LINETRAXX® VME420
Multi-functional monitoring relay for undervoltage, overvoltage and frequency monitoring in AC/DC systems with separate supply voltage
Device features

- Monitoring AC/DC systems for under-voltage, overvoltage and frequency in the voltage range of 0…300 V
- Various monitoring functions selectable: $< U, > U, < f, > f$
- Start-up delay, response delay and delay on release
- Adjustable switching hysteresis
- r.m.s. value measurement (AC+DC)
- Digital measured value display via multi-functional LC display
- Preset function (automatic setting of basic parameters)
- LEDs: Power On, Alarm 1, Alarm 2
- Measured value memory for operating value
- Continuous self monitoring
- Internal test/reset button
- Two separate alarm relays (one changeover contact each)
- N/C or N/O operation and fault memory behaviour selectable
- Password protection for device setting
- Sealable transparent cover
- Two-module enclosure (36 mm)
- Push-wire terminal (two terminals per connection)
- RoHS compliant

Product description

The VME420 series voltage relays are designed to monitor the frequency, undervoltage, overvoltage and the voltage between two threshold values in AC and DC systems. The voltages are measured as r.m.s. values. The currently measured value is continuously shown on the LC display. The measured value required to trigger the alarm relay is stored. Due to adjustable response times, installation-specific characteristics, such as device-specific start-up procedures, short-time voltage fluctuations, etc. can be considered. The relays require an external supply voltage.

Typical applications

- Voltage and frequency monitoring of single-phase machines and electrical installations
- Earth fault monitoring in medium-voltage systems via voltage transformers
- Monitoring of battery systems
- Switching machinery and equipment on and off at a certain voltage level

Function

Once the supply voltage is applied, the start-up delay $t$ begins. Measured voltage and frequency values changing during this time do not influence the switching state of the alarm relays. The devices feature two separately adjustable measuring channels (overvoltage/undervoltage). When the measuring quantity exceeds the response value ("Alarm 1") or falls below the response value ("Alarm 2"), the time of the response delays $t_{on1/2}$ begins. Once the response delay has elapsed, the alarm relays switch and the alarm LEDs light up. When the measuring value exceeds or falls below the release value (response value plus hysteresis) after the alarm relays have switched, the selected release time $t_{off}$ begins. When $t_{off}$ has elapsed, the alarm relays switch back to their initial position. When the fault memory is activated, the alarm relays remain in alarm position until the reset button "R" is pressed. When the fault memory is set to continuous mode, the alarm parameters remain stored, even on failure of the supply voltage.

Preset function

After connecting the device for the first time, the nominal system voltage will be determined (PrE run), and the response values for overvoltage and undervoltage as well as for underfrequency and overfrequency will automatically be set. When no voltage is determined within a nominal system voltage range (PrE run), the response values will be set to the minimum or maximum voltage. In this case, the message "AL not SET" appears on the display. As long as no button is pressed, a nominal system voltage is being searched cyclically (PrE run). If a button is pressed, the search will be interrupted and the message "AL not SET" disappears. In this case, the appropriate response values have to be set in the menu. When activating the frequency monitoring function, the preset frequency will automatically be stored.
1 - Power On LED "ON" (green); lights when supply voltage is applied and flashes in the event of system fault alarm

2 - Alarm LED "AL1" (yellow), lights when the set response value $>U_f/U_f$ is exceeded and flashes in the event of system fault alarm

3 - Alarm LED "AL2" (yellow), lights when the value falls below the set response value $<U_f/U_f$ and flashes in the event of system fault alarm

4 - Multi-functional LC display

5 - Test button "T": Arrow up button: To change the measured value display, move upwards in the menu or to change parameters. To call up the self test: press the button >1.5 s

6 - Reset button “R”: Arrow down button: to change the measured value indication, move downwards in the menu or to change parameters. To delete stored alarms: press the button “T” >1.5 s

7 - “MENU” button: Enter button: to confirm the measured value indication or to confirm changed parameters. To call up the menu system, press the button “T” >1.5 s Press the ESC button > 1.5 s to abort an action or to return to the previous menu level

When the menu item LED is activated, the alarm LED “AL1” indicates that K1 is in the alarm state. When “AL2” lights up, K2 is in the alarm position.

1 - Connection to the system/load being monitored
2 - Supply voltage $U_S$ (see ordering information)
3 - Alarm relay “K1”: Configurable for $<U_f/U_f$/ERROR
4 - Alarm relay “K2”: Configurable for $<U_f/U_f$/ERROR
5 - Line protection according to IEC 60364-4-43: A fuse recommended. If being supplied from an IT system, both lines have to be protected by a fuse.
Ordering information

<table>
<thead>
<tr>
<th>Supply voltage 1) Us</th>
<th>Type</th>
<th>Art. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16…72 V, 15…460 Hz</td>
<td>VME420-D-1</td>
<td>B 7301 0001</td>
</tr>
<tr>
<td>70…300 V, 15…460 Hz</td>
<td>VME420-D-2</td>
<td>B 7301 0002</td>
</tr>
<tr>
<td>DC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Device version with screw terminals on request.  
1) Absolut values

Accessories

<table>
<thead>
<tr>
<th>Type designation</th>
<th>Art. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting clip for screw mounting (1 piece per device)</td>
<td>B 9806 0008</td>
</tr>
</tbody>
</table>

Dimension diagram XM420

Dimensions in mm  
Open the front plate cover in direction of arrow!

Screw mounting  
Note: The upper mounting clip must be ordered separately (see ordering information).
Technical data

### Insulation coordination acc. to IEC 60664-1/IEC 60664-3
- Rated insulation voltage: 250 V
- Rated impulse voltage/pollution degree: 4 kV/3
- Protective separation (reinforced insulation) between: (A1, A2) - (U1+/-, U2/-) - (11-12-14) - (21-22-24)

### Supply voltage
- **VME420-D-1:**
  - Supply voltage $U_s$: AC 16...72 V/DC 9.6...94 V
  - Frequency range $f_s$: 15...460 Hz
- **VME420-D-2:**
  - Supply voltage $U_s$: AC/DC 70...300 V
  - Frequency range $f_s$: 15...460 Hz
  - Power consumption: ≤ 4 VA

### Response values
- **Undervoltage $< U$ (Alarm 2):**
  - Frequency $f_s$: DC, 15...460 Hz
  - Frequency range: 10...500 Hz
- **Overvoltage $> U$ (Alarm 1):**
  - Frequency $f_s$: AC/DC 6...300 V
  - Resolution of setting $U_f$: 6.0...49.9 V
  - Resolution of setting $U_f$: 1 V

#### Preset function:
- **Undervoltage $< U$:**
  - Resolution of setting $U_f$: 0.1 V
- **Overvoltage $> U$:**
  - Resolution of setting $U_f$: 1 V

### Resolution of setting for $U_f$.
- $U_f$: 0.1 V
- $U_f$: 1 V

### Response time
- **Start-up delay $t$:**
  - 0...300 s (0 s)*
- **Response delay $t_{on1/2}$:**
  - 0...300 s (0 s)*
- **Delay on release $t_{off}$:**
  - 0...300 s (0.5 s)*

#### Time response
- **Resolution of setting $t_{on1/2}$, $t_{off}$ (0...10 s):**
  - $t_{on1/2}$: 0.1 s
  - $t_{off}$: 1 s
- **Resolution of setting $t_{on1/2}$, $t_{off}$ (10...99 s):**
  - $t_{on1/2}$: 10 s
- **Operating time, voltage $f_{es}$:**
  - DC/AC 16.7 Hz: ≤ 130 ms, AC 42...460 Hz: ≤ 70 ms
  - Operating time frequency $f_{es}$: AC 15...460 Hz: ≤ 310 ms
- **Response time $t_n$:**
  - $t_n = t_{on1/2} + t_{off}$
- **Recovery time $t_b$:**
  - ≤ 300 ms

### Displays, Memory
- Display: LC display, multifunctional, not illuminated
- Data register: 10000
- Contact data acc. to IEC 60947-5-1:
  - AC 13
  - DC 14
  - DC 12
  - DC 12

### Switching elements
- **Number:**
  - 2 x 1 changeover contacts (K1, K2)
- **Operating principle:**
  - N/C operation/N/O operation
- **K2: Err, < U, > U, < Hz, > Hz, S AL (undervoltage < U):**
- **K1: Err, < U, > U, < Hz, > Hz, S AL (overvoltage > U):**

### Environment/EMC
- **EMC:**
  - IEC 61326-1
- **Operating temperature:**
  - -25...+55 °C
- **Classification of climatic conditions acc. to IEC 60721:**
  - Stationary use (IEC 60721-3-3): 3K5 (no condensation, no formation of ice)
  - Transport (IEC 60721-3-2): 2K3
  - Long-term storage (IEC 60721-3-1): 1K4
- **Classification of mechanical conditions acc. to IEC 60721:**
  - Stationary use (IEC 60721-3-3): 3M4
  - Transport (IEC 60721-3-2): 2M2
  - Long-term storage (IEC 60721-3-1): 1M3

### Connection
- **Connection type:**
  - push-wire terminals
- **Connection properties:**
  - rigid: 0.2...2.5 mm² (AWG 24...14)
  - flexible without ferrule: 0.75...2.5 mm² (AWG 19...14)
  - flexible with ferrule: 0.2...1.5 mm² (AWG 24...16)
  - Stripping length: 10 mm
  - Opening force: 50 N
  - Test opening, diameter: 2.1 mm

### Other
- **Operating mode:**
  - continuous operation
- **Mounting:**
  - any position
- **Degree of protection, internal components (DIN EN 60529):**
  - IP30
- **Degree of protection, terminals (DIN EN 60529):**
  - IP20
- **Flammability class:**
  - UL94 V-0

### Weight
- ≤ 150 g

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**Notes:**
- * = factory setting
- ** = The technical data applies to the operating range of the rated frequency 15...460 Hz only