



**Zakład Mechaniki i Elektroniki  
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## DESCRIPTION

The PNM-31 voltage relay is designed for three-phase system voltage control in order to protect load against voltage increase / decrease outside the preset range. There is a fixed OFF-time delay (approximately 5 seconds) set in the system. The device is capable of detecting incorrect phase sequence and voltage unbalance.

## FEATURES

- Three-phase load protection against voltage swing and unbalance, and incorrect phase sequence,
- Control and indication of every phase voltage,
- Minimum (170 ÷ 225 V) and maximum (235 ÷ 290 V) voltage adjustment,
- Control and indication of correct phase sequence and voltage unbalance,
- Fixed OFF-time delay,
- Relay output - changeover contact, maximum load 16 A,
- Relay state indicator,
- Mounted on TH 35 rail.



## CAUTION

The device is designed for three-phase installation and must be installed in accordance with standards valid in a particular country. The device should be connected according to the details included in this operating manual. Installation, connection and control should be carried out by a qualified electrician staff, who act in accordance with the service manual and the device functions. Disassembling of the device is equal with a loss of guarantee and can cause electric shock. Before installation make sure the connection cables are not under voltage. The cruciform head screwdriver 3,5 mm should be used to instal the device. Improper transport, storage, and use of the device influence its wrong functioning. It is not advisable to instal the device in the following cases: if any device part is missing or the device is damaged or deformed. In case of improper functioning of the device contact the producer.

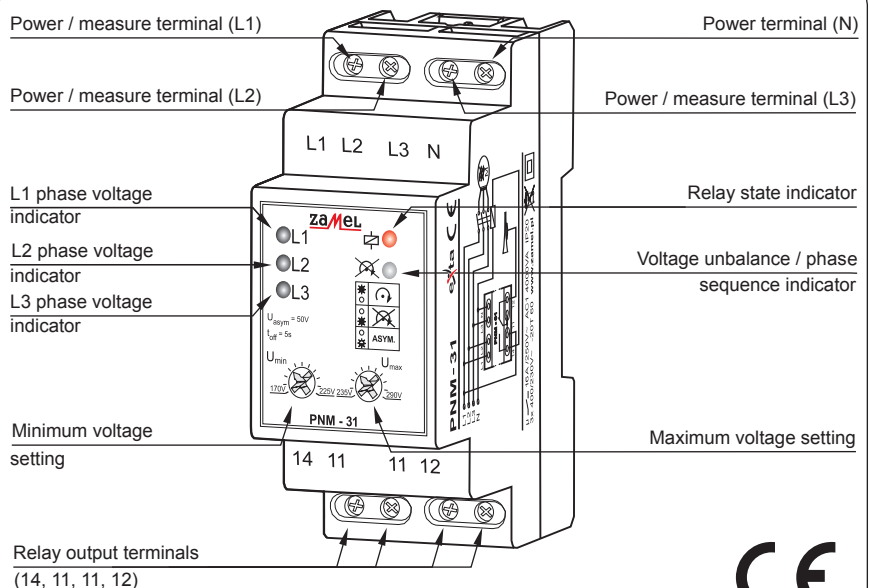


The symbol means selective collecting of electrical and electronic equipment. It is forbidden to put the used equipment together with other waste

## TECHNICAL DATA

PNM-31	
Power terminals:	L1, L2, L3, N
Rated voltage:	230/400 V AC
Rated voltage tolerance:	-15 ÷ +10 %
Rated frequency:	50 / 60 Hz
Rated current:	10 mA
Relay state and soft network indicator:	red LED
Voltage unbalance / phase sequence indicator:	yellow LED
Voltage threshold settings:	2x rotary potentiometer
U <sub>min</sub> adjustment range:	170 ÷ 225 V
U <sub>max</sub> adjustment range:	235 ÷ 290 V
OFF-time t <sub>off</sub> :	5 s
Voltage / time setting accuracy:	±2 %
Output relay parameters:	1NO/NC - 16 A / 250 V AC1 4000 VA
Number of terminal clamps:	8
Section of connecting cables:	0,2 ÷ 2,50 mm <sup>2</sup>
Ambient temperature range:	-20 ÷ +60 °C
Operating position:	freely
Mounting:	rail TH 35 (PN-EN 60715)
Protection degree:	IP20 (PN-EN 60529)
Protection level:	II
Overvoltage category:	II
Pollution degree:	2
Dimensions:	double-modular (35 mm) 90x35x66 mm
Weight:	0,11 kg
Reference standards:	PN-EN 60730-1; PN-EN 60730-2-1; PN-EN 61000-4-2,3,4,5,6,11

## APPEARANCE

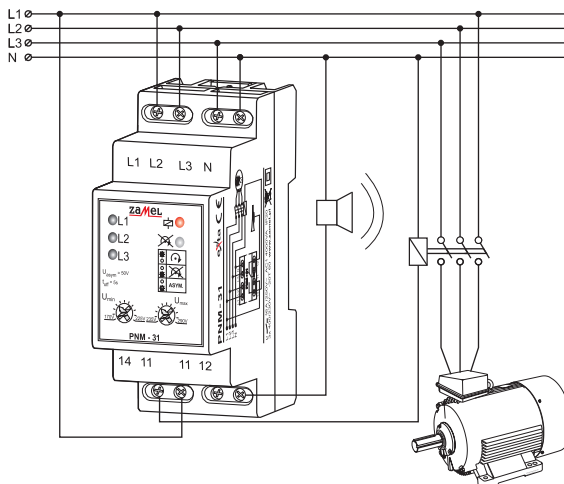


## MOUNTING, FUNCTIONING

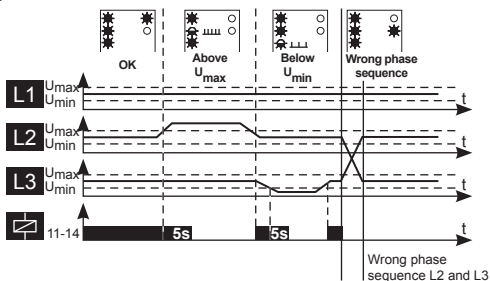
1. Disconnect the electric network by means of appropriate cut-off, current-limiting circuit-breaker or separator.
2. **Check if there is no any voltage between power leads.**
3. Mount the **PNM-31** device on TH 35 rail.
4. Connect the system leads according to the electrical diagram.
5. Connect power supply circuit.
7. Set maximum  $U_{max}$  and minimum  $U_{min}$  voltage required.

If incorrect phase sequence is detected, the yellow LED will light. If the sequence is correct, the system will control every phase voltage. If any phase voltage is outside the preset range  $<U_{min}, U_{max}>$ , the device will start OFF-time delay counting (approx. 5 s). If, during this time, incorrect voltage does not reach correct value, the output relay will be OFF (red LED will be OFF). The relay will be switched ON again in case of voltage return to the correct range (accounting voltage hysteresis of approx. 3 V). Three green LEDs indicate phase voltages of L1, L2, L3 lines. If the give LED lights (\*), the indicated voltage is within the preset range  $<U_{min}, U_{max}>$ . Quick LED pulsing (⚡) indicates  $U_{max}$ , exceeding and slow pulsing (⚡), decrease below  $U_{min}$ . The device is capable of voltage unbalance detecting. In case of unbalance exceeding 50 V the output relay is OFF and the yellow LED pulses.

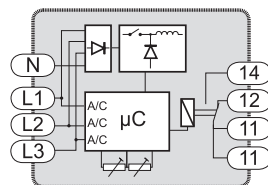
## CONNECTION



## TIME DIAGRAMS



## INNER DIAGRAM



## PRODUCT FAMILY

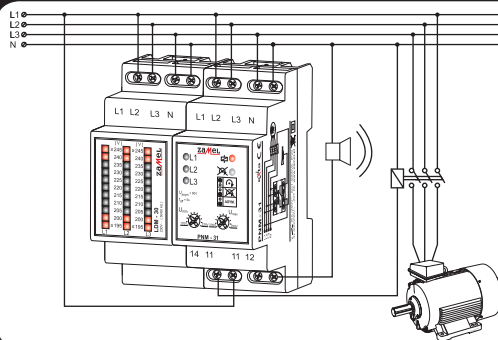
The PNM-31 is a member of the PNM product family.

### PNM - xx

Device version:  
10 – single phase  
31 – three-phase  
32 – three-phase, LCD

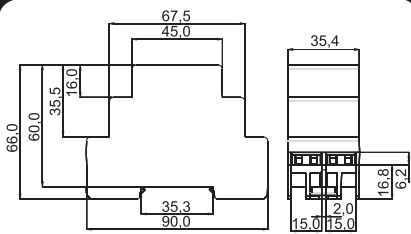
Device type

## EXAMPLE OF INSTALLATION



The PNM-31 voltage relay is applicable together with the LDM-30 voltage indicator. Three-phase system voltage is being measured in the relay circuit. The relay outputs cut OFF load power supply (e.g. the motor) in case of the preset voltage range exceeding. The voltage indicator enables continuous voltage visualization for the controlled circuit.

## DIMENSIONS



## SIGNALLING

### LED SIGNALLING

DIODY	L1, L2, L3
*	The given phase within the preset range
⚡	The phase voltage greater than $U_{max}$
⚡	The phase voltage less than $U_{min}$
⚡	The given phase lack

⚡	Relay ON
○	Relay OFF
⚡	Incorrect phase sequence
⚡	Voltage unbalance

## WARRANTY CARD

There is 24 months guarantee on the product

Salesman stamp and signature, date of sale

1. ZMIE ZAMEL SP. J. assures 24 months guarantee for the product.
2. The manufacturer's guarantee does not cover any of the following actions:
  - a) mechanical damage during transport, loading / unloading or under other circumstances,
  - b) damage caused by incorrect product mounting or misuse,
  - c) damage caused by unauthorised modifications made by the PURCHASER or any third parties to the product or any other devices needed for the product functioning,
  - d) damage caused by Act of God or any other incidents independent of the manufacturer.
3. The PURCHASER shall lay any claims in writing to the dealer or ZMIE ZAMEL SP. J.
4. ZMIE ZAMEL SP. J. is liable for processing any claim according to current Polish legislation.
5. ZMIE ZAMEL SP. J. shall process the claim at its own discretion: product repair, replacement or money return.
6. The manufacturer's guarantee is valid in the Republic of Poland.
7. The PURCHASER's statutory rights in any applicable legislation whether against the retailer arising from the purchase contract or otherwise are not affected by this warranty.

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