



AN004

Protection for Local Area Networks (LAN)

Application Note AN004 for ESP Cat-5, ESP Cat-5e,
ESP Cat-5/Gigabit, ESP Cat-5e/Gigabit & ESP Cat-5/PoE



Protection for Local Area Networks (LAN)

ESP LAN Series protectors offer combined Category C, B tested protection (to BS EN/IEC 61643-21), for twisted pair Ethernet networks with RJ45 connections, including Power over Ethernet (PoE).

Suitable for systems signalling on up to eight wires of either shielded or unshielded twisted pair cable, ESP Cat-5 Series protectors operate in Full Mode, capable of handling partial lightning currents as well as allowing continual operation of protected equipment.

Protectors include as standard:

- Very low let-through voltage (enhanced protection to BS EN 62305) between all lines
- Effective protection without impairing the system's normal operation
- Repeated protection in lightning intense environments
- Low capacitance circuitry to prevent the start-up signal degradation associated with other types of network protector
- Low in-line resistance to minimise unnecessary reductions in signal strength, to maximise signalling distance
- Convenient holes for flat mounting, or vertical mounting via TS35 'Top Hat' DIN rail

Installation

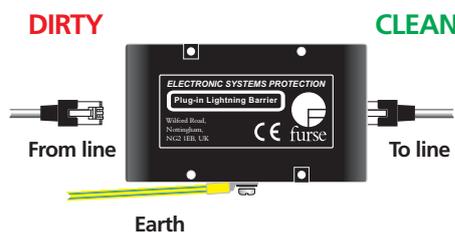
For use at boundaries up to LPZ 0_B to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Use these protectors on network cables that travel between buildings to prevent damage to equipment, e.g. computers, servers, repeaters and hubs.

Connect in series with the network cable, either:

- near to where it enters or leaves the building, or
- as it enters the network hub, or
- close to the equipment being protected

This should be close to the system's earth star point (to enable a good connection to earth).



A Furse ESP Cat-5e/Gigabit (above and detail below) protecting a hub from transient overvoltages on a network connection with another building.



	ESP Cat-5	ESP Cat-5e	ESP Cat-5/Gigabit ¹	ESP Cat-5e/Gigabit	ESP Cat-5/PoE
Pairs protected	1-2, 3-6 ¹	1-2, 3-6 ¹	1-2, 3-6, 4-5, 7-8	1-2, 3-6, 4-5, 7-8	1-2, 3-6, 4-5, 7-8
Network	Up to 100 Mb/s	Up to 100 Mb/s	Up to 1 Gb/s	Up to 1 Gb/s	Up to 100 Mb/s
Maximum working voltage U_c					
Data / power	5 V	5 V	5 V	5 V	5 V / 58 V
Current rating	300 mA	300 mA	300 mA	300 mA	350 mA (15.6 W)
In-line resistance (per line ±10%)					
Data / power	1 Ω	1 Ω	1 Ω	1 Ω	4.4 Ω
Networking standards	10/100baseT TIA Cat-5	10/100baseT TIA Cat-5e	10/100/1000baseT TIA Cat-5	10/100/1000baseT TIA Cat-5e	10/100baseT TIA Cat-5/PoE
¹ The connections on the remaining pairs are open circuit	IEEE 802.3i IEEE 802.3u	IEEE 802.3i IEEE 802.3u	IEEE 802.3i IEEE 802.3u IEEE 802.3ab	IEEE 802.3i IEEE 802.3u IEEE 802.3ab	IEEE 802.3i IEEE 802.3u IEEE 802.3af



The ESP Cat-5e and ESP Cat-5e/Gigabit

These lightning barriers have been designed to cater for high end networking systems that demand the increased performance of Cat-5e cabling.

The attenuation on the communication pairs is lower on these barriers compared to the rest of the networking barriers as higher specification components are used throughout.

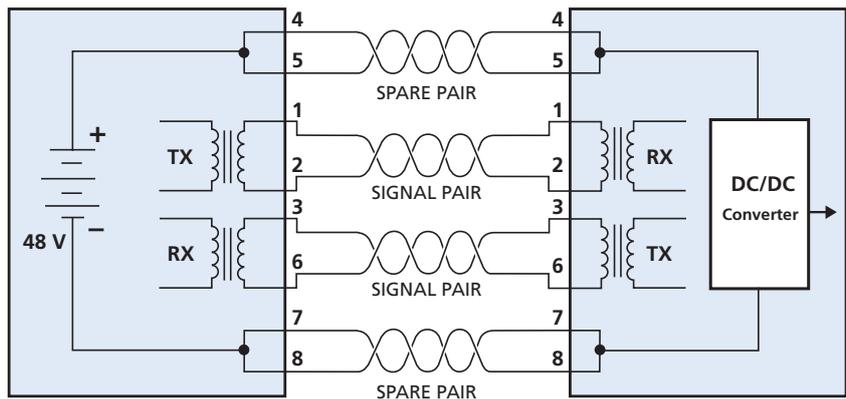


Figure 1. PoE uses spare twisted pairs

The ESP Cat-5/PoE (Power over Ethernet)

“Power-over-Ethernet” (PoE) or “Active Ethernet” is a technology that integrates both power and data over a standard Cat-5 Ethernet cable.

A version of electrical power over network connections has been utilised in the telecommunications industry for many years.

It is this feature that allows the telephone service to continue to function when you experience a loss of mains power.

The ESP Cat-5/PoE lightning barrier will protect both types of PoE:

- one system provides power over the spare twisted pairs (4-5 & 7-8, see Figure 1)
- the other system uses a center tapping on the isolation transformers to inject the power on the same pairs used for data communication (1-2 & 3-6, see Figure 2)

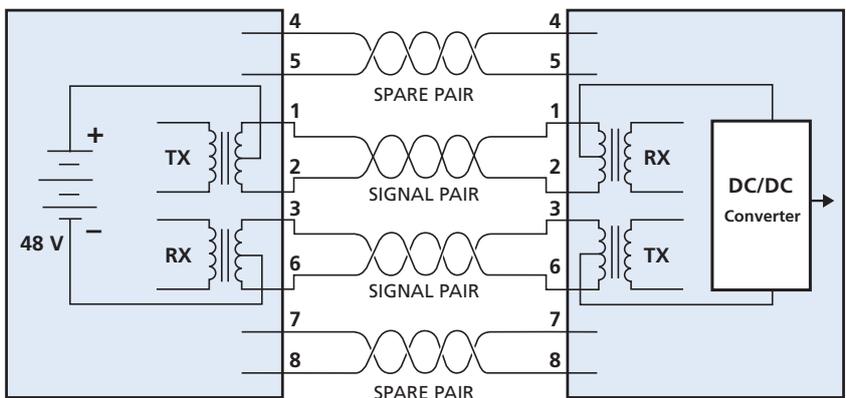


Figure 2. PoE uses transformer on data pairs

The key benefit of using a PoE system is that remote or power critical networking components can be powered from a central location.

The PoE hub can also be tied into a UPS system, for example. This would enable networked security cameras and VoIP phones to operate in the event of a mains power loss.

Full specifications of all of the products in the Furse ESP range of transient overvoltage protectors can be found in the Total Solution Product Catalogue.

To request a copy, contact Furse Sales at the address opposite.

Full product data can be downloaded in PDF form from our website at www.furse.com. Copies of the Total Solution Product Catalogue can also be requested from our website.



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