VARIMETER
Undercurrent Relay
IK 9271, IL 9271, IP 9271, SK 9271, SL 9271, SP 9271

0224263


IK 9271


IL 9271


IL 9271/5_ _


SL 9271/5_ _


SK 9271


IP 9271


SL 9271CT


SP 9271CT

- According to IEC/EN 60 255-1
- IP 9271, SP 9271, SP 9271CT: 3-phase
  IK 9271, IL 9271, SK 9271, SL 9271, SL 9271CT: single phase
- Measuring ranges from AC 0.1 ... 100 A
- IK 9271, SK 9271:
  with 4 ranges settable by rotational switch, 1 changeover contact
- IL 9271, SL 9271:
  with 5 ranges settable by rotational switch, 1 changeover contact
  with 4 ranges programmable by bridges, 2 changeover contacts
- IP 9271, SP 9271: with 1 range, 2 changeover contacts
- Settable response value
- Fixed hysteresis
- Settable time delay
- De-energized on trip
- Optionally energized on trip
- LED indicators
- With auxiliary voltage
- Auxiliary supply and measuring input galvanic separated
- Devices available in 2 enclosure versions:
  - I-model, e.g. IK _ _ _ _, depth 61 mm
    with terminals at the bottom for installations systems
    and industrial distribution systems according to DIN 43 880
  - S-model, e.g. SK _ _ _ _, depth 100 mm
    with terminals at the top for cabinets with mounting plate
    and cable duct
- Width IK 9271, SK 9271: 17.5 mm
  IL 9271, SL 9271, SL 9271CT: 35 mm
  IP 9271, SP 9271, SP 9271CT: 70 mm

Approvals and Markings

CE cULus *) A025518

*) only IL-devices

Applications

Undercurrent detection in single phase or 3-phase voltage systems

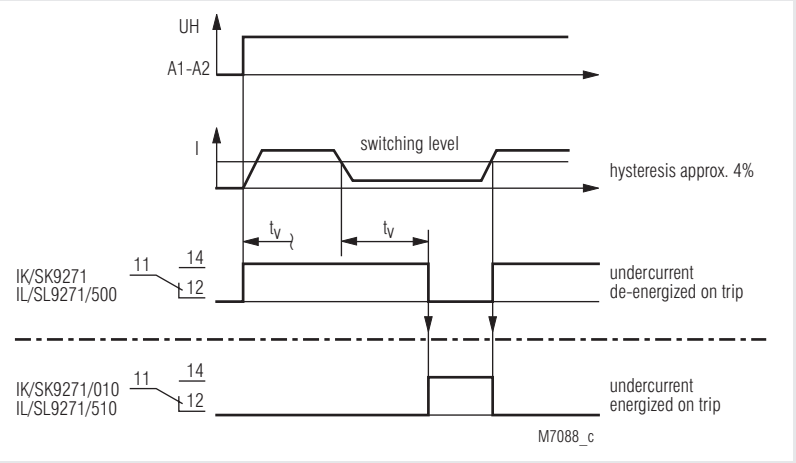
Indicators

IK 9271.11, SK 9271.11
IL 9271.11/5_ _
SL 9271.11/5_ _:
green LED: on when aux. supply connected
yellow LED: on when output contacts switched

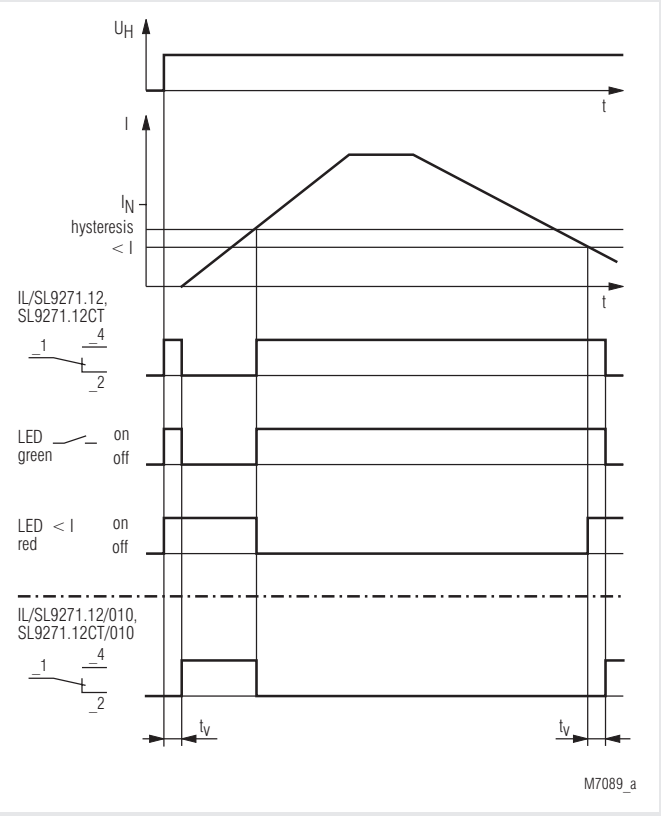
IL 9271, SL 9271,
IP 9271, SP 9271:
green LED: on when current within limits
red LED I_{max}: on when undercurrent

All technical data in this list relate to the state at the moment of edition. We reserve the right for technical improvements and changes at any time.

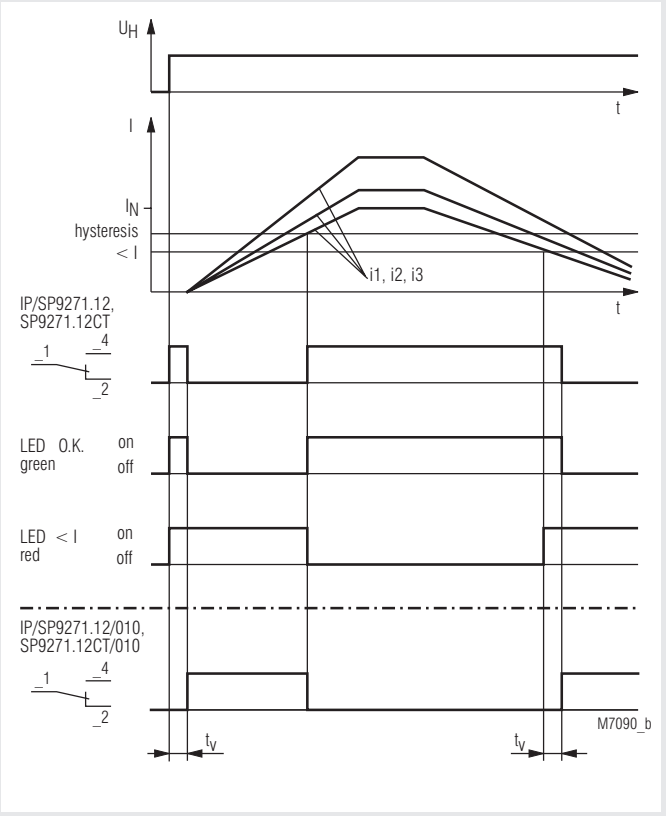
Function Diagram IK/SK 9271, IL/SL 9271.11/500



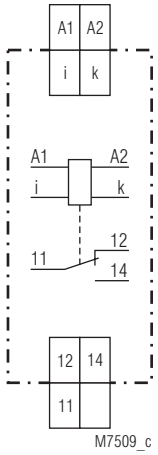
Function Diagram IL 9271.12, SL 9271.12



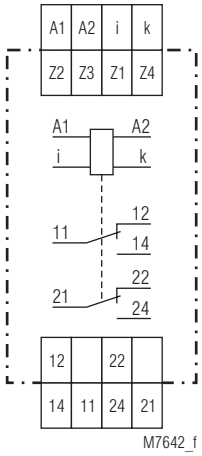
Function Diagram IP 9271, SP 9271



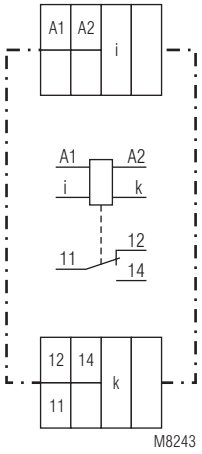
Circuit Diagrams



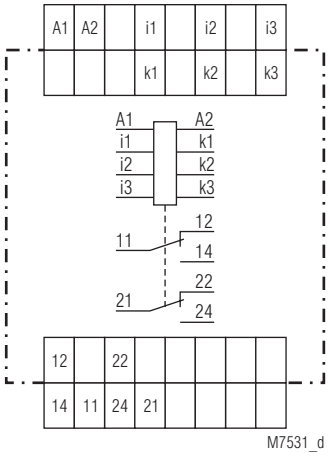
IK 9271.11, SK 9271.11



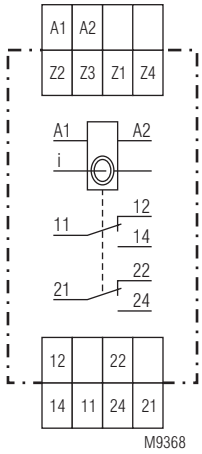
IL 9271.12, SL 9271.12



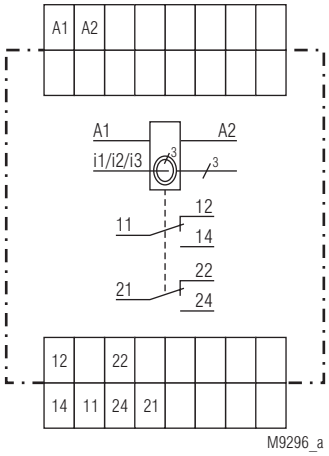
IL 9271.11/5_ _



IP 9271.12, SP 9271.12



SL 9271.12CT



SP 9271.12CT

Connection Terminals

Terminal designation	Signal description
A1, A2	Auxiliary voltage AC or DC
i, k	Current measuring circuit AC
i1, k1; i2, k2; i3, k3	Current measuring circuit phase 1; 2; 3
Z1 / Z2, Z3, Z4	Measuring ranges with bridges via terminals
11, 12, 14	Contacts Rel. 1
21, 22, 24	Contacts Rel. 2

Technical Data

Type						
	IK 9271	**SL 9271/5_ _**	**IL 9271**	**SL 9271CT**	**IP 9271**	**SP 9271CT**
Depth 61 mm	IK 9271.11	IL 9271.11/5_ _	IL 9271.12	-	IP 9271.12	-
Depth 100 mm	SK 9271.11	SL 9271.11/5_ _	SL 9271.12	SL 9271.12CT	SP 9271.12	SP 9271.12CT
Width	17.5 mm	35 mm	35 mm	35 mm	70 mm	70 mm
Measuring input	single-phase	single-phase	single-phase	single-phase	3-phase	3-phase
Measuring range (Nominal frequency 50 ... 400 Hz)	**0.1 ... 15 A** 4 part ranges settable with switch: 0.1 ... 1 A 0.5 ... 5 A 1 ... 10 A 1.5 ... 15 A Max. thermal continuous current: 20 A at 50 °C 15 A at 60 °C	**0.1 ... 50 A** 5 part ranges settable with switch: 0.1 ... 1 A 0.5 ... 5 A 2.5 ... 25 A 3 ... 30 A 5 ... 50 A Max. thermal continuous current: 50 A at 50 °C 60 A at 40 °C	**0.1 ... 15 A** 4 part ranges programmable with bridges: 0.1 ... 1 A (Z1-Z2) 0.5 ... 5 A (Z1-Z3) 1 ... 10 A (Z1-Z4) 1.5 ... 15 A (Z3-Z1-Z4) Max. thermal continuous current: 20 A t 50 °C 15 A at 60 °C	**0.5 ... 100 A** 4 part ranges programmable with bridges: 0.5 ... 5 A (Z1-Z2) 2.5 ... 25 A (Z1-Z3) 7.5 ... 75 A (Z1-Z4) 10 ... 100 A (Z3-Z1-Z4) Max. thermal continuous current: limited only by diameter of cable 25 mm²	**0.1 ... 15 A** 1 fixed measuring range per unit 0.1 ... 1 A 0.5 ... 5 A 1 ... 10 A 1.5 ... 15 A Max. thermal continuous current: 3 x 15 A t 50 °C 3 x 20 A at 45 °C	**0.5 ... 100 A** 1 fixed measuring range per unit 0.5 ... 5 A 2.5 ... 25 A 5 ... 50 A 7.5 ... 75 A 10 ... 100 A Max. thermal continuous current: limited only by diameter of cable 25 mm²
	5 ... 750 mA*) 4 part ranges settable with switch: 5 ... 50 mA 25 ... 250 mA 50 ... 500 mA 75 ... 750 mA Max. thermal continuous current: 5 A at 50 °C		**0.01 ... 1.5 A** 4 part ranges programmable with bridges: 0.01 ... 0.1 A (Z1-Z3) 0.5 ... 0.5 A (Z1-Z2) 0.1 ... 1 A (Z1-Z4) 0.15 ... 1.5 A (Z2-Z1-Z4) Max. thermal continuous current: 20 A at 50 °C 15 A at 60 °C			
Max. current at 50 °C		all ranges 80 A / 3 s				
Wire current path Solid Stranded ferruled	 2 x 2.5 mm² 2 x 1.5 mm²	 1 x 10 mm² 1 x 6 mm²	 2 x 2.5 mm² 2 x 1.5 mm²	CT-diameter = 10 mm 25 mm²	 2 x 2.5 mm² 2 x 1.5 mm²	CT-diameter = 10 mm 25 mm²
Contacts	1 changeover	1 changeover	2 changeover	2 changeover	2 changeover	2 changeover
Weight:	IK 9271: 70 g SK 9271: 90 g	IL 9271/5_ _: 125 g SL 9271/5_ _: 150 g	IL 9271: 125 g SL 9271: 150 g	approx. 230 g	IP 9271: 200 g SP 9271: 250 g	approx. 470 g

*) Rated impulse voltage / pollution degree (auxiliary voltage - measuring circuit): 4 kV/2

Technical Data

Max. overload: see table
Temperature influence: ≤ 0.05 % / K
Reaction time: see characteristic switching delay

Setting Ranges

Response value: infinite variable within measuring range
Hysteresis: approx. 4 % of setting value, fixed
Repeat accuracy: ≤ ± 1 %
Switching delay: 0.1 ... 20 sec settable

Auxiliary Circuit

Auxiliary voltage U_H: AC/DC 24 V, AC 220 ... 240 V
other voltages on request

Voltage range
at AC: 0.8 ... 1.1 U_H
at DC: 0.8 ... 1.25 U_H
Nominal consumption
at AC 230 V:
IL/SL 9271, IP/SP 9271: 3.2 VA
IK/SK 9271, IL/SL 9271/500: 2.3 VA
at DC 24 V:
IL/SL 9271, IP/SP 9271: 0.8 W
IK/SK 9271, IL/SL 9271/500: 0.4 W
Nominal frequency: 50 / 60 Hz
Frequency range: ± 5 %

Output

Contacts
IK 9271.11, SK 9271.11
IL/SL 9271.11/5_ _: 1 changeover contact
IL 9271.12, SL 9271.12
SL 9271.12CT: 2 changeover contacts
IP 9271.12, SP 9271.12
SP 9271.12CT: 2 changeover contacts
Thermal current I_{th}: 5 A
Switching capacity
to AC 15
NO contact:
IK 9271, IL 9271/5_ _: 3 A / AC 230 V IEC/EN 60 947-5-1
NC contact: 1 A / AC 230 V IEC/EN 60 947-5-1
IL/SL 9271, IP/SP 9271,
SL 9271CT, SP 9271CT: 5 A / AC 230 V IEC/EN 60 947-5-1
NC contact: 2 A / AC 230 V IEC/EN 60 947-5-1
Electrical life IEC/EN 60 947-5-1
to AC 15 bei 1 A, AC 230 V
NO contact
IK/SK 9271, IL/SL 9271/5_ _: 3 x 10^5 switching cycles IEC/EN 60 947-5-1
to AC 15 at 2 A, AC 230 V
IL/SL 9271, IP/SP 9271,
SL 9271CT, SP 9271CT: 2 x 10^5 switching cycles IEC/EN 60 947-5-1
Short-circuit strength
max. fuse rating:
IK/SK 9271, IL/SL 9271/5_ _: 4 A gG / gL IEC/EN 60 947-5-1
IL/SL 9271, IP/SP 9271
SL 9271CT, SP 9271CT: 10 A gG / gL IEC/EN 60 947-5-1
Mechanical life: > 50 x 10^6 switching cycles

Technical Data

General Data

Operating mode: Continuous operation
Temperature range
Operation: - 20 ... + 60°C
Storage: - 25 ... + 70°C
Altitude: < 2.000 m
Clearance and creepage distances
rated impulse voltage/
pollution degree: IEC 60 664-1

	IP/SP	IK/SK IL/SL-devices/5_ _	IL/SL
Auxiliary voltage - Contacts	4 kV/2	4 kV/2	4 kV/2
Auxiliary voltage - Measuring circuit	6 kV/2	6 kV/2*)	4 kV/2
Measuring circuit - Contacts	6 kV/2	6 kV/2	4 kV/2
Measuring circuit-Measuring circuit	6 kV/2	-	-
Contacts-Contacts	4 kV/2	-	4 kV/2
The contacts are not designed for voltage systems with 400 / 690 V.			

*) 4 kV/2 at IK/SK 9271 with measuring range 5 ... 750 mA and IK 9271.11/800

EMC
Electrostatic discharge: 8 kV (air) IEC/EN 61 000-4-2
HF irradiation:
IK/SK9271, IP/SP 9271,
SL/SP 9271:
80 MHz ... 1 GHz: 20 V / m IEC/EN 61 000-4-3
1 GHz ... 2.7 GHz: 10 V / m IEC/EN 61 000-4-3
SL/SP 9271CT, SL9271/5:
80 MHz ... 2.7 GHz: 10 V / m IEC/EN 61 000-4-3
Fast transients: 4 kV IEC/EN 61 000-4-4
Surge voltages between
wires for power supply
IK/SK 9271, IL/SL 9271/5_ _: 2 kV IEC/EN 61 000-4-5
IL/SL 9271, IP/SP 9271,
SL/SP 9271CT: 1 kV IEC/EN 61 000-4-5
between wire and ground:
IK/SK 9271, IL/SL 9271/5_ _: 4 kV IEC/EN 61 000-4-5
IL/SL 9271, IP/SP 9271,
SL/SP 9271CT: 2 kV IEC/EN 61 000-4-5
Interference suppression: Limit value class B EN 55 011
Degree of protection:
Housing: IP 40 IEC/EN 60 529
Terminals: IP 20 IEC/EN 60 529
Housing: Thermoplastic with V0 behaviour according to UL subject 94
Vibration resistance: Amplitude 0.35 mm frequency 10 ... 55 Hz IEC/EN 60 068-2-6
Climate resistance: 20 / 060 / 04 IEC/EN 60 068-1
Terminal designation: EN 50 005
Wire connection: 2 x 2.5 mm^2 solid or
2 x 1.5 mm^2 stranded ferruled
DIN 46 228-1/-2/-3/-4
Min. cross section: 0,6 mm^2
Insulation of wires
or sleeve length: 10 mm
Wire fixing: Flat terminals with self-lifting clamping piece IEC/EN 60 999-1
Fixing torque: 0.8 Nm
Mounting: DIN rail IEC/EN 60 715

Dimensions

Width x height x depth
IK 9271: 17.5 x 90 x 61 mm
SK 9271: 17.5 x 90 x 100 mm
IL 9271: 35 x 90 x 61 mm
SL 9271, SL 9271CT: 35 x 90 x 100 mm
IP 9271: 70 x 90 x 61 mm
SP 9271, SP 9271CT: 70 x 90 x 100 mm

CCC-Data

Switching capacity

to AC 15:	5 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13:	2 A / DC 24 V	IEC/EN 60 947-5-1

Technical data that is not stated in the CCC-Data, can be found in the technical data section.

Standard Types

IK 9271.11 AC 220 ... 240 V 50/60 Hz 0.1 ... 15 A
Article number: 0050331
SK 9271.11 AC 220 ... 240 V 50/60 Hz 0.1 ... 15 A
Article number: 0050647

- Single phase
- 4 programmable ranges up to 15 A
- energized on trip
- Auxiliary voltage U_H: AC 220 ... 240 V
- 1 changeover contact
- Width: 17.5 mm

IP 9271.12 AC 220 ... 240 V 50/60 Hz 0.5 ... 5 A
Article number: 0049961
SP 9271.12 AC 220 ... 240 V 50/60 Hz 0.5 ... 5 A
Article number: 0050648

- 3-phase
- Range: 0.5 ... 5 A
- de-energized on trip
- Auxiliary voltage U_H: AC 220 ... 240 V
- 2 changeover contacts
- Width: 70 mm

Variants

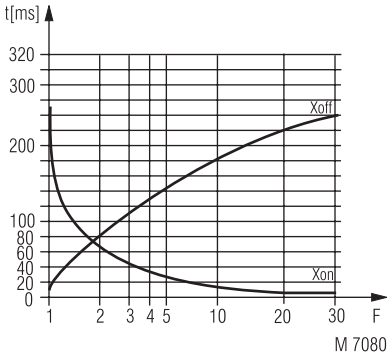
IK 9271.11/010, SK 9271.11/010:	single phase current relay energized on trip, 1 changeover contact
IK 9271.11/800:	single phase current relay energized on trip, exept with 1 measuring ranges from 10 ... 100 mA 1 changeover contact
IL 9271.12/010, SL 9271.12/010:	single phase current relay energized on trip, 2 changeover contacts
IL 9271.11/500, SL 9271.11/500:	same as IK/SK 9271.11, except with 5 measuring ranges from 0.1 ... 50 A
IL 9271.11/510, SL 9271.11/510:	same as IK/SK 9271.11/010, except with 5 measuring ranges from 0.1 ... 50 A
IP 9271.12/010, SP 9271.12/010:	3-phase current relay energized on trip 2 changeover contacts
SL 9271.12CT:	single phase current relay with built in CT, de-energized on trip, 2 changeover contacts
SP 9271.12CT:	3-phase current relay with built in CT, de-energized on trip, 2 changeover contacts

Ordering example for variants

SP 9271 .12 CT /_ _ 0 AC 220 ... 240 V 50 / 60 Hz 5 ... 50 A

- Measuring range
- Nominal frequency
- Auxiliary voltage
- 0: de-energized on trip
  1: energized on trip
- Variant, if required
- Built in CT
- Contacts
- Type

Characteristics



Switching delay

The characteristic shows the switching delay depending on the values of X_{on} - X_{off} when switching the current on or off. A slow current change reduces the delay.

$$F = \frac{\text{I applied}}{\text{I setting}}$$