

MU200-4AD/8AD Analog Quantity Input Module

User Manual

Thank you for using MU200-4AD/8AD analog quantity input module independently developed and produced by MEGMEET, which is mainly combined with MU200 series main module to complete the 4 or 8 channels analog quantity 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 MU200-4AD/8AD 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:

MU200-4AD 4-channel analog quantity input module

MU200-8AD 8-channel analog quantity input module

Version Number: A01

Date: 2022-12-06

BOM Code: R33010780

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

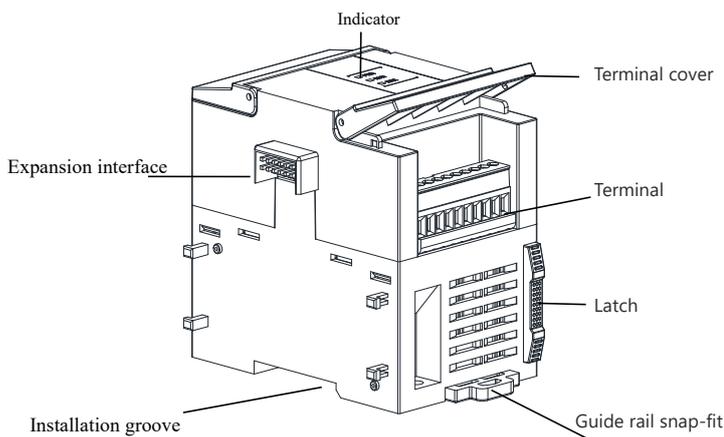


Fig 1-1 Outline structure diagram of expansion module

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 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 rail, as shown in Figure 2-1.

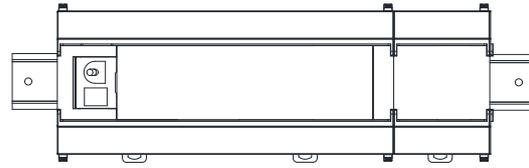


Fig 2-1 Installation diagram

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.

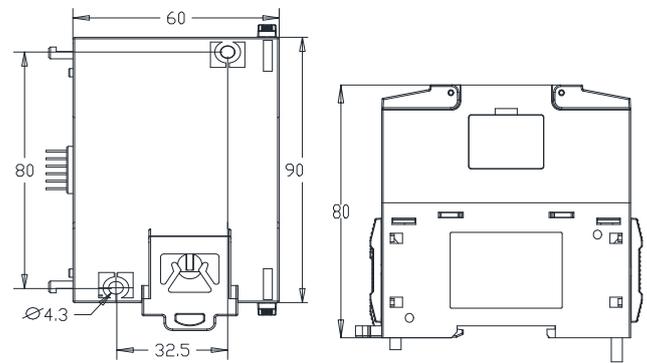


Fig 2-2 Screw installation diagram

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 ²	AWG12	H2.0/14 Tube-type prefabricated insulated terminal or wire end tinning
Signal	0.8~1.0mm ²	AWG18、20	H1.5/14 Tube-type prefabricated insulated terminal $\Phi 3$ or $\Phi 4$ 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:

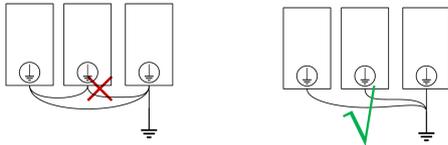


Fig 2-3 Controller grounding diagram

Figure 2-4 and Figure 2-5 show 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 **Do not occur short-circuit between voltage terminals and current terminals in any mode.**
- ③ The ground terminal is well connected;
- ④ Do not use the empty pin of terminal.

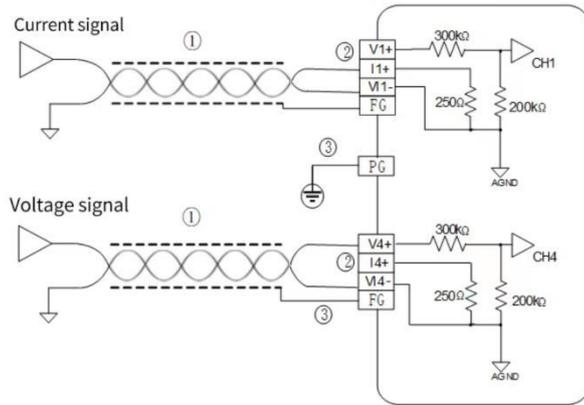


Fig 2-4 MU200-4AD terminal wiring diagram

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.

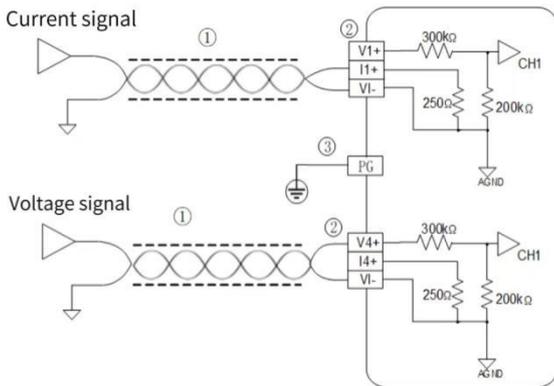


Fig 2-5 MU200-8AD terminal wiring diagram

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	
	MU200-4AD	MU200-8AD
Number of Analog quantity input	4 points	8 points
Range of Analog quantity input	Voltage: -10 ~ +10V -5 ~ +5V 0 ~ 5V 1 ~ 5V 0 ~ 10V (Scale is switched by upper machine)	
Resolution	5mV (Voltage) /10uA (Current)	
Number of ADC bit	14bit	16bit
Conversion speed	8ms/4 channels	16ms/8 channels
Sampling precision	±1% (full scale)	
Input impedance	Voltage	400K Ω
	Current	250 Ω
Isolation	The analog circuit and digital circuit are separated with a photoelectric coupler and the analog channels are not separated with each other.	
24V power consumption	30mA	45mA

4. Terminal

Table 4-1 shows the terminal layout of the MU200-4AD, as shown in the following:

Table 4-1 Terminal definition of MU200-4AD

Terminal	Signal name	Terminal	Signal name
V1+	voltage input+ of CH1	V3+	voltage input+ of CH3
I1+	current input+ of CH1	I3+	current input+ of CH3
VI1-	voltage¤t input-of CH1	VI3-	voltage¤t input- of CH3
FG	Frame ground	FG	Frame ground
●	NC	●	NC
V2+	voltage input+ of CH2	V4+	voltage input+ of CH4
I2+	current input+ of CH2	I4+	current input+ of CH4
VI2-	voltage¤t input-of CH2	VI4-	voltage¤t input-of CH4
FG	Frame ground	FG	Frame ground
PG	Protection Ground	PG	Protection Ground

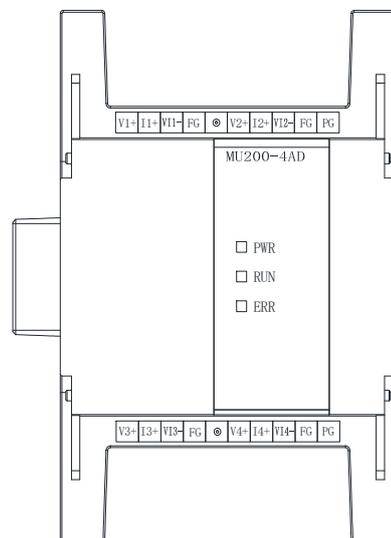


Fig 4-1 Terminal diagram of MU200-4AD

Table 4-2 shows the terminal layout of the MU200-8AD, as shown in the following:

Table 4-2 Terminal definition of MU2000-8AD

Terminal	Signal name	Terminal	Signal name
V1+	voltage input+ of CH1	V5+	voltage input+of CH5
I1+	current input+ of CH1	I5+	current input+ of CH5
V2+	voltage input+ of CH2	V6+	voltage input+ of CH6
I2+	current input+ of CH2	I6+	current input+ of CH6
V3+	voltage input+ of CH3	V7+	voltage input+ of CH7
I3+	current input+ of CH3	I7+	current input+ of CH7
V4+	voltage input+ of CH4+	V8+	voltage input+ of CH8
I4+	current input+ of CH4	I8+	current input+ of CH8
VI-	Common ground terminal of analog quantity input	VI-	Common ground terminal of analog quantity input
PG	Protection Ground	●	NC

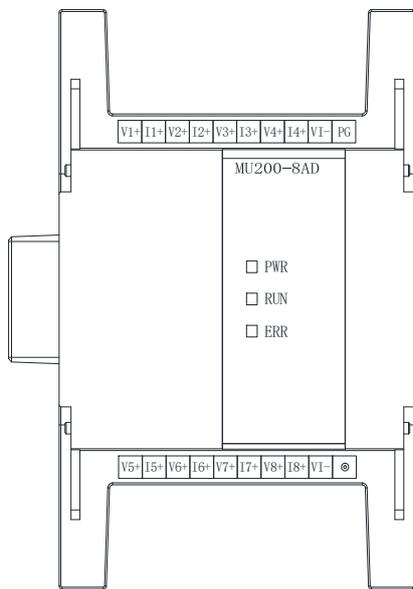


Fig 4-2 Terminal diagram of MU200-8AD

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 Calibration Function

This module supports voltage (non-differential) and current input modes, of which the default digital quantity ranges -10000 to 10000 respectively. Users can set the digital quantity range to other numbers by using this function. For the calculation method, see Formula 5-1.

$$D = \frac{S_U - S_L}{U_U - U_L} \times (U_i - U_L) + S_L \quad (5-1)$$

Among that, D = Input digital value corresponding to voltage or current

U_i = Actual input voltage or current value

U_U = Upper range

U_L = Lower range

S_U = Upper calibration

S_L = Lower calibration

Note 1: Table 5-2 Upper/lower limit of range in different mode

Mode	-10~10V	0~10V	-5~5V	0~5V	1~5V	0~20mA	4~20mA
U_U	10V	10V	5V	5V	5V	20mA	20mA
U_L	-10V	0	-5V	0	1V	0mA	4mA

Note 2: The default scaling limit is -10000 to 10000. The full input range in $\pm 10V$ mode is -10000 to 10000 if the upper and lower limit of the scaling are set based on the default ± 10000 , as shown in the following.

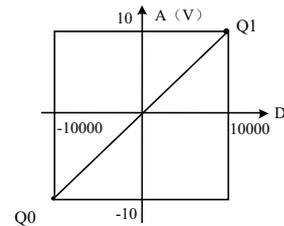


Fig 5-1 Scaling correspondence

Note 3: The scaling limits are only used for customer calibration and physical scaling. The actual input result may exceed the scaling limits because of the over-range input signal.

5.3 Input Comparer function

The voltage level and backlash value of comparer limits in expansion module should be set. The flag bit of the input comparer status register is set when an input limit-comparer motion occurs. Enter the limits comparer and execute as shown below.

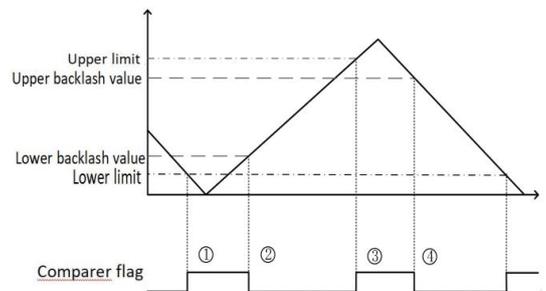


Fig 5-2 Input comparer function diagram

- ① Comparer status register is set when the acquisition value is lower than the lower limit of comparer ;
- ② Comparer status register is reset when the acquisition value exceeds the lower backlash value of comparer;

- ③ Comparer status register is set when the acquisition value exceeds the upper limit of comparer;
- ④ Comparer status register is reset when the acquisition value is lower than the upper backlash value of comparer;

5.4 Disconnection detection function

The disconnection detection function is supported only when the input range is 1 to 5V or 4 to 20 mA. The disconnection detection flag setting function is as follows:

- ① If the input signal is lower than 0.3V or 1mA, the input disconnection status register is set to 1;
- ② If the input signal is greater than 0.3V or 1mA, the input disconnection status register is reset to 0.

6. Application Example

Example: Set channel 1 to -10V ~ +10V, scale to the digital quantity of -10000 to 10000, and close other channels. The point number of average value is set to 8; Store the sampling result of current value by D501, and store the sampling result of average value by D500.

System setting mode: Open Configuration on the home page under Program Management → Unit configuration, and configuration interface will pop up; Open the Expansion module column, select the main module and drag it to the configuration interface, and then select MU200-4AD in Special module, and 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.

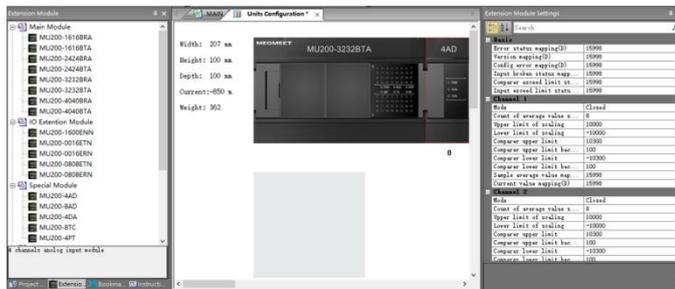


Fig 6-1 Configuration interface

Set the basic parameter register mapping and parameter register of channel 1, as shown below. Other channels are closed by default.

Table 6-1 Module Configuration

Basic	
Error status mapping (D)	100
Version mapping (D)	101
Configuration error mapping (D)	102
Input disconnection status mapping (D)	103
Comparer exceed limit status mapping (D)	104
Input exceed limit status mapping (D)	105
Input channel 1	

Mode	-10V~10V
Count of average value sampled	8
Upper limit of scaling	10000
Lower limit of scaling	-10000
Comparer upper limit	10300
Comparer upper limit backlash value	100
Comparer lower limit	-10300
Comparer lower limit backlash value	100
Sample average value mapping (D)	500
Current sample value mapping (D)	501

When input the voltage of +5V though channel 1, then: $U_i = 5V$; $U_u = 10V$; $U_L = -10V$; $S_u = 10000$; $S_L = -10000$; It is shown by formula 5-1:

$$D = \frac{S_u - S_L}{U_u - U_L} \times (U_i - U_L) + S_L$$

$$= \frac{10000 - (-10000)}{10 - (-10)} \times [5 - (-10)] + (-10000) = 5000$$

It can be observed in the Element monitoring table: D501=5000

Description:

1. Set the error status mapping register. Table 6-2 shows the error status.

Table 6-2 Error status

Register name	Description
Module error status (16Bit)	Error when each bit is 1, normal when it is 0: BIT0: Module error BIT4: Error parameter setting BIT8: Input disconnection BIT9: Comparer over-limit BIT10: Input over-limit

2. Set the module version mapping register.
3. Set the configuration error mapping register, which stores the ID of the wrong parameter when the parameter is incorrectly configured. Default: 0(Normal). Other: Error ID.
4. Set the input disconnection status mapping register. Table 6-3 shows the channel correspondence.

Table 6-3 Input disconnection status register

Register name	Description
Input disconnection status mapping register (16Bit)	BIT0~7: Disconnection flag of CH1~8 (0: Normal; 1: Alarm) BIT8~15:Reserved

5. Set the input comparer status mapping register. Table 6-4 shows the channel correspondence.

Table 6-4 Comparer status register

Register name	Description
Input comparer status register (16Bit)	BIT0~7: Comparer exceed limit flag of CH1~8 (0: Normal; 1: Alarm) BIT8~15:Reserved

6. Set the input exceed limit status mapping register. Table 6-5 shows the channel correspondence.

Table 6-5 Over-limit status register

Register name	Description
Input exceed limit status register (16Bit)	BIT0~7: Comparer exceed limit flag of CH1~8 (0: Normal; 1: Alarm) BIT8~15:Reserved

7. Set the average sample number, ranging from 1 to 100, among that 8 is the default. The A/D converted data can be averaged internally and then stored in the data register (D element) with the averaging function, to reduce the fluctuation of input signal from noise and others, which will reduce the response speed of the A/D value.

7. Routine Inspection

1. Check that the wiring of analog input meets the requirements;
2. Check that the expansion interface of MU200-4AD/8AD 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 MU200-4AD/8AD 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): MU200-4AD/8AD 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, input value and connection conditions;

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.

Shenzhen Megmeet Electrical Co.,Ltd

Add: 5th Floor, Block B Unisplendour Information Harbor, Langshan Road, Shenzhen, 518057, China

Tel: 400-666-2163 (+86) 0755-86600500

Fax: (+86)0755-86600999

Zip: 518067

Website: www.megmeet.com