

## VOLTAGE MONITORING RELAY

### RN-101M “VOLT CONTROL”



## OPERATING MANUAL

*Quality control system on the production complies with requirements ISO 9001:2008*

Review the Operating manual before using the unit

Store the unit in the operating environment for 2 hours before switching to the mains.

**WARNING! THE UNIT SHOULD BE OPERATED IN THE ELECTRIC MAINS PROTECTED WITH AUTOMATIC CIRCUIT BREAKER WITH THE BREAKING CURRENT OF 32 A, NO MORE.**

This unit is not designed for power-cut in event of a short circuit

This unit is safe for use in case of compliance with operating rules

Do not use abrasives or organic compounds for cleaning (spirit, gasoline, solvents, etc.).

**NEVER ATTEMPT TO REMOVE AND REPAIR THE UNIT.**

**NEVER ATTEMPT TO OPERATE THE UNIT WITH THE MECHANICAL DAMAGE OF THE HOUSING.**

**NEVER ATTEMPT TO OPERATE THE UNIT UNDER CONDITIONS OF HIGH HUMIDITY.**

**DO NOT LET WATER INTO THE UNIT.**

**UNPLUG THE UNIT BY DISCONNECTING THE POWER CORD FOR TROUBLESHOOTING, MAINTENANCE, OR INSTALLATION WORKS**

The device is safe for use when observing the rules of exploitation

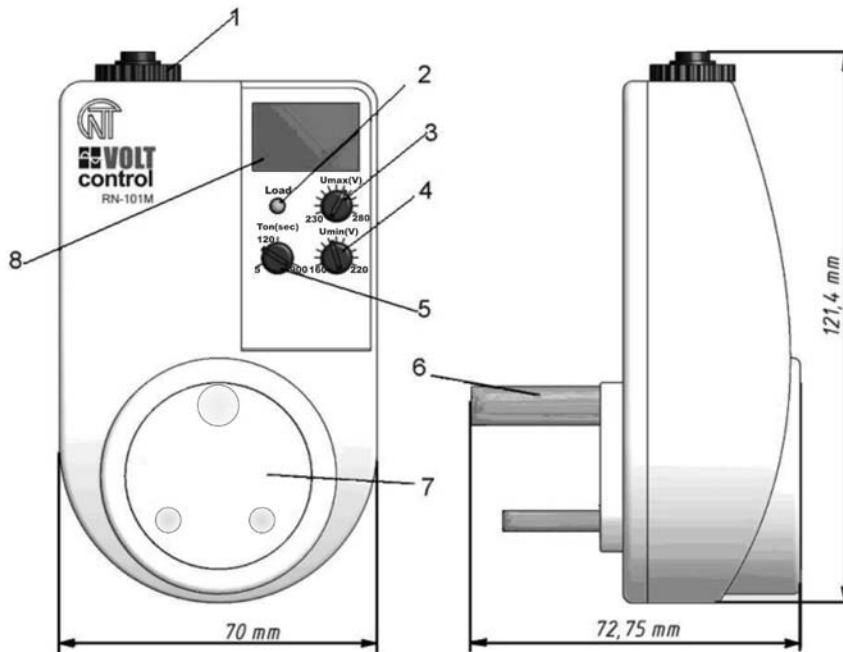
## 1 GENERAL APPLICATION

The RN-101M voltage protection relay is designed to disconnect (turn OFF) industrial or home-used single-phase 220V/50Hz equipment with rated power up to 3.5 kW (16A) in case of inadmissible voltage surges, with automatic turn ON function when the mains parameters return back to normal values after the fault.

The RN-101M combines and comprises several devices in one compact case:

- Surge protector (over/under voltage faults),
- Protection of the connected power load from high-frequency impulse voltage faults.
- Over-current protection from overload and short circuits.
- Multifunctional digital voltmeter and functional state indicator. The **RN-101M “Volt Control”** displays the input RMS voltage value, the output relay status (closed/open) and the status of the over-current protection circuit breaker.

**ATTENTION! Do not use this device in inverter circuits.**



- 1- overcurrent protection circuit breaker switch button
- 2- three-digit seven-segment LED display
- 3- max voltage adjustment knob ( $U_{max}$ )
- 4- min voltage adjustment knob ( $U_{min}$ )
- 5- autoreclosing time delay setting knob
- 6- input plug
- 7- output socket
- 8 - power load state LED indicator

**Figure 1** – Front Panel and Overall Dimensions

## 2 TECHNICAL BRIEF

### 2.1 GENERAL INFORMATION

The main technical specifications are provided in the Table 1.

**Table 1**

Item	Unit	Value
Purpose of device	-	Control and distribution equipment
Typical operation	-	Continued
Index protection of electrical shock	-	I
Face panel protection degree	-	IP30
Operational temperature range	°C	from -20 to + 55
Permissible degree of pollution	-	II
Overvoltage category	-	III
Nominal voltage of insulation	V	450
Rated impulse withstand voltage,	kV	2,5

## 2.2 Main

Technical Specifications are provided in the Table 2

**Table 2**

Rated voltage, V	220
Rated voltage frequency, Hz	47 – 65
Harmonical configuration (nonsinusoidality) of power supply voltage	EN 61000-3-2 (IEC 1000-3-2)
Adjustment ranges: - minimal voltage tripping range ( <b>U<sub>min</sub></b> ), V - maximal voltage tripping range ( <b>U<sub>max</sub></b> ), V - autoreclosing time delay ( <b>T<sub>on</sub></b> ), sec	160 – 220 230 – 280 5 – 900
Fixed tripping time delay for overvoltage faults, sec	1
Fixed tripping time delay for undervoltage faults, sec	7
Fixed tripping time delay when voltage drops over 60V below the <b>U<sub>min</sub></b> setting ore if voltage drops below 140V, sec	0,12
Fixed tripping time delay in case of voltage increase more than 30V than the adjusted maximal voltage tripping threshold ( <b>U<sub>max</sub></b> ), sec	0,12
Maximal commutation current (active power load), A (no less than)	16
Tripping Voltage level accuracy, V	to 3
Minimal operation voltage level at which RN-101M will keep working (effective value), V	120
Maximal operation voltage level at which RN-101M will keep working (effective value), V	400
Voltage hysteresis, V (no less than)	4
Total power consumption, mA	to 15
Commutation life of the output contacts: - under 16A power load, times (no less than) - under 5A power load, times (no less than)	100 000 1 000 000
Outer dimensions, (2 S-modules),	Figure 1
Weight, kg, no less than	0,170

RN-101M “Volt Control” complies with requirements:

IEC 60947-1:2004, IDT; IEC 60947-6-2:1992, IDT; CISPR 11:2004, IDT; IEC 61000-4-2:2001, IDT

No harmful substances in excess of the maximum permissible concentration is available.

### 3 PRE-STARTING PROCEDURE

3.1. With use of the front panel knobs, set the maximum (**U<sub>max</sub>**) and minimum (**U<sub>min</sub>**) voltage tripping thresholds then set the autoreclosing time delay depending on the type of device to be protected (AC units, refrigerators, and other compressor-based devices allow re-start after no less than 3-4 min., other instrumentation reset delay shall be set in accordance with their operating instructions).

**ATTENTION!** Not to break or turn the knobs, please, don't make excessive efforts when performing adjusting operations.

3.2. Turn ON the power and if necessary set adjusted values for maximal and minimal voltage, as well as the autoreclosing time delay. On turning the knobs front panel digital indicator will show corresponding parameter values simultaneously with flickering points in the lower order.

3.3. When necessary, push the overcurrent protection breaker switch button.

### 4 RELAY OPERATION

The relay have several functional states which are as follows:

- normal state;
- voltage fault;
- current fault;
- autoreclosing (**AR**) time delay countdown.

The relay is in the normal state when the monitored voltage is within the specified limits, the overcurrent protection breaker is closed and the **AR** delay time has expired. In this state, the load is connected to the mains, the LOAD LED is ON, and the display shows the monitored voltage value.

If the monitored voltage value gets lower than the user-preset limits for the time that exceeds the specification, the relay switches to the voltage fault state. In this state, the load is disconnected from the mains, the LOAD LED turns OFF, and the display flickers the monitored voltage value.

After the voltage returns back to normal level, and if the **AR** delay time has not yet expired, the relay switches into the state of the **AR** delay countdown indication. In this state, the time in seconds remaining before the relay transfer to the normal state is displayed, and the low order digit flickers a point. After the **AR** delay time is over, the relay switches to normal operation mode.

When the current overload protection breaker trips, the load is disconnected from the mains, the LOAD LED flickers, and the display shows the monitored voltage value. In this case, in order to connect load, the protection breaker needs to be switched ON. The miniature circuit breaker reset button is at the top of the device (black button). It will come up in short circuit condition and needs to be pressed down for resetting.

To avoid undesired fault tripping to minor and/or short-term undervoltage, the fixed minimal voltage tripping time delay function is provided. When deep undervoltage occurs (more than 60V below minimal voltage setting ore voltage drops below 165V), the relay trips within 0.12 sec.

*When the relay is energized, the display shows “StA” indication shortly, and then the relay switches to the **AR** delay mode.*

**5 WARRANTY**

Service life is 10 years. Refer to the manufacturer upon the expire of the service life.

Warranty period is 36 month upon the day of sale.

The manufacturer guarantees trouble-free operation of RN-101M device within thirty six months after the date of sale on the following conditions:

- manufacturer’s QC department inspection seal is intact;
- integrity of the device case, no traces of mechanical damage, case opening, cracks, chipping, etc.

Warranty service is provided in the place of purchase.

Post-warranty service shall be provided by the manufacturer.

**Earnest request:** indicate the reason for return in the notice of faults field at the return of the device or in case of submitting for warranty service or post-warranty service.

**6 STORAGE AND SHIPPING CONDITIONS**

The **RN-101M “Volt Control”** product in original manufacturer packing should be stored in enclosed rooms at the temperature in the range from -45°C to +60°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 switch material. The Buyer must provide the protection of the switch against mechanical damages in transit.

**7 ACCEPTANCE CERTIFICATE**

The RN-101M voltage-monitoring relay has been manufactured and accepted in conformity with technical regulations and current technical documentation, and is declared fit for the operation.

(SEAL)

Quality Control Department seal

Date of manufacture

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**8 NOTICES OF CLAIMS**

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**Contacts:**

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