RCNTEC
Resilient Cloud and Network TEChnologies

Resilient Power Control Module

RPCM

User Manual

For models:

RPCM 1502 (16A)
RPCM 1532 (32A)
RPCM ME 1563 (63A - Mining Edition)
RPCM 3x250
RPCM DELTA

Version 202011161900

Contents

Congratulations on purchase of your RPCM!

Dear Customer!

Please accept our congratulations on your purchase of RPCM - Resilient Power Control Module. This device will allow you to be in control of your power supply infrastructure with great user experience.

We have paid a lot of attention to craft the device the way we would want it to be for ourselves. In many ways, physically, ergonomically, architecturally, electrically it is designed to be one stop shop for many power control tasks that people meet in many circumstances.

We have made every effort to make RPCM useful both in enterprise environment behind firewall and in less strict environment with access to Internet, where all the power of the Cloud comes to your service.

We have tried to make interfaces as intuitive as possible and prepared detailed documentation to assist you in every case that may be not obvious or expected for this class of equipment.

Bon voyage! We hope you enjoy it!

RCNTEC Team.

I. Introduction

1.1. Main Functions

RPCM stands for Resilient Power Control Module. It was designed in response to market demand for managed and switched PDU, that could protect individual outlets from short circuits.

During its development, we decided to add features, such as power metering and proper grounding diagnostics. As a result, RPCM has the following characteristics:

Inputs:

- 2 x 16A or 2 x 32A with ATS functionality (16A current capacity for model RPCM 1502 and 32A for model RPCM 1532);
- 1 x 63A (63A current capacity for model RPCM 1563);
- 3 x 250A for RPCM 3x250, 3 x 467A for RPCM DELTA.

Outlets:

- 10 x 10A (for RPCM 1502, RPCM 1532, RPCM ME 1563);
- 30 x 25A (for RPCM 3x250 and RPCM DELTA).

Overconsumption protection with individual configuration of each outlet for alarm and turn off threshold.

Power metering on each outlet:

- instant milliamps;
- instant Watts;
- instant VAs;
- instant Vars;
- accumulated Watts;
- accumulated VAs;
- accumulated Vars.

Proper grounding indication.

Configuration of activation sequence and delays;

Priority configuration for outlets to turn off in case of input consumption in excess of set limit: 16A for RPCM 1502 model, 32A for RPCM 1532, 63A for RPCM ME 1563, 250A for RPCM 3x250 and RPCM DELTA by default;

Remote control via web interface, SSH, SNMP v1/v2c/v3, REST API.

Main applications of RPCM include:

- increasing electrical safety;
- increasing fire safety;
- ensuring continuous operation;

- monitoring and saving energy;
- management IT infrastructure with flexibility.

1.2. RPCM AC Features

Remote power management of individual outlets — System administrators can turn on/off and reset any of the 10 outlets without visiting the site where the equipment is installed and they can control unauthorized connection/disconnection of the equipment, accidental unplugging of supply cables or PSU failure on the connected equipment.

Outlet level short circuit protection — When a short circuit occurs on one of the connected devices, RPCM will cut off the power supply only to that device, leaving all other devices up and running;

Note. Devices connected to other outlets on RPCM and other devices powered from the same power input stay on. Since ATS is used for reserving power input, short circuit protection on RPCM prevents both input power lines from switching off and all the equipment on the rack from turning off due to one failed device, eliminating the difficulty of locating the failed device before the power in the rack is restored.

Proper grounding diagnostics — RPCM prevents damages and equipment failures, while increasing electrical safety with the help of automatic monitoring and proper grounding diagnostics.

Configurable electrical current consumption limits for each outlet — System administrators can prevent fire hazards by setting current limits on each outlet and configuring administrators notifications or automated power cut off on the outlet where an equipment exceeding the defined limits was detected.

Customizable outlet activation sequence and delays to initiate service correctly after complete power loss events — System administrators can guarantee power up for equipment after a full blackout, as well as set activation the sequence and delays during startup following a power cut off, to ensure proper initiation of IT infrastructure and information systems.

Power meters on each individual outlet — Commercial data centers can offer the best prices to their customers for colocation services in comparison to their competitors, thanks to the possibility of individual power consumption metering detailed up to a single client device.

ATS (Automatic Transfer Switch) — *for RPCM 1502 and RPCM 1532 only* — When power loss occurs on one of the inputs, all electricity consumers are switched over to another power input without interruption in power supply.

Highest density of controllable power supply outlets with power meters per 1U in the industry for systems with ATS — 10 managed outlets per 1U. As a result, one less power management device per rack is required when, compared to competitors.

User friendly remote management interfaces — Multitude of easy to use interfaces such as web-console, SSH command line interface, SNMP, REST API and physical on-device buttons, display and per channel LED status indicators provide centralized teams and field engineers all necessary tools to manage the power infrastructure the smart way.

Automation watchdogs — RPCM has a convenient system for monitoring health of the powered devices based on power consumption, network availability, TCP port availability and hashrate (for mining) to automate recovery of equipment from failures by detecting issues and power cycling powered devices automatically.

Adaptable notification system. RPCM has a few notification methods: email, SNMP Trap and system logging (event log). Events are also sent to the RPCM Cloud. You can configure the use of all channels at once or select one or several methods.

Note. The event is in any case recorded in the system log. Then, depending on what type of notification was configured, the user will get a notification about the event. If the SNMP Trap option is configured, the corresponding notifications will be received via the SNMP protocol, if the settings for sending via SMTP are made, the messages will be received by email. Both options can be configured.

A latest version of the documentation: https://rpcm.pro/docs/

Use the latest version for information about new features and methods of work.

You can ask technical support to get latest version this documentation.

Contacts for contacting technical support for the RPCM product:

Tel: 8 (800) 302 87 87, +7 (495) 009 87 87. E-mail: info@rcntec.com

Technical support https://rpcm.pro

Feedback https://rpcm.pro/#contacts

2. Installing RPCM

Brief description of the section:

2.1. Operating Instructions and Specifications — This section contains information on the operating conditions of the Resilient Power Control Module (RPCM).

2.2. Mounting onto rack— detailed instructions for preparing for installing and connecting the Resilient Power Control Module (RPCM).

2.3. Mounting RPCM 3x250 and RPCM DELTA — this chapter contains instructions for installing the Resilient Power Control Module (RPCM 3x250 and RPCM DELTA modules) and is designed for professionals with the appropriate qualifications.

2.1. Operating Instructions and Specifications

2.1.1. Before You Begin

- The RPCM must not be connected to an electrical system whose voltage exceeds the limits specified in the operating instructions.
- Do not operate without grounding.
- The plugs of both cords must be easily accessible for disconnection in case of danger.
- Do not allow liquids to enter into RPCM.
- In case liquids or foreign objects enter the system, or if there are signs of malfunction, such as loud noise, smoke, burning smell, disconnect RPCM from the input power supply immediately.

ATTENTION! If any abnormal situation occurs, please contact technical support. Do not attempt to open or repair the Resilient Power Control Module (RPCM) yourself. Repairs should be carried out only by a service engineer.

2.1.2. Requirements for Ambient Conditions during Use

Normal ambient conditions for the operation of the Resilient Power Control Module (RPCM) are the following:

- Operating range of temperature 0-40°C;
- Operating range of relative humidity — 45-85% (non-condensation);
- Operating range of altitude above sea level is 0-2000 m.

The environment is non-explosive, does not have considerable amount of conductive dust, vapors, corrosive gases in concentrations harmful to RPCM components and materials.

The surface of the RPCM housing must not be chipped, scratched, dented or otherwise defective.

Note. At 120V the power is:

for RPCM 1502 (16A) 120x16 = 1920 VA;

for RPCM 1532 (32A) 120x32 = 3840 VA;

for RPCM ME 1563 (63A) 120x63 = 7560 VA.

2.1.3. General Technical Characteristics

Table 2.1.1. General Technical Characteristics RPCM 1502, RPCM 1532, RPCM 1563.

Name of the characteristic	**Model RPCM 1502**	**Model RPCM 1532**	**Model RPCM 1563**
Maximum power, VA	3840 (from calculation of 16A x 240V)	7680 (from calculation of 32A x 240V)	15120 (from calculation of 63A x 240V)
Type of input connectors	2 (two) IEC-320-C20 connectors	2 (two) 2P+PE 32A 250V connectors	1 (one) 2P+PE 63A 250V connector
Rated input current, A	16	32	63
Rated voltage (1 line), V	100-240	100-240	100-240
Frequency, Hz	50/60 ± 5%	50/60 ± 5%	50/60 ± 5%
Switching time between inputs, ms	3.5 - 14	3.5 - 14	—
Name of the characteristic	**Model RPCM 1502**	**Model RPCM 1532**	**Model RPCM 1563**
Grounging control	Indication of proper grounding connection	Indication of proper grounding connection	Indication of proper grounding connection
Type of outlet connectors	10 IEC-320-C13 connectors	10 IEC-320-C13 connectors	10 IEC-320-C13 connectors
Rated voltage, V	100-240	100-240	100-240
Rated outlet current, A	10	10	10
Current Overload and Short Circuit Protection Parameters	Overload protection: adjustable 0.1-10 A (default 10 A), short circuit protection - 7-17 **i**Nom	Overload protection: adjustable 0.1-10 A (default 10 A), short circuit protection - 7-17 **i**Nom	Overload protection: adjustable 0.1-10 A (default 10 A), short circuit protection - 7-17 **i**Nom
Power-on delays and sequence (default intervals between power-ons — 1s)	Programmable (default delay of 1s)	Programmable (default delay of 1s)	Programmable (default delay of 1s)
Dimensions, mm	440 x 365 x 44	440 x 365 x 44	440 x 365 x 44

Table 2.1.2. General Technical Characteristics RPCM 3x250 and RPCM DELTA

Name of the characteristic	**Model RPCM 3x250**	**Model RPCM DELTA**
Inputs		
Maximum power, VA	180 kW at 240V	up to 156 kW nominal at 208V
Type of input connection	3 line + neutral (WYE topology) and protective conductor (ground)	3 phases (DELTA topology) and protective conductor (ground)
Connections	2 (two) bus terminals 70-180 mm2 for each connection	2 (two) bus terminals 70-180 mm2 for each connection
Max input current, A	250	467
Rated input voltage, V	3 phase 100-240V (line-neutral)/ 173-415 (line-line) WYE topology	3 phase 208V (line-line) DELTA topology
Frequency, Hz	50/60 + 5%	50/60 + 5%
Outlets		
Total connections number	90 connections, 30 controlled channels (3 connections per channel)	90 connections, 30 controlled channels (3 connections per channel)
Outlets connections type	Clamp terminals: 4mm^2 with a ferrule and 6mm^2 without a ferrule for connecting phase and 2.5 mm^2 with a ferrule and 4mm^2 without a ferrule for connecting neutral conductors	Clamp terminals: 4mm^2 with a ferrule and 6mm^2 without a ferrule for connecting phase and 2.5 mm^2 with a ferrule and 4mm^2 without a ferrule for connecting neutral conductors
Rated outlet voltage (1 phase, 2 wires + grounding), V	240	240
Rated outlet current, A	25	25
Type of circuit breaker	Overload protection: adjustable 2-25 A (default 25 A), short circuit protection - 3 **i**Nom, short ciruit tripping current >75A	Overload protection: adjustable 27A max / 25A nominal / 21.6 A derated, short circuit protection - 3 **i**Nom, short ciruit tripping current >75A
Power-on delays and sequence (default intervals between power-ons — 1s)	Programmable (default delay of 1s)	Programmable (default delay of 1s)
Dimensions, mm	600x600x250	600x600x250
Form-factor	Wall panel box	Wall panel box
Weight, kg	34	34

Contacts for contacting technical support for the RPCM product:

Tel: 8 (800) 302 87 87, +7 (495) 009 87 87. E-mail: info@rcntec.com

Technical support https://rpcm.pro

Feedback https://rpcm.pro/#contacts

2.2. Mounting into Rack RPCM 1502, RPCM 1532, RPCM ME 1563

2.2.1. Description

This chapter section instructions for installing the Resilient Power Control Module (RPCM) and is designed for professionals with the appropriate qualifications.

Before you begin, read this guide to help you complete the installation process. If necessary, contact RCNTEC support for assistance.

Adhere strictly to the safety precautions listed below.

2.2.2. Planning before Installation

For your convenience, we prepared a checklist of the necessary actions before installing the remote power management module RPCM:

- provide a suitable place for unpacking, installing and running the RPCM;
- maintaining the necessary operating conditions;
- provide the necessary power supplies;
- provide network connections and lay external cables needed for trouble-free operation of the Resilient Power Control Module (RPCM).

Power and ground requirements for RPCM 1502 (at 16A):

- voltage 100-240V;
- frequency in the AC network of 50-60 Hz;
- 2 (two) power cables with IEC-320-C19 for power supply;
- grounding;
- easy accessibility of plugs of both power cords for disconnection in case of danger.

Power and ground requirements for RPCM 1532 (at 32A):

- voltage 100-240V;
- frequency in the AC network of 50-60 Hz;
- 2 (two) sockets for 2P+PE 32A 250V for power supply;
- grounding;
- easy accessibility of plugs of both power cords for disconnection in case of danger.

Power and ground requirements for RPCM ME 1563 (at 63A):

- voltage 100-240V;
- frequency in the AC network of 50-60 Hz;
- 1 (one) socket for 2P+PE 63A 250V for power supply;
- grounding;
- easy accessibility of a plug of a power cord for disconnection in case of danger.

Note. In order to protect outlets from short circuits, short circuit protection selectivity has to be ensured in the electrical design.

For RPCM 1502, RPCM 1532, RPCM ME 1563, the short-circuit protection actuation current at the terminals RPCM ~ 7 to 17 iNom for 10A or from ~ 70 to ~ 170 A, the response time at fault is about 2 milliseconds. The circuit breakers on the inputs must be selected so that when a short circuit current occurs, the action of the circuit breaker protecting the input line in the RPCM occurs after the expected protection response time provided by the RPCM functionality. The manufacturer recommends the use of selective circuit breakers before entering RPCM to ensure complete selectivity of protection.

2.2.3. Preparatory steps

CAUTION! There is a risk of electric shock or injury as a result exposure to high energy levels. Installation and maintenance should perform the specialists, who know the order of performance of works, precautions and risks associated with the use of components connected to an AC source.

CAUTION! To avoid electric shock, do not attempt to open the equipment case yourself. In case of unforeseen situations for assistance, please contact the RCNTEC support service (refer to the "Troubleshooting" section of this manual for contact information).

CAUTION! To reduce the risk of fire, electric shock, or damage to power sources, observe the following rules:

- Connect only to the circuit with the overcurrent protection of the distribution circuit with the appropriate rated current.
- Connect the input power cables to a grounded electrical outlet that is located near the equipment and is easily accessible.
- Before connecting the input power, make sure that all switches are in the OFF position.
- Make sure that the components connected to the module are configured or suitable for operation at the same voltage value as the module — 230V. If the voltage test is not performed, this can lead to serious damage to the equipment.

CAUTION! To reduce the risk of injury from high residual current, before connecting the power, check the grounding.

To avoid personal injury, adhere strictly to the power current requirements for occupational safety and health.

2.2.4. Acclimatization

The maximum permissible temperature range for storage during storage is 20°C/h. Before turning on the Resilient Power Management Module (RPCM), it takes time to adapt to the new conditions at least 24 hours for acclimatization. At this time, you can continue to physically install the RPCM device. If condensation is present after 24 hours, wait until the condensation evaporates completely before turning on the system.

Ambient conditions for the operation of the RPCM are the following:

- operating range of environmental parameters 0-40°C;
- operating range of relative humidity is 45-85% (without condensation);
- operating range of altitude above sea level is 0-2000 m.

2.2.5. Checking the Packaging

Before unpacking the boxes, ensure that they do not have dents, cuts, stains and other damages due to incorrect handling in the course of shipping . In case of damage is found, photograph the packaging, contact the supplier and attach the photo.

2.2.6. Installing RPCM

Before starting the installation, ensure the ambient conditions for operations and power requirements are in accordance with the instructions in this User Manual.

Installing the Remote Power Management Module

Note. If you purchased a cables fixation kit, install it before installing the RPCM in the rack.

To install RPCM:

1 install the rack nuts as in Figure 2.2.1;

2 mount the module RPCM on the rack and secure it as shown in Figure 2.2.2;

3 prepare the power lines to connect the module as shown in Figure 2.2.3 for RPCM 1502 and RPCM 1532 or Figure 2.2.4 for RPCM ME 1563;

4 connect the power cables the inputs;

5 connect to the outlets the cables with the IEC-320-C14 connectors for connecting the powered devices.

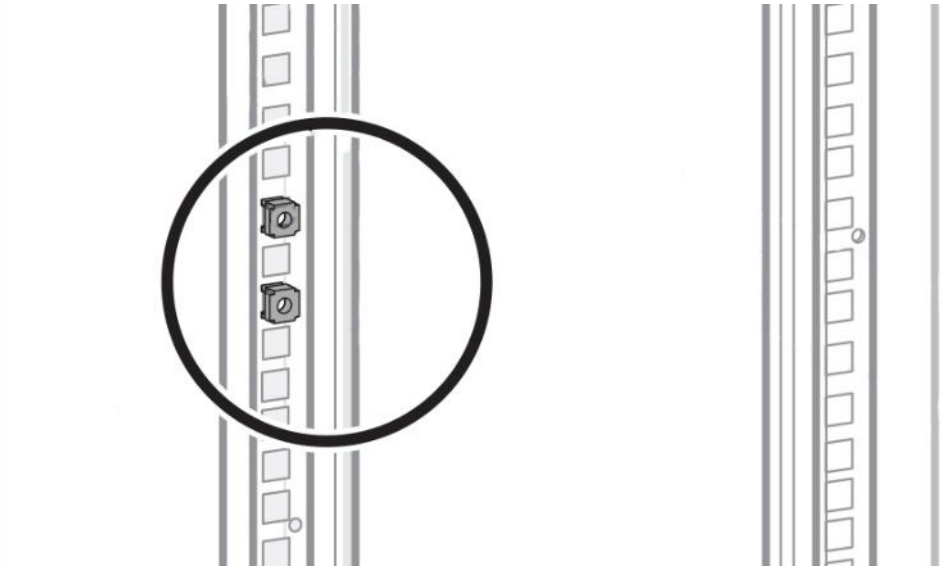

Figure 2.2.1. Inserting rack nuts.

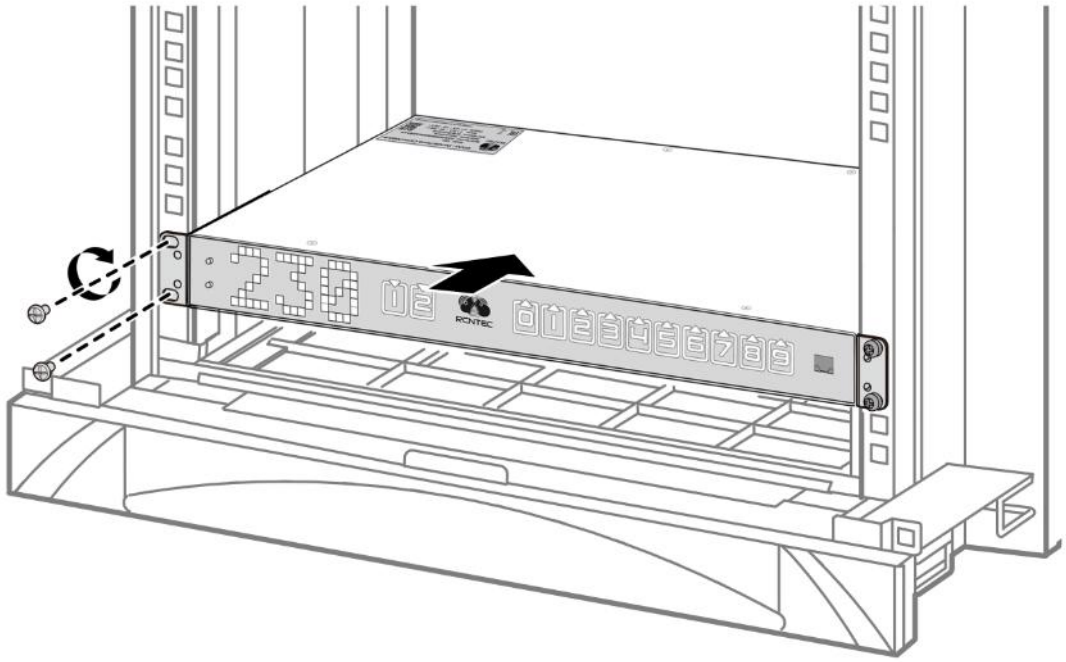

Figure 2.2.2. Mounting the Resilient Power Control Module (RPCM).

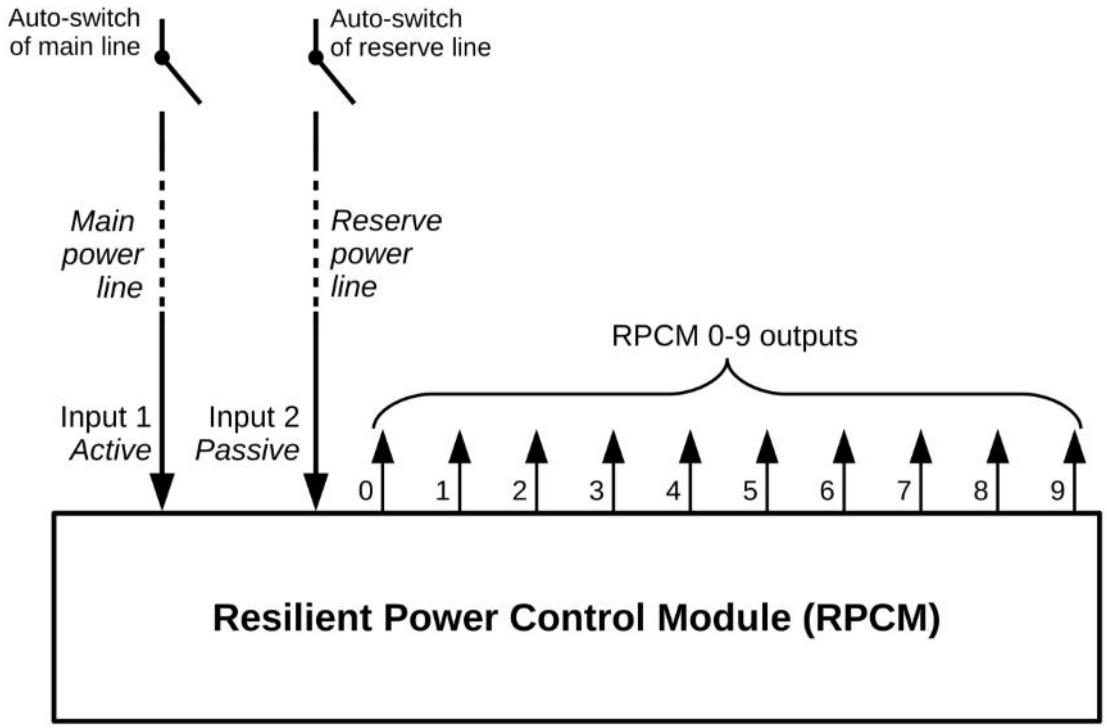

Figure 2.2.3. Connecting RPCM 1502 and RPCM 1532.

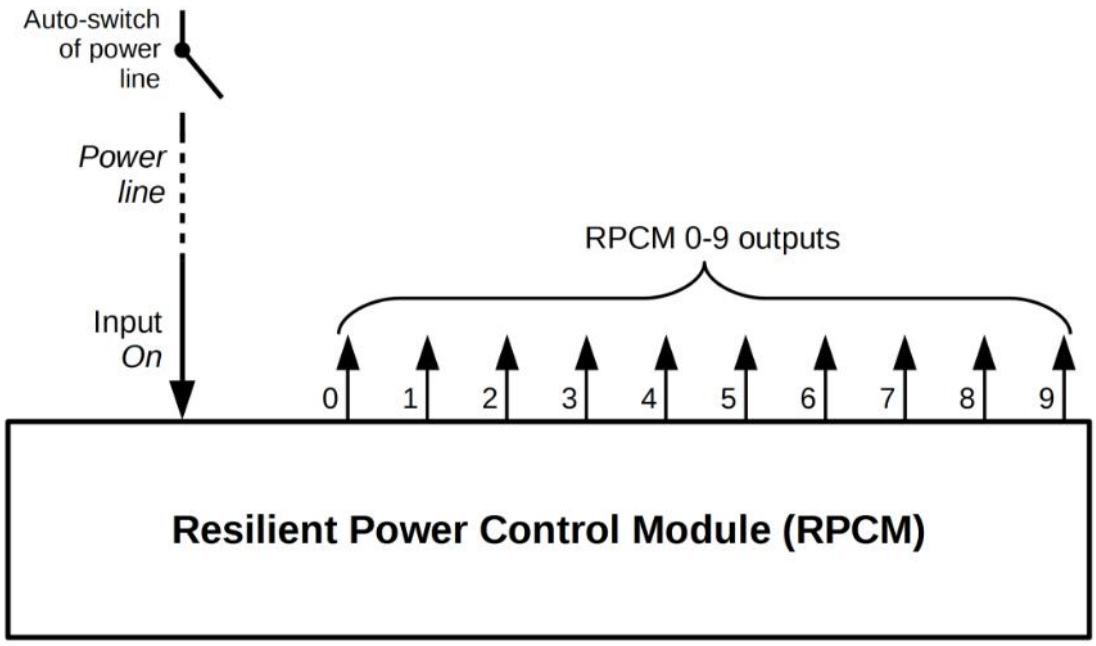

Figure 2.2.4. Connecting RPCM ME 1563.

Note. When connecting two inputs with a single neutral, and these inputs are connected through an automatic differential switch, the differential automation switch should turn off himself.

Solutions:

- do not use automatic differential switches on inputs for connecting RPCM AC ATS;
- use automatic differential switches with 300mA tripping current at the inputs;
- if an RCD with small currents is needed — use an RCD at the terminals.

2.2.7. 2P+PE 32A 250V and 2P+PE 63A 250V Connectors

Connectors for connecting models on 32A and 63A - 2P+PE 32A 250V and 2P+PE 63A 250V look similar, but notice significant differences in the overall dimensions and thickness of contacts.

These differences are due to the varying calculated current capacities.

Also, remember that the RPCM ME (1563) has only one input to connect to a power supply with a 2P+PE 63A 250V connector, and RPCM 32A (1532) has two 2P+PE 63A 250V connectors.

Below are the images, as well as information about the overall dimensions of the connectors and thickness of the contacts.

2.2.7.1. 2P+PE 32A 250V Connector

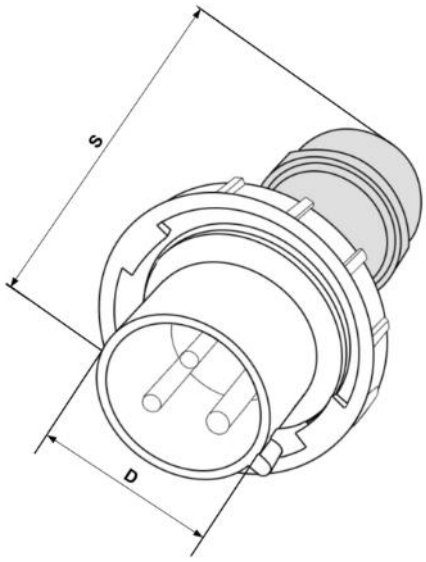

Figure 2.2.5. 2P+PE 32A 250V connector, installed on RPCM 32A (1532).

Dimensions 2P+PE 32A 250V:

- S (total length) = 175 mm;
- D (diameter of the connector collar) = 56.5 mm.

Diameter of contacts 2P+PE 32A 250V:

- L (line) = 6 mm;
- N = (zero working conductor) = 6 mm;
- PE (zero protective conductor) = 8 mm.

For the correct detection of a short circuit to ground, the correct connection of the phase and neutral wires (neutral) is necessary. Connection of contacts is shown in figure 2.2.6.

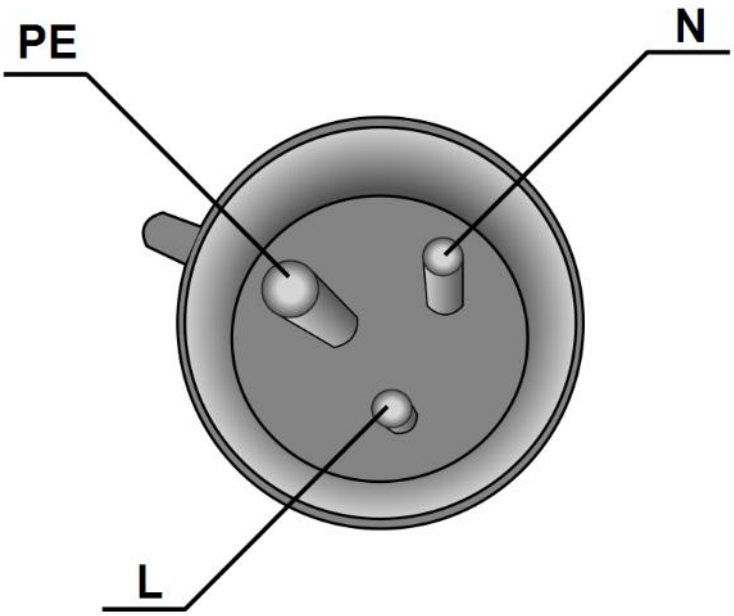

Figure 2.2.6. Connection of 2P + PE 32A 250V contacts on the RPCM 1532.

To connect the 2P+PE 32A 250V connectors, use the appropriate sockets. The appearance and method of attachment may vary depending on the manufacturer's design and the conditions of use.

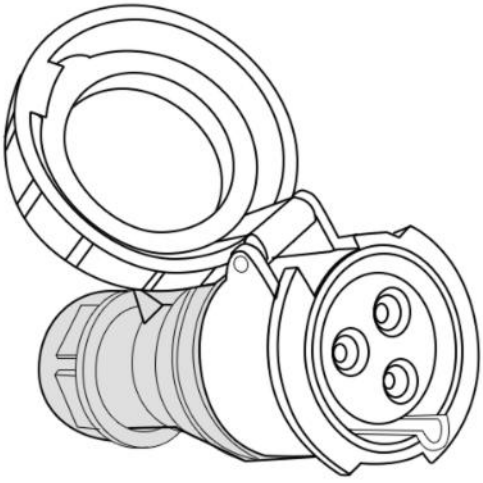

Figure 2.2.7. Socket for connector 2P+PE 32A 250V - RPCM 32A (1532).

2.2.7.2 2P+PE 63A 250V Connector

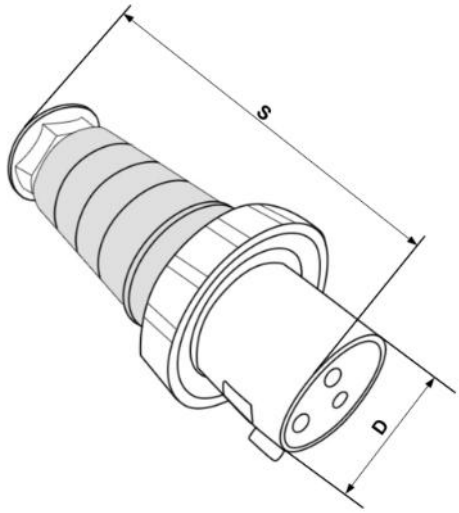

Figure 2.2.8. 2P+PE 63A 250V connector, installed on RPCM ME (1563).

Dimensions 2P+PE 63A 250V:

- S (total length) = 235 mm;
- D (diameter of the connector collar) = 69.5 mm.

Diameter of contacts 2P+PE 63A 250V:

- L (line) = 6 mm;
- N = (zero working conductor) = 6 mm:
- PE (zero protective conductor) = 8 mm.

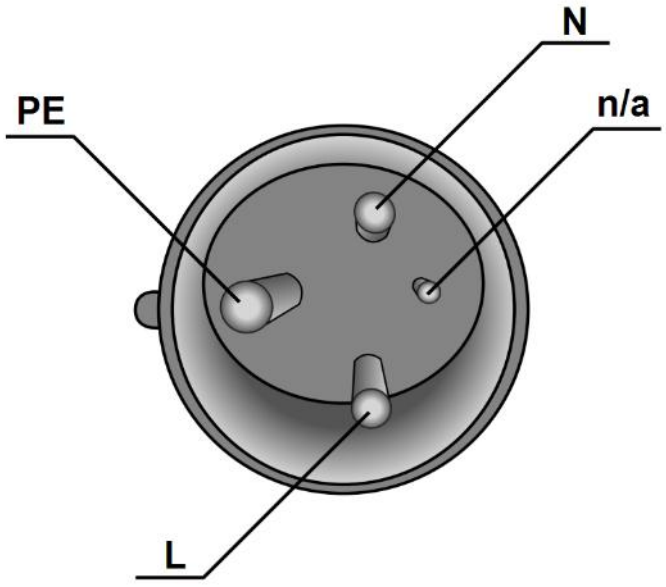

Figure 2.2.9. Connection 2P + PE 63A 250V contacts to RPCM ME (1563).

Note. A guide marked as "n / a" is not applicable for current transmission and is not connected to the power supply.

To connect the 2P+PE 63A 250V connectors, the corresponding outlets are also used. The appearance and method of attachment may vary depending on the manufacturer's design and the conditions of use.

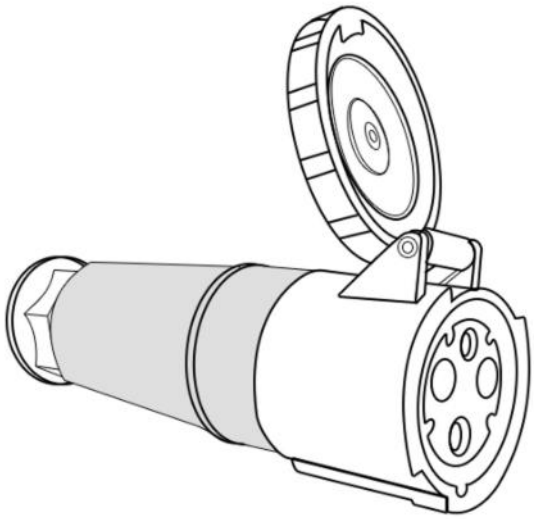

Figure 2.2.10. Socket for connector 2P+PE 63A 250V - RPCM ME (1563).

2.2.8. Accessories

2.2.8.1. The Cable Holder

The cable holder is designed to secure the power cables securely with ties. It is fixed to the RPCM module body by means of screws.

This item is purchased separately.

RPCM's form together with a cable holder installed is shown in the example for RPCM 1502 (16A) in Figure 2.2.9.

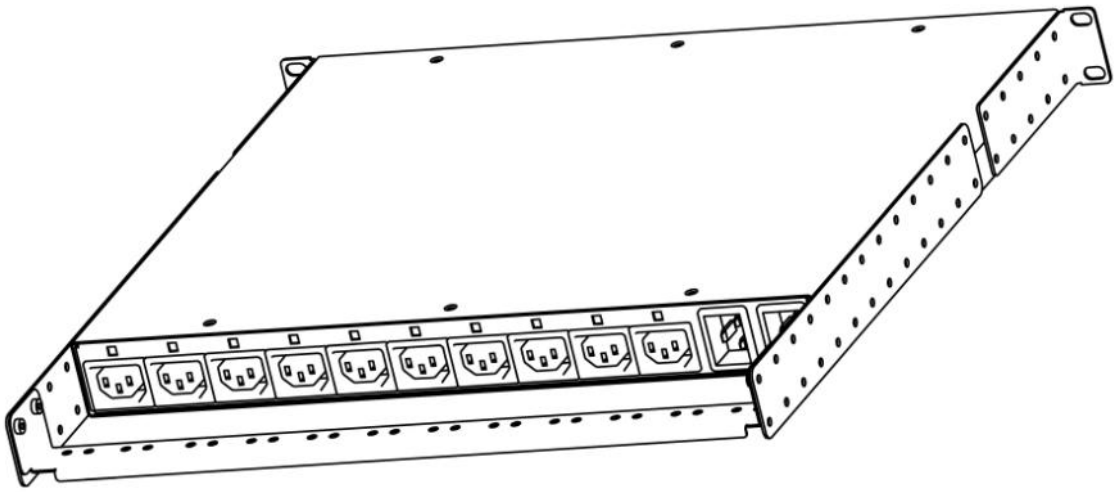

Figure 2.2.11. Cable holder mounted on RPCM 1502 (16A).

Table 2.2.1. Information about the cable holder (tray). This component is purchased separately.

Characteristics	**Value**
Name (English)	Power cords retention kit for RPCM
Full name	Kit for fastening the power cables of RPCM
Locations of cable fasteners	12
Distance of installation to the rear panel RPCM	50-250mm (adjustable)
Product dimensions	Length — 440mm; width — 32mm
Material	Metal, painting blue
Weight	300 gr (together with box)
Package size	500x50x50mm
Delivery conditions	*Purchased separately*

2.2.8.2. Case PDU short brackets

An additional set of brackets for supporting to the rack includes the Case PDU short brackets and set of bolts and nuts.

Table 2.2.2. Information about PDU short brackets..

Characteristics	**Value**
Name (English)	Case PDU short brackets
Full name	Kit for rack supporting with case PDU short brackets
Product dimensions	Length — 120mm; width — 21.5mm; high — 44mm
Material	Metal, painting blue
Delivery conditions	*Purchased separately*

2.3. Mounting RPCM 3x250 and RPCM DELTA

2.3.1. Short description

This chapter contains instructions for installing the Resilient Power Control Module (RPCM 3x250 and RPCM DELTA modules) and is designed for professionals with the appropriate qualifications.

Before you begin, read this guide. This document contains the necessary information for a successful and safe installation, and this will simplify the installation process. If necessary, contact RCNTEC Customer Support for assistance.

The model RPCM 3x250 is connected according to the WYE topology, that is, there are 3 lines and neutral, as well as a protective conductor (protective ground).

Model RPCM DELTA is designed for networks of 208V line-to-line and is connected to the DELTA topology, there 3 line come in, and also a protective conductor (protective ground).

These models have several fundamental differences from RPCM 16A, RPCM 32A, RPCM ME 63A:

- It uses an electrical cabinet of an electrical panel, the case of which is made in the blue RCNTEC color.
- There are no connectors to the power line, but there are electrical terminals. This is dictated by the requirements to withstand high power.
- **These RPCM modifications have 30 controllable channels of 25 amps.** The equipment is connected to the PDU using clamp terminals, which makes the RPCM 3x250 and RPCM DELTA independent of the connectors used (sockets and plugs).
- Terminals allow to significantly increase the number of connected devices — 3 devices per channel.
- The conductors of outlets are connected directly, without intermediate "male-female" connectors. Either special tool or slotted screwdriver can be used to connect wires to terminals.

Figure 2.3.1. General view of RPCM 3x250.

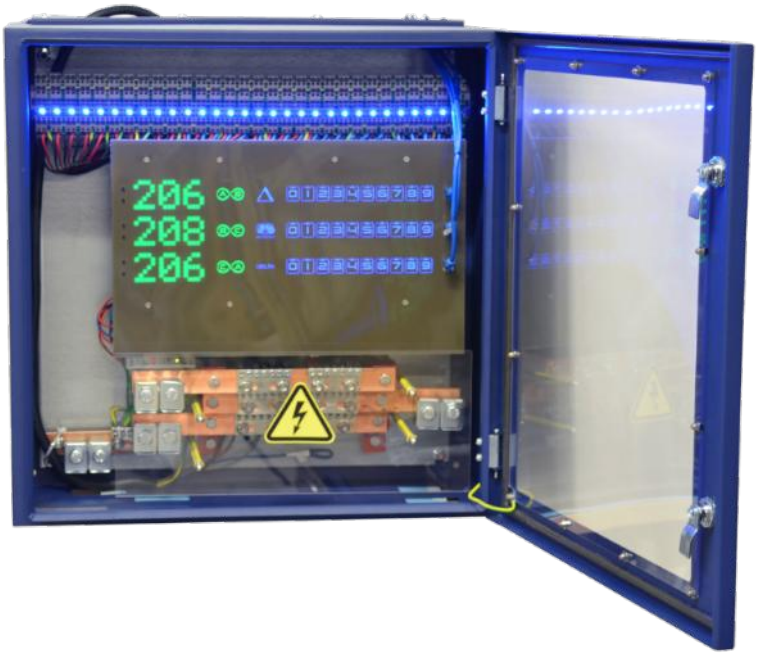

Figure 2.3.2. General view of RPCM DELTA with the opened door.

2.3.2. Planning before installation

Power and ground requirements for the RPCM 3x250 model:

- voltage 3 phase 173-415V (line-to-line)/100-240V (line-to-neutral) WYE configuration;
- frequency in the AC network of 50-60 Hz;
- grounding must be connected;
- circuits breakers/disconnects must easily accessible for shutdown in case of danger.

Power and ground requirements for the RPCM DELTA model:

- voltage 3 phase 208V (line-to-line) DELTA configuration;
- frequency in the AC network of 50-60 Hz;
- grounding must be connected;
- turn off switches or batch switches must be easily accessible for shutdown in case of danger.

Note. In order to protect outlets from short circuits, short circuit protection selectivity has to be ensured in the electrical design.

For RPCM 3x250 and DELTA the short-circuit current is 3 iNom or 75Amps.

Accordingly, to ensure selectivity, the circuit breakers at the inputs must be selected so that the operation does not occur at short-circuit currents below 75A, the upper threshold of the tripping current of the upstream circuit breakers must be chosen so that the tripping does not occur at the fault current measured at the point connect the consumer. To ensure complete selectivity, the use of selective circuit breakers with a trip delay at short circuit 10ms is recommended.

2.3.3. Preparatory steps

CAUTION! There is a risk of electric shock or injury as a result exposure to high energy levels. Installation and maintenance should perform the specialists, who know the order of performance of works, precautions and risks associated with the use of components connected to an AC source.

CAUTION! To avoid electric shock, do not attempt to open the equipment case yourself. In case of unforeseen situations for assistance, please contact the RCNTEC support service (refer to the "Troubleshooting" section of this manual for contact information).

CAUTION! To reduce the risk of fire, electric shock, or damage to power sources, observe the following rules:

- Connect only to the circuit with the overcurrent protection of the distribution circuit with the appropriate rated current.
- Connect the input power cables to a grounded electrical outlet that is located near the equipment and is easily accessible.

- Before connecting the input power, make sure that all switches are in the OFF position.
- Make sure that the components connected to the module are configured or suitable for operation at the same voltage value as the module. If the voltage test is not performed, this can lead to serious damage to the equipment.

CAUTION! To reduce the risk of injury from high residual current before connecting the power, check the grounding.

To avoid personal injury, loss of data or damage, follow these steps precautions when installing and maintaining the RPCM:

- use proven tools and materials;
- use of unsuitable tools can damage the equipment;
- adhere strictly to the power current requirements for occupational safety and health.

Instructional Safeguards.

RPCM 3x250 and RPCM DELTA belong to a class of PERMANENTLY CONNECTED EQUIPMENT.

For RPCM 3x250 and RPCM DELTA in 600x600x250 enclosure appropriate DISCONNECT DEVICE (either Circuit Breaker or Fused Disconnect) shall be provided as part of the building/facility installation.

RPCM 3x250 and RPCM DELTA in 800x600x250 enclosure has a placeholder for Circuit Breaker. If placeholder for the Circuit Breaker is not used to install the Circuit breaker then the appropriate DISCONNECT DEVICE (either Circuit Breaker or Fused Disconnect) shall be provided as part of the building/facility installation.

RPCM 3x250 requires a 4-pole Circuit Breaker.

RPCM DELTA requires a 3-pole Circuit Breaker.

Please ensure, that no flammable materials are located above and below RPCM 3x250 and RPCM DELTA as well as at least 1 meter left and right from the place of installation.

Please make sure to connect Protective Grounding conductor(s) before you connect phase and neutral conductors.

ATTENTION. RPCM 3x250 and RPCM DELTA are designed to be operated by a category of users belonging to SKILLED PERSONs. SKILLED PERSON may require appropriate certification depending on Country/State/City of RPCM installation. Please consult your local laws before operating RPCM.

Should the user, who is not a SKILLED PERSON need to operate RPCM 3x250 or RPCM DELTA, such user needs to wear insulated gloves before opening the door of the RPCM and be extremely careful not to touch metal parts of the RPCM with non insulated skin. Failure to do so may result in ELECTRIC SHOCK, BURN, INJURY or DEATH.

2.3.4. Acclimatization

The maximum permissible temperature range for storage during storage is 20°C/h. Before turning on the Resilient Power Management Module (RPCM), it takes time to adapt to the new conditions at least 24 hours for acclimatization. At this time, you can continue to physically install the RPCM device. If condensation is present after 24 hours, wait until the condensation evaporates completely before turning on the system.

Ambient conditions for the operation of the RPCM are the following:

- operating range of environmental parameters 0-40°C;
- operating range of relative humidity is 45-85% (without condensation);
- operating range of altitude above sea level is 0-2000 m.

2.3.5. Checking the Packaging

Before unpacking the boxes, ensure that they do not have dents, cuts, stains and other damages due to incorrect handling in the course of shipping . In case of damage is found, photograph the packaging, contact the supplier and attach the photo.

2.3.6. Physical installation (wall mounting) *RPCM 3x250* and *RPCM DELTA*

For wall mounting, special hanging brackets are used.

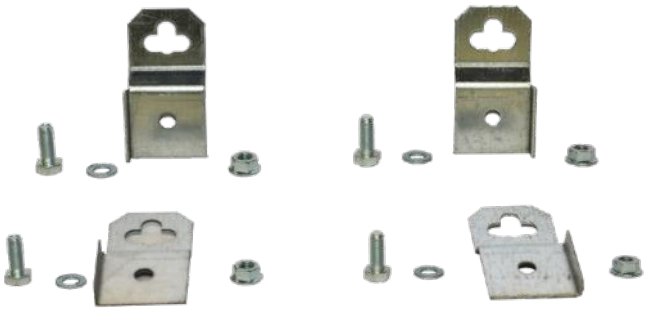

Figure 2.3.3. A set of hinged brackets with mounting hardware of wall mounting RPCM 3x250 and RPCM DELTA.

Before mounting on the wall, you need to screw the brackets to the back of the RPCM.

For fastening on the wall, it is necessary to provide a fastening that withstands a load of 30 or more kilograms.

2.3.7. Supplying power to inputs

2.3.7.1 General information on power supply

The power supply is supplied to the inputs by connecting current-conducting conductors of the corresponding section to the pair terminals.

ATTENTION! You can not change the connection order in any way. Incorrect connection leads to the failure of RPCM and other equipment, which at the moment may be included in the conclusions.

Note. For better contrast, some illustrations are provided in a light gray enclosure.

2.3.7.2. Connecting RPCM 3x250

The RPCM 3x250 connections are made strictly according to the purpose of the terminals.

The assignment of the terminals for connecting the RPCM 3x250 is shown in Figure 2.3.4.

IMPORTANT! The RPCM 3x250 model is designed for electrical networks with a voltage <240V connected to the WYE topology, that is, there comes 3 lines and neutral, as well as a protective conductor (protective earth).

WARNING! Incorrect connection leads to equipment failure and creates a dangerous situation!

ATTENTION! The equipment must be connected by a qualified technician and a special permit for working with high voltage equipment!

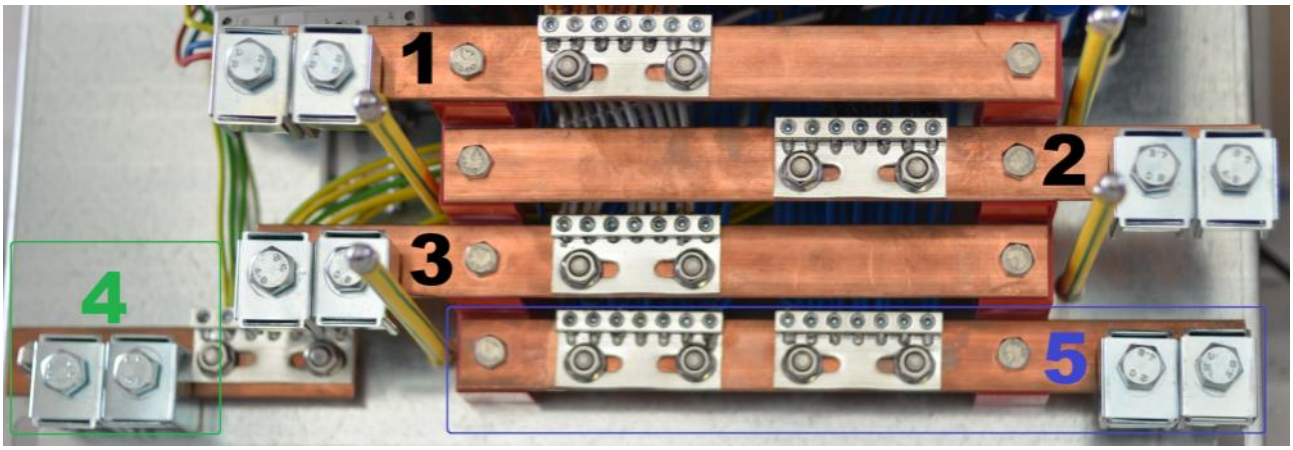

Figure 2.3.4. Terminal assignment for RPCM connection 3x250.

Legend:

1 — terminal block and terminals for line 1;

2 — terminal block and terminals for line 2;

3 — terminal block and terminals for line 3;

4 — terminal block and terminals for supplying **grounding**;

5 — terminal block and terminals for connection to **neutral**.

2.3.7.3. Connecting RPCM DELTA

The RPCM DELTA connections are performed strictly according to the assignment of the terminals.

The assignment of the terminals for connecting RPCM RPCM DELTA is shown in Figure 2.3.5.

IMPORTANT! The RPCM DELTA model is designed for ~208V line-to-line voltage and is connected to the DELTA topology, that is, 3 lines are fed to the device, as well as a protective conductor (protective ground).

WARNING! Incorrect connection leads to equipment failure and creates a dangerous situation!

ATTENTION! The equipment must be connected by a qualified technician and a special permit for working with high voltage equipment!

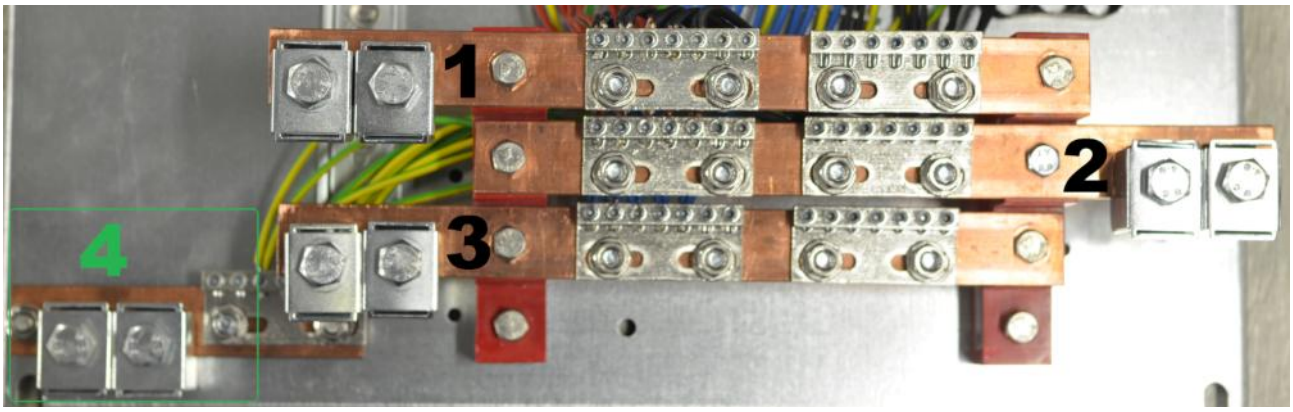

Figure 2.3.5. Terminal assignment for RPCM DELTA connection.

Legend:

1 — terminal block and terminals for line 1;

2 — terminal block and terminals for line 2;

3 — terminal block and terminals for line 3;

4 — terminal block and terminals for supplying **grounding**;

IMPORTANT! The RPCM DELTA uses a line-to-line connection. Therefore, the terminal block for connecting the neutral conductor (neutral) is absent.

2.3.7.4. Recommendations for connection

Use double cables for input power supply, see as an example Figure 2.3.6.

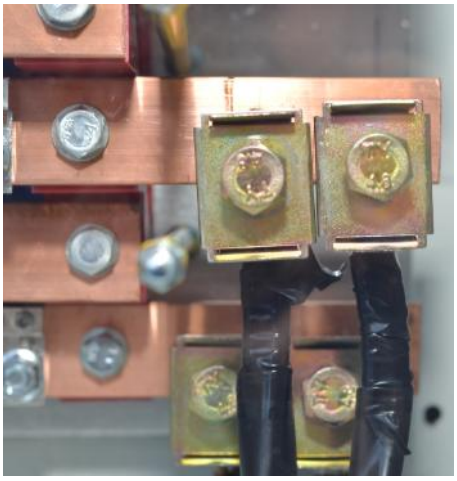

Figure 2.3.6. Terminals with incoming line 2 cables at the RPCM 3x250 input.

To screw down the terminals, use the appropriate socket wrench (see Figure 2.3.7.)

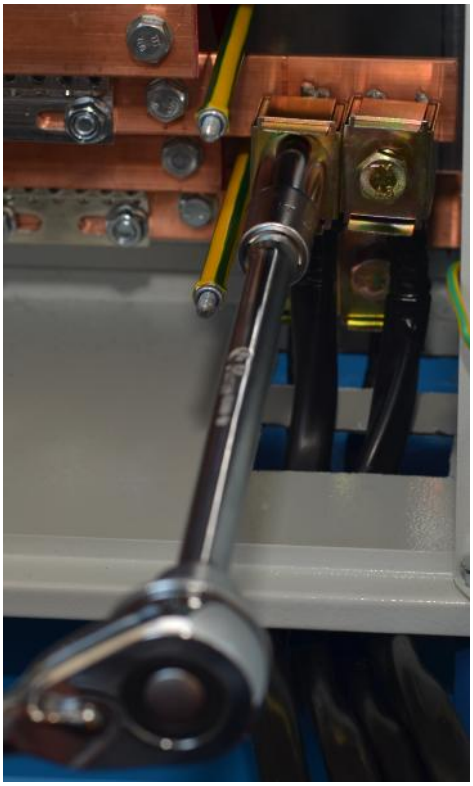

Figure 2.3.7. Connecting the cable to the terminals on the input (white-gray background was pictured for more contrast).

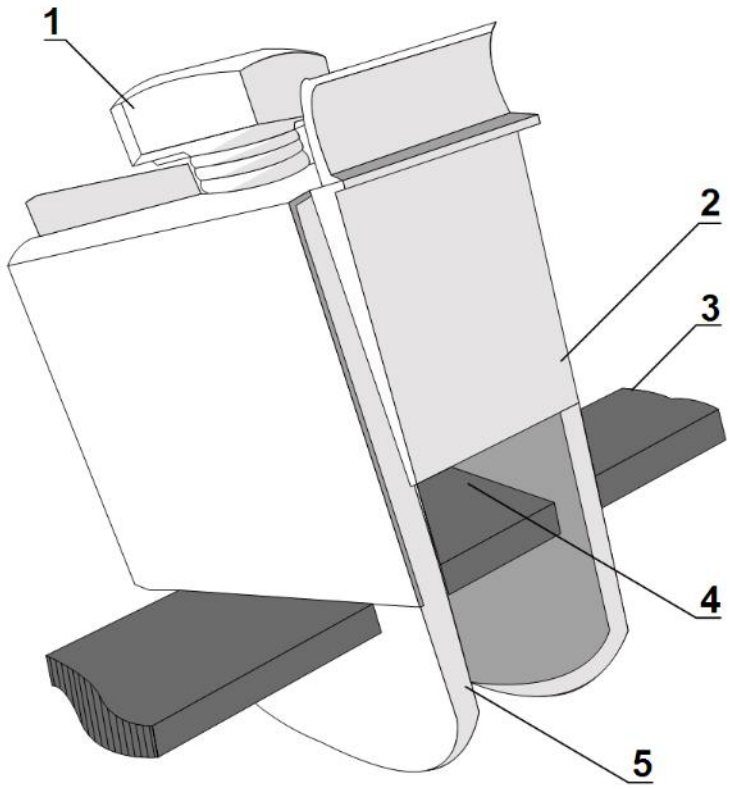

Figure 2.3.8. The input terminal.

Legend:

1 — pressure (tightening) bolt;

2 — pressure pad;

3 — terminal rail;

4 — place for the stripped part of the cable;

5 — terminal case.

How to cable connection for RPCM 3x250 and RPCM DELTA inputs:

1. Strip the isolation on the cable. The length of the stripped part of the cable should be 25-30 mm.

2. Using a socket wrench, unscrew the terminal bolt so that there is free space between the pressure pad and the terminal rail.

3. Insert the cable as shown in Figure 2.3.10 and tighten the bolt to ensure good contact between the cable conductors, the terminal and the rail.

After installation, it is necessary to close the input terminal area with an insulating plastic shield.

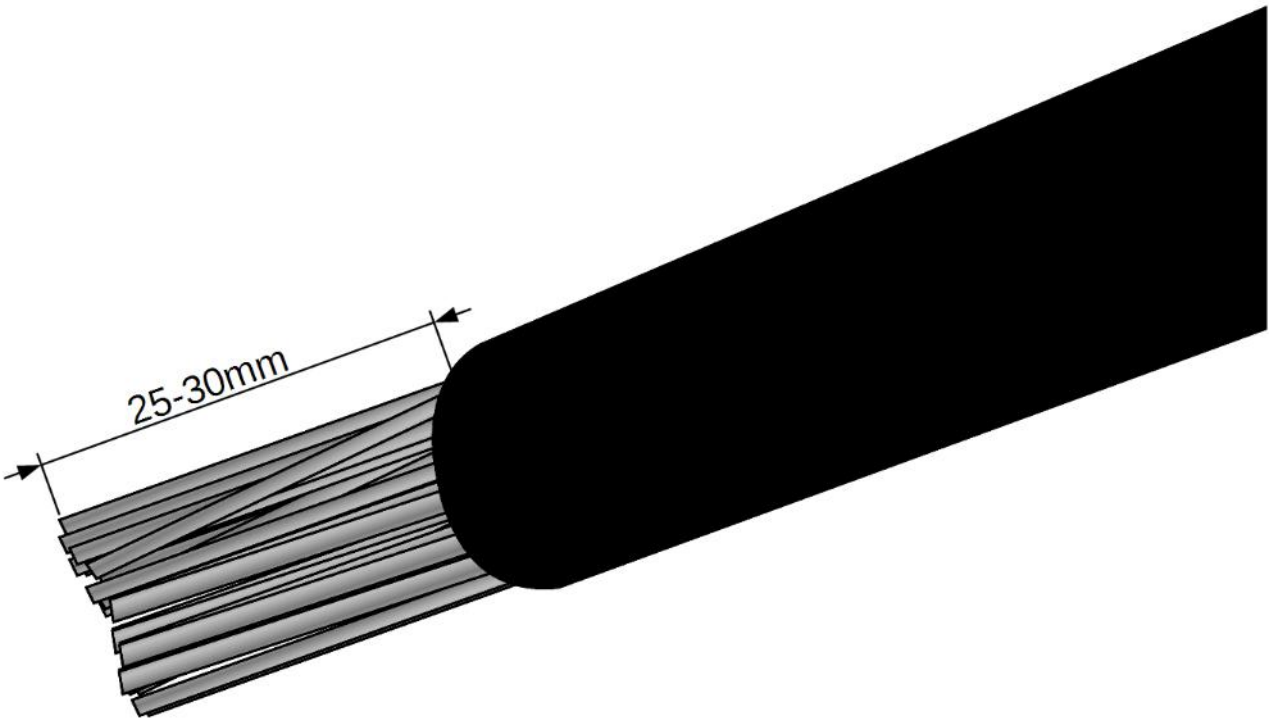

Figure 2.3.9. Stripped cable.

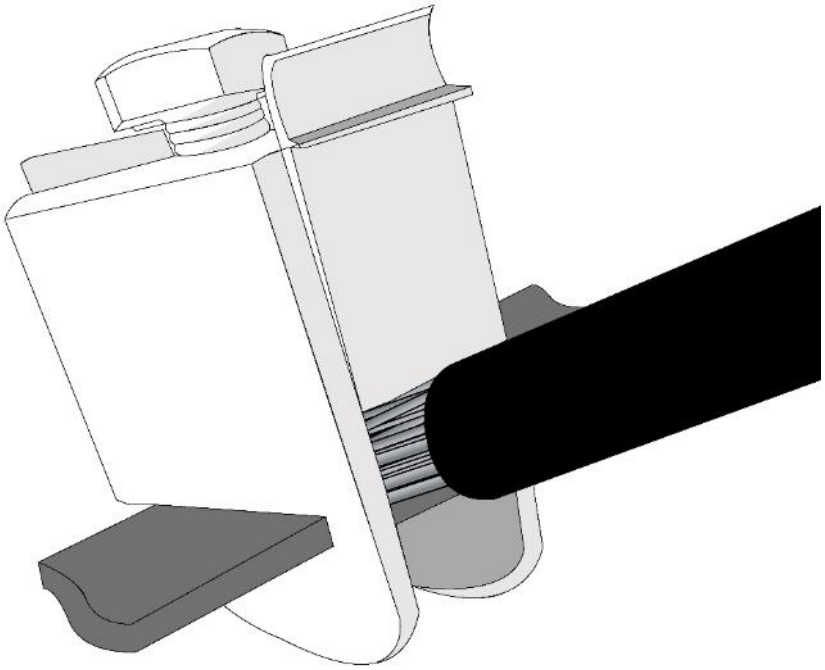

Figure 2.3.10. The terminal with cable is connected.

Figure 2.3.11. RPCM 3x250 with the insulating shield installed (white-gray background was pictured for more contrast).

2.3.8. Connecting consumers to conclusions

There is a terminal block with LED outlets indicators at the top of the RPCM 3x250 and RPCM DELTA.

Figure 2.3.12. Upper panel with outlet terminal blocks as in case of RPCM 3x250.

The color marking is used to recognize outgoing conductors

For RPCM 3x250:

- *grey color* — line;
- *blue color* — neutral;
- *yellow-green* — grounding.

For RPCM DELTA:

- *grey* — line;
- *yellow-green* — ground.

Figure 2.3.13. The upper panel with the RPCM DELTA terminals (fragment).

For installation, conductors are used with a specially prepared contact area — stripped from insulation and tinned.

Requirements for inlet conductors:

L1, L2, L3 (phase) — conductor with a cross section of 0.75-4.0 mm^2, stripping 11-13 mm;

N (neutral) — a conductor with a cross section of 0.75-4.0 mm^2, stripping 11-13 mm;

PE (grounding) —a conductor with a cross section of 0.75-2.5 mm^2, stripping 10-12 mm.

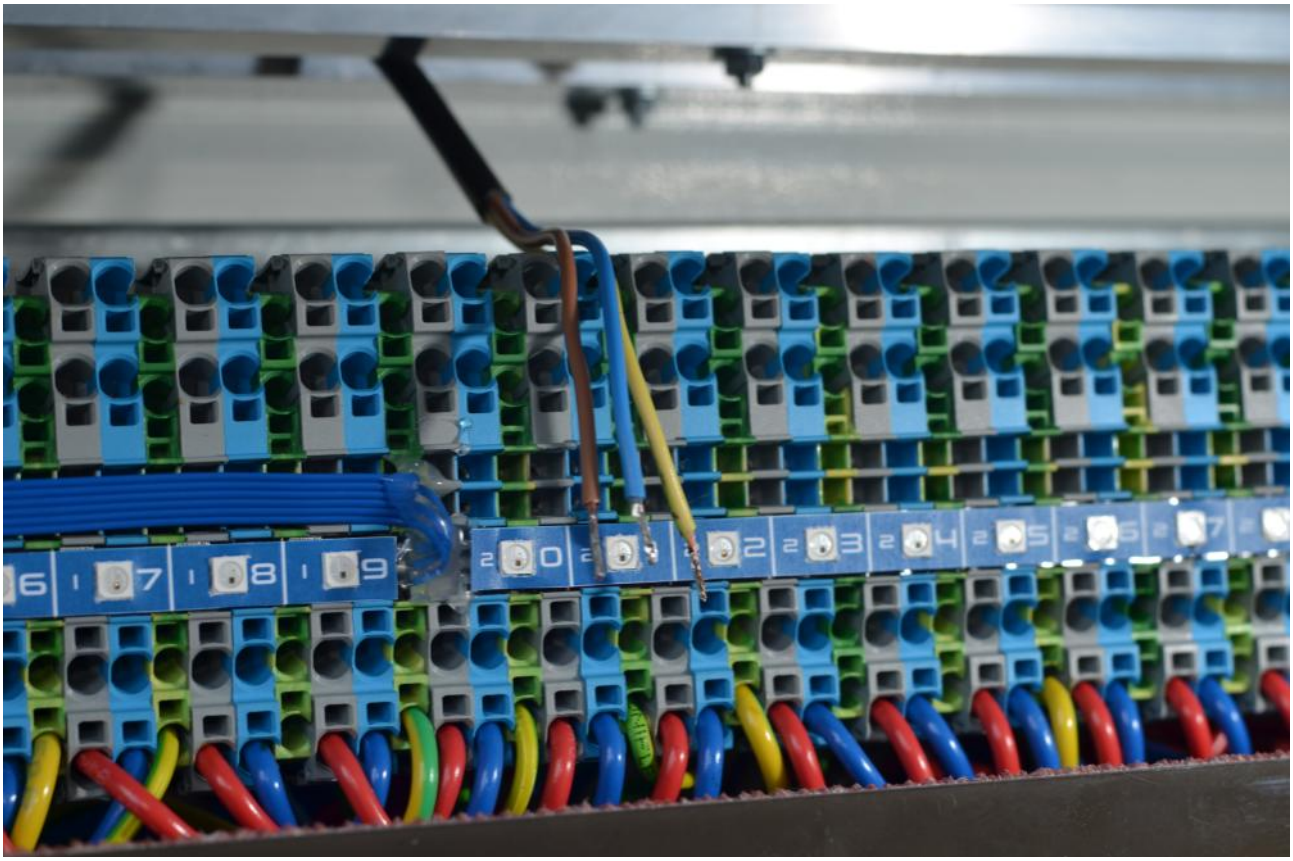

Figure 2.3.14. Cables ready for installation.

The cable is installed using a special terminal tool resembling a curved slotted screwdriver:

Figure 2.3.15. Tool for mounting the cable in the terminals on the output.

At first, it is necessary to insert the terminal tool into the rectangular slot of the required terminal and push it as far as possible, without exerting very much effort.

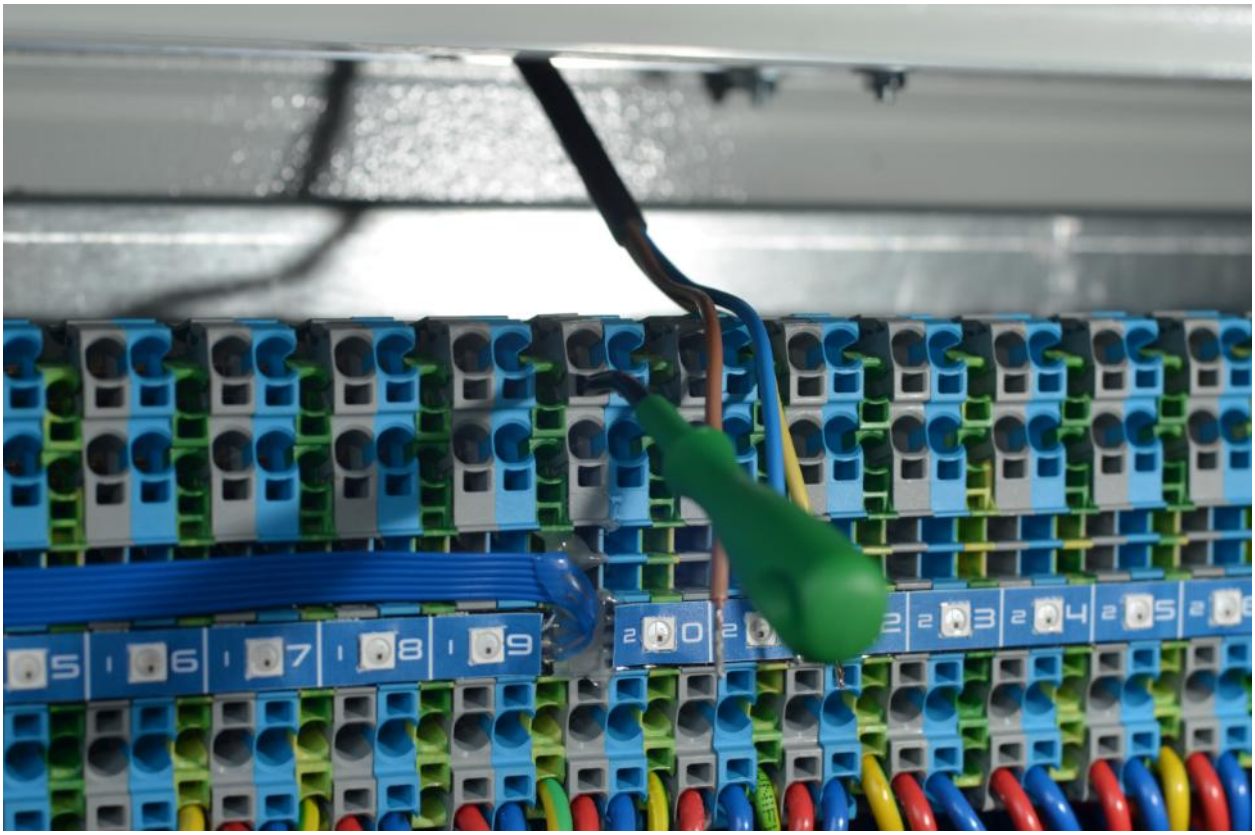

Figure 2.3.16. The cable mounting tool is inserted into the terminal.

Further, a conductor must be inserted into the round cable hole.

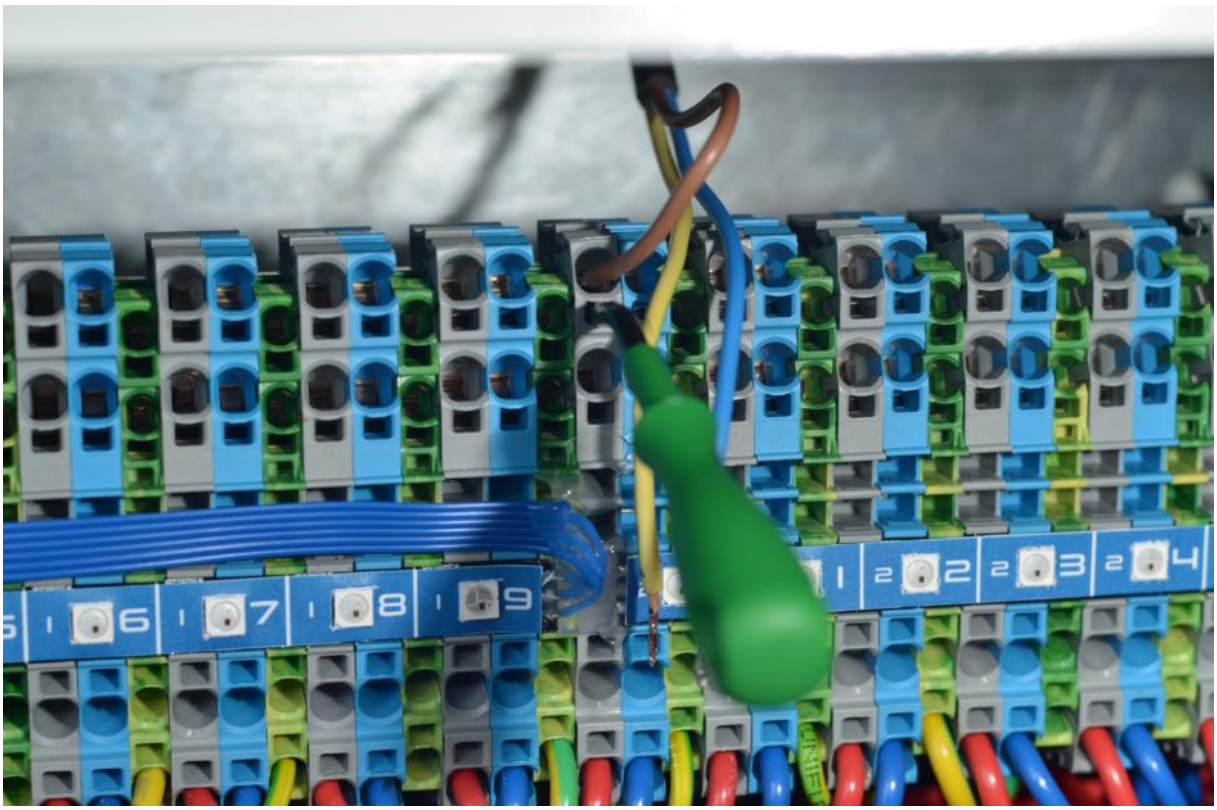

Figure 2.3.17. Connect the cable (line) to an outlet.

Then remove the tool from the groove on the terminal.

The wire is connected.

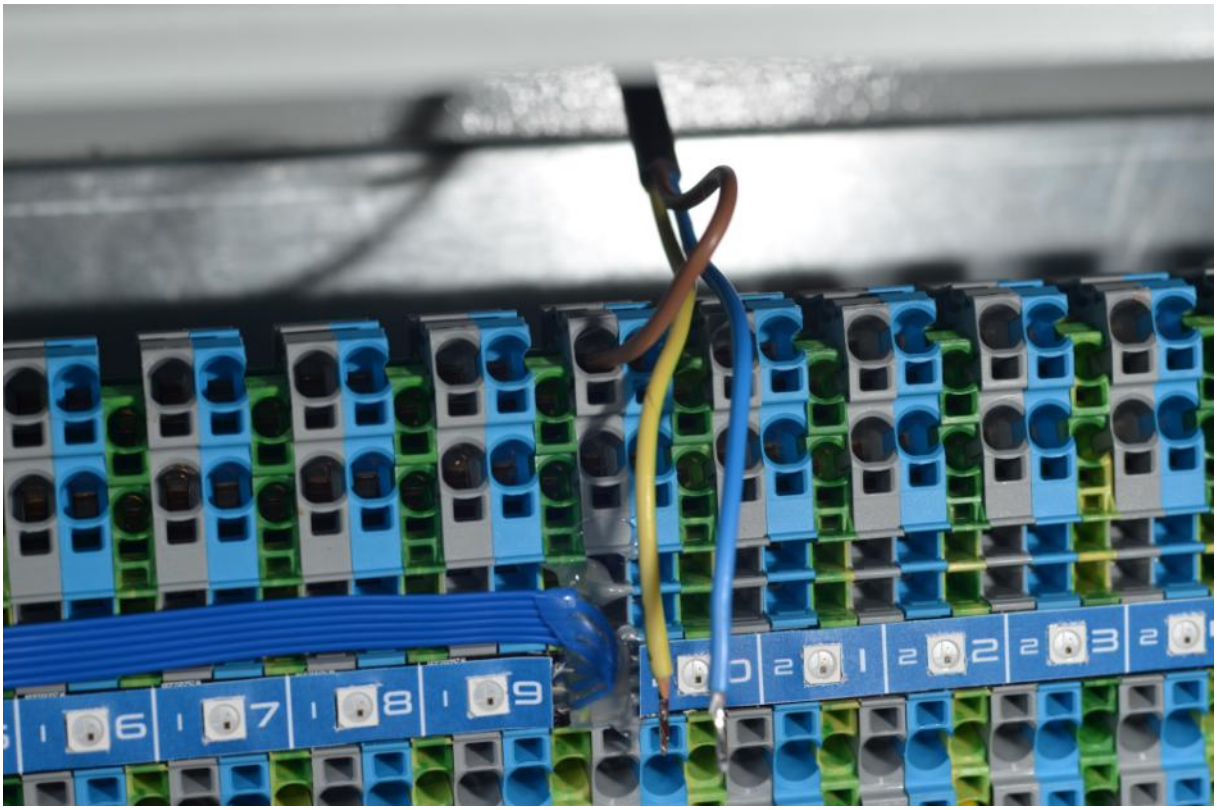

Figure 2.3.18. The cable is connected.

2.3.9. Completion of work

ATTENTION! After connection, it is necessary to check the correctness of the connection according to this manual.

To ensure safety and prevent accidents, after completing the work, close the RCPM 3x250 or RPCM DELTA door with a key for both locks.

Figure 2.3.19. Key for the RCPM 3x250 or RPCM DELTA door.

Figure 2.3.20. RPCM 3x250 in a safe state with the door closed.

3. Start Setting Up

Brief description of this chapter:

3.1. Setting Up a Network, Assigning IP Addresses — This section describes the procedure for displaying information about the available IP and MAC addresses, and the procedure for assigning IP addresses using various methods.

3.2. System Requirements — System requirements for input power supply for the Resilient Power Control Module (RPCM) and the computer for administration are given.

3.3. Modes of Operation — There are various schemes for connecting RPCM with the specifics of a task.

3.1. Getting primary information, network configuration

3.1.1. Getting Information via the RPCM Display

The RPCM display is a matrix of luminous segments for displaying alphanumeric messages.

Note. For more information on the appearance and display device of the RPCM, it is recommended that you read the information in section *"4.1. RPCM Physical Interface"*.

Below is the name and sequence of the value demonstration by pressing the controls (the top or bottom buttons on the case).

Switching between messages occurs by pressing the upper or lower buttons.

The bottom button switches the messages on the screen in order from top to bottom.

The top button toggles the values in reverse order.

Figure 3.1.1. The draw of the display panel with control elements and Ethernet ports for RPCM with ATS: RPCM 1502 or RPCM 1532.

In order to avoid accidental skipping of the desired message press and release the top or the bottom button. The result will appear on the screen within 5 seconds.

Switching occurs in a circle (cyclically). Thus, if you press the lower button for 5 seconds in succession, for example, "*Voltage*" will be shown, then "*Current strength on input*", then "*Power*", "*IP address*", "*MAC address*" , "*Serial name*", "*Serial number*", "*User message*", then again "*Voltage*", "*Input current*" and so on.

RPCM 3x250 and RPCM DELTA have displays showing information for sections (phases) 1, 2, 3 (RPCM 3x250) or AB, BC, AC (RPCM DELTA) separately and total 6 buttons (top and bottom for each section). Please refer to: "4.1.3. Description of the RPCM 3x250 and RPCM DELTA".

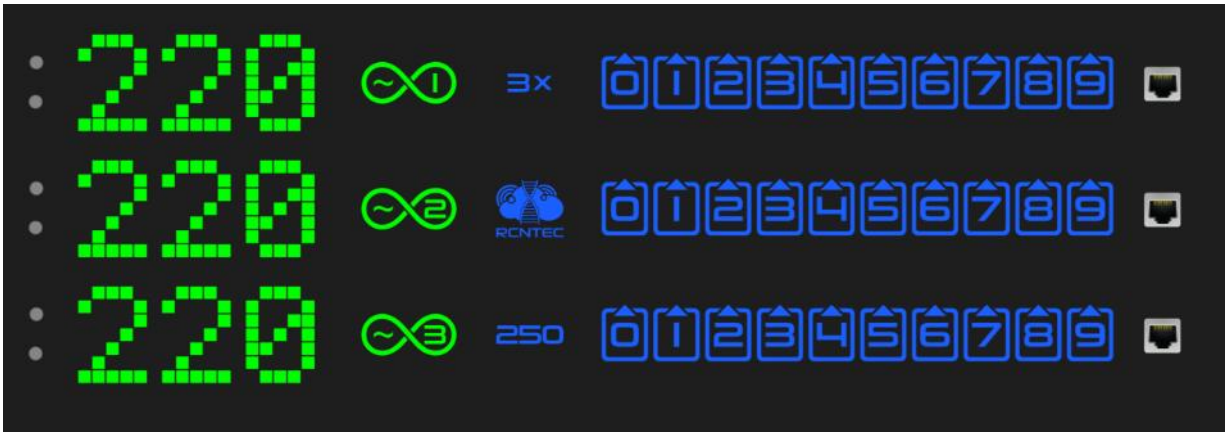

Figure 3.1.2. The draw of the display panel with control elements and Ethernet ports for RPCM 3x250.

Note. Pressing and hold of top button about 20 seconds reset RPCM to factory settings. After that, the password of the user *rpcmadmin* will be reset to the standard — *rpcmpassword*. If for some reason there is no user with such a name, it will be created again with the standard password *rpcmpassword*.

3.1.2. How RPCM Get IP Addresses

Basic methods for assigning IP addresses:

- Assignment by DHCP;
- Auto-assignment of IP addresses by Zero Configuration (APIPA or IPv4LL);
- Manual assignment of static IP.

The options are examined in order.

3.1.3. Assigning IP Address by DHCP

Assigning IP address by DHCP is used for RPCM by default.

If the DHCP server is missing or temporarily down, RPCM will receive an address from the range 169.254.xxx.xxx. For more details, see *"3.1.4. Auto Assign IP Address through Zero Configuration (APIPA)"* in this User Manual.

3.1.4. Auto Assignment of IP Addresses via Zero Configuration (APIPA)

Zeroconf or Zero Configuration Networking is a technology that automatically creates an IP network without manually configuration or DHCP servers.

This variant is often called *Automatic Private IP Addressing (APIPA)*. This method serves as a replacement for DHCP service. The alternative is to manually configure IP addresses and subnet mask.

It is also referred to as — *IPv4LL — IPv4 Link Local*.

Note: When using this method of network address configuration, IP is automatically assigned from the range of 169.254.xxx.xxx, network mask (Netmask) 255.255.0.0 (other notation- CIDR standard- 169.254.0.0/16).

3.1.5. Manual Assignment of Static IP Addresses

This procedure is performed by system administrators and system engineers in the final configuration of the equipment.

For more information, refer to section *4.6. RPCM Configuration Management*, and also to the chapter *6. Command Reference RPCM CLI*

Note: It is also recommended to create rules in DHCP server settings to bind of network parameters to RPCM's specific MAC address permanently. This method allows you to change the network settings without directly accessing this device.

3.2. System Requirements

3.2.1. Power Requirements

Model RPCM 1502:

- Frequency — 50-60Hz.
- Voltage — 100-240V.
- Grounding is required.
- Connection via **2 (two) IEC-320-C20** connectors;

Model RPCM 1532:

- Frequency — 50-60Hz.
- Voltage — 100-240V.
- Grounding is required.
- Maximum of **32A** for input current;

Model RPCM ME 1563 (ME — Mining Edition):

- Frequency — 50-60Hz.
- Voltage — 100-240V.
- Grounding is required.
- Connection via **1 (one) 2P+PE 63A 250V to 63A** connector.

Model RPCM 3x250:

- Frequency — 50-60Hz.
- 100-240V line-to-neutral, 173-415V line-to-line WYE.
- Connection directly via terminals.

Model RPCM DELTA:

- Frequency ~ 50-60Hz.
- It is designed for ~208V line-to-line DELTA.
- Grounding is required.
- Connection directly via terminals.

3.2.2. Computer Requirements for Administration

In order to connect and manage via web interface, the following are required:

- RAM — 2GB or more;
- Minimum network bandwidth (LAN) - 1Mb/s;
- A mouse or similar device;
- An internet browser.

The RPCM web interface supports various browsers, including:

- Chrome — from version 61.0.3163.100;
- Safari — from version version 10.1.1;
- Firefox — from version version 56.0;
- Opera — from version version 48.0.2685.32.

To connect and manage via SSH in command line mode, the following are required:

- RAM — 256MB;
- Minimum network bandwidth (LAN) - 64Kb/s;
- For UNIX-like systems (including Mac OS X), you can use the built-in terminal emulator. For operating systems belonging to the Windows family, it is recommended to use the free program PUTTY .

3.3. Modes of Operation

3.3.1. Scheme with Two UPS — Only for RPCM 1502/1532

This is the most protected, and, therefore, the most preferred connection scheme.

Each RPCM input is fed from two separate power lines each powered from its own UPS. In the event of power failure of the first UPS input UPS switches to batteries and once their change runs out the UPS goes down and the RPCM's ATS switches over to the second reserve input.

If the power supply stops on both inputs, batteries of the primary input will be consumed first and then RPCM's ATS will switch over to secondary input.

This way capacity of batteries of both UPS sum up in to allow for longer total uptime without external power source.

You can sum up the UPS capacity (increase the total UPS battery life as well) on the main and backup inputs in this way.

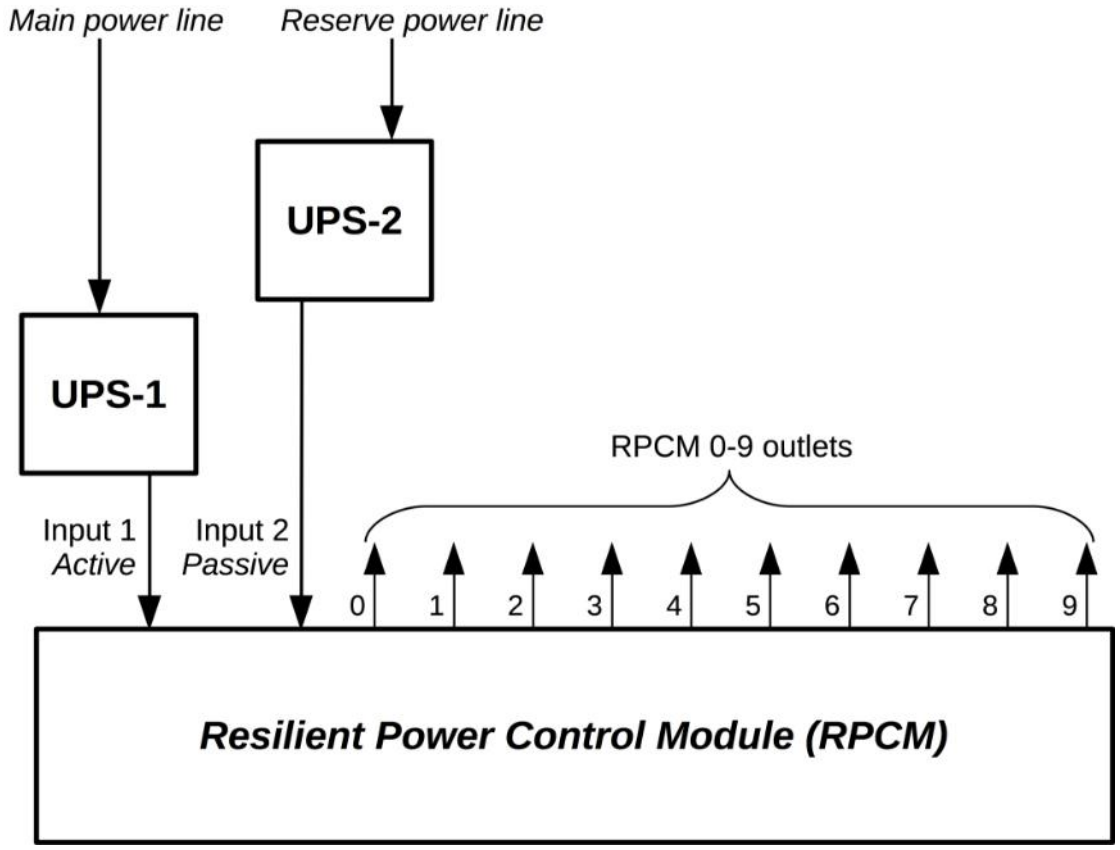

Figure 3.3.1. Scheme with two UPS — only for RPCM 1502 and RPCM 1532.

3.3.2. Scheme Using a Bypass

In this case, it is assumed that only one UPS is connected to the active input. The UPS is not connected to the backup input.

In standard situation, power is supplied through the main input. If the mains voltage fails, the UPS automatically switches to the internal battery. If the battery charge runs out, it will switch to the backup channel.

In this case, during normal operation, a quality power supply is fed to the active input, which is stabilized in terms of voltage and frequency.

If the battery becomes depleted, a switch to the backup line occurs, where there is no additional equipment that improves the power characteristics; nevertheless the existing power supply still prevents outages.

The main purpose of this scheme is protect against failures of the UPS power supply on the active channel. If it fails, the devices connected to the outlets will continue to work anyway, receiving power from the backup input until issue with the UPS are remedied.

IMPORTANT! When using the UPS as the main input, it is recommended to consult with the manufacturer of the UPS and confirm that when a fault occurs, the UPS can briefly withstand a fault, or go into protection and recover, but not fail. Otherwise, it is recommended to use the circuit with the UPS on the backup input.

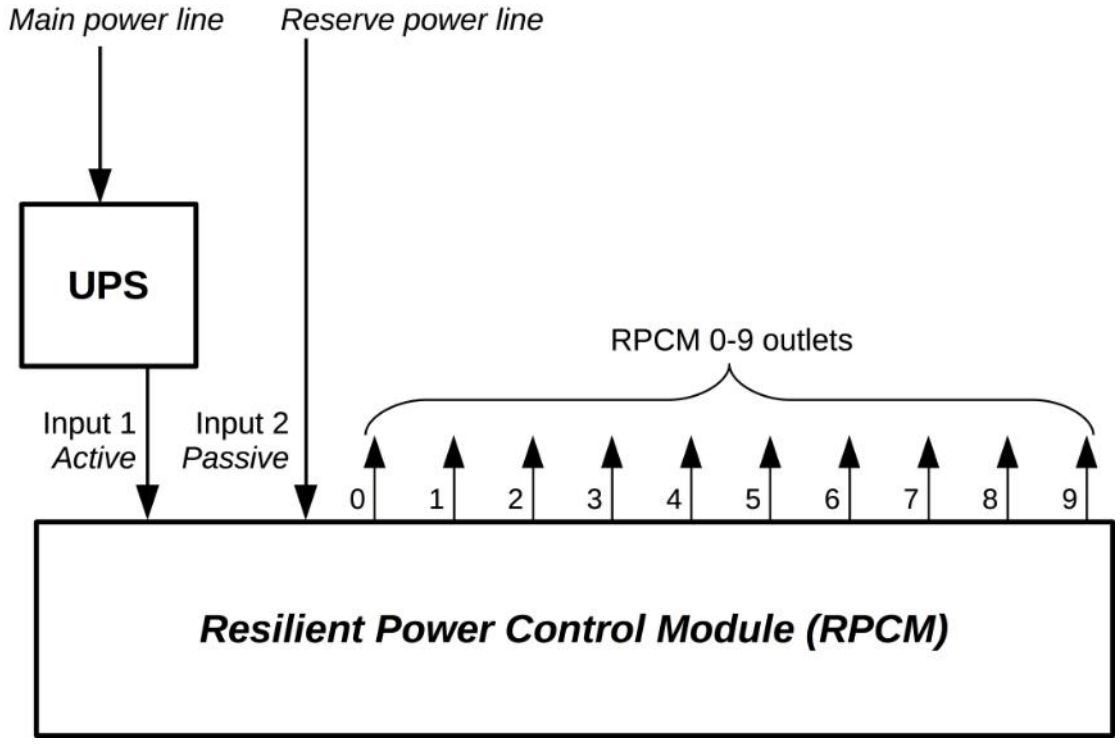

Figure 3.3.2. Scheme using a bypass with a single uninterruptible power supply unit.

3.3.3. Scheme for RPCM ME 1563

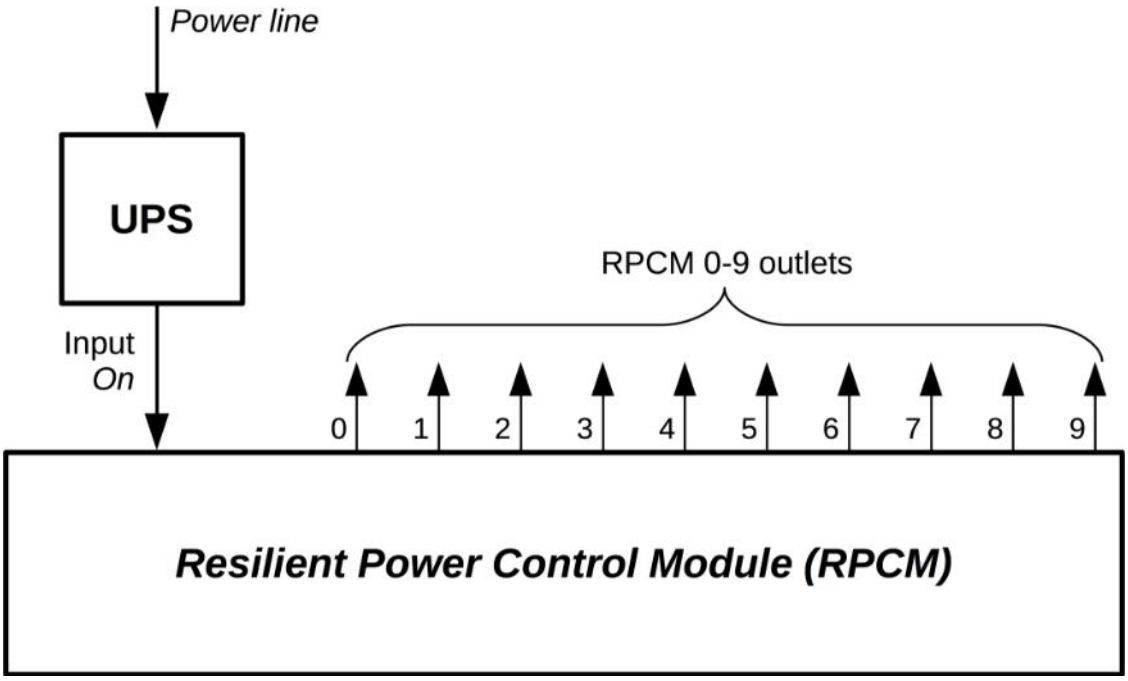

Figure 3.3.3. Scheme with a single power — for RPCM ME 1563.

4. Description of the RPCM Device

Brief description of this chapter:

4.1. Physical Interface — A description of the external control elements of the Resilient Power Control Module (RPCM), electrical connections and devices on the outlets.

4.2. Web Interface of RPCM — A description of the management method based on the use of application layer protocols: HTTP (HTTPS) via an internet browser.

4.3. RPCM SSH Interface — Information about using the command line interface via SSH connection.

4.4. Input Operation —A description of how to configure inputs to power the device.

4.5. Outlet Operation — A description of how to configure outlets to power equipment connected to RPCM.

4.6. RPCM Configuration Management — A description of the Resilient Power Control Module general configuration.

4.7. Updating the RPCM Software — A description of updating the Resilient Power Control Module software both through the Web interface and from the command line.

4.8. System Journal — A description of the event log and system messages of the Resilient Power Control Module.

4.9. Network Utilities — Information about the Network Diagnostic Tools section and usage features.

4.10. Documentation — Getting documentation about this version RPCM.

4.11. Automation — Information about automation tool for control the selected devices, e.g. router, switches, servers and miners.

4.12 About This RPCM — This menu items for getting additional information.

4.1. Physical Interface

4.1.1. General Information about Appearance and Control Elements

Resilient Power Control Module (RPCM) is an electronic device in a 1U form factor case for mounting on a standard 19" server rack.

Overall dimensions are height 44mm x width 440mm x depth 365mm.

Special angled brackets are used to mount the device to a server rack.

There is a LED display on the front panel.

The left part of the display shows the device's system information about the device; the right part — displays inputs and outlets statuses.

On the left part of the front panel there are two buttons for controlling the operation of the device.

On the right part of the front panel there is a control network RJ-45 port for connecting an Ethernet network cable.

The LED panel is covered with a transparent non-flammable material to protect it from being damaged.

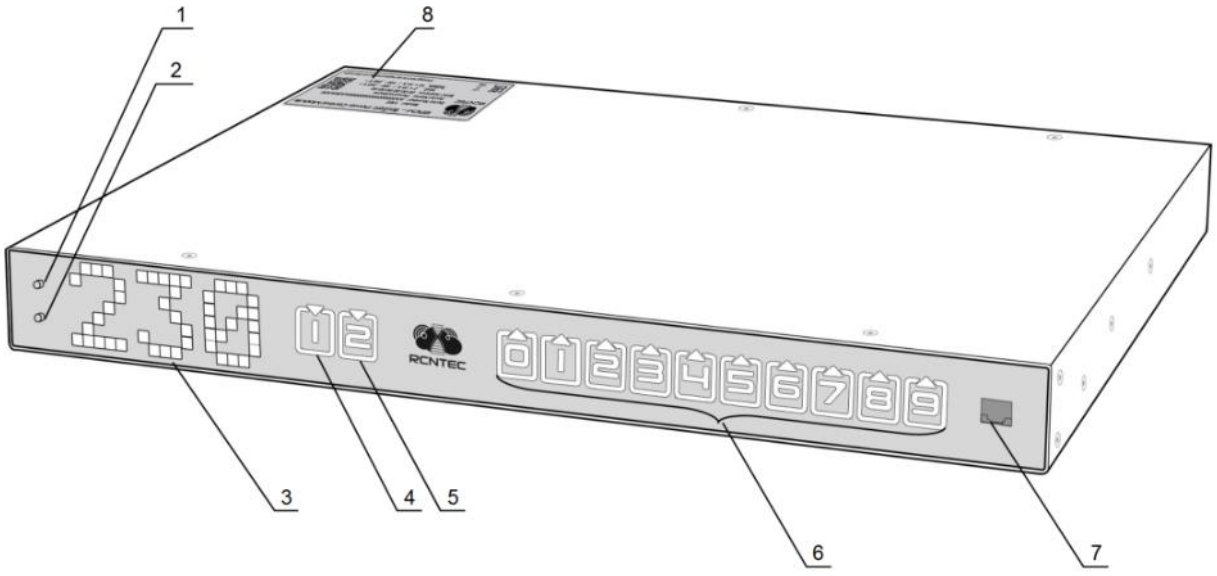

Figure 4.1.1. Front panel with indicators and controls RPCM 1502 and RPCM 1532.

Legend:

1 — the top control button;

2 — the bottom control button;

3 — LED display;

4 — input indicator 1;

5 — input indicator 2;

6 — outlet indicators 0-9;

7 — Ethernet control port.

On the back of the device are connection ports:

- 2 (two) IEC-320-C20 input connectors (RPCM 1502) or 2 (two) 2P+PE 32A 250V connectors (RPCM 1532);
- 10 outlets in the form of IEC-320-C13.

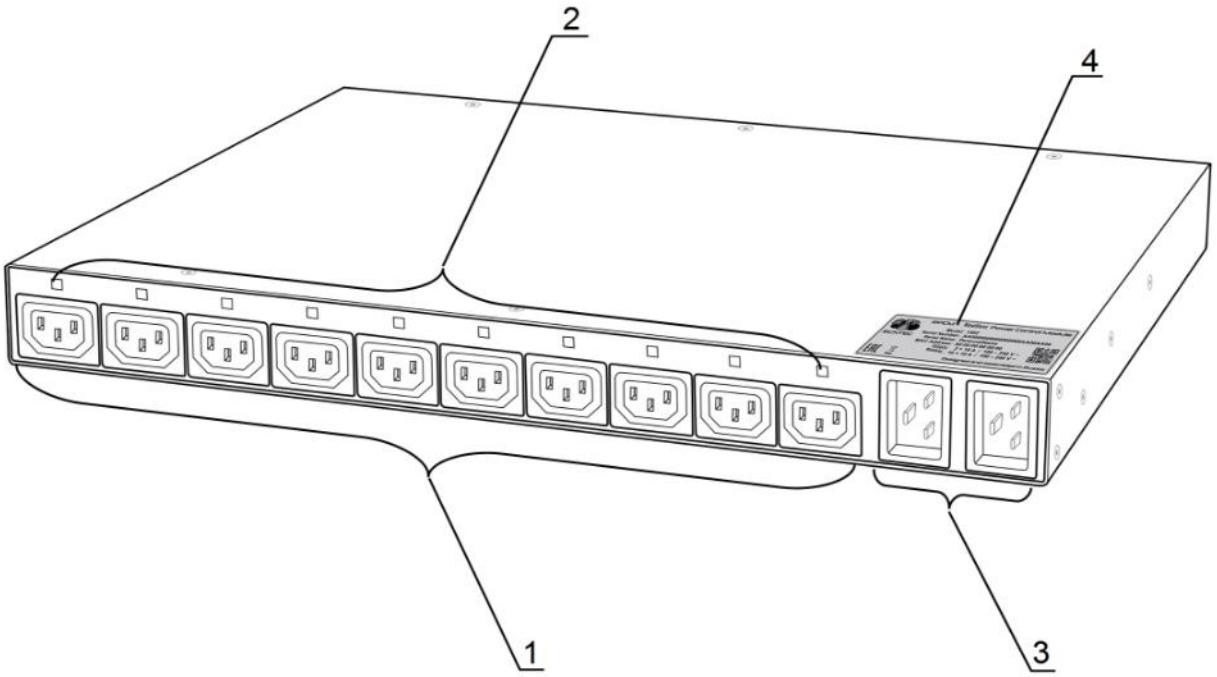

Figure 4.1.2. Rear side of RPCM 1502 (16A).

Legend:

1 — outlets 0-9;

2 — LED outlet indicators 0-9;

3 — inputs — 2 (two) IEC-320-C20 connectors;

4 — serial sticker.

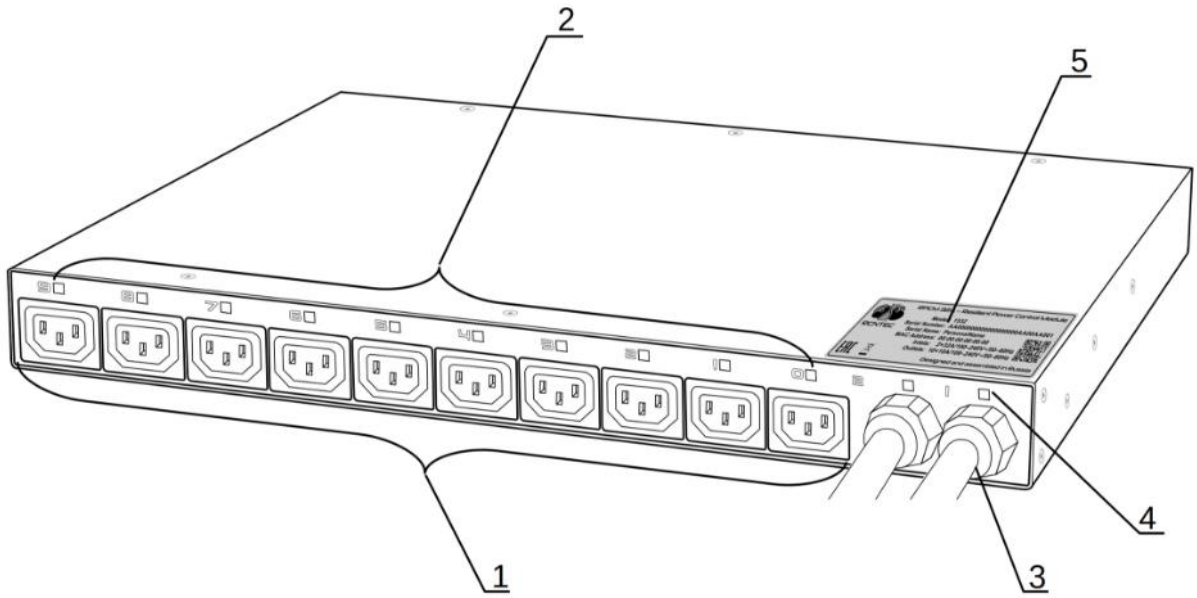

Figure 4.1.3. Rear side of RPCM 1532 (32A).

Legend:

1 — outlets 0-9;

2 — LED outlet indicators 0-9;

3 — inputs — 2 (two) 2P+PE 32A 250V connectors;

4 — input indicators;

5 — serial sticker.

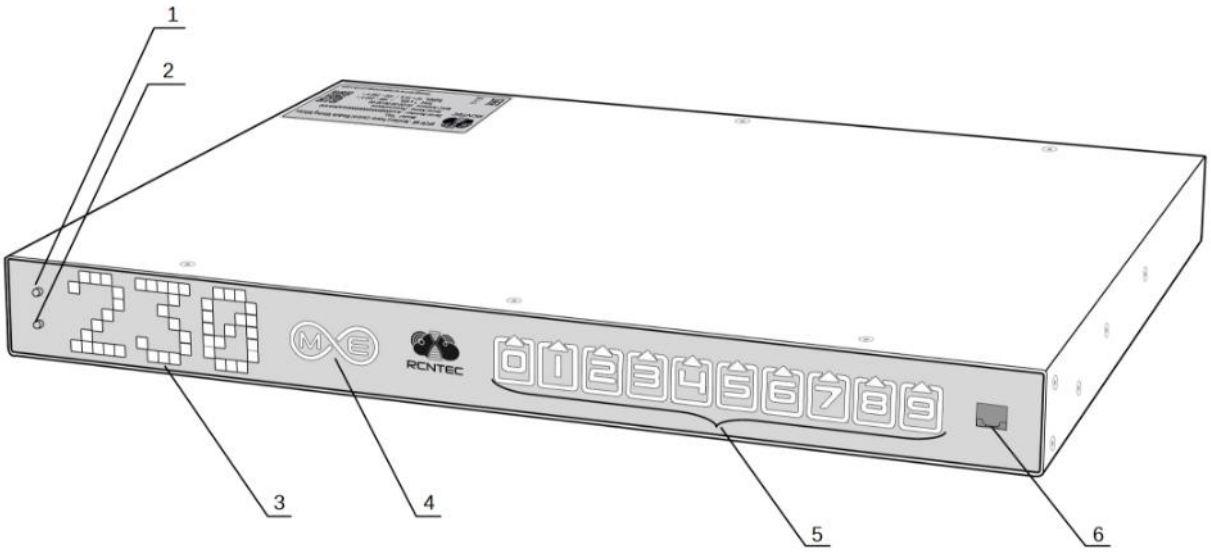

Figure 4.1.4. Front side of RPCM ME 1563 (63A).

Legend:

1 — top control button;

2 — bottom control button;

3 — LED display;

4 — input indicator;

5 — outlet indicators 0-9;

6 — Ethernet control port.

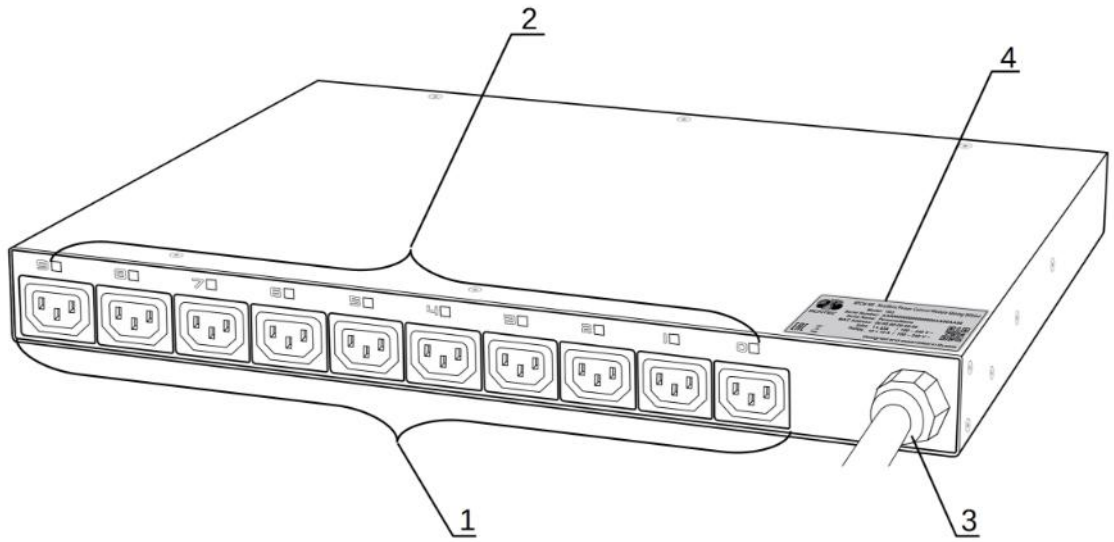

Figure 4.1.5. Rear side of RPCM ME 1563 (63A).

Legend:

1 — outlets 0-9;

2 — LED outlet indicators 0-9;

3 — input (inlet) 2P+PE 63A 250V;

4 — serial sticker.

4.1.2. Information on the display

The right side of the indicator is used to display the status of the device:

- By default, it displays the value of the input voltage in volts;
- When the button is pressed, it can switch to display modes for current capacity, power, IP address, MAC address, serial number and serial name;
- Also it is used to display special code sequences during service.

Below is the name and sequence of the value demonstration by pressing the controls (the top or bottom buttons on the case).

Table 4.1.1. Display messages.

Name of the value	**Unit of measurement**	**Sample message**
Voltage	Volt, V	230
Current input	Amps, A	14
Power	Kilowatts, KW	3.2
IP address	dotted digits	192.168.1.1
MAC address	hexadecimal digits separated by a colon **:**	B8:F7:4A:42:EC:22
Serial name	English characters	KrepkiyLob
Serial number	English characters and numbers	RU2017101100000002-MO01DN01
User message	English characters and numbers	Any, for example "#01"

Switching between messages occurs by pressing the upper or lower buttons.

The bottom button switches the messages on the screen in order from top to bottom according to Table 4.1.1.

The top button toggles the values in reverse order.

When system starts, the information display sequence as follows:

- Initially, the message "*RPCM has started*" appears in the module display for 5 seconds;
- 5 seconds after startup, default message is displayed (by default — voltage in the form *230Volts*) and has the appearance of a running line going left-to-right;
- The following data is displayed when the button is pressed.

Then, when the button is pressed, the following are alternately displayed:

- current;
- power;
- IP address;
- MAC address;
- serial number;
- serial name;
- user message.

To view in the reverse order, you need to press the top button. The values will be displayed in reverse order except for the message "*RPCM has started*".

It is possible to reset the system to factory settings. **To reset to factory settings, press the top button on the device and hold for 20 seconds.**

The *rpcmadmin* user password will be reset to the default password. If a user with this name is missing for some reason, it will be created again with the default *rpcmpassword* password.

The left side of the display panel is used to represent the status of the input and outlet channels:

- inlet indicators *1* and *2* for models RPCM 1502 and RPCM 1532, or single inlet indicator for models RPCM 1563, RPCM 3x250, RPCM DELTA;
- indicators for the ten outlets *0* — *9*.

Description of input color signals:

- *green* — input is active, frequency and voltage within specified ranges;
- *blue* — input is reserve (for models RPCM with AC ATS), frequency and voltage within specified ranges;
- *red* — there is no voltage on this input;
- *gray* — input is administratively disabled;
- *yellow* — the frequency or voltage of the input is outside the specified limits;
- *blinking from green / blue / red to yellow* — no grounding;
- *blinking from green / blue to white* — incorrect connection of the phase conductor and the neutral conductor.

Description of color output signals:

- *green* — output is on and in working condition, load is connected;
- *blue* — output is administrative and in fact turned on, but the load is not connected;
- *red* — the output was disconnected due to input overload, overcurrent, short circuit at the output, overvoltage at the output (accompanied by appropriate messages);
- *yellow* — output is enabled, but has an overload condition (accompanied by corresponding messages);
- *gray* — output is administratively disabled;
- *magenta* — the output is faulty (administratively enabled, but has no voltage).

These symbols can be displayed on RPCM physical screen:

```
Standard ascii 5x7 font:
Space
Numbers 0-9
English letters A-Z, a-z
! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [ \ ] ^ _ ` { | } -> <-
```

Figure 4.1.6. Appearance of the model RPCM 1502 with an active display. Front pane shown on top, rear panel shown at the bottom.

Figure 4.1.7. Appearance of the model RPCM 1532 with an active display. Front pane shown on top, rear panel shown at the bottom.

Figure 4.1.8. Appearance of the model RPCM ME 1563 with an active display. Front pane shown on top, rear panel shown at the bottom.

4.1.3. Description of *RPCM 3x250* and *RPCM DELTA*

4.1.3.1. General description of appearance *RPCM 3x250* and *RPCM DELTA*

Models *RPCM 3x250* and *RPCM DELTA* are designed for 3 (three) phase WYE and DELTA power source rescpectively.

The RPCM 3x250 and RPCM DELTA are assembled in a wall-mounted enclosure.

These models have several fundamental differences from models *RPCM 16A, RPCM 32A, RPCM ME 63A*:

- It uses an electrical cabinet — wall-mounted enclosure, the case of which is made in the blue RCNTEC color.
- There are the electrical terminals for connections to the power line. Bus bars with terminals are covered with a transparent polycarbonate panel for security reasons.
- **These RPCM modifications have 30 channels of 25 amps each.** The equipment is connected to the PDU using terminals, which makes the RPCM 3x250 and RPCM DELTA independent of the connectors used (sockets and plugs).
- In addition to the universality of the use of terminals allows you to significantly increase the number of connected devices — 3 devices per channel — without the use of additional equipment.

- The inlet conductors are connected directly, without intermediate "male-female" connectors. For the installation of wires to the terminals a special tool is used. Each conductor: the line or ground or neutral wire is connected separately to the corresponding terminal output.

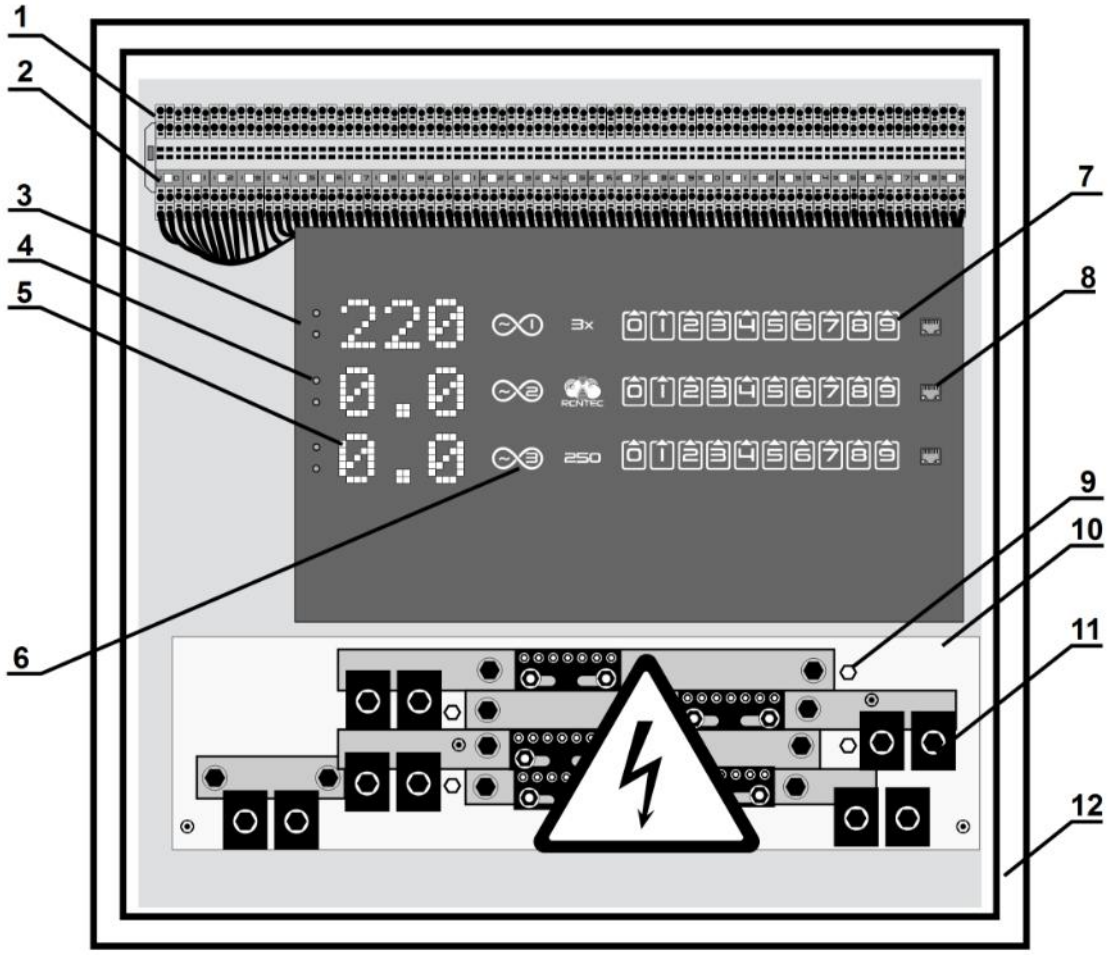

Figure 4.1.9. The main elements of RPCM 3x250 and RPCM DELTA.

Note. For better contrast, Figure 4.1.9 shows a light gray housing. Standard delivery is carried out in a proprietary dark blue case with a glass door.

Legend:

1 — terminal block for 90 ports (3 connections for each of 30 outlets);

2 — LED indicators outputs (30 indicators per 30 outlets);

3 — display panel;

4 — control buttons;

5 — displays for parameter display (voltage, current, IP, MAC, SerialName);

6 — phase number (from 1 to 3);

7 — outlets indicators;

8 — RJ-45 socket (Ethernet) for connecting the control network;

9 — fixing the insulating shield;

10 — insulating shield made of transparent plastic;

11 — terminal blocks with terminals;

12 — wall-mounted enclosure.

4.1.3.2. Features of terminal blocks *RPCM 3x250* and *RPCM DELTA*

Model RPCM 3x250 is designed for electrical networks with voltage <240V connected to the "WYE" topology, that is, there comes 3 lines and neutral, and also a protective conductor (protective earth).

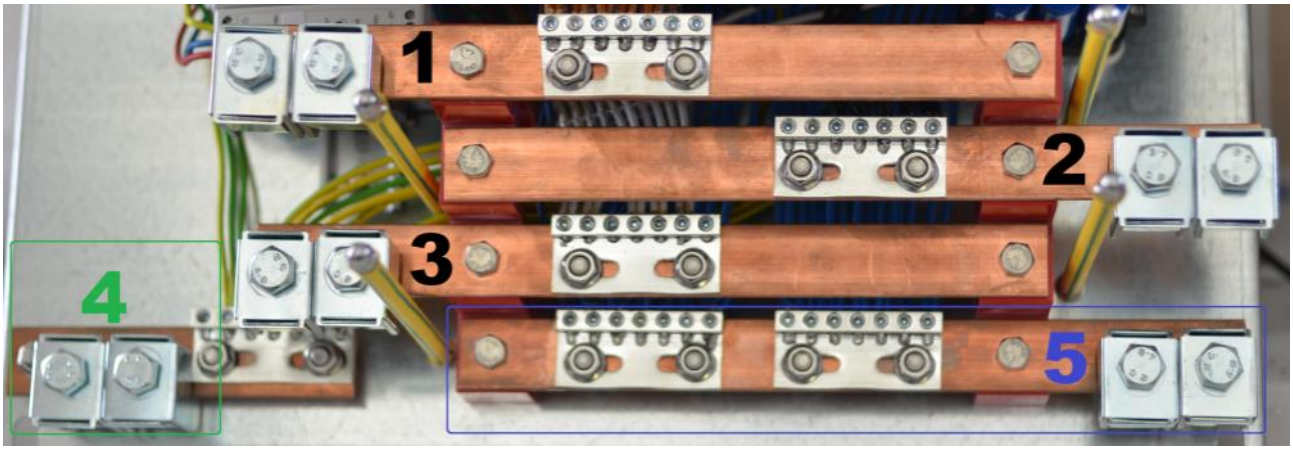

Figure 4.1.10. Terminal assignment for RPCM 3x250.

Legend:

1 — terminal block and terminals for line 1 connection — 100-240V (line-to-neutral);

2 — terminal block and terminals for line 2 connection — 100-240V (line-to-neutral);

3 — terminal block and terminals for line 3 connection — 100-240V (line-to-neutral);

4 — terminal block and terminals for supplying **grounding**;

5 — terminal block and terminals for connection to **neutral**.

Model RPCM DELTA is designed for 3 phase 208V line-to-line to line voltage in DELTA configuration.

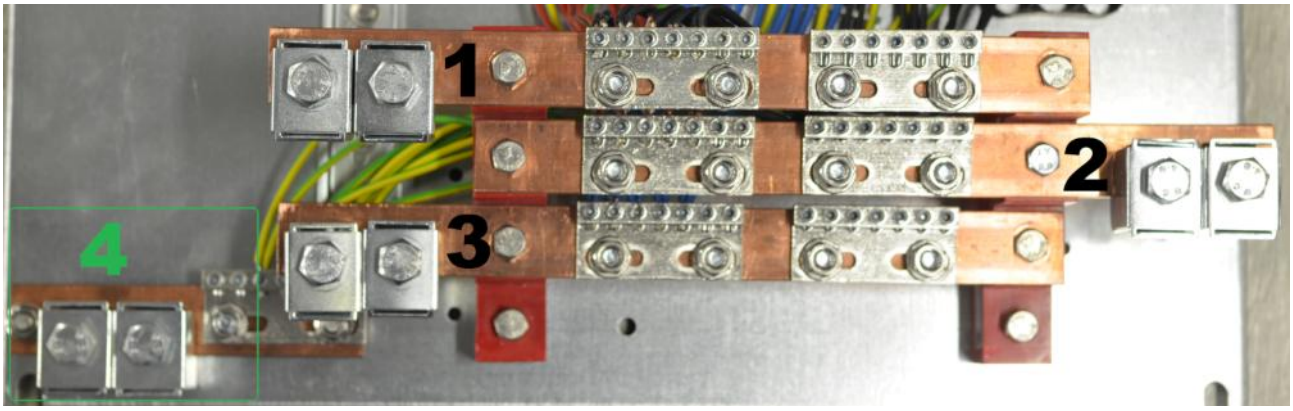

Figure 4.1.11. Terminal assignment for RPCM DELTA.

Legend:

1 — terminal block and terminals for line 1 connection;

2 — terminal block and terminals for line 2 connection;

3 — terminal block and terminals for line 3 connection;

4 — terminal block and terminals for supplying **grounding**;

Figure 4.1.12. Appearance of RPCM 3x250 (the door is closed).

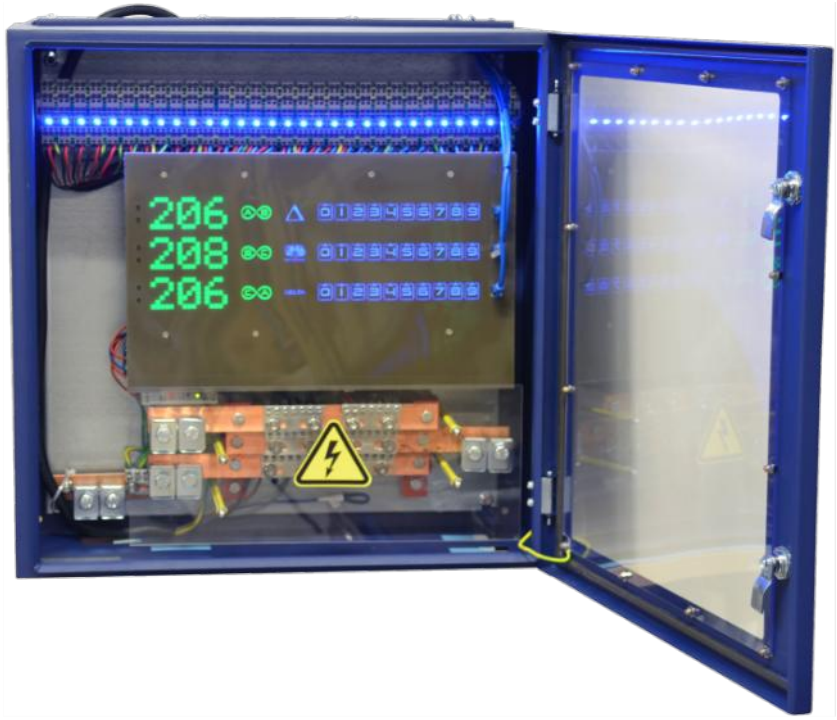

Figure 4.1.13. Appearance of RPCM DELTA (the door is opened).

4.1.4. Front panel device control

4.1.4.1. Basic Principles

An indicator is used to obtain information about the status of devices.

When controlling RPCM through a physical interface (upper and lower buttons), the following actions are used:

- quick press — pressing and releasing the button for 0.5 - 1 seconds, waiting for the result after releasing;
- press and hold — press and hold the button for more than 5 seconds to get the effect.

RPCM 1502, RPCM 1532, RPCM ME 1563 models are designed to be connected to a single-phase power supply circuit, therefore, they have one set of control elements: a display and two buttons.

RPCM 3x250 and RPCM DELTA have displays and control buttons for each of 3 phases. This scheme is necessary to connect directly to a three-phase power supply system. Total RPCM 3x250 or RPCM DELTA includes 3 displays and 6 buttons.

There are two interface modes:

- View mode;
- Control Mode.

RPCM start in View Mode.

4.1.4.2. View Mode

In this mode, the original information is displayed.

Alerts in view mode (View Mode) are displayed in green, except for the message specified by the user..

The list of messages View Mode is presented in table 4.1.1.

Switching between messages in the view mode occurs by pressing the top or bottom buttons.

The bottom button switches the messages on the screen in order from top to bottom according to Table 4.1.

The top button toggles the values in reverse order.

In order to avoid accidental skipping of the desired item, the top or bottom button must be pressed, released, wait for the result for 5 seconds.

Switching occurs in a circle (cyclically). For example, with successive presses of 5 seconds for the bottom button, "*Voltage*", then "*Current strength on input*", then "*Power*", "*IP address*", "*MAC address*", "*Serial name*", "*Serial number*", "*User message*", then again "*Voltage*", "*Current strength at input*" and so on.

Note. Reset to factory settings is available in both View mode and Control mode.

Pressing the top button for a long time for about 20 seconds resets the RPCM to the factory default settings. After that, the user password *rpcmadmin* will be reset to standard — *rpcmpassword*. If for some reason there is no user with such a name, it will be created again with the standard password *rpcmpassword*.

4.1.4.3. Description of the Control Mode

This mode is intended for operational control.

All messages in the Control Mode are displayed yellow.

The entrance to the Control Mode is made by pressing while holding the bottom key. Immediately after logging in, an inscription in the form of a running line will appear on the indicator panel: "*Control Mode! Be Careful!*"

Next, you are prompted to return to the "*Return To View Mode*" view.

A step-by-step transition between the available functions occurs by a single press of the bottom button. A single press of the top button performs a step-by-step transition in the reverse order.

Pressing and holding the lower button causes a state change for the proposed function. For example, pressing and holding the bottom button while the function is active *Outlet 1 Switch OFF* performs administrative shutdown of the 1st pin. Accordingly, after its activation, the function of administrative activation — *Outlet 1 Switch ON* becomes available.

The list of available functions and corresponding informational messages is presented in Table 4.1.2.

ATTENTION! *Do not press the control buttons of the module control unnecessarily! Erroneous or untimely use of controls can lead to unpredictable actions, such as disabling the client device and creating an emergency. Please, in case of unusual situations, contact RCNTEC support service.*

4.1.4.4. Objects and Functions of Control Mode

When working in Control Mode, the concepts of "object" and "function" are distinguished.

An object is something that can be operated. This can be a separate output, input, ATS for switching inputs in models RPCM 1502, RPCM 1532, also RPCM as a device.

Individual objects: inputs and outputs are displayed on the panel with the corresponding digit. When you select this object for manipulation, its indicator starts flashing.

Step-by-step transition between objects is performed using a single press of the top or bottom button.

General level objects:

- RPCM as a whole device;
- ATS to switch inputs in RPCM 1502 and RPCM 1532 models.

The available manipulations with these levels are displayed immediately upon entering the Control Mode after a suggestion to return to the view mode - *Return To View Mode*.

Operations with inputs and outputs are available after a step by step transition to the next level.

4.1.4.5. Control Mode Actions: troubleshooting and regular operations

All operations Control Mode for the physical interface can be divided as: *troubleshooting* and *regular*. The need for troubleshooting operations arises due to non-standard situations, such as the occurrence of an overload, a short circuit. After elimination of the causes of such occurens, *troubleshooting* operations and their prompts are disappeared.

Regular operations are always available for this object. For example, any output can be administratively turned off regardless of its state (normal operation, short circuit, and so on).

There are available combinations of operations. For example, when overloading RPCM on input according to default survival priorities, the 9th outlet automatically disconnected. In such occurrence, the output indicator (in this case, it is the number "9" on the display) will be displayed in red. After selecting the object, the message suggests to turn off the output administratively

4.1.4.6. General RPCM Control Order in Control Mode Operations

All switching between functions and objects is performed by single pressing the bottom or top button. The bottom button is used to move forward (down the list), the top button in the opposite direction.

When you enter in the Control mode, "Control Mode! Be Careful!" message is displayed.

Further, the message "Return To View Mode" suggests returning the view mode in case switching to Control mode happened by mistake.

Additionally, for ease of use, a short press of two buttons together is used to go to the first menu item — *Return To View Mode*.

After that, if necessary, demonstrate operations for RPCM. If there are no reasons for these operations, it proceeds to inlet operations.

If there is an AC ATS and a connected backup line, it is proposed to switch to another inlet. This step will be skipped for RPCM ME 1563, RPCM 3x250 and RPCM DELTA.

Next the operations of administrative disconnection of inputs become available (only for models with AC ATS — RPCM 1502, RPCM 1532).

When moving to the next level, operations with outlets are performed.

Next the selected current output is indicated by the flashing indicator (its number) on the display.

First, a transition is performed to the available troubleshooting operations in the order for select outlet, then to regular operations of administrative disconnection and activation of outlet.

Table 4.1.2. Available operations in Control Mode.

Function / Message	**Object**	**Mode**	**Description**
Control Mode! Be Careful!			Message alerting that Control Mode has been entered
Return To View Mode		Regular	Menu item to return to View Mode
Operations for RPCM			
Beeper Switch OFF		Regular	Turn off the beeper
Reset All Short Circuits		Troubleshooting	Reset outlets that have been turned off due to short circuits. Make sure to remove SHORT CIRCUIT conditions first!
Switch ATS to Inlet N	*N* — inlet 1 or 2	Regular	Switching between inlets for models with ATS (automatic transfer switch)
Operations with the current Inlet			
Inlet N Switch OFF	*N* — inlet 1 or 2	Regular	Disable input number N (only for models with ATS)
Inlet N Switch ON	*N* — inlet 1 or 2	Regular	Enabling input with the number N (only for models with ATS)
Operations with the current output			
Outlet N OC Switch OFF	*N* — *Outlet* 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to overload
Outlet N IOC Switch OFF	*N* — *Outlet* 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to overload on Inlet
Outlet N OV Switch OFF	*N* — *Outlet* 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to overvoltage
Outlet N SC Switch OFF	*N* — *Outlet* 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to short circuit
Outlet N MF Switch OFF	*N* — *Outlet* 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to on malfunction
Outlet N Switch ON	*N* — *Outlet* 0-9	Regular	Switch ON outlet
Outlet N Switch OFF	*N* — *Outlet* 0-9	Regular	Switch OFF outlet

4.2. Web Interface of RPCM

4.2.1. General Information

This type of management is based on use of application-level protocols: HTTP (HTTPS). The connection is made via any Internet browser on the standard 80 (443) port.

For access to the web-interface RPCM's enter the IP address or domain name in the address bar. For example: `https://192.168.1.2` or `https://192.168.1.2`

Authentication is based on the user name and password. The default username is: *rpcmadmin*, the default password is: *rpcmpassword*

RPCM's web interface supports various models and versions of browsers, such as:

- Chrome — from version 61.0.3163.100 (official build);
- Safari — from version 10.1.1;
- Firefox — from version 56.0;
- Opera — from version of 48.0.2685.32.

After entering the specified web page, the authentication window will open, where you must enter the username and password, and you can select a different interface language.

Next, the system automatically switch to the main window of the RPCM web interface — *Dashboard*, which provides general information, as well as tools for managing the system.

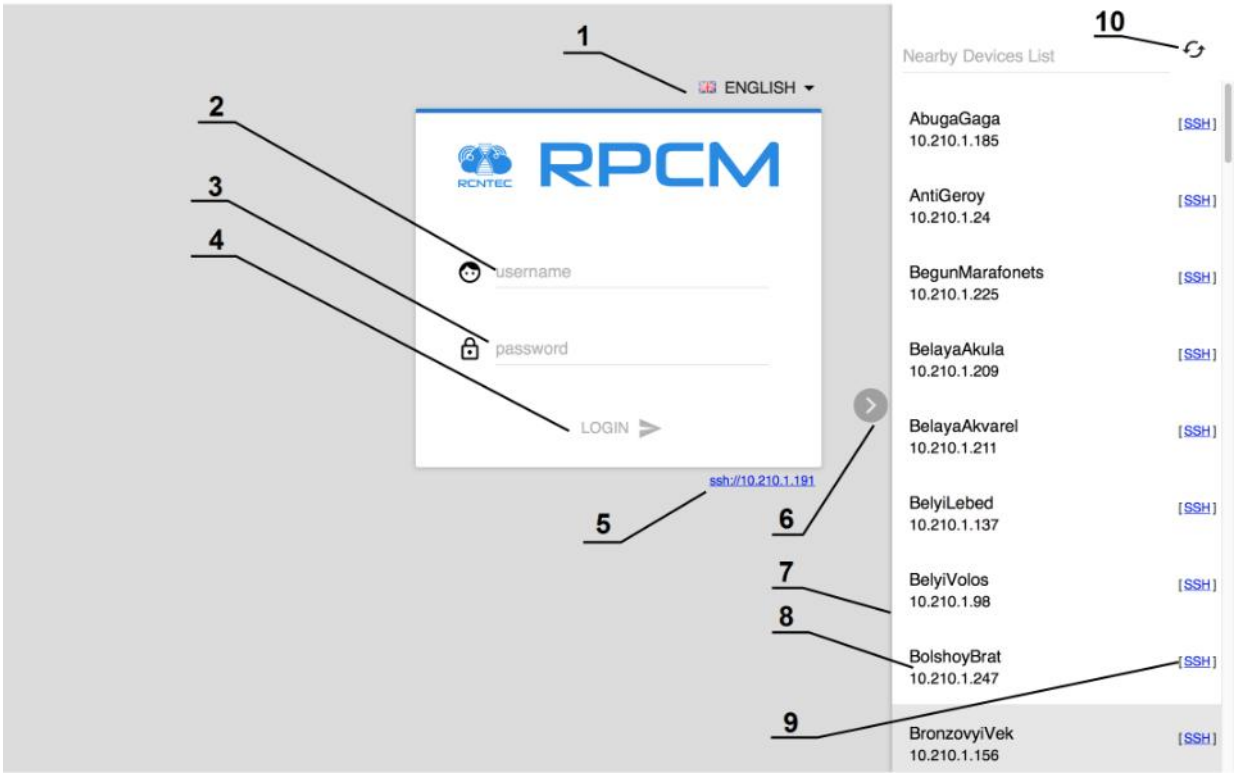

Figure 4.2.1. Login window.

Legend:

1 — menu for selecting the language of the web interface;

2 — field for entering the user name;

3 — field for entering password;

4 — *LOGIN* button to confirm entered details and log in to the of RPCM's web interface;

5 — link for SSH connection in terminal, using default SSH-client;

6 — "show-collapse" button "Nearest devices" panel to search for neighboring RPCM;

7 — "Nearby Device List" panel to search for nearby RPCM;

8 — serial name and IP address of one of the neighboring RPCM;

9 — link to open SSH connection to neighbor RPCM in terminal using default SSH client;

10 — the button for refresh the "Nearest devices" list.

Note. "Nearby Device List" — a list of RPCMs that are located in the same network segment and are currently available.

4.2.2. Description of the Control Panel — Dashboard

Two modes are available in Dashboard:

- **View Mode** — to visually inform about the status of the system;
- **Control Mode** — for performing various operations, including turning off of inputs and outlets.

View Mode is shown by default.

In this mode, a miniature graph displaying main parameters is located near each input or outlet. This presentation of the data allows you to quickly obtain detailed information about both input and output power flowing through the RPCM (see Figure 4.2.2).

Graphs for the two inputs are placed horizontally. Graphs for the ten outlets from *0* to *9* are arranged in a single row and timelines are arranged vertically to fit all 10 outlet into screen width.

Use the Unlock Control button on the Top Control Bar to switch between *View Mode* and *Control Mode*.

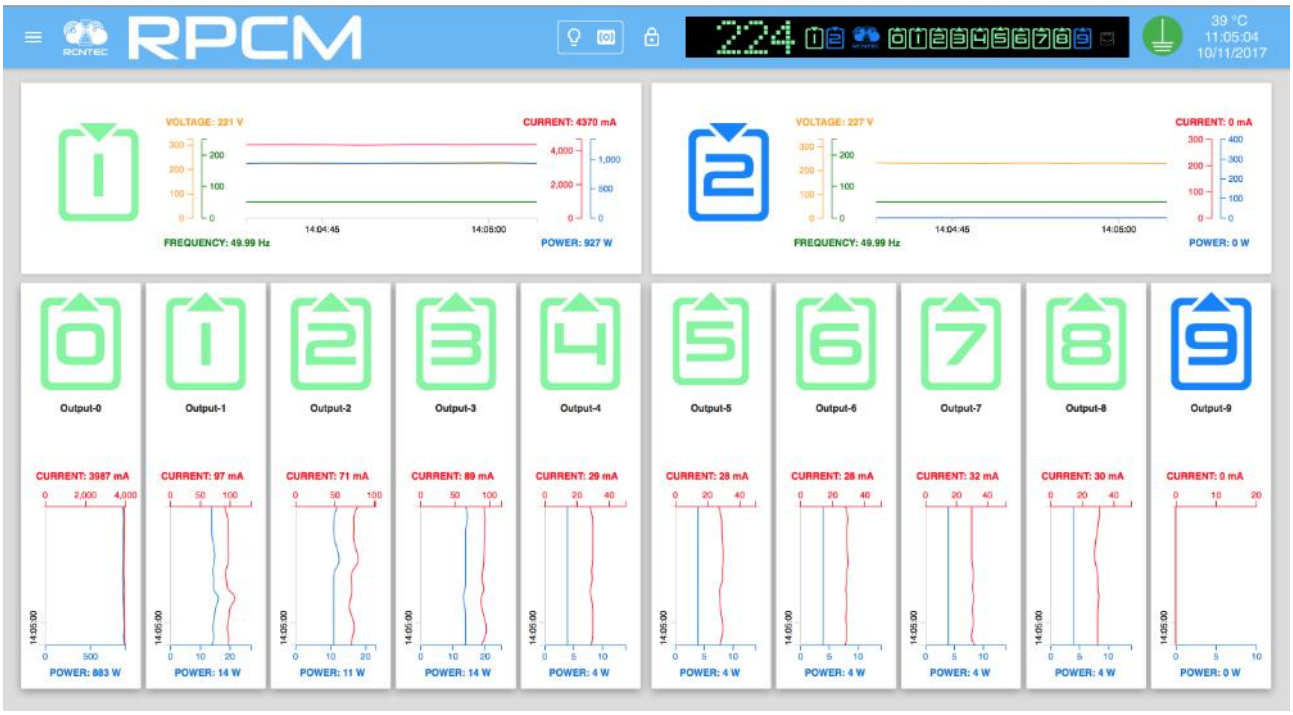

Figure 4.2.2. Dashboard in View Mode for RPCM 1502 and RPCM 1532.

4.2.3. Description of RPCM's Color Signal System

To quickly obtain information, a color coding of inlets and outlets status is used. Below is a brief description of the color options.

Description of input color signals:

- *green* — input is active, frequency and voltage within specified ranges;
- *blue* — input is reserve (for models RPCM with ATS), frequency and voltage within specified ranges;
- *red* — there is no frequency on this input;
- *gray* — input is administratively disabled;
- *yellow* — the frequency or voltage of the input is outside the specified limits;
- *blinking from green / blue / red to yellow* — no grounding;
- *blinking from green / blue to white* — incorrect (inverse) connection of the phase conductor and the neutral conductor.

Description of color output signals:

- *green* — output is on and in working condition, load is connected;
- *blue* — output is administratively and in fact turned on, but the load is not connected;
- *red* — the output was disconnected due to input overload, overcurrent, short circuit at the output, overvoltage at the output (accompanied by appropriate messages);
- *yellow* — output is on, but has an overload condition (accompanied by corresponding messages);

- *gray* — output is administratively disabled;
- *magenta* — the output is faulty (administratively on, but has no voltage on it).
- *blinking from grey / red to magenta* — the output is faulty (administratively off or off due to short circuit/overcurrent/input overload/overvoltage but has voltage on it).

Note. This color coding is used for the physical interface, web interface and command line interface.

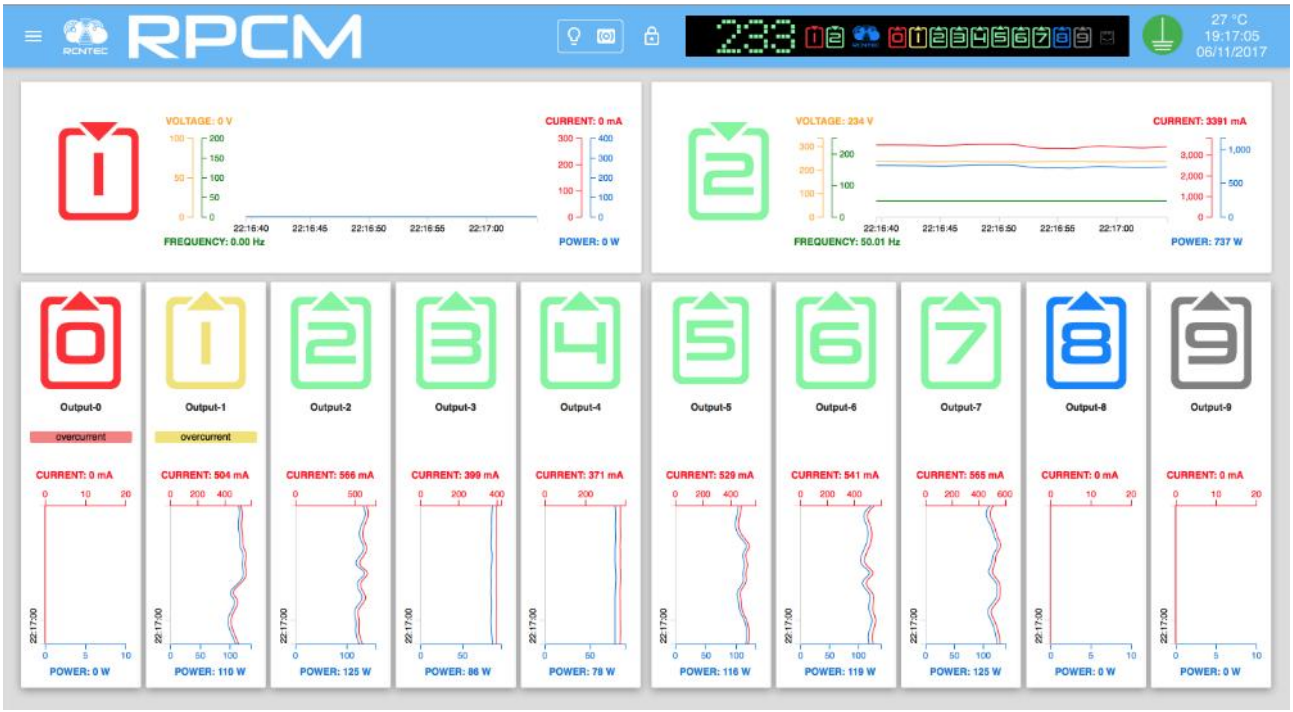

Figure 4.2.3. An example of the color coding on the Dashboard of RPCM's web interface

4.2.4. Top Control Bar

This panel is intended for displaying general information and switching between modes of operation.

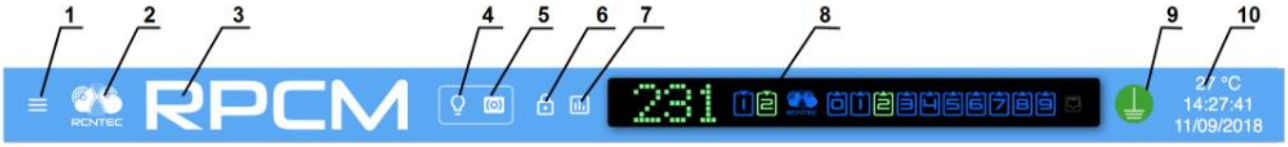

Figure 4.2.4. Control elements on the Top Control Bar.

Legend:

1 — menu button;

2 — RCNTEC logo (click to visit the RCNTEC website — rcntec.com);

3 — RPCM name (click to visit the RPCM product site — rpcm.pro);

4 — light identification button depicted as a lightbulb image;

5 — sound identification button depicted as a radio-image;

6 — Unlock Control button depicted as a lock;

7 — button to activate showing of Limits on graphs;

8 — Virtual Front Panel, a click on this object switch to Dashboard;

9 — grounding icon;

10 — group of service values: internal temperature in degrees Celsius, time and date.

The display unit in turn shows:

- Voltage value at the active input
- Status of inputs *1* and *2*.
- Status of the outlets from *0* to *9*.

4.2.5. Information about the Status of Inputs in View Mode

For active input in View Mode, the information about electrical parameters is displayed (see below).

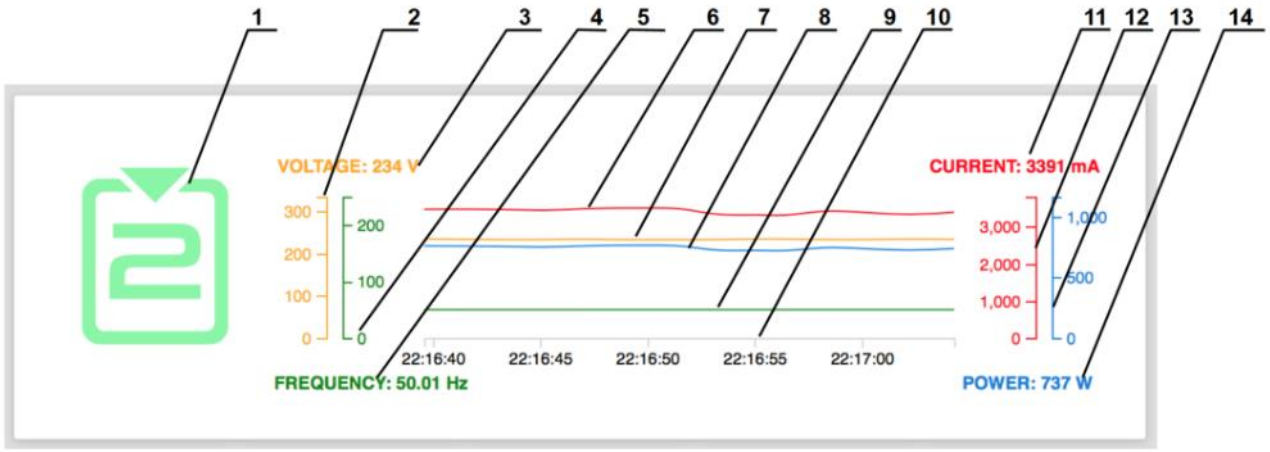

Figure 4.2.5. Block of information about input status in View Mode.

Legend:

1 — number of the inlet;

2 — inlet voltage scale;

3 — instant inlet voltage value;

4 — input frequency scale;

5 — instant inlet voltage value;

6 — curve of the current (milliamps) graph;

7 — curve of the voltage graph;

8 — curve of active power (watts) graph;

9 — curve of the frequency graph;

10 — time scale for all graphs;

11 — instant inlet current consumption value (milliamps);

12 — input current scale;

13 — input active power scale;

14 — instant inlet active power consumption value (watts).

4.2.6. Information on the Status of Outlets in View Mode

For outlets in View Mode, the information about electrical parameters is available (see below).

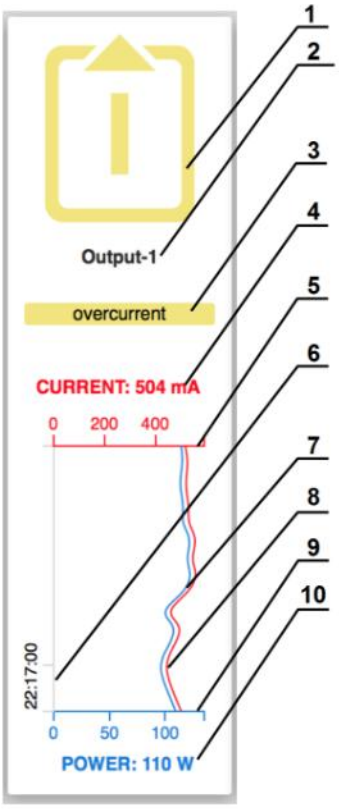

Figure 4.2.6. Block of information about the outlets status in the View Mode.

Legend:

1 — outlet number;

2 — outlet name;

3 — fault status message;

4 — instant outlet current consumption value (milliamps);

5 — outlet current scale;

6 — time scale for all graphs;

7 — curve of active power (watts) graph;

8 — curve of the current (milliamps) graph;

9 — output active power scale;

10 — instant outlet active power value (watts).

4.2.7. Control Mode

To activate the Control Mode, you need to press the Unlock Control button on the Top Control Bar.

After this, the graphs near each object (input or outlet) are simultaneously replaced by controls.

Caution! Be careful when operating in Control Mode. Do not leave the console unattended with the Control Mode turned on.

Figure 4.2.7. Control panel of RPCM's web interface — Dashboard in Control Mode for RPCM 1502 and RPCM 1532.

4.2.8. Management of inputs in Control Mode

For the inputs in Control Mode, the following controls are available:

- **TURN ON** — turns on input (if it is turned off);
- **TURN OFF** — turns off input (only for RPCM with ATS);
- **ACTIVATE** — activates the input (only for RPCM with ATS);
- **IDENTIFY** — makes input indicator blink to help locate it quickly in the rack.

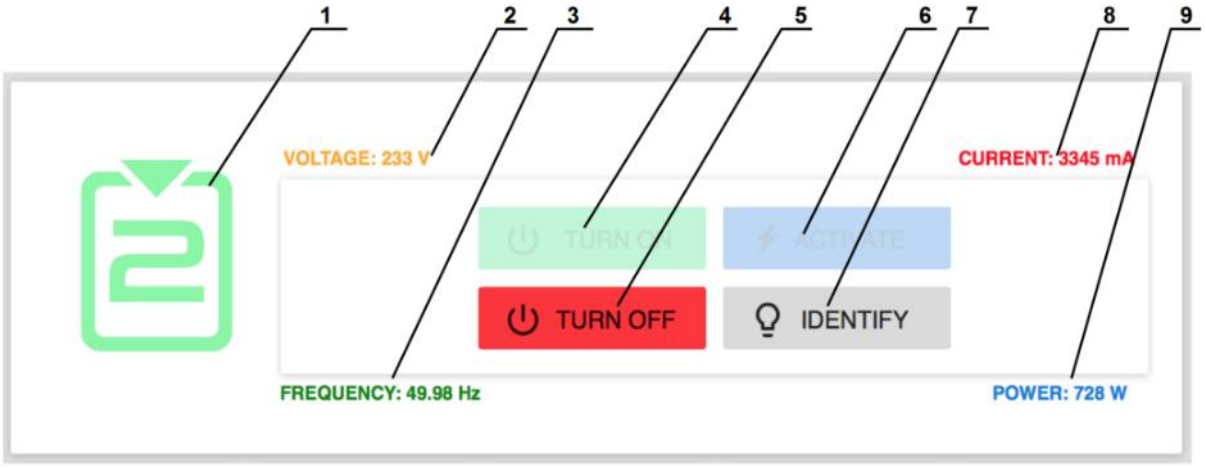

Figure 4.2.8. Controlling the status of inputs in Control Mode for RPCM 1502 and RPCM 1532.

Legend:

1 — input number;

2 — instant input voltage value;

3 — instant input frequency value;

4 — **TURN ON** button — turns on the input;

5 — **TURN OFF** button — turns off the input;

6 — **ACTIVATE** button— switches active input;

7 — **IDENTIFY** button — activates input indicator blinking to help locate it quickly in the rack;

8 — instant input current (milliamps) value;

9 — instant input active power consumption (watts) value.

4.2.9. Management of Outlets in Control Mode

For outlets, the following controls can be used:

- **TURN ON** — turns on outlet (if it is turned off);
- **TURN OFF** — turns on outlet(if it is turned on);
- **RESET** — turns off the outlet for 3 seconds and then turns it on;
- **IDENTIFY** — makes outlet indicator blink to help locate it quickly in the rack.

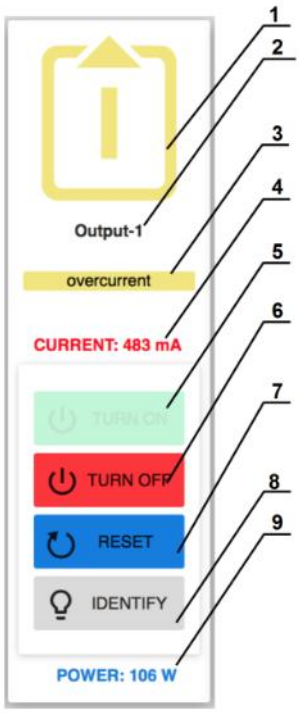

Figure 4.2.9. Controlling the status of outlets in Control Mode.

Legend:

1 — outlet number;

2 — outlet name;

3 — fault status message;

4 — instant outlet current consumption value (milliamps);

5 — **TURN ON** button— turns on the outlet;

6 — **TURN OFF** button — turns off the outlet;

7 — **RESET** button – turn the outlet off for 3 seconds and then turns it on;

8 — **IDENTIFY** button — makes outlet indicator blink to help locate it quickly on the rack;

9 — instant outlet active power consumption (watts).

4.2.10. Management of All Outlets in Control mode

If required, you can turn all outlets on, or turn all outlets off, or reset all outlets with buttons: "TURN ALL OUTPUTS ON", "TURN ALL OUTPUTS OFF" and "RESET ALL OUTPUTS" respectively

Figure 4.2.10. Control buttons for all outlets in Control mode.

Attention! Be careful when using these functions. For example, some outlets can be turned off because have issues such as a short circuit or current overload. Be sure to correct issues before resetting outlets with "RESET ALL OUTPUTS" button.

4.2.11. Accessing Other Sections of The Web Interface

To access other sections of the web interface to manage specific parameters click on the Menu button on the left side of the Top Control Bar (see section *4.2.4. Top Control Bar*).

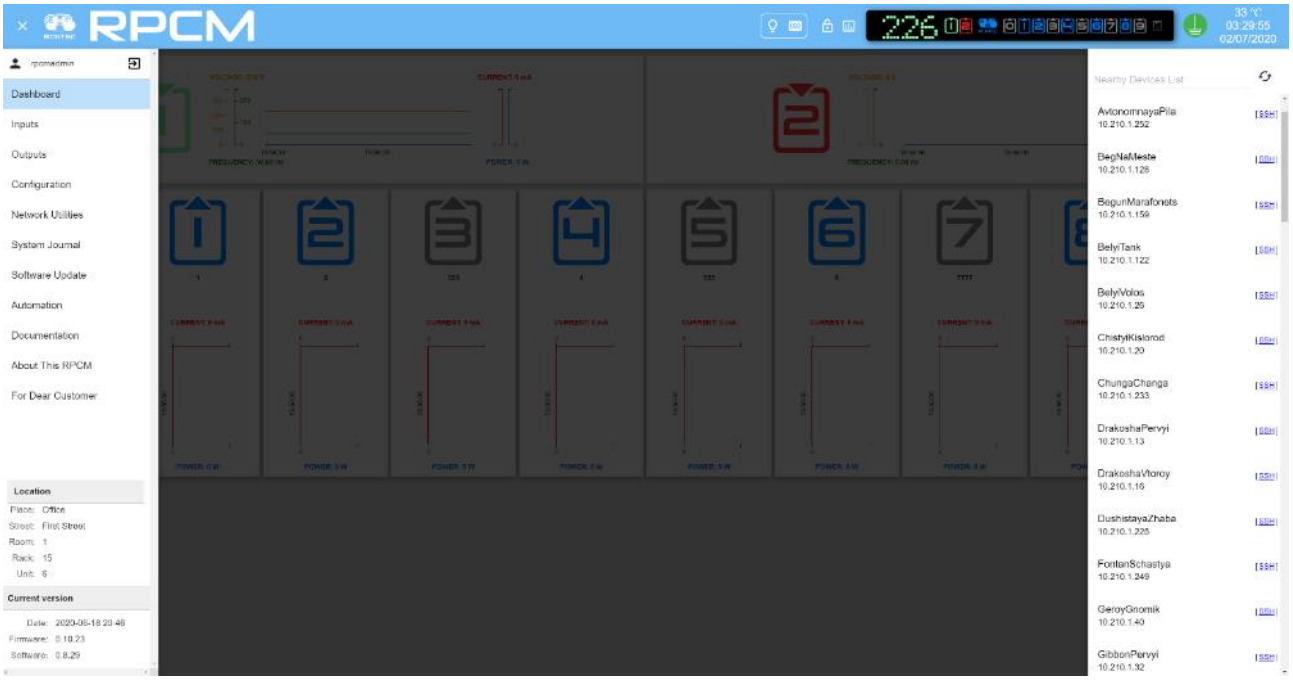

Figure 4.2.11. Menu for jumping between sections of the RPCM's web interface.

4.2.12 Warning for Unsecured Connections

When using the standard HTTP protocol, all data is transmitted in clear text, including user names and passwords.

When you try to access RPCM via unsecured HTTP protocol, RPCM will show a warning bar suggesting to switch to an encrypted HTTPS connection.

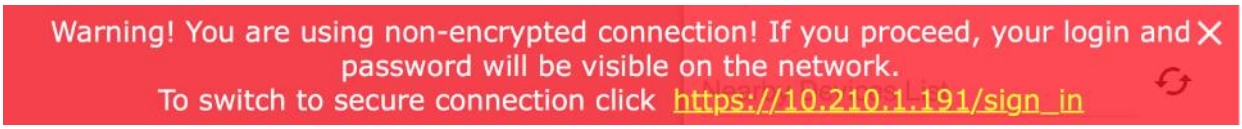

Figure 4.2.12. A warning about an insecure connection.

4.2.13. Web Interface differences for Models *RPCM ME 1563, RPCM 3x250 and RPCM DELTA*

There are some differences in appearance of the web interface for non-ATS models (RPCM1563, RPCM3250 and RPCM3123). For example, as long non-ATS models do not have a redundant inlet, the Dashboard shows details of only one Inlet.

Control Mode also has differences. These models have only **IDENTIFY** button for input management.

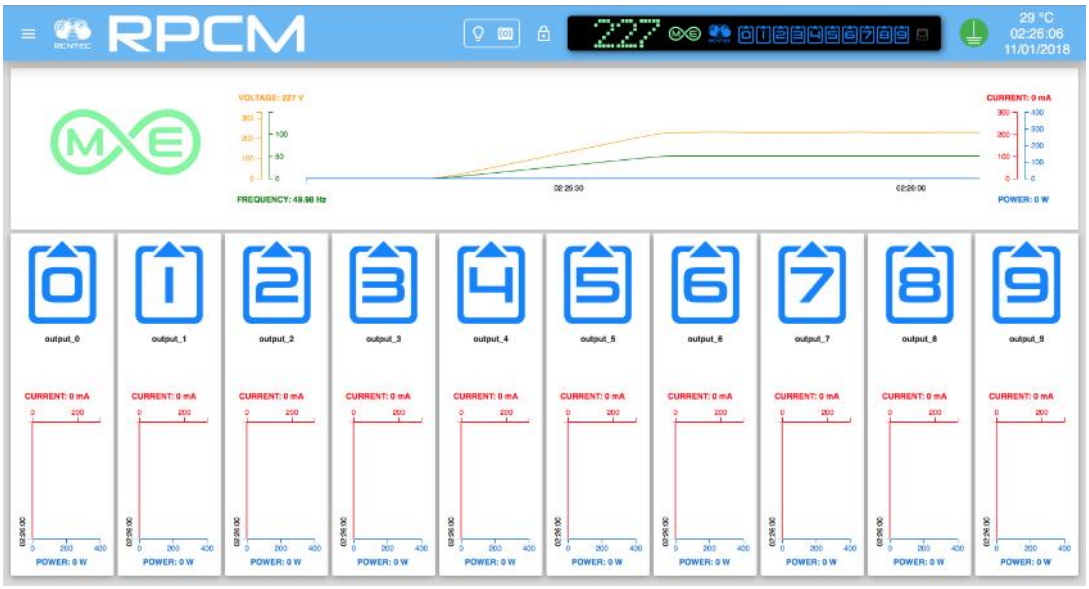

Figure 4.2.13. Dashboard in View Mode RPCM ME 1563.

Figure 4.2.14. Dashboard in Control Mode RPCM ME 1563.

Figure 4.2.15. The Dashboard control panel of the RPCM 3x250 module #3 in the View Mode.

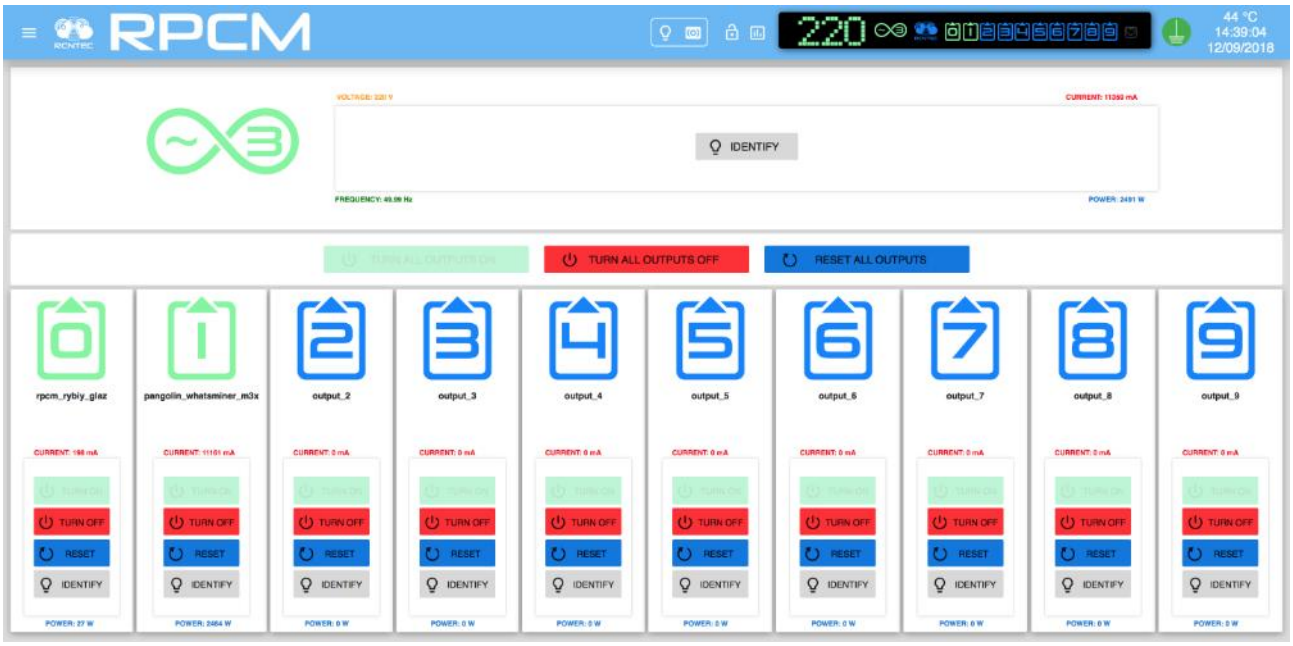

Figure 4.2.16. The Dashboard control panel of the RPCM 3x250 module #3 in the Control Mode.

4.2.14. Showing Current Limits on graphs

By default current/voltage/frequency values scales in web-interface's graphs are getting automatically adjusted to the maximum values appeared during the time interval shown on the graph.

Sometimes to evaluate actual usage of current flowing through the RPCM as well as voltage and frequency on different channels you might want to see current consumption of several outlets as well as voltage and frequencies of both inlets in the same scale based on maximum set limits.

To achieve this use the button to activate showing of Limits on the Top Control Bar and turn on limit switches for inlets and outlets of interest.

Figure 4.2.17. The Dashboard control panel in the Show Limits mode RPCM with ATS.

Figure 4.2.18. The Dashboard control panel in the Show Limits mode RPCM 1502 and RPCM 1532 with the switches on the inputs and the 2nd output turned on.

After switching on the required switches click "Show Limits" button again to have graphs displayed with the scales set according to the required configuration.

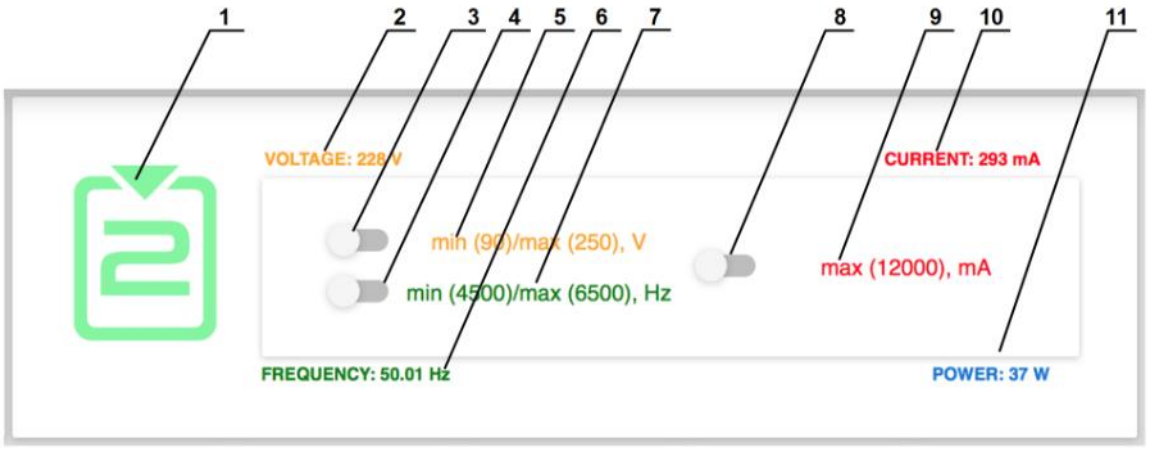

Figure 4.2.19. Show Limits settings RPCM with ATS for input 2.

Legend:

1 — number of the inlet;

2 — instant input voltage;

3 — voltage limit switch;

4 — frequency limit switch;

5 — input voltage limit values;

6 — instant input frequency value;

7 — input frequency limit values;

8 — current limit switch;

9 — current limit value;

10 — instant current consumption value (milliamps);

11 — instant active power consumption value (watts).

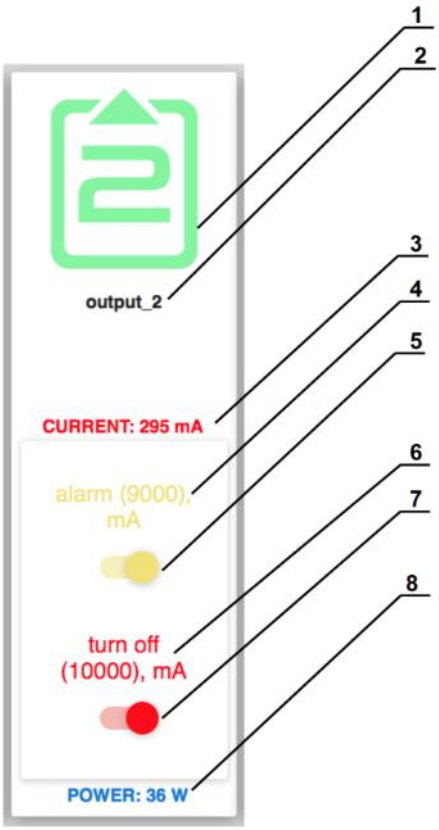

Figure 4.2.20. Show Limits settings for RPCM 1502 and RPCM 1532 for outlet 2.

Legend:

1 — number of the outlet;

2 — name of the outlet;

3 — instant current consumption value (milliamps);

4 — current alarm limit value;

5 — **current alarm limit switch**;

6 — current turn off limit value;

7 — **current turn off limit switch**;

8 — instant active power consumption value (watts).

After setting the limit demonstration, you can observe threshold values in the form of colored bars.

Figure 4.2.21. The Dashboard control panel in the "View Mode" with the Show Limits mode enabled.

Figure 4.2.22. The Dashboard in Show Limit configuration mode for RPCM 3x250 with the limit switches of the input and 0 and 1 outlets turned on.

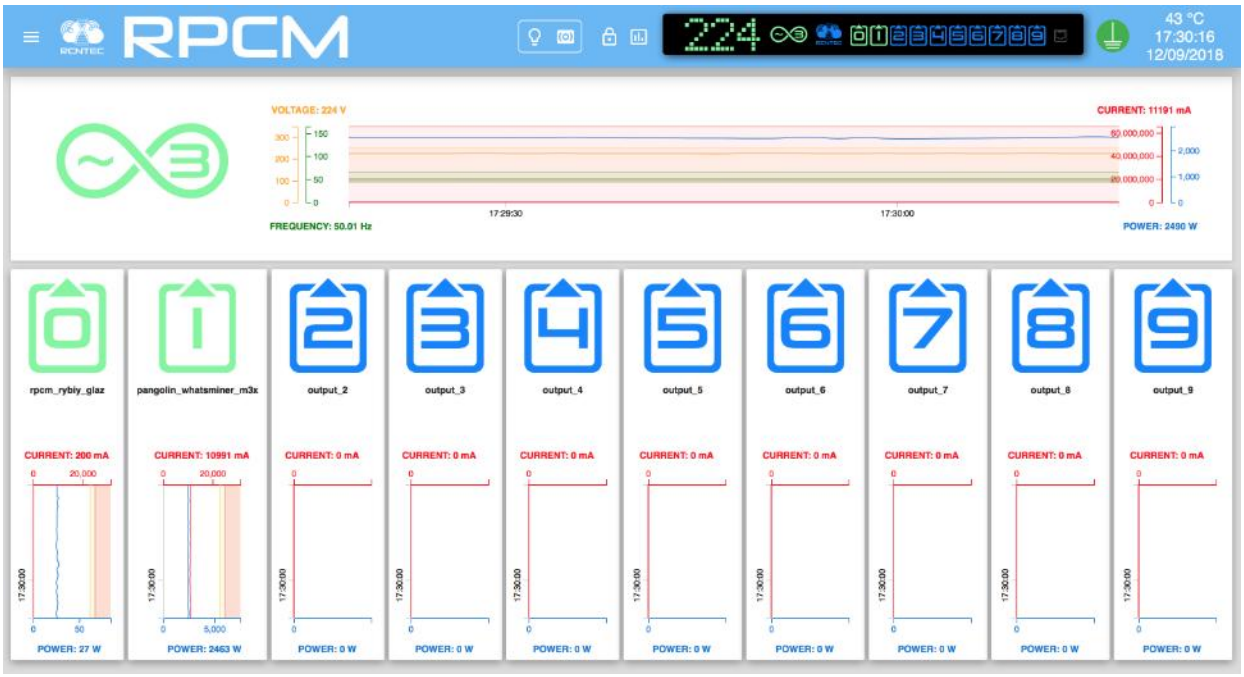

Figure 4.2.23. The Dashboard of RPCM 3x250 "View Mode" with the Show Limit activated.

4.2.15. Phase and neutral conductors inversion indication

In order to correctly detect and isolate short circuits to protective earthing it is essential to ensure that phase and neutral wires are connected correctly. In case of inverse connection (conductors for phase and neutral swapped), the following message appears in an Input area of the RPCM Dashboard: *"(P <-> N). SWAP INPUT PHASE AND NEUTRAL WIRES TO BE ABLE TO CATCH SHORT CIRCUITS TO PROTECTIVE EARTHING*.

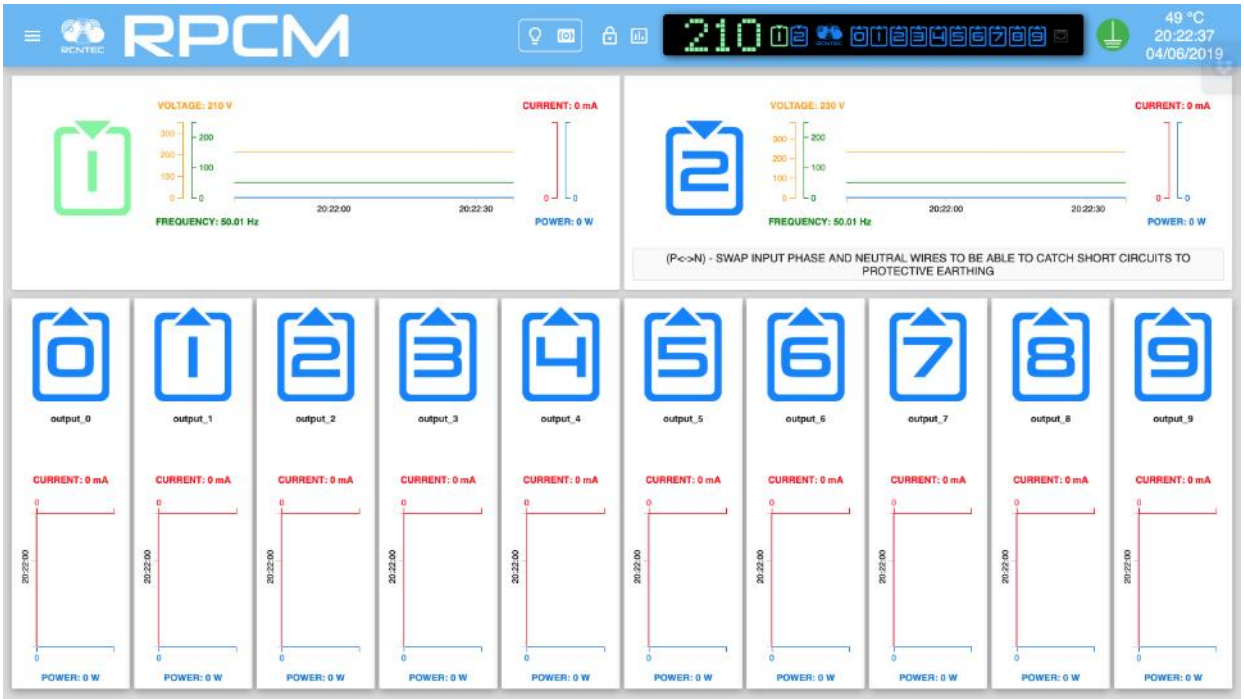

Figure 4.2.24. Dashboard control panel - notification of incorrect (inverse) connection of phase and neutral conductors at inlet "2".

In order to attract attention, the number of such input will change color (blink) from the main one: blue or green to white.

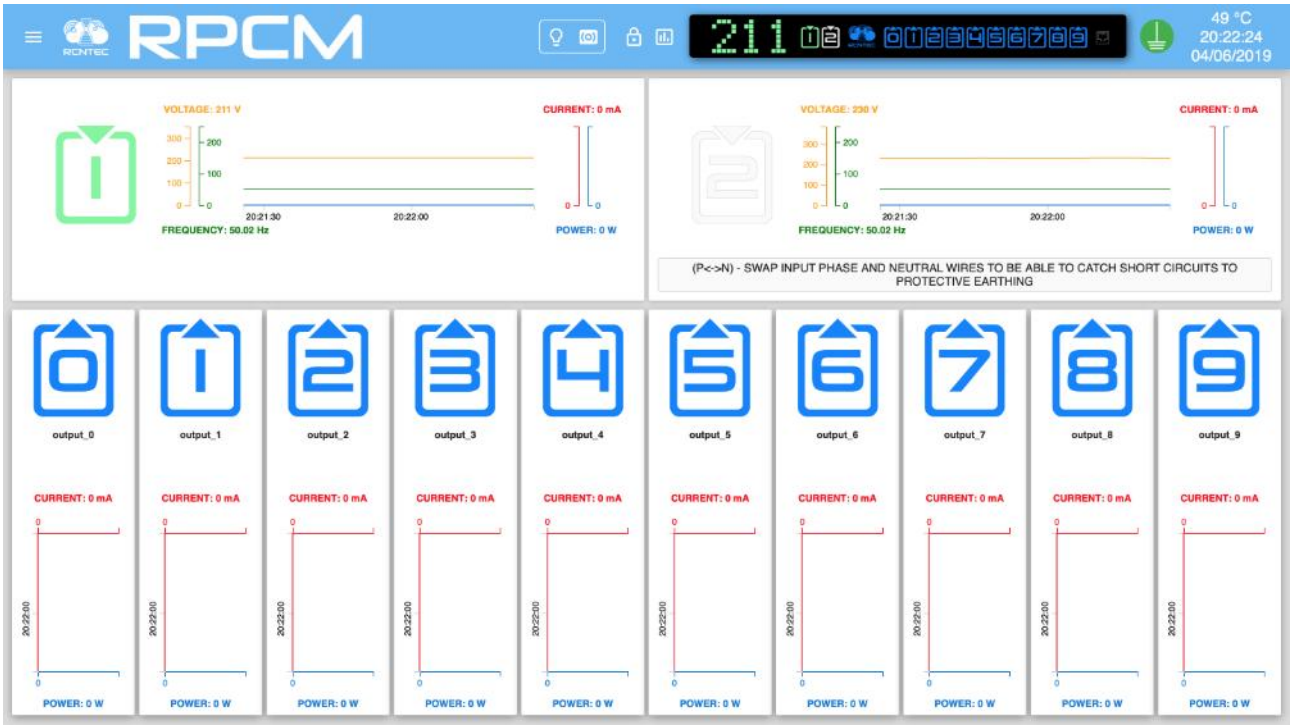

Figure 4.2.25. Dashboard control panel – blinking into white during notification of incorrect (inverse) connection of the phase and neutral conductors at the inlet "2".

Additional information. RPCM measures current on the phase conductor. Even though IEC320 standard defines location of phase and neutral wires in the plug and the socket, RPCM 1502, comes with the default cable with the Schuko CEE/7 plug, which is not polarized, so when plugged into the socket, phase and neutral wires can be legally interchanged. For other RPCM models this phase and neutral interchange can happen due to human mistakes during wiring of the sockets to which RPCM is connected. If such wiring error takes place, all functions except for the detection of a "phase-> ground" short circuit will work as designed. That is, in case of a short circuit to ground, if the input is connected incorrectly, the current will be measured on the neutral conductor instead of phase conductor, so the short circuit current will not be detected because current doesn't flow through the phase conductor.

4.3. RPCM SSH Interface

4.3.1. General Information

Secure Shell (SSH) — Industry standard protocol for encrypted access to remote terminals. SSH uses tcp port 22 by default.

RPCM uses SSH to provide access to its CLI interface (command line interface) for text based remote control.

There are a lot of SSH clients for most operating systems. You can use the built-in programs for terminal emulation in UNIX-like systems (including MacOS X). If you use Microsoft Windows platforms, it is recommended to use the free PUTTY software.

Note: The RPCM command-line interface is called "RPCM CLI".

4.3.2. SSH Connection

To connect using the SSH protocol, you need to use the following command or its equivalent:

```
ssh <ip_address>
```

Note: If you are using other systems and software, such as PUTTY, consult the relevant documentation.

In the RPCM system, SSH access uses authentication based on username and password.

The default username is *rpcmadmin* The default password is *rpcmpassword*

Example:

```
ssh rpcmadmin@192.168.1.xxx
```

Once the connection is established, the password is requested:

```
rpcmadmin@192.168.1.xxx's password:
```

After successful authentication, the system displays the current RPCM status information.

From the example (see Figure 4.3.1.) above the following information is available:

- serial name *"DobriyVolk"* (All RPCM devices have unique serial names for easy identification);
- internal temperature of the device is 28 degrees Celsius;
- continuous working time (uptime) is 33 days 59 minutes and 49 seconds;
- grounding condition is in order (GOOD).

Also there is information about the firmware version, release date and so on.

```
RPCMCli version 0.7.39 is starting
user rpcmadmin successfully authenticated from 192.168.xx.yy, access level superuser
Auto-logout time is set to 3600 seconds

          [Serial Name]: DobriyVolk                    [Temperature]: 28C
        [Serial Number]: RU20171011000000002MO01DN02         [Ground]: GOOD
     [Firmware Version]: 0.9.705           [Firmware Release Date]: 20190413083614
     [Software Version]: 0.7.39            [Software Release Date]: 20190409182006
[Model/Hardware Version]: 1502/RPCM                        [Uptime]: 33d+00:59:49
       [Force Failback]: OFF          [Failback Delay in Seconds]: 0

-------------------------------------------------------------------------------
        [Input 1]: 233V @ 49.99Hz    2.338A   0.493KW (ACTIVE, PRIORITY)
        [Input 2]: 232V @ 49.99Hz    0.000A   0.000KW
-------------------------------------------------------------------------------
       [Output 0]:  OFF <admin:  ON>     0mA      0W   (SHORT)
       [Output 1]:   ON <admin:  ON>   586mA    125W   (OVERLOAD)
       [Output 2]:   ON <admin:  ON>   223mA     46W
       [Output 3]:   ON <admin:  ON>   530mA    112W
       [Output 4]:   ON <admin:  ON>   251mA     52W
       [Output 5]:   ON <admin:  ON>   223mA     46W
       [Output 6]:   ON <admin:  ON>   525mA    112W
       [Output 7]:   ON <admin:  ON>     0mA      0W
       [Output 8]:   ON <admin:  ON>     0mA      0W
       [Output 9]:  OFF <admin: OFF>     0mA      0W

Type 'help' to get suggestions
DobriyVolk [192.168.xx.zz] 0 rpcmadmin >
```

Figure 4.3.1. Express information output.

Input information:

- voltage for 1 and 2 inputs;
- primary and active is input 1; input 2 in the redundant secondary input;
- total current consumption (on active input 1);
- total power (on active input 1).

Outlet information:

- **Output 0** — Outlet 0 is in a short-circuit condition;
- **Output 1** — Outlet 1 is in the state of overload (according to the set parameters);
- **Output 2** — Outlet 2 is in operating mode under load;
- **Output 3** — Outlet 3 is in operating mode under load;
- **Output 4** — Outlet 4 is in operating mode under load;
- **Output 5** — Outlet 5 is in operating mode under load;
- **Output 6** — Outlet 6 is in operating mode under load;
- **Output 7** — Outlet 7 is in operating mode without load;
- **Output 8** — Outlet 8 is in operating mode without load;
- **Output 9** —Outlet 9 is administratively turned off.

4.3.3. Description of the Color Coding for RPCM CLI

To obtain information quickly, a color indication of the status of inputs and outlets is used. (See Figure 4.3.1.) Below is a brief description of the color signals (designations).

Description of input color signals:

- *green* — input is primary, frequency and voltage within the specified ranges;
- *blue* — input is secondary, frequency and voltage within the specified ranges;
- *red* — lights when there is no frequency (voltage);
- *yellow* — frequency or input voltage is outside the specified limits;
- *grey* — when the input is administratively turned off;
- *if the ground is not connected, the [Ground] column flashes BAD in brown-yellow color*.

Description of the outlet color signals:

- *green* — outlet is switched on and in working order, the load is connected;
- *blue* — outlet is administrable and actually enabled, but the load is not connected;
- *red* — outlet was disabled due to overload of the outlet channel or overload of the input line;
- *yellow* — outlet is turned on, but has an overload condition;
- *grey* — outlet is administratively turned off;
- *purple* — outlet is malfunctioning (administratively on, but physically off).

Note. A similar scheme is used for the physical interface, for the web interface and for the command line interface.

4.3.4. Fundamentals of the RPCM CLI Interface and Getting Help

The basis of the command line interface is *command*.

The command can be supplemented with *subcommands* — one or more.

At the end of the command line, specify *the parameter*, which specifies the scope or object of the application.

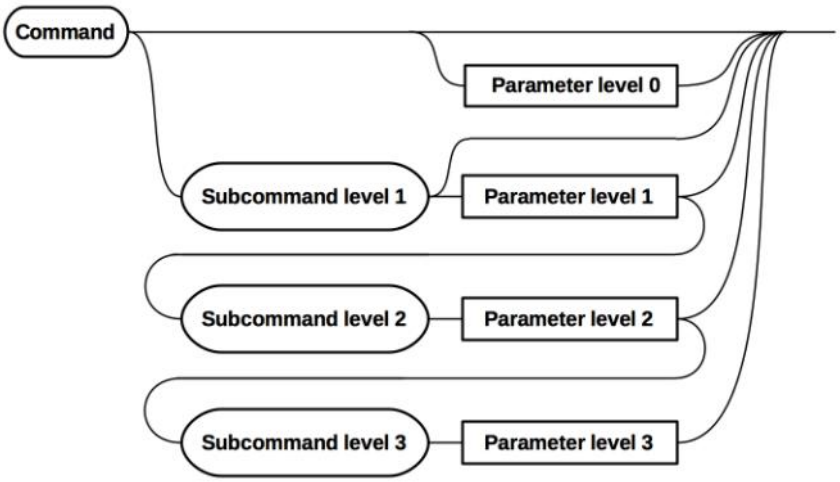

Figure 4.3.2. General scheme of the command line interface.

The built-in help is invoked by the *help* command.

After entering the `help` command, the system displays the available commands:

```
RPCM Commands description:

  exit - exit from command line interface
  help - show this help
  add-add configuration for rpcm subsystems: snmp, etc.
  delete - delete configuration elements for rpcm subsystems: snmp, etc.
  restart - restart outputs, internal-controller and interface-controller
  set - set outputs on / off, input parameters, beeper, etc.
  show-show inputs, outputs, snmp, etc. information
  version - show system software version and system time
  quit command line interface

Type 'help' to get suggestions
```

To get information on each individual command, you must enter the command name and the service word `help` or the question mark `?`

For example, to get information about the available functions of the `set` command, enter:

`set help` or `set?`

The returned description of resulting from the `set` command:

```
RPCM Commands description:

set action-confirmation - set confirmation of actions for the web interface
  enabled                   to enabled (will double check dangerous actions)
  disabled                  to disabled
set all inputs          - set input force failback
  force failback            configuration (available on RPCM1502/RPCM1532)
    delay                     set stabilization delay
    off                       disable failback
    on                        enable failback
set all outputs         - set all outputs state
```

```
  off                       turn them off
  on                        turn them on
set api                   - set api options
  generate-new-key          generate new API access key
  key                       enables or disables existing key
set automation            - set automation parameters
  device-name <name>        for particular device with name
set button-control        - set button control mode
  enabled                   to enabled
  disabled                  to disabled (will disable control from physical
                              buttons)
set buzzer                - set buzzer state
  alternate                 make it alternate
  disabled                  disable it (set buzzer enable required for buzzer
                              to produce sound after this command)
  enabled                   enable it
  off                       turn it off
  on                        turn it on
set cloud                 - allow or disallow export of telemetry
  exportTelemetry           to RPCM.CLOUD
    enable                  allow
    disable                 disallow
set display               - set RPCM display settings
set input 1-2             - set input 1-2 state
  active                    make input active (available on RPCM1502/RPCM1532)
  current limit             set total input current limit
  description               set input description
  frequency limit           set input frequency limits
    max                       top value
    min                       bottom value
  name                      set input name
  off                       turn it off (available on RPCM1502/RPCM1532/
                                                      RPCM4076)
  on                        turn it off (available on RPCM1502/RPCM1532/
                                                      RPCM4076)
  prioritized               set input prioritized (available on RPCM1502/
                                                             RPCM1532)
  recognition               make input blink
  voltage limit             set input voltage limits
    max                       top value
    min                       bottom value
set group <name>          - set various parameters for user's group
set output 0-9            - set output 0-9 state
  description               configure output description
  name                      configure output name
  off                       turn it off
  on                        turn it on
  overcurrent               tune overcurrent limits
  overvoltage               tune overvoltage turn off settings
  recognition               make it blink
  recover turn on after
    overvoltage             configure recover turn on after overvoltage
```

```
                              parameters
  survival priority         set turn off on input overload priority
set radius                - set Radius configuration
  server                      adjust Radius server options
set snmp                  - set SNMP configuration
  adminState                  enable/disable snmp
  community                   adjust SNMP community settings
  trap                        adjust SNMP traps settings
  user                        adjust SNMP users settings
set time                  - set new time
  value                       value
  zone                        zone
  synchronization             toggle ntp synchronization
set user <username>       - set parameters for username
  authenticator               set Authenticator for user
  accessLevel                 set Access Level for user
  disabled                    disables user account
  enabled                     enables user account
  password                    set password for user
set help                  - show this help

Type 'help' to get suggestions
```

We get obtain about using the command *set output <output number>.*

```
set output 0 ?
```

Help displays:

```
RPCM Commands description:

  set output 0-9 off - turn off output number 0-9
  set output 0-9 on-turn on output number 0-9
  set output 0-9 recognition - set output 0-9 recognition state
    off to off
    on to on
  set output 0-9 overcurrent - tune overcurrent limits
    alarm for alarming
    turn off for turning off
  set output 0-9 help - show this help
```

By sequentially typing in subcommands from the previous help output and adding the service word `help` or the question mark `?`, you can get information about all functions of RPCM CLI. The general scheme of work with the help is indicated in Figure 4.3.3.

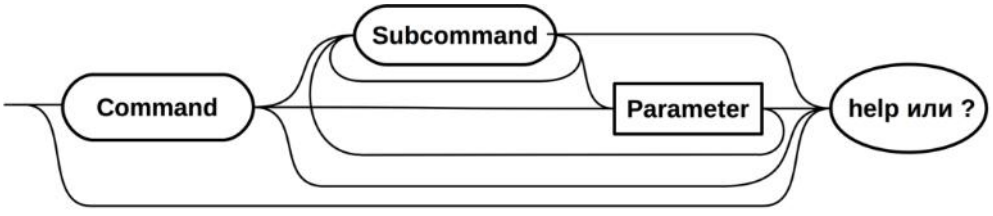

Figure 4.3.3. General scheme of obtaining information

4.3.5. Methods of Working with RPCM CLI

- **View command history** - use the *up arrow key to view previous commands*; use the *down arrow key* to go back.
- **Completion of partially entered commands** — to autocomplete partially entered commands, press the *"Tab"* key, for example, `set o` pressing the *"Tab"* key results in `set output` command.
- **Using abbreviations for commands** — for example, the abbreviation of `sh e` is expanded into full `sh everything` command by pressing the *"Enter"* key.

4.3.6. Interface Features for RPCM without ATS

RPCM without ATS have only one input. In particular, after activation, only one input information is displayed. RPCM ME 1563 does not have the ability to disable / enable a single input and switch between inputs.

In other aspects of its management via SSH CLI is similar to working with other models: RPCM 1502 (16A) and RPCM 1532 (32A).

```
RPCMCli version 0.7.39 is starting
user rpcmadmin successfully authenticated from 192.168.xx.yy, access level superuser
Auto-logout time is set to 3600 seconds

          [Serial Name]: ZloyZayats                    [Temperature]: 28C
        [Serial Number]: RU2017101100000002MO01DN02         [Ground]: GOOD
     [Firmware Version]: 0.9.705           [Firmware Release Date]: 20180831083352
     [Software Version]: 0.7.39            [Software Release Date]: 20190205140647
[Model/Hardware Version]: 1563/RPCM ME                       [Uptime]: 33d+00:59:49
       [Force Failback]: OFF            [Failback Delay in Seconds]: 0

--------------------------------------------------------------------------------
        [Input 1]: 233V @ 49.99Hz    2.338A    0.493KW
--------------------------------------------------------------------------------
       [Output 0]:  OFF <admin:  ON>      0mA       0W    (SHORT)
       [Output 1]:   ON <admin:  ON>    586mA     125W    (OVERLOAD)
       [Output 2]:   ON <admin:  ON>    223mA      46W
       [Output 3]:   ON <admin:  ON>    530mA     112W
       [Output 4]:   ON <admin:  ON>    251mA      52W
       [Output 5]:   ON <admin:  ON>    223mA      46W
       [Output 6]:   ON <admin:  ON>    525mA     112W
       [Output 7]:   ON <admin:  ON>      0mA       0W
       [Output 8]:   ON <admin:  ON>      0mA       0W
       [Output 9]:  OFF <admin: OFF>      0mA       0W


Type 'help' to get suggestions
ZloyZayats [192.168.xx.zz] 0 rpcmadmin >
```

Figure 4.3.4. Summary information for RPCM ME 1563 (63A).

4.4. Input Operation

4.4.1. Short Description

This chapter describes how to configure power inputs.

You can switch into this section using the menu entry *Inputs* or by typing *https://<name_or_IP_RPCM>/inputs* in the browser line (provided that authentication was previously successful).

Figure 4.4.1. "Inputs" section is selected in jump menu.

4.4.2. General Description of the Inputs Section

After a successful enter to the Inputs section, the main window of this section is displayed on the screen.

At the top, we see a modified version of the top bar of the Dashboard — Top Control Bar.

Figure 4.4.2. "Inputs" section — main window.

4.4.3. The Top Control Bar

This panel is intended for displaying general information and switching between modes of operation.

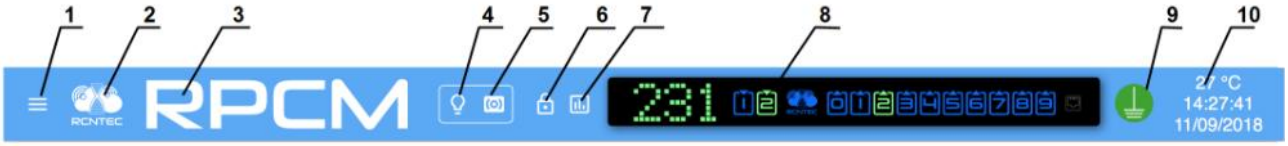

Figure 4.4.3. "Inputs" Section — main window.

Legend:

1 — menu button;

2 — RCNTEC logo (click to visit the RCNTEC website — rcntec.com);

3 — RPCM name (click to visit the RPCM product site — rpcm.pro);

4 — light identification button depicted as a lightbulb image;

5 — sound identification button depicted as a radio-image;

6 — Unlock Control button depicted as a lock;

7 — button to activate showing of Limits on graphs ("Show Limits" button);

8 — Virtual Front Panel, a click on this object switch to Dashboard;

9 — grounding icon;

10 — group of service values: internal temperature in degrees Celsius, time and date.

4.4.4. Information Area of the Inputs Section

There are areas of information and controls for each input below the top bar of the Top Control Bar. These areas can be conditionally divided into left and right parts.

On the left part of each area the information in text values and graphs based on physical sizes is presented:

- voltage in volts;
- frequency in hertz;
- current in milliamps;
- power in watts.

On the right side you can see the following groups of preset values.

"INFORMATION" contains the following data:

- **Name** — specified input name;
- **Description** — comment field of 256 characters long;
- **Frequency** — information about the frequency of the power supply at the input;
- **Active** — indicator of whether the channel is active with a value *Yes*, or a backup with a value — *No*;
- **Priority** — administratively set priority with values *Yes* or *No*
- **Recognition** — indicator of whether the input identification mode is enabled on the device. *OFF* — indicates the identification of the input is not currently enabled. *ON* — that now the input is in identification mode.

"FAILBACK" group contains the following data:

- **Status** — *Yes* or *No*. If set to *No*, failback to the previous active state after fault elimination and stabilization is disabled;
- **Delay, s** — wait time in seconds before returning to the active state. (This parameter is necessary to avoid frequent switching between inputs due to the ever-changing situation when power is applied, for example, if there is interference in the network);

"LIMITS" group contains the following data:

- **Min. frequency, Hz** — minimum permissible frequency;
- **Max. frequency, Hz** — maximum permissible frequency;
- **Min. voltage, V** — minimum permissible voltage;
- **Max. voltage, V** — maximum permissible voltage;
- **Max. current, A** — maximum permissible current.

"COUNTERS" group contains the following data:

- **kWh** — accumulated kilowatt hours (active energy);
- **kVAh** — accumulated kilovoltamp hours (apparent energy);
- **kVArh** — accumulated kilovar hours (reactive energy).

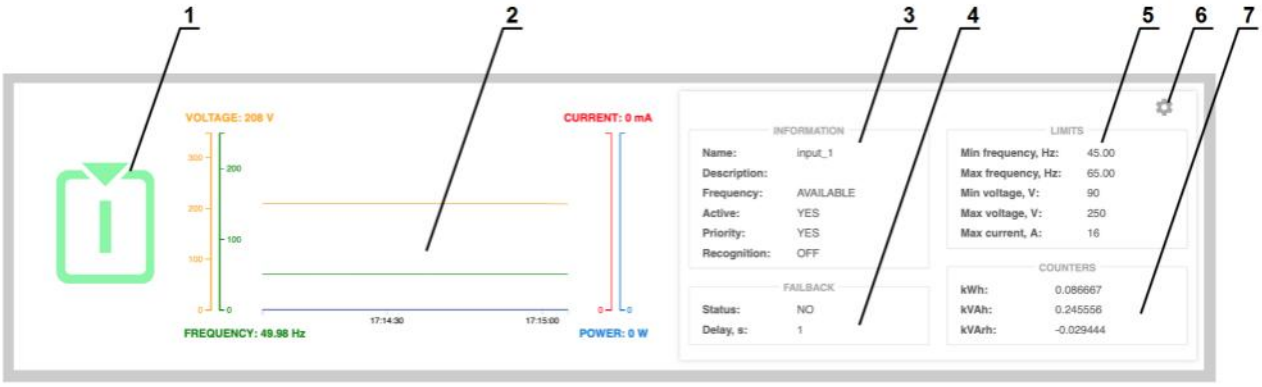

Figure 4.4.4. I input information panel.

Legend:

1 — number of the inlet;

2 — current value graphs area;

3 — *"INFORMATION"* block with the basic values of the outlet;

4 — "*Failback* " block owith field values *Status* and *Waiting*;

5 — "*LIMITS"* block of values for with the maximum allowed parameters;

6 — *"gear"* button to open the "*INPUT SETTINGS"* window;

7 — "*COUNTERS "block* with parameters of power consumption.

4.4.5. Entering and modifying Parameters

To set the input control parameters, the **INPUT SETTINGS** pop-up window is used. To open it, you need to click on the control depicted as a *gear* of the corresponding input.

When you click on the top text information area (to the right of the chart), a pop-up window will be opened to set the parameters of the first input; if you click on the bottom information area — the parameters window for the second input will request to be set.

In the appeared window that appears, you can set the following values:

COMMON INPUT SETTINGS

- **Failback** — two states are available: *Yes* or *No*. As mentioned above, this parameter determines whether this input will be returned to the active state after switching;
- **Delay, s** — wait time in seconds before returning to the active state.

INPUT SETUP 1

- **Name** — specified input name;
- **Description** — comment field of 256 characters long;
- **Priority entry** — administrator-defined priority of input (may be *Yes* or *No*);
- **Max. current, A** — maximum permissible frequency;
- **Min. frequency, Hz** — minimum permissible frequency, min. value 46Hz;
- **Max. frequency, Hz** — maximum permissible frequency, max. value 70Hz;
- **Min. voltage, V** — minimum permissible voltage, min. value 80V;
- **Max. voltage, V** — maximum permissible voltage, min. value 576V.

Note: The specified minimums and maximums are the maximum allowable parameters that can be used in the RPCM Smart PDU settings. Please note that the functionality of the RPCM Smart PDU guarantee stable work only if the limits specified in the technical specification for the model you are using are met. The performance of the equipment connected to the RPCM Smart PDU is determined by the technical specifications of such equipment (please refer to the documentation of the manufacturer of the connected equipment to find out the maximum allowable values).

To confirm entry, press the *APPLY* button. To cancel, instead of pressing **APPLY** simply close the window using the **CLOSE** button.

Figure 4.4.5. INPUT SETTINGS pop-up window (entering the main parameters).

Note: Input 2 is configured in the same way.

4.4.6. Management of Inlets in Control Mode

Figure 4.4.6. Control Mode of the Input Section.

Legend:

1 — inlet number;

2 — instant input voltage value;

3 — instant input frequency value;

4 — **TURN ON** button — turns on the input;

5 — **ACTIVATE** button— switches active input;

6 — **TURN OFF** button — turns off the input;

7 — **IDENTIFY** button — activates input indicator blinking to help locate it quickly in the rack;

8 — instant input current value (milliamps);

9 — instant power consumption (watts).

10 — "*INFORMATION* "text block about the basic values of the outlet;

11 — "*Failback"* text block with field values *Status* and *Delay* ;

12 — "*LIMITS"* text block with the maximum allowed parameters;

13 — "*COUNTERS* text block;

14 — active "*gear" button* to open *INPUT SETTINGS* pop-up window.

4.4.7. Input Management differences of RPCM ME 1563, RPCM 3x250, RPCM DELTA

RPCM ME 1563 (and an interface of RPCM 3x250, RPCM DELTA) has single input.

Figure 4.4.7. "Inputs" Section — main window of RPCM ME 1563.

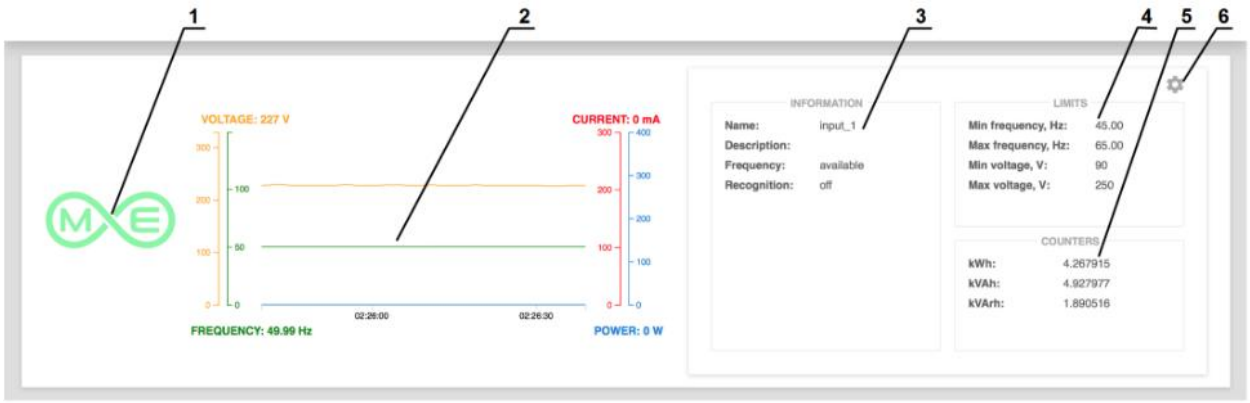

Figure 4.4.8. Information field for input of models RPCM 1502 and RPCM 1532 for example.

Legend:

1 — inlet number;

2 — area of graphs ;

3 — *"INFORMATION"* block with the basic values of the outlet;

4 — "*LIMITS"* block of values for with the maximum allowed minimum parameters;

5 — "*COUNTERS"* block;

6 — *"gear"* button to show the "I*NPUT SETTINGS"* pop-up window.

For Control Mode, if there is only one input, it is not possible to enable input when it is disabled, because RPCM 1563 will be completely de-energized; accordingly, there are no elements **ON**, **OFF** and **ACTIVE**.

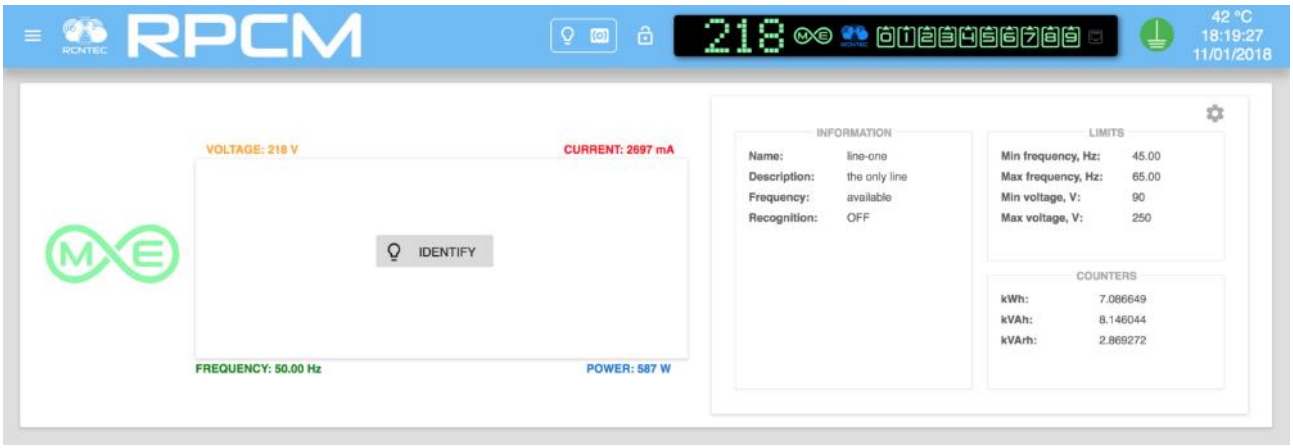

Figure 4.4.9. Control input area in Control Mode for RPCM 1563.

4.4.8. Showing Current Limits on graphs

By default current/voltage/frequency values scales in web-interface's graphs are getting automatically adjusted to the maximum values appeared during the time interval shown on the graph.

Sometimes to evaluate actual usage of current flowing through the RPCM as well as voltage and frequency on different channels you might want to see current consumption of several outlets as well as voltage and frequencies of both inlets in the same scale based on maximum set limits.

To achieve this use "Show Limits" button on the Top Control Bar and turn on limit switches for inlets of interest. After activating this item, the mode for setting a demonstration of the set limits is activated.

Figure 4.4.10. Setting the Showing Current Limits on graphs for RPCM with ATS.

After enabling the demo mode, selected areas of the set limits are turned on for the selected parameters.

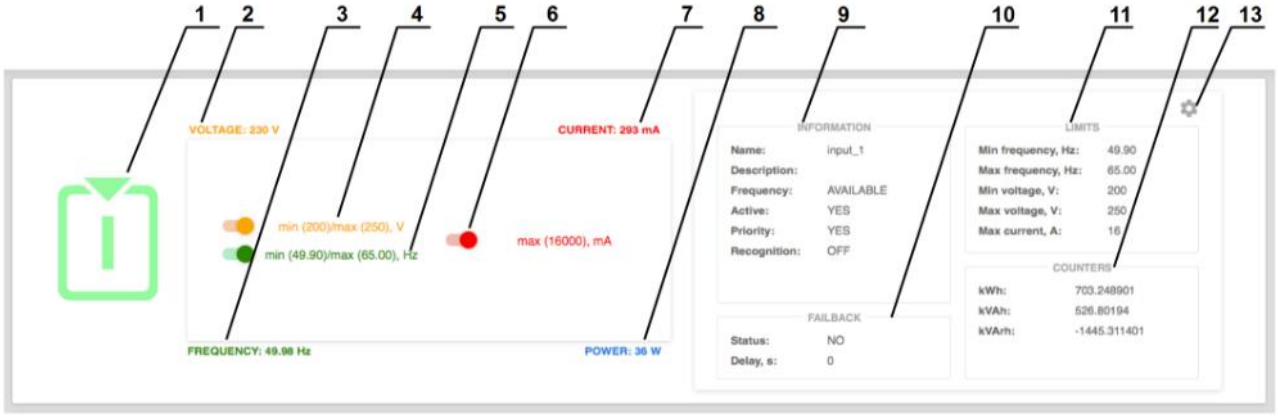

Figure 4.4.11. The setting items for Showing Current Limits in the input area 1 (RPCM 1502, 1532).

Legend

1 — inlet number;

2 — instant input voltage;

3 — instant input frequency;

4 — voltage limit switch;

5 — frequency limit switch;

6 — current limit switch;

7 — instant input current;

8 — instant power consumption.

9 — "*INFORMATION*" block;

10 — "*Failback*" block;

11 — "*LIMITS*" block ;

12 — "*COUNTERS*" block;

13 — "*gear*" button to show the *INPUT SETTINGS* pop-up window.

Figure 4.4.12. Showing Current Limits for the first input is on (RPCM 1502 and RPCM 1532).

4.4.9. Phase and neutral conductors inversion indication

In order to correctly detect and isolate short circuits to protective earthing it is essential to ensure that phase and neutral wires are connected correctly. In case of inverse connection (conductors for phase and neutral swapped), the following message appears in an Input area of the RPCM Dashboard: *"(P <-> N). SWAP INPUT PHASE AND NEUTRAL WIRES TO BE ABLE TO CATCH SHORT CIRCUITS TO PROTECTIVE EARTHING*.

Figure 4.4.13. Notification of incorrect (inverse) connection at input "2".

In order to attract attention, the number of such input will change color (blink) from the main one: blue or green to white.

Figure 4.4.14. When notifying about the incorrect (inverse) connection is on, the inputs number is blinking.

Additional information. RPCM measures current on the phase conductor. Even though IEC320 standard defines location of phase and neutral wires in the plug and the socket, RPCM 1502, comes with the default cable with the Schuko CEE/7 plug, which is not polarized, so when plugged into the socket, phase and neutral wires can be legally interchanged. For other RPCM models this phase and neutral interchange can happen due to human mistakes during wiring of the sockets to which RPCM is connected. If such wiring error takes place, all functions except for the detection of a "phase-> ground" short circuit will work as designed. That is, in case of a short circuit to ground, if the input is connected incorrectly, the current will be measured on the neutral conductor instead of phase conductor, so the short circuit current will not be detected because current doesn't flow through the phase conductor.

4.5. Outlet Operation

4.5.1. Short Description

This section describes how to configure the outlets (outputs) to provide power to consumers.

You can access this section via *Outputs* menu item or by using *https://<name_or_IP_RPCM>/outputs URL* directly in web-browser address bar (provided that authentication passed successfully before).

Figure 4.5.1. Outputs item in menu.

4.5.2. Output (Outlets) section

Figure 4.5.2. Outputs section

4.5.3. Top Control Bar

This panel is intended for displaying general information and switching between modes of operation.

Note. Clicking on the Virtual Front Panel causes a transition to the Dashboard.

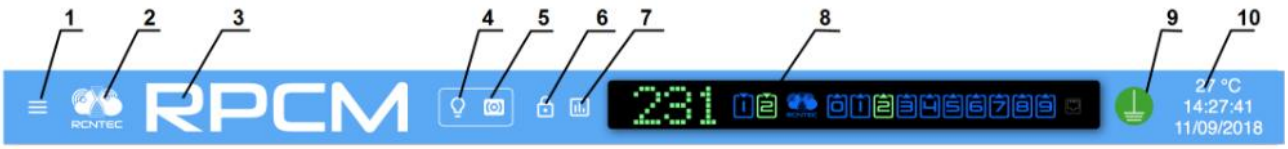

Figure 4.5.3. Top Control Bar

Legend:

1 — menu button;

2 — RCNTEC logo (click to visit the RCNTEC website — rcntec.com);

3 — RPCM name (click to visit the RPCM product site — rpcm.pro);

4 — light identification button depicted as a lightbulb image;

5 — sound identification button depicted as a radio-image;

6 — Unlock Control button depicted as a lock;

7 — button to activate showing of Limits on graphs;

8 — Virtual Front Panel, a click on this object switch to Dashboard;

9 — grounding icon;

10 — group of service values: internal temperature in degrees Celsius, time and date.

4.5.4. Information Area of the Outputs Section

Each area has a graph for the outlet, allowing you to get a visual representation of the physical characteristics of the power supply.

In the left part on each area information is presented in the form of two graphs and in text values according for:

- current in amps;
- active power in watts.

On the right side you can see the following text blocks of preset values (see below).

"INFORMATION" contains the following data:

- **Name** — outlet name;
- **Description** — outlet description (max 256 characters in length);
- **Recognition** — indicator of whether the outlet identification mode is enabled on the device. *OFF* — indicates the identification of the outlet is not currently enabled. *ON* — outlet identification mode is enabled;
- **Survival priority** — outlets with higher absolute values will turn off first in the event of input overload.

"COUNTERS" contain the following data:

- **kWh** — accumulated value of kilowatt hours (active power);
- **kVAh** — accumulated value of kilovoltamp hours (apparent power);
- **kVArh** — accumulated value of kilovar hours (reactive power).

"ALARM LIMIT" contains the following data:

- **Current, mA** — when this value is exceeded for time longer than duration specified in the next field alarm is triggered;
- **Duration, s** — duration of time after which an alert is triggered if the excess current is observed;
- **Reached, times** — number of times the alarm current limit has been reached;
- **Fired, times** — number of times overcurrent alarm fired.

"TURN OFF LIMIT" contains the following data:

- **Current, mA** — when this value is exceeded for time longer than duration specified in the next field outlet turn off is triggered;
- **Duration, s** — duration of time after which outlet gets turned off if the excess current is observed;
- **Reached, times** — number of times the turn off current limit has been reached;
- **Fired, times** — number of times overcurrent turn off has fired.

"OVERVOLTAGE PROTECTION" contains the following data:

- **Overvoltage shutdown limit, V** — if the voltage exceeds the specified value, the output is turned off;
- **Recover turn on after overvoltage, s** - after the voltage returns below the shutdown limit value and the specified time in seconds passes, the output turns back on.

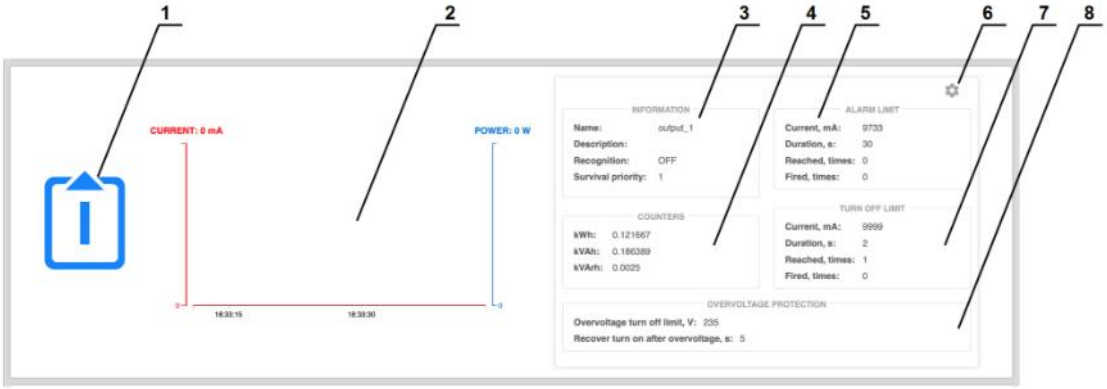

Figure 4.5.4. Presentation of outlet parameters.

Legend:

1 — outlet number;

2 — graph of current and active power;

3 — *"INFORMATION"* block with the basic values of the outlet;

4 — *"COUNTERS"* block with accumulated power consumption counters;

5 — *"ALARM LIMIT"* block;

6 — "*gear*" button to open the "*OUTPUT SETTINGS*" overlay interface;

7 — *"TURN OFF LIMIT"* block;

8 — *"OVERVOLTAGE PROTECTION"* block.

4.5.5. Setting the Output Parameters

To set the outlet parameters, use the *OUTPUT SETTINGS* overlay interface. To open it, click on the "gear" button (on the right side of the screen) of the corresponding outlet.

In the appeared overlay at the top there is an **OUTPUT START SEQUENCE DIAGRAM**, illustrating sequence of activation of outlets according and activation delays. The current outlet is indicated in a dark green color.

List of additional pop-up window settings **OUTLET SETTINGS**:

- **Name** — name of the outlet;
- **Description** — more detailed description;
- **don't turn on automatically after startup** — when voltage is applied to the RPCM after a complete shutdown, this output will remain off;
- **turn on after start-up, s** — delay at start-up; set to avoid high in-rush currents and to start infrastructure in correct order during start-up after power blackout;
- **survival priority** — priority with which the channels are deactivated in case of a general overload (highest is 0, lower is 9, the higher the priority, the later the channel is disconnected in the event of input overload);
- **overcurrent alarm limit, mA** — maximum permissible current; when exceeded, the system initiates alarm condition indication that the limit was exceeded;
- **overcurrent alarm limit, s** — delay in seconds, after which the alarm is activated;
- **overcurrent turn off limit, mA** — maximum permissible current capacity; when exceeded, the system initiates a procedure turning off the outlet due to overload;

- **overcurrent turn off limit, s** — delay in seconds, after which the outlet is turned off;
- **overvoltage turn off limit, V** — maximum permissible overvoltage; when exceeded, the system turns off the outlet due to overvoltage;
- **recover turn on after overvoltage limit, s** — delay in seconds, after which the outlet is turned on when voltage goes back to allowed value.

To confirm entry, press the **APPLY** button. To cancel, instead of pressing **APPLY**, it is necessary to close the window using the **CLOSE** button.

Figure 4.5.5. The CONFIGURE OUTLET pop-up window.

4.5.6. Management of Outlets in Control Mode

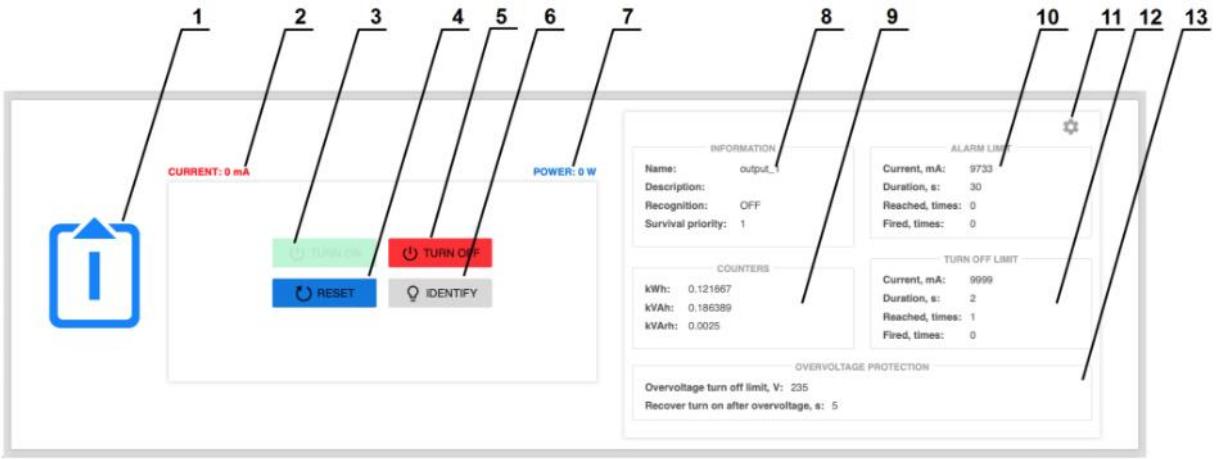

Figure 4.5.6. Elements of Outlets in Control Mode.

Legend:

1 —outlet number;

2 — instants current value;

3 — **TURN ON** button— set on the outlets (if turned off);

4 — **RESET** button;

5 — **TURN OFF** button — turn off the outlets;

6 — **IDENTIFY** button — to turn on LED outlet light locate it quickly on the rack;

7 — power consumption on this outlet;

8 — *"INFORMATION"* block with the basic values of the outlet;

9 — *"COUNTERS"* block with parameters of power consumption;

10 — *"ALARM LIMIT"* block;

11 — "*gear*" button to open the pop-up window "*OUTPUT SETTINGS*";

12 — *"TURN OFF LIMIT"* block;

13 — "*OVERVOLTAGE PROTECTION"* block.

Figure 4.5.7. General view of the section Outputs in Control Mode.

4.5.7. Showing Current Limits on graphs

By default current/voltage/frequency values scales in web-interface's graphs are getting automatically adjusted to the maximum values appeared during the time interval shown on the graph.

Sometimes to evaluate actual usage of current flowing through the RPCM as well as voltage and frequency on different channels you might want to see current consumption of several outlets as well as voltage and frequencies of both inlets in the same scale based on maximum set limits.

To achieve this use "Show Limits" button on the Top Control Bar and turn on limit switches for inlets and outlets of interest.

Figure 4.5.8. Setting Showing Current Limits for the outlet 1.

After enabling the demo mode, selected areas of the set limits are turned on for the selected parameters.

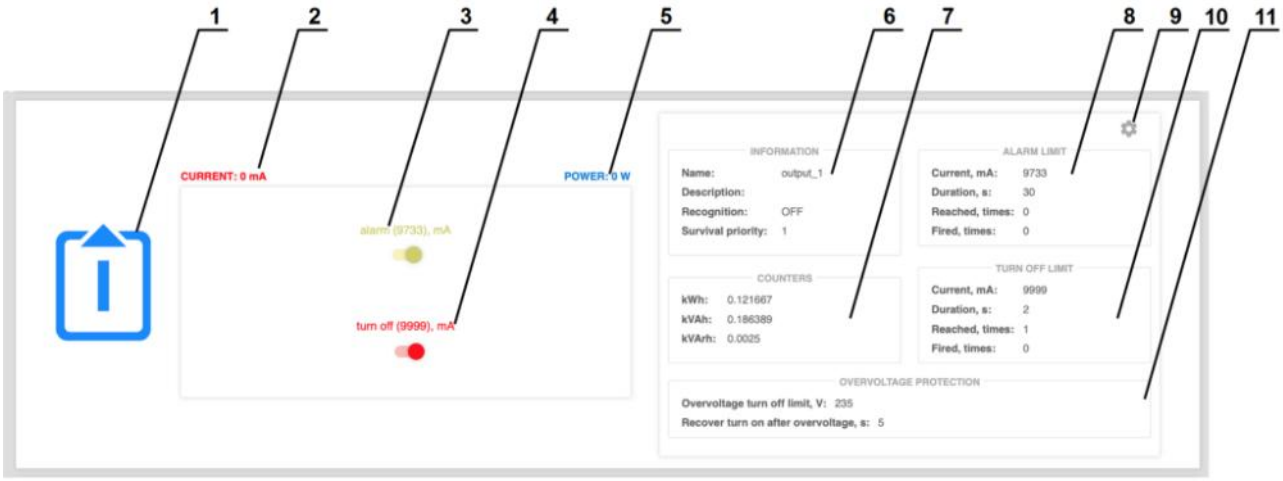

Figure 4.5.9. Setting Showing Current Limits for an outlet are on.

Legend:

1 — number of the outlet;

2 — instant current consumption value (milliamps);

3 — switch on/off S*howing Current Limits* of notification;

4 — switch on/off S*howing Current Limits* of turn off;

5 — instant active power consumption value (watts);

6 — *"INFORMATION"* block with the basic values of the outlet;

7 — *"COUNTERS"* block with parameters of power consumption;

8 — *"ALARM LIMIT"* block;

9 — "*gear*" button to open the pop-up window "*OUTPUT SETTINGS*";

10 — group of set values *"TURN OFF LIMIT"* with the minimum allowed parameters set;

11 — *"OVERVOLTAGE PROTECTION"* block.

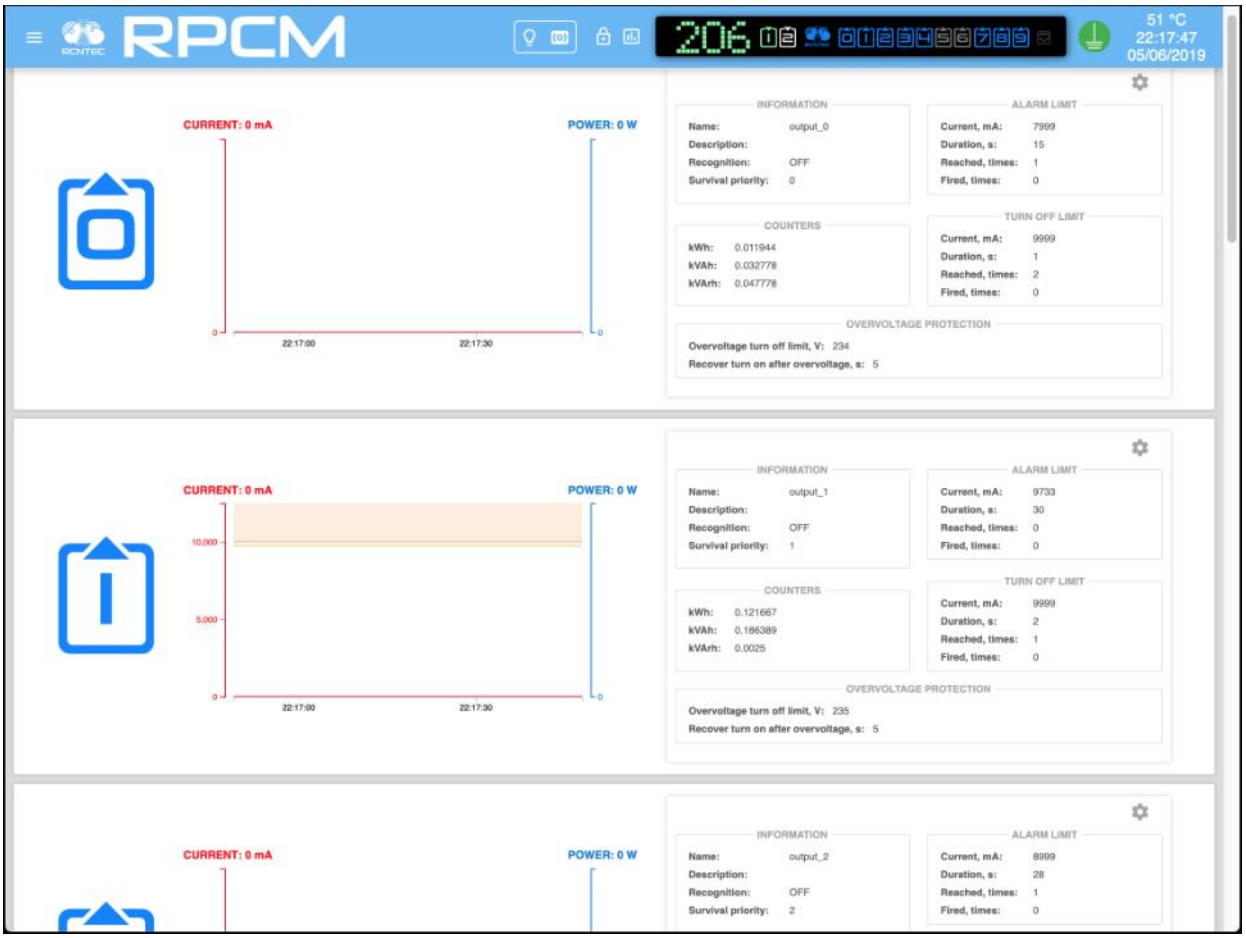

Figure 4.5.10. The Showing Current Limits is turned on for output 1.

4.6. RPCM Configuration Section

4.6.1. General Information

This chapter describes the configuration of device level settings of the Resilient Power Control Module (RPCM).

Almost all the necessary tools for it can be found in the *"Configuration"* section of the web interface.

You can reach to this section by using the menu item *Configuration* or by typing *https://<name_or_IP_RPCM>/configuration/* in the browser string (provided that authentication was previously successful).

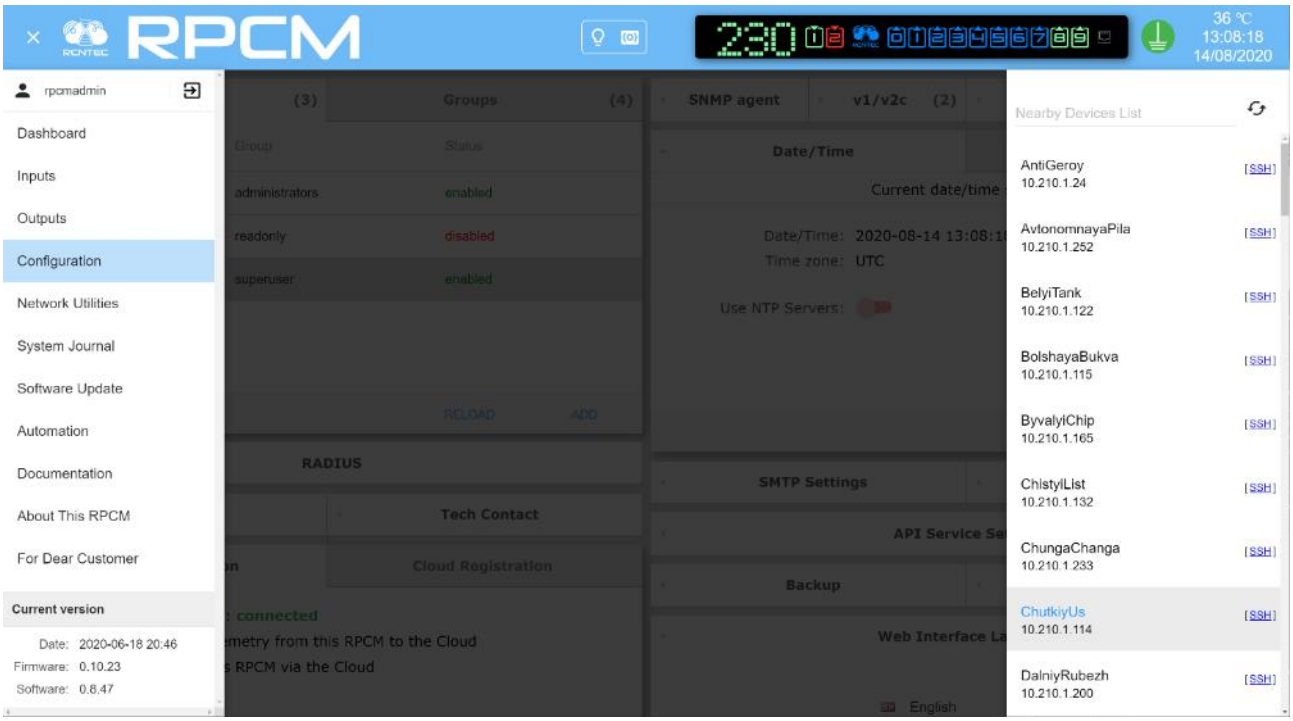

Figure 4.6.1. "Configuration" menu section.

4.6.2. Main Window of the "Configuration" Section

After a successful transition to the "*Configuration*" section, the main window of this section is displayed on the screen.

At the top is a modified version of the upper band of the Control Panel — Top Control Bar.

Under the Top Control Bar are management areas with a set of tabs on which the management objects are concentrated. Each area is designed to manage set of parameters, grouped into to services e.g. "Network Settings".

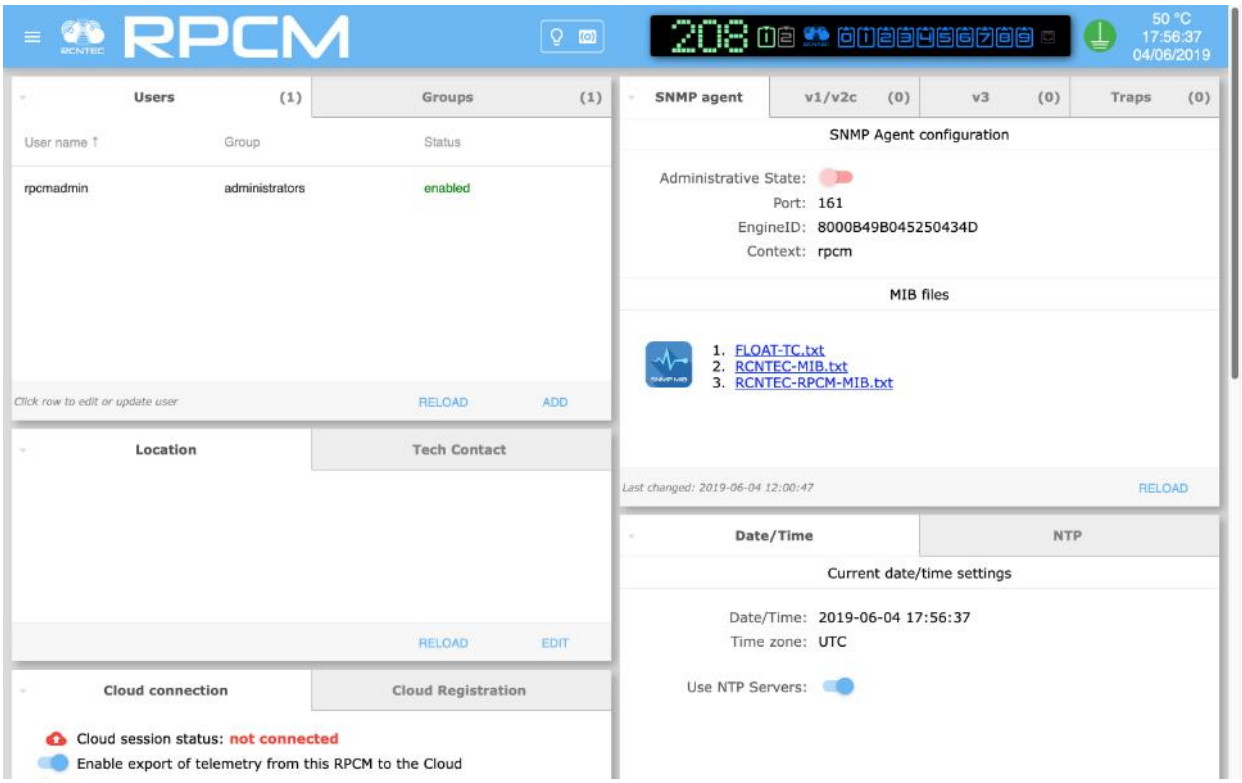

Figure 4.6.2. The window of the "Configuration" section.

Also, the control panel can be collapsed.

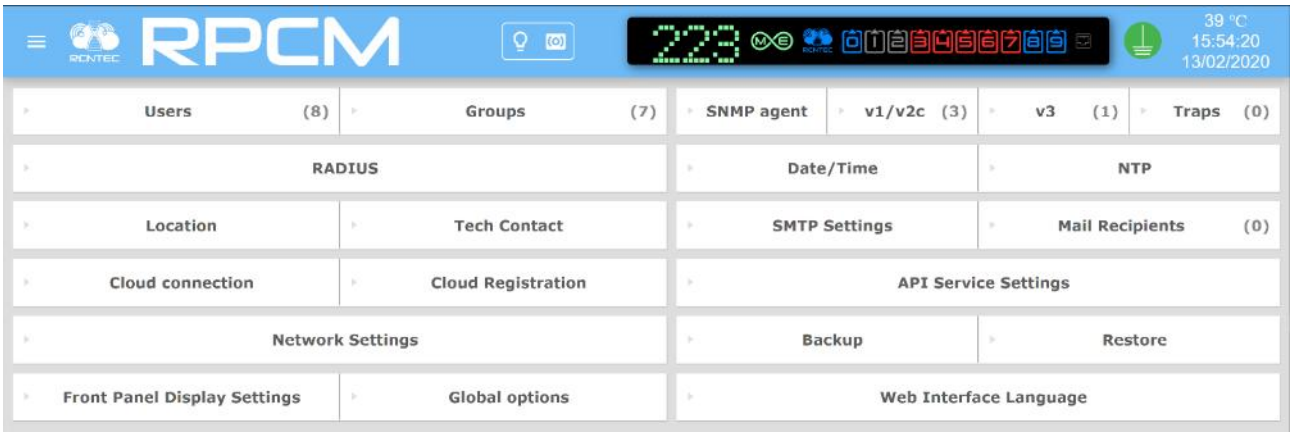

Figure 4.6.3. "Configuration" section is a view with collapsed control panels.

4.6.3. Top Control Bar

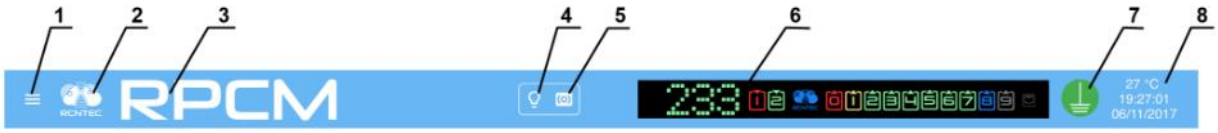

Figure 4.6.4. "Top Control Bar".

Legend:

1 — menu button;

2 — RCNTEC logo (click to visit the RCNTEC website — rcntec.com);

3 — RPCM name (click to visit the RPCM product site — rpcm.pro);

4 — light identification button depicted as a lightbulb image;

5 — sound identification button depicted as a radio-image;

6 — Virtual Front Panel, a click on this object switch to Dashboard;

7 — grounding icon;

8 — group of service values: internal temperature in degrees Celsius, time and date.

4.6.4. General Description of Management Areas

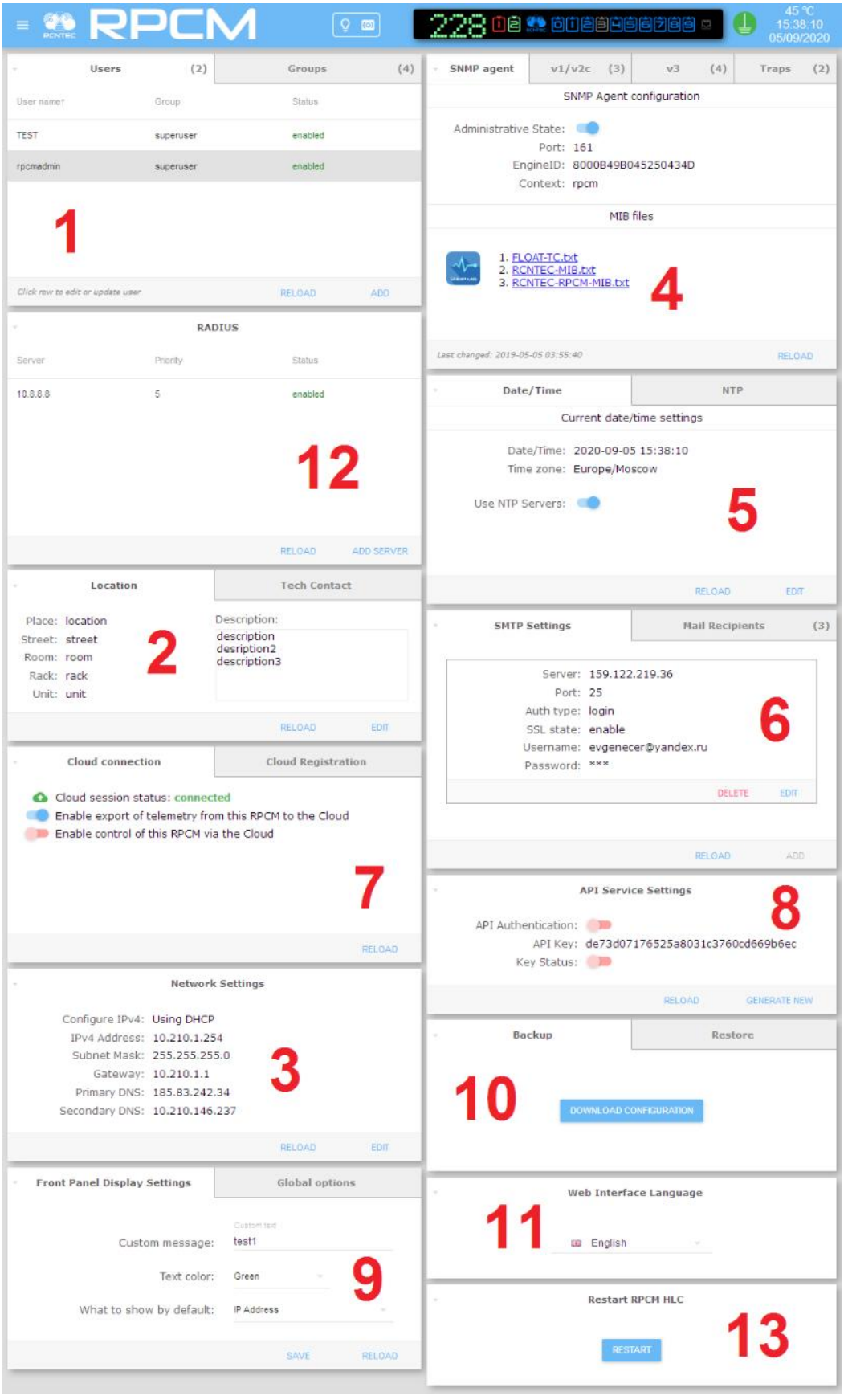

Figure 4.6.5. "Configuration" section— management panels.

Legend:

1 — *Users and Groups* panel;

2 — *Location and Tech contact panel*;

3 — *Network* settings panel;

4 — *SNMP settings* panel;

5 — *Date/Time and NTP settings* panel;

6 — *SMTP Setting* panel;

7 — *Cloud Connection / Cloud Registration* panel.

8 — API *Settings* panel;

9 — Front panel Display settings panel;

10 — Backup/Restore panel;

11 — Language selecting panel;

12 —RADIUS servers settings panel;

13 — HLC (High Level Controller) bypass button.

Note. During the restart, HLC (High Level Controller) is temporarily unavailable: connection to the RPCM management interface, management via Web, SSH, SNMP and REST API, automation functions will be suspended. Power supply, short circuit protection will continue to work.

4.6.5. Setting Up System User Accounts And Groups

When you enter the "*Configuration*" section in the "Users and Groups" control area, the "*Users*" tab is opened to control users.

The following elements of information and management are present in this tab:

- list of created users with indication of group and status (*Enabled* or *Disabled*);
- **RELOAD** button for updating information after account changes;
- **ADD USERS** button to open the window to create a new user.

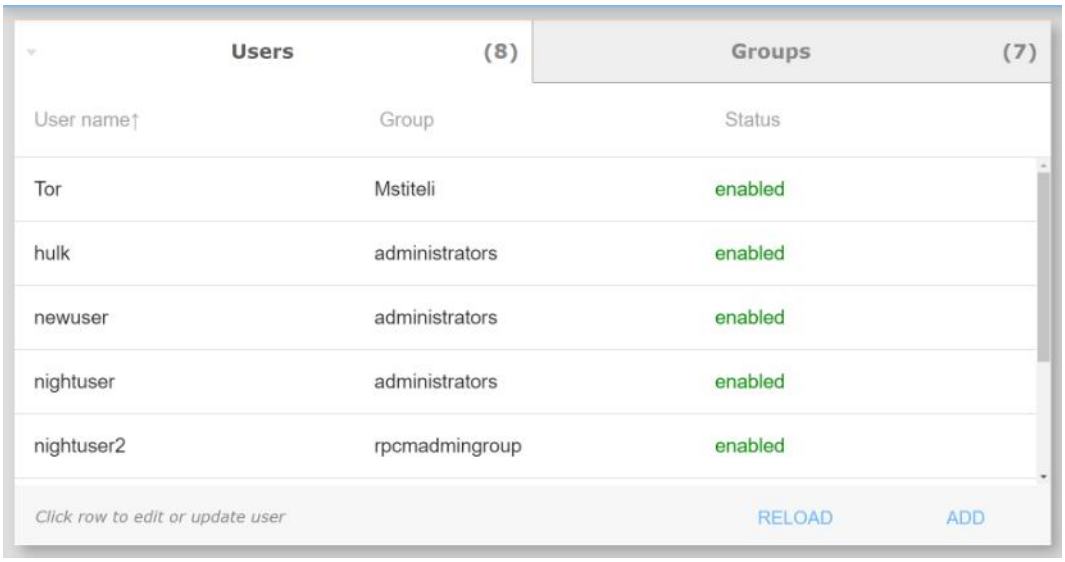

Figure 4.6.6. — Users and groups management panel. The "Users" tab is active.

By default, only one user account *rpcmadmin* is created (with the default password *rpcmpassword*). To enter a new user, press the **ADD** button. The following fields are available in the appeared window:

- **User name** — the name of the new user;
- **Password** — password;
- **Confirm Password** — confirmation of the password;
- **Expiration seconds** — time in seconds after which the session opened under the user's account is expired and interrupted;
- **Access level** — user's privilege level;
- **Disabled** — when this switch is set to ON (blue), the user account will be created, but locked;
- **Authentificator** — "Local", "Local & RADIUS" "RADIUS".

To create an account, click on the **CREATE** button. To cancel, use the **CANCEL** button.

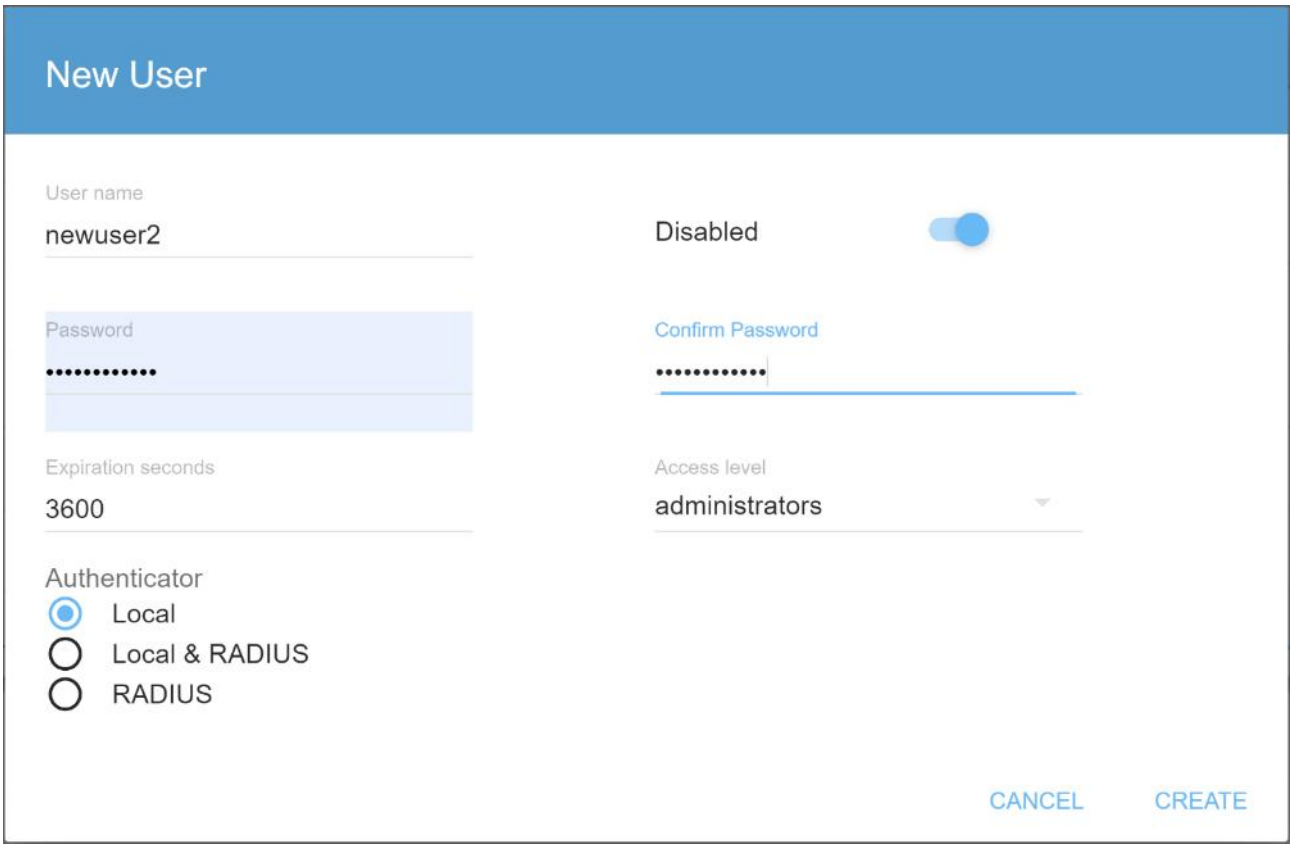

Figure 4.6.7. "New User" pop-up window for creating an RPCM system user account.

To edit an existing account, click on the username and the account settings editing window will open.

The following input fields are available in this window:

- **User name** — the name of the new user;
- **Password** — password;
- **Confirm password** — confirmation of the password;
- **Expiration seconds** — time in seconds after which the session opened under the user's account is expired and interrupted;
- **Access level** — user's privilege level;
- **Disabled** — when this switch is set to *ON* (blue), the user account will be created, but locked;
- **Authentificator** — "Local", "Local & RADIUS" "RADIUS".

Note. If you select "Local", this user will be authenticated by the local authentication DB.

If you select "RADIUS", this user will be authenticated by RADIUS servers (one or more).

If you select "Local & RADIUS" ", the authentication system will try authenticate this user by RADIUS servers. If all RADIUS servers unavailable, will use fallback to local DB.

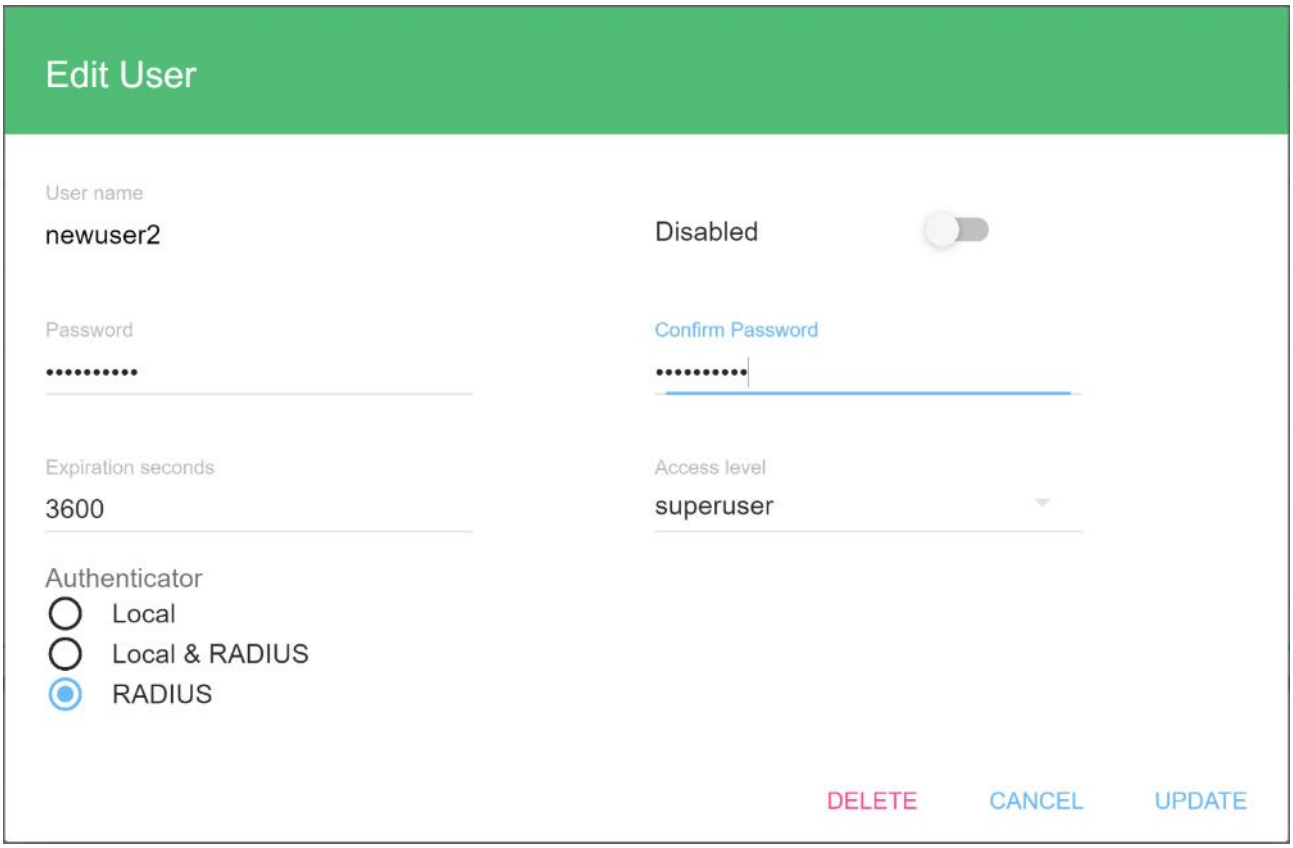

Figure 4.6.8. "Edit User" window for RPCM system user account editing.

To update user account with new settings click **UPDATE** button.

To cancel changes, use the **CANCEL** button.

DELETE button is intended to remove the user. After clicking **DELETE** button a confirmation window will appear to confirm the deletion of this account.

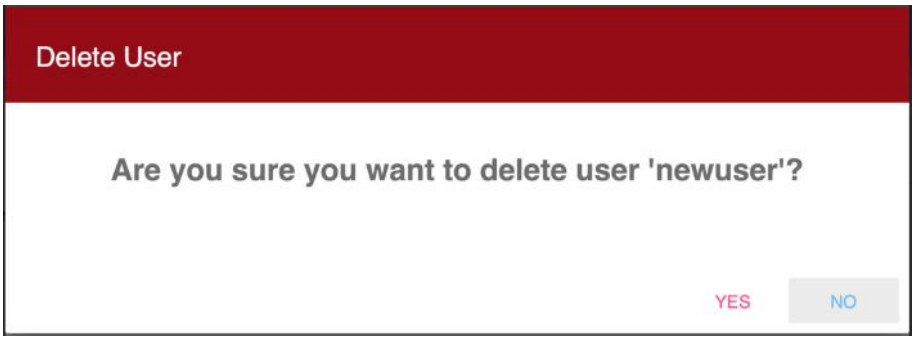

Figure 4.6.9. "Delete User" confirmation window.

Note. Pop-up windows intended to create new entities have a blue title. In turn, pop-up windows for editing parameters have a green title. If the window is intended to confirm a request for some critical action, for example, deleting an object or stopping a service, it has a red heading.

Creating and modifying RPCM system account groups occurs in the same way.

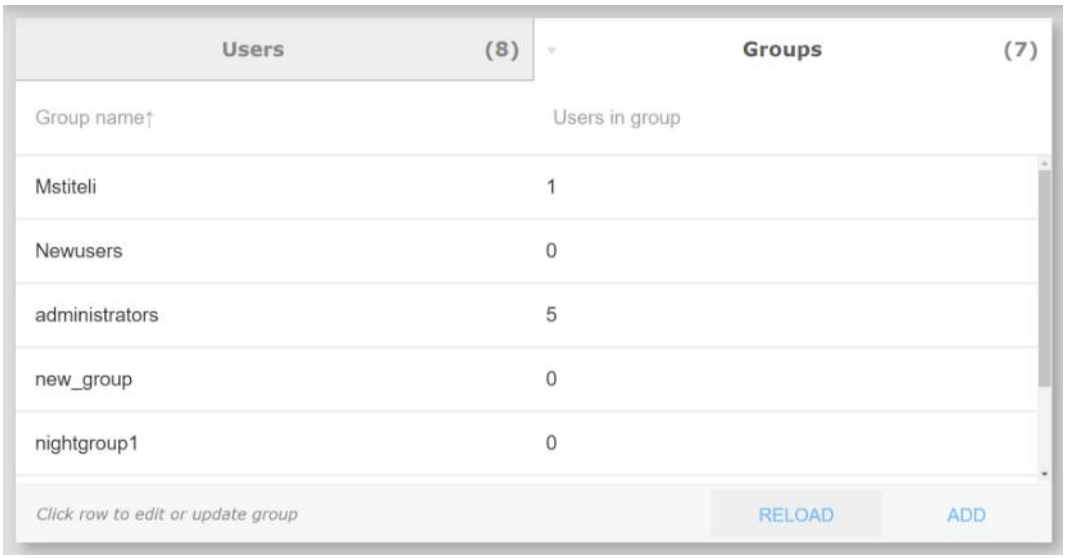

Figure 4.6.10. User and group management panel. Active tab "Group".

To enter a new group, press the **ADD** button. It will show this windows to fill a group name and set UNIX-like permission Read-Write-eXecute (RWX).

Objects for set permission is following (see Figure 4.6.11.):

- configuration (management of RPCM configuration);
- inputs;
- outputs;
- system journal (read-write);
- automation (read-write);
- utils (execute action only).

To create a group, click on the **CREATE** button. To cancel, use the **CANCEL** button.

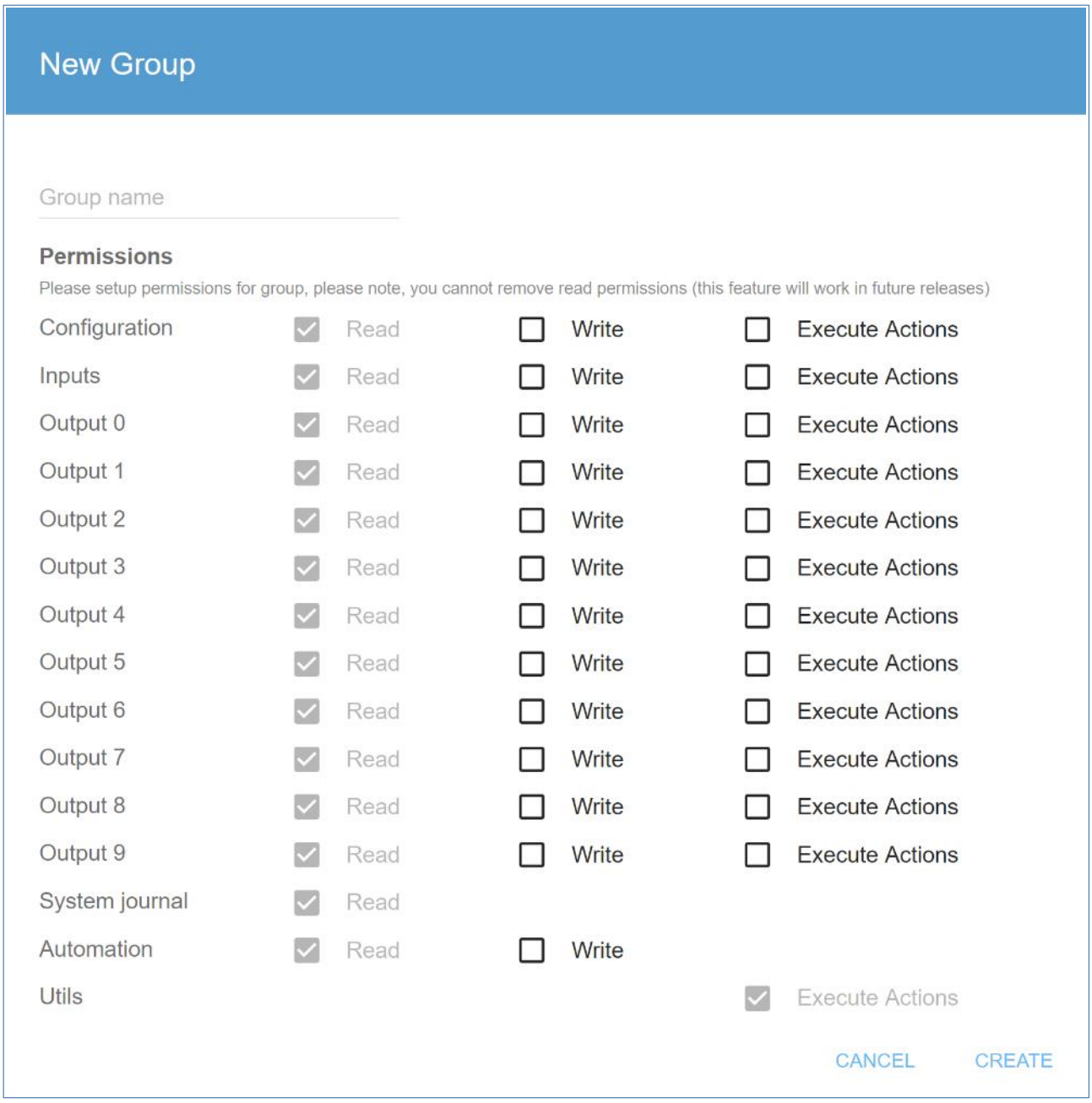

Figure 4.6.11. "New Group" window.

To edit an existing group, click on the groupname and the group settings editing window will open.

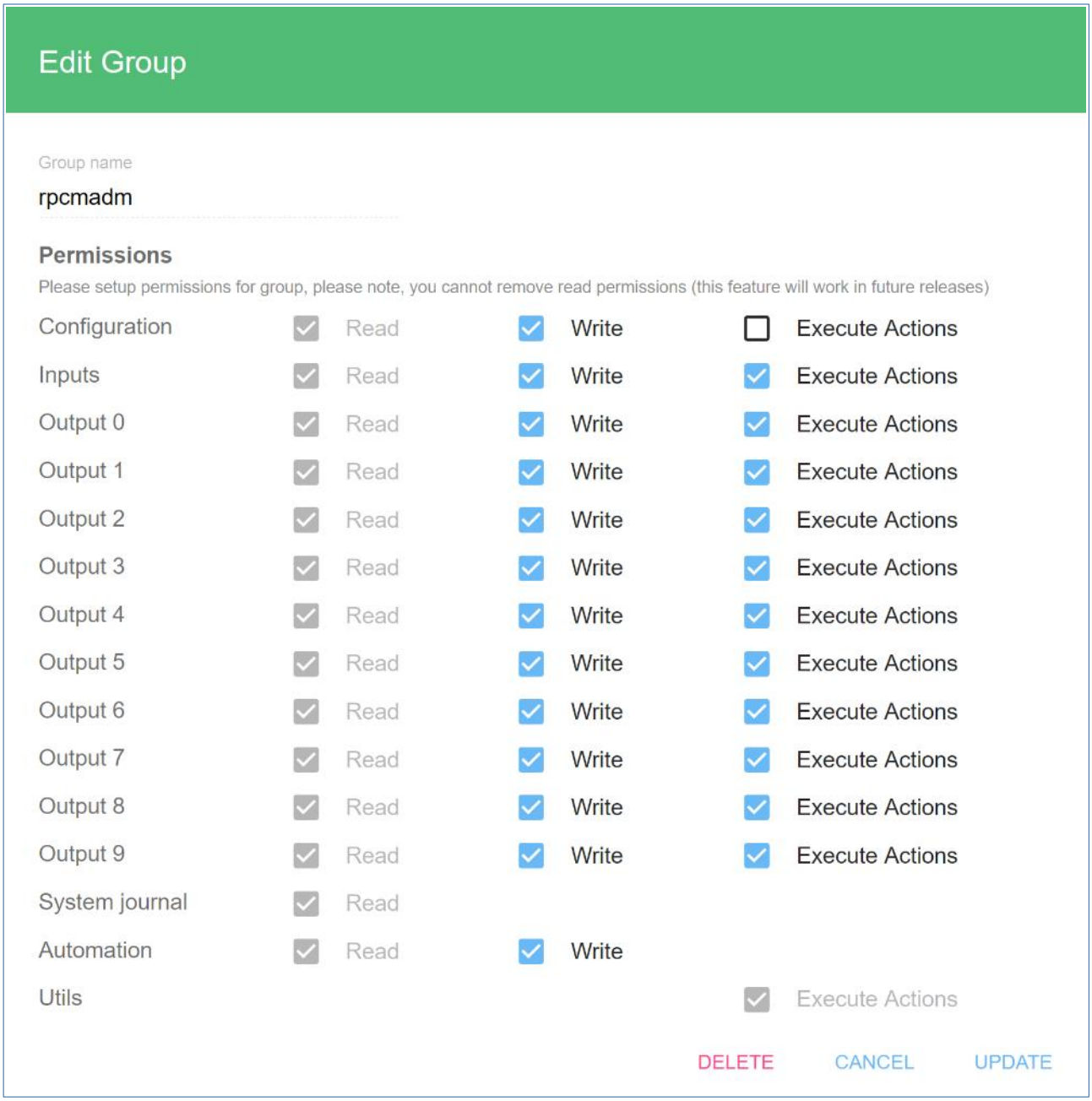

Figure 4.6.12. "Edit Group" window.

To update group information with new settings click **UPDATE** button.

To cancel changes, use the **CANCEL** button.

DELETE button is intended to remove the group. After clicking **DELETE** button a confirmation window will appear to confirm the deletion of this group.

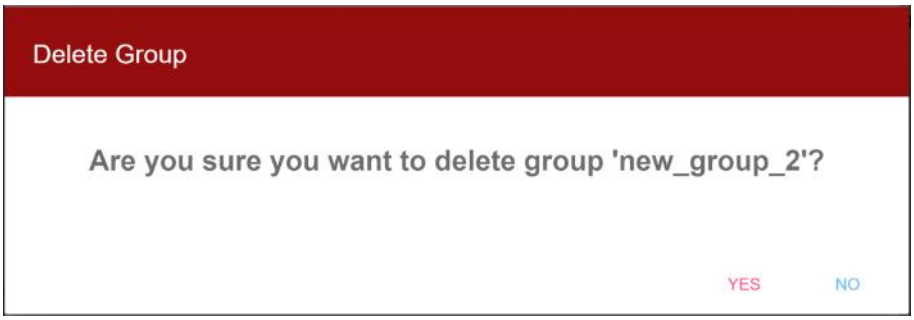

Figure 4.6.13. "Delete Group" window.

4.6.6. Information about Technical Support Location and Contacts

This area serves to fill reference information in order to obtain it quickly in order that it may be quickly obtained when needed.

The following fields are displayed in the Location tab:

- **Place** — name of the place where the device is located;
- **Street** — fill address or other geographic identifier of where this RPCM device is located;
- **Room** — name or number of the room where the device is located;
- **Rack** — coordinates or rack number where the module is mounted;
- **Unit** — unit number in 19" inch rack;
- **Description** — text field for recording additional information.

Also there are **EDIT** button for opening the pop-up window for editing parameters and **RELOAD** button for updating information presented in this area.

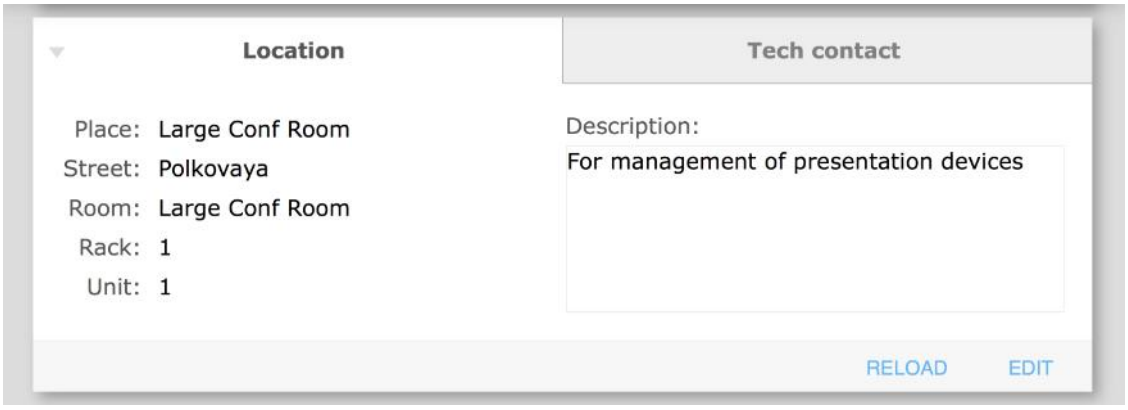

Figure 4.6.14. Location and Tech contact panel. The "Location" tab is active.

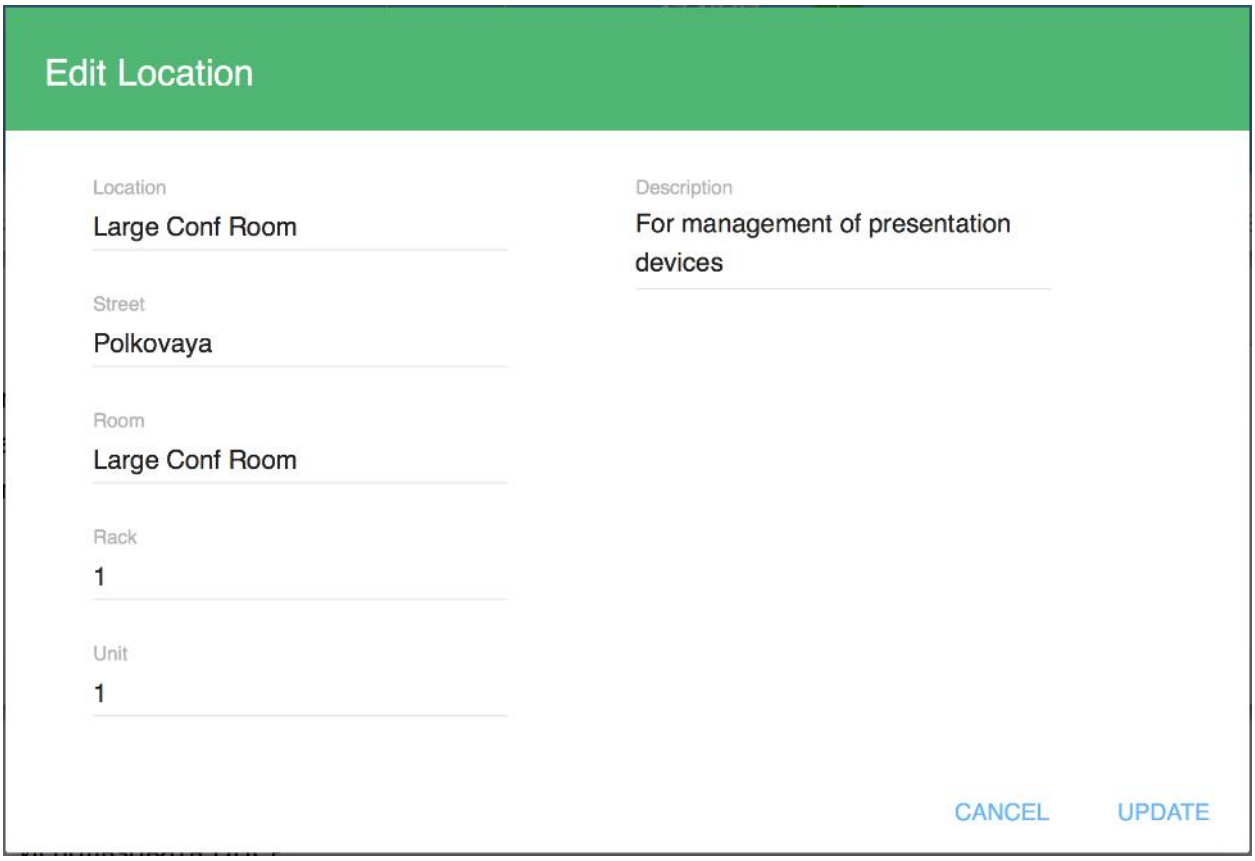

Figure 4.6.15. The "Edit Location" pop-up window.

To save the information entered click the **UPDATE** button.

To cancel changes click the **CANCEL** button.

The "Tech Contact" tab is intended for specifying technical support details, in particular contact number, email and name of the company providing support (or name of the contact person).

Figure 4.6.16. "Location" and "Tech contact" panel. "Tech Contact" tab is active.

You can edit these parameters by opening the edit window by clicking the **EDIT** button.

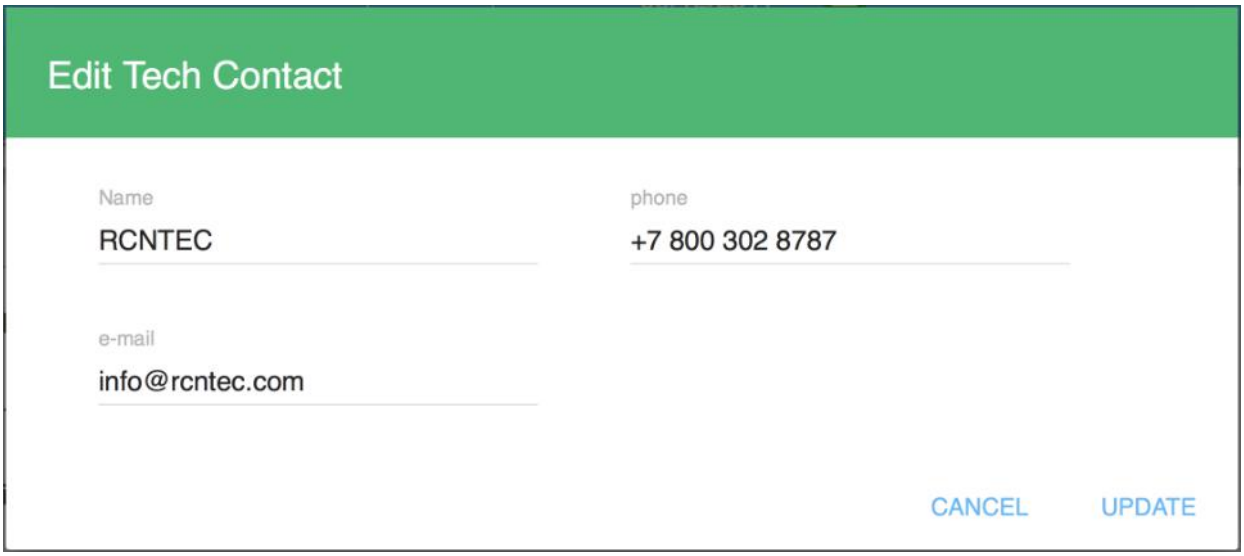

Figure 4.6.17. The "Edit Tech Contact" window.

4.6.7. Network Settings

By default RPCM is configured to obtain IP address via DHCP protocol. In case it cannot obtain IP address via DHCP (for example if DHCP server is not available), RPCM will self-assign the IP address from IP Link Local range (169.254.0.0/16).

It is also possible to configure static IP address settings.

Note. The mechanism for automatic assignment of IP addresses is named *Automatic Private IP Addressing (APIPA)* or *IPv4 Link Local (IPv4LL)* or *Zero Configuration Networking*. When using this method of network address configuration, IP is automatically assigned from the range of 169.254.xxx.xxx, network mask (Netmask) 255.255.0.0 (another designation is CIDR — 169.254.0.0/16).

The following fields are available in the Network Settings area:

- **Configure IPv4** — Using DHCP (or static address);
- **IPv4 address**;
- **Subnet mask**;
- **Gateway** — default gateway;
- **Primary DNS** — IP address of the primary DNS server;
- **Secondary DNS** — IP address of the secondary DNS server.

There are also **EDIT** button for opening the pop-up window for editing network parameters and the **RELOAD** button to refresh information in this area.

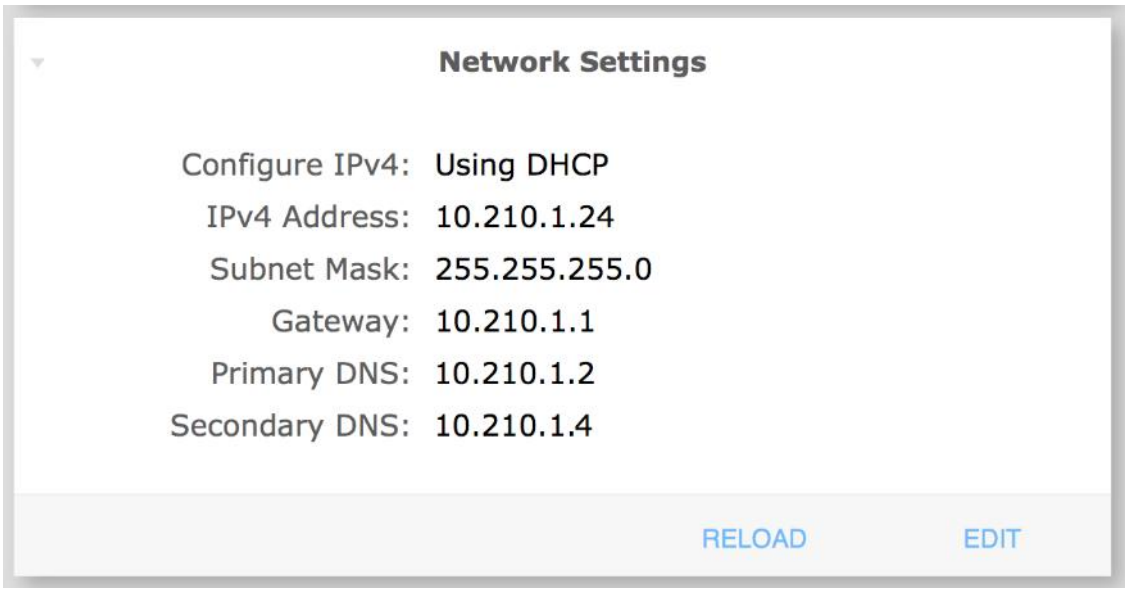

Figure 4.6.18. "Network Settings" panel.

To assign the static IP address, click the **EDIT** button, then in the pop-up window that appears choose Static in Configure IPv4 field and enter static IP address parameters in fields below.

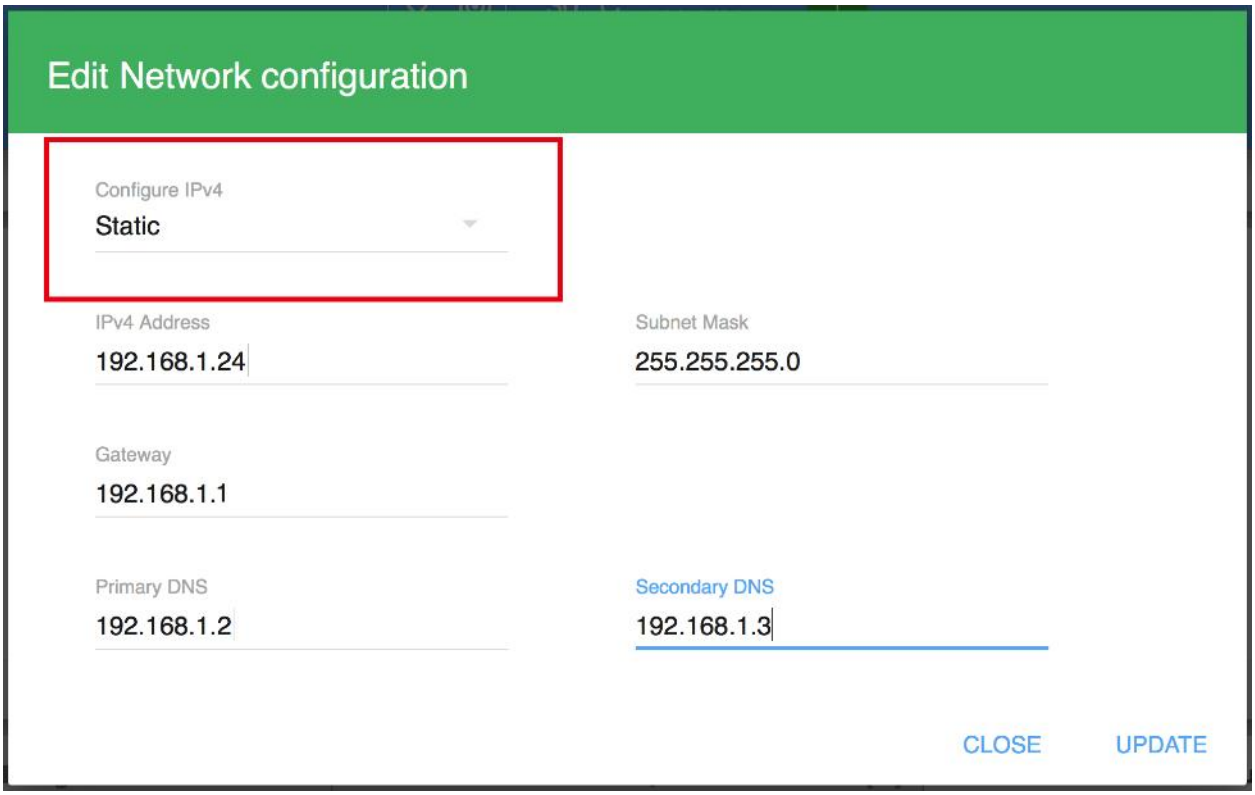

Figure 4.6.19. The "Edit Network Configuration" pop-up window. Red box shows the Configure IPv4 item for switching to the static address mode.

To save the entered information click the **UPDATE** button.

To cancel changes, click **CANCEL**.

4.6.8. SNMP Settings

4.6.8.1. General Settings of SNMP

The SNMP panel contains four tabs:

- **SNMP agent** — general settings of the SNMP agent;
- **v1/v2c** — set up the community-based authentication for SNMP versions 1 and 2c;
- **v3** — configuration of authentication based on user accounts for SNMP version 3;
- **Traps** — configuration of address to send SNMP traps.

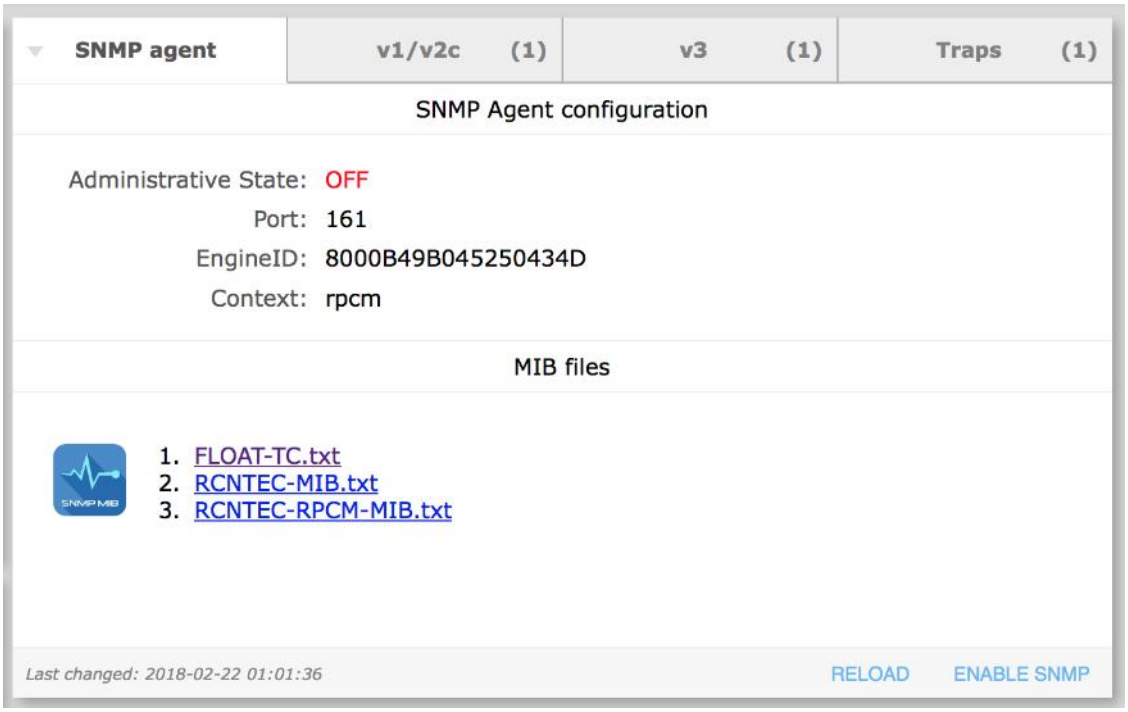

Figure 4.6.20. SNMP management panel. "SNMP agent" tab is active.

The SNMP Agent tab consists of two areas:

1 *SNMP Agent configuration* — to get information and enable / disable SNMP agent service;

2 *MIB files* — MIB files download links.

Additional information. Management Information Base (MIB) — is a list of data (parameters) used to manage objects in the communication network. MIB files are used by infrastructure management and monitoring software to use user readable names for parameters instead of digit based OID (object identifiers).

The *"SNMP Agent configuration panel"* contains the following fields:

The fields are:

- **Administrative State** — the state of SNMP agent service - ON or OFF, by default — OFF;
- **Port** — port for network access - 161;

- **EngineID** — unique device identifier to distinguish it among other interrogated devices according to SNMP protocol;
- **Context** — name of context (ContextName).

The only available change is to enable the use of SNMP by enabling the SNMP agent. To do this, use the **ENABLE SNMP** button. After activating it, a pop-up window with a green header with the title "Change SNMP agent administrative state" will ask you to confirm enabling SNMP.

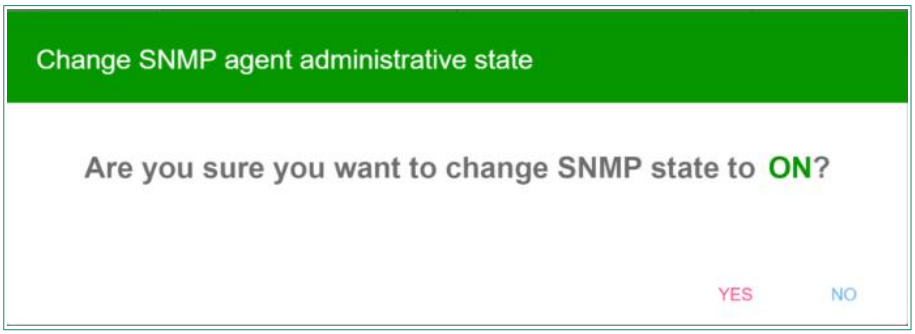

Figure 4.6.21. Window confirmation that SNMP is enabled.

Figure 4.6.22. SNMP management panel. SNMP agent is ON.

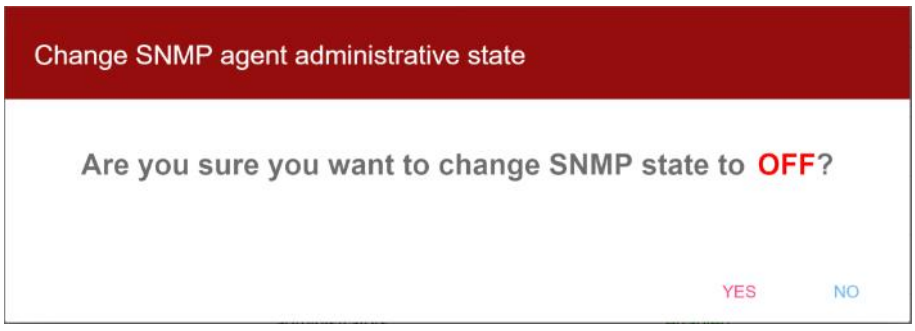

Figure 4.6.23. Window to confirm disabling of SNMP.

Also you can disable SNMP agent. To do this, use the **DISABLE SNMP** button. After clicking **DISABLE SNMP**, a pop-up window with the red title "Change SNMP agent administrative state" will ask you to confirm disabling SNMP.

Additional information.

The first version of the protocol SNMPv1 is organized the simplest and least security. The basis of SNMPv1 security is the Community-based Security Model, that is, authentication based on a single text string- a kind of group name and a two-in-one password (there is even the term "community- string"). In fact, the name of community is a kind of password. This "key" is broadcast in the body of the message in clear text. Community is of two types: read-only (read only values of variables) and read-write (read and write values of variables). Despite the low level of security, SNMPv1 is still in use thanks to simplicity of implementation.

SNMP version 2 in the latest revision *SNMPv2c* also uses *Community-based Security,* however, owing to the changes introduced to it, the performance of the protocol is significantly improved, and security improvements have also been made.

The third version of the protocol — *SNMPv3* supports *User-based Security Model* and *traffic encryption*. At the same time, these functions are not mandatory.

Note. The SNMP community name is case sensitive.

4.6.8.2. Control Access to RPCM via SNMP version 1 and 2c

Use *"v1/v2c"* tab to control access to RPCM via SNMP version 1 and 2c.

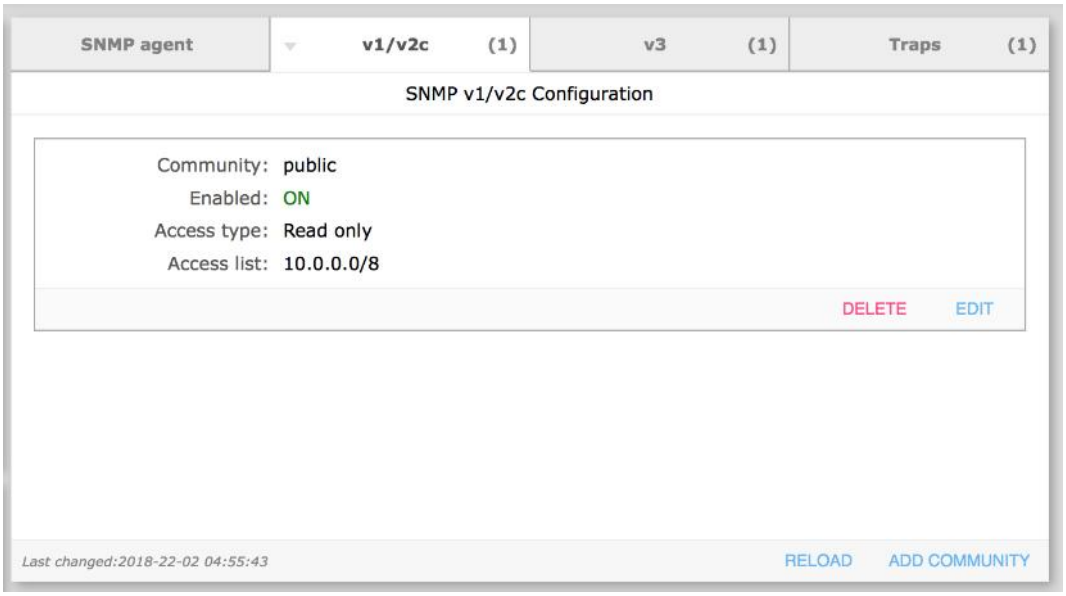

Figure 4.6.24. SNMP management panel. The tab "v1/2c" is active.

This tab provides information:

- **Community** — configured community string;
- **Enabled** — indicator of whether the particular community has been enabled or disabled. Can be *ON* or *OFF*;
- **Access type** — type of access. Can be *Read only* or *Read / Write*;
- **Access list** — list of subnets (comma separated if more than 1) for which access is allowed.

This tab has the following action buttons:

- **DELETE** — to delete the current SNMP community record;
- **EDIT** — to edit the current SNMP community record;
- **RELOAD** — to refresh information in the SNMP management panel.
- **ADD COMMUNITY** — to create a new SNMP community record;

To create a new SNMP community record, use the **ADD COMMUNITY** button. The "New SNMP community" window will appear.

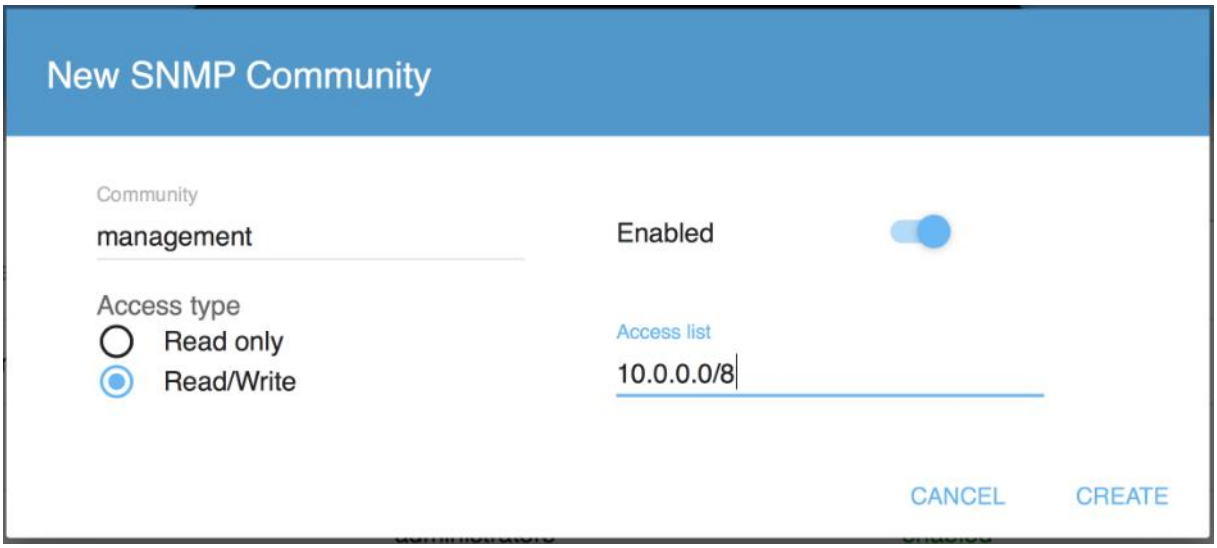

Figure 4.6.25. "New SNMP community" pop-up window.

You need to give community a name, choose whether it will be Read Only or Read/Write as well as configure access list to define list of subnets that will be allowed access to this community.

Subnet format is network_address/subnet_mask, for example: 10.0.0.0/8 or 172.16.0.0/12 etc

To specify several subnets that need to have access to the community, type in the comma separated subnet list, for example: "10.0.0.0/8, 172.16.0.0/12, 192.168.0.0/16",

Note the Enabled switch. If it is turned off then this particular community will be created but will not be active.

To confirm the creation of a new SNMP community entry, click **CREATE** button.

To cancel the creation, click **CANCEL**.

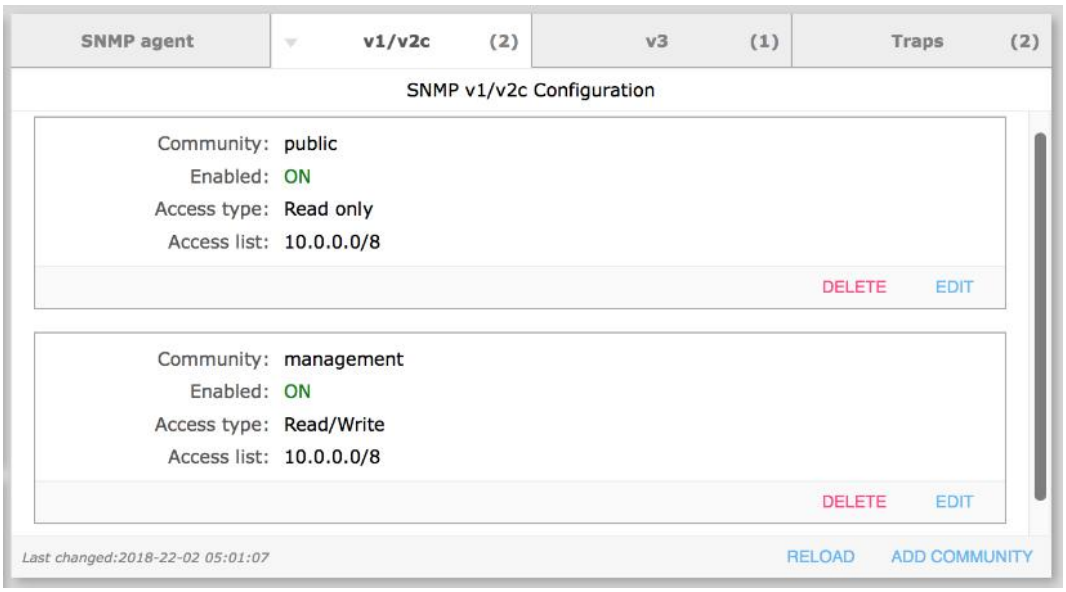

Figure 4.6.26. SNMP management panel, "v1/2c" tab. The new SNMP community "management" was created.

Note. Tab title contains number of configured records in parentheses.

Use **EDIT** button within the record to open the pop-up window to make the necessary changes. For example, set the community entry to *"Enabled: ON"*

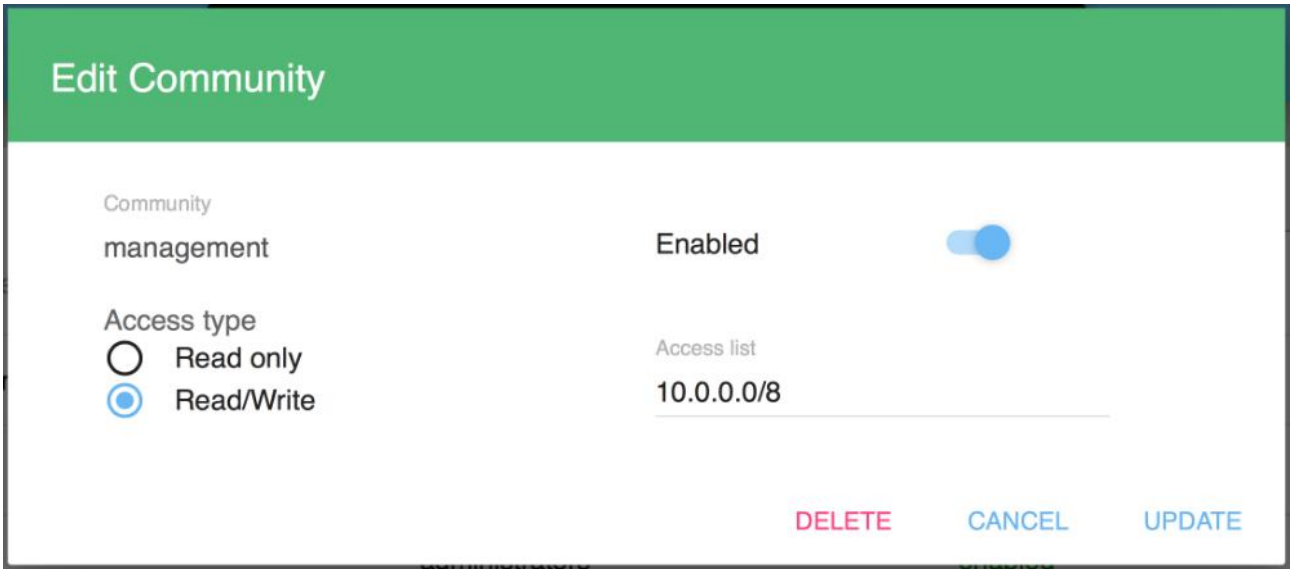

Figure 4.6.27. The "Edit Community" (SNMP) window.

Use ***DELETE*** button to remove the SNMP community record.

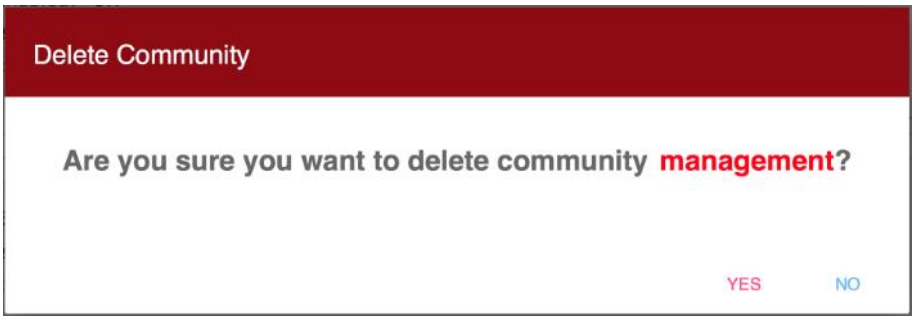

Figure 4.6.28. Confirmation of removal of the SNMP community record.

4.6.8.3. Access management via *SNMPv3* protocol

Access control via *SNMPv3* protocol is located in the tab *"v3".*

As it was said above, the basis of the SNMP protocol version 3 security is authentication using user accounts.

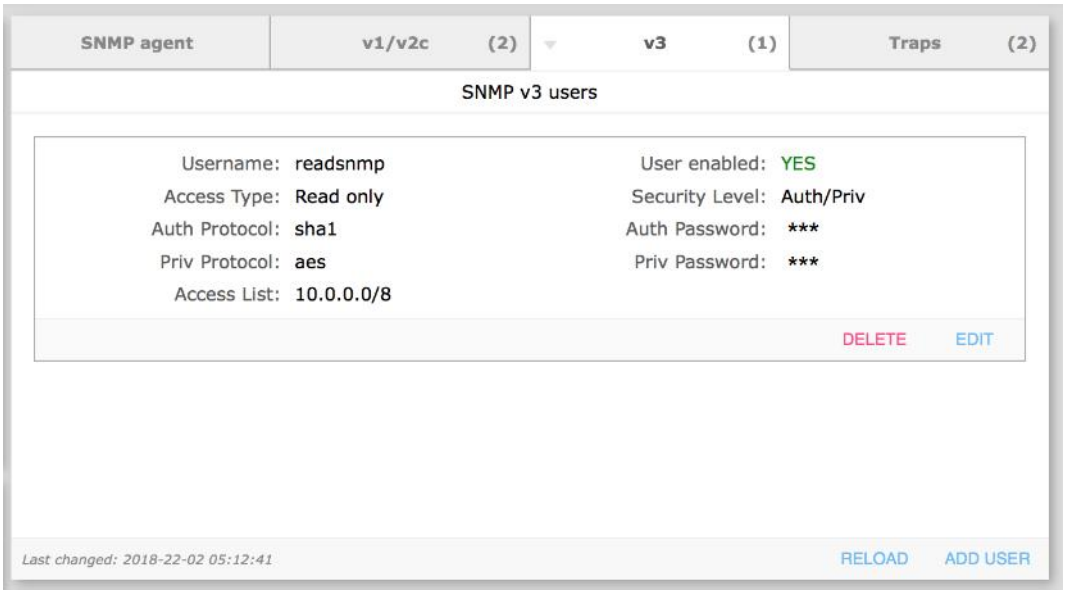

Figure 4.6.29. SNMP management panel, "SNMP v3 Users" tab.

The "SNMP v3 Users" tab displays the following fields:

- **Username** — username;
- **Access Type** — either *"Read only"* or *"Read / Write"*;
- **Auth Protocol** — authentication protocol: "*md5*" or "*sha1*";
- **Priv Protocol** — encryption protocol: *"des"* or *"aes"*;
- **Access List** — which IP addresses/subnets are allowed for this user (if you need to specify multiple IP addresses or subnets, type them in separated by commas);
- **User enabled** — "*YES*" or "*NO*";

- **Security Level** — NoAuth/NoPriv (just username for authentication), Auth/NoPriv (use password but no encryption), Auth/Priv (use password and encryption);
- **Auth Password** — password of the user for authentication;
- **Priv Password** — key for encryption.

This tab has the following action buttons:

- **DELETE** — to delete the current SNMP user record;
- **EDIT** — to edit the current SNMP user record;
- **ADD USER** — to create a new SNMP user record;
- **RELOAD** — to update information in the SNMP management panel.

To create a new SNMPv3 user account, use the ***ADD USER*** button. A *"New SNMP User"* pop-up window will appear.

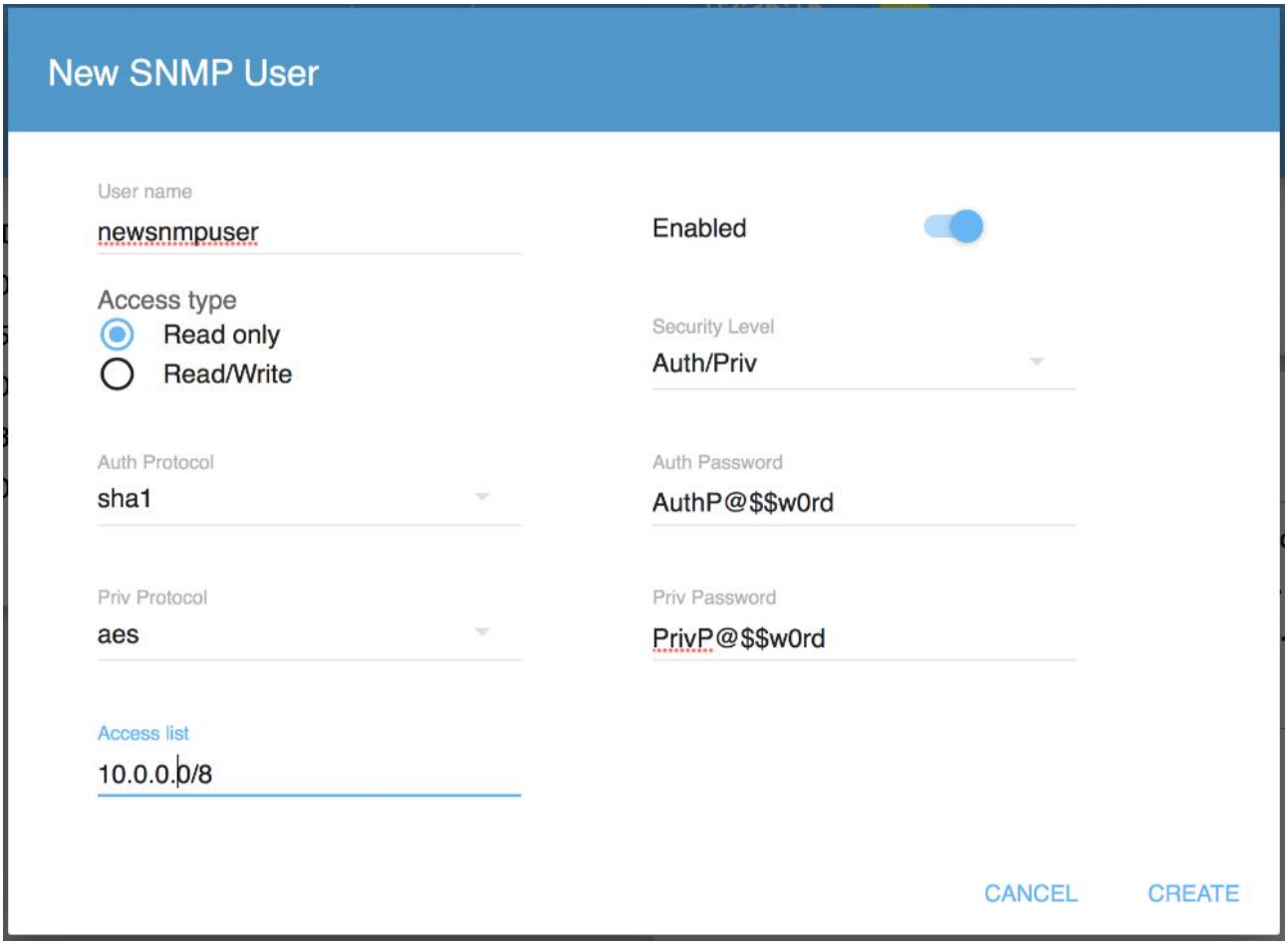

Figure 4.6.30. "New SNMP User" pop-up window.

Please note the "Enabled" switch. If it is turned off then the user will be created but will not be active.

To confirm the creation of a new SNMPv3 user, click **CREATE** button.

To cancel user creation, click **CANCEL**.

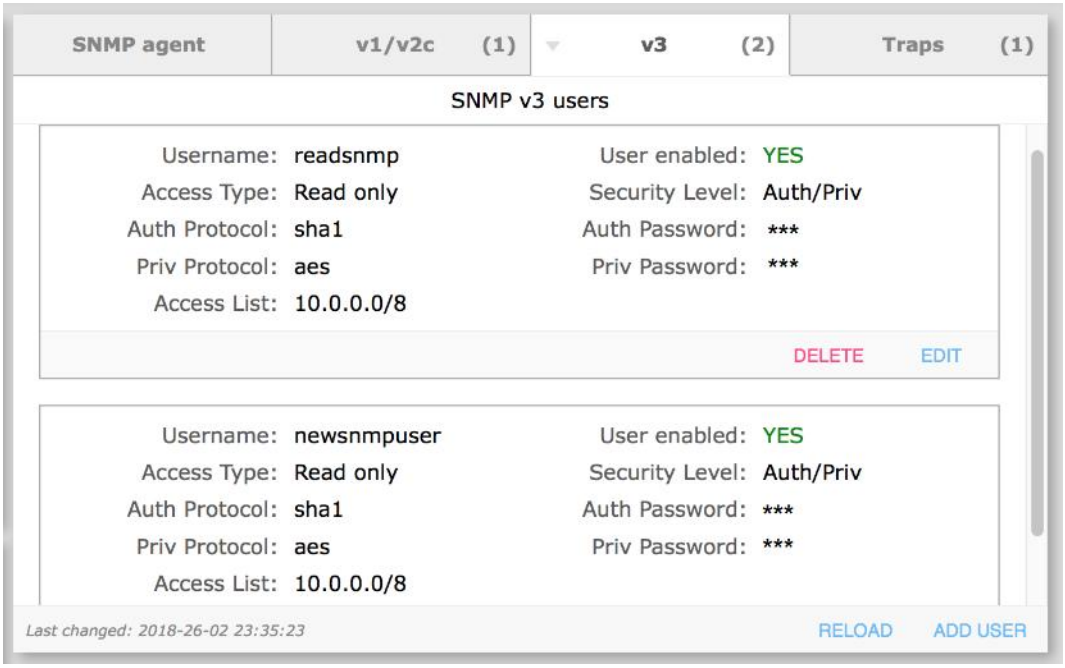

Figure 4.6.31. SNMP management panel. "SNMP v3 Users" tab. A new SNMP user record has been created.

If you need to make changes to SNMP user configuration, click the **EDIT** button within the SNMPv3 user record to open "Edit SNMP User" pop-up window.

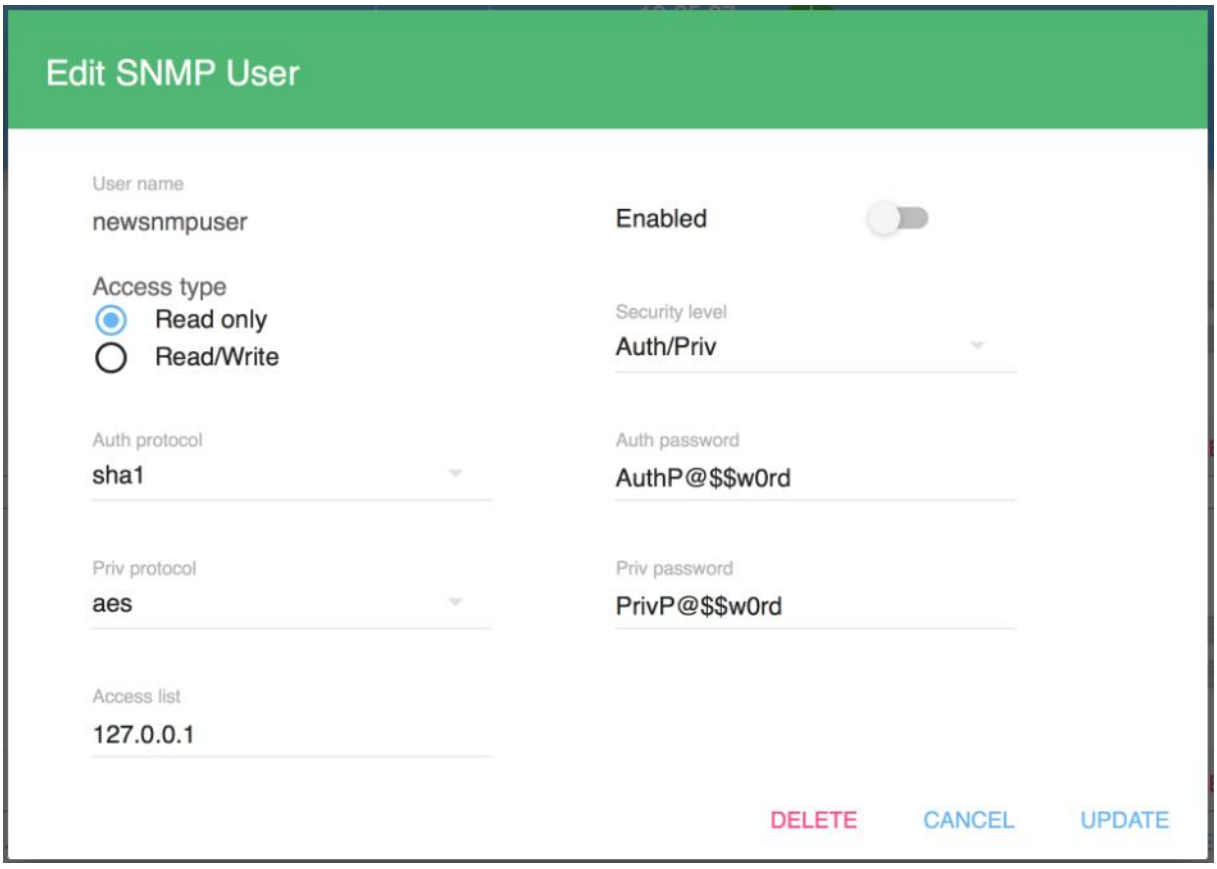

Figure 4.6.32. "Edit SNMP User" window.

Use **DELETE** button either from the "Edit SNMP User" window or from the SNMP management panel user record, to delete SNMPv3 user account.

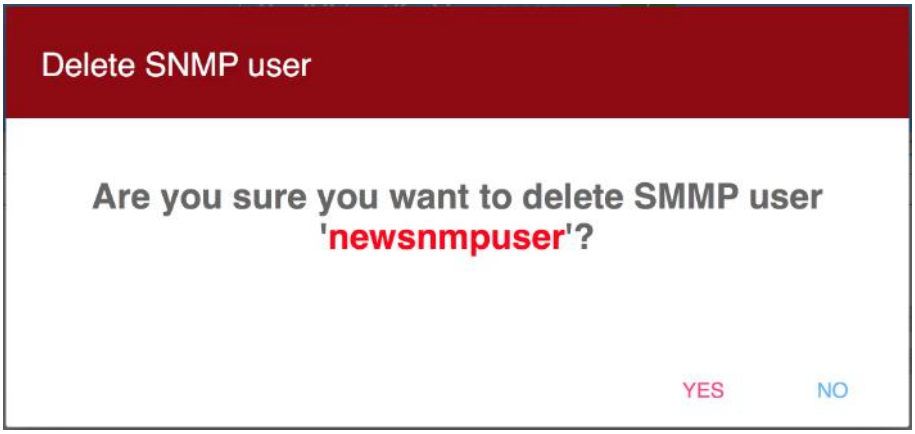

Figure 4.6.33. Window confirming the removal of the current SNMPv3 user account.

4.6.8.4. Configuring SNMP Traps

SNMP traps are configured in the *Traps tab*.

Additional information:

An SNMP trap is a special message, which is sent by the SNMP agent to the receiver (monitoring server). Such messages are sent to alert the administrator about critical events, e.g., a short circuit, outlet turn of due to overcurrent and so on.

SNMP Trap configuration record has the following attributes:

- **SNMP version** — v1;
- **Destination Address** — IP address of the message receiver (monitoring server);
- **Port** — receiver's UDP port to which traps will be sent, default is 162;
- **Enabled** — status of SNMP Trap configuration record — *ON* or *OFF*;
- **Community** — name of the community according to SNMP v1/2c authentication scheme.

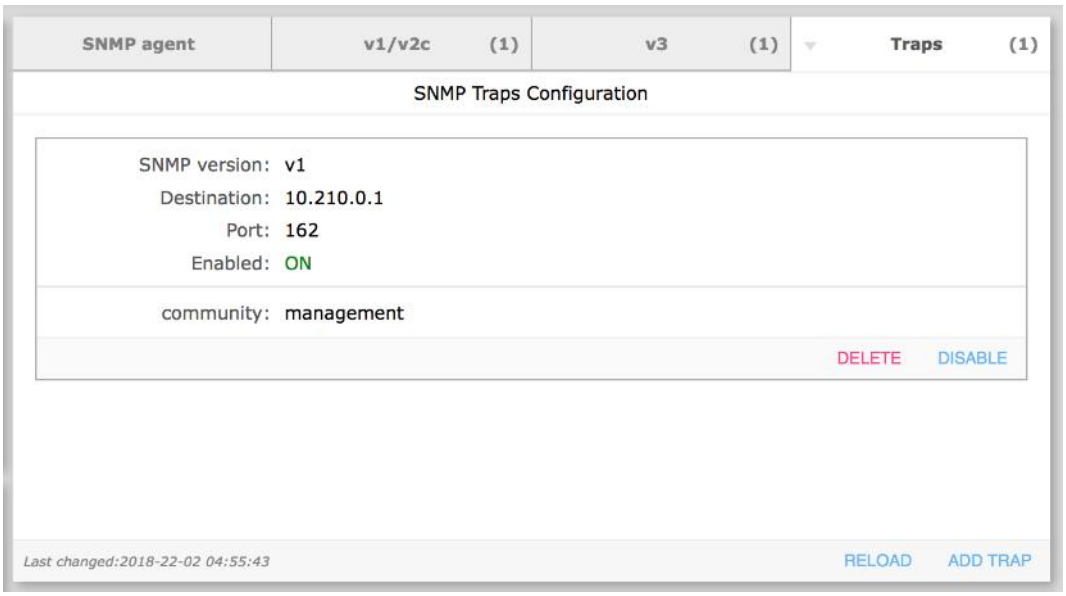

Figure 4.6.34. SNMP management panel. The "Traps" tab.

Each SNMP trap configuration record contains the following buttons:

- **DELETE** — to delete the SNMP trap configuration record;
- **DISABLE/ENABLE** — to disable/enable sending messages to this destination.

When you click **DELETE** button, a deletion confirmation window will open.

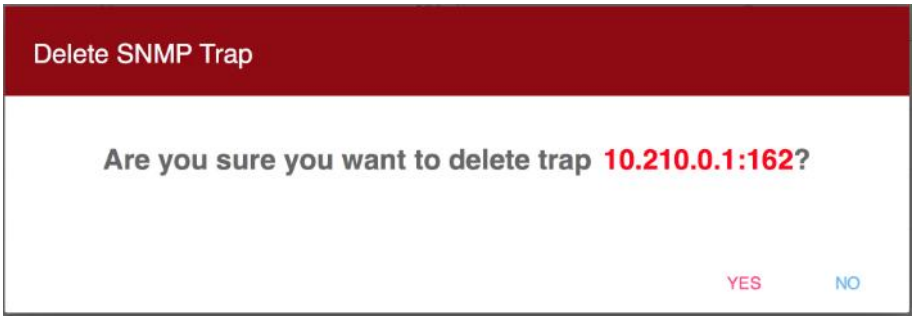

Figure 4.6.35. Window confirming deletion os SNMP Trap configuration settings.

Initially, no SNMP trap records are configured.

SNMP Traps Configuration panel contains the following buttons:

- **ADD TRAP** — to add new SNMP Trap configuration record;
- **RELOAD** — reload settings from the RPCM (if settings have been change from another connection, e.g., from the command line interface or another browser session).

Click **ADD TRAP** button to open New SNMP Trap pop-up window.

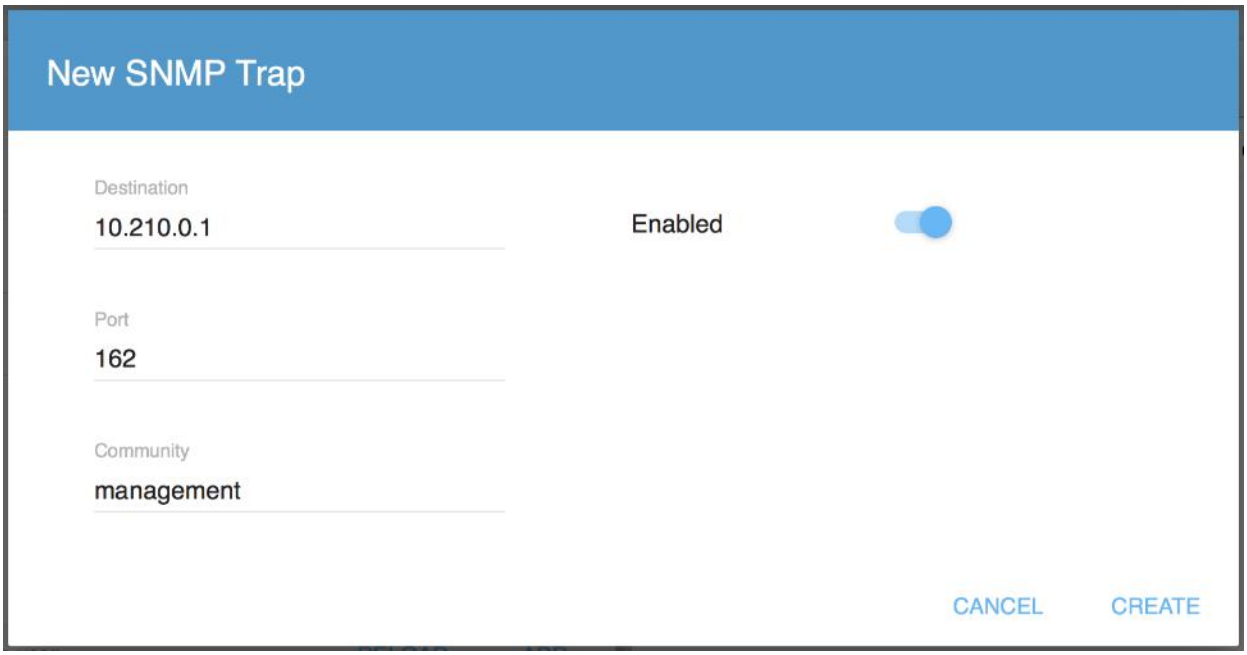

Figure 4.6.36. Window for creating new SNMP trap record settings.

In the window that appears, you can specify the settings:

- **Destination** — IPv4 trap destination address**;**
- **Port** — UDP port of the destination address (default is 162)**;**
- **Community** — SNMP community string**;**
- **Enabled** — *On*/*Off* switch**.**

To confirm the creation of a new SNMP Trap configuration record click the **CREATE** button.

To cancel the creation, click the **CANCEL** button.

4.6.9. Time Management Panel

The "*Date/Time*" tab shows current time and time zone.

It has two fields:

- **Date/time** — system time in the "YYYY-MM-DD HH:MM:SS" format;
- **Time zone** — time zone.

There are two buttons available: —

- **EDIT** — to edit Time settings;
- **RELOAD** — to reload settings from RPCM (in case settings have been changed from the other interface like CLI or another browser session)

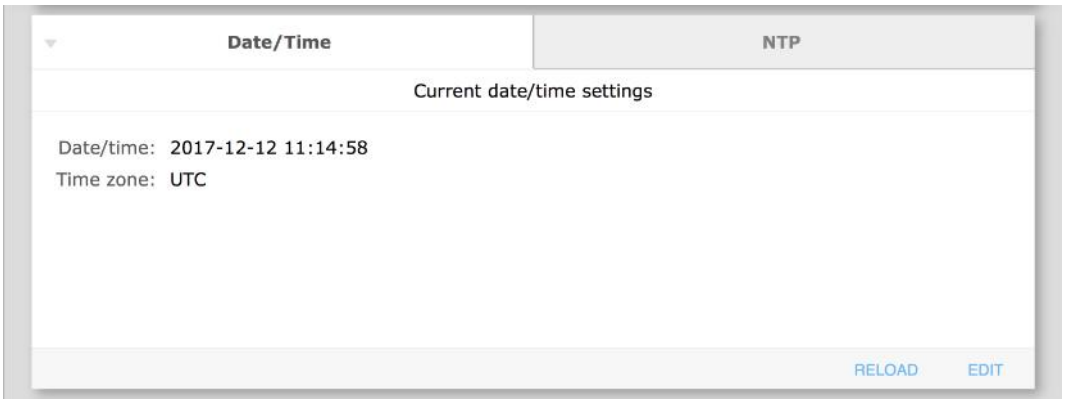

Figure 4.6.37. "Date/Time" tab for managing system time.

Click **EDIT** button, in turn, to open Date/Time settings pop-up window

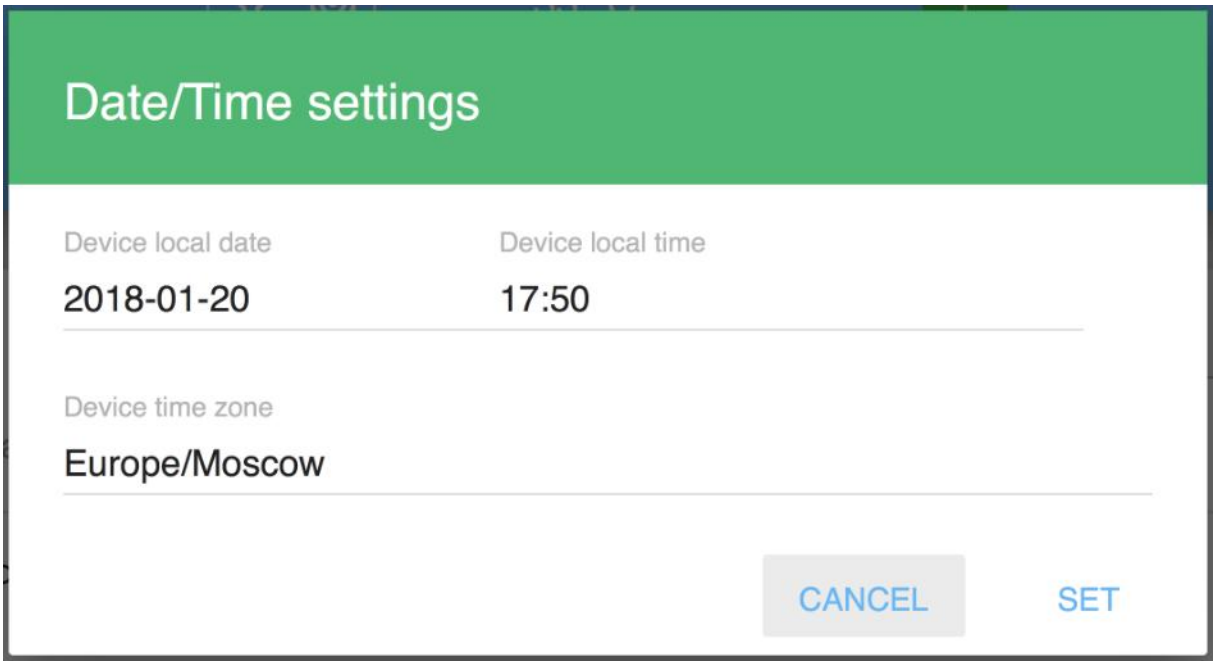

Figure 4.6.38. "Date/Time settings" pop-up windows for adjusting system time and time zone.

Note. The time zone has to be selected from a predefined list. To see full list of options you need to clear the field. To simplify selection of a correct time zone, when you start entering letters into the "Device time zone" field, list of options narrows down leaving only options matching the entered value.

When you click on the "Device local date" field, a window opens in calendar format to change the date.

Figure 4.6.39. Pop-up calendar window for changing the system date.

By clicking on the relevant objects you can change the year, month and date.

To cancel changes, use the **CANCEL** button.

To change the system time, click on the *"Device local time"* field of the "Date/Time settings" pop-up window (see figure 4.6.37)

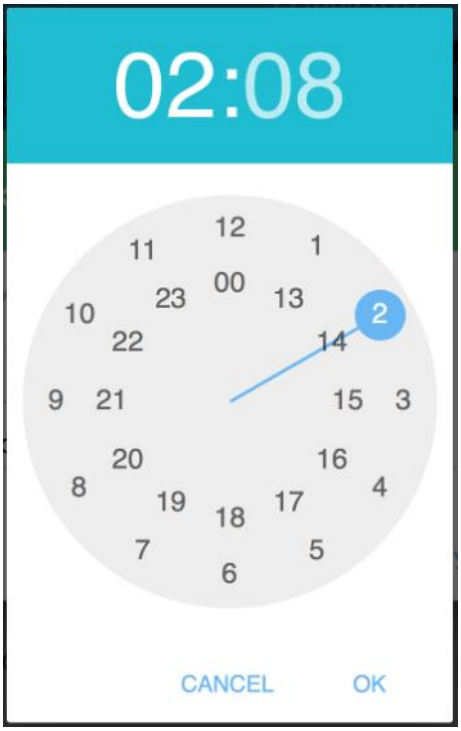

Figure 4.6.40. Time change pop-up - clock adjustment.

To set time, just click on hour value first, the interface will remember hour and switch to minutes, click on minutes and you're all set.

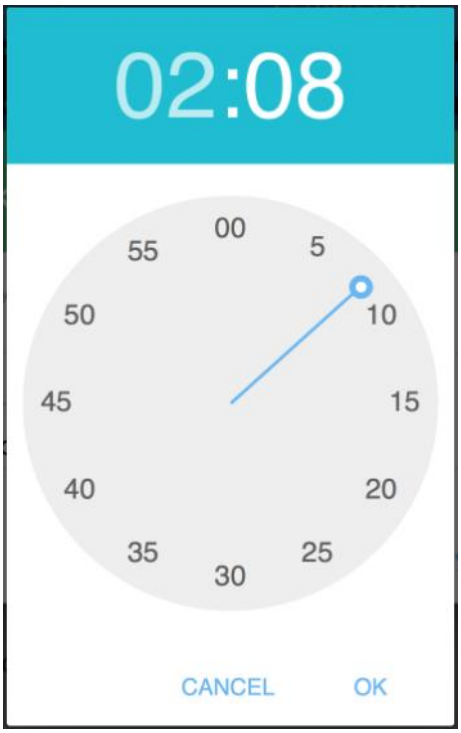

Figure 4.6.41. Time change pop-up window — minutes adjustment.

If the desired minute that you want to set lays between values shown on the clock picture, just click area between numbers.

To confirm the time value click **OK** button.

To cancel changes — click the **CANCEL** button.

To configure synchronization of time with time servers using **NTP** (*Network Time Protocol*), use the **NTP** tab.

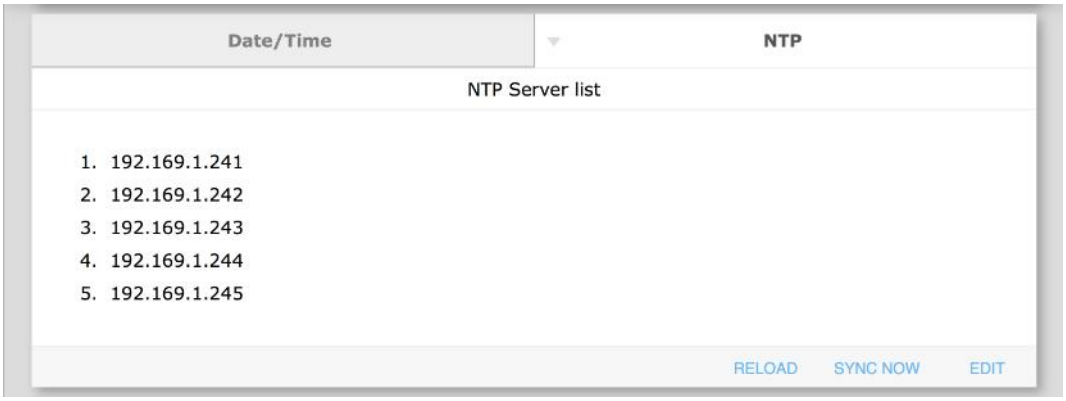

Figure 4.6.42. "NTP" tab for setting up time servers.

Click **EDIT** button to open NTP server list pop-up window to configure up to 5 ntp server addresses.

Click **RELOAD** button to refresh information in tab from RPCM (in case it was changed from another interface like CLI or another browser session).

Click **SYNC NOW** button to immediately initiate the time synchronization process with configured time servers.

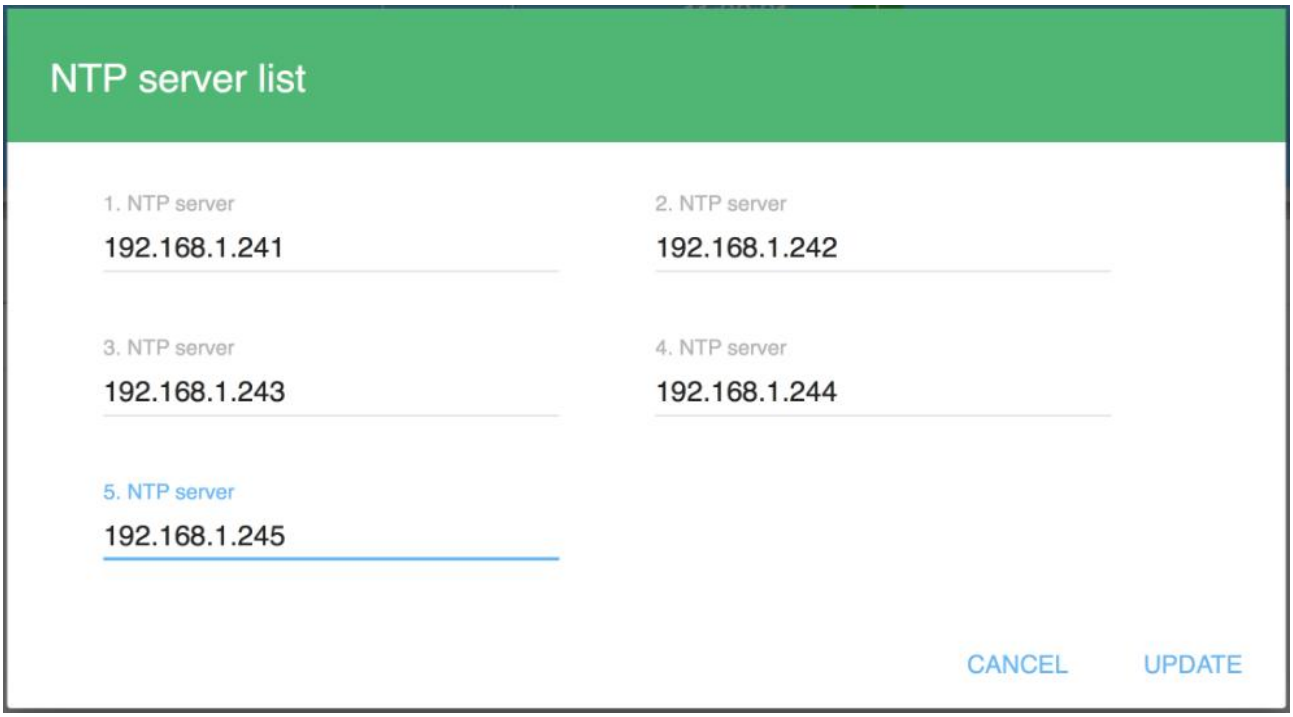

Figure 4.6.43. Pop-up window for editing NTP address servers.

4.6.10. SMTP Settings and Mail recipients

This panel is used to configure settings for sending email notifications.

In the **SMTP Settings** tab, you can specify configuration details to connect to a mail server for sending messages.

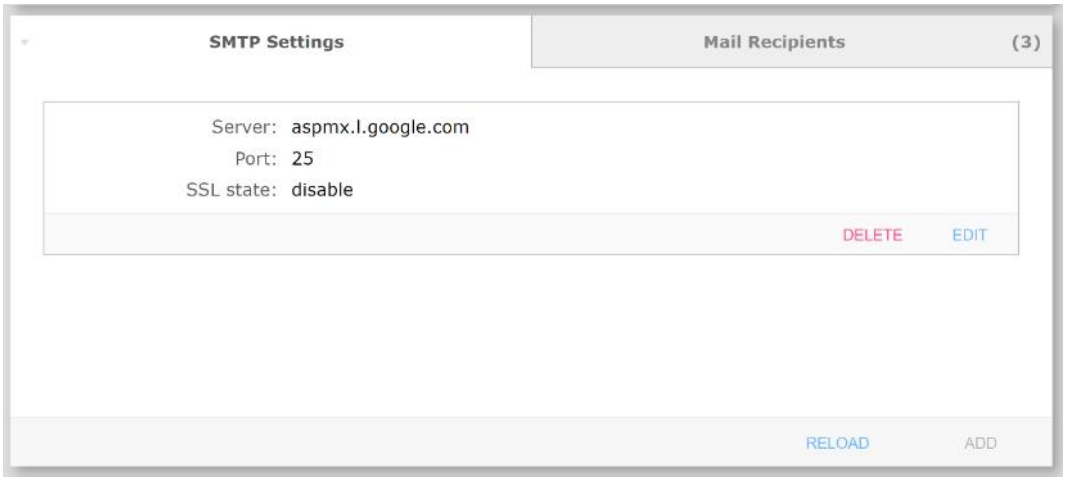

Figure 4.6.44. SMTP management panel, "SMTP Settings" tab.

SMTP Settings tab has the following fields:

- **Server** — server name (FQDN) or IP address;
- **Port** — TCP port number on which the server is waiting for the connection;
- **HELO domain** — optional SMTP protocol HELO value to use when connection to the SMTP server;

- **Auth type** — authentication method to use when connection to the SMTP server for sending messages, the following values are available: *PLAIN* (transmission of the password in clear text), *LOGIN* (AUTH LOGIN is the SMTP authentication method in which the login and password are transmitted as text encoded according to Base64 algorithm), *CRAM MD5* (a method of protecting authentication data based on the MD5 algorithm) and NONE (no authentication performed).
- **SSL state** — following option are available: *enable* (sets up encrypted SSL connection with the certificate authentication), disable (use unencrypted connection), enable-dontverify-cert (encrypted connection without certificate verification) and tls (use starttls protocol for encryption on non-encrypted port).
- **Username** and **Password** — for user authentication.
- **Sender's email** — mail address for the field "FROM:" in messages.

To update information in SMTP Settings panel from RPCM use **RELOAD** button (this is useful when configuration was changed from the other interface like CLI or another browser session).

To configure new SMTP server settings, use the **ADD** button. When you click it, the SMTP server settings pop-up window is displayed.

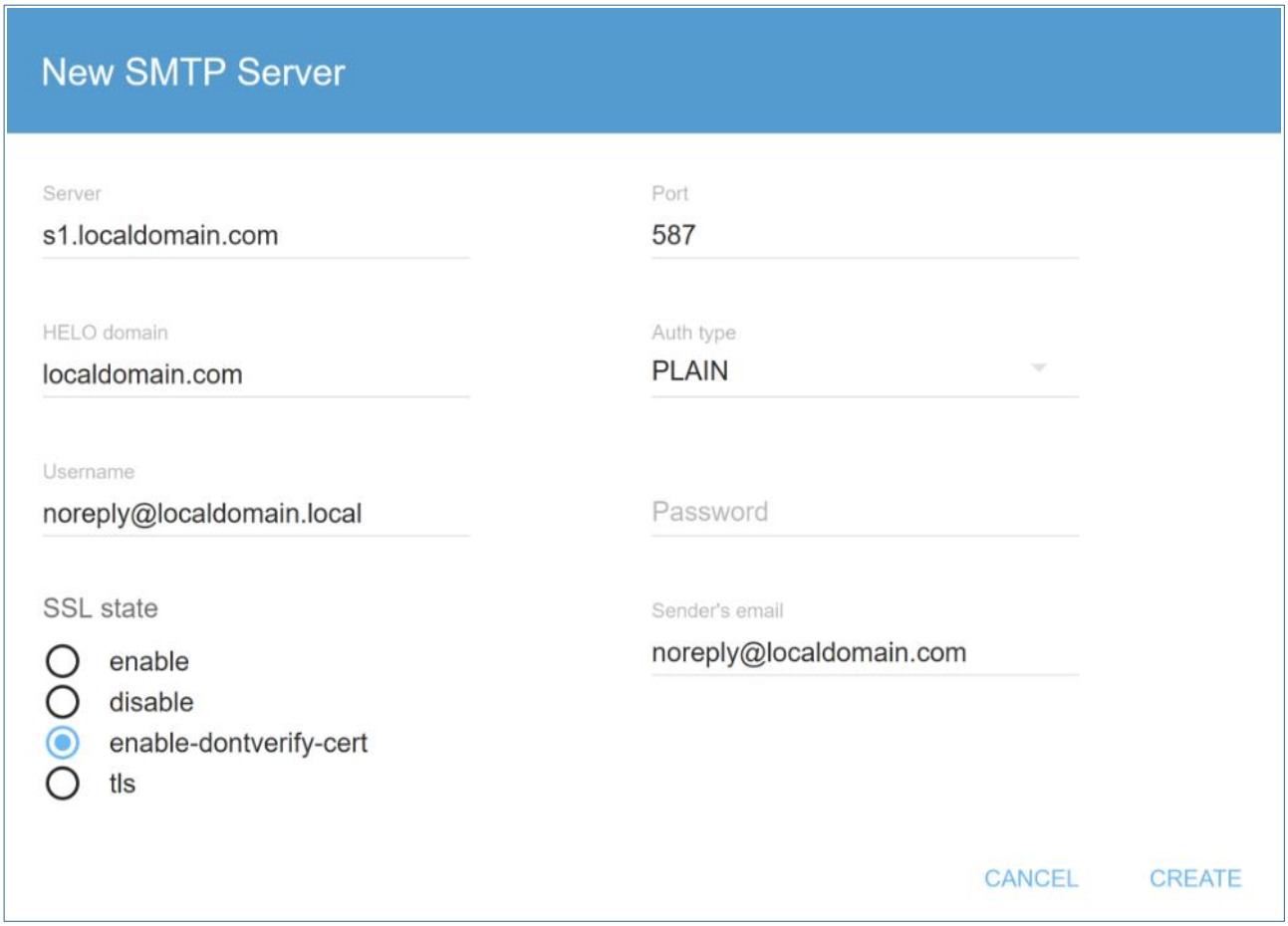

Figure 4.6.45. "New SMTP Server" pop-up window.

To finalize creation of SMTP server configuration click **CREATE** button. To cancel, press **CANCEL**.

If you need to change the SMTP server settings, click the **EDIT** in the SMTP server configuration record, which will open the Edit SMTP Server pop-up window.

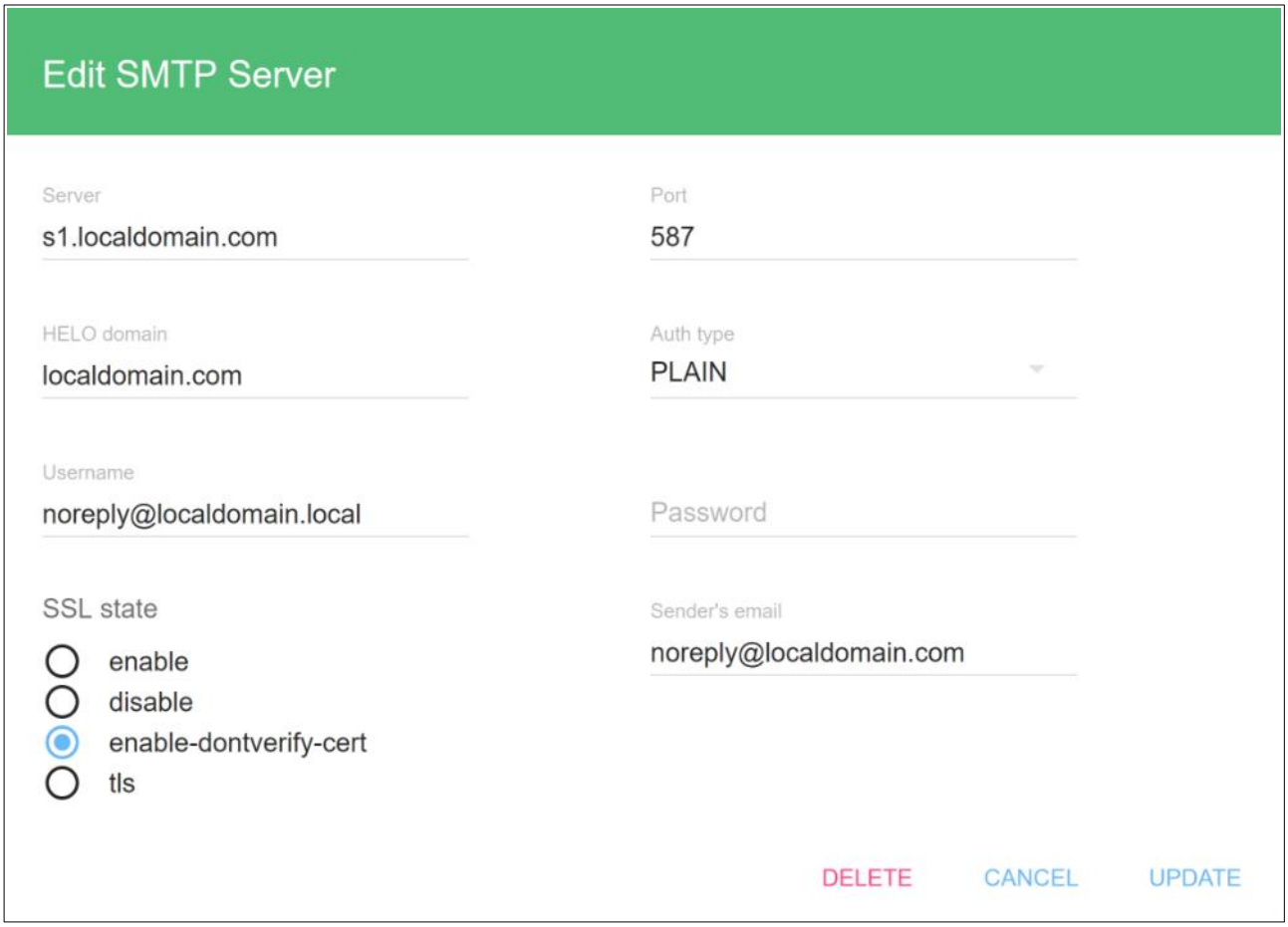

Figure 4.6.46. "Edit SMTP server" pop-up window.

Click **DELETE** button to delete SMTP Server configuration. A confirmation window will appear.

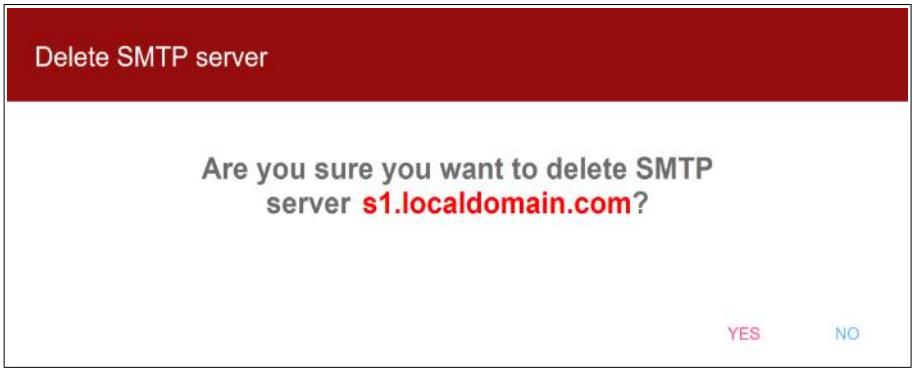

Figure 4.6.47. Confirmation pop-up window "Delete SMTP server".

In the *Mail recipients* tab, you can configure up to 5 e-mail recipients records.

Email recipient records have following fields:

- **email** — main address of the recipient;
- **cc** — address for sending a copy;
- **bcc** — address for sending a hidden copy.

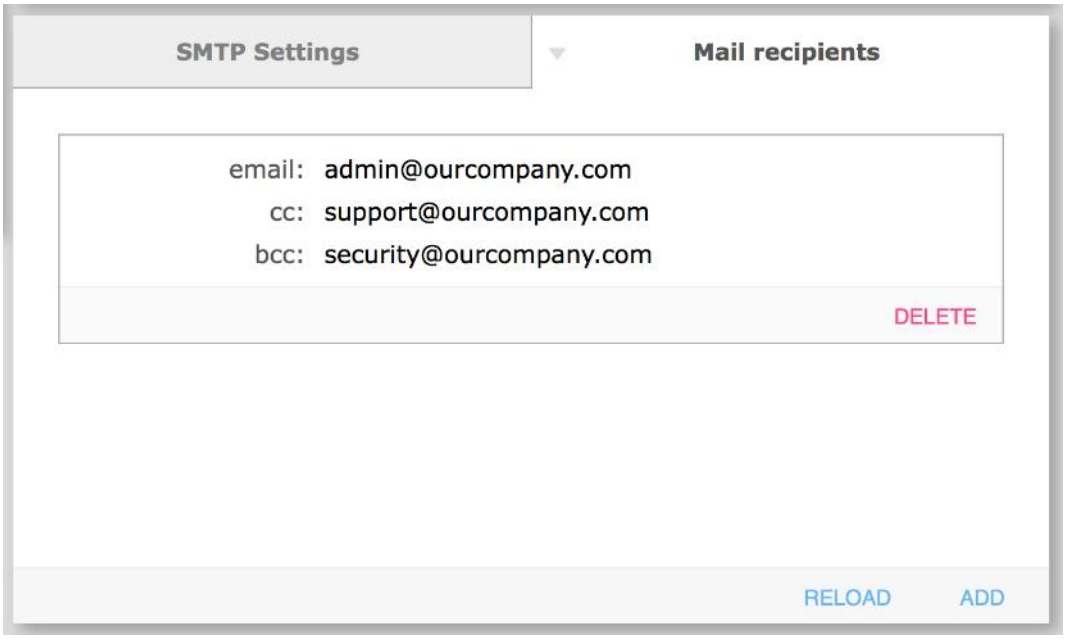

Figure 4.6.48. SMTP management panel. The "Mail recipients" tab.

Click **ADD** button to configure a new mail recipient record, it will open the *"New recipient"* pop-up window.

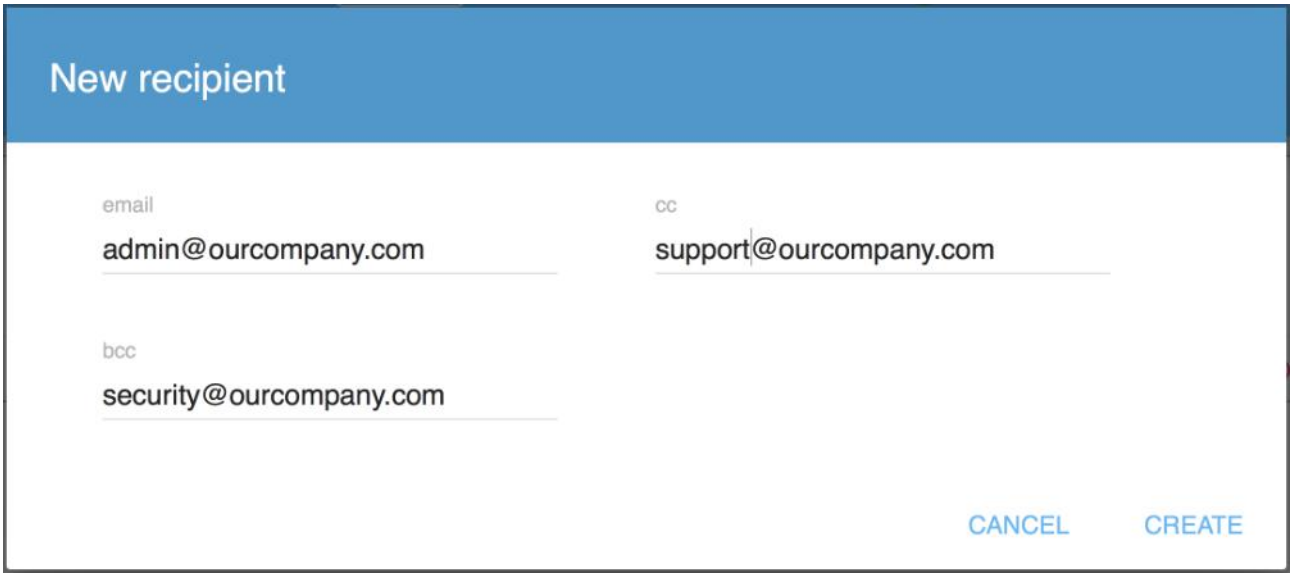

Figure 4.6.49. "New recipient" pop-up window.

To finalize configuration of the new mail recipient record, click the **CREATE** button. To cancel, click **CANCEL** button.

To delete the mail recipient record, click the **DELETE** button within the mail recipient record panel. It will open the Delete recipient confirmation pop-up window.

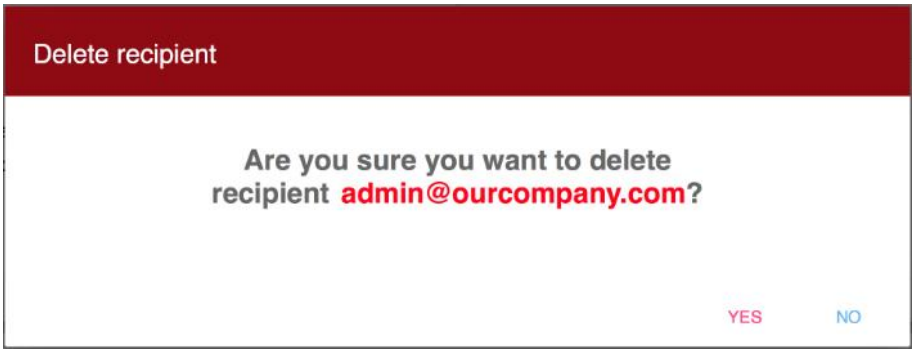

Figure 4.6.50. "Delete recipient" confirmation pop-up window.

Click the **RELOAD** button to refresh mail recipient records from the RPCM (in case the list of records was changed from another interface like CLI or another browser session).

4.6.11. Cloud Connection Settings (RPCM.CLOUD)

More information. RPCM.CLOUD is an complementary online service that provides extended monitoring, telemetry collection, power consumption analysis, software updates and many other features for the entire customer's fleet of RPCM devices.

Cloud Connection Settings panel is intended to control state of the RPCM.CLOUD connection.

There are the following fields and controls in the "Cloud Connection" tab:

Cloud session status — information about the status of the connection;

Enable export of telemetry from this RPCM to the Cloud — this switch enables/disables the export of telemetry data from RPCM to the RPCM.CLOUD (enabled by default);

Enable control of this RPCM via the Cloud — this switch enables/disables the control of RPCM from the RPCM.CLOUD (disabled by default).

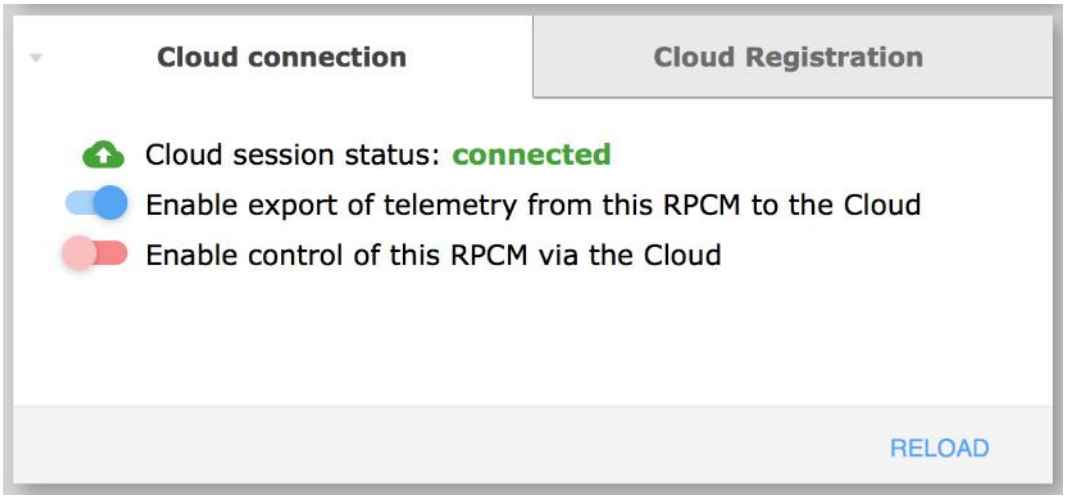

Figure 4.6.51. RPCM Cloud configuration panel —"Cloud Connection" tab

The "Cloud Registration" tab is intended to manage and track the registration in RPCM.CLOUD.

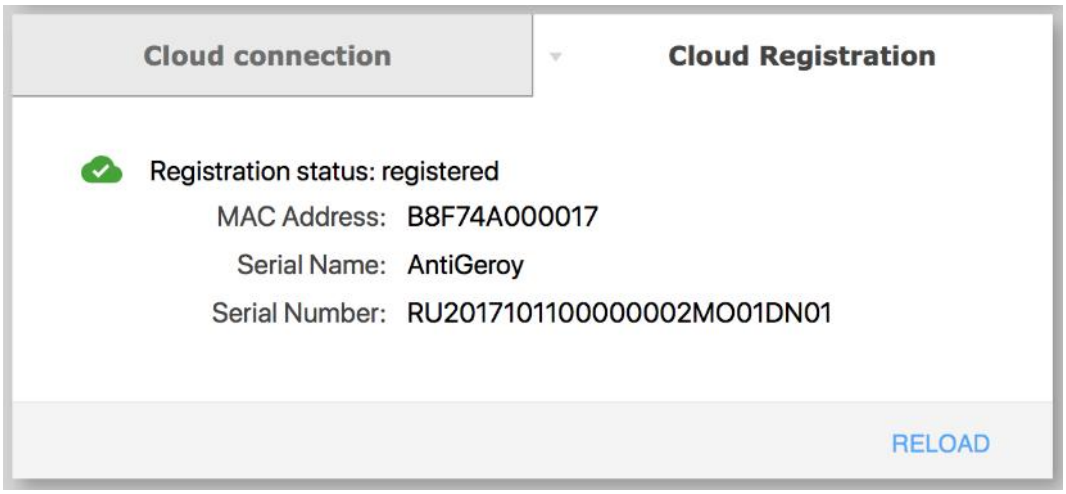

Figure 4.6.52. RPCM Cloud configuration panel — "Cloud Registration" tab.

4.6.12. API Service Settings

RPCM features REST API service listening on TCP Port number 8888.

Figure 4.6.53. The "API Settings" area.

This panel includes the following fields and controls:

- *API Authentication* — this switch enables/disables authentication when using the REST API (disabled by default);
- *API Key* — shows the generated API key;
- *Key Status* — this switch enables/disables the key (enabling API Authentication and setting the Key Status to disabled state, effectively disables access to REST API).

Click the **GENERATE NEW** button to generate a new API key.

Click the **RELOAD** button to refresh API Service Settings from the RPCM (in case the configuration was changed from another interface like CLI or another browser session.

4.6.13. Front Panel Display Settings

Note. For more information on the appearance and display device of the RPCM, it is recommended that you read the information from the section *"4.1. Physical Interface"*.

The RPCM display is a matrix of light segments for displaying alphanumeric messages.

To configure it via the web-interface, use the "Display Settings for Device" area in the "Configuration" section.

Table 4.6.1. Display messages.

Value Name	**Unit of measurement**	Example of message
Voltage	Volt, V	230
Current	Amps, A	14
Power	Kilowatts, KW	3.2
IP Address	dotted digits	192.168.1.1
MAC Address	hexadecimal digits separated by a colon	68:05:CA:42:EC:22
Serial Name	English characters	KrepkiyLob
Serial Number	English characters and numbers	RU2017101100000002-MO01DN01
User Message	English characters and numbers	Any, for example "N01"

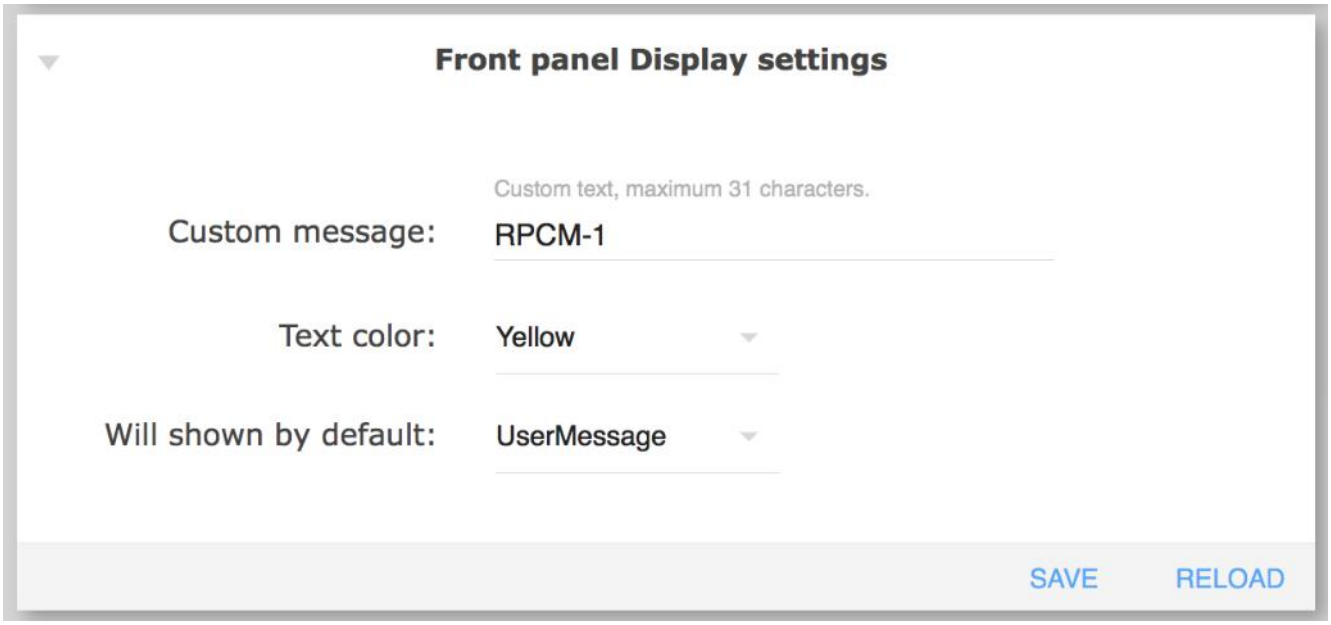

Figure 4.6.54. Front Panel Display setting.

Front Panel Display Settings has the following fields:

- **Custom message** — message displayed on the display when User Message option is selected in "What to show by default" field or when user reaches User Message by using buttons on the physical front display panel (up to 31 characters);
- **Text color** — color of the Custom Message;
- **What to show by default** — use this field to select what will be shown on physical display upon start-up of the RPCM (see Table 4.6.1).

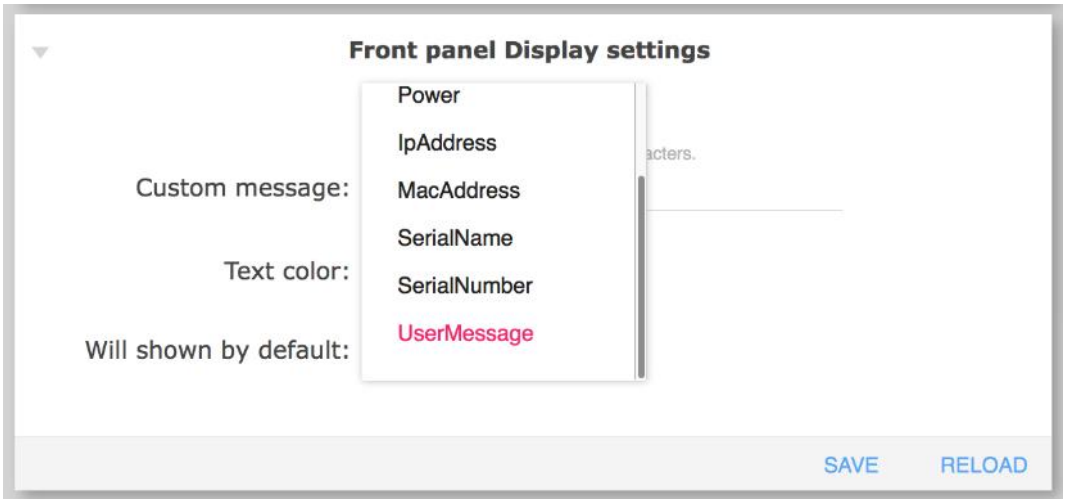

Figure 4.6.55. Select the default message to display.

4.6.14. Backup and restore settings

The **Backup** tab contains a single button named **DOWNLOAD CONFIGURATION.**

Clicking DOWNLOAD CONFIGURATION initiates download of backup configuration file.

The name of the file is: "RPCM_SerialName_YYYYMMDD_HHMMSS.config", where:

- *SerialName* — the RPCM device serial name;
- *YYYYMMDD* — date of backup file creation in the "year-month-day" format;
- *HHMMSS* — time of backup file creation in the "hours-minutes-seconds" format

For example, RPCM_SerialName_20190410_231551.config. The file name is created automatically.

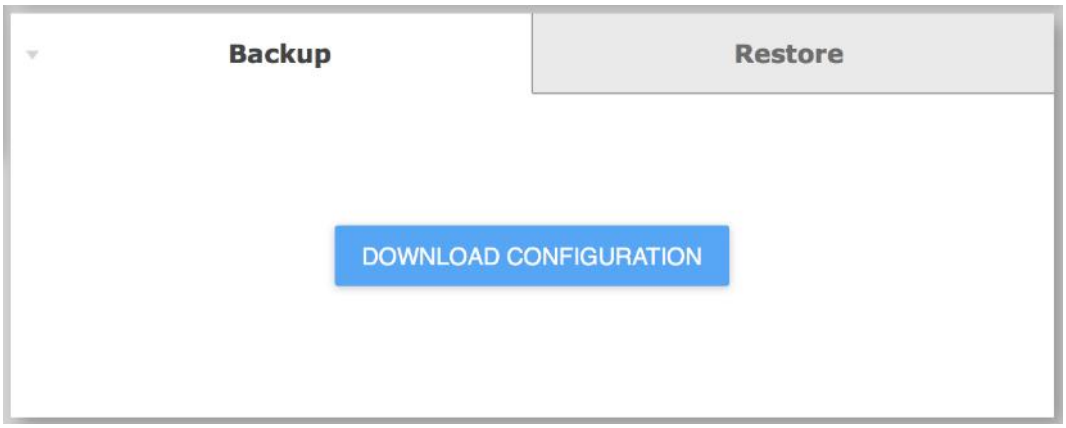

Figure 4.6.56. Backup tab.

The "Restore" tab is used to restore the RPCM configuration from a backup copy. It contains a single button named **“CHOOSE FILE...”**

Clicking **“CHOOSE FILE...”** opens the standard file selection window of the operating system. You need to select the configuration backup file to proceed.

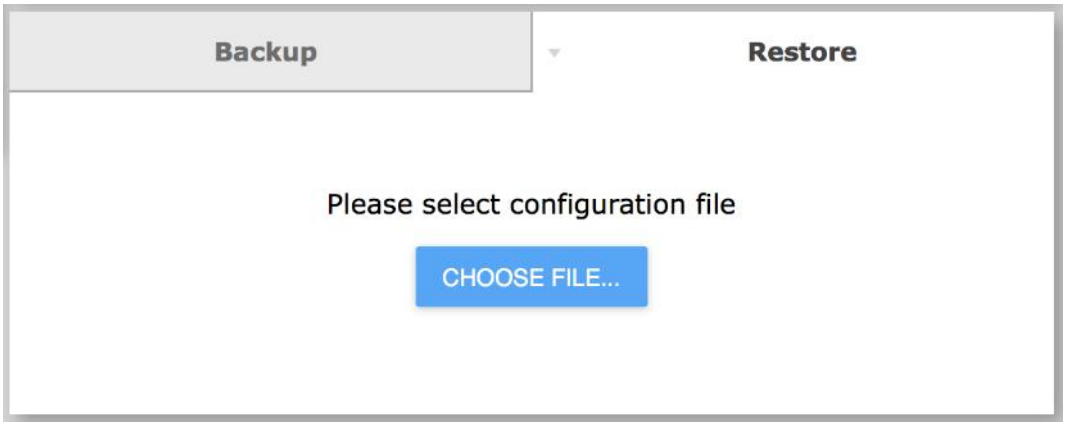

Figure 4.6.57. Restore tab.

After selecting a configuration file, it is loaded. When the download is complete, the "Restore" panel contains items for selecting recovery options.

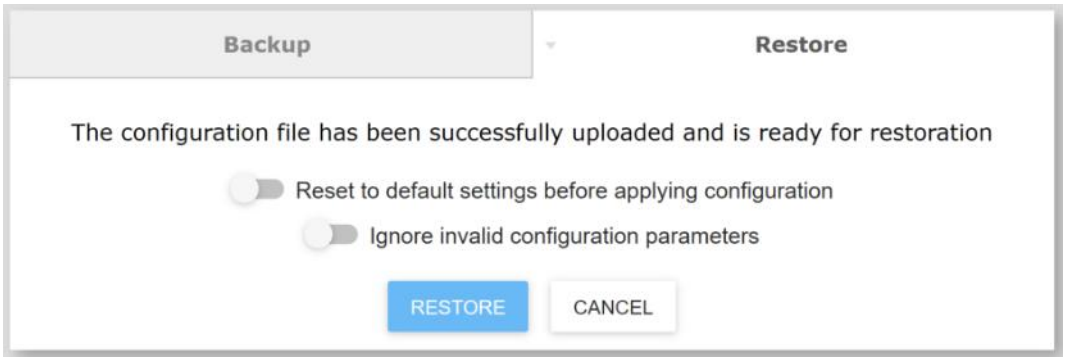

Figure 4.6.58. Restore tab — the selection of options for restore .

These restore options is available:

- **Reset to default setting before applying configuration** — is turning OFF by default;
- **Ignore invalid configuration parameters** — is turning OFF by default.

Note. By default, a "delta restore" of the configuration will be performed — only those sections will be restored, that are in the backup file. All settings will be saved (These settings were before the start of the restore and which are not in the backup file). If you need to restore the device strictly to the state of the backup, you should set turn ON the option Reset to default settings before applying the configuration.

There will showed the progress indicator after pressing the RESTORE button

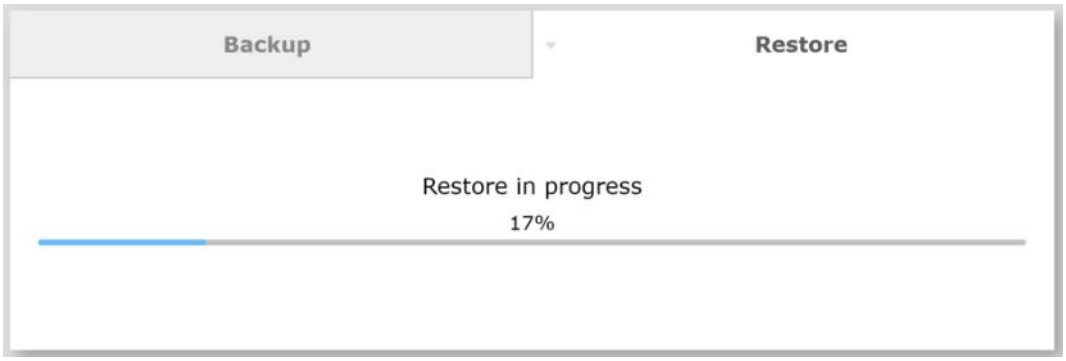

Figure 4.6.59. Restore tab — the progress indicator.

Figure 4.6.60. Restore tab — the confirmation of RESTART RPCM HLC.

In the final window of the recovery procedure, the following buttons are available:

RESTORE ANOTHER CONFIG;

RESTART RPCM HLC.

The HLC must be restarted to apply the restored settings. After pressing the **RESTART RPCM HLC** button, only the controller will restart. The power supply to the connected client devices will remain unchanged.

4.6.15. Web Interface Language

Panel of number 11 (see Figure 4.6.9.) — " Web Interface Language " — for select language of web interface.

Press popup menu for select available language.

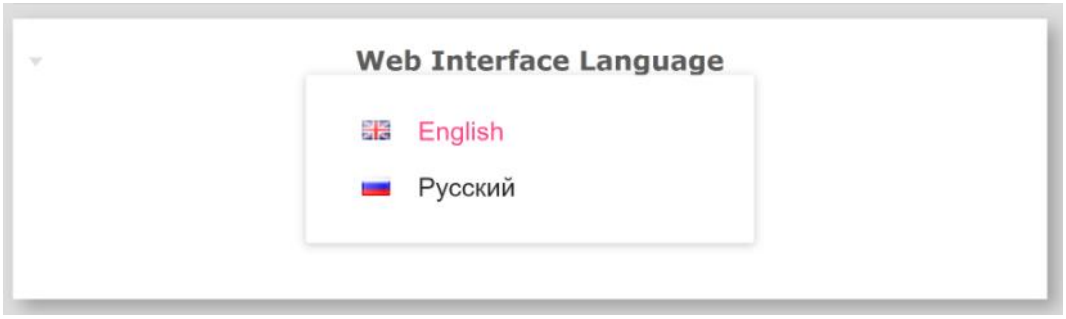

Figure 4.6.61. Web Interface Language panel.

4.6.16. RADIUS server setting

Panel of number 12 (see Figure 4.6.9.) — for entering and editing RADIUS server information setting.

RADIUS servers (Remote Authentication in Dial-In User Service) use RADIUS protocol for authentication, authorization and data collect about using resources.

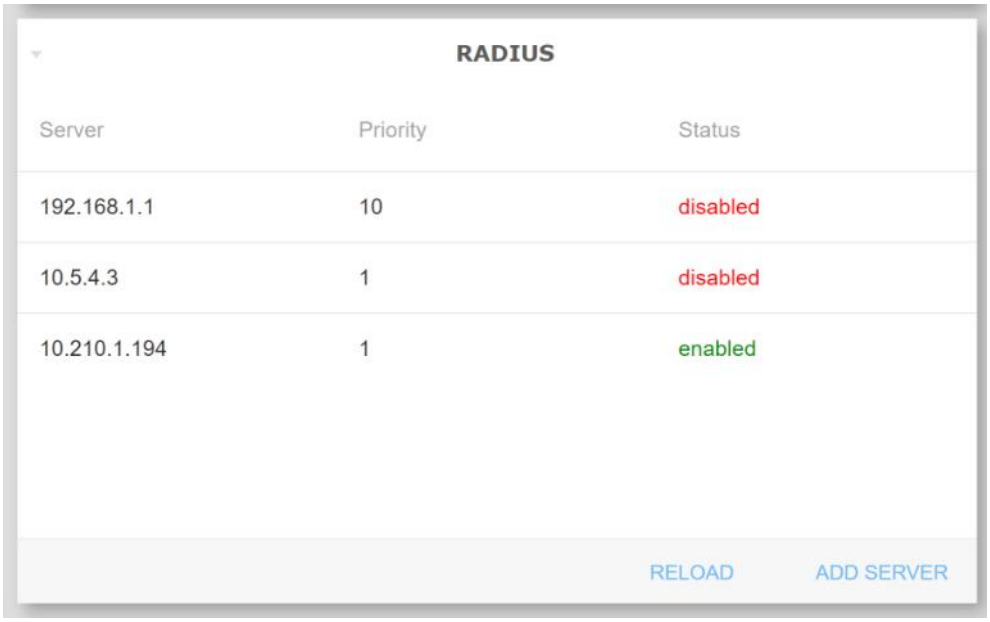

Figure 4.6.62. RADIUS panel.

Press **ADD** button to configure a new RADIUS server record, it will open the *"New* RADIUS server*"* window.

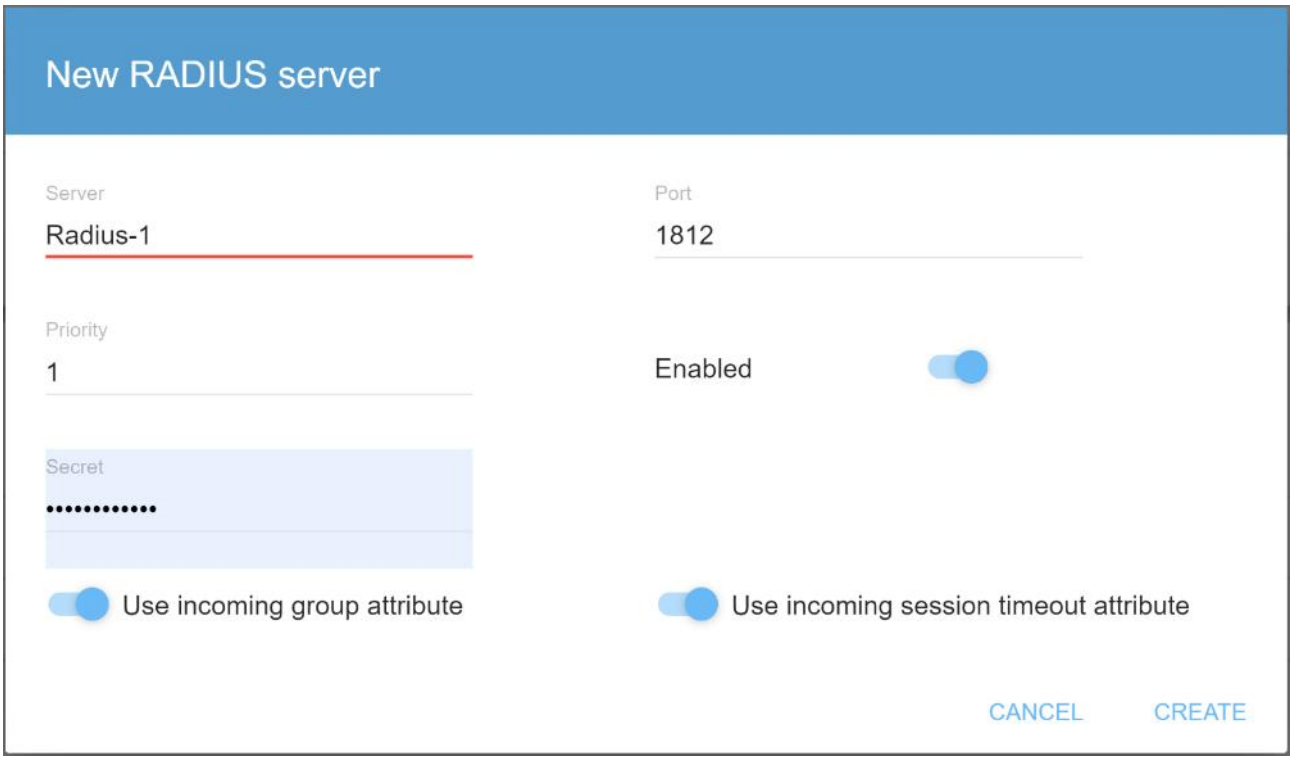

Figure 4.6.63. “New RADIUS server” window.

Fields are available:

- **Server** — IP or FQDN
- **Port** — TCP port, default number is 1812
- **Priority** — the server priority, some RADIUS servers are available;
- **Secret** — the password phrase for authentification;
- **Switch "Use incoming group attribute"**
- **Switch "Use incoming session attribute"**
- **Switch Enabled**.
- To enter a new RADIUS server, click on the **CREATE** button. To cancel, use the **CANCEL** button.

Click on RADIUS server record on RADIUS panel to change setting. The window "Update RADIUS server" will show

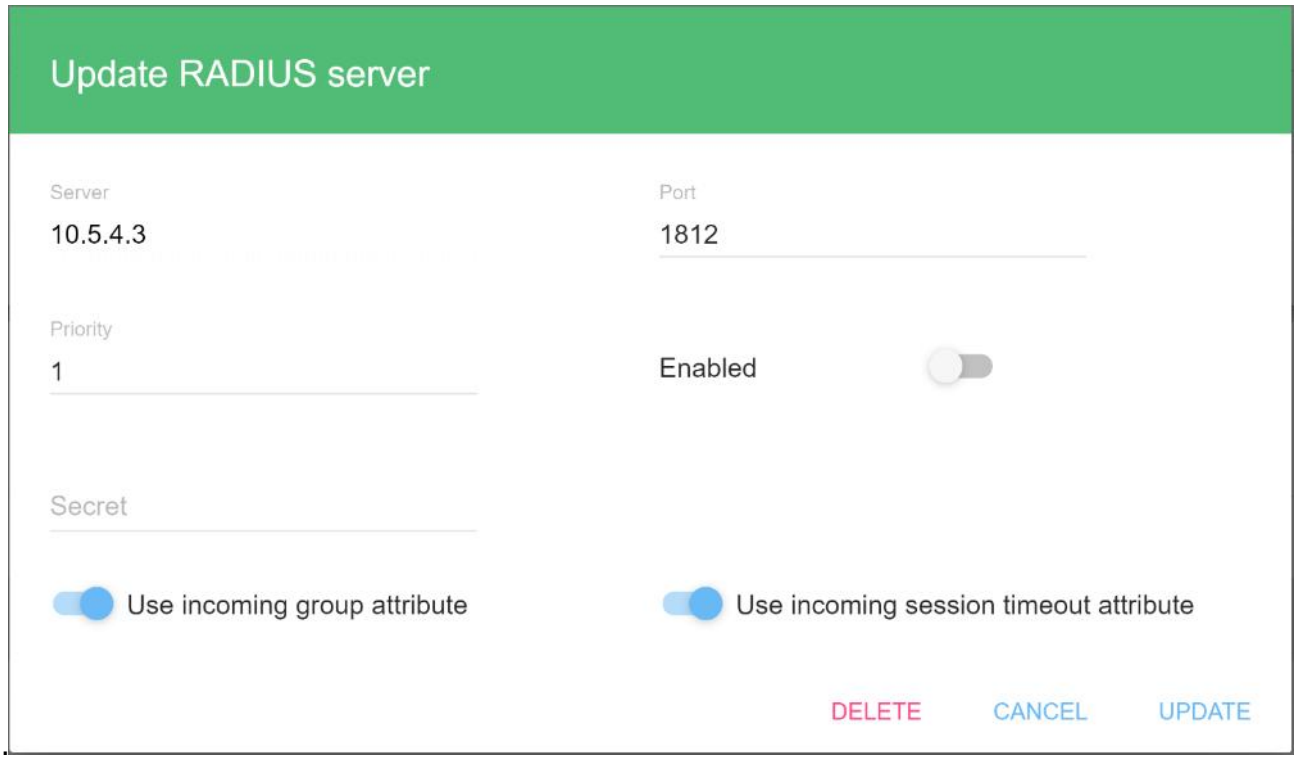

Figure 4.6.64. "Update RADIUS server" window.

To update RADIUS server information account with new settings click **UPDATE** button.

To cancel changes, use the **CANCEL** button.

DELETE button is intended to remove the server. After clicking **DELETE** button a confirmation window will appear to confirm the deletion of this RADIUS server record.

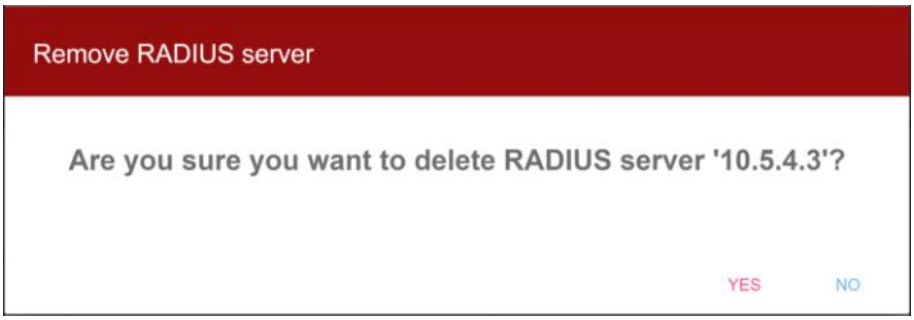

Figure 4.6.65. "Delete RADIUS server" window.

4.6.17. Restart RPCM HLC

Panel of number 13 (see Figure 4.6.9.) — for restarting High Level Controller.

Figure 4.6.66. "Restart RPCM HLC" panel.

To restart High Level Controller press **RESTART** button.

During restart of HLC (High Level Controller) you will not be able to log on to RPCM, control it via Web, SSH, SNMP and REST API interfaces and Automations will be suspended.

Note. Some details about RPCM Software and Firmware.

RPCM uses 3 controllers:

High Level Controller (HLC), which runs Software;

Low Level Controller (LLC), which runs Firmware;

Display Controller, which runs Display Firmware.

Low Level Controller is responsible for low level operations such as input and outlet management, ATS (for RPCM AC ATS 16A, RPCM AC ATS 32A, RPCM DC ATS 76A), meters, overload and short circuit protection.

Display Controller is responsible for external displays.

High Level Controller is responsible for the user interfaces, including web interface, SSH CLI, REST API, SNMP and so on.

Software updates may include Firmware updates.

4.7. The RPCM Software Updating

4.7.1. General Information

This section describes the software update for the Resilient Power Control Module (RPCM).

You can access this section by using the *Software Update* menu item or by typing *https://<name_or_IP_RPCM>/update/* in the browser address line (provided that authentication was successful before).

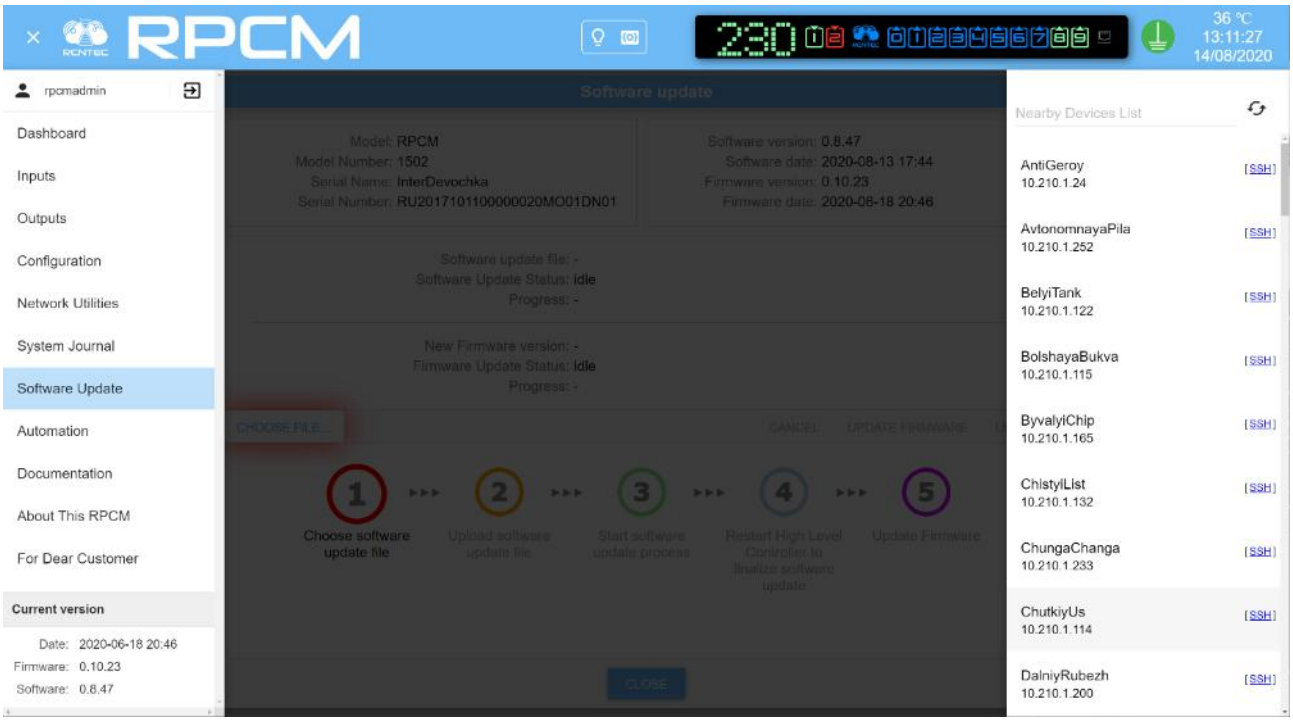

Figure 4.7.1. "Software Update" section.

Note. Some details about RPCM Software and Firmware.

RPCM uses 3 controllers:

High Level Controller (HLC), which runs Software;

Low Level Controller (LLC), which runs Firmware;

Display Controller, which runs Display Firmware.

Low Level Controller is responsible for low level operations such as input and outlet management, ATS (for RPCM AC ATS 16A, RPCM AC ATS 32A, RPCM DC ATS 76A), meters, overload and short circuit protection.

Display Controller is responsible for external displays.

High Level Controller is responsible for the user interfaces, including web interface, SSH CLI, REST API, SNMP and so on.

Software updates may include *Firmware* updates.

ATTENTION! For models with ATS it is necessary to connect power at the first input and set it as active and priority input to avoid disconnecting consumers when updating. This is necessary when updating the controller firmware, process of which takes about 1 minute.

4.7.2. Description of the Update Window

Window for *Software Update* can be divided into three areas:

1 — General information about this RPCM;

2 — Information about software and firmware update process;

3 — Steps area.

Figure 4.7.2. Main window of the "Software Update" section.

Information fields contains the following:

- *Model;*
- *Model Number, for example —1502, 1532 etc;*
- *Serial Name;*
- *Software version;*
- *Software release date;*
- *Firmware version;*
- *Firmware date.*

Update file selection and process control area contains the following:

- *Software update file;*
- State;
- *Progress*.

And also the following buttons:

- **CHOOSE FILE**;
- **CANCEL;**
- **UPDATE FIRMWARE;**
- **UPLOAD.**

In the Information area, the sequence of the update is shown graphically:

1 Select the firmware file;

2 Upload the file to the device;

3 Start the update process;

4 Restart the device.

At the bottom of the window there is a button **CLOSE**, which is pressed to go to the section *Control Panel* (*Dashboard*).

4.7.3. Update procedure

The update procedure is as follows:

With the help of the **CHOOSE FILE** buttons, operating system file selection window appears.

During the entire set of update processes, status information will be displayed in the window:

- *Software update file* — selected file;
- *State*;
- *Progress.*

NOTE. When RPCM is eligible for update, update files are available in device section of the https://my.rpcm.cloud/ when the device is registered in the cloud, or can be obtained by contacting technical support in any convenient way. By default, update files have the *.rpcm extension.*

Figure 4.7.3. Step 1 — selecting an update file.

After file selection, the **UPLOAD** buttons is activated.

The file upload stage — Stage 1 — consists of two successively starting processes:

- the process of uploading a file;
- verification process;
- By clicking on the **UPLOAD** button, a copy of the update file is transferred to the RPCM and its subsequently verified;
- In the bottom right corner, a pop-up window appears with information about the progress of the update and buttons for a pause depicted as two vertical lines "||";
- In the main window of "*Software Update*" at this stage, the **UPLOAD** button changes to **PAUSE**.

Figure 4.7.4. Ready to upload the update file.

Figure 4.7.5. File upload process

After the upload, RPCM starts verification of the update file. In the main window "*Software update*" at this stage, the **PAUSE** button changes to **UPDATE**. At this stage, the new **UPDATE** button is inactive and will become active only after the verification procedure is finished.

After the verification procedure is completed, the **UPDATE** button becomes active. When you click on it, the update procedure begins.

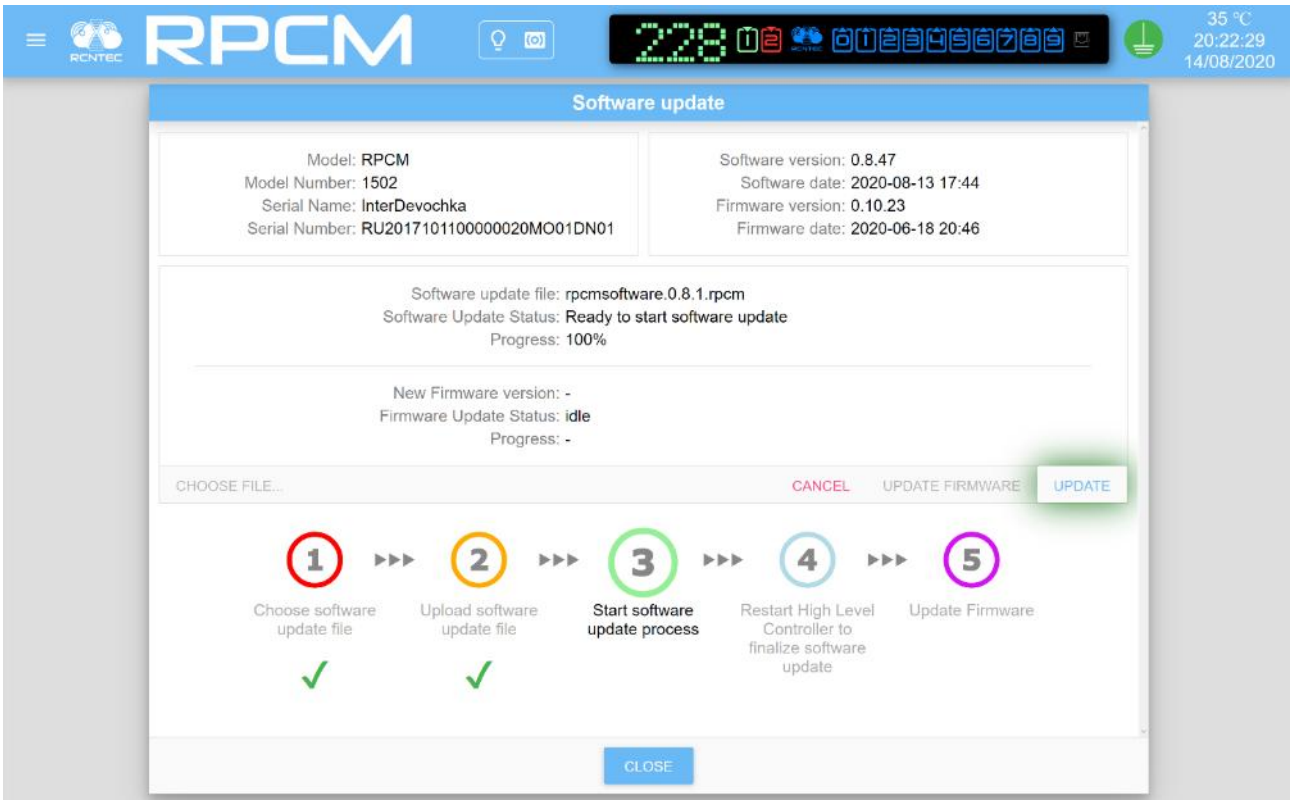

Figure 4.7.6. RPCM is ready to be updated.

Clicking on the **UPDATE** button starts the process of installation of the new Software.

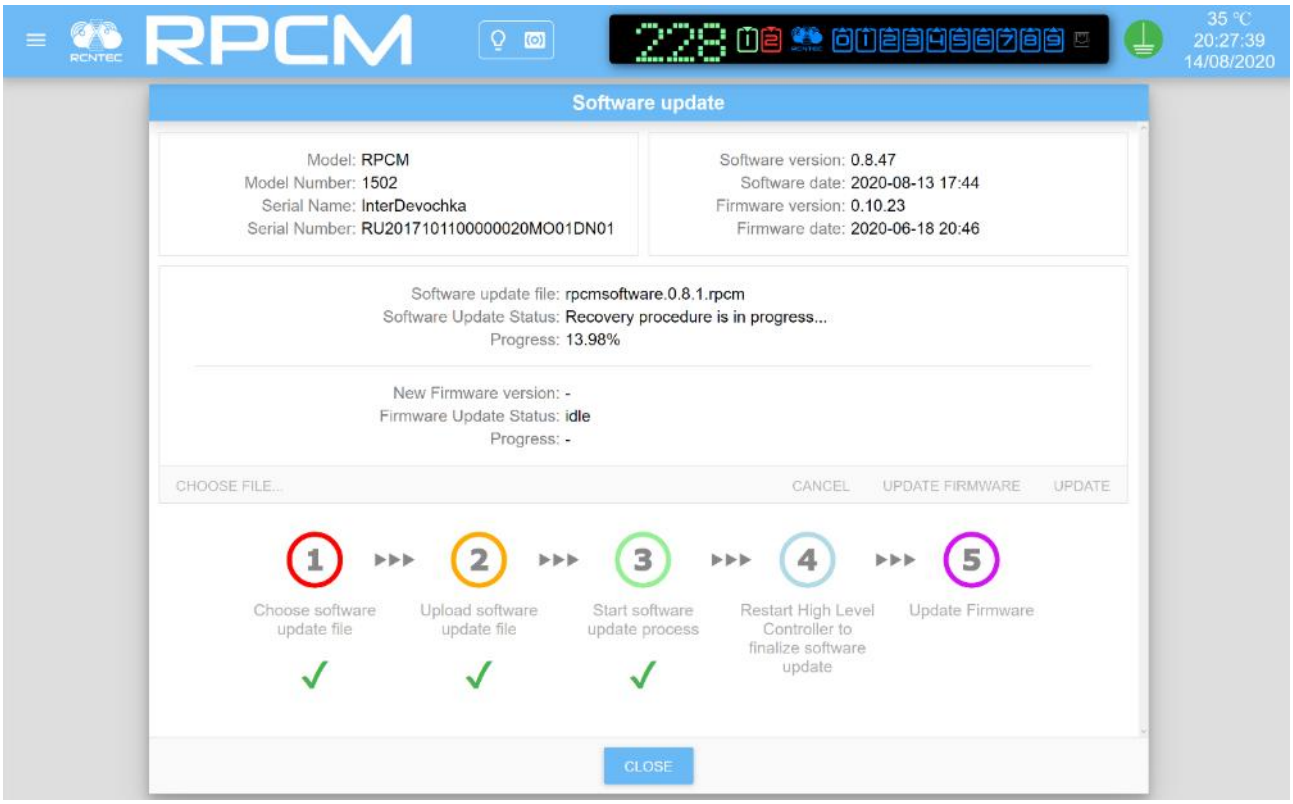

Figure 4.7.7. Applying the update.

After the update is applied, the update validation step occurs.

Externally, there are no changes except for the message **Verifying applied update...**

Figure 4.7.8. Verifying an update.

HLC have to be restarted after successful completion of the update and validation procedure.

The **UPDATE** button is changed to **RESTART TO FINALIZE UPDATE**.

To restart, you must click on the **RESTART TO FINALIZE UPDATE** button, which will appear instead of the blocked **UPDATE**.

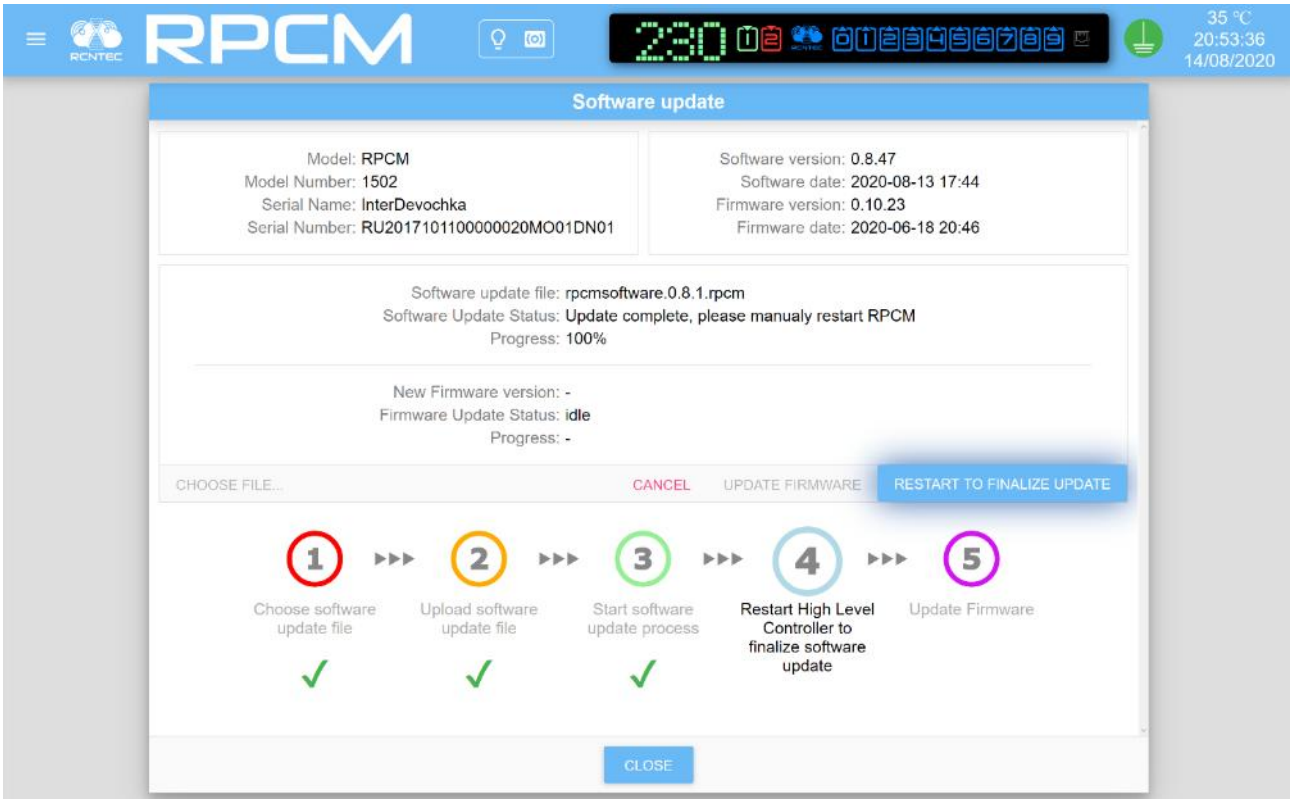

Figure 4.7.9. Window with the "RESTART TO FINALIZE UPDATE" button.

After clicking on the active item, a window with a confirmation message will appear to restart the device.

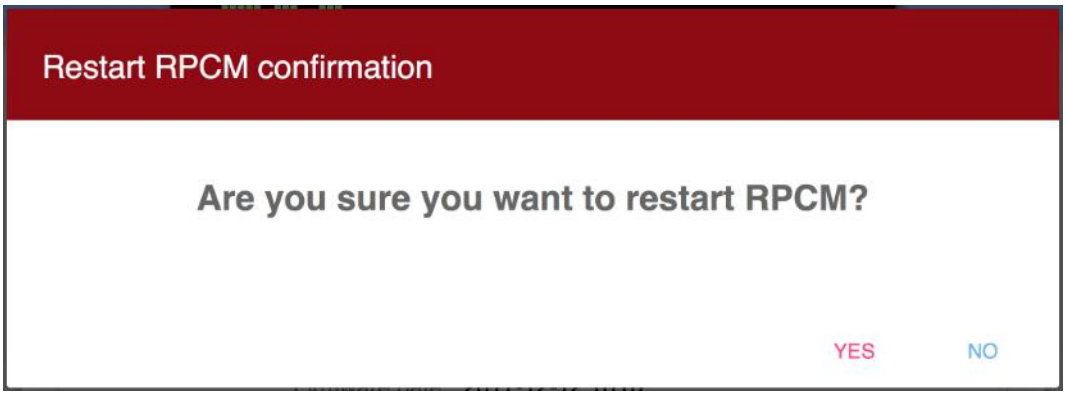

Figure 4.7.10. A window confirming restart.

If you press "**YES**" the controller will restart. The update does not affect the operation of the electrical part, including the connected client devices to the RPCM outlets. The power is not cut off.

If you select "NO", the changes are rolled back.

You have to update firmware (if necessary) after a successful reboot of the HLC.

IMPORTANT for models with two inputs (16A and 32A)! When updating the firmware is running, Input 1 must be powered, otherwise the power will be temporarily cut off during the firmware update process. In case for models (16A, 32A) Input 1 have to be priority as well. If it is not possible to apply voltage to Input 1, then you can update the firmware later, when it becomes possible to supply power to Input 1, or when a temporary disconnection of consumers will be acceptable.

4.7.4. Updating via SSH CLI

This section describes the updating procedure via the SSH CLI (Command Line Interface).

Below is an example of updating the system via SSH CLI from a UNIX family operating system.

For operating from a Windows family of operating systems, it is recommended to use the PUTTY software suite to perform the procedure of uploading the update file and to access the command line via the SSH protocol.

Start of the procedure for copying the update file using the SCP protocol:

```
scp rpcmsoftware.0.3.27.rpcm rpcmadmin@192.168.1.28:rpcmsoftware.0.3.27.rpcm
```

Where:

- *rpcmsoftware.0.3.27.rpcm* is the name of the update file;
- *rpcmadmin* is the username with administrator rights;
- *192.168.1.28* is the IP address of the updated RPCM device;

The system may require to accept the SSH key in order to proceed:

```
The authenticity of host ' 192.168.1.28 (192.168.1.28) 'can not be established.

ECDSA key fingerprint is SHA256: 24WVCVbzZA + OxfJ0G6ZKvkEdq + fgnTp / enInTufSueI.

Are you sure you want to continue connecting (yes / no)?
```

You need to answer "yes".

We receive a message about the necessity to authenticate with the password:

```
Warning: Permanently added'192.168.1.28 '(ECDSA) to the list of known hosts.

rpcmadmin@192.168.1.28's password:
```

After successfully entering the password, the process of copying of the update file begins:

```
rpcmsoftware.0.3.27.rpcm 100% 1537MB 8.6MB / s 02:58
```

We connect to RPCM in command line mode (CLI via the SSH protocol):

```
ssh rpcmadmin@192.168.1.28
```

Password request:

```
rpcmadmin@192.168.1.28's password:
```

After logging in you get the following screen:

```
Last login: Wed Jan 5 01:36:33 2000 from 192.168.1.10
RPCMCli version 0.3.25 is starting
user rpcmadmin successfully authenticated from 192.168.1.10, access level superuser
Auto-logout time is set to 3600 seconds
          [Serial Name]: SuperGeroy                          [Temperature]: 27C
      [Serial Number]: RU2017101100000001MO01DN01               [Ground]: GOOD
[Firmware Version]: 0.9.400                             [Release Date]: 20180116132229
[Software Version]: 0.3.25                   [Software Release Date]: 20171225083104
                    [Uptime]: 09:04:12                 [Model / Hardware Version]: 1502 /
RPCM
    [Force Failback]: OFF                       [Failback Delay in Seconds]: 0
--------------------------------------------------------------------------------
                  [Input 1]: 239V @ 49.98Hz 0.000A 0.000KW (ACTIVE, PRIORITY)
                  [Input 2]: 241V @ 49.98Hz 0.000A 0.000KW
--------------------------------------------------------------------------------
                [Output 0]: ON <admin: ON> 0mA 0W
                [Output 1]: ON <admin: ON> 0mA 0W
                [Output 2]: ON <admin: ON> 0mA 0W
                [Output 3]: ON <admin: ON> 0mA 0W
                [Output 4]: ON <admin: ON> 0mA 0W
                [Output 5]: ON <admin: ON> 0mA 0W
                [Output 6]: ON <admin: ON> 0mA 0W
                [Output 7]: ON <admin: ON> 0mA 0W
                [Output 8]: ON <admin: ON> 0mA 0W
                [Output 9]: ON <admin: ON> 0mA 0W

Type 'help' to get suggestions

SuperGeroy [192.168.1.28] 0 rpcmadmin>
```

To view the status, use the command:

```
show update
```

Immediately after uploading the file, it is verified:

```
Current update status:
--------------------------------------------------------------------------
                              Status: Software update file is being verified ...
                          Progress: 77.90%
--------------------------------------------------------------------------
```

After the verification is completed

```
show update
```

command will show that you are ready to start the software update:

```
Current update status:
--------------------------------------------------------------------------
                              Status: Ready to start software update
--------------------------------------------------------------------------
```

At this stage, you need to enter a command to start the update procedure:

```
start update
```

You can check progress by entering the following command in the process of update:

```
show update
```

The system responds with following:

```
Software update has started ...

Type 'help' to get suggestions
```

Note. If you attempt to `start update` before the file upload is finished, the system returns:

"We are not ready to start update, software update file should be uploaded and verified ..."

The update procedure does not start in this state.

The status of readiness can be controlled with the help of the command:

```
show update
```

The system response can depend on the current update status and can be of one of the following (see examples below):

```
Current update status:
------------------------------------------------------------------------------
                             Status: Recovery procedure is in progress ...
                           Progress: 5.73%
------------------------------------------------------------------------------

Current update status:
------------------------------------------------------------------------------
                             Status: Applying update ...
                           Progress: 14.88%
------------------------------------------------------------------------------

Current update status:
------------------------------------------------------------------------------
                             Status: Verifying applied update ...
                           Progress: 41.17%
------------------------------------------------------------------------------
```

After the upgrade process is completed:

```
show update
```

returns:

```
Current update status:
------------------------------------------------------------------------------
               Status: Update complete, please manually restart RPCM
             Progress: 100 %
------------------------------------------------------------------------------
```

After this message, you need to restart the High Level Controller (HLC) by entering the following command:

```
restart high-level-controller
```

The system issues a request to confirm the restart:

```
Please enter 'RESTART' (ALL CAPS MANDATORY) and press ENTER to restart High Level Con-
troller immediately, or anything else to cancel:
```

You need to enter (ALL CAPS):

```
RESTART
```

You will see confirmation of upcoming restart:

```
Please disconnect your SSH session manually... Restarting High Level Controller in 5 sec-
onds...
```

Please note! If RPCM obtains an IP address via DHCP or via Zero Configuration Networking, then the IP address after the restart may change.

To prevent this situation, it is recommended to bind the IP address to the MAC address via the DHCP server settings or assign static addresses.

4.8. System Journal

4.8.1. General Information

This section describes the Resilient Power Control Module (RPCM) event log.

You can access to this section by using the menu item *System journal* or by typing *https://<name_or_IP_RPCM>/logs/* in the browser string (provided that authentication was previously successful).

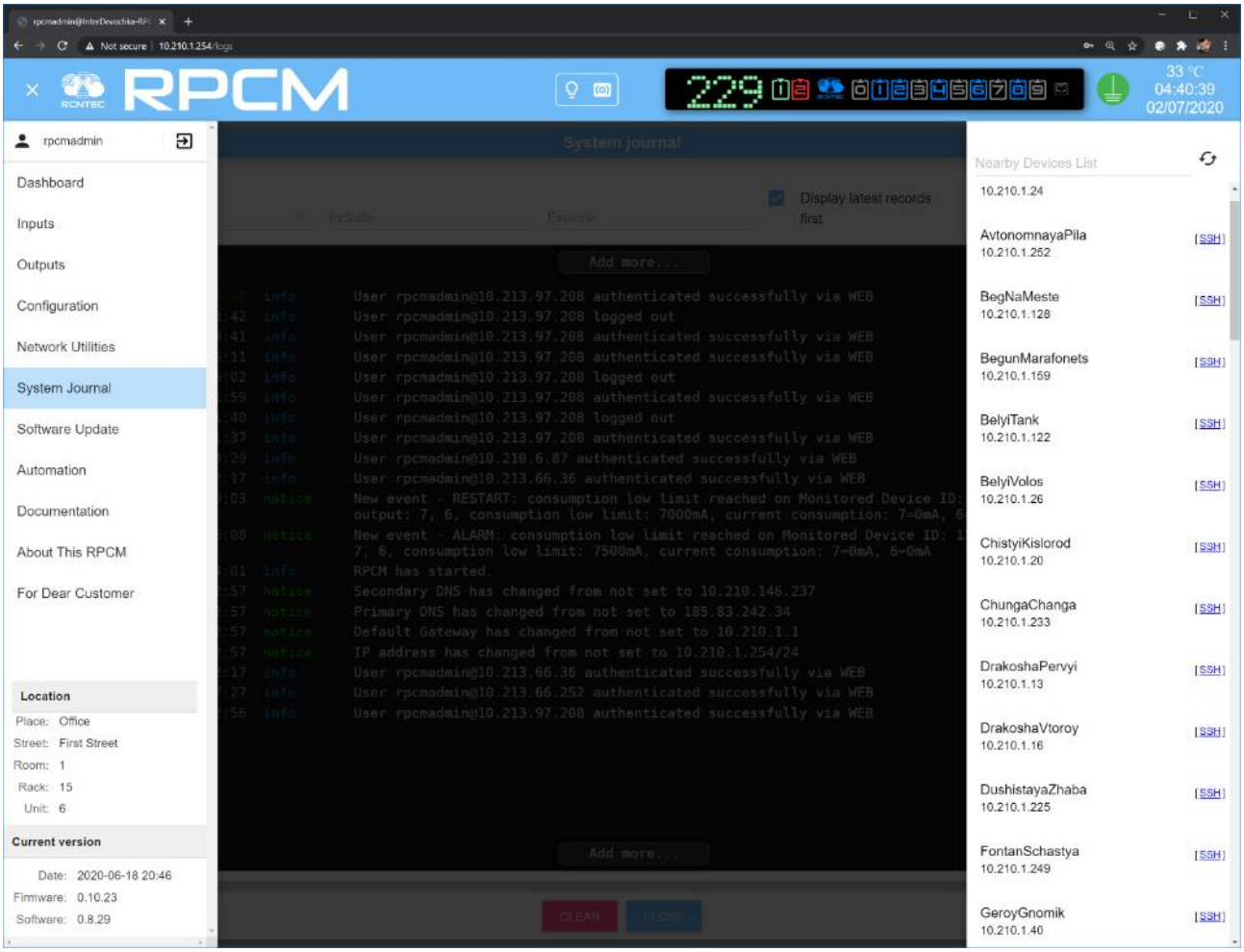

Figure 4.8.1. Menu to go to the "System journal" section.

4.8.2. Description of the System Journal Window

The Event Log window can be conditionally divided into 3 areas:

1 — *Filter bar*;

2 — *Information panel*;

3 — *Action buttons*.

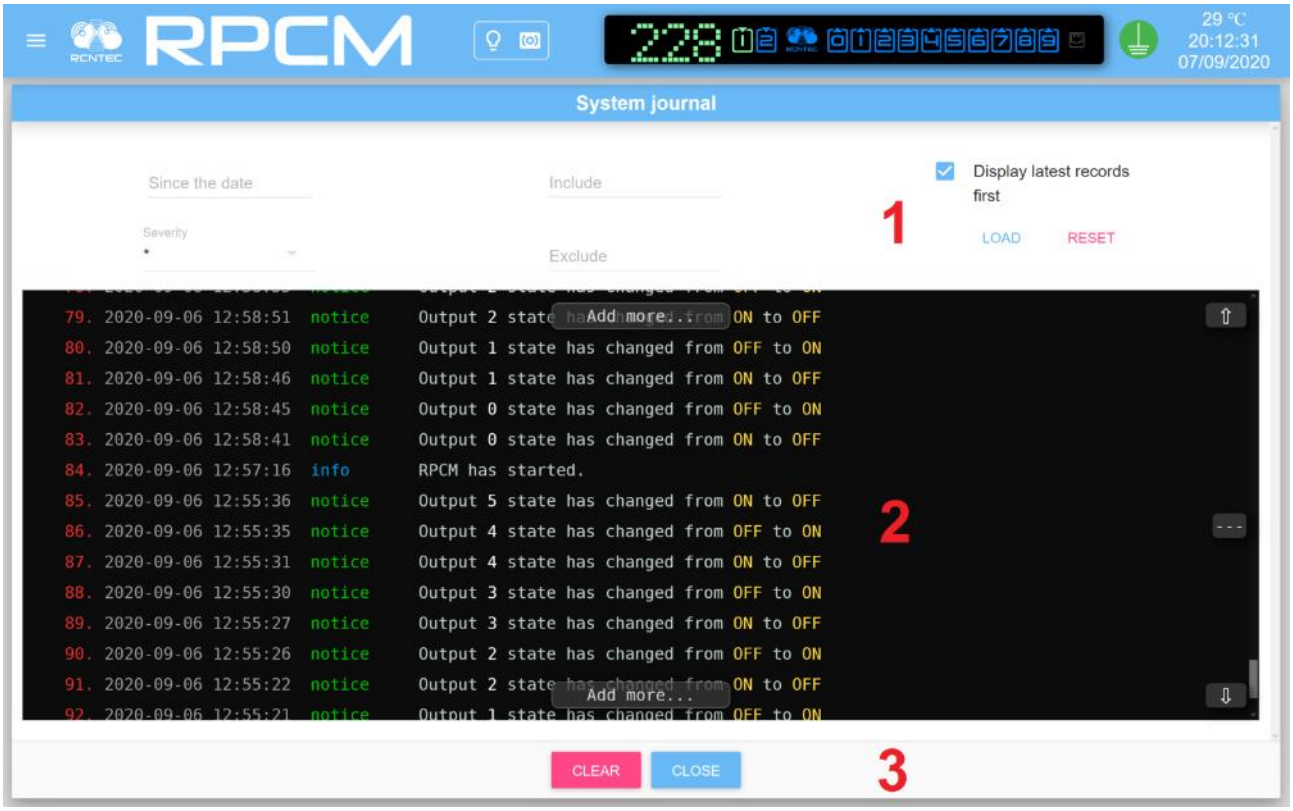

Figure 4.8.2. Main window of the "System Journal".

4.8.3. Filter Bar

It is located immediately under the heading "System journal".

It serves to control the demonstration mode.

Figure 4.8.3. Filter bar of the "System journal"

Below is a list of items from the *Filter bar*.

The field **"Since the date"** — element is used to set the start date and time from which the log entries are needed.

Selection menu "**Severity**" — it is used to limit the output of messages by type. The asterisk symbol (*) removes the restriction.

There are 8 types of messages in RPCM:

- **emergency** — "especially dangerous";
- **alert** — sudden events by reference values;
- **critical** — critical error;
- **error** — non-critical error;

- **warning** — warning;
- **notice** — comment about the condition;
- **info** — information message;
- **debug** — information for debugging.

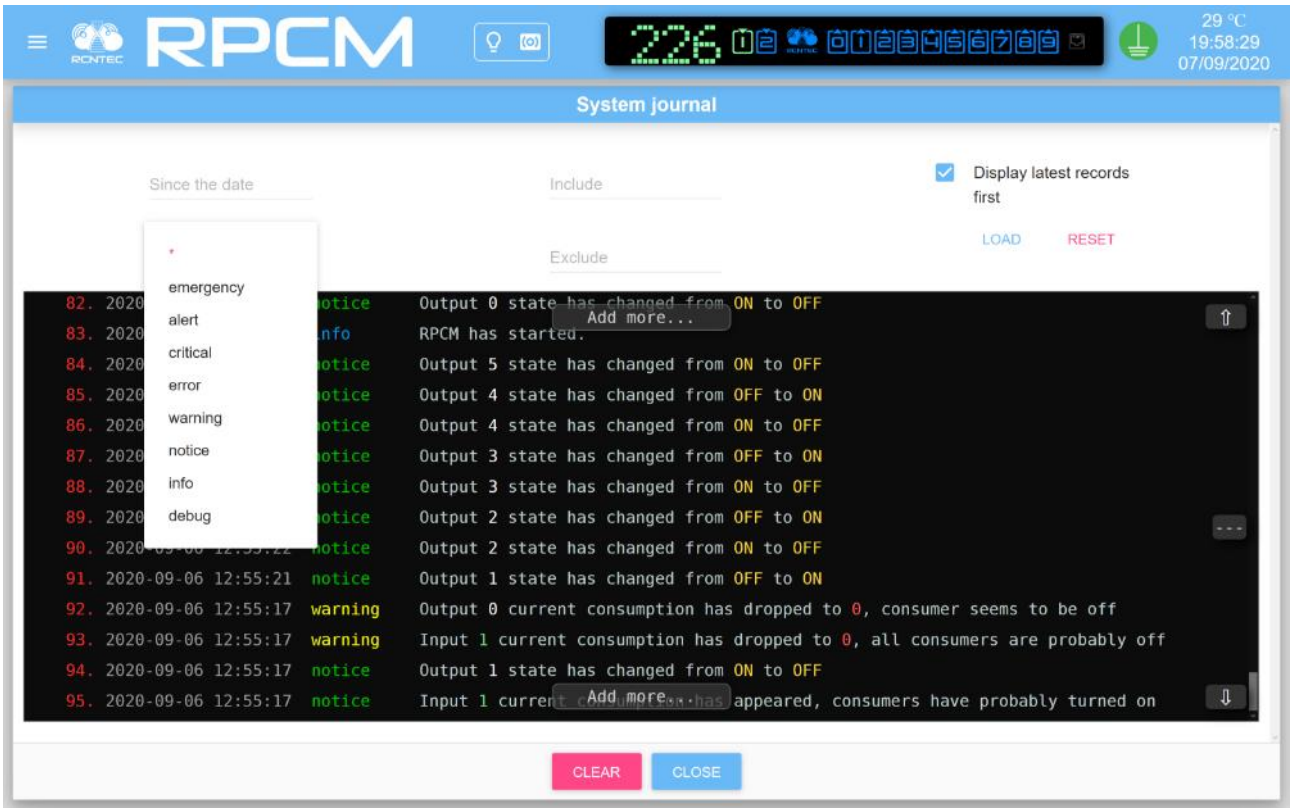

Figure 4.8.4. Drop-down menu for"Type of messages".

The **"Include"** field is intended to filter output records; only messages containing keywords are displayed.

The **"Exclude"** field is intended intended to filter of output records, but opposite in action, i.e. only messages that do not contain keywords are displayed.

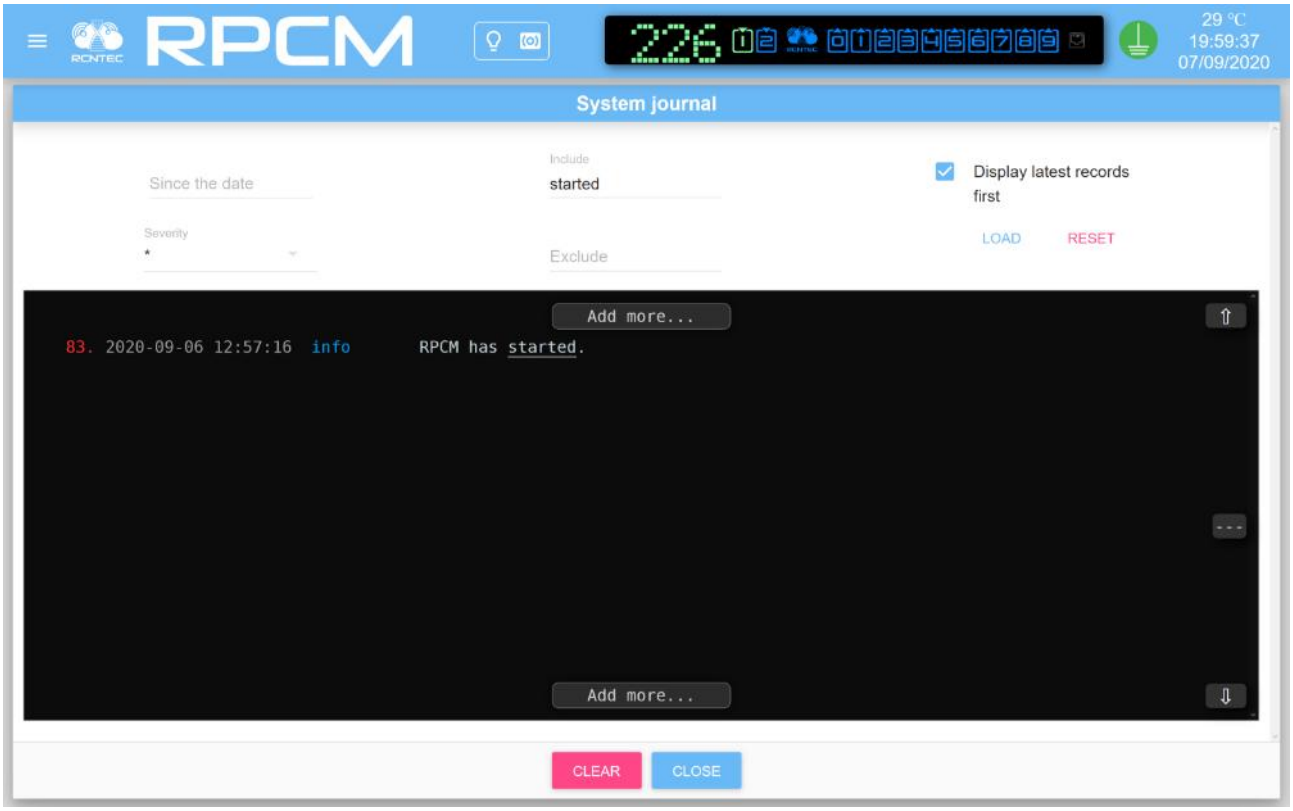

Figure 4.8.5. Action of the Exclude item. Only messages that do not contain the word "alarm" are displayed

The **LOAD** and **RESET** buttons are used to load messages and reset to the original values, respectively.

4.8.4. Information Panel And Bottom Buttons *CLEAR* and *CLOSE*.

The Information window is a black field with a white font for displaying system messages.

It can contain the control **"Add more ..."** to display a new group of messages.

The **CLEAR** button serves to clear the information window.

The **CLOSE** button closes this window and switches to the *Dashboard*.

4.9. Network Utilities

4.9.1. General Information

This section describes the "Network Utilities" section of the Resilient Power Control Module (RPCM).

You can get to this section using the menu item *Network Utilities* or by typing *https://<name_or_IP_RPCM>/netutils/* in the browser string (assuming that authentication was successful before).

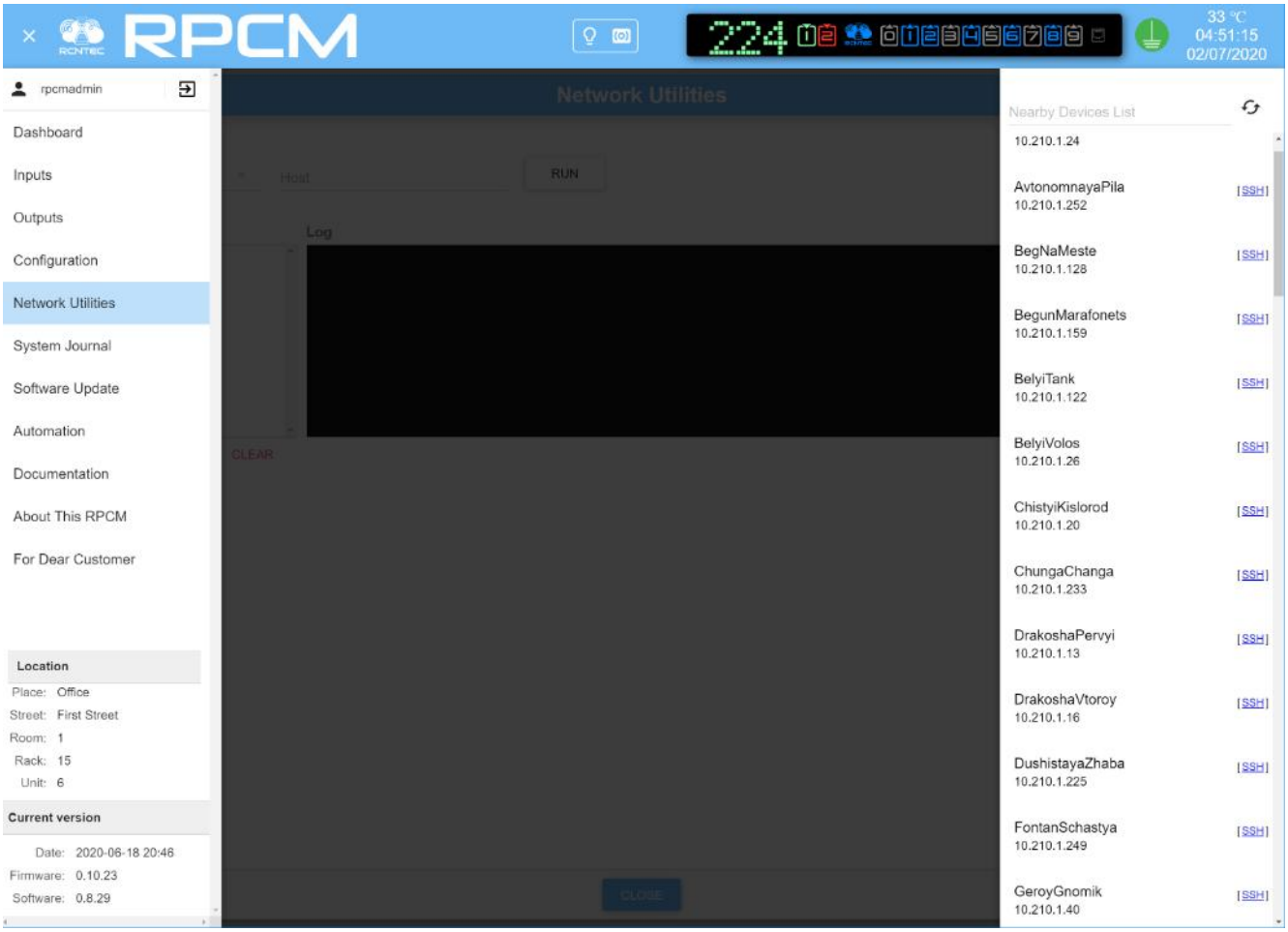

Figure 4.9.1. Menu to go to the "Network Utilities" section.

4.9.2. Description of the "Network Utilities" Window

The "Network Utilities" window can be conditionally divided into 4 areas:

1 — Command area;

2 — History of commands;

3 — Log;

4 — Bottom area.

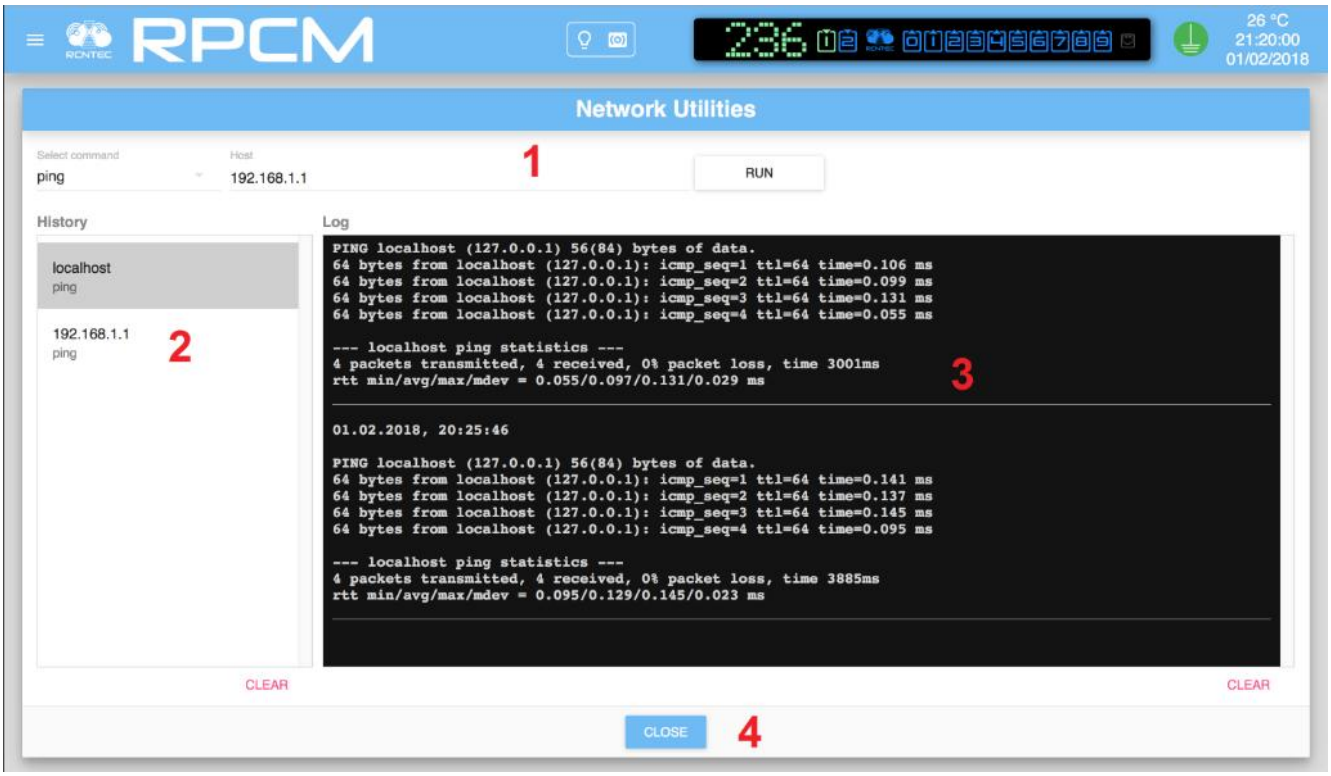

Figure 4.9.2. Window of the "Network Utilities" section.

4.9.3. Description of the "Command Area"

Select command — when pressed, the drop-down menu is invoked, where the command is selected, e.g. *ping*.

Host — field for entering the IP address or network name of the device as a parameter of the test command; the device name can be in short or full format (FQDN).

The **RUN** button starts the execution of a command with a name or address as a parameter.

Figure 4.9.3. The command area of the "Network Utilities" section.

4.9.4. Description of other elements of the "Network Utilities"

The following is a description of all other areas with controls (see Figure 4.9.2.)

History area collects and presents information about previous requests.

Clicking on the selected item demonstrates the status of the "Network Utilities" section at the time of the completion of this command and allows you to re-execute it if necessary.

At the bottom of the "History" area is the control **CLEAR**, upon activation of which all commands from this list are deleted.

The "Log" area serves to demonstrate the system output about regarding from executing commands.

Also has the control **CLEAR**, which deletes information from this list when activated.

In the lower part of the window there the is the **CLOSE** button, to return to *"Dashboard".*

4.10. Documentation

This chapter describes the "Documentation" section of the Resilient Power Control Module (RPCM).

You can access to this section by using the menu item *Documentation* or by typing *https://<name_or_IP_RPCM>/docs/* in the browser string (provided that authentication was successful before).

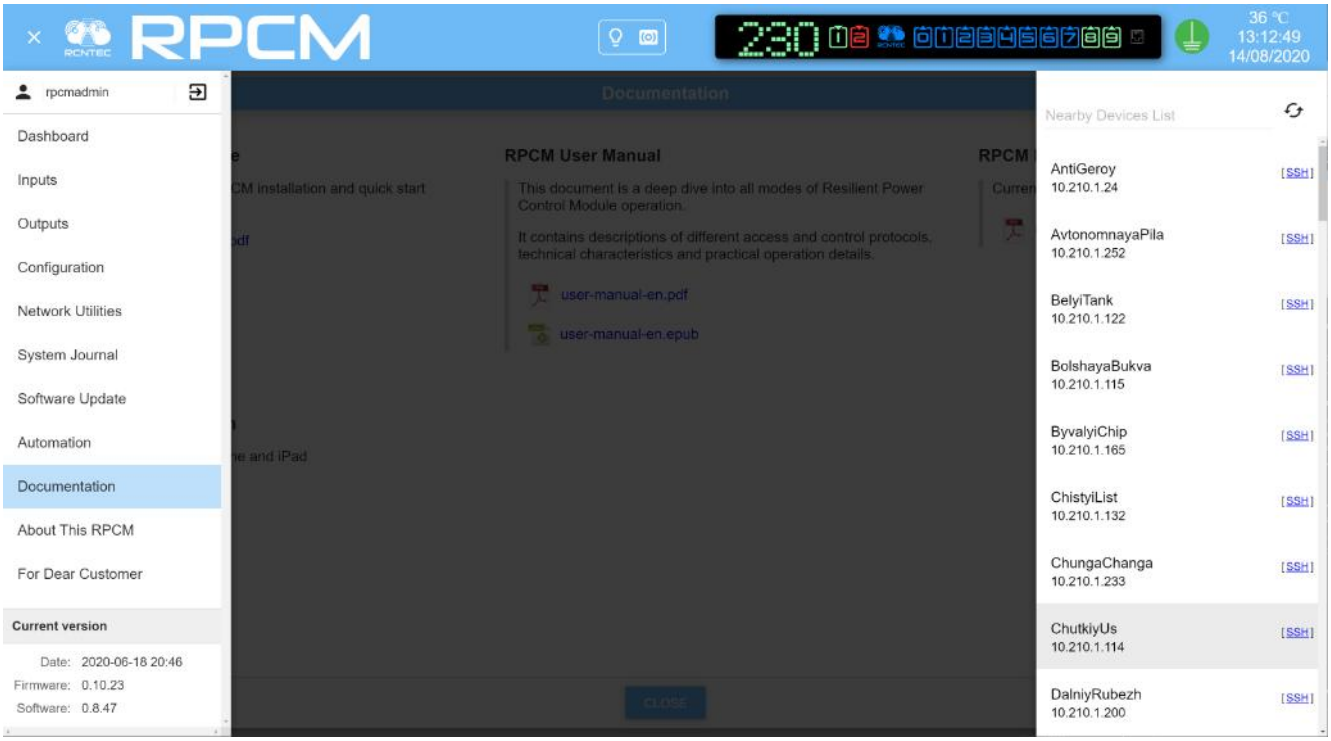

Figure 4.10.1. Menu to go to the "Documentation" section.

This section is designed to access built-in documentation via web interface.

Figure 4.10.2. The window of the "Documentation" section.

The **CLOSE** button will switch you to the Dashboard.

4.11. Automation Tools

4.11.1. Short Description

This chapter describes the "Automation" section of the Resilient Power Control Module (RPCM).

You can go to this section using the menu item *"Automation"* or by typing https://<name_or_IP_RPCM>/automation/ in the browser string (assuming that authentication was previously successful).

Figure 4.11.1. "Automation" item in menu

The "Automation" interface is intended for monitoring various parameters of the connected equipment, as well as for rebooting the device by cycling power in the event detection of critical conditions specified in the monitoring settings.

RPCM allows you to monitor the following metrics:

- energy consumption;
- availability over the network (via the ICMP echo/reply (ping));
- service availability (via the availability of the TCP port with the specified number);
- hashrate (for mining equipment).

You can configure one or more watchdogs simultaneously (up to 4) for each device connected to the output.

Figure 4.11.2. The Automation section window (PING, TCP PORT, and MINER STATUS subsections are not shown, scrolling is required).

In case of violation of the predetermined conditions (the drop in the level of power consumption or hashrate, the unavailability of the TCP port or the network interface for ICMP echo/reply (ping)), a power reset is performed.

IMPORTANT! In addition to checking the current consumption level, all other tests: "**PING**", "**TCP PORT**" and "**HASHRATE**" are performed over a data network.

RPCM cannot distinguish between device unavailability due to a crash and device unavailability due to scheduled maintenance.

This should be taken into account when setting parameters, such as unavailable time for reloading and the interval between reloads, so that technical maintenance work on the network does not lead to mass restarts due to false test triggers.

Note. Also, when performing technical maintenance related to network equipment through which devices under watchdog are connected or the equipment under watchdog, it is recommended to disable the corresponding test settings.

4.11.2. Top Control Bar

Top Control Bar displays information about RPCM. There are following elements:

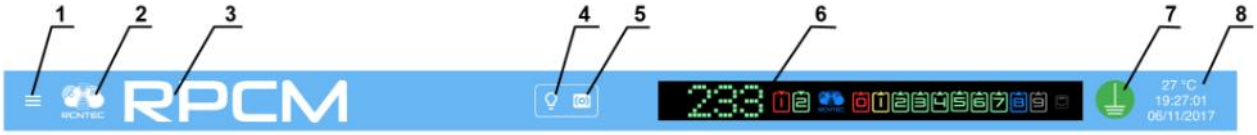

Figure 4.11.3. The Top Control Bar.

Legend:

1 — Menu button.

2 — RCNTEC logo (click to jump to the RCNTEC website — https://rcntec.com);

3 — RPCM name (click to jump to the RPCM product site — https://rpcm.pro);

4 — light identification activation button depicted as a lightbulb image;

5 — sound identification activation button depicted as a radio image;

6 — Virtual Front Panel, click on it to jump to the Dashboard;

7 — grounding icon;

8 — group of service values (from top to bottom): internal temperature in degrees Celsius, time, and date.

4.11.3. Sub-sections of the Main Window (General Description)

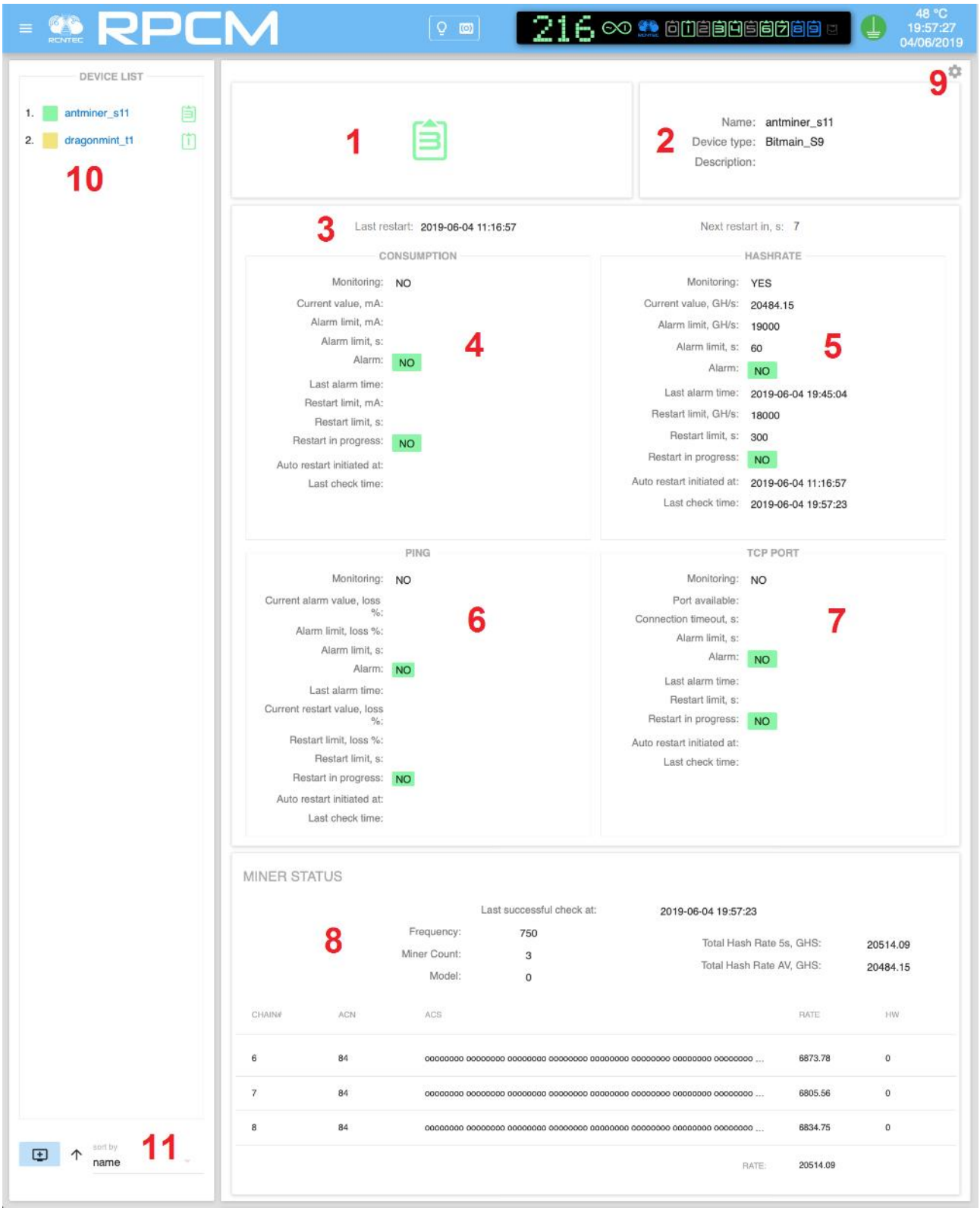

Figure 4.11.4. "Automation" section — with numbered subsections.

Description of subsections in Figure 4.11.4:

1 — outlet number;

2 — general parameters of a watchdog — name, device type (for mining modules), description (extended comment up to 254 characters inclusive);

3 — date and time of the last reboot and estimated time to a next reboot;

4 — "**CONSUMPTION**" subsection for information about current consumption parameters and corresponding actions of RPCM;

5 — "**HASHRATE**" subsection for information about the configured parameters for the mining devices and the corresponding actions of RPCM;

6 — "**PING**" subsection for information about the availability of the device over the network when testing through ICMP echo request/reply (ping) and the corresponding actions of RPCM;

7 — "**TCP PORT**" subsection for information on the availability of the network resource available at specified TCP port and the corresponding actions of RPCM;

8 — "**MINER STATUS**" subsection for information on specific parameters of mining, this area should be displayed if you set up a special mining device, what is supported RPCM Software;

9 — "gear" button to open the settings pop-up window.

10 — "**DEVICE LIST**" subsection — the list of configured devices in sorted order;

11 — "**ADD DEVICE**" button to open the "Add device" pop-up window.

Note that sections from 1 to 9 are unique for each device that you add. In the case of multiple devices, scroll is used to view information on devices that did not fit in one screen. Also, a quick transition to the desired device is carried out by clicking the particular watchdog name in the "**LIST OF DEVICES**" subsection.

4.11.4. Description of the Subsections of the Automation Section

4.11.4.1. Outlet Number

The output number looks similar to the other sections: "Dashboard" and "Outputs". Figure 4.11.4. it is indicated by the number "*1*".

To quickly obtain information, the color coding is used. Below is a brief description of the color coding.

Description of color outlet signals:

- *green* — output is on and in working condition, load is connected;
- *blue* — output is administratively and in fact turned on, but the load is not connected;
- *red* — the output was disconnected due to input overload, overcurrent, input overcurrent, short circuit at the output, overvoltage at the output (accompanied by appropriate messages);
- *yellow* — output is on, but has an overload condition (accompanied by corresponding messages);
- *gray* — output is administratively disabled;
- *magenta* — the output is faulty (administratively on, but has no voltage on it).
- *blinking from grey / red to magenta* — the output is faulty (administratively off or off due to short circuit/overcurrent/input overload/overvoltage but has voltage on it);

4.11.4.2. Description of Common Parameters

Figure 4.11.4. this section is numbered "*2*".

The description of the general parameters is given for the convenience of obtaining information and visual identification of the system. The following fields are displayed:

- name of the monitored device;
- type of device (for mining modules);
- description (extended comment up to 254 characters).

4.11.4.3. Last Reboot

In Figure 4.11.4., this section is marked with the number "*3*".

Displays the date and time of the last reboot, as well as the time zone in UTC format.

4.11.4.4. "CONSUMPTION" Subsection

In Figure 4.11.4., this section is indicated by the number "*4*".

A summary of the monitoring settings for current consumption is displayed. Below are the parameters of this section displayed in the general window "Automation":

- **Monitoring —** has two values "NO" or "YES", the field is intended to indicate the watchdog status;
- **Current value, mA** — current value at the moment;
- **Alarm limit, mA** — current value to trigger the alert;
- **Alarm limit, s** — stabilization delay before alarm;

- **Alarm** — the field is intended to alarm you of a critical situation;
- **Last alarm time** — information about the date and time of the last alarm;
- **Restart limit, mA** — current value to trigger the restart;
- **Restart limit, s** — stabilization delay before restart;
- **Restart in progress** — if the consumer device is in the process of rebooting, this will be displayed in this field;
- **Auto restart initiated at:** — the date and time the device reset procedure was started;
- **Last check time** — time of last control.

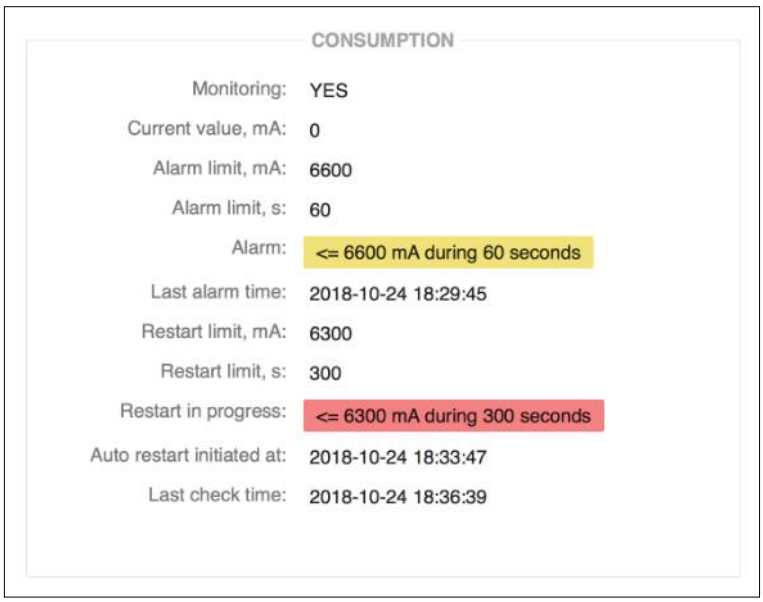

Figure 4.11.5. "Automation" section — "CONSUMPTION" subsection.

4.11.4.5. "HASHRATE" Subsection

In Figure 4.11.4., this section is marked with the number "*5*".

It demonstrates basic information about the status of hashrate level monitoring.

More information. Hashrate — a unit of measurement that allows to determine the effective computing power of equipment involved in the production of crypto currency.

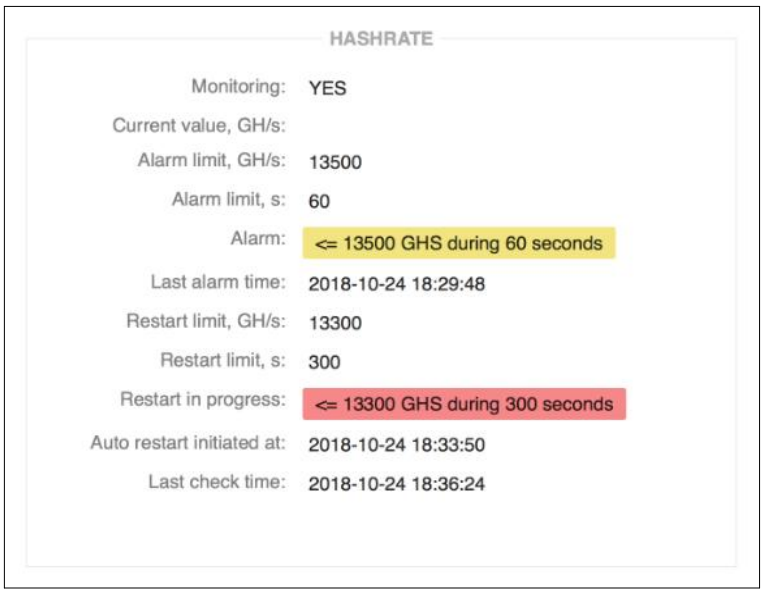

Figure 4.11.6. "Automation" Section— "HASHRATE" subsection

- A summary of the monitoring settings for *"HASHRATE" subsection is displayed.*
- **Monitoring** — has two values "*NO*" or "*YES*", the field is intended to indicate the watchdog status;
- **Current value, GH/s** — the number of calculated hashes per second;
- **Alarm limit, GH/s** — the hashrate limit to trigger the alarm;
- **Alarm limit, s** — stabilization delay before alarm;
- **Alarm** — this field indicates whether the hashrate alarm is currently active;
- **Last alarm time** — date and time when the alarm was triggered last time;
- **Restart limit, GH/s** — the hashrate limit to trigger the restart;
- **Restart limit, s** — stabilization delay before triggering restart;
- **Restart in progress** — this field indicates whether restart has been initiated;
- **Auto restart initiated at:**— the date and time at which the restart procedure was initiated;
- **Last check time** — time of last control.

Note. Figure 4.11.5 shows that messages in the *Alarm* field are displayed on a yellow background in order to attract the attention of the administrator.

4.11.4.6. "PING" Subsection

In Figure 4.11.4., this section is marked with the number "6".

This subsection demonstrates information about the status of monitoring by ICMP echo requests/replies (ping).

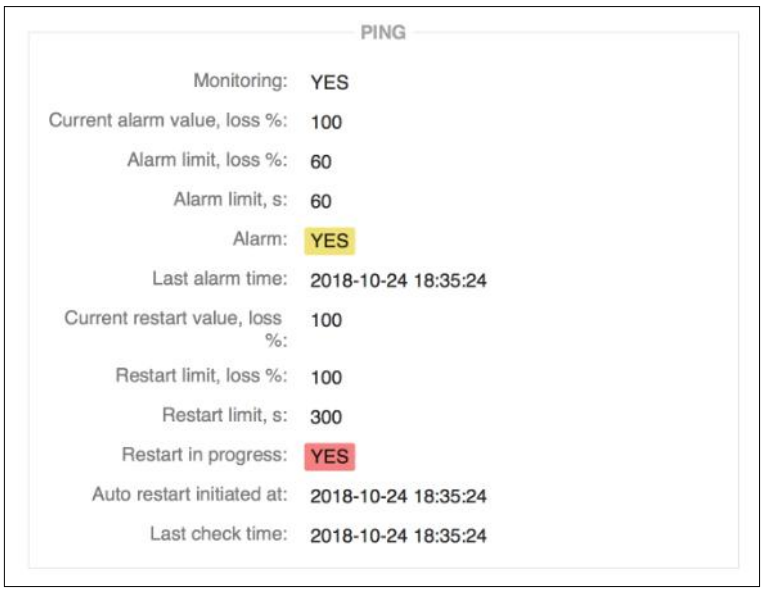

Figure 4.11.7. "Automation" section — "PING" subsection.

The test based on ICMP echo requests/replies (pings). If the ICMP packets reach the device under test, and the test passes within specified timing parameters, the device is considered available.

- **Monitoring** — has two values "*NO*" or "*YES*", the field is intended to indicate the watchdog status;
- **Current alarm value, loss %** — percentage of currently observed lost packets used compare against alarm limit value;
- **Alarm limit, loss %** — the maximum number of lost packets to trigger an alert;
- **Alarm limit, s** — stabilization delay before alarm is triggered;
- **Alarm** — indicated whether alarm is currently active;
- **Last alarm time** — information about the date and time when the last alarm was triggered;
- **Current restart value, loss %** — percentage of currently observed lost packets used compare against restart limit value;
- **Restart limit, loss %** — the maximum number of lost packets to trigger a restart;
- **Restart limit, s** — stabilization delay before triggering restart;
- **Restart in progress** — indicates whether the restart process has been triggered;
- **Auto restart initiated at:** — the date and time the device restart procedure was initiated;
- **Last check time** — time of last control.

Note. The method of calculating the observed loss values for alarms and restarts used in ICMP echo request/reply (ping) tests.

ICMP echo requests are sent every **Check interval, s.**

If after sending ICMP echo request, the reply does not arrive within the **Request timeout, s**, the packet is considered lost.

Results of ICMP echo requests/replies (pings) for alarm and restart purposes are collected in their own queues. Sizes of queues are calculated according to the following formulas: Qa = Da / I and Qr = Dr / I, where:

Qa – size of Alarm packet loss queue

Qr – size of Restart packet loss queue

Da – "Min. duration for alarm, s" value

Dr – "Min. duration for restart, s" value

I- "Check interval, s" value

Each ICMP echo request/reply (ping) result value swaps the oldest value to ensure that the queue does not overflow.

Loss percentage is calculated according to the following formulas: Pa = La / Qa x 100 and Pr = Lr / Qr x 100, where:

Pa- "Current alarm value, loss %" value

Pr- "Current restart value, loss %" value

La – number of packets in Alarm packet loss queue, that have exceeded "Max. latency limit, ms" or "Request timeout, s" values

Lr – number of packets in Restart packet loss queue, that have exceeded "Max. latency limit, ms" or "Request timeout, s" values

4.11.4.7. "TCP port" Subsection

In Figure 4.11.4., this section is marked with the number "7".

It demonstrates information about the TCP port watchdog status.

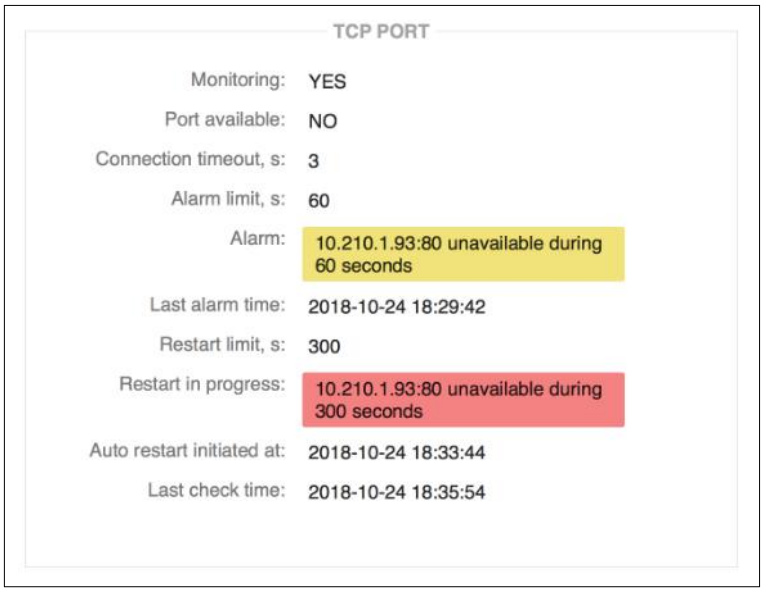

Figure 4.11.8. "Automation" section — "TCP port" subsection.

A summary of the monitoring settings for the TCP port status is displayed:

- **Monitoring** — has two values "*NO*" or "*YES*", the field is intended to indicate the watch-dog status;
- **Port available** — values **YES** or **NO** depending on the test results;
- **Connection timeout, s** — configured connection timeout after which tcp connection is deemed unavailable;
- **Alarm limit, s** — stabilization timeout for alarm;
- **Alarm** — this field indicates whether TCP Port unavailability alert is currently active;
- **Last alarm time** — information about the date and time when the last alarm was triggered;
- **Restart limit, s** — stabilization timeout for restart;
- **Restart in progress** — indicates whether the restart process has been triggered;
- **Auto restart initiated at:** — the date and time the device restart procedure was initiated;
- **Last check time** — time of last control.

4.11.4.8. "MINER STATUS" Subsection

In Figure 4.11.4., this section is marked with the number "8".

This section shows more detailed information about the status of the miner.

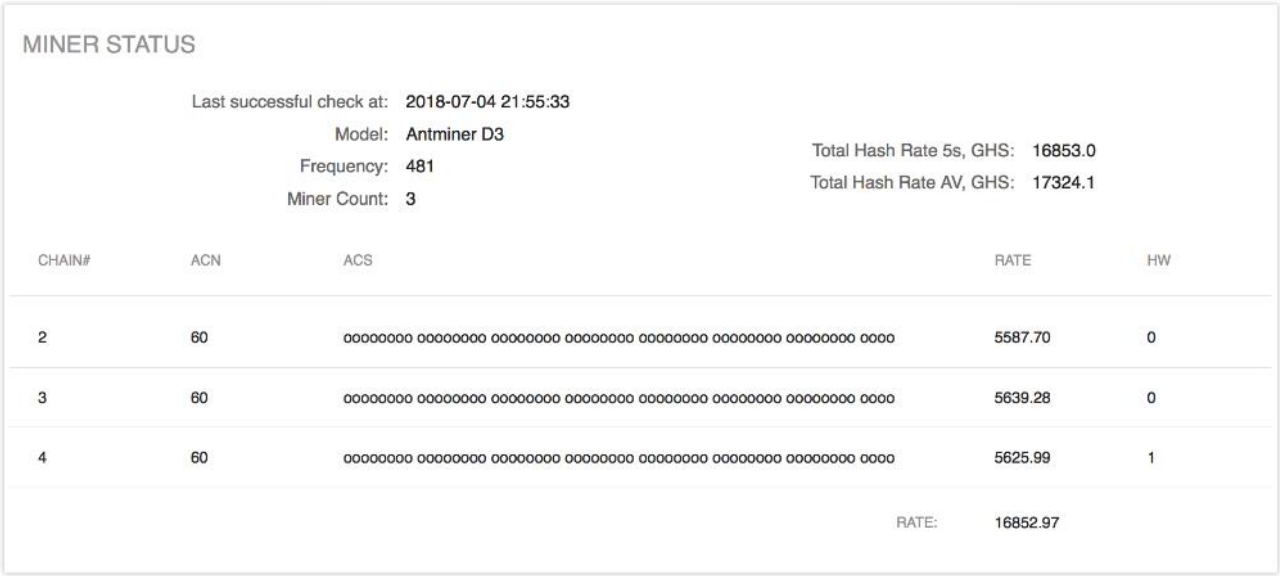

Figure 4.11.9. "Automation" section — "MINER STATUS" subsection.

- **Last successful check at** — date and time of last successful hashrate checking;
- **Model** — information about the configure miner model, for example: *Bitmain D3*, *Bitmain L3*, *Bitmain S9, Bitmain S11*;
- **Frequency** — current frequency of the miner;

- **Miner Count** — the number of ASIC boards;
- **Total Hash Rate 5s, GHS** — number of calculated gigahashes per second (last 5s reading);
- **Total Hash Rate AV, GHS** — number of calculated gigahashes per second (average value as reported by miner API).
- Below is a description of the information on the status of the rulers (boards) with ASIC installed in a specific miner.
- **CHAIN#** — the number of the ASIC board
- **ACN** — the number of ASIC chips on this board.
- **ACS** — information about the status of each ASIC chip. The symbol "o" means normal state, the symbol "x" indicates a failure in the operation of the ASIC or its inaccessibility.
- **RATE** — total gigahashes per second calculated by all ASIC chips of this board;
- **HW** — number hardware errors reported by miner's API.

4.11.4.9. "Edit device" Window

In Figure 4.11.4., this section is indicated by the number "*9*".

Click the "gear" button on the top right of the subsection to open the pop-up editing window.

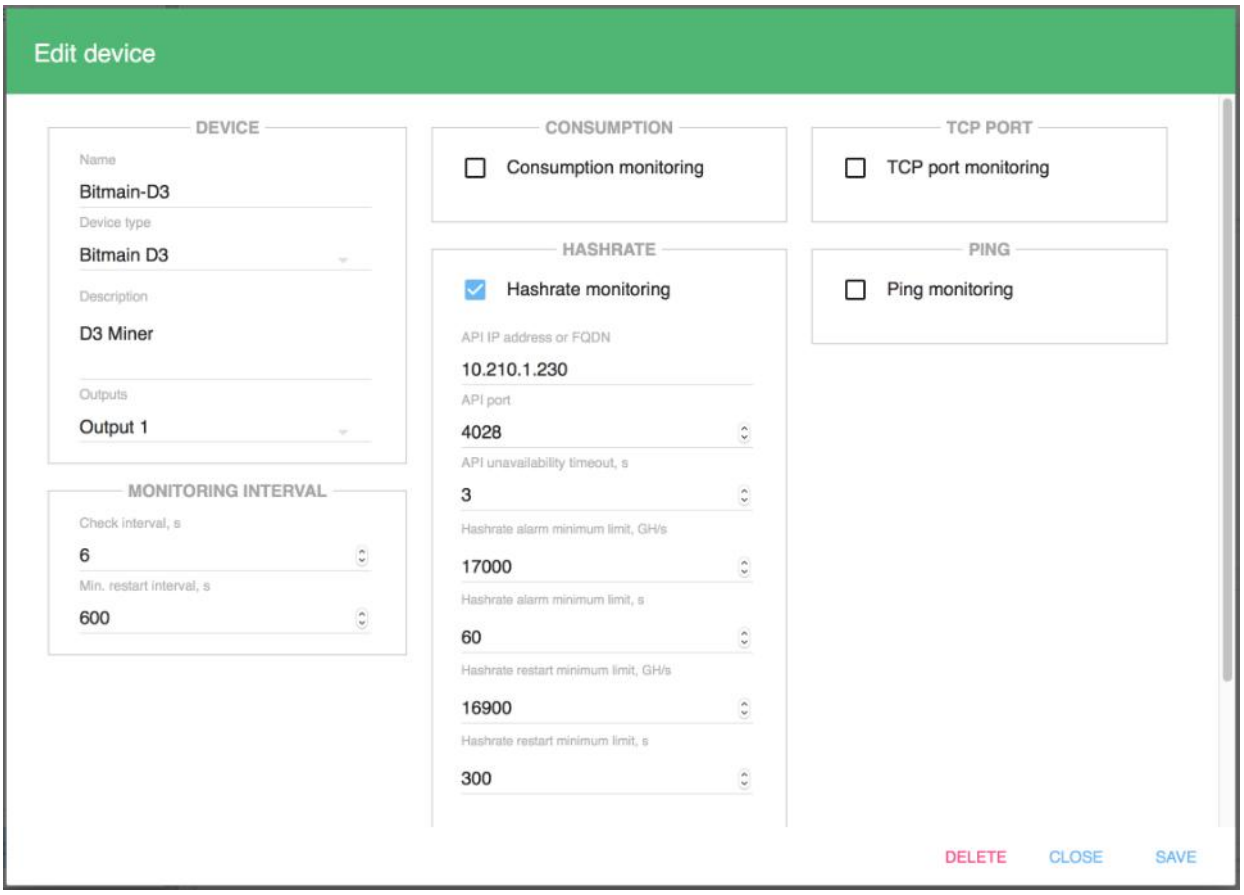

Figure 4.11.10. "Edit device" pop-up window.

There are following buttons at the bottom right corner of the window: "**DELETE**", "**CLOSE**", "**SAVE**".

SAVE — to confirm the information entered;

CLOSE — to close the window without saving (discarding changes);

DELETE — delete this particular watchdog configuration.

4.11.4.10. "LIST OF DEVICES" Subsection

In Figure 4.11.4., this section is marked with the number "10".

This area shows list of devices that are being monitored and has "ADD DEVICE" button to open the new watchdog configuration pop-up window.

Clicking on any of the configured devices automatically positions the interface web page on the parameters area of this device.

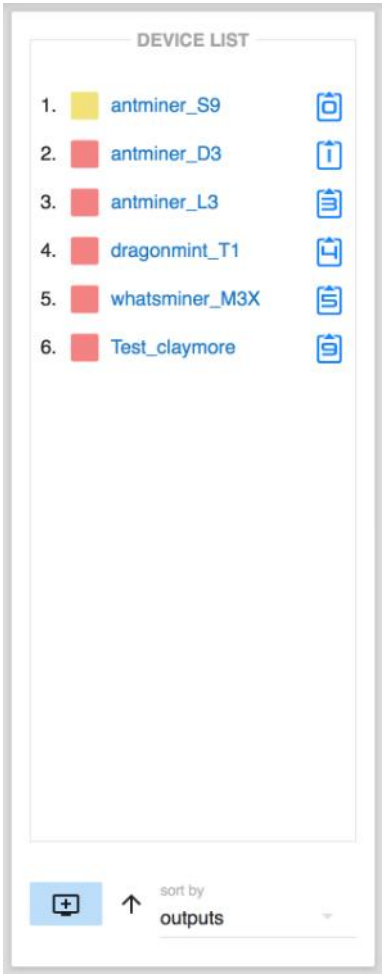

Figure 4.11.11. The "Device List" subsection. As an example, 6 devices with different configurations of miners have been created. At the bottom there is an "ADD DEVICE" button (depicted as monitor with "+" sign) as well as "sort by" drop down selection option.

4.11.5. Managing Parameters

4.11.5.1. Parameters Common to All Types of Monitoring

To configure a new watchdog automation, click "**ADD DEVICE**" button to open a configuration pop-up windows. This pop-up window has more parameters than than are available in view mode of the "Automation" interface.

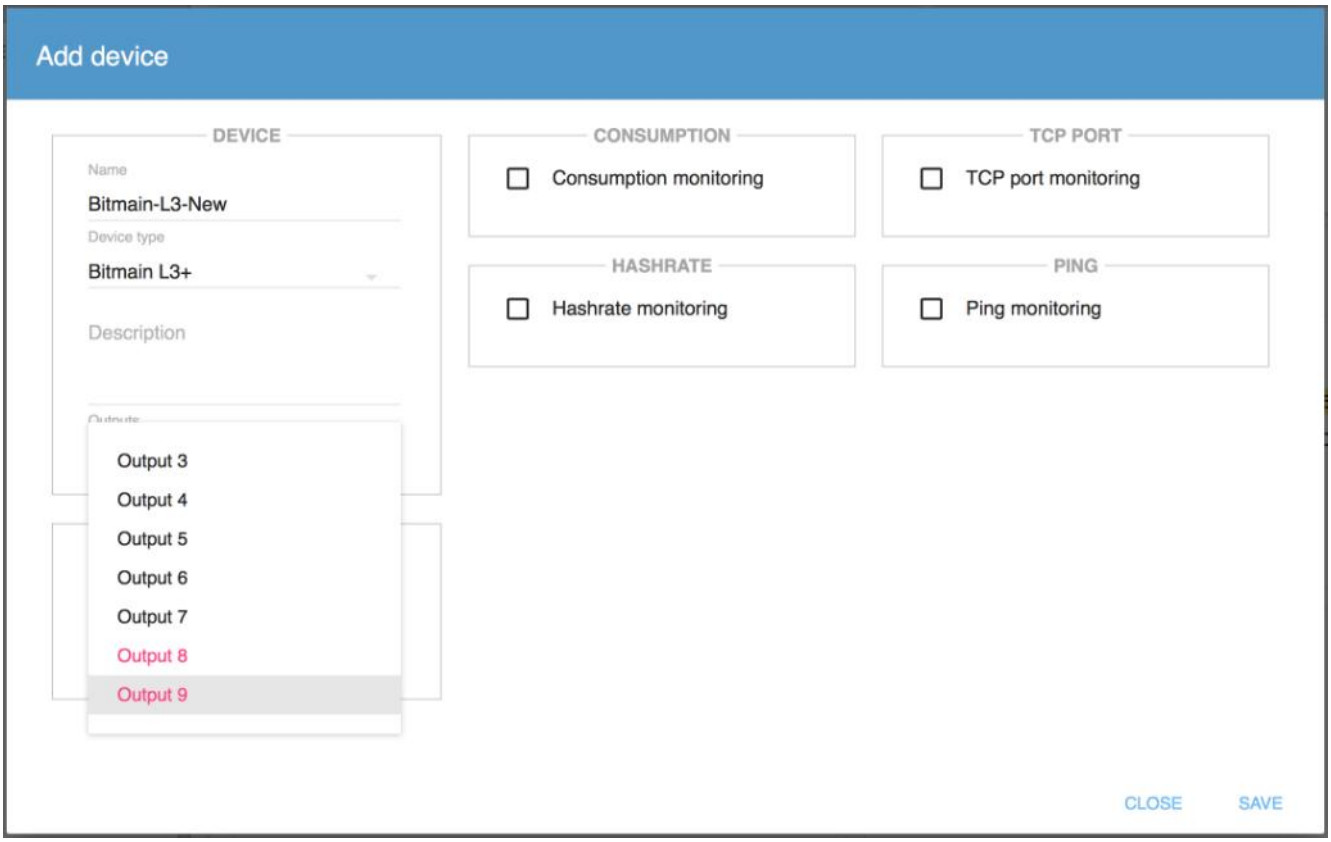

Figure 4.11.12. The "Add device" pop-up window with "Outputs" drop-down menu.

In the *"Add device"* pop-up window *on the left side there are fields for values common to all types of* watchdogs:

Subsection **DEVICE** includes fields:

Name — watchdog name;

Device type — the drop-down menu to select from predefined values of different miners and other devices;

Description (comment up to 254 characters)

Outputs — the device can be connected to one or several outlets, which are selected in this field.

Figure 4.11.13 shows the "*Device type*" drop-down menu. The "*Bitmain L3 +*" item is selected (so it's highlighted in red).

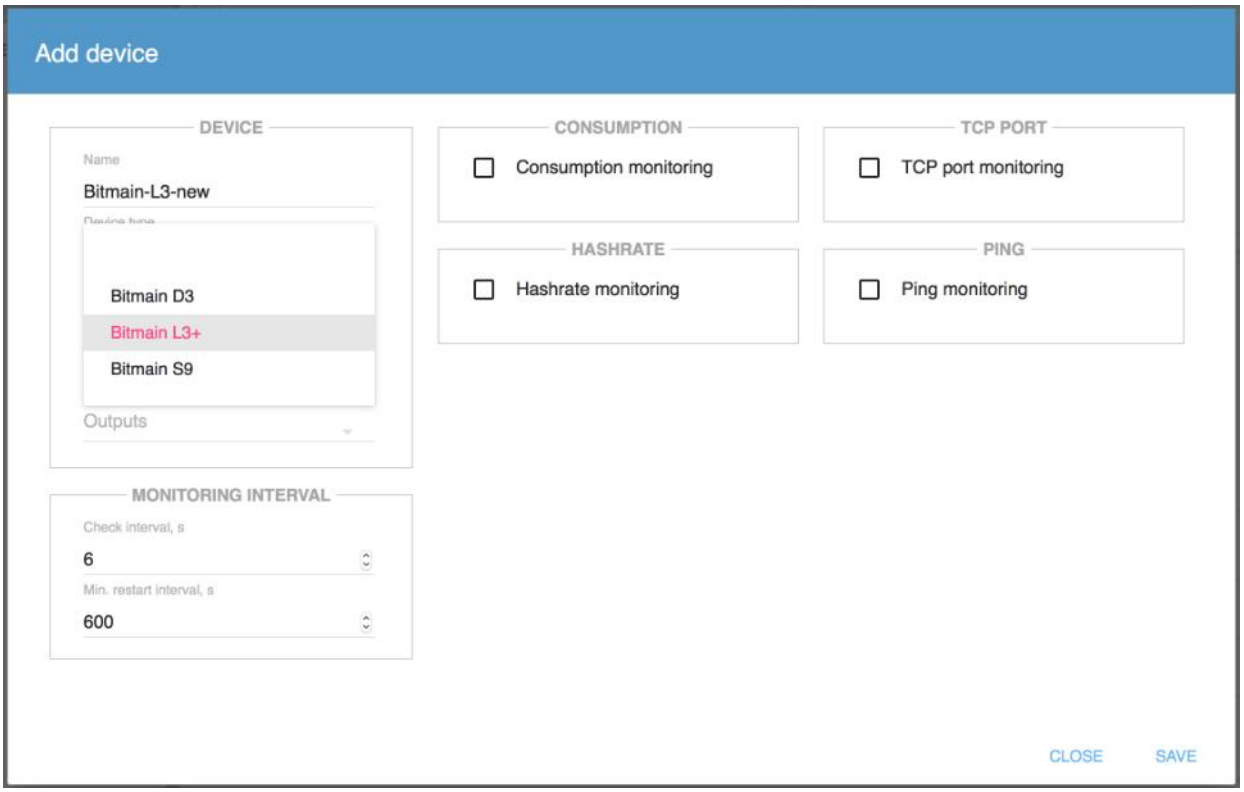

Figure 4.11.13. Pop-up window "Add device" with the opened Device type.

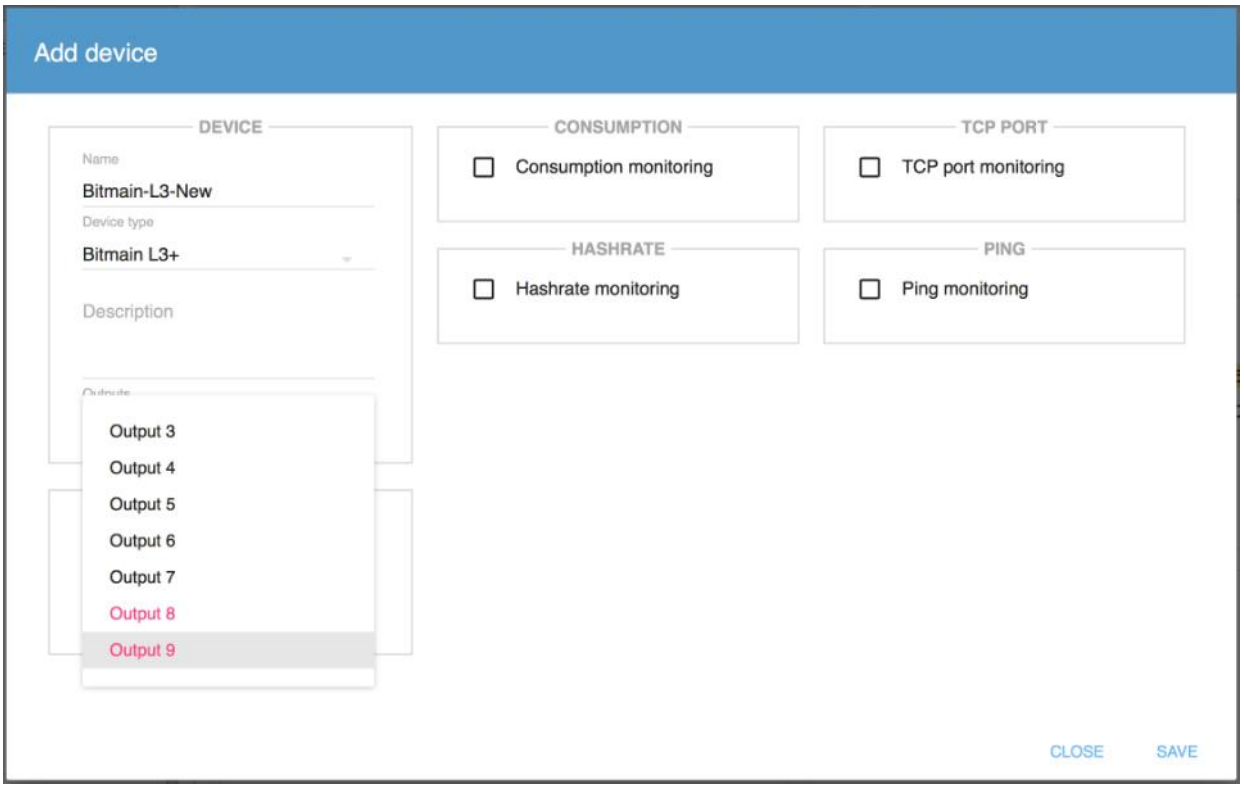

Figure 4.11.14. Selecting Output 8 and Output 9 outputs in the "Add Device" pop-up window with the "Output.

The outputs selection drop-down menu does not disappear after selecting the output. In order to confirm outputs selection you need to click outside the drop-down menu area. This is organized

in such way to simplify configuration of multiple outputs for a single device for which the watchdog is being configured.

Figure 4.11.15 shows the final result when two outputs are configure for a device. Note that output 8 without load is shown in blue color. Output 9 has load, which is depcited by the green color. This observation may occur when a device with two power supplies has unequal load distribution, for example when one of power supplies works in standby mode.

Figure 4.11.15. Two outputs: Output 8 without load, Output 9 under load.

Note. If the CONSUMPTION test on a device that uses several power socket is enabled, then the mA limit is defined as the sum of the currents of all the sockets involved. Current value, mA, Alarm limit, mA, Restart limit for reload, mA — they all operate with a sum of currents..

In the "**MONITORING INTERVAL**" subsection (see Figure 4.11.11) two important parameters have to be configured:

Check interval, s — interval between tests performed by the watchdog

Min. restart interval, s — indicates the number of seconds during which under no circumstances will the subsequent restart be performed

The minimum restart interval plays an important role when monitoring is done using several simultaneous tests. Its application prevents multiple restarts of the same device due to triggering of restart by several tests at the same time. For example, if network becomes unavailable, it can simultaneously trigger restart by following tests: ping monitoring, TCP port monitoring, and a hashrate monitoring.

4.11.5.2. Configure Monitoring Parameters

In the right part of the *"Add device"* pop-up window you can configure:

watchdog based on consumption;

watchdog based on hashrate;

watchdog based on TCP port monitoring;

watchdog based on ICMP echo request/reply (ping).

You can use one type of monitoring, as well as two, three or all four simultaneously. To do this, you need to activate appropriate check boxes.

When the desired monitoring type is activated, fields with parameters specific for this particular test type appear.

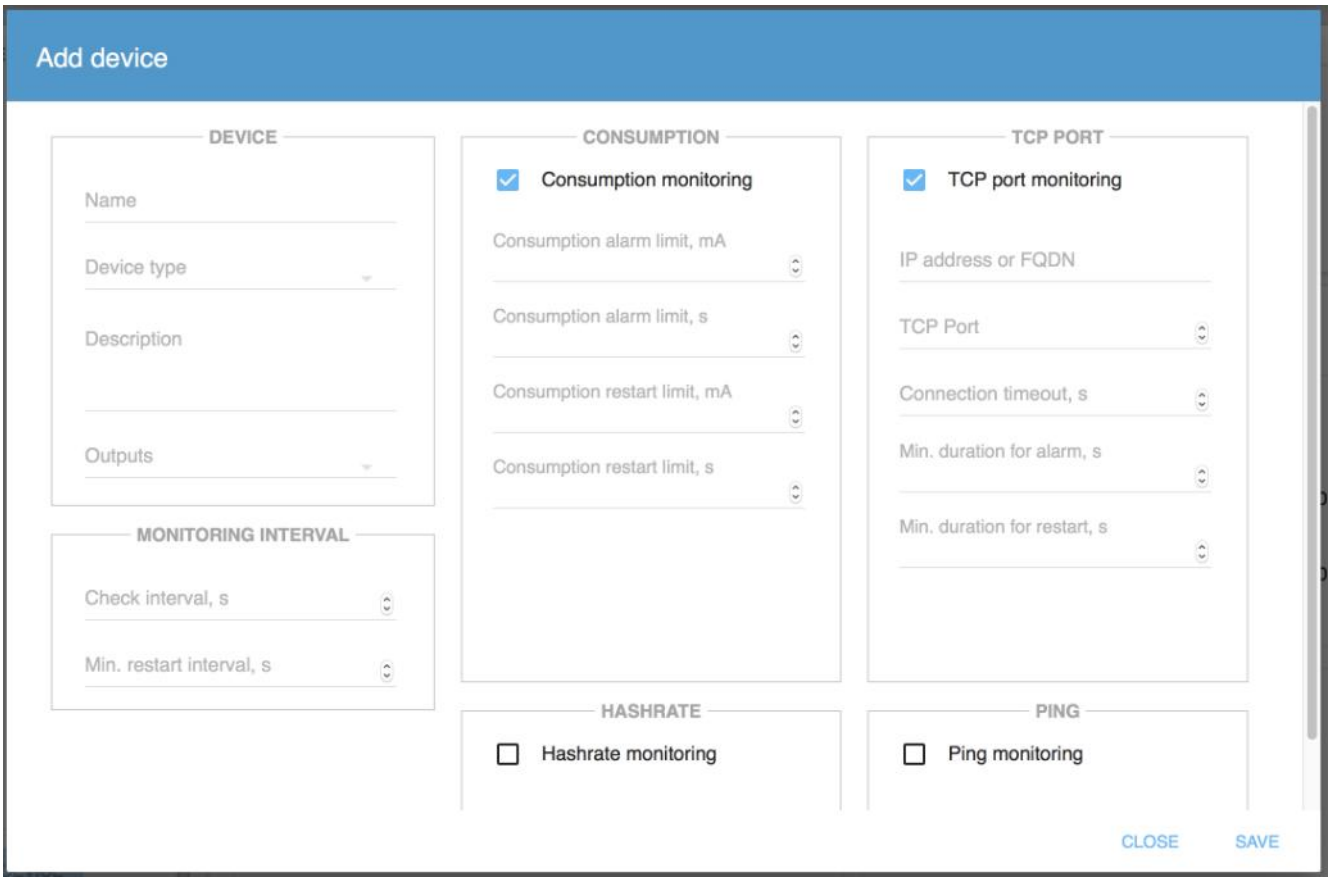

Figure 4.11.16. Configuring watchdog tests based on consumption and TCP port monitoring.

To configure consumption monitoring, you need to enter parameters in the following fields:

Consumption alarm limit, mA — the bottom threshold of the current consumption value, reaching of which triggers an alarm;

Consumption alarm limit, s — stabilization delay in seconds for alarm;

Consumption restart limit, mA — the bottom threshold of the current consumption value, reaching of which triggers a restart;

Consumption restart limit, c — stabilization delay in seconds for restart.

To configure monitoring of the TCP port, you need to enter parameters in the following fields:

IP address or FQDN;

TCP Port — port being checked for successful connection;

Connection timeout, *s* — the time interval during which the service has to respond;

Min. duration for alarm, s —stabilization delay in seconds for alarm;

Min. duration for restart , s — stabilization delay in seconds for restart.

Figure 4.11.17 shows the fields for configuration of the watchdogs based on hashrate and Ping (ICMP echo request/reply) monitoring.

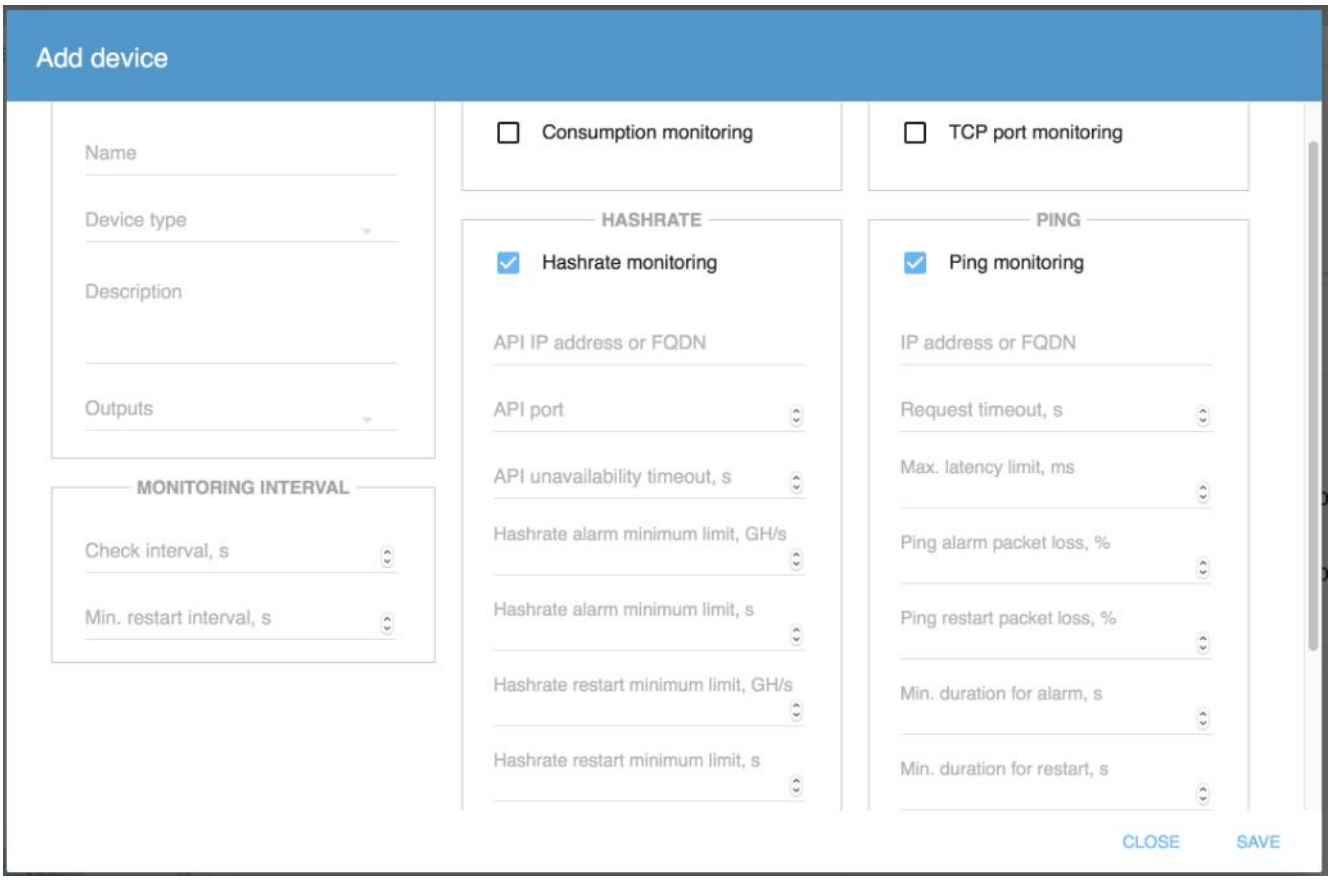

Figure 4.11.17. Setting up watchdogs based on hashrate and Ping (ICMP echo request/reply) monitoring.

To configure hashrate monitoring, you need to enter parameters in the following fields:

API IP address or FQDN;

API port — port on which miner responds to API requests;

API unavailability timeout, s — time interval during which the API has to respond to the request;

Hashrate alarm minimum limit, GH/s — the bottom threshold of the hashrate value, reaching of which triggers an alarm;

Hashrate alarm minimum limit, s — stabilization delay in seconds for alarm;

Hashrate restart minimum limit, GH/s — the bottom threshold of the hashrate value, reaching of which triggers a restart;

Hashrate restart minimum limit, s — stabilization delay in seconds for restart.

To configure monitoring by ping, you must enter the data in the fields:

IP address or FQDN;

Request timeout, s — time interval during which the device should send the ICMP echo reply packet in response to ICMP echo request;

Max. latency limit, ms — maximum round-trip latency value in milliseconds, exceeding of which causes the packets to be considered lost;

Ping alarm packet loss, % — percentage of lost packets (top limit), which triggers an alarm;

Ping restart packet loss,% — percentage of lost packets (top limit), which triggers a restart;

Min. duration for alarm, s — stabilization delay in seconds for alarm;

Min. duration for restart, s — stabilization delay in seconds for restart.

After you finish entering the required values, you need to save the changes. To do this, use the "**SAVE**" button in the bottom right corner of the window: You can click "**CLOSE**" to discard the newly entered configuration and close the pop-up window.

SAVE — to save the entered information;

CLOSE — to close the window without saving (cancel).

IMPORTANT! Since only one ICMP packet is sent within the "**Check interval, s**", it is recommended to assign sufficiently large interval for "**Min. duration for alarm, s" and "Min. duration for restart, s"** parameters to make sure they fit several test intervals, so that several ICMP packets will be sent during stabilization delays to ensure enough statistics is gathered to make informed alarm/restart decision. It is also not recommended to make the "**Check interval, s" too long.**

4.11.6. Combination of Tests

Different devices may have different symptoms of failure.

For example, if a device responds to ICMP packets, it does not necessarily mean that the service is working. If the TCP port responds to requests — it does not always mean that the system is working properly. A group of tests allows you to detect more failure situations to automatically initiate a corrective restart, rather than a single test. In some cases, one test is enough, in other cases not, it all depends on the problem you are solving.

When some tests are combined, the load adds up. But a large number and high frequency of inspections create an additional load that can interfere with the network and the device being tested.

In many cases, different network based tests can perform similar functions.

For example, the main task of the test "**PING**" is to check the availability of the device on the network and stability of connection with it. Other functions such as "**HASHRATE**" and "**TCP PORT**" monitoring can indirectly perform the same function. Therefore, simultaneous running of all three tests: "**PING**", "**HASHRATE**" and "**TCP PORT**" on a single target may not always be efficient.

The "**CONSUMPTION**" test is performed locally on RPCM and therefore it is well suited to be combined with all other types of checks.

4.12 About This RPCM

This chapter describes the "About This RPCM" section of the Resilient Power Control Module (RPCM).

You can access to this section by using the menu item *Documentation* or by typing *https://<name_or_IP_RPCM>/about/* in the browser string (provided that authentication was successful before).

Figure 4.12.1. Menu to go to the "Documentation" section.

This section is designed to demonstration general information about this RPCM.

Figure 4.12.2. The window of the "Documentation" section.

The **CLOSE** button will switch you to the Dashboard.

5. The Reference for RPCM REST API

5.1. General information

5.1.1 Accessing REST API

REST API is available on TCP port 8888 using non-encrypted HTTP protocol.

The REST API is available over the protocols

for HTTP — TCP port 8888;

for HTTPS — TCP port 8443.

5.1.2 Authentication

By default endpoint is available without authentication. API authentication can be switched on in web interface or via command line interface.

Once authentication is turned on, it is necessary to include the API key with each request. Two methods of API key inclusion are supported:

First method — in the body of URL:

for HTTP:

```
curl -X GET http://192.168.1.24:8888/api/cachedStatus?apikey=373ac3fde3ae0740e0fb76e912e3e18e
```

for HTTPS:

```
curl -k -X GET https://192.168.1.24:8443/api/cachedStatus?apikey=373ac3fde3ae0740e0fb76e912e3e18e
```

Second method — in the header of HTTP/HTTPS.

for HTTP:

```
curl -X GET http://192.168.1.24:8888/api/cachedStatus -H API-KEY:373ac3fde3ae0740e0fb76e912e3e18e
```

for HTTPS:

```
curl -k -X GET https://192.168.1.24:8443/api/cachedStatus -H API-KEY:373ac3fde3ae0740e0fb76e912e3e18e
```

If API keys are provided both ways, the key, provided inside of the URL will be used.

Further descriptions and examples of requests and replies in this paragraph assume authentication is switched off.

If the service is unavailable, the message is:

```
'{"resultOfLastCommand":"FAILED","reason":"SERVICE_UNAVAILABLE"}'
```

5.1.3 Parameters

There are two notations of parameters:

- REST API parameters in the URL directly;
- JSON parameters in a queries (commands). Example: {"id": 18}

5.2. Protocol Commands

5.2.1. Get Device Status

5.2.1.1. Overview

It returns the current status of RPCM in JSON format.

5.2.1.2. Get the API Status

Command:

```
GET /api/status
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/status
```

REPLY:


```
{
  "rOLC": "OK",
  "sNa": "InterDevochka",
  "sNu": "RU2017101100000020MO01DN01",
  "MAC": "B8F74A000029",
  "hwV": 6,
  "fwV": "0.9.768",
  "fwRD": "20190902110124",
  "rtcB": "19090201111513",
  "rtc": "19092106075826",
  "r": 255,
  "LR": 96,
  "R": 357,
  "p": "YES",
  "g": 150,
  "temp": 34,
  "b": 0,
  "ref": 43679,
  "refP": 56896,
  "refM": 29404,
  "exB": {
    "top": {
      "pr": "NO",
      "ms": 1629767314
```

```
    },
    "bottom": {
      "pr": "NO",
      "ms": 1629767320
    }
  },
  "ats": {
    "aL": 1,
    "pL": 1,
    "fF": "YES",
    "fFDS": 2,
    "gG": 7,
    "lines": {
      "1": {
        "frA": "YES",
        "fre": 5000,
        "vol": 228,
        "vRE": 0,
        "admS": "ON",
        "rS": "OFF",
        "iMa": 1120,
        "iWa": 256,
        "aKWh": 191.578887,
        "aKVAh": 191.622772,
        "aKVarh": -1.116667
      },
      "2": {
        "frA": "NO",
        "fre": 0,
        "vol": 0,
        "vRE": 0,
        "admS": "ON",
        "rS": "OFF",
        "iMa": 0,
        "iWa": 0,
        "aKWh": 0.000278,
        "aKVAh": -0.005278,
        "aKVarh": -0.012222
      }
    },
    "channels": {
      "0": {
        "admS": "ON",
        "actS": "ON",
        "t1C": "ON",
        "t2C": "ON",
        "cbFS": "OFF",
        "fSC1": 0,
        "fSC2": 0,
        "oAFS": "OFF",
        "oTFS": "OFF",
        "loTFS": "OFF",
```

```
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 1,
          "aKWh": 1.925278,
          "aKVAh": 1.931667,
          "aKVarh": -0.059444
        },
        "1": {
          "admS": "ON",
          "actS": "ON",
          "t1C": "ON",
          "t2C": "ON",
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 1,
          "aKWh": 0.001944,
          "aKVAh": 0.003056,
          "aKVarh": 0.0
        },
        "2": {
          "admS": "ON",
          "actS": "ON",
          "t1C": "ON",
          "t2C": "ON",
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 4,
          "aKWh": 0.001389,
```

```
          "aKVAh": 0.001389,
          "aKVarh": 0.0
        },
        "3": {
          "admS": "ON",
          "actS": "ON",
          "t1C": "ON",
          "t2C": "ON",
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 3,
          "aKWh": 0.000833,
          "aKVAh": 0.001389,
          "aKVarh": 0.0
        },
        "4": {
          "admS": "ON",
          "actS": "ON",
          "t1C": "ON",
          "t2C": "ON",
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 1,
          "aKWh": 0.000833,
          "aKVAh": 0.001389,
          "aKVarh": 0.0
        },
        "5": {
          "admS": "ON",
          "actS": "ON",
          "t1C": "ON",
          "t2C": "ON",
```

```
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 1120,
          "iWa": 257,
          "iVA": 257,
          "iVar": 0,
          "q": 4,
          "aKWh": 189.642501,
          "aKVAh": 189.670837,
          "aKVarh": -1.069722
        },
        "6": {
          "admS": "ON",
          "actS": "ON",
          "t1C": "ON",
          "t2C": "ON",
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 4,
          "aKWh": 0.001111,
          "aKVAh": 0.001111,
          "aKVarh": 0.0
        },
        "7": {
          "admS": "OFF",
          "actS": "OFF",
          "t1C": "OFF",
          "t2C": "OFF",
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
```

```
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 1,
          "aKWh": 0.001944,
          "aKVAh": 0.001944,
          "aKVarh": 0.0
        },
        "8": {
          "admS": "ON",
          "actS": "ON",
          "t1C": "ON",
          "t2C": "ON",
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 1,
          "aKWh": 0.000833,
          "aKVAh": 0.001667,
          "aKVarh": 0.0
        },
        "9": {
          "admS": "ON",
          "actS": "ON",
          "t1C": "ON",
          "t2C": "ON",
          "cbFS": "OFF",
          "fSC1": 0,
          "fSC2": 0,
          "oAFS": "OFF",
          "oTFS": "OFF",
          "loTFS": "OFF",
          "rS": "OFF",
          "ovTFS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "iVA": 0,
          "iVar": 0,
          "q": 1,
          "aKWh": 0.001667,
          "aKVAh": 0.002222,
          "aKVarh": 0.0
```

```
        }
      }
    },
    "wE": "F813002245",
    "RPCM": 1
  }
```

5.2.1.3. Getting the Cached Status

Command

```
GET /api/cachedStatus
```

An information about a device status, what a controller send for short period ~1sec. c.

Example:

```
curl -X GET http://192.168.1.24:8888/api/cachedStatus
```

REPLY:

```
{
  "rOLC": "OK",
    "lAKWh": {
     "1": 1.3764e-06,
     "2": 0.0
    },

   "lAKVAh": {
     "1": 0.1230093598,
     "2": 0.0
   },

  "lAKVarh": {
    "1": 0.1218919396,
    "2": 0.0
  },

  "cAKWh": {
    "0": 0.0,
    "1": 7.133e-07,
    "2": 0.0,
    "3": 0.0,
    "4": 0.0,
    "5": 0.0,
    "6": 0.0,
    "7": 6.631e-07,
    "8": 0.0,
    "9": 0.0
  },

  "cAKVAh": {
    "0": 0.0121986401,
    "1": 0.0132102584,
```

```
   "2": 0.0080757274,
   "3": 0.0123178148,
   "4": 0.0106087625,
   "5": 0.0045980744,
   "6": 0.0177543983,
   "7": 0.0091794795,
   "8": 0.0156715583,
   "9": 0.0193946628
 },

  "cAKVarh": {
  "0": 0.0082569417,
  "1": 0.0126927554,
  "2": 0.0141780066,
  "3": 0.0116872656,
  "4": 0.0043564472,
  "5": 0.0132827532,
  "6": 0.0193782567,
  "7": 0.0113033723,
  "8": 0.0204264783,
  "9": 0.0063296608
             },

 "cbFF": {
   "0": 0,
   "1": 0,
   "2": 0,
   "3": 0,
   "4": 0,
   "5": 0,
   "6": 0,
   "7": 0,
   "8": 0,
   "9": 0
  },

 "cOALM": {
   "0": 9500,
   "1": 9500,
   "2": 9500,
   "3": 9500,
   "4": 9500,
   "5": 9500,
   "6": 9500,
   "7": 9500,
   "8": 9500,
   "9": 9500
  },

 "cOALS": {
   "0": 30,
   "1": 30,
```

```
    "2": 30,
    "3": 30,
    "4": 30,
    "5": 30,
    "6": 30,
    "7": 30,
    "8": 30,
    "9": 30
  },

  "cOALR": {
    "0": 0,
    "1": 0,
    "2": 0,
    "3": 0,
    "4": 0,
    "5": 0,
    "6": 0,
    "7": 0,
    "8": 0,
    "9": 0
  },

  "cOAF": {
    "0": 0,
    "1": 0,
    "2": 0,
    "3": 0,
    "4": 0,
    "5": 0,
    "6": 0,
    "7": 0,
    "8": 0,
    "9": 0
  },

  "cOTLM": {
    "0": 10000,
    "1": 10000,
    "2": 10000,
    "3": 10000,
    "4": 10000,
    "5": 10000,
    "6": 10000,
    "7": 10000,
    "8": 10000,
    "9": 10000
  },

    "cOTLS": {
    "0": 2,
    "1": 2,
```

```
    "2": 2,
    "3": 2,
    "4": 2,
    "5": 2,
    "6": 2,
    "7": 2,
    "8": 2,
    "9": 2
  },

  "cOTLR": {
    "0": 0,
    "1": 0,
    "2": 0,
    "3": 0,
    "4": 0,
    "5": 0,
    "6": 0,
    "7": 0,
    "8": 0,
    "9": 0
  },

  "cOTF": {
    "0": 0,
    "1": 0,
    "2": 0,
    "3": 0,
    "4": 0,
    "5": 0,
    "6": 0,
    "7": 0,
    "8": 0,
    "9": 0
  },

  "cAS": {
    "0": 1,
    "1": 1,
    "2": 1,
    "3": 1,
    "4": 1,
    "5": 1,
    "6": 1,
    "7": 1,
    "8": 1,
    "9": 1
  },

  "cTOD": {
    "0": 2,
    "1": 3,
```

```
  "2": 4,
  "3": 5,
  "4": 6,
  "5": 7,
  "6": 8,
  "7": 9,
  "8": 10,
  "9": 11
},

"cTOfIOP": {
  "0": 0,
  "1": 1,
  "2": 2,
  "3": 3,
  "4": 4,
  "5": 5,
  "6": 6,
  "7": 7,
  "8": 8,
  "9": 9
 },

"lMiV": {
  "1": 90,
  "2": 90
},

"lMaV": {
  "1": 250,
  "2": 250
},

"lMiF": {
  "1": 4500,
  "2": 4500
},

"lMaF": {
  "1": 6500,
  "2": 6500
},

"RPCM": 1,
"rtcHLC": "20180112011524",
"softwareVersion": "0.3.25",
"softwareReleaseDate": "20171225083104",
"sNa": "KrasnyiPerets",
"sNu": "RU2017122100000009MO01DN01",
"MAC": "B8F74A00005F",
"hwV": 63,
"fwV": "0.9.391",
```

```
  "fwRD": "20171212160749",
  "rtcB": "17122804125841",
  "rtc": "18011205011518",
  "temp": 37,
  "ref": 43717,
  "refP": 57726,
  "refM": 29486,

"exB": {
    "top": {
      "pr": "NO",
      "ms": 643777932
    },
    "bottom": {
      "pr": "NO",
      "ms": 401768969
    }
  },
  "ats": {
    "aL": 1,
    "pL": 1,
    "fF": "NO",
    "fFDS": 0,
    "gG": 13,
    "lines": {
        "1": {
          "frA": "YES",
          "fre": 4999,
          "vol": 234,
          "rS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "aKWh": 1.0e-06,
          "aKVAh": 0.123009,
          "aKVarh": 0.121892
        },
        "2": {
          "frA": "NO",
          "fre": 0,
          "vol": 0,
          "rS": "OFF",
          "iMa": 0,
          "iWa": 0,
          "aKWh": 0.0,
          "aKVAh": 0.0,
          "aKVarh": 0.0
        }
    },

  "channels": {
    "0": {
      "admS": "ON",
```

```
      "actS": "ON",
      "t1C": "ON",
      "t2C": "ON",
      "cbFS": "OFF",
      "fSC1": 0,
      "fSC2": 0,
      "oAFS": "OFF",
      "oTFS": "OFF",
      "loTFS": "OFF",
      "rS": "OFF",
      "iMa": 0,
      "iWa": 0,
      "iVA": 0,
      "iVar": 0,
      "aKWh": 0.0,
      "aKVAh": 0.012199,
      "aKVarh": 0.008257
          },
    "1": {
      "admS": "ON",
      "actS": "ON",
      "t1C": "ON",
      "t2C": "ON",
      "cbFS": "OFF",
      "fSC1": 0,
      "fSC2": 0,
      "oAFS": "OFF",
      "oTFS": "OFF",
      "loTFS": "OFF",
      "rS": "OFF",
      "iMa": 0,
      "iWa": 0,
      "iVA": 0,
      "iVar": 0,
      "aKWh": 1.0e-06,
      "aKVAh": 0.01321,
      "aKVarh": 0.012693
          },
    "2": {
      "admS": "ON",
      "actS": "ON",
      "t1C": "ON",
      "t2C": "ON",
      "cbFS": "OFF",
      "fSC1": 0,
      "fSC2": 0,
      "oAFS": "OFF",
      "oTFS": "OFF",
      "loTFS": "OFF",
      "rS": "OFF",
      "iMa": 0,
      "iWa": 0,
```

```
    "iVA": 0,
    "iVar": 0,
    "aKWh": 0.0,
    "aKVAh": 0.008076,
    "aKVarh": 0.014178
      },
  "3": {
    "admS": "ON",
    "actS": "ON",
    "t1C": "ON",
    "t2C": "ON",
    "cbFS": "OFF",
    "fSC1": 0,
    "fSC2": 0,
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "iVA": 0,
    "iVar": 0,
    "aKWh": 0.0,
    "aKVAh": 0.012318,
    "aKVarh": 0.011687
      },
  "4": {
    "admS": "ON",
    "actS": "ON",
    "t1C": "ON",
    "t2C": "ON",
    "cbFS": "OFF",
    "fSC1": 0,
    "fSC2": 0,
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "iVA": 0,
    "iVar": 0,
    "aKWh": 0.0,
    "aKVAh": 0.010609,
    "aKVarh": 0.004356
      },
  "5": {
    "admS": "ON",
    "actS": "ON",
    "t1C": "ON",
    "t2C": "ON",
    "cbFS": "OFF",
```

```
    "fSC1": 0,
    "fSC2": 0,
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "iVA": 0,
    "iVar": 0,
    "aKWh": 0.0,
    "aKVAh": 0.004598,
    "aKVarh": 0.013283
       },
  "6": {
    "admS": "ON",
    "actS": "ON",
    "t1C": "ON",
    "t2C": "ON",
    "cbFS": "OFF",
    "fSC1": 0,
    "fSC2": 0,
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "iVA": 0,
    "iVar": 0,
    "aKWh": 0.0,
    "aKVAh": 0.017754,
    "aKVarh": 0.019378
       },
  "7": {
    "admS": "ON",
    "actS": "ON",
    "t1C": "ON",
    "t2C": "ON",
    "cbFS": "OFF",
    "fSC1": 0,
    "fSC2": 0,
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "iVA": 0,
    "iVar": 0,
    "aKWh": 1.0e-06,
    "aKVAh": 0.009179,
```

```
      "aKVarh": 0.011303
          },
    "8": {
      "admS": "ON",
      "actS": "ON",
      "t1C": "ON",
      "t2C": "ON",
      "cbFS": "OFF",
      "fSC1": 0,
      "fSC2": 0,
      "oAFS": "OFF",
      "oTFS": "OFF",
      "loTFS": "OFF",
      "rS": "OFF",
      "iMa": 0,
      "iWa": 0,
      "iVA": 0,
      "iVar": 0,
      "aKWh": 0.0,
      "aKVAh": 0.015672,
      "aKVarh": 0.020426
          },
    "9": {
      "admS": "ON",
      "actS": "ON",
      "t1C": "ON",
      "t2C": "ON",
      "cbFS": "OFF",
      "fSC1": 0,
      "fSC2": 0,
      "oAFS": "OFF",
      "oTFS": "OFF",
      "loTFS": "OFF",
      "rS": "OFF",
      "iMa": 0,
      "iWa": 0,
      "iVA": 0,
      "iVar": 0,
      "aKWh": 0.0,
      "aKVAh": 0.019395,
      "aKVarh": 0.00633
      }
    }
  },
  "wE": "F80D002245"
}
```

5.2.1.4. Query and Return the Status with Full Keys Names

Command:

```
GET /api/cachedStatusWithFullNames
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/cachedStatusWithFullNames
```

REPLY:


```
{
  "resultOfLastCommand": "OK",
  "serialName": "InterDevochka",
  "serialNumber": "RU2017101100000020MO01DN01",
  "MAC": "B8F74A000029",
  "hardwareVersion": 6,
  "firmwareVersion": "0.9.768",
  "firmwareReleaseDate": "20190902110124",
  "rtcBoot": "19090201111513",
  "rtc": "19092106080047",
  "restartReason": 255,
  "llcResetsCount": 96,
  "restartsCount": 357,
  "displayModePrintFromHLC": "YES",
  "globalFlagsOfLLC": 150,
  "temperature": 34,
  "buzzerState": 0,
  "ref": 43520,
  "refPlus": 57028,
  "refMinus": 29512,
  "externalButtons": {
    "top": {
      "pressed": "NO",
      "microseconds": 1629906830
    },
    "bottom": {
      "pressed": "NO",
      "microseconds": 1629906835
    }
  },
  "ats": {
    "activeLine": 1,
    "priorityLine": 1,
    "forceFailback": "YES",
    "forceFailbackDelaySeconds": 2,
    "groundGood": 7,
    "lines": {
      "1": {
        "frequencyAvailable": "YES",
        "frequency": 4999,
        "voltage": 229,
```

```
        "vRE": 0,
        "adminState": "ON",
        "recognitionState": "OFF",
        "instantMilliamps": 1120,
        "instantWatts": 256,
        "accumulatedKWh": 191.588607,
        "accumulatedKVAh": 191.632781,
        "accumulatedKVarh": -1.116667
      },
      "2": {
        "frequencyAvailable": "NO",
        "frequency": 0,
        "voltage": 0,
        "vRE": 0,
        "adminState": "ON",
        "recognitionState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "accumulatedKWh": 0.000278,
        "accumulatedKVAh": -0.005278,
        "accumulatedKVarh": -0.012222
      }
    },
    "channels": {
      "0": {
        "adminState": "ON",
        "actualState": "ON",
        "trigger1Control": "ON",
        "trigger2Control": "ON",
        "circuitBreakerFiredState": "OFF",
        "falseShortCircuitCounters1": 0,
        "falseShortCircuitCounters2": 0,
        "overcurrentAlarmFiredState": "OFF",
        "overcurrentTurnOffFiredState": "OFF",
        "lineOvercurrentTurnOffFiredState": "OFF",
        "recognitionState": "OFF",
        "overvoltageTurnOffFiredState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "instantVAs": 0,
        "instantVars": 0,
        "quadrant": 1,
        "accumulatedKWh": 1.925278,
        "accumulatedKVAh": 1.931667,
        "accumulatedKVarh": -0.059444
      },
      "1": {
        "adminState": "ON",
        "actualState": "ON",
        "trigger1Control": "ON",
        "trigger2Control": "ON",
        "circuitBreakerFiredState": "OFF",
```

```
      "falseShortCircuitCounters1": 0,
      "falseShortCircuitCounters2": 0,
      "overcurrentAlarmFiredState": "OFF",
      "overcurrentTurnOffFiredState": "OFF",
      "lineOvercurrentTurnOffFiredState": "OFF",
      "recognitionState": "OFF",
      "overvoltageTurnOffFiredState": "OFF",
      "instantMilliamps": 0,
      "instantWatts": 0,
      "instantVAs": 0,
      "instantVars": 0,
      "quadrant": 4,
      "accumulatedKWh": 0.001944,
      "accumulatedKVAh": 0.003056,
      "accumulatedKVarh": 0.0
    },
    "2": {
      "adminState": "ON",
      "actualState": "ON",
      "trigger1Control": "ON",
      "trigger2Control": "ON",
      "circuitBreakerFiredState": "OFF",
      "falseShortCircuitCounters1": 0,
      "falseShortCircuitCounters2": 0,
      "overcurrentAlarmFiredState": "OFF",
      "overcurrentTurnOffFiredState": "OFF",
      "lineOvercurrentTurnOffFiredState": "OFF",
      "recognitionState": "OFF",
      "overvoltageTurnOffFiredState": "OFF",
      "instantMilliamps": 0,
      "instantWatts": 0,
      "instantVAs": 0,
      "instantVars": 0,
      "quadrant": 4,
      "accumulatedKWh": 0.001389,
      "accumulatedKVAh": 0.001389,
      "accumulatedKVarh": 0.0
    },
    "3": {
      "adminState": "ON",
      "actualState": "ON",
      "trigger1Control": "ON",
      "trigger2Control": "ON",
      "circuitBreakerFiredState": "OFF",
      "falseShortCircuitCounters1": 0,
      "falseShortCircuitCounters2": 0,
      "overcurrentAlarmFiredState": "OFF",
      "overcurrentTurnOffFiredState": "OFF",
      "lineOvercurrentTurnOffFiredState": "OFF",
      "recognitionState": "OFF",
      "overvoltageTurnOffFiredState": "OFF",
      "instantMilliamps": 0,
```

```
        "instantWatts": 0,
        "instantVAs": 0,
        "instantVars": 0,
        "quadrant": 3,
        "accumulatedKWh": 0.000833,
        "accumulatedKVAh": 0.001389,
        "accumulatedKVarh": 0.0
      },
      "4": {
        "adminState": "ON",
        "actualState": "ON",
        "trigger1Control": "ON",
        "trigger2Control": "ON",
        "circuitBreakerFiredState": "OFF",
        "falseShortCircuitCounters1": 0,
        "falseShortCircuitCounters2": 0,
        "overcurrentAlarmFiredState": "OFF",
        "overcurrentTurnOffFiredState": "OFF",
        "lineOvercurrentTurnOffFiredState": "OFF",
        "recognitionState": "OFF",
        "overvoltageTurnOffFiredState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "instantVAs": 0,
        "instantVars": 0,
        "quadrant": 1,
        "accumulatedKWh": 0.000833,
        "accumulatedKVAh": 0.001389,
        "accumulatedKVarh": 0.0
      },
      "5": {
        "adminState": "ON",
        "actualState": "ON",
        "trigger1Control": "ON",
        "trigger2Control": "ON",
        "circuitBreakerFiredState": "OFF",
        "falseShortCircuitCounters1": 0,
        "falseShortCircuitCounters2": 0,
        "overcurrentAlarmFiredState": "OFF",
        "overcurrentTurnOffFiredState": "OFF",
        "lineOvercurrentTurnOffFiredState": "OFF",
        "recognitionState": "OFF",
        "overvoltageTurnOffFiredState": "OFF",
        "instantMilliamps": 1120,
        "instantWatts": 257,
        "instantVAs": 257,
        "instantVars": 0,
        "quadrant": 4,
        "accumulatedKWh": 189.652221,
        "accumulatedKVAh": 189.680831,
        "accumulatedKVarh": -1.069722
      },
```

```
      "6": {
        "adminState": "ON",
        "actualState": "ON",
        "trigger1Control": "ON",
        "trigger2Control": "ON",
        "circuitBreakerFiredState": "OFF",
        "falseShortCircuitCounters1": 0,
        "falseShortCircuitCounters2": 0,
        "overcurrentAlarmFiredState": "OFF",
        "overcurrentTurnOffFiredState": "OFF",
        "lineOvercurrentTurnOffFiredState": "OFF",
        "recognitionState": "OFF",
        "overvoltageTurnOffFiredState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "instantVAs": 0,
        "instantVars": 0,
        "quadrant": 4,
        "accumulatedKWh": 0.001111,
        "accumulatedKVAh": 0.001111,
        "accumulatedKVarh": 0.0
      },
      "7": {
        "adminState": "OFF",
        "actualState": "OFF",
        "trigger1Control": "OFF",
        "trigger2Control": "OFF",
        "circuitBreakerFiredState": "OFF",
        "falseShortCircuitCounters1": 0,
        "falseShortCircuitCounters2": 0,
        "overcurrentAlarmFiredState": "OFF",
        "overcurrentTurnOffFiredState": "OFF",
        "lineOvercurrentTurnOffFiredState": "OFF",
        "recognitionState": "OFF",
        "overvoltageTurnOffFiredState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "instantVAs": 0,
        "instantVars": 0,
        "quadrant": 4,
        "accumulatedKWh": 0.001944,
        "accumulatedKVAh": 0.001944,
        "accumulatedKVarh": 0.0
      },
      "8": {
        "adminState": "ON",
        "actualState": "ON",
        "trigger1Control": "ON",
        "trigger2Control": "ON",
        "circuitBreakerFiredState": "OFF",
        "falseShortCircuitCounters1": 0,
        "falseShortCircuitCounters2": 0,
```

```
        "overcurrentAlarmFiredState": "OFF",
        "overcurrentTurnOffFiredState": "OFF",
        "lineOvercurrentTurnOffFiredState": "OFF",
        "recognitionState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "instantVAs": 0,
        "instantVars": 0,
        "quadrant": 4,
        "accumulatedKWh": 0.000833,
        "accumulatedKVAh": 0.001667,
        "accumulatedKVarh": 0.0
      },
      "9": {
        "adminState": "ON",
        "actualState": "ON",
        "trigger1Control": "ON",
        "trigger2Control": "ON",
        "circuitBreakerFiredState": "OFF",
        "falseShortCircuitCounters1": 0,
        "falseShortCircuitCounters2": 0,
        "overcurrentAlarmFiredState": "OFF",
        "overcurrentTurnOffFiredState": "OFF",
        "lineOvercurrentTurnOffFiredState": "OFF",
        "recognitionState": "OFF",
        "overvoltageTurnOffFiredState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "instantVAs": 0,
        "instantVars": 0,
        "quadrant": 4,
        "accumulatedKWh": 0.001667,
        "accumulatedKVAh": 0.002222,
        "accumulatedKVarh": 0.0
      }
    }
  },
  "wE": "F802002145",
  "RPCM": 1,
  "rtcHLC": "20190921080002",
  "softwareVersion": "0.8.1",
  "softwareReleaseDate": "20190912194412",
  "lineAccumulatedKWh": {
    "1": 189.2880554199,
    "2": 2048.0065917968
  },
  "lineAccumulatedKVAh": {
    "1": 189.331665039,
    "2": 8000.0375976562
  },
  "lineAccumulatedKVarh": {
    "1": -1.105000019,
```

```
    "2": 1200.0405273437
  },
  "channelAccumulatedKWh": {
    "0": 1.9252778053,
    "1": 0.0019444444,
    "2": 0.0013888889,
    "3": 0.0008333333,
    "4": 0.0008333333,
    "5": 187.3516693115,
    "6": 0.0011111111,
    "7": 0.0019444444,
    "8": 0.0008333333,
    "9": 0.0016666667
  },
  "channelAccumulatedKVAh": {
    "0": 1.9316665649,
    "1": 0.0030555555,
    "2": 0.0013888889,
    "3": 0.0013888889,
    "4": 0.0013888889,
    "5": 187.3797149658,
    "6": 0.0011111111,
    "7": 0.0019444444,
    "8": 0.0016666667,
    "9": 0.0022222223
  },
  "channelAccumulatedKVarh": {
    "0": -0.0594444465,
    "1": 0.0,
    "2": 0.0,
    "3": 0.0,
    "4": 0.0,
    "5": -1.05805552,
    "6": 0.0,
    "7": 0.0,
    "8": 0.0,
    "9": 0.0
  },
  "circuitBreakerFiringFacts": {
    "0": 0,
    "1": 1,
    "2": 2,
    "3": 1,
    "4": 1,
    "5": 1,
    "6": 1,
    "7": 1,
    "8": 1,
    "9": 0
  },
  "channelOvercurrentAlarmLimitMilliamps": {
    "0": 7000,
```

```
      "1": 100,
      "2": 9500,
      "3": 9500,
      "4": 9500,
      "5": 9500,
      "6": 9500,
      "7": 9500,
      "8": 9500,
      "9": 9500
    },
    "channelOvercurrentAlarmLimitSeconds": {
      "0": 30,
      "1": 5,
      "2": 30,
      "3": 30,
      "4": 30,
      "5": 30,
      "6": 30,
      "7": 30,
      "8": 30,
      "9": 30
    },
    "channelOvercurrentAlarmLimitReached": {
      "0": 1,
      "1": 4,
      "2": 0,
      "3": 0,
      "4": 0,
      "5": 4,
      "6": 0,
      "7": 0,
      "8": 0,
      "9": 0
    },
    "channelOvercurrentAlarmFired": {
      "0": 0,
      "1": 1,
      "2": 0,
      "3": 0,
      "4": 0,
      "5": 2,
      "6": 0,
      "7": 0,
      "8": 0,
      "9": 0
    },
    "channelOvercurrentTurnOffLimitMilliamps": {
      "0": 10000,
      "1": 100,
      "2": 10000,
      "3": 10000,
      "4": 10000,
```

```
      "5": 10000,
      "6": 10000,
      "7": 10000,
      "8": 10000,
      "9": 10000
    },
    "channelOvercurrentTurnOffLimitSeconds": {
      "0": 2,
      "1": 2,
      "2": 2,
      "3": 2,
      "4": 2,
      "5": 2,
      "6": 2,
      "7": 2,
      "8": 2,
      "9": 2
    },
    "channelOvercurrentTurnOffLimitReached": {
      "0": 2,
      "1": 220,
      "2": 0,
      "3": 0,
      "4": 0,
      "5": 4,
      "6": 0,
      "7": 0,
      "8": 0,
      "9": 0
    },
    "channelOvercurrentTurnOffFired": {
      "0": 0,
      "1": 39,
      "2": 0,
      "3": 0,
      "4": 0,
      "5": 4,
      "6": 0,
      "7": 0,
      "8": 0,
      "9": 0
    },
    "channelAdministrativeStatus": {
      "0": 0,
      "1": 0,
      "2": 1,
      "3": 1,
      "4": 1,
      "5": 1,
      "6": 1,
      "7": 0,
      "8": 0,
```

```
      "9": 0
    },
    "channelTurnOnDelayOnStartup": {
      "0": 2,
      "1": 3,
      "2": 4,
      "3": 5,
      "4": 6,
      "5": 7,
      "6": 8,
      "7": 9,
      "8": 10,
      "9": 11
    },
    "channelTurnOffOnInputOverloadPriority": {
      "0": 0,
      "1": 1,
      "2": 2,
      "3": 3,
      "4": 4,
      "5": 5,
      "6": 6,
      "7": 7,
      "8": 8,
      "9": 9
    },
    "lineMinimumVoltage": {
      "1": 90,
      "2": 30
    },
    "lineMaximumVoltage": {
      "1": 250,
      "2": 286
    },
    "lineMinimumFrequency": {
      "1": 4600,
      "2": 4600
    },
    "lineMaximumFrequency": {
      "1": 6500,
      "2": 6500
    },
    "lineUserTotalAmps": {
      "1": 16,
      "2": 16
    },
    "overvoltageThreshold": {
      "0": 65535,
      "1": 65535,
      "2": 65535,
      "3": 65535,
      "4": 65535,
```

```
      "5": 65535,
      "6": 65535,
      "7": 65535,
      "8": 65535,
      "9": 65535
    },
    "recoverAfterOvervoltageSeconds": {
      "0": 65535,
      "1": 65535,
      "2": 65535,
      "3": 5,
      "4": 6,
      "5": 7,
      "6": 8,
      "7": 9,
      "8": 65535,
      "9": 65535
    },
    "channelOvervoltageTurnOffFacts": {
      "0": 132,
      "1": 88,
      "2": 271,
      "3": 722,
      "4": 335,
      "5": 125,
      "6": 773,
      "7": 1508,
      "8": 1137,
      "9": 473
    }
  }
```


5.2.2. Getting the Software Version

It returns the current software version of RPCM in JSON format.

Command:

```
GET /api/softwareVersion
```

Example:

```
curl -X GET http://192.168.1.52:8888/api/softwareVersion
```

REPLY:


```
{"resultOfLastCommand":"OK","softwareVersion":"0.3.25"}
```


5.2.3. Getting the Outlet Status

Command:

```
GET /api/channel/channelNumber
```

It returns the current status of the outlet in JSON format.

Synonyms:

```
GET /api/output/[channelNumber]
```

```
GET /api/outlet/[channelNumber]
```

Parameter:

channelNumber = Outlet number of interest

The return is:


```
{"admS":"ON","actS":"ON","t1C":"ON","t2C":"ON","cbFS":"OFF","fSC1":0,"fSC2":0,"oAFS":"OFF"
,"oTFS":"OFF","loTFS":"OFF","rS":"OFF","ovTFS":"OFF","iMa":0,"iWa":0,"iVA":0,"iVar":0,"q":
1,"aKWh":0.001944,"aKVAh":0.003056,"aKVarh":0.0}
```


Example:

```
curl -X GET http://10.210.1.52:8888/api/channel/0
```

REPLY:


```
{
"admS":"ON",
"actS":"ON",
"t1C":"ON",
"t2C":"ON",
"cbFS":"OFF",
"fSC1":0,"fSC2":0,
"oAFS":"OFF",
"oTFS":"OFF",
"loTFS":"OFF",
"rS":"OFF","iMa":0,
"iWa":0,"iVA":0,
"iVar":0,
"aKWh":0.0,
"aKVAh":0.012199,
"aKVarh":0.008257
}
```


5.2.4. Setting the Outlet Status

5.2.4.1. Change the Outlet Status

Command:

```
PUT /api/channel/channelNumber/newState
```

Parameters:

channelNumber = [0-9] (Outlet number of interest (single digit))

newState = on|off (desired state)

Example:

```
curl -X PUT http://10.210.1.52:8888/api/channel/0/on
```

```
curl -X PUT http://10.210.1.52:8888/api/channel/0/off
```

REPLY:


```
{
  "rOLC": "OK",
  "ats": {
    "channels": {
      "0": {
        "admS": "ON",
        "actS": "ON",
        "t1C": "ON",
        "t2C": "ON",
        "cbFS": "OFF",
        "fSC1": 0,
        "fSC2": 0,
        "oAFS": "OFF",
        "oTFS": "OFF",
        "loTFS": "OFF",
        "rS": "OFF",
        "ovTFS": "OFF",
        "iMa": 0,
        "iWa": 0,
        "iVA": 0,
        "iVar": 0,
        "aKWh": 1.909722,
        "aKVAh": 1.914167,
        "aKVarh": -0.049722
      }
    }
  },
  "RPCM": 1
}
```


5.2.4.2. How to Use a Mask

Change multiple-outlets status

Command:

```
PUT /api/multiple-outlets/mask/[mask]/[state]
```

Parameters:

mask - bit outlet mask

if mask = 3 — set inlets: 0 and 1 to ON

if mask = 1023 — set all inlets (0 - 9) to ON

state = [on, off]

REPLY: GET /api/status is used as a system response.

Example:

```
curl -X PUT http://192.168.1.24:8888/api/multiple-outlets/mask/3/on
```

Setting of recognition to ON

Command:

PUT /api/recognition/mask/[mask]

Parameters:

mask — bit outlet mask, where 0-9 bits for outlets (14-15 bits for inlets).

if mask = 0 – turn off recognition for all

if mask = 3 — turn off recognition 0 and 1 outlets.

REPLY: GET /api/status is used as a system response.

Example:

```
curl -X PUT http://192.168.1.24:8888/api/recognition/mask/0
```

5.2.4.3 Reboot All Outlets

Command:

```
PUT /api/(channels|outputs|outlets)/restart
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/outputs/restart
```

Outlets will rebooted with restart delays for every port. Restart dealy is a timeout bettween outlet turning off and turning on.

5.2.4.4 Turn On All Outlets

Command:

```
PUT /api/(channels|outputs|outlets)/on
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/outputs/on
```

5.2.4.5 Turn Off All Outlets

Command:

```
PUT /api/(channels|outputs|outlets)/off
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/outputs/off
```

5.2.4.6 Reboot of the Outlet

Command:

```
PUT /api/(channel|output|outlet)/channelNumber/restart
```

Parameters:

channelNumber = [0-9]

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/output/1/restart
```

5.2.4.7 Outlet Reboot with Delay

Command:

```
PUT /api/(channel|output|outlet)/(channelNumber)/restart/restartDelay
```

Parameters:

channelNumber = [0-9]

restartDelay = [1-65535]

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/output/1/restart/3
```

5.2.4.8 Setting the Restart Delay for an Outlet

Command:

```
PUT /api/(channel|output|outlet)/channelNumber/restart/delay/restartDelay
```

Parameters:

channelNumber = [0-9]

restartDelay = [1-65535]

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/output/1/restart/delay/10
```

5.2.5. Input Status Setting

5.2.5.1. Change Input State

Command:

```
PUT /api/input/[inputNumber]/[state]
```

Parameter:

inputNumber — the number of an input[1, 2]

state - [on, off]

REPLY: GET /api/status is used as a system response.

Example:

```
curl -X PUT http://192.168.1.24:8888/api/input/1/on
```

5.2.5.2. Active Input Setting

Command:

```
PUT /api/inlet/[inputNumber]/activate
```

Parameters:

inputNumber —input number [1, 2]

REPLY: GET /api/status is used as a system response.

Example:

```
curl -X PUT http://192.168.1.24:8888/api/input/1/activate
```

5.2.5.3. Current Limit Setting

Command:

```
PUT /api/input/[inputNumber]/current-limit/[limit]
```

Parameters:

inputNumber —input number [1, 2]

limit — maximum of available current.

REPLY: GET /api/status is used as a system response

Example:

```
curl -X PUT http://192.168.1.24:8888/api/input/1/current-limit/10
```

5.2.5.4. Input Recognition Setting

Command:

```
PUT /api/input/[inputNumber]/recognition/[state]
```

Parameters:

inputNumber —input number [1, 2]

state — [on, off]

REPLY: GET /api/status is used as a system response

Example:

```
curl -X PUT http://192.168.1.24:8888/api/input/1/recognition/on
```

5.2.6. Date and Time Operations

5.2.6.1. How to Get Information about Time and Date

Command:

```
GET /api/time
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/time
```

REPLY:

```
{"resultOfLastCommand":"OK","time":"2020-11-05 11:33:33 +0300"}
```

5.2.6.2. Date and Time Setting

Command:

```
PUT /api/time/[timeData]
```

Parameters:

timeData — including [year][month][day][hour][minute][second]

REPLY:

```
{"resultOfLastCommand":"OK","time":"2020-11-05 11:33:33 +0300"}
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/time/20201105114233
```

The effect of this command will be permanent, provided that the "Use NTP server" parameter is set to "OFF". In case the parameter is enabled, the time will be synchronized with the NTP servers time within 5 to 10 seconds

5.2.7. Beeper Setting

Command:

```
PUT /api/beeper/[state]
```

Parameters:

```
  state - [on, off, alternate, disable, enable]
```

REPLY: `GET /api/status` is used as a system return.

Example:

```
curl -X PUT http://192.168.1.24:8888/api/beeper/on
```

5.2.8. Front Display Messages Settings

5.2.8.1. User Message Setting

Command:

```
PUT /api/display/user-message
```

Parameters:

message

fgColor

Return is:

```
  true
```

Example:

```
curl -X PUT http://192.168.1.42:8888/api/display/user-message -d
'{"fgColor":"grey","message":"hello"}'
```

5.2.8.2. Default Message Setting

Command:

```
PUT /api/display/what-to-show
```

Parameters:

whatToShow

REPLY:

```
  true
```

Example:

```
curl -X PUT http://192.168.1.42:8888/api/display/what-to-show -d
'{"whatToShow":"userMessage"}'
```

5.2.8.3. User Message Getting

Command:

```
GET /api/display/user-message
```

REPLY:

```
  {"message":"hello","fgColor":"grey"}
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/display/user-message
```

5.2.8.4. Get current display message

Command:

```
GET /api/display/what-is-shown
```

REPLY:

```
  "userMessage"
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/display/what-is-shown
```

5.2.8.5. An Information About Allowed Colors

Command:

```
GET /api/display/allow-colors
```

REPLY:

```
  ["red","green","blue","yellow","purple","grey"]
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/display/allow-colors
```

5.2.8.6. What Variants Is Showed

Command:

GET /api/display/what-to-show-variants

REPLY:

```
["voltage","current","power","ipAddress","macAddress","serialName","serialNumber","userMes
sage"]
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/display/what-to-show-variants
```

5.2.9. Automation tools

5.2.9.1. Get `Automation` State

Command:

```
GET /api/automation/state
```

REPLY:

```
  {
    "resultOfLastCommand": 'OK',
    "state": {
      "1": {
        "hashRate": {
```

```
        "alarm": true,
        "lastAlarmTime": '2019-09-19 22:44:21',
        "restartRequested": false,
        "restartRequestedTime": null,
        "lastCheckTime": '2019-09-21 14:38:34',
        "lastAlarmHashRate": 'ghsAv=11846.88, ghs5s=13143.71',
        "lastRestartHashRate": null,
        "instantValues": {
          "hashRateValues": {
            "ghsAv": 12020.02,
            "ghs5s": 13799.6
          },
          "minHashRateValue": 12020.02
        }
      },
      "consumption": {
        "alarm": false,
        "lastAlarmTime": null,
        "restartRequested": false,
        "restartRequestedTime": null,
        "lastCheckTime": null,
        "lastAlarmMilliamps": null,
        "lastRestartMilliamps": null,
        "instantValues": {
          "instantOutputsMilliamps": [],
          "sumInstantOutputsMilliamps": null
        }
      },
      "ping": {
        "alarm": false,
        "lastAlarmTime": null,
        "restartRequested": false,
        "restartRequestedTime": null,
        "lastCheckTime": null,
        "instantValues": {
          "alarmPacketPercentage": null,
          "restartPacketPercentage": null
        }
      },
      "tcpPortAvailability": {
        "alarm": false,
        "lastAlarmTime": null,
        "restartRequested": false,
        "restartRequestedTime": null,
        "lastCheckTime": null,
        "instantValues": {
          "tcpPortAvailable": null
        }
      },
      "lastRestartTime": null,
      "secondsUntilRestart": null,
      "minerState": {
```

```
        "STATS": [
          {
            "Type": 'DragonMint_T1'
          },
          {
            "GHS 5s": 13799.6,
            "GHS av": 12020.02,
            "miner_count": 3,
            "frequency": null
          }
        ]
      },
      "lastSuccessUpdateMinerState": '2019-09-21 14:38:34',
      "minerStats": {
        "Model": 'DragonMint_T1',
        "table": {
          "column_names": [
            'ASC',
            'Enabled',
            'Status',
            'MHS av',
            'MHS 5s'
          ],
          "rows": [
            [
              0,
              'Y',
              'Alive',
              3560577.23,
              2060526.22
            ],
            [
              1,
              'Y',
              'Alive',
              5074930.01,
              9017298.11
            ],
            [
              2,
              'Y',
              'Alive',
              3384514.66,
              2721771.11
            ]
          ]
        },
        "Total Hash Rate AV in MH/s": 12020021.9,
        "Total Hash Rate 5s in MH/s": 13799595.44
      }
    },
    "6": {
```

```
        "hashRate": {
          "alarm": true,
          "lastAlarmTime": '2019-09-19 22:44:21',
          "restartRequested": false,
          "restartRequestedTime": null,
          "lastCheckTime": '2019-09-21 14:38:29',
          "lastAlarmHashRate": 'ghsAv=195.83, ghs5s=62.914',
          "lastRestartHashRate": null,
          "instantValues": {
            "hashRateValues": {
              "ghsAv": 189.32,
              "ghs5s": 68.467
            },
            "minHashRateValue": 68.467
          }
        },
        "consumption": {
          "alarm": false,
          "lastAlarmTime": null,
          "restartRequested": false,
          "restartRequestedTime": null,
          "lastCheckTime": null,
          "lastAlarmMilliamps": null,
          "lastRestartMilliamps": null,
          "instantValues": {
            "instantOutputsMilliamps": [],
            "sumInstantOutputsMilliamps": null
          }
        },
        "ping": {
          "alarm": false,
          "lastAlarmTime": null,
          "restartRequested": false,
          "restartRequestedTime": null,
          "lastCheckTime": null,
          "instantValues": {
            "alarmPacketPercentage": null,
            "restartPacketPercentage": null
          }
        },
        "tcpPortAvailability": {
          "alarm": false,
          "lastAlarmTime": null,
          "restartRequested": false,
          "restartRequestedTime": null,
          "lastCheckTime": null,
          "instantValues": {
            "tcpPortAvailable": null
          }
        },
        "lastRestartTime": null,
        "secondsUntilRestart": null,
```

```
        "minerState": {
          "STATUS": [
            {
              "STATUS": 'S',
              "When": 1569065910,
              "Code": 70,
              "Msg": 'BMMiner stats',
              "Description": 'bmminer 1.0.0'
            }
          ],
          "STATS": [
            {
              "BMMiner": '2.0.0',
              "Miner": '30.0.1.3',
              "CompileTime": 'Tue Mar 19 14:28:28 CST 2019',
              "Type": 'Antminer S11'
            },
            {
              "STATS": 0,
              "ID": 'BC50',
              "Elapsed": 2846215,
              "Calls": 0,
              "Wait": 0,
              "Max": 0,
              "Min": 99999999,
              "GHS 5s": '68.46700',
              "GHS av": 189.32,
              "miner_count": 3,
              "frequency": '606',
              "fan_num": 2,
              "fan1": 0,
              "fan2": 0,
              "fan3": 0,
              "fan4": 0,
              "fan5": 2760,
              "fan6": 2760,
              "fan7": 0,
              "fan8": 0,
              "temp_num": 3,
              "temp1": 0,
              "temp2": 0,
              "temp3": 0,
              "temp4": 0,
              "temp5": 0,
              "temp6": 0,
              "temp7": 0,
              "temp8": 0,
              "temp9": 0,
              "temp10": 0,
              "temp11": 0,
              "temp12": 0,
              "temp13": 0,
```

```
            "temp14": 0,
            "temp15": 0,
            "temp16": 0,
            "temp2_1": 0,
            "temp2_2": 0,
            "temp2_3": 0,
            "temp2_4": 0,
            "temp2_5": 0,
            "temp2_6": 15,
            "temp2_7": 0,
            "temp2_8": 15,
            "temp2_9": 0,
            "temp2_10": 0,
            "temp2_11": 0,
            "temp2_12": 0,
            "temp2_13": 0,
            "temp2_14": 0,
            "temp2_15": 0,
            "temp2_16": 0,
            "temp3_1": 0,
            "temp3_2": 0,
            "temp3_3": 0,
            "temp3_4": 0,
            "temp3_5": 0,
            "temp3_6": 15,
            "temp3_7": 0,
            "temp3_8": 15,
            "temp3_9": 0,
            "temp3_10": 0,
            "temp3_11": 0,
            "temp3_12": 0,
            "temp3_13": 0,
            "temp3_14": 0,
            "temp3_15": 0,
            "temp3_16": 0,
            "temp_pcb_1": '-',
            "temp_pcb_2": '-',
            "temp_pcb_3": '-',
            "temp_pcb_4": '-',
            "temp_pcb_5": '-',
            "temp_pcb_6": '0-0',
            "temp_pcb_7": '-',
            "temp_pcb_8": '0-0',
            "temp_pcb_9": '-',
            "temp_pcb_10": '-',
            "temp_pcb_11": '-',
            "temp_pcb_12": '-',
            "temp_pcb_13": '-',
            "temp_pcb_14": '-',
            "temp_pcb_15": '-',
            "temp_pcb_16": '-',
            "temp_chip_1": '-',
```

```
            "temp_chip_2": '-',
            "temp_chip_3": '-',
            "temp_chip_4": '-',
            "temp_chip_5": '-',
            "temp_chip_6": '15-15',
            "temp_chip_7": '-',
            "temp_chip_8": '15-15',
            "temp_chip_9": '-',
            "temp_chip_10": '-',
            "temp_chip_11": '-',
            "temp_chip_12": '-',
            "temp_chip_13": '-',
            "temp_chip_14": '-',
            "temp_chip_15": '-',
            "temp_chip_16": '-',
            "freq_avg1": 0,
            "freq_avg2": 0,
            "freq_avg3": 0,
            "freq_avg4": 0,
            "freq_avg5": 0,
            "freq_avg6": 600.5,
            "freq_avg7": 0,
            "freq_avg8": 600.57,
            "freq_avg9": 0,
            "freq_avg10": 0,
            "freq_avg11": 0,
            "freq_avg12": 0,
            "freq_avg13": 0,
            "freq_avg14": 0,
            "freq_avg15": 0,
            "freq_avg16": 0,
            "total_rateideal": 11500,
            "total_freqavg": 600.53,
            "total_acn": 168,
            "total_rate": 68.46,
            "chain_rateideal1": 0,
            "chain_rateideal2": 0,
            "chain_rateideal3": 0,
            "chain_rateideal4": 0,
            "chain_rateideal5": 0,
            "chain_rateideal6": 5750.38,
            "chain_rateideal7": 0,
            "chain_rateideal8": 5751.07,
            "chain_rateideal9": 0,
            "chain_rateideal10": 0,
            "chain_rateideal11": 0,
            "chain_rateideal12": 0,
            "chain_rateideal13": 0,
            "chain_rateideal14": 0,
            "chain_rateideal15": 0,
            "chain_rateideal16": 0,
            "temp_max": 0,
```

```
            "Device Hardware%": 0.0013,
            "no_matching_work": 20911,
            "chain_acn1": 0,
            "chain_acn2": 0,
            "chain_acn3": 0,
            "chain_acn4": 0,
            "chain_acn5": 0,
            "chain_acn6": 84,
            "chain_acn7": 0,
            "chain_acn8": 84,
            "chain_acn9": 0,
            "chain_acn10": 0,
            "chain_acn11": 0,
            "chain_acn12": 0,
            "chain_acn13": 0,
            "chain_acn14": 0,
            "chain_acn15": 0,
            "chain_acn16": 0,
            "chain_acs1": '',
            "chain_acs2": '',
            "chain_acs3": '',
            "chain_acs4": '',
            "chain_acs5": '',
            "chain_acs6": '',
            "chain_acs7": '',
            "chain_acs8": '',
            "chain_acs9": '',
            "chain_acs10": '',
            "chain_acs11": '',
            "chain_acs12": '',
            "chain_acs13": '',
            "chain_acs14": '',
            "chain_acs15": '',
            "chain_acs16": '',
            "chain_hw1": 0,
            "chain_hw2": 0,
            "chain_hw3": 0,
            "chain_hw4": 0,
            "chain_hw5": 0,
            "chain_hw6": 20899,
            "chain_hw7": 0,
            "chain_hw8": 12,
            "chain_hw9": 0,
            "chain_hw10": 0,
            "chain_hw11": 0,
            "chain_hw12": 0,
            "chain_hw13": 0,
            "chain_hw14": 0,
            "chain_hw15": 0,
            "chain_hw16": 0,
            "chain_rate1": '',
            "chain_rate2": '',
```

```
              "chain_rate3": '',
              "chain_rate4": '',
              "chain_rate5": '',
              "chain_rate6": '68.4670',
              "chain_rate7": '0.00000',
              "chain_rate8": '0.00000',
              "chain_rate9": '',
              "chain_rate10": '',
              "chain_rate11": '',
              "chain_rate12": '',
              "chain_rate13": '',
              "chain_rate14": '',
              "chain_rate15": '',
              "chain_rate16": '',
              "chain_xtime6":
'{X1=1,X2=1,X3=1,X5=1,X6=1,X7=1,X11=1,X12=1,X13=1,X14=1,X15=1,X16=1,X17=1,X18=1,X19=1,X20=
1,X22=1,X23=1,X24=1,X25=1,X26=1,X27=1,X28=1,X30=1,X32=1,X33=1,X35=1,X36=1,X37=1,X38=1,X39=
1,X40=1,X41=1,X42=1,X43=1,X44=1,X45=1,X46=1,X47=1,X48=1,X49=1,X50=1,X51=1,X52=1,X53=1,X54=
1,X55=1,X56=1,X57=1,X58=1,X59=1,X60=1,X61=1,X62=1,X63=1,X64=1,X65=1,X66=1,X67=1,X68=1,X69=
1,X70=1,X71=1,X72=1,X73=1,X74=1,X75=1,X76=1,X77=1,X78=1,X79=1,X80=1,X81=1,X82=1}',
              "chain_xtime8":
'{X4=1,X5=1,X6=1,X7=1,X8=1,X9=1,X10=1,X11=1,X12=1,X13=1,X14=1,X15=1,X16=1,X20=1,X21=1,X22=
1,X24=1,X25=1,X26=1,X27=1,X28=1,X29=1,X30=1,X31=1,X32=1,X33=1,X34=1,X35=1,X36=1,X37=1,X38=
1,X39=1,X40=1,X41=1,X42=1,X43=1,X44=1,X45=1,X46=1,X47=1,X48=1,X49=1,X50=1,X51=1,X52=1,X53=
1,X54=1,X55=1,X56=1,X57=1,X58=1,X59=1,X60=1,X61=1,X62=1,X63=1,X64=1,X65=1,X66=1,X67=1,X68=
1,X69=1,X70=1,X71=1,X72=1,X73=1,X74=1,X75=1,X76=1,X77=1,X78=1,X79=1,X80=1,X81=1,X82=1,X83=
1}',
              "chain_offside_6": '0',
              "chain_offside_8": '0',
              "chain_opencore_6": '0',
              "chain_opencore_8": '0',
              "miner_version": '30.0.1.3',
              "miner_id": '80141d006f904814'
            }
          ],
          "id": 1
        },
        "lastSuccessUpdateMinerState": '2019-09-21 14:38:29',
        "minerStats": {
          "Total Hash Rate AV, GHS": 189.32,
          "Total Hash Rate 5s, GHS": 68.467,
          "Frequency": 606,
          "Miner Count": 3,
          "Model": 0,
          "table": {
            "column_names": [
              'CHAIN#',
              'ACN',
              'ACS',
              'RATE',
              'HW'
            ],
```

```
          "rows": [
            [
              6,
              84,
              '',
              '68.4670',
              20899
            ],
            [
              8,
              84,
              '',
              '0.00000',
              12
            ]
          ]
        },
        "Rate": 68.467
      }
    }
  }
}
```


Example:

```
curl -X GET http://192.168.1.10:8888/api/automation/state
```

5.2.9.2. Get the Automation Device Types List

Command:

```
GET /api/automation/device-types
```

REPLY:


```
{
  "1": {
      "name": "Bitmain_D3",
      "settings": {
          "checkIntervalSeconds": 6,
          "interRestartIntervalSeconds": 600,
          "consumption": {
              "alarmBottomLimitMilliamps": 4500,
              "restartBottomLimitMilliamps": 4300,
              "alarmSeconds": 60,
              "restartSeconds": 300
          },
          "hashRate": {
              "hashrateMeasurementUnit": "GH/s",
              "api": {
                  "port": 4028,
                  "unavailabilityTimeoutSeconds": 3
              },
              "alarmBottomLimit": 16700,
```

```
            "restartBottomLimit": 16500,
            "alarmSeconds": 60,
            "restartSeconds": 300
        }
    }
},
"2": {
    "name": "Bitmain_L3+",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": 3900,
            "restartBottomLimitMilliamps": 3700,
            "alarmSeconds": 60,
            "restartSeconds": 300
        },
        "hashRate": {
            "hashrateMeasurementUnit": "GH/s",
            "api": {
                "port": 4028,
                "unavailabilityTimeoutSeconds": 3
            },
            "alarmBottomLimit": 500,
            "restartBottomLimit": 490,
            "alarmSeconds": 60,
            "restartSeconds": 300
        }
    }
},
"3": {
    "name": "Bitmain_S9",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": 6600,
            "restartBottomLimitMilliamps": 6300,
            "alarmSeconds": 60,
            "restartSeconds": 300
        },
        "hashRate": {
            "hashrateMeasurementUnit": "GH/s",
            "api": {
                "port": 4028,
                "unavailabilityTimeoutSeconds": 3
            },
            "alarmBottomLimit": 13500,
            "restartBottomLimit": 13300,
            "alarmSeconds": 60,
            "restartSeconds": 300
        }
```

```
        }
    },
    "4": {
        "name": "Whatsminer_M3X",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": 11000,
                "restartBottomLimitMilliamps": 10900,
                "alarmSeconds": 60,
                "restartSeconds": 300
            },
            "hashRate": {
                "hashrateMeasurementUnit": "GH/s",
                "api": {
                    "port": 4028,
                    "unavailabilityTimeoutSeconds": 3
                },
                "alarmBottomLimit": 12500,
                "restartBottomLimit": 12400,
                "alarmSeconds": 60,
                "restartSeconds": 300
            }
        }
    },
    "5": {
        "name": "Claymore",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": 5400,
                "restartBottomLimitMilliamps": 4500,
                "alarmSeconds": 60,
                "restartSeconds": 300
            },
            "hashRate": {
                "hashrateMeasurementUnit": "MH/s",
                "api": {
                    "port": 3333,
                    "unavailabilityTimeoutSeconds": 3
                },
                "alarmBottomLimit": 180,
                "restartBottomLimit": 170,
                "alarmSeconds": 60,
                "restartSeconds": 300
            }
        }
    },
    "6": {
        "name": "DragonMint_T1",
```

```
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": 7500,
                "restartBottomLimitMilliamps": 7000,
                "alarmSeconds": 60,
                "restartSeconds": 300
            },
            "hashRate": {
                "hashrateMeasurementUnit": "GH/s",
                "api": {
                    "port": 4028,
                    "unavailabilityTimeoutSeconds": 3
                },
                "alarmBottomLimit": 16000,
                "restartBottomLimit": 15800,
                "alarmSeconds": 60,
                "restartSeconds": 300
            }
        }
    },
    "7": {
        "name": "Bitmain_S11",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": 6600,
                "restartBottomLimitMilliamps": 6300,
                "alarmSeconds": 60,
                "restartSeconds": 300
            },
            "hashRate": {
                "hashrateMeasurementUnit": "GH/s",
                "api": {
                    "port": 4028,
                    "unavailabilityTimeoutSeconds": 3
                },
                "alarmBottomLimit": 20400,
                "restartBottomLimit": 20300,
                "alarmSeconds": 60,
                "restartSeconds": 300
            }
        }
    },
    "8": {
        "name": "Bitmain_T15",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
```

```
            "alarmBottomLimitMilliamps": 6600,
            "restartBottomLimitMilliamps": 6300,
            "alarmSeconds": 60,
            "restartSeconds": 300
        },
        "hashRate": {
            "hashrateMeasurementUnit": "GH/s",
            "api": {
                "port": 4028,
                "unavailabilityTimeoutSeconds": 3
            },
            "alarmBottomLimit": 22900,
            "restartBottomLimit": 22800,
            "alarmSeconds": 60,
            "restartSeconds": 300
        }
    }
},
"9": {
    "name": "Bitmain_S15",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": 6600,
            "restartBottomLimitMilliamps": 6300,
            "alarmSeconds": 60,
            "restartSeconds": 300
        },
        "hashRate": {
            "hashrateMeasurementUnit": "GH/s",
            "api": {
                "port": 4028,
                "unavailabilityTimeoutSeconds": 3
            },
            "alarmBottomLimit": 26900,
            "restartBottomLimit": 26800,
            "alarmSeconds": 60,
            "restartSeconds": 300
        }
    }
},
"10": {
    "name": "Small-Router",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": null,
            "restartBottomLimitMilliamps": null,
            "alarmSeconds": null,
            "restartSeconds": null
```

```
            },
            "hashRate": {
                "hashrateMeasurementUnit": null,
                "api": {
                    "port": null,
                    "unavailabilityTimeoutSeconds": null
                },
                "alarmBottomLimit": null,
                "restartBottomLimit": null,
                "alarmSeconds": null,
                "restartSeconds": null
            }
        }
    },
    "11": {
        "name": "Medium-Router",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": null,
                "restartBottomLimitMilliamps": null,
                "alarmSeconds": null,
                "restartSeconds": null
            },
            "hashRate": {
                "hashrateMeasurementUnit": null,
                "api": {
                    "port": null,
                    "unavailabilityTimeoutSeconds": null
                },
                "alarmBottomLimit": null,
                "restartBottomLimit": null,
                "alarmSeconds": null,
                "restartSeconds": null
            }
        }
    },
    "12": {
        "name": "Large-Router",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": null,
                "restartBottomLimitMilliamps": null,
                "alarmSeconds": null,
                "restartSeconds": null
            },
            "hashRate": {
                "hashrateMeasurementUnit": null,
                "api": {
```

```
                "port": null,
                "unavailabilityTimeoutSeconds": null
            },
            "alarmBottomLimit": null,
            "restartBottomLimit": null,
            "alarmSeconds": null,
            "restartSeconds": null
        }
    }
},
"13": {
    "name": "Small-Switch",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": null,
            "restartBottomLimitMilliamps": null,
            "alarmSeconds": null,
            "restartSeconds": null
        },
        "hashRate": {
            "hashrateMeasurementUnit": null,
            "api": {
                "port": null,
                "unavailabilityTimeoutSeconds": null
            },
            "alarmBottomLimit": null,
            "restartBottomLimit": null,
            "alarmSeconds": null,
            "restartSeconds": null
        }
    }
},
"14": {
    "name": "Medium-Switch",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": null,
            "restartBottomLimitMilliamps": null,
            "alarmSeconds": null,
            "restartSeconds": null
        },
        "hashRate": {
            "hashrateMeasurementUnit": null,
            "api": {
                "port": null,
                "unavailabilityTimeoutSeconds": null
            },
            "alarmBottomLimit": null,
```

```
            "restartBottomLimit": null,
            "alarmSeconds": null,
            "restartSeconds": null
        }
    }
},
"15": {
    "name": "Large-Switch",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": null,
            "restartBottomLimitMilliamps": null,
            "alarmSeconds": null,
            "restartSeconds": null
        },
        "hashRate": {
            "hashrateMeasurementUnit": null,
            "api": {
                "port": null,
                "unavailabilityTimeoutSeconds": null
            },
            "alarmBottomLimit": null,
            "restartBottomLimit": null,
            "alarmSeconds": null,
            "restartSeconds": null
        }
    }
},
"16": {
    "name": "Small-Server",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": null,
            "restartBottomLimitMilliamps": null,
            "alarmSeconds": null,
            "restartSeconds": null
        },
        "hashRate": {
            "hashrateMeasurementUnit": null,
            "api": {
                "port": null,
                "unavailabilityTimeoutSeconds": null
            },
            "alarmBottomLimit": null,
            "restartBottomLimit": null,
            "alarmSeconds": null,
            "restartSeconds": null
        }
```

```
        }
    },
    "17": {
        "name": "Medium-Server",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": null,
                "restartBottomLimitMilliamps": null,
                "alarmSeconds": null,
                "restartSeconds": null
            },
            "hashRate": {
                "hashrateMeasurementUnit": null,
                "api": {
                    "port": null,
                    "unavailabilityTimeoutSeconds": null
                },
                "alarmBottomLimit": null,
                "restartBottomLimit": null,
                "alarmSeconds": null,
                "restartSeconds": null
            }
        }
    },
    "18": {
        "name": "Large-Server",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": null,
                "restartBottomLimitMilliamps": null,
                "alarmSeconds": null,
                "restartSeconds": null
            },
            "hashRate": {
                "hashrateMeasurementUnit": null,
                "api": {
                    "port": null,
                    "unavailabilityTimeoutSeconds": null
                },
                "alarmBottomLimit": null,
                "restartBottomLimit": null,
                "alarmSeconds": null,
                "restartSeconds": null
            }
        }
    },
    "19": {
        "name": "Modem",
```

```
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": null,
                "restartBottomLimitMilliamps": null,
                "alarmSeconds": null,
                "restartSeconds": null
            },
            "hashRate": {
                "hashrateMeasurementUnit": null,
                "api": {
                    "port": null,
                    "unavailabilityTimeoutSeconds": null
                },
                "alarmBottomLimit": null,
                "restartBottomLimit": null,
                "alarmSeconds": null,
                "restartSeconds": null
            }
        }
    },
    "20": {
        "name": "Custom",
        "settings": {
            "checkIntervalSeconds": 6,
            "interRestartIntervalSeconds": 600,
            "consumption": {
                "alarmBottomLimitMilliamps": null,
                "restartBottomLimitMilliamps": null,
                "alarmSeconds": null,
                "restartSeconds": null
            },
            "hashRate": {
                "hashrateMeasurementUnit": null,
                "api": {
                    "port": null,
                    "unavailabilityTimeoutSeconds": null
                },
                "alarmBottomLimit": null,
                "restartBottomLimit": null,
                "alarmSeconds": null,
                "restartSeconds": null
            }
        }
    }
}
```


Example:

```
curl -X GET http://192.168.1.10:8888/api/automation/device-types
```

5.2.9.3. Get the Automation Devices List

Command:

```
GET /api/automation/devices
```

REPLY:


```
{
  "1": {
    "deviceType": 6,
    "name": "dragonmint_t1",
    "description": "",
    "checkIntervalSeconds": 6,
    "interRestartIntervalSeconds": 600,
    "consumption": {
      "alarmBottomLimitMilliamps": null,
      "restartBottomLimitMilliamps": null,
      "alarmSeconds": null,
      "restartSeconds": null,
      "enabled": false
    },
    "hashRate": {
      "api": {
        "ipAddress": "192.168.1.37",
        "port": 4028,
        "unavailabilityTimeoutSeconds": 3
      },
      "alarmBottomLimit": 15700,
      "restartBottomLimit": 8000,
      "alarmSeconds": 60,
      "restartSeconds": 300,
      "enabled": true
    },
    "ping": {
      "ipAddress": null,
      "connectTimeout": null,
      "upperLimitMilliseconds": null,
      "alarmPacketLossPercentage": null,
      "restartPacketLossPercentage": null,
      "alarmSeconds": null,
      "restartSeconds": null,
      "enabled": false
    },
    "tcpPortAvailability": {
      "ipAddress": null,
      "port": null,
      "connectTimeout": null,
      "alarmSeconds": null,
      "restartSeconds": null,
      "enabled": false
    },
    "outputs": [
```

```
      1
    ]
  },
  "6": {
    "deviceType": 3,
    "name": "antminer_s11",
    "description": "",
    "checkIntervalSeconds": 6,
    "interRestartIntervalSeconds": 1800,
    "consumption": {
      "alarmBottomLimitMilliamps": null,
      "restartBottomLimitMilliamps": null,
      "alarmSeconds": null,
      "restartSeconds": null,
      "enabled": false
    },
    "hashRate": {
      "api": {
        "ipAddress": "192.168.1.161",
        "port": 4028,
        "unavailabilityTimeoutSeconds": 3
      },
      "alarmBottomLimit": 19000,
      "restartBottomLimit": 10,
      "alarmSeconds": 60,
      "restartSeconds": 300,
      "enabled": true
    },
    "ping": {
      "ipAddress": null,
      "connectTimeout": null,
      "upperLimitMilliseconds": null,
      "alarmPacketLossPercentage": null,
      "restartPacketLossPercentage": null,
      "alarmSeconds": null,
      "restartSeconds": null,
      "enabled": false
    },
    "tcpPortAvailability": {
      "ipAddress": null,
      "port": null,
      "connectTimeout": null,
      "alarmSeconds": null,
      "restartSeconds": null,
      "enabled": false
    },
    "outputs": [
      3
    ]
  }
}
```

Example:

```
curl -X GET http://192.168.1.10:8888/api/automation/devices
```

5.2.9.4. Automation Set Up

Command:

```
POST /api/automation
```

Parameters:

deviceType — ID deviceType;

name —name (digitals, letters, symbols [-_] from 0 to 25 characters);

description — comment(digitals, letters, grammatical symbols from 0 to 255 characters);

checkIntervalSeconds — checking timeout, s (number 1 to 5 digits);

interRestartIntervalSeconds — min. timeout to restart, s (number 1 to 5 digits);

consumptionEnabled — circumstance monitoring (true/false).

If test is ON, following parameters are necessary:

consumptionAlarmBottomLimitMilliamps — the bottom threshold of the current consumption value, reaching of which triggers for alarm, mA (number 1 to 5 digits);

consumptionRestartBottomLimitMilliamps — the bottom threshold of the current consumption value, reaching of which triggers for restart, mA (number 1 to 5 digits);

consumptionAlarmSeconds — stabilization delay in seconds for alarm, s (number 1 to 5 digits);

consumptionRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

hashRateEnabled — hashrate monitoring (true/false).

If test is ON, following parameters are necessary:

hashRateApiIPAddress — IP address or FQDN for API Requests

hashRateApiPort —API port

hashRateApiUnavailabilityTimeoutSeconds — time interval during which the API has to respond to the request, s (number 1 to 5 digits)

hashRateAlarmBottomLimit — the bottom threshold of the hashrate value, reaching of which triggers an alarm, GH/s (number 1 to 7 digits)

hashRateRestartBottomLimit — the bottom threshold of the hashrate value, reaching of which triggers a restart, GH/s (from 1 to 5 digits);

hashRateAlarmSeconds — stabilization delay in seconds for alarm, s (from 1 to 5 digits);

hashRateRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

pingEnabled —ICMP access monitoring (ping) (true/false);

If test is ON, following parameters is necessary:

pingIPAddress — IP address or FQDN for ICMP Requests

pingConnectTimeoutSeconds — time interval during which the device should send the ICMP echo reply packet in response to ICMP echo request (from 1 to 5 digits);

pingUpperLimitMilliseconds — maximum round-trip latency value in milliseconds, exceeding of which causes the packets to be considered los (from 1 to 5 digits);

pingAlarmPacketLossPercentage — percentage of lost packets (top limit), which triggers an alarm, %

pingRestartPacketLossPercentage — percentage of lost packets (top limit), which triggers a restart, %

pingAlarmSeconds — мandн. продолжandтельность для оповещенandя, s (from 1 to 5 digits);

pingRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

tcpPortAvailabilityEnabled —TCP Port Availability monitoring (true/false).

If test is ON, following parameters are necessary:

tcpPortAvailabilityIPAddress — IP address or FQDN;

tcpPortAvailabilityPort — TCP port;

tcpPortAvailabilityConnectTimeout — the time interval during which the service has to respond, s (from 1 to 5 digits);

tcpPortAvailabilityAlarmSeconds — stabilization delay in seconds for alarm, s (from 1 to 5 digits);

tcpPortAvailabilityRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

outputs — (an array)

REPLY:

```
{ "id":1947 }
```

Example:

```
curl -X POST http://192.168.1.42:8888/api/automation -d
'{"tcpPortAvailabilityEnabled":true,"consumptionEnabled":true,"deviceType":"8201","checkIn
tervalSeconds":6,"consumptionAlarmBottomLimitMilliamps":4500,"consumptionAlarmSeconds":60,
"consumptionRestartBottomLimitMilliamps":4300,"consumptionRestartSeconds":300,"hashRateApi
Port":4028,"hashRateApiUnavailabilityTimeoutSeconds":3,"hashRateAlarmBottomLimit":16700,"h
ashRateAlarmSeconds":60,"hashRateRestartBottomLimit":16500,"hashRateRestartSeconds":300,"i
```

```
nterRestartIntervalSeconds":600,"name":"test","outputs":
[8],"hashRateEnabled":true,"hashRateApiIPAddress":"127.0.0.1","tcpPortAvailabilityIPAddres
s":"127.0.0.1","tcpPortAvailabilityPort":"80","tcpPortAvailabilityConnectTimeout":"3","tcp
PortAvailabilityAlarmSeconds":"60","tcpPortAvailabilityRestartSeconds":"300","pingEnabled"
:false}'
```

5.2.9.5. Automation Configuration Setting

Command:

```
PUT /api/automation
```

Parameters:

id — ID automation

deviceType — ID deviceType;

name —name (digitals, letters, symbols [-_] from 0 to 25 characters);

description — comment(digitals, letters, grammatical symbols from 0 to 255 characters);

checkIntervalSeconds — checking timeout, s (number 1 to 5 digits);

interRestartIntervalSeconds — min. timeout to restart, s (number 1 to 5 digits);

consumptionEnabled — circumstance monitoring (true/false).

If test is ON, following parameters are necessary:

consumptionAlarmBottomLimitMilliamps — the bottom threshold of the current consumption value, reaching of which triggers for alarm, mA (number 1 to 5 digits);

consumptionRestartBottomLimitMilliamps — the bottom threshold of the current consumption value, reaching of which triggers for restart, mA (number 1 to 5 digits);

consumptionAlarmSeconds — stabilization delay in seconds for alarm, s (number 1 to 5 digits);

consumptionRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

hashRateEnabled — hashrate monitoring (true/false).

If test is ON, following parameters are necessary:

hashRateApiIPAddress — IP address or FQDN for API Requests

hashRateApiPort —API port

hashRateApiUnavailabilityTimeoutSeconds — time interval during which the API has to respond to the request, s (number 1 to 5 digits)

hashRateAlarmBottomLimit — the bottom threshold of the hashrate value, reaching of which triggers an alarm, GH/s (number 1 to 7 digits)

hashRateRestartBottomLimit — the bottom threshold of the hashrate value, reaching of which triggers a restart, GH/s (from 1 to 5 digits);

hashRateAlarmSeconds — stabilization delay in seconds for alarm, s (from 1 to 5 digits);

hashRateRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

pingEnabled —ICMP access monitoring (ping) (true/false);

If test is ON, following parameters are necessary:

pingIPAddress — IP address or FQDN for ICMP Requests

pingConnectTimeoutSeconds — time interval during which the device should send the ICMP echo reply packet in response to ICMP echo request (from 1 to 5 digits);

pingUpperLimitMilliseconds — maximum round-trip latency value in milliseconds, exceeding of which causes the packets to be considered los (from 1 to 5 digits);

pingAlarmPacketLossPercentage — percentage of lost packets (top limit), which triggers an alarm, %

pingRestartPacketLossPercentage — percentage of lost packets (top limit), which triggers a restart, %

pingAlarmSeconds — мandн. продолжandтельность для оповещенandя, s (from 1 to 5 digits);

pingRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

tcpPortAvailabilityEnabled —TCP Port Availability monitoring (true/false).

If test is ON, following parameters are necessary:

tcpPortAvailabilityIPAddress — IP address or FQDN;

tcpPortAvailabilityPort — TCP port;

tcpPortAvailabilityConnectTimeout — the time interval during which the service has to respond, s (from 1 to 5 digits);

tcpPortAvailabilityAlarmSeconds — stabilization delay in seconds for alarm, s (from 1 to 5 digits);

tcpPortAvailabilityRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

outputs — (an array)

REPLY:

```
  { "id":1947 }
```

Example:

```
curl -X PUT http://192.168.1.42:8888/api/automation -d
'{"id":1947,"tcpPortAvailabilityEnabled":true,"consumptionEnabled":true,"deviceType":"8201
","checkIntervalSeconds":6,"consumptionAlarmBottomLimitMilliamps":4500,"consumptionAlarmSe
conds":60,"consumptionRestartBottomLimitMilliamps":4300,"consumptionRestartSeconds":300,"h
ashRateApiPort":4028,"hashRateApiUnavailabilityTimeoutSeconds":3,"hashRateAlarmBottomLimit
":16700,"hashRateAlarmSeconds":60,"hashRateRestartBottomLimit":16500,"hashRateRestartSecon
ds":300,"interRestartIntervalSeconds":600,"name":"test2","outputs":
[8],"hashRateEnabled":true,"hashRateApiIPAddress":"127.0.0.1","tcpPortAvailabilityIPAddres
s":"127.0.0.1","tcpPortAvailabilityPort":"80","tcpPortAvailabilityConnectTimeout":"3","tcp
PortAvailabilityAlarmSeconds":"60","tcpPortAvailabilityRestartSeconds":"300","pingEnabled"
:false}'
```

5.2.9.6. Delete Automation

Command:

```
DELETE /api/automation
```

Parameters:

id — ID automation

REPLY:

```
  { "id":1947 }
```

Example:

```
curl -X DELETE http://192.168.1.42:8888/api/automation -d '{"id":1947}'
```

5.2.10 Additional Commands for Automation

5.2.10.1 General Information

This section contains automation commands in REST API notation using keys.

Parameters used:

Automation-Name-value — the name of the automation settings — you can use numbers, upper and lower case characters, and signs — and _. length should be from 1 to 25;

Device-Type-Name-value — the type of device to set, numbers, upper and lower case characters, and symbols: -, + and _ are used, length should be from 1 to 25;

Outlets-Numbers-value — numbers of outputs — numbers in the form of single digits from 0 to 9, it is possible to specify several outputs, separated by commas.

Description-Text-value — description (comment up to 254 characters), can contain upper and lower case characters, punctuation marks and spaces (including tabs).

Check-Interval-Seconds-value — the interval between checks in seconds, an integer from 1 to 99999 or the service word default for the default value.

Restart-Interval-Seconds-value — the interval between reboots in seconds, an integer from 1 to 99999 or the default keyword for the default value.

Enabled-value — set permission (enables) for a particular property or function, service words are used: on or off (enable or disable).

Alarm-Bottom-Limit-Milliamps-value — the lower current limit at which the alarm is triggered, an integer from 1 to 99999 or the default service word for the default value.

Restart-Bottom-Limit-Milliamps-value — the lower current limit at which a restart is triggered, an integer from 1 to 99999, or the default word for the default value.

Timeout-Alarm-Seconds-value — control interval (delay) in seconds before the notification, an integer from 1 to 99999, or the service word default for the default value.

Timeout-Restart-Seconds-value — control interval (delay) in seconds before notification, an integer from 1 to 99999, or the default service word for the default value.

Alarm-Bottom-Limit-Hashrate-Value — The lower hashrate limit at which an alert is triggered, an integer from 1 to 99999, or the default keyword for the default value.

Restart-Bottom-Limit-Hashrate-Value — The lower hashrate limit at which a restart is triggered, an integer from 1 to 99999, or the default keyword for the default value.

API-IP-Address-Value — IP address of the mining device that needs to be checked.

API-TCP-Port-Value — TCP port of the mining device for the API connection, which needs to be checked, an integer up to 65535 or the default keyword for the default value.

API-Unavailability-Timeout-Seconds-Hasrate-value — control interval (delay) in seconds before the notification, an integer from 1 to 99999, or the default service word for the default value.

IP-Address-Value — the IP address of the device to be checked for availability.

Connect-Timeout-Value — allowable timeout of the device before sending a response over the network, the availability of which must be checked as an integer from 1 to 99999.

Upper-Limit-Milliseconds-Value — maximum ICMP packet transit time (Max. Latency limit, ms), an integer from 1 to 99999.

Alarm-Packet-Loss-Percentage-Value — the maximum allowed number of lost packets in% for notification.

Restart-Packet-Loss-Percentage-Value — the maximum allowable number of lost packets in% for reboot.

Alarm-Seconds-Value — alarm delay time in seconds, an integer from 1 to 99999.

Restart-Seconds-Value — restart grace period in seconds, an integer from 1 to 99999.

TCP-Port-Value — TCP port of a network device for checking the availability of a TCP service, which must be checked, an integer up to 65535.

5.2.10.2 Adding Automation Test Settings

Command:

```
POST /api/automation/name/Automation-Name-value/device-type-name/Device-Type-Name-value/
outputs/Outlets-Numbers-value/description/Description-Text-value/check-interval-seconds/
Check-Interval-Seconds-value/inter-restart-interval-seconds/Restart-Interval-Seconds-value
```

Example:

```
curl -X POST http://192.168.1.24:8888/api/automation/name/Automation1/device-type-name/
Bitmain_D3/outputs/1/description/desc/check-interval-seconds/2/inter-restart-interval-
seconds/300
```

5.2.10.3 Adding Automation Test Settings with Default Values

Command:

```
POST /api/automation/name/Automation-Name-value/device-type-name/Device-Type-Name-value/
outputs/Outlets-Numbers-value
```

Example:

```
curl -X POST  http://192.168.1.24:8888/api/automation/name/Automation1/device-type-name/
Bitmain_D3/outputs/2
```

5.2.10.4 Changing the Settings of the Automation Test settings to their default values

Command:

```
PUT /api/automation/name/Automation-Name-value/default
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/default
```

5.2.10.5 Changing the Name of Automation Test Settings

Command:

```
PUT /api/automation/name/Automation-Name-value/name/a
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/name/a
```

5.2.10.6 Changing the description of Automation Test Settings

Command:

```
PUT /api/automation/name/Automation-Name-value/description/Description-Text-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/description/desc
```

5.2.10.7 Changing the Device Type

Command:

```
PUT /api/automation/name/Automation-Name-value/device-type-name/Device-Type-Name-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/device-type-name/
Bitmain_D3
```

5.2.10.8 Modifying Outlets

Command:

```
PUT /api/automation/name/Automation-Name-value/outputs/Outlets-Numbers-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/outputs/3,4
```

5.2.10.9 Changing Check Interval Seconds (Value or Default)

Command:

```
PUT /api/automation/name/Automation-Name-value/check-interval-seconds/Check-Interval-
Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/check-interval-
seconds/12
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/check-interval-
seconds/default
```

5.2.10.10 Changing Inter Restart Interval Seconds (Value or Default)

Command:

```
PUT /api/automation/name/Automation-Name-value/inter-restart-interval-seconds/Restart-
Interval-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/inter-restart-
interval-seconds/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/inter-restart-
interval-seconds/default
```

5.2.10.11 Deleting Automation Test Settings by Name

Command:

```
DELETE /api/automation/name/Automation-Name-value
```

Example:

```
curl -X DELETE http://192.168.1.24:8888/api/automation/name/AntMiner-1
```

5.2.10.12 Setting a Consumption Test in One Command

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/enabled/Enabled-value/alarm-bottom-limit-milliamps/Alarm-Bottom-Limit-Milliamps-value/restart-bottom-limit-milliamps/Restart-Bottom-Limit-Milliamps-value/alarm-seconds/Timeout-Alarm-Seconds-value/restart-seconds/Timeout-Restart-Seconds-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/enabled/on/alarm-bottom-limit-milliamps/default/restart-bottom-limit-milliamps/default/alarm-seconds/30/restart-seconds/60
```

5.2.10.13 Setting the Consumption Test with Default Parameters

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/defaults/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/defaults/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/defaults/enabled/off
```

5.2.10.14 Enabling / Disabling the Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/enabled/off
```

5.2.10.15 Setting Alarm Bottom Limit Milliamps for a Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/alarm-bottom-limit-milliamps/Alarm-Bottom-Limit-Milliamps-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/alarm-bottom-limit-milliamps/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/alarm-bottom-limit-milliamps/default
```

5.2.10.16 Configuring Restart Bottom Limit Milliamps for a Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/restart-bottom-limit-milliamps/Restart-Bottom-Limit-Milliamps-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/restart-bottom-limit-milliamps/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/restart-bottom-limit-milliamps/default
```

5.2.10.17 Configuring Alarm Seconds for a Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/alarm-seconds/Timeout-Alarm-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/alarm-seconds/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/alarm-seconds/default
```

5.2.10.18 Configuring Restart Seconds for a Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/restart-seconds/Timeout-Restart-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/restart-seconds/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/restart-seconds/default
```

5.2.10.19 Configuring a Hash-Rate Test in one Command

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/enabled/Enabled-value/alarm-bottom-limit/Alarm-Bottom-Limit-Hashrate-Value/restart-bottom-limit/Restart-Bottom-Limit-Hashrate-Value/alarm-seconds/Timeout-Alarm-Seconds-value/restart-seconds/Timeout-Restart-Seconds-value/api-ip-address/API-IP-Address-Value/api-port/API-TCP-Port-Value/api-unavailability-timeout-seconds/API-Unavailability-Timeout-Seconds-Hasrate-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/enabled/on/alarm-bottom-limit/default/restart-bottom-limit/default/alarm-seconds/20/restart-seconds/40/api-ip-address/192.168.0.1/api-port/default/api-unavailability-timeout-seconds/default
```

5.2.10.20 Setting Hash Rate with Default Parameters

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/defaults/enabled/Enabled-value/api-ip-address/API-IP-Address-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/defaults/enabled/on/api-ip-address/192.168.0.2
```

5.2.10.21 Enabling / Disabling Hash-Rate Test

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/enabled/off
```

5.2.10.22 Configuring the Alarm Bottom Limit for a Hash Rate Test

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/alarm-bottom-limit/Alarm-Bottom-Limit-Hashrate-Value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/alarm-bottom-limit/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/alarm-bottom-limit/default
```

5.2.10.23 Configuring the Restart Bottom Limit for a Hash-Rate Test

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/restart-bottom-limit/Restart-Bottom-Limit-Hashrate-Value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/restart-bottom-limit/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/restart-bottom-limit/default
```

5.2.10.24 Configuring Alarm Seconds for a Hash Rate Test

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/alarm-seconds/Timeout-Alarm-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/alarm-seconds/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/alarm-seconds/default
```

5.2.10.25 Configuring Restart Seconds for a Hash Rate Test

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/restart-seconds/Timeout-Restart-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/restart-seconds/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/restart-seconds/default
```

5.2.10.26 Configuring API IP Address for a Hash-Rate Test

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/api-ip-address/API-IP-Address-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-ip-address/192.168.1.1
```

5.2.10.27 Configuring the API Port for a Hash-Rate Test

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/api-port/API-TCP-Port-Value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-port/
123
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-port/
default
```

5.2.10.28 Configuring the API Unavailability Timeout Seconds Parameter for a Hash-Rate Test

Command:

```
PUT http://192.168.1.24:8888/api/automation/name/Automation-Name-value/hash-rate/api-
unavailability-timeout-seconds/API-Unavailability-Timeout-Seconds-Hasrate-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-
unavailability-timeout-seconds/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-
unavailability-timeout-seconds/default
```

5.2.10.29 Single Command for a Ping Test Setup

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/enabled/Enabled-value/ip-address/IP-
Address-Value/connect-timeout-seconds/Connect-Timeout-Value/upper-limit-milliseconds/
Upper-Limit-Milliseconds-Value/alarm-packet-loss-percentage/Alarm-Packet-Loss-Percentage-
Value/restart-packet-loss-percentage/Restart-Packet-Loss-Percentage-Value/alarm-seconds/
Alarm-Seconds-Value/restart-seconds/Restart-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/enabled/on/ip-
address/192.168.0.1/connect-timeout-seconds/30/upper-limit-milliseconds/20/alarm-packet-
loss-percentage/30/restart-packet-loss-percentage/70/alarm-seconds/30/restart-seconds/60
```

5.2.10.30 Enabling / disabling ping test

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/enabled/off
```

5.2.10.31 Configuring IP Address for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/ip-address/IP-Address-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/ip-address/
192.168.1.1
```

5.2.10.32 Configuring Connect Timeout Seconds for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/connect-timeout-seconds/Connect-
Timeout-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/connect-timeout-
seconds/25
```

5.2.10.33 Setting Upper Limit Milliseconds for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/upper-limit-milliseconds/Upper-Limit-
Milliseconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/upper-limit-
milliseconds/22
```

5.2.10.34 Configuring Alarm Packet Loss Percentage for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/alarm-packet-loss-percentage/Alarm-
Packet-Loss-Percentage-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/alarm-packet-
loss-percentage/33
```

5.2.10.35 Configuring Restart Packet Loss Percentage for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/restart-packet-loss-percentage/
Restart-Packet-Loss-Percentage-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/restart-packet-
loss-percentage/77
```

5.2.10.36 Configuring Alarm Seconds for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/alarm-seconds/Alarm-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/alarm-seconds/32
```

5.2.10.37 Configuring Restart Seconds for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/restart-seconds/Restart-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/restart-
seconds/62
```

5.2.10.38 Configuring the TCP Port Availability Test in One Command

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/enabled/Enabled-
value/ip-address/IP-Address-Value/port/TCP-Port-Value/connect-timeout-seconds/Connect-
Timeout-Value/alarm-seconds/Alarm-Seconds-Value/restart-seconds/Restart-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-
availability/enabled/on/ip-address/192.168.0.1/port/3333/connect-timeout-seconds/20/alarm-
seconds/30/restart-seconds/60
```

5.2.10.39 Enabling / Disabling the TCP Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-
availability/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-
availability/enabled/off
```

5.2.10.40 Configuring IP Address for a Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/ip-address/IP-
Address-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/ip-address/192.168.11.11
```

5.2.10.41 Configuring TCP Port for a Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/port/TCP-Port-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/port/2222
```

5.2.10.42 Configuring Connect Timeout Seconds for a Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/connect-timeout-seconds/Connect-Timeout-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/connect-timeout-seconds/22
```

5.2.10.43 Configuring Alarm Seconds for a Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/alarm-seconds/Alarm-Seconds-Value
```

Example:

```
 curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/alarm-seconds/33
```

5.2.10.44 Configuring Restart Seconds for a Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/restart-seconds/Restart-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/restart-seconds/63
```

5.3. JSON Return in Case of Unrecognized Command

```
{"resultOfLastCommand":"FAILED","reason":"UNKNOWN_COMMAND"}
```

5.4 Translation of Fields in JSON Returns

```
# Serial Name of the device
'sNa' => 'serialName',

# Serial Number of the device
'sNu' => 'serialNumber',

# Release Date Firmware
'fwRD' => 'firmwareReleaseDate',

# Temperature
'temp' => 'temperature',

# Active input
'aL' => 'activeLine',

# Priority Entry
'pL' => 'priorityLine',

# Indication of earth connection. At a value of 15, there is no ground, the other is
present.
'gG' => 'groundGood',

# Input variable voltage detected
'frA' => 'frequencyAvailable',

# The frequency at the input, multiplied by 100. In order to get the actual frequency the
value should be divided by 100
'fre' => 'frequency',

# Voltage
'vol' => 'voltage',

# Accumulated kilowatt hour value on input or output from the beginning of device life
'aKWh' => 'accumulatedKWh',

# Accumulated value of kilovolt-ampere-hours on input or output from the beginning of life
of the device. Negative values mean that the kilovolt-amperes were considered in the ca-
pacitive nature of the reactive load.
'aKVAh' => 'accumulatedKVAh',

# Accumulated kilowatt hour value on input or output from the beginning of the life of the
device. Negative values mean the capacitive nature of the reactive load, positive - and
the inductive nature of the reactive load
'aKVarh' => 'accumulatedKVarh',

# Administrative state of input or output
'admS' => 'adminState',
```

```
# Actual output state
'actS' => 'actualState',

# Flag of the short-circuit protection
'cbFS' => 'circuitBreakerFiredState',

# Overload flag without disconnecting output
'oAFS' => 'overcurrentAlarmFiredState',

# Overload flag with output disconnection
'oTFS' => 'overcurrentTurnOffFiredState',

# Instantaneous current
'iMa' => 'instantMilliamps',

# Instantaneous active energy in watts
'iWa' => 'instantWatts',

# Instantaneous value of the total energy in volt-amperes. Negative values indicate the
capacitive nature of the reactive load at the time of reading.
'iVA' => 'instantVAs',

# Instantaneous value of reactive energy in the var. Negative values indicate the capaci-
tive nature of the reactive load at the time of reading. Positive values mean the induc-
tive nature of the reactive load at the time of reading.
'iVar' => 'instantVars',

# Number of short-circuit protection trips
'cbFF' => 'circuitBreakerFiringFacts',

# Over current limit in milliamperes for output without disabling input
'cOALM' => 'channelOvercurrentAlarmLimitMilliamps',

# Pause to confirm current overflow before erecting the flag
'cOALS' => 'channelOvercurrentAlarmLimitSeconds',

# The number of excess current exceeding the set limit without waiting for an acknowledg-
ment pause
'cOALR' => 'channelOvercurrentAlarmLimitReached',

# The number of excess current exceeding the established limit with the expectation of a
confirming pause
'cOAF' => 'channelOvercurrentAlarmFired',

# Over current limit in milliamperes for output with disconnection of input
'cOTLM' => 'channelOvercurrentTurnOffLimitMilliamps',

# Pause to confirm current overflow before erecting the flag
'cOTLS' => 'channelOvercurrentTurnOffLimitSeconds',

# The number of excess current exceeding the set limit without waiting for an acknowledg-
ment pause
```

```
'cOTLR' => 'channelOvercurrentTurnOffLimitReached',

# The number of facts that the output is disconnected from exceeding the current limit in
excess of the set limit while waiting for a confirming pause
'cOTF' => 'channelOvercurrentTurnOffFired',

# Device model
'hwV' => 'hardwareVersion',

# Firmware version
'fwV' => 'firmwareVersion',

# Real time clock value at the time of device startup
'rtcB' => 'rtcBoot',

# Flag of necessity to return to priority input after its restoration
'fF' => 'forceFailback',

# Pause before returning to priority input after recovery
'fFDS' => 'forceFailbackDelaySeconds',

# Activity of visual indication (flashing) of input or output
'rS' => 'recognitionState',

# Flag for disabling output based on detection of current overload
'loTFS' => 'lineOvercurrentTurnOffFiredState',

# The administrative status of the power-on output
'cAS' => 'channelAdministrativeStatus',

# Pause before powering on the device
'cTOD' => 'channelTurnOnDelayOnStartup',

# The priority of output survival when input is overloaded. Outlets with large values will
be turned off before the outlets with lower values.
'cTOfIOP' => 'channelTurnOffOnInputOverloadPriority',

# Minimum allowable input voltage
'lMiV' => 'lineMinimumVoltage',

# Maximum allowable input voltage
'lMaV' => 'lineMaximumVoltage',

# Minimum input frequency
'lMiF' => 'lineMinimumFrequency',

# Maximum allowable input frequency
'lMaF' => 'lineMaximumFrequency'
```

6. Command Reference of RPCM CLI

A brief description of the section:

6.1. General Description of the Command System

6.2. Command: *help* is to Obtain Help

6.3. Commands: *exit* and *quit* — these are two analogous commands that serve to properly conclude an SSH session.

6.4. Commands: *add* and *delete* —these commands are used to create or delete entities in the RPCM management system, such as user accounts, automation settings, and so on.

6.5. Command: *restart* — for "Power Cycling" of Connected Devices

6.6. Command: *show* — Obtaining Information about the Status of RPCM and Connected Equipment

6.7. Command: show all command allows to display different parameters for many objects at once.

6.8. Command: set command — it is the main command to set the required values within the RPCM work setup.

6.9. Command: *set output* —it serves to control the outlet by setting various parameters.

6.10. Command: set *automation* — it serves to to configure the monitoring and control system (reboot) of the connected devices.

6.11. Command: *start* — it is used to run additional procedures.

6.12. Command: *whoami* — displays the name of the active user account in which the system is running.

6.13. Command: *ping* — it is used to diagnose network connections.

6.14. Command: *cancel* — it is use to cancel the update.

6.1. General Description of the Command System

The basis of the command line interface is *command*.

If necessary, the command can be successively supplemented with *options* (one or more).

At the end of the command line, specify *the parameter*, which specifies the scope or object of the application.

WARNING! The CLI command line interface uses the function of autocompletion of parameters, including during deletion. Because it is strongly recommended to avoid similar names, for example, user accounts, names of devices for automation, e-mail addresses and so on.

To avoid erroneous operation of commands due to auto-completion parameters:

- do not use similar names of devices, users, and so on;
- do not work with RPCM in poor communication conditions;
- it is also recommended to always monitor the state of the system using the *show all* command sets;
- carefully read the obsessed commands before pressing the "Enter" key.

Limit conventions:

- Frequency — min. value 46Hz, max. value 70Hz;
- Voltage — min. value 80V, max. value 576V;
- Time indicators — min. value 0 seconds, max. value 65535 seconds.

Note: The specified minimums and maximums are the maximum allowable parameters that can be used in the RPCM Smart PDU settings. Please note that the functionality of the RPCM Smart PDU guarantee stable work only if the limits specified in the technical specification for the model you are using are met. The performance of the equipment connected to the RPCM Smart PDU is determined by the technical specifications of such equipment (please refer to the documentation of the manufacturer of the connected equipment to find out the maximum allowable values).

6.2. Command *help*

6.2.1. Getting List of Commands

At the prompt, enter `help` or the question mark `?`

Example:

`help`

The return is:

```
RPCM Commands description:

  add     - add configuration for rpcm subsystems: ntp, snmp, etc.
  cancel  - cancel update procedure
  delete  - delete configuration elements for rpcm subsystems: ntp, snmp etc.
  exit    - exit from command line interface
  help    - show this help
  quit    - quit command line interface
  restart - restart outputs, internal-controller and interface-controller
  start   - start update procedure
  set     - set outputs on/off, input parameters, buzzer, etc.
  show    - show inputs, outputs, snmp, etc. information
  whoami  - show current user's username
```

6.2.2. Getting Help

After the command, enter the service word `help` or question mark `?` or simply press *Enter*. This procedure can be repeated repeatedly to obtain an exhaustive result.

Example:

`set ?`

The return is:

```
RPCM Commands description:

  set all outputs         - set all outputs state
    off                     turn them off
    on                      turn them on
  set action confirmation - set confirmation of actions for the web interface
    enabled                 to enabled
    disabled                to disabled
  set api                 - set api options
    generate-new-key        generate new API access key
    key                     enables or disables existing key
  set automation          - set automation parameters
    device-name <name>      for particular device with name
  set button control mode - set button control mode
    enabled                 to enabled
    disabled                to disabled
```

```
  set buzzer              - set buzzer state
    alternate                 make it alternate
    off                       turn it off
    on                        turn it on
    disabled                  disabled it
  set display             - set RPCM display settings
  set output 0-9          - set output 0-9 state
    off                       turn it off
    on                        turn it on
    overcurrent               tune overcurrent limits
    recognition               make it blink
    survival priority         set turn off on input overload priority
  set time                - set new time
    value                     value
    zone                      zone
    synchronization           toggle ntp synchronization
  set help                - show this help


Type 'help' to get suggestions
```

For example, we get information on `set output`

```
set output 0 ?
```

The return is:

```
RPCM Commands description:

set output 0-9 off - turn off output number 0-9
    set output 0-9 on-turn on output number 0-9
    set output 0-9 recognition - set output 0-9 recognition state
        off to off
        on to on
    set output 0-9 overcurrent - tune overcurrent limits
        alarm for alarming
        turn off for turning off
    set output 0-9 help - show this help
```

For example, get help *set output 0-9 overcurrent*

```
set output 0 overcurrent ?
```

The return is:

```
RPCM Commands description:

  set output 0-9 overcurrent alarm    - tune overcurrent alarm limits
  set output 0-9 overcurrent turn off - tune overcurrent turn off limits
  set output 0-9 overcurrent help     - show this help
```

6.2.3. Auto-completion as a simplified help

To simplify the input of commands and options in the command line, you can use auto-completion by pressing the **Tab** key twice. At the set time this function can serve as a short help as it speeds up instruction set.

For example, following the command `set output` upon twice pressing **Tab,** the system will remind you to specify the output number

```
0 1 2 3 4 5 6 7 8 9
```

Following the command `set output 0` (already with the indication of the number) upon double pressing **Tab** a hint about the available functions will appear:

```
? description help mode name off on overcurrent recognition
```

6.3. Exit commands for *exit* and *quit*

These are two analogous commands that serve to properly conclude an SSH session. Entering the command:

`exit`

or

`quit`

The running processes in this session cease, and the session is closed. To resume operation, you must re-establish the SSH connection.

6.4. Commands: *add* and *delete*

These commands are used to create or delete entities in the RPCM management system, such as user accounts, automation settings, and so on.

ATTENTION! Since the CLI command line interface uses the auto-completion function for parameters, including when deleting, it is recommended to refrain from using similar names, for example, user accounts, device names for automation, e-mail addresses, and so on.

Help displays:

```
add ?
```

The return is:

```
RPCM Commands description:

 add automation
    device-name    - add automation device
  add cloud   - add cloud registration certificate
  add mail    - add email notificiation recipients
  add ntp     - add ntp configuration item
    server        add ntp server
  add smtp    - add smtp configuration item
    server        add smtp server
  add snmp    - add snmp configuration item
    community     add snmp community
    user          add snmp user
  add user    - add local user to RPCM
  add help    - show this help
```

And the `delete` command removes what was given by Commands: add command

```
delete ?
```

A response of the system:

```
RPCM Commands description:

  delete automation
    device-name    - delete automation device
  delete mail
    recipient - delete email notification recipients
  delete ntp
    server    - delete ntp server from configuration
  delete smtp
    server    - delete smtp server from configuration
  delete snmp - delete snmp configuration item
    community     delete snmp community
    user          delete snmp user
  delete user - delete local user from RPCM
  delete help - show this help
```

6.4.1 Commands: *add automation* and *delete automation*

Serves to set or remove a device for automatic monitoring and control (reboot).

Note. For more detailed information, it is recommended to refer to the sections: *"4.11 Automation tools"* and *"5.6. Monitoring and monitoring of specialized devices for mining using RPCM"*.

Commands: add command with the `automation device` options is used to enter the device parameters for connecting to the automation system.

Required parameters:

name - the name of the new device for automation from 1 to 25 characters;

device-type - the supported type of devices is a miner device from 1 to 25 characters:

outputs - RPCM outlets numbers (can be multiple) in the format *"[0-9]"* or *"[0-9], [0-9], ..."*

Optional parameters:

description - description (comment) from 1 to 254 characters;

default - set the default values for the parameters *check-interval-seconds* and *inter-restart-interval-seconds*

check-interval-seconds - the interval of checking the installed parameters in seconds.

inter-restart-interval-seconds - the interval in seconds between reboots of the controlled device (connected to the RPCM pins)

Display help:

```
add automation ?
```

The return is:

```
RPCM Commands description:

  add automation device-name NAME device-type DEVICE-TYPE outputs OUTPUTS

                                  - adds automation for device

Required parameters:
  device-name                     - name of the new automation device,
                                      1 to 25 characters
  device-type                     - type name of the miner device,
                                      1 to 25 characters
  outputs                         - numbers of RPCM outputs
                                      ("[0-9]" or "[0-9], [0-9], ...")

Optional parameters:
  --description                   - description of the new automation device,
                                      1 to 254 characters
```

```
   --default                          - set default values for parameters
                                          check-interval-seconds
                                          and inter-restart-interval-seconds
    --check-interval-seconds           - check interval of automation tests in
                                          seconds
    --inter-restart-interval-seconds - interval between restarts of automation
                                          device in seconds

  Example:
    add automation device-name Name device-type Bitmain_D3 outputs "1, 2, 4" --d
escription TestDevice --default
    add automation device-name Name device-type Bitmain_D3 outputs "1" --descrip
tion TestDevice --default
    add automation device-name Name device-type Bitmain_D3 outputs "1" --descrip
tion TestDevice --check-interval-seconds 10 --inter-restart-interval-seconds 100

Type 'help' to get suggestions
```

The `delete` command with the `automation device` option is used to disconnect the device from the automation and control system RPCM.

After applying the command, the device will not be loaded when critical parameters are accessed.

Required parameters:

- *name* - the name of the new device for automation from 1 to 25 characters.

Display help:

```
delete automation ?
```

The return is:

```
delete automation device-name - device name to delete configured automation
for

Type 'help' to get suggestions
```

6.4.2 Deleting with autocompletion

Autocompletion of a parameter, for example, the device name for monitoring or the name of the account in some cases helps to speed up the work, but sometimes it can lead to undesirable consequences. For example, when executing a delete command.

IMPORTANT! Removal is done without confirmation.

If the specified value matches the already existing parameter, pressing the "Tab" key is not required. Auto-completion will work immediately when you press the Enter key.

You need to carefully consider the removal procedure and carefully check which objects are to be deleted.

Remove the automation device *"DEVICE-12"* by using autocompletion.

List the available devices with the command show all automations.

The return is:

```
ID Name Device Type Outputs
------------------------------------------------------------------------
2 DEVICE-2 Bitmain_D3 2
6 DEVICE-12 Bitmain_D3 2

Type 'help' to get suggestions
```

Since we have two devices with similar names: "*DEVICE-2*" and "*DEVICE-12*". When deleting the desired element with autocompletion, you must enter a unique combination of symbols, the determinant. In this case, it will be "*DEVICE-1*".

To delete, just enter the command `delete automation device-name DEVICE-1`

The return is:

```
Automation Device ID: 6, Name: 'DEVICE-12' has been deleted

Type 'help' to get suggestions

AntiGeroy [10.210.1.24] 2 rpcmadmin>
```

Output all devices with `show all automations`

The return is:

```
 show all automations
ID Name Device Type Outputs
------------------------------------------------------------------------
2 DEVICE-2 Bitmain_D3 2
14 DEVICE-1 Bitmain_D3 0
15 DEVICE-10 Bitmain_D3 9

Type 'help' to get suggestions
```

Remove the device "*DEVICE-1*"

```
delete automation device-name DEVICE-1
```

The return is:

```
Automation Device ID: 14, Name: 'DEVICE-1' has been deleted

Type 'help' to get suggestions
```

If we enter the same command again:

```
delete automation device-name DEVICE-1
```

Device "*DEVICE-10*" will be deleted, without asking for confirmation:

```
Automation Device ID: 15, Name: 'DEVICE-10' has been deleted

Type 'help' to get suggestions
```

Such a scenario occurs, for example, when there is a bad connection, when the response of the interface is "delayed" by the commands entered. Also such situations occur when incorrect input of a non-existent parameter.

Returning to the previous version, when we have two devices "*DEVICE-2*" and "*DEVICE-12*".

If you need to delete "*DEVICE-2*", but by mistake entered "*DEVICE-1*" (the "1" key was pressed instead of the "2" key), then the `delete automation device-name DEVICE-1` command did not will give an error message, and delete "*DEVICE-12*".

6.4.3 Command *add cloud*

This command submit offline registration data form RCNTEC.

Help ask:

```
add cloud ?
```

The return is:

```
    add cloud certificate   - command to submit offline registration data
                              from RCNTEC


Type 'help' to get suggestions
```

6.4.4 Commands: *add mail* and *delete mail*

These commands are used to set or delete the recipient of an alert by e-mail.

Commands: `add mail` is used to enter the recipient's requisites for sending e-mail messages.

Used parameters:

recipient — main recipient;

--cc — address for sending a carbon copy;

--bcc — address for sending a blind carbon copy.

The return is:

```
 add mail ?
```

The return is:

```
Please add email recipients, example:
  add mail recipient info@example.com --cc "duty@example.com, ivan@example.com" --bcc "se-
curity@example.com"
```

Example of use:

```
add mail recipient user@yandex.ru
```

The return is:

```
Email recipient added
```

The command `delete mail` is used to delete the details of the specified recipient.

Help displays:

```
delete mail recipient ?
```

The return is:

```
RPCM Commands:
delete mail recipient <email@example.com> - delete email notification recipient
```

Example of use:

```
delete mail recipient user@yandex.ru
```

The return regarding deletion of recipient:

```
Recipient user@yandex.ru deleted
```

6.4.5 Commands: *add ntp server* and *delete ntp server*

Commands: `add ntp server` is used to specify the NTP server (time service).

The `delete` command with the `ntp server` is used to remove the NTP server (time service) from the RCPM settings.

The argument specifies the IP address or server name.

The help for the commands `add ntp server ?` Or `delete ntp server ?` Is the same:

```
Please specify valid IP address or hostname
```

Example. Creating an NTP server with IP 192.168.1.251

```
add ntp server 192.168.1.251
```

The return is:

```
Server 192.168.1.251 has been added
```

To remove the NTP server from IP 192.168.1.251:

```
delete ntp server 192.168.1.251
```

```
Server has been deleted
```

6.4.6 Commands: *add smtp server* and *delete smtp server*

These commands are used to set or delete the notification system settings by e-mail.

Commands: `add smtp server` is used to add a group of parameters required for sending e-mail messages.

The command `delete smtp server` is used to delete a group of parameters for the specified smtp server.

These options are available for `add smtp server`:

Required

Server — server address: IP or hostname (short name or FQDN) from 5 to 128 characters long;

Port — TCP port number from 1 to 65535.

Additional:

Helo — indicator of the sender's domain in FQDN format up to 128 characters;

Username — username used for server authentication and used as the "From:" field, up to 32 characters;

Password — password of the user account used for server authentication, up to 32 characters;

AuthType — authentication method by the server. Standard values for the SMTP protocol are used: PLAIN, LOGIN, CRAM_MD5;

SSL — encryption parameter; the default values are: enable, disable, enable-dontverify-cert.

The return is:

```
add smtp server ?
```

The return is:

```
Required parameters:
Server   - address must be an ip address or hostname, 5 to 128 characters
Port     - TCP port number from 1 to 65535

Optional parameters:
Helo     - domain is optional, however if provided it must be FQDN of
           your domain, up to 128 characters
Username - username used for authentication with server, up to 255 characters
Password - password for server authentication, up to 255 characters
AuthType - authentication type used for server: PLAIN, LOGIN, CRAM_MD5
     SSL - encryption parameter: enable, disable, enable-dontverify-cert, tls
    From - from field in the notification message, up to 255 characters
```

Example:

```
add smtp server smtp.gmail.com port 587 --helo gmail.com --username user@gmail.com --pass-
word HelloWorld123 --authType plain --ssl enable
```

```
add smtp server smtp.yandex.ru port 25 --username user@yandex.ru --password MyPassword --
authType plain --helo yandex.ru --ssl enable
add smtp server smtp.example.com port 25 --username user --password password --authType
plain --helo example.com --ssl enable --from info@example.com


Type 'help' to get suggestions
```

Please note that at the very bottom of the help output is an expanded example for the Yandex.-Mail email:

```
add smtp server smtp.yandex.ru port 25 --username user@yandex.ru --password MyPassword --
authType plain --helo yandex.ru --ssl enable –from user@yandex.ru
```

If the command is entered correctly, the system will return:

```
SMTP server added or existing one updated
```

The command `delete smtp server` deletes the connection data to the specified smtp server.

The return is:

```
delete smtp server ?
```

The return is:

```
    RPCM Commands:
    delete smtp server <server> - delete smtp server from configuration
```

Example of use:

```
delete smtp server smtp.yandex.ru
```

The return is:

```
Server smtp.yandex.ru deleted
```

6.4.7 Commands: *add* and *delete* with *snmp*

Additional information.

The first version of the protocol *SNMPv1* is organized most simply and least safely. The basis of *SNMPv1* security is the Community-based Security Model, i.e. authentication based on a single text string-a kind of group name and a two-in-one password (there is even the term *"community- string"*). In fact, the name *community* and this is a kind of password. This "key" is broadcast in the body of the message in clear text. *Community* are of two types: *read-only* (read only values of variables) and *read-write* (reading and writing values of variables). Despite the low level of security, *SNMPv1* due to the ease of implementation is still in use.

SNMP version 2 in the latest release *SNMPv2c* also uses *Community-based Security,* however, owing to the changes introduced in it, the performance of the protocol is significantly improved, and security improvements are also made.

The third version of the protocol *SNMPv3* already supports *User-based Security Model* and *traffic encryption*.

By default, the Resilient Power Control Module contains *community — "public"* with read-write access.

Note. The SNMP community name is case sensitive.

The help for available options for `add snmp` and `delete snmp` is shown below.

```
add snmp ?
```

Help displays:

```
RPCM Commands description:

  add snmp community - add specific SNMPv2 command
  add snmp trap      - add SNMP Trap command
  add snmp user      - add specific SNMPv3 user
  add snmp help      - show this help


Type 'help' to get suggestions
    community - add specific SNMPv2 command
```

And

```
delete snmp ?
```

```
RPCM Commands description:

  delete snmp community - delete specific SNMPv2 command
  delete snmp trap      - delete specific SNMP Trap command
  delete snmp user      - delete specific SNMPv3 user
  delete snmp help      - show this help


Type 'help' to get suggestions
    community - delete specific SNMPv2 command
```

6.4.7.1. Commands: *add* and *delete* with *snmp community*

Commands: `add snmp community` and `delete snmp community` is used for the creating SNMP community for SNMPv1 and SNMPv2c protocols.

When you create one, the required parameters are filled in:

--accessList — allowed subnet or a separate IP address;

--accessType — access type, `ro` or `rw` values are used;

--enabled — newly created community will be enabled or disabled (this property can be changed later), respectively *yes* or *no* values are available.

Note! You can use auto-hint by tabbing twice.

```
add snmp community public
```

```
--accessList --accessType --enabled
Type 'help' to get suggestions
```

Example: creating community *public*

For example, *--accessList* have the value * 10.0.0.0 / 8 *;* --accessType * has the value *rw* and *--enabled - no*

```
add snmp community public --accessList 10.0.0.0/8 --accessType rw --enabled no
```

The return is:

```
Community public added.
```

The command `delete snmp community` is for deleting a community using the SNMP v1 and v2c protocol.

To delete, just specify the name community.

Example: Deleting the community *public*

```
delete snmp community public
```

The return is:

```
Community public deleted.
```

6.4.7.2 The commands: *add* and *delete* with *snmp user*

Additional information. SNMPv3 can have the security level:

authPriv — authentication and encryption, the maximum level of security (access with password authentication Auth Password — method HMAC-MD5-96, and with AES-128 encryption by Priv Password key.)

Commands: add and `delete` with the `snmp user` to create a user account using the *SNMPv3 protocol*

When you create the required parameters are filled in:

--accessList — the allowed subnet or a separate IP address;

--accessType — access type, the values of `ro` or `rw` are used;

--authPass — SNMP user account password string;

--authProt — used authentication protocol by password;

--enabled — the newly created account will be enabled or disabled (this property can be changed later), respectively *yes* or *no*;

--privPass — keyword (password) for encryption;

--privProt — type of encryption;

--secLevel — type of authentication.

Attention! There is no standard help output for this command. You can use auto-hint with double-tabbing.

```
add snmp user newrpcmuser
```

Only after the second press of Tab does auto-hint appear:

```
No user options specified for user: newrpcmuser
Example: add snmp user newrpcmuser --accessList 10.0.0.0/24 --accessType ro --authPass
deadbeef --privPass deadbeef --authProt sha1 --privProt aes --secLevel authPriv --enabled
yes
Type 'help' to get suggestions
```

Example: Creating the SNMPv3 account *newrpcmuser*

For example *--accessList* have the value *10.0.0.0/8*;

--accessType — rw;

--enabled — no;

--authPass — AuthPa$$w0rd;

--authProt — sha1;

--privPass — Pr1vPa$$w0rd;

--privProt — aes;

--secLevel — authPriv.

The command to create an SNMPv3 *newrpcmuser* account with the specified parameters:

```
 add snmp user newrpcmuser --accessList 10.0.0.0/8 --accessType rw --authPass AuthPa$$w0rd
--authProt sha1 --enabled no --privPass Pr1vPa$$w0rd --privProt aes --secLevel authPriv
```

The return is:

```
User newrpcmuser added.
```

The `delete` command with the `snmp` `user is for deleting a user account in the *SNMPv3* framework.

To delete, just specify the name of the SNMPv3 user account.

Example: Deleting the SNMPv3 account *newrpcmuser*

```
delete snmp user newrpcmuser
```

The return is:

```
User newrpcmuser deleted.
```

6.4.7.3 Commands: *add* and *delete* with *snmp trap*

Additional information:

An SNMP trap is a special message, which is sent by the SNMP agent to the receiver (monitoring server). Such messages are sent to alert the administrator about critical events, e.g., a short circuit, outlet turn of due to overcurrent and so on.

The commands: `add snmp trap` and `delete snmp trap` are for creating and deleting creates SNMP trap settings .

Help ask:

```
add snmp trap v1 destination ?
```

The return is:

```
Please set ip address of server which will catch traps and community string
```

Example: `add snmp trap v1 destination 192.168.1.100 port 162 community public --enabled yes`

To create the target settings, you must specify the following parameters:

v1 — SNMP version is not a configurable constant, always set to *v1*;

destination — IP address of the message receiver (monitoring server), e.g. 192.168.1.100;

port — number of the TCP port that the receiver listens, the default is 162;

community — name of the community according to the SNMP v1/2c authorization scheme.

Example: Entering values from the prompt (see above)

```
add snmp trap v1 destination 192.168.1.100 port 162 community public --enabled yes
```

The return is:

```
SNMP Trap added
```

The command `delete snmp trap` deletes the created target settings for SNMP Trap

The return is:

```
delete snmp trap ?
```

In the return, the system displays a prompt with a suggestion to remove the available SNMP Trap target settings:

```
Please provide existing destination to delete: 192.168.1.100:162
```

Deletion these goal settings:

```
delete snmp trap 192.168.1.100: 162
```

Confirmation of deletion:

```
Trap destination 192.168.1.100:162 deleted
```

6.4.8 Commands: *add* and *delete* of *user* and *group*

6.4.8.1 Create and delete user

Command: add `user`.

Help ask: `add user ?`:

The return is:

```
Username should start with letter, numbers, underscores or hyphens and be 2 to 32 charac-
ters long
```

Command: `delete user`.

Help ask:

```
delete user ?
```

```
The return is:
```

```
Please provide username of existing users
```

Example. Creating and deleting a user *testuser*

To create user:

```
 add user testuser
```

The return is:

```
Please enter password:
Please enter password again for confirmation:
User 'testuser' has been added
```

To delete the user:

```
delete user testuser
```

The return is:

```
User 'testuser' has been deleted.
```

6.4.8.2 Create and delete a group

Help ask:

```
 add group ?
```

The return is:

```
Please provide groupname to add
```

Help ask:

```
delete group ?
```

The return is:

```
Please provide username of one of existing users
```

Example. Create and delete *tescli2*.

To create group:

```
add group testcli2
```

The return is:

```
Group testcli2 added with default permissions, please dont forget to adjust them
```

To delete group:

```
delete group testcli2
```

The return is:

```
Group testcli2 is deleted.
```

6.4.9 *Add* and *delete* with *radius server*

Commands: add and *delete* with the radius server are used to create and delete a RADIUS authentication/authorization server entry.

When creating, the required parameters are filled in:

IP or FQDN of the RADIUS server;

secret <access key>, may include letters, numbers and punctuation marks from 8 to 128 characters;

Extra options:

--port — <0-65534> — a port for work with the RADIUS server;

--priority — value <0-65534> — if several RADIUS servers are specified, priority is set for use;

--use-vsa-group — "yes" or "no" to use group attributes;

--use-vsa-session-timeout — "yes" or "no" to use session attributes;

--enabled — "yes" or "no" — the newly created RADIUS entry will be allowed or denied use.

Help request:

```
add radius server 192.169.1.1 ?
```

The return is:

```
RPCM Commands description:

  add radius server <ip> secret <secret>   - add radius-server
                                             shared secret can contain
                                             alphanumeric, punctuation,
                                             minimum 8 maximum 128 characters
      --port                    <0-65534>  - radius server's UDP port
                                             (1812 by default)
```

```
    --enabled                 <yes|no>   - is server enabled
                                           (no by default)
    --use-vsa-group           <yes|no>   - use incoming group attribute
    --use-vsa-session-timeout <yes|no>   - use incoming session
                                           timeout attribute
    --priority                <1-100>    - server usage priority
                                           higher is more priority

  Example: add radius server 1.2.3.4 secret mySharedSecret --enabled yes
           add radius server 1.2.3.4 secret mySuperSecretShared --port 1812--
```

Example: It is creating a server with IP 192.168.1.1 with the keyword *secret mySharedSecret* with priority 1, port 1812, initially allowed for use, --accessList be 10.0.0.0/8; --accessType is rw and --enabled — no.

```
add radius server 1.2.3.4 secret mySuperSecretShared --port 1812 --enabled yes
```

The return is:

```
Radius server was 192.168.1.1 added
```

To remove it, you need to specify the name or IP RADIUS server.

Example: removing the RADIUS server 192.168.1.1.

```
delete radius server 192.169.1.1
```

The return is:

```
Server 192.168.1.1 was deleted
```

6.5. Command *restart*

This command is used to reset (reboot) the following devices:

- internal RPCM controllers;
- external devices connected to the RPCM outlets.

6.5.1. Command *restart output*

This allows you to restart the device (provided that the connected device allows it and the correct settings are configured on it).

Additional options are available for the `restart` command:

--after — delay before restart;

--off-delay— delay for turn on power supply.

Help displays:

```
restart ?
```

The return is:

```
RPCM Commands description:

  restart output 0-9 - restart output
    --after [0-9] + [mshd]? option to delay restart
    --off-delay [0-9] + [mshd]? option to set off delay
  restart help - show this help
```

An example of applying the command `restart output` to the output *0*

```
restart output 0
```

```
Restarting output 0 after 0 seconds with off delay 3 seconds

[o ... O]
```

After executing the command, the system displays information on the status of all outlets:

```
[Output 0]: ON <admin: ON> 0mA 0W
[Output 1]: ON <admin: ON> 0mA 0W
[Output 2]: ON <admin: ON> 0mA 0W
[Output 3]: ON <admin: ON> 0mA 0W
[Output 4]: ON <admin: ON> 0mA 0W
[Output 5]: ON <admin: ON> 0mA 0W
[Output 6]: ON <admin: ON> 0mA 0W
[Output 7]: ON <admin: ON> 0mA 0W
[Output 8]: ON <admin: ON> 0mA 0W
[Output 9]: ON <admin: ON> 0mA 0W
```

ATTENTION! Using the `restart output` design with the outlet number and the `?` Character (with the word `help`) will also cause the outlet to reset! A hint in this option is not displayed.

6.5.2. Command *restart high-level-controller*

Additional information. RPCM uses 3 controllers:

High Level Controller (HLC), where is the software is running,

Low Level Controller (LLC), which operates under the firmware

Display Controller, where the Display Firmware is running.

Low Level Controller is responsible for electronic operations such as input and outlet management, ATS (except RPCM ME 1563), meters, overload and short circuit protection. *Low Level Controller* works under the control of *Firmware*.

High Level Controller responsible for the user interface, including web interface, SSH CLI, REST API, SNMP and so on. *High Level Controller* runs under *Software*.

Display Controller is responsible for external indication.

For the user available is the option:

```
restart
```

This command is used to restart *HLC*, for example, during the update procedure.

In return, the system issues a request to confirm the reset:

```
Please enter 'RESTART' (ALL CAPS MANDATORY) and press ENTER to restart High Level Con-
troller immediately, or anything else to cancel:
```

After entering the command:

```
RESTART
```

You will receive a proposal to restart the SSH CLI session:

```
Please disconnect your SSH session manually... Restarting High Level Controller in 5 sec-
onds ...
```

WARNING! If the mode of obtaining an IP address is via DHCP or by means of auto-assignment (Zero Configuration Networking), then the IP address after the reset may change.

To prevent this situation, we recommend using the binding function to bind IP address to the MAC address on the DHCP server.

For information on the operation of this design, refer to section "*4.7. Updating the RPCM software*".

6.6. Command *show* — Information about the Status of RPCM

6.6.1 General Information about the show command

Below is a brief list of the options:

- **action confirmation** — show confirmation of critical actions for the web-interface;
- **active users** — list of users connected to the management system;
- **all** — data on items on the majority of system objects;
- **api**— displays information about REST API state and authentication setup;
- **automation device** — displays information about device, if it is connected to the RPCM automation system for monitoring and control purposes (reboot);
- **cloud** — displays parameters for interaction with the centralized ("cloud") RPCM control system — RPCM.CLOUD;
- **button-control** — displays show button control mode;
- **configuration —** displays configuration restoration statuses;
- **show display —** displays RPCM display settings;
- **everything** — displays information about the state of the system;
- **group —** displays information about specific groups and permissions;
- **input 1-2** — data about the status of inputs *1 - 2*;
- **show logs** — show RPCM logs
- **mail recipients** — show configured mail recipients for alerts;
- **nearby-devices** — show another RPCM in this network, which are accessible and can be detected via *Bonjour* protocol
- **network** — displays network settings and details;
- **ntp** — displays ntp settings;
- **output 0-9** — data on the status of the outputs *0 – 9*;
- **radius servers** — an information radius server;
- **temperature** — value of internal temperature RPCM;
- **time** — It displays the value of the system time or a list of time zones;
- **update** — show RPCM software update information;
- **user** — shows the detailed information about the user, including the list of entered commands;

- **version** — firmware version and system time;
- **help** — Help displays. You can also use the question mark ?

6.6.2 Using *show help*

General view (example):

```
show ?
```

System answer:

```
RPCM Commands description:

show action-confirmation - show confirmation of actions for the web interface
show active
  users                  - show users and sessions currently logged in
show all                 - show information about all inputs, outputs
                             counters, automations, groups or users
show api                 - show REST API state and authentication setup
show automation
  device-name <name>     - show automation configured for device name
show cloud               - show RPCM.CLOUD related information
show configuration       - show configuration restoration statuses
show button-control      - show button control mode
show display             - show RPCM display settings
show everything          - show everything important in one screen
show group <groupname>   - show information about specific group
show input 1
                         - show information on particular input
show logs                - show RPCM logs
show mail
  recipients             - show configured mail recipients
show nearby-devices      - show nearby devices detected via bonjour
show network             - show network settings and details
show ntp                 - show ntp settings
show output 0-9          - show information on particular output
show radius server       - show detailed information about
                             specific radius server
show smtp                - show SMTP mail servers configuration and
                             list of notification recipients
show snmp                - show SNMP configuration
show temperature         - show RPCM internal temperature
show time                - show RPCM time configuration
show version             - show RPCM software version and system time
show update              - show RPCM software update information
show user <username>     - show detailed user information
  history                  - show commands history of user
show help                - show this help

Type 'help' to get suggestions
```

6.6.3 Command *show action-confirmation*

It show a status of critical operations confirmation: disconnecting and resetting power outlets. In the web interface, this function corresponds to the setting in the menu *Configuration -> Global option -> Get second confirmation from user for Turn Off/Reset requests:.*

Example:

```
show action-confirmation
```

The return is:

```
Confirmation of actions for the web interface is enabled
Type 'help' to get suggestions
```

6.6.4 Command *show active users*

It displays a list of users who are connected to the management system.

Example:

```
show active users
```

The return is:

```
------------------------------------------------------------------------------
        [Record ID]: 1
         [Username]: rpcmadmin
            [Group]: superuser
       [IP Address]: 10.213.68.28
         [Interface]: WEB
    [Authenticator]: local
          [Expires]: 2020-09-17 19:29:08
             [Idle]: 28466s
       [Session ID]: 20200917152908__10_213_68_28__local__eaed174e
------------------------------------------------------------------------------
        [Record ID]: 2
         [Username]: rpcmadmin
            [Group]: superuser
       [IP Address]: 10.213.68.28
         [Interface]: WEB
    [Authenticator]: local
          [Expires]: 2020-09-17 19:29:08
             [Idle]: 28466s
       [Session ID]: 20200917152908__10_213_68_28__local__16b8a9da
------------------------------------------------------------------------------
        [Record ID]: 3
         [Username]: rpcmadmin
            [Group]: superuser
       [IP Address]: 10.213.97.208
         [Interface]: ssh
    [Authenticator]: local
          [Expires]: 2020-09-18 03:23:34
             [Idle]: 0s
```

```
      [Session ID]: 20200917232321__10_213_97_208__local__a5294753
--------------------------------------------------------------------------------

Type 'help' to get suggestions
```

6.6.5 Command *show api*

It is used for display information about REST API setting.

Information:

- *API Interface enabled / disabled*
- *API Authentication enabled / disabled*
- *Key* — a key value.

Command:

```
show api
```

The return is:

```
     API Interface:                                                    enabled
API Authentication:                                                   disabled
--------------------------------------------------------------------------------
               Key: 97d2cd29b113084d85a19318e4ac7ef5                   enabled

Type 'help' to get suggestions
```

6.6.6 Command *show automation*

Displays information about device, if it is connected to the RPCM automation system for monitoring and control purposes (reboot).

Note. For more detailed information, it is recommended to refer to the sections: *"4.11 Automation tools"* .

Required parameters:

- *name* — the name of the new device for automation from 1 to 25 characters;

Display help:

```
show automation ?
```

Answer system

```
    show automations device-name - device name to show configured automation for

Type 'help' to get suggestions
```

Note. The value of the parameter *name* should be clarified using the `show all automation` command. For more details, see" 6.7. Structure *show all*- show *command all* "

Example. Suppose you need to display information about the device with the name Antminer_S9.

Use the command:

```
show automation device name Antminer_S9
```

The return is:

```
                                        [ID]: 2
                                [Device Type]: Bitmain_S9
                                       [Name]: Antminer_S9
                                [Description]:
                                    [Outputs]: 1
                      [Check Interval Seconds]: 6
              [Inter Restart Interval Seconds]: 600
                    [Consumption Test Enabled]: OFF
                      [Hash Rate Test Enabled]: ON
                [Hash Rate Alarm Bottom Limit]: 13500
              [Hash Rate Restart Bottom Limit]: 13300
                     [Hash Rate Alarm Seconds]: 60
                   [Hash Rate Restart Seconds]: 300
                    [Hash Rate API IP Address]: 192.168.1.93
                          [Hash Rate API Port]: 4028
  [Hash Rate API Unavailability Timeout Sec.]: 3
                           [Ping Test Enabled]: OFF
         [TCP Port Availability Test Enabled]: OFF

Type 'help' to get suggestions
```

6.6.7 Command *show button-control*

It displays permission for switch to Control mode on the front panel.

Command:

```
show button-control
```

The return is:

```
Button control mode is enabled

Type 'help' to get suggestions
```

6.6.8 Command *show cloud*

This command displays parameters for interaction with the centralized ("cloud") RPCM control system — RPCM.CLOUD

Example:

```
show cloud
```

The return is:

```
RPCM.CLOUD Information
--------------------------------------------------------------------------------
Telemetry export to cloud: enabled
      Registration status: registered
     Cloud session status: connected

Type 'help' to get suggestions
```

6.6.9 Command *show configuration*

This command displays a status of restoring from a backup confuguration .

Help ask:

```
show configuration ?
```

The return is:

```
  show configuration restore status      - show current status of
                                           configuration restoration
  show configuration last restore result - show the result of the last
                                           configuration restore

Type 'help' to get suggestions
```

6.6.9.1 Command *show configuration restore status*

This command displays a status of restore RPCM configuration from a backup file or "Idle" if there no restore processes.

Command:

```
show configuration restore status
```

The return is:

```
Idle
Examples:
- to upload configuration file
  scp RPCM_FirstBatchSeven_20181128_194640.config
rpcmadmin@10.0.0.1:RPCM_FirstBatchSeven_20181128_194640.config
- to download configuration file
  scp rpcmadmin@10.0.0.1:config ./
```

6.6.9.2 Command *show configuration last restore result*

This command displays a result of last restore processes.

```
show configuration last restore result
```

The return is:

```
No data on the last restore result

Type 'help' to get suggestions
```

6.6.10 Command *show display*

It shows the messages set on the hardware display of the device.

Available options:

- *user message* — sets a custom message;
- *default message* — allows you to select data to be shown on the display by default.

Default message content may be following :

- *voltage,*
- *current,*
- *power,*
- *ipAddress,*
- *macAddress,*
- *serialName,*
- *serialNumber,*
- *userMessage.*

Help ask:

```
show display?
```

The return is:

```
  show display user message - show custom message to be displayed
  show display default message - show parameter that will be displayed

Type 'help' to get suggestions
```

Example 1. Show user message.

Command:

```
show display user message
```

The return is:

```
[User Message]: 'RPCM-FOR-NETWORK'
       [Color]: green

Type 'help' to get suggestions
```

Example 2. Get information, what is default message.

Command:

```
show display default message ?
```

The return is:

```
'voltage' is now displayed

Type 'help' to get suggestions
```

6.6.11 Command *show everything*

It displays general information about the system status.

Data on the status of inputs and outlets, grounding, internal temperature of the device, and the load at each outlet are presented. Also, service information about the serial number, serial name, firmware version and software are displayed.

Example:

```
show everything
```

The return is:

```
           [Serial Name]: AntiGeroy                [Temperature]: 26C
         [Serial Number]: RU2017101100000002MO01DN01    [Ground]: GOOD
      [Firmware Version]: 0.9.748        [Firmware Release Date]: 20190528215402
      [Software Version]: 0.7.100        [Software Release Date]: 20190610154514
[Model/Hardware Version]: 1502/RPCM                    [Uptime]: 36d+11:41:00
        [Force Failback]: OFF        [Failback Delay in Seconds]: 0
--------------------------------------------------------------------------------
 (P<->N) [Input 1]: 224V @ 50.01Hz    0.274A   0.033KW (ACTIVE, PRIORITY)
         [Input 2]:   0V @  0.00Hz    0.000A   0.000KW
 (P<->N) SWAP INPUT PHASE AND NEUTRAL WIRES TO BE ABLE
         TO CATCH SHORT CIRCUITS TO PROTECTIVE EARTHING
--------------------------------------------------------------------------------
        [Output 0]:   ON <admin:  ON>     0mA      0W
        [Output 1]:   ON <admin:  ON>     0mA      0W
        [Output 2]:  OFF <admin:  ON>     0mA      0W  (SHORT)
        [Output 3]:   ON <admin:  ON>   274mA     33W  (OVERLOAD)
        [Output 4]:   ON <admin:  ON>     0mA      0W
        [Output 5]:  OFF <admin: OFF>     0mA      0W
        [Output 6]:   ON <admin:  ON>     0mA      0W
        [Output 7]:   ON <admin:  ON>     0mA      0W
        [Output 8]:   ON <admin:  ON>     0mA      0W
        [Output 9]:  OFF <admin:  ON>     0mA      0W  (SHORT)

Type 'help' to get suggestions
```

6.6.12 Command *show group*

It display an information about group permissions settings by the classical UNIX scheme: Read-Write-eXecute.

Parameter: *group name*.

Help ask:

```
show group ?
```

The return is:

```
Please provide group name..

Type 'help' to get suggestions
```

Example. Show permissions for *new_group.*

Command:

```
show group new_group
```

The return is:

```
           [Groupname]: new_group
--------------------------------------------------------------------------------
[Grobal configuration]: Read access
              [Inputs]: Read access, Write access
            [Output 0]: Read access, Write access
            [Output 1]: Read access, Write access
            [Output 2]: Read access, Write access
            [Output 3]: Read access, Write access
            [Output 4]: Read access, Write access
            [Output 5]: Read access, Write access
            [Output 6]: Read access, Write access
            [Output 7]: Read access, Write access
            [Output 8]: Read access, Write access
            [Output 9]: Read access, Write access
         [System Logs]: Read access
          [Automation]: Read access, Write access
           [Utilities]: Execution access

Type 'help' to get suggestions
```

6.6.13 Command *show input*

It displays information about the status of inputs.

As a parameter it is required to specify the number of input: *1* or *2*

Example:

```
show input 1
```

The return is:

```
 (P<->N)                  [Input]: 1
                           [Name]: name_num_1
                    [Description]: faza1 na stenke
                        [Voltage]: 224
       [Minimum Allowed Voltage]: 200
       [Maximum Allowed Voltage]: 250
                      [Frequency]: 50.00
     [Minimum Allowed Frequency]: 49.90
     [Maximum Allowed Frequency]: 65.00
   [Maximum Allowed Current Amps]: 16
              [Instant Milliamps]: 328
                  [Instant Watts]: 50
                [Accumulated KWh]: 818.527526
               [Accumulated KVAh]: 652.735290
              [Accumulated KVarh]: -1434.435302

 (P<->N) SWAP INPUT PHASE AND NEUTRAL WIRES TO BE ABLE
         TO CATCH SHORT CIRCUITS TO PROTECTIVE EARTHING


Type 'help' to get suggestions
```

6.6.14 Command show *logs*

Displays the system messages — logs.

Get help:

show logs ?

The return is:

```
RPCM Commands description:

show logs             - show all RPCM logs
  --since <date>      - show logs since date
  --severity <level> - show logs with severity level
  --include <string> - show logs that include a string
  --exclude <string> - show logs that do not include a string
  --reverse           - show logs in reverse order
show logs help        - show this help


Type 'help' to get suggestions
```

Parameters:

--since <date> — display log entries from the specified date;

--severity <level> —show log entries the selected severity level;

--include <string> — show log entries that include the specified expression (character string);

--exclude <string> — show log entries that do not include the specified expression (character string);

--reverse — show log records in reverse order;

If no parameter is specified, all log entries are displayed.

The information is displayed on the page, at the end of each page the following message is displayed: *"Press 'space' for next page or press 'q' to quit ..."*

You can continue the output by pressing the **"Space"** key stop the output by pressing the key **"Q"**.

Example 1. Display all records:

```
show logs
```

The return is:

```
Time Severity Message
------------------------------------------------- --------------------
2018-09-03 20: 01: 21.648 informational RPCM has started.
2018-09-03 20: 01: 34.644 informational User x@192.168.7.79 authentication failed via ssh
2018-09-03 20: 01: 35.621 informational User x@192.168.7.79 authentication failed via ssh
2018-09-03 20: 01: 35.868 informational User x@192.168.7.79 authentication failed via ssh
2018-09-03 20: 01: 43.935 informational User rpcmadmin@192.168.7.79 authenticated success-
fully via ssh
2018-09-03 20: 02: 47.022 notice User x has been added by rpcmadmin@192.168.7.79 via CLI
2018-09-03 20: 02: 49.818 informational User rpcmadmin@192.168.7.79 logged out
2018-09-03 20: 02: 53.745 informational User x@192.168.7.79 authenticated successfully via
ssh
2018-09-03 20: 04: 05.247 informational User rpcmadmin@192.168.66.252 authenticated suc-
cessfully via WEB
2018-09-03 20: 04: 58.084 informational User x@192.168.66.252 authenticated successfully
via ssh
2018-09-03 20: 05: 13.932 notice User x@192.168.7.79 via CLI has been set API Authentica-
tion to: ON
2018-09-03 20: 05: 35.559 notice Added Monitored Device ID: 1, name: test by
x@192.168.66.252 via CLI
Press 'space' for next page or press 'q' to quit ...
```

Example 2. Display of all records starting from the date 2020-01-01, the level of the message character is "notice".

Command:

```
show logs --since 2020-09-03 --severity informational --include User
```

The return is:

```
Time                      Severity       Message
-------------------------------------------------------------------------------
2020-09-03 19:00:15.654  informational  User rpcmadmin@10.213.66.36 authenticated success-
fully via WEB by local with session id 20200903160015__10_213_66_36__local__c73cf78f
2020-09-04 07:29:53.767  informational  User rpcmadmin@10.210.1.148 authenticated success-
fully via WEB by local with session id 20200904042952__10_210_1_148__local__a2647950
```

```
2020-09-04 07:36:00.556  informational  User rpcmadmin@10.210.1.148 authenticated success-
fully via ssh by local with session id 20200904043600__10_210_1_148__local__d00a00c1
2020-09-04 08:18:07.619  informational  User rpcmadmin@10.210.1.148 logged out
2020-09-04 08:35:49.541  informational  User rpcmadmin@10.213.117.156 authenticated suc-
cessfully via WEB by local with session id 20200904053549__10_213_117_156__local__c7be98a0
2020-09-04 08:38:32.791  informational  User rpcmadmin@10.213.117.156 authenticated suc-
cessfully via WEB by local with session id 20200904053832__10_213_117_156__local__3c754c44
2020-09-04 08:40:54.364  informational  User rpcmadmin@10.210.1.148 authenticated success-
fully via WEB by local with session id 20200904054054__10_210_1_148__local__0064b197
2020-09-04 08:56:20.821  informational  User rpcmadmin@10.210.1.148 authenticated success-
fully via WEB by local with session id 20200904055620__10_210_1_148__local__43f6b6fa
2020-09-04 09:11:05.645  informational  User rpcmadmin@10.210.1.148 authenticated success-
fully via WEB by local with session id 20200904061105__10_210_1_148__local__385074ce
2020-09-04 10:58:57.751  informational  User rpcmadmin@10.213.67.16 authenticated success-
fully via WEB by local with session id

Press 'space' for next page or press 'q' to quit…
```

6.6.15 Command *show mail recipients*

It display a list of mail recipients for messages about system events.

Command:

```
show mail recipients
```

The return is:

```
SMTP Mail Recipients:
------------------------------------------------------------------------------
1.   to: igor@smtp.com
     cc: duty@example.com, ivan@example.com, ivan@example.com
2.   to: evgenii.zemchik@rcntec.com
     cc: duty@example.com, ivan@example.com
3.   to: 12das@inbox.ru
     cc: 12das@inbox.ru
    bcc: 12das@inbox.ru
4.   to: info@example.com
     cc: duty@example.com, ivan@example.com
    bcc: security@example.com

Type 'help' to get suggestions
```

6.6.16 Command *show nearby-devices*

Nearby devices — another RPCMs in this network, they are accessible and can be detected via *Bonjour* protocol.

Use command show nearby-devices for collecting information about these devices.

Example:

```
show nearby-devices
```

The return is:

```
Nearby RPCM devices:
              RPCM mDNS Name   IP address       TTL
-------------------------------------------------------------------------------
  AvtonomnayaPila-RPCM.local.  192.168.1.20      89
  BegunMarafonets-RPCM.local.  192.168.1.47      101
       BeloyeUkho-RPCM.local.  192.168.1.115     101
        BelyiFlag-RPCM.local.  192.168.1.166     101
    BelyiShokolad-RPCM.local.  192.168.1.118     101
```

There are *Serial Names*, *IP addresses* and *TTL* in this list.

6.6.17 Command *show network*

It is used to display detailed information about the network access settings.

Example of use:

```
show network
```

The return is:

```
[Bonjour Network Name]: BelyiVolos-RPCM.local
[Hostname]: BelyiVolos-RPCM
  [Current System Time]: 2000-01-06 17:39:59 +0000
          [MAC Address]: B8: F7: 4A: 00: 00: 27
[Network Type]: DHCP
[DHCP Hostname]: BelyiVolos-RPCM
[IP Address]: 192.168.1.148
[Netmask]: 255.255.255.0
[Default Gateway]: 192.168.1.1
[Primary DNS Server]: 192.168.242.36
[Secondary DNS Server]: 192.168.97.45
```

6.6.18 Command *show* of *ntp*

It is used to display a list of time servers using NTP protocol.

```
show ntp
```

The return is:

```
NTP configuration
-------------------------------------------------------------------------------

[NTP Servers]: 195.168.1.241, 195.168.1.242, 195.168.1.243, 195.168.1.244
```

6.6.19 Command *show output*

It displays outlet status information.

As a parameter it is required to specify the outlet number from *0* to *9*

Example:

```
show output 3
```

Information about this outlet (3):

```
                                  [Output]: 3
                              [Actual State]: ON (OVERLOAD)
                               [Admin State]: ON
                                      [Name]: output_3
                               [Description]:
                          [Instant Milliamps]: 324
                              [Instant Watts]: 48
                          [Instant Milliamps]: 324
                              [Instant Watts]: 48
                                [Instant VAs]: 72
                               [Instant Vars]: 53
                            [Accumulated KWh]: 6.720278
                           [Accumulated KVAh]: 8.777778
                          [Accumulated KVarh]: 1.509722
       [Overcurrent Alarm Limit Milliamps]: 10
         [Overcurrent Alarm Limit Seconds]: 31
   [Overcurrent Alarm Limit Reached Times]: 1
            [Overcurrent Alarm Fired Facts]: 1
    [Overcurrent Turn Off Limit Milliamps]: 10001
      [Overcurrent Turn Off Limit Seconds]: 3
[Overcurrent Turn Off Limit Reached Times]: 0
        [Overcurrent Turn Off Fired Facts]: 0
        [Overvoltage Turn Off Limit Volts]: disabled
[Recover Turn On After Overvoltage Seconds]: disabled
     [Turn Off on Input Overload Priority]: 3 (higher values shut down first)
        [Turn On Delay on Startup Seconds]: 11


Type 'help' to get suggestions
```

6.6.20 Command *show radius server*

It show information about RADIUS servers.

Help ask:

```
show radius server ?
```

The return is:

```
RPCM Commands description:
```

```
   show radius server <server>    - show detailed information about
                                   specific radius server

Type 'help' to get suggestions
```

Example. Show an information about RADIUS server with IP 192.168.1.1.

Command:

```
show radius server 192.168.1.1
```

The return is:

```
                 [Server]: 192.168.1.1
               [Priority]: 10
               [UDP Port]: 1812
             [Secret Key]: ** hidden **
               [Disabled]: NO
           [Use Group VSA]: NO
 [Use Session Timeout VSA]: NO

 Detailed information about Vendor Specific Attributes supported by RPCMs
 is available in documentation

Type 'help' to get suggestions
```

6.6.21 Command *show smtp*

It is used to display the settings of mail servers, and recipient addresses.

Help for the keywords `help` and`?` Is not available.

Example of use

```
show smtp
```

The return is:

```
SMTP Servers:
-------------------------------------------------------------------------------
     Server: smtp.gmail.com
       Port: 587
        SSL: enable
 Login Type: plain
HELO Domain: gmail.com
       From: user@gmail.com
   Username: user@gmail.com
   Password: ********

SMTP Recipients:
-------------------------------------------------------------------------------
1.   to: igor@example.com
     cc: duty@example.com, ivan@example.com, ivan@example.com

Type 'help' to get suggestions
```

In this case, it is clear that both the sending and receiving of messages use the same account *user@yandex.ru*

The return is:

```
SMTP Servers:
-------------------------------------------------------------------
     Server: smtp.yandex.ru
       Port: 25
        SSL: enable
 Login Type: plain
HELO Domain: yandex.ru
   Username: user@yandex.ru
   Password: MyPassword

SMTP Recipients:
-------------------------------------------------------------------
1. to: user@yandex.ru
  Type 'help' to get suggestions
```

6.6.22 Command *show snmp*

It is used to provide detailed information about SNMP access settings.

The `--reveal-keys` is available for displaying hidden passwords.

Example of use:

```
show snmp
```

The return is:

```
SNMP Agent configuration:
------------------------------------------------ -------------------------
Administrative State: OFF
                Port: 161 / udp
            EngineID: 8000B49B045250434D
             Context: rpcm


SNMP v1 / v2c Configuration:
------------------------------------------------ -------------------------
 Community: public
   Enabled: YES
AccessType: ReadOnly
accessList: 10.0.0.0/8

 Community: management
   Enabled: NO
AccessType: ReadWrite
accessList: 10.0.0.0/8
```

```
SNMP v3 Users:
------------------------------------------------ -------------------------
     Username: readsnmp User enabled: YES
   AccessType: ReadOnly Security Level: AuthPriv
Auth Protocol: sha1 Auth Password: ********
Priv Protocol: aes Priv Password: ********
  Access List: 10.0.0.0/8

     Username: readwritesnmp User enabled: YES
   AccessType: ReadWrite Security Level: AuthPriv
Auth Protocol: sha1 Auth Password: ********
Priv Protocol: aes Priv Password: ********
  Access List: 10.0.0.8
```

The help in the command is implemented only by a hint at auto-completion.

6.6.23 Command *show temperature*

It displays the temperature value in degrees Celsius inside the device.

Example:

```
show temperature
```

Temperature value:

```
 Temperature : 32C
```

6.6.24 Command *show time*

It displays the system time or displays a list of time zones

The available options are `zones`, `help` or `?`

Help displays:

```
show time ?
```

The return is:

```
RPCM Commands description:
    show time-show time configuration
    show time zones - show available timezones
    show time help - show this help message
```

6.6.24.1. Getting information about the system time

It is used simply as a `show time` output command with no parameters.

Example:

```
show time
```

The return is:

```
Time configuration
------------------------------------------------------------------------------
```

```
Timezone : Europe / Moscow
Local Time : 2017-11-13 03:31:43 +0300
UTC Time : 2017-11-13 00:31:43 UTC
Time Offset : 10800
NTPServers: No NTP servers configured
```

6.6.24.2. Command *show time zones*

It is used to display a list of time zones.

Command:

```
show time zones
```

The return is:

```
Timezones:
--------------------------------------------------------------------------------
  Antarctica/Casey            Antarctica/South_Pole       Antarctica/Vostok
  Antarctica/Rothera          Antarctica/DumontDUrville   Antarctica/Syowa
  Antarctica/McMurdo          Antarctica/Macquarie        Antarctica/Palmer
  Antarctica/Mawson           Antarctica/Troll            Antarctica/Davis
  GMT-0                       Iceland                     Cuba
  MST                         Libya                       Indian/Christmas
  Indian/Kerguelen            Indian/Reunion              Indian/Maldives
  Indian/Mayotte              Indian/Mahe                 Indian/Cocos
  Indian/Antananarivo         Indian/Mauritius            Indian/Chagos
  Indian/Comoro               Singapore                   Arctic/Longyearbyen
  Japan                       Navajo                      MET
  GMT                         Mexico/BajaSur              Mexico/General
  Mexico/BajaNorte            EST5EDT                       US/Mountain
  US/Samoa                    US/Pacific-New              US/East-  Indiana
  US/Aleutian                 US/Eastern                  US/Alaska
  US/Pacific                  US/Michigan                 US/Central
  US/Indiana-Starke           US/Hawaii                   US/Arizona
  America/Santa_Isabel        America/Louisville          America/Yellowknife
  America/Puerto_Rico         America/El_Salvador         America/Jujuy
  America/Nassau              America/St_Lucia            America/Godthab
  America/Guadeloupe          America/Anchorage           America/Virgin
  America/Whitehorse          America/Caracas             America/Catamarca
  America/Santo_Domingo       America/Nome                America/Tijuana
  America/Maceio              America/Ensenada            America/Iqaluit
  America/Cayman              America/Merida              America/Noronha
  America/Hermosillo          America/St_Johns            America/Grand_Turk
  America/Menominee           America/Port-au-Prince      America/Cordoba
  America/Porto_Acre          America/Aruba               America/Detroit
  America/Marigot             America/Dawson_Creek        America/Thule
  America/Danmarkshavn        America/Guayaquil           America/Anguilla
  America/St_Thomas           America/Ojinaga             America/Metlakatla
  America/Santarem            America/Montevideo          America/Mendoza
  America/Rosario             America/Montreal            America/Fort_Nelson
  America/Adak                America/Lima                America/Edmonton
  America/Boa_Vista           America/Los_Angeles         America/Winnipeg
```

```
America/Chihuahua           America/Bogota              America/Grenada
America/New_York            America/North_Dakota/New_Salem
America/North_Dakota/Center
America/North_Dakota/Beulah America/Moncton            America/Guatemala
America/Kralendijk          America/Dominica           America/Mazatlan
America/Cancun              America/Punta_Arenas       America/Bahia
America/Vancouver           America/Cuiaba             America/Nipigon
America/Tegucigalpa         America/Port_of_Spain      America/La_Paz
America/Santiago            America/Porto_Velho        America/Panama
America/Recife              America/Rankin_Inlet       America/Belem
America/Sao_Paulo           America/Yakutat            America/Belize
America/St_Barthelemy       America/Phoenix            America/Blanc-Sablon
America/Pangnirtung         America/Mexico_City        America/Guyana
America/Shiprock            America/Manaus             America/Araguaina
America/Swift_Current       America/Rainy_River        America/Resolute
America/Creston             America/Costa_Rica         America/Montserrat
America/Kentucky/Louisville  America/Kentucky/Monticello  America/Miquelon
America/Paramaribo          America/Matamoros          America/Goose_Bay
America/Jamaica             America/  Indianapolis       America/Atka
America/Antigua             America/Chicago            America/Curacao
America/Regina              America/Coral_Harbour      America/St_Kitts
America/Campo_Grande        America/Sitka              America/Halifax
America/Eirunepe            America/Fort_Wayne         America/Monterrey
America/St_Vincent          America/Scoresbysund       America/Cayenne
America/Knox_IN             America/Glace_Bay          America/Bahia_Banderas
America/Havana              America/Asuncion           America/Rio_Branco
America/Juneau              America/  Indiana/Knox       America/
Indiana/Petersburg
America/  Indiana/Tell_City   America/Indiana/Vincennes   America/
Indiana/Marengo
America/Indiana/Winamac     America/Indiana/  Indianapolis  America/Indiana/Vevay
America/Managua             America/Toronto            America/Dawson
America/Inuvik              America/Thunder_Bay        America/Boise
America/Lower_Princes       America/Barbados           America/Argentina/Jujuy
America/Argentina/San_Juan  America/Argentina/Catamarca America/Argentina/Tucuman
America/Argentina/Cordoba   America/Argentina/Rio_Gallegos
America/Argentina/Mendoza
America/Argentina/Ushuaia   America/Argentina/San_Luis  America/Argentina/La_Rioja
America/Argentina/Salta     America/Argentina/Buenos_Aires
America/Argentina/ComodRivadavia
America/Cambridge_Bay       America/Fortaleza          America/Atikokan
America/Buenos_Aires        America/Martinique         America/Tortola
America/Denver              Africa/Bujumbura           Africa/Asmera
Africa/Bamako               Africa/Gaborone            Africa/Sao_Tome
Africa/Bangui               Africa/Libreville          Africa/Juba
Africa/Khartoum             Africa/Kampala             Africa/Casablanca
Africa/Mbabane              Africa/Lusaka              Africa/Cairo
Africa/Lome                 Africa/Luanda              Africa/Ouagadougou
Africa/Mogadishu            Africa/Conakry             Africa/Maputo
Africa/Blantyre             Africa/Porto-Novo          Africa/Banjul
Africa/Tripoli              Africa/Malabo              Africa/Tunis
Africa/Niamey               Africa/Dar_es_Salaam       Africa/Harare
```

```
Africa/Brazzaville          Africa/Bissau               Africa/Dakar
Africa/Douala               Africa/Windhoek             Africa/Abidjan
Africa/Ndjamena             Africa/Lagos                Africa/Lubumbashi
Africa/Monrovia             Africa/Kigali               Africa/Freetown
Africa/Nairobi              Africa/Addis_Ababa          Africa/Djibouti
Africa/El_Aaiun             Africa/Accra                Africa/Nouakchott
Africa/Ceuta                Africa/Timbuktu             Africa/Maseru
Africa/Asmara               Africa/Johannesburg         Africa/Kinshasa
Africa/Algiers            NZ-CHAT                     Iran
Egypt                       Europe/London               Europe/Helsinki
Europe/Chisinau             Europe/Guernsey             Europe/Uzhgorod
Europe/Prague               Europe/Oslo                 Europe/Busingen
Europe/Vilnius              Europe/Brussels             Europe/Moscow
Europe/Bratislava           Europe/Zaporozhye           Europe/Skopje
Europe/Isle_of_Man          Europe/Budapest             Europe/Vatican
Europe/Podgorica            Europe/Stockholm            Europe/Minsk
Europe/Kaliningrad          Europe/Kirov                Europe/Paris
Europe/Malta                Europe/Jersey               Europe/Kiev
Europe/Vienna               Europe/Belgrade             Europe/Riga
Europe/Copenhagen           Europe/Andorra              Europe/Tiraspol
Europe/San_Marino           Europe/Sofia                Europe/Sarajevo
Europe/Ulyanovsk            Europe/Lisbon               Europe/Mariehamn
Europe/Rome                 Europe/Nicosia              Europe/Volgograd
Europe/Simferopol           Europe/Madrid               Europe/Istanbul
Europe/Tirane               Europe/Saratov              Europe/Astrakhan
Europe/Belfast              Europe/Warsaw               Europe/Athens
Europe/Samara               Europe/Bucharest            Europe/Zurich
Europe/Tallinn              Europe/Monaco               Europe/Ljubljana
Europe/Gibraltar            Europe/Amsterdam            Europe/Vaduz
Europe/Luxembourg           Europe/Berlin               Europe/Dublin
Europe/Zagreb               EET                         ROK
Brazil/West                 Brazil/DeNoronha            Brazil/East
Brazil/Acre                 Zulu                        Chile/EasterIsland
Chile/Continental           Australia/Yancowinna        Australia/Brisbane
Australia/Lindeman          Australia/Broken_Hill       Australia/North
Australia/Hobart            Australia/South             Australia/Queensland
Australia/Currie            Australia/Lord_Howe         Australia/West
Australia/NSW               Australia/LHI               Australia/ACT
Australia/Perth             Australia/Darwin            Australia/Victoria
Australia/Melbourne         Australia/Canberra          Australia/Adelaide
Australia/Eucla             Australia/Sydney            Australia/Tasmania
GMT0                        Kwajalein                   GB-Eire
PRC                         Poland                      Pacific/Fiji
Pacific/Tahiti              Pacific/Auckland            Pacific/Kosrae
Pacific/Wallis              Pacific/Truk                Pacific/Efate
Pacific/Tongatapu           Pacific/Samoa               Pacific/Apia
Pacific/Marquesas           Pacific/Fakaofo             Pacific/Niue
Pacific/Wake                Pacific/Norfolk             Pacific/Midway
Pacific/Bougainville        Pacific/Honolulu            Pacific/Majuro
Pacific/Enderbury           Pacific/Galapagos           Pacific/Kwajalein
Pacific/Saipan              Pacific/Palau               Pacific/Pitcairn
Pacific/Ponape              Pacific/Guam                Pacific/Noumea
```

Pacific/Pohnpei	Pacific/Johnston	Pacific/Nauru
Pacific/Kiritimati	Pacific/Rarotonga	Pacific/Gambier
Pacific/Guadalcanal	Pacific/Chatham	Pacific/Easter
Pacific/Port_Moresby	Pacific/Pago_Pago	Pacific/Funafuti
Pacific/Tarawa	Pacific/Yap	Pacific/Chuuk
EST	Universal	NZ
Hongkong	Portugal	MST7MDT
ROC	GB	UCT
PST8PDT	GMT+0	WET
CET	Etc/GMT-0	Etc/GMT+8
Etc/GMT-4	Etc/GMT+1	Etc/GMT+9
Etc/GMT-11	Etc/GMT	Etc/GMT+12
Etc/GMT-10	Etc/GMT-2	Etc/GMT+6
Etc/GMT-6	Etc/Zulu	Etc/GMT+5
Etc/GMT0	Etc/GMT-9	Etc/GMT+10
Etc/GMT-5	Etc/GMT-3	Etc/Universal
Etc/GMT+2	Etc/UCT	Etc/GMT-13
Etc/GMT-8	Etc/GMT-7	Etc/GMT+3
Etc/GMT+0	Etc/GMT-14	Etc/GMT+7
Etc/UTC	Etc/GMT+11	Etc/GMT-1
Etc/Greenwich	Etc/GMT+4	Etc/GMT-12
Canada/Mountain	Canada/Yukon	Canada/East-Saskatchewan
Canada/Eastern	Canada/Saskatchewan	Canada/Newfoundland
Canada/Pacific	Canada/Central	Canada/Atlantic
W-SU	Jamaica	Eire
UTC	Atlantic/Stanley	Atlantic/St_Helena
Atlantic/Canary	Atlantic/Reykjavik	Atlantic/Faeroe
Atlantic/Cape_Verde	Atlantic/Madeira	Atlantic/South_Georgia
Atlantic/Azores	Atlantic/Bermuda	Atlantic/Jan_Mayen
Atlantic/Faroe	CST6CDT	Asia/Tbilisi
Asia/Shanghai	Asia/Choibalsan	Asia/Aden
Asia/Urumqi	Asia/Dili	Asia/Yangon
Asia/Aqtobe	Asia/Yekaterinburg	Asia/Kathmandu
Asia/Brunei	Asia/Krasnoyarsk	Asia/Tel_Aviv
Asia/Singapore	Asia/Bangkok	Asia/Tomsk
Asia/Vientiane	Asia/Chungking	Asia/Magadan
Asia/Qyzylorda	Asia/Srednekolymsk	Asia/Dubai
Asia/Bishkek	Asia/Atyrau	Asia/Qatar
Asia/Dacca	Asia/Hebron	Asia/Ulaanbaatar
Asia/Harbin	Asia/Famagusta	Asia/Saigon
Asia/Kabul	Asia/Khandyga	Asia/Kashgar
Asia/Pontianak	Asia/Kuala_Lumpur	Asia/Tehran
Asia/Macao	Asia/Anadyr	Asia/Jakarta
Asia/Barnaul	Asia/Baku	Asia/Vladivostok
Asia/Ulan_Bator	Asia/Hong_Kong	Asia/Ho_Chi_Minh
Asia/Baghdad	Asia/Dushanbe	Asia/Aqtau
Asia/Chongqing	Asia/Makassar	Asia/Jerusalem
Asia/Omsk	Asia/Hovd	Asia/Amman
Asia/Jayapura	Asia/Oral	Asia/Phnom_Penh
Asia/Colombo	Asia/Muscat	Asia/Macau
Asia/Kolkata	Asia/Irkutsk	Asia/Ashkhabad
Asia/Ujung_Pandang	Asia/Calcutta	Asia/Nicosia

```
  Asia/Yerevan                Asia/Taipei                 Asia/Sakhalin
  Asia/Rangoon                Asia/Kamchatka              Asia/Pyongyang
  Asia/Ust-Nera               Asia/Istanbul               Asia/Katmandu
  Asia/Kuwait                 Asia/Yakutsk                Asia/Riyadh
  Asia/Beirut                 Asia/Bahrain                Asia/Thimbu
  Asia/Tokyo                  Asia/Seoul                  Asia/Karachi
  Asia/Gaza                   Asia/Ashgabat               Asia/Samarkand
  Asia/Thimphu                Asia/Manila                 Asia/Novosibirsk
  Asia/Tashkent               Asia/Chita                  Asia/Damascus
  Asia/Almaty                 Asia/Novokuznetsk           Asia/Dhaka
  Asia/Kuching                Turkey                      Greenwich
  Israel                      HST                         Factory
```

6.6.25 Command *show update*

Displays the status of the system during the upgrade.

Using:

```
show update
```

The following are the possible responses of the system.

If updating is idle:

```
 Current update status:
--------------------------------------------------------------------------------
Software Update Status: Idle
--------------------------------------------------------------------------------
Firmware Update Status: Idle
--------------------------------------------------------------------------------
Type 'help' to get suggestions
```

Ready to start the update procedure:

```
Current update status:
------------------------------------------------ -------------------------
               Status: Ready to start software update
------------------------------------------------ -------------------------
```

The update process is started:

```
Software update has started ...

Type 'help' to get suggestions
```

If there was an attempt to start the update process before the update file was finished, the system will respond:

```
 We are not ready to start update, software update file should be uploaded and
verified ...
```

Preliminary recovery procedure is in progress:

```
Current update status:
------------------------------------------------ -------------------------
               Status: Recovery procedure is in progress ...
             Progress: 5.73%
------------------------------------------------ -------------------------
```

Application update:

```
Current update status:
------------------------------------------------- -------------------------
               Status: Applying update ...
             Progress: 14.88%
------------------------------------------------- -------------------------
```

The update application is being checked:

```
Current update status:
------------------------------------------------- -------------------------
               Status: Verifying applied update ...
             Progress: 41.17%
------------------------------------------------- -------------------------
```

Update completed, the system asks to restart High Level Controller (HLC):

```
Current update status:
------------------------------------------------- -------------------------
               Status: Update complete, please manually restart RPCM
             Progress: 100%
------------------------------------------------- -------------------------
```

For more details, please refer to the section: *"4.7. Updating the RPCM Software"*.

6.6.26 Command *show user*

It is used to display detailed information about the user.

Options s available: `history`

6.6.26.1. Displaying User Information

It is used with the parameter *username*

Help:

```
show user ?
```

The return is:

```
Please provide username to show information about

Type 'help' to get suggestions
```

You can get information about users after pressing tab.

Command:

```
show user <Tab button>
```

The return is:

```
rpcmadmin  test379    vasya

Type 'help' to get suggestions
```

Example. Getting detailed information about the user *rpcmadmin*:

Command:

```
show user rpcmadmin
```

The return is:

```
                  [Username]: rpcmadmin
              [User Disabled]: NO
              [Authenticator]: LOCAL
                      [Group]: superuser
           [Last Login Time]: 2020-04-21 20:52:22
           [User Changed At]: 2019-12-12 01:19:58
           [User Created At]: 2019-12-12 01:19:58
[Session Expiration Timeout]: 3600

Active user's sessions:

Source IP Address     Applied Group  Session expires at     Timeout   Idle
-------------------------------------------------------------------------------
WEB    10.213.97.208  superuser      2020-04-05 23:30:37     3600s      1381s
WEB    10.210.6.88    superuser      2020-04-06 21:18:40     3600s      1303s
ssh    10.213.97.208  superuser      2020-04-21 23:19:52     3600s         0s

Type 'help' to get suggestions
```

In particular, you can see the data:

- **Username**;
- **User Disabled** (if "NO" — user enabled);
- **Access Level** — privilege level;
- **Last Login Time** — time of the last login to the system;
- **User Changed At** — time when the user parameters were last modified;
- **User Created At** — user creation time;
- **Session Expiration Timeout** — session termination time (for security reasons the session is not allowed to remain open indefinitely).

6.6.26.2. Command *show user history*

It displays the list of the last commands entered by this user.

Example. We receive information about the commands entered by the user *rpcmadmin*:

```
show user rpcmadmin history
```

List of used commands:

```
History for user: rpcmadmin
1: add user testuser
2: whoami
3: add user?
4: delete user?
5: delete user testuser
6: add?
7: exit
```

6.6.27 Command *show version*

It displays information about the firmware version and device software, as well as the serial name, serial number, uptime and system time.

Example:

```
show version
```

Information about the RPCM module:

```
             [Serial Name]: AntiGeroy
           [Serial Number]: RU2017101100000002MO01DN01
                  [Model]: 1502
        [Hardware Version]: RPCM
                 [Uptime]: 36d+11:44:14
        [Software Version]: 0.7.100
   [Software Release Date]: 20190610154514
        [Firmware Version]: 0.9.748
   [Firmware Release Date]: 20190528215402
[Current System Time Zone]: Europe/Moscow
     [Current System Time]: 2019-07-04 12:40:02 +0300


Type 'help' to get suggestions
```

6.7. Command *show all*

It serves to display various information about RPCM elements.

It includes the following options:

- **automation** — a list of all connected devices for automation management (on/off or reboot);
- **counters** — values of power counters for connected devices set thresholds for preliminary notifications and shutdown;
- **groups** — general information about all groups;
- **inputs** — data about all inputs (1-2);
- **outputs** — information about all outlets;
- **users** — a list of all registered users of the system;
- **groups** — a list of system security group with information about permissions;
- **radius server —** an information about RADIUS servers;
- **help**.

Help displays (for example):

```
show all help
```

The return is:

```
RPCM Commands description:

show all automations  - show all configured automations
show all counters     - show counters for device, like circuit breaker firings
                        alarm limit firings and overload turn off firings
show all groups       - show information about all groups
show all inputs       - show information about all inputs
  names                  show all names for inputs
  descriptions           show all descriptions for inputs
  meter readings         show all input instant and accumulated meter readings
  limits                 show all limits for inputs
show all outputs      - show information about all outputs
  alarm limits           show alarm limits and action delays for outputs
  descriptions           show all outputs descriptions
  limits                 show all limits and action delays for outputs
  meter readings         show all outputs instant and accumulated meter
                         readings
  names                  show all outputs names
  survival priorities    show all outputs turn off on Input overload
                           priorities
```

```
  startup delays          show turn on startup delays for outputs
  turn off limits         show turn off limits and action delays for outputs
show all radius
  servers             - show all configured radius servers
show all users        - show all users accounts
  logs                    show all users login and logout logs
show all help         - show this help

Type 'help' to get suggestions
```

6.7.1 Command s*how all automations*

Displays information about automated devices.

Note. For more detailed information, it is recommended to refer to the sections: *"4.11 Automation tools"* and *"5.6. Monitoring and monitoring of specialized devices for mining using RPCM"*.

On the question mark, instead of a hint, simply a list of devices is displayed:

```
show all automations ?
```

The return is:

```
ID Name Device Type Outputs
1 dragonmint_t1 DragonMint_T1 0
2 Antminer_S9 Bitmain_S9 1
3 Antminer_D3 Bitmain_D3 1
4 Antminer_L3_plus Bitmain_L3 + 1
5 nonexistent_claymore Claymore 1

Type 'help' to get suggestions
```

A similar list displays for any other parameter value.

Displays information about automated devices.

Note. For more detailed information, it is recommended to refer to the sections: *"4.11 Automation tools"*.

On the question mark, instead of a hint, simply a list of devices is displayed:

```
show all automation ?
```

The return is:

```
ID Name Device Type Outputs
1 dragonmint_t1 DragonMint_T1 0
2 Antminer_S9 Bitmain_S9 1
3 Antminer_D3 Bitmain_D3 1
4 Antminer_L3_plus Bitmain_L3 + 1
5 nonexistent_claymore Claymore 1

Type 'help' to get suggestions
```

A similar list displays for any other parameter value.

6.7.2 Command *show all counters*

It serves for demonstration of meter readings

Example of work:

```
show all counters
```

Information about the meters:

```
Over-              Over-
                     current    Over-   current     Over-
             Circuit    Alarm  current  Turn Off   current
             Breaker    Limit    Alarm     Limit  Turn Off
               Fired  Reached    Fired   Reached     Fired
               Facts    Times    Facts     Times     Facts
[Output 0]:        1        0        0         0         0
[Output 1]:        3        0        0         0         0
[Output 2]:        6    29164      457         0         0
[Output 3]:        2        0        0         0         0
[Output 4]:        2        0        0         0         0
[Output 5]:        1        0        0         0         0
[Output 6]:        0       35        3        33        33
[Output 7]:        0        0        0         0         0
[Output 8]:        3        0        0         0         0
[Output 9]:        2        0        0         0         0
```

6.7.3 Command s*how all groups*

Show an information about all security groups with permissions.

Note. Object permissions in RPCM have to set UNIX-style: Read-Write-eXecute — ***RWX*** notation.

The notation of a list:

Glb — Global config RPCM;

Inp — Inputs 1..2 ;

Ou# — Outputs 0..9;

Log — System logs permissions;

Aut — Automation configuration;

Utl — for use to Utilities permissions.

Help ask:

```
show all groups ?
```

The return is:

```
RPCM Commands description:

  show groups  - groups and their permissions

Type 'help' to get suggestions
```

Example. How to use:

```
show all groups
```

The return is:

```
           Groupname Glb Inp Ou0 Ou1 Ou2 Ou3 Ou4 Ou5 Ou6 Ou7 Ou8 Ou9 Log Aut Utl
-------------------------------------------------------------------------------
      administrators RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX   R  RW   X
*           superuser RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX   R  RW   X
          nightgroup1   R   R   R   R   R   R   R   R   R   R   R   R   R   R   X
      rpcmadmingroup   R   R   R   R   R   R   R   R   R   R   R   R   R   R   X
            Newusers RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX   R  RW   X
            Mstiteli   R RWX   R RWX  RX RWX RWX RWX  RW RWX RWX RWX   R   R   X
           new_group   R  RW  RW  RW  RW  RW  RW  RW  RW  RW  RW  RW  RW   R  RW   X
             testcli  RW RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX   R  RW   X
-------------------------------------------------------------------------------

  R: Read access, W: Write access, *: Your user Group
  N: No access,   X: Access to execute Turn Off, Turn On or Restart
                     Backup configuration, Restart High Level Controller, etc..

  Glb - Global config, Inp - Inputs 1..2, Ou# - Outputs 0..9
  Log - System logs,   Aut - Automation configuration, Utl - Utilities

Type 'help' to get suggestions
```

6.7.4 Command *show all inputs*

Displays information about the inputs.

The available parameters are: *names*, *descriptions*, *limits, meter readings*.

The call to the `show all inputs ?` immediately displays information about the inputs.

Example of work:

```
show all inputs
```

The return is:

```
     [Input 1]: 226V @ 50.01Hz 0.000A 0.000KW (ACTIVE, PRIORITY)
     [Input 2]: 227V @ 50.01Hz 0.000A 0.000KW
```

For the command, the auto-completion prompt is available. By double pressing the **Tab** key, the following list of parameters is displayed:

```
descriptions  limits        meter         names
```

6.7.4.1 Command *show all inputs names*

It shows the names of inputs.

Example of use:

```
show all inputs names
```

Information on the names of inputs:

```
[Input 1] input_1
[Input 2] input_2
```

6.7.4.2 Command *show all inputs descriptions*

It shows the descriptions of inputs.

Example of use:

```
show all inputs descriptions
```

Description of inputs:

```
show all inputs descriptions
[Input 1] Main
[Input 2] Reserve
```

6.7.4.3 Command *show all inputs limits*

It shows the current limits for inputs.

Example of use:

```
 show all inputs limits
```

Information on the limits:

```
            Current  Minimum  Maximum    Current    Minimum    Maximum
            Voltage  Voltage  Voltage  Frequency  Frequency  Frequency
[Input 1]:    234V      89V     250V    49.99Hz    45.00Hz    65.00Hz (ACTIVE, PRIORITY)
[Input 2]:    235V      90V     240V    49.99Hz    45.00Hz    65.00Hz
```

6.7.4.4 Command *show all meter readings*

It indicates the value of the meters.

Example of use:

```
 show all inputs meter readings
```

Information from the meters:

```
             Instant    Instant    Accumul    Accumul    Accumul
            Milliamps      Watts        KWh      Kvars       KVAh
[Input 1]:          0          0     796.28   -1437.20     623.85
[Input 2]:         31         -1     170.16       8.42     173.73

Type 'help' to get suggestions
```

6.7.5 Command *show all outputs*

It displays information about the outlet.

The available options are: *alarm, descriptions, help, limits, meter, names, startup, survival, turn*.

Help call via command `show all outputs ?`

```
RPCM Commands description:

  show all outputs alarm
    limits                 - show alarm limits and action delays for outputs
  show all outputs limits  - show all limits and action delays for outputs
  show all outputs meter
    readings               - show all outputs instant and accumulated meter readings
  show all outputs recover
    turn on limits         - show recover turn on limits and action delays for outputs
  show all outputs startup
    delays                 - show turn on startup delays for outputs
  show all outputs turn
    off limits             - show turn off limits and action delays for outputs
  show all outputs help    - show this help

Type 'help' to get suggestions
```

The `show all outputs` construct without parameters displays outlet information about the outlets

Example of use:

```
show all outputs
```

The return is:

```
[Output 0]:   ON <admin:  ON>     0mA      0W
[Output 1]:   ON <admin:  ON>     0mA      0W
[Output 2]:   ON <admin:  ON>     0mA      0W
[Output 3]:   ON <admin:  ON>     0mA      0W
[Output 4]:   ON <admin:  ON>     0mA      0W
[Output 5]:   ON <admin:  ON>     0mA      0W
[Output 6]:   ON <admin:  ON>     0mA      0W
[Output 7]:   ON <admin:  ON>     0mA      0W
[Output 8]:   ON <admin:  ON>     0mA      0W
[Output 9]:   ON <admin:  ON>     0mA      0W
```

For the `show all outputs`, a hint is available with auto-completion. Pressing the **Tab** key twice, will display following list of parameters:

```
? meter descriptions startup survival turn
```

6.7.5.1 Command *show all outputs alarm limits*

It displays the current limit values after which an alarm is sent.

Use:

```
show all outputs alarm limits
```

The return is:

```
                                                          Over-
                                      Over-     Over-   current     Over-
                           Over-    current   current     Alarm   current
                         current      Alarm     Alarm     Limit     Alarm
               Instant     Alarm      Limit     Limit   Reached     Fired
             Milliamps    Active  Milliamps   Seconds     Times     Times
[Output 0]:          0        NO       9500        30         0         0
[Output 1]:          0        NO       9501        30         0         0
[Output 2]:          0        NO       9000        30     29164       457
[Output 3]:          0        NO       9501        31         0         0
[Output 4]:          0        NO       9500        30         0         0
[Output 5]:          0        NO       9500        30         0         0
[Output 6]:          0        NO       1000         5        35         3
[Output 7]:          0        NO       9500        30         0         0
[Output 8]:          0        NO       9500        30         0         0
[Output 9]:          0        NO       9500        30         0         0
```

6.7.5.2 Command *show all outputs turn off limits*

It displays the current limits after which the outlets are disconnected.

Use:

```
show all outputs turn off limits
```

Limit value information:

```
                                   Over-               Over-
                                 current     Over-   current     Over-     Over-
                         Over-  Turn Off   current  Turn Off   current   voltage
             Instant   current     Limit  Turn Off     Limit  Turn Off  Turn Off
              Milli-  Turn Off    Milli-     Limit   Reached     Fired     Limit
                amps    Active      amps   Seconds     Times     Times     Volts
[Output 0]:        0        NO      8999         2         0         0  disabled
[Output 1]:        0        NO     16000         2         0         0  disabled
[Output 2]:       30        NO     10000         2         0         0  disabled
[Output 3]:        0        NO     10001         3         0         0  disabled
[Output 4]:        0        NO     10000         2         0         0  disabled
[Output 5]:        0        NO     10000         2         0         0  disabled
[Output 6]:        0        NO     10000         5        33        33  disabled
[Output 7]:        0        NO     10000         2         0         0  disabled
[Output 8]:        0        NO     10000         2         0         0  disabled
[Output 9]:        0        NO      9990         2         0         0  disabled

Type 'help' to get suggestions
```

6.7.5.3 Command *show all outputs limits*

It displays the current limit values after which an alarm is sent and current limit values for shut-down.

Use:

```
show all outputs limits
```

Limit value information:

```
                                                          Over-
                                         Over-     Over-  current    Over-
                              Over-    current   current    Alarm  current
                            current      Alarm     Alarm    Limit    Alarm
               Instant        Alarm      Limit     Limit  Reached    Fired
             Milliamps       Active  Milliamps   Seconds    Times    Times
[Output 0]:          0           NO       9500        30        0        0
[Output 1]:          0           NO       9500        30        0        0
[Output 2]:          0           NO       9500        30        0        0
[Output 3]:          0           NO       9500        30        0        0
[Output 4]:          0           NO       9500        30        0        0
[Output 5]:          0           NO       9500        30        0        0
[Output 6]:          0           NO       9500        30        0        0
[Output 7]:          0           NO       9500        30        0        0
[Output 8]:          0           NO       9500        30        0        0
[Output 9]:          0           NO       9500        30        0        0

                                                          Over-
                                        Over-     Over-  current    Over-
                              Over-   current   current Turn Off  current
                            current  Turn Off  Turn Off    Limit Turn Off
               Instant     Turn Off     Limit     Limit  Reached    Fired
             Milliamps       Active Milliamps   Seconds    Times    Times
[Output 0]:          0           NO     10000         2        0        0
[Output 1]:          0           NO     10000         2        0        0
[Output 2]:          0           NO     10000         2        0        0
[Output 3]:          0           NO     10000         2        0        0
[Output 4]:          0           NO     10000         2        0        0
[Output 5]:          0           NO     10000         2        0        0
[Output 6]:          0           NO     10000         2        0        0
[Output 7]:          0           NO     10000         2        0        0
[Output 8]:          0           NO     10000         2        0        0
[Output 9]:          0           NO     10000         2        0        0


                                        Over-   Recover    Over-
                              Over-   voltage     after  voltage
                            voltage  Turn Off     Over- Turn Off
                           Turn Off     Limit   voltage    Fired
               Voltage       Active     Volts   Seconds    Times
[Output 0]:        230          OFF  disabled  disabled    65535
```

```
[Output 1]:        230       OFF   disabled  disabled     65535
[Output 2]:        230       OFF   disabled  disabled     65535
[Output 3]:        230       OFF   disabled  disabled     65535
[Output 4]:        230       OFF   disabled  disabled     65535
[Output 5]:        230       OFF   disabled  disabled     65535
[Output 6]:        230       OFF   disabled  disabled     65535
[Output 7]:        230       OFF   disabled  disabled     65535
[Output 8]:        230       OFF   disabled  disabled     65535
[Output 9]:        230       OFF   disabled  disabled     65535

Type 'help' to get suggestions
```

6.7.5.4 Command *show all outputs meter readings*

It reads and displays the current meter readings on the outlets.

Use:

```
show all outputs meter readings
```

Information about the meters:

```
              Instant   Inst    Accumul   Inst    Accumul   Inst    Accumul
            Milliamps  Watts        KWh   Vars      KVarh    VAs       KVAh
[Output 0]:         0      0      0.000      0      0.006      0      0.047
[Output 1]:         0      0      0.651      0      0.089      0      0.712
[Output 2]:         0      0    241.670      0      0.040      0    241.746
[Output 3]:         0      0      0.000      0      0.108      0      0.092
[Output 4]:         0      0      0.000      0      0.045      0      0.078
[Output 5]:         0      0      0.000      0      0.088      0      0.099
[Output 6]:         0      0     65.848      0      0.075      0     65.855
[Output 7]:         0      0      0.013      0      0.117      0      0.112
[Output 8]:         0      0      0.000      0      0.009      0      0.080
[Output 9]:         0      0      0.000      0      0.098      0      0.124
```

6.7.5.5 Command *show all outputs startup delays*

it indicates information about the delay in applying voltage to the outlets when the power is turned on.

Use:

```
show all outputs startup delays
```

```
        Turn On Delay At Startup
    [Output 0]: 3 seconds
    [Output 1]: 3 seconds
    [Output 2]: 4 seconds
    [Output 3]: 11 seconds
    [Output 4]: 6 seconds
    [Output 5]: 7 seconds
    [Output 6]: 3 seconds
    [Output 7]: 9 seconds
    [Output 8]: 10 seconds
    [Output 9]: 11 seconds
```

6.7.5.6 Command *show all outputs survival priorities*

It displays information about survival priority, affecting the order of switching off the voltage supply to the outlets with a general excess of the permissible current.

For RPCM 1502 — the total current limit is 16A; for RPCM 1532 — 32A, for RPCM ME 1563 — 63A.

The higher the number, the higher the priority and the sooner the device will be turned off.

An additional parameter `sorted` indicating the sorting according to the survival priorities is available.

A brief hint is shown when pressing the **Tab** key twice:

```
show all outputs survival priorities
```

Hint:

```
sorted
```

Use:

With the usual sorting:

```
show all outputs survival priorities
```

The return is:

```
        Output Priority Name
    [Output 0]: 9 output_0
    [Output 1]: 1 output_1
    [Output 2]: 2 output_2
    [Output 3]: 3 output_3
    [Output 4]: 4 output_4
    [Output 5]: 5 output_5
    [Output 6]: 6 output_6
    [Output 7]: 7 output_7
    [Output 8]: 8 output_8
    [Output 9]: 9 output_9
```

With prioritization:

```
show all planned survival priorities sorted
```

The return is:

```
    Output Priority Name
------------------------------------------------------------------------------
[Output 1]: 1 output_1
[Output 2]: 2 output_2
[Output 3]: 3 output_3
[Output 4]: 4 output_4
[Output 5]: 5 output_5
[Output 6]: 6 output_6
[Output 7]: 7 output_7
[Output 8]: 8 output_8
```

```
[Output 0]: 9 output_0
[Output 9]: 9 output_9
```

6.7.6 Command *show all radius servers*

Show an information about RADIUS servers.

The notation of a list:

Prio — server priority, lower number is higher priority;

Server — a RADIUS server address;

Port — a port and the protocol;

Options — additional options.

Example. How to use:

```
show all radius server
```

The return is:

```
Prio          Server      Port  Secret                                Options
-------------------------------------------------------------------------------
  10     192.168.1.1  1812/udp  ** hidden **
   1        10.5.4.3  1812/udp  ** hidden **                        D, G, T
   1    10.210.1.194  1812/udp  ** hidden **

  D: Server is disabled, G: Accept and use Group Vendor Specific Attribute
  T: Accept and Use Session Timeout Vendor Specific Attribute
  Servers with higher priority will used first

Type 'help' to get suggestions
```

6.7.7 Command *show all users*

6.7.7.1. General Information about Command *show all users*

It displays information about users.

The available options are: *log, help.*

Help displays:

```
show all users ?
```

The return is:

```
RPCM Commands description:

  show all users      - show all existing users
  show all users log  - show all users login and logout logs
  show all users logs --last N - show last N records of users logins and logouts
  show all users help - show this help
```

Pressing the **Tab** key provides brief help:

```
show all users
```

The return is:

```
? help logs
```

Without parameters, it displays information about system users:

```
show all users
```

The return is:

```
      Username  Group             Authenticator  Last Login            Disabled
-------------------------------------------------------------------------------
      nightuser  administrators     LOCAL+RADIUS  2019-12-12 01:18:47         NO
      rpcmadmin  superuser                LOCAL  2020-04-08 21:21:52         NO
     nightuser2  rpcmadmingroup           RADIUS  2020-04-08 18:35:59 +0000   NO
        newuser  administrators           RADIUS  2020-04-08 18:35:59 +0000   NO
       rpcmtest  administrators           RADIUS  2020-04-08 18:35:59 +0000   NO
            Tor  Mstiteli           LOCAL+RADIUS  2020-02-05 13:31:32         NO
           hulk  administrators             LOCAL  2020-02-05 13:35:46         NO
         radius  administrators           RADIUS  2020-04-08 18:35:59 +0000  YES

  Displayed Group is configured locally and may be different for radius
  authenticated users. Actual applied group for user displayed by:
  'show user <username>' or 'show active users' commands
```

6.7.7.2. Command *show all users logs*

The available parameter is: *--last N*

The output of the classic help is not used, the command `show all users logs ?` Immediately outputs the log.

Ask help:

```
show all users logs <Tab>
```

The return is:

```
--last
```

Example 1. Command *Show all users logs* without parameter:

```
show all users logs
```

The return is:

```
Username         Type    Login time           Logout Time
-------------------------------------------------------------------
rpcmadmin         ssh     2019-04-12 07:17:59  2019-04-12 07:21:15
rpcmadmin         WEB     2019-04-12 10:21:26  2019-04-16 19:52:52 +0000
rpcmadmin         WEB     2019-04-12 10:23:07  2019-04-16 19:52:52 +0000
rpcmadmin         ssh     2019-04-12 13:51:03  2019-04-12 13:54:28
rpcmadmin         ssh     2019-04-12 18:47:18  2019-04-12 18:48:06
rpcmadmin         WEB     2019-04-16 15:07:21  2019-04-16 19:52:52 +0000
```

```
rpcmadmin         WEB     2019-04-16 15:39:01  2019-04-16 19:52:52 +0000
rpcmadmin         ssh     2019-04-16 17:44:44  2019-04-16 18:47:54
rpcmadmin         WEB     2019-04-16 17:48:43  2019-04-16 19:52:52 +0000
rpcmadmin         ssh     2019-04-16 19:07:40  2019-04-16 19:52:52 +0000
```

Example 2. With the parameter *--last*

```
 show all users logs --last
```

The return is:

```
Username                    Type    Login time           Logout Time
-------------------------------------------------------------------------
rpcmadmin                   ssh     2018-01-31 21:56:49  2018-01-31 22:10:57
rpcmadmin                   ssh     2018-01-31 23:11:00
rpcmadmin                   web     2018-01-31 23:12:40
rpcmadmin                   ssh     2018-01-31 23:20:10
rpcmadmin                   web     2018-01-31 23:23:54
```

6.8. Command *set*

6.8.1. General Description of the Command *set*

It is the main command to set the required values within the RPCM work setup.

Below is a brief list of options for the command *set* with comments:

- **action confirmation** — set confirmation of critical actions for the web-interface;
- **all** — set up state for all outlets of the RPCM;
- **api** — REST API access setting;
- **automation** — automation functions settings;
- **buzzer** — control of the sound signal;
- **display** — set up parameters on the front indicator panel;
- **group** — system security group settings;
- **input** — for managing the input, allows you to set up a variety of settings for each of the inputs;
- **output** — for managing the outlet, allows you to set up a variety of settings for each of the outlets;
- **radius server** — settings of server RADIUS;
- **snmp** — settings of configuration SNMP;
- **time** — time settings;
- **user** — settings for the user;
- **group** — group settings;
- **help** — call help.

You can use the *TAB* key for auto-completion (prompts) and the service word `help` or the question mark`?` for displaying information about valid parameters.

The output of the command `set ?`

```
RPCM Commands description:

set action-confirmation - set confirmation of actions for the web interface
  enabled                 to enabled (will double check dangerous actions)
  disabled                to disabled
set all inputs          - set input force failback
  force failback          configuration (available on RPCM1502/RPCM1532)
```

```
    delay                     set stabilization delay
    off                       disable failback
    on                        enable failback
set all outputs           - set all outputs state
  off                         turn them off
  on                          turn them on
set api                   - set api options
  generate-new-key            generate new API access key
  key                         enables or disables existing key
set automation            - set automation parameters
  device-name <name>         for particular device with name
set button-control        - set button control mode
  enabled                     to enabled
  disabled                    to disabled (will disable control from physical
                                buttons)
set buzzer                - set buzzer state
  alternate                   make it alternate
  disabled                    disable it (set buzzer enable required for buzzer
                                to produce sound after this command)
  enabled                     enable it
  off                         turn it off
  on                          turn it on
set cloud                 - allow or disallow export of telemetry
  exportTelemetry             to RPCM.CLOUD
    enable                    allow
    disable                   disallow
set display               - set RPCM display settings
set input 1-2             - set input 1-2 state
  active                      make input active (available on RPCM1502/RPCM1532)
  current limit               set total input current limit
  description                 set input description
  frequency limit             set input frequency limits
    max                         top value
    min                         bottom value
  name                        set input name
  off                         turn it off (available on RPCM1502/RPCM1532/
                                                        RPCM4076)
  on                          turn it off (available on RPCM1502/RPCM1532/
                                                        RPCM4076)
  prioritized                 set input prioritized (available on RPCM1502/
                                                              RPCM1532)
  recognition                 make input blink
  voltage limit               set input voltage limits
    max                         top value
    min                         bottom value
set group <name>          - set various parameters for user's group
set output 0-9            - set output 0-9 state
  description                 configure output description
  name                        configure output name
  off                         turn it off
  on                          turn it on
  overcurrent                 tune overcurrent limits
```

```
  overvoltage               tune overvoltage turn off settings
  recognition               make it blink
  recover turn on after
    overvoltage             configure recover turn on after overvoltage
                              parameters
  survival priority         set turn off on input overload priority
set radius                - set Radius configuration
  server                    adjust Radius server options
set snmp                  - set SNMP configuration
  adminState                enable/disable snmp
  community                 adjust SNMP community settings
  trap                      adjust SNMP traps settings
  user                      adjust SNMP users settings
set time                  - set new time
  value                     value
  zone                      zone
  synchronization           toggle ntp synchronization
set user <username>       - set parameters for username
  authenticator             set Authenticator for user
  accessLevel               set Access Level for user
  disabled                  disables user account
  enabled                   enables user account
  password                  set password for user
set help                  - show this help

Type 'help' to get suggestions
```

6.8.2 Command *set action-confirmation*

Enables or disables confirmation of critical operations: disconnecting and resetting power leads. The web interface corresponds to the setting in the menu **Configuration -> Global options -> Get second confirmation from user for Turn Off/Reset requests.**

Available parameters:

- enabled
- disabled
- help

Help ask:

```
set action-confirmation ?
```

The return is:

```
RPCM Commands description:

  set action-confirmation  - set confirmation of actions for the web interface
    enabled                  to enabled (will double check dangerous actions)
    disabled                 to disabled
  set action-confirmation
```

```
    help                    - show this help

Type 'help' to get suggestions
```

Example. Second confirmation from user for Turn Off/Reset requests will set On.

The command is:

```
set action-confirmation enabled
```

The return is:

```
Confirmation of actions for the web interface is enabled
```

6.8.3 Command *set all*

Help ask:

```
set all ?
```

The return is:

```
RPCM Commands description:

  set all inputs          - set input force failback
    force failback            configuration (available on RPCM1502/RPCM1532)
      delay                     set stabilization delay
      off                       disable failback
      on                        enable failback
  set all outputs  - set all outputs state
    off                turn them off
    on                 turn them on
  set all help     - show this help


Type 'help' to get suggestions
```

6.8.3.1 Command *set all inputs*

Use this command for force failback turn off/on and set failback delay.

Help ask:

```
set all inputs ?
```

The return is:

```
    set all inputs force failback delay - Sets Force Failback Delay switching for Inputs
(in seconds)
                                    on    - Enables Force Failback switching for Inputs
                                    off   - Disables Force Failback switching for Inputs

Type 'help' to get suggestions
```

Example 1. Set inputs force failback delay to 9 seconds.

Command:

```
set all inputs force failback delay 9
```

The return is:

```
Force Failback Delay has been set to 9 seconds

Type 'help' to get suggestions
```

Example 2. Set inputs force failback to ON.

Command:

```
set all inputs force failback on
```

The return is:

```
Force Failback has been set to ON

Type 'help' to get suggestions
```

6.8.3.2 Command *set all outputs*

It is used to administratively turn off or turn off all outlets at once.

The available options are : *on* and *off*.

Help ask:

```
set all outputs ?
```

The return is:

```
RPCM Commands description:

set all outputs off  - set all outputs state to off
set all outputs on   - set all outputs state to on
set all outputs help - show this help

Type 'help' to get suggestions
```

Example 1. Set inputs force failback to OFF and ON.

Turn OFF command:

```
 set all outputs off
```

The return is:

```
Turning outputs 0-9 OFF…

[ooooooooo]

        [Output 0]:  OFF <admin: OFF>     0mA      0W
```

```
        [Output 1]:  OFF <admin: OFF>     0mA      0W
        [Output 2]:  OFF <admin: OFF>     0mA      0W
        [Output 3]:  OFF <admin: OFF>     0mA      0W
        [Output 4]:  OFF <admin: OFF>     0mA      0W
        [Output 5]:  OFF <admin: OFF>     0mA      0W
        [Output 6]:  OFF <admin: OFF>     0mA      0W
        [Output 7]:  OFF <admin: OFF>     0mA      0W
        [Output 8]:  OFF <admin: OFF>     0mA      0W
        [Output 9]:  OFF <admin: OFF>     0mA      0W

Type 'help' to get suggestions
```

Turn ON command:

```
set all outputs on
```

The return is:

```
Turning outputs 0-9 ON...

[OOOOOOOOOO]

        [Output 0]:   ON <admin:  ON>     0mA      0W
        [Output 1]:   ON <admin:  ON>     0mA      0W
        [Output 2]:   ON <admin:  ON>     0mA      0W
        [Output 3]:   ON <admin:  ON>     0mA      0W
        [Output 4]:   ON <admin:  ON>     0mA      0W
        [Output 5]:   ON <admin:  ON>     0mA      0W
        [Output 6]:   ON <admin:  ON>     0mA      0W
        [Output 7]:   ON <admin:  ON>     0mA      0W
        [Output 8]:   ON <admin:  ON>     0mA      0W
        [Output 9]:   ON <admin:  ON>     0mA      0W

Type 'help' to get suggestions
```

6.8.4 Command *set api*

Command set api is used to set the conditions for accessing the API.

Available options:

- **generate-new-key** - is used to generate access keys;
- **key key-body** - allows or prohibits the use of this key — *enable* | *disable* parameters, respectively;
- **authentication** - enables or disables key authentication service using *enable* | *disable* parameters.

Help ask:

```
set api ?
```

The return is:

```
RPCM Commands help:

set api generate-new-key - generate new access key for API
set api key enable | disable - enable or disable access key for API
set api authentication enable | disable - toggle API service authentication

Type 'help' to get suggestions
```

Example 1. Key generation:

Call command:

```
set api generate-new-key
```

The return is:

```
New key: 659d8a7a78f701c7ae139a14fa5cfc48
Key successful saved

Type 'help' to get suggestions
```

Example 2. Prohibit the use of this key with the command:

```
set api key 659d8a7a78f701c7ae139a14fa5cfc48 disable
```

The return is:

```
Key: 659d8a7a78f701c7ae139a14fa5cfc48 successful disabled

Type 'help' to get suggestions
```

To re-enable the use of this key, enter the command:

```
set api key 659d8a7a78f701c7ae139a14fa5cfc48 enable
```

The return is:

```
Key: 659d8a7a78f701c7ae139a14fa5cfc48 successful enabled

Type 'help' to get suggestions
```

Example 3. Disable the service *API authentication*.

Command:

```
set api authentication disable
```

The return is:

```
API Authentication successful disabled

Type 'help' to get suggestions
```

Re-enable *authentication* service:

```
set api authentication enable
```

The return is:

```
API Authentication successful enabled

Type 'help' to get suggestions
```

6.8.5 Command *set button-control*

Turn ON / OFF switching to Control mode with front panel buttons. View mode will work property.

Parameters:

enabled / disabled

Help ask:

```
set button-control ?
```

The return is:

```
RPCM Commands description:
set button-control       - set button control mode
  enabled                   to enabled
  disabled                  to disabled (will disable control from physical
                              buttons)
set button-control help  - show this help

Type 'help' to get suggestions
```

Example. Turn OFF and turn ON switching to Control mode

Command (turn OFF):

```
set button-control disabled
```

The return is:

```
Button control mode is DISABLED

Type 'help' to get suggestions
```

Command (turn ON):

```
set button-control enabled
```

The return is:

```
Button control mode is ENABLED

Type 'help' to get suggestions
```

6.8.6 Command *set buzzer*

It serves to control the sound signal.

The available options are: `alternate`, `on`, `off`

The `on` parameter turns on the speaker sound of the RPCM module, which helps to find the device in the rack.

The parameter `off` disables the speaker sound of the RPCM module.

The parameter `alternate` changes the speaker sound period.

Help displays: `set buzzer ?`

The return is:

```
  set buzzer alternate - set buzzer to alternate
  set buzzer off - turn buzzer off
  set buzzer on - turn buzzer on
  set buzzer help - show this help
```

Example 1. Command set buzzer alternate

It sets the mode of periodic sound mode.

Example:

```
set buzzer alternate
```

The return is:

```
Buzzer set to ALTERNATING
```

Example 2. Command set buzzer on

It enables the sound of the internal speaker of the RPCM module.

Example:

```
set buzzer on
```

The return is:

```
Buzzer turned ON
```

Example 3. Command *set buzzer off*

It enables the sound of the internal speaker of the RPCM module.

Example:

```
set buzzer off
```

The return is:

```
Buzzer turned OFF
```

6.8.7 Command *set cloud*

It is used for enables export telemetry information to RPCM.CLOUD

Parameters:

exportTelemetry (enable / disable) — permission or prohibit export telemetry information.

Help ask:

```
set cloud ?
```

The return is:

```
    set cloud exportTelemetry enable  - enables export telemetry information
                                        to RPCM.CLOUD
                              disable - disables export telemetry information
                                        to RPCM.CLOUD

Type 'help' to get suggestions
```

Example. Enable export telemetry information.

Command:

```
set cloud exportTelemetry enable
```

The return is:

```
Export of telemetry to the cloud is now: enabled

RPCM.CLOUD Information
------------------------------------------------------------------------------
Telemetry export to cloud: enabled
      Registration status: registered
     Cloud session status: connected

Type 'help' to get suggestions
```

6.8.8 Command s*et display*

6.8.8.1 General information About Using *set display*

Used to set or change the default message on the screen.

Available options:

- **user message** — sets the user message.
- **default message** — allows you to select the data to be shown on the display by default.

By default, the display shows the network voltage. The parameter *user message* allows to specify exclusive message. By default, this is an empty value (no characters).

In turn, the parameter *default message* allows you to choose to use as a default message either the built-in parameters or a message specified by the user.

Help:

```
set display ?
```

The return is:

```
set display user message - custom message to be displayed
set display default message - parameter that will be

Type 'help' to get suggestions
```

6.8.8.2 Setting User Message

When setting a user message from one word, you just need to specify this word in after the parameter *user message*.

For example:

```
set display user message RPCM-1
```

```
User Message is 'RPCM-1'
Color is 'blue'

Type 'help' to get suggestions
```

Note. For a custom message, the question mark *?* Is not interpreted as a help request, and is also a message symbol.

When setting a custom message of several words, you just need to specify in quotes the text to display on the display.

For example, you need to set the output message "*RPCM # 1*"

Command:

```
set display user message "RPCM # 1"
```

The return is:

```
User Message changed from 'RPCM-1' to 'RPCM # 1'
Foreground color is 'red'
Background color is 'black'
```

6.8.8.3 Selection of Information for the Default Message

Help:

```
set display default message ?
```

The return is:

```
Please enter the display.

  Required parameters:
    message - parameter that will be displayed

  Supported default messages: voltage, current, power, ipAddress,
                              macAddress, serialName, serialNumber,
                              userMessage
```

```
  Example:
    set display default message test macAddress
    set display default message voltage

Type 'help' to get suggestions
```

To set a custom message as the default:

```
set display default message userMessage
```

The return is:

```
Default Message changed from 'voltage' to 'userMessage'

Type 'help' to get suggestions
```

Note. In this case, the user message must be pre-set by the command

```
set display user message" user-message "
```

To set IP, you must use the parameter *ipAddress*

```
set display default message ipAddress
```

The return is:

```
Default Message changed from 'userMessage' to 'ipAddress'

Type 'help' to get suggestions
```

Now the IP address will be displayed as the default message.

You can return the mains voltage as a default by typing:

```
set display default message voltage
```

The return is:

```
Default Message changed from 'ipAddress' to 'voltage'

Type 'help' to get suggestions
```

6.8.9 Command *set group*

For setting UNIX-group permission: Read-Write-eXecute.

Also there is UNIX-like notation: rwx

Required parameter:

group name.

Available parameters:

--global_config — set permission of RPCM global configuration;

--inputs — set permission of inputs configuration;

--output0 ... -- output9 — set permission of outlets configuration;

--userlogs — set permission of access to logs;

--automation — set permission of access to automation tools;

--utils — set permission of access to system tools.

IMPORTANT! Prohibition or permission, as well as a change in account privileges, occurs immediately, without a request for confirmation from the user. Please consider this if you need to perform actions with the rpcmadmin master record.

Help ask:

```
set group new_group ?
```

The return is:

```
RPCM Commands description:

  set group <groupname>
      --global_config <permissions>   - rw (Read, Write)
      --inputs        <permissions>   - rwx (Read, Write, Execute)
      --output0       <permissions>   - rwx (Read, Write, Execute)
      --output1       <permissions>     ...
      --output2       <permissions>
      --output3       <permissions>
      --output4       <permissions>
      --output5       <permissions>
      --output6       <permissions>
      --output7       <permissions>
      --output8       <permissions>
      --output9       <permissions>
      --userlogs      <permissions>   - r (Read)
      --automation    <permissions>   - rwx (Read, Write, Execute)
      --utils         <permissions>   - x Execute)
```

Example. Disabling to change global configuration for *new_group*.

The command is:

```
set group new_group --global_config r
```

The return is:

```
New permissions applied to group: new_group

Type 'help' to get suggestions
```

6.8.10 Command *set input*

Use command `set input` for configuration inputs.

You should use number input as necessary parameters — digits 1 and 2.

Others parameters:

active — set active input;

name — inputs name, max 26 symbols allowed: digits, english alphabetic symbols, англandского алфавandта, symbols "minus" and "underlining";

description – a comment, max 256 allowed: digits, english alphabetic symbols, англandского алфавandта, symbols "minus", "underlining" and space;

frequency — setting frequency limits;

current — setting max. current limit in Amps, when the limit is reached, the outputs will be turned off in accordance with survival priority settings;

voltage — setting min. and max. voltage limit;

on | off — administrative turn on /off;

prioritized — set input as prioritized input to be used;

recognition — recognition state, turns on or off blinkinng input.

Help ask:

```
set input ?
```

The return is:

```
RPCM Commands description:

set input 1-2 active      - Set input as Active (switch to input)
              name        - Input name, 26 characters long brief description. Should
                            contain alphanumerical characters, hyphens, underscores.
              description - Extented description, 256 characters long description.
                     Should contain alphanumerical, punctuation characters and
                     spaces
              frequency   - Set Frequency limits for input
              current     - Set Current limit for input
              voltage     - Set Voltage limits for input
              on | off    - Administrative status of input
              prioritized - Set input as prioritized input to be used
              recognition - Recognition state, turns on or off blinkinng input

Type 'help' to get suggestions
```

Example 1. Setting input 1 as active (for RPCM with ATS only).

Command:

```
set input 1 active
```

The return is:

```
Active Input is set to 1

Type 'help' to get suggestions
```

Example 2. Setting input 1 as prioritized (for RPCM with ATS only).

Command:

```
set input 1 prioritized
```

The return is:

```
Priority Input is set to 1

Type 'help' to get suggestions
```

Example 3. Setting name of input 2 to «LINE-2».

Command:

```
set input 2 name LINE-2
```

The return is:

```
Name for Input 2 has been updated

Type 'help' to get suggestions
```

Example 4. Setting description input 2 as "Reserve Line". If you want use two or more words, you should use quotation marks.

Command:

```
set input 2 description "Reserve Line"
```

The return is:

```
Description for Input 2 has been updated

Type 'help' to get suggestions
```

Attention. You can use command `show input` for check results.

Check configuration of input 2 after commands from examples 3 and 4.

Command:

show input 2

The return is:

```
                        [Input]: 2
                         [Name]: LINE-2
                  [Description]: Reserve Line
                      [Voltage]: 0
       [Minimum Allowed Voltage]: 100
       [Maximum Allowed Voltage]: 250
                    [Frequency]:  0.00
     [Minimum Allowed Frequency]: 46.00
     [Maximum Allowed Frequency]: 75.00
   [Maximum Allowed Current Amps]: 16
              [Instant Milliamps]: 0
                  [Instant Watts]: 0
                [Accumulated KWh]: 10.495000
               [Accumulated KVAh]: 10.512500
              [Accumulated KVarh]: -0.346667
```

Example 5. Turning on recognition for input 1.

Command:

```
set input 1 recognition on
```

The return is:

```
Recognition for Input 1 has been turned ON

Type 'help' to get suggestions
```

Example 6. Administrative turn off input 2.

Command:

```
set input 2 off
```

The return is:

```
Administrative state for Input 2 has been changed to OFF

Type 'help' to get suggestions
```

6.8.10.1 Command *set input frequency limit*

Use this command for frequency top and bottom limits.

Help ask (also the input number is necessary):

```
set input 1 frequency ?
```

The return is:

```
RPCM Commands description:

  set input 1-2 frequency limit min - minimum allowed frequency at
                                        specified on input
                                max - maximum allowed frequency at
                                        specified on input

Type 'help' to get suggestions
```

Example. Set frequency limits from 48Hz to 61Hz.

Command:

```
set input 1 frequency limit min 48 max 61
```

The return is:

```
Minimum frequency value is set to 48.00Hz for Input 1
Maximum frequency value is set to 61.00Hz for input 1

Type 'help' to get suggestions
```

6.8.10.2 Command *set input current limit*

Use this command for a top current limit.

Help ask (also the input number is necessary):

```
set input 1 current ?
```

The return is:

```
RPCM Commands description:

  set input 1-2 current limit      - Set the input current limit in Amps.
                                     When the limit is reached, the outputs
                                     will be turned off in accordance
                                     with survival priority settings


Type 'help' to get suggestions
```

Example. Set top current limit 8A.

Command:

```
 set input 1 current limit 8
```

The return is:

```
Input 1 limit of current has been set to: 8A

Type 'help' to get suggestions
```

6.8.10.3 Command *set input voltage limit*

Use this command for voltage top and bottom limits.

Help ask (also the input number is necessary):

```
set input 1 voltage ?
```

The return is:

```
set input 1-2 voltage limit min - minimum allowed voltage at
                                      specified on input
                                max - maximum allowed voltage at
                                      specified on input

Type 'help' to get suggestions
```

Example. Set voltage limits from 215V to 241V.

Command:

```
set input 1 voltage limit min 215 max 241
```

The return is:

```
Minimum voltage value is set to 215 for Input 1
Maximum voltage value is set to 241 for Input 1

Type 'help' to get suggestions
Type 'help' to get suggestions
```

6.8.11 Command *set radius server*

For changing of RADIUS servers settings.

Required parameters:

ip — IP of RADIUS server ;

secret key.

Available parameters:

priority <priority> — numbers from 1 to 100, then more then high priority;

port <port> — from 1 to 65534;

enabled <yes|no> ;

use-vsa-group <yes|no> — enable or disable VSA (Vendor-Specific Attributes) answer from RADIUS server;

use-vsa-session-timeout <yes|no> — timeout VSA answer from RADIUS server.

Help ask:

```
set radius server ?
```

The return is:

```
RPCM Commands description:

 set radius server <ip> secret <secret key>   - set shared secret
                       priority <priority>       1-100, server usage priority
                                                 higher is more priority
                           port <port>           port 1-65534
                        enabled <yes|no>         enabled flag
                  use-vsa-group <yes|no>         to use Group VSA from radius
                                                 server response
         use-vsa-session-timeout <yes|no>        to use Session Timeout VSA from
                                                 radius server response

    If you want to add new radius server, use add command.

Type 'help' to get suggestions
```

Example. Set RADIUS server priority (IP 192.168.1.1) to 12.

The command is:

```
set radius server 192.168.1.1 secret password-key priority 12
```

The return is:

```
Radius server 192.168.1.1 updated

Type 'help' to get suggestions
```

6.8.12 Command *set snmp*

It is for updating SNMP parameters.

The available options are: `adminState`,`community`, `user`,`help` or `?`

Help displays:

```
set snmp ?
```

The return is:

```
RPCM Commands description:

  set snmp adminState - Administrative state of SNMP Agent: on / off.
  set snmp community  - SNMPv2 per community parameters (accessList, community, etc)
  set snmp user       - SNMPv3 per user parameters (username, Auth, Access List, etc.)
  set snmp help       - show this help


Type 'help' to get suggestions
```

6.8.12.1 Command *set snmp adminState*

It administratively enables or disables the SNMP agent, allowing or denying work with this protocol.

The available values are: *on* or *off*.

Help displays:

```
set snmp adminState ?
```

The return is:

```
Please set 'on' or 'off'.
```

Example. Turning SNMP access off and on again.

stopping the agent:

```
set snmp adminState off
```

The return is:

```
SNMP Agent administrative state is now off
```

Agent startup:

```
set snmp adminState on
```

The return is:

```
SNMP Agent administrative state is now on
```

6.8.12.2 Command *set snmp community*

It controls the configuration of access via SNMP version *1* and *2c*.

Options available are the following:

--accessList — allowed subnet or a separate IP address;

--accessType — access type; `ro` or `rw` values are used;

--enabled — newly created community will be enabled or disabled (this property can be changed later), *yes* or *no* values are available.

Only the short auto-completion help is available.

The command `set snmp community` displays the names of the created community after the key **Tab** is pressed twice.

```
newcommunity public
```

If there is only one community entry in the system, you can use the auto-completion hint:

`set snmp community public --` after the key **Tab** is pressed twice, it will return:

```
--accessList --accessType --enabled
```

Example. Allowing access by community *public* by setting the option *--enabled* to *yes*

```
set snmp community public --enabled yes
```

The return is:

```
Community public updated
```

6.8.12.3 Command *set snmp user*

Command `set snmp user` for editing the properties of the user account in the framework of using the protocol *SNMPv3*

Options available are the following:

--accessList — allowed subnet or a separate IP address;

--accessType — access type; `ro` or `rw` values are used;

--authPass — SNMP user account password string;

--authProt — used authentication protocol by password;

--enabled — newly created account will be enabled or disabled (this property can be changed later), values are *yes* or *no*;

--privPass — keyword (password) for encryption;

--privProt — type of encryption;

--secLevel — type of authentication.

Attention! There is no standard hint output for this command. You can use auto-hint with double tabbing.

`set snmp user` — after pressing the **Tab** key twice, it will display a list of existing users

```
newsnmpuser newrpcmuser2
```

If there is only one SNMP user account in the system, you can use the auto-completion hint:

`set snmp user newrpcmuser` after pressing the **Tab** key twice, it will display a list of available parameters:

```
--accessList --accessType --authPass --authProt --enabled --privPass --privProt --secLevel
```

Example. Allow access by using the *newrpcmuser* account by setting the *--enabled* option to *yes*.

```
set snmp user newrpcmuser --enabled yes
```

The return is:

```
SNMPv3 user: newrpcmuser updated.
```

6.8.13 Command *set time*

It set the system time and time zone.

The available options are: `value`,`zone`, `help` or `?`

Help displays: `set time ?`

The return is:

```
RPCM Commands description:

    set time value           - set time for RPCM
    set time zone            - set time zone
    set time synchronization - toggle synchronization via NTP protocol
    set time help            - show this help
```

6.8.13.1. Command *set time value*

Set the system time.

Help displays:

`set time value ?`

The return is:

```
Setting time to:

Please specify the date and time or just the time in the following format: YYYY-MM-DD HH:
MM: SS
Example: "2017-06-05 14:32:11" or "20:22:33"
```

Example 1. Setting the system time in full format (date + time).

`set time value 2017-11-13 19:38:39`

The return is:

```
Setting time to: 2017-11-13

Time has been set
```

Attention! The quotes are required when setting the exact time in the format *"YYYY-MM-DD HH: MM: SS"*.

Example 2. Correcting the system time.

`set time value 00:13:06`

The return is:

```
Setting time to: 00:13:06
Time has been set
```

6.8.13.2. Command *set time zone*

It set the time zone.

Help displays:

```
set time zone ?
```

The return is:

```
Invalid timezone has been provided, please use <tab> suggestions to select valid timezone
or use 'show time zones' command to see complete list of time zones
```

The return follows that you need to use the `show time zones` command to get information about time zones

Example. We will establish a time zone for Moscow.

```
set time zone Europe/Moscow
```

The return is:

```
Timezone Europe/Moscow has been set
```

6.8.14 Command *set user*

6.8.14.1 General information

It is used to enabling or disabling user.

Available parameters:

accessLevel — setting privilege level;

disabled;

enabled;

password — changing user password.

IMPORTANT! Prohibition or permission, as well as a change in account privileges, occurs immediately, without a request for confirmation from the user. Please consider this if you need to perform actions with the rpcmadmin master record.

Help ask:

```
set user ?
```

The return is:

```
RPCM Commands description:

  set user <username> - set parameters for username
    authenticator         set Authenticator for user
    accessLevel           set Access Level for user
    disabled              disables user account
```

```
    enabled               enables user account
    password              set password for user
  set user help       - show this help

  If you want to add new user, use add command.

Type 'help' to get suggestions
```

6.8.14.2. Setting privilege level

For example user *newuser* will get set superuser level:

Help ask:

```
set user newuser accessLevel ?
```

The return is:

```
Please provide correct Access Level, the one of: superuser, administrators

Type 'help' to get suggestions
```

The command is:

```
set user newuser accessLevel superuser
```

The return is:

```
Access Level has been successfully changed

Type 'help' to get suggestions
```

6.8.14.3 Disable or enable some user

How to disable user.

The command is:

```
set user newuser disabled
```

The return is:

```
User newuser is now disabled

Type 'help' to get suggestions
```

Note. The use of a question mark "?" in this case it does not cause a help output and does not affect the result of the lock.

```
set user newuser disabled ?
```

The return is:

```
User newuser is now disabled

Type 'help' to get suggestions
```

How to enable user:

```
set user newuser enabled
```

The return is:

```
User 'newuser' is now enabled

Type 'help' to get suggestions
```

6.8.14.4 Change password

How to change password.

The command is:

```
set user newuser password
```

The return is:

```
Please enter password: Please enter password: Please enter password again for
confirmation:
```

The return is after successfully confirmation:

```
Password has been successfully changed

Type 'help' to get suggestions
```

Password has to include english letters, numbers and symbols: underline and hyphen.

If new password has non-available symbols, you get warning:

```
Entered password contains characters that are not allowed. Allowed characters: letters,
numbers and punctuation characters.

Type 'help' to get suggestions
```

If new password and confirmation are not identically, you get warning:

```
Entered passwords do not match. Please try again.

Type 'help' to get suggestions
```

6.9. Command *set output*

This command serves to control the outlet by setting various parameters.

Help ask:

```
set output ?
```

The return is:

```
RPCM Commands description:

set output 0-9 description       - set output description
set output 0-9 name              - set output name
set output 0-9 off               - turn off output number 0-9
set output 0-9 on                - turn on output number 0-9
set output 0-9 overcurrent       - tune overcurrent limits
  alarm                            for alarming
  turn off                         for turning off
set output 0-9 overvoltage       - set output overvoltage turn off
  turn off                         configuration
    disabled                       disable it
    limit volts 0-65534            set limit in volts
set output 0-9 recognition       - set output 0-9 recognition state
  off                              to off
  on                               to on
set output 0-9 recover turn on   - set recover turn on after overvoltage
  after overvoltage                configuration
    disabled                       disable recover turn on
    seconds 0-65534                set stabilization delay before turning on
set output 0-9 survival priority - set output turn off on input overload
                                   priority
set output 0-9 help              - show this help

Type 'help' to get suggestions
```

6.9.1 Command *set output description*

This command set an outlet description.

Example of use:

```
set output 0 description "Outlet 0"
```

The return is:

```
Description for Output 0 has been updated

Type 'help' to get suggestions
```

6.9.2 Command *set output name*

This command set an outlet name.

Example of use:

```
set output 0 name "Out-0"
```

The return is:

```
Description for Output 0 has been updated

Type 'help' to get suggestions
```

6.9.3 Command *set output off*

It administratively disables the specified outlet from `0` to `9`.

Example of use:

```
set output 9 off
```

The return is:

```
[Output 9]: ON <admin: ON> 0mA 0W
```

6.9.4 Command *set output on*

It administratively includes the specified outlet from `0` to `9`.

Example of use:

```
set output 9 on
```

The return is:

```
[Output 9]: ON <admin: ON> 0mA 0W
```

6.9.5 Command *set output overcurrent*

it allows you to control power current consumption.

It is possible to set the threshold value for pre-alarm *alarm* and then turn off.

The available options are: `alarm`, `turn off`, `help`

Help ask:

```
set output 9 overcurrent ?
```

The return is:

```
RPCM Commands description:
  set output 0-9 overcurrent alarm    - tune overcurrent alarm limits
  set output 0-9 overcurrent turn off - tune overcurrent turn off limits
  set output 0-9 overcurrent help     - show this help

Type 'help' to get suggestions
```

6.9.5.1. Command *set output overcurrent alarm limit*

Available level 1 parameters indicating current units are: `amps`,`milliamps`, and time unit seconds` for the delay parameter of the signal.

Available are level 2 parameters, indicating the numerical values of the parameters.

Help ask:

```
set output 9 overcurrent alarm limit
```

The return is:

```
RPCM Commands description:

  set output 0-9 overcurrent
    alarm limit amps 0.000-10.000 - set limit in amps
  set output 0-9 overcurrent
    alarm limit milliamps 0-10000 - set limit in milliamps
  set output 0-9 overcurrent
    alarm limit seconds 0-65535 - set alarm confirmation
                                  delay in seconds
  set output 0-9 overcurrent
    alarm limit help - show this help
```

Example 1. Setting alarm outlet limit to 9A to outlet *9*.

Command:

```
set output 9 overcurrent alarm limit amps 9.00
```

The return is:

```
New overcurrent alarm limit for output 9 is 9.0 amps (was 9.5 amps)
```

Example 2. Setting the delay for the alarm limit in 5 seconds for the outlet *9.*

Command*:*

```
set output 9 overcurrent alarm limit seconds 5
```

The return is:

```
New overcurrent alarm limit confirmation delay for output 9 is 5 seconds (was 30 seconds)
```

6.9.5.2. Command *set output overcurrent turn off limit*

Available level 1 parameters indicating current units are: `amps`, `milliamps`, and time unit seconds` for the delay parameter of the signal.

Available level 2 parameters indicating the numerical values of the parameters of level 1.

Help ask:

```
set output 9 overcurrent turn off limit ?
```

The return is:

```
RPCM Commands description:

  set output 0-9 overcurrent turn off limit - tune overcurrent turn off
                                                limits
    amps 0.000-10.000 set limit in amps
    milliamps 0-10000 set limit in milliamps
    seconds 0-65535 set turn off confirmation
                                                  delay in seconds
  set output 0-9 overcurrent turn off help - show this help
```

Example 1. Setting turn off outlet limit to 9.5A for outlet 9.

Command:

```
set output 9 overcurrent turn off limit amps 9.50
```

The return is:

```
New overcurrent turn off limit for output 9 is 9.5 amps (was 10.0 amps)
```

Example 2. Setting the delay for turn off to 5 seconds for the outlet *9*.

```
set output 9 overcurrent turn off limit seconds 5
```

The return is:

```
New overcurrent turn off limit confirmation delay for output 9 is 5 seconds (was 2 sec-
onds)
```

6.9.6 Command *set output overvoltage*

It turn ON overcurrent control and set ann overcurrent top limit.

Help ask:

```
set output 0 overvoltage ?
```

The return is:

```
RPCM Commands description:

set output 0-9 overvoltage turn off - tune overvoltage turn off
set output 0-9 overvoltage help     - show this help


Type 'help' to get suggestions
```

Command set *output overvoltage turn off limit*.

Help ask:

set output 0 overvoltage turn on ?

The return is:

```
RPCM Commands description:

set output 0-9 overvoltage turn off limit - tune overvoltage turn off
  volts 0-65534                             set limit in volts
  disabled                                  disable overvoltage turn off
set output 0-9 overvoltage turn help      - show this help


Type 'help' to get suggestions
```

Example 1. Setting a limit of 240V.

Command:

```
set output 0 overvoltage turn off limit volts 240
```

The return is:

```
New overvoltage turn off limit for output 0 is 240 volts (was disabled)

Type 'help' to get suggestions
```

Example 2. Disabling an overvoltage turn OFF limit.

Command:

```
set output 0 overvoltage turn off limit disabled
```

The return is:

```
Disable overvoltage turn off limit for output 0 (was 240 volts)

Type 'help' to get suggestions
```

6.9.7 Command *set output recognition*

It includes LED backlighting on the back of the panel to make it easier to find the desired outlet in the rack.

The two available state are: `on` and `off`.

Help ask:

```
set output 9 recognition ?
```

The return is:

```
 set output 0-9 recognition off - set output 0-9 recognition blinking off
 set output 0-9 recognition on - set output 0-9 recognition blinking on
 set output 0-9 recognition help - show this help
```

6.10. Command *set automation*

6.10.1. General Information

The command `set automation` is intended for editing the properties of automation for selected device.

Required:

- name — the name of the connected device for which the automation rules are configured;

Available options:

- **name** — the new name of the connected device for which automation rules are configured;
- **device-type** — type of supported miner (device for crypto currency production);
- **description** — additional description of the device up to 254 characters;
- **outputs** — outlets numbers, where the device is connected (one or more) in the format *"[0-9]"* or *"[0-9], [0-9]..."*
- **check-interval-seconds** — check interval in seconds;
- **inter-restart-interval-seconds** — the protection interval between reboots in seconds;
- **test** — test configuration for Automation.

Display help:

```
set automation ?
```

The return is:

```
set automation device-name - device name to set configured automation for

Type 'help' to get suggestions
```

Example a query help with device name:

```
set automation device-name DEVICE-2 ?
```

The return is:

```
PCM Commands description:

  set automation device-name DEVICE-2
    check-interval-seconds            - interval between automation tests in
                                        seconds
    default                           - set default values for parameters
                                        check-interval-seconds and
                                        inter-restart-interval-seconds
    description                       - description of device, 1 to 254
                                        characters
    device-type                       - type of device, 1 to 25 characters
    inter-restart-interval-seconds    - interval between restarts of device in
                                        seconds
```

```
    new-name                            - new name of device, 1 to 25 characters
    outputs                             - number of RPCM outputs ("[0-9]" or
                                            "[0-9], [0-9], ...")
    test                                - configure Automation test

  Example:
    set automation device-name DEVICE-2 new-name Name
    set automation device-name DEVICE-2 description Description

Type 'help' to get suggestions
```

Example. Add a Description for the device named *"DEVICE-2"*.

The command is:

```
set automation device name DEVICE-2 name description New_Description_for_DEVICE-2
```

The return is:

```
 Description changed from '' to 'New_Description_for_DEVICE-2`'
```

6.10.2. Command *set automation test*

Used to configure test methods (select and configure parameters for verification).

Contains options:

- **consumption** — according to current consumption. When the consumption drops below the set limit, it indicates the idle operation and the device reboots;
- **hash-rate** — hash level, only for mining devices of supported types;
- **ping** — using ICMP packages similar to the command *ping*;
- **tcp-port-availability** — by the availability of the TCP port.

Help ask:

```
set automation device name DEVICE-2 test ?
```

The return is:

```
    set automation device-name <name> test
      consumption                       - Consumption test
      hashrate                          - Hashrate test
      ping                              - Ping test
      tcp-port-availability             - TCP Port Availability test

Type 'help' to get suggestions
```

6.10.2.1. Command *set automation device test consumption*

Used to specify the monitoring of the current consumption level.

Available options:

- **enabled** — answer "yes" or "no" to enable (enable) this control method;

- **alarm-bottom-limit-milliamps** — the lower limit of current consumption in mA, upon which the notification occurs (a warning is sent);
- **restart-bottom-limit-milliamps** — the lower limit of current consumption in mA, after which the device reboots;
- **alarm-seconds** — the delay time in seconds before the notification (sending a warning);
- **restart-seconds** — delay time in seconds before rebooting the device;
- **default** — set all parameters to the default value.

Help ask:

```
set automation device-name DEVICE-2 test consumption ?
```

The return is:

```
  set automation device-name DEVICE-NAME test consumption

  Parameters:
    --enabled yes|no                 - enables Consumption test
    --alarm-bottom-limit-milliamps   - alarm bottom limit milliamps of automation device
    --restart-bottom-limit-milliamps - restart bottom limit milliamps of automation device
    --alarm-seconds                  - time in seconds to trigger the alarm after reaching
                                       the alarm-bottom-limit-milliamps
    --restart-seconds                - time in seconds to trigger the restart after reach-
ing
                                       the restart-bottom-limit-milliamps
    --default                        - set default values for all parameters

  Example:
    set automation device-name testName test consumption --enabled yes --default
    set automation device-name testName test consumption --enabled yes --alarm-bottom-
limit-milliamps 4500 --restart-bottom-limit-milliamps 4300 --alarm-seconds 60 --restart-
seconds 300
    set automation device-name testName test consumption --alarm-bottom-limit-milliamps
4600
    set automation device-name testName test consumption --enabled no

Type 'help' to get suggestions
```

Example 1. Set for a device with the name *"DEVICE-2"* lower warning limit is 3500mA, reboot limit is 3300mA, delay before alert is 600 seconds, delay before restart is 3000 seconds:

```
set automation device name DEVICE-2 test consumption --enabled yes --alarm-bottom-limit-
milliamps 3500 --restart-bottom-limit-milliamps 3300 --alarm-seconds 600 --restart-seconds
3000
```

The return is:

```
Automation Device ID: 5, Name: 'DEVICE-2' has been updated
  Consumption Enabled changed from 'OFF' to 'ON'
  Consumption Alarm Bottom Limit Milliamps set to '3500'
  Consumption Restart bottom Limit Milliamps set to '3300'
  Consumption Alarm Seconds set to '600'
  Consumption Restart Seconds set to '300'
```

```
Type 'help' to get suggestions
```

Example 2. Turn off current consumption testing for this device:

```
set automation device name DEVICE-2 test consumption --enabled no
```

The return is:

```
Automation Device ID: 5, Name: 'nonexistent_claymore' has been updated
  Consumption Enabled changed from 'ON' to 'OFF'

Type 'help' to get suggestions
```

6.10.2.2. Command set automation device test hashrate

It is used to specify the settings for monitoring the level of hashrate of specialized devices (miners) for mining crypto currency.

This setting applies only to preset devices for mining. It is not applicable for other devices.

Available options:

- **enabled** — answer "yes" or "no" to enable (enable) this control method;
- **api-ip-address** — IP Address for API access to the miner (device for crypto currency production);
- **api-port** — TCP port for API access to the miner (device for crypto currency extraction);
- **api-unavailability-timeout-seconds** — a valid timeout when the monitored device is unavailable;
- **alarm-bottom-limit** — the lower limit of the hash, after which an alert occurs (a warning is sent out);
- **restart-bottom-limit** — the lower limit of the hash, after which the device reboots;
- **alarm-seconds** — the delay time in seconds before the notification (sending a warning);
- **restart-seconds** — delay time in seconds before rebooting the device;
- **default** — set all parameters to the default value.

Note. At the time of writing, the following types of devices for mining are supported:

Bitmain S9, Bitmain D3, Bitmain L3 +

Whatsminer M3X

Claymore

DragonMint T1

Help ask:

set automation device name DEVICE-2 test hashRate ?

The return is:

```
 set automation device-name DEVICE-2 test hashrate

  Parameters:
    --enabled yes|no                     - enables Hashrate test
    --api-ip-address                     - api IP Address of miner device
    --api-port                           - api port of miner device
    --api-unavailability-timeout-seconds - api unavailability timeout in seconds
    --alarm-bottom-limit                 - alarm bottom limit hashrate for device
    --restart-bottom-limit               - restart bottom limit hashrate for device
    --alarm-seconds                      - time in seconds to trigger the alarm
                                             after reaching the alarm-bottom-limit
    --restart-seconds                    - time in seconds to trigger the restart
                                             after reaching the restart-bottom-limit
    --default                            - set default values for all parameters

  Example:
    set automation device-name testName test hashrate --enabled yes --api-ip-address
127.0.0.1 --default
    set automation device-name testName test hashrate --enabled yes --api-ip-address
127.0.0.1 --api-port 4028 --api-unavailability-timeout-seconds 3 --alarm-bottom-limit
16700 --restart-bottom-limit 16500 --alarm-seconds 60 --restart-seconds 300
    set automation device-name testName test hashrate --api-unavailability-timeout-seconds
4
    set automation device-name testName test hashrate --enabled no

Type 'help' to get suggestions
```

Example 1. Set for a device with the name *"DEVICE-2"* lower hash limit for alerting 13500, reboot limit of 13300, delay before 60 seconds warning, delay before restart in 300 seconds, change IP to 10.210.1.93.

```
set automation device-name DEVICE-2 test hashrate --enabled yes --api-ip-address
10.210.1.93 --api-port 4028 --api-unavailability-timeout-seconds 3 --alarm-bottom-limit
13500 --restart-bottom-limit 13300 --alarm-seconds 60 --restart-seconds 300
```

The return is:

```
Automation Device ID: 2, Name: 'DEVICE-2' has been updated
  Hash Rate Enabled changed from 'OFF' to 'ON'
  Hash Rate API IP Address set to '10.210.1.93'
  Hash Rate API Port set to '4028'
  Hash Rate API Unavailability Timeout Seconds set to '3'
  Hash Rate Alarm Bottom Limit set to '13500'
  Hash Rate Restart Bottom Limit set to '13300'
  Hash Rate Alarm Seconds set to '60'
  Hash Rate Restart Seconds set to '300'

Type 'help' to get suggestions
```

Example 2. Turn off the hash testing for this device and change the IP address to 10.210.1.91:

```
set automation device-name DEVICE-2 test hashrate --enabled no --api-ip-address
10.210.1.91
```

The return is:

```
Automation Device ID: 2, Name: 'DEVICE-2' has been updated
  Hash Rate Enabled changed from 'ON' to 'OFF'
  Hash Rate API IP Address changed from '10.210.1.93' to '10.210.1.91'

Type 'help' to get suggestions
```

6.10.2.3. Command set *automation device test ping*

This design is designed to configure the monitoring method using ICMP packets similar to the ping command.

Available options:

- **enabled** — answer "yes" or "no" to enable (enable) this control method;
- **ip-address** — IP Address for testing (sending ICMP packets);
- **connect-timeout-seconds** — an acceptable timeout when the monitored device does not have time to respond;
- **upper-limit-milliseconds** — the limit in milliseconds for the packet to pass;
- **alarm-packet-loss-percentage** — the percentage of loss in packets under which the notification is performed;
- **restart-packet-loss-percentage** — the percentage of loss in packets under which the reboot is performed;
- **alarm-seconds** — the delay time in seconds before the notification (sending a warning);
- **restart-seconds** — delay time in seconds before rebooting the device;
- **default** — set all parameters to the default value.

Help ask:

```
set automation device-name DEVICE-2 test ping ?
```

The return is:

```
  set automation device-name DEVICE-NAME test ping

  Parameters:
    --enabled yes|no                - enables Ping test
    --ip-address                    - IP Address of the remote device
    --connect-timeout-seconds       - connect timeout in seconds
    --upper-limit-milliseconds      - limit in milliseconds after which echo reply
                                        is considered lost
    --alarm-packet-loss-percentage  - alarm packet loss percentage
    --restart-packet-loss-percentage - restart packet loss percentage
    --alarm-seconds                 - time in seconds to trigger the alarm after
                                        reaching the alarm-packet-loss-percentage
    --restart-seconds               - time in seconds to trigger the restart after
                                        reaching the restart-packet-loss-percentage
    --default                       - set default values for all parameters
```

```
  Example:
    set automation device-name testName test ping --enabled yes --ip-address 127.0.0.1 --
default
    set automation device-name testName test ping --enabled yes --ip-address 127.0.0.1 --
connect-timeout-seconds 3 --upper-limit-milliseconds 100 --alarm-packet-loss-percentage 50
--restart-packet-loss-percentage 80 --alarm-seconds 10 --restart-seconds 60
    set automation device-name testName test ping --connect-timeout-seconds 4
    set automation device-name testName test ping --enabled no

Type 'help' to get suggestions
```

Example: Set for a device with the name *"nonexistent_claymore"*, delay before replying in 3 seconds, packet loss percentage for notification 50, packet loss limit for reboot 80, delay before notification in 10 seconds, delay before reboot to 60 seconds, change IP to 10.210.1.243.

The command is:

```
set automation device name nonexistent_claymore test ping enabled yes --ip-address
10.210.1.243 --connect-timeout-seconds 3 --upper-limit-milliseconds 100 --alarm-packet-
loss-percentage 50 --restart-packet-loss-percentage 80 --alarm-seconds 10 --restart-sec-
onds 60
```

The return is:

```
Automation Device ID: 5, Name: 'nonexistent_claymore' has been updated
  Ping Connect Timeout changed from '5' to '3'
  Ping Upper Limit Milliseconds changed from '3000' to '100'
  Ping Alarm Packet Loss Percentage changed from '5' to '50'
  Ping Alarm Seconds changed from '60' to '10'
  Ping Restart Packet Loss Percentage changed from '10' to '80'
  Ping Restart Seconds changed from '120' to '60'
  Ping Enabled already 'ON'
  Ping Ip Address already '10.210.1.243'
```

6.10.2.4. Command *set automation device test tcp-port-availability*

Used to specify the settings for monitoring by accessibility of the selected TCP port.

Available options:

- **enabled** — answer "yes" or "no" to enable (enable) this control method;
- **ip-address** — IP Address for port access to the device;
- **port** — TCP port for accessing the device;
- **connect-timeout-seconds** — an acceptable timeout when the monitored device does not have time to respond;
- **alarm-seconds** — the delay time in seconds before the notification (sending a warning);
- **restart-seconds** — delay time in seconds before rebooting the device;
- **default** — set all parameters to the default value.

Help ask:

```
set automation device-name DEVICE-2 test tcp-port-availability ?
```

The return is:

```
  set automation device-name DEVICE-NAME test tcp-port-availability

  Parameters:
    --enabled yes|no          - enables TCP Port Availability test
    --ip-address              - IP Address of the remote device
    --port                    - port of the remote device
    --connect-timeout-seconds - connect timeout in seconds
    --alarm-seconds           - time in seconds to trigger the alarm after reaching
                                the connect-timeout-seconds
    --restart-seconds         - time in seconds to trigger the restart after reaching
                                the connect-timeout-seconds
    --default                 - set default values for all parameters

  Example:
    set automation device-name testName test tcp-port-availability --enabled yes --default
    set automation device-name testName test tcp-port-availability --enabled yes --ip-ad-
dress 127.0.0.1 --port 80 --connect-timeout-seconds 3 --alarm-seconds 10 --restart-seconds
60
    set automation device-name testName test tcp-port-availability --ip-address 127.0.0.2
    set automation device-name testName test tcp-port-availability --enabled no

Type 'help' to get suggestions
```

Example 1. Set for the device with the name *"nonexistent_claymore"*, TPC port 80, timeout at connection in 3 seconds, delay before notification in 10 seconds, delay before reboot in 60 seconds, change IP to 10.210.1.243.

The command is:

```
set automation device-name DEVICE-2 test tcp-port-availability --enabled yes --ip-address
10.210.1.243 port 80 --connect-timeout-seconds 3 --alarm-seconds 10 --restart-seconds 60
```

The return is:

```
Automation Device ID: 5, Name: 'nonexistent_claymore' has been updated
  TCP Port Availability Enabled changed from 'OFF' to 'ON'
  TCP Port Availability IP Address set to '10 .210.1.243 '
  TCP Port Availability Port set to '80'
  TCP Port Availability Connect Timeout set to '3'
  TCP Port Availability Alarm Seconds set to '10'
  TCP Port Availability Restart Seconds set to '60'

Type 'help' to get suggestions
```

Example 2. Disable testing for this device on the TCP port:

```
set automation device-name DEVICE-2 test tcp-port-availability --enabled no
```

The return is:

```
Automation Device ID: 5, Name: 'nonexistent_claymore' has been updated
  TCP Port Availability Enabled changed from 'ON' to 'OFF'
```

6.11. Command *start*

6.11.1. General information

It is used to run additional procedures.

Help ask:

```
start ?
```

Output of information about the command:

```
RPCM Commands description:

    start firmware
      update            - start firmware update procedure
    start update        - start software update procedure
                            (software update file should already be uploaded)
    start configuration
      restore           - start configuration restoration procedure
                            (configuration file should already be uploaded)

Type 'help' to get suggestions
```

6.11.2. Command *start update*

It is used to start the system update process after downloading the update file.

Help ask:

```
start update?
```

The return is:

```
We are not ready to start update, software update file should be uploaded and verified...
```

For information on the operation of this command, refer to section *4.7. Updating the RPCM* software.

6.11.3. Command *start firmware update*

Used to update the firmware.

The firmware have to updated after installing the software.

The procedure requires a separate manual start.

Use:

```
start firmware update
```

For more details, please refer to the section: *"4.7. Updating the RPCM software"*.

6.11.4. Command *start configuration restore*

Use this command to restore of configuration from a backup file.

You have to upload a backup file before start configuration restore. For example:

```
scp RPCM_FirstBatchSeven_20181128_194640.config
rpcmadmin@10.0.0.1:RPCM_FirstBatchSeven_20181128_194640.config
```

Help ask:

```
start configuration restore ?
```

The return is:

```
  start configuration restore       - start configuration restoration procedure
                                      (configuration file should already
                                      be uploaded)

  Parameters:
    --with-reset-to-default yes|no  - reset RPCM to default settings before
                                      restoration procedure
    --skip-invalid-params yes|no    - skip invalid params

  Example:
    start configuration restore
    start configuration restore --with-reset-to-default yes
    start configuration restore --with-reset-to-default yes --skip-invalid-param
s yes
    start configuration restore --skip-invalid-params yes

Type 'help' to get suggestions
```

Parameters:

--with-reset-to-default yes|no — by default is OFF;

--skip-invalid-params yes|no — by default is OFF.

Note. By default, a "delta restore" of the configuration will be performed — only those sections will be restored, that are in the backup file. All settings that were before the start of the restore and which are not in the backup file will be saved. I If you need to restore all setting strictly from backup, you can use parameter start configuration restore--with-reset-to-default yes.

Example. To restore configuration without additional parameters:

Command:

```
start configuration restore
```

The return is:

```
Configuration restore without reset started...
Type 'help' to get suggestions
```

For information about a progress of restoring use command:

```
show configuration restore status
```

The return is:

```
Process of restoring the configuration... Progress: 6%
Type 'help' to get suggestions
```

Next step you have to restart High Level Controller (HLC).

Command:

```
restart high-level-controller
```

6.12. Command *whoami*

Displays the name of the active user account in which the system is running.

Example:

```
whoami
```

The return is:

```
Current username is 'rpcmadmin'
```

6.13. Command *ping*

It is used to diagnose network connections.

Help displays: `ping ?`

Information about the command:

```
RPCM Commands description:
ping <hostname or ip> - ICMP ping to ip address or hostname
```

Example:

```
ping 192.168.1.254
```

The return is:

```
Ping 192.168.1.254 (192.168.1.254):
64 bytes from 192.168.1.254: icmp_seq = 0 ttl = 53 time = 3.304 ms
64 bytes from 192.168.1.254: icmp_seq = 1 ttl = 53 time = 2.037 ms
64 bytes from 192.168.1.254: icmp_seq = 2 ttl = 53 time = 2.215 ms
64 bytes from 192.168.1.254: icmp_seq = 3 ttl = 53 time = 2.389 ms
64 bytes from 192.168.1.254: icmp_seq = 4 ttl = 53 time = 2.207 ms
```

6.14. Command *cancel*

Use to cancel the update.

Parameters:

- **update** — interrupts the update procedure deletes all downloaded data and starts the recovery procedure;
- **configuration restore** — interrupts the restore procedure, deletes all loaded configuration file.

Display help:

```
cancel ?
```

The return is:

```
RPCM Commands description:

    cancel update         - abort software update procedure
                              (it will abort software update procedure, remove
                               all uploaded data and start recovery procedure)
    cancel configuration
      restore             - abort configuration restore procedure
                              (it will remove uploaded configuration)

Type 'help' to get suggestions
```

6.14.1. *Cancel update*

Command:

```
cancel update
```

For more information about updating, it is recommended to refer to the section: *"4.7. RPCM software update"*

6.14.2. *Cancel configuration restore*

Command:

```
cancel configuration restore
```

For more information about the configuration restore process, it is recommended to refer to the sections: *"4.6.14. Backup and Restore Settings"* and *"6.11.4 Command start configuration restore".*

Appendices

Brief description of these appendices:

Appendix 1. Troubleshooting contains information about the main ways to eliminate minor problems, as well as about contacting support services.

Appendix 2. Specifications describes the technical characteristics, functions of the device and various requirements, including safety and environmental protection.

Appendix 1. Troubleshooting

ATTENTION! Before you start any action, you need to check whether the grounding is properly connected.

ATTENTION! If any abnormal situation not described in this section occurs, please contact technical support. Do not attempt to open or repair the Resilient Power Control Module (RPCM) yourself. Repairs should be carried out only by a service engineer.

Malfunctions on inputs

Possible malfunctions during power-up are listed in Table A1.1.

Table A1.1. Power failure.

Name of the characteristic	**Recommended actions**
The device does not turn on, the indicators do not light up.	Check the following parameters: the enclosure is not damaged, fluid has not entered the enclosure and there are no other violations; climatic parameters: temperature and humidity; proper connection of RPCM to the power supply, electrical parameters are within allowed range.
The device is on, one of the input indicators light in red.	Check for correct power connection, voltage and frequency according to the technical specifications on the relevant input.
The device is on, one or both of the inputs blink yellow.	Check that the grounding connection is correct
The device is on, the indicators are continuously lit in yellow (one or both of the inputs).	The frequency or voltage of the input is out of the specified limits. Check that the power supply is in accordance with section

Faults when connecting to the control interface

Possible malfunctions when connecting to the control interface are included in Table A1.2.

Table A1.2. Faults connecting to the Control Interface.

Name of the characteristic	**Recommended actions**
The device can not obtain an IP address.	Check the following: the cable (patch cord) is working properly for the local network, the device is properly connected to the network.
Internet browser displays a message about the unavailability of the page.	Verify that the IP address or network name of the device is correct. If you are trying to access via the FQDN name — try to access the IP address instead. Check the network functionality between the computer running the browser and RPCM (for example, using the network command `ping`). Check that the TCP port 80 is allowed on the network from your computer to RPCM. Check the internet browser version.
Unable to connect using the SSH protocol.	Verify that the IP address or network name of the device is correct. If you are trying to access, use the FQDN name — try to access the IP address instead. Verify that the network is functioning between the computer running the browser and the RPCM module (for example, using the network command `ping` Check that TCP port 22 must is allowed on the network from your computer to the desired RPCM module. Check that your SSH client can work with the SSH2 (SSHv2) protocol.
The connection is established, but it is impossible to get to the web interface or via the SSH protocol.	Verify that the username and password are correct. The default username and password are *rpcmadmin* and *rpcmpassword*. If you have changed this data and can not remember — follow the procedure to reset to factory settings **To reset the password, you must press upper button on the device and hold for ~20 seconds.** **WARNING!** Resetting to factory settings will reset all settings, including network settings.
The connection is not established, there is no access via the Ethernet network, for other devices the network is functioning properly.	Reboot the *High Level Controller (HLC)* running the Software. This module restarts without interrupting the power supply of the connected devices. **To reboot the High Level Controller, simultaneously press both buttons on the device and hold for 11-13 seconds.**

Malfunctions when connecting devices to the RPCM outlets

Possible malfunctions when connecting devices to the RPCM power outlets are included in Table A1.3.

Table A1.3. Devices malfunctions connecting to the RPCM power outlets.

Name of the characteristic	Recommended actions
The connected device does not turn on; the corresponding outlet indicator does not light up	Check whether the outlet is turned on. If necessary, turn it on (see chapter *4. Description of the RPCM Device*).
The connected device does not turn on, the output indicator light red	Check the presence of a short circuit or overload, correct the problem and put the outlet into operational mode.
The connected device does not turn on, the output indicator lights in blue	Check that the cable is working and that the device is connected correctly (see chapter *4. Description of the RPCM Device*).
Connected device does not turn on, output indicator lights in red	Check if the current consumption or overload is exceeded, correct the problem and put the outlet into operational mode
Connected device does not turn on, output indicator lights in purple	The outlet is malfunctioning (administratively on, but physically off). Try to turn off the outlet and then turn it on.

Other malfunctions

In the event of any malfunction, contact technical support.

Contacts for accessing technical support for RPCM

Resilient Cloud and Network Technologies (RCNTEC)

phone: 8 (800) 302 87 87

phone: +7 (495) 009 87 87

e-mail: info@rcntec.com

Feedback https://rpcm.pro/#contacts

Technical support https://rpcm.pro

Appendix 2. Specifications

Specifications

Technical characteristics of the device are listed in Table A2.1.

Table A2.1. Technical Specifications of RPCM.

Name of the characteristic	**Model RPCM 1502**	**Model RPCM 1532**	**Model RPCM 1563 (Mining Edition)**
Power, VA	3840 (at the max. rate of 16A x 240V)	7680 (at the max. rate of 32A x 240V)	15120 (at the max. rate of 63A x 240V)
Inputs (Inlets)			
Type of input connectors	2 (two) IEC-320-C20 connectors	2 cables with IEC60309 2P+PE 32 A 250V connectors	1 cables with IEC60309 2P+PE 63A 250V connector
Rated voltage (line + neutral + grounding), V	100-240	100-240	100-240
Rated current, A	16	32	63
Frequency, Hz	50/60 ± 5%	50/60 ± 5%	50/60 ± 5%
Switching time between inputs, ms	3.5-14	3.5-14	3.5-14
Ground control	Indication of proper grounding conductor connection	Indication of proper grounding conductor connection	Indication of proper grounding conductor connection
Outlets			
Type of outlet connectors	10 (ten) IEC-320-C13 connectors	10 (ten) IEC-320-C13 connectors	10 (ten) IEC-320-C13 connectors
Rated voltage, V	100-240	100-240	100-240
Rated current, A	10	10	10
Overcurrent and short circuit protection parameters	Overload protection: adjustable 0.1-10A (default 10A) Short circuit protection 7-17**i**Nom	Overload protection: adjustable 0.1-10A (default 10A) Short circuit protection 7-17 **I**nom	Overload protection: adjustable 0.1-10A (default 10A) Short circuit protection 7-17 **I**nom

Name of the characteristic	**Model RPCM 1502**	**Model RPCM 1532**	**Model RPCM 1563 (Mining Edition)**
Power Metering	Separate power metering for each of 10 outlets	Separate power metering for each of 10 outlets	Separate power metering for each of 10 outlets
Turn on delay at startup (outlets)	Programmable (default with a delay of 1s)	Programmable (default with a delay of 1s)	Programmable (default with a delay of 1s)
Light indication			
Inlets (inputs) status	On / off / parameter mismatch / priority frequency / voltage / current / power / designation of correctly connected earth	On / off / parameter mismatch / priority frequency / voltage / current / power / designation of correctly connected earth	On / off / parameter mismatch / priority frequency / voltage / current / power / designation of correctly connected earth
Outlets (outputs) status	On / off / Short circuit / overload	On / off / Short circuit / overload	On / off / Short circuit / overload
Remote control and monitoring			
Inlets (inputs) status	On / off. / parameter mismatch / priority frequency / voltage / current / power / designation of properly connected grounding	On / off. / parameter mismatch / priority frequency / voltage / current / power / designation of properly connected grounding	On / off. / parameter mismatch / priority frequency / voltage / current / power / designation of properly connected grounding
Outlets (outputs) status	On / off / short circuit / overload control thresholds of consumption and on-delay	On / off / short circuit / overload control thresholds of consumption and on-delay	On / off / short circuit / overload control thresholds of consumption and on-delay
Power Metering	Measurement of power consumption to the accuracy of one client device	Measurement of power consumption to the accuracy of one client device	Measurement of power consumption to the accuracy of one client device
Supported protocols	HTTP / HTTPS (web-interface / REST API), SSH, SNMP	HTTP / HTTPS (web-interface / REST API), SSH, SNMP	HTTP / HTTPS (web-interface / REST API), SSH, SNMP

Name of the characteristic	Model RPCM 1502	Model RPCM 1532	Model RPCM 1563 (Mining Edition)
Supported protocols	HTTP / HTTPS (web-interface / REST API), SSH, SNMP	HTTP / HTTPS (web-interface / REST API), SSH, SNMP	HTTP / HTTPS (web-interface / REST API), SSH, SNMP
Dimensions (WxDxH), mm	440 x 365 x 44	440 x 365 x 44	440 x 365 x 44
Weight, kg	6	6,59	7,14
Cooling	Passive	Passive	Passive
Installs into	Standard 19" rack, space occupied 1U	Standard 19" rack, space occupied 1U	Standard 19" rack, space occupied 1U
Noise level (switching on / switching ports), dBA, not higher	30	30	30

Technical Characteristics of the Devices *RPCM 3x250* and *RPCM DELTA*

Technical characteristics of the devices RPCM 3x250 and RPCM DELTA are listed in Table A2.2.

Table A2.2. Technical Specifications of Resilient Power Control Module: RPCM 3x250 and RPCM DELTA

Name of the characteristic	Model RPCM 3x250	Model RPCM DELTA
Inputs		
Power, VA	180 kW at 415/240V WYE	156 kW at 208V DELTA
Connection	3 lines + neutral (WYE topology) and protective conductor (ground)	3 lines (DELTA topology) and protective conductor (ground)
Type of input connectors	2 (two) bus terminals 70-180 mm2 for each connection, 2 (two) bus terminals 70-180 mm2 for each connection	2 (two) bus terminals 70-180 mm2 for each connection, 2 (two) bus terminals 70-180 mm2 for each connection
Rated input voltage and current	3 phases 100-240V (line-to-neutral with a WYE topology) 250A 415V (line-to-line voltage)	3 phases (line-to-line voltage with a DELTA topology ~208V) 467A
Frequency, Hz	50/60 ± 5%	50/60 ± 5%
Outlets		

Name of the characteristic	**Model RPCM 3x250**	**Model RPCM DELTA**
Number of connections	90 connections, 30 controlled outlets (3 connections per channel)	90 connections, 30 controlled outlets (3 connections per channel)
Connection type	Spring terminals: 4(6) mm2 for connecting line and neutral conductors, 2.5(4) mm2 for protective conductors	Spring terminals: 4(6) mm2 for connecting line and neutral conductors, 2.5(4) mm2 for protective conductors
Rated voltage and current of the controlled channel	100-240V (line-to-neutral), 25A for each controlled channel	208V (line-to-line), 25A for each controlled channel
Overcurrent and short circuit protection parameters	Overload protection: adjustable 0.1-25A (default 25A) Short circuit protection — 3 **i**Nom, >75A	Overload protection: adjustable 0.1-27A max / 25A nominal / 21.6 A derated, short circuit protection — 3 **i**Nom, >75A
Power Metering	Separate power metering for each of 30 outlets	Separate power metering for each of 30 outlets
Turn on delay at startup (outlets)	Programmable (default with a delay of 1s)	Programmable (default with a delay of 1s)
Light indication		
Inlets (inputs) status	On / off / parameter mismatch / priority frequency / voltage / current / power / designation of correctly connected earth	On / off / parameter mismatch / priority frequency / voltage / current / power / designation of correctly connected earth
Outlets (outputs) status	On / off/ Short circuit / overload	On / off / Short circuit / overload
Remote control and monitoring		
Inlets (inputs) status	On / off. / parameter mismatch / priority frequency / voltage / current / power / designation of properly connected grounding	On / off. / parameter mismatch / priority frequency / voltage / current / power / designation of properly connected grounding
Outlets (outputs) status	On / off / short circuit / overload control thresholds of consumption and on-delay	On / off / short circuit / overload control thresholds of consumption and on-delay
Power Metering	Measurement of power consumption to the accuracy of	Measurement of power consumption to the accuracy of

Name of the characteristic	Model RPCM 3x250	Model RPCM DELTA
	one client device	one client device
Supported protocols	HTTP / HTTPS (web-interface / REST API), SSH, SNMP	HTTP / HTTPS (web-interface / REST API), SSH, SNMP
Watchdog	Reboot the channel (outlets / socket) when the hashrate decreases in the miners; Reboot the channel (output / socket) in the absence of responses to ICMP; requests (pings); Reboot the channel (output / socket) when the TCP port is unavailable; Reboot the channel (output / socket) when the current decreases	Reboot the channel (outlets / socket) when the hashrate decreases in the miners; Reboot the channel (output / socket) in the absence of responses to ICMP; requests (pings); Reboot the channel (output / socket) when the TCP port is unavailable; Reboot the channel (output / socket) when the current decreases
Others parameters		
Network	3 x Ethernet 10/100 Mbps	3 x Ethernet 10/100 Mbps
Dimensions (WxDxH), mm	600x600x250 мм	600x600x250 мм
Form-factor	Wall-mounting enclosure	Wall-mounting enclosure
Weight, kg	34	34
Work temperature	0 ~ +40 °C	0 ~ +40 °C
Store temperature	-20 ~ +60 °C	-20 ~ +60 °C
Cooling	Passive	Passive
Noise level (switching on / switching ports), dBA, not higher	<30	<30

List of functions of the device

- Automatic transfer switch (ATS) without interruption of power supply (for RPCM AC ATS 16A, RPCM AC ATS 32A, RPCM DC ATS 76A).
- Per outlet short circuit isolation. In the event of a fault on one of the connected devices, RPCM will automatically cut off only the power supply to the device where the fault occurred, preventing the disconnection of the rest of the equipment — both connected to the RPCM, and everything else connected to the same power bus (with selective protection).
- Configurable thresholds of current consumption for each port, which should allow the administrator to prevent the occurrence of fire hazards situations by setting individual thresholds of current consumption on each port and alerting administrators or automatically shutting down the power supply to a consumer exceeding the specified limit.

- Remote power management of individual ports, which should provide an opportunity for the administrator to enable, disable and reset any of the 10 ports without having to physically visit the facility where the equipment is installed and monitor facts of unauthorized disconnection / connection of equipment or accidental disconnection of the power cable or power supply failure of a connected equipment.
- Diagnostics of properly connected grounding, which should ensure the prevention of equipment failures, as well as increase electrical safety during the operation of the equipment.
- Customizable sequence and of activation of ports when power is supplied to the inputs, which should provide administrators the opportunity to guarantee the activation of equipment after complete power loss in the facility, and to customize the sequence and delays when switching on the equipment after a full blackout in order to allows the IT infrastructure and information system to launch correctly.
- Use of power meters on each individual input or outlet with the ability to measure power consumption to the accuracy of one client device.
- Functions of monitoring the health of connected devices by the level of power consumption, availability by network and the level of the hashrate (only for specialized devices).

Requirements for ambient conditions during use

Normal ambient conditions for the operation of the RPCM are following:

- Operating range of ambient temperature 0-40° C;
- Operating range of relative humidity is 45-85% (non-condensing); -
- Operating range of altitude above sea level is 0-2000 m.

The environment is non-explosive, does not contain a significant amount of conductive dust, vapors, corrosive gases in concentrations harmful to the component and RPCM module materials.

The quality of the connections of the modules must ensure reliable contact of the connecting parts and prevent their inadvertent disconnection.

Electrical connectors should provide reliable operation of the technical components; the external connectors must allow for multiple disconnection and connection of peripherals in normal mode without loss of connection quality, provide reliable electrical and mechanical contact.

The surface of the RPCM housing must not be chipped, scratched, dented or otherwise defective.

Ensuring safety and environmental protection

Resilient Power Control Module (RPCM) is designed and manufactured in such a way that, when used for its intended purpose and in compliance with the installation, operation (use), storage, transportation and maintenance requirements, it ensures:

- the necessary level of protection against direct or indirect exposure to electric current;
- the absence of unacceptable risk of occurrence of the elevated temperatures or emissions which can lead to dangers;

- the necessary level of protection against injuries;
- the necessary level of protection against dangers of non-electrical origin arising from the use of low-voltage equipment, including those caused by physical, chemical or biological factors;
- the necessary level of insulation protection;
- the necessary level of mechanical and wear resistance;
- the necessary level of resistance to external influencing factors, including those of non-mechanical nature, under appropriate climatic conditions of the external environment;
- the absence of unacceptable risk for overloads, emergency modes and failures, caused by the influence of external and internal factors;
- the absence of unacceptable risk when connecting and (or) mounting.

All work on the settings and maintenance of RPCM must be carried out by specialists who have studied the technical documentation, design, features of RPCM and are authorized in accordance with the "Rules for the Installation of Electrical Installations", "Interindustry Safety Rules for the Operation of Electrical Installations" and "Regulations Technical Operation of Electrical Installations of Consumers "; having a qualification group for safety precautions of not less than Group III up to 1000V, and having the necessary competence to perform the specified types of work.

In the manufacture of RPCM, their testing, storage, transportation and operation (application), as well as during disposal, measures should be provided to prevent harm to the environment, wildlife and human health.

Disposal should be carried out in accordance with the procedure established in the enterprise operating the product.

It is allowed to dispose of utilizations materials on a contractual basis with an organizations that has a license for ecological utilizations.

After the conclusion of the term of use the product does not pose a danger to life, human health and the environment.

Glossary

General Terms

RPCM — Resilient Power Control Module — a device combining the functions of power monitoring, automatic transfer switch (ATS) without interrupting the operation of the connected equipment, short-circuit protection and power metering on each port.

Serial Name — unique device name **RPCM** for easy identification during maintenance and technical support.

Serial Number — serial number of the device

Front Panel — front plane of the device case with the indicating and operating elements located on it.

Back Panel — rear plane of the device housing the connectors for outlets and and inputs fixed to it.

Input — physical input channel through which power is supplied to the device.

Inlet — (see **Input**)

Outlet — a physical channel for connection of the powered equipment. Only 10 channels from *0* to *9* with the functions of flexible control and monitoring.

Output— (see **Outlet**)

RTC — Real Time Clock

ATS — Automatic Transfer Switch; a functionality that detects absence of frequency on main power input or degradation of power input quality and switches consumers over to the reserve power input.

Recognition — an object identification. For power management, you need to accurately identify the object: a separate input, output, or the entire RPCM. To solve this problem, a backlight or a sound signal (beeper) can be used.

Administrative status — the object status as defined by the RPCM administrator (user). "***Administratively off*** " means that the power supply has been turn off by the administrator. The state ***"administratively on, hardware off"*** means that, according to the administrative settings, power should be supplied, but it was interrupted at the hardware level, for example, an overload or short circuit protection of the RPCM was triggered.

Delay before — the time in seconds, it takes to check if an event is actually taking place, or if it is a short-term change in characteristics, for example, a noise on the power supply. **Notification delay —** when a timeout is set in seconds before informing the user (administrator) about the event. **Turn off delay —** when power off is delayed to prevent a bad situation.

"Cold" start — start power to the RPCM from an external source after a complete shutdown. A **"cold" restart** terminates and resumes power to the RPCM outlets.

Network

DHCP — Dynamic Host Configuration Protocol is based on the TCP / IP stack. It is used to automatically assign an IP address and other network parameters to network nodes.

DHCP server — service to support the DHCP protocol in the network.

Zero Configuration (Networking) — technology to quickly set up a local TCP / IP network without a DHCP server and manually configure settings. When using this method of network address configuration, IP is automatically assigned from the range *169.254.xxx.xxx*, network mask (Netmask) *255.255.0.0* (Another notation - CIDR standard - *169.254.0.0/16*).

APIPA — Automatic Private IP Addressing — Atomic addressing in a private network. It has another name — **Zero Configuration (Networking)**.

IPv4LL — IPv4 Link Local - also referred to as **Zero Configuration Networking** or **APIPA** (**Automatic Private IP Addressing**).

MAC address — Media Access Control (address) or hardware address — a unique factory identifier. MAC address is assigned to each physical interface in Ethernet family networks.

SSH — Secure Shell — application level protocol of the TCP/IP stack. The main application is emulation of the CLI interface (command line interface) on the client side.

Connection and management

Web interface — graphical interface for remote control of RPCM over HTTP / HTTPS protocols via Internet browser.

CLI — Command Line Interface for remote control of RPCM over SSH.

Authentication — process of authenticating a client, for example by login and password.

Web Interface

Main Window — the first view where the transition occurs in the web interface.

View Mode — a view, that is installed by default in **Main Window** of **Dashboard**. The main purpose is to provide detailed information about the state of the system.

Control Mode — the system management mode screen, which includes such operations as complete disconnection of inputs and outlets. This mode is called by pressing **Unlock Control button**.

Top Control Bar — blue color bar at the top of the **Main Window** It is intended for displaying general information and switching between operating modes.

Virtual Front Panel — information area on the **Top Control Bar** and serves for relaying the indicator on the front panel of the device.

Reflection Block — see **Virtual Front Panel.**

Unlock Control Button — intended for switching the **Main Window** between **View Mode** and **Control Mode**.

Disclaimer

This User Manual does not replace project documentation, regulations or other documents on operation, modernization, security and so on as stipulated by law.

The Resilient Power Control Module (RPCM) improves electrical safety in the operation of equipment, reduces the risk of interruption in power supply, short-circuit, unauthorized connection / disconnection of equipment, accidental disconnection of a power cable or failure of power supply of connected equipment, as well as equipment itself, fire hazards, and other hazards, but it is not a guarantee that these events will never happen.

RCNTEC LLC accepts no responsibility for any expenses incurred by or due to be made by the buyer, loss or damage to his property (real damage) due to use of the Resilient Power Control Module (RPCM) in accordance with this manual, as well as the non-received the incomes that the buyer would receive and would have received under normal conditions of in commerce, by not using the Resilient Power Control Module (RPCM). In addition, RCNTEC LLC also does not take responsibility for loss or damage, lost revenue, including those cases when the damage is caused by the above events.

RCNTEC LLC is not liable for such damage as violation of the integrity of data, including damage, removal or unforeseen modification; failure, violation or modification of the operation of software or hardware, the operation of lines or communication channels; other unforeseen situations that may occur when using the Resilient Power Control Module (RPCM) in accordance with this manual.

In any event, RCNTEC's liability can not exceed the cost of the acquired Resilient Power Control Module (RPCM).

This User Manual is compiled by qualified specialists and meets high standards of integrity and reliability of information. Nevertheless, RCNTEC LLC does not make any statements and does not give any guarantees (directly or indirectly) regarding the completeness or accuracy of the information contained in this User Manual.

RCNTEC LLC RESERVES THE RIGHT TO MAKE ANY CHANGES OR UPDATES IN THIS USER MANUAL AT ANY TIME WITHOUT NOTICE.

WARNING! The electrical equipment must be installed, operated and maintained only by persons who have knowledge of the general safety requirements and who are sufficiently qualified to carry out work on electrical equipment.

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