



## TECHNICAL SPECIFICATIONS

Rated line / phase supply voltage	400/230 V
Mains frequency	45 – 65Hz
Harmonic composition (unsinusoidality) of supply voltage	EN 50160
Lower threshold for voltage disconnection, Umin	195 V
Upper threshold of voltage disconnection, Umax	260 V
Fixed minimum voltage trip delay	5 s
Fixed tripping delay for maximum voltage	1 s
Phase reversal protection tripping time control range	0.25 – 10 s
Response time when voltage exceeding 290V	≤ 0.25 s
Restart time (AR)	5 s
Tripping time in case of phase failure	≤ 0.25 s
Ready time when the supply voltage is applied	≤ 0.2 s
Phase misalignment detection value	40 V
Hysteresis of voltage	5 – 6 V
Hysteresis of phase imbalance	5 – 6 V
Accuracy of determination of the voltage operation threshold	≤ 3 V
Voltage when maintaining serviceability: - for one phase - for three phases	95 – 450 V 95 – 450 V
Power consumption (when load is connected)	≤ 1.2 W
Maximum switching current of output contacts	5 A
Commutation life of output contacts: - under load of 5 A (cos φ = 1.0) - under load of 1 A (cos φ = 1.0)	≥ 100 tys.cykli ≥ 1 mln cykli
Device service	Switchgear and controlgear
Rated operating condition	Continuous
Climatic design version	NF 3.1
Protection class rating of the front panel	IP 40
Protection class rating of the terminal block	IP 20
Permissible contamination level	II
Overvoltage category	II
Electric shock protection class	II
Rated voltage of insulation	450 V
Rated impulse withstand voltage	4.0 kV
Conductor cross-section for connecting to terminals	0.5 – 1.5 mm <sup>2</sup>
Tightening torque of the terminal screws	0.4 N*m
Weight	≤ 0.100 kg
Overall dimensions, HxBxL	90x18x65 mm
The device meets the requirements of the following: EN 60947-1; EN 60947-6-2; EN 55011; EN 61000-4-2	
The device installation (mounting) is on standard 35 mm DIN-rail	
The device remains operational capability in any position in space	
Housing material – self-extinguishing plastic	
Harmful substances in amounts exceeding maximum permissible concentrations are not available	

## OPERATION CONDITIONS

The device is intended for operation in the following conditions:

- Ambient temperature: from minus 35 to +55 °C;

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- Atmospheric pressure: from 84 to 106.7 kPa;
- Relative humidity (at temperature of +25 °C): 30 ... 80 %.

If the temperature of the device after transportation or storage differs from the ambient temperature at which it is supposed to be operated, then before connecting to the mains keep the device under the operating conditions within two hours (because of condensation may be on the device elements).

**ATTENTION!** The device is not intended for operation in the following conditions:

- Significant vibration and shocks;
- High humidity;
- Aggressive environment with content in the air of acids, alkalis, etc., as well as severe contaminations (grease, oil, dust, etc.).

## DEVICE CONNECTION



**WARNING! THE DEVICE TERMINALS AND INTERNAL COMPONENTS ARE UNDER POTENTIALLY LETHAL VOLTAGE.**

The device is not intended for the load commutation in case of short circuit. So the power supply load circuit should have installed automatic circuit breaker for current no more than 6.3 A class B.

To improve the device performance, it is recommended to install the fuse (fuse-link) in the power supply circuit of RNPP-313 (L1, L2, L3) for current 1 A.

All connections must be performed when the device is deenergized.

It is not allowed to leave exposed portions of wire protruding beyond the terminal block.

To ensure the reliability of electrical connections the flexible (stranded) wires with insulation for voltage of at least 450 V should be used, the ends of which it is necessary to be striped of insulation for 5±0.5 mm and tightened with bootlaces. It is recommended to use the wire with cross-section of at least 1 mm<sup>2</sup>.

Wires fastening should exclude mechanical damage, twisting and abrasion of the wire insulation.

For a reliable contact, tighten the terminal screws with the force 0.4 N\*m.

When reducing the tightening torque, the junction point is heated, the terminal block may be melted and wire can burn. If you increase the tightening torque, it is possible to have thread failure of the terminal block screws or the compression of the connected wire.

- 1) Connect the device according to the diagram shown in Fig. 2.
- 2) Set the phase imbalance protection activation time using the **Toff(s)** control (item 4, Fig. 1).
- 3) Feed the supply voltage to the terminals of the device.

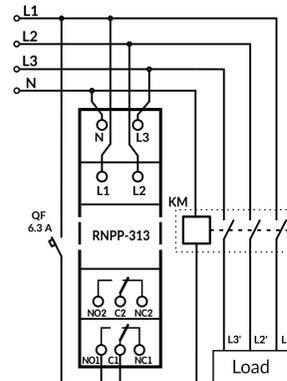


Figure 2

## THE DEVICE USE

RNPP-313 can be operated in the following modes:

- 1) Minimum voltage control**  
In this mode, if the network voltage drops below 195 V, the protected equipment will disconnect from the network.
- 2) Maximum voltage control**  
In this mode, if the network voltage exceeds 260 V, the protected equipment will disconnect from the network.
- 3) Phases presence control**  
In this mode, if one of the phases is lost, the protected equipment will disconnect from the network.
- 4) Control of incorrect phase sequence and presence of phase sticking**  
In this mode, if there is an incorrect connection or phase sticking, the protected equipment will disconnect from the network.
- 5) Phase imbalance control**  
In this mode, if the voltage difference between phases exceeds 40 V, the protected equipment will disconnect from the network.
- 6) Broken zero control**  
If there is a neutral break, the protected equipment will disconnect from the network, and the L1, L2, L3 and Off indicators will turn off.

**Notes:**

- 1) The control of the phase presence and broken zero are kept in any operating mode.
- 2) In all operation modes, the device is operated when the phase is broken or the voltage drops below 100 V in one or more phases for the fixed time of 0.25 seconds.

The device at the output has two groups of independent output changeover contacts (NO1-C1-NC1, NO2-C2-NC2). If there is no voltage to the device, the contacts C1-NC1 (C2-NC2) are closed, and the contacts NO1-C1 (NO2-C2) are open.

When the RNPP-313 is operated, the load is disconnected by interrupting the power supply of the KM coil through NO1-C1 (NO2-C2) contacts.

When power is supplied to the device terminals, the L1, L2 and L3 indicators turn on, and the automatic reclosing (AR) countdown begins, with the Off indicator flashing. At the end of the AR countdown, the Off indicator turns off, and the device connects the protected equipment to the network.

In the event of a fault, the AR countdown starts immediately after the device disconnects the protected equipment.

The status options for the indicators L1, L2, L3, and Off are provided in the table below.

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## The status options for the indicators L1, L2, L3 and Off

Indicators L1, L2, L3	Status of indicators L1, L2, L3	Indicator Off	Status of indicator Off	Functional status of RNPP-313
● ● ●	Constant lighting of each (all)	○	Absence of light	The voltage applied to each phase is within the range of 195 – 260V
○ ○ ○	Flashing of one (all)	○	Flashing (AR time countdown)	
○ ○ ○	Flashing of one (all)	●	Constant lighting	Increase of voltage in one phase (phases)
○ ○ ○	Absence of light of one (all)	●	Constant lighting	1) Lowering the voltage in one phase (phases) below the threshold; 2) Phase failure or under-voltage in one of the phases below 100V
○ ○ ○	Alternate flashing of two; indicators (first: the middle and lower lights, then the middle and upper indicators light)	●	Constant lighting	Phase imbalance failure
● ○ ○	Alternate lighting (first upper, then middle, then lower indicators light)	●	Constant lighting	Failure due to incorrect phase sequence and the presence of phase sticking

**Notes:**

- 1) The failure is displayed in order of priority:  
1 – Phase failure or voltage drop below 100V (highest priority);  
2 – Phase sequence;  
3 – Minimum and maximum voltage;  
4 – Phase imbalance.
- 2) Simultaneous faults are triggered based on the shortest delay time among these faults (refer to "Technical Specifications").

## EXAMPLES OF RNPP-313 USING

### RNPP-313 in "Minimum voltage control" mode

If the voltage drops below 195 V, the device will trigger after 5 seconds, the red OFF indicator will light up, and the corresponding LINE indicator(s) will turn off. If the voltage falls below 100V, the device will trigger within 0.25 seconds.

### RNPP-313 in "Maximum voltage control" mode

If the voltage exceeds 260 V, the device will trigger after 1 second, and the red OFF indicator will light up.

### RNPP-313 in "Phases presence control" mode

If there is a phase loss or if the voltage drops below 100V on one or two phases, the device will trigger within 0.25 seconds, and the corresponding phase indicator will turn off.