

ESP240/XXX Series **NEW** **152 – 153**

Combined Type 1 and 2 protection for single phase mains power supplies and power distribution systems

ESP415/XXX Series **NEW** **154 – 155**

Combined Type 1 and 2 protection for three phase mains power supplies and power distribution systems

ESP D1 Series **NEW** **156 – 157**

Protection for single and three phase mains power supplies and power distribution systems

ESP M2/M4 Series **NEW** **158 – 159**

Protectors with an extra high maximum surge current capacity for three phase mains power supplies

ESP M1 Series **160 – 161**

Protection for single and three phase mains power supplies and power distribution systems

ESP M1R, M2R, M4R Series **NEW** **162 – 163**

Three phase mains power protector with remote status display panel

ESP DC Series **164 – 165**

Advanced protector for DC supplies and DC power distribution systems

ESP 5A/BX and 16A/BX Series **166 – 167**

Protectors for mains supplies and fused connections of up to 16 amps. Each also available ready boxed to IP66

ESP MC Series **NEW** **168 – 169**

A high performance plug-in mains protector suitable for use on British style (three square pin) plugs and sockets



LPZ
 $0_A \rightarrow 2$

COMMON
MODE
Equipotential
Bonding

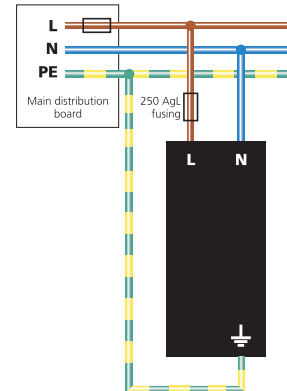
MAINS
TEST
TYPE
1 + 2

e
ENHANCED
Low let-through
voltage

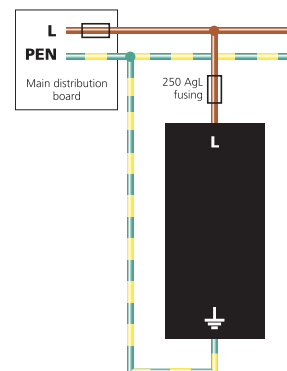
STATUS
INDICATION +
VOLT-FREE
CONTACT

Installation

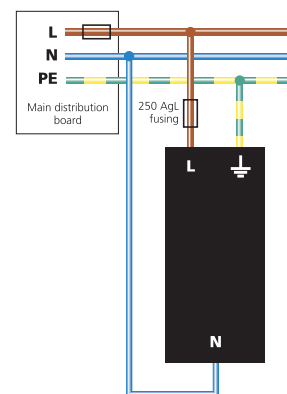
The diagrams below illustrate how to wire the appropriate ESP protector according to your chosen electrical system



TNS earthing system



TNC earthing system



TT earthing system

Combined Type 1 and 2 tested protector (to BS EN 61643-11) for use on the main distribution board, particularly where a structural Lightning Protection System (LPS) is employed, for equipotential bonding. For use at boundaries up to LPZ 0_A to protect against flashover (typically the main distribution board location) through to LPZ 2 to protect electrical equipment from damage.

Features and benefits

- ✓ Enhanced protection (to BS EN 62305) offering low let-through voltage further minimizing the risk of flashover creating dangerous sparking or electric shock
- ✓ Repeated protection in lightning intense environments
- ✓ The varistor based design eliminates the high follow current (I_f) associated with spark gap based surge protection
- ✓ Compact, space saving design
- ✓ Indicator shows when the protector requires replacement
- ✓ Remote signal contact can indicate the protectors' status through interfacing with a building management system

Application

- ✓ Use on single phase mains supplies and power distribution systems for protection against partial direct or indirect lightning strikes
- ✓ ESP 240/I/XXX versions for use with Class I or II Lightning Protection Systems (LPS)
- ✓ ESP 240/III/XXX versions for use with Class III or IV LPS; or exposed overhead single phase power lines where no LPS is fitted
- ✓ ESP 240/X/TNS versions also cover TNC-S earthing systems

Installation

Protector to be installed in the main distribution panel with connecting leads of minimal length. The protector should be fused and is suitable for attachment to a 35mm top hat DIN rail.

IMPORTANT

The primary purpose of Lightning current or Equipotential bonding mains Type 1 Surge Protective Devices (SPDs) is to prevent dangerous sparking caused by flashover to protect against the loss of human life. In order to protect electronic equipment and ensure the continual operation of systems, transient overvoltage mains Type 2 and 3 SPDs such as the ESP 240 M1 are further required, typically installed at downstream sub-distribution boards feeding sensitive equipment. BS EN 62305 refers to the correct application of mains Type 1, 2 and 3 SPDs as a coordinated set.

For further information, please refer to "A Guide to BS EN 62305:2006 Protection Against Lightning" available from Furze.

Accessories

Weatherproof enclosure

WBX D4

Electrical specification	NEW ESP 240/I/TNS	NEW ESP 240/III/TNS	NEW ESP 240/I/TNC	NEW ESP 240/III/TNC	NEW ESP 240/I/TT	NEW ESP 240/III/TT
Nominal voltage - Phase - Neutral U_o (RMS)	240V					
Maximum voltage - Phase-Neutral U_c (RMS/DC)	320V/420V					
Temporary Overvoltage TOV U_t^1	335V					
Short circuit withstand capability	25kA/50Hz					
Back-up fuse (see installation instructions)	250A					
Leakage current (to earth)	<2.5mA	<2.5mA	<2.5mA	<2.5mA	–	–
Volt free contact – current rating – nominal voltage (RMS)	0.5A 250V					

¹ Temporary Overvoltage rating is for a maximum duration of 5 seconds tested to BS/EN/IEC 61643

Transient specification Type 1 (BS/EN), Class I (IEC)	ESP 240/I/TNS	ESP 240/III/TNS	ESP 240/I/TNC	ESP 240/III/TNC	ESP 240/I/TT	ESP 240/III/TT
Nominal discharge current 8/20 μ s (per mode) I_n	50kA	25kA	50kA	25kA	50kA/100kA (N-E)	25kA/50kA (N-E)
Let-through voltage U_p at I_n^1	<1.5kV	<1.3kV	<1.5kV	<1.3kV	<1.5kV	<1.3kV
Impulse discharge current 10/350 μ s I_{imp} (per mode) ²	50kA	25kA	50kA	25kA	50kA/100kA (N-E)	25kA/50kA (N-E)
Let-through voltage U_p at I_{imp}^1	<1.2kV	<1.2kV	<1.2kV	<1.2kV	<1.2kV	<1.2kV
Let-through voltage U_p at 1.2/50 μ s (N-E, TT system)	–	–	–	–	<1.2kV	<1.2kV

Type 2 (BS/EN), Class II (IEC)

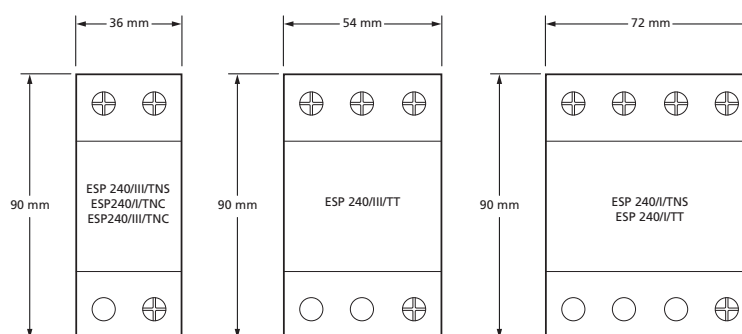
Nominal discharge current 8/20 μ s (per mode) I_n	50kA	25kA	50kA	25kA	50kA/100kA (N-E)	25kA/50kA (N-E)
Let-through voltage U_p at I_n^1	<1.5kV	<1.3kV	<1.5kV	<1.3kV	<1.5kV	<1.3kV
Maximum discharge current I_{max} (per mode) ²	100kA	100kA	100kA	100kA	100kA/160kA (N-E)	100kA/100kA (N-E)

¹ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$), phase to earth and neutral to earth.

² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

Mechanical specification	ESP 240/I/TNS	ESP 240/III/TNS	ESP 240/I/TNC	ESP 240/III/TNC	ESP 240/I/TT	ESP 240/III/TT
Temperature range	–40 to +80°C					
Connection type	Screw Terminal					
Conductor size (stranded)	25mm ²					
Earth connection	Screw Terminal					
Volt free contact	Connect via screw terminal with conductor up to 1.5mm ² (stranded)					
Degree of protection (IEC 60529)	IP20					
Case material	Thermoplastic, UL 94 V-0					
Mounting	Indoor, 35mm top hat DIN rail					
Weight – unit	0.84kg	0.44kg	0.44kg	0.29kg	0.68kg	0.44kg
– packaged	0.94kg	0.54kg	0.54kg	0.39kg	0.78kg	0.54kg
Dimensions to DIN 43880 - HxDxW ¹	90mm x 68mm x 72mm (4TE)	90mm x 68mm x 36mm (2TE)	90mm x 68mm x 36mm (2TE)	90mm x 68mm x 36mm (2TE)	90mm x 68mm x 72mm (4TE)	90mm x 68mm x 54mm (3TE)

¹ The remote signal contact (removable) adds 10mm to height



Standard depth 68 mm



LPZ
 $0_A \rightarrow 2$

COMMON
MODE
Equipotential
Bonding

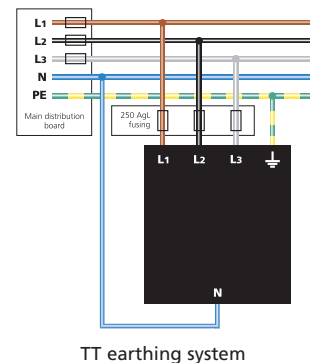
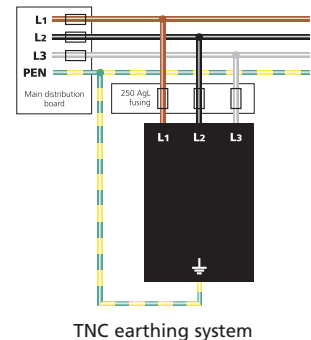
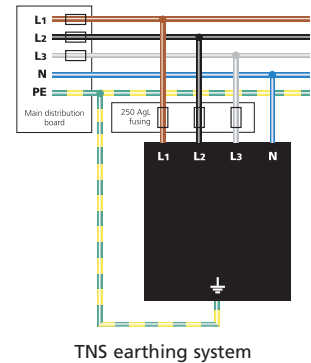
MAINS
TEST
TYPE
1 + 2

e
ENHANCED
Low let-through
voltage

STATUS
INDICATION +
VOLT-FREE
CONTACT

Installation

The diagrams below illustrate how to wire the appropriate ESP protector according to your chosen electrical system.



Combined Type 1 and 2 tested protector (to BS EN 61643-11) for use on the main distribution board, particularly where a structural Lightning Protection System (LPS) is employed, for equipotential bonding. For use at boundaries up to LPZ 0_A to protect against flashover (typically the main distribution board location) through to LPZ 2 to protect electrical equipment from damage.

Features and benefits

- ✓ Enhanced protection (to BS EN 62305) offering low let-through voltage further minimizing the risk of flashover creating dangerous sparking or electric shock
- ✓ Repeated protection in lightning intense environments
- ✓ The varistor based design eliminates the high follow current (I_f) associated with spark gap based surge protection
- ✓ Compact, space saving design
- ✓ Indicator shows when the protector requires replacement
- ✓ Remote signal contact can indicate the protectors' status through interfacing with a building management system

Application

- ✓ Use on three phase mains supplies and power distribution systems for protection against partial direct or indirect lightning strikes
- ✓ ESP 415/I/XXX versions for use with Class I or II Lightning Protection Systems (LPS)
- ✓ ESP 415/III/XXX versions for use with Class III or IV LPS; or exposed overhead three phase power lines where no LPS is fitted
- ✓ ESP 415/X/TNS versions also cover TNC-S earthing systems

Installation

Protector to be installed in the main distribution panel with connecting leads of minimal length. The protector should be fused and is suitable for attachment to a 35mm top hat DIN rail.

IMPORTANT

The primary purpose of Lightning current or Equipotential bonding mains Type 1 Surge Protective Devices (SPDs) is to prevent dangerous sparking caused by flashover to protect against the loss of human life. In order to protect electronic equipment and ensure the continual operation of systems, transient overvoltage mains Type 2 and 3 SPDs such as the ESP 240 M1 are further required, typically installed at downstream sub-distribution boards feeding sensitive equipment. BS EN 62305 refers to the correct application of mains Type 1, 2 and 3 SPDs as a coordinated set.

For further information, please refer to "A Guide to BS EN 62305:2006 Protection Against Lightning" available from Furse.

Accessories

Weatherproof enclosures

WBX D4

Use with TNS and TNC versions

WBX D8

Use with TT versions

Electrical specification	NEW ESP 415/I/TNS	NEW ESP 415/III/TNS	NEW ESP 415/I/TNC	NEW ESP 415/III/TNC	NEW ESP 415/I/TT	NEW ESP 415/III/TT
Nominal voltage - Phase - Neutral U_o (RMS)	240V					
Maximum voltage - Phase-Neutral U_c (RMS/DC)	320V/420V					
Temporary Overvoltage TOV U_t^1	335V					
Short circuit withstand capability	25kA/50Hz					
Back-up fuse (see installation instructions)	250A					
Leakage current (to earth)	<2.5mA	<2.5mA	<2.5mA	<2.5mA	–	–
Volt free contact – current rating – nominal voltage (RMS)	0.5A 250V					

¹ Temporary Overvoltage rating is for a maximum duration of 5 seconds tested to BS/EN/IEC 61643

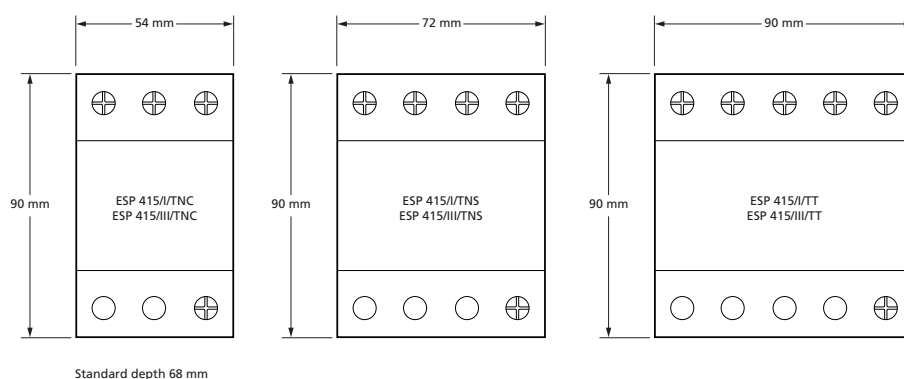
Transient specification	ESP 415/I/TNS	ESP 415/III/TNS	ESP 415/I/TNC	ESP 415/III/TNC	ESP 415/I/TT	ESP 415/III/TT
Type 1 (BS/EN), Class I (IEC)						
Nominal discharge current 8/20μs (per mode) I_n	25kA	20kA	25kA	20kA	25kA/100kA (N-E)	20kA/50kA (N-E)
Let-through voltage U_p at I_n^1	<1.4kV	<1.5kV	<1.4kV	<1.5kV	<1.4kV	<1.5kV
Impulse discharge current 10/350μs I_{imp} (per mode) ²	25kA	12.5kV	25kA	12.5kV	25kA/100kA (N-E)	25kA/100kA (N-E)
Let-through voltage U_p at I_{imp}^1	<1.3kV	<1.2kV	<1.3kV	<1.2kV	<1.3kV	<1.2kV
Let-through voltage U_p at 1.2/50μs (N-E, TT system)	–	–	–	–	<1.2kV	<1.2kV
Type 2 (BS/EN), Class II (IEC)						
Nominal discharge current 8/20μs (per mode) I_n	25kA	20kA	25kA	20kA	25kA/100kA (N-E)	20kA/50kA (N-E)
Let-through voltage U_p at I_n^1	<1.4kV	<1.5kV	<1.4kV	<1.5kV	<1.4kV	<1.5kV
Maximum discharge current I_{max} (per mode) ²	100kA	50kA	100kA	50kA	100kA/160kA (N-E)	50kA/100kA (N-E)

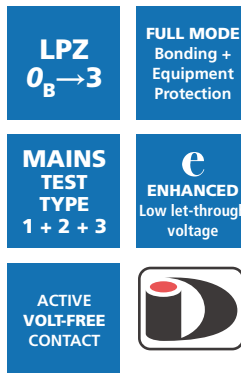
¹ The maximum transient voltage let-through of the protector throughout the test (±5%), phase to earth and neutral to earth.

² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

Mechanical specification	ESP 415/I/TNS	ESP 415/III/TNS	ESP 415/I/TNC	ESP 415/III/TNC	ESP 415/I/TT	ESP 415/III/TT
Temperature range	–40 to +80°C					
Connection type	Screw Terminal					
Conductor size (stranded)	25mm ²					
Earth connection	Screw Terminal					
Volt free contact	Connect via screw terminal with conductor up to 1.5mm ² (stranded)					
Degree of protection (IEC 60529)	IP20					
Case material	Thermoplastic, UL 94 V-0					
Mounting	Indoor, 35mm top hat DIN rail					
Weight – unit	0.84kg	0.59kg	0.64kg	0.44kg	0.9kg	0.67kg
– packaged	0.94kg	0.69kg	0.74kg	0.54kg	1.0kg	0.77kg
Dimensions to DIN 43880 - HxDxW ¹	90mm x 68mm x 72mm (4TE)	90mm x 68mm x 72mm (4TE)	90mm x 68mm x 54mm (3TE)	90mm x 68mm x 54mm (3TE)	90mm x 68mm x 90mm (5TE)	90mm x 68mm x 90mm (5TE)

¹ The remote signal contact (removable) adds 10mm to height





Combined Type 1, 2 and 3 tested protector (to BS EN 61643) for use on mains power distribution systems primarily to protect connected electronic equipment from transient overvoltages on the mains supply, e.g. computer, communications or control equipment. Innovative remote display options allow both protector and display to be mounted in their optimum position. For use at boundaries up to LPZ 0_B to protect against flashover (typically the main distribution board location, with multiple metallic services entering) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

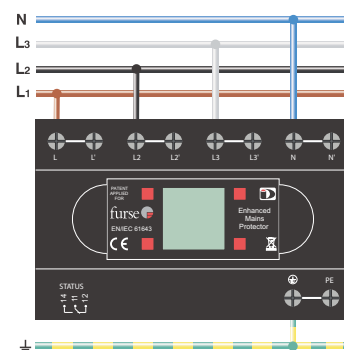
- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all sets of conductors (phase to neutral, phase to earth, neutral to earth – Full Mode protection)
- ✓ Full mode design capable of handling partial lightning currents as well as allowing continual operation of protected equipment
- ✓ Repeated protection in lightning intense environments
- ✓ Innovative multiple thermal disconnect technology for safe disconnection from faulty or abnormal supplies (without compromising protective performance)
- ✓ Three way visual indication of protection status and advanced pre-failure warning so you need never be unprotected
- ✓ Three phase ESP XXX D1R/LED or ESP XXX D1R/LCD units (where XXX = 208, or 415, or 480) have a remote display that allows the protector to be mounted close to the incoming feed or distribution board with the display being mounted in a visible position e.g. at the front of the panel
- ✓ Three phase ESP XXX D1/LCD or ESP XXX D1R/LCD units have backlit LCD intelligent display offering clear status information that can be rotated should the unit be mounted on its side to facilitate short connecting leads for optimal protection
- ✓ Remote indication facility allows pre-failure warning to be linked to a building management system, buzzer or light
- ✓ Changeover active volt free contact enables the protector to be used to warn of phase loss (i.e. power failure, blown fuses etc)
- ✓ Flashing warning of potentially fatal neutral to earth supply faults (due to incorrect earthing, wiring errors or unbalanced conditions)
- ✓ Through terminal facility allows series connection on low current supplies to eliminate high additive voltage associated with connecting leads on units installed in parallel
- ✓ Compact space saving DIN housing



Installation

Install in parallel, within the power distribution board or directly (via fuses) on to the supply feeding equipment. Can be installed in series for low current supplies – see installation instructions.

For three phase ESP XXX D1R/LED or ESP XXX D1R/LCD units, position remote display, making sure that the cable is long enough, is unimpeded within the cabinet, and allows a minimum of 60mm behind the panel front (for the interconnection cable).



Parallel connection of ESP 415 D1, ESP 208 D1 and ESP 480 D1 series to three phase star (4 wire and earth) supplies (fuses not shown for clarity)

At distribution boards, the protector can be installed either on the load side of the incoming isolator, or on the closest outgoing way to the incoming supply. Connect, with very short connecting leads, to phase(s), neutral and earth.

Accessories

Weatherproof enclosures

WBX D4

Use with single phase protectors

WBX D8

Use with three phase protectors

ESP RLA HD-1

Spare 1 metre cable assembly for three phase ESP XXX D1R/LED or ESP XXX D1R/LCD

ESP RLA HD-4

Spare 4 metre cable assembly for three phase ESP XXX D1R/LED or ESP XXX D1R/LCD

Electrical specification	SINGLE PHASE			THREE PHASE SERIES ¹		
	NEW ESP 120 D1	NEW ESP 240 D1	NEW ESP 277 D1	NEW ESP 208 D1 Series	NEW ESP 415 D1 Series	NEW ESP 480 D1 Series
Nominal voltage - Phase - Neutral U_o (RMS)	120V	240V	277V	208V	415V	480V
Maximum voltage - Phase-Neutral U_c (RMS)	150V	280V	350V	150V	280V	350V
Temporary Overvoltage TOV U_T^2	208V	415V	480V	208V	415V	480V
Short circuit withstand capability	25kA, 50Hz					
Working voltage (RMS)	90-150V	200-280V	232-350V	156-260V	346-484V	402-600V
Frequency range	47-63Hz					
Back-up fuse (see installation instructions)	125A					
Leakage current (to earth)	<250µA					
Indicator circuit current	<10mA					
Volt free contact ³	Screw terminal					
– current rating	1A					
– nominal voltage (RMS)	250V					

¹ Three phase series (208V, 415V or 480V) include fixed (D1) or remote (D1R) LED or LCD options e.g. ESP 415 D1/LED, ESP 415 D1/LCD, ESP 415 D1R/LED, ESP 415 D1R/LCD

² Temporary Overvoltage rating is for a maximum duration of 5 seconds tested to BS/EN/IEC 61643

³ Minimum permissible load is 5V DC, 10mA to ensure reliable operation

Transient specification	ESP 120 D1	ESP 240 D1	ESP 277 D1	ESP 208 D1 Series	ESP 415 D1 Series	ESP 480 D1 Series
Type 1 (BS/EN), Class I (IEC)						
Nominal discharge current 8/20µs (per mode) I_n	20kA					
Let-through voltage U_p at I_n^1	<600V	<900V	<1kV	<600V	<900V	<1kV
Impulse discharge current 10/350µs I_{imp} (per mode) ²	4kA					
Let-through voltage U_p at I_{imp}^1	<500V	<750V	<850V	<500V	<750V	<850V
Impulse discharge current (per phase) I_{imp}^3	6.25kA					
Type 2 (BS/EN), Class II (IEC)						
Nominal discharge current 8/20µs (per mode) I_n	20kA					
Let-through voltage U_p at I_n^1	<600V	<900V	<1kV	<600V	<900V	<1kV
Maximum discharge current I_{max} (per mode) ²	40kA					
Maximum discharge current I_{max} (per phase)	80kA					
Type 3 (BS/EN), Class III (IEC)						
Let-through voltage at U_{oc} of 6kV 1.2/50µs and I_{sc} of 3kA 8/20µs (per mode) ⁴	<390V	<600V	<680V	<390V	<600V	<680V

¹ The maximum transient voltage let-through of the protector throughout the test (±5%), phase to neutral, phase to earth and neutral to earth.

² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

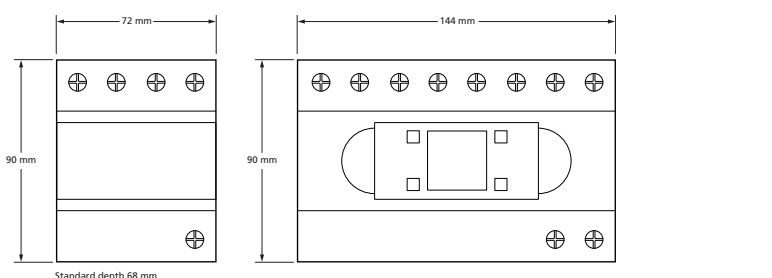
³ Rating is considered as the current capability of the protector for equipotential bonding near the service entrance.

⁴ Combination wave test within BS 6651:1999 App. C, Cats C-Low & B-High, IEEE C62.41-2002 Location Cats C1 & B3, SS CP 33:1996 App. F, AS 1768-1991 App. B, Cat B, UL1449 mains wire-in

Mechanical specification	ESP 120 D1	ESP 240 D1	ESP 277 D1	ESP 208 D1 Series	ESP 415 D1 Series	ESP 480 D1 Series
Temperature range	-40 to +70°C					
Connection type	Screw terminal					
Conductor size (stranded)	25mm²					
Earth connection	Screw terminal					
Volt free contact	Connect via screw terminal with conductor up to 2.5mm² (stranded)					
Display connection (three phase 208/415/480 D1R/LED or D1R/LCD versions)	–			HD-D Type 1 metre interconnection cable – 4 metre cable (ESP RLA HD-4) optional		
Degree of protection (IEC 60529)	IP20					
Case material	PBT UL-94 V-0					
Weight – unit	0.4kg				0.85kg	
– packaged	0.5kg				0.95kg	
Dimensions to DIN 43880 – HxDxW'	90mm x 68mm x 72mm (4TE)			90mm x 68mm x 144mm (8TE)		

¹ The remote signal contact (removable) adds 10mm to height

If you desire a protector with an extra high maximum surge current use the ESP M2 or M4 series. If your supply is fused at 16 amps, or less, the in-line protectors (and their ready boxed derivatives) may be more suitable.





LPZ
 $0_A \rightarrow 3$

FULL MODE
Bonding +
Equipment
Protection

MAINS
TEST
TYPE
1 + 2 + 3

e
ENHANCED
Low let-through
voltage

ACTIVE
VOLT-FREE
CONTACT

3-WAY + N-E
FAULT
STATUS
INDICATION

Combined Type 1, 2 and 3 tested protector (to BS EN 61643-11) for use on the main distribution board directly feeding electronic equipment such as computers, communication and control equipment, particularly where a structural Lightning Protection System (LPS) is employed. For use at boundaries up to LPZ 0_A to protect against flashover (typically the main distribution board location) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Very low let-through voltage between all sets of conductors (phase to neutral, phase to earth and neutral to earth)
- ✓ Full mode design capable of handling high energy partial lightning currents as well as allowing continual operation of protected equipment
- ✓ Innovative multiple thermal disconnect technology, for safe disconnection from faulty or abnormal supplies (without compromising protective performance)
- ✓ Three way visual indication of protection status
- ✓ Advanced pre-failure warning so you need never be unprotected
- ✓ Remote indication facility allows pre-failure warning to be linked to a building management system, buzzer or light
- ✓ Changeover active volt free contact enables the protector to be used to warn of phase loss (i.e. power failure, blown fuses, etc)
- ✓ Unique flashing warning of potentially fatal neutral to earth supply faults (caused by incorrect earthing, wiring errors or unbalanced conditions)
- ✓ Robust steel housing
- ✓ Protector base provides ultra low inductance earth bond to metal panels
- ✓ Convenient holes for flat mounting

Application

Use ESP M2 versions on main distribution panel for buildings with a Class III or IV structural LPS fitted or exposed 3 phase power lines where no LPS is fitted. Use ESP M4 versions on main distribution panel for buildings with a Class I or II LPS fitted.

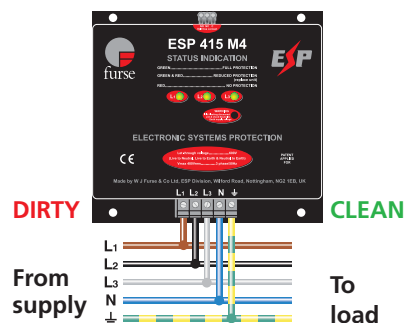
Installation

Install in parallel, within the power distribution board, either on the load side of the incoming isolator, or on the closest outgoing way to the incoming supply.



Live connecting leads should be fused accordingly

Connect, with very short connecting leads, to phase(s), neutral and earth. Phase/live connecting leads should be fused with high rupture capacity (HRC) fuses, a switchfuse, MCCB or type 'C' MCB.



Parallel connection to three phase star (4 wire and earth) supplies (fuses not shown for clarity)

Accessories

Weatherproof enclosures

WBX M2

For use with the ESP XXX M2

WBX M4

For use with the ESP XXX M4

For main distribution boards with multiple metallic services (gas, water, telecom/data lines) entering and for sub-distribution boards, the ESP M1 Series are more suited. If your supply is fused at 16 amps, or less, the in-line protection (ESP 240 (or 120-5A (or -16A) and ready-boxed derivatives) may be suitable. If you need to mount the the display panel separately from the main protector unit, use the ESP XXX M2R or ESP XXX M4R.

Electrical specification	ESP 415 M2	ESP 415 M4	NEW ESP 480 M2	NEW ESP 480 M4
Nominal voltage - Phase - Neutral U_0 (RMS)	415V	415V	480V	480V
Maximum voltage - Phase-Neutral U_c (RMS)	280V	280V	350V	350V
Temporary Overvoltage TOV U_t^1	415V	415V	480V	480V
Short circuit withstand capability	25kA, 50Hz			
Working voltage (RMS)	346-484V	346-484V	402-600V	402-600V
Frequency range	47-63Hz			
Back-up fuse (see installation instructions)	200A	315A	200A	315A
Leakage current (to earth)	<500 μ A	<1000 μ A	<500 μ A	<1000 μ A
Indicator circuit current	<20mA	<40mA	<20mA	<40mA
Volt free contact ² – current rating – nominal voltage (RMS)	Screw terminal 1A 250V			

¹ Temporary Overvoltage rating is for a maximum duration of 5 seconds tested to BS/EN/IEC 61643

² Minimum permissible load is 5V DC, 10mA to ensure reliable operation

Transient specification	ESP 415 M2	ESP 415 M4	ESP 480 M2	ESP 480 M4
Type 1 (BS/EN), Class I (IEC)				
Nominal discharge current 8/20 μ s (per mode) I_n	40kA	80kA	40kA	80kA
Let-through voltage U_p at I_n^1	<900V	<900V	<1kV	<1kV
Impulse discharge current 10/350 μ s I_{imp} (per mode) ²	8kA	16kA	8kA	16kA
Let-through voltage U_p at I_{imp}^1	<750V	<750V	<850V	<850V
Impulse discharge current (per phase) I_{imp}^3	12.5kA	25kA	12.5kA	25kA
Type 2 (BS/EN), Class II (IEC)				
Nominal discharge current 8/20 μ s (per mode) I_n	40kA	80kA	40kA	80kA
Let-through voltage U_p at I_n^1	<900V	<900V	<1kV	<1kV
Maximum discharge current I_{max} (per mode) ²	80kA	160kA	80kA	160kA
Maximum discharge current I_{max} (per phase)	160kA	320kA	160kA	320kA
Type 3 (BS/EN), Class III (IEC)				
Let-through voltage at U_{oc} of 6kV 1.2/50 μ s and I_{sc} of 3kA 8/20 μ s (per mode) ⁴	<590V	<570V	<670V	<650V

¹ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$), phase to neutral, phase to earth and neutral to earth.

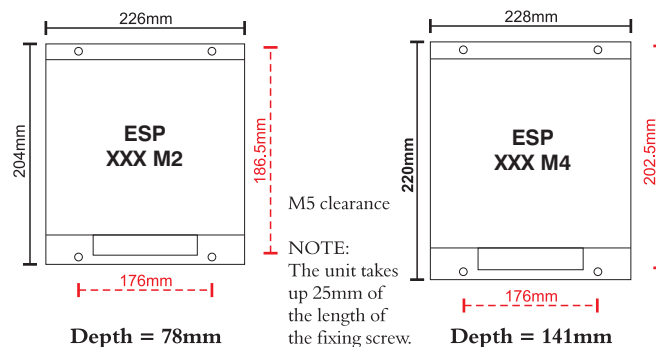
² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

³ Rating is considered as the current capability of the protector for equipotential bonding near the service entrance.

⁴ Combination wave test within BS 6651:1999 App. C, Cats C-Low & B-High, IEEE C62.41-2002 Location Cats C1 & B3, SS CP 33:1996 App. F, AS 1768-1991 App. B, Cat B, UL1449 mains wire-in

Mechanical specification	ESP 415 M2	ESP 415 M4	ESP 480 M2	ESP 480 M4
Temperature range	–40 to +70°C			
Connection type	Screw terminal			
Conductor size (stranded)	25mm ²	50mm ²	25mm ²	50mm ²
Earth connection	Screw terminal			
Volt free contact	Connect via screw terminal with conductor up to 2.5mm ² (stranded)			
Degree of protection (IEC 60529)	IP20			
Case material	Steel			
Weight – unit	2.35kg	3.9kg	2.35kg	3.9kg
– packaged	2.5kg	4.2kg	2.5kg	4.2kg

Dimensions

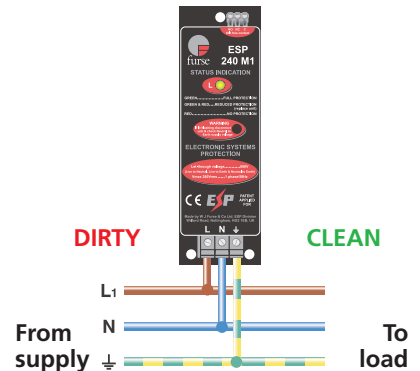




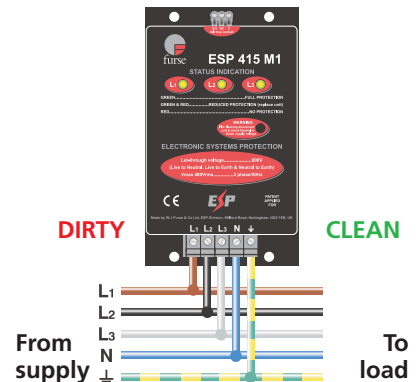
LPZ $0_B \rightarrow 3$	FULL MODE Bonding + Equipment Protection
MAINS TEST TYPE 1 + 2 + 3	e ENHANCED Low let-through voltage
ACTIVE VOLT-FREE CONTACT	3-WAY + N-E FAULT STATUS INDICATION

Installation

Install in parallel, within the power distribution board or directly (via fuses) on to the supply feeding equipment.



Parallel connection of single phase protectors
ESP 240 M1, ESP 120 M1 or ESP 277 M1
(fuses not shown for clarity)



Parallel connection of ESP 415 M1,
ESP 208 M1 or ESP 480 M1 to three phase
star (4 wire and earth) supplies
(fuses not shown for clarity)

At distribution boards, the protector can be installed either on the load side of the incoming isolator, or on the closest outgoing way to the incoming supply. Connect, with very short connecting leads, to phase(s), neutral and earth.

Accessories

Weatherproof enclosures

WBX 3

Use with single phase protectors

WBX 4

Use with three phase protectors

Combined Type 1, 2 and 3 tested protector (to BS EN 61643) for use on mains power distribution systems primarily to protect connected electronic equipment from transient overvoltages on the mains supply, e.g. computer, communications or control equipment. For use at boundaries up to LPZ 0_B to protect against flashover (typically the main distribution board location, with multiple metallic services entering) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all sets of conductors (phase to neutral, phase to earth, neutral to earth – 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 multiple thermal disconnect technology for safe disconnection from faulty or abnormal supplies (without compromising protective performance)
- ✓ Three way visual indication of protection status and advanced pre-failure warning so you need never be unprotected
- ✓ Remote indication facility allows pre-failure warning to be linked to a building management system, buzzer or light
- ✓ Changeover active volt free contact enables the protector to be used to warn of phase loss (i.e. power failure, blown fuses etc)
- ✓ Flashing warning of potentially fatal neutral to earth supply faults (due to incorrect earthing, wiring errors or unbalanced conditions)
- ✓ Robust steel housing
- ✓ Base provides ultra low inductance earth bond to metal panels
- ✓ Compact size for installation in the power distribution board
- ✓ ESP 240 M1 has Network Rail Approval PA05/01832.
NRS PADS reference 086/047149



ESP 415 M1 installed within a control panel on the mains input to protect the panel's control systems.
Note the remote indication connection (top of protector)

Electrical specification	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1	ESP 277 M1	ESP 480 M1
Nominal voltage - Phase - Neutral U_o (RMS)	120V	208V	240V	415V	277V	480V
Maximum voltage - Phase-Neutral U_c (RMS)	150V	150V	280V	280V	350V	350V
Temporary Overvoltage TOV U_t^1	208V	208V	415V	415V	480V	480V
Short circuit withstand capability	25kA, 50Hz					
Working voltage (RMS)	90-150V	156-260V	200-280V	346-484V	232-350V	402-600V
Frequency range	47-63Hz					
Back-up fuse (see installation instructions)	125A					
Leakage current (to earth)	<250 μ A					
Indicator circuit current	<10mA					
Volt free contact ²	Screw terminal 1A 250V					
– current rating						
– nominal voltage (RMS)						

¹ Temporary Overvoltage rating is for a maximum duration of 5 seconds tested to BS/EN/IEC 61643

² Minimum permissible load is 5V DC, 10mA to ensure reliable operation

Transient specification	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1	ESP 277 M1	ESP 480 M1
Type 1 (BS/EN), Class I (IEC)						
Nominal discharge current 8/20μs (per mode) <i>I</i> _n	20kA					
Let-through voltage <i>U</i> _p at <i>I</i> _n ¹	<600V	<600V	<900V	<900V	<1kV	<1kV
Impulse discharge current 10/350μs <i>I</i> _{imp} (per mode) ²	4kA					
Let-through voltage <i>U</i> _{res} at <i>I</i> _{imp} ¹	<500V	<500V	<750V	<750V	<850V	<850V
Impulse discharge current (per phase) <i>I</i> _{imp} ³	6.25kA					
Type 2 (BS/EN), Class II (IEC)						
Nominal discharge current 8/20μs (per mode) <i>I</i> _n	20kA					
Let-through voltage <i>U</i> _p at <i>I</i> _n ¹	<600V	<600V	<900V	<900V	<1kV	<1kV
Maximum discharge current <i>I</i> _{max} (per mode) ²	40kA					
Maximum discharge current <i>I</i> _{max} (per phase)	80kA					
Type 3 (BS/EN), Class III (IEC)						
Let-through voltage at <i>U</i> _{oc} of 6kV 1.2/50μs and <i>I</i> _{sc} of 3kA 8/20μs (per mode) ⁴	<390V	<390V	<600V	<600V	<680V	<680V

¹ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$), phase to neutral, phase to earth and neutral to earth.

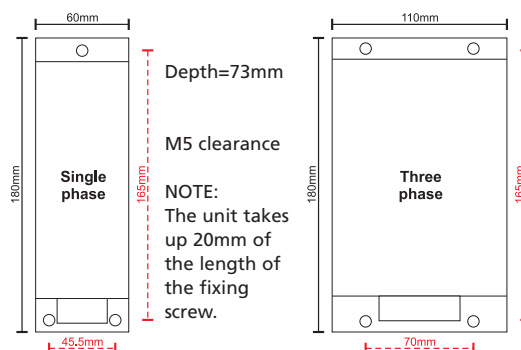
² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

³ Rating is considered as the current capability of the protector for equipotential bonding near the service entrance.

⁴ Combination wave test within BS 6651:1999 App. C, Cats C-Low & B-High, IEEE C62.41-2002 Location Cats C1 & B3, SS CP 33:1996 App. F, AS 1768-1991 App. B, Cat B, UL1449 mains wire-in

Mechanical specification	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1	ESP 277 M1	ESP 480 M1
Temperature range	–40 to +70°C					
Connection type	Screw terminal					
Conductor size (stranded)	16mm ²					
Earth connection	Screw terminal					
Volt free contact	Connect via screw terminal with conductor up to 2.5mm ² (stranded)					
Degree of protection (IEC 60529)	IP20					
Case material	Steel					
Weight – unit	0.6kg	1.0kg	0.6kg	1.0kg	0.6kg	1.0kg
– packaged	0.7kg	1.1kg	0.7kg	1.1kg	0.7kg	1.1kg

Dimensions



If you desire a protector with an extra high maximum surge current use the ESP M2 or M4 series. If your supply is fused at 16 amps, or less, the in-line protectors (ESP 240 (or 120-5A (or -16A) and their ready boxed derivatives) may be more suitable. If you need to mount the display panel separately from the main protector unit, use the ESP M1R series.

ESP M1R, M2R, M4R Series



FULL MODE
Bonding +
Equipment
Protection

**MAINS
TEST
TYPE**
1 + 2 + 3

e
ENHANCED
Low let-through
voltage

**ACTIVE
VOLT-FREE
CONTACT**

**3-WAY + N-E
FAULT
STATUS
INDICATION**

LPZ
M1R 0_B→3
M2R 0_A→3
M4R 0_A→3

**REMOTE
INDICATION
LED DISPLAY**

Combined Type 1, 2 and 3 tested protector (to BS EN 61643-11) for use on mains power distribution systems primarily to protect connected electronic equipment from transient overvoltages on the mains supply, e.g. computer, communications or control equipment. Remote display allows both display and protector unit to be mounted in their optimum positions. For use at boundaries up to LPZ 0_A to protect against flashover (typically the main distribution board location, with multiple metallic services entering) through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ The remote display means the protector can be mounted close to the incoming feed or first way on the distribution board and the display in an easily visible position, e.g. on front of cabinet
- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all sets of conductors (phase to neutral, phase to earth, neutral to earth – 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 multiple thermal disconnect technology for safe disconnection from abnormal or faulty supplies
- ✓ Remote display gives three way visual indication of protection status and is easily installed using standard drilling tools
- ✓ Plug-in cable connections between protector and display enable easy connection (1m cable supplied as standard)
- ✓ Advanced pre-failure warning so you need never be unprotected
- ✓ Remote indication facility allows pre-failure warning to be linked to a building management system, buzzer or light
- ✓ Changeover active volt free contact enables the protector to be used to warn of phase loss (i.e. power failure, blown fuses, etc)
- ✓ Unique flashing warning of potentially fatal neutral to earth supply faults (caused by incorrect earthing, wiring errors or unbalanced conditions)
- ✓ Robust steel housing (protector), and sturdy ABS housing (display)
- ✓ Base provides ultra-low inductance earth bond to metal panels
- ✓ Remote display comes with integral fixings and a panel drilling template



Front view of a cabinet with the display unit, easily visible, mounted on the front of the door, whilst the protector unit is installed deep within

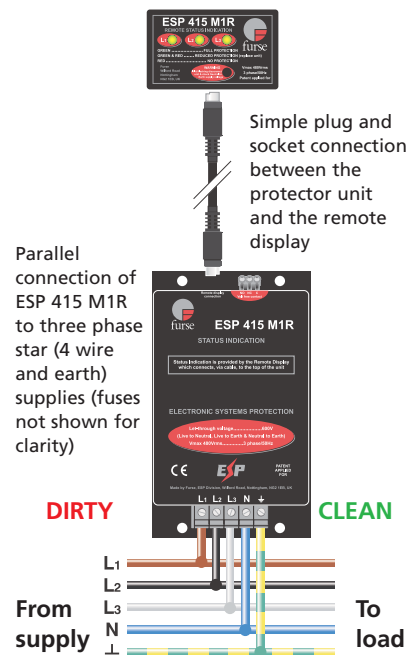
Application

Use ESP M1R versions on main distribution panel for buildings with multiple metallic services (e.g. gas, water, telephone lines) and on sub-distribution boards feeding sensitive equipment. Use ESP M2R versions on main distribution panel for buildings with a Class III or IV structural LPS fitted or exposed 3 phase power lines where no LPS is fitted. Use ESP M4R versions on main distribution panel for buildings with a Class I or II LPS fitted.

Installation

Installation of the protector unit is identical to the ESP M1, M2 or M4 Series.

Position remote display, making sure that the cable is long enough, is unimpeded within the cabinet, and allows a minimum of 60mm behind the panel front (for the interconnection cable).



Accessories

ESP RLA-1

Spare 1 metre cable assembly

ESP RLA-4

Spare 4 metre cable assembly

ESP RDU

Spare display unit

For three phase applications where a remote display is unnecessary, use the respective ESP M1, M2 or M4 Series.

Electrical specification	ESP 415 M1R	NEW ESP 480 M1R	NEW ESP 415 M2R	NEW ESP 480 M2R	NEW ESP 415 M4R	NEW ESP 480 M4R
Nominal voltage - Phase - Neutral U_o (RMS)	415V	480V	415V	480V	415V	480V
Maximum voltage - Phase-Neutral U_c (RMS)	280V	350V	280V	350V	280V	350V
Temporary Overvoltage TOV U_T^1	415V	480V	415V	480V	415V	480V
Short circuit withstand capability	25kA, 50Hz					
Working voltage (RMS)	346-484V	402-600V	346-484V	402-600V	346-484V	402-600V
Frequency range	47-63Hz					
Back-up fuse (see installation instructions)	125A	125A	200A	200A	315A	315A
Leakage current (to earth)	<250 μ A	<250 μ A	<500 μ A	<500 μ A	<1000 μ A	<1000 μ A
Indicator circuit current	<10mA	<10mA	<20mA	<20mA	<40mA	<40mA
Volt free contact ² – current rating – nominal voltage (RMS)	Screw terminal 1A 250V					

¹ Temporary Overvoltage rating is for a maximum duration of 5 seconds tested to BS/EN/IEC 61643.

² Minimum permissible load is 5V DC, 10mA to ensure reliable operation.

Under fault conditions, the remote display will go blank if the L1 phase loses power or becomes faulty. This is due to the isolation requirements needed for circuitry mounted externally to the main protector unit.

Transient specification	ESP 415 M1R	ESP 480 M1R	ESP 415 M2R	ESP 480 M2R	ESP 415 M4R	ESP 480 M4R
Type 1 (BS/EN), Class I (IEC)						
Nominal discharge current 8/20 μ s (per mode) I_n	20kA	20kA	40kA	40kA	80kA	80kA
Let-through voltage U_p at I_n^1	<900V	<1kV	<900V	<1kV	<900V	<1kV
Impulse discharge current 10/350 μ s i_{imp} (per mode) ²	4kA	4kA	8kA	8kA	16kA	16kA
Let-through voltage U_p at i_{imp}^1	<750V	<850V	<750V	<850V	<750V	<850V
Impulse discharge current (per phase) i_{imp}^3	6.25kA	6.25kA	12.5kA	12.5kA	25kA	25kA
Type 2 (BS/EN), Class II (IEC)						
Nominal discharge current 8/20 μ s (per mode) I_n	20kA	20kA	40kA	40kA	80kA	80kA
Let-through voltage U_p at I_n^1	<900V	<1kV	<900V	<1kV	<900V	<1kV
Maximum discharge current I_{max} (per mode) ²	40kA	40kA	80kA	80kA	160kA	160kA
Maximum discharge current I_{max} (per phase)	80kA	80kA	160kA	160kA	320kA	320kA
Type 3 (BS/EN), Class III (IEC)						
Let-through voltage at U_{oc} of 6kV 1.2/50 μ s and I_{sc} of 3kA 8/20 μ s (per mode) ⁴	<600V	<680V	<590V	<670V	<570V	<650V

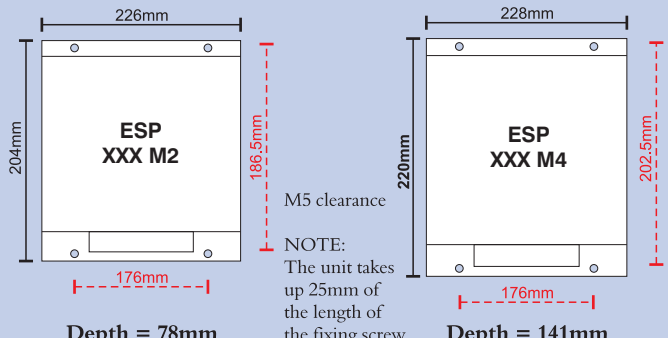
¹ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$), phase to neutral, phase to earth and neutral to earth.

² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

³ Rating is considered as the current capability of the protector for equipotential bonding near the service entrance.

⁴ Combination wave test within BS 6651:1999 App. C, Cats C-Low & B-High, IEEE C62.41-2002 Location Cats C1 & B3, SS CP 33:1996 App. F, AS 1768-1991 App. B, Cat B, UL1449 mains wire-in

Mechanical specification	ESP 415 M1R	ESP 480 M1R	ESP 415 M2R	ESP 480 M2R	ESP 415 M4R	ESP 480 M4R
Temperature range	–40 to +70°C					
Connection type	Screw terminal					
Conductor size (stranded)	16mm ²	16mm ²	25mm ²	25mm ²	50mm ²	50mm ²
Earth connection	Screw terminal					
Volt free contact	Connect via screw terminal with conductor up to 2.5mm ² (stranded)					
Degree of protection (IEC 60529)	IP20					
Display connection	6 way 1 metre interconnection cable - 4 metre cable optional (ESP RLA-4)					
Case material	Unit – Steel, Display – ABS					
Weight – unit	1.1kg	1.1kg	2.45kg	2.45kg	4kg	4kg
– packaged	1.2kg	1.2kg	2.55kg	2.55kg	4.3kg	4.3kg

Dimensions	 <p>The image shows two technical drawings of the ESP M2 and ESP M4 units. The ESP M2 unit has a width of 226mm, a height of 204mm, and a depth of 78mm. The ESP M4 unit has a width of 228mm, a height of 220mm, and a depth of 141mm. Both units have a mounting bracket with a depth of 176mm. The ESP M2 unit has a mounting hole diameter of 186.5mm, and the ESP M4 unit has a mounting hole diameter of 202.5mm. A note indicates that the unit takes up 25mm of the length of the fixing screw.</p>					
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FULL MODE
Bonding +
Equipment
Protection

**MAINS
TEST
TYPE
2 + 3**

e
ENHANCED
Low let-through
voltage

**LPZ
1→3**

**STATUS
INDICATION +
VOLT-FREE
CONTACT**

Application

Use on DC power distribution systems to protect connected electronic equipment from transient overvoltages on the DC supply, e.g. DC fed communications or control equipment.

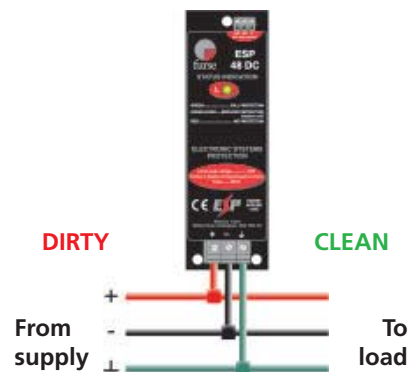
Installation

Install in parallel, within the power distribution board or directly on the supply feeding the equipment.

Combined Type 2 and 3 tested protector (to BS EN 61643-11) for use on DC systems to protect connected electronic equipment from transient overvoltages on the mains supply, e.g. control equipment. Available for 12, 24, 36 and 48V DC systems. For use at boundaries LPZ 1 through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Low let-through voltage (enhanced protection to BS EN 62305) between all sets of conductors (positive to negative, positive to earth and negative to earth) – Full Mode protection) allowing continuous operation of equipment
- ✓ Repeated protection in lightning intense environments
- ✓ Visual indication of protector status
- ✓ Advanced pre-failure warning so you need never be unprotected
- ✓ Remote indication facility allows pre-failure warning to be linked to a building management system, buzzer or light
- ✓ Robust steel housing
- ✓ Simple parallel connection
- ✓ Base provides ultra low inductance earth bond to metal panels
- ✓ Compact size for installation in the power distribution board
- ✓ Maintenance free



Parallel connection of ESP 48 DC

At distribution boards, the protector can be installed either on the load side of the incoming isolator, or on the closest outgoing way to the incoming supply. Connect, with very short connecting leads, to positive, negative and earth.

Accessories

WBX 3

Weatherproof enclosure

Electrical specification	ESP 12 DC	ESP 24 DC	ESP 36 DC	ESP 48 DC
Nominal voltage (RMS)	12V	24V	36V	48V
Maximum voltage (RMS)	15V	30V	45V	60V
Working voltage (RMS)	9-15V	18-30V	27-45V	36-60V
Back-up fuse (see installation instructions)	100A			
Leakage current (to earth)	<250µA			
Indicator circuit current	<10mA			
Volt free contact ¹	Screw terminal			
– current rating	1A			
– nominal voltage (RMS)	250V			

¹ Minimum permissible load is 5V DC, 10mA to ensure reliable operation

Transient specification	ESP 12 DC	ESP 24 DC	ESP 36 DC	ESP 48 DC
Type 2 (BS/EN), Class II (IEC)				
Nominal discharge current 8/20µs (per mode) <i>I</i> _n	5kA			
Let-through voltage <i>U</i> _p at <i>I</i> _n ¹	<250V	<250V	<250V	<250V
Maximum discharge current <i>I</i> _{max} (per mode) ²	20kA			
Type 3 (BS/EN), Class III (IEC)				
Let-through voltage at <i>U</i> _{oc} of 6kV 1.2/50µs and <i>I</i> _{sc} of 3kA 8/20µs (per mode) ³	<190V	<190V	<190V	<190V

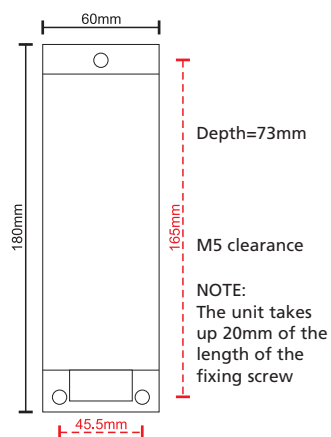
¹ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$) per mode.

² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

³ Combination wave test within BS 6651:1999 App. C, Cats C-Low & B-High, IEEE C62.41-2002 Location Cats C1 & B3, SS CP 33:1996 App. F, AS 1768-1991 App. B, Cat B, UL1449 mains wire-in

Mechanical specification	ESP 12 DC	ESP 24 DC	ESP 36 DC	ESP 48 DC
Temperature range	–40 to +70°C			
Connection type	Screw terminal			
Conductor size (stranded)	16mm ²			
Earth connection	Screw terminal			
Volt free contact	Connect via screw terminal with conductor up to 2.5mm ² (stranded)			
Degree of protection (IEC 60529)	IP20			
Case material	Steel			
Weight – unit	0.6kg	0.6kg	0.6kg	0.6kg
– packaged	0.7kg	0.7kg	0.7kg	0.7kg

Dimensions



ESP 5A/BX and 16A/BX Series



FULL MODE
Bonding +
Equipment
Protection

MAINS
TEST
TYPE
2 + 3

e
ENHANCED
Low let-through
voltage

LPZ
1→3

BX
IP66

Combined Type 2 and 3 tested protector (to BS EN 61643-11) for use on low current (up to 5 or 16A) single phase systems to protect connected electronic equipment from transient overvoltages on the mains supply, e.g. fire/intruder alarm panels. Protectors with /BX suffix come ready-boxed, to IP66, for use in dirty or damp environments. Available for 90-150 volts, 200-280 volts and 232-350 volts supplies. For use at boundaries LPZ 1 through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Very low let-through voltage (enhanced protection to BS EN 62305) between all sets of conductors (phase to neutral, phase to earth, neutral to earth - Full Mode protection) allowing continuous operation of equipment
- ✓ Repeated protection in lightning intense environments
- ✓ Compact size for easy incorporation in the protected system
- ✓ Removable DIN rail foot for simple clip-on mounting to top hat DIN rails (unboxed versions)
- ✓ Colour coded terminals give a quick and easy installation check – grey for the dirty (line) end and green for the clean end
- ✓ Available ready-boxed to IP66 for use in dirty or damp environments (protectors with /BX suffix)
- ✓ Robust housing and substantial earth stud
- ✓ Fixing holes ready for flat mounting
- ✓ Maintenance free
- ✓ ESP 240-5A/BX has Network Rail Approval PA05/02896. NRS PADS reference 087/037285



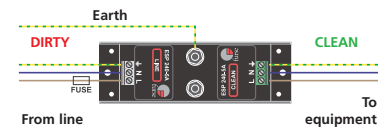
Ready boxed protector (here an ESP 240-5A/BX) installed on the fused connection (spur) to an alarm panel

Application

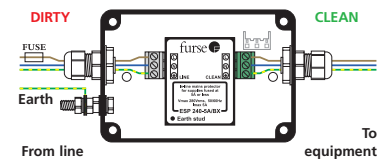
Use these protectors on low current mains power supplies, e.g. CCTV cameras, alarm panels and telemetry equipment.

Installation

Connect in-line with the power supply usually either within the equipment panel (or for CCTV cameras, in an enclosure close by), or on the fused connection that supplies equipment.



Connect in-line on supplies fused up to 5A (ESP 120-5A, ESP 240-5A or ESP 277-5A) or 16A (ESP 120-16A, ESP 240-16A or ESP 277-16A). Note how the protector can also be earthed from its earth stud



Connect in-line on supplies fused up to 5A (ESP 120-5A/BX, ESP 240-5A/BX or ESP 277-5A/BX) or 16A (ESP 120-16A/BX, ESP 240-16A/BX or ESP 277-16A/BX). Note how the protector can also be earthed from its earth stud

To protect equipment inside a building from transients entering on an outgoing feed (e.g. to CCTV cameras or to site lighting) the protector should be installed as close to where the cable leaves the building as possible. Unless ready-boxed, protectors should be installed either within an existing cabinet/cubicle or in a separate enclosure.

Accessories

If several ESP 120-5A or 16A, ESP 240-5A or 16A or ESP 277-5A or 16A protectors are to be installed together, or if one is in use alongside Lightning Barriers for video or signal lines, these can be simultaneously mounted and earthed on a CME kit and housed in a suitable WBX enclosure.

If your supply is fused at more than 16 amps the ESP 120 M1, ESP 240 M1 or ESP 277 M1 are suitable.

Electrical specification

	ESP 120-5A ESP 120-5A/BX	ESP 120-16A ESP 120-16A/BX	ESP 240-5A ESP 240-5A/BX	ESP 240-16A ESP 240-16A/BX	ESP 277-5A ESP 277-5A/BX	ESP 277-16A ESP 277-16A/BX
Nominal voltage - Phase - Neutral U_o (RMS)	120V	120V	240V	240V	277V	277V
Maximum voltage - Phase-Neutral U_c (RMS)	150V	150V	280V	280V	350V	350V
Working voltage (RMS)	90-150V	90-150V	200-280V	200-280V	232-350V	232-350V
Frequency range	47-63Hz					
Current rating (supply)	5A or less	16A or less	5A or less	16A or less	5A or less	16A or less
Back-up fuse (see installation instructions)	5A	16A	5A	16A	5A	16A
Leakage current (to earth)	<0.5mA					

Transient specification

Type 2 (BS/EN), Class II (IEC)

120 volt protectors

240 volt protectors

277 volt protectors

Nominal discharge current 8/20μs (per mode) <i>I</i> _n	5kA		
Let-through voltage <i>U</i> _p at <i>I</i> _n ¹	450V	750V	790V
Maximum discharge current <i>I</i> _{max} (per mode) ²	10kA		
Type 3 (BS/EN), Class III (IEC)			
Let-through voltage at <i>U</i> _{oc} of 6kV 1.2/50μs and <i>I</i> _{sc} of 3kA 8/20μs (per mode) ³	390V	590V	670V

¹ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$), phase to neutral, phase to earth and neutral to earth.

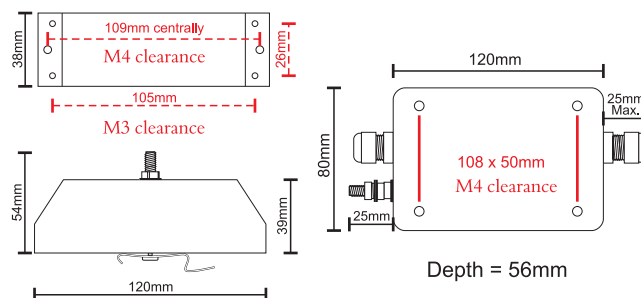
² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

³ Combination wave test within BS 6651:1999 App. C, Cats C-Low & B-High, IEEE C62.41-2002 Location Cats C1 & B3, SS CP 33:1996 App. F, AS 1768-1991 App. B, Cat B, UL1449 mains wire-in

Mechanical specification

	ESP 120-5A ESP 240-16A	ESP 120-16A ESP 277-5A	ESP 240-5A ESP 277-16A	ESP 120-5A/BX ESP 240-16A/BX	ESP 120-16A/BX ESP 277-5A/BX	ESP 240-5A/BX ESP 277-16A/BX
Temperature range	-40 to +70°C			-40 to +70°C		
Connection type	Screw terminal			Screw terminal		
Conductor size (solid)	4mm ²			4mm ²		
Earth connection	Via earth terminal or M6 stud			Via earth terminal or M6 stud		
Cable glands	-			-5A/BX 4.8 – 8mm cable (PG9) -16A/BX 8 – 12mm cable (PG13.5)		
Degree of protection (IEC 60529)	IP20			IP66		
Case material	Steel			PVC		
Weight – unit	0.23kg			0.26kg		
– packaged	0.25kg			0.31kg		

Dimensions





FULL MODE
Bonding +
Equipment
Protection

**SIGNAL/
TELECOM**
TEST CAT
D + C + B

**MAINS
TEST
TYPE**
2 + 3

e
ENHANCED
Low let-through
voltage

LPZ
Mains 1→3
Data 0_B→3

Combined Type 2 and 3 tested protector (to BS EN 61643-11) with telecom or network protection options. Suitable for use on 220/230/240 volts supplies. Available with British style (three square pin) plugs and sockets with double-pole action. For use at boundaries LPZ 1 through to LPZ 3 to protect sensitive electronic equipment.

Features and benefits

- ✓ Low let-through voltage between all sets of conductors
- ✓ Three way visual indication of protection status
- ✓ Protects against radio frequency interference
- ✓ TN and Cat-5e versions can conveniently protect both mains and telecom/data lines in one unit
- ✓ Rugged, heavy duty construction
- ✓ Bracket kit ESP MC/19BK available for rear or 19" rack mounting
- ✓ Maintenance free

Application

ESP MC series can be used to protect all sorts of plug-in equipment, including hospital laboratory equipment, modems, fax machines and PCs.

Installation

Simply plug the ESP MC series into the mains and your equipment into the ESP MC.

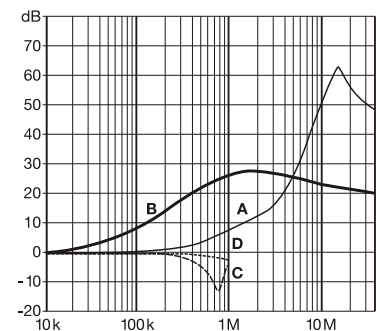


ESP MC installed within a network rack, protecting the externally-fed network switch

RFI performance

Per CISPR 17:

A = 50Ω/50Ω sym, B = 50Ω/50Ω asym, C = 0.1Ω/100Ω sym, D = 100Ω/0.1Ω sym



Accessories

ESP MC/19BK bracket kit can be used for rear mounting, or reversed for use in 19" cabinets. All fixings supplied.

Electrical specification – mains

	ESP MC	NEW ESP MC/TN/RJ11-4/6	NEW ESP MC/Cat-5e
Nominal voltage - Phase - Neutral U_o (RMS)		220/230/240V	
Maximum voltage - Phase-Neutral U_c (RMS)		280V	
Frequency range		47-63Hz	
Current rating (supply)		13A	
Leakage current (to earth)		<0.5mA	

Electrical specification – telecom/data

Nominal voltage	–	296V	5V
Maximum working voltage U_c^1	–	296V	5V ²
Current rating (signal)	–	300mA	300mA
In-line resistance (per line $\pm 10\%$)	–	4.4 Ω	1 Ω
Bandwidth (~ 3 dB 50 Ω system)	–	20MHz	–
Maximum data rate		–	100Mbps

¹ Maximum working voltage (DC or AC peak) of telecom/data protection measured at <10 μ A leakage for ESP MC/TN/RJ11-4/6 and 1mA for ESP MC/Cat-5e.

² Maximum working voltage is 5V for data pairs 1/2 & 3/6.

Transient specification – mains

	ESP MC	ESP MC/TN/RJ11-4/6	ESP MC/Cat-5e
Type 2 (BS/EN), Class II (IEC)			
Nominal discharge current 8/20 μ s (per mode) I_n		5kA	
Let-through voltage U_p at I_n^1		850V	
Maximum discharge current I_{max} (per mode) ²		10kA	
Type 3 (BS/EN), Class III (IEC)			
Let-through voltage at U_{oc} of 6kV 1.2/50 and I_{sc} of 3kA 8/20 (per mode) ³		680V	
Let-through voltage at U_{oc} of 6kV 1.2/50 and I_{sc} of 500A 8/20 (per mode) ⁴		555V	

¹ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$), phase to neutral, phase to earth and neutral to earth.

² The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

³ Combination wave test within BS 6651:1999 App. C, Cats C-Low & B-High, IEEE C62.41-2002 Location Cats C1 & B3, SS CP 33:1996 App. F, AS 1768-1991 App. B, Cat B, UL1449 mains wire-in

⁴ To BS 6651:1999 Appendix C, Category A-High, UL1449 mains plug-in

Transient specification – telecom/data

Let-through voltage (all conductors) ¹ U_p			
C2 test 4kV 1.2/50 μ s, 2kA 8/20 μ s to BS/EN/IEC 61643-21 – line to line / line to earth	–	390V / 390V	120V / 700V ³
C1 test 1kV, 1.2/50 μ s, 0.5kA 8/20 μ s to BS/EN/IEC 61643-21 – line to line / line to earth	–	395V / 395V	74V / 600V ³
B2 test 4kV 10/700 μ s to BS/EN/IEC 61643-21 – line to line / line to earth	–	295V / 295V	21V / 550V ³
5kV, 10/700 μ s ² – line to line / line to earth	–	300V / 300V	25V / 600V ³
Maximum surge current ⁴			
D1 test 10/350 μ s to BS/EN/IEC 61643-21	–	1kA	1kA
8/20 μ s to ITU (formerly CCITT), BS 6651:1999 Appendix C	–	10kA	10kA

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

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

³ The 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.

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

Mechanical specification

	ESP MC	ESP MC/TN/RJ11-4/6	ESP MC/Cat-5e
Temperature range		–25°C to +70°C	
Connection type		Via British style three square pin plug and socket to BS 1363	
Connection type – telecom/data	–	RJ11	RJ45
Earth connection		Via plug and socket	
Case material		Steel	
Weight – unit	1.70kg	1.75kg	1.75kg
– packaged	1.75kg	1.8kg	1.8kg

Dimensions

