



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

Combined Category D, C, B tested protector (to BS EN 61643) 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 ethernet SPDs provide 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, or vertically via TS35 'Top Hat' DIN rail
- ✓ Substantial earth connection to enable effective earthing
- ✓ Supplied with short (50 cm) Cat-5e UTP or Cat-6 STP cable to enable neat installation

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-6 cabling.

- ✓ To protect up to 100baseT and up to 1000baseT networks with Cat-5/Cat-5e cabling use ESP Cat-5e and ESP Cat-5e/Gb respectively
- ✓ To protect up to 10GbaseT networks with Cat-6 cabling use ESP Cat-6
- ✓ To protect up to 100baseT, 1000baseT and 10GbaseT Power over Ethernet (PoE) networks use ESP Cat-5e/PoE, ESP Cat-5e/Gb/PoE and ESP Cat-6/PoE respectively

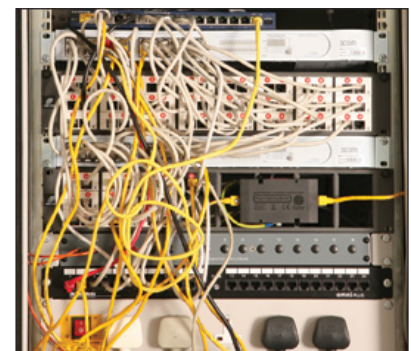
For further application information, see separate **Application Note AN004** (contact us for a copy).

Installation

Connect in series with the network cable, either:

- a) near to where it enters or leaves the building, or
- b) as it enters the network hub, or
- c) 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/Gb protecting a hub from transient overvoltages on a network connection with another building

Technical note

The interfaces used in Ethernet 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 unshielded RJ45 connections

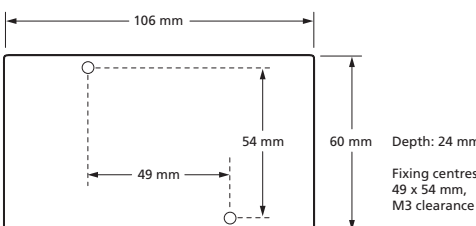
ESP CAT6/STP-1

1 metre screened cable with shielded RJ45 connections

Technical specification

Electrical specification	<div style="display: flex; justify-content: space-around; font-size: small;"> ESP Cat-5e IMPROVED ESP Cat-5e/PoE IMPROVED ESP Cat-5e/Gb NEW ESP Cat-5e/Gb/PoE NEW ESP Cat-6 NEW ESP Cat-6/PoE</div>					
	Maximum working voltage U_c^1 - data ² - power ³	5 V -	5 V 58 V	5 V -	5 V 58 V	5 V -
Current rating	300 mA	400 mA ⁴	300 mA	400 mA ⁴	300 mA	400 mA ⁴
In-line resistance (per line $\pm 10\%$) - data ² - power ³	1 Ω -	1 Ω 4.4 Ω	1 Ω -	1 Ω -	1 Ω -	1 Ω -
Maximum data rate	100 Mbps	100 Mbps	1000 Mbps	1000 Mbps	1000 Mbps	1000 Mbps
Networking standards	10/100baseT TIA Cat-5e IEEE 802.3i IEEE 802.3u	10/100baseT TIA Cat-5/PoE IEEE 802.3i IEEE 802.3u IEEE 802.3af	10/100/1000baseT TIA Cat-5e IEEE 802.3i IEEE 802.3u IEEE 802.3ab	10/100/1000baseT TIA Cat-5e IEEE 802.3i IEEE 802.3u IEEE 802.3ab IEEE 802.3af	10/100/1000/ 10GbaseT TIA Cat-6 IEEE 802.3i IEEE 802.3u IEEE 802.3ab IEEE 802.3an	10/100/1000/ 10GbaseT TIA Cat-6 IEEE 802.3i IEEE 802.3u IEEE 802.3ab IEEE 802.3an IEEE 802.3af

Transient specification	ESP Cat-5e	ESP Cat-5e/PoE	ESP Cat-5e/Gb	ESP Cat-5e/Gb/PoE	ESP Cat-6	ESP Cat-6/PoE
Let-through voltage (all conductors) ⁵ U_p						
C2 test 4 kV 1.2/50 μ s, 2 kA 8/20 μ s to BS EN/EN/IEC 61643-21 - line to line - line to earth ⁶	120 V 700 V	120 V/88 V ⁸ 700 V	120 V 700 V	120 V/86 V ⁸ 700 V	120 V 700 V	120 V/86 V ⁸ 700 V
C1 test 1 kV, 1.2/50 μ s, 0.5 kA 8/20 μ s to BS EN/EN/IEC 61643-21 - line to line - line to earth ⁶	74 V 600 V	74 V/63 V ⁸ 600 V	74 V 600 V	74 V/73.5 V ⁸ 600 V	74 V 600 V	74 V/73.5 V ⁸ 600 V
B2 test 4 kV 10/700 μ s to BS EN/EN/IEC 61643-21 - line to line - line to earth ⁶	21 V 550 V	21 V/65 V ⁸ 550 V	21 V 550 V	21 V/65 V ⁸ 550 V	21 V 550 V	21 V/65 V ⁸ 550 V
5 kV, 10/700 μ s ⁷ - line to line - line to earth ⁶	25 V 600 V	25 V/80 V ⁸ 600 V	25 V 600 V	25 V/65.8 V ⁸ 600 V	25 V 600 V	25 V/65.8 V ⁸ 600 V
Maximum surge current ⁹						
D1 test 10/350 μ s to BS EN/EN/IEC 61643-21 8/20 μ s to ITU-T K.45:2003, IEEE C62.41.2:2002				1 kA 10 kA		

Mechanical specification	ESP Cat-5e, ESP Cat-5e/PoE, ESP Cat-5e/Gb, ESP Cat-5e/Gb/PoE	ESP Cat-6, ESP Cat-6/PoE
Temperature range	-40 to +80 °C	-40 to +80 °C
Connection type	RJ45 sockets	RJ45 sockets
Cable (supplied)	0.5 m Cat-5e UTP patch lead	0.5 m Cat-6 STP patch lead
Earth connection	M4/DIN rail	M4/DIN rail
Case material	ABS UL94 V-0	ABS UL94 V-0
Weight - unit - packaged	0.15 kg 0.2 kg	0.15 kg 0.2 kg
Dimensions		

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

² Data pairs 1/2 and 3/6 are protected as standard. Pairs 4/5 and 7/8 are also protected on Gigabit (Gb) & Cat-6 barriers.

³ PoE protectors transmit power to IEEE 802.3af. ESP Cat-5e/PoE using Mode A (combined phantom power/data) and Mode B (power on spare pairs 4/5 and 7/8), ESP Cat-5e/Gb/PoE and ESP Cat-6/PoE using Mode A (combined phantom power/data) only.

⁴ Based on 15.4 W of transmitted PSE power, to IEEE 802.3af.

⁵ The maximum transient voltage let-through of the protector throughout the test ($\pm 10\%$), line to line & line to earth. Response time <10 ns (on all protected pairs).

⁶ 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.

⁷ Test to IEC 61000-4-5:2006, 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).

⁸ The first number is for the data pair, with the second number for the power pair.

⁹ The installation and connectors external to the protector may limit the capability of the protector.

To protect datacomms systems based on twisted pairs, use the ESP D, E or H Series. Local protection for networked equipment is also available. For protection of legacy coaxial Ethernet networks, please contact us for details of our ESP ThinNet and ESP ThickNet protectors.

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