Data & signal protection
ESP D & TN Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | LOW IN-LINE RESISTANCE 9.4Ω | CURRENT RATING 300 mA

Combined Category D, C, B tested protector (to BS EN 61643) suitable for most twisted pair signalling applications. Available for working voltages of up to 6, 15, 30, 50 and 110 Volts. ESP TN suitable for Broadband, POTS, dial-up, T1/E1, lease line and *DSL telephone applications. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features & 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
- Low in-line resistance minimises unnecessary reductions in signal strength
- Strong, flame retardant, ABS housing
- Supplied ready for flat mounting on base or side
- Built-in DIN rail foot for simple clip-on mounting to top hat DIN rails
- Colour coded terminals give a quick and easy installation check - grey for the dirty (line) end and green for the clean end
- Screen terminal enables easy connection of cable screen to earth
- Substantial earth stud to enable effective earthing
- Integral earthing plate for enhanced connection to earth via a CME kit
- ESP 06D and ESP 50D have PADS reference 086/000551 (ESP 06D) and 086/000553 (ESP 50D)
- ESP TN is suitable for telecommunication applications in accordance with Telcordia and ANSI Standards (see Application Note AN005)

Application

Use on twisted pair lines, e.g. those found in process control equipment, modems and computer communications interfaces.

Installation

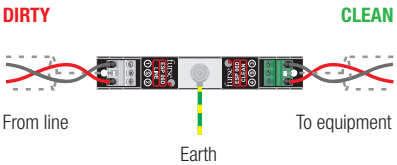
Connect in series with the data communication or signal line either near where it enters or leaves the building or close to the equipment being protected (e.g. within its control panel). Either way, it must be very close to the system's earth star point. Install protectors either within an existing cabinet/ cubicle or in a separate enclosure.

Accessories

Combined Mounting/Earthing kits:
CME 4 Mount & earth up to 4 protectors
CME 8 Mount & earth up to 8 protectors
CME 16 Mount & earth up to 16 protectors
CME 32 Mount & earth up to 32 protectors

Weatherproof enclosures:
WBX 2/G
For use with up to 2 protectors
WBX 3, WBX 3/G
For use with up to 3 protectors
WBX 4, WBX 4/GS
For use with a CME 4 and up to 4 protectors
WBX 8, WBX 8/GS
For use with a CME 8 and up to 8 protectors
WBX 16/2/G
For use with one or two CME 16and up to 32 protectors

Install in series (in-line)



NOTE: Derivatives of these protectors are available ready-boxed to IP66, for use in damp or dirty environments. Slim Line (ESP SL), ATEX (ESP SLX) and PCB mount (ESP PCB) versions are also available. If your system requires a protector with a very low resistance or higher current, see the ESP E & H Series. Also use the ESP E Series for systems needing a higher bandwidth. Protectors for 3-wire (ESP SL/3W) and RTD (ESP RTD, ESP SL RTD) are available, as are the space saving protectors (ESP Q, ESP SL Series). The ESP KT and TN Series are additional protectors specifically for telephone lines.
The ESP KS Series are protectors for data and signal lines on an LSA-PLUS module.

Data & signal protection
ESP D & TN Series

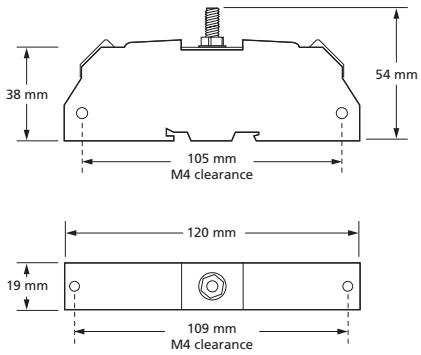
ESP D & TN Series - Technical specification

Electrical Specification	ESP 06D	ESP 15D	ESP 30D	ESP 50D	ESP 110D	ESP TN
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V	–
Maximum working voltage *Uc*[2]	7.79 V	19 V	37.1 V	58 V	132 V	296 V
Current rating (signal)	300 mA					
In-line resistance (per line ±10%)	9.4 Ω	9.4 Ω	9.4 Ω	9.4 Ω	9.4 Ω	4.4 Ω
Bandwidth (-3 dB 50 Ω system)	800 kHz	2.5 MHz	4 MHz	6 MHz	9 MHz	20 MHz

Transient Specification	ESP 06D	ESP 15D	ESP 30D	ESP 50D	ESP 110D	ESP TN
Let-through voltage (all conductors)[3] *Up*						
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21	12.0 V	25.0 V	44.0 V	78.0 V	155 V	395 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21	11.5 V	24.5 V	43.5 V	76.0 V	150 V	390 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21	10.0 V	23.0 V	42.5 V	73.0 V	145 V	298 V
5 kV, 10/700 µs[4]	10.5 V	23.8 V	43.4 V	74.9 V	150 V	300 V
Maximum surge current						
D1 test 10/350 µs to – Per signal wire	2.5 kA					
BS EN/EN/IEC 61643-21: – Per pair	5 kA					
8/20 µs to ITU-T K.45:2003, – Per signal wire	10 kA					
IEEE C62.41.2:2002: – Per pair	20 kA					

Mechanical Specification	ESP 06D	ESP 15D	ESP 30D	ESP 50D	ESP 110D	ESP TN
Temperature range	-40 to +80 °C					
Connection type	Screw terminal					
Conductor size (stranded)	2.5 mm²					
Earth connection	M6 stud					
Case material	ABS UL94 V-0					
Weight: – Unit	0.08 kg					
– Packaged (per 10)	0.85 kg					
Dimensions	See diagram below					

[1] Nominal voltage (DC or AC peak) measured at < 5 µA (ESP 15D, ESP 30D, ESP 50D, ESP 110D) and <200 µA (ESP 06D)
[2] Maximum working voltage (DC or AC peak) measured at < 1 mA leakage (ESP 15D, ESP 30D, ESP 50D, ESP 110D), < 10 mA (ESP 06D) and < 10 µA (ESP TN)
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)



Data & signal protection
ESP E Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | HIGH BANDWIDTH | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | LOW IN-LINE RESISTANCE 1 Ω | CURRENT RATING 1.25 A

Combined Category D, C, B tested protector (to BS EN 61643) suitable for twisted pair signalling applications which require either a lower in-line resistance, an increased current or a higher bandwidth than the ESP D Series. Also suitable for DC power applications less than 1.25 Amps. Available for working voltages of up to 6, 15, 30, 50 and 110 Volts. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features & 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
- Very low (1 Ω) in-line resistance allows resistance critical applications (e.g. alarm loops) to be protected
- High (1.25 A) maximum running current
- High bandwidth enables higher frequency (high traffic or bit rate) data communications
- Screen terminal enables easy connection of cable screen to earth
- Strong, flame retardant, ABS housing
- Built-in DIN rail foot for simple clip-on mounting to top hat DIN rails
- Colour coded terminals give a quick and easy installation check - grey for the dirty (line) end and green for clean
- Substantial earth stud to enable effective earthing
- Supplied ready for flat mounting on base or side
- Integral earthing plate for enhanced connection to earth via CME kit
- ESP 06E and ESP 15E have Network Rail Approval PA05/02047. NRS PADS reference 086/000201 (ESP 06E) and 086/000200 (ESP 15E)

Application

Use these units to protect resistance sensitive, higher frequency or running current systems, e.g. high speed digital communications equipment or systems with long signal lines.

Installation

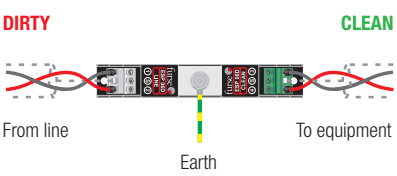
Connect in series with the data communication or signal line either near where it enters or leaves the building or close to the equipment being protected (e.g. within its control panel). Either way, it must be very close to the system's earth star point. Install protectors either within an existing cabinet/ cubicle or in a separate enclosure.

Accessories

Combined Mounting/Earthing kits:
CME 4 Mount & earth up to 4 protectors
CME 8 Mount & earth up to 8 protectors
CME 16 Mount & earth up to 16 protectors
CME 32 Mount & earth up to 32 protectors

Weatherproof enclosures:
WBX 2/G
For use with up to 2 protectors
WBX 3, WBX 3/G
For use with up to 3 protectors
WBX 4, WBX 4/GS
For use with a CME 4 and up to 4 protectors
WBX 8, WBX 8/GS
For use with a CME 8 and up to 8 protectors
WBX 16/2/G
For use with one or two CME 16and up to 32 protectors

Install in series (in-line)



NOTE: Slim Line (ESP SL), ATEX (ESP SLX) and PCB mount (ESP PCB) are available. For many twisted pair data and signal applications, the lower cost ESP D Series may be suitable. For applications requiring higher current (1.25 A to 4 A) or ultra-low in-line resistance, the ESP H Series protectors may be more suitable. For data and signal lines on LSA-PLUS modules, use the ESP KS Series.

Data & signal protection
ESP E Series

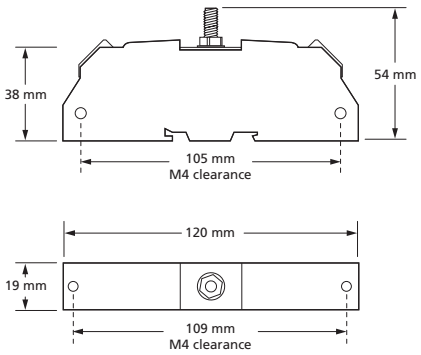
ESP E Series - Technical specification

Electrical Specification	ESP 06E	ESP 15E	ESP 30E	ESP 50E	ESP 110E
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V
Maximum working voltage *Uc*[2]	7.79 V	16.7 V	36.7 V	56.7 V	132 V
Current rating (signal)	1.25 A				
In-line resistance (per line ±10%)	1.0 Ω				
Bandwidth (-3 dB 50 Ω system)	45 MHz				

Transient Specification		ESP 06E	ESP 15E	ESP 30E	ESP 50E	ESP 110E
Let-through voltage (all conductors)[3] *Up*						
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		36.0 V	39.0 V	60.0 V	86.0 V	180 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		26.2 V	28.0 V	49.0 V	73.5 V	170 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		16.0 V	25.5 V	43.5 V	65.0 V	160 V
5 kV, 10/700 µs[4]		17.0 V	26.2 V	44.3 V	65.8 V	165 V
Maximum surge current						
D1 test 10/350 µs to	– Per signal wire	2.5 kA				
BS EN/EN/IEC 61643-21:	– Per pair	5 kA				
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA				
IEEE C62.41.2:2002:	– Per pair	20 kA				

Mechanical Specification	ESP 06E	ESP 15E	ESP 30E	ESP 50E	ESP 110E
Temperature range	-40 to +80 °C				
Connection type	Screw terminal				
Conductor size (stranded)	2.5 mm²				
Earth connection	M6 stud				
Case material	ABS UL94 V-0				
Weight: – Unit	0.08 kg				
– Packaged (per 10)	0.85 kg				
Dimensions	See diagram below				

[1] Nominal voltage (DC or AC peak) measured at < 10 µA (ESP 15E, ESP 30E, ESP 50E, ESP 110E) and < 200 µA (ESP 06E)
[2] Maximum working voltage (DC or AC peak) measured at < 5 mA leakage (ESP 15E, ESP 30E, ESP 50E, ESP 110E) and < 10 mA (ESP 06E)
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)



Data & signal protection
ESP H Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | LOW IN-LINE RESISTANCE 0.05 Ω | CURRENT RATING 4 A

Combined Category D, C, B tested protector (to BS EN 61643) suitable for twisted pair signalling applications which require either a lower in-line resistance or an increased current than the ESP D or E Series. Also suitable for DC power applications less than 4 Amps. Available for working voltages of up to 6, 15, 30, 50 and 110 Volts. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features & 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
- Ultra-low (< 0.05 Ω) in-line resistance allows resistance critical applications (e.g. alarm loops) to be protected
- Very high (4 A) maximum running current
- Strong, flame retardant ABS housing
- Supplied ready for flat mounting on base or side
- Built-in DIN rail foot for simple clip-on mounting to top hat DIN rails
- Colour coded terminals give a quick and easy installation check - grey for the dirty (line) end and green for clean
- Screen terminal enables easy connection of cable screen to earth
- Substantial earth stud to enable effective earthing
- Integral earth plate enables enhanced connection to earth via CME kit

Application

Use these applications to protect resistance sensitive or higher running current systems, e.g. systems with long signal lines, or DC power applications.

Installation

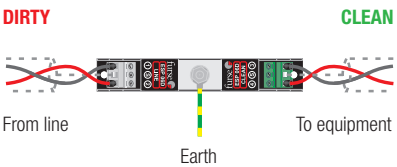
Connect in series with the data communication or signal line either near where it enters or leaves the building or close to the equipment being protected (e.g. within its control panel). Either way, it must be very close to the system's earth star point. Install protectors either within an existing cabinet/ cubicle or in a separate enclosure.

Accessories

Combined Mounting/Earthing kits:
CME 4 Mount & earth up to 4 protectors
CME 8 Mount & earth up to 8 protectors
CME 16 Mount & earth up to 16 protectors
CME 32 Mount & earth up to 32 protectors

Weatherproof enclosures:
WBX 2/G
For use with up to 2 protectors
WBX 3, WBX 3/G
For use with up to 3 protectors
WBX 4, WBX 4/GS
For use with a CME 4 and up to 4 protectors
WBX 8, WBX 8/GS
For use with a CME 8 and up to 8 protectors
WBX 16/2/G
For use with one or two CME 16 and up to 32 protectors

Install in series (in-line)



NOTE: For some data and signal applications with lower current, higher in-line resistance or higher bandwidth requirements, the ESP D or E Series protectors or the Slim Line ESP SL Series may be more suitable. If the protector is to be mounted directly onto a PCB, use the ESP PCB/**D or ESP PCB/**E protectors.

Data & signal protection
ESP H Series

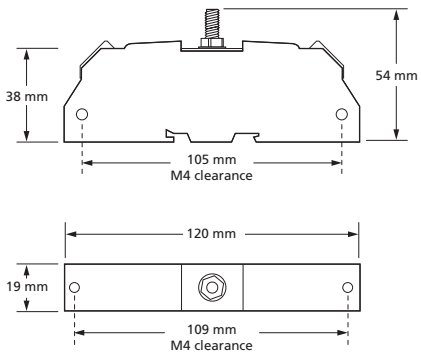
ESP H Series - Technical specification

Electrical Specification	ESP 06H	ESP 15H	ESP 30H	ESP 50H	ESP 110H
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V
Maximum working voltage *Uc*[2]	7.79 V	16.7 V	36.7 V	56.7 V	132 V
Current rating (signal)	4 A				
In-line resistance (per line ±10%)	0.05 Ω				
Bandwidth (-3 dB 50 Ω system)	160 KHz	140 KHz	130 KHz	120 KHz	120 KHz

Transient Specification		ESP 06H	ESP 15H	ESP 30H	ESP 50H	ESP 110H
Let-through voltage (all conductors)[3] *Up*						
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		12.0 V	27.5 V	46.0 V	67.0 V	150 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		11.0 V	26.5 V	45.0 V	66.5 V	145 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		10.5 V	25.5 V	43.5 V	65.0 V	140 V
5 kV, 10/700 µs[4]		10.8 V	26.2 V	44.3 V	65.8 V	145 V
Maximum surge current						
D1 test 10/350 µs to	– Per signal wire	2.5 kA				
BS EN/EN/IEC 61643-21:	– Per pair	5 kA				
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA				
IEEE C62.41.2:2002:	– Per pair	20 kA				

Mechanical Specification		ESP 06E	ESP 15E	ESP 30E	ESP 50E	ESP 110E
Temperature range		-40 to +80 °C				
Connection type		Screw terminal				
Conductor size (stranded)		2.5 mm^2				
Earth connection		M6 stud				
Case material		ABS UL94 V-0				
Weight:	– Unit	0.08 kg				
	– Packaged (per 10)	0.85 kg				
Dimensions		See diagram below				

[1] Nominal voltage (DC or AC peak) measured at < 10 µA (ESP 15H, ESP 30H, ESP 50H, ESP 110H) and < 200 µA (ESP 06H)
[2] Maximum working voltage (DC or AC peak) measured at < 5 mA leakage (ESP 15H, ESP 30H, ESP 50H, ESP 110H) and < 10 mA (ESP 06H)
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)



Data & signal protection
ESP D/BX Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | CURRENT RATING 300 mA | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | BX IP66 | LOW IN-LINE RESISTANCE 9.4 Ω

Combined Category D, C, B tested protector (to BS EN 61643) based on the ESP D Series and ESP TN but ready-boxed to IP66 for use in damp or dirty environments. Suitable for most twisted pair signalling applications. Available for working voltages of up to 6, 15, 30, 50 and 110 Volts. ESP TN suitable for Broadband, POTS, dial-up, T1/E1, lease line and *DSL telephone applications. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features & 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
- Low in-line resistance minimises unnecessary reductions in signal strength
- Ready-boxed to IP66 and supplied ready for flat mounting
- Available with screw terminals or with IDC terminals (by adding /I suffix to part number)
- Colour coded terminals for quick and easy installation check - grey for the dirty (line) end and green for clean
- Screen terminal enables easy connection of cable screen to earth
- Substantial earth stud to enable effective earthing
- ESP TN/BX and ESP TN/2BX are suitable for telecommunication applications in accordance with Telcordia and ANSI Standards (see Application Note AN005)
- Supplied as standard with screw terminals - for IDC terminals order part code plus /I (e.g. ESP TN/BX/I)
- ESP TN/BX has Network Rail Approval PA05/02877. NRS PADS reference 087/037286

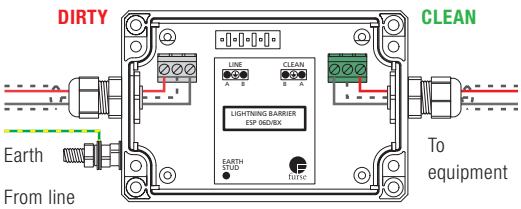
Application

Use these ready-boxed protectors on twisted pair lines in dirty or damp environments. For two wire lines, use /BX versions. For four wire lines, use /2BX versions.

Installation

Connect in series with the data communication, signal or telephone line either near where it enters/leaves the building or close to the equipment being protected. Either way, it must be very close to the system's earth star point.

Install in series (in-line)



NOTE: For installation in the equipment panel, protectors which are not boxed may be more suitable. If your system requires a protector with a very low resistance, higher current or higher bandwidth use the ESP E or H Series. Unboxed protectors for 3-wire RTD systems are available - as are plug-in protectors for telephone lines and compact Slim Line protectors.

Data & signal protection
ESP D/BX Series

ESP D/BX Series - Technical specification

Electrical Specification	ESP 06D/BX ESP 06D/2BX	ESP 15D/BX ESP 15D/2BX	ESP 30D/BX ESP 30D/2BX	ESP 50D/BX ESP 50D/2BX	ESP 110D/BX ESP 110D/2BX	ESP TN/BX ESP TN/2BX
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V	–
Maximum working voltage *Uc*[2]	7.79 V	19 V	37.1 V	58 V	132 V	296 V
Current rating (signal)	300 mA					
In-line resistance (per line ±10%)	9.4 Ω	9.4 Ω	9.4 Ω	9.4 Ω	9.4 Ω	4.4 Ω
Bandwidth (-3 dB 50 Ω system)	800 kHz	2.5 MHz	4 MHz	6 MHz	9 MHz	20 MHz

Transient Specification	ESP 06D/BX ESP 06D/2BX	ESP 15D/BX ESP 15D/2BX	ESP 30D/BX ESP 30D/2BX	ESP 50D/BX ESP 50D/2BX	ESP 110D/BX ESP 110D/2BX	ESP TN/BX ESP TN/2BX
Let-through voltage (all conductors)[3] *Up*						
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21	12.0 V	25.0 V	44.0 V	78.0 V	155 V	395 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21	11.5 V	24.5 V	43.5 V	76.0 V	150 V	390 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21	10.0 V	23.0 V	42.5 V	73.0 V	145 V	298 V
5 kV, 10/700 µs[4]	10.5 V	23.8 V	43.4 V	74.9 V	150 V	300 V
Maximum surge current						
D1 test 10/350 µs to – Per signal wire	2.5 kA					
BS EN/EN/IEC 61643-21: – Per pair	5 kA					
8/20 µs to ITU-T K.45:2003, – Per signal wire	10 kA					
IEEE C62.41.2:2002: – Per pair	20 kA					

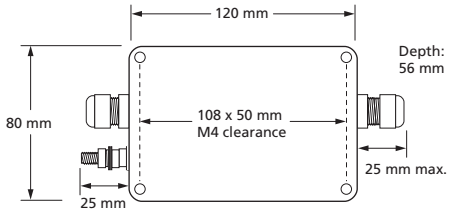
Mechanical Specification	ESP 06D/BX ESP 06D/2BX	ESP 15D/BX ESP 15D/2BX	ESP 30D/BX ESP 30D/2BX	ESP 50D/BX ESP 50D/2BX	ESP 110D/BX ESP 110D/2BX	ESP TN/BX ESP TN/2BX
Temperature range	-40 to +80 °C					
Connection type	Screw terminal - for IDC terminal use part number with /I					
Conductor size (stranded)	1.5 mm^2					
Earth connection	M6 stud					
Cable glands	Accommodate 2.3-6.7 mm diameter cable (PG7)					
Degree of protection (IEC 60529)	M6 stud					
Case material	PVC					
Weight: – Unit	0.3 kg					
– Packaged (per 10)	0.35 kg					
Dimensions	See diagram below					

[1] Nominal voltage (DC or AC peak) measured at < 10 µA (ESP 15D/BX, ESP 15D/2BX, ESP 30D/BX, ESP 30D/2BX, ESP 50D/BX, ESP 50D/2BX, ESP 110D/BX, ESP 110D/2BX) and < 200 µA (ESP 06D/BX & ESP 06D/2BX)

[2] Maximum working voltage (DC or AC peak) measured at < 1 mA leakage (ESP 15D/BX, ESP 15D/2BX, ESP 30D/BX, ESP 30D/2BX, ESP 50D/BX, ESP 50D/2BX, ESP 110D/BX, ESP 110D/2BX), < 10 mA (ESP 06D/BX, ESP 06D/2BX) and < 10 µA (ESP TN/BX, ESP TN/2BX)

[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns

[4] 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)



Data & signal protection
ESP SL Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | LED OPTIONAL INDICATION | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage

REPLACEABLE PROTECTION MODULE | LOW IN-LINE RESISTANCE 1 Ω | CURRENT RATING 750 mA | HIGH BANDWIDTH | ULTRA SLIM 7 mm WIDTH

Combined Category D, C, B tested protector (to BS EN 61643) suitable for twisted pair signalling applications which require either a lower in-line resistance, an increased current and/or higher bandwidth. Also suitable for DC power applications less than 0.75 Amps. Available for working voltages of up to 6, 15, 30, 50 and 110 Volts. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features & 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
- Ultra slim 7 mm width ideal for compact protection of large numbers of lines (e.g. process control installations)
- Optional LED status indication versions available for low current DC power applications - add L suffix to part number - e.g. ESP SL30L
- Two stage removable protection module with simple quick release mechanism allowing partial removal for easy line commissioning and maintenance as well as full removal for protection replacement
- Strong, flame retardant, polycarbonate housing
- High (750 mA) maximum running current
- High bandwidth enables higher frequency (high traffic or bit rate) data communications
- Screen terminal enables easy connection of cable screen to earth
- Suitable for earthed or isolated screen systems - add /I suffix to part number for versions that require isolated screens - e.g. ESP SL30/I
- Built-in innovative DIN rail foot with locking feature for simple positioning and clip-on mounting to top hat DIN rails
- 4 mm^2 terminals allow for larger cross section wiring, stranded wires terminated with ferrules or fitting two wires into a single terminal
- Convenient earthing through DIN foot and/or earth terminal
- Very low (1 Ω) in-line resistance allows resistance critical applications (e.g. alarm loops) to be protected

Application

Use these protectors where installation space is at a premium and large numbers of lines require protection (e.g. process control, high speed digital communication equipment or systems with long signal lines).

Installation

Connect in series with the data communication or signal line either near where it enters or leaves the building or close to the equipment being protected (e.g. within its control panel). Either way, it must be very close to the system's earth star point. Install protectors either within an existing cabinet/ cubicle or in a separate enclosure.

Accessories

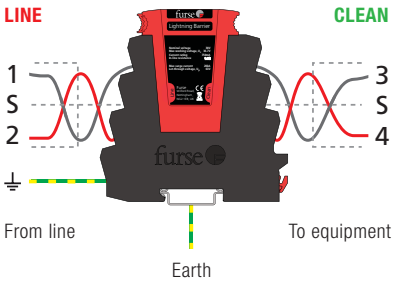
Replacement modules:

ESP SLXX/M
Standard module replacement where XX is voltage rating (06, 15, 30, 50 or 110)

ESP SLXXL/M
LED module replacement where XX is voltage rating, as above

ESP SL/B
Base replacement (common for standard and LED modules)

ESP SL/I/B
Base replacement with isolated screen from earth



NOTE: The ESP SL 'Slim Line' Series is also available for protection of 3-wire, RS 485 and RTD applications (ESP SL/3W, ESP SL RS485 & ESP SL RTD). The ESP SL X Series has approvals for use in hazardous areas.

Data & signal protection
ESP SL Series

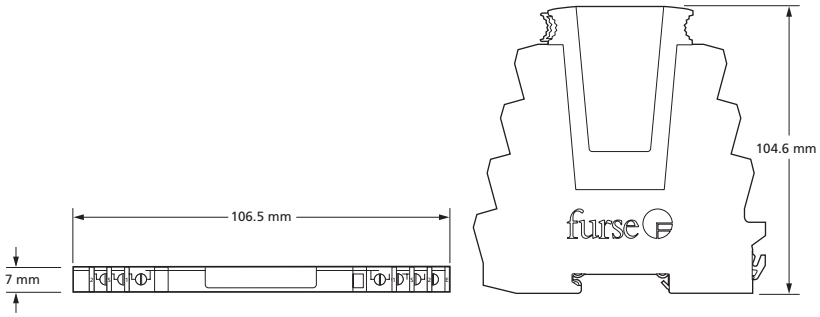
ESP SL Series - Technical specification

Electrical Specification	ESP SL06	ESP SL15	ESP SL30	ESP SL50	ESP SL110	ESP SL TN
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V	–
Maximum working voltage *Uc*[2]	7.79 V	16.7 V	36.7 V	56.7 V	132 V	296 V
Current rating (signal)	750 mA					
In-line resistance (per line ±10%)	1.0 Ω					
Bandwidth (-3 dB 50 Ω system)	45 MHz	45 MHz	45 MHz	45 MHz	45 MHz	20 MHz

Transient Specification	ESP SL06	ESP SL15	ESP SL30	ESP SL50	ESP SL110 E	SP SL TN
Let-through voltage (all conductors)[3] *Up*						
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21	36.0 V	38.4 V	63.0 V	90.3 V	185 V	395 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21	26.2 V	29.4 V	51.3 V	77.2 V	175 V	390 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21	16.0 V	26.8 V	45.4 V	68.3 V	165 V	298 V
5 kV, 10/700 µs[4]	17.0 V	27.5 V	46.3 V	69.1 V	170 V	300 V
Maximum surge current						
D1 test 10/350 µs to – Per signal wire	1.25 kA					
BS EN/EN/IEC 61643-21: – Per pair	2.5 kA					
8/20 µs to ITU-T K.45:2003, – Per signal wire	10 kA					
IEEE C62.41.2:2002: – Per pair	20 kA					

Mechanical Specification	ESP SL06	ESP SL15	ESP SL30	ESP SL50	ESP SL110	ESP SL TN
Temperature range	-40 to +80 °C					
Connection type	Screw terminal					
Conductor size (stranded)	4 mm²					
Earth connection	Via DIN rail or 4 mm² earth terminal					
Case material	FR polycarbonate UL94 V-0					
Weight: – Unit	0.08 kg					
– Packaged (per 10)	0.85 kg					
Dimensions	See diagram below					

[1] Nominal voltage (DC or AC peak) measured at < 10 µA (ESP SL15, ESP SL30, ESP SL50, ESP SL110 and LED variants) and < 200 µA (ESP SL06 and ESP SL06L)
[2] Maximum working voltage (DC or AC peak) measured at < 1 mA leakage
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)



Data & signal protection
ESP SL X Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | LED OPTIONAL INDICATION | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | REPLACEABLE PROTECTION MODULE

LOW IN-LINE RESISTANCE 1 Ω | CURRENT RATING 750 mA | ATEX/IEC APPROVED | HIGH BANDWIDTH | ULTRA SLIM 7 mm WIDTH

Combined Category D, C, B tested protector (to BS EN 61643) suitable for twisted pair signalling applications within hazardous environments (ATEX/IECEx approved). Available for working voltages of up to 15 and 30 Volts. For use at boundaries up to LPZ *0* to protect against flashover through to LPZ 3 to protect sensitive electronic equipment.

Features & benefits

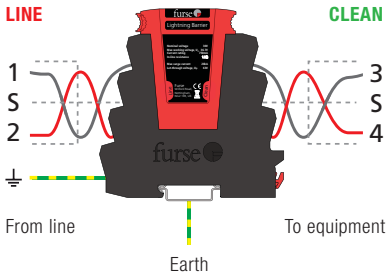
- Approved for use in hazardous environments for the protection of Intrinsically Safe circuits (Classification: II 2(1) G, Ex ia (ia Ga) IIC T4 Gb)
- Very low let-through voltage (enhanced protection to BS EN 62305) between all lines - Full Mode protection
- Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- Repeated protection in lightning intense environments
- Ultra slim 7 mm width ideal for compact protection of large numbers of lines (e.g. process control installations)
- Optional LED status indication versions available for low current DC power applications
- Negligible self-capacitance and self-inductance offering minimal interference when protecting Intrinsically Safe circuits
- Very low (1 Ω) in-line resistance allows resistance critical applications (e.g. alarm loops) to be protected
- High (750 mA) maximum running current
- High bandwidth enables higher frequency (high traffic or bit rate) data communications
- Screen terminal enables easy connection of cable screen to earth
- Suitable for earthed or isolated screen systems - add /I suffix to part number for versions that require isolated screens
- Built-in innovative DIN rail foot with locking feature for simple positioning and clip-on mounting to top hat DIN rails
- 4 mm^2 terminals allow for larger cross section wiring, stranded wires terminated with ferrules or fitting two wires into a single terminal
- Approval references for ESP SL X Series: IECEx SIR 10.0030X, Sira 10ATEX2063X

Application

Use these protectors in hazardous environments where installation space is at a premium and large numbers of lines require protection (e.g. process control, 4-20 mA loops, fire and gas detectors and shut-down systems). Suitable for high speed digital communication equipment or systems with long signal lines. See Furse Application Note AN013.

Installation

Connect in series with the data communication or signal line either near where it enters or leaves the building or close to the equipment being protected (e.g. within its control panel). Either way, it must be very close to the system's earth star point. Install protectors either within an existing cabinet/cubicle or in a separate enclosure.



Accessories

Replacement modules:

ESP SL15X/M, ESP30X/M
Standard module replacement for 15 and 30 V protectors respectively

ESP SL15XL/M, ESP30XL/M
LED module replacement for 15 and 30 V protectors respectively

ESP SLX/B
Base replacement (common for standard and LED modules)

ESP SLX/I/B
Base replacement with isolated screen from earth

NOTE: Use the standard ESP SL 'Slim Line' Series for non-hazardous areas. The ESP SL Series is also available for protection of 3-wire, RS 485, RTD & telecommunication applications (ESP SL/3W, ESP SL RS485, ESP SL RTD & ESP SL TN).

Data & signal protection
ESP SL X Series

ESP SL X Series - Technical specification

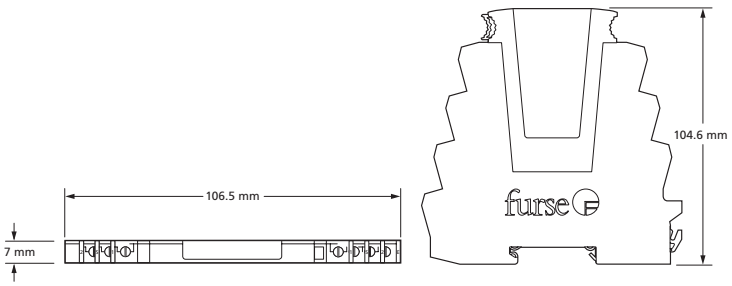
Electrical Specification	ESP SL15X	ESP SL30X
Nominal voltage[1]	15 V	30 V
Maximum working voltage *Uc*[2]	16.7 V	36.7 V
Current rating (signal)	750 mA	
In-line resistance (per line ±10%)	1.0 Ω	
Bandwidth (-3 dB 50 Ω system)	45 MHz	

Intrinsically Safe Specification		ESP SL15X	ESP SL30X
Maximum voltage U_i		30 V	
Maximum power P_i:	– Per -40 °C < Ta < 40 °C	1.3 W	
	– Per -40 °C < Ta < 60 °C	1.2 W	
	– Per -40 °C < Ta < 80 °C	1.0 W	
Capacitance C_i		0 µF	
Inductance L_i		0 µH	
Certificate number		IECEx SIR 10.0030X, Sira 10ATEX2063X	
Classification		Ex II 2 (1) G, Ex ia (ia Ga) IIC T4 Gb	

Transient Specification		ESP SL15X	ESP SL30X
Let-through voltage (all conductors)[3] *Up*			
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		38.4 V	63.0 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		29.4 V	51.3 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		26.8 V	45.4 V
5 kV, 10/700 µs[4]		27.5 V	46.3 V
Maximum surge current			
D1 test 10/350 µs to	– Per signal wire	1.25 kA	
BS EN/EN/IEC 61643-21:	– Per pair	2.5 kA	
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA	
IEEE C62.41.2:2002:	– Per pair	20 kA	

Mechanical Specification		ESP SL15X	ESP SL30X
Temperature range		-40 to +80 °C	
Connection type		Screw terminal	
Conductor size (stranded)		4 mm²	
Earth connection		Via DIN rail or 4 mm² earth terminal	
Case material		FR polycarbonate UL94 V-0	
Weight:	– Unit	0.08 kg	
	– Packaged (per 10)	0.85 kg	
Dimensions		See diagram below	

[1] Nominal voltage (DC or AC peak) measured at < 10 µA
[2] Maximum working voltage (DC or AC peak) measured at < 1 mA leakage
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)



Data & signal protection
ESP SL LED 4-20 mA Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | REPLACEABLE PROTECTION MODULE | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | LOW IN-LINE RESISTANCE 1 Ω | CURRENT RATING 75 mA | ULTRA SLIM 7 mm WIDTH | LED INDICATION

Combined Category D, C, B tested protector (to BS EN 61643) suitable for twisted pair 4-20 mA loop systems with innovative LED protector status indication. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment (e.g. transmitters, monitors, controllers).

Features & 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
- Innovative LED indication of protection status provides easy visual checking and quick maintenance
- Ultra slim 7 mm width ideal for compact protection of large numbers of lines (e.g. process control installations)
- Two stage removable protection module with simple quick release mechanism allowing partial removal for easy line commissioning and maintenance as well as full removal for protection replacement
- Very low (1 Ω) in-line resistance for minimal system interference
- High (75 mA) maximum running current - can also be used on 10-50 mA systems (e.g. process control)
- Screen terminal enables easy connection of cable screen to earth
- Strong, flame retardant, polycarbonate housing
- Built-in innovative DIN rail foot with locking feature for simple positioning and clip-on mounting to top hat DIN rails
- 4 mm² terminals allow for larger cross section wiring, stranded wires terminated with ferrules or fitting two wires into a single terminal
- Convenient earthing through DIN foot and/or earth terminal

Application

Use these protectors on 4-20 mA loop systems - ideal where installation space is at a premium and large numbers of lines require protection, or for systems with long signal lines.

Installation

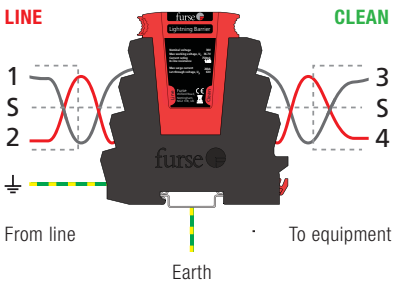
Connect in series with the 4-20 mA current loop either near where it enters or leaves the building or close to the equipment being protected (e.g. within its control panel). Either way, it must be very close to the system's earth star point. Install protectors either within an existing cabinet/ cubicle or in a separate enclosure.

Accessories

ESP SL30L/4-20/M
Module replacement

ESP SL/B
Base replacement

TECHNICAL NOTE: 4-20 mA current loops can serve multiple devices over a long distance. The devices and wiring produce a voltage drop (also known as "loop drops") but these do not reduce the 4-20 mA current as long as the power supply voltage is greater than the sum of the voltage drops around the loop at the maximum signalling current of 20 mA. For design considerations, each ESP SL30L/4-20 device installed within the loop introduces a 1.7 V loop drop.



NOTE: The ESP SL 'Slim Line' Series is also available for protection of systems up to 110 V as well as 3-wire, RS 485, RTD & telecommunication applications (ESP SL/3W, ESP SL RS485, ESP SL RTD & ESP SL TN). The ESP SL X Series has approvals for use in hazardous areas.

Data & signal protection
ESP SL LED 4-20 mA Series

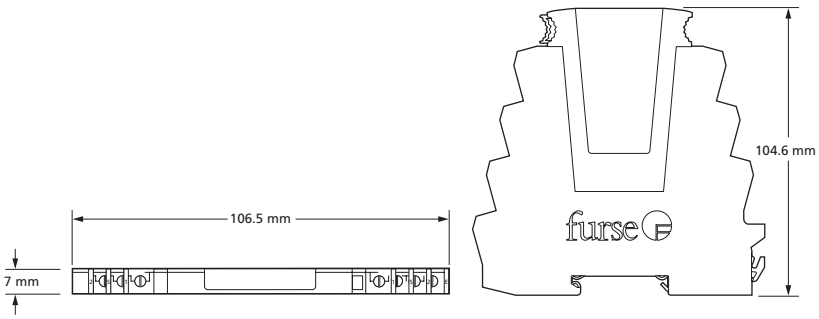
ESP NEW SL LED 4-20 mA Series - Technical specification

Electrical Specification	ESP SL30L/4-20
Nominal voltage[1]	30 V
Maximum working voltage *Uc*[2]	36.7 V
Current rating (signal)[3]	75 mA
In-line resistance (per line ±10%)	1.0 Ω
Series voltage drop[4]	1.7 V

Transient Specification		ESP SL30L/4-20
Let-through voltage (all conductors)[5] *Up*		
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		63.0 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		51.3 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		45.4 V
5 kV, 10/700 µs[6]		46.3 V
Maximum surge current		
D1 test 10/350 µs to	– Per signal wire	1.25 kA
BS EN/EN/IEC 61643-21:	– Per pair	2.5 kA
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA
IEEE C62.41.2:2002:	– Per pair	20 kA

Mechanical Specification		ESP SL30L/4-20
Temperature range		-40 to +80 °C
Connection type		Screw terminal
Conductor size (stranded)		4 mm²
Earth connection		Via DIN rail or 4 mm² earth terminal
Case material		FR polycarbonate UL94 V-0
Weight:	– Unit	0.08 kg
	– Packaged (per 10)	0.85 kg
Dimensions		See diagram below

[1] Nominal voltage (DC or AC peak) measured at < 10 µA
[2] Maximum working voltage (DC or AC peak) measured at < 1 mA leakage
[3] The minimum current for LED indicator operation is 2 mA
[4] At 20 mA
[5] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[6] 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)



Data & signal protection
ESP SL 3-Wire Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | REPLACEABLE PROTECTION MODULE | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | LOW IN-LINE RESISTANCE 1 Ω | CURRENT RATING 500 mA | HIGH BANDWIDTH | ULTRA SLIM 7 mm WIDTH

Combined Category D, C, B tested protector (to BS EN 61643) suitable for 3-wire signalling applications which require either a lower in-line resistance, an increased current and/or higher bandwidth. Also suitable for DC power applications less than 0.5 Amps. Available for working voltages of up to 6, 15, 30, 50 and 110 Volts. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features & 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
- Ultra slim 7 mm width ideal for compact protection of large numbers of lines (e.g. process control installations)
- Two stage removable protection module with simple quick release mechanism allowing partial removal for easy line commissioning and maintenance as well as full removal for protection replacement
- Very low (1 Ω) in-line resistance allows resistance critical applications (e.g. alarm loops) to be protected
- High (500 mA) maximum running current
- High bandwidth enables higher frequency (high traffic or bit rate) data communications
- Strong, flame retardant, polycarbonate housing
- Built-in innovative DIN rail foot with locking feature for simple positioning and clip-on mounting to top hat DIN rails
- 4 mm² terminals allow for larger cross section wiring, stranded wires terminated with ferrules or fitting two wires into a single terminal
- Convenient earthing through DIN foot and/or earth terminal

Application

Use these protectors for 3-wire systems where installation space is at a premium and large numbers of lines require protection (e.g. process control, high speed digital communication equipment or systems with long signal lines).

Installation

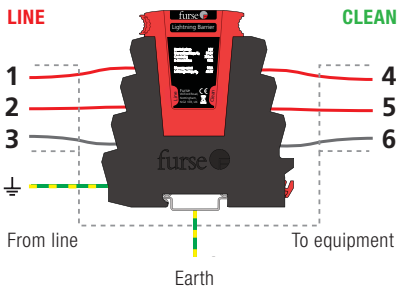
Connect in series with the data communication or signal line either near where it enters or leaves the building or close to the equipment being protected (e.g. within its control panel). Either way, it must be very close to the system's earth star point. Install protectors either within an existing cabinet/ cubicle or in a separate enclosure.

Accessories

Replacement modules:

ESP SLXX/3W/M
Standard module replacement where XX is voltage rating (06, 15, 30, 50 or 110)

ESP SL/3W/B
Base replacement



NOTE: The ESP SL 'Slim Line' Series is also available for protection of 2-wire systems up to 110 V, RS 485, RTD and telecommunication applications (ESP SL Series, ESP SL RS485, ESP SL RTD and ESP SL TN). The ESP SL X Series has approvals for use in hazardous areas.

Data & signal protection
ESP SL 3-Wire Series

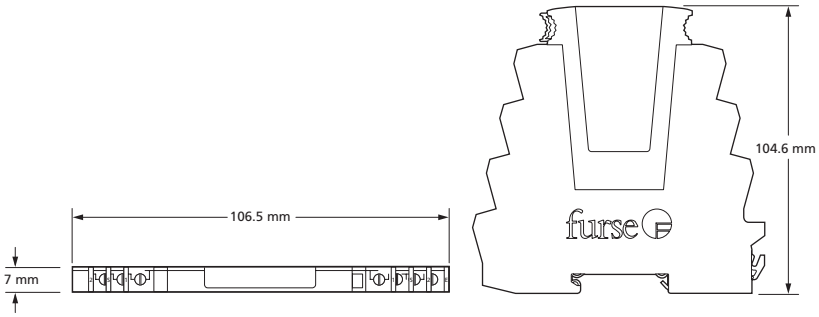
ESP SL 3-Wire Series - Technical specification

Electrical Specification	ESP SL06/3W	ESP SL15/3W	ESP SL30/3W	ESP SL50/3W	ESP SL110/3W
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V
Maximum working voltage *Uc*[2]	7.79 V	16.7 V	36.7 V	56.7 V	132 V
Current rating (signal)	500 mA				
In-line resistance (per line ±10%)	1.0 Ω				
Series voltage drop	45 MHz				

Transient Specification		ESP SL06/3W	ESP SL15/3W	ESP SL30/3W	ESP SL50/3W	ESP SL110/3W
Let-through voltage (all conductors)[3] *Up*						
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		36.0 V	38.4 V	63.0 V	90.3 V	185 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		26.2 V	29.4 V	51.3 V	77.2 V	175 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		16.0 V	26.8 V	45.4 V	68.3 V	165 V
5 kV, 10/700 µs[4]		17.0 V	27.5 V	46.3 V	69.1 V	170 V
Maximum surge current						
D1 test 10/350 µs to	– Per signal wire	1.25 kA				
BS EN/EN/IEC 61643-21:	– Per pair	2.5 kA				
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA				
IEEE C62.41.2:2002:	– Per pair	20 kA				

Mechanical Specification		ESP SL06/3W	ESP SL15/3W	ESP SL30/3W	ESP SL50/3W	ESP SL110/3W
Temperature range		-40 to +80 °C				
Connection type		Screw terminal				
Conductor size (stranded)		4 mm²				
Earth connection		Via DIN rail or 4 mm² earth terminal				
Case material		FR polycarbonate UL94 V-0				
Weight:	– Unit	0.08 kg				
	– Packaged (per 10)	0.85 kg				
Dimensions		See diagram below				

[1] Nominal voltage (DC or AC peak) measured at < 10 µA (ESP SL15/3W, ESP SL30/3W, ESP SL50/3W, ESP SL110/3W) and < 200 µA (ESP SL06/3W)
[2] Maximum working voltage (DC or AC peak) measured at < 1 mA leakage
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)



Data & signal protection
ESP Q & TNQ Series

LPZ 0→3 | FULL MODE Bonding + Equipment Protection | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | CURRENT RATING 750 mA | ULTRA COMPACT DESIGN

Combined Category D, C, B tested protector (to BS EN 61643) suitable for 4 twisted pair lines. Available for working voltages of up to 6, 15, 30, 50 and 110 Volts. ESP TNQ suitable for Broadband, POTS, dial-up, T1/E1, lease line and *DSL telephone applications. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive

Features & 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
- Almost twice as space efficient as smallest competitor
- Standard DIN module (18 mm) depth
- Removable (plug-in) terminals allow pre-wiring of cable looms, for easier installation
- Suitable for earthed or isolated screen systems
- Built-in DIN rail foot for clip-on mounting to top hat or G DIN rails
- Optional flat mounting on side
- 2.5 mm^2 terminals allow for larger cross section wiring, stranded wires terminated with ferrules or fitting two wires into a single terminal
- Very low resistance to minimise unwanted signal strength reductions
- Strong, flame retardant, ABS housing
- Colour coded terminals (grey for line, green for clean) give a quick and easy installation check
- Screen terminal enables easy connection of cable screen to earth
- Simple, yet substantial, connection to earth via DIN rail
- ESP TNQ is suitable for telecommunication applications in accordance with Telcordia and ANSI Standards (see Application Note AN005)
- Available as a 'UL Listed' version, add /UL to part code (ESP 06Q, ESP 15Q, ESP 30Q and ESP 50Q only)

Application

Use these protectors where installation space is at a premium and large numbers of lines require protection.

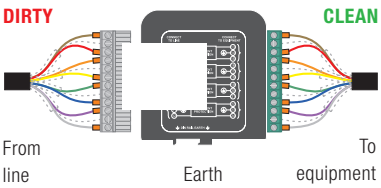
Installation

Connect in series with the signal or data line either near where it enters or leaves the building or close to the equipment being protected. Install in a cabinet/cubicle close to the system's earth star point.

Accessories

For suitable enclosures for the ESP Q & TNQ Series, please contact us.

ESP 06Q, ESP 15Q, ESP 30Q, ESP 50Q, ESP 110Q and ESP TNQ installed in series (in-line)



NOTE: The ESP Q Series is also available for protection of RS 485 and RTD applications (ESP RS485Q, ESP RTDQ). Protectors for individual data and signal lines are available (ESP D Series and Slim Line ESP SL Series), or ready-boxed to IP66 (ESP **D/BX etc). Alternatively, for individual protectors with higher current or bandwidth use the ESP E and ESP H Series.

Data & signal protection
ESP Q & TNQ Series

ESP Q & TNQ Series - Technical specification

Electrical Specification	ESP 06Q	ESP 15Q	ESP 30Q	ESP 50Q	ESP 110Q	ESP TNQ
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V	–
Maximum working voltage *Uc*[2]	7.79 V	18.8 V	37.8 V	57.8 V	132 V	296 V
Current rating (signal)	750 mA	750 mA	750 mA	750 mA	750 mA	300 mA
In-line resistance (per line ±10%)	1.0 Ω	1.0 Ω	1.0 Ω	1.0 Ω	1.0 Ω	4.3 Ω
Bandwidth (-3 dB 50 Ω system)	1 MHz	2.5 MHz	6 MHz	5 MHz	15 MHz	20 MHz

Transient Specification		ESP 06Q	ESP 15Q	ESP 30Q	ESP 50Q	ESP 110Q	ESP TNQ
Let-through voltage (all conductors)[3] *Up*							
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		15.0 V	28.0 V	53.0 V	84.0 V	188 V	395 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		12.5 V	26.5 V	48.0 V	76.0 V	175 V	390 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		10.0 V	23.0 V	43.5 V	64.5 V	145 V	298 V
5 kV, 10/700 µs[4]		10.8 V	26.2 V	44.3 V	65.8 V	150 V	300 V
Maximum surge current							
D1 test 10/350 µs to	– Per signal wire	2.5 kA					
BS EN/EN/IEC 61643-21:	– Per pair	5 kA					
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA					
IEEE C62.41.2:2002:	– Per pair	20 kA					

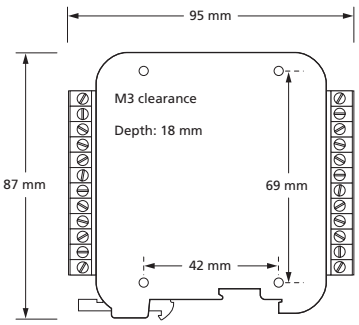
Mechanical Specification		ESP 06Q	ESP 15Q	ESP 30Q	ESP 50Q	ESP 110Q	ESP TNQ
Temperature range		-40 to +80 °C					
Connection type		Pluggable 12 way screw terminal					
Conductor size (stranded)		2.5 mm^2					
Earth connection		Via DIN rail or M5 threaded hole in base of unit					
Case material		ABS UL94 V-0					
Weight:	– Unit	0.1 kg					
	– Packaged (each)	0.12 kg					
	– Packaged (per 10)	1.3 kg					
Dimensions		See diagram below					

[1] Nominal voltage (DC or AC peak) measured at < 5 µA (ESP 15Q, ESP 30Q, ESP 50Q, ESP 110Q) and < 200 µA (ESP 06Q)

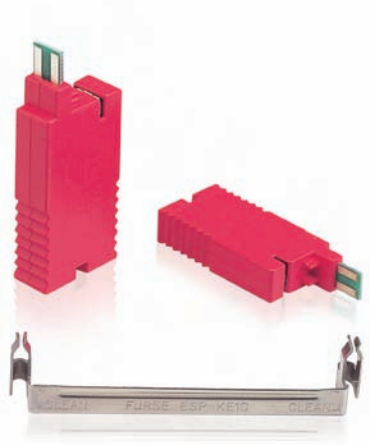
[2] Maximum working voltage (DC or AC peak) measured at < 5 mA leakage (ESP 15Q, ESP 30Q, ESP 50Q, ESP 110Q) and < 10 µA (ESP TNQ)

[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns

[4] 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)



Data & signal protection
ESP KS & KE Series



LPZ 0→3 | FULL MODE Bonding + Equipment Protection | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | CURRENT RATING 150 mA

Combined Category D, C, B tested protector (to BS EN 61643) suitable for use on ten line LSA-PLUS disconnection modules to protect individual twisted pair data or signal lines. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features & 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
- Quick and easy plug-in installation
- Colour of housing distinguishes electrically different protectors to help avoid confusion when installed with other protectors (e.g. the ESP KT1/2) on the same distribution frame
- Protect only the lines you need
- Ridged finger holds make it easy to obtain a firm grip for installation or removal
- Use the ESP KE10 to provide trouble free earthing for up to ten protectors (per disconnection module)

Application

Use these units to protect signal, data, control and instrumentation systems with LSA-PLUS disconnection modules.

Installation

Install protectors on all data communication and signal lines that enter or leave each building. All protectors must be installed via the ESP KE10 earth bar. Identify the lines requiring protection and clip the ESP KE10 on to the disconnection modules' earth points. Plug the protector directly into each disconnection module requiring protection (ensuring the correct orientation) for a series connection.

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

NOTE: For PSTN and U interface ISDN lines on LSA-PLUS modules, use the ESP KT1 or ESP K10T1. For S/T interface ISDN lines on LSA-PLUS modules, use the ESP KT2 or ESP K10T2. For individual twisted pair data or signal lines, use the ESP D, E or H Series Lightning Barriers. The ESP SL and ESP Q Series Lightning Barriers are suitable for high density data and signal lines.

Data & signal protection
ESP KS & KE Series

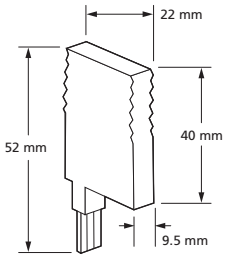
ESP KS & KE Series - Technical specification

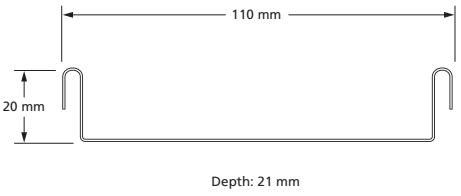
Electrical Specification	ESP KS06	ESP KS15	ESP KS30	ESP KS50
Nominal voltage[1]	6 V	15 V	30 V	50 V
Maximum working voltage *Uc*[2]	7.79 V	16.7 V	33.4 V	58 V
Current rating (signal)	150 mA			
In-line resistance (per line ±10%)	1 Ω	22 Ω	22 Ω	22 Ω
Bandwidth (-3 dB 50 Ω system)	2 MHz	5 MHz	5 MHz	5 MHz

Transient Specification		ESP KS06	ESP KS15	ESP KS30	ESP KS50
Let-through voltage (all conductors)[3] *Up*					
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		16.0 V	26.5 V	48.0 V	98.0 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		14.5 V	24.0 V	46.5 V	84.5 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		11.5 V	23.0 V	45.0 V	75.0 V
5 kV, 10/700 µs[4]		12.0 V	24.4 V	48.8 V	80.0 V
Maximum surge current[5]					
D1 test 10/350 µs to	– Per signal wire	1 kA			
BS EN/EN/IEC 61643-21:	– Per pair	2 kA			
8/20 µs to ITU-T K.45:2003,	– Per signal wire	5 kA			
IEEE C62.41.2:2002:	– Per pair	10 kA			

Mechanical Specification	ESP KS06	ESP KS1	ESP KS30	ESP KS50	ESP KE10
Temperature range	-40 to +80 °C				–
Connection type	To LSA-PLUS disconnection modules (BT part number 237A)				
Earth connection	Via ESP KE10 earth bar				–
Material	ABS UL94 V-0				Stainless Steel
Weight: – Unit	0.01 kg				0.01 kg
– Packaged	0.10 kg (per 10)				0.12 kg (per 10)
Dimensions	See diagram below				

[1] Nominal voltage (DC or AC peak) at 200 µA for ESP KS06 and at 5 µA for ESP KS15, ESP KS30 and ESP KS50
[2] Maximum working voltage (DC or AC peak) at 10 mA for ESP KS06, at 1 mA for ESP KS15 and ESP KS30, and at 5 µA for ESP KS50.
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)
[5] The installation and connections external to the protector may limit the capability of the protector





Data & signal protection
ESP PCB/D & PCB/TN Series

LPZ 0→3 | **FULL MODE** Bonding + Equipment Protection | **SIGNAL/ TELECOM** TEST CAT D + C + B | **ENHANCED** Low let-through voltage | **LOW IN-LINE RESISTANCE** 9.4 Ω | **CURRENT RATING** 300 mA

Combined Category D, C, B tested protector (to BS EN 61643) for 'through hole' mounting directly onto the PCB of data communication, signal or telephone equipment. Available for working voltages of up to 110 Volts. ESP PCB/TN suitable for Broadband, POTS, dial-up, T1/E1, lease line and *DSL telephone applications. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.

Features & benefits

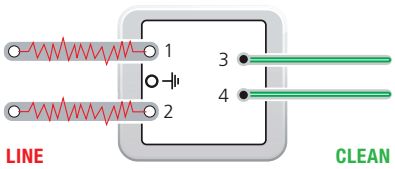
- Suitable for wave soldering
- Very low let-through voltage (enhanced protection to BS EN 62305) between all lines - Full Mode protection
- Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- Repeated protection in lightning intense environments
- Low in-line resistance minimises unnecessary reductions in signal strength
- 2 pin clean end and 3 pin line end to ensure correct insertion
- ESP PCB/TN is suitable for telecommunication applications in accordance with Telcordia and ANSI Standards (see Application Note AN005)

Installation

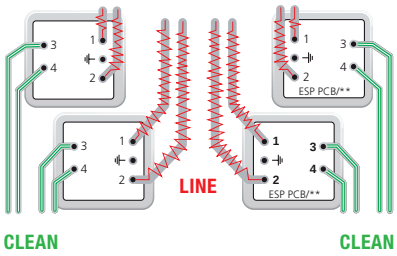
Connect in series, soldering pins direct onto PCB. Tracks to line and earth pins should be as wide as practical (see Furse Application Note AN003). Dirty (line) tracks should be routed parallel and as close together as possible. This should also be implemented on clean tracks, however clean tracks should never be routed close and parallel to line tracks or dirty barrier earth connections as transients can be re-introduced after the protector due to electromagnetic coupling.

The use of an earth layer or plane is highly recommended as this reduces the electromagnetic field produced by a transient discharging to earth considerably, and hence the chance of the transient being picked up on clean tracks.

Maximum line to clean separation. Large input tracks and pads (using top and bottom copper layers). Earth pin is bonded to an earth layer/plane.



All dirty (line) incoming tracks are separated from the clean output tracks, individual line and clean tracks are routed close together. Earth pins are bonded to an earth layer/plane.



Data & signal protection
ESP PCB/D & PCB/TN Series

ESP PCB/D & PCB/TN Series - Technical specification

Electrical Specification	ESP PCB/06D	ESP PCB/15D	ESP PCB/30D	ESP PCB/50D	ESP PCB/110D	ESP PCB/TN
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V	–
Maximum working voltage *Uc*[2]	7.79 V	19 V	37.1 V	58 V	132 V	296 V
Current rating (signal)	300 mA					
In-line resistance (per line ±10%)	9.4 Ω	9.4 Ω	9.4 Ω	9.4 Ω	9.4 Ω	4.4 Ω
Bandwidth (-3 dB 50 Ω system)	800 kHz	2.5 MHz	4 MHz	6 MHz	9 MHz	20 MHz

Transient Specification		ESP PCB/06D	ESP PCB/15D	ESP PCB/30D	ESP PCB/50D	ESP PCB/110D	ESP PCB/TN
Let-through voltage (all conductors)[3] *Up*							
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		12.0 V	25.0 V	44.0 V	78.0 V	155 V	395 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		11.5 V	24.5 V	43.5 V	76.0 V	150 V	390 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		10.0 V	23.0 V	42.5 V	73.0 V	145 V	298 V
5 kV, 10/700 µs[4]		10.5 V	23.8 V	43.4 V	74.9 V	150 V	300 V
Maximum surge current[5]							
D1 test 10/350 µs to	– Per signal wire	2.5 kA					
BS EN/EN/IEC 61643-21:	– Per pair	5 kA					
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA					
IEEE C62.41.2:2002:	– Per pair	20 kA					

Mechanical Specification	ESP PCB/D & PCB/TN Series
Temperature range	-40 to +80 °C
Connection type	0.64 mm (0.025") square PCB pins, 1.2 mm diameter PCB holes recommended
Case Material	ABS UL94 V-0
Dimensions	See diagram below

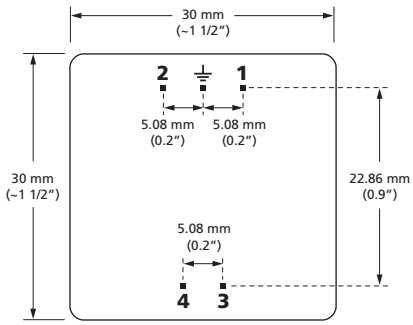
[1] Nominal voltage (DC or AC peak) measured at < 5 µA (ESP PCB/15D, ESP PCB/30D, ESP PCB/50D, ESP PCB/110D) and <200 µA (ESP PCB/06D)

[2] Maximum working voltage (DC or AC peak) measured at < 1 mA leakage (ESP PCB/15D, ESP PCB/30D, ESP PCB/50D, ESP PCB/110D), < 10 mA (ESP PCB/06D) and < 10 µA (ESP PCB/TN)

[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns

[4] 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)

[5] The installation and connections external to the protector may limit the capability of the protector

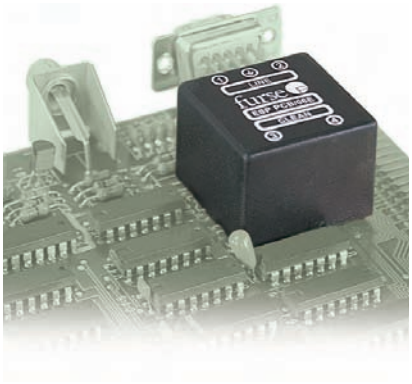


Depth: 20 mm (~0.8")
Weight: 35 g

Pins are positioned centrally
Pin 1 connects through Pin 3
Pin 2 connects through Pin 4

(Underside pin view)

Data & signal protection
ESP PCB/E Series



LPZ 0→3 | FULL MODE Bonding + Equipment Protection | HIGH BANDWIDTH | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | LOW IN-LINE RESISTANCE 1 Ω | CURRENT RATING 1.25 A

Combined Category D, C, B tested protector (to BS EN 61643) for 'through hole' mounting directly onto the PCB of data communication, signal or telephone equipment which require a lower in-line resistance, an increased current or a higher bandwidth than the PCB/D Series. Available for working voltages of up to 110 Volts for AC & DC power applications up to 125 Amps. For use at boundaries up to LPZ *0* to protect against flashover (typically the service entrance location) through to LPZ 3 to protect sensitive electronic equipment.**

Features & benefits

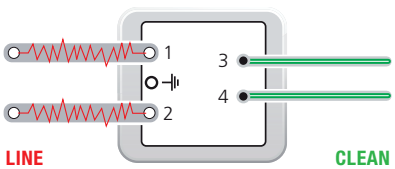
- Suitable for wave soldering
- Very low let-through voltage (enhanced protection to BS EN 62305) between all lines - Full Mode protection
- Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- Repeated protection in lightning intense environments
- Very low (1 Ω) in-line resistance for resistance critical applications
- High (1.25 A) maximum running current
- Higher bandwidth enables higher frequency data communications
- 2 pin clean end and 3 pin line end to ensure correct insertion

Installation

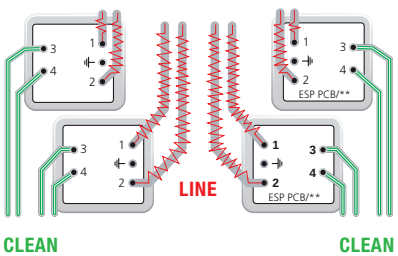
Connect in series, soldering pins direct onto PCB. Tracks to line and earth pins should be as wide as practical (see Furse Application Note AN003). Dirty (line) tracks should be routed parallel and as close together as possible. This should also be implemented on clean tracks, however clean tracks should never be routed close and parallel to line tracks or dirty barrier earth connections as earth connections as transients can be re-introduced after the protector due to electromagnetic coupling.

The use of an earth layer or plane is highly recommended as this reduces the electromagnetic field produced by a transient discharging to earth considerably, and hence the chance of the transient being picked up on clean tracks.

Maximum line to clean separation. Large input tracks and pads (using top and bottom copper layers). Earth pin is bonded to an earth layer/plane.



All dirty (line) incoming tracks are separated from the clean output tracks, individual line and clean tracks are routed close together. Earth pins are bonded to an earth layer/plane.



Data & signal protection
ESP PCB/E Series

ESP PCB/E Series - Technical specification

Electrical Specification	ESP PCB/06E	ESP PCB/15E	ESP PCB/30E	ESP PCB/50E	ESP PCB/110E
Nominal voltage[1]	6 V	15 V	30 V	50 V	110 V
Maximum working voltage *Uc*[2]	7.79 V	16.7 V	36.7 V	56.7 V	132 V
Current rating (signal)	1.25 A				
In-line resistance (per line ±10%)	1.0 Ω				
Bandwidth (-3 dB 50 Ω system)	45 MHz				

Transient Specification		ESP PCB/06E	ESP PCB/15E	ESP PCB/30E	ESP PCB/50E	ESP PCB/110E
Let-through voltage (all conductors)[3] *Up*						
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		36.0 V	39.0 V	60.0 V	86.0 V	180 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		26.2 V	28.0 V	49.0 V	73.5 V	170 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		16.0 V	25.5 V	43.5 V	65.0 V	160 V
5 kV, 10/700 µs[4]		17.0 V	26.2 V	44.3 V	65.8 V	165 V
Maximum surge current[5]						
D1 test 10/350 µs to	– Per signal wire	2.5 kA				
BS EN/EN/IEC 61643-21:	– Per pair	5 kA				
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA				
IEEE C62.41.2:2002:	– Per pair	20 kA				

Mechanical Specification	ESP PCB/E Series
Temperature range	-40 to +80 °C
Connection type	0.64 mm (0.025") square PCB pins, 1.2 mm diameter PCB holes recommended
Case Material	ABS UL94 V-0
Dimensions	See diagram below

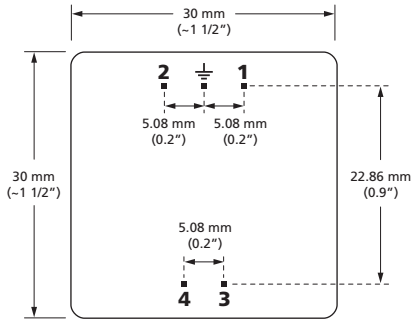
[1] Nominal voltage (DC or AC peak) measured at < 10 µA (ESP PCB/15E, ESP PCB/30E, ESP PCB/50E, ESP PCB/110E) and < 200 µA (ESP PCB/06E)

[2] Maximum working voltage (DC or AC peak) measured at < 5 mA leakage (ESP PCB/15E, ESP PCB/30E, ESP PCB/50E, ESP PCB/110E), < 10 mA (ESP PCB/06E)

[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns

[4] 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).

[5] The installation and connections external to the protector may limit the capability of the protector

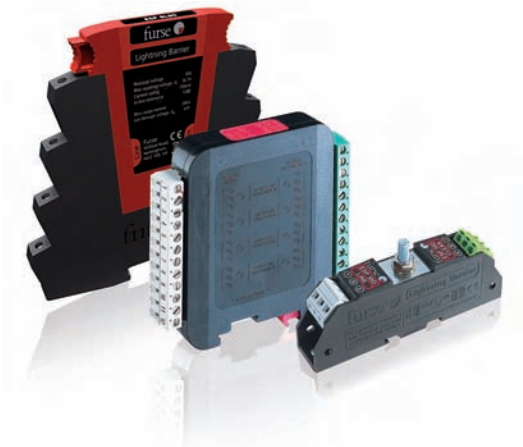


Depth: 20 mm (~0.8")
Weight: 35 g

Pins are positioned centrally
Pin 1 connects through Pin 3
Pin 2 connects through Pin 4

(Underside pin view)

Data & signal protection
ESP RTD, RTDQ & SL RTD Series



LPZ 0→3 | FULL MODE Bonding + Equipment Protection | ESP SL RTD ULTRA SLIM 7 mm WIDTH | SIGNAL/ TELECOM TEST CAT D + C + B | ENHANCED Low let-through voltage | ESP RTDQ ULTRA COMPACT 18 mm WIDTH | LOW IN-LINE RESISTANCE | ESP SL RTD HIGH BANDWIDTH

Combined Category D, C, B tested protector (to BS EN 61643) suitable for 3-wire RTD systems to protect monitoring equipment. For use at boundaries up to LPZ *0* (ESP RTD & ESP RTDQ) or LPZ *0* (ESP SL RTD) to protect against flashover (typically the service entrance location) through to LPZ 3. Available as standard ESP RTD format, or compact ESP RTDQ and Slim Line ESP SL RTD versions for installations where a high number of lines require protection.

Features & benefits

- Protects all three wires on a 3-wire RTD system with a single protector
- 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
- Low in-line resistance minimises reductions in signal strength
- Built-in DIN rail foot for simple mounting to top hat DIN rails
- Convenient earthing through DIN foot and/or earth terminal
- ESP RTD can be flat mounted on base or side
- ESP RTD and ESP RTDQ have colour coded terminals for quick and easy installation check
- ESP SL RTD has ultra slim 7 mm width ideal for compact protection of large numbers of lines (e.g. process control installations)
- ESP SL RTD includes two stage removable protection module with simple quick release mechanism allowing partial removal for easy line commissioning and maintenance as well as full removal for protection replacement

For further information on RTD applications, see separate Application Note AN001 (contact us for a copy).

Installation

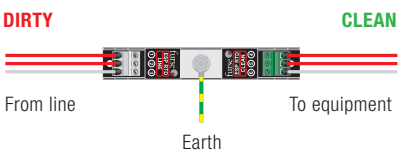
Connect in series with the signal line either near where it enters or leaves the building or close to the equipment being protected ensuring it is very close to the system's earth star point. Install protectors either within an existing cabinet/ cubicle or in a separate enclosure.

Accessories

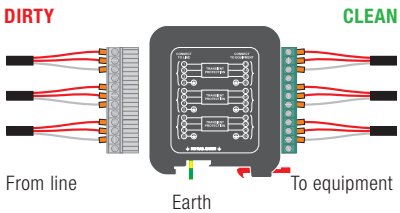
Replacement module for ESP SL RTD:
ESP SLRTD/M
Standard module replacement
ESP SLRTD/B
Base replacement

Combined Mounting/Earthing kits for ESP RTD:
CME 4 For up to 4 x ESP RTD
CME 8 For up to 8 x ESP RTD
CME 16 For up to 16 x ESP RTD
CME 32 For up to 32 x ESP RTD

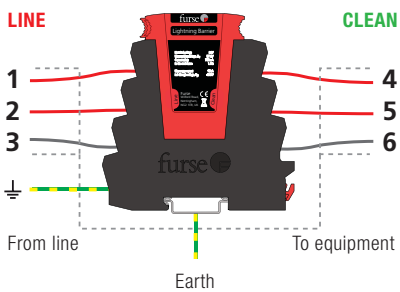
ESP RTD installed in series



ESP RTDQ installed in series (in-line)



ESP SL RTD installed in series



NOTE: For 2-wire or 4-wire RTD applications, use one or two ESP 06D or ESP SL06 protectors respectively.

Data & signal protection
ESP RTD, RTDQ & SL RTD Series

ESP RTD, RTDQ & SL RTD Series - Technical specification

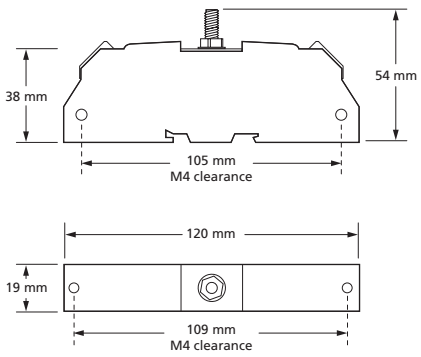
Electrical Specification	ESP RTD	ESP SL RTD	ESP RTDQ
Nominal voltage[1]	6 V		
Maximum working voltage *Uc*[2]	7.79 V		
Current rating (signal)	200 mA	500 mA	700 mA
In-line resistance (per line ±10%)	10 Ω	1.0 Ω	1.0 Ω
Bandwidth (-3 dB 50 Ω system)	800 kHz	1.5 MHz	800 kHz

Transient Specification		ESP RTD	ESP SL RTD	ESP RTDQ
Let-through voltage (all conductors)[3] *Up*				
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		12.0 V	17.9 V	15.0 V
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		11.5 V	12.1 V	12.5 V
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		10.0 V	11.0 V	10.0 V
5 kV, 10/700 µs[4]		10.5 V	11.3 V	10.5 V
Maximum surge current				
D1 test 10/350 µs to	– Per signal wire	2.5 kA	1.25 kA	2.5 kA
BS EN/EN/IEC 61643-21:	– Per pair	5 kA	2.5 kA	5 kA
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA		
IEEE C62.41.2:2002:	– Per pair	20 kA		

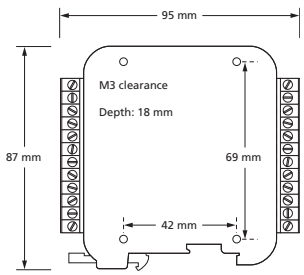
Mechanical Specification		ESP RTD	ESP SL RTD	ESP RTDQ
Temperature range		-40 to +80 ºC		
Connection type		Screw terminal		Pluggable 12 way screw terminal
Conductor size (stranded)		2.5 mm²	4 mm²	2.5 mm²
Earth connection		M6 stud	Via DIN rail or 4 mm² earth terminal	Via DIN rail or M5 threaded hole in base of unit
Case Material		ABS UL94 V-0	FR polycarbonate UL94 V-0	ABS UL94 V-0
Weight:	– Unit	0.08 kg	0.08 kg	0.1 kg
	– Packaged (per 10)	0.85 kg	0.85 kg	1.3 kg
Dimensions		See diagram below		

[1] Nominal voltage (DC or AC peak) measured at < 200 µA
[2] Maximum working voltage (DC or AC peak) measured at < 10 mA
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)

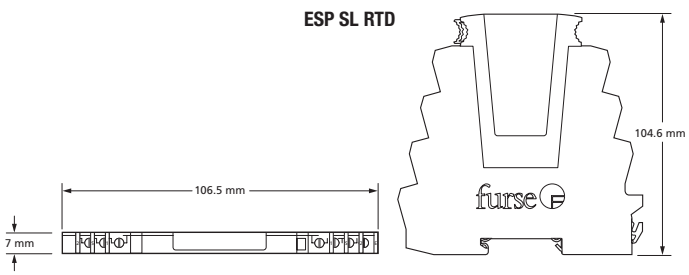
ESP RTD



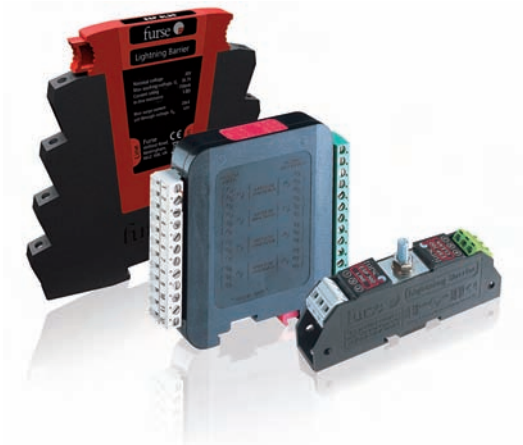
ESP RTDQ



ESP SL RTD



Data & signal protection
ESP RS485, RS485Q & SL RS485 Series



FULL MODE Bonding + Equipment Protection | ESP SL RTD ULTRA SLIM 7 mm WIDTH | LPZ 0→3 | ENHANCED Low let-through voltage | ESP RTDQ ULTRA COMPACT 18 mm WIDTH | SIGNAL/TELECOM TEST CAT D + C + B | LOW IN-LINE RESISTANCE | HIGH BANDWIDTH

Combined Category D, C, B tested protector (to BS EN 61643) specifically designed for RS 485 and Fieldbus applications, such as Profibus DP. For use at boundaries up to LPZ *0* (ESP RS485 & ESP RS485Q), or LPZ *0* (ESP SL RS485) protect against flashover (typically the service entrance location) through to LPZ 3. Available as standard ESP RS485 format, or compact ESP RS485Q and Slim Line ESP SL RS485 versions for installations where a high number of lines require protection.

Features & 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
- 45 MHz bandwidth greatly exceeds 12 Mbps maximum speeds
- Low in-line resistance minimises reductions in signal strength
- Suitable for earthed or isolated screen systems
- Built-in DIN rail foot for simple mounting to top hat DIN rails
- Convenient earthing through DIN foot and/or earth terminal
- ESP RS485 can be flat mounted on base or side
- ESP RS485 and ESP RS485Q have colour coded terminals for quick and easy installation check
- ESP SL RS485 has ultra slim 7mm width ideal for compact protection of large numbers of lines (e.g. process control installations)
- ESP SL RS485 includes two stage removable protection module with simple quick release mechanism allowing partial removal for easy line commissioning and maintenance as well as full removal for protection replacement
- ESP SL RS485 includes optional LED status indication - add L suffix to part number - i.e. ESP SL RS485L

Application

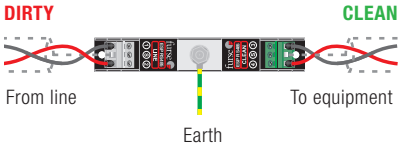
Connect in series with the signal line either near where it enters or leaves the building or close to the equipment being protected ensuring it is very close to the system's earth star point. Install protectors either within an existing cabinet/ cubicle or in a separate enclosure.

Accessories

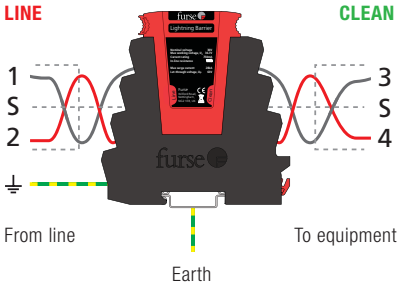
Replacement module for ESP SL RS485:
ESP SLRS485/M
Standard module replacement
ESP SLRS485/B
Base replacement

Combined Mounting/Earthing kits for ESP RS485:
CME 4 For up to 4 x ESP RS485
CME 8 For up to 8 x ESP RS485
CME 16 For up to 16 x ESP RS485
CME 32 For up to 32 x ESP RS485

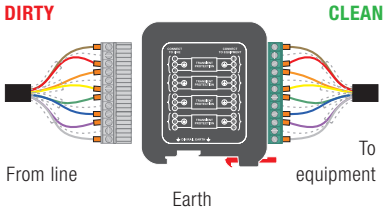
ESP RS485 installed in series



ESP SL RS485 installed in series



ESP RS485Q installed in series (in-line)



NOTE: The ESP SL 'Slim Line' Series is also available for protection of 3-wire and RTD applications (ESP SL/3W & ESP SL RTD). The ESP SL X Series has approvals for use in hazardous areas.

Data & signal protection
ESP RS485, RS485Q & SL RS485 Series

ESP RS485, RS485Q & SL RS485 Series - Technical specification

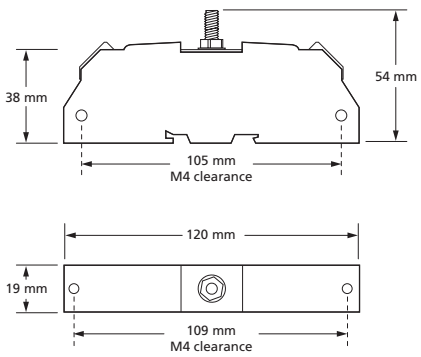
Electrical Specification	ESP RS485	ESP SL RS485	ESP RS485Q
Nominal voltage[1]	15 V		
Maximum working voltage *Uc*[2]	16.7 V		
Current rating (signal)	300 mA		
In-line resistance (per line ±10%)	1 Ω		
Bandwidth (-3 dB 50 Ω system)	45 MHz		

Transient Specification		ESP RS485	ESP SL RS485	ESP RS485Q
Let-through voltage (all conductors)[3] *Up*				
C2 test 4 kV 1.2/50 µs, 2 kA 8/20 µs to BS EN/EN/IEC 61643-21		55.0 V		
C1 test 1 kV, 1.2/50 µs, 0.5 kA 8/20 µs to BS EN/EN/IEC 61643-21		42.0 V		
B2 test 4 kV 10/700 µs to BS EN/EN/IEC 61643-21		27.2 V		
5 kV, 10/700 µs[4]		28.2 V		
Maximum surge current				
D1 test 10/350 µs to	– Per signal wire	2.5 kA	1.25 kA	2.5 kA
BS EN/EN/IEC 61643-21:	– Per pair	5 kA	2.5 kA	5 kA
8/20 µs to ITU-T K.45:2003,	– Per signal wire	10 kA		
IEEE C62.41.2:2002:	– Per pair	20 kA		

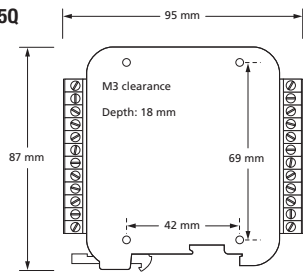
Mechanical Specification		ESP RS485	ESP SL RS485	ESP RS485Q
Temperature range		-40 to +80 ºC		
Connection type		Screw terminal		Pluggable 12 way screw terminal
Conductor size (stranded)		2.5 mm²	4 mm²	2.5 mm²
Earth connection		M6 stud	Via DIN rail or 4 mm² earth terminal	Via DIN rail or M5 threaded hole in base of unit
Case Material		ABS UL94 V-0	FR polycarbonate UL94 V-0	ABS UL94 V-0
Weight:	– Unit	0.08 kg		0.1 kg
	– Packaged (per 10)	0.85 kg		1.3 kg
Dimensions		See diagram below		

[1] Nominal voltage (DC or AC peak) measured at < 10 µA
[2] Maximum working voltage (DC or AC peak) measured at < 5 mA
[3] The maximum transient voltage let-through of the protector throughout the test (±10%), line to line & line to earth, both polarities. Response time < 10 ns
[4] 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)

ESP RS485



ESP RS485Q



ESP SL RS485