

VARIMETER Asymmetry Relay AK 9840

Translation
of the original instructions



- According to IEC/EN 60255-1
- For nominal voltages from 3 AC 110 up to 690 V
- Detection of
 - Voltage asymmetry
 - Incorrect phase sequence
 - Phase failure
 - Undervoltage
- Voltage feedback recognition
- Also suitable for harmonic industrial mains
- Closed circuit operation
- Contact position indication
- With adjustable delay
- 2 C/O contacts
- Width: 75 mm

Product Description

The asymmetry relays AK 9840 of the VARIMETER series monitors voltage asymmetry, under voltage, phase failure as well as incorrect phase sequence at three-phase mains. The measurement is very simple and can be carried out without much wiring effort, as no separate auxiliary voltage is required. Early detection of impending failures and preventive maintenance prevent costly damage and as a user you benefit from the operational safety and high availability of your system.

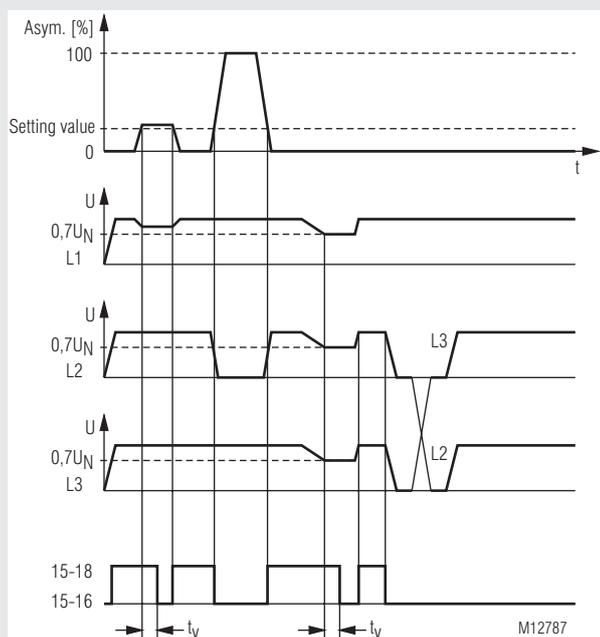
Approvals and Markings



Applications

Monitoring three-phase mains for voltage asymmetry, phase failure or incorrect phase sequence.

Function Diagram



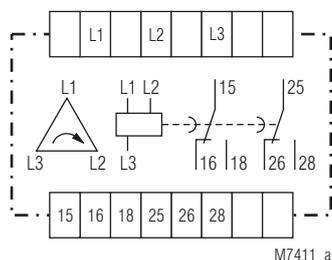
Function

The AK 9840 asymmetry relay monitors the voltage symmetry of the phase voltages, the undervoltage and the correct phase sequence L1-L2-L3. Voltage asymmetry and undervoltage are determined by measuring the arithmetic average between the three phases.

If there is no fault in the system being monitored the output relay is energized (closed circuit principle), contact 15-18, 25-28 is closed, and this is indicated by a green LED. The instrument responds to asymmetrical voltage changes caused by unequal mains loading or failure of an outer conductor due to the melting of a fuse. An asymmetry relay always only detects the difference between two voltages, and hence does not react to symmetric voltage falls in the mains supply unless the voltage drops below the undervoltage recognition value set at $0.7 U_N$. If the set asymmetry is exceeded positively or negatively or if there is undervoltage, the output relay is deenergized after the set response delay. If the phase sequence is incorrect, the output relay responds without delay. The LED indicator is extinguished. Thanks to the special circuitry which evaluates the phase angle, in a fault condition, the relay will not be affected by any voltage feedback. Depending on the mains conditions, the feedback is identified as asymmetry - delayed - or as incorrect phase sequence - non-delayed.

Mains supplies with a mid-point conductor can also be monitored with the Instrument. It is not necessary to connect the neutral. The nominal voltage for this application must be converted to delta voltage when placing an order. Industrial mains with thyristors, with automatic reactive current compensating plant and with emergency power generators have a high harmonic content. With the AK 9840 the measuring principle employed ensures that no errors occur in the response values. Also suitable for automatic changeover to battery-powered operation of emergency lightings when the supply voltage drops by 30 % (to VDE 0108).

Circuit Diagrams



AK 9840.82

Connection Terminals

Klemmenbezeichnung	Signalbeschreibung
L1, L2, L3	Connection of the monitoring 3-phase system
15, 16, 18	1. changeover contact
25, 26, 28	2. changeover contact

Indicators

LED: On, when output relay active

Technical Data

Input

Nominal voltage U_N:	3 AC 400 V additional voltages for ranges 3 AC 110 ... 690 V are also available on request
Voltage range:	0.7 ... 1.1 U_N / 0.7 ... 1.2 U_N to 1.5 s
Nominal consumption:	≤ 7.1 VA
Nominal frequency:	50 / 60 Hz
Frequency range:	± 5 % / 10 % to 1.5 s
Max. harmonics level:	Distortion factor $K \leq 12\%$

Setting Ranges

Setting range:	5 ... 20 % U_N voltage asymmetry settable 0.98 fixed
Hysteresis:	
Voltage feedback recognition:	Up to 100 % - setting value, e.g. when setting value = 5 % asymmetry, 100 % - 5 % = 95 % Recognition of voltage feedback up to 95 %
Undervoltage setting:	0.7 U_N
Delay:	0.5 ... 5 s infinite variable

Output

Contacts	
AK 9840.82:	2 changeover contacts
Thermal current I_{th}:	6 A
Switching capacity	
To AC 15	
NO contact:	2 A / AC 230 V IEC/EN 60947-5-1
NC contact:	1 A / AC 230 V IEC/EN 60947-5-1
To DC 13:	1 A / DC 24 V IEC/EN 60947-5-1
Electrical life	
At 6 A, AC 230 V $\cos \varphi = 1$:	1,5 x 10 ⁵ switching cycles
Short-circuit strength	
Max. fuse rating:	4 A gG / gL IEC/EN 60947-5-1
Mechanical life:	> 30 x 10 ⁵ switching cycles

General Data

Operating mode:	Continuous operation
Temperature range:	
Operation:	- 20... + 60 °C
Storage:	- 25... + 60 °C
Altitude:	≤ 2000 m
Clearance and creepage distances	
Rated impulse voltage / pollution degree:	
Measuring input / contact:	6 kV / 2 IEC 60664-1
Contacts 15, 16, 18 / 25, 26, 28:	4 kV / 2 IEC 60664-1
EMC	
Electrostatic discharge:	8 kV (air) IEC/EN 61000-4-2
HF irradiation	
80 MHz ... 2,7 GHz:	10 V / m IEC/EN 61000-4-3
Fast transients:	2 kV IEC/EN 61000-4-4
Surge voltages	
Between	
wire for powers supply:	1 kV IEC/EN 61000-4-5
Between wire and ground:	2 kV IEC/EN 61000-4-5
HF wire guided:	10 V IEC/EN 61000-4-6
Interference suppression:	Limit value class B EN 55011
Degree of protection	
Housing:	IP 40 IEC/EN 60529
Terminals:	IP 20 IEC/EN 60529
Housing:	Thermoplastic with V0 behaviour according to UL subject 94
Vibration resistance:	Amplitude 0.35 mm IEC/EN 60068-2-6 frequency 10 ... 55 Hz
Climate resistance:	20 / 060 / 04 IEC/EN 60068-1
Terminal designation:	EN 50005
Wire connection:	DIN 46228-1/-2/-3/-4

Technical Data

Screw terminals:	2 x 2.5 mm ² solid or 2 x 1.5 mm ² stranded wire with sleeve
Insulation of wires or sleeve length:	8 mm
Wire fixing:	Plus-minus terminal screws M3.5 with self-lifting clamping piece
Fixing torque:	0.8 Nm
Mounting:	DIN rail IEC/EN 60715
Weight:	300 g

Dimensions

Width x height x depth:	75 x 77 x 119 mm
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Standard Type

AK 9840.82	3 AC 400 V	50 / 60 Hz
Article number:	0040621	
• Output:	2 changeover contacts	
• Nominal voltage U_N :	3 AC 400 V	
• Width:	75 mm	

Characteristic

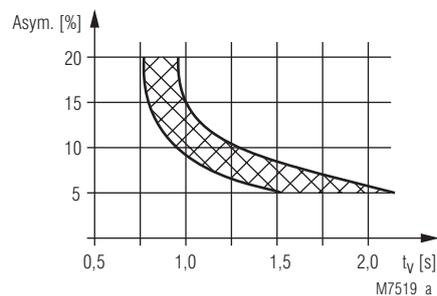


Diagramm Start up delay

The diagram shows the start delay in relation of the adjusted asymmetry when the unit is switched to the symmetric mains.