

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

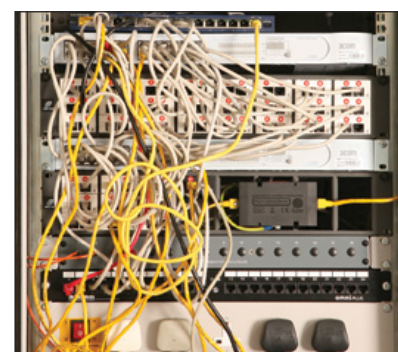
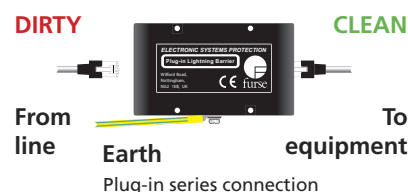
For further application information, see separate **Application Note AN004** (contact us for a copy).

## 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

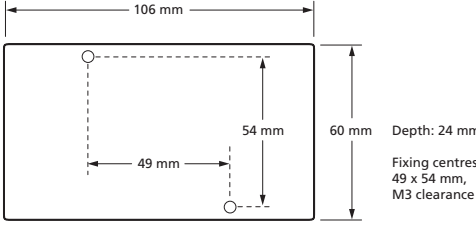
### ESP CAT6/STP-1

1 metre screened cable with shielded RJ45 connections

## Technical specification

Electrical specification	<div style="display: flex; justify-content: space-around; font-size: small;"> <span>IMPROVED</span> <span>IMPROVED</span> <span>NEW</span> <span>NEW</span> <span>NEW</span> </div>					
	ESP Cat-5e	ESP Cat-5e/PoE	ESP Cat-5e/Gb	ESP Cat-5e/Gb/PoE	ESP Cat-6	ESP Cat-6/PoE
<b>Maximum working voltage <math>U_c^1</math></b> - data <sup>2</sup> - power <sup>3</sup>	5 V -	5 V 58 V	5 V -	5 V 58 V	5 V -	5 V 58 V
<b>Current rating</b>	300 mA	400 mA <sup>4</sup>	300 mA	400 mA <sup>4</sup>	300 mA	400 mA <sup>4</sup>
<b>In-line resistance</b> (per line $\pm 10\%$ ) - data <sup>2</sup> - power <sup>3</sup>	1 $\Omega$ -	1 $\Omega$ 4.4 $\Omega$	1 $\Omega$ -	1 $\Omega$ -	1 $\Omega$ -	1 $\Omega$ -
<b>Maximum data rate</b>	100 Mbps	100 Mbps	1000 Mbps	1000 Mbps	1000 Mbps	1000 Mbps
<b>Networking standards</b>	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
<b>Let-through voltage</b> (all conductors) <sup>5</sup> $U_p$						
<b>C2 test</b> 4 kV 1.2/50 $\mu$ s, 2 kA 8/20 $\mu$ s to BS EN/EN/IEC 61643-21 - line to line - line to earth <sup>6</sup>	120 V 700 V	120 V/88 V <sup>8</sup> 700 V	120 V 700 V	120 V/86 V <sup>8</sup> 700 V	120 V 700 V	120 V/86 V <sup>8</sup> 700 V
<b>C1 test</b> 1 kV, 1.2/50 $\mu$ s, 0.5 kA 8/20 $\mu$ s to BS EN/EN/IEC 61643-21 - line to line - line to earth <sup>6</sup>	74 V 600 V	74 V/63 V <sup>8</sup> 600 V	74 V 600 V	74 V/73.5 V <sup>8</sup> 600 V	74 V 600 V	74 V/73.5 V <sup>8</sup> 600 V
<b>B2 test</b> 4 kV 10/700 $\mu$ s to BS EN/EN/IEC 61643-21 - line to line - line to earth <sup>6</sup>	21 V 550 V	21 V/65 V <sup>8</sup> 550 V	21 V 550 V	21 V/65 V <sup>8</sup> 550 V	21 V 550 V	21 V/65 V <sup>8</sup> 550 V
5 kV, 10/700 $\mu$ s <sup>7</sup> - line to line - line to earth <sup>6</sup>	25 V 600 V	25 V/80 V <sup>8</sup> 600 V	25 V 600 V	25 V/65.8 V <sup>8</sup> 600 V	25 V 600 V	25 V/65.8 V <sup>8</sup> 600 V
<b>Maximum surge current</b> <sup>9</sup>						
D1 test 10/350 $\mu$ s to BS EN/EN/IEC 61643-21 8/20 $\mu$ 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
<b>Temperature range</b>	-40 to +80 °C	-40 to +80 °C
<b>Connection type</b>	RJ45 sockets	RJ45 sockets
<b>Cable (supplied)</b>	0.5 m Cat-5e UTP patch lead	0.5 m Cat-6 STP patch lead
<b>Earth connection</b>	M4/DIN rail	M4/DIN rail
<b>Case material</b>	ABS UL94 V-0	ABS UL94 V-0
<b>Weight - unit</b> - packaged	0.15 kg 0.2 kg	0.15 kg 0.2 kg
<b>Dimensions</b>		

<sup>1</sup> Maximum working voltage (DC or AC peak) measured at 1 mA leakage.

<sup>2</sup> 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.

<sup>3</sup> 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.

<sup>4</sup> Based on 15.4 W of transmitted PSE power, to IEEE 802.3af.

<sup>5</sup> 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).

<sup>6</sup> 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.

<sup>7</sup> 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).

<sup>8</sup> The first number is for the data pair, with the second number for the power pair.

<sup>9</sup> 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.