



D3-VM31(N) / P44-VM31(N)

**Three phase Voltage monitor 1 relay
(software selectable NEUTRAL monitoring)**

Version 5.16

Operating instructions and Guarantee Certificate
www.iconelectronics.co.za

Description:

In addition to providing OVER and / or UNDER voltage protection, this device will monitor phase failure, phase reversal, phase imbalance & neutral failure (if enabled via software).

A programmable start-up delay, reaction delay, recovery 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”. Neutral error “n.Err”. 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.

Operation:

Even though the average of the 3 phases is being displayed, the individual phase to phase voltages are monitored. If all phases are in the correct order, and no phase imbalance exists, AND all 3 phase to phase voltages are ABOVE the “LO” parameter AND below the “HI” parameter, the relay is energised.

If the voltage goes out of limits (eg above the “HI” parameter), the relay is de-energised until the voltage drops below the “HI” parameter by the “HYST” amount of volts. Eg: “HI”=410V, “HYST”=5V.

The relay is energised while the voltage is BELOW 410V. Once this setpoint is reached, the relay de-energises until the voltage drops to below 405V (410V-5V).

If the latch is used, the relay remains de-energised until the latch is removed.

START-UP delay: The relay is energised at startup for the pre-set time. Monitoring starts after the delay has lapsed.

TRIGGER delay: Fault conditions (NOT phase fail or reversal) are tolerated for this period of time before the relay is de-energised. If a fault condition is detected for longer, the relay is de-energised.

RECOVERY delay: When the relay is de-energised, it will not re-energise before this amount of time, even if all fault conditions are removed. This delay is active at start-up if the START UP delay parameter is set to ZERO.

Menu functionality:

Press the menu “⌂” button repeatedly until the desired setting is reached.

The “▲” and “▼” buttons are used to change the value. “⌂” will display the next menu item. To exit the menu hold “⌂” button for 3 seconds.

Adjustable Parameters:

- 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.

- **Neutral monitoring** (“nEUt”) (Default: “off”)

Enable / Disable neutral monitoring.
- **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.
- **Trigger delay** (“tr 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.
- **Recovery delay** (“rEC. d”) (Default: 0 seconds)

Once the relay is de-energised, it will NOT re-energise for this period of time, even if all fault conditions are removed. To implement this timer at start-up, set the START UP delay parameter to 0.
- **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 (“▼” and “▲” simultaneously), all values are reset to default.

Menu options:

Exit the menu before making the following adjustments.

1. Lock / unlock parameters: (default: unlocked)

Press “▼”, then “⏏” and hold the 2 buttons until the desired option is displayed. The display cycles between “Loc” (no changes allowed) & “u.Loc” (parameters may be adjusted)

2. Full / reduced menu (default: Full)

Press “▲”, then “⏏” and hold the 2 buttons until the desired option is displayed. The display cycles between “rEdu” (limited menu) & “Full” (all parameters are accessible)

3. Access Code: (default: no code)

Once options 1 & 2 are set as required, Press “▼” and “▲” simultaneously until “CODE” is displayed. Now use the “▼” and “▲” to enter a code. (1-9999)

Once a code is entered, access to options 1 & 2 is not permitted. To clear the code & reset option 1 & 2 to default, re-enter the same code again. If the code is forgotten. Press and hold “▼” and “▲” until “CODE” is displayed while re-applying power to the device. To exit without setting a code, press “⏏” while “CodE” & “diSA” is displayed.

Please Note:

- The latch pins MUST BE ISOLATED FROM THE INPUT.
- 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 detect the fault as a low phase (not phase failure), since the load may be generating a voltage on the 3rd phase.

Specifications:

Accuracy:	Voltage: ±2% (typically 1% at 25 °C)
	Frequency : ±0.05%
Display Resolution:	Voltage: 1 Volt
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
Start-up delay:	1 to 100 sec
Reaction delay:	0 to 100 sec

Programming Example :

Configure the device to monitor the NEUTRAL

Press “⏏” repeatedly until the display indicates “nEUt”.

Use the “▼” and “▲” buttons to change the value to “on”.

Press and hold “⏏” for 3 seconds to exit the menu.

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 it 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)

