

PS00011297A00

GL20-0032ETN Digital Output Module User Guide

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Preface

■ Introduction

GL20-0032ETN series 32-channel digital output expansion module supports output of source type and can be used with GL20 series communication interface modules and Easy series PLC products.

This guide describes the mechanical installation, electrical installation and programming examples of the product.

■ Standard

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 24 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
UL/cUL certification	-		UL 61010-1 UL 61010-2-201 UL 61010-2-030 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201 CSA C22.2 NO. 61010-2-030

Certification	Directive	Standard
KCC Certification	-	-
EAC certification	-	-

■ More documents

Name	Data Code	Description
GL20-RTU-ECT Communication Interface Module User Guide	PS00004985	This guide describes the installation, wiring and more of the product.
GL20-RTU-PN Communication Interface Module User Guide	PS00007594	This guide describes the installation, wiring and more of the product.

■ Revision History

Date	Version	Description
May 2023	A00	First release

■ Access to the Guide

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

- Visit <http://www.inovance.com>, go to Support > Download, search by keyword, and then download the PDF file.
- Scan the QR code on the product with your mobile phone.

■ Warranty

The warranty period of the product is 18 months as of the date of manufacture (refer to the barcode on the equipment). If otherwise agreed upon, the agreed terms and conditions shall prevail. After the warranty period expires, maintenance will be charged.

Within the warranty period, maintenance will be charged for damages caused by the following:

- Damage caused by operations not following the instructions in the user guide

- Damage caused by fire, flood, or abnormal voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

The maintenance fee 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 the Product Warranty Card.

Fundamental Safety Instructions

■ Safety Precautions

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

■ Safety Levels and Definitions



DANGER: Indicates that failure to comply with the notice 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 or moderate personal injuries or damage to the equipment. Please keep this guide well so that it can be read when necessary and forward this guide to the end user.

Control System Design



DANGER

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



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

Installation



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



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

Wiring



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



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

Operation and Maintenance



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

Safety Recommendations

- In the position where the operator directly touches the machinery part, for example, where a machinery tool is loaded/unloaded, or where a machine runs automatically, manually-operated devices or similar must be installed independently of the PLC to start or stop the automatic operation of the system.
- If you need to modify the program while the system is running, use the lock function or other protective measures. Ensure that only authorized personnel can make the necessary modifications.

Disposal



- 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.

1 Product Information

1.1 Model and Nameplate

GL 20 - 00 32 E TN

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②

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① Product Information

GL: General local module

② Serial Number

20: 20 series module

③ I/O Points

00: 0 input

④ I/O Points

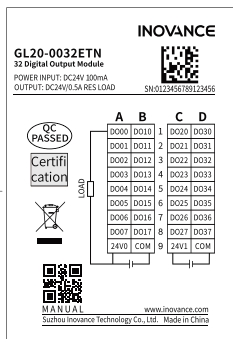
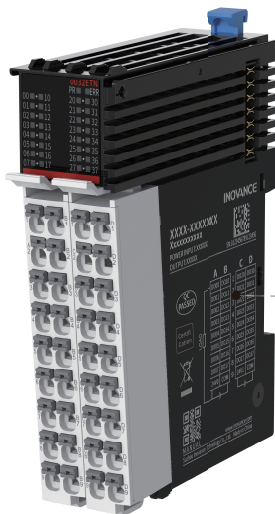
32: 32 outputs

⑤ Module Type

E: Logic I/O expansion module

⑥ Output type

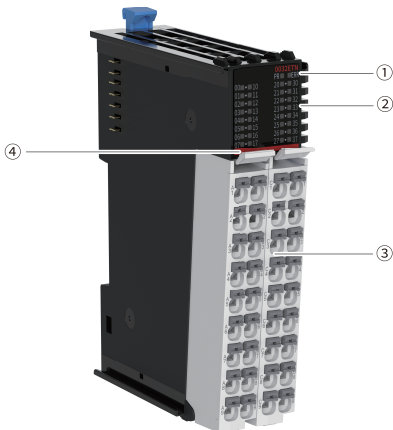
TN: Transistor output (sink)



Based on the above description of model number and nameplate, the relevant ordering data of this product is described in the following table.

Model	Description	Product Code	Applicable Model
GL20-0032ETN	GL20 series 32-channel transistor NPN output module	01440467	GL20 communication interface module, Easy series

1.2 Components



No.	Name	Description			
①	Signal Indicator	PR (POWER +RUN)	Power / running indicator	Yellow green	ON: The module is in normal operation. Flashing quickly: The module is addressed successfully. Flashing slowly: The module is powered on but not addressed. OFF: The module is not powered on or is faulty.
		ERR	Error indicator	Red	Module fault
②	I/O signal indicator	00 to 37	I/O signal indicator	Yellow green	ON: Input/Output active OFF: Input/Output inactive
③	Terminals	/	0 input and 32 outputs	/	See detailed definition in "3.2 Terminal Definition" on page 20
④	Color identification		Red: Digital output		Orange: Analog output
			Gray: Digital input		Green: Analog input
			White: Communication		Blue: Other module

Note

- Flashing quickly: on for 200 ms followed by off for 200 ms.
- Flashing slowly: on for 200 ms followed by off for 1000 ms.

1.3 Technical Specifications

■ General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	24 mm x 100 mm x 75 mm
Weight	Approx. 115 g

■ Power Supply Specifications

Item	Specification
Rated bus input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated bus input current	125mA (typical@5 V)
Rated terminal input voltage	24 VDC (20.4 VDC to 28.8 VDC)
Rated terminal input current	100mA (typical@24 V)
Rated terminal output voltage	N/A
Rated terminal output current	N/A
Hot swap	Not supported

■ Output Specifications

Item	Specification
Output type	Digital output, low side
Output mode	Sink
Output channels	32
Output Voltage	24 VDC $\pm$ 10% (21.6 VDC to 26.4 VDC)
Output load (resistive load)	0.5 A/point; 8 A/module
Output load (inductive load)	7.2 W/point; 48 W/module
Output load (lamp load)	5 W/point; 36 W/module
ON/OFF hardware response time	100 μ s/100 μ s
Leakage current at OFF	10 μ A

Item	Specification
Switching frequency	100 Hz with resistive load, 0.5 Hz with inductive load, 10 Hz with lamp load
Isolation	Yes
Output action display	Output indicators are turned ON (via software control) when the outputs are in the driving state
Output derating	Full load when operating at 45°C (namely, 32-channel output current does not exceed 8 A), output current derated to 50% when operating at 55°C (namely, 32-channel output current does not exceed 4 A)
Protection	Short circuit protection, overcurrent protection

■ Software specifications

Item	Specification
Programming software version	InoProShop V1.7.3 and above
Output mode upon stop	Output zero, output last value, output preset value
Preset value	0 or 1
Output port anomaly detection and indication	N/A
Output channel logic level configuration	Not supported
Independent channel enable configuration	Not supported
Diagnostic report configuration	Not supported
When in stop mode	Output according to output mode upon stop and present value, no refresh
I/O Mapping	Supports bitwise, byte-wise and word-wise addressing

1.4 Environmental Specifications

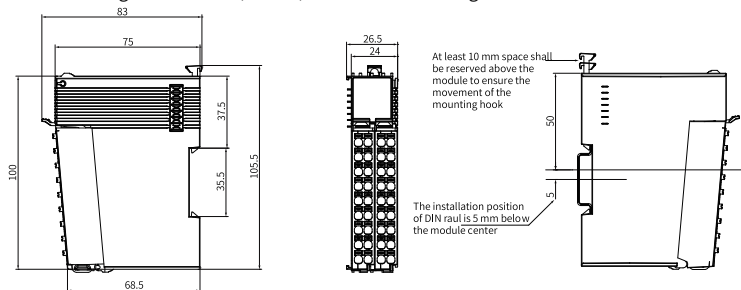
Item	Specification
Operating temperature	-20°C to 55°C
Ambient operating humidity	10% to 90% RH (non-condensing)
Working environment	No corrosive and flammable gas and no excessive conductive dust
Storage temperature	-40°C to 70°C (<90% RH, non-condensing)
Altitude	≤2000 m
Pollution degree	2 or less
Noise immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Vibration resistance	IEC 60068-2-6 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1g, 10 times each in X, Y and Z directions
Shock resistance	IEC 60068-2-27 150 m/s ² , 11 ms, 3 times each in ±X, ±Y and ±Z directions, 18 times in total

2 Mechanical Installation

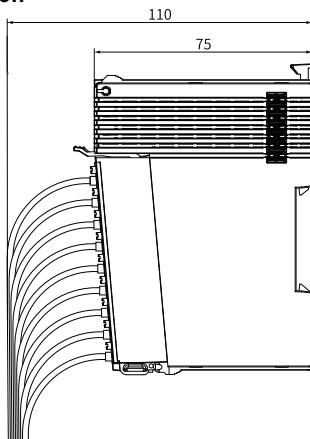
2.1 Mounting Dimensions

■ Module

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



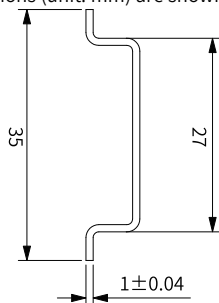
■ Cable Connection



2.2 Installation Method

■ Installing Modules Side-by-Side

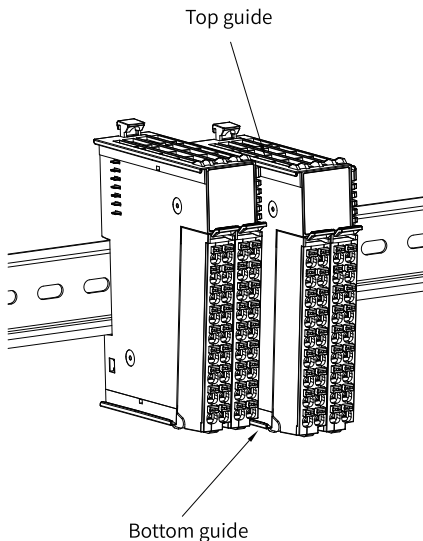
The module is mounted onto a DIN rail in conformity with IEC 60715 (width: 35 mm, thickness: 1 mm). The dimensions (unit: mm) are shown below.



Caution

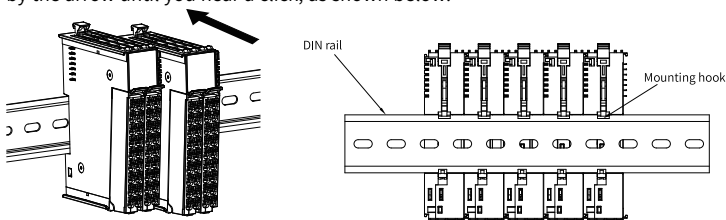
When installed on a DIN rail other than the recommended one (especially the one whose thickness is not 1.0 mm), the module will not fit in place as the mounting hook does not work.

You can install multiple modules side by side with the help of top and bottom guides on the modules, as shown below.

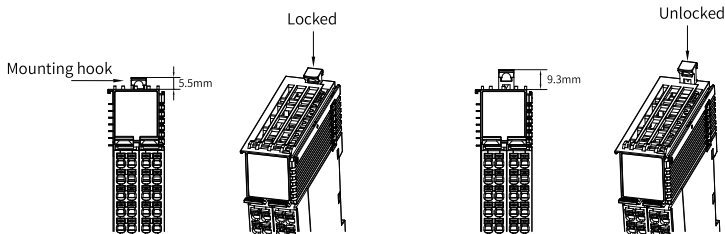


■ Installing Module onto DIN Rail

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



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



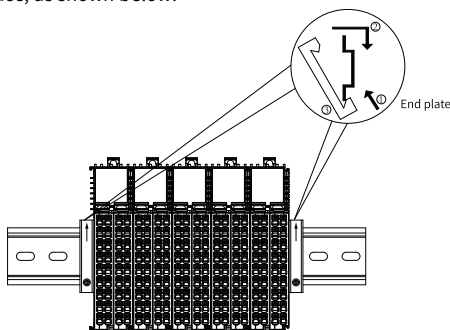
- If the mounting hook is pressed down, it is locked.
- If the mounting hook is lifted up, it is unlocked.

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



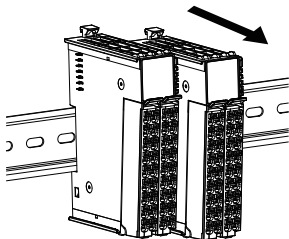
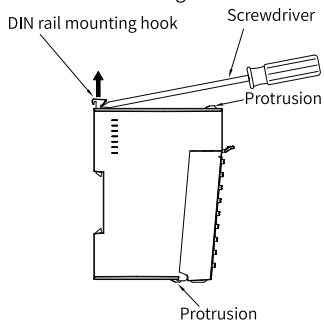
When the module is not installed on the rail, keep the mounting hook in the locked state. Keeping the mounting hook unlocked for a prolonged time may cause the hook to fail.

3. Mount an end plate on a side of the PLC or expansion module. To mount the end plate, hook the bottom of it to the bottom of the DIN rail, rotate the end plate to hook the top of it to the top of the DIN rail, and then tighten the screw to lock the end plate in place, as shown below.



■ Removing the Module

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



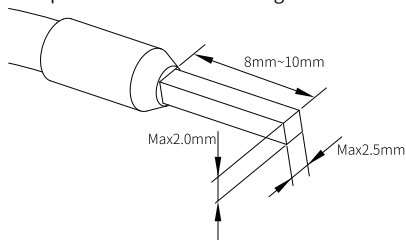
3 Electrical Installation

3.1 Cable Selection

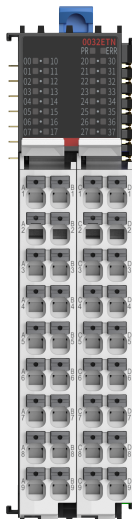
The cable lug and cable diameter included in the following table are only for reference.

Material Name	Applicable Cross Sectional Area of the Cable		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	

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



3.2 Terminal Definition

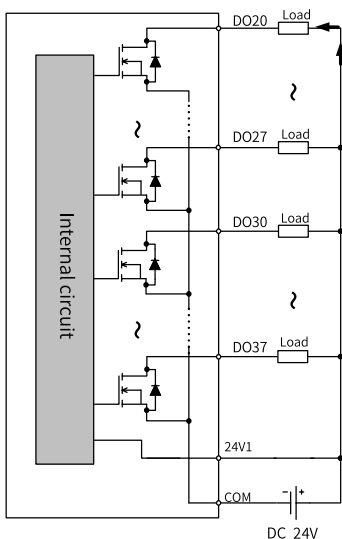
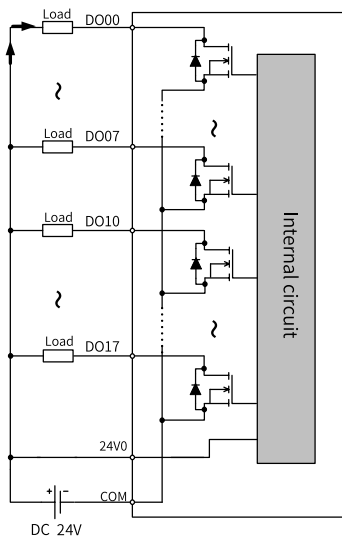


Mark	Signal	Terminal	Terminal	Signal	Mark
00	DO00	A1	B1	DO10	10
01	DO01	A2	B2	DO11	11
02	DO02	A3	B3	DO12	12
03	DO03	A4	B4	DO13	13
04	DO04	A5	B5	DO14	14
05	DO05	A6	B6	DO15	15
06	DO06	A7	B7	DO16	16
07	DO07	A8	B8	DO17	17
/	24V0	A9	B9	COM	/

Mark	Signal	Terminal	Terminal	Signal	Mark
20	DO20	C1	D1	DO30	30
21	DO21	C2	D2	DO31	31
22	DO22	C3	D3	DO32	32

Mark	Signal	Terminal	Terminal	Signal	Mark
23	DO23	C4	D4	DO33	33
24	DO24	C5	D5	DO34	34
25	DO25	C6	D6	DO35	35
26	DO26	C7	D7	DO36	36
27	DO27	C8	D8	DO37	37
/	24V1	C9	D9	COM	/

3.3 Terminal Wiring



Note

To ensure the normal operation of the module, 24V0 and 24V1 of the module need to be connected to a 24V power supply at the same time.

4 Fault Diagnosis

4.1 Fault Diagnosis

When the ERR indicator of the module is ON, it indicates that the module encounters a fault. The module reports a fault code. You can get the fault code through the diagnostic data object dictionary value displayed on the "CoE Online" interface, as shown below. For the module installed in slot n ($n=0-16$), the object dictionary definition for index $0xA000+0x40*n$ is shown in the table below.

GL20_RTU_ECT x Device						
General		☒ Read this page ☐ Auto Update ☒ Offline from ESI file ☐ Online from device				
Process Data(PDO Setting)		Index/Subindex	Name	Flags	Type	Value
Startup parameters(SDO Setting)	16#1018:16#00	Identity		RO	USINT	
	16#1C00:16#00	Sync manager type		RO	USINT	
	16#1C12:16#00	RxPDO assign		RO	USINT	
Online	16#1C13:16#00	TxPDO assign		RO	USINT	
	16#1C32:16#00	SM output parameter		RO	USINT	
	16#1C33:16#00	SM input parameter		RO	USINT	
CoE Online	16#3010:16#00	Port 0 error counter		RO	USINT	
	16#3011:16#00	Port 1 error counter		RO	USINT	
	16#3012:16#00	ESC error counter		RO	USINT	
Device Diagnosis	16#3016:16#00	Station address		RO	USINT	
	16#3020:16#00	Fpga sortf version		RO	UDINT	
	16#3021:16#00	Module software version		RO	USINT	
EtherCAT I/O Mapping	16#6000:16#00	3200END input		RO	USINT	
	16#7040:16#00	0032ETN output		RO	USINT	
	16#8000:16#00	3200END DI Filter time parameters		RW	USINT	
Status	16#8040:16#00	0032ETN DO configure stopmode parameters		RW	USINT	
	16#8041:16#00	0032ETN configure stopvalue parameters		RW	USINT	
	16#A000:16#00	3200END Diagnosis information		RO	USINT	
Information	16#01	3200END Module Diagnosis information		RO	UDINT	
	16#02	3200END DI-CH0 Diagnosis information		RO	UDINT	
	16#03	3200END DI-CH1 Diagnosis information		RO	UDINT	
	16#04	3200END DI-CH2 Diagnosis information		RO	UDINT	
	16#05	3200END DI-CH3 Diagnosis information		RO	UDINT	
	16#A040:16#00	0032ETN Diagnosis information		RO	USINT	
	16#01	0032ETN Module Diagnosis information		RO	UDINT	
	16#02	0032ETN DO-CH0 Diagnosis information		RO	UDINT	
	16#03	0032ETN DO-CH1 Diagnosis information		RO	UDINT	
	16#04	0032ETN DO-CH2 Diagnosis information		RO	UDINT	
	16#05	0032ETN DO-CH3 Diagnosis information		RO	UDINT	
	16#F000:16#00	Modular device profile		RO	USINT	
	16#F030:16#00	Configured Module Ident List		RO	USINT	
	16#F050:16#00	Detected Module Ident List		RO	USINT	
	16#F100:16#00	Device Status		RO	USINT	
	16#F110:16#00	Module Error Flag		RO	USINT	
	16#F120:16#00	LBus Count		RO	USINT	
	16#F800:16#00	Device configuration data		RO	USINT	
	16#FB00:16#00	Control word		RW	UDINT	

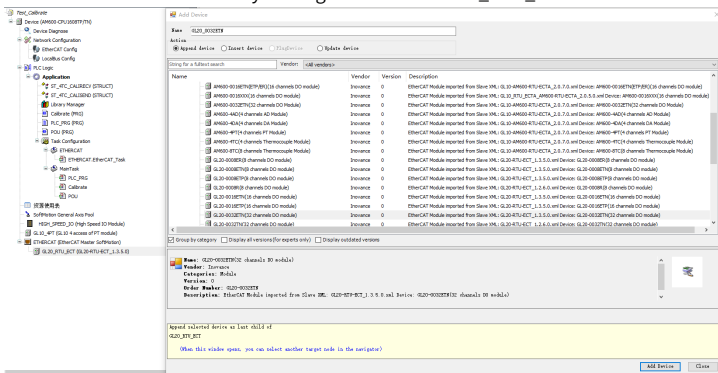
■ Module Fault Code

Fault Code	Fault Description	Solution
0x5003	External 24 V power failure	Check the isolated power supply of the module

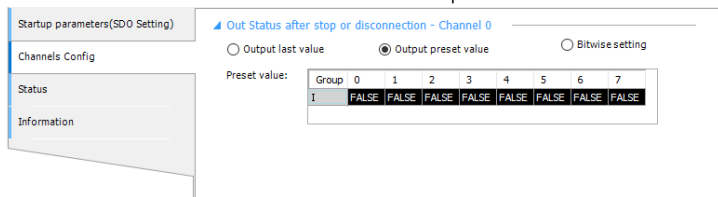
5 Programming Examples

The following is an example where AM600 is used as the master control module along with the GL20-0032ETN module.

1. Add GL20-0032ETN module by adding it under the GL20_RTU_ECT module.



2. Double click the module and set Out Status after stop or disconnection.



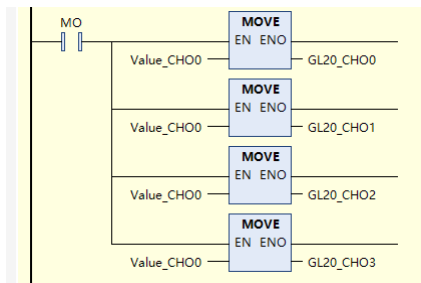
3. Add custom output variables GL20_CHO0, GL20_CHO1, GL20_CHO2, and GL20_CHO3.

PROGRAM POU									
	Scope	Name	Address	Data type	Initialization	Persistent	Constant	Comment	Attributes
31	VAR	GL20_0032_OUT0		USINT		☐	☐		
32	VAR	GL20_0032_OUT1		USINT		☐	☐		
33	VAR	GL20_0032_OUT2		USINT		☐	☐		
34	VAR	GL20_0032_OUT3		USINT		☐	☐		
35	VAR	GL20_0032_Value0		USINT		☐	☐		
36	VAR	GL20_0032_Value1		USINT		☐	☐		
37	VAR	GL20_0032_Value2		USINT		☐	☐		
38	VAR	GL20_0032_Value3		USINT		☐	☐		

4. Map the variables GL20_CHO0, GL20_CHO1, GL20_CHO2, and GL20_CHO3 to the output channels of the configured module.

General	Find	Filter	Show all	Add FB for IO Channel... Go to Instance				
Process Data(PDO Setting)	Variable		Channel	Address	Type	Default Value	Unit	Description
Startup parameters(SDO Setting)	Application.POU.GL20_0032_OUT0		Device control	%QW1	USINT			Device control
	Application.POU.GL20_0032_OUT1		GL20_0032ETN Digital output CH0-8bit	%QW5	USINT			GL20_0032ETN Digital output CH0-8bit
	Application.POU.GL20_0032_OUT1		GL20_0032ETN Digital output CH1-8bit	%QW6	USINT			GL20_0032ETN Digital output CH1-8bit
Online	Application.POU.GL20_0032_OUT2		GL20_0032ETN Digital output CH2-8bit	%QW6	USINT			GL20_0032ETN Digital output CH2-8bit
CoE Online	Application.POU.GL20_0032_OUT3		GL20_0032ETN Digital output CH3-8bit	%QW7	USINT			GL20_0032ETN Digital output CH3-8bit
			LBUS status	%IWI0	USINT			LBUS status
Device Diagnosis			Fault ID	%IWI1	USINT			Fault ID
EtherCAT I/O Mapping								
EtherCAT IEC Objects								
Status								
Information								

5. Define the input and output variables with the LD programming language as shown in the figure below.



6. After successful compiling, download the project and run it.

6 Appendix: Version Information

6.1 Appendix: Version Information

Module Firmware Version	Communication Interface Module Firmware Version	XML File Version	InoProShop Version
0.1.13.0 and later	GL20-RTU-ECT: 2.4.12.0 and later GL20-RTU-PN: 2.1.1.0 and later	1.3.9.0 and later	V1.7.3 SP2 and later