

## MC100-2DA/4DA Analog Quantity Output 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:

*MC100-2DA Analog Quantity Output Module*

*MC100-4DA Analog Quantity Output Module*

Version: V1.1

Revision Date: 2009-10-8

BOM Code: R29090037

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

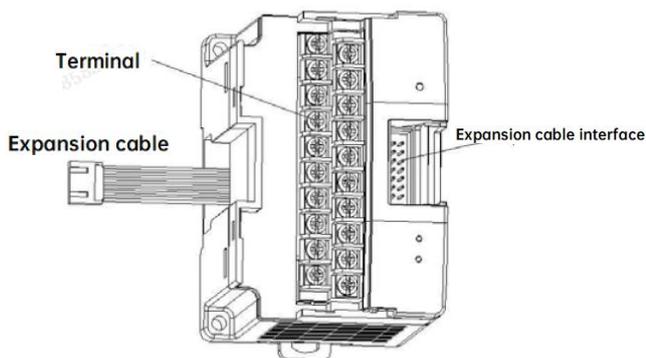


Fig. 1-1 Appearance and part name

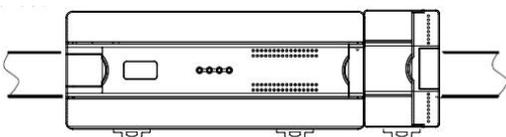
## 2. Installation Description

### 2.1 Installation method

The PLC must be installed horizontally on the backplane of the electrical cabinet, and maintain a distance of more than 20cm from the peripheral equipment or cabinet wall. The installation in other directions is not conducive to the PLC heat dissipation, and there can be no heating equipment under the PLC. As shown in the picture below:

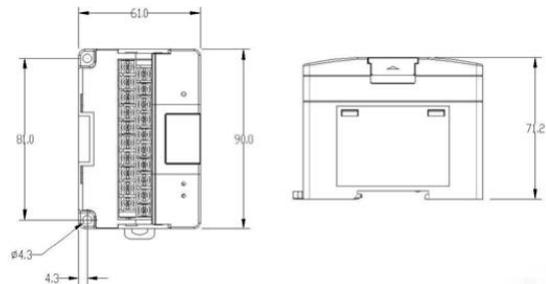
#### DIN rail mounting

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.

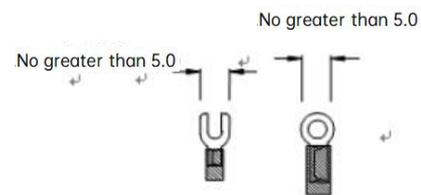


### 2.2 Cable connection and specification

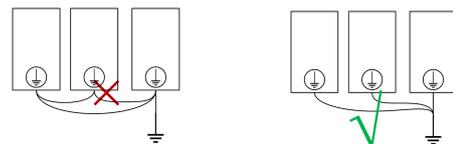
It is recommended to use stranded copper conductors and prefabricate insulated plugs to ensure connection quality. The following table lists the sectional areas and models of the recommended cables.

Cable	Recommended NO.	Cross-Section
AC power line (L, N)	AWG12/AWG18	1.0—2.0mm <sup>2</sup>
Ground line	AWG12	2.0mm <sup>2</sup>
Input signal (X)	AWG18/AWG20	0.8—1.0mm <sup>2</sup>
Input signal (Y)	AWG18/AWG20	0.8—1.0mm <sup>2</sup>

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 (0.1 μF ~ 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.

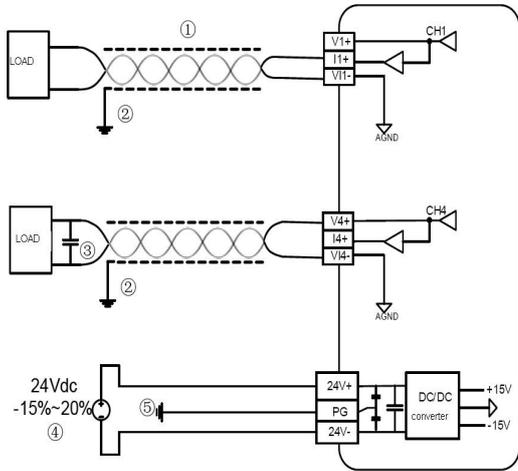


Fig.2-5 Terminal wiring diagram of MC100-4DA/2DA

### 3. Technical Specification

#### 3.1 Environmental Temperature

- ◆ Temperature range for PLC usage: -5°C~55°C. 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		Description
Power specification	Analog circuit	24Vdc (-15%~+20%), Max. ripple voltage 5%, 120mA (from basic module or external power supply)
	Digital circuit	5Vdc 50 mA (from basic module)
Conversion speed		2ms/channel (Changing the number of channels used will not change the conversion speed)
Analog output	Voltage output	-10Vdc~+10Vdc (External load impedance is not less than 2k $\Omega$ )
	Current output	0~20mA (External load impedance is not greater than 520k $\Omega$ )
Digital output		Default: -2000~+2000 Setting range: -10000~+10000
Resolution	Voltage output	5mV
	Current output	10 $\mu$ A

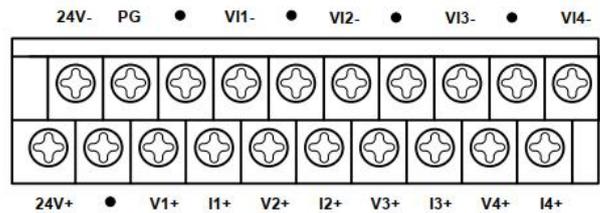
Accuracy	±1% of full range
Isolation	Between analog circuit and digital circuit: photocoupler. Between analog circuit and input 24Vdc power: internal isolation. Between analog channels: none

### 4. Terminal Introduction

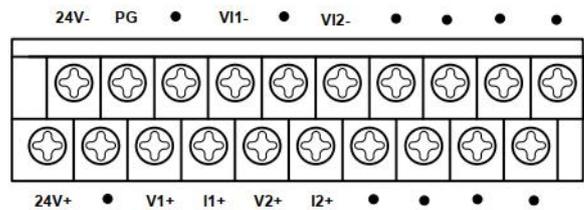
Table 4-1 describes the definitions of MC100-2DA/4DA terminals.

Remark	Description	Remark	Description
24V+	Positive 24V analog power	I2+	Current output of CH2
24V-	Negative 24V analog power	V12-	Common ground of CH2
.	NC	V3+	Voltage output of CH3
PG	GND	.	NC
V1+	Voltage output of CH1	I3+	Current output of CH3
.	NC	V13-	Common ground of CH3
I1+	Current output of CH1	V4+	Voltage output of CH4
V11-	Common ground of CH1	.	NC
V2+	Voltage output of CH2	I4+	Current output of CH4
.	NC	V14-	Common ground of CH4

MC100-4DA:



MC100-2DA:



### 5. Characteristic Setting

The output channel characteristic of MC100-2DA/4DA is the linear relationship between the channel's analog output quantity AO and digital output quantity DO. 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 (AO0, DO0) and Q1 (AO1, DO1), where DO0 is the channel's digital output corresponding to analog output AO0, and DO1 is the channel's digital output corresponding to analog output AO1.

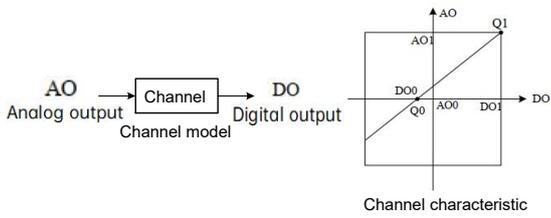


Figure 5-1 MC100-2DA/4DA channel characteristic

To simplify the operation process without affecting functions, AO0 and AO1 are respectively fixed to 0 and the maximum value in the current mode. That is to say, in Figure 5-1, AO0 is 0 and AO1 is the maximum analog output in the current mode. AO0 and AO1 will change according to the mode and users cannot change their values.

If you just set the channel mode without changing the value of DO0 and DO1, the channel characteristic should be as shown in Figure 5-2. The AO in Figure 5-2 is default.

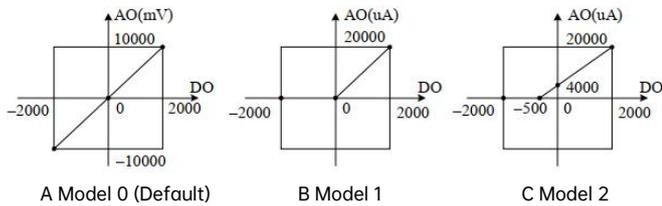


Fig. 5-2 Default characteristics corresponding to each mode

You can change the channel characteristic by changing DO0 and DO1. The setting range of DO0 and DO1 is -10,000 ~ 10,000. If the setting is outside this range, MC100-2DA/4DA will not accept it, but maintain the original valid setting. Figure 5-3 provides for your reference an example of changing channel characteristics.

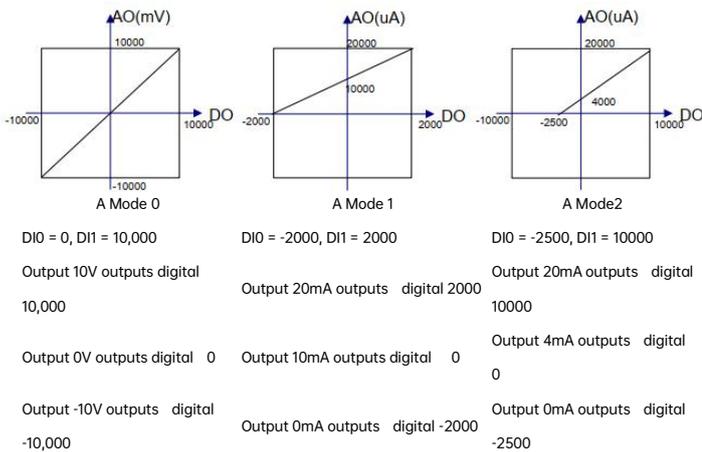


Fig. 5-3 Changing channel characteristics

## 6. Application Example

Example: Set MC100-2DA/4DA CH1 and CH2 to mode 0 (-10V ~ 10V), set CH3 to mode 1 (0 ~ 20mA), and CH4 to mode 2 (4 ~ 20mA).

Set as per the following: CH1 outputs the saw-tooth wave (-10V ~ 10V), using variant D1. CH2 outputs 5V voltage, using variant D2; CH3 outputs 5mA current, using variant D3; CH4 outputs 7.2mA current, using variant D4.

The channel setting interface is as follows:

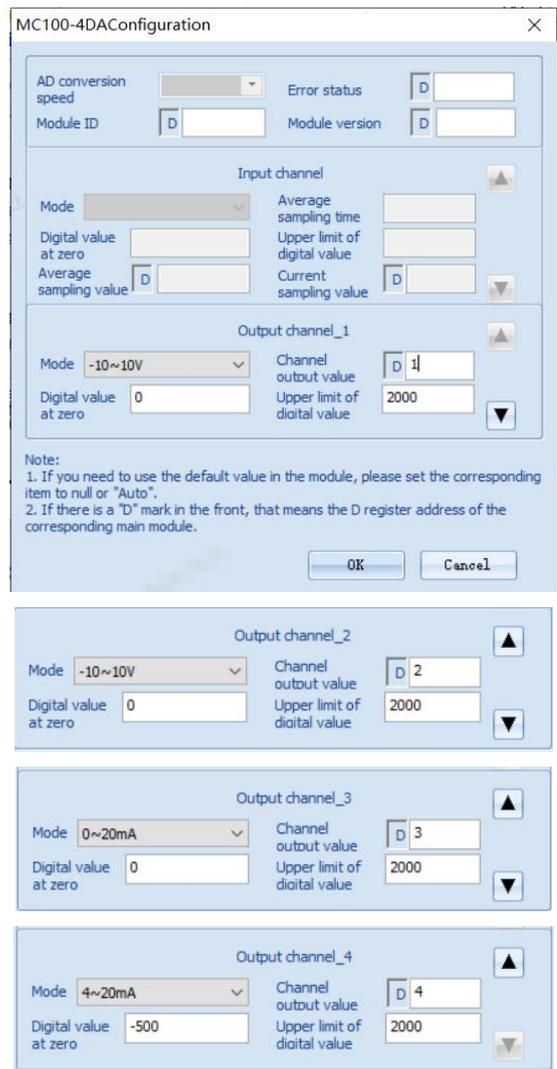


Fig 6-1 Channel property setting

User program:

```

/*Output data variable: D1 is saw-tooth variable, D1, D2 and D3 are constant*/
SM1 [ MOV -2000 D1 ]
SM0 [ ADD D1 10 D1 ]
[ > D1 2000 [ MOV -2000 D1 ]
M0 [ MOV 1000 D2 ]
M1 [ MOV 500 D3 ]
M2 [ MOV 720 D4 ]

```

## 7. Routine Inspection

1. Check that the wiring of analog input meets the requirements.
2. Check that the extension cable of MC100-2DA/4DA 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 MC100-2DA/4DA faulty.

- The status of the RUN indicator

Flash quickly: MC100-2DA/4DA 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.

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