

## Introduction

The “feed cable” in an Audio Frequency Induction Loop System is the section of wire from the amplifier to the loop and consists of the flow and return current paths from and to the amplifier terminals. For good performance, this section of wiring should be made up in such a way that unwanted generation of magnetic field is minimised.

It is the area enclosed by a loop of wire that generates magnetic field, and causes the wire to have inductance. Minimising the effective area of unwanted wire loops will minimise unwanted magnetic field.

If the feed cable is not correctly implemented, there is a risk of causing crosstalk to other circuits. In some cases, this could lead to feedback within the loop system or via other audio systems.

Note that the resistance of the feed cable is part of the overall system impedance, and should be taken into consideration when calculating the cable cross-sectional area (cable gauge) that can be used and the voltage headroom available in the amplifier. Using longer, smaller gauge, or differently configured feed cable to the feeds specified in your design could result in voltage clipping and, in some cases being unable to commission the system to the requirements of IEC 60118-4. The feed cable configuration is not affected by the wire size used for the cores.

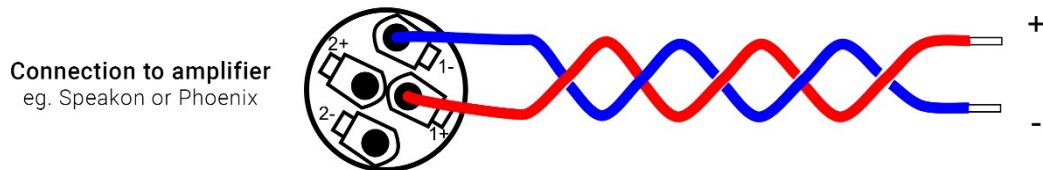
You can use stranded or solid cored cable; stranded cable is usually much easier to handle!

## Recommended Configurations:

### 1. Twisted Feed Pair

This configuration uses two wires (one for flow of current from amplifier to the loop, and one for the return current) twisted tightly together.

It is easiest to make this cable by taking two wires of the same length, each longer than you need for the route. Firmly hold the ‘start’ ends of each wire together (use a vice or get an assistant to do this), place the ‘destination’ ends together in a hand drill (or a very slow electric drill), and, keeping the wires taut, turn the drill until the wires are tightly twisted together. Note that the length of the resulting twisted pair of wires will be shorter than the straight wires you started with.



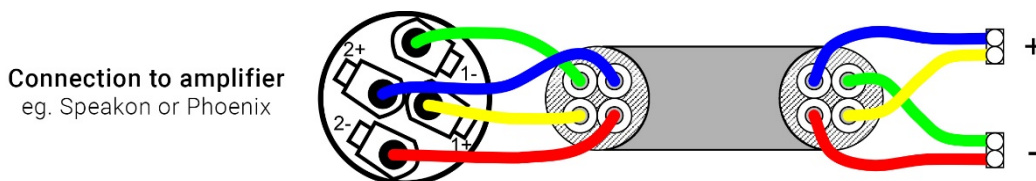
### 2. Four-core wire connected as Starquad.

This configuration uses one overall sheathed four-core cable to do the same job. The diagonally opposite cores of the feed cable wires are connected in parallel, resulting in two paths through the cable – one for flow of current, the other for the return.

Although this cable may be a little more expensive than twisting wires together, it does have better, more consistent and more predictable magnetic performance, and generally has the lowest impedance for a given length. Four core cable is generally easier to install because of the smooth outer jacket. It can be difficult to produce long twisted lengths of wire by hand, whilst four-core wire can be purchased in reel lengths.

*Never use a single four core cable to send two separate loop circuits.*

*Note that ‘starquad’ is a wiring method, not a type of cable.*



## **General good practice for feed cables**

- Avoid placing a long run (more than about 5 metres) of loop feed cable very close to and parallel to 'small signal' wiring. This could include microphone wiring, telephone wiring, and similar. Whilst interference to computer network cables has not been known, it makes sense to keep some separation.
- Avoid placing the loop feed cable in the same conduit compartment (or other containment) as:
  - AC mains power cables and other high voltage cables.
  - Small signal audio cables \*
  - Analogue telephone cables \*

*\* except for short distances*
- Always use one of the loop feed configurations described in this document.
- There is no maximum length to either configuration of feed cable, it is only limited by the voltage headroom of your amplifier.
- In general, using a starquad configuration will allow double the length in comparison to twisted pair, and is recommended when more than 10m length is required.