a WOLONG company

WL200 Series IO Modules

User Manual

Wolong Electric Group Co.,Ltd

Foreword

Overview

Thank you for purchasing and using the WL200 series card-type IO module produced by Wolong Electric Group Co., Ltd.
WL200 series card type IO module can be used with WLC300 series PLC, WAC500,WAC600 series PAC. This manual introduces the basic parameters of the product, mechanical installation, electrical installation.

Who to read

Person with specialized knowledge of electrical engineering (qualified electrical engineer or person with equivalent knowledge).

Meet standards

Certified name	Command name		Standards-compliant
CE certification	EMC directive	2014/30/EU	24V DC products: EN 61131-2 220V AC 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	-		-
KCC certification	-		-
EAC certification	-		-

Version change log

Serial number	Summary of revisions	Release version	Revision date
1	Creation	V1.0	2024.06

About manual access

This manual is not shipped with the product. To obtain an electronic version of the PDF file, you can do so by the following means：

- Log in to our official website to get product information and technical support, the way to get is as follows: Log in to our official website (www.olimc.com)→Service and Support→Data Download→Search for keywords and download.
- Use your cell phone to scan the QR code on the product body to get the product companion manual.

Warranty statement

Under normal use, the product failure or damage, our company is responsible for 18 months warranty (from the date of shipment, to the bar code on the body shall prevail, there is a contract agreement in accordance with the agreement). If the warranty period exceeds 18 months, maintenance fee will be charged.

Within 18 months, repair costs will be charged for damage to the product caused by the following:

- Damage to the product caused by not operating the product as specified in the manual.
- Fire, flood, abnormal voltage, resulting in damage to the product.
- Product damage caused by using the product for non-normal functions.
- Damage to the product caused by exceeding the scope of use specified for the product.
- Force majeure (natural disasters, earthquakes, lightning strikes) factors caused by secondary damage to the product.

The relevant service fees are calculated according to the manufacturer's standardized criteria, and if there is a covenant, the principle of covenant priority will be dealt with.

See the product warranty card for detailed warranty instructions.

Catalogs

1. Safety precautions

1.1. Security statement

1. Before handling, installation, operation, or maintenance, read this manual thoroughly and follow all safety precautions marked on the product and in the manual. Neglect may result in personal injury or equipment damage, or even death.
2. The "Danger" and "Warning" items in this manual do not represent all the safety items to be observed, but are only supplementary to all the safety precautions.
3. This product should be used in an environment that complies with the design specifications, otherwise it may cause malfunction. Abnormal functioning or damage to parts, etc. caused by failure to comply with the relevant regulations are not covered by the product quality warranty.
4. We do not assume any legal responsibility for personal safety accidents, property damage, etc., caused by non-compliant operation of the product.

1.2. Definition of security levels

For personal safety and to avoid damage to property, it is must to pay attention to the safety signs and tips in this manual.

Safety marking	Name	Instructions
	Danger	Failure to comply with the relevant requirements may result in serious personal injury or even death.
	Warning	Failure to comply with the requirements may result in personal injury or equipment damage.

Personnel requirements

Qualified professionals: This means that the staff operating the equipment must have undergone and passed professional electrical training and safety knowledge training, and have been familiar with the installation, commissioning, commissioning, and maintenance of the equipment, as well as the steps and requirements, and be able to avoid all kinds of emergencies.

1.3. Security guidance

General principle	
	● Only trained and qualified personnel are allowed to perform the relevant operations. ● Do not perform wiring, inspection, or device replacement with the power turned on. Make sure that all input power is disconnected before wiring or checking. ● The product is designed to be used in indoor, overvoltage class II electrical environments. The power supply system should be equipped with lightning protection devices to ensure that lightning overvoltage is not applied to the product's power inputs or signal inputs and outputs to avoid damage to the equipment. ● Unauthorized modifications to the product are prohibited and may cause fire, electric shock or other injury.

	● It is prohibited to drop metal shavings, copper wires, screws, cables and other conductive objects inside the product. ● It is forbidden to touch the product with wet objects or body parts, otherwise there is a danger of electric shock.

Portage	
	● Choose appropriate handling tools and take mechanical protection measures, such as wearing anti-smash shoes and work clothes, to avoid personal injury. ● Ensure that the product is not subjected to physical shock and vibration.

During control system design	
	● Be sure to design safety circuits to ensure that the control system will still work safely when the external power supply drops out or the programmable controller malfunctions; ● If the rated load current is exceeded or the load is short-circuited, etc., resulting in prolonged overcurrent, the module may smoke or catch fire, and a safety device such as a fuse or fuse should be installed externally.
	● Be sure to provide an emergency brake circuit, a protection circuit, an interlock circuit for forward and reverse operation, and position upper and lower interlock switches to prevent damage to the machine in the external circuit of the programmable controller; ● For safe operation of the equipment, design external protection circuits and safety mechanisms for output signals related to major accidents; ● The programmable controller CPU may turn off all outputs after detecting an abnormality in its own system; when some of the controller's circuits fail, it may cause its outputs to be uncontrolled, and in order to ensure normal operation, it is necessary to design suitable external control circuits; ● Damage to output units such as relays and transistors of programmable controllers can prevent their outputs from being controlled to the ON or OFF state; ● Programmable controllers are designed to be used in indoor, over-voltage class III electrical environments, and their power supply system level should have lightning protection devices to ensure that lightning over-voltage is not applied to the power inputs or signal inputs, control outputs, and other ports of the programmable controllers to avoid damage to the equipment.

Installation	
	● It is prohibited to install the product on flammable materials and to avoid close contact or adhesion of the product to flammable materials. ● It is prohibited to run products with damaged or missing components. ● Do not use the programmable controller in the following places: places with dust, grease, conductive dust, corrosive gases, and flammable gases; places exposed to high temperatures, condensation, and wind and rain; places with vibrations and

	shocks; and places where electric shocks, fires, and mishandling can also lead to damage and deterioration of the product.
	● In order to prevent accidental touching by persons who do not have the relevant knowledge of electrical equipment, resulting in damage to the equipment or the risk of electric shock, the product must be installed in a lockable control cabinet with IP20 or higher protection. Only personnel with relevant electrical knowledge and equipment training should operate the control cabinet. ● When installing, you must ensure that each module is tightly connected and fixed to prevent problems such as communication failure or detachment during use due to poor connection. ● After installation, please check to make sure that there is no obstruction above the product vent, otherwise it may cause excessive heat inside the product and poor heat dissipation, resulting in chip burnout triggering system control failures, misoperation and so on.

Wiring	
	● Before wiring, it must be clear that each interface and power supply type, specification, etc., and in line with the relevant standards and requirements to ensure that the system is wired correctly. ● In order to ensure the safety of personnel and equipment use, adequate wire diameter and specifications of the cable should be used for reliable grounding. ● Control signals and communication signal cables should be wired separately from strong interference power lines and power lines. ● Secure cables with long distances or large mass.
	● When performing wiring work, all power supplies connected to this product must be disconnected. ● At the end of installation and wiring, before carrying out power operation, please check whether the module terminal cover is installed in place, to avoid touching the energized terminals which may cause personnel injury, equipment system failure or misoperation. ● When external power supply is input to the product, it is necessary to install protection devices or devices with appropriate specifications to prevent the product from being damaged due to external power supply failures or over-voltage and over-current phenomena.

Commissioning and operation	
	● Before powering up and running, please make sure to check whether the working environment of the product system meets the requirements, and confirm whether the corresponding protection circuit is designed to protect the product to work safely even when the external equipment fails. ● It is prohibited to damage the product's output units such as relays, transistors, etc., as this will make it impossible to control their outputs to the ON or OFF state.

	● For modules or terminals that require external power supply, safety devices such as fuses or circuit breakers should be installed externally to avoid damage to the product module due to external power supply or equipment failure. ● Be sure to install an emergency brake circuit, a protection circuit, an interlock circuit for forward and reverse operation, and position upper and lower interlock switches to prevent damage to the machine in the product's external circuit. ● To enable safe operation of the equipment, design external protection circuits and safety mechanisms for output signals related to major accidents. ● When the controller system malfunctions, it may result in uncontrolled output. To ensure that the equipment can operate normally, it is necessary to design a suitable external control circuit.

Warranty, maintenance and component replacement	
	● It is prohibited for products and components to come into contact with or be accompanied by flammable materials. ● All power connected to the product must be disconnected before product care, maintenance and component operation. ● Metal shavings, copper wires, screws, cables, and other conductive objects are prohibited from entering the interior of the product during servicing, maintenance, and component replacement. ● During care, maintenance and component replacement, the product and internal components must be protected against static electricity.
Note	● Tighten the screws with the appropriate torque.

When scrapped	
	● The components in the product contain heavy metals and the product must be disposed of as industrial waste at the end of its life.
	● This product should not be disposed of randomly, but should be collected and treated in a special way.

2. Product specification

2.1. Product information

Naming convention

WL200 - DQ 16 D

① ② ③ ④

Serial number	Name	Clarification
①	Product series	WL200: WL200 series card IO modules
②	Module type	DI: digital input module DQ: digital quantity output Module DIO: digital input/output module AI: analog input Module AQ: analog output Module TC: thermocouple temperature measurement module RTD: RTD temperature measurement module
③	IO points	16: 16 outputs
④	Special type of marking	S: source type D: drain type R: relay

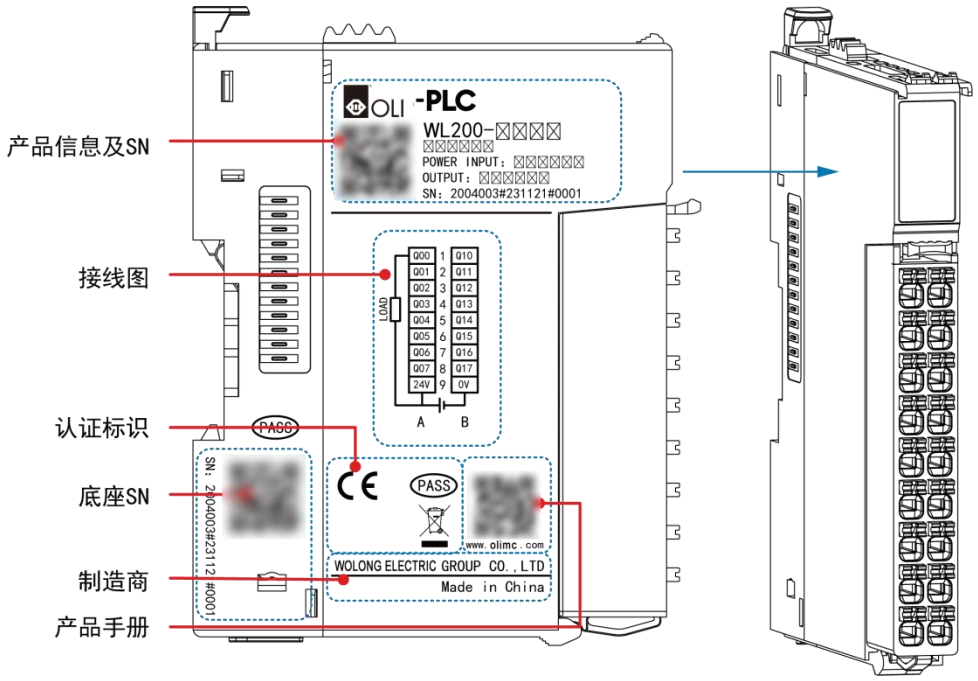
Note : Number ④ is ignored as null in IO modules without specific function identification.

Product list

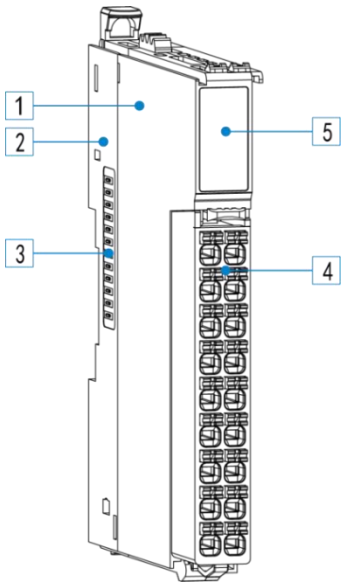
Model number	Machine code	Descriptive
WL200-DI16	20030102	16-channel digital input module
WL200-DQ16D	20030208	16-Channel Digital Output Module (Drain Type)
WL200-DQ16S	20030205	16-channel digital output module (source type)
WL200-AI4	20030416	4-channel analog input module
WL200-AQ4	20030518	4-channel analog output module
WL200-TC4	20030422	4-Channel thermocouple temperature measurement module
WL200-RTD4	20030420	4-Channel RTD Temperature Measurement Module

Note : The products marked with "*" are products that have been planned but not released, the parameters of this part of the product are for reference only, and the actual parameters of the released products shall prevail.

Nameplate logo



Component description



Number	Name	Functional description
①	IO module body	Each IO module host, technical parameters refer to the details of each module
②	IO module base	The IO module base and the IO module can be separated, connecting the IO module upwards and connecting the DIN rail downwards. For the installation of the module base, etc., please refer to the description in the section "4. Mechanical Installation".
③	IO module communication	Electrical connection between IO modules

	terminals	
④	IO module terminals	Refer to "4.4. Terminal definition and wiring" for the function definition of each IO module.
⑤	IO module indicators and model identification	Includes IO module communication indication, IO status indication and module type identification, the indication and identification of each module refer to the description of each module in the "Indicator lights and model number identification " section of this chapter.

Note : Detailed description of each IO module component, refer to each module description.

2.2. WL200-DI16 digital input module

2.2.1. Indicator lights and model number identification

Icon	Markings	Functional definition		
	R	Operation indicator light	Green	Slow flash (0.5Hz): program running
				Fast flash (20Hz): normal operation, normal communication with the CPU
	E	Error indicator	Red	Always on: communication abnormality of the latter module or abnormal power supply on the field side
				Flashing (10Hz): module shorted, disconnected, or overheated
				Out: module works normally
	00-07 10-17	IO channel indicator	Green	Bright: signal input available
				Out: no signal input
	WL200-DI16	Module name and type identification		

2.2.2. Technical specification

Basic specifications

Items	Specifications
IP rating	IP20
Dimensions (W x H x D)	12x105x85mm
Weights	73g

Power supply specifications

Items	Specifications
Bus input power supply	5V DC (4.75V DC~5.25V DC)

voltage rating	
Bus input power supply current rating	35mA (typical at 5V)
Terminal input power supply rated voltage	24V DC (20.4V DC to 28.8V DC)
Terminal input power supply rated current	10mA (typical at 24V)
Module hot swap function	Be in favor of
24V input anti-reverse	Be in favor of

Input specifications

Items	Specifications
Input type	Digital input
Input method	Source/drain
Input channel	16-way
Input voltage rating	24V DC (20.4V DC to 28.8V DC)
Input current	4mA (typical at 24V)
ON voltage	≥15V DC
OFF voltage	≤5V DC
Hardware response time ON/OFF	100us/100us
Input impedance	Reference value 6k~6.3k
Isolated or not	Yes
Input motion display	Input indicator lights when the input is driven (hardware control)
Input derating	75% derating at 55°C operation

Software specifications

Items	Specifications
Input channel logic level configuration	Unsupported
Independent channel enable configuration	Unsupported
Diagnostic reporting function configuration	Be in favor of
Downtime	Output is not refreshed, input is refreshed in safeop support
IO mapping	Supports per-bit access, per-byte access, per-word access, three IO mapping methods

2.3. WL200-DQ16D digital output module (drain type)

2.3.1. Indicator lights and model number identification

Icon	Markings	Functional definition

	R	Operation Indicator Light	Green	Slow flash (0.5Hz): program running
				Fast flash (20Hz): normal operation, normal communication with the CPU
	E	Error indicator	Red	Always on: communication abnormality of the latter module or abnormal power supply on the field side
				Flashing (10Hz): output short circuit, overcurrent, overheat, undervoltage
				Out: module works normally
	00-07 10-17	IO channel indicator	Green	Bright: signal output available
				Out: no signal output
	WL200-DQ16D	Module name type identification		

2.3.2. Technical specifications

Basic specifications

Items	Specifications
IP rating	IP20
Dimensions (W x H x D)	12x105x85mm
Weights	74g

Power supply specifications

Items	Specifications
Bus input power supply voltage rating	5V DC (4.75V DC to 5.25V DC)
Bus input power supply current rating	70mA (typical at 5V)
Terminal input power supply rated voltage	24V DC (20.4V DC to 28.8V DC)
Terminal input power supply rated current	10mA (typical at 24V)
Module hot swap function	Be in favor of
24V input anti-reverse	Be in favor of

Output specifications

Items	Specifications
Output type	Digital output, transistorized low side output
Output method	Leaky type
Output channel	16
Output voltage rating	24V DC±10% (21.6V DC to 26.4V DC)

Output load (resistive load)	0.5A/point, 4A/module
Output load (inductive load)	7.2W/point, 24W/module
Output load (lamp load)	5W/point, 18W/module
Hardware response time ON/OFF	100us/100us
Drain current when OFF	10μA
Switching frequency	Resistive load 100Hz, inductive load 0.5Hz, lamp load 10Hz
Isolated or not	Optical isolation for each channel, isolation voltage ≥ 3KVrms
Output motion display	Output indicator lights when the output is driven (software controlled)
Protective function	Short-circuit protection, overheating protection, overcurrent protection, undervoltage protection, 24V power reverse connection protection.
External power supply abnormality check	Be in favor of
Output abnormality detection indication	Be in favor of

Software specifications

Items	Specifications
Stop Output Mode	Three types of outputs: hold, clear, and preset
Output port abnormality detection and indication	Not have
Output channel logic level configuration	Unsupported
Independent channel enable configuration	Unsupported
Diagnostic reporting function configuration	Be in favor of
Downtime	Output is not refreshed, input is refreshed in safeop support
I/O refresh method	Free-running refresh (retains synchronized refresh)
IO mapping	Supports per-bit access, per-byte access, per-word access, three IO mapping methods

2.4. WL200-DQ16S digital output module (source type)

2.4.1. Indicator lights and model number identification

Icon	Markings	Functional definition		
	R	Operation Indicator Light	Green	Slow flash (0.5Hz): program running
				Fast flash (20Hz): normal operation, normal communication with the CPU
	E	Error indicator	Red	Always on: communication abnormality of the latter module or abnormal power supply on the field side
				Flashing (10Hz): output short-circuit, undervoltage, open-circuit, overheat
				Out: module works normally
	00-07 10-17	IO channel indicator	Green	Bright: signal output available
				Out: no signal output
	WL200-DQ16S	Module name type identification		

2.4.2. Technical specification

Basic specification

Items	Specifications
IP rating	IP20
Dimensions (W x H x D)	12x105x85mm
Weights	74g

Power supply specifications

Items	Specifications
Bus input power supply voltage rating	5V DC (4.75V DC to 5.25V DC)
Bus input power supply current rating	70mA (typical at 5V)
Terminal input power supply rated voltage	24V DC (20.4V DC to 28.8V DC)
Terminal input power supply rated current	10mA
Module hot swap function	Be in favor of
24V input anti-reverse	Be in favor of

Output specification

Items	Specifications
Output type	Digital output
Output method	Source type
Output channel	16
Output voltage rating	24V DC±10% (21.6V DC to 26.4V DC)
Output load (resistive load)	0.5A/point, 4A/module
Output load (inductive load)	7.2W/point, 12W/module
Output load (lamp load)	5W/point, 18W/module
Hardware response time ON/OFF	100us/100us
Drain current when OFF	10μA
Switching frequency	Resistive load 100Hz, inductive load 0.5Hz, lamp load 10Hz
Isolation method	Optical isolation for each channel, isolation voltage ≥ 3KVrms
Output motion display	Output indicator lights when the output is driven (software controlled)
Protective function	Short-circuit protection, overheating protection, overcurrent protection, undervoltage protection, 24V power reverse connection protection, ground failure protection
External power supply abnormality check	Be in favor of
Output abnormality detection indication	Be in favor of

Software specifications

Items	Specifications
Stop output mode	Three types of outputs: hold, clear, and preset
Output port abnormality detection and indication	Not have
Output channel logic level configuration	Unsupported
Independent channel enable configuration	Unsupported
Diagnostic reporting function configuration	Be in favor of
Downtime	Output is not refreshed, input is refreshed in safeop support
IO mapping	Supports per-bit access, per-byte access, per-word access, three IO mapping methods

2.5. WL200-AI4 analog input module

2.5.1. Indicator lights and model number identification

Icon	Markings	Functional definition		
	R	Operation indicator Light	Green	Slow flash (0.5Hz): program running
				Fast flash (20Hz): normal operation, normal communication with the CPU
	E	Error indicator	Red	Always on: communication abnormality of the latter module or power supply abnormality on the field side, or over-range
				Flashing (10Hz): module short-circuit, disconnection,
				Out: module works normally
	00-03	IO channel indicator	Green	Bright: signal input available
				Flashing (5Hz): channel over-range
				Out: no signal input
	WL200-AI4	Module name type identification		

2.5.2. Technical specification

Basic specifications

Items	Specifications
IP rating	IP20
Dimensions (W x H x D)	12x105x85mm
Weights	72g

Power supply specifications

Items	Specifications
Bus input power supply voltage rating	5V DC (4.75V DC to 5.25V DC)
Bus input power supply current rating	70mA (typical at 5V)
Terminal input power supply rated voltage	24V DC (20.4V DC to 28.8V DC)
Terminal input power supply rated current	10mA (typical at 24V)
Module hot swap function	Be in favor of
24V power supply anti-reverse	Be in favor of

Input specification

Items	Specifications
Input type	Analog input
Input method	Voltage/current
Input channel	4
Resolution	16-bit
Voltage input range	0~5V, 0~10V, ±10V, ±5V
Voltage input Impedance	110KΩ
Voltage input accuracy (25°C)	±0.1%
Voltage input limit	±11V
Current input range	0~20mA, 4~20mA, -20~20mA
Current input impedance	250Ω
Current input accuracy (25°C)	±0.1%
Current input limit	±24mA
Input Diagnostics	Field-side power supply detection, over-range detection
Isolated or not	Non-isolated between channels, system side and field side photoelectric isolation, isolation voltage ≥ 3KVrms
Input motion display	Input indicator lights up when there is signal input

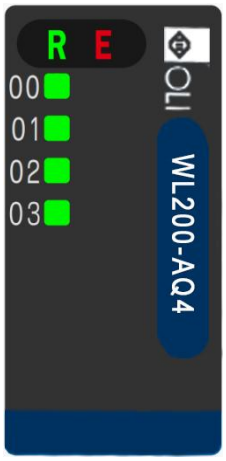
Software specifications

Items	Specifications
Software input filter time	Supported, software configurable 1~255ms (default 10ms)
Diagnostic reporting function configuration	Be in favor of
Overlimit detection	Be in favor of
Peak hold	Be in favor of
Converted digital range configuration	0-5V: 0~5000 0-10V: 0~10000 ±10V: -10000~10000 ±5V: -5000~5000 0-20mA: 0~20000 4-20mA: 4000~20000 -20~20mA: -20000~20000
Input channel logic Level Configuration	Unsupported
Independent channel enable configuration	Be in favor of
Shutdown mode	Output is not refreshed, input is refreshed in safeop support
IO mapping	Supports per-bit access, per-byte access, per-word access, three IO mapping

	methods

2.6. WL200-AQ4 analog output module

2.6.1. Indicator lights and model number identification

Icon	Markings	Functional definition		
	R	Operation indicator light	Green	Slow flash (0.5Hz): program running
				Fast flash (20Hz): normal operation, normal communication with the CPU
	E	Error indicator	Red	Always on: communication abnormality of the latter module or power supply abnormality on the field side, or over-range
				Flashing (10Hz): module shorted, disconnected, or overheated
				Out: module works normally
	00-03	IO channel indicator	Green	Bright: signal output available
				Flashing (5Hz): channel over-range
				Out: no signal output
	WL200-AQ4	Module name type identification		

2.6.2. Technical specification

Basic specification

Items	Specifications
IP rating	IP20
Dimensions (W x H x D)	12x105x85mm
Weights	74g

Power supply specifications

Items	Specifications
Bus input power supply voltage rating	5V DC (4.75VDC~5.25VDC)
Bus input power supply current rating	35mA (typical at 5V)
Terminal input power supply rated voltage	24VDC (20.4VDC to 28.8VDC)
Terminal input power supply rated current	120mA
Module hot swap function	B
24V input anti-reverse	Be in favor of

Output specification

Items	Specifications
Output type	Analog output
Output method	Voltage/current
Output channel	4-way
Resolution	16-bit
Voltage output range	0~5V, 0V~10V, ±10V, ±5V
Voltage output impedance	1kΩ
Voltage output accuracy (25°C)	±0.1%
Voltage output accuracy (full temperature range)	± 0.5%
Current output range	0~20mA, 4~20mA
Current output impedance	0Ω~1kΩ
Current output accuracy (25°C)	±0.1%
Current output accuracy (full temperature range)	± 0.5%
Output protection	Voltage short circuit protection, current open circuit protection, overheating protection
Isolated or not	Non-isolated between channels, system and field side optoelectronic isolation, isolation voltage ≥ 3KVrms
Output motion display	When there is a signal output, the output indicator lights up

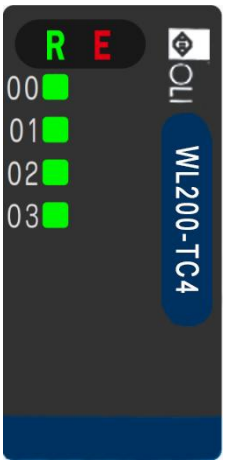
Software specifications

Items	Specifications
Conversion mode configuration	0~5V, 0~10V, ±10V, ±5V, 0~20mA, 4~20mA
Configuration of output states after shutdown	Reset: clear, hold: hold, preset value: preset value
Output preset value configuration after shutdown	Supported (valid if output state is configured as preset value)
Independent channel enable configuration	Be in favor of
Converted digital range configuration	0-5V: 0~5000 0-10V: 0~10000 ±10V: -10000~10000 ±5V: -5000~5000 0-20mA: 0~20000 4-20mA: 4000~20000
Diagnostic reporting	Be in favor of

function configuration	
Downtime	Output is not refreshed, input is refreshed in safeop support
IO mapping	Supports per-bit access, per-byte access, per-word access, three IO mapping methods

2.7. WL200-TC4 thermocouple temperature measurement module

2.7.1. Indicator lights and model number identification

Icon	Markings	Functional definition		
	R	Operation indicator light	Green	Slow flash (0.5Hz): program running
				Fast flash (20Hz): normal operation, normal communication with the CPU
	E	Error indicator	Red	Always on: communication abnormality of the latter module or power supply abnormality on the field side, or over-range
				Flashing (10Hz): module shorted, disconnected, or overheated
				Out: module works normally
	00-03	IO channel indicator	Green	Bright: signal input available
				Flashing (5Hz): channel over-range
				Out: no signal input
	WL200-TC4	Module name type identification		

2.7.2. Technical specification

Basic specifications

Items	Specifications
IP rating	IP20
Dimensions (W x H x D)	12x105x85mm
Weights	72g

Power supply specifications

Items	Specifications
Bus input power supply voltage rating	5V DC (4.75V DC~5.25V DC)
Bus input power supply current rating	35mA (typical at 5V)
Terminal input power supply rated voltage	24VDC (-15% to +20%)
Terminal input power supply rated current	100mA

Module hot swap function	Be in favor of
24V input anti-reverse	Be in favor of

Output specification

Items	Specifications
Output channel	4-way
Resolution	24-bit
Display sensitivity	0.1°C, 0.1°F
Input terminal	4 thermocouple inputs
Thermocouple type	K，J，E，B，N，R，S，T
Compensation method	Internal cold end compensation
Accuracy (25°C at room temperature)	Full scale*(±0.1%) + cold end compensation error
Accuracy (room temperature -20℃~55℃)	Full scale*(±0.3%) + cold end compensation error
Isolated or not	Isolated between I/O terminals and power supply, not between channels
Input motion display	Channel indicator lights up when there is signal input
Input derating	Not have
Overrun and disconnection detection	Supports overrun detection, disconnection detection

Software specifications

Items	Specifications
Filtering time	0~100s (default 5s)
Diagnostic reporting function	Be in favor of
Diagnostic test	Supports overrun and disconnection detection
Sensor type configuration	Supported thermocouple types: K, J, E, B, N, R, S, T, the default is type K thermocouple
Independent channel configuration	Be in favor of
Display mode	Degree celsius (°C)*10
Sensitivity	0.1°C, 0.1°F
Sample refresh	Asynchronous refresh according to sampling time, synchronous refresh according to bus cycle not required
Stop mode	Output according to the maximum value without refreshing
Disconnected or overrun	Output according to the maximum value without refreshing
Channel diagnostics	Over the upper limit alarm, over the lower limit alarm, disconnection alarm
Configuration diagnostics	Configuration error recognition, channel parameter configuration error

Accuracy range

Sensor type	Detection range	ADC sampling accuracy
K	-270.0℃ ～ +1370.0℃，	≥±1.5℃@-270℃≤T≤-200℃

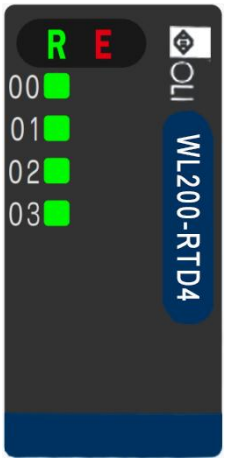
	-454.0℉～+2498.0℉	<±1.5℃@-200℃≤T≤-100℃ <±1℃@-100℃≤T≤500℃ <±0.2% display value @500℃≤T≤1300℃ ≥±2.6℃@1300℃≤T≤1370℃
J	-210.0℃～+1200.0℃， -346.0℉～+2192.0℉	≥±1℃@-210℃≤T≤-100℃ <±1℃@-100℃≤T≤500℃ <±0.2% display value @500℃≤T≤1200℃
E	-270.0℃～+1000.0℃， -454.0℉～+1832.0℉	≥±1℃@-270≤T≤-200 <±1℃@-200≤T≤400 <±1.5℃@400℃≤T≤1000℃
B	200.0℃～1800.0℃， 392.0℉～3272.0℉	≥±5°C@200°C ≤T≤400°C ＜±5℃@400℃ ≤T≤750℃ ＜±3℃@750℃ ≤T≤1200℃ <±3.5℃@1200℃≤T≤1800℃
N	-200.0℃～+1300.0℃， -328.0℉～+2372.0℉	<±2℃@-200℃≤T≤-150℃ <±1.5℃@-150℃≤T≤750℃ <±0.2% display value @750℃≤T≤1300℃
R	-50.0℃ ～ +1765.0℃ ， -58.0℉～+3209.0℉	≥±4℃@-50℃≤T≤0℃ <±4℃@0℃≤T≤250℃ <±2℃@250℃≤T≤500℃ <±3.5℃@500℃≤T≤1700℃ ≥±3.5℃@1700℃≤T≤1765℃
S	-50.0℃ ～ +1765.0℃ ， -58.0℉～+3209.0℉	≥±4℃@-50℃≤T≤0℃ <±4℃@0℃≤T≤250℃ <±2℃@250℃≤T≤500℃ <±3.5℃@500℃≤T≤1700℃ ≥±3.5℃@1700℃≤T≤1768℃
T	-270.0℃ ～ +400.0℃ ， -454.0℉～+752.0℉	≥±1℃@-270℃≤T≤-200℃ <±1℃@-200℃≤T≤400℃

Cold end compensation error

Direction of installation	Adjacent module type	Cold end compensation error (-20℃~0℃)	Cold end compensation error (0℃~55℃)
Horizontal upright mounting	Temperature modules	±3°C	±1.75°C
	Non-temperature Modules	±6.5°C	±4.5°C
Non-horizontal upright mounting	Temperature modules	±5.5°C	±4°C
	Non-temperature modules	±5.5°C	±4.5°C

2.8. WL200-RTD4 RTD temperature measurement module

2.8.1. Indicator lights and model number identification

Icon	Markings	Functional definition		
	R	Operation indicator light	Green	Slow flash (0.5Hz): program running
				Fast flash (20Hz): normal operation, normal communication with the CPU
	E	Error indicator	Red	Always on: communication abnormality of the latter module or power supply abnormality on the field side, or over-range.
				Flashing (10Hz): module shorted, disconnected, or overheated
				Out: module works normally
	00-03	Channel status indicator	Green	Always on: signal input available
				Flashing (5Hz): channel over-range
				Out: no signal input
	WL200-RTD4	Module name type identification		

2.8.2. Technical specification

Basic specification

Items	Specifications
IP rating	IP20
Dimensions (W x H x D)	12x105x85mm
Weights	73g

Power supply specifications

Items	Specifications
Bus input power supply voltage rating	5V DC (4.75V DC~5.25V DC)
Bus input power supply current rating	35mA (typical at 5V)
Terminal input power supply rated voltage	24VDC (20.4VDC to 28.8VDC)
Terminal input power supply rated current	100mA (typical at 24V)
Module hot swap function	Be in favor of
24V input anti-reverse	Be in favor of

Input specification

Items	Specifications
Output channel	4-way
Resolution	24-bit
Display sensitivity	0.1°C, 0.1°F
Input terminal	4 thermocouple inputs
Thermocouple type	Pt100, Pt1000
Wiring method	Two/three/four lines
Accuracy (25°C at room temperature)	Full scale*±0.1%
Accuracy (room temperature -20℃~55℃)	Full scale* (±0.3%)
Filtering time	1~100s (default 5s)
Isolation method	Isolation between I/O terminals and power supply, isolation between channels

Detection range and accuracy

Sensor type	Detection range	Accurate
Pt100	-200.0°C to +850.0°C, -328.0°F to +1562.0°F	±1°C@ T < 300°C ±2℃@300℃≤T≤700℃ ±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℃@300℃≤T≤700℃ ±2.5°C@ T > 700°C

Software specifications

Items	Specifications
Diagnostic reporting function configuration	Be in favor of
Standalone channel enable configuration	Be in favor of
Display mode	Celsius (°C), Fahrenheit (°F)
Sample refresh	Asynchronous refresh according to sampling time, synchronous refresh according to bus cycle not required
Stop mode	Continue refreshing according to the sampling time
Exceed a limit	Output according to maximum/minimum value
System diagnosis	System power supply abnormality
Channel diagnostics	Over the upper limit alarm, over the lower limit alarm, disconnection alarm
Configuration diagnostics	Configuration error recognition, channel parameter configuration error

2.9. Environmental norms

Items	Specifications
Operating environment	No corrosive, flammable gases, conductive dust (dirt) no

	emergency situation
Operating Temperature	Temperature: -20°C to +55°C
Working environment humidity	Humidity: 10%RH～90%RH, no condensation
Storage ambient temperature	-40℃~70℃ (relative humidity <90%, no condensation)
Height above sea level	Below 3000m
Contamination level	Below pollution level 2
Immunity	Power cord 2kV in accordance with IEC61000-4-4
Overvoltage category	Class I
EMC immunity class	Zone B according to IEC61131-2
Vibration	IEC 60068-2-6 5 Hz to 8.4 Hz, 3.5 mm, 8.4 Hz to 150 Hz, 1 g. X/Y/Z triaxial, 10 cycles/axis
Impact resistance	IEC 60068-2-27 150m/s2, 11ms, ±X/Y/Z six directions, 3 times/square To, a total of 18 times

3. Mechanical installation

3.1. Preparation for installation

3.1.1. Installation precautions

Before installation	
	● Check and make sure all products are disconnected before installation. ● Before installation, please check the overall size of the planned system to ensure that there is enough space to accommodate the module. This module should be installed in a control box with >50m of space around it to ensure that the hardware working system can dissipate heat well.

Installation	
	● When installing, use parts that meet the requirements, such as screws and spacers. ● When installing, please do not drop metal wires, debris, screws and other objects inside the product, which may cause a short circuit, or cause poor heat dissipation.

After installation	
	● After installation, confirm that the connected communication cables and terminals are securely connected. ● After installation, make sure that the rail on which the module is located is securely fastened. ● After installation, ensure that the space inside the chassis alignment strong and weak separation, neat planning, to avoid clutter, affecting heat dissipation. ● After installation, please remove the stickers attached to the module's heat dissipation holes to allow for smooth heat dissipation. ● After installation, check for air circulation around the module.

3.1.2. Installation environment and location

Before safety, check, evaluate and confirm that the installation environment meets the operating conditions of all components, including factors such as temperature, humidity, dust and corrosion protection.

Environmental requirements

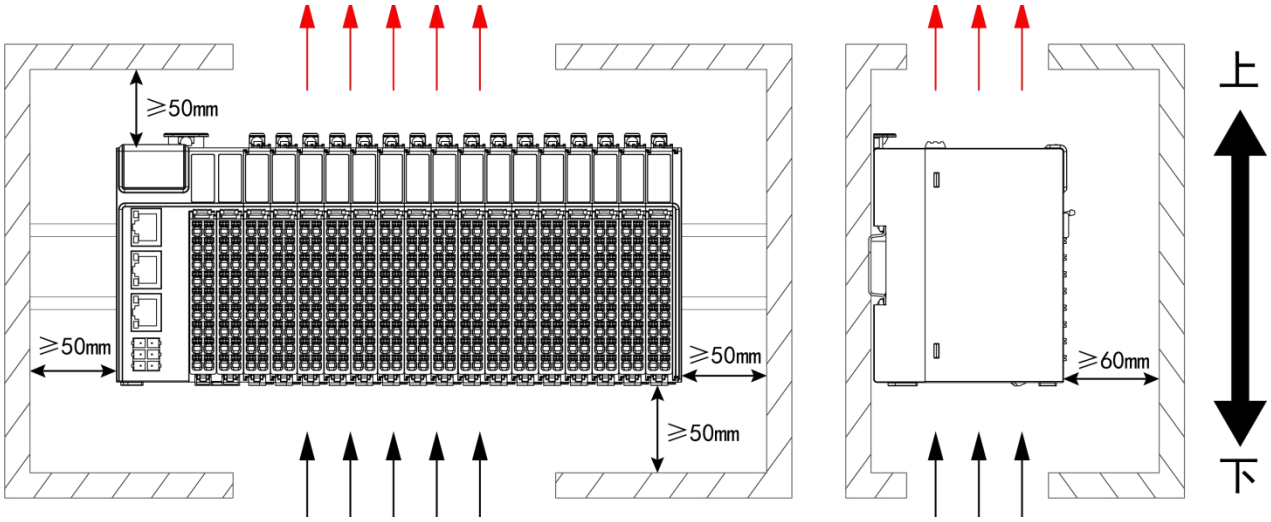
Matrix	Request
Temp	● -20°C~55°C ● No drastic changes in temperature ● Installation in a closed space such as a cabinet, using a fan for ventilation and heat dissipation if necessary
Humidity level	● Relative humidity of air 5%~95% without condensation

Location requirements

Establishments	Request
Indoor, overcharge pressure class II	● No strong electric field, strong magnetic field and direct sunlight ● No dust, iron powder and other conductive powders, oil mist, salt, organic solvents ● No corrosive, flammable gases ● No direct vibration or transmitted shock to the body.

3.1.3. Mounting space

The best installation position for this product is horizontal installation, the heat dissipation is designed to be through the natural wind convection mode, in order to ensure normal ventilation and heat dissipation and to reserve enough space for wiring, the product should be reserved around the sufficient clearance.

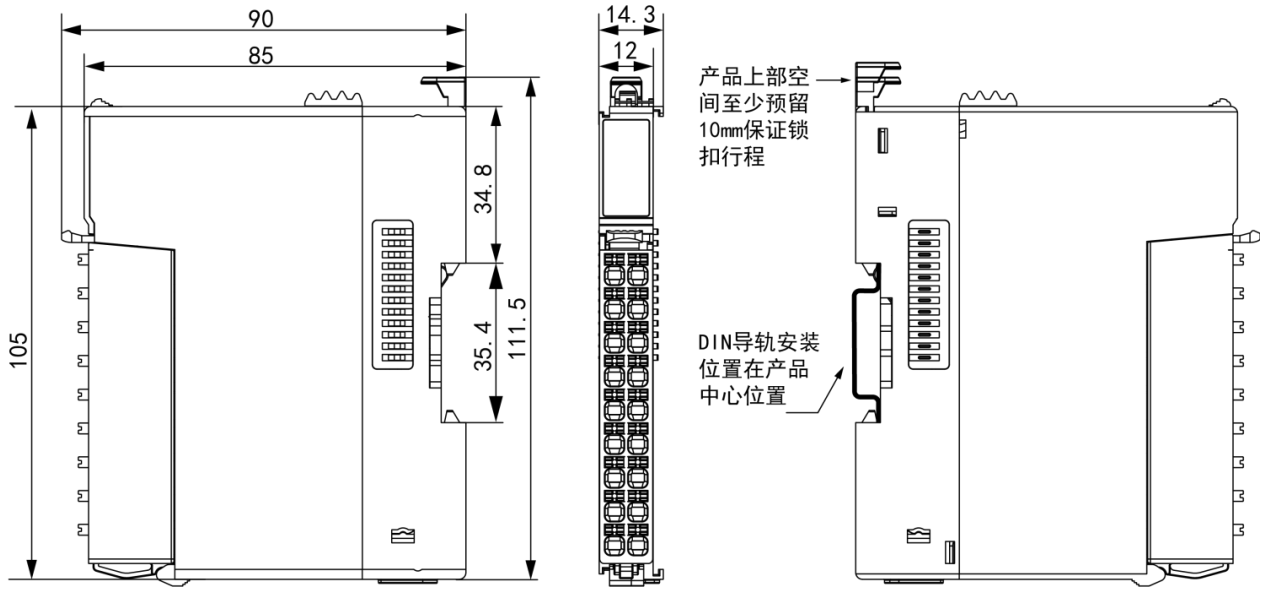


Instruction : If high-temperature heat source equipment (heaters, transformers, large resistors, etc.) exists around this product, keep at least 100mm of clearance between it and the high-temperature heat source equipment.

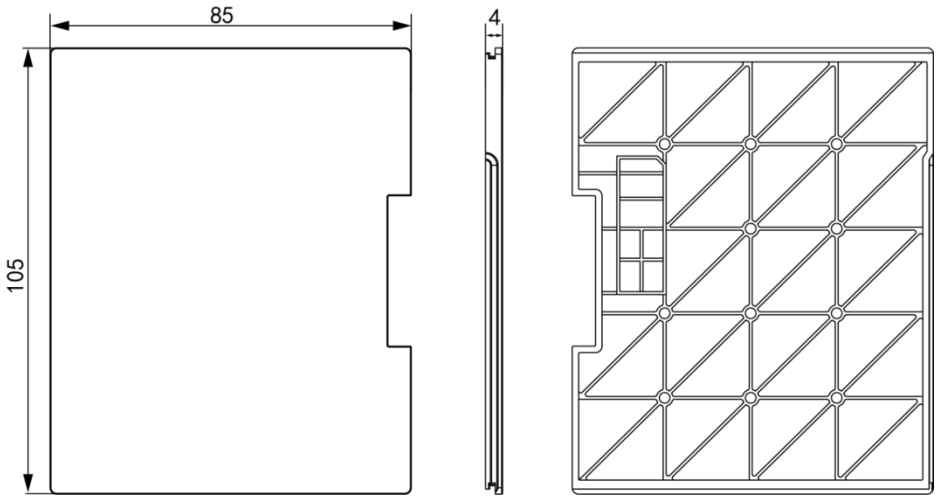
Note : When installing this product using the vertical optimal mounting method other than the one shown above, use a cable duct or other means to hold the cable when wiring so that the weight of the cable is not exerted on the rail clamps, the IO module and chassis, and the IO module terminals, resulting in malfunction due to the weight of the cable that causes the product to fall off the DIN rail or the terminals to fall off.

3.1.4. Product size

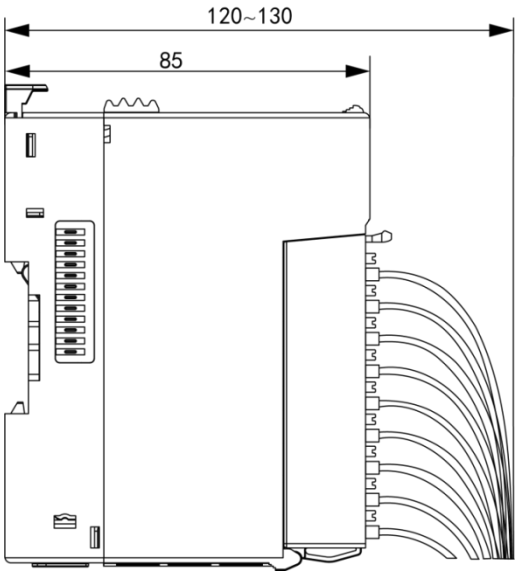
IO module (Unit: mm)



End cap dimensions (Unit: mm)

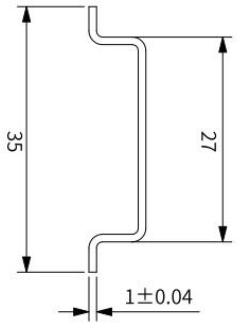


Dimensions of the product after connecting the cable (Unit: mm)



3.2. Installation and disassembly

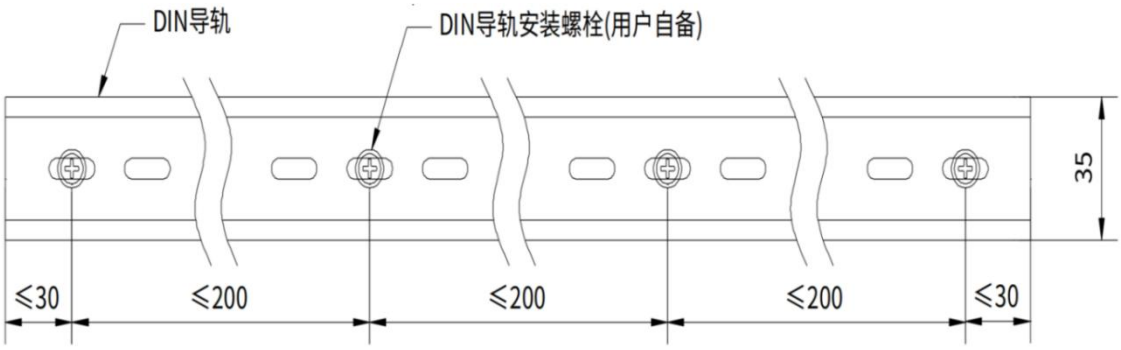
3.2.1. Mounting



Modules are DIN-rail mounted, DIN-rail compliant to IEC60715. (35mm wide, 1mm thick), dimensional information is shown on the right,unit is mm.

Note : The modules are mounted to DIN rails other than those recommended above (in particular DIN

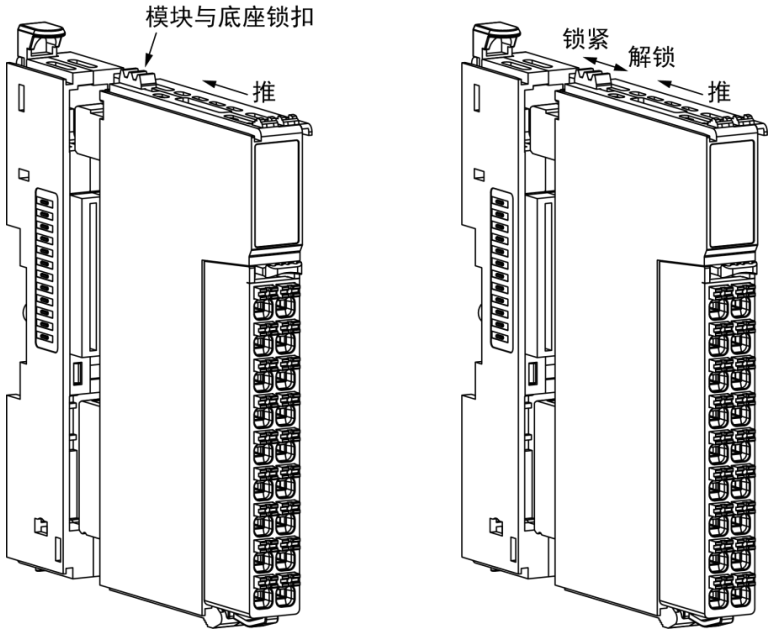
When the thickness of the guide rail is not 1.0mm), it will lead to the failure of the DIN rail latch, and the production cannot be installed in place, which in turn causes the product to not work properly.



Note : In order to ensure the strength of the DIN rail, it is necessary to install the DIN rail mounting bolts (supplied by the user) within 30mm from the end of the DIN rail, and the interval between two adjacent bolts must be within 200mm.

Module mounting to module base

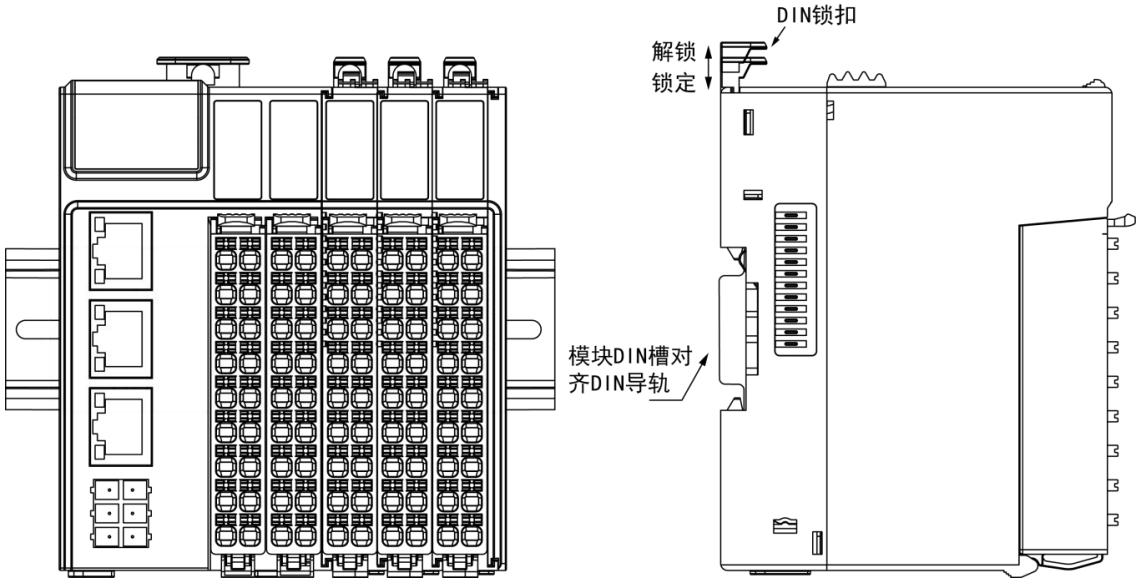
Step 1 Align the IO module with the base and push down until the IO module sinks into the module base. Push the module and the module base latch toward the inside base of the module (locking direction) until the module and the base latch cannot slide.



Note : The module and base latches should not be left unlocked for a long period of time or the latches will fail.

Module mounting to DIN rail

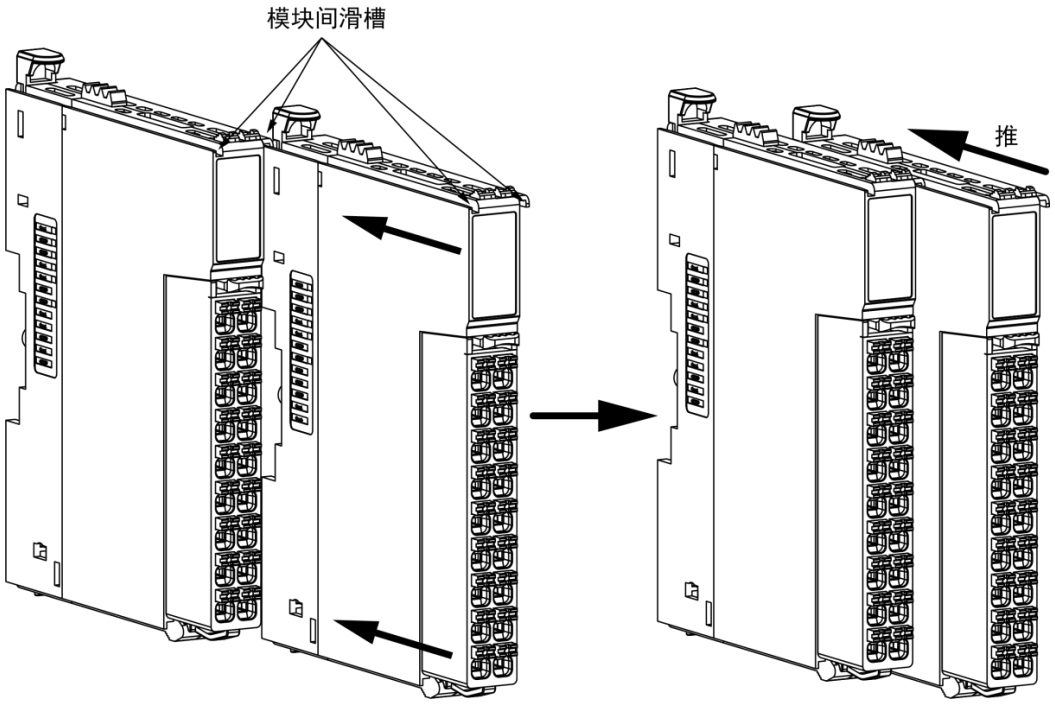
Step 1 Align the IO module DIN slot with the DIN rail, press down on the module until the module DIN slot snaps into the DIN rail, and press down on the DIN latch (in the locking direction) to put the module DIN latch in the locked state.



Note : The DIN latch must not be left unlocked for a long period of time or it will cause the latch to fail.

Inter-module installation

Align the inter-module slots on both modules and push down on the module to be installed until all module IO terminals are on a level surface.



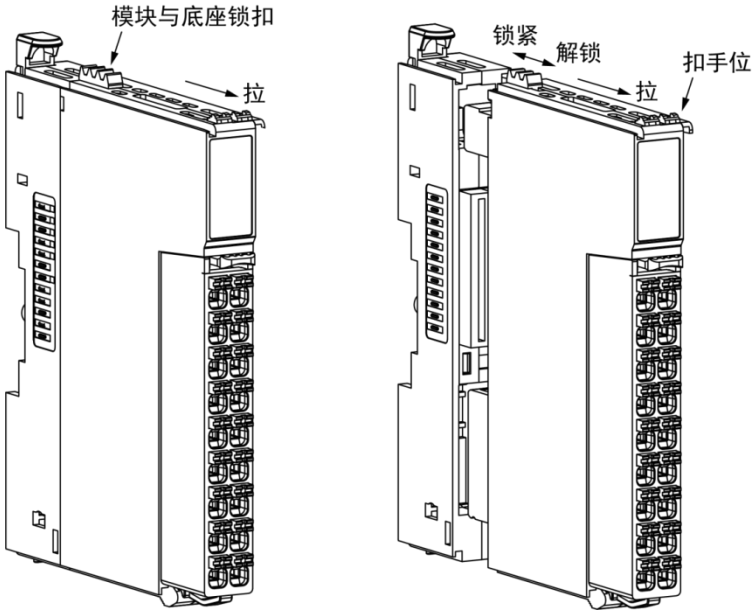
Note:

- When the module is not mounted on the rail, please keep the rail latch in the locked state, if it is unlocked for a long time it will cause the latch to fail.
- Before installing the module, if the module exists right end cover plate, you need to remove the right end cover plate before installing, the right end cover plate is installed on the rightmost module, without installing the right end cover plate module may not work properly.
- After the module is installed, you need to make sure that the module and the base latch, and the base and DIN rail latch are in a locked state, otherwise the module may fall off.
- After the module is installed, it is necessary to install the rail fixing fittings at both ends, and the rail fixing fittings need to be purchased by the user.

3.2.2. Dismantle

Module removal from base

Step 1 Trigger the blue latch between the module and the base (module and base latch) on the IO module towards the direction of the module LEDs (unlocked) so that the latch is placed in the unlocked state, and pull the module outward by pulling on the grommet position position by hand.

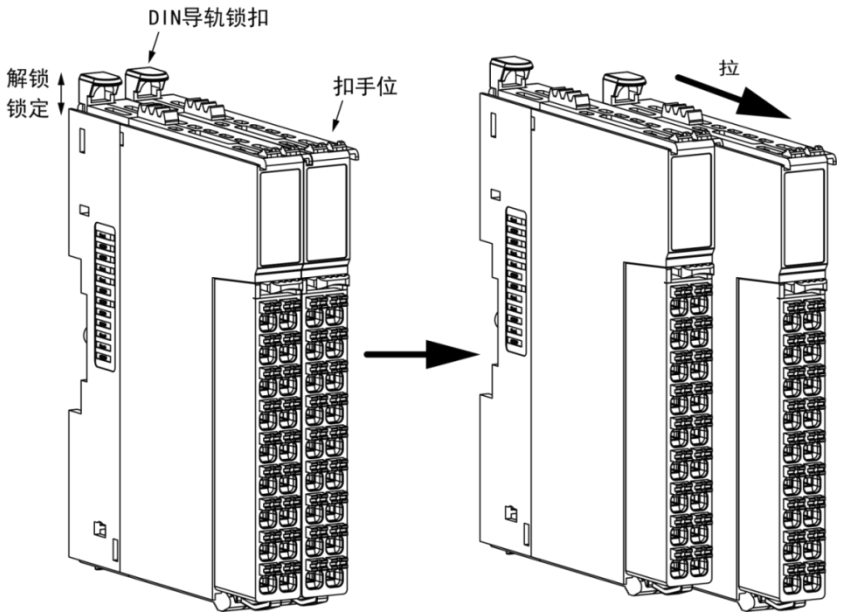


Note:

- If the IO module terminals are already wired, it is necessary to remove the IO module terminals before disassembling the module;
- The latch between the module and the base needs to be in a locked state (away from the direction of the IO indicator) after the module is removed from the base, and prolonged periods of time in an unlocked state can easily cause the latch to fail;

Module removal from DIN rail

Step 1 Toggle the DIN rail latch of the IO module to be disassembled upward by hand or with the help of a tool such as a screwdriver to make the DIN rail latch in an unlocked state, hold the gripper bit of the module to be disassembled by hand, and pull the module outward to separate the module from the DIN rail.



Note:

- If the IO module terminals are already wired, it is necessary to remove the IO module terminals before disassembling the module;
- Before the module is removed from the DIN rail, it is necessary to ensure that the DIN rail latch is in the unlocked state and the module and base latch is in the locked state, otherwise it is easy to separate the module from the base;
- After the module is removed from the DIN rail, the DIN rail latch needs to be pressed down and locked, and prolonged unlocking of the DIN rail latch may lead to latch failure;
- It is necessary to ensure that the module and the base latch are in a locked state before the module is separated from the DIN rail, otherwise the module will be separated from the base;

4. Electrical installation

4.1. Wiring requirements

- When wiring, you must ensure that all external power is turned off.
- After completing the wiring, when starting the power supply or operating the module, verify that the module top terminal cover is properly installed. Failure to do so may result in electric shock or incorrect operation.
- When wiring, check the voltage ratings and terminal configurations defined in the product specifications to ensure proper safety wiring. Connecting power that does not match the rating or incorrect product safety wiring may cause a fire or damage the product.
- Ensure that there are no foreign objects such as metal shavings or wiring remnants in each module. These foreign objects can cause fire, damage, or operational errors.

4.2. Grounding requirements

Power cable grounding

- Proper independent grounding must be used.
- Please use a wire cross-sectional area ≥ 2mm2, length ≤ 30cm grounding wire, and ground the ground terminal of the power module.
- If the grounding point is close to the product, you must ensure that the grounding cable is secure.

Shielded cable grounding

- For cables transmitting sensitive signals such as analog I/O, RS485, EtherCAT, etc., shielded cables must be used, with the grounding point as close to the module as possible.
- The exposed shielded part of the shielded cable after stripping is grounded to as large an area of the conductive backing plate as possible to ensure good contact.

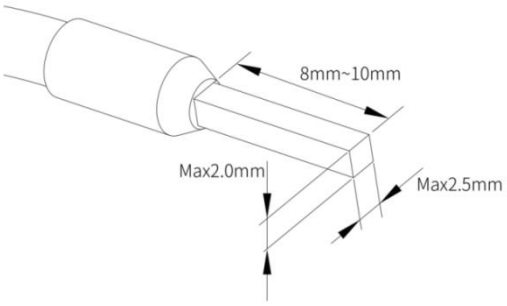
Cabling requirements

- Cable wiring, avoid and power lines (high voltage, high current) and other transmission of strong interference signal lines and cables bundled together, which may increase the noise, surge and the impact of induction, affecting the reliability of the measurement, should be separated from the alignment and avoid parallel alignment.
- It is recommended to use shielded cables to improve anti-interference capability.
- Make a single point ground for the shielded wire cable.

4.3. Cable selection

Matching material name	Wire diameter		Wire lug model	Crimping tool
	National standard/mm²	American standard/AWG		
Tube lugs	0.3	22	E0308	Please select the appropriate crimping pliers for crimping the wire
	0.5	20	E0508	
	0.75	18	E7508	
	1.0	18	E1008	
	1.5	16	E1508	

The wire lug diameters in the above table are for reference only, and can be reasonably calculated and otherwise adjusted according to actual use. If other tubular lugs are used, please crimp them to the stranded wires, the shape and size requirements are shown in the figure on the right.



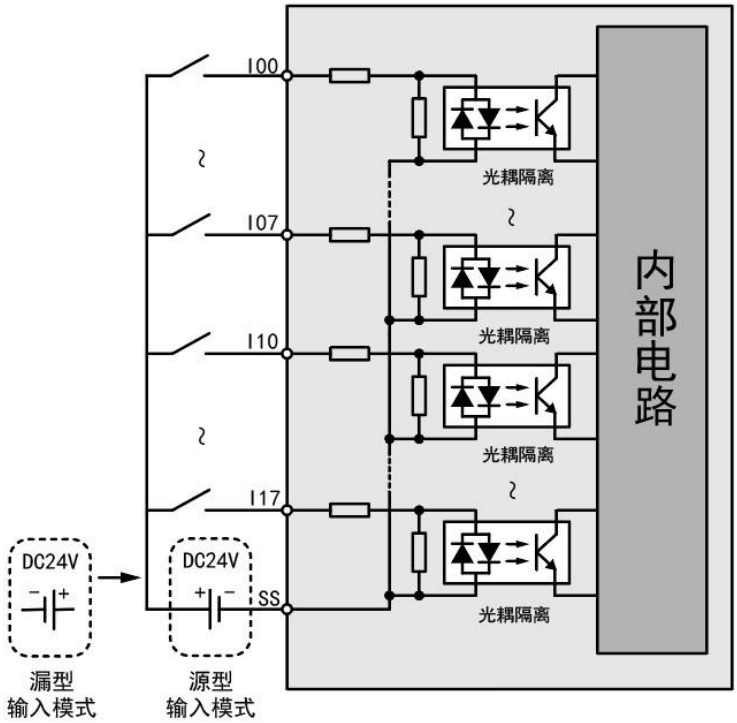
4.4. Terminal definition and wiring

4.4.1. WL200-DI16

Terminal definition

Icon	Left signal	Left terminal	Right terminal	Right signal
	I00	A0	B0	I10
	I01	A1	B1	I11
	I02	A2	B2	I12
	I03	A3	B3	I13
	I04	A4	B4	I14
	I05	A5	B5	I15
	I06	A6	B6	I16
	I07	A7	B7	I17
	SS	A8	B8	SS

External wiring



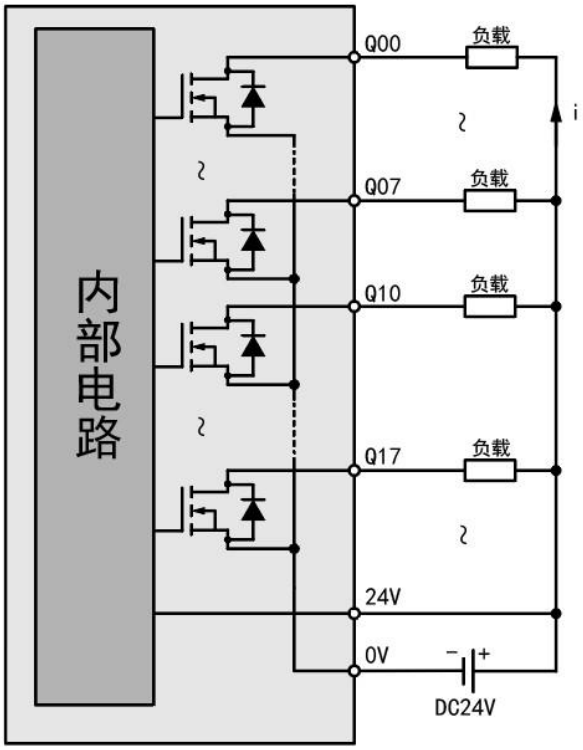
Note : The WL200-DI16 supports both source and drain inputs, and a single module supports only one mode.

4.4.2. WL200-DQ16D

Terminal definition

Icon	Left signal	Left terminal	Right terminal	Right signal
	Q00	A0	B0	Q10
	Q01	A1	B1	Q11
	Q02	A2	B2	Q12
	Q03	A3	B3	Q13
	Q04	A4	B4	Q14
	Q05	A5	B5	Q15
	Q06	A6	B6	Q16
	Q07	A7	B7	Q17
	24V	A8	B8	0V

External wiring



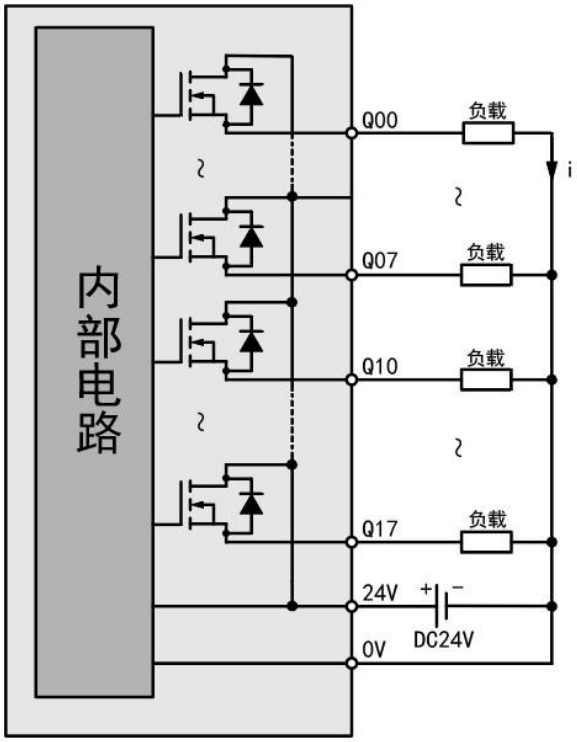
Note : The WL200-DQ16D requires an external 24V power supply to power the internal switching tubes, otherwise the module will not work properly.

4.4.3. WL200-DQ16S

Terminal definition

Icon	Left signal	Left terminal	Right terminal	Right signal
	Q00	A0	B0	Q10
	Q01	A1	B1	Q11
	Q02	A2	B2	Q12
	Q03	A3	B3	Q13
	Q04	A4	B4	Q14
	Q05	A5	B5	Q15
	Q06	A6	B6	Q16
	Q07	A7	B7	Q17
	24V	A8	B8	0V

External wiring



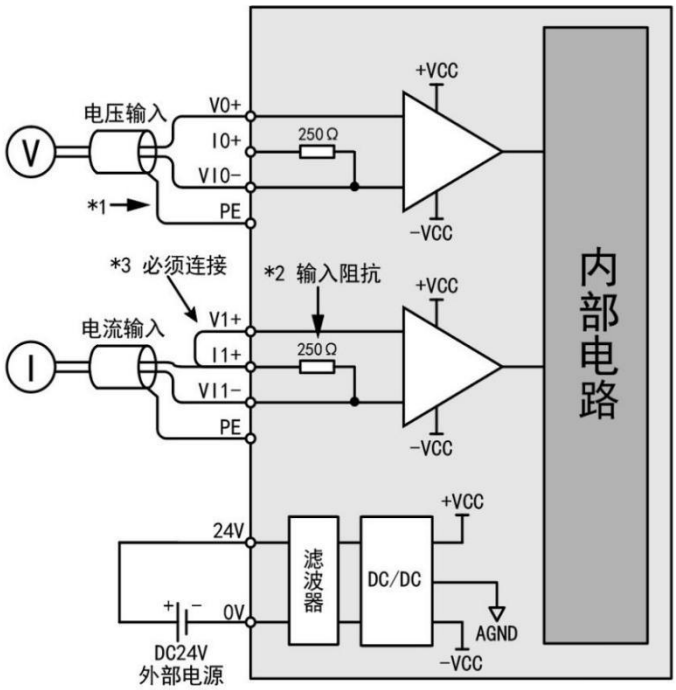
Note : The WL200-DQ16S output current is supplied from the external power supply terminals, and sufficient current needs to be supplied to ensure that the module output reaches the nominal output current capability.

4.4.4. WL200-AI4

Terminal definition

Icon	Left signal	Left terminal	Right terminal	Right signal
	V0+	A0	B0	VI0-
	I0+	A1	B1	PE
	V1+	A2	B2	VI1-
	I1+	A3	B3	PE
	V2+	A4	B4	VI2-
	I2+	A5	B5	PE
	V3+	A6	B6	VI3-
	I3+	A7	B7	PE
	24V	A8	B8	0V

External wiring



Note:

- *1 Use two-core twisted shielded wire for the analog signal line and ground the shield effectively, otherwise it may cause inaccurate acquisition;
- *2 The default input impedance of AI4 is 250Ω, please make sure that the output device has enough driving capability;
- *3 If current is input, the (V+) and (I+) terminals must be connected.

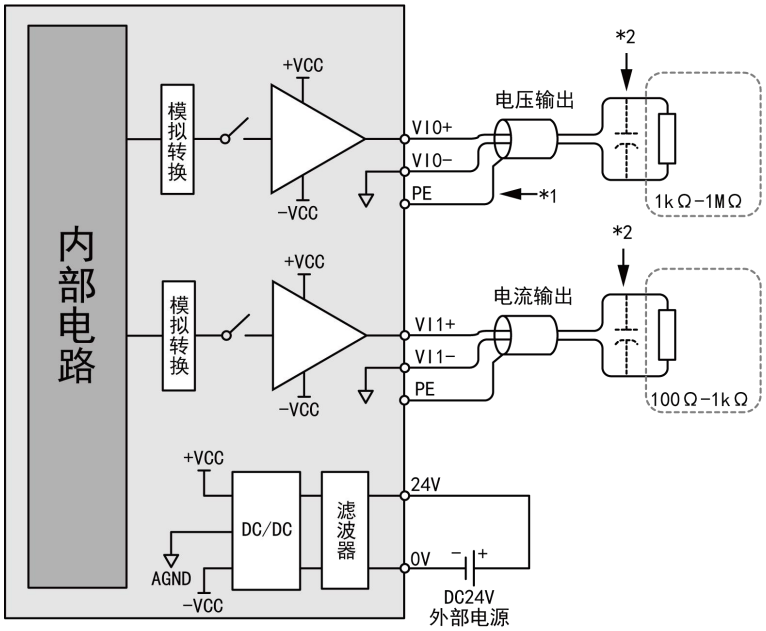
4.4.5. WL200-AQ4

Terminal definition

Icon	Left signal	Left terminal	Right terminal	Right signal
	VI0+	A0	B0	VI0-
	VI0+	A1	B1	PE
	VI1+	A2	B2	VI1-
	VI1+	A3	B3	PE
	VI2+	A4	B4	VI2-
	VI2+	A5	B5	PE
	VI3+	A6	B6	VI3-

	VI3+	A7	B7	PE
	24V	A8	B8	0V

External wiring



Note:

- *1 Use two-core twisted shielded wires for the power supply line and analog signal line, and ground the shield effectively.
- *2 If there is noise or ripple in the external wiring, connect a 0.1 to 0.47 mF 25V capacitor in parallel with the output.

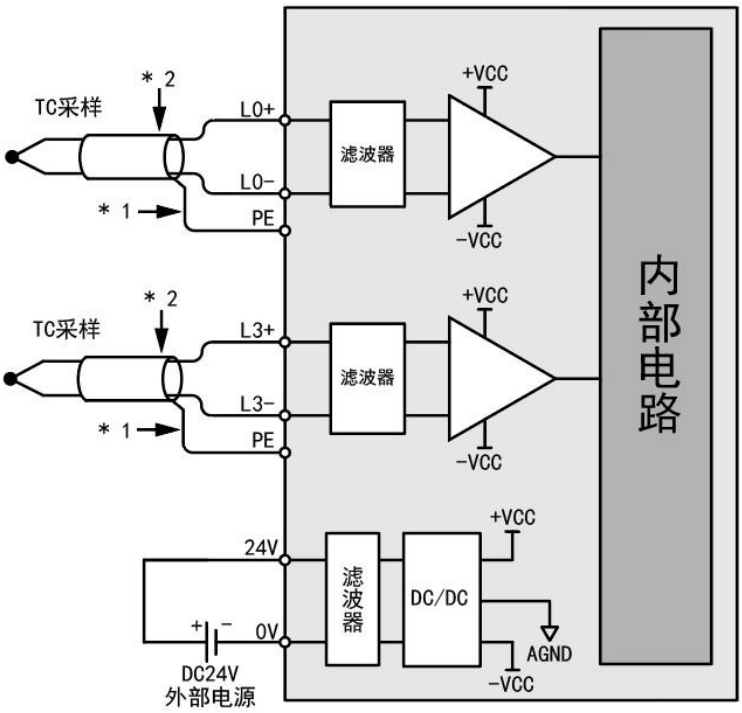
4.4.6. WL200-TC4

Terminal definition

Icon	Left signal	Left terminal	Right terminal	Right signal
	L0+	A0	B0	L0-
	L1+	A1	B1	L1-
	L2+	A2	B2	L2-
	L3+	A3	B3	L3-
	NC	A4	B4	NC
	NC	A5	B5	NC

	NC	A6	B6	NC
	PE	A7	B7	PE
	24V	A8	B8	0V

External wiring



Note:

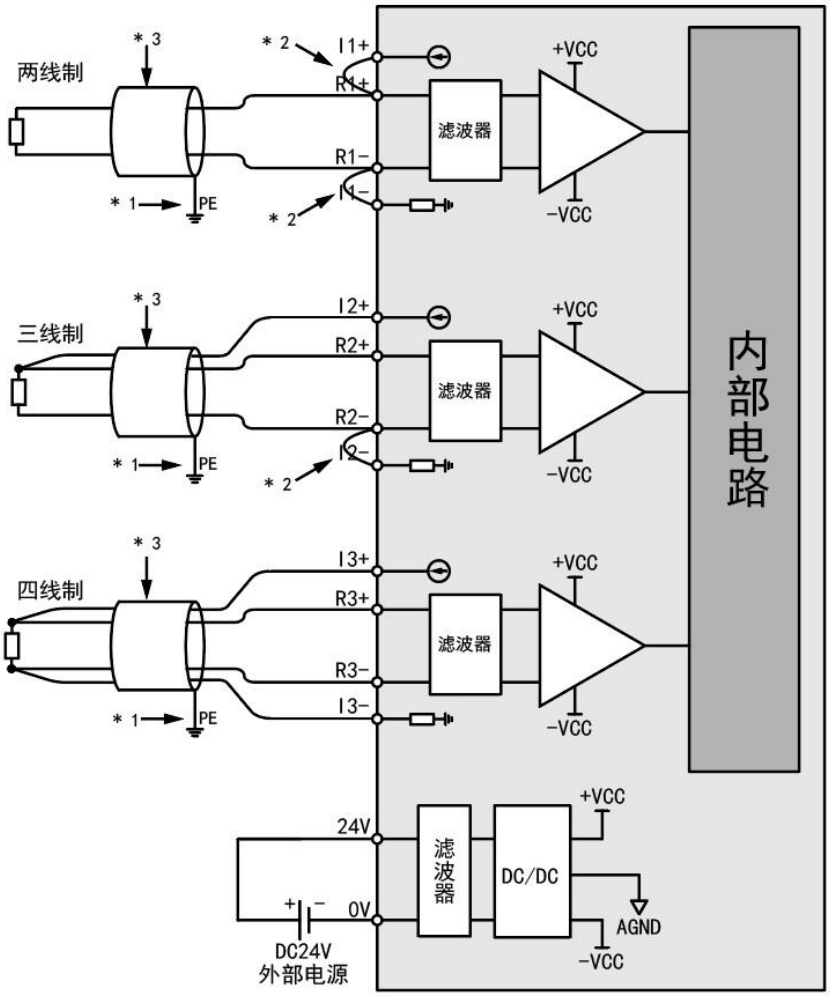
- *1 Cables are required to use compensating conductors with a shield, and the shield is recommended to be connected to PE;
- *2 Compensating leads are required when thermocouples need to be extended, and failure to use compensating leads may result in abnormal temperature measurements.

4.4.7. WL200-RTD4

Terminal definition

Icon	Left signal	Left terminal	Right terminal	Right signal
	I0+	A0	B0	I0-
	R0+	A1	B1	R0-
	I1+	A2	B2	I1-
	R1+	A3	B3	R1-
	I2+	A4	B4	I2-
	R2+	A5	B5	R2-
	I3+	A6	B6	I3-
	R3+	A7	B7	R3-
	24V	A8	B8	0V

External wiring



Note:

- *1 Cables are required to be shielded and the shield is recommended to be connected to PE;
- *2 If the two-wire connection method is used, it is necessary to short Ix+ to Rx+ and Ix- to Rx-, in which case the resistance on the cable will affect the measured value; if the three-wire connection method is used, it is necessary to short Ix- to Rx-;
- *3 It is necessary to use cables with low wire resistance and no resistance difference between wires

5. Fault codes

5.1. WL200-DI16 Digital Input Module

Fault Code (Decimal)	Fault Type	Solution
0	Normal	Module operates normally, no faults
1	Configuration mismatch	Check whether the hardware configuration matches the software configuration.
2	Abnormal power supply on the field side	Check whether the power supply on the field side of the module is normal
3	Overcurrent	Check if there is a high current load connected
4	Tailboard error	Check whether the connection of the tailboard is normal

5.2. WL200-DQ16X Digital Output Module

Fault Code (Decimal)	Fault Type	Solution
0	Normal	Module operates normally, no faults
1	Configuration mismatch	Check whether the hardware configuration matches the software configuration.
2	Abnormal power supply on the field side	Check whether the power supply on the field side of the module is normal
3	Overcurrent	Check if there is a high current load connected
4	Tailboard error	Check whether the connection of the tailboard is normal
85	Group 0 IO output abnormal	Check if there is short circuit, over temperature, over current, under voltage in module 00, 01, 10, 11 channels
86	Group 1 IO output abnormality	Check for short-circuit, over-temperature, over-current, and under-voltage on module 02, 03, 12, and 13 channels.
87	Group 2 IO output abnormality	Check whether there is short circuit, over temperature, over current, under voltage in module 04, 05, 14, 15 channel
88	Group 3 IO output abnormality	Check module 06, 07, 16, 17 channels for short circuit, over temperature, over current, under voltage

5.3. WL200-AI4 analog input module

Fault Code (decimal)	Fault type	Solution
0	Normal	Module operates normally, no faults
1	Configuration mismatch	Check whether the hardware configuration matches the software configuration.
2	Abnormal power supply on the field side	Check whether the power supply on the field side of the module is normal
3	Overcurrent	Check if there is a high current load connected
4	Tailboard error	Check whether the connection of the tailboard is normal
25	Channel 0 disconnection	Check if channel 0 is disconnected
26	Channel 1 disconnected	Check channel 1 for breaks
27	Channel 2 disconnected	Check channel 2 for breaks
28	Channel 3 disconnected	Check channel 3 for disconnection
29	Channel 0 exceeds upper limit	Check that channel 0 exceeds the upper limit and make sure that the upper range limit is not exceeded.
30	Channel 1 exceeds upper limit	Check if channel 1 exceeds the upper limit, make sure the upper range limit is not exceeded.
31	Channel 2 upper limit exceeded	Check if channel 2 exceeds the upper limit, make sure that the upper range limit is not exceeded.
32	Channel 3 upper limit exceeded	Check if channel 3 exceeds the upper limit, make sure the upper range limit is not exceeded.
33	Channel 0 exceeds lower limit	Check if channel 0 exceeds the lower limit, make sure the lower range limit is not exceeded.
34	Channel 1 exceeds lower limit	Check if channel 1 exceeds the lower limit, make sure the lower range limit is not exceeded.
35	Channel 2 exceeds lower limit	Check if channel 2 exceeds the lower limit, make sure the lower range limit is not exceeded.
36	Channel 3 lower limit exceeded	Check if channel 3 exceeds the lower limit, make sure the lower range limit is not exceeded.

5.4. WL200-AQ4 Analog Output Module

Fault Code (decimal)	Fault Type	Solution
0	Normal	Module operates normally, no faults
1	Configuration mismatch	Check whether the hardware configuration matches the software configuration.
2	Abnormal power supply on the field side	Check whether the power supply on the field side of the module is normal
3	Overcurrent	Check whether there is a high current load connected
4	Tailboard error	Check whether the connection of the tailboard is normal
21	Channel 0 short circuit	Check channel 0 wiring for short circuit.
22	Channel 1 short circuit	Check channel 1 wiring for shorts.
23	Channel 2 short circuit	Check channel 2 wiring for shorts.
24	Channel 3 short circuit	Check channel 3 wiring for shorts.
25	Channel 0 disconnected	Check channel 0 for breaks
26	Channel 1 disconnected	Check channel 1 for breaks
27	Channel 2 disconnected	Check channel 2 for breaks
28	Channel 3 disconnected	Check channel 3 for breaks
29	Channel 0 exceeds upper limit	Check if channel 0 exceeds the upper limit, make sure that the upper range limit is not exceeded.
30	Channel 1 exceeds upper limit	Check if channel 1 exceeds the upper limit, make sure the upper range limit is not exceeded.
31	Channel 2 upper limit exceeded	Check that channel 2 exceeds the upper limit and make sure that the upper range limit is not exceeded.
32	Channel 3 exceeds upper limit	Check that channel 3 has exceeded the upper limit and make sure that the upper range limit has not been exceeded.
33	Channel 0 exceeds lower limit	Check if channel 0 exceeds the lower limit, make sure the lower range limit is not exceeded.
34	Channel 1 exceeds	Check if channel 1 exceeds the lower limit, make sure the lower

Fault Code (decimal)	Fault Type	Solution
	lower limit	range limit is not exceeded.
35	Channel 2 exceeds lower limit	Check if channel 2 exceeds the lower limit, make sure the lower range limit is not exceeded.
36	Channel 3 lower limit exceeded	Check if channel 3 exceeds the lower limit, make sure the lower range limit is not exceeded.

5.5. WL200-TC4/WL200-RTD4 Temperature Measurement Module

Fault Code (decimal)	Fault Type	Solution
0	Normal	Module operates normally, no faults
1	Configuration mismatch	Check whether the hardware configuration matches the software configuration.
2	Abnormal power supply on the field side	Check whether the power supply on the field side of the module is normal
3	Overcurrent	Check if there is a high current load connected
4	Tailboard error	Check whether the connection of the tailboard is normal
25	Channel 0 disconnection	Check if channel 0 is disconnected
26	Channel 1 disconnected	Check channel 1 for breaks
27	Channel 2 disconnected	Check channel 2 for breaks
28	Channel 3 disconnected	Check channel 3 for breaks
29	Channel 0 exceeds upper limit	Check if channel 0 exceeds the upper limit, make sure that the upper range limit is not exceeded.
30	Channel 1 exceeds upper limit	Check if channel 1 exceeds the upper limit, make sure the upper range limit is not exceeded.
31	Channel 2 upper limit exceeded	Check if channel 2 exceeds the upper limit, make sure that the upper range limit is not exceeded.
32	Channel 3 upper limit exceeded	Check if channel 3 exceeds the upper limit, make sure the upper range limit is not exceeded.
33	Channel 0 exceeds	Check if channel 0 exceeds the lower limit, make sure the lower

Fault Code (decimal)	Fault Type	Solution
	lower limit	range limit is not exceeded.
34	Channel 1 exceeds lower limit	Check if channel 1 exceeds the lower limit, make sure the lower range limit is not exceeded.
35	Channel 2 exceeds lower limit	Check if channel 2 exceeds the lower limit, make sure the lower range limit is not exceeded.
36	Channel 3 lower limit exceeded	Check that channel 3 has not exceeded the lower limit of the range.