

## PEM

### EARTH LOOP IMPEDANCE MONITORS

A compact DIN rail mounted unit designed to monitor the integrity of earth wiring. The PEM is ideally suited for use with high current socket outlet equipment, where the integrity of a very low earth impedance must be maintained to ensure the correct operation of fuse or circuit breaker protection.

Stable operation and small hysteresis is obtained with high quality electronic circuitry, allowing the PEM to measure an earth loop impedance down to less than 0.4 Ohms. The impedance is measured from the earth point in a supply distribution unit to the protected appliance by means of a pilot earth conductor in the supply cable; the unit uses an earth loop circulating current of less than 0.5 Amps at a nominal 6 volts.

A pilot earth protection feature is also provided: the optional connection of a remote diode (supplied with each unit) allows the PEM to detect the difference between a good earth and a crushed (i.e. shorted) cable in trailing lead applications.

As well as its prime function as an impedance monitor, the PEM will also detect earth fault currents flowing in the earth conductors when the resulting potential of the protected equipment is raised by approximately 1 volt. This makes it an ideal addition, for example, to welding supplies where, in conjunction with a circuit breaker, it will give protection against supply 'burn-out' by mis-routed welding currents. A front facia 'push to test' button is provided to test the operation of both functions.

Green and red front facia LEDs indicate the normal and tripped states of the monitor. An isolated changeover relay allows use with shunt trips, UVR circuit breakers or contactor coils; the relay may be supplied in 'energise on fault' or 'de-energise on fault' configurations.

Electrical connection is made via screw terminals on the front facia. The PEM can be supplied for use with either 110 or 230 VAC power supplies. The addition of an external ballast resistor (part ref. PEMYRES) allows the 230VAC unit to be used with a 415VAC power supply.

#### Standard units:-

- PEM2A** Relay normally energised (de-energising on fault)
- PEM2B** Relay normally de-energised (energising on fault)
- PEM3A** As above but without 'test' push button
- PEM3B** and LED indicators.
- PEM4A** As PEM2 but with an in-built time delay of
- PEM4B** Approximately 0.25 seconds.

#### Accessories:-

- PEMYRES** 10K/50W ballast resistor, allowing use of 230 VAC units with 415VAC power supply

#### When ordering, please specify:-

- a) Product type number (e.g. PEM2A)
- b) Power supply voltage (110 or 230 VAC)
- c) Trip impedance (in Ohms)



### Product Specification

#### Power supply:

operating voltages (ranges)	110V AC (100 - 120 V)
(all for 50/60Hz.)	230 V AC (200 - 250 V)
	415 V AC (380 - 440 V)

power consumption < 6 VA

#### Control:

trip levels	various fixed levels
	0.4 to 100 Ohms

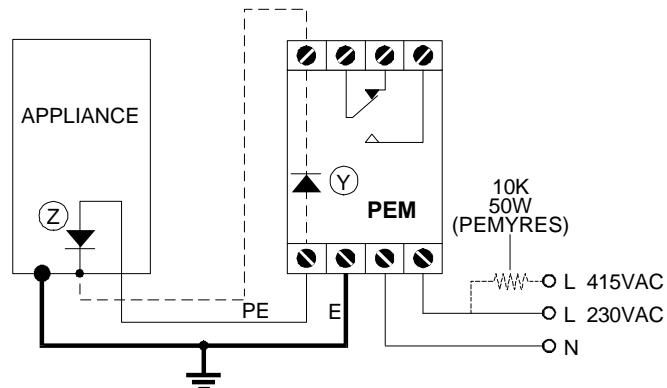
#### Relay output:

(ratings for resistive load)	SPCO contacts, rated
	3 A @ 250V AC or 30 V DC, 1 A @ 440V AC

#### Physical:

operating temperature	standard unit: -10 to +40°C
weight	approx. 300 g
dimensions (w x h x d)	45 x 68 x 114 mm

### Connection (standard unit)



For pilot earth core protection, use remote diode 'Z' and solid line connection. Where pilot earth protection is not required, use internal diode 'Y' and dotted line connection.



**Frank W. Murphy Manufacturer**  
PO Box 470248, Tulsa, Oklahoma 74147, USA  
Tel: + 1 918 627 3550 Fax: + 1 918 664 6146  
email: sales@fwmurphy.com  
web: www.fwmurphy.com

**Frank W. Murphy Ltd.**  
Church Road, Laverstock, Salisbury U.K.  
Tel: + 44 1722 410055 Fax: +44 1722 410088  
email: sales@fwmurphy.co.uk  
web: www.fwmurphy.co.uk

*Pour service en français*  
Tél: + 44 1722 410697 Fax: +44 1722 410088  
email: france@fwmurphy.co.uk  
web: www.fwmurphy.co.uk/francais.htm

**Frank W. Murphy Manufacturer**  
Control Systems and Services Division  
PO Box 1819, Rosenberg, Texas 77471, USA  
Tel: + 1 281 342 0297 Fax: + 1 281 341 6006  
email: sales@fwmurphy.com

**Murphy Switch of California**  
41343 12th Street West, Palmdale, CA 93551, USA  
Tel: + 1 661 272 4700 Fax: + 1 661 947 7570  
email: sales@murmuryswitch.com

**Murphy de Mexico S.A. de C.V.**  
Blvd. Antonio Rocha Cordero 300, Fracción del  
Aguaie San Luis Potosí, S.L.P. México 78384  
Tel: + 52 48 206264 Fax: + 52 48 206336  
email: ventasmx@murmurymex.com.mx

**Macquarie Corporation**  
1620 Hume Highway, Campbellfield, Vic. 3061, Australia  
Tel: + 61 3 9358 5555 Fax: + 61 3 9358 5558  
email: murphy@macquarie.com.au