

3-Phase Voltage Monitoring Relays

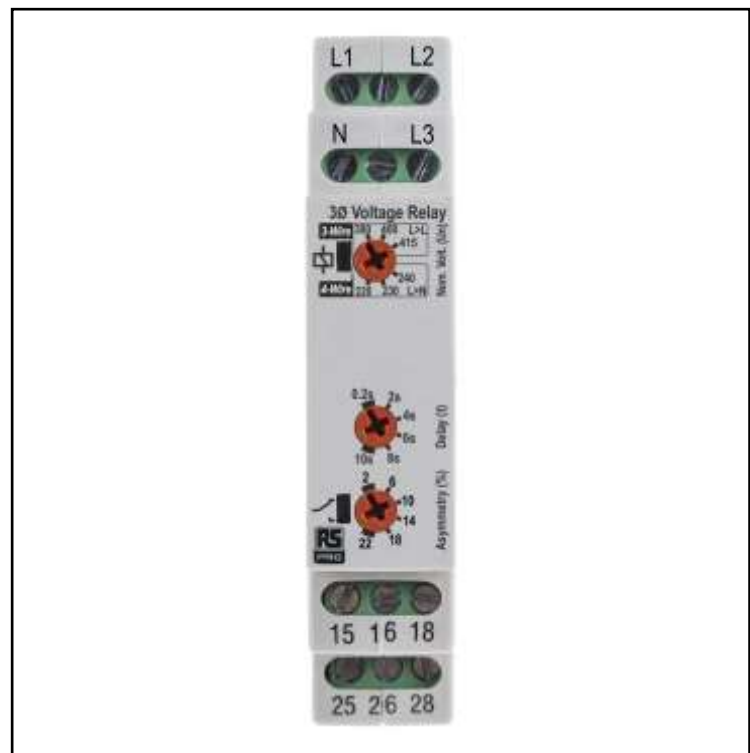
FEATURES

- 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 loss¹
- 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

¹ When 4-wire monitoring selected

RS PRO 3-Phase Asymmetry Relay

RS Stock No.: 2257385



RS Professionally Approved Products bring to you professional quality parts across all product categories. Our product range has been tested by engineers and provides a comparable quality to the leading brands without paying a premium price.

3-Phase Voltage Monitoring Relays

Product Description

A 3-Phase Asymmetry relay for connecting to a 3-wire or 4-wire supply. The product is designed to monitor its own supply and in conjunction with an external contactor, disconnect the supply to the load/equipment in the event of a fault occurring. For the output relay to energise, all phases (and neutral – if applicable) must be present, phase sequence correct and measured phase asymmetry/unbalance within the set limits. If any of these conditions are not met, the relay (+ contactor) will de-energise, disconnect the supply and thus protect the equipment.

General Specifications

Monitoring mode:	Asymmetry	
Phase sequence detection:	Yes	
Trip levels:		
Under [2]:	Fixed $\pm 2\%$ 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:	$\approx 2\%$ of trip level (factory set)	
Setting accuracy:	$\pm 3\%$	
Repeat accuracy:	$\pm 0.5\%$ at constant conditions	
Immunity from micro power cuts:	<50ms	
Response time (tr):	$\approx 50\text{ms}$	
Time delay (t):	0.2 – 10s ($\pm 5\%$)	
Power on delay (Td):	$\approx 1\text{s}$ (worst case = Td x 2)	
Reset time:	50 – 100ms	
Power on indication:	Green LED	
Relay status indication:	Red LED	

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Mechanical Specifications

Housing:	Grey flame retardant UL94
Dimensions:	To DIN 43880. Width 17.5mm
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.

Electrical Specifications

Input:	L1, L2, L3, N
Supply/monitoring voltage Un:	<i>There are 6 nominal voltages to choose from on this product</i>
3-wire monitoring:	380, 400, 415V AC
4-wire monitoring:	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)
Power consumption (max.):	2.5VA
Output:	15, 16, 18 / 25, 26, 28
Relay configuration:	DPDT
Output rating:	AC1 – 250V 5A, AC15 – 250V 2A, DC1 – 25V 5A
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

Protection Category

IP Rating	IP20 (Terminal Protection)
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Additional Information

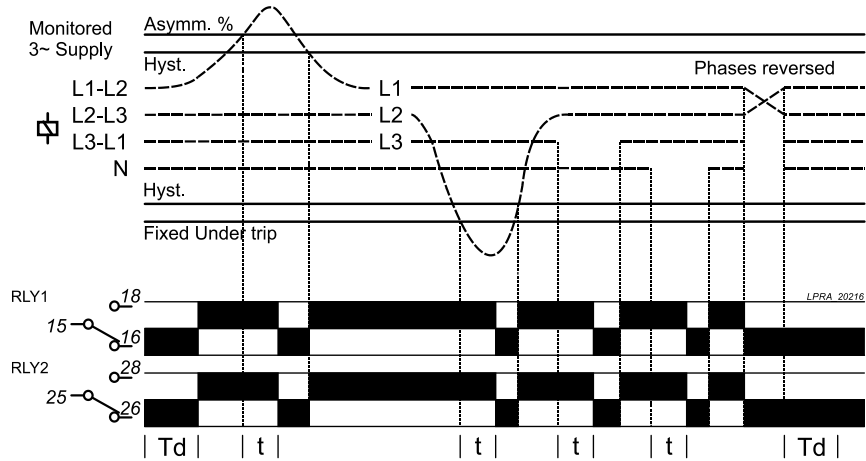
Custom Tariff Number	85394900
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Approvals

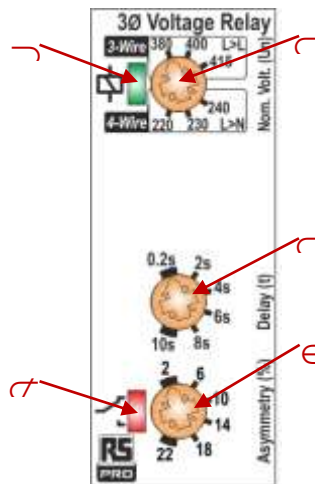
Declarations	CE, RoHS and C-tick compliant
Standards Met	EMC: Immunity EN 61000-6-2, Emissions: EN 61000-6-4

Function Diagram



Setting Details

1. Power supply status (Green) LED
2. Relay output / Timing status (Red) LED
3. "Nominal (Un)" voltage selector
4. "Delay (t)" adjustment
5. "Asymmetry %" trip adjustment



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Setting Up

Applying power.

- Set the “Nominal (Un)” \subset voltage selector to match that of the voltage being monitored.
- Set the “Asymmetry %” \in adjustment to maximum. Set the “Delay (t)” \subseteq to minimum.
- Apply power and the green “Power supply” \supseteq LED will illuminate. The red LED $\not\subset$ will illuminate and relay energise after the short Power on delay (Td).
- Refer to the fault diagnosis 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:

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

[ANSI/NEMA MG 1-2001]

where V_{ave} is the average of the three phases

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

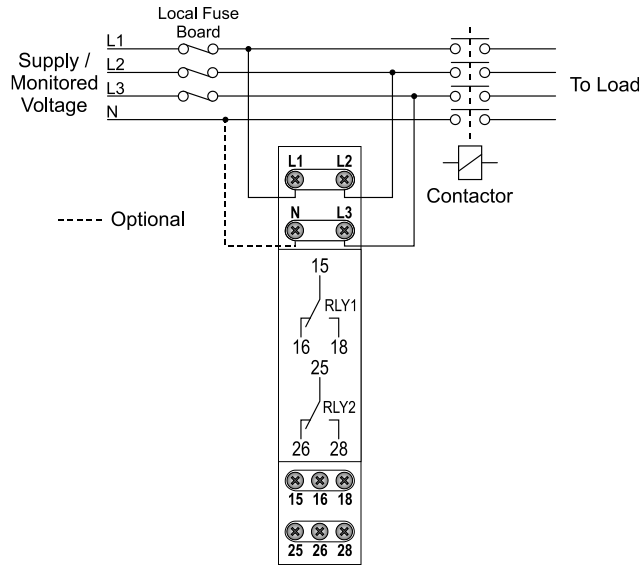
- Set the “Delay (t)” as required. (Note that the delay is only effective should any phases exceed the set trip point. However, if the supply drops below the 2nd under voltage trip level, any set time delay is automatically cancelled and the relays de-energise immediately).

Fault Diagnostics

Supply fault:	Green LED \supseteq	Red LED $\not\subset$	Relay
Phase or neutral missing	LED's flash alternately		De-energised
Phases reversed (no delay)	Flashing	Off	De-energised
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-energised

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Connection Diagram



Dimensions

