

ESP TN/JP, TN/RJ11 and ISDN/RJ45 Series **188 – 189**

Plug-in protectors for phone lines (RJ11 or British style jack plug & socket connections) and ISDN S/T interface lines (RJ45 connections)

ESP KT and KE Series **190 – 191**

Single and ten way protectors for PSTN and ISDN phone lines using LSA-PLUS disconnection modules

ESP Cat-5 Series **192 – 193**

Computer network protector for twisted pair Ethernet (10, 100 and 1000baseT) and Power over Ethernet (PoE) networks with Cat-5 or Cat-5e cabling and RJ45 connections

ESP LA and LB Series **194 – 195**

Local protectors for PC's and computer equipment with 'D' connectors

ESP LN Series **196 – 197**

Local protectors for up to Cat-5 cabling with RJ45 connectors, including multiport applications

ESP ThinNet and ThickNet Series **198**

Protectors for use on coaxial Thick and Thin Ethernet networks

ESP TN/JP, TN/RJ11 and ISDN/RJ45 Series



LPZ $0_B \rightarrow 3$	FULL MODE Bonding + Equipment Protection
SIGNAL/ TELECOM TEST CAT D + C + B	e ENHANCED Low let-through voltage
CURRENT 300mA RATING	LOW INLINE 4.4Ω RESISTANCE

Combined Category D, C, B tested protector (to BS EN 61643-21) suitable to protect telephony equipment plugged into a BT telephone (BS 6312), Modem (RJ11) or ISDN (RJ45) socket. For use at boundaries up to LPZ 0_B to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all lines – Full Mode protection
- ✓ Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- ✓ Repeated protection in lightning intense environments
- ✓ Supplied in a sturdy ABS housing ready for flat mounting, or vertically via TS35 'Top Hat' DIN rail
- ✓ Substantial earth connection to enable effective earthing
- ✓ ESP TN/JP, ESP TN/RJ11-2/6, ESP TN/RJ11-4/6 and ESP TN/RJ11-6/9 are suitable for telecommunication applications in accordance with Telcordia and ANSI Standards (see Application Note AN005)

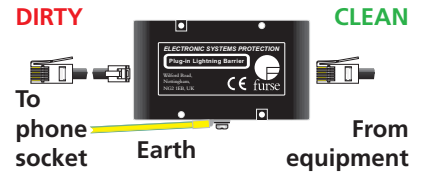
Application

- ✓ For PSTN (e.g. POTS, dial-up, lease line, T1/E1, *DSL and Broadband) use ESP TN/JP or TN/RJ11
- ✓ ESP TN/JP and ESP TN/RJ11... are suitable for use on telephone lines with a maximum (or ringing) voltage of up to 296 volts
- ✓ For telephone lines with a British style, jack plug and socket connection, use ESP TN/JP
- ✓ For telephone lines with RJ11 connections protect the middle 2 (of 6) conductors with ESP TN/RJ11-2/6, the middle 4 (of 6) with ESP TN/RJ11-4/6 or all 6 with ESP TN/RJ11-6/6
- ✓ For S/T interface ISDN lines, use ESP ISDN/RJ45-4/8 and ESP ISDN/RJ45-8/8
- ✓ For S/T interface ISDN lines with RJ45 connections protect the middle 4 (of 8) conductors (paired 3&6, 4&5) with ESP ISDN/RJ45-4/8, or all 8 (outside pairs 1&2, 7&8) with ESP ISDN/RJ45-8/8

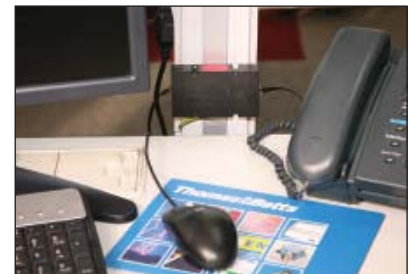
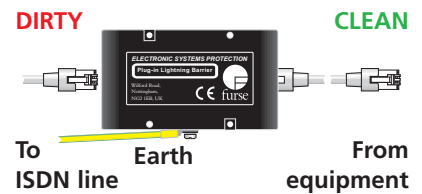
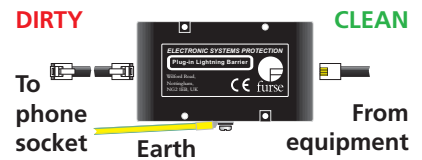
For further information on RJ45 ISDN applications, see separate Application Note AN002 and for global telephony applications, see separate Application Note AN005 (contact Furse for a copy).

Installation

Connect in series with the telephone or ISDN line. These units are usually installed close to the equipment being protected and within a short distance of a good electrical earth.



Plug-in series connection for ESP TN/JP (above) and ESP TN/RJ11-2/6, 4/6 & 6/6 (below) and ESP ISDN/RJ45-4/8 & 8/8 (bottom)



An ESP TN/RJ11-4/6 protecting an external fax line. Note the short earth connection made to the local ring main

Accessories

ESP CAT5e/UTP-1

1 metre cable with RJ45 connections

For non-ISDN wire-in applications the high performance ESP TN or ready-boxed derivative ESP TN/BX or ESP TN/2BX can be used. Protect PBX telephone exchanges and other equipment with LSA-PLUS connections.

Electrical specification

	ESP TN/JP	ESP TN/ RJ11-2/6	ESP TN/ RJ11-4/6	ESP TN/ RJ11-6/6	ESP ISDN/ RJ45-4/8	ESP ISDN/ RJ45-8/8
Nominal voltage	296V	296V	296V	296V	5V	5V/58V ²
Maximum working voltage U_c¹	296V	296V	296V	296V	58V	58V
Current rating (signal)	300mA					
In-line resistance (per line $\pm 10\%$)	4.4 Ω					
Bandwidth ($-3\text{dB } 50\Omega$ system)	20MHz	20MHz	20MHz	20MHz	19MHz	19MHz

¹ Maximum working voltage (DC or AC peak) measured at $<10\mu\text{A}$ leakage for ESP TN/JP and ESP TN/RJ11 products and $5\mu\text{A}$ for ESP ISDN/RJ45 products.

² Maximum working voltage is 5V for pairs 3/6 & 4/5, and 58V for pairs 1/2 & 7/8.

Transient specification

	ESP TN/JP	ESP TN/ RJ11-2/6	ESP TN/ RJ11-4/6	ESP TN/ RJ11-6/6	ESP ISDN/ RJ45-4/8	ESP ISDN/ RJ45-8/8
Let-through voltage (all conductors) ¹ U_p						
C2 test 4kV 1.2/50 μs , 2kA 8/20 μs to BS/EN/IEC 61643-21						
– line to line	395V	395V	395V	395V	28V	28V / 88V ³
– line to earth	395V	395V	395V	395V	88V	88V
C1 test 1kV, 1.2/50 μs , 0.5kA 8/20 μs to BS/EN/IEC 61643-21						
– line to line	390V	390V	390V	390V	23V	23V / 63V ³
– line to earth	390V	390V	390V	390V	63V	63V
B2 test 4kV 10/700 μs to BS/EN/IEC 61643-21						
– line to line	295V	295V	295V	295V	26V	26V / 65V ³
– line to earth	295V	295V	295V	295V	65V	65V
5kV, 10/700 μs ²						
– line to line	300V	300V	300V	300V	27V	27V/80V ³
– line to earth	300V	300V	300V	300V	80V	80V
Maximum surge current ⁴						
D1 test 10/350 μs to BS/EN/IEC 61643-21	1kA					
8/20 μs to ITU (formerly CCITT), BS 6651:1999 Appendix C	10kA					

¹ The maximum transient voltage let-through the protector throughout the test ($\pm 10\%$), line to line & line to earth, both polarities. Response time $<10\text{ns}$

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).

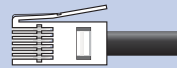
³ The first let-through voltage value is for pairs 3/4 & 5/6, and the second value is for pairs 1/2 & 7/8.

⁴ The installation and connectors external to the protector may limit the capability of the protector.

Mechanical specification

	ESP TN/JP	ESP TN/ RJ11-2/6	ESP TN/ RJ11-4/6	ESP TN/ RJ11-6/6	ESP ISDN/ RJ45-4/8	ESP ISDN/ RJ45-8/8
Temperature range	-25 to +70°C					
Connection type	Standard BT jack plug and socket (to BS 6312)	RJ11 plug and socket	RJ11 plug and socket	RJ11 plug and socket	RJ45 plug and socket	RJ45 plug and socket
Earth connection	M4/DIN rail					
Case material	ABS UL94 V-0					
Weight – unit	0.15kg					
– packaged	0.2kg					

Dimensions



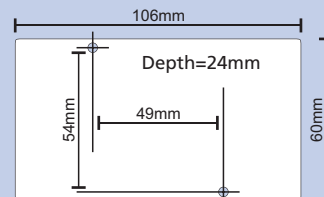
ESP TN/JP cable length = 1 metre



ESP ISDN/RJ45-4/8, -8/8 cable length = 0.25 metre



ESP TN/RJ11-2/6, 4/6, 6/6 cable length = 1 metre



Fixing centres 49mm x 54mm
M3 clearance

ESP KT and KE Series



LPZ $0_B \rightarrow 3$	FULL MODE Bonding + Equipment Protection
SIGNAL/ TELECOM TEST CAT D + C + B	e ENHANCED Low let-through voltage
HIGH BANDWIDTH	LOW INLINE 4.4Ω RESISTANCE

Combined Category D, C, B tested protector (to BS EN 61643-21) suitable for use on ten line LSA-PLUS disconnection modules to PBX telephone exchanges, ISDN and other telecom equipment with LSA-PLUS disconnection modules. For use at boundaries up to LPZ 0_B to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Low cost protection for large numbers of data and signal lines
- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all lines – Full Mode protection
- ✓ Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- ✓ Repeated protection in lightning intense environments
- ✓ Colour of housing distinguishes electrically different protectors – avoids confusion when installed together on the same distribution frame
- ✓ Quick and easy plug-in installation
- ✓ Under power line cross conditions /PTC versions offer safe disconnection during fault duration. The unit will then auto reset once the fault has been corrected
- ✓ At larger installations ESP K10T1/2 and ESP K10T1/PTC provide all in one protection for all ten lines on a standard LSA-PLUS disconnection modules
- ✓ Use the ESP KE10 to provide trouble free earthing for up to ten ESP KT1/2s and ESP KT1/PTC (per disconnection module)
- ✓ ESP K10T1/2 have an integral earth connection making the ESP KE10 unnecessary
- ✓ ESP KT1/PTC and ESP K10T1/PTC have resettable overcurrent protection and are rated for power cross faults
- ✓ ESP KT1, ESP KT1/PTC, ESP K10T1 & ESP K10T1/PTC are suitable for telecommunication applications in accordance with Telcordia and ANSI Standards (see Application Note AN005)

Application

- ✓ For PSTN (e.g POTS, dial-up, lease line, T1/E1, *DSL and Broadband) and U interface ISDN lines, use ESP KT1 (or ESP KT1/PTC) and ESP K10T1 (or ESP K10T1/PTC)
- ✓ For S/T interface ISDN lines, use ESP KT2 & ESP K10T2
- ✓ Protect single lines with ESP KT1, ESP KT2 or ESP KT1/PTC
- ✓ Protect all ten lines on a disconnection module with ESP K10T1 or ESP K10T2

For further information on global telephony applications, see separate Application Note AN005 (contact Furse for a copy).

Installation

Install protectors on all lines that enter or leave each building (including extensions to other buildings).

Identify the lines requiring protection and plug-in the protector (ensuring the correct orientation) for a series connection. Plug ESP K10T1/2 directly into each disconnection module requiring protection.



Firmly push an ESP K10T1 (or ESP K10T2) into each disconnection module requiring protection, so that it clips securely into the earth point, at each end of the module

ESP KT1/2 and ESP KT1/PTC must be installed via the ESP KE10 earth bar. Clip an ESP KE10 on to the disconnection module and plug an ESP KT1/2 or ESP KT1/PTC in to each line on the module that needs protecting.



Having pushed the ESP KE10 earth bar on to the disconnection modules' earth points, firmly push an ESP KT1 (or ESP KT2) into each line/pair requiring protection

In the unlikely situation that the protector is damaged, it will sacrifice itself and fail short circuit, taking the line out of commission – indicating it needs replacing and preventing subsequent transients from damaging equipment.

For individual telephone lines and lines at unmanned sites the high performance ESP TN, ready-boxed derivative ESP TN/BX or ESP TN/2BX, or plug-in ESP TN/JP or ESP TN/RJ11 Series should be used. For plug-in S/T interface ISDN protection, use the TN or ISDN Series protectors.

Electrical specification	ESP KT1	ESP KT1/PTC	ESP KT2	ESP K10T1	ESP K10T1/PTC	ESP K10T2
Maximum working voltage U_c^1						
– line to line	296V	296V	58V	296V	296V	58V
– line to earth	296V	296V	5V	296V	296V	5V
Current rating (signal)	300mA	145mA	300mA	300mA	145mA	300mA
In-line resistance (per line $\pm 10\%$)	4.4 Ω					
Bandwidth (–3dB 50Ω system)	>20MHz	>40MHz	>19MHz	>20MHz	>40MHz	>19MHz

¹ Maximum working voltage (DC or AC peak) at 10 μ A for ESP KT1, ESP KT1/PTC, ESP K10T1, ESP K10T1/PTC and at 5 μ A for ESP KT2 and ESP K10T2.

Transient specification	ESP KT1	ESP KT1/PTC	ESP KT2	ESP K10T1	ESP K10T1/PTC	ESP K10T2
Let-through voltage (all conductors)¹ U_p						
C2 test 4kV 1.2/50 μ s, 2kA 8/20 μ s to BS/EN/IEC 61643-21						
– line to line	395V	395V	28V	395V	395V	28V
– line to earth	395V	395V	88V	395V	395V	88V
C1 test 1kV, 1.2/50 μ s, 0.5kA 8/20 μ s to BS/EN/IEC 61643-21						
– line to line	390V	390V	23V	390V	390V	23V
– line to earth	390V	390V	63V	390V	390V	63V
B2 test 4kV 10/700 μ s to BS/EN/IEC 61643-21						
– line to line	295V	295V	26V	295V	295V	26V
– line to earth	295V	295V	65V	295V	295V	65V
5kV, 10/700 μ s ²						
– line to line	300V	300V	27V	300V	300V	27V
– line to earth	300V	300V	80V	300V	300V	80V
Maximum surge current³						
D1 test 10/350 μ s to BS/EN/IEC 61643-21						
– line to line			1kA			
– line to earth			2kA			
8/20 μ s to ITU (formerly CCITT), BS 6651:1999 Appendix C						
– line to line			5kA			
– line to earth			10kA			

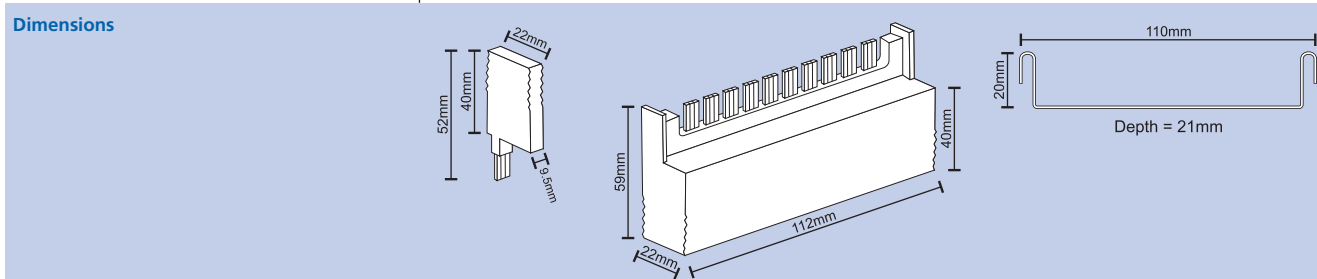
¹ The maximum transient voltage let-through the protector throughout the test ($\pm 10\%$), line to line & line to earth, both polarities. Response time <10ns

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.

Power faults specification	ESP KT1	ESP KT1/PTC	ESP KT2	ESP K10T1	ESP K10T1/PTC	ESP K10T2
Power/Line Cross and Power Induction - tests to: ITU-T (formerly CCITT) K.20, K.21 and K.45, Telcordia GR-1089-CORE, Issue 2:2002, UL 60950/IEC 950						
– power/line cross	–	110/230Vac (15min)	–	–	110/230Vac (15min)	–
– power induction	–	600V, 1A (0.2sec)	–	–	600V, 1A (0.2sec)	–

Mechanical specification	ESP KT1, ESP KT2, ESP KT1/PTC	ESP K10T1, ESP K10T2, ESP K10T1/PTC	ESP KE10
Temperature range	–25 to +70°C		–
Connection type	To LSA-PLUS disconnection modules (BT part number 237A)		–
Earth connection	Via ESP KE10 earth bar	Via integral earth clip	–
Material	ABS UL94 V-0		Stainless Steel
Weight – unit	0.01kg	0.10kg	0.01kg
– packaged	0.12kg (per 10)	0.12kg	0.10kg (per 10)



ESP Cat-5 Series



LPZ $0_B \rightarrow 3$	FULL MODE Bonding + Equipment Protection
SIGNAL/ TELECOM TEST CAT D + C + B	e ENHANCED Low let-through voltage
LOW IN-LINE 1Ω RESISTANCE	CURRENT 300mA RATING

Combined Category D, C, B tested protector (to BS EN 61643-21) suitable to protect twisted pair Ethernet networks, including Power over Ethernet (PoE), with RJ45 connections. For use at boundaries up to LPZ 0_B to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Suitable for systems signalling on up to eight wires of either shielded or unshielded twisted pair cable
- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all lines – Full Mode protection
- ✓ Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- ✓ Repeated protection in lightning intense environments
- ✓ Unlike some competing devices, the ESP Cat-5 Series provides effective protection without impairing the system's normal operation
- ✓ Low capacitance circuitry prevents the start-up signal degradation associated with other types of network protector
- ✓ Low in-line resistance minimises unnecessary reductions in signal strength to maximise signalling distance
- ✓ Sturdy ABS housing with convenient holes for flat mounting
- ✓ Substantial earth connection to enable effective earthing
- ✓ Supplied with short (25cm) Cat-5e UTP cable to enable neat installation
- ✓ Cat-5/PoE includes resettable overcurrent protection

Application

Use these protectors on network cables that travel between buildings to prevent damage to equipment, e.g. computers, servers, repeaters and hubs. Suitable for computer networks up to Cat-5e cabling.

- ✓ To protect up to 100baseT and up to 1000baseT networks with Cat-5 cabling use ESP Cat-5 and ESP Cat-5/Gigabit respectively
- ✓ To protect up to 100baseT and up to 1000baseT networks with Cat-5e cabling use ESP Cat-5e and ESP Cat-5e/Gigabit respectively
- ✓ To protect up to 100baseT Power over Ethernet (PoE) networks use ESP Cat-5/PoE

For further application information, see separate Application Note AN004 (contact Furse for a copy).

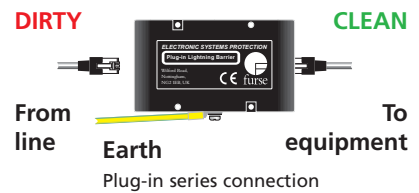
To protect coaxial Ethernet networks, use the ESP ThinNet or ESP ThickNet. To protect datacomms systems based on twisted pairs, use the D, E or H Series. Local protection for networked equipment is also available.

Installation

Connect in series with the network cable, either:

- near to where it enters or leaves the building, or
- as it enters the network hub, 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).



A Furse ESP Cat-5e/Gigabit (left and detail below) protecting a hub from transient overvoltages on a network connection with another building



Technical note

The interfaces used in 10, 100 and 1000baseT Ethernet and PoE networks incorporate an isolation transformer which gives these systems an inbuilt immunity to transients between line and earth of 1,500 volts or more

Accessories

ESP CAT5e/UTP-1

1 metre cable with RJ45 connections

Electrical specification	ESP Cat-5	ESP Cat-5e	ESP Cat-5/Gigabit	ESP Cat-5e/Gigabit	ESP Cat-5/PoE
Maximum working voltage U_c^1 – data ² – power ³	5V – –	5V – –	5V – –	5V – –	5V 58V
Current rating	300mA	300mA	300mA	300mA	350mA
In-line resistance (per line $\pm 10\%$) – data ² – power ³	1 Ω – –	1 Ω – –	1 Ω – –	1 Ω – –	4.4 Ω 4.4 Ω
Maximum data rate	100Mbps	100Mbps	1000Mbps	1000Mbps	100Mbps
Networking standards	10/100baseT TIA Cat-5 IEEE 802.3i IEEE 802.3u	10/100baseT TIA Cat-5e IEEE 802.3i IEEE 802.3u	10/100/1000baseT TIA Cat-5 IEEE 802.3i IEEE 802.3u IEEE 802.3ab	10/100/1000baseT TIA Cat-5e IEEE 802.3i IEEE 802.3u IEEE 802.3ab	10/100baseT TIA Cat-5/PoE IEEE 802.3i IEEE 802.3u IEEE802.3af

¹ Maximum working voltage (DC or AC peak) measured at 1mA leakage.

² Data pairs 1/2 and 3/6 are protected as standard. Pairs 4/5 and 7/8 are also protected on the ESP Cat-5/Gigabit and ESP Cat-5e/Gigabit barriers.

³ Power pairs 4/5 and 7/8.

Transient specification	ESP Cat-5	ESP Cat-5e	ESP Cat-5/Gigabit	ESP Cat-5e/Gigabit	ESP Cat-5/PoE
Let-through voltage (all conductors)¹ U_p					
C2 test 4kV 1.2/50 μ s, 2kA 8/20 μ s to BS/EN/IEC 61643-21 – line to line – line to earth ²	120V 700V	120V 700V	120V 700V	120V 700V	120V/88V ⁵ 700V
C1 test 1kV, 1.2/50 μ s, 0.5kA 8/20 μ s to BS/EN/IEC 61643-21 – line to line – line to earth ²	74V 600V	74V 600V	74V 600V	74V 600V	74V/63V ⁵ 600V
B2 test 4kV 10/700 μ s to BS/EN/IEC 61643-21 – line to line – line to earth ²	21V 550V	21V 550V	21V 550V	21V 550V	21V/65V ⁵ 550V
5kV, 10/700 μ s – line to line – line to earth ³	25V 600V	25V 600V	25V 600V	25V 600V	25V/80V ⁵ 600V
Maximum surge current⁴					
D1 test 10/350 μ s to BS/EN/IEC 61643-21			1kA		
8/20 μ s to ITU (formerly CCITT), BS 6651:1999 Appendix C			10kA		

¹ The maximum transient voltage let-through the protector throughout the test ($\pm 10\%$), line to line & line to earth, both polarities. Response time <10ns.

² The interfaces used in Cat-5/5e systems incorporate an isolation transformer that inherently provides an inbuilt immunity to transients between line and earth of 1,500 volts or more.

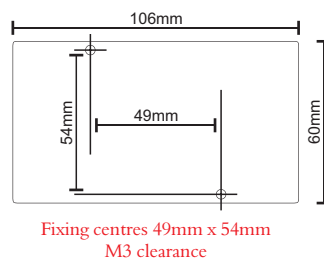
³ Test to BS 6651:1999 Appendix C, Cat C-High, IEC 61000-4-5:1995, ITU-T (formerly CCITT) K.20, K.21 and K.45, Telcordia GR-1089-CORE, Issue 2:2002, ANSI TIA/EIA/IS-968-A:2002 (formerly FCC Part 68).

⁴ The installation and connections external to the protector may limit the capability of the protector.

⁵ The first number is for the data pair, with the second number for the power pair

Mechanical specification	ESP Cat-5, ESP Cat-5e, ESP Cat-5/Gigabit, ESP Cat-5e/Gigabit, ESP Cat-5/PoE
Temperature range	-25°C to +70°C
Connection type	RJ45 sockets, 25cm patch lead included
Cable	0.25m plug-plug Cat-5e UTP patch lead
Earth connection	M4/DIN rail
Case material	ABS UL94 V-0
Weight – unit	0.15kg
– packaged	0.2kg

Dimensions



ESP LA and LB Series



LPZ 2→3	FULL MODE Bonding + Equipment Protection
SIGNAL/ TELECOM TEST CAT C + B	e ENHANCED Low let-through voltage
CURRENT 300mA RATING	LOW INLINE ~0Ω RESISTANCE

Combined Category C, B tested protector (to BS EN 61643-21) suitable to protect PCs and other computer equipment on systems using 9, 15 or 25 pins. For use on lines running within buildings at boundaries up to LPZ 2 through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Let-through voltage below equipment susceptibility levels
- ✓ Negligible in-line resistance
- ✓ Suitable for equipment using "D" connectors – DB-9, DB-15 and DB-25
- ✓ ESP LA-5/25 protects pins 1, 2, 3, 7 & 20 to earth/shell. Note pin 1 is connected to earth
- ✓ ESP LA-25/25 and ESP LB-25/25 protects all pins. Note pin 1 is connected to earth/shell
- ✓ ESP LA-9/9, ESP LB-9/9, ESP LA-15/15 and ESP LB-15/15 protect all pins
- ✓ Sturdy plastic housing
- ✓ Male/female connectors allow easy plug-in installation without rewiring
- ✓ Earthed via shell and supplementary earth strap

Application

Use on cables running within a building to protect equipment locally from transients induced onto data cables from the magnetic field caused by a lightning strike.

- ✓ For Asynchronous RS 232 systems, use ESP LA-5/25
- ✓ For RS 232 systems, use ESP LA-25/25, ESP LA-9/9 or ESP LA-15/15
- ✓ For RS 422, RS 423 and RS 485 systems, use ESP LB-9/9, ESP LB-15/15 or ESP LB-25/25

Installation

Simple plug-in connection to the communication port, between the equipment to be protected and its incoming data cable. Make suitable attachment to earth.

Technical note

ESP LA... and ESP LB... protectors are designed only for use on cables running within a building (typically LPZ 2) to offer local protection to equipment. They therefore will not be able to handle the higher level transients that occur when lines between buildings are protected. ESP LA... and ESP LB... protectors should not be used in such an application (up to LPZ 0_A) where high energy ESP lightning barriers (such as ESP E Series) should be employed. If they are used in lines between buildings, there is a high risk of the protector being overloaded and destroyed during transient activity. Connected equipment will, in most cases, still be protected, but there is a small risk that equipment will suffer damage in such circumstances.



ESP LA-5/25 installed on the parallel port of a PC, protecting the printer connection

For coaxial Ethernet cables running external to the building, use the ESP ThinNet or ESP ThickNet. For cabling up to Cat-5e with RJ45 connections (running external to the building) and local protection for up to Cat-5 with RJ45 connections, (running within a building) products are also available. Contact Fursey.

Electrical specification	ESP LA-5/25	ESP LA-25/25	ESP LA-9/9	ESP LB-9/9	ESP LA-15/15	ESP LB-15/15	ESP LB-25/25
Nominal voltage ¹	23.1V	23.1V	23.1V	5.8V	15.3V	6.4V	5.8V
Maximum working voltage U_c ²	25.7V	25.7V	25.7V	6.4V	17.1V	7.13V	6.4V
Capacitance	<500pF	<500pF	<500pF	<2000pF	<50pF	<50pF	<2000pF
Current rating	300mA						
In-line resistance	~0Ω						

¹ Nominal voltage (DC or AC peak) measured at 5μA (ESP LA-5/25, ESP LA-9/9, ESP LA-25/25, ESP LA-15/15), 0.5mA (ESP LB-15/15) and 1mA (ESP LB-9/9, ESP LB-25/25).

² Maximum working voltage (DC or AC peak) measured at 1mA leakage (ESP LA-5/25, ESP LA-9/9, ESP LA-25/25, ESP LA-15/15) and 10mA (ESP LB-15/15, ESP LB-9/9 and ESP LB-25/25).

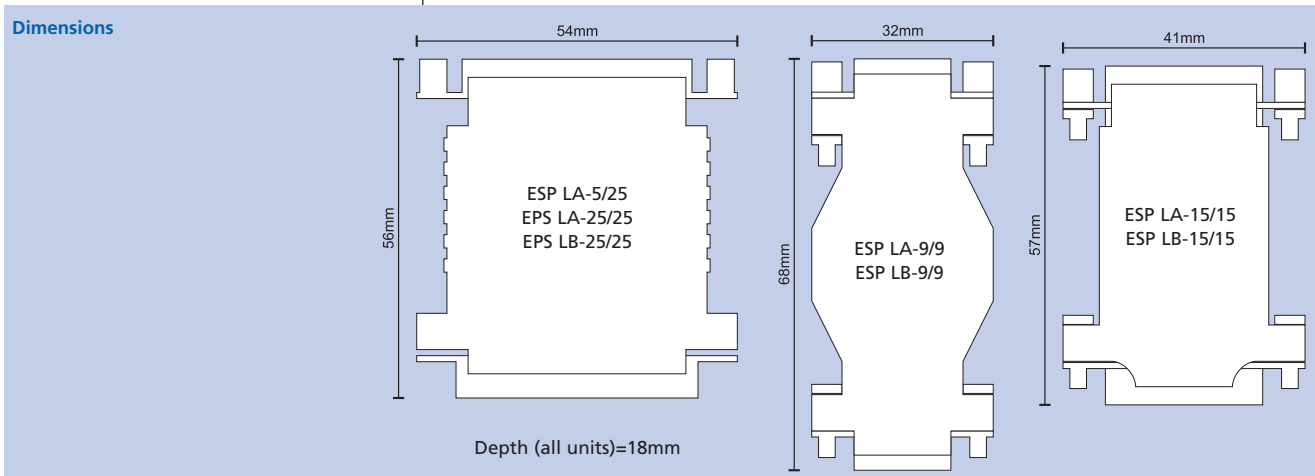
Transient specification	ESP LA-5/25	ESP LA-25/25	ESP LA-9/9	ESP LB-9/9	ESP LA-15/15	ESP LB-15/15	ESP LB-25/25
Let-through voltage ¹ U_p							
C1 test 0.5kV 1.2/50μs, 0.25kA 8/020μs to BS/EN/IEC 61643-21	–	–	–	12.5V	31.5V	16.0V	12.5V
B2 test 1kV 10/700μs to BS/EN/IEC 61643-21	36.5V	36.5V	36.5V	10.0V	27.5V	14.0V	10.0V
1.5kV, 10/700μs ²	37.5V	37.5V	37.5V	10.5V	28.5V	14.6V	10.5V
Protection provided	Pins 1, 2, 3, 7 and 20 to earth/shell ³	Pins 1 – 25 to earth/shell ³	Pins 1 – 9 to earth/shell	Pins 1 – 9 to earth/shell	Pins 1 – 15 to earth and each other	Pins 1 – 15 to earth and each other	Pins 1 – 25 to earth/shell ³
Maximum surge current							
8/20μs to ITU (formerly CCITT), BS 6651:1999 Appendix C	200A	200A	200A	300A	350A	700A	300A

¹ The maximum transient voltage let-through the protector throughout the test (±10%). Response time <10ns.

² Test to BS 6651:1999 Appendix C, Cat C-Low, 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/S-968-A:2002 (formerly FCC Part 68).

³ Pin 1 connected to earth/shell.

Mechanical specification	ESP LA-5/25	ESP LA-25/25	ESP LA-9/9	ESP LB-9/9	ESP LA-15/15	ESP LB-15/15	ESP LB-25/25
Temperature range	–25°C to +70°C						
Connection type	DB-25 m-f	DB-25 m-f	DB-9 m-f	DB-9 m-f	DB-15 m-f	DB-15 m-f	DB-25 m-f
Earth connection	Shell or 150mm earth lead (supplied)						
Casing material	ABS UL94 V-0						
Weight – unit	50g	50g	40g	40g	50g	50g	50g
– packaged	70g	70g	50g	50g	60g	60g	70g





LPZ 2→3	FULL MODE Bonding + Equipment Protection
SIGNAL/ TELECOM TEST CAT C + B	e ENHANCED Low let-through voltage
CURRENT 300mA RATING	LOW INLINE ~0Ω RESISTANCE

Combined Category C, B tested protector (to BS EN 61643-21) suitable to protect equipment on twisted pair applications using Cat-5 wiring with RJ45 connectors. For use on lines running within buildings at boundaries up to LPZ 2 through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Suitable for systems signalling on up to 8 wires of unshielded twisted pair cable – protects all 8 pins in each line
- ✓ Use to protect 1, 4, 8 or 16 lines
- ✓ Suitable for RS 422/423, 10baseT, 100baseT, Token Ring and Fast Ethernet systems
- ✓ Available for individual connections or for multiport applications
- ✓ Free standing or 19" rack mounted versions available for multiport applications
- ✓ Let-through voltage below equipment susceptibility levels
- ✓ Protects twisted pair lines operating at speeds up to 100Mbps
- ✓ Available as 4 or 8 port free standing versions (ESP LN-4 and ESP LN-8) and 8 or 16 port 19" rack mounted panels (ESP LN-8/16 and ESP LN-16/16)
- ✓ Negligible in-line resistance
- ✓ Sturdy housing and simple plug in installation
- ✓ Simple earthing via single braided metal strap

Application

Use on network cables running within a building to protect systems locally from transients induced onto data cables from the magnetic field caused by a lightning strike. Suitable for internal cabling Cat-5.

- ✓ Protect the network connection to individual pieces of equipment with the ESP LN
- ✓ Protect multiport applications such as hubs, switches and patch panels with the ESP LN-4, ESP LN-8, ESP LN-8/16 or ESP LN-16/16

Installation

Plug in connection between incoming data cables and equipment to be protected. Make suitable attachment to earth.

Technical note

ESP LN... range of protectors are designed only for use on cables running within a building (typically LPZ 2) to offer local protection to equipment. They therefore will not be able to handle the higher level transients that occur when lines between buildings are protected. ESP LN... range of protectors should not be used in such an application (up to LPZ 0_A) where high energy ESP lightning barriers (such as ESP E and ESP Cat-5 Series) should be employed. If they are used in lines between buildings, there is a high risk of the protector being overloaded and destroyed during transient activity. Connected equipment will, in most cases, still be protected, but there is a small risk that equipment will suffer damage in such circumstances.



ESP LN installed on the network connection to a PC. Note the black earth lead connection to the chassis of the PC

For coaxial Ethernet cables running external to the building, use the ESP ThinNet and ESP ThickNet. Protectors for up to Cat-5e cabling with RJ45 connections running external to the building and local protection for PCs and computer communications with D connectors (cables running within a building), are also available. Contact Furse.