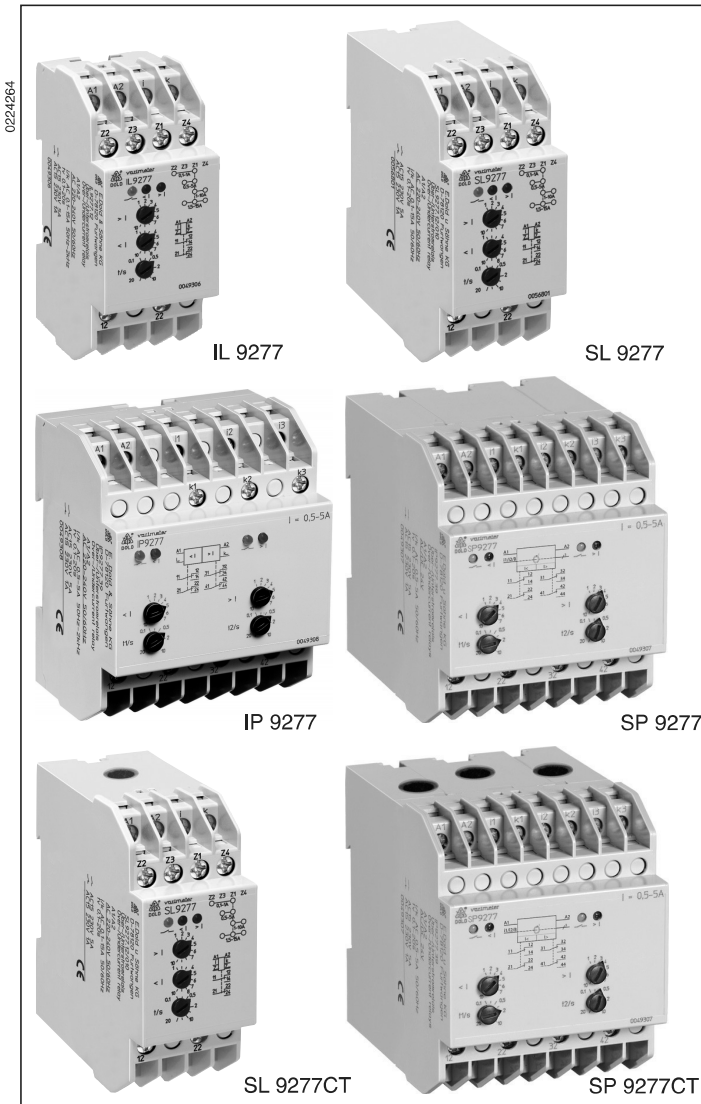


## VARIMETER

### Over- and Undercurrent Relay

IL 9277, IP 9277, SL 9277, SP 9277



- According to IEC/EN 60 255, DIN VDE 0435-303
- IP 9277, SP 9277, SP 9277CT: 3-phase  
IL 9277, SL 9277, SL 9277CT: single phase
- Detects over- and undercurrent
- Measuring ranges from 0.1 ... 15 A
- With built in current transformer for 0.5 ... 100 A
- IL 9277, SL 9277 with 4 programmable ranges
- Settable 0.1 ... 1 I<sub>N</sub>
- Separate setting for over- and undercurrent
- Fixed hysteresis approx. 4 %
- Settable time delay
- IP 9277, SP 9277 with separate settable time delay for over- and undercurrent
- de-energized on trip
- LED indicators for over-, under- and normal current
- Auxiliary supply and measuring input galvanic separated
- IL 9277, SL 9277 with one output relay for over- and undercurrent
- IP 9277, SP 9277 with separate output relays for over- and undercurrent
- Optionally energized on trip
- **Devices available in 2 enclosure versions:**  
**I-model, e.g. IL \_\_\_\_\_, depth 61 mm**  
**with terminals at the bottom for installations systems and industrial distribution systems according to DIN 43 880**  
**S-model, e.g. SL \_\_\_\_\_, depth 100 mm**  
**with terminals at the top for cabinets with mounting plate and cable duct**
- Width IL 9277, SL 9277, SL 9277CT: 35 mm  
IP 9277, SP 9277, SP 9277CT: 70 mm

#### Approvals and Marking



\*) only IL 9277 and IP 9277

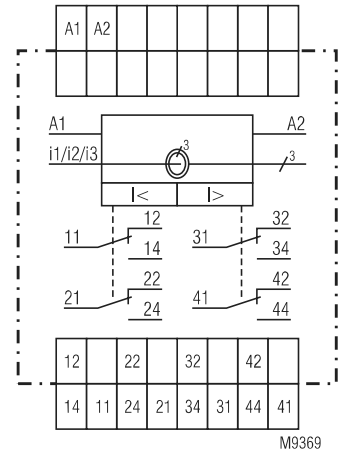
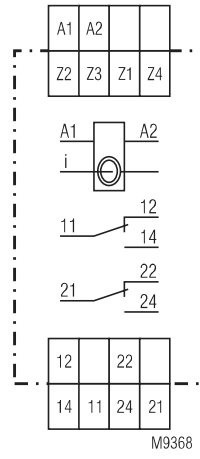
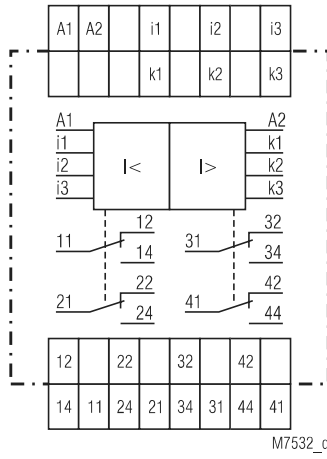
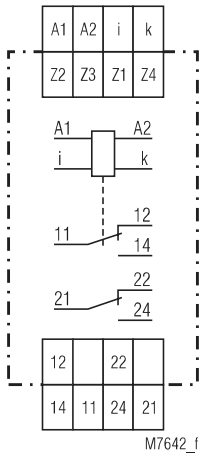
#### Applications

Over- and undercurrent detection in single phase or 3-phase voltage systems

#### Indicators

|                             |                       |
|-----------------------------|-----------------------|
| LED green:                  | current within limits |
| LED red I <sub>max</sub> ': | overcurrent           |
| LED red I <sub>min</sub> ': | undercurrent          |

## Circuit Diagram



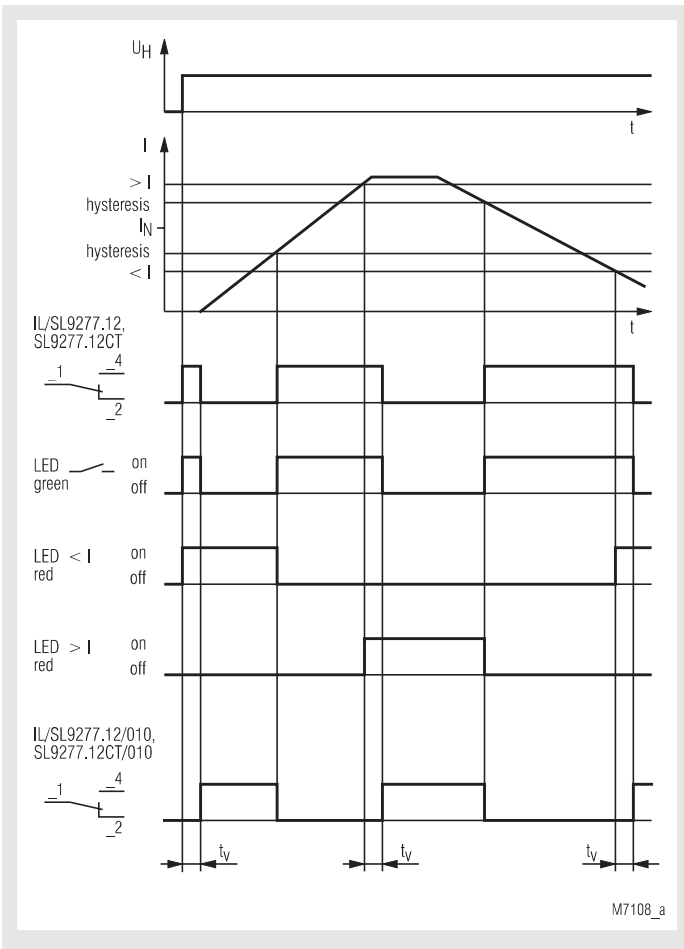
IL 9277.12, SL 9277.12

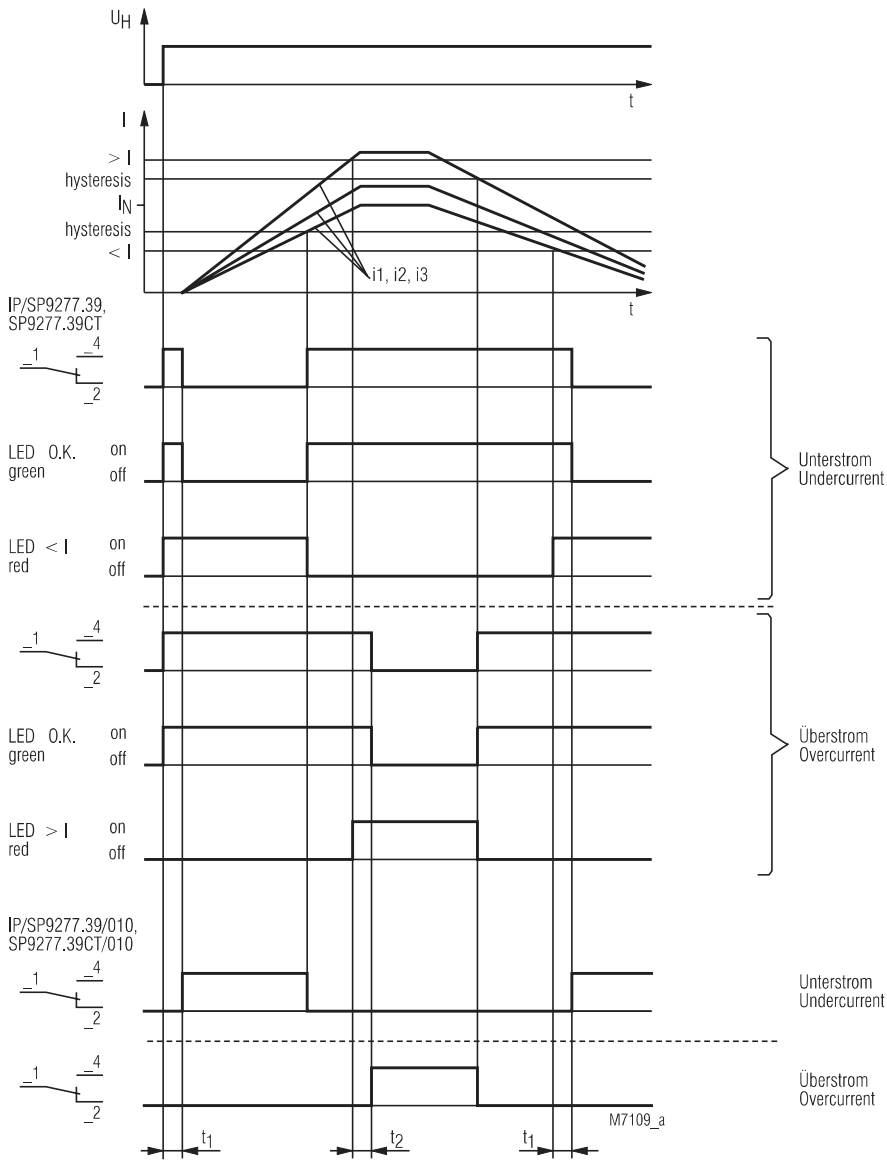
IP 9277.39, SP 9277.39





SL 9277.12CT

SP 9277.39CT

## Function Diagram IL 9277, SL 9277, SL 9277CT





| Type   |   |               |  |  |
|--|--|--|---|--|
|  | <b>IL 9277</b>   | <b>SL 9277CT</b>   | <b>IP 9277</b>  | <b>SP 9277CT</b>   |
| Depth 61 mm  | IL 9277.12   |  | IP 9277.39  |  |
| Depth 100 mm                                       | SL 9277.12   | SL 9277.12CT   | SP 9277.39  | SP 9277.39CT   |
| Width  | 35 mm  | 35 mm  | 70 mm   | 70 mm  |
| Measuring input                                    | single-phase   | single-phase   | 3-phase   | 3-phase  |
| Measuring range                                    | 0.1 ... 15 A<br>settable with<br>switch<br>range / bridge  | 0.5 ... 100 A<br>settable with<br>bridges:<br>range / bridge                                   | 1 Meas. range<br>per unit   | 1 Meas. range<br>per unit  |
| Nominal frequency<br>50 ... 400 Hz                 | 0.1 ... 1 A / Z1-Z2<br>0.5 ... 5 A / Z1-Z3<br>1 ... 10 A / Z1-Z4<br>1.5 ... 15 A / Z3-Z1-Z4<br><br>0.01 ... 1.5 A<br>programmable with<br>bridges:<br>range / bridge<br>0.01 ... 0.1 A / Z1-Z3<br>0.05 ... 0.5 A / Z1-Z2<br>0.1 ... 1 A / Z1-Z4<br>0.15 ... 1.5 A / Z2-Z1-Z4 | 0.5 ... 5 A / Z1-Z2<br>2.5 ... 25 A / Z1-Z3<br>7.5 ... 75 A / Z1-Z4<br>10 ... 100 A / Z3-Z1-Z4 | 0.1 ... 1 A<br>0.5 ... 5 A<br>1 ... 10 A<br>1.5 ... 15 A                          | 0.5 ... 5 A<br>2.5 ... 25 A<br>5 ... 50 A<br>7.5 ... 75 A<br>10 ... 100 A          |
| Continuous current/<br>Max. ambient<br>temperature | 20 A / 50 °C<br>15 A / 60 °C   | limited only by<br>diameter of cable<br>25 mm <sup>2</sup>                                     | 3 x 15 A / 50 °C<br>3 x 20 A / 45 °C  | limited only by<br>diameter of cable<br>25 mm <sup>2</sup>                         |
| Wire current path<br>Solid<br>Stranded ferrule     | 2 x 2.5 mm <sup>2</sup><br>2 x 1.5 mm <sup>2</sup>   | CT-diameter = 10 mm<br>25 mm <sup>2</sup>  | 2 x 2.5 mm <sup>2</sup><br>2 x 1.5 mm <sup>2</sup>                                | CT-diameter = 10 mm<br>25 mm <sup>2</sup>  |
| Contacts   | 2 C/O contacts   | 2 C/O contacts   | 2 x 2 C/O contacts *)   | 2 x 2 C/O contacts *)  |
| Weight:  | IL 9277: 125 g<br>SL 9277: 150 g   | approx. 230 g  | IP 9277: 200 g<br>SP 9277: 250 g  | approx. 470 g  |

\*) 2 changeover contacts for overcurrent, 2 changeover contacts for undercurrent

## Technical Data

**Max. overload:** see table  
**Temperature influence:**  $\leq 0.05\%$  / 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:**  $\leq \pm 1\%$   
**Switching delay:** 0.1 ... 20 sec settable

### Auxiliary Circuit

#### Auxiliary voltage $U_H$

IL 9277, SL 9277, SL 9277CT: AC/DC 24 V  
 AC 115 ... 127 V, AC 220 ... 240 V,  
 AC 400 ... 440 V

IP 9277, SP 9277, SP 9277CT: AC/DC 24 V  
 AC 115, 127 V  
 AC 220 ... 240 V, AC 400 ... 440 V

#### Voltage range

at AC: 0.8 ... 1.1  $U_H$   
 at DC: 0.8 ... 1.25  $U_H$

#### Nominal consumption

IL 9277, SL 9277, SL 9277CT

at AC 230 V: 3.2 VA  
 at DC 24 V: 0.8 W

IP 9277, SP 9277, SP 9277CT

at AC 230 V: 7.2 VA  
 at DC 24 V: 1 W

**Nominal frequency:** 50 / 60 Hz

**Frequency range:**  $\pm 5\%$

### Output

#### Contacts

IL 9277.12, SL 9277.12,

SL 9277.12CT: 2 changeover contact

IP 9277.39, SP 9277.39,

SP 9277.39CT: 2 x 2 changeover contact

**Thermal current  $I_{th}$ :** 5 A

#### Switching capacity

to AC 15

NO contact: 5 A / AC 230 V IEC/EN 60 947-5-1

NC contact: 1 A / AC 230 V IEC/EN 60 947-5-1

#### Electrical life

to AC 15 at 2 A, AC 230 V

NO contact: 2 x 10<sup>6</sup> switching cycles IEC/EN 60 947-5-1

#### Short-circuit strength

**max. fuse rating:** 10 A gL IEC/EN 60 947-5-1

**Mechanical life:** > 50 x 10<sup>6</sup> switching cycles

### General Data

**Operating mode:** Continuous operation

**Temperature range:** - 20 ... + 60°C

#### Clearance and creepage distances

rated impuls voltage/

pollution degree: IEC 60 664-1

|  | IP/SP-devices  | IL/SL-devices |
|--|----------------|---------------|
| supply - contacts  | 4 kV/2         | 4 kV/2        |
| supply - Measuring Circuit   | 6 kV/2         | 4 kV/2        |
| Measuring Circuit-Measuring Circuit                                | 6 kV/2         | -             |
| Measuring Circuit - contacts                                       | 6 kV/2         | 4 kV/2        |
| Measuring Circuit, max. voltage:                                   | 3 AC 400/690 V | AC 230 V/400  |
| The contacts are not designed for voltage systems with 400 / 690 V |                |               |
| contacts, max. voltage:  | AC 230/400 V   | AC 230/400 V  |

## Technical Data

### EMC

Electrostatic discharge: 8 kV (air) IEC/EN 61 000-4-2

HF irradiation: 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: 1 kV IEC/EN 61 000-4-5

between wire and ground: 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

20 / 060 / 04 IEC/EN 60 068-1

**Climate resistance:** 20 / 060 / 04 IEC/EN 60 068-1

**Terminal designation:** EN 50 005

**Wire connection:** 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

**Wire fixing:** Flat terminals with self-lifting

clamping piece IEC/EN 60 999-1

DIN rail IEC/EN 60 715

### Dimensions

#### Width x height x depth

IL 9277: 35 x 90 x 61 mm

SL 9277, SL 9277CT: 35 x 90 x 100 mm

IP 9277: 70 x 90 x 61 mm

SP 9277, SP 9277CT: 70 x 90 x 100 mm

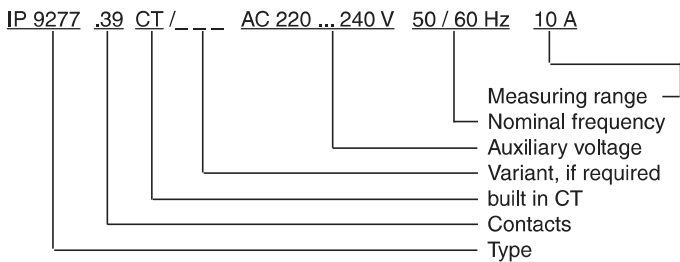
## Standard Types

|  |         |            |
|--|---------|------------|
| IL 9277.12 AC 220 ... 240 V  |         |            |
| Article number:  | 0049306 | stock item |
| SL 9277.12 AC 220 ... 240 V  |         |            |
| Article number:  | 0054111 |            |
| <ul style="list-style-type: none"> <li>• Single phase</li> <li>• 4 programmable ranges up to 15 A</li> <li>• de-energized on trip</li> <li>• Auxiliary voltage <math>U_H</math>: AC 220 ... 240 V</li> <li>• 2 changeover contacts</li> <li>• Width 35 mm</li> </ul>             |         |            |
| IP 9277.39 0.5 ... 5 A AC 220 ... 240 V  |         |            |
| Article number:  | 0049308 | stock item |
| SP 9277.39 0.5 ... 5 A AC 220 ... 240 V  |         |            |
| Article number:  | 0056075 |            |
| <ul style="list-style-type: none"> <li>• 3-phase</li> <li>• Range 0.5 ... 5 A</li> <li>• de-energized on trip</li> <li>• Auxiliary voltage <math>U_H</math>: AC 220 ... 240 V</li> <li>• 2 changeover contacts each for over- and undercurrent</li> <li>• Width 70 mm</li> </ul> |         |            |

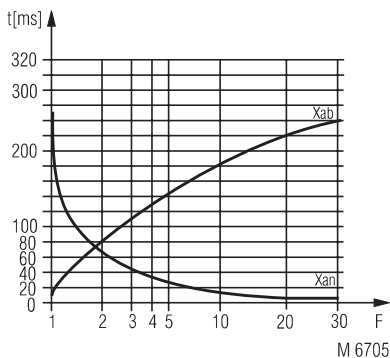
## Variants

|                                 |  |
|---------------------------------|--|
| IL 9277.12/010, SL 9277.12/010: | single phase current relay energized on trip                                 |
| IP 9277.39/010, SP 9277.39/010: | 3-phase current relay energized on trip                                      |
| IP 9277.39/002, SP 9277.39/002: | 3-phase current relay undercurrent de-energized on trip                      |
| SL 9277.12CT                    | overcurrent energized on trip<br>single phase current relay with built in CT |
| SP 9277.39CT                    | 3-phase current relay with built in CT                                       |

## Ordering example for variants



## Characteristics



### Switching delay

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

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