

VARIMETER

Over- and Undervoltage Relay

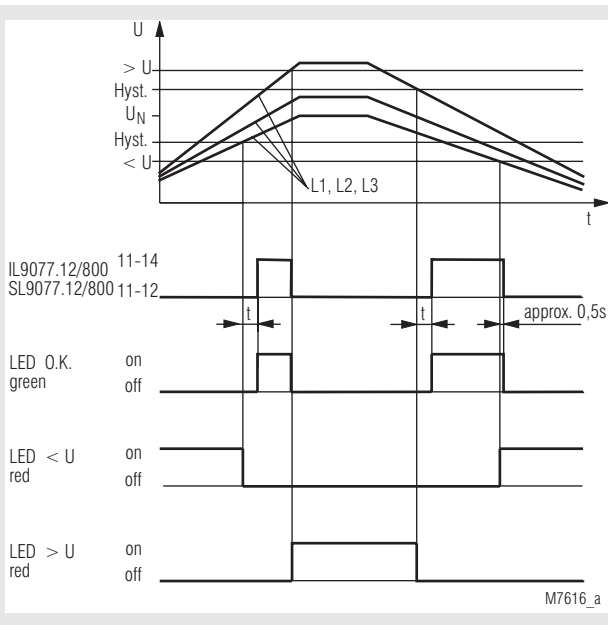
IL 9077/800, SL 9077/800

Translation
of the original instructions



- According to IEC/EN 60255-1
- Identification of overvoltage, undervoltage and phase failure
- Mains fault diagnostics with a number of LEDs
- Setting values for overvoltage and undervoltage can be set separately
- Large Setting Ranges $0.9 \dots 1.3 U_N$ and $0.7 \dots 1.1 U_N$
- Time delay on reset variable between $1 \dots 60$ s
- De-energized on trip
- No auxiliary voltage
- Independent of phase sequence
- Single-phase connection possible
- Fast reaction on overvoltage
- High overload possible
- 2 changeover contacts
- Devices available in 2 enclosure versions:
 - IL 9077: Depth 59 mm, with terminals at the bottom for installation systems and industrial distribution systems according to DIN 43880
 - SL 9077: Depth 98 mm, with terminals at the top for cabinets with mounting plate and cable duct
- Width 35 mm

Function Diagram



Approvals and Markings



*) only IL 9077/800

Applications

Monitoring of three-phase voltage systems to identify overvoltage and undervoltage, e.g. to monitor in-house generation equipment in accordance with VDE 0100.

Function

All 3 phase voltages are measured with N. If they are in the acceptable range, a green LED goes on and the output relay is activated.

If at least one phase exceeds the setting value for overvoltage (variable between $0.9 \dots 1.3 U_N$) or if at least one phase falls short of the setting value for undervoltage (variable between $0.7 \dots 1.1 U_N$), the output relay releases immediately on overvoltage, after approx. 0.5 s on undervoltage and the green LED goes off (fault state). 2 red LEDs then indicate the cause of the fault:

- Undervoltage " $< U$ "
- Overvoltage " $> U$ "

When all 3 phase voltages are below the chosen setting value for overvoltage and above the chosen setting value for undervoltage again, the relevant red LED goes out, the output relay is activated again after the adjusted delay time and the green LED goes on again (acceptable state).

When the system returns to an acceptable state, there is a hysteresis of about 4 % of the set value with both the set voltage thresholds.

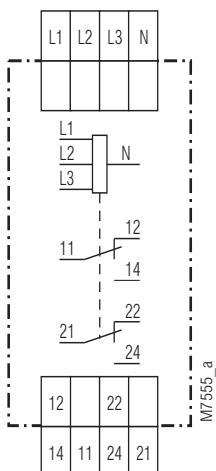
Indicators

Green LED	: State, output relay excited
Red LED " $< U$ ":	Fault message / undervoltage
Red LED " $> U$ ":	Fault message / overvoltage

Notes

The terminals L1, L2 and L3 have to be bridged if the relay is used in single phase systems.

Circuit Diagrams



IL/SL 9077.12/800

Technical Data

Input

Nominal voltage U_N:	3 AC / N 230 V / 400 V
IL/SL 9077.12/800:	
Voltage range:	0.7 ... 1.5 U_N
Maximum overload:	1.9 U_N for 1 h
Nominal consumption:	Approx. 8 VA (L3-N)
Nominal frequency:	50 / 60 Hz
Input resistance:	Approx. 180 k Ω (L1-N, L2-N)

Setting Ranges

Setting value for overvoltage "> U":	Variable between 0.9 ... 1.3 U_N
Setting value for undervoltage "< U":	Variable between 0.7 ... 1.1 U_N
Hysteresis:	Approx. 4 % of the set value in each case
Time delay:	Variable between 1 ... 60 s on reset

Response Time on Overvoltage

Time the relay needs to switch off on overvoltage at IL/SL 9077.12/800: The time delay is mainly depending on the overvoltage jump (if the voltage goes just over the setting level, or much higher) and also on the phase angle of the voltage.

voltage difference between 1.0 U_N / 1.0 U_N (230 V) to ...	typ. response time of the output relay setting value at 1.15 U_N ms
1.2 U_N	50 ... 70
1.3 U_N	30 ... 46
1.4 U_N	10 ... 42
1.5 U_N	8 ... 26
1.6 U_N	7 ... 24
1.7 U_N	6 ... 23

Output

Contacts	2 changeover contacts
IL/SL 9077.12/800:	AgNi 0.15; 5 μ gold plated
Contact material:	
Switching voltage:	AC 250 V
Thermal current I_{th}:	4 A
Switching capacity	
To AC 15	
NO contact:	3 A / AC 230 V IEC/EN 60947-5-1
NC contact:	2 A / AC 230V IEC/EN 60947-5-1
Electrical life:	IEC/EN 60947-5-1
To AC 15 at 1 A, AC 230 V:	1.5 x 10 ⁵ switching cycles

General Data

Operating mode:	Continuous operation
Temperature range:	
Operation:	- 20 ... + 60 °C
Storage:	- 25 ... + 60 °C
Relative air humidity:	93 % at 40 °C
Altitude:	< 2000 m

Clearance and creepage distances

Rated rated impulse voltage / pollution degree:	4 kV / 2	IEC 60664-1
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EMC

Electrostatic discharge:	8 kV (air)	IEC/EN 61000-4-2
HF irradiation		
80 MHz ... 1 GHz:	10 V / m	IEC/EN 61000-4-3
1 GHz ... 2 GHz:	10 V / m	IEC/EN 61000-4-3
2 GHz ... 2.7 GHz:	10 V / m	IEC/EN 61000-4-3
Fast transients:	4 kV	IEC/EN 61000-4-4

Technical Data

Surge voltages

Between		
wires for power supply:	2 kV	IEC/EN 61000-4-5
Between wire and ground:	2 kV	IEC/EN 61000-4-5
Interference suppression:	Limit value class B	EN 55011

Degree of protection:

Housing:	IP 40	IEC/EN 60529
Terminals:	IP 20	IEC/EN 60529

Housing:

Highly non-flammable thermoplastic with V0 behaviour according to UL subject 94
Amplitude 0.35 mm, frequency 10 ... 55 Hz IEC/EN 60068-2-6
20 / 60 / 04 IEC/EN 60068-1

Vibration resistance:

Climate resistance:

Wire connection:

2 x 2.5 mm² solid or 2 x 1.5 mm² stranded wire with sleeve
DIN 46228-1/-2/-3/-4

Wire fixing:

Flat terminals with self-lifting clamping piece IEC/EN 60999-1
0.8 Nm

Fixing torque:

DIN rail IEC/EN 60715

Mounting:

Weight

IL 9077/800: 110 g

SL 9077/800: 139 g

Dimensions

Width x height x depth

IL 9077/800: 35 x 90 x 59 mm

SL 9077/800: 35 x 90 x 98 mm

Standard Types

IL 9077.12/800	3/N AC 400 / 230 V	1 ... 60 s
Article number:		0050694
• Output:		2 changeover contacts
• Nominal voltage U_N :		3/N AC 400 / 230 V
• Time delay:		1 ... 60 s adjustable

SL 9077.12/800	3/N AC 400 / 230 V	1 ... 60 s
Article number:		0054757
• Output:		2 changeover contacts
• Nominal voltage U_N :		3/N AC 400 / 230 V
• Time delay:		1 ... 60 s adjustable

Ordering Example

IL 9077 .12 /800 3/N AC 400/230 V 50 / 60 Hz 0.1 ... 60 s

