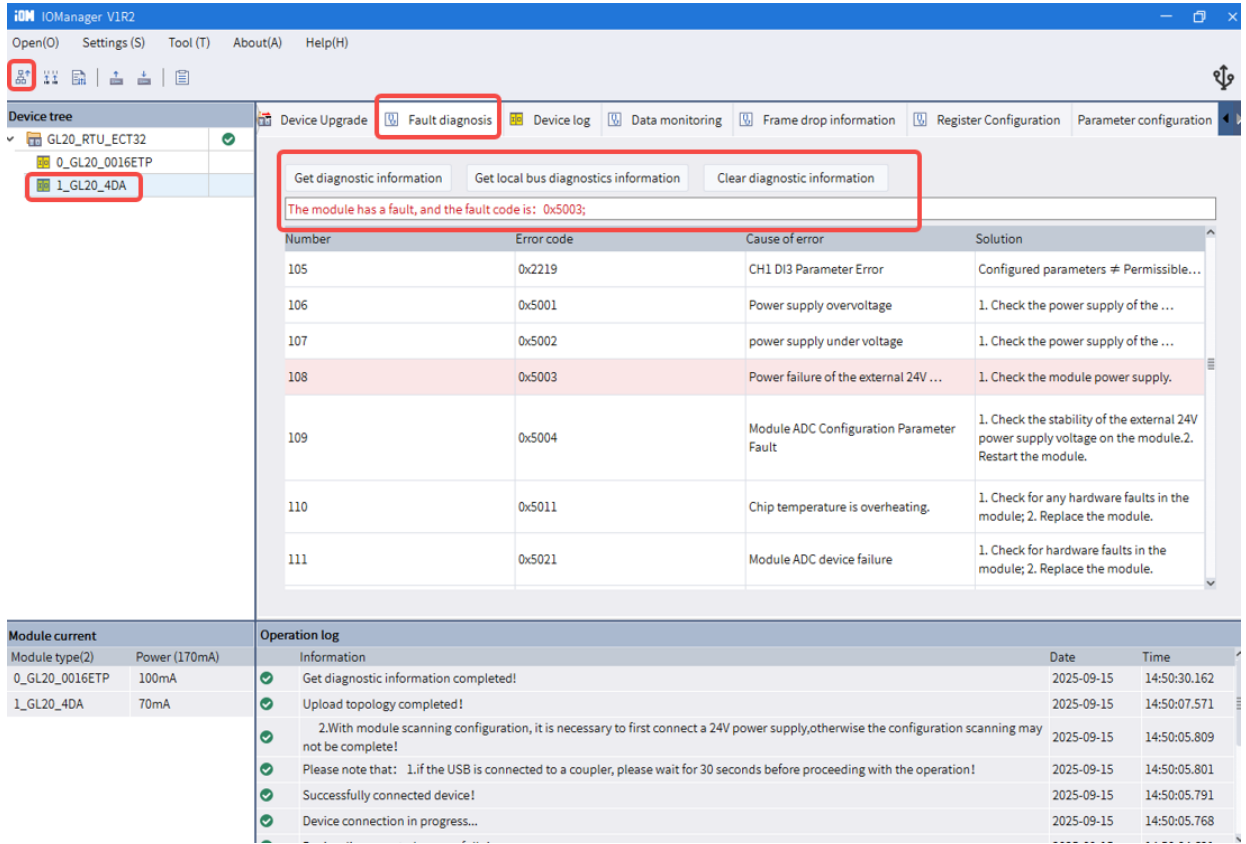
1. Open the IOManager configuration tool on the PC desktop.



2. In the menu bar, select "Open > Connect Devices" to connect this product to IOManager.
 - If the connection succeeds, "Connected" is displayed in the upper right corner of the interface.
 - If the connection fails, check whether the driver is properly installed.
3. Click the configuration topology upload button on the upper left corner of the interface to view the configuration information, as shown below.



- In the "Fault diagnosis" interface, select the faulty modules to be viewed in the "Device tree" on the left. Click "Get diagnostic information" to view the fault information of the current module. In the figure below, the fault code is 0x5003, indicating an external 24 V power supply failure for the current module). For specific meanings and solutions of fault codes, see "Fault Code List".



9.3 Fault Type

All faults of this product can be accessed via the object dictionary, including module faults, channel faults, communication faults, and configuration faults. When a fault occurs, relevant fault information can be accessed in the host programming software by viewing object dictionaries 0xF100, 0xF110, and the diagnostic object dictionary 0xAxxx of the expansion module. The 0xF100 object dictionary allows querying of fault information such as whether the current local bus status matches the configuration. The 0xF110 object dictionary allows querying of the slot numbers of expansion modules and the 0xAxxx object dictionary allows querying of specific fault information of the expansion modules.

Index	0xF100: Device Status				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Device status	USINT	RO	NO	0
1	LBus Status	UINT	RO	YES	0
2	Cfg Fault ID	UINT	RO	YES	0


Subindex 1: LBus expansion module status

Status Value	Description
0x01	Local bus initialization
0x02	Local bus pre-operational status
0x04	Local bus safe-operational status
0x41	GL20-1DNM/GL20-2SCOM-MDB waiting for configuration parameter distribution
0x08	Local bus operational status
0x10	Switchover from safe-operational to operational status
0x20	Switchover from operational status to safe-operational status
0x80	Local bus fault

Subindex 2: Cfg Fault ID

ID	Description
0x0000	Consistent configuration
0x1000	No expansion module scanned.
0x1001	The number of configured I/O modules is greater than the number of actual scanned I/O modules.
0x1002	Number of configured modules less than that of scanned modules
0x1003	The type of configured I/O modules is inconsistent with that of actual scanned I/O modules.

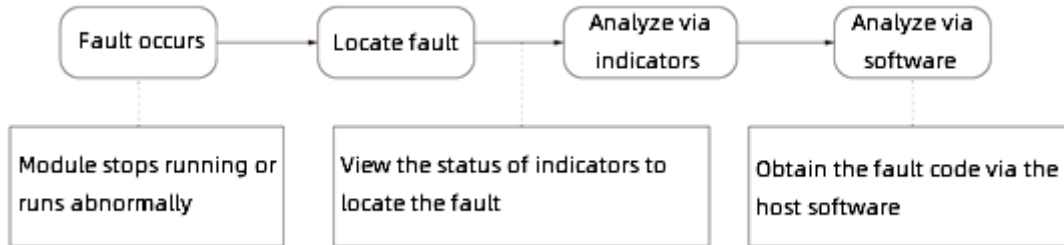
Index	0xF110: Device Diagnosis				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	SubIndex 000	USINT	RO	NO	2
1	ErrorSlot1	UDINT	RO	NO	-
2	ErrorSlot2	UDINT	RO	NO	-

 **NOTE**

This subindex indicates the actual slot positions of the faulty modules, where each bit represents an expansion module. "0" indicates that the expansion module is normal. "1" indicates that the expansion module is faulty. For example, 0x0005 indicates that the modules in slots 1 and 3 are faulty.

9.4 Troubleshooting Process

When this product and expansion modules are faulty, identify the fault type and location based on the signal indicators of the product and expansion modules. If the indicator shows abnormalities, use the troubleshooting function of the programming software, or use IOManager to check the fault code of the corresponding module and solve the fault.



9.5 Common Fault Cases

9.5.1 How to Handle Frame Loss/Communication Disconnection

Fault Description

- The acquisition value of the analog input module remains unchanged.

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
Device control			%QW1	UINT	0			Device control
GL20_4DA DA CH0		GL20_4DA DA CH0	%QW2	INT	20000			GL20_4DA DA CH0
GL20_4DA DA CH1		GL20_4DA DA CH1	%QW3	INT	20000			GL20_4DA DA CH1
GL20_4DA DA CH2		GL20_4DA DA CH2	%QW4	INT	0			GL20_4DA DA CH2
GL20_4DA DA CH3		GL20_4DA DA CH3	%QW5	INT	0			GL20_4DA DA CH3
LBus status			%IW2	UINT	8			LBus status
Fault ID			%IW3	UINT	0			Fault ID
ErrorSol1			%ID2	UDINT	0			ErrorSol1
ErrorSol2			%ID3	UDINT	0			ErrorSol2
GL20_4AD AD CH0			%IW8	INT	20014			GL20_4AD AD CH0
GL20_4AD AD CH1			%IW9	INT	20014			GL20_4AD AD CH1
GL20_4AD AD CH2			%IW10	INT	0			GL20_4AD AD CH2
GL20_4AD AD CH3			%IW11	INT	1			GL20_4AD AD CH3

- The SF indicator of the communication interface module is flashing, and the PR indicator of the subsequent module is flashing quickly.
- In the "CoE Online" interface, the fault code 0x1006 (communication disconnection) is displayed.

Index:Subindex	Name	Flags	Type	Value
16#1009:16#00	Hardware version	RO	STRING(16)	'00.00.01.00'
16#100A:16#00	Software version	RO	STRING(16)	'03.00.06.00'
16#1018:16#00	Identity	RO	USINT	16#04
16#1C00:16#00	Sync manager type	RO	USINT	16#04
16#1C12:16#00	RxPDO assign	RO	USINT	16#02
16#1C13:16#00	TxPDO assign	RO	USINT	16#03
16#1C32:16#00	SM output parameter	RO	USINT	16#20
16#1C33:16#00	SM input parameter	RO	USINT	16#20
16#3010:16#00	Port 0 error counter	RO	USINT	16#04
16#3011:16#00	Port 1 error counter	RO	USINT	16#04
16#3012:16#00	ESC error counter	RO	USINT	16#04
16#3016:16#00	Station address	RO	USINT	16#04
16#3020:16#00	Fpga soft version	RO	UDINT	16#00010405
16#3021:16#00	Module software version	RO	USINT	16#04
16#5000:16#00	Disable Slot Control	RW	USINT	16#04
16#5001:16#00	Disable Function Control	RW	UINT	16#0000
16#6000:16#00	4AD input	RO	USINT	16#04
16#7040:16#00	4DA output	RO	USINT	16#04
16#8000:16#00	4AD module transform mode	RW	USINT	16#04
16#8001:16#00	4AD module Filter	RW	USINT	16#04
16#8002:16#00	4AD module Detect	RW	USINT	16#04
16#8040:16#00	4DA module transform mode	RW	USINT	16#04
16#8041:16#00	4DA module Stopmode	RW	USINT	16#04
16#8042:16#00	4DA module Stopvalue	RW	USINT	16#04
16#A000:16#00	4AD module Diagnosis information	RO	USINT	16#05
16#A040:16#00	4DA module Diagnosis information	RO	USINT	16#05
16#01	4DA Module Diagnosis information	RO	UINT	16#1006
16#02	4DA CH0 Diagnosis information	RO	UINT	16#0000
16#03	4DA CH1 Diagnosis information	RO	UINT	16#0000
16#04	4DA CH2 Diagnosis information	RO	UINT	16#0000
16#05	4DA CH3 Diagnosis information	RO	UINT	16#0000
16#F000:16#00	Modular device profile	RO	USINT	16#02
16#F030:16#00	Configured Module Ident List	RO	USINT	16#02

- In the "CoE Online" interface, the frame loss count increases.

Index:Subindex	Name	Flags	Type	Value
16#F110:16#00	Module Error Flag	RO	USINT	2
16#F120:16#00	LBus Count	RO	USINT	41
16#01	LBus Set Slot Address Mail Lost Count	RO	UDINT	5
16#02	LBus Get Open DaisyChain Mail Lost Count	RO	UDINT	0
16#03	LBus Get Slot Info Mail Lost Count	RO	UDINT	30
16#04	LBus Set Slot Config Data Mail Lost Count	RO	UDINT	0
16#05	LBus Get Slot Config Data Mail Lost Count	RO	UDINT	0
16#06	LBus Get Slot State Mail Lost Count	RO	UDINT	0
16#07	LBus Set Slot State Mail Lost Count	RO	UDINT	0
16#08	LBus Get Slot Diagnostic Data Mail Lost Count	RO	UDINT	0
16#09	LBus PDO Data Send Count	RO	UDINT	6224
16#0A	LBus PDO Data Lost Count Slot1	RO	UDINT	1
16#0B	LBus PDO Data Lost Count Slot2	RO	UDINT	1
16#0C	LBus PDO Data Lost Count Slot3	RO	UDINT	0
16#0D	LBus PDO Data Lost Count Slot4	RO	UDINT	0
16#0E	LBus PDO Data Lost Count Slot5	RO	UDINT	0
16#0F	LBus PDO Data Lost Count Slot6	RO	UDINT	0
16#10	LBus PDO Data Lost Count Slot7	RO	UDINT	0
16#11	LBus PDO Data Lost Count Slot8	RO	UDINT	0
16#12	LBus PDO Data Lost Count Slot9	RO	UDINT	0
16#13	LBus PDO Data Lost Count Slot10	RO	UDINT	0
16#14	LBus PDO Data Lost Count Slot11	RO	UDINT	0
16#15	LBus PDO Data Lost Count Slot12	RO	UDINT	0
16#16	LBus PDO Data Lost Count Slot13	RO	UDINT	0
16#17	LBus PDO Data Lost Count Slot14	RO	UDINT	0
16#18	LBus PDO Data Lost Count Slot15	RO	UDINT	0
16#19	LBus PDO Data Lost Count Slot16	RO	UDINT	0
16#1A	LBus PDO Data Lost Count Slot17	RO	UDINT	0
16#1B	LBus PDO Data Lost Count Slot18	RO	UDINT	0
16#1C	LBus PDO Data Lost Count Slot19	RO	UDINT	0
16#1D	LBus PDO Data Lost Count Slot20	RO	UDINT	0
16#1E	LBus PDO Data Lost Count Slot21	RO	UDINT	0
16#1F	LBus PDO Data Lost Count Slot22	RO	UDINT	0
16#20	LBus PDO Data Lost Count Slot23	RO	UDINT	0
16#21	LBus PDO Data Lost Count Slot24	RO	UDINT	0
16#22	LBus PDO Data Lost Count Slot25	RO	UDINT	0
16#23	LBus PDO Data Lost Count Slot26	RO	UDINT	0

Possible Cause

- When the MCU of the analog module resets, the PR indicator of this module flashes slowly, the PR indicator of the subsequent module flashes quickly, and the SF indicator of the communication interface

module flashes. It indicates that disconnection faults are triggered for this module and the subsequent ones and the frame loss count keeps increasing (the acquisition values of the analog input module displayed in the PLC remain unchanged, and the analog output module fails to output).

- When the CPLD of the analog module resets, the PR indicator of this module flashes. After the CPLD recovers, the PR indicator of this module turns solid on, the PR indicator of the subsequent module flashes quickly, and the SF indicator of the communication interface module flashes. It indicates that disconnection faults are triggered for this module and the subsequent ones and the frame loss count keeps increasing (the acquisition values of the analog input module displayed in the PLC remain unchanged, and the analog output module can output normally after the CPLD recovers).
- When the CPLD of the digital module resets, the PR indicator of this module flashes slowly, the PR indicator of the subsequent module flashes quickly, and the SF indicator of the communication interface module flashes. It indicates that disconnection faults are triggered for this module and the subsequent ones and the frame loss count keeps increasing (the acquisition values of the digital input module displayed in the PLC remain unchanged, and the digital output module fails to output).
- EMC interference causes distortion of physical signals.

Solution

1. If the frame loss fault occurs every time the module is powered on without external signal interference, the module hardware is faulty and needs to be replaced.
2. In all other cases, the fault is due to EMC interference. Refer to the steps in the table below to solve it.

No.	Step
1	Check whether the communication cable meets the shielded Cat 5e cable specification and the communication cable length requirements. For details, see " Preparation before Wiring ".
2	Check whether the communication port is connected properly and in good contact.
3	Check whether the distance between the communication cable and the power cable is greater than 30 cm. For details, see " 5.1.3 Wiring Requirements ".
4	For multi-node communication, check whether an equipotential grounding wire is added between the nodes. For details, see " 5.1.5 Equipotential Grounding Requirements ".
5	Add ferrite clamp on both sides of the communication cable. For details, see " 12.7 Appendix 7: Information on Magnetic Rings and Ferrite Clamps ".
6	Wind magnetic rings around the drive output (U/V/W) cables. For details, see " 12.7 Appendix 7: Information on Magnetic Rings and Ferrite Clamps ".
7	Use shielded power cables and ground the shield properly.

9.5.2 How to Solve the Absence of Analog Input Data

Fault Description

The analog input module fails to collect input data, as shown below.

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
Device control			%QW1	UINT	0			Device control
GL20_4DA DA CH0			%QW2	INT	20000			GL20_4DA DA CH0
GL20_4DA DA CH1			%QW3	INT	20000			GL20_4DA DA CH1
GL20_4DA DA CH2			%QW4	INT	20000			GL20_4DA DA CH2
GL20_4DA DA CH3			%QW5	INT	20000			GL20_4DA DA CH3
LBus status			%IW2	UINT	8			LBus status
Fault ID			%IW3	UINT	0			Fault ID
ErrorSolt1			%ID2	UDINT	0			ErrorSolt1
ErrorSolt2			%ID3	UDINT	0			ErrorSolt2
GL20_4AD AD CH0			%IW8	INT	20014			GL20_4AD AD CH0
GL20_4AD AD CH1			%IW9	INT	20013			GL20_4AD AD CH1
GL20_4AD AD CH2			%IW10	INT	0			GL20_4AD AD CH2
GL20_4AD AD CH3			%IW11	INT	0			GL20_4AD AD CH3

Possible Cause

- The enabled channel is not activated.
- Wiring fault
 - The wiring of the 24V power supply is incorrect or in poor connection.
 - The wiring in voltage or current mode is incorrect or in poor connection.
- EMC interference
- Hardware damage

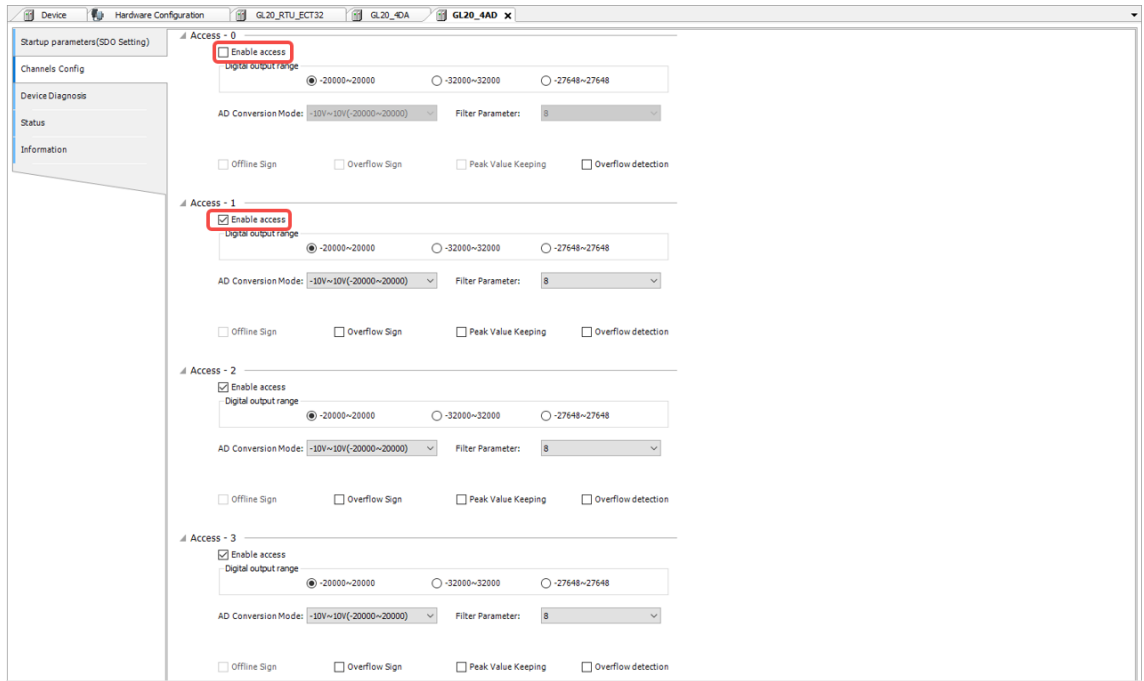
Solution

1. Check whether the enable channel of the module is activated.
 - a. In the "Devices" navigation tree on the left, double-click "GL20_4AD" under "ETHERCAT_C > GL20_RTU_ECT32" to open the configuration interface, as shown below.

Line	Index/Subindex	Name	Value	Bitlength	IsDownload	Abort if error	Jump to line if error	Next line	Comm
1	16#8000:16#01	4AD module CH0 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
2	16#8000:16#02	4AD module CH1 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
3	16#8000:16#03	4AD module CH2 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
4	16#8000:16#04	4AD module CH3 transform mode	128	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
5	16#8001:16#01	4AD module CH0 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
6	16#8001:16#02	4AD module CH1 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
7	16#8001:16#03	4AD module CH2 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
8	16#8001:16#04	4AD module CH3 Filter	8	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
9	16#8002:16#01	4AD module CH0 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
10	16#8002:16#02	4AD module CH1 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
11	16#8002:16#03	4AD module CH2 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
12	16#8002:16#04	4AD module CH3 Detect	0	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	4AD mc
13	16#4000:16#01	Module Config Information	4,0,3,0,0,0,7,0,5,5,5,5,6,6,7,0,0,0,0,0,0,0,0	192	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	Module
14	16#4001:16#01	Module Data Information	48,16,244,16,0,0,0,0,0,48,0,12	96	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	Module

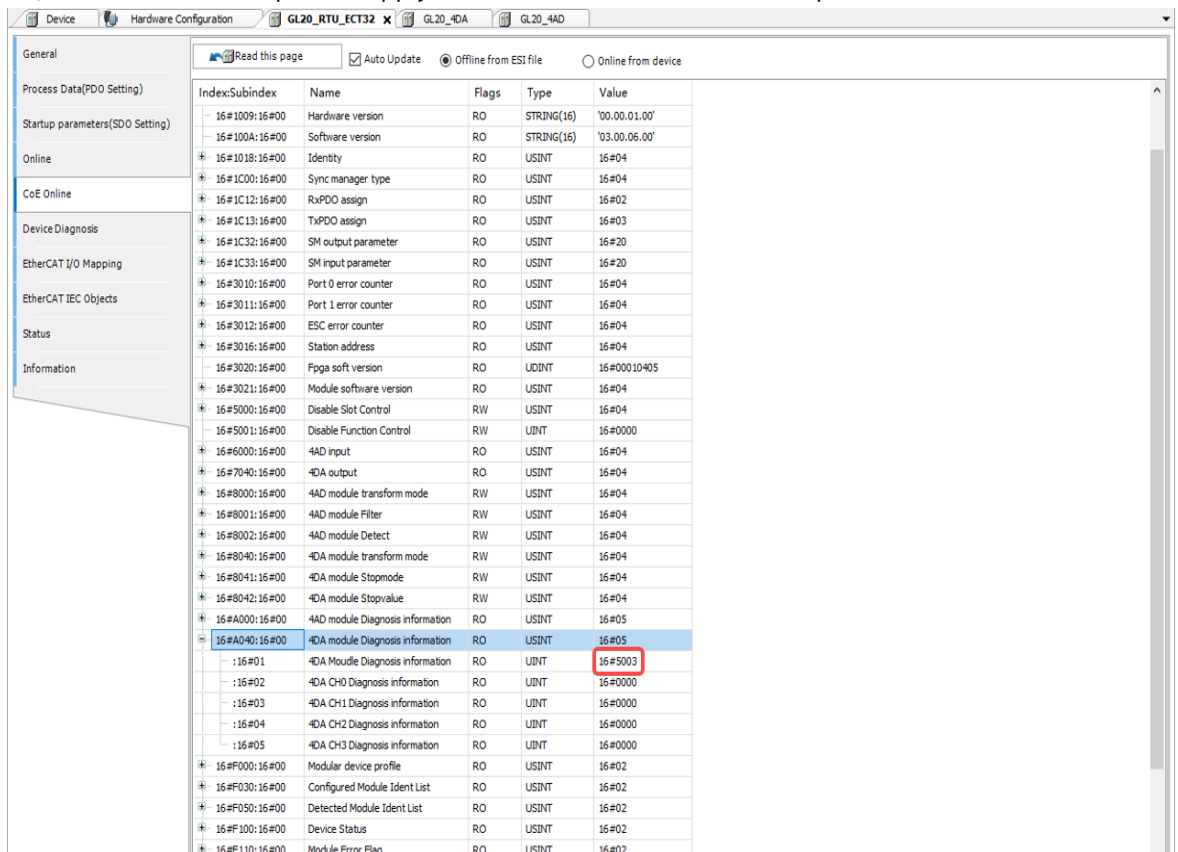
- b. In the "Channel Config" interface, check whether the "Enable access" of the corresponding channel is checked.
 - If unchecked, it indicates that the enable channel is not activated. Check "Enable access".

- If checked, it indicates that the enable channel is activated. Proceed to the next step.



2. Check whether the 24 V power supply for the module is normal.

- If the ERR indicator of the module is solid on in red and the SF indicator of the communication interface module is flashing, double-click "GL20_RTU_ECT32" in the "Devices" navigation tree to open the configuration interface. In the "CoE Online" interface, the fault code 0x5003 indicates abnormal power supply. Check whether 24 V power supply is normal and wired correctly.
- If the ERR indicator of the module is off and the SF indicator of the communication interface module is off, it indicates that the power supply is normal. Proceed to the next step.



3. Check whether the terminal wiring of the module is correct.
 - a. Check whether the terminal wiring is correct. For the specific terminal wiring diagram, see the "Terminal Wiring" section in the "GL20-4AD Analog Input Module User Guide".
 - If the terminal wiring is incorrect, re-wire according to the wiring diagram.
 - If the terminal wiring is correct, proceed to the next step.
 - b. Check whether the terminal wiring is in good connection.
 - If the connection is loose, re-connect the terminal cables.
 - If the connection is correct, proceed to the next step.
4. Check for EMC interference and identify the sources of on-site EMC interference.
 - If there is EMC interference, refer to the steps in the table below to solve.

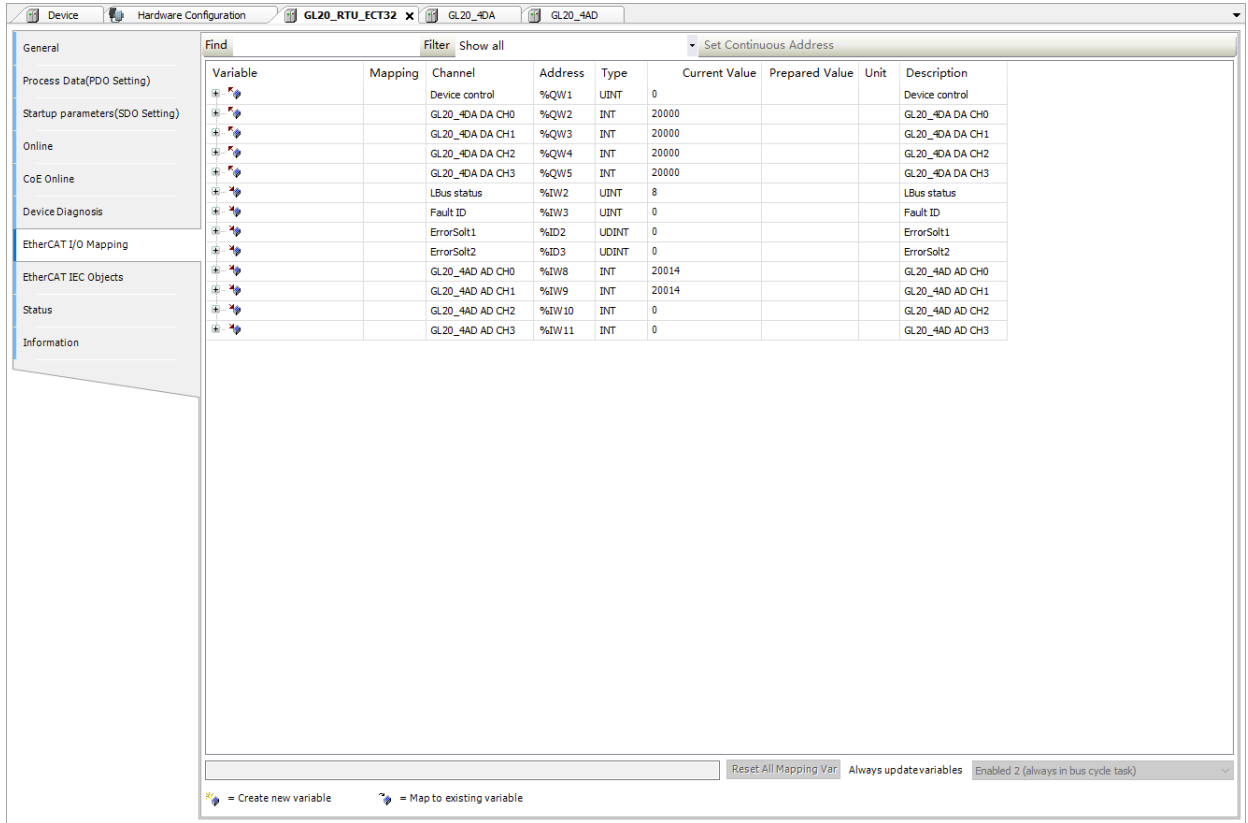
No.	Step
1	Check whether the distance between the signal cable and the power cable is greater than 30 cm. For details, see " 5.1.3 Wiring Requirements ".
2	Check whether the analog signal cables are shielded cables and meet the grounding requirements. For details, see " 5.1.4 Grounding Requirements for Shielded Cables ".
3	Wind 5 turns of magnetic rings around the analog signal cables and the power supply cables (L/N) of analog control devices such as PLCs. For details, see " 12.7 Appendix 7: Information on Magnetic Rings and Ferrite Clamps ".
4	Reliably connect the PE terminal of the motor to the PE terminal of the servo drive, and connect the PE terminal of the servo drive to the PE terminal of the grid terminal.
5	Add an equipotential grounding wire between the host controller and the drive. For details, see " 5.1.5 Equipotential Grounding Requirements ".
6	Wind 2 to 4 turns of magnetic rings around the drive output (U/V/W) cables. For details, see " 12.7 Appendix 7: Information on Magnetic Rings and Ferrite Clamps ".
7	Increase the filtering capacitance between AI and GND, with a recommended maximum of 0.22 μ F.
8	Use shielded power cables and ground the shield properly.

- If there is no EMC interference, proceed to the next step.
5. Check whether the module hardware is damaged.
 - Replace the module. If the input data is normal, it indicates that the module hardware is damaged. Replace with a new module.
 - Replace the module. If there is still no input data, remove the user terminal input wiring and directly connect the DA module output cable to the input terminal of the AD module. If the input is normal, it indicates a problem with the external device. Troubleshoot the external device.

9.5.3 How to Solve Jitter in Analog Input Data

Fault Description

The collected values fluctuate significantly. For example, with an input code value of 20000, the collected value falls outside the accuracy range, as shown below.



Possible Cause

- EMC interference
- Hardware damage

Solution

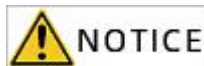
1. Check for EMC interference and identify the sources of on-site EMC interference.
 - If there is EMC interference, refer to the steps in the table below to solve.

No.	Step
1	Increase the software filter parameter value. For details, see " How to Set Filter Time ".
2	Check whether the distance between the signal cable and the power cable is greater than 30 cm. For details, see " 5.1.3 Wiring Requirements ".
3	Check whether the analog signal cables are shielded cables and meet the grounding requirements. For details, see " 5.1.4 Grounding Requirements for Shielded Cables ".
4	Wind 5 turns of magnetic rings around the analog signal cables and the power supply cables (L/N) of analog control devices such as PLCs. For details, see " 12.7 Appendix 7: Information on Magnetic Rings and Ferrite Clamps ".
5	Reliably connect the PE terminal of the motor to the PE terminal of the servo drive, and connect the PE terminal of the servo drive to the PE terminal of the grid terminal.
6	

No.	Step
	Add an equipotential grounding wire between the host controller and the drive. For details, see " 5.1.5 Equipotential Grounding Requirements ".
7	Wind 2 to 4 turns of magnetic rings around the drive output (U/V/W) cables. For details, see "Appendix 7: Information on Magnetic Rings and Ferrite Clamps".
8	Increase the filtering capacitance between AI and GND, with a recommended maximum of 0.22 μ F.
9	Use shielded power cables and ground the shield properly.

- If there is no EMC interference, proceed to the next step.
2. Check whether the module hardware is damaged.
- Replace the module. If the input data is normal, it indicates that the module hardware is damaged. Replace with a new module.
 - Replace the module. If data jitter still exists, remove the user terminal input wiring and directly connect the DA module output cable to the input terminal of the AD module. If the input is data normal, it indicates a problem with the external device. Troubleshoot the external device.

9.5.4 How to Solve Non-Operating Expansion Modules



This case primarily solves the fault of the expansion module failing to operate for the first time upon power-on. Operation failures after the first operation are considered module disconnection faults.

Fault Description

- The PR indicator of the module flashes slowly.
- The PR indicator of the module flashes quickly, and the SF indicator of the communication interface module flashes in red.

Possible Cause

- If the PR indicator of the module flashes slowly, it indicates a local bus addressing failure.
- If the PR indicator of the module flashes quickly, and the SF indicator of the communication interface module flashes in red, it indicates an inconsistency between the configured modules and actual modules.
 - In the "Devices" navigation tree, double-click "GL20_RTU_ECT32" to open the configuration interface. In the "CoE Online" interface, if the "Fault ID" under "Device Status" is "0x1002", it indicates that the configured modules is less than the actual modules.

Index/Subindex	Name	Flags	Type	Value
16#1000:16#00	Device type	RO	UDINT	16#00001389
16#1001:16#00	Error Register	RO	USINT	16#00
16#1008:16#00	Device Name	RO	STRING(16)	'GL20-RTU-ECT32'
16#1009:16#00	Hardware version	RO	STRING(16)	'00.00.01.00'
16#100A:16#00	Software version	RO	STRING(16)	'03.00.06.00'
* 16#1018:16#00	Identity	RO	USINT	16#04
* 16#1C00:16#00	Sync manager type	RO	USINT	16#04
* 16#1C12:16#00	RxPDO assign	RO	USINT	16#01
* 16#1C13:16#00	TxPDO assign	RO	USINT	16#03
* 16#1C32:16#00	SM output parameter	RO	USINT	16#20
* 16#1C33:16#00	SM input parameter	RO	USINT	16#20
* 16#3010:16#00	Port 0 error counter	RO	USINT	16#04
* 16#3011:16#00	Port 1 error counter	RO	USINT	16#04
* 16#3012:16#00	ESC error counter	RO	USINT	16#04
* 16#3016:16#00	Station address	RO	USINT	16#04
16#3020:16#00	Fpga soft version	RO	UDINT	16#00010405
* 16#3021:16#00	Module software version	RO	USINT	16#04
* 16#5000:16#00	Disable Slot Control	RW	USINT	16#04
16#5001:16#00	Disable Function Control	RW	UINT	16#0000
* 16#6000:16#00	4AD input	RO	USINT	16#04
* 16#8000:16#00	4AD module transform mode	RW	USINT	16#04
* 16#8001:16#00	4AD module Filter	RW	USINT	16#04
* 16#8002:16#00	4AD module Detect	RW	USINT	16#04
* 16#A000:16#00	4AD module Diagnosis information	RO	USINT	16#05
* 16#F000:16#00	Modular device profile	RO	USINT	16#02
* 16#F030:16#00	Configured Module Ident List	RO	USINT	16#00
* 16#F050:16#00	Detected Module Ident List	RO	USINT	16#02
16#F100:16#00	Device Status	RO	USINT	16#02
:16#01	LBus Status	RO	UINT	16#0002
:16#02	Fault ID	RO	UINT	16#1002
* 16#F110:16#00	Module Error Flag	RO	USINT	16#02
* 16#F120:16#00	LBus Count	RO	USINT	16#29
* 16#F130:16#00	LBus DiagInfo	RO	USINT	---
* 16#F140:16#00	IP Info	RO	USINT	---
* 16#F800:16#00	Device configuration data	RO	USINT	16#04
16#FB00:16#00	Control word	RW	UINT	16#0000

- In the "Devices" navigation tree, double-click "GL20_RTU_ECT32" to open the configuration interface. In the "CoE Online" interface, if the "Fault ID" under "Device Status" is "0x1001", it indicates that the configured modules is more than the actual modules.

Index/Subindex	Name	Flags	Type	Value
* 16#1C32:16#00	SM output parameter	RO	USINT	16#20
* 16#1C33:16#00	SM input parameter	RO	USINT	16#20
* 16#3010:16#00	Port 0 error counter	RO	USINT	16#04
* 16#3011:16#00	Port 1 error counter	RO	USINT	16#04
* 16#3012:16#00	ESC error counter	RO	USINT	16#04
* 16#3016:16#00	Station address	RO	USINT	16#04
* 16#3020:16#00	Fpga soft version	RO	UDINT	16#0010405
* 16#3021:16#00	Module software version	RO	USINT	16#04
* 16#5000:16#00	Disable Slot Control	RW	USINT	16#04
* 16#5001:16#00	Disable Function Control	RW	UINT	16#0000
* 16#6000:16#00	4AD input	RO	USINT	16#04
* 16#7040:16#00	4DA output	RO	USINT	16#04
* 16#7080:16#00	0008ETN output	RO	USINT	---
* 16#8000:16#00	4AD module transform mode	RW	USINT	16#04
* 16#8001:16#00	4AD module Filter	RW	USINT	16#04
* 16#8002:16#00	4AD module Detect	RW	USINT	16#04
* 16#8040:16#00	4DA module transform mode	RW	USINT	16#04
* 16#8041:16#00	4DA module Stopmode	RW	USINT	16#04
* 16#8042:16#00	4DA module Stopvalue	RW	USINT	16#04
* 16#8080:16#00	0008ETN module configure stopmode parameters	RW	USINT	---
* 16#8081:16#00	0008ETN module configure stopvalue parameters	RW	USINT	---
* 16#A000:16#00	4AD module Diagnosis information	RO	USINT	16#05
* 16#A040:16#00	4DA module Diagnosis information	RO	USINT	16#05
* 16#A080:16#00	0008ETN Diagnosis information	RO	USINT	---
* 16#F000:16#00	Modular device profile	RO	USINT	16#02
* 16#F030:16#00	Configured Module Ident List	RO	USINT	16#00
* 16#F050:16#00	Detected Module Ident List	RO	USINT	16#02
16#F100:16#00	Device Status	RO	USINT	16#02
:16#01	LBus Status	RO	UINT	16#0002
:16#02	Fault ID	RO	UINT	16#1001
* 16#F110:16#00	Module Error Flag	RO	USINT	16#02
* 16#F120:16#00	LBus Count	RO	USINT	16#29
* 16#F130:16#00	LBus DiagInfo	RO	USINT	---
* 16#F140:16#00	IP Info	RO	USINT	---
* 16#F800:16#00	Device configuration data	RO	USINT	16#04
16#FB00:16#00	Control word	RW	UINT	16#0000

Solution

Local bus addressing failure

1. Check whether the expansion module is installed properly.

Power off the expansion module, reconnect it, and then restart the system to check whether the expansion module operates normally.

 - If the expansion module operates normally, it indicates that the expansion module is not properly installed.
 - If the expansion module fails to operate, proceed to the next step.
2. Check for damage to the expansion module hardware.
 - a. In the "Devices" navigation tree, double-click "GL20_RTU_ECT32" to open the configuration interface. In the "CoE Online" interface, if the "LBus Status" under "Device Status" is "0x80", it indicates a local bus fault.

16#F100:16#00	Device Status	RO	USINT	16#02	
:16#01	LBus Status	RO	UINT	16#0002	0x80

- b. Replace the expansion module. If the local bus addressing succeeds after power-on, it indicates that the expansion module hardware is damaged. Replace with a new expansion module.

Inconsistency between the configured modules and actual modules

Ensure consistency between the configured modules and actual modules. Power on and run the system again.

9.6 Fault Code List

9.6.1 GL20 Expansion Module Fault Code

The fault codes of the GL20 expansion modules are listed in the table below.

Fault Code	Description	Solution
Communication Protocol Conversion Module Fault		
0x1000	The number of scanned expansion modules is 0.	<ol style="list-style-type: none"> 1. Check that the module is installed properly and supplied with power. 2. Check the contact of the communication interface of the expansion module or restart the rack.
0x1001	The number of I/O modules configured is more than the number of I/O modules actually scanned.	<ol style="list-style-type: none"> 1. Check the number and installation sequence of expansion modules. 2. Check the contact of the communication interface of the expansion module or restart the rack.
0x1002	The number of I/O modules configured is less than the number of I/O modules actually scanned.	
0x1003	The type of I/O modules configured is inconsistent with that of the I/O modules actually scanned.	
0x1004	The I/O module configuration failed.	Check the contact of the communication interface of the expansion module or restart the rack.
0x1005	The I/O module status switch failed.	
0x1006	The I/O module is disconnected.	<ol style="list-style-type: none"> 1. Check whether the module in the corresponding slot is powered off or removed. 2. Check the contact of the communication interface of the expansion module or restart the rack.
Module Application Parameter Configuration Fault		
0x2003	The 2SCOM-MDB/2S485-MDB module is placed in a wrong slot.	Place the module in the first four slots.

Fault Code	Description	Solution
0x2004	The number of submodules for serial port 0/1 of the 2SCOM-MDB/2S485-MDB module exceeds 31.	Reduce the number of submodules for serial port 0/1.
0x2005	The process data of the 2SCOM-MDB /2S485-MDB module exceeds 480 bytes.	Reduce module process data.
...
0x2010	The baud rate of the RS485 module channel is configured incorrectly.	The configuration parameters sent to the module are out of the specified range or do not meet the requirements. Check the configuration parameters.
0x2011	The communication method of the RS485 module channel is configured incorrectly.	
0x2012	The data bit-related parameters of the RS485 module channel is configured incorrectly.	
0x2013	The data packet size of the RS485 module channel is configured incorrectly.	
0x2014	The message interval of the RS485 module channel is configured incorrectly.	
0x2015	The sending buffer of the RS485 module channel is configured incorrectly.	
0x2016	The receiving buffer of the RS485 module channel is configured incorrectly.	
...
0x2020	The baud rate of the CAN module channel is configured incorrectly.	The configuration parameters sent to the module are out of the specified range or do not meet the requirements. Check the configuration parameters.
0x2021	The communication method of the CAN module channel is configured incorrectly.	

Fault Code	Description	Solution
0x2022	The data bit-related parameters of the CAN module channel is configured incorrectly.	
0x2023	The buffer size of the CAN module channel is configured incorrectly.	
0x2024	The heartbeat interval of the CAN module channel is configured incorrectly.	
0x2025	The standard frame upper limit of the CAN module channel is configured incorrectly.	
0x2026	The standard frame lower limit of the CAN module channel is configured incorrectly.	
...	...	
0x2030	The serial port parameters of the 2SCOM/2SCOM-MDB module channel are configured incorrectly.	The configuration parameters sent to the module are out of the specified range or do not meet the requirements. Check the configuration parameters.
0x2031	The data packet size of the 2SCOM module channel is configured incorrectly.	
0x2032	The timeout parameter of the 2SCOM module channel is configured incorrectly.	
0x2033	The port protocol of the 2SCOM/2SCOM-MDB module channel is configured incorrectly.	
...	...	
0x2040	The Modbus slave address of the 2SCOM-MDB/2S485-MDB module channel is configured incorrectly.	The configuration parameters sent to the module are out of the specified range or do not meet the requirements. Check the configuration parameters.
0x2041	The serial parameters of the 2S485-MDB module channel are configured incorrectly.	
...

Fault Code	Description	Solution
0x2100	The CH0 preset value is out of range.	Set the preset value within the required range.
0x2101	The CH0 counter is configured incorrectly.	<p>Check and correct the following settings:</p> <ul style="list-style-type: none"> • The single-ended counting function is enabled but the DI is not configured in counting mode. • The single-ended interface enabled by the command is inconsistent with the counting interface configured for DI. • The counter is configured as a differential interface, but DI0 and DI1 are both configured in counting mode.
0x2102	The CH0 signal type is not supported.	<p>Check whether the signal type is within the allowed range.</p> <p>Allowed values: A/B phase single frequency, A/B phase 2x frequency, A/B phase 4x frequency, pulse + direction, CW/CCW, single-phase counting (A), single-phase counting (B).</p>
0x2103	The CH0 counter limit is configured incorrectly.	Ensure the minimum value of the CH0 counter is smaller than the maximum value.
0x2104	The CH0 unit pulse increment is configured incorrectly.	Ensure the unit pulse increment is not smaller than 1.
0x2105	The CH0 time base of the speed measurement is configured incorrectly.	Check whether the time base is within the allowed range.
0x2106	The CH0 input filter parameter is configured incorrectly.	Check whether the filter parameter is within the allowed range.
0x2107	The CH0 frequency sampling time is configured incorrectly.	Check whether the frequency sampling time is within the allowed range.
0x2108	The CH0 reset function is configured incorrectly.	The reset function is enabled by the command, but the DI is not configured for the reset function. Configure the DI for the reset function.
0x2109	The CH0 preset function is configured incorrectly.	The preset function is enabled by the command, but the DI is not configured for the preset function. Configure the DI for the preset function.

Fault Code	Description	Solution
0x210A	The CH0 comparison 0 function is configured incorrectly.	The comparison function is enabled by the command, but the DO is not configured for the comparison function. Configure the DO for the comparison function.
0x210B	The CH0 comparison 1 function is configured incorrectly.	The comparison function is enabled by the command, but the DO is not configured for the comparison function. Configure the DO for the comparison function.
0x210C	The CH0 comparison 2 function is configured incorrectly.	The comparison function is enabled by the command, but the DO is not configured for the comparison function. Configure the DO for the comparison function.
0x210D	The CH0 comparison 3 function is configured incorrectly.	The comparison function is enabled by the command, but the DO is not configured for the comparison function. Configure the DO for the comparison function.
0x210E	The CH0 probe 0 function is configured incorrectly.	The probe function is enabled by the command, but the DI is not configured for the probe function. Configure the DI for the probe function.
0x210F	The CH0 probe 1 function is configured incorrectly.	The probe function is enabled by the command, but the DI is not configured for the probe function. Configure the DI for the probe function.
0x2110	The CH0 probe 2 function is configured incorrectly.	The probe function is enabled by the command, but the DI is not configured for the probe function. Configure the DI for the probe function.
0x2111	The CH0 probe 3 function is configured incorrectly.	The probe function is enabled by the command, but the DI is not configured for the probe function. Configure the DI for the probe function.
0x2112	The CH0 DO0 parameter is configured incorrectly.	Check whether the configuration parameter is within the allowed range. Allowed values: Normal output, comparison output.
0x2113	The CH0 DO1 parameter is configured incorrectly.	Check whether the configuration parameter is within the allowed range. Allowed values: Normal output, comparison output.
0x2114	The CH0 DO2 parameter is configured incorrectly.	Check whether the configuration parameter is within the allowed range. Allowed values: Normal output, comparison output.

Fault Code	Description	Solution
0x2115	The CH0 DO3 parameter is configured incorrectly.	Check whether the configuration parameter is within the allowed range. Allowed values: Normal output, comparison output.
0x2116	The CH0 DI0 parameter is configured incorrectly.	Check whether the configuration parameter is within the allowed range. Allowed values: Normal input, probe function, counting, reset, preset, gating.
0x2117	The CH0 DI1 parameter is configured incorrectly.	Check whether the configuration parameter is within the allowed range. Allowed values: Normal input, probe function, counting, reset, preset, gating.
0x2118	The CH0 DI2 parameter is configured incorrectly.	Check whether the configuration parameter is within the allowed range. Allowed values: Normal input, probe function, counting, reset, preset, gating.
0x2119	The CH0 DI3 parameter is configured incorrectly.	Check whether the configuration parameter is within the allowed range. Allowed values: Normal input, probe function, counting, reset, preset, gating.
0x2200 - 0x2219	CH1	Same as CH0
0x2300 - 0x2319	CH2	Same as CH0
0x2400 - 0x2419	CH3	Same as CH0
I/O Module Fault		
0x5001	Power supply overvoltage	Check whether the module power supply voltage is within the normal range.
0x5002	Power supply undervoltage	
0x5003	External 24 V power supply failure	Check whether the 24 V power supply is normal.
0x5004	ADC device configuration parameter fault	1. Check whether the external 24 V power supply voltage is stable. 2. Restart the module.
0x5011	Chip overtemperature	1. Check whether the module hardware is faulty. 2. Replace the module.

Fault Code	Description	Solution
0x5021	ADC device fault	
0x5022	DAC device fault	
0x5023	ADC reference fault	
0x5031	The TC module cold end sampling channel is faulty.	<ol style="list-style-type: none"> 1. Check whether the cold end channel circuit of the TC module is faulty. 2. Replace the module.
I/O Channel Fault		
0x6001	Channel open-circuited	<ol style="list-style-type: none"> 1. Check whether the external wiring of the module channels is normal. 2. Check whether the module hardware is faulty. 3. Replace the module.
0x6002	Channel short-circuited	
0x6003	Channel data upper limit exceeded	<ol style="list-style-type: none"> 1. Check whether the input module hardware is faulty. 2. Check whether the external signals are abnormal.
0x6004	Channel data lower limit exceeded	
0x6005	Channel data overflow	
0x6006	Channel data underflow	
0x6007	Channel overcurrent	<ol style="list-style-type: none"> 1. Check whether the external wiring is short-circuited. 2. Check whether the load is causing overcurrent. 3. Check whether the module channel circuit is faulty.
0x6009	Channel configuration data fault	Check whether the configuration parameters are properly transmitted.
...
0x6010	The sending buffer of the RS485 module channel is full.	Decrease the length of data sent from the module, or increase the sending interval or baud rate.

Fault Code	Description	Solution
0x6011	The receiving buffer of the RS485 module channel is full.	Decrease the length of data sent to the module or increase the sending interval.
0x6012	The receiving frame counter value of the RS485 module channel is faulty.	Check whether the frame counter value is correct.
0x6013	The receiving frame segnum value of the RS485 module channel is faulty.	Check whether the frame segnum value is correct.
0x6014	Noise detected on the RS485 module channel	Check the channel wiring for interference.
0x6015	Parity bit fault detected on the RS485 module channel	Check whether the configuration parameter and calculation of the parity bit is correct.
...
0x6020	The sending buffer of the CAN module channel is full.	Decrease the length of data sent from the module, or increase the sending interval or baud rate.
0x6021	The receiving buffer of the CAN module channel is full.	Decrease the length of data sent to the module or increase the sending interval.
0x6022	The receiving frame counter value of the CAN module channel is faulty.	Check the counter value of the frames or the EtherCAT cycle value written to the module on the bus.
0x6023	The bus load ratio of the CAN module exceeds 30%.	Check whether the receive/transmit data volume on the bus is too large.
0x6024	The fault counter sent by TEC of the CAN module exceeds 127.	<ol style="list-style-type: none"> 1. Check whether there is any break or short circuit in the connection between the receiving cables and the bus. 2. Check whether the receive/transmit data volume on the bus is too large.
0x6025	The fault counter sent by REC of the CAN module exceeds 127.	
...
0x6030	24 V output fault of SSI module channel	Check for short circuit in module or encoder wiring.
0x6031	Communication fault of SSI module channel	<ol style="list-style-type: none"> 1. Check whether the positive and negative terminals of the DATA signal line and the Clock signal line are reversed. If yes, correct the wiring. 2. See solution for 0x6032.

Fault Code	Description	Solution
0x6032	Abnormal SSI module channel data	<ol style="list-style-type: none"> 1. Check the encoder surroundings for interference. 2. Check whether the configured frame interval time matches the encoder. 3. Replace the sensor.
...
0x6040	The sending buffer of the 2SCOM module channel is full.	Decrease the length of data sent from the module, or increase the sending interval or baud rate.
0x6041	The receiving buffer of the 2SCOM module channel is full.	Decrease the length of data sent to the module or increase the sending interval.
0x6042	The receiving frame counter value of the 2SCOM module channel is faulty.	Check whether the frame counter value is correct.
0x6043	The receiving frame segnum value of the 2SCOM module channel is faulty.	Check whether the frame segnum value is correct.
0x6044	Noise detected on the 2SCOM/2SCOM-MDB module channel	Check the channel wiring for interference.
0x6045	Parity bit fault detected on the 2SCOM/2SCOM-MDB module channel	Check whether the configuration parameter and calculation of the parity bit is correct.
0x6046	Submodules of the 2SCOM-MDB module channel are configured incorrectly.	Check whether the submodule configuration matches the working mode of serial port 0/1.
...
0x6070	Noise detected on the 2S485-MDB module channel	Check the channel wiring for interference.
0x6071	Parity bit fault detected on the 2S485-MDB module channel	Check whether the configuration parameter and calculation of the parity bit is correct.
0x6072	Submodules of the 2S485-MDB module channel are configured incorrectly.	Check whether the submodule configuration matches the working mode of serial port 0/1.
...
0x6060	M: Modbus response parameter mismatch	<ol style="list-style-type: none"> 1. Check for communication faults. 2. Check whether the parameter is supported by the master.

Fault Code	Description	Solution
0x6061	M: Modbus slave ID mismatch	Check for communication faults.
0x6062	M: Modbus response address mismatch	
0x6063	M: Modbus response data length mismatch	
0x6064	M: Modbus communication timeout	
0x6065	M: Modbus CRC check fault	
0x6066	Illegal parameter	Set the parameters correctly.
0x6067	Illegal data address	Set the data address correctly.
0x6068	Illegal data value	Set the data value correctly.
0x6069	Slave device fault	<ol style="list-style-type: none"> 1. Check whether the connection between the module and the slave is normal. 2. Check whether the module channel configuration is correct.
...
0x6800	CH0 phase A open-circuited	Check whether the terminal wiring is properly connected.
0x6801	CH0 phase B open-circuited	
0x6802	CH0 frequency limit exceeded	Check whether the frequency of the external devices is abnormal. <ul style="list-style-type: none"> • Differential interface: Frequency > 4 M • Single-ended interface: Frequency > 500 K
0x6803	CH0 count value overflow	Count value > maximum value
0x6804	CH0 count value underflow	Count value < minimum value
0x6805	Number/stepsize limit of CH0 comparison 0 function exceeded	Number > 1024 or number < 1 or stepsize < 1
0x6806	Number/stepsize limit of CH0 comparison 1 function exceeded	

Fault Code	Description	Solution
0x6807	Number/stepsize limit of CH0 comparison 2 function exceeded	
0x6808	Number/stepsize limit of CH0 comparison 3 function exceeded	
0x6809	Hold time/pulse number of CH0 comparison 0 output function is configured incorrectly.	Hold time < 1 or pulse number < 1.
0x680A	Hold time/pulse number of CH0 comparison 1 output function is configured incorrectly.	
0x680B	Hold time/pulse number of CH0 comparison 2 output function is configured incorrectly.	
0x680C	Hold time/pulse number of CH0 comparison 3 output function is configured incorrectly.	
0x680D	Start/stop position and stepsize direction of CH0 comparison 0 output function is configured incorrectly.		Start and end positions are equal; start position < end position, stepsize < 0; start position > end position, stepsize > 0.
0x680E	Start/stop position and stepsize direction of CH0 comparison 1 output function is configured incorrectly.	
0x680F	Start/stop position and stepsize direction of CH0 comparison 2 output function is configured incorrectly.	
0x6810	Start/stop position and stepsize direction of CH0 comparison 3 output function is configured incorrectly.	
0x6811	CH0 comparison 0 limit exceeded	Comparison value > maximum value or comparison value < minimum value.
0x6812	CH0 comparison 1 limit exceeded	
0x6813	CH0 comparison 2 limit exceeded	
0x6814	CH0 comparison 3 limit exceeded	
0x6815	CH0 comparison 0 type fault	Check whether the comparison type is within the allowed range.

Fault Code	Description	Solution
0x6816	CH0 comparison 1 type fault	Allowed values: multi-point comparison, equally-spaced comparison.
0x6817	CH0 comparison 2 type fault	
0x6818	CH0 comparison 3 type fault	
0x6819	Control mode fault of CH0 comparison 0 output function	Check whether the control mode is within the allowed range. Allowed values: time control, pulse control, level control.
0x681A	Control mode fault of CH0 comparison 1 output function	
0x681B	Control mode fault of CH0 comparison 2 output function	
0x681C	Control mode fault of CH0 comparison 3 output function	
0x681D	CH0 DO0 short-circuit fault	1. Check whether the terminal wiring is short-circuited. 2. Replace the module for cross-validation.
0x681E	CH0 DO1 short-circuit fault	1. Check whether the terminal wiring is short-circuited. 2. Replace the module for cross-validation.
0x681F	CH0 DO2 short-circuit fault	1. Check whether the terminal wiring is short-circuited. 2. Replace the module for cross-validation.
0x6820	CH0 DO3 short-circuit fault	1. Check whether the terminal wiring is short-circuited. 2. Replace the module for cross-validation.
0x6900 - 0x6920	CH1	Same as CH0
0x6A00 - 0x6A20	CH2	
0x6B00 - 0x6B20	CH3	

9.6.2 EtherCAT Application Layer Status Code

The status codes of the EtherCAT application layer are described in the table below.

Status Code	Meaning	Current Status (or Status Change)	Resulting Status
0x0000	No error	Any	Current status + E
0x0001	Unspecified error	Any	Any + E
0x0002	No memory	Any	Any + E
0x0011	Invalid requested status change	I->S, I->O, P->O O->B, S->B, P->B	Current status + E
0x0012	Unknown requested status	Any	Current status + E
0x0013	Bootstrap not supported	I->B	I + E
0x0014	No valid firmware	I->P	I + E
0x0015	Invalid mailbox configuration	I->B	I + E
0x0016	Invalid mailbox configuration	I->P	I + E
0x0017	Invalid sync manager configuration	P->S, S->O	Current status + E
0x0018	No valid inputs available	O, S->O	S + E
0x0019	No valid outputs available	O, S->O	S + E
0x001A	Sync error	O, S->O	S + E
0x001B	Sync manager watchdog	O, S	S + E
0x001C	Invalid sync manager type	O, S, P->S	S + E
0x001D	Invalid output configuration	O, S, P->S	S + E
0x001E	Invalid input configuration	O, S, P->S	S + E
0x001F	Invalid watchdog configuration	O, S, P->S	S + E
0x0020	Slave needs a cold restart	Any	Current status + E
0x0021	Slave needs INIT	B, P, S, O	Current status + E
0x0022	Slave needs PREOP	S, O	S + E, O + E
0x0023	Slave needs SAFEOP	O	O + E
0x0024	Invalid input mapping	P->S	P + E

Status Code	Meaning	Current Status (or Status Change)	Resulting Status
0x0025	Invalid output mapping	P->S	P + E
0x0026	Inconsistent settings	P->S	P + E
0x0027	Freerun not supported	P->S	P + E
0x0028	Synchronization not supported	P->S	P + E
0x0029	Freerun needs 3 buffer modes	P->S	P + E
0x002A	Background watchdog	S, O	P + E
0x002B	No valid inputs and outputs	O, S->O	S + E
0x002C	Fatal sync error	O	S + E
0x002D	No sync error	S->O	S + E
0x0030	Invalid DC SYNC configuration	O, S->O, P->S	P + E, S + E
0x0031	Invalid DC latch configuration	O, S->O, P->S	P + E, S + E
0x0032	PLL error	O, S->O	S + E
0x0033	DC sync I/O error	O, S->O	S + E
0x0034	DC sync timeout error	O, S->O	S + E
0x0035	DC invalid sync period	P->S	P + E
0x0036	DC sync0 period	P->S	P + E
0x0037	DC sync1 period	P->S	P + E
0x0041	MBX_AOE	B, P, S, O	Current status + E
0x0042	MBX_EOE	B, P, S, O	Current status + E
0x0043	MBX_COE	B, P, S, O	Current status + E
0x0044	MBX_FOE	B, P, S, O	Current status + E
0x0045	MBX_SOE	B, P, S, O	Current status + E
0x004F	MBX_VOE	B, P, S, O	Current status + E
0x0050	EEPROM no access	Any	Any + E
0x0051	EEPROM error	Any	Any + E

Status Code	Meaning	Current Status (or Status Change)	Resulting Status
0x0060	Local restart of the slave station	Any	I
0x0052	External hardware not ready	I	I
0x0070	Configuration error	P, S	P
0x0071	Local bus error	P, S	Current status + E
0x0072	Local module's data configuration error	S, O	Current status + E
Other codes < 0x8000	Reserved	-	-
0x8000-0xFF FF	Specific vendor	-	-

9.6.3 SDO Communication Fault Code

The SDO communication fault codes are listed in the table below.

Value	Meaning
0x05 03 00 00	Toggle bit not alternated.
0x05 04 00 00	SDO protocol timed out.
0x05 04 00 01	Client/server command specifier not valid or unknown.
0x05 04 00 05	Out of memory.
0x06 01 00 00	Unsupported access to an object.
0x06 01 00 01	Attempt to read a write only object.
0x06 01 00 02	Attempt to write a read only object.
0x06 02 00 00	Object does not exist in the object dictionary.
0x06 04 00 41	Object cannot be mapped to the PDO.
0x06 04 00 42	The number and length of the objects to be mapped would exceed PDO length.
0x06 04 00 43	General parameter incompatibility reason
0x06 04 00 47	General internal incompatibility in the device.
0x06 06 00 00	Access failed due to a hardware error.

Value	Meaning
0x06 07 00 10	Data type does not match; length of service parameter does not match.
0x06 07 00 12	Data type does not match; length of service parameter too high.
0x06 07 00 13	Data type does not match; length of service parameter too low.
0x06 09 00 11	Subindex does not exist.
0x06 09 00 30	Value range of parameter exceeded (only for write access).
0x06 09 00 31	Value of parameter written too high
0x06 09 00 32	Value of parameter written too low
0x06 09 00 36	Maximum value is less than minimum value
0x08 00 00 00	General error
0x08 00 00 20	Data cannot be transferred or stored to the application.
0x08 00 00 21	Data cannot be transferred or stored to the application because of local control.
0x08 00 00 22	Data cannot be transferred or stored to the application because of the present device state.
0x08 00 00 23	Object dictionary dynamic generation fails or no object dictionary is present.

10 Maintenance

10.1 Cleaning and Routine Inspection

10.1.1 Cleaning



Ensure the power is off before cleaning. Do not use volatile solvents such as paint thinner, benzene, or chemical wipes.

For daily cleaning, wipe the dirt with a soft, dry cloth. If dirt remains, wipe with a cloth that has been dampened with a properly diluted detergent (2%) and wrung out.

10.1.2 Routine Inspection

The performance of this product may be affected by product aging or harsh operating conditions. Therefore, routine inspections are required to ensure the product is in proper working condition.

It is recommended to perform inspections every six months to one year. In harsh environments, shorten the inspection interval.

Tool Preparation

- Multimeter (for measuring voltage)
- Flat screwdriver (for removing modules and cables)
- ESD cleaning cloth (for wiping dust or dirt)
- Thermometer (for measuring temperature)
- Hygrometer (for measuring humidity)

Routine Inspection Items



Before performing inspections on environment and installation wiring, ensure the module is powered off. Failure to do so may result in electric shock, module fault, or malfunction.

Item	Description	Inspection Standard	Solution
24 VDC power supply inspection	Measure whether the input power supply voltage is within the specified range.	Voltage range: 20.4 VDC to 28.8 VDC	Use a multimeter to measure the input power voltage. If the power supply voltage does not meet the standard, check for faults in the power supply and ensure the voltage is within the normal range.

Item	Description	Inspection Standard	Solution
Environmental inspection	Check whether the module's operating environment contains any corrosive or flammable gases.	No corrosive and flammable gas	If the environment does not meet the specifications, modifications must be made.
	Check whether there is accumulation of conductive dust in the module's working environment.	No noticeable accumulation of conductive dust	If the environment does not meet the specifications, regular cleaning and modifications must be made.
	Check whether the module's operating environment is subject to vibration or shock.	Vibration and shock must comply with the specifications. For details, see " 2.5 Environmental Specifications ".	If the environment does not meet the specifications, modifications must be made.
	Check whether the module's operating environment temperature and humidity comply with the specifications.	<ul style="list-style-type: none"> • Temperature: -20°C to +55°C • Humidity: < 95% RH (30°C), without condensation 	If the environment does not meet the specifications, modifications must be made.
Installation and wiring inspection	Check whether the cables for the power terminal and EtherCAT interface terminal are securely connected.	Terminals and cables are securely connected with no looseness.	Securely connect the terminal to the cable.
	Check whether the snap-fit joint of the module are securely locked onto the DIN rail.	The module is securely installed on the rail with no looseness.	Securely connect the module to the DIN rail.
PE grounding and shielding inspection	Check whether the PE grounding is secure.	The screws for PE grounding are secure with no looseness.	Tighten the screws for PE grounding.
	Check the PE grounding cable conductor for any damage.	The PE grounding cable conductor layer is undamaged.	Replace the PE grounding cable.
	Check for any rust or oxidation at the PE grounding point.	No rust or oxidation at the PE grounding point.	Remove rust or oxidation from the PE grounding point.

Item	Description	Inspection Standard	Solution
	Check the shielding layer of the shielded cable for any damage, corrosion, or oxidation.	No damage, corrosion, or oxidation for the shielding layer of the shielded cable.	Replace the shielded cable.
	Check whether the shielding layer of the shielded cable is reliably connected.	Ensure reliable connection of the shielding layer of the shielded cable.	Securely connect the shielding layer of the shielded cable.

10.2 Component Replacement

10.2.1 Communication Interface Module Replacement

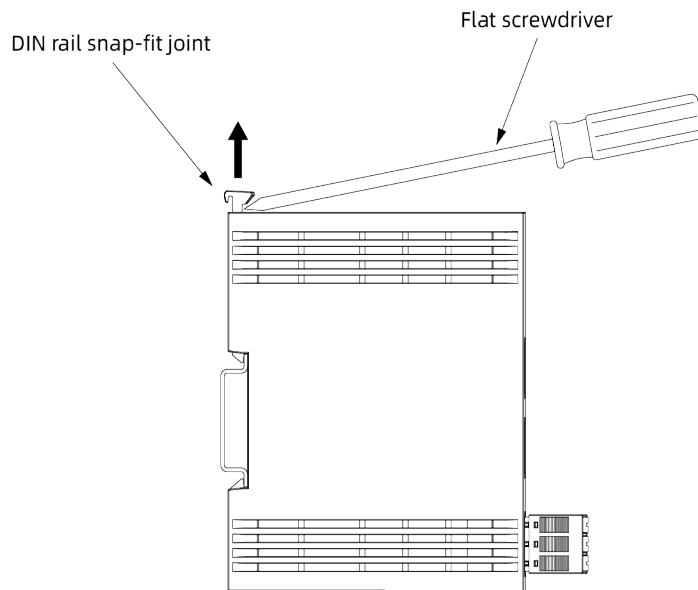
When this product is damaged, it can be replaced. After replacement, no configuration update is required.

Prerequisites

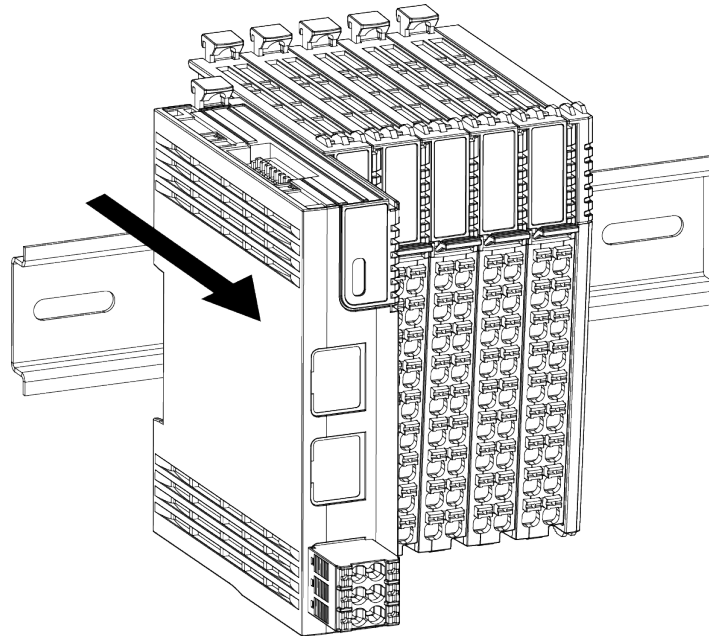
This product and its expansion modules are all powered off.

Procedure

1. Use a flat screwdriver or similar tool to pry up the snap-fit joint of the DIN rail and remove the old product, as shown below.



2. Pull the old product away from the rail, as shown below.



3. For how to install the new product, see "[4.3.2 Product Installation](#)".

10.2.2 Power Terminal Replacement

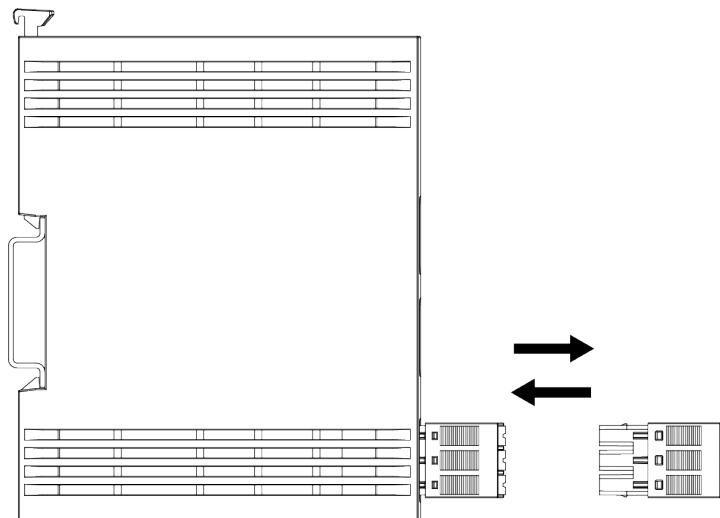
When the power terminal of this product is damaged, it can be replaced.

Prerequisites

The power cable is removed. For detailed instructions, see "[5.3.5 Cable Connection and Disconnection](#)".

Procedure

1. Remove the old power terminal, as shown below.



2. Insert the new power terminal.

10.2.3 End Cover Replacement

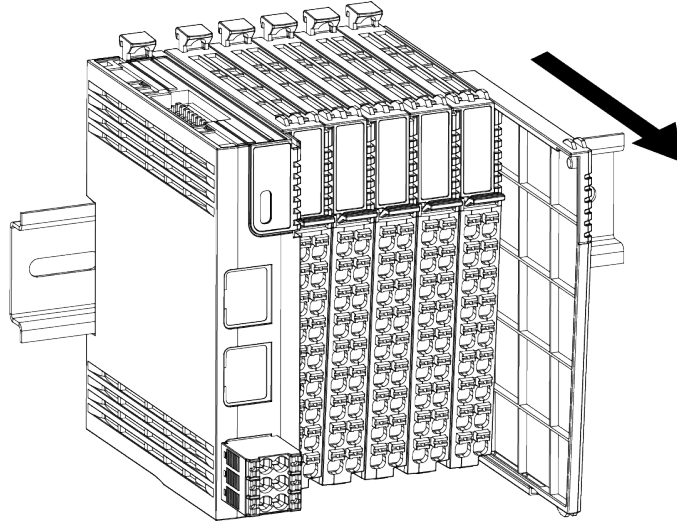
When the end cover of this product is damaged or missing, it can be replaced.

Prerequisites

This product and its expansion modules are all powered off.

Procedure

1. Remove the end cover, as shown below.



2. Replace the new end cover. For detailed instructions, see "[4.3.4 End Cover Installation](#)".

10.3 Firmware Upgrade

10.3.1 Introduction

When the firmware version of this product is low and needs to be upgraded, the InoProShop programming software and the IOManager configuration tool can be used (AutoShop programming software is not supported).

When updating the firmware of this product, ensure that the MCU version and FPGA version are strictly matched, as shown in the following table.

MCU Version	FPGA Version
3.1.5.0	1.4.0.11

10.3.2 Upgrade via InoProShop Programming Software

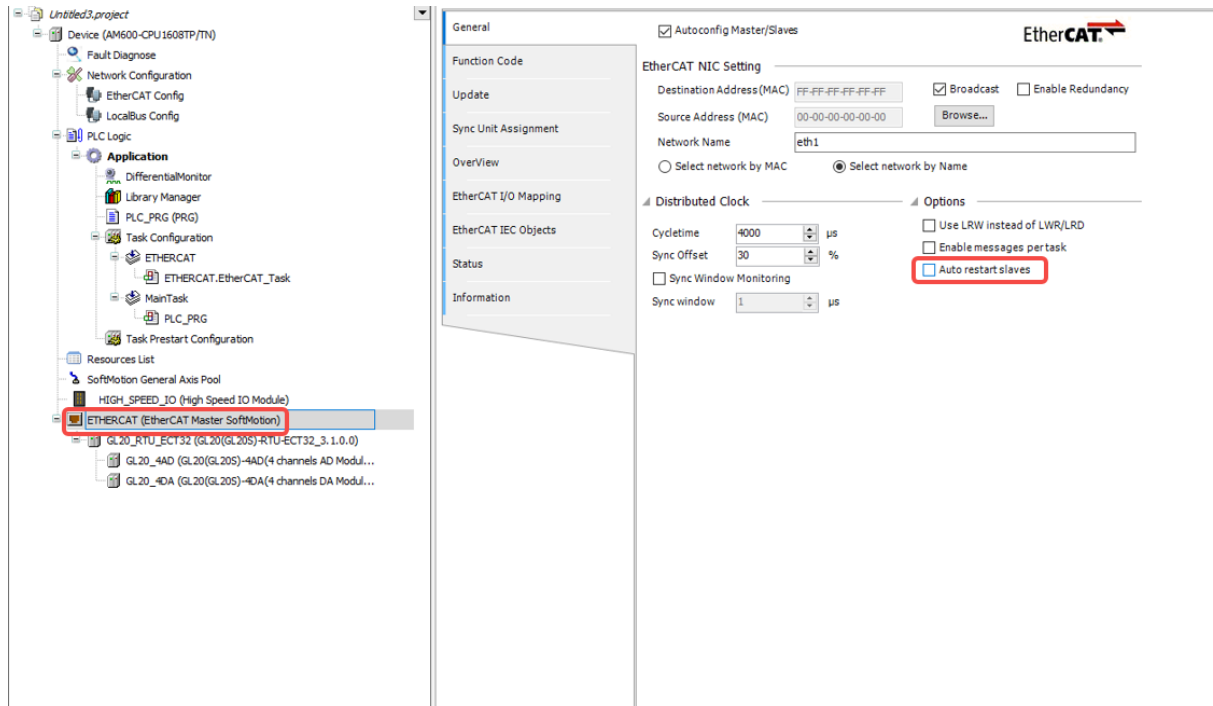
Prerequisites

- Obtain the firmware for upgrade from Inovance technical support (MCU: GR10_RTE_APP_ECTA32_x.x.x.x.bin; FPGA: GR10_RTE_FPGA_x.x.x.x.bin).
- This product is connected to a PC equipped with InoProShop programming software via a network cable.
- This product is powered on and turned on.

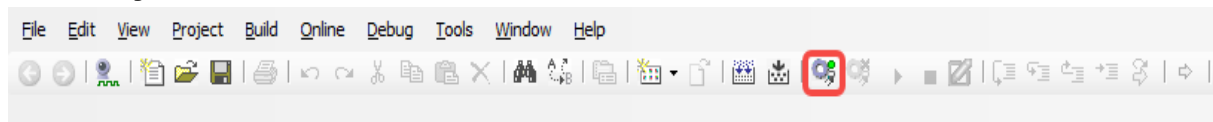
Procedure

1. Open the InoProShop programming software on the PC desktop and open the project.

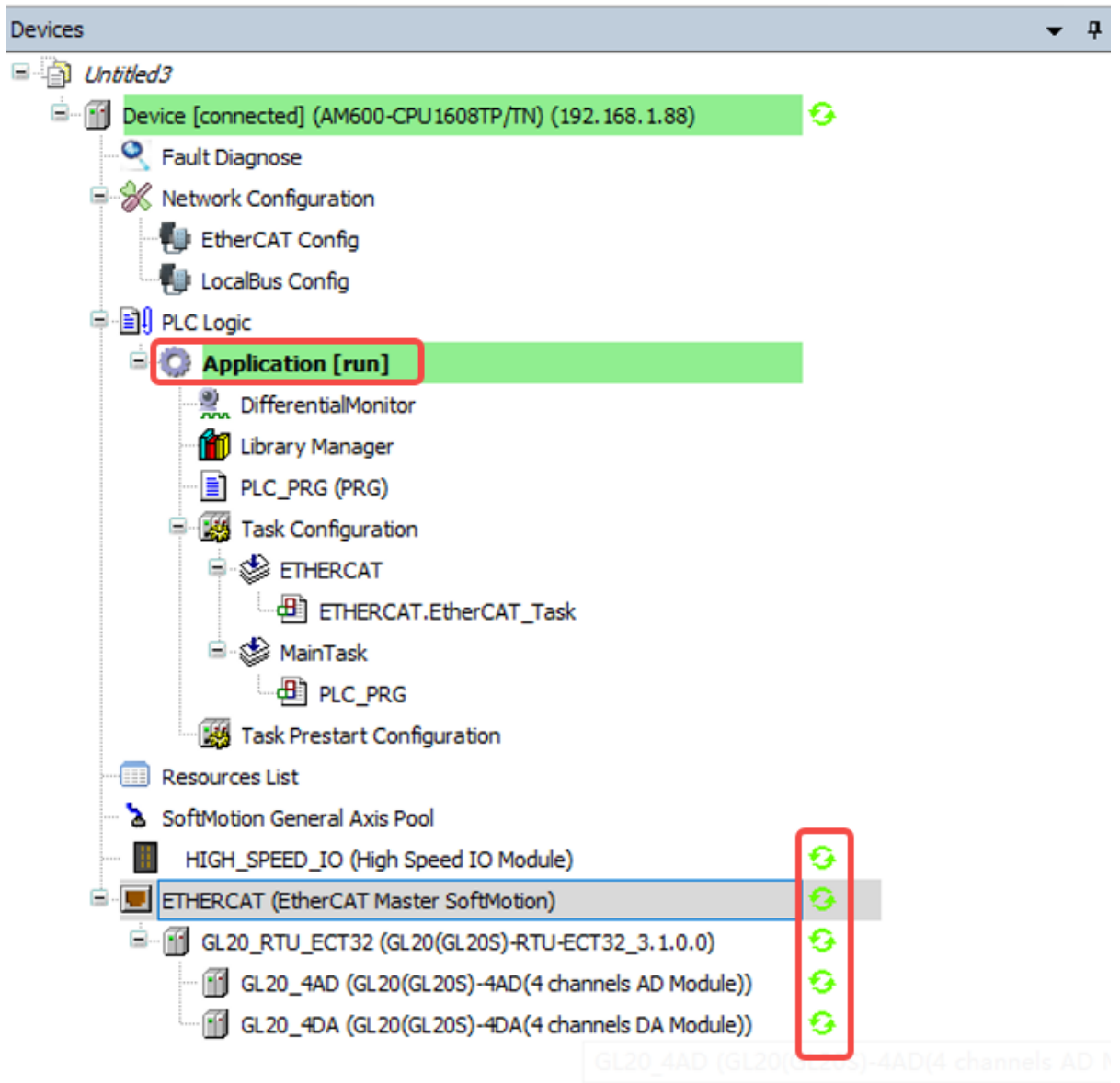
- In the "Devices" navigation tree on the left, double-click the "ETHERCAT" node to open the configuration interface. In the "General" interface, uncheck "Auto restart slaves".



- Click the login button on the toolbar, as shown below.

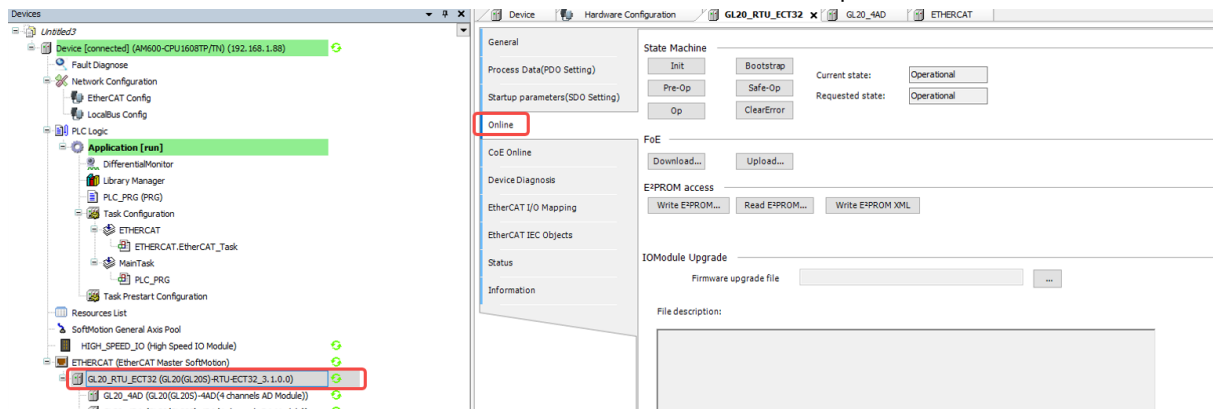


After a successful login, the "Application" node displays "run", as shown below.

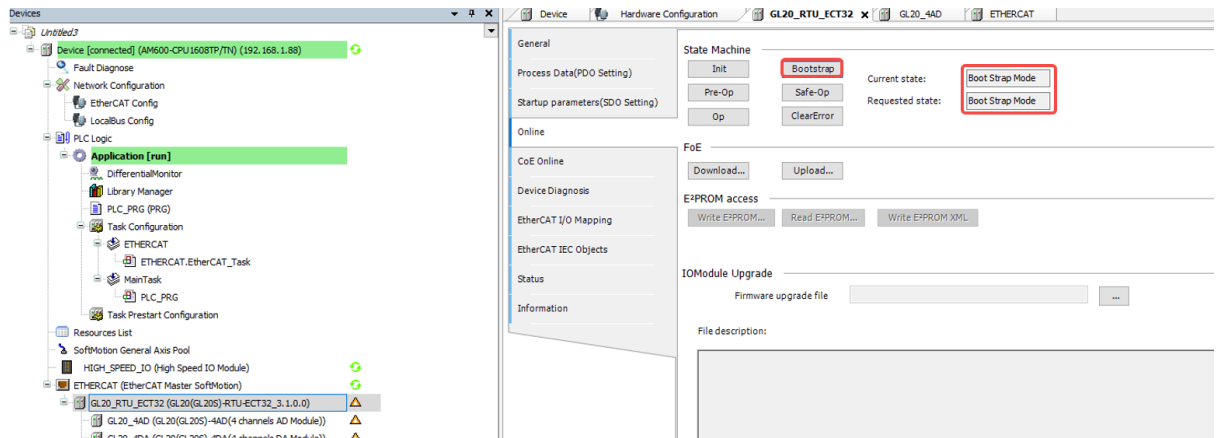


4. Double-click the EtherCAT communication interface module under the "ETHERCAT" node to upgrade the MCU firmware. In the opened interface, click "Online".

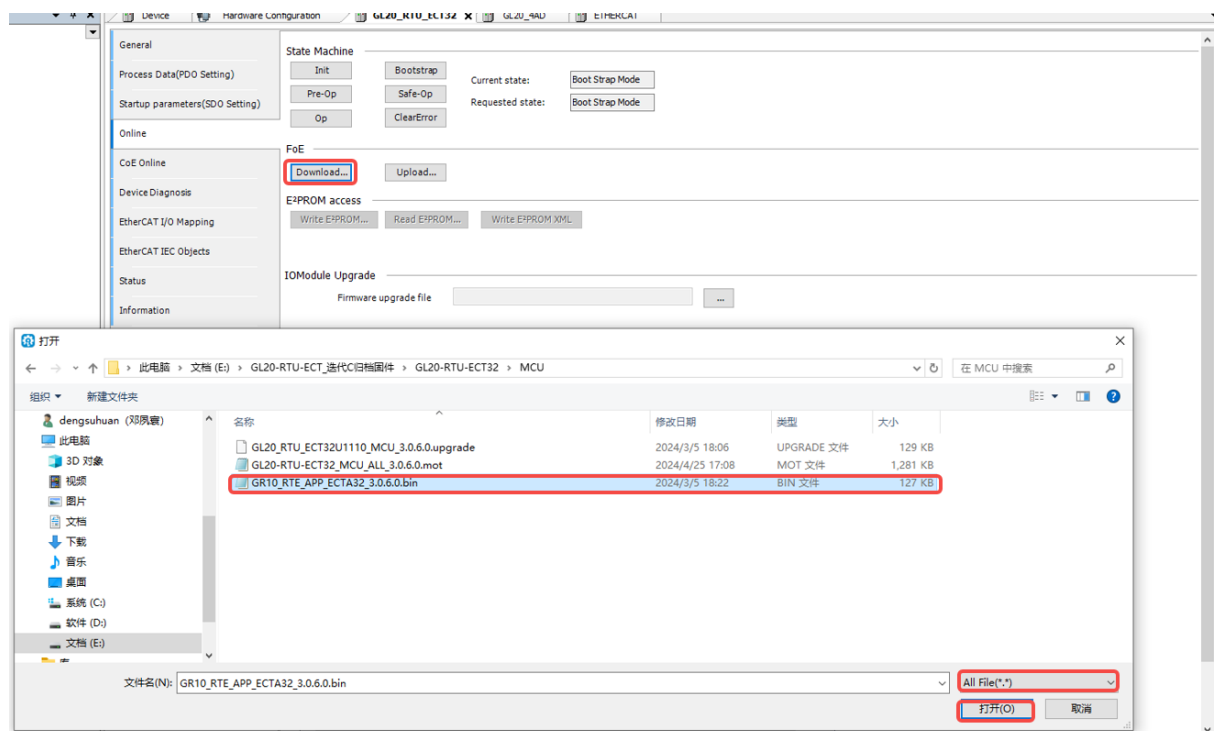
The current status of the EtherCAT communication interface module is "Operational".



5. Click "Bootstrap" to switch the EtherCAT communication interface module status to "Boot Strap Mode", as shown below.

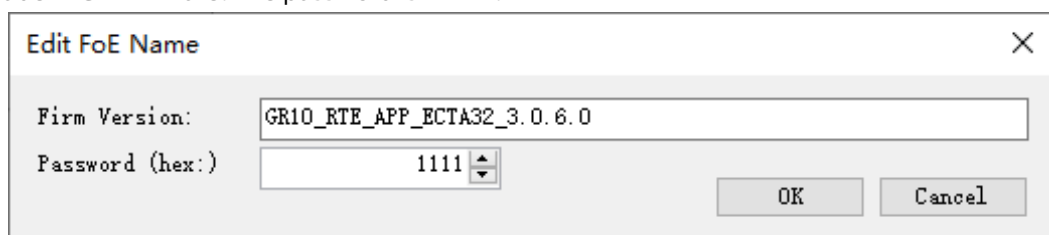


6. Click "Download", select the MCU or FPGA firmware upgrade file in the pop-up dialog box, and click "Open", as shown below.

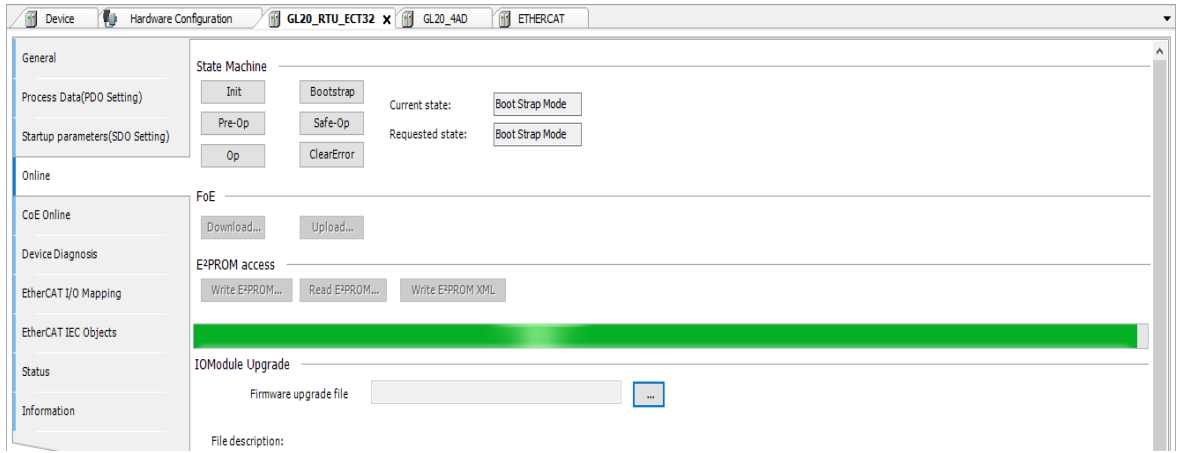


7. In the opened "Edit FoE Name" window, enter the password "1111" and click "OK".

- Upgrade MCU firmware: The password is "1111".
- Upgrade FPGA firmware: The password is "2222".

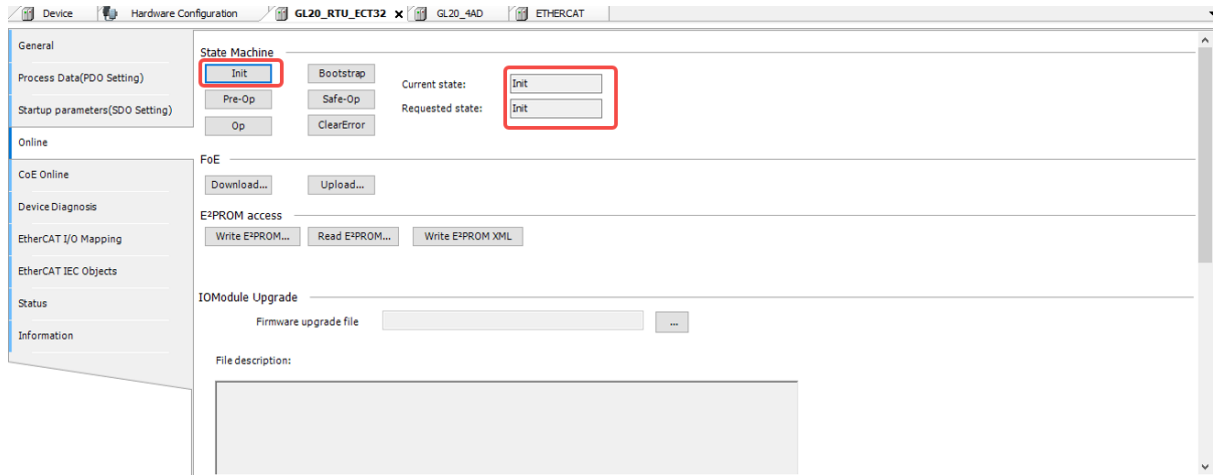


The upgrade process is displayed through a progress bar, as shown below.

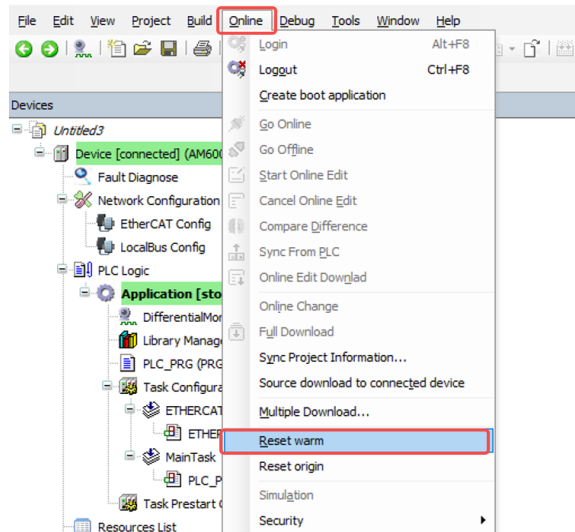


After the upgrade is complete, the file download successful prompt will be displayed in the message bar.

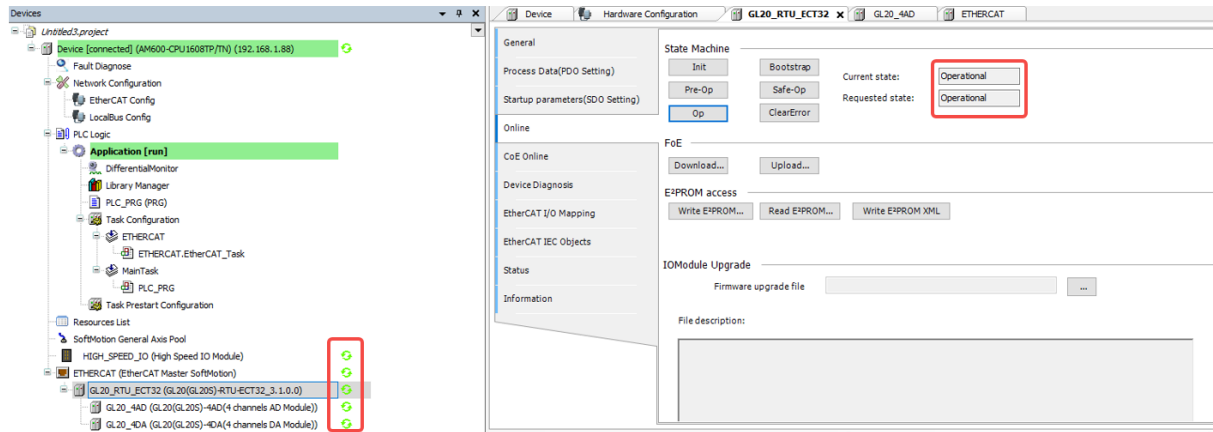
8. Click "Init" to switch to the "Init" state, as shown below.



9. Select "Online > Reset warm" from the menu bar to perform a hot reset on the EtherCAT bus.



10. Click the start button on the toolbar and wait for the device status to change to "Operational", as shown below.



11. Power on again.

12. In the "CoE Online" interface, check if the "Value" of "Software version" is the upgraded version.

General Auto Update Offline from ESI file Online from device

Index:Subindex	Name	Flags	Type	Value
16#1000:16#00	Device type	RO	UDINT	16#00001389
16#1001:16#00	Error Register	RO	USINT	16#00
16#1008:16#00	Device Name	RO	STRING(16)	'GL20-RTU-ECT32'
16#1009:16#00	Hardware version	RO	STRING(16)	'00.00.01.00'
16#100A:16#00	Software version	RO	STRING(16)	'03.00.06.00'
16#1018:16#00	Identity	RO	USINT	16#04
16#1C00:16#00	Sync manager type	RO	USINT	16#04
16#1C12:16#00	RxPDO assign	RO	USINT	16#02
16#1C13:16#00	TxPDO assign	RO	USINT	16#03
16#1C32:16#00	SM output parameter	RO	USINT	16#20
16#1C33:16#00	SM input parameter	RO	USINT	16#20
16#3010:16#00	Port 0 error counter	RO	USINT	16#04
16#3011:16#00	Port 1 error counter	RO	USINT	16#04
16#3012:16#00	ESC error counter	RO	USINT	16#04

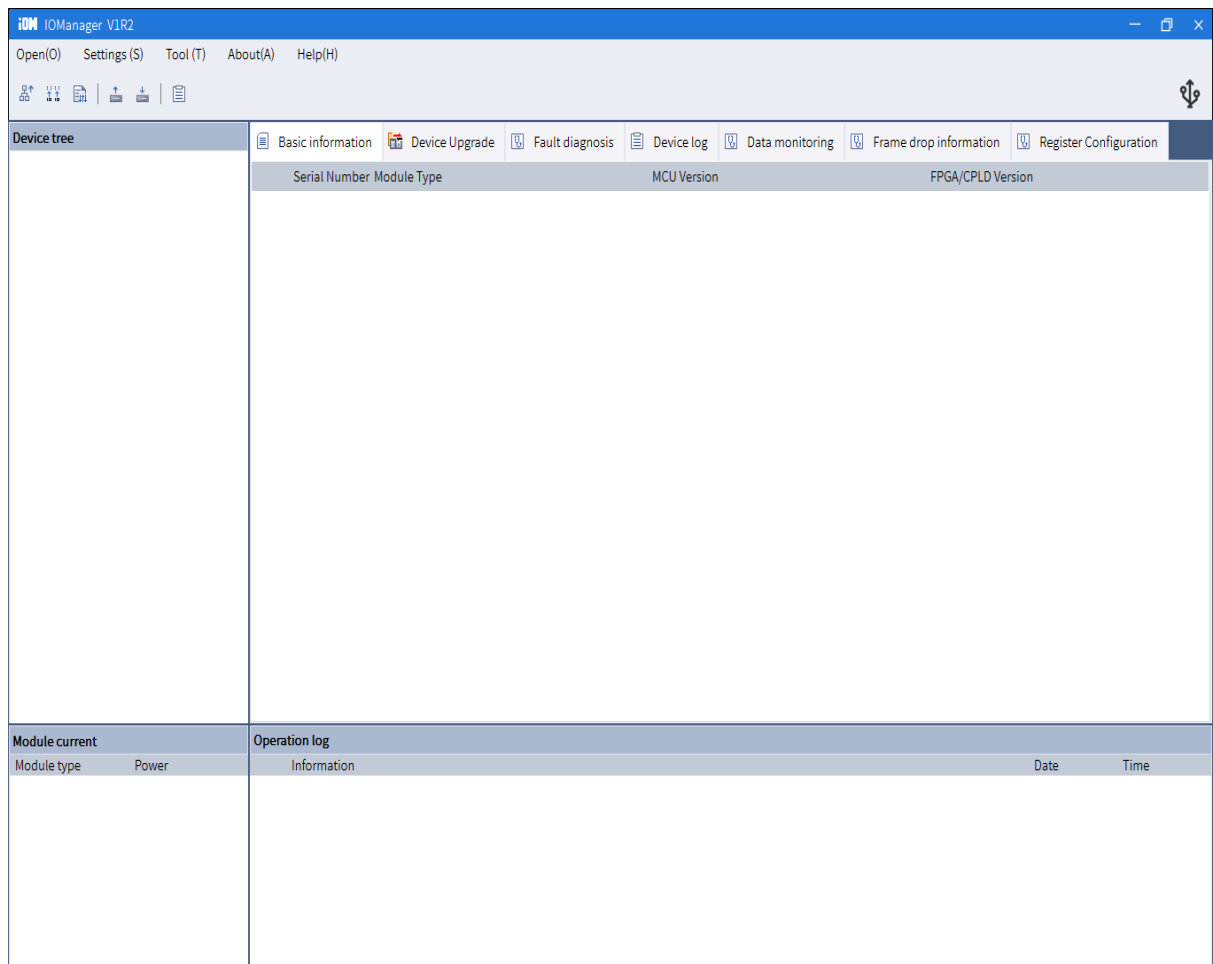
10.3.3 Upgrade via IOManager Configuration Tool

Prerequisites

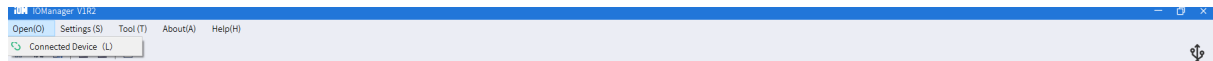
- Obtain the firmware for upgrade from Inovance technical support (MCU: GL20-RTU-ECTU1110_MCU_x.x.x.x.upgrade; FPGA: GL20_RTU_ECTU1120_FPGA_x.x.x.x.upgrade).
- Disconnect the network cable between the product and the PLC, then power off and on again.
- This product is connected to a PC equipped with the IOManager configuration tool via a USB cable.

Procedure

1. Open the IOManager configuration tool on the PC desktop.

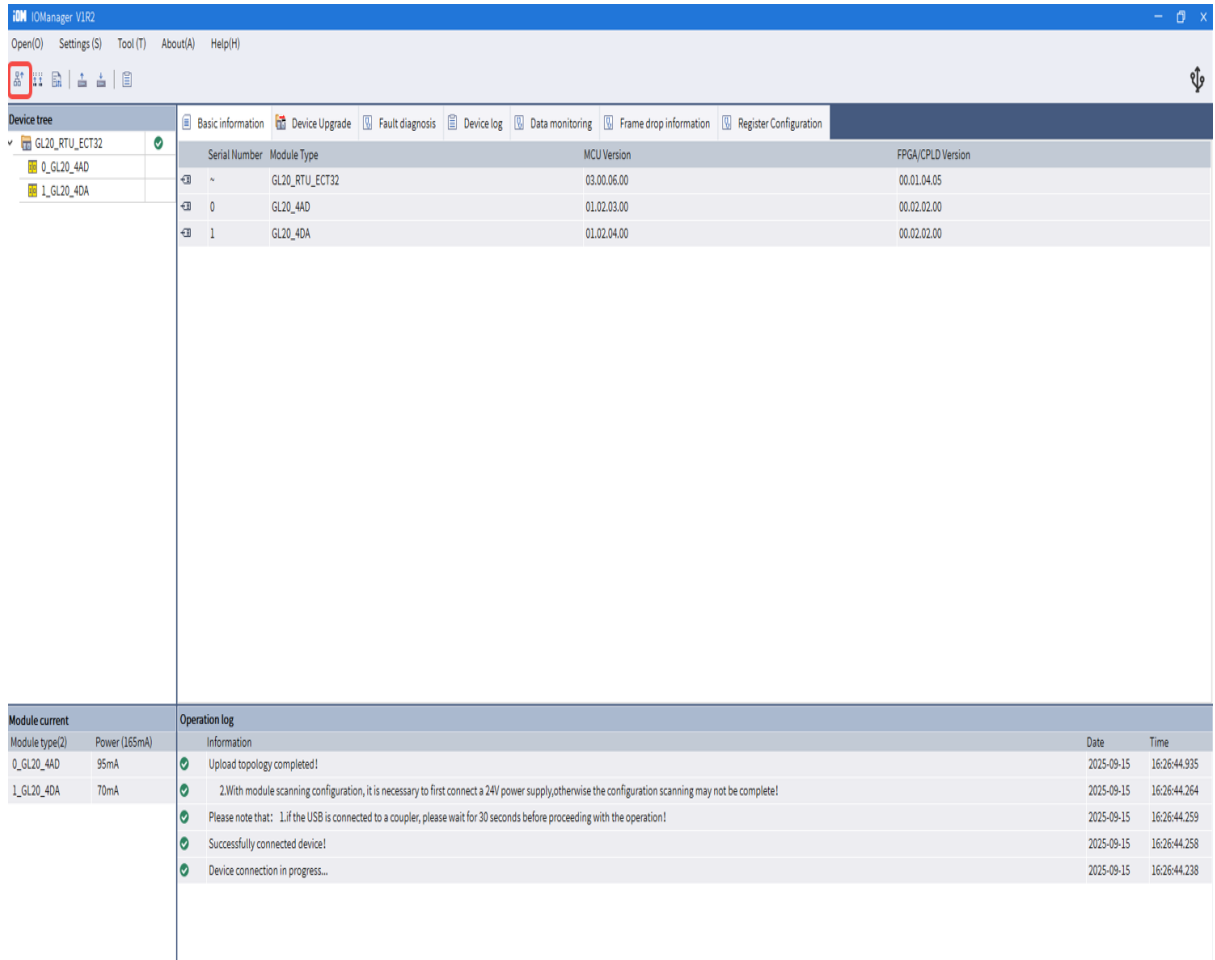


2. In the menu bar, select "Open > Connected Device" to connect this product, as shown below.

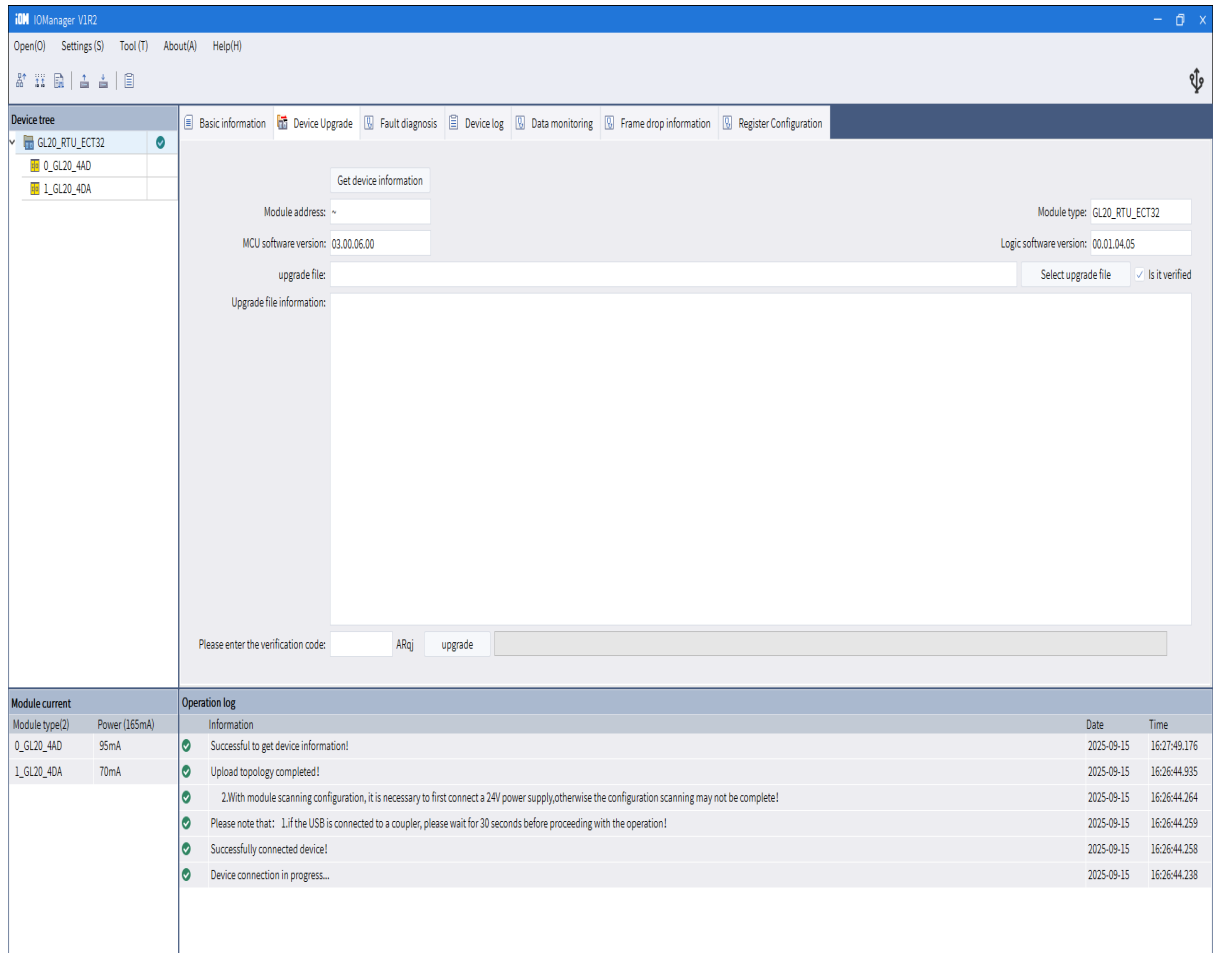


If the connection is successful, "Connected" is displayed in the upper right corner of the interface. If the connection fails, check whether the driver is correctly installed.

3. Click the configuration topology upload button on the upper left corner of the interface to view the configuration information, as shown below.

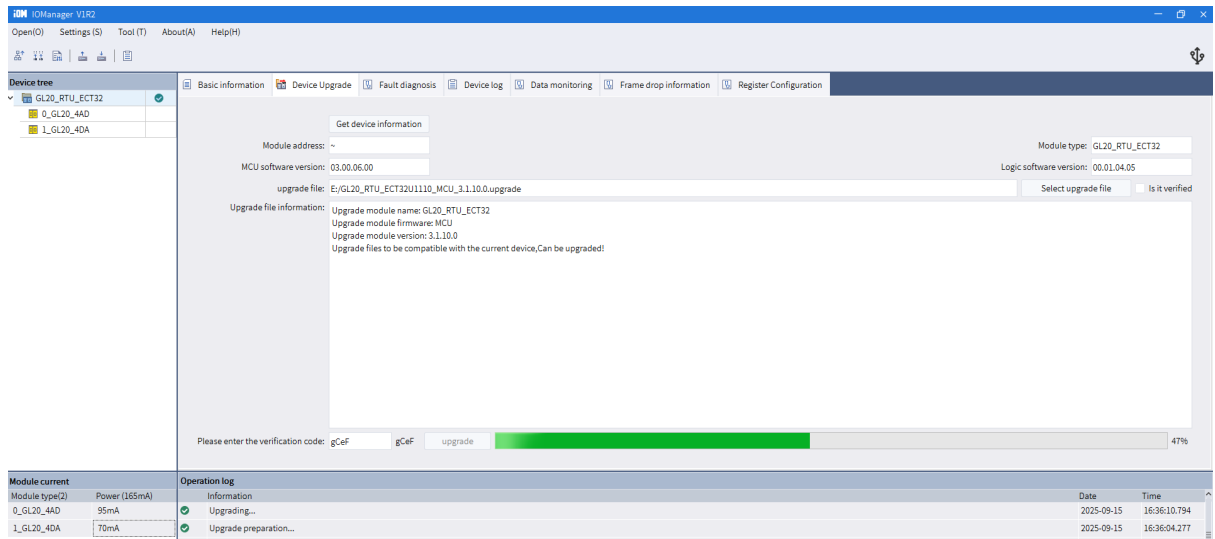


4. Click "Device Upgrade" and click "GL20_RTU_ECT32" in the "Device tree" on the left. Click "Get device information", and view the current firmware version information, as shown below.



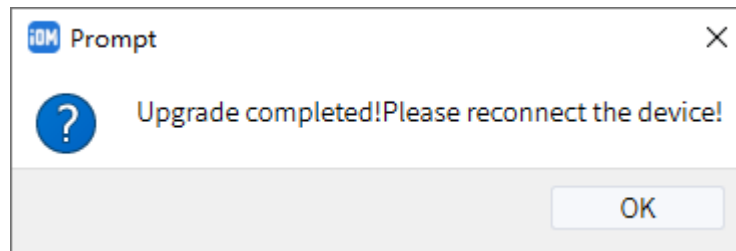
- Click "Select upgrade file", select the MCU firmware or FPGA firmware stored locally, enter the verification code, and click "upgrade" to upgrade the firmware.

During the upgrade process, a progress bar will be displayed at the bottom of the interface, as shown below.

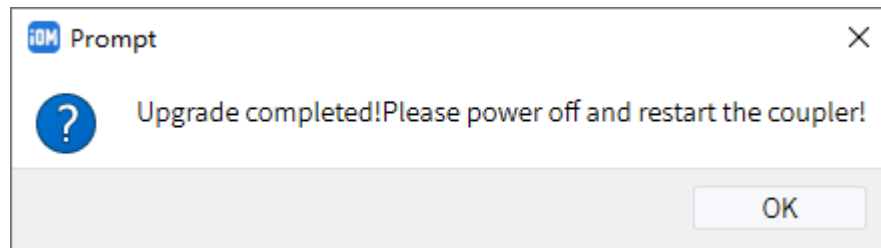


- Upon completion, perform the corresponding operation based on the firmware type.

- Upgrade MCU firmware: Click "OK".

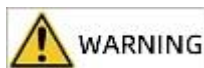


- Upgrade FPGA firmware: Click "OK". Power off, disconnect the USB cable, and restart the product as prompted.



- Perform steps 2, 3, and 4 to check whether the firmware version of this product has been updated.

10.4 Maintenance



Unauthorized repair of this product is strictly prohibited. Inovance shall not be held responsible for the potential damage to the product caused by unauthorized disassembly.

When this product requires repair, contact Inovance technical support, who will provide the designated repair address (either the factory or an authorized agent). Mail the faulty product to the specified repair address.

Before returning the product for repair:

- Provide a detailed description of the fault.
- Specify whether to replace the accessories (contact Inovance for accessory pricing details).

11 FAQ

11.1 How to Check if a Module is Online

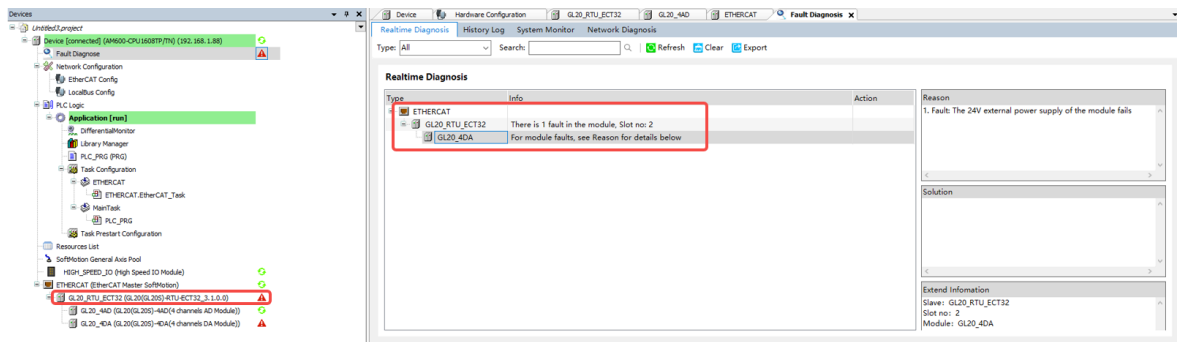
Prerequisites

- This product is connected to a PC equipped with InoProShop programming software via a network cable.
- This product is powered on and turned on.

Procedure

1. Check the PR indicator of the module.
 - Solid on: The module is online.
 - Flashing quickly or slowly: If the SF indicator of the EtherCAT communication interface module is flashing, it indicates that the module is offline.

When the module is offline, a fault will be displayed in the InoProShop programming software interface, as shown below.



2. In the "Devices" navigation tree on the left, double-click "GL20_RTU_ECT32". In "CoE Online" interface, check the value of subindex "F110: 16#01" to locate the faulty module. Take the following figure as an example, the value of subindex "F110: 16#01" is "0x180", indicating that the 8th and 9th modules are faulty.

General Auto Update Offline from EST file Online from device

Index:Subindex	Name	Flags	Type	Value
* 16#1C32:16#00	SM output parameter	RO	USINT	16#20
* 16#1C33:16#00	SM input parameter	RO	USINT	16#20
* 16#3010:16#00	Port 0 error counter	RO	USINT	16#04
* 16#3011:16#00	Port 1 error counter	RO	USINT	16#04
* 16#3012:16#00	ESC error counter	RO	USINT	16#04
* 16#3016:16#00	Station address	RO	USINT	16#04
16#3020:16#00	Fpga soft version	RO	UDINT	16#00010405
* 16#3021:16#00	Module software version	RO	USINT	16#04
* 16#5000:16#00	Disable Slot Control	RW	USINT	16#04
16#5001:16#00	Disable Function Control	RW	UINT	16#0000
* 16#6000:16#00	4AD input	RO	USINT	16#04
* 16#7040:16#00	4DA output	RO	USINT	16#04
* 16#8000:16#00	4AD module transform mode	RW	USINT	16#04
* 16#8001:16#00	4AD module Filter	RW	USINT	16#04
* 16#8002:16#00	4AD module Detect	RW	USINT	16#04
* 16#8040:16#00	4DA module transform mode	RW	USINT	16#04
* 16#8041:16#00	4DA module Stopmode	RW	USINT	16#04
* 16#8042:16#00	4DA module Stopvalue	RW	USINT	16#04
* 16#A000:16#00	4AD module Diagnosis information	RO	USINT	16#05
* 16#A040:16#00	4DA module Diagnosis information	RO	USINT	16#05
* 16#F000:16#00	Modular device profile	RO	USINT	16#02
* 16#F030:16#00	Configured Module Ident List	RO	USINT	16#02
* 16#F050:16#00	Detected Module Ident List	RO	USINT	16#02
* 16#F100:16#00	Device Status	RO	USINT	16#02
* 16#F110:16#00	Module Error Flag	RO	USINT	16#02
:16#01	ErrorSlot1	RO	UDINT	16#00000002
:16#02	ErrorSlot2	RO	UDINT	16#00000000
* 16#F120:16#00	LBus Count	RO	USINT	16#29
* 16#F130:16#00	LBus DiagInfo	RO	USINT	---
* 16#F140:16#00	IP Info	RO	USINT	---
* 16#F800:16#00	Device configuration data	RO	USINT	16#04
16#FB00:16#00	Control word	RW	UINT	16#0000

3. The fault codes of the 8th and 9th modules are "0x1006", indicating that they are offline, as shown below.

Device Hardware Configuration GL20_RTU_ECT32 x GL20_4AD ETHERCAT Fault Diagnosis

General Read this page Auto Update Offline from ESI file Online from device

Process Data(PDO Setting)

Startup parameters(SDO Setting)

Online

CoE Online

Device Diagnosis

EtherCAT I/O Mapping

EtherCAT IEC Objects

Status

Information

Index/Subindex	Name	Flags	Type	Value
* 16#3011:16#00	Port 1 error counter	RO	USINT	16#04
* 16#3012:16#00	ESC error counter	RO	USINT	16#04
* 16#3016:16#00	Station address	RO	USINT	16#04
16#3020:16#00	Fpga soft version	RO	UDINT	16#00010405
* 16#3021:16#00	Module software version	RO	USINT	16#04
* 16#5000:16#00	Disable Slot Control	RW	USINT	16#04
16#5001:16#00	Disable Function Control	RW	UINT	16#0000
* 16#6000:16#00	4AD input	RO	USINT	16#04
* 16#7040:16#00	4DA output	RO	USINT	16#04
* 16#8000:16#00	4AD module transform mode	RW	USINT	16#04
* 16#8001:16#00	4AD module Filter	RW	USINT	16#04
* 16#8002:16#00	4AD module Detect	RW	USINT	16#04
* 16#8040:16#00	4DA module transform mode	RW	USINT	16#04
* 16#8041:16#00	4DA module Stopmode	RW	USINT	16#04
* 16#8042:16#00	4DA module Stopvalue	RW	USINT	16#04
* 16#A000:16#00	4AD module Diagnosis information	RO	USINT	16#05
* 16#A040:16#00	4DA module Diagnosis information	RO	USINT	16#05
:16#01	4DA Moudle Diagnosis information	RO	UINT	16#1006
:16#02	4DA CH0 Diagnosis information	RO	UINT	16#0000
:16#03	4DA CH1 Diagnosis information	RO	UINT	16#0000
:16#04	4DA CH2 Diagnosis information	RO	UINT	16#0000
:16#05	4DA CH3 Diagnosis information	RO	UINT	16#0000
* 16#F000:16#00	Modular device profile	RO	USINT	16#02
* 16#F030:16#00	Configured Module Ident List	RO	USINT	16#02
* 16#F050:16#00	Detected Module Ident List	RO	USINT	16#02
* 16#F100:16#00	Device Status	RO	USINT	16#02
* 16#F110:16#00	Module Error Flag	RO	USINT	16#02
* 16#F120:16#00	LBus Count	RO	USINT	16#29
* 16#F130:16#00	LBus DiagInfo	RO	USINT	---
* 16#F140:16#00	IP Info	RO	USINT	---
* 16#F800:16#00	Device configuration data	RO	USINT	16#04
16#FB00:16#00	Control word	RW	UINT	16#0000

4. (Optional) Check the frame loss object dictionary F120, the frame loss counts for the 8th and 9th modules have increased.

Index:Subindex	Name	Flags	Type	Value
16#F120:16#00	LBus Count	RO	USINT	16#29
:16#01	LBus Set Slot Address Mail Lost Count	RO	UDINT	16#00000005
:16#02	LBus Get Open DaisyChain Mail Lost Count	RO	UDINT	16#00000000
:16#03	LBus Get Slot Info Mail Lost Count	RO	UDINT	16#0000000A
:16#04	LBus Set Slot Config Data Mail Lost Count	RO	UDINT	16#00000000
:16#05	LBus Get Slot Config Data Mail Lost Count	RO	UDINT	16#00000000
:16#06	LBus Get Slot State Mail Lost Count	RO	UDINT	16#00000000
:16#07	LBus Set Slot State Mail Lost Count	RO	UDINT	16#00000000
:16#08	LBus Get Slot Diagnostic Data Mail Lost Count	RO	UDINT	16#000001D3
:16#09	LBus PDO Data Send Count	RO	UDINT	16#0000CAFB
:16#0A	LBus PDO Data Lost Count Slot1	RO	UDINT	16#00000000
:16#0B	LBus PDO Data Lost Count Slot2	RO	UDINT	16#000059D3
:16#0C	LBus PDO Data Lost Count Slot3	RO	UDINT	16#00000000
:16#0D	LBus PDO Data Lost Count Slot4	RO	UDINT	16#00000000
:16#0E	LBus PDO Data Lost Count Slot5	RO	UDINT	16#00000000
:16#0F	LBus PDO Data Lost Count Slot6	RO	UDINT	16#00000000
:16#10	LBus PDO Data Lost Count Slot7	RO	UDINT	16#00000000
:16#11	LBus PDO Data Lost Count Slot8	RO	UDINT	16#00000000
:16#12	LBus PDO Data Lost Count Slot9	RO	UDINT	16#00000000
:16#13	LBus PDO Data Lost Count Slot10	RO	UDINT	16#00000000
:16#14	LBus PDO Data Lost Count Slot11	RO	UDINT	16#00000000
:16#15	LBus PDO Data Lost Count Slot12	RO	UDINT	16#00000000
:16#16	LBus PDO Data Lost Count Slot13	RO	UDINT	16#00000000
:16#17	LBus PDO Data Lost Count Slot14	RO	UDINT	16#00000000
:16#18	LBus PDO Data Lost Count Slot15	RO	UDINT	16#00000000
:16#19	LBus PDO Data Lost Count Slot16	RO	UDINT	16#00000000
:16#1A	LBus PDO Data Lost Count Slot17	RO	UDINT	16#00000000
:16#1B	LBus PDO Data Lost Count Slot18	RO	UDINT	16#00000000
:16#1C	LBus PDO Data Lost Count Slot19	RO	UDINT	16#00000000
:16#1D	LBus PDO Data Lost Count Slot20	RO	UDINT	16#00000000
:16#1E	LBus PDO Data Lost Count Slot21	RO	UDINT	16#00000000
:16#1F	LBus PDO Data Lost Count Slot22	RO	UDINT	16#00000000
:16#20	LBus PDO Data Lost Count Slot23	RO	UDINT	16#00000000

11.2 How to Check if the Channel is Normal

Prerequisites

- This product is connected to a PC equipped with InoProShop programming software via a network cable.
- This product is powered on and turned on.

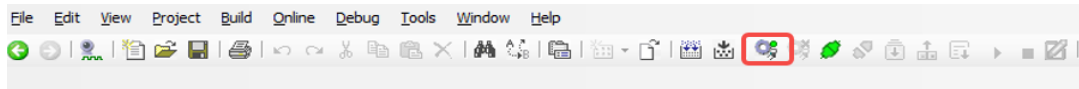
Procedure

For digital modules

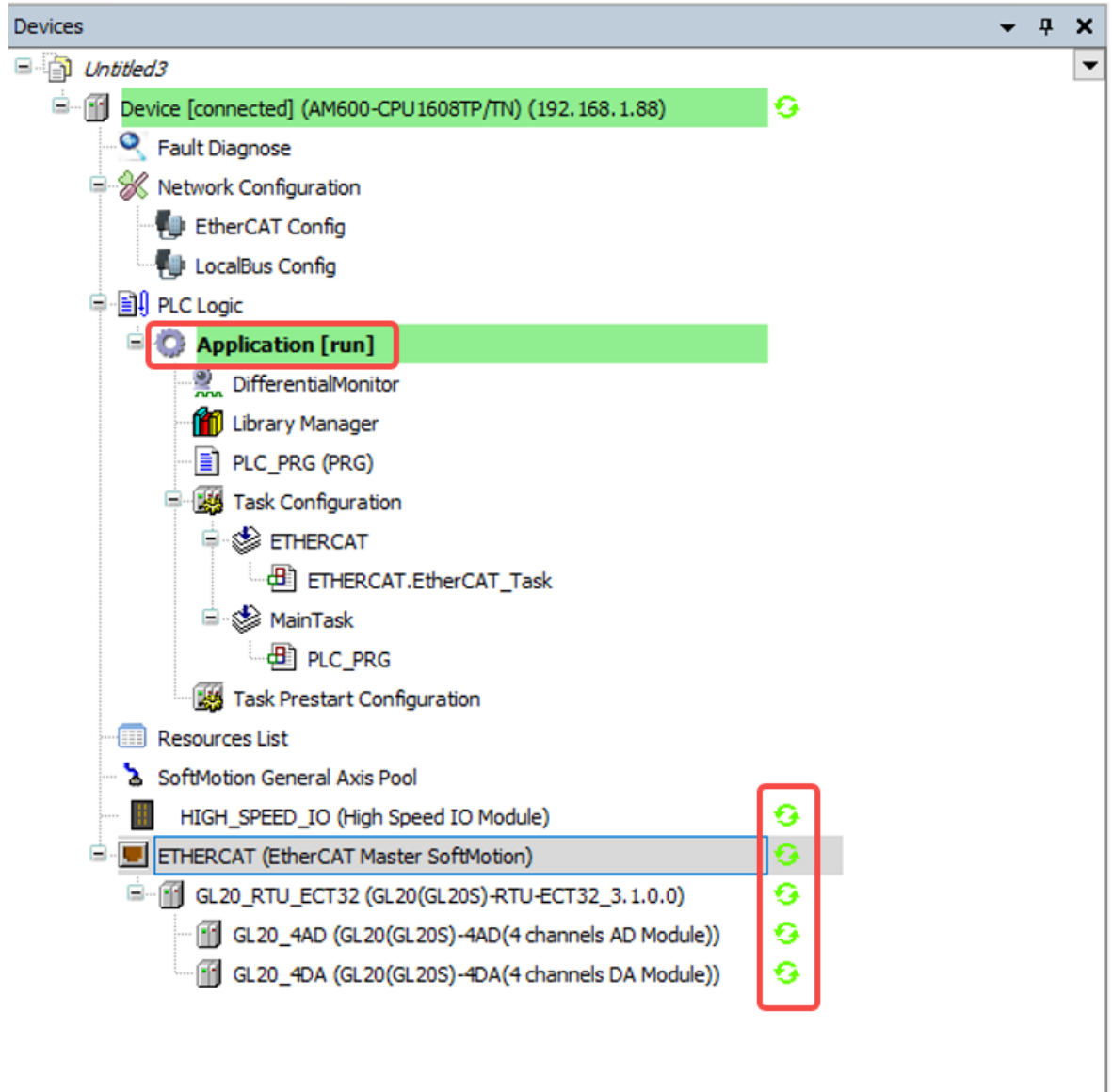
For example, connect the 3rd point of channel 0 of the GL20-0016ETN module to the 3rd point of channel 0 of the GL20-1600END module. During actual use, this method can be used to verify whether the input and output points are functioning properly.



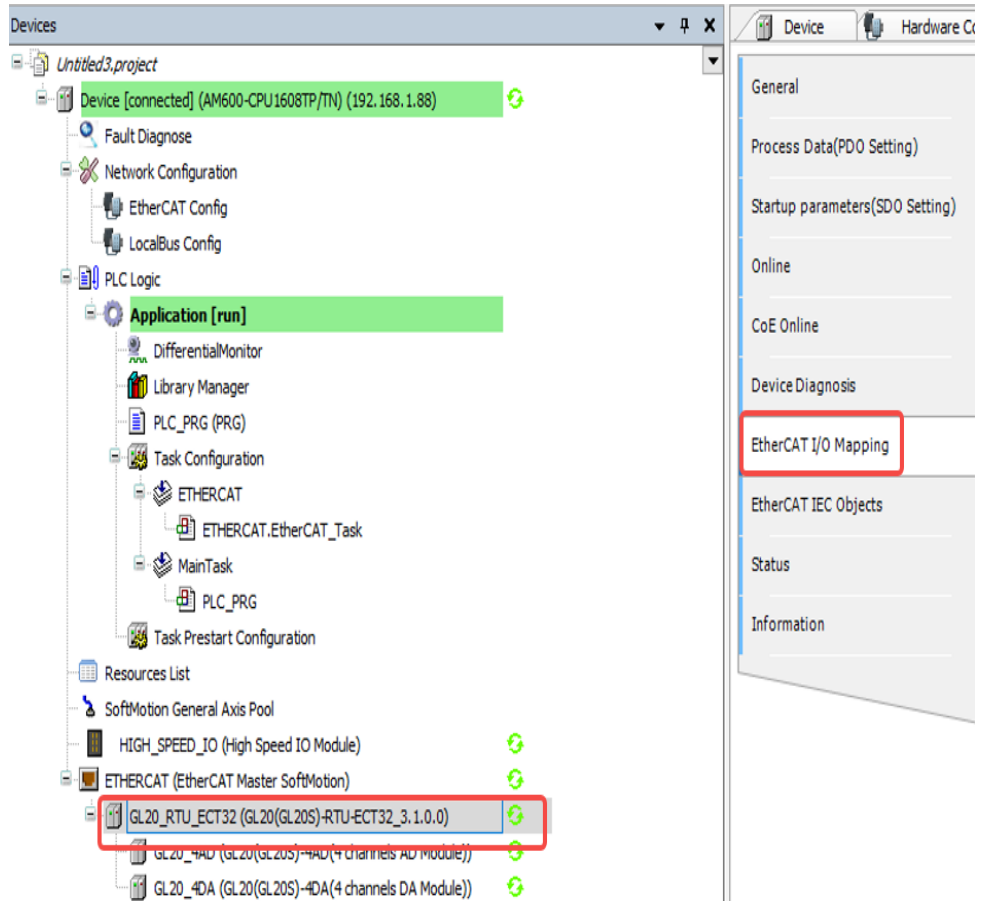
1. Check whether the output indicators on the GL20-0016ETN module and the input indicators on the GL20-1600END module are solid on. If so, it indicates that the module output and input points are functioning properly.
2. Confirm the result through the InoProShop programming software interface.
 - a. Open the InoProShop programming software on the PC desktop and open the project.
 - b. Click the login button on the toolbar, as shown below.



After a successful login, the "Application" node displays "run", as shown below.

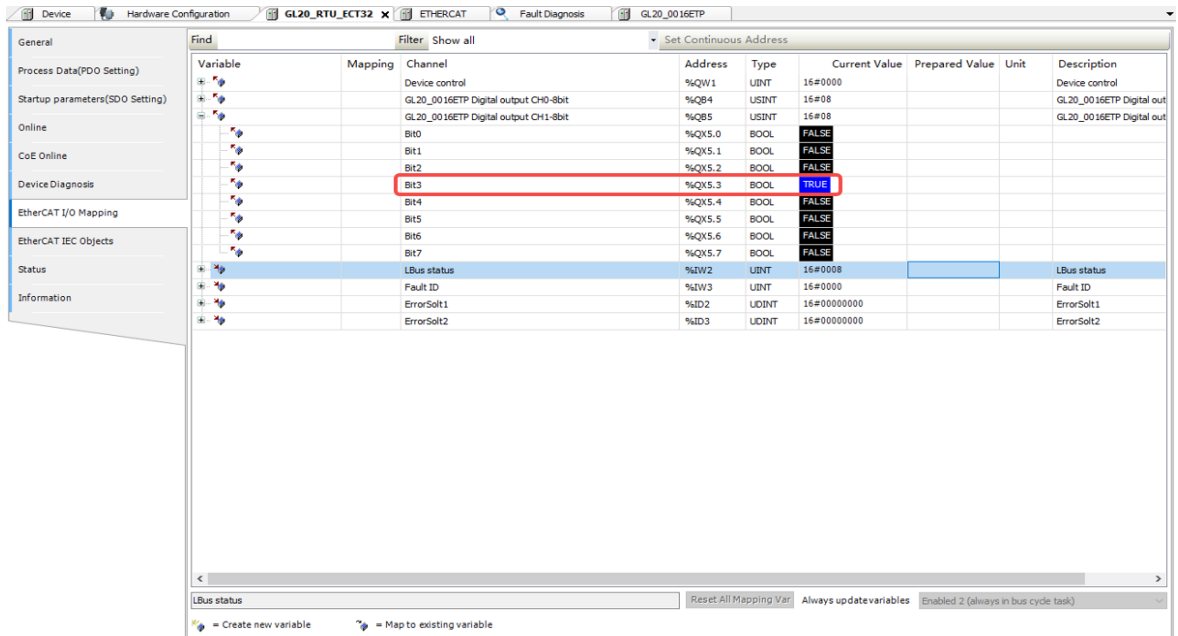


- c. In the "Devices" navigation tree on the left, double-click the "GL20_RTU_ECT32" node to open the "EtherCAT I/O Mapping" interface.



d. Check the values corresponding to the mapping addresses of the GL20-0016ETN module and the GL20-1600END module. If "Bit3" is "TRUE", it indicates that the output and input points are functioning properly.

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
		Device control	%QW1	UINT	16#0000			Device control
		GL20_0016ETP Digital output CH0-8bit	%QB4	USINT	16#08			GL20_0016ETP Digital out
		Bit0	%QX4.0	BOOL	FALSE			
		Bit1	%QX4.1	BOOL	FALSE			
		Bit2	%QX4.2	BOOL	FALSE			
		Bit3	%QX4.3	BOOL	TRUE			
		Bit4	%QX4.4	BOOL	FALSE			
		Bit5	%QX4.5	BOOL	FALSE			
		Bit6	%QX4.6	BOOL	FALSE			
		Bit7	%QX4.7	BOOL	FALSE			
		GL20_0016ETP Digital output CH1-8bit	%QB5	USINT	16#00			GL20_0016ETP Digital out
		Lbus status	%IW2	UINT	16#0008			Lbus status
		Fault ID	%IW3	UINT	16#0000			Fault ID
		ErrorSolt1	%ID2	UDINT	16#00000000			ErrorSolt1
		ErrorSolt2	%ID3	UDINT	16#00000000			ErrorSolt2



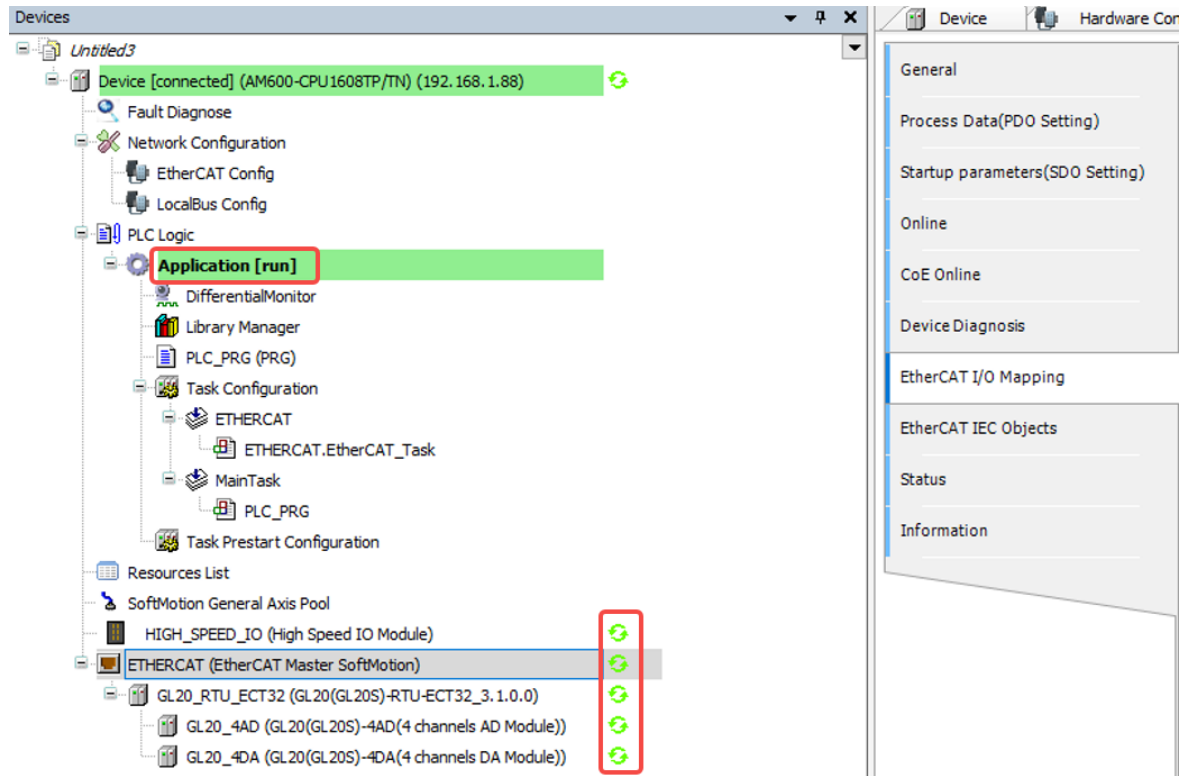
For analog modules

For example, connect the four output channels of the GL20-4DA module to the four input channels of the GL20-4AD module. During actual use, this method can be used to verify whether the input and output channels are functioning properly.

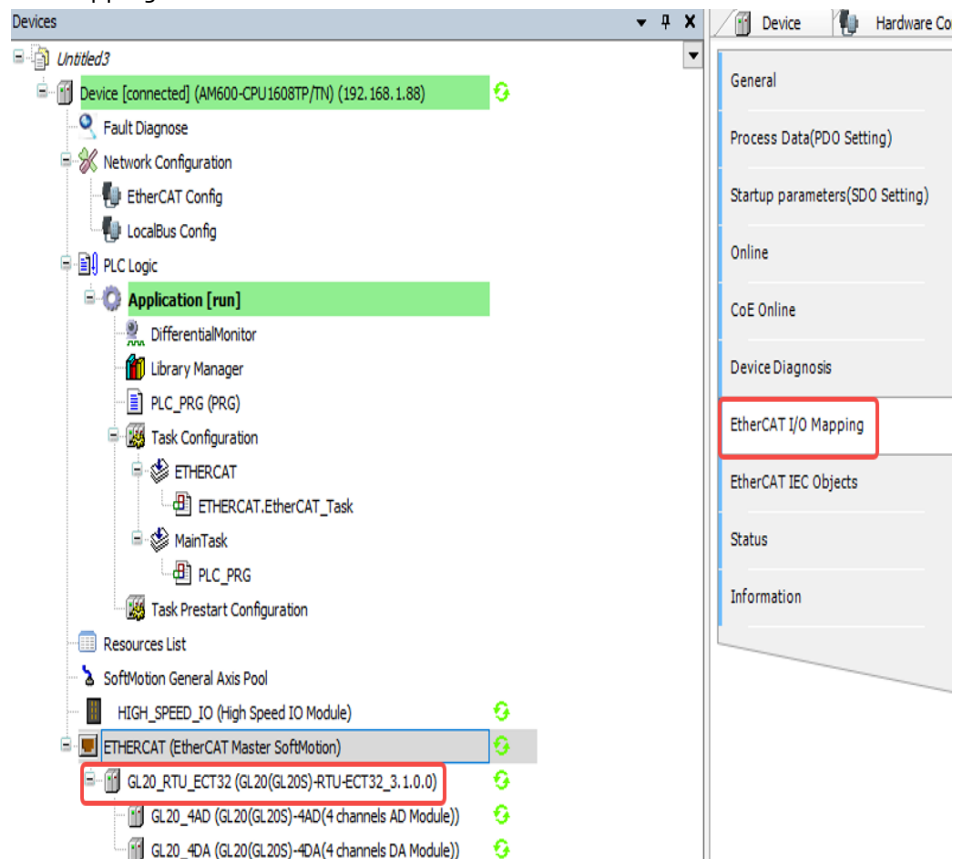
1. Check whether the output indicators on the GL20-4DA module and the input indicators on the GL20-4AD module are solid on. If so, it indicates that the module output and input channels are functioning properly.
2. Confirm the result through the InoProShop programming software interface.
 - a. Open the InoProShop programming software on the PC desktop and open the project.
 - b. Click the login button on the toolbar, as shown below.



After a successful login, the "Application" node displays "run", as shown below.



- c. In the "Devices" navigation tree on the left, double-click the "GL20_RTU_ECT32" node to open the "EtherCAT I/O Mapping" interface.



- d. Check the values corresponding to the mapping addresses of the GL20-4AD module and the GL20-4DA module. If all four channels of the GL20-4DA module output a code value of 20000, and all four channels of the GL20-4AD module receive a code value of 20000, it indicates that the output and input channels are functioning properly.

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit	Description
		Device control	%QW1	UDINT	0			Device control
		GL20_4DA DA CH0	%QW2	INT	20000			GL20_4DA DA CH0
		GL20_4DA DA CH1	%QW3	INT	20000			GL20_4DA DA CH1
		GL20_4DA DA CH2	%QW4	INT	20000			GL20_4DA DA CH2
		GL20_4DA DA CH3	%QW5	INT	20000			GL20_4DA DA CH3
		LBus status	%IW2	UDINT	8			LBus status
		Fault ID	%IW3	UDINT	0			Fault ID
		ErrorSoft1	%ID2	UDINT	0			ErrorSoft1
		ErrorSoft2	%ID3	UDINT	0			ErrorSoft2
		GL20_44D AD CH0	%IW8	INT	20012			GL20_44D AD CH0
		GL20_44D AD CH1	%IW9	INT	20011			GL20_44D AD CH1
		GL20_44D AD CH2	%IW10	INT	20010			GL20_44D AD CH2
		GL20_44D AD CH3	%IW11	INT	20017			GL20_44D AD CH3

11.3 How to View Module Firmware Version

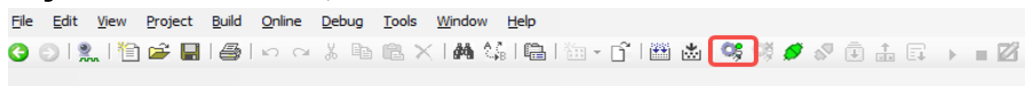
11.3.1 View via InoProShop Programming Software

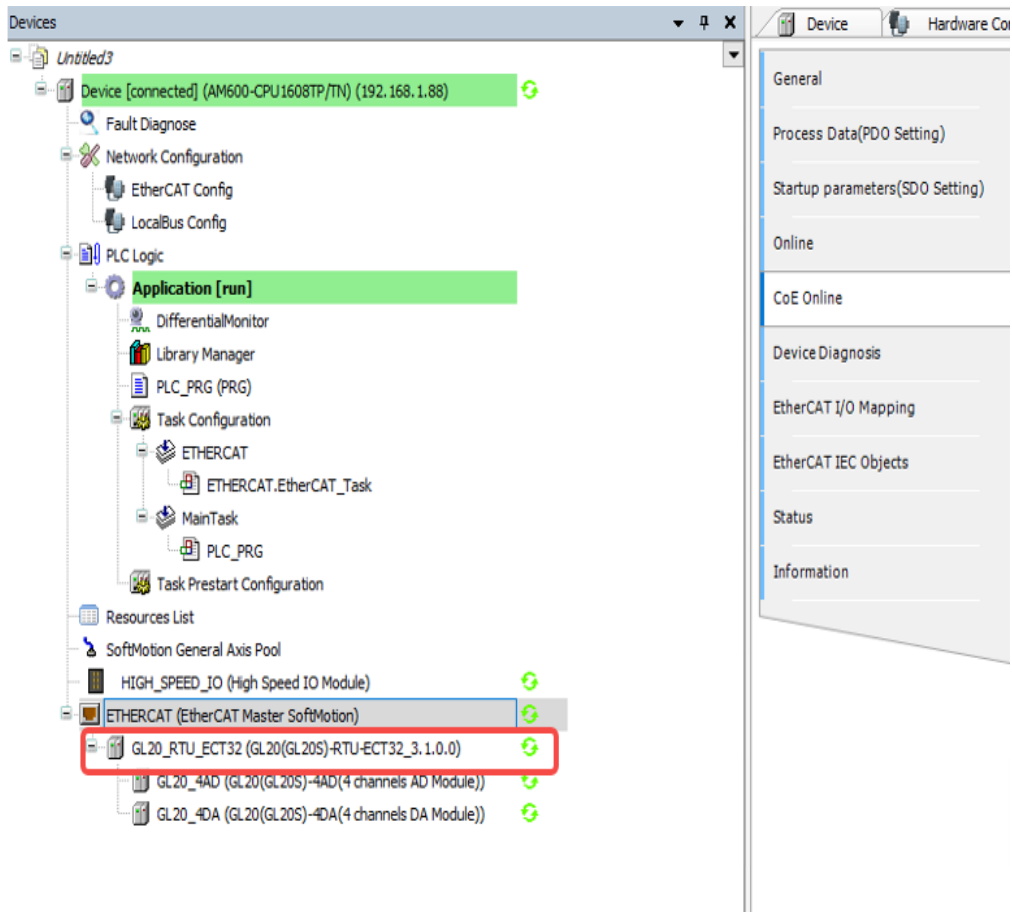
Prerequisites

- This product is connected to a PC equipped with InoProShop programming software via a network cable.
- This product is powered on and turned on.

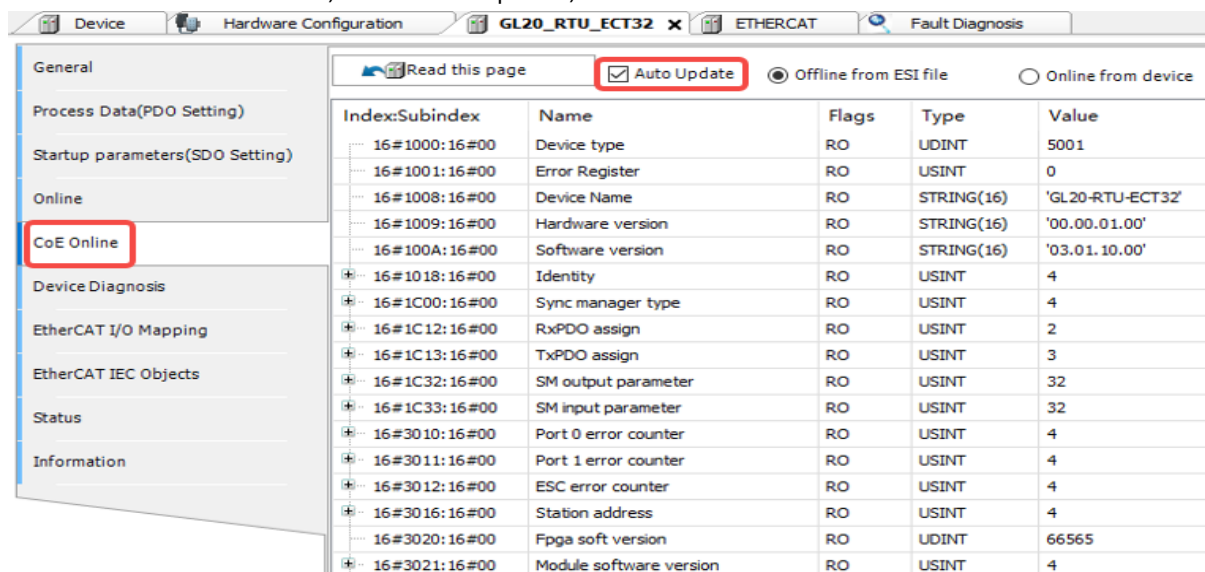
Procedure

1. Open the InoProShop programming software on the PC desktop and open the project.
2. Click the login button on the toolbar, as shown below.



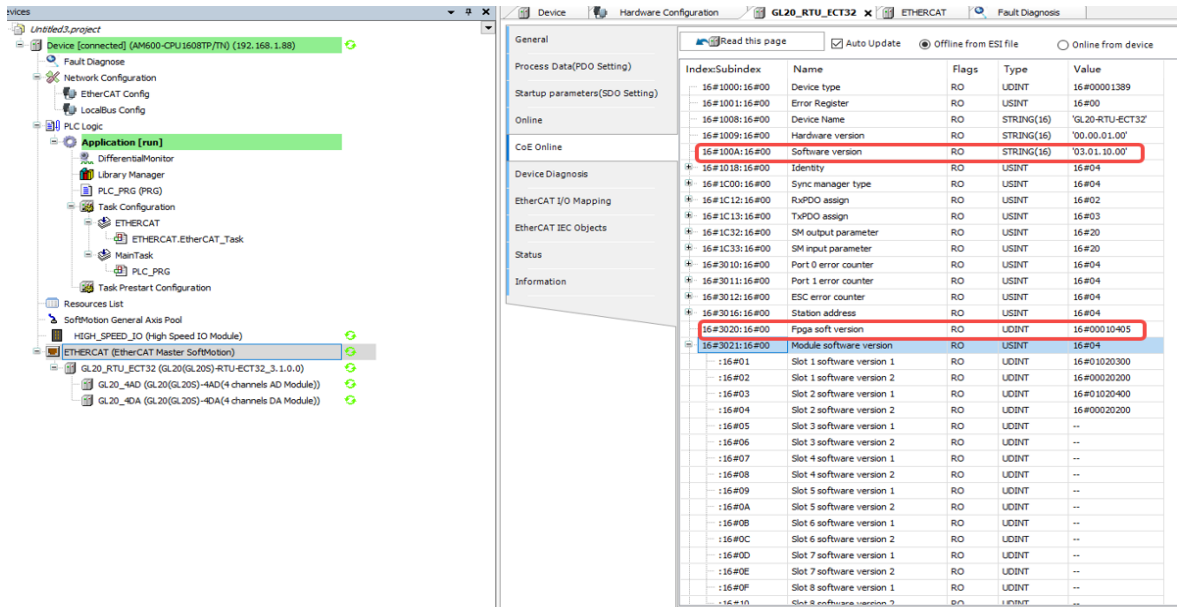


4. In the "Online CoE" interface, check "Auto Update", as shown below.

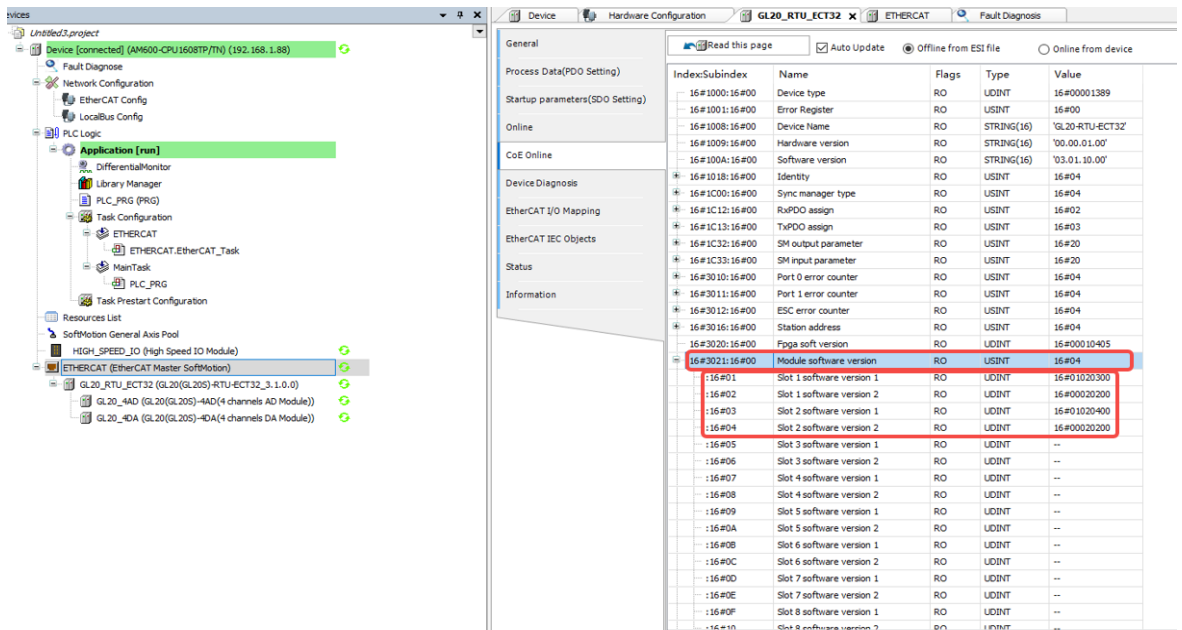


5. Check the firmware version information for the EtherCAT communication interface module and expansion module.

- For the firmware version of the EtherCAT communication interface module: Check the object dictionary 0x100A for the MCU version, and check the object dictionary 0x3020 for the FPGA version, as shown below.



- For the firmware version of the expansion module: Check the object dictionary 0x3021, where the MCU version and CPLD version are displayed alternately, as shown below.



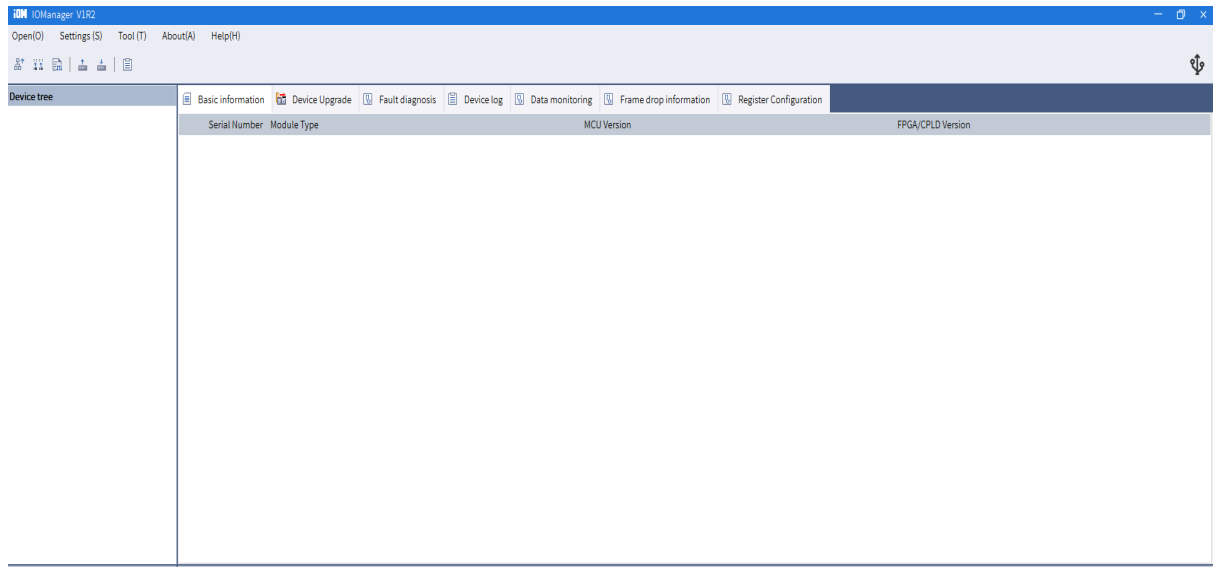
11.3.2 View via IOManager Configuration Tool

Prerequisites

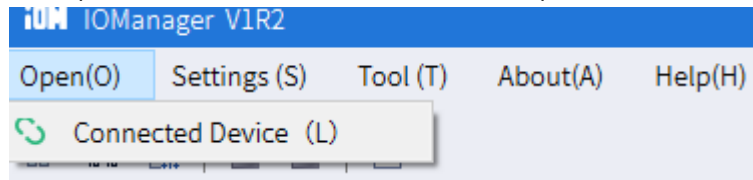
- This product is connected to a PC equipped with the IOManager configuration tool via a USB cable.
- This product is powered on and turned on.

Procedure

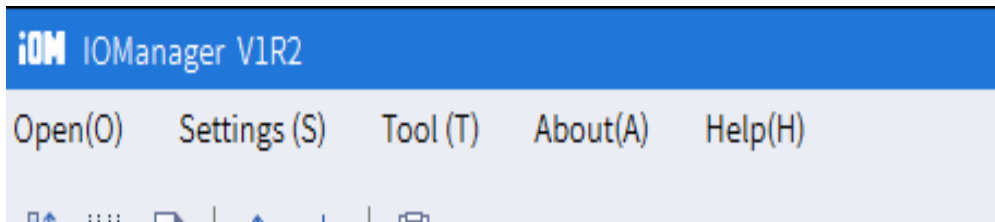
1. Open the IOManager configuration tool on the PC desktop.



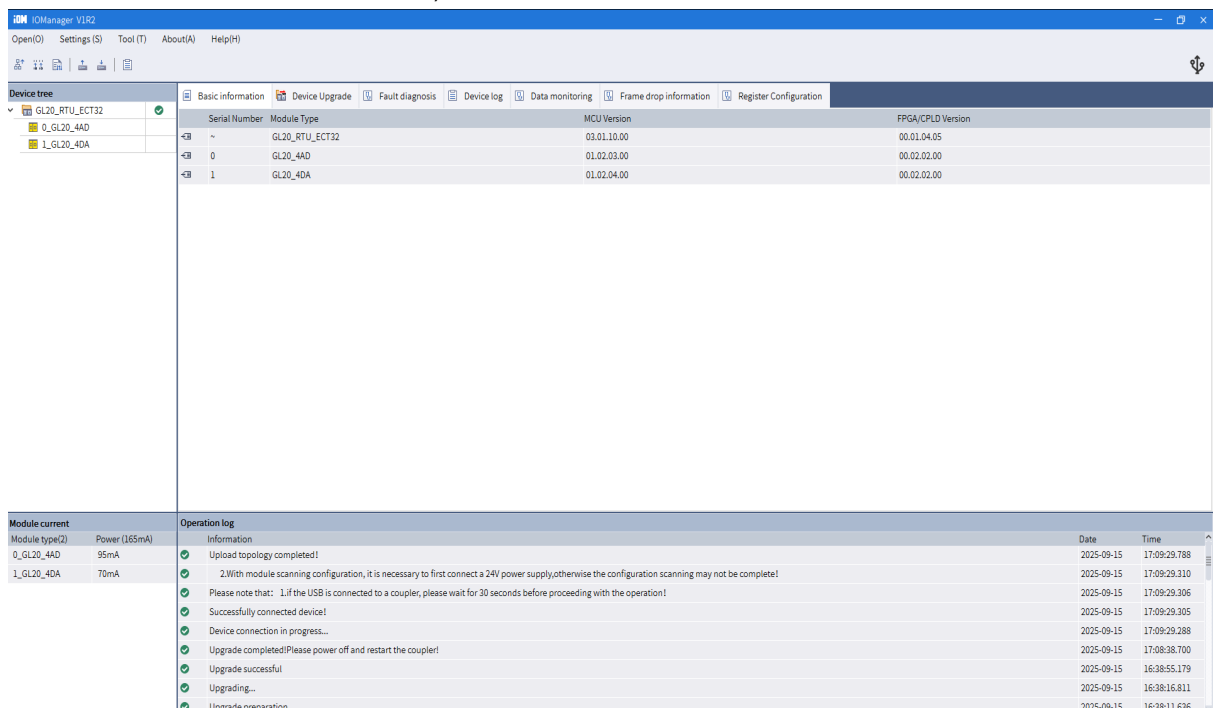
2. In the menu bar, select "Open > Connected Device" to connect this product, as shown below.



If the connection is successful, "Connected" is displayed in the upper right corner of the interface. If the connection fails, check whether the driver is correctly installed.



3. Click the configuration topology upload button on the upper left corner of the interface to view the module firmware version information, as shown below.



11.4 How to Set the Filter Time

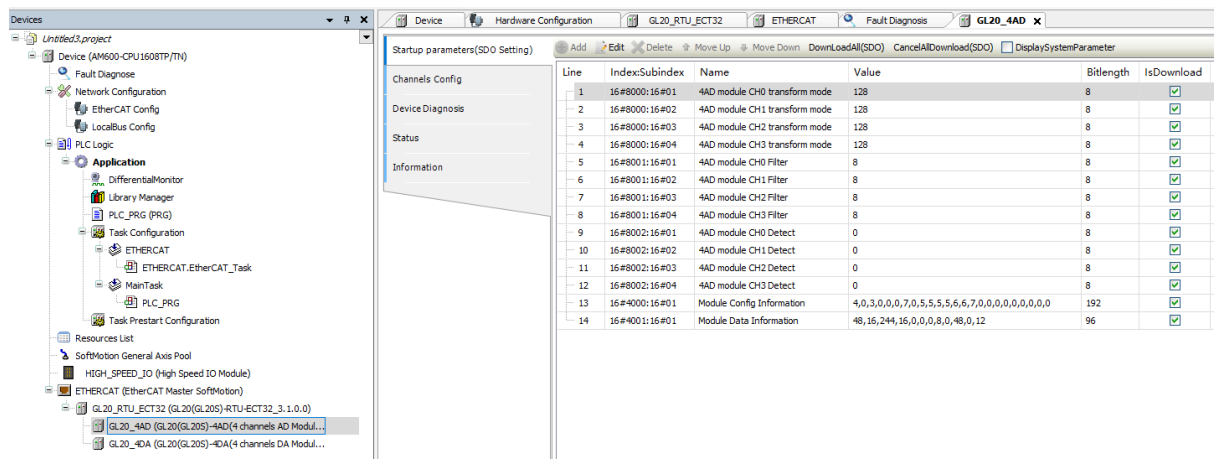
When data jitter occurs to the analog module, increase the filter time.

Prerequisites

- This product is connected to a PC equipped with InoProShop programming software via a network cable.
- This product is powered on and turned on.

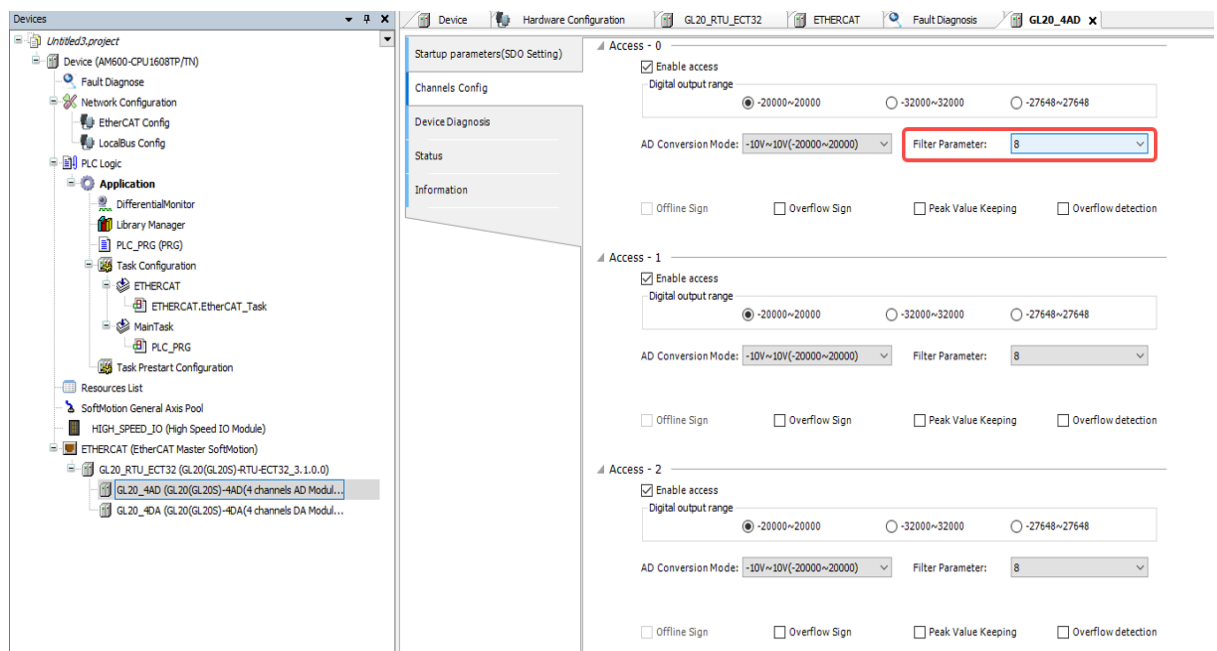
Procedure

1. Open the InoProShop programming software on the PC desktop and open the project.
2. Take the GL20-4AD module as an example. In the "Devices" navigation tree on the left, double-click "GL20-4AD" under "ETHERCAT_C > GL20_RTU_ECT32".



Line	Index/Subindex	Name	Value	Bitlength	IsDownload
1	16#8000:16#01	4AD module CH0 transform mode	128	8	<input checked="" type="checkbox"/>
2	16#8000:16#02	4AD module CH1 transform mode	128	8	<input checked="" type="checkbox"/>
3	16#8000:16#03	4AD module CH2 transform mode	128	8	<input checked="" type="checkbox"/>
4	16#8000:16#04	4AD module CH3 transform mode	128	8	<input checked="" type="checkbox"/>
5	16#8001:16#01	4AD module CH0 Filter	8	8	<input checked="" type="checkbox"/>
6	16#8001:16#02	4AD module CH1 Filter	8	8	<input checked="" type="checkbox"/>
7	16#8001:16#03	4AD module CH2 Filter	8	8	<input checked="" type="checkbox"/>
8	16#8001:16#04	4AD module CH3 Filter	8	8	<input checked="" type="checkbox"/>
9	16#8002:16#01	4AD module CH0 Detect	0	8	<input checked="" type="checkbox"/>
10	16#8002:16#02	4AD module CH1 Detect	0	8	<input checked="" type="checkbox"/>
11	16#8002:16#03	4AD module CH2 Detect	0	8	<input checked="" type="checkbox"/>
12	16#8002:16#04	4AD module CH3 Detect	0	8	<input checked="" type="checkbox"/>
13	16#4000:16#01	Module Config Information	4,0,3,0,0,0,7,0,5,5,5,5,6,6,7,0,0,0,0,0,0,0,0,0	192	<input checked="" type="checkbox"/>
14	16#4001:16#01	Module Data Information	48,16,244,16,0,0,0,8,0,48,0,12	96	<input checked="" type="checkbox"/>

3. Take channel 0 as an example. In the "Channels Config" interface, increase the value of "Filter Parameter", as shown below.



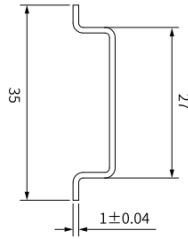
The screenshot shows the 'Channels Config' interface for the 'GL20_4AD' module. The 'Filter Parameter' for channel 0 is highlighted in red, indicating it is the focus of the configuration step.

12 Appendix

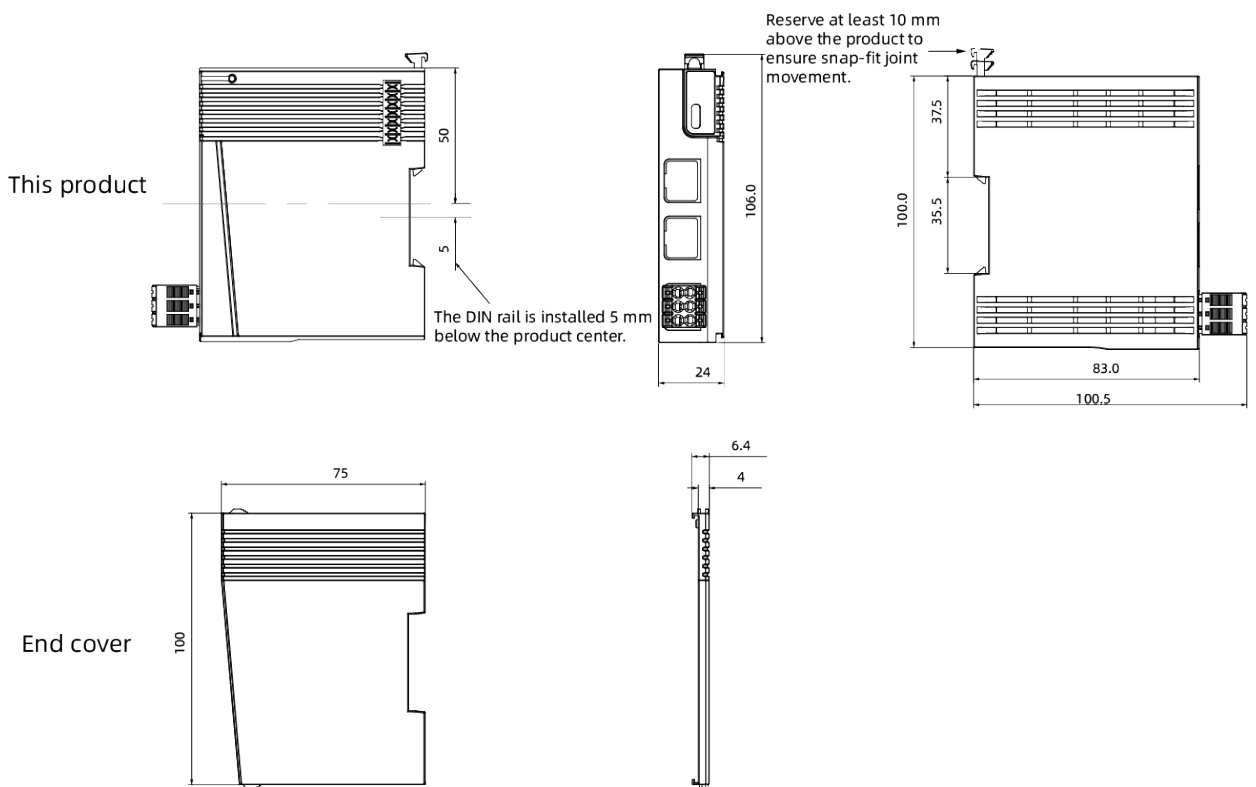
12.1 Appendix 1: Dimensional Diagram

This appendix includes the dimensional diagrams of the DIN rail, the product, end cover, and connection cables. Comply with the specific dimensional requirements for installation in control cabinets, control rooms, and so on.

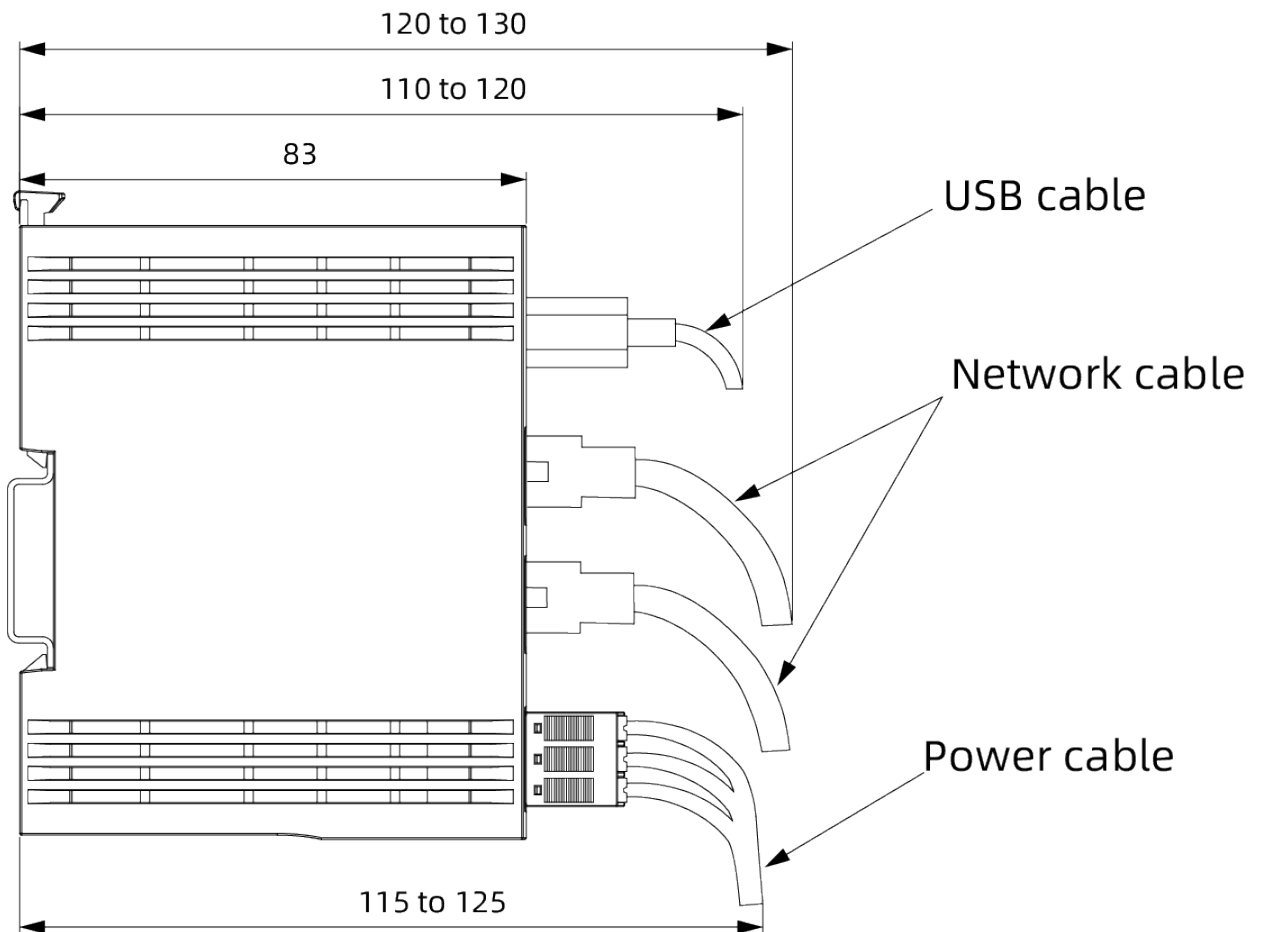
DIN rail



This product and end cover

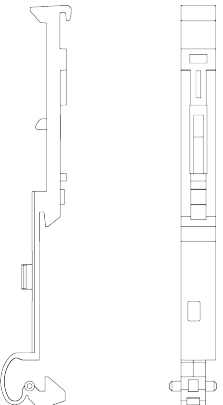
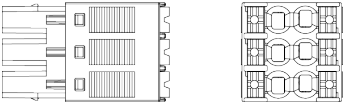


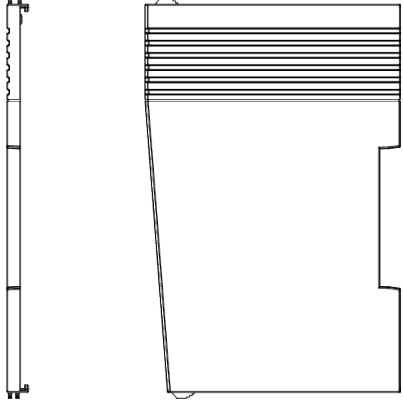
Connection cable



12.2 Appendix 2: Accessories/Spare Parts

The ordering data for the accessories and spare parts of this product is shown below.

Name	Diagram	Material Code
Snap-fit joints of the DIN rail		20212441
24 V power supply terminal		15210903
End cover		20212484

Name	Diagram	Material Code
		

12.3 Appendix 3: Object Dictionary

12.3.1 Object Dictionary Structure

According to the ETG5001 standard protocol, the object dictionary of devices is uniformly divided according to the protocol. The detailed object dictionary structure is shown in the table below.

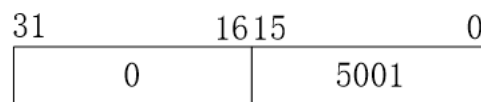
Index	Type	Description
Communication Area Object Dictionary		
0x1000 - 0x1FFF	Communication configuration area	EtherCAT Standard Communication Object Dictionary
Manufacturer Parameters		
0x3000 - 0x3FFF	Manufacturer parameters	User-defined object dictionary for the ECT communication interface module
Module Object Dictionary		
0x6000 - 0x6FFF	Input parameters	TxPDO, used for mapping process data of expansion modules
0x7000 - 0x7FFF	Output parameters	RxPDO, used for mapping process data of expansion modules.
0x8000 - 0x8FFF	Configuration parameters	Configuration parameters for configuring expansion modules on the master
0xA000 - 0xAFFF	Diagnostic parameters	Diagnostic parameters for displaying fault diagnostic information of the slave.
Device Object Dictionary		
0xF000 - 0xFFFF	Device description area	Configuration object dictionary for the ECT communication interface module

12.3.2 Communication Area Object Dictionary

Index	0x1000: Device type				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Device type	UDINT	RO	NO	5001

 NOTE

The lower 15 bits indicate that the device uses the 5001 protocol. The higher 15 bits being 0 indicate that the device sub-module uses a custom protocol, and all bits here are 0.



Index	0x1001: Error Register				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Error Register	USINT	RO	NO	0

 NOTE


- 0: No fault occurred.
- 1: A fault has occurred.

Index	0x1008: Device name				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Device name	STRING	RO	NO	-

 NOTE

The device name for GL20-RTU-ECT32-INT is "GL20-RTU-ECT32".

Index	0x100A: Softwareversion				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Softwareversion	STRING	RO	No	-

 NOTE

The description format is XX.XX.XX.XX, with "XX" representing V version, B version, D version, and F version, respectively.

Index	0x1018: Identity				
Subindex	Name	Data type	Access type	Mapping	Default value
0	SubIndex 000	USINT	RO	NO	4
1	Vendor ID	UDINT	RO	NO	0x00100000
2	Product code	UDINT	RO	NO	-
3	Revision	UDINT	RO	NO	-
4	Serial number	UDINT	RO	NO	-



The product code for the GL20-RTU-ECT32-INT module is "0x10F41001".

Index	0x16nm: RxPDO-Map				
Subindex	Name	Data type	Access type	Mapping	Default value
0	SubIndex 000	USINT	RW	NO	-
1	SubIndex 001	UDINT	RW	NO	-
2	SubIndex 002	UDINT	RW	NO	-
...
255	SubIndex 255	UDINT	RW	NO	-



Each slot can occupy up to 0x08 RxPDO-Maps. The start index address of the slot is calculated as $0x1600 + n \cdot 0x08$, where n represents the position of the slot. The specific number of indexes occupied by the slot and the amount of sub-index data included in each index are determined by the type of module placed in the slot. For the allocation of PDOs for different types of modules, see "[Appendix 4: Object Dictionary Definitions of the Expansion Module](#)".

Index	0x1Anm: TxPDO-Map				
Subindex	Name	Data type	Access type	Mapping	Default value
0	SubIndex 000	USINT	RW	NO	-
1	SubIndex 001	UDINT	RW	NO	-

Index	0x1Anm: TxPDO-Map				
Subindex	Name	Data type	Access type	Mapping	Default value
2	SubIndex 002	UDINT	RW	NO	-
...
255	SubIndex 255	UDINT	RW	NO	-

 **NOTE**

Each slot can occupy up to 0x08 TxPDO-Maps. The start index address of the slot is calculated as $0x1A00 + n \cdot 0x08$, where n represents the position of the slot. The specific number of indexes occupied by the slot and the amount of sub-index data included in each index are determined by the type of module placed in the slot. For the allocation of PDOs for different types of modules, see "[Appendix 4: Object Dictionary Definitions of the Expansion Module](#)".

Index	0x1C00: Sync manager type				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Sync manager type	USINT	RO	NO	4
1	SubIndex 001	UDINT	RO	NO	1
2	SubIndex 002	UDINT	RO	NO	2
3	SubIndex 003	UDINT	RO	NO	3
4	SubIndex 004	UDINT	RO	NO	4

 **NOTE**

Indicates the usage mode of the SM channel. SM0 and SM1 are used for mailbox communication, and SM2 and SM3 are used for process data communication.

Index	0x1C12: RxPDO assign				
Subindex	Name	Data type	Access type	Mapping	Default value
0	RxPDO assign	USINT	RW	NO	-
1	SubIndex 001	UDINT	RW	NO	-

Index	0x1C12: RxPDO assign				
Subindex	Name	Data type	Access type	Mapping	Default value
...
64	SubIndex 064	UDINT	RW	NO	-



Each sub-index represents an RxPDO assignment for a module.

Index	0x1C13: TxPDO assign				
Subindex	Name	Data type	Access type	Mapping	Default value
0	TxPDO assign	USINT	RW	NO	-
1	SubIndex 001	UDINT	RW	NO	-
...
64	SubIndex 064	UDINT	RW	NO	-



Each sub-index represents the TxPDO allocation for a module.

Index	0x1C32: SM output parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
0	SubIndex 000	USINT	RO	NO	32
1	Sync mode	UINT	RW	NO	-
2	Cycle time	UDINT	RW	NO	-
4	Sync modes supported	UINT	RO	NO	-
5	Minimum cycle time	UDINT	RO	NO	-
6	Calc and copy time	UDINT	RO	NO	-
9	Delay time	UDINT	RO	NO	-

Index	0x1C32: SM output parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
11	SM event missed counter	UDINT	RO	NO	-
32	Sync error	BOOL	RO	NO	-

**NOTE**

Please refer to the standard EtherCAT protocol for usage.

Index	0x1C33: SM input parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
0	SM input parameter	USINT	RO	NO	32
1	Sync mode	UINT	RO	NO	-
2	Cycle time	UINT	RO	NO	-
4	Sync modes supported	UINT	RO	NO	-
5	Minimum cycle time	UINT	RO	NO	-
6	Calc and copy time	UINT	RO	NO	-
9	Delay time	UINT	RO	NO	-
11	SM event missed counter	UINT	RO	NO	-
32	Sync error	BOOL	RO	NO	-

**NOTE**

Please refer to the standard EtherCAT protocol for usage.

12.3.3 Manufacturer Parameter Object Dictionary

Index	0x3010: Port 0 error counter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Port 0 error counter	USINT	RO	NO	4
1	Port 0 invalid frame counter	USINT	RO	NO	-
2	Port 0 Rx error counter	USINT	RO	NO	-
3	Port 0 Forwarded Rx error counter	USINT	RO	NO	-
4	Port 0 lost link counter	USINT	RO	NO	-

**NOTE**

Refer to the ET1100 datasheet for usage.

Index	0x3011: Port 1 error counter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Port 0 error counter	USINT	RO	NO	4
1	Port 1 invalid frame counter	USINT	RO	NO	-
2	Port 1 Rx error counter	USINT	RO	NO	-
3	Port 1 forwarded Rx error counter	USINT	RO	NO	-
4	Port 1 lost link counter	USINT	RO	NO	-

**NOTE**


Refer to the ET1100 datasheet for usage.

Index	0x3012: ESC error counter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	ESC error counter	USINT	RO	NO	4
1	ECAT Processing unit error counter	USINT	RO	NO	-
2	PDI error counter	USINT	RO	NO	-
3	Watchdog counter process data	USINT	RO	NO	-
4	Watchdog counter PDI	USINT	RO	NO	-




Refer to the ET1100 datasheet for usage.

Index	0x3016: Station address				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Station address	USINT	RO	NO	4
1	Rotary switch value	UINT	RO	NO	0
2	Configuration station address	UINT	RO	NO	0
3	Configuration station alias	UINT	RO	NO	0
4	Alias in eeprom	UINT	RW	NO	0

 **NOTE**

- Subindex 1: Rotary switch value (reserved)
- Subindex 2: Configuration station address (read from the value of register 0x0010/0x0011 in ET1100)
- Subindex 3: Configuration station alias (read from the value of register 0x0012/0x0013 in ET1100)
- Subindex 4: Alias in eeprom (station alias saved locally)
- 0x6nnn: Module Inputs, indicating the PDO parameters of the expansion module. For details, see "[12.4 Appendix 4: Expansion Module Object Dictionary Definition](#)".
- 0x7nnn: Module Outputs, indicating the PDO parameters of the expansion module. For details, see "[12.4 Appendix 4: Expansion Module Object Dictionary Definition](#)".
- 0x8nnn: Configuration Area, indicating the configuration parameters for the expansion module (written by the master). For details, see "[12.4 Appendix 4: Expansion Module Object Dictionary Definition](#)".
- 0xAnnn: Diagnosis, indicating the diagnostic information of the expansion module. For details, see "[12.4 Appendix 4: Expansion Module Object Dictionary Definition](#)".

Index	0xF000: Module Device Profile				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	SubIndex 000	USINT	RO	NO	2
1	Index distance	UINT	RO	NO	0x40
2	Maximum number of modules	UINT	RO	NO	16

 **NOTE**

- Subindex 1: Index distance (indicating the maximum number of entries each module can occupy in the object dictionary, which is 16#40 here).
- Subindex 2: Maximum number of modules (indicating the maximum number of modules that can be connected, which is 16 here).

Index	0xF010: Module Profile List				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	SubIndex 000	USINT	RO	NO	-
1	Module 1 Profile	UDINT	RO	NO	0
2	Module 2 Profile	UDINT	RO	NO	0

Index	0xF010: Module Profile List				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
...



The expansion modules connected to the GL20-RTU-ECT32-INT communication interface module all adopt custom protocols, therefore all subindices of the object dictionary are set to 0.

Index	0xF030: Configured Module Ident List				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Configured Module Ident List	USINT	RW	NO	-
1	SubIndex 001	UDINT	RW	NO	-
2	SubIndex 002	UDINT	RW	NO	-
...
16/32	SubIndex 016/032	UDINT	RW	NO	-



The 0xF030 object dictionary is used by the master to send the device identification code for each module in the slot.

Index	0xF050: Detected Module Ident List				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Detected Module Ident List	USINT	RO	NO	-
1	SubIndex 001	UDINT	RO	NO	-
2	SubIndex 002	UDINT	RO	NO	-
...
16/32	SubIndex 016/032	UDINT	RO	NO	-



After the GL20-RTU-ECT32-INT module is powered on and completes self-check, it automatically identifies the device identification codes of the connected local modules and writes them into the object dictionary.

Index	0xF100: Device Status				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Device status	USINT	RO	NO	0
1	LBus Status	UINT	RO	YES	0
2	Cfg Fault ID	UINT	RO	YES	0

- Subindex 1: LBus expansion module status

Status Value	Definition
0x01	Local bus initialization
0x02	Local bus pre-operational status
0x04	Local bus safe-operational status
0x41	DNM/2SCOM-MD waiting for configuration parameter distribution
0x08	Local bus operational status
0x10	Switchover from safe-operational to operational status
0x20	Switchover from operational status to safe-operational status
0x80	Local bus fault

- Subindex 2: Cfg fault ID

ID	Definition
0x0000	Consistent configuration
0x1000	No expansion module scanned.
0x1001	Number of configured modules greater than that of scanned modules
0x1002	Number of configured modules less than that of scanned modules
0x1003	Type of configured modules inconsistent with that of scanned modules

Index	0xF110: Device Diagnosis				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Device Diagnosis	USINT	RO	NO	2
1	ErrorSolt1	UDINT	RO	NO	-
2	ErrorSolt2	UDINT	RO	NO	-

 **NOTE**

- Each bit of the subindex represents the status of an expansion module, where 0 indicates the module is not faulty and 1 indicates faulty.
- Subindex 1: ErrorSlot1 (for faulty modules with a position of 0 to 31)
- Subindex 2: ErrorSlot2 (for faulty modules with a position of 32 to 63) Subindex 2 is reserved.

Index	0xF800: Device Configuration data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Device Configuration data	USINT	RO	NO	2
1	Unused	USINT	RW	NO	0
2	Slave and module error run state	USINT	RW	NO	0
3	EtherCAT Communication error mode	USINT	RW	NO	1
4	ESC error counter behavior	USINT	RW	NO	0

- Subindex 2: Slave and module error run state (operational status of the ECT communication interface module and expansion module upon a fault)

Bit	Description
Bit 0 to 7	Operational mode of the expansion module upon a fault 0: Self-processing (maintain the current status) 1: Stop output

- Subindex 3: ECT communication error mode (the handling method of the state machine after Port 0 of the GL20-RTU-ECT32-INT module is disconnected)

Bit	Description
Bit 0 to 7	Handling method of the state machine when Port 0 of the GL20-RTU-ECT32-INT module is disconnected. 0: Automatic switchover based on state type. If the current state is OP, switch to the Pre-OP state. 1: If the current state is OP, maintain it.

- Subindex 4: ESC error counter behavior (the handling method when the ET1100 detects an internal error)

Bit	Description
Bit 0 to 7	Handling method when the internal error counter of the ESC module counts a fault 0: No alarm 1: Alarm

Index	0xFB00: Controlword				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Controlword	UINT	RW	YES	0

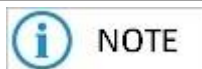
Bit	Description
Bit 0	Control bit of the expansion module's state machine 0: Automatic control based on EtherCAT state machine 1: Force stop the operation of the expansion module
Bit 1 to 3	Reserved
Bit 4 to 7	Expansion module control command 1: Module configuration command 2: Module stop command

Bit	Description
	4: Module operation command
Bit 8 to 15	Module slot, max. 32

12.3.4 Expansion Module Object Dictionary

Each expansion module connected to the ECT communication interface module connector is standardized as a "Module" type. The configuration parameters, process data, and diagnostic parameters of each module are instantiated into an object dictionary for management. The indexing of the module's object dictionary is dynamically allocated based on the module's position. The dynamic allocation range of the object dictionary is shown in the following table.

Parameter Type	Module 0	Module 1	Module n (Note)
RxPDO mapping	1600h to 1607h	1608h to 160Fh	1600h + n * 08h to 1608h + n * 08h
TxPDO mapping	1A00h to 1A07h	1A08h to 1A0Fh	1A00h + n * 08h to 1A08h + n * 08h
Input process data	6000h to 603Fh	6040h to 607Fh	6000h + n * 40h to 603Fh + n * 40h
Output process data	7000h to 703Fh	7040h to 707Fh	7000h + n * 40h to 703Fh + n * 40h
Configuration data	8000h to 803Fh	8040h to 807Fh	8000h + n * 40h to 803Fh + n * 40h
Diagnostic data	A000h to A03Fh	A040h to A07Fh	A000h + n * 40h to A03Fh + n * 40h



"n" ranges from 0 to 15/31, indicating the slot position of the module.

Inovance supports the allocation of a unique object dictionary base value to each GL20 series module connected to an EtherCAT branch. This base value is used to dynamically allocate the object dictionary for PDO data, configuration data, and diagnostic data based on the module's slot position.

- The rule for dynamic allocation are calculated is as follows:

Object dictionary index = object dictionary base value + module position (n * 0x40)

- The index calculation method for RxPDO and TxPDO mapping is as follows:

Object dictionary index = object dictionary base value + module position (n * 0x08)

The module position "n" starts from 0, indicating the slot number where the module is located.

The object dictionary basic values for the GL20 series modules are shown in the following table.

Module Type	Object Dictionary Base Value					
	RxPDO Mapping	TxPDO Mapping	Process Data		Configurati on Data	Diagnostic Data
			TxPDO	RxPDO		
GL20-1600END	-	0x1A01	0x6000	-	-	-
GL20-0016xxx	0x1601	-	-	0x7000	0x8000	-
GL20-4AD	-	0x1A02	0x6000	-	0x8000	0xA000
GL20-4DA	0x1602	-	-	0x7000	0x8000	0xA000

Example:

The actual configuration is: GL20-RTU-ECT32-INT + GL20-1600END + GL20-4AD + GL20-1600END + GL20-4AD

Based on the mapping relationships and dynamic PDO allocation rules, the object dictionary for this configuration is:

Module	Object dictionary					
	RxPDO Mapping	TxPDO Mapping	Process Data			Diagnostic Data
			TxPDO	RxPDO	Configurati on data	
GL20-1600END (slot 0)	-	0x1A01	0x6000	-	0x8000	0xA000
GL20-4AD (slot 1)	-	0x1A0A	0x6040	-	0x8040 0x8041 0x8042	0xA040
GL20-1600END (slot 2)	-	0x1A11	0x6080	-	0x8080	0xA080
GL20-4AD (slot 3)	-	0x1A1A	0x60C0	-	0x80C0 0x80C1 0x80C2	0xA0C0

**NOTE**

PDO Mapping: bit operation $1A00 + n * 08h$, 8-bit operation $1A01 + n * 08h$, 16-bit operation $1A02 + n * 08h$.

12.3.5 Expansion Module Identification Code

The local bus protocol stack of the ECT communication interface module features automatic module scanning. This function allows the EtherCAT master to directly scan the types and positions of the GL20 series modules connected after the ECT communication interface module to identify the actual module type in each slot. This enables the configuration relationship of the modules to be established. The configuration and scanning of expansion modules are performed via the device identification capability of the GL20 series modules.

Each GL20 series expansion module is assigned a unique device identification code, which is a 32-bit data. During the power-on initialization of the ECT communication interface module, it queries the identification code of each expansion module in the subsequent slots and then writes them into subindices 1-16/32 of object dictionary 0xF050 in the order of slots 0-15/31. When the EtherCAT master initiates the scanning function, it reads the 0xF050 object dictionary to obtain the device identification code of the expansion modules connected after the ECT communication interface module. This identification code allows the system to determine the model and configuration of each expansion module in subsequent slots.

The EtherCAT master must send the module configuration obtained through manual configuration or automatic scanning to the ECT communication interface module while it is in the Pre-Operational state. This indicates that the master writes the identification code of each GL20 series modules in slots 0-15/31 sequentially into the subindexes 1-16/32 of object dictionary 0xF030. The ECT communication interface module checks whether the device identification codes at index 0xF030 and index 0xF050 are the same. If so, the system starts normally; if not, a fault is reported. The device identification codes for the expansion modules are shown in the table below.

Model	Type	Identification Code
GL20-0016ETN	Digital output	0x10F41020
GL20-0016ETP	Digital output	0x10F41024
GL20-1600END	Digital input	0x10F41010
GL20-4DA	Analog output	0x10F41040
GL20-4AD	Analog input	0x10F41030
GL20-0008ER	Digital output	0x10F41023
GL20-0800END	Digital input	0x10F41012
GL20-0008ETN	Digital output	0x10F41022
GL20-0008ETP	Digital output	0x10F41025
GL20-0808ETN	Digital input/output	0x10F41060
GL20-3232ETN(-M)	Digital input/output	0x10F41061

Model	Type	Identification Code
GL20-3200END(-M)	Digital input	0x10F41011
GL20-0032ETN(-M)	Digital output	0x10F41021
GL20-3200END	Digital input	0x10F41011
GL20-0032ETN	Digital output	0x10F41021
GL20-4PT	Temperature measurement	0x10F41050
GL20-4TC	Temperature measurement	0x10F41051
GL20-2CAN	Communication	0x10F41090
GL20-2S485	Communication	0x10F41091
GL20-PS2	Digital output	0x10F41080
GL20-8ADV	Analog input	0x10F41031
GL20-8ADI	Analog input	0x10F41032
GL20-0404ETP-5V	Digital input/output	0x10F41064
GL20-0004ER	Digital output	0x10F41027
GL20-0004ETP-2A	Digital output	0x10F41028
GL20-2SCOM	Communication	0x10F41094
GL20-2SSI	Communication	0x10F41093
GL20-1DNM	Communication	0x10F41095
GL20-2SCOM-MDB	Serial	0x10F41098
GL20-2S485-MDB	Serial	0x10F41099
GL20-2HC	Encoder	0x10F41082
GL20-8DAV	Analog output	0x10F41042
GL20-8DAI	Analog output	0x10F41042

12.3.6 ECT Communication Interface Module State Machine

The primary function of the ECT communication interface module is to connect the GL20 series modules, centralizing the data management. It converts the configuration data, process data, and diagnostic data of the GL20 series modules into object dictionaries in the EtherCAT network, facilitating data exchange through these object dictionaries. This enables the integration of local modules into the EtherCAT network. The ECT communication interface module controls the expansion modules connected after it via the local bus. The state machine of the ECT communication interface module is the same as the EtherCAT state machine, which includes four states: Init, Pre-Operational, Safe-Operational, and Operational.

Local module state:

Slave Status	Function
Init	Self-check and data initialization.
Pre-Operational	Device diagnosis and module parameter configuration
Safe-Operational	Device diagnosis Input detection is valid but the output detection is invalid.
Operational	Normal data input/output

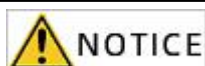
Slave state transition:

Status Transition No.	Function	Requirement
1	Initialize FPGA Identify module type	The device type is successfully identified.
2	Download the configuration Set the operating mode in case of configuration fault Set configuration parameters	<ol style="list-style-type: none"> 1. The state machine of the ECT communication interface module is in the Safe-Operational or Operational state. 2. The device is not faulty. 3. The device is faulty but is allowed to be in the Operational state. 4. The device is stopped in a non-forced way.
3	/	<ol style="list-style-type: none"> 1. The state machine of the ECT communication interface module transitions from the Safe-Operational or Operational state to other states. 2. The device is faulty and is not allowed to be in the Operational state. 3. The device is stopped in a forced way (FB00h:0 = 1).

The state of the ECT communication interface module can be switched via the related control word. The branch module state can be queried via the related state word. Detailed definitions are as follows:

Index	Subindex	Note
FB00h	0	Bit 0: Expansion module state machine control bit 0: Automatic control based on the EtherCAT state machine 1: Force stop the operation of the expansion module Bit 1 to Bit 3: Reserved Bit 4 to Bit 7: Expansion module control command 1: Module configuration command 2: Module stop command 4: Module run command Bit 8 to Bit 15: Expansion module slot The maximum module slot is 32.
F100h	1	Local bus status word (expansion module status) 0x01: Init 0x02: Pre-Operational 0x04: Safe-Operational 0x41: DNM/2SCOM-MD waiting for configuration parameter distribution 0x08: Operational 0x10: Safe-Operational to Operational 0x20: Operational to Safe-Operational 0x80: Local bus fault
	2	0x0000: Configuration matches the actual setup 0x1000: No expansion module detected 0x1001: Number of configured modules are more than that of detected modules 0x1002: Number of configured modules are less than that of detected modules 0x1003: Configured module types do not match detected module types

The control word 0xFB00 and the status word 0xF100 are mapped to the object dictionary at indices 0x17A0 and 0x1BA0, respectively.



During operation, input PDOs can be read when the local bus status word (expansion module status) is 0x04 (Safe-Operational). When this status word is 0x08 (Operational), input and output operations can be performed.

12.3.7 Configuration Data for ECT Communication Interface Module

The ECT communication interface module provides object dictionary 0xF800 for basic configuration of its working modes. Through this object dictionary, users can set: (1) the operation mode of the expansion modules when the ECT module and its expansion modules are faulty, (2) state machine handling when Port 0 of the ECT module is disconnected, and (3) the handling method when ET1100 detects an internal error. The detailed definitions are as follows:

Index	0xF800: Device Configuration data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Device configuration data	USINT	RO	NO	2
1	Unused	USINT	RW	NO	0
2	Slave and module error run state	USINT	RW	NO	0
3	EtherCAT communication error mode	USINT	RW	NO	1
4	ESC error counter behavior	USINT	RW	NO	0

- Subindex 2: Slave and module error run state (operation mode when the ECT module and its expansion modules are faulty)

Bit	Description
Bit 0 to 7	Operation mode of the expansion module upon a fault 0: Self-processing (Maintain the current status) 1: Stop output

- Subindex 3: ECT communication error mode (the handling method of the state machine after Port 0 of the ECT module is disconnected)

Bit	Description
Bit 0 to 7	Handling method of the state machine when Port 0 of the ECT module is disconnected 0: Automatic switchover based on state type. If the current state is OP, switch to the Pre-OP state. 1: If the current state is OP, maintain it.

- Subindex 4: ESC error counter behavior (the handling method when the ET1100 detects an internal error)

Bit	Description
Bit 0 to 7	Handling method when the internal error counter of the ESC module counts a fault 0: No alarm 1: Alarm

12.4 Appendix 4: Expansion Module Object Dictionary Definition

12.4.1 GL20-1600END

Introduction

GL20-1600END and GL20-1600END-5V are 16-channel DI modules, primarily used for digital input acquisition.

- Name: DI16 Module
- Module Category: Digital In
- Module identification code: 0x10F41010

Process data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A00+0x08*n$ is shown in the table below.

Index	0x1A00+0x08*n: 1600END input-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	16
1	Digital input bit0	UDINT	RO	NO	0x6xx0 0101
2	Digital input bit1	UDINT	RO	NO	0x6xx0 0201
3	...	UDINT	...	...	...
16	Digital input bit15	UDINT	RO	NO	0x6xx0 1001

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A01+0x08*n is shown in the table below.

Index	0x1A01+0x08*n: 1600END input-8-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	Digital input CH0-8bit	UDINT	RO	NO	0x6xx10108
2	Digital input CH1-8bit	UDINT	RO	NO	0x6xx10208

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A02+0x08*n is shown in the table below.

Index	0x1A02+0x08*n: 1600END input-16bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital input CH0-16bit	UDINT	RO	NO	0x6xx20110

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 1600END Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	3
1	1600END Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	1600END CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	1600END CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 1600END input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	1600END Digital Input CH0-8bit	USINT	RO	YES	0
2	1600END Digital Input CH1-8bit	USINT	RO	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 1600END module configure parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	1600END Digital Input Filter Time CH0	UINT	RW	NO	0x04
2		UINT	RW	NO	0x04

Index	0x8000+0x40*n: 1600END module configure parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	1600END Digital Input Filter Time CH1				

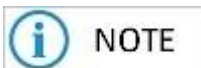
The subindex represents the filter time configuration for detected digital inputs. Each group supports independent filter time configuration. Default is 0x0004, corresponding to a filter time of 1ms. The specific configuration range is shown below.

Filter Time	Description	Filter Time	Description
0x0000	No filter	-	-
0x0001	The filter time is 0.25ms.	0x0010	The filter time is 4ms.
0x0002	The filter time is 0.5ms.	0x0020	The filter time is 8ms.
0x0004	The filter time is 1ms.	0x0040	The filter time is 16ms.
0x0008	The filter time is 2ms.	0x0080	The filter time is 32ms.

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 1600END Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	3
1	1600END Module Diagnosis Information	UINT	RO	YES	0
2	1600END CH0 Diagnosis Information	UINT	RO	YES	0
3	1600END CH1 Diagnosis Information	UINT	RO	YES	0

**NOTE**

There is currently no fault information for digital input modules.

12.4.2 GL20-0016XXX

Introduction

The GL20-0016XXX series modules are 16-channel DO modules, including GL20-0016ETN (0x1041020) and GL20-0016ETP (0x10F41024). They are primarily used for digital output control. GL20-0016ETN/0016ETP are uniformly described as 0016XXX in the table below.

- Name: DO16 Module
- Module category: Digital Out

Process data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1600+0x08*n$ is shown in the table below.

Index	0x1600+0x08*n: 0016xxx Output-bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	16
1	Digital output bit0	UDINT	RO	NO	0x7xx00101
2	Digital output bit1	UDINT	RO	NO	0x7xx00201
3	...	...	...	...	...
16	Digital output bit15	UDINT	RO	NO	0x7xx01001

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1601+0x08*n$ is shown in the table below.

Index	0x1601+0x08*n: 0016xxx Output-8bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	Digital output CH0-8bit	UDINT	RO	NO	0x7xx10108
2	Digital output CH1-8bit	UDINT	RO	NO	0x7xx10208

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1602+0x08*n$ is shown in the table below.

Index	0x1602+0x08*n: 0016xxx Output-16bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-16bit	UDINT	RO	NO	0x7xx20110

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A04+0x08*n$ is shown in the table below.

Index	0x1A04+0x08*n: 0016xxx Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	3
1	0016xxx Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	0016xxx CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	0016xxx CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310

Process data: For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x7000+0x40*n$ is shown in the table below.

Index	0x7000+0x40*n: 0016xxx output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	0016xxx Digital Output CH0-8-bit	USINT	RW	YES	0
2	0016xxx Digital Output CH1-8bit	USINT	RW	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 0016xxx module configure stop mode parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	DO module CH0 stop mode after EtherCAT lost link	USINT	RW	NO	0xFF
2	DO module CH1 stop mode after EtherCAT lost link	USINT	RW	NO	0xFF

Subindex 1: DO module CH0 stop mode after EtherCAT lost link (the usage of subindex 2 is the same as subindex 1)

Bit 0 to 7	Output mode upon stop, with each bit corresponding to an output 0: Maintain the current output status 1: Output the preset value defined in object dictionary 8001
------------	--

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 0016xxx module configure stop value parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	DO module CH0 stop value after EtherCAT lost link	USINT	RW	NO	0
2	DO module CH1 stop value after EtherCAT lost link	USINT	RW	NO	0

Subindex 1: DO module CH0 stop value after EtherCAT lost link (the usage of subindex 2 is the same as subindex 1)

Bit 0 to 7	Output preset value upon stop, with each bit corresponding to the preset value of an output 0: Output 0 1: Output 1
------------	---

Diagnostic Data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0xA000+0x40*n$ is shown in the table below.

Index	0xA000+0x40*n: 0016xxx Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	3
1	0016xxx Module Diagnosis Information	UINT	RO	YES	0
2	0016xxx CH0 Diagnosis Information	UINT	RO	YES	0
3	0016xxx CH1 Diagnosis Information	UINT	RO	YES	0

**NOTE**

Refer to the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.3 GL20-4AD

Introduction

GL20-4AD is a 4-channel analog input remote module. Powered by an external 24 VDC supply, the module supports voltage and current input modes, with a resolution of up to 16 bits, and selectable input range levels.

- Name: 4AD Module
- Module category: Analog In
- Module identification code: 0x10F41030

Process data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A02+0x08*n$ is shown in the table below.

Index	0x1A02+0x08*n: 4AD Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4AD CH0	UDINT	RO	NO	0x6xx00110
2	4AD CH1	UDINT	RO	NO	0x6xx00210
3	4AD CH2	UDINT	RO	NO	0x6xx00310
4	4AD CH3	UDINT	RO	NO	0x6xx00410

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 4AD Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1	4AD Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	4AD CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	4AD CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	4AD CH2 Diagnostic Information	UDINT	RO	NO	0xAxxx0410
5	4AD CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0510

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 4AD input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4

Index	0x6000+0x40*n: 4AD input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
1	4AD CH0	INT	RO	YES	0
2	4AD CH1	INT	RO	YES	0
3	4AD CH2	INT	RO	YES	0
4	4AD CH3	INT	RO	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 4AD module transform mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4AD module CH0 transform mode	USINT	RW	NO	0x80
2	4AD module CH1 transform mode	USINT	RW	NO	0x80
3	4AD module CH2 transform mode	USINT	RW	NO	0x80
4	4AD module CH3 transform mode	USINT	RW	NO	0x80

Subindex 1: 4AD module CH0 transform mode (the usage of subindices 2, 3, and 4 is the same as subindex 1)

Bit 0 to 3	CH0 conversion method: 0: -10 V to 10 V 1: 0 V to 10 V 2: -5 V to 5 V 3: 0 V to 5 V 4: 1 V to 5 V 5: -20 mA to 20 mA 6: 0 mA to 20 mA 7: 4 mA to 20 mA
Bit 4	Reserved (for other additional voltage and current conversion methods)

Bit 5 to 6	CHO range: 0: ± 20000 1: ± 32000 2: ± 27648 (default for PN platform) and ± 20000 (default for other platforms)
Bit 7	Ch0 channel enabling 0: Disable 1: Enable

PN adaptation version - digital to analog conversion table

	Rated Output Range	Corresponding Rated Digital Value	Output Limit Range	Corresponding Digital Limit Range
Analog voltage input	-10 V to +10 V	-20000 to +20000 -32000 to 32000 -27648 to 27648	-10.24 V to 10.24 V	-20400 to 20400 -32640 to 32640 -28200 to 28200
	0 V to 10 V	0 to 20000 0 to 32000 0 to 27648	-0.5 V to 10.24 V	-1000 to 20400 -1600 to 32640 -1382 to 28200
	-5 V to 5 V	-20000 to 20000 -32000 to 32000 -27648 to 27648	-5.12 V to 5.12 V	-20400 to 20400 -32640 to 32640 -28200 to 28200
	0 V to 5 V	0 to 20000 0 to 32000 0 to 27648	-0.25 V to 5.12 V	-1000 to 20400 -1600 to 32640 -1382 to 28200
	1 V to 5 V	0 to 20000 0 to 32000 0 to 27648	0.8 V to 5.12 V	-1000 to 20400 -1600 to 32640 -1382 to 28200
Analog current output	-20 mA to 20 mA	-20000 to 20000 -32000 to 32000 -27648 to 27648	-20.56 mA to 20.56 mA	-20400 to 20400 -32640 to 32640 -28200 to 28200

	Rated Output Range	Corresponding Rated Digital Value	Output Limit Range	Corresponding Digital Limit Range
	0 mA to 20 mA	0 to 20000 0 to 32000 0 to 27648	-1 mA to 20.56 mA	-1000 to 20400 -1600 to 32640 -1382 to 28200
	4 mA to 20 mA	0 to 20000 0 to 32000 0 to 27648	3.2 mA to 20.56 mA	-1000 to 20400 -1600 to 32640 -1382 to 28200

For rated output ranges 0 V to 10 V, 0 V to 5 V, 1 V to 5 V, 0 mA to 20 mA, and 4 mA to 20 mA, when the digital values are 0 to 20000, the code value corresponding to the lower limit is -200. Only values less than -200 are determined as below the lower limit, and values greater than 20000 are determined as above the upper limit. In other modes, values exceeding the rated range are directly determined as beyond upper or lower limits, namely overflow or underflow.

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 4AD Module Filter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4AD Module CH0 Filter	USINT	RW	NO	0x08
2	4AD Module CH1 Filter	USINT	RW	NO	0x08
3	4AD Module CH2 Filter	USINT	RW	NO	0x08
4	4AD Module CH3 Filter	USINT	RW	NO	0x08

Subindex 1: 4AD module CH0 Filter (The usage of subindices 2, 3, and 4 is the same as subindex 1)

Bit	Description
Bit 0 to 7	CH0 channel filter parameter

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 4AD Module Detect				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4AD Module CH0 Detect	USINT	RW	NO	0
2	4AD Module CH1 Detect	USINT	RW	NO	0
3	4AD Module CH2 Detect	USINT	RW	NO	0
4	4AD Module CH3 Detection	USINT	RW	NO	0

Subindex 1: Analog Input CH0-Detect (the usage of subindices 2, 3, and 4 is the same as subindex 1)

Bit	Description
Bit 0	CH0 peak hold function 0: Disable; 1: Enable
Bit 1	CH0 wire break detection function 0: Disable; 1: Enable
Bit 2	CH0 overlimit flag 0: Disable; 1: Enable
Bit 3	CH0 overflow flag 0: Disable; 1: Enable
Bit 4 to 7	Reserved

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 4AD Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1	4AD Module Diagnosis Information	UINT	RO	YES	0

Index	0xA000+0x40*n: 4AD Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	4AD CH0 Diagnosis Information	UINT	RO	YES	0
3	4AD CH1 Diagnosis Information	UINT	RO	YES	0
4	4AD CH2 Diagnosis Information	UINT	RO	YES	0
5	4AD CH3 Diagnosis Information	UINT	RO	YES	0



Refer to the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.4 GL20-4DA

Introduction

The GL20-4DA module is a 4-channel analog output remote module. Powered by an external 24 VDC supply, the module supports voltage and current output modes, with a resolution up to 16 bits, and selectable output range levels.

- Name: 4DA Module
- Module category: Analog Out
- Module identification code: 0x10F41040

Process data

Mapping data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1602+0x08*n is shown in the table below.

Index	0x1602+0x08*n: 4DA Output Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4DA CH0	UDINT	RO	NO	0x7xx00110

Index	0x1602+0x08*n: 4DA Output Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	4DA CH1	UDINT	RO	NO	0x7xx00210
3	4DA CH2	UDINT	RO	NO	0x7xx00310
4	4DA CH3	UDINT	RO	NO	0x7xx00410

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 4DA Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1	4DA Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	4DA CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	4DA CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	4DA CH2 Diagnosis Information	UDINT	RO	NO	0xAxxx0410
5	4DA CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0510

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 4DA Output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4DA CH0	INT	RO	YES	0
2	4DA CH1	INT	RO	YES	0
3	4DA CH2	INT	RO	YES	0
4	4DA CH3	INT	RO	YES	0

Configuration data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8000+0x40*n$ is shown in the table below.

Index	0x8000+0x40*n: 4DA module transform mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4DA module CH0 transform mode	USINT	RW	NO	0x80
2	4DA module CH0 transform mode	USINT	RW	NO	0x80
3	4DA module CH0 transform mode	USINT	RW	NO	0x80
4	4DA module CH0 transform mode	USINT	RW	NO	0x80

Subindex 1: 4DA module CH0 transform mode (subindices 2, 3, and 4 are used in the same way as subindex 1)

Bit	Description
Bit 0 to 3	CH0 conversion method 0: -10 V to 10 V 1: 0 V to 10 V 2: -5 V to 5 V 3: 0 V to 5 V 4: 1 V to 5 V 5: 0 mA to 20 mA 6: 4 mA to 20 mA
Bit 4	Reserved (For other additional voltage and current conversion methods)
Bit 5 to 6	0: ± 20000 1: ± 32000 2: ± 27648 (default for PN platform) and ± 20000 (default for other platforms)
Bit 7	CH0 channel enabling 0: Disable 1: Enable

Different measurement ranges correspond to different digital ranges. See the following table for the analog-to-digital mapping:

	Rated Output Range	Corresponding Rated Digital Value	Output Limit Range	Corresponding Digital Limit Range
Analog voltage input	-10 to +10 V	20000 to +20000 -27648 to 27648 -32000 to 32000	-11 V to 11 V	-22000 to 22000 -32767 to 32767 -29030 to 29030
	0 V to 10 V	0 to 20000 0 to 32000 0 to 27648	-0.5 V to 10.5 V	-1000 to 21000 -1600 to 32767 -1382 to 29030
	-5 V to 5 V	-20000 to 20000 0 to 32000 -27648 to 27648	-5.5 V to 5.5 V	-22000 to 22000 -32767 to 32767 -29030 to 29030
	0 V to 5 V	0 to 20000 0 to 32000 0 to 27648	-0.25 V to 5.25 V	-1000 to 21000 -1600 to 32767 -1382 to 29030
	1 V to 5 V	0 to 20000 0 to 32000 0 to 27648	0.8 V to 5.2 V	-1000 to 21000 -1600 to 32767 -1382 to 29030
Analog current output	0 mA to 20 mA	0 to 20000 0 to 32000 0 to 27648	0 mA to 21 mA	0 to 21000 0 to 32767 0 to 29030
	4 mA to 20 mA	0 to 20000 0 to 32000 0 to 27648	3.2 mA to 20.8 mA	-1000 to 21000 -1600 to 32767 -1382 to 29030

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: 4DA module stop mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4DA module CH0 stop mode	USINT	RW	NO	0
2	4DA module CH1 stop mode	USINT	RW	NO	0

Index	0x8001+0x40*n: 4DA module stop mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
3	4DA module CH2 stop mode	USINT	RW	NO	0
4	4DA module CH3 stop mode	USINT	RW	NO	0

Subindex 1: 4DA module CH0 stop mode (subindices 2, 3, 4 are used in the same way as subindex 1)

Bit 0 to 7	<p>Input status of CH0 in stop mode</p> <p>0: Output reset</p> <p>1: Output maintained</p> <p>2: Outputs the preset value of subindex 4</p>
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For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 4DA module stop value				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4DA module CH0 stop value	UINT	RW	NO	0
2	4DA module CH1 stop value	UINT	RW	NO	0
3	4DA module CH2 stop value	UINT	RW	NO	0
4	4DA module CH3 stop value	UINT	RW	NO	0

Subindex 1: 4DA module CH0 stop value (subindices 2, 3, 4 are used in the same way as subindex 1)

Bit	Description
Bit 0 to 15	Output value after CH0 stops in stop mode

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 4DA Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of Diagnosis 4DA	USINT	RO	NO	5
1	4DA Module Diagnosis information	UINT	RO	NO	0
2	4DA CH0 Diagnosis information	UINT	RO	NO	0
3	4DA CH1 Diagnosis information	UINT	RO	NO	0
4	4DA CH2 Diagnosis information	UINT	RO	NO	0
5	4DA CH3 Diagnosis information	UINT	RO	NO	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.5 GL20-0008XXX

Introduction

The GL20-0008xxx series modules are 8-channel DO modules, including GL20-0008ETN (0x1041022), GL20-0008ETP (0x10F41025), and GL20-0008ER (0x1041023). They are primarily used for digital output control. GL20-0008ETN/0008ETP/0008ER are referred to as 0008xxx in the table below.

- Name: DO08 Module
- Module category: Digital Out



GL20-0008ER is an 8-channel relay DO module and the others are transistor DO modules.

Process data

Mapping data: For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1600+0x08*n$ is shown in the table below.

Index	0x1600+0x08*n: 0008xxx Output-bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	Digital output bit0	UDINT	RO	NO	0x7xx00101
2	Digital output bit1	UDINT	RO	NO	0x7xx00201
3	...	...	...	...	...
8	Digital output bit7	UDINT	RO	NO	0x7xx00801

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1601+0x08*n$ is shown in the table below.

Index	0x1601+0x08*n: 0008xxx Output-8bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-8bit	UDINT	RO	NO	0x7xx10108

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1602+0x08*n$ is shown in the table below.

Index	0x1602+0x08*n: 0008xxx Output-16bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-16bit	UDINT	RO	NO	0x7xx20110

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A04+0x08*n$ is shown in the table below.

Index	0x1A04+0x08*n: 0008xxx Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1		UDINT	RO	NO	0xAxxx0110

Index	0x1A04+0x08*n: 0008xxx Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	0008xxx Module Diagnosis Information				
2	0008xxx CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 0008xxx Output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	0008xxx Digital Output CH0-8-bit	USINT	RW	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 0008xxx module configure stop mode parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	DO module CH0 stop mode after EtherCAT lost link	USINT	RW	NO	0xFF

Subindex 1: DO module CH0 stop mode after EtherCAT lost link

Bit 0 to 7	<p>Output mode upon stop, with each bit corresponding to an output</p> <p>0: Maintain the current output status</p> <p>1: Output the preset value defined in object dictionary 8001</p>
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For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 0008xxx module configure stop value parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	DO module CH0 stop value after EtherCAT lost link	USINT	RW	NO	0

Subindex 1: DO module CH0 stop value after EtherCAT lost link

Bit 0 to 7	Output preset value upon stop, with each bit corresponding to the preset value of an output 0: Output 0 1: Output 1
------------	---

Diagnostic Data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 0008xxx Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	0008xxx Module Diagnostics Information	UINT	RO	YES	0
2	0008xxx CH0 Diagnostic Information	UINT	RO	YES	0



Refer to the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.6 GL20-0808ETN

Introduction

The GL20-0808ETN module supports eight digital inputs and eight digital outputs.

- Name: DO08 Module
- Module category: Digital Input and Output

- Module identification code: 0x10F41060

Process data

Mapping data: For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A00+0x08*n$ is shown in the table below.

Index	0x1A00+0x08*n: 0808ETN input-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	Digital output bit0	UDINT	RO	NO	0x6xx00101
2	Digital output bit1	UDINT	RO	NO	0x6xx00201
3	...	...	...	...	...
8	Digital output bit7	UDINT	RO	NO	0x6xx00801

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A01+0x08*n$ is shown in the table below.

Index	0x1A01+0x08*n: 0808ETN input-8-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-8bit	UDINT	RO	NO	0x6xx10108

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A02+0x08*n$ is shown in the table below.

Index	0x1A02+0x08*n: 0808ETN input-16bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-16bit	UDINT	RO	NO	0x6xx20110

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1600+0x08*n$ is shown in the table below.

Index	0x1600+0x08*n: 0808ETN output-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8

Index	0x1600+0x08*n: 0808ETN output-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
1	Digital input bit0	UDINT	RO	NO	0x7xx00101
2	Digital input bit1	UDINT	RO	NO	0x7xx00201
3	...	...	...	...	...
8	Digital input bit7	UDINT	RO	NO	0x7xx00801

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1601+0x08*n is shown in the table below.

Index	0x1601+0x08*n: 0808ETN output-8bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital input CH0-8bit	UDINT	RO	NO	0x7xx10108

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1602+0x08*n is shown in the table below.

Index	0x1602+0x08*n: 0808ETN output-16bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital input CH0-16bit	UDINT	RO	NO	0x7xx20110

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 0808ETN Module Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	3
1	0808ETN Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	0808ETN DI-CH0 Diagnostic Information	UDINT	RO	NO	0xAxxx0210

Index	0x1A04+0x08*n: 0808ETN Module Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
3	0808ETN DO-CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0310

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 0808ETN input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	0808ETN Digital Input CH0-8bit	USINT	RO	YES	0

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 0808ETN output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	0808ETN Digital Output CH0-8bit	USINT	RW	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 0808ETN DI-CH0 Filter Time Parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital input filter time 8bit	UINT	RO	NO	0x04

The subindex represents the filter time configuration for detected digital inputs. Each group supports independent filter time configuration. Default is 0x0004, corresponding to a filter time of 1ms. The specific configuration range is shown below:

Filter Time	Description	Filter Time	Description
0x0000	No filter	-	-
0x0001	The filter time is 0.25ms.	0x0010	The filter time is 4ms.
0x0002	The filter time is 0.5ms.	0x0020	The filter time is 8ms.
0x0004	The filter time is 1ms.	0x0040	The filter time is 16ms.
0x0008	The filter time is 2ms.	0x0080	The filter time is 32ms.

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 0808ETN module configure stop mode parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	DO module CH0-8bit stop mode after EtherCAT lost link	USINT	RW	NO	0xFF

Subindex 1: DO module CH0-8bit stop mode after EtherCAT lost link

Bit 0 to 7	Output mode upon stop, with each bit corresponding to an output 0: Maintain the current output status 1: Output the preset value defined in object dictionary 8002
------------	--

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 0808ETN module configure stop value parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	DO module 8bit stop value after EtherCAT lost link	USINT	RW	NO	0

Subindex 1: DO module 8bit stop value after EtherCAT lost link

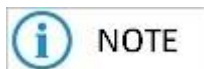
Bit 0 to 7	Output preset value upon stop, with each bit corresponding to the preset value of an output 0: Output 0
------------	--

	1: Output 1
--	-------------

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 0808ETN Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	3
1	0808ETN Module Diagnosis Information	UINT	RO	NO	0
2	0808ETN DI-CH0 Diagnosis Information	UINT	RO	NO	0
3	0808ETN DO-CH0 Diagnosis Information	UINT	RO	NO	0



Refer to the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.7 GL20-4PT

Introduction

The GL10-4PT module is used for thermal resistor temperature collection. It is equipped with four independent channels for simultaneous temperature collection. The configuration of each channel is independent from each other.

- Name: 4PT Module
- Module category: Temperature Measure
- Module identification code: 0x10F41050

Process data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A03+0x08*n is shown in the table below.

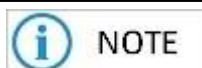
Index	0x1A03+0x08*n: 4PT Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	PT CH0	UDINT	RO	NO	0x6xx00120
2	PT CH1	UDINT	RO	NO	0x6xx00220
3	PT CH2	UDINT	RO	NO	0x6xx00320
4	PT CH3	UDINT	RO	NO	0x6xx00420

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 4PT Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	6
1	4PT Diagnosis Information Mapping	UDINT	RO	NO	0xAxxx0110
2	Module Error Code	UDINT	RO	NO	0xAxxx0210
3	Channel Error Code CH0	UDINT	RO	NO	0xAxxx0310
4	Channel Error Code CH1	UDINT	RO	NO	0xAxxx0410
5	Channel Error Code CH2	UDINT	RO	NO	0xAxxx0510
6	Channel Error Code CH3	UDINT	RO	NO	0xAxxx0610

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 4PT Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4PT CH0	REAL (32-bit, displaying with a 0.1°C unit or in the corresponding Fahrenheit unit)	RO	YES	0x00000000
2	4PT CH1	REAL	RO	YES	0x00000000
3	4PT CH2	REAL	RO	YES	0x00000000
4	4PT CH3	REAL	RO	YES	0x00000000



Each subindex represents the detected PT thermal resistance temperature of a channel.

Configuration data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8000+0x40*n$ is shown in the table below.

Index	0x8000+0x40*n: 4PT Sampling Time				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4PT Sampling Time	USINT	RW	NO	0x0003
2	Reserve0	USINT	RW	NO	0x0000
3	Reserve1	USINT	RW	NO	0x0000
4	Reserve2	USINT	RW	NO	0x0000

Where:

Sampling Time	Options include: 2 (250ms), 3 (500ms), and 4 (1000ms).
---------------	---

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: 4PT Temperature Unit				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RW	NO	4
1	4PT Temperature Unit	USINT	RW	NO	0x0000
2	Reserve0	USINT	RW	NO	0x0000
3	Reserve1	USINT	RW	NO	0x0000
4	Reserve2	USINT	RW	NO	0x0000

Where:

Temperature Unit	Options include: 0: Celsius (default) 1: Fahrenheit
------------------	---

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 4PT module transform mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4PT module CH0 transform mode	USINT	RW	NO	0xC1
2	4PT module CH0 transform mode	USINT	RW	NO	0xC1
3	4PT module CH0 transform mode	USINT	RW	NO	0xC1
4	4PT module CH0 transform mode	USINT	RW	NO	0xC1

Each subindex represents whether to enable temperature detection and the thermal resistance sensor model for each channel. Default is 0xC1, which corresponds to enabling Pt100 mode. In this mode, a fault is reported and triggers shutdown. The setting rule is as follows:

Bit	Note
Bit 0 to 5	thermal resistance sensor model 0: Reserved 1: Pt100

Bit	Note
	2: Pt500 3: Pt1000 4: Reserved 5: Reserved 6: Cu100 7: KTY84 8: NTC5K 9: NTC10K
Bit 6	Reserved
Bit 7	Determines whether to enable temperature detection channel 0: Disable 1: Enable

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8003+0x40*n is shown in the table below.

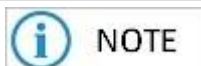
Index	0x8003+0x40*n: 4PT Module Transform Filter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4PT Module CH0 Filter	USINT	RW	NO	0x05
2	4PT Module CH1 Filter	USINT	RW	NO	0x05
3	4PT Module CH2 Filter	USINT	RW	NO	0x05
4	4PT Module CH3 Filter	USINT	RW	NO	0x05



The subindex represents the input filter parameter of the temperature detection channel. The range is 0 to 100 (unit: s) and the default is 0x05.

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8004+0x40*n is shown in the table below.

Index	0x8004+0x40*n: 4PT Sensor Input Bias				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4PT Sensor Input CH0 Bias	INT	RW	NO	0x00000000
2	4PT Sensor Input CH1 Bias	INT	RW	NO	0x00000000
3	4PT Sensor Input CH2 Bias	INT	RW	NO	0x00000000
4	4PT Sensor Input CH3 Bias	INT	RW	NO	0x00000000



The subindex represents the temperature offset parameter for the temperature detection channel, with a range of -204.8 to 204.7 and a default of 0. The unit is 0.1°C (or the corresponding Fahrenheit unit).

For example, set the temperature offset parameter to -204.8°, so the offset value is -2048.

Access - 0

Enable access Default

Sensor Type: Filter Time:

Overflow Detect

Lower Value(°C): (-200-850) Upper Value(°C): (-200-850)

Enable Offset

Offset Value(°C): (-204.8-204.7)

Sensor Offline Detect Up and Down Overflow detection

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8005+0x40*n is shown in the table below.

Index	0x8005+0x40*n: 4PT Sensor Input UpLimit				
Subindex	Name	Data Type	Access type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4PT Sensor Input CH0 UpLimit	INT	RW	NO	0x00002134
2	4PT Sensor Input CH1 UpLimit	INT	RW	NO	0x00002134

Index	0x8005+0x40*n: 4PT Sensor Input UpLimit				
Subindex	Name	Data Type	Access type	Mapping	Default Value
3	4PT Sensor Input CH2 UpLimit	INT	RW	NO	0x00002134
4	4PT Sensor Input CH3 UpLimit	INT	RW	NO	0x00002134

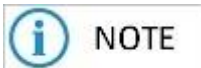
The subindex represents the upper limit parameter of the temperature detection channel with a unit of 0.1 °C/°F. The range is same as the setting temperature range of the current mode. The default value is the maximum of the setting temperature range of the current mode.

For sensor models Pt100, Pt500, and Pt1000, the lower limit is -200°, corresponding to the setting value of -2000, and the upper limit is 850°, corresponding to the setting value of 8500. For sensor model Cu100, the lower limit is -50°, corresponding to the setting value of -500, and the upper limit is 150°, corresponding to the setting value of 1500. For the temperature setting values, the unit is 0.1°. For sensor models KTY, NTC5K, and NTC10K, the upper and lower limits are configured as shown below.

Sensor Model	Upper Limit	Upper Limit Setting Value	Lower Limit	Lower Limit Setting Value
KTY84	200°	2000	0	0
NTC5K	200°	2000	-30	-300
NTC10K	200	2000	-25	-250

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8006+0x40*n is shown in the table below.

Index	0x8006+0x40*n: 4PT Sensor Input DownLimit				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4PT Sensor Input CH0 DownLimit	INT	RW	NO	0xF830
2	4PT Sensor Input CH1 DownLimit	INT	RW	NO	0xF830
3	4PT Sensor Input CH2 DownLimit	INT	RW	NO	0xF830
4	4PT Sensor Input CH3 DownLimit	INT	RW	NO	0xF830



The subindex represents the lower limit parameter of the temperature detection channel with a unit of 0.1 °C/°F. The range is same as the setting temperature range of the current mode. The default value is the minimum value of the setting temperature range of the current mode.

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8007+0x40*n is shown in the table below.

Index	0X8007+0x40*n: 4PT Sensor Input Detect				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4PT Sensor Input CH0 Detect	USINT	RW	NO	0x0000
2	4PT Sensor Input CH1 Detect	USINT	RW	NO	0x0000
3	4PT Sensor Input CH2 Detect	USINT	RW	NO	0x0000
4	4PT Sensor Input CH3 Detect	USINT	RW	NO	0x0000

The subindex represents the input functions and diagnostic option parameters for the temperature detection channel. Default is 0x0000, indicating temperature offset, wire break detection, and over-limit detection are disabled. The setting rule is as follows:

Bit	Note
Bit 0	Temperature offset function: 0: Disable; 1: Enable
Bit 1	Wire break detection function: 0: Disable; 1: Enable
Bit 2	Over-limit detection function: 0: Disable; 1: Enable
Bit 3	Overflow detection function: 0: Disable; 1: Enable
Bit 4 to 7	Reserved

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 4PT Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1	Module Error Code	UINT	RO	YES	0x0000
2	Channel Error Code CH0	UINT	RO	YES	0x0000
3	Channel Error Code CH1	UINT	RO	YES	0x0000
4	Channel Error Code CH2	UINT	RO	YES	0x0000
5	Channel Error Code CH3	UINT	RO	YES	0x0000

**NOTE**

The PT thermal resistor input supports module fault detection and channel fault detection.

The module exception diagnostic code is defined as follows:

Diagnostic Code	Fault Description	Solution
0x5003	Module 24 V power supply failure	Check the external power supply wiring and the power supply voltage.

The channel exception diagnostic codes are defined as follows:

Diagnostic Code	Fault Description	Solution
0x6001	Channel open-circuited	Check the wiring of the sensor.
0x6003	Channel data exceeds upper limit	Check whether the sensors, wiring, or configured limit ranges are appropriate.
0x6004	Channel data exceeds lower limit	Check whether the sensors, wiring, or configured limit ranges are appropriate.
0x6005	Overflow	Check whether the selected sensor range is exceeded.
0x6006	Underflow	Check whether the selected sensor range is undershot.

**NOTE**

See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.8 GL20-4TC

Introduction

The GL20-4TC module is used for thermocouple temperature collection. It is equipped with four independent channels for simultaneous temperature collection. The configuration of each channel is independent from each other.

- Name: 4TC Module
- Module category: Temperature Measure
- Module identification code: 0x10F41051

Process data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A03+0x08*n$ is shown in the table below.

Index	0x1A03+0x08*n: 4TC Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	TC CH0	UDINT	RO	NO	0x6xx00120
2	TC CH1	UDINT	RO	NO	0x6xx00220
3	TC CH2	UDINT	RO	NO	0x6xx00320
4	TC CH3	UDINT	RO	NO	0x6xx00420

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A04+0x08*n$ is shown in the table below.

Index	0x1A04+0x08*n: 4TC Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1	Module Error Code	UDINT	RO	NO	0xAxxx0110
2	Channel Error Code CH0	UDINT	RO	NO	0xAxxx0210

Index	0x1A04+0x08*n: 4TC Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
3	Channel Error Code CH1	UDINT	RO	NO	0xAxxx0310
4	Channel Error Code CH2	UDINT	RO	NO	0xAxxx0410
5	Channel Error Code CH3	UDINT	RO	NO	0xAxxx0510

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 4TC Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4TC CH0	REAL	RO	YES	0x00000000
2	4TC CH1	REAL	RO	YES	0x00000000
3	4TC CH2	REAL	RO	YES	0x00000000
4	4TC CH3	REAL	RO	YES	0x00000000



Each subindex represents the detected TC thermocouple temperature of a channel.

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 4TC Sampling Time				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4TC Sampling Time	USINT	RW	NO	0x0003
2	Reserve0	USINT	RW	NO	0x0000
3	Reserve1	USINT	RW	NO	0x0000

Index	0x8000+0x40*n: 4TC Sampling Time				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
4	Reserve2	USINT	RW	NO	0x0000

Where:

Sampling Time	Options include: 2 (250ms), 3 (500ms), and 4 (1000ms). Options 0 (50ms) and 1 (125ms) are not included.
---------------	--

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 4TC Temperature Unit				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RW	NO	0x0000
1	4TC Temperature Unit	USINT	RW	NO	0x0000
2	Reserve0	USINT	RW	NO	0x0000
3	Reserve1	USINT	RW	NO	0x0000
4	Reserve2	USINT	RW	NO	0x0000

Where:

Temperature Unit	Options include: 0: Celsius (default) 1: Fahrenheit
------------------	---

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 4TC module transform mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4TC module CH0 transform mode	USINT	RW	NO	0xC0
2	4TC module CH1 transform mode	USINT	RW	NO	0xC0

Index	0x8002+0x40*n: 4TC module transform mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
3	4TC module CH2 transform mode	USINT	RW	NO	0xC0
4	4TC module CH3 transform mode	USINT	RW	NO	0xC0

Each subindex represents whether to enable the temperature detection channel and the thermocouple sensor model. Default is 0xC0, which corresponds to enabling K-type thermocouple. In this mode, a fault is reported and triggers shutdown. The setting rule is as follows:

Bit	Description
Bit 0 to 5	Thermocouple sensor models include: 0: K 1: J 2: E 3: B 4: N 5: R 6: S 7: T
Bit 6	Reserved
Bit 7	Determines whether to enable temperature detection channel 0: Disable 1: Enable

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8003+0x40*n is shown in the table below.

Index	0x8003+0x40*n: 4TC Module Transform Filter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4TC Module CH0 Filter	USINT	RW	NO	0x05
2	4TC Module CH1 Filter	USINT	RW	NO	0x05

Index	0x8003+0x40*n: 4TC Module Transform Filter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
3	4TC Module CH2 Filter	USINT	RW	NO	0x05
4	4TC Module CH3 Filter	USINT	RW	NO	0x05

**NOTE**

The subindex represents the input filter parameter of the temperature detection channel. The range is 0 to 100 (unit: s) and the default is 0x05.

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8004+0x40*n$ is shown in the table below.

Index	0x8004+0x40*n: 4TC Sensor Input Bias				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4TC Module CH0 Bias	INT	RW	NO	0x00000000
2	4TC Module CH1 Bias	INT	RW	NO	0x00000000
3	4TC Module CH2 Bias	INT	RW	NO	0x00000000
4	4TC module CH3 Bias	INT	RW	NO	0x00000000

**NOTE**

The subindex represents the temperature offset parameter for the temperature detection channel, with a range of -204.8 to 204.7 and a default of 0. The unit is 0.1°C/°F.

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8005+0x40*n$ is shown in the table below.

Index	0x8005+0x40*n: 4TC Sensor Input UpLimit				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1		INT	RW	NO	0x3584

Index	0x8005+0x40*n: 4TC Sensor Input UpLimit				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	4TC Sensor input CH0 UpLimit				
2	4TC Sensor input CH1 UpLimit	INT	RW	NO	0x3584
3	4TC Sensor input CH2 UpLimit	INT	RW	NO	0x3584
4	4TC Sensor input CH3 UpLimit	INT	RW	NO	0x3584

 **NOTE**

The subindex represents the upper limit parameter of the temperature detection channel with a unit of 0.1 °C/°F. The range is same as the setting temperature range of the current mode. The default value is the maximum of the setting temperature range of the current mode.

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8006+0x40*n is shown in the table below.

Index	0x8006+0x40*n: 4TC Sensor Input DownLimit				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4TC Sensor input CH0 DownLimit	INT	RW	NO	0xF574
2	4TC Sensor input CH1 DownLimit	INT	RW	NO	0xF574
3	4TC Sensor input CH2 DownLimit	INT	RW	NO	0xF574
4	4TC Sensor input CH3 DownLimit	INT	RW	NO	0xF574

 **NOTE**

The subindex represents the lower limit parameter of the temperature detection channel with a unit of 0.1°C/°F. The range is same as the setting temperature range of the current mode. The default value is the minimum value of the setting temperature range of the current mode.

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8007+0x40*n is shown in the table below.

Index	0x8007+0x40*n: 4TC Sensor Input Detect				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	4TC Sensor Input CH0 Detect	USINT	RW	NO	0x0000
2	4TC Sensor Input CH1 Detect	USINT	RW	NO	0x0000
3	4TC Sensor Input CH2 Detect	USINT	RW	NO	0x0000
4	4TC Sensor Input CH3 Detect	USINT	RW	NO	0x0000

The subindex represents the input functions and diagnostic option parameters for the temperature detection channel. Default is 0x0000, indicating temperature offset, wire break detection, and over-limit detection are disabled. The setting rule is as follows:

Bit	Description
Bit 0	Temperature offset function: 0: Disable; 1: Enable
Bit 1	Wire break detection function: 0: Disable; 1: Enable
Bit 2	Over-limit detection function: 0: Disable; 1: Enable
Bit 3	Overflow detection function: 0: Disable; 1: Enable
Bit 4 to 6	Reserved
Bit 7	Default is 0. Value 1 is for test tooling only, used to block the cold junction temperature. In normal conditions, there is no need to configure this bit.

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 4TC Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5

Index	0xA000+0x40*n: 4TC Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
1	Module Error Code	UINT	RO	YES	0x0000
2	Channel Error Code CH0	UINT	RO	YES	0x0000
3	Channel Error Code CH1	UINT	RO	YES	0x0000
4	Channel Error Code CH2	UINT	RO	YES	0x0000
5	Channel Error Code CH3	UINT	RO	YES	0x0000

The TC thermocouple input supports module fault detection and channel fault detection.

The module exception diagnostic code is defined as follows:

Diagnostic Code	Fault Description	Solution
0x5003	Module 24 V power supply failure	Check the external power supply wiring and the power supply voltage.

The channel exception diagnostic codes are defined as follows:

Diagnostic Code	Fault Description	Solution
0x6001	Channel open-circuited	Check the signal wiring and ensure the sensor type is correct.
0x6003	Channel data exceeds upper limit	Check the sensor, wiring, or reconfigure the upper limit.
0x6004	Channel data exceeds lower limit	Check the sensor, wiring, or reconfigure the lower limit.
0x6005	Overflow	Check whether the selected sensor range is exceeded.
0x6006	Underflow	Check whether the selected sensor range is undershot.



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.9 GL20-3232ETN

Introduction

The GL20-3232ETN is provided with 32 digital inputs for receiving the digital input, and 32 digital outputs for controlling the digital output.

- Name: GL20-3232ETN
- Module category: Digital In/Out
- Module identification code: 0x10F41061

Process data

Mapping data: (Output) For the module in slot n ($n=0$ to 31), the object dictionary definition for index $0x1600+0x08*n$ is shown in the table below:

Index	0x1600+0x08*n: 3232ETN Output-bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	32
1	Digital output bit 0	UDINT	RO	NO	0x7xx00101
2	Digital output bit 1	UDINT	RO	NO	0x7xx00201
3	...	...	...	...	...
32	Digital output bit 31	UDINT	RO	NO	0x7xx02001

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1601+0x08*n$ is shown in the table below.

Index	0x1601+0x08*n: 3232ETN Output-8bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	4
1	Digital output CH0-8bit	UDINT	RO	NO	0x7xx00108
2	Digital output CH1-8bit	UDINT	RO	NO	0x7xx00208
3	Digital output CH2-8bit	UDINT	RO	NO	0x7xx00308
4	Digital output CH3-8bit	UDINT	RO	NO	0x7xx00408

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1602+0x08*n$ is shown in the table below.

Index	0x1602+0x08*n: 3232ETN Output-16bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	2
1	Digital output CH0-16bit	UDINT	RO	NO	0x7xx00110
2	Digital output CH1-16bit	UDINT	RO	NO	0x7xx00210

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A04+0x08*n$ is shown in the table below.

Index	0x1A04+0x08*n: 3232ETN Diagnosis Information Mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	9
1	3232ETN Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	3232ETN DI-CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	3232ETN DI-CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	3232ETN DI-CH2 Diagnosis Information	UDINT	RO	NO	0xAxxx0410
5	3232ETN DI-CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0510
6	3232ETN DO-CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0610

Index	0x1A04+0x08*n: 3232ETN Diagnosis Information Mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
7	3232ETN DO-CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0710
8	3232ETN DO-CH2 Diagnosis Information	UDINT	RO	NO	0xAxxx0810
9	3232ETN DO-CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0910

Mapping data: (Input) For the module in slot n (n=0 to 31), the object dictionary definition for index 0x1A00+0x08*n is shown in the table below:

Index	0x1A00+0x08*n: 3232ETN input-bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	32
1	Digital input bit 0	UDINT	RO	NO	0x6xx00101
2	Digital input bit 1	UDINT	RO	NO	0x6xx00201
3	...	UDINT	...	...	...
32	Digital input bit 31	UDINT	RO	NO	0x6xx02001

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A01+0x08*n is shown in the table below.

Index	0x1A01+0x08*n: 3232ETN input-8bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	4
1	Digital input CH0-8bit	UDINT	RO	NO	0x6xx00108
2	Digital Input CH1-8bit	UDINT	RO	NO	0x6xx00208
3	Digital input CH2-8bit	UDINT	RO	NO	0x6xx00308
4	Digital input CH3-8bit	UDINT	RO	NO	0x6xx00408

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A02+0x08*n is shown in the table below.

Index	0x1A02+0x08*n: 3232ETN input-16bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	2
1	Digital input CH0-16bit	UDINT	RO	NO	0x6xx00110
2	Digital Input CH1-16bit	UDINT	RO	NO	0x6xx00210

Process data: (Input) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 3232ETN input				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	4
1	3232ETN Digital Input CH0-8-bit	USINT	RO	YES	0x00
2	3232ETN Digital Input CH1-8-bit	USINT	RO	YES	0x00
3	3232ETN Digital Input CH2-8-bit	USINT	RO	YES	0x00
4	3232ETN Digital Input CH3-8-bit	USINT	RO	YES	0x00

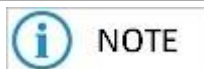
**NOTE**

Detected digital input values, where each bit represents a digital input, and each byte is a group.

Process data: (Output) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 3232ETN output				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	4
1	3232ETN Digital Output CH0-8-bit	USINT	RW	YES	0x00

Index	0x7000+0x40*n: 3232ETN output				
Subindex	Name	Data type	Access type	Mapping	Default value
2	3232ETN Digital Output CH1-8bit	USINT	RW	YES	0x00
3	3232ETN Digital Output CH2-8bit	USINT	RW	YES	0x00
4	3232ETN Digital Output CH3-8bit	USINT	RW	YES	0x00



Digital output value, each bit represents a digital output, and each byte is a group.

Configuration data

Configuration data (Input): For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8000+0x40*n$ is shown in the table below.

Index	0x8000+0x40*n: 3232ETN DI Filter time parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	4
1	DI module CH0 filter time	UINT	RO	NO	0x0004
2	DI module CH1 filter time	UINT	RO	NO	0x0004
3	DI module CH2 filter time	UINT	RO	NO	0x0004
4	DI module CH3 filter time	UINT	RO	NO	0x0004

Detected filter time setting. Each group can independently set the filter time. The default value is 0x0004, corresponding to a filter time of 1ms. The setting range is as follows.

Filter time	Description	Filter time	Description
0x0000	No filter	-	-
0x0001	The filter time is 0.25 ms.	0x0010	The filter time is 4 ms.
0x0002	The filter time is 0.5 ms.	0x0020	The filter time is 8 ms.

Filter time	Description	Filter time	Description
0x0004	The filter time is 1 ms.	0x0040	The filter time is 16 ms.
0x0008	The filter time is 2 ms.	0x0080	The filter time is 32 ms.

Configuration data (Output): For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: 3232ETN DO configure stopmode parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	4
1	DO module CH0 stopmode after EtherCAT lost link	USINT	RW	NO	0xFF
2	DO module CH1 stopmode after EtherCAT lost link	USINT	RW	NO	0xFF
3	DO module CH2 stopmode after EtherCAT lost link	USINT	RW	NO	0xFF
4	DO module CH3 stopmode after EtherCAT lost link	USINT	RW	NO	0xFF

**NOTE**

The handling mode for digital output when the system is shut down or any fault occurs. Each bit can be set to define the handling mode for the corresponding digital output, with each byte being set as a group. When the bit is 0, the current value is maintained; when the bit is 1, the output follows the preset value. The default value of each bit is 1, meaning the default value of each group is 0xFF.

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8002+0x40*n$ is shown in the table below.

Index	0x8002+0x40*n: 3232ETN DO configure stopvalue parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	4

Index	0x8002+0x40*n: 3232ETN DO configure stopvalue parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
1	DO module CH0 stop value after EtherCAT link lost	USINT	RW	NO	0x00
2	DO module CH1 stop value after EtherCAT link lost	USINT	RW	NO	0x00
3	DO module CH2 stop value after EtherCAT link lost	USINT	RW	NO	0x00
4	DO module CH3 stop value after EtherCAT link lost	USINT	RW	NO	0x00

 **NOTE**

The preset value for the digital output when stop occurs due to fault. When the system is set to output according to the preset value in fault mode, the output value is determined by the settings here. Each bit can be set to a preset value of the corresponding digital output, with each byte being set as a group. When the bit is 0, the preset value is 0; when the bit is 1, the preset value is 1. The default value of each bit is 0, meaning the default value of each group is 0x00.

Diagnostic data

Diagnostic data: For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0xA000+0x40*n$ is shown in the table below.

Index	0xA000+0x40*n: 3232ETN Diagnosis Information				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	9
1	3232ETN Module Diagnostics Information	UINT	RO	YES	0x0000
2	3232ETN DI-CH0 Diagnosis Information	UINT	RO	YES	0x0000
3		UINT	RO	YES	0x0000

Index	0xA000+0x40*n: 3232ETN Diagnosis Information				
Subindex	Name	Data type	Access type	Mapping	Default value
	3232ETN DI-CH1 Diagnosis Information				
4	3232ETN DI-CH2 Diagnosis Information	UINT	RO	YES	0x0000
5	3232ETN DI-CH3 Diagnosis Information	UINT	RO	YES	0x0000
6	3232ETN DO-CH0 Diagnosis Information	UINT	RO	YES	0x0000
7	3232ETN DO-CH1 Diagnosis Information	UINT	RO	YES	0x0000
8	3232ETN DO-CH2 Diagnosis Information	UINT	RO	YES	0x0000
9	3232ETN DO-CH3 Diagnosis Information	UINT	RO	YES	0x0000



Fault detection is not supported for digital inputs. For digital outputs, fault detection is only supported for the output power supply. When the output power supply is faulty (undervoltage), the diagnostic code is 0x5003.

12.4.10 GL20-3200END

Introduction

GL20-3200END is a 32-channel DI module, primarily used for digital input acquisition.

- Name: GL20-3200END
- Module category: Digital In
- Module identification code: 0x10F41011

Process data

Mapping data: (Input) For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A00+0x08*n$ is shown in the table below.

Index	0x1A00+0x08*n: 3200END input-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	32
1	Digital input bit0	UDINT	RO	NO	0x6xx00101
2	Digital input bit 1	UDINT	RO	NO	0x6xx00201
3	...	...	...	...	...
32	Digital input bit31	UDINT	RO	NO	0x6xx02001

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A01+0x08*n$ is shown in the table below.

Index	0x1A01+0x08*n: 3200END input-8-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	Digital input CH0-8bit	UDINT	RO	NO	0x6xx00108
2	Digital Input CH1-8bit	UDINT	RO	NO	0x6xx00208
3	Digital input CH2-8bit	UDINT	RO	NO	0x6xx00308
4	Digital input CH3-8bit	UDINT	RO	NO	0x6xx00408

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A02+0x08*n$ is shown in the table below.

Index	0x1A02+0x08*n: 3200END input-16bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	Digital input CH0-16bit	UDINT	RO	NO	0x6xx00110

Index	0x1A02+0x08*n: 3200END input-16bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	Digital Input CH1-16bit	UDINT	RO	NO	0x6xx00210

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 3200ENDDiagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1	3200END Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	3200END DI-CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	3200END DI-CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	3200END DI-CH2 Diagnosis Information	UDINT	RO	NO	0xAxxx0410
5	3200END DI-CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0510

Process data: (Input) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 3200END input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	3200END Digital Input CH0-8-bit	USINT	RO	YES	0x00
2	3200END Digital Input CH1-8-bit	USINT	RO	YES	0x00

Index	0x6000+0x40*n: 3200END input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
3	3200END Digital Input CH2-8-bit	USINT	RO	YES	0x00
4	3200END Digital Input CH3-8-bit	USINT	RO	YES	0x00



The subindex represents the detected digital input values, where each bit corresponds to a digital input, and each byte is a group.

Configuration data

Configuration data (Input): For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8000+0x40*n$ is shown in the table below.

Index	0x8000+0x40*n: 3200END DI Filter Time Parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	DI module CH0 filter time	UINT	RO	NO	0x0004
2	DI module CH1 filter time	UINT	RO	NO	0x0004
3	DI module CH2 filter time	UINT	RO	NO	0x0004
4	DI module CH3 filter time	UINT	RO	NO	0x0004

The subindex represents the filter time configuration for detected digital inputs. Each group supports independent filter time configuration. Default is 0x0004, corresponding to a filter time of 1ms. The specific configuration range is shown below:

Filter Time	Description	Filter Time	Description
0x0000	No filter	-	-
0x0001	The filter time is 0.25ms.	0x0010	The filter time is 4ms.
0x0002	The filter time is 0.5ms.	0x0020	The filter time is 8ms.
0x0004	The filter time is 1ms.	0x0040	The filter time is 16ms.

Filter Time	Description	Filter Time	Description
0x0008	The filter time is 2ms.	0x0080	The filter time is 32ms.

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 3200END Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1	3200END Module Diagnosis Information	UINT	RO	NO	0x0000
2	3200END DI-CH0 Diagnosis Information	UINT	RO	NO	0x0000
3	3200END DI-CH1 Diagnosis Information	UINT	RO	NO	0x0000
4	3200END DI-CH2 Diagnosis Information	UINT	RO	NO	0x0000
5	3200END DI-CH3 Diagnosis Information	UINT	RO	NO	0x0000

NOTE

Fault detection is not supported for digital inputs. For digital outputs, fault detection is only supported for the output power supply. When the output power supply is faulty (undervoltage), the diagnostic code is 0x5003.

12.4.11 GL20-0032ETN

Introduction

The GL20-0032ETN is a 32-channel DO module, primarily used for digital output control.

- Name: GL20-0032ETN

- Module Category: Digital Out
- Module identification code: 0x10F41021

Process data

Mapping data: (Output) For the module in slot n ($n=0$ to 31), the object dictionary definition for index $0x1600+0x08*n$ is shown in the table below:

Index	0x1600+0x08*n: 0032ETN Output-bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	32
1	Digital output bit0	UDINT	RO	NO	0x7xx00101
2	Digital output bit1	UDINT	RO	NO	0x7xx00201
3	...	...	...	...	...
32	Digital output bit31	UDINT	RO	NO	0x7xx02001

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1601+0x08*n$ is shown in the table below.

Index	0x1601+0x08*n: 0032ETN Output-8bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	Digital output CH0-8bit	UDINT	RO	NO	0x7xx00108
2	Digital output CH1-8bit	UDINT	RO	NO	0x7xx00208
3	Digital output CH2-8bit	UDINT	RO	NO	0x7xx00308
4	Digital output CH3-8bit	UDINT	RO	NO	0x7xx00408

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1602+0x08*n$ is shown in the table below.

Index	0x1602+0x08*n: 0032ETN Output-16bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2

Index	0x1602+0x08*n: 0032ETN Output-16bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
1	Digital output CH0-16bit	UDINT	RO	NO	0x7xx00110
2	Digital output CH1-16bit	UDINT	RO	NO	0x7xx00210

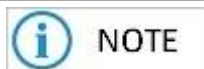
For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 0032ETN Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1	0032ETN Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	0032ETN DO-CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	0032ETN DO-CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	0032ETN DO-CH2 Diagnosis Information	UDINT	RO	NO	0xAxxx0410
5	0032ETN DO-CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0510

Process data: (Output) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 0032ETN output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	0032ETN Digital Output CH0-8-bit	USINT	RW	YES	0x00

Index	0x7000+0x40*n: 0032ETN output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	0032ETN Digital Output CH1-8bit	USINT	RW	YES	0x00
3	0032ETN Digital Output CH2-8bit	USINT	RW	YES	0x00
4	0032ETN Digital Output CH3-8bit	USINT	RW	YES	0x00




The subindex represents the digital output value, where each bit corresponds to a digital output, and each byte is a group.

Configuration data

Configuration data (Output): For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8000+0x40*n$ is shown in the table below.


Index	0x8000+0x40*n: 0032ETN DO configure stop mode parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	DO module CH0 stop mode after EtherCAT lost link	USINT	RW	NO	0xFF
2	DO module CH1 stop mode after EtherCAT lost link	USINT	RW	NO	0xFF
3	DO module CH2 stop mode after EtherCAT lost link	USINT	RW	NO	0xFF
4	DO module CH3 stop mode after EtherCAT lost link	USINT	RW	NO	0xFF

 **NOTE**

The subindex represents the handling method for digital output when the system is shut down or faulty. Each bit defines the handling method for the corresponding digital output, with each byte forming a group for configuration. When the bit is 0, maintain the current value; when the bit is 1 (0xFF, default), output the preset value.

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: 0032ETN configure stop value parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	DO module CH0 stop value after EtherCAT lost link	USINT	RW	NO	0x00
2	DO module CH1 stop value after EtherCAT lost link	USINT	RW	NO	0x00
3	DO module CH2 stop value after EtherCAT lost link	USINT	RW	NO	0x00
4	DO module CH3 stop value after EtherCAT lost link	USINT	RW	NO	0x00

 **NOTE**

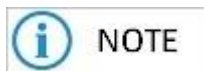
The subindex represents the preset value for digital output upon shutdown. Each bit defines the preset value for the corresponding digital output, with each byte forming a group for configuration. When the bit is 0 (0x00, default), the preset value is 0; when the bit is 1, the preset value is 1.

Diagnostic data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0xA000+0x40*n$ is shown in the table below.

Index	0xA000+0x40*n: 0032ETN Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1		UINT	RO	YES	0x0000

Index	0xA000+0x40*n: 0032ETN Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	0032ETN Module Diagnosis information				
2	0032ETN DO-CH0 Diagnosis information	UINT	RO	YES	0x0000
3	0032ETN DO-CH1 Diagnosis information	UINT	RO	YES	0x0000
4	0032ETN DO-CH2 Diagnosis information	UINT	RO	YES	0x0000
5	0032ETN DO-CH3 Diagnosis information	UINT	RO	YES	0x0000



Fault detection is not supported for digital inputs. For digital outputs, fault detection is only supported for the output power supply. When the output power supply is faulty (undervoltage), the diagnostic code is 0x5003.

12.4.12 GL20-0800END

Introduction

GL20-0800END is an 8-channel DI module, primarily used for digital input acquisition.

- Model: GL20-0800END
- Module category: Digital In
- Module identification code: 0x10F41012

Process data

Mapping data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A00+0x08*n is shown in the table below.

Index	0x1A00+0x08*n: 0800END input-bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	Digital input bit0	UDINT	RO	NO	0x6xx00101
2	Digital input bit1	UDINT	RO	NO	0x6xx00201
3	...	...	...	...	...
32	Digital input bit7	UDINT	RO	NO	0x6xx00801

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A01+0x08*n is shown in the table below.

Index	0x1A01+0x08*n: 0800END input-8bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital input CH0-8bit	UDINT	RO	NO	0x6xx10108

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A02+0x08*n is shown in the table below.

Index	0x1A02+0x08*n: 0800END input-16bit mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital input CH0-16bit	UDINT	RO	NO	0x6xx20110

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 0800END Module Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	0800END Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110

Index	0x1A04+0x08*n: 0800END Module Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	0800END Diagnosis information	UDINT	RO	NO	0xAxxx0210

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 0800END input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	0800END Digital Input CH0-8bit	USINT	RO	YES	0x00

**NOTE**

The subindex represents the detected digital input values, where each bit corresponds to a digital input, and each byte is a group.

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 0800END module configure parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	0800END Digital Input Filter Time	UINT	RO	NO	0x0004

The subindex represents the filter time configuration for detected digital inputs. Each group supports independent filter time configuration. Default is 0x0004, corresponding to a filter time of 1ms. The specific configuration range is shown below:

Filter Time	Description	Filter Time	Description
0x0000	No filter	-	-
0x0001	The filter time is 0.25ms.	0x0010	The filter time is 4ms.
0x0002	The filter time is 0.5ms.	0x0020	The filter time is 8ms.

Filter Time	Description	Filter Time	Description
0x0004	The filter time is 1ms.	0x0040	The filter time is 16ms.
0x0008	The filter time is 2ms.	0x0080	The filter time is 32ms.

Diagnostic data

Diagnostic data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 0800END Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	2
1	0800END Module Diagnosis Information	UINT	RO	YES	0x0000
2	0800END Diagnosis information	UINT	RO	YES	0x0000



Fault detection is not supported for digital inputs. For digital outputs, fault detection is only supported for the output power supply. When the output power supply is faulty (undervoltage), the diagnostic code is 0x5003.

12.4.13 GL20-0004ETP-2A

Introduction

GL20-0004ETP-2A is a 4-channel relay DO module, primarily used for digital output control.

- Name: DO04 Module
- Module category: Digital Out
- Module identification code: 0x10F41028

Process data

Mapping data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1600+0x08*n is shown in the table below.

Index	0x1600+0x08*n: 0004ETP-2A Output-bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	Digital output bit0	UDINT	RO	NO	0x7xx00101
2	Digital output bit1	UDINT	RO	NO	0x7xx00201
3	Digital output bit2	UDINT	RO	NO	0x7xx00301
4	Digital output bit3	UDINT	RO	NO	0x7xx00401
5	Invalid bit0	UDINT	RO	NO	0x7xx00501
6	...	...	...	...	...
8	Invalid bit3	UDINT	RO	NO	0x7xx00801

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1601+0x08*n is shown in the table below.

Index	0x1601+0x08*n: 0004ETP-2A Output-8bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-8bit	UDINT	RO	NO	0x7xx10108

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1602+0x08*n is shown in the table below.

Index	0x1602+0x08*n: 0004ETP-2A Output-16bit Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-16bit	UDINT	RO	NO	0x7xx20110

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 0004ETP-2A Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5

Index	0x1A04+0x08*n: 0004ETP-2A Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
1	0004ETP-2A Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	0004ETP-2A CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	0004ETP-2A CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	0004ETP-2A CH2 Diagnosis Information	UDINT	RO	NO	0xAxxx0410
5	0004ETP-2A CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0510

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 0004ETP-2A output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	0004ETP-2A Digital Output CH0-8bit	USINT	RW	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 0004ETP-2A module configure stop mode parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1		USINT	RW	NO	0x0F

Index	0x8000+0x40*n: 0004ETP-2A module configure stop mode parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	DO module CH0 stop mode after EtherCAT lost link				

Subindex 1: DO module CH0 stop mode after EtherCAT lost link

Bit 0 to 7	Output mode upon stop, with each bit corresponding to an output 0: Maintain the current output status 1: Output the preset value defined in object dictionary 8001
------------	--

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 0004ETP-2A module configure stop value parameters				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	DO module 4bit stop value after EtherCAT lost link	USINT	RW	NO	0

Subindex 1: DO module 4bit stop value after EtherCAT lost link

Bit 0 to 7	Output preset value upon stop, with each bit corresponding to the preset value of an output 0: Output 0 1: Output 1
------------	---

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 0004ETP-2A Module Diagnosis Enable				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	DO Module Diagnosis Enable	UINT	RW	NO	0XFF

Subindex 1: DO Module Diagnosis Enable

Bit 0	Open circuit to VDD 0: Disable
-------	-----------------------------------

	1: Enable
Bit 1	Switch ON open circuit 0: Disable 1: Enable
Bit 2	Switch OFF open circuit 0: Disable 1: Enable
Bit 3	Overload 0: Disable 1: Enable
Bit 4	Overcurrent 0: Disable 1: Enable
Bit 5	Undervoltage 0: Disable 1: Enable
Bit 6	Overtemperature 0: Disable 1: Enable
Bit 7	24 V power supply failure 0: Disable 1: Enable
Bit 5 to 8	Reserved

Diagnostic data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0xA000+0x40*n$ is shown in the table below.

Index	0xA000+0x40*n: 0004ETP-2A Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	5
1		UINT	RO	YES	0

Index	0xA000+0x40*n: 0004ETP-2A Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	0004ETP-2A Module Diagnosis Information				
2	0004ETP-2A CH0 Diagnosis Information	UINT	RO	YES	0
3	0004ETP-2A CH1 Diagnosis Information	UINT	RO	YES	0
4	0004ETP-2A CH2 Diagnosis Information	UINT	RO	YES	0
5	0004ETP-2A CH3 Diagnosis Information	UINT	RO	YES	0



Refer to the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.14 GL20-0004ER

Introduction

The GL20-0004ER module is a 4-channel relay output module, primarily used for digital output control.

- Name: DO04 Module
- Module category: Digital Out
- Module identification code: 0x10F41027

Process data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1600+0x08*n is shown in the table below.

Index	0x1600+0x08*n: 0004ER Output-bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	8
1	Digital output bit0	UDINT	RO	NO	0x7xx00101
2	Digital output bit1	UDINT	RO	NO	0x7xx00201
3	Digital output bit2	UDINT	RO	NO	0x7xx00301
4	Digital output bit3	UDINT	RO	NO	0x7xx00401
5	Invalid bit0	UDINT	RO	NO	0x7xx00501
6	Invalid bit1	UDINT	RO	NO	0x7xx00601
7	Invalid bit2	UDINT	RO	NO	0x7xx00701
8	Invalid bit3	UDINT	RO	NO	0x7xx00801

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1601+0x08*n is shown in the table below.

Index	0x1601+0x08*n: 0004ER Output-8bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-8bit	UDINT	RO	NO	0x7xx10108

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1602+0x08*n is shown in the table below.

Index	0x1602+0x08*n: 0004ER Output-16bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-16bit	UDINT	RO	NO	0x7xx20110

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 0004ER Module Diagnosis Information Mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	2
1	0004ER Module Diagnosis information	UDINT	RO	NO	0xAxxx0110
2	0004ER CH0 Diagnosis information	UDINT	RO	NO	0xAxxx0210

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 0004ER output				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	0004ER Digital Output CH0-8-bit	USINT	RW	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 0004ER module configure stopmode parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	DO module CH0 stopmode after EtherCAT lost link	USINT	RW	NO	0x0F

Subindex 1: DO module CH0 stopmode after EtherCAT lost link

Bit 0 to 7	Output mode upon stop: each bit corresponds to an output port. 0: Keep present output status 1: Output to preset value defined in object dictionary 8001
------------	--

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 0004ER module configure stopvalue parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	DO module 4bit stopvalue after EtherCAT lost link	USINT	RW	NO	0

Subindex 1: DO module 4bit stopvalue after EtherCAT lost link

Bit 0 to 7	Output preset value upon stop: each bit corresponds to the preset value of a output port. 0: Output 0 1: Output 1
------------	---

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 0004ER Diagnosis Information				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	2
1	0004ER Module Diagnosis information	UINT	RO	YES	0
2	0004ER CH0 Diagnosis information	UINT	RO	YES	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.15 GL20-2CAN

Introduction

The GL20-2CAN is a 2-channel CAN communication module.

- Name: GL20-2CAN
- Module category: Communication

- Module identification code: 0x10F41090

Process data

Mapping data: (Input) For the module in slot n (n=0 to 3), the object dictionary definition for index 0x1B00+0x08*n is shown in the table below:

Index	0x1B00+0x08*n: CAN Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	30
1	CAN0_Frame0_RX_ID	UDINT	RO	NO	0x6xx00120
2	CAN0_Frame0_RX_DATA0	UDINT	RO	NO	0x6xx00220
...	...	UDINT	RO	NO	...
30	CAN0_RX_Couter and Frame8_length	UDINT	RO	NO	0x6xx02020

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1B01+0x08*n is shown in the table below.

Index	0x1B01+0x08*n: CAN Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	30
1	CAN1_Frame0_RX_ID	UDINT	RO	NO	0x6xx10120
2	CAN1_Frame0_RX_DATA0	UDINT	RO	NO	0x6xx10220
...	...	UDINT	RO	NO	...
30	CAN1_RX_Couter and Frame8_length	UDINT	RO	NO	0x6xx12020

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: CAN Module Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	14
1	CAN Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	CAN0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	CAN1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	CAN0 REEOR FRAME COUNTER	UDINT	RO	NO	0xAxxx0410
5	CAN1 REEOR FRAME COUNTER	UDINT	RO	NO	0xAxxx0510
6	CAN0 AND CAN1 LOADRATE	UDINT	RO	NO	0xAxxx0610
7	CAN0 TEC/REC Error Value	UDINT	RO	NO	0xAxxx0710
8	CAN1 TEC/REC Error Value	UDINT	RO	NO	0xAxxx0810
9	reservedata0	UDINT	RO	NO	0xAxxx0910
10	reservedata1	UDINT	RO	NO	0xAxxx0A10
11	reservedata2	UDINT	RO	NO	0xAxxx0B10
12	reservedata3	UDINT	RO	NO	0xAxxx0C10
13	reservedata4	UDINT	RO	NO	0xAxxx0D10
14	reservedata5	UDINT	RO	NO	0xAxxx0E10

Process data: (Input) For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: CAN0 Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	30

Index	0x6000+0x40*n: CAN0 Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
1	CAN0_Frame0_RXID	UDINT	RW	YES	0
2	CAN0_Frame0_RX_DATA0	UDINT	RW	YES	0
3	CAN0_Frame0_RX_DATA1	UDINT	RW	YES	0
4	CAN0_Frame1_RXID	UDINT	RW	YES	0
5	CAN0_Frame1_RX_DATA0	UDINT	RW	YES	0
6	CAN0_Frame1_RX_DATA1	UDINT	RW	YES	0
7	CAN0_Frame2_RXID	UDINT	RW	YES	0
8	CAN0_Frame2_RX_DATA0	UDINT	RW	YES	0
9	CAN0_Frame2_RX_DATA1	UDINT	RW	YES	0
10	CAN0_Frame3_RXID	UDINT	RW	YES	0
11	CAN0_Frame3_RX_DATA0	UDINT	RW	YES	0
12	CAN0_Frame3_RX_DATA1	UDINT	RW	YES	0
13	CAN0_Frame4_RXID	UDINT	RW	YES	0
14	CAN0_Frame4_RX_DATA0	UDINT	RW	YES	0
15	CAN0_Frame4_RX_DATA1	UDINT	RW	YES	0
16	CAN0_Frame5_RXID	UDINT	RW	YES	0

Index	0x6000+0x40*n: CAN0 Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
17	CAN0_Frame5_RX_DATA0	UDINT	RW	YES	0
18	CAN0_Frame5_RX_DATA1	UDINT	RW	YES	0
19	CAN0_Frame6_RXID	UDINT	RW	YES	0
20	CAN0_Frame6_RX_DATA0	UDINT	RW	YES	0
21	CAN0_Frame6_RX_DATA1	UDINT	RW	YES	0
22	CAN0_Frame7_RXID	UDINT	RW	YES	0
23	CAN0_Frame7_RX_DATA0	UDINT	RW	YES	0
24	CAN0_Frame7_RX_DATA1	UDINT	RW	YES	0
25	CAN0_Frame8_RXID	UDINT	RW	YES	0
26	CAN0_Frame8_RX_DATA0	UDINT	RW	YES	0
27	CAN0_Frame8_RX_DATA1	UDINT	RW	YES	0
28	CAN0_Frame0_TO_Frame3_length	UDINT	RW	YES	0
29	CAN0_Frame4_TO_Frame7_length	UDINT	RW	YES	0
30	CAN0_RX_Couter and Frame8_length	UDINT	RW	YES	0

SubIndex 1: CAN0_Frame0_RXID is the ID and frame-related flag of the data received by the CAN0 channel of the CAN module through the CAN interface.

Bit	Description	Remark
Bit 0 to 29	ID value	-
Bit 30	1: Remote frame 0: Data frame	Default: 0
Bit 31	1 - Extended frame 0 - Standard frame	Default: 0

SubIndex 2: CAN0_Frame0_RX_DATA0 is the high 32 bits of the data received by the CAN0 channel of the CAN module via the CAN interface.

SubIndex 3: CAN0_Frame0_RX_DATA1 is the low 32 bits of the data received by the CAN0 channel of the CAN module via the CAN interface.

SubIndex 4 to SubIndex 27: Same definition as 0 to 3

SubIndex 28: CAN0_Frame0_to Frame3 length

The length of the CAN data frame (including ID, max. 12). For example, if the CAN data length is 8, plus the frame ID length of 4, the length is 12.

Bit	Description	Remark
Bit 0 to 7	Frame0 data length	Default: 0
Bit 8 to 15	Frame1 data length	Default: 0
Bit 16 to 23	Frame2 data length	Default: 0
Bit 24 to 31	Frame3 data length	Default: 0

SubIndex 29: CAN0_Frame4_to Frame7 length

The length of the CAN data frame (including ID, max 12). For example, if the CAN data length is 8, plus the frame ID length of 4, the length is 12.

Bit	Description	Remark
Bit 0 to 7	Frame4 data length	Default: 0
Bit 8 to 15	Frame5 data length	Default: 0
Bit 16 to 23	Frame6 data length	Default: 0
Bit 24 to 31	Frame7 data length	Default: 0

SubIndex 30: AN0_TX_couter_and_Frame8 length

"couter" is the count of data to be sent by the CAN1 channel of the CAN module. To distinguish duplicate data, the counter should be different for consecutive frames, incrementing by 1 for each frame sent and cycling from 0 to 65535. The length of Frame8 is the same as that of the previous frames.

Bit	Description	Remark
Bit 0 to 7	Frame8 data length	Default: 0
Bit 15 to 31	counter	Default: 0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6001+0x40*n is shown in the table below.

Index	0x6001+0x40*n: CAN1 Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	30
1	CAN1_Frame0_RXID	UDINT	RW	YES	0
2	CAN1_Frame0_RX_DATA0	UDINT	RW	YES	0
3	CAN1_Frame0_RX_DATA1	UDINT	RW	YES	0
4	CAN1_Frame1_RXID	UDINT	RW	YES	0
5	CAN1_Frame1_RX_DATA0	UDINT	RW	YES	0
6	CAN1_Frame1_RX_DATA1	UDINT	RW	YES	0
7	CAN1_Frame2_RXID	UDINT	RW	YES	0
8	CAN1_Frame2_RX_DATA0	UDINT	RW	YES	0
9	CAN1_Frame2_RX_DATA1	UDINT	RW	YES	0
10	CAN1_Frame3_RXID	UDINT	RW	YES	0
11	CAN1_Frame3_RX_DATA0	UDINT	RW	YES	0
12	CAN1_Frame3_RX_DATA1	UDINT	RW	YES	0
13		UDINT	RW	YES	0

Index	0x6001+0x40*n: CAN1 Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	CAN1_Frame4_ RXID				
14	CAN1_Frame4_ RX_DATA0	UDINT	RW	YES	0
15	CAN1_Frame4_ RX_DATA1	UDINT	RW	YES	0
16	CAN1_Frame5_ RXID	UDINT	RW	YES	0
17	CAN1_Frame5_ RX_DATA0	UDINT	RW	YES	0
18	CAN1_Frame5_ RX_DATA1	UDINT	RW	YES	0
19	CAN1_Frame6_ RXID	UDINT	RW	YES	0
20	CAN1_Frame6_ RX_DATA0	UDINT	RW	YES	0
21	CAN1_Frame6_ RX_DATA1	UDINT	RW	YES	0
22	CAN1_Frame7_ RXID	UDINT	RW	YES	0
23	CAN1_Frame7_ RX_DATA0	UDINT	RW	YES	0
24	CAN1_Frame7_ RX_DATA1	UDINT	RW	YES	0
25	CAN1_Frame8_ RXID	UDINT	RW	YES	0
26	CAN1_Frame8_ RX_DATA0	UDINT	RW	YES	0
27	CAN1_Frame8_ RX_DATA1	UDINT	RW	YES	0

Index	0x6001+0x40*n: CAN1 Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
28	CAN1_Frame0_ TO_Frame3_ length	UDINT	RW	YES	0
29	CAN1_Frame4_ TO_Frame7_ length	UDINT	RW	YES	0
30	CAN1_RX_Couter and Frame8_length	UDINT	RW	YES	0



The definition of the CAN1 channel is the same as CAN0 channel.

Mapping data: (Output) For the module in slot n (n=0 to 3), the object dictionary definition for index 0x1700+0x08*n is shown in the table below:

Index	0x1700+0x08*n: CAN Output Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	30
1	CAN0_Frame0_ TXID	UDINT	RO	NO	0x7xx40120
2	CAN0_Frame0_ TX_DATA0	UDINT	RO	NO	0x7xx40220
...	...	UDINT	RO	NO	...
30	CAN0_TX_Couter and Frame8_length	UDINT	RO	NO	0x7xx42020

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1701+0x08*n is shown in the table below.

Index	0x1701+0x08*n: CAN Output Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	30
1		UDINT	RO	NO	0x7xx50120

Index	0x1701+0x08*n: CAN Output Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	CAN1_Frame0_TXID				
2	CAN1_Frame0_TX_DATA0	UDINT	RO	NO	0x7xx50220
...	...	UDINT	RO	NO	...
30	CAN1_TX_Couter and Frame8_length	UDINT	RO	NO	0x7xx52020

Process data: (Output) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: CAN0 Output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	30
1	CAN0_Frame0_TXID	UDINT	RW	YES	0
2	CAN0_Frame0_TX_DATA0	UDINT	RW	YES	0
3	CAN0_Frame0_TX_DATA1	UDINT	RW	YES	0
4	CAN0_Frame1_TXID	UDINT	RW	YES	0
5	CAN0_Frame1_TX_DATA0	UDINT	RW	YES	0
6	CAN0_Frame1_TX_DATA1	UDINT	RW	YES	0
7	CAN0_Frame2_TXID	UDINT	RW	YES	0
8	CAN0_Frame2_TX_DATA0	UDINT	RW	YES	0
9	CAN0_Frame2_TX_DATA1	UDINT	RW	YES	0

Index	0x7000+0x40*n: CAN0 Output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
10	CAN0_Frame3_TXID	UDINT	RW	YES	0
11	CAN0_Frame3_TX_DATA0	UDINT	RW	YES	0
12	CAN0_Frame3_TX_DATA1	UDINT	RW	YES	0
13	CAN0_Frame4_TXID	UDINT	RW	YES	0
14	CAN0_Frame4_TX_DATA0	UDINT	RW	YES	0
15	CAN0_Frame4_TX_DATA1	UDINT	RW	YES	0
16	CAN0_Frame5_TXID	UDINT	RW	YES	0
17	CAN0_Frame5_TX_DATA0	UDINT	RW	YES	0
18	CAN0_Frame5_TX_DATA1	UDINT	RW	YES	0
19	CAN0_Frame6_TXID	UDINT	RW	YES	0
20	CAN0_Frame6_TX_DATA0	UDINT	RW	YES	0
21	CAN0_Frame6_TX_DATA1	UDINT	RW	YES	0
22	CAN0_Frame7_TXID	UDINT	RW	YES	0
23	CAN0_Frame7_TX_DATA0	UDINT	RW	YES	0
24	CAN0_Frame7_TX_DATA1	UDINT	RW	YES	0
25	CAN0_Frame8_TXID	UDINT	RW	YES	0

Index	0x7000+0x40*n: CAN0 Output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
26	CAN0_Frame8_TX_DATA0	UDINT	RW	YES	0
27	CAN0_Frame8_TX_DATA1	UDINT	RW	YES	0
28	CAN0_Frame0_TO_Frame3_length	UDINT	RW	YES	0
29	CAN0_Frame4_TO_Frame7_length	UDINT	RW	YES	0
30	CAN0_TX_Couter and Frame8_length	UDINT	RW	YES	0

SubIndex 1: CAN0_Frame0_RXID is the ID and frame-related flag of the data received by the CAN0 channel of the CAN module through the CAN interface.

Bit	Description	Remark
Bit 0 to 29	ID value	-
Bit 30	1: Remote frame 0: Data frame	Default: 0
Bit 31	1: Extended frame 0: Standard frame	Default: 0

SubIndex 2: CAN0_Frame0_RX_DATA0 is the high 32 bits of the data received by the CAN0 channel of the CAN module via the CAN interface.

SubIndex 3: CAN0_Frame0_RX_DATA1 is the low 32 bits of the data received by the CAN0 channel of the CAN module via the CAN interface.

SubIndex 4-SubIndex 27: Same definition as 0-3

SubIndex 28: CAN0_Frame0_to Frame3 length

The length of the CAN data frame (including ID, max 12). For example, if the CAN data length is 8, plus the frame ID length of 4, the length is 12.

Bit	Description	Remark
Bit 0 to 7	Frame0 data length	Default: 0

Bit	Description	Remark
Bit 8 to 15	Frame1 data length	Default: 0
Bit 16 to 23	Frame2 data length	Default: 0
Bit 24 to 31	Frame3 data length	Default: 0

SubIndex 29: CAN0_Frame4_to Frame7 length

The length of the CAN data frame (including ID, max 12). For example, if the CAN data length is 8, plus the frame ID length of 4, the length is 12.

Bit	Description	Remark
Bit 0 to 7	Frame4 data length	Default: 0
Bit 8 to 15	Frame5 data length	Default: 0
Bit 16 to 23	Frame6 data length	Default: 0
Bit 24 to 31	Frame7 data length	Default: 0

SubIndex 30: AN0_TX_couter_and_Frame8 length

"couter" is the count of data to be sent by the CAN1 channel of the CAN module. To distinguish duplicate data, the counter should be different for consecutive frames, incrementing by 1 for each frame sent and cycling from 0 to 65535. The length of Frame8 is the same as that of the previous frames.

Bit	Description	Remark
Bit 0 to 7	Frame8 data length	Default: 0
Bit 15 to 31	counter	Default: 0

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7001+0x40*n is shown in the table below.

Index	0x7001+0x40*n: CAN1 Output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	30
1	CAN1_Frame0_TXID	UDINT	RW	YES	0
2	CAN1_Frame0_TX_DATA0	UDINT	RW	YES	0
3	CAN1_Frame0_TX_DATA1	UDINT	RW	YES	0
4		UDINT	RW	YES	0

Index	0x7001+0x40*n: CAN1 Output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	CAN1_Frame1_ TXID				
5	CAN1_Frame1_ TX_DATA0	UDINT	RW	YES	0
6	CAN1_Frame1_ TX_DATA1	UDINT	RW	YES	0
7	CAN1_Frame2_ TXID	UDINT	RW	YES	0
8	CAN1_Frame2_ TX_DATA0	UDINT	RW	YES	0
9	CAN1_Frame2_ TX_DATA1	UDINT	RW	YES	0
10	CAN1_Frame3_ TXID	UDINT	RW	YES	0
11	CAN1_Frame3_ TX_DATA0	UDINT	RW	YES	0
12	CAN1_Frame3_ TX_DATA1	UDINT	RW	YES	0
13	CAN1_Frame4_ TXID	UDINT	RW	YES	0
14	CAN1_Frame4_ TX_DATA0	UDINT	RW	YES	0
15	CAN1_Frame4_ TX_DATA1	UDINT	RW	YES	0
16	CAN1_Frame5_ TXID	UDINT	RW	YES	0
17	CAN1_Frame5_ TX_DATA0	UDINT	RW	YES	0
18	CAN1_Frame5_ TX_DATA1	UDINT	RW	YES	0
19	CAN1_Frame6_ TXID	UDINT	RW	YES	0

Index	0x7001+0x40*n: CAN1 Output				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
20	CAN1_Frame6_TX_DATA0	UDINT	RW	YES	0
21	CAN1_Frame6_TX_DATA1	UDINT	RW	YES	0
22	CAN1_Frame7_TXID	UDINT	RW	YES	0
23	CAN1_Frame7_TX_DATA0	UDINT	RW	YES	0
24	CAN1_Frame7_TX_DATA1	UDINT	RW	YES	0
25	CAN1_Frame8_TXID	UDINT	RW	YES	0
26	CAN1_Frame8_TX_DATA0	UDINT	RW	YES	0
27	CAN1_Frame8_TX_DATA1	UDINT	RW	YES	0
28	CAN1_Frame0_TO_Frame3_length	UDINT	RW	YES	0
29	CAN1_Frame4_TO_Frame7_length	UDINT	RW	YES	0
30	CAN1_TX_Couter and Frame8_length	UDINT	RW	YES	0



The definition of the CAN1 channel is the same as CAN0 channel.

Configuration data

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: CAN setpar				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RW	NO	15
1	CAN0 enable and mode	UINT	RW	NO	0x0080
2	CAN0 baud rate	UINT	RW	NO	0x00FA
3	CAN0 buffer size	UINT	RW	NO	0x0400
4	CAN0 heartbeat interval	UINT	RW	NO	0x000A
5	CAN1 enable and mode	UINT	RW	NO	0x0080
6	CAN1 baud rate	UINT	RW	NO	0x00FA
7	CAN1 buffer size	UINT	RW	NO	0x0400
8	CAN1 heartbeat interval	UINT	RW	NO	0x000A
9	reservepar0	UINT	RW	NO	0x0000
10	reservepar1	UINT	RW	NO	0x0000
11	reservepar2	UINT	RW	NO	0x0000
12	reservepar3	UINT	RW	NO	0x0000
13	reservepar4	UINT	RW	NO	0x0000
14	reservepar5	UINT	RW	NO	0x0000
15	reservepar6	UINT	RW	NO	0x0000

SubIndex 1: CAN0 enable and mode setting

Bit	Description	Remark
Bit 0 to 1	Mode 0: Normal mode 1: Loop mode	-

Bit	Description	Remark
	2: Silent mode 3: Loop and Silent mode	
Bit 2 to 6	Reserved	-
Bit 7	1: Enable 0: Disable	-
Bit 8 to 15	Reserved	-

SubIndex 2: CAN0 baud rate

Bit	Description	Remark
Bit 0 to 15	Currently supported baud rates: 10, 20, 50, 100, 125, 250, 500, 800, 1000	Unit: kbps

SubIndex 2: CAN0 buffer size

Bit	Description	Remark
Bit 0 to 14	TX buffer size: 1 to 1024. Default is 1024, indicating 1024 frames of storage.	Unit: byte
Bit 15	Buffer overflow policy: Discard new or old data. Default is to discard new data.	-

SubIndex 3: CAN0 heartbeat interval

Bit	Description	Remark
Bit 0 to 15	Options include 0 (indicating no heartbeat packets are sent) and a value between 10 (default, indicating heartbeat packets are sent at intervals of 10 ms) to 65535.	Unit: ms

SubIndex 4: CAN1 enable and mode setting

Bit	Description	Remark
Bit 0 to 1	Mode 0: Normal mode 1: Loop mode 2: Silent mode 3: Loop and Silent mode	-
Bit 2 to 6	Reserved	-

Bit	Description	Remark
Bit 7	1: Enable 0: Disable	-
Bit 8 to 15	Reserved	-

SubIndex 5: CAN1 baud rate

Bit	Description	Remark
Bit 0 to 15	Currently supported baud rates: 10, 20, 50, 100, 125, 250, 500, 800, 1000	Unit: kbps

SubIndex 6: CAN1 buffer size

Bit	Description	Remark
Bit 0 to 14	TX buffer size, 1-1024. Default 1024, indicating 1024 frames.	Unit: byte
Bit 15	Action taken when the buffer is full: Discard new data, or discard old data.	Default is to discard new data.

SubIndex 7: CAN1 heartbeat interval

Bit	Description	Remark
Bit 0 to 15	0, 10-65535; default 10, heartbeat packets are sent at intervals of 10 ms. 0 indicates no heartbeat packets are sent.	Unit: ms

For the module in slot n ($n = 0$ to 3), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: CAN FIFO				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RW	NO	15
1	CAN0 min and max standard frame format	UDINT	RW	NO	0x07F0000
2	CAN0 min extend frame format	UDINT	RW	NO	0x00000000
3	CAN0 max extend frame format	UDINT	RW	NO	0x1FFFFFFF

Index	0x8001+0x40*n: CAN FIFO				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
4	CAN1 min and max standard frame format	UDINT	RW	NO	0x07F0000
5	CAN1 min extend frame format	UDINT	RW	NO	0x00000000
6	CAN1 max extend frame format	UDINT	RW	NO	0x1FFFFFFF
7	module bar code	UDINT	RW	NO	0x00000000
8	module reservepar0	UDINT	RW	NO	0x00000000
9	module reservepar1	UDINT	RW	NO	0x00000000
10	module reservepar2	UDINT	RW	NO	0x00000000
11	module reservepar3	UDINT	RW	NO	0x00000000
12	module reservepar4	UDINT	RW	NO	0x00000000
13	module reservepar5	UDINT	RW	NO	0x00000000
14	module reservepar6	UDINT	RW	NO	0x00000000
15	module Reservepar7	UDINT	RW	NO	0x00000000

Diagnostic data

Diagnostic data: For the module in slot n (n = 0 to 3), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: CAN module Diagnosis information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	UINT	RO	NO	15

Index	0xA000+0x40*n: CAN module Diagnosis information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
1	CAN Module Diagnosis Information	UINT	RO	YES	0
2	CAN0 Diagnostic information	UINT	RO	YES	0
3	CAN1 Diagnostic information	UINT	RO	YES	0
4	CAN0 REEOR FRAME COUNTER	UINT	RO	YES	0
5	CAN1 REEOR FRAME COUNTER	UINT	RO	YES	0
6	CAN0 AND CAN1 LOADRATE	UINT	RO	YES	0
7	CAN0 TEC/REC Error Value	UINT	RO	YES	0
8	CAN1 TEC/REC Error Value	UINT	RO	YES	0
9	reservedata0	UINT	RO	YES	0
10	reservedata1	UINT	RO	YES	0
11	reservedata2	UINT	RO	YES	0
12	reservedata3	UINT	RO	YES	0
13	reservedata4	UINT	RO	YES	0
14	reservedata5	UINT	RO	YES	0
15	reservedata6	UINT	RO	YES	0

12.4.16 GL20-2SCOM

Introduction

GL20-2SCOM is a 2-channel communication module that supports RS232, RS485, and RS422 communication protocols.

- Name: GL20-2SCOM
- Module category: Communication
- Module identification code: 0x10F41094

Process data

Mapping data: (Input) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A03+0x08*n is shown in the table below:

Index	0x1A03+0x08*n: 2SCOM Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	15
1	2SCOM-1 RXCOUNTER and length	UDINT	RO	NO	0x6xx00110
2	2SCOM-1 RX_DATA1	UDINT	RO	NO	0x6xx00210
3	2SCOM-1 RX_DATA2	UDINT	RO	NO	0x6xx00310
4	2SCOM-1 RX_DATA3	UDINT	RO	NO	0x6xx00410
5	2SCOM-1 RX_DATA4	UDINT	RO	NO	0x6xx00510
6	2SCOM-1 RX_DATA5	UDINT	RO	NO	0x6xx00610
7	2SCOM-1 RX_DATA6	UDINT	RO	NO	0x6xx00710
8	2SCOM-2 RXCOUNTER and length	UDINT	RO	NO	0x6xx00810
9	2SCOM-2 RX_DATA1	UDINT	RO	NO	0x6xx00910
10	2SCOM-2 RX_DATA2	UDINT	RO	NO	0x6xx00A10
11		UDINT	RO	NO	0x6xx00B10

Index	0x1A03+0x08*n: 2SCOM Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	2SCOM-2 RX_DATA3				
12	2SCOM-2 RX_DATA4	UDINT	RO	NO	0x6xx00C10
13	2SCOM-2 RX_DATA5	UDINT	RO	NO	0x6xx00D10
14	2SCOM-2 RX_DATA6	UDINT	RO	NO	0x6xx00E10
15	RX_status	UDINT	RO	NO	0x6xx00F10

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 2SCOM Module Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	15
1	2SCOM Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	2SCOM-1 Diagnosis information	UDINT	RO	NO	0xAxxx0210
3	2SCOM-2 Diagnosis information	UDINT	RO	NO	0xAxxx0310
4	2SCOM-1 Miss Frame count	UDINT	RO	NO	0xAxxx0410
5	2SCOM-2 Miss Frame count	UDINT	RO	NO	0xAxxx0510
6	reserve Diagnosis information0	UDINT	RO	NO	0xAxxx0610
7	...	...	...	...	...

Index	0x1A04+0x08*n: 2SCOM Module Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
15	reserve Diagnosis information9	UDINT	RO	NO	0xAxxx0E10

Process data: (Input) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 2SCOM RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	15
1	2SCOM-1 RXCOUNTER and length	UDINT	RW	YES	0
2	2SCOM-1 RX_DATA1	UDINT	RW	YES	0
3	2SCOM-1 RX_DATA2	UDINT	RW	YES	0
4	2SCOM-1 RX_DATA3	UDINT	RW	YES	0
5	2SCOM-1 RX_DATA4	UDINT	RW	YES	0
6	2SCOM-1 RX_DATA5	UDINT	RW	YES	0
7	2SCOM-1 RX_DATA6	UDINT	RW	YES	0
8	2SCOM-2 RXCOUNTER and length	UDINT	RW	YES	0
9	2SCOM-2 RX_DATA1	UDINT	RW	YES	0
10	2SCOM-2 RX_DATA2	UDINT	RW	YES	0
11	2SCOM-2 RX_DATA3	UDINT	RW	YES	0

Index	0x6000+0x40*n: 2SCOM RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
12	2SCOM-2 RX_DATA4	UDINT	RW	YES	0
13	2SCOM-2 RX_DATA5	UDINT	RW	YES	0
14	2SCOM-2 RX_DATA6	UDINT	RW	YES	0
15	RX_status	UDINT	RW	YES	0

SubIndex 1: 2SCOM RX_length and counter

Bit	Description	Remark
Bit 0 to 15	Frame count. Cycle from 0 to 65535.	-
Bit 16 to 23	Segment number. When the count is the same but the segment numbers are different, it indicates that the frames are consecutive.	-
Bit 24 to 31	Frame length. It indicates the length of the frame data.	-

Mapping data: (Output) For the module in slot n (n=0 to 31), the object dictionary definition for index 0x1603+0x08*n is shown in the table below:

Index	0x1603+0x08*n: 2SCOM Output Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	15
1	2SCOM-1 TXCOUNTER and length	UDINT	RO	NO	0x7xx00110
2	2SCOM-1 TX_DATA1	UDINT	RO	NO	0x7xx00210
3	2SCOM-1 TX_DATA2	UDINT	RO	NO	0x7xx00310
4	2SCOM-1 TX_DATA3	UDINT	RO	NO	0x7xx00410
5	2SCOM-1 TX_DATA4	UDINT	RO	NO	0x7xx00510

Index	0x1603+0x08*n: 2SCOM Output Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
6	2SCOM-1 TX_DATA5	UDINT	RO	NO	0x7xx00610
7	2SCOM-1 TX_DATA6	UDINT	RO	NO	0x7xx00710
8	2SCOM-2 TXCOUNTER and length	UDINT	RO	NO	0x7xx00810
9	2SCOM-2 TX_DATA1	UDINT	RO	NO	0x7xx00910
10	2SCOM-2 TX_DATA2	UDINT	RO	NO	0x7xx00A10
11	2SCOM-2 TX_DATA3	UDINT	RO	NO	0x7xx00B10
12	2SCOM-2 TX_DATA4	UDINT	RO	NO	0x7xx00C10
13	2SCOM-2 TX_DATA5	UDINT	RO	NO	0x7xx00D10
14	2SCOM-2 TX_DATA6	UDINT	RO	NO	0x7xx00E10
15	TX_status	UDINT	RO	NO	0x7xx00F10

Process data: (Output) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 2SCOM TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	15
1	2SCOM-1 TXCOUNTER and length	UDINT	RW	YES	0
2	2SCOM-1 TX_DATA1	UDINT	RW	YES	0

Index	0x7000+0x40*n: 2SCOM TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
3	2SCOM-1 TX_DATA2	UDINT	RW	YES	0
4	2SCOM-1 TX_DATA3	UDINT	RW	YES	0
5	2SCOM-1 TX_DATA4	UDINT	RW	YES	0
6	2SCOM-1 TX_DATA5	UDINT	RW	YES	0
7	2SCOM-1 TX_DATA6	UDINT	RW	YES	0
8	2SCOM-2 TXCOUNTER and length	UDINT	RW	YES	0
9	2SCOM-2 TX_DATA1	UDINT	RW	YES	0
10	2SCOM-2 TX_DATA2	UDINT	RW	YES	0
11	2SCOM-2 TX_DATA3	UDINT	RW	YES	0
12	2SCOM-2 TX_DATA4	UDINT	RW	YES	0
13	2SCOM-2 TX_DATA5	UDINT	RW	YES	0
14	2SCOM-2 TX_DATA6	UDINT	RW	YES	0
15	TX_status	UDINT	RW	YES	0

SubIndex 1: 2SCOM TX_length and counter

Bit	Description
Bit 0 to 15	Frame count. Cycle from 0 to 65535.
Bit 16 to 23	Segment number. When the count is the same but the segment numbers are different, it indicates that the frames are consecutive.

Bit	Description
Bit 24 to 31	Frame length. It indicates the length of the frame data.

Configuration data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8000+0x40*n$ is shown in the table below.

Index	0x8000+0x40*n: 2SCOM setpar1				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	UINT	RW	NO	12
1	2SCOM-1 enable and settings	UINT	RW	NO	0x0284
2	2SCOM-1 timeout settings	UINT	RW	NO	0x0023
3	2SCOM-1 datapacket_size	UINT	RW	NO	0x0014
4	2SCOM-2 enable and settings	UINT	RW	NO	0x0284
5	2SCOM-2 timeout settings	UINT	RW	NO	0x0023
6	2SCOM-2 datapacket_size	UINT	RW	NO	0x0014
7	module bar_code_H	UINT	RW	NO	0x0200
8	module bar_code_L	UINT	RW	NO	0x0200
9	Reserved parameters1	UINT	RW	NO	0x0000
10	Reserved parameters2	UINT	RW	NO	0x0000
11	Reserved parameters3	UINT	RW	NO	0x0000
12	Reserved parameters4	UINT	RW	NO	0x0000

Index	0x8000+0x40*n: 2SCOM setpar1				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
13	Reserved parameters5	UINT	RW	NO	0x0000
14	Reserved parameters6	UINT	RW	NO	0x0000
15	Reserved parameters7	UINT	RW	NO	0x0000

Serial port enabling and configuration

Bit	Description	Remark
Bit 0 to 3	Baud rate. Options 3 to 8 correspond to: 4.8 k, 9.6 k, 19.2 k, 38.4 k, 57.6 k, and 115.2 k, respectively.	Unit: bps
Bit 4 to 6	Reserved	
Bit 7	1: Enable port 0: Disable port	Default is 1.
Bit 8	Variable stop bit: 1: 2 bits 0: 1 bit	Default is 0.
Bit 9 to 10	Variable parity bit: 2: Odd parity check 1: Even parity check 0: No parity check	Default is 1.
Bit 11	Variable data bit: 1: 7 bits 0: 8 bits	Default is 0.
Bit 12	TX flow control: 1: TX disabled 0: TX enabled	Default is 0.
Bit 13	RX flow control: 1: RX disabled 0: RX enabled	Default is 0.

Bit	Description	Remark
Bit 14 to 15	Port protocol type: 2: RS422 1: RS485 0: RS232	Default is 0.

2SCOM timeout settings

Bit	Description	Remark
Bit 0 to 15	Range: 0 to 10000. Default is 35.	Unit: 0.1 character

2SCOM data packet settings

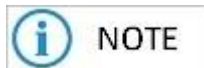
Bit	Description	Remark
Bit 0 to 7	Options include 4, 8, 12, 16, 20 (default), 24, 28, 32, 36, 40, 44, 48, 52, 56, and 60.	Unit: byte.
Bit 8	1: Data is transmitted in packets of the configured size. 0: Data is automatically controlled and sent frame by frame.	Default is 0.
Bit 9	1: Discard old data when the TX buffer is full. 0: Discard new data when the TX buffer is full.	Default is 0.
Bit 10	1: Discard old data when the RX buffer is full. 0: Discard new data when the RX buffer is full.	Default is 0.
Bit 11 to 15	Reserved	-

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 2SCOM module Diagnosis information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	UINT	RO	NO	15
1	2SCOM Module Diagnosis information	UINT	RO	YES	0
2		UINT	RO	YES	0

Index	0xA000+0x40*n: 2SCOM module Diagnosis information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	2SCOM-1 Diagnosis information				
3	2SCOM-2 Diagnosis information	UINT	RO	YES	0
4	2SCOM-1 Miss Frame count	UINT	RO	YES	0
5	2SCOM-2 Miss Frame count	UINT	RO	YES	0
6	reserve Diagnosis information0	UINT	RO	YES	0
7	...	...	...	...	...
15	reserve Diagnosis information9	UINT	RO	YES	0

**NOTE**

The fault code ID is represented using a 16-bit unsigned integer. Fault categories can be added based on actual development needs.

12.4.17 GL20-8ADV

Introduction

The GL20-8ADV module is an 8-channel analog input remote module. Powered by an external 24 VDC supply, the module supports voltage input mode, with a resolution of up to 16 bits, and selectable input range levels.

- Name: 8ADV Module
- Module category: Analog In
- Module identification code: 0x10F41031

Process data

Mapping data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A02+0x08*n is shown in the table below.

Index	0x1A02+0x08*n: 8ADV Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADV CH0	UDINT	RO	NO	0x6xx00110
2	8ADV CH1	UDINT	RO	NO	0x6xx00210
3	8ADV CH2	UDINT	RO	NO	0x6xx00310
4	8ADV CH3	UDINT	RO	NO	0x6xx00410
5	8ADV CH4	UDINT	RO	NO	0x6xx00510
6	8ADV CH5	UDINT	RO	NO	0x6xx00610
7	8ADV CH6	UDINT	RO	NO	0x6xx00710
8	8ADV CH7	UDINT	RO	NO	0x6xx00810

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 8ADV Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	9
1	8ADV Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	8ADV CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	8ADV CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	8ADV CH2 Diagnosis Information	UDINT	RO	NO	0xAxxx0410
5	8ADV CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0510

Index	0x1A04+0x08*n: 8ADV Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
6	8ADV CH4 Diagnosis Information	UDINT	RO	NO	0xAxxx0610
7	8ADV CH5 Diagnosis Information	UDINT	RO	NO	0xAxxx0710
8	8ADV CH6 Diagnosis Information	UDINT	RO	NO	0xAxxx0810
9	8ADV CH7 Diagnosis Information	UDINT	RO	NO	0xAxxx0910

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 8ADV Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADV CH0	UINT	RO	YES	0
2	8ADV CH1	UINT	RO	YES	0
3	8ADV CH2	UINT	RO	YES	0
4	8ADV CH3	UINT	RO	YES	0
5	8ADV CH4	UINT	RO	YES	0
6	8ADV CH5	UINT	RO	YES	0
7	8ADV CH6	UINT	RO	YES	0
8	8ADV CH7	UINT	RO	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 8ADV module transform mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADV module CH0 transform mode	USINT	RW	NO	0x80
2	8ADV module CH1 transform mode	USINT	RW	NO	0x80
3	8ADV module CH2 transform mode	USINT	RW	NO	0x80
4	8ADV module CH3 transform mode	USINT	RW	NO	0x80
5	8ADV module CH4 transform mode	USINT	RW	NO	0x80
6	8ADV module CH5 transform mode	USINT	RW	NO	0x80
7	8ADV module CH6 transform mode	USINT	RW	NO	0x80
8	8ADV module CH7 transform mode	USINT	RW	NO	0x80

Subindex 1: 8ADV module CH0 transform mode (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit 0 to 3	CH0 conversion method 0: -10 V to 10 V 1: 0 V to 10 V 2: -5 V to 5 V 3: 0 V to 5 V 4: 1 V to 5 V
Bit 4	Reserved (for other additional voltage conversion methods)
Bit 5 to 6	0: ± 20000 1: ± 32000 2: ± 27648 (default for PN platform) and ± 20000 (default for other platforms)

Bit 7	Ch0 channel enabling 0: Disable 1: Enable
-------	---

PN adaptation version - digital to analog conversion table

	Rated Output Range	Corresponding Rated Digital Value	Output Limit Range	Corresponding Digital Limit Range
Analog voltage input	-10 V to +10 V	-20000 to 20000 -32000 to 32000 -27648 to 27648	-10.24 V to 10.24 V	-20400 to 20400 -32640 to 32640 -28200 to 28200
	0 V to 10 V	0 to 20000 0 to 32000 0 to 27648	-0.5 V to 10.24 V	-1000 to 20400 -1600 to 32640 -1382 to 28200
	-5 V to 5 V	-20000 to 20000 -32000 to 32000 -27648 to 27648	-5.12 V to 5.12 V	-20400 to 20400 -32640 to 32640 -28200 to 28200
	0 V to 5 V	0 to 20000 0 to 32000 0 to 27648	-0.25 V to 5.12 V	-1000 to 20400 -1600 to 32640 -1382 to 28200
	1 V to 5 V	0 to 20000 0 to 32000 0 to 27648	0.8 V to 5.12 V	-1000 to 20400 -1600 to 32640 -1382 to 28200

For rated output ranges 0 V to 10 V, 0 V to 5 V, and 1 V to 5 V, when the digital values are 0 to 20000, the code value corresponding to the lower limit is -200. Only values less than -200 are determined as below the lower limit, and values greater than 20000 are determined as above the upper limit. In other modes, values exceeding the rated range are directly determined as beyond upper or lower limits, namely overflow or underflow.

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: 8ADV Module Filter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADV Module CH0 Filter	USINT	RW	NO	0x08
2	8ADV Module CH1 Filter	USINT	RW	NO	0x08
3	8ADV Module CH2 Filter	USINT	RW	NO	0x08
4	8ADV Module CH3 Filter	USINT	RW	NO	0x08
5	8ADV Module CH4 Filter	USINT	RW	NO	0x08
6	8ADV Module CH5 Filter	USINT	RW	NO	0x08
7	8ADV Module CH6 Filter	USINT	RW	NO	0x08
8	8ADV Module CH7 Filter	USINT	RW	NO	0x08

Subindex 1: 8ADV module CH0 Filter (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit	Description
Bit 0 to 7	CH0 channel filter parameter

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 8ADV Module Detect				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADV Module CH0 Detect	USINT	RW	NO	0
2	8ADV Module CH1 Detect	USINT	RW	NO	0
3		USINT	RW	NO	0

Index	0x8002+0x40*n: 8ADV Module Detect				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	8ADV Module CH2 Detect				
4	8ADV Module CH3 Detect	USINT	RW	NO	0
5	8ADV Module CH4 Detect	USINT	RW	NO	0
6	8ADV Module CH5 Detect	USINT	RW	NO	0
7	8ADV Module CH6 Detect	USINT	RW	NO	0
8	8ADV Module CH7 Detect	USINT	RW	NO	0

Subindex 1: 8ADV module CH0 Detect (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit	Description
Bit 0	CH0 peak hold function 0: Disable 1: Enable
Bit 1	CH0 wire break detection function 0: Disable 1: Enable
Bit 2	CH0 overlimit flag 0: Disable 1: Enable
Bit 3	CH0 overflow flag 0: Disable (default) 1: Enable
Bit 4 to 7	Reserved

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 8ADV Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	9
1	8ADV Module Diagnosis information	UINT	RO	YES	0
2	8ADV CH0 Diagnosis information	UINT	RO	YES	0
3	8ADV CH1 Diagnosis information	UINT	RO	YES	0
4	8ADV CH2 Diagnosis information	UINT	RO	YES	0
5	8ADV CH3 Diagnosis information	UINT	RO	YES	0
6	8ADV CH4 Diagnosis information	UINT	RO	YES	0
7	8ADV CH5 Diagnosis information	UINT	RO	YES	0
8	8ADV CH6 Diagnosis information	UINT	RO	YES	0
9	8ADV CH7 Diagnosis information	UINT	RO	YES	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.18 GL20-8ADI

Introduction

The GL20-8ADI module is an 8-channel analog input remote module. Powered by an external 24 VDC supply, the module supports current input mode, with a resolution of up to 16 bits, and selectable input range levels.

- Name: 8ADI Module
- Module category: Analog In
- Module identification code: 0x10F41032

Process data

Mapping data: For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A02+0x08*n$ is shown in the table below.

Index	0x1A02+0x08*n: 8ADI Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADI CH0	UDINT	RO	NO	0x6xx00110
2	8ADI CH1	UDINT	RO	NO	0x6xx00210
3	8ADI CH2	UDINT	RO	NO	0x6xx00310
4	8ADI CH3	UDINT	RO	NO	0x6xx00410
5	8ADI CH4	UDINT	RO	NO	0x6xx00510
6	8ADI CH5	UDINT	RO	NO	0x6xx00610
7	8ADI CH6	UDINT	RO	NO	0x6xx00710
8	8ADI CH7	UDINT	RO	NO	0x6xx00810

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A04+0x08*n$ is shown in the table below.

Index	0x1A04+0x08*n: 8ADI Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	9
1	8ADI Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110

Index	0x1A04+0x08*n: 8ADI Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	8ADI CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	8ADI CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	8ADI CH2 Diagnosis Information	UDINT	RO	NO	0xAxxx0410
5	8ADI CH3 Diagnosis Information	UDINT	RO	NO	0xAxxx0510
6	8ADI CH4 Diagnosis Information	UDINT	RO	NO	0xAxxx0610
7	8ADI CH5 Diagnosis Information	UDINT	RO	NO	0xAxxx0710
8	8ADI CH6 Diagnosis Information	UDINT	RO	NO	0xAxxx0810
9	8ADI CH7 Diagnosis Information	UDINT	RO	NO	0xAxxx0910

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 8ADI Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADI CH0	INT	RO	YES	0
2	8ADI CH1	INT	RO	YES	0
3	8ADI CH2	INT	RO	YES	0
4	8ADI CH3	INT	RO	YES	0

Index	0x6000+0x40*n: 8ADI Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
5	8ADI CH4	INT	RO	YES	0
6	8ADI CH5	INT	RO	YES	0
7	8ADI CH6	INT	RO	YES	0
8	8ADI CH7	INT	RO	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 8ADI module transform mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADI module CH0 transform mode	USINT	RW	NO	0x85
2	8ADI module CH1 transform mode	USINT	RW	NO	0x85
3	8ADI module CH2 transform mode	USINT	RW	NO	0x85
4	8ADI module CH3 transform mode	USINT	RW	NO	0x85
5	8ADI module CH4 transform mode	USINT	RW	NO	0x85
6	8ADI module CH5 transform mode	USINT	RW	NO	0x85
7	8ADI module CH6 transform mode	USINT	RW	NO	0x85
8	8ADI module CH7 transform mode	USINT	RW	NO	0x85

Subindex 1: 8ADI module CH0 transform mode (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit 0 to 3	CH0 conversion method
	5: -20 mA to 20 mA

	6: 0 mA to 20 mA 7: 4 mA to 20 mA
Bit 4	Reserved (for other additional current conversion methods)
Bit 5 to 6	0: ± 20000 1: ± 32000 2: ± 27648 (default for PN platform) and ± 20000 (default for other platforms)
Bit 7	Ch0 channel enable 0: Disable 1: Enable

PN adaptation version - digital to analog conversion table

	Rated Output Range	Corresponding Rated Digital Value	Output Limit Range	Corresponding Digital Limit Range
Analog current output	-20 mA to 20 mA	-20000 to 20000 (-32000 to 32000) -27648 to 27648	-20.56 mA to 20.56 mA	-20400 to 20400 (-32640 to 32640) -28200 to 28200
	0 mA to 20 mA	0 to 20000 (0 to 32000) 0 to 27648	-1 mA to 20.56 mA	-1000 to 20400 (-1600 to 32640) -1382 to 28200
	4 mA to 20 mA	0 to 20000 (0 to 32000) 0 to 27648	3.2 mA to 20.56 mA	-1000 to 20400 (-1600 to 32640) -1382 to 28200

For rated output ranges 0 mA to 20 mA and 4 mA to 20 mA, when the digital values are 0 to 20000, the code value corresponding to the lower limit is -200. Only values less than -200 are determined as below the lower limit, and values greater than 20000 are determined as above the upper limit. In other modes, values exceeding the rated range are directly determined as beyond upper or lower limits, namely overflow or underflow.

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: 8ADI Module Filter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1		USINT	RW	NO	0x08

Index	0x8001+0x40*n: 8ADI Module Filter				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	8ADI Module CH0 Filter				
2	8ADI Module CH1 Filter	USINT	RW	NO	0x08
3	8ADI Module CH2 Filter	USINT	RW	NO	0x08
4	8ADI Module CH3 Filter	USINT	RW	NO	0x08
5	8ADI Module CH4 Filter	USINT	RW	NO	0x08
6	8ADI Module CH5 Filter	USINT	RW	NO	0x08
7	8ADI Module CH6 Filter	USINT	RW	NO	0x08
8	8ADI Module CH7 Filter	USINT	RW	NO	0x08

Subindex 1: 8ADI module CH0 Filter (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit	Description
Bit 0 to 7	CH0 channel filter parameter

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 8ADI Module Detect				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8ADI Module CH0 Detect	USINT	RW	NO	0
2	8ADI Module CH1 Detect	USINT	RW	NO	0
3	8ADI Module CH2 Detect	USINT	RW	NO	0

Index	0x8002+0x40*n: 8ADI Module Detect				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
4	8ADI Module CH3 Detect	USINT	RW	NO	0
5	8ADI Module CH4 Detect	USINT	RW	NO	0
6	8ADI Module CH5 Detect	USINT	RW	NO	0
7	8ADI Module CH6 Detect	USINT	RW	NO	0
8	8ADI Module CH7 Detect	USINT	RW	NO	0

Subindex 1: 8ADI module CH0 Detect (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit	Description
Bit 0	CH0 peak hold function 0: Disable 1: Enable
Bit 1	CH0 wire break detection function 0: Disable 1: Enable
Bit 2	CH0 overlimit flag 0: Disable 1: Enable
Bit 3	CH0 overflow flag 0: Disable (default) 1: Enable
Bit 4 to 7	Reserved

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 8ADI Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	9
1	8ADI Module Diagnosis Information	UINT	RO	NO	0
2	8ADI CH0 Diagnosis Information	UINT	RO	NO	0
3	8ADI CH1 Diagnosis Information	UINT	RO	NO	0
4	8ADI CH2 Diagnosis Information	UINT	RO	NO	0
5	8ADI CH3 Diagnosis Information	UINT	RO	NO	0
6	8ADI CH4 Diagnosis Information	UINT	RO	NO	0
7	8ADI CH5 Diagnosis Information	UINT	RO	NO	0
8	8ADI CH6 Diagnosis Information	UINT	RO	NO	0
9	8ADI CH7 Diagnosis Information	UINT	RO	NO	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.19 GL20-2SSI

Introduction

The GL20-2SSI module serves as an interface between absolute (SSI) type encoders and controllers, enabling the processing of periodically sampled encoder values within the controller.

- Name: 2SSI Module
- Module category: Communication
- Module identification code: 0x10F41093

Process data

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A03+0x08*n$ is shown in the table below.

Index	0x1A03: Channel Para Input				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	12
1	Ch0 Para Input	UDINT	RO	NO	0x60000120
2 to 6	Ch0 Reserve data0	UDINT	RO	NO	...
7	Ch1 Para Input	UDINT	RO	NO	0x60000720
9-12	Ch1 Reserve data0	UDINT	RO	NO	...

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A04+0x08*n$ is shown in the table below.

Index	0x1A04: 2SSI Diagnosis Information mapping				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	12
1	2SSI Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	2SSI-CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	2SSI-CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310

Index	0x1A04: 2SSI Diagnosis Information mapping				
Sub-index	Name	Data type	Access type	Mapping	Default value
4	reserve0	UDINT	RO	NO	0xAxxx0410
5-11	.....	.....	.....	.....	.....
12	reserve8	UDINT	RO	NO	0xAxxx0C10

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x08*n is shown in the table below.

Index	0x6000: 2SSI RX_data				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	12
1	Chn_0 Para Input	UDINT	RO	YES	0
2	Chn_0 Reserve_0	UDINT	RO	YES	0
3 to 6	.....	.....	.....	.....	.....
7	Chn_1 Para Input	UDINT	RO	YES	0
8	Chn_1 Reserve_0	UDINT	RO	YES	0
9-12	.....	.....	.....	.....	.....

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000: 2SSI Chn_0 ConfigData				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RW	NO	12
1	Chn_0 Enable and BaudRate	UINT	RW	NO	0x0401
2	Chn_0 Frame Format	UINT	RW	NO	0x0104
3	Chn_0 Parity Check and Pulse interval	UINT	RW	NO	0x0000

Index	0x8000: 2SSI Chn_0 ConfigData				
Sub-index	Name	Data type	Access type	Mapping	Default value
4	Chn_0 Frame Length and MSB	UINT	RW	NO	0X1919
5	Chn_0 Reserve0	UINT	RW	NO	0X0000
6	Chn_0 Reserve1	UINT	RW	NO	0X0000
7	Chn_1 Enable and BaudRate	UINT	RW	NO	0x0401
8	Chn_1 Frame Format	UINT	RW	NO	0x0104
9	Chn_1 Parity Check and Pulse interval	UINT	RW	NO	0x0000
10	Chn_1 Frame Length and MSB	UINT	RW	NO	0X1919
11	Chn_1 Reserve0	UINT	RW	NO	0X0000
12	Chn_1 Reserve1	UINT	RW	NO	0X0000

SubIndex 001:

Bit	Description	Remark
Bit 0	Channel 0 enable: 0: Disable 1: Enable	-
Bit 1	Multi-sampling mode: 0: Disable 1: Enable	-
Bit 2 to 7	Reserved	-
Bit 8 to 11	Baud rate, in kbit/s 0: 100K 1: 200K 2: 300K 3: 400K 5: 500K	Unit: kbps

Bit	Description	Remark
	6: 1000K 7: 1250K 8: 1500K 9: 2000K	
Bit 12 to 15	Reserved	-

SubIndex 002:

Bit	Description	Remark
Bit 0	Coding format: 0: Gray code 1: Binary code	-
Bit 1 to 2	Data format conversion: 0: Gray code ->binary code 1: Binary code ->Gray code 2: Disable	-
Bit 3 to 7	Reserved	-
Bit 8 to 9	Frame type: 0: SinglTurn-13Bit 1: MultiTurn-25Bit 2: Variable	-
Bit 10 to 15	Reserved	-

SubIndex 003:

Bit	Description	Remark
Bit 0 to 2	Parity check 0: Disable 1: Odd 2: Even	-
Bit 3	Direction inversion: 0: No invert sign 1: Invert sign	Inverts the encoder value to adapt to the direction of motor rotation.

Bit	Description	Remark
Bit 4 to 7	Reserved	-
Bit 8 to 10	Frame TX interval: 0: 1024 1: 16 2: 32 3: 48 4: 64 5: 512	-
Bit 11 to 15	Reserved	-

SubIndex004 series PLC

Bit	Description	Remark
Bit 0 to 7	Data frame size	-
Bit 8 to 15	Data bit length	-

SubIndex007-SubIndex0012 refers to SubIndex001-SubIndex006.

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000: 2SSI module Diagnosis information				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	12
1	SSI Module Diagnosis information	UINT	RO	NO	0
2	Ch0 Diagnosis information	UINT	RO	NO	0
3	Ch1 Diagnosis information	UINT	RO	NO	0
4-12	reserve0 to 8	UINT	RO	NO	0

**NOTE**

See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.20 GL20-2S485

Introduction

GL20-2S485 is a dual-channel RS485 communication module.

- Name: GL20-2S485
- Module category: Communication
- Module identification code: 0x10F41091

Process data

Mapping data: (Input) For the module in slot n (n=0 to 31), the object dictionary definition for index 0x1A03+0x08*n is shown in the table below:

Index	0x1A03+0x08*n: RS485 Input Mapping				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	15
1	RS485-0 RXCOUNTER and length	UDINT	RO	NO	0x6xx00110
2	RS485-0 RX_DATA1	UDINT	RO	NO	0x6xx00210
3	RS485-0 RX_DATA2	UDINT	RO	NO	0x6xx00310
4	RS485-0 RX_DATA3	UDINT	RO	NO	0x6xx00410
5	RS485-0 RX_DATA4	UDINT	RO	NO	0x6xx00510
6	RS485-0 RX_DATA5	UDINT	RO	NO	0x6xx00610
7	RS485-0 RX_DATA6	UDINT	RO	NO	0x6xx00710
8	RS485-1 RXCOUNTER and length	UDINT	RO	NO	0x6xx00810
9	RS485-1 RX_DATA1	UDINT	RO	NO	0x6xx00910

Index	0x1A03+0x08*n: RS485 Input Mapping				
Sub-index	Name	Data type	Access type	Mapping	Default value
10	RS485-1 RX_DATA2	UDINT	RO	NO	0x6xx00A10
11	RS485-1 RX_DATA3	UDINT	RO	NO	0x6xx00B10
12	RS485-1 RX_DATA4	UDINT	RO	NO	0x6xx00C10
13	RS485-1 RX_DATA5	UDINT	RO	NO	0x6xx00D10
14	RS485-1 RX_DATA6	UDINT	RO	NO	0x6xx00E10
15	RX STATUS	UDINT	RO	NO	0x6xx00F10

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 2S485 Module Diagnosis Information Mapping				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	15
1	RS485 Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	RS485-0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	RS485-1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
4	RS485-0 ERROR FRAME COUNTER	UDINT	RO	NO	0xAxxx0410
5	RS485-1 ERROR FRAME COUNTER	UDINT	RO	NO	0xAxxx0510
6	RS485-0 REEOR FRAME SEGNUM	UDINT	RO	NO	0xAxxx0610
7	RS485-1 REEOR FRAME SEGNUM	UDINT	RO	NO	0xAxxx0710
8	reserve Diagnosis information0	UDINT	RO	NO	0xAxxx0810
9-14	...	...	...	...	...

Index	0x1A04+0x08*n: 2S485 Module Diagnosis Information Mapping				
Sub-index	Name	Data type	Access type	Mapping	Default value
15	reserve Diagnosis information7	UDINT	RO	NO	0xAxxx0E10

Process data: (Input) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: RS485 RX_data				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	15
1	RS485-0 RXCOUNTER and length	UDINT	RW	YES	0
2	RS485-0 RX_DATA1	UDINT	RW	YES	0
3	RS485-0 RX_DATA2	UDINT	RW	YES	0
4	RS485-0 RX_DATA3	UDINT	RW	YES	0
5	RS485-0 RX_DATA4	UDINT	RW	YES	0
6	RS485-0 RX_DATA5	UDINT	RW	YES	0
7	RS485-0 RX_DATA6	UDINT	RW	YES	0
8	RS485-1 RXCOUNTER and length	UDINT	RW	YES	0
9	RS485-1 RX_DATA1	UDINT	RW	YES	0
10	RS485-1 RX_DATA2	UDINT	RW	YES	0
11	RS485-1 RX_DATA3	UDINT	RW	YES	0
12	RS485-1 RX_DATA4	UDINT	RW	YES	0
13	RS485-1 RX_DATA5	UDINT	RW	YES	0
14	RS485-1 RX_DATA6	UDINT	RW	YES	0
15	RX STATUS	UDINT	RW	YES	0

SubIndex 1: RS485-0 RXCOUNTER and length

Bit	Remark
Bit 0 to 15	Channel-0 frame count, cycles from 0 to 65535.
Bit 16 to 23	Channel-0 segment number: When the count is the same but the segment numbers are different, it indicates that the frames are consecutive.
Bit 24 to 31	Channel-0 data length

SubIndex 2-7: Communication data received on channel 0

SubIndex 8-14: Channel-1 data, the definition of which is the same as channel-0.

SubIndex 15: Reserved

Mapping data: (Output) For the module in slot n (n=0 to 31), the object dictionary definition for index 0x1603+0x08*n is shown in the table below:

Index	0x1603+0x08*n: RS485 Output Mapping				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	15
1	RS485-0 TXCOUNTER and length	UDINT	RO	NO	0x7xx00110
2	RS485-0 TX_DATA1	UDINT	RO	NO	0x7xx00210
3	RS485-0 TX_DATA2	UDINT	RO	NO	0x7xx00310
4	RS485-0 TX_DATA3	UDINT	RO	NO	0x7xx00410
5	RS485-0 TX_DATA4	UDINT	RO	NO	0x7xx00510
6	RS485-0 TX_DATA5	UDINT	RO	NO	0x7xx00610
7	RS485-0 TX_DATA6	UDINT	RO	NO	0x7xx00710
8	RS485-1 TXCOUNTER and length	UDINT	RO	NO	0x7xx00810
9	RS485-1 TX_DATA1	UDINT	RO	NO	0x7xx00910
10	RS485-1 TX_DATA2	UDINT	RO	NO	0x7xx00A10
11	RS485-1 TX_DATA3	UDINT	RO	NO	0x7xx00B10
12	RS485-1 TX_DATA4	UDINT	RO	NO	0x7xx00C10

Index	0x1603+0x08*n: RS485 Output Mapping				
Sub-index	Name	Data type	Access type	Mapping	Default value
13	RS485-1 TX_DATA5	UDINT	RO	NO	0x7xx00D10
14	RS485-1 TX_DATA6	UDINT	RO	NO	0x7xx00E10
15	TX STATUS	UDINT	RO	NO	0x7xx00F10

Process data: (Output) For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: RS485 TX_data				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	15
1	RS485-0 TXCOUNTER and length	UDINT	RW	YES	0
2	RS485-0 TX_DATA1	UDINT	RW	YES	0
3	RS485-0 TX_DATA2	UDINT	RW	YES	0
4	RS485-0 TX_DATA3	UDINT	RW	YES	0
5	RS485-0 TX_DATA4	UDINT	RW	YES	0
6	RS485-0 TX_DATA5	UDINT	RW	YES	0
7	RS485-0 TX_DATA6	UDINT	RW	YES	0
8	RS485-1 TXCOUNTER and length	UDINT	RW	YES	0
9	RS485-1 TX_DATA1	UDSINT	RW	YES	0
10	RS485-1 TX_DATA2	UDSINT	RW	YES	0
11	RS485-1 TX_DATA3	UDSINT	RW	YES	0
12	RS485-1 TX_DATA4	UDSINT	RW	YES	0
13	RS485-1 TX_DATA5	UDSINT	RW	YES	0
14	RS485-1 TX_DATA6	UDSINT	RW	YES	0
15	TX STATUS	UDSINT	RW	YES	0

SubIndex 1: RS485-0 TXCOUNTER and length

Bit	Remark	Remark
Bit 0 to 15	Channel-0 frame count, cycles from 0 to 65535.	-
Bit 16 to 23	Channel-0 segment number: When the frame length exceeds 24, you can set multiple frames with the same counter but different segment numbers. The module will combine them into one frame and send it.	-
Bit 24 to 31	Data length to be sent on channel 0.	-

SubIndex 2-7: Communication data to be sent on channel 0.

SubIndex 8-14: Channel-1 data, the definition of which is the same as channel-0.

SubIndex 15: Reserved.

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n 2S485 setpar1				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	UINT	RW	NO	15
1	2S485-0 enable and settings	UINT	RW	NO	0x0084
2	2S485-0 message_interval	UINT	RW	NO	0x0023
3	2S485-0 Number_terminals	UINT	RW	NO	0x001F
4	2S485-0 datapacket_size	UINT	RW	NO	0x0014
5	2S485-0 TX_buffersize	UINT	RW	NO	0x0600
6	2S485-0 RX_buffersize	UINT	RW	NO	0x0600
7	2S485-1 enable and settings	UINT	RW	NO	0x0084
8		UINT	RW	NO	0x0023

Index	0x8000+0x40*n 2S485 setpar1				
Sub-index	Name	Data type	Access type	Mapping	Default value
	2S485-1 message_interval				
9	2S485-1 Number_termin als	UINT	RW	NO	0x001F
10	2S485-1 datapacket_size	UINT	RW	NO	0x0014
11	2S485-1 TX_buffersize	UINT	RW	NO	0x0600
12	2S485-1 RX_buffersize	UINT	RW	NO	0x0600
13	module bar_code_H	UINT	RW	NO	0x0200
14	module bar_code_L	UINT	RW	NO	0x0200
15	reserved parameters	UINT	RW	NO	0x0000

SubIndex 1: 2S485-0 enable and settings

Bit	Description	Remark
Bit 0 to 3	Baud Rate: 3-9 correspond to 48, 96, 192, 384, 576, 1152, and 2304, respectively.	Unit: 0.1 kbps.
Bit 4 to 6	Reserved	-
Bit 7	1: Enable 0: Disable	-
Bit 8	Variable stop bit: 1: 2 bit 0: 1 bit	-
Bit 9 to 10	Variable parity bit: 2: Odd 1: Even	-

Bit	Description	Remark
	0: No parity	
Bit 11	Variable data bit: 1: 7 bit 0: 8 bit	-
Bit 12 to 13	Flow control 2: TX flow only 1: RX flow only 0: No flow control	-
Bit 14 to 15	Reserved	-

SubIndex 2: 2S485-0 message_interval

Bit	Description	Remark
Bit 0 to 15	0-65565, default 35	Unit: 0.1 characters

SubIndex 3: 2S485-0 Number_terminals

Bit	Description	Remark
Bit 0 to 7	1 to N, the maximum value of N is 32.	-
Bit 8 to 15	RXPDO write interval, unit: milliseconds	0 defaults to 5ms.

SubIndex 4: 2S485-0 datapacket_size

Bit	Description	Remark
Bit 0 to 7	Supports 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, and 60 bytes.	-
Bit 8 to 14	Reserved	-
Bit 15	1: Send data based on packet size 0: Send data according to software flow control	-

SubIndex 5: 2S485-0 TX_buffersize

Bit	Description	Remark
Bit 0 to 14	TX buffer size setting	-
Bit 15	TX buffer policy 1: Discard old data	-

Bit	Description	Remark
	0: Discard new data	

SubIndex6: 2S485-0 RX_buffersize

Bit	Description	Remark
Bit 0 to 14	RX buffer size setting	-
Bit 15	RX buffer policy 1: Discard old data 0: Discard new data	-

SubIndex 7: 2S485-1 enable and settings

Bit	Description	Remark
Bit 0 to 3	Baud rate: 1-9 correspond to 12, 24, 48, 96, 192, 384, 576, 1152, and 2304, respectively.	Unit: 0.1 kbps.
Bit 5 to 6	Reserved	-
Bit 7	1: Enable 0: Disable	-
Bit 8	Variable stop bit: 1: 2 bit 0: 1 bit	-
Bit 9 to 10	Variable parity bit: 2: Odd check 1: Even check 0: No check	-
Bit 11	Variable data bit: 1: 7 bit 0: 8 bit	-
Bit 12 to 13	Flow control 2: TX flow only 1: RX flow only 0: No flow control	-
Bit 14 to 15	Reserved	-

SubIndex 8: 2S485-1 message_interval

Bit	Description	Remark
Bit 0 to 15	0-65565, default 35	Unit: 0.1 characters

SubIndex 9: 2S485-1 Number_terminals

Bit	Description	Remark
Bit 0 to 7	1 to N, the maximum value of N is 32.	-
Bit 8 to 15	RXPDO write interval, unit: milliseconds	0 defaults to 5ms.

SubIndex 10: 2S485-1 datapacket_size

Bit	Description	Remark
Bit 0 to 7	Supports 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, and 60 bytes.	-
Bit 8 to 14	Reserved	-
Bit 15	1: Send data based on packet size 0: Send data according to software flow control	-

SubIndex 11: 2S485-1 TX_buffersize

Bit	Description	Remark
Bit 0 to 14	TX buffer size setting	-
Bit 15	TX buffer policy 1: Discard old data 0: Discard new data	-

SubIndex 12: 2S485-1 RX_buffersize

Bit	Description	Remark
Bit 0 to 14	RX buffer size setting	-
Bit 15	RX buffer policy 1: Discard old data 0: Discard new data	-

SubIndex 13: module bar_code_H

Bit	Description	Remark
Bit 0 to 15	16 high bits of the machine barcode.	-

SubIndex 14: module bar_code_L

Bit	Description	Remark
Bit 0 to 15	16 low bits of the machine barcode.	-

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 2S485 module Diagnosis information				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	UINT	RO	NO	15
1	2S485 Module Diagnosis information	UINT	RO	NO	0
2	2S485-0 Diagnosis information	UINT	RO	NO	0
3	2S485-1 Diagnosis information	UINT	RO	NO	0
4	2S485-0 ERROR FRAME COUNTER	UINT	RO	RO	0
5	2S485-1 ERROR FRAME COUNTER	UINT	RO	NO	0
6	2S485-0 REEOR FRAME SEGNUM	UINT	RO	NO	0
7	2S485-1 REEOR FRAME SEGNUM	UINT	RO	NO	0
8	reserve Diagnosis information0	UINT	RO	RO	0
9	reserve Diagnosis information1	UINT	RO	RO	0
10	reserve Diagnosis information2	UINT	RO	RO	0
11	reserve Diagnosis information3	UINT	RO	RO	0

Index	0xA000+0x40*n: 2S485 module Diagnosis information				
Sub-index	Name	Data type	Access type	Mapping	Default value
12	reserve Diagnosis information4	UINT	RO	RO	0
13	reserve Diagnosis information5	UINT	RO	RO	0
14	reserve Diagnosis information6	UINT	RO	RO	0
15	reserve Diagnosis information7	UINT	RO	RO	0

12.4.21 GL20-0404ETP-5V

Introduction

The GL20-0404ETP-5V module is provided with 4 digital inputs and 4 digital outputs.

- Name: DO04 Module
- Module category: Digital Out
- Module identification code: 0x10F41064

Process data

Mapping data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1600+0x08*n is shown in the table below.

Index	0x1600+0x08*n: 0404ETP Output-bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	8
1	Digital output bit 0	UDINT	RO	NO	0x7xx00101
2	Digital output bit 1	UDINT	RO	NO	0x7xx00201
3	Digital output bit 2	UDINT	RO	NO	0x7xx00301
4	Digital output bit 3	UDINT	RO	NO	0x7xx00401
5	Invalid bit 0	UDINT	RO		0x7xx00501
6	...	...	...	...	...

Index	0x1600+0x08*n: 0404ETP Output-bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
8	Invalid bit 3	UDINT	RO	NO	0x7xx00801

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1601+0x08*n is shown in the table below.

Index	0x1601+0x08*n: 0404ETP Output-8bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-8bit	UDINT	RO	NO	0x7xx10108

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1602+0x08*n is shown in the table below.

Index	0x1602+0x08*n: 0404ETP Output-16bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	Digital output CH0-16bit	UDINT	RO	NO	0x7xx20110

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A00+0x08*n is shown in the table below.

Index	0x1A00+0x08*n: 0404ETP input-bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	8
1	Digital input bit 0	UDINT	RO	NO	0x6xx00101
2	Digital input bit 1	UDINT	RO	NO	0x6xx00201
3	Digital input bit 2	UDINT	RO	NO	0x6xx00301
4	Digital input bit 3	UDINT	RO	NO	0x6xx00401
5	Invalid bit 0	UDINT	RO	NO	0x6xx00501
6	...	...	...	...	...
8	Invalid bit 3	UDINT	RO	NO	0x6xx00801

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A01+0x08*n is shown in the table below.

Index	0x1A01+0x08*n: 0404ETP input-8-bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	Digital input CH0-8bit	UDINT	RO	NO	0x6xx10108

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A02+0x08*n is shown in the table below.

Index	0x1A02+0x08*n: 0404ETP input-16bit mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	Digital input CH0-16bit	UDINT	RO	NO	0x6xx20110

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 0404ETP Module Diagnosis Information Mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	6
1	0404ETP Module 24V Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	0404ETP Module 5V Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	0404ETP DO-CH0 Diagnostic Information	UDINT	RO	NO	0xAxxx0310
4	0404ETP DO-CH1 Diagnostic Information	UDINT	RO	NO	0xAxxx0410
5	0404ETP DO-CH2 Diagnostic Information	UDINT	RO	NO	0xAxxx0510

Index	0x1A04+0x08*n: 0404ETP Module Diagnosis Information Mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
6	0404ETP DO-CH3 Diagnostic Information	UDINT	RO	NO	0xAxxx0610

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 0404ETP input				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	0404ETP Digital Input CH0-8-bit	USINT	RO	YES	0

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 0404ETP output				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	0404ETP Digital Output CH0-8-bit	USINT	RW	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 0404ETP DI-CH0 Filter time parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	2
1	Digital input Filter time 8bit	UINT	RO	NO	0x04

Detected filter time setting. Each group can independently set the filter time. The default value is 0x0004, corresponding to a filter time of 1ms. The setting range is as follows.

Filter time	Description	Filter time	Description
0x0000	No filter	-	-

Filter time	Description	Filter time	Description
0x0001	The filter time is 0.25 ms.	0x0010	The filter time is 4 ms.
0x0002	The filter time is 0.5 ms.	0x0020	The filter time is 8 ms.
0x0004	The filter time is 1 ms.	0x0040	The filter time is 16 ms.
0x0008	The filter time is 2 ms.	0x0080	The filter time is 32 ms.

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: 0404ETP module configure stopmode parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	DO module CH0-8bit stop mode after EtherCAT link lost	USINT	RW	NO	0x0F

Subindex 1: DO module CH0-8bit stop mode after EtherCAT link lost

Bit 0 to 4	Output mode upon stop: each bit corresponds to an output port. 0: Keep present output status 1: Output to preset value defined in object dictionary 8002
------------	--

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8002+0x40*n$ is shown in the table below.

Index	0x8002+0x40*n: 0404ETP module configure stopvalue parameters				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	1
1	DO module 8bit stopvalue after EtherCAT lost link	USINT	RW	NO	0

Subindex 1: DO module 8bit stopvalue after EtherCAT lost link

Bit 0 to 4	Output preset value upon stop: each bit corresponds to the preset value of a output port. 0: output 0 1: output 1
------------	---

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 0404ETP Diagnosis Information				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	6
1	0404ETP Module 24V Diagnosis Information	UINT	RO	YES	0
2	0404ETP Module 5V Diagnosis Information	UINT	RO	YES	0
3	0404ETP DO-CH0 Diagnosis Information	UINT	RO	YES	0
4	0404ETP DO-CH1 Diagnosis Information	UINT	RO	YES	0
5	0404ETP DO-CH2 Diagnosis Information	UINT	RO	YES	0
6	0404ETP DO-CH3 Diagnosis Information	UINT	RO	YES	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.22 GL20-PS2

Introduction

GL20-PS2 is a power supply module that provides power to subsequent modules.

- Name: Power supply module
- Module category: Digital Out
- Module identification code: 0x10F41080

Process data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: PS2 Module Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	PS2 Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110

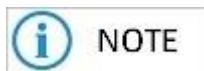
Configuration data

/

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: PS2 Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	1
1	PS2 Module Diagnosis Information	UINT	RO	NO	0



Refer to the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.23 GL20-1DNM

Introduction

The GL20-1DNM module is a DeviceNet Master (DNM) module.

- Name: GL20-1DNM
- Module category: Communication
- Module identification code: 0x10F41095

Process data

The process data for the DNM module is provided in the I/O mapping under the virtual station, not in the that of the EtherCAT bus. Therefore, the process data is not described in this section.

Configuration data

The configuration data for the DNM module is divided into two parts. First is the basic configuration of the module, as shown in the object dictionary below. Second is the configuration items for each DeviceNet slave, which are packaged by the backend and sent to the PLC, and are not described in the object dictionary.

For the module in slot n ($n = 0$ to 3), the object dictionary definition for index $0x8000+0x40*n$ is shown in the table below.

Index	0x8000+0x40*n: 1DNM setpar0				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	UINT	RW	NO	15
1	MAC_ID And Device_Type	UDINT	RW	NO	0x0044003F
2	ProductName_0	UDINT	RW	NO	0x30324C47
3	ProductName_1	UDINT	RW	NO	0x4E44312D
4	ProductName_2	UDINT	RW	NO	0x2020204D
5	ProductName_3	UDINT	RW	NO	0x00000000
6	Vendor ID	UDINT	RW	NO	0x0000067C
7	Product Code	UDINT	RW	NO	0x00000000
8	Revision	UDINT	RW	NO	0x00000000
9	Serial number	UDINT	RW	NO	0x00000000
10	Reserved_0	UDINT	RW	NO	0x00000000
11	Reserved_1	UDINT	RW	NO	0x00000000
12	Reserved_2	UDINT	RW	NO	0x00000000
13	Reserved_3	UDINT	RW	NO	0x00000000
14	Reserved_4	UDINT	RW	NO	0x00000000
15	Reserved_5	UDINT	RW	NO	0x00000000

Subindices 1 to 9 are the configuration data required by the DNM module. For details, see Appendix II.

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 1DNM setpar1				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	UINT	RW	NO	15
1	BaudRate	UINT	RW	NO	0x007D
2	Config Verify Code	UINT	RW	NO	0x0000
3	Transmission Flag	UINT	RW	NO	0x0000
4	Reserved_0	UINT	RW	NO	0x0000
5	Reserved_1	UINT	RW	NO	0x0000
6	Reserved_2	UINT	RW	NO	0x0000
7	Reserved_3	UINT	RW	NO	0x0000
8	Reserved_4	UINT	RW	NO	0x0000
9	Reserved_5	UINT	RW	NO	0x0000
10	Reserved_6	UINT	RW	NO	0x0000
11	Reserved_7	UINT	RW	NO	0x0000
12	Reserved_8	UINT	RW	NO	0x0000
13	Reserved_9	UINT	RW	NO	0x0000
14	Reserved_10	UINT	RW	NO	0x0000
15	LED For Produce	UINT	RW	NO	0x0000

Subindex 2 is the configuration verification code. It is used to verify the DeviceNet configuration data stored in the Flash of the DNM module (This configuration verification code is not used in the new scheme).

Subindex 3 is the transmission mode flag. When set to 0, it indicates the transmission mode where the address mapping is included in the PDO data, and the size of the data transmitted in one frame is 120 bytes. When set to 1, it indicates the transmission mode where addresses are pre-mapped before PDO data transmission. Default is 0.

Subindex 15 is used for test equipment indicator control. The test equipment controls the LED indicators on the module by sending SDO commands.

Diagnostic data

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: DeviceNet Master Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	15
1	Module Err	UINT	RO	NO	0
2	OffLine Number	UINT	RO	NO	0
3	Slave Offline1_Flag	UINT	RO	NO	0
4	Slave Offline2_Flag	UINT	RO	NO	0
5	Slave Offline3_Flag	UINT	RO	NO	0
6	Slave Offline4_Flag	UINT	RO	NO	0
7	1DNM Status	UINT	RO	NO	0
8	DNSlave Station	UINT	RO	NO	0
9	DNSlave ErrCode	UINT	RO	NO	0
10	CANRec Frame Count	UINT	RO	NO	0
11	REC Err Count	UINT	RO	NO	0
12	TEC Err Count	UINT	RO	NO	0
13	CAN BUS-OFF Count	UINT	RO	NO	0
14	CAN Load Rate	UINT	RO	NO	0
15	Reserved_0	UINT	RO	NO	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

- DN master state machine

Status Code	Description
0	Normal operational status
2	Slave initialization
4	Master initialization
5	Duplicate name detection
6	Faulty status

- DN slave fault code

:16#08	DNSlave Station	RO	UINT	16#003F
:16#09	DNSlave ErrCode	RO	UINT	16#0003

The reported slave faults are queued. If multiple slaves under the master are faulty, the data in the queue will be updated continuously, including slave ID and fault codes, as shown below.

Fault Code	Fault Name	Fault Description
0x0000	Online	The device is online.
0x0001	Offline	The device is disconnected. Check the configuration.
0x0002	Disconnected	The connection is abnormally closed. Check the configuration.
0x0003	Duplicate ID	A duplicate ID is sent, or a device with duplicate MAC ID is detected.
0x0004	ProduceSize Error	The received data length is configured improperly.
0x0008	ConsumerSize Error	The sent data length is configured improperly.
0x0010	VendorID Error	The manufacturer ID is configured improperly (disabled).
0x0020	DeviceType Mismatch	The device type is configured improperly (disabled).
0x0040	ProductCode Mismatch	The product code is configured improperly (disabled).
0x0080	CCV Mismatch	The connection rate is configured improperly (disabled).

- Bus communication statistics

Data	Description
recFrameps	Number of received CAN messages
sumRecErrCn	Number of received faults
sumTranErrCnt	Number of transmitted faults

Data	Description
sumBusOffNoCnt	Bus disconnection count
overload	Load rate

12.4.24 GL20-2HC

Introduction

The GL20-2HC module is a counting module with two high-speed input channels.

- Name: Encoder Module
- Module category: Encoder
- Module identification code: 0x10F41082

Process data

Mapping data (Output): For the module in slot n ($n=0$ to 3), the object dictionary definition for index $0x1700+0x08*n$ is shown in the table below:

Index	0x1700+0x08*n: 2HC CH0 RxPDO Mapping Parameter				
Sub-index	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	18
1	Sub-index 1	UDINT	RO	NO	0x7xx00110
2	Sub-index 2	UDINT	RO	NO	0x7xx00210
3	Sub-index 3	UDINT	RO	NO	0x7xx00320
...	...	UDINT	RO	NO	...
18	Sub-index 18	UDINT	RO	NO	0x7xx01220

For the module in slot n ($n = 0$ to 3), the object dictionary definition for index $0x1701+0x08*n$ is shown in the table below.

Index	0x1701+0x08*n: 2HC CH1 RxPDO Mapping Parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	18
1	Subindex 1	UDINT	RO	NO	0x7xx10110
2	Subindex 2	UDINT	RO	NO	0x7xx10210
3	Subindex 3	UDINT	RO	NO	0x7xx10320

Index	0x1701+0x08*n: 2HC CH1 RxPDO Mapping Parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
...	...	UDINT	RO	NO	...
18	Subindex 18	UDINT	RO	NO	0x7xx11220

Mapping data (Input): For the module in slot n (n=0 to 3), the object dictionary definition for index 0x1B00+0x08*n is shown in the table below:

Index	0x1B00+0x08*n: 2HC CH0 RxPDO Mapping Parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	17
1	Subindex 1	UDINT	RO	NO	0x6xx00110
2	Subindex 2	UDINT	RO	NO	0x6xx00210
3	Subindex 3	UDINT	RO	NO	0x6xx00320
...	...	UDINT	RO	NO	...
17	Subindex 17	UDINT	RO	NO	0x6xx01120

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1B01+0x08*n is shown in the table below.

Index	0x1B01+0x08*n: 2HC CH1 RxPDO Mapping Parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	17
1	Subindex 1	UDINT	RO	NO	0x6xx10110
2	Subindex 2	UDINT	RO	NO	0x6xx10210
3	Subindex 3	UDINT	RO	NO	0x6xx10320
...	...	UDINT	RO	NO	...
17	Subindex 17	UDINT	RO	NO	0x6xx11120

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 2HC Module Diagnosis Information Mapping				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	3
1	2HC Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	2HC CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	2HC CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310

Process data: For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 2HC CH0 Output				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	18
1	2HC CH0 Encoder command value	UINT	RW	YES	0
2	2HC CH0 DO function command value	UINT	RW	YES	0
3	2HC CH0 Encoder preset value	DINT	RW	YES	0
4	2HC CH0 Probe function command value	UDINT	RW	YES	0
5	2HC CH0 Compare function command value	UDINT	RW	YES	0
6	2HC CH0 Compare 0 command size /step	INT	RW	YES	0
7		INT	RW	YES	0

Index	0x7000+0x40*n: 2HC CH0 Output				
Subindex	Name	Data type	Access type	Mapping	Default value
	2HC CH0 Reserve700				
8	2HC CH0 Reserve701	INT	RW	YES	0
9	2HC CH0 Reserve702	INT	RW	YES	0
10	2HC CH0 Compare 0 position value 1	DINT	RW	YES	0
11	2HC CH0 Reserve703	DINT	RW	YES	0
12	2HC CH0 Reserve704	DINT	RW	YES	0
13	2HC CH0 Reserve705	DINT	RW	YES	0
14	2HC CH0 Compare 0 position value 2	DINT	RW	YES	0
15	2HC CH0 Reserve706	DINT	RW	YES	0
16	2HC CH0 Reserve707	DINT	RW	YES	0
17	2HC CH0 Reserve708	DINT	RW	YES	0
18	2HC CH0 Compare command parameter	UDINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7001+0x40*n is shown in the table below.

Index	0x7001+0x40*n: 2HC CH1 Output				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	18

Index	0x7001+0x40*n: 2HC CH1 Output				
Subindex	Name	Data type	Access type	Mapping	Default value
1	2HC CH1 Encoder command value	UINT	RW	YES	0
2	2HC CH1 DO function command value	UINT	RW	YES	0
3	2HC CH1 Encoder preset value	DINT	RW	YES	0
4	2HC CH1 Probe function command value	UDINT	RW	YES	0
5	2HC CH1 Compare function command value	UDINT	RW	YES	0
6	2HC CH1 Compare 0 command size /step	INT	RW	YES	0
7	2HC CH1 Reserve710	INT	RW	YES	0
8	2HC CH1 Reserve711	INT	RW	YES	0
9	2HC CH1 Reserve712	INT	RW	YES	0
10	2HC CH1 Compare 0 position value 1	DINT	RW	YES	0
11	2HC CH1 Reserve713	DINT	RW	YES	0
12	2HC CH1 Reserve714	DINT	RW	YES	0
13	2HC CH1 Reserve715	DINT	RW	YES	0
14	2HC CH1 Compare 0 position value 2	DINT	RW	YES	0
15		DINT	RW	YES	0

Index	0x7001+0x40*n: 2HC CH1 Output				
Subindex	Name	Data type	Access type	Mapping	Default value
	2HC CH1 Reserve716				
16	2HC CH1 Reserve717	DINT	RW	YES	0
17	2HC CH1 Reserve718	DINT	RW	YES	0
18	2HC CH1 Compare command parameter	UDINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 2HC CH0 Input				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	17
1	2HC CH0 Encoder status	USINT	RW	YES	0
2	2HC CH0 DI status	USINT	RW	YES	0
3	2HC CH0 DO status	USINT	RW	YES	0
4	2HC CH0 Compare status	USINT	RW	YES	0
5	2HC CH0 Probe status	UDINT	RW	YES	0
6	2HC CH0 Encoder present position	DINT	RW	YES	0
7	2HC CH0 Measure value 1	UDINT	RW	YES	0
8	2HC CH0 Measure value 2	UDINT	RW	YES	0
9	2HC CH0 Probe 0 positive value	DINT	RW	YES	0

Index	0x6000+0x40*n: 2HC CH0 Input				
Subindex	Name	Data type	Access type	Mapping	Default value
10	2HC CH0 Probe 1 positive value	DINT	RW	YES	0
11	2HC CH0 Reserve600	DINT	RW	YES	0
12	2HC CH0 Reserve601	DINT	RW	YES	0
13	2HC CH0 Probe 0 negative value	DINT	RW	YES	0
14	2HC CH0 Probe 1 negative value	DINT	RW	YES	0
15	2HC CH0 Reserve602	DINT	RW	YES	0
16	2HC CH0 Reserve603	DINT	RW	YES	0
17	2HC CH0 Error code	UDINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6001+0x40*n is shown in the table below.

Index	0x6001+0x40*n: 2HC CH1 Input				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	17
1	2HC CH1 Encoder status	USINT	RW	YES	0
2	2HC CH1 DI status	USINT	RW	YES	0
3	2HC CH1 DO status	USINT	RW	YES	0
4	2HC CH1 Compare status	USINT	RW	YES	0
5	2HC CH1 Probe status	UDINT	RW	YES	0
6		DINT	RW	YES	0

Index	0x6001+0x40*n: 2HC CH1 Input				
Subindex	Name	Data type	Access type	Mapping	Default value
	2HC CH1 Encoder present position				
7	2HC CH1 Measure value 1	UDINT	RW	YES	0
8	2HC CH1 Measure value 2	UDINT	RW	YES	0
9	2HC CH1 Probe 0 positive value	DINT	RW	YES	0
10	2HC CH1 Probe 1 positive value	DINT	RW	YES	0
11	2HC CH1 Reserve610	DINT	RW	YES	0
12	2HC CH1 Reserve611	DINT	RW	YES	0
13	2HC CH1 Probe 0 negative value	DINT	RW	YES	0
14	2HC CH1 Probe 1 negative value	DINT	RW	YES	0
15	2HC CH1 Reserve612	DINT	RW	YES	0
16	2HC CH1 Reserve613	DINT	RW	YES	0
17	2HC CH1 Errorcode	UDINT	RW	YES	0

Configuration data

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n 2HC CH0 Configuration Parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	9

Index	0x8000+0x40*n 2HC CH0 Configuration Parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
1	2HC CH0 Encoder type	UDINT	RW	NO	0x00000000
2	2HC CH0 Input filter	UDINT	RW	NO	0x00000702
3	2HC CH0 Time base for speed measurement	UDINT	RW	NO	0x00000005
4	2HC CH0 Unit pulse increment	UDINT	RW	NO	0x00000000
5	2HC CH0 Pluse rate sample time	UDINT	RW	NO	0x0000000A
6	2HC CH0 Maximum count value	DINT	RW	NO	0x7FFFFFFF
7	2HC CH0 Minimum count value	DINT	RW	NO	0x80000000
8	2HC CH0 External input function selection	UDINT	RW	NO	0x00000000
9	2HC CH0 External output function selection	UDINT	RW	NO	0x00000000

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n 2HC CH1 Configuration Parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	9
1	2HC CH1 Encoder type	UDINT	RW	NO	0x00000000
2	2HC CH1 Input filter	UDINT	RW	NO	0x00000702

Index	0x8001+0x40*n 2HC CH1 Configuration Parameter				
Subindex	Name	Data type	Access type	Mapping	Default value
3	2HC CH1 Time base for speed measurement	UDINT	RW	NO	0x00000005
4	2HC CH1 Unit pulse increment	UDINT	RW	NO	0x00000000
5	2HC CH1 Pulse rate sample time	UDINT	RW	NO	0x0000000A
6	2HC CH1 Maximum count value	DINT	RW	NO	0x7FFFFFFF
7	2HC CH1 Minimum count value	DINT	RW	NO	0x80000000
8	2HC CH1 External input function selection	UDINT	RW	NO	0x00000000
9	2HC CH1 External output function selection	UDINT	RW	NO	0x00000000

SubIndex 1: Encoder type

Bit	Description	Remark
0	Counter type 0: Linear 1: Ring	-
1	Counting direction 0: Phase A leads Phase B (forward) 1: Phase B leads Phase A (reverse)	-
2 to 3	Measured value 0: Do not measure 1: Frequency 2: Cycle 3: Speed	-

Bit	Description	Remark
4 to 7	Pulse input method 0: AB phase 1x frequency 1: AB phase 2x frequency 2: AB Phase 4x Frequency 3: Pulse+Direction 4: CW/CCW 5: Single-phase counting (A) 6: Single-phase counting (B)	-
8	Wiring method 0: Differential Interface 1: Single-ended Interface	-
9	Wire break detection 0: Disable 1: Enable	Valid for differential interface only.
10	Action upon exceeding count limit 0: Stop counting 1: Continue counting	Valid for linear counting only.
14	Sleep control 0: Disable sleep mode 1: Enable sleep mode	When this function is enabled, all functions of the entire channel are disabled.

SubIndex 2: Input Filter

Bit	Description	Remark
0 to 7	Count signal filter parameter 1 to 50 ns 2 to 100 ns 3 to 200 ns 4 to 500 ns 5: 1 us 6: 2 us 7: 5 us 8: 10 us 9: 20 us	-

Bit	Description	Remark
	10: 50 us 11: 100 us 12: 200 us 13: 500 us 14 to 1 ms 15 to 2 ms 16 to 5 ms 17 to 10 ms 18 to 20 ms 19 to 50 ms 20 to 100 ms	
8 to 15	DI signal filter parameter 0: No filtering Filter type 1: 1 to 100 ns 2 to 500 ns 3: 1 us 4: 100 us 5: 250 us 6: 500 us 7 to 1 ms 8 to 2 ms 9 to 4 ms 10 to 8 ms 11 to 16 ms 12 to 32 ms Filter type 2: 32 to 100 ns 33 to 500 ns 34: 1 us 35: 100 us 36: 250 us 37: 500 us 38 to 1 ms	-

Bit	Description	Remark
	39 to 2 ms 40 to 4 ms 41 to 8 ms 42 to 16 ms 43 to 32 ms	

SubIndex 3: Time base for speed measurement

Bit	Description	Remark
0 to 7	Time base for speed measurement 1 to 1 ms 2 to 10 ms 3 to 100 ms 4: 1s 5: 60s	-

SubIndex 5: Pulse rate sample time

Bit	Description	Remark
0 to 7	Frequency sampling time 3: 500us 4 to 1 ms 5 to 2 ms 6 to 5 ms 7 to 10 ms 8 to 20 ms 9 to 50 ms 10 to 100 ms 11 to 200 ms 12 to 500 ms 13: 1s 14: 2s 15: 5s 16: 10s 17: 20s 18: 25s	-

SubIndex 8: External input function selection

Bit	Description	Remark
0 to 3	DI0 function selection: 0: Standard input 1: Probe function 2: Counting 3: Clear 4: Preset 5: Gating	DI0
4	DI0 level logic: 0: Positive logic 1: Negative logic	DI0
8 to 11	DI1 function selection: 0: Standard input 1: Probe function 2: Counting 3: Clear 4: Preset 5: Gating	DI1
12	DI1 level logic: 0: Positive logic 1: Negative logic	DI1

SubIndex 9: External output function selection

Bit	Description	Remark
0 to 3	DO0 function selection: 0: Standard output 1: Comparison output	DO0
4	DO0 level logic: 0: Positive logic 1: Negative logic	DO0
5 to 6	Output settings when the module is not running: 0: Output 0	DO0

Bit	Description	Remark
	1: Output 1 2: Hold	

Diagnostic data

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 2HC module diagnosis information				
Subindex	Name	Data type	Access type	Mapping	Default value
0	Number of entries	USINT	RO	NO	3
1	2HC Module Diagnosis information	UINT	RO	YES	0
2	2HC CH0 Diagnosis information	UINT	RO	YES	0
3	2HC CH1 Diagnosis information	UINT	RO	YES	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.25 GL20-2SCOM-MDB

Introduction

GL20-2SCOM-MDB is a 2-channel communication module that supports RS232, RS485, and RS422 communication protocols.

- Name: GL20-2SCOM-MDB
- Module category: Serial
- Module identification code: 0x10F41098

Process data

Mapping data (output): For the module in slot n (n=0 to 3), the object dictionary definition for index 0x1700+0x08*n is shown in the table below.

Index	0x1700+0x08*n: 2SCOM-MDB RPDO Output0 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x7xx00108
2	Subindex 002	UDINT	RO	NO	0x7xx00208
⋮	⋮	UDINT	RO	NO	⋮
119	Subindex 119	UDINT	RO	NO	0x7xx07708
120	Subindex 120	UDINT	RO	NO	0x7xx07808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1701+0x08*n is shown in the table below.

Index	0x1701+0x08*n: 2SCOM-MDB RPDO Output1 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x7xx10108
2	Subindex 002	UDINT	RO	NO	0x7xx10208
⋮	⋮	UDINT	RO	NO	⋮
119	Subindex 119	UDINT	RO	NO	0x7xx17708
120	Subindex 120	UDINT	RO	NO	0x7xx17808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1702+0x08*n is shown in the table below.

Index	0x1702+0x08*n: 2SCOM-MDB RPDO Output2 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x7xx20108
2	Subindex 002	UDINT	RO	NO	0x7xx20208
⋮	⋮	UDINT	RO	NO	⋮
119	Subindex 119	UDINT	RO	NO	0x7xx27708
120	Subindex 120	UDINT	RO	NO	0x7xx27808

For the module in slot n ($n = 0$ to 3), the object dictionary definition for index $0x1703+0x08*n$ is shown in the table below.

Index	0x1703+0x08*n: 2SCOM-MDB RPDO Output3 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x7xx30108
2	Subindex 002	UDINT	RO	NO	0x7xx30208
⋮	⋮	UDINT	RO	NO	⋮
119	Subindex 119	UDINT	RO	NO	0x7xx37708
120	Subindex 120	UDINT	RO	NO	0x7xx37808

Mapping data (Input): For the module in slot n ($n=0$ to 3), the object dictionary definition for index $0x1B00+0x08*n$ is shown in the table below:

Index	0x1B00+0x08*n: 2SCOM-MDB TPDO Input0 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x6xx00108
2	Subindex 002	UDINT	RO	NO	0x6xx00208
⋮	⋮	UDINT	RO	NO	⋮
119	Subindex 119	UDINT	RO	NO	0x6xx07708
120	Subindex 120	UDINT	RO	NO	0x6xx07808

For the module in slot n ($n = 0$ to 3), the object dictionary definition for index $0x1B01+0x08*n$ is shown in the table below.

Index	0x1B01+0x08*n: 2SCOM-MDB TPDO Input1 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x6xx10108
2	Subindex 002	UDINT	RO	NO	0x6xx10208
...	...	UDINT	RO	NO	...

Index	0x1B01+0x08*n: 2SCOM-MDB TPDO Input1 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
119	Subindex 119	UDINT	RO	NO	0x6xx17708
120	Subindex 120	UDINT	RO	NO	0x6xx17808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1B02+0x08*n is shown in the table below.

Index	0x1B02+0x08*n: 2SCOM-MDB TPDO Input2 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x6xx20108
2	Subindex 002	UDINT	RO	NO	0x6xx20208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x6xx27708
120	Subindex 120	UDINT	RO	NO	0x6xx27808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1B03+0x08*n is shown in the table below.

Index	0x1B03+0x08*n: 2SCOM-MDB TPDO Input3 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x6xx30108
2	Subindex 002	UDINT	RO	NO	0x6xx30208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x6xx37708
120	Subindex 120	UDINT	RO	NO	0x6xx37808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 2SCOM-MDB Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	63
1	2SCOM-MDB Module Diagnosis Information	UINT	RO	NO	0x00
2	2SCOM-0 Diagnosis Information1	UINT	RO	NO	0x00
...
32	2SCOM-0 Diagnosis Information31	UINT	RO	NO	0x00
33	2SCOM-1 Diagnosis Information1	UINT	RO	NO	0x00
...
63	2SCOM-1 Diagnosis Information31	UINT	RO	NO	0x00

Process data: For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 2SCOM-MDB Frame0 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM- MDB_Frame0_T X_0	USINT	RW	YES	0
2	2SCOM- MDB_Frame0_T X_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119		USINT	RW	YES	0

Index	0x7000+0x40*n: 2SCOM-MDB Frame0 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	2SCOM-MDB_Frame0_T X_118				
120	2SCOM-MDB_Frame0_T X_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7001+0x40*n is shown in the table below.

Index	0x7001+0x40*n: 2SCOM-MDB Frame1 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame1_T X_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame1_T X_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame1_T X_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame1_T X_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7002+0x40*n is shown in the table below.

Index	0x7002+0x40*n: 2SCOM-MDB Frame2 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame2_T X_0	USINT	RW	YES	0

Index	0x7002+0x40*n: 2SCOM-MDB Frame2 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	2SCOM-MDB_Frame2_T X_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame2_T X_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame2_T X_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7003+0x40*n is shown in the table below.

Index	0x7003+0x40*n: 2SCOM-MDB Frame3 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame3_T X_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame3_T X_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame3_T X_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame3_T X_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 2SCOM-MDB Frame0 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame0_RX_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame0_RX_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame0_RX_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame0_RX_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6001+0x40*n is shown in the table below.

Index	0x6001+0x40*n: 2SCOM-MDB Frame1 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame1_RX_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame1_RX_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame1_RX_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame1_RX_119	USINT	RW	YES	0

For the module in slot n ($n = 0$ to 3), the object dictionary definition for index $0x6002+0x40*n$ is shown in the table below.

Index	0x6002+0x40*n: 2SCOM-MDB Frame2 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame2_RX_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame2_RX_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame2_RX_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame2_RX_119	USINT	RW	YES	0

For the module in slot n ($n = 0$ to 3), the object dictionary definition for index $0x6003+0x40*n$ is shown in the table below.

Index	0x6003+0x40*n: 2SCOM-MDB Frame3 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame3_RX_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame3_RX_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame3_RX_118	USINT	RW	YES	0
120		USINT	RW	YES	0

Index	0x6003+0x40*n: 2SCOM-MDB Frame3 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	2SCOM-MDB_Frame3_RX_119				

Configuration data

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	UINT	RW	NO	15
1	COM0 (M/S/F) Mode / Port Protocol / Baud Rate	UINT	RW	NO	0x0400
2	COM0 (M/S/F) Serial Port Settings	UINT	RW	NO	0x0209
3	COM0 (M/S/F) Char Pitch	UINT	RW	NO	0x0023
4	COM0 (M/F) Response Timeout	UINT	RW	NO	0x03E8
5	COM0 (M) Delay Between Polls	UINT	RW	NO	0x0064
6	COM0 (M/S) Master Control & Slave ID	UINT	RW	NO	0x0110
7	COM0 (S) Response Delay	UINT	RW	NO	0x0032
8	COM1 (M/S/F) Mode / Port Protocol / Baud Rate	UINT	RW	NO	0x0400
9		UINT	RW	NO	0x0209

Index	0x8000+0x40*n				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	COM1 (M/S/F) Serial Port Settings				
10	COM1 (M/S/F) Char Pitch	UINT	RW	NO	0x0023
11	COM1 (M/F) Response Timeout	UINT	RW	NO	0x03E8
12	COM1 (M) Delay Between Polls	UINT	RW	NO	0x0064
13	COM1 (M/S) Master Control & Slave ID	UINT	RW	NO	0x0110
14	COM1 (S) Response Delay	UINT	RW	NO	0x0032
15	Reserved	UINT	RW	NO	0x0000

SubIndex 1: COM0 (M/S/F) Mode / Port Protocol / BaudRate

Bit	Description	Remark
Bit 0 to 1	Operation mode: 0: Modbus master 1: Modbus slave 2: Free protocol	Default is 0.
Bit 2	Reserved	Default is 0.
Bit 3 to 4	Port protocol type: 2: RS422 1: RS485 0: RS232	Default is 0.
Bit 5 to 7	Reserved	Default is 0.
Bit 8 to 11	Baud rate: Options 3 to 8 respectively correspond to 48, 96, 192, 384, 576, and 1152.	Unit: 0.1 kbps Default is 4.

Bit	Description	Remark
Bit 12 to 15	Reserved	Default is 0.

SubIndex 2: COM0 (M/S/F) Serial Port Settings

Bit	Description	Remark
Bit 0	Data bit 0: 7 bits 1: 8 bits	Default is 1.
Bit 1 to 2	Parity bit 0: No parity check 1: Odd parity check 2: Even parity check	Default is 0.
Bit 3 to 4	Stop bit 1: 1 bit 2: 2 bits	Default is 1.
Bit 5	Serial mode 0: RTU 1: ASCII (Not supported)	Default is 0 (non-changeable).
Bit 6 to 7	Reserved	Default is 0.
Bit 8 to 15	Free coefficient: 0 to 255	Default is 2.

SubIndex 3: COM0 (M/S/F) Char Pitch (Unit is 0.1 character)

Bit	Description	Remark
Unsigned16	Character spacing: frame interval detection time when receiving messages 35 to 10000. Unit is 0.1 character.	Default is 35.

SubIndex 4: COM0 (M/F) Response Timeout

Bit	Description	Remark
Unsigned16	Response timeout time: the time the master waits for the slave to respond after sending a command 10 to 65535	Unit: ms. Default is 1000.

SubIndex 5: COM0 (M) Delay Between Polls

Bit	Description	Remark
Unsigned16	Polling delay: the delay from receiving a response from the slave to sending the next command 0 to 65535	Unit: ms. Default is 100.

SubIndex 6: COM0 (M/S) Master Control & Slave ID

Bit	Description	Remark
Bit 0	Action upon read timeout 0: Maintain the last input value 1: Reset the input value	Default is 0.
Bit 1	Data output mode 0: Polling	Default is 0 (non-changeable).
Bit 2	Module control enabling 0: Disable 1: Enable	Default is 0.
Bit 3	Module control method 0: Level triggered (active continuously) 1: Rising edge triggered (active only at the rising edge)	Default is 0.
Bit4	Power-on time output 1: Enable	Default is 1 (non-changeable).
Bit 5 to 7	Reserved	-
Bit 8 to 15	Slave ID: 1 to 247	Default is 1.

 NOTE

- To control the Modbus read/write commands, enable module control by setting Bit 2 to 1 (default is 0, indicating disabled). The Modbus read/write commands can be controlled by adjusting the value of "module control output".
- Module control method (default is level triggered) is only effective when the module control is enabled. This parameter is effective only when the module control is enabled.

SubIndex 7: COM0 (S) Response Delay

Bit	Description	Remark
Unsigned16	Response delay:0 to 65535	Default is 50.

SubIndex 8 to 14: Same as serial port 0

Diagnostic data

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 2SCOM-MDB Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	63
1	2SCOM-MDB Module Diagnostics Information	UDINT	RO	YES	0xAxxx0110
2	2SCOM-0 Diagnosis Information1	UDINT	RO	YES	0xAxxx0210
3	2SCOM-0 Diagnosis Information2	UDINT	RO	YES	0xAxxx0310
...
32	2SCOM-0 Diagnosis Information31	UDINT	RO	YES	0xAxxx2010
33	2SCOM-1 Diagnosis Information1	UDINT	RO	YES	0xAxxx2110
...
63	2SCOM-1 Diagnosis Information31	UDINT	RO	YES	0xAxxx3F10



Refer to the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.26 GL20-8DAV

Introduction

GL20-8DAV module is a 8-channel analog output module. Powered by an external 24 VDC supply, it supports voltage output mode, with a resolution up to 16 bits, and selectable output range levels.

- Name: 8DAV Module
- Module category: Analog Out
- Module identification code: 0x10F41042

Process data

Mapping data: For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1602+0x08*n$ is shown in the table below.

Index	0x1602+0x08*n: 8DAV Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8DAV CH0	UDINT	RO	NO	0x7xx00110
2	8DAV CH1	UDINT	RO	NO	0x7xx00210
3	8DAV CH2	UDINT	RO	NO	0x7xx00310
4	8DAV CH3	UDINT	RO	NO	0x7xx00410
5	8DAV CH4	UDINT	RO	NO	0x7xx00510
6	8DAV CH5	UDINT	RO	NO	0x7xx00610
7	8DAV CH6	UDINT	RO	NO	0x7xx00710
8	8DAV CH7	UDINT	RO	NO	0x7xx00810

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x1A04+0x08*n$ is shown in the table below.

Index	0x1A04+0x08*n: 8DAV Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	9
1	8DAV Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2		UDINT	RO	NO	0xAxxx0210

Index	0x1A04+0x08*n: 8DAV Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	8DAV CH0 Diagnosis Information				
3	8DAV CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
...
9	8DAV CH7 Diagnosis Information	UDINT	RO	NO	0xAxxx0910

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 8DAV Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8DAV CH0	INT	RO	YES	0
2	8DAV CH1	INT	RO	YES	0
3	8DAV CH2	INT	RO	YES	0
4	8DAV CH3	INT	RO	YES	0
5	8DAV CH4	INT	RO	YES	0
6	8DAV CH5	INT	RO	YES	0
7	8DAV CH6	INT	RO	YES	0
8	8DAV CH7	INT	RO	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 8DAV module transform mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8DAV module CH0 transform mode	USINT	RW	NO	0x80
2	8DAV module CH1 transform mode	USINT	RW	NO	0x80
3	8DAV module CH2 transform mode	USINT	RW	NO	0x80
4	8DAV module CH3 transform mode	USINT	RW	NO	0x80
5	8DAV module CH4 transform mode	USINT	RW	NO	0x80
6	8DAV module CH5 transform mode	USINT	RW	NO	0x80
7	8DAV module CH6 transform mode	USINT	RW	NO	0x80
8	8DAV module CH7 transform mode	USINT	RW	NO	0x80

Subindex 1: 8DAV module CH0 transform mode (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit	Description
Bit 0 to 3	CH0 conversion method 0: -10 V to 10 V 1: 0 V to 10 V 2: -5 V to 5 V 3: 0 V to 5 V 4: 1 V to 5 V
Bit 4	Reserved (for other additional voltage and current conversion methods)
Bit 5 to 6	0: ± 20000 1: ± 32000 2: ± 27648 (default for PN platform) and ± 20000 (default for other platforms)
Bit 7	CH0 channel enable 0: Disable

Bit	Description
	1: Enable

Different measurement ranges correspond to different digital ranges. See the following table for the analog-to-digital mapping:

	Rated Output Range	Corresponding Rated Digital Value	Output Limit Range	Corresponding Digital Limit Range
Analog voltage input	-10 V to +10 V	-20000 to 20000	-10.25 V to 10.25 V	-20500 to 20500
		-27648 to 27648		-32767 to 32767
		-32000 to 32000		-28339 to 28339
	0 V to 10 V	0 to 20000	-0.5 V to 10.25 V	-1000 to 20500
		0 to 32000		-1600 to 32767
0 to 27648	-1382 to 28339			
-5 V to 5 V	-20000 to 20000	-5.5 V to 5.5 V	-22000 to 22000	
	0 to 32000		-32767 to 32767	
-27648 to 27648	-30412 to 30412			
0 V to 5 V	0 to 20000	-0.25 V to 5.25 V	-1000 to 21000	
	0 to 32000		-1600 to 32767	
0 to 27648	-1382 to 29030			
1 V to 5 V	0 to 20000	0.8 V to 5.2 V	-1000 to 21000	
	0 to 32000		-1600 to 32767	
0 to 27648	-1382 to 29030			

For the module in slot n ($n = 0$ to 31), the object dictionary definition for index $0x8001+0x40*n$ is shown in the table below.

Index	0x8001+0x40*n: 8DAV module stop mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	8DAV module CH0 stop mode	USINT	RW	NO	0
2	8DAV module CH1 stop mode	USINT	RW	NO	0
3	8DAV module CH2 stop mode	USINT	RW	NO	0

Index	0x8001+0x40*n: 8DAV module stop mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
4	8DAV module CH3 stop mode	USINT	RW	NO	0
5	8DAV module CH4 stop mode	USINT	RW	NO	0
6	8DAV module CH5 stop mode	USINT	RW	NO	0
7	8DAV module CH6 stop mode	USINT	RW	NO	0
8	8DAV module CH7 stop mode	USINT	RW	NO	0

Subindex 1: 8DAV module CH0 stop mode (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit 0 to 7	<p>Input status of CH0 in stop mode</p> <p>0: Output reset</p> <p>1: Output maintained</p> <p>2: Outputs the preset value of subindex 4.</p>
------------	--

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 8DAV module stop value				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	8DAV module CH0 stop value	UINT	RW	NO	0
2	8DAV module CH1 stop value	UINT	RW	NO	0
3	8DAV module CH2 stop value	UINT	RW	NO	0
4	8DAV module CH3 stop value	UINT	RW	NO	0
5	8DAV module CH4 stop value	UINT	RW	NO	0

Index	0x8002+0x40*n: 8DAV module stop value				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
6	8DAV module CH5 stop value	UINT	RW	NO	0
7	8DAV module CH6 stop value	UINT	RW	NO	0
8	8DAV module CH7 stop value	UINT	RW	NO	0

Subindex 1: 8DAV module CH0 stop value (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit	Description
Bit 0 to 15	Output value after CH0 stops in stop mode

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 8DAV Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of Diagnosis 4DA	USINT	RO	NO	9
1	8DAV Module Diagnosis information	UINT	RO	YES	0
2	8DAV CH0 Diagnosis information	UINT	RO	YES	0
3	8DAV CH1 Diagnosis information	UINT	RO	YES	0
4	8DAV CH2 Diagnosis information	UINT	RO	YES	0
5	8DAV CH3 Diagnosis information	UINT	RO	YES	0

Index	0xA000+0x40*n: 8DAV Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
6	8DAV CH4 Diagnosis information	UINT	RO	YES	0
7	8DAV CH5 Diagnosis information	UINT	RO	YES	0
8	8DAV CH6 Diagnosis information	UINT	RO	YES	0
9	8DAV CH7 Diagnosis information	UINT	RO	YES	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.27 GL20-8DAI

Introduction

The GL20-8DAI module is a 8-channel analog output module. Powered by external 24V DC, it supports current output mode, with a resolution up to 16 bits, and selectable output range levels.

- Name: 8DAI Module
- Module category: Analog Out
- Module identification code: 0x10F41042

Process data

Mapping data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1602+0x08*n is shown in the table below.

Index	0x1602+0x08*n: 8DAI Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8DAI CH0	UDINT	RO	NO	0x7xx00110

Index	0x1602+0x08*n: 8DAI Input Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	8DAI CH1	UDINT	RO	NO	0x7xx00210
3	8DAI CH2	UDINT	RO	NO	0x7xx00310
4	8DAI CH3	UDINT	RO	NO	0x7xx00410
5	8DAI CH4	UDINT	RO	NO	0x7xx00510
6	8DAI CH5	UDINT	RO	NO	0x7xx00610
7	8DAI CH6	UDINT	RO	NO	0x7xx00710
8	8DAI CH7	UDINT	RO	NO	0x7xx00810

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 8DAI Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	9
1	8DAI Module Diagnosis Information	UDINT	RO	NO	0xAxxx0110
2	8DAI CH0 Diagnosis Information	UDINT	RO	NO	0xAxxx0210
3	8DAI CH1 Diagnosis Information	UDINT	RO	NO	0xAxxx0310
...
9	8DAI CH7 Diagnosis Information	UDINT	RO	NO	0xAxxx0910

Process data: For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 8DAI Input				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8DAI CH0	INT	RO	YES	0
2	8DAI CH1	INT	RO	YES	0
3	8DAI CH2	INT	RO	YES	0
4	8DAI CH3	INT	RO	YES	0
5	8DAI CH4	INT	RO	YES	0
6	8DAI CH5	INT	RO	YES	0
7	8DAI CH6	INT	RO	YES	0
8	8DAI CH7	INT	RO	YES	0

Configuration data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n: 8DAI module transformation mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	8
1	8DAI module CH0 transform mode	USINT	RW	NO	0x85
2	8DAI module CH1 transform mode	USINT	RW	NO	0x85
3	8DAI module CH2 transform mode	USINT	RW	NO	0x85
4	8DAI module CH3 transform mode	USINT	RW	NO	0x85
5	8DAI module CH4 transform mode	USINT	RW	NO	0x85
6	8DAI module CH5 transform mode	USINT	RW	NO	0x85
7		USINT	RW	NO	0x85

Index	0x8000+0x40*n: 8DAI module transformation mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	8DAI module CH6 transform mode				
8	8DAI module CH7 transform mode	USINT	RW	NO	0x85

Subindex 1: 8DAI module CH0 transform mode (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit	Description
Bit 0 to 3	CH0 conversion method 5: 0 mA to 20 mA 6: 4 mA to 20 mA
Bit 4	Reserved (for other additional voltage and current conversion methods)
Bit 5 to 6	0: ± 20000 1: ± 32000 2: ± 27648 (default for PN platform) and ± 20000 (default for other platforms)
Bit 7	CH0 channel enable 0: Disable 1: Enable

Different measurement ranges correspond to different digital ranges. See the following table for the analog-to-digital mapping:

	Rated Output Range	Corresponding Rated Digital Value	Output Limit Range	Corresponding Digital Limit Range
Analog current output	0 mA to 20 mA	0 to 20000 0 to 32000 0 to 27648	0 mA to 21 mA	0 to 21000 0 to 32767 0 to 29030
	4 mA to 20 mA	0 to 20000 0 to 32000 0 to 27648	3.2 mA to 20.8 mA	-1000 to 21000 -1600 to 32767 -1382 to 29030

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8001+0x40*n is shown in the table below.

Index	0x8001+0x40*n: 8DAI module Stopmode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	8DAI module CH0 stop mode	USINT	RW	NO	0
2	8DAI module CH1 stop mode	USINT	RW	NO	0
3	8DAI module CH2 stop mode	USINT	RW	NO	0
4	8DAI module CH3 stop mode	USINT	RW	NO	0
5	8DAI module CH4 stop mode	USINT	RW	NO	0
6	8DAI module CH5 stop mode	USINT	RW	NO	0
7	8DAI module CH6 stop mode	USINT	RW	NO	0
8	8DAI module CH7 stop mode	USINT	RW	NO	0

Subindex 1: 8DAI module CH0 stop mode (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit 0 to 7	Input status of CH0 in stop mode 0: Output reset 1: Output maintained 2: Outputs the preset value of subindex 4.
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For the module in slot n (n = 0 to 31), the object dictionary definition for index 0x8002+0x40*n is shown in the table below.

Index	0x8002+0x40*n: 8DAI module stop mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	4
1	8DAI module CH0 stop mode	UINT	RW	NO	0

Index	0x8002+0x40*n: 8DAI module stop mode				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	8DAI module CH1 stop mode	UINT	RW	NO	0
3	8DAI module CH2 stop mode	UINT	RW	NO	0
4	8DAI module CH3 stop mode	UINT	RW	NO	0
5	8DAI module CH4 stop mode	UINT	RW	NO	0
6	8DAI module CH5 stop mode	UINT	RW	NO	0
7	8DAI module CH6 stop mode	UINT	RW	NO	0
8	8DAI module CH7 stop mode	UINT	RW	NO	0

Subindex 1: 8DAI module CH0 stop mode (The usage of subindex 2 to 8 is the same as subindex 1.)

Bit	Description
Bit 0 to 15	Output value after CH0 stops in stop mode

Diagnostic data

For the module in slot n (n = 0 to 31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 8DAI Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of Diagnosis 4DA	USINT	RO	NO	9
1	8DAI Module Diagnosis information	UINT	RO	YES	0
2	8DAI CH0 Diagnosis information	UINT	RO	YES	0

Index	0xA000+0x40*n: 8DAI Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
3	8DAI CH1 Diagnosis information	UINT	RO	YES	0
4	8DAI CH2 Diagnosis information	UINT	RO	YES	0
5	8DAI CH3 Diagnosis information	UINT	RO	YES	0
6	8DAI CH4 Diagnosis information	UINT	RO	YES	0
7	8DAI CH5 Diagnosis information	UINT	RO	YES	0
8	8DAI CH6 Diagnosis information	UINT	RO	YES	0
9	8DAI CH7 Diagnosis information	UINT	RO	YES	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.4.28 GL20-2S485-MDB

Introduction

- Name: GL20-2S485-MDB
- Module category: Serial
- Module identification code: 0x10F41099

Process data

Mapping data (output): For the module in slot n (n=0 to 3), the object dictionary definition for index 0x1700+0x08*n is shown in the table below.

Index	0x1700+0x08*n: 2S485-MDB RPDO Output0 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x7xx00108
2	Subindex 002	UDINT	RO	NO	0x7xx00208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x7xx07708
120	Subindex 120	UDINT	RO	NO	0x7xx07808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1700+0x08*n is shown in the table below.

Index	0x1701+0x08*n: 2S485 -MDB RPDO Output1 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x7xx10108
2	Subindex 002	UDINT	RO	NO	0x7xx10208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x7xx17708
120	Subindex 120	UDINT	RO	NO	0x7xx17808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1702+0x08*n is shown in the table below.

Index	0x1702+0x08*n: 2S485 -MDB RPDO Output2 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x7xx20108
2	Subindex 002	UDINT	RO	NO	0x7xx20208
...	...	UDINT	RO	NO	...

Index	0x1702+0x08*n: 2S485 -MDB RPDO Output2 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
119	Subindex 119	UDINT	RO	NO	0x7xx27708
120	Subindex 120	UDINT	RO	NO	0x7xx27808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1703+0x08*n is shown in the table below.

Index	0x1703+0x08*n: 2S485 -MDB RPDO Output3 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x7xx30108
2	Subindex 002	UDINT	RO	NO	0x7xx30208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x7xx37708
120	Subindex 120	UDINT	RO	NO	0x7xx37808

Mapping data (Input): For the module in slot n (n=0 to 3), the object dictionary definition for index 0x1B00+0x08*n is shown in the table below:

Index	0x1B00+0x08*n: 2S485 -MDB TPDO Input0 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x6xx00108
2	Subindex 002	UDINT	RO	NO	0x6xx00208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x6xx07708
120	Subindex 120	UDINT	RO	NO	0x6xx07808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1B01+0x08*n is shown in the table below.

Index	0x1B01+0x08*n: 2S485-MDB TPDO Input1 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x6xx10108
2	Subindex 002	UDINT	RO	NO	0x6xx10208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x6xx17708
120	Subindex 120	UDINT	RO	NO	0x6xx17808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1B02+0x08*n is shown in the table below.

Index	0x1B02+0x08*n: 2S485-MDB TPDO Input2 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x6xx20108
2	Subindex 002	UDINT	RO	NO	0x6xx20208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x6xx27708
120	Subindex 120	UDINT	RO	NO	0x6xx27808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1B03+0x08*n is shown in the table below.

Index	0x1B03+0x08*n: 2S485-MDB TPDO Input3 Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	Subindex 001	UDINT	RO	NO	0x6xx30108
2	Subindex 002	UDINT	RO	NO	0x6xx30208
...	...	UDINT	RO	NO	...
119	Subindex 119	UDINT	RO	NO	0x6xx37708
120	Subindex 120	UDINT	RO	NO	0x6xx37808

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x1A04+0x08*n is shown in the table below.

Index	0x1A04+0x08*n: 2S485-MDB Diagnosis Information Mapping				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	63
1	2S485-MDB Module Diagnosis Information	UINT	RO	NO	0x00
2	2S485-0 Diagnosis Information1	UINT	RO	NO	0x00
...
32	2S485-0 Diagnosis Information31	UINT	RO	NO	0x00
33	2S485-1 Diagnosis Information1	UINT	RO	NO	0x00
...
63	2S485-1 Diagnosis information31	UINT	RO	NO	0x00

Process data: For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7000+0x40*n is shown in the table below.

Index	0x7000+0x40*n: 2S485-MDB Frame0 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM- MDB_Frame0_T X_0	USINT	RW	YES	0
2	2SCOM- MDB_Frame0_T X_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM- MDB_Frame0_T X_118	USINT	RW	YES	0

Index	0x7000+0x40*n: 2S485-MDB Frame0 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
120	2SCOM-MDB_Frame0_T X_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7001+0x40*n is shown in the table below.

Index	0x7001+0x40*n: 2S485-MDB Frame1 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame1_T X_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame1_T X_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame1_T X_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame1_T X_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7002+0x40*n is shown in the table below.

Index	0x7002+0x40*n: 2S485-MDB Frame2 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame2_T X_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame2_T X_1	USINT	RW	YES	0

Index	0x7002+0x40*n: 2S485-MDB Frame2 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame2_T X_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame2_T X_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x7003+0x40*n is shown in the table below.

Index	0x7003+0x40*n: 2S485-MDB Frame3 TX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame3_T X_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame3_T X_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame3_T X_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame3_T X_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6000+0x40*n is shown in the table below.

Index	0x6000+0x40*n: 2S485-MDB Frame0 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame0_RX_0	USINT	RW	YES	0

Index	0x6000+0x40*n: 2S485-MDB Frame0 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
2	2SCOM-MDB_Frame0_RX_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame0_RX_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame0_RX_119	USINT	RW	YES	0

Index	0x6000+0x40*n: 2S485-MDB Frame0 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame0_RX_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame0_RX_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame0_RX_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame0_RX_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6001+0x40*n is shown in the table below.

Index	0x6001+0x40*n: 2S485-MDB Frame1 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame1_RX_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame1_RX_1	USINT	RW	YES	0

Index	0x6001+0x40*n: 2S485-MDB Frame1 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame1_RX_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame1_RX_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6002+0x40*n is shown in the table below.

Index	0x6002+0x40*n: 2S485-MDB Frame2 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1	2SCOM-MDB_Frame2_RX_0	USINT	RW	YES	0
2	2SCOM-MDB_Frame2_RX_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame2_RX_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame2_RX_119	USINT	RW	YES	0

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x6003+0x40*n is shown in the table below.

Index	0x6003+0x40*n: 2S485-MDB Frame3 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	120
1		USINT	RW	YES	0

Index	0x6003+0x40*n: 2S485-MDB Frame3 RX_data				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	2SCOM-MDB_Frame3_RX_0				
2	2SCOM-MDB_Frame3_RX_1	USINT	RW	YES	0
...	...	USINT	RW	YES	...
119	2SCOM-MDB_Frame3_RX_118	USINT	RW	YES	0
120	2SCOM-MDB_Frame3_RX_119	USINT	RW	YES	0

Configuration data

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0x8000+0x40*n is shown in the table below.

Index	0x8000+0x40*n:				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	UINT	RW	NO	15
1	2S485-0(M/S/F) Mode/BaudRate	UINT	RW	NO	0x0400
2	2S485-0(M/S/F) Serial Port Settings	UINT	RW	NO	0x0209
3	2S485-0(M/S/F) Char Pitch (Unit: 0.1 character)	UINT	RW	NO	0x0023
4	2S485-0(M/F) Response Timeout	UINT	RW	NO	0x03E8
5	2S485-0(M) Delay Between Polls	UINT	RW	NO	0x0064
6	2S485-0(M/S) Master Control And Slave ID	UINT	RW	NO	0x0110
7	2S485-0(S) Response Delay	UINT	RW	NO	0x0032
8	2S485-1(M/S/F) Mode/BaudRate	UINT	RW	NO	0x0400

Index	0x8000+0x40*n:				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
9	2S485-1(M/S/F) Serial Port Settings	UINT	RW	NO	0x0209
10	2S485-1(M/S/F) Char Pitch (Unit is 0.1 characters)	UINT	RW	NO	0x0023
11	2S485-1(M/F) Response Timeout	UINT	RW	NO	0x03E8
12	2S485-1(M) Delay Between Polls	UINT	RW	NO	0x0064
13	2S485-1(M/S) Master Control And Slave ID	UINT	RW	NO	0x0110
14	2S485-1(S) Response Delay	UINT	RW	NO	0x0032
15	Reserve	UINT	RW	NO	0x0000

SubIndex 1: 2S485-0 (M/S/F) Mode/Port Protocol/BaudRate

Bit	Description	Remark
Bit 0 to 1	Operation mode: 0: Modbus master 1: Modbus slave 2: Free protocol	Default is 0.
Bit 2 to 7	Reserved	Default is 0.
Bit 8 to 11	Baud rate: Options 3 to 8 respectively correspond to 48, 96, 192, 384, 576, and 1152.	Unit: 0.1 kbps Default is 4.
Bit 12 to 15	Reserved	Default is 0.

SubIndex 2: 2S485-0 (M/S/F) Serial Port Settings

Bit	Description	Remark
Bit 0	Data bit 0: 7 bits 1: 8 bits	Default is 1.
Bit 1 to 2	Parity bit 0: No parity check 1: Odd parity check	Default is 0.

Bit	Description	Remark
	2: Even parity check	
Bit 3 to 4	Stop bit 1: 1 bit 2: 2 bits	Default is 1.
Bit 5	Serial mode 0: RTU 1: ASCII (Not supported)	Default is 0 (non-changeable).
Bit 6 to 7	Reserved	Default is 0.
Bit 8 to 15	Free coefficient: 0 to 255	Default is 2.

SubIndex 3: 2S485-0 (M/S/F) Char Pitch (Unit is 0.1 characters)

Bit	Description	Remark
Unsigned16	Character spacing: frame interval detection time when receiving messages 35 to 10000. Unit is 0.1 character.	Default is 35.

SubIndex 4: 2S485-0 (M/F) Response Timeout

Bit	Description	Remark
Unsigned16	Response timeout time: the time the master waits for the slave to respond after sending a command 10 to 65535	Unit: ms. Default is 1000.

SubIndex 5: 2S485-0 (M) Delay Between Polls

Bit	Description	Remark
Unsigned16	Polling delay: the delay from receiving a response from the slave to sending the next command 0 to 65535	Unit: ms. Default is 100.

SubIndex 6: 2S485-0 (M/S) Master Control & Slave ID

Bit	Description	Remark
Bit 0	Action upon read timeout 0: Maintain the last input value 1: Reset the input value	Default is 0.
Bit 1	Data output mode	

Bit	Description	Remark
	0: Polling	Default is 0 (non-changeable).
Bit 2	Module control enabling 0: Disable 1: Enable	Default is 0.
Bit 3	Module control method 0: Level triggered (active continuously) 1: Rising edge triggered (active only at the rising edge)	Default is 0.
Bit 4	Power-on time output 1: Enable	Default is 1 (non-changeable).
Bit 5 to 7	Reserved	-
Bit 8 to 15	Slave ID: 1 to 247	Default is 1.

 **NOTE**

- To control the Modbus read/write commands, enable module control by setting Bit 2 to 1 (default is 0, indicating disabled). The Modbus read/write commands can be controlled by adjusting the value of "module control output".
- Module control method (default is level triggered) is only effective when the module control is enabled.

SubIndex 7: 2S485-0 (S) Response Delay

Bit	Description	Remark
Unsigned16	Response delay:0 to 65535	Default is 50.

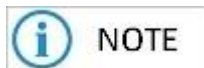
SubIndex 8 to 14: Same as serial port 0

Diagnostic data

For the module in slot n (n = 0 to 3), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 2S485-MDB Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
0	Number of entries	USINT	RO	NO	63
1		UINT	RO	YES	0

Index	0xA000+0x40*n: 2S485-MDB Module Diagnosis Information				
Subindex	Name	Data Type	Access Type	Mapping	Default Value
	2S485-MDB Module Diagnosis Information				
2	2S485-0 Diagnosis Information1	UINT	RO	YES	0
3	2S485-0 Diagnosis Information2	UINT	RO	YES	0
...
31	2S485-0 Diagnosis Information30	UINT	RO	YES	0
32	2S485-0 Diagnosis Information31	UINT	RO	YES	0
33	2S485-1 Diagnosis Information1	UINT	RO	YES	0
34	2S485-1 Diagnosis Information2	UINT	RO	YES	0
...
62	2S485-1 Diagnosis Information30	UINT	RO	YES	0
63	2S485-1 Diagnosis Information31	UINT	RO	YES	0



See the "[9.6 Fault Code List](#)" for detailed meanings of fault codes.

12.5 Appendix 5: Version Matching Information

This section describes the firmware version, compatible XML file version, supported functions, compatible module model, and compatible AutoShop/InoProShop version, as shown below.



The GL20-1DNM, GL20-2S485, GL20-2S485-MDB, GL20-2SCOM, GL20-2SCOM-MDB, and GL20-2CAN modules have specific requirements for the firmware version of the matching PLC. For details, see the user manual of the related module.

Firmware Version	Compatible XML File Version	Supported Function	Material Code of Compatible Module	Compatible Module Model	Bus Current Consumption	AutoShop Version	InoProShop Version
3.1.5.0	3.0.11.0	Online modification of SDO for a single module	01440293	GL20-0016 ETN	145 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
		Upgrade of expansion modules with MCU	01440292	GL20-0016 ETP	100 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
		Parameter settings via I/O configuration tool	01440291	GL20-1600 END	120 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440287	GL20-4DA	70 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440288	GL20-4AD	95 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440334	GL20-0008 ER	110 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440381	GL20-0800 END	105 mA		V1.7.3 SP6 and above

Firmware Version	Compatible XML File Version	Supported Function	Material Code of Compatible Module	Compatible Module Model	Bus Current Consumption	AutoShop Version	InoProShop Version
						V4.10.0.0 and above	
			01440379	GL20-0008 ETN	115 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440380	GL20-0008 ETP	80 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440339	GL20-0808 ETN	130 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440290	GL20-3232 ETN-M	250 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440378	GL20-3200 END-M	95 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440377	GL20-0032 ETN-M	85 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440337	GL20-4PT	95 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440338	GL20-4TC	95 mA		V1.7.3 SP6 and above

Firmware Version	Compatible XML File Version	Supported Function	Material Code of Compatible Module	Compatible Module Model	Bus Current Consumption	AutoShop Version	InoProShop Version
						V4.10.0.0 and above	
			01440456	GL20-2S485	155 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440351	GL20-PS2	55 mA	V4.10.0.2 and above	V1.7.3 SP6 and above
			01440466	GL20-3200 END	85 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440467	GL20-0032 ETN	80 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440482	GL20-8ADV	65 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440489	GL20-8ADI	65 mA	V4.10.0.0 and above	V1.7.3 SP6 and above
			01440506	GL20-0404 ETP-5V	90 mA	V4.10.0.0 and above	V1.7.3 SP5 and above
			01440485	GL20-0004 ER	90 mA		V1.7.3 SP5 and above

Firmware Version	Compatible XML File Version	Supported Function	Material Code of Compatible Module	Compatible Module Model	Bus Current Consumption	AutoShop Version	InoProShop Version
						V4.10.0.2 and above	
			01440512	GL20-0004 ETP-2A	80 mA	V4.10.0.2 and above	V1.8.0.0 and above
			01440484	GL20-1DNM	100 mA	-	V1.8.0.0 and above
			01440519	GL20-2HC	95 mA	V4.10.0.2 and above	V1.7.3 SP6 and above
			01440673	GL20-2SCO M-MDB	170 mA	-	V1.7.3 SP6 and above

12.6 Appendix 6: Function Differences Between Inovance PLC Programming Software and Third-party PLC Programming Software

The following table introduces the function differences among the Inovance PLC programming software (AutoShop/InoProShop) compatible with this product, IOManager tool, and third-party PLC programming software.

Function	Description	AutoShop	InoProShop	Beckhoff TwinCAT	Omron Sysmac Studio	Keyence KV STUDIO	IOManager
Login and download	This function synchronizes project data between the programming software	√	√	√	√	√	×

Function		Description	AutoShop	InoProShop	Beckhoff TwinCAT	Omron Sysmac Studio	Keyence KV STUDIO	IOManager
		and the controller (including the configuration information for the EtherCAT communication interface module and the GL20 module).						
Commissioning	Forced refresh	This function uses forced values to refresh specific bits.	x	√	√	√	x	x
	Current value modification	This function changes the variable values used in the user program and settings, as well as the TRUE /FALSE values of input and output bits.	√	√	√	√	x	x

Function		Description	AutoShop	InoProShop	Beckhoff TwinCAT	Omron Sysmac Studio	Keyence KV STUDIO	IOManager
	I/O monitor	This function displays the values of inputs and outputs.	√	√	√	√	×	×
Device scanning		This function scans and uploads the actual configuration of the device.	√	√	√	√	×	√
Node address configuration		This function sets the node address of the EtherCAT slave.	√	√	√	√	×	√
Device disabling		This function disables the EtherCAT slave.	√	√	×	×	×	×
I/O module disabling		This function disables the GL20 module.	×	√	×	×	×	×
Device upgrade		This function upgrades the firmware of the	×	×	×	×	×	√

Function	Description	AutoShop	InoProShop	Beckhoff TwinCAT	Omron Sysmac Studio	Keyence KV STUDIO	IOManager
	EtherCAT communication interface module and the GL20 series module via the Type-C port connected to the EtherCAT communication interface module.						
Troubleshooting	This function retrieves fault information from the EtherCAT communication interface module and GL20 series module.	√	√	√(CoE Online)	√(Function block)	×	√

12.7 Appendix 7: Information on Magnetic Rings and Ferrite Clamps

12.7.1 Product selection

The magnetic ring is mainly used on the input or output side of the drive. Install it as close to the drive as possible. Installing a magnetic ring on the input side can suppress noise in the input power system of the AC

drive. Installing a magnetic ring on the output side primarily reduces the AC drive's external interference and also lowers bearing current.

The magnetic ring or ferrite clamp can also be used to suppress the leakage current or other signal cable interference in some applications.

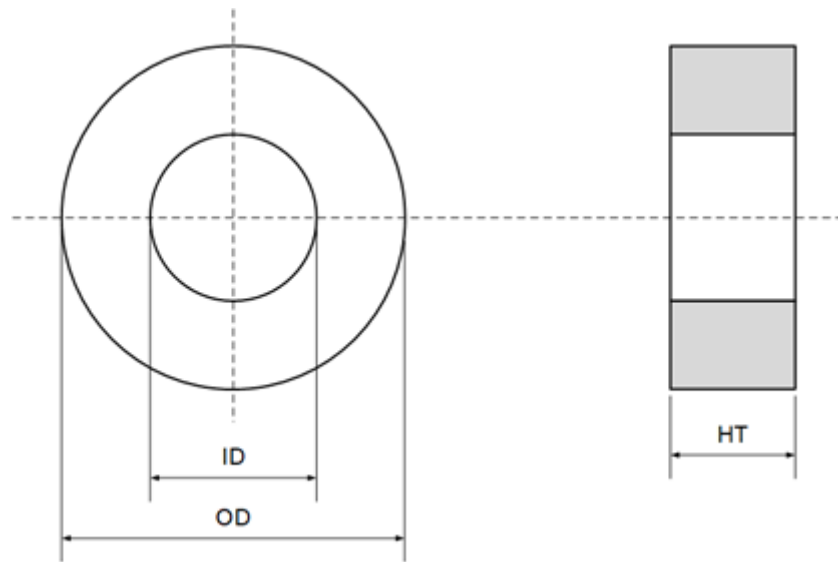
- Amorphous magnetic ring: It features high permeability when the frequency is equal to or lower than 1 MHz and excellent suppression performance on interference generated by the drive. However, its cost is relatively high.
- Ferrite clamp: It can reduce noise of various signal cables when the frequency is higher than 1 MHz. In addition, it is cost-effective and easy to install.

Product type	Product model	Material code	Appearance
Magnetic ring	DY644020H	11013031	
	DY805020H	11013032	
	DY1207030H	11013033	
Ferrite clamp	DYR-130-B	11013046	

12.7.2 Dimensions

Magnetic Ring

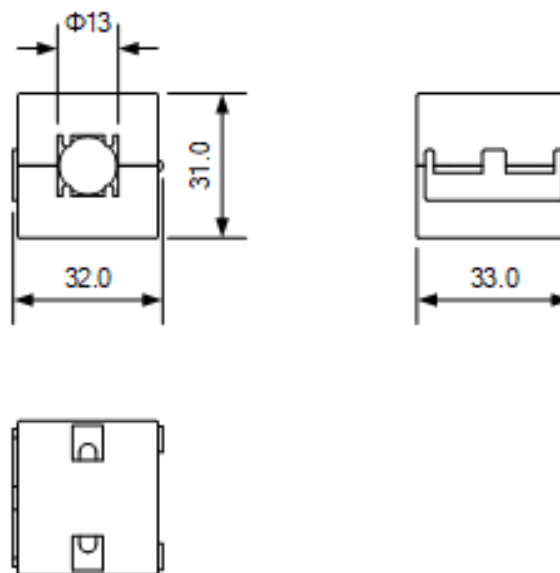
The dimensional diagram and description of the magnetic ring is shown below.



Model	Dimensions (OD×ID×HT)	Note
DY644020H	64 mm×40 mm×20 mm	-
DY805020H	80 mm×50 mm×20 mm	-
DY1207030H	120 mm×70 mm×30 mm	This model is not suitable for servo drives.

Ferrite Clamp

The dimensional diagram and description of the ferrite clamp is shown below.



Model	Dimensions (Width×Height×Depth×Inner Diameter)
DYR-130-B	32 mm×31 mm×33 mm×13 mm

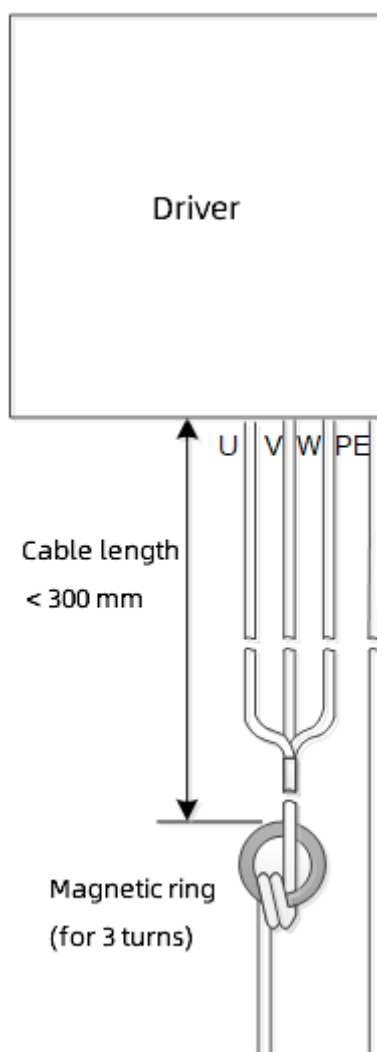
12.7.3 Installation Instructions

NOTICE

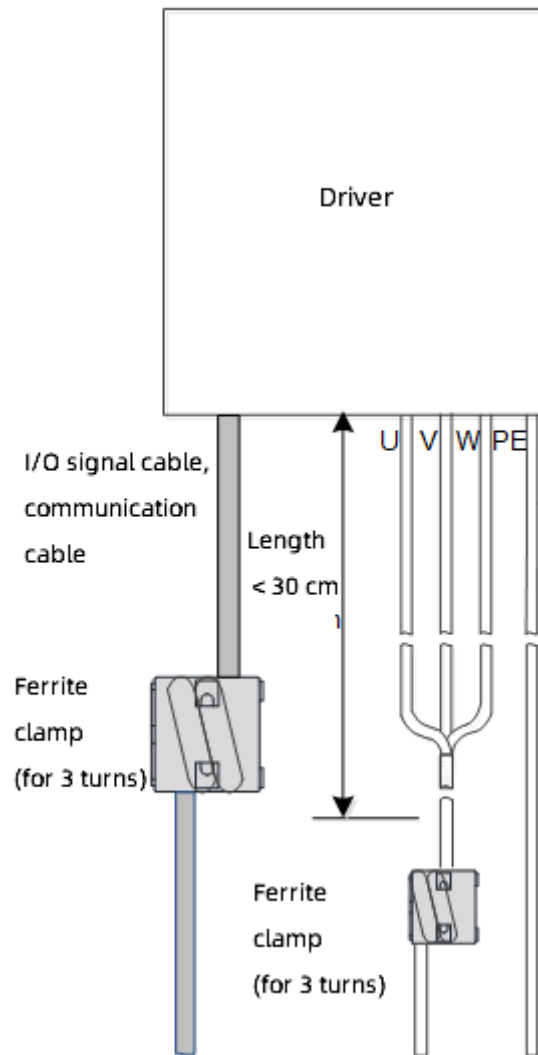
- When installing magnetic rings or ferrite clamps on the main circuit, ensure the main circuit wires can pass through them; otherwise, they will be unusable.
- Do not wind the PE cable around magnetic rings or ferrite clamps.

Magnetic Ring

The following figure shows the installation method of a magnetic ring.

**Ferrite Clamp**

The following figure shows the installation method of a ferrite clamp.



12.8 Appendix 8: Recycling and Disposal

The recycling and disposal of this product must comply with environmental protection requirements. Contact a company qualified for electronic waste disposal and dispose of the product according to the applicable regulations of your country/region.

13 Terminology

DC

DC (Distributed Clock) synchronization mode achieves data synchronization through distributed clocks. The master periodically reads the local clock of the slave that supports DC synchronization (typically the first slave in the network that supports DC synchronization), and then periodically sends this clock as the system clock to other slaves. Upon receiving the system clock, the other slaves compare it with their own clocks and dynamically adjust their own clocks based on the time deviation. The slaves generate precise synchronization signals through SYNC0 and trigger interrupts, thereby controlling the synchronous execution of tasks across devices.

Free Run

In Free Run mode, the control cycles within slaves are generated by a local timer. Since each slave in the EtherCAT network starts running at different times, each slave refreshes its I/O according to its own cycle, operating asynchronously.

PDO

PDO (Process Data Object) is used for real-time data exchange, transmitting data in a periodic or event-triggered manner.

SDO

SDO (Service Data Object) is used for unstructured data exchange, transmitting node parameter configuration or critical parameters.

SM

SM (Sync Manager) synchronization mode achieves data synchronization through SM channels. When the data frame sent from the master reaches the slave, a Sync Manager event is triggered. Upon receiving this signal, the slave immediately enters the interrupt service program to execute data exchange and I/O refresh. In this mode, since data frames arrive at each slave at different times, there is a time deviation in when each slave receives the data. The more slaves there are and the more complex the system configuration, the worse the synchronization effect will be.

ESI

ESI (EtherCAT Slave Interface) is an XML file format used to define the communication interface information for EtherCAT slave devices. These files contain the characteristics of slave devices, such as the structure of input and output data objects, register mapping, and communication parameters.



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