

ESP D1 Series (Single Phase)



- LPZ**
 $0_B \rightarrow 3$
- FULL MODE**
Bonding + Equipment Protection
- MAINS TEST TYPE**
1 + 2 + 3
- ENHANCED**
Low let-through voltage
- ACTIVE VOLT-FREE CONTACT**

Combined Type 1, 2 and 3 tested protector (to BS EN 61643) for use on single phase 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.

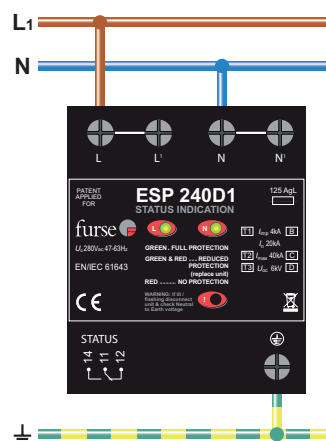
Features and benefits

- ✓ 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)
- ✓ 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

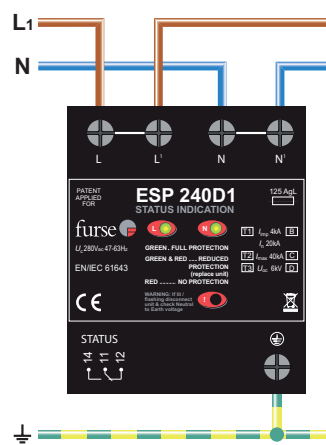
If you desire a protector with an extra high maximum surge current use the ESP M2 or ESP M4 series. If your supply is fused at 16 Amps, or less, the in-line protectors (and their ready-boxed derivatives) may be more suitable.

Installation

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



Parallel connection of ESP 120 D1, ESP 240 D1 and ESP 277 D1 series to single phase supplies (fuses not shown for clarity)



Series connection of ESP 120 D1, ESP 240 D1 and ESP 277 D1 to single phase supplies up to 125 A (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, neutral and earth.

For TT installations, contact Furse.

Accessories

Weatherproof enclosure

WBX D4

ESP D1 Series (Single Phase)

Technical specification

Electrical specification	ESP 120 D1	ESP 240 D1	ESP 277 D1
Nominal voltage - Phase-Neutral U_o (RMS)	120 V	240 V	277 V
Maximum voltage - Phase-Neutral U_c (RMS)	150 V	280 V	350 V
Temporary Overvoltage TOV U_T^1	175 V	350 V	402 V
Short circuit withstand capability		25 kA, 50 Hz	
Working voltage (RMS)	90-150 V	200-280 V	232-350 V
Frequency range		47-63 Hz	
Max. back-up fuse (see installation instructions)		125 A	
Leakage current (to earth)		< 250 μ A	
Indicator circuit current		< 10 mA	
Volt free contact ²		Screw terminal	
- current rating		1 A	
- nominal voltage (RMS)		250 V	

Transient specification	ESP 120 D1	ESP 240 D1	ESP 277 D1
Type 1 (BS EN/EN), Class I (IEC)			
Nominal discharge current 8/20 μ s (per mode) I_n		20 kA	
Let-through voltage U_p at I_n^3	600 V	900 V	1 kV
Impulse discharge current 10/350 μ s I_{imp} (per mode) ⁴		4 kA	
Let-through voltage U_p at I_{imp}^3	500 V	750 V	850V
Impulse discharge current (per phase) I_{imp}^5		6.25 kA	
Type 2 (BS EN/EN), Class II (IEC)			
Nominal discharge current 8/20 μ s (per mode) I_n		20 kA	
Let-through voltage U_p at I_n^3	600 V	900 V	1 kV
Maximum discharge current I_{max} (per mode) ⁴		40 kA	
Maximum discharge current I_{max} (per phase)		80 kA	
Type 3 (BS EN/EN), Class III (IEC)			
Let-through voltage at U_{oc} of 6 kV 1.2/50 μ s and I_{sc} of 3 kA 8/20 μ s (per mode) ⁶	390 V	600 V	680 V

Mechanical specification	ESP 120 D1	ESP 240 D1	ESP 277 D1
Temperature range		-40 to +80 °C	
Connection type		Screw terminal	
Conductor size (stranded)		25 mm ²	
Earth connection		Screw terminal	
Volt free contact		Connect via screw terminal with conductor up to 1.5 mm ² (stranded)	
Degree of protection (IEC 60529)		IP20	
Case material		FR ABS UL-94 V-0	
Weight - unit		0.4 kg	
- packaged		0.5 kg	
Dimensions to DIN 43880 - HxDxW ⁷		90 mm x 88 mm x 72 mm (4TE)	

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

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

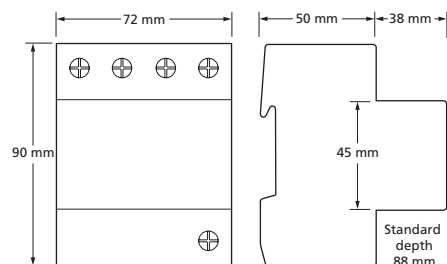
³ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$), phase to neutral, phase to earth and neutral to earth.

⁴ The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

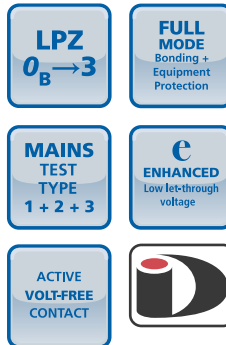
⁵ Rating is considered as the current capability of the protector for equipotential bonding near the service entrance.

⁶ Combination wave test within BS EN/IEC 61643, IEEE C62.41-2002, Location Cats C1 & B3, SS 555:2010, AS/NZS 1768-2007, UL 1449 mains wire-in.

⁷ The remote signal contact (removable) adds 10 mm to height.



ESP D1 Series (Three Phase)



Installation

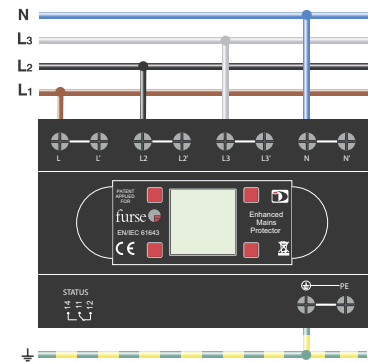
Install in parallel, within the power distribution board or directly (via fuses) on to the supply feeding equipment. Can be installed in series for low current supplies - see installation instructions.

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

Combined Type 1, 2 and 3 tested protector (to BS EN 61643) for use on three phase 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
- ✓ ESP XXX D1R 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
- ✓ ESP XXX D1/LCD or ESP XXX D1R/LCD units have backlit LCD intelligent display offering clear status information that can be rotated for side mounting to facilitate short connecting leads
- ✓ 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



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 phases, neutral and earth.

For TT installations, contact Furse.

Accessories

Weatherproof enclosure

WBX D8

ESP RLA HD-1

Spare 1 m cable assembly for ESP XXX D1R or ESP XXX D1R/LCD

ESP RLA HD-2

Spare 2 m cable assembly for ESP XXX D1R or ESP XXX D1R/LCD

ESP RLA HD-4

Spare 4 m cable assembly for ESP XXX D1R or ESP XXX D1R/LCD

For spare displays, contact Furse.

ESP D1 Series (Three Phase)

Technical specification

Electrical specification

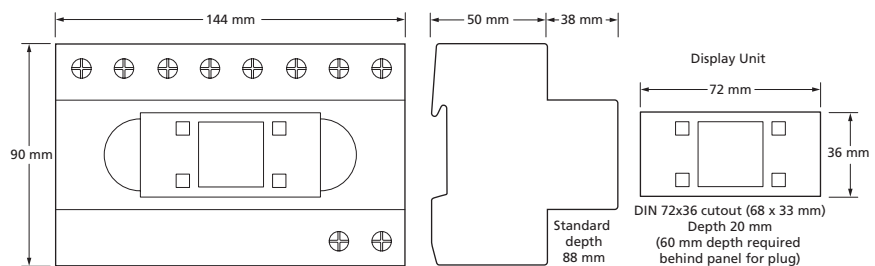
	ESP 208 D1 Series ¹	ESP 415 D1 Series ¹	ESP 480 D1 Series ¹
Nominal voltage - Phase-Neutral U_0 (RMS)	120 V	240 V	277 V
Maximum voltage - Phase-Neutral U_c (RMS)	150 V	280 V	350 V
Temporary Overvoltage TOV U_T^2	175 V	350 V	402 V
Short circuit withstand capability		25 kA, 50 Hz	
Working voltage (RMS)	156-260 V	346-484 V	402-600 V
Frequency range		47-63 Hz	
Max. back-up fuse (see installation instructions)		125 A	
Leakage current (to earth)		< 250 μ A	
Indicator circuit current		< 10 mA	
Volt free contact ³		Screw terminal	
- current rating		1 A	
- nominal voltage (RMS)		250 V	

Transient specification

	ESP 208 D1 Series	ESP 415 D1 Series	ESP 480 D1 Series
Type 1 (BS EN/EN, Class I (IEC))			
Nominal discharge current 8/20 μ s (per mode) /In		20 kA	
Let-through voltage U_p at I_n^4	600 V	900 V	1 kV
Impulse discharge current 10/350 μ s /Imp (per mode) ⁵		4 kA	
Let-through voltage U_p at I_{imp}^4	500 V	750 V	850V
Impulse discharge current (per phase) /Imp ⁶		6.25 kA	
Type 2 (BS EN/EN, Class II (IEC))			
Nominal discharge current 8/20 μ s (per mode) /In		20 kA	
Let-through voltage U_p at I_n^4	600 V	900 V	1 kV
Maximum discharge current /max (per mode) ⁵		40 kA	
Maximum discharge current /max (per phase)		80 kA	
Type 3 (BS EN/EN, Class III (IEC))			
Let-through voltage at U_{oc} of 6 kV 1.2/50 μ s and I_{sc} of 3 kA 8/20 μ s (per mode) ⁷	390 V	600 V	680 V

Mechanical specification

	ESP 208 D1 Series	ESP 415 D1 Series	ESP 480 D1 Series
Temperature range		-40 to +80 °C	
Connection type		Screw terminal	
Conductor size (stranded)		25 mm ²	
Earth connection		Screw terminal	
Volt free contact		Connect via screw terminal with conductor up to 1.5 mm ² (stranded)	
Display connection (D1R & D1R/LCD versions)		HD-D Type 1 metre interconnection cable 2 metre cable (ESP RLA HD-2) or 4 metre cable (ESP RLA HD-4) optional	
Degree of protection (IEC 60529)		IP20	
Case material		FR ABS UL-94 V-0	
Weight - unit		0.85 kg	
- packaged		0.95 kg	
Dimensions to DIN 43880 - HxDxW ⁸		90 mm x 88 mm x 144 mm (8TE)	



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

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

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

⁴ The maximum transient voltage let-through of the protector throughout the test ($\pm 5\%$), phase to neutral, phase to earth and neutral to earth.

⁵ The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

⁶ Rating is considered as the current capability of the protector for equipotential bonding near the service entrance.

⁷ Combination wave test within BS EN/IEC 61643, IEEE C62.41-2002 Location Cats C1 & B3, SS 555:2010, AS/NZS 1768-2007, UL 1449 mains wire-in.

⁸ The remote signal contact (removable) adds 10 mm to height.

If you desire a protector with an extra high maximum surge current use the ESP M2 or ESP 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.

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