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PS00007574A05

GL20-4PT
Temperature Detection Module
User Guide

Suzhou Inovance Technology Co., Ltd.

Add.: No.52, Tian E Dang Road, Wuzhong District,
Suzhou 215104, P.R. China
Tel: (0512) 6637 6666 Fax: (0512) 6285 6720
www.inovance.com

Preface

■ Introduction

The GL20-4PT 4-channel thermal resistor temperature detection module can be used with Easy series products and GL20 series communication interface modules such as GL20-RTU-ECT.

This guide describes the mechanical installation, electrical installation, programming commissioning, troubleshooting and version matching information of the product.

■ Standard

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification	Directive		Standard
CE Certification	EMC Directive	2014/30/EU	**24 VDC products:** EN 61131-2 **220 VAC products:** EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD Directive	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS Directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL Certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 61010-2-201
KCC Certification	-		-

Certification	Directive		Standard
EAC certification	-		-
UKCA Certification	Safety Regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC Regulations	Electromagnetic Compatibility Regulations 2016	**24 VDC products:** EN 61131-2 **220 VAC products:** EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS Regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Documents

Document Name	Document Coding	Description
GL20-RTU-ECT Communication Interface Module User Guide	PS00004985	This guide describes the installation, wiring and more of the product.
GL20-RTU-PN Communication Interface Module User Guide	PS00007594	This guide describes the installation, wiring and more of the product.
GL20-RTU-ECT32 Communication Interface Module User Guide	PS00013434	This guide describes the product information, mechanical installation, electrical installation, commissioning, and troubleshooting of the product.
GL20-4PT Temperature Detection Module User Guide (This guide)	PS00007574	This guide describes the mechanical installation, electrical installation, programming commissioning, troubleshooting and version matching information of the product.

■ Revision History

Revision date	Version	Description
March 2025	A05	Made minor corrections.
July 2024	A04	Updated *"1.4 Environmental Specifications" on page 15*.
June 2024	A03	Updated the "Rated current of bus input power supply" of power supply specifications in *"1.3 Technical Specifications" on page 12*.
January 2024	A02	• Updated the operation steps in *" Program Commissioning" on page 26*. • Updated the matching version in *" Appendix: Version Matching Information" on page 38*.
November 2023	A01	**Added the following content:** • Added *" Fault Diagnosis" on page 35*. • Added *" Appendix: Version Matching Information" on page 38*. **Updated the following content:** • Update the parameters in *"1.3 Technical Specifications" on page 12*. • Updated *"2.3 Installation Method" on page 18*.
December 2022	A00	Initial release.

■ Access to the Guide

This guide is not delivered with the product. You can obtain the PDF version by the following methods:

- Do keyword search under Service and Support at *www.inovance.com*.
- Scan the QR code on the product with your smart phone.
- Scan the QR code below to install My Inovance app, where you can search for and download user guides.

■ Warranty Disclaimer

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. Maintenance will be charged after the warranty expires.

Within the warranty period, maintenance will be charged for the following damage:

- Damage caused by operations not following the instructions in the user guide
- Damage caused by fire, flood, or unusual voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

The maintenance is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see the Product Warranty Card.

Fundamental Safety Instructions

■ Safety Disclaimer

1. Read and comply with the safety instructions during installation, operation, and maintenance of the equipment.
2. To ensure your safety and prevent damage to the equipment, follow the marks on the equipment and all the safety instructions in this guide.
3. "CAUTION", "WARNING", and "DANGER" items in the guide do not indicate all safety precautions that need to be followed; instead, they just supplement the safety precautions.
4. Use this equipment according to the designated environment requirements; otherwise, a fault may occur. Malfunction or damage caused by improper use is not covered by warranty.
5. Inovance shall take no responsibility for any personal injury or property damage caused by improper use.

■ Safety Levels and Definitions

"DANGER" indicates that failure to comply with the notice can result in severe personal injury or even death.

"WARNING" indicates that failure to comply with the notice may result in severe personal injury or even death.

"CAUTION" indicates that failure to comply with the notice may result in minor or moderate personal injury or equipment damage. Keep this guide properly for future use and deliver it to the end user.

Control System Design

- 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.

WARNING

- 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 PLC to prevent damage to the equipment.
- To ensure safe operation, for the output signals that may cause critical accidents, use external protection circuits and safety mechanism.
- Once the CPU of the PLC detects an exception 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 cannot be applied to the PLC's power supply input terminals, signal input terminals and output terminals, preventing damage to the equipment.

Installation

WARNING

- Installation must be carried out by skilled personnel who have undergone specialized electrical training and possess comprehensive electrical expertise.
- 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 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 result in damage or deterioration to the equipment.
- 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 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 skilled personnel who have undergone specialized electrical training and possess comprehensive electrical expertise.
- Disconnect all external power supplies of the system before wiring. Failure to comply may result in electric shock, module fault or malfunction.
- 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.

- To avoid electric shock, cut off the power supply before connecting the equipment to the power supply.
- The input power of the product must meet the specifications listed in this guide. If the power input does not meet the specifications, the equipment may be damaged. Thus, check regularly that the DC power provided by the switching-mode power supply unit is stable.

Operation and Maintenance

- Operation and maintenance must be carried out by skilled personnel who have undergone specialized electrical training and possess comprehensive electrical expertise.
- 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. Failure to comply may result in electric shock.
- Disconnect all external power supplies of the system before assembling/disassembling the module or connecting/removing the communication cables. Failure to comply may result in electric shock or malfunction.

Safety Recommendations

- In the position where the operator directly touches the machinery part, for example, where a machinery tool is loaded/unloaded, or where a machine runs automatically, the on-site manual operating devices and any other alternative means must be carefully arranged and designed so that they are independent of the programmable controller and can start or terminate the automatic running of the system.
- If you need to modify the program while the system is running, use the lock function or other protective measures. Ensure that only authorized personnel can make the necessary modifications.

Disposal

- Treat the scrapped equipment as industrial waste. Dispose of the battery according to local laws and regulations.
- Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

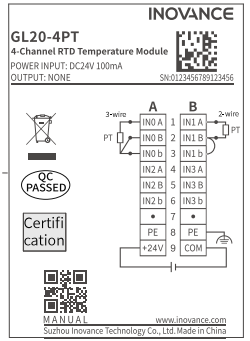
1 Product Information

1.1 Naming Rules and Nameplate

GL 20 -4 PT

① ② ③ ④

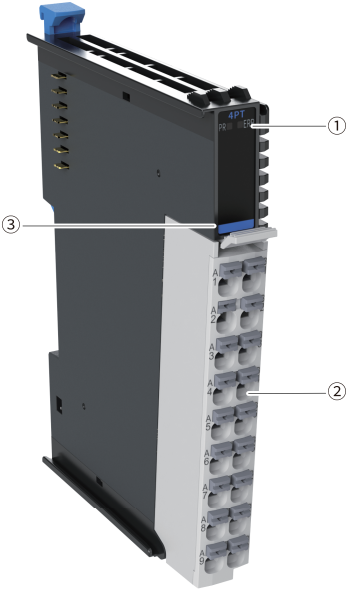
① **Product Information** GL: Inovance general local module	③ **Number of I/O Channels** 4: 4-channel input
② **Series Number** 20: 20 series module	④ **Module Type** PT: Thermal resistor temperature detection



The data for ordering the product is shown below.

Model	Description	Product Code	Applicable Model
GL20-4PT	GL20 series 4-channel input thermal resistor temperature detection module	01440337	It is applicable to Easy series products and GL20 series communication interface modules, such as GL20-RTU-ECT.

1.2 Components



<table>
<tr><th>No.</th><th>Name</th><th colspan="4">Description</th></tr>
<tr><td rowspan="2">①</td><td rowspan="2">Signal indicator</td><td>PR (POWER +RUN)</td><td>Power/Run indicator</td><td>Yellow-green</td><td>• Steady ON: Module in normal operation
• Quick flashing: Module addressed successfully
• Slow flashing: Module powered on but not addressed
• OFF: Module not powered on or abnormal</td></tr>
<tr><td>ERR</td><td>Error indicator</td><td>Red</td><td>ON when the module is faulty. For details, see "Fault Diagnosis" on page 35.</td></tr>
<tr><td>②</td><td>I/O terminal</td><td colspan="4">4-channel thermal resistor input. For details, see "3.2 Terminal Definition" on page 23 .</td></tr>
<tr><td rowspan="3">③</td><td rowspan="3">Color identification</td><td colspan="2">Red: Digital output</td><td colspan="2">Orange: Analog output</td></tr>
<tr><td colspan="2">Gray: Digital input</td><td colspan="2">Green: Analog input</td></tr>
<tr><td colspan="2">White: Communication</td><td colspan="2">Blue: Other module</td></tr>
</table>

- Quick flashing: 200 ms ON followed by 200 ms OFF.
- Slow flashing: 200 ms ON followed by 1s OFF.

1.3 Technical Specifications

■ General Specifications

Item	Specification
IP rating	IP20
Dimensions (W x H x D)	12 mm x 100 mm x 75 mm
Weight (g)	Approx. 60 g

■ Power supply specifications

Item	Specification
Rated voltage of bus input power supply	5 VDC (4.75 VDC to 5.25 VDC)
Rated current of bus input power supply	95 mA (typical@5 V)
Rated voltage of terminal input power supply	24 VDC (20.4 VDC to 28.8 VDC)
Rated current of terminal input power supply	100 mA (typical@24 V)
Rated voltage of terminal output power supply	/
Rated current of terminal output power supply	/
Hot swap	Not supported
Anti-reverse connection 24 V	Supported

■ Input specifications

Item	Description
Maximum number of input channels	4 channels
Digital resolution	24 bits
Display sensitivity	0.1°C, 0.1°F

Item	Description
Input terminal	4-channel thermal resistor input
Sensor Type	Pt100, Pt500, Pt1000, Cu100, KTY84-130, NTC5K, NTC10K
Wiring method	Two-wire/Three-wire
Accuracy (normal temperature: 25°C)	Full scale* (±0.1%), (0 mV to 1000 mV full range). Only ADC sampling accuracy is defined here. For specific temperature measurement accuracy, see *" Detection range and accuracy" on page 13*.
Accuracy (ambient temperature: -20°C to +55°C)	Full scale* (±0.3%), (0 mV to 1000 mV full range). Only ADC sampling accuracy is defined here. For specific temperature measurement accuracy, see *" Detection range and accuracy" on page 13*.
Sampling cycle	250 ms, 500 ms, 1,000 ms/4 channels (configurable through software)
Filter time	0s to 100s (configurable through software, default 5s)
Isolation mode	I/O terminals isolated from power supply; Isolation between channels

■ Detection range and accuracy

Sensor Type	Detection range	Accuracy
Pt100	-200.0°C to +850.0°C, -328.0°F to +1562.0°F	±1°C@ T < 300°C ±2°C@ 300°C ⩽ T ⩽ 700°C ±2.5°C@ T > 700°C
Pt500	-200.0°C to +850.0°C, -328.0°F to +1562.0°F	±1°C@ T < 300°C ±2°C@300°C ⩽ T ⩽ 700°C ±2.5°C@ T > 700°C
Pt1000	-200.0°C to +850.0°C, -328.0°F to +1562.0°F	±1°C@ T < 300°C ±2°C@300°C ⩽ T ⩽ 700°C ±2.5°C@ T > 700°C
Cu100	-50.0°C to +150.0°C, -58.0°F to +302.0°F	±1°C@-50°C ⩽ T ⩽ +150°C
KTY84-130	0.0°C to 200.0°C, 32.0°F to 392.0°F	±1.5°C@ 0°C ⩽ T ⩽ 200°C

Sensor Type	Detection range	Accuracy
NTC5K (B value 2000)	-30.0°C to +200.0°C, -22.0°F to +392.0°F	±1.5°C@ -30°C ⩽ T ⩽ +200°C
NTC5K (B value 3950)	-15.0°C to +100.0°C, 5.0°F to 212.0°F	±1.5°C@ -15°C ⩽ T ⩽ +100°C
NTC5K (B value 6000)	0.0°C to 100.0°C, 32.0°F to 212.0°F	±1.5°C@ 0°C ⩽ T ⩽ 100°C
NTC10K (B value 2000)	-25.0°C to +200.0°C, -13.0°F to +392.0°F	±1.5°C@ -25°C ⩽ T ⩽ +200°C
NTC10K (B value 3950)	0.0°C to 150.0°C, 32.0°F to 302.0°F	±1.5°C@ 0°C ⩽ T ⩽ 150°C
NTC10K (B value 6000)	6.0°C to 100.0°C, 42.8°F to 212.0°F	±1.5°C@ 6°C ⩽ T ⩽ 100°C

■ Software specifications

Item	Description
Input PDO data volume	16 bytes
Diagnostic report function configuration	Supported
Diagnostic detection enable configuration	Overflow and offline detection supported
Overflow detection enable configuration	Supported
Independent channel configuration	Supported
Temperature offset enable configuration	Supported
Temperature setting range	-204.8 to +204.7 temperature units
Sampling cycle	250 ms, 500 ms, 1,000 ms/4 channels
Display mode	Centigrade degree (°C), Fahrenheit degree (°F)
Sensitivity accuracy	0.1°C, 0.1°F
Sampling refresh	Refresh asynchronously according to the sampling cycle, no need to refresh synchronously according to the bus cycle

Item	Description
Stop mode	Continue refreshing according to sampling cycle
Offline or overflow	Output based on maximum value, no further refresh
System diagnosis	System power supply error
Channel diagnosis	Beyond upper limit alarm, beyond lower limit alarm, offline alarm, overflow error
Software diagnosis	Not supported
Configuration diagnosis	Configuration error identification, channel parameter configuration error

1.4 Environmental Specifications

Item	Specification
Installation/ application environment	Free from conductive dust, conductive fibers, explosive dust, flammable gases, water mist/greasy dirt, corrosive dusts/gases, strong vibration, and repetitive shock
Altitude	⩽ 2,000 m
Pollution degree	2
Immunity	2 kV on power supply cable (compliant with IEC 61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
Anti-static rating	Contact discharge +/-6 kV and air discharge +/-8 kV
Vibration resistance	• Application scenario: Tested according to IEC60068-2-6, 3.5 mm amplitude from 5 Hz to 8.4 Hz; 1 g acceleration from 8.4 Hz to 200 Hz; 10 cycles per axial direction • Transportation scenario: Tested according to IEC60068-2-64, 0.01 g^2/Hz power spectral density from 5 Hz to 100 Hz; 0.001 g^2/Hz power spectral density at 200 Hz; 1.14 g Grms
Shock resistance	Application/Transportation scenario: Tested according to IEC60068-2-27; 15 g peak acceleration, 11 ms pulse width, 18 cycles in total in X, Y and Z axial directions
Operating temperature/humidity	• Temperature: -20°C to +55°C • Humidity: < 95% RH (30°C), without condensation

Item	Specification
Storage temperature/ humidity	• Temperature: -20°C to +60°C • Humidity: < 95% RH (30°C), without condensation
Transportation temperature/humidity	• Temperature: -40°C to +70°C • Humidity: < 95% RH (40°C), without condensation

2 Mechanical Installation

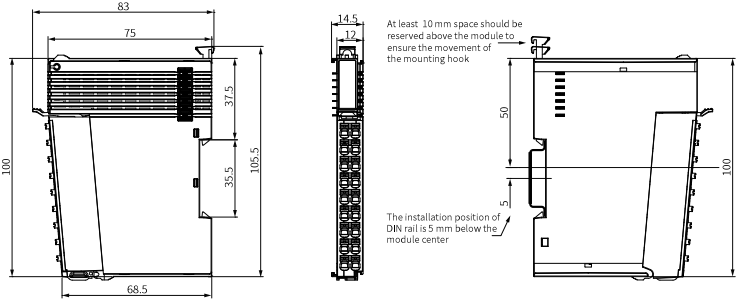
2.1 Installation Precautions

- Make sure the module is powered off before installing or removing.
- Do not hot swap the modules. Otherwise, the modules may be damaged by overcurrent or overvoltage, and the communication interface module or PLC may be subject to restart, user data loss or corruption.
- Do not drop or shock the housing or terminals of the module to avoid damage.

2.2 Installation Dimensions

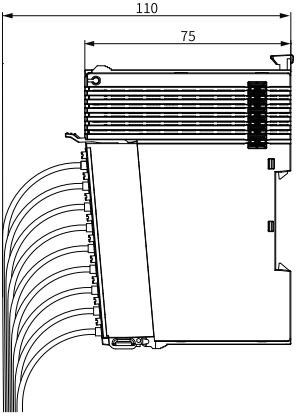
■ Module

The installation dimensions (in mm) are shown in the figure below.



■ Cable connection

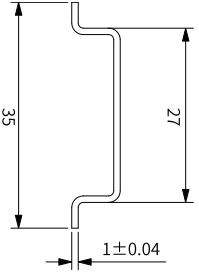
Cable dimensions (in mm) are shown in the figure below.



2.3 Installation Method

■ Installing the modules to each other

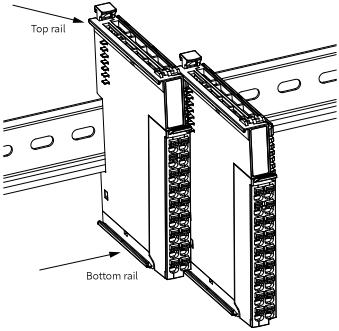
The module is mounted onto a DIN rail in conformity with IEC 60715 (width: 35 mm, thickness: 1 mm). The dimensions (unit: mm) are shown below.



Caution

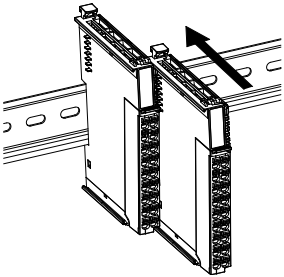
When installed on a DIN rail other than the recommended one (especially the one whose thickness is not 1.0 mm), the product will not fit in place as the mounting hook does not work.

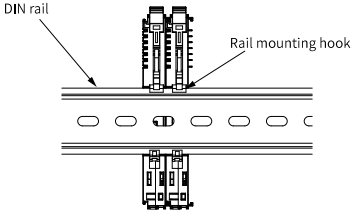
Install the modules to each other through top and bottom guide rails, as shown below.



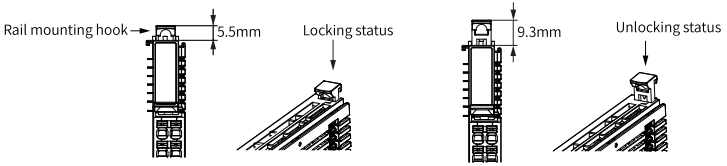
■ Installing the module onto DIN rail

1. Align the module with the DIN rail and push it in the direction indicated by the arrow until you hear a click. See the following figure.





2. Make sure the DIN rail mounting hook of the module is locked. The locked and unlocked states of the mounting hook are shown below.



- If the mounting hook is pressed down, it is locked.
- If the mounting hook is lifted up, it is unlocked.

To lock the PLC to the DIN rail, press down the mounting hook.

Caution

When the module is not installed on the rail, keep the mounting hook in the locked state. Keeping the mounting hook unlocked for a prolonged time may cause the hook to fail.

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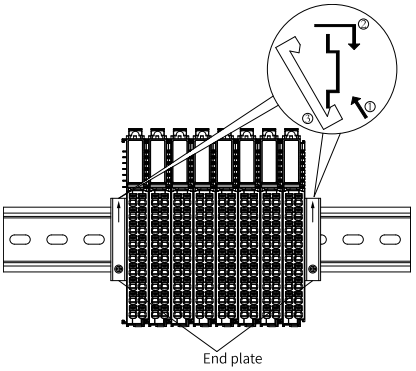
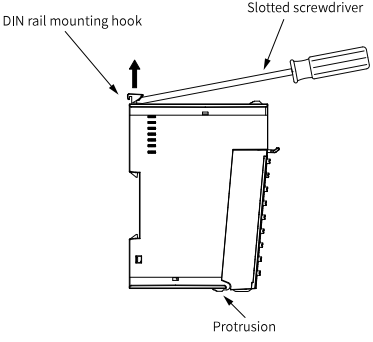
3. Mount a DIN rail end plate on both sides of the PLC or the module.

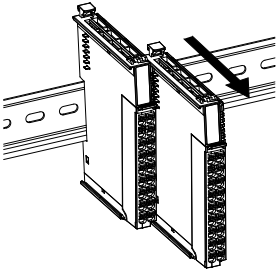
To install the end plate, hook the bottom of it to the bottom of the DIN rail, rotate the end plate to hook the top of it to the top of the DIN rail, and then tighten the screw to lock the end plate in place.



■ Removal

Pry the DIN rail mounting hook upwards with a tool such as a slotted screwdriver, hold the protrusions and pull the module out straight forward. Then, press down the top of the mounting hook.





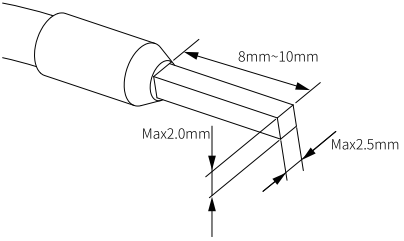
3 Electrical Installation

3.1 Cable Selection

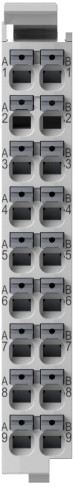
The cable lugs and diameters in the following table are only for reference.

Material Name	Applicable Cable Diameter		KST		Suzhou Yuanli	
	mm^2	AWG	Model	Crimping Tool	Model	Crimping Tool
Tubular lug	0.3	22	E0308	KST2000L	0308	YAC-5
	0.5	20	E0508		0508	
	0.75	18	E7508		7508	
	1.0	18	E1008		1008	
	1.5	16	E1508		1508	

To use other types of tubular lugs, crimp the lug to the cables according to the shape and dimension requirements shown below.



3.2 Terminal Definition



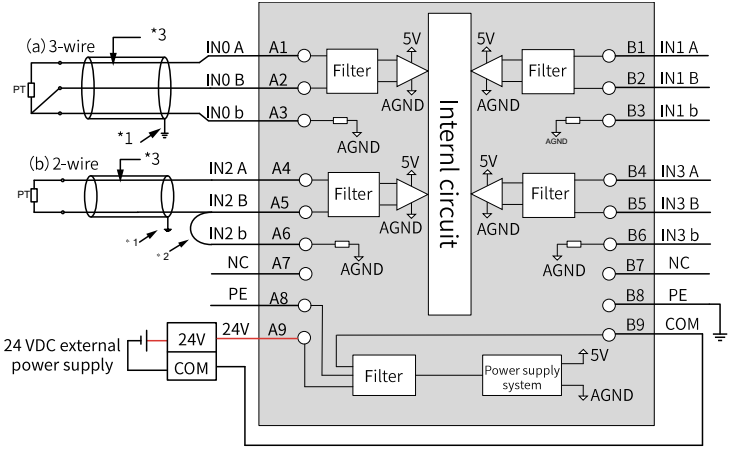
Left Signal	Left Terminal	Right Terminal	Right Signal
IN0 A	A1	B1	IN1 A
IN0 B	A2	B2	IN1 B
IN0 b	A3	B3	IN1 b
IN2 A	A4	B4	IN3 A
IN2 B	A5	B5	IN3 B
IN2 b	A6	B6	IN3 b
•	A7	B7	•
PE	A8	B8	PE
+24 V	A9	B9	COM

3.3 Terminal Wiring

■ Precautions

- Do not bundle the expansion cable together with power cables (high voltage, large current) that produce strong interference signals; otherwise, it may be influenced by noise, surge and induction. Separate it from other cables and avoid cabling in parallel.
- Select recommended cables and pinboards for connection. It is recommended that shielded cables be used as extension cables to enhance capacity of resisting interference.
- Apply single-point grounding for the shielding of shielded cable and solder sealed cable.

■ Circuit block diagram and wiring diagram



Caution

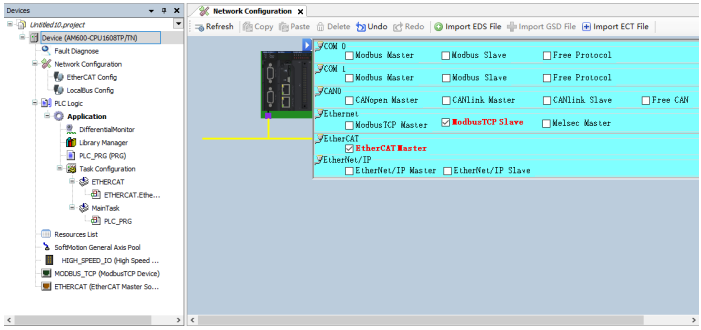
- *1: The cable is required to be shielded. It is recommended to connect the shield to PE.
- *2: If two-wire connection is used, short the INB and INb channels together. In this case, the resistance on the cable will affect the measurement.
- *3: Use a cable having three low-resistance wires that have no difference in resistance.
- The connection methods for B1-B3 and B4-B5 are the same as those for A1-A3 and A4-A6.

4 Program Commissioning

The following is an example where AM600 is used as the master control module along with the GL20-4PT module.

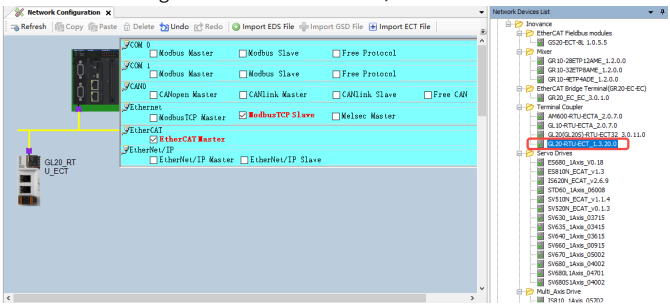
1. Enable the AM600 PLC as the EtherCAT master and add the GL20-RTU-ECT module.

   a. In the left **Devices** pane, double-click on **Network Configuration**, then click on the AM600 figure and check **EtherCAT Master** checkbox to enable the PLC as an EtherCAT master.

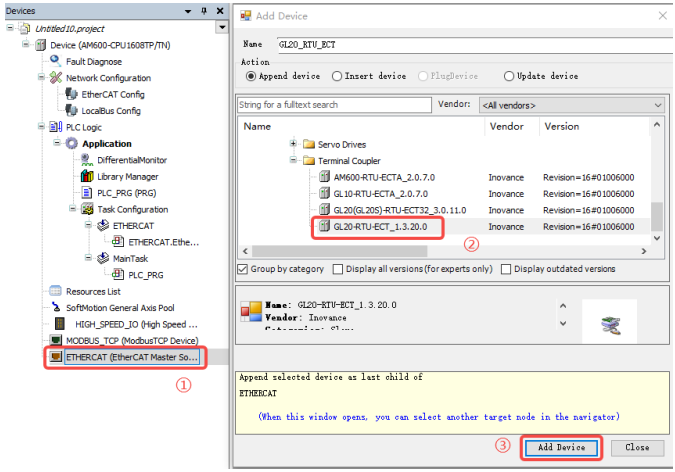


   b. Add the GL20-RTU-ECT communication interface module.

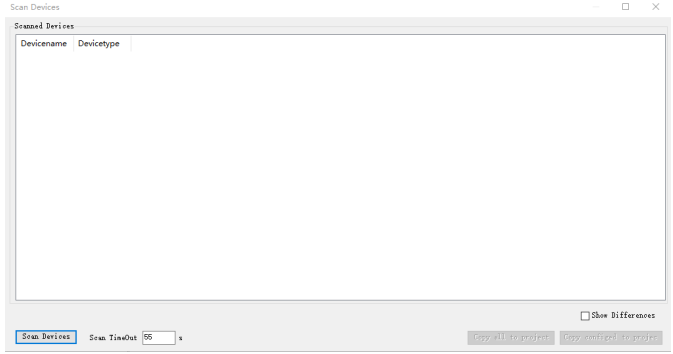
- Method 1: In the right **Network Devices List**, double-click on GL20-RTU-ECT.



- Method 2: In the left **Devices** pane, right-click on **ETHERCAT(EtherCAT Master SoftMotion)** ① and select **Add Device**, then select GL20_RTU_ECT _*x.x.x.x* ② in the popup dialog box and click **Add Device** ③.

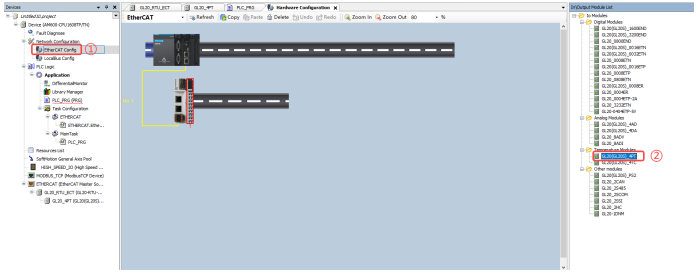


- Method 3: In the left **Devices** pane, right-click on **ETHERCAT(EtherCAT Master SoftMotion)** and select **Scan For Devices**, then click **Scan Devices** and select the scanned GL20-RTU-ECT module, and finally click **Copy all to project**.

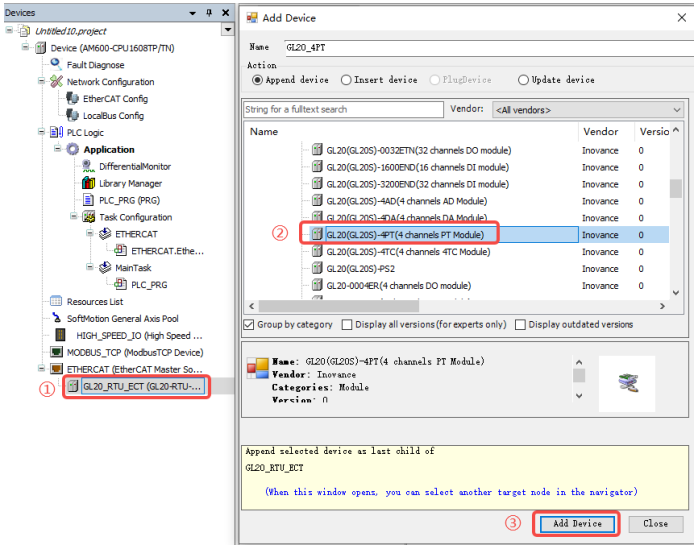


2. Add GL20-4PT module.

- Method 1: In the left **Devices** pane, double-click on **EtherCAT Config** ①, or in the **Network Configuration** pane, double-click on the GL20-RTU-ECT icon to open the **Hardware Configuration** pane, then in the right **In\Output Module List**, double-click on **GL20-4PT** ② or drag the GL20-4PT module and place it after the GL20-RTU-ECT module.

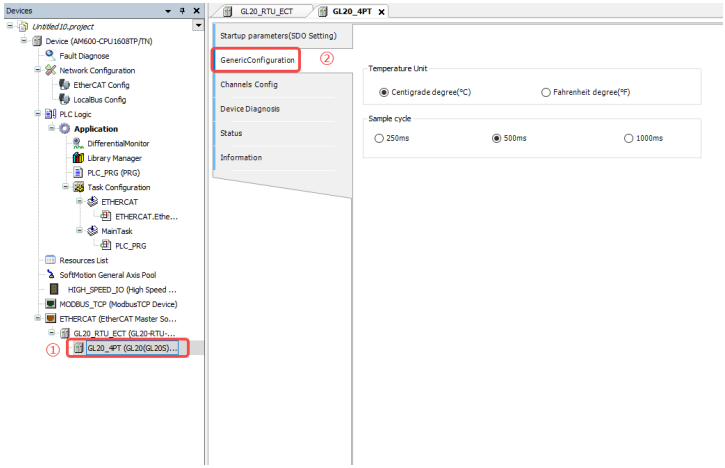


- Method 2: In the left **Devices** pane, right-click on **GL20_RTU_ECT** ① and select **Add Device**, then select GL20-4PT ② in the popup dialog box and click **Add Device** ③.



- Method 3: In the left **Devices** pane, right-click on **ETHERCAT(EtherCAT Master SoftMotion)** and select **Scan For Devices**, then click **Scan Devices** and select the scanned GL20-4PT module, and finally click **Copy all to project**.

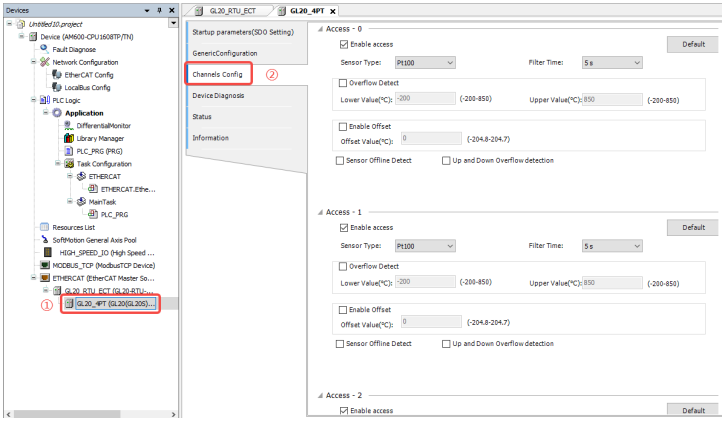
3. Double-click the module ① to set **GenericConfiguration** ②.



Parameters are shown in the following table.

Parameter	Description	Parameter Settings
Temperature unit	The unit of temperature data collected by the module	Supported temperature units: • Centigrade degree (℃) • Fahrenheit degree (°F)
Sampling cycle	Module 4-channel temperature data sampling polling time	Supported sampling cycles: • 250 ms • 500 ms • 1,000 ms

4. Double-click the module to set **Channels config**.



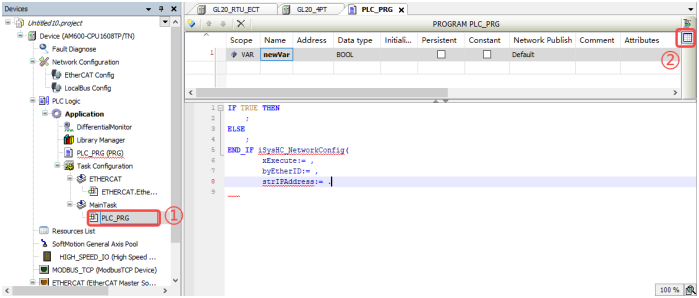
Parameters are shown in the following table.

Parameter	Description	Parameter Settings
Enable access	For channel enabling	• Check to enable the channel • Uncheck to disable the channel
Sensor Type	Type of sensor connected to the module channel	Supported types: • Pt100 • Pt500 • Pt1000 • Cu100 • KTY84 • NTC5K • NTC10K
Filter Time	Module analog channel sampling filter time	Unit: s; Range: 0 to 100s
Overflow Detect	Channel data overflow detection switch	• Check to enable overflow detection • Uncheck to disable overflow detection
Lower Value (°C)	Lower limit of channel data	Range: -200°C to +850°C
Upper Value (°C)	Upper limit of channel data	Range: -200°C to +850°C

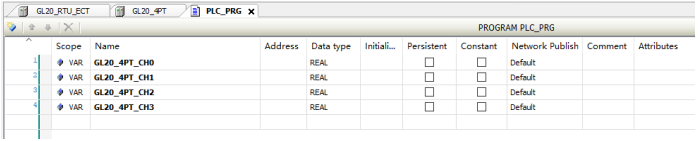
Parameter	Description	Parameter Settings
Enable Offset	Channel data offset enable switch	• Check to enable temperature offset • Uncheck to disable temperature offset
Offset Value (°C)	Offset of channel data	Range: -204.8°C to +204.7°C
Sensor Offline Detect	Channel offline detection enable switch	• Check to enable sensor offline detection • Uncheck to disable sensor offline detection
Up and Down Overflow detection	Channel data overflow detection enable switch	• Check to enable overflow detection • Uncheck to disable overflow detection

5. Create new variables.

a. Double-click **PLC_PRG** ① in the left **Devices** pane, and then click  ② on the right to switch to table mode.

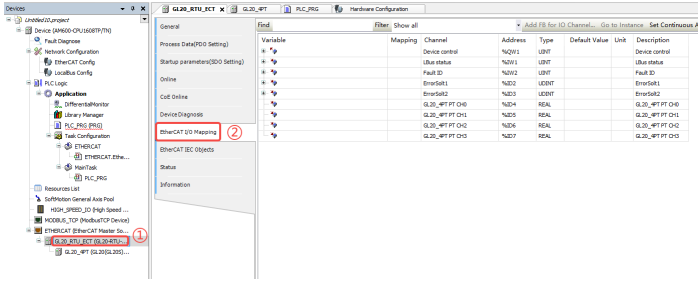


b. Add custom input variables **GL20_4PT_CH0, GL20_4PT_CH1**, **GL20_4PT_CH2**, and **GL20_4PT_CH3**. Set the scope to **VARs** and data type to **REAL**, as shown below.



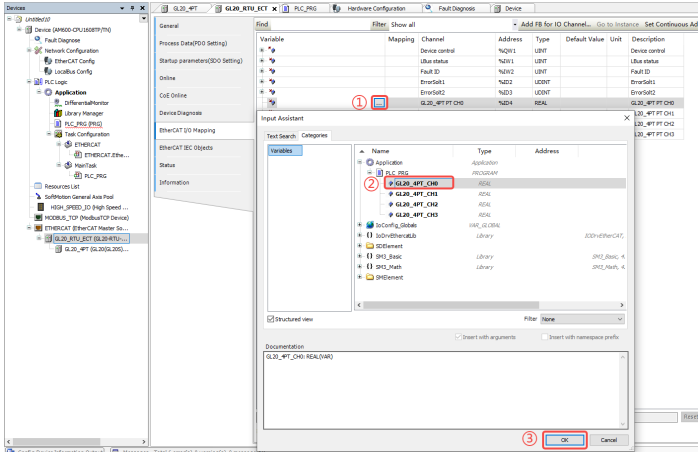
6. Map variables to the corresponding input channels.

a. Double-click **GL20_RTU_ECT** ① in the left **Devices** pane, and then click the **EtherCAT I/O Mapping** ② tab on the right.

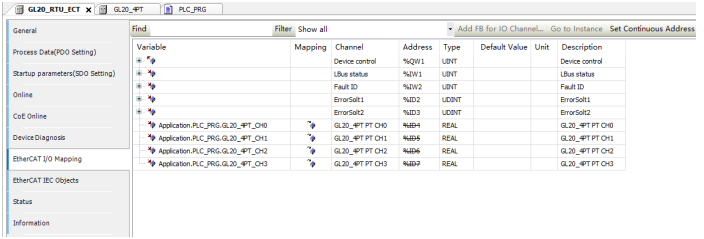


b. On the **EtherCAT I/O Mapping** tab, double-click the variable entry and click

① to open the **Input Assistant** dialog box. Select **Application**>**PLC_PRG**>specific variables ② and click **OK** ③.



In the **EtherCAT I/O Mapping** tab, map the input variables **GL20_4PT_CH0**, **GL20_4PT_CH1**, **GL20_4PT_CH2** and **GL20_4PT_CH3** to the input channels of the configured module, as shown in the figure below.



7. Double-click **PLC_PRG** in the left **Devices** pane and complete the programming on the **PLC_PRG** page.
8. Check, compile, log in, download, and run the program.

   a. Click  on the toolbar at the top of the interface to check whether the program is correct.

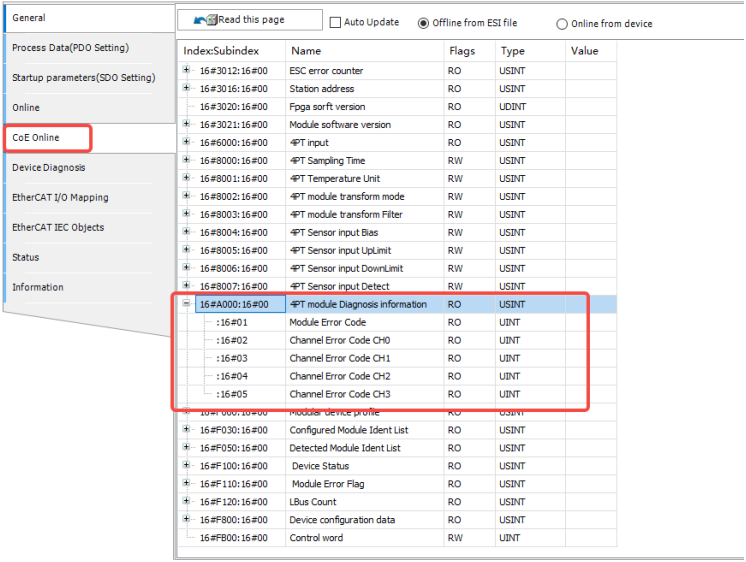
   b. After the program check is correct, click  on the toolbar at the top of the interface to compile all the code into PLC executable code.

   c. After the compilation is correct, click  on the toolbar at the top of the interface, and follow the interface prompts to log in to the PLC and download the program.

   d. After the program download is complete, click  on the toolbar at the top of the interface to execute the program.

5 Troubleshooting

When the ERR indicator is ON, it indicates that the module encounters a fault. The module reports a fault code, which can be obtained through the diagnostic data object dictionary value in the "CoE Online" interface, as shown below. For the module installed in slot n (n = 0 to 31), the object dictionary definition for index 0xA000 +0x40*n is shown in the table below.



For the module installed in slot n (n=0-31), the object dictionary definition for index 0xA000+0x40*n is shown in the table below.

Index	0xA000+0x40*n: 4PT Diag data				
Subindex	Name	Data Type	Access Mode	Mapping	Default Value
0	Subindex 000	USINT	RO	NO	5
1	Module Error Code	UINT	RO	NO	0x0000
2	Channel Error Code CH0	UINT	RO	NO	0x0000

Index	0xA000+0x40*n: 4PT Diag data				
Subindex	Name	Data Type	Access Mode	Mapping	Default Value
3	Channel Error Code CH1	UINT	RO	NO	0x0000
4	Channel Error Code CH2	UINT	RO	NO	0x0000
5	Channel Error Code CH3	UINT	RO	NO	0x0000

Note

The PT thermal resistor input supports module fault detection and channel fault detection.

The module exception diagnostic code is defined as follows:

Diagnostic Code	Fault Description	Solution
0x5003	Module 24 V power supply failure	Check the external power supply wiring and verify the power supply voltage.

The channel exception diagnostic codes are defined as follows:

Diagnostic Code	Fault Description	Solution
0x6001	Channel open-circuited	Check the wiring of the sensor.
0x6002	Channel short-circuited	/
0x6003	Channel data exceeds upper limit	Check whether the sensors, wiring, or configured limit ranges are appropriate.
0x6004	Channel data exceeds lower limit	Check whether the sensors, wiring, or configured limit ranges are appropriate.

Diagnostic Code	Fault Description	Solution
0X6005	Overflow	Check whether the selected sensor range is exceeded.
0X6006	Underflow	Check whether the selected sensor range is undershot.

6 Appendix: Version Matching Information

Contact Inovance technical support to obtain the firmware of GL20-4PT module and the firmware of communication interface module. XML files and the AutoShop/InoProShop software can be downloaded from the software and debugging tools tab on the GL20 series product page at *https://www.inovance.com*. The following table describes the version matching information.

GL20-4PT module firmware version	Communication interface module firmware version	XML/GSD file version	AutoShop/ InoProShop version
Board software version 2.0.5.0 and later	• GL20-RTU-ECT: Board software 2.4.3.0 and later • GL20-RTU-ECT32: Board software 2.5.9.0 and later • GL20-RTU-PN: Board software 2.1.1.0 and later	• GL20-RTU-ECT: 1.3.9.0 and later • GL20-RTU-ECT32: 3.0.2.0 and later • GL20-RTU-PN: 20230323 and later	• AutoShop (ECT): V4.8.2.4 and later • InoProShop (ECT): V1.7.3 and later • InoProShop (ECT32): V1.7.3 SP6 and later