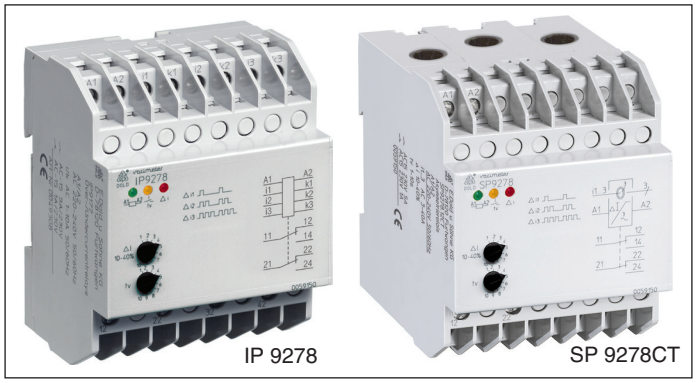
VARIMETER
Current Asymmetry Relay with integrated current transformer up to 100 A - IP 9278, SP 9278CT

Translation of the original instructions

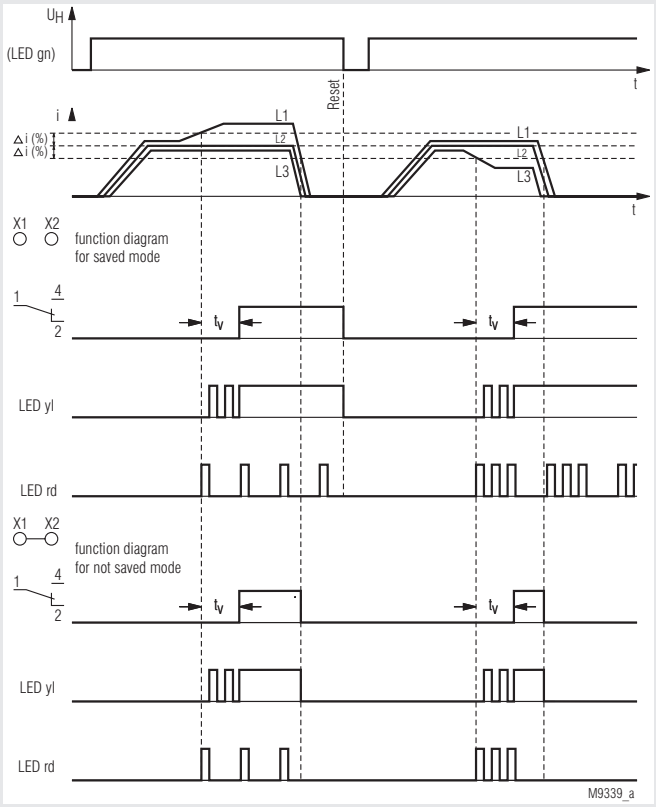
DOLD

0254039



- According to IEC/EN 60255-1
- IP 9278, SP 9278: 3-phase
- Measuring range IP 9278, SP 9278: up to 15 A
  SP 9278CT: up to 100 A
- 2 changeover contacts
- Adjustable asymmetry
- Settable time delay
- Open circuit operation
- LED indicators
- With auxiliary voltage
- Auxiliary supply and measuring input galvanic separated
- As option with external remote reset
- Width 70 mm

Function Diagram



Approvals and Markings

CE

Applications

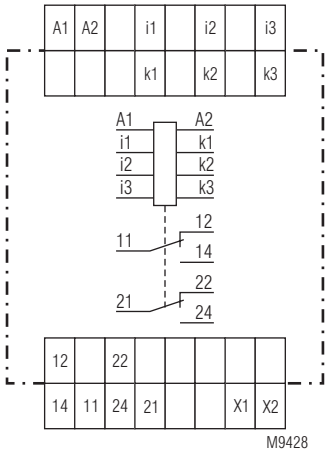
Monitoring of current asymmetry in 3-phase systems e.g. monitoring of heating elements, heating and load circuits

Function

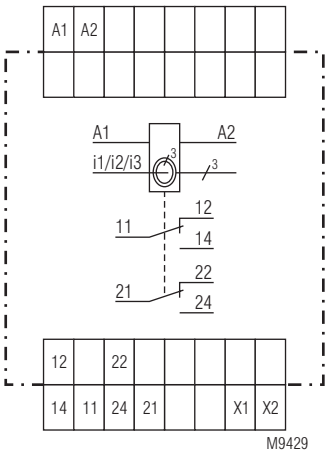
The IP 9278 monitors 3 currents (phases) on asymmetry.
Within the operating range the device searches continuously for the 2 currents with the smallest current difference in %.
The currents in these 2 paths are the reference for the asymmetry calculation of the third current path. The asymmetry is adjustable within 10 ... 40%.

If asymmetry is detected, the fault is indicated after an adjustable time delay t_v by 2 changeover contacts. Without bridge the fault is stored, with bridge it auto resets.
The flashing code on the red LED indicates in which current path the failure occurred.
The reset is made by disconnecting the auxiliary voltage.
On request the unit is also available with remote reset.

Circuit Diagrams



IP 9278.12



SP 9278.12CT

Connection Terminals

Terminal designation	Signal description
A1, A2	Auxiliary voltage U_H
i1, k1, i2, k2, i3, k3	Connection of AC current measuring circuit
11, 12, 14	Contact ouput relais 1
21, 22, 24	Contact ouput relais 2
X1, X2	Contact function selection (manual reset, auto reset)

Indicators

LED green:	On when aux. supply connected
LED yellow:	On when output contacts switched, flashes during timing
LED red:	Failure code: 1 Short pulse, followed by longer space = failure in current path i1/k1 2 Short pulses, followed by longer space = failure in current path i2/k2 3 Short pulses, followed by longer space = failure in current path i3/k3 4 Short pulses, followed by longer space = current is out of operating range

Notes

For small currents at the bottom end of the operating range it is recommended to adjust the asymmetry value slightly higher to reduce the response sensitivity.

Technical Data

Input

Measuring Ranges

	IP 9278 SP 9278	SP 9278CT	
Measuring range:	1 ... 15 A	4 ... 50 A	8 ... 100 A
	other ranges on request		
Operating range (asymmetry ± 10 %):	0.9 ... 16.5 A	3.5 ... 55 A	9 ... 110 A
	at asymmetry setting > 10 % the operating range is reduced, e. g.		
Asymmetry ± 20 %:	1.2 ... 13.7 A	4.5 ... 45 A	9 ... 90 A
Asymmetry ± 40 %:	1.5 ... 11.5 A	6 ... 39 A	12 ... 78 A

When the current falls below or rises above the operating range a fault is indicated by the output relay and the red LED gives the flash code 4 (Out of range).

The current transformers are mounted in the base of the SP 9278, the wires are lead through the CTs (no terminals).

Measuring Circuit

Frequency range of measuring current:	50 ... 400 Hz
Max. permitted continuous current of the current paths	
IP 9278:	20 A at 45°C ambient temperature 15 A bei 50°C ambient temperature
SP 9278CT:	100 A
Temperature influence:	≤ 0.05 % / K
Reaction time:	approx. 500 ms

Setting Ranges

Response value of asymmetry:	Adjustable within the operating range 10 ... 40 % compared to the mean value of the 2 current paths with the lowest difference.
Repeat accuracy:	≤ ± 1 %
Time delay t_v:	0.1 ... 20 s settable (logarithmic scale)

Technical Data

Auxiliary Circuit

Auxiliary voltage U_H:	AC/DC 24 V, AC 220 ... 240 V others 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:	3.2 VA
at DC 24 V:	1 W
Nominal frequency:	50 / 60 Hz
Frequency range:	± 5 %

Output

Contacts		
IP 9278.12, SP 9278.12CT:	2 changeover contacts	
Thermal current I_{th}:	5 A	
Switching capacity		
to AC 15		
NO contact:	5 A / AC 230 V	IEC/EN 60947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60947-5-1
Electrical life		
at 1 A, AC 230 V		
NO contact:	2 x 10^5 switch. cycl.	IEC/EN 60947-5-1
Short-circuit strength		
max. fuse rating:	10 A gG / gL	IEC/EN 60947-5-1
Mechanical life:	> 50 x 10^6 switching cycles	

General Data

Operating mode:	Continuous operation	
Temperature range		
Operation:	- 20 ... + 60 °C	
Storage:	- 25 ... + 60 °C	
Altitude:	≤ 2000 m	
Clearance and creepage distances		
Rated impulse voltage / Pollution degree:		IEC 60664-1
Supply - contacts:	4 kV/2	
Supply - Measuring circuit:	6 kV/2	
Measuring circuit - contacts:	6 kV/2	
Measuring circuit - Measuring circuit -	6 KV/2	
The contacts are not designed for voltage systems with 400 / 690 V		
EMC		
Electrostatic discharge:	8 kV (air)	IEC/EN 61000-4-2
HF irradiation 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:	1 kV	IEC/EN 61000-4-5
between wire and ground:	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	
Vibration resistance:	Amplitude 0.35 mm frequency 10 ... 55 Hz	IEC/EN 60068-2-6
Climate resistance:	20 / 060 / 04	IEC/EN 60068-1
Terminal designation:	EN 50005	
Wire connection:	2 x 2.5 mm² solid or 2 x 1.5 mm² stranded ferruled DIN 46228-1/-2/-3/-4	
Current path i/k		
on SP 9278CT:	3 x 25 mm² with insulation max. 10 mm ∅ DIN 46228-1/-2/-3/-4	
Wire fixing:	Flat terminals with self-lifting clamping piece	IEC/EN 60999-1
Fixing torque:	0,8 Nm	
Mounting:	DIN rail	IEC/EN 60715
Weight		
IP 9278:	200 g	
SP 9278CT:	300 g	

Dimensions

Width x height x depth	
IP 9278:	70 x 90 x 61 mm
SP 9278CT:	70 x 90 x 100 mm

Standard Type

IP 9278.12 AC/DC 24 V 1 ... 15 A 0.1 ... 20 s

Article number:	0057915
• Measuring range:	1 ... 15 A
• 2 changsover contacts	
• Auxiliary voltage U_H:	AC/DC 24 V
• Time delay:	0.1 ... 20 s

Variant

IP 9278.12/100:	Variant with external remote reset control voltage on terminals X1-X2 AC/DC 10 ... 265 V for reset

Ordering example for variants