



- LPZ**
 $0_A \rightarrow 2$
- FULL MODE**
Bonding +
Equipment
Protection
- SIGNAL/
TELECOM**
TEST CAT
D + C + B
- e**
ENHANCED
Low let-through
voltage
- HIGH**
BANDWIDTH

Combined Category D, C, B tested protector (to BS EN 61643-21) suitable for RF systems using coaxial cables at frequencies between DC and 2.7GHz and where DC power is present. Suitable for RF systems with power up to 2.3kW. For use at boundaries up to LPZ 0_A to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Restricts let-through voltage below damage levels of interface circuitry
- ✓ Very low attenuation and near unity 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
- ✓ Available with N, 7/16 DIN and BNC connectors
- ✓ Additional mounting plates give increased flexibility
- ✓ Robust silver plated aluminium housing

Part numbering system

Furse RF protectors have six digit part codes, prefixed with ESP RF. The selected digits define the exact specification of the required protector, e.g. **ESP RF AABCDE**

Connector type – ESP RF AAxxxx

The first 2 digits refer to the connector type:

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

Line impedance – ESP RF xxBxxx

3rd digit refers to the line impedance. Currently only one option:

- 1** – 50Ω transmission line.

Gas Discharge Tube (GDT) selection – ESP RF xxxCxx

Select the 4th digit from the Gas Discharge Tube selection table.

Selection of the correct GDT is critical in the effectiveness of using these protectors. For the correct GDT, take the maximum RF power or voltage of the system and select 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 – ESP RF xxxxDx

5th digit specifies the protector rating.

- 1** – Higher specification
- 2** – Standard specification

Case plating – ESP RF xxxxxE

6th digit specifies the case plating. Currently only one option.

- 1** – Silver

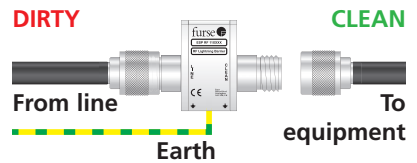
For RF applications where the connected equipment is very sensitive to transient overvoltages, use the higher specification RF protectors. ESP CCTV/B and ESP CCTV/T are suitable for use on coaxial (or twisted pair) CCTV lines. For coaxial CATV lines, use the CATV/F.

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 and pager systems. They can be used in applications where DC power is required to pass to the equipment.

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. 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



ESP RF 111121 on a coaxial cable running between an antenna and an RF receiver

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.

Accessories

ESP RF BK1

Straight mounting plates

ESP RF BK2

90° angled mounting plates

ESP RF GDT-x

Replacement gas discharge tubes (Where x is the correct GDT part code digit for your system. See GDT selection, above.)

Electrical specification

ESP RF xx1x21

Gas Discharge Tube voltage	90V	150V	230V	350V	470V	600V
Maximum working voltage U_c (RMS)¹	51V	85V	130V	200V	265V	340V
Characteristic impedance	50Ω					
Bandwidth	DC-2.7GHz					
Voltage standing wave ratio	≤1.1					
Insertion loss over bandwidth	≤0.1dB					
Maximum power¹	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' below.

Transient specification

ESP RF xx1x21

Gas Discharge Tube voltage	90V	150V	230V	350V	470V	600V
Let-through voltage (all conductors)¹ U_p						
C2 test 4kV 1.2/50μs, 2kA 8/20μs to BS EN/EN/IEC 61643-21	<700V	<650V	<700V	<800V	<900V	<1050V
C1 test 1kV, 1.2/50μs, 0.5kA 8/20μs to BS EN/EN/IEC 61643-21	<550V	<450V	<550V	<650V	<800V	<950V
B2 test 4kV 10/700μs to BS EN/EN/IEC 61643-21	<400V	<350V	<450V	<550V	<730V	<800V
5kV, 10/700μs²	<430V	<370V	<470V	<580V	<750V	<830V
Maximum surge current³						
D1 test 10/350μs to BS EN/EN/IEC 61643-21				2.5kA		
8/20μs to ITU (formerly CCITT), BS 6651:1999 Appendix C				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 Test to BS 6651:1999 Appendix C, Cat C-High, IEC 61000-4-5:1995, ITU-T (formerly CCITT) K.20, K.21 and K.45, Telcordia GR-1089-CORE, Issue 2:2002, ANSI TIA/EIA/IS-968-A:2002 (formerly FCC Part 68).

³ The installation and connections external to the protector may limit the capability of the protector.

Mechanical specification

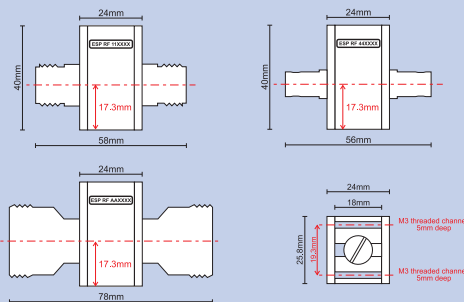
ESP RF 111x21

ESP RF AA1x21

ESP RF 441x21

Temperature range	-25°C to +70°C		
Connection type	N female	7/16 DIN female	BNC female
Earth connection	Via mounting fixtures		
Case material	Aluminium, Silver plated		
Weight – unit	120g	190g	90g
– packaged	140g	210g	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

V_{Peak}	Max RF voltage	V_{RMS}	Max RF power -50Ω system (P_{RMS})	GDT voltage code	GDT part digit
72V		51V	50W	90V	1
120V		85V	145W	150V	2
185V		130V	340W	230V	3
280V		200V	785W	350V	4
375V		265V	1.4kW	470V	5
480V		340V	2.3kW	600V	6