

## VARIMETER

### Overcurrent Relay

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

Translation  
of the original instructions



02241259



IK 9270



IL 9270



IL 9270/5\_ \_



SL 9270/5\_ \_



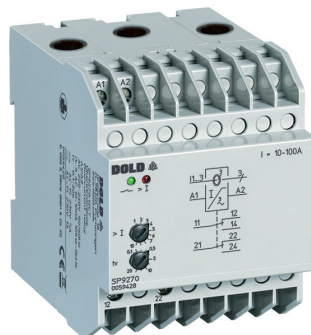
SK 9270



IP 9270



SL 9270CT



SP 9270CT

- According to IEC/EN 60255-1
- 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 43880
  - 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

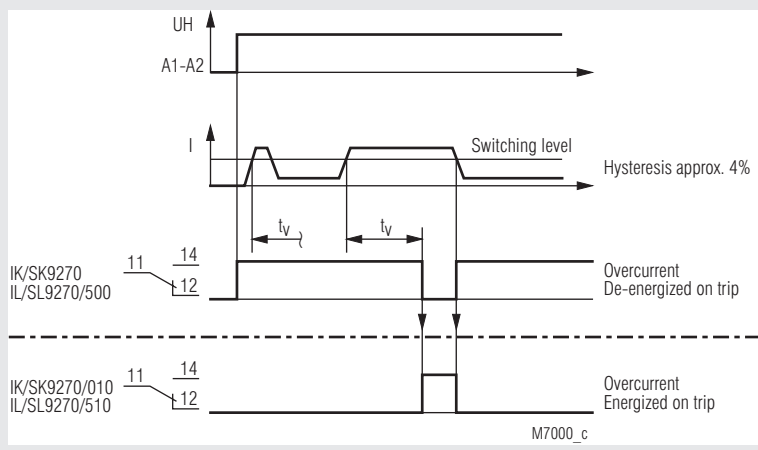
LED red  $I_{max}$ :

Overcurrent

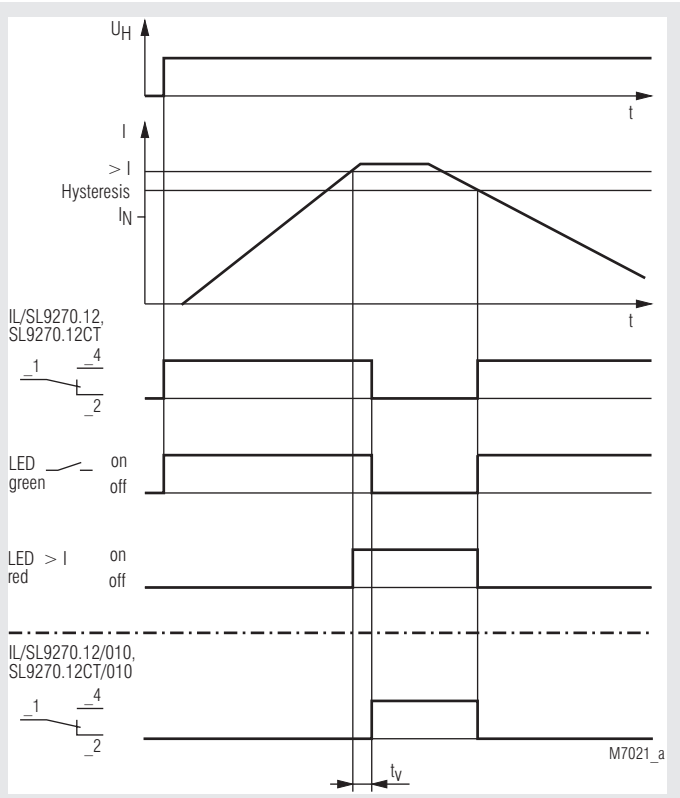
#### Product Description

The overcurrent relay is suitable for monitoring currents in three-phase and alternating current networks. When the switching point is exceeded, the relays changed their state after the time lapse. Due to the adjustable switching point, the relays are universally applicable. By means of the adjustable time delay, current peaks can be taken into account or faded out if required. Readiness for operation and overcurrent are each signaled via an LED.

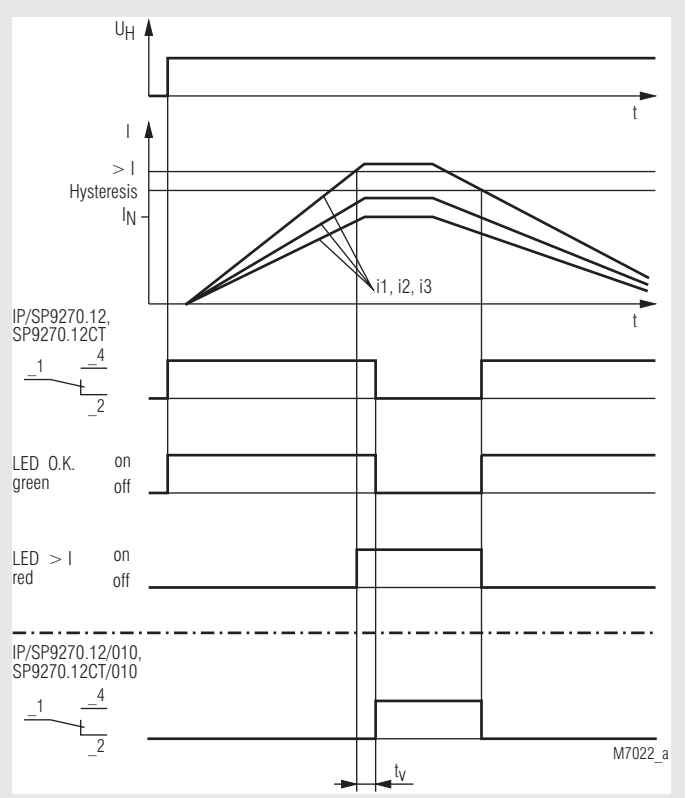
**Function Diagram IK/SK 9270, IL/SL 9270.11/500**



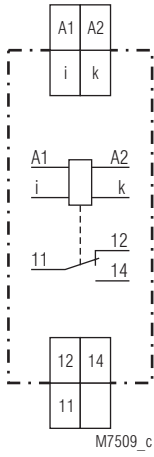
**Function Diagram IL 9270.12, SL 9270.12**



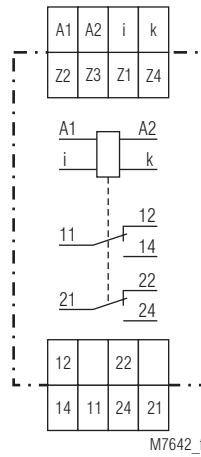
**Function Diagram IP 9270, SP 9270**



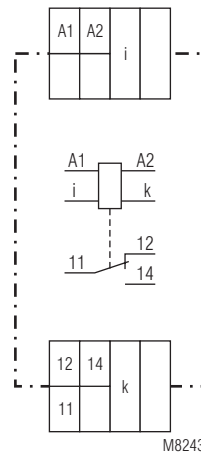
## Circuit Diagrams



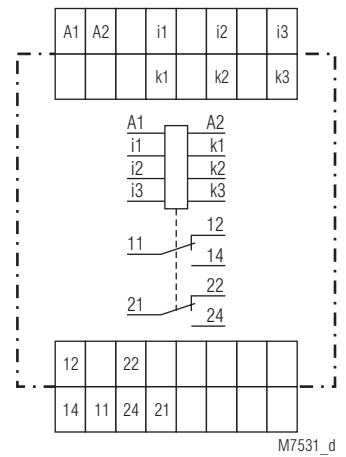
IK 9270.11, SK 9270.11



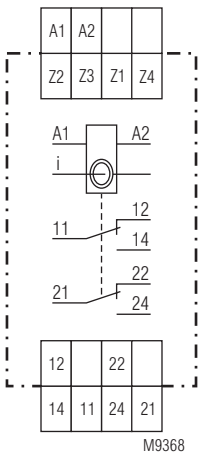
IL 9270.12, SL 9270.12



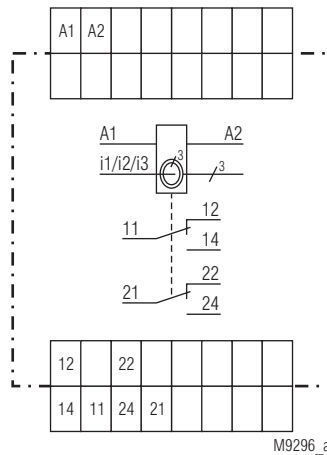
IL 9270.11/5\_



IP 9270.12, SP 9270.12



SL 9270.12CT









SP 9270.12CT

### Connection Terminals

Terminal designation	Signal 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 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

<b>Max. overload:</b>	See table
<b>Temperature influence:</b>	≤ 0.05 % / K
<b>Reaction time:</b>	See characteristic switching delay
<b>Internal resistor:</b>	< 5 mΩ

## Setting Ranges

<b>Response value:</b>	Infinite variable within measuring range
<b>Hysteresis:</b>	Approx. 4 % of setting value, fixed
<b>Repeat accuracy:</b>	≤ ± 1 %
<b>Switching delay:</b>	0.1 ... 20 sec settable

## Auxiliary Circuit

<b>Auxiliary voltage U<sub>H</sub>:</b>	AC/DC 24 V, AC 220 ... 240 V other voltages on request
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## Voltage range

At AC:	0.8 ... 1.1 U <sub>H</sub>
At DC:	0.8 ... 1.25 U <sub>H</sub>

## 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

<b>Nominal frequency:</b>	50 / 60 Hz
<b>Frequency range:</b>	± 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<sub>th</sub>:

<b>Switching capacity</b> To AC 15	5 A
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NO contact:		
IK 9270, IL 9270/5_ _:	3 A / AC 230 V	IEC/EN 60947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60947-5-1

IL/SL 9270, IP/SP 9270, SL 9270CT, SP 9270CT:	5 A / AC 230 V	IEC/EN 60947-5-1
NC contact:	2 A / AC 230 V	IEC/EN 60947-5-1
		IEC/EN 60947-5-1

### 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 60947-5-1
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 60947-5-1

### Short-circuit strength

<b>max. fuse rating:</b>		
IK/SK 9270, IL/SL 9270/5_ _:	4 A gG / gL	IEC/EN 60947-5-1
IL/SL 9270, IP/SP 9270 SL 9270CT, SP 9270CT:	6 A gG / gL	IEC/EN 60947-5-1

<b>Mechanical life:</b>	> 50 x 10 <sup>6</sup> switching cycles
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## Technical Data

### General Data

<b>Operating mode:</b>	Continuous operation
<b>Temperature range</b>	
Operation:	- 20 ... + 60°C
Storage:	- 25 ... + 70°C
<b>Altitude:</b>	< 2000 m

### Clearance and creepage distances

Rated impulse voltage/ pollution degree:	IEC 60664-1
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	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.

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

### EMC

Electrostatic discharge:	8 kV (air)	IEC/EN 61000-4-2
HF irradiation:		
IK/SK9270, IP/SP 9270, SL/SP 9270:		
80 MHz ... 1 GHz:	20 V / m	IEC/EN 61000-4-3
1 GHz ... 2.7 GHz:	10 V / m	IEC/EN 61000-4-3
SL/SP 9270CT, SL9270/5:		
80 MHz ... 2.7 GHz:	10 V / m	IEC/EN 61000-4-3
Fast transients:	4 kV	IEC/EN 61000-4-4
Surge voltages between wires for power supply		
IK/SK 9270, IL/SL 9270/5_ _:	2 kV	IEC/EN 61000-4-5
IL/SL 9270, IP/SP 9270, SL/SP 9270CT:	1 kV	IEC/EN 61000-4-5
Between wire and ground:		
IK/SK 9270, IL/SL 9270/5_ _:	4 kV	IEC/EN 61000-4-5
IL/SL 9270, IP/SP 9270, SL/SP 9270CT:	2 kV	IEC/EN 61000-4-5
HF wire guided:	10 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 Amplitude 0.35 mm frequency 10 ... 55 Hz	IEC/EN 60068-2-6
20 / 060 / 04	IEC/EN 60068-1
EN 50005	
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	
0,6 mm <sup>2</sup>	

### Vibration resistance:

<b>Climate resistance:</b>	
<b>Terminal designation:</b>	EN 50005
<b>Wire connection:</b>	
Min. cross section:	0,6 mm <sup>2</sup>
Insulation of wires or sleeve length:	10 mm
<b>Wire fixing:</b>	Flat terminals with self-lifting clamping piece
	IEC/EN 60999-1
<b>Fixing torque:</b>	0.8 Nm
<b>Mounting:</b>	DIN rail
	IEC/EN 60715

## 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 60947-5-1  
 To DC 13: 2 A / DC 24 V IEC/EN 60947-5-1



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 50/60Hz 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

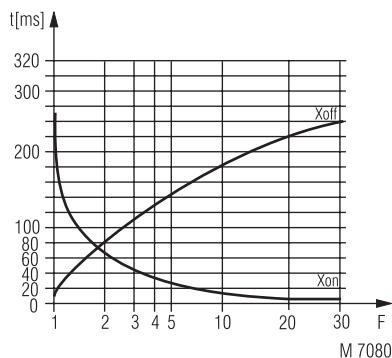
IK 9270.11, SK 9270.11:	Single phase current relay, de-energized on trip, 1 changeover contact
IL 9270.12, SL 9270.12:	Single phase current relay, de-energized on trip, 2 changeover contacts
IL 9270.12/010, SL 9270.12/010:	Single phase current relay, energized on trip, 2 changeover contacts
IL 9270.11/500, 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

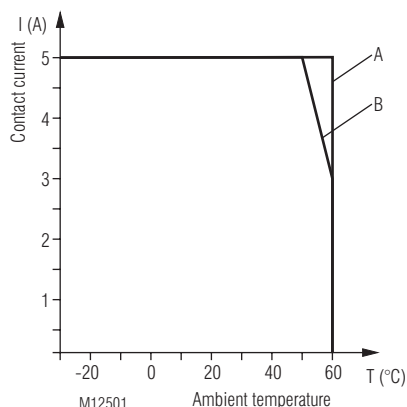
### Characteristics



#### 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.

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



#### Continuous current limit curve

A = Devices mounted away from heat generation components  
 B = IK 9270, SK 9270 mounted without distance, heated by units with similar load



