

## VARIMETER

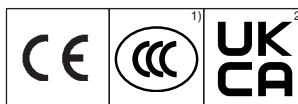
Undervoltage Relay, 3-phase  
IK 9171, IL 9171, SK 9171, SL 9171

Translation  
of the original instructions



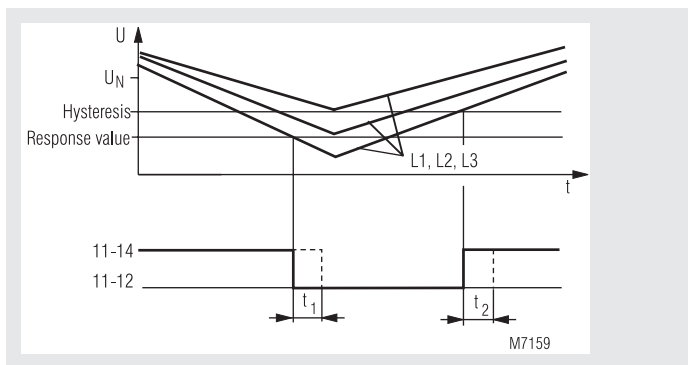
- According to IEC/EN 60255-1
- Monitoring of undervoltage in 3-phase system
- Also for single phase
- Without auxiliary supply
- Optionally for 3p3w systems
- LED indicator for state of output relay
- Independent of phase sequence
- 1 or 2 changeover contacts
- Optionally fixed or settable response value
- As option with phase sequence detection
- Optionally with or without N
- Optionally with off-delay  $t_1$
- Optionally with on delay  $t_2$
- Devices available in 2 enclosure versions:
  - I-model: Depth 59 mm, with terminals at the bottom for installation systems and industrial distribution systems according to DIN 43880
  - S-model: Depth 98 mm, with terminals at the top for cabinets with mounting plate and cable duct
- Width:
  - IK 9171, SK 9171: 17.5 mm
  - IL 9171, SL 9171: 35 mm

### Approvals and Markings



<sup>1)</sup> Only IL 9171; <sup>2)</sup> Only IK/SK 9171

### Function Diagram



### Application

Monitoring of voltage systems on undervoltage. Automatic switching to emergency supply or of emergency light in the case of phase loss according to DIN VDE 0100-710 or DIN VDE 0108.

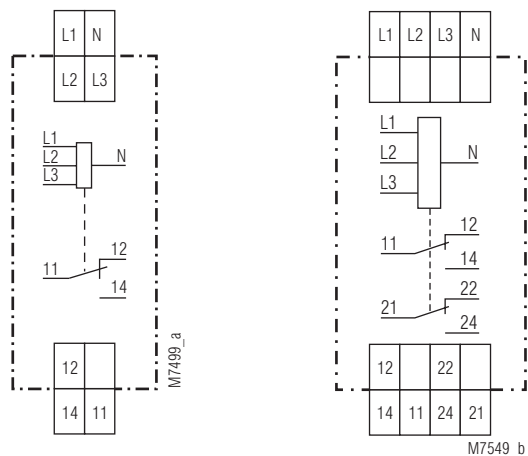
Variants with  $t_2$  is used in unstable voltage systems, where after phase failure detection the consumers should be energized one after the other. This is done by setting the operate delay e.g. 0.1 ... 20 s of the different relays to different values.

This variant is also used where a consumer after only short phase failure should not be started immediately (e.g. compressors).

### Function

The arithmetic mean value of each phase is measured against N. The variants without N measure L1 and L3 against L2 (IK/SK 9171) and L1 and L2 against L3 (IL/SL 9171).

### Circuit Diagrams



IK 9171.11,  
SK 9171.11

IL 9171.12,  
SL 9171.12

### Indicators

Yellow LED: Output contact active (11-14 closed)

### Notes

To measure single-phase voltage terminals L1, L2, L3 have to be linked together.

The time delay  $t_1$  is only active if the voltage L1-N (IK/SK 9171) or L3-N (IL/SL 9171) is at least  $0,5 U_N$ .

Please be aware, that devices of this variant show "good" state after applying power supply even when there is a fault e.g. wrong phase sequence or undervoltage. Only after elapse of the time delay  $t_1$  the unit changes into "failure" state.

## Technical Data

### Input Circuit

#### Nominal voltage $U_N$

3-phase without neutral: 3 AC 100 V, 110 V, 127 V, 220 V, 230 V,  
3 AC 240 V, 290 V, 400 V, 415 V, 440 V,  
3 AC 480 V, 500 V

3-phase with neutral: 3/N AC 100 V / 58 V; 3/N AC 110 V / 64 V;  
3/N AC 220 V / 127 V; 3/N AC 230 V / 133 V;  
3/N AC 380 V / 220 V; 3/N AC 400 V / 230 V;  
3/N AC 415 V / 240 V; 3/N AC 440 V / 254 V;  
3/N AC 480 V / 277 V; 3/N AC 500 V / 290 V  
1.15  $U_N$  continuously

#### Max overload:

#### Nominal consumption

IK/SK 9171.11: Approx. 6 VA

IL/SL 9171.12: Approx. 8 VA

#### Frequency range:

45 ... 65 Hz

### Setting ranges

**Response value:** Fixed: 0.7 or 0.85  $U_N$   
Adjustable: 0.55 ... 1.05  $U_N$   
**Hysteresis:** Approx. 4 % of setting value

#### Time delay $t_1$ / $t_2$ :

0.5 ... 20 s

#### Reaction time:

Approx. 100 ms

### Output

#### Contacts

IK/SK 9171.11: 1 changeover contact  
IL/SL 9171.12: 2 changeover contacts

#### Contact material:

AgNi

#### Switching voltage:

AC 250 V

#### Thermal current $I_{th}$ :

4 A

#### Switching capacity

to AC 15 NO contact: 3 A / AC 230 V IEC/EN 60947-5-1

NC contact: 1 A / AC 230 V IEC/EN 60947-5-1

**Electrical life** IEC/EN 60947-5-1

to AC 15 at 1 A, AC 230 V:  $\geq 3 \times 10^5$  switching cycles

#### Short circuit strength

**max. fuse rating:** 4 A gG / gL IEC/EN 60947-5-1

**Mechanical life:**  $\geq 30 \times 10^6$  switching cycles

### General Data

**Operating mode:** Continuous operation

#### Temperature range:

Operation: - 20 ... + 60 °C

Storage: - 25 ... + 60 °C

Relative air humidity: 93 % at 40 °C

**Altitude:**  $\leq 2000$  m

#### Clearance and creepage distances

Rated impulse voltage / pollution degree: 4 kV / 2 IEC 60664-1

#### EMC

Electrostatic discharge: 8 kV (air) IEC/EN 61000-4-2

HF irradiation IEC/EN 61000-4-3

80 MHz ... 1 GHz: 20 V / m IEC/EN 61000-4-3

1 GHz ... 2 GHz: 20 V / m IEC/EN 61000-4-3

2 GHz ... 2.7 GHz: 1 V / m IEC/EN 61000-4-3

Fast transients: 2 kV IEC/EN 61000-4-4

#### Surge voltages

Between wires for power supply: 2 kV IEC/EN 61000-4-5

Between wire and ground: 4 kV IEC/EN 61000-4-5

HF-wire guided: 30 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, frequency 10 ... 55 Hz, IEC/EN 60068-2-6

20 / 060 / 04 IEC/EN 60068-1

**Climate resistance:** EN 50005

**Terminal designation:** EN 50005

**Wire connection:** 2 x 2.5 mm<sup>2</sup> solid or 2 x 1.5 mm<sup>2</sup> stranded ferruled

DIN 46228-1/-2/-3/-4

**Wire fixing:** Flat terminals with self-lifting clamping piece IEC/EN 60999-1

**Fixing torque:** 0.8 Nm

## Technical Data

**Mounting:** DIN rail IEC/EN 60715

#### Weight

IK 9171: 65 g

SK 9171: 83 g

IL 9171: 110 g

SL 9171: 137 g

### Dimensions

#### Width x height x depth

IK 9171: 17.5 x 90 x 59 mm

SK 9171: 17.5 x 90 x 98 mm

IL 9171: 35 x 90 x 59 mm

SL 9171: 35 x 90 x 98 mm

### Classification to DIN EN 50155 for IK 9171

#### Vibration and

**shock resistance:** Category 1, Class B IEC/EN 61373

**Protective coating of the PCB:** No

### Standard Type

IK 9171.11/200 3/N AC 400/230 V 50/60 Hz 0.85  $U_N$

Article number: 0049292

SK 9171.11/200 3/N AC 400/230V 50/60Hz 0.85  $U_N$

Article number: 0054744

• Output: 1 changeover contact

• Nominal voltage  $U_N$ : 3/N AC 400/230 V

• Detection of undervoltage at  $< 0.85 U_N$

• Fixed response value: 0.85  $U_N$

• No time delay

• For 3p3w connection

• Width: 17.5 mm

### Variants

#### I\_ 9171/001

0 NC circuit operation with N  
1 NC circuit operation without N

0 Without time delay

3 Settable time delay  $t_1$

4 Settable time delay  $t_2$

0 Settable response value

2 Fixed response value

K Width 17.5 mm

L Width 35 mm

IK 9171.11/034: - With settable time  $t_1$

- NC circuit operation without N

- Detection of phase sequence

IL 9171.12/801: As Standard Type /200 but

output relay with goldplated contacts.

This module is also suitable for switching small

loads. The contacts also

permit the maximum switching current (4 A).

However, since the gold plating will be burnt off

at this current level, the device is no longer

suitable for switching small loads after this.

SK 9171.11/800: Same as IK 9171.11/201 but with increased transient

and climate resistance

### Ordering example for variants

IK 9171 .11 / \_ \_ \_ 3 AC 400 V 50/60 Hz 0.55 ... 1.05  $U_N$  0.5 ... 20 s

