



# Resilient Power Control Module

## RPCM



User Manual

For models:

RPCM DC ATS 76A

RPCM DC 232A

Version 201911151115

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## **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 to RPCM

## 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 76A -48VDC (42-58VDC) (ATS), max. current 76A for RPCM DC ATS 76A.

1 x 232A -48VDC (42-58VDC), max. current 232A for RPCM DC 232A.

### **Outlets:**

10 outlets, designed for a current of 30A (with a 4 mm<sup>2</sup> cross section); 24A (with a cross section of 2.5 mm<sup>2</sup> wires).

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

Proper grounding indication.

Configuration of activation sequence and delays;

Priority configuration for outlets to turn off in case of input consumption in exceed input of consumption limit.

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 DC Features

**Remote power management of individual outlets** — operations team 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 disconnection of power cables or PSU failure on the powered 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 in 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 current consumption limits for each outlet** — operations team can prevent fire hazards by setting current limits on each outlet and configuring administrators notifications or automated power cut off on the outlet where consumption exceeding the defined limits was detected.

**Customizable outlet activation sequence and delays to start up services correctly after complete power loss events** — operations team can guarantee powering on of equipment after a full blackout, as well as set activation sequence and delays during startup following a power cut off, to ensure proper start up of telecom, IT infrastructure and information systems.

**Power meters on each individual outlet** — access to detailed consumption information on every unit of powered equipment allows to optimize power consumption, bill contractors to which you provide power on sites, troubleshoot issues with much better insights and plan expansions based on real life consumption telemetry data.

**ATS (Automatic Transfer Switch)** — *for RPCM DC ATS 76A 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 to consumers. This allows to significantly increase uptime of equipment with single power supply unit. Also this functionality makes it easy to maintain DC power sources like battery packs, rectifiers etc without planning downtimes.

**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 and TCP port availability to automate recovery of equipment from failures by detecting issues and power cycling powered devices automatically.

## **IMPORTANT!**

**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](mailto:info@rcntec.com)

Technical support <http://rpcm.pro>

Feedback <http://www.rcntec.com/feedback>

## 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).

## 2.1. Operating Instructions and Specifications

### 2.1.1. Before You Begin

The RPCM must not be connected to an electrical system where voltage exceeds the limits specified in the RPCM datasheet.

Do not operate without grounding.

Switches or circuit breakers used to provide power towards the RPCM 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 qualified 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 enclosure must not be chipped, scratched, dented or otherwise defective.

### 2.1.3. General Technical Characteristics

Table 2.1.1. General Technical Characteristics RPCM RPCM DC ATS 76A, RPCM DC 232A

Characteristics	RPCM DC ATS 76A	RPCM DC 232A
<b>Inputs</b>		
Power	3.648 kVA @ 48VDC	11.136 kVA @ 48VDC
Connection	2 DC inputs	1 DC input
Connection Type	Spring terminals (1.5-16 mm <sup>2</sup> )	Screw terminals: rigid cable (25-95 mm <sup>2</sup> ); flexible cable (35-95 mm <sup>2</sup> )
Rated voltage	-48VDC (42-58VDC)	-48VDC (42-58VDC)
<b>Outlets</b>		
Number of connections	10 clamp terminals	10 clamp terminals
Connection Type	Clamp terminals: 4 mm <sup>2</sup>	Clamp terminals: 4 mm <sup>2</sup>
Rated voltage	-48VDC	-48VDC
Rated and maximum current	30A (with a cross section of 4 mm <sup>2</sup> ); 24A (with a cross section of 2.5 mm <sup>2</sup> )	30A (with a cross section of 4 mm <sup>2</sup> ); 24A (with a cross section of 2.5 mm <sup>2</sup> )
Overload and short circuit protection parameters	Overload protection: adjustable 0.1-30A (default 30A); short-circuit protection (tripping current 87.5A)	Overload protection: adjustable 0.1-30A (default 30A); short-circuit protection (tripping current 87.5A)
<b>Light indication (display)</b>		
Input Status	On / off / voltage out of range / activity parameters; current / voltage; indication of the presence / absence of grounding	On / off / voltage out of range / activity parameters; current / voltage; indication of the presence / absence of grounding
Channel Status (Outputs)	On / off / short / overcurrent at the output / overcurrent at the inputs	On / off / short / overcurrent at the output / overcurrent at the inputs
<b>Other options</b>		
Communication Interface	Ethernet 10/100 Mbps (one for each input)	Ethernet 10/100 Mbps (one for each input)



Characteristics	RPCM DC ATS 76A	RPCM DC 232A
Completeness of the product	RPCM DC ATS 76A, 19 "rack mount kit, Quick Start Guide	RPCM DC 232A, 19" rack mount kit, Quick Start Guide
Dimensions (WxDxH)	440 x 365 x 44 mm,	440 x 365 x 44 mm
Form Factor	installation in a standard 19 " cabinet (occupies 1U)	installation in a standard 19 " cabinet (occupies 1U)
Operating temperature	0 ~ +40 ° C	0 ~ +40 ° C
Storage temperature	-20 ~ +60 ° C	-20 ~ +60 ° C
Relative air humidity	45 ~ 85% (no condensation)	45 ~ 85% (no condensation)

### Technical Support Information for RPCM:

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

Feedback <http://www.rcntec.com/feedback> Technical Support <http://rpcm.pro>

## 2.2. Mounting RPCM DC ATS 76A, RPCM DC 232A

### 2.2.1. Description

This chapter section contains instructions for installing the Resilient Power Control Module (RPCM) and is intended for personnel 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. Installation and Operation Requirements

#### Power and ground requirements for RPCM DC ATS 76A:

voltage -42 - -58 VDC;

grounding;

easy accessibility of switches or circuit breakers of both inputs for disconnection in case of danger.

#### Power and ground requirements for RPCM DC 232A:

voltage -42 - -58 VDC;

grounding;

easy accessibility of switches or circuit breakers 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 DC ATS 76A, RPCM DC 232A — short circuit protection trips at ~87.5A current on the outlet. Short circuit tripping time – around 100 microseconds. In order to isolate short circuit on individual outlets you should choose circuit breakers on input that have tripping delay 2 ms or longer.

### 2.2.3. Preparatory steps

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

Before connection the input power, make sure that all Switches or Circuit Breakers are in the OFF position;

Make sure that the equipment connected to the module outputs are configured and suitable for operation at the same voltage levels as RPCM module — 48 VDC. Failure to ensure correct voltage ranges can lead to serious damage to the equipment.

**CAUTION!** To reduce the risk of injury, 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 cable fixation kit, install it before installing the RPCM in the rack.

To install RPCM:

install the rack nuts as in Figure 2.2.1;

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

prepare the power lines to connect the module as shown in Figure 2.2.3 for RPCM DC ATS 76A or Figure 2.2.4 for RPCM DC 232A;

connect the power cables to the inputs;

connect power cables of the power equipment to outlet clamp terminals.

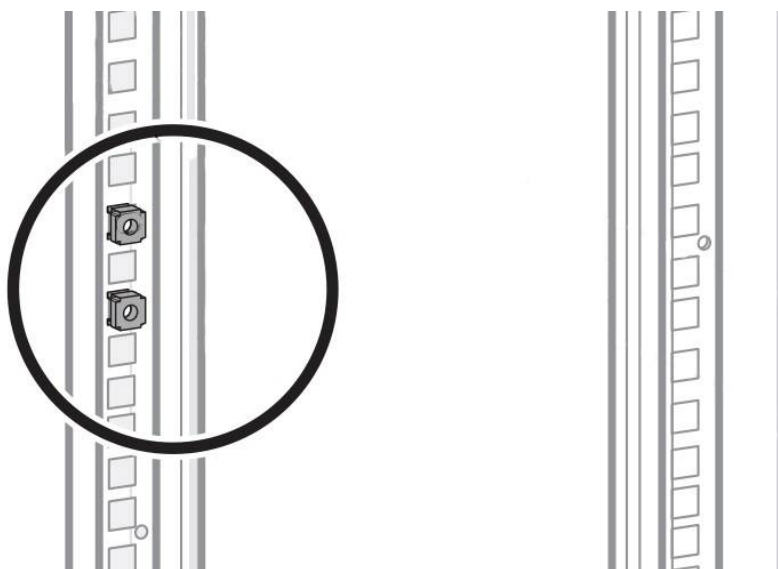


Figure 2.2.1. Inserting rack nuts.

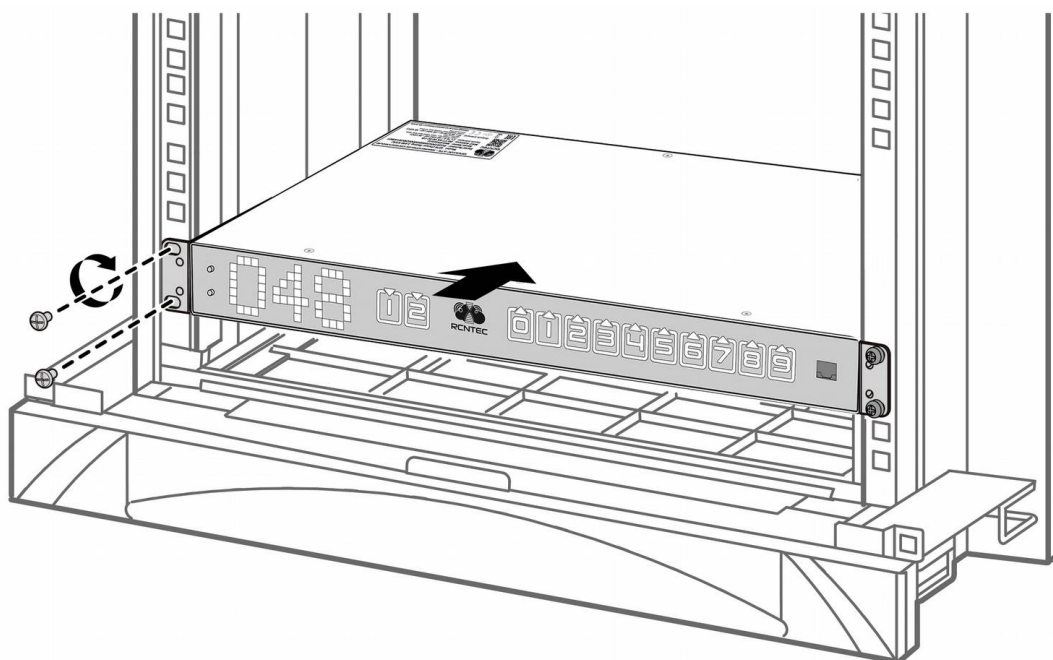


Figure 2.2.2. Mounting the Resilient Power Control Module (RPCM).

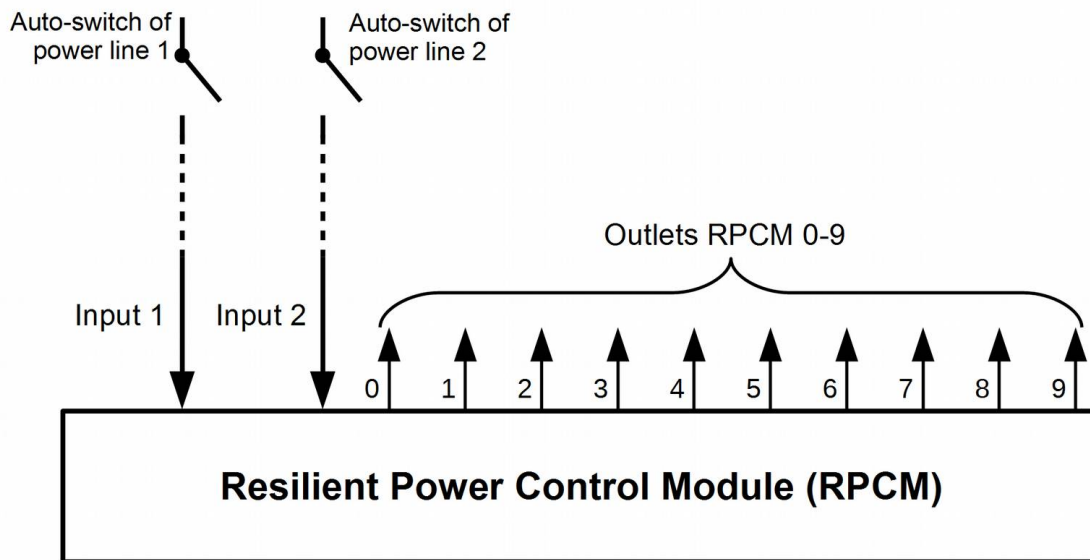


Figure 2.2.3. Connecting RPCM DC ATS 76A.

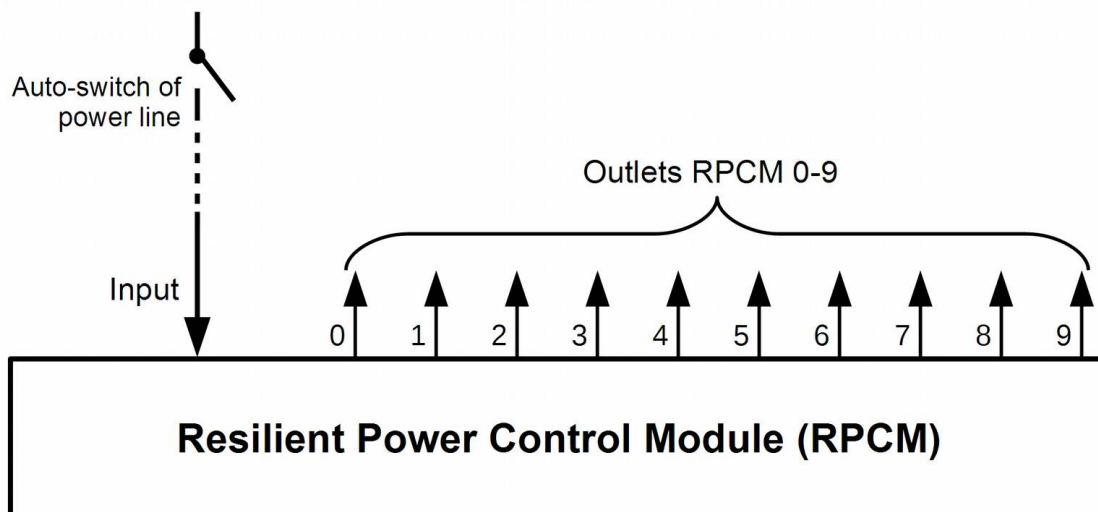


Figure 2.2.3. Connecting RPCM DC 232A.

## 2.2.7. Terminals for input and output connections

Input terminals of RPCM DC ATS 76A and RPCM DC 232A have significant differences in design, dimensions and cross-sectional area of wires. These differences originate from the difference in maximum current values.

The RPCM DC232A model has only one input for connecting to a power source with two terminals, while the RPCM DC ATS 76A has 2 pairs of terminals.

### 2.2.7.1. Connecting wires to RPCM DC ATS 76A inputs

The procedure for connecting wires to input terminals of RPCM DC ATS 76A.

Carefully study the labeling and polarity of the connection.

Remove the insulation from the wire.

Before inserting wire into terminal, you must first open the clamp. To do this, insert a screwdriver into the rectangular shaft near the clamp.

To disconnect, you must also insert a screwdriver into the rectangular shaft near the clamp.

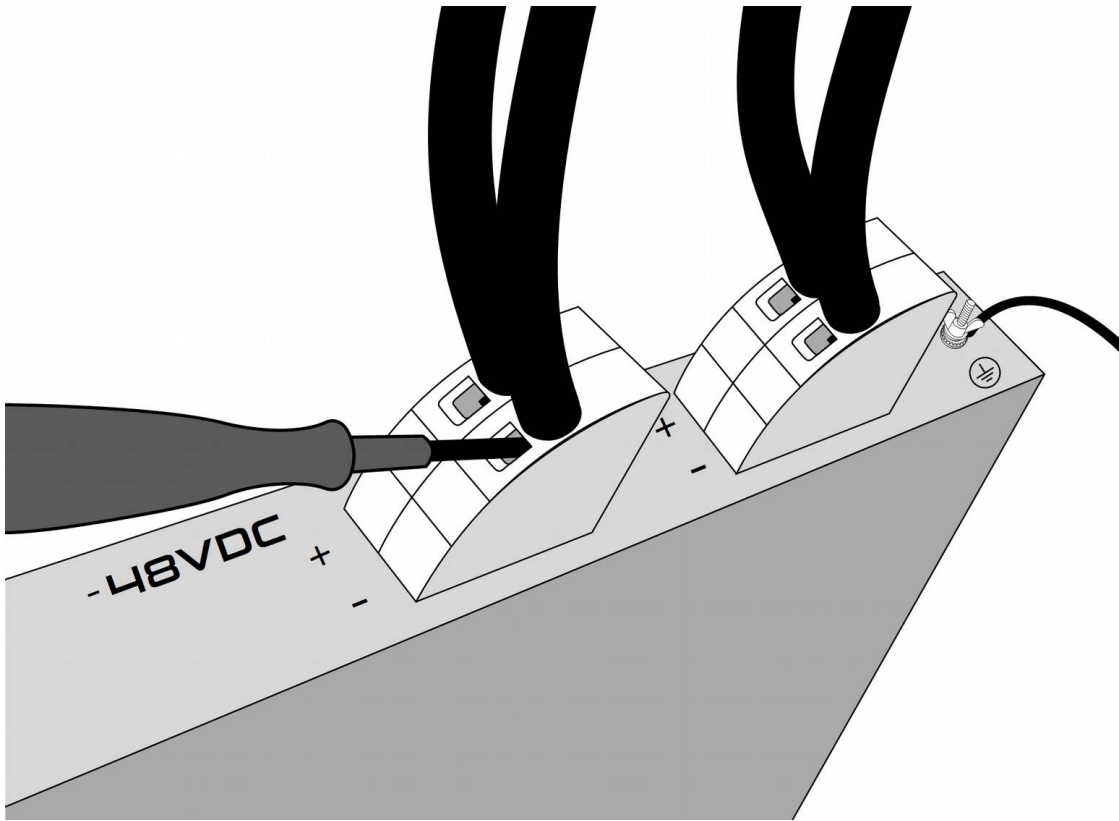


Figure 2.2.5. Connecting wires to the input terminals of RPCM DC ATS 76A.

**IMPORTANT!** No mechanical loads should be transferred to the Push-in spring clip, otherwise the electrical connection may be damaged.

### 2.2.7.2. Connecting wires to the inputs RPCM DC 232A

To connect the input to the electrical circuit use two terminals with screws for the positive and negative conductors.

#### **To connect cable to the screw terminal:**

Remove insulation from wire.

Insert the wire into the contact hole.

Insert the hex key into the side hole to tighten the screw.

Tighten the screw with a force of 10 Nm ... 12 Nm.

Connect the second conductor in the same way.



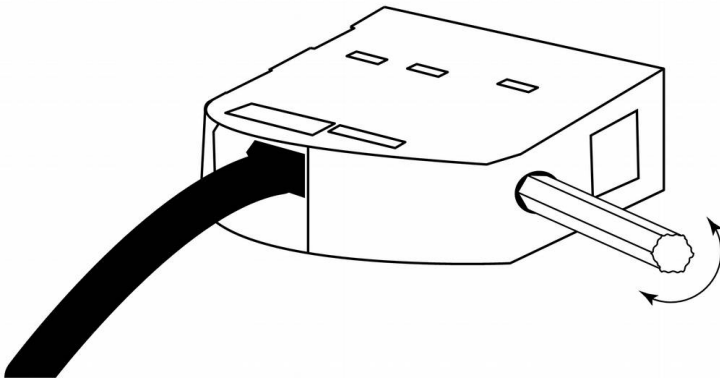


Figure 2.2.6. Connect the conductor to the input terminal of RPCM DC 232A.

### 2.2.7.3. Connection of conductors to RPCM DC ATS 76A and RPCM DC 232A output clamp terminals

RPCM DC uses clamp terminals to connect power wires to supply power to loads.

To connect the conductor to the RPCM DC ATS 76A outlet and RPCM DC 232A outlet, you must:

Remove the insulation from the conductor.

To open the clamp, press the orange button with a screwdriver.

Insert the conductor directly into the round hole of the terminal.

Remove the screwdriver releasing the button and make sure that the conductor sits in the terminal firmly.

Similarly connect the second conductor.

To remove the conductor, you also need to push in the orange button with a screwdriver, remove the conductor and release the button.

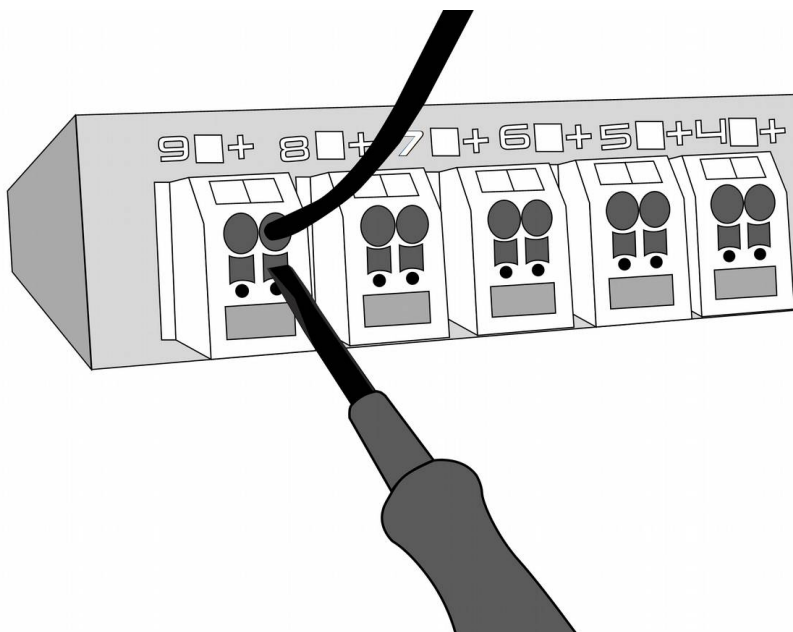


Figure 2.2.7. Connecting the conductor to the RPCM DC ATS 76A or RPCM DC 232A outlet terminal.

## 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 DC 232A.

In order to avoid accidental to switch messages, the upper or lower button must be held for 5 seconds.

**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*. (see section 4.1. RPCM Physical Interface).

### 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 is 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 and Ground Requirements

#### **Power and Ground Requirements for RPCM DC ATS 76A:**

voltage -42 - -58VDC;

grounding is required;

input circuit breakers should be easily accessible to disconnect in case of danger.

#### **Power and Ground Requirements for RPCM DC 232A:**

voltage -42 - -58VDC;

grounding is required;

input circuit breakers should be easily accessible to disconnect 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 DC ATS 76A, RPCM DC 232A** — short circuit protection trips at ~87.5A current on the outlet. Short circuit tripping time – around 100 microseconds. In order to isolate short circuit on individual outlets you should choose circuit breakers on input that have tripping delay 2 ms or longer.

### 3.2.2. Computer Requirements for Administration

A physical cable with an RJ45 connector for connecting to an Ethernet-family LAN is needed.

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 for RPCM DC ATS 76A

RPCM DC ATS is generally designed to be powered by two sources, including batteries.

The power is provided from the input with higher voltage. At equal voltage, the power comes from both inputs. In fact, this is a logical OR circuit that supplies power from a source that has a higher voltage.

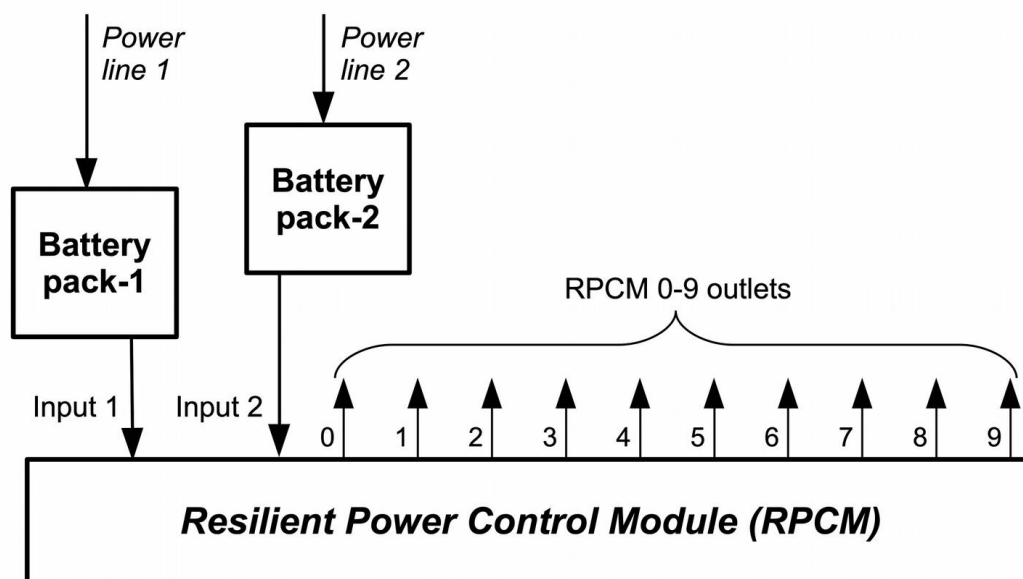


Figure 3.3.1. Scheme for RPCM DC ATS 76A .

#### 3.3.2. Scheme for RPCM DC 232A

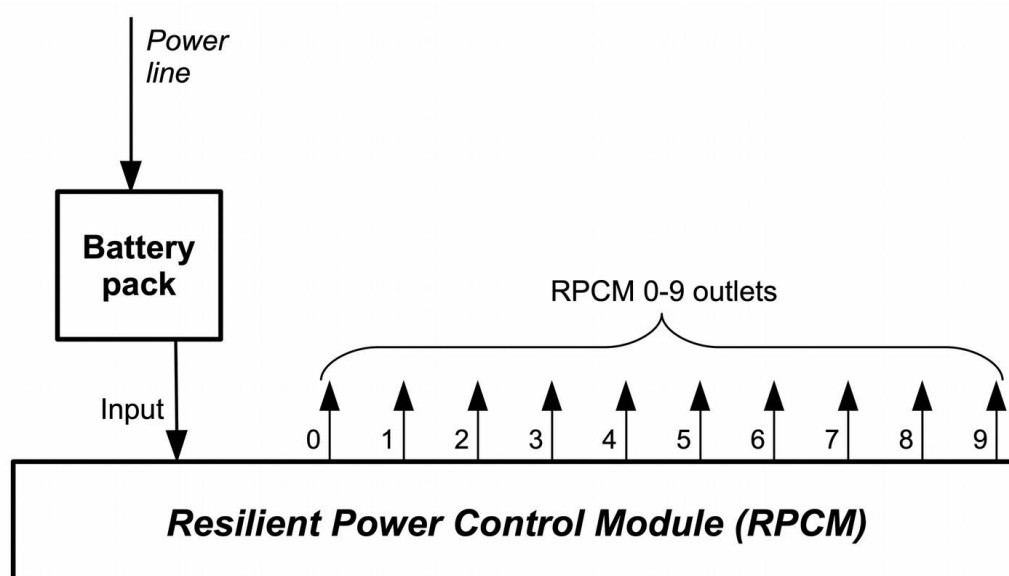


Figure 3.3.2. Scheme with a single power supply unit — for RPCM DC 232A.



## 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** — Regarding getting documentation about this version RPCM.

**4.11. Automation** — Information about automation tool for control the selected devices.

## 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 44 x width 440mm x depth 365mm.

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

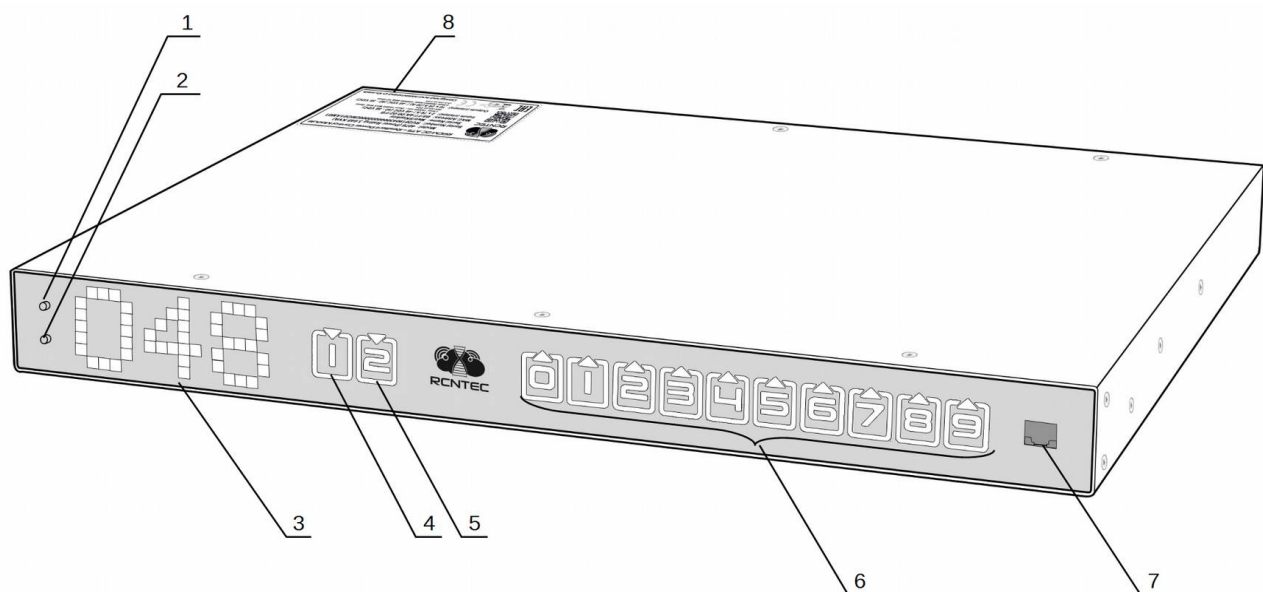
There is an LED display in the center of the device on the front panel.

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 DC ATS 76A.*

**Legend:**

- 1 — top control button;
- 2 — bottom control button;
- 3 — LED display.
- 4 — input indicator 1;
- 5 — input indicator 2;
- 6 — outlet indicators 0-9;
- 7 — Ethernet control port.

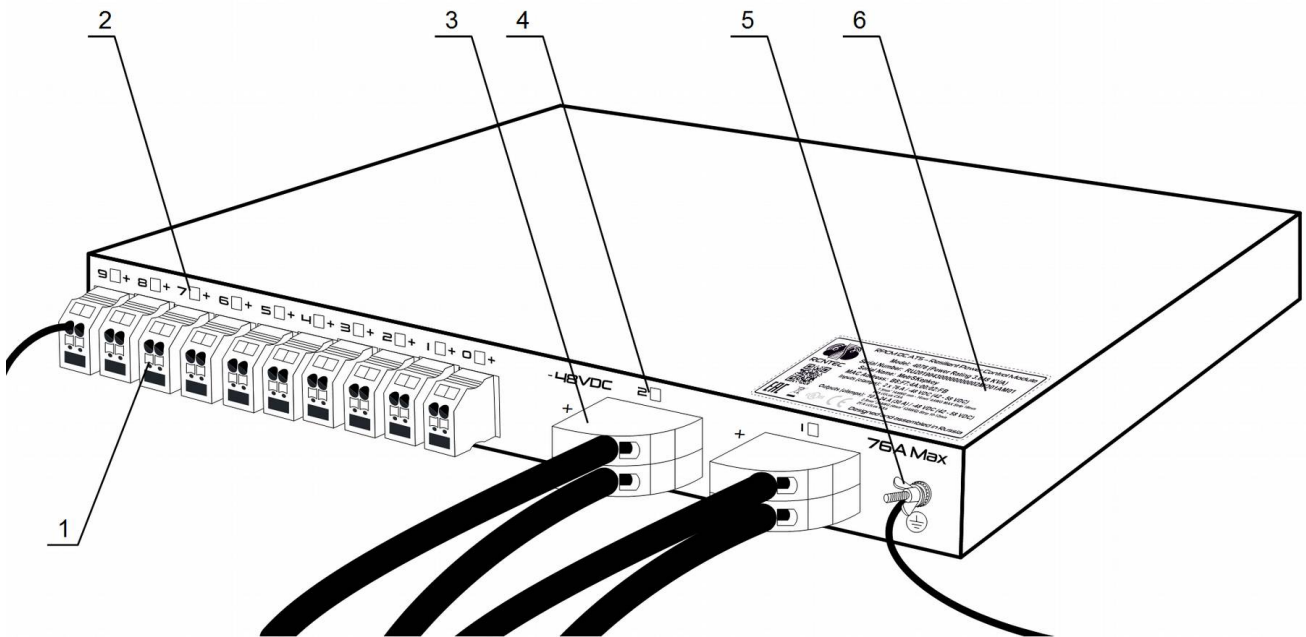


Figure 4.1.2. Rear side of RPCM DC ATS 76A.

**Legend:**

- 1 — outlets;
- 2 — outlet indicators;
- 3 — input terminals;
- 4 — input indicators;
- 5 — grounding screw;
- 6 — serial sticker.

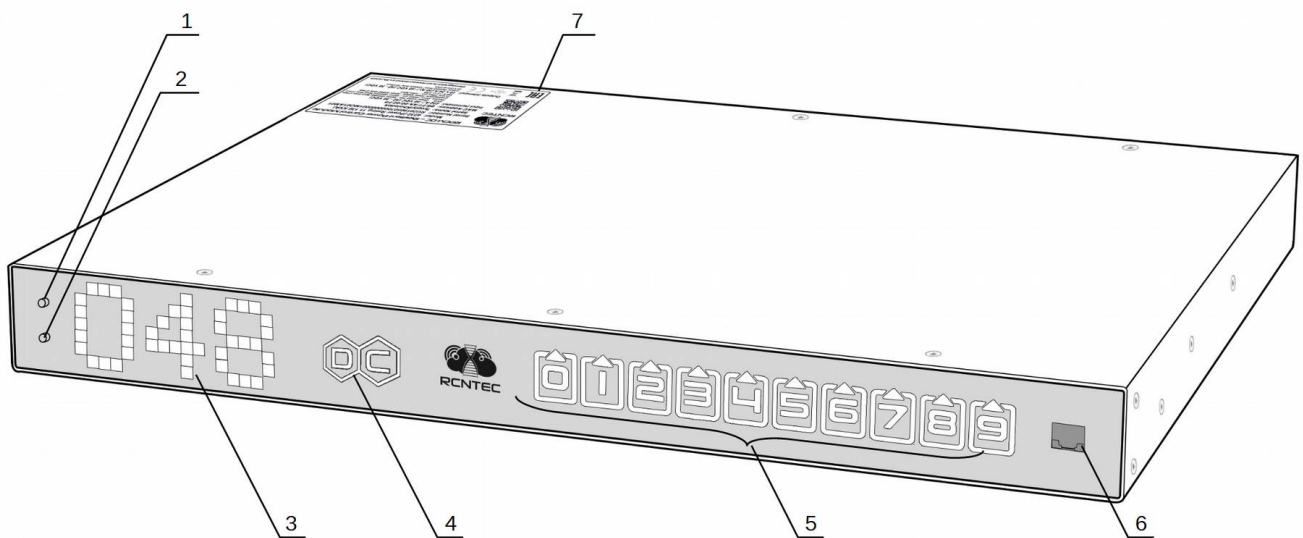


Figure 4.1.3. Front panel with indicators and controls RPCM DC 232A.

**Legend:**

- 1 — top control button;
- 2 — bottom control button;
- 3 — display;
- 4 — input indicator;
- 5 — outlet indicators 0-9;
- 6 — Ethernet control port.

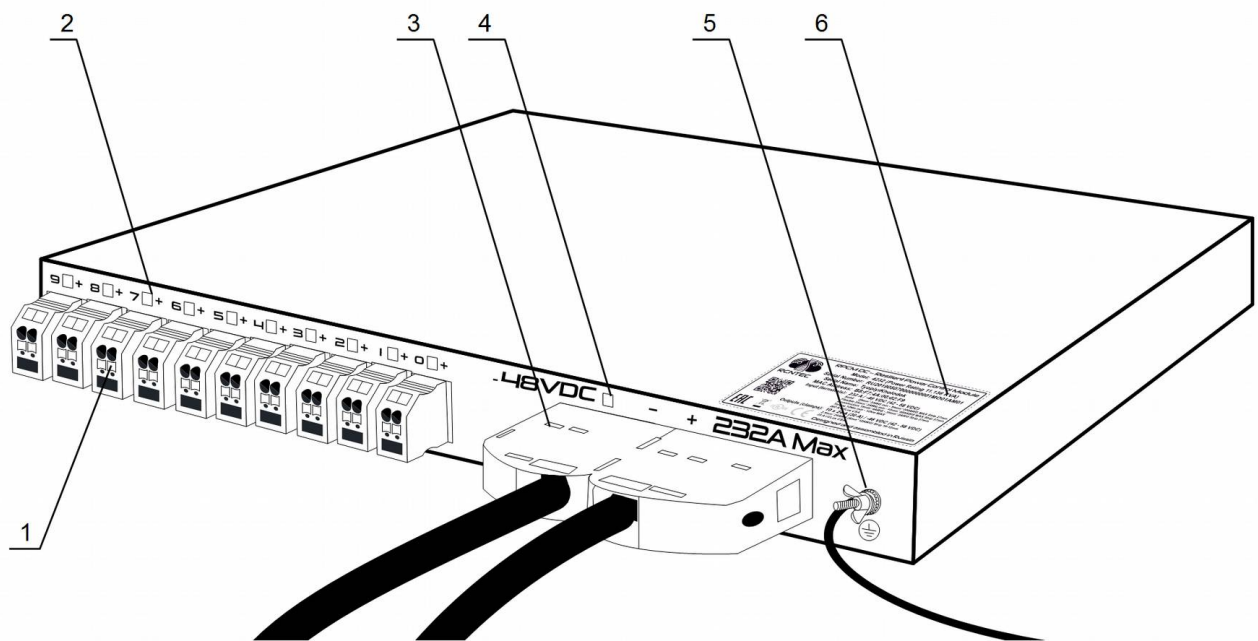


Figure 4.1.4. Rear side of RPCM DC 232A.

**Legend:**

- 1 — outlets;
- 2 — outlet indicators;
- 3 — input;
- 4 — input indicator;
- 5 — grounding screw;
- 6 — serial sticker.

### 4.1.2. Displaying information on the display

**The left part 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	048
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	68: 05: CA: 42: EC: 22
Serial name	English characters	KrepkiyLob
Serial number	English characters and numbers	RU2017101100000002MO01 DN01
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.

**At system starts, the information display sequence is follows:**

Initially, the message "*RPCM has started*" appears in the module display for 5 seconds;

5 seconds after startup, default message is displayed 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, you must press the top button on the device and hold for 20 seconds.**

The *rpcmadmin* user password will be reseted 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.

**ATTENTION!** *Do not attempt to use non-standard sequences to control the module unless necessary! Incorrect or untimely use of controls can lead to failure and emergency situations. Please, contact RCNTEC support, if you have any non-standard scenarios.*

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 DC ATS 76A or single inlet indicator for models RPCM DC 232A;

indicators for the ten outlets 0 — 9.

#### **Description of input color signals:**

*green* — input is active, voltage within specified ranges;  
*blue* — input is reserve (for models RPCM with ATS), voltage within specified ranges;  
*red* — there is no voltage on this input;  
*gray* — input is administratively disabled;  
*yellow* — the voltage of the input is outside the specified limits;  
*blinking from green / blue / red to yellow* — no grounding.



**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);

**These symbols can be displayed on RPCM physical screen:**

Standard ascii 5x7 font:

Space

Numbers 0-9

English letters A-Z, a-z

! " # \$ % & ' ( ) \* + , - . / : ; < = > ? @ [ \ ] ^ \_ ` { | } -> <-



Figure 4.1.5. Appearance of the model RPCM DC ATS 76A with an active display. Front panel shown on top, rear panel shown at the bottom.



Figure 4.1.6. Appearance of the model RPCM DC 232A with an active display.

### 4.1.3. Front panel device control

#### 4.1.3.1. 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.

There are two interface modes:

View mode;

Control Mode.

RPCM start in View Mode.

### 4.1.3.2. 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 - it is displayed in red.

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 4.1.1.

The top button toggles the values in reverse order.

In order to avoid accidental skipping of the desired item, the upper or lower 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 on input*", then "*Power*", "*IP address*", "*MAC address*", "*Serial name*", "*Serial number*", "*User message*", then again "*Voltage*", "*Current at input*" and so on.

In View Mode, special functions are also available:

reset to factory settings;

reboot control module — *High Level Controller (HLC)*, which is running Software.

Pressing the top button for a long time for about 20 seconds resets the RPCM **to the factory default 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*.

### 4.1.3.3. Description of the Control Mode

This mode is intended for operational control.

All messages in the Control Mode (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.*

#### 4.1.3.4. Objects and Functions of Control Mode

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

An object is something that needs to be performed. This can be a separate output, input, ATS for switching outputs in the models RPCM DC ATS 76A 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 bottom or top button.

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.

#### 4.1.3.5. Control Mode Actions: "hot" and regular operations

All operations Control Mode for the physical interface can be divided as: "hot" and "regular". The need for "hot" operations arises due to non-standard situations, such as the occurrence of a short circuit or an active sound signal. After elimination of the causes of such occurrences, for example, turning off the sound signal (beeper), "hot" 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 situations, 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

#### 4.1.3.6. 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 the "hot" operations for RPCM. If there are no reasons for "hot" operations, it proceeds to inlet operations.

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 "hot" operations in the order for select outlet, then to regular operations of administrative disconnection and activation of outlet.

*Table 4.1.2. List of available operations in Control Mode.*

<b>Function / Message</b>	<b>Object</b>	<b>Mode</b>	<b>Description</b>
<i>Control Mode! Be Careful!</i>			Message alerting that Control Mode has been entered
Return to View Mode			
<i>Return To View Mode</i>		Regular	Menu item to return to View Mode
<b>Hot operations for RPCM</b>			
<i>Beeper Switch OFF</i>		"Hot"	Turn off the beeper
<i>Reset All Short Circuits</i>		"Hot"	Reset outlets that have been turned off due to short circuits. Make sure to remove SHORT CIRCUIT conditions first!
<b>Regular operations with the current Inlet</b>			
<i>Inlet N Switch OFF</i>	<i>N</i> — inlet 1 or 2	Regular	Disable input number N (only for models with ATS)
<i>Inlet N Switch ON</i>	<i>N</i> — inlet 1 or 2	Regular	Enabling input with the number N (only for models with ATS)

Function / Message	Object	Mode	Description
<b>"Hot" operations with the current output</b>			
<i>Outlet N OC Switch OFF</i>	<i>N — Outlet 0-9</i>	"Hot"	Switch off the outlet, when it was turned off due to overload
<i>Outlet N IOC Switch OFF</i>	<i>N — Outlet 0-9</i>	"Hot"	Switch off the outlet, when it was turned off due to overload on Inlet
<i>Outlet N OV Switch OFF</i>	<i>N — Outlet 0-9</i>	"Hot"	Switch off the outlet, when it was turned off due to overvoltage
<i>Outlet N SC Switch OFF</i>	<i>N — Outlet 0-9</i>	"Hot"	Switch off the outlet, when it was turned off due to short circuit
<i>Outlet N MF Switch OFF</i>	<i>N — Outlet 0-9</i>	"Hot"	Switch off the outlet, when it was turned off due to on malfunction
Regular operations with the current output			
<i>Outlet N Switch ON</i>	<i>N — Outlet 0-9</i>	Regular	Switch ON outlet
<i>Outlet N Switch OFF</i>	<i>N — Outlet 0-9</i>	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: `http://192.168.1.2` (`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.

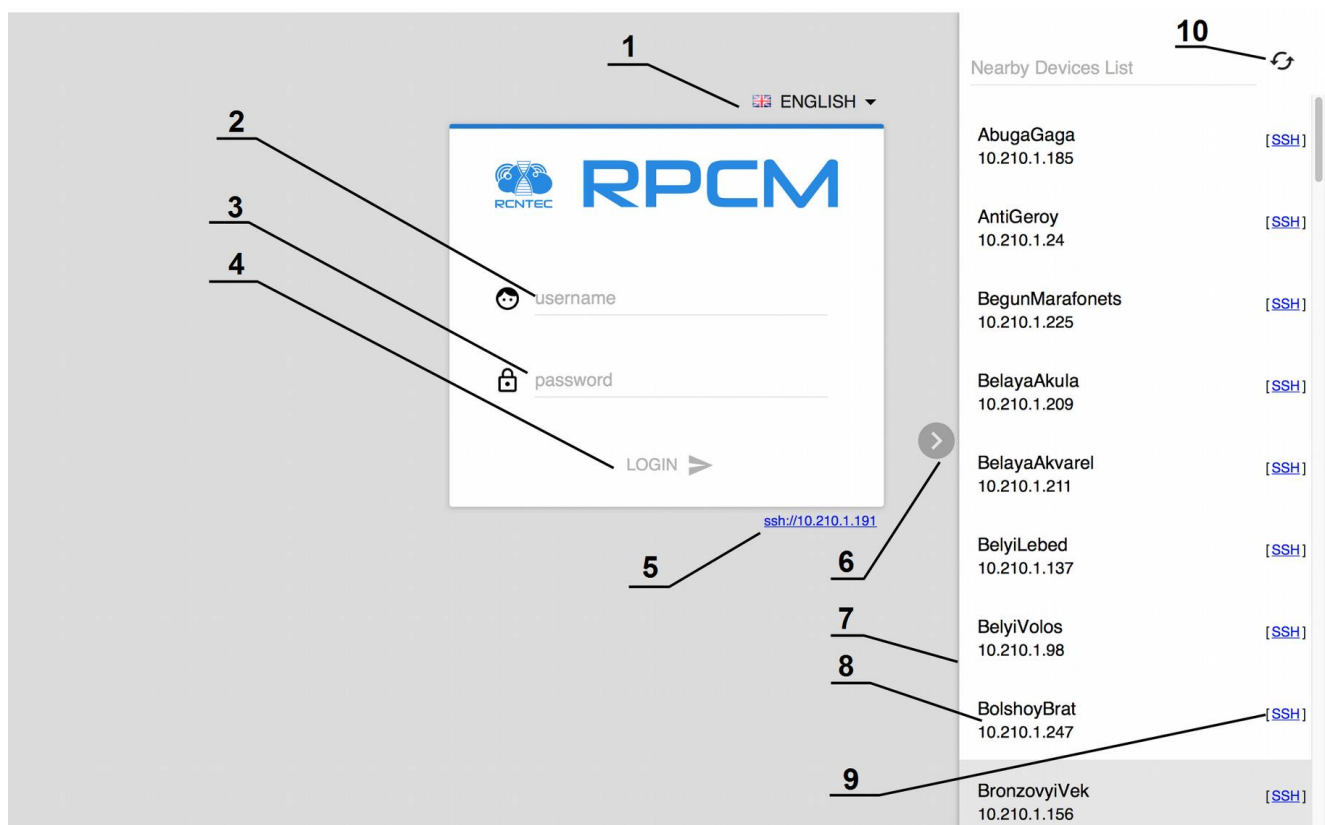


Figure 4.2.1. Login window.

**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 to refresh restarting 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*.



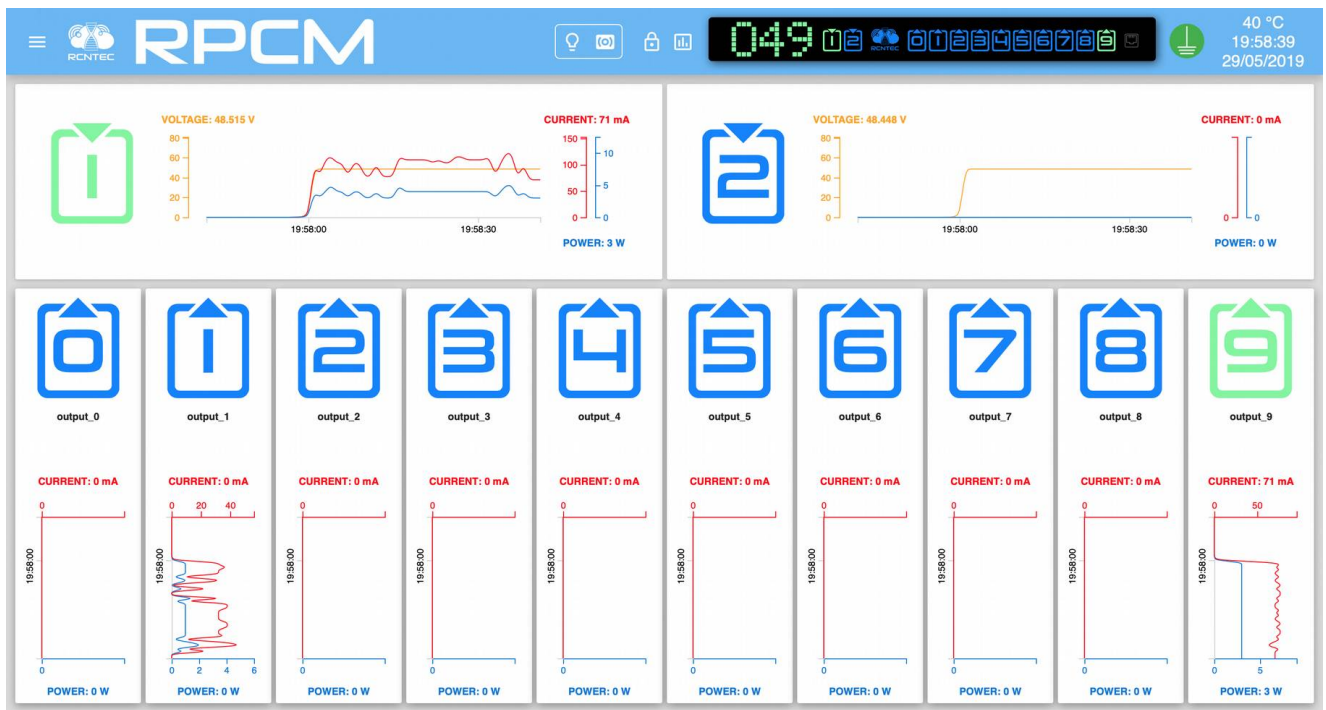


Figure 4.2.2. Dashboard in View Mode for RPCM DC ATS 76A.

### 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, voltage within specified ranges;
- blue* — input is reserve (for models RPCM with ATS), voltage within specified ranges;
- red* — there is no voltage on this input;
- gray* — input is administratively disabled;
- yellow* — the voltage of the input is outside the specified limits;
- blinking from green / blue / red to yellow* — no grounding.

#### 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.

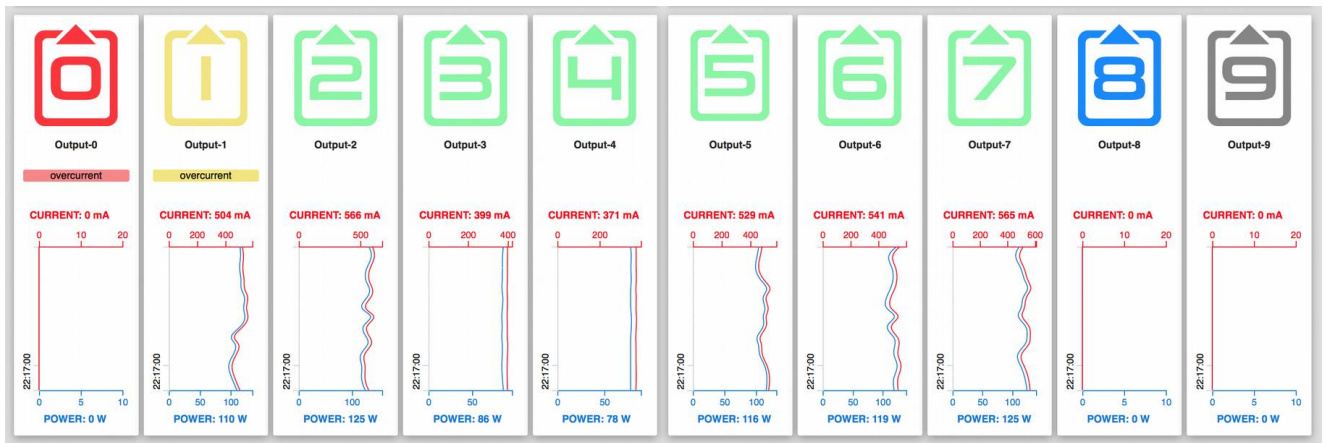


Figure 4.2.3. An example of the color coding on the Dashboard of RPCM's web interface

#### 4.2.4. Top Control Bar

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

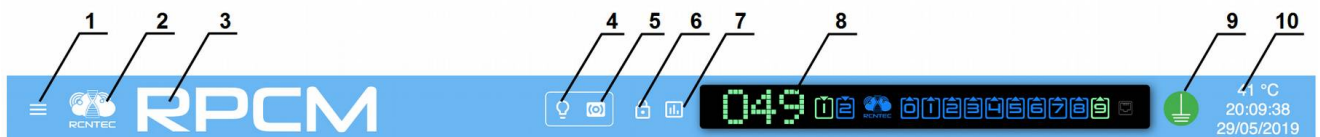


Figure 4.2.4. Control elements on the Top Control Bar.

##### 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 following information is displayed:

input voltage in volts;

total current consumption in milliamperes;

total power consumption in watts.

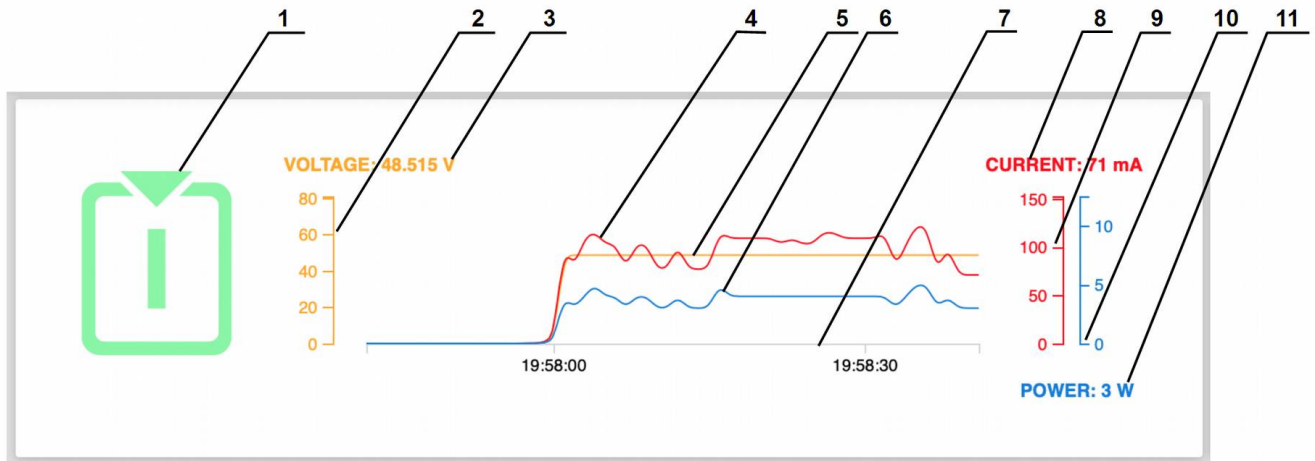


Figure 4.2.5. Block of information about input status in View Mode.

#### Legend:

- 1 — number of the inlet;
- 2 — inlet voltage scale;
- 3 — instant inlet voltage value;
- 4 — curve of the current (milliamps) graph;
- 5 — instant inlet voltage value;
- 6 — curve of the voltage graph;
- 7 — curve of active power (watts) graph;
- 8 — time scale for all graphs;
- 9 — instant inlet current value (milliamps);
- 10 — input active power scale;
- 11 — instant inlet active power consumption value (watts).

### 4.2.6. Information on the Status of Outlets in View Mode

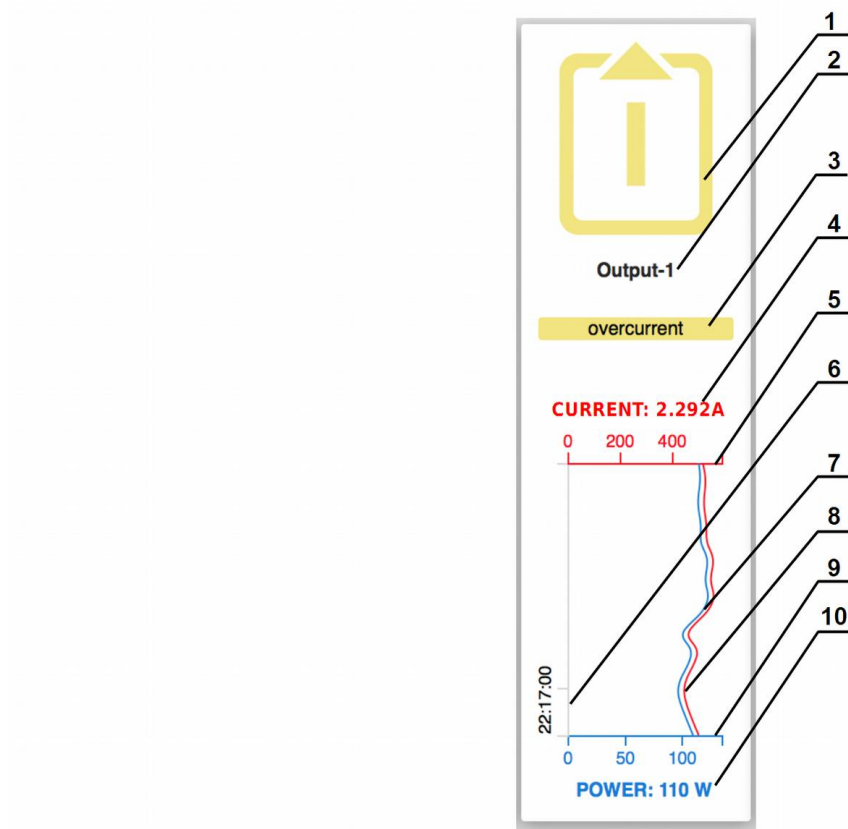


Figure 4.2.6. Block of information about the outlets status in the View Mode.

#### Legend:

- 1 — outlet number;
- 2 — outlet name;
- 3 — status message;
- 4 — instant current value;
- 5 — current consumption scale;
- 6 — time scale for all graphs;
- 7 — graph of current;
- 8 — graph of power consumption;
- 9 — power consumption scale;
- 10 — instant power consumption.

Also, the color scheme shows the status of the outlets according to RPCM's color signal system.

## 4.2.7. Control Mode

To activate 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. Dashboard in Control Mode for RPCM DC ATS 76A.

### 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);

**IDENTIFY** — makes input indicator blink to help locate it quickly in the rack.

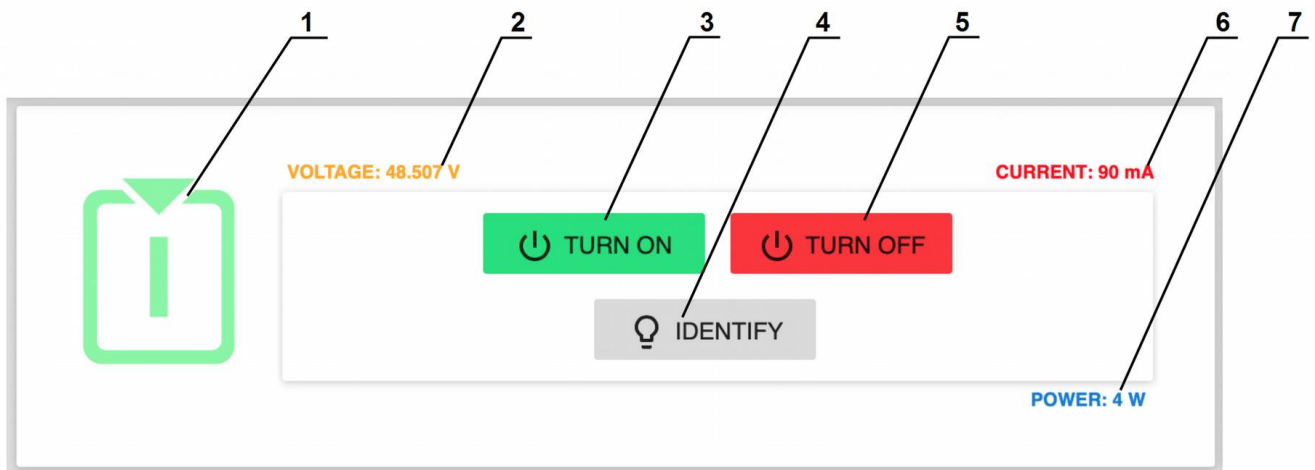


Figure 4.2.8. Controlling the status of inputs in Control Mode for RPCM DC ATS 76A.

**Legend:**

- 1 — input number;
- 2 — instant input voltage value;
- 3 — **TURN ON** button — turns on the input;
- 4 — **TURN OFF** button — turns off the input;
- 5 — **IDENTIFY** button — activates input indicator blinking to help locate it quickly in the rack;
- 6 — instant input current value (milliamps);
- 7 — instant input active power consumption value (watts) .

### 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);

**IDENTIFY** — makes outlet indicator blink to help locate it quickly in the rack.

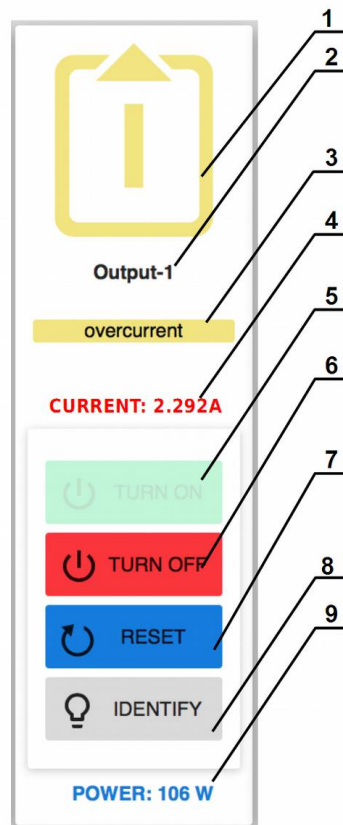


Figure 4.2.9. Controlling the status of the outlets in Control Mode.

#### Legend:

- 1 — outlet number;
- 2 — outlet name;
- 3 — 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 elements 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. Menu for Navigating to 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 you try to access RPCM via unsecured HTTP protocol, RPCM will show a warning bar suggesting to switch to an encrypted HTTPS connection.

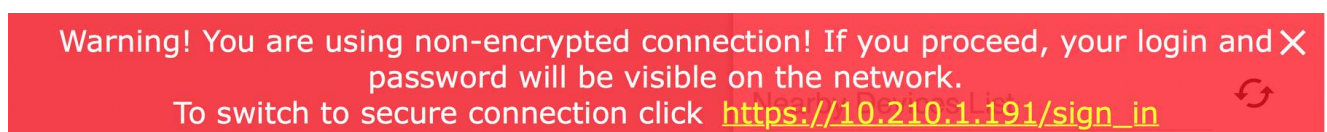


Figure 4.2.12. A warning about an insecure connection.



### 4.2.13. Web Interface differences for Models *RPCM DC 232A*

There are some differences in appearance of the web interface for non-ATS models (for example *RPCM DC 232A*). 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.

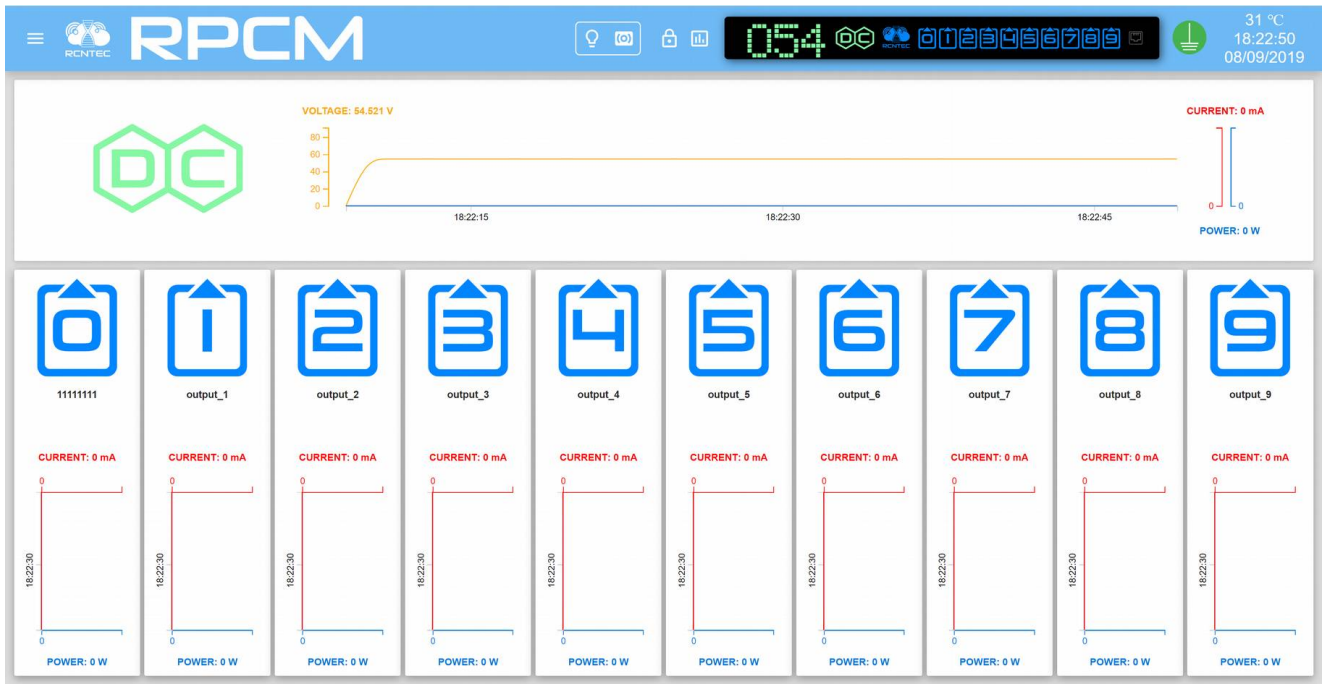


Figure 4.2.13. Dashboard in View Mode *RPCM DC 232A*.

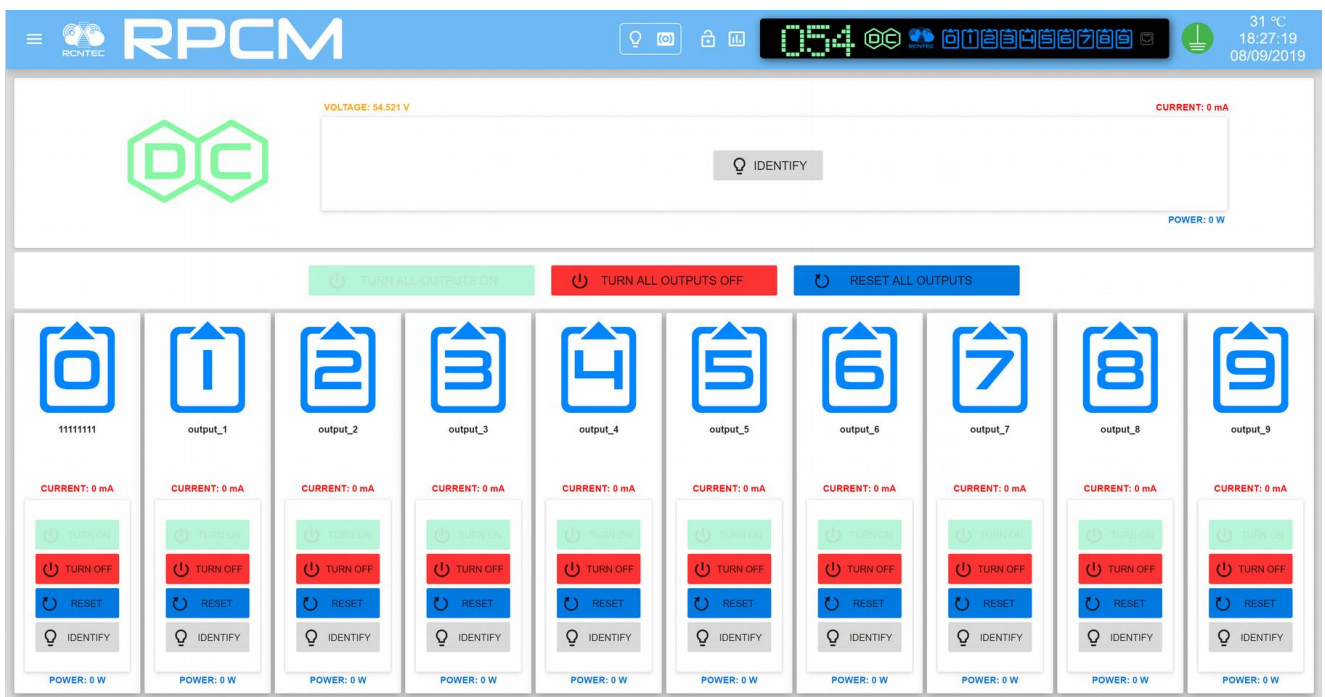


Figure 4.2.14. Dashboard in Control Mode *RPCM DC 232A*.

## 4.2.14. Showing Current Limits on graphs

By default current/voltage 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 on different channels you might want to see current consumption of several outlets as well as voltage 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 4.2.15. The Dashboard control panel in the Show Limits mode RPCM DC with ATS.

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

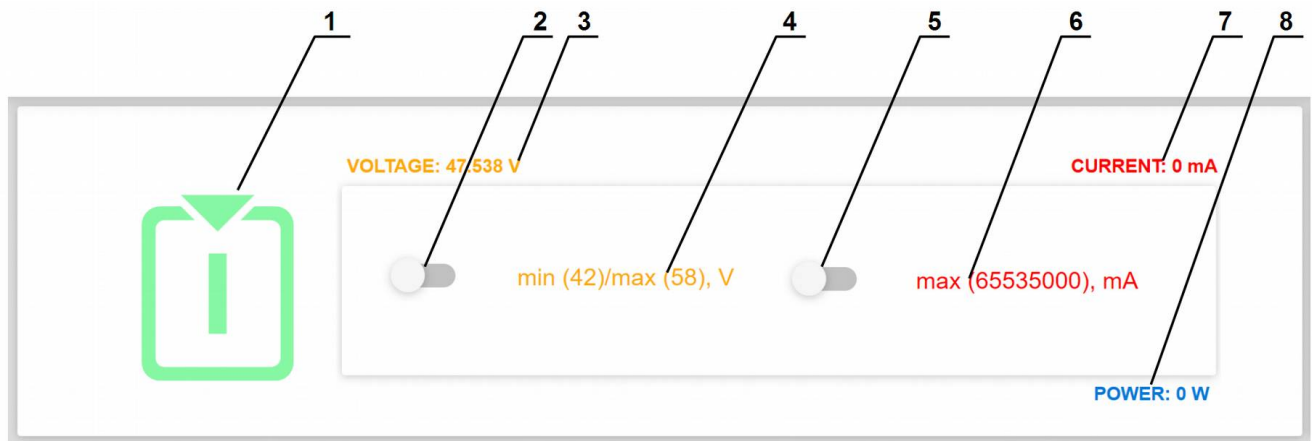


Figure 4.2.16. Show Limits settings RPCM DC with ATS for input 2.

**Legend:**

- 1 — inlet number;
- 2 — voltage limit switch;
- 3 — instant input voltage;
- 4 — input voltage limit values;
- 5 — current limit switch;
- 6 — current voltage limit values;
- 7 — instant input current;
- 8 — instant input power consumption.

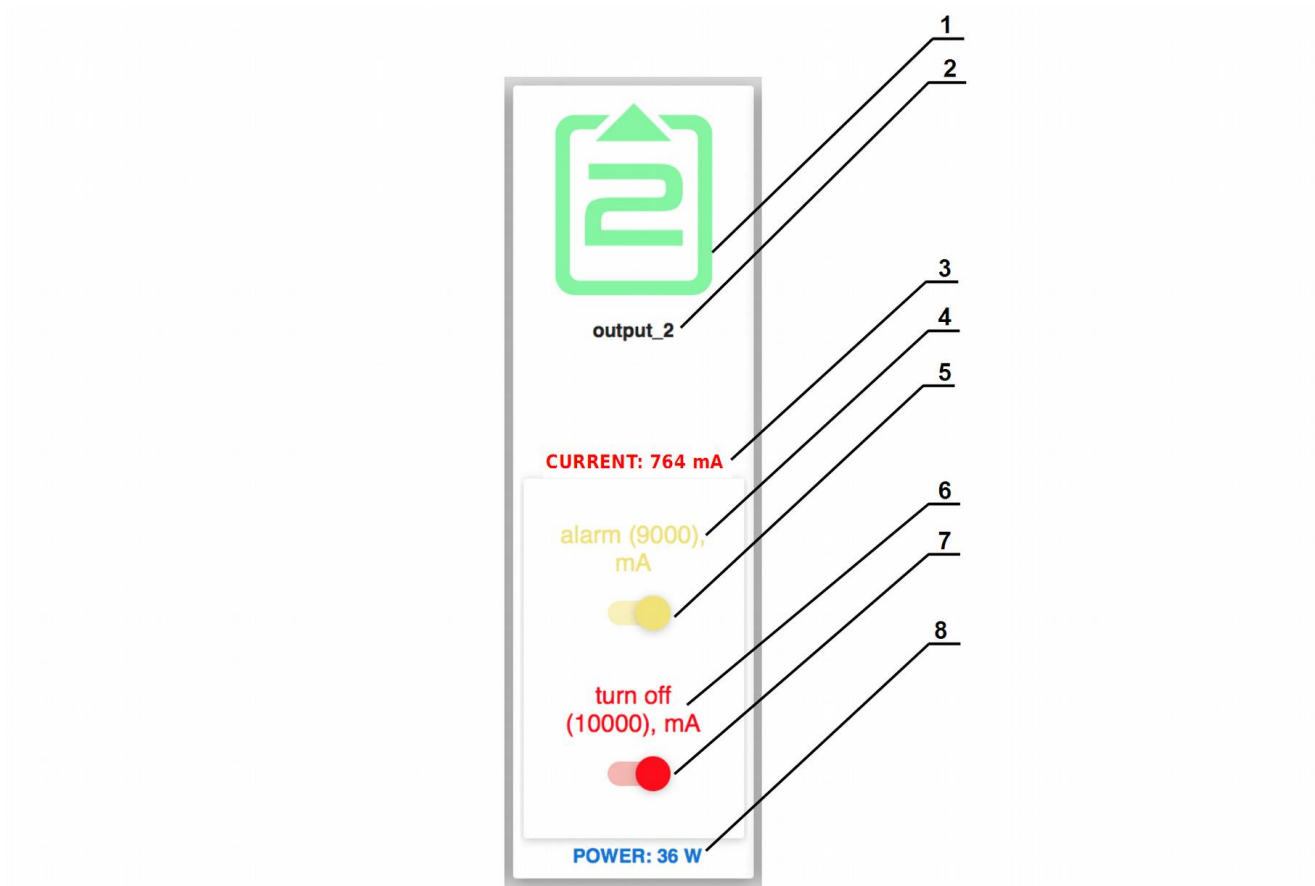


Figure 4.2.17. Settings for demonstrating the established limits RPCM DC ATS 76A.

#### Conventions in Figure 4.2.17.

- 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.

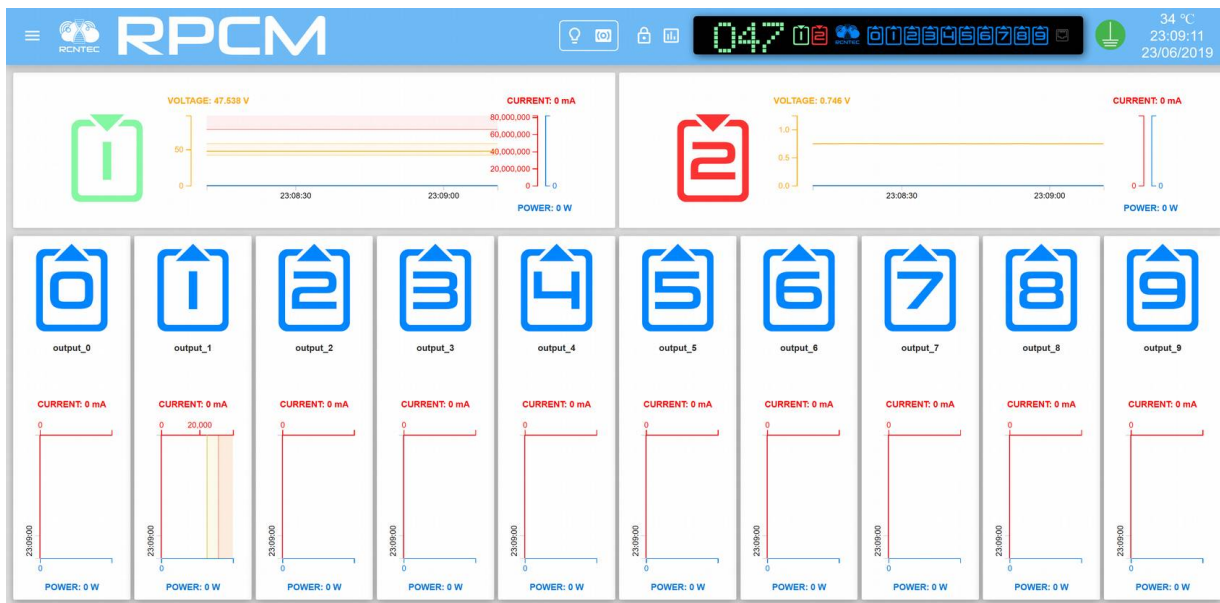


Figure 4.2.18. The Dashboard control panel in the "Show Limits mode".

## 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 0.7.78 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]: RU20171011000000002M001DN02 [Ground]: GOOD
[Firmware Version]: 0.9.743 [Firmware Release Date]: 20190515093438
[Software Version]: 0.7.78 [Software Release Date]: 20190518105432
[Model/Hardware Version]: 4076/RPCM DC ATS 76A [Uptime]: 7087d+20:00:49

-----
[Input 1]: 47.8V 2.338A 0.493KW (ACTIVE, PRIORITY)
[Input 2]: 47.8V 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 System 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 on;

*red* — lights when there is no voltage;

*yellow* — input voltage is outside the specified limits;

*grey* — when the input is administratively turned off;

*if the ground is bad, the [Ground] field flashes BAD in yellow color.*

#### Description of the outlet color signals:

*green* — outlet is switched on and is in working order, and the energy is consumed;

*blue* — outlet switched on, but the energy is not consumed;

*red* — outlet was switched off due to short circuit, overcurrent on output, overcurrent on input or overvoltage;

*yellow* — outlet is turned on, but has an alarm overcurrent condition;

*grey* — outlet is administratively turned off;

*magenta* — outlet is malfunctioning (administratively on, but no voltage provided to output).

**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.

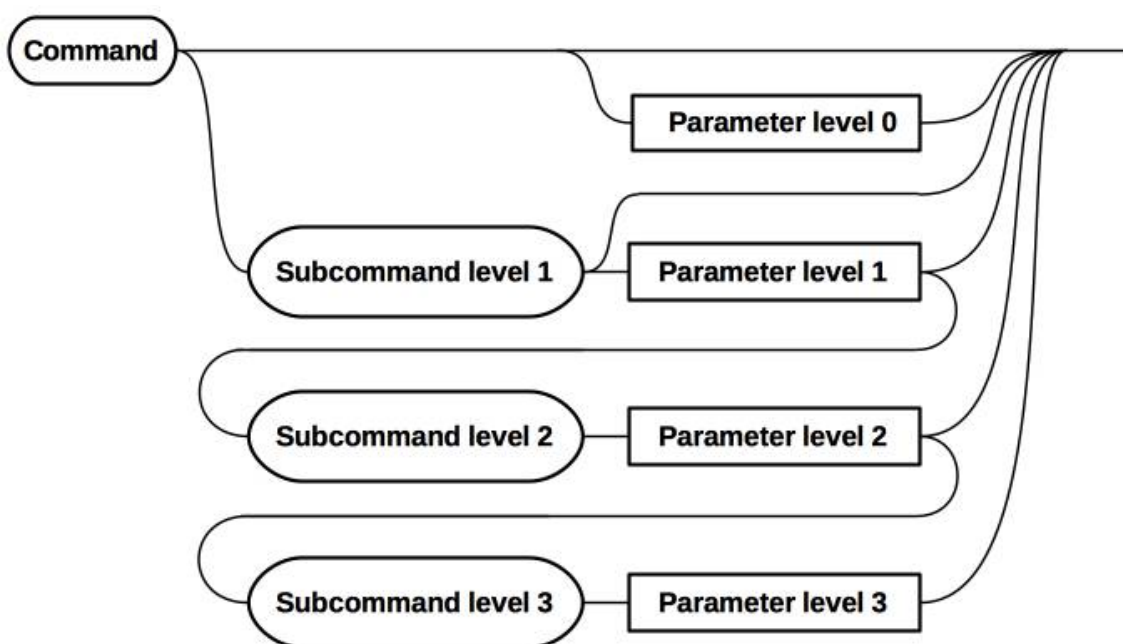


Figure 4.3.2. General scheme of the command line interface.



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 all outputs - set all outputs state
  off turn them off
  on turn them on
set buzzer - set buzzer state
  alternate set it to alternate
  off turn it off
  on turn it on
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
set time - set new time
  value value
  zone zone
set help - show this help
```

We get obtain about using the set command with the output subcommand:

set output?

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
```

The general scheme of work with the help is indicated in Figure 4.3.3.

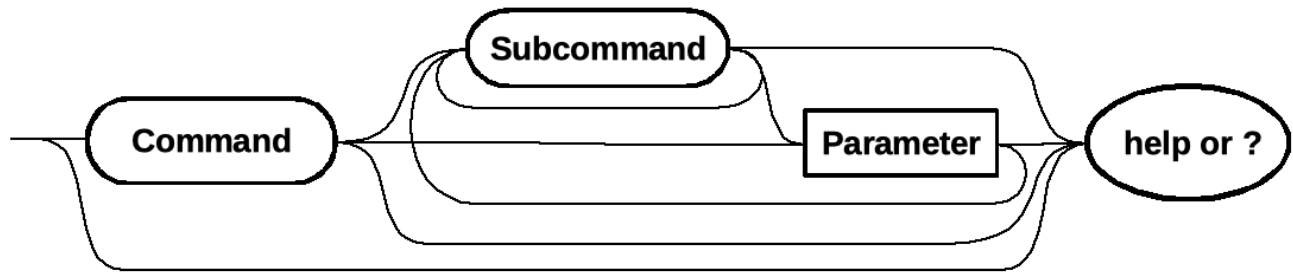


Figure 4.3.3. General scheme of obtaining information

### 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 to the view.

**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, for example RPCM DC 232A.

RPCM without ATS does not have the ability to disable / enable a single input.

In other aspects of its management via SSH CLI it is similar to working with RPCM DC ATS 76A.

```

RPCMcli version 0.7.75 is starting
user rpcadmin 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]: RU2017101100000002M001DN02 [Ground]: GOOD
[Firmware Version]: 0.9.743 [Firmware Release Date]: 20190515093438
[Software Version]: 0.7.75 [Software Release Date]: 20190516112014
[Model/Hardware Version]: 4076/RPCM DC ATS 76A [Uptime]: 6d+05:07:59
-----
[Input 1]: 48V 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 rpcadmin >

```

Figure 4.3.4. Summary information for RPCM DC 232A.

## 4.4. Input Operation

### 4.4.1. Short Description

This chapter describes how to configure inputs.

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



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

### 4.4.2. General Description of the Inputs Section

At the top, we see — Top Control Bar. Also there are two information areas for inputs 1 and 2 below.



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.

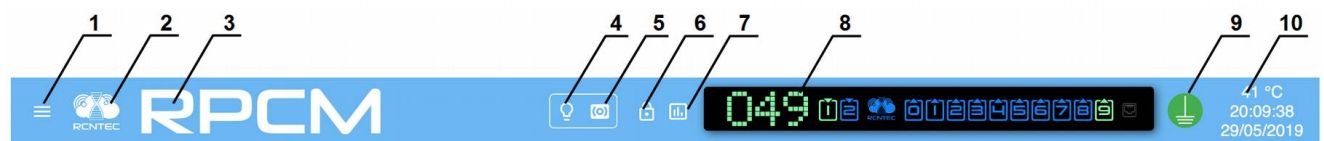


Figure 4.4.3. "Inputs" Section — main window.

#### 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;
- 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.

**Note.** Clicking on the Broadcast Unit (device status) causes a transition to the Control Panel (Dashboard).

#### 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 divided into left and right parts.

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

voltage in volts;

capacity in amps;

power in watts.

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

**"INFORMATION"** contains the following data:

**Name** — user settable input name;

**Description** — comment field up to 255 characters long;

**Active** — indicator of whether the input is active with a value *YES*, or a backup with a value — *NO*;

**Recognition** — YES if input recognition blinking is activated, NO otherwise.

**"LIMITS"** group contains the following data:

**Min. voltage, V** — minimum allowed voltage;

**Max. voltage, V** — maximum allowed voltage;

**Max. current, A** — maximum allowed current.

**"COUNTERS"** group contains the following data:

**kWh** — accumulated kilowatt hours.

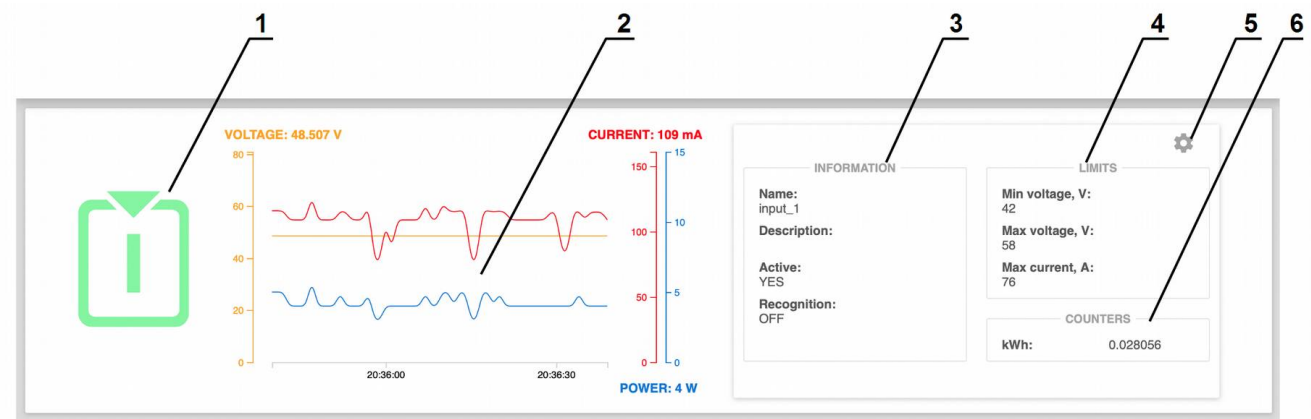


Figure 4.4.4. Input information panel.

#### Legend:

- 1 — number of the inlet;
- 2 — current value graphs area ;
- 3 — “INFORMATION” block;
- 4 — “LIMITS” block;
- 5 — “gear” button to call the “INPUT SETTINGS” window;
- 6 — “COUNTERS” block.

### 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 (see section 4.4.4 *Information area of the Inputs section*).

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:

#### INPUT (1 or 2) SETTINGS

- Name** — specified input name;
- Description** — comment field of 256 characters long;
- Max. current, A** — maximum current;
- Min. voltage, V** — minimum voltage;
- Max. voltage, V** — maximum voltage.

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

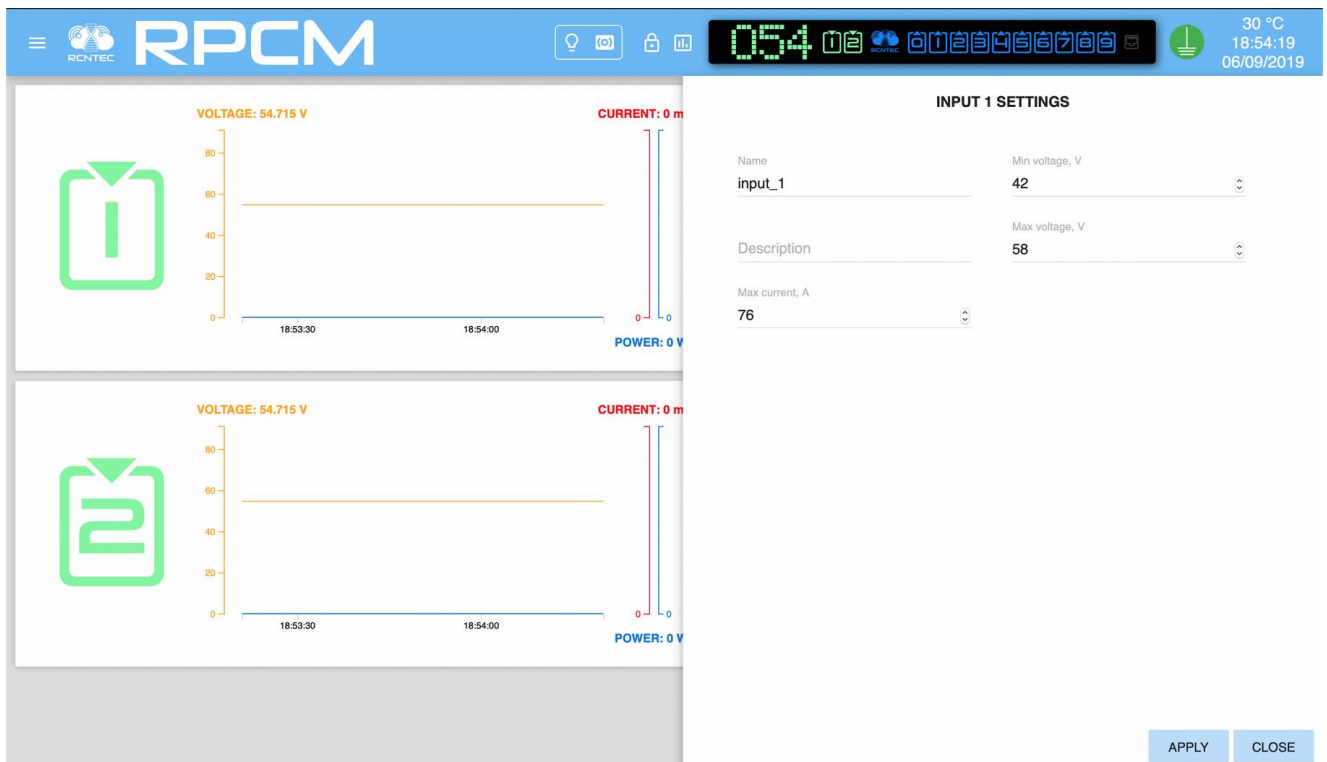


Figure 4.4.5. INPUT SETTINGS pop-up window (entering the main parameters).

**Note:** Input 2 is configured in the same way.



### 4.4.6. Management of Inlets in Control Mode

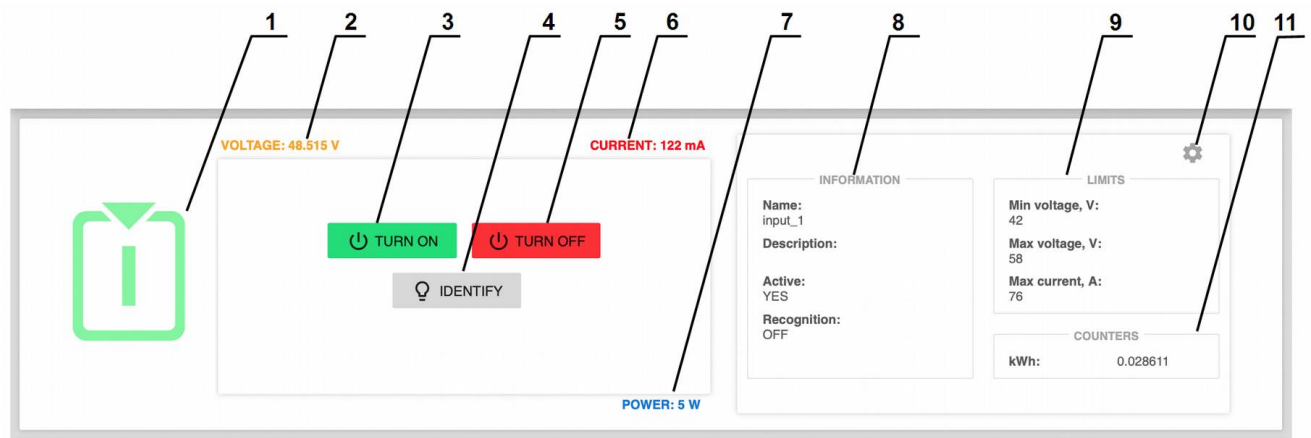


Figure 4.4.6. Control Mode of the Input Section.

#### Legend:

- 1 — inlet number;
- 2 — instant input voltage value;
- 3 — **TURN ON** button — turns on the input;
- 4 — **IDENTIFY** button — activates input recognition blinking to help locate it in the rack;
- 5 — **TURN OFF** button — to turn off input (if it's on);
- 6 — instant current value (milliamps);
- 7 — instant power consumption value (watts);
- 8 — *INFORMATION* block with Name, Description and Recognition state;
- 9 — *LIMITS* block with the thresholds;
- 10 — *gear* button to call the *INPUT SETTINGS* pop-up window;
- 11 — *COUNTERS* block with the accumulated power consumption data (kWh).

### 4.4.7. Input Management of RPCM DC without ATS

RPCM DC 232A has single input.



Figure 4.4.7. "Inputs" Section — main window of RPCM DC 232A.

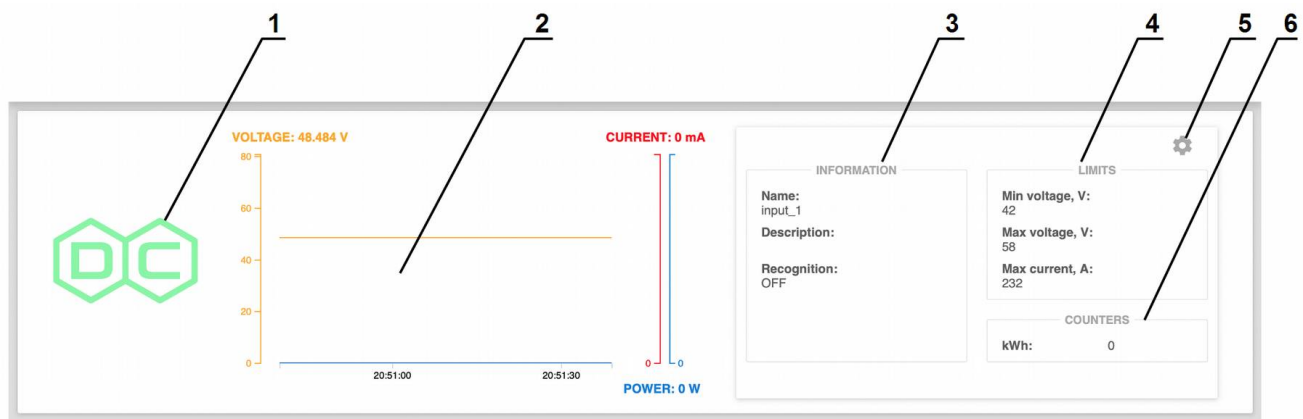


Figure 4.4.8. Input panel of RPCM DC 232A.

#### Legend:

- 1 — input indicator;
- 2 — graph area;
- 3 — *INFORMATION* block;
- 4 — *LIMITS* block with the thresholds;
- 5 — *gear* button to show the "INPUT SETTINGS" pop-up window;
- 6 — "*COUNTERS*" block.

In Control Mode Control, input has an **IDENTIFY** button to help quickly locate the device.

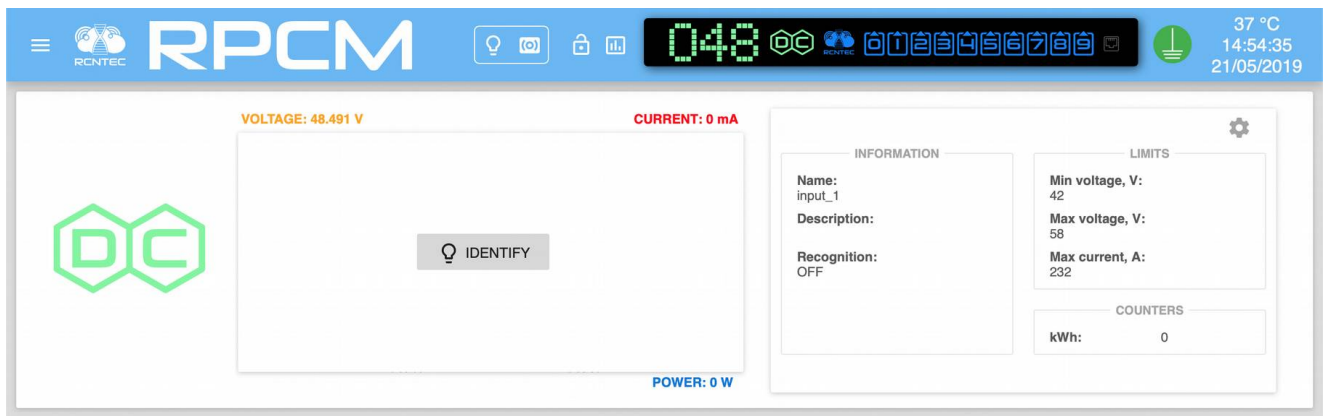


Figure 4.4.9. Control input area in Control Mode for RPCM DC 232A.

### 4.4.8. Showing Current Limits on graphs

By default current/voltage 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 on different inputs you might want to see current consumption of several inputs as well as voltage 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.

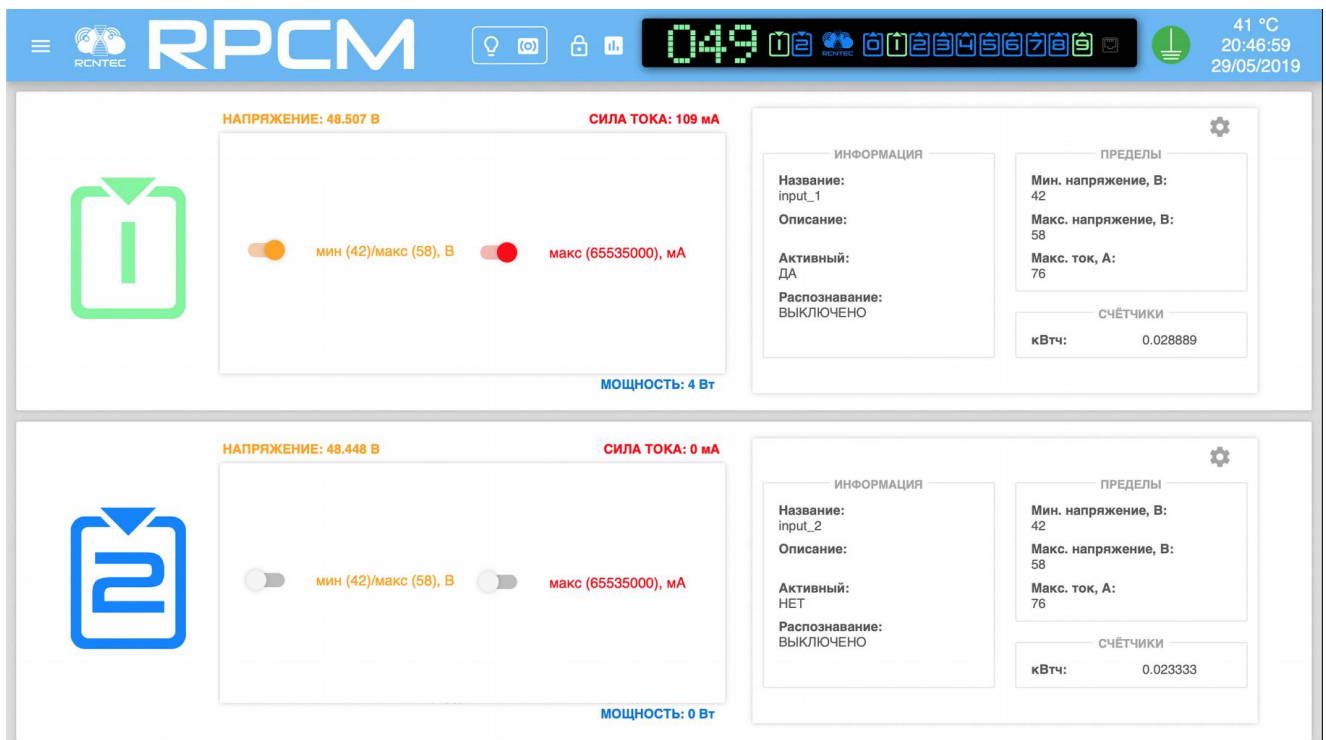


Figure 4.4.10. Showing Current Limits on graphs configuration for RPCM DC ATS 76A.

After enabling *Showing Current Limits*, selected areas of the set limits are turned on for the selected parameters.

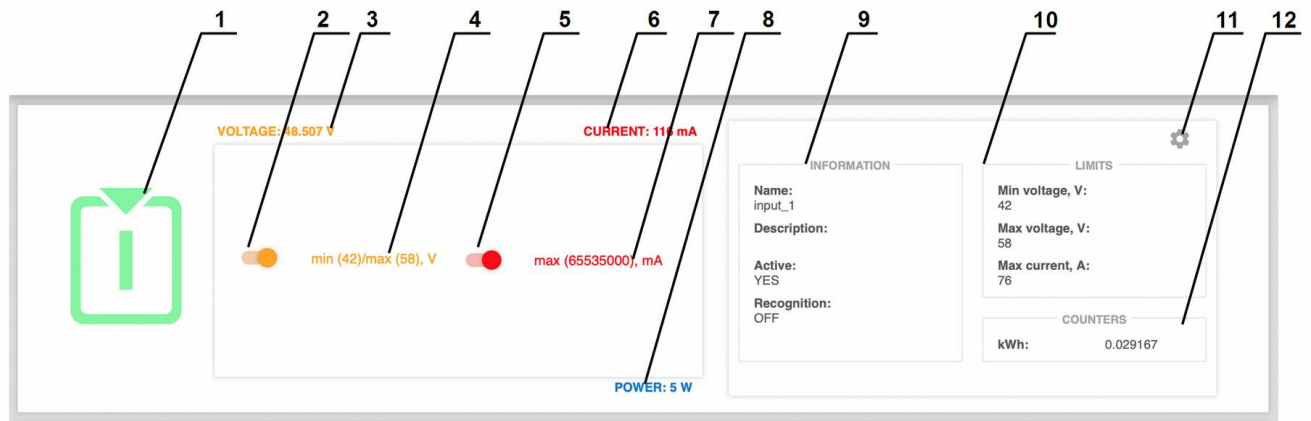


Figure 4.4.11. The setting items for Showing Current Limits.

**Legend:**

- 1 — inlet number;
- 2 — voltage limit switch;
- 3 — instant input voltage;
- 4 — voltage limit value;
- 5 — current limit switch;
- 6 — instant input current;
- 7 — current limit value;
- 8 — instant power consumption.
- 9 — “INFORMATION” block;
- 10 — *LIMITS* block with the thresholds;
- 11 — *gear* button to open the *INPUT SETTINGS* pop-up window;
- 12 — “*COUNTERS*” block with parameters of power consumption.



Figure 4.4.12. Showing Current Limits mode for the first input is on.

## 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 typing:

`http://<name_or_IP_RPCM>/outputs` directly in web-browser address bar (provided that authentication passed successfully before).

**Note.** Screenshots of the RPCM DC 232A are shown as an illustration. For other models of RPCM DC, the basic principles of working are preserved.



Figure 4.5.1. Select menu is the *Outputs* item.

### 4.5.2. Output (Outlets) section

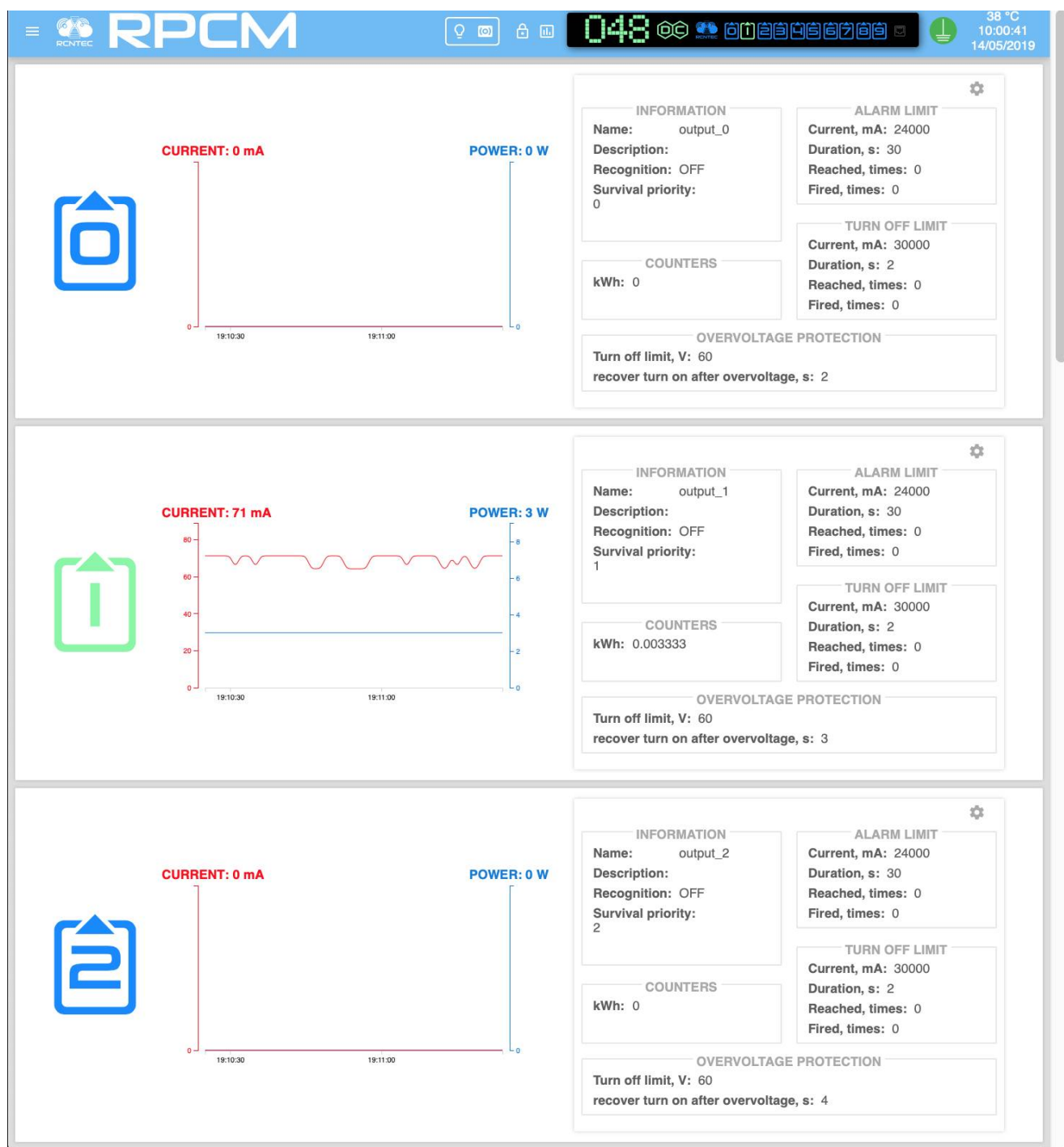


Figure 4.5.2. Main window of the section Outputs

### 4.5.3. Top Control Bar

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

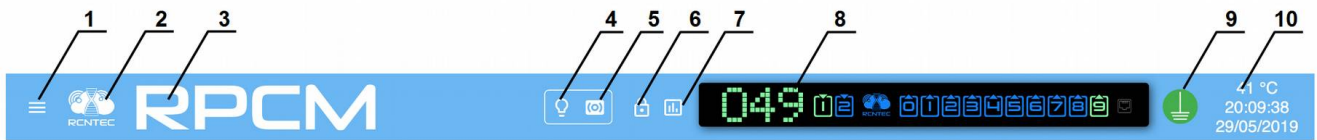


Figure 4.5.3. Top Control Bar

#### 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 Section Outputs

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);

**"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.

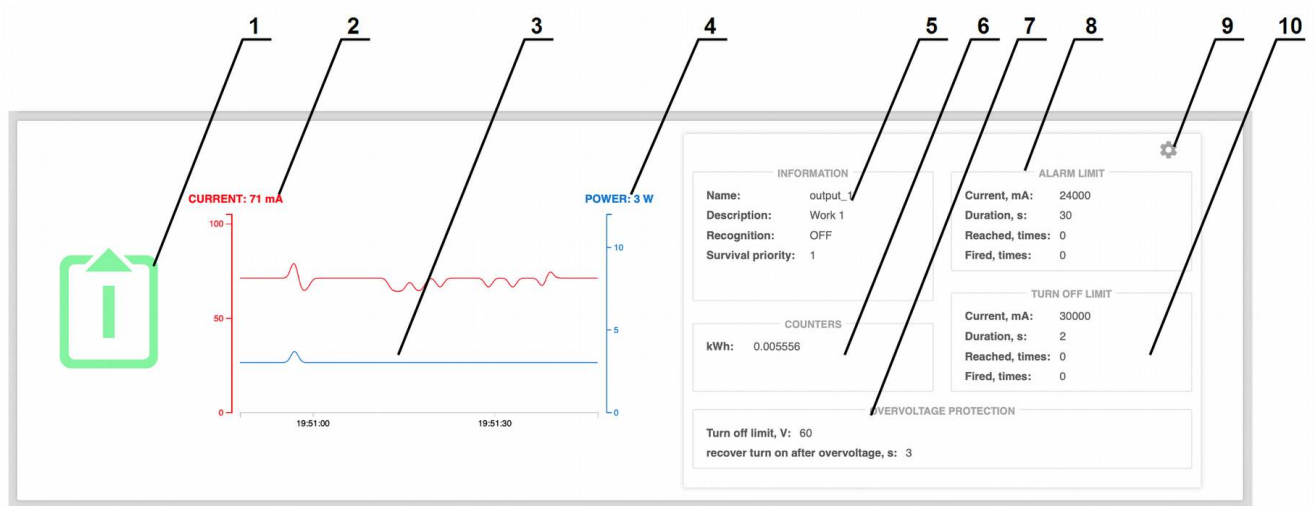


Figure 4.5.4. Presentation of technical outlet parameters.

#### Legend:

- 1 — outlet number;
- 2 — instant current value;
- 3 — graph of current and active power;
- 4 — instant power value;
- 5 — "INFORMATION" values block;
- 6 — "COUNTERS" block with accumulated power consumption counters;;
- 7 — "OVERVOLTAGE PROTECTION" block;
- 8 — "ALARM LIMIT" block;
- 9 — "gear" button to open the "OUTPUT SETTINGS" overlay interface;
- 10 — "TURN OFF LIMIT" block.

### 4.5.5. Setting the Output Parameters

To set the outlet control parameters, use the pop-up window *OUTPUT SETTINGS*. To open it, click on the *gear* button of the corresponding outlet.

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

**Name** — name of the outlet;

**Description** — more detailed description;

**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 OUPUT SETTINGS pop-up window.

### 4.5.7. Management of Outlets in Control Mode

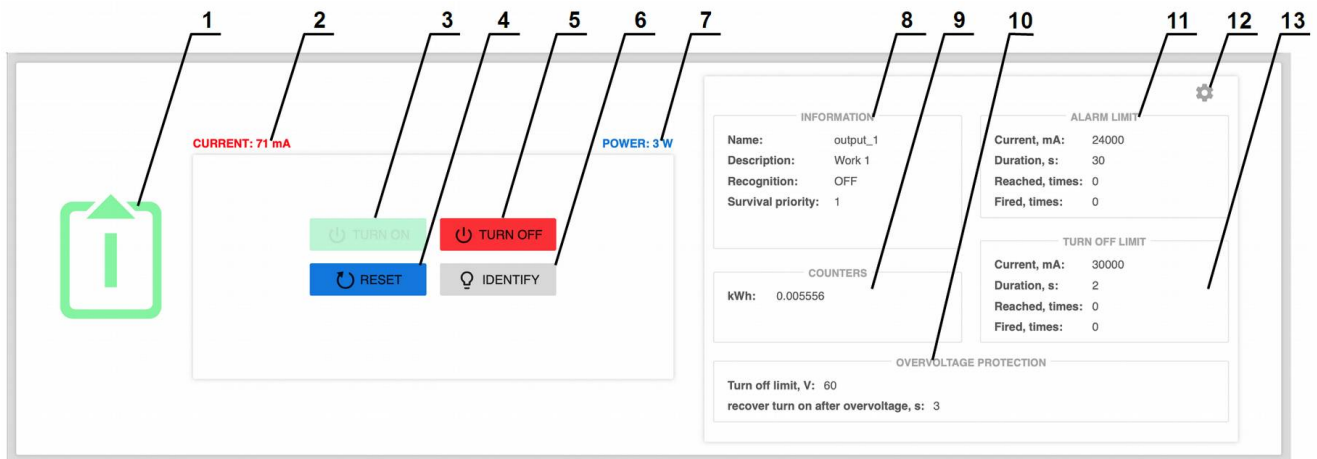


Figure 4.5.6. Outlet panel in Control Mode.

#### Legend:

- 1 — outlet number;
- 2 — instant current value;
- 3 — **TURN ON** button — use to turn on the outlet;
- 4 — **RESET** button – use to cycle power on the outlet;
- 5 — **TURN OFF** button — use to turn off the outlet;
- 6 — **IDENTIFY** button — to turn on recognition blinking on outlet to locate it in the rack;
- 7 — instant power consumption;
- 8 — “**INFORMATION**” block;
- 9 — “**COUNTERS**” block;
- 10 — “**ALARM LIMIT**” block;
- 11 — “**TURN OFF LIMIT**” block;
- 12 — “*gear*” button to open the “**OUTPUT SETTINGS**” pop-up window;
- 13 — “**OVERVOLTAGE PROTECTION**” block.

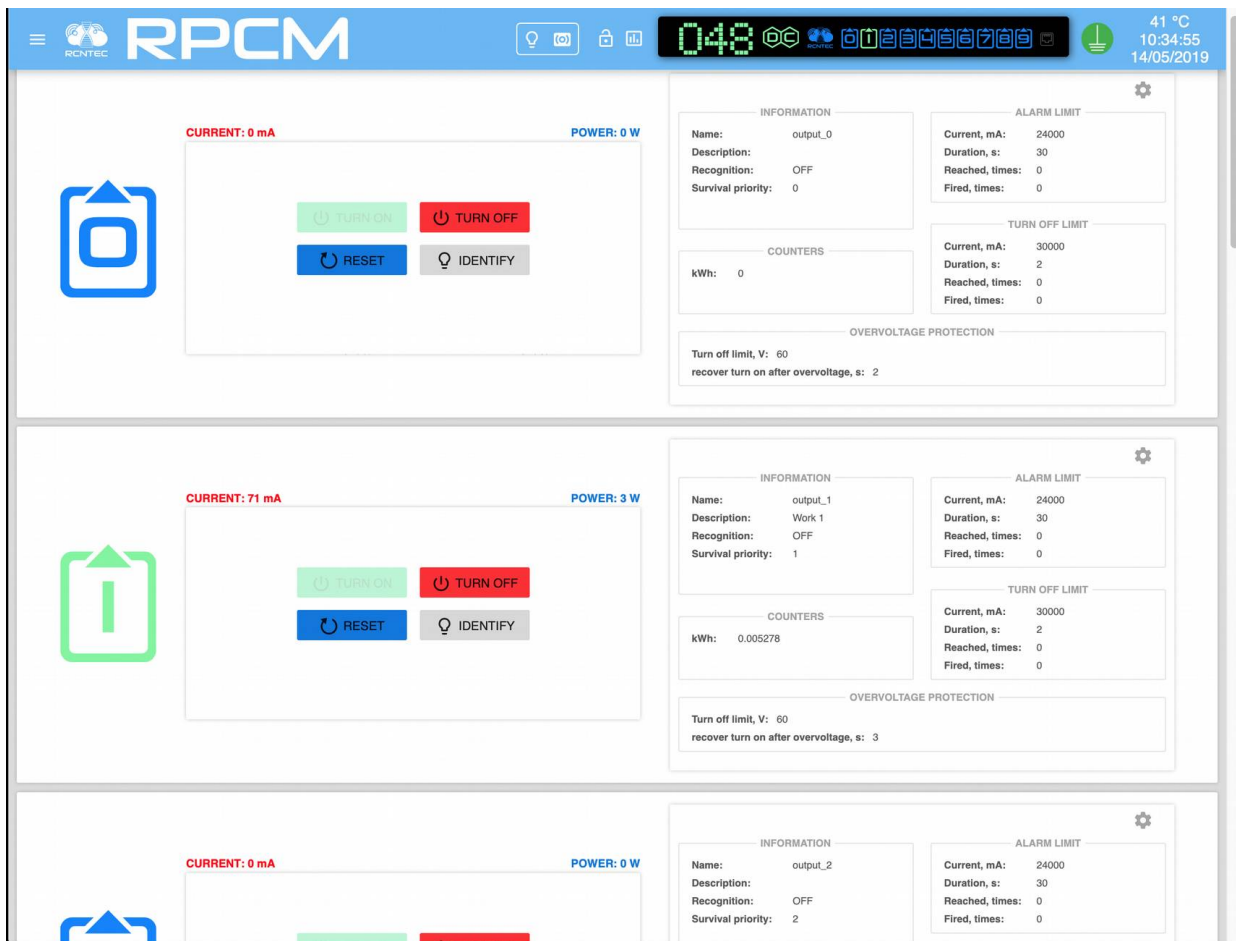


Figure 4.5.7. General view of the Outputs section in Control Mode.

### 4.5.8. Showing Current Limits on graphs

By default current/voltage 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 current flowing through the RPCM on different channels you might want to see current consumption of several outlets 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 outlets of interest.

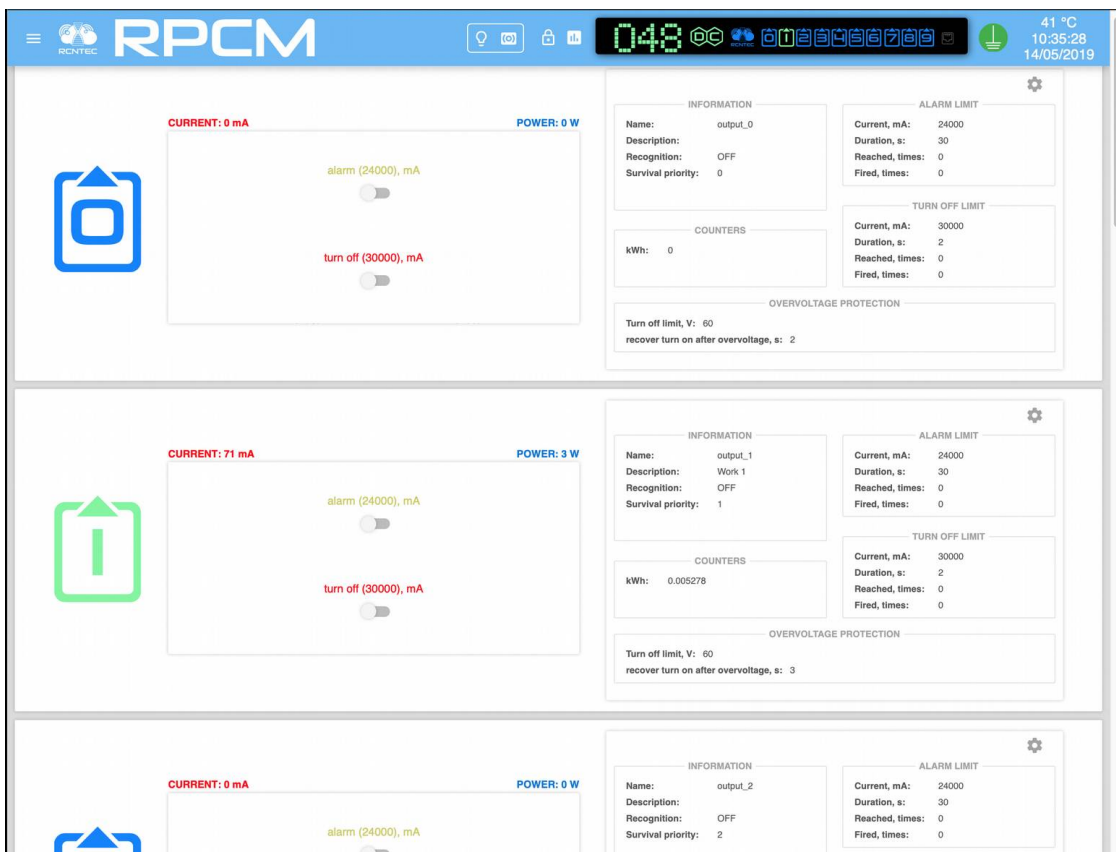


Figure 4.5.8. Showing Current Limits configuration.

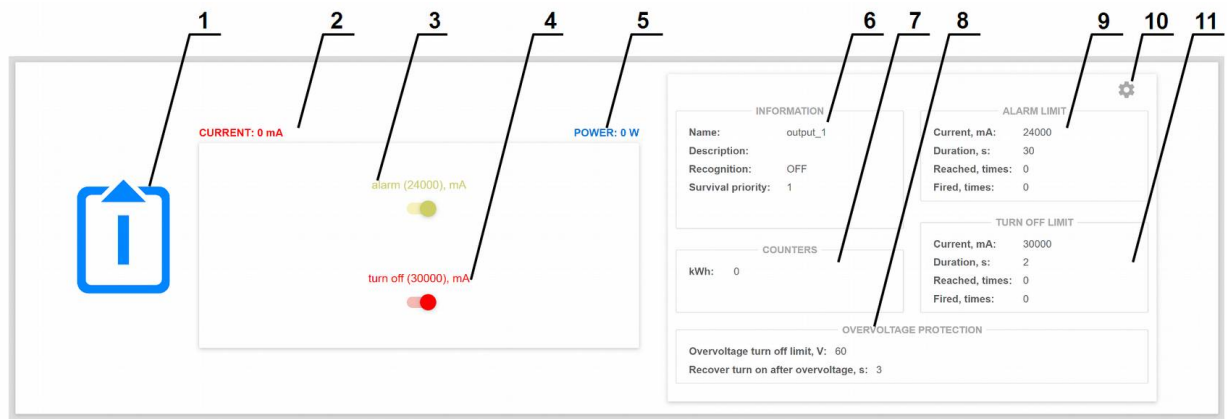


Figure 4.5.9. Showing Current Limits configuration – switches for outlet 1 are on.

**Legend:**

- 1 — number of the outlet;
- 2 — instant current consumption value (milliamps);
- 3 — switch on/off *Showing Current Limits* for notification;
- 4 — switch on/off *Showing Current Limits* for turning off;
- 5 — instant power consumption value (watts);
- 6 — "INFORMATION" block;
- 7 — "COUNTERS" block;
- 8 — "OVERVOLTAGE PROTECTION" block;
- 9 — "ALARM LIMIT" block;
- 10 — gear button to open the "OUTPUT SETTINGS" pop-up window;
- 11 — "TURN OFF LIMIT" block.





Figure 4.5.10. The Limits Demonstration Mode 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 are found in the *"Configuration"* section of the web interface.

You can reach this section by using the *Configuration* menu item or by typing:

`http://<name_or_IP_RPCM>/configuration/` in the browser address string (provided that authentication was previously successful).

**Note.** Screenshots of the RPCM DC 232A are shown as an illustration. For other models of RPCM DC, the basic principles are the same.

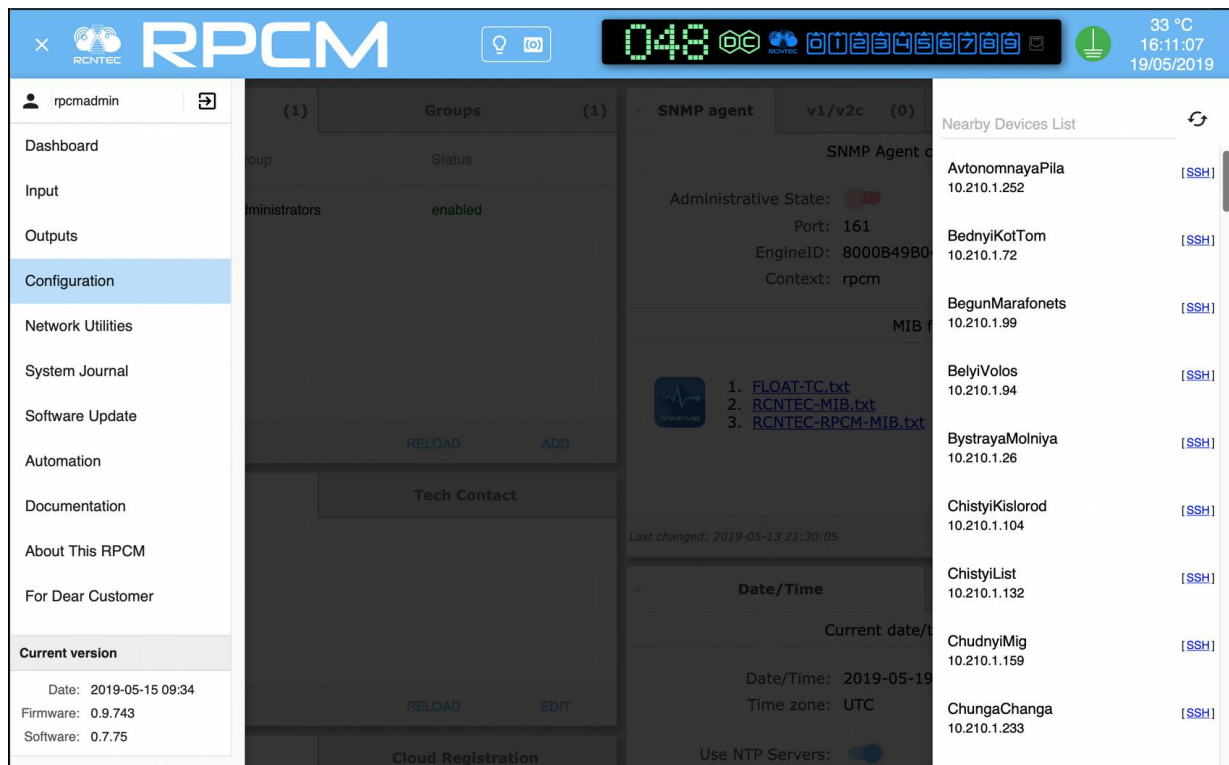


Figure 4.6.1. "Configuration" menu item.

### 4.6.2. Main Window of the "Configuration" Section

Under the Top Control Bar there are management panels with a set of tabs on which management objects are concentrated. Each panel is designed to manage a set of parameters, related to a particular functionality e.g. "Network Settings".

Figure 4.6.2. "Configuration" section — main window.

Control panels can be collapsed to fit all panels on screen for easy navigation.

Figure 4.6.3. "Configuration" section with collapsed panels.

### 4.6.3. Top Control Bar in Configuration Section

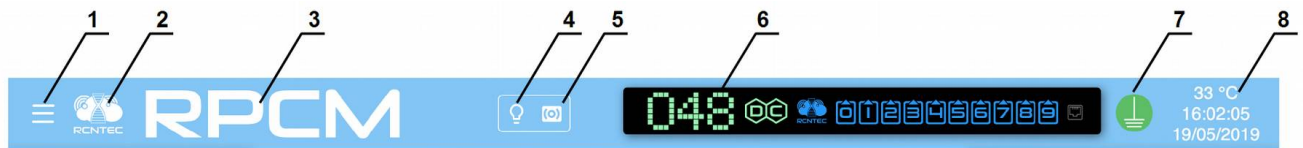


Figure 4.6.4. "Top Control Bar" in Configuration section.

#### 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 Panels

In the configuration section, there are the following field for managing common RPCM parameters:

**Users and Groups** — user and group management;

**Location and Tech Contact** — reference information about the location of the device and contacts of the engineering service;

**Network settings** — configuration of network parameters;

**SNMP** — access settings (monitoring and management) via SNMP;

**Date / Time and NTP** — time and address settings for the Time service (Network Time Protocol)

**SMTP Settings / Mail recipients** — mail transport and mail agent setting for email notification;

**Cloud Connection / Cloud Registration** — setting for integration with the RPCM Cloud

**Front panel Display settings** — for tuning display message on the Front Display.

The screenshot displays the RPCM Configuration interface. The top header shows the RPCM logo, a status bar with '048' and various icons, and a temperature/time display (32 °C, 22:47:43, 15/05/2018).

**Left Column Panels:**

- Users (1):** A table with columns 'User name', 'Group', and 'Status'. It lists 'rpcadmin' in the 'administrators' group with status 'enabled'. A red '1' is placed over the 'enabled' status.
- Location (2):** A panel with a large red '2' in the center.
- Cloud connection (7):** Shows 'Cloud session status: not connected' and two toggle switches for telemetry export and control. A red '7' is placed over the second toggle.
- Network Settings (3):** Displays network configuration: 'Configure IPv4: Using DHCP', 'IPv4 Address: 10.210.1.153', 'Subnet Mask: 255.255.255.0', 'Gateway: 10.210.1.1', 'Primary DNS', and 'Secondary DNS: 185.83.242.34'. A red '3' is placed over the IP address.
- Front Panel Display Settings (9):** Includes 'Custom message' (set to 'Custom text'), 'Text color' (set to 'Red'), and 'What to show by default' (set to 'Voltage'). A red '9' is placed over the 'Text color' dropdown.

**Right Column Panels:**

- SNMP agent:** Shows 'Administrative State' (toggle), 'Port: 161', 'EngineID: 8000B49B045250434D', and 'Context: rpcm'. Below it, 'MIB files' are listed: '1. FLOAT-TC.txt', '2. RCNTEC-MIB.txt', and '3. RCNTEC-RPCM-DC-MIB.txt'. A red '4' is placed over the list.
- Date/Time:** Shows 'Current date/time settings' with 'Date/Time: 2018-05-15 22:47:43' and 'Time zone: UTC'. A toggle for 'Use NTP Servers' is present. A red '5' is placed over the toggle.
- SMTP Settings (6):** Shows 'No data'. A red '6' is placed over the text.
- API Service Settings (8):** Shows 'API Authentication' (toggle), 'API Key: 6550c0504449b8a677ffef6e6e6022ca8', and 'Key Status' (toggle). A red '8' is placed over the 'API Authentication' toggle.
- Backup (10):** Shows a 'DOWNLOAD CONFIGURATION' button. A red '10' is placed over the button.

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* 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.

### 4.6.5. Setting Up System User Accounts And Groups

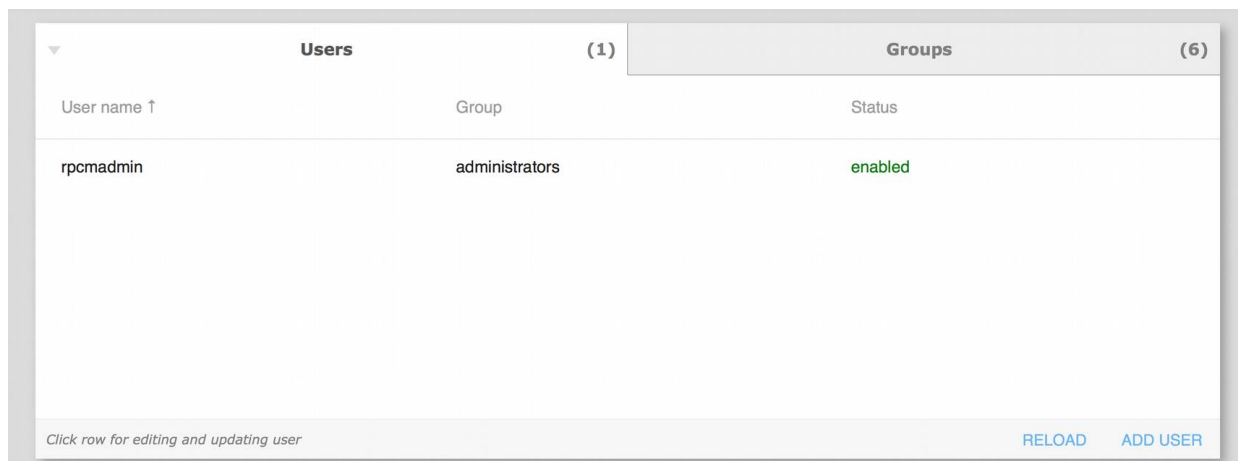
When you enter the "*Configuration*" section in the "Users and Groups" panel, the "*Users*" tab is opened to control users.

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.



Users (1)		Groups (6)
User name ↑	Group	Status
rpcadmin	administrators	enabled

Click row for editing and updating user

RELOAD ADD 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, click on the **ADD USER** button. The following fields are available in the appeared window:

**User name** — the name of the new user;

**Password** — password;

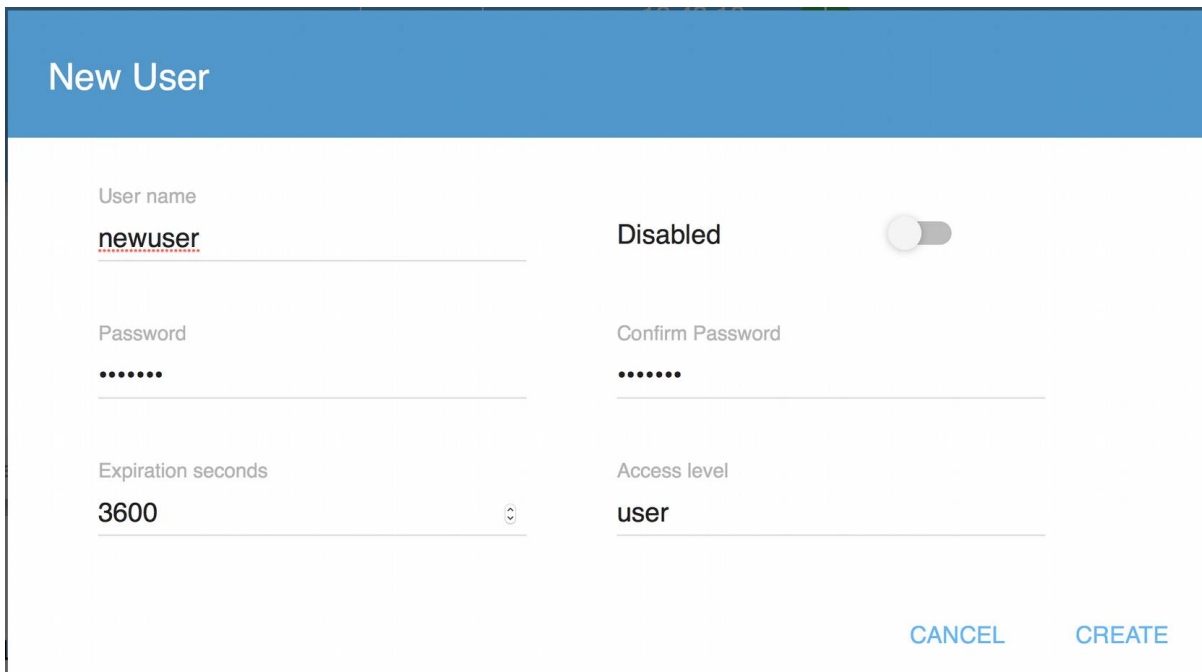
**Confirm Password** — confirmation of the password;

**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.

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



The screenshot shows a 'New User' form with the following fields and values:

- User name:** newuser
- Disabled:** Toggle switch is ON (blue)
- Password:** Masked with dots
- Confirm Password:** Masked with dots
- Expiration seconds:** 3600
- Access level:** user
- Buttons:** CANCEL and CREATE

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.

Appearance of the Edit User window.

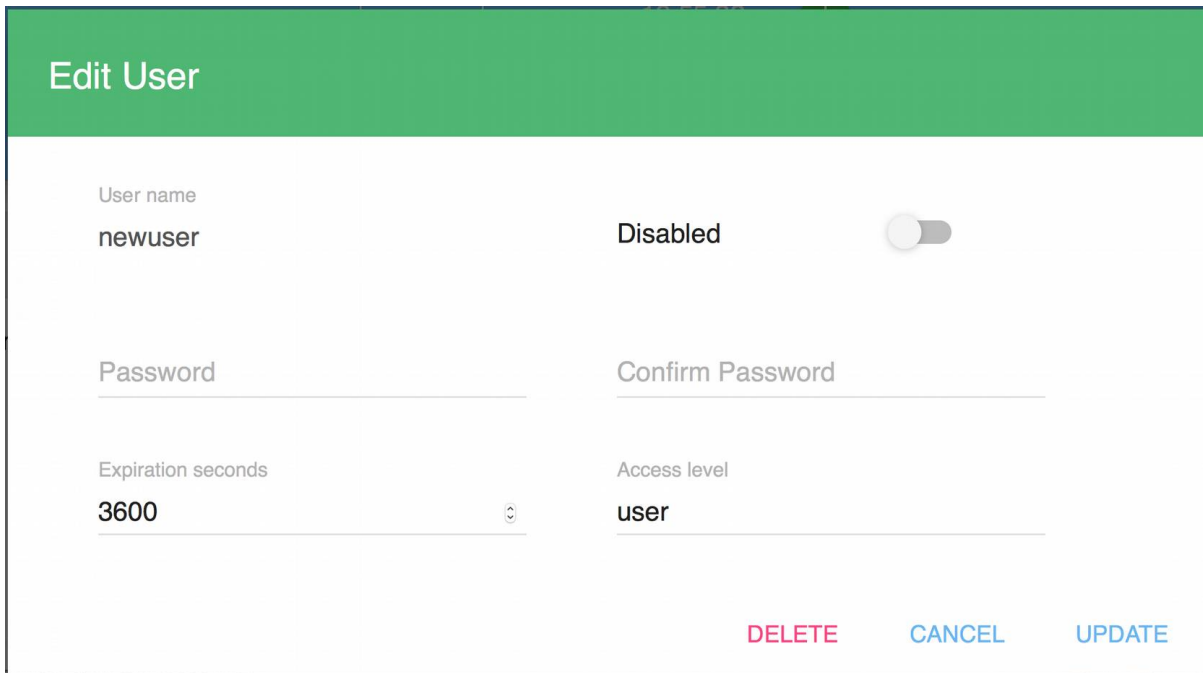


Figure 4.6.8. "Edit User" window for RPCM system user account editing.

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.

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.

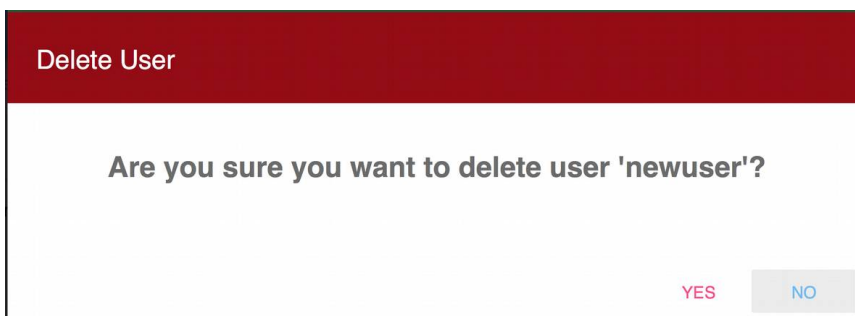
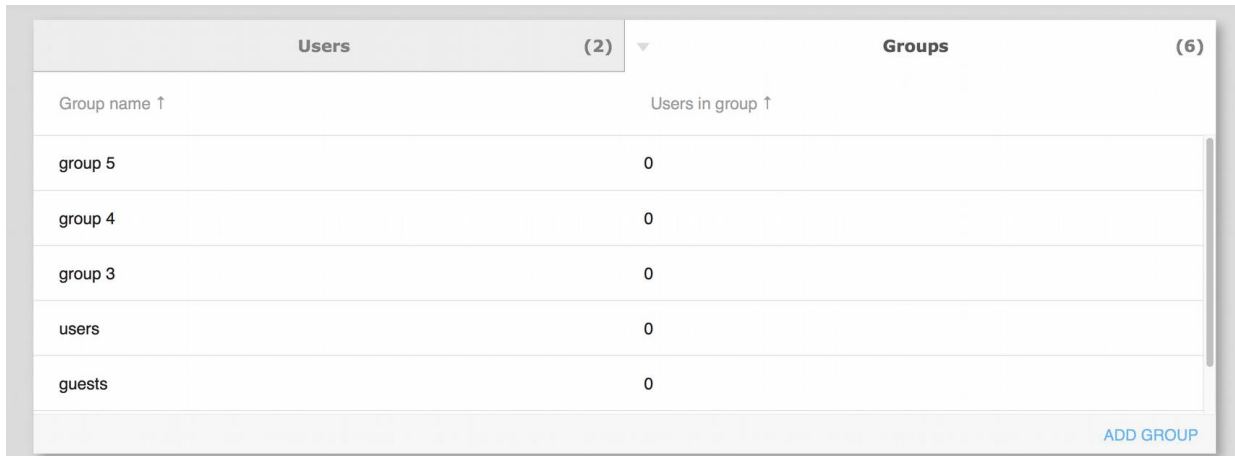


Figure 4.6.8. "Delete User" confirmation window.

**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.



Users (2)	Groups (6)
Group name ↑	Users in group ↑
group 5	0
group 4	0
group 3	0
users	0
guests	0

[ADD GROUP](#)

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

### 4.6.6. Information About Technical Support Location and Contacts

This panel 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;

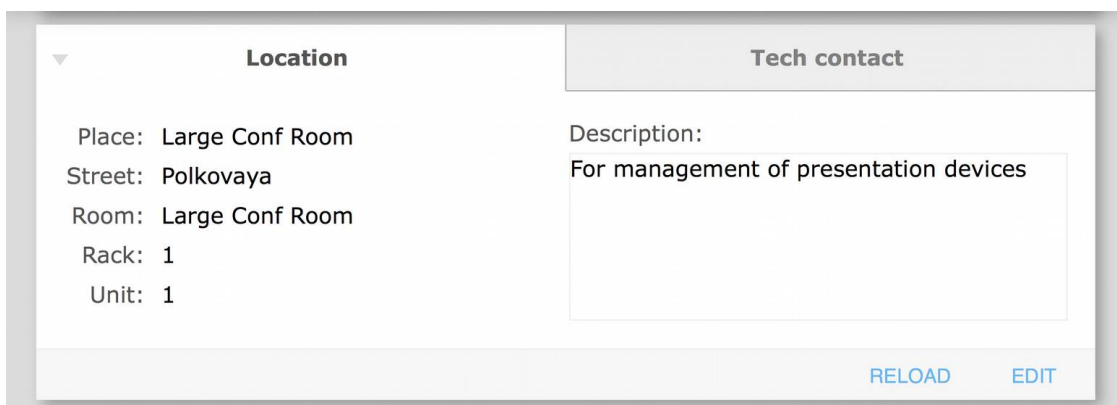
**Room** — name or number of the room where the device is located;

**Rack** — coordinates or rack number where the module is mounted;

**Unit** — unit number in 19" inch rack;

**Description** — text field for recording additional information.

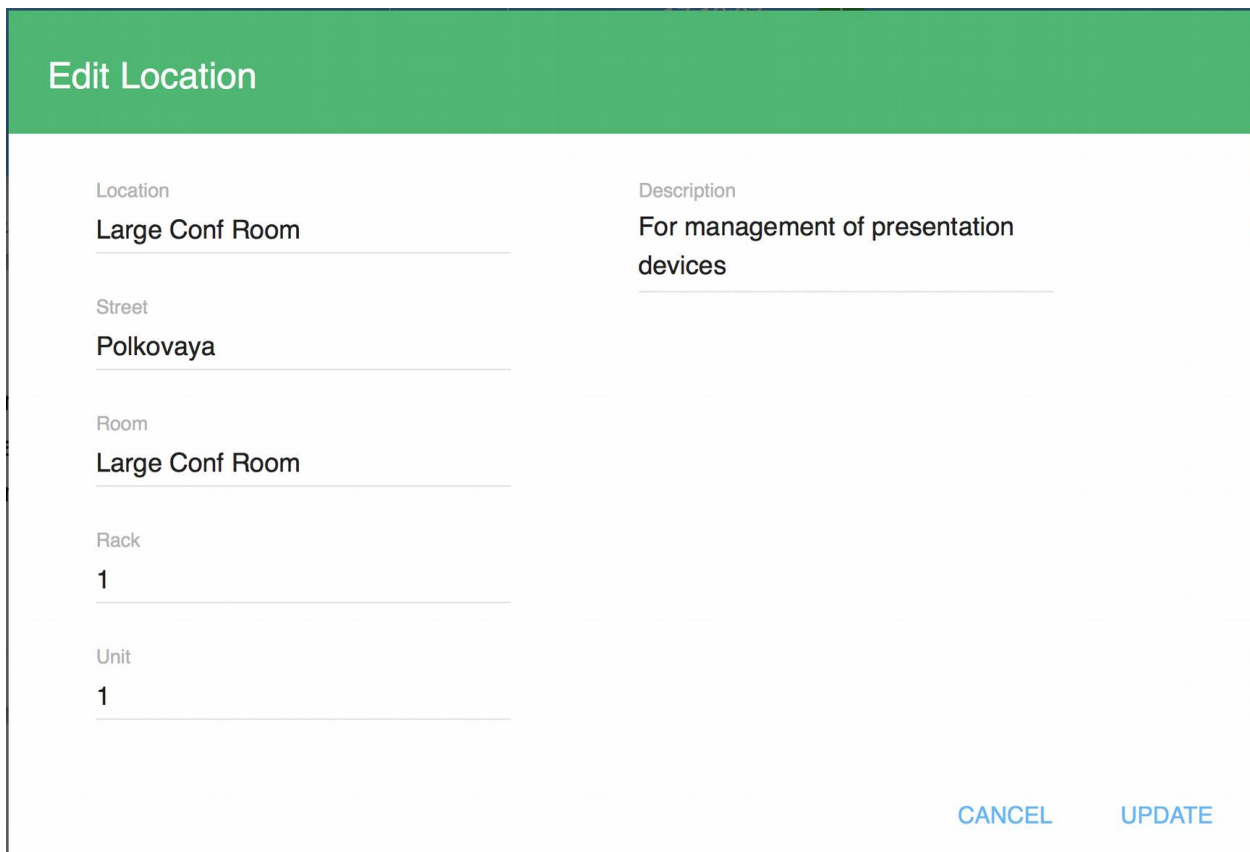
Also there are **EDIT** button for calling the pop-up window for editing parameters and **RELOAD** button for updating information presented in this panel.



Location	Tech contact
Place: Large Conf Room Street: Polkovaya Room: Large Conf Room Rack: 1 Unit: 1	Description: For management of presentation devices

[RELOAD](#) [EDIT](#)

Figure 4.6.11. Location and Tech contact panel. The "Location" tab is active.



The "Edit Location" pop-up window has a green header bar with the title "Edit Location". Below the header, the form is divided into two columns. The left column contains five input fields with labels "Location", "Street", "Room", "Rack", and "Unit". The right column contains a larger text area with a label "Description". At the bottom right of the form are two buttons: "CANCEL" and "UPDATE".

Location	Description
Large Conf Room	For management of presentation devices
Polkovaya	
Large Conf Room	
1	
1	

Figure 4.6.12. 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).

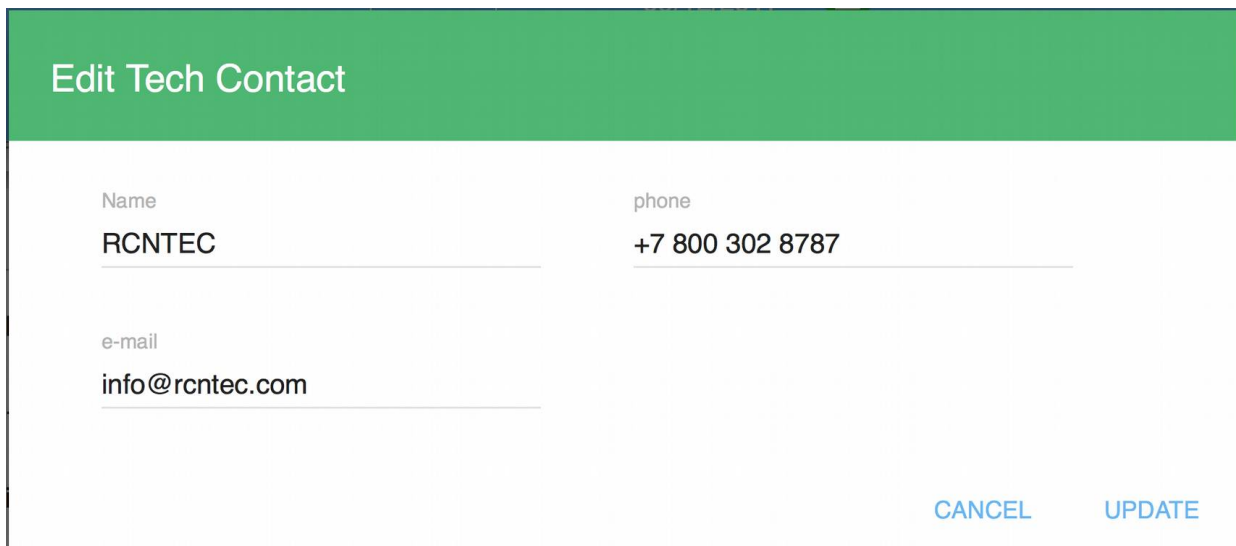


The "Location" and "Tech contact" panel shows two tabs. The "Location" tab is currently selected and highlighted. The "Tech contact" tab is also visible. The "Tech contact" tab contains three input fields: "Name", "Phone", and "e-mail". At the bottom right of the panel are two buttons: "RELOAD" and "EDIT".

Location	Tech contact
Name: RCNTEC	
Phone: +7 800 302 8787	
e-mail: info@rcntec.com	

Figure 4.6.13. "Location" and "Tech contact" panel. "Tech Contact" tab is active.

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



Edit Tech Contact	
Name	phone
RCNTEC	+7 800 302 8787
e-mail	
info@rcntec.com	
<div>CANCEL UPDATE</div>	

Figure 4.6.14. 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 panel:

**Configure IPv4** — Using DHCP (or static address);

**IPv4 address**;

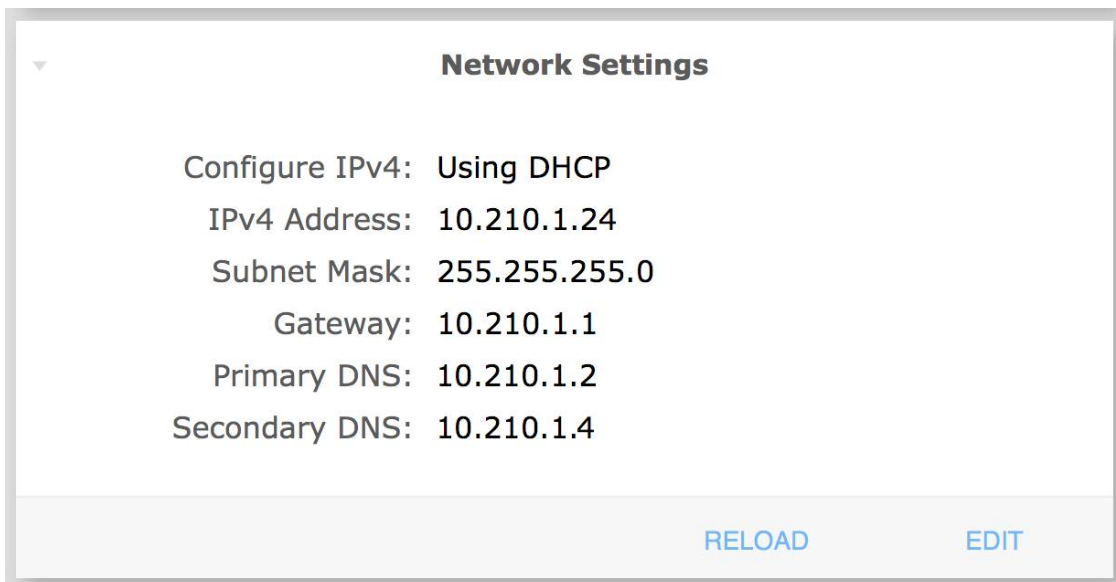
**Subnet mask**;

**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 calling the pop-up window for editing network parameters and the **RELOAD** button to refresh information in this panel.



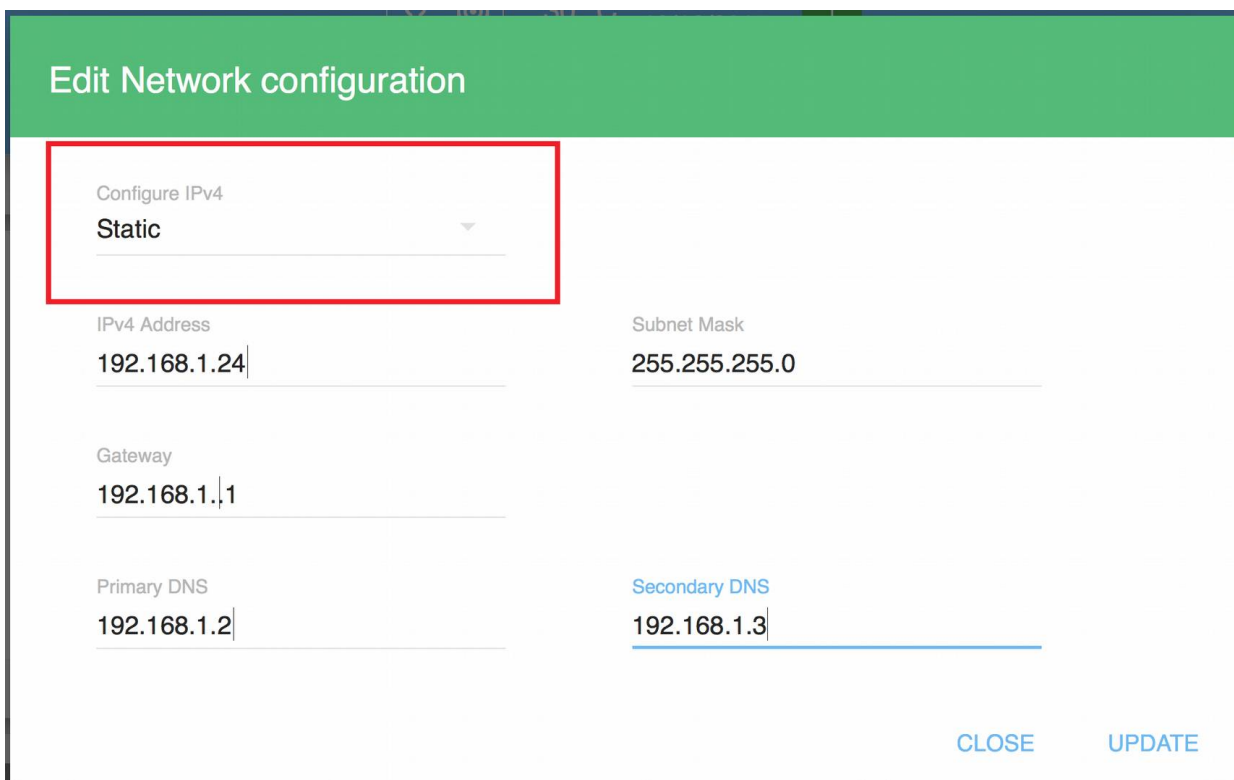
The "Network Settings" panel displays the current configuration for IPv4. It includes fields for "Configure IPv4" (set to "Using DHCP"), "IPv4 Address" (10.210.1.24), "Subnet Mask" (255.255.255.0), "Gateway" (10.210.1.1), "Primary DNS" (10.210.1.2), and "Secondary DNS" (10.210.1.4). At the bottom right, there are "RELOAD" and "EDIT" buttons.

Configure IPv4:	Using DHCP
IPv4 Address:	10.210.1.24
Subnet Mask:	255.255.255.0
Gateway:	10.210.1.1
Primary DNS:	10.210.1.2
Secondary DNS:	10.210.1.4

RELOAD EDIT

Figure 4.6.15. "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.



The "Edit Network configuration" pop-up window allows users to modify network settings. A red box highlights the "Configure IPv4" dropdown menu, which is currently set to "Static". Below this, there are input fields for "IPv4 Address" (192.168.1.24), "Subnet Mask" (255.255.255.0), "Gateway" (192.168.1.1), "Primary DNS" (192.168.1.2), and "Secondary DNS" (192.168.1.3). At the bottom right, there are "CLOSE" and "UPDATE" buttons.

Edit Network configuration

Configure IPv4  
Static

IPv4 Address: 192.168.1.24 Subnet Mask: 255.255.255.0

Gateway: 192.168.1.1

Primary DNS: 192.168.1.2 Secondary DNS: 192.168.1.3

CLOSE UPDATE

Figure 4.6.16. 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

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.


▼ <b>SNMP agent</b>	<b>v1/v2c</b> (1)	<b>v3</b> (1)	<b>Traps</b> (1)
<b>SNMP Agent configuration</b>			
Administrative State: <input checked="" type="checkbox"/>			
Port: 161			
EngineID: 8000B49B045250434D			
Context: rpcm			
<b>MIB files</b>			
<div style="display: flex; align-items: flex-start;">  <div> <ol style="list-style-type: none"> <li>1. <a href="#">FLOAT-TC.txt</a></li> <li>2. <a href="#">RCNTEC-MIB.txt</a></li> <li>3. <a href="#">RCNTEC-RPCM-DC-MIB.txt</a></li> </ol> </div> </div>			
Last changed: 2019-09-04 13:35:26			<a href="#">RELOAD</a>

Figure 4.6.17. SNMP management panel. "SNMP agent" tab is active.

The SNMP Agent tab consists of two areas:

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

*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.

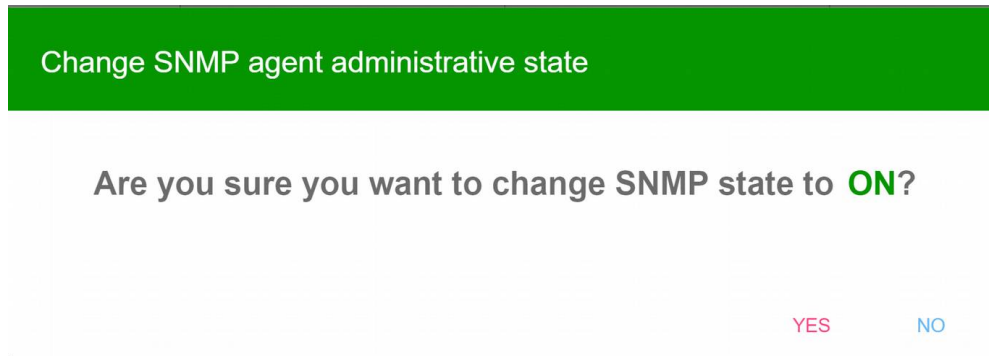


Figure 4.6.18. Window confirmation that SNMP is enabled.

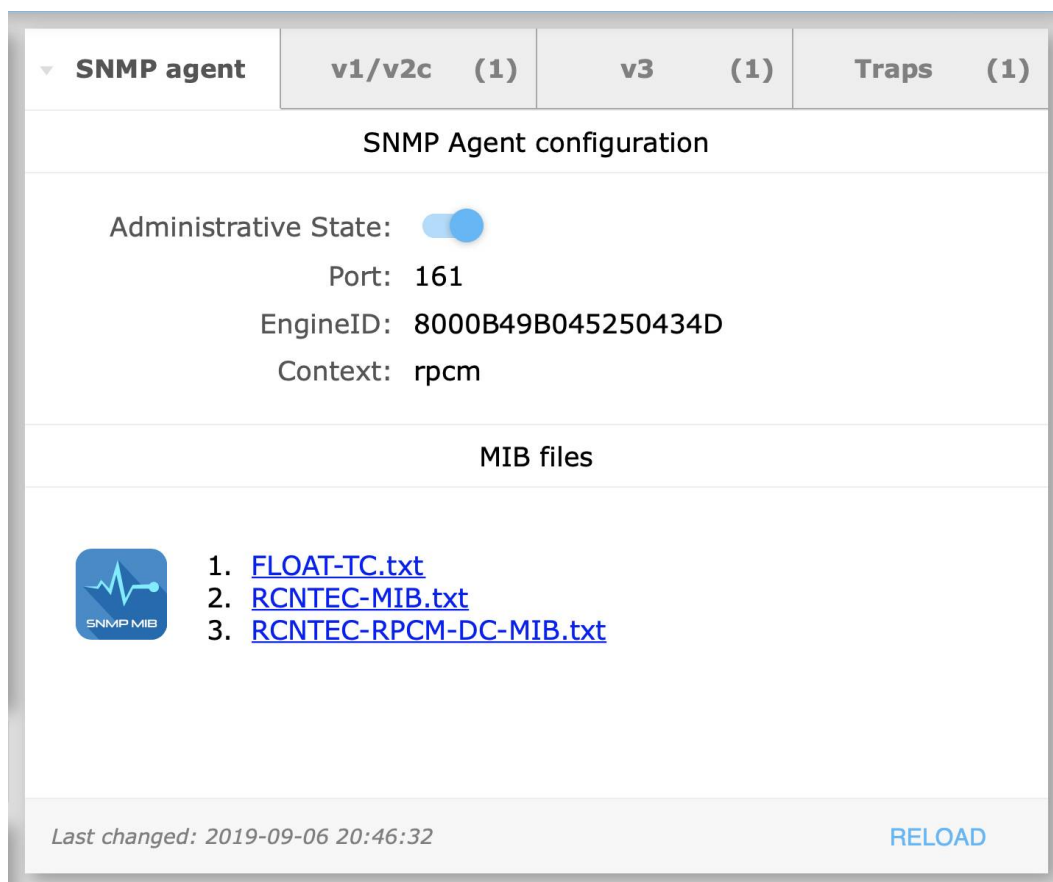


Figure 4.6.19. SNMP management panel. SNMP agent is ON.

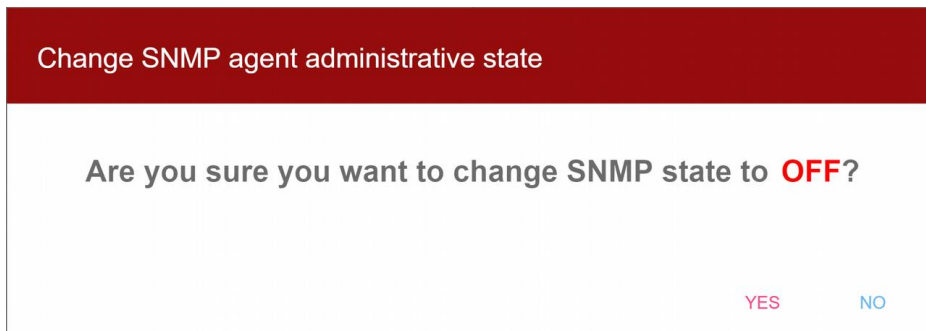


Figure 4.6.20. Window to confirm disabling of SNMP.

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.

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

Figure 4.6.21. SNMP management panel. The tab "v1/2c" is active.

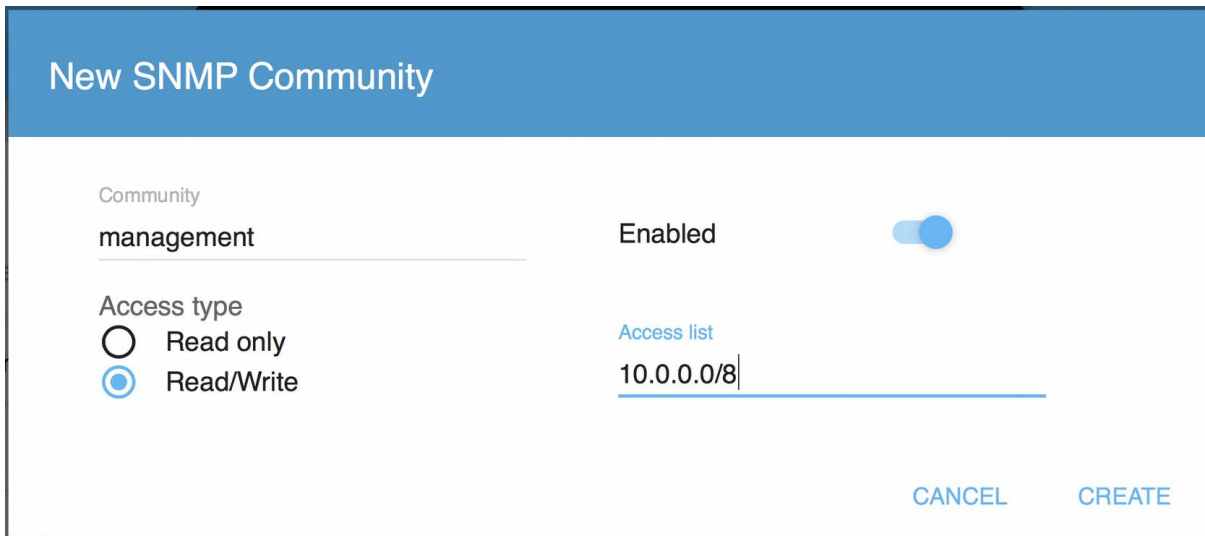
This tab provides information:

- **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.



The "New SNMP Community" window has a blue header. Below the header, there are two main sections. The first section is labeled "Community" and contains a text input field with the value "management" and a toggle switch labeled "Enabled" which is currently turned on. The second section is labeled "Access type" and contains two radio buttons: "Read only" (which is unselected) and "Read/Write" (which is selected). To the right of the radio buttons is a text input field labeled "Access list" with the value "10.0.0.0/8". At the bottom right of the window are two buttons: "CANCEL" and "CREATE".

Figure 4.6.22. "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.

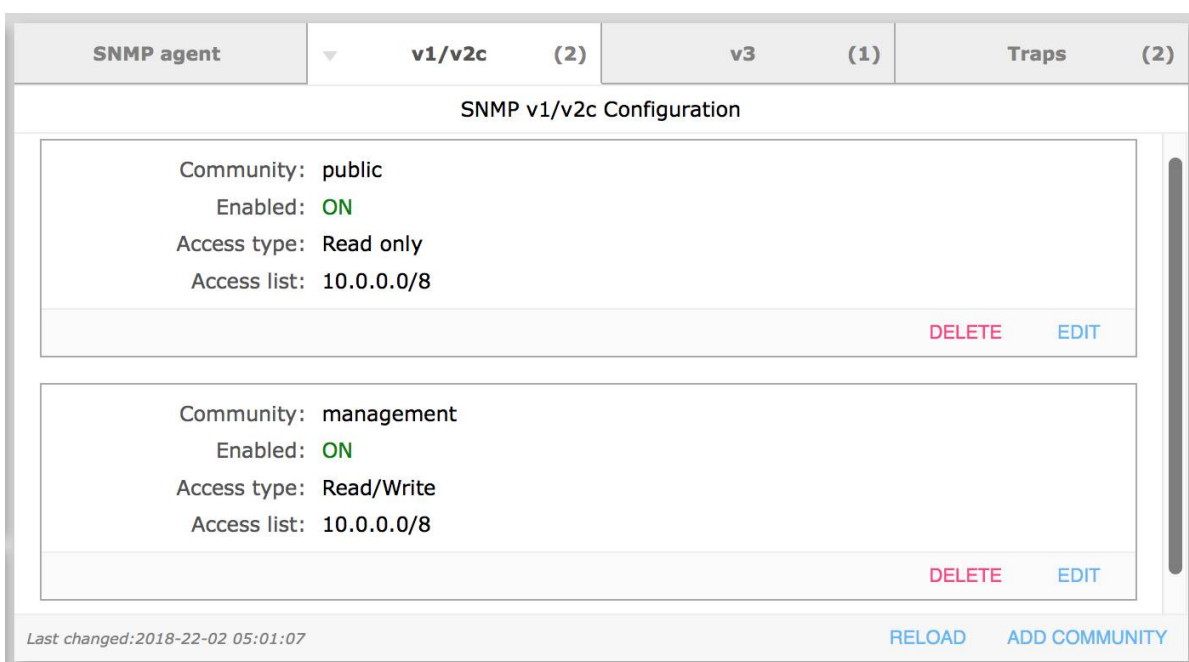
Subnet format is network\_address/subnet\_mask, for example: 10.0.0.0/8 or 172.16.0.0/12 etc

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**.



The "SNMP v1/v2c Configuration" window shows a table of SNMP communities. The table has columns for "SNMP agent", "v1/v2c", "v3", and "Traps". The "v1/v2c" column has a dropdown menu showing "v1/v2c (2)". The "v3" column has a dropdown menu showing "v3 (1)". The "Traps" column has a dropdown menu showing "Traps (2)". The table contains two entries. The first entry has "Community: public", "Enabled: ON", "Access type: Read only", and "Access list: 10.0.0.0/8". The second entry has "Community: management", "Enabled: ON", "Access type: Read/Write", and "Access list: 10.0.0.0/8". Each entry has "DELETE" and "EDIT" buttons. At the bottom of the window, there is a "Last changed" timestamp "2018-22-02 05:01:07" and two buttons: "RELOAD" and "ADD COMMUNITY".



Figure 4.6.23. 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"

The screenshot shows a window titled "Edit Community" with a green header. Inside, there are several fields: "Community" with the value "management", "Enabled" with a blue toggle switch, "Access type" with radio buttons for "Read only" and "Read/Write" (the latter is selected), and "Access list" with the value "10.0.0.0/8". At the bottom right, there are three buttons: "DELETE" (pink), "CANCEL" (blue), and "UPDATE" (blue).

Figure 4.6.24. The "Edit Community" (SNMP) window.

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

The screenshot shows a window titled "Delete Community" with a dark red header. The main content area is white and contains the text "Are you sure you want to delete community management?". At the bottom right, there are two buttons: "YES" (pink) and "NO" (blue).

Figure 4.6.25. 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.

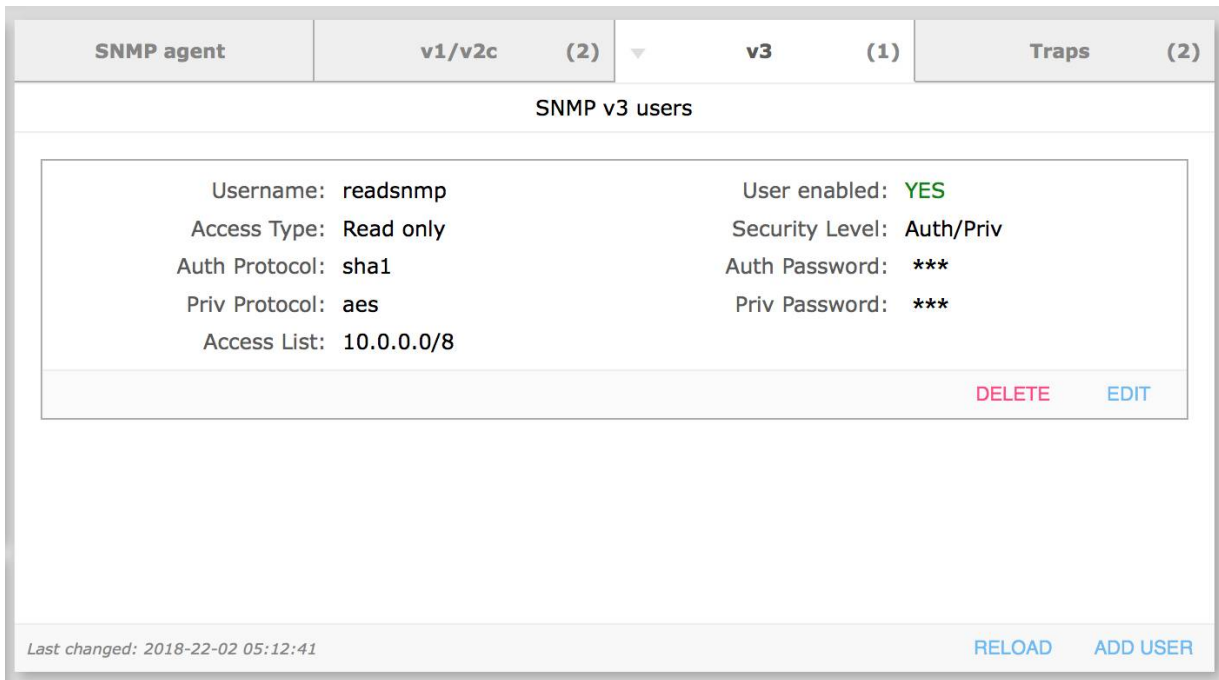


Figure  
4.6.26.  
SNMP

management panel, "SNMP v3 Users" tab.

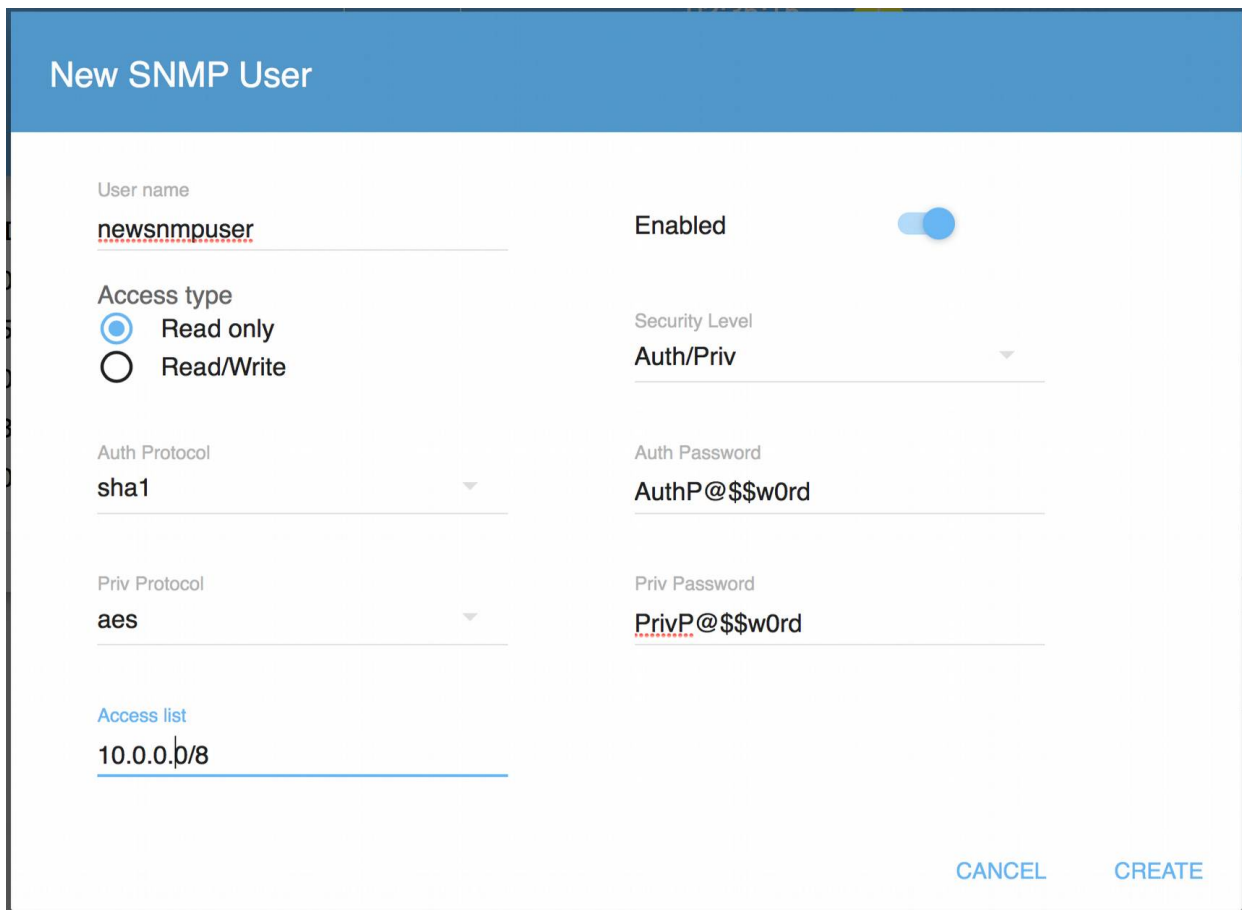
The "SNMP v3 Users" tab displays the following fields:

- **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** — 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.



**New SNMP User**

User name: newsnmpuser

Enabled: ☒

Access type: ☒ Read only ☐ Read/Write

Security Level: Auth/Priv

Auth Protocol: sha1

Auth Password: AuthP@\$w0rd

Priv Protocol: aes

Priv Password: PrivP@\$w0rd

Access list: 10.0.0.0/8

[CANCEL](#) [CREATE](#)

Figure 4.6.27. "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**.

SNMP agent	v1/v2c (1)	v3 (2)	Traps (1)
SNMP v3 users			
<div> <div> Username: readsnmp  Access Type: Read only  Auth Protocol: sha1  Priv Protocol: aes  Access List: 10.0.0.0/8 </div> <div> User enabled: YES  Security Level: Auth/Priv  Auth Password: <input type="password"/>  Priv Password: <input type="password"/> </div> </div>			
			DELETE EDIT
<div> <div> Username: newsnmpuser  Access Type: Read only  Auth Protocol: sha1  Priv Protocol: aes  Access List: 10.0.0.0/8 </div> <div> User enabled: YES  Security Level: Auth/Priv  Auth Password: <input type="password"/>  Priv Password: <input type="password"/> </div> </div>			
Last changed: 2018-26-02 23:35:23 <div>RELOAD ADD USER</div>			

Figure 4.6.28. 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.

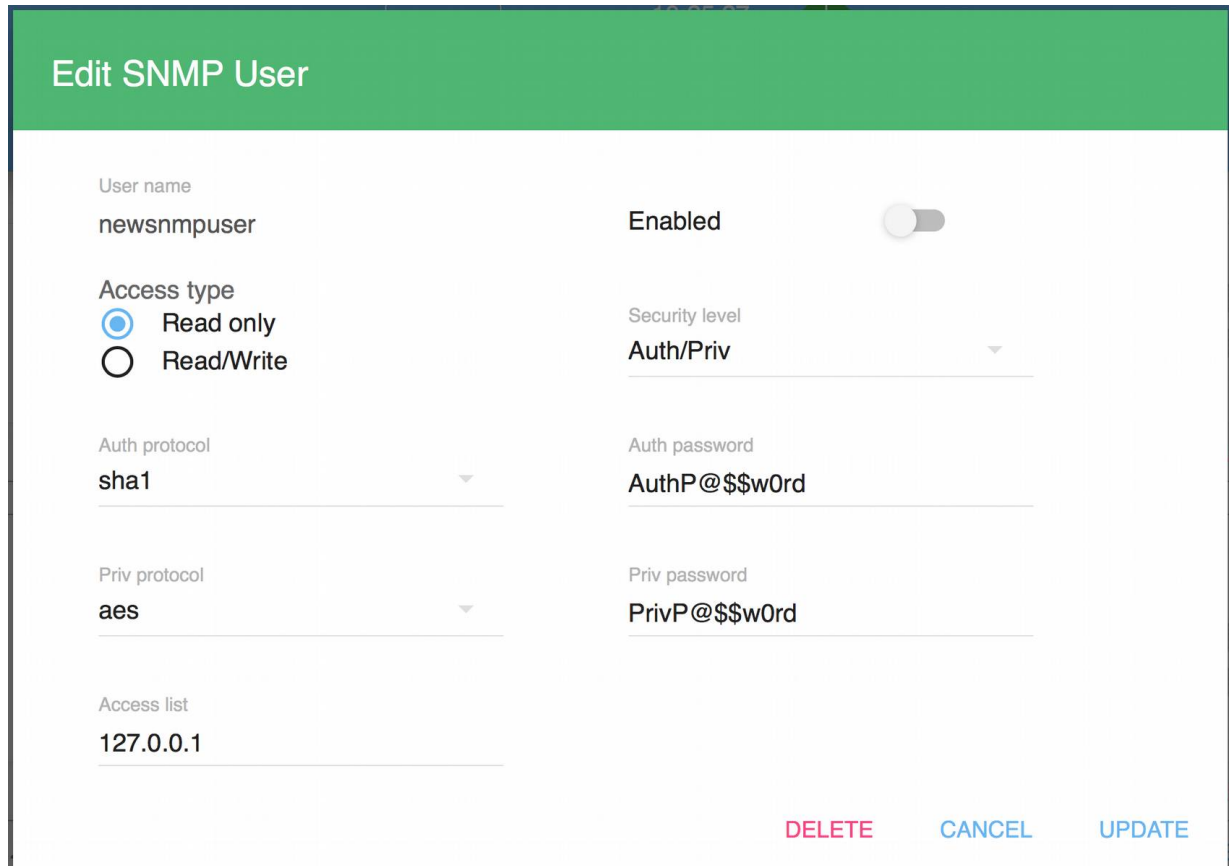


Figure 4.6.29. "Edit SNMP User" window.

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

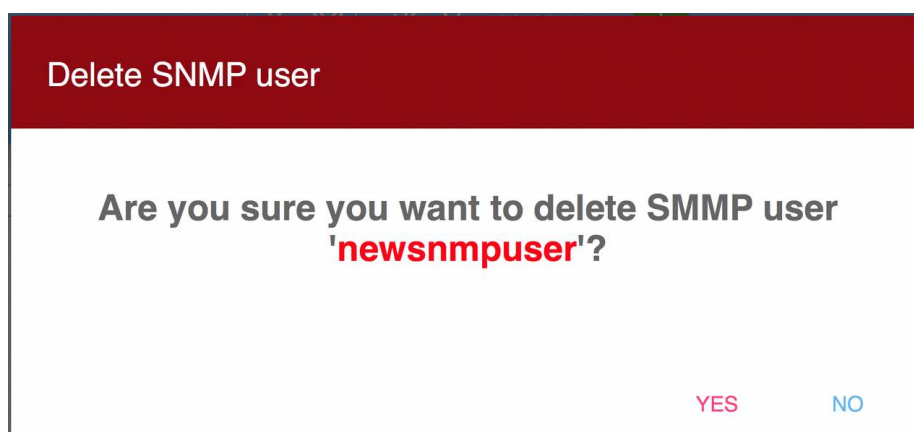


Figure 4.6.30. Window confirming the removal of the current SNMPv3 user account.

#### 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.

The screenshot shows the 'SNMP Traps Configuration' panel. At the top, there are tabs for 'SNMP agent', 'v1/v2c (1)', 'v3 (1)', and 'Traps (1)'. The 'Traps (1)' tab is selected. Below the tabs, the panel displays the configuration for a single trap record:

- SNMP version: v1
- Destination: 10.210.0.1
- Port: 162
- Enabled: ON (in green)
- community: management

At the bottom right of the configuration box, there are two buttons: 'DELETE' (in red) and 'DISABLE' (in blue). At the very bottom of the panel, there is a status bar showing 'Last changed: 2018-22-02 04:55:43' on the left and 'RELOAD' and 'ADD TRAP' buttons on the right.

Figure 4.6.31. 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.

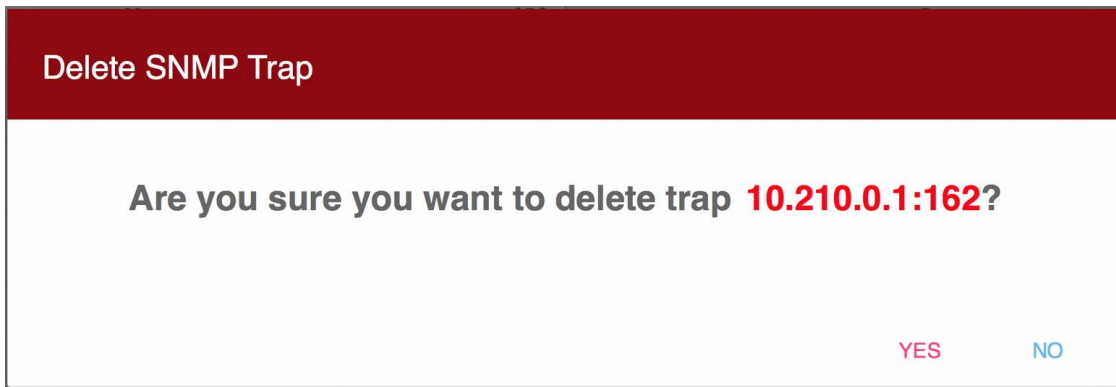


Figure 4.6.32. Window confirming deletion of SNMP Trap configuration settings.

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 changed 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.

 A screenshot of a web interface window titled "New SNMP Trap" with a blue header. The main content area is white and contains three input fields: "Destination" with the value "10.210.0.1", "Port" with the value "162", and "Community" with the value "management". To the right of the "Destination" field is an "Enabled" label and a blue toggle switch. At the bottom right, there are two buttons: "CANCEL" and "CREATE", both in blue.

Figure 4.6.33. 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)

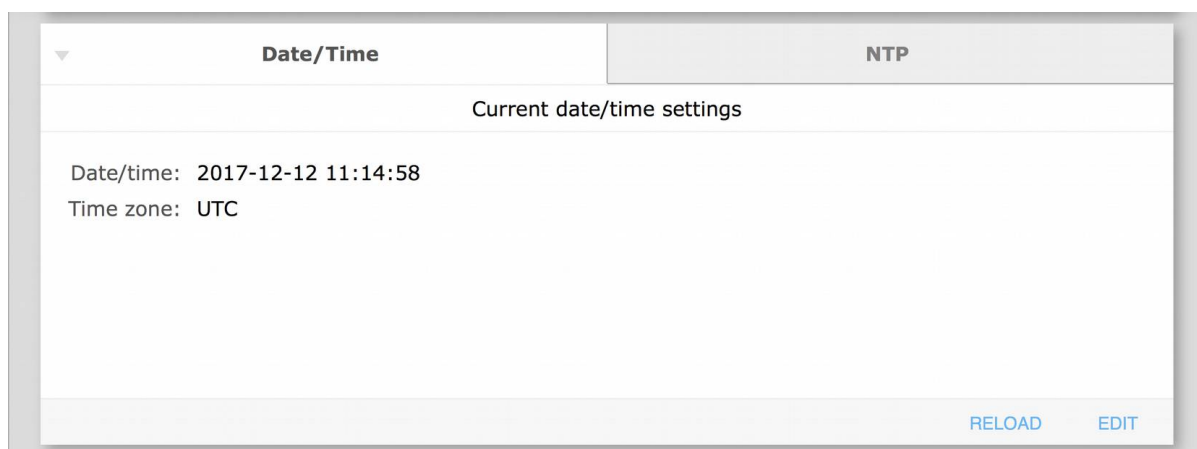


Figure 4.6.34. "Date/Time" tab for managing system time.

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

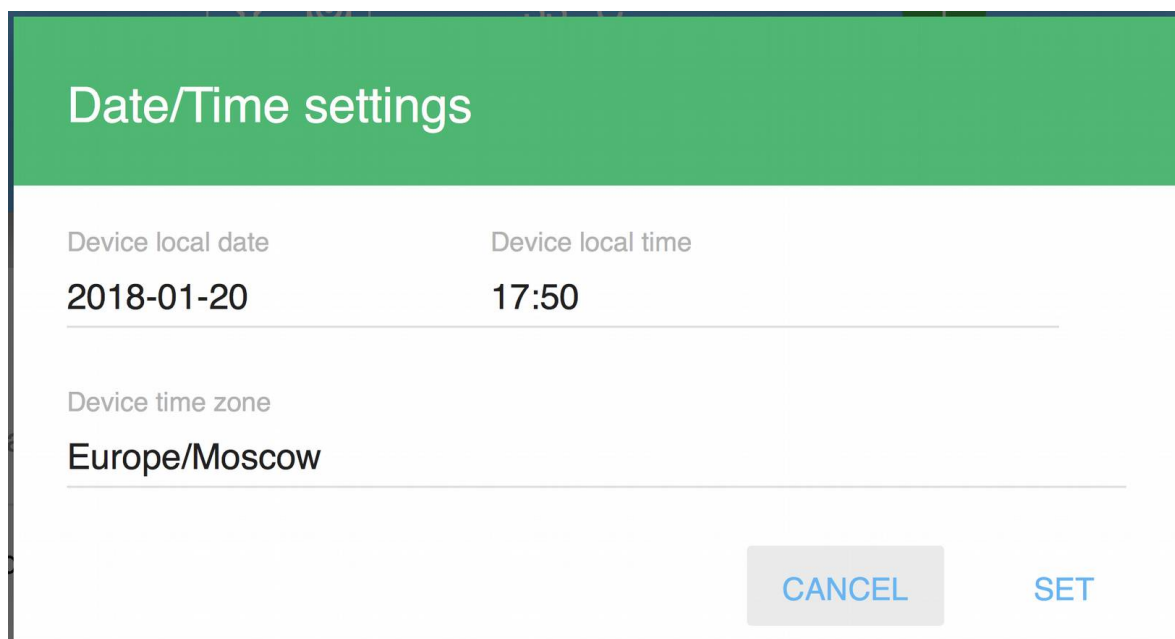


Figure 4.6.35. "Date/Time settings" pop-up windows for adjusting system time and time zone.

**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.

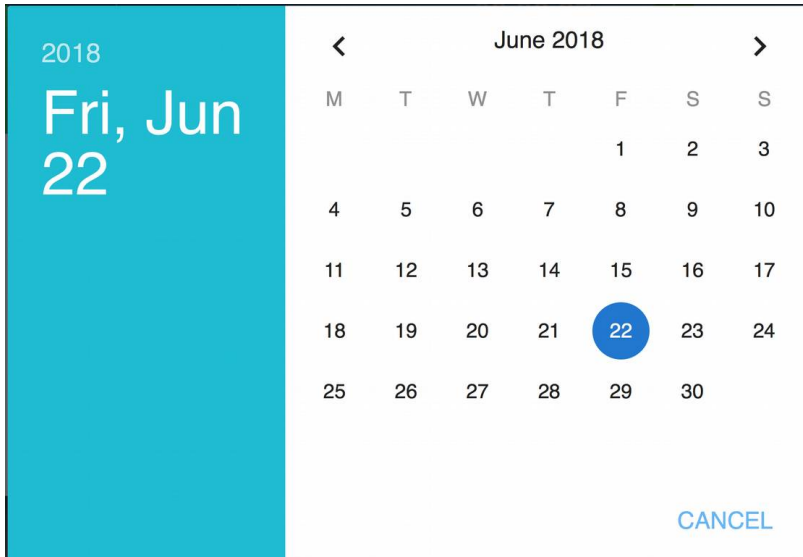


Figure 4.6.36. Pop-up calendar window for changing the system date.

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 4.6.35)

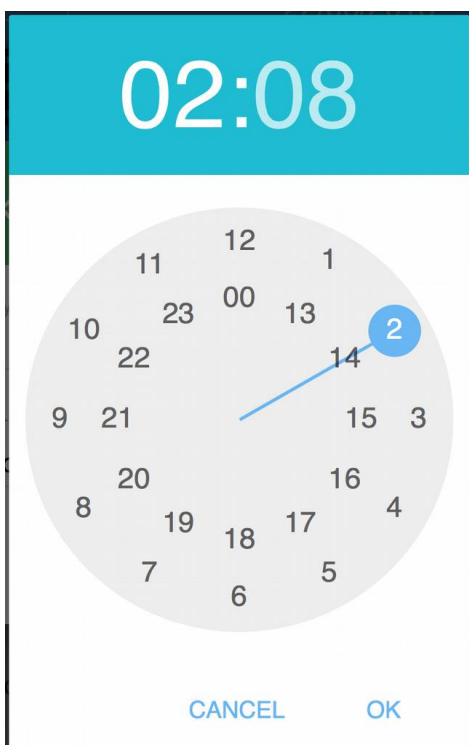


Figure 4.6.37. Time change pop-up - clock adjustment.



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.

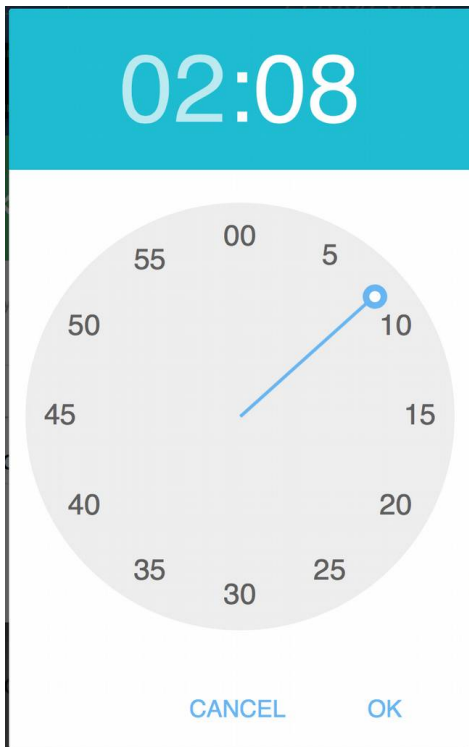


Figure 4.6.38. Time change pop-up window — minutes adjustment.

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.

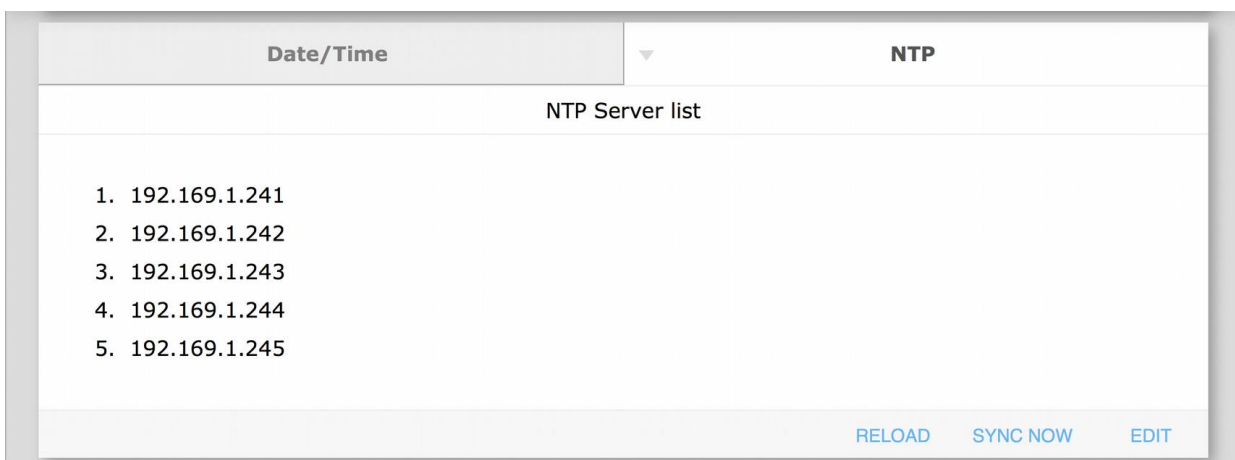
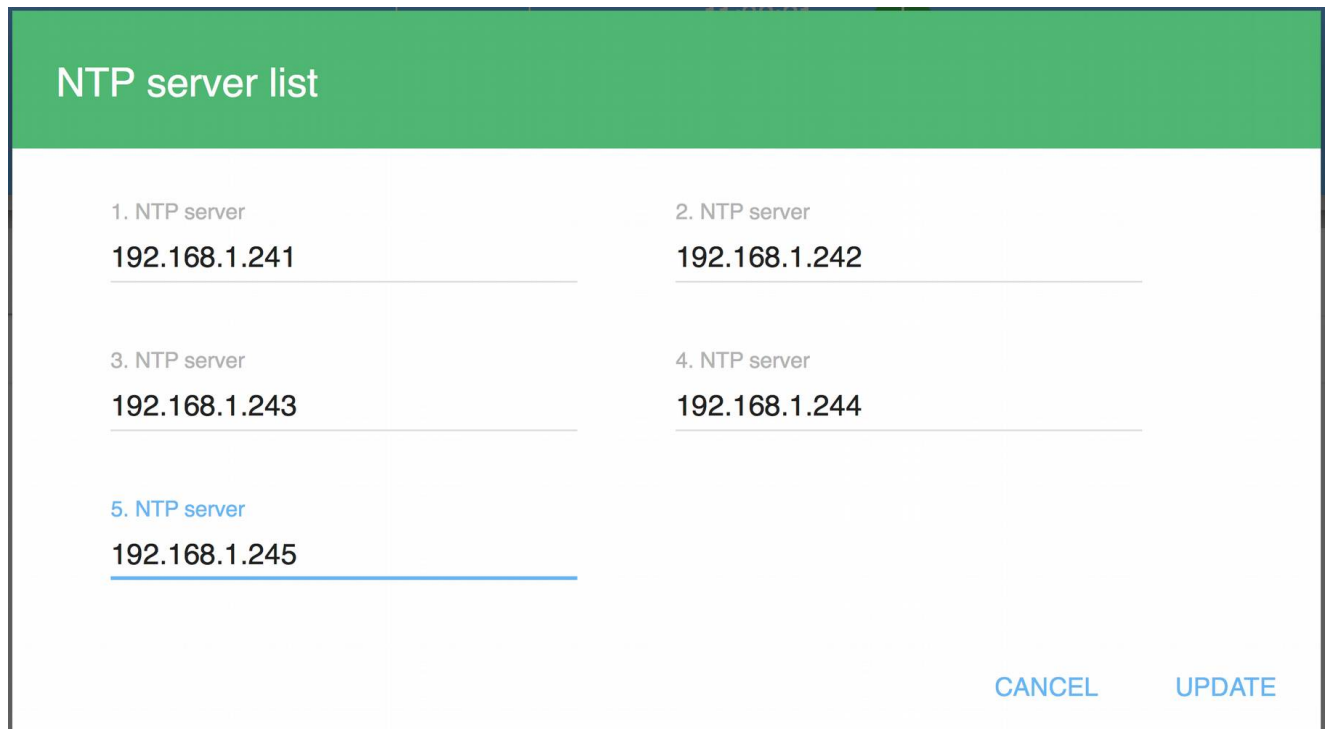


Figure 4.6.39. "NTP" tab for setting up time servers.

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.



The image shows a pop-up window titled "NTP server list" with a green header. It contains a list of five NTP servers, each with a label and an IP address in a text input field. The first four servers are numbered 1 through 4, and the fifth is numbered 5. The IP addresses are 192.168.1.241, 192.168.1.242, 192.168.1.243, 192.168.1.244, and 192.168.1.245. At the bottom right, there are two buttons: "CANCEL" and "UPDATE".

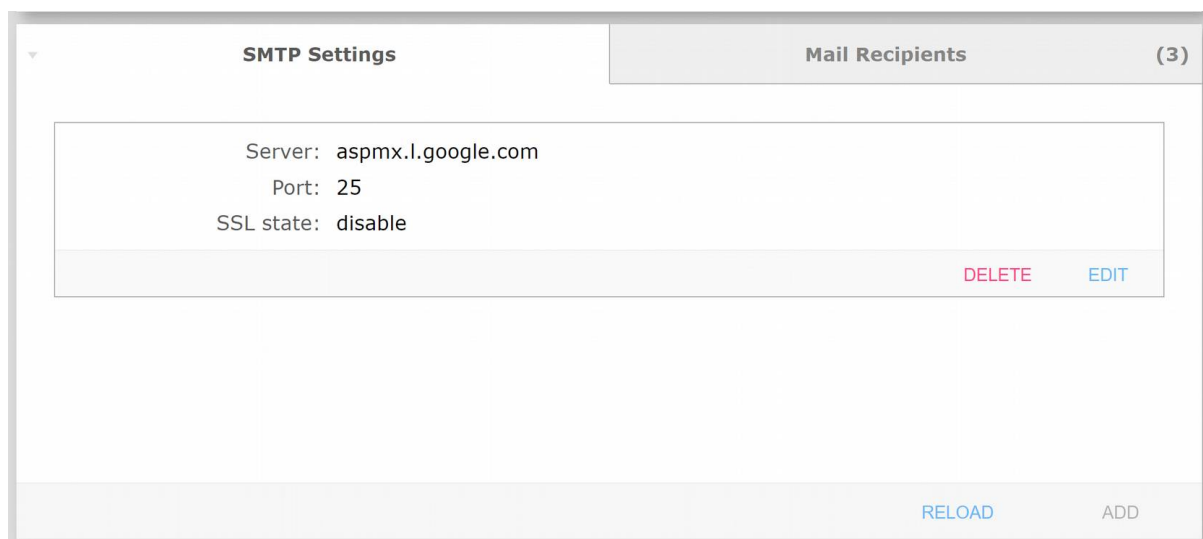
Label	IP Address
1. NTP server	192.168.1.241
2. NTP server	192.168.1.242
3. NTP server	192.168.1.243
4. NTP server	192.168.1.244
5. NTP server	192.168.1.245

Figure 4.6.40. 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.



The image shows a management panel with two tabs: "SMTP Settings" and "Mail Recipients (3)". The "SMTP Settings" tab is active, showing a form with the following fields: "Server: aspmx.l.google.com", "Port: 25", and "SSL state: disable". Below the form are two buttons: "DELETE" and "EDIT". At the bottom of the panel, there are two buttons: "RELOAD" and "ADD".

Figure 4.6.41. 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).

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.

## New SMTP Server

Server	Port
smtp1.ourcompany.com	587
HELO domain	Auth type
smtp1.ourcompany.com	CRAM_MD5
Username	Password
rpcminfo@ourcompany.com	.....
SSL state	
<input type="radio"/> enable	
<input type="radio"/> disable	
<input checked="" type="radio"/> enable-dontverify-cert	
<input type="radio"/> tls	
<div>CANCEL CREATE</div>	

Figure 4.6.42. "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.

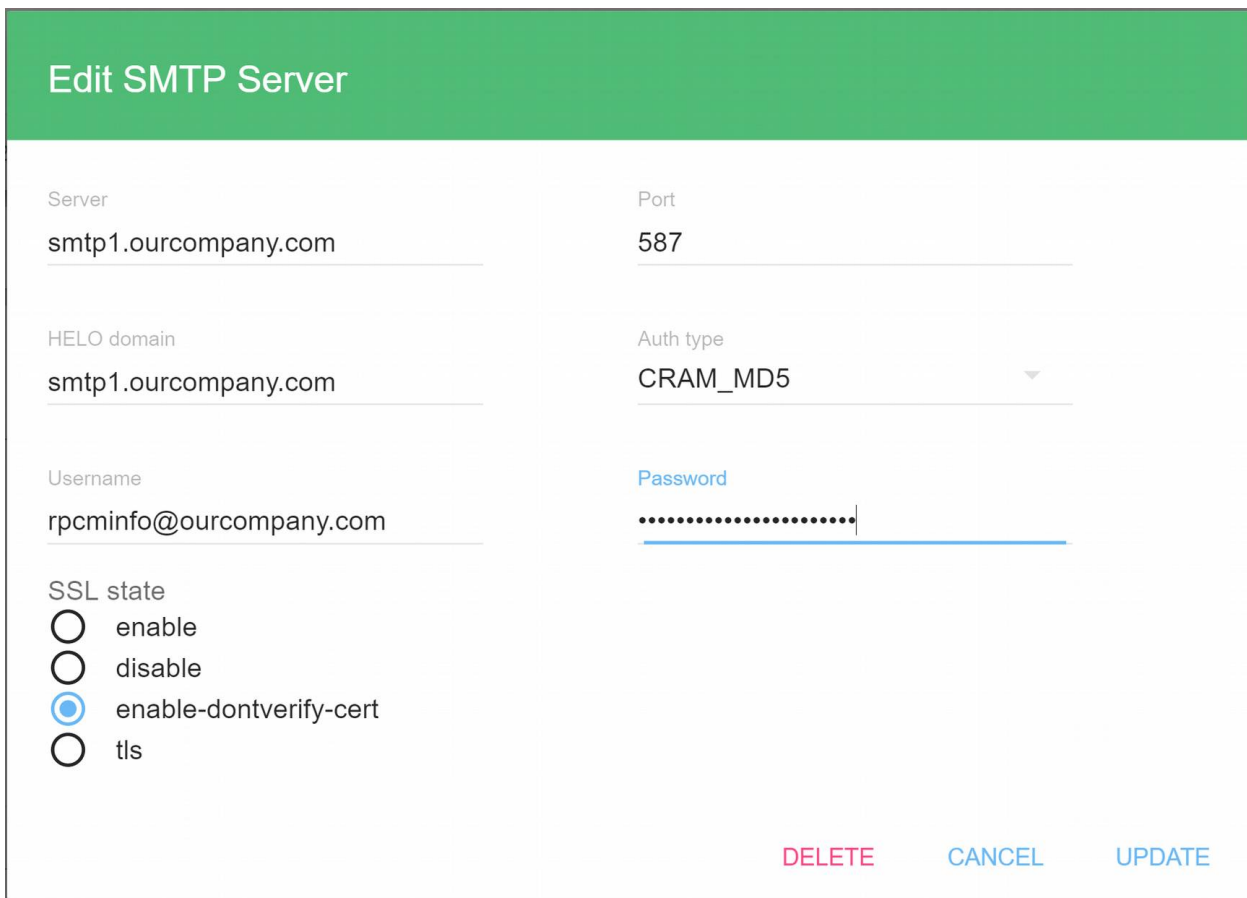


Figure 4.6.43. "Edit SMTP server" pop-up window.

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

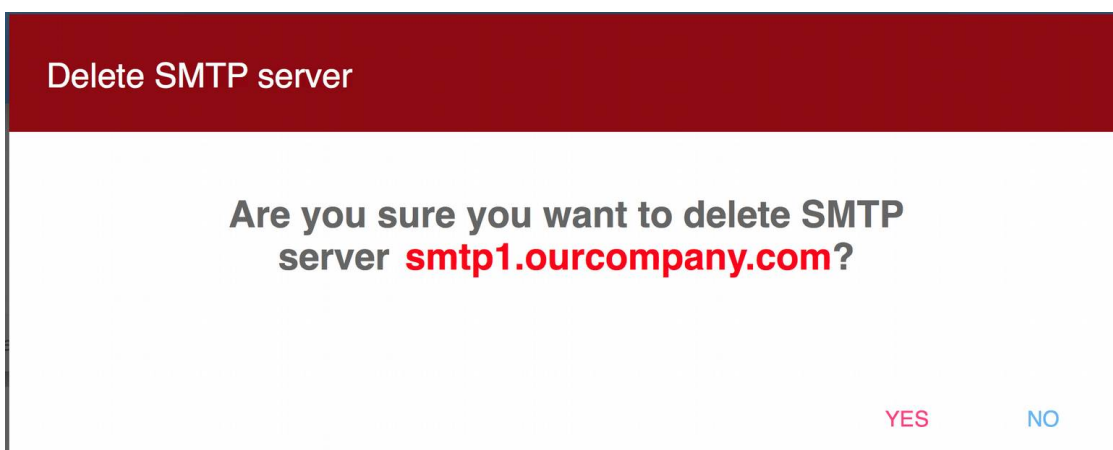


Figure 4.6.44. Confirmation pop-up window "Delete SMTP server".

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.

The image shows a web interface for SMTP management. It has two tabs: 'SMTP Settings' and 'Mail recipients'. The 'Mail recipients' tab is active, showing a list of recipients. Each recipient entry includes fields for 'email', 'cc', and 'bcc'. In this case, the email is 'admin@ourcompany.com', cc is 'support@ourcompany.com', and bcc is 'security@ourcompany.com'. There is a 'DELETE' button next to the entry. At the bottom of the panel, there are 'RELOAD' and 'ADD' buttons.

SMTP Settings	Mail recipients
<div>email: admin@ourcompany.com cc: support@ourcompany.com bcc: security@ourcompany.com</div> <div>DELETE</div>	

RELOAD ADD

Figure 4.6.45. 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.

The image shows a 'New recipient' pop-up window. It has a blue header with the title 'New recipient'. Below the header, there are three input fields: 'email' (admin@ourcompany.com), 'cc' (support@ourcompany.com), and 'bcc' (security@ourcompany.com). At the bottom right, there are 'CANCEL' and 'CREATE' buttons.

New recipient	
email	cc
admin@ourcompany.com	support@ourcompany.com
bcc	
security@ourcompany.com	

CANCEL CREATE

Figure 4.6.46. "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.

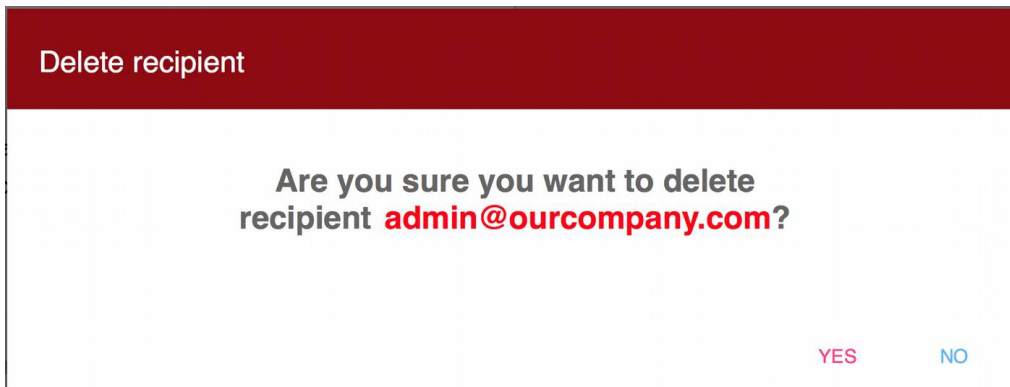


Figure 4.6.47. "Delete recipient" confirmation pop-up window.

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).

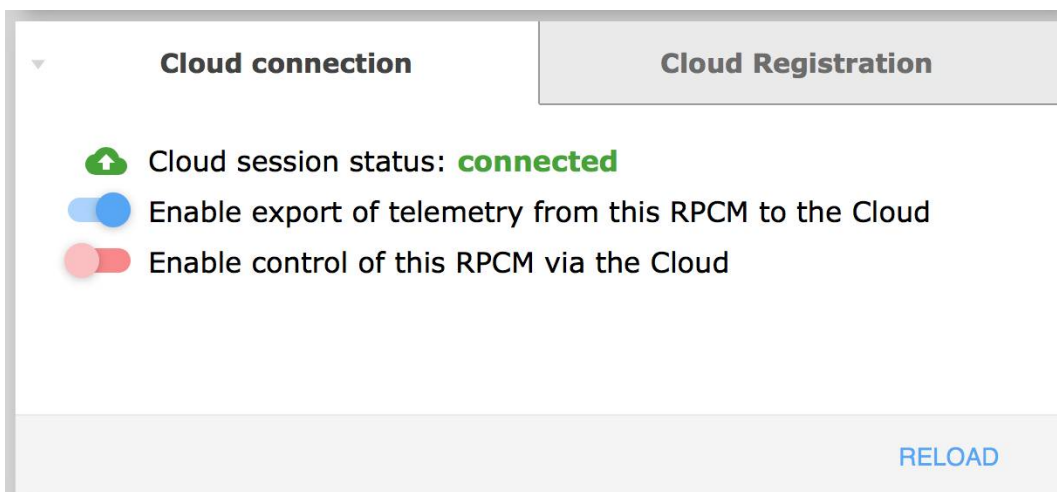


Figure 4.6.48. RPCM Cloud configuration panel — "Cloud Connection" tab

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

**Cloud connection** ▼ **Cloud Registration**

✓ Registration status: registered

MAC Address: B8F74A000017

Serial Name: AntiGeroy

Serial Number: RU2017101100000002MO01DN01

RELOAD

Figure 4.6.49. RPCM Cloud configuration panel — "Cloud Registration" tab.

## 4.6.12. API Service Settings

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

▼ **API Service Settings**

API Authentication: ☒

API Key: 88ba3e8e614df5988483a8b2269cdab9

Key Status: ☒

RELOAD GENERATE NEW

Figure 4.6.50. The "API Settings" panel.

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" panel in the "Configuration" section.

Table 4.6.1. Messages displayed on the display.

Value Name	Unit of measurement	Example of message
Voltage	Volt, V	048
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 :	68:05:CA:42:EC:22
Serial name	English characters	KrepkiyLob
Serial number	English characters and numbers	RU2017101100000002M001 DN01
Post user	It is recommended to use English characters and numbers, hyphen -	Any, for example "N01"

▼

Front panel Display settings

Custom text, maximum 31 characters.

Custom message: RPCM-1

Text color: Yellow ▼

Will shown by default: UserMessage ▼

SAVE RELOAD

Figure 4.6.51. 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).

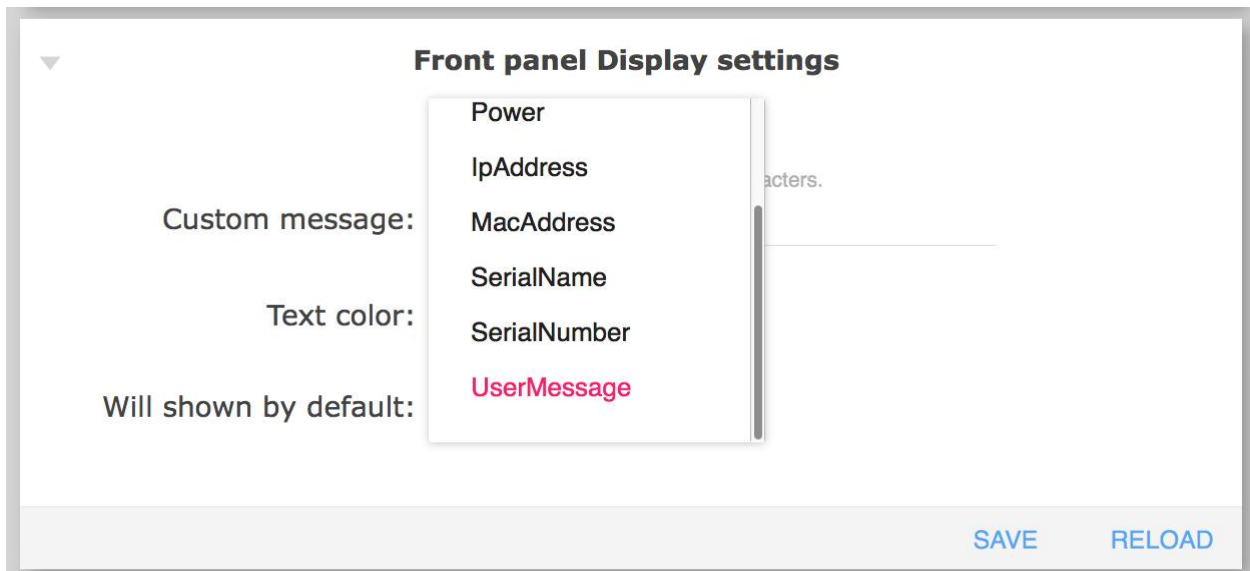


Figure 4.6.52. Select the default message to display.

#### 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 4.6.53. 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.

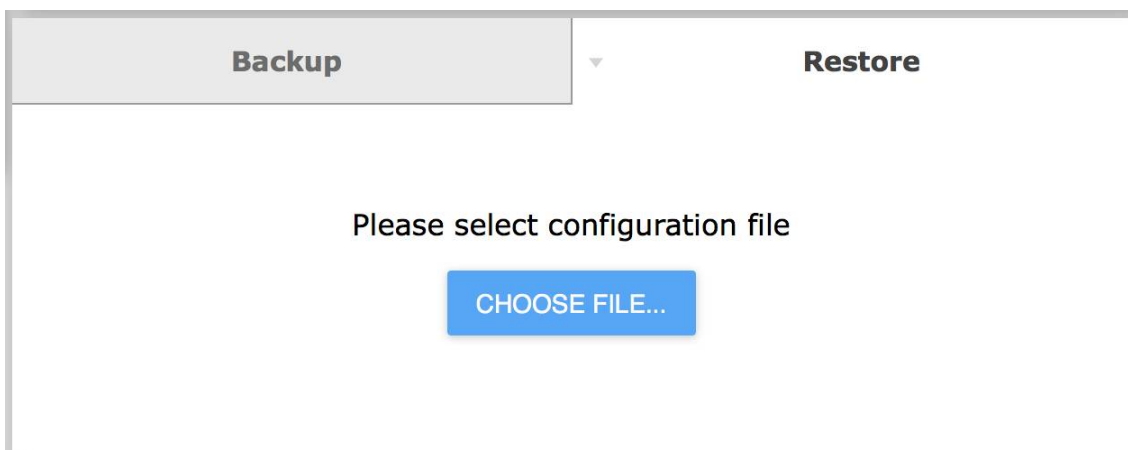


Figure 4.6.54. Restore tab.

## 4.7. Updating the RPCM Software

### 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 menu item *Navigation Update* or by typing: `http://<name_or_IP_RPCM>/update/` in the browser line (provided that authentication was successful before).

**Note.** Screenshots of the RPCM DC 232A are shown as an illustration. For other models of RPCM DC, the basic principles of working are preserved.

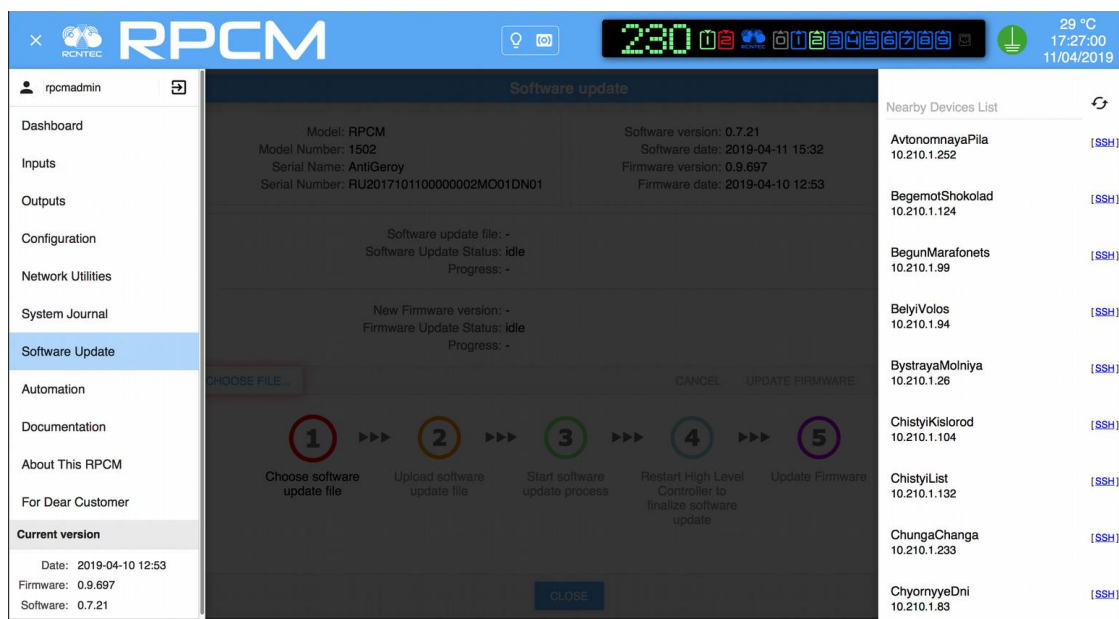


Figure 4.7.1. Navigation to the "Software Update" menu.

**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 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 — Information Fields;
- 2 — Update file selection and process control area;
- 3 — Progress steps area.



Figure 4.7.2. Main window of the "Software Update" section.

**Information fields contains the following:**

*Model (Model);*  
*Model Number;*  
*Serial Name;*  
*Software version;*  
*Software release date;*  
*Firmware version;*  
*Firmware date.*

**Management 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:

**Select the firmware file;**

**Upload the file to the device;**

**Start the update process;**

**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)*.

## 4.7.2. Update via SSH CLI

This section describes the procedure for updating via the SSH CLI (Command Line Interface). Applying this method is especially important if there is no possibility to use a channel with a bandwidth for updating via web interface.

Given 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 downloading 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 scprpcmsoftware.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;

*SuperGeroy* is the serial name.

The system returns the need to accept the SSH key:

```
The authenticity of host ' 192.168.1.28 (192.168.1.28) 'can not be established.
ECDSA key fingerprint isSHA256: 24WVCVbzZA + 0xfJ0G6ZKvkEdq + fgnTp / enInTufSueI.
Are you sure you want to continue connecting (yes / no)?
```

After the answer yes

We receive a message about the need for password authentication:

```
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 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) with the SSH protocol:

```
ssh rpcmadmin @ 192.168.1.28
```

Request a password:

```
rpcmadmin@192.168.1.28's password:
```

Successful authentication response:

```
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]: RU2017101100000001M001DN01      [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]: 4076 / RPCM
[Force Failback]: OFF                          [Failback Delay in Seconds]: 0
-----
  [Input 1]: 49V  0.000A 0.000KW (ACTIVE, PRIORITY)
  [Input 2]: 49V  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 downloading the file, it is verified:

Current update status:

```
-----
                Status: Software update file is being verified ...
                Progress: 77.90%
                -----
```

After the verification is completed, the return to the entered command is:

show update

The system will prompt you when you are ready to start the update procedure:

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

In the response to the input command:

show update

The system responds with following:

Software update has started ...

Type 'help' to get suggestions

**Note.** If you type `start update` before the update file is finished, the system will respond with:

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 status 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, the system responds to the command:

show update

It will return the following response:

```
Current update status:
```

```
-----  
                Status: Update complete, please manually restart RPCM  
                Progress: 100 %  
-----
```

After this message, you need to enter the command to restart the High Level Controller (HLC):

```
restart high-level-controller
```

In response, the system issues a request to confirm the restart:

```
Please enter 'RESTART' (ALL CAPS MANDATORY) and press ENTER to restart High Level  
Controller immediately, or anything else to cancel:
```

After the command is entered:

```
RESTART
```

You will receive a proposal to restart the SSH CLI session:

```
Please disconnect your SSH session manually... Restarting High Level Controller in 5  
seconds...
```

**WARNING!** If RPCM gets 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.



## 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 *Navigation System journal* or by typing: `http://<name_or_IP_RPCM>/logs/` in the browser line (provided that authentication was successful before).

**Note.** Screenshots of the RPCM DC 232A are shown as an illustration. For other models of RPCM DC, the basic principles of working are preserved.

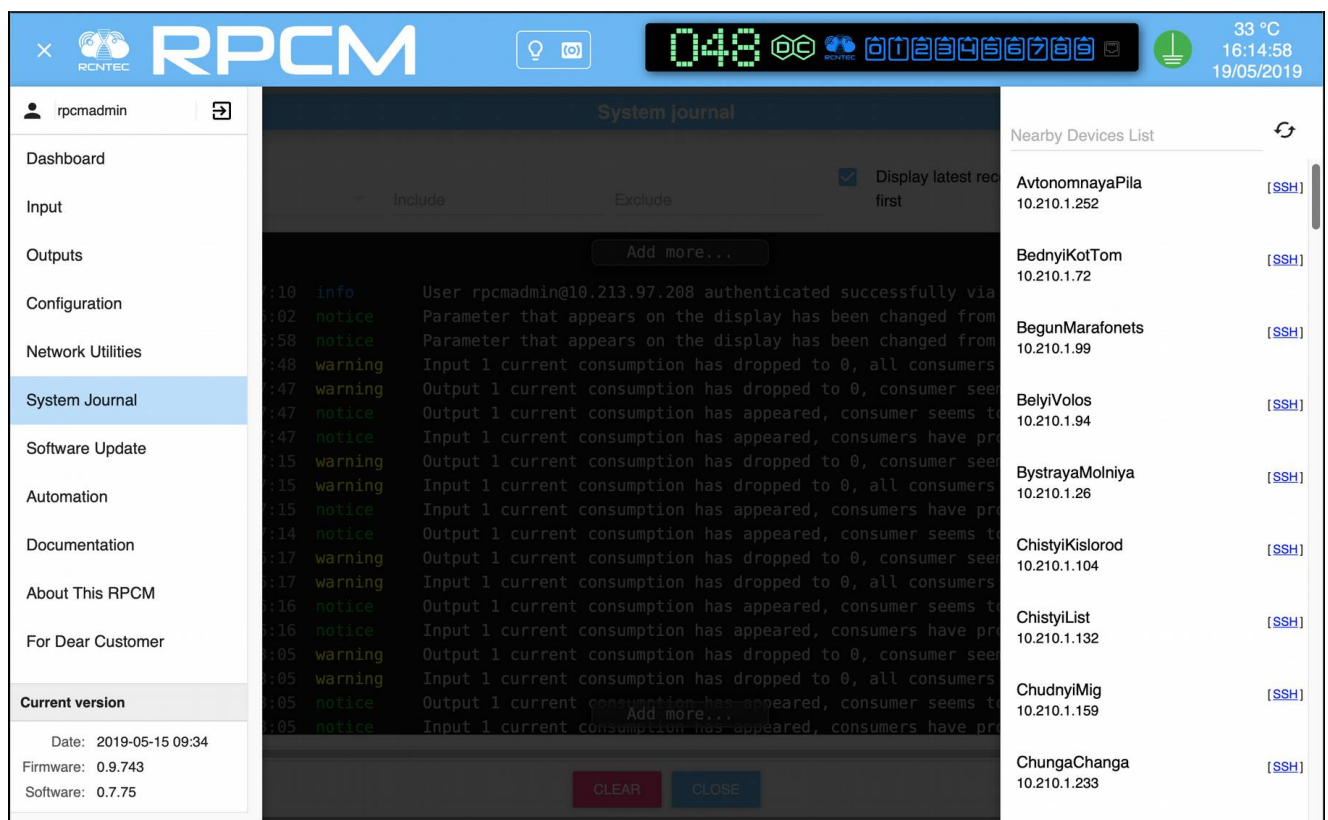


Figure 4.8.1. Menu to go to the "System journal" section.

### 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 window*;
- 3 — *Action buttons*.

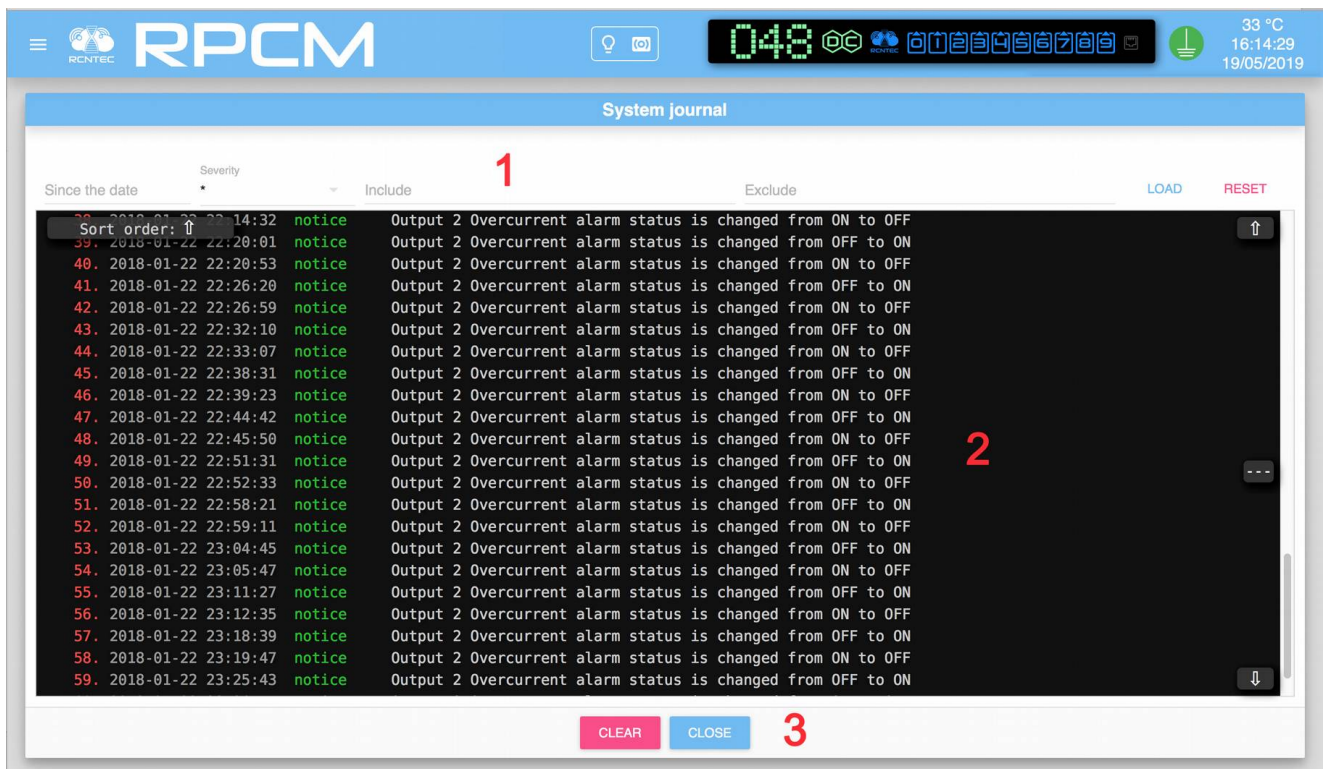


Figure 4.8.2. Main window of the "System Journal".

### 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.

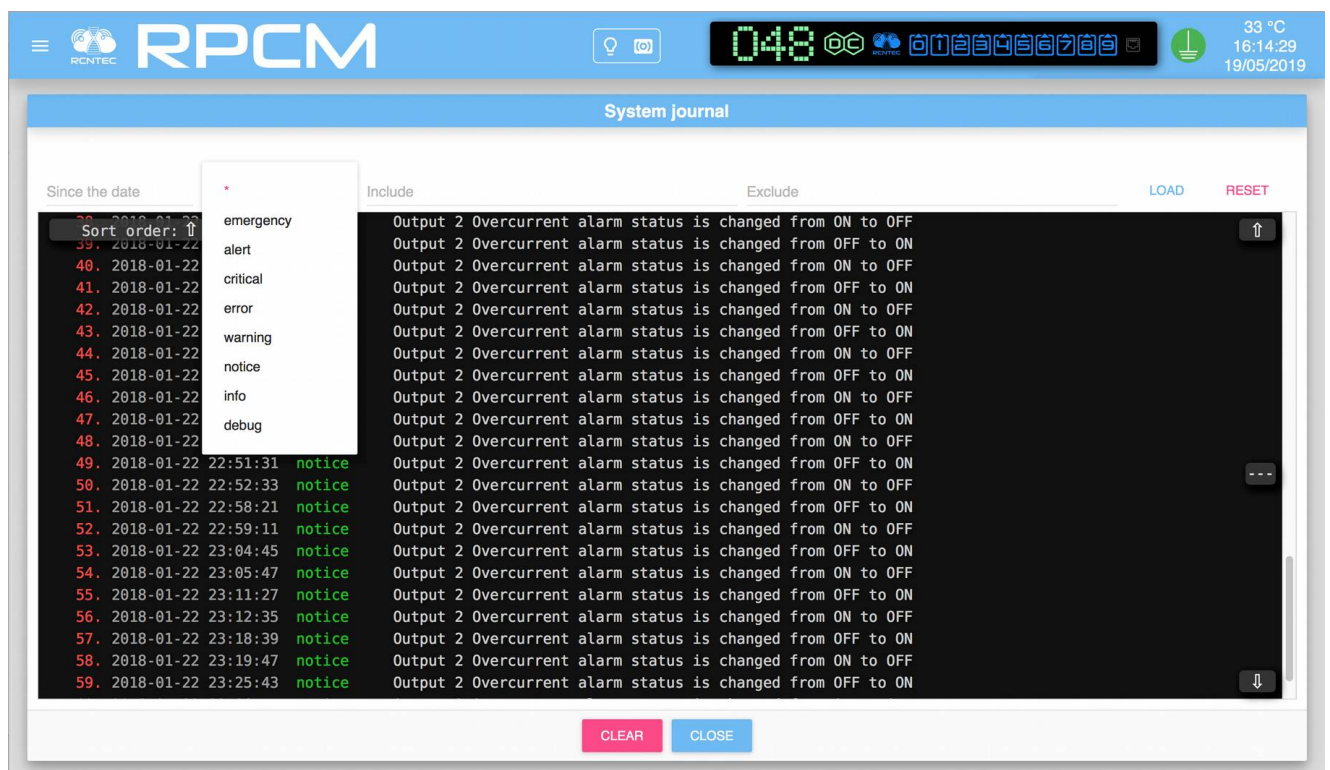


Figure 4.8.4. Drop-down menu for "Type of messages".

The field **"Include"** serves to filter output records; only messages containing keywords are displayed.

The field **"Exclude"** is 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 Window 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 Navigation *Network Utilities* or by typing: `http://<name_or_IP_RPCM>/netutils/` in the browser string (assuming that authentication was successful before).

**Note.** Screenshots of the RPCM DC 232A are shown as an illustration. For other models of RPCM DC, the basic principles of working are preserved.

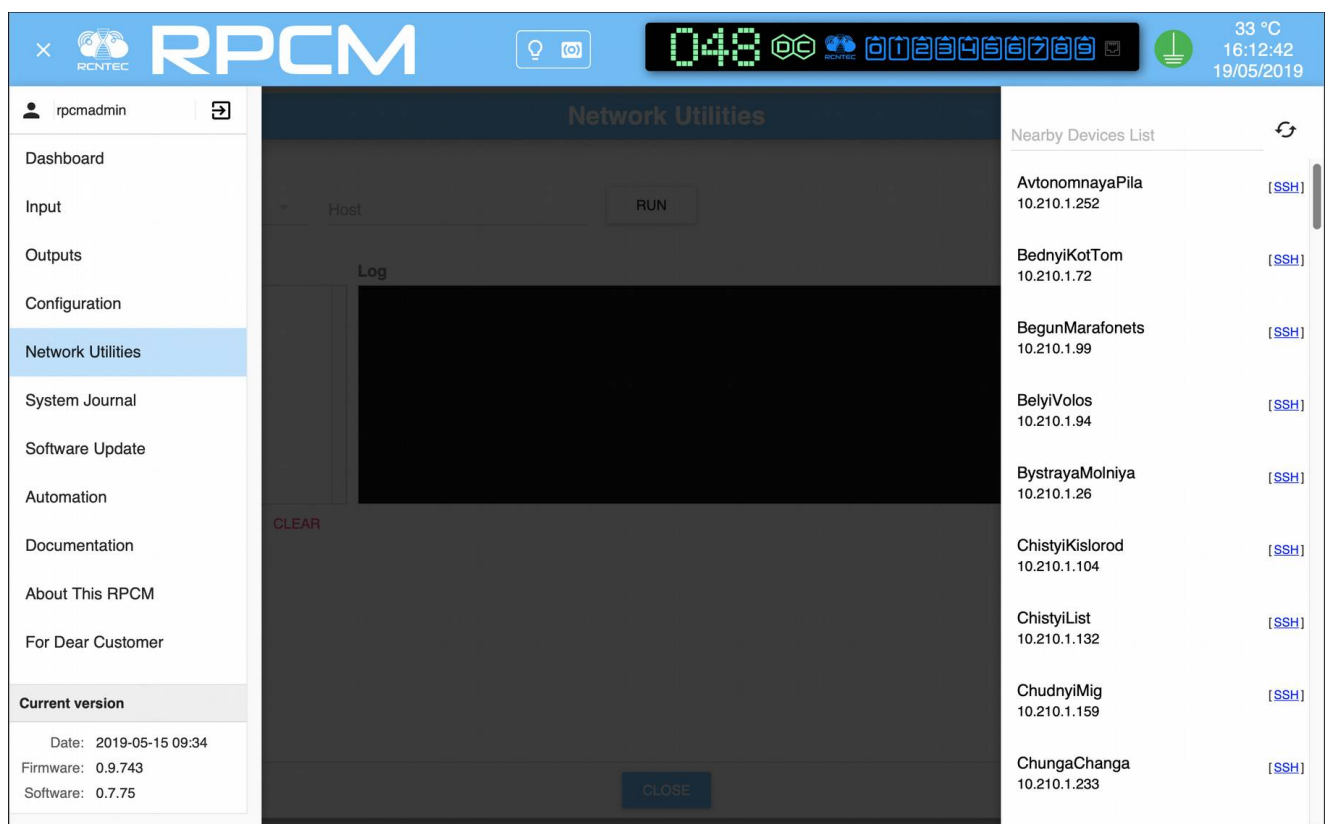


Figure 4.9.1. Menu to go to the "Network Utilities" section.

## 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.

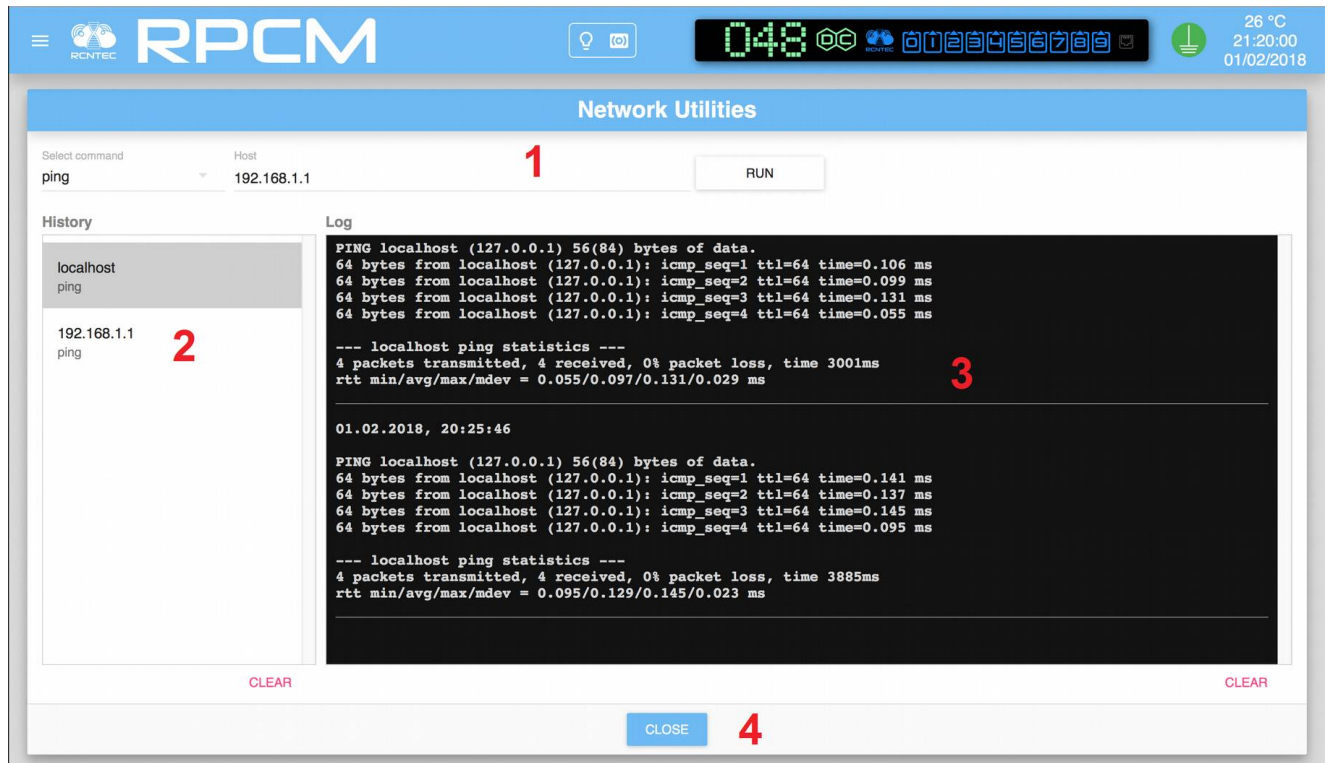


Figure 4.9.2. Window of the "Network Utilities" section.



### 4.9.3. Description of the "Command Area"

The "Command Area" contains the following fields and controls:

**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 on-screen button **RUN** - starts the execution of a command with a name or address as a parameter.

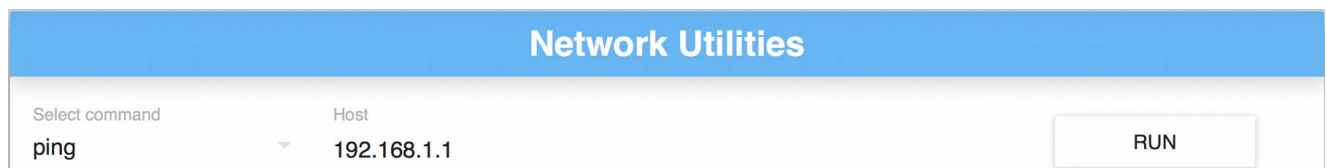


Figure 4.9.3. The command area of the "Network Utilities" section.

### 4.9.4. Description of other elements of the "Network Utilities" window

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 Navigation *Documentation* or by typing `http://<name_or_IP_RPCM>/docs/` in the browser string (provided that authentication was successful before).

**Note.** Screenshots of the RPCM DC ATS 76A are shown as an illustration. For other models of RPCM DC, the basic principles of working are preserved.

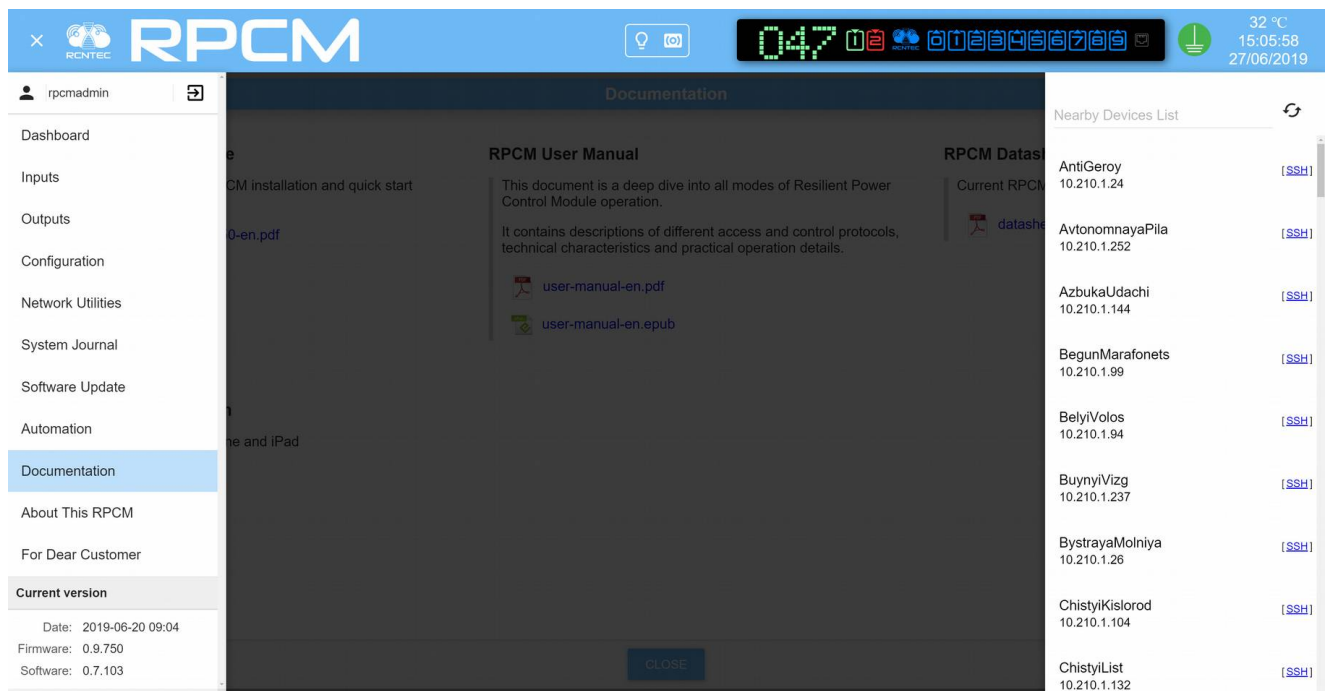


Figure 4.10.1. Menu to go to the "Documentation" section.

This section is designed to access built-in documentation via web interface.



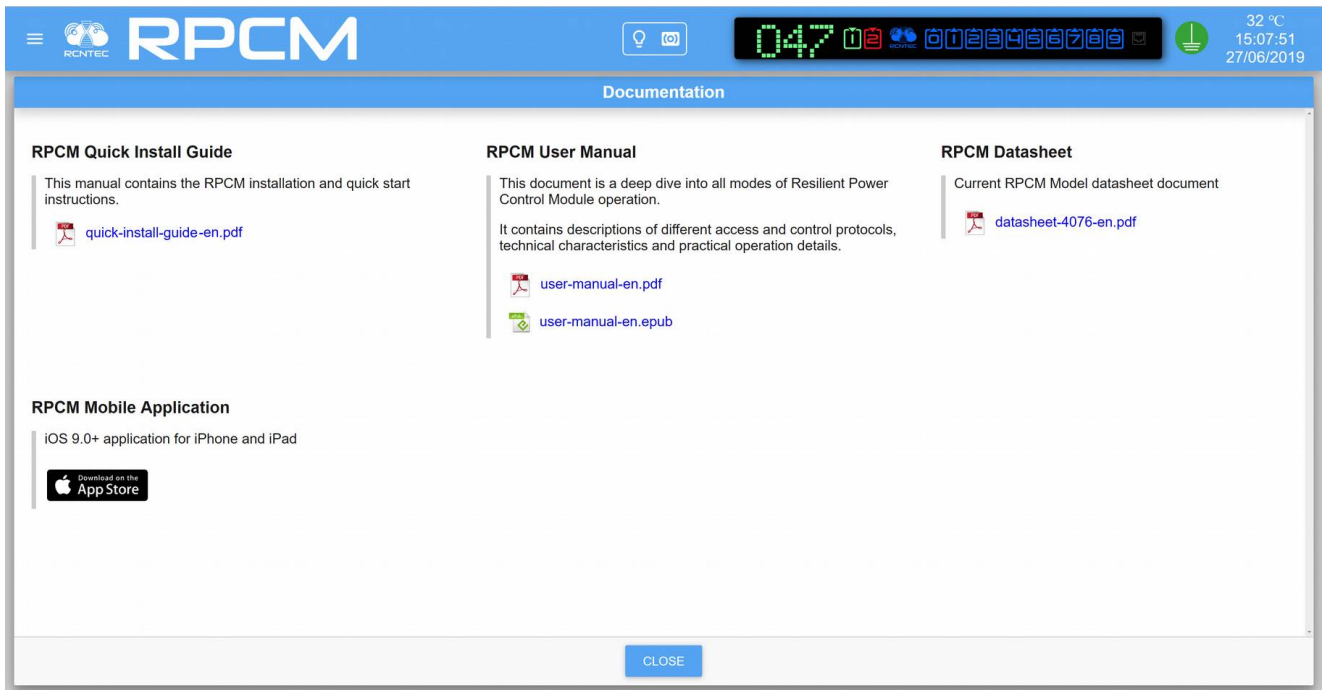


Figure 4.10.2. The window of the "Documentation" section.

All operations: viewing, copying a document, copying a link to a document are performed in accordance with features of the interface and settings of the web browser used. For additional information, please, see the documentation of your web browser.

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:

`http://<name_or_IP_RPCM>/automation/` in the browser string (assuming that authentication was previously successful).

**Note.** Screenshots of the RPCM DC 232A are shown as an illustration. For other models of RPCM DC, the basic principles of working are preserved.

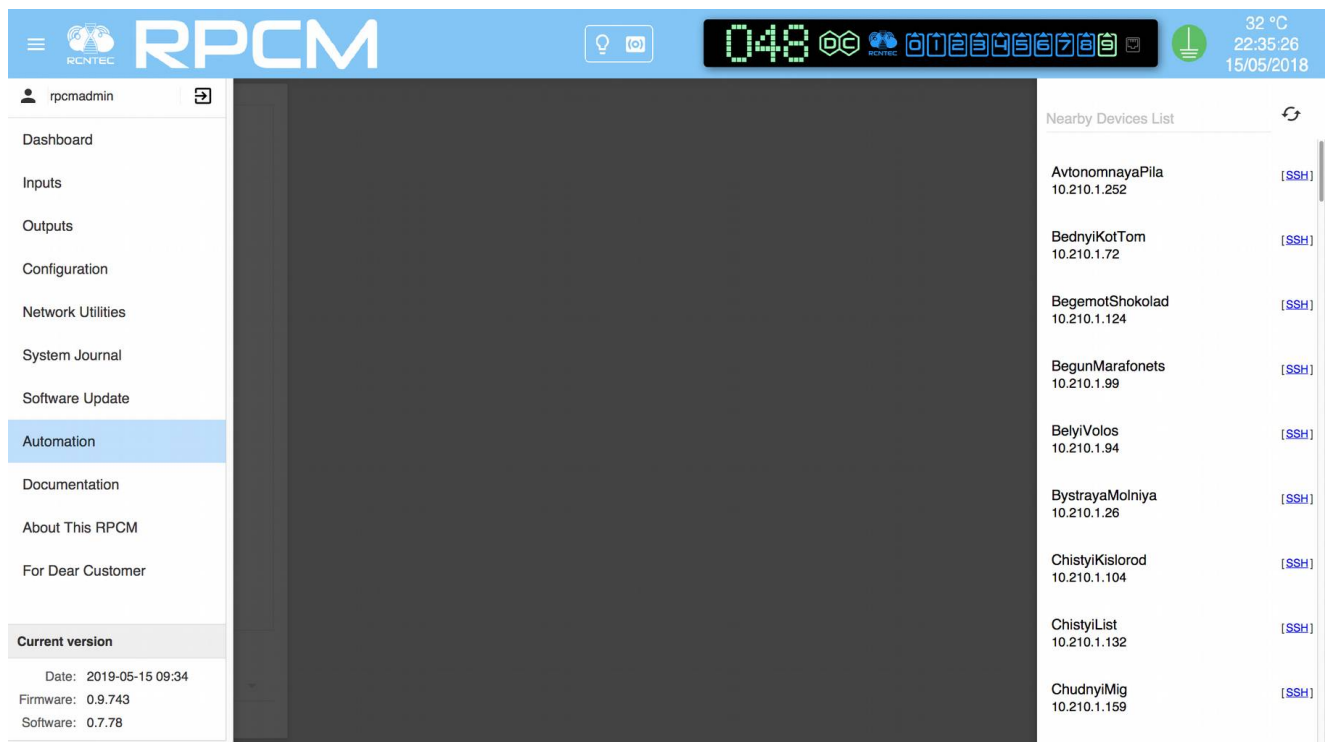


Figure 4.11.1. "Automation" item in menu

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

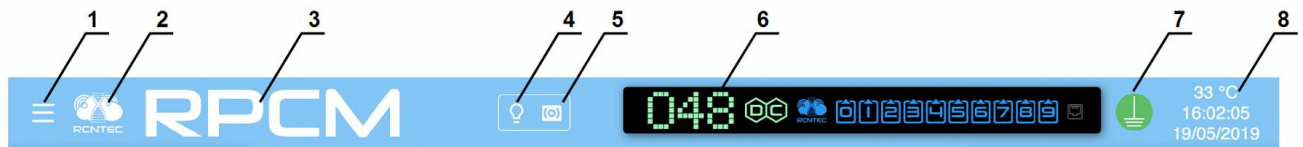


Figure 4.11.3. Section "Automation" — the top bar of the Top Control Bar.

#### Legend:

- 1 — the call button of the jump menu;
- 2 — RCNTEC logo, (click on the link to RCNTEC company website — [rcntec.com](http://rcntec.com));
- 3 — name of RPCM (by clicking on the link it goes to RPCM product site — [rpcm.pro](http://rpcm.pro));
- 4 — the light identification button in the form of a lightbulb image;
- 5 — the sound identification button in the form of a radio-image;
- 6 — Virtual Front Panel, repeating the indicator on the front panel. When you click on this area, you go to the Control Panel (Dashboard).
- 7 — grounding icon;
- 8 — set of service values (in column, from top to bottom): internal temperature in degrees Celsius, time and date.

### 4.11.3. Sub-sections of the Main Window (General Description)

The main window of the "Automation" section is divided into 11 subsections.

The screenshot displays the RPCM Automation section interface. The top bar shows the RPCM logo, a temperature of 48 °C, and the time 19:57:27 on 04/06/2019. The interface is divided into several subsections, numbered 1 through 11:

- 1**: A green clipboard icon.
- 2**: Device information for 'antminer\_s11', including Name, Device type (Bitmain\_S9), and Description.
- 3**: Last restart time: 2019-06-04 11:16:57.
- 4**: CONSUMPTION monitoring details, including Monitoring (NO), Current value, mA, Alarm limit, mA, Alarm limit, s, Alarm (NO), Last alarm time, Restart limit, mA, Restart limit, s, Restart in progress (NO), Auto restart initiated at, and Last check time.
- 5**: HASHRATE monitoring details, including Monitoring (YES), Current value, GH/s (20484.15), Alarm limit, GH/s (19000), Alarm limit, s (60), Alarm (NO), Last alarm time (2019-06-04 19:45:04), Restart limit, GH/s (18000), Restart limit, s (300), Restart in progress (NO), Auto restart initiated at (2019-06-04 11:16:57), and Last check time (2019-06-04 19:57:23).
- 6**: PING monitoring details, including Monitoring (NO), Current alarm value, loss %, Alarm limit, loss %, Alarm limit, s, Alarm (NO), Last alarm time, Current restart value, loss %, Restart limit, loss %, Restart limit, s, Restart in progress (NO), Auto restart initiated at, and Last check time.
- 7**: TCP PORT monitoring details, including Monitoring (NO), Port available, Connection timeout, s, Alarm limit, s, Alarm (NO), Last alarm time, Restart limit, s, Restart in progress (NO), Auto restart initiated at, and Last check time.
- 8**: MINER STATUS section, showing Last successful check at: 2019-06-04 19:57:23, Frequency: 750, Miner Count: 3, Model: 0, Total Hash Rate 5s, GHS: 20514.09, and Total Hash Rate AV, GHS: 20484.15.
- 9**: A gear icon for settings.
- 10**: DEVICE LIST on the left sidebar, showing a list of devices: 1. antminer\_s11 and 2. dragonmint\_t1.
- 11**: A bottom bar with a plus icon, an up arrow, and a sort by name dropdown.

Figure 4.11.3. "Automation" section — with numbered subsections.

**Description of subsections in Figure 4.11.3:**

- 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;
- 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;
- 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 4.11.3. 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.

CONSUMPTION	
Monitoring:	YES
Current value, mA:	0
Alarm limit, mA:	6600
Alarm limit, s:	60
Alarm:	<= 6600 mA during 60 seconds
Last alarm time:	2018-10-24 18:29:45
Restart limit, mA:	6300
Restart limit, s:	300
Restart in progress:	<= 6300 mA during 300 seconds
Auto restart initiated at:	2018-10-24 18:33:47
Last check time:	2018-10-24 18:36:39

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.



HASHRATE	
Monitoring:	YES
Current value, GH/s:	
Alarm limit, GH/s:	13500
Alarm limit, s:	60
Alarm:	<= 13500 GHS during 60 seconds
Last alarm time:	2018-10-24 18:29:48
Restart limit, GH/s:	13300
Restart limit, s:	300
Restart in progress:	<= 13300 GHS during 300 seconds
Auto restart initiated at:	2018-10-24 18:33:50
Last check time:	2018-10-24 18:36:24

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).

PING	
Monitoring:	YES
Current alarm value, loss %:	100
Alarm limit, loss %:	60
Alarm limit, s:	60
Alarm:	YES
Last alarm time:	2018-10-24 18:35:24
Current restart value, loss %:	100
Restart limit, loss %:	100
Restart limit, s:	300
Restart in progress:	YES
Auto restart initiated at:	2018-10-24 18:35:24
Last check time:	2018-10-24 18:35:24

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:  $Q_a = D_a / I$  and  $Q_r = D_r / I$ , where:

$Q_a$  — size of Alarm packet loss queue

$Q_r$  — size of Restart packet loss queue

$D_a$  — “Min. duration for alarm, s” value

$D_r$  — “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:  $P_a = L_a / Q_a \times 100$  and  $P_r = L_r / Q_r \times 100$ , where:

$P_a$  — “Current alarm value, loss %” value

$P_r$  — “Current restart value, loss %” value

$L_a$  — number of packets in Alarm packet loss queue, that have exceeded “Max. latency limit, ms” or “Request timeout, s” values

$L_r$  — 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.

TCP PORT	
Monitoring:	YES
Port available:	NO
Connection timeout, s:	3
Alarm limit, s:	60
Alarm:	10.210.1.93:80 unavailable during 60 seconds
Last alarm time:	2018-10-24 18:29:42
Restart limit, s:	300
Restart in progress:	10.210.1.93:80 unavailable during 300 seconds
Auto restart initiated at:	2018-10-24 18:33:44
Last check time:	2018-10-24 18:35:54

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 watchdog 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.

MINER STATUS

Last successful check at: 2018-07-04 21:55:33

Model: Antminer D3

Frequency: 481

Miner Count: 3

Total Hash Rate 5s, GHS: 16853.0

Total Hash Rate AV, GHS: 17324.1

CHAIN#	ACN	ACS	RATE	HW
2	60	00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000	5587.70	0
3	60	00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000	5639.28	0
4	60	00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000	5625.99	1

RATE:

16852.97

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*;

**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.

**Edit device**

**DEVICE**

Name  
Bitmain-D3

Device type  
Bitmain D3

Description  
D3 Miner

Outputs  
Output 1

**MONITORING INTERVAL**

Check interval, s  
6

Min. restart interval, s  
600

**CONSUMPTION**

☐ Consumption monitoring

**TCP PORT**

☐ TCP port monitoring

**HASHRATE**

☒ Hashrate monitoring

API IP address or FQDN  
10.210.1.230

API port  
4028

API unavailability timeout, s  
3

Hashrate alarm minimum limit, GH/s  
17000

Hashrate alarm minimum limit, s  
60

Hashrate restart minimum limit, GH/s  
16900

Hashrate restart minimum limit, s  
300

**PING**

☐ Ping monitoring

**DELETE** **CLOSE** **SAVE**

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.

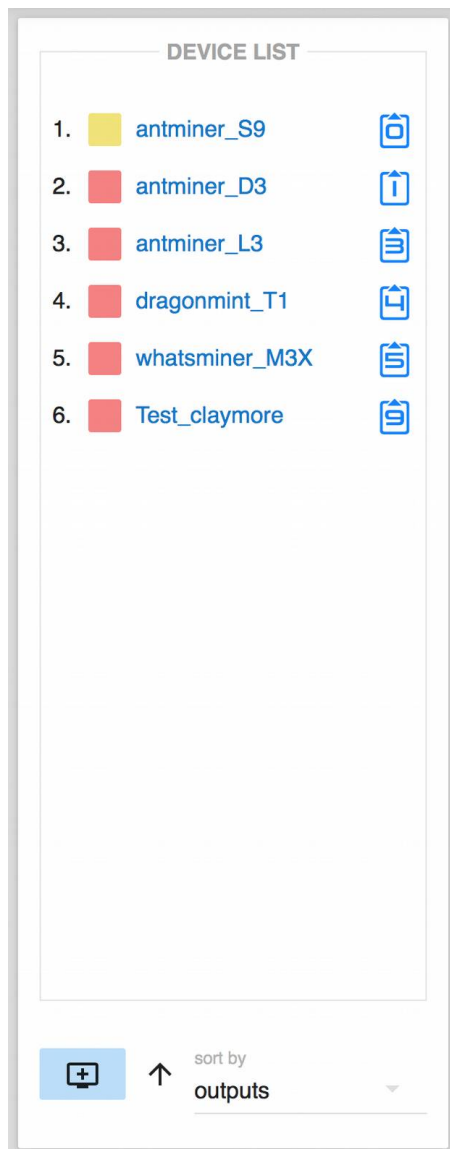


Figure 4.11.11. The "Device List" subsection. As an example, 6 devices with different configurations of miners have been created. At the bottom there is an "ADD DEVICE" button (depicted as monitor with "+" sign) as well as "sort by" drop down selection option.

## 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).

The screenshot shows the "Add device" window with the following sections:

- DEVICE**: Name is "Bitmain-L3-new". The "Device type" dropdown is open, showing options: "Bitmain D3", "Bitmain L3+" (highlighted in red), and "Bitmain S9". There is also an "Outputs" dropdown.
- CONSUMPTION**: ☐ Consumption monitoring
- TCP PORT**: ☐ TCP port monitoring
- HASHRATE**: ☐ Hashrate monitoring
- PING**: ☐ Ping monitoring
- MONITORING INTERVAL**: Check interval, s is 6; Min. restart interval, s is 600.

Buttons at the bottom right: CLOSE, SAVE.

Figure 4.11.13. Pop-up window "Add device" with the called Device type.

The screenshot shows the "Add device" window with the following sections:

- DEVICE**: Name is "Bitmain-L3-New". The "Device type" dropdown is set to "Bitmain L3+". The "Description" field is empty. The "Outputs" dropdown is open, showing options: "Output 3", "Output 4", "Output 5", "Output 6", "Output 7", "Output 8" (highlighted in red), and "Output 9" (highlighted in red).
- CONSUMPTION**: ☐ Consumption monitoring
- TCP PORT**: ☐ TCP port monitoring
- HASHRATE**: ☐ Hashrate monitoring
- PING**: ☐ Ping monitoring

Buttons at the bottom right: CLOSE, SAVE.

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 configured for a device. Note that output 8 (Output 8) without load is shown in blue color. Output 9 (Output 9) has load, which is depicted 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.

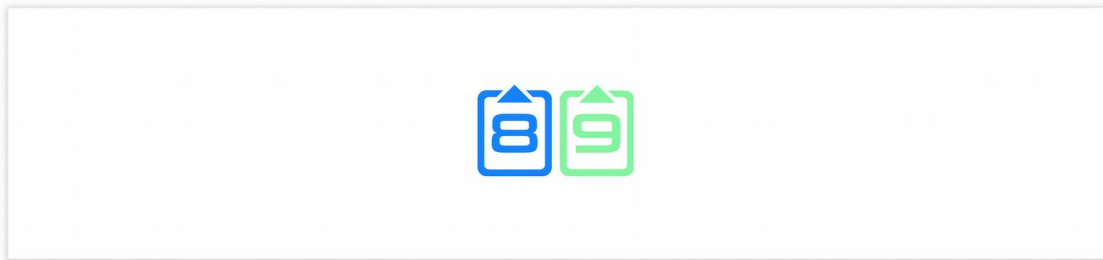


Figure 4.11.15. Two outputs: Output 8 without load, Output 9 under load.

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 shows the fields for configuration of the watchdogs based on consumption and TCP port monitoring.

The screenshot shows a web-based configuration interface titled "Add device". It contains several sections for configuring a watchdog:

- DEVICE**: Fields for Name, Device type (dropdown), Description, and Outputs (dropdown).
- MONITORING INTERVAL**: Fields for Check interval, s and Min. restart interval, s, both with spinners.
- CONSUMPTION**: A checked checkbox for "Consumption monitoring". Below it are four fields with spinners: Consumption alarm limit, mA; Consumption alarm limit, s; Consumption restart limit, mA; and Consumption restart limit, s.
- TCP PORT**: A checked checkbox for "TCP port monitoring". Below it are four fields with spinners: IP address or FQDN; TCP Port; Connection timeout, s; Min. duration for alarm, s; and Min. duration for restart, s.
- HASHRATE**: An unchecked checkbox for "Hashrate monitoring".
- PING**: An unchecked checkbox for "Ping monitoring".

At the bottom right of the form are "CLOSE" and "SAVE" buttons.

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.

The screenshot shows a web-based configuration interface titled "Add device". It is divided into several sections:

- General Information:** Fields for Name, Device type (dropdown), Description, and Outputs (dropdown).
- MONITORING INTERVAL:** Fields for Check interval, s (spinner) and Min. restart interval, s (spinner).
- Monitoring Options:** Checkboxes for Consumption monitoring and TCP port monitoring.
- HASHRATE:**
  - ☒ Hashrate monitoring
  - API IP address or FQDN (text input)
  - API port (spinner)
  - API unavailability timeout, s (spinner)
  - Hashrate alarm minimum limit, GH/s (spinner)
  - Hashrate alarm minimum limit, s (spinner)
  - Hashrate restart minimum limit, GH/s (spinner)
  - Hashrate restart minimum limit, s (spinner)
- PING:**
  - ☒ Ping monitoring
  - IP address or FQDN (text input)
  - Request timeout, s (spinner)
  - Max. latency limit, ms (spinner)
  - Ping alarm packet loss, % (spinner)
  - Ping restart packet loss, % (spinner)
  - Min. duration for alarm, s (spinner)
  - Min. duration for restart, s (spinner)

At the bottom right, there are "CLOSE" and "SAVE" buttons.

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 closes 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 check

## 5. The Reference for RPCM REST API

### 5.1. Accessing REST API

REST API is available on TCP port 8888 using non-encrypted HTTP protocol.

### 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.

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 – inside of the URL:

```
curl -X GET http://192.168.1.24:8888/api/cachedStatus?apikey=373ac3fde3ae0740e0fb76e912e3e18e
```

Second method – in the HTTP header:

```
curl -X GET http://192.168.1.24:8888/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"}'
```

##### 5.2.1.2. Get 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 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 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",
    "overvoltageTurnOffFiredState": "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": -0.05944444465,
  "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/4:8888/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 Outlet Status

### 5.2.4.1. Overview

It sets the administrative status of an outlet (output).

### 5.2.4.2. Change 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",
        "iMa": 0,
        "iWa": 0,
        "iVA": 0,
        "iVar": 0,
        "aKWh": 0.0,
        "aKVAh": 0.012199,
        "aKVarh": 0.008257
    }
},
"RPCM": 1
}

```

#### 5.2.4.4. Operation with 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 и 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
```

### 5.2.5. Input Status Setting

Command:

```
PUT /api/inlet/
```

or

```
PUT /api/input/
```

#### 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 – number in 3 digitals.

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/rtc
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/rtc
```

REPLY:

```
{"resultOfLastCommand":"OK","rtcB":"19090201111513","rtc":"19092106080145","rtcAtBoot":"Mon 2019-09-02 11:15:13","rtcNow":"Sat 2019-09-21 08:01:45"}
```

#### 5.2.6.2. Date and Time Setting

Command:

```
PUT /api/rtc/[rtcData]
```

Parameters:

rtcData — [year][month][day][hour][minute][second]

REPLY: GET /api/status is used as a system return.

Example:

```
curl -X PUT http://192.168.1.24:8888/api/rtc/19092106103246
```



## 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. What is shown

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",  
"userMessage"]
```

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": 'bmmminer 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,X1
9=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,X6
4=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,X2
1=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,X6
3=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 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
        }
    },
    "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
        }
    }
},
"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 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** — мин. продолжительность для оповещения, 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",
"checkIntervalSeconds":6,"consumptionAlarmBottomLimitMilliamps":4500,"consumptionA
larmSeconds":60,"consumptionRestartBottomLimitMilliamps":4300,"consumptionRestartS
econds":300,"hashRateApiPort":4028,"hashRateApiUnavailabilityTimeoutSeconds":3,"ha
shRateAlarmBottomLimit":16700,"hashRateAlarmSeconds":60,"hashRateRestartBottomLimi
t":16500,"hashRateRestartSeconds":300,"interRestartIntervalSeconds":600,"name":"te
st","outputs":
[8,{"hashRateEnabled":true,"hashRateApiIPAddress":"127.0.0.1","tcpPortAvailability
IPAddress":"127.0.0.1","tcpPortAvailabilityPort":"80","tcpPortAvailabilityConnectT
imeout":"3","tcpPortAvailabilityAlarmSeconds":"60","tcpPortAvailabilityRestartSeco
nds":"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** — мин. продолжительность для оповещения, 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,"co
nsumptionAlarmSeconds":60,"consumptionRestartBottomLimitMilliamps":4300,"consumpti
onRestartSeconds":300,"hashRateApiPort":4028,"hashRateApiUnavailabilityTimeoutSeco
nds":3,"hashRateAlarmBottomLimit":16700,"hashRateAlarmSeconds":60,"hashRateRestart
BottomLimit":16500,"hashRateRestartSeconds":300,"interRestartIntervalSeconds":600,
"name":"test2","outputs":
[8],"hashRateEnabled":true,"hashRateApiIPAddress":"127.0.0.1","tcpPortAvailability
IPAddress":"127.0.0.1","tcpPortAvailabilityPort":"80","tcpPortAvailabilityConnectT
imeout":"3","tcpPortAvailabilityAlarmSeconds":"60","tcpPortAvailabilityRestartSeco
nds":"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}'
```

## 5.3. 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 capacitive 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
capacitive nature of the reactive load at the time of reading. Positive values
mean the inductive 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
acknowledgment 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

```

```

acknowledgment 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 add and delete configurations for SNMP, SMTP, automation, users etc.

**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. Construction: *set output* Is Command *set* with Level 1 Subcommand *output*** —it serves to control the outlet by setting various parameters.

**6.10. Construction: *automation device* — is Command: *set* with the 1Level subcommand: *automation device*** — 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 *subcommands* (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.

## 6.2. Command *help* is to Obtain Help

### 6.2.1. Getting List of Commands

At the prompt, enter *help* or the question mark ?

Example:

*help*

The return is:

PCM 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 on the Subcommands of a Specific Command

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 ?`

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 subcommands 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 the appropriate environment for SNMP management or other similar methods.

Accordingly, the add command adds the user and community to the SNMP

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 notification 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 the 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* and *delete* with Level 1 Subcommand *user*

The *add* command with the *user* subcommand is used to create a user.

The *delete* command with the *user* subcommand is used to delete a user.

Help displays: *add user ?*:

The return is:

Username should start with letter, numbers, underscores or hyphens and be 2 to 32 characters long

Help displays: *delete user ?*:

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 deleting the user:

```
delete user testuser
```

The return is:

User 'testuser' has been deleted.

### 6.4.2. Commands: *add* and *delete* with Level 1 subcommand of *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*. At the same time, these functions are not mandatory.

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 subcommands for `add snmp` and `delete snmp` is shown below.

```
add snmp ?
```

Help displays:

```
user - add specific SNMPv3 user
community - add specific SNMPv2 command
```

And

```
delete snmp ?
```

Help displays:

```
user-delete specific SNMPv3 user
community - delete specific SNMPv2 command
```

#### 6.4.2.1. Commands: *add* and *delete* with Level 1 Subcommand *snmp* and the Level 2 Subcommand *community*

The `add` and `delete` commands with the level 1 subcommand `snmp` and the community-level subcommand 2 to create a community using the \* SNMP v1 and v2c \* protocol

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.

**Attention!** There is no standard help output for this command. You can use auto-hint by tabbing twice.

```
add snmp community public
```

After the first time you press the Tab key, the value appears.

```
add snmp community public --
```

Only after the second press of Tab appears auto-hint:

```
--accessList --accessType --enabled
```

**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 `delete` command with the level 1 subcommand `snmp` and the level 2 subcommand `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.
```

#### 6.4.2.2. The commands: *add* and *delete* with a subcommand of level 1 *snmp* and a subcommand of the 2 level *user*

**Additional information.** SNMPv3 can have one of three security levels:

**noAuthNoPriv** — passwords are transmitted in the clear, there is no data confidentiality (access with authorization only on the User Name line and without encryption is similar to SNMP v1);

**authNoPriv** — authentication without confidentiality (access with Auth Password authentication — HMAC-MD5-96 method, but without encryption);

**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.)

The *add* and *delete* commands with the level 1 subcommand *snmp* and the level 2 subcommand *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 newrpcuser
```

After the first time you press the Tab key, the value appears.

```
add snmp user newrpcuser -
```

Only after the second press of Tab does auto-hint appear:

```
--accessList --accessType --authPass --authProt --enabled --privPass --privProt --secLevel
```

**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 level 1 subcommand `snmp` and the level 2 subcommand `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.
```

### 6.4.2.3. Commands: *add* and *delete* with Level 1 Subcommand *snmp* and the Level 2 Subcommand *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` and `delete` with the subcommand of level 1 `snmp` and the second subcommand `user` are for creating and deleting target settings for sending messages within the SNMP Trap *192.168.0.1:162* service

The `add snmp trap` command With the optional `v1 destination` option creates SNMP trap settings using protocol version *v1* .

Show help:

```
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
```

### 6.4.3. Commands: *add* and *delete* with Level 1 Subcommand *ntp server*

The `add` command with the `ntp server` subcommand is used to specify the NTP server (time service).

The `delete` command with the `ntp server` subcommand 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
```

#### 6.4.4. Commands: *add* and *delete* with Level 1 Subcommand *smtp server*

These commands are used to set or delete the notification system settings by e-mail.

The *add* command with the *smtp server* subcommand is used to add a group of parameters required for sending e-mail messages.

The *delete* command with the *smtp server* subcommand 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 65536.

##### 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 65536
```

##### Optional parameters:

```
Must be FQDN of
    your domain, up to 128 characters
Username - username used for authentication with server and used as From field
    in the notification message, up to 32 characters
Password - password for server authentication, up to 32 characters
AuthType - authentication type used for server: PLAIN, LOGIN, CRAM_MD5
SSL - encryption parameter: enable, disable, enable-dontverify-cert
```

Example:

```
add smtp server smtp.gmail.com port 587 --helo gmail.com --username user@gmail.com --password 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
```

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
```

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
```

### 6.4.5. The *add* and *delete* commands with the Level 1 Subcommand *mail*

These commands are used to set or delete the recipient of an alert by e-mail.

The `add` command with the `mail` subcommand 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 "security@example.com"
```

Example of use:

```
add mail recipient user@yandex.ru
```

The return is:

```
Email recipient added
```

The delete command with the mail subcommand 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
```

### 6.4.6. The *add* and *delete* commands with the level 1 subcommand *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".

The add command with the automation device subcommand 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,<br>1 to 25 characters    |
| device-type | - type name of the miner device,<br>1 to 25 characters        |
| outputs     | - numbers of RPCM outputs<br>("[0-9]" or "[0-9], [0-9], ...") |

#### Optional parameters:

- |                                  |   |
|----------------------------------|---|
| --description                    | - description of the new automation device,<br>1 to 254 characters                                  |
| --default                        | - set default values for parameters<br>check-interval-seconds<br>and inter-restart-interval-seconds |
| --check-interval-seconds         | - check interval of automation tests in<br>seconds  |
| --inter-restart-interval-seconds | - interval between restarts of automation<br>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 subcommand 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
```

### 6.4.7. 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 rpcadmin>
```

**ATTENTION!** If there is a bad connection, it is possible that the selected device will first be deleted first, and then a device with a similar name will be mistakenly deleted. For example, we have three devices *"DEVICE-1"*, *"DEVICE-2"* and *"DEVICE-10"*.

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*".

### **To avoid errors in 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.

## 6.5. Command *restart* for "Cold Restarting" of Connected Devices

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* with the *output* Level 1 Subcommand and the Outlet Numbers

Construction of the short-term release of the supply voltage to the indicated outlet.

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: outlet number and delay after restart *--after* and for subsequent power supply *--off-delay*.

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 ... 0]
```

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* with Name of Controller as an Argument

**Additional information.** RPCM uses 3 controllers:

*High Level Controller (HLC)*, where 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 high-level-controller
```

This construction 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 Controller 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 seconds ...

**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 and Connected Equipment

### 6.6.1. General Information about the *show* command

Below is a brief list of the first-level subcommands of the *show* command with comments:

**active users** — list of users connected to the management system;

**all** — data on items on the majority of system objects;

**action confirmation** — show confirmation of actions for the web;

**automation** — show information about device, if it is connected to the RPCM automation system for monitoring and control purposes (reboot);

**button-control** — show button control mode;

**cloud** — displays parameters for interaction with the centralized ("cloud") RPCM control system — RPCM.CLOUD

**display** — display settings show;

**everything** — displays information about the state of the system;

**input 1-2** — data about the status of inputs 1 - 2;

**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** — list ntp servers for time correction;

**output 0-9** — data on the status of the outputs 0-9;

**snmp** — detailed information about settings SNMP, include versions SNMPv1/v2c, SNMPv3;

**temperature** — value of internal temperature RPCM;

**time** — It displays the value of the system time or a list of time zones;

**update** — displays information about an software update process;

**version** — firmware version and system time;

**update** — show RPCM software update information;

**user** — shows the detailed information about the user, including the list of entered commands;

**help** — Help displays. You can also use the question mark ?

## 6.6.2. Using *show* with the Subcommands *help*

General view (example):

show ?

System answer:

RPCM Commands description:

```
show active
  users          - show users and sessions currently logged in
show all         - show information about all inputs/outputs/counters
show action
  confirmation    - show confirmation of actions for the web interface
show automation
  device-name <name> - show automation configured for device name
show cloud       - show RPCM.CLOUD related information
show button control
  mode           - show button control mode
show display     - show RPCM display settings
show everything   - show everything important in one screen
show input 1-2   - 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 output 0-9  - show information on particular output
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* with Level 1 Subcommand *active users*

It displays a list of users who are connected to the management system.

Example:

```
show active users
```

The information from a system:

Username	Type	IP Address	Expires	Idle
rpcmadmin	ssh	192.168.6.246	2017-10-31 21:49:50 UTC	120391s
rpcmadmin	ssh	192.168.97.208	2017-10-31 22:07:03 UTC	119358s
rpcmadmin	web	192.168.7.5	2017-11-01 16:20:19 UTC	53762s
rpcmadmin	ssh	192.168.7.5	2017-11-01 09:42:40 UTC	77621s
rpcmadmin	ssh	192.168.7.5	2017-11-01 14:30:48 UTC	60333s
rpcmadmin	ssh	192.168.97.208	2017-11-01 16:24:45 UTC	53496s
rpcmadmin	ssh	192.168.97.208	2017-11-02 07:16:21 UTC	0s

### 6.6.4. Command *show* with the Level 1 Subcommand *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:

```
KhitryiLis [10.210.1.153] 0 rpcmadmin > show everything

      [Serial Name]: KhitryiLis           [Temperature]: 34C
      [Serial Number]: RU201905070000002M001AM01   [Ground]: GOOD
      [Firmware Version]: 0.9.743           [Firmware Release Date]: 20190515093438
      [Software Version]: 0.7.75           [Software Release Date]: 20190515165655
      [Model/Hardware Version]: 4232/RPCM DC 232A   [Uptime]: 00:00:00
-----
      [Input 1]:          48.065V      0.064A      0.003KW
-----
      [Output 0]:  ON <admin:  ON>      0mA      0W
      [Output 1]:  ON <admin:  ON>     64mA      3W
      [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
```



### 6.6.5. Command *show* with the Level 1 Subcommand *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 2
```

The return is:

```
[Input]: 1
[Name]: input_1
[Description]:
[Voltage]: 48.065
[Minimum Allowed Voltage]: 42
[Maximum Allowed Voltage]: 58
[Maximum Allowed Current Amps]: 65535
[Instant Milliamps]: 64
[Instant Watts]: 3
[Accumulated KWh]: 0.253611
```

### 6.6.6. The *show* command with Level 1 Subcommand *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]: 1
[Actual State]: ON
[Admin State]: ON
[Name]: output_1
[Description]: Work 1
[Instant Milliamps]: 71
[Instant Watts]: 3
[Instant Milliamps]: 71
[Instant Watts]: 3
[Instant VAs]:
[Instant Vars]:
[Accumulated KWh]: 0.246389
[Accumulated KVAh]:
[Accumulated KVarh]:
[Overcurrent Alarm Limit Milliamps]: 24000
[Overcurrent Alarm Limit Seconds]: 30
[Overcurrent Alarm Limit Reached Times]: 0
[Overcurrent Alarm Fired Facts]: 0
[Overcurrent Turn Off Limit Milliamps]: 30000
[Overcurrent Turn Off Limit Seconds]: 2
[Overcurrent Turn Off Limit Reached Times]: 0
[Overcurrent Turn Off Fired Facts]: 0
[Overvoltage Turn Off Limit Volts]: 60
[Recover Turn On After Overvoltage Seconds]: 3
[Turn Off on Input Overload Priority]: 1 (higher values shut down first)
```

```
[Turn On Delay on Startup Seconds]: 3
```

```
Type 'help' to get suggestions
```

### 6.6.7. Command *show* with Subcommand *temperature*

It displays the temperature value in degrees Celsius inside the device.

Example:

```
show temperature
```

Temperature value:

```
Temperature : 32C
```

### 6.6.8. Command *show* with Level 1 Subcommand *time*

It displays the system time or displays a list of time zones

The available subcommands 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
```

#### 6.6.8.1. 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
```

#### 6.6.8.2. Command *show* with Level 1 Subcommand *time* with the Level 2 Subcommand *zones*

It is used to display a list of time zones.

Format:

```
show time zones
```

## Timezones:

Antarctica/Casey	Antarctica/South_Pole	Antarctica/Vostok
Antarctica/Rothera	Antarctica/DumontD'Urville	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_Barthlemy	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

### 6.6.9. Command *show* with Level 1 Subcommand *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]: KhitryiLis
[Serial Number]: RU2019050700000002M001AM01
[Model]: 4232
[Hardware Version]: RPCM DC 232A
[Uptime]: 00:00:00
[Software Version]: 0.7.75
[Software Release Date]: 20190515165655
[Firmware Version]: 0.9.743
[Firmware Release Date]: 20190515093438
[Current System Time Zone]: UTC
[Current System Time]: 2019-05-17 11:57:25 +0000
```

Type 'help' to get suggestions

### 6.6.10. Command *show* with Level 1 Subcommand *user*

It is used to display detailed information about the user.

Subcommands available: history

#### 6.6.10.1. 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
```

**Example.** Getting detailed information about the user *rpcmadmin*:

```
show user rpcmadmin
```

The return is:

```
Username : rpcmadmin
User Disabled : NO
User Disabled : superuser
      Last Login Time : 2017-11-13 22:27:32
      User Changed At : 2017-11-02 22:03:00
      User Created At : 2017-05-13 14:06:15
Session Expiration Timeout : 3600
```

In particular, you can see the data:

**Username** — username;

**User Disabled** — validity;

**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).

### 6.6.10.2. Command *show* with Level 1 Subcommand *user* with Level 2 Subcommand *history*

It displays the list of the last commands entered by this user.

It is mandatory to use the *username* followed by the second level subcommand *history*

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
```

### 6.6.11. Command *show* with Level 1 Subcommand *network*

It is used to display detailed information about the network access settings.

Example of use:

```
show network
```

The return is:

```
[Bonjour Network Name]: KhitryiLiS-RPCM.local
      [Hostname]: KhitryiLiS-RPCM
[Current System Time]: 2019-05-17 11:57:56 +0000
      [MAC Address]: B8:F7:4A:00:02:FA
      [Network Type]: DHCP
      [DHCP Hostname]: KhitryiLiS-RPCM
      [IP Address]: 10.210.1.153
      [Netmaks]: 255.255.255.0
      [Default Gateway]: 10.210.1.1
      [Primary DNS Server]:
      [Secondary DNS Server]: 185.83.242.34
```

Type 'help' to get suggestions

### 6.6.12. Command *show* with Level 1 Subcommand *snmp*

It is used to provide detailed information about SNMP access settings.

The --reveal-keys subcommand 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.

Hint displays:

```
show snmp
```

```
--reveal-keys
```

Using the `show snmp --reveal-keys` constructs the configuration with hidden passwords:

```

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: AuthP @ $$ w0rd
Priv Protocol: aes Priv Password: Pr1vP @ $$ w0rd
    Access List: 10.0.0.0/8

    Username: readwritesnmp User enabled: YES
    AccessType: ReadWrite Security Level: AuthPriv
Auth Protocol: sha1 Auth Password: AuthP@ssw0rd2
Priv Protocol: aes Priv Password: Pr1vP@ssw0rd2
    Access List: 10.0.0.8

SNMP Traps configuration:
Destination      Port  Version  Community      Enabled
-----
192.168.1.100    162   v1       public         YES

```

### 6.6.13. Command *show* with Level 1 Subcommand 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
```

### 6.6.14. Command *show* with Level 1 Subcommand *smtp*

It is used to display the settings of mail servers, and recipient addresses.

The *--reveal-password option*, which allows the display of passwords for SMTP accounts, is available.

Help for the keywords *help* and *?Is* not available.

Pressing the **Tab** key twice will displays the contextual prompt:

```
--reveal-password
```

Example of use

```
show smtp
```

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: *****

SMTP Recipients:
-----
1. to: user@yandex.ru
```

In this case, it is clear that both the sending and receiving of messages use the same account *user@yandex.ru*

Use of the parameter *--reveal-password*:

```
show smtp --reveal-password
```

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
```

### 6.6.15. Command *show* with Level-1 Subcommand *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" and "5.6. Monitoring and monitoring of specialized devices for mining using RPCM".

The `show` command with the `automation device` subcommand is used to enter the device parameters required to connect to the automation system.

Required parameters:

*name* - the name of the new device for automation from 1 to 25 characters;

Display help:

```
show automation ?
```

The return is:

```
show automation 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* with the level 1 subcommand *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

### 6.6.16. The *show* Command with Level 1 Subcommand *cloud*

This command displays parameters for interaction with the centralized ("cloud") RPCM control system — RPCM.CLOUD

Example:

```
show cloud
```

The return is:

```
show cloud?
RPCM.CLOUD Information
-----
Telemetry export to cloud: enabled
    Registration status: registered
    Cloud session status: connected
Type 'help' to get suggestions
```

### 6.6.17. The *show* Command with Level 1 Subcommand *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
  BelayeUkho-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.

### 6.6.18. The *show* Command with Level 1 Subcommand *logs*

Displays the system messages — logs.

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:

```
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
successfully 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
successfully via WEB
2018-09-03 20: 04: 58.084 informational User x@192.168.66.252 authenticated Press 'space'
for next page or press 'q' to quit ...
```

### 6.6.19. Command *show* with Level 1 Subcommand *update*

Displays the status of the system during the upgrade.

Using:

```
show update
```

The following are the possible responses of the system.

**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"*.

## 6.7. Construction *show all* is Command *show* with Level 1 Subcommand *all*

The `show all` structure is actually a `show` command with the subcommand `all`.

It serves to display various information about RPCM elements.

It has a fairly extensive set of built-in functions in the form of level 2 subcommands and is therefore considered separately from the rest of command `show`

It includes the following level 2 subcommands:

**counters** — values of power counters for connected devices set thresholds for preliminary notifications and shutdown;

**inputs** — data about all inputs (1-2);

**outputs** — information about all outlets;

**users** — a list of all registered users of the system;

**help** — help on subcommands.

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 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
  limits              show all limits and action delays for outputs
  meter readings      show all outputs instant and accumulated meter
                      readings
  startup delays      show turn on startup delays for outputs
  turn off limits      show turn off limits and action delays for outputs
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. Construction *show all* with Level 2 Subcommand *counters*

It serves for demonstration of meter readings

Help is unavailable.

Example of work:

```
show all counters
```

Information about the meters:

	Circuit	Over- current Alarm Limit Reached Facts Times	Over- current Alarm Fired Facts	Over- current Turn Off Limit Reached Times	Over- current Turn Off Fired 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

### 6.7.2. Construction *show all* with Level 2 Subcommand *inputs*

Displays information about the inputs.

The available subcommands are: *names, descriptions, limits, meter readings*.

The call to the `show all inputs?` Command is not available. Immediately displays information about the inputs.

Example of work:

```
show all inputs
```

The return is:

[Input 1]:	48.065V	0.064A	0.003KW (ACTIVE, PRIORITY)
[Input 2]:	48.065V	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
--------------	--------	-------	-------



### 6.7.2.1. Construction *show all* with Level 2 Subcommand *inputs* and Level 3 Subcommand *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
```

### 6.7.2.2. Construction *show all* with Level 2 Subcommand *inputs* and Level 3 Subcommand *descriptions*

It shows the names of inputs.

Example of use:

```
show all inputs descriptions
```

Description of inputs:

```
show all inputs descriptions
[Input 1] First
[Input 2] Second
```

### 6.7.2.3. Construction *show all* with Level 2 Subcommand *inputs* and Level 3 Subcommand *limits*

It shows the current limits for inputs.

Example of use:

```
show all inputs limits
```

Information on the limits:

	Voltage			Current
	Curr	Min	Max	Max
[Input 1]:	48.065V	42V	58V	76A
[Input 2]:	48.065V	42V	58V	76A

### 6.7.2.4. Construction *show all* with Level 2 Subcommand *inputs* subcommands and Level 3 Subcommand *meter readings*

It indicates the value of the meters.

Example of use:

```
show all inputs meter readings
```

Information from the meters:

	Instant Milliamps	Instant Watts	Accumul KWh
[Input 1]:	71	3	0.25
[Input 1]:	0	0	0

Type 'help' to get suggestions

### 6.7.3. Construction *show all* with Level 2 Subcommand *outputs*

It displays information about the outlet.

The available subcommands 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:

?	descriptions	limits	names	startup	turn
alarm	help	meter	recover	survival	

Type 'help' to get suggestions

### 6.7.3.1. Construction *show all* with Level 2 Subcommand *output* with Level 3 Subcommand *alarm limits*

It displays the current limit values after which an alarm is sent.

Use:

```
show all outputs alarm limits
```

The return is:

	Instant Milliamps	Over- current Turn Off Active	Over- current Turn Off Limit Milliamps	Over- current Turn Off Limit Seconds	Over- current Turn Off Limit Reached Times	Over- current Turn Off Fired Times
[Output 0]:	0	NO	30000	2	0	0
[Output 1]:	64	NO	30000	2	0	0
[Output 2]:	0	NO	30000	2	0	0
[Output 3]:	0	NO	30000	2	0	0
[Output 4]:	0	NO	30000	2	0	0
[Output 5]:	0	NO	30000	2	0	0
[Output 6]:	0	NO	30000	2	0	0
[Output 7]:	0	NO	30000	2	0	0
[Output 8]:	0	NO	30000	2	0	0
[Output 9]:	0	NO	30000	2	0	0

Type 'help' to get suggestions

### 6.7.3.2. Construction *show all* with Level 2 Subcommand *output* with Level 3 Subcommand *turn off limits*

It displays the current limits after which the outlets are disconnected.

Use:

```
show all outputs turn off limits
```

Limit value information:

	Instant Milli- amps	Over- current Turn Off Active	Over- current Turn Off Limit Milli- amps	Over- current Turn Off Limit Seconds	Over- current Turn Off Limit Reached Times	Over- current Turn Off Fired Times	Over- voltage Turn Off Limit 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

### 6.7.3.3. Construction *show all* with Level 2 Subcommand *output* with Level 3 Subcommand *limits*

It displays the current limit values after which an alarm is sent and current limit values for shutdown.

Use:

show all outputs limits

Limit value information:

	Instant Milliamps	Over- current Alarm Active	Over- current Alarm Limit Milliamps	Over- current Alarm Limit Seconds	Over- current Alarm Limit Reached Times	Over- current Alarm Fired Times
[Output 0]:	0	NO	24000	30	0	0
[Output 1]:	71	NO	24000	30	0	0
[Output 2]:	0	NO	24000	30	0	0
[Output 3]:	0	NO	24000	30	0	0
[Output 4]:	0	NO	24000	30	0	0
[Output 5]:	0	NO	24000	30	0	0
[Output 6]:	0	NO	24000	30	0	0
[Output 7]:	0	NO	24000	30	0	0
[Output 8]:	0	NO	24000	30	0	0
[Output 9]:	0	NO	24000	30	0	0

	Instant Milliamps	Over- current Turn Off Active	Over- current Turn Off Limit Milliamps	Over- current Turn Off Limit Seconds	Over- current Turn Off Limit Reached Times	Over- current Turn Off Fired Times
[Output 0]:	0	NO	30000	2	0	0
[Output 1]:	71	NO	30000	2	0	0
[Output 2]:	0	NO	30000	2	0	0
[Output 3]:	0	NO	30000	2	0	0
[Output 4]:	0	NO	30000	2	0	0
[Output 5]:	0	NO	30000	2	0	0
[Output 6]:	0	NO	30000	2	0	0
[Output 7]:	0	NO	30000	2	0	0
[Output 8]:	0	NO	30000	2	0	0
[Output 9]:	0	NO	30000	2	0	0

	Voltage	Over- voltage Turn Off Active	Over- voltage Turn Off Limit Volts	Recover after Over- voltage Seconds	Over- voltage Turn Off Fired Times
[Output 0]:	48	OFF	60	2	65535
[Output 1]:	48	OFF	60	3	65535
[Output 2]:	48	OFF	60	4	65535
[Output 3]:	48	OFF	60	5	65535
[Output 4]:	48	OFF	60	6	65535

```
[Output 5]:      48      OFF      60      7      65535
[Output 6]:      48      OFF      60      8      65535
[Output 7]:      48      OFF      60      9      65535
[Output 8]:      48      OFF      60     10      65535
[Output 9]:      48      OFF      60     11      65535
```

Type 'help' to get suggestions

#### 6.7.3.4. Construction *show all* with Level 2 Subcommands *output* with Level 3 Subcommands *meter readings*

It reads and displays the current meter readings on the outlets.

Use:

```
show all outputs meter readings
```

Information about the meters:

	Instant Milliamps	Inst Watts	Accumul KWh	Inst Vars	Accumul KVarh	Inst VAs	Accumul 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

### 6.7.3.5. Construction *show all* with Level 2 Subcommands *outputs* with Parameter *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

```

### 6.7.3.6. Construction *show all* with Level 2 Subcommands *outputs* with Parameter *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.

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 outcomes survival priorities
```

Hint:

```
sorted
```

Use:

With the usual sorting:

```
show all outcomes 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

```

#### 6.7.4. Construction *show all* with Level 2 Subcommand *users*

It displays information about users.

The available subcommands 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 help - show this help

```

Without parameters, it displays information about system users:

```
show all users
```

The return is:

Username	Access Level	Last Login	Disabled
rpcadmin	superuser	2018-01-31 23:23:54	NO
new administrators		2018-01-24 16:23:05	NO
x administrators		2018-01-31 23:20:51	NO

### 6.7.4.1. Construction *Show all* with Level 2 Subcommand 2 *users* with Level 3 Subcommand *logs*

It displays the user log.

The available parameter is: *--last*

The output of the classic help is not used, the command `show all users logs?` Immediately outputs the log.

Pressing the key **Tab** twice provide brief help:

```
show all users logs
```

The return is:

```
--last
```

#### Examples of use.

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

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	

### 6.7.5. *Show all* construction with a sub-command of 2 levels *automation*

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 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.

## 6.8. 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.

Up to 3 subcommands can be used with 3 corresponding parameters.

Below is a brief list of the level 1 subcommands for the command *set* with comments:

**all** — used with second level subcommand outputs to disable 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;

**output** — for managing the outlet, allows you to set up a variety of settings for each of the outlets;

**help** — call help.

In order to facilitate the submission of material, the options for using this command are ordered according to level 1 subcommands further than level 2 subcommands.

It is also recommended to use the *TAB* key for auto-completion (prompts) and the service word *help* or the question mark *?* for displaying information about valid parameters and subcommands. Via gradual "advancement" of subcommands, you can access all the system settings.

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 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 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

## 6.8.2. Command *set* with Level 1 Subcommand *all*

It is itself not used.

The subcommands available is outputs.

Help displays is: set all?

RPCM Commands description:

```

set all outputs - set all outputs state
  off turn them off
  on turn them on
set all help - show this help

```

### 6.8.2.1. Command *set* with Level 1 Subcommand *all* with Level 2 Subcommand *outputs*

It is used to administratively turn off or turn off all outlets at once.

The available options are : *on* and *off*.

Help displays: set all outputs?

The return is:

```

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

```

### 6.8.3. Command *set* with Level 1 Subcommand *buzzer*

It serves to control the sound signal.

The available subcommands 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*.

Help displays: `set buzzer?`

The return is:

RPCM Commands description:

```
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
```

Type 'help' to get suggestions

#### 6.8.3.1. Command *set* with Level 1 Subcommand *buzzer* with Level 2 Subcommand *alternate*

It sets the mode of periodic sound mode (then on, then off until off).

Example:

```
set buzzer alternate
```

The return is:

```
Buzzer set to alternate
```

#### 6.8.3.2. Command *set* Level 1 Subcommand *buzzer* with Level 2 Subcommand *on*

It enables the sound of the internal speaker of the RPCM module.

Example:

```
set buzzer on
```

The return is:

```
Buzzer turned ON
```

### 6.8.3.3. The *set* command with the subcommand of level 1 *buzzer* with the subcommand of the second level *off*

It enables the sound of the internal speaker of the RPCM module.

Example:

```
set buzzer off
```

The return is:

```
Buzzer turned OFF
```

### 6.8.4. Command *set* with Level 1 Subcommand *time*

It set the system time and time zone.

The available subcommands 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

#### 6.8.4.1. Command *set* with Level 1 Subcommand *time* with Level 2 Subcommand *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
```

### 6.8.4.2. Command *set* with Level 1 Subcommand *time* with Level 2 Subcommand *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 the 'show time zones' command to see the 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
```

### 6.8.5. Command *set* with Level 1 Subcommand *snmp*

It is for updating SNMP parameters.

The available subcommands are: `adminState`, `community`, `user`, `help` or `?`

Help displays:

```
set snmp ?
```

The return is:

```
adminState - Administrative state of SNMP Agent: on / off.
community  - SNMPv2 per community parameters (accessList, community, etc)
user        - SNMPv3 per user parameters (username, Auth, Access List, etc.)
```

### 6.8.5.1. Command *set* with Level 1 Subcommand *snmp* with Level 2 Subcommand *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 is off
```

Agent startup:

```
set snmp adminState on
```

The return is:

```
SNMP Agent administrative state now is on
```

### 6.8.5.2. Command *set* with Level 1 Subcommand *snmp* with Level 2 Subcommand *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
```

### 6.8.5.3. Command *set* with Level 1 Subcommand *snmp* with Level 2 Subcommand *user*

The set command with the level 1 subcommand *snmp* and the level 2 subcommand *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.
```



### 6.8.6. Command *set* with Level 1 Subcommand *api*

The *set* command with the *api* level 1 subcommand 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.

The return is:

```
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:

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
```

## 6.8.7. Set Command with of Level 1 Subcommand *Display*

### 6.8.7.1. General information About Using *set* with Level 1 Subcommand *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
```

### 6.8.7.2. 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 changed from '' to 'RPCM-1'
Foreground color is 'red'
Background color is 'black'
```

**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'
```

### 6.8.7.3. 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
```

## 6.8.8. Set command with subcommand of level 1 user

### 6.8.8.1. General information about using the level 1 user subcommand

Used to change the properties that prohibit or allow a user account.

Available options:

**accessLevel** — sets the e-privilege level: administrator or super user;

**disabled** — disables (blocks) the account;

**enabled** — allows (unlocks) an account

**password** — allows you to set or change the password for the user.

**IMPORTANT!** Disabling or enabling, and also change of privileges of the account occurs immediately, without asking for confirmation from the user. Please consider this if you need to perform actions on the main entry *rpcmadmin*.

Help Request:

```
set user?
```

The return is:

RPCM Commands description:

```
set user <username> - set parameters for username
accessLevel set Access Level for user
disabled disables user account
enables enables user account
password set password for user
set user help - show this help
```

Type 'help' to get suggestions`

### 6.8.8.2. Change user privilege level

For example, set the normal user *newuser* superuser level:

Help Request:

```
set user newuser accessLevel?
```

The return is:

Please provide correct access level, one of: superuser, administrators

Type 'help' to get suggestions

Change the level to "superuser":

```
set user newuser accessLevel superuser
```

The return is:

Access Level has been successfully changed

Type 'help' to get suggestions

### 6.8.8.3. Permission and prohibition of the account

Disabling (blocking) an account is very simple. Suppose you need to block the user *newuser*.

Enter the command:

```
set user newuser disabled
```

The return is:

User newuser is now disabled

Type 'help' to get suggestions

Please note that the use of the question mark ? In this case does not cause the output of the help and an account will disabled.

```
set user newuser disabled ?
```

The return is:

```
User newuser is now disabled
Type 'help' to get suggestions
```

The account can be enabled again by the *enabled* subcommand:

```
set user newuser enabled
```

The return is:

```
User 'newuser' is now enabled
Type 'help' to get suggestions
```

#### 6.8.8.4. Setting and changing the account password

```
set user newuser password
```

The return is:

```
Please enter password:
Please enter password again for confirmation: ``
```

If everything is OK, a message will be displayed:

```
Password has been successfully changed
Type 'help' to get suggestions
```

Only English letters, numbers and underscores and minus "-" are allowed in the password.

If the password contains invalid characters, a warning will be displayed:

```
Entered password contains characters that are not allowed. Allowed characters: letters,
numbers and punctuation characters.
Type 'help' to get suggestions
```

If the password and confirmation do not match, a message is displayed:

```
Entered passwords do not match. Please try again.
Type 'help' to get suggestions
```

## 6.9. Construction *set output* Is Command *set* with Level 1 Subcommand *output*

The *set output* structure is actually a *set* command with the level 1 subcommand *output*.

It serves to control the outlet by setting various parameters.

It has a fairly extensive set of built-in functions in the form of second-level subcommands and is therefore considered separately from the rest of the *set* commands.

This construction is used with parameters — the numbers from 0 to 9 are for specifying the outlet number.

The available level 2 subcommands are: *off*, *on*, *recognition*, *overcurrent*, *help*.

Help displays:

*set output ?*

The return is:

RPCM Commands description:

<i>set output 0-9 off</i>	- turn off output number 0-9
<i>set output 0-9 on</i>	- turn on output number 0-9
<i>set output 0-9 recognition</i>	- set output 0-9 recognition state
<i>off</i>	to off
<i>on</i>	to on
<i>set output 0-9 overcurrent</i>	- tune overcurrent limits
<i>alarm</i>	for alarming
<i>turn off</i>	for turning off
<i>set output 0-9 help</i>	- show this help
<i>set output 0-9 survival priority</i>	- set output turn off on input overload
	priority

Type 'help' to get suggestions

### 6.9.1. Construction *set output* with Level 2 Subcommand *off*

It administratively disables the specified outlet from 0 to 9.

Example of use:

*set output 9 off*

System returns:

[Output 9]: ON <admin: ON> 0mA 0W

### 6.9.2. Construction *set output* with Level 2 Subcommand *on*

It administratively includes the specified outlet from 0 to 9.

Example of use:

```
set output 9 on
```

System returns:

```
[Output 9]: ON <admin: ON> 0mA 0W
```

### 6.9.3. Construction *set output* construct with Level 2 Subcommand *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 subcommands are: on and off.

Using the on subcommand turns on the backlight; the off subcommand turns off.

Help displays:

```
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
```

### 6.9.4. Construction *set output* with Level 2 Subcommand *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 subcommands are: alarm, turn off, help

Help displays:

```
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



#### 6.9.4.1. Construction *set output* with Level 2 Subcommand *overcurrent* with Level 3 Subcommand *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 displays:

```
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.

```
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 sound signal in 5 seconds for the outlet 9.

```
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)

#### 6.9.4.2. Construction *set output* with Level 2 Subcommand *overcurrent* with Level 3 Subcommand *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 displays:

```
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 alarm outlet limit to 9A for outlet 9.

```
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 the sound signal 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
seconds)
```

## 6.10. Construction *set automation* is Command *set* with Level 1 Subcommand *automation*

### 6.10.1. General Information

The `set` command with the level 1 subcommand `automation` device with level 2 subcommand 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 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
```

```

new-name          seconds
                  - 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

For 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* with Level 1 Subcommand *automation* with Level 2 Subcommand *test*

Used to configure test methods (select and configure parameters for verification).

Contains subcommands of the level 3:

**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.

Here is the help for the second level subcommand *test* for the device with the name "Antminer\_S9 "

```
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* with Level 1 Subcommand *automation device* Level 2 Subcommand *test* with Level 3 Subcommand *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.

A query for displaying the reference about the second level subcommand test with the third level subcommand consumption of the device with the name "DEVICE-2" is:

```
set automation device-name DEVICE-2 test consumption ?
```

The return is:

```
Optional parameters:
  --enabled                - 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
reaching                  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
Optional parameters:
enabled - enabled Consumption test
alarmBottomLimitMilliamps - alarm bottom limit milliamps of automation device
restartBottomLimitMilliamps - restart bottom limit milliamps of automation device
alarmSeconds - time in seconds to trigger the alarm after reaching
               the alarmBottomLimitMilliamps
restartSeconds - time in seconds to trigger the restart after reaching
                the restartBottomLimitMilliamps
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 --
alarmBottomLimitMilliamps 4500 --restartBottomLimitMilliamps 4300 --alarmSeconds 60 --
restartSeconds 300

set automation device name testName test consumption --alarmBottomLimitMilliamps 4600
```

```
set automation device name testName test consumption --enabled no
```

**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 --  
alarmBottomLimitMilliamps 3500 --restartBottomLimitMilliamps 3300 --alarmSeconds 600 --  
restartSeconds 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* with Level 1 Subcommand *automation device* Level 2 Subcommand *test* with Level 3 Subcommand *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 supported 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

A query for displaying the reference about the second level subcommand *test* with Level 3 Subcommand *hashRate* of the device with the name "*DEVICE-2*" is:

```
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. The *set* command with Level 1 Subcommand *automation device* Level 2 Subcommand *test* with Level 3 Subcommand *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.

A query for displaying the reference about the second level subcommand test with Level 3 Subcommand ping device with the name "*nonexistent\_claymore*" is:

```
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 ipAddress
10.210.1.243 connectTimeoutSeconds 3 upperLimitMilliseconds 100 alarmPacketLossPercentage
50 restartPacketLossPercentage 80 alarmSeconds 10 restartSeconds 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. The *set* command with the level 1 subcommand *automation device* with Level 2 Subcommand *test* with Level 3 Subcommand *tcpPortAvailability*

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.

A query for displaying the reference about the second level subcommand *test* with the subcommand of the third level *tcp-port-availability* of the device with the name "*nonexistent\_claymore*" is:

```
set automation device-name DEVICE-2 test tcp-port-availability ?
```

The return is:

```
set automation device name nonexistent_claymore test tcpPortAvailability?
Optional parameters:
enabled - enables TCP Port Availability test
ipAddress - IP Address of the remote device
port-port of the remote device
```

```
connectTimeoutSeconds - connect timeout in seconds
alarmSeconds - time in seconds to trigger the alarm after reaching
                  the connectTimeoutSeconds
restartSeconds - time in seconds to trigger the restart after reaching
                  the connectTimeoutSeconds
default - set default values for all parameters
```

Example:

```
set automation device name testName test tcpPortAvailability --enabled yes --default
set automation device name testName test tcpPortAvailability --enabled yes --ipAddress
127.0.0.1 --port 80 --connectTimeoutSeconds 3 --alarmSeconds 10 --restartSeconds 60
set automation device name testName test tcpPortAvailability --ipAddress 127.0.0.2
set automation device name testName test tcpPortAvailability --enabled no
```

**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.

The available subcommands is: update

Help displays:

```
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* with Level 1 Subcommand *update*

It is used to start the system update process after downloading the update file.

Help displays:

```
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 construction, refer to section 4.7. *Updating the RPCM software*.

### 6.11.3. Command *start* with Level 1 Subcommand *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*".

## 6.12. 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
```

Use:

```
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.

It includes the following level 2 subcommands:

**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* command with a level 2 subcommand *update*

Using:

```
cancel update
```

For more information, it is recommended to refer to the section: "4.7. RPCM software update"

### 6.14.2. *Cancel* command with subcommand level 2 *configuration restore*

Using:

```
cancel update
```

For more information, it is recommended to refer to the section: "4.6.14. Backup and Restore Settings."

# 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.

**ATTENTION! Only for service engineers.** During servicing, both power cords must be disconnected, dangerous voltage remains on the device when only one power cord is disconnected.

### 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 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 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 When 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 <code>ping</code> ). 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 <code>ping</code> ). Check that TCP port 22 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 <code>rpcmadmin</code> and <code>rpcmpassword</code> . If you have changed this data and can not remember — follow the procedure to reset to factory settings <b>To reset the password, you must press top button on the device and hold for ~20 seconds.</b> (See section 4.6. <i>RPCM Configuration Management</i> ). <b>WARNING!</b> Resetting to factory settings will reset all settings, including

Name of the characteristic	Recommended actions
	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 <i>High Level Controller (HLC)</i> running the Software. This module restarts without interrupting the power supply of the connected devices. <b>To reboot the High Level Controller, simultaneously press both buttons on the device and hold for 11-13 seconds.</b>

## 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. Malfunctions when connecting devices 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. <i>Description of the RPCM Device</i> ).
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. <i>Description of the RPCM Device</i> ).
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](tel:8(800)3028787)

phone: [+7 \(495\) 009 87 87](tel:+7(495)0098787)

e-mail: [info@rcntec.com](mailto:info@rcntec.com)

[www.rcntec.com](http://www.rcntec.com)

Feedback <http://www.rcntec.com/feedback>

Technical support <http://rpcm.pro>

## Appendix 2. Specifications

Technical characteristics of the device are listed in Table A2.1.

Name of the characteristics	RPCM DC ATS 76A	RPCM DC 232A
<b>Inputs</b>		
Power	3.648 kVA (at 48V)	11.136 kVA (at 48V)
Connection	2 DC inputs	1 DC input
Connection Type	Clamp terminals (1.5-16 mm <sup>2</sup> )	Screw terminals: rigid cable (25-95 mm <sup>2</sup> ); flexible cable (35-95 mm <sup>2</sup> )
Rated voltage	-48 VDC (42-58VDC)	-48 VDC (42-58VDC)
<b>Outlets</b>		
Number of connections	10 clamp terminals	10 clamp terminals
Connection Type	Clamp terminals: 4 mm <sup>2</sup>	Clamp terminals: 4 mm <sup>2</sup>
Rated voltage	48VDC	48VDC
Rated and maximum current	30A (with a cross section of 4 mm <sup>2</sup> ); 24A (with a cross section of 2.5 mm <sup>2</sup> )	30A (with a cross section of 4 mm <sup>2</sup> ); 24A (with a cross section of 2.5 mm <sup>2</sup> )
Overcurrent and short circuit protection parameters	Overload protection: adjustable 1-30 A (default 30A); short-circuit protection (tripping current 87.5A)	Overload protection: adjustable 0.1-30 A (default 30A); short-circuit protection (tripping current 87.5A)
Electricity metering	Split change on each managed channel	Split change on each managed channel
Switching time of controlled channels	Programmable by default with a delay of 1s.	Programmable by default with a delay of 1s.
<b>Light indication (display)</b>		
Input Status	On / off / mismatch voltage / activity parameters; current / voltage; indication of the presence / absence of grounding	On / off / mismatch voltage / activity parameters; current / voltage; indication of the presence / absence of grounding
Channel Status (Outputs)	On / off / short / overcurrent	On / off / short / overcurrent

Name of the characteristics	RPCM DC ATS 76A	RPCM DC 232A
	at the output / overcurrent at the inputs	at the output / overcurrent at the inputs
<b>Remote control and monitoring</b>		
Input Status	On / off / mismatch parameters / activity; voltage / current / power	On / off / mismatch parameters / activity; voltage / current / power
Channel Status	On / off / short / overcurrent at the output / overcurrent at the input; control of consumption thresholds and turn-on delay	On / off / short / overcurrent at the output / overcurrent at the input; control of consumption thresholds and turn-on delay
Electricity metering	Separate measurement of electricity on each of the 30 controlled channels	Separate measurement of electricity on each of the 30 controlled channels
Supported Protocols	HTTP / HTTPS (WEB interface / REST API); SSH; SNMPv1, SNMPv2c, SNMPv3, SNMP Traps; SMTP	HTTP / HTTPS (WEB interface / REST API); SSH; SNMPv1, SNMPv2c, SNMPv3, SNMP Traps; SMTP
Automation (Watchdog)	Channel reboot (output / outlet) while decreasing the hashrate of miners; channel reset (output / outlet) in the absence of ICMP responses; requests (pings); channel reboot (output / outlet) when TCP port is unavailable; channel reset (output / outlet) with decreasing current	Channel reboot (output / outlet) while decreasing the hashrate of miners; channel reset (output / outlet) in the absence of ICMP responses; requests (pings); channel reboot (output / outlet) when TCP port is unavailable; channel reset (output / outlet) with decreasing current
<b>Other options</b>		
Communication Interface	Ethernet 10/100 Mbps (one for each input)	Ethernet 10/100 Mbps (one for each input)
Completeness of the product	RPCM DC ATS 76A, 19 "rack mount kit, Quick Start Guide	RPCM DC 232A, 19" rack mount kit, Quick Start Guide
Dimensions (WxDxH)	440 x 365 x 44 mm	440 x 365 x 44 mm

Name of the characteristics	RPCM DC ATS 76A	RPCM DC 232A
Installs into	Standard 19" rack, space occupied 1U	Standard 19" rack, space occupied 1U
Module weight / gross weight with packaging (kg)	5.2 / 8.13	5.2 / 8.13
Operating temperature	0 ~ +40 ° C	0 ~ +40 ° C
Storage temperature	-20 ~ +60 ° C	-20 ~ +60 ° C
Relative air humidity	45 ~ 85% (no condensation)	45 ~ 85% (no condensation)
Cooling	Passive	Passive
Noise level	<30 dBA (enable / switch ports)	<30 dBA (enable / switch ports)

## List of functions of the device

ATS without interruption of power supply (in 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 failure and equipment failures, as well as increase electrical safety in the operation of the equipment thanks to automatic monitoring and indication of the proper grounding connection.

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 voltage on main power input or degradation of power input quality and switches consumers over to the reserve power input.

## 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 — an 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.

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