

## Montec-3PVM-LCD

### 3 Phase Multifunction Voltage Monitoring Relay



The Montec-3PVM-LCD is a 3 Phase Multifunction Voltage Monitoring Relay with a LCD Display which monitors phase sequence, phase failure and phase voltage asymmetry inc. neutral failure (only in 4-wire connection).

- 3-wire or 4-wire connection (with or without neutral)
- Optionally monitors upper and lower voltage & frequency in 3-phase circuits
- The relay draws its supply from the source being monitored
- Both output relays can have their functions set individually
- Measures real effective value of AC voltage (True RMS)
- Optional response delay of the output contact to the measured fault state or transition from the fault state to the OK state inc. delayed response of output contacts after connecting the power supply
- Possibility of automatic or manual transition from fault state (memory)
- Optional closing or opening of the output contact when measuring a fault state
- Password protection against unauthorised changes to settings
- Digital backlit display with the possibility of monitoring the current state of the network, inc. possible failures
- The last five fault states are stored in a history that can be viewed retrospectively
- Sealable transparent cover for display and control

#### Order Code

**Montec-3PVM-LCD**

#### Montec-3PVM-LCD Technical Specification

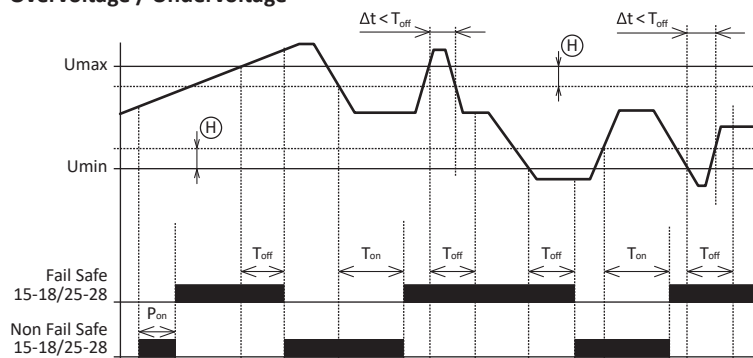
Supply and Measuring Terminals	L1, L2, L3, (N)
Supply and Monitored Voltage	$U_{LN} = 3 \sim 90 - 288V$ (AC 45 - 65Hz) / $U_{LL} = 3 \sim 155 - 500V$ (AC 45 - 65Hz)
Power Consumption (max.)	5VA
Measuring Options	Phase - Neutral Voltage: 3 Phase, 4 Wire / Phase - Phase Voltage: 3 Phase, 3 Wire
Adjustable Upper (OV) and Lower (UV) Voltage Levels	Phase - Neutral Voltage: 90 - 288Vac / Phase - Phase Voltage: 155 - 500Vac
High (HC) / Low (LC) Cut-Off Voltage	Phase - Neutral Voltage: 310Vac / 85Vac / Phase - Phase Voltage: 535Vac / 50Vac
Adjustable Upper (OF) and Lower (UF) Frequency Level	45 - 65Hz
Adjustable Asymmetry	Absolute: 5 - 99Vac / Percentage: 2 - 50%
Adjustable Voltage and Frequency Hysteresis Level	3 - 20Vac (OV, UV, HC, LC) / 0.5 - 2Hz (OF, UF)
Adjustable Hysteresis Asymmetry	Absolute: 3 - 99Vac / Percentage: 2 - 15%
Accuracy of Measured Voltage	+/- 5V
Accuracy of Measured Frequency	+/- 0.3Hz
Adjustable Delay after Supply Connection $P_{on}$	0 - 999s (HW Initialisation 250ms)
Adjustable Delay $T_{on}$	0.5 - 999s
Adjustable Delay $T_{off}$	0.1 - 999s
Fixed Delay	< 100ms (Phase Sequence Failure) / < 200ms (HC, LC) / < 500ms (Neutral Fail)
Changeover Contacts	2 x Changeover (AgSnO <sub>2</sub> )
Rated Current	5A / AC1
Switching Power	1200VA / AC1, 150W / DC1

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Switching Voltage	240Vac /30Vdc
Max. Output Power Dissipation	5W
Mechanical Life	5,000,000 Cycles
Electrical Life (AC1)	50,000 Cycles
Operating Temperature	-10°C to +60°C
Storage Temperature	-20°C to +70°C
Dielectric Strength	4kV (Supply Output)
Operating Position	Any
Mounting	DIN-Rail EN 60715
Protection Degree	IP40 Front Panel with Cover / IP20 Cover & Terminals
Overvoltage Category	III
Pollution Degree	2
Max. Cable Size (mm <sup>2</sup> )	Solid Wire max. 1x 2.5 or 2x 1.5 / Stranded Wire with Ferrule max. 1x 2.5 (AWG 24-12)
Dimensions	90 x 36 x 66.5mm
Weight	132g
Standards	EN 61812-1, EN IEC 63044

## Montec-3PVM-LCD Functions

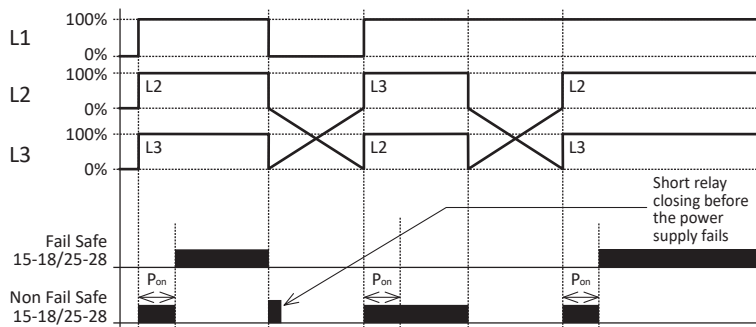
### Overvoltage / Undervoltage



- After the supply/monitored voltage is connected, the delay  $P_{on}$  starts timing - during the timing the output contact is: a) open if the unit is set to run in FAIL SAFE mode. b) closed if the unit is set to run in NON-FAIL SAFE mode. After the delay, if the monitored voltage is in the range  $U_{min} - U_{max}$ , the output contact closes.
- If the monitored voltage exceeds the set value  $U_{max}$ , the time delay to the fault state ( $T_{off}$ ) starts. After the delay, the output contact opens.
- If the monitored voltage falls below the  $U_{max}$  value reduced by the set hysteresis, the time delay ( $T_{on}$ ) will begin. After the delay, the output contact closes.
- If the duration of the fault state ( $\Delta t$ ) is shorter than the set value  $T_{off}$ , the status of the output contact does not change.
- If the monitored voltage falls below the value  $U_{min}$ , the time delay to the fault state ( $T_{off}$ ) starts. After the delay, the output contact opens.
- If the monitored voltage exceeds the value  $U_{min}$  increased by the set hysteresis, the time delay ( $T_{on}$ ) will begin. After the delay, the output contact closes.
- If the duration of the fault state ( $\Delta t$ ) is shorter than the set value  $T_{off}$ , the status of the output contact does not change.

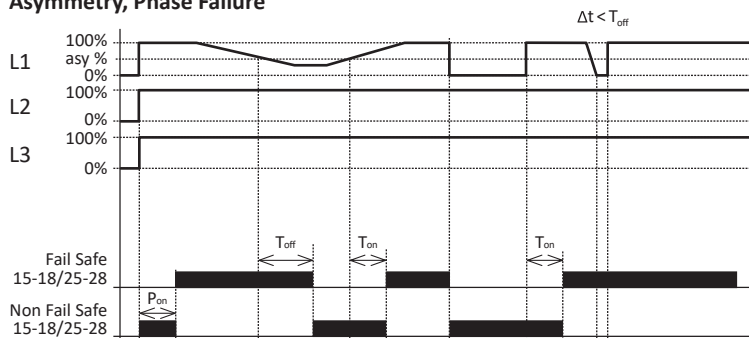
## Montec-3PVM-LCD Functions

### Phase Sequence



- After the supply/monitored voltage is connected, the delay  $P_{on}$  starts timing - during the timing the output contact is:
  - a) open if the unit is set to run in FAIL SAFE mode.
  - b) closed if the unit is set to run in NON-FAIL SAFE mode.
 After the delay, if the phase sequence is correct, the output contact closes.
- If the phase sequence is incorrect after the  $P_{on}$  delay, the output contact remains open.

### Asymmetry, Phase Failure



- After the supply/monitored voltage is connected, the delay  $P_{on}$  starts timing - during the timing the output contact is:
  - a) open if the unit is set to run in FAIL SAFE mode.
  - b) closed if the unit is set to run in NON-FAIL SAFE mode.
 After the delay, if the phase asymmetry is lower than the set value (absolute or percentage), the output contact closes.
- If the phase asymmetry exceeds the set value, the time delay to the fault state ( $T_{off}$ ) begins. After the delay, the output contact opens.
- If the phase asymmetry falls below the set value, the time delay to the OK state ( $T_{on}$ ) begins. After the delay, the output contact closes.
- If the duration of the fault state ( $\Delta t$ ) is shorter than the set value  $T_{off}$ , the status of the output contact does not change.
- If a phase failure occurs, the time delay to the fault state ( $T_{off}$ ) begins. After the delay, the output contact opens.
- If the phase failure resumes, the time delay to the OK state ( $T_{on}$ ) will begin. After the delay, the output contact closes.
- If the duration of the fault state ( $\Delta t$ ) is shorter than the set value  $T_{off}$ , the status of the output contact does not change.

### Graph Legend:

$P_{on}$  - Power ON delay (delay after power supply connection)  
 $P_{on}$  - 0-999s (min. 250ms hardware initialisation)  
 $T_{on}$  - ON delay  
 $T_{on}$  - 0.5-999s  
 $T_{off}$  - OFF delay  
 $T_{off}$  - 0.1-999s

$T_{off}$  - Adjustable for Overvoltage, Undervoltage, Over-frequency, Under-frequency & asymmetry faults (asymmetry = percentage difference between voltage in different phases)  
 $T_{off}$  - Phase sequence, failure <100ms; Neutral fail <500ms  
 $\Delta t$  - Duration of the fault state  
 $\textcircled{H}$  - Hysteresis