

GR10 Series EtherCAT Hybrid Module



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Preface

Introduction

Thank you for purchasing the EtherCAT-based expansion module developed and manufactured independently by Inovance. The series includes three models: GR10-32ETP8AME, GR10-28ETP12AME and GR10-4ETP4ADE. It supports up to 16 digital outputs, 16 digital inputs, 8 analog inputs, 4 analog outputs and 1 phase-AB counting (10K). It also supports EtherCAT to RS485 conversion.

This guide describes the specifications, features and usage of the product. Please read this guide carefully before using to ensure safety. You can obtain the latest version on our website www.inovance.com.

Reader

This guide is intended for users who use or understand Inovance PLC products, including: electrical engineers, software engineers, and system engineers.

Cautions for New User

For the users who use this product for the first time, read the manual carefully. In case of any question about functions or performance, do not hesitate to contact the technical support personnel of Inovance to ensure correct use.

Revision History

Date	Version	Description
2019-11	A00	First release

Safety Instructions

■ Safety Disclaimers

1. Before installing, using, and maintaining this equipment, read the safety information and precautions thoroughly, and comply with them during operations.
2. To ensure the safety of humans and equipment, follow the signs on the equipment and 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 : 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.

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, please 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's 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's 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.
- ◆ 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.



- ◆ 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. Remove it before operation for 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



- ◆ Maintenance & inspection must be carried out by qualified personnel.
- ◆ 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 communication wirings. Failure to comply may result in electric shock or malfunction.



- ◆ 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



- ◆ Dispose of the product as industrial waste.

1 Product Information

Model Number and Nameplate

Take GR10-32ETP8AME module as an example. The product model number is described as follows:

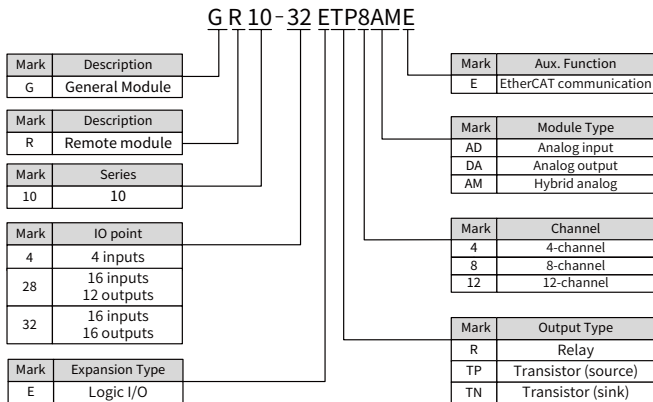
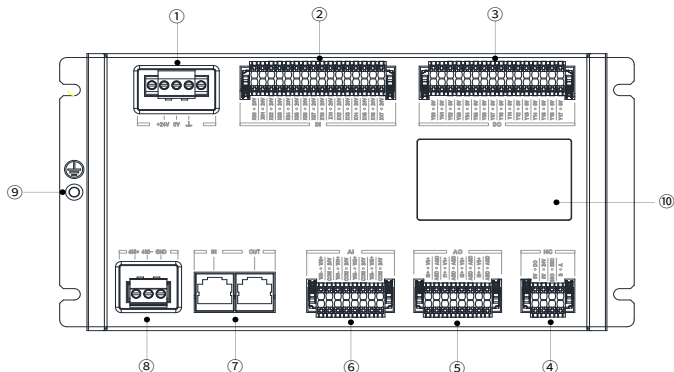


Figure1 Model number description

Model	Category	Description
GR10-32ETP8AME	EtherCAT hybrid analog module	16 digital inputs, 16 digital outputs, 4 analog inputs, 4 analog outputs and 1 high-speed counting with comparison output
GR10-28ETP12AME	EtherCAT hybrid analog module	16 digital inputs, 12 digital outputs, 8 analog inputs and 4 analog outputs
GR10-4ETP4ADE	EtherCAT analog input module	4 digital inputs and 4 analog inputs

External Interface



No.	Interface Name	Function			
①	Power terminal	No.	Signal	Type	Description
		1	+24V	Power	24 V power supply
		2	0V	Power	24V power ground
		3	PE	Protective GD	Connected with PE
②	DI terminal	See "Electrical Design Reference" for details			
③	DO terminal	See "Electrical Design Reference" for details			
④	Counting terminal	High-speed counting terminal, only supported by GR10-32ETP8AME. The specifications are as follows:			
		Item			Specifications
		Channel Type			Digital input, source (type P)
		Input voltage class			24 VDC (max.: 30 V)
		Input current (typical)			5 mA (reference value)
		On voltage			> 15 VDC
		OFF voltage			< 5 VDC
		Port filter time constant			Configurable
		Input impedance			3.3 K (reference value)
		Max. counting speed			10 Kbps
Least ideal duty cycle of 2-phase input			(40%: 60%) –(60%: 40%)		
⑤	AO terminal	See "Electrical Design Reference" for details			
⑥	Analog input terminal	See "Electrical Design Reference" for details			
⑦	EtherCAT communication port	2 RJ45 ports, 100Mbps IN-EtherCAT communication input interface IN/OUT			
⑧	RS485 port	Only for GR10-32ETP8AME and GR10-4ETP4ADE. The pins are defined as follows:			
		No.	Signal	Description	Remarks
		1	485+	485 positive signal	Reserved
		2	485-	485 negative signal	Reserved
		3	GND	485 ground	Reserved

⑨	Grounding terminal	Module grounding terminal		
⑩	Indicator	The indicators are described as follows:		
		Name	Color	Definition
		POWER	Green	Power indicator (3.3 V)
		RUN	Green	Normal operation indicator
		ERR	Red	Fault indicator
		SF	Red	EtherCAT communication error indicator
		A	Green	Encoder phase-A signal input indicator, on when input is active
		B	Green	Encoder phase-B signal input indicator, on when input is active

Product Specifications

Item	Specifications		
Model	GR10-32ETP8AME	GR10-28ETP12AME	GR10-4ETP4ADE
Power supply voltage	24 VDC (20.4 VDC–28.8 VDC) (-15% to +20%)		
communication port	EtherCAT slave interface		
DI channel	16, P-type	8, P-type	4, P-type
DO channel	16, P-type	12, P-type	4, voltage/current input
AI channel	4, voltage/current input	8, voltage/current input	--
AO channel	4, voltage output	4, voltage output	--
Highspeed counting channel	1	--	--
Sensor power output	24 VDC (-15% to +20%), 25 mA each channel		
Isolation	I/O and internal logic circuit: isolated; between I/Os: no isolation		
Program upgrade	EtherCAT firmware upgrade, supports FOE		
Min. bus cycle	1 ms		
Alarm display	Alarms are displayed through parameters		

Specifications of DI and DO Channels

Item	DI	Item	DO
Channel Type	Digital input, source (P-type)	Channel Type	Digital transistor output, high-side output (source or P-type)
Input voltage class	24 VDC (max.: 30 V)	Power supply voltage	24 VDC (-15% to +20%)
Input current (typical)	4 mA (reference value)	Max. output current	2 A
On voltage	> 15 VDC	Max. OFF leakage current	Less than 0.5 mA
OFF Voltage	< 5 VDC	ON response time	Below 0.5 ms (hardware response time)
Port filter time constant	Configurable	OFF response time	Below 0.5 ms (hardware response time)
Input impedance	4.3K (reference value)	Limiting load	Resistive load: 12 Ω (1kHz); lamp load: 48 W (1kHz)
--	--	Channel protection	Short-circuit protection

Specifications of AI and AO Channels

1) Basic specifications

Item	AI	Item	AO
Channel Type	Voltage and current input, configurable	Channel Type	Voltage and current input, configurable
Voltage input impedance	$\geq 1\text{ M}\Omega$	Voltage output load	1 K Ω to 1M Ω
Current sampling impedance	250 Ω	Current load impedance	0 Ω to 600 Ω
Voltage input range	1–5 V/0–10 V	Output voltage range	0–5 V/0–10 V
Current input range	4–20 mA	Stability time (limiting hopping)	200 μ s
Resolution	16 bits	Resolution	16 bits
Sampling time	Configurable, sampling of all channels can be completed in 1 ms	Conversion time	1 ms/all channels
Accuracy (ambient temperature: 0 to 55 °C)	Voltage: $\pm 0.1\%$, current: $\pm 0.1\%$, max. error: $\pm 50\text{ ppm}/^{\circ}\text{C}$	Accuracy (ambient temperature: 0 to 55 °C)	Voltage: $\pm 0.15\%$, max. error: $\pm 30\text{ ppm}/^{\circ}\text{C}$

2) Detection mode

Mode	Rated Range	Rated Digital Value	Input Limiting Range	Limiting Digital Value
Analog voltage input	1 to 5V	0 to 20000	0.8 V to 5.2 V	–1000 to 21,000
	0 V to 10 V	0 to 20000	–0.5 V to 10.5 V	–1000 to 21,000
Analog current input	4–20 mA	0 to 20000	3.2 mA to 20.8 mA	–1000 to 21,000
Analog Voltage Output	0 to 5V	0 to 20000	–0.25 V to 5.25 V	–1000 to 21,000
	0V to 10V	0 to 20000	–0.5 V to 10.5 V	–1000 to 21,000

3) Basic functions

Category	Item	Description
Analog input	Mode switching	Mode switching is achieved through software configuration
	Filter mode	Median filter + Singular value filter
	Filter time setting	Filter time is set by software
	Peak hold	Save the digital value corresponding to the max. input detection signal
	Wire breakage detection	When there is no signal input, the corresponding flag bit shows that the detection system is disconnected (wire breakage detection is only available in the 4–20 mA and 1–5 V voltage detection modes), reference source abnormality detection (exceeded by $\pm 2.5\%$)
Analog output	Mode switching	Mode switching is achieved through software configuration
	Output retention	It is used to set whether to maintain the output signal or output a fixed value

2 Mechanical Design Reference

Mounting Dimensions

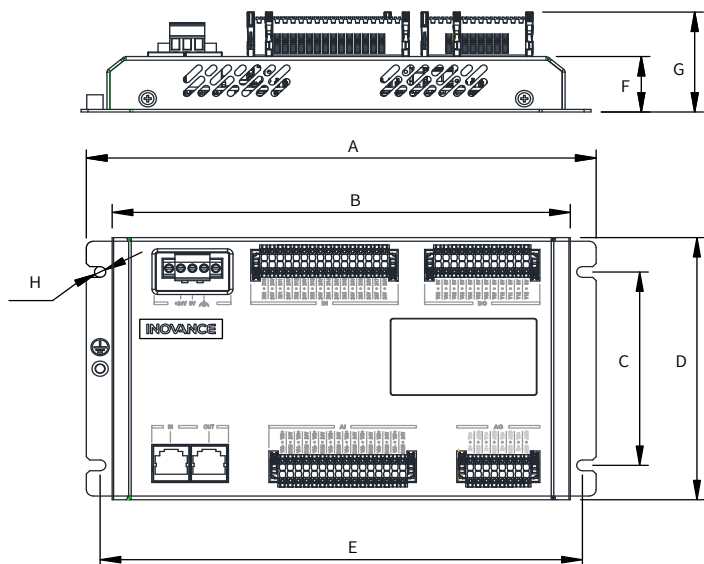


Figure2 Product Dimensions (in mm)

Dimensions (mm)	GR10-32ETP8AME	GR10-4ETP4ADE	GR10-28ETP12AME
A	237	157	222
B	214.5	134.5	199.46
C	90	90	90
D	122	122	122
E	225	145	210
F	25.8	25.8	25.8
G	46.49	46.49	46.49
H	4x Ø 5	4x Ø 5	4x Ø 5

3 Electrical Design Reference

Cable Preparation

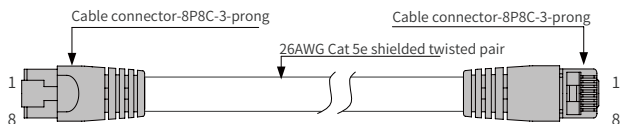


Figure 4 EtherCAT cable preparation



Use Cat 5e shielded twisted pair (STP) cables, with injection molded and iron shelled connector.

Length requirements:

According to FastEthernet technology, when an EtherCAT bus is used, the length of the cable between the devices must not exceed 100 meters. Exceeding this length will attenuate the signal and affect communication.

Technical requirements:

100% continuity test, no short circuit, open circuit, misalignment and poor contact.

Use a shielded cable as the EtherCAT bus for network data transmission, with the following recommended specifications:

Item	Specifications
Cable type	Flexible crossover cable, S-FTP, Cat 5e
Complied standards:	EIA/TIA568A, EN50173, ISO/IEC11801 EIA/TI Abulletin TSB, EIA/TIA SB40-A&TSB36
Conductor cross section	AWG26
Conductor type	Twisted pair
Pair	4

■ Definition of Input and Output Terminals

1) Digital input and output (DI/DO)

The input is source input and active high; the output type is source output and active high.

The DI terminals of GR10-32ETP8AME are detailed in the following table:

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Group 1 input 0	Input	X00	+24 V	Power	24 V power supply for DI
Group 1 input 1	Input	X01	+24 V	Power	24 V power supply for DI
Group 1 input 2	Input	X02	+24 V	Power	24 V power supply for DI
Group 1 input 3	Input	X03	+24 V	Power	24 V power supply for DI
Group 1 input 4	Input	X04	+24 V	Power	24 V power supply for DI
Group 1 input 5	Input	X05	+24 V	Power	24 V power supply for DI
Group 1 input 6	Input	X06	+24 V	Power	24 V power supply for DI
Group 1 input 7	Input	X07	+24 V	Power	24 V power supply for DI
Group 2 input 0	Input	X10	+24 V	Power	24 V power supply for DI
Group 2 input 1	Input	X11	+24 V	Power	24 V power supply for DI
Group 2 input 2	Input	X12	+24 V	Power	24 V power supply for DI
Group 2 input 3	Input	X13	+24 V	Power	24 V power supply for DI
Group 2 input 4	Input	X14	+24 V	Power	24 V power supply for DI
Group 2 input 5	Input	X15	+24 V	Power	24 V power supply for DI
Group 2 input 6	Input	X16	+24 V	Power	24 V power supply for DI
Group 2 input 7	Input	X17	+24 V	Power	24 V power supply for DI

The DO terminals of GR10-32ETP8AME are detailed in the following table:

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Group 1 output 0	Output	Y00	0 V	Power	DO output back to ground
Group 1 output 1	Output	Y01	0 V	Power	DO output back to ground
Group 1 output 2	Output	Y02	0 V	Power	DO output back to ground
Group 1 output 3	Output	Y03	0 V	Power	DO output back to ground
Group 1 output 4	Output	Y04	0 V	Power	DO output back to ground
Group 1 output 5	Output	Y05	0 V	Power	DO output back to ground
Group 1 output 6	Output	Y06	0 V	Power	DO output back to ground
Group 1 output 7	Output	Y07	0 V	Power	DO output back to ground
Group 2 output 0	Output	Y10	0 V	Power	DO output back to ground
Group 2 output 1	Output	Y11	0 V	Power	DO output back to ground

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Group 2 output 2	Output	Y12	0 V	Power	DO output back to ground
Group 2 output 3	Output	Y13	0 V	Power	DO output back to ground
Group 2 output 4	Output	Y14	0 V	Power	DO output back to ground
Group 2 output 5	Output	Y15	0 V	Power	DO output back to ground
Group 2 output 6	Output	Y16	0 V	Power	DO output back to ground
Group 2 output 7	Output	Y17	0 V	Power	DO output back to ground

The DI terminals of GR10-28ETP12AME are detailed in the following table:

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Group 1 input 0	Input	X00	X10	Input	Group 2 input 0
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI
Group 1 input 1	Input	X01	X11	Input	Group 2 input 1
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI
Group 1 input 2	Input	X02	X12	Input	Group 2 input 2
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI
Group 1 input 3	Input	X03	X13	Input	Group 2 input 3
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI
Group 1 input 4	Input	X04	X14	Input	Group 2 input 4
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI
Group 2 input 5	Input	X05	X15	Input	Group 2 input 5
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI
Group 2 input 6	Input	X06	X16	Input	Group 2 input 6
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI
Group 2 input 7	Input	X07	X17	Input	Group 2 input 7
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI

The DO terminals of GR10-28ETP12AME are detailed in the following table:

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Group 1 output 0	Output	Y00	0V	Power	DO output back to ground
Group 1 output 1	Output	Y01	0V	Power	DO output back to ground
Group 1 output 2	Output	Y02	0V	Power	DO output back to ground

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Group 1 output 3	Output	Y03	0V	Power	DO output back to ground
Group 1 output 4	Output	Y04	0V	Power	DO output back to ground
Group 1 output 5	Output	Y05	0V	Power	DO output back to ground
Group 1 output 6	Output	Y06	0V	Power	DO output back to ground
Group 1 output 7	Output	Y07	0V	Power	DO output back to ground
Group 2 output 0	Output	Y10	0V	Power	DO output back to ground
Group 2 output 1	Output	Y11	0V	Power	DO output back to ground
Group 2 output 2	Output	Y12	0V	Power	DO output back to ground
Group 2 output 3	Output	Y13	0V	Power	DO output back to ground

The DI terminals of GR10-4ETP4ADE are detailed in the following table:

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Signal Name
Group 1 input 0	Input	X00	X02	Input	Group 1 input 2
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI
Group 1 input 1	Input	X01	X03	Input	Group 1 input 3
24 V power supply for DI	Power	+24 V	+24 V	Power	24 V power supply for DI

2) Analog input and output (AI/ AO)

The AI terminals of GR10-32ETP8AME, GR10-28ETP12AME and GR10-4ETP4ADE are detailed as follows:

* The DI terminals of GR10-32ETP8AME and GR10-4ETP4ADE only have 4 groups of inputs (VI0-/ + to VI3-/ +)

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Voltage/current input negative terminal 0	Input	VI0-	VI0+	Input	Voltage/current input positive terminal 0
+24 V reference ground	Power	COM	+24 V	Power	Only supplies power for AI module (max. current 0.5 A)
Voltage/current input negative terminal 1	Input	VI1-	VI1+	Input	Voltage/current input positive terminal 1
+24 V reference ground	Power	COM	+24 V	Power	Only supplies power for AI module (max. current 0.5 A)
Voltage/current input negative terminal 2	Input	VI2-	VI2+	Input	Voltage/current input positive terminal 2
+24 V reference ground	Power	COM	+24 V	Power	Only supplies power for AI module (max. current 0.5 A)
Voltage/current input negative terminal 3	Input	VI3-	VI3+	Input	Voltage/current input positive terminal 3
+24 V reference ground	Power	COM	+24 V	Power	Only supplies power for AI module (max. current 0.5 A)

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Voltage/current input negative terminal 4	Input	VI4-	VI4+	Input	Voltage/current input positive terminal 4
+24 V reference ground	Power	COM	+24 V	Power	Only supplies power for AI module (max. current 0.5 A)
Voltage/current input negative terminal 5	Input	VI5-	VI5+	Input	Voltage/current input positive terminal 5
+24 V reference ground	Power	COM	+24 V	Power	Only supplies power for AI module (max. current 0.5 A)
Voltage/current input negative terminal 6	Input	VI6-	VI6+	Input	Voltage/current input positive terminal 6
+24 V reference ground	Power	COM	+24 V	Power	Only supplies power for AI module (max. current 0.5 A)
Voltage/current input negative terminal 7	Input	VI7-	VI7+	Input	Voltage/current input positive terminal 7
+24 V reference ground	Power	COM	+24 V	Power	Only supplies power for AI module (max. current 0.5 A)

The AO terminals of GR10-32ETP8AME and GR10-28ETP12AME are detailed as follows:

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Positive current output 0	Output	I0+	V0+	Output	Positive voltage output 0
AO output back to ground	Power	AGD	AGD	Power	AO output back to ground
Positive current output 1	Output	I1+	V1+	Output	Positive voltage output 1
AO output back to ground	Power	AGD	AGD	Power	AO output back to ground
Positive current output 2	Output	I2+	V2+	Output	Positive voltage output 2
AO output back to ground	Power	AGD	AGD	Power	AO output back to ground
Positive current output 3	Output	I3+	V3+	Output	Positive voltage output 3
AO output back to ground	Power	AGD	AGD	Power	AO output back to ground

3) High-speed counting terminal (HC)

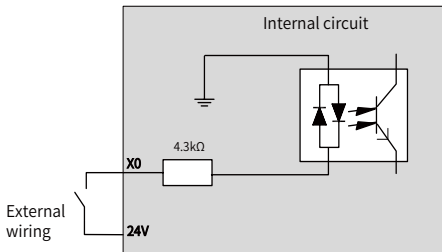
Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
DO output back to ground	Power	0V	DO	Output	Comparison output, source output, active high
DO output back to ground	Power	0V	24V	Power	24 V power supply
Counting phase-AB common terminal	Input	SSO	SSO	Input	Counting phase-AB common terminal

Function	Type	Signal Name (column A)	Signal Name (column B)	Type	Function
Counting phase-B	Input	B	A	Input	Counting phase-A

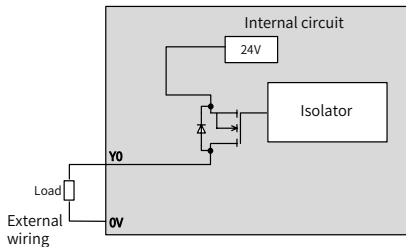
■ External Wiring

1) DI/DO wiring

Wiring diagram of GR10-32ETP8AME-DI, GR10-28ETP12AME-DI and GR10-4ETP4ADE-DI terminals (including external wiring and internal circuits):



Wiring diagram of GR10-32ETP8AME-DO and GR10-28ETP12AME-DO terminals (including external wiring and internal circuits):



2) AI/AO wiring

Wiring diagram of GR10-32ETP8AME-AO and GR10-28ETP12AME-AO terminals:

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:

- 3) Improper use or uninstallation/repair/modification without prior permission
- 4) Fire, flood, abnormal voltage, other disasters, and secondary disasters
- 5) Hardware damage caused by dropping or transportation after procurement
- 6) Failure to operate the product by observing the User Manual provided by Inovance
- 7) 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.