



**D4-VM32 / P49-VM32  
D4-VM32N / P49-VM32N  
Voltage & Frequency monitor**

Operating instructions and Guarantee Certificate

[www.icon-electronics.com](http://www.icon-electronics.com)

**Description:**

This device incorporates independent voltage and frequency monitors. Each function controls a separate relay. In addition to providing OVER and / or UNDER voltage and frequency protection, this device will monitor phase failure, phase reversal and phase imbalance (neutral failure on "N" devices). The voltage and frequency is monitored independently with separate upper and lower set-points. A programmable start-up delay, reaction delay, hysteresis, phase imbalance limit and phase imbalance hysteresis is also included. By changing the calibration setting, the readings may be adjusted from 90 – 110%. The individual phase-to-phase voltages are monitored and can be viewed by pressing the "+" button. Every key-press cycles the display in the following order: the voltage between phase 1 and 2, then 1 and 3, then 2 and 3, line frequency and the average of all three phases. Under normal conditions the average of all 3 phases is displayed. Under fault conditions, the display indicates the offending phases using the left hand character, and the message "Hi" or "Lo". A phase imbalance or reversal is indicated by "PH.ib" or "Ph.Er". If the start-up or reaction delay is keeping the relay(s) energised during a fault condition, the display indicates "----" as a warning. A latch facility is also incorporated.

**Menu operation:**

Press the "MENU" button repeatedly until the desired setting is reached, press "SELECT" to display the current value of the selected setting, or sub menu. The "+" and "-" buttons are used to change the value. "ENTER" will return the device to the menu. The "BACK" button will exit the menu.

**Menu options:**

• Upper voltage limit ("Hi") (default: Disabled)

If the input voltage on any phase exceeds this value, the relay de-energises. To disable this feature, set is to maximum (501V). "diSA" is displayed.

• Lower voltage limit ("Lo") (default: Disabled)

If the input voltage on any phase drops below this value, the relay de-energises. To disable this feature, set is to minimum (249V). "diSA" is displayed.

• Voltage Hysteresis ("HySt")

If the input voltage has exceeded the "Hi" setting, or dropped below the "Lo" setting, the voltage must drop, or rise above the applicable limit by this amount before the relay re-energises. This setting is limited to the difference between the "Hi" and "Lo" settings.

• Phase imbalance ("Ph.ib") (default: 20V)

If the difference between any 2 phases exceeds this amount, the relay is de-energised.

• Phase imbalance hysteresis ("Ph. H")

If a phase imbalance has been detected, the voltage difference between the 2 phases that caused the imbalance must reduce by this amount before the relay will re-energise.

• Upper Frequency limit ("Fr.Hi") (default: Disabled)

If the line frequency exceeds this value, the frequency relay de-energises. To disable this feature, set is to maximum (55.1 Hz). "diSA" is displayed.

• Lower Frequency limit ("Fr.Lo") (default: Disabled)

If the line frequency drops below this value, the relay de-energises. To disable this feature, set is to minimum (44.9 Hz). "diSA" is displayed.

• Frequency Hysteresis ("Fr.Hy")

If the frequency has exceeded the "Fr.Hi" setting, or dropped below the "Fr.Lo" setting, the frequency must drop, or rise above the applicable limit by this amount before the relay re-energises. This setting is limited to the difference between the "Fr.Hi" and "Fr.Lo" settings.

• Startup delay ("St d") (default: 1 Second)

If all 3 phases are present, and NOT reversed, the relay is energised upon start-up. The device does NOT monitor voltage errors until the start-up delay has lapsed. This feature is used to allow for over/under-voltage conditions following a power-up. During this time, the display alternates between the actual voltage, and whether it is Hi or Low.

• Reaction delay ("rE d") (Default: 0 seconds)

This function is similar to the start-up delay. The device will tolerate voltage errors for this period of time once monitoring has commenced.

• Calibration ("CAL") (Default: 100%)

This function may be used re-calibrate the device. The readings may be adjusted from 90% to 110%.

• Reset ("rEst)

By selecting this option, all values are reset to default.

Latch facility:

If the latch pins are shorted, the relay will not re-energise until the short is removed, even if the input voltage is within the pre-set limits.

Lock adjustment & full / reduced menu:

When not in a menu or sub-menu, press and hold “+” and “-“. After 3 seconds the display will show “----“. If the keys are released at this point, the lock settings feature will be activated (settings may be viewed, but not changed). If the keys are held for an additional 2 seconds, the display will show “\_\_\_\_\_“. The full menu will be activated. To toggle the lock feature, or full / reduced menu, repeat the above procedure.

Please Note:

- The latch pins MUST BE ISOLATED FROM THE INPUT.
- As a power saving feature, the display dims if settings are not being made.
- We recommend that all relay connections be disconnected while making adjustments and the unit be reset by disconnecting the power after settings have been changed.
- Certain settings are reset to default when the device is re-configured. Before commissioning, re-check all settings to ensure they are correct.
- Even though the device seems to operate correctly, the relay will not energise if the input voltage is below the operating voltage.
- If one phase should fail while an inductive load is connected, the device may indicate the fault as a low phase (not phase failure). The load may be generating a voltage on the 3<sup>rd</sup> phase.

Specifications:

Accuracy:	Voltage:	±0.5% at 25 °C
	Frequency :	±0.05%
Display Resolution:	Voltage:	1 Volt
	Frequency:	0.1 Hz
Input voltage:	±15% of rated voltage	
Led indication:	Relay status	
Response time:	Phase failure /reversal:	<1 Sec
	Over / Under voltage	<2 Sec
	Phase imbalance	<2 sec
	Frequency	<1 Sec
Start-up delay:	1 to 100 sec	
Reaction delay:	0 to 100 sec	

Example: Set the device to energise the relay if the input voltage is between 350V and 400V.

Press “MENU” to display “Hi”. Press “SELECT”. Use the “+” and “-“ buttons to change the value to “400”. Press “ENTER” to return to the menu. “Lo” is displayed. Press “SELECT”. Use “+” and “-“ to change the value to “350”. Press “ENTER”. Press “BACK”.

12 Month guarantee:

Our product is guaranteed for a 12 (twelve) month period from date of purchase. This guarantee is valid for defects arising from failure during specified conditions. This guarantee does not cover damage due to abuse, tampering or improper installation. Our company does not accept liability for any consequential damage or loss arising from product malfunction. Should this product prove to be defective, kindly return for inspection or repair. For further information contact your nearest distributor.

Relay specifications:

**Contact rating:** 10A 250 VAC 2500VA (Resistive)  
**Mechanical life:** 30 million operations  
**Electrical life:** 250 000 operations (at maximum load)

**Note: If the input voltage is below the minimum operating voltage, the relay may not energize. Even though the device’s display is on.**

