

PS00011314A00

GL20-3200END

Digital Input Module

User Guide

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Preface

■ Introduction

GL20-3200END series 32-channel digital input expansion module supports input 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 - 32 00 E ND

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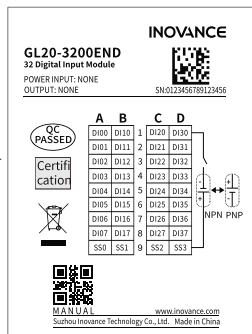
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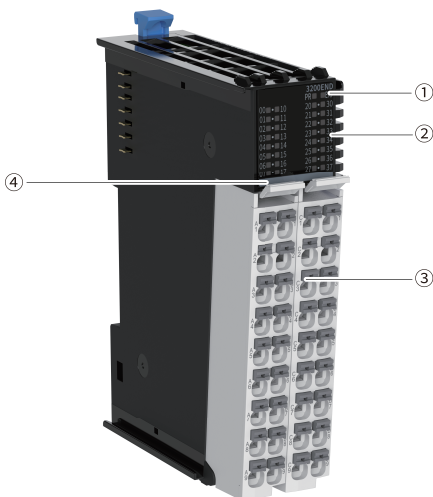
① Product Information GL: General local module	③ I/O Points 32: 32 inputs	⑤ Module Type E: Logic I/O expansion module
② Serial Number 20: 20 series module	④ I/O Points 00: 0 outputs	⑥ Output Type ND: Transistor input (source/sink)



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
GL20-3200END	GL20 series 32-channel digital input module	01440466	Easy series products and GL20 series communication interface modules

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	/	32 inputs and 0 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. 112 g

■ Power Supply Specifications

Item	Specification
Rated bus input voltage	5 VDC (4.75 VDC to 5.25 VDC)
Rated bus input current	60 mA (typical@5 V)
Rated terminal input voltage	N/A
Rated terminal input current	N/A
Rated terminal output voltage	N/A
Rated terminal output current	N/A
Hot swap	Not supported

■ Input Specifications

Item	Specification
Input type	Digital input
Input mode	Sink/Source
Input channels	32
Input Voltage	24 VDC $\pm$ 10% (21.6 VDC to 26.4 VDC)
Input current (typical)	4 mA (typical@24 V)
ON voltage	> 15 VDC
OFF voltage	< 5 VDC
ON/OFF hardware response time	100 μ s/100 μ s
Software filter time	Supported

Item	Specification
Input impedance	Reference: 5.3k to 5.6k
Isolation	Yes
Input action display	Input indicators are turned ON (via software control) when the inputs are in the driving state
Input derating	Full load when operating at 45°C, and the number of active input channels reduces to 50% (namely, 16 input channels available)

■ Software specifications

Item	Specification
Programming software version	InoProShop V1.7.3 and above
Software input filter time	Options include Without filter, 0.25 ms, 0.5 ms, 1ms (factory setting), 2 ms, 4 ms, 8 ms, 16 ms, and 32 ms. You can set two filter time parameters, each for 16 channels.
Input port anomaly detection and indication	N/A
Input channel logic level configuration	Not supported
Independent channel enable configuration	Not supported
Diagnostic report configuration	Not supported
Stop mode	Outputs are not refreshed, inputs can be refreshed when in state SAFE-OPERATIONAL
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)

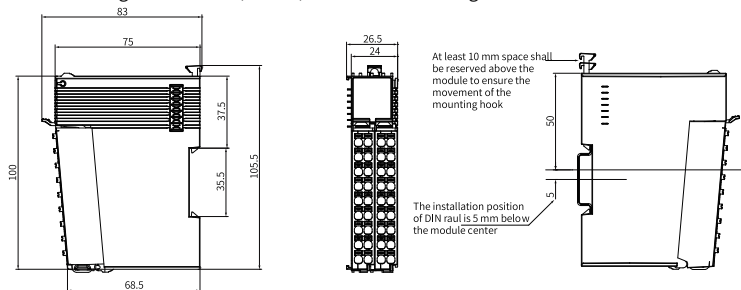
Item	Specification
Operating environment	No corrosive and flammable gas and no excessive conductive dust
Storage temperature	-40°C to 70°C (<90% RH, non-condensing)
Altitude	≤2000 m
Pollution degree	2 or less
Noise immunity	2 kV on power supply line (Conforms to IEC 61000-4-4)
Overvoltage category	I
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

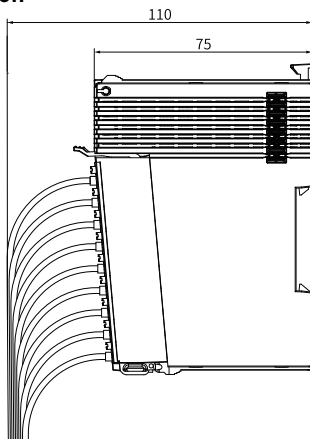
2.1 Mounting Dimensions

■ Module

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



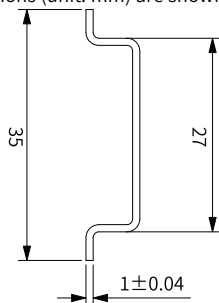
■ Cable Connection



2.2 Installation Method

■ Installing Modules Side-by-Side

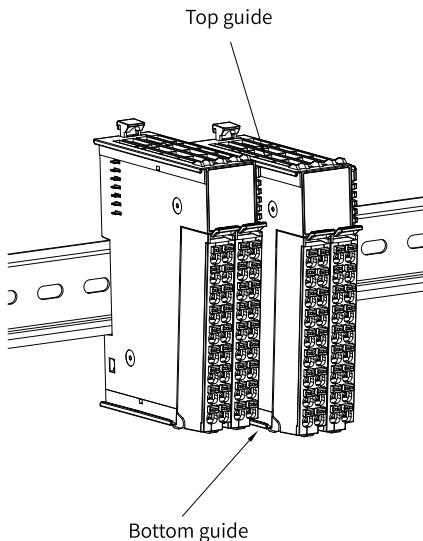
The module is mounted onto a DIN rail in conformity with IEC 60715 (width: 35 mm, thickness: 1 mm). The dimensions (unit: mm) are shown below.



Caution

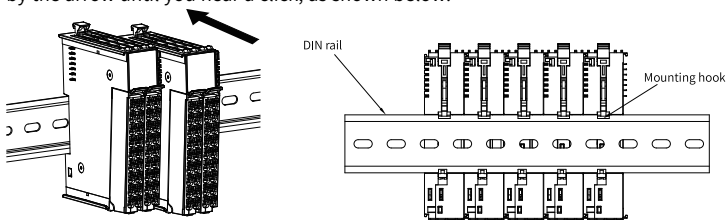
When installed on a DIN rail other than the recommended one (especially the one whose thickness is not 1.0 mm), the module will not fit in place as the mounting hook does not work.

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

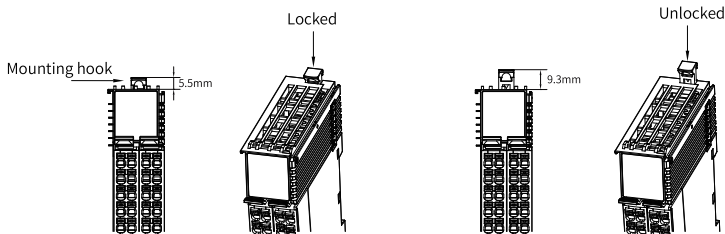


■ Installing Module onto DIN Rail

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.



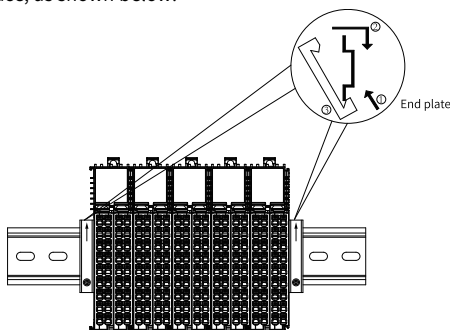
- If the mounting hook is pressed down, it is locked.
- If the mounting hook is lifted up, it is unlocked.

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



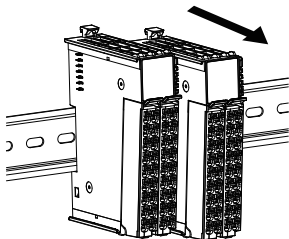
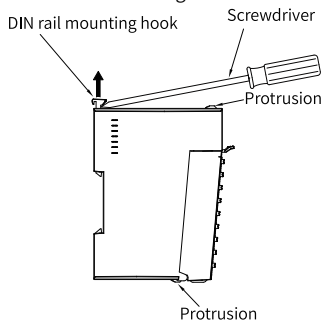
When the module is not installed on the rail, keep the mounting hook in the locked state. Keeping the mounting hook unlocked for a prolonged time may cause the hook to fail.

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.



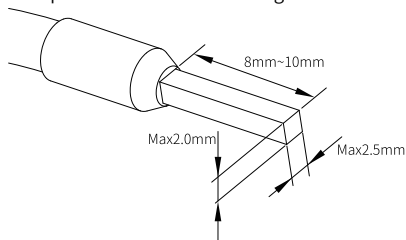
3 Electrical Installation

3.1 Cable Selection

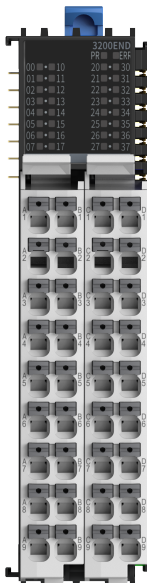
The cable lug and cable diameter included in the following table are only for reference.

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.



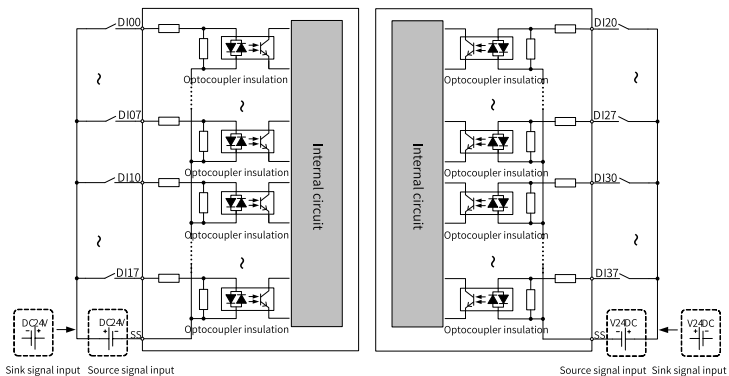
3.2 Terminal Definition



Mark	Signal	Terminal	Terminal	Signal	Mark
00	DI00	A1	B1	DI10	10
01	DI01	A2	B2	DI11	11
02	DI02	A3	B3	DI12	12
03	DI03	A4	B4	DI13	13
04	DI04	A5	B5	DI14	14
05	DI05	A6	B6	DI15	15
06	DI06	A7	B7	DI16	16
07	DI07	A8	B8	DI17	17
/	SS0	A9	B9	SS1	/

Mark	Signal	Terminal	Terminal	Signal	Mark
20	DI20	C1	D1	DI30	30
21	DI21	C2	D2	DI31	31
22	DI22	C3	D3	DI32	32
23	DI23	C4	D4	DI33	33
24	DI24	C5	D5	DI34	34
25	DI25	C6	D6	DI35	35
26	DI26	C7	D7	DI36	36
27	DI27	C8	D8	DI37	37
/	SS2	C9	D9	SS3	/

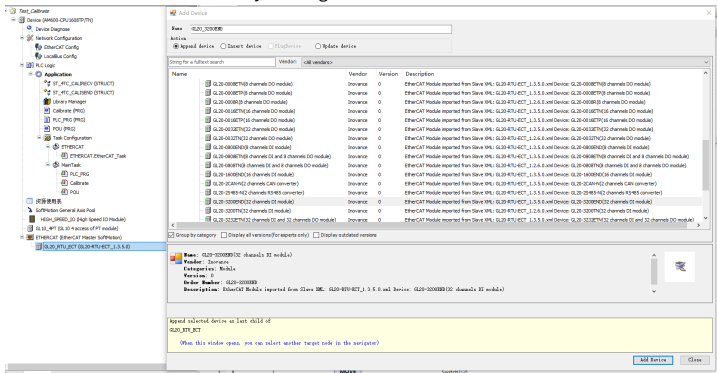
3.3 Terminal Wiring



4 Programming Examples

The following is an example where AM600 is used as the master control module along with the GL20-3200END module.

1. Add GL20-3200END module by adding it under the GL20_RTU_ECT module.



2. Double click the module to set the filter time of the channels.

Startup parameters(SDO Setting)

Channels Config

Status

Information

Access - 1

Filter Time: 1ms

Access - 2

Filter Time: 1ms

Access - 3

Filter Time: 1ms

Out Status after stop or disconnection - Channel 0

☐ Output last value
 ☒ Output preset value
 ☐ Bitwise setting

Preset value:

Group	0	1	2	3	4	5	6	7
I	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE

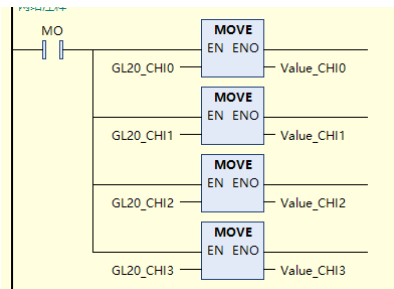
3. Add custom input variables GL20_CHI0, GL20_CHI1, GL20_CHI2, and GL20_CHI3.

PROGRAM POU									
	Scope	Name	Address	Data type	Initialization	Persistent	Constant	Comment	Attributes
17	VAR	M0_Switch		BOOL		☐	☐		
18	VAR	Switch1		ARRAY[1..16] OF BOOL		☐	☐		
19	VAR	GL20_3200_CHI0		USINT		☐	☐		
20	VAR	GL20_3200_CHI1		USINT		☐	☐		
21	VAR	GL20_3200_CHI2		USINT		☐	☐		
22	VAR	GL20_3200_CHI3		USINT		☐	☐		

4. Map the variables GL20_CHI0, GL20_CHI1, GL20_CHI2, and GL20_CHI3 to the input 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)	+	Device control	%QW1	UINT			Device control
Online	+	LBUS status	%LW10	UINT			LBUS status
CoE Online	+	Fault ID	%LW11	UINT			Fault ID
Device Diagnosis	+	Application.POU.GL20_3200_CH00	?	GL20_3200END Digital input CH0-8bit	%IB24	USINT	GL20_3200END Digital input CH0-8bit
	+	Application.POU.GL20_3200_CH01	?	GL20_3200END Digital input CH1-8bit	%IB25	USINT	GL20_3200END Digital input CH1-8bit
	+	Application.POU.GL20_3200_CH02	?	GL20_3200END Digital input CH2-8bit	%IB26	USINT	GL20_3200END Digital input CH2-8bit
	+	Application.POU.GL20_3200_CH03	?	GL20_3200END Digital input CH3-8bit	%IB27	USINT	GL20_3200END Digital input CH3-8bit
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.

5 Appendix: Version Information

5.1 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