

VOLTAGE MONITORING RELAY

RN-101M



USERS MANUAL

1 GENERAL APPLICATION

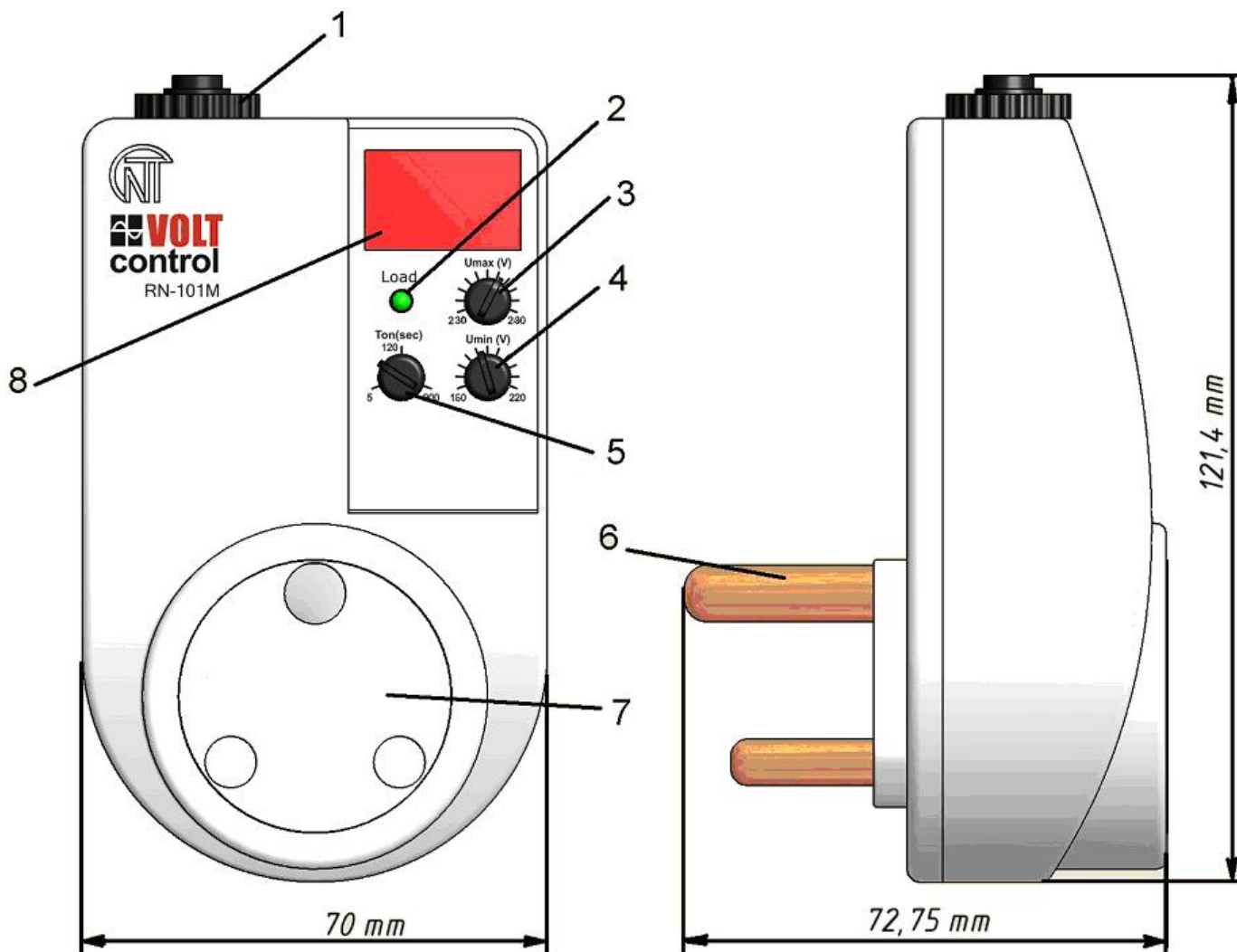
The RN-101M voltage protection relay is designed to disconnect (turn OFF) industrial or home-used single-phase 240V/50Hz equipment with rated power up to 3.5 kW (16A) in case of inadmissible voltage surges, with automatic turn ON function when the mains parameters return back to normal values after the fault.

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

- supply-line filter which protection of the connected power load from high-frequency and high-voltage impulse faults.
- current protection circuit breaker

The RN-101M 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

Rated voltage, V	240
Frequency range, Hz	47 – 65
Adjustment range	
- minimal voltage tripping threshold (Umin), V	180 – 240
- maximal voltage tripping threshold (Umax), V	250 – 300
- autoreclosing time delay setting, sec	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 Umin setting ore if voltage drops below 140V, sec	0,12
Fixed time delay for tripping when voltage reaches 30V over the Umax setting, sec	0,12
Maximal operational power load (active load), A, at least	16
Voltage tripping threshold measurement accuracy, V	up to 3
Minimum operational voltage, V	420
Voltage hysteresis (voltage based resetting ratio), V, at least	4
Operating temperature range, °C	from -25 to +40
Storage temperature range, °C	from -45 to +70
Total power consumption, mA	up to 15
Output terminals commutation lifetime (times):	
- under load of 16A, times, at least	100 000
- under load of 5A, times, at least	1 million
Dimensions, mm	121 x 70 x 76
Weight, kg, at most	0,190

3 PRE-STARTING PROCEDURE

3.1. With use of the front panel knobs, set the maximum (**Umax**) and minimum (**Umin**) 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).

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 (7 s). When deep undervoltage occurs (more than 60V below minimal voltage setting or 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

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

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

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