

## VARIMETER

### Overcurrent Relay

IK 9270, IL 9270, IP 9270, SK 9270, SL 9270, SP 9270

02241259



IK 9270



IL 9270



IL 9270/5\_ \_



SL 9270/5\_ \_



SK 9270



IP 9270



SL 9270CT



SP 9270CT

- According to IEC/EN 60 255-1
- IP 9270, SP 9270CT: 3-phase  
IK 9270, SK 9270, IL 9270, SL 9270CT: single phase
- Measuring ranges from 0.1 ... 100 A
- Settable response value
- Fixed hysteresis
- Settable time delay
- De-energized on trip
- As option 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 installation 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 9270, SK 9270: 17.5 mm  
IL 9270, SL 9270CT: 35 mm  
IP 9270, SP 9270CT: 70 mm

#### Approvals and Markings



\*) only IL-devices

#### Applications

Overcurrent detection in single phase or 3-phase voltage systems

#### Indicators

IK 9270.11, SK 9270.11

IL 9270.11/5\_ \_ ,

SL 9270.11/5\_ \_ :

LED green:

aux. supply connected

LED yellow:

output contacts switched

IL 9270, SL 9270,

IP 9270, SP 9270:

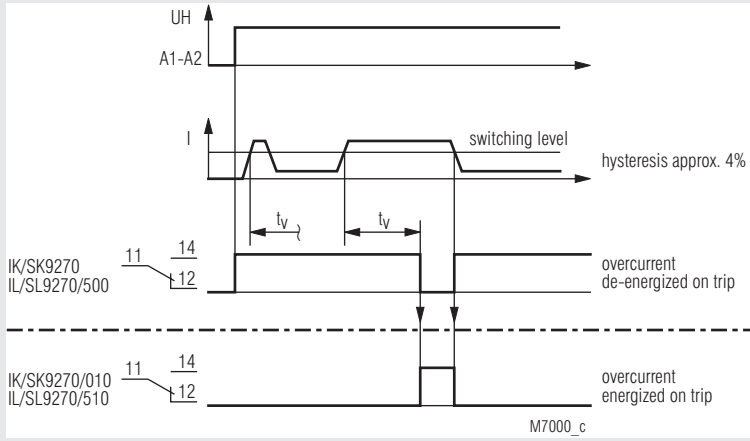
LED green:

current within limits

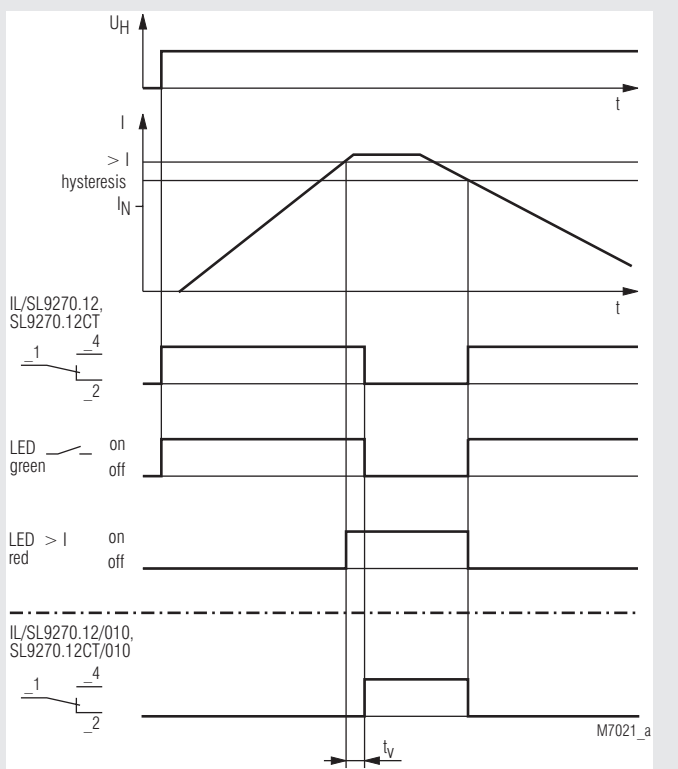
LED red  $I_{max}$ :

overcurrent

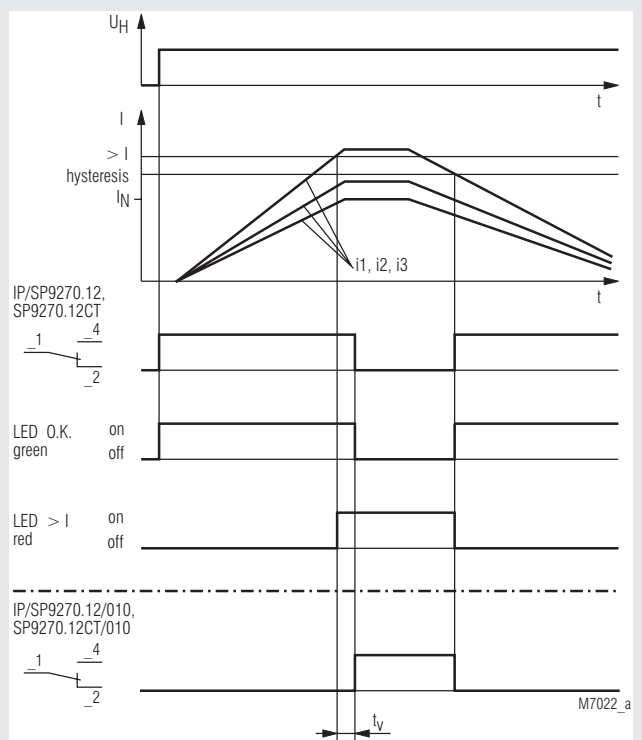
Function Diagram IK/SK 9270, IL/SL 9270.11/500



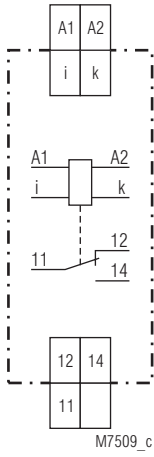
Function Diagram IL 9270.12, SL 9270.12



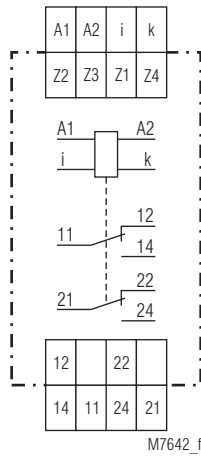
Function Diagram IP 9270, SP 9270



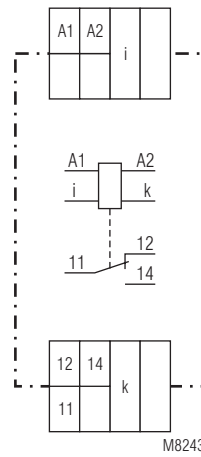
## Circuit Diagrams



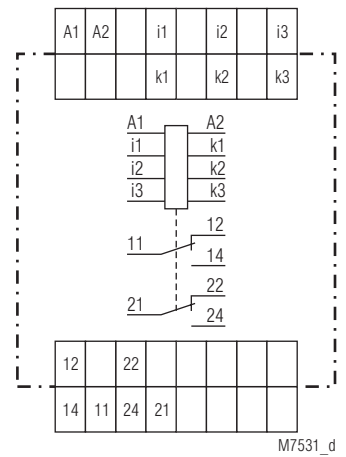
IK 9270.11, SK 9270.11



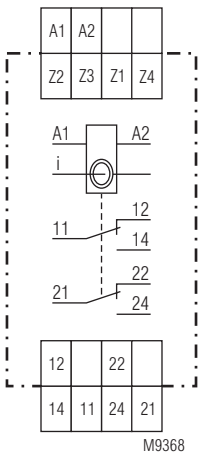
IL 9270.12, SL 9270.12



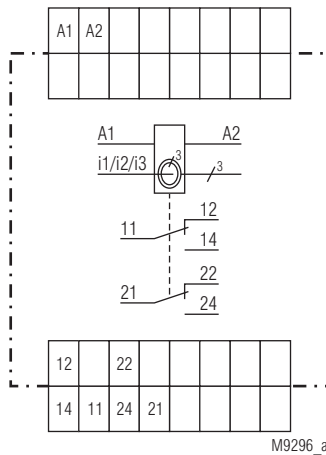
IL 9270.11/5\_



IP 9270.12, SP 9270.12



SL 9270.12CT









SP 9270.12CT

### Connection Terminals

Terminal designation	Signal designation
A1, A2	Auxiliary voltage AC or DC
i, k	Current measuring circuit AC or DC
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 9270	SL 9270/5_ _	IL 9270	SL 9270CT	IP 9270	SP 9270CT
Depth 61 mm	IK 9270.11	IL 9270.11/5_ _	IL 9270.12	-	IP 9270.12	-
Depth 100 mm	SK 9270.11	SL 9270.11/5_ _	SL 9270.12	SL 9270.12CT	SP 9270.12	SP 9270.12CT
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)	<b>0.1 ... 15 A</b>  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	<b>0.1 ... 50 A</b>  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	<b>0.1 ... 15 A</b>  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	<b>0.5 ... 100 A</b>  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 mm <sup>2</sup>	<b>0.1 ... 15 A</b>  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	<b>0.5 ... 100 A</b>  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 mm <sup>2</sup>
	<b>5 ... 750 mA<sup>*)</sup></b>  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		<b>0.01 ... 1.5 A</b>  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 mm <sup>2</sup> 2 x 1.5 mm <sup>2</sup>	1 x 10 mm <sup>2</sup> 1 x 6 mm <sup>2</sup>	2 x 2.5 mm <sup>2</sup> 2 x 1.5 mm <sup>2</sup>	CT-diameter = 10 mm 25 mm <sup>2</sup>	2 x 2.5 mm <sup>2</sup> 2 x 1.5 mm <sup>2</sup>	CT-diameter = 10 mm 25 mm <sup>2</sup>
Contacts	1 changeover	1 changeover	2 changeover	2 changeover	2 changeover	2 changeover
Weight:	IK 9270: 70 g SK 9270: 90 g	IL 9270/5_ _: 125 g SL 9270/5_ _: 150 g	IL 9270: 125 g SL 9270: 150 g	approx. 230 g	IP 9270: 200 g SP 9270: 250 g	approx. 470 g

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

## Technical Data

**Max. overload:** see table  
**Temperature influence:**  $\leq 0.05\%$  / K  
**Reaction time:** see characteristic switching delay  
**Internal resistor:**  $< 5\text{ m}\Omega$

### Setting Ranges

**Response value:** infinite variable within measuring range  
**Hysteresis:** approx. 4 % of setting value, fixed  
**Repeat accuracy:**  $\leq \pm 1\%$   
**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 9270, IP/SP 9270: 3.2 VA  
IK/SK 9270, IL/SL 9270/500: 2.3 VA  
at DC 24 V:  
IL/SL 9270, IP/SP 9270: 0.8 W  
IK/SK 9270, IL/SL 9270/500: 0.4 W  
**Nominal frequency:** 50 / 60 Hz  
**Frequency range:**  $\pm 5\%$

### Output

#### Contacts

IK 9270.11, SK 9270.11  
IL/SL 9270.11/5\_ \_ : 1 changeover contact  
IL 9270.12, SL 9270.12  
SL 9270.12CT: 2 changeover contacts  
IP 9270.12, SP 9270.12  
SP 9270.12CT: 2 changeover contacts

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

#### Switching capacity

to AC 15  
NO contact:  
IK 9270, IL 9270/5\_ \_ : 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 9270, IP/SP 9270,  
SL 9270CT, SP 9270CT: 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

to AC 15 bei 1 A, AC 230 V  
NO contact  
IK/SK 9270, IL/SL 9270/5\_ \_ : 3 x 10<sup>5</sup> switching cycles IEC/EN 60 947-5-1  
to AC 15 at 2 A, AC 230 V  
IL/SL 9270, IP/SP 9270,  
SL 9270CT, SP 9270CT: 2 x 10<sup>5</sup> switching cycles IEC/EN 60 947-5-1

#### Short-circuit strength

##### max. fuse rating:

IK/SK 9270, IL/SL 9270/5\_ \_ : 4 A gL IEC/EN 60 947-5-1  
IL/SL 9270, IP/SP 9270  
SL 9270CT, SP 9270CT: 6 A gL IEC/EN 60 947-5-1

**Mechanical life:**  $> 50 \times 10^6$  switching cycles

## Technical Data

### General Data

**Operating mode:** Continuous operation  
**Temperature range**  
Operation: - 20 ... + 60°C  
Storage: - 25 ... + 70°C  
**Altitude:**  $< 2.000\text{ m}$

### 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 <sup>*)</sup>	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.

<sup>\*)</sup> 4 kV/2 at IK/SK 9270 with measuring range 5 ... 750 mA

### EMC

Electrostatic discharge: 8 kV (air) IEC/EN 61 000-4-2  
HF irradiation:  
IK/SK9270, IP/SP 9270,  
SL/SP 9270:  
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 9270CT, SL9270/5:  
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 9270, IL/SL 9270/5\_ \_ : 2 kV IEC/EN 61 000-4-5  
IL/SL 9270, IP/SP 9270,  
SL/SP 9270CT: 1 kV IEC/EN 61 000-4-5  
between wire and ground:  
IK/SK 9270, IL/SL 9270/5\_ \_ : 4 kV IEC/EN 61 000-4-5  
IL/SL 9270, IP/SP 9270,  
SL/SP 9270CT: 2 kV IEC/EN 61 000-4-5  
HF wire guided: 10 V IEC/EN 61 000-4-6  
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  
20 / 060 / 04 IEC/EN 60 068-1

### Climate resistance:

### Terminal designation:

### Wire connection:

EN 50 005  
2 x 2.5 mm<sup>2</sup> solid or  
2 x 1.5 mm<sup>2</sup> stranded ferruled  
DIN 46 228-1/-2/-3/-4  
0,6 mm<sup>2</sup>

Min. cross section:

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 9270: 17.5 x 90 x 61 mm  
SK 9270: 17.5 x 90 x 100 mm  
IL 9270: 35 x 90 x 61 mm  
SL 9270, SL 9270CT: 35 x 90 x 100 mm  
IP 9270: 70 x 90 x 61 mm  
SP 9270, SP 9270CT: 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 9270.11/010 AC 220 ... 240 V 50/60 Hz 0.1 ... 15 A

Article number: 0050330

SK 9270.11/010 AC 220 ... 240V 50/60Hz 0.1 ... 15 A

Article number: 0050736

- 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 9270.12/010 AC 220 ... 240 V 50/60 Hz 0.5 ... 5 A

Article number: 0049438

SP 9270.12/010 AC 220 ... 240 V 50/60 Hz 0.5 ... 5 A

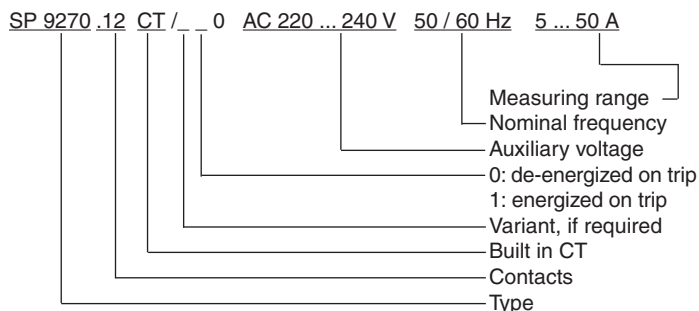
Article number: 0050736

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

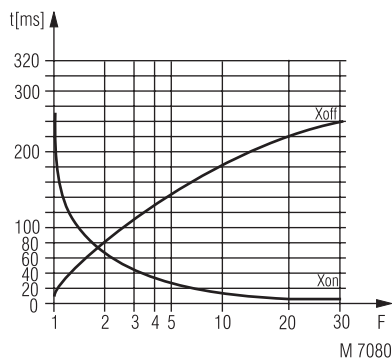
## Variants

IK 9270.11, SK 9270.11:	Single phase current relay, de-energized on trip, 1 changeover contact
IL 9270.12, SL 9270.12:	Single phase current relay, de-energized on trip, 2 changeover contacts
IL 9270.12/010, SL 9270.12/010:	Single phase current relay, energized on trip, 2 changeover contacts
IL 9270.11/500, SL 9270.11/500:	Same as IK/SK 9270.11, except with 5 measuring ranges from 0.1 ... 50 A
IL 9270.11/510, SL 9270.11/510:	Same as IK/SK 9270.11/010, except with 5 measuring ranges from 0.1 ... 50 A
IP 9270.12, SP 9270.12:	3-phase current relay, de-energized on trip, 2 changeover contacts
SL 9270.12CT:	Single phase current relay with built in CT, de-energized on trip, 2 changeover contacts
SP 9270.12CT:	3-phase current relay with built in CT, energized on trip, 2 changeover contacts

## Ordering Example for variants



## 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.

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