



- ◆ Advanced protectors for mains supplies and power distribution systems.
- ◆ On single phase supplies of 200–280 volts, use ESP 240 M1.
- ◆ For three phase supplies of 346–484 volts, use ESP 415 M1.

Application

Use on mains power distribution systems to protect connected electronic equipment from transient overvoltages on the mains supply, eg computer, communications or control equipment.



An ESP 415 M1 mounted, within a WBX 4 enclosure, directly alongside a mains panel and connected to its first outgoing way. Note how the protector is mounted on its side to help keep its connecting leads as short as possible.

Features and benefits

- ✓ Very low let-through voltage between all sets of conductors (phase to neutral, phase to earth and neutral to earth).
- ✓ Maximum surge current greatly in excess of the 10kA worst case indicated in BS 6651 and IEEE C62.41.
- ✓ Repeated protection in lightning intense environments with 20 years predicted lifetime.
- ✓ Innovative multiple thermal disconnect technology, anticipates standards authorities' future demands, 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.



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).

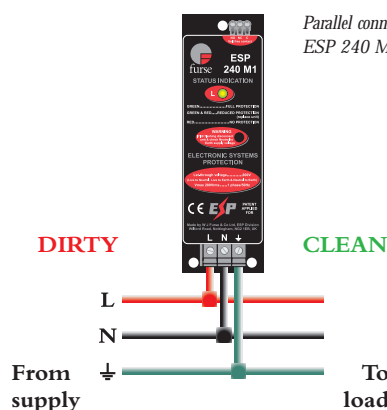
If you desire a protector with an extra high maximum surge current use the ESP 415 M2 or M4. If your supply is fused at 16 amps, or less, the in-line protectors (ESP 120(or 240)-5A(or -16A) and their ready-boxed derivatives) may be more suitable. If you need to mount the display panel separately from the main protector unit, use the ESP 415 M1R.

- ✓ Changeover active volt free contact enables the protector to be used to warn of phase loss (ie 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.
- ✓ Simple parallel connection.
- ✓ Base provides ultra low inductance earth bond to metal panels.
- ✓ Compact size for installation in the power distribution board.
- ✓ Maintenance free.

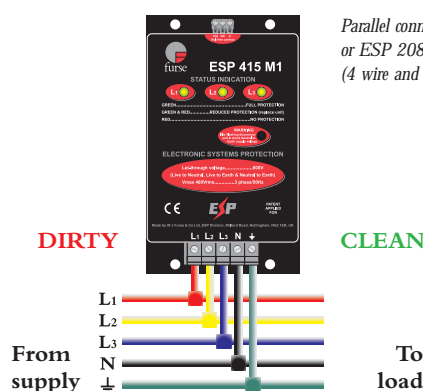
Installation

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

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. On supplies over 100 amps, phase/live connecting leads should be fused with either 63 or 100 amp high rupture capacity (HRC) fuses, a switchfuse, MCCB or type 'C' MCB.



Parallel connection of single phase protectors ESP 240 M1 or ESP 120 M1.



Parallel connection of ESP 415 M1 or ESP 208 M1 to three phase star (4 wire and earth) supplies.

Suitable accessories

If the protector cannot be incorporated within the panel, use the WBX 3 enclosure for the ESP 240 M1 or ESP 120 M1 and the WBX 4 for the ESP 415 M1 or ESP 208 M1.

Electrical specification

	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1
Nominal voltage (RMS)	120V	208V	240V	415V
Working voltage (RMS)	90-150V	156-260V	200-280V	346-484V
Frequency range	40-60Hz	40-60Hz	40-60Hz	40-60Hz
Current rating (supply)	Direct connection to supplies up to 100A Connection via series fuses to supplies greater than 100A See installation instructions			
Leakage current (to earth)	<250 μ A	<250 μ A	<250 μ A	<250 μ A
Indicator circuit current	<10mA	<10mA	<10mA	<10mA
Volt free contact*	Screw terminal	Screw terminal	Screw terminal	Screw terminal
- current rating	1A	1A	1A	1A
- nominal voltage (RMS)	250V	250V	250V	250V

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

Transient specification

	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1
Let-through voltage (all conductors)¹				
6kV 1.2/50 μ s open circuit voltage,	400V	400V	600V	600V
3kA 8/20 μ s short circuit current to:				
<i>BS 6651:1999 Appendix C, Cats C-Low & B-High</i>				
<i>IEEE C62.41-1991² Location Cats C1 & B3</i>				
<i>SS CP 33:1996 Appendix F</i>				
<i>AS 1768-1991 Appendix B, Cat B</i>				
<i>UL1449 mains wire-in</i>				
4kV 1.2/50 μ s open circuit voltage,	385V	385V	570V	570V
2kA 8/20 μ s short circuit current to:				
<i>IEC 1000-4-5:1995</i>				
2kV 1.2/50 μ s open circuit voltage,	370V	370V	530V	530V
1kA 8/20 μ s short circuit current				
5kA 8/20 μ s to <i>NFC 61-740</i>	445V	445V	690V	690V
2.5kA 8/20 μ s to <i>BS EN 60099-1:1994</i>	395V	395V	590V	590V
6kV 0.5 μ s 100kHz ring wave, 500A to:	Available	Available	510V	510V
<i>IEEE C62.41-1991² Location Cat B3</i>	on request	on request		
<i>AS 1768-1991 Appendix B, Cat B</i>				
Maximum surge current³				
- between any two conductors	30kA	30kA	30kA	30kA
- total unit to earth	60kA	120kA	60kA	120kA

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

2 Formerly IEEE 587 and ANSI C62.41.

3 Tested with 8/20 μ s waveshape to BS 6651:1999 Appendix C. Note: The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation.

Mechanical specification

	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1
Temperature range	-40 to +70°C	-40 to +70°C	-40 to +70°C	-40 to +70°C
Connection type	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Conductor size (stranded)	16mm ²	16mm ²	16mm ²	16mm ²
Earth connection	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Volt free contact	Connect via screw terminal with conductor up to 2.5mm ² (stranded)			
Weight - unit	0.6kg	1.0kg	0.6kg	1.0kg
- packaged	0.7kg	1.1kg	0.7kg	1.1kg
Dimensions	<p>60mm</p> <p>180mm</p> <p>45.5mm</p> <p>Depth = 65mm</p> <p>M5 clearance</p> <p>NOTE: The unit takes up 20mm of the length of the fixing screw.</p> <p>110mm</p> <p>180mm</p> <p>70mm</p> <p>Single phase</p> <p>Three phase</p>			