

Terminal Protection to IP20

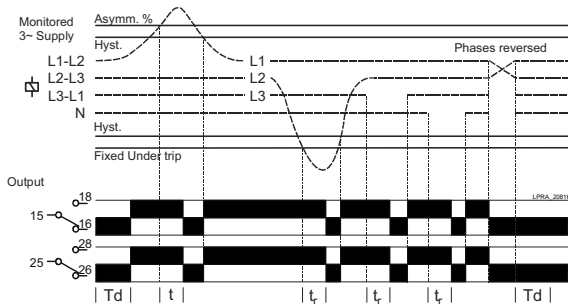


- Compact 17.5mm DIN rail housing
- Microprocessor based
- True R.M.S. monitoring measuring phase to phase (3-wire) or phase to neutral (4-wire) voltages
- Selectable nominal voltages to suit most popular 3-wire or 4-wire supply voltages
- Monitors own supply and detects phase asymmetry/unbalance
- Detects incorrect phase sequence, phase loss and neutral loss<sup>1</sup>
- Adjustment for Asymmetry trip level
- Adjustment for Time delay
- DPDT relay output 5A
- Green LED indication for supply status
- Red LED indication for relay status

Dims: to DIN 43880  
W. 17.5mm

<sup>1</sup> Only when 4-wire monitoring selected

### FUNCTION DIAGRAM



### TECHNICAL SPECIFICATION

Supply/monitoring voltage Un L1, L2, L3, (N) <sup>1</sup>	3-wire monitoring <b>3-Wire</b>	4-wire monitoring <b>4-Wire</b>
	380, 400, 415V AC	220, 230, 240V AC
Frequency range:	48 – 63Hz	
Supply variation:	243- 540V AC (L-L)	
Overvoltage category:	III (IEC 60664)	
Rated impulse withstand voltage:	4kV (1.2/50µs) IEC 60664	
Power consumption (max.):	2.5VA	
Monitoring mode:	Asymmetry	
Trip levels:	Under [2]: Fixed ± 2% see below	
Asymmetry:	2 – 22%	
Measuring ranges:	Nominal (Un)	Under [2]
	3-wire (L-L)	380V 243V 400V 256V 415V 265V
	4-wire (L-N)	220V 140V 230V 147V 240V 153V
Hysteresis:	≈ 2% of trip level (factory set)	
Setting accuracy:	± 3%	
Repeat accuracy:	± 0.5% at constant conditions	
Immunity from micro power cuts:	<50ms	
Response time (t <sub>r</sub> ):	≈ 50ms	
Time delay (t <sub>d</sub> ):	0.2 – 10s (± 5%) <i>Note: actual delay (t) = adjustable delay + response time</i>	
Power on delay (Td):	≈ 1s (worst case = Td x 2)	
Reset time:	50 – 100ms	
Power on indication:	Green LED	
Relay status indication:	Red LED	
Ambient temperature:	-20 to +60°C	
Relative humidity:	+95% max.	
Output (15, 16, 18 / 25, 26, 28):	DPDT relay	
Output rating:	AC1	250V 5A (1250VA)
	AC15	250V 2A
	DC1	25V 5A (125W)
Electrical life:	≥ 150,000 ops at rated load	
Dielectric voltage:	2kV AC (rms) IEC 60947-1	
Rated impulse withstand voltage:	4kV (1.2/50µs) IEC 60664	
Housing:	Orange flame retardant UL94	
Weight:	90g	
Mounting option:	On to 35mm symmetric DIN rail to BS EN 60715 or direct surface mounting via 2 x M3.5 or 4BA screws using the black clips provided on the rear of the unit.	
Terminal conductor size	≤ 2.5mm <sup>2</sup> solid or stranded	
Terminal screw:	M2.5	
Tightening torque:	0.4Nm (3.5Lb-In) Max.	
Approvals:	Conforms to IEC.	

### INSTALLATION AND SETTING



Installation work must be carried out by qualified personnel.

- BEFORE INSTALLATION, ISOLATE THE SUPPLY.
- Connect the unit as required. The Connection Diagram below shows a typical installation, whereby the supply to a load is being monitored by the Phase monitoring relay. If a fault should occur (i.e. fuse blowing), the relay will de-energise and assuming control of the external Contactor, de-energise the Contactor as well.
- Only connect the Neutral if available and 4-wire monitoring is required.

#### Applying power.

- Set the “Nominal (Un)” **3** voltage selector to match that of the voltage being monitored.
- Set the “Asymmetry %” **5** adjustment to maximum. Set the “Delay (t)” **4** to minimum.
- Apply power and the green “Power supply” **1** LED will illuminate. The red LED **2** will illuminate and relay energise after the short Power on delay (Td).
- Refer to the troubleshooting table if the unit fails to operate correctly.

#### Setting the unit (with power applied).

- Assuming all phases are perfectly balanced it should be possible to set the “Asymmetry (%)” adjustment to minimum which will ensure that it will detect the smallest of changes in the phase voltages. However, if large changes in phase voltages are likely, then the “Asymmetry (%)” setting should be increased.
- The formula used for calculating “Asymmetry” is as follows:

$$\text{Asymmetry} = \frac{\text{Maximum deviation from } V_{ave}}{V_{ave}} \times 100\%$$

where  $V_{ave}$  is the average of the three phases  
[ANSI/NEMA MG 1-2001]

Note that “Phase asymmetry” can also referred to as “Phase unbalance”

- Set the “Delay (t)” as required. (Note that the delay is only effective should any phases exceed the set trip point. However, if the supply drops below the 2<sup>nd</sup> under voltage trip level, any set time delay is automatically cancelled and the relays de-energise immediately).

#### Troubleshooting.

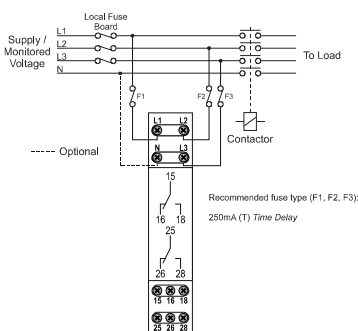
The table below shows the status of the unit during a particular fault condition.

Supply fault	Green LED <b>1</b>	Red LED <b>2</b>	Relay
Phase or neutral missing	LED's flash alternately	Off	De-energised
Phases reversed (no delay)	Flashing	Off	De-energise
Phase asymmetry trip point exceeded (during timing)	On	Flashing	Energised for delay (t)
Phase asymmetry trip point exceeded (after timing)	On	Off	De-energised
Phases < fixed under trip level [2]	On	Off	De-energ

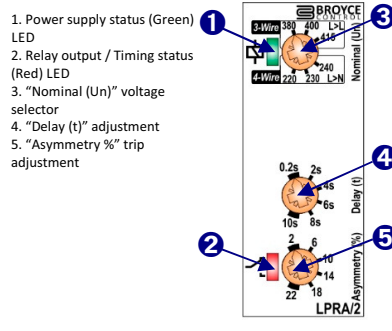
Note:

“L-L” has the same meaning as “phase to phase” and “L-N”, the same as “phase to neutral”

### CONNECTION DIAGRAM



### SETTING DETAILS



### DIMENSIONS

