

# TVM SERIES



## Description

The TVM Series Provides protection for motors and other sensitive loads. Continuously measures the voltage of each of the three phases using a microcomputer circuit design that senses under and overvoltage, voltage unbalance, phase loss, and phase reversal. Protection is provided even when regenerated voltages are present. Includes a trip delay to prevent nuisance tripping and a restart delay to prevent short cycling after a momentary power outage.

## Operation

Upon application of line voltage, the restart delay begins. The output relay is de-energized during restart delay. Under normal conditions, the output energizes after restart delay. Undervoltage, overvoltage, and voltage unbalance must be sensed for continuous trip delay period before the output is de-energized. The output will not de-energize if a fault is corrected during the trip delay. The restart delay begins as soon as the output relay de-energizes. If the restart delay is completed when the fault is corrected, the output relay will energize immediately.

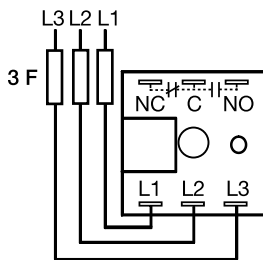
The output relay will not energize if a fault or phase reversal is sensed as 3-phase input voltage is applied.

**Reset:** Reset is automatic upon correction of a fault.

## LED Operation

The LED flashes green during the restart delay, then glows green when the output energizes. It flashes red during the trip delay then glows red when the output de-energizes. It flashes red/green if phase reversal is sensed.

## Wiring Diagram



L1 = Phase A  
L2 = Phase B  
L3 = Phase C  
NO = Normally Open  
NC = Normally Closed  
C = Common, Transfer Contact

Relay contacts are isolated.

F = 2A Fast acting fuses are recommended, but not required

## Ordering Information

MODEL	LINE VOLTAGE	VOLTAGE UNBALANCE	TRIP DELAY	RESTART DELAY
TVM208A100.5S3S	208VAC	10%	0.5s	3s
TVM230A101S1S	230VAC	10%	1s	1s
TVM480A45S5S	480VAC	4%	5s	5s

If you don't find the part you need, call us for a custom product 800-843-8848

## Features & Benefits

FEATURES	BENEFITS
<b>Proprietary microcontroller based circuitry</b>	Constant monitoring to protect against phase loss, phase reversal; over, under, and unbalanced voltage; short cycling
<b>Compact design measures 2 in. (50.8mm) square</b>	Perfect for OEM applications where cost, size and ease of installation are important
<b>LED indication</b>	Provides diagnostics of relay, fault and time delay status
<b>Encapsulated</b>	Protects against shock, vibration and humidity

## TVM SERIES

### Accessories



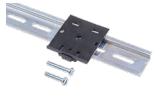
**LPSM003ZXID (Indicating), LPSM003Z (Non-indicating) Fuse Holders**  
Littelfuse POWR-SAFE Dead Front holders provide optimum protection to personnel for Class CC and Midget-Style fuses. 600 VAC/DC



**OKLK002.T Midget Fuse (2 Amp)**  
10 x 38 fast acting, high-interrupting capacity, current-limiting type fuse. 600 Vac/500 Vdc



**P1015-13 (AWG 10/12), P1015-64 (AWG 14/16), P1015-14 (AWG 18/22) Female Quick Connect**  
These 0.25 in. (6.35 mm) female terminals are constructed with an insulator barrel to provide strain relief.



**P1023-20 DIN Rail Adapter**  
Allows module to be mounted on a 35 mm DIN type rail with two #10 screws.



**VRM6048 Voltage Reduction Module**  
Allows the voltage monitor to monitor a 3-phase 550 to 600VAC Line.

### Specifications

#### Line Voltage Type

3-phase delta or wye with no connection to neutral

#### Input Voltage

208 to 480VAC

#### AC Line Frequency

50 - 100 Hz

#### Phase Sequence

ABC

#### Power Consumption

Approx. 2W for 240V units  
Approx. 3W for 480V units

#### Overvoltage, Undervoltage, & Voltage Unbalance

##### Overvoltage & Undervoltage

Voltage detection with delay trip & automatic reset

##### Undervoltage Trip Point

88 - 92% of the selected line voltage

##### Reset Voltage

≅ +3% of trip voltage

##### Overvoltage Trip Point

109 - 113% of the selected line voltage

##### Reset Voltage

≅ -3% of trip voltage

##### Trip Variation vs Temperature

≤ ±2%

##### Voltage Unbalance

Factory fixed from 4 - 10%

##### Reset On Balance

≅ -0.7% unbalance

##### Trip Delay Range

Fixed from 0.2 - 100s ±15% or ±0.1s, whichever is greater

##### Restart Delay Range

Fixed from 0.5s - 999m ±15% or ±0.2s, whichever is greater

#### Phase Reversal & Phase

##### Loss Response

≤ 200ms; automatic reset

##### Phase Loss

≥ 25% unbalance

#### Output

##### Type

Isolated SPDT relay contacts

##### Rating

**208 to 240VAC (55°C)**

10A resistive @ 125VAC, 5A @ 250VAC, 1/4 hp @ 125VAC

**380 to 480VAC**

10A resistive @ 240VAC, 1/4 hp @ 125VAC, 1/3 hp @ 250VAC, max. voltage 277VAC  
Mechanical - 1 x 10<sup>6</sup>; Electrical - 1 x 10<sup>5</sup>

#### Life

##### Protection

##### Phase Reversal/Failure

ASME A17.1 Rule 210.6

##### Motors and Generators

NEMA MG1 14:30, 14:35

##### Surge

IEEE C62.41-1991 Level B

##### Dielectric Breakdown

**208 to 240VAC**

≥ 1500V RMS input to output terminals

**380 to 480VAC**

≥ 2500V RMS input to output terminals

#### Mechanical

##### Mounting

Surface mount with one #8 (M5 x 0.8) screw

##### Dimensions

**H** 50.8 mm (2.0"); **W** 50.8 mm (2.0");

**D** 31.75 mm (1.25")

##### Termination

0.25 in. (6.35 mm) male quick connect terminals

#### Environmental

##### Operating/Storage

##### Temperature

-40° to 55°C / -40° to 85°C

##### Humidity

95% relative, non-condensing

##### Weight

≅ 2.8 oz (79 g)