MU200-8TC Thermocouple Module User Manual

Thank you for using MU200-8TC thermocouple input module independently developed and produced by MEGMEET, which is mainly combined with MU200 series main module to complete the 8-channel thermocouple 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 MU200-8TC thermocouple module 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:

MU200–8TC   8-channel thermocouple input module

Version Number：A00

Revision Date：2023-03-29

BOM Code：R33010840

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).
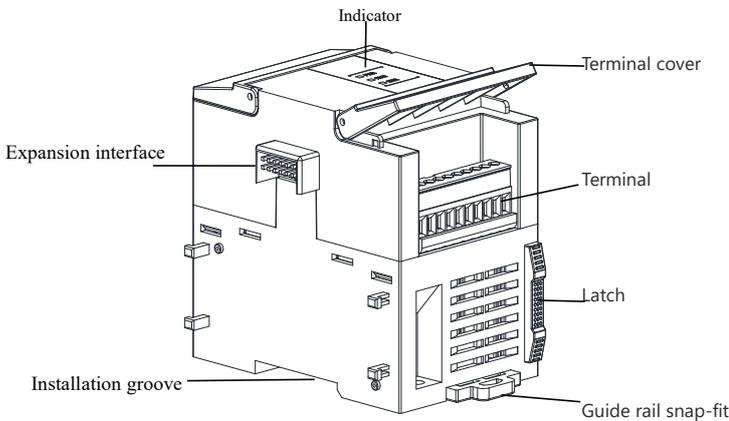
1. Outline and Component Name

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.
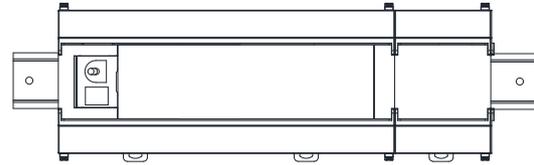

Fig 2-1 Installation diagram

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.
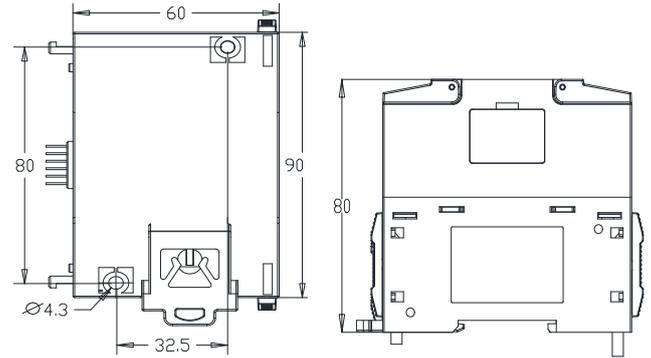

Fig 2-2   Screw installation diagram

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	2.0mm²	AWG12	H2.0/14 Tube-type prefabricated insulated terminal or wire end tinning
Signal	0.8～1.0mm²	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:
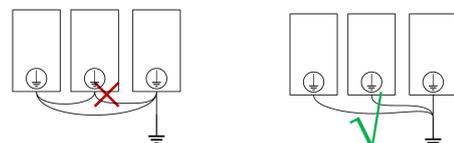

Fig 2-3 Controller grounding diagram

Figure 2-4 shows the wiring requirements for terminals. ① ~ ③ indicates the notice when wiring:

① It is recommended to use a shielded compensation cable, keeping far away from the power line;

② The ground terminal is well connected;
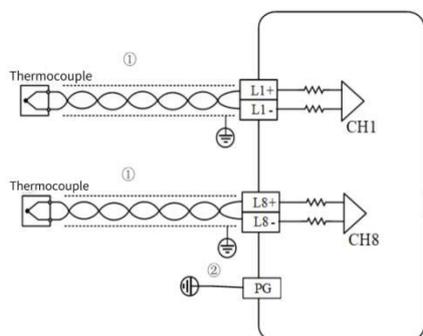
③ Do not use the empty pin of terminal.

Fig 2-4 MU200-8TC terminal wiring diagram

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℃ ~ 55℃. 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	8
Sensor mode	J-type, K-type, R-type, S-type, T-type, E-type, N-type, B-type thermocouple
Display mode	Celsius（℃）、Fahrenheit（℉）
Temperature resolution	0.1℃
Response time	800ms/8CH
Precision	±0.5% of F.S. (@25°C±5°C)
	±1% of F.S. (@0 ~ 50°C)
Sensitivity	0.1℃
Cooling-junction compensation	Internal cooling-junction (±1.5°C (Max.) in the range of −25°C ~ +85°C)
Isolation mode	Isolation between channels (400VDC) Isolation between analog and digital quantity (1500VDC)
Alarm function	Disconnection detection, over-limit alarm, slope alarm
24V bus power consumption	≤30mA

Sensor type	Temperature range(℃)
J	-200 ~ 1200
K	-200 ~ 1370
R	-50 ~ 1760
S	-50 ~ 1760
T	-200 ~ 400
E	-200~1000
N	-200 ~ 1300
B	200 ~ 1800

Table 3-2 Sensor type and temperature range

4. Terminal

Table 4-1 shows the terminal layout of the MU200-8TC and Table 4-1 describes the signal definition.

Table 4-1 Terminal definition of MU200-8TC

| Terminal	Signal name	Terminal	Signal name
L1+	+ thermocouple of CH1	L5+	+ thermocouple of CH5
L1-	- thermocouple of CH1	L5-	- thermocouple of CH5
L2+	+ thermocouple of CH2	L6+	+ thermocouple of CH6
L2-	- thermocouple of CH2	L6-	- thermocouple of CH6
L3+	+ thermocouple of CH3	L7+	+ thermocouple of CH7
L3-	- thermocouple of CH3	L7-	- thermocouple of CH7
L4+	+ thermocouple of CH4	L8+	+ thermocouple of CH8
L4-	- thermocouple of CH4	L8-	- thermocouple of CH8
●	NC	INA	External cooling-junction A
PG	Protection Ground	INB	External cooling-junction B
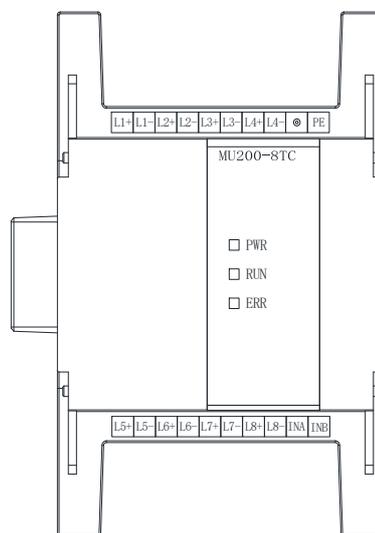
Fig 4-1　Terminal diagram of MU200-8TC

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 Over-limit alarm

The user can set a upper limit and lower limit alarm value of temperature 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: 18000
Upper-limit of channel 2		
Upper-limit of channel 3		
Upper-limit of channel 4		
Upper-limit of channel 5		
Upper-limit of channel 6		
Upper-limit of channel 7		
Upper-limit of channel 8		
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		
Lower-limit of channel 5		
Lower-limit of channel 6		
Lower-limit of channel 7		
Lower-limit of channel 8		

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 (℃/s,℉/s)	0~10000 (adjustable) Default: 1000
Heating rate of channel 2		
Heating rate of channel 3		
Heating rate of channel 4		
Heating rate of channel 5		
Heating rate of channel 6		
Heating rate of channel 7		
Heating rate of channel 8		
Cooling rate of channel 1	Cooling rate (℃/s,℉/s)	-10000~0 (adjustable) Default: -1000
Cooling rate of channel 2		
Cooling rate of channel 3		
Cooling rate of channel 4		
Cooling rate of channel 5		
Cooling rate of channel 6		
Cooling rate of channel 7		
Cooling rate of channel 8		

5.4 Temperature deviation

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:

Temperature output value = Measured value + Deviation value

Setting range: -1000~1000,　　default: 0

6. Application

Example：Channel 1 accesses J-type thermocouple to output Celsius temperature; The average sampling number is set to 4. Storing the average temperature values in D200; Other channels 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 MU200-8TC 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.
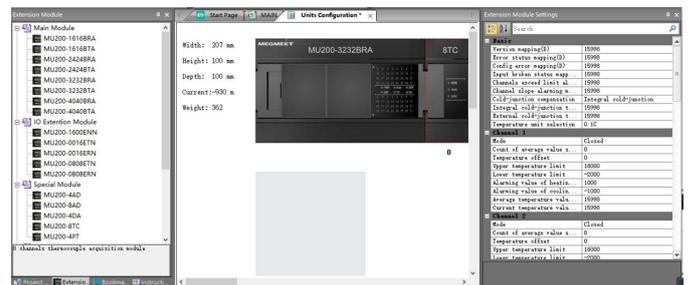

Fig 6-1　Configuration interface

Set the basic parameter register mapping and parameter register of channel 1 , as shown below

Table 6-1 Module configuration

Basic	
Version mapping（D）	100
Fault status（D）	101
Configuration error mapping（D）	102
Input disconnection mapping（D）	103
Channel over-limit alarm mapping(D)	104
Channel slope alarm mapping（D）	105
Cooling-junction compensation selection	Internal cooling-junction
Internal cooling-junction temperature（D）	106
External cooling-junction temperature（D）	107
Temperature unit selection	Degree centigrade: 0.1℃
Input channel 1	
Mode	J-type
Average sampling number	8
Temperature deviation	0
Temperature upper limit	12000

Temperature lower limit	-2000
Alarm value of heating rate	1000
Alarm value of cooling rate	-1000
Average temperature value mapping（D）	200
Current temperature value mapping（D）	201

Description：

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

<p align="center">Table 6-2 Fault status</p>

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 BIT4：Input disconnection BIT6：Slope over-limit BIT7：Cooling-junction temperature over-limit BIT10：Input over-limit

2、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.

3、Set the input disconnection status register. If the channel is open, the module will detect if there is disconnection. If the input is in open circuit, the module will generate an alarm, the disconnection status register will be set, while the ERR alarm light will generate an alarm.

<p align="center">Table 6-3 Input disconnection status register</p>

Register name	Description
Disconnection status register (16Bit)	0~7bit：Disconnection alarm of channel 1~8 8~15bit：Reserved

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

<p align="center">Table 6-4   Channel over-limit alarm register</p>

Register name	Description
Input over-limit alarm register (16Bit)	BIT0~7：Upper-limit alarm of channel 1~8 (0：Normal 1：Alarm) BIT8~15：Lower-limit alarm of channel 1~8 (0：Normal 1：Alarm)

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

<p align="center">Table 6-5 Slope over-limit alarm register</p>

Register name	Description
Slope over-limit alarm register (16Bit)	BIT0~7: Positive slope alarm of channel 1~8 (0：Normal 1：Alarm) BIT8~15: Negative slope alarm of channel 1~8 (0：Normal 1：Alarm)

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

7、Set the average value address of temperature. If the temperature unit is 0.1°C, D200 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 thermocouple input meets the requirements;

2. Check that the expansion interface of MU200-8TC 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 MU200-8TC is ON and the RUN indicator blinks normally (10Hz) when Set the MC200 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): MU200-8TC 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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