

Introduction
 This document explains how to install Furse Slim Line ESP Surge Protection Devices (SPDs) for Twisted pair data communication/ signal/telephone lines:
 ESP SL06, ESP SL15, ESP SL30, ESP SL50, ESP SL110, ESP SL TN, ESP SL RS485

Low current DC power supplies:
 ESP SL06L, ESP SL15L, ESP SL30L, ESP SL50L, ESP SL110L

Twisted pair 4-20 mA loop systems:
 ESP SL30L/4-20
 and isolated screen versions (suffix /I).

3-Wire & RTD systems:
 ESP SL06/3W, ESP SL15/3W, ESP SL30/3W, ESP SL50/3W, ESP SL110/3W, ESP SL RTD

Furse ESP Slim Line LED SPDs (ESP SL**L) are directly comparable to their standard Slim Line equivalent in performance plus incorporate an LED indicator for easy status checking.



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

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

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

	Maximum Current
ESP SL** Series (06 - 110)	750 mA
ESP SL**L Series (06 - 110)	750 mA
ESP SL**/3W Series (06 - 110)	500 mA
ESP SL RTD	500 mA
ESP SL TN	750 mA
ESP SL30L/4-20	75 mA
ESP SL RTD	500 mA

Note: Minimum current for reliable LED operation is 3 mA. Whilst the SPD functions at lower current ratings, the LED will not illuminate.

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.



Figure 2: Installation on a 35 mm 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).

3.2 Enclose the SPD

ESP SPDs should be installed within a panel or enclosure.
 The ESP SPD should ideally be installed within an existing cabinet/cubicle or in an enclosure to the required IP rating, such as WBX SLQ.



Figure 3a: Slide out the DIN rail release clip.



Figure 3b: Pull up and release to engage the latchback mechanism.

3.3 Series connection

ESP SPDs are connected in-line (series) with the data communication, signal, measurement, or telephone line (see Figures 1a & 1b).
 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.

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

3.4 Fixing methods

Furse ESP SPDs should be mounted on a 35 mm DIN rail to EN 50022.
 The ESP SPD's DIN rail release clip features a latchback mechanism to hold the clip off the rail for easy removal and adjustment whilst on the DIN rail.
 This release clip should be engaged using a terminal screwdriver or by hand by pulling the clip out and upwards in the housing (see Figures 3a & 3b).

ESP SPDs should always be installed in a dry environment.

3.5 Connections to line, clean, screen and earth terminals

The clean end of the ESP SPD should be connected to the cabling going to the protected equipment (see Figures 1a & 1b).
 Cable screens are connected to earth (DIN rail & earth terminal) via the terminals marked S, except the ESP SL**/3W Series & ESP SL RTD where the screen could be connected to the earth terminal marked \perp .
 The screw terminals should be tightened between 0.5-0.8 Nm torque (do not exceed 0.8 Nm). Cable stripping length is 9.5mm.

Hand tighten connections only, do not use power driven screwdrivers.

The screw terminals will accommodate conductor of up to 4 mm².

We recommend that these are terminated with a boot lace ferrule.

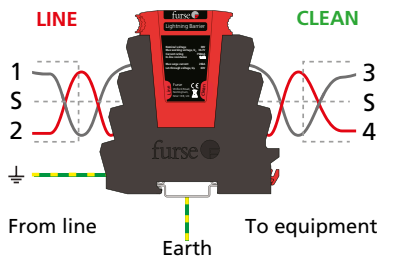


Figure 1a: Series connection of ESP SL** Series, ESP SL**L Series, ESP SL TN, ESP SL 4-20 mA and ESP SL RS485.

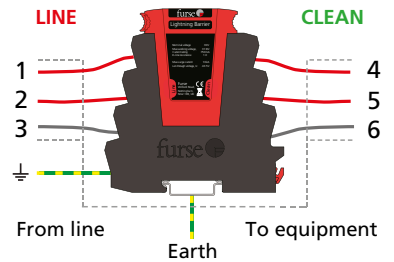


Figure 1b: Series connection of ESP SL RTD and ESP SL**/3W Series.

	Line Resistance
ESP SL** Series (06 - 110)	1.0 Ω
ESP SL**L Series (06 - 110)	1.0 Ω
ESP SL**/3W Series (06 - 110)	1.0 Ω
ESP SL RTD	1.0 Ω
ESP SL TN	4.4 Ω
ESP SL30L/4-20	1.0 Ω
ESP SL RS485	1.0 Ω

	Bandwidth (-3 dB)
ESP SL** Series (06 - 110)	45 MHz
ESP SL**L Series (06 - 110)	45 MHz
ESP SL**/3W Series (06 - 110)	45 MHz
ESP SL RTD	1.5 MHz
ESP SL TN	20 MHz
ESP SL30L/4-20	45 MHz
ESP SL RS485	45 MHz

	Normal Working Voltage	Maximum DC Working Voltage	Maximum AC Working Voltage
ESP SL06, ESP SL06L, ESP SL06/3W	6 V	7.79 V	5 V
ESP SL15, ESP SL15L, ESP SL15/3W	15 V	16.7 V	11 V
ESP SL30, ESP SL30L, ESP SL30/3W	30 V	36.7 V	25 V
ESP SL50, ESP SL50L, ESP SL50/3W	50 V	56.7 V	40 V
ESP SL110, ESP SL110L, ESP SL110/3W	110 V	132 V	93 V
ESP SL RTD	6 V	7.79 V	5 V
ESP SL TN	296 V	296 V	-
ESP SL30L/4-20	30 V	36.7 V	25 V
ESP SL RS485	15 V	16.7 V	11 V

3. Installation

3.1 Location

- ESP 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)

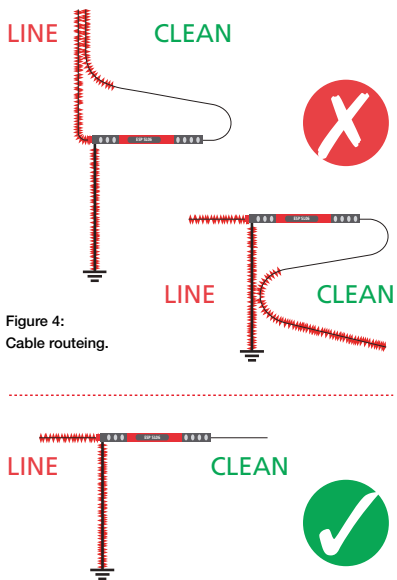


Figure 4:
Cable routing.

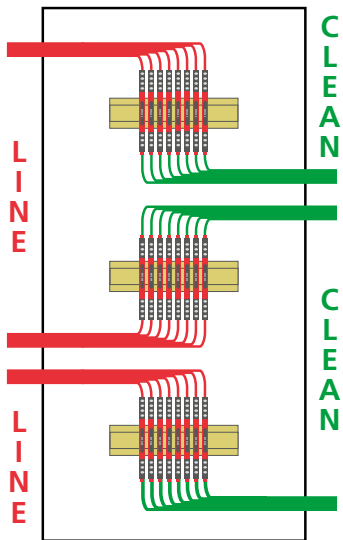


Figure 5: Positioning of adjacent rows of SPDs.

For isolated screen versions

For situations where the cable screen needs to be isolated from the local earth to avoid earth loops (e.g. fire alarm panels) the isolated screen version should be used (this has /I suffix in the part code e.g. ESP SL30/I). With the isolated screen version there is no continuity between the screen and earth connections in the absence of a transient overvoltage.

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 4). 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 5).

Note: When using the DIN rail foot to provide the earth to the ESP SPD in conjunction with a base plate (i.e. 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 lines.

3.7 Earthing

ESP 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. This connection should be made, either:

- Through installation on a 35 mm DIN rail (which in turn is connected to earth)
- By connecting an earth cable to the ESP SPD via the SPD's earth terminal marked \perp (see Figures 1a & 1b)

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

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

SPD or base plate earth bonds of 2, 3 or 4 m 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 m of connecting lead is not sufficient, the incoming line should be re-routed to bring it within 4 m 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 (see Figure 6).

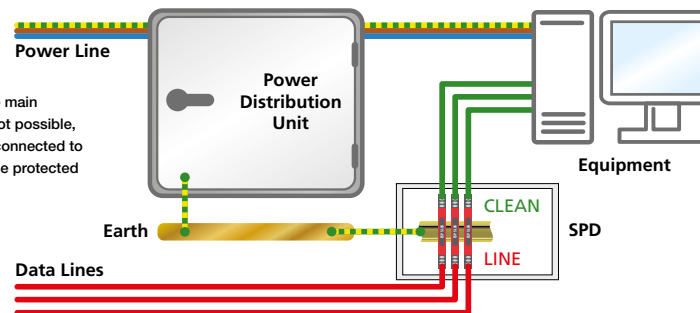
3.8 Status indication (LED versions only)

Furse ESP Slim Line LED SPDs give a continuous visual display of their status, via a top-mounted green LED*, as follows:

- Green LED = Full protection, power on. Illuminated**
- No light from LED = NO PROTECTION/FAULT**
Check power supply, fuses and connections. Replace module if fault remains.

* LED units designed for use on low current DC power supplies operate only on currents > 3 mA.

Figure 6:
If connection to the main electrical earth is not possible, ESP SPDs can be connected to the earth local to the protected equipment.



3.9 Maintenance/Spares

In the unlikely event of a failure, replacement modules are available, contact Furse sales on +44 (0)115 964 3700.

If a replacement module is required please quote part number with a suffix /M (e.g. a replacement module for an ESP SL30 SPD would be ESP SL30/M).

ESP SPDs contain no user serviceable parts and must be replaced with equivalent genuine Furse modules.

The modules can easily be removed by pressing in the release button and pulling the module away from the base.

The module is keyed to prevent it being inserted the wrong way around.

3.10 Insulation/Flash testing

When the surge protection module is fitted, ESP SL Series SPDs will not meet the 500 V insulation requirements to earth.

The ESP SPD module should therefore be disconnected before insulation testing.

When the module is 1 cm away from being fully inserted there is a 2nd hold point.

Instead of completely removing the module & having to record the location in which it is required to be replaced, this point allows the module to be held in place within the base but disconnected from the system's wiring.



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