NOVATEK ELECTRO
ISO 9001

MULTIFUNCTIONAL TIMER-RELAY EM-125

OPERATING MANUAL

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

Dear Customer,
NOVATEK-ELECTRO Ltd. Company thanks you for purchasing our products. You will be able to use properly the device after carefully studying the Operating Manual. Store the Operating Manual throughout the service life of the device.

DEVICE SERVICE

Multifunctional timer-relay EM-125 (hereinafter referred to as the device, EM-125) is a microprocessor device designed for home automation - a smart receptacle.

EM-125 allows you to turn on or off the load on a schedule or in a manual mode, while protecting the load from various voltage accidents and power overloads.

After registration on server «my.overvis.com», EM-125 control and adjustment is possible from anywhere in the world where there is an Internet connection.

EM-125 accumulates real-time energy consumption statistics and sends the accumulated data to the «my.overvis.com» server, as a result of which you can view the saved reports for a week, month, or a year.

You can save electric power consumption by using the device to control climate and water heating devices according to a preplanned schedule.

Key features:
- Measurement of the mains voltage and frequency;
- Measurement of the current consumed by the load;
- Measurement of power consumed by the load;
- Metering of the electric power consumed by the load;
- Load protection against emergency voltages in the mains;
- Load protection against overcurrent consumption;
- Load protection against excess power consumption;
- Real-time clock with a reserve of rate of clock up to 5 days (if power supply is off);
- Automatic time synchronization with a SNTP- server;
- Automatic load control according to the schedule set by the user;
- Planning of vacation (with blocking of program execution);
- Limitation of the of work load time;
- Manual load control from the front panel;
- Manual control blocking after a specified period of time (child lock).

CONTROLS
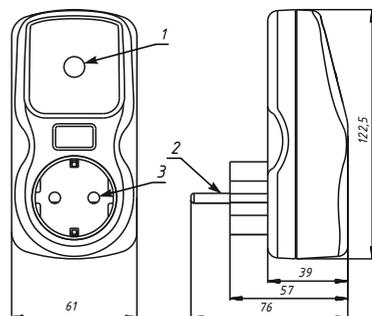
Figure 1

1 – Control and display button «ENTER»;
2 – «Plug» – to connect to the mains;
3 – «Receptacle» – to connect the load.

Indication of «ENTER» button:
- Blue (flashes with a period of 0.5 s) – connects to a Wi-Fi access point;
- Blue (on) – the load is on;
- Blue (flashes every 5 seconds) – power supply is on, the load is disconnected;
- Red (flashes with a period of 0.5 s) – counting of the AR time;
- Red (on) – the presence of an emergency or the unit is blocked due to an emergency;
- Blue-red (flashes with a period of 0.35 s) – Wi-Fi connection setting mode is on;
- Blue-red (flashes with a period of 0.1 s) – resets to factory settings;
- Purple (flashes with a period of 0.1 s) – embedded software update.

TRANSPORTATION AND STORAGE

The device 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 %.

ACCEPTANCE CERTIFICATE

EM-125 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

_____   _____

Seal

TECHNICAL SPECIFICATIONS

Rated power supply voltage	220 – 240 V
Mains frequency	45 – 62 Hz
Voltage at which performance is maintained	100 – 400 V
Maximum switched current at active load	16 A
Connected load power, not more	3.6 kW
Readiness time at voltage supply, not more	0.4 s
Precision of mains voltage measurement	±3 V
Precision of load current measurement	±0.3 A
Accuracy of the real time clock	±1 s/day [1]
Reserve time of rate of real-time clock	up to 5 days [2]
Wi-Fi frequency	2.412 - 2.484 GHz
Supported Wi-Fi standards	IEEE 802.11 b/g/n
Wi-Fi encryption protocol	WPA2/PSK
Time synchronization protocol with SNTP server	yes
Protocol of data exchange with «my.overvis.com» server	yes
Maximum number of events (schedule)	512
Maximum log (records) length	10 000
Type of log entry	In a loop
Log recording period	5 min
Purpose of the device	Control & distribution equipment
Nominal operation	Long
Climatic performance	NF 4
Level od unit protection	IP30
Switching resource of output contacts at cos φ= 1: - at the load of 16 A, not less - at the load of 5 A, not less	100 000 times 1 million times
Power consumption (under load), not more	2.5 W
Permissible degree of contamination	II
Overvoltage category	II
Electric shock protection class	I
Rated insulation voltage	450 V
Rated impulse withstand voltage	2.5 kV
Mass, not more	0.16 kg
Dimensions , HxBxL	122.5x61x76 mm
The device meets the requirements of the following: EN 60947-1; EN 60947-6-2; EN 55011; EN 61000-4-2	
The device maintains its performance at any position in space	
Body material - self-extinguishing plastic	
Harmful substances in amounts exceeding maximum permissible concentrations are not available	

[1] - provided that synchronization with the SNTP server is enabled;
[2] - provided that the unit has worked from the mains at least for 30 minutes.

TERMS AND ABBREVIATIONS

Wi-Fi – a family of standards for transmitting digital data streams over radio channels;

RMS – effective (quadratic) value;
AR – automatic restart of the load;
By default - the preset values of the parameters that the unit uses in its work, until the user explicitly changes these values;
Web-interface - the system of user interaction with the unit through a computer browser;
Purple – the color of the indicator, obtained by mixing the blue and red glow.

MODES OF OPERATION

The device can work in three modes:
- Normal operation mode;
- Manual control mode;
- Wi-Fi connection setup mode.

Normal operation mode. EM-125 performs connection to a user-defined access point, measures and controls parameters of the mains (voltage and current) to protect the load, as well as controls the load (on/off) according to a user-defined schedule.

In the event of emergency (overcurrent or overvoltage above a predetermined level, voltage decrease below a predetermined level) EM-125 performs an emergency power cutoff.

Manual control mode. If the user changed the state of the load manually with the front panel or remotely through the «my.overvis.com» server, EM-125 will block the next scheduled event and go into the manual control mode.

When the next scheduled event occurs, EM-125 returns to normal operation.

The state of the manual control will be remembered when EM-125 is disconnected from the mains.

In the **Wi-Fi connection setup mode,** EM-125 creates its own access point with the name «EM-125_xxxxxxxx», where xxxxxxxx – is a unique unit code.

A user having connected to this access point, and in a Web browser (Opera, Google Chrome, Fire Fox, etc.) by going to the address «http://em.com» or «http://192.168.4.1», gets access to the device Wi-Fi connection settings.

EM-125 CONNECTION

⚠ *When EM-125 is connected to the main, the receptacle and internal elements of the device will be under life-threatening voltage.*

⚠ *The device is not intended for switching the load at short circuits. Therefore, the device must be operated in an electrical network protected by a circuit breaker with a tripping current of not more than 16A.*

⚠ *It is forbidden to connect a load with power of more than 3.6 kW to the device.*
The load current must not exceed the maximum current of the receptacle into which the device is connected.

- **Connect the load to the EM-125 receptacle;**
- **Turn on EM-125 with the load in the wall receptacle.**

🔲 ADJUSTMENT OF THE DEVICE

Wi-Fi connection setup

To enter the setup mode, press and hold the «ENTER» button (Fig.1, pos.1) on the front panel of device for 5-6 seconds. At the same time, the «ENTER» button will flash in blue and red, and de-vice will create an access po-int named «EM-125_xxxxxxxx», where xxxxxxxx – is a unique device code (see Fig. 2)

By means of an electronic device (PC with Wi-Fi, a phone, i-pad, laptop, etc.) connect to the access point using the following parame-ters:

- The name of the access point is «EM-125_xxxxxxxx»;
- Security «No».

Fire up the Web-browser (Google Chrome, Opera, Fire Fox, etc.) on the electronic device.

In the address bar of the browser, enter «http://em.com» or «http://192.168.4.1» and follow the entered link.

The electronic device screen will open Web interface EM-125.

Following the instructions on the screen, configure the EM-125 Wi-Fi connection and log in to the «my.overvis. com» server.

Note - to force exit from the Wi-Fi connection setup mode - press and hold the «ENTER» button on the front panel of EM-125 for 5-6 seconds, the «ENTER» button will stop fla-shing blue and red, and the device will go to the normal operation mode.

Web- interface of EM-125

User authorization

After opening the Web-inter-face of EM-125 in the PC bro-wser (or any other device with a browser installed), the user authorization page will be displayed.

To access the EM-125, you must enter a password (default is «admin») .
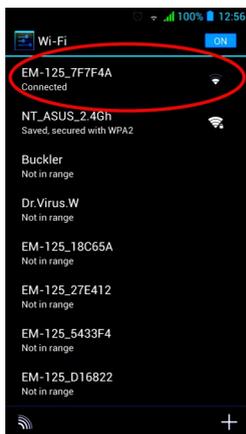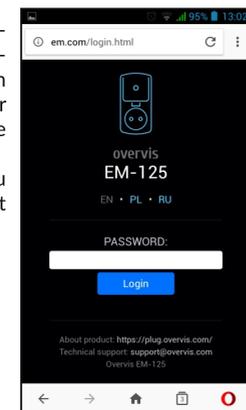
State

After successful authoriza-tion, a state page will be displayed, where current state information is displayed.

At the top of the screen, the name of the device - «overvis EM-125», current power con-sumption with a load of «0 W» and the button « 🔲 ».

In the middle of the screen there is a manual control button and readings of the measured network parame-ters (current and load power, voltage and network freque-ncy).
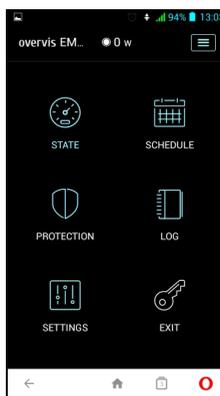
At the bottom of the screen are meters of consumed electric power and the amount of money spent.

Main menu

When you press the « 🔲 » button, the main menu of the EM-125 will be displayed.

To close the menu, press the « 🔲 » button again.

Schedule

It opens after clicking on menu item «SCHEDULE».

Double-clicking on a schedule adds an event.

Double-clicking on an event opens the event settings window.

A change in duration of the event is carried out by drag-ging the entire block or using the elements « ⌃ » and «⌄».

To delete an event, click «✕» in the upper left corner of the event.

To save the current schedule in EM-125 - click on the «Save» button.

To cancel the changes made, click the «Cancel» button.

Protection

It is open after clicking on menu item «PROTECTI-ON».

This menu item contains the settings of the EM-125 protective functions:
• Voltage protection;
• Current protection;
• Power protection.

Voltage protection:
• Upper threshold - the ma-ximum voltage value, upon reaching which the load will be disconnected;
• Shutdown delay – protec-tion response time when the threshold is reached;
• Lower threshold – the minimum voltage value, upon reaching which the load will be disconnected;
• Hysteresis – voltage hysteresis value;
• Delay of re-closure – delay before re-closure of the load in case of a failure;
• Re-closures – the number of allowed re-closures in case of a failure;
• Save – to save the settings in the EM-125.

Current protection:
• Current threshold – current value upon reaching which the load will be disconnected;
• Shutdown delay – protection response time when a threshold is reached;
• Delay of re-closure – delay before re-closure of the load in the event of a failure;
• Re-closures – the number of allowed re-closures in the event of a failure;
• Save – to save settings in the EM-125.

Power protection:
• Protection – protection operation mode (disabled, active or full power);
• Power threshold – power value, upon reaching which the load will be disconnected;
• Shutdown delay – protection response time when a threshold is reached;
• Delay of re-closure – delay before re-closure of the load in the event of a failure;
• Re-closures – the number of allowed re-closures in the event of a failure;
• Save – to save settings in the EM-125.

Settings

Opens after clicking on menu item «SETTINGS» .
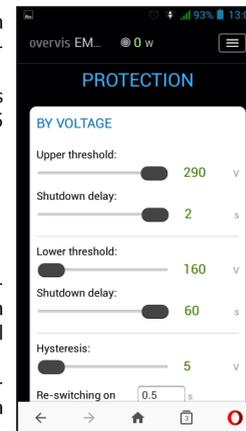
This menu item contains the main settings for the device:
• Access to the device;
• Cost of electric power supply;
• Wi-Fi;
• Vacation;
• Date and time;
• Cloud Overvis;
• Optional.

Access to the device:
• Device name – a name of the device;
• Password – sets a pass-word for access to the device via the Web-interface;
• Save – to save settings in the EM-125.

Cost of electric power supply:
• Cost of 1 kW/h – sets the cost of electricity per 1 kWh;
• Currency – sets currency in which the cost of consumed power is calculated;
• Save – to save settings in the EM-125.

WI-FI:
• Service Set Identifier (SSID) – the name of the network to which EM-125 is connected;
• Network password – a password of the network to which the EM-125 is connected;
• TCP/IP settings – TCP/IP configuration mode (manual or automatic DHCP);
• IP address – IP address of EM-125 in a Wi-Fi network;
• Subnet mask – a subnet mask to which the EM-125 is connected;
• Default gateway – an address of the main gateway in the Wi-Fi network;
• Save – to save settings in EM-125.

Vacation:
• Enable scheduled vacation – vacation scheduler opera-ting mode (disabled or enabled);
• Start date – the start date of the vacation scheduler;
• End date – the end date of the vacation scheduler;
• Save – to save settings in the EM-125.

Note - during the work of the vacation scheduler, load connection is blocked.

Date and time:
• Time on the device – the current date and time on the device;
• Time zone – the current time zone on the device;
• Enable automatic daylight saving time – a parameter that allows you to enable or disable the EM-125 to automati-cally switch over to daylight saving time;
• Time correction – correction of the clock in the EM-125, it is set in seconds per day;
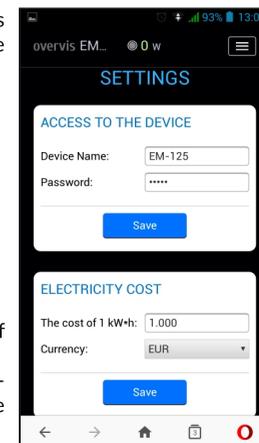
• *Enable time synchronization* – a parameter that allows you to enable or disable EM-125 to synchronize time with the NTP exact time server;

• *NTP server address* – address of the NTP time server;

• *Port* – a port for connection to the exact time server;

• *Synchronization period* – the period with which the device will synchronize with the exact time server;

• *Save* – to save the settings in the EM-125;

• *Synchronize with server* – a forced start of time synchronization between the exact time server and EM-125;

• *Synchronize with PC* – to start time synchronization between PC and EM-125.

Cloud Overvis:

• *Switch on remote access via the cloud* – connection of EM-125 to Overvis Cloud is allowed or denied;

• *Server address* – sets the address of the Overvis cloud;

• *Port* – a port of connection;

• *State* – service information about the state of connection to the Overvis cloud;

• *Save* – to save settings in the EM-125.

Optional:

• *Blocking of the front panel after* – the time after which the front panel will be blocked after power supply to the device (child protection);

• *Blocking of the instrument after* – the time after which load connection will be blocked for all operating modes;

• *Reset time for reclosing counters* – the time after which the counters of allowed re-closures will be reset from the moment the failure disappears;

• *Display brightness* – sets brightness of the glow of the EM-125 control button;

• *Save* – to save settings in the EM-125.

Configurable parameters of EM-125

Name	Range		Value after reset
	from	to	
Wi-Fi			
Service Set Identifier(SSID)	32 symbols in ASCII		«NT_CHECK_P1»
Password of the network	64 symbols in ASCII		«12345678»
TCP/IP settings	Manually / Automatically		Automatically
IP address	0.0.0.0	255.255.255.255	192.168.0.2
Subnet mask	0.0.0.0	255.255.255.255	255.255.255.0
Default gateway	0.0.0.0	255.255.255.255	192.168.0.1
Voltage protection			
Upper threshold, V	230	290	255
Upper threshold shutdown delay, s	0.2	2.0	0.5
Lower threshold, V	100	220	190
Lower threshold shutdown delay, s	0.2	60.0	12.0
Hysteresis, V	0	20	5

Name	Range		Value after reset
	from	to	
Re-closure delay, s	0.5	600.0	5.0
Number of re-closures	No, 1, 2, 3, 5, 7, 10, always		Always
Current protection			
Current threshold, A	1.0	16.0	10.0
Shutdown delay, s	0.2	10.0	5.0
Re-closure delay, s	0.5	600.0	60.0
Number of re-closures	No, 1, 2, 3, 5, 7, 10, always		3
Power protection			
Protection enabling	Off/ Active/ Full		Active
Power threshold, W	100	3680	2300
Shutdown delay, s	0.2	10.0	5.0
Re-closure delay, s	0.5	600.0	60.0
Number of re-closures	No, 1, 2, 3, 5, 7, 10, always		3
Vacation			
Work enabled	Off/On		Off
Date of the beginning	dd/mm/yy		17.08.2018
Date of the end	dd/mm/yy		17.08.2018
Access to the device			
Name of the device	32 symbols in ASCII		«EM-125»
Password of access to Web	32 symbols in ASCII		«admin»
Cost of power supply			
Cost of power supply	0.001	999.999	1.000
Currency	BYR, BGN, CZK, CHF, EUR, GBP, INR, KZT, LVL, LTL, MDL, PLN, PRB, RUB, RON, SEK, UAH, USD		EUR
Date and time			
Greenwich Mean Time (GMT)	GMT-12:00	GMT+13:00	GMT+0:00
Time correction, s	-9.9	+9.9	+0.0
Automatic daylight saving time	No/ Yes		No
Time synchronization	Off/ On		On
Address of NTP server	32 symbols in ASCII		«time.windows.com»
Port of connection	1	65535	123
Period of synchronization, s	3600	86400	7200
Cloud my.overvis.com			
Work enabling	Off / On		On
Server address	32 symbols in ASCII		«my.overvis.com»
Port of connection	1	65535	20502
Optional			
Device blocking after, s	No	60 - 43200	No

Name	Range		Value after reset
	from	to	
Blocking of the control button	No	60 - 600	No
Reset time of re-closure counters, s	60	3600	60
Display brightness	1	15	12

Remote adjustment and control is done through the «my.overvis.com» server

Setup and adjustment through the «my.overvis. com» server is possible only after presetting the Wi-Fi connection and authorizing on the «my.overvis.com» server (see «Wi-Fi connection settings»).

Enter the link «https://my.overvis.com» in the address bar of the web-browser of the electronic device (PC, laptop, mobile phone, i-pad, etc.) and make the click through it.

Options for connecting to the EM-125 will appear on the screen of the device from which the click-through was made. It is necessary to choose the most suitable option and follow the further instructions displayed on the screen.

After connection to EM-125, configure the necessary parameters.

To disconnect from EM-125, simply close the «my. overvis.com» page.

ⓝ OPERATION OF THE DEVICE

When describing operation of the unit, the settings of the manufacturer are used.

Note - all described thresholds and time delays can be changed by the user through the «my.overvis.com» server (described above).

Normal operation of the device

After connection of EM-125 to the power supply outlet, a time delay of 5 s takes place, then, if the mains voltage is within the acceptable limits, the unit begins to turn on/off the load according to a schedule set by the user.

Note - After 5 seconds, if the schedule is not set (disabled), there will be automatically switching to the manual control mode.

After switching on the load, EM-125 will constantly control the value of the mains voltage, current and power consumed by the load. In case one of them goes beyond the limits, EM-125 performs emergency power cutoff.

Moreover, after connecting EM-125 to the power outlet, a connection will be made to the user's Wi-Fi network (for time synchronization and access to the «my. overvis.com» server).

Every 5 minutes, EM-125 saves the statistical data (voltage, current, power, etc.) to non-volatile memory, for further transfer them to the «my.overvis.com» server.

When a manual control command is received (from the front panel or the «my.overvis.com» server), the execution of the current scheduled event will be blocked, the load will be turned off (or turned on depending on the command), and EM-125 will be switched to the manual control mode.

When the next scheduled event occurs, the manual control will be disabled and EM-125 will return to normal operation.

Every 1-2 hours (depending on the load of the «my.overvis. com» server) the accumulated statistics are sent to the «my. overvis.com» server.

Load protection against the mains overvoltage

During operation, the EM-125 measures continuously the value of the mains voltage.

With an abrupt increase in voltage above 300 ± 10 V, the load will be off with a minimum time delay of 0.02 s (fixed time).

With a gradual increase in voltage above the threshold of 255 V (Upper cut-off threshold), the load will be disconnected after a time of 0.5 s (Cutoff delay on upper threshold).

After switching off the load, if the mains voltage drops below 250 V («Upper cut-off threshold» minus «Hysteresis»), the operation will return to the normal mode of operation after the AR time.

When voltage drops below the threshold of 190 V (Lower cutoff threshold), the load will be off after a time of 12.0 s (Cutoff delay on the lower threshold).

After switching off the load, if the mains voltage rises above 195 V («Lower cutoff threshold» plus «Hysteresis»), the operation will return to the normal mode of operation after the AR time.

The device operation in the emergency mode is described in the clause «Load cutting off due to emergency».

Load overcurrent protection

During operation, the EM-125 continuously measures the magnitude of current consumed by the load.

When the load current rises above the threshold of 10 A (Cutoff threshold), the load will be off after a time of 5.0 s (Cutoff delay).

After switching off the load, the operation will return to the normal mode of operation after the automatic reclosing time.

Operation of the unit in the emergency mode is described in clause «Load switching off due to emergency».

Consumed power load protection

During operation, the EM-125 continuously measures the value of power consumed by the load.

When the load power increases above the threshold of 2300 W (Cutoff threshold), the load will be off after a time of 5.0 s (Cutoff delay).

After cutting off the load, the operation will return to normal mode of operation after an automatic reclosing time.

The operation of the device in the emergency mode is described in the clause «Load cutting off due to the emergency».

Emergency power cutting off

In the event of an emergency situation (overvoltage, overcurrent, overpower, etc.), the load will be off, the AR counting time starts and the «ENTER» button starts to glow red.

When the emergency situation disappears, the «ENTER» button flashes in red with frequency of 0.5 s, indicating that the automatic reclosing time is being counted, after which the load will be automatically switched on.

If the AR counting time has ended before the end of emergency, the load will be switched on without delay after the end of emergency.

If the number of automatic restart attempts was exceeded (for current and power protection «3», for voltage protection «no»), the unit will block the load switching on and the «ENTER» button will constantly glow red.

To restore operation of EM-125, you must unplug it from the power outlet, wait for 5 seconds and turn it on again.

Load control from the front panel

A single pressing on the «ENTER» button with a duration of 2 - 4 seconds puts the device into the manual load control mode, thereby each pressing of the button switches on (if turned off) or off (if turned on) the load.

Note - as a protection against children, control from the front panel can be blocked in the EM-125 settings.

Reset to factory settings

To reset to factory settings:
- Disconnect the device from the power outlet.
- Disconnect the load from the receptacle of the device.
- Press and hold the «ENTER» button on the front panel of the device.
- Connect the unit to the power outlet and continue to hold the button for 3 s. Thereby, the «ENTER» button will flash quickly in blue and red, release the «ENTER» button.

When reset to the factory settings is completed, the «ENTER» button will stop flashing and the unit will automatically reboot.

The device has been reset to the factory settings and is ready for use.

The protocol of data exchange between EM-125 and the «my.overvis.com» server

The data exchange protocol between EM-125 and the «my.overvis.com» server is a closed protocol and it is not disclosed for security reasons.

All data are received and sent in an encrypted form using 256 bit encryption.

OPERATION CONDITIONS

The device is intended for operation in the following conditions:
– Ambient temperature: from minus 5 to +40 °C;
– Atmospheric pressure: from 84 to 106.7 kPa;
– Relative humidity (at temperature of +25 °C): 30 ... 80 %.

If the temperature of the device after transportation or storage differs from the ambient temperature at which it is supposed to be operated, then before connecting to the mains keep the device under the operating conditions within two hours (because of condensation may be on the device elements).

ATTENTION! The device 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

Do not make any attempt to open and repair the device yourself.

Do not use the device with mechanical damage to the case.

Do not allow water to enter the internal parts of the device, the receptacle and the plug.

To improve performance, use the unit at load currents not exceeding 10 A.

During operation and maintenance, meet the requirements of the «Rules for the technical operation of electriity-generating equipment of consumers», «The safety regulations for operation of electricity-generating equipment of consumers», and «Labor protection during operation of electricity-generating equipment».

MAINTENANCE

Attention! Under maintenance, disconnect the device and units connected to it from the mains.

The maintenance rate recommended is every six months.

Maintenance procedure:
1) check visually that there is no soot on the plug of the device, in case of detection, remove carbon deposits;
2) check visually the integrity of the case, in case of cracks and chips, remove the unit from operation and send it for repair;
3) if necessary, wipe the body of the device with a cloth.

Do not use abrasives or solvents for cleaning.

SERVICE LIFE AND WARRANTY

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

Shelf life is 3 years.

Warranty period of the device operation is 3 years from the date of sale.

During the warranty period of operation (in the case of failure of the device) the manufacturer is responsible for free repair of the device.

ATTENTION! IF THE DEVICE HAS BEEN OPERATED IN VIOLATION OF THE REQUIREMENTS OF THIS MANUAL, THE USER WILL LOSE THE RIGHT TO WARRANTY SERVICE.

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

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

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

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

CLAIMS DATA

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

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For all questions, please contact the manufacturer:
NOVATEK-ELECTRO Ltd,
59, Admiral Lazarev Str.;
Odessa, 65007, Ukraine.
Tel.: +38 (048)738-00-28,
Tel./fax: +38 (0482) 34-36-73
www.novatek-electro.com

Date of sale_____   VN221222