Easergy Range - VD23
Voltage detector relay for transfer system and safety

VD23 is a compact voltage detection relay for MV networks voltage from 3 kV to 36 kV, 50/60 Hz, efficient and self-adapted.

Product at a glance

- At the leading edge of technology.
  VD23 provides a presence and an absence of voltage relay for all MV network neutral systems.
- Self-adapted to the network voltage.
  VD23 is ready to use.
- Skilfully designed.
  VD23 displays the voltage (in % of the calibrated voltage).
- Adapted to various situation.
  VD23 can be configured to work on different combination of phase and unbalanced voltage.
- Compact and in DIN format.
  VD23 fits naturally into MV cubicles.
- The VD23 function is also available in the Flair 23DM, which also includes the fault current detection function and the possibility to communicate via an RS485 Modbus port.

The VD23, voltage detector relay for transfer system and safety, provides:
- Presence of voltage detection
- Absence of voltage detection
- Automatic calibration
- Flexibility
- Programmable logic.

Application

- Application based on presence of voltage
  - The loss of voltage activates a change of state of the R1 relay
  - Automatic transfer systems
  - Alarms on voltage loss
  - Automation on loss of voltage.
- Application based on absence of voltage
  - Earth locking on presence on voltage
  - Alarms on voltage presence.

Reference

The ordering code for the VD23 is: EMS58421.

Compatibility

VD23 VPIS-VO input is compatible with VPIS V2 only. It is not compatible with VPIS V3.
VD23 - voltage detector relay

Hardware and software description

Voltage detection

- VD23 detects a presence and absence of voltage, and activates 2 relays:
  - R1 = Presence of voltage
  - R2 = Absence of voltage.
- The 2 functions are running simultaneously
  - The two relay outputs are separate and can therefore work independently (e.g. voltage absence for automatic transfer function, voltage presence indication for interlocking on earthing switch, etc).
  - The combination of the function allows specific applications.

Calibration principle

- At the VD23 power up, the voltage input is scanned, and as soon as it is stabilized, the input voltage is memorized, and is considered as the nominal voltage.
  - Stabilization time = 3 s
  - At any time, through the keyboard configurator a new calibration can be done.

Settings

- By configuration (microswitches) the phase to take into account or the unbalanced voltage can be chosen
  - Select the phase or phases voltage to be checked
  - Select to check the unbalanced voltage
  - Select to check phase to earth or phase to phase voltage.
  For example:
  - 3 phases and unbalanced: V1+V2+V3+V0
  - 3 phases: V1+V2+V3, or U12+U13+U23
  - Single phase: V1, V2, V3, U12, U13 or U23
  - Unbalanced voltage only: V0.
- Relay fail-safe position
  - A switch allows choice of normal or inverse position for each relay.
  It gives the relay position when power supply is down.
- Time delay is configurable for each relay
  - On active position
  - On inactive position.
- Thresholds are configurable (from keyboard) independently for both relays
  - Configuration in % of the voltage
  - Single voltage or unbalanced voltage.

Assembly and dimension

- Compact case assembly:
  - DIN format 93 x 45 mm
  - Secured, extraction-proof mounting
  - Extractable terminal connections
  - Mounting in all types of MV cubicle: RM6, SM6, CAS, FBX others.
- Dimension in mm
  - Outer casing:
    - H x L x P: 48 x 96 x 100
    - Flush-mounting cut-out (max. plate thickness: 20/10°)
  - L: 92 (-0, + 0.8); H: 45 (-0, + 0.6)
### Characteristics

**Frequency (auto-detection)**
- 50 Hz and 60 Hz

**Service voltage**
- Un: 3 to 36 kV - Vn: 1.7 to 24 kV

**Cubicles**
- RM6 – Ringmaster - SM6 24/36 - CAS - MCSet - FBX

**Display**
- 4 digits LCD

**Measurement**
- Voltage (% of the nominal voltage) With VPIS V2-VO
  - Phase-to-neutral or phase-to-phase voltages

#### Voltage detection

| Configuration of detection mode | Measurement type | Phase-to-neutral or phase-to-phase voltage
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<td>via microswitches</td>
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| Configuration of thresholds and time delays | Voltage presence (R1) | 40 to 90% (10% increments) |
| Thresholds settings (% of rated voltage) | Residual voltage threshold | 30 to 60% (10% increments) |
| Accuracy ±10% | Voltage absence (R2) | 10 to 30% (10% increments) |

**Time delays settings**
- Activation time delay (R1 or R2 direct)
  - 0 to 1 s (0.1 s increments) and from 1 to 21 s (2 s increments) and from 1 to 15 mn (1, 3, 5, 7, 10, 15 mn)
- Release time delay (R1 or R2 direct)
  - 0 to 1 s (0.1 s increments) and from 1 to 3 s (0.5 s increments)

**Characteristics of relays R1 and R2**
- Maximum load
  - AC: 8 A; DC: 8 A
- Maximum cut-off voltage
  - AC: 400 V; DC: 300 V
- Maximum cut-off power
  - AC: 2000 VA (8 A, 240 V); DC: 240 W (8 A, 30 V)
- Dielectric between open contacts
  - 1 kV - 1 min

**Power supply**
- Auxiliary power supply
  - Voltage
    - 24 to 48 Vdc; -20% +10%
  - Insulation
    - Inputs / mechanical ground: 2 kV 50 Hz 1 min

**Test mode**
- By button on the front panel
  - Product name; Software version; Network frequency; Digits test

**Insulation resistance**
- Standards
  - Dielectric withstand: IEC 60255-5
  - Impulse wave: IEC 60255-5
  - Insulation resistance: IEC 60255-5
  - R > 100 MΩ 500 V, 1 min

**EMC (immunity and electromagnetic interference)**
- Standards
  - Electrostatic discharge: IEC 61000-4-2
  - Radiated fields: IEC 61000-4-3
  - Fast transients: IEC 61000-4-4
  - Impulse waves: IEC 61000-4-6
  - Common mode radio frequencies: IEC 61000-4-6
  - 50 Hz magnetic fields: IEC 61000-4-8
  - Damped oscillatory waves: IEC 61000-4-12
  - Damped oscillatory waves - short: IEC 61000-4-18
  - Damped oscillatory waves - rapid: IEC 61000-4-18
  - Damped oscillatory waves - rapid: IEC 61000-4-18

**Climatic tests**
- Standards
  - Level
  - Comments
  - In operation
    - Exposure to cold: IEC 60068-2-1
    - Exposure to dry heat: IEC 60068-2-2
    - Exposure to damp heat: IEC 60068-2-78
    - Temperature variation: IEC 60068-2-14
  - In storage
    - Damp heat cyclic test: IEC 60068-2-30
    - Damp oscillatory waves: IEC 60068-2-18
    - Damp oscillatory waves - rapid: IEC 60068-2-18

**Corrosive atmosphere**
- Salt spray test: IEC 60068-2-52
  - Kb / 2
  - 3 cycles: exposure period of 2 hours with 22 hours rest

**Mechanical tests**
- Standards
  - Level
  - Comments
  - In operation
    - Vibrations: IEC 60228-2-26 Fc
    - Shock test: IEC 60228-2-27 Ea
    - Seismic test: IEC 60228-2-29
  - In storage
    - Vibrations: IEC 60228-2-26 Fc
    - Shock test: IEC 60228-2-27 Ea
    - Seismic test: IEC 60228-2-29

**Enclosure protection**
- Standards
  - IP41/IP30
  - On front panel / Other parts
  - IK07
  - 2 joules

**Packaging impact protection**
- IEC 60068-2-32, NF EN 22248
  - Method 1m / 6 sides / 4 corners
**Microswitches**

- 6 microswitches are dedicated to define the logical:
  - SW1: direct/inverse action on output relays.
    - The inverse action switches the logical relay output.
  - SW2: calculation on phase to earth voltage (V) or phase to phase voltage (U)
  - SW3, SW4, SW5: choice of the voltage to monitor (used/not used).
    - SW3= Ph 1 / SW4= Ph 2 / SW5= Ph 3.
  - SW6: monitor of the unbalanced voltage (used/not used).
    - Only for phase to earth voltage

- Example of settings:
  - V1: Phase to earth voltage on line 1 is present
  - TT: Phase to earth voltage on line 1 is absent
  - V1+V2: V1 or V2 is present
  - V1.V2: V1 and V2 are present.

**Accessories**

VD23 is fitted to a VPIS-VO adapted for the voltage measurement. The VPIS-VO, is linked to the capacitor connected to the MV busbar, and delivers a voltage signal on a specific connector. Various references of VPIS-VO allows adaptation to different level of MV Voltage and MV capacitors values.

Consult VPIS V2 Technical Leaflet (reference ENMED309037EN) for VPIS references to be used in each case.