MC100-2AD/4AD Analog Quantity Input Module User Manual

Thank you for using MC100 series PLC. 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 MC100 series PLC, convenient for on-site reference.

This manual is for the following MC100 series members:

MC100-2AD   *MC100-4AD*

For detailed product information, please refer to *MC100 Series PLC User Manual*, *X-Builder Programming Software User Manual*, and *MC200/MC100 Series PLC Programming Reference Manual*. For ordering the above user manuals, contact your Megmeet distributor or sales office.
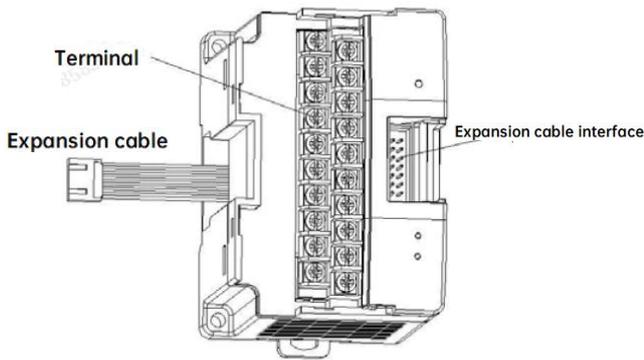
1. Appearance and Part Names

Fig. 1-1 Appearance and part name

2. Installation Description

2.1 Installation method

DIN rail mounting

Generally, you can mount the PLC onto a 35mm-wide rail (DIN). Open the DIN snap-fit at the bottom of the module and lock the bottom of the module onto the DIN rail; Rotate module close to the DIN guide rail and close the DIN snap-fit with a double-checking.
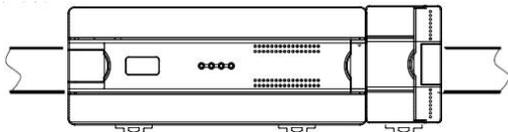
Screw fixing

Fixing the PLC with screws can stand greater shock than DIN rail mounting. M3 screws can be chosen to fix the PLC onto the backboard of the electric cabinet through the mounting holes on PLC enclosure, as the following figure.
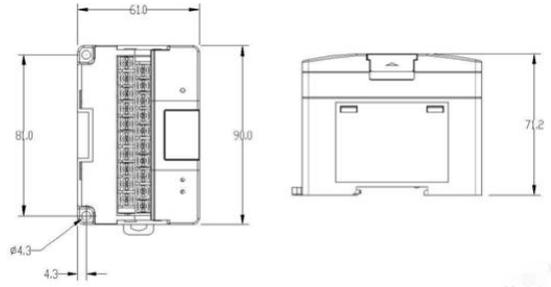


2.2 Cable connection and specification

It is recommended to use stranded copper conductors and prefabricate insulated plugs to ensure connection quality. The following table lists the sectional areas and models of the recommended cables.

Cable	Recommended NO.	Cross-Section	Terminal and heat shrink tubing
AC power line (L、N)	AWG12/AWG18	1.0—2.0mm^2	H1.5/14 prefabricate insulated tubing terminal, or Wire end tinning treatment
Ground line	AWG12	2.0mm^2	H2.0/14 prefabricate insulated tubing terminal, or Wire end tinning treatment
Input signal (X)	AWG18/AWG20	0.8—1.0mm^2	UT1-3 or OT1-3 cold-pressed terminal, Φ3 or Φ4 heat shrink tubing
Input signal (Y)	AWG18/AWG20	0.8—1.0mm^2	

Fix the prepared cable head onto the PLC terminals with screws correctly. Fastening torque: 0.5~0.8Nm.
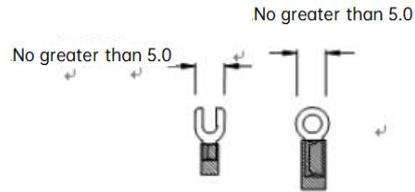
◆For the safety (to prevent electric shock and fire accidents) and lower noise, the ground terminal of the controller should be connected in accordance with the requirements from national electrical regulations, and the ground resistance should be less than 100 Ω . Single point grounding should be used when wiring multiple controllers, and the ground wire cannot form a loop. As shown in the diagram below:
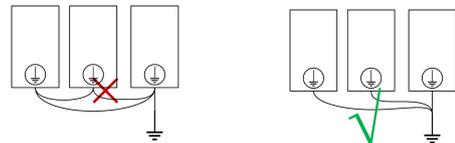

Note for wiring:

1. It is recommended to use a shielded twisted-pair cable for analog input. The cable should be far away from power cable or other cables that may generate electrical power interference.

2. If there is interference in the external electrical wiring and the input signal fluctuates, you can connect a smoothing capacitor (0.1μF ~ 0.47 μF /25V).

3. If the current channel uses the current input mode, short-circuit the voltage input terminal and the current input terminal.

4. The analog power supply can use the auxiliary output 24Vdc power supply of the main module, or other required power supply.

5. Grounding terminal PG of the module is well grounded.

6. Do not use the empty pin on the terminal.
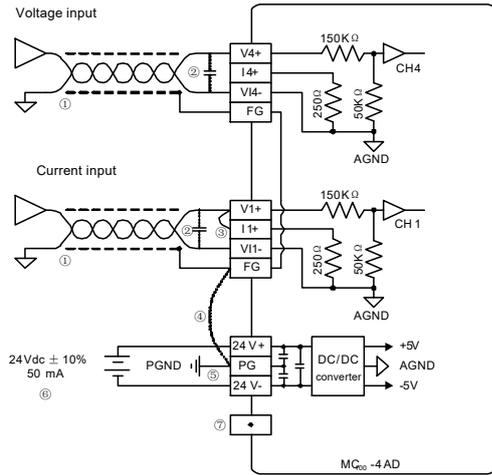
When designing the wiring, please pay attention to that the excessive load may cause system instability.

3. Technical Specification

3.1 Environmental Temperature

◆ Temperature range for PLC usage：-5℃~55℃. A well-ventilated place should be selected when the ambient temperature exceeds 55°C for a long time.

◆ 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		Specification	
Conversion speed		15ms/channel (normal speed), 6ms/channel (high speed)	
Analog input range	Voltage	-10V~10V, input impedance 1MΩ	Four channels can be used at the same time, input range can be selected by setting BFM (see Table 2-5)
	Current	-20mA~20mA, input impedance 250Ω	
Digital output		Default: −2000~+2000 Setting range: -10000~+10000	
Resolution	Voltage input	Depending on the input range (see Table 2-5)	
	Current input	10µA	
Accuracy		±1% of full range	
Isolation		Between analog circuit and digital circuit: photocoupler. Between analog circuit and input 24Vdc power: internal isolation. Between analog channels: none	
Analog power		24VDC (-15%~20%), Max. ripple voltage 5%, 50mA (From basic module or external power)	
Digital power		5VDC 50mA (From basic module)	

4. Terminal Introduction

Table 4-1 describes the definitions of MC100-2AD/4AD terminals.

Remark	Description	Remark	Description
24V+	Positive 24V analog power	I2+	Current input of CH2
24V-	Negative 24V analog power	VI2-	Common ground of CH2
·	NC	V3+	Voltage input of CH3
PG	GND	FG	Shielding ground
V1+	Voltage input of CH1	I3+	Current input of CH3
FG	Shielding ground	VI3-	Common ground of CH3
I1+	Current input of CH1	V4+	Voltage input of CH4
VI1-	Common ground of CH1	FG	Shielding ground
V2+	Voltage input of CH2	I4+	Current input of CH4
FG	Shielding ground	VI4-	Common ground of CH4

MC100-4AD:
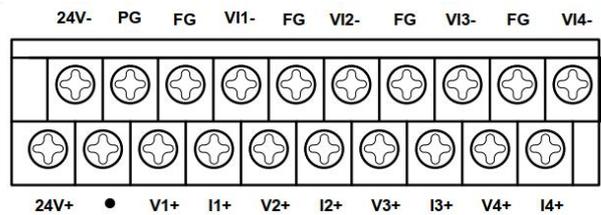
MC100-2AD:
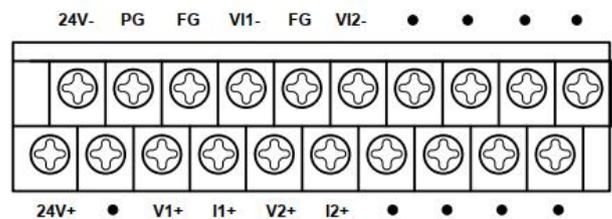
5. Characteristic Setting

5.1 Analog Input Channel Characteristics Setting

The input channel characteristic of MC100-2AD/4AD is the linear relationship between the channel's analog input quantity AI and digital input quantity DI. It can be set by the user. Each channel can be considered as the model shown in Figure 5-1. As it is of linear characteristic, the channel characteristic can be defined by just two points: Q0 (AI0, DI0) and Q1 (AI1, DI1), where DI0 is the channel's digital input corresponding to analog input AI0, and DI1 is the channel's digital input corresponding to analog input AI1.
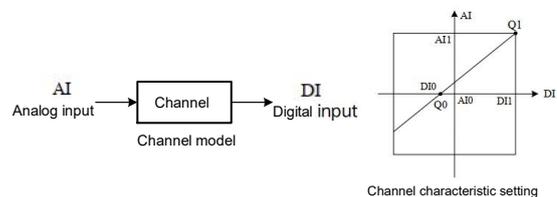

Figure 5-1 MC100-2AD/4AD channel characteristic

To simplify the operation process without affecting functions, AI0 and AI1 are respectively fixed to 0 and the maximum value in the current mode. That is to say, in Figure 5-1, AI0 is 0 and AI1 is the maximum analog output in the current mode. AI0 and AI1 will change according to the mode and users cannot change their values.

If you just set the channel mode without changing the value of DI0 and DI1, the channel characteristic should be as shown in Figure 5-2. The AI in Figure 5-2 is default.

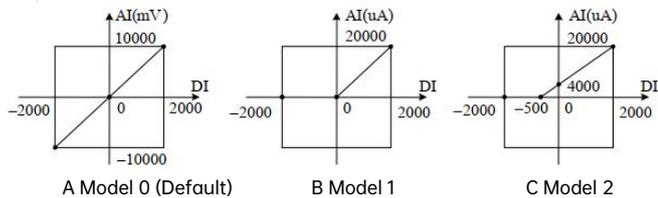
A Model 0 (Default)   B Model 1   C Model 2

Fig. 5-2　Default input characteristics corresponding to each mode

You can change the channel characteristic by changing DI0 and DI1. The setting range of DI0 and DI1 is −10,000 ~ 10,000. If the setting is outside this range, MC100-2AD/4AD will not accept it, but maintain the original valid setting. Figure 5-3 provides for your reference an example of changing channel characteristics.

A Mode 0

DI0 = 0, DI1 = 10,000

Analog input 10V outputs 10,000

Analog input 0V outputs 0

Analog input -10V outputs -10,000

A Mode 1

DI0 = -2000, DI1 = 2000

Analog input 20mA outputs 2000

Analog input 10mA outputs 0

Analog input 0mA outputs -2000

A Mode2

DI0 = -2500, DI1 = 10000
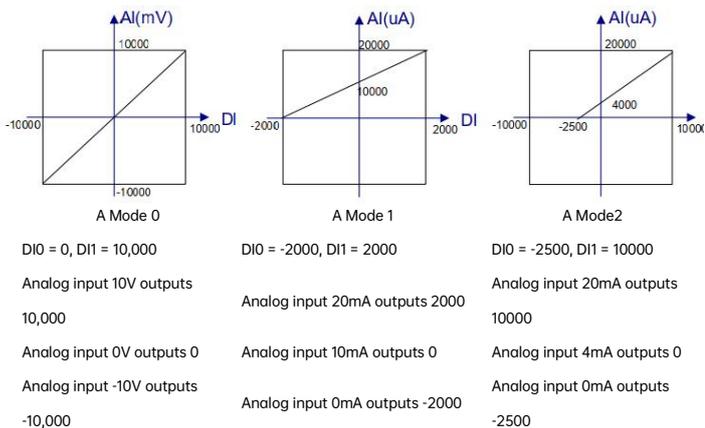
Analog input 20mA outputs 10000

Analog input 4mA outputs 0

Analog input 0mA outputs -2500

Fig. 5-3　Changing input channel characteristics

6. Application Example

Example: The MC100-2AD/4AD module address is 1 (for the addressing of expansion modules, refer to the *MC100 Series PLC User Manual*). Use its channel 1 for voltage input (-10V~10V), CH2 and CH3 for current input (4mA~20mA). Close CH4. Set the average value to 4, and use the data registers D1001, D1002, and D1003 to receive the conversion result; reset the characteristic data of CH1 with the mode 0 as shown in the Figure 5-3.

The following figures show the system block setting:
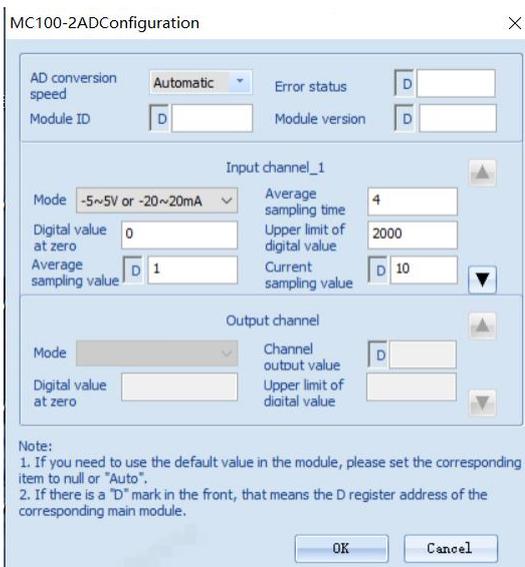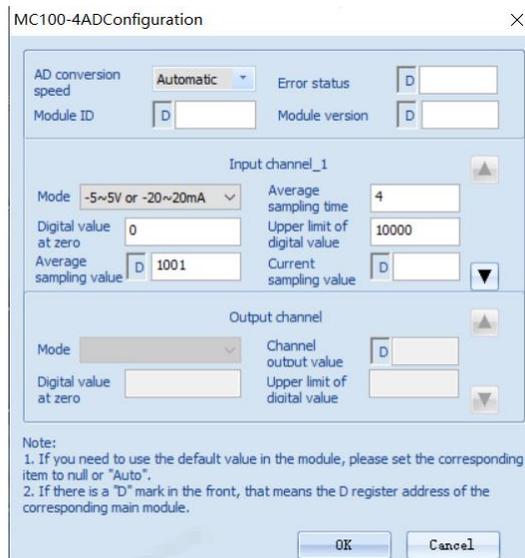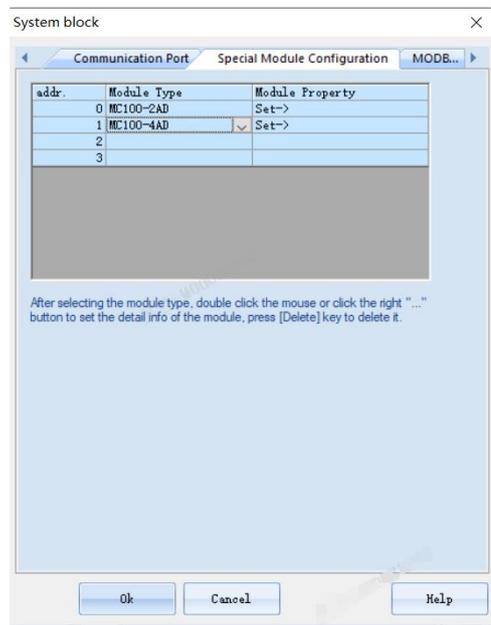
7. Routine Inspection

1. Check that the wiring of analog input meets the requirements.

2. Check that the extension cable of MC100-2AD/4AD is properly inserted in the extension port.

3. Check that the 5V and 24V power supplies are not overloaded. Note: The digital circuit is powered by the basic module through extension cable.

4. Check the application, make sure the operation method and parameter range are correct.

5. Set the MC100 basic module to RUN state.

8. Inspection Upon Fault

In case of abnormality, check the following items:

● The status of the POWER indicator

ON: the extension cable is properly connected;

OFF: check the extension cable connection and the basic module.

● The wiring of analog input

● The status of the 24V indicator

ON: 24Vdc power supply normal;

OFF: 24Vdc power supply possibly faulty, or MC100-2AD/4AD faulty.

● The status of the RUN indicator

Flash quickly: MC100-2AD/4AD in normal operation;

Flash slowly or OFF: Check the information in X-Builder configuration page.

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.