RN-111

SINGLE PHASE VOLTAGE RELAY

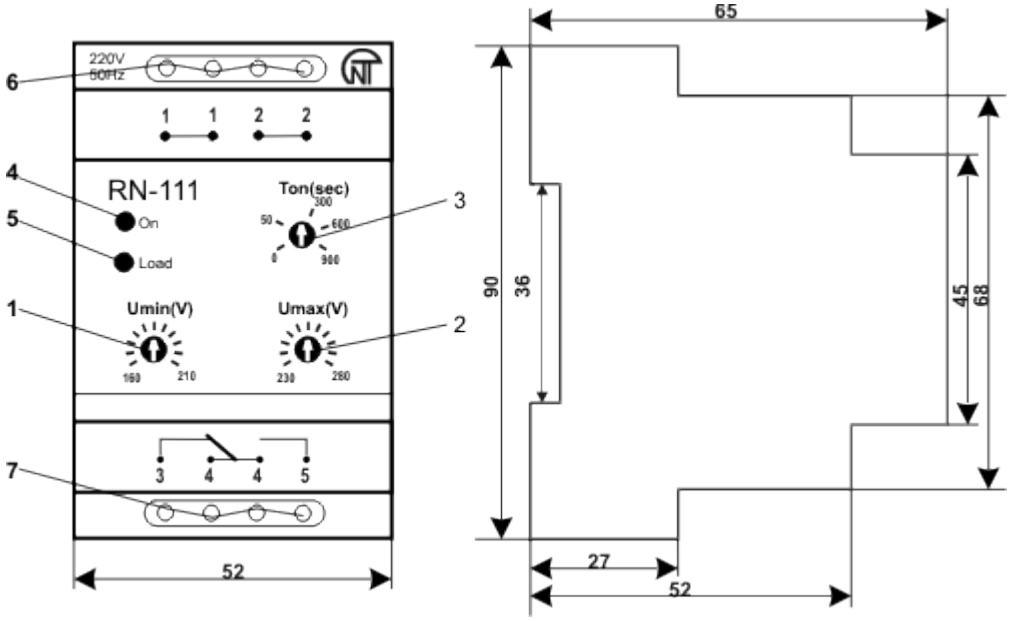
SERVICE MANUAL

1 APPLICATIONS

The RN-111 Voltage Relay is designed to de-energize any power appliance/ industrial single-phase load 220V/50Hz when there are abnormal voltage variations in the mains and to energize this load automatically on return to normal operating conditions when the mains voltage parameters regenerate:

- if load power is below 3,5 kW (up to 16A) de-energization is performed directly through the relay output contacts that are connected in series with the load power supply;
- if load power is above 3,5 kW (16A) de-energization is effected by the magnetic starter of the corresponding power (MS is not supplied in the complete set) that has the relay output contacts to be connected in series with its coil power supply.

CONTROLS DESCRIPTION AND DIMENSIONS DIAGRAM



1. trip adjustment control for Umin;
2. trip adjustment control for Umax;
3. reset delay control, Ton;
4. green LED indicating that mains voltage is present;
5. green LED indicating that output contacts have switched;
6. input contacts;
7. output contacts.

2 DESCRIPTION

The relay is connected in parallel to the mains supply to be monitored by the input ***(1-1) – (2-2)*** contacts. The input contacts are provided with twin terminals for ease of wiring, i.e.***the 1-1 terminals are the first point of connection and the 2-2 terminals are the second point of connection***. The relay has the group of two-way break-before-make output ***3—4-4—5*** contacts with a common ***4-4*** point. The ***4-5*** contacts are connected in series with a load power supply. If the load value doesn't exceed 16 A (3, 5 kW), the ***4-5*** contacts are directly connected to the break in the load power supply, i.e. they are connected in series with the load. If the load power is above 16 A (3,5 kW), the ***4-5*** contacts are connected in series to the coil power supply of the magnetic starter of the corresponding power that switches the load. The ***3-4*** contacts are used in control & alarm circuits, if necessary.

When the relay trips due to overvoltage/ undervoltage, the load is de-energized by the ***break of 4-5 N. C. contacts*** that disconnect either the load power supply directly or the magnetic starter coil power supply. The load will be automatically re-energized on return to normal conditions when voltage parameters regenerate. The automatic reset delay Ton is set by user.

To provide immunity to minor and/or short-term undervoltage avoiding excessive trippings of the relay when Umin is reached the fixed trip delay is provided. The relay will trip with 0.1 sec time delay when there is deep undervoltage/abrupt overvoltage more than 30V below/above Umin/Umax threshold setting.

Output contacts (3-5) specification

	Max.current under U~250V A.C.	Max. power when contacts are closed	Max. switch. power	Max. long-term safe voltage A.C./D.C.	Max. current under U=30VD.C.
Cosφ=0.4	5 A	5000 VA	4000 VA	380/150 V	5 A
Cosφ=1.0	16 A				

Before the relay is plugged-in one must set the maximum and the minimum voltage trip thresholds by the front-panel contact arms of potentiometers. Also user must set the automatic reset delay according to the device that the relay is to protect (reset delay for air-conditioners, refrigerators and compressor installations is no less than 3-4 min, reset delay for other instrumentation corresponds to their operating instructions).

Adjustable trip parameters are set by user. It is recommended to set trip parameters before the relay is plugged-in.

On plugging the relay in the load will be energized after the time delay equal to the reset delay Ton has expired. Ton is set by the potentiometer.

The relay is provided with a light indication signalling that the mains voltage (input voltage) exists (the green “On” LED glows), and that the output voltage exists at the protected apparatus (the green “Load” LED glows; it goes out when the relay trips).

The relay energizes the load with the time delay equal to the automatic reset delay Ton.

3 TECHNICAL BRIEF

Nominal voltage, V	220
Mains frequency, Hz	48-52
Adjustable trip range:	
for Umin threshold, V	160 - 210
for Umax threshold, V	230 - 280
Adjustable reset delay range, s	5 - 900
Fixed trip delay when Umax is reached, s	0,5
Fixed trip delay when Umin is reached, s	12
Fixed trip delay when voltage is 30V below Umin threshold, s	0,1
Fixed trip delay when voltage is 30V above Umax threshold, s	0,1
Maximum switched current(resistive load), A, no less	16
Accuracy of trip threshold for voltage, V	to 3
Operating voltage, V	400
Transient withstand, V	450
Operating temperature range, °C	from -25 to + 55
Hysteresis, V , no less	5-6
Storage temperature, °C	from -45 to + 70
Total input current, mA	to 15
Life, operations	
under 16A load, operations, no less	100 000
under 5A load, operations, no less	1 000 000
Case Dimensions, (W*H*D), mm	52x88x65
Weight , kg, not more	0.150
Mounting	standard DIN-rail 35mm

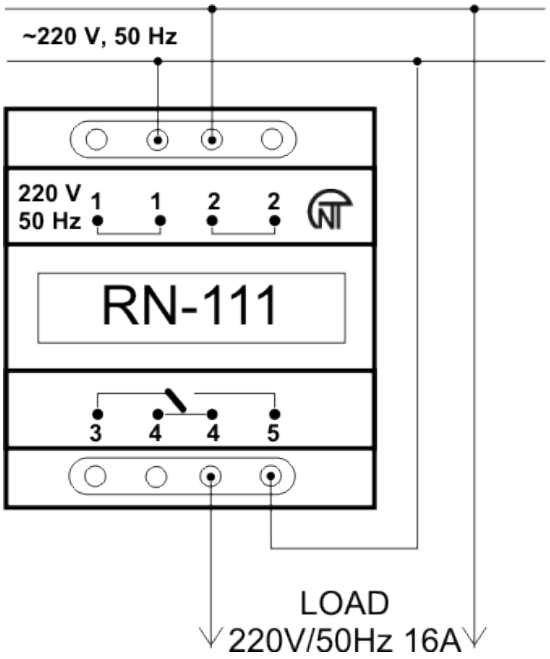
Trip setting ranges and their fixed values can be changed at customer's request.

4 FEATURES

1. trip settings (Umax, Umin, Reset delay) are adjusted in a wide range;
2. fixed trip delay when voltage is 30V below/above user-set Umin/Umax threshold is provided;
3. high accuracy for trip thresholds;
4. fixed trip delay is provided to ignore starting voltage drops that cause nuisance tripping of the relay when Umin is reached;
5. quite a high power of output contacts is provided that enables to extend the relay application range and in some instances to abandon auxiliary switching devices;
6. two-way break-before make contact group in the output allows alarm signalling to operate;

7. LED indicators of the mains voltage in the input and voltage in the output;
8. trip/reset hysteresis for Umax/Umin is approximately 5V; it means that if the relay had tripped due to a voltage drop below Umin threshold and the load was de-energized, the relay would reset automatically and energize the load when the voltage exceeds 5V above Umin threshold (reaching the level set by hysteresis) with reset delay Ton;
9. compactness, low power demand and small weight of the relay;
10. mounted on a standard DIN rail.

WIRING DIAGRAM



5 STORAGE AND SHIPPING CONDITIONS

The relays in manufacturer package should be stored in enclosed rooms at –45 to +70 °C and exposed to no more than 80% of relative humidity when there are no fumes in the air that exert a deleterious effect on package and the relay material. The Buyer must provide the protection of the relay against mechanical damages in transit.

6 WARRANTY

Novatek-Electro company warrants a trouble-free operation of the RN-111 manufactured by it within 36 months from the date of sale, provided:
-- the proper connection;
-- the safety of the inspection quality control department seal;
-- the integrity of the case, no traces of an opening, cracks, spalls etc.