Introduction

This document explains how to install plug-in Furse ESP Surge Protection Devices (SPDs) for computer networks with RJ45 connections:

ESP Cat-5e

for 10/100baseT systems that signal on up to 4 wires of either unshielded or shielded twisted pair cable.

ESP Cat-5e/PoE

for 10/100baseT systems that also transmit power to IEEE 802.3at, using Mode A (combined 'phantom' power/data) and Mode B (power on spare pairs).

ESP Cat-6

for 10/100/1000/10GbaseT systems that signal on up to 8 wires of either unshielded or shielded twisted pair cable.

ESP Cat-6/PoE

for 10/100/1000/10GbaseT systems that also transmit power to IEEE 802.3at, using Mode A and/or Mode B.

1. Safety note:

Warning! Installation by person with electrotechnical expertise only.

Warnung! Installation nur durch elektrotechnische Fachkraft.

Avvertenza! Fare installare solo da un elettricista qualificato.
Avertissement! Installation uniquement par des personnes qualifiées en électrotechnique.

Advertencia! La instalación deberá ser realizada únicamente por electricistas especializados.

2. Before installation

2.1 Make sure that the RJ45 sockets on the ESP SPD are physically compatible with the network cabling.

2.2 Check that the maximum signalling voltage of the network will never exceed the ESP SPD's maximum working (or signalling) voltage:

	Maximum Working (or Signalling) Voltage	
	Data	Power
ESP Cat-5e, ESP Cat-6	5 V	-
ESP Cat-5e/PoE, ESP Cat-6/PoE	5 V	58 V

2.3 Ensure that the network's signalling or data rate does not exceed:

	Maximum data rate
ESP Cat-5e, ESP Cat-5e/PoE	100 Mbps
ESP Cat-6, ESP Cat-6/PoE	10 Gbps*

* with Cat-6a cable

3. Installation

3.1 Connection

Furse ESP Cat-5 & Cat-6 SPDs are connected in series with the network cable *(see Figure 1)*.

The dirty, or *line*, side of the ESP SPD should be connected to the cable carrying the incoming transient overvoltages. The output, or clean, side of the ESP SPD ensures a transient free signal to the equipment being protected.

3.2 SPD location

Install the ESP SPD in a convenient place, either:

(a) near to where the network cable enters or leaves the building,
(b) as the 'dirty' *line* network cable enters the network hub, or
(c) close to the equipment being protected

The ESP SPD's location may be dictated by the need to keep its connection to earth short (see Section 3.5 - Earthing).

3.3 Mounting

Fixing holes on the side of the ESP SPD enable it to be screwed to any flat surface, or the TS35 DIN Rail attachment can be used to mount and earth via DIN rail.

Before doing so, ensure that it is close to a good earthing point *(see Section 3.5 - Earthing)*.

3.4 Keep clean cables away from line (dirty) cables

The *clean* cable (connecting the ESP SPD's *clean* socket to the protected equipment) should never be routed next to the dirty *line* or the dirty earth cable *(see Figure 2)*.

The clean cable must be kept at least 5 cm apart from either the ESP SPD's own dirty line or earth cables, or those of neighbouring SPDs.

Figure 1:
Plug-in series connection.

If the network cables either in or out of the ESP SPD are longer than required, neatly coil and bind the surplus out of the way, keeping this away from clean cables.

3.5 Earthing

ESP SPDs for mains power supplies and ESP SPDs for data/signal/ measurement/ telephone lines should be connected to the same earth point.

The ESP SPD should therefore be bonded to the main electrical earth or earth star point.

The ESP SPD must be connected to earth, either:

(a) through installation on a TS35 'top hat' DIN rail (which in turn is connected to earth), or
(b) by connecting a crimped earth cable to the ESP SPD via the M4 threaded hole in the unit *(see Figure 1)*

The best way to ensure a good earth connection when using a DIN rail is to mount the DIN rail in a metal cabinet.

The entire length of the DIN rail should be in contact with the metal of the cabinet (if the cabinet is painted this should be removed where the rail is to be mounted to give a good electrical connection).

The DIN rail should then be bonded to the cabinet at its mounting points and the chassis of the cabinet bonded to the main electrical earth or earth star point.

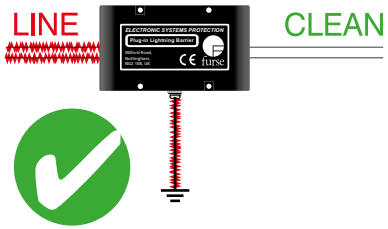
Alternatively if a non-metal housing is used the DIN rail should be bonded to a metal base plate.

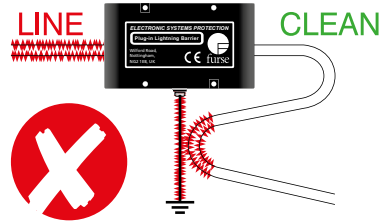
The base plate should then be bonded to the earth star point.

The guidelines below refer to non-DIN rail earthing and the earthing of DIN rail base plates.

The barrier or base plate earth bond should be less than 1 metre long (otherwise the effectiveness of the ESP SPD will be reduced).

10 mm² stranded green/yellow cable should be used for this bond.





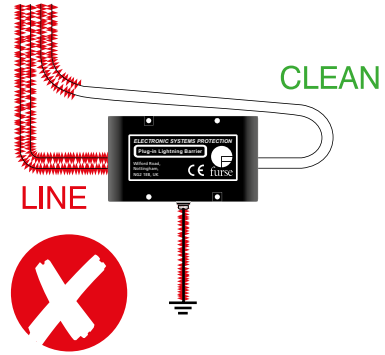


Figure 2:
Cable routeing.

Barrier or base plate earth bonds of 2, 3 or 4 metres are allowed if:

– 2, 3 or 4 parallel earth bonds are used and
– these parallel earth bonds are kept at least 5 cm apart from each other

Where even 4 metres of connecting lead is not sufficient, the incoming line should be re-routed to bring it within 4 metres of the earth.

In circumstances where the line cannot ideally be re-routed, the ESP SPD can alternatively be connected to the electrical earth local to the equipment being protected (eg the earth bar of the local power distribution board) (*see Figure 3*).

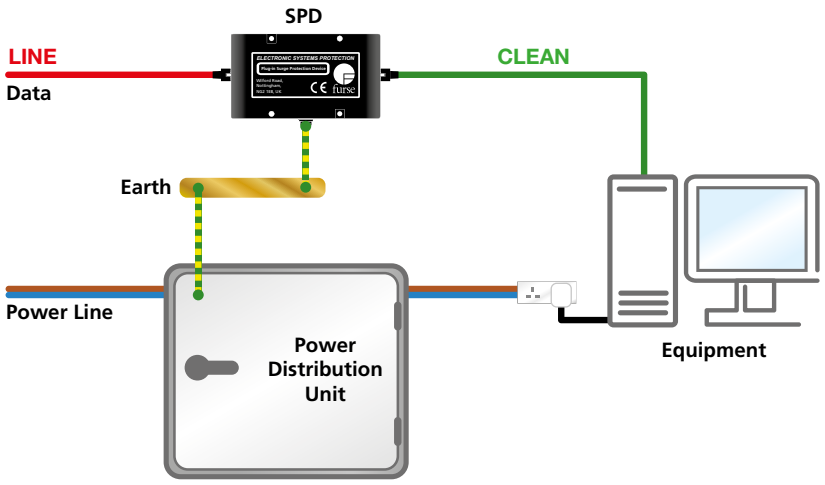


Figure 3:
Connection to the equipment earth star point.

Notes

Installation instructions for protecting computer networks (with RJ45 connections)

ESP Cat-5 & ESP Cat-6 Series

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