

Introduction

This document explains how to install Furse ESP Surge Protection Devices (SPDs) for twisted pair data communication/signal/ telephone lines and RTD installations:

ESP 06D, ESP 15D, ESP 30D, ESP 50D, ESP 110D, ESP TN, ESP 06E, ESP 15E, ESP 30E, ESP 50E, ESP 110E, ESP 06H, ESP 15H, ESP 30H, ESP 50H, ESP 110H, ESP RS485, ESP RTD

	Bandwidth (-3 dB)
ESP 06D	800 kHz
ESP 15D	2.5 MHz
ESP 30D	4.0 MHz
ESP 50D	6.0 MHz
ESP 110D	9.0 MHz
ESP TN	20.0 MHz
ESP 06E, ESP 15E, ESP 30E, ESP 50E, ESP 110E, ESP RS485	45 MHz
ESP 06H	160 kHz
ESP 15H	140 kHz
ESP 30H	130 kHz
ESP 50H, ESP 110H	120 kHz
ESP RTD	800 kHz

2.3 Ensure that the current passing through the ESP SPD does not exceed:



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.

	Maximum Current
ESP 06D, ESP 15D, ESP 30D, ESP 50D, ESP 110D, ESP TN & ESP RS485	300 mA DC or AC RMS
ESP 06E, ESP 15E, ESP 30E, ESP 50E & ESP 110E	1.25 A DC or AC RMS
ESP 06H, ESP 15H, ESP 30H, ESP 50H & ESP 110H	4 A DC or AC RMS
ESP RTD	200 mA DC or AC RMS

2.4 Make sure that the system's maximum line voltage (DC or AC) will never exceed the maximum working voltage of the ESP SPD.

Otherwise the SPD will clamp signal voltages as though they were transient overvoltages.

	Normal Working Voltage	Maximum DC Working Voltage	Maximum AC Working Voltage
ESP 06D, ESP RTD	6 V	7.79 V	5 V
ESP 15D	15 V	19 V	13 V
ESP 30D	30 V	37.1 V	26 V
ESP 50D	50 V	58 V	41 V
ESP 110D	110 V	132 V	93 V
ESP TN	-	296 V	-
ESP 06E, ESP 06H	6 V	7.79 V	5 V
ESP 15E, ESP 15H, ESP RS485	15 V	16.7 V	11 V
ESP 30E, ESP 30H	30 V	36.7 V	25 V
ESP 50E, ESP 50H	50 V	56.7 V	40 V
ESP 110E, ESP 110H	110 V	132 V	93 V

2. Before installation

2.1 Check that the voltage drop caused by the resistance of the unit does not interfere with the normal operation of the system.

	Line Resistance
ESP 06D, ESP 15D, ESP 30D, ESP 50D & ESP 110D	9.4 Ω
ESP TN	4.4 Ω
ESP 06E, ESP 15E, ESP 30E, ESP 50E, ESP 110E & ESP RS485	1.0 Ω
ESP 06H, ESP 15H, ESP 30H, ESP 50H & ESP 110H	< 0.05 Ω
ESP RTD	10.0 Ω

2.2 Be sure that the ESP SPD's bandwidth will not restrict the system bandwidth.

LINE

CLEAN



Figure 1a: Series connection (ESP D Series, ESP E Series, ESP H Series, ESP TN & ESP RS485).

LINE

CLEAN

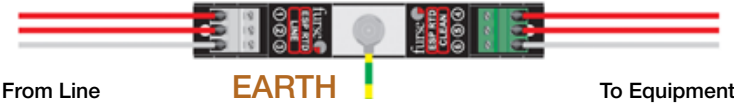


Figure 1b: Series connection (ESP RTD).

3. Installation

3.1 Series connection

Furse ESP SPDs are connected in series with the data communication, signal, measurement, or telephone line.

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 SPD ensures a transient free signal to the equipment being protected (see Figure 1).

The screw terminals should be tightened between 0.3-0.5 Nm (do not exceed 0.5 Nm). Cable stripping length is 6 mm.

Note: Do NOT use power driven screwdrivers to make connections to the ESP SPD. Hand tighten connections only.

3.2 SPD location

- SPDs are usually located either:
- (a) near to where the lines requiring protection enter or leave the building, or
 - (b) close to the equipment being protected (or actually within its control panel)

3.3 Enclose the SPD

ESP SPDs should be installed within a panel or enclosure.

The SPD should be ideally installed within an existing cabinet/cubicle or in an enclosure to the required IP rating. Suitable enclosures are available from Furse.

ESP SPDs should always be installed in a dry environment.

3.4 Fixing methods

Furse ESP SPDs can be mounted in a number of ways.

(a) Flat mounting

Fixing holes on the base and sides of the ESP SPD enable small quantities to be screwed to flat surfaces (see Figures 2 and 3).

(b) DIN rail mounting

The ESP SPD has a built-in DIN rail foot enabling it to be clipped on to 'top hat' DIN rails (see Figure 4).

(c) On a Combined Mounting and Earthing (CME) kit

Accessory CME kits enable groups of ESP SPDs to be simultaneously mounted and earthed.



Figure 2: Base hole flat mounting.



Figure 3: Side hole flat mounting.



Figure 4: Installation on 'top hat' DIN rail.

Either way, it is important that the SPD's connection to earth (or SPD earth bond) is kept short (see Section 3.7 - Earthing).

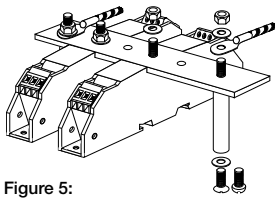


Figure 5: Installation on a CME kit.

These utilise the ESP SPD's earth stud to connect it to the CME kit's heavy duty copper earth bar (see Figure 5). The fixing centres for CME kits are shown in Figure 6, overleaf.
Hand tighten screw fixings - do not use power driven screwdrivers.

3.5 Line, clean, screen and earth connections

Cable wires should be terminated with a boot lace ferrule. The *line* end of the ESP SPD should be connected to the dirty, incoming line - ie from where the transient overvoltage is expected.

... continued overleaf

ABB Furse
UK Office
Wilford Road
Nottingham NG2 1EB
Tel: +44 (0) 115 964 3700
Fax: +44 (0) 115 986 0071
National Sales Tel: +44 (0) 333 999 9900
National Sales Fax: +44 (0) 333 999 9901
E-Mail: enquiry@furse.com

www.furse.com

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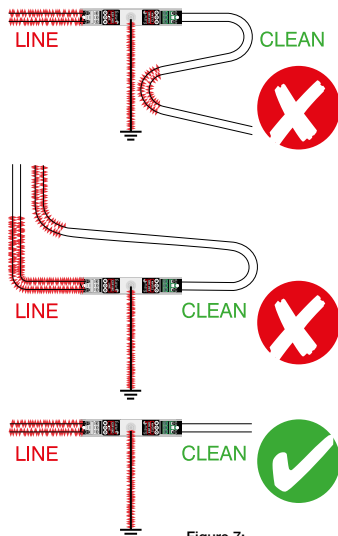


Figure 7:
Cable routing.

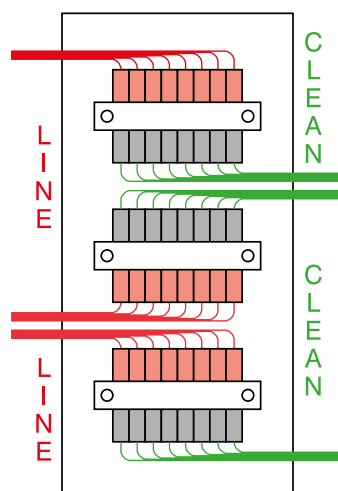


Figure 8:
Positioning of adjacent rows of ESP SPDs.



Installation instructions for data-line Surge Protection Devices

ESP D & TN Series,
ESP E Series, ESP H Series,
ESP RTD, ESP RS485

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for a better world™

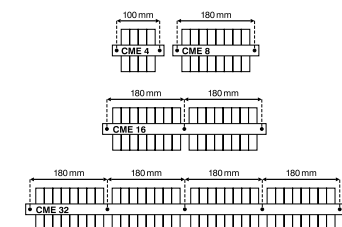
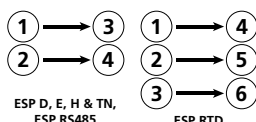


Figure 6:
Fixing centres for CME kits.

The *clean* end of the ESP SPD should be connected to the line going to the protected equipment. This can be seen in *Figure 1, overleaf*.

Cable screens are earthed via the terminals marked Ⓢ, except the ESP RTD which is earthed via the earth stud. The input/*line* and output/*clean* terminals are paired:



3.7 Earthing

Protectors for mains power supplies and ESP SPDs for data/ signal/ 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 'top hat' or G DIN rail (which in turn is connected to earth), or
- (b) by connecting a crimped earth cable to the SPD via the M6 threaded earth stud (see *Figure 1, overleaf*).

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 ESP SPD 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.

ESP SPD 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 9*).

3.6 Keep clean cables away from dirty cables

Cables connected to the ESP SPD's clean end should never be routed next to dirty *line* cables or dirty SPD earth bonds (see *Figure 7*).

If rows of ESP SPDs are installed close to each other, dirty *line* cables and earth bonds must be kept at least 5 cm apart from *clean* cables (see *Figure 8*).

Note: When using the DIN rail foot mounting option in conjunction with a base plate (ie DIN rail not directly bonded onto cabinet chassis) ensure the earth bond to the base plate (or DIN rail itself) is kept clear of the clean cables.

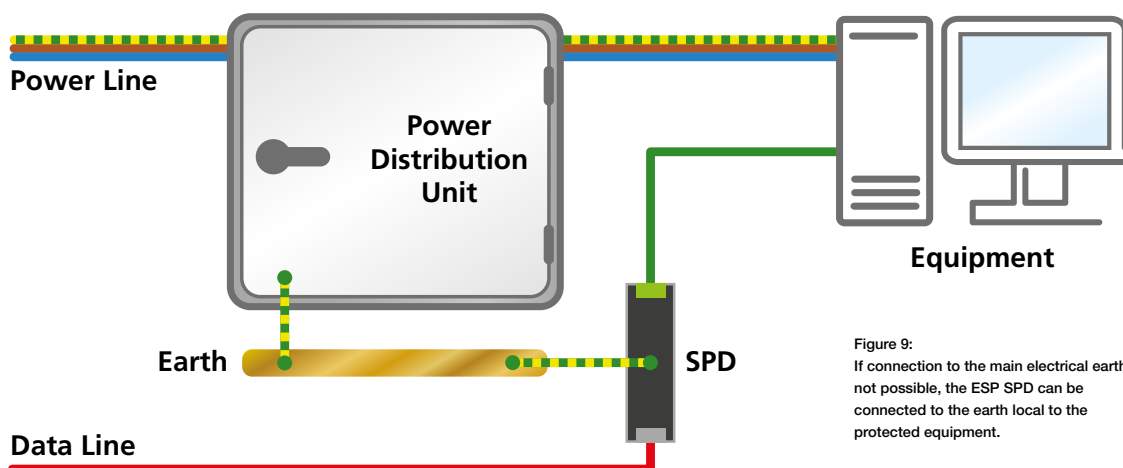


Figure 9:
If connection to the main electrical earth is not possible, the ESP SPD can be connected to the earth local to the protected equipment.