Type: LPRC/2

Phase Failure, Phase Sequence, Under and Over Voltage plus Time Delay

Terminal Protection to IP20



Dims: to DIN 43880
W. 17.5mm

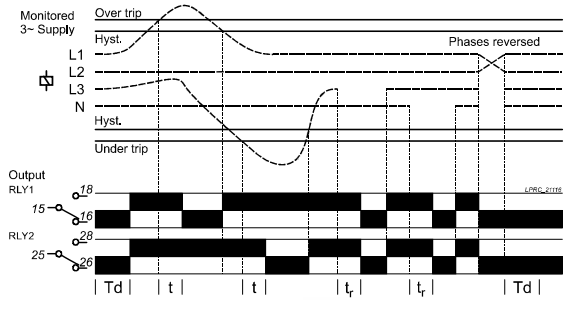
- ❑ **Compact 17.5mm DIN rail housing**
- ❑ **Microprocessor based**
- ❑ **True R.M.S. monitoring measuring phase to phase (3-wire) or phase to neutral (4-wire) voltages**
- ❑ **Selectable nominal voltages to suit most popular 3-wire or 4-wire supply voltages**
- ❑ **Monitors own supply and detects if one or more phases exceed the set Under or Over voltage trip levels**
- ❑ **Detects incorrect phase sequence, phase loss and neutral loss[1]**
- ❑ **Adjustments for Under and Over voltage trip levels**
- ❑ **Adjustment for Time delay**
- ❑ **Independent relay outputs - Under voltage monitoring (RLY2) / Over voltage monitoring (RLY1)**
- ❑ **2 x SPDT relay output 5A**
- ❑ **Green LED indication for supply status**
- ❑ **Individual Red LED indication for both relay statuses**

[1] Only when 4-wire monitoring selected

ISO 9001:2015 Cert. No. 14125771

FUNCTION DIAGRAM

Under and Over Voltage Monitoring



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)" ❹ voltage selector to match that of the voltage being monitored.
- Set the Over %" ❺ adjustment to maximum and the "Under %" ❼ adjustment to minimum. Set the "Delay (t)" ❻ to minimum.
- Apply power and the green "Power supply" ❶ LED will illuminate. Both the red "RLY1" ❷/"RLY2" ❸ LED's will illuminate and corresponding RLY1 and RLY2 relays 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).

- Set the "Over %" and the "Under %" adjustments to give the required monitoring range.
- If large supply variations are anticipated, the adjustments should be set further from the nominal voltage.
- Set the "Delay (t)" adjustment as required. (Note that the delay is only effective should the supply increase above or drop below the set trip levels. However, if during an under voltage condition the supply drops below the 2nd under voltage trip level, any set time delay is automatically cancelled and both relays de-energise immediately).

Troubleshooting.

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

Supply fault	Green LED ❶	Red LED ❷	Red LED ❸	Relay RLY1	Relay RLY2
Phase or neutral[2] missing	Flashing[1]	Off	Flashing[1]	De-energised	De-energised
Phases reversed (no delay)	Flashing	Off	Off	De-energised	De-energised
Under voltage condition (during timing)	On	On	Flashing	Energised	En for delay (t)
Under voltage condition (after timing)	On	Off	Off	Energised	De-energised
Over voltage condition (during timing)	On	Flashing	On	En for delay (t)	Energised
Over voltage condition (after timing)	On	Off	On	De-energised	Energised
Phases < fixed under trip level [2]	On	Off	Off	De-energised	De-energised

[1] Green and Red LED's alternate in this fault condition
[2] Refer to Technical Specification for neutral loss/shift threshold voltage

TECHNICAL SPECIFICATION

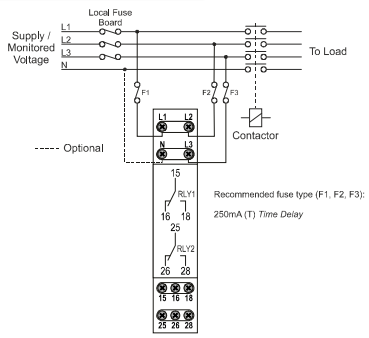
Supply/monitoring voltage Un **(L1, L2, L3, (N)):**		3-wire monitoring **3-Wire**		4-wire monitoring **4-Wire**	
LPRC/2 (LV)*		110, 208, 220V AC		63.5, 120, 127V AC	
LPRC/2*		380, 400, 415V AC		220, 230, 240V AC	
Frequency range:		48 – 63Hz			
Supply variation:		LV: 70 – 286V Std: 243- 540V AC (L>L)			
Overvoltage category:		III (IEC 60664)			
Rated impulse withstand voltage:		4kV (1.2/50µS) IEC 60664			
Power consumption (max.):		2.5VA			
Monitoring mode:		Under and Over voltage			
Trip levels:					
Under [2]:		Fixed ± 2% *see below*			
Under:		75 – 95% of Un			
Over:		105 – 125% of Un			
Neutral loss/shift detection threshold:		≈ 45V rms (assuming balanced load across phases). Applies if unit set to: 220, 230 or 240V L>N			
Measuring ranges:		Nominal (Un)	Under [2]	Under	Over
LPRC/2 (LV)	3-wire (L>L)	**110V**	70V	83 – 105V	116 – 138V
		208V	133V	156 – 198V	218 – 260V
		220V	140V	165 – 209V	231 – 275V
	4-wire (L>N)	**63.5V**	40V	48 – 60V	67 – 79V
		120V	76V	90 –114V	126 – 150V
		127V	81V	95 – 121V	133 – 159V
LPRC/2	3-wire (L>L)	**380V**	243V	285 – 361V	399 – 475V
		400V	256V	300 – 380V	420 – 500V
		415V	265V	311 – 394V	436 – 519V
	4-wire (L>N)	**220V**	140V	165 – 209V	231 – 275V
		230V	147V	173 – 219V	242 – 288V
		240V	153V	180 – 228V	252 – 300V
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_r):		≈ 50ms			
Time delay (t):		0.2 – 10s (± 5%) *Note: actual delay (t) = adjustable delay + response time*			
Power on delay (Td):		≈ 1s (worst case = Td x 2)			
Reset time:		50 – 100ms			
Power on indication:		Green LED			
Relay status indication:		Red LED x2			
Ambient temperature:		-20 to +60°C			
Relative humidity:		+95% max.			
Output **(15, 16, 18 / 25, 26, 28)**:		2 x SPDT 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 black clips provided on the rear of the unit.			
Terminal conductor size		≤ 2.5mm² solid or stranded			
Terminal screw:		M2.5			
Tightening torque:		0.4Nm (3.5Lb-In) Max.			
Approvals:		Conforms to IEC. CE, and RoHS Compliant. EMC: Immunity: EN 61000-6-2 Emissions: EN 61000-6-4			

* Please state model variant when ordering

IND. CONT. EQ. E111187

Note: "L>L" has the same meaning as "phase to phase" and "L>N", the same as "phase to neutral"

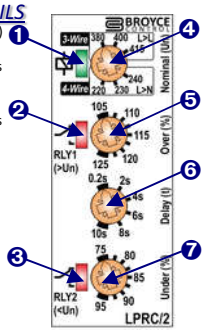
CONNECTION DIAGRAM



SETTING DETAILS

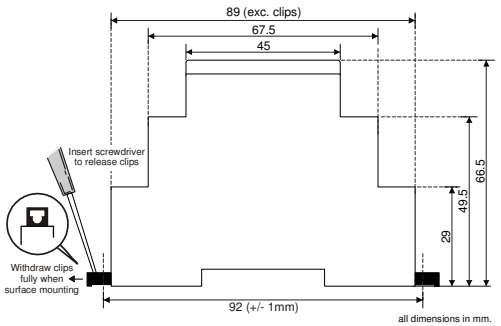
1. Power supply status (Green) LED
2. Relay output / Timing status (Red) LED for Over voltage tripping
3. Relay output / Timing status (Red) LED for Under voltage tripping
4. "Nominal (Un)" voltage selector
5. "Over %" trip level adjustment^
6. "Delay (t)" adjustment
7. Under %" trip level adjustment^

^scaled as % of the selected nominal voltage "Un"



Above example showing LPRC/2 (HV)

DIMENSIONS



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