



# MC500 Series PLC

## Hardware Manual

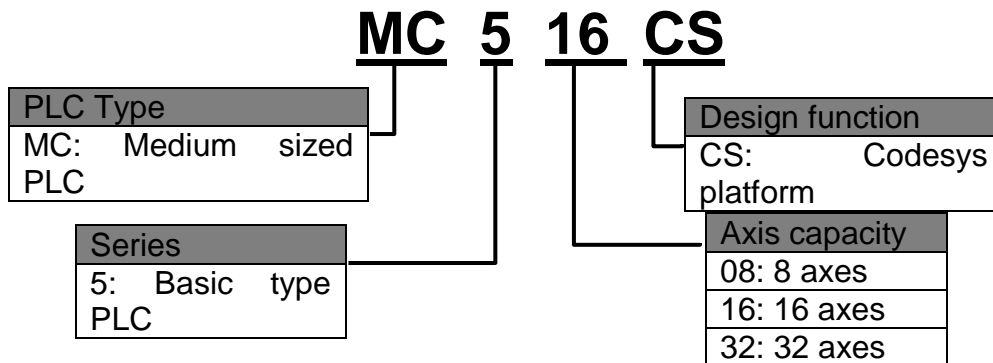


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202401 V0.01

## 1.1. Model Number and Nameplate

### 1.1.1. Model Number

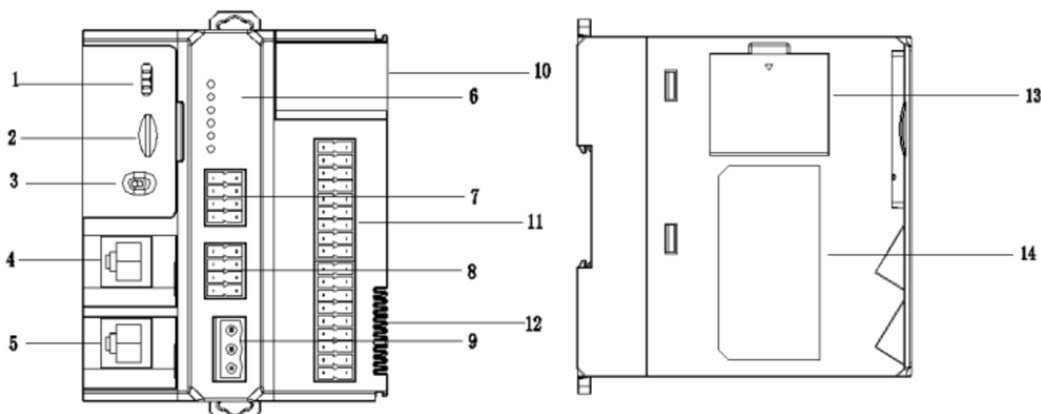


### 1.1.2. Nameplate

Leadshine
Model: MC516CS
POWER INPUT: DC24V 1A
16DI: DC24V NPN/PNP
16DO: DC24V NPN 0.3A
S/N: XXX-XXX-XXX



## 1.2. External Interface



- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. USB port</li> <li>2. SD card slot</li> <li>3. RUN/STOP/RESET Switch</li> <li>4. Internet port</li> <li>5. EtherCAT port</li> <li>6. Running status indicator light</li> <li>7. RS485 port</li> </ol> | <ol style="list-style-type: none"> <li>8. RS232 port, CAN port</li> <li>9. Power port</li> <li>10. I/O status indicator light</li> <li>11. I/O port</li> <li>12. Extension module port</li> <li>13. Battery slot</li> <li>14. Label</li> </ol> |
|--|--|

No.	Interface	Name	Definition	Description
1	USB port	/	USB connect	Type-C connector connecting with PC
2	SD card slot	SD	SD card holder Used for inserting SD cards	User download program, standard micro SD card , FAT32 type, Maximum capacity 32G
3	RUN/STOP/RESET Switch	/	RUN- system run STOP- system stop	Switching RUN/STOP 5 times within 5 second to trigger restore factory settings
4	EtherNET Port	EtherNET	Ethernet communication RJ45 port	Modbus TCP/IP protocol
5	EtherCAT Port	EtherCAT	EtherCAT communication	/
6	Running status indicator light	POWER	Power status	Light up when power on, light off when power off
		RUN	System status	Light up when system run, light off when system stop
		ERR	System failure	/
		CRUN	CANopen run	/
		CERR	CANopen error	/
		BAT	Battery error	Alarm when battery level low
7	RS485 port	R(COM0)	Termination resistor	Modbus RTU protocol Free communication protocol
		485+(COM0)	485+	
		485-(COM0)	485-	
		GND(COM0)	GND	
		R(COM1)	Terminator	
		485+(COM1)	485+	
		485-(COM1)	485-	
		GND(COM1)	GND	
8	CANopen port	R	CAN terminator	CANopen protocol
		H	CAN differential H signal	
		L	CAN differential L signal	
		GND	CAN ground	
	RS232 port	TXD(COM2)	TXD	Modbus RTU protocol Free communication protocol
		RXD(COM2)	RXD	
		GND(COM2)	GND	
9	Power port	24V	DC 24V input	DC 24V input
		EGND		
		PE		
10	I/O status indicator light	/	16 input 16 output	Lights up when signal valid, light off when signal invalid
11	I/O port	/		Refer to pins definition
12	Extension module port	/	Connect to extension module	Maximum extend 32 module don't support hot swapping
13	Battery slot	Battery	Install spare battery	Install spare battery
14	Label	/	PLC label	/

## 1.3.Product Specification

### 1.3.1.General Specification

Specifications	MC508CS	MC516CS	MC532CS
	EtherCAT 8 axes + pulse 6 axes	EtherCAT 16 axes + pulse 6 axes	EtherCAT 32 axes + pulse 6 axes
Axes of Pulse	Local 6 axes 200K pulse output		
Module Capacity	Maximum extend 32 R2 series extension modules		
EtherNET	1* EtherNET port, Modbus,Socket,program upload or download ,debugging		
EtherCAT	EtherCAT master , up to 128 slaves		
Serial port communication	RS232*1,RS485*2,free communication protocol, modbus rtu master and slave		
CAN	Maximum 31 slave		
Capacity of Program file	20 M Byte		
Capacity of data	40 M Byte		
Power-Failure RetentionArea	512K Byte		
USB port	Type-C port, program upload or download, debugging		
SD card slot	User download program, standard micro SD card,FAT32 type, Maximum capacity 32G		
Function	Point to point , E-CAM, Interpolation		
High-speed counter	6 inputs ,200K		
IO Quantity	High-speed input/ normal input: 12 inputs 200K/4 inputs 1K(NPN/PNP) High-speed output/ normal output: 12 outputs 200K/4 outputs 10K(NPN)		
RTC clock	RTC		
Program software	Leadsys Studio ,CODESYS V3.5(SP15) or higher		
Program Language	ST,LD,CFC,SFC FBD,IL		
Power input	DC 24V		
Power rating	3.6W		
Dimension	L 98.50mm*W 81.75mm*H100.00mm		

### 1.3.2.Dimension



### 1.3.3.Input Specification

The input signal support NPN or PNP type.

- 1) Voltage is below 5.0V is disconnected (OFF),
- 2) Voltage of the input signal is greater than 15.0V is closed state (ON)

Specifications		Input (IN0~IN15)
Input type		NPN/PNP NPN:SS0/SS1 connect to 24V+ PNP:SS0/SS1 connect to 0V
Electrical Parameters	Input voltage	24VDC
	Input resistance	High speed input 3.3KΩ , normal input 4.7KΩ
	Input ON	Over DC 15V, Current above 5mA
	Input OFF	Below DC 5V, Current above 1mA
Filtering function	Digital filtering	Input(X0~X15),digital filtering 1~1000ms
High speed function		High speed counting function , frequency : 200K
Common		2 common terminal , SS0 for IN0~IN7,SS1 for IN8~IN15

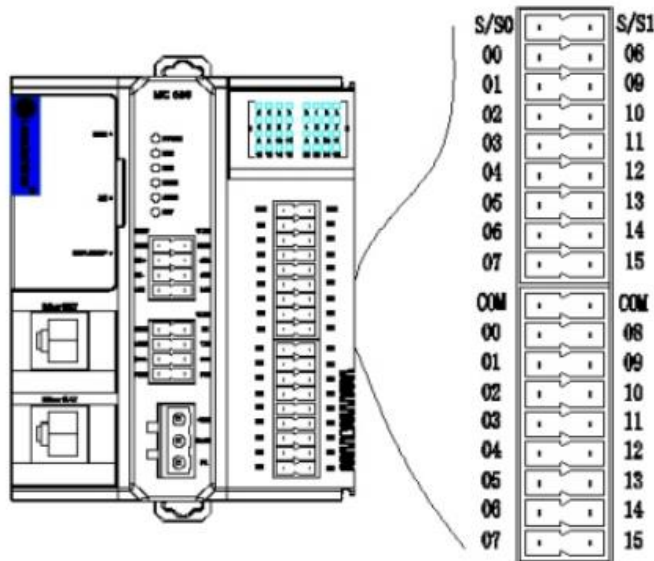
### 1.3.4.Output Specification

The output signal is NPN type.

- 1) The output is valid (state "ON"), it is in a low-level state,
- 2) And when the output is invalid (state "OFF"), it is in a high-level state.
- 3) The high-speed output circuit has a short circuit protection function.

Specifications		Output (Y0~Y15)
Voltage		DC5V~24V
Output type		NPN
Maximum output current	Resistive load	0.5A/output, 2.4A/COM
High speed output frequency		High speed output maximum frequency 200kHz, Normal output maximum frequency 10kHz
Common		Each group using one common terminal Non-isolated from each other

## 1.4. Terminal Layout

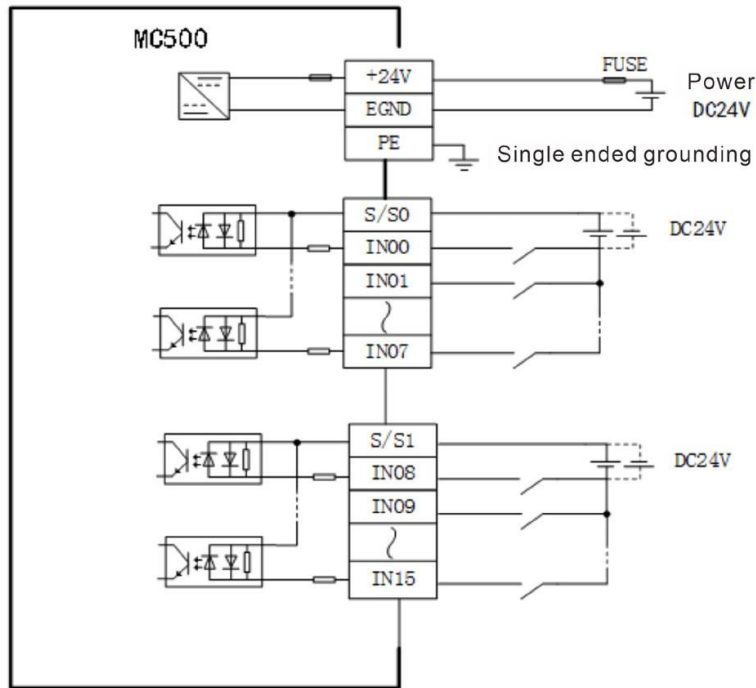


Label	Definition	Note	Label	Definition	Note
SS0	Input common		SS1	Input common	
0	High speed input		8	High speed input	
1	High speed input		9	High speed input	
2	High speed input		10	High speed input	
3	High speed input		11	High speed input	
4	High speed input		12	Normal input	
5	High speed input		13	Normal input	
6	High speed input		14	Normal input	
7	High speed input		15	Normal input	
COM	Output common		COM	Output common	
0	High speed output	Pulse Axis 0 PUL	8	High speed output	Pulse Axis 4 PUL
1	High speed output	Pulse Axis 0 DIR	9	High speed output	Pulse Axis 4 DIR
2	High speed output	Pulse Axis 1 PUL	10	High speed output	Pulse Axis 5 PUL
3	High speed output	Pulse Axis 1 DIR	11	High speed output	Pulse Axis 5 DIR
4	High speed output	Pulse Axis 2 PUL	12	Normal output	
5	High speed output	Pulse Axis 2 DIR	13	Normal output	
6	High speed output	Pulse Axis 3 PUL	14	Normal output	
7	High speed output	Pulse Axis 3 DIR	15	Normal output	

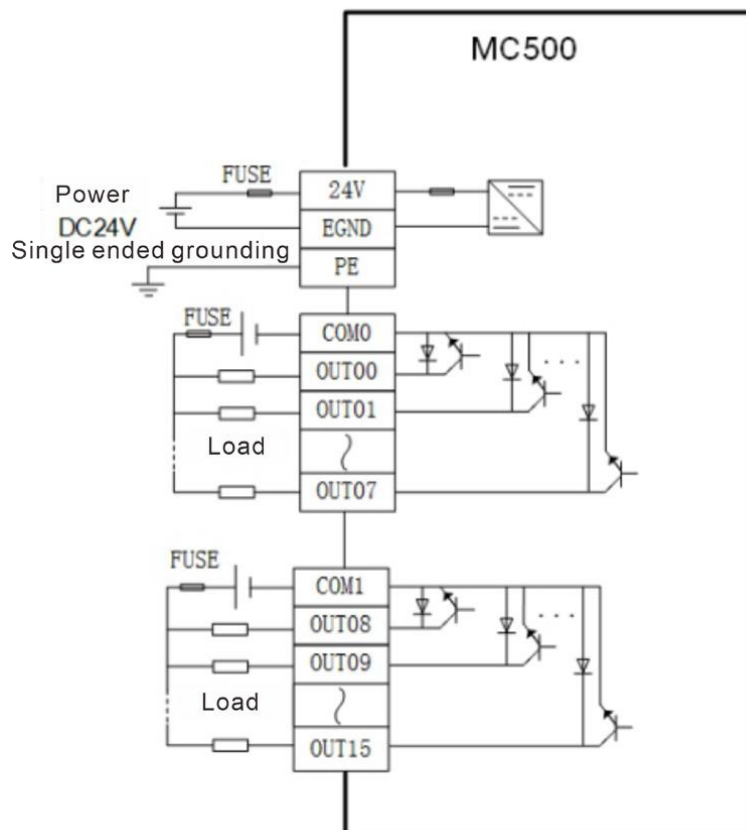
**1) When the inductive load suddenly turns off, a large reverse electromotive force will be generated between the contacts, users should connect a freewheeling diode in parallel on the load**

### 1.4.1. Equivalent internal circuit:

#### 1) Input equivalent circuit

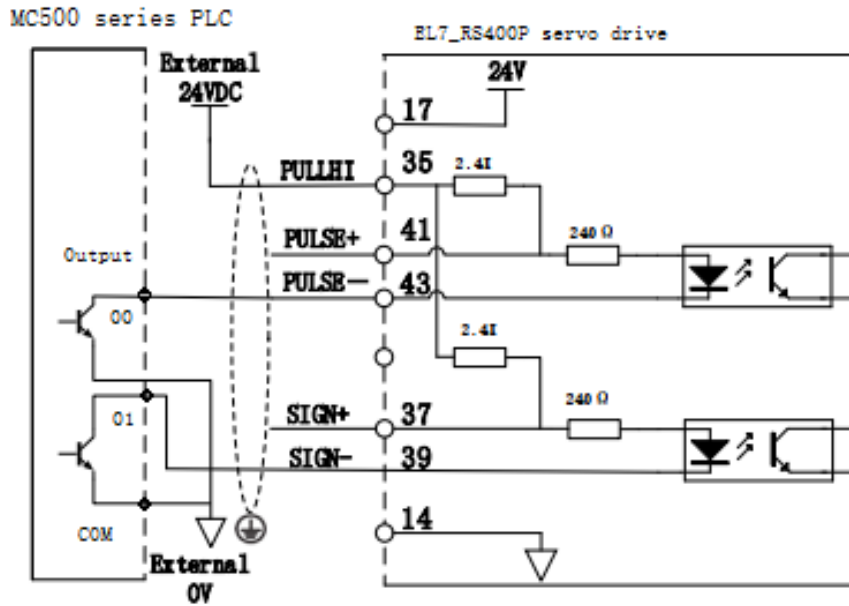


#### 2) Output equivalent circuit

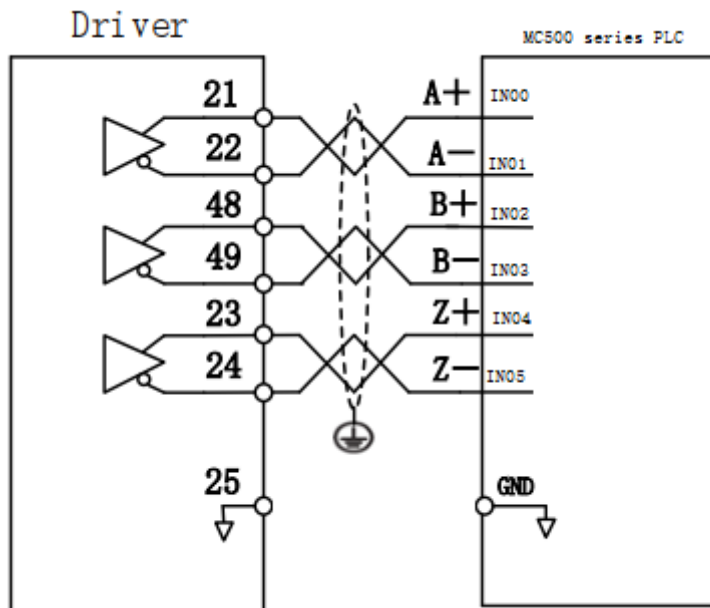


### 1.4.2.High Speed IO Wiring

#### 1) High speed output wiring



#### 2) High speed input counter wiring

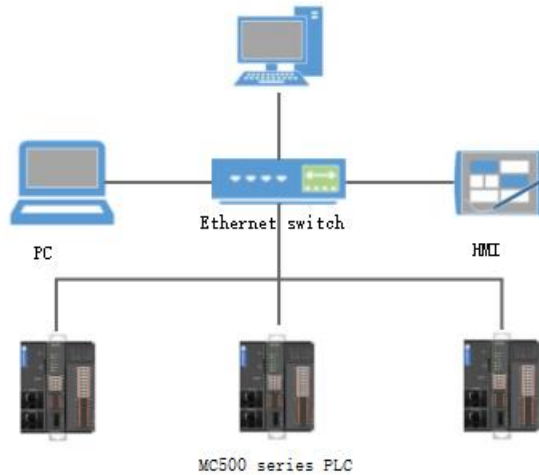




## 1.5.Communication Connection

### 1.5.1.Ethernet connection

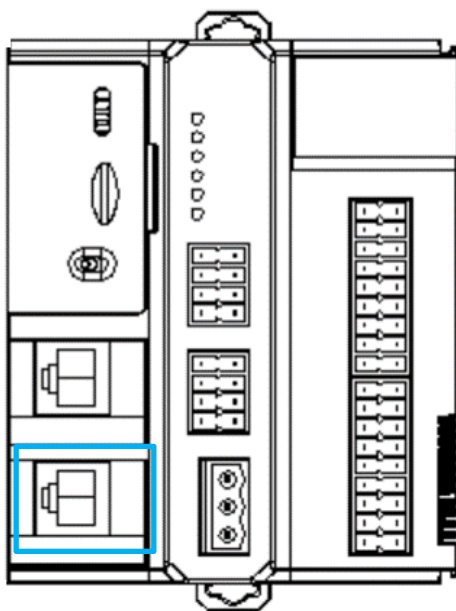
1) The PLC Ethernet port can be connected to the hub or switch through Ethernet cables, and connected to other network devices through the hub or switch to achieve multi-point connection.



2) The MC500 series can be connected through Ethernet cable directly, the default IP address is 192.168.1.3



### 1.5.2.EtherCAT Interface



1) Interface definition

No.	Signal name	Description
1	TX data+	Send data+
2	TX data-	Send data-
3	RX data+	Receive data+
4	/	/
5	/	/
6	RX data-	Receive data-
7	/	/
8	/	/

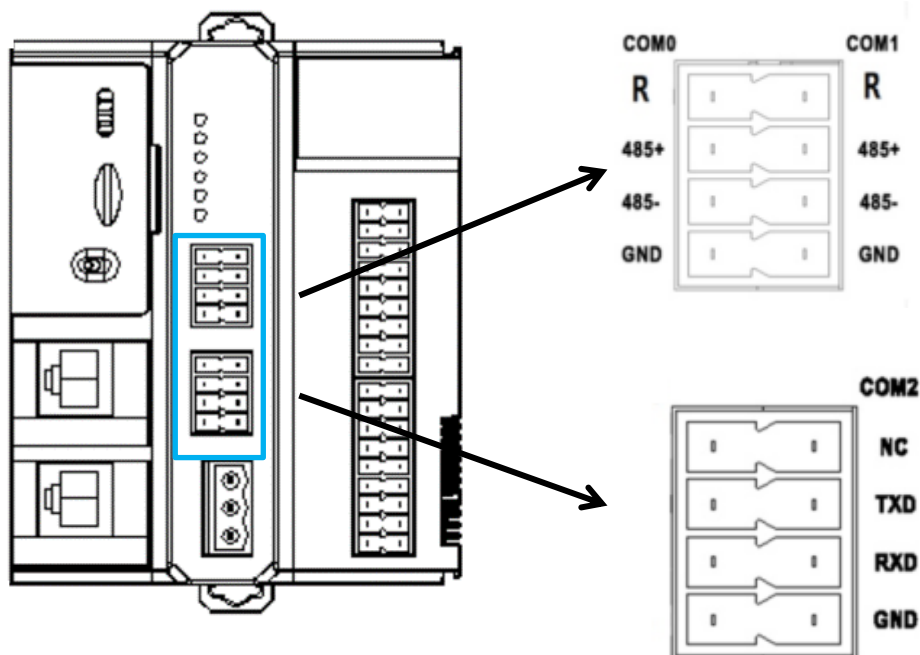
### 1.5.2.1. EtherCAT BUS Specification

Communication protocol	EtherCAT COE(PDO、 SDO)
Synchronous mode	Servo adopts DC distributed clock, and the IO adopts input and output synchronization
Physical layer	100BASE-TX
Baud rate	100 Mbps (100BASE-TX)
Duplex mode	Duplex
Topology	Line
Transmission media	Network cable
Maximum transmission distance between nodes	100m
Salve numbers	maximum 128
EtherCAT framelength	44Byte~1498Byte
Processing data	Maximum 1486 bytes per Ethernet frame

### 1.5.3. RS485/RS232 connection

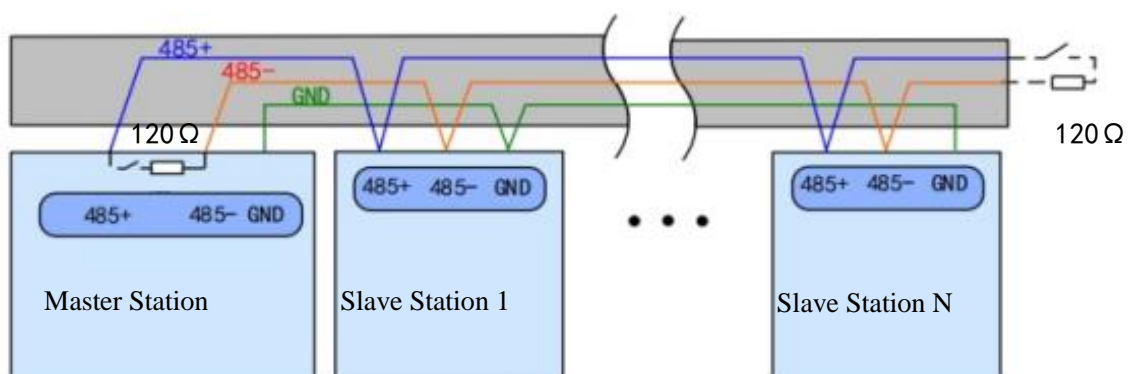
MC500 series PLC support 2 channels RS485 and 1 channel RS232 communication connection, baud-rate up to 115200bps

#### 1.5.3.1. Interface Definition



#### 1.5.3.2. Communication Diagram

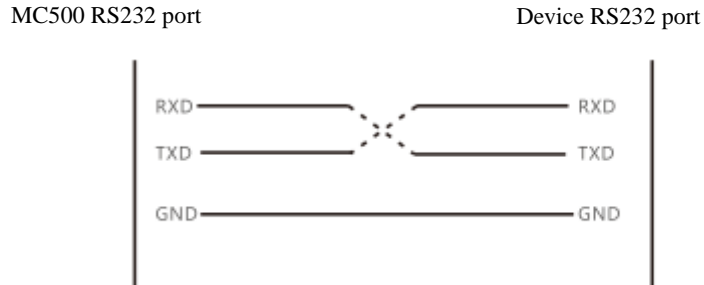
1) RS485 connection



2) RS32 connection

- Connect the data receiving pin of the host to the data sending pin of the serial device
- Connect the data sending pin of the host to the data receiving pin of the serial device
- Directly connect the grounding pin between the host and the serial device.

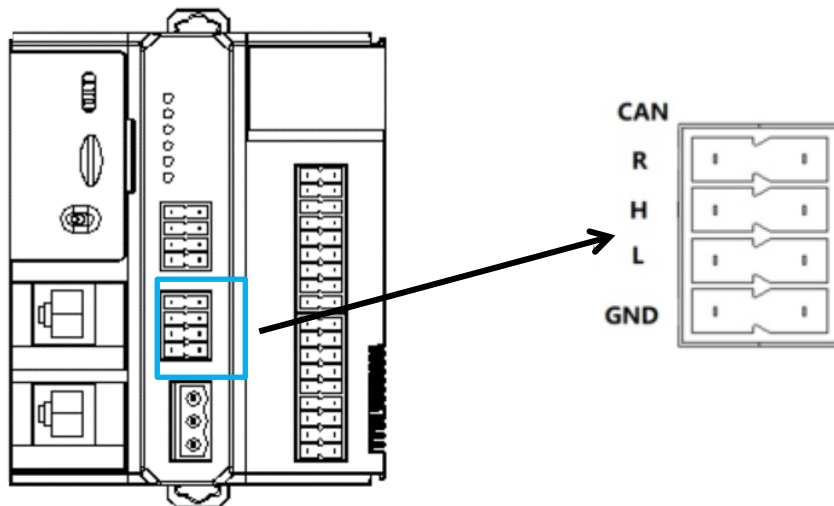
As shown in the following figure:



- 1) Please pay attention to matching the communication speed and line length.
- 2) When the baud rate is set to 115200, the line length should not exceed 3 meters.
- 3) Recommended to use a complete shielded communication line,

**1.5.4.CANopen connection**

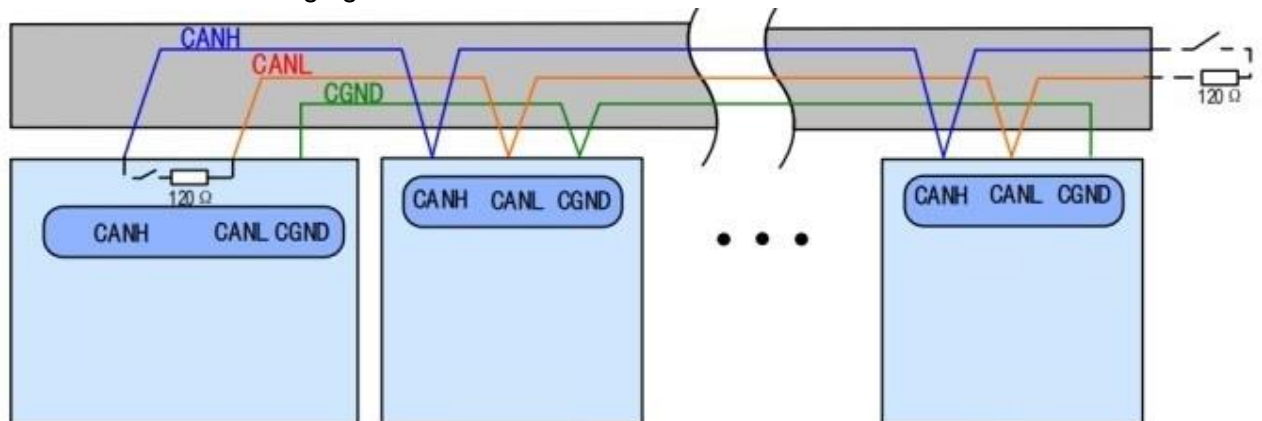
**1.5.4.1.Interface Definition**



**1.5.4.2.Communication Wiring**

- 1) All three wires of the devices must be connected together one by one.
- 2) A 120 Ω terminal resistor should be added to both ends of the bus

As shown in the following figure:



## 1.6.Operation And Maintenance

### ● Maintenance of battery

The battery of MC500 is used for RTC timing:

- (1) If no battery is installed or the battery is in a discharged state, the clock will stop timing:
- (2) The longest service life of a battery is 5 years, depending on the usage environment.
- (3) When the battery is about to run out of power, the BAT indicator light will turn red

### ● Restore factory default IP address

The default IP address of the MC500 host at the factory is 192.168.1.3.

- (1) If the address is modified, communication with another PC unit network may not be able to match due to forgetting the last IP address modification.
- (2) In the presence of a PC environment, connect the PC and PLC host through the TYPE C interface, and set the IP address of the host through the LeadSys Studio software.
- (3) In the absence of a PC environment, the initialization setting of the host IP address can be triggered by quickly switching the status of the "RUN/STOP" switch.

### ● SD card burning user program

- (1) Compile the SD card user program generated by LeadSys studio, store it in the root directory of the SD card, and then load the SD card into the PLC main module.
- (2) Power off and restart the PLC to update the program.
- (3) After the program download is completed, the RUN light will flash normally.
- (4) If the download fails or the program is not running, the RUN indicator light will turn off.

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