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PS00004986A08

GL20-4DA
Analog Output Module

User Guide

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Preface

■ Introduction

GL20-4DA series 4-channel analog output module supports voltage and current output modes with 16-bit resolution. It can be used together with Easy series, AM300, AM500, AC800 (through GL20-RTU-ECT) PLCs and GL20 series communication interface modules such as GL20-RTU-ECT.

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

■ Standards compliance

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

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

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

■ More Data

Name	Code	Description
GL20-RTU-ECT Communication Interface Module User Guide	PS00004985	Introduces the installation, wiring, and other information of the product.
GL20-RTU-PN Communication Interface Module User Guide	PS00007594	Introduces the installation, wiring, and other information of the product.
GL20-RTU-ECT32 Communication Interface Module User Guide	PS00013434	Introduces the product information, mechanical installation, electrical installation, program commissioning, and troubleshooting of the product.
GL20-4DA Analog Output Module User Guide	PS00004986	Introduces mechanical installation, electrical installation, and program commissioning of the product.

■ Revision History

Date	Version	Revision
April 2025	A08	• Updated *"1.3 Technical Data" on page 12*. • Made minor corrections.
July 2024	A07	Updated *"1.4 Environmental Specifications" on page 16*.
June 2024	A06	• Updated "Applicable Model" in *"1.1 Naming Rules and Nameplate" on page 9*. • Updated the "Rated current of bus input power supply" of power supply specifications in *"1.3 Technical Data" on page 12*. • Updated the "Output PDO data volume" parameter to the software specifications in section *"1.3 Technical Data" on page 12*. • Updated *"1.4 Environmental Specifications" on page 16*.
February 2024	A05	• Updated the operation steps in *" Program Commissioning" on page 30*. • Updated the matching version in *" Appendix: Version Matching Information" on page 41*.
July 2023	A04	Made minor corrections.
May 2023	A03	Added "Fault Diagnosis" and "Version Matching Information" sections.
February 2023	A02	Added “Environmental Specifications”. Updated the effect diagram and structure diagram.
June 2022	A01	Made minor corrections.
March 2022	A00	Initial release.

■ Access to the Guide

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

- Do keyword search under Service and Support at *www.inovance.com*.
- Scan the QR code on the product with your smart phone.
- Scan the QR code below to install My Inovance 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 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.

Fundamental Safety Instructions

■ Safety Disclaimer

1. Read and comply with the safety instructions during installation, operation, and maintenance of the equipment.
2. To ensure your safety and prevent damage to the equipment, follow the marks on the equipment and all the safety instructions in this guide.
3. "CAUTION", "WARNING", and "DANGER" items in the guide do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.
4. Use this equipment according to the designated environment requirements; otherwise, a fault may occur. Malfunction or damage caused by improper use is not covered by warranty.
5. Inovance shall take no responsibility for any personal injury or property damage caused by improper use.

■ Safety Levels and Definitions

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

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

"CAUTION" indicates that failure to comply with the notice may result in minor or moderate personal injury or equipment damage. Keep this 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 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.

WARNING

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

Installation

WARNING

- Installation 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 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 equipment.
- The controller is open-type equipment that must be installed in a control cabinet with lock (IP rating of the control cabinet enclosure > IP20). Only qualified professionals can open the cabinet.

CAUTION

- 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 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 programmable controller and can start or terminate the automatic running of the system.
- If you need to modify the program while the system is running, use the lock function or other protective measures. Ensure that only authorized personnel can make the necessary modifications.

Disposal

- Treat the scrapped equipment 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.

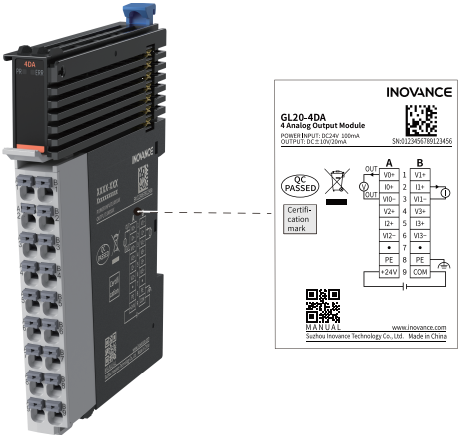
1 Product Information

1.1 Naming Rules and Nameplate

GL 20 - 4 DA

① ② ③ ④

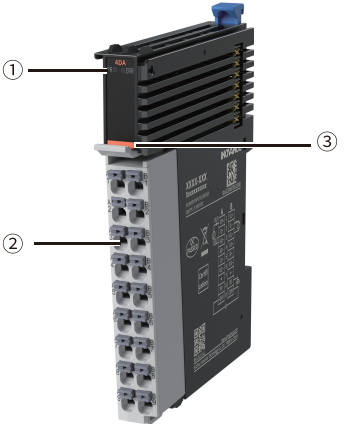
① **Product information** GL: Inovance general local module	③ **Number of I/O channels** 4: 4 channels 8: 8 channels
② **Series number** 20: 20 series module	④ **Module type** DA: Analog output AD: Analog input AM: Hybrid module PT: Thermal resistor temperature detection TC: Thermocouple temperature detection



The data for ordering the product is shown in the following table.

Model	Description	Material code	Applicable model
GL20-4DA	GL20-4DA series 4-channel analog output module (voltage/ current output supported)	01440287	• Easy, AM300, and AM500 series PLCs (local) • AC800 series PLC with GL20-RTU-ECT (remote) • GL20 series communication interface modules such as GL20-RTU-PN (remote)

1.2 Components



<table>
<tr><th>No.</th><th>Interface</th><th colspan="4">Function</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Signal indicator</td><td>PR (POWER +RUN)</td><td>Power/Operation indicator</td><td>Yellow-green</td><td>• Steady ON: The module is operating normally.
• 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.</td></tr>
<tr><td>ERR</td><td>State machine error indicator</td><td>Red</td><td>ON when the module is faulty. For details, see "Troubleshooting" on page 38.</td></tr>
<tr><td>2</td><td>User terminal</td><td colspan="4">For details, see "3.2 Terminal Assignment" on page 26.</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">Color identification</td><td colspan="2">Red: Digital output</td><td colspan="2">Orange: Analog output</td></tr>
<tr><td colspan="2">Gray: Digital input</td><td colspan="2">Green: Analog input</td></tr>
<tr><td colspan="2">White: Communication</td><td colspan="2">Blue: Other modules</td></tr>
</table>

1.3 Technical Data

■ Basic

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	12 mm x 100 mm x 75 mm
Weight	About 60 g

■ Power supply

Item	Specification
Rated voltage of bus input power supply	5 VDC (4.75 VDC to 5.25 VDC)
Rated current of bus input power supply	70 mA (typical value @5 V)
Rated voltage of terminal input power supply	24 VDC (20.4 VDC to 28.8 VDC)
Rated current of terminal input power supply	100 mA (typical@24 V)
Rated voltage of terminal output power supply	/
Rated current of terminal output power supply	/
Hot swap	Not supported

■ Output

Item	Specification
Output type	Analog output
Output mode	Voltage/Current

Item	Specification
Number of output channels	4
Resolution	16 bits
Conversion time	60 μs/channel
Voltage output range	±10 V, 0 V to 10 V, ±5 V, 0 V to 5 V, 1 V to 5 V
Voltage output load	1 kΩ
Voltage output accuracy (25°C)	±0.1% (full range)
Voltage output accuracy (full temperature range)	±0.5% (full range)
Voltage output diagnosis	Short circuit detection and overtemperature protection supported
Current output range	0 mA to 20 mA, 4 mA to 20 mA
Current output load	0 Ω to 600 Ω
Current output accuracy (25°C)	±0.1% (full range)
Current output accuracy (full temperature range)	±0.5% (full range)
Current output diagnosis	Open circuit detection and overtemperature protection supported
Isolation	No isolation among interface channels, isolation applied between the power supply and interface, also between the interface and the bus
Output indicator	/
Output derating	For derating requirements in different installation positions in the current output mode, see *"1.4 Environmental Specifications" on page 16*.

■ Software

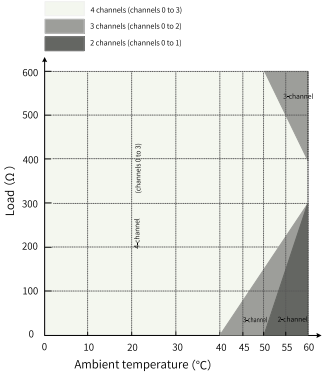
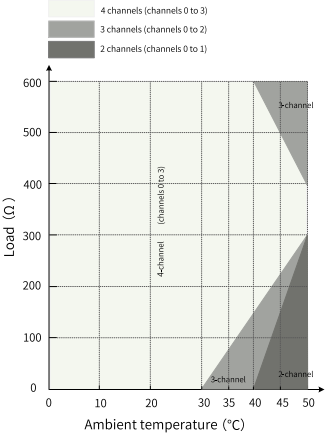
Item	Specification
Output PDO data volume	Max. 8 bytes
Independent channel enable configuration	Supported
Diagnostic report function configuration	Supported
Diagnostic detection enable configuration	Short circuit detection on voltage side and open circuit detection on current side (This function is not available for modes with output range containing 0.)
Conversion mode configuration	±10 V, 0 V to 10 V, ±5 V, 0 V to 5 V, 1 V to 5 V, 0 mA to 20 mA, and 4 mA to 20 mA
Output status configuration after stop	Output zero, output last value, output preset value
"Output present value" after stop	Supported
Digital range conversion	-20000 to +20000 -32000 to +32000 -27648 to +27648 For details, see the following table.
Stop mode	Outputted based on fault stop status mode and preset value (no longer updated)

The following table shows the digital range and limit range corresponding to the analog voltage output range and analog current output range.

Analog	Rated output range	Corresponding digital value	Output limit range	Corresponding digital value
Analog voltage output	-10 V to +10 V	-20000 to +20000 -32000 to +32000 -27648 to +27648	-11 V to +11 V	-22000 to +22000 -32767 to +32767 -30404 to +30404
	0 V to 10 V	0 to 20000 0 to 32000 0 to 27648	-0.5 V to +10.50 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 +5.50 V	-22000 to +22000 -32767 to +32767 -30404 to +30404
	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

1.4 Environmental Specifications

Item		Specification
Installation/Operating environment		Free from conductive dust, conductive fibers, explosive dust, flammable gases, water mist/greasy dirt, corrosive dusts/gases, strong vibration, and repetitive shock
Max. altitude		⩽ 2000 m
Pollution degree		2
Immunity		2 kV on power supply cable (compliant with IEC 61000-4-4)
Overvoltage category		I
EMC immunity level		Zone B, IEC61131-2
ESD protection level		Contact discharge +/-6 kV, air discharge +/-8 kV
Vibration resistance		• 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 g^2/Hz power spectral density at 5 Hz to 100 Hz; 0.001 g^2/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 gravitational acceleration, 11 ms pulse width, 18 times in X/Y/Z-axis directions
Operating temperature/ humidity		• Temperature: -20°C to +55°C • Humidity: < 95% RH (30°C), without condensation
Storage temperature/ humidity		• Temperature: -20°C to +60°C • Humidity: < 95% RH (30°C), without condensation
Transportation temperature/ humidity		• Temperature: -40°C to +70°C • Humidity: < 95% RH (40°C), without condensation
Installation position and limit (voltage output mode)	Installation position	Requirements on the installation position
	Limit	No limit

Item		Specification
Installation position and limit (current output mode)	Installation position	The module can be mounted in four directions, as shown in *"2.1 Requirements on Installation Position" on page 18*.
	Limit	Horizontal installation  Non-horizontal installation 

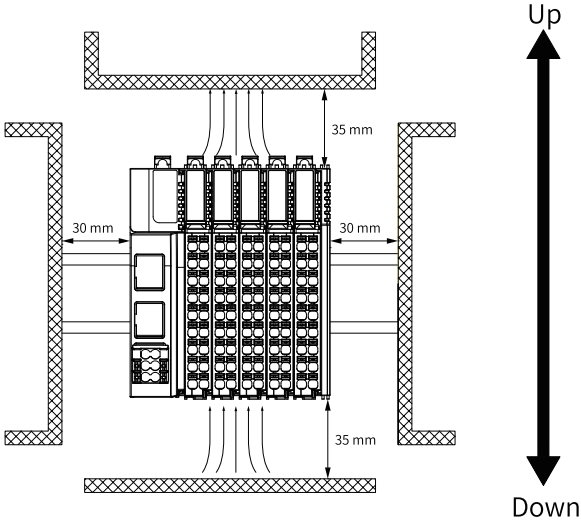
2 Mechanical Installation

2.1 Requirements on Installation Position

The product can be installed horizontally (recommended), vertically, on top or at the bottom of the electrical cabinet. Different installation positions require different operating temperatures/limits, see details in *"1.4 Environmental Specifications" on page 16*.

■ Optimal installation position

It is recommended to install the product horizontally, dissipating heat through natural convection. To ensure proper ventilation and sufficient wiring space, reserve sufficient clearance around the product as shown below.

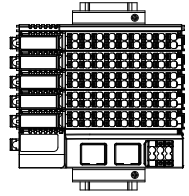


Note

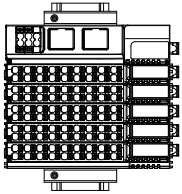
If there is a high-temperature heating source (heater, transformer, large resistor and so on) around the product, keep the product away from the heating source by at least 100 mm.

■ Other installation positions

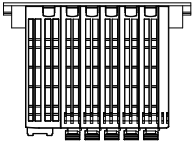
Other installation positions are shown below. The same clearances as the optimal installation position are also required.



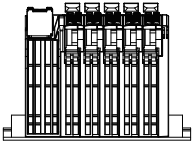
Vertical mounting 1



Vertical mounting 2



Cabinet top mounting



Cabinet bottom mounting

Caution

In case of vertical installation:

- If the module is mounted to the PLC, make sure the PLC is arranged below all I/O modules (see vertical mounting 1). The number of modules cannot exceed 6, and the type of modules is not limited.
- Hold the cables with a cable duct to prevent the weight of cables being applied to the lower end plate, which may result in disconnection of the product from the DIN rail.

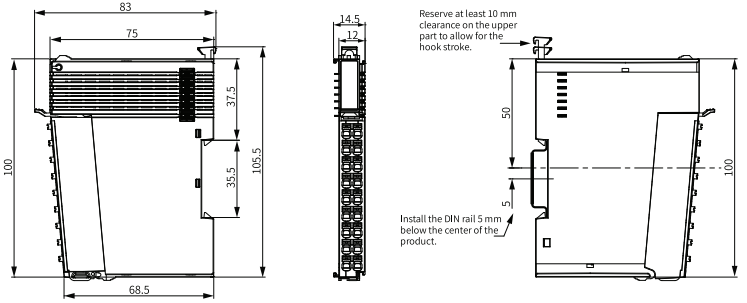
2.2 Installation Precautions

- Make sure the module is powered off before installing or removing.
- Do not hot swap the modules. Otherwise, the modules may be damaged by overcurrent or overvoltage, and the communication interface module or PLC may be subject to restart, user data loss or corruption.
- Do not drop or shock the housing or terminals of the module to avoid damage.

2.3 Mounting Dimensions

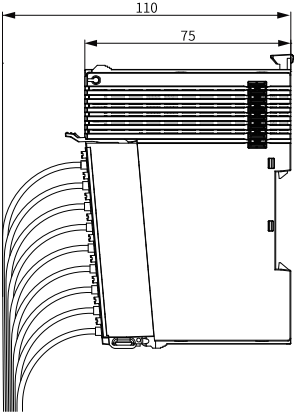
■ Module

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



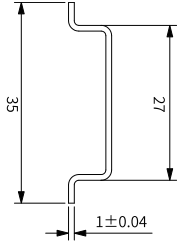
■ Cable connection

Cable dimensions (in mm) are shown in the figure below.



2.4 Installation Method

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

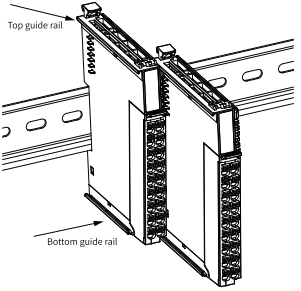


Caution

If the thickness of the DIN rail is not as required, the product cannot fit in or function properly as the DIN rail mounting hook does not work.

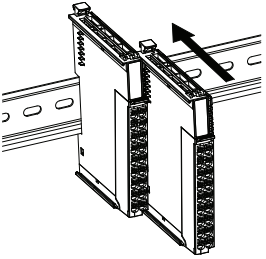
■ Installing modules side by side

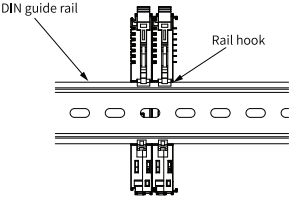
Install modules side by side by sliding them along the top and bottom guide rails of the module, as shown below.



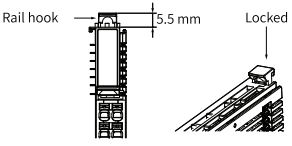
■ Installing modules onto DIN Rail

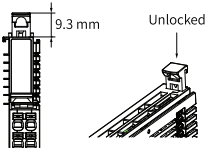
1. Align the module with the DIN rail and push the module in the direction indicated by the arrow until you hear a click, as shown below.





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.

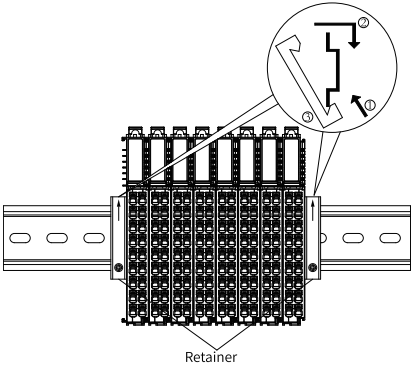
To lock the module to the DIN rail, press down the mounting hook.

Caution

When the module is not installed on the DIN rail, keep the rail hook in locked state. A hook that kept in unlocked state for a long period of time may fail to function properly.

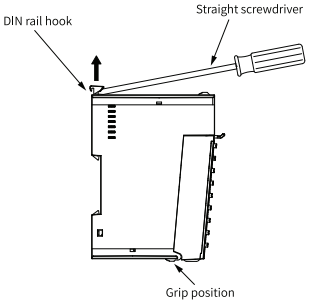
3. Install a DIN rail end plate on both sides of the PLC or the module.

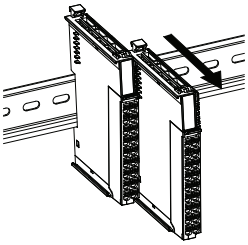
   To install the end plate, hook the bottom of it to the bottom of the DIN rail, rotate the end plate to hook the top of it to the top of the DIN rail, and then tighten the screw to lock the end plate in place.



■ Removing modules

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


DIN rail hook
Straight screwdriver
Grip position



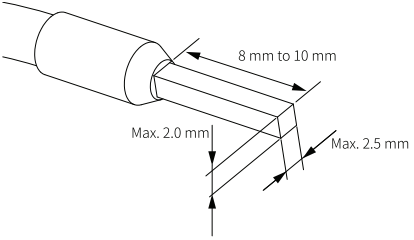
3 Electrical Installation

3.1 Cable Selection

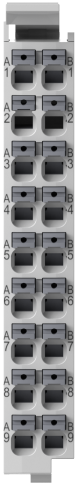
The cable lug and cross sectional area shown in the following table are only for reference.

Material Name	Applicable cross sectional area of the cable		KST		Suzhou Yuanli	
	mm^2	AWG	Model	Crimping pliers	Model	Crimping pliers
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 Assignment



Left signal	Left terminal	Right terminal	Right signal
V0+	A1	B1	V1+
I0+	A2	B2	I1+
VI0-	A3	B3	VI1-
V2+	A4	B4	V3+
I2+	A5	B5	I3+
VI2-	A6	B6	VI3-
-	A7	B7	-
PE	A8	B8	PE
24V	A9	B9	COM

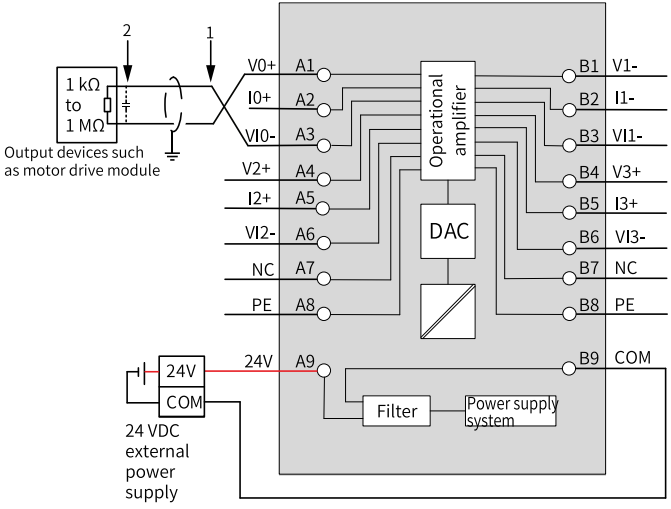
3.3 Wiring of Terminals

■ Wiring precautions

- Do not bundle the expansion cable together with power cables (high voltage/ current cables) that generate strong interference signals; otherwise, the expansion cable may be affected by noise, surge, and induction. Route expansion cables and power cables through different routes.
- Use recommended cables and adapter boards for connection. It is recommended that shielded cables be used as expansion cables to enhance anti-interference capacity.
- Apply single-point grounding for the shield of shielded cables and welded-seal cables.

■ External wiring

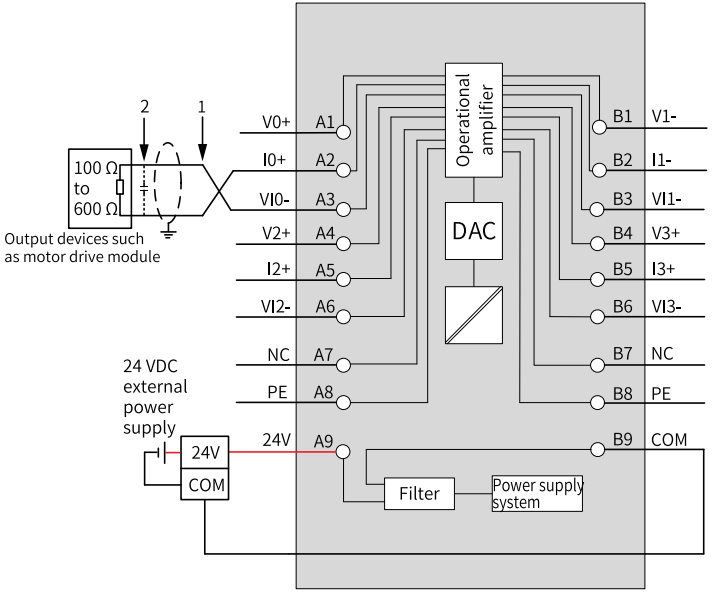
Connection for voltage-controlled signal



Caution

- 1: Use 2-conductor shielded twisted pair cables for analog signals.
- 2: If noises or ripples are generated in external wiring, connect a 25 V capacitor of 0.1 μF to 0.47 μF between terminals V+/VI+ and VI-.
- Connection of A4 and A6, B1 and B3, B4 and B6 is the same as that of A1 and A3.

Connection for current-controlled signal



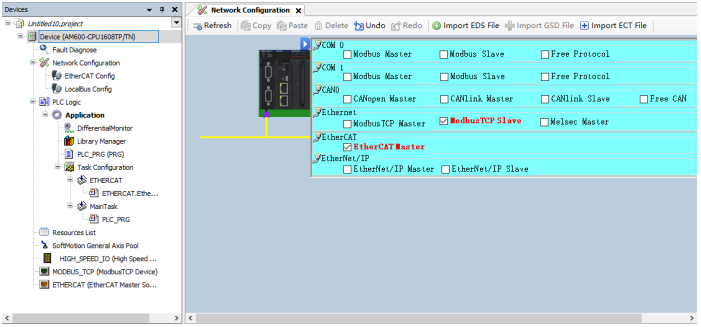
- 1: Use 2-conductor shielded twisted pair cables for analog signals.
- 2: If noises or ripples are generated in external wiring, connect a 25 V capacitor of 0.1 μF to 0.47 μF between terminals I+/VI+ and VI-.
- Connection of A5 and A6, B2 and B3, B5 and B6 is the same as that of A2 and A3.

4 Program Commissioning

The following is an example where the output voltage of channel 0 of the GL20-4DA module is assigned to the corresponding variable, and AC802 is used as the main control module.

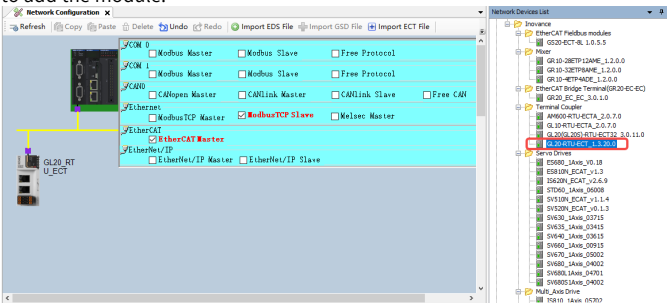
1. Enable the AM600 PLC as the EtherCAT master and add the GL20-RTU-ECT communication interface module.

   a. In the left **Devices** pane, double-click **Network Configuration** and click the AM600 PLC figure in the upper left corner of the interface. Check the "EtherCAT Master" to enable the PLC as an EtherCAT master.

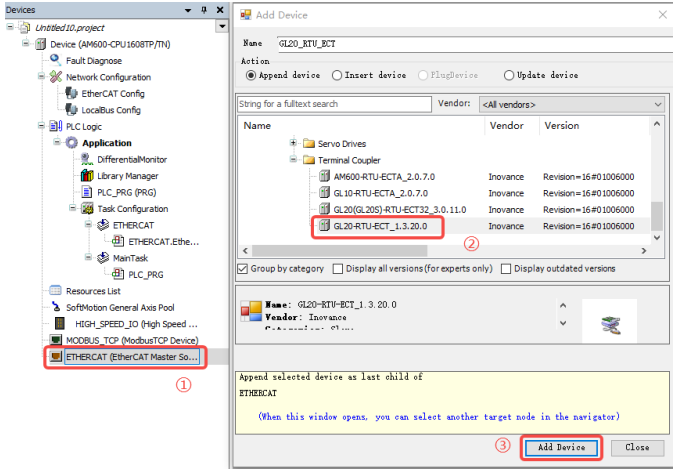


   b. Add the GL20-RTU-ECT communication interface module.

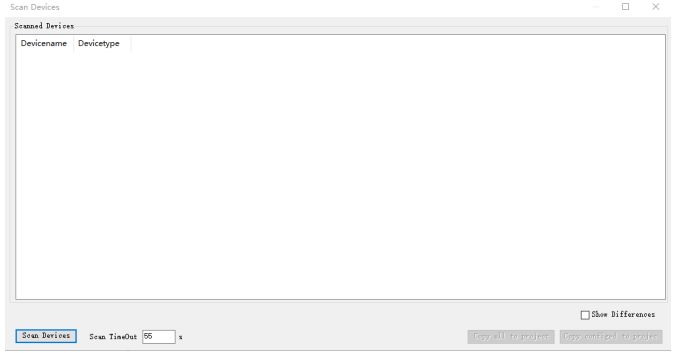
   - Method 1: In the right **Network Devices List**, double-click "GL20-RTU-ECT" to add the module.



- Method 2: In the left **Devices** pane, right-click **ETHERCAT(EtherCAT Master SoftMotion)** and select **Add Device**. Select "GL20_RTU_ECT *_x.x.x.x* " in the pop-up dialog box and click **Add Device**.

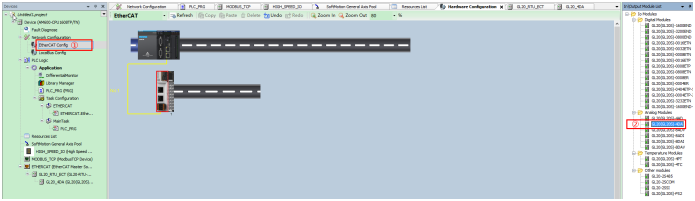


- Method 3: In the left **Devices** pane, right-click **ETHERCAT(EtherCAT Master SoftMotion)** and select **Scan For Devices**. Click **Scan Devices**, select the GL20-RTU-ECT module, and click **Copy Scan Device**.

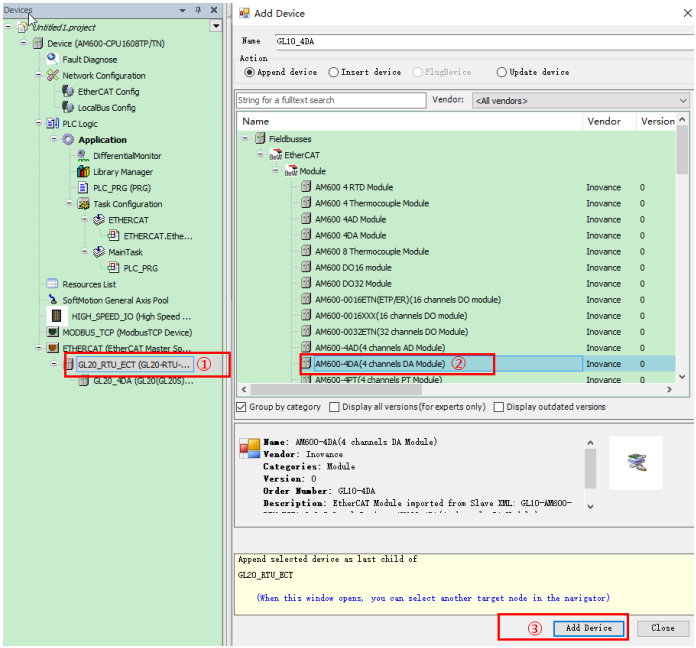


2. Add GL20-4DA module.

- Method 1: Open the **Hardware Configuration** pane by double-clicking **EtherCAT Config** in the left **Devices** pane, or double-clicking the GL20-4DA figure in the **Network Configuration** pane. In the right **In\Output Module List**, double-click "GL20-4DA" or drag and place it after the GL20-RTU-ECT module.

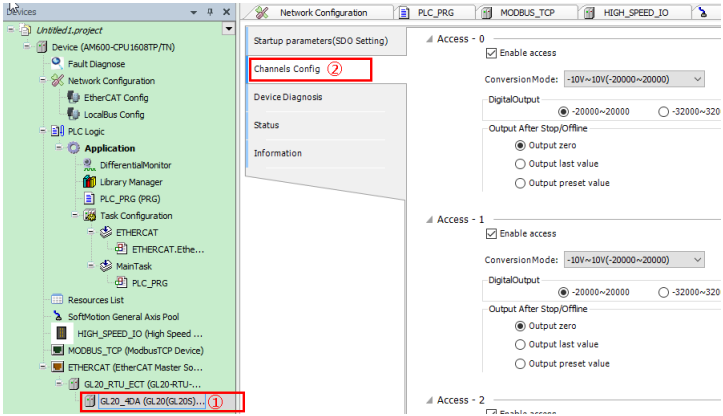


- Method 2: In the left **Devices** pane, right-click "GL20_RTU_ECT" and select **Add Device**. Select "GL20-4DA" in the pop-up dialog box and click **Add Device**.



- Method 3: In the left **Devices** pane, right-click **ETHERCAT(EtherCAT Master SoftMotion)** and select **Scan For Devices**. Click **Scan Devices**, select the GL20-4DA module, and click **Copy Scan Device**.

3. Double-click the module to set **Channels config**.



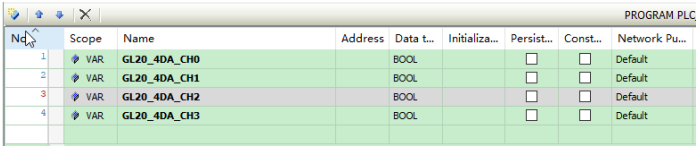
The parameters for channel configuration are shown in the following table.

Name	Description	Setting
Enable access	For channel enabling	• Check to enable the channel • Uncheck to disable the channel
Conversion mode	Output current/voltage range	Select a proper mode as needed.
Digital output range	Indicates the digital range that corresponds to the physical signal range. For example, 0 V to 10 V corresponds to 0 to 20000.	The following ranges are supported: • -20000 to +20000 • -32000 to +32000 • -27648 to +27648
Output status after stop	Output mode of the output channel of the module in non-OP state (when the module is stopped or the coupler is disconnected)	• **Output zero**: After a fault occurs, the output is cleared. • **Output last value**: All channels in the corresponding group retain the output state before module stop or network disconnection. • **Output preset value**: Set the "analog mA" and "digital value" as needed.

4. Create output variables.

a. Double-click **PLC_PRG** in the left **Devices** pane, and then click  on the right to switch to table mode.

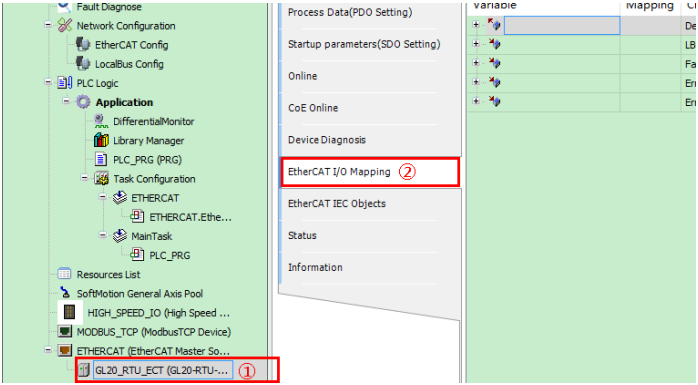
b. Add custom output variables "GL20_4DA_CH0", "GL20_4DA_CH1", "GL20_4DA_CH2", and "GL20_4DA_CH3". Set the scope of these variables to "VAR" and data type to "INT", as shown below.



No	Scope	Name	Address	Data t...	Initializa...	Persist...	Const...	Network Pu...
1	VAR	**GL20_4DA_CH0**		BOOL		☐	☐	Default
2	VAR	**GL20_4DA_CH1**		BOOL		☐	☐	Default
3	VAR	**GL20_4DA_CH2**		BOOL		☐	☐	Default
4	VAR	**GL20_4DA_CH3**		BOOL		☐	☐	Default

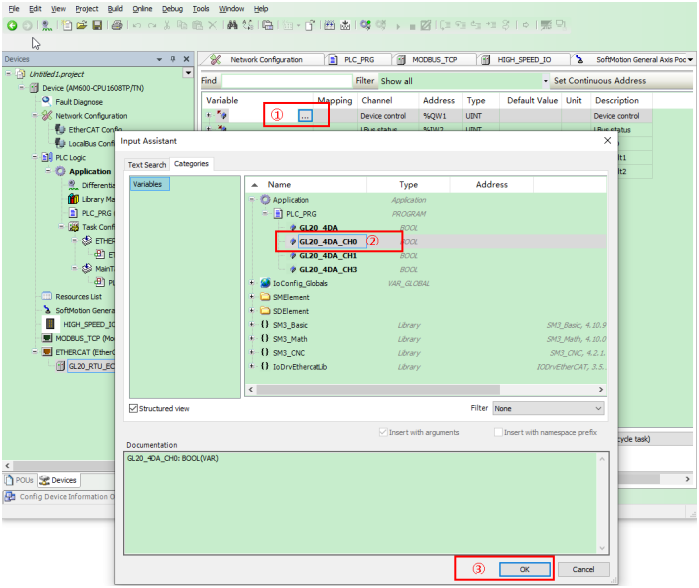
5. Map output variables to the corresponding output channel.

a. Double-click **GL20_RTU_ECT** in the left **Devices** pane, and then click the **EtherCAT I/O Mapping** tab on the right.

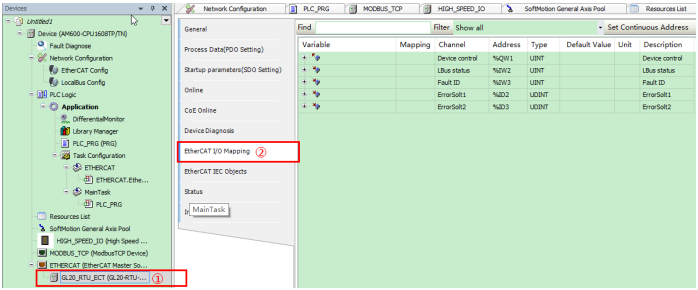


b. On the **EtherCAT I/O Mapping** tab, double-click the variable entry and click

to open the **Input Assistant** dialog box. Select **Application**>**PLC_PRG**>specific variables and click **OK**.



Map the output variables “GL20_4DA_CH0”, "GL20_4DA_CH1", “GL20_4DA_CH2”, and "GL20_4DA_CH3" to the output channels of the configuration module, as shown below.



6. Double-click **PLC_PRG** in the left **Devices** pane and complete the programming on the **PLC_PRG** page.
7. Check, compile, log in, download, and run the program.

   a. Click  on the toolbar at the top of the interface to check whether the program is correct.

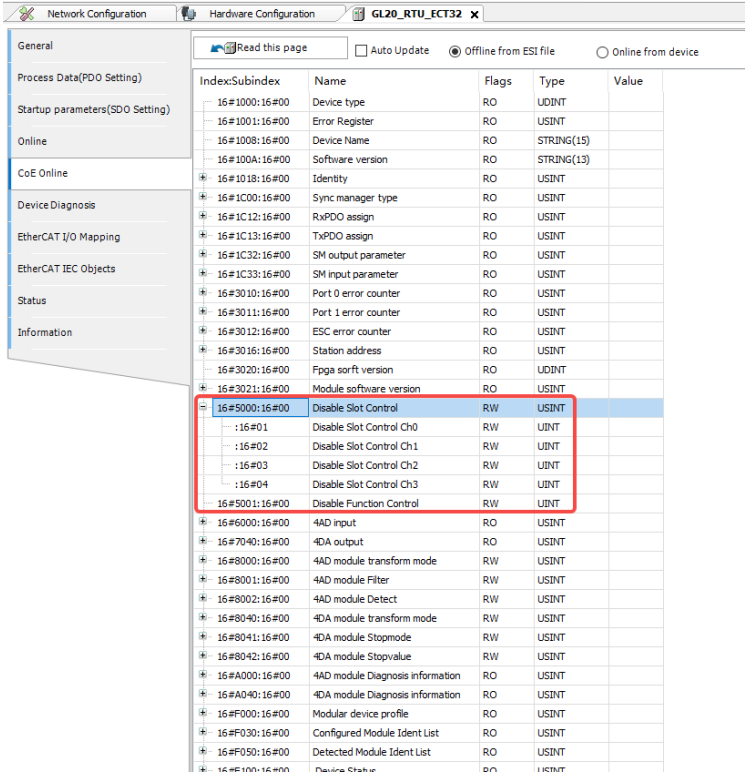
   b. Click  on the toolbar to compile all the code into PLC executable code.

   c. Click  on the toolbar, and follow the interface prompts to log in to the PLC and download the program.

   d. Click  on the toolbar to execute the program.

5 Fault Diagnosis

When the ERR indicator is ON, the module is faulty. In this case, 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=0-31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.



Index:Subindex	Name	Flags	Type	Value
16#1000:16#00	Device type	RO	UDINT	
16#1001:16#00	Error Register	RO	USINT	
16#1008:16#00	Device Name	RO	STRING(15)	
16#100A:16#00	Software version	RO	STRING(13)	
16#1018:16#00	Identity	RO	USINT	
16#1C00:16#00	Sync manager type	RO	USINT	
16#1C12:16#00	RxPDO assign	RO	USINT	
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	
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	
16#3016:16#00	Station address	RO	USINT	
16#3020:16#00	Fpga sorft version	RO	UDINT	
16#3021:16#00	Module software version	RO	USINT	
16#5000:16#00	Disable Slot Control	RW	USINT	
:16#01	Disable Slot Control Ch0	RW	UINT	
:16#02	Disable Slot Control Ch1	RW	UINT	
:16#03	Disable Slot Control Ch2	RW	UINT	
:16#04	Disable Slot Control Ch3	RW	UINT	
16#5001:16#00	Disable Function Control	RW	UINT	
16#6000:16#00	4AD input	RO	USINT	
16#7040:16#00	4DA output	RO	USINT	
16#8000:16#00	4AD module transform mode	RW	USINT	
16#8001:16#00	4AD module Filter	RW	USINT	
16#8002:16#00	4AD module Detect	RW	USINT	
16#8040:16#00	4DA module transform mode	RW	USINT	
16#8041:16#00	4DA module Stopmode	RW	USINT	
16#8042:16#00	4DA module Stopvalue	RW	USINT	
16#A000:16#00	4AD module Diagnosis information	RO	USINT	
16#A040:16#00	4DA module Diagnosis information	RO	USINT	
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	

Index	0xA000+0x40*n: 4DA Diagnostic Information				
Subindex	Name	Data type	Access mode	Mapping	Default value
0	4DA fault code	USINT	RO	NO	5
1	4DA module fault information	UINT	RO	NO	0
2	4DA module channel 0 fault information	UINT	RO	NO	0
3	4DA module channel 1 fault information	UINT	RO	NO	0
4	4DA module channel 2 fault information	UINT	RO	NO	0
5	4DA module channel 3 fault information	UINT	RO	NO	0

■ Module fault code

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

■ Module channel fault code

Fault code	Fault name	Description	Solution
0x6001	Channel disconnected	The current value is outputted in the current mode, but no circuit is formed between the positive and negative ends. This fault can also be reported upon excessively heavy load.	Select "4 mA to 20 mA". The default current output upon power-on is 4 mA. A circuit must be formed between the positive and negative ends.
0x6002	Channel short-circuited	The voltage value is outputted in the voltage mode but the positive and negative ends are shorted.	Select "1 V to 5 V". The default voltage output upon power-on is 1 V. The positive and negative terminals cannot be shorted directly.
0x6003	Channel data upper limit violated	-	-
0x6004	Channel data lower limit violated	-	-
0x6005	Channel data overflow	-	-
0x6006	Channel data underflow	-	-

6 Appendix: Version Matching Information

Contact Inovance technical support to obtain the firmware of this module and the firmware of communication interface module. XML files and the AutoShop/InoProShop software can be downloaded from the software and debugging tools tab on the GL20 series product page at *https://www.inovance.com*. The following table describes the version matching information.

■ Locally adapted

Name	Board software version	Logic software/programming software version
Local module	Board software: 1.1.8.0 and later	-
Easy series PLC	V6.1.0.1 and later	AutoShop: V4.8.2.3 and later
AM300/AM500 PLC	V1.2.0.0 and later	InoProShop: V1.7.2 SP2 and later
AM780	V1.10.0.0 and later	InoProShop: V1.7.3 SP4 and later

■ Remotely adapted

Name	Board software version	Logic software/ programming software version	XML/GSD file version
Local module	Board software: 1.1.8.0 and later	-	-
GL20-RTU-ECT	2.4.13.0 and later	0.1.3.2 and later	1.3.9.0 and later
GL20-RTU-ECT32	2.5.9.0 and later	0.1.4.2 and later	16 and 32_3.0.4.0 and later
GL20-RTU-PN	2.1.1.0 and later	-	20230323 and later
Easy series PLC	V6.1.0.1 and later	AutoShop: V4.8.2.3 and later	-
AM300/AM500	V1.2.0.0 and later	InoProShop: V1.7.3SP6 and later	-
AM780	V1.10.0.0 and later	InoProShop: V1.7.3SP4 and later	-