Mains power protection
ESP M1R, M2R & M4R Series

FULL MODE Bonding + Equipment Protection

MAINS TEST TYPE 1 + 2 + 3

REMOTE INDICATION LED DISPLAY

ENHANCED Low let-through voltage

ACTIVE VOLT-FREE CONTACT

3-WAY + N-E FAULT STATUS INDICATION

LPZ *0*→3

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. Remote display allows both display and protector unit to be mounted in their optimum positions. 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

- 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
- Plug-in cable connections between protector and display enable easy connection (1 m 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

Application

ESP M1R: main distribution board for buildings with multiple metallic services (e.g. gas, water, telecoms) & sub-distribution boards feeding sensitive equipment. ESP M2R: main distribution board for buildings with Class III or IV LPS fitted or exposed 3-ph power lines where no LPS is fitted. ESP M4R: main distribution board for buildings with a Class I or II LPS.

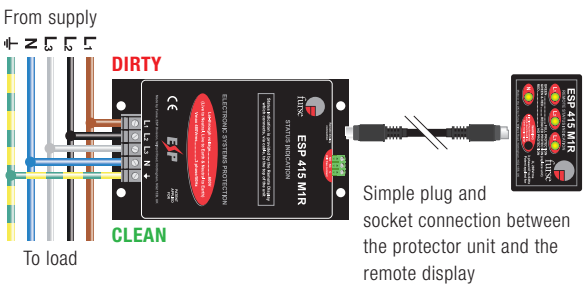
Installation

Installation of the protector unit is identical to the ESP M1, M2 or M4. 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). For TT installations, contact Furse.

Accessories

ESP RLA-1
Spare 1 metre cable assembly
ESP RLA-2
Spare 2 metre cable assembly
ESP RLA-4
Spare 4 metre cable assembly

Parallel connection of ESP 415 M1R to three phase star (4 wire and earth) supplies (fuses not shown for clarity)



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

Mains power protection
ESP M1R, M2R & M4R Series

ESP M1R, M2R & M4R Series - Technical specification

Electrical Specification	ESP 415 M1R	ESP 480 M1R	ESP 415 M2R	ESP 480 M2R	ESP 415 M4R	ESP 480 M4R
Nominal voltage - Phase-Neutral *Uo* (RMS)	240 V	277 V	240 V	277 V	240 V	277 V
Maximum voltage - Phase-Neutral *Uc* (RMS)	280 V	350 V	280 V	350 V	280 V	350 V
Temporary Overvoltage TOV U_T[1]	350 V	402 V	350 V	402 V	350 V	402 V
Short circuit withstand capability	25 kA/50 Hz					
Working voltage (RMS)	346-484 V	402-600 V	346-484 V	402-600 V	346-484 V	402-600 V
Frequency range	47-63 Hz					
Max. back-up fuse (see installation instructions)	125 A	125 A	200 A	200 A	315 A	315 A
Leakage current (to earth)	< 250 µA	< 250 µA	< 500 µA	<500 µA	< 1000 µA	< 1000 µA
Indicator circuit current	< 10 mA	< 10 mA	< 20 mA	< 20 mA	< 40 mA	< 40 mA
Volt free contact:[2]	Screw terminal					
– Current rating	1 A					
– Nominal voltage (RMS)	250 V					

Transient Specification	ESP 415 M1R	ESP 480 M1R	ESP 415 M2R	ESP 480 M2R	ESP 415 M4R	ESP 480 M4R
Type 1 (BS EN/EN), Class I (IEC)						
Nominal discharge current 8/20 µs (per mode) *In*	20 kA	20 kA	40 kA	40 kA	80 kA	80 kA
Let-through voltage *Up* at *In*[3]	900 V	1 kV	900 V	1 kV	900 V	1 kV
Impulse discharge current 10/350 µs *Iimp* (per mode)[4]	4 kA	4 kA	8 kA	8 kA	16 kA	16 kA
Let-through voltage Up at *Iimp*[3]	750 V	850 V	750 V	850 V	750 V	850 V
Impulse discharge current (per phase) *Iimp*[5]	6.25 kA	6.25 kA	12.5 kA	12.5 kA	25 kA	25 kA
Type 2 (BS EN/EN), Class II (IEC)						
Nominal discharge current 8/20 µs (per mode) *In*	20 kA	20 kA	40 kA	40 kA	80 kA	80 kA
Let-through voltage *Up* at *In*[3]	900 V	1 kV	900 V	1 kV	900 V	1 kV
Maximum discharge current Imax (per mode)[4]	40 kA	40 kA	80 kA	80 kA	160 kA	160 kA
Maximum discharge current Imax (per phase)	80 kA	80 kA	160 kA	160 kA	320 kA	320 kA
Type 3 (BS EN/EN), Class III (IEC)						
Let-through voltage at *Uoc* of 6 kV 1.2/50 µs and *Isc* of 3 kA 8/20 µs (per mode)[6]	600 V	680 V	590 V	670 V	570 V	650 V

Mechanical Specification	ESP 415 M1R	ESP 480 M1R	ESP 415 M2R	ESP 480 M2R	ESP 415 M4R	ESP 480 M4R
Temperature range	-40 to +80 °C					
Connection type	Screw terminal					
Conductor size (stranded)	16 mm²	16 mm²	25 mm²	25 mm²	50 mm²	50 mm²
Earth connection	Screw terminal					
Volt free contact	Connect via screw terminal with conductor up to 2.5 mm² (stranded)					
Degree of protection (IEC 60529)	IP20					
Display connection	6 way 1 metre interconnection cable - 2 or 4 metre cable optional					
Case material	Unit - Steel, Display - ABS					
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					

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

[2] Minimum permissable load is 5 V DC, 10 mA 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

[3] The maximum transient voltage let-through of the protector throughout the test (±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