

VARIMETER

Overcurrent Relay

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



0224259



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 AC 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,

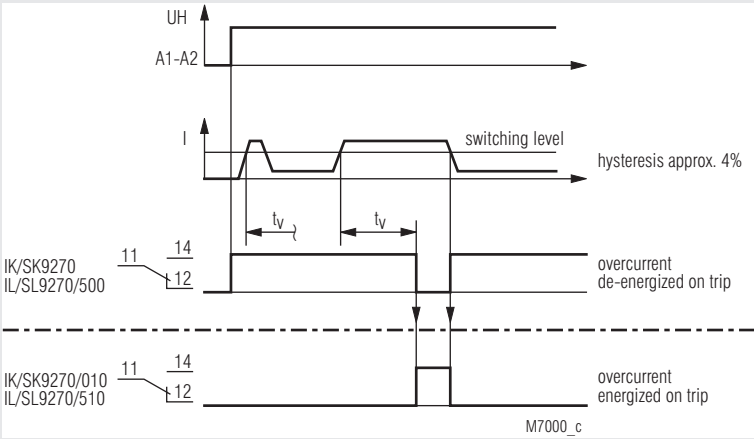
IP 9270, SP 9270:

LED green:

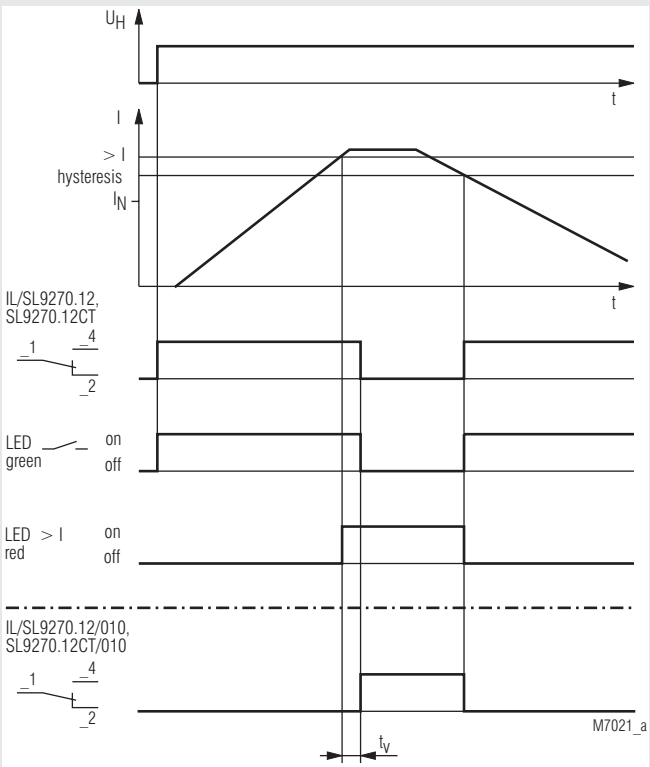
current within limits

LED red I_{max} :

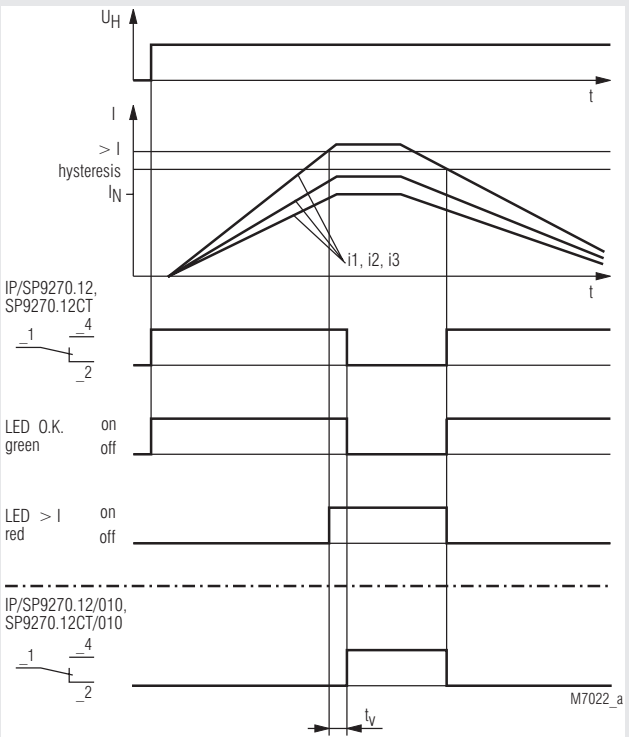
overcurrent



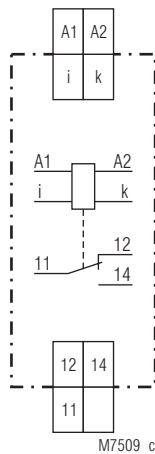
Function Diagram IL 9270.12, SL 9270.12



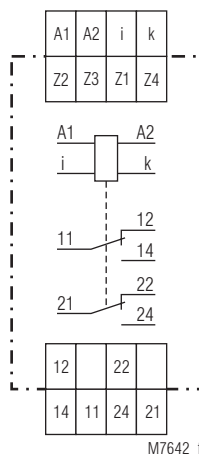
Function Diagram IP 9270, SP 9270



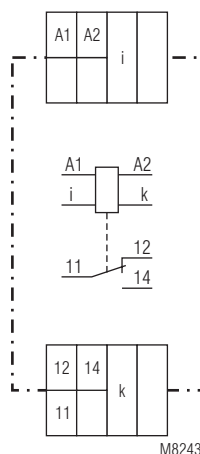
Circuit Diagrams



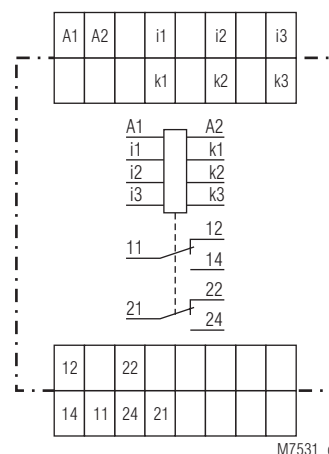
IK 9270.11, SK 9270.11



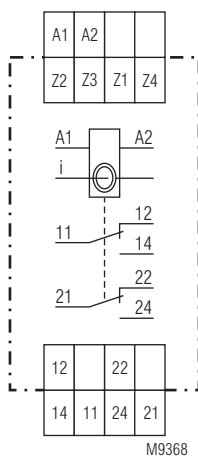
IL 9270.12, SL 9270.12



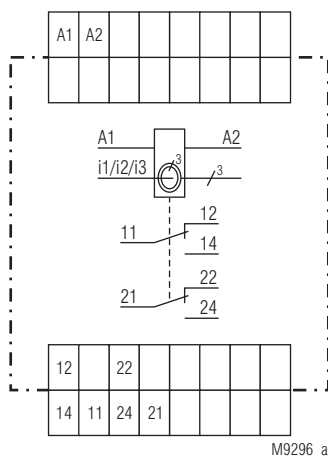
IL 9270.11/5_



IP 9270.12, SP 9270.12



SL 9270.12CT



SP 9270.12CT

Connection Terminals

Terminal designation	Signal 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

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)	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 at 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 mm ²	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 at 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 mm ²
	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 mm ² 2 x 1.5 mm ²	1 x 10 mm ² 1 x 6 mm ²	2 x 2.5 mm ² 2 x 1.5 mm ²	CT-diameter = 10 mm 25 mm ²	2 x 2.5 mm ² 2 x 1.5 mm ²	CT-diameter = 10 mm 25 mm ²
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

^{*)} 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	
Internal resistor:	< 5 mΩ	
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 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:	± 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} :	5 A	
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	IEC/EN 60 947-5-1	
to AC 15 bei 1 A, AC 230 V		
NO contact		
IK/SK 9270, IL/SL 9270/5__:	3 x 10 ⁵ 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 ⁵ switching cycles	IEC/EN 60 947-5-1
Short-circuit strength		
max. fuse rating:		
IK/SK 9270, IL/SL 9270/5__:	4 A gG / gL	IEC/EN 60 947-5-1
IL/SL 9270, IP/SP 9270		
SL 9270CT, SP 9270CT:	6 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 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:		EN 50 005	
Terminal designation:		2 x 2.5 mm² solid or 2 x 1.5 mm² stranded ferruled DIN 46 228-1/-2/-3/-4	
Wire connection:		0,6 mm²	
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 ... 240 V 50/60 Hz 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

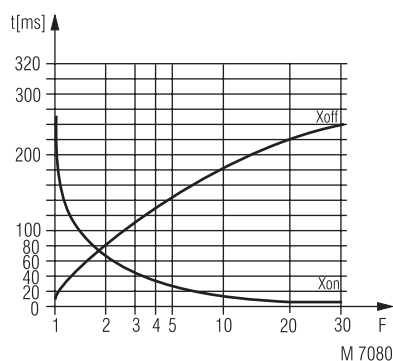
Variants

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

SP 9270 .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.

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