



- ◆ Suitable for RF systems using coaxial cables at frequencies between DC and 2.7GHz.
- ◆ Effective protection without impairing system performance.
- ◆ Suitable for RF systems with power up to 2.3kW.
- ◆ Suitable for applications where DC power is present on the coaxial cable.

Application

The Standard RF protector offers a cost effective protection solution for use on coaxial cables to protect RF transmitter and receiver systems, including electronics located at the antenna or dish. Typical examples include cell sites, military communications, satellite earth stations, pager systems and emergency communications systems. They can be used in applications where DC power is required to pass to the equipment.

Features & benefits

- ✓ Restricts let-through voltage to below the damage levels of interface circuitry.
- ✓ Provides repeated protection in lightning intense environments.
- ✓ Very low attenuation and near unity Voltage Standing Wave Ratio (VSWR) over a wide range of frequencies ensure the protectors do not impair system performance.
- ✓ Wide bandwidth means a single product is suitable for a range of applications, including the transmission of DC power.
- ✓ Easily mounted and earthed via fixtures on the base of the unit that accept M3 screws or via mounting brackets.
- ✓ Available with N, 7/16 DIN and BNC connectors.
- ✓ Additional mounting plates – ESP RF BK1 (straight) and ESP RF BK2 (90° angled) – give increased flexibility in mounting methods.
- ✓ Robust silver plated aluminium housing.



ESP RF 111121 installed on a coaxial cable running between an antenna and an RF receiver. Note the earth lead (behind the cable tray) attached to the mounting fixture.

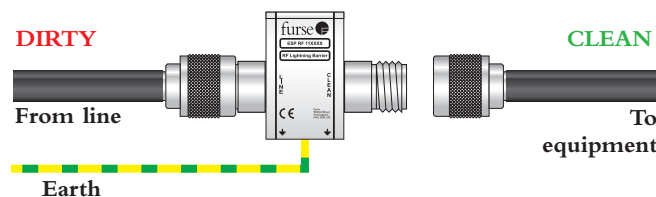
Technical Note

These protectors are based on a continuous transmission line with a GDT connected between this line and screen/earth, and are suited for applications where DC is required to pass to the equipment. Protectors with other connectors are available. Contact Furse.

For RF applications where the connected equipment is very sensitive to transient overvoltages, use the higher specification RF protectors. ESP CCTV/B and ESP CCTV/T are suitable for use on coaxial (or twisted pair) CCTV lines. For coaxial ethernet lines, use the ESP ThinNet or ESP ThickNet and for coaxial CATV lines, use the ESP CATV/E.

Installation

In a building, connect in series with the coaxial cable near where it enters or leaves the structure, or close to the equipment being protected. This should be close to the system's earth star point (to enable a good connection to earth). On a mast, connect in series with the coaxial cable near the antenna/dish being protected. Install in a radio communications room, an existing cabinet or a suitable enclosure.



ESP RF 111A21 with N female connectors installed in series

Part numbering system

Furse RF protectors have six figure part codes, prefixed with ESP RF. Example: **ESP RF AABCDE**

Connector type - **AAXXXX**

- 11** - N type female connectors
- 44** - BNC female connectors
- AA** - 7/16 DIN type female connectors

Line impedance - **XXBXXX**

- 1** - 50Ω transmission line.

Gas Discharge Tube (GDT) selection - **XXXCXX**

The selection of the correct GDT is critical in the effectiveness of a transient overvoltage protection system using Standard RF protectors. For the correct GDT, take the maximum RF power or the maximum RF voltage of the system and select, from the table opposite, a GDT with a voltage/power handling greater than the system.

Important note: When using the peak RF voltage to select the GDT, if the system is a multi-carrier system the (in phase) peak RF voltage can be calculated as the total of all the single carrier peak voltages on the transmission line.

Protector rating - **XXXXDX**

- 2** - Standard specification

Case plating - **XXXXXE**

- 1** - Silver

Accessories

Additional mounting plates:

- ESP RF BK1 (straight) and ESP RF BK2 (90° angled)

Replacement gas discharge tubes:

- ESP RF GDT-x (Where x is the correct GDT part code digit for your system. See GDT Selection, above.)

Adapters are also available to convert to other connection interfaces.

Electrical specification

	ESP RF XX1X21					
Gas Discharge Tube voltage	90V	150V	230V	350V	470V	600V
Maximum working voltage (RMS) ¹	51V	85V	130V	200V	265V	340V
Characteristic impedance	50Ω	50Ω	50Ω	50Ω	50Ω	50Ω
Bandwidth	DC - 2.7GHz					
Voltage standing wave ratio	≤1.1	≤1.1	≤1.1	≤1.1	≤1.1	≤1.1
Insertion loss over bandwidth	≤0.1dB	≤0.1dB	≤0.1dB	≤0.1dB	≤0.1dB	≤0.1dB
Maximum power ¹	50W	145W	340W	785W	1.4kW	2.3kW

¹ The maximum RF working voltage and maximum power for the protectors is dependent on the GDT selected. See 'Gas Discharge Tube selection' on page 102 and below.

Transient specification

Gas Discharge Tube voltage	90V	150V	230V	350V	470V	600V
Let-through voltage (all conductors) ¹						
5kV, 10/700μs test to:	430V	370V	470V	580V	750V	830V
BS 6651:1999 Appendix C, Cat C-High ITU (formerly CCITT) IX K17						
Maximum surge current	20kA	20kA	20kA	20kA	20kA	20kA

¹ The maximum transient voltage let-through the protector throughout the test (±10%). Response time <10ns. This let-through voltage represents a deviation from the applied signal voltage, present at the time of the test.

² Tested with 8/20μs waveshape to ITU (formerly CCITT), BS 6651:1999 Appendix C.

Mechanical specification

	ESP RF 111X21	ESP RF AA1X21	ESP RF 441X21
Temperature range	-25°C to +70°C	-25°C to +70°C	-25°C to +70°C
Connection type	N female	7/16 DIN female	BNC female
Earth connection	Via mounting fixtures	Via mounting fixtures	Via mounting fixtures
Finish	Silver plated	Silver plated	Silver plated
Weight	- unit - packaged		
	120g 140g	190g 210g	90g 110g
Dimensions			
ESP RF BK1	Straight mounting bracket, 53 x 26.3 x 3mm Two M4 clearance mounting holes, 16.3mm apart		
ESP RF BK2	90° mounting bracket, 33 x 26.3 x 3mm, 20 x 26.3 x 3mm Two M4 clearance mounting holes, 16.3mm apart, 14mm from fold line (Mounting brackets supplied with screws for fixing to protector)		

Gas Discharge Tube selection

Max RF voltage	Max RF power	GDT voltage	GDT part code digit
V _{Peak}	-50Ω system (P _{RMS})		
72V	50W	90V	1
120V	145W	150V	2
185V	340W	230V	3
280V	785W	350V	4
375V	1.4kW	470V	5
480V	2.3kW	600V	6