

# Mains power protection

## ESP M1 Series



**LPZ**  
**0 → 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) 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 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 & benefits

- Very low let-through voltage (enhanced protection to IEC/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 120 M1 and ESP 240 M1 have Network Rail Approval PA05/02700 and PA05/01832 respectively. NRS PADS reference 086/000556 (ESP 120 M1) and 086/047149 (ESP 240 M1)

### Installation

Install in parallel, within the power distribution board or directly (via fuses) 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. For TT installations, contact Furse.

### Accessories

Weatherproof enclosures:

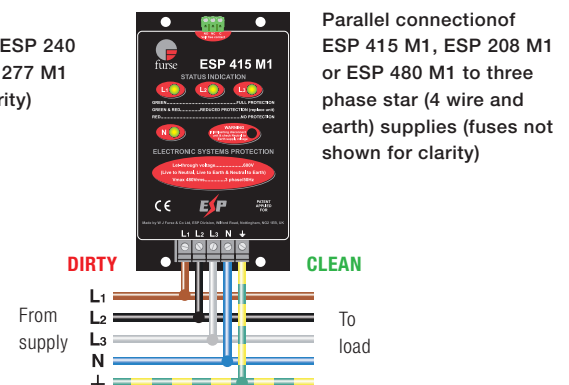
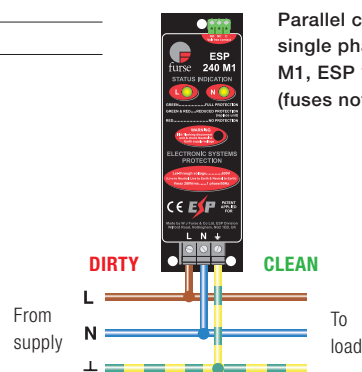
**WBX 3**

Use with single phase protectors

**WBX 4**

Use with three phase protectors

**Full product range order codes can be found on pages 17/8-17/9**



**NOTE:** 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 (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.

# Mains power protection

## ESP M1 Series

### ESP M1 Series - Technical specification

Electrical specification	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1	ESP 277 M1	ESP 480 M1
ABB order code	7TCA085460R0070	7TCA085460R0089	7TCA085460R0097	7TCA085460R0078	7TCA085460R0112	7TCA085460R0136
Nominal voltage - Phase-Neutral $U_0$ (RMS)	120 V	120 V	240 V	240 V	277 V	277 V
Maximum voltage - Phase-Neutral $U_c$ (RMS)	150 V	150 V	280 V	280 V	350 V	350 V
Temporary Overvoltage TOV $U_T^{(1)}$	175 V	175 V	350 V	350 V	402 V	402 V
Short circuit withstand capability	25 kA/50 Hz	25 kA/50 Hz	25 kA/50 Hz	25 kA/50 Hz	25 kA/50 Hz	25 kA/50 Hz
Working voltage (RMS)	90-150 V	156-260 V	200-280 V	346-484 V	232-350 V	402-600 V
Frequency range	47-63 Hz					
Max. back-up fuse (see installation instructions)	≤ 125 A					
Leakage current (to earth)	< 250 µA					
Indicator circuit current	< 10 mA					
Volt free contact: <sup>(2)</sup>	Screw terminal					
– Current rating	1 A					
– Nominal voltage (RMS)	250 V					
Transient specification	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1	ESP 277 M1	ESP 480 M1
Type 1 (BS EN/EN), Class I (IEC)						
Nominal discharge current 8/20 µs (per mode) $I_n$	20 kA					
Let-through voltage $U_p$ at $I_n$	< 1 kV	< 1 kV	< 1.3 kV	< 1.3 kV	< 1.4 kV	< 1.4 kV
Impulse discharge current 10/350 µs $I_{imp}$ (to earth) <sup>(4)</sup>	4 kA					
Let-through voltage $U_p$ at $I_{imp}$	< 1 kV	< 1 kV	< 1.3 kV	< 1.3 kV	< 1.4 kV	< 1.4 kV
Total discharge current 10/350 µs $I_{total}$ (total to earth) <sup>(4,5)</sup>	8 kA	16 kA	8 kA	16 kA	8 kA	16 kA
Type 2 (BS EN/EN), Class II (IEC)						
Nominal discharge current 8/20 µs (per mode) $I_n$	20 kA					
Let-through voltage $U_p$ at $I_n$	< 1 kV	< 1 kV	< 1.3 kV	< 1.3 kV	< 1.4 kV	< 1.4 kV
Maximum discharge current $I_{max}$ (L/N-PE, L-N) <sup>(4)</sup>	40 kA, 40 kA					
Type 3 (BS EN/EN), Class III (IEC)						
Let-through voltage at $U_{oc}$ of 6 kV 1.2/50 µs and $I_{sc}$ of 3 kA 8/20 µs (per mode) <sup>(3,6)</sup>	390 V	390 V	600 V	600 V	680 V	680 V
Mechanical specification	ESP 120 M1	ESP 208 M1	ESP 240 M1	ESP 415 M1	ESP 277 M1	ESP 480 M1
Temperature range	-40 to +80 °C					
Connection type	Screw terminal - maximum torque 1.5 Nm					
Conductor size (stranded)	16 mm²					
Earth connection	Screw terminal - maximum torque 1.5 Nm					
Volt free contact	Connect via screw terminal with conductor up to 2.5 mm² (stranded) - maximum torque 0.25 Nm					
Degree of protection (IEC 60529)	IP20					
Case material	Steel					
Weight: – Unit	0.6 kg	1.0 kg	0.6 kg	1.0 kg	0.6 kg	1.0 kg
– Packaged	0.7 kg	1.1 kg	0.7 kg	1.1 kg	0.7 kg	1.1 kg
Dimensions	See diagrams below					

<sup>(1)</sup> Temporary Overvoltage rating is for a maximum duration of 5 seconds tested to BS EN/EN/IEC 61643

<sup>(2)</sup> Minimum permissible load is 5 V DC, 10 mA to ensure reliable operation

<sup>(3)</sup> The maximum transient voltage let-through of the protector throughout the test (±10%), phase to neutral, phase to earth and neutral to earth

<sup>(4)</sup> The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation

<sup>(5)</sup> Rating is considered as the current capability of the protector for equipotential bonding near the service entrance

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

