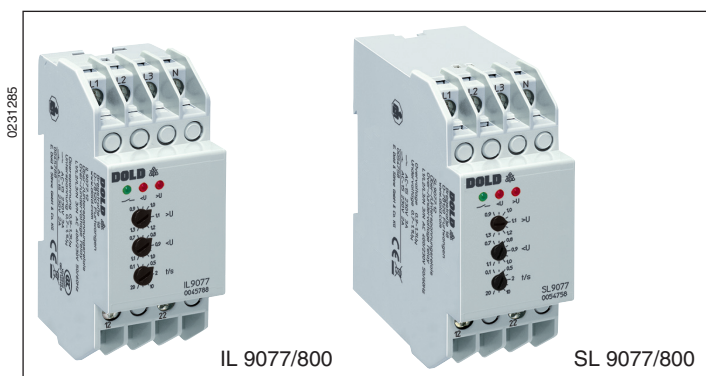


## VARIMETER PRO Over- and Undervoltage Relay IL 9077/800, SL 9077/800

Translation  
of the original instructions



### Your advantages

- Preventive maintenance
- For better productivity

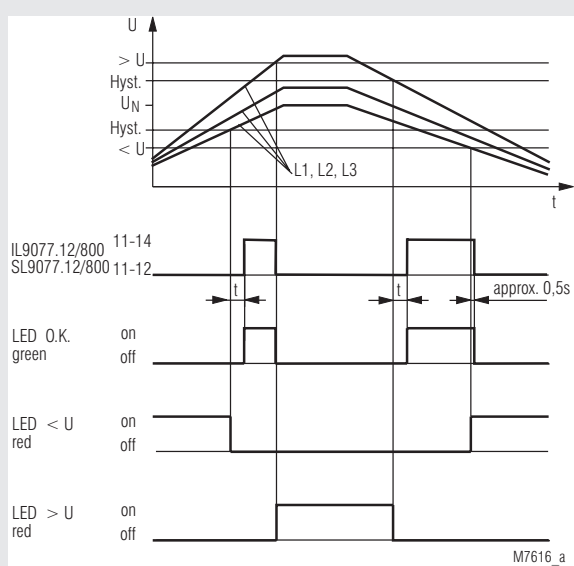
### Features

- 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

### Product Description

The Over- and Undervoltage relays IL 9077/800 and SL 9077/800 of the VARIMETER PRO series monitor overvoltage, undervoltage and phase failure in three-phase or single-phase networks. The measurement is simple and without extensive wiring, as no separate auxiliary supply is necessary. The early detection of up-coming break downs and preventive maintenance avoid expensive damages. As user you profit from the reliability and availability of your plant.

### 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.

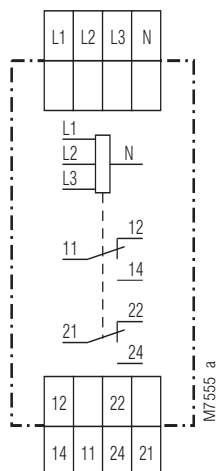
### Function

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.

### Circuit Diagrams



### Connection Terminals

Terminal designation	Signal description
L1, L2, L3	Phase voltages L1, L2, L3
N	Neutral
11, 12, 14 21, 22, 24	Changeover contact (outputrelays)

## Indicators

Green LED $\overline{U}$ :	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.

## Technical Data

### Input

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

### Setting Ranges

<b>Setting value for overvoltage "<math>&gt; U</math>":</b>	Variable between 0.9 ... 1.3 $U_N$
<b>Setting value for undervoltage "<math>&lt; U</math>":</b>	Variable between 0.7 ... 1.1 $U_N$
<b>Hysteresis:</b>	Approx. 4 % of the set value in each case
<b>Time delay:</b>	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

<b>Contacts</b> IL/SL 9077.12/800:	2 changeover contacts	
<b>Contact material:</b>	AgNi 0.15; 5 $\mu$ gold plated	
<b>Switching voltage:</b>	AC 250 V	
<b>Thermal current <math>I_{th}</math>:</b>	4 A	
<b>Switching capacity</b> 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
<b>Electrical life:</b>	IEC/EN 60947-5-1	
To AC 15 at 1 A, AC 230 V:	1.5 x 10 <sup>5</sup> switching cycles	

## Technical Data

### General Data

**Operating mode:** Continuous operation

### Temperature range:

Operation:	- 20 ... + 60 °C
Storage:	- 25 ... + 60 °C
Relative air humidity:	93 % at 40 °C
<b>Altitude:</b>	≤ 2000 m

### Clearance and creepage distances

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

### 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

### Vibration resistance:

Amplitude 0.35 mm, frequency 10 ... 55 Hz IEC/EN 60068-2-6  
20 / 60 / 04 IEC/EN 60068-1

### Climate resistance:

### Wire connection:

2 x 2.5 mm<sup>2</sup> solid or  
2 x 1.5 mm<sup>2</sup> stranded wire with sleeve  
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

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

