

Introduction

This document explains how to install Furse Intrinsically Safe Slim Line ESP Surge Protection Devices (SPDs) for Twisted pair data communication/ signal/telephone lines: ESP SL15X, ESP SL30X

Low current DC power supplies:

ESP SL15XL, ESP SL30XL and isolated screen versions (suffix /I).

Furse ESP Slim Line LED SPDs (ESP SL**XL) 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.

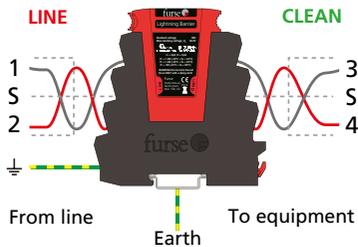


Figure 1: Series connection of ESP SL**X.

2. Certification Marking/Special conditions for safe use

2.1 The ESP SL**X (and variants) Series have a group IIC T4 certification making them acceptable for use with all gas/air mixtures.

2.2 The certificate numbers have an 'X' suffix, which indicates that the certificates contain one or more Special Conditions for Safe Use Conditions and Conditions of Certification.

Those installing or inspecting the equipment should refer to this section of the certificate.

2.3 The specific ATEX certification and ratings are clearly marked on the product label for each of the ESP SL**X (and **XL) SPDs, in the following format:

Ⓔ II 2 (1) G IECEx SIR 10.0030X
Ex ia [ia Ga] IIC t4 Gb SIRA 10ATEX2063X

In addition there is a separate label on both the replaceable module and base housing to indicate the manufacturing date.

2.4 The equipment has not been assessed as a safety related device (as referred to by Directive 94/9/EC Annex II, Clause 1.5).

Note: ESP SLX (and **XL) SPDs provide surge protection on the Intrinsically Safe (IS) circuits only and do not replace the IS barrier itself.**

3. Before installation

3.1 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 SL15X, ESP SL15XL, ESP SL30X, ESP SL30XL	1.0 Ω

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

	Bandwidth (-3 dB)
ESP SL15X, ESP SL15XL, ESP SL30X, ESP SL30XL	45 MHz

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

	Maximum Current
ESP SL15X, ESP SL15XL, ESP SL30X, ESP SL30XL	750 mA

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



Figure 2: Installation on a 35 mm DIN rail.

3.4 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 SL15X, ESP SL15XL	15 V	16.7 V	11 V
ESP SL30X, ESP SL30XL	30 V	36.7 V	25 V

4. Installation

4.1 Installation (IEC 60079-14/EN 60079-14)

Installation of this equipment shall only be carried out by suitably trained personnel in accordance with the applicable code of

practice. If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

"Aggressive substances" e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

"Suitable precautions" e.g. regular checks as part of routine inspections or establishing from the material's datasheet that it is resistant to specific chemicals.

4.2 Location

The ESP SPD may be installed in Zones 1 & 2 and has an output suitable for connection into Zone 0 for flammable gases and vapours with Apparatus Groups IIA, IIB & IIC and Temperature Classes T1, T2, T3 & T4. Field instrument protection should take place in Zone 1 and as close as practically possible to the Zone 0 boundary, preferably within 1 m to prevent transient overvoltages from entering Zone 0.

The ESP SPD must not be installed in a location where it may be attacked by aggressive substances and must be protected from excessive dust, moisture and other contaminants by an enclosure. The ESP SPD must not be subjected to thermal and/or mechanical stresses in excess of those permitted in the certification documentation (see product datasheet for further details - contact Furse).

Ideally, the ESP SPD should be installed within the housing of the field instrument. However, due to space restrictions within the housing of the field instrument, or risk of mechanical damage, it may be necessary to mount the unit in a suitable enclosure available from Furse.

The ESP SPD will always require additional protection when installed in dust environments.

Ensure the ESP SPD is mounted on a separate DIN rail to the IS Barriers (see Figure 2).

When locating the ESP SPD, ensure it's connection to earth (or SPD earth bond is kept short (see Section 4.9 - Earthing).

4.3 Power/Temperature rating

The equipment is only certified for use in ambient temperatures in the ranges as detailed below and shall not be used outside these ranges.
 -40 °C < Ta < 40 °C (Pi = 1.3 W)
 -40 °C < Ta < 60 °C (Pi = 1.2 W)
 -40 °C < Ta < 80 °C (Pi = 1 W)

4.4 Enclose the SPD

ESP SL**X SPDs should be installed within the housing of the field instrument or a suitable protective enclosure available from Furse, such as WBX SLQ. The ESP SPD must be installed in an enclosure to protect it against aggressive substances, excessive dust, moisture, other contaminants and to prevent risk of mechanical damage. ESP SPDs should always be installed in a dry environment.

4.5 Series connection

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



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



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

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.

4.6 Fixing methods

Furse ESP SPDs should be mounted on a | 35 mm DIN rail to EN 50022 (see Figure 2).

This should be a separate DIN rail to the IS Barriers.

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).

4.7 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 Figure 1). Cable screens are connected to earth (DIN rail and earth terminal) via the terminals marked S. 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 these are terminated with a boot lace ferrule.

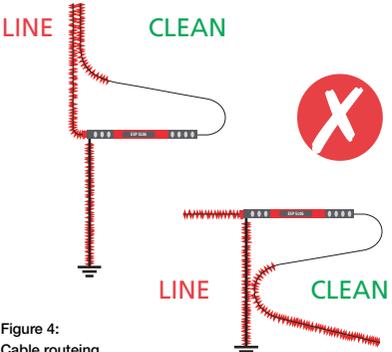


Figure 4: Cable routing.



For isolated screen versions

For situations where the cable screen needs to be isolated from the local earth to avoid earth loops (e.g. ATEX field earths) the isolated

screen version should be used (this has /I suffix in the part code e.g. ESP SL30X/I).

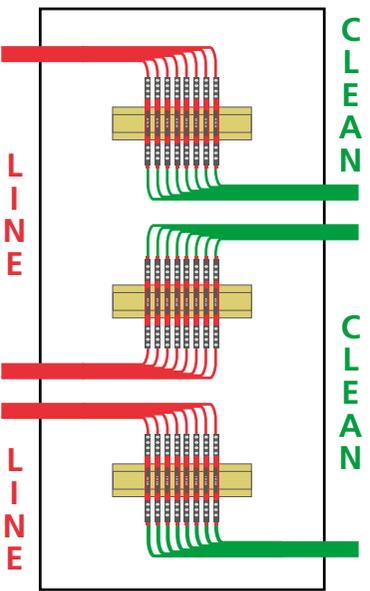


Figure 5: Positioning of adjacent rows of SPDs.

With the isolated screen version there is no continuity between the screen & earth connections in the absence of a transient overvoltage.

4.8 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 barrier earth bonds (see Figure 4). If rows of ESP SPDs are installed close to each other, dirty line cables & 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.

4.9 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:

- (a) Through installation on a 35 mm DIN rail (which in turn is connected to earth)
- (b) By connecting an earth cable to the SPD via the SPD's earth terminal marked ⏏ (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 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 barrier 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. Barrier or base plate earth bonds of 2, 3 or 4 m are allowed if:

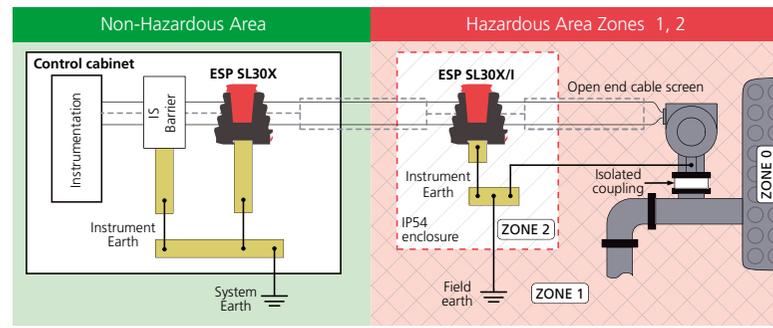


Figure 6: The ESP SL**X Series can provide protection for the PLC or RTU I/O as well as providing protection for the IS barrier. The isolated screen (ESP SL**X/I) version should be used in Zone 1, 2.

- 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.

4.10 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.

4.11 Inspection and maintenance/spare parts

Repair of this equipment is not possible and should not be attempted. The plastic enclosure must not be rubbed in service as it may present an electrostatic risk.

Inspection & maintenance should be carried out in accordance with European, national & local regulations which may refer to the IEC standard IEC 60079-17. In addition specific industries or end users may have specific requirements which should also be met. If the outer enclosure of the ESP SPD needs to be cleaned, this should be done with a

cloth lightly moistened by a dilute mixture of detergent in water.

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

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 SL30X SPD would be ESP SL30X/M).

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.

4.12 Insulation/Flash testing

When the surge protection module is fitted, ESP SL**X 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 and 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.

4.13 Conditions for safe use

ESP SL**X SPDs provide surge protection on the Intrinsically safe (IS) circuits only and do not replace the IS barrier itself.



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