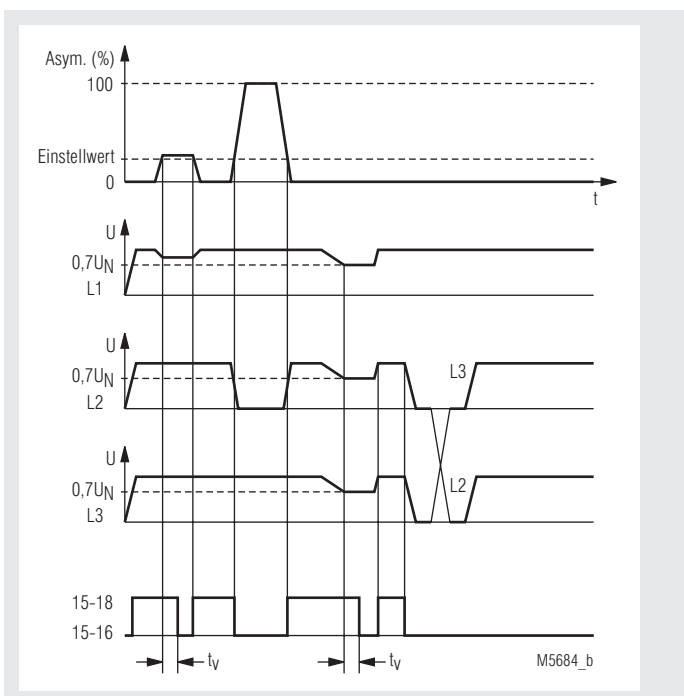


## VARIMETER Asymmetry Relay AK 9840

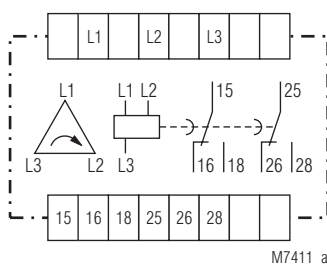


- According to EN 60 255-1
- For nominal voltages from 3 AC 230 up to 500 V
- Detection of
  - voltage asymmetry
  - incorrect phase sequence
  - phase failure
  - undervoltage
- Voltage feedback recognition
- Also suitable for harmonic industrial mains
- Closed circuit operation
- Contact position indication
- With adjustable delay
- 2 C/O contacts
- Width: 75 mm

### Function Diagram



### Circuit Diagram



AK 9840.82

### Approvals and Markings



### Application

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

### 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, 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).

### Indication

LED: on, when output relay active

## Technical Data

### Input

<b>Nominal voltage <math>U_N</math>:</b>	3 AC 400 V additional voltages for ranges 3 AC 100 ... 690 V are also available
<b>Voltage range:</b>	0.7 ... 1.1 $U_N$ / 0.7 ... 1.2 $U_N$ to 1.5 s
<b>Nominal consumption:</b>	≤ 7.1 VA
<b>Nominal frequency:</b>	50 / 60 Hz
<b>Frequency range:</b>	± 5 % / 10 % to 1.5 s
<b>Max. harmonics level:</b>	distortion factor $K \leq 12$ %

### Setting Ranges

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

### Output

<b>Contacts</b>	AK 9840.82:	2 changeover contacts
<b>Thermal current <math>I_{th}</math>:</b>		6 A
<b>Switching capacity</b>		
to AC 15		
NO contact:	3 A / AC 230 V	IEC/EN 60 947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60 947-5-1
<b>Electrical life</b>		
to AC 15 at 1 A, AC 230 V:	≥ 2.5 x 10 <sup>5</sup> switch. cycl.	IEC/EN 60 947-5-1
<b>Short-circuit strength</b>		
<b>max. fuse rating:</b>	4 AgL	IEC/EN 60 947-5-1
<b>Mechanical life:</b>	> 30 x 10 <sup>6</sup> switching cycles	

### General Data

<b>Operating mode:</b>	Continuous operation
<b>Temperature range:</b>	- 20 ... + 60°C
<b>Clearance and creepage distances</b>	
rated impulse voltage / pollution degree:	
Measuring input to contacts:	6 kV / 2 IEC 60 664-1
Relay contact to relay contact:	4 kV / 2 IEC 60 664-1
<b>EMC</b>	
Electrostatic discharge:	8 kV (air) IEC/EN 61 000-4-2
HF irradiation:	3 V/m IEC/EN 61 000-4-3
Fast transients:	2 kV IEC/EN 61 000-4-4
Surge voltages between wire for powers supply:	1 kV IEC/EN 61 000-4-5
between wire and ground:	2 kV IEC/EN 61 000-4-5
Interference suppression:	Limit value class B EN 55 011
<b>Degree of protection</b>	
Housing:	IP 40 IEC/EN 60 529
Terminals:	IP 20 IEC/EN 60 529
<b>Housing:</b>	Thermoplastic with V0 behaviour according to UL subject 94
<b>Vibration resistance:</b>	Amplitude 0.35 mm IEC/EN 60 068-2-6 frequency 10 ... 55 Hz
<b>Climate resistance:</b>	20 / 060 / 04 IEC/EN 60 068-1
<b>Terminal designation:</b>	EN 50 005
<b>Wire connection:</b>	2 x 2.5 mm <sup>2</sup> solid or 2 x 1.5 mm <sup>2</sup> stranded wire with sleeve DIN 46 228-1/-2/-3/-4
<b>Wire fixing:</b>	Flat terminals with self-lifting clamping piece IEC/EN 60 999-1
<b>Fixing torque:</b>	0.8 Nm
<b>Mounting:</b>	DIN rail IEC/EN 60 715
<b>Weight:</b>	300 g

### Dimensions

<b>Width x height x depth:</b>	75 x 78 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

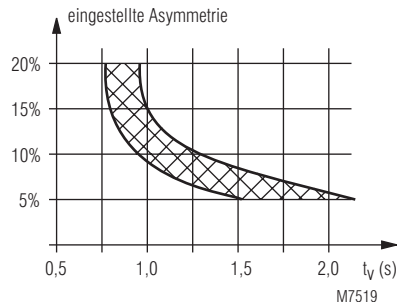


Diagramm Start up delay

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