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Overview

Thank you for purchasing the GL10-RTU-COP communication module developed and manufactured independently by Inovance. This product is a CANopen bus slave expansion module which can connect up to 16 DI/DO modules, or 8 AI/AO modules.

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

Safety Instructions

Safety Disclaimers

- Before installing, using, and maintaining this equipment, read the safety information and precautions thoroughly, and comply with them during operations.
- To ensure the safety of humans and equipment, follow the signs on the equipment and all the safety instructions in this user guide.
- The "CAUTION", "WARNING" and "DANGER" signs are only supplements to the safety instructions.
- Use this equipment according to the designated environment requirements. Damage caused by improper usage is not covered by warranty.
- 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 : The "CAUTION" sign indicates that failure to comply with the notice may result in minor or moderate personal injury 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.

During control system design

WARNING

- 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.

CAUTION

- An emergency stop circuit, a protection circuit, a forward/reverse operation interlocked circuit, and a 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, design 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 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.

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Installation

WARNING

- 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.

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

WARNING

- 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.
- Install the terminal cover attached to the product before power-on or operation after wiring is completed. Failure to comply may result in electric shock
- 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.

CAUTION

- Prevent dropping metal filings and wire ends drop into ventilation holes of the PLC at wiring. Failure to comply may result in fire, fault and malfunction.
- The external wiring specification 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 diameter and connect the cables to ground reliably.
- Ensure that all cables are connected to the correct interface. Failure to comply may result in module and external equipment fault.
- Tighten bolts on the terminal block in the specified torque range. If the terminal is not tight, short-circuit, fire or malfunction may be caused. If the terminal is too tight, fall-off, short-circuit, fire or malfunction may be caused.
- If the connector is used to connect with external equipment, perform correct crimping or welding with the tool specified by manufacturer. If connection is in poor contact, short-circuit, fire or malfunction may be caused.
- A label on the top of the module is to prevent foreign matters entering the module. Do not remove the label during wiring. Remember to remove it before system operation, facilitating ventilation.
- Do not bundle control wires, communication wires and power cables together. They must be run with distance of more than 100 mm. Otherwise, noise may result in malfunction.
- Select shielded cable for high-frequency signal input/output in applications with serious interference so as to enhance system anti-interference ability.

Operation and Maintenance

WARNING

- 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 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 removing the module or connecting/removing the communication wirings. Failure to comply may result in electric shock or malfunction.

CAUTION

- Get with the guide and ensure safety before online modification, forcible output, and RUN/STOP operation.
- Disconnect the power supply before installing/removing the extension card.

Disposal

CAUTION

- Treat scrapped module as industrial waste. Dispose the battery according to local laws and regulations.

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Product Information

Model Number and Nameplate

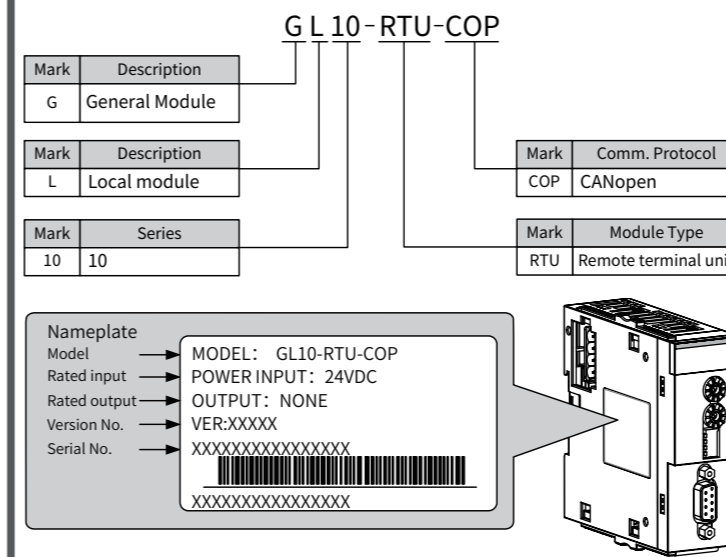


Figure 1 Description of model number and nameplate

Model	Category	Description
GL10-RTU-COP	CAN communication module	CANopen protocol communication interface module

External Interface

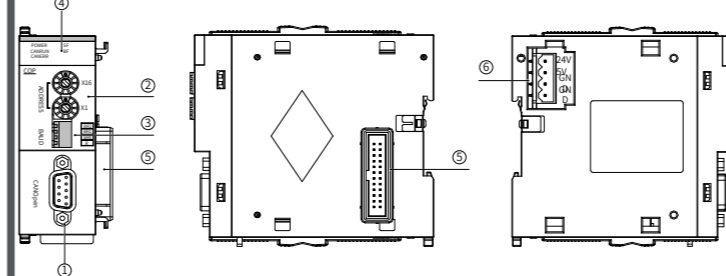


Figure 2 Diagram of the digital output modules interface

No.	Interface Name	Function
①	DB9 interface	CANopen communication interface
②	Dialing switch	ADDR1 Station address can be set through 16-bit rotary DIP switch. Decimal slave address = ADDR1*16+ADDR0 (address: 1-63)
		ADDR0
		DIP1 Matching resistance switch
		DIP2 Set baud rate to BR0
③	DIP switch	DIP3 Set baud rate to BR1
		DIP4 Set baud rate to BR2
		POWER Power indicator Green ON when power supply is switched on
		CANRUN CAN bus operation indicator Green ON when the module is in normal operation
④	Signal indicators	CANERR CAN bus error indicator Red ON when CAN Bus error occurs
		SF Slave configuration error indicator Red ON if error occurs during configuring slave expansion module
		BF Slave expansion bus error indicator Red Flashing if error occurs on slave expansion module

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⑤	Local expansion module back-end interface	Connect back-end module, not supporting hot plugging
⑥	Internal 24 V power input terminal	Connect to power modules

General Specifications

Item	Specifications
Power supply specifications	24 VDC (20.4 VDC to 28.8 VDC) (-15% to +20%)
Internal 5 V power output current	1,200 mA (rated value)
Protocol for communication with CPU module	CANopen
CANopen communication rates	10 Kbps, 20 Kbps, 50 Kbps, 125 Kbps, 250 Kbps, 500 Kbps, 800 Kbps, 1 Mbps
Max. stations supported by CANopen network	63
Station number range	1-127, the station number can be set with 2 round DIP switches
Expandability of subsequent IO modules	Can expand up to 16 IO modules. The actual number and configuration depend on each module's power consumption
CANopen network interface	One DB9 male connector interface

Mechanical Design Reference

Mounting Dimensions

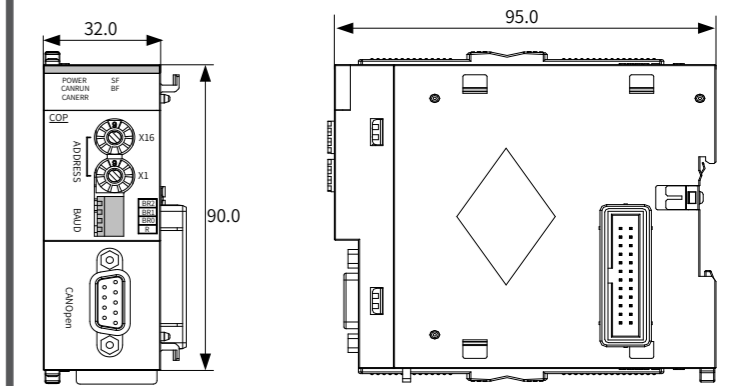


Figure 3 Mounting dimensions (in mm)

Electrical Design Reference

Diagram of Networking through CANopen Bus

CAN bus topology is shown below. Using shielded twisted cables to connect CAN bus is recommended. Two 120Ω termination resistors are attached to both ends of the bus to prevent signal reflection. Reliable single-point grounding is often used for shielded layers.

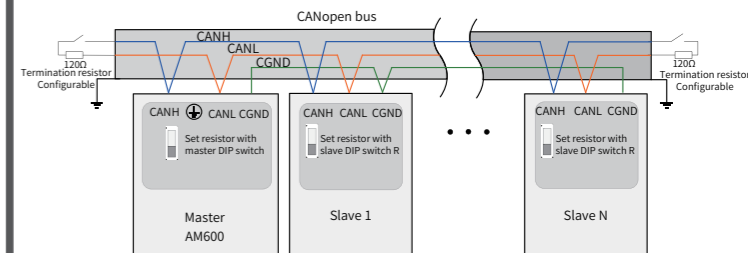


Figure 4 Diagram of CANopen communication connection

CANopen Communication Interface Description

GL10-RTU-COP module uses DB9 connector for data transmission.

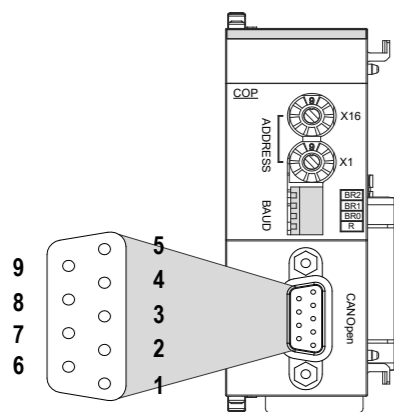


Figure 5 CANOpen terminal definition on CPU module

Terminal Definition

CANopen uses DB9 connector for data transfer. Below is the definition of DB9 pins:

Diagram	Pin	Definition
	PIN2	CANL
	PIN7	CANH
	PIN3	CGND

Use shielded twisted cable to connect CAN bus, and attach a 120Ω terminal matching resistance to each end of the bus to prevent signal reflection. Reliable single-point grounding is often used for shield. Do not bundle the cable together with DC cable, high voltage cable, and so forth, so that communication signal will not be interfered.

Below is the relationship between the values set by CANopen module's DIP switch and communication baud rates:

Values set by DIP switch (BR2/BR1/BR0)	0	1	2	3	4	5	6	7
Baud rate (bit/s)	1 M	800 K	500 K	250 K	125 K	50 K	20 K	10 K

Below is the relationship between CANopen transmission rate and transmission distance:

Baud rate (bit/s)	Maximum length of bus (m)
1 M	30
500 k	80
250 k	150
125k	300
50k	1000

Below is the relationship among numbers of CANopen nodes, cable impedances and transmission distances:

Max. number of nodes	Comm. cable impedance		
	16	32	64
33 Ω/km	575 m	530 m	460 m
70 Ω/km	270 m	250 m	215 m
88 Ω/km	215 m	200 m	170 m
93 Ω/km	205 m	185 m	160 m
157 Ω/km	120 m	110 m	95 m

Communication Connection

1) Connection of DB9 connector

◆ Plug DB9 connector with wire into DB9 plug of module (pay attention to the

connector orientation)

◆ Tighten the screws at both sides of DB9 connector

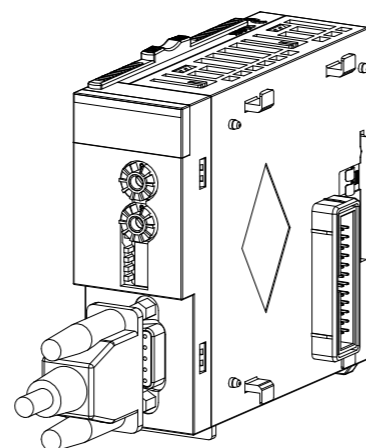


Figure 6 Diagram of DB9 connector connection

◆ Disassembly procedures: Loosen the screws at both sides of DB9 connector, hold the plastic part of DB9 to pull out the connector along a horizontal direction with the module.

2) Requirements for securing communication cable

To avoid the influence on the communication cable due to other stresses and ensure the stability of communication, secure the cable near the equipment before CANopen communication.

Fault Indication and Countermeasures for CANopen Remote Communication Expansion Module

LED ON/OFF State	CANRUN LED (Green) Meaning	CANERR LED (Red) Meaning
Constant OFF	—	No error
Constant ON	CAN bus is in normal operation	CAN bus is not connected
Blinking	Pre-operational state	Pre-operational state
Single flash	CAN bus is in stop state	At least one error counter of CAN controller reaches its limit or exceeds the alerting value (too many error frames)
Double flash	—	Error control event (node monitoring or heartbeat event)
Triple flash	—	Timeout error for communication with synchronizing object

INOVANCE Warranty Agreement

The warranty period of the product is 18 months (The period is subject to the date information indicated by the barcode on the product, or the terms and conditions of the purchase contract if otherwise specified). During the warranty period, if the product fails or is damaged under the condition of normal use by following the instructions, Inovance will be responsible for free maintenance.

Within the warranty period, maintenance will be charged for the damages due to the following causes:

- Improper use or uninstallation/repair/modification without prior permission
- Fire, flood, abnormal voltage, other disasters, and secondary disasters
- Hardware damage caused by dropping or transportation after procurement
- Failure to operate the product by observing the User Guide provided by Inovance
- Faults and damages caused by factors outside of the product (such as peripheral devices)

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

The maintenance fee is charged as 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 when seeking maintenance.

If there is any problem during the service, contact us or our agent directly.

You are assumed to agree on terms and conditions of this warranty agreement by purchase of the product. This agreement shall be interpreted by Inovance.

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