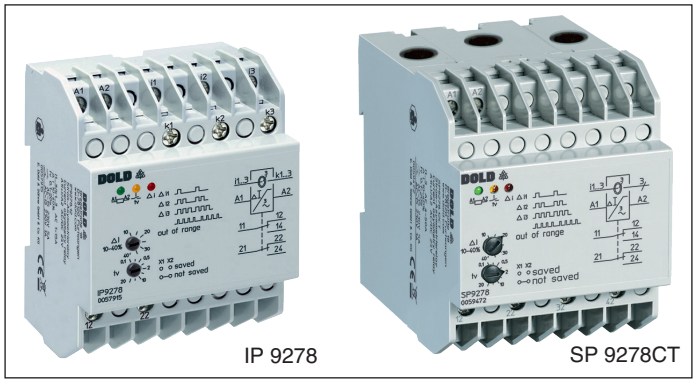
VARIMETER
Current Asymmetry Relay with integrated current transformer up to 100 A - IP 9278, SP 9278CT

Translation
of the original instructions

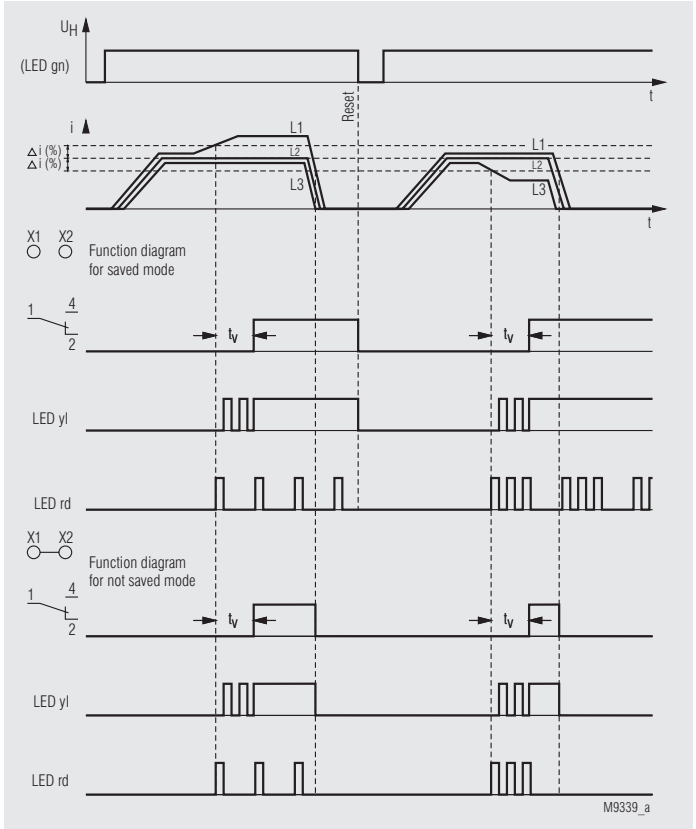
0254039



Product Description

The current asymmetry relay IP 9278 or SP 9278CT monitors the current symmetry of the 3 phases in three-phase networks. With the integrated current transformers, currents of up to 100 A can be measured. In the event of asymmetry, the changeover relay is switched after the adjustable delay time t_v has elapsed. Optionally, the error can be stored.

Function Diagram



Your Advantages
- Preventive maintenance
- For better productivity
- Quicker fault locating
- Auxiliary supply and measuring input galvanic separated
- With integrated current transformer
- As option with external remote reset

Features
- 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
- Width 70 mm

Approvals and Markings

CE

Applications

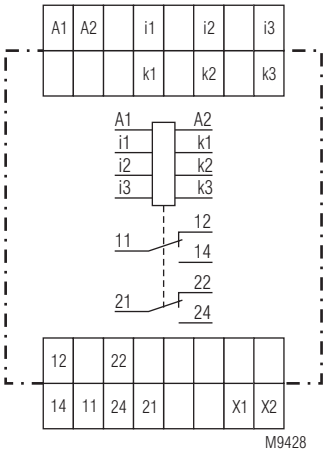
Monitoring of current asymmetry in 3-phase systems e.g. monitoring of heating elements, heating and load circuits

Function

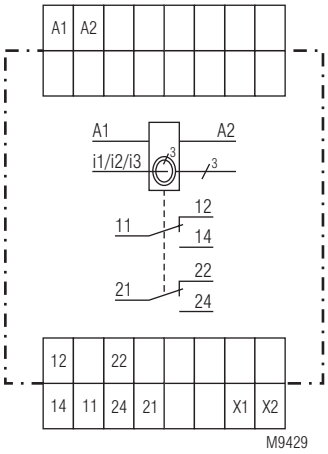
The IP 9278 monitors 3 currents (phases) on asymmetry.
Within the operating range the device searches continuously for the 2 currents with the smallest current difference in %.
The currents in these 2 paths are the reference for the asymmetry calculation of the third current path. The asymmetry is adjustable within 10 ... 40 % or 5 ... 35 % (/xx1).

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. (Bridge over X1-X2).
The flashing code on the red LED indicates in which current path the failure occurred.
The reset is made by disconnecting the auxiliary voltage.
Version (/1xx) has the remote reset function. A control voltage at X1(+) - X2 deletes the error memory or switches the unit to non-storing operation.

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)
X1(+) - X2	(/1xx) Remote reset AC/DC 10 ... 265 V

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).

Remote reset at X1, X2 only with variant /1xx: 10 V ... 265 V

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 %, resp. 5 ... 35 % (with variant /xx1) 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)

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

Technical Data

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
Aux. voltage - contacts:	4 kV/2	
Aux. voltage - meas. circuit:	6 kV/2	
Meas.circuit - contacts:	6 kV/2	
Meas. circuit - meas. 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

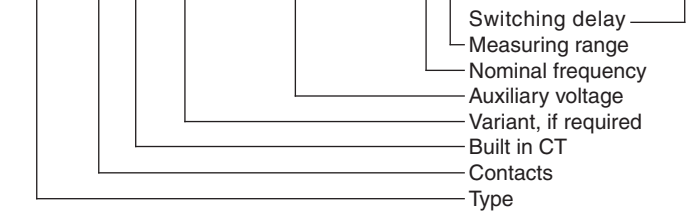
IP 9278.12 AC/DC 24 V 1 ... 15 A 0.1 ... 20 s

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

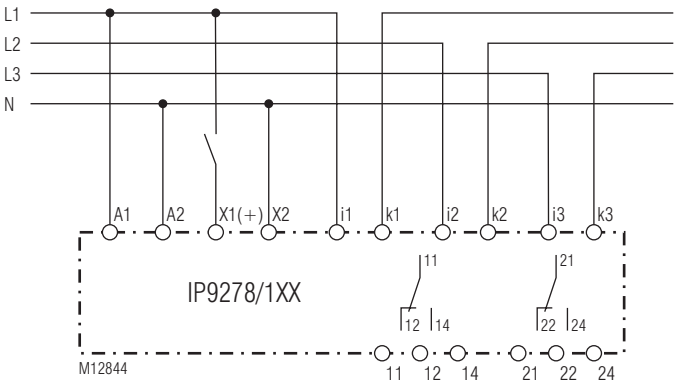
Ordering example for variants

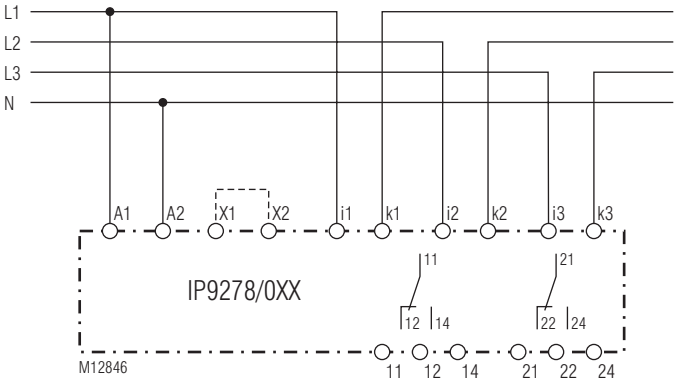
SP 9278 .12 CT /_ _ _ AC 220 ... 240 V 50 / 60 Hz 4 ... 50 A 0.1 ... 20 s



IP 9278.12/100:	With external remote reset control voltage on terminals X1(+) - X2 AC/DC 10 ... 265 V for reset
SP 9278.12CT/001:	Asymmetry adjustment: 5 ... 35 %
SP 9278.12CT/101:	With external remote reset control voltage at terminals X1(+) - X2 AC/DC 10 ... 265 V for reset Asymmetry adjustment: 5 ... 35 %

Application Examples





X1-X2 without bridge : save mode
X1-X2 with bridge : not save mode