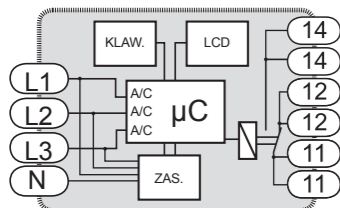


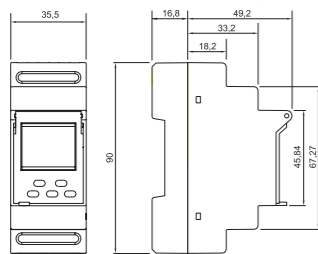
## MOUNTING

1. Disconnect power supply by the phase fuse, the circuit-breaker or the switch- disconnecter combined to the proper circuit.
2. Check if there is no voltage on connection cables by means of a special measure equipment.
3. Install the PNM-32 on the TH-35 DIN rail in the switchboard.
4. Connect the cables with the terminals in accordance with the installing diagram.
5. Switch on the power supply from the mains.

## INNER DIAGRAM



## DIMENSIONS



## PRODUCT FAMILY

The PNM-32 is a member of the PNM product family.

### PNM - xx

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

Device type

## WARRANTY CARD

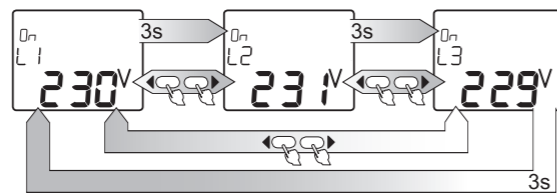
There is 24 months guarantee on the product

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.

Salesman stamp and signature, date of sale

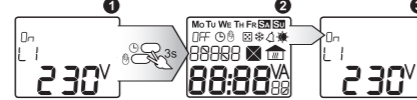
## FUNCTIONING

After power supply switching on it is necessary to set maximum and minimum voltage, hysteresis, phase unbalance and the relay ON-time and OFF-time. If not, the following default values will be set  $U_{\Delta} = 235 \text{ V}$ ,  $U^{\nabla} = 225 \text{ V}$ ,  $H_{15t} = 1 \text{ V}$ ,  $t_{on} = 2 \text{ s}$ ,  $t_{off} = 2 \text{ s}$ ,  $R_{SY} = 10 \text{ V}$ . If all phase voltages are greater or equal to 170 V, automatic phase sequence checking will start. In case of incorrect phase sequence the output relay will be switched OFF (OFF), the symbol will be displayed:  $E_{rr}$ , and a message with info which phases are to be changed over in order to set a correct phase sequence will be displayed too. If the phase sequence is correct, the device will start displaying measured voltages in three-second cycles (see the figure) and voltages controlling.



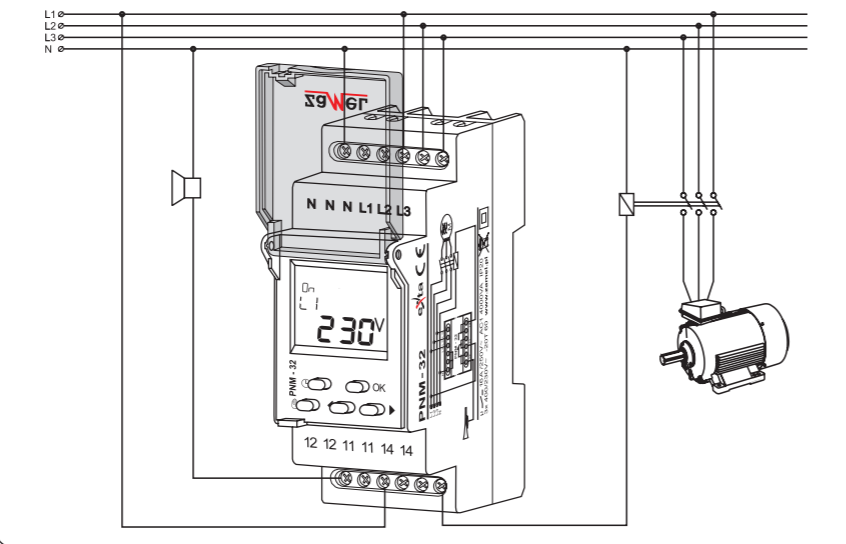
It is possible to toggle between the phases by pressing the cursors  $\leftarrow$   $\rightarrow$  which causes breaking cyclic phase voltages display (every 3 s) and holding the set phase display for 20 seconds. If the voltages are included within the set range ( $U^{\nabla}$ ,  $U_{\Delta}$ ), after  $t_{on}$  time the relay will be ON ( $O_n$ ). Any voltage threshold exceeding for the given phase will be signalled by the following symbol:  $\blacktriangle$  for the minimum threshold  $U_{\Delta}$  and the  $\blacktriangledown$  symbol for the max voltage  $U^{\nabla}$ , and start counting the time  $t_{off}$ , and then will switch OFF the output relay (OFF). If, during displaying e.g. the L3 phase voltage, the L1 or L2 phase voltage falls below the voltage threshold  $U^{\nabla}$ , or exceeds the min  $U_{\Delta}$ , threshold, the device will toggle the phase value displayed actually to the phase with the incorrect voltage value and will remain in this state until the wrong value disappears or the relay is OFF. Układ wykrywa również asymetrię napięcia. The device is capable of detecting voltage unbalance. If the potential difference between the phases is greater than  $R_{SY}$ , the display will show  $\blacktriangle$ , and after  $t_{off}$  time the relay will be OFF (OFF).

## MAIN RESET



- 1 In order to cancel the circuit data and set default values it is necessary, in the main window, to press and hold simultaneously (M) and (S) keys for 3 seconds;
- 2 All display fields will be lighted;
- 3 The main window will be entered after a while.

## CONNECTION



# VOLTAGE RELAY PNM-32

INSTRUCTION MANUAL



Zakład Mechaniki i Elektroniki  
ZAMEL sp.j.  
J.W. Dzida, K. Łodzińska

**ZAMEL**

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Tel. +48 (32) 210 46 65, Fax +48 (32) 210 80 04  
www.zamelcet.com, e-mail: marketing@zamel.pl

## DESCRIPTION

The PNM-32 voltage relay is designed for the three-phase system voltage control and load protection. It is possible to set minimum and maximum voltage, hysteresis, voltage unbalance and ON / OFF delay. The device is capable of detecting voltage unbalance and phase sequence. The LCD display and keyboard enable easy parameters visualization and programming.

## FEATURES

- Three-phase load protection against voltage swing and unbalance, and incorrect phase sequence,
- Measured voltage state indicator,
- Relay state indicator,
- The device supplying with any phase,
- Minimum (170 ± 225 V) and maximum (235 ± 290 V) voltage setting,
- OFF-time delay adjustment,
- Voltage control for each phase,
- Correct phase sequence control,
- Voltage unbalance control,
- Relay output - single changeover contact, maximum load 16 A,
- Mounted on TH 35 rail.



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.



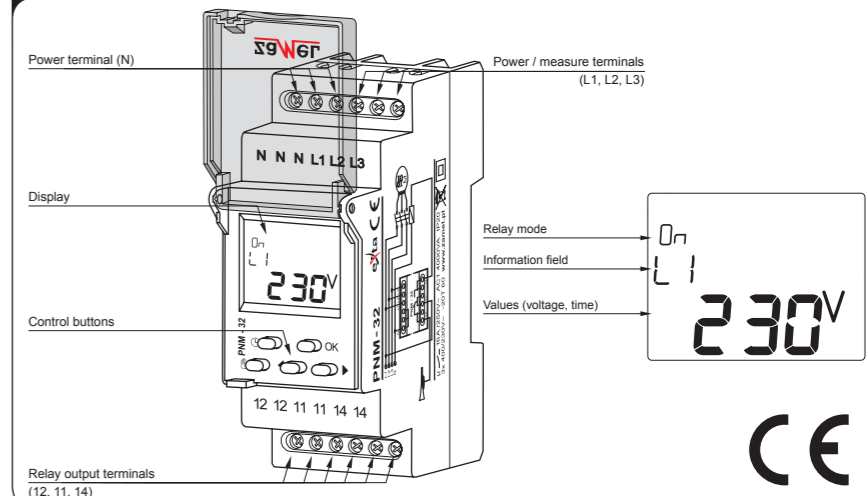
The symbol means selective collecting of electrical and electronic equipment. It is forbidden to put the used equipment together with other waste

## TECHNICAL DATA

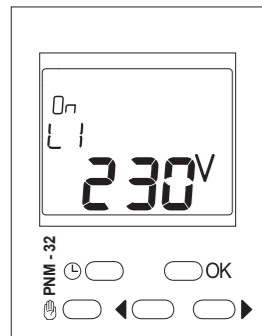
PNM-32	
Power terminals:	L1, L2, L3, N
Rated voltage:	230/400 V AC
Rated voltage tolerance:	-15 + +10 %
Rated frequency:	50 / 60 Hz
Rated current:	2 W / 14 VA
Measured voltage indicator:	wyświetlacz LCD
Relay state and soft network indicator:	wyświetlacz LCD
Voltage unbalance / phase sequence indicator:	wyświetlacz LCD
Voltage threshold settings:	klawiatura
Umin adjustment range:	170 + 225 V
Umax adjustment range:	235 + 290 V
Voltage hysteresis adjustment range:	1 + 4 V
Unbalance level adjustment range:	10 + 60 V
OFF-time toff:	2 + 15 s keyboard
ON-time ton:	2 + 15 s keyboard
Time setting accuracy:	max ±1 s / 24 h at temp. 25 °C
Voltage measurement accuracy (50 Hz sinus):	±1,5 %*
Output relay parameters:	1NO/NC - 16 A / 250 V AC1 4000 VA
Number of terminal clamps:	12
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:	0,12 kg
Reference standards:	PN-EN 60730-1; PN-EN 60730-2-1; PN-EN 61000-4-2,3,4,5,6,11

\* The PNM-32 device is not fitted with the True RMS converter and therefore only 50 Hz sinusoidal voltages can be measured correctly, if there are significant harmonic distortions, the measurement result error may be serious.

## APPERANCE



## DESCRIPTION



### Description of displayed fields and messages

On OFF - relay state

↔ - unbalance

L1, L2, L3 - phase designator

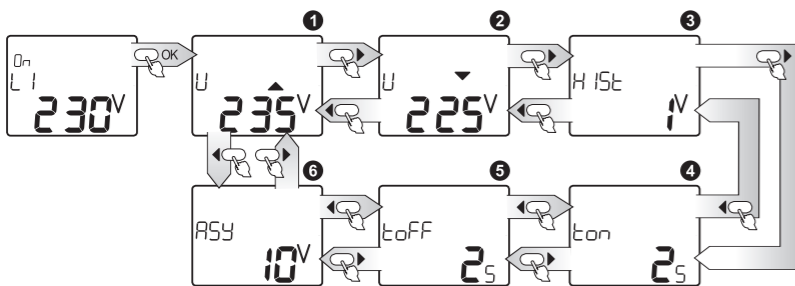
L1-L2, L2-L3 - change phase sequence

Err - wrong phase sequence, **HI** - Warning! Voltage measured greater than 300 V

### Button description

- ⏪ • exit from the edition mode or menu;
- ⏩ • exit from the edition mode or menu;
- OK • the main menu or submenu access (setting adjustment);
- ↔ • for the main window - displayed phases changeover;
- the main menu navigation, parameter change in a submenu.

## MAIN MENU

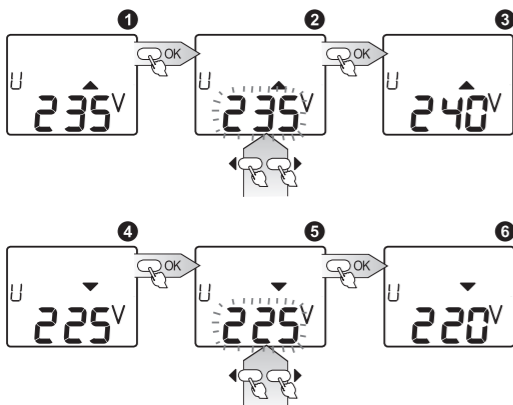


Press OK to enter menu from the main window; menu scrolling by means of the cursors ↔.

Function	Description
U <sup>▲</sup>	MAX THRESHOLD SETTING
U <sup>▼</sup>	MIN THRESHOLD SETTING
H ISt	VOLTAGE HYSTERESIS SETTING
t <sub>on</sub>	ON-TIME SETTING
t <sub>off</sub>	OFF-TIME SETTING
RSY	UNBALANCE LEVEL SETTING

**Caution! Main menu access causes immediate relay switch OFF!**

## MAXIMUM AND MINIMUM THRESHOLD SETTING

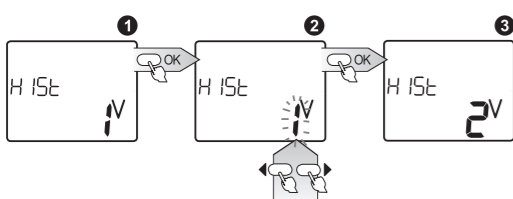


- 1 U<sup>▲</sup> - maximum threshold setting, enter by pressing OK;
- 2 With ↔ cursors select maximum threshold value, setting range: 235+290 V;
- 3 After pressing OK button, changes are saved and the main menu is entered, where, with the left and right cursors ↔ it is possible to enter another menu item or exit the menu by means of ⏪ or ⏩;
- 4 U<sup>▼</sup> - minimum threshold setting, enter by pressing OK;
- 5 With ↔ cursors select minimum threshold value, setting range: 170+225 V;
- 6 After pressing OK button, changes are saved and the main menu is entered, where, with the cursors ↔ it is possible to enter another menu item or exit the menu by means of ⏪ or ⏩.

**It is possible to exit any submenu window at any moment, without setting saving by means of pressing the keys ⏪ or ⏩.**

If you do not exit a submenu (and thus enter the main menu) during 15 seconds after pressing any key, the measurement result display window will be entered automatically without changes saved.

## VOLTAGE HYSTERESIS SETTING

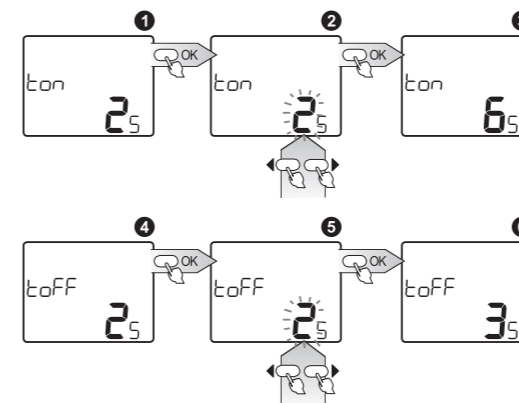


- 1 H ISt - voltage hysteresis setting;
- 2 With ↔ cursors select hysteresis value, setting range: 1+4 V;
- 3 After pressing OK button, changes are saved and the main menu is entered, where, with the cursors ↔ it is possible to enter another menu item or exit the menu by means of ⏪ or ⏩.

**It is possible to exit any submenu window at any moment, without setting saving by means of pressing the keys ⏪ or ⏩.**

If you do not exit a submenu (and thus enter the main menu) during 15 seconds after pressing any key, the measurement result display window will be entered automatically without changes saved.

## ON-TIME AND OFF-TIME SETTING

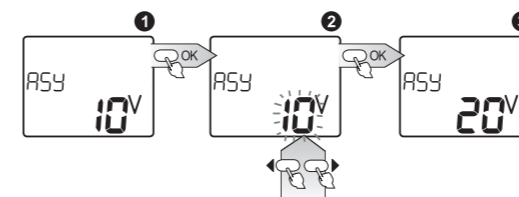


- 1 t<sub>on</sub> - relay ON-time setting, enter by pressing OK;
- 2 With ↔ cursors select time in seconds, setting range: 2+15 s;
- 3 After pressing OK button, changes are saved and the main menu is entered, where, with the cursors ↔ it is possible to enter another menu item or exit the menu by means of ⏪ or ⏩;
- 4 t<sub>off</sub> - relay OFF-time setting, enter by pressing OK;
- 5 With ↔ cursors select time in seconds, setting range: 2+15 s;
- 6 After pressing OK button, changes are saved and the main menu is entered, where, with the cursors ↔ it is possible to enter another menu item or exit the menu by means of ⏪ or ⏩.

**It is possible to exit any submenu window at any moment, without setting saving by means of pressing the keys ⏪ or ⏩.**

If you do not exit a submenu (and thus enter the main menu) during 15 seconds after pressing any key, the measurement result display window will be entered automatically without changes saved.

## UNBALANCE LEVEL SETTING

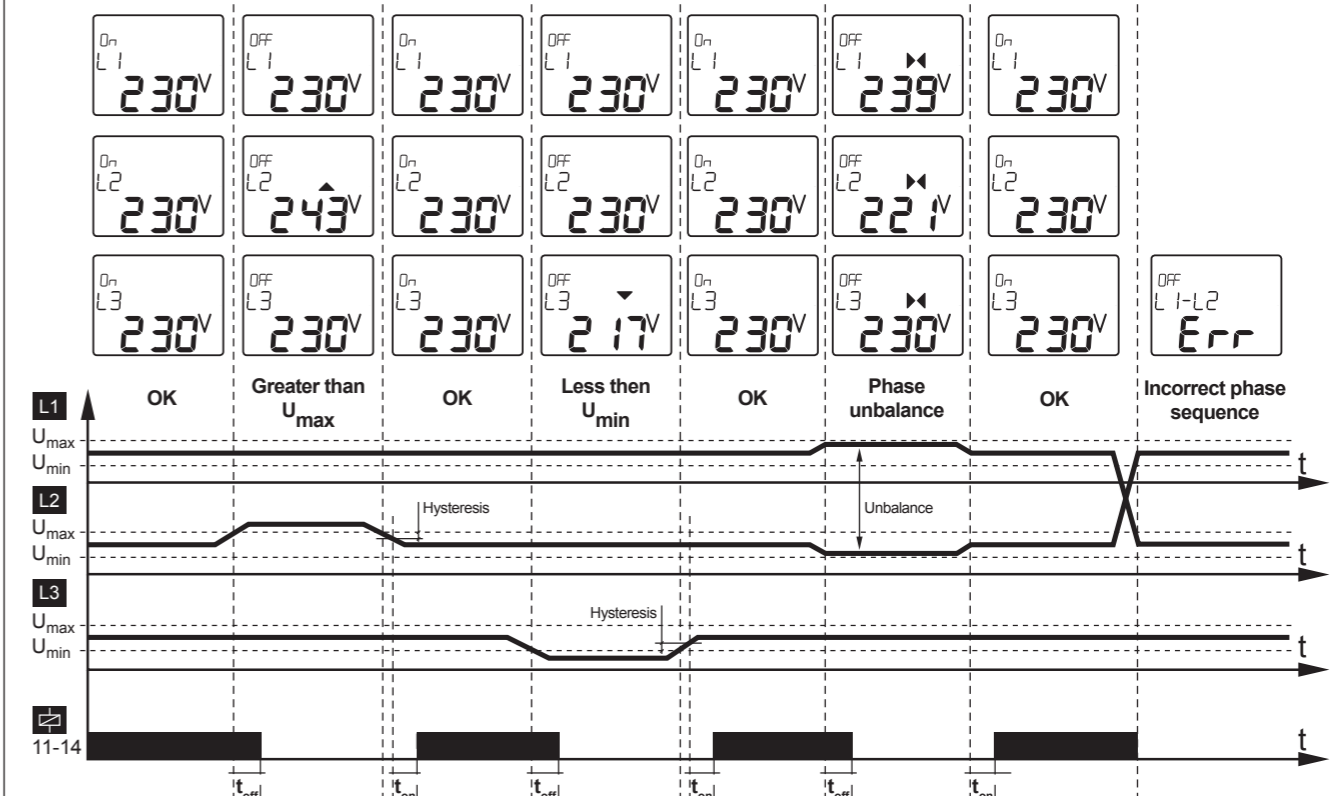


- 1 RSY - unbalance level setting, enter by pressing OK;
- 2 With ↔ cursors select unbalance level value, setting range: 10+60 V;
- 3 After pressing OK button, changes are saved and the main menu is entered, where, with the cursors ↔ it is possible to enter another menu item or exit the menu by means of ⏪ or ⏩.

**It is possible to exit any submenu window at any moment, without setting saving by means of pressing the keys ⏪ or ⏩.**

If you do not exit a submenu (and thus enter the main menu) during 15 seconds after pressing any key, the measurement result display window will be entered automatically without changes saved.

## TIME DIAGRAMMS AND MESSAGES



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