

**MULTIFUNCTIONAL
TWO-CHANNEL
TIME DELAY RELAY
REV-201M**



OPERATING MANUAL

Quality control system on the development and production complies with requirements ISO 9001:2015

Review the Operating manual before using the unit.

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



NEVER ATTEMPT TO REMOVE AND REPAIR THE UNIT.

Some of the unit components may be live.

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

The unit is not designed for operation under impact or vibration conditions.

DO NOT LET WATER INTO THE UNIT.

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

This present manual contains necessary information about application, main operation principles and adjustment setting for the two-channel electronic time delay relay REV-201M (hereinafter REV-201M).

1 GENERAL DESCRIPTION AND OPERATION

1.1 APPLICATION

REV-201M is designed for the commutation of electrical circuits of 230/240V 50Hz AC as well as 24 – 100V DC electrical circuits with the adjustable time delay setting.

The relay has two channels and can be operated by one of seven operation algorithms that the user specifies:

- Turn **ON** time delay relay;
- Pulse relay 1;
- Intermittent relay 1;
- Operation relay *.
- Pulse relay 2;
- Intermittent relay 2;
- Off-delay relay.

* *REV-201M could be used as the relay of pre-starting signalization for the machinery that require to announce that some mechanism or machinery will soon take a start to make people aware of this and get away from the risky zones. Widely used for steel plants, heavy machinery, cranes and construction mechanisms as well as mining companies for the technological stuff safety.*

Time delay setting for each channel starts from the moment of the power supply given to the corresponding channel. REV-201M allows to provide 2 modes of operation:

Mode 1. Independent operation of channels. To each of two channels power supply is given independently and thus each channel starts the countdown from the moment the power supply is given. This is the mode when 2 independent time relays are functioning in one compact case housing (2 time delay relays in one case).

Mode 2. Parallel operation of the channels. To each of two channels the power supply is applied simultaneously. Thus the time countdown on each channel starts at the same time and comes one and the same input power supply. Triggering time corresponds to the user-adjusted settings for each of the channels. So the REV-201M in this mode operates like one time delay relay with 2 output contacts that have the same or different time settings.

ATTENTION!!! The power supply of both channels must necessarily have common neutral.

1.2 FIRMWARE VERSIONS AND CHANGES

10.10.2007 V1 First released version

12.09.2014 V2 Timeslot are changeed (timeslot are multiple 10).

Two operation algorithms were added: "Pulse 2" and "Intermittent 2".

03.03.2016 V3 The operation algorithm of "Turn-off Delay" was added.

08.08.2018 V4 Bug fixes

1.3 TECHNICAL PARAMETERS

1.3.1 Basic technical characteristics are shown below in Table 1.

Table 1

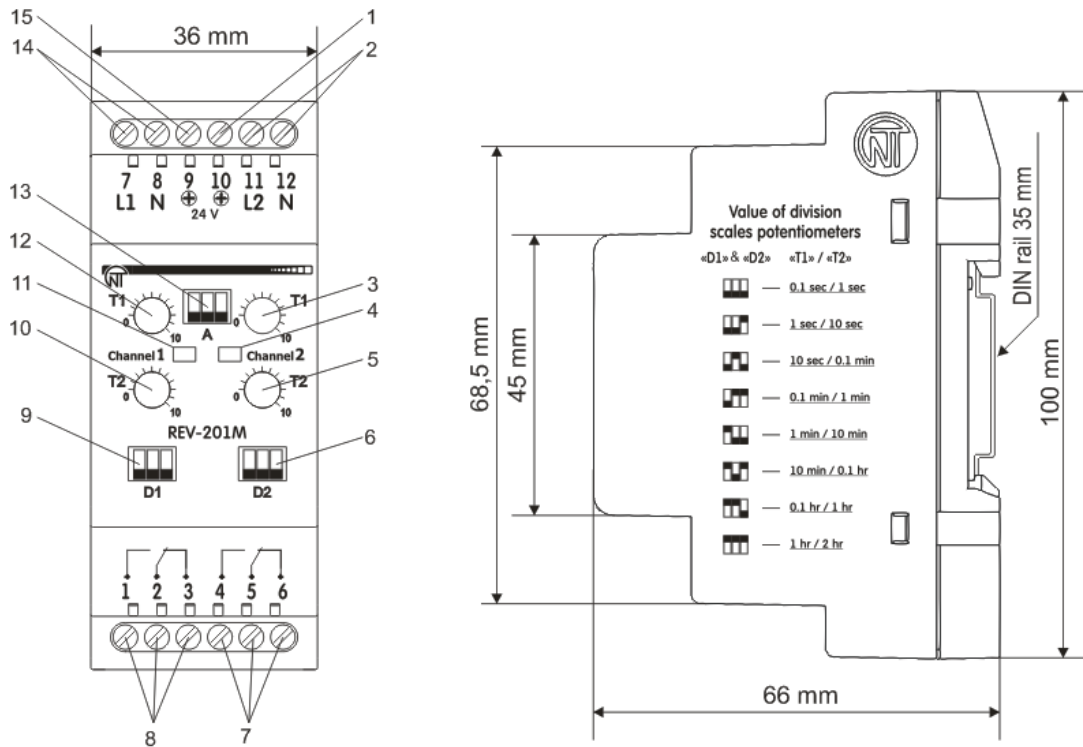
Rated AC input power supply (terminals L, N), V	150 – 300	
Voltage Harmonicas Distortion Factor, not more than	12 %	
Rated DC input power supply (terminals +24, N), V	24 ±10%	
Rated power circuit frequency, Hz	50 – 60	
Harmonical configuration (nonsinusoidality) of power supply voltage	EN 50160	
Initialization readiness time after the power supply application to the channel, sec, less then	0.25	
Timing accuracy, %, not less then	1.5	
Time setting accuracy (scale accuracy), %, not less then	4	
Number of operation algorithms	7	
The time setting range is divided in 8 subsections	T1	T2
	0-1 s	0-10 s
	0-10 s	0-100 s
	0-100 s	0-1 min
	0-1 min	0-10 min
	0-10 min	0-100 min
	0-100 min	0-1 hour
	0-1 hour	0-10 hours
	0-10 hours	0-20 hours
Time setting adjustment	Smooth	

Number of scale marks for the potentiometer knobs	10
Type and quantity of the output commutation terminals	1 changeover
Protection degree: - housing - contact terminals	IP40 IP20
Commutation lifetime of the output terminals at $\cos\phi=1$: - under the load of 7A, times, not less then - under the load of 1A, times, not less then	100 000 1 000 000
Rated power consumption (under the load), VA, not more then	1.0
Allowable soil level	II
Overvoltage category	II
Nominal voltage of isolation, V	450
Nominal impulse withstanding voltage, kV	2.5
Cross section of wires of connection terminals, mm ²	0.5-2
Maximal tightening torque of terminals external screws, N*m	0.4
Weight, kg, not more then	0.150
Outer dimensions,	Figure1
Operation temperature range, °C	from - 30 to +55
Storage temperature, °C	from - 45 to +60

Arbitrary mounting position
Standard 35 mm DIN rail mounting

Electrical characteristics for the Output terminals

Cos φ	Maximal current at U~250V	Maximal capacity	Maximal Voltage ~	Maximal Current at U _{DC} =28V
1.0	5 A	1250 VA	275 V	3 A



- 1, 15 – DC input terminals +24V for both Channels;
- 2, 14 – AC input terminals ~230/240V for both Channels;
- 3, 5 – Adjustment knobs for the **Channel 2**;
- 4, 11 – Two color LED indicators for channels – glows **GREEN** - when the voltage is present on the power supply input and glows **RED** – when the triggering output terminals are ON;
- 6, 9 – DIP switches to select timing ranges for the Channel 1 (**D1**) and Channel 2 (**D2**);
- 7, 8 – output terminals for both Channels.
- 10, 12 – Adjustment knobs for the **Channel 1**;
- 13 – DIP switch (**A**) to select the operation mode for the REV-201M;

Figure 1- Overall dimensions of the unit

REV-201M complies with requirements: EN 60947-1; EN 60947-6-2; EN 61000-4-2; EN 55011.
Pollutants in the amount, which is not to exceed the maximum permissible concentration are none.

1.3.2 Front panel view and outer dimensions are shown on figure 1.

1.3.3 REV-201M operation algorithms.

- Energized (Turned **ON**) state of the REV-201M corresponds the **closed** position of the output terminals **1-2** (Channel 1) and **4-5** terminals (Channel 2). Thus the terminals **2-3** (Channel 1) and terminals **5-6** (Channel 2) are **open** when the REV-201M turned ON.

- Deenergized (Turned **OFF**) state of the REV-201M is when terminals **1-2** (Channel 1) and terminals **4-5** (Channel 2) are open. And accordingly when the REV-201M is in **OFF** state – then terminals **2-3** (Channel 1) and terminals **5-6** (Channel 2) are closed.

- Initialization time delay. After the power supply is given to the input terminals of the REV-201M with the initially preset Zero time delay settings REV-201M turns ON not momentarily but within the time of approximately 250 milliseconds. This happens due to smooth voltage increase on the power supply source of REV-201M.

1.3.3.1 “Turn ON time delay”

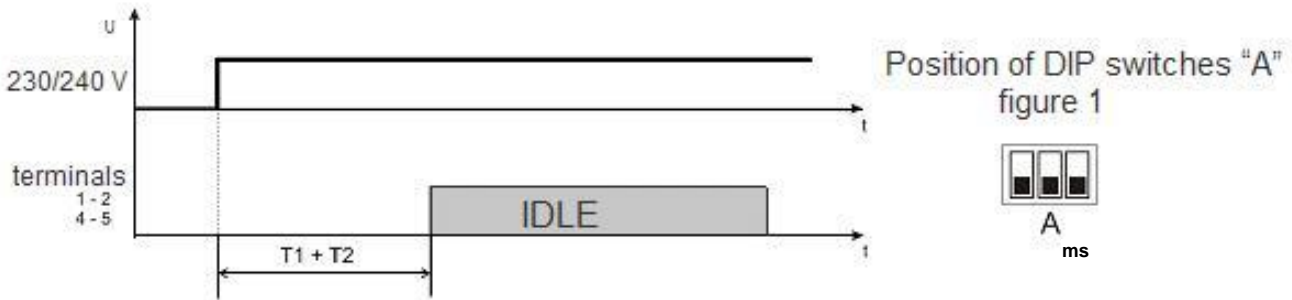


Figure 2 – The working algorithm of relay “Turn ON time delay”

Timing countdown on each channel starts from the moment when the power supply source is applied to the input terminals «L1-N», (Channel 1); «L2-N», (Channel 2). Time delay setting is selected using the knobs of potentiometers 3, 5, 10, 12 (figure 1). Each channel has two adjustable knobs: T1 and T2. Time delay for the output contacts triggering of is determined as the sum of the values adjusted by both knobs (T1 + T2) for each channel separately.

When the power supply is present – **GREEN** LED starts glowing and timing countdown begins. After the expiry of time delay interval – **RED** LED turns on and the output contacts change the position to the **ON** state.

1.3.3.2 “Impulse 1” operation mode

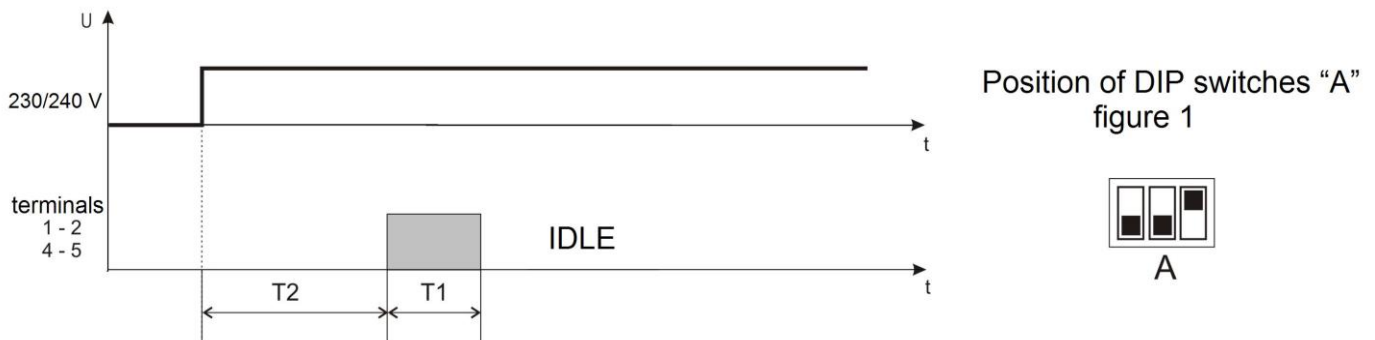


Figure 3 – The working algorithm of relay “Impulse 1”

Time counting on each of the channels starts from the moment the power is applied to the terminals «L1-N», (Channel 1); «L2-N», (Channel 2). Each channel has two adjustments T1 and T2.

When the power supply is given – on the channel **GREEN** LED starts glowing and countdown begins. Time delay intervals are adjusted using the knobs 5 and 10 (Figure 1.) in the diapason T2 for the Channel 1 and Channel 2 respectively – pause time.

After the turn **ON** time delay expiry REV-201M turns **ON** for the time determined by the knobs 3 and 12 (Figure 1) in the diapason T1 – LED indicator change the color to **RED**.

When the Turn **ON** time interval comes to an end REV-201M turns **OFF** the load and REV-201M switches to the idle mode. **LED** color indicator changes to **GREEN**. A relay working cycle is restarted after recurrent de-energizing and reenergizing the voltage supply.

1.2.3.3 “Intermittent 1” operation mode

In the figure 4 there is represented the working algorithm of relay "Intermittent 1".

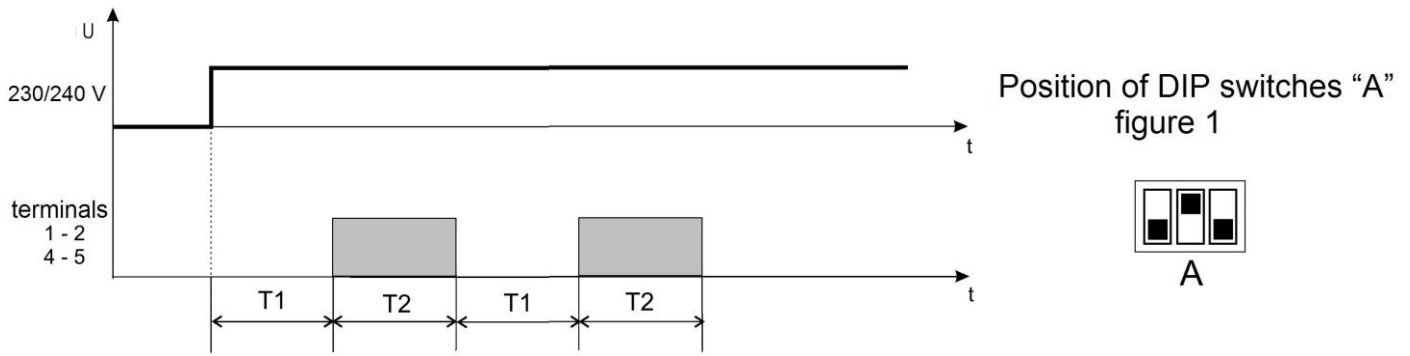


Figure 4 – The working algorithm of relay “Intermittent 1”

Time counting on each channel starts from the moment of power supply to the terminals «L1-N» (Channel 1); «L2-N» (Channel 2). Each channel has two adjustments **T1** and **T2**.

When the power supply is given to channel then the time reading **T1** starts, adjusted by the knobs of potentiometers 3, 12 (figure 1) for the 1-st and the 2-nd channels correspondently – time of pause. at this moment GREEN LED indicator glows and the power load is turned OFF.

After the termination of this time interval (**T1**) power load turns ON and starts the timing countdown of another interval (**T2**) that is adjusted by lower potentiometer knob 5, 10 (figure 1), for the 1-st and the 2-nd channels correspondently – time of work and this is indicated with the RED LED indicator.

After the termination of the **T2** timing countdown REV-201M turns OFF the power load and the LED indicator changes to GREEN. From this moment new countdown basing the **T1** timing starts and the process keep on working in cycle mode in this way further.

Note – if the time interval of potentiometer **T2** is equal to zero, the load relay will not switch over.

1.3.3.4 Control (pre-starting signalization) operation function

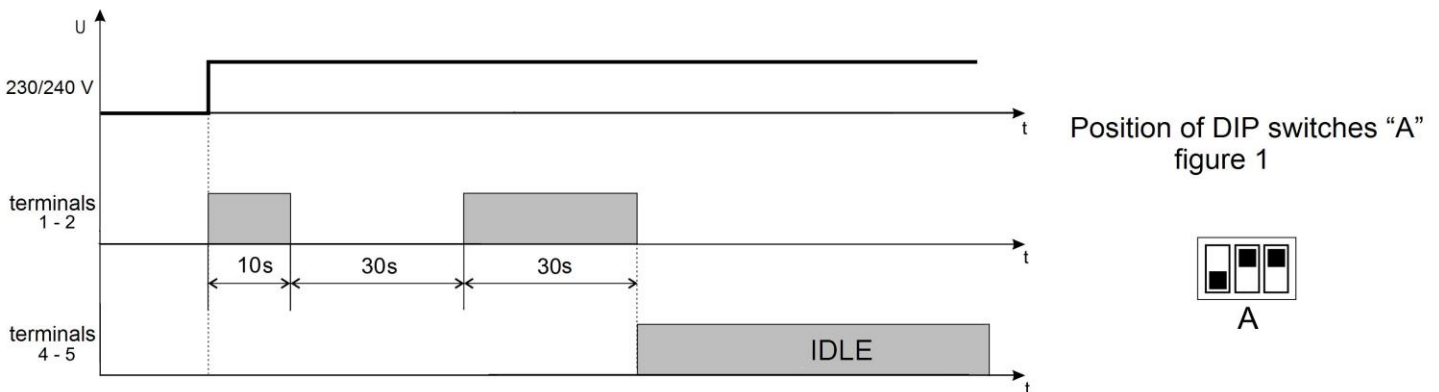


Figure 5 – The working algorithm of relay Control (pre-starting signalization)

ATTENTION! For the proper operation of REV-201M it should be connected in accordance with the parallel channels operation – Mode 2 (for details kindly see paragraph 1.1. Application).

After the power supply is given to the input terminals REV-201M turns **ON** the power load for the Channel 1 – simultaneously **RED LED (Channel 1)** and **GREEN LED (Channel 2)** indicator starts glowing – this indicates about the preliminary signalization with the fixed time delay of 10 seconds.

After this interval the output relay of the “Channel 1” turns **OFF** for the fixed time of 30 seconds – this is indicated by **GREEN LED** glowing on the “Channel 1”.

After the expiration of the pause for the “Channel 1” **GREEN LED** change the color to **RED** – second announcement signal with the time of 30 seconds;

After the end of the second announcement signal the output relay of the “Channel” 1 turns **OFF**, LED changes from **RED** to **GREEN** and the output relay of the “Channel 2” turns **ON**. At the same time **GREEN LED** of the “Channel 2” change the color to **RED** and switches to **IDLE** state.

If you want to restart the algorithm – you will have to turn **OFF** the power supply and turn it **ON** afterwards.

ATTENTION!!!

*-In this mode of operation time adjustment knobs (**T1** and **T2**) as well as the DIP switched for the time ranges (**D1** and **D2**) doesn't function. All timing frames and intervals are preprogrammed and fixed. On special customer request for the algorithm “START-PAUSE-START” it's possible to change the timing intervals and delays as per requirement.*

-REV-201M has internally preprogrammed block that doesn't allow to turn **ON** the power load on **Channel 2** until output contacts of **Channel 1** are being closed (**ON**).

1.3.3.5 "Impulse 2".

In the figure 6 there is represented the working algorithm of relay "Impulse 2".

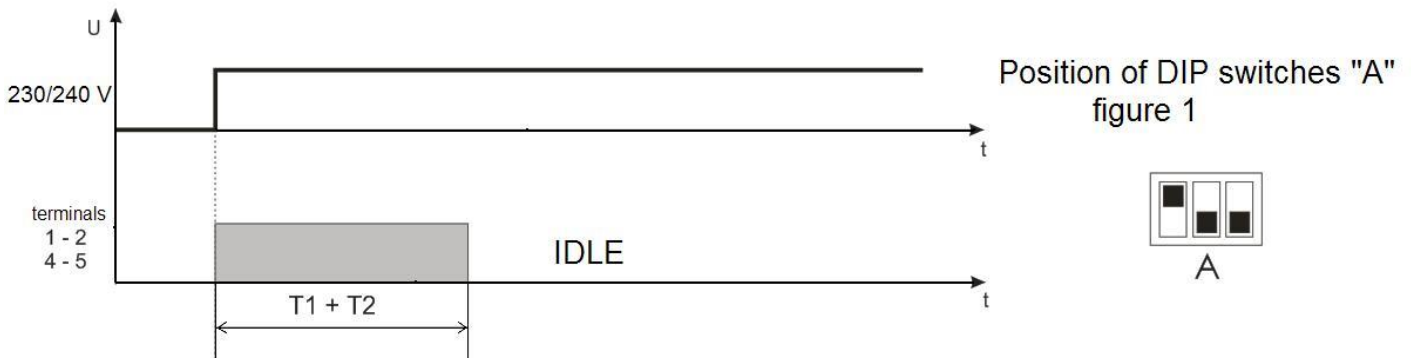


Figure 6– The working algorithm of relay "Impulse 2"

Time counting on each channel begins from the moment of power supply to the terminals «L1-N» (channel 1) and «L2-N» (channel 2). The time delay is adjusted by the potentiometer knobs 3,5,10,12 (figure 1). Each channel has two time setting adjustments **T1** and **T2**. The channel cutting off delay is defined by sum of delays arranged by two potentiometers (**T1 + T2**).

At power supply on the channel there switches the load relay on, a red LED of this channel is on and the time reading begins **T1 + T2**. After delay time period the load relay switches off, the LED changes the light to green and the relay turns in standby mode.

The restart of relay is made after de-energizing and energizing again of power supply.

1.3.3.6 Intermittent 2

In the figure 7 is resulted the working algorithm of relay "Intermittent 2"

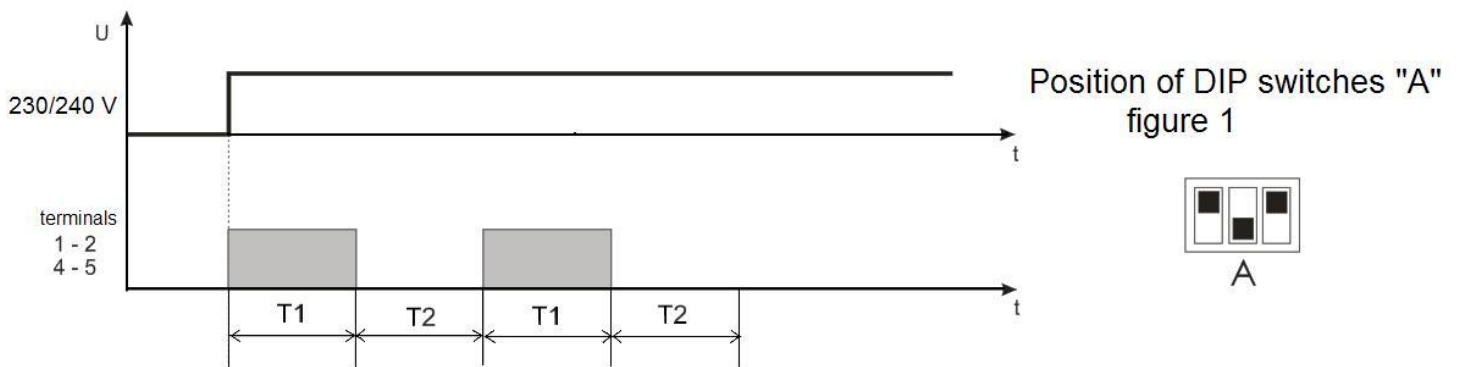


Figure 7– The working algorithm of relay "Intermittent 2"

Time reading on each channel begins from the moment of power supply to the terminals «L1-N» (channel 1) and «L2-N» (channel 2). Each channel has two setting adjustments **T1** и **T2**.

At energizing the power supply to the channel the load relay switches on and the time reading **T1** starts, adjusted by the knobs of potentiometers 12, 3 (figure 1) for the 1-st and 2-nd channels correspondently – time of work. The red LED of the channel is on.

After the end of delay time period **T1**, the load relay switches off and the time reading **T2** begins, arranged by potentiometers knobs 5, 10 (figure 1) for the 1-st and the 2-nd channels correspondently – time of pause. The LED of the channel changes the light to green color.

After the end of delay time period **T2**, the load relay switches on, the LED changes color to the red one and the cycle of relay work is restarted (the delay time reading **T1** begins and so on).

Note – if the time interval of potentiometer **T1** is equal to zero, the load relay will not switch over.

1.3.3.7 Turn-off Delay

Figure 8 shows the relay operation algorithm for "Turn-off Delay".

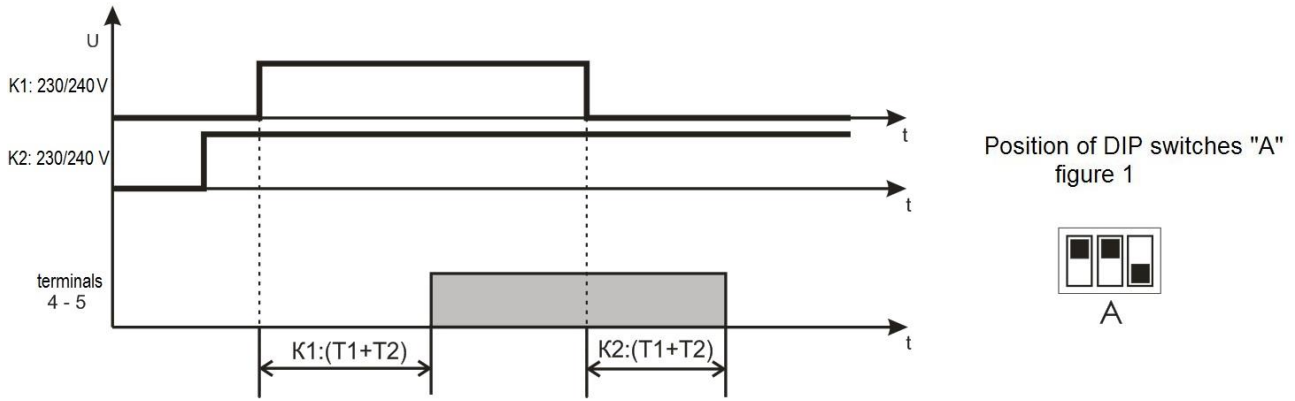


Figure 8 – The working algorithm of relay “Turn-off Delay”

After voltage supplies to the second channel, the green LED of the second channel lights up and the relay switches to the standby mode.

When voltage supplies to the first channel, the green LED of the first channel lights up and timing of $T1 + T2$ of the first channel is started.

Upon completion of time-delay the load relay of the second channel is activated, LED of the second channel changes its color to red and the relay switches to standby mode.

In case of power failure in the first channel, the green LED of the first channel is off and timing of $T1 + T2$ of the second channel is started.

Upon completion of time-delay the load relay of the second channel is disabled, LED of the second channel changes its color to green and the relay switches to standby mode.

Note: In this mode, the supply voltage of the second channel is used as the main power supply for the relay and the power input of the first channel is used as the control signal.

2 GENERAL USE AND APPLICATION

2.1 FIRST START UP PREPARATIONS

ATTENTION! All settings and adjustments of REV-201M should be made on deenergized device.

All wiring or cable connections (disconnections) to the REV-201M must be necessarily made on fully deenergized device.

Adjustment should be made in the following sequence:

- Setting the operation algorithm
- Setting of timing parameters and delays

IMPORTANT NOTICES:

-When changing the operation algorithm it's necessary to take into account that newly set up algorithm will take effect only after full deenergization of the REV-201M (not less then 1 second), input terminals with the subsequent turning ON of the device.

- After changing the time setting of the relay being energized it is necessary to note that a new time setting will be effective only since the next cycle of relay work.

2.1.1 Operation algorithms selection







List of the operation algorithms is shown in the Table 2 below.

For more details kindly see paragraphs 1.3.3.

Select the required operation algorithm and set an appropriate position of DIP switches “A” (Figure 1).

Table 2

Nº	OPERATION MODE	A	DESCRIPTION
1	Turn ON time delay		After the power supply application REV-201M performs user preset time delay $T1+T2$ that will be followed by opening of the output contacts and REV-201M will switch to idle state.
2	Impulse 1		After power supply application comes time delay interval adjusted by the potentiometer knob T2 , then the output contacts close for the time T1 and by the end of the T1 time interval output contacts open and REV-201M comes to idle state









3	Intermittent 1		After energizing the power supply the set time period T1 takes place, after the end of set time period the relay contacts get closed for the set time period T2. After the end of set time period T2 the relay contacts get open and the relay restarts the program from the beginning.
4	Control mode (pre-start signals)		After power supply application REV-201M output contacts close, then comes fixed time interval of 10 seconds and output contacts open. Then comes new fixed time interval of 30 seconds and output contacts close again for the time of 30 seconds. Then contacts open and REV-201M switch to idle state.
5	Impulse 2		After energizing the power supply the relay contacts get closed for the set time period T1+T2, After the end of set time period the relay contacts get open and the relay switches over into the stand-by mode.
6	Intermittent 2		After energizing the power supply the relay contacts get closed for the set time period T1. After the termination of this time interval T1 the relay contacts get open and starts the timing countdown of set time interval T2. After the termination of the T2 timing countdown REV-201M starts and the process keep on working in cycle mode in this way further
7	Turn-off Delay		After voltage supplies to the second channel, the relay switches to the standby mode (contacts of the first (1, 2) and the second (4, 5) channels are open). When voltage supplies to the first channel, timing of T1 + T2 of the first channel is started. Upon completion of time-delay, the contacts (4, 5) of the second channel are closed and the relay switches to the standby mode. In case of power failure in the first channel, timing of T1 + T2 of the second channel is started. Upon completion of time-delay, the contacts (4, 5) of the second channel are open and the relay switches to the standby mode.
8	Reserved		After energizing the power supply the relay is in a stand-by mode. The LEDs (1,6 figure 1) blink in red-green colors, the relay contacts are in the standard open mode.

NOTICE: When using the REV-201M in **Control operation mode** it doesn't respond to any position or change of the knobs position **D1, D2** as well as timing knobs **T1, T2** (see Figure 1).

2.1.2 Timing parameters adjustment.

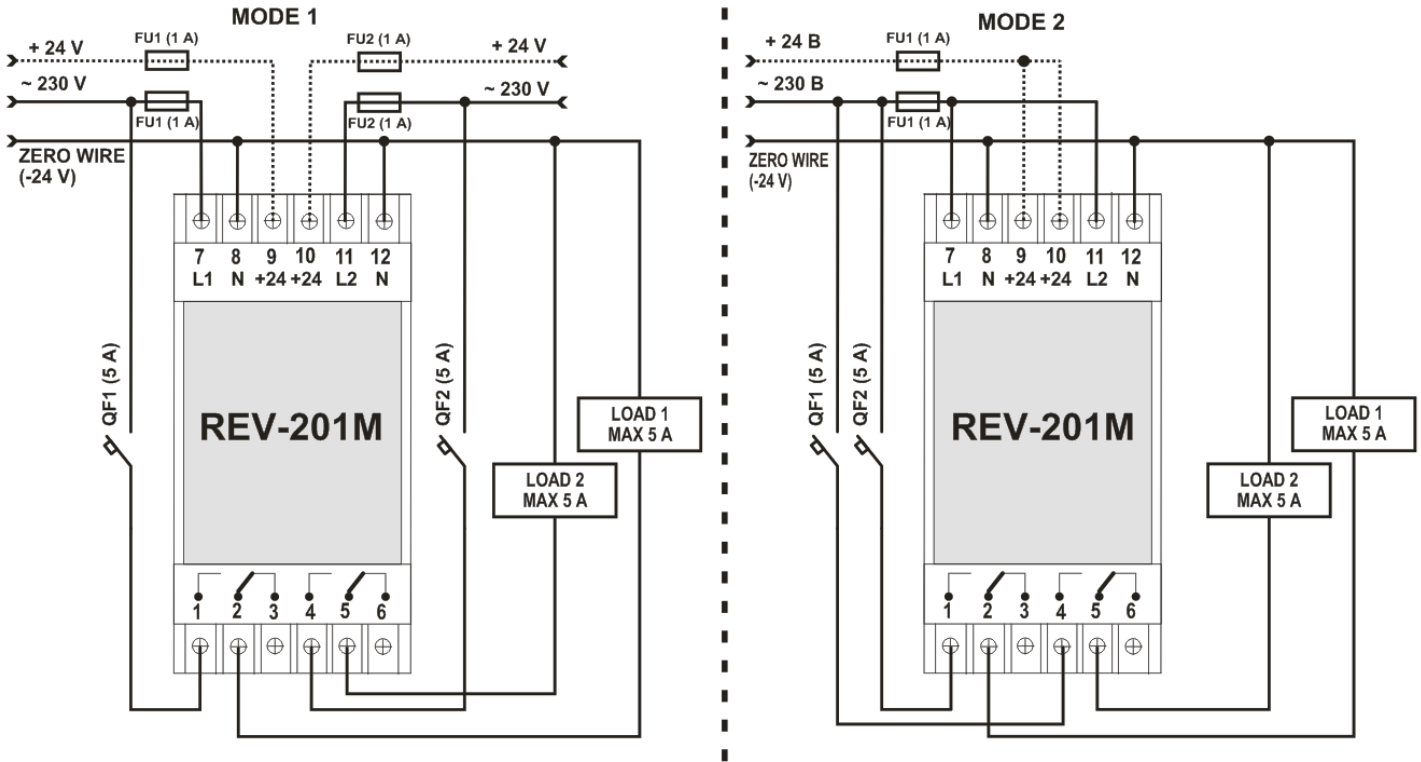
Adjustment of time intervals should be made with the use of potentiometer knobs **10, 12** (Figure 1) for the Channel 1 and potentiometer knobs **3, 5** (Figure 1) for the Channel 2. Timing limits for the knobs are set up below with the use of DIP switches **6** (Channel 1), **9** (Channel 2) (see Figure 1) in accordance with the Table 3:

Table 3

N	DIP switch position (D1, D2)	Time intervals adjusted by T1	Time intervals adjusted by T2
1		0 – 1 sec	0 – 10 sec
2		0 – 10 sec	0 – 100 sec
3		0 – 100 sec	0 – 1 min
4		0 – 1 min	0 – 10 min
5		0 – 10 min	0 – 100 min
6		0 – 100 min	0 – 1 hour
7		0 – 1 hour	0 – 10 hours
8		0 – 10 hours	0 – 20 hours

NOTICE: Note – when arranging the time settings by the potentiometers 2, 3 (figure 1) it is necessary to note that there is so called “dead” zones on the range extremes as a result of potentiometers construction feature.

2.1.3. Connect REV-201M as shown on Figure 9 depending on the chosen operation mode (Paragraph 1.1.)



QA - automatic circuit breaker with the breaking current of 5 A not more.

Figure 9 – Wiring diagram depending on required operation mode

ATTENTION!!! It is strictly prohibited to use simultaneously both power supply inputs for 24V DC and mains 230/240 VAC. Only one power supply input should be used.

2.2 USAGE AND OPERATION OF REV-201M

Connect the power supply to the input terminals of the REV-201M. Turn **ON** the device. **GREEN** LED indicator of the corresponding channel should glow and timing countdown begins in accordance with the user-selected operation algorithm (see paragraph 2.1.1).

When the output relay is turned **ON** (closed state of the contacts 1-2 (**Channel 1**) and contacts 4-5 (**Channel 2**) – then LED indicator change the color and start glowing **RED**.

3 SAFETY PRECAUTIONS and TECHNICAL MAINTAINANCE

3.1 SAFETY PRECAUTIONS

Power off the unit, as well as any other units connected to it, before maintenance, trouble-shooting or installation works.

- 3.1.2 Do not expose the inner electric components of the unit, as well as input contacts of terminal blocks and sockets, to water.
- 3.1.3 Switching, adjustment and maintenance of the unit should be conducted by the qualified personnel, who is familiar with the provisions of this user manual.
- 3.1.4 The following regulations should be enforced while operating and maintaining the unit: "Operational regulations of Electrical Installations", and "Safety Regulations for the Operation of Electrical Installations".

3.2 TECHNICAL MAINTAINANCE

It is recommended to perform technical maintenance every 6 months of use.

The maintenance procedure includes visual inspection to verify the connection of cables to the REV-201M terminals, as well as the absence of fractures and cracks on the case.

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

All safety regulations provided under section 3.1 should be enforced during the maintenance.

4 PRODUCT LIFETIME WARRANTY AND STORAGE CONDITIONS

Service life – is 10 years. Contact manufacturer upon the expiry of the service life.

Guaranteed storage life – is 3 years.

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

During the warranty period the Manufacturer is responsible for free repair of the unit, if the Consumer has complied with the requirements of this Operating Manual.

ATTENTION! IF THE UNIT HAS BEEN OPERATED WITH VIOLATION OF THE REQUIREMENTS OF THIS OPERATION MANUAL, BUYER WILL FORFEIT THE RIGHT TO WARRANTY SERVICE.

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

Post-warranty service is performed by the Manufacturer at current rates.

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

5 TRANSPORTATION

REV-201M in the shipping box should be stored indoors at a temperature of -45 to +60 °C and relative humidity of no more than 80% with no vapors available in the air, capable of producing harmful effect on the shipping box and unit materials.

When transporting REV-201M, the user should provide some protection against mechanical damage

6 ACCEPTANCE CERTIFICATE

Electronic two-channel time delay relay REV-201M was inspected and approved for the safe operation and use by the quality assurance department.

Quality control department seal

Production date

Stamp

Sale date _____

7 DATA ON CLAIMS

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



With questions and comments, please contact manufacturer at the following address:

"Novatek-Electro" Ltd.

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Odessa, Ukraine, 65007.

Tel: +38 048 738-00-28; +38 0482 37-48-27;

Fax: +38 0482 34 36 73.

www.novatek-electro.com

VN210915