



19011285 A01

Overview

Thank you for purchasing the GL10-2PH high-speed differential pulse positioning module developed and manufactured independently by Inovance.

This product delivers 2\*1 MHz high-speed differential output. It supports multiple pulse output modes, including direction + pulse (required) or CW + CCW. It also supports homing positioning and left and right limiting. This product is a perfect solution for sophisticated manufacture industries which involves a large number of axes, such as mobile phone manufacture and TP. 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](http://www.inovance.com)) for the latest version of the guide.

Safety Instructions

Safety Precautions

- 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, 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 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.

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.

Product Information

Model Number and Nameplate

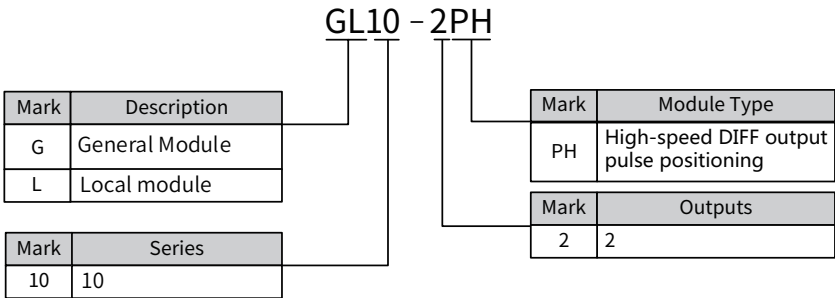
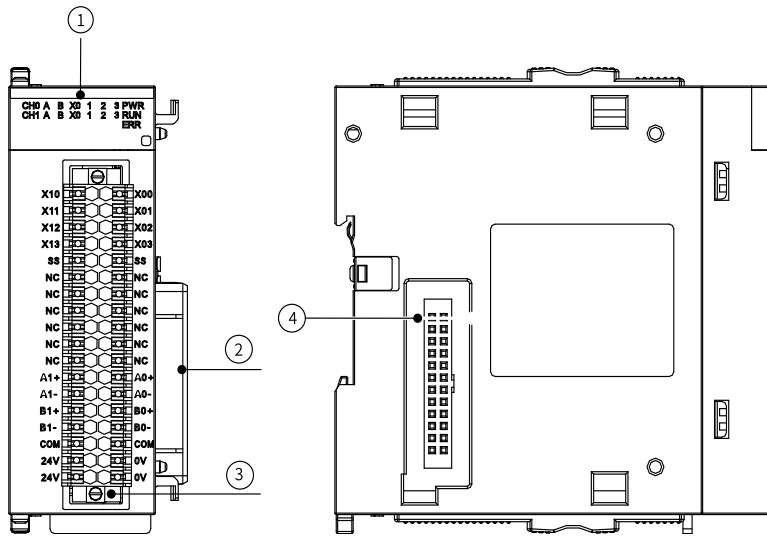


Figure 1 Description of model number and nameplate

| Model    | Category         | Description                                                                                                                    | Applicable Model |
|----------|------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------|
| GL10-2PH | Local I/O module | For local bus expansion, 2 high-speed differential output pulse positioning modules, output frequency 1 MHz, 8 ordinary inputs | H3U series       |

External Interface



| No. | Interface Name                                | Function                                                 |                            |       |                                        |
|-----|-----------------------------------------------|----------------------------------------------------------|----------------------------|-------|----------------------------------------|
| ①   | State indicator                               | PWR                                                      | Power indicator            | Green | ON when power supply is switched on    |
|     |                                               | RUN                                                      | Normal operation indicator | Green | ON when power supply is switched on    |
|     |                                               | ERR                                                      | Fault indicator            | Red   | ON when the module is faulty           |
|     | Signal indicator                              | CH0/1                                                    | Indicator                  | Green | On when channel 0/1 is ready to output |
|     |                                               | A/B                                                      | Pulse+direction Indicator  | Green | --                                     |
| ②   | X0-X3                                         | Digital input indicator                                  |                            |       |                                        |
|     |                                               | Green                                                    |                            |       |                                        |
|     |                                               | On when the input signal is active                       |                            |       |                                        |
| ②   | Local expansion module back-end interface     | Connect back-end module, not supporting hot plugging     |                            |       |                                        |
| ③   | User terminal                                 | Pulse output terminal, see "Electrical Design Reference" |                            |       |                                        |
| ④   | Front-end interface of local expansion module | Connects front-end module, not supporting hot plugging   |                            |       |                                        |

General Specifications

| Item                    | Specifications                                             |
|-------------------------|------------------------------------------------------------|
| Rated operating voltage | 24 VDC (20.4 VDC to 28.8 VDC) (–15% to +20%)               |
| Output channel          | 2                                                          |
| User terminal           | 36-pin leaf spring terminal, for both I/O and power supply |

|                                 |                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------|
| Internally consumed current     | Approx. 150 mA                                                                                 |
| Output short-circuit protection | Yes                                                                                            |
| System program upgrade method   | USB firmware upgrade                                                                           |
| Positioning                     | Absolute pulse positioning, relative pulse positioning, speed control, multiple homing methods |
| Operating temperature           | -5~55°C                                                                                        |
| Storage temperature             | -25~70°C                                                                                       |
| Humidity                        | 10~95%, no-condensation                                                                        |

#### I/O specification:

| Input           | Specifications                | Output                | Specifications            |
|-----------------|-------------------------------|-----------------------|---------------------------|
| Input type      | SINK/SOURCE input             | Output type           | 5 V differential output   |
| Input voltage   | DC 24 V                       | Insulation            | Opto-couplers isolation   |
| Input impedance | 3.3 K                         | Max. output frequency | 1 MHz                     |
| Input is ON     | Input current is above 2.0 mA | Output mode           | Pulse+direction or CW/CCW |
| Input is OFF    | Input current is below 1.0 mA | Number of channels    | 2                         |

### Mechanical Design Reference

#### Mounting Dimensions

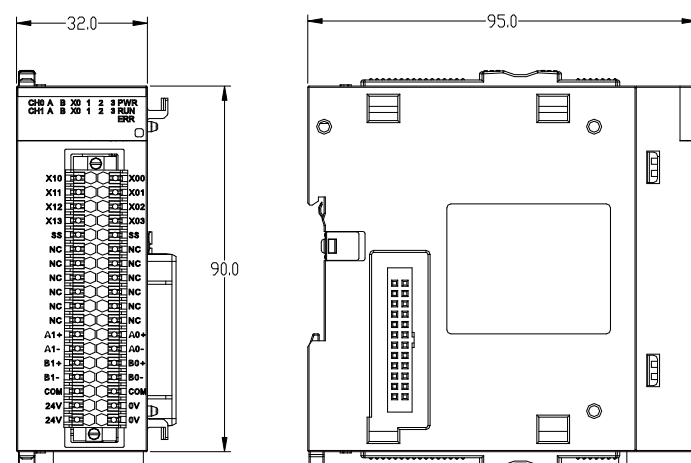


Figure 2 Mounting dimensions (in mm)

### Electrical Design Reference

#### Cable Selection

| Material Name | Model     | Applicable Cable Diameter |     | Manufacturer  | Crimping Tool |
|---------------|-----------|---------------------------|-----|---------------|---------------|
|               |           | MM <sup>2</sup>           | AWG |               |               |
| Tubular lug   | GTVE07512 | 0.75                      | 21  | Suzhou Yuanli | YAC-5         |

Those cable lugs are applicable to this module, and the cable rated temperature is required to be above 75°C.

#### Cable Preparing Procedures

- ◆ Remove the insulation of the cable so that a length of 11~14 mm of the conductor is exposed, and put the cable through a cable marking sleeve.
- ◆ Insert the exposed end into the hole of the cable lug, and then crimp it with recommended crimping tool.

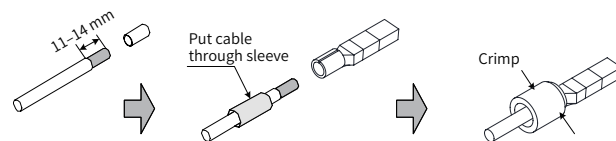


Figure 3 Diagram of cable preparing

#### Terminal Layout

The positioning module supports 2 channels: channel 0 on the left and channel 1 on the right.

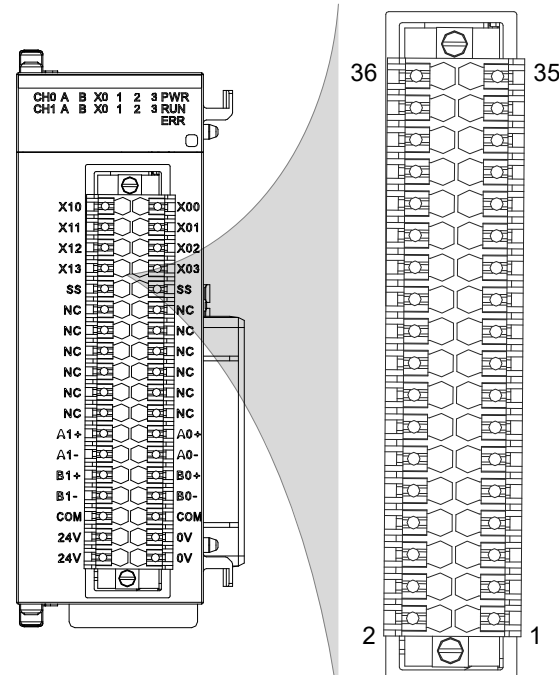
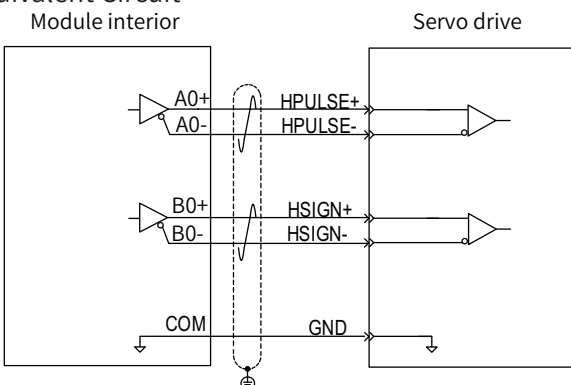


Figure 4 Terminal layout

#### External Wiring

| Ext. Wiring | Signal Name<br>Column B    | Terminal<br>No. | Signal Name<br>Column A | Ext. Wiring                |
|-------------|----------------------------|-----------------|-------------------------|----------------------------|
|             | CH1 POS limit<br>( X10 )   | 36              | 35                      | CH0 NEG limit<br>( X00 )   |
|             | CH1 NEG limit<br>( X11 )   | 34              | 33                      | CH0 POS limit<br>( X01 )   |
|             | CH1 home SW<br>( X12 )     | 32              | 31                      | CH0 home SW<br>( X02 )     |
|             | CH1 in. signal<br>( X13 )  | 30              | 29                      | CH0 in. signal<br>( X03 )  |
|             | CH1 in. COM<br>( SS )      | 28              | 27                      | CH0 in. COM<br>( SS )      |
|             | Not connected<br>( NC )    | 26              | 25                      | Not connected<br>( NC )    |
|             | Not connected<br>( NC )    | 24              | 23                      | Not connected<br>( NC )    |
|             | Not connected<br>( NC )    | 22              | 21                      | Not connected<br>( NC )    |
|             | Not connected<br>( NC )    | 20              | 19                      | Not connected<br>( NC )    |
|             | Not connected<br>( NC )    | 18              | 17                      | Not connected<br>( NC )    |
|             | Not connected<br>( NC )    | 16              | 15                      | Not connected<br>( NC )    |
|             | CH1 DIFF out. A<br>( A1+ ) | 14              | 13                      | CH0 DIFF out. A<br>( A0+ ) |
|             | CH1 DIFF out. A<br>( A1- ) | 12              | 11                      | CH1 DIFF out. A<br>( A0- ) |
|             | CH1 DIFF out. B<br>( B1+ ) | 10              | 9                       | CH1 DIFF out. B<br>( B0+ ) |
|             | CH1 DIFF out. B<br>( B1- ) | 8               | 7                       | CH1 DIFF out. B<br>( B0- ) |
|             | Out. COM<br>( COM )        | 6               | 5                       | Out. COM<br>( COM )        |
|             | 24V power +<br>( 24V )     | 4               | 3                       | Power GND<br>( 0V )        |
|             | 24V power +<br>( 24V )     | 2               | 1                       | Power GND<br>( 0V )        |

#### Internal Equivalent Circuit



\*1 4-core shielded twisted pair cables are used for differential output to reduce noise interference;

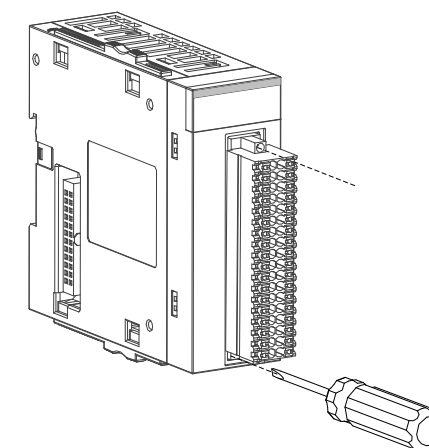
\*2 The common GND for differential output must be connected to the GND terminal of the servo drive to reduce noise interference.

\*3 Ensure that the metal spring piece at the bottom the of the module is securely installed. Mount the module on a well-grounded metal bracket, and ensure that the spring piece is in good contact with the bracket.

\*4 To reduce noise interference, the module must be powered by 24 V voltage from a switching power supply or PLC, rather than a servo drive or AC drive.

#### Wiring Precautions

After the IO terminal block is mounted to the expansion module, fix it with a torque of 0.2~0.25 N m, as shown in the figure:



Do not bundle the terminal connection cables together with power cables (high voltage, large current) which produce strong interference signals. Separate it from other cables and avoid cabling in parallel.

## INOVANCE Warranty Agreement

The warranty period of the product is 18 months (subject to information indicated by the barcode on the product). 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:

- 1) Improper use or uninstallation/repair/modification without prior permission
- 2) Fire, flood, abnormal voltage, other disasters, and secondary disasters
- 3) Hardware damage caused by dropping or transportation after procurement
- 4) Failure to operate the product by observing the User Guide provided by Inovance
- 5) 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 according to 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 Suzhou Inovance Technology Co., Ltd.

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