



# System Wiring

系统接线

## Benefits of better wiring

Save time and money.

Reduce risk of delay in commissioning.

Improve reliability.

Reduce risk of damage to electronics.

Easier to comply with worldwide regulations.

## 好的接线所体现出的优势

节省时间和金钱

在使用中降低延误工期的风险

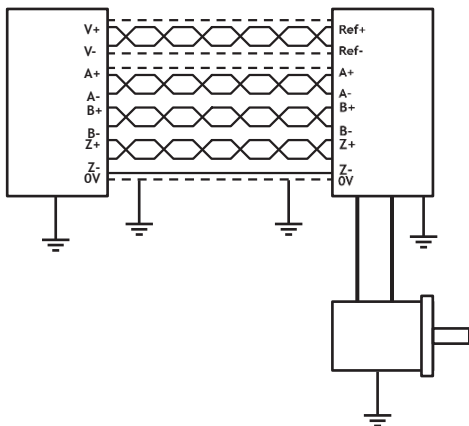
提高可靠性

降低电子设备损坏的风险

很容易的做到符合国际规程

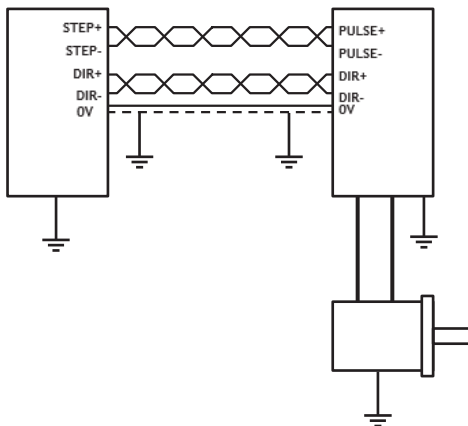
# Connecting a Trio Controller to a Servo Drive

## 一个Trio控制器和一个驱动器的连接



# Connecting a Trio Controller to a Stepper Drive

一个Trio控制器和一个驱动器的连接



## Cable Classes (BS IEC 61000-5-2:1997)

Class 1 Very sensitive signals.

Class 2 Sensitive signals.

Class 3 Interfering signals.

Class 4 Strongly interfering signals.

## 线缆等级

等级1 非常敏感的信号

等级2 敏感的信号

等级3 干扰信号

等级4 强干扰信号

Class 1 Very sensitive signals (low level analogue signals, high speed encoder, Ethernet).

Class 2 Sensitive signals (+/-10V analogue, low speed RS422 or RS485, digital inputs and outputs).

Class 3 Interfering signals (low voltage AC or DC power, circuits driving suppressed inductive loads, filtered motor cables).

Class 4 Strongly interfering signals (input and output power cables to drives, cables to welding equipment, DC motor cables, unsuppressed inductive loads).

# Cable Routing

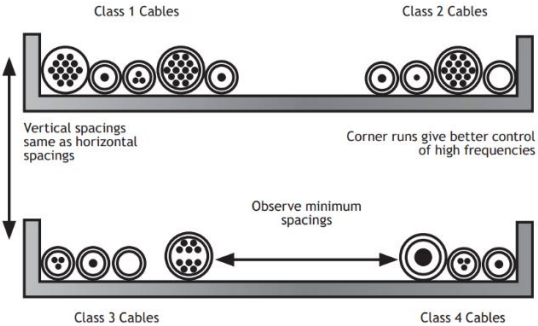
# 线缆的布线

Keep different cable classes separate.

Ideally, minimum of 150mm between cable classes on long cable runs.

将不同等级的线缆分开布置

理想的情况，长距离电缆同向布线时应该将不同等级线缆之间最少保持150mm间距



Segregating cable trays

# Panel Layout

# 电气柜的布置

Use conductive backplate (zinc plated, **NOT** painted).

Equipment with metal case in direct contact with backplate.

Keep cables separated by class.

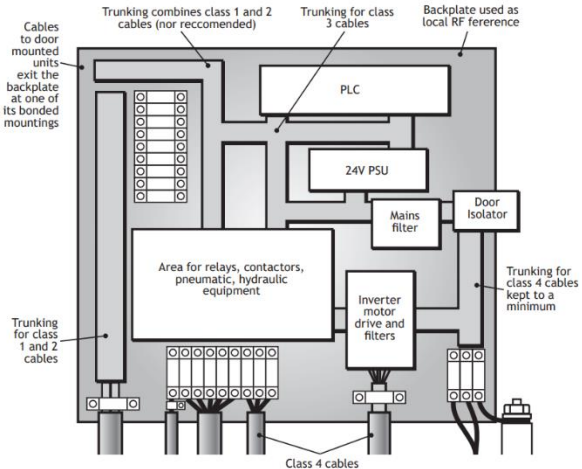
If different class cables must cross, then cross at 90°.

使用导体做为背板（采用没有被喷漆的锌板）

使用金属器件直接与背板连接

根据等级保持电缆的分离

如果不同等级的线缆必须交叉，则应该保持90°交叉



Backplate layout in unshielded cabinet

# Earth and 0V

# 接地和0V

Earth or Ground.

大地

Common Bonding Network - protective conductor.

通常的连接网络 - 保护性的导体

0V - signal or power return path.

0V - 信号或功率返回通道

DO NOT Connect 0V to Earth.

不能将0V和大地进行连接

Earth connections - low impedance.

接地连接 - 小电阻



Long wire is ok for DC at 60Hz but poor for higher frequency EMC



Minimum wire length is better for control of higher frequencies

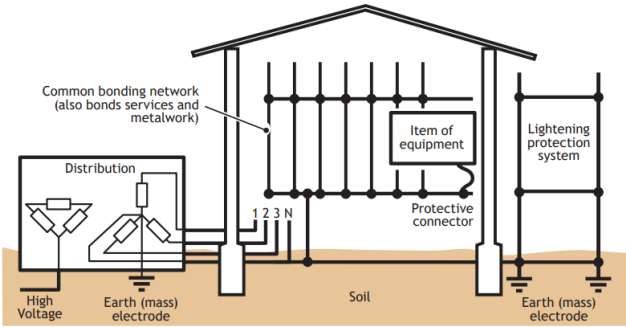


Short, wide braid strap on its own is good up to 3MHz approx.



Short, wide metal plates with multiple bonds are better for control of high frequencies, but metal to metal bonds are best

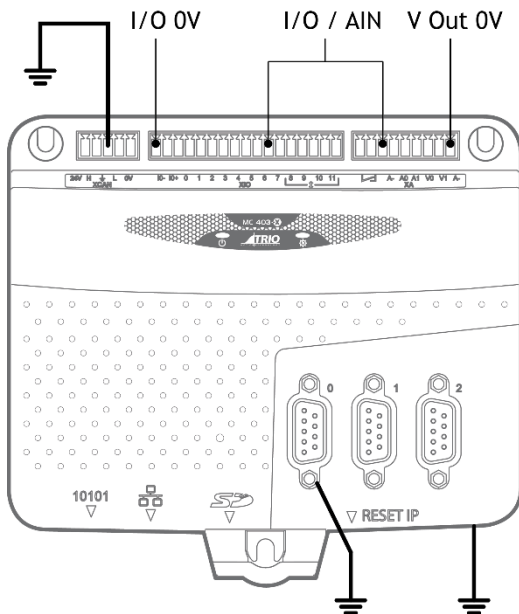
*Bonding Conductors: Use only where direct metal to metal bonding is not practical.*



*Common bonding networks.*



# MC403X- Earth and 0V MC403X 接地和0V



# Differential Signals

# 差分信号

Use screened cable.

采用屏蔽电缆

Ideally used twisted pair cable.

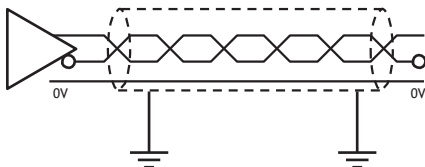
最理想的是采用双绞线缆

Termination required for RS485 and RS422.

对于RS485和RS422需要终端电阻

Must connect 0V reference to both ends.

两端必须连接0V



# Screened Cables

# 屏蔽线缆

Where possible use D-type connector and conductive shell.

Connect screen at both ends.

Screen should be earthed directly at both ends of cable or through the equipment it is plugged into.

Do not connect 0V to screen.

0V is connected through the cores of the cable.

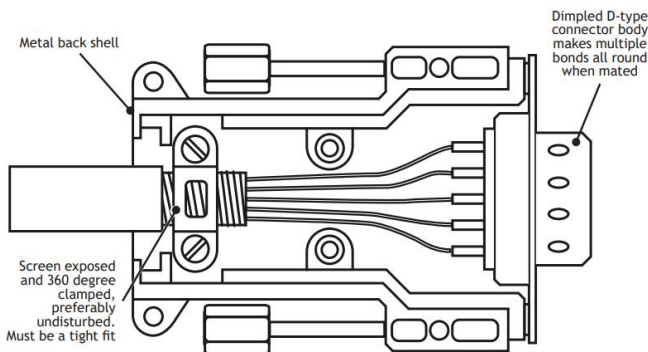
使用外壳为导体的D型连接器是可以的

连接屏蔽层到两侧的连接器的上

屏蔽应该在线缆两侧端点处直接与大地连接，或者通过被插入的设备直接与大地连接。

不能把0V和屏蔽进行连接

0V通过线缆内的线进行相互连接

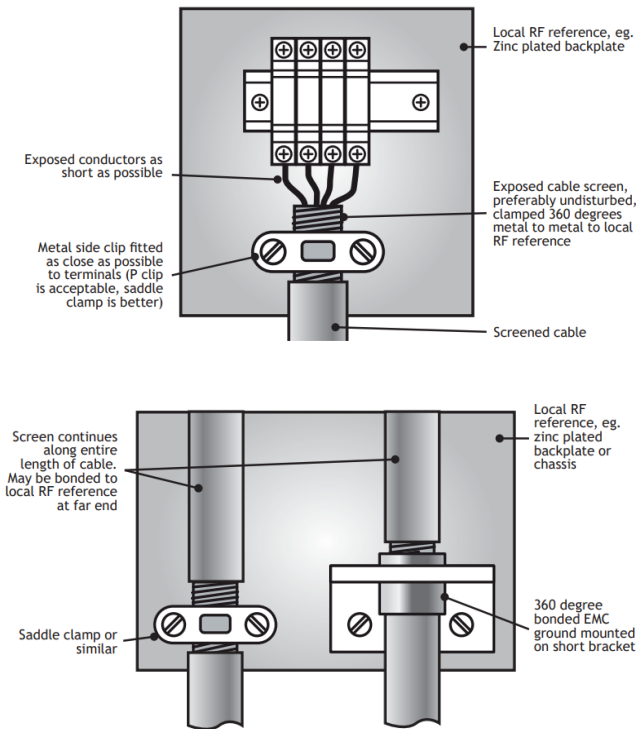


Other 360 degree bonding methods and shielded connectors are acceptable if basic requirements are met

*360 degree cable screen termination in a shielded D-type connector.*

Connection methods if D-type connectors are not used on equipment.

如果在设备上没有使用D型连接器的连接方法



Screened cables entering or leaving the product

# Screened Cables

# 屏蔽线缆

## NOT RECOMMENDED

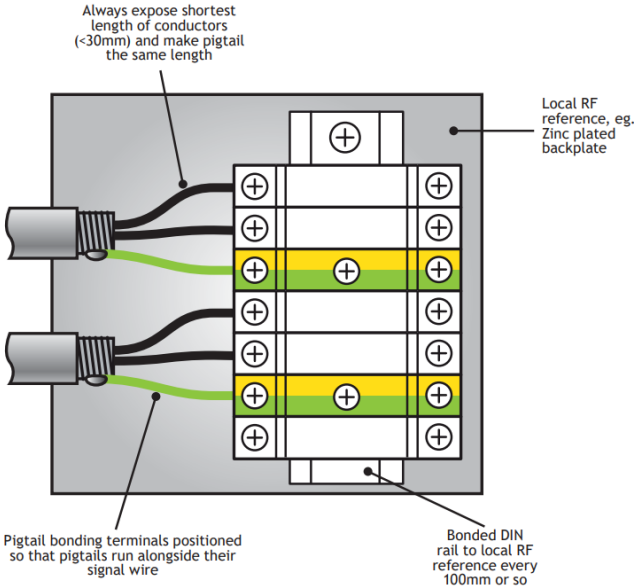
Use only if there is no better way of attaching screens.

Not to be used with sensitive signals or very noisy cables.

## 不推荐的方法

只有在没有更好的方式连接屏蔽层的情况下采用的方式

不能用在敏感信号或信号噪声非常大的线缆上。



“EMC for Systems and Installations”, *Tim Williams and Keith Armstrong*  
“Installation cabling and earthing techniques for EMC”, *Keith Armstrong*  
“Design techniques for EMC”, *Keith Armstrong, The UK EMC Journal*  
[www.compliance-club.com](http://www.compliance-club.com)