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

A025518

*) only IL-devices

Applications

Undercurrent detection in single phase or 3-phase voltage systems

Indicators

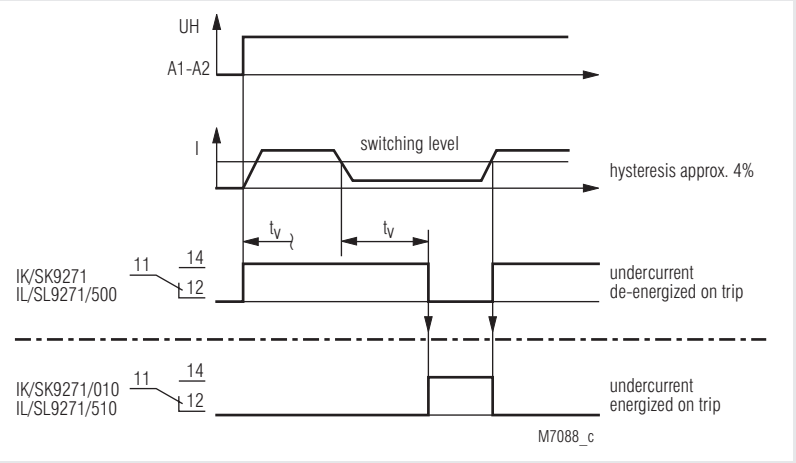
IK 9271.11, SK 9271.11
IL 9271.11/5_ _
SL 9271.11/5_ _:

green LED:	on when aux. supply connected
yellow LED:	on when output contacts switched

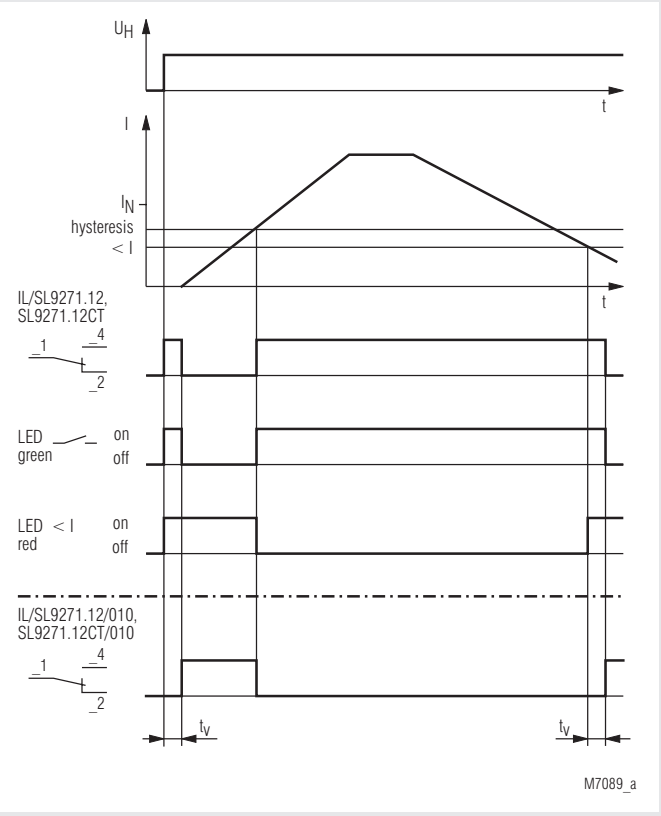
IL 9271, SL 9271,
IP 9271, SP 9271:

green LED:	on when current within limits
red LED I_{max}:	on when undercurrent

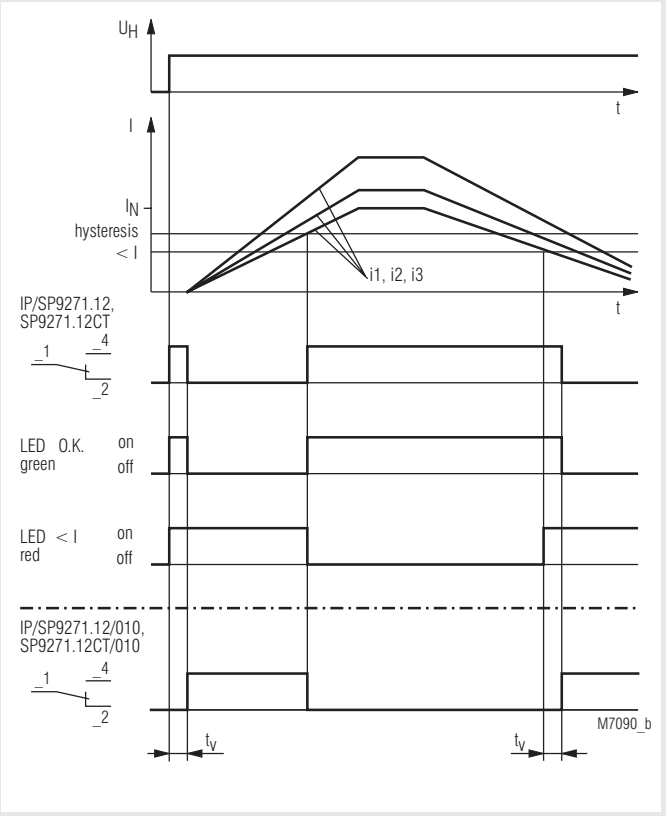
Function Diagram IK/SK 9271, IL/SL 9271.11/500



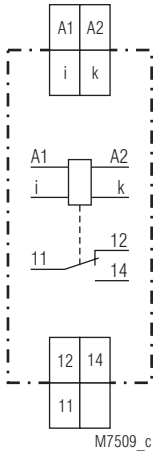
Function Diagram IL 9271.12, SL 9271.12



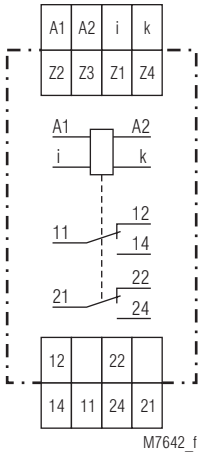
Function Diagram IP 9271, SP 9271



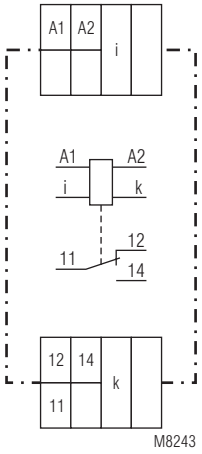
Circuit Diagrams



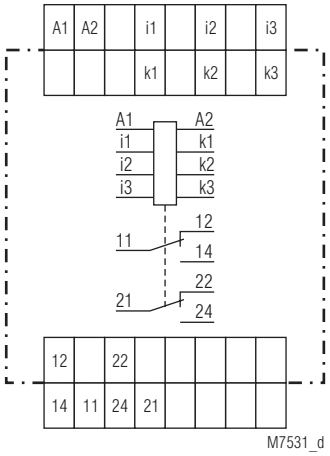
IK 9271.11, SK 9271.11



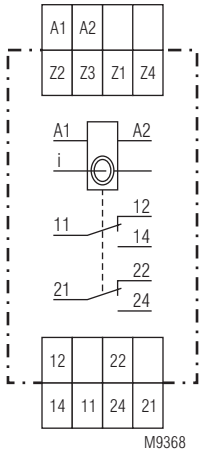
IL 9271.12, SL 9271.12



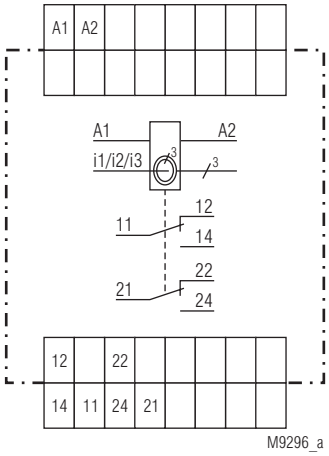
IL 9271.11/5_ _



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

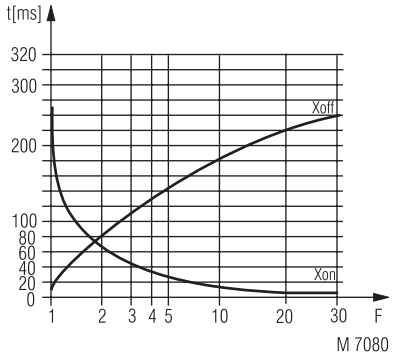
IK 9271.11/010, SK 9271.11/010:	single phase current relay energized on trip, 1 changeover contact
IK 9271.11/800:	single phase current relay energized on trip, exept with 1 measuring ranges from 10 ... 100 mA 1 changeover contact
IL 9271.12/010, SL 9271.12/010:	single phase current relay energized on 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.

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