

MC100 Series PLC Quick Start

User Manual

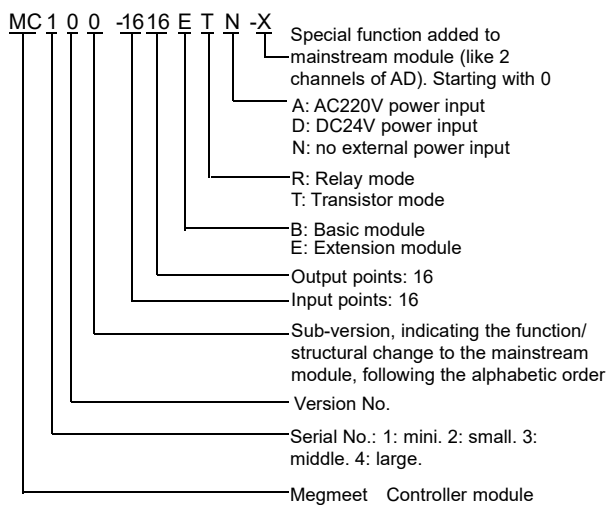
Thank you for using Megmeet programmable logic controller (PLC). Before using the MC100 series PLC product, please carefully read this booklet so as to better understand it, fully use it, and ensure safety.

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. Briefly introduced in this booklet are the hardware specs, features, and usage of MC100 series PLC, plus the optional parts and FAQ for your reference. For detailed product information, please refer to our *MC100 Series PLC User Manual*, *ControlStar Programming Software User Manual*, and *MC200/MC100 Series PLC Programming Manual*. For ordering the above user manuals, contact your Megmeet distributor or sales office.

1 Introduction

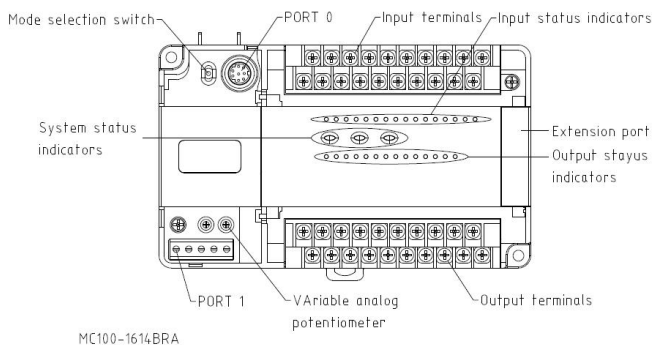
1.1 Model Designation

The model designation is shown in the following figure.



1.2 Outline

The outline of the basic module is shown in the following figure by taking the example of MC100-1614BRA.



PORT0 and PORT1 are communication terminals. PORT0 uses RS232 mode with Mini DIN8 socket. PORT1 uses RS485 or RS232 mode. The busbar socket is for connecting the extension module. The mode selection switch has three positions: ON, TM and OFF.

1.3 Terminal Introduction

Different PLC has different terminal layout. Listed in the following table are the terminals common in all PLCs.

Pin	Function
L/N	220Vac input live line and neutral line
⊕	Earth terminal
+24V	Auxiliary DC power for users' external equipment, work with COM
COM	Negative pole of +24V auxiliary power
S/S	Input mode selection: sink mode when connected with +24V, or source mode when connected with COM
●	Null, for isolation. Leave it suspended

The input & output terminals of different PLCs are shown below.

MC100-1006BRA, MC100-1006BTA

Terminal	Function
X0 ~ X11	Digital inputs, work with COM to generate input signal
Y0, COM0	Digital outputs, group 0
Y1, COM1	Digital outputs, group 1
Y2 ~ Y5, COM2	Digital outputs, group 2

The COMx of different output groups are isolated from each other

MC100-1410BRA, MC100-1410BTA

Terminal	Function
X0 ~ X15	Digital inputs, work with COM to generate input signal
Y0, COM0	Digital outputs, group 0
Y1, COM1	Digital outputs, group 1
Y2~Y11, COM2	Digital outputs, group 2

The COMx of different output groups are isolated from each other

MC100-1614BRA, MC100-1614BTA

Terminal	Function
X0 ~ X17	Digital inputs, work with COM to generate input signal
Y0, COM0	Digital outputs, group 0
Y1, COM1	Digital outputs, group 1
Y2 ~ Y7, COM2	Digital outputs, group 2
Y10~Y15, COM3	Digital outputs, group 3

The COMx of different output groups are isolated from each other

MC100-2416BRA, MC100-2416BTA

Terminal	Function
X0 ~ X27	Digital inputs, work with COM to generate input signal
Y0, COM0	Digital outputs, group 0
Y1, COM1	Digital outputs, group 1
Y2 ~ Y7, COM2	Digital outputs, group 2
Y10~Y17, COM3	Digital outputs, group 3

The COMx of different output groups are isolated from each other

MC100-3624BRA, MC100-3624BTA

Terminal	Function
X0 ~ X43	Digital inputs, work with COM to generate input signal
Y0, COM0	Digital outputs, group 0
Y1, COM1	Digital outputs, group 1
Y2 ~ Y7, COM2	Digital outputs, group 2
Y10 ~ Y17, COM3	Digital outputs, group 3
Y20 ~ Y27, COM4	Digital outputs, group 4

The COMx of different output groups are isolated from each other

MC100-1614BRA1, MC100-1614BTA1

Terminal	Function
X0 ~ X17	Digital inputs, work with COM to generate input signal
Y0, COM0	Digital outputs, group 0
Y1, COM1	Digital outputs, group 1
Y2 ~ Y7, COM2	Digital outputs, group 2
Y10~Y15, COM3	Digital outputs, group 3
AV1+, AI1+, AV11-	Analog input, group 1. AV1+: + U input, AI1+: + I input, AV11-: common negative pole for Uinput and I input
AV2+, AI2+, AV12-	Analog input, group 2. AV2+: + U input, AI2+: + I input, AV12-: common negative pole for U input and I input
AVO+, AIO+, AO-	Analog output. AVO+: + U output, AIO+: + I output, AO-: common negative pole for U output and I output

2 Power Supply

The specification of PLC built-in power and power for extension modules is listed in the following table.

Item	Unit	Min.	Rated	Max.	Note
Power supply voltage	Vac	85	220	264	Normal startup and operation
Input current	A	/	/	1.5	Input: 90Vac, 100% output
Output current	5V/GND	mA	/	900	The total power of outputs 5V/GND and 24V/GND ≤ 10.4W. Max. output power: 24.8W (sum of all branches)
	24V/GND	mA	/	300	
	24V/COM	mA	/	600	

3 Digital Inputs & Outputs

Input Characteristic And Specification

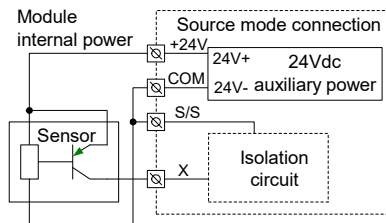
The input characteristic and specs are shown as follows:

Item	High-speed input terminals X0~X7	General input terminal
Input mode	Source mode or sink mode, set through S/S terminal	
Electric parameters	Input voltage	24Vdc
	Input impedance	3.3kΩ
	Input ON	External circuit resistance < 400Ω
	Input OFF	External circuit resistance > 24kΩ
Filtering function	Digital filter	X0~X17 have digital filtering function. Filtering time: 0, 8, 16, 32 or 64ms (selected through user programme)
	Hardware filter	Input terminals other than X0 ~ X17 are hardware filters. Filtering time is about 8ms
High-speed function	X0~X7: high-speed counting, interrupt, and pulse catching X0 and X1: up to 50kHz counting frequency X2~X5: up to 10kHz counting frequency The sum of input frequency should be less than 60kHz	
Common terminal	Only one common terminal: COM	

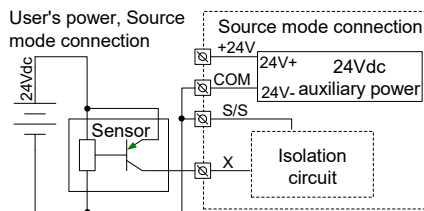
The input terminal act as a counter has a limit over the maximum frequency. Any frequency higher than that may result in incorrect counting or abnormal system operation. Make sure that the input terminal arrangement is reasonable and external sensors used are proper.

PLC provides the S/S terminal for selecting input mode: sink mode or source mode. You can select the sink mode by connecting S/S terminal with +24V terminal, which enables you to connect a NPN mode sensor.

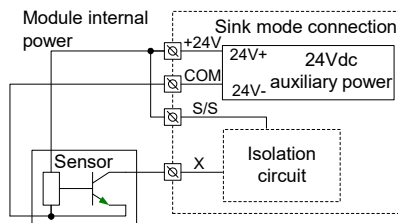
Wiring of source mode input with internal power



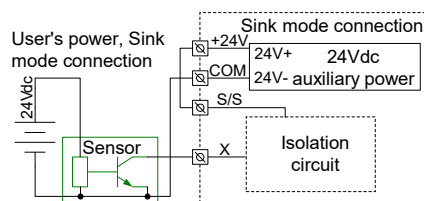
Wiring of source mode input with external power



Wiring of sink mode input with internal power



Wiring of sink mode input with external power



Output characteristic and specification

The following table shows the relay output and transistor output.

Item	Relay output	Transistor output
Output mode	When output state is ON, the circuit is closed; OFF, open	
Common terminal	Divided into multiple groups, each with a common terminal COMn, suitable for control circuits with different potentials. All common terminals are isolated from each other	
Voltage	220Vac; 24Vdc, no polarity requirement	24Vdc, correct polarity required
Current	Accord with output electric specs (see following Table)	
Difference	High driving voltage, large current	Small driving current, high frequency, long lifespan
Application	Loads with low action frequency such as intermediate relay, contactor coil, and LEDs	Loads with high frequency and long life, such as control servoamplifier and electromagnet that action frequently

The electric specs of outputs is shown in the following table.

Item	Relay output terminal	Transistor output terminal
Switched voltage	Below 250Vac, 30Vdc	5~24Vdc
Circuit isolation	By Relay	PhotoCoupler
Operation indication	Relay output contacts closed, LED on	LED is on when optical coupler is driven
Leakage current of open circuit	/	Less than 0.1mA/30Vdc
Minimum load	2mA/5Vdc	5mA (5~24Vdc)
Max. output current	Resistive load	Y0, Y1: 0.3A/1 point; Others: 0.3A/1 point, 0.8A/4 point, 1.2A/6 point, 1.6A/8 point. Above 8 points, total current increases 0.1A at each point increase
	Inductive load	220Vac, 80VA Others: 12W/24Vdc
	Illumination load	220Vac, 100W Others: 1.5W/24Vdc
Response time	OFF→ON ON→OFF	Y0, Y1: 10us Others: 0.5ms
Y0, Y1 max. output frequency	/	Each channel: 100kHz
Output common terminal	Y0-COM0; Y1-COM1. After Y2, every 8 terminals use one isolated common terminal	
Fuse protection	No	

4 Analog Inputs & Outputs

4.1 Usage Of Analog Terminals

MC100 series PLC provides the basic module with integrated AD/DA function, serving as a small-scale total solution with low cost for users who need to control the analog signal.

PLCs that support input and output of analog signals are listed below:

Model	Analog input			Analog output		
	Channel number	V input	I input	Channel number	V input	I input
MC100-1614BRA1	2	✓	✓	1	✓	✓
MC100-1614BTA1	2	✓	✓	1	✓	✓

The user terminals related to analog signals are defined below.

	Terminal	Note		Terminal	Note
Analog input	AV1+	Input CH1: voltage input	Analog output	AVO+	Output CH: volt signal output
	AI1+	Input CH1: current input		AI0+	Output CH: current output
	AV1/-	Input CH1: common ground		AO-	Output CH: common GND
	AV2+	Input CH2: voltage input			
	AI2+	Input CH2: current input			
	AV2/-	Input CH2: common ground			

Note:

Never input voltage signal and current signal to the same channel simultaneously. When measuring the current signal, short the voltage signal input terminal with the current signal input terminal

4.2 Analog Signal Input & Output Specs

The analog signal input and output specs is listed in the following table.

Item	Description
Max. conversion speed	AD conversion 4ms/2 channels
	DA conversion 4ms/channel

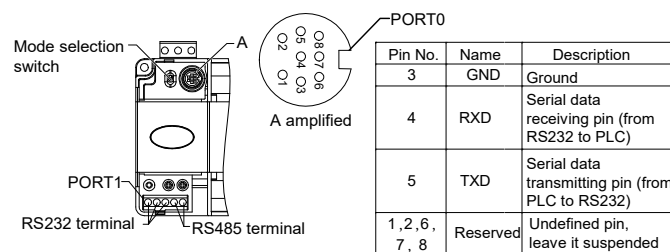
Item		Description
Analog input range	Voltage input	-10 ~ 10Vdc (input impedance $\geq 200k\Omega$), input signal freq. <10Hz. Warning: the unit could be damaged with input voltage $>\pm 15Vdc$
	Current input	-20 ~ 20mA (input impedance: 250Ω), input signal freq. <10Hz. Warning: the unit could be damaged with input voltage $>\pm 30mA$
Analog output range	Voltage output	-10~10Vdc(external load impedance: $2k\Omega\sim 1M\Omega$)
	Current output	0 ~ 20mA (external load impedance: $\leq 500\Omega$)
Digital range		-10000 ~ 10000
Resolution	Voltage I/O	5mV
	Current I/O	10 μ A
Total precision	Analog input	DC -10 ~ 10V, -20 ~ 20mA: $\pm 1\%$
	Analog output	$\pm 1\%$
Isolation		Between analog circuit and digital circuit: optical coupler. Between analog channels: none

5 Communication Port

MC100 series PLC basic module has two serial asynchronous communication ports: PORT0 and PORT1. Supported baud rates:

115200 bps	57600 bps	38400 bps	19200 bps
9600 bps	4800 bps	2400 bps	1200 bps

The mode selection switch determines the communication protocol.



As a terminal dedicated to user programming, PORT0 can be converted to programming protocol through the mode selection switch. The relationship between PLC operation status and the protocol used by PORT0 is shown in the following table.

Mode selection switch position	status	PORT0 operation protocol
ON	Running	Programming protocol, or Modbus protocol, or free-port protocol, or N: N network protocol (ECBUS), as determined by user program and system configuration
ON \rightarrow TM	Running	Converted to programming protocol
OFF \rightarrow TM	Stop	
OFF	Stop	If the system configuration of user program is free-port protocol, it converts to programming protocol automatically after stop; or system protocol keeps unchanged

PORT1 is ideal for connection with equipment that can communicate (such as inverters). With Modbus protocol or RS485 terminal free protocol, it can control multiple devices through the network. Its terminals are fixed with screws. You can use a shielded twisted-pair as the signal cable to connect communication ports by yourself.

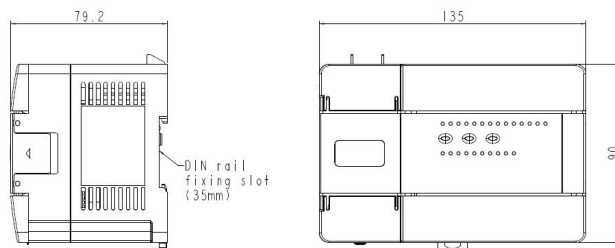
Note: Never use RS232 terminal and RS485 at the same time. Besides, suspend the unused terminals, or communication could be interrupted.

6 Installation

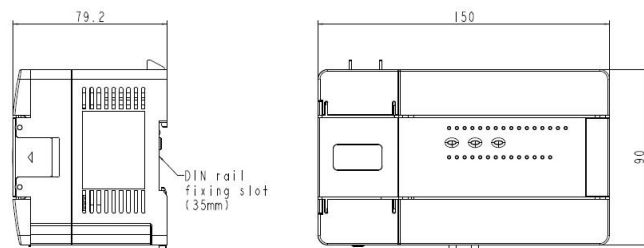
PLC is applicable to Installation category II, Pollution degree 2.

6.1 Installation Dimensions (Unit: mm)

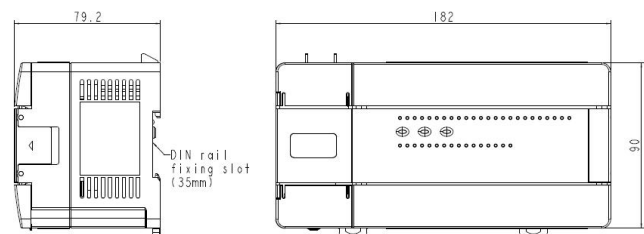
The dimensions for the outline and mounting holes of MC100-1006BRA and MC100-1006BTA are shown below:



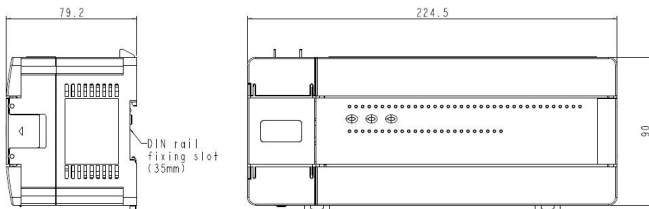
The dimensions for the outline and mounting holes of MC100-1614BRA and MC100-1614BTA are shown in the following figure:



The dimensions for the outline and mounting holes of MC100-2416BRA, MC100-2416BTA, MC100-1614BRA1 and MC100-1614BTA1 are shown in the following figure.

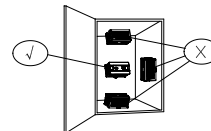


The dimensions for the outline and mounting holes of MC100-3624BRA and MC100-3624BTA are shown below:



6.2 Installation Position

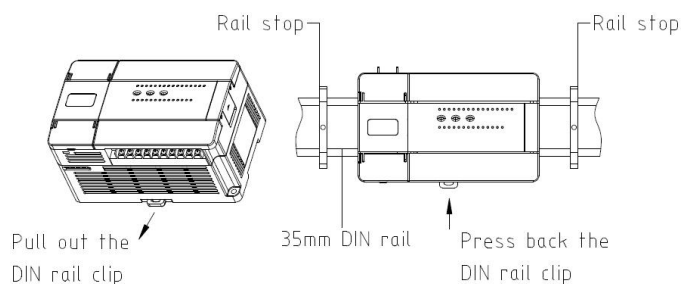
Mount the PLC onto the cabinet backboard horizontally. You must provide a clearance of at least 15cm, both above and below the unit, for proper cooling. Never mount them to the floor or ceiling of an enclosure or other directions. See the following figure. No heat generating equipment should be around the PLC.



6.3 Installation Method

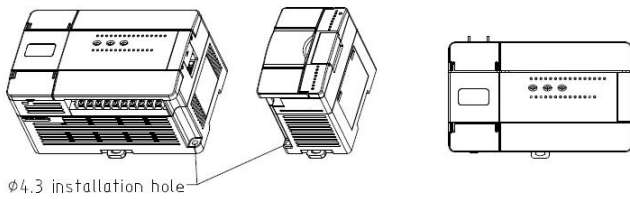
DIN rail mounting

Generally you can mount the PLC onto a 35mm-wide rail (DIN), as shown in the following figure.



Screw fixing

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



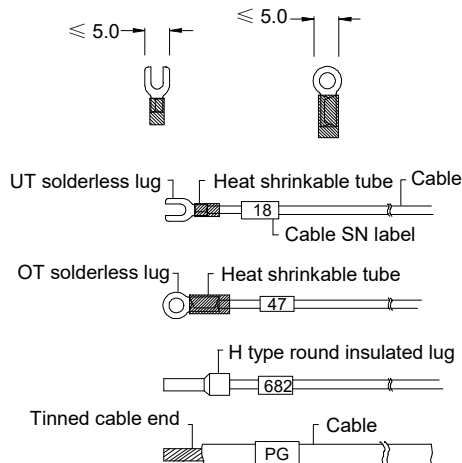
6.4 Cable Specs

When wiring a PLC, use multi-strand copper wire and ready-made insulated terminals to ensure the quality. The recommended model and the cross-sectional area of the cable are shown in the following table.

Wire	Cross-sectional area	Recommended model	Cable lug and heat-shrink tube
AC power cable (L, N)	1.0~2.0mm ²	AWG12, 18	H1.5/14 round insulated lug, or tinned cable lug
Earth cable (⊕)	2.0mm ²	AWG12	H2.0/14 round insulated lug, or tinned cable end
Input signal cable (X)	0.8~1.0mm ²	AWG18, 20	UT1-3 or OT1-3 solderless lug
Output signal cable (Y)	0.8~1.0mm ²	AWG18, 20	Φ3 or Φ4 heat shrinkable tube

Fix the prepared cable head onto the PLC terminals with screws. Fastening torque: 0.5~0.8Nm.

The recommended cable processing-method is shown in the following figure.



7 Power-on Operation And Maintenance

Startup

Check the cable connection carefully. Make sure that the PLC is clear of alien objects and the heat dissipation channel is clear.

1. Power on the PLC, the PLC POWER indicator should be on.
2. Start the Controlstar software on the host and download the compiled user program to the PLC.
3. After checking the download program, switch the mode selection switch to the ON position, the RUN indicator should be on. If the ERR indicator is on, the user program or the system is faulty. Loop up in the *MC200/MC100 series PLC Programming Manual* and remove the fault.
4. Power on the PLC external system to start system debugging.

Routine maintenance

Do the following:

1. Ensure the PLC a clean environment. Protect it from aliens and dust.
2. Keep the ventilation and heat dissipation of PLC in good condition.
3. Ensure that the cable connections are reliable and in good condition.

Notice

1. The warranty range is confined to the PLC only.
2. **Warranty period is 18 months**, within which period Megmeet Network Power 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.
5. The service fee will be charged according to the actual costs. If there is any contract, the contract prevails.
6. Please keep this paper and show this paper to the maintenance unit when the product needs to be repaired.
7. If you have any question, please contact the distributor or our company directly.

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