

Installation and Cabling

General guidelines

Introduction

This application note gives a brief description of best practice for cable installation and layout from the EMC viewpoint only. The installer may need to consider other issues such as safety, cost and the environment.

What are the cables carrying?

Most installations will have a mixture of electrical equipment. Cables to this equipment could be AC or DC power, signal or control lines. These cables could be carrying high power, high frequency or both. To reduce cable emissions and any interference pick-up some simple guidelines should be considered.

- Avoid routing cables carrying sensitive signals alongside cables likely to cause interference.
- Keep cables as short as possible.
- Screened cables should be properly terminated. Ideally there should be a 360° screen connection. This is explained later.
- Supply and return cables should be routed together.
- Power and signal return (0 V) should always be separate.

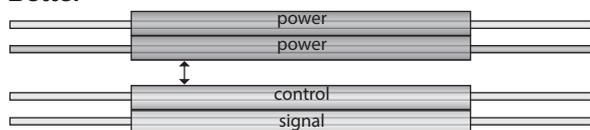
Cable Routing

Poor



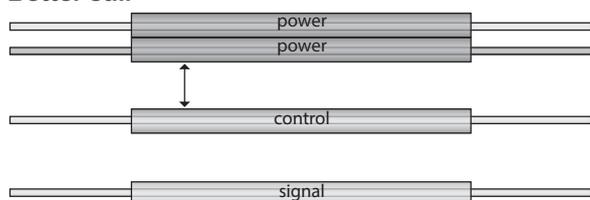
Avoid running cables together e.g. in trunking. When cables are placed closely together even screening can be ineffective. Effects depend on the type and level of interference.

Better



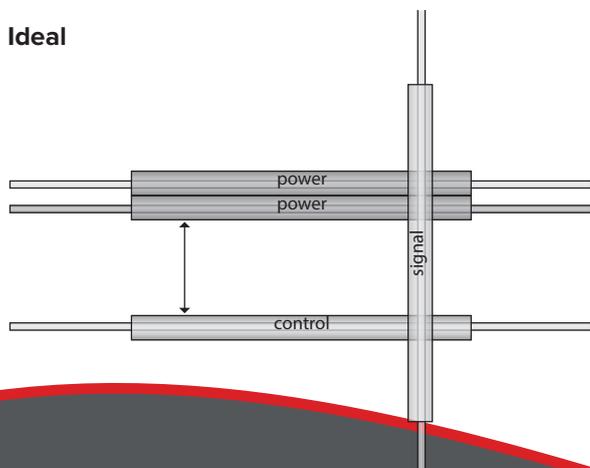
Separate signal and power cables as far as possible. Doubling the distance between cable quarters the level of coupling.

Better still

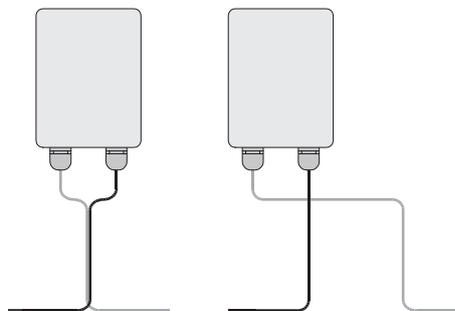


Maximise the distance between cables. Arrange them in order of sensitivity. The most sensitive cable should be as far as possible from cables likely to cause interference.

Ideal

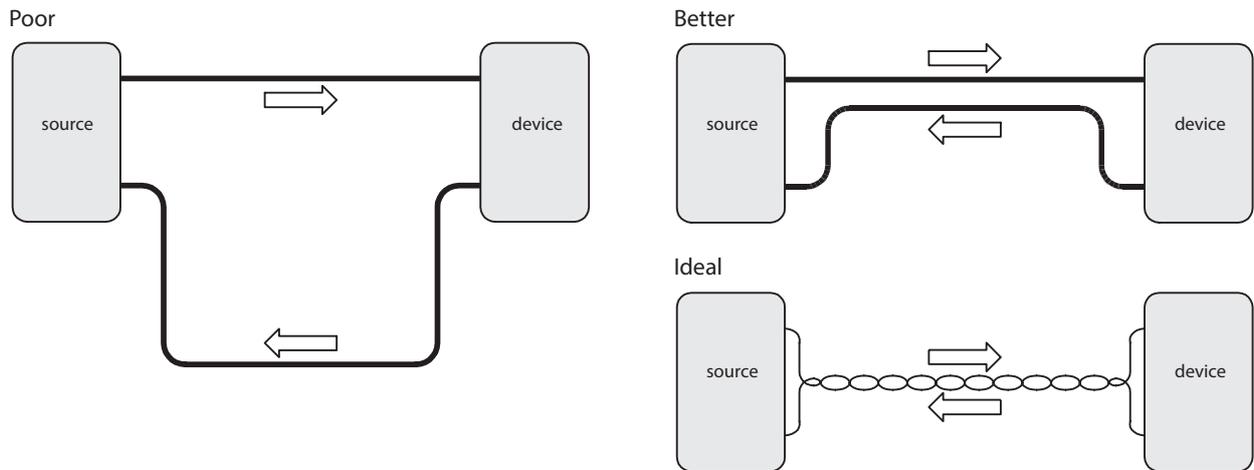


Lay cables at right angles. This gives the minimum coupling.



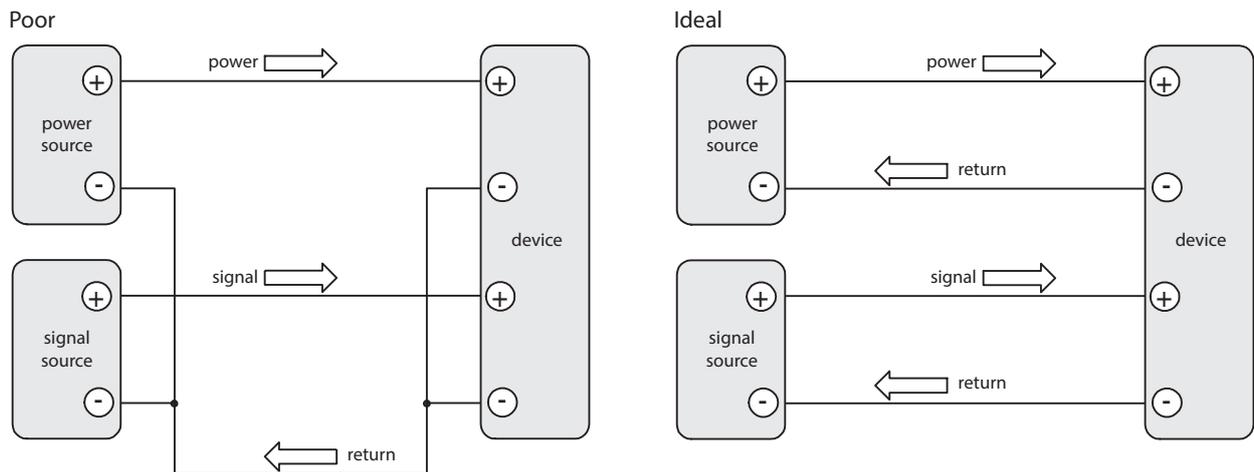
Supply and Return Cables

This advice applies to all cable types, power or signal. When power (or signal) goes to a device the current must always return to the source. If the supply and return paths are not close to each other then a loop can be formed and the possibility of radiated emissions is increased. Whenever possible route supply and return cables close to each other. If possible bundle or twist together.



Power and Signal Return (0 V)

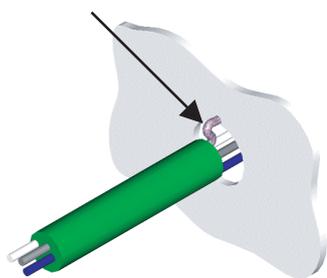
Most devices need a power supply with a +VE and -VE. Often the -VE is wired to the 0 V of the power supply. Signal returns are often referenced to 0 V also. It is important not to use the same connection as power supply currents (and noise) will interfere with signals.



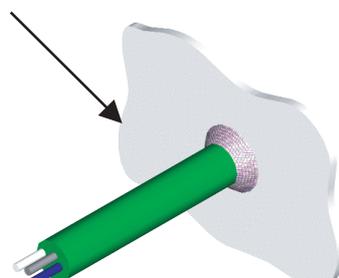
Connecting Screens

When connecting a screened cable to a panel, enclosure or connector a 360° screen connection is better than a tail connection. Properly designed cable glands or connector back shells are the best way to achieve this.

Tail Connection – Not Ideal



360° Connection - Ideal



360° Connection within cable gland

