TRIO MOTION TECHNOLOGY

A MEMBER OF THE ESTUN GROUP

QUICK START GUIDE

ELECTROMAGNETIC COMPATIBILITY

ALL MODELS

INTRODUCTION

Trio Motion Technology products are certified to comply with the requirements of Annex I to the Directive 2014/30/EU on Electromagnetic disturbance and Electromagnetic immunity. To achieve this compliance, certain requirements or best engineering practices must be implemented by the corresponding system designer.

INTENDED CONDITIONS OF USE

Trio Motion Technology products are designed for operation in Industrial environments with high noise levels that may induce currents or electrical potentials that are damaging to microelectronics. Our products are nevertheless designed and tested to withstand the level of electromagnetic disturbance common to these environments, on the provision that the appropriate EMC guidelines have been employed by a qualified competent system integrator.

The Trio Motion Technology product range is designed to be integrated, by the customer, as a control system for industrial machines and auxiliary equipment.

PRODUCT SPECIFIC REQUIREMENTS

Trio Motion's extensive product and application knowledge combined with product testing reflect that the best immunity is achieved by placing some constraint on the system into which the product is being integrated. This information is recorded in the Product Technical Manual (available at www.triomotion.com) and presented in this document for the commissioning engineer.

Product	Specific Feature	Requirements
ALL	0V wire (current return)	1. Always connect ALL 0V current return wires 2. Do not use the screen for 0V current return 3. It is highly recommended to avoid connecting 0V across internal isolation barriers. If a single 24V supply is used for the main power and IO power then these two isolated 0V will have to be connected but this should only be done if the 24V supply is free from switching noise 4. Do not join together 0V from high power and / or noisy sources with the 0V from signal ports (incl. CAN bus DC input) 5. Do not use any controller 0V connection as a current return for peripheral devices
ALL	All 24V DC ports	1. It is highly recommended to use surge filters on all DC supply and 0V return. If more than one device is connected to the same PSU then this is a requirement, (see Surge Protection on page 6 and Product Technical Manual)
ALL	Cable routing	1. Maintain 150mm separation of parallel Class I and Class II cable (IEC 61000-5-2:1997) (see manual) 2. Unless otherwise specified, all cables must be <30m in length
ALL	Proximity to source of disturbance	1. Place controllers and expansion modules as far from mains cables, mains filters, contactors, circuit breakers, drives, transducers or other high power sources of EM disturbance as physically possible within the enclosure design
ALL	Enclosure / Safety Cabinet design	1. Trio's products should always be installed within a locked cabinet with access limited to authorised personnel only

Product	Specific Feature	Requirements
ALL	Differential Stepper / Encoder Signals	1. Screened, twisted pair cable 2. Connect screen to metal chassis at both ends (See Cable Shields on page 11 and Product Technical Manual) 3. 0V reference connected at both ends
ALL	CAN bus	1. Screened, twisted pair cable with characteristic impedance of 120 Ohm (±10 Ohm) 2. Connect screen to Chassis at every node
ALL	Digital I/O	1. It is highly recommended to separate PSU and 0V return (the I/O is internally isolated)
ALL	ADC / DAC	1. Use DAC 0V reference pin not common 0V
ALL	RS232 / RS422 / RS485 Serial ports	1. Screened cable 2. Connect screen to Chassis at both ends 3. 0V reference connected at both ends 4. (See cable shields, page 11 and in Product Technical Manual)
ALL	EtherNet	1. Overall Foil Braided Shield / Unshielded Twisted Pair, (Compliant with Industrial SF/ UTP and TIA Cat5e, minimum) 2. Cable ≤30m in length
ALL	EtherCAT	1. Overall Foil Braided Shield / Unshielded Twisted Pair, (Compliant with Industrial SF/ UTP and TIA Cat5e, minimum) 2. Connect screen to Chassis at both ends, this is achieved by the shield connection built in to the RJ45 socket 3. Cable ≤30m in length

Product	Specific Feature	Requirements
Controllers with metal chassis or metal back panel	Protective Earth Connection	1. Mount on bare metal backplane 2. Use a minimum 4mm wide but preferred 10mm wide, braided conductor to connect Chassis to PE, as close to the *Motion Coordinator* as possible 3. (See EMC Earth on page 9 and EMC Section in the Product Technical Manual)
Flexslice Coupler Flex-6 Nano Flex-X Nano Flex-7	Cable routing	1. Cable <100m in length
HMI Uniplay	Chassis Ground	1. Connect between FG on the HMI power terminal and machine chassis or local PE 2. At a minimum: #14 AWG Ground wire 3. Highly recommended: 10mm wide braided conductor to connect FG to machine chassis or PE, as close to the HMI as possible
MC4N MC6N	SD Card Slot	1. Retain plastic slot protector when not in use
MC302X	All Cables	1. Screened cable 2. Connect screen to Chassis at both ends (See Cable Shields on page 11 and Product Technical Manual) 3. 0V reference connected at both ends
MC4XX / MC5XX / MC6XX	Digital I/O	1. Screened cable or EMC Mesh, (due to high speed inputs) 2. Connect screen to metal chassis at both ends
MC464	RS232 / RS485	1. <3m in length
PC-MCAT PC-MCAT-2	All Cables	1. <3m in length except for Ethernet and Ethercat ports

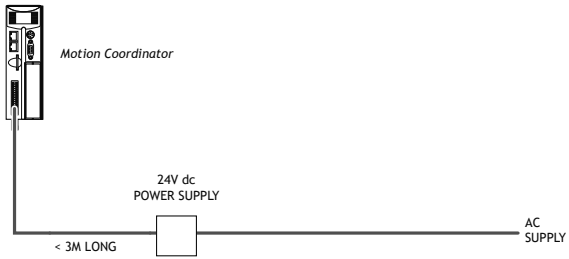
RECOMMENDED INSTALLATION

The following diagrams and information detail the typically required Surge Protection, EMC Earth and Cable Shields however more comprehensive information can be found in the corresponding Product Technical Manual (available at www.triomotion.com)

SURGE PROTECTION

SINGLE POWER SUPPLY

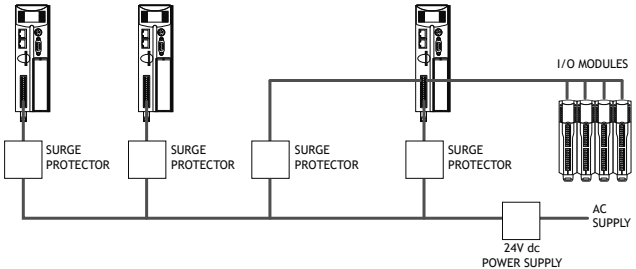
Where the device is supplied with 24V dc from one dedicated 24V power source and the connecting cable is less than 3 metres, there is no need for a separate surge protection device.



Motion Coordinator with dedicated power source

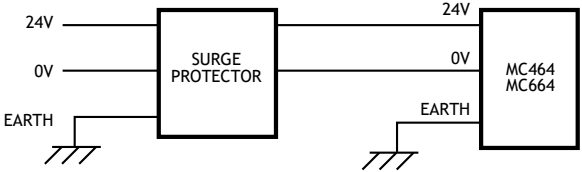
DISTRIBUTED POWER SUPPLY

If the device is connected to a distributed power supply or the cable length between the power source and the device is longer than 3 metres, then a surge protection device must be fitted to comply with the CE EMC directive.



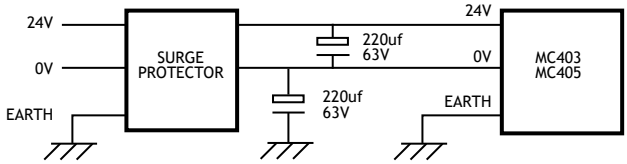
Distributed power supply with surge protection

MC664 / MC464 AND IO DEVICES



Surge protection device

MC403 / MC405

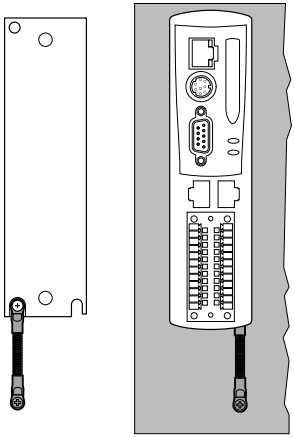


Surge protection device

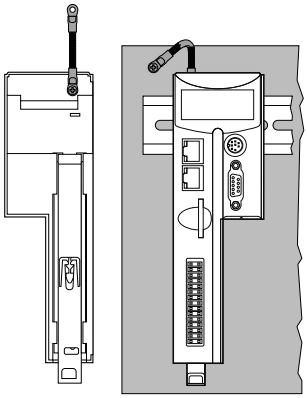
If the I/O power is from a different power source to the main device power, then the I/O power must also have a surge protector fitted.

EMC EARTH

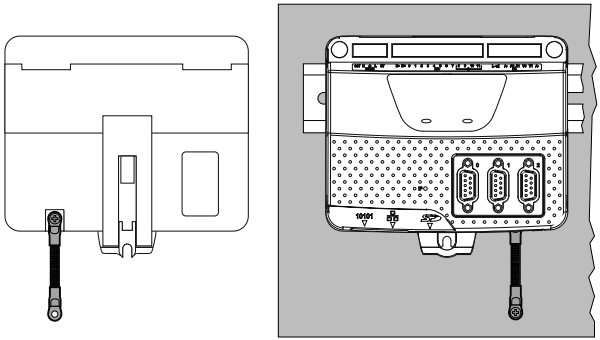
Typical additional earth attachment.



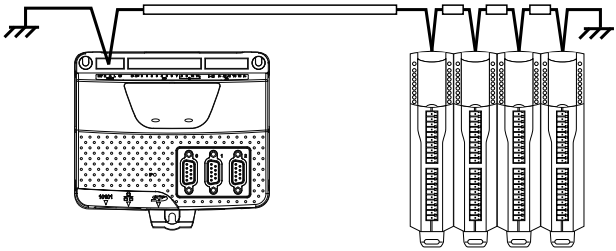
MC4N / M|6N Earth Braid shown rear (left) and front (right)



MC664 (X) / MC464 Earth Braid shown rear (left) and front (right)

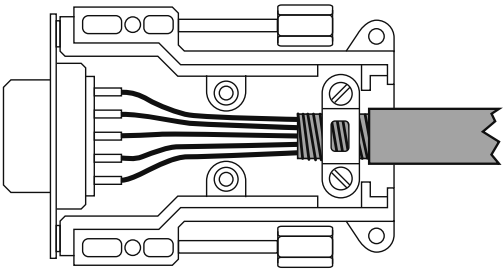


MC403 Earth Braid. MC508 / MC405 is Similar



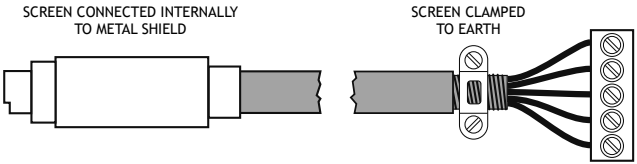
MC403 and CAN I/O Modules

CABLE SHIELDS



Both ends of the encoder cable's screen must be connected using a 360 degree contact and not a pig-tail connection.

The 0V must be connected separately from the screen. Make sure that encoder cables are specified with one extra wire to carry the 0V.



All serial cables must be terminated in an 8-pin mini-DIN connector. For best EMC performance, clamp the screen of the serial cable where it enters the connector cover. Do not make a "pig-tail" connection from the screen to the plug cover.

Both ends of the serial cable's screen must be connected using a 360 degree contact and not a pig-tail connection.

The 0V must be connected separately from the screen. Make sure that serial cables are specified with one extra wire to carry the 0V.

This applies to RS422/RS485 serial connections as well as RS232.

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介绍

翠欧公司产品经认证符合关于电磁干扰和电磁抗扰性2014/30/EU标准附件I的要求，某些要求或最佳工程实践必须由相应的系统设计者来实现其合规性

预期使用条件

翠欧公司产品的设计充分考虑了工业环境中的高噪声问题，避免由此产生的电流电势对微电子元器件的损坏。当系统集成商遵循EMC指南，我们所设计的产品经过测试可以承受这些环境中常见的电磁干扰。

翠欧系列产品旨在由客户集成，作为工业机器和辅助设备的控制系统。

产品特定要求

Trio Motion丰富的产品和应用知识与产品测试相结合，反映出通过对产品集成的系统施加一些约束，可实现最佳电磁干扰免疫。此信息记录在产品技术手册中(可从www.triomotion.com获取)，本文档适用于调试工程师。

产品	特征	要求
ALL	0V线(电流返回)	1. 始终连接所有0V电流返回线 2. 不要将屏蔽用于0V电流返回 3. 强烈建议避免系统内部隔离措施使用共用0V的方式进行短接。如果系统中只有一个24V电源为主控制器和IO设备供电，如果主电源和IO电源使用单个24V电源，则必须连接这两个隔离的0V，但只有在24V电源没有开关噪声的情况下才能连接。 4. 不要把大功率和/或高噪声设备的0V连接到信号接口的0V上（包括CAN总线电源直流输入）。 5. 不使用任何控制器0V连接作为外围设备的电流返回。
ALL	所有24V直流接口	1. 强烈建议所有直流电源和0V回路上增加浪涌滤波器。如果有多个设备连接到同一个电源，则这是一项要求，(可参见第6页的浪涌保护和产品技术手册)
ALL	电缆布线	1. I类和II类平行电缆需保持150mm的间距(IEC 61000−5− 2:20 97)(见手册) 2. 除非另有规定，所有电缆的长度必须小于30m
ALL	靠近干扰源	1. 在电柜设计中，将控制器和扩展模块放置在远离电源电缆、电源滤波器、接触器、断路器、驱动器、传感器或其他具有高功率电磁干扰源的地方
ALL	外壳/安全柜设计	1. Trio的产品应始终安装在一个上锁的机柜内，只有授权人员才能进入
ALL	差分步进/编码器信号	1. 屏蔽双绞线 2. 将屏蔽层的两端和金属外壳连接起来(参见第11页和产品技术手册中的电缆屏蔽) 3. 两端都需与0V参考连接
ALL	CAN总线	1. 使用特征阻抗为120欧姆的屏蔽双绞线电缆(±10欧姆) 2. 在每个节点将屏蔽层连接到金属外壳上
ALL	数字I/O	1. 强烈建议对供电电源进行隔离处理(I/O内部隔离)

产品	特征	要求
ALL	模数转换器/数模转换器	1. 使用DAC的0V参考引脚进行信号连接，而不是公共0V
ALL	RS232/RS422/RS485 串行端口	1. 屏蔽电缆 2. 将屏蔽层的两端连接金属外壳 3. 两端都需与0V参考连接 4. 请参阅《产品技术手册》第11页的电缆屏蔽
ALL	EtherNet	1. 整体箔编织屏蔽非屏蔽双绞线，(最低符合工业SF/UTP双绞线和五类网线标准) 2. 电缆长度不大于30m
ALL	EtherCAT	1. 整体箔编织屏蔽非屏蔽双绞线，(最低符合工业SF/UTP双绞线和五类网线标准) 2. 将屏蔽层两端与金属外壳连接起来，这是通过RJ45插座内置的屏蔽连接实现的。 3. 电缆长度不大于30m

产品	特征	要求
带有金属底盘或金属背板的控制器	保护接地	1. 安装在无涂层金属背板上 2. 使用最少4毫米宽推荐优选10毫米宽的编织导线将金属外壳连接到保护地，尽可能靠近运动控制器 3. 请参阅第9页的EMC Earth和产品技术手册的EMC章节
Flexslice Coupler Flex-6 Nano Flex-6X Nano Flex-7	电缆布线	1. 电缆长度小于100m
HMI Uniplay	底盘接地	1. 将HMI电源端子上的FG与机械设备外壳地或者保护地连接起来 2. 最少: 使用14AWG线径的地线 3. 强烈建议: 10mm宽的编织导线，10mm宽的编织导线将FG连接到机器底盘或PE，尽可能靠近HMI
MC4N MC6N	SD卡插槽	1. 不使用时保留塑料槽保护器
MC302X	所有电缆	1. 屏蔽电缆 2. 将屏蔽层和金属外壳连接起来 3. 0V参考在两端都需要连接
MC4XX / MC5XX / MC6XX	数字I/O	1. 屏蔽电缆或EMC 屏蔽材料（由于高速输入） 2. 将屏蔽层两端和金属外壳连接起来
MC464 (X)	RS232 / RS485	1. 长度不大于30m
PC-MCAT PC-MCAT-2	所有电缆	1. 长度小于3米，Ethernet和Ethercat电缆除外

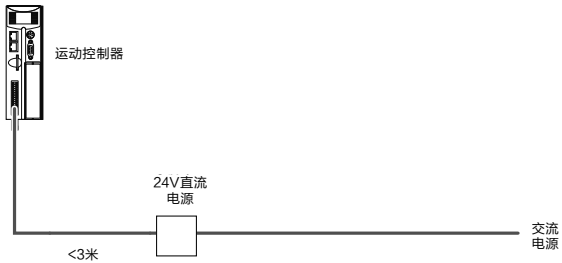
推荐安装

下面的图表和信息详细说明了通常需要的浪涌保护，EMC接地和电缆屏蔽，但更全面的信息可以在相应的产品技术手册中找到(可在www.triomotion.com找到)。

浪涌保护

单电源供电

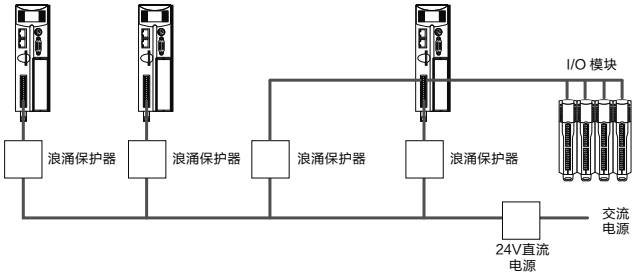
如果设备由一个专用24V电源供电，并且连接电缆小于3米，则不需要单独的浪涌保护装置。



带专用电源的运动控制器

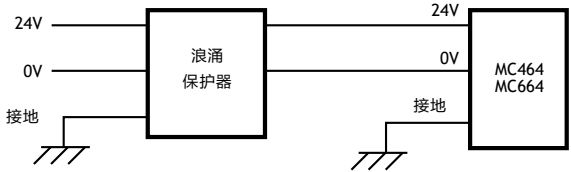
分布式电源供电

如果设备由分布式电源供电或电源与设备之间的电缆长度超过3米，则必须安装符合CE EMC指令的浪涌保护装置。



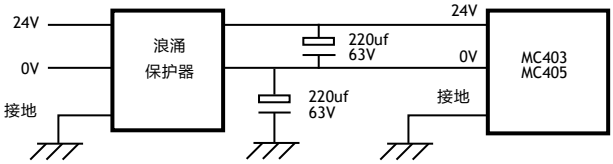
带浪涌保护的分布式电源

MC664 / MC464 和 IO 设备



浪涌保护器

MC403 / MC405

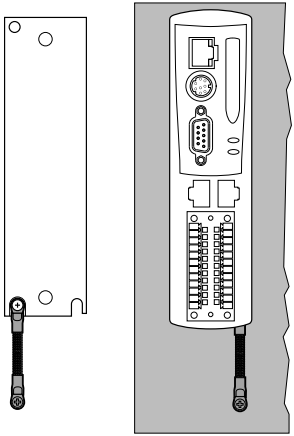


浪涌保护器

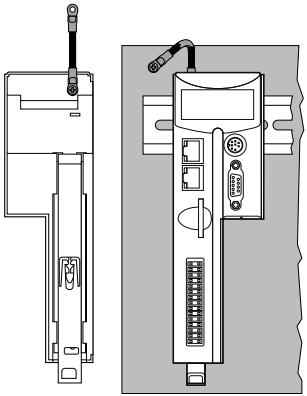
如果I/O电源与主设备电源不是同一个电源，则I/O电源还必须安装浪涌保护器。

EMC接地

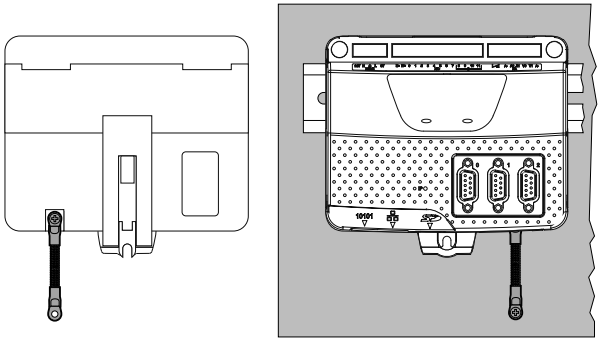
典型的附加接地连接。



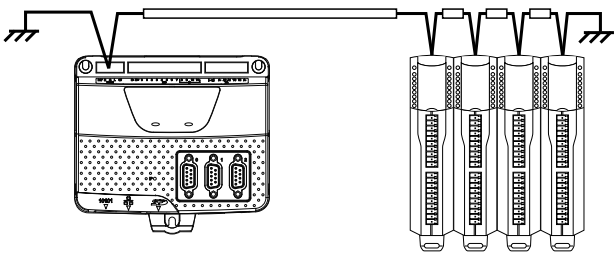
MC4N /MC6N 接地编织线后视图（左图所示）前视图（右图所示）



MC664 (X) / MC464接地编织线后视图（左图所示）前视图（右图所示）



MC403 接地编织。MC508 / MC405 相似



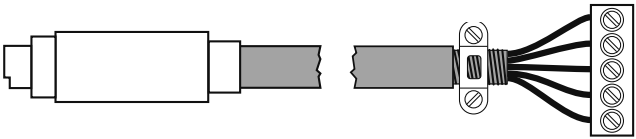
MC403 和 CAN I/O 模块

电缆屏蔽

编码器电缆屏蔽的两端必须使用360度全接触式连接，而不是使用“猪尾”式连接。

0V线与屏蔽层必须分开连接，确保编码器电缆指定有一根额外的线来承载0v。

屏蔽层连接到金属外壳内部　　屏蔽层可连接到大地



所有串行电缆必须接到一个8针迷你DIN连接器中。为了获得最佳EMC性能，在连接器外部请不要破坏电缆的屏蔽层。不要采用“猪尾”式把屏蔽层连接到插头外壳上

串行电缆屏蔽的两端必须使用360度全接触连接，而不是使用“猪尾”式连接方式。

0V线必须与屏蔽层分开连接。确保串行电缆指定有一根专用的电线来承载0V。

这适用于RS422/RS485串行连接以及RS232。

TRIO MOTION TECHNOLOGY
UK | USA | CHINA | INDIA | EUROPE
WWW.TRIOMOTION.COM

CAD data Drawings to aid packaging and mounting are available in various formats from the Trio web site. Products should be wired by qualified persons. Specifications may change without notice. È & OE

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