## Voltage Monitoring Relay : 3 Phase 3 Wire

| Model | | VMR31A0 | VMR31A1 | VMR31A2 | VMR31A3 | VMR31M4 | VMR38A0 | VMR39A0 |
|---|---|---|---|---|---|---|---|---|
| Trip Setting | Over Voltage | 420-520 V | 420-520 V | 420-520 V | 420-520 V | 420-520 V | x | 420-520 V |
| | Under Voltage | 285-410 V | 285-410 V | 285-410 V | 285-410 V | 285-410 V | 285-410 V | x |
| Time Delay | Trip Delay | 0.2-10 Sec | 5 Sec | 5 Sec | 0.2-10 Sec | 0.2-10 Sec | 0.2-10 Sec | 0.2-10 Sec |
| | Reset Delay | 5 Sec | 0.2-10 Sec | 5 Sec | 0.2-10 Sec | Manual Reset | 5 Sec | 5 Sec |
| | Phase Failure Delay | Less then 1 Sec | | | | | | |
| | Power on Delay | 5 Sec | 0.2-10 Sec | 5 Sec | 0.2-10 Sec | 1 Sec | 5 Sec | 5 Sec |
| Indication | Mains(Continuous On) | Power On | | | | | | |
| | OV (Continuous On) | Over Voltage | | | | | x | Over Voltage |
| | UV (Continuous On) | Under Voltage | | | | | | x |
| | All LED Off | Phase Failure | | | | | | |

## Voltage Monitoring Relay : 3 Phase 4 Wire

| Model | | VMR41A0 | VMR41A1 | VMR41A2 | VMR41A3 | VMR41M4 | VMR48A0 | VMR49A0 |
|---|---|---|---|---|---|---|---|---|
| Trip Setting | Over Voltage | 245-315 V | 245-315 V | 245-315 V | 245-315 V | 245-315 V | x | 245-315 V |
| | Under Voltage | 165-235 V | 165-235 V | 165-235 V | 165-235 V | 165-235 V | 165-235 V | x |
| Time Delay | Trip Delay | 0.2-10 Sec | 5 Sec | 5 Sec | 0.2-10 Sec | 0.2-10 Sec | 0.2-10 Sec | 0.2-10 Sec |
| | Reset Delay | 5 Sec | 0.2-10 Sec | 5 Sec | 0.2-10 Sec | Manual Reset | 5 Sec | 5 Sec |
| | Phase Failure Delay | Less then 1 Sec | | | | | | |
| | Power on Delay | 5 Sec | 0.2-10 Sec | 5 Sec | 0.2-10 Sec | 1 Sec | 5 Sec | 5 Sec |
| Indication | Mains(Continuous On) | Power On | | | | | | |
| | OV (Continuous On) | Over Voltage | | | | | x | Over Voltage |
| | UV (Continuous On) | Under Voltage | | | | | | x |
| | All LED Off | Phase Failure | | | | | | |

## Specifications :

Voltage : 240±35%/ 415±35%
Frequency : 40 to 70 Hz
Power Consumption : 8VA/Phase
Setting Accuracy : ± 5% of setting
Hysteresis : 3%
Relay Output :
Contact Arrangement : 1C/O or 2C/O
Contact Rating : 5A Res. @ 250 VAC / 30VDC
Contact Material : Ag Alloy
Mechanical Life Expectancy : 3 x $10^6$ Operations
Operating Temperature : -20°C to +70°C
Storage Temperature : -25°C to +80°C
Pollution Degree : 2
Degree of Protection : IP-20 for Terminals, IP-40 for Housing
Mounting : Din Rail
Dimensions in mm(WXHXD): 37 x 65 x 92 (mm)
Weight : 130 gm

## Application / Protection :

- Under Voltage
- Over Voltage
- Single Phasing, Phase Loss Protection
- Reverse Phase Sequence

## Caution :

1.Do not touch the terminal area while the power is turned ON.
2.Before installation, check to ensure that specifications agree with intended application.

MRM PROCOM® Pvt. Ltd.

## Voltage Monitoring & Protection Relay Series

## Introduction :

Micro-controller based design to monitor and protect from Unhealthy supply/line voltage (eg. under/over / unbalance Voltage / reverse phase sequence / singe phasing)

## Features :

- true RMS measurement.
- 3PH-3W / 3PH-4W systems.
- micro-controller based design with SMD technology
- no auxiliary required (self powered).
- programmable auto & manual reset.
- programmable fail safe & non fail safe mode.
- adjustable on time delay & off time delay
- led indication for all faults.
- DPDT relay. SPDT relay (5a resistive contacts)
- din rail mounting (35 mm)
- terminations - screw type

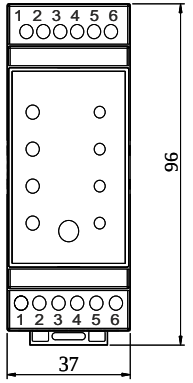
## Single Phase, Phase Reversal, Unbalance Protection Relay 3 Phase 3 Wire

| Model | | VMP32A2 | VMP34A3 | VMP36A2 | VMP37A2 |
|---|---|---|---|---|---|
| Trip Setting | Voltage Unbalance | N/A | 4-20% | 10% | 15% |
| Time Delay | Trip & Reset Delay Ub | x | 0.2-10 Sec | 5 Sec | 5 Sec |
| | Trip Delay PR | Less then 100 msec | | | |
| | Trip Delay Ph. Fail | Less then 1 Sec | | | |
| | Power On Delay | 1 Sec | 0.2-10 Sec | 5 Sec | 5 Sec |
| | Reset Delay Ph. Fail | 1 Sec | 0.2-10 Sec | 5 Sec | 5 Sec |
| Indication | Mains(Continuous On) | Power On | | | |
| | UB/PR | Blinks: Phase Reverse, Continuous On: Unbalance Voltage | | | |
| | All LED Off | Phase Failure(SPP) | | | |

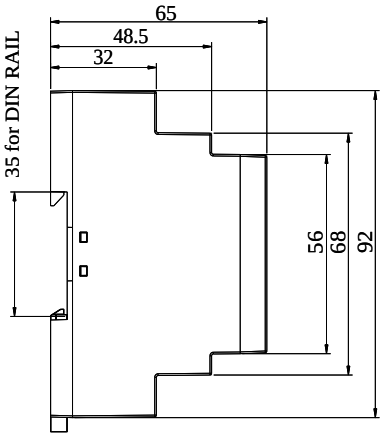
## Single Phase, Phase Reversal, Unbalance Protection Relay 3 Phase 4 Wire

| Model | | VMP42A2 | VMP44A3 | VMP46A2 | VMP47A2 |
|---|---|---|---|---|---|
| Trip Setting | Voltage Unbalance | N/A | 4-20% | 10% | 15% |
| Time Delay | Trip & Reset Delay Ub | x | 0.2-10 Sec | 5 Sec | 5 Sec |
| | Trip Delay PR | Less then 100 msec | | | |
| | Trip Delay Ph. Fail | Less then 1 Sec | | | |
| | Power On Delay | 1 Sec | 0.2-10 Sec | 5 Sec | 5 Sec |
| | Reset Delay Ph. Fail | 1 Sec | 0.2-10 Sec | 5 Sec | 5 Sec |
| Indication | Mains(Continuous On) | Power On | | | |
| | UB/PR | Blinks: Phase Reverse, Continuous On: Unbalance Voltage | | | |
| | All LED Off | Phase Failure(SPP) | | | |

## Dimensions :



Side View



Front View

## Functional Description :

■ VMR31A0, VMR31A1, VMR31A2, VMR31A3, VMR31M4
VMR41A0, VMR41A1, VMR41A2, VMR41A3, VMR41M4

The above VMR Series continuously measures the voltage of each of the three phases using a micro-controller circuit design that senses and provides the following protection schemes for the mentioned models: -

- Under Voltage Protection.
- Over Voltage Protection.
- Phase Loss (Single Phase Prevention).

■ *VMR38A0*
*VMR48A0*
The above VMR Series continuously measures the voltage of each of the three phases using a micro-controller circuit design that senses and provides the following protection schemes for the above mentioned models: -

- Under Voltage Protection.
- Phase Loss (Single Phase Prevention).

■ *VMR39A0*
*VMR49A0*
The above VMR Series continuously measures the voltage of each of the three phases using a micro-controller circuit design that senses and provides the following protection schemes for the above mentioned models: -

- Over Voltage Protection.
- Phase Loss (Single Phase Prevention).

■ *VMP33A0, VMP33A1, VMP33A2, VMP33M4, VMP35A0, VMP35A1, VMP35A2, VMP43A0, VMP43A1, VMP43A2, VMP43M4, VMP45A0, VMP45A1, VMP45A2*

The above VMP Series continuously measures the voltage of each of the three phases using a micro-controller circuit design that senses and provides the following protection schemes for the mentioned models: -

- Under Voltage Protection.
- Over Voltage Protection.
- Phase Unbalance Protection.
- Phase Sequence/Phase Reversal.
- Phase Loss (Single Phase Prevention).

■ *VMP34A3, VMP36A2, VMP37A2, VMP44A3, VMP46A2, VMP47A2*
The above VMP Series continuously measures the voltage of each of the three phases using a micro-controller circuit design that senses and provides the following protection schemes for the mentioned models: -

- Phase Unbalance Protection.
- Phase Sequence/Phase Reversal.
- Phase Loss (Single Phase Prevention).

■ *VMP32A2*
*VMP42A2*
The above VMP Series continuously measures the voltage of each of the three phases using a micro-controller circuit design that senses and
provides the following protection schemes for the mentioned models: -

- Phase Sequence/Phase Reversal.
- Phase Loss (Single Phase Prevention).

## Fault Detection :

When Power is applied, the relay energizes after the defined On Delay Time, provided all three phases are balanced and in the correct sequence. The relay will de-energise when any one one of the following faults occur: -

- **Under Voltage**
  Under Voltage is a condition in which voltage is lower than the level set by the preset.
- **Over Voltage** Over Voltage is a condition in which voltage is upper than the level set by the preset.
- **Phase Loss (Single Phase Prevention).**
  Phase Loss is the total loss of one of the three phases.
- **Phase Sequence/Phase Reversal.**
  A phase reversal problem occurs when the supply phase is reversed due to wrong connection (except than RYB) or on reversing any of the phase of the three phases in power distribution systems.
- **Voltage Unbalance or Excessive phase angle error.**
  Voltage unbalance takes place when the magnitudes of phase or line voltages are different and the phase angles differ from the balanced conditions, or both. Voltage unbalance is defined as the largest difference between the average RMS voltage and the RMS value of any single voltage phase divided by the average RMS voltage, usually expressed as a percentage.

$$\frac{\text{Maximum Deviation from Average Voltage}}{\text{Average voltage}} \times 100 \quad \%$$

Example:
Measured voltages:
241 Volts
243 Volts
233 Volts

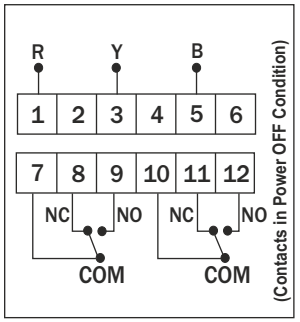
Average Voltage = 239

$$\frac{6}{239} \times 100 = \textbf{2.5\%}$$ **Voltage Unbalance**

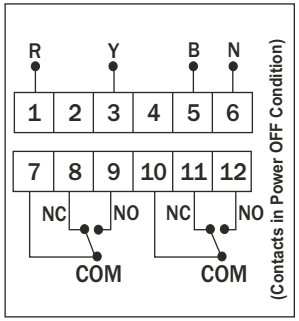
The relay will energize again when proper power supply conditions are established.

## Connection Diagram :

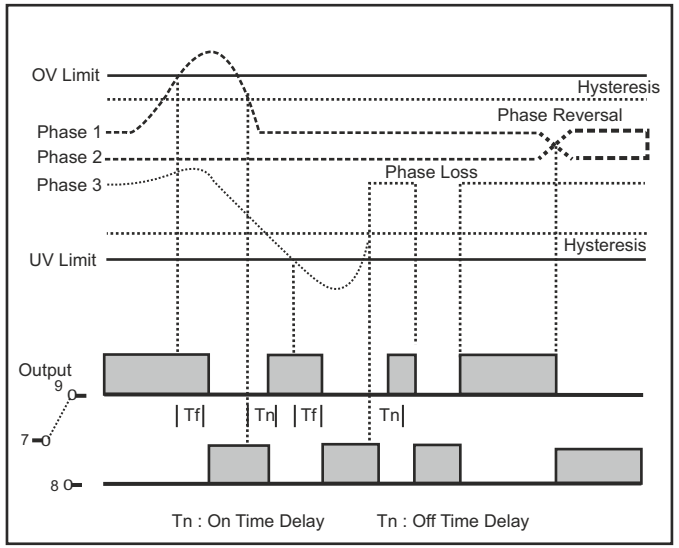
**Connection Diagram**
3 Phase 3 Wire Connection




**Connection Diagram**
3 Phase 4 Wire Connection




## Function Diagram :





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