

## MU200-4PT RTD Module User Manual

Thank you for using MU200-4PT thermal resistance input module independently developed and produced by MEGMEET, which is mainly combined with MU200 series main module to complete the 4-channel thermal resistance input function. Before using the product, please carefully read this manual so as to better understand it, fully use it, and ensure safety. This quick start manual is to offer you a quick guide to the design, installation, connection and maintenance of MU200-4PT for the convenience of users to access the required information on site, and provide a brief introduction to relevant accessories, FAQs, etc.

This manual is suitable for the following MU200 series members:

### *MU200-4PT 4-channel thermal resistance input module*

Version Number: A00

Revision Date: 2022-10-28

BOM Code: R33010834

For detailed product information, please refer to *MU200 Series PLC User Manual*, *MU200 Series PLC Programming Reference Manual*. For ordering the above user manuals, contact your Megmeet distributor or download from MEGMEET website ([www.megmeet.com](http://www.megmeet.com)).

## 1. Outline and Component Name

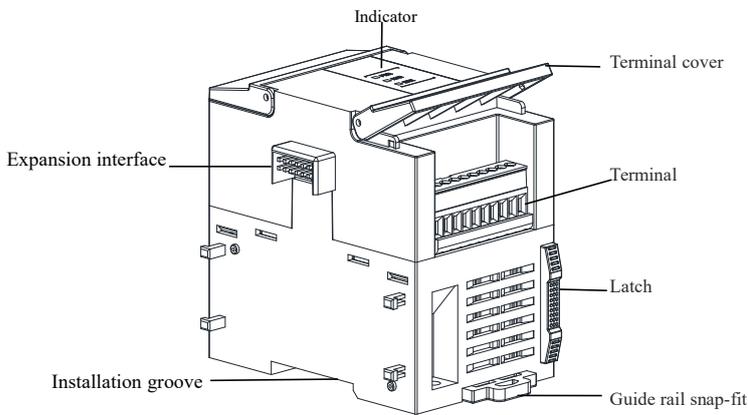


Fig 1-1 Outline structure diagram of expansion module

## 2. Installation

### 2.1 Standard 35mm DIN slot installation

- ◆ Fixed installation guide rails;
- ◆ Open the DIN snap-fit at the bottom of the module and fix the bottom of the module to the DIN guide rail;
- ◆ Insert the module into the expansion socket of the front module one by one;
- ◆ Push up the side latch to fix with the front module, and fix the module to the guide rail by pushing up the latch.

\*Checking carefully that the DIN snap-fit is tightly fixed to the DIN guide rail, as shown in Figure 2-1.

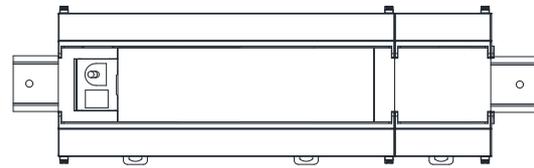


Fig 2-1 Installation diagram

### 2.2 Panel installation

The screws (M3 optional), must be used to fix the module in situations with high vibration. Positioning and drilling the installation holes according to the dimensions shown in Figure 2-2, and use the suitable screws to fix the module on the backplane.

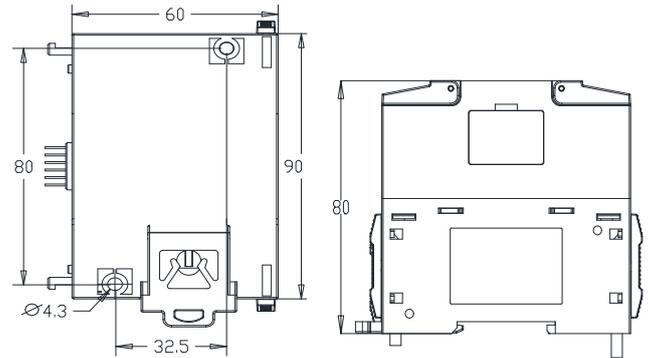


Fig 2-2 Screw installation diagram

### 2.3 Cable connection and specification

It is recommended to use shielded twisted-pair cables and prefabricate insulated terminal ends to ensure the quality of the wiring. The following table lists the cross-section and models of the recommended cables.

Table 2-1 Recommended model of cable

Cable	Cross-section	Cable No.	Terminal and heat shrink tube
Ground	2.0mm <sup>2</sup>	AWG12	H2.0/14 Tube-type prefabricated insulated terminal or wire end tinning
Signal	0.8 ~ 1.0mm <sup>2</sup>	AWG18、20	H1.5/14 Tube-type prefabricated insulated terminal Φ3 or Φ4 heat shrink tube

Fix the finished cable end on the PLC terminal by the screw in a correct position and 0.5 ~ 0.8Nm tightening torque, to ensure reliable connection without damaging the screw.

### 2.4 Wiring requirement

For the safety (to prevent electric shock and fire accidents) and lower noise, the ground terminal of the controller should be connected in accordance with the requirements from national electrical regulations, and the ground resistance should be less than 100 Ω. Single point grounding should be used when wiring multiple controllers, and the ground wire cannot form a loop. As shown in the diagram below:

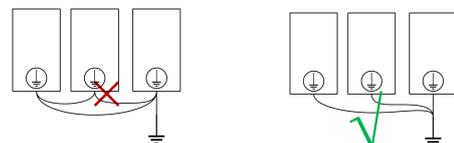
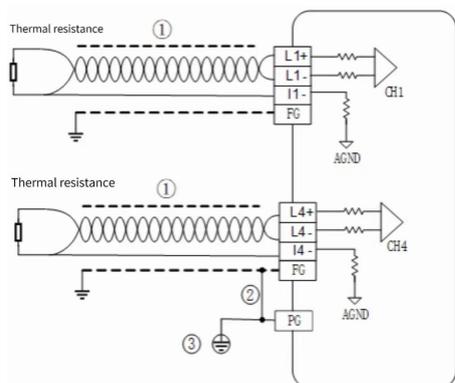


Fig 2-3 Controller grounding diagram

Figure 2-4 shows the wiring requirements for terminals. ①~④ indicates the notice when wiring:

- ① It is recommended to use a shielded twisted-pair cable, keeping far away from the power line;
- ② If there is strong external interference, connect frame ground terminal FG to module ground terminal PG.
- ③ The ground terminal is well connected;
- ④ Do not use the empty pin of terminal.



It is necessary to calculate the sum of the current consumed by all power supplies of expansion modules before the connection operation to ensure that the current of all power supplies is less than the output current provided by the corresponding power supply of the main module.

### 3. Technical Specification

#### 3.1 Environment index

- ◆ Environment temperature range of PLC: -5°C ~ 55°C. When the temperature exceeds 55°C for a long time, a well-ventilated place should be selected.
- ◆ Place without corrosion, flammable and explosive gas and liquid.
- ◆ Solid place without vibration.
- ◆ This controller is designed for II standard installation environment and 2-level pollution occasions.

#### 3.2 Performance Specification

Table 3-1 Performance specification

Item	Technical specification		
Input channel	4		
Sensor mode	PT100、CU50、CU100、0~300R		
Display mode	Celsius (°C)、Fahrenheit (°F)		
Temperature resolution	0.1°C		
Sampling cycle	250ms/4CH、500ms/4CH、1000ms/4CH (optional)		
Overall precision	±1% of the full scale		
Measurement range	PT100	-200~850°C	18.520Ω ~390.48Ω
	Cu100	-50~150°C	78.4Ω ~164.27Ω
	Cu50	-50~150°C	39.242Ω ~82.135Ω
	NTC		0~300R
Isolation mode	The analog circuit and digital circuit are separated with a photoelectric coupler and the analog channels are not separated with each other.		

Isolated withstand voltage	Between digital circuit and ground (500VAC) Between analog circuit and ground (500VAC) Between digital circuit and analog circuit (500VAC)
Function	First-order delay filter Over-limit detection function Slope alarm function Temperature compensation function
24V bus power consumption	30mA

### 4. Terminal

Table 4-1 shows the terminal layout of the MU200-4PT and Table 4-1 describes the signal definition.

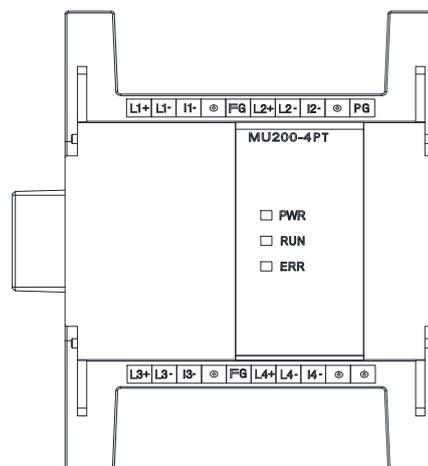


Table 4-1 Terminal diagram of MU200-4PT

Table 4-1 Table 4-1 Terminal definition of MU200-4PT

Terminal	Signal name	Terminal	Signal name
L1+	+ thermal resistance input of CH1	L3+	+ thermal resistance input of CH3
L1-	- thermal resistance input of CH1	L3-	- thermal resistance input of CH3
I1-	Signal Ground input of CH1	I3-	Signal Ground input of CH3
●	NC	●	NC
FG	Frame ground	FG	Frame ground
L2+	+ thermal resistance input of CH2	L4+	+ thermal resistance input of CH4
L2-	- thermal resistance input of CH2	L4-	- thermal resistance input of CH4
I2-	Signal Ground input of CH2	I4-	Signal Ground input of CH4
●	NC	●	NC
PG	Protection ground	●	NC

### 5. Characteristic and Function

#### 5.1 Panel status indicator

Table 5-1 Panel indicator and function

Item	Function
PWR indicator	Connection status between expansion module and main module ON: connection succeed OFF: connection fail
RUN operation indicator	Mainly for fault of expansion module Fast flash(10Hz): operation in normal

	Slow flash(1Hz): module fault and operation error
ERR alarm indicator	Mainly for the application layer Normal: OFF Faulty : ON (parameter configuration error, out of limit) Flash (communication error with main module)

### 5.2 Temperature filter

The MU200-4PT thermal resistance input module has the function of filtering the measured temperature, and the filter process uses the first-order hysteresis filtering algorithm. The algorithm is as follows:

$$y(n) = \frac{x(n) + k * y(n-1)}{k + 1} \quad (5-1)$$

among: y(n) is current filter output

x(n) is current sampling

y(n-1) is last filter output

K is first-order hysteresis filter constant

Setting range: 0~100, default: 0

### 5.3 Over-limit detection

The MU200-4PT has the function of over-limit detection, and the upper and lower temperature alarm values can be set for each channel. When the measured temperature is out of limit, the channel over-limit register will be set and the ERR light will generate an alarm.

Table 5-2 Temperature over-limit alarm

Name	Description	Range
Upper-limit of channel 1	Temperature alarm upper-limit	-2000~18000 (adjustable) Default: 8500
Upper-limit of channel 2		
Upper-limit of channel 3		
Upper-limit of channel 4		
Lower-limit of channel 1	Temperature alarm lower-limit	-2000~18000 (adjustable) Default: -2000
Lower-limit of channel 2		
Lower-limit of channel 3		
Lower-limit of channel 4		

### 5.3 Slope alarm

This module has the function for detecting the temperature-change slope, which is shown in the fact that the channel temperature slope register will be set when the temperature changes too fast and the ERR light will generate an alarm.

Table 5-3 Heating/cooling rate table

Name	Description	Range
Heating rate of channel 1	Heating rate (°C/s, °F/s)	0~10000 (adjustable) Default: 1000
Heating rate of channel 2		
Heating rate of channel 3		
Heating rate of channel 4		
Cooling rate of channel 1	Cooling rate (°C/s, °F/s)	-10000~0 (adjustable) Default: -1000
Cooling rate of channel 2		
Cooling rate of channel 3		
Cooling rate of channel 4		

### 5.4 Temperature compensation

The module has a channel temperature compensation function, which can add or subtract a fixed temperature on the basis of the measured temperature so that the measured temperature is closer to the real value, that is:

$$\text{Temperature output value} = \text{Measured value} + \text{Compensation value}$$

Setting range: -999~999, default: 0.

### 6. Application

Example: Channel 1 accesses Pt100 thermal resistance to output Celsius temperature; The point of average value is set to 4. Storing the conversion temperature values in D105; channel 2, 3, 4 are closed.

System setting mode: Open Configuration on the home page under Program Management → Unit configuration, popping up configuration interface; Open the Expansion module column, select the main module and drag it to the configuration interface, and then select MU200-4PT in Special module, and lastly place it on the unit configuration interface, as shown in Figure 6-1. In this case, you can set the parameters in the expansion module properties column.

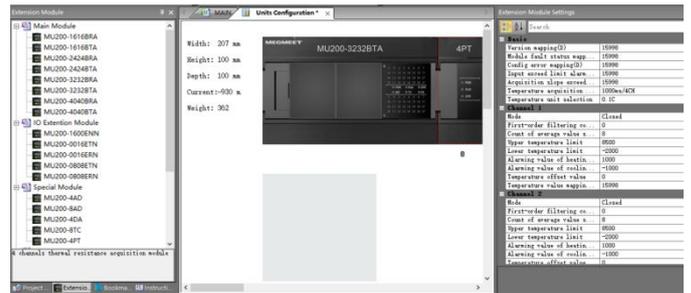


Fig 6-1 Configuration interface

Set the basic parameter register address and parameter register of channel 1, as shown below. Channels 2, 3, and 4 are closed by default.

Table 6-1 Module configuration

Basic parameter	
Version address (D)	100
Fault status (D)	101
Parameter setting error address (D)	102
Input over-limit alarm address (D)	103
Slope over-limit alarm address (D)	104
Sampling speed	1000ms/4CH
Temperature unit selection	Degree centigrade: 0.1°C
Input channel 1	
Mode	PT100
First-order hysteresis filter constant	0
Average sampling speed/acquisition	4
Temperature upper limit	8500
Temperature lower limit	-2000
Alarm value of heating rate	1000
Alarm value of cooling rate	-1000
Temperature compensation value	0
Temperature value address (D)	105

Description:

1. Set the module version register. Table 6-2 describes the version information.

Table 6-2 Module version information

Register name	Description
Version information (16Bit)	BIT0~3: MCU software version BIT4~7: FPGA software version BIT8~11: Hardware version BIT12~13: Reserved BIT14: 0: General module 1: Customized module BIT15: 0: Release version 1: Test version

2. Set the module fault status register. Table 6-3 describes the fault status.

Table 6-3 Fault status

Register name	Description
Module error status (16Bit)	Fault status indicated by bit (0: Normal 1: Faulty) BIT0: Internal fault of expansion module BIT1: Parameter configuration error  BIT6: Slope over-limit BIT10: Input over-limit

3. Set the parameter error register, which stores the ID of the wrong parameter when the parameter is incorrectly configured. The default value 0 indicates normal. Other, error ID.

4. Set the channel input over-limit register, Table 6-4 shows the channel correspondence.

Table 6-4 Channel input over-limit register

Register name	Description
Input over-limit alarm register (16Bit)	BIT0~3: Upper-limit alarm of channel 1~4 (0: Normal 1: Alarm) BIT8~11: Lower-limit alarm of channel 1~4 (0: Normal 1: Alarm)

5. Set the alarm register for over-limit slope in channel. Table 6-5 shows the channel correspondence.

Table 6-5 Slope over-limit alarm register

Register name	Description
Slope over-limit alarm register (16Bit)	BIT0~3: Positive slope alarm of channel 1~4 (0: Normal 1: Alarm) BIT8~11: Negative slope alarm of channel 1~4 (0: Normal 1: Alarm)

6. Set the module acquisition speed, 250ms/4CH、500ms/4CH、1000ms/4CH can be chosen

7. Set the temperature unit. The user can choose 0.1°C Celsius or 0.1°F Fahrenheit.

8. Set the temperature value address. If the temperature unit is 0.1°C, D105 is 500 from the background monitoring table, that is, the temperature measured by the module is 50°C.

## 7. Routine Inspection

1. Check that the wiring of thermal resistance input meets the requirements;

2. Check that the expansion interface of MU200-4PT is properly inserted in expansion jack;

3. Check the application for making sure the operation method and parameter range are correct;

4. Check that the PWR indicator of MU200-4PT is ON and the RUN indicator blinks normally (10Hz) when set the MU200 basic module to RUN state.

## 8. Fault Inspection

In case of abnormality, check the following items:

●The status of the PWR indicator:

ON: connection correctly;

OFF: check the connection and main module condition.

●The status of the RUN indicator:

Flash quickly(10Hz): MU200-4PT in normal operation;

Flash slowly(1Hz) or OFF: check the information of module status address in element monitoring table by software

●The status of the ERR indicator:

ON: check the parameter configuration and temperature range;

Flash: check the expansion connection and restart;

OFF: Normal

## Notice

1. The warranty range is confined to the PLC only.
2. Warranty period is 18 months, within which period Megmeet conducts free maintenance and repairing to the PLC that has any fault or damage under the normal operation conditions.
3. The start time of warranty period is the delivery date of the product, of which the product SN is the sole basis of judgment. PLC without a product SN shall be regarded as out of warranty.
4. Even within 18 months, maintenance will also be charged in the following situations:
  - Damages incurred to the PLC due to mis-operations, which are not in compliance with the User Manual;
  - Damages incurred to the PLC due to fire, flood, abnormal voltage, etc;
  - Damages incurred to the PLC due to the improper use of PLC functions.
  - Remove the PLC personally.
5. The service fee will be charged according to the actual costs. If there is any contract, the contract prevails.
6. If you have any question, please contact the distributor or our company directly.

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