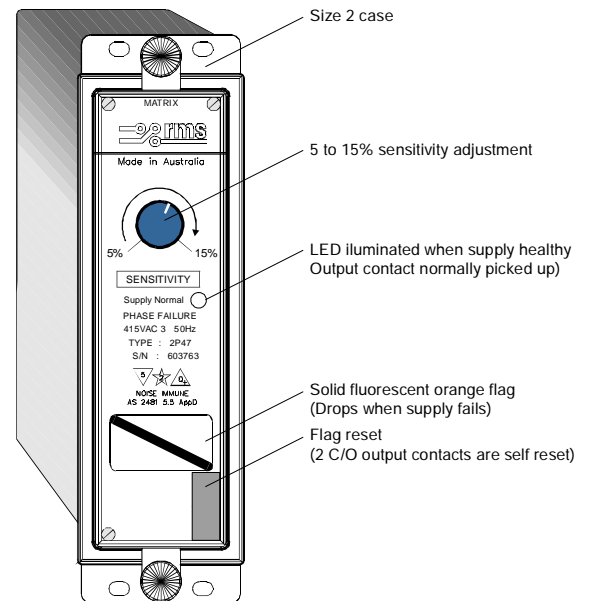
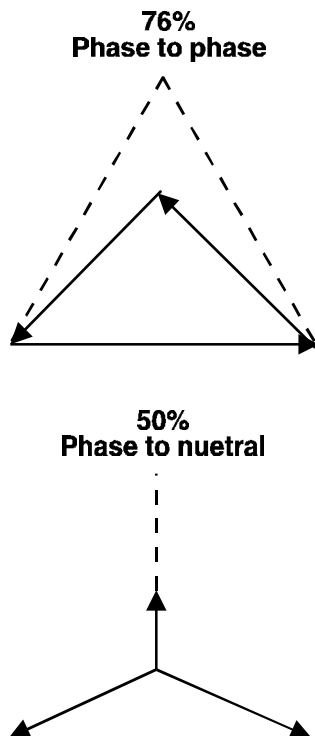


Features

- Detects phase angle imbalance
- Detects negative phase sequence
- Detects supply undervoltage
- Unaffected by frequency variations of $\pm 5\text{Hz}$
- Adjustable 5-15% out of balance setting
- Range of detection voltages & frequencies available
- No auxiliary voltage required
- Fail safe operation (Contact normally picked up)
- Filter rejects harmonics & control tones
- Standard heavy duty contacts
- Optional mechanical flag indication
- Made in Australia

Description

The 2P47 relay is a phase failure relay suitable for 3 phase supplies. The relay is designed to provide protection for rotating equipment from the damaging effects of excessive negative sequence voltage resulting from phase failure, phase unbalance and reversed phase sequence. The 2P47 output relay is normally energised and drops out when phase angle unbalance is greater than the pre-set, under voltage or reverse phase sequence.



2P47 relay depicted in a 2E rack mount case with flag

Applications

Made in Australia

MOTOR PROTECTION

The 2P47 phase failure relay has the sensitivity to detect the voltage unbalance caused by a motor single phasing. In most instances even a motor with no load and no other loads connected to the open phase will be detected when single phasing. In using the 2P47 relay it must be realised that it only monitors the supply voltage at the point of connection and therefore provides no protection for single phasing due to faulty switchgear, connections or blown fuses etc., on the load side of this point. The 2P47 relay is ideal for detecting phase failure and unbalance of HT lines and for this purpose 110V relays are also available. As the 2P47 detects the presence of negative sequence voltage a relay connected on the load side of a three phase transformer will detect a blown fuse or high impedance in one phase of the supply to the transformer, regardless of the transformer winding connections. Pump motors on the end of a HT line with fuse protection and therefore high probability of single line outages are an obvious application for the 2P47 relay.

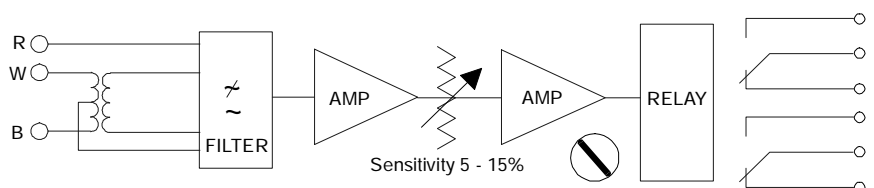
PHASE REVERSAL PROTECTION

The 2P47 relay can be used for transportable cranes, refrigerated transporters, etc., which on being connected from one supply to another require phase reversal protection. The advantage of the 2P47 for this application is the added protection of phase failure and undervoltage.

3 PHASE UNDERVOLTAGE

It is a useful undervoltage relay in that phase angles are also monitored. As an example three single phase undervoltage relays may not detect an open phase which is connected to a healthy phase through a low impedance load. The 2P47 relay however will detect this condition due to the change in phase angles. In using the 2P47 relay as an undervoltage relay it must be remembered that only the B-W voltage is monitored directly. The other two \emptyset to \emptyset voltages are monitored for correct phase angle and voltage balance with respect to the B-W voltage. The difference in percentage undervoltage expressed as phase to phase and phase to neutral must also be appreciated. As a guide, when two \emptyset to \emptyset voltages are equally reduced as shown - the relationship is as follows:

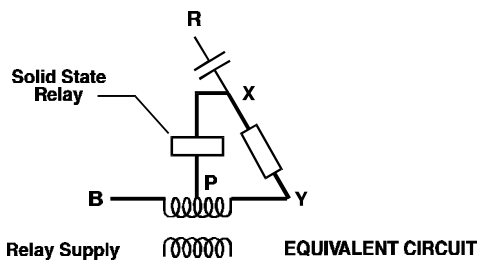
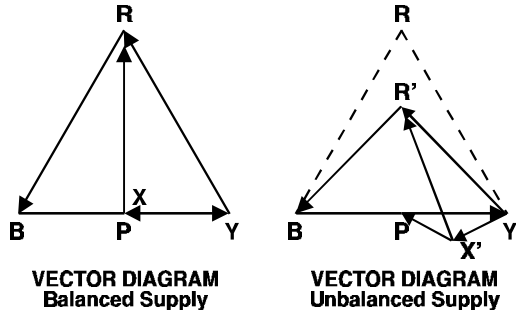
95% \emptyset to \emptyset = 90% \emptyset to N
 90% \emptyset to \emptyset = 80% \emptyset to N
 85% \emptyset to \emptyset = 69% \emptyset to N





Principle of Operation

The unit consists of a simple RC circuit across the R-Y phase such that point x will only be at the same potential as point p for a balanced supply of correct phase sequence. The solid state relay circuit is designed to release the relay at either a set out of balance voltage (X-P voltage), or a set undervoltage of the B-W phase (relay supply). Special filtering circuitry is used to prevent high frequency or ripple control signals from affecting the operation of the relay.



Technical Data

OUT OF BALANCE SETTING

Adjustable 5-15% expressed as phase to phase voltage difference as a % of nominal voltage when two phase to phase voltages are reduced equally with the third at nominal voltage. The equivalent negative sequence voltage expressed as a % of nominal phase to neutral voltage would be 10-31%. (Other settings are available to order.)

UNDervOLTAGE SETTING

80% fixed - expressed as phase to phase voltage % of nominal voltage. (Other settings are available to order)

CONTACTS

2 Changeover

6R RELAY CONTACT RATINGS

Make & Carry Continuously

3,000 VA AC resistive with maximums of 660V & 12A
3,000 VA DC resistive with maximums of 660V & 12A

Make & Carry for 0.5 Seconds

7,500 VA AC resistive with maximums of 660V & 30A
7,500 VA DC resistive with maximums of 660V & 30A

AC Break Capacity

3,000 VA AC resistive with maximums of 660V & 12A

DC Break Capacity (Amps)

Voltage			24V	48V	125V	250V
Resistive rating	a	12	1.5	0.5	0.25	
	b	12	12	10	5	
L/R=40ms	Maximum break *	a	12	1	0.4	0.2
		b	30	15	5.5	3.5
	1K operations (N3 Rating)	a	12	12	5	2.5
		b	12	12	5	2.5

a = Without magnetic blowouts b = With magnetic blowouts

* As tested by Powernet Yarraville laboratories in Victoria.



QUALITY
MANAGEMENT
SYSTEM
ISO9001 NATA CERTIFIED

AS/NZS ISO9001-94
REGISTRATION
6869

Due to RMS continuous product improvement policy this information is subject to change without notice. 2P47/Iss. B/08/04/98/2/2

ACCURACY

±2% of 5 - 15% of nominal

INSULATION WITHSTAND

In accordance with AS2481-1981 (clause 5-4), IEC 255-5: 2KV RMS between input and frame, output and frame, and output and input. 1.2/50 5KV impulse between each terminal and earth, between circuits not normally connected together and between terminals of the same circuit.

PHOENIX POWER-COMBICON PLUG IN TERMINALS

Connection pitch: 7.62mm
Continuous load current: 20A at 48 degrees Celsius
16A at 65 degrees Celsius
Short rated current: 180A at 48 degrees Celsius for 3s
Rated surge voltage: 6KV
wire connections: Solid: 0.2-4mm²
Stranded: 0.2-4mm²
With ferrules: 0.25-4mm²

NOISE IMMUNITY

Withstands the high frequency interference test detailed in AS2481-1981 (clause 5-5 App. D), IEC 255-22-1.

AMBIENT OPERATING TEMPERATURE RANGE

-5 to 55 degrees Celsius

2P47 Options

Check the appropriate box under each section to accurately specify the relay configuration required and return with request for quotation:

2P47 Type Number if known: K_____

SENSING SUPPLY - 3 Phase 3 or 4 wire (3 wire connection)

- 110V 50Hz
 415V 50Hz
 440V 50Hz
 Other _____

CASE STYLE (Refer Part B Section 6 for details)

- Size 2E Case for rack mounting (4u high, 1/8 width)
 Size HD Case for flush mounting in vertical format

CASE FUNCTION

- Draw out
 Non draw out (De-mountable rear terminal block)

TIME DELAY

- Required
 Not required

ELECTRO-MECHANICAL FLAG

- Required (Vertical format only)
 Not required

CONNECTION TERMINALS

- Phoenix compression screw terminals (Standard)
 2BA studs (Non draw out only)
 2BA screws (non draw out only)

SPECIAL CUSTOMER LABELLING (* SPECIFY ANY 2)

- Not Required (Standard labelling)
 * Type No. _____
 * Order No. _____
 * Name: _____
 * Other: _____