

# TIME DELAY RELAY REV-120N

## Operating Manual

The quality management system of development and production complies with the requirements of ISO 9001:2015

Dear Customer,

Company thanks you for purchasing our products. You will be able to use properly the product after carefully studying the Operating Manual. Keep the Manual throughout the service life of the product.

## APPLICATION

The time delay relay REV-120N (hereinafter referred to as the product, REV-120N) is the microprocessor-based device intended for on/off switching the load in user-defined time intervals.

REV-120N can be operated by ten operation modes:

- on-delay;
- time delay when energizing;
- periodic with on-delay;
- periodic with time delay when energizing;
- off-delay (when control contact opening);
- pulse I (when control contact closing);
- pulse II (when control contact opening);
- on/off delay (according to control contact);
- pitch of the load relay (during each control contact closing);
- pulse generator of 0.5 s.

### Software history

19.05.2016	v2	First program version
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### Controls and overall dimensions of REV-120N

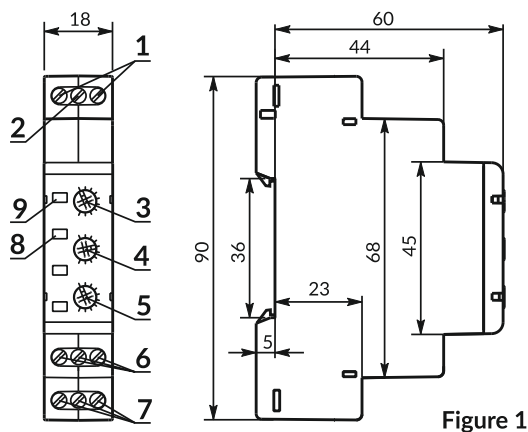


Figure 1

- 1 – input contacts 20-265 V – N, L;
- 2 – input control contact S;
- 3 – regulator for setting the time interval  $\Delta T$ ;
- 4 – regulator for setting the time  $T$ ;
- 5 – regulator for setting the operation mode  $W$ ;
- 6, 7 – output contacts of load relay:
  - «NO1/NO2» – normally open contact (hereinafter NO);
  - «NC1/NC2» – normally closed contact (hereinafter NC);
  - «C1/C2» – changeover contact (hereinafter C);
- 8 – LED indicator of load relay ON;
- 9 – LED indicator of power ON.

## TERMS AND ABBREVIATIONS

It periodically flashes – the indicator short-time enabling.  
It periodically is off – the indicator short-time disabling.

## OPERATION CONDITIONS

The product is designed for operation in the following conditions:

- Ambient temperature: from minus 30 to +55°C;
- Atmospheric pressure: from 84 to 106.7 kPa;
- Relative air humidity (at temperature of +25°C): 30 ... 80 %.

When moving from a cold to a warm location or, conversely, the details of the product can cause condensation that can cause undesired operation. In this case, before connecting the product to the mains keep it within two hours of operating conditions.

The product 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.).

## SAFETY PRECAUTIONS

It is strictly forbidden to carry out mounting works and maintenance without disconnecting the product from the mains.

- to open and repair the product independently;
- to operate the product with mechanical damages of the case.

It is not allowed water penetration on terminals and internal elements of the product.

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.

## TRANSPORTATION AND STORAGE

The product 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 %.

## SERVICE LIFE AND WARRANTY

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

Shelf life is 3 years.

Warranty period of the product operation is 5 years from the date of sale. During the warranty period of operation (in the case of failure of the product) the manufacturer is responsible for free repair of the product.

**Attention! If the product was operated in violation of the requirements of this OPERATING MANUAL, the buyer forfeits the right to warranty service.**

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

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

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

## ACCEPTANCE CERTIFICATE

REV-120N has been manufactured and accepted in accordance with the requirements of current technical documentation and classified as fit for operation.

Head of QCD

Date of manufacture

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## Basic specifications

Operating supply voltage	AC 20 – 265V DC 20 – 75 V
Frequency of supply mains	45 – 62 Hz
Permissible harmonic configuration (unsinusoidality) of power supply voltage	EN 50160
Readiness time when energizing	≤ 0.4 s
Accuracy of time delay	≥ 0.5%
Accuracy of time setting (accuracy of scale)	≥ 2.5 %
Number of operation modes	10
Adjustment range of time is divided into 10 subranges	0.1...1 s 1...10 s 6 s...1 min 1...10 min 6 min...1 h 1...10 h 0.1...1 day 1...10 days Continuously ON Continuously OFF
Time delay adjustment	Smooth
Service of the product	Switchgear and control gear
Rated operating condition	Continuous
Type and quantity of contacts (switching)	2
Climatic design version	NF 3.1
Protection rating of case	IP40
Protection rating of terminal box	IP20
Commutation lifetime of output contacts if $\cos \varphi = 1$ :	
- under load of 6 A	≥ 100 000 times
- under load of 1 A	≥ 1 mln. times
Power consumption (under load)	≤ 1.5 W
Permissible contamination level	II
Overtoltage category	II
Electric shock protection class	II
Rated insulation voltage	450 V
Rated impulse withstand voltage	2.5 kV
Wire cross-section for connection to terminals	0.5 – 2 mm <sup>2</sup>
Tightening torque of terminal screws	0.4 N*m
Weight	≤ 0.15 kg
Overall dimensions, HxBxL	90x18x65 mm
The product meets the requirements of the following: EN 60947-1; EN 60947-6-2; EN 55011; EN 61000-4-2	
Product installation (mounting) is on standard 35mm DIN rail	
The product remains functional at any position in space	
Case material is self-extinguishing plastic	
Harmful substances in amounts exceeding maximum permissible concentrations are not available	

## Specifications of the load relay contacts

$\cos \varphi$	Max. current at U~ 250 V	Max. switching power	Max. permissible continuous AC voltage	Max. current at 28 V DC
1	6 A	1500 VA	275 V	3 A

## ADJUSTMENT OF THE PRODUCT

Before connecting the device, you should configure it. Its setting is performed in the following order:

- The operation mode adjustment;
- The time interval adjustment;
- The time delay adjustment.

For precise positioning the regulators  $\Delta T$  and W it is recommended to rotate them to the extreme left and then turning right to count the desired number of positions (fixation of position).

**Note** – when changing the operation mode or time intervals of the product under the power supply, it is necessary to consider that the changes will take effect only after de-energizing (for at least 1 s) and re-energizing of

-2-

the product.

**Do not use excessive force when performing installation operations.**

## The product operation mode adjustment

Operation modes and their description present in chapter «Article operation modes». Find the desired mode of the REV-120 operation and set the regulator for the operation mode setting **W** to the required position (fig.1 it.5).

## Time interval adjustment

List of time intervals is given in Table. Find the required time interval and set the regulator setting for the time interval  $\Delta T$  (Fig.1 it.3) to the required position.

## Time intervals

$\Delta T$ knob position	Time interval	$\Delta T$ knob position	Time interval
1 s	from 0.1 to 1 s	10h	from 1 to 10 h
10 s	from 1 to 10 s	1d	from 0.1 to 1 day
1m	from 6 s to 1 min	10d	from 1 to 10 days
10 m	from 1 to 10 min	ON	continuously ON
1 h	from 6 min to 1 h	OFF	continuously OFF

## Time delay adjustment

Time delay adjustment is performed by the regulator for setting T time. Based on the selected time interval, set the required time delay.

## REV-120N CONNECTION



**PRODUCT TERMINALS AND INTERNAL COMPONENTS ARE UNDER POTENTIALLY LETHAL VOLTAGE.**

The product is not designed for load commutation in case of short circuits. An automatic AC circuit breaker, class B, with rating of not more than 6 A, should be connected in the power supply circuit of the load.

To improve performance of the product it is recommended to install the fuse or the analogue in the power supply circuit of REV-120N for 1 A current.

All connections must be performed when the product is deenergized.

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

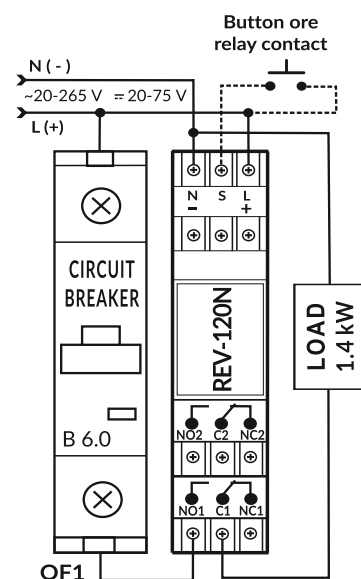
To ensure the reliability of electrical connections you should use flexible (stranded) wires with insulation for voltage of no less than 450 V, the ends of which it is necessary to be striped of insulation for  $5 \pm 0.5$  mm and tightened with bootlaces. The cable cross section to connect the load . depends on current (power) of the load. For example for the current of 6 A it is no less than 1.5 mm<sup>2</sup>. Wires fastening should exclude mechanical damage, twisting and abrasion of the wire insulation.

**Connect REV-120N in accordance with the diagram given in Fig.2.**

## USE OF REV-120N

After the power supply to the product the indicator ON (Fig.1 it.9) is on, there is small pause (no more than 400 ms) before the product begins to operate according to the selected operation mode.

The enabled load relay status corresponds to the closed condition of the contacts NO1-C1 (NO2-C2) and the open condition of the contacts NC1-C1 (NC2-C2).



QF1 – Circuit breaker max 6 A

Rysunek 2



The disabled load relay status corresponds to the open condition of the contacts NO1-C1 (NO2-C2) and the closed condition of the contacts NC1-C1 (NC2-C2).

Periodic flashing of LED indicator of the load relay indicates the time delay after which the load relay will on.

Periodic disabling of LED indicator of the load relay indicates the time delay after which the load relay will off.

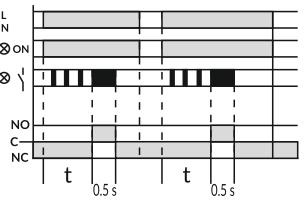


## REV-120N OPERATION MODES

Name and W knob position	Description
<b>A</b> <b>On-delay</b> 	<p>After energizing, the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay (Fig.1 it.8) periodically flashes.</p> <p>At the end of the delay time the load relay contacts NO and C are closed, the indicator ON of the load relay is on and the product goes into standby mode until power-off.</p>
<b>B</b> <b>Time delay when energizing</b> 	<p>After energizing, the load relay contacts NO and C are closed, the indicator ON of the load relay (Fig.1 it.8) is on and the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay periodically is off.</p> <p>At the end of the delay time the load relay contacts are opened, the indicator ON of the load relay is off and the product goes into standby mode until power-off.</p>
<b>C</b> <b>Periodic with on-delay</b> 	<p>After energizing, the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay (Fig.1 it.8) periodically flashes.</p> <p>At the end of the delay time the load relay contacts NO and C are closed for the set time <math>t</math> and the indicator ON of the load relay is on. During the delay time the indicator ON of the load relay periodically is off.</p> <p>At the end of the delay time the load relay contacts are opened, and the product starts fulfillment of algorithm from the beginning.</p>
<b>D</b> <b>Periodic with time delay when energizing</b> 	<p>After energizing, the load relay contacts NO and C are closed, the indicator ON of the load relay (Fig.1 it.8) is on and the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay (Fig.1 it.8) periodically is off.</p> <p>At the end of the delay time the load relay contacts NO and C are open for the set time <math>t</math> and the indicator ON of the load relay is off. During the delay time the indicator ON of the load relay periodically flashes.</p> <p>At the end of the delay time the product starts fulfillment of algorithm from the beginning.</p>
<b>E</b> <b>Off-delay</b> 	<p>After energizing, the product goes into standby mode, in this case the load relay contacts NO and C are open, and the indicator ON of the load relay (Fig.1 it.8) is off.</p> <p>When control contact S is closed with power supply terminal L, the load relay contacts are closed, the indicator ON of the load relay is on and the product goes into standby mode.</p> <p>When control contact S is open, the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay periodically is off.</p> <p>At the end of the delay time the load relay contacts are open, the indicator ON of the load relay is off and the product</p>

Name and W knob position	Description
	<p>goes into standby mode.</p> <p>In case of repeated closing of the control contact S, the algorithm is repeated.</p>
<b>F</b> <b>Pulse 1</b> 	<p>After energizing, the product goes into standby mode, in this case the load relay contacts NO and C are open, and the indicator ON of the load relay (Fig.1 it.8) is off.</p> <p>When control contact S is closed, the load relay contacts are closed, the indicator ON of the load relay is on and the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay periodically is off.</p> <p>At the end of the delay time the load relay contacts are open, the indicator ON of the load relay is off and the product goes into standby mode.</p> <p>In case of opening and repeated closing of the control contact S, the algorithm is repeated.</p>
<b>G</b> <b>Pulse 2</b> 	<p>After energizing, the product goes into standby mode, in this case the load relay contacts NO and C are open, and the indicator ON of the load relay (Fig.1 it.8) is off.</p> <p>When control contact S is closed, the product continues being in standby mode.</p> <p>When control contact S is open, the load relay contacts are open, the indicator ON of the load relay is on and the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay periodically is off.</p> <p>At the end of the delay time the load relay contacts are open, the indicator ON of the load relay is off and the product goes into standby mode.</p> <p>In case of closing the control contact S, the algorithm is repeated.</p>
<b>H</b> <b>On/off delay</b> 	<p>After energizing, the product goes into standby mode, in this case the load relay contacts NO and C are open, and the indicator ON of the load relay (Fig.1 it.8) is off.</p> <p>When control contact S is closed, the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay periodically flashes.</p> <p>At the end of the delay time the load relay contacts are closed, the indicator ON of the load relay is on and the product goes into standby mode.</p> <p>When control contact S is open, the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay periodically is off.</p> <p>At the end of the delay time the load relay contacts are open, the indicator ON of the load relay is off and the product goes into standby mode.</p> <p>In case of repeated closing of the control contact S, the algorithm is repeated.</p>
<b>I</b> <b>Pitch of the load relay</b> 	<p>After energizing, the product goes into standby mode, in this case the load relay contacts NO and C are open, and the indicator ON of the load relay (Fig.1 it.8) is off.</p> <p>When control contact S is closed, the load relay contacts and the indicator ON of the load relay change its state to the opposite, and the product switches to standby mode.</p> <p>When control contact S is open, the product continues being in standby mode.</p> <p>In case of repeated closing of the control contact S, the algorithm is repeated.</p>



Name and W knob position	Description
<p style="text-align: center;"><b>J</b></p> <p style="text-align: center;"><b>Pulse generator of 0.5 s</b></p> 	<p>After energizing, the set delay time <math>t</math> (T regulator) occurs. During the delay time the indicator ON of the load relay (Fig.1 it.8) periodically flashes.</p> <p>At the end of the delay time the load relay contacts NO and C are closed for 0.5 s, the indicator ON of the load relay is on for 0.5 s and the product goes into standby mode until power-off.</p>

## MAINTENANCE



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

Maintenance of the product must be performed by qualified service personnel.

Recommended frequency of maintenance is every six months.

Maintenance procedure:

- 1) Check the connection reliability of the wires, if necessary, clamp with the force at  $0.4 \text{ N} \cdot \text{m}$ ;
- 2) Visually check the integrity of the housing, in case of detection of cracks and damages to remove the product from service and send for repair;
- 3) If necessary, wipe with cloth the front panel and the product housing.

*Do not use abrasives and solvents for cleaning.*

## CLAIMS DATA

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

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

For all questions, please contact the manufacturer:

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[www.novatek-electro.com](http://www.novatek-electro.com)

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

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