



GL10-4DA

Analog Output Module User Guide



19011098A02

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Overview

This user guide provides information on the GL10-4DA analog output module developed and manufactured independently by Inovance. It is a 4-channel analog output module that supports voltage and current output, with a resolution of up to 16 bits.

This user guide covers the specifications, functional characteristics, and operational guidelines of the product. Read the document before use to ensure safe operation. Visit Inovance’s official website (www.inovance.com) to download the latest version of the guide.

Safety Instructions

Safety precautions
1. Before installing, using, and maintaining this product, read the safety information and precautions thoroughly, and comply with them during operations.

2. To ensure personal and equipment safety, follow the safety instructions in this user guide.

3. The “CAUTION,” “WARNING,” and “DANGER” signs are only supplements to the safety instructions.

4. Use this equipment according to the designated environment requirements. Damage caused by improper usage is not covered by warranty.

5. Inovance shall take no responsibility for any personal injuries or property damage caused by improper usage.

Safety levels and definition

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

CAUTION : Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

Keep this guide properly for future use and deliver this guide to the end user.

Control System Design



- ◆ Provide a safety circuit outside the controller 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.



- ◆ 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 controller to prevent damage to the machine.
- ◆ To ensure safe operation, for the output signals that may cause critical accidents, use external protection circuits 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 surge protector, assuring that overvoltage due to lightning shock can't be applied to the PLC's power supply input terminals, signal input terminals and output terminals, to prevent damage to the equipment.

Installation



- ◆ Installation must be carried out by qualified professionals.
- ◆ Disconnect all external power supplies of the system before disassembling the module. Failure to do so may result in electric shock, module fault or malfunction.
- ◆ Do not use the controller 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 damage the product.
- ◆ 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.

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- ◆ 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. Incorrect installation may cause malfunctions, faults, or detachment.

During Wiring



- ◆ Wiring must be carried out by qualified professionals.
- ◆ Disconnect all external power supplies of the system before wiring. Failure to comply may result in electric shock, module fault or malfunction.
- ◆ Install the terminal cover attached to the product before power-on or operation after wiring is done. Failure to comply may result in electric shock.
- ◆ 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.



- ◆ Do not drop metal filings or wire ends into ventilation holes of the controller during wiring. Failure to comply may result in fire, fault and malfunction.
- ◆ The external wiring specifications and installation method must comply with local regulations. For details, see the wiring section in this guide.
- ◆ To ensure safety of equipment and operator, use cables with sufficient cross sectional area and connect the cables to ground reliably.
- ◆ Ensure that all cables are connected to the correct interface. Failure to comply may result in module fault and external equipment fault.
- ◆ Tighten bolts on the terminal block with the specified tightening torque. If the terminal bolt is connected improperly, short circuit, fire or malfunction may occur. Tighten the bolts with improper tightening torque may damage the bolts and modules, leading to fall-off, short circuit, fire, or malfunction.
- ◆ If a connector is used to connect to the external equipment, perform press-fitting, crimping, or welding with the tools specified by manufacturer. Improper connection may result in short-circuit, fire or malfunction.
- ◆ The module is attached with a label on the top to prevent unwanted matters from falling into the module during wiring. Do not remove the label during wiring. Remove this label before system operation to facilitate ventilation.
- ◆ Route control cables, communication cables, main circuit cables and power cables through different routes with a clearance of at least 100 mm among different types of cables. Failure to comply may result in malfunction caused by noise.
- ◆ Use shielded cables for high-frequency signal inputs or input cables in applications with significant interference.

Operation and Maintenance



- ◆ Operation and maintenance must be carried out by qualified professionals.
- ◆ Do not touch the terminals with power on. Failure to comply may result in electric shock or malfunction.
- ◆ Disconnect all external power supplies of the system before cleaning the module or re-tightening screws on the terminal block or screws of the connector. Failure to comply may result in electric shock.
- ◆ Disconnect all external power supplies of the system before disassembling the module or connecting/disconnecting the communication cables. Failure to comply may result in electric shock or malfunction.



- ◆ Read through the user guide before operation, including online modification, forced output, RUN, and STOP operations.
- ◆ Disconnect the power supply before installing/removing the extension card.

Disposal



- ◆ Dispose retired batteries as industrial waste, following region-specific disposal regulations.

Product Information

Model and Nameplate

GL 10 - 4 DA
① ② ③ ④

①	Product information GL: Local module	③	Number of I/Os 4: 4 channels 8: 8 channels
②	Series 10: 10 series module	④	Module type DA: Analog output

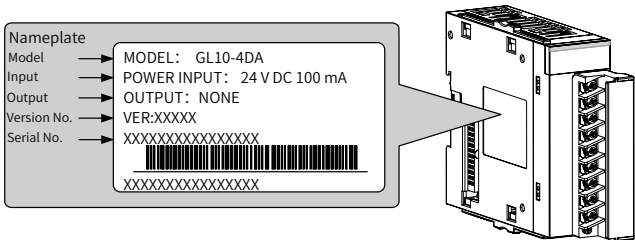


Figure 1 Description of model number and nameplate

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Model	Type	Description
GL10-4DA	AO	4-channel DA module, supporting voltage/current output

External interface

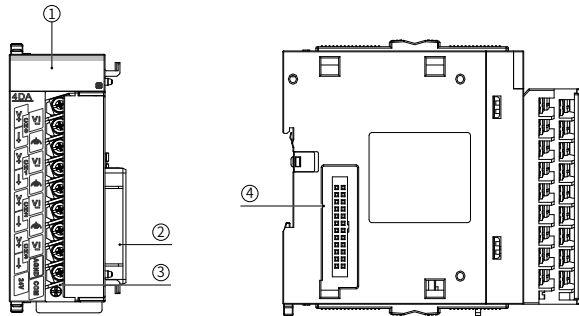


Figure 2 Module interface

No.	Interface	Name
①	Signal indicator	RUN: operation state indicator, which is turned on during normal operation and turned off when a fault occurs ERR: error state indicator, which is turned on when a fault occurs.
②	Local expansion module downstream interface	Connect downstream module, not supporting hot plugging.
③	User Output terminals	4-channel output (supporting voltage or current output)
④	Local expansion module upstream interface	Connect upstream module, not supporting hot plugging.

General specifications

Item	Specification
Output channel	4
Power supply voltage	24 VDC (20.4 VDC to 28.8 VDC) (-15%~+20%)
Internal 5 V power consumption	85 mA (typical value)
Voltage output load	1 kΩ to 1 MΩ
Current load impedance	0 Ω to 600 Ω
Voltage output range	Bipolar: ±5 V, ±10 V; Unipolar: +5 V, +10 V
Output current range	4 mA to 20 mA, 0 mA to 20 mA
Accuracy (normal temperature: 25° C)	Voltage: ±0.1%, current: ±0.1% (full ranges)
Accuracy (ambient temperature: 0°C to 55°C)	Voltage: ±0.15%, current: ±0.8%
Resolution	16 bits
Conversion time	1 ms/channel
Isolation mode	I/O terminals isolated from power supply; Non-isolation between channels
Output short-circuit protection	Yes
System program upgrade method	USB interface
Isolation mode	I/O terminals isolated from power supply; Non-isolation between channels
System program upgrade method	USB interface

※0mA current accuracy: 0.15%

Mechanical Design Reference

Installation Dimensions

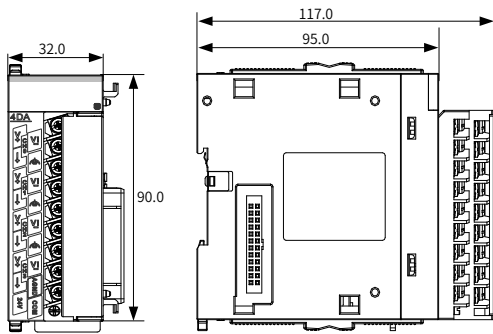


Figure 3 Mounting dimensions (in mm)

Electrical Design Reference

■ Cable selection

Material name	Model	Applicable cross sectional area of the cable		Manufacturer	Crimping pliers
		mm ²	AWG		
Y-type cable lug	TNS1.25-3	0.5~0.75	22~18	Suzhou Yuanli	RYO-8 YYT-8

Those cable lugs are applicable to digital/analog modules, and the cable rated temperature is required to be above 75 °C.

■ Cable preparation

Cable preparation:

- ◆ Strip the cable insulation by 6 mm.
- ◆ Pass the cable through the cable sleeve.
- ◆ Insert the exposed conductor into the hole of the cable lug, and then crimp it with recommended tool.
- ◆ Use a heat-shrinkable tube (Ø3) of 20 mm long to wrap the copper tube of a cable lug and then perform thermal shrinkage.

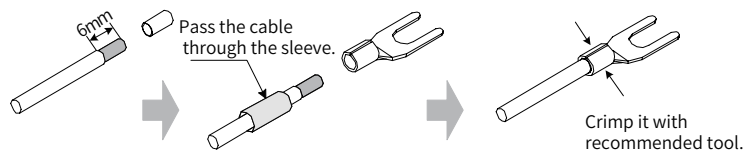


Figure 4 Cable preparation

- ◆ Put the cable lug onto the terminal and tighten the screw with a screwdriver. The maximum tightening torque is 0.8 N·m.

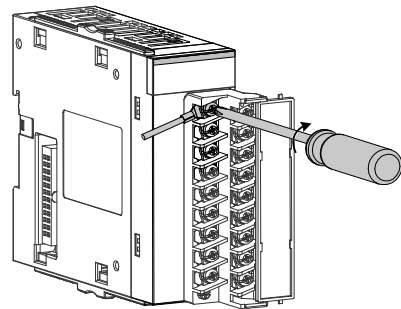


Figure 5 Connecting cable to terminal block

■ Terminal Arrangement

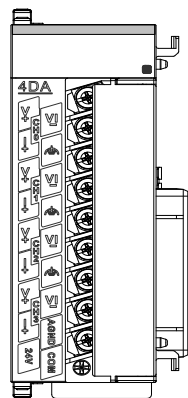


Figure 6 Terminal arrangement of the module

■ Terminal assignment

No.	Network name	Type	Function	Description
1	V+	Output	V+ of channel 0	Voltage output
2	VI-	Output	V-/I- of channel 0	Voltage/current output
3	I+	Output	I+ of channel 0	Current output
4	-	-	Shield ground	Internally connected to housing ground
5	V+	Output	V+ of channel 1	Voltage output
6	VI-	Output	V-/I- of channel 1	Voltage/current output
7	I+	Output	I+ of channel 1	Current Output

No.	Network name	Type	Function	Description
8	-	-	Shield ground	Internally connected to housing ground
9	V+	Output	V+ of channel 2	Voltage output
10	VI-	Output	V-/I- of channel 2	Voltage/current output
11	I+	Output	I+ of channel 2	Current Output
12	-	-	Shield ground	Internally connected to housing ground
13	V+	Output	V+ of channel 3	Voltage output
14	VI-	Output	V-/I- of channel 3	Voltage/current output
15	I+	Output	I+ of channel 3	Current Output
16	AGND	Analog ground	Analog ground	-
17	24V	Power supply	24 V power supply	-
18	COM	Power supply GND	Power supply GND	-

■ External wiring

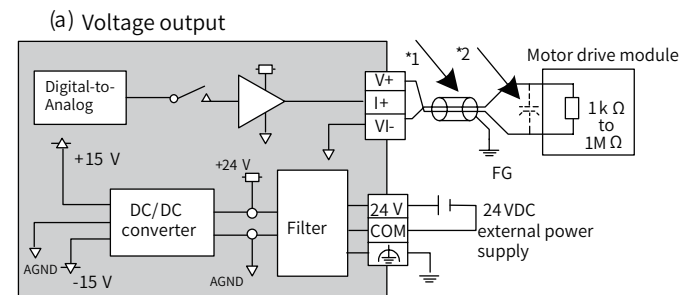


Figure 7 Connection for voltage-controlled signal

*1 Use 2-core shielded twisted pair cable as power cable.

*2 If noises or ripples are generated in external wiring, connect a capacitor of 0.1 to 0.47μF25V between terminals V+/I+ and VI-.

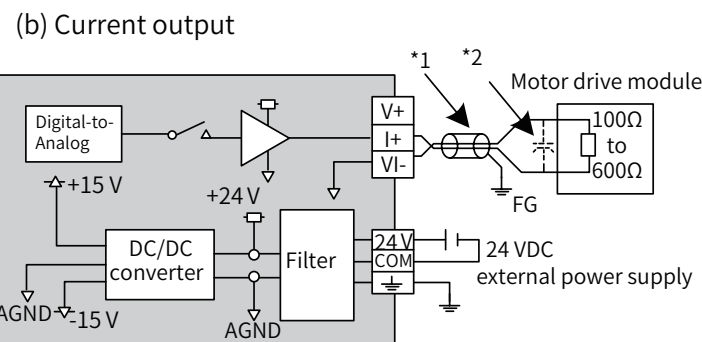


Figure 8 Connection for current-controlled signal

*1 Use 2-core shielded twisted pair cable as power cable.

*2 If noises or ripples are generated in external wiring, connect a capacitor of 0.1 to 0.47μF25V between terminals V+/I+ and VI-.

■ Wiring precautions

- 1) Do not bundle the cable together with AC cable, main lines, or high voltage cables, otherwise it may increase noise, power surges and inductive interference.
- 2) Implement single-point grounding for shielded cables and the shield layers of soldered connections.
- 3) Non-welded crimp terminals with sleeves are prohibited for terminal blocks. Use marking sleeve or insulation sleeve to cover the crimped terminal ends of cables.

INOVANCE Warranty Agreement

Inovance provides an 18-month free warranty (subject to information indicated by the barcode on the product or the contract terms) to the equipment itself from the date of manufacturing for the failure or damage under normal use conditions.

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

- a) Damage caused by improper use and unauthorized disassembly, repair, or retrofit;
- b) Damage caused by fire, flood, abnormal voltage, other disasters, and secondary disasters;
- c) Hardware damage caused by equipment fall-off or that caused during transportation;
- d) Damage caused by operations not following the user guide;
- e) Faults and damages caused by external factors, such as peripheral devices.

If there is any failure or damage to the product, properly fill out the Product Warranty Card.

The maintenance fee is charged based on the latest Maintenance Price List of Inovance.

The Product Warranty Card is not re-issued. Keep the card and present it to the maintenance personnel during maintenance.

If there is any problem during the service, contact Inovance or Inovance agents.

Customers purchasing the product are assumed to agree on terms and conditions of drawn this warranty agreement.

Inovance reserves the right to interpret this agreement.

INOVANCE Product Warranty Card

Customer information	Company address:	
	Company name: P.C.:	Contact:
		Tel.:
Product Information	Product model:	
	Product barcode (attached here):	
	Product distributor name:	
Fault information	(Service date and description):	
	Serviced by:	

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