INOVANCE

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ECFA

GL10-0016ETP

Digital Output User Guide

19011101A02

Overview

This user guide provides information on the GL10-0016ETP digital output expansion module developed by Inovance.

This module is a 16-channel sourcing-type digital output unit (transistor-based), which can be seamlessly integrated with modules such as GL10-RTU-ECTA and GL10-RTU-COP to increase the number of available digital output ports.

This guide describes the specifications, characteristics and using methods of the product. Read this guide carefully before using to ensure safe operation. Visit our website (www.inovance.com) for the latest version of the guide.

Safety Instructions

Safety precautions

1. Before installation, operation, and maintenance, read through the safety instructions.
2. To ensure personal and equipment safety, follow all 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 definitions

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

WARNING

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.

CAUTION

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

WARNING

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.

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 unwanted matters on ventilation surface. Failure to comply may result in poor ventilation, which may cause fire, fault and malfunction.

Ensure the module is connected to the respective connector securely and hook the module firmly. Improper installation may result in malfunction, fault or fall-off.

During wiring

WARNING

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.

CAUTION

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 input/output in applications with serious interference so as to enhance system anti-interference ability.

Operation and Maintenance

WARNING

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.

CAUTION

Read through the user guide before operation, such as online modification, forced output, RUN, and STOP operations.

Disconnect the power supply before installing/removing the extension card.

Disposal

CAUTION

Dispose of retired batteries as industrial waste according to local laws and regulations.

Product Information

■ Model and nameplate

G L 10 -00 16 E TP

Mark	Description
G	General module

Mark	Description
L	Local module

Mark	Series
10	10 series

Mark	I/O point
00	0 input

Mark	Output type
TP	Transistor (source)

Mark	Module type
E	Logic I/O expansion

Mark	I/Opoints
16	16 output points

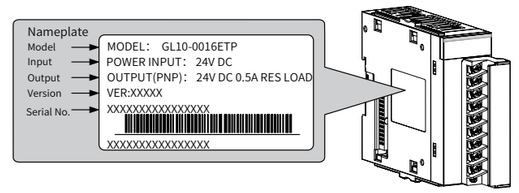

Figure 1 Description of model and nameplate

Model	Type	Description
GL10-0016ETP	Digital transistor output (Source)	16-point DO module; transistor output (Source)

■ External Interfaces

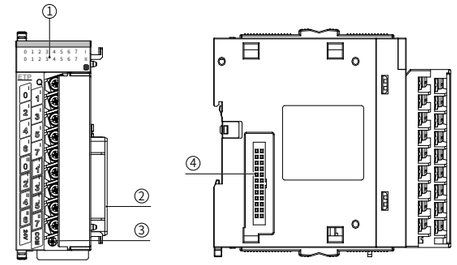

Figure 2 Digital output modules interface

No.	Interface	Name
①	Signal indicator	Corresponding to various output signal; ON: output active; OFF: output inactive
②	Local expansion module back-end interface	Connect back-end module, not supporting hot plugging
③	User output terminals	2groups output with 8 channels in each group
④	Local expansion module front-end interface	Connect front-end module, not supporting hot plugging

■ General Specifications

Item		GL10-0016ETP
Max. number of output channels		16
Output connection mode		18-point wiring terminal
Output type		Transistor, high-side output
Output mode		Source
Power supply voltage		24 VDC (-15% to +20%)
Internal 5 V power consumption		65 mA (typical value)
Output Voltage Class		12 V to 24 V (-5% to +20%)
Max. leakage current at OFF		Below 0.5 mA
ON response time		0.5 ms below (hardware response time)
OFF response time		0.5 ms below (hardware response time)
Max. load	Resistive load	0.5 A/point, 2 A/common terminal
	Inductive load	12 W/24 VDC(in total)
	Lamp load	2 W/24 VDC(in total)
Isolation mode		Optocoupler isolation
Output action display		Output indicator ON when optocoupler drive is activated
Short circuit-proof output		Yes, the current is limited to 1 A ~ 1.7 A when short protection is applied

Mechanical Design Reference

■ Mounting dimensions

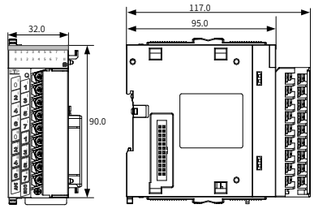

Figure 3 Mounting dimensions (in mm)

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 preparing procedures:

- ◆ Strip the cable shield 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 crimping tool.
- ◆ Use a heat-shrinkable tube (Φ3) of 20 mm long to wrap the copper tube of a cable lug and then perform thermal shrinkage.

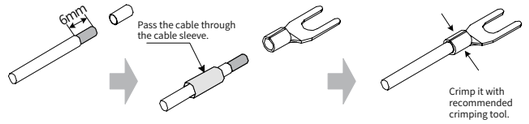

Figure 4 Cable preparing

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

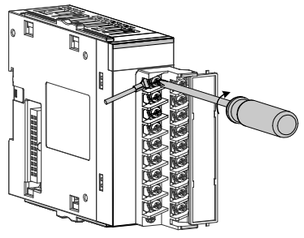

Figure 5 Connecting cable to terminal block

■ Terminal arrangement

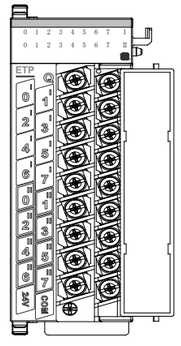

Figure 6 Terminal arrangement of the digital output module

■ Terminal assignment

No.	Network name	Type	Function	Description
Interface for the 2nd group of output				
1	Q0	Output	User output 0 in the 1st group	SOURCE output, active high
2	Q1	Output	User output 1 in the 1st group	SOURCE output, active high
3	Q2	Output	User output 2 in the 1st group	SOURCE output, active high
4	Q3	Output	User output 3 in the 1st group	SOURCE output, active high
5	Q4	Output	User output 4 in the 1st group	SOURCE output, active high
6	Q5	Output	User output 5 in the 1st group	SOURCE output, active high
7	Q6	Output	User output 6 in the 1st group	SOURCE output, active high
8	Q7	Output	User output 7 in the 1st group	SOURCE output, active high
Interface for the 2nd group of outputs				
9	Q0	Output	User output 0 in the 2nd group	SOURCE output, active high
10	Q1	Output	User output 1 in the 2nd group	SOURCE output, active high
11	Q2	Output	User output 2 in the 2nd group	SOURCE output, active high
12	Q3	Output	User output 3 in the 2nd group	SOURCE output, active high
13	Q4	Output	User output 4 in the 2nd group	SOURCE output, active high
14	Q5	Output	User output 5 in the 2nd group	SOURCE output, active high
15	Q6	Output	User output 6 in the 2nd group	SOURCE output, active high
16	Q7	Output	User output 7 in the 2nd group	SOURCE output, active high
Power supply interface				
17	24V	Power supply	24 V power supply	-
18	COM	Power supply	Power supply GND	-

■ External wiring

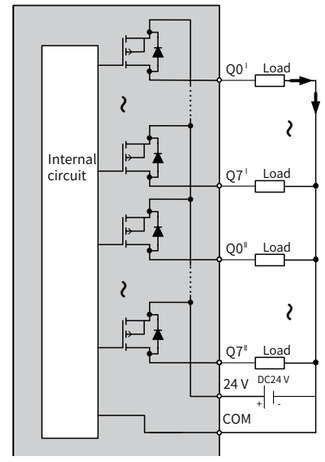

Figure 7 Module output wiring diagram

■ Wiring precautions

1) Do not bundle the terminal cables together with power cables (high voltage/high current) which produce strong interference signals. Separate it from other cables and avoid cabling in parallel.
2) Use recommended cables and adapter boards. It is recommended to use shielded cables as terminal cables for proper anti-interference ability.

■ Electric shock protection when using inductive load

When the inductive load is applied, large back EMF will be produced between contacts and arc discharge is also caused when the inductive load stops. This may result in contact failure or contact sag, shortening the contact lifetime. Therefore, you can connect a parallel freewheeling diode to the load to extend the service life of the product. The freewheel diode must satisfy: ① reverse voltage is 5 to 10 times of load voltage; ② forward current is higher than load current.

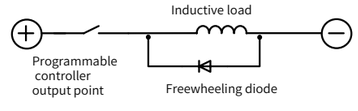

Figure 8 Electric shock protection when using inductive load

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 failure to operate the product according to the user guide provided by Inovance;

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 product distributor.

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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