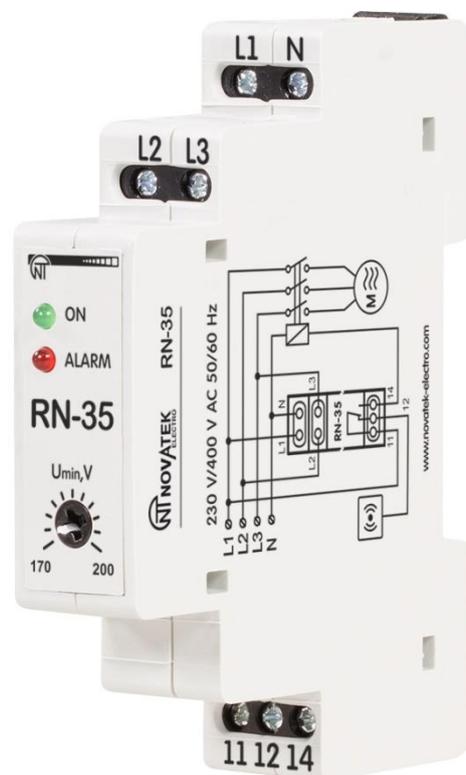


**VOLTAGE AND PHASE  
CONTROL RELAY  
RN-35**



**OPERATION MANUAL  
TECHNICAL PASSPORT**

*The quality management system of production complies with  
the requirements of ISO 9001: 2008*



**Dear Customer,**  
NOVATEK-ELECTRO LLC. Company thanks you for purchasing our products.  
You will be able to use properly the device after carefully studying the Operation Manual.  
Store the Operation Manual throughout the service life of the device.

**ATTENTION!** ALL REQUIREMENTS OF THIS OPERATION MANUAL ARE COMPULSORY TO BE MET!



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

TO ENSURE THE DEVICE SAFE OPERATION IT IS **STRICTLY FORBIDDEN** THE FOLLOWING:

–TO CARRY OUT MOUNTING WORKS AND MAINTENANCE WITHOUT DISCONNECTING THE DEVICE FROM THE MAINS;

–TO OPEN AND REPAIR THE DEVICE INDEPENDENTLY;

–TO OPERATE THE DEVICE WITH MECHANICAL DAMAGES OF THE HOUSING.

**IT IS NOT ALLOWED** WATER PENETRATION ON TERMINALS AND INTERNAL ELEMENTS OF THE DEVICE.

During operation and maintenance the regulatory document requirements must be met, namely:

Regulations for Operation of Consumer Electrical Installations;

Safety Rules for Operation of Consumer Electrical Installations;

Occupational Safety in Operation of Electrical Installations.

Installation, adjustment and maintenance of the device must be performed by the skilled professionals having studied this Operation Manual.

The device is safe for use under keeping of the operating rules.

This Operation Manual is intended to familiarize you with design, the requirements for safety, operation and maintenance procedures of the voltage and phase control relay RN–35 (hereinafter referred to as the "device", "RN–35").

The device meets the requirements of the following:

- Low-voltage switchgear; Part 1; General rules (IEC 60947-1:2004);
- Low-voltage circuit breaker and controller; Part 6-2; Multifunctional equipment; Control and safety switching equipment (IEC 60947-6-2:1992);
- Electromagnetic compatibility; Industrial, scientific and medical RF equipment; Electromagnetic interference characteristics; Standards and measuring procedure (CISPR 11:2004);
- Electromagnetic compatibility; Part 4-2; Testing and measurement techniques; Electrostatic discharge immunity test (IEC 61000-4-2:2001).

Harmful substances in amounts exceeding maximum permissible concentrations are not available.

## 1. APPLICATION

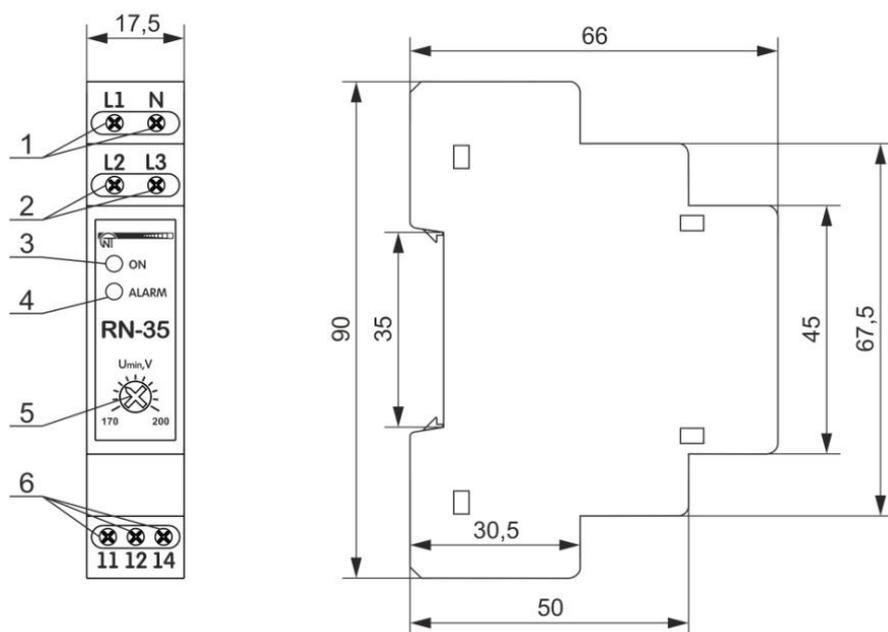
### 1.1. The Device Application

RN-35 is the microprocessor-based device intended to protect three-phase consumers (e.g., engines and generators) against damage in case of improper full phase and non-symmetry of the mains voltage or phase sequence. Using the potentiometer you can set the limit values of the voltage.

#### Features:

- Protection against non-symmetry of the mains voltage, fault and error in phase sequence;
- Adjustment of the threshold voltage;
- Resistance to short-time voltage fluctuations;
- Maximum switching current of the relay output contacts is 10 A;
- Single-module design;
- Mounting on standard DIN rail of 35 mm.

### 1.2. Controls, Overall and Mounting Dimensions



- 1 - Input contacts of phase L1 and zero contacts of mains;
- 2 - Input contacts L1 and L2;
- 3 - Green LED indicating correct phase sequence;
- 4 - Red LED ALARM indicating incorrect phase sequence;
- 5 - Control knob for  $U_{max}$  /  $U_{min}$  actuation;
- 6 - Output contacts.

**Fig. 1** – Front panel and overall mounting dimensions of RN-35

## 2. SPECIFICATIONS

### 2.1. Basic Specifications

Basic specifications of the device are given in Table 2.1.

**Table 2.1** – Basic Specifications

Description	Value
Rated line / phase to neutral voltage ( $\dots$ / $\sim$ ), V	230 / 400
Mains frequency, Hz	50 – 60
Device service	Switchgear and control gear
Rated operating condition	Continuous
Rated current consumption, mA	34
Voltage control range, V	170 ÷ 200
Hysteresis of voltage reset, V	10

Max. tightening torque of terminal screws, N*m	0.4
On delay, s	5 ÷ 10
Off delay, s	1 ÷ 5
Conductor cross-section for connecting to terminals, mm <sup>2</sup>	0.2 ÷ 2.50
Protection class rating	IP20
Electric shock protection class	II
Overvoltage category	II
Permissible contamination level	II
Rated impulse withstand voltage, kV	2
Overall dimensions, mm	90x17.5x66
Weight, g, maximum	77
Mounting on standard 35 mm DIN-rail	

## 2.2. Operation Conditions

The device is intended for operation in the following conditions:

- Ambient temperature: from minus 35 to +50 °C;
- 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.).

## 3. THE DEVICE DESCRIPTION AND OPERATION

### 3.1. Design

RN-35 is designed to be placed in a plastic housing for mounting on standard 35 mm DIN-rail, 1 module of S type. The housing is made of impact-resistant, self-extinguishing material. The housing design with overall and mounting dimensions is shown in Fig. 1.

### 3.2. Principle of Operation

The device controls correct phase sequence. In case of incorrect phase sequence detection, the red LED lights up, and in case of correct one, the green LED lights up. If the voltage of all the phases is not beyond the permissible values, the relay will remain on, and load control is enabled. In the other case, the relay will be off.

	Correct phase sequence
	Incorrect phase sequence
	Mains voltage unbalance

## 4. INTENDED USE

### 4.1. Preparation for Connection:

- Unpack the device (we recommend to keep the original packing for the entire warranty period of the device operation);
- Check the device for damage after transportation; in case of such damages detection, contact the supplier or the manufacturer;
- Carefully study the Operation Manual (**pay special attention to the connection diagram to power the device**);
- If you have any questions regarding the installation of the device, please contact the manufacturer by telephone number indicated at the end of this Operation Manual.

### 4.2. General

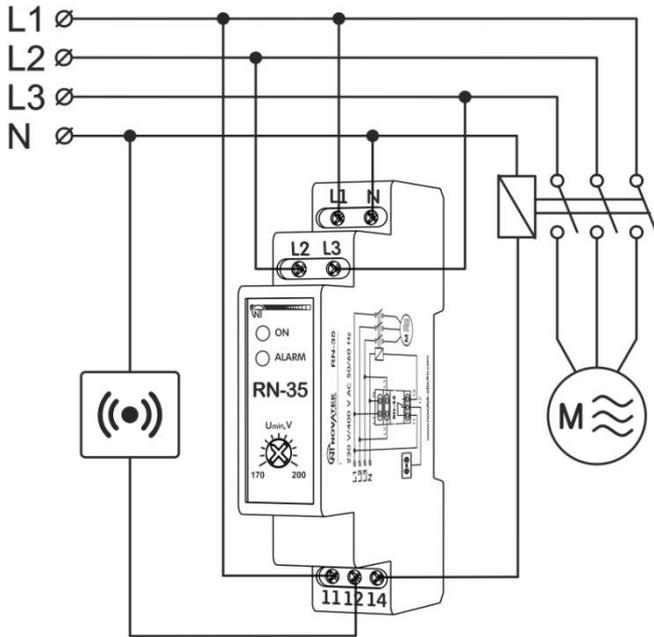
It is required to prepare the cables to connect the device to power supply and external devices. To ensure the reliability of electrical connections you should use flexible (stranded) wires, the ends of which it is

necessary to be striped of insulation for  $5\pm 0.5$  mm and tightened with bootlaces. Recommended cable cross-section for connection to power supply and external devices is from 0.2 to 2.5 mm<sup>2</sup>.

Error when performing the installation works may damage the device and connected devices.

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

**IT IS NOT ALLOWED TO LEAVE EXPOSED PORTIONS OF WIRE PROTRUDING BEYOND THE TERMINAL BLOCK.**



**Fig. 2 – Connection Diagram**

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.

### 4.3. Connection

**ATTENTION! ALL CONNECTIONS MUST BE PERFORMED WHEN THE PRODUCT IS DE-ENERGIZED.**

1. Disconnect power supply;
2. Connect the RN-35 in accordance with the diagram;
3. Check de-energizing of power wires using the appropriate device;
4. Install RN-35 in the switchboard on 35 mm rail;
5. Connect power supply;
6. Set threshold voltage (Fig. 1).

**ATTENTION! NOT TO DAMAGE CONTROL KNOBS, PLEASE DON'T APPLY MUCH FORCE DURING THE PARAMETERS SETTING.**

## 5. MAINTENANCE AND SAFETY PRECAUTIONS

### 5.1. Safety Precautions



THE TERMINALS AND THE DEVICE INTERNAL ELEMENTS CONTAINS POTENTIALLY LETHAL VOLTAGE.

DURING MAINTENANCE IT IS **NECESSARY TO DISABLE** THE DEVICE AND CONNECTED DEVICES FROM THE MAINS.

Maintenance of the device must be performed by the skilled professionals.  
Recommended frequency of maintenance is every six months.

### 5.2. Maintenance Procedure:

- 1) Check the connection reliability of the wires, if necessary, clamp with the force;
- 2) Visually check the integrity of the housing, in case of detection of cracks and damages take the device

out of service and send for repair;

3) If necessary, wipe the front panel and the housing of the device with cloth.

**Do not use abrasives and solvents for cleaning.**

**6. SERVICE LIFE AND MANUFACTURER WARRANTY**

6.1. The lifetime of the device is 10 years. Upon expiration of the service life, contact the manufacturer.

6.2. Shelf life is 3 years.

6.3. Warranty period of the device operation is 5 years from the date of sale.

During the warranty period of operation (in the case of failure of the device) the manufacturer is responsible for free repair of the device.

**ATTENTION! IF THE DEVICE HAS BEEN OPERATED IN VIOLATION OF THE REQUIREMENTS OF THIS OPERATION MANUAL, THE MANUFACTURER HAS THE RIGHT TO REFUSE IN WARRANTY SERVICE.**

6.4. Warranty service is performed at the place of purchase or by the manufacturer of the device.

6.5. Post-warranty service of the device is performed by the manufacturer at current rates.

6.6. Before sending for repair, the device should be packed in the original or other packing excluding mechanical damage.

**7. TRANSPORTATION AND STORAGE**

The device in the original package is permitted to be transported and stored at the temperature from minus 45 to +60 °C and relative humidity of no more than 80 %.

**8. ACCEPTANCE CERTIFICATE**

RN-35 has been manufactured and accepted in accordance with the requirements of current technical documentation and classified as fit for operation.

Seal

Head of QCD

Date of manufacture

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**9. CLAIMS DATA**

You are kindly requested, in case of the device return and transfer it to the warranty (post-warranty) service please indicate detailed reason for the return in the field of the claims data.

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*The Company is grateful to you for the information about the quality of the device and suggestions for its operation.*



For all questions, please contact the manufacturer:

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59 Admiral Lazarev Str.;

Odessa 65007, Ukraine.

Tel.: (048) 738-00-28,

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Date of sale \_\_\_\_\_