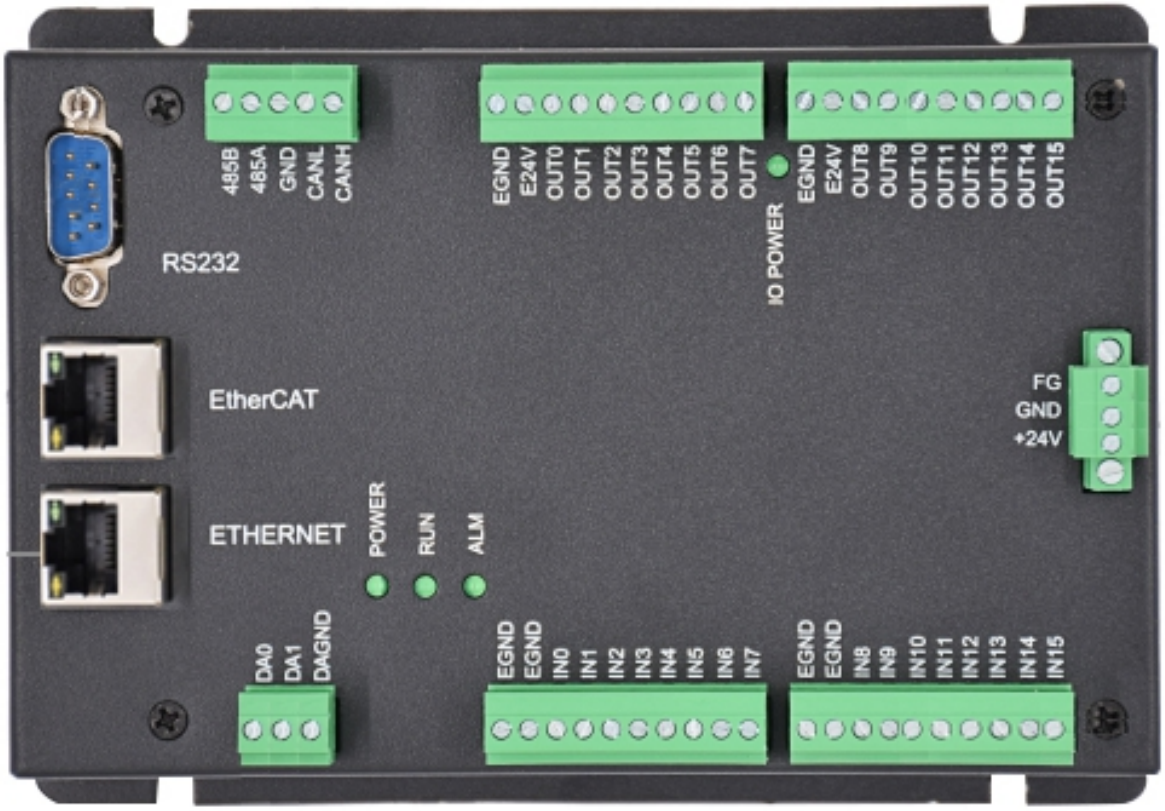
EMC8Z

Ether CAT 总线控制器使用手册

Ether CAT Ether CAT controller user manual User's Manual



摩川技术(深圳）有限公司

Moschon Technology (Shenzhen) Co. , Ltd.

目录

前言/Foreword

感谢您使用本公司总线控制器。

Thank you for using our bus controller.

在使用本产品前，请务必仔细阅读本手册，了解必要的安全信息、注意事项以及操作方法等。错误的操作可能引发极其严重的后果。

Before using this product, please read this manual carefully to understand the necessary safety information, precautions, and operation methods.Incorrect operation can have extremely serious consequences.

本产品的设计和制造不具备保护人身安全免受机械系统威胁的能力，请用户在机械系统设计和制造过程中考虑安全防护措施，防止因不当的操作或产品异常造成事故。

This product is designed and manufactured without the ability to protect personal safety from mechanical system threats. Users are advised to consider safety precautions during mechanical system design and manufacturing to prevent accidents caused by improper operation or product abnormalities.

由于产品的改进，手册内容可能变更，恕不另行通知。用户对产品的任何改装我公司将不承担任何责任。

阅读时，请注意手册中的以下标示：

Due to product improvements, the contents of this manual are subject to change without notice. Our company will not be responsible for any modification of the product by the user.

When reading, please pay attention to the following signs in the manual:

注意：提醒您注意文字中的要点。

小心：表示错误的操作可能导致人身伤害和设备损坏。

本产品经过国家强制 3C 认证，CE 认证，ROHS 认证

This product has passed the national mandatory 3C certification, CE certification, ROHS certification

1 概述/Overview

1.1 产品介绍/Product Introduction

EMC8Z 是运动控制器集成梯形图和组态软件的产品。EMC8Z 可应用于各种需要脱机或联机运行的场合。 EMC8Z 支持最多达 12 轴直线插补、电子凸轮、电子齿轮、同步跟随、虚拟轴设置等。 EMC8Z 支持多任务同时运行，同时可以在 PC 上直接仿真运行。

EMC8Z is a motion controller integrated ladder diagram and configuration software products. EMC8Z can be used in all kinds of situations that need to run offline or online. EMC8Z supports up to 12-axis LINEAR interpolation, electronic cam, electronic gear, synchronous follow, virtual shaft setup, etc. . The EMC8Z supports multitasking and can be run directly on a PC.

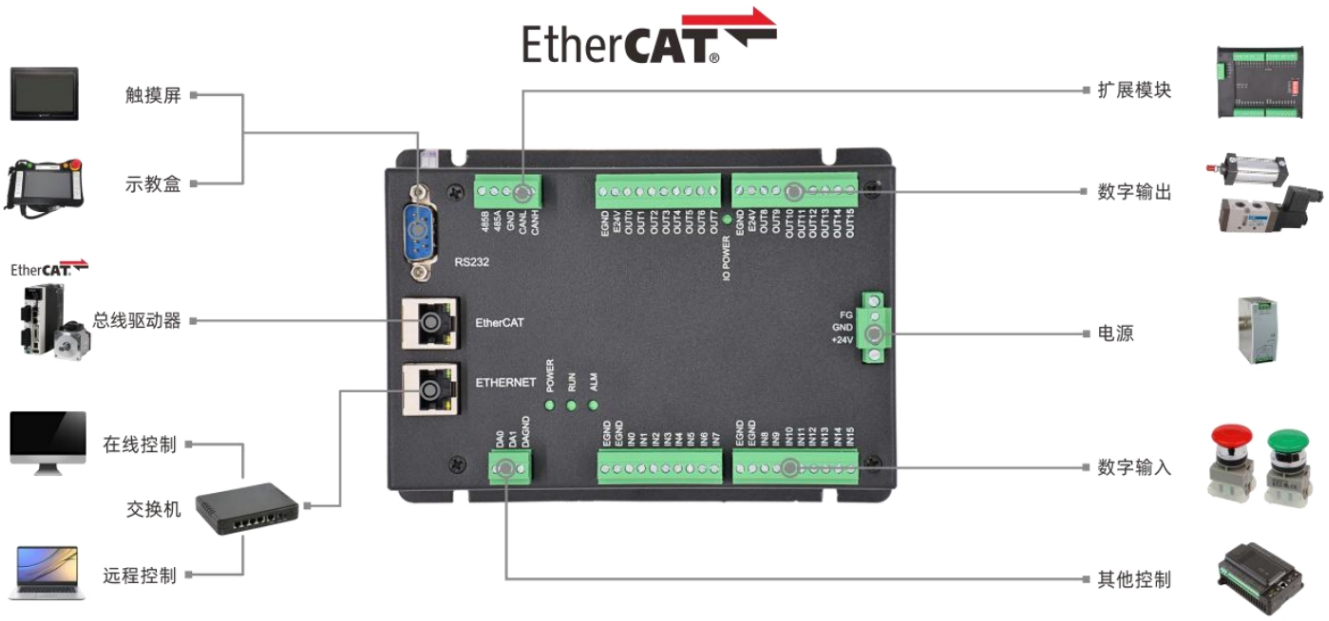
1.2 特性/Characteristics

● 支持 EtherCAT 总线通讯
Support for Ethercat bus communication
● 最多达 12 轴运动控制（虚拟轴数）
Up to 12-axis motion control (virtual axis)
● ECAT 最快 1ms 的刷新周期
The fastest refresh cycle of ECAT is 1ms
● 通过 CAN 总线，最多可扩展到 512 个隔离输入或输出口
With CAN bus, it CAN be extended to 512 isolated i/o ports
● 轴正负限位信号口/原点信号口可以随意配置为任何输入口
The axis positive and negative limit signal port/origin signal port can be randomly configured as any input port
● 输出口最大输出电流可达 300mA,可直接驱动部分电磁阀
The maximum output current can reach 300MA, which can drive part of solenoid valve directly
● RS232、RS485 接口、以太网接口
RS232, RS485 interface, ethernet interface
● 支持最多达 12 轴直线插补
Supports up to 12-axis LINEAR interpolation
● 支持电子凸轮、电子齿轮、位置锁存、同步跟随、虚拟轴等功能
Support Electronic Cam, electronic gear, position latching, synchronous follow, virtual axis and other functions
● 支持 ZBasic 多文件多任务编程
Support Zbasic multi-file multi-task programming
● 多种程序加密手段，保护客户的知识产权
A variety of encryption procedures to protect the intellectual property rights of customers
● 掉电检测，掉电存储
Power-down detection, power-down storage

1.3 连接配置/Connection configuration

EMC8Z 运动控制器支持以太网，232，CAN，485 等通讯接口，通过 CAN 总线可以连接各个扩展模块，从而扩展输入输出点数或运动轴(CAN 总线两端需要并接 120 欧姆的电阻)。

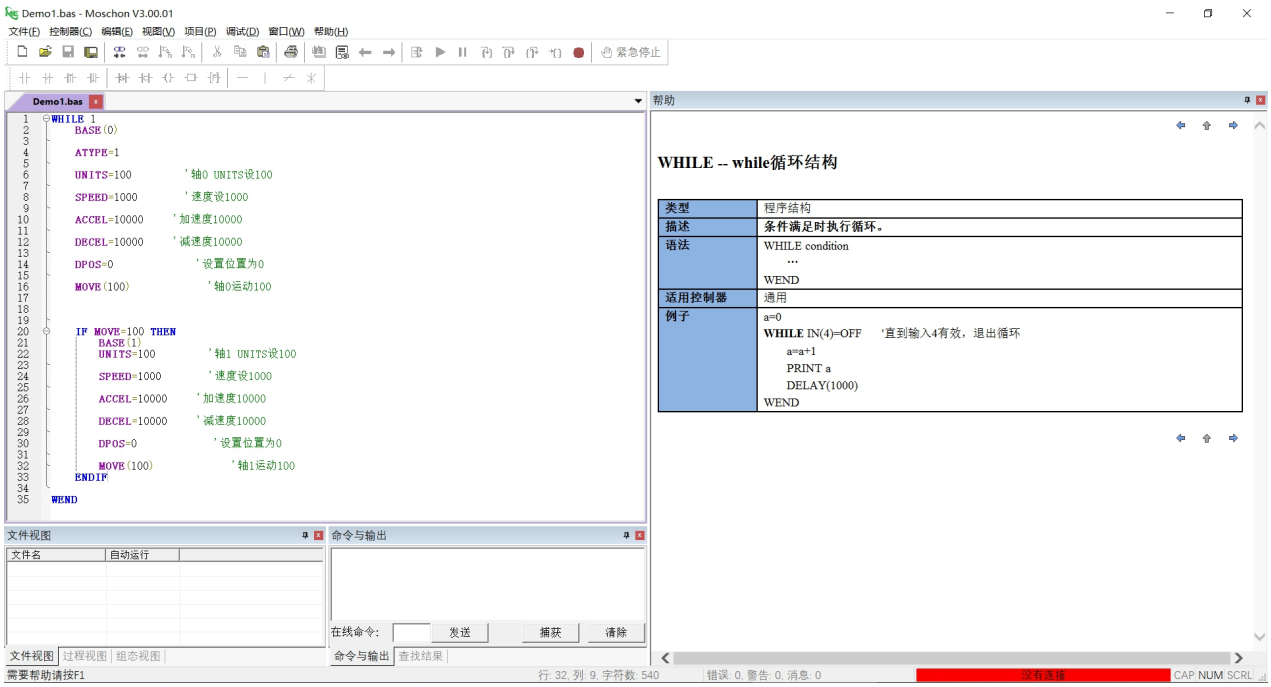
The EMC8Z motion controller supports Ethernet, 232, CAN, 485 and other communication interfaces. The CAN bus CAN be used to connect the extension modules to extend the input/output points or the motion axis (both ends of the CAN bus require 120 ohms of resistance to be connected) .



1.4 安装和编程/Installation and programming

EMC 控制器通过 Moschon 开发环境来调试，Moschon 是一个很方便的编程、 编译和调试环境。Moschon 可以通过串口、485、USB 或以太网与控制器建立连接。应用程序可以使用 VC,VB，VS，C++Builder，C#,等软件来开发。调试时可以 把 Moschon 软件同时连接到控制器，程序运行时需要动态库 emotion.dll。

The EMC controller is debugged through the Moschon development environment, which is a convenient programming, compilation, and debugging environment. Moschon can connect to the controller via serial port, 485, USB, or Ethernet. Application Program can use VC, VB, VS, c + + Builder, c # , and other software to develop. When debugging Moschon software can be connected to the controller at the same time, the program needs dynamic library emotion. Dll.



2 硬件描述 / Hardware description

2.1 EMC8Z 系列型号规格/EMC8Z series model specification

型号 Model number	EMC8Z
基本轴数 Number of basic axes	8
最多扩展轴数 Maximum number of extended axes	12
基本轴类型 BASIC AXIS type	Ether CAT
内部 IO 数 INTERNAL IO number	16 进 16 出（带过流保护） 16 in 16 out (with overcurrent protection)
最多扩展 IO 数 Maximum number of extended Io	512 进 512 出 512 In, 512 out
内部 AD/DA 数 Internal Ad/da number	2 路 DA（0-10V） Route 2 DA (0-10V)
最多扩展 AD/DA EXTEND AD/DA at most	256 路 AD，128DA 256 Ad, 128DA
脉冲位数 Number of pulses	32
编码器位数 Encoder digit	32
速度加速度位数 Number of bits of acceleration	32

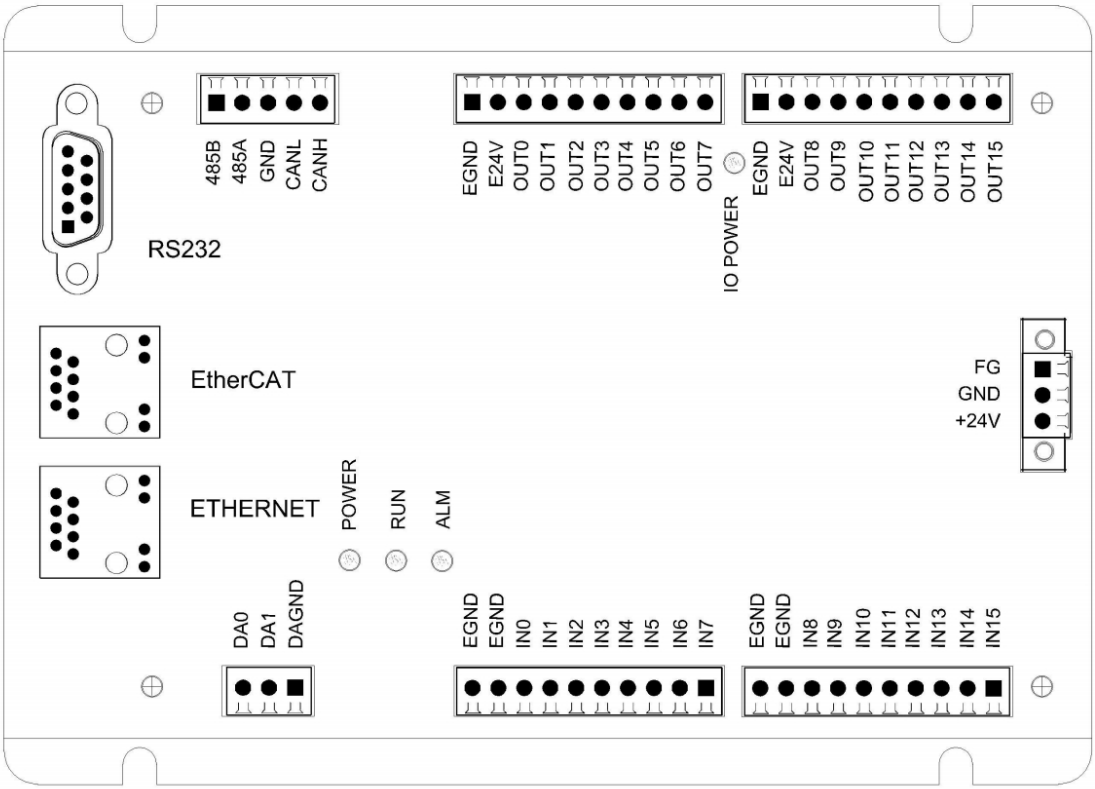
数组空间 Array space	320000
程序空间 Program space	6144kbyte
Flash 空间 Flash space	8129kbyte
电源输入 Power input	24V 直流输入（功耗 10W 内，不用风扇散热），IO24V 输入 24V DC input (power consumption within 10W, no fan cooling), IO24V input
通讯接口 Communication interface	RS232,RS485,RS422,以太网，U 盘，CAN,Ether CAT RS232, RS485, RS422, Ethernet, USB, CAN, Ether CAT
外形尺寸 Contour dimension	252*133mm

注：本系列不带脉冲轴和编码器
Note:This series does not carry pulse axes and encoders

2.1.1 订货信息

型号 Model number	规格描述 Specification
EMC8Z	8 轴 Ether CAT 控制，不支持圆弧插补、连续插补、不支持机械手 8 axis Ether CAT control, no ARC interpolation, continuous interpolation, no manipulator

2.2 EMC6Z/8Z 接线/EMC6Z/8z connection



注：
1.EMC8Z 具有 8 个轴，最多达 12 个虚拟轴。EMC8Z 可以通过扩展模块来扩展轴。
2.EMC8Z 板上自带 40 个通用输入口，16 个通用输出口，2 个 0-10V DA。
3.EMC8Z 带 1 个 RS232 串口，1 个 RS485,1 个 RS422，1 个以太网接口。
4.EMC8Z 带一个 CAN 总线接口，支持通过 ZCAN 协议来连接扩展模块。
5.EMC8Z 带一个 EtherCAT 接口，支持通过 ZCAN 协议来连接扩展模块。
Note:
1.EMC8Z has 8 axes and up to 12 virtual axes. The EMC8Z can extend the axis by extending the module.
2.EMC8Z board with 40 general-purpose input, 16 general-purpose output, 20-10V DA.
3.EMC8Z WITH 1 RS232 serial port, 1 RS485,1 RS422,1 Ethernet interface.
4.The EMC8Z comes with a CAN bus interface that supports connecting extension modules through the ZCAN protocol.
5.EMC8Z comes with an EtherCAT interface that supports connecting extension modules through the ZCAN protocol.

2.2.1 电源接口 CN16/Power Interface CN16

针脚号 Stitch number	名称 Name	说明 Account for
1	EARTH	安规地/屏蔽层 Ground/shielding layer
2	GND	内部电源地 Internal power source
3	+24V	内部电源 24V 输入 Internal Power 24V input

2.2.2 通讯接口 CN17/COM INTERFACE CN17

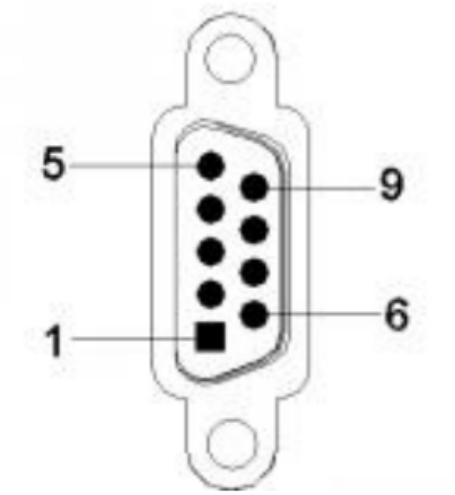
CAN 总线上链接多个控制器时，需要在最两边控制器的 CANL 与 CANH 端并接 120 欧姆的电阻。CAN 总线通讯双方必须保证对应 GND 连上或是控制器和扩展模块用同一个电源。EMC8Z 控制器和扩展模块用不同电源供电时：控制器电源 EGND 要连接扩展模块电源的 GND，否则可能烧坏 CAN。（接线参考见第三章扩展模块）

When multiple controllers are linked on the CAN bus, a 120 ohm resistor is required at the CANL and Canh ends of the most two-sided controller. Both sides of the CAN bus communication must ensure that the corresponding GND is connected or that the controller and the extension module use the same power supply. When the EMC8Z controller and the extension module are powered by a different power source: The controller power source, the EGND, is connected to the extension module power GND , otherwise it may burn out the CAN. (for wiring, see the extension module in Chapter 3.)

针脚号 Stitch number	名称 Name	说明 Account for
1	485B	485-
2	485A	485+

3	GND	内部电源地 Internal power source
4	CANL	CAN 差分数据- Can differential data -
5	CANH	CAN 差分数据+ CAN difference data

2.2.3 RS232 接口 CN12/RS232 interface CN12

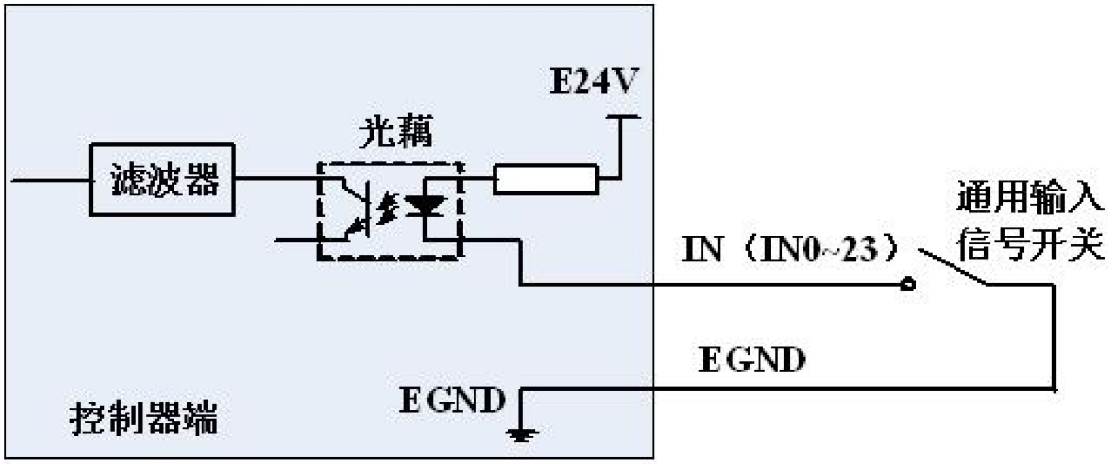


RS232 接口。其 9pin 引脚定义如下：
RS232 interface. The 9pin pin is defined as follows:

针脚号 Stitch number	名称 Name	说明 Account for
2	RXD	接收数据引脚 Data receiving pin
3	TXD	发送数据引脚 Send Data Pin
5	GND	内部电源地 Internal power source
9	E5V	电源 5V 输出，可用于对文本屏供电 Power Supply 5V output, can be used to power the text screen

注：与电脑连接需要使用双母头的交叉线
Note: The computer connection requires the use of a double-header cross-line

2.2.4 通用输入信号/Universal input signal



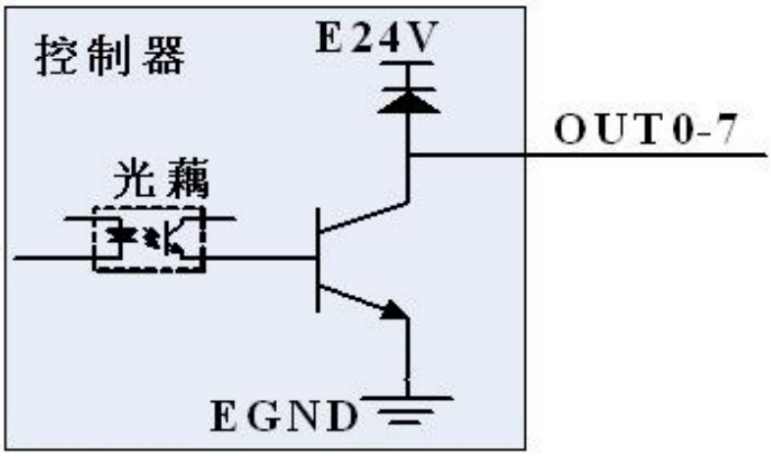
2.2.4.1 输入 0-7/Enter 0-7

针脚号 Stitch number	名称 Name	说明 Account for
1	IN7	输入 7 Inputting7
2	IN6	输入 6 Inputting6
3	IN5	输入 5 Inputting5
4	IN4	输入 4 Inputting4
5	IN3	输入 3 Inputting3
6	IN2	输入 2 Inputting2
7	IN1	输入 1 Inputting1
8	IN0	输入 0 Inputting0
9	EGND	IO 电源地 Io Power source
10	EGND	IO 电源地 Io Power source

2.2.4.2 输入 8-15/Enter 8-15

针脚号 Stitch number	名称 Name	说明 Account for
1	IN15	输入 15 Inputting15
2	IN14	输入 14 Inputting14
3	IN13	输入 13 Inputting13
4	IN12	输入 12 Inputting12
5	IN11	输入 11 Inputting11
6	IN10	输入 10 Inputting10
7	IN9	输入 9 Inputting9
8	IN8	输入 8 Inputting8
9	EGND	IO 电源地 Io Power source
10	EGND	IO 电源地 Io Power source

2.2.5 通用输出 CN10/General purpose output CN10



输出电路

2.2.5.1 输出 0-7/Output 0-7

针脚号 Stitch number	名称 Name	说明 Account for
1	EGND	IO 电源地 Io Power source
2	E24V	IO 电源正，输入电源 Io Power on. Input Power
3	OUT0	输出 0 Output 0
4	OUT1	输出 1 Output1
5	OUT2	输出 2 Output2
6	OUT3	输出 3 Output3
7	OUT4	输出 4 Output4
8	OUT5	输出 5 Output5
9	OUT6	输出 6 Output6
10	OUT7	输出 7 Output7

2.2.5.1 输出 8-15/Output 8-15

针脚号 Stitch number	名称 Name	说明 Account for
1	EGND	IO 电源地 Io Power source
2	E24V	IO 电源正，输入电源 Io Power on. Input Power
3	OUT8	输出 8 Output 8
4	OUT9	输出 1 Output9
5	OUT10	输出 10 Output10
6	OUT11	输出 11 Output11
7	OUT12	输出 12 Output12

8	OUT13	输出 13 Output13
9	OUT14	输出 14 Output14
10	OUT15	输出 15 Output15

注：请把内部电源 24V 和外部 IO 电源 24V 分开供电，特别是现场电磁干扰严重的情况下
Note: Please Supply Internal Power Supply 24V and external IO power supply 24V separately, especially in case of serious electromagnetic interference

2.2.6 ADDA 信号 /Adda signal

针脚号 Stitch number	名称 Name	说明 Account for
1	DAGND	模拟输出口 GND Analog Export Gnd
2	DA1	0-10V 模拟输入口 1 0-10V analog Input 1
3	DA0	0-10V 模拟输出口 0 0-10V analog output 0

3 扩展模块/ Extension Module

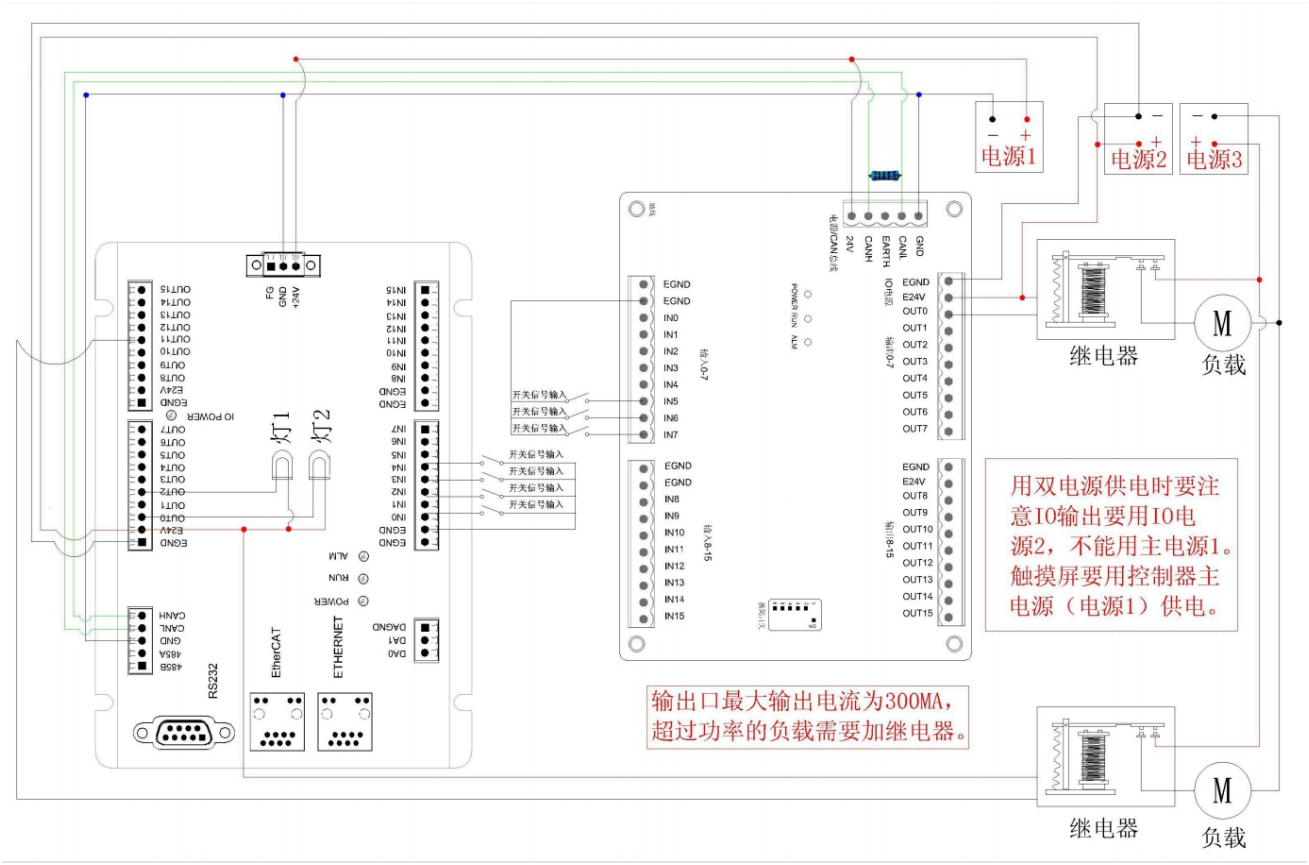
3.1 扩展模块 CAN 总线、输入输出、电源接线参考/Extension module CAN bus, input and output, power connection reference

CAN 总线上链接多个 MIO 扩展模块时，需要在最末端的 MIO 扩展模块 CANL 与 CANH 端并 接一个 120 欧姆的电阻。

EMC8 系列控制器采用单电源供电，MIO 扩展卡采用双电源供电，使用时将 IO 板的两路电源接到一路电源即可。EMC8Z 控制器和扩展模块用不同电源供电时：控制器电源 EGND 要 连接扩展模块电源的 GND，否则可能烧坏 CAN。

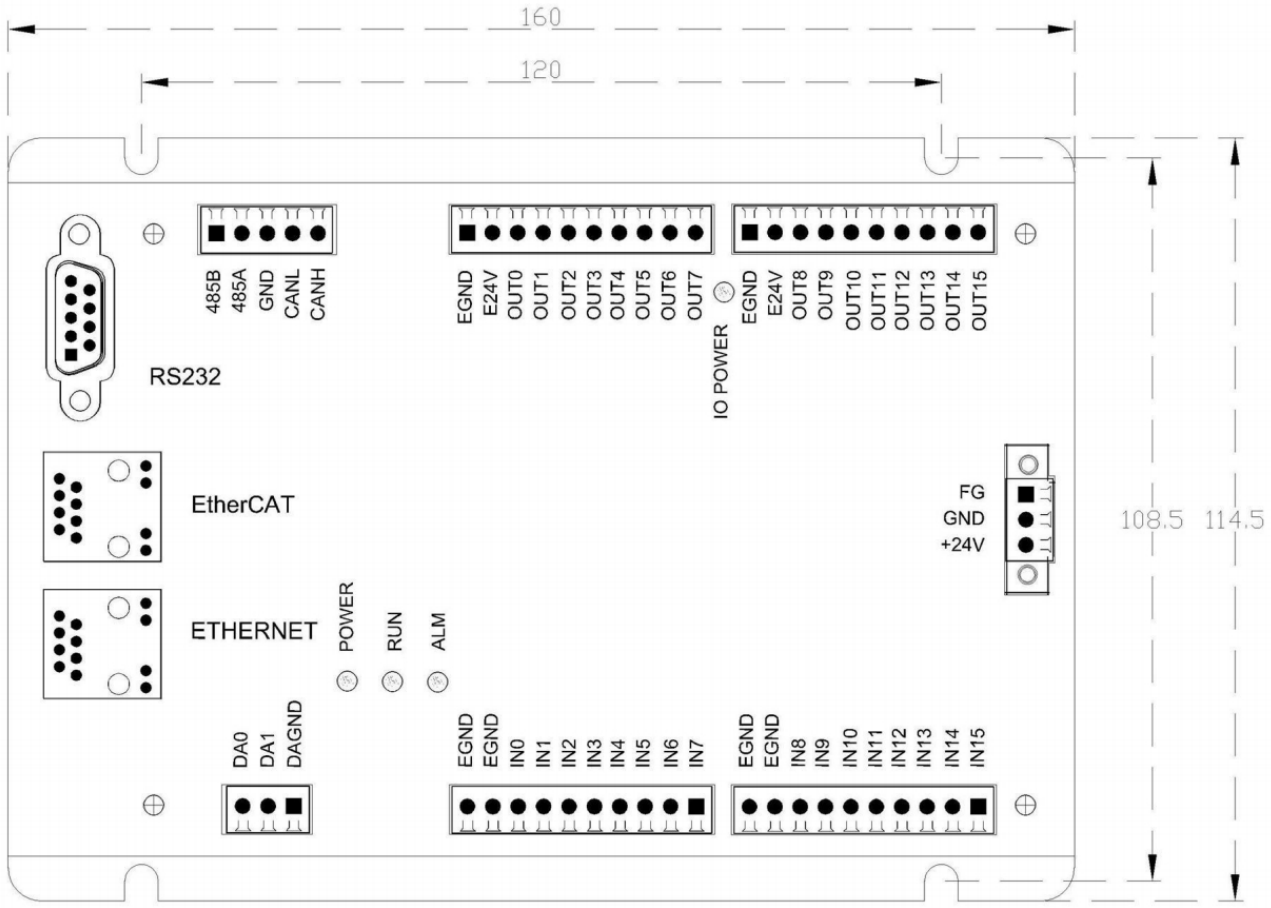
When multiple MIO extension modules are linked on the CAN bus, a 120 ohm resistor is connected to the Terminal Mio Extension Module CANL and Canh.

EMC8 series controller is powered by single power supply, MIO EXPANSION CARD is powered by double power supply. When in use, two power supply of IO board can be connected to one power supply. When the EMC8Z controller and the extension module are powered by a different power source: the controller power source, the EGND, is connected to the extension module power GND , otherwise it may burn out the CAN.



4 硬件安装/Hardware installation

4.1 EMC8Z 安装/EMC8Z installation



单位/Unit：mm
安装孔直径/Diameter of mounting hole： 5.5mm
高度/Height：75mm

5 常见问题/Frequently asked questions

问题 Questions	解决问题的建议 Advice on how to solve a problem
电机不转动 Motor not turning	确认控制器的 ATYPE 有配置正确 Verify that the controller's ATYPE is configured correctly
	确认脉冲发送方式和驱动器的输入脉冲方式是否匹配 Verify that the pulse mode is matched to the driver's input pulse mode
	确认是否有硬件限位，软件限位，ALM 信号起作用 Verify that the hardware, software, and ALM signals are active
	可以用测试软件进行测试，观察脉冲计数等是否正常 Can use the test software to test, observe whether the pulse count is normal or not
控制器已经正常工作，正常发出脉冲，但电机不转动 The controller is working properly, sending out pulses normally, but the motor is not turning	检查驱动器和电机之间的连接是否正确，驱动器与控制器之间的接线是否接触良好 Check that the connection between the drive and the motor is correct and that the wiring between the drive and the controller is in good contact
	确保驱动器工作正常，没有出现报警 Make sure the drive is working properly and there is no alarm
电机可以转动，但工作不正常 The motor can turn, but it doesn't work properly	检查设置减速度和速度是否超过了设备极限 Check that the deceleration setting and the speed limit of the equipment are exceeded
	检查输出脉冲频率是否超过了驱动器的接收极限 Check if the output pulse frequency exceeds the receiving limit of the driver
	检查控制器和驱动器是否正确接地，抗干扰措施是否做好 Check the controller and driver are properly grounded, anti-interference measures are done
	脉冲和方向信号输出端光电隔离电路中使用的限流电阻过大，工作电流偏小 The current limiting resistance used in the photoelectric isolation circuit at the output of pulse and direction signals is too large and the working current is too small
能够控制电机，但电机出现振荡或是过冲 Can control the motor, but the motor oscillates or overshoots	可能是驱动器参数设置不当，检查驱动器参数设置 Drive parameter settings may be incorrect. Check drive parameter settings
	应用软件中加减速时间和运动速度设置不合理 The setting of acceleration and deceleration time and motion speed is unreasonable in application software
能够控制电机，但工作时，回原点定位不准 Can control the motor, but work, back to the origin location is not accurate	原点信号开关是否工作正常 Whether the origin signal switch is working properly
	原点信号是否受到干扰 If the origin signal is being jammed

限位信号不起作用 The Stop Signal's not working	限位传感器工作不正常 The limit sensor is not working properly
	限位传感器信号受到干扰 The limit sensor signal is jammed
扩展模块连接不上，扩展模块警告灯亮 The extension module is not connected. The extension module warning light is on	检查 120 欧姆电阻是否有安装在两端 Check that the 120 ohm resistor is installed at both ends
	检查是否有多个扩展模块采用同样的 ID Check to see if multiple extension modules have the same ID
输入口检测不到信号 No signal detected at the input port	检查 IO 电源有无供给 Check the IO power supply
	检查信号电平是否与输入口匹配 Check if the signal level matches the input port
	检查输入口编号是否与 IO 板的 ID 相匹配 Check that the input port number matches the IO board ID
输出口操作时没有反应 There is no response at the output port	检查 IO 电源有无供给，IO 板上也要供电源 Check the IO power supply, IO board to power
	检查输入口编号是否与 IO 板的 ID 相匹配 Check that the input port number matches the IO board ID
控制器网口连接不上 The controller network interface is not connected	网口的灯是否点亮？ Is the light on at the net port?
	是否采用直连网线且电脑不支持自动交叉？ Do you use a direct line and the computer does not support automatic crossover?
	控制器 IP 地址是否被修改？ Has the controller Ip address been modified?
	PC 的网卡 IP 地址是否与控制器一个网段？ Is the IP address of the PC's network card a network segment with the controller?
控制器串口连接不上 The serial port of the controller is not connected	串口参数是否被运行程序修改，可以通过？*SETCOM 查看当前的所有串口配置 Is The serial port parameter modified by the running program and can be passed? * SETCOM looks at all current serial port configurations

6 保修及售后服务 /Warranty and after-sales service

请保留好包装箱以便运输、储存或需要退回本公司维修时使用。一年保修期：

Please keep the packing box for transportation, storage or need to return to the company for maintenance.One year warranty period:

来自本驱动器使用一年内因为产品自身的原因造成的损坏，负责保修。

From the use of this drive within one year because of the product itself caused by the damage, responsible for the warranty.

不在保修之列：/Not covered by warranty:

不恰当的接线、电源电压和用户外围配置造成的损坏。/Damage caused by improper wiring, power supply voltage and user peripheral configuration.

无本公司书面授权条件下，用户擅自对产品进行更改。/Without the written authorization of the company, users make changes to the products without authorization.

超出电气和环境的要求使用。/Use beyond electrical and environmental requirements.

驱动器序列编号被撕下或无法辨认。/The drive serial number has been torn off or is unreadable.

外壳被明显破坏。/The outer shell was visibly damaged.

不可抗拒的灾害。/An irresistible disaster.6.2 售后服务 /Aftersales Service

添加微信或者拨打电话

（+86）18926788846

Email：Tech@TQKTEC.COM

您拨打电话之前，请先记录以下信息：

Before you call, please record the following information:

故障现象/Fault phenomenon

产品型号和序列号/Product model and serial number

安装日期或者生产日期/Installation date or production date