

Introduction

This document explains how to install a Furse ESP Surge Protective Device (SPD) for RF communication installations:

ESP RF 111A11

ESP RF AA1A11

ESP RF 441A11



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

	Bandwidth (-3 db)
All ESP RF Series	50-2700 MHz

2.2 Check that signal loss caused by insertion of the unit does not interfere with normal system operation.

	Insertion Loss over Bandwidth (-3 db)
All ESP RF Series	< 0.4 db

2.3 Ensure that the characteristic impedance of the ESP SPD matches that of the system on to which it is to be installed.

	Characteristic Impedance
All ESP RF Series	50 Ω

2.4 Ensure the system's maximum line voltage (RMS) never exceeds the maximum working voltage of the ESP SPD. Otherwise the ESP SPD will clamp signal voltages as though they were transient overvoltages.

	Max RF Voltage	
	V _{PEAK}	V _{RMS}
All ESP RF Series	120 V	86 V

Note: Incorrect application may result in damage to the SPD and put the system at risk.

3. Installation

3.1 Series connection

Furse ESP SPDs are connected in series with the RF 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 Figures 1, 2 & 3).

3.2 SPD location

ESP SPDs are usually located either:

- near to where the line requiring protection enters or leaves the building, or
- close to the equipment being protected (or actually within its control panel).

It is important that the ESP SPD's connection to earth (or barrier earth bond) is kept short (see Section 3.7 - Earthing).



Figure 1: ESP RF 111A11 (N female) series connection.



Figure 2: ESP RF AA1A11 (7/16 DIN female) series connection.



Figure 3: ESP RF 441A11 (BNC female) series connection.



Figure 4: ESP RF 111A11 installed on a coaxial cable running between an antenna and a RF receiver. Note the earth lead (behind the cable tray) attached to the mounting fixture.

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

3.3 Enclose the SPD

ESP SPDs should be installed within a panel or enclosure. Ideally, the ESP SPD should be installed within an existing cabinet/cubicle or in an enclosure to the required IP rating.

... continued overleaf

Suitable enclosures are available from Furse.

ESP SPDs should always be installed in a dry environment.

3.4 Fixing methods

ESP RF Series SPDs have two mounting options:

(a) Flat mounting

M3 serrated channels in the ESP SPD base enable it to be fixed to flat surfaces (see *Figure 4, overleaf*).

(b) Bracket mounting

Four mounting brackets are available from Furse to enable easier and more flexible mounting:

	Mounting facility
ESP RF BK1	Straight mounting bracket (1 unit)
ESP RF BK2	90° angled mounting bracket (1 unit)
ESP RF BK3	Bulkhead through mounting bracket (1 unit)
ESP RF BK4	Bulkhead through mounting bracket (4 units)

Contact Furse for further information.

3.5 Line, clean, screen and earth connections

Cable wires should be terminated with a male type connector.

The *line* end of the ESP SPD should be connected to the dirty, incoming cable. The clean end of the ESP Lightning Barrier should be connected to the cable going to the protected equipment. Cable screens are earthed when connected to the unit (see *Section 3.7 - Earthing*).

Note: Do NOT use power driven screwdrivers to make connections to ESP SPDs.

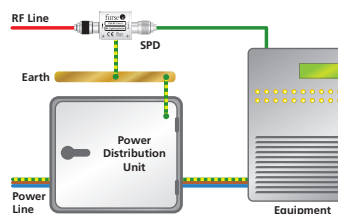
Hand tighten connections only.

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 earth bonds (see *Figures 1, 2, and 3, overleaf*).

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.

Figure 5:
If connection to the main electrical earth is not possible, the Lightning Barrier can be connected to the earth local to the protected equipment.



3.7 Earthing

Protectors for mains power supplies and ESP SPDs for RF 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 by connecting a crimped earth cable via the M3 serrated channels or M5 caged nuts in the base of the unit.

Note: Most metal cable trays are insufficiently bonded together to form a good earth bond. A separate earth wire should still be used.

The barrier or base plate earth bond should be less than 1 m long (otherwise the effectiveness of the 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 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 cable should be re-routed to bring it within 4 metres of the earth.

In circumstances where the cable cannot 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 5*).



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